

UNITED STATES TARIFF COMMISSION

**SUMMARIES OF TRADE AND TARIFF
INFORMATION**

**Prepared in Terms of the Tariff Schedules
of the United States (TSUS)**

Schedule 7

**Specified Products; Miscellaneous
and Nonenumerated Products
(In 8 volumes)**

VOLUME 2

**Optical Goods, Scientific and Professional Instruments,
and Watches and Other Timing Devices**



TC Publication 322
Washington, D. C.
1970

UNITED STATES TARIFF COMMISSION

Glenn W. Sutton, *Chairman*

Penelope H. Thunberg

Bruce E. Clubb

Will E. Leonard, Jr.

Herschel D. Newsom

George M. Moore

Kenneth R. Mason, *Secretary*

The Summaries series will consist of 62 volumes. The titles of the volumes previously released are listed inside the back cover of this volume.

**Address all communications to
United States Tariff Commission
Washington, D.C. 20436**

UNITED STATES TARIFF COMMISSION

**SUMMARIES OF TRADE AND TARIFF
INFORMATION**

**Prepared in Terms of the Tariff Schedules
of the United States (TSUS)**

Schedule 7

**Specified Products; Miscellaneous
and Nonenumerated Products
(In 8 volumes)**

VOLUME 2

**Optical Goods, Scientific and Professional Instruments,
and Watches and Other Timing Devices**

TC Publication 322
Washington, D. C.
1970

**SUMMARIES OF TRADE AND TARIFF INFORMATION
BY SCHEDULES**

- Schedule 1 - Animal and Vegetable Products
(in 14 volumes)**
- Schedule 2 - Wood and Paper; Printed Matter
(in 5 volumes)**
- Schedule 3 - Textile Fibers and Textile Products
(in 6 volumes)**
- Schedule 4 - Chemicals and Related Products
(in 12 volumes)**
- Schedule 5 - Nonmetallic Minerals and Products
(in 5 volumes)**
- Schedule 6 - Metals and Metal Products
(in 11 volumes)**
- Schedule 7 - Specified Products; Miscellaneous
and Nonenumerated Products
(in 8 volumes)**
- Schedule 8 - Special Classification Provisions
(in 1 volume)**

Schedule 7 Volumes

- 1 - Footwear, Headwear, Gloves, Luggage, Handbags, Flat Goods, and Miscellaneous Articles of Fur and Leather.**
- 2 - Optical Goods, Scientific and Professional Instruments, and Watches and Other Timing Devices**
- 3 - Photographic Equipment and Supplies, Recordings, and Musical Instruments**
- 4 - Arms and Ammunition, Fishing Tackle, Wheel Goods, Sporting Goods, Games, and Toys**
- 5 - Furniture, Buttons and Other Fastening Devices, Brooms, Brushes, Umbrellas, Canes, and Clothespins**
- 6 - Jewelry and Related Articles, Decorative Materials, Combs, Smokers' Articles, Pens, Pencils, Works of Art, and Antiques**
- 7 - Rubber and Plastics Products**
- 8 - Pyrotechnics and Products Not Elsewhere Enumerated**

F O R E W O R D

In an address delivered in Boston on May 18, 1917, Frank W. Taussig, distinguished first chairman of the Tariff Commission, delineated the responsibility of the newly established Commission to operate as a source of objective, factual information on tariffs and trade. He stated that the Commission was already preparing a catalog of tariff information--

designed to have on hand, in compact and simple form, all available data on the growth, development and location of industries affected by the tariff, on the extent of domestic production, on the extent of imports, on the conditions of competition between domestic and foreign products.

The first such report was issued in 1920. Subsequently three series of summaries of tariff information on commodities were published--in 1921, 1929, and 1948-50. The current series, entitled Summaries of Trade and Tariff Information, presents the information in terms of the tariff items provided for in the eight tariff schedules of the Tariff Schedules of the United States (abbreviated to TSUS in these volumes), which on August 31, 1963, replaced the 16 schedules of the Tariff Act of 1930.

Through its professional staff of commodity specialists, economists, lawyers, statisticians, and accountants, the Commission follows the movement of thousands of articles in international commodity trade, and during the years of its existence, has built up a reservoir of knowledge and understanding, not only with respect to imports but also regarding products and their uses, techniques of manufacturing and processing, commercial practices, and markets. Accordingly, the Commission believes that, when completed, the current series of summaries will be the most comprehensive publication of its kind and will present benchmark information that will serve many interests. This project, although encyclopedic, attempts to conform with Chairman Taussig's admonition to be "exhaustive in inquiry, and at the same time brief and discriminating in statement."

This series is being published in 62 volumes of summaries, each volume to be issued as soon as completed. Although the order of publication may not follow the numerical sequence of the items in the TSUS, all items are to be covered. As far as practicable, each volume reflects the most recent developments affecting U.S. foreign trade in the commodities included.

SUMMARIES OF TRADE AND TARIFF INFORMATION

SCHEDULE 7

Volume 2

C O N T E N T S

	<u>Page</u>
Foreword-----	iii
Introduction-----	1
Ophthalmic lenses, unmounted-----	7
Lenses, prisms, mirrors, and other optical elements (except ophthalmic lenses)-----	13
Eyeglasses and similar articles-----	23
Telescopes (including prism binoculars and field and opera glasses) and other astronomical instruments, frames and mountings for any of the foregoing and parts thereof-----	31
Microscopes and diffraction apparatus-----	39
Magnifiers, door viewers, and optical appliances and instruments not specially provided for-----	53
Medical, dental, surgical, and veterinary instruments-----	59
Therapeutic appliances and respiratory equipment-----	69
Hearing aids-----	79
Orthopedic appliances, prostheses, and related articles-----	87
X-ray apparatus-----	95
Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments-----	105
Rangefinders, rules, balancing machines, and non-optical measuring or checking instruments-----	117
Navigational instruments and parts-----	127
Meteorological, hydrological, and geophysical instruments-----	137
Calipers, gauges, and micrometers-----	147
Optical measuring or checking instruments and appliances, and parts-----	155
Balances and parts-----	161
Strength testing machines and parts-----	167
Hydrometers, thermometers, barometers, and similar instruments-----	173
Clinical thermometers-----	181
Apparatus for measuring, checking, or automatic control of variables of liquids or gases, or automatic control of temperature-----	187
Instruments or apparatus for physical or chemical analysis and related articles-----	197
Counting devices, speedometers, etc.-----	207
Electrical measuring, testing and controlling instruments-----	215
Meters for registering the supply of electricity, gas, or liquid, and parts of such meters-----	229
Stroboscopes and parts thereof-----	241

	<u>Page</u>
Watches, watch movements, watch cases, and parts of watch cases-----	247
Clocks, clock movements, clock cases and parts of clock cases-----	273
Standard marine chronometers and certain parts thereof-----	291
Timing devices (except watches and clocks) and cases-----	297
Parts of watch movements-----	311
Parts for timing devices other than watch movements-----	323
Jewel bearings-----	333
Appendixes:	
Appendix A. Tariff Schedules of the United States Annotated:	
General headnotes and rules of interpretation, and	
excerpts relating to the items included in this volume-----	A-1
Appendix B. Value of U.S. imports for consumption, by TSUS	
items included in the individual summaries of this volume,	
total and from the 3 principal suppliers, 1968-----	B-1
Appendix C. Watches and watch movements: The escape clause	
rates of duty in effect from July 28, 1954 to	
January 10, 1967, inclusive-----	C-1

CONTENTS

vii

Numerical List of TSUS Items in This Volume

	<u>Page</u>		<u>Page</u>
708.01-----	7	709.19-----	59
708.03-----	13	709.21-----	59
708.05-----	15	709.23-----	59
708.07-----	15	709.25-----	59
708.09-----	15	709.27-----	59
708.21-----	15	709.40-----	69
708.23-----	15	709.45-----	69
708.25-----	15	709.50-----	79
708.27-----	15	709.54-----	87
708.29-----	15	709.55-----	87
708.41-----	23	709.56-----	87
708.43-----	23	709.57-----	87
708.45-----	23	709.61-----	95
708.47-----	23	709.63-----	95
708.51-----	31	709.66-----	95
708.52-----	31	710.04-----	105
708.53-----	31	710.06-----	117
708.55-----	31	710.08-----	105, 117, 127, 137
708.57-----	31	710.12-----	105
708.59-----	31	710.14-----	127
708.71-----	39	710.16-----	127
708.72-----	39	710.20-----	127
708.73-----	39	710.21-----	127
708.75-----	39	710.26-----	137
708.76-----	39	710.27-----	137
708.78-----	39	710.30-----	127
708.80-----	39	710.34-----	137
708.82-----	39	710.36-----	137
708.85-----	53	710.40-----	105
708.87-----	53	710.42-----	105
708.89-----	53	710.46-----	127
708.91-----	53	710.50-----	137
708.93-----	53	710.60-----	105
709.01-----	59	710.61-----	105
709.03-----	59	710.63-----	105
709.05-----	59	710.65-----	147
709.06-----	59	710.67-----	117
709.07-----	59	710.68-----	117
709.09-----	59	710.70-----	117
709.10-----	59	710.72-----	117
709.11-----	59	710.76-----	105
709.13-----	59	710.78-----	105
709.15-----	59	710.80-----	105, 117, 147
709.17-----	59	710.86-----	155

Numerical List of TSUS Items in This Volume

	<u>Page</u>		<u>Page</u>
710.88-----	155	713.19-----	241
710.90-----	155	715.05-----	247
711.04-----	161	715.15-----	273
711.08-----	161	715.20-----	291
711.25-----	167	715.25-----	273
711.30-----	173	715.27-----	273
711.34-----	181	715.29-----	273
711.36-----	173	715.31-----	273
711.37-----	173	715.33-----	273
711.40-----	173	715.40-----	297
711.42-----	173	715.45-----	297
711.45-----	173	715.47-----	297
711.47-----	173	715.49-----	297
711.49-----	173	715.51-----	297
711.55-----	173	715.53-----	297
711.60-----	173	715.60-----	297
711.67-----	173	715.62-----	297
711.82-----	187	715.64-----	297
711.83-----	187	715.66-----	297
711.84-----	187	715.68-----	297
711.85-----	187	716.08-----	247
711.86-----	197	716.10-----	247
711.88-----	197	716.11-----	247
711.90-----	207	716.12-----	247
711.91-----	207	716.13-----	247
711.93-----	207	716.14-----	247
711.98-----	207	716.15-----	247
711.99-----	207	716.16-----	247
712.05-----	215	716.20-----	247
712.10-----	215	716.21-----	247
712.12-----	215	716.22-----	247
712.15-----	215	716.23-----	247
712.20-----	215	716.24-----	247
712.25-----	215	716.25-----	247
712.27-----	215	716.26-----	247
712.47-----	215	716.30-----	247
712.49-----	215	716.31-----	247
712.51-----	215	716.32-----	247
713.05-----	229	716.33-----	247
713.07-----	229	716.34-----	247
713.09-----	229	716.35-----	247
713.11-----	229	716.36-----	247
713.15-----	229	717.---	247
713.17-----	241	718.---	247

CONTENTS

ix

Numerical List of TSUS Items in This Volume

	<u>Page</u>		<u>Page</u>
719.--	247	720.36	297
720.02	273	720.40	311, 323
720.04	273	720.42	323
720.06	273	720.44	311, 323
720.08	273	720.60	333
720.10	273	720.65	311
720.12	273	720.67	323
720.14	273	720.70	311
720.16	273	720.75	311
720.18	273	720.80	291
720.20	247	720.82	323
720.21	247	720.84	291
720.22	247	720.86	323
720.24	247	720.90	311
720.25	247	720.92	291
720.26	247	720.94	323
720.28	247	721.05	311
720.29	247	721.10	291
720.30	247	721.12	323
720.33	273	721.20	273, 323
720.34	273		

INTRODUCTION

This volume, identified as volume 7:2 of the Summaries series, is a compendium of tariff and trade information on the various manufactured products provided for under the Tariff Schedules of the United States (TSUS) in schedule 7, part 2, subparts A through E. It contains 34 summaries presenting analytical material on the following broad groups of commodities: (1) optical goods, (2) medical instruments and X-ray apparatus, (3) other scientific and professional instruments, and (4) watches, clocks, and timing devices. These commodities are used throughout the world in the fields of research, industry, medicine and many other professions, and as consumer articles.

U.S. consumption of the articles covered by this volume is estimated to have been valued at about \$6.3 billion in 1968, more than half of which was accounted for by sales of scientific and professional instruments. A significant part of the total was reflected in the sales of medical instruments and X-ray apparatus. The remainder represented the sale of watches, clocks and timing devices, and optical goods. The demand for these articles is generally related to various factors such as the level of health care, medical specialization, industrial modernization and expansion, technological improvement in instrumentation, population growth, and disposable income.

The Bureau of the Census classifies the above-named commodities principally under twelve industry headings (based on the Standard Industrial Classification, 1967 edition). The primary product shipments of firms classified in these 12 industry groups have (in the aggregate) annually averaged about 85 percent of their shipments of

INTRODUCTION

all products. In terms of broad commodity groups, the twelve SIC industries and the value (in millions of dollars) of total shipments of all products by each industry during 1965-67, as reported by the Bureau of the Census, were as follows:

SIC industry code	Commodity-industry group	Value of shipments		
		1965	1966	1967
	Optical goods:			
3831(pt.) ^{1/}	Optical instruments & lenses----	73	83	82
3851	Ophthalmic goods-----	318	347	362
	Medical and X-ray:			
3693	X-ray apparatus & tubes-----	164	240	220
3841	Surgical & medical instruments--	298	360	405
3842	Surgical appliances & supplies--	680	769	866
3843	Dental equipment & supplies-----	194	220	210
	Other scientific and professional:			
3611	Electric measuring instruments--	863	1,020	1,176
3811	Engineering & scientific instruments-----	584	749	887
3821	Mechanical measuring devices----	1,451	1,429	1,450
3822	Automatic temperature controls--	596	628	621
3831(pt.) ^{1/}	Optical instruments & lenses----	218	249	251
	Watches and clocks:			
3871	Watches and clocks-----	612	669	716
3872	Watchcases-----	45	58	62
	Total-----	6,096	6,821	7,308

^{1/} Estimated.

Five of the industry groups shown above (3821, 3831, 3841, 3842, and 3843) have been among the pace setters of U.S. industry in output during the past ten years--demonstrating growth at a rate more rapid than that for manufacturing industries in the aggregate. During 1965-67, the total value of shipments for the twelve industries increased about 9 percent per year; shipments by the medical instrument industries showed the greatest increase, those of optical goods had the least. About 60 percent of the 1967 total value of shipments originated in scientific and professional instrument industries, 23 percent in medical and X-ray equipment industries, 11 percent from among the industries of watches and clocks, and the remaining 6 percent from industries of optical goods.

INTRODUCTION

In 1968, the overall output of firms in these twelve industries probably approximated \$8 billion. In the same year, production of the articles covered by this volume (primary products of these concerns) was estimated to have been valued at about \$6.8 billion.

U.S. export statistics for the articles discussed in this volume are collected by the Bureau of the Census in accordance with Schedule B, Statistical Classification of Domestic and Foreign Commodities Exported from the United States, 1965 edition as amended. Official statistics on the value (in millions of dollars) of U.S. exports of the articles covered by this volume, by broad commodity groups, were as follows during 1967-68:

<u>Commodity group</u>	<u>Value of exports</u>	
	<u>1967</u>	<u>1968</u>
Optical goods:		
Optical elements-----	12	13
Spectacles and frames-----	8	7
Binoculars, microscopes & other apparatus----	11	15
Medical instruments & X-ray apparatus:		
Electro-medical apparatus-----	21	25
X-ray apparatus (including industrial and scientific)-----	18	19
Other medical instruments-----	86	92
Other scientific & professional instruments:		
Electrical measuring & controlling instruments-----	290	315
Meters and counters, nonelectric-----	10	9
Other measuring & controlling instruments----	346	361
Watches, clocks and timing devices:		
Clocks, movements & cases-----	14	18
Watches & cases-----	2	3
Total-----	818	877

In the aggregate, U.S. exports of the articles under consideration have been larger than imports of similar items; in both 1967 and 1968 the net favorable balance of trade was larger than the total value of imports. By far the greater part of the total value of these exports was accounted for by scientific and professional instruments; most of the remainder represented medical instruments and X-ray apparatus.

Exports accounted for about 13 percent of the value of output in 1967, well above the 8 percent average for all U.S. manufacturing industries. For the individual groups, this relationship varied from 18 percent for exports of medical and other scientific instruments to

INTRODUCTION

4 percent for watches, clocks, and timing devices. In terms of value, about 40 percent of the exports went to markets in Western Europe, 35 percent to Canada and countries of South America, 15 percent to Asian markets, and lesser amounts to Australia, African countries, and Communist-controlled areas.

Import statistics in this volume are presented in terms of TSUS classifications as contained in the Tariff Schedules of the United States Annotated, an official publication of the U.S. Tariff Commission consisting of the legal tariff text plus annotations. All import data shown are imports for consumption, which reflect total arrivals of the articles considered in this volume except for in-transit shipments and articles entered into bonded storage warehouses. Official statistics on the value (in millions of dollars) of U.S. imports of the articles covered by this volume, by broad commodity groups, were as follows during 1966-68:

<u>Commodity group</u>	<u>Value of imports</u>		
	<u>1966</u>	<u>1967</u>	<u>1968</u>
Optical goods:			
Optical elements-----	23	24	29
Spectacles and frames-----	19	21	25
Binoculars, microscopes & other apparatus-----	36	37	45
Medical instruments & X-ray apparatus:			
Electro-medical apparatus-----	1	2	3
X-ray & radiological apparatus-----	13	17	22
Other medical instruments-----	12	14	16
Other scientific and professional instruments:			
Electrical measuring & controlling apparatus-----	36	42	52
Meters and counters-----	6	7	10
Other measuring & controlling instruments-----	40	50	55
Watches, clocks, and timing devices:			
Watches, movements & cases-----	104	115	120
Clocks & similar time mechanisms-----	27	24	28
Total-----	<u>317</u>	<u>353</u>	<u>405</u>

During 1966-68, the value of total imports of the articles included in this volume of summaries increased about 13 percent per year; imports of medical instruments and X-ray apparatus accounted for the greatest increase, those of watches, clocks, and timing devices had the least. Japan and countries of the European Economic Community were the principal sources of optical goods and instruments imported into the United States; Switzerland supplied most of the imports of watches, clocks, and timing devices.

Instruments and apparatus of the kinds discussed in this volume may be subject to the provisions of Public Law 89-651, which became effective on February 1, 1967 and which permits duty-free entry of instruments or apparatus for use of non-profit educational and scientific institutions if no instrument or apparatus of equivalent scientific value to such article, for the purposes for which the instrument or apparatus is intended to be used, is being manufactured in the United States. (See Headnote 6, Part 4, Schedule 8 in the TSUS.) All imports under the provisions of P.L. 89-651 are entered under TSUS item 51.60 or 851.65, and are not included in the import statistics reported in this volume. (See the separate volume of Summaries on Schedule 8 of the TSUS.)

Commodity TSUS
item

Lenses, ophthalmic, not mounted----- 708.01

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Imports of ophthalmic lenses supply a very minor part of total consumption. The value of exports has ranged from 2 to 3 times the value of imports during the period 1964-68.

Description and uses

This summary covers contact lenses and unmounted ophthalmic lenses, which are elements of glass or plastics used in the manufacture of eyeglasses, goggles, and similar articles. Ophthalmic lenses vary in use from the inexpensive colored or tinted lenses used in ready-to-wear sunglasses and goggles to the more expensive prescription types--single vision, bifocal and trifocal lenses used in eyeglasses to correct defective vision. Lenses, other than ophthalmic, are included in a separate summary in this volume.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
708.01	Lenses, ophthalmic, unmounted.	19% ad val.	15% ad val.	9.5% ad val.

The above tabulation shows the column 1 rate in effect as of December 31, 1967 and modifications therein as a result of concessions granted by the United States in the General Agreement on Tariffs and Trade (GATT) concluded on June 30, 1967. Only the second and final

December 1969

OPHTHALMIC LENSES, UNMOUNTED

stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

In the period 1964-68, the value of apparent annual consumption of ophthalmic lenses increased by about 47 percent, from almost \$74 million in 1964 to more than \$109 million in 1968 (table 1). In each of these years, domestically produced products supplied more than 97 percent of the value of domestic consumption. Several factors have stimulated the demand for ophthalmic lenses. Among these are (1) educational and promotional activities of the several trade groups associated with the ophthalmic industry (2) more widespread and more frequent vision screening in schools and for motor vehicle drivers licenses, (3) the availability of eye care under the programs of Medicare and Medicaid, (4) the emergence of eyeglasses as a fashion accessory and (5) an affluent society which increasingly demands more than one set of glasses, contact lenses, or combinations thereof. Defective vision is widespread and people today have both the means and interest in correcting visual defects. Breakage and changes in prescriptions and styles result in large annual replacements. Data are not available on the use of contact lenses, which is known to have increased rapidly in recent years.

U.S. producers

There are about 20 companies producing eyeglass and sunglass lenses in the United States; eyeglasses are also a major product of most of these companies. Three companies probably produce more than 50 percent of the total output of ophthalmic lenses. Two of these companies have sales agencies throughout the United States and sell the greater part of their output through these outlets.

Eyeglass and sunglass lenses are produced in New York, New Jersey, Massachusetts, Ohio, Minnesota, Virginia, Pennsylvania, Missouri and California. About 60 percent of U.S. production consists of single vision lenses, the remainder being multi-focal lenses.

Only three or four firms, probably accounting for less than five percent of total lens output, are single product companies. Several of the diversified firms make many varieties of optical equipment; one is reputed to be the leading producer of flat glass in the United States and another is the leading producer of household glassware in the United States.

U.S. production

Domestic shipments of ophthalmic lenses increased steadily in each year during the period 1964-68; the value of shipments rose from about \$76 million in 1964 to about \$112 million in 1968, an increase of 47 percent (table 1). The general excellence of the domestically produced lenses available to the opticians throughout the United States have enabled the domestic industry to retain the same proportion of the U.S. market, despite increases in imports during the years 1964-68.

U.S. exports

U.S. exports of ophthalmic lenses increased from 1.9 million pairs, valued at \$2.0 million in 1964 to 4.3 million pairs, valued at \$4.9 million in 1968 (table 1); exports during this period accounted for an annual average of about 4 percent of the value of U.S. production of such articles.

Exports are shipped to all areas of the non-Communist world. The following tabulation, compiled from official statistics of the U.S. Department of Commerce, shows the quantity and value of U.S. exports of ophthalmic lenses (unmounted), by principal market, for 1968:

<u>Market</u>	<u>Quantity</u> (pairs)	<u>Value</u>
Canada-----	1,318,456	\$1,330,351
Switzerland-----	572,707	768,294
Netherlands-----	368,323	618,798
West Germany-----	272,302	420,616
Japan-----	282,555	384,776
All other-----	<u>1,457,558</u>	<u>1,426,119</u>
Total-----	<u>4,271,901</u>	<u>4,948,954</u>

U.S. imports

U.S. imports of ophthalmic lenses increased each year during the period 1964-68--from 2.5 million pairs, valued at \$0.9 million in 1964 to 6.3 million pairs, valued at \$2.4 million in 1968 (table 2). Despite the substantial increase in terms of both quantity and value, the ratio of imports to U.S. consumption changed very little; annual imports have accounted for less than 3 percent of the value of domestic consumption during each of these years (table 1).

Practically all imported lenses are comparable to and compete directly with ophthalmic lenses made in the United States. Japan was

OPHTHALMIC LENSES, UNMOUNTED

the principal source of imports in 1968, accounting for more than 56 percent of the quantity and almost 44 percent of the value of total imports. France and the United Kingdom were other important sources of U.S. imports.

**PUBLIC
INFORMATION**



U.S. TARIFF COMMISSION

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 2043
PHONE: NA. 8-3947

For release
May 27, 1970

**TARIFF COMMISSION RELEASES VOLUME OF TARIFF
SUMMARIES ON OPTICAL GOODS, SCIENTIFIC
AND PROFESSIONAL INSTRUMENTS, AND
WATCHES AND OTHER TIMING DEVICES**

Information on imports, exports, and production became available today on optical goods, scientific and professional instruments, and watches and other timing devices as the Tariff Commission released another volume in its new series of Summaries of Trade and Tariff Information. This volume is the seventh of eight to be published on the miscellaneous products covered by Schedule 7 of the Tariff Schedules of the United States.

The Summaries of Trade and Tariff Information are designed to meet the needs of wide and varied interests that include the Congress, the courts, Government agencies, importers, domestic producers, research organizations, and many others. The summaries contain accurate descriptions, in terms of the tariff schedules, of the thousands of products imported into the United States, methods of production, world supplies, and importance in trade and in the U.S. economy. The summaries also include substantive analytical material with regard to the basic factors affecting trends in consumption, production, and trade, and those bearing on the competitive position and economic health of domestic industries.

The Tariff Commission's current edition of volumes issued in the new series of tariff summaries is too limited for general distribution. As a service to the public, however, the 42 field offices of the Department of Commerce, and selected public and university libraries in the larger cities will be supplied with copies for commercial and professional consultation.

OPHTHALMIC LENSES, UNMOUNTED

11

Table 1.--Ophthalmic lenses, unmounted: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Ship- ments <u>1/</u>	Imports	Ex- ports <u>2/</u>	Apparent consump- tion	Ratio :(percent) of imports to consumption
1964-----	76,270	935	1,993	73,829	1.3
1965-----	81,780	1,081	3,741	79,120	1.4
1966-----	90,770	1,386	4,328	87,828	1.6
1967-----	98,900	1,836	3,822	96,914	1.9
1968-----	111,757	2,426	4,949	109,234	2.2

1/ Partly estimated.

2/ In terms of quantity, exports of ophthalmic lenses (in thousands of pairs) amounted to 1,886 in 1964, 3,514 in 1965, 3,638 in 1966, 2,972 in 1967, and 4,272 in 1968.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

OPHTHALMIC LENSES, UNMOUNTED

Table 2.--Ophthalmic lenses, unmounted: U.S. imports for consumption, by principal sources, 1964-68

Country	1964	1965	1966	1967	1968
Quantity (pairs)					
Japan-----	1,405,946	1,747,416	1,908,535	2,726,652	3,521,597
France-----	428,881	497,735	436,334	820,480	966,647
United Kingdom-	269,430	243,442	115,857	124,027	477,575
Belgium-----	251,316	126,552	289,009	211,019	202,138
Canada-----	103,413	218,321	115,243	143,561	131,938
All other-----	83,173	119,771	72,817	183,518	944,679
Total-----	2,542,159	2,953,237	2,937,795	4,209,257	6,244,574
Value					
Japan-----	\$393,023	\$416,693	\$568,948	\$828,624	\$1,065,991
France-----	268,103	357,413	516,942	646,725	672,442
United Kingdom-	118,860	105,847	74,046	92,258	226,363
Belgium-----	77,117	58,088	116,928	108,796	80,846
Canada-----	47,575	90,971	81,632	74,824	59,242
All other-----	30,657	52,325	27,400	84,913	321,201
Total-----	935,335	1,081,337	1,385,896	1,836,140	2,426,085

Source: Compiled from official statistics of the U.S. Department of Commerce.

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

13

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Lenses, prisms, mirrors and other optical elements (except ophthalmic lenses):	
Not mounted-----	708.03, -.09
Mounted-----	708.21, -.29

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. imports of these optical elements, which were about three times the value of exports in 1968, are believed to supply a significant part of U.S. consumption.

Description and uses

This summary covers mounted and unmounted optical elements composed of optically worked glass, synthetic optical crystals, or other material such as lenses (other than ophthalmic lenses), prisms, and mirrors, all of which are used in various kinds of instruments and apparatus. It does not embrace any unmounted elements of glass or synthetic crystals which have not been optically worked; such elements are covered in a summary on items 540.61-67.

Optical lenses of the type covered in this summary are primarily used for three purposes: (1) to concentrate light into beams of various configurations as in a searchlight or headlight; (2) to project an image onto a sensitized plate (photographic) or a screen (projection); and (3) to magnify or diminish the size of an image. Prisms are generally used for forming spectra (series of radiant energies arranged in order of wave length) or for reflecting rays through right angles as in binoculars, periscopes, and rangefinders. Optical mirrors are usually incorporated in telescopes, projectors, microscopes, and in medical, dental, or surgical instruments.

Other optical elements covered in this summary include optical flats, used for checking the flatness of a surface; diffraction gratings, used in the study of spectra; interference filters, used as color filters or for splitting a beam of light; and polarising elements.

December 1969

7:2

14 LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
 (EXCEPT OPHTHALMIC LENSES)

Unmounted elements of glass or crystal are covered in this summary only if "optically worked," i.e., the glass or the synthetic crystals have been subjected to grinding or polishing incident to surface shaping for producing optical properties. The term "mounted optical elements" covers such elements when in a permanent frame or other mounting suitable for fitting to an instrument or apparatus but does not include those elements which are themselves separate instruments or apparatus (e.g. spectacles, hand magnifiers, and medical or dental mirrors). Ophthalmic lenses, generally intended to correct certain defects of vision or to protect the eyes, are discussed in summaries covering items 708.01 and 708.41-.47 elsewhere in this volume.

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

15

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Lenses, prisms, mir- rors and other optical elements (except ophthal- mic lenses):			
	Not mounted:			
708.03	Lenses (other than ophthal- mic).	28% ad val.	22% ad val.	14% ad val.
708.05	Prisms-----	40% ad val.	32% ad val.	20% ad val.
708.07	Mirrors-----	40% ad val.	32% ad val.	20% ad val.
708.09	Other-----	42.5% ad val.	34% ad val.	21% ad val.
	Mounted:			
	Lenses:			
708.21	Projection-----	35% ad val.	28% ad val.	17.5% ad val.
708.23	Other-----	25% ad val.	20% ad val.	12.5% ad val.
708.25	Prisms-----	40% ad val.	32% ad val.	20% ad val.
708.27	Mirrors-----	40% ad val.	32% ad val.	20% ad val.
708.29	Other-----	42.5% ad val.	34% ad val.	21% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

Data are not available on apparent consumption of optical elements, but it is known that the value of producers' shipments of all optical instruments and lenses increased by more than 52 percent during the period 1964-67. Inasmuch as optical elements are used in the original instrument assembly, and as optional attachments and replacement parts, it is quite probable that consumption of such elements has increased at an equivalent rate during the period.

U.S. producers and production

There are probably 15 companies in the United States that produce commercial quantities of optical elements for their own use or for resale. Three or four of these are large concerns which manufacture other articles as well as those covered here. Lenses and other optical elements are not the principal products of several of the producers. The bulk of domestic production comes from plants located in the States of New York, Pennsylvania, and Massachusetts.

Data are not available on domestic production of optical elements, but it is believed that production is substantially greater than imports. Annual production probably increased considerably during the period 1964-68.

U.S. exports

During 1965-67, annual U.S. exports of optical elements declined in total quantity, although rising unit values accounted for a modest increase in total value (table 1). The largest decline was in exports of photographic and projection lenses, from 393,000 units shipped in 1965 to 145,000 units shipped in 1967, a decline of 63 percent. Exports of other optical elements decreased from 1,853,000 units in 1965 to 1,655,000 units in 1967, a decline of 11 percent. Higher unit values in 1967, particularly those of prisms, mirrors, and other optical elements--which accounted for 92 percent of total export shipments--made possible a 3 percent increase in total export values over the three-year period, even though the number of units exported declined by 20 percent.

The downward trend of 1965-67 was reversed in 1968, when the total quantity of exports of the articles herein considered increased

120 percent over 1967. Also, the value of these exports in 1968 amounted to about \$8.4 million, an increase of about 9 percent over 1967. In the aggregate, 1968 recorded the highest volume and value of export shipments of the four-year period, 1965-68.

Exports are shipped all over the world. Photographic and projection lenses go principally to Canada, the United Kingdom, and Mexico; other optical elements find their largest markets in Canada, the United Kingdom, Japan, and the Netherlands.

U.S. imports

The value of annual imports of optical elements more than doubled during the years 1964 to 1968 inclusive, with lenses accounting for over 95 percent of the total in each year (table 2). The bulk of these imports were from Japan, whose share of the U.S. import trade increased from about 44 percent in 1964 to more than 65 percent in 1968. Other major suppliers were West Germany, France, the United Kingdom and Switzerland (table 3).

The analysis of 1968 imports indicates that the largest category was photographic lenses, which accounted for over 55 percent of the value of total imports of optical elements (table 4). Most of the imported photographic lenses are specifically designed for use with imported cameras and are generally of a higher quality than the domestic articles.

Imports from Japan of lenses other than photographic are usually used in the manufacture of inexpensive slide viewers, opera and field glasses, and similar articles. Most of the imports from West Germany are used as replacement lenses in imported instruments or are made of glass not usually produced in the United States.

Imports of prisms, mirrors, and other optical elements (table 5) accounted for only about 3 percent of the value of 1968 imports, but as a group they have been growing faster than imports of lenses (table 2).

Average foreign unit values for 1968 reflect the wide variance in types, quality, and prices of imported lenses, ranging from \$8.28 for mounted optical lenses other than projection and photographic types to \$0.49 for other unmounted lenses (table 4). These values indicate that while price is a foremost consideration, some imports (most notably those from the United Kingdom) compete on a nonprice basis, probably because of superior quality of particular types of optical elements.

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

Table 1.--Lenses, prisms, mirrors, and other optical elements (except ophthalmic lenses): U.S. exports of domestic merchandise, by principal markets, 1965-68

(Quantity in thousands of units; value in thousands of dollars)

Year and country	: Photographic		: Other		: Total	
	: and projec-		: optical			
	: tion lenses		: elements			
	: Quan-	: Value	: Quan-	: Value	: Quan-	: Value
	: tity		: tity		: tity	
1965:	:	:	:	:	:	:
Canada-----	325	829	451	1,127	776	1,956
United Kingdom-----	12	734	482	786	494	1,520
Netherlands-----	1/	19	85	355	85	374
Japan-----	3	70	75	365	78	435
West Germany-----	3	97	79	355	82	452
France-----	3	170	61	369	64	539
Mexico-----	2	197	32	75	34	272
All other-----	45	886	588	1,035	633	1,921
Total-----	393	3,002	1,853	4,467	2,246	7,469
1966:	:	:	:	:	:	:
Canada-----	224	443	520	1,390	744	1,833
United Kingdom-----	6	521	165	742	171	1,263
Netherlands-----	1/	13	263	916	263	929
Japan-----	2	59	86	570	88	629
West Germany-----	4	103	60	493	64	596
France-----	3	146	45	434	48	580
Mexico-----	2	141	140	108	142	249
All other-----	44	785	382	932	426	1,717
Total-----	285	2,211	1,661	5,585	1,946	7,796
1967:	:	:	:	:	:	:
Canada-----	100	446	670	1,306	770	1,752
United Kingdom-----	3	370	219	968	222	1,338
Netherlands-----	-	-	229	823	229	823
Japan-----	2	111	74	632	76	743
West Germany-----	6	144	20	476	26	620
France-----	1	68	63	503	64	571
Mexico-----	5	266	163	101	168	367
All other-----	28	576	217	900	245	1,476
Total-----	145	1,981	1,655	5,709	1,800	7,690

See footnote at end of table.

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

19

Table 1.--Lenses, prisms, mirrors, and other optical elements (except ophthalmic lenses): U.S. exports of domestic merchandise, by principal markets, 1965-68--Continued

(Quantity in thousands of units; value in thousands of dollars)

Year and country	: Photographic		: Other		: Total	
	: and projec-		: optical			
	: tion lenses		: elements			
	: Quan-	: Value	: Quan-	: Value	: Quan-	: Value
	: tity		: tity		: tity	
1968:	:	:	:	:	:	:
Canada-----	339	478	1,962	1,456	2,301	1,934
United Kingdom-----	49	359	285	1,282	334	1,641
Japan-----	6	122	108	642	114	764
Netherlands-----	7	27	281	723	288	750
West Germany-----	11	125	213	454	224	579
France-----	5	106	132	425	137	531
Mexico-----	50	299	69	131	119	430
All other-----	74	655	379	1,111	453	1,766
Total-----	541	2,171	3,429	6,224	3,970	8,395

1/ Less than 500 units.

Source: Compiled from official statistics of the U.S. Department of Commerce.

December 1969

7:2

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

Table 2.--Lenses, prisms, mirrors, and other optical elements (except
ophthalmic lenses): U.S. imports for consumption, by kinds,
1964-68

(In thousands of dollars)

Kind	1964	1965	1966	1967	1968
Lenses-----	11,151	15,907	20,727	21,992	26,142
Prisms-----	113	158	275	425	444
Mirrors-----	176	83	103	153	122
Other elements-----	182	373	355	117	130
Total-----	11,622	16,521	21,460	22,687	26,838

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Lenses, prisms, mirrors, and other optical elements (except
ophthalmic lenses): U.S. imports for consumption, by principal
sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Japan-----	5,130	8,455	11,863	13,693	17,840
West Germany-----	3,443	4,359	5,011	4,100	5,255
France-----	1,091	1,215	1,553	1,972	1,602
United Kingdom-----	768	1,062	961	1,044	580
Switzerland-----	594	811	1,034	938	607
All other-----	596	619	1,038	940	954
Total-----	11,622	16,521	21,460	22,687	26,838

Source: Compiled from official statistics of the U.S. Department of Commerce.

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

21

Table 4.--Optical lenses (except ophthalmic lenses): U.S. imports for consumption, by types, by principal sources, 1968

Country	Mounted			Un-	Total
	Pro- jection:	Photo- graphic	Other optical	(Other optical)	
Quantity (1,000 units)					
Japan-----	1,013	1,631	682	4,088	7,414
West Germany-----	51	137	70	165	423
France-----	<u>1</u>	5	4	88	97
Switzerland-----	1	4	13	1	19
United Kingdom-----	2	1	11	445	459
All other-----	3	9	29	58	99
Total-----	1,070	1,787	809	4,845	8,511
Value (1,000 dollars)					
Japan-----	2,428	9,613	3,695	1,890	17,626
West Germany-----	147	3,297	1,485	207	5,136
France-----	11	566	592	190	1,359
Switzerland-----	35	247	266	8	556
United Kingdom-----	15	138	321	64	538
All other-----	19	539	338	31	927
Total-----	2,655	14,400	6,697	2,390	26,142
Unit value (each)					
Japan-----	\$2.40	\$5.89	\$5.42	\$.46	\$2.38
West Germany-----	2.88	24.07	21.21	1.26	12.14
France-----	-	113.20	14.80	2.16	14.01
Switzerland-----	-	61.75	20.46	8.00	29.26
United Kingdom-----	-	138.00	29.18	.14	1.17
All other-----	6.33	59.89	11.66	.53	9.36
Total-----	2.48	8.06	8.28	.49	3.07

1/ Less than 500 units.

Source: Compiled from official statistics of the U.S. Department of Commerce.

December 1969

7:2

LENSES, PRISMS, MIRRORS, AND OTHER OPTICAL ELEMENTS
(EXCEPT OPHTHALMIC LENSES)

Table 5.--Prisms, mirrors, and other optical elements (except ophthalmic lenses): U.S. imports for consumption, by kinds, by principal sources, 1968

(In thousands of dollars)

Country	Optical prisms		Optical mirrors		Other optical elements	
	Mounted	Un-mounted	Mounted	Un-mounted	Mounted	Un-mounted
United Kingdom---	2	6	3	4	12	15
Japan-----	43	61	25	26	21	38
West						
Germany---	30	38	8	10	16	18
Switzerland--	26	6	11	2	1	5
France-----	216	-	26	1	-	<u>1/</u>
All other---	14	2	1	5	-	4
Total---	331	113	74	48	50	80

1/ Less than \$500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Eyeglasses and similar articles thereof:	
Lorgnettes-----	708.41
Other (except frames and mountings, and parts thereof)-----	708.43,-.45
Frames and mountings, and parts thereof-----	708.47

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

About 90 percent of the value of U.S. consumption of eyeglasses and similar articles--estimated at about \$261 million in 1968--was supplied from domestic production. Imports were more than three times the value of exports in that year.

Description and uses

The most common eyeglasses consist of a frame (front and a pair of temples) designed to hold lenses that aid vision or compensate for defective sight. Sunglasses are frames into which are inserted prescription and nonprescription plastics or glass lenses. They are worn for protection against the glare of the sun or snow, or for the sake of appearance. Lorgnettes are eyeglasses or opera glasses with a long vertical handle on one side in place of the temples. Safety glasses or goggles are eyeglasses provided with extra strength lenses used by workers to prevent injury to the eye from flying objects, and extreme brightness. Pince-nez and monocles are types of "similar articles" covered by the tariff descriptions in this summary; however, there is virtually no trade in such articles.

The term "mountings" is rarely used in conjunction with the eyeglass trade; in past years it was synonymous with "frames".

Frames for the commodities herein discussed are made of plastics, aluminum or other metal, or a combination of plastics and metal. Lenses are of glass or plastics. Eyeglasses are manufactured in a variety of sizes, qualities and styles. Some styles of frames incorporate a decorative piece attached to the upper part of the front; others have metal trim along the temples as well as rhinestones or other decorations on both the front and temples. The frames of eyeglasses and sunglasses are subject to rapid obsolescence at the whims of shifting fashions.

EYEGASSES AND SIMILAR ARTICLES

U.S. tariff treatment

The column 1 (trade agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Eye- glasses, lorg- nettes, goggles and similar arti- cles, all the foregoing whether used for correc- tive, protective, or other pur- poses; frames and mountings for any of the foregoing, and parts of such frames and mountings:			
708.41	Lorgnettes-----	45% ad val.	36% ad val.	22.5% ad val.
	Other (except frames and mountings, and parts thereof):			
708.43	Valued not over \$2.50 per doz.	30% ad val.	24% ad val.	15% ad val.
708.45	Valued over \$2.50 per doz.	17% ad val.	16% ad val.	15% ad val.
708.47	Frames and mount- ings, and parts thereof.	17% ad val.	16% ad val.	15% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

December 1969

7:2

U.S. consumption

In the period 1964-68, the value of apparent annual consumption of eyeglasses, lorgnettes, goggles, and similar articles increased, by more than 50 percent, from \$169 million in 1964 to about \$261 million in 1968 (table 1). In each of these years, domestically produced products supplied more than 90 percent of the consumption.

The growing demand for ophthalmic products, especially sunglasses and eyeglasses, has resulted from population growth, the development of eyeglasses as a fashion accessory, more widespread and more frequent vision screening in the schools in conjunction with health programs and by States in connection with automobile drivers' licenses, educational and promotional programs developed by trade associations, and the establishment of medicare and medicaid.

U.S. producers

There are about 100 domestic firms that manufacture ophthalmic goods of a type discussed in this summary. About one-fourth of them produce only one type of ophthalmic article but make several other types of articles related to eye care. Two of the largest domestic manufacturers make a variety of other products, both in the United States and in foreign countries, including optical components for use with missiles and rockets, and precision components for the aerospace field.

Although eyeglasses, sunglasses, frames, etc. are manufactured in several regions of the continental United States and in Puerto Rico, the establishments located in the States of New York, New Jersey, Massachusetts, Rhode Island, and Maryland probably account for 75 percent of domestic production.

During recent years there has been a steady rise in expenditures by the producers for improved machines and equipment and in research and development; this has resulted in both labor savings and improved products.

U.S. production

Domestic shipments of the ophthalmic goods under review, which increased each year during the period 1964-68, were 50 percent greater in 1968 than in 1964. The value of shipments rose from about \$160 million in 1964 to almost \$243 million in 1968. Ready-to-wear sunglasses and sun goggles accounted for more than 30 percent of these shipments in each year. The high quality and wide variety of domestic spectacle and sunglass frames available to optometrists and

EYEGASSES AND SIMILAR ARTICLES

assemblers of sunglasses throughout the United States have enabled the domestic industry to retain its share of the U.S. market, despite increases in imports. However, virtually all highly decorated frames, on which the ornamentation is applied by hand, are imported chiefly from France and Italy.

U.S. exports

The value of exports of eyeglasses and similar articles increased moderately in the years 1964-68--from \$6.2 million in 1964 to \$7.3 million in 1969.

Exports are shipped to all areas of the non-Communist world. Canada is the largest market; in 1968 that country received more than 40 percent of the total exports of these commodities. Other important markets were the Netherlands, Switzerland, and West Germany (table 2).

U.S. imports

The value of annual U.S. imports of lorgnettes, eyeglasses, goggles, and similar articles rose from about \$15 million in 1964 to more than \$25 million in 1968. In each of the years 1964-68, the ratio of imports to U.S. consumption remained in the range of 9 to 10 percent.

In recent years, styling of eyeglasses, sunglasses, and frames has become increasingly important. Importers have offered a great variety of new shapes, colors and decorations, which has stimulated the demand for their products.

About 90 percent of the imports consist of completed sunglasses and frames for eyeglasses and sunglasses, the bulk of which are highly ornamented sunglasses and complete frames from France and Italy, and gold-filled and plastics frames from West Germany, in the over "\$2.50 per dozen" class (table 3). The remaining small volume of imports consist principally of lorgnettes, undecorated sunglasses and plastics eyeglass frames.

EYEGASSES AND SIMILAR ARTICLES

27

Table 1.--Eyeglasses and similar articles and parts thereof: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Shipments ^{1/}	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
1964-----	160,430	14,965	6,216	169,179	8.8
1965-----	172,298	16,995	7,020	182,273	9.3
1966-----	190,930	19,392	7,462	202,860	9.6
1967-----	212,000	20,974	7,786	225,188	9.3
1968-----	242,780	25,189	7,307	260,662	9.7

^{1/} Partly estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

EYEGASSES AND SIMILAR ARTICLES

Table 2.--Eyeglasses and similar articles and parts thereof: U.S. exports, by types and by principal markets and values, 1965 and 1968

(In thousands of dollars)

Year and type	: Total : : value :	Country and value
1965:	:	:
Sun glasses and goggles--	1,712	Canada, 624; Japan, 153; Hong Kong, 114; all other, 821.
Ophthalmic spectacles and eyeglasses-----	589	Canada, 367; Netherlands, 30; Australia, 23; all other, 169.
Protective spectacles and goggles-----	1,742	Canada, 845; Mexico, 117; Venezuela, 111; all other, 669.
Spectacle frames and mountings-----	1,875	Canada, 713; Netherlands, 158; Sweden, 115; all other, 889.
Spectacles and parts, n.e.c-----	1,102	Canada, 725; Netherlands, 57; Sweden, 37; all other, 283.
1968:	:	:
Sun glasses and goggles--	2,722	Canada, 955; Netherlands, 219; Hong Kong, 175; all other, 1,373.
Ophthalmic spectacles and eyeglasses-----	319	Canada, 89; Japan, 48; United Kingdom, 47; all other, 135.
Protective spectacles and goggles-----	1,338	Canada, 566; Venezuela, 127; Switzerland, 91; all other, 554.
Spectacle frames and mountings-----	1,791	Canada, 745; Netherlands, 94; Australia, 85; all other, 867.
Spectacles and parts, n.e.c-----	1,136	Canada, 715; Switzerland, 87; Sweden, 44; all other, 290.

Source: Compiled from the official statistics of the U.S. Department of Commerce.

EYEGASSES AND SIMILAR ARTICLES

29

Table 3.--Eyeglasses and similar articles and parts thereof: U.S. imports for consumption, by TSUSA items and by principal sources, 1968

Country	708.4100	708.4300	708.4520	708.4550	708.4720	708.4740
	Quantity (dozens)					
France----	1/	26,458	584,944	7,938	383,683	1/
Italy-----	1/	612,281	827,677	3,257	144,724	1/
Japan-----	1/	67,895	553,733	37,614	25,212	1/
W. Ger-----	1/	151	40,001	8,043	81,718	1/
U.Kr-----	1/	2,999	1,060	800	10,203	1/
All						
other----	1/	410,357	68,795	2,830	93,596	1/
Total----	1/	1,120,141	2,076,210	60,482	739,136	1/
	Value (1,000 dollars)					
France----	2	35	4,994	56	5,008	225
Italy-----	-	759	4,465	44	2,138	55
Japan-----	2	99	2,443	203	221	8
W. Ger-----	2/	2/	349	86	1,711	89
U.Kr-----	-	6	11	9	245	23
All						
other----	6	75	590	27	1,165	40
Total----	10	974	12,852	425	3/ 10,489	440

1/ Quantity not reported in official statistics.

2/ Less than \$500.

3/ Because of rounding, figures do not add to this total.

Source: Compiled from official statistics of the U.S. Department of Commerce.

TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES) 31
 AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
 ANY OF THE FOREGOING AND PARTS THEREOF

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Telescopes:	
Not designed for use with infra-red light:	
Field glasses and opera glasses, except prism binoculars-----	708.51
Prism binoculars-----	708.52
Other-----	708.53
Designed for use with infra-red light-----	708.55
Astronomical instruments not specially provided for----	708.57
Frames and mountings for the foregoing articles, and parts thereof-----	708.59

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

It is estimated that U.S. consumption of telescopes and other astronomical instruments totalled nearly \$100 million in value in 1968, over \$25 million of which was supplied by imports. U.S. exports of these articles were small, amounting to a value of less than \$1 million.

Description and uses

This summary covers reflecting or refracting telescopes, including prism binoculars, field and opera glasses, and telescopic sights for firearms. These are optical instruments which contain a combination of lenses, or lenses and mirrors in either one or two cylindrical holders, usually of metal or plastics. These instruments are employed to aid the eye in viewing, or the camera in photographing, distant objects.

Other astronomical instruments covered by this summary include altazimuths (or certain azimuth circles), designed to measure both altitudes and azimuths; transit instruments, used to observe the apparent passage of celestial bodies above the meridian line at the place of observation; coelestats, intended to facilitate astronomical observation, particularly by reflecting a given part of the sky

32 TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES)
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

into a vertical or horizontal stationary instrument; spectrohelioscopes, and spectroheliographs, employed in studying the sun; heliometers, used in measuring the angular diameter of the sun and the angular distance between two heavenly bodies; and coronagraphs, used to observe the sun's corona at times other than that of total solar eclipse. In addition to complete instruments, this summary covers frames and mountings, and parts thereof. Planetariums, however, are not included within the scope of this summary; they are classified under TSUS items 678.50, 688.40, 851.60 or 862.10 depending upon the operation, and purpose for which they are intended. Also excluded from this summary are toy type telescopes, telescopic sights, binoculars or field glasses; they are discussed in the summary on toys in volume 7:4.

TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES) 33
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
708.51	Telescopes: Not designed for use with infra- red light: Field glasses and opera glasses, except prism binocu- lars-----	17.5% ad val.	14% ad val.	8.5% ad val.
708.52	Prism binoculars	30% ad val.	26% ad val.	20% ad val.
708.53	Other-----	22.5% ad val.	21% ad val.	20% ad val.
708.55	Designed for use with infra-red light-----	11.5% ad val.	9% ad val.	5.5% ad val.
708.57	Astronomical instru- ments not special- ly provided for---	45% ad val.	36% ad val.	22.5% ad val.
708.59	Frames and mountings and parts thereof-	The col- umn 1 rate ap- plicable: to the article of which the frames and mount- ings are: parts.	<u>1/</u>	<u>1/</u>

1/ Duty status not affected by the trade conference.

34 TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES)
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

U.S. consumption of telescopes, including prism binoculars, field glasses, other astronomical instruments and frames and mountings for any of the foregoing and parts of frames and mountings continued to increase in the period 1964-68, with imports gradually supplying an increasing proportion of consumption according to industry sources. It is estimated that consumption of these articles was valued at about \$100 million in 1968. Telescopic sights for firearms accounted for a large part of this total; telescopes, spotting scopes, prism binoculars, field glasses, and other astronomical instruments accounted for the remainder. In terms of value, about three-fourths of all astronomical instruments marketed were probably supplied by domestic producers in 1968.

U.S. producers

Several companies produce telescopes and telescopic sights in the United States. One company produces about 90 percent of all the prism binoculars and spotting telescopes. Several small firms produce opera glasses.

Domestic establishments producing telescopes and astronomical instruments in the United States are concentrated for the most part in Massachusetts, New York, New Jersey, and Connecticut; the remainder of these production facilities are located in Illinois, Tennessee, and California.

U.S. production

Data are not available on annual U.S. production of telescopes and other astronomical instruments. It is estimated, however, that production of such articles was valued at about \$75 million in 1968. Industry sources report that domestic production declined during the period 1964-68, primarily because of increased import competition, particularly from Japan and West Germany.

TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES) 35
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

U.S. exports

Export data for these articles and parts were not separately reported in official U.S. statistics before 1965; however, prior to that year exports were probably negligible.

The principal markets for astronomical instruments, and the value of such U.S. exports to each in 1965-68, as compiled from official statistics, were as follows (in thousands of dollars):

Country	1965	1966	1967	1968
Canada-----	15	79	159	94
Chile-----	27	686	106	80
West Germany-----	-	-	90	35
Republic of Korea-----	-	14	60	144
Other-----	331	281	426	427
Total-----	373	1,060	841	780

U.S. imports

Imports of astronomical instruments increased each year from a value of \$12.3 million in 1964 to \$22 million in 1966, declined to \$21 million in 1967, and then rose to more than \$25 million in 1968 (table 1). The long-range trend of increased U.S. imports of astronomical instruments can be traced to three principal factors: (1) the United States market for these articles has been expanding; (2) the imported articles are of adequate quality and are competitively priced (both Japan and Germany have efficient industries that mass produce telescopes and related articles at relatively low costs); and (3) some domestic manufacturers found it advantageous to turn to other products or become importers of some of these items. One domestic producer of binoculars and spotting scopes imports telescopic sights for firearms from Japan.

Japan is by far the principal source of imports, supplying more than 90 percent of the value of imports in each of the years 1964-68 (table 1). Improved quality standards in Japanese-made telescopes and prism binoculars were largely responsible for expanded shipments of these items to the United States. Japan ships expensive as well as inexpensive optical goods; imports from Germany consist largely

36 TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES)
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

of fine telescopic sights for rifles and expensive telescopes, binoculars and field glasses. Hong Kong and Italy are less important sources for telescope-type articles.

In 1968 the volume of imports, by type of articles, in terms of value, was: binoculars, field glasses, and opera glasses, 67 percent; telescopes and other astronomical instruments, 31 percent; and frames and mountings, and parts thereof, 2 percent (table 2). Telescopic sights for firearms, included with telescopes and other astronomical instruments, are significant import items. Imports of telescopes designed for use with infra-red light are very small. Some parts are imported.

TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES) 37
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

Table 1.--Telescopes (including prism binoculars and field and opera glasses), astronomical instruments, n.s.p.f., frames and mountings for any of the foregoing and parts of such frames and mountings: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Japan-----	11,414	15,853	20,162	19,139	23,241
West Germany--	509	617	690	741	751
Hong Kong-----	270	437	636	539	497
Italy-----	72	105	253	152	187
All other-----	64	123	309	207	410
Total-----	12,329	17,135	22,050	20,778	25,086

Source: Compiled from official statistics of the U.S. Department of Commerce.

38 TELESCOPES (INCLUDING PRISM BINOCULARS AND FIELD AND OPERA GLASSES)
AND OTHER ASTRONOMICAL INSTRUMENTS, FRAMES AND MOUNTINGS FOR
ANY OF THE FOREGOING AND PARTS THEREOF

Table 2.--Telescopes (including prism binoculars and field and opera glasses), astronomical instruments, n.s.p.f., frames and mountings for any of the foregoing and parts of such frames and mountings: U.S. imports for consumption, by types, 1964-68

(In thousands of dollars)

Type	1964	1965	1966	1967	1968
Binoculars, field glasses and opera glasses-----	8,704	12,406	16,519	14,496	16,845
Telescopes and astronomical instruments---	3,495	4,561	5,283	5,959	7,734
Frames, mountings and parts-----	130	168	248	323	508
Total-----	12,329	17,135	22,050	20,778	25,087

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Microscopes and diffraction apparatus:	
Compound optical microscopes-----	708.71, -.76
Electron, proton, and similar microscopes and diffraction apparatus-----	708.78
Frames and mountings, and parts thereof-----	708.80, -.82

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

The value of U.S. imports of the articles covered in this summary, which was three times that of exports, amounted to more than a third of the value of domestic consumption--estimated to be in excess of \$48 million--in 1968. Imports supply virtually all of the U.S. market for one segment of these commodities--low-priced, compound optical microscopes.

Description and uses

Compound optical microscopes are optical instruments consisting essentially of a lens or system of lenses designed to produce a magnified image of an object, and an eye piece which further magnifies the observed image. They usually incorporate means for illuminating the object from an external or integral light source, a specimen stage, one or two eyepiece-holder tubes (depending on whether a monocular or binocular type), and an objective holder.

Electron and proton microscopes differ from the optical type in that they use controlled beams of electrons or protons instead of light rays. Microscopes using electrons make possible magnifications of the order of 200,000 times, while those employing protons, which have a wavelength 40 times shorter than electrons, allow even more highly magnified images.

The optical, electron and proton microscopes are of two types: general purpose (primarily optical), used by amateurs, teachers, etc.; and specialized research types, used by industrial, scientific, and educational laboratories for the study of minute particles of matter in such fields as botany, chemistry, medicine, metallurgy, and food production.

Diffraction apparatus, also utilizing a beam of electrons directed at a specimen, produce diffraction patterns for the study of crystalline matter. The dimensions, orientation, and atomic arrangement of the crystals of the specimen can be calculated from the diameter, intensity, and sharpness of the rings in the pattern.

Microprojection apparatus are specially equipped microscopes, (enabling rapid change of focus) used for horizontal or vertical projection of magnified images in educational, scientific and medical demonstration rooms, technical laboratories, etc.

In addition to visual observation of the specimen, photomicrographic apparatus permit the photographic recording of magnified images. This apparatus may be composed either of a microscope permanently incorporating a photographic or cinematograph camera, or a conventional microscope to which a conventional camera is temporarily fixed by means of a simple attachment.

Simple microscopes, which are comprised of a single lens or magnifying glass set in a tubular frame, are excluded from discussion in this summary (see the summary in this volume on items 708.85, -.93). Separately imported photographic or cinematograph cameras for microphotography are also excluded (see the summary in volume 7:3 on items 722.02, -.16).

MICROSCOPES AND DIFFRACTION APPARATUS

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Compound optical mi-			
	croscopes; elec-			
	tron, proton, and			
	similar micro-			
	scopes and dif-			
	fraction appara-			
	tus; frames, and			
	mountings there-			
	for, and parts of			
	such frames and			
	mountings:			
	Compound optical			
	microscopes:			
	Not provided with			
	means for			
	photographing			
	or projecting			
	the image:			
708.71	Valued not over	25% ad	23% ad val.	20% ad val.
	\$25 each.	val.		
708.72	Valued over \$25	33% ad	27% ad val.	20% ad val.
	but not over	val.		
	\$50 each.			
708.73	Valued over \$50	45% ad	36% ad val.	22.5% ad
	each.	val.		val.
708.75	Provided with	45% ad	36% ad val.	22.5% ad
	means for pro-	val.		val.
	jecting the			
	image.			
708.76	Other-----	15% ad	12% ad val.	7.5% ad val.
		val.		

Table continued on next page.

MICROSCOPES AND DIFFRACTION APPARATUS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Microscopes and dif- fraction appara- tus:--Cont'd.			
708.78	Electron, proton, and similar mi- croscopes and dif- fraction appara- tus.	22% ad val.	17.5% ad val.	11% ad val.
	Frames and mountings, and parts thereof:			
703.80	For compound op- tical micro- scopes.	30% ad val.	24% ad val.	15% ad val.
705.82	Other-----	22% ad val.	17.5% ad val.	11% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A to this volume for all the staged rates).

It should be noted that the rate table does not show U.S. tariff treatment of articles of a type which are covered within the scope of this summary but which are entered under the special duty-free provisions of item 851.60 or 851.65. See introduction to this volume for further details.

U.S. consumption

Domestic consumption of microscopes and diffraction apparatus was valued at more than an estimated \$48 million in 1968, an increase of about 32 percent over 1965, when the value was \$36.5 million (table 1). This expansion of consumption is attributable to greater emphasis on scientific research in educational institutions, wider application of measuring and checking operations in certain manufacturing processes for quality control purposes, exploitation of the potential of photomicrographic and microprojection equipment as demonstration, diagnostic and instruction aids in medical and technical laboratories, and larger outlays of both public and private funds for these purposes.

U.S. producers

There are two domestic firms currently producing compound optical microscopes and three firms producing electron and similar microscopes and diffraction apparatus. All of these firms are located in four states: New York, Massachusetts, New Jersey, and California. The companies that manufacture electron and proton microscopes and diffraction apparatus produce a variety of products ranging from laboratory instruments to electronic control and missile guidance systems; those producing compound optical microscopes also produce lenses and a wide variety of other optical instruments.

U.S. production

The value of domestic manufacturers' shipments of the articles included in this summary increased from \$29.6 million in 1965 to an estimated \$34.8 million in 1968. These data are understated, however, since parts were not covered in the annual surveys for each of those years. In addition, data on shipments for the entire period 1965-68 do not include microprojection and photomicrographic equipment, thus understating apparent consumption and overstating the ratio of imports to consumption. Nevertheless, domestic production supplied more than 60 percent of annual U.S. consumption during 1965-68.

U.S. exports

Exports of microscopes and diffraction apparatus have kept pace with consumption and domestic shipments, rising more than 30 percent in value during the years 1965-68, and averaging more than 10 percent of domestic producers' shipments for each of these years (table 1).

Compound optical microscopes comprise the bulk of export shipments; in 1968 they accounted for almost one-half of the total exports value. These articles, along with parts and accessories, have provided most of the growth in exports between 1965-68 (table 2). Few, if any, precision microscopes produced in the United States sell at less than \$100, the average unit value of compound optical microscopes exported in 1968.

Exports of microscopes and diffraction apparatus are widely sold in many countries. Principal foreign markets in 1968 for these products were Canada, the Netherlands, Mexico, and the United Kingdom, in that order (table 2).

U.S. imports

As indicated in table 1, the value of U.S. imports of microscopes and diffraction apparatus has increased annually from about \$9.8 million in 1965 to about \$17.9 million in 1968, and has substantially exceeded the annual exports of domestic merchandise in that period; the ratio of imports to apparent consumption has ranged between 27 and 37 percent. These data do not include imports of articles of a type which would be covered by this summary if dutiable but which are covered by TSUS item 851.60 or 851.65. In addition, articles imported under either of the above items are not separately shown in the official statistics by type of instrument. However, preliminary reports from the Business and Defense Services Administration of the Department of Commerce covering the period March 1, 1967 through December 31, 1969, showing applications received for duty-free entry of instruments which would otherwise be covered by this summary, indicate their value in excess of \$27 million for the period, most of which represents electron microscopes and parts.

Compound optical microscopes accounted for about 21 percent of the aggregate value of dutiable imports in 1968; frames, mountings and parts 34 percent; and electron, proton and similar microscopes and diffraction apparatus accounted for the remainder (tables 3 & 4).

Compound optical microscopes having a foreign value under \$25 each usually comprise more than 90 percent of the total number of imported microscopes--the ratio was 94.3 percent in 1968. The great bulk of the microscopes valued not over \$25 each has been supplied by Japan; most of the remainder has been from West Germany. The Japanese microscopes compete with similar domestic articles primarily on the basis of price; domestic trade sources indicate that they now supply virtually all of the market for student-grade instruments.

The market for imported compound optical microscopes in the \$25 to \$50 value bracket and the over \$50 value bracket is also dominated by Japanese instruments. However, the higher priced instruments equipped with microprojection and photomicrographic equipment are supplied largely by West Germany. Imports of the latter equipment, negligible prior to 1963, have constituted the fastest growing segment of compound optical microscope imports; in 1968 they accounted for over 30 percent of the total.

The average foreign unit values of imported compound optical microscopes for 1965-68, computed from official statistics of the U.S. Department of Commerce, by TSUS number, are shown in the following tabulation:

TSUS item	Description	Average foreign unit value			
		1965	1966	1967	1968
	Compound optical mi-				
	croscopes:				
708.71	Not over \$25 each---	\$3.94	\$3.85	\$4.35	\$4.69
708.72	\$25 to \$50 each-----	32.88	36.93	35.48	34.54
708.73	Over \$50 each-----	154.30	141.45	133.61	159.95
708.75	With projection				
	apparatus-----	277.03	108.55	97.15	44.75
708.76	With photographic				
	apparatus-----	425.27	661.41	589.97	537.13

MICROSCOPES AND DIFFRACTION APPARATUS

Table 1.--Compound optical, electron, proton and similar microscopes and diffraction apparatus, and frames, mountings and parts: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1965-68

(In thousands of dollars)

Year	Ship- ments <u>1/</u>	Im- ports <u>2/</u>	Exports	Apparent consump- tion	Ratio(percent) of imports to consumption
1965-----	29,643	9,839	2,980	36,502	27.0
1966-----	33,071	12,301	3,477	41,895	29.4
1967-----	32,100	14,486	3,858	42,728	33.9
1968-----	<u>3/</u> 34,764	17,883	4,334	48,313	37.0

1/ Data do not include microprojection and photomicrographic apparatus.

2/ Data exclude similar instruments and apparatus entered under TSUS item 851.60 or 851.65.

3/ Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 2.--Compound optical, electron, proton and similar microscopes and diffraction apparatus, and frames, mountings and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Year and country	Com- pound optical micro- scopes	Electron & proton micro- scopes and dif- fraction appa- ratus	Micropro- jection and photomicro- graphic equipment	Parts and acces- sories	Total
1965:					
Canada-----:	214	104	-	171	489
Netherlands----:	-	40	-	19	59
Mexico-----:	84	-	-	-	84
United Kingdom-----:	104	93	-	49	246
France-----:	66	234	77	84	461
Chile-----:	-	-	-	-	-
Japan-----:	31	-	-	16	47
Brazil-----:	58	-	-	-	58
Austria-----:	-	-	-	-	-
All other-----:	815	281	171	269	1,535
Total-----:	1,372	752	248	608	2,980
1966:					
Canada-----:	222	154	32	215	623
Netherlands----:	45	-	-	350	395
Mexico-----:	158	75	-	48	281
United Kingdom-----:	68	63	36	47	214
France-----:	44	25	106	23	198
Chile-----:	24	-	-	-	24
Japan-----:	25	-	-	-	25
Brazil-----:	38	-	-	-	38
Austria-----:	30	-	-	-	30
All other-----:	871	210	318	250	1,649
Total-----:	1,525	527	492	933	3,477

Table continued on next page.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 2.--Compound optical, electron, proton and similar microscopes and diffraction apparatus, and frames, mountings and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68--continued

(In thousands of dollars)						
Year and country	Compound optical microscopes	Electron & proton microscopes and diffraction apparatus	Microprojection and photomicrographic equipment	Parts and accessories	Total	
1967:						
Canada-----	433	224	83	252	992	
Netherlands----	46	16	15	273	350	
Mexico-----	301	-	-	21	322	
United Kingdom-----	53	180	21	58	312	
France-----	54	18	-	21	93	
Chile-----	70	-	-	-	70	
Japan-----	59	-	-	-	59	
Brazil-----	93	-	-	-	93	
Austria-----	22	-	-	18	40	
All other-----	809	305	171	242	1,527	
Total-----	1,940	743	290	885	3,858	
1968:						
Canada-----	346	294	36	229	905	
Netherlands----	49	39	-	308	396	
Mexico-----	225	-	-	16	241	
United Kingdom-----	55	109	30	29	223	
France-----	75	81	-	54	210	
Chile-----	185	-	-	-	185	
Japan-----	157	-	-	-	157	
Brazil-----	124	13	-	14	151	
Austria-----	30	-	-	110	140	
All other-----	870	280	162	1/ 414	1,726	
Total-----	2,116	816	228	1,174	4,334	

1/ Includes exports, valued at 114 thousand dollars, to Pakistan.

Source: Compiled from official statistics of the U.S. Department of Commerce.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 3.--Compound optical microscopes: U.S. imports for consumption, by types, by principal sources, 1965-68

Year and country	Not over \$25 each	Over \$25 but not over \$50 each	Over \$50 each	With projection means	With photographic means	Total
Quantity (number)						
1965:						
West Germany--	2,026	535	283	292	2,337	5,473
Japan-----	332,540	12,441	1,693	1	2,587	349,262
Austria-----	-	-	-	1	354	355
France-----	-	-	41	-	1	42
All other-----	1,079	100	381	2	388	1,950
Total-----	335,645	13,076	2,398	296	5,667	357,082
1966:						
West Germany--	1,074	264	338	187	2,517	4,380
Japan-----	488,532	8,247	1,814	840	2,740	502,173
Austria-----	-	-	-	-	168	168
France-----	-	-	20	1	32	53
All other-----	1,676	154	260	13	190	2,293
Total-----	491,282	8,665	2,432	1,041	5,647	509,067
1967:						
West Germany--	383	2,045	343	243	2,972	5,986
Japan-----	382,186	11,530	2,278	710	4,202	400,906
Austria-----	-	-	2	11	218	231
France-----	-	-	564	1,174	-	1,738
All other-----	1,664	96	368	34	83	2,245
Total-----	384,233	13,671	3,555	2,172	7,475	411,106
1968:						
West Germany--	701	2,492	746	387	2,248	6,574
Japan-----	515,270	12,192	3,309	3,425	5,134	539,330
Austria-----	-	-	-	52	262	314
France-----	-	-	-	201	-	201
All other-----	1,685	52	277	40	163	2,217
Total-----	517,656	14,736	4,332	4,105	7,807	548,636

See footnotes at end of table, continued on next page.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 3.--Compound optical microscopes: U.S. imports for consumption, by types, by principal sources, 1965-68--Continued

Year and country	Not over \$25 each	Over \$25 but not over \$50 each	Over \$50 each	With projection means	With photographic means ^{1/}	Total
Value (1,000 dollars)						
1965:						
West Germany--	2	24	93	78	1,876	2,073
Japan-----	1,318	402	141	^{2/}	343	2,204
Austria-----	-	-	-	1	140	141
France-----	-	-	17	-	1	18
All other-----	4	4	119	3	50	180
Total-----	1,324	430	370	82	2,410	4,616
1966:						
West Germany--	6	9	68	101	3,036	3,220
Japan-----	1,875	304	192	10	489	2,870
Austria-----	-	-	-	-	137	137
France-----	-	-	3	^{2/}	6	9
All other-----	8	7	81	2	67	165
Total-----	1,889	320	344	113	3,735	6,401
1967:						
West Germany--	6	70	98	124	3,606	3,904
Japan-----	1,660	411	230	11	466	2,778
Austria-----	-	-	1	2	239	242
France-----	-	-	43	59	-	102
All other-----	5	4	103	15	99	226
Total-----	1,671	485	475	211	4,410	7,252
1968:						
West Germany--	6	60	177	87	2,852	3,202
Japan-----	2,417	427	430	16	722	4,012
Austria-----	-	-	-	51	520	571
France-----	-	-	-	9	-	9
All other-----	5	2	86	21	99	213
Total-----	2,428	509	693	184	4,193	8,007

^{1/} Data exclude imports of photographic and cinematograph cameras for microphotography (see summaries covering TSUS items 722.02-.04 and 722.10-.18).

^{2/} Less than \$500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 4.--Other microscopes, diffraction apparatus and parts: U.S. imports for consumption, by types, by principal sources, 1965-68

(In thousands of dollars)

Year and country	Equip- ment, total	Year and Country	Frames, mountings and parts for--		
			Opti- cal micro- scopes	All other equip- ment	Total
1965:		1965:			
Japan-----	340	W. Germany--	2,035	73	2,108
West Germany-----	203	Japan-----	1,506	121	1,627
Netherlands-----	182	Switzerland--	299	3	302
France-----	54	U.K.-----	104	28	132
U.K.-----	48	Netherlands--	-	78	78
Switzerland-----	3	France-----	8	-	8
All other-----	7	All other---	122	9	131
Total-----	837	Total---	4,074	312	4,386
1966:		1966:			
Japan-----	509	W. Germany--	1,912	94	2,006
U.K.-----	322	Japan-----	1,419	179	1,598
West Germany-----	283	Switzerland--	562	1	563
Netherlands-----	148	U.K.-----	168	83	251
Philippine Rep.-----	13	Austria-----	79	-	79
France-----	6	Netherlands--	-	67	67
Belgium-----	1	France-----	50	-	50
All other-----	-	All other---	4	-	4
Total-----	1,282	Total---	4,194	424	4,618

Table continued on next page.

MICROSCOPES AND DIFFRACTION APPARATUS

Table 4.--Other microscopes, diffraction apparatus and parts: U.S. imports for consumption, by types, by principal sources, 1965-68 -- continued

(In thousands of dollars)

Year and country	Equip- ment, total	Year and Country	Frames, mountings and parts for--		
			Opti- cal micro- scopes	All other equip- ment	Total
1967:		1967:			
Japan-----	1,033	W. Germany--	1,946	224	2,170
U.K.-----	641	Japan-----	1,478	216	1,694
West Germany-----	411	Switzerland-	409	3	412
Netherlands-----	336	U.K.-----	178	46	224
Switzerland-----	65	Netherlands-	-	91	91
France-----	32	Austria-----	68	-	68
All other-----	11	All other---	16	30	46
Total-----	2,529	Total---	4,095	610	4,705
1968:		1968:			
Japan-----	1,901	W. Germany--	2,592	164	2,756
West Germany-----	257	Japan-----	1,585	572	2,157
U.K.-----	1,059	Switzerland-	493	134	627
Netherlands-----	603	U.K.-----	131	224	355
Switzerland-----	-	Austria-----	111	-	111
France-----	4	Netherlands-	20	-	20
All other-----	6	All other---	9	11	20
Total-----	3,830	Total---	4,941	1,105	6,046

Source: Compiled from official statistics of the U.S. Department of Commerce.

MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS 53
 NOT SPECIALLY PROVIDED FOR

<u>Commodity</u>	<u>TSUS item</u>
Optical appliances and instruments not specially provided for:	
Hand magnifiers, magnifying glasses, loupes, thread counters, and similar articles-----	708.85
Door viewers (door eyes)-----	708.87
Other optical appliances and instruments-----	708.89
Frames and mountings, and parts thereof:	
Frames and mountings, and parts thereof for hand magnifiers and similar articles-----	708.91
Other-----	708.93

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of the optical appliances and instruments discussed in this summary amounted to about \$9 million by value in 1968, almost 15 percent of this amount represented imported merchandise; the value of exports of domestic merchandise was nearly twice the value of imported merchandise.

Description and uses

Articles discussed in this summary include optical instruments used to magnify objects--hand magnifiers, magnifying glasses, loupes (a watchmaker's eyeglass or biconvex lens mounted in a light frame that is fitted to the eye), thread counters, door viewers (an optical lens set in a door to permit through-vision), glass polygons and various other optical appliances and instruments; frames and mountings for the foregoing and parts of such frames and mountings. Simple microscopes which are comprised of a single lens set in a tubular frame are also included. Compound microscopes, which are comprised of an objective and an eyepiece, usually mounted in a sliding tube, are covered in the summary on "Compound Optical Microscopes", elsewhere in this volume. Also, photo enlargers, microscope projectors, and slide viewers are discussed in separate summaries in volume 7:3.

54 MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS
NOT SPECIALLY PROVIDED FOR

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUS-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
708.85	Hand magnifiers, magnifying glasses, loupes, thread counters, and sim- ilar articles.	25% ad val.	20% ad val.	12.5% ad val.
708.87	Door viewers (door eyes).	20% ad val.	16% ad val.	10% ad val.
708.89	Other optical ap- pliances and in- struments.	45% ad val.	36% ad val.	22.5% ad val.
708.91	Frames and mountings, and parts thereof; for magnifiers, magnifying glasses, loupes, thread counters, and simi- lar articles.	30% ad val.	24% ad val.	15% ad val.
708.93	Frames and mountings and parts thereof for the optical ap- pliances and in- struments not pro- vided for elsewhere in part 2 of this schedule or under item 708.91.	45% ad val.	36% ad val.	22.5% ad val.

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade (GATT). Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS 55
NOT SPECIALLY PROVIDED FOR

U.S. consumption

Data relating to apparent domestic consumption of the articles herein considered are not separately available; although it is believed that the value of such articles consumed in 1968 was approximately \$9 million. The consumption of all optical instruments and lenses has increased more than 5 percent per year since 1964 and the use of the articles enumerated in this summary is believed to have at least kept pace with the general upward trend of the optical industry.

U.S. producers

There are about 25 domestic firms engaged in the production of hand magnifiers, magnifying glasses, loupes, and similar articles, and frames, mountings, and parts of such articles. All of these companies are diversified and manufacture other optical instruments, and none of them devotes a major share of their production facilities to the articles under consideration.

Establishments producing these articles are located primarily in Illinois, New Jersey, New York, and Massachusetts. Two of the concerns are major producers of optical goods.

U.S. production

Although data are not available on domestic production of individual types of optical instruments covered by this summary, industry sources report that annual domestic production of hand magnifiers and magnifying glasses has declined in the last decade (1959-68) because of increasing import competition. Production of door viewers has fluctuated with the changes in construction activity. Although imports were larger in 1968 than in 1962, domestic production is still several times larger than imports. It is estimated that annual domestic production of optical appliances and instruments herein considered was valued at about \$10 million in 1968.

U.S. exports

The following tabulation, compiled from official statistics of

56 MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS
NOT SPECIALLY PROVIDED FOR

the U.S. Department of Commerce, shows U.S. exports of optical appliances and instruments, by principal sources, for the years 1964-68:

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Canada-----	236	662	553	759	1,048
West Germany-----	356	95	60	418	51
Argentina-----	10	-	-	161	-
United Kingdom-----	29	114	106	117	58
France-----	217	61	46	72	57
All other-----	806	971	935	930	1,773
Total-----	1,654	1/ 1,902	1,700	2,457	2,987

1/ Because of rounding, figures do not add to this total.

U.S. imports

The foreign value of U.S. imports of optical appliances and instruments rose from \$1.4 million in 1964 to \$1.8 million in 1968 for an average annual increase of 6.6 percent throughout the period (table 1). Japan, West Germany, Hong Kong, and the United Kingdom, in that order of importance, were the principal sources of optical appliances and instruments shipped to the United States. Of the total value of optical appliances and instruments imported in 1968, hand magnifiers, magnifying glasses, etc. (item 708.85) constituted 68 percent; door viewers (item 708.87), 14 percent; other optical appliances and instruments (item 708.89), 12 percent; and frames and mountings and parts thereof (items 708.91 and 708.93) accounted for the remainder (table 2).

MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS 57
 NOT SPECIALLY PROVIDED FOR

Table 1.--Optical appliances and instruments not provided for elsewhere; frames and mountings for such articles, and parts of such frames and mountings: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Japan-----	888	1,009	1,048	1,138	1,172
West Germany-----	117	125	144	136	137
Hong Kong-----	92	111	107	75	107
United Kingdom-----	84	40	88	60	116
France-----	51	80	121	55	109
Switzerland-----	8	2	15	9	9
All other-----	124	18	200	65	106
Total-----	1,364	1,385	1,723	1,538	1,756

Source: Compiled from official statistics of the U.S. Department of Commerce.

58 MAGNIFIERS, DOOR VIEWERS, AND OPTICAL APPLIANCES AND INSTRUMENTS
NOT SPECIALLY PROVIDED FOR

Table 2.--Optical appliances and instruments not provided for elsewhere; frames and mountings for such articles, and parts of such frames and mountings: U.S. imports for consumption, by types, 1964-68

(In thousands of dollars)

Type	1964	1965	1966	1967	1968
Hand magnifiers, magnifying glasses, loupes, thread counters, and similar articles-----	1,075	1,138	1,133	1,102	1,196
Door viewers (door eyes)-----	61	128	253	167	238
Other appliances and instruments-----	181	71	282	184	206
Frames and mountings and parts thereof-----	47	48	55	85	116
Total-----	1,364	1,385	1,723	1,538	1,756

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Medical, dental, surgical and veterinary instruments, and parts thereof:	
Optical instruments and appliances, and parts thereof-----	709.01-.05
Other-----	709.06-.27

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Imports of medical, surgical, dental, and veterinary instruments supply a minor part of total consumption. The value of annual exports has ranged from 6 to 7 times that of imports during the period 1964-68.

Description and uses

The articles considered in this summary include a wide variety of instruments and appliances used in the professional practice of medicine and dentistry for the prevention, diagnosis, and treatment of diseases and injuries and the correction of physical deformities and defects of the human body.

In addition to those instruments and appliances specially provided for, this summary includes (under the several classifications of "other") most of the instruments used by physicians and surgeons in the many and varied operations performed on the human body. Also included are various instruments and apparatus (excluding X-ray) such as proctoscopes, gastroscopes, bronchoscopes, and electrocardiogram machines, used in medical diagnosis of humans, and instruments used in veterinary practice.

Other medical appliances, excluded from this summary but discussed elsewhere in this volume, are as follows:

<u>TSUS item</u>	<u>Brief description</u>
709.40-----	Mechano-therapy appliances, etc.
709.45-----	Artificial respiration, oxygen therapy or similar apparatus, etc.
709.50-----	Hearing aids and parts thereof
709.54-.57-----	Orthopedic appliances, artificial limbs, eyes, teeth, etc.

MEDICAL, DENTAL, SURGICAL, AND VETERINARY INSTRUMENTS

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Medical, dental, surgical and veterinary in- struments and apparatus (in- cluding electro- medical apparatus and ophthalmic instruments), and parts thereof: Optical instruments and appliances, and parts thereof:			
709.01	Mirrors and reflectors-----	45% ad val.	36% ad val.	22.5% ad val.
709.03	Binocular loupes for eye exami- nations-----	25% ad val.	20% ad val.	12.5% ad val.
709.05	Other-----	50% ad val.	40% ad val.	25% ad val.
709.06	Other: Anesthetic ap- paratus and instruments (except sy- ringes), and parts thereof--	19% ad val.	15% ad val.	9.5% ad val.
709.07	Basal metabolism apparatus, and parts thereof--	22% ad val.	17.5% ad	11% ad val.

Tabulation continued on next page.

TSUS item	Commodity	Rate pursuant to conces- sions granted in 1964-67 trade conference		
		Rate as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
709.09	Bougies, catheters, drains, and sondes, and parts thereof--	12.5% ad val.	10% ad val.	6% ad val.
709.10	Percussion hammers and stethoscopes-----	19% ad val.	15% ad val.	9.5% ad val.
709.11	Sphygmomanometers, tensimeters, and oscillometers, and parts thereof-----	9% ad val.	7% ad val.	4.5% ad val.
709.13	Syringes, including hypodermic syringes, and parts thereof (except needles)-----	42.5% ad val.	34% ad val.	21% ad val.
	Electro-medical apparatus, and parts thereof:			
709.15	Electro-surgical apparatus and parts thereof-----	36% ad val.	28.5% ad val.	18% ad val.
709.17	Other-----	12% ad val.	9.5% ad val.	6% ad val.
709.19	Dental burs-----	22.5% ad val.	18% ad val.	11% ad val.

Tabulation continued on next page.

MEDICAL, DENTAL, SURGICAL, AND VETERINARY INSTRUMENTS

TSUS item	Commodity	Rate pursuant to conces- sions granted in 1964-67 trade conference		
		Rate as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Medical, dental, surgical and veterinary in- struments, etc. (con.): Needles:			
709.21	Dental hypo- dermic-----	17.5% ad val.	14% ad val.	8.5% ad val.
709.23	Other-----	32% ad val.	25.5% ad val.	16% ad val.
	Other:			
709.25	Dental instru- ments, and parts thereof-----	14% ad val.	11% ad val.	7% ad val.
709.27	Other-----	36% ad val.	28.5% ad val.	18% ad val.

The above tabulation shows the column 1 rates in effect as of December 31, 1967 and modifications therein as a result of concessions granted by the United States in the General Agreement on Tariffs and Trade concluded on June 30, 1967. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

In the period 1964-68, the value of apparent annual domestic consumption of the articles herein considered increased 50 percent, from \$258 million in 1964 to more than \$387 million in 1968 (table 1). In each of these years, domestic production supplied more than 95 percent of the value of consumption.

Several factors have stimulated and will continue the demand for medical, surgical, and dental instruments and apparatus. Among these are (1) population growth, which has resulted in increased need for medical, surgical, and dental facilities; (2) rising family income,

December 1969

7:2

which has resulted in a higher level of health care practice and expanding demand for health care services; and (3) the spread of private group insurance and government programs for health protection, including Medicare and Medicaid. This latter factor has made better health care services available to more people.

Three-fourths of the population is already covered by some form of hospitalization insurance, including Medicare and related programs. At the same time, the expanding rate of population and the national economy should sustain and probably accelerate the demand for health services.

U.S. producers

There are approximately 200 firms in the United States manufacturing medical, dental, surgical and veterinary instruments and apparatus. A substantial part of the total output of such articles is accounted for by 20 to 25 large firms. All but a few of the concerns devote a major share of their production facilities to the manufacture of the articles under consideration. The principal producing regions include New England, Middle Atlantic, East North Central, and Pacific.

One or more of the large U.S. concerns have subsidiary plants in European countries where they produce certain types of instruments for the foreign markets.

U.S. production (shipments)

Domestic production of the articles under review increased in each year during the period 1964-68; it was more than 58 percent greater in 1968 than in 1964. The estimated value of shipments rose from \$305 million in 1964 to \$483 million in 1968 (table 1). The greater share (more than 75 percent) of the total production in each year was composed of medical and surgical instruments and apparatus; dental equipment accounted for 13 to 14 percent; and the remainder was distributed among a variety of articles not separately identifiable.

U.S. exports

The value of U.S. exports of these articles, which for a number of years has been many times larger than the foreign value of imports, rose steadily from about \$55 million in 1964 to more than \$113 million in 1968 (table 1).

Many of the instruments and apparatus manufactured in the United States have a world wide reputation for excellence. A substantial

part of the exports are composed of accessories and parts for instruments that were originally produced in the United States. Shipments are made to all areas of the world; these instruments and appliances are imported into Communist-controlled countries as well as non-Communist. Canada is the largest customer; in 1968, it was the destination for more than 35 percent of the exports. Other important markets were the United Kingdom, the Netherlands, France, West Germany, Japan, and Mexico (table 2).

U.S. imports

The value of U.S. imports of medical, surgical, dental and veterinary instruments increased each year during the period 1964-68, from about \$8 million in 1964 to almost \$18 million in 1968 (table 1). The bulk of the aggregate increase was attributable to the rise in the importation of optical instruments and appliances used in medical practice, and electro medical apparatus and dental instruments including burs and needles. Notwithstanding the increase in imports, both the aggregate imports and the imports of individual items have continued to be small relative to exports and domestic output. The ratio of imports to consumption, while increasing every year, has changed very little. Annual imports have accounted for less than 5 percent of the value of domestic consumption during each year in the five-year period.

West Germany is the principal source of U.S. imports of medical, dental, surgical and veterinary instruments and appliances; in 1968, it supplied 60 percent of the imports of such articles (table 3). Japan, United Kingdom, and Switzerland are other important suppliers of these commodities.

Table 1.--Medical, dental, surgical and veterinary instruments and apparatus and parts thereof: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Shipments <u>1/</u>	Imports	Exports	Apparent con- sumption	Ratio (per- cent) of imports to consumption
1964-----	304,524	8,054	54,804	257,774	3.1
1965-----	329,246	9,380	68,728	269,898	3.5
1966-----	383,367	12,132	84,461	311,038	3.9
1967-----	431,050	15,138	100,880	345,308	4.4
1968-----	483,000	17,799	113,429	387,370	4.6

1/ Partly estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

MEDICAL, DENTAL, SURGICAL, AND VETERINARY INSTRUMENTS

Table 2.--Medical, dental, surgical and veterinary instruments and apparatus and parts thereof: U.S. exports of domestic merchandise, by export classes and by principal markets, 1968

(In thousands of dollars)

Export Schedule B number ^{1/}	Total value	Country and value
719.1955-----	6,039	Canada, 2,699; United Kingdom, 284; Philippines, 215; Turkey, 168; Mexico, 162; Peru, 161; and all other, 2,350.
726.1000-----	24,733	Canada, 5,509; France, 1,903; West Germany, 1,860; Italy, 1,231; Japan, 1,097; United Kingdom, 1,060; and all other, 12,073.
861.7110-----	2,021	Canada, 790; Japan, 129; Venezuela, 113; Sweden, 107; Korea Republic, 94; and all other, 788.
861.7120-----	8,305	Canada, 2,503; Japan, 542; Sweden, 511; West Germany, 484; Venezuela, 344; and all other, 3,921.
861.7130-----	2,027	Canada, 579; Japan, 249; Mexico, 165; Switzerland, 115; Brazil, 103; and all other, 816.
861.7140-----	12,762	Canada, 4,139; Ireland, 1,719; Japan, 713; France, 591; West Germany, 572; and all other, 5,028.
861.7150-----	56,695	Canada, 23,190; United Kingdom, 33,171; France, 2,460; Netherlands, 2,073; Japan, 1,739; Australia, 1,098; and all other, 22,818.
861.7210-----	947	Canada, 473; Venezuela, 73; United Kingdom, 62; Mexico, 48; Japan, 45; and all other, 246.
Total exports--	113,529	All markets

^{1/} Statistical classification of domestic merchandise exported from the United States.

Source: Compiled from official statistics of the U.S. Department of Commerce.

MEDICAL, DENTAL, SURGICAL, AND VETERINARY INSTRUMENTS

67

Table 3.--Medical, dental, surgical and veterinary instruments and apparatus and parts thereof: U.S. imports for consumption, by TSUS items and by principal sources, 1968

(In thousands of dollars)

TSUS item	Total value	Country and value
709.01-----	25	Ireland, 7; France, 7; and all other, 11.
709.03-----	4	West Germany, 1; and all other, 3.
709.05-----	1,579	West Germany, 677; Switzerland, 505; United Kingdom, 89; and all other, 308.
709.06-----	428	United Kingdom, 288; West Germany, 95; Australia, 35; and all other, 10.
709.07-----	18	United Kingdom, 6; Netherlands, 5; and all others, 7.
709.09-----	1,401	West Germany, 790; United Kingdom, 491; Switzerland, 19; Japan, 15; and all other, 86.
709.10-----	128	Japan, 58; West Germany, 51; Italy, 5; and all other, 14.
709.11-----	547	West Germany, 296; Japan, 215; and all other, 36.
709.13-----	309	Japan, 166; United Kingdom, 48; Italy, 40; and all other, 55.
709.15-----	190	West Germany, 142; United Kingdom, 25; and all other, 23.
709.17-----	2,629	West Germany, 1,142; United Kingdom, 511; Japan, 280; Netherlands, 255; and all other, 441.
709.19-----	994	West Germany, 685; Canada, 227; Japan, 41; Switzerland, 30; and all other, 11.
709.21-----	41	Japan, 39; and all other, 2.
709.23-----	257	Japan, 133; United Kingdom, 91; France, 9; and all other, 24.
709.25-----	4,119	West Germany, 2,836; Switzerland, 449; Japan, 376; United Kingdom, 175; Sweden, 120; and all other, 163.
709.27-----	5,130	West Germany, 3,940; Pakistan, 392; United Kingdom, 214; Sweden, 192; Italy, 162; and all other, 230.
Total imports--	17,799	All sources.

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Mechano-therapy appliances, massage apparatus, and parts thereof-----	709.40
Respiratory equipment and parts thereof-----	709.45

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Domestic production is believed to supply virtually all of United States consumption of mechano-therapy appliances, massage apparatus and respiratory equipment. U.S. exports of these articles were many times the value of imports in 1968.

Description and uses

Mechanical physical therapy appliances are used principally to treat diseases of the joints and muscles and to facilitate their strengthening and development by forced mechanical reproduction of various physical movements; such treatment is usually carried out under medical supervision. For customs purposes, appliances are considered mechano-therapeutic whether they incorporate comparatively simple mechanical devices such as springs, wheels, pulleys, adjustable counterweights, etc., which are hand-operated and perform only one function; or whether they are more complex power-operated multi-purpose devices.

Some relatively simple mechanical therapeutic appliances include apparatus for rotation exercises of the wrist or feet, for rehabilitation of the fingers, for trunk exercises, or for simultaneous flexion and extension of the knee and hip. Some of the more complex appliances include apparatus for walking exercises, consisting of a frame with supporting crutches and hand grips, resting on a series of wheels; apparatus for rehabilitation of the lower limbs, consisting of a kind of one-wheeled bicycle fixed on a frame, which can be pedalled when the patient is sitting up or lying down; and universal-type apparatus, power-operated, which by the use of interchangeable accessories, can be employed for numerous therapeutic purposes.

Apparatus for massage of parts of the body usually operate by friction or vibration; they may be hand or power-operated, or of an electro-mechanical type with a motor built into the working unit. The latter type usually includes interchangeable attachments such as brushes, sponges, or discs (flat or toothed), to permit various methods of ap-

THERAPEUTIC APPLIANCES AND RESPIRATORY EQUIPMENT

plication. Other therapeutic appliances covered by this summary include those used for aerosol, oxygen, or ozone therapy, including "iron lungs"; breathing appliances such as those used by airmen, divers, or firemen; and other respiration equipment, including mechanical devices used in artificial respiration as well as gas masks. Hereinafter in this summary the term, therapeutic appliances, will include all of the above described articles.

This summary does not cover electro-therapy apparatus, discussed under item numbers 709.01-.27 elsewhere in this volume, nor does it cover physical culture or exercising equipment designed for use in the home or in health clubs, which is discussed under item 735.20. This summary also excludes wholly stationary apparatus such as steps, ladders, or parallel bars, even if they are for use in the rehabilitation of limbs; such articles are discussed in other summaries, depending upon their component material of chief value.

U.S. tariff treatment

The column 1 rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate pursuant to concessions granted in 1964-67 trade conference		
		Rate as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
709.40	Mechano-therapy appliances and massage apparatus and parts thereof.	9.5% ad val. <u>1/</u>	<u>1/</u>	<u>1/</u>
709.45	Artificial respiration, ozone therapy, oxygen therapy, aerosol therapy or similar apparatus; breathing appliances, including gas masks and similar respirators; parts of the foregoing.	10% ad val.	8% ad val.	5% ad val.

1/ No concession was granted on this item by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade (GATT). It was, however, subjected to five annual modifications beginning October 1, 1966, with the final stage effective October 1, 1970 at the rate of 6 percent ad valorem (see Pres. Proc. 3744, September 13, 1966). The rate prior to October 1, 1966 was 12 percent ad valorem.

The above tabulation shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the GATT. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all of the staged rates).

U.S. consumption

Data relating to apparent consumption of therapeutic appliances and parts are not separately available. However, apparent consumption of all surgical, orthopedic, and prosthetic appliances and supplies has increased at about 6 percent per year since 1963; the use of therapeutic appliances is believed to have at least kept pace due to the increasingly widespread use of these therapeutic tools by the medical profession.

U.S. producers

There are more than 40 domestic firms manufacturing therapeutic appliances, most of which also produce related equipment not covered in this summary. Several of these firms are large and diverse, with therapeutic appliances constituting a minor portion of their total output. Principal producing areas are the East North Central, Middle Atlantic, and Southern States.

U.S. production

Current data on domestic production for most of the articles covered in this summary are not separately available. (Data are available in the Census of Manufactures only for the value of shipments of respiratory equipment--\$14 million in 1958 and \$30 million in 1963.) Trade sources indicate, however, that the use of therapeutic appliances has increased and that domestic production supplies nearly all of the U.S. consumption, due primarily to the special-purpose nature of most of these articles and to the technological advantages held by the domestic producers.

THERAPEUTIC APPLIANCES AND RESPIRATORY EQUIPMENT

U.S. exports

The aggregate value of U.S. exports of mechano-therapy appliances, therapeutic appliances, and respiratory equipment as compiled from official statistics, is shown below:

Commodity	Value (1,000 dollars)			
	1965	1966	1967	1968
Mechano-therapy and massage apparatus-----	772	768	876	946
Therapeutic appliances and respiratory equipment-----	6,625	7,507	10,583	9,518
Total-----	7,397	8,275	11,459	10,464

Over 50 percent of the exports of mechano-therapy appliances and massage apparatus was shipped to countries in this hemisphere in 1968 (table 1). About 33 percent of the exports of respiratory equipment also went to this group of countries (table 2). This large penetration of U.S. exports into Western Hemisphere markets resulted from the technological superiority of U.S. products coupled with a relatively high demand for therapeutic appliances in Canada, Latin and South America, countries which have been unable to generate and sustain significant indigenous productive capacity. Principal markets in 1968 for exports of mechano-therapy and massage apparatus were Canada, Venezuela, the United Kingdom, and Mexico; for exports of artificial respiration, oxygen therapy and similar equipment, the principal markets were Canada, Japan, and West Germany.

U.S. imports

The aggregate value of U.S. imports of therapeutic appliances was \$1,280,000 in 1968, almost seven times the estimated \$184,000 value of imports in 1963. Imports have been small compared to exports, which were more than eight times as large as imports in 1968.

The annual value of imports of mechano-therapy appliances and massage apparatus increased irregularly from an estimated \$215,000 in 1964 to \$797,000 in 1968 (table 3). The major share of these imports came from Japan; these were usually inexpensive massage apparatus or mechanical "one function" therapy devices. Most of the remaining imports were supplied by France and Hong Kong.

Imports of artificial respiration, oxygen therapy and similar equipment--increasing somewhat irregularly from an estimated \$477,000 in 1964 to \$483,000 in 1968-- have grown at a slower pace than that of mechano-therapy and massage apparatus (table 4). However, while the value of imports of the latter equipment in 1968 was almost equal to that of exports, the value of imports of respiration equipment in that year was only about 5 percent of the value of exports. The United Kingdom was the principal supplier in 1968 of imports of artificial respiration, oxygen therapy and similar equipment.

Although total imports of therapeutic appliances grew at almost twice the rate of exports between 1965 and 1968, they have not been a major factor in U.S. consumption because few countries produce therapeutic appliances in appreciable quantities and what is exported to the United States is generally noncompetitive in price and/or performance.

THERAPEUTIC APPLIANCES AND RESPIRATORY EQUIPMENT

Table 1.--Mechano-therapy appliances, massage apparatus, and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	250	350	368	473
Mexico-----	14	36	72	48
United Kingdom-----	51	22	69	62
Venezuela-----	37	35	51	73
Japan-----	46	20	33	45
Philippines-----	16	23	24	22
Singapore-----	-	-	22	-
Netherlands-----	-	-	18	-
France-----	-	-	17	-
West Germany-----	21	22	16	-
Belgium-----	-	16	16	-
Sweden-----	-	16	14	-
Hong Kong-----	-	14	13	12
All other-----	337	214	143	211
Total-----	772	768	876	946

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Ozone, oxygen, or aerosol therapeutic appliances and respiratory equipment, including gas masks: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	2,222	2,435	3,091	2,336
West Germany-----	232	395	1,297	513
Japan-----	490	572	679	631
United Kingdom-----	213	266	457	376
Australia-----	159	296	412	426
Netherlands-----	396	319	410	402
Mexico-----	270	433	332	409
Chile-----	196	176	290	380
France-----	179	178	251	306
New Zealand-----	18	28	234	65
Republic of South Africa-----	182	186	231	333
Italy-----	256	218	224	356
All other-----	1,812	2,005	2,675	2,985
Total-----	6,625	7,507	10,583	9,518

Source: Compiled from official statistics of the U.S. Department of Commerce.

THERAPEUTIC APPLIANCES AND RESPIRATORY EQUIPMENT

Table 3.--Mechano-therapy appliances, massage apparatus, and parts:
U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Japan-----	184	58	319	159	536
France-----	17	4	26	39	201
West Germany-----	1	3	13	32	2
United Kingdom-----	1	2	7	30	1/
Hong Kong-----	-	21	15	9	45
Netherlands-----	10	7	12	7	-
All other-----	2	2	16	9	13
Total-----	215	97	408	285	797

1/ Less than \$500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Ozone, oxygen or aerosol therapeutic appliances and respiratory equipment, including gas masks: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
United Kingdom-----	308	86	47	128	182
Sweden-----	61	138	121	100	45
West Germany-----	7	14	76	70	59
Canada-----	52	13	40	56	41
Australia-----	26	19	8	17	12
All other-----	23	11	17	65	144
Total-----	477	281	309	436	483

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Hearing aids and parts thereof-----	709.50

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Approximately 468,000 hearing aids were marketed in the United States in 1968; about 84 percent was supplied from domestic production. Exports were about half as large as imports.

Description and uses

A hearing aid is an instrument that amplifies the amount of sound energy reaching the ear of the user. Virtually all such instruments are now of the electronic type. In all electronic hearing aids, the sound energy is converted into electrical energy which is amplified and converted into sound energy. Basic components of the electronic hearing aid are: (1) the microphone, which converts the sound energy into electrical energy; (2) the amplifier (most models produced since the early 1950's for use in hearing aids employ transistors); and (3) the receiver, which converts the electrical energy back into sound energy. Every electronic hearing aid is powered by a very small battery or energy cell.

Four types of electronic hearing aids are in use today. They are (1) body, (2) eyeglass, (3) behind-the-ear, and (4) in-the-ear. The body aid can be carried in a pocket, pinned to the clothing, or worn in a special carrier, such as a tie clasp or hair barrette, and connected by a cord to the ear piece. The eyeglass unit consists of specially styled plastic eyeglass frames which house a complete hearing aid. Sounds are carried from a miniature microphone in the temple section through an almost invisible, plastic-covered wire to a receiver, usually behind the ear. Sound amplification can be designed for one or both ears. The twin aid (binaural) produces a stereophonic effect. The behind-the-ear type is a small unit which fits snugly behind the ear. The in-the-ear type, which is the most recent innovation in the market, contains all the elements of the basic aid in a miniaturized instrument; the complete instrument is inserted into the ear and part of it extends into the ear canal.

HEARING AIDS

U.S. tariff treatment

The column 1 (trade agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
709.50	Hearing aids and parts thereof.	12% ad val.	9.5% ad val.	6% ad val.

The tabulation above shows the column 1 rate of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

Estimated apparent U.S. consumption of hearing aids increased from 346,000 units in 1963 to 468,000 units in 1968--an annual average increase of 6.2 percent (table 1). The increase in consumption can be attributed principally to technological and design improvements, but also to better merchandising techniques and more professional fittings. Recent developments in transducers, miniature circuitry and energy cells have permitted the production of instruments that are less bulky and conspicuous but more powerful and reliable than heretofore possible.

Industry sources report that in 1968 there were about 11.5 million persons with some type of hearing loss in the United States; yet only 2.2 million of these persons wore hearing aids. Not all persons with a hearing deficiency are potential users of hearing aids, e.g., in instances of severe sensorineural loss, an aid is of no help. Moreover, many persons have hearing losses so slight as to not warrant the expense and bother of a hearing aid. Others do not wear an aid for reasons of vanity, inability to afford an instrument, or because of the ability to read lips.

According to the National Hearing Aid Journal, a trade publication, the share of domestic consumption supplied by each type of hearing aid, in 1959 and 1968, was as follows:

<u>Type of aid</u>	<u>Percent of total supplied in--</u>	
	<u>1959</u>	<u>1968</u>
Behind-the-ear-----	25	50
Eyeglass-----	48	26
Conventional (body)-----	27	15
In-the-ear-----	1/	9

1/ In-the-ear types were not reported separately until 1961 when they supplied about 4 percent of consumption.

The decrease in the relative importance of the conventional and eyeglass types of hearing aids and the subsequent increase in behind-the-ear and in-the-ear types reflect the impact of the above-mentioned improvements in technology and design. In particular, new ear mold impression techniques and extended range transducers (that are impervious to humidity and ear wax) have helped to increase customer appeal for in-the-ear type aids. Industry spokesmen predict that in-the-ear aids will be the largest selling type within a few years.

U.S. producers

At the present time there are probably 40 domestic producers of hearing aids in the United States, of which 15 or more produce in-the-ear aids. Although the number of domestic companies engaged in the manufacture of hearing aids has increased, an amalgamation of smaller manufacturers into larger corporate entities has occurred. Several of these firms manufacture equipment employed in diagnosing and correcting hearing defects. Some are diversified companies that make a wide range of other electronic products for civilian and military applications but, generally speaking, the producers of hearing aids restrict their activities to the manufacture and marketing of hearing aids.

Approximately 80 percent of the domestic producers are situated in the northeast and midwest sections of the United States, the remaining 20 percent are scattered throughout the far west and southern sections.

U.S. production

The volume of production of hearing aids in the United States fluctuated with no apparent trend during the period 1963-66 but showed an upward trend in 1967-68. Estimated production during that period reached a low of 347,000 units in 1965, but increased to the highest level of 432,000 units in 1968 (table 1). Data are not separately available on U.S. production of hearing aid parts.

U.S. exports

U.S. exports of hearing aids and parts showed no definite trend during the period 1963-68; they decreased in value from \$6.1 million in 1963 to \$5.5 million in 1967 and then increased to \$6.1 million in 1968 (table 2). Canada and Denmark have consistently been the principal markets for such exports. Overseas markets of secondary importance include Switzerland, West Germany, the United Kingdom, and Austria, in that order.

U.S. imports

U.S. imports of hearing aids expanded from an estimated 30,000 units in 1963 to 83,000 units in 1967 and then decreased to 74,000 units in 1968 (table 1). The ratio of imports to U.S. consumption was 8.7 percent in 1963 and 15.8 percent in 1968. From the standpoint of value, imports of hearing aids and parts more than doubled in the period discussed; they increased from a value of \$1.2 million in 1963 to \$2.9 million in 1967, but declined to \$2.5 million in 1968 (table 3). Imported hearing aids are competitive with domestically produced articles as to both quality and price. In addition, demand is enhanced for some imported hearing aids because of the producer's prestige.

Imports of complete hearing aids increased in value from \$1.0 million in 1963 to \$2.2 million in 1968. Imports of parts for hearing aids increased from \$198,000 in the earlier year to \$736,000 in 1967, but declined to \$308,000 in 1968 (table 4). The rapid increase in the value of parts imported in 1963-67 is at least partially attributable to increased imports of parts by domestic producers for use in domestically-assembled instruments.

Principal sources of imports were Denmark and West Germany (table 3). Other sources were Austria, Switzerland, the Netherlands, and the United Kingdom, in that order.

Table 1.--Hearing aids: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1963-68

(Quantity in thousands of units)

Year	: Produc- tion	: Imports	: Ex- ports	: Apparent consump- tion	: Ratio (percent) of imports to consumption
1963-----	355	<u>1/</u> 30	39	346	8.7
1964-----	385	68	42	411	16.5
1965-----	347	54	38	363	14.9
1966-----	350	69	37	382	18.1
1967-----	<u>1/</u> 400	83	34	449	18.5
1968-----	<u>1/</u> 432	74	38	468	15.8

1/ Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

HEARING AIDS

Table 2.--Hearing aids and parts thereof: U.S. exports of domestic merchandise, by principal markets, 1963-68

(In thousands of dollars)

Country	1963	1964	1965	1966	1967	1968
Canada-----	2,067	2,117	1,613	1,552	1,599	1,784
Denmark-----	950	940	996	889	933	1,097
West Germany-----	659	726	70	591	545	628
Switzerland-----	426	467	513	538	569	507
United Kingdom-----	514	710	766	561	457	456
Austria-----	345	398	400	515	275	316
All other-----	1,179	1,278	1,773	1,282	1,081	1,319
Total-----	6,140	6,636	6,131	5,928	5,459	6,107

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Hearing aids and parts thereof: Imports for consumption,
by principal sources, 1963-68

(In thousands of dollars)

Country	1963	1964	1965	1966	1967	1968
Denmark-----	290	600	554	549	610	799
West Germany-----	243	430	318	513	671	665
Austria-----	159	414	397	559	473	312
Switzerland-----	93	159	252	340	304	309
Netherlands-----	78	133	75	130	158	178
United Kingdom-----	235	334	335	349	471	41
All other-----	116	102	188	314	220	215
Total-----	1,214	2,172	2,119	2,754	1/ 2,905	2,519

1/ Because of rounding, figures do not add to this total.

Source: Compiled from official statistics of the U.S. Department of Commerce.

HEARING AIDS

Table 4.--Hearing aids and parts thereof: U.S. imports,
by types, 1963-68

(In thousands of dollars)

Type	1963	1964	1965	1966	1967	1968
Hearing aids-----	1,016	1,714	1,586	2,221	2,169	2,211
Parts of hearing aids-----	198	458	533	533	736	308
Total-----	1,214	2,172	2,119	2,754	2,905	2,519

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Artificial teeth and dentures wholly or almost wholly of plastics-----	709.54
Other artificial teeth and dentures-----	709.55
Bone and joint prostheses, bone plates, screws, and nails, and other internal fixation devices and appliances-----	709.56
Other orthopedic appliances, prostheses and related articles-----	709.57

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of orthopedic appliances, prostheses, and related equipment was valued at over \$82 million in 1968. Exports, although accounting for only a small part of domestic production, were more than four times the value of imports.

Description and uses

This summary includes a variety of orthopedic and fracture appliances and prosthetic articles used in the professional practice of medicine and dentistry. Many types of these articles are required to be custom made or fitted. Three groups of items are covered: (1) orthopedic appliances, surgical belts, trusses and the like; (2) artificial limbs, eyes, teeth, and other artificial parts of the body; and (3) splints and other fracture appliances. The first group of appliances is employed to prevent or correct deformities of the body. It covers orthopedic appliances for animals as well as for humans, but it excludes protective devices such as saddle blankets, shin pads for horses (see item 790.30 in summaries volume 7:1), and football safety equipment (see item 734.72 in summaries volume 7:4). The second group includes artificial parts used to replace defective parts of the body. Such replacement parts usually resemble the real ones in appearance. The third group covers items employed to immobilize injured parts of the body or for setting fractures. It includes plates, nails, and other materials inserted inside the body to hold together two parts of a broken bone or for similar treatment of fractures. Appliances which form inseparable parts of hospital beds (see item 727.04 in summaries volume 7:5) are excluded.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the Tariff Schedules of the United States Annotated (1969)) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Orthopedic appli- ances, surgical belts, trusses, and similar articles; arti- ficial limbs, eyes, teeth, and other pros- thetic articles; splints and other fracture appliances:			
709.54	Artificial teeth and dentures wholly or almost wholly of plastics-----	10% ad val.	8% ad val.	5% ad val.
709.55	Other artificial teeth and dentures-----	45% ad val.	36% ad val.	22.5% ad val.
709.56	Bone and joint prostheses, bone plates, screws, nails, and other inter- nal fixation devices and appliances-----	36% ad val.	28.5% ad val.	18% ad val.
709.57	Other-----	20% ad val.	16% ad val.	10% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see the appendix A in this volume for all the staged rates).

U.S. consumption

Apparent consumption of orthopedic appliances and prostheses and related articles increased from a value of \$76.5 million in 1965 to \$82.6 million in 1968 (table 1). Data on apparent consumption are not available for years prior to 1965 because export data are not comparable to the data for years 1965-68. Nearly all of the consumption is supplied by domestic production.

The expansion in domestic consumption of these articles reflects, to a large extent, advances made in recent years in developing new and better appliances and related articles, and improved techniques for treating injuries, replacing the loss of eyes, limbs, teeth, etc., and preventing and correcting deformities. Data on the portion of consumption supplied by the various types of orthopedic appliances and related equipment are not available, but in terms of value, artificial teeth probably account for the largest share; orthopedic appliances--surgical belts and trusses, the second largest; and bone and joint prostheses, bone plates, screws and nails, the remainder.

U.S. producers

There are probably 60 concerns, mostly small firms, manufacturing orthopedic appliances and prosthetic articles. Most of these companies devote a major portion of their facilities to the production of these items. Orthopedic and prosthetic appliance manufacturing establishments are concentrated in the Middle Atlantic and East North Central States.

U.S. production

Production of orthopedic appliances and prosthetic articles rose in an irregular pattern from an estimated value of \$79 million in 1964 to about \$88.5 million in 1968 (table 1). The average annual rate of increase during the 1964-68 period was approximately 2.9 percent.

Exports

Exports of orthopedic appliances, surgical belts, trusses, and similar articles; artificial limbs, eyes, teeth, and other prosthetic articles; and splints and other fracture appliances increased from a value of \$5.5 million in 1965 to \$7.7 million in 1968, when exports accounted for almost 9 percent of the value of domestic production (table 1). Canada was the principal export market for these articles, followed by several European countries and Japan (table 2). Comparable data for exports in the years prior to 1965 are not available.

U.S. imports

Imports of orthopedic appliances and prosthetic articles, which supplied about 2 percent of consumption in 1968, gradually increased in value from \$0.8 million in 1964 to \$1.8 million in 1968 (table 3). The requirement that many types of these articles be custom made or fitted tends to limit imports to a considerable extent. The principal sources, in order of importance, of imports of orthopedic appliances and similar items are West Germany, Trinidad, Switzerland, and Italy (table 3). In 1968, artificial teeth and dentures accounted for about 65 percent of the imports by value; surgical belts, trusses, and other orthopedic appliances, about 28 percent; and bone and joint prostheses, bone plates, screws, and nails, the remainder (table 4).

Table 1.--Orthopedic appliances, prostheses, and similar articles:
 U.S. production, imports for consumption, exports of domestic
 merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Produc- tion <u>1/</u>	Imports	Exports	Apparent con- sumption	Ratio (percent) of imports to con- sumption
1964-----	79,000	845	<u>2/</u>	<u>2/</u>	<u>2/</u>
1965-----	81,000	1,015	5,513	76,502	1.3
1966-----	84,000	1,285	6,102	79,183	1.6
1967-----	86,000	1,473	6,923	80,550	1.8
1968-----	88,500	1,810	7,735	82,575	2.2

1/ Estimated.
2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Orthopedic appliances, prostheses, and similar articles:
U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	1,658	1,934	2,143	2,419
United Kingdom-----	298	446	516	469
Belgium-----	159	98	366	224
France-----	327	259	360	467
Japan-----	212	285	340	397
West Germany-----	353	217	269	237
Australia-----	282	246	235	242
Mexico-----	311	351	231	379
Venezuela-----	223	275	224	289
Switzerland-----	115	140	221	268
All other-----	1,575	1,851	2,018	2,344
Total-----	5,513	6,102	6,923	7,735

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Orthopedic appliances, prostheses, and similar articles:
U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
West Germany-----	261	300	425	505	474
Trinidad-----	158	209	236	273	305
Switzerland-----	178	180	251	266	270
Italy-----	83	96	124	120	264
Israel-----	27	10	30	118	113
Sweden-----	53	93	80	50	36
Colombia-----	37	24	60	37	72
Japan-----	27	19	37	30	49
France-----	-	2	3	22	35
United Kingdom-----	3	38	6	14	55
All other-----	18	44	36	38	137
Total-----	845	1,015	1,285	1,473	1,810

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Orthopedic appliances, prostheses, and similar articles:
U.S. imports for consumption, by types, 1964-68

(In thousands of dollars)

Type	1964	1965	1966	1967	1968
Plastic artificial teeth and dentures-----	358	471	507	519	783
Other artificial teeth and dentures-----	270	255	314	363	396
Bone and joint prostheses, bone plates, screws and nails-----	25	11	93	96	123
Other orthopedic appliances, surgical belts, trusses, and similar articles-----	192	278	371	496	508
Total-----	845	1,015	1,285	1,473	1,810

Source: Compiled from official statistics of the U.S. Department of Commerce.

CommodityTSUS
item

X-ray apparatus and parts thereof----- 709.61, -.66

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of X-ray equipment and similar apparatus and parts was valued at more than \$177 million in 1968; about 88 percent of such use was supplied from domestic production. In that year imports exceeded exports by more than \$3 million.

Description and uses

This summary deals with apparatus and specialty equipment based on the use of X-rays or the radiations from radioactive substances, and parts thereof (X-ray film is not included in this summary but is treated in Volume 7:3; radioactive substances are covered in Volume 4:1 and other chemical summary volumes). The articles discussed in this summary have numerous applications in medicine, in industry, and in scientific research.

Equipment involving the use of X-rays usually has a fundamental element containing an X-ray generating tube or tubes, a pedestal or support which permits directing and lowering and raising the mechanism, and a special assembly of transformers and rectifiers which supply the voltage needed to operate the equipment. The three major types of X-ray apparatus are for use as follows: (1) medical or dental diagnosis, (2) medical radio-therapy, and (3) in industry.

Apparatus based on the use of radiations from radioactive substances is interchangeable in application with X-ray equipment, except in the fields of medical and dental diagnosis where it is only partially interchangeable. Such equipment includes therapy apparatus, which employs radioactive cobalt, radium or some other radioactive isotope. Cobalt 60 isotope units, first used in Canada almost two decades ago, are now frequently used in the treatment of certain types of cancer. Also included in this summary are beta and gamma ray thickness gauges (used in industry) and the equipment for analyzing the composition of metal objects.

X-RAY APPARATUS

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Apparatus based on the use of X-rays or of the radia- tions from ra- dioactive sub- stances, whether for medical, in- dustrial, or other uses, and parts thereof:			
	X-ray apparatus and parts thereof:			
709.61	X-ray tubes, and parts of tubes.	6.5% ad val.	5% ad val.	3% ad val.
709.63	Other-----	5.5% ad val.	4% ad val.	2.5% ad val.
709.66	Apparatus based on the use of the radiations from radioactive sub- stances, and parts thereof.	12% ad val.	9.5% ad val.	6% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

U.S. consumption of X-ray apparatus and related equipment increased in value each year during the period 1964-68--from about \$110 million in 1964 to more than \$177 million in 1968 (table 1). For several years prior to 1958, the value of consumption of medical X-ray apparatus is reported to have expanded at the rate of 7 to 10 percent annually; however, largely because of the development of the image intensifier used in fluoroscopy ^{1/}, the annual rate of growth averaged about 17 percent during the period 1958-68. It is understood that the pent up demand for the image intensifier had been largely satisfied by the end of 1968 and the annual rate of growth in consumption for subsequent years will probably be nearer the pre-1958 level.

Other factors which have affected the level of consumption of medical X-ray apparatus include population increases, expanding health insurance coverage, and the resulting expansion in hospital and medical facilities; developments in diagnostic and radio-therapy techniques, which have reduced radiation hazards, have also been a factor. Moreover, the above factors have contributed to the increased use of existing X-ray apparatus, necessitating more repairs with resultant increased demand for replacement parts. The development of the Penarex X-ray apparatus--a dental machine which rotates around the patient and photographs all teeth and other parts of the jaw on one film, as opposed to the conventional apparatus which can X-ray only a few teeth at a time--has stimulated sales of dental X-ray apparatus.

Prices for X-ray apparatus vary considerably between types. Standard X-ray units for medical purposes ordinarily sell at from \$15,000 to \$20,000. Standard dental X-ray machines range in price from \$1,700 to \$1,800. The Penarex machines retail for about \$6,000 per unit.

It is estimated that in 1968 there were 211,000 X-ray machines and apparatus (based on the process of radiations from radioactive substances) in use in the United States. Of these, 112,000 were diagnostic medical X-ray units and 99,000 were dental X-ray units. In addition, there were less than 1,000 medical therapy units that produce and control X-rays and other radiations, and approximately the same number of such units employed in industry and scientific research.

^{1/} Fluoroscopy is the direct viewing of organs and tissues of the body by projecting the X-rays upon a fluorescent screen. This is an alternate method to that of photographing various organs and tissues.

U.S. producers

There are approximately 114 domestic producers of X-ray apparatus, including tubes and other specialties. Of these, three producers account for well over half of the domestic production. Several of the leaders in the X-ray field are highly diversified companies that produce items ranging from electrical appliances to missile systems.

The domestic producers of X-ray equipment are generally considered assemblers rather than manufacturers. They receive the major components--generators, tubes, tube housings, photo electric timers, tables, and hangers--and assemble them into complete X-ray units. Some parts and components are manufactured in the assembling establishment, others are purchased from affiliates or sub-contractors.

Most of the X-ray tubes used in medical apparatus are made by four companies (one of which also makes X-ray apparatus, tables, etc.). Approximately half of the tubes produced in the United States are employed as replacement items in existing X-ray apparatus. All X-ray apparatus manufacturers produce image intensifier systems but none of the manufacturers produce image intensifier tubes. Only two domestic suppliers make these tubes and they are heavily engaged in the production of light amplifiers for night vision equipment employed by the military forces.

U.S. production

Production of X-ray and similar apparatus increased steadily from an annual value of more than \$117 million in 1964 to an estimated \$174 million in 1968 (table 1)--an annual average rate of growth of 8.3 percent. While much of this growth resulted from increased demand for X-ray installations (as discussed in the section on U.S. consumption), it also came from such technological developments as the image intensifier units and remote control X-ray apparatus, the types which permit examination of the patient by a radiologist from an adjoining room.

Data are not available on the production of X-ray and similar apparatus by types nor by values of replacement or repair parts.

U.S. exports

Exports of X-ray and similar apparatus were equivalent to about 11 percent of total domestic production in 1968; they increased from a value of about \$14 million in 1964 to almost \$19 million in 1968.

Exports were generally comprised of standard X-ray apparatus; in contrast, imported articles included more sophisticated specialty equipment.

Canada, which in 1968 accounted for about 42 percent of total U.S. export sales of X-ray and related apparatus, has consistently been the principal market for such equipment (table 2). The bulk of the equipment and parts shipped to West Germany in 1968 was destined for U.S. government installations. Economic aid was also a factor in the purchase of X-ray apparatus in the United States by some of the lesser developed countries.

U.S. imports

Imports, which in 1968 supplied more than 12 percent of the value of total U.S. consumption of X-ray and similar equipment, increased steadily from a value of \$7.3 million in 1964 to over \$22 million in 1968 (table 1). Most of this increase was attributable to the importation of X-ray apparatus; imports of X-ray tubes increased to a much lesser extent (table 3).

In addition to a number of small importers, three large concerns import and distribute X-ray equipment and repair parts as one of their principal lines of business. Domestic producers also utilize foreign-made components and parts in X-ray apparatus assembled in the United States.

The increase in the share of U.S. consumption supplied by imports (from 6.6 percent in 1964 to 12.4 percent in 1968) may be attributed to several factors--a principal one is the procurement of special types of apparatus from overseas. Traditionally, European doctors have employed much highly technical special-purpose X-ray equipment and the European manufacturers have worked closely with them to develop such equipment. Areas where European manufacturers have made special contributions in the X-ray equipment field include laminography, layer X-ray, angiography, circulatory X-ray, and body section radiography. Much of the demand for this highly specialized equipment has been supplied by imports. U.S. manufacturers and importers also import standard, less costly apparatus whenever such a procedure provides competitive advantage. Some mobile X-ray equipment comes from Japan, and certain closed circuit TV camera equipment, used in connection with X-ray rooms, is imported from Germany. Also, a substantial percentage of image intensifier tubes is supplied by imports.

X-RAY APPARATUS

The value of imports of apparatus based on the use of radiations from radioactive substances and parts thereof has increased about 80 percent since 1964, but this trade still approximated only three-quarters of a million dollars in 1968 (table 3).

The relative importance of major overseas sources of X-ray apparatus and related equipment remained almost unchanged between 1964 and 1968. In the last reporting year, West Germany was the principal supplier, followed by the Netherlands, France, Sweden, and Canada, in that order (table 4).

Table 1.--X-ray apparatus and related equipment and parts thereof:
U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Production	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
1964-----	117,262	7,276	14,302	110,236	6.6
1965-----	121,410	10,134	14,152	117,392	8.6
1966-----	155,642	12,987	16,668	151,961	8.5
1967-----	163,484	17,067	18,477	162,074	10.5
1968-----	<u>1/</u> 174,177	22,078	18,807	177,448	12.4

1/ Estimated value reported in Surgical Business magazine, annual issue, January 1968.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

X-RAY APPARATUS

Table 2.--X-ray apparatus and related equipment and parts thereof:
U.S. exports of domestic merchandise, by principal markets, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Canada-----	4,528	5,549	5,756	7,743	7,818
Japan-----	631	686	856	1,005	1,515
West Germany-----	513	523	1,053	633	883
Mexico-----	410	329	500	389	826
France-----	279	694	500	485	614
United Kingdom-----	323	421	703	695	499
All other-----	6,368	5,950	7,300	7,527	6,652
Total-----	13,052	14,152	16,668	18,477	18,807

Source: Compiled from official statistics of the U.S. Department of Commerce.

X-RAY APPARATUS

103

Table 3.--X-ray apparatus and related equipment and parts thereof:
U.S. imports for consumption, by types, 1964-68

(In thousands of dollars)

Type	1964	1965	1966	1967	1968
X-ray apparatus and parts thereof-----	6,060	9,101	11,301	14,898	19,455
X-ray tubes and parts thereof-----	786	757	1,294	1,644	1,853
Apparatus based on the use of radiations from radioactive substances, and parts thereof-----	430	276	392	525	770
Total-----	7,276	10,134	12,987	17,067	22,078

Source: Compiled from official statistics of the U.S. Department of Commerce.

X-RAY APPARATUS

Table 4.--X-ray apparatus and related equipment and parts thereof:
U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
West Germany-----	2,889	4,193	5,214	6,930	9,347
Netherlands-----	1,197	1,829	2,650	2,953	3,753
France-----	814	1,560	1,759	1,818	3,121
Sweden-----	848	1,102	988	1,793	1,079
Canada-----	472	305	426	1,287	1,367
Japan-----	187	183	296	529	-
Switzerland-----	187	81	345	341	-
All other-----	682	881	1,309	1,416	3,411
Total-----	7,276	10,134	12,987	17,067	22,078

Source: Compiled from official statistics of the U.S. Department of Commerce.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

105

<u>Commodity</u>	<u>TSUS item</u>
Surveying and hydrographic instruments	710.04
and parts-----	710.08(pt.)-.12, 710.40-.42
Drawing, marking-out, and mathematical calculating instruments and parts----	710.60-.63, 710.76-.78, 710.80(pt.)

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

The greater part of U.S. consumption of all the articles considered in this summary is supplied from domestic production. Exports, although smaller than imports, have been significant compared with production.

Description and uses

Surveying and hydrographic instruments included in this summary are those intended for use, for example, in cartography (both land and hydrographic), in the preparation of plans, in triangulation measurements, in calculating the area of a piece of land, and in similar measurements for construction, mining, military operations, and other purposes. The instruments include theodolites, for measuring horizontal and vertical angles; levels, for determining the difference in height between two points; plane-tables, drawing boards mounted on tripods so that the board can be rotated around a vertical axis and leveled; alidades which give the direction of objects from a plane-table station; surveying compasses and rangefinders; tacheometers (tachymeters), which measure distance from any given point by telescopic observation of a staff held at that point; land chains; pickets or ranging poles; and levelling staves.

The term surveying instruments also includes photogrammetrical instruments. These are special optical surveying instruments used chiefly for plotting topographic and other maps, but also for other purposes such as in the study of tides or ground swells. The maps are usually plotted from photographs taken from two different viewpoints with known bearings to accurately determine the shape, size, and coordinates of the area photographed. These instruments include apparatus consisting of a projector, a negative carrier, an objective and a projection table which enable the scale of the photograph to be

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

changed; stereo-plotting apparatus (such as stereocomparators, stereo-planigraphs and stereotopographs) used to plot the planigraphic details and contour lines constituting a map; and coordinatographs of the type used with stereo-plotting apparatus to support the map under preparation. Aerial survey photographic cameras, not included here, are covered in another summary for items 722.10-.18.

Drawing instruments included in this summary are those such as pantographs and eidographs (for tracing and reproducing maps, plans, and drawings to a given scale), T squares, adjustable squares and set squares, drawing compasses, dividers, drawing pens, drafting machines, and other drawing, and drafting instruments. Measuring rules of all kinds, not included here, are covered in another summary for items 710.67-.72. Marking-out instruments, i.e., instruments for marking construction or other lines on the surface of a part to be machined, sawn, etc., include beam compasses, scribes, punches, straight-edges, squares and other instruments. Mathematical calculating instruments covered by this summary include slide rules, disc calculators, cylindrical calculators, pocket type adding and subtracting devices, and other calculating instruments. Drawing and mathematical calculating instruments are widely used in the United States in connection with engineering and drafting activities. Calculating and accounting machines, not included here, are covered in the summary for items 676.15-.25.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
710.04	Surveying and hydro- graphic instruments; drawing, marking-out and mathematical calculating instru- ments; and parts of the foregoing arti- cles: Photogrammetrical in- struments and parts.	28% ad val.	22% ad val.	14% ad val.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

107

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
710.08 (pt.)	Other optical instru- ments and parts ex- cept rangefinders (but including sur- veying rangefinders).	28% ad val.	22% ad val.	14% ad val.
710.12	Surveying compasses and parts. Other surveying and hydrographic in- struments and parts:	28% ad val.	22% ad val.	14% ad val.
710.40	Not of metal-----	16-2/3% ad val.	13% ad val.	8% ad val.
710.42	Of metal----- Disc calculators, slide rules, and other mathematical cal- culating instru- ments, all the fore- going and parts thereof:	28% ad val.	22% ad val.	14% ad val.
710.60	Not of metal-----	13.5% ad val.	10.5% ad val.	6.5% ad val.
710.61	Of metal-----	22% ad val.	17.5% ad val.	11% ad val.
710.63	Protractors and parts---	22% ad val.	17.5% ad val.	11% ad val.
710.76	Lettering pens (includ- ing fountain type), used by draftsmen, and parts.	20% ad val.	16% ad val.	10% ad val.
710.78	Hand styluses-----	11.25% ad val.	9% ad val.	5.5% ad val.
710.80 (pt.)	Other drafting and drawing instruments and apparatus.	15% ad val.	12% ad val.	7.5% ad val.

December 1969

7:2

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

The value of domestic consumption of the instruments and parts discussed herein increased from \$31 million in 1964 to \$43 million in 1968 (table 1). Surveying instruments (including photogrammetrical instruments) comprise by far the greater part of consumption; drawing, marking-out, and mathematical calculating instruments account for a relatively small share of domestic use.

The increase in consumption reflects a higher level of engineering and construction activity and more extensive technical education in high schools, trade schools, and colleges. Most of the sales of drawing and mathematical calculating instruments are made to students for whom price is an important consideration, with the remainder going to engineers, scientists, and draftsmen. Demand for this class of instruments is mainly responsive to the number of students enrolled in technical education courses.

Considering other factors, most surveying instruments are high precision optical instruments and are costly to produce. Hence, the quality of the product is, in most cases, a much more important factor than relative price. Demand for surveying instruments varies directly with construction activity.

U.S. producers

More than 50 domestic firms produce as their principal products the instruments and parts discussed in this summary. At least 25 firms produce marking devices, 10 produce photogrammetrical instruments, 12 to 15 make other surveying instruments, and about three firms produce drawing and mathematical calculating instruments.

Many producers also import and distribute some instruments complementary to their production and manufacture other articles such as industrial process instruments, and aircraft and navigational instruments. Certain firms, that manufacture widely differing articles, produce some of the articles herein considered, such as lettering pens for draftsmen and markers, only secondarily. Several firms either have subsidiaries abroad, or are subsidiaries of foreign-owned companies.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

Most of the 50 producers have fewer than 20 employees working directly on the instruments considered here; however, the great bulk of production is manufactured by a few large producers. These firms are located chiefly in the Middle Atlantic, North Central, and New England regions.

U.S. production

The annual value of manufacturers' shipments--including surveying, hydrographic, drawing, marking-out and mathematical calculating instruments, machines, and parts--increased from an estimated \$25 million in 1964 to an estimated \$37 million in 1968, an increase of over 48 percent (table 1). Shipments of surveying instruments and parts (other than photogrammetrical instruments) probably accounted for about 65 percent of the 1968 total; drawing, marking-out, and mathematical calculating instruments for 20 percent; and photogrammetrical instruments and parts for about 15 percent.

U.S. exports

The value of U.S. exports of the instruments and parts discussed in this summary increased steadily from about \$4 million in 1964 to nearly \$5 million in 1968 (table 1). Exports, although smaller than imports, averaged about 14 percent of the value of production during the years 1964-68.

Exports of these instruments and parts during 1965-68, by end-use groups, were as follows (in thousands of dollars):

End-use	1965	1966	1967	1968
Drawing, drafting, marking-out, and mathematical calculating instru- ments-----	2,365	3,105	2,911	2,764
Surveying instruments-----	1,674	1,439	1,706	2,013
Total-----	4,039	4,544	4,617	4,777

Source: Compiled from official statistics of the U.S. Department of Commerce.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

Domestically produced articles generally cannot compete pricewise in third markets with corresponding instruments produced in European or Asian countries. However, some producers of American surveying instruments of the highest precision and accuracy differentiate their products by application of special designs as, for example, the use of verniers etched in silver or aluminum on domestically produced theodolites rather than the optical verniers provided on most foreign made theodolites and thereby obtain foreign sales. Similarly, drawing and mathematical calculating instruments, produced in a great variety of styles, shapes and patterns, are, in many cases, sufficiently different to gain consumer preference. Principal export markets in 1968 for the articles discussed here were Canada, Mexico, Japan, the United Kingdom, and Venezuela (table 2).

U.S. imports

U.S. imports of the instruments and parts covered by this summary were valued at an estimated \$9.5 million in 1964 and increased irregularly to \$10.0 million in 1968 for an average annual rate of growth of only 1.5 percent (table 1). However, imports accounted for 24 percent of domestic consumption in 1968, and were equal to 27 percent of U.S. production. Since both imports and exports have been growing at a rate slower than domestic production in recent years, the ratio of imports to consumption has been declining.

Some instruments imported under item 710.08 "other optical instruments" have applications other than as surveying instruments. It is believed, however, that imports thereunder are predominantly surveying instruments such as theodolites, transits, clinometers and surveying rangefinders. Therefore, all import data for item 710.08 are included in this summary.

Imports of articles classified in item 710.80 "other" were separated into three subcategories, effective January 1966, for statistical purposes (see the TSUSA-1969). This permits inclusion in this summary of separate import data for drafting and drawing machines, instruments, and apparatus.

Imports have been almost equally composed of surveying and hydrographic instruments and parts, and drawing, drafting, marking-out, and mathematical calculating instruments, machines, and parts (table 3). Imports of optical surveying instruments (including photogrammetrical instruments) made up most of the imports of surveying instruments in 1968; imports of drawing and drafting machines, instruments and apparatus were a major part of imports of the latter class. Many of the imported articles supplement domestic production rather than compete directly; some imports originate in foreign subsidiaries of U.S. firms.

In recent years, West Germany has accounted for a substantial part of the U.S. imports of the instruments and parts considered herein (table 4). Switzerland, Japan, and Italy accounted for most of the remainder. In 1968, nearly half of the imports of surveying instruments and parts was supplied by Switzerland, while more than half of the imports of drawing and mathematical calculating instruments and parts was supplied by West Germany.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

Table 1.--Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments, and parts thereof: U.S. shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Ship- ments ^{1/}	Imports	Exports	Apparent con- sumption	Ratio (percent) of imports to consumption
1964-----	25,200	^{1/} 9,473	^{1/} 4,000	30,673	31
1965-----	27,900	^{1/} 9,235	4,039	33,096	28
1966-----	29,900	9,996	4,544	35,352	28
1967-----	35,500	10,432	4,617	41,315	25
1968-----	37,300	10,042	4,777	42,565	24

^{1/} Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

113

Table 2.--Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments, and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	1,518	1,427	1,522	1,399
Mexico-----	192	371	274	340
Japan-----	35	40	214	321
United Kingdom-----	175	391	276	282
Venezuela-----	124	119	149	234
West Germany-----	107	91	124	177
France-----	51	70	40	170
Switzerland-----	37	68	59	166
Brazil-----	18	60	106	132
Republic of Korea-----	90	98	29	119
Chile-----	17	63	67	100
Australia-----	86	179	289	92
Thailand-----	56	66	106	91
Spain-----	150	110	64	61
Netherlands-----	76	225	51	31
All other-----	1,307	1,166	1,247	1,062
Total-----	4,039	4,544	4,617	4,777

Source: Compiled from official statistics of the U.S. Department of Commerce.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

Table 3.--Surveying, hydrographic, drawing, marking-out, and
mathematical calculating instruments and parts thereof:
U.S. imports for consumption, by types and TSUS items,
1965-68

(In thousands of dollars)

Type and TSUS item	1965	1966	1967	1968
Surveying and hydrographic instruments and parts:				
Optical (other than photogrammetrical) (710.08) ^{1/} -----	1,042	1,511	2,699	3,015
Photogrammetrical (710.04)-----	1,264	845	1,061	1,178
Miscellaneous surveying and hydrographic (710.40-.42)-----	2,945	2,135	1,605	576
Surveying compasses (710.12)-----	74	49	46	150
Total-----	5,325	4,540	5,411	4,919
Drawing, marking-out, and mathematical calculating instruments, drafting machines, and parts:				
Drawing and drafting (710.80(pt.))----- ^{2/}	1,845	2,982	3,125	2,827
Mathematical calculating (710.60-.61)-----	1,188	1,466	1,147	1,342
Lettering pens (710.76)-----	785	926	660	852
Protractors (710.63)-----	74	74	74	101
Hand styluses (710.78)-----	18	8	15	1
Total-----	3,910	5,456	5,021	5,123

^{1/} Includes an insignificant amount of instruments other than surveying and hydrographic instruments.

^{2/} Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

SURVEYING, HYDROGRAPHIC, DRAWING, MARKING-OUT, AND
MATHEMATICAL CALCULATING INSTRUMENTS

115

Table 4.--Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
West Germany-----	2,981	4,506	3,934	3,725
Switzerland-----	2,762	2,563	3,258	2,432
Japan-----	1,281	1,596	1,701	2,131
Italy-----	1,171	367	519	770
United Kingdom-----	623	391	388	396
Canada-----	134	276	230	203
Denmark-----	79	134	111	124
Hong Kong-----	20	18	14	34
All other-----	184	145	277	227
Total-----	9,235	9,996	10,432	10,042

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Rangefinders (except surveying rangefinders), rules, balancing machines, non-optical measuring or checking instruments, apparatus, and machines not provided for elsewhere in the TSUS: and parts of the foregoing-----	710.06, 710.08(pt.), 710.67-.72, 710.80(pt.)

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Most of the U.S. consumption of the articles and parts considered in this summary is believed to have been supplied from domestic production. U.S. exports have been larger than imports.

Description and uses

This summary includes rangefinders (and parts), i.e., instruments for measuring distances by optical means; they are used chiefly by the armed forces. Not included here are surveying rangefinders (see summary covering surveying instruments elsewhere in this volume) and rangefinders designed for use with photographic cameras (see summary covering item 722.78 in volume 7:3).

Folding rules and other rules (and parts thereof) covered by this summary include school rulers, architects', engineers' and ordnance rules and divided scales, V-shaped rules for measuring the diameter of convex bodies, and vertical measuring apparatus with movable crosshead. Slide rules, however, are considered mathematical calculating instruments, and are discussed in another summary in this volume covering items 710.60 and 710.61.

This summary covers balancing machines and parts, including dynamic and static types, for balancing armatures, rotors, crank-shafts, wheels, propeller shafts, connecting rods, and other articles. In dynamic balancing machines the article to be balanced is rotated and the imbalance is measured mechanically, with, for example, the tracing of diagrams on a recording plate; static balancing machines operate on the tilting principle, the article does not rotate, and the degree of imbalance is measured on scales or dials. Balancing machines which indicate imbalance electrically, such as those in which vibrations due to imbalance are detected by a special sensitive element and

RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL
MEASURING OR CHECKING INSTRUMENTS

amplified, are excluded here and covered by another summary in this volume dealing with items 712.05 through 712.51.

This summary also covers numerous other non-optical measuring or checking instruments, apparatus, and machines (and parts thereof) that are not specially provided for elsewhere in the TSUS. These include, for example, test benches for internal combustion engines, motor vehicle brakes, pumps, and other articles provided the test benches do not incorporate electrical means of measurement; planimeters for measuring the area of a plane surface (such as on plans, diagrams, skins, or hides) and integrators, analyzers and other instruments utilizing the planimetric principle to measure other factors (such as volume, etc.); head contour measurers which are used by hatters; sine bars, hardened steel bars used in setting out and checking angles to close limits; bubble levels and block levels (but excluding surveying levels); map measurers used for measuring distances on maps or plans; spherometers, used to measure the curvature of spherical surfaces such as lenses or mirrors; opticians' centering machines for determining and marking the axis and center of a lens; mechanical vibration detection and recording apparatus used on machines, bridges, dams, etc.; gear testing machines, for testing profile forms, pitch diameters, tooth spacing, and rolling contact; and many other non-optical measuring or checking instruments, apparatus, and machines.

All of the foregoing instruments, apparatus and machines, particularly the non-optical measuring or checking types, are provided for elsewhere in the TSUS if electrical, the essential tests being, alternatively: (1) measuring or checking of electrical quantities, (2) measuring or detecting alpha, beta, gamma, x-ray, cosmic, or similar radiations, or (3) operation which depends on an electrical phenomenon which varies according to the factor to be ascertained (see headnotes 1 and 2 of subpart D, part 2, schedule 7, of the TSUSA-1969). Instruments, apparatus, or machines meeting any one of the above tests are covered in the summary for items 712.05 to 712.51, also included in this volume.

RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL MEASURING OR CHECKING INSTRUMENTS 119

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate pursuant to concessions granted in 1964-67 trade conference		
		Rate as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Rangefinders (except surveying rangefinders); rules; balancing machines; and non-optical measuring or checking instruments, apparatus, and machines not specially provided for; and parts of the foregoing articles:			
710.06	Optical rangefinders (except surveying rangefinders).	45% ad val.	36% ad val.	22.5% ad val.
710.08	Other optical instruments and parts.	28% ad val.	22% ad val.	14% ad val.
710.67	Aluminum folding rules and parts.	26% ad val.	20.5% ad val.	13% ad val.
710.68	Wooden folding rules and parts.	24% ad val.	19% ad val.	12% ad val.
710.70	Other folding rules and parts.	20% ad val.	16% ad val.	10% ad val.
710.72	Other rules-----	17.5% ad val.	14% ad val.	8.5% ad val.
710.80	Balancing machines and other non-optical measuring or checking instruments, apparatus, machines, and parts.	15% ad val.	12% ad val.	7.5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all of the staged rates).

U.S. consumption

In 1968, most of U.S. consumption of the articles covered by this summary is believed to have been supplied from domestic production. However, since data are not separately available on domestic production of the wide variety of articles considered herein, apparent consumption cannot be readily estimated.

In recent years, it is believed that domestic consumption of rangefinders has been largely displaced by the use of radar. The remaining demand has been cyclical in nature and mostly as replacement instruments. The demand has been further limited because of the high durability of such instruments. They are procured primarily for use by NATO forces.

The demand for measuring rules during 1965-68 is believed to have increased substantially concomitant with the extensive increase in technical education in high schools, trade schools, and colleges during this period. (See discussion on consumption of drawing and mathematical calculating instruments elsewhere in this volume).

Domestic consumption of balancing machines, tied primarily to growth in the number of motor vehicles but also limited by instrument durability and by competition from electrical counterparts, is believed to have remained relatively static over the period. In contrast, the greater use of measuring and checking instruments to exact the close tolerances required by modern production methods has contributed to an appreciable increase in consumption of these non-optical instruments, apparatus, and machines during 1965-68.

U.S. producers and production

The aggregate number of domestic producers of the rangefinders, rules, balancing machines, and non-optical measuring or checking instruments, apparatus, and machines covered by this summary is estimated to be between 75 and 100 firms. Rangefinders other than surveying and photographic types are produced intermittently by 5 to 8 firms; non-electrical balancing machines by 10 to 15 firms; folding and other rules (except slide rules) by 20 to 30 firms; and the wide variety of

nonelectrical and non-optical measuring or checking instruments and apparatus by as many as 50 firms. These concerns are fairly widely scattered throughout the United States. Virtually all of them produce related equipment such as other optical instruments and apparatus, electrical balancing machines, other drawing and drafting apparatus, and measuring or checking instruments and apparatus more specifically classified elsewhere in the TSUS. In most cases, items covered by this summary account for a smaller share of the producers' overall value of production than do other items. Thus, estimates of production would be of extremely limited reliability. However, it is believed that production of rules, balancing machines, and other non-optical measuring or checking instruments and apparatus steadily increased between 1965-68, while production of rangefinders during the same period generally declined.

U.S. exports

U.S. exports of the instruments, apparatus, machines and parts covered by this summary were valued at about \$14 million in 1968, compared with almost \$12 million in 1965. Such exports were distributed among the various kinds of instruments as shown below (in thousands of dollars):

Kind	1965	1966	1967	1968
Rules and other non-optical measuring or checking instruments, appliances and machines, and parts-----	7,970	8,688	8,391	8,933
Balancing machines, other testers, and parts-----	3,729	4,769	5,372	5,198
Rangefinders and parts-----	231	221	78	132
Total-----	11,930	13,678	13,841	14,263

Source: Compiled from official statistics of the U.S. Department of Commerce.

Exports of some dynamic and static balancing machines are not included above but are a part of the export category covering calipers, micrometers, and gauges as reported in the summary for items 710.65 and 710.80(pt.). In addition, exports of rangefinders and parts include exports of surveying and photographic rangefinders which are believed to be minimal.

RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL
MEASURING OR CHECKING INSTRUMENTS

While exports of rangefinders and parts have declined, those of rules and other non-optical measuring or checking instruments, apparatus, and parts have grown, and exports of balancing machines and parts have increased even faster. The United States enjoys a favorable balance of trade in each kind of the articles discussed herein, penetrating export markets throughout most of the world (table 1). Among the major trading partners for these instruments and apparatus (Canada, Japan, Mexico, and the United Kingdom), the market in Japan has grown relatively faster, increasing 50 percent since 1965. Nevertheless, Canada continued to be the most important market for exports of these items in 1968 by a 4 to 1 margin over Japan.

U.S. imports

U.S. imports of rangefinders, rules, balancing machines, and other nonelectrical and non-optical measuring or checking instruments, apparatus, machines, and parts considered in this summary were valued at an estimated \$3.4 million in 1965, increasing steadily to \$6.3 million in 1968--an average annual increase of about 23 percent (table 2). By far the greater part of these imports have been balancing machines and other non-optical measuring or checking instruments and apparatus; virtually all of the remainder were various types of rules.

Item 710.08 "other optical instruments and parts" covers parts for the rangefinders included in this summary. It is believed, however, that imports entered under that item are predominantly surveying instruments such as theodolites, transits, etc. Therefore, meaningful data on imports of parts for rangefinders entered under item 710.08 are not available. These imports are believed to be insignificant. Moreover, for item 710.80(part), "balancing machines and other non-optical measuring or checking instruments, apparatus and parts", figures shown in tables 2 and 3 are data reported under TSUSA item 710.8060.

In recent years, imports have been less than half the value of exports and are believed to have been very small compared with domestic consumption. West Germany was the principal supplier during 1966-68 (table 3). Japan displaced the United Kingdom as the number two supplier in 1967 and 1968; Switzerland is also an important supplier.

RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL MEASURING OR CHECKING INSTRUMENTS 123

Table 1.--Rangefinders 1/, rules, balancing machines 2/, and other non-optical measuring or checking instruments, apparatus, machines, and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	3,218	3,557	3,971	4,168
Japan-----	709	994	975	1,067
Mexico-----	829	919	878	928
United Kingdom-----	708	986	991	923
West Germany-----	371	628	381	603
Republic of South Africa-----	523	593	583	522
France-----	465	308	337	509
Venezuela-----	569	505	510	485
Netherlands-----	334	459	588	364
Brazil-----	144	448	209	358
Australia-----	366	288	394	335
Italy-----	272	229	308	265
India-----	385	264	366	222
Belgium and Luxembourg-----	186	110	146	209
All other <u>3/</u> -----	2,851	3,390	3,204	3,305
Total-----	11,930	13,678	13,841	14,263

1/ Includes an unknown amount of surveying and photographic rangefinders and parts.

2/ Some exports of balancing machines are not included. (See export data in summary for items 710.65 and 710.80(pt.), "Calipers, gauges, and micrometers".)

3/ These exports went to a substantial number of countries, no one of which received a significant part of the total.

Source: Compiled from official statistics of the U.S. Department of Commerce.

124 RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL
MEASURING OR CHECKING INSTRUMENTS

Table 2.--Rangefinders (except surveying and photographic), rules, balancing machines, and other non-optical measuring or checking instruments, apparatus, machines, and parts: U.S. imports for consumption, by types and TSUS items, 1965-68

(In thousands of dollars)

Type and TSUS item	1965	1966	1967	1968
Balancing machines and other non-optical measuring or checking instruments, apparatus, and parts (710.80(pt.)) <u>1/</u> -----	<u>2/</u> 2,800	3,940	4,527	5,274
Rules (except folding rules) (710.72)-----	537	835	853	875
Wooden folding rules and parts (710.68)-----	13	36	87	110
Folding rules other than wooden or aluminum and parts (710.70)-----	6	<u>3/</u>	16	10
Aluminum folding rules and parts (710.67)-----	-	1	1	2
Rangefinders (except surveying rangefinders) (710.06) <u>4/</u> -----	26	-	1	1
Total-----	3,382	4,812	5,485	6,272

1/ Data shown for 1966-68 are reported under TSUSA item 710.8060.

2/ Estimated. Prior to January 1, 1966, imports of these articles were not separately reported.

3/ Less than \$500.

4/ Imports of parts and rangefinders, which are believed to be insignificant, are reported under item 710.08 "other optical instruments and parts" in another summary covering surveying instruments in this volume.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

RANGEFINDERS, RULES, BALANCING MACHINES, AND NON-OPTICAL MEASURING OR CHECKING INSTRUMENTS 125

Table 3.--Rangefinders (except surveying and photographic), rules, balancing machines, and other non-optical measuring or checking instruments, apparatus, machines, and parts: U.S. imports for consumption, by principal sources, 1966-68

(In thousands of dollars)

Country	1966	1967	1968
West Germany-----	1,478	1,667	1,894
Japan-----	862	1,034	1,328
United Kingdom-----	1,124	970	1,178
Switzerland-----	654	914	794
Netherlands-----	164	121	331
Canada-----	112	320	330
Italy-----	114	100	112
Sweden-----	83	83	80
France-----	65	108	77
Denmark-----	76	68	52
Hong Kong-----	33	17	33
Poland-----	5	36	22
All other-----	42	47	41
Total-----	4,812	5,485	6,272

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Navigational instruments and parts-----	710.08(pt.), -.14, -.16, -.20, -.21, -.30, -.46

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. production of navigational instruments and parts supplied over 95 percent of domestic consumption of such articles in recent years. Exports were a significant part of domestic production.

Description and uses

This summary covers special marine or river navigational instruments and instruments designed specifically for air navigation and parts thereof. Nautical instruments include: automatic pilots, which control a ship's rudder in relation to the readings of a gyroscopic compass; course recording apparatus, which provides an accurate record of the course during a trip; inclinometers for measuring rolling; logs, which indicate the speed of a ship by measuring the apparent distance covered in a given time; sounding equipment, used to determine the depth of the water and the nature of the sea bed; navigational compasses for direction finding; and instruments for determining a ship's position such as sextants, octants, and azimuths.

Air navigation or flight instruments include: altimeters, a type of barometer which indicates altitude only; air speed indicators, which show the speed of the aircraft in relation to the surrounding air; climbing or diving speed indicators, which measure the vertical speed of ascent or descent by means of a differential pressure gauge; horizon flight indicators and bank and turn indicators, which indicate the angle of the aircraft; machmeters, airspeed indicators calibrated to show mach numbers directly (i.e., to show a number representing the ratio of the airspeed of the aircraft to the speed of sound in the surrounding atmosphere); automatic pilots, which control the equilibrium and flight of the aircraft according to a predetermined setting; and navigational compasses, position instruments, and other flight and navigation instruments.

Radio and radar navigational aid apparatus are not included herein but are included in another summary for item 685.60; marine chronometers are included in the summary for items 715.20-.33; and any

NAVIGATIONAL INSTRUMENTS AND PARTS

navigational instruments (such as certain ships' logs and depth-sounding instruments), whose operations depend on variations in electrical phenomenon according to the factor to be ascertained, are included in the summary for items 712.05-.51. The summary for item 685.60 may be found in volume 6:11; the remaining summaries may be found elsewhere in this volume.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Navigational instru- ments, compasses (except surveying), and parts of the foregoing:			
710.08	Optical instruments (pt.) and parts.	28% ad val.	22% ad val.	14% ad val.
710.14	Gyroscopic compasses and parts.	11.5% ad val.	9% ad val.	5.5% ad val.
710.16	Other compasses and parts.	19% ad val.	15% ad val.	9.5% ad val.
710.20	Ships' logs-----	92¢ each + 14% ad val.	73¢ each + 11% ad val.	46¢ each + 7% ad val.
710.21	Parts of ships' logs.	50% ad val.	40% ad val.	25% ad val.
710.30	Automatic pilots and parts.	11.5% ad val.	9% ad val.	5.5% ad val.
710.46	Other navigational instruments and parts.	10% ad val.	8% ad val.	5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

December 1969

7:2

The average ad valorem equivalent of the compound duty shown above for item 710.20 for the rate in effect in 1968, based on imports entered in 1968, was 16.25 percent.

U.S. consumption

The value of domestic consumption of the instruments and parts discussed herein doubled from \$216 million in 1965 to \$439 million in 1968 (table 1). Demand for these instruments is directly related to sales of aircraft, ships and boats, and to their overhaul. Factory sales of aircraft during 1965-68 increased about 20 percent per year; the comparable figure for ships and boats was about 9 percent. Aircraft sales, from which is derived most of the demand for navigational instruments, tend to occur intermittently, as new models or improvements are available; consumption of navigational instruments follows the same pattern. Partially offsetting the demand for navigational instruments of the types included in this summary was the increased use of electronic navigational aids (electronic navigation and guidance systems); however, consumption of nonelectrical navigational instruments during 1965-68 grew at an average annual rate of about 27 percent.

U.S. producers and production

There are currently 25 to 30 major producers (each having annual production valued in excess of \$100,000) of navigational instruments in the United States. Most of these firms produce both air navigation and nautical instruments; a lesser number also manufacture electronic navigation and guidance systems. Since 1961, some large producers have changed their primary product line from individual instruments used for indicating air speed, rate-of-climb, angle-of-yaw and similar flight characteristics to chiefly the manufacture of complete instrumentation systems for navigation and guidance. Navigational instrument producers in the United States are generally concentrated in the Middle Atlantic, North Central, and New England States.

The annual value of manufacturers' shipments of navigational instruments increased from \$257 million in 1964 to an estimated \$510 million in 1968, expanding at almost 20 percent per year (table 1). The more important products included in these shipments were automatic pilots, rate gyroscopes, and fully floated gyroscopes.

U.S. exports

The value of U.S. exports of navigational instruments was \$57 million in 1965 and \$84 million in 1967, but it dropped to \$77 million in 1968 (table 1). Exports accounted for about 22 percent of

NAVIGATIONAL INSTRUMENTS AND PARTS

the value of production in 1965 and about 15 percent in 1968; in the latter year exports were almost 12 times the value of imports.

By far the greatest share of exports of navigational instruments and parts were those used for air navigation or flight, as indicated below (in thousands of dollars):

Use	1965	1966	1967	1968
Flight instruments-----	51,535	71,985	74,320	65,748
Nautical instruments-----	5,231	8,013	9,944	11,501
Total-----	56,766	79,998	84,264	77,249

Source: Compiled from official statistics of the U.S. Department of Commerce.

Exports of flight instruments ranged from 85 to 91 percent of the total value of exports annually during 1965-68. It may be noted, however, that this value is probably understated because navigational instruments exported as parts of aircraft are not separately reported. The principal markets for navigational instruments in recent years were the United Kingdom, Japan, Canada, and West Germany (table 2).

U.S. imports

U.S. imports of the instruments and parts covered by this summary were valued at \$3.5 million in 1964 and jumped to \$7.5 million in 1965; they declined to \$4.3 million in 1966 but increased in the next two years, reaching a total of \$6.5 million in 1968 (table 1). Except for 1965, the annual ratio of imports to consumption remained fairly constant at about 1.6 percent.

Item 710.08 covering "optical instruments and parts" includes some instruments such as sextants which are used for navigational purposes. However, it is believed that imports entered under that item are predominantly surveying instruments such as theodolites, transits, clinometers, etc. Therefore, meaningful data on imports of navigational instruments entered under item 710.08 are not available.

Almost half of the imports in 1968 were miscellaneous navigational instruments and parts (item 710.46) such as horizons and other position instruments (table 3). A significant portion consisted of compasses and parts (items 710.14-.16). Imports of automatic pilots and parts (710.30) and ships' logs and parts (710.20-.21) were relatively small during 1965-67; in 1968, the large jump in imports of ships' logs and parts was due to the importation of parts for ships'

logs (valued at \$1.7 million) by the U.S. Government. These parts were entered duty free under the provisions of schedule 8, part 3, subpart A.

Canada was the chief source of imports in 1968; other important suppliers were Japan, the United Kingdom, and West Germany (table 4).

NAVIGATIONAL INSTRUMENTS AND PARTS

Table 1.--Navigational instruments and parts: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Ship- ments <u>1/</u>	Imports	Exports	Apparent consump- tion	Ratio (percent) of imports to consumption
1964-----	257,038	3,465	<u>2/</u>	<u>2/</u>	<u>2/</u>
1965-----	265,137	7,519	56,766	215,890	3.5
1966-----	370,682	4,309	79,998	294,993	1.5
1967-----	429,672	5,800	84,264	351,208	1.7
1968-----	510,000	6,517	77,249	439,268	1.5

1/ Partly estimated.

2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Navigational instruments and parts: U.S. exports
 of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
United Kingdom-----	8,115	9,849	15,888	13,911
Japan-----	5,966	14,533	9,218	9,208
Canada-----	5,103	6,397	5,940	6,863
West Germany-----	5,639	9,633	11,042	6,486
Italy-----	4,236	2,733	5,181	5,810
Australia-----	3,533	3,034	3,697	4,530
Netherlands-----	1,315	2,258	3,536	3,658
Denmark-----	1,430	1,497	2,441	3,439
Republic of China (Taiwan)-----	31	643	1,260	2,153
Greece-----	125	237	1,928	1,813
Turkey-----	96	466	868	1,263
Belgium-----	627	5,259	1,671	1,047
Switzerland-----	1,711	2,505	758	852
Israel-----	864	1,199	731	648
Brazil-----	176	671	340	636
Republic of Korea-----	91	89	398	590
Mexico-----	192	403	918	556
Sweden-----	1,227	760	845	555
Colombia-----	78	214	221	535
Norway-----	156	500	421	422
Ireland-----	121	189	309	358
All other-----	15,934	16,929	16,653	11,916
Total-----	56,766	79,998	84,264	77,249

Source: Compiled from official statistics of the U.S. Department of Commerce.

NAVIGATIONAL INSTRUMENTS AND PARTS

Table 3.--Navigational instruments and parts: U.S. imports for consumption, by types and TSUS items, 1965-68

(In thousands of dollars)

Type and TSUS item	1965	1966	1967	1968
Ships' logs and parts (710.20-.21)-	60	31	88	<u>1/</u> 1,766
Compasses and parts, other than gyroscopic or survey type (710.16)-----	795	787	862	937
Gyroscopic compasses (710.14)-----	262	135	309	361
Automatic pilots and parts (710.30)-----	422	526	364	313
Other navigational instruments and parts (710.46)-----	5,980	2,830	4,177	3,140
Total-----	7,519	4,309	5,800	6,517

1/ Includes imports valued at \$1.7 million, entered free of duty for U.S. Government use.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Imports of navigational instruments and parts in item 710.08 "Optical instruments and parts" are believed negligible; import data for item 710.08 are included in the summary covering surveying instruments elsewhere in this volume.

Table 4.--Navigational instruments and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	5,847	1,579	1,379	3,360
Japan-----	375	464	1,032	1,185
United Kingdom-----	925	1,153	1,900	477
West Germany-----	119	200	318	413
France-----	32	288	686	370
Denmark-----	10	69	160	225
Sweden-----	171	159	189	184
Italy-----	-	1	14	104
Hong Kong-----	3	11	48	22
All other-----	37	1/ 385	74	177
Total-----	7,519	4,309	5,800	6,517

1/ Includes imports from Switzerland, valued at \$347 thousand.

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Meteorological, hydrological, and geophysical instruments and parts-----	710.08(pt.), 710.26-.27, 710.34-.36, 710.50

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

The value of U.S. consumption of non-electrical meteorological, hydrological, and geophysical instruments, and parts was estimated to have been in excess of \$31 million in 1968, most of which was supplied from domestic production. U.S. exports in that year were valued at about \$7 million, which was twice the value of imports.

Description and uses

This summary includes meteorological instruments (and parts thereof) such as wind direction indicators; anemometers, for measuring wind speed; evaporation meters; sunshine recorders; nephoscopes, which determine the speed and direction of cloud movements; radiosondes, apparatus used for high altitude research work; theodolites, used for example, in recording successive positions of sounding balloons; and other meteorological instruments.

Hydrological instruments (and parts) covered by this summary include rain gauges; special level recorders, used for recording fluctuations in the level of lakes or rivers; current meters, for measuring the speed of currents in rivers, canals, and other waterways; swell and tide recorders and various other instruments.

This summary also includes geophysical instruments (and parts) such as seismometers and seismographs, for indicating or recording the time, duration, and intensity of movements of a point on the earth's crust; and magnetic or gravimetric instruments (e.g. magnetic balances, magnetic theodolites, gravimeters, and torsion balances) used in prospecting for ores, oil, or other minerals.

All of the meteorological, hydrological, and geophysical instruments included in this summary are non-electrical in that the instruments do not depend on an electrical phenomena that varies according to the factor to be ascertained. Electrical instruments with the same or similar applications as those covered by this summary include such

instruments as electrical-type anemometers, in which a generator produces a fluctuating voltage indicated on a voltmeter calibrated in wind speed; electrical actinometers, solarimeters and pyrhelimeters for measuring the intensity of solar rays; seismometers and seismographs, in which seismic waves are converted into electric impulses; and moving iron magnetometers, in which an induced E.M.F. is measured by a cathode ray oscillograph or valve voltmeter. These and other electrical counterparts of the instruments covered by this summary are included in the summary for items 712.05-.51 elsewhere in this volume.

Although meteorological instruments generally detect and measure heat, moisture, winds and other phenomena of the atmosphere, it should be noted that thermometers, barometers, hygrometers and psychrometers, and combinations of these instruments are not included here but in another summary covering items 711.36-.67, which more specifically describe such instruments (see general headnote 10(c) in the TSUSA-1969).

Similarly, some geophysical instruments (such as various gas, sludge and soil analysis instruments) are covered in the summary on instruments and apparatus for physical or chemical analysis, items 711.86-.88. Special types of non-electrical anemometers used for measuring the speed of air currents in mines, tunnels, chimneys, furnaces and other air-passages; and some industrial instruments (such as flow meters and liquid level indicators) which are based on the same working principles as some hydrological instruments are treated in the summary for items 711.82-.85. These summaries on related instruments may be found elsewhere in this volume.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Meteorological, hydrological, and geophysical instruments, and parts of the foregoing:			
710.08 (pt.)	Optical instruments and parts except photogrammetrical instruments and parts and rangefinders.	28% ad val.	22% ad val.	14% ad val.
710.26	Anemometers-----	\$2.25 ea. + 35% ad val.	\$1.80 each + 28% ad val.	\$1.12 each + 17.5% ad val.
710.27	Parts of anemometers.	45% ad val.	36% ad val.	22.5% ad val.
710.34	Portable or field type seismographs and parts thereof.	11.5% ad val.	9% ad val.	5.5% ad val.
710.36	Other seismographs and parts thereof.	22% ad val.	17.5% ad val.	11% ad val.
710.50	Other instruments and parts thereof.	22% ad val.	17.5% ad val.	11% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the General Agreement on Tariffs and Trade concluded on June 30, 1967. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

The average ad valorem equivalent of the compound duty shown above (item 710.26) for the rate in effect in 1968, based on imports entered in 1968, was 33.7 percent.

U.S. consumption

The value of U.S. consumption of non-electrical meteorological, hydrological, and geophysical instruments is estimated to have been in excess of \$31 million in 1968, most of which was supplied from domestic production. The U.S. Government is the largest consumer of meteorological and hydrological instruments, including those for military requirements, weather service use, and for pollution research and control. Geophysical instruments are primarily used by mineralogists and oceanographers, and in the field of seismology, volcanology and magnetism.

Consumption of these instruments has increased rapidly because of more frequent and detailed weather observations, increasing use of weather satellites, more scientific studies of space and the earth, greater activity by mineralogists and oceanographers, and continuing military requirements.

U.S. producers and production

There are approximately 50 U.S. producers of the instruments considered herein, 10 to 15 of which are relatively large and account for most of the production. The major firms, which also produce related instruments, are located principally in California, New Jersey, New York, and Massachusetts.

The value of U.S. production of non-electrical meteorological, hydrological and geophysical instruments is not separately reported in official statistics, but is estimated to have totaled about \$35 million in 1968. It is believed that production has increased substantially in recent years.

U.S. exports

The value of U.S. exports of non-electrical meteorological, hydrological, and geophysical instruments and parts ranged between \$6 million and \$7 million annually during 1965-68. In 1968 exports represented about 20 percent of the value of production and were twice as large as imports. Based on official statistics, exports of these in-

METEOROLOGICAL, HYDROLOGICAL, AND GEOPHYSICAL INSTRUMENTS 141

struments and parts during 1965-68, by end-use groups, were as follows (in thousands of dollars):

End use	1965	1966	1967	1968
Geophysical instruments and parts-----	4,975	4,014	3,753	3,449
Meteorological and hydrological instruments and parts-----	1,930	1,978	2,470	3,436
Total -----	6,905	5,992	6,223	6,885

Exports of geophysical instruments and parts have been declining, due in part to greater consumer preference for electrical counter-parts of these instruments. (In 1968, exports of electrical geophysical instruments were almost eight times larger than the \$3.4 million reported above.) On the other hand, despite an insignificant increase in 1966, exports of meteorological and hydrological instruments and parts increased at an average annual rate of more than 21 percent during the period 1965-68. Most of this growth has been in exports of meteorological instruments reflecting increased usage of such instruments in monitoring weather throughout the world. Principal markets for these exports in 1968 were Canada, France, the United Kingdom, and the Republic of South Africa (table 1).

U.S. imports

The value of U.S. imports of meteorological, hydrological, and geophysical instruments and parts amounted to \$290,000 and \$157,000 in 1965 and 1966, respectively. In 1967 and 1968, imports of similar instruments and parts were correspondingly valued at \$4.0 million and \$3.5 million (table 2). In the latter two years, however, nearly all of the imports entered duty free for U.S. Government use and consisted of instruments and parts other than anemometers, seismographs and parts.

Even with the large increase in imports in 1967-68, including the instruments and parts that did not enter the usual channels of commerce, the ratio of imports to consumption did not rise above 11 percent in 1968. The bulk of imports during 1968 was supplied by Canada, and lesser amounts by Switzerland, Hong Kong, and Japan (table 3).

Import data for some instruments and parts covered by this summary are not included. Instruments and parts imported under item 710.08 "optical instruments. . ." includes instruments such as theodolites which are, for example, sometimes used for meteorological purposes. However, it is believed that these imports are predominantly instru-

ments used for surveying, such as transits, clinometers, tacheometers, surveying rangefinders, etc. Therefore, import data for all of item 710.08 are included in another summary in this volume covering surveying instruments.

Table 1.--Meteorological, hydrological and geophysical instruments and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	2,224	2,387	1,759	1,647
France-----	309	213	135	569
United Kingdom-----	153	197	540	368
Republic of South Africa-----	62	75	106	320
Mexico-----	376	71	113	258
Brazil-----	78	186	80	223
Australia-----	551	389	648	216
India-----	36	30	55	212
Turkey-----	72	103	296	206
Venezuela-----	178	60	37	128
Chile-----	91	79	137	122
Republic of Korea-----	68	73	148	101
West Germany-----	276	203	163	87
Italy-----	166	62	122	86
Peru-----	79	52	69	84
Pakistan-----	53	-	15	83
Spain-----	57	15	-	76
Greece-----	21	19	27	72
Egypt-----	57	43	74	71
Republic of China (Taiwan)-----	-	48	69	69
Sweden-----	-	52	15	66
Philippines-----	-	-	26	62
Indonesia-----	31	81	13	57
Jamaica-----	-	20	23	52
Nigeria-----	281	30	17	-
All other-----	1,686	1,504	1,536	1,650
Total-----	6,905	5,992	6,223	6,885

Source: Compiled from official statistics of the U.S. Department of Commerce.

METEOROLOGICAL, HYDROLOGICAL, AND GEOPHYSICAL INSTRUMENTS

Table 2.--Meteorological, hydrological, and geophysical instruments and parts: U.S. imports for consumption, by types, 1965-68

(In thousands of dollars)

Type	1965	1966	1967	1968
Anemometers and parts-----	27	23	26	26
Portable seismographs and parts-----	35	6	39	11
Other seismographs and parts-----	12	2	28	-
Other meteorological, hydrological and geophysical instruments and parts-----	216	126	3,933	3,429
Total-----	290	157	4,026	3,466

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Meteorological, hydrological, and geophysical instruments and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	131	83	3,818	3,098
Switzerland-----	5	6	10	277
Hong Kong-----	-	-	25	22
Japan-----	11	14	33	20
West Germany-----	20	20	64	19
Italy-----	1	3	5	16
United Kingdom-----	89	14	34	10
All other-----	33	17	37	4
Total-----	290	157	4,026	3,466

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Calipers and micrometers and parts----	710.65
Other gauges-----	710.80(pt.)

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Virtually all U.S. consumption of calipers, micrometers, gauges, and gauge blocks is supplied from domestic production. Exports are smaller than imports.

Description and uses

The articles discussed in this summary are non-electrically-operated instruments which are used for measuring certain physical dimensions. Calipers, for example, typically consist of a pair of hinged legs with a vernier reading device and are used to determine the diameter or thickness of objects, or the distance between surfaces. Micrometer calipers are a type of caliper for making precise measurements having a spindle moved by a finely threaded screw. Micrometers are instruments which are finely adjustable by screw threads and are generally used with a microscope or telescope for measuring very small distances or angles as, for example, those used to measure boring, reaming, threading, as depth gauges, gauges for checking gear-wheels, and screw threads. Calipers are relatively low-resolution dimensional measuring devices capable of measurements to 1/100 of an inch and micrometers are considered of medium-resolution with capabilities to 1/10,000 of an inch.

The gauges covered by this summary are generally medium-resolution dimensional measuring instruments. Included are thickness gauges such as feeler gauges (caliper type), gauges for yarn and wire (generally a plate with calibrated holes), gauges for holes (including jewelers' ring gauges) or grooves, limit gauges (with fixed or adjustable jaws), plain or threaded plug, ring and screw gauges, spherical end gauges, flat and shaped gauges, slip gauges, column type gauges, and other non-electrically-operated gauges used during manufacturing processes.

Gauge blocks included in this summary are a type of high-resolution gauge capable of dimensional measurements within a few micro-inches. They consist of small blocks of steel having parallel

CALIPERS, GAUGES, AND MICROMETERS

faces and dimensions within narrowly specified tolerances; the blocks are given a stabilizing heat treatment to minimize dimensional change with age. They are supplied in sets, with those sets having the largest number of blocks being more versatile. Gauge blocks are the standards used for calibration of dimensional measuring devices, for setting special-purpose gauges, and for direct use with accessories as gauging devices.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate	Rate pursuant to conces- sions granted in 1964-67 trade conference	
		as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Micrometers, calipers, gauges, and parts of the foregoing:			
710.65	Calipers and microm- eters, and parts thereof.	20% ad val.	16% ad val.	10% ad val.
710.80 (pt.)	Other gauges and gauge blocks.	15% ad val.	12% ad val.	7.5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

Some instruments and apparatus of the types discussed in this summary and repair components therefor may be entered free of duty under TSUS item 851.60 or 851.65, pursuant to the provisions of Public Law 89-651. (See the introduction to this volume, and the separate volume of Summaries on Schedule 8 of the TSUS). Such duty-free imports are not included in the import data reported in this summary.

U.S. consumption

The value of domestic consumption of calipers, gauges, and micrometers increased from \$113 million in 1965 to an estimated \$142 million in 1968, an average rate of growth of about 8 percent per year (table 1). The expansion of the domestic market for such articles has been due to the continued growth in domestic industrial production and to a greater use of measuring and checking instruments to exact the close tolerances required by modern production methods.

U.S. producers

There are more than 90 establishments, located in 16 states, producing calipers, gauges, and micrometers; the largest number is concentrated in New York, Illinois, Massachusetts, Pennsylvania, and California. Most of the remaining producers are located in Michigan, Connecticut, New Jersey, and Ohio.

Most of the 90 manufacturers also produce complementary or related articles such as special dies and tools, die sets, jigs, fixtures, other machine tools, parts and attachments for mining machinery and equipment and parts for metal-cutting type machine tools. Although shipments of such secondary articles annually comprise about 25 percent of these firms' total shipments, the four largest producers annually account for about 40 percent of total shipments of micrometers, calipers, and gauges; the 8 largest producers, 55 percent; the 20 largest, 70 percent; and the 50 largest for about 90 percent of domestic shipments.

U.S. production

Manufacturers' shipments of calipers, gauges and micrometers have grown at a steady rate of about 10 percent annually in recent years, from a value of \$93 million in 1964 to about \$140 million in 1968 (table 1). Shipments of gauges probably accounted for more than half of the total in 1968, shipments of calipers and micrometers a relatively large part and those of gauge blocks, a very small part.

U.S. exports

U.S. exports of the dimensional measuring instruments included in this summary were valued at \$4.4 million in 1965, dropped to \$2.7 million in 1966, and gradually increased to \$4.2 million in 1968 (table 1). The largest declines in 1966 occurred in shipments to the Republic of South Africa, Canada, and Mexico (table 2). It should be noted, however, that the value of exports is overstated because exports of some balancing machines are included.

Between 1965-68, exports averaged about 3 percent of the value of production and about 70 percent that of imports. Principal markets in 1968 were Canada, Brazil, Mexico, and Italy.

U.S. imports

The value of U.S. imports of calipers, gauges, micrometers, and parts totaled an estimated \$2.7 million in 1964 and increased each year to \$6.4 million in 1967, declining slightly in 1968 to \$5.9 million (table 1). Despite the overall 120 percent increase in imports between 1964-68, the ratio of imports to consumption increased only from 3 percent in 1965 to 4 percent in 1968.

Imports of calipers, micrometers, and parts accounted for more than half of the value of imports in 1968, although imports of gauges and gauge blocks have been growing at a faster rate (table 3). In both categories, Japan's share of the U.S. import market has been growing more rapidly than that of any other country. In 1968, Japan supplied more than 45 percent of total U.S. imports of calipers, micrometers, gauges and gauge blocks. Other important suppliers in 1968 were West Germany, the United Kingdom, and Switzerland.

Table 1.--Calipers, gauges, micrometers, and parts: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Shipments	Imports	Ex-ports <u>1/</u>	Apparent consumption	Ratio (percent) of imports to consumption
1964-----	93,078	<u>2/</u> 2,669	<u>3/</u>	<u>3/</u>	<u>3/</u>
1965-----	114,000	<u>2/</u> 3,403	4,375	113,028	3
1966-----	119,000	5,293	2,707	121,586	4
1967-----	<u>2/</u> 130,000	6,375	3,301	133,074	5
1968-----	<u>2/</u> 140,000	5,891	4,230	141,661	4

1/ Data include an unknown amount of exports of balancing machines.

2/ Estimated.

3/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

CALIPERS, GAUGES, AND MICROMETERS

Table 2.--Calipers, gauges, micrometers, and other precision measuring tools, and parts 1/: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	1,069	663	630	778
Brazil-----	86	100	142	542
Mexico-----	740	355	432	460
Italy-----	82	143	171	316
United Kingdom-----	330	146	265	261
Republic of South Africa-----	721	79	67	242
West Germany-----	183	101	137	241
Republic of China (Taiwan)-----	-	13	24	157
Argentina-----	112	101	91	155
Japan-----	82	136	309	144
Australia-----	75	51	108	99
France-----	53	80	66	77
Venezuela-----	41	31	50	69
India-----	299	128	63	53
All other <u>2/</u> -----	502	580	746	636
Total-----	4,375	2,707	3,301	4,230

1/ These data include an unknown amount of balancing machines.

2/ These exports went to a substantial number of countries, no one of which received a significant part of the total.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Calipers, gauges, micrometers, and parts: U.S. imports for consumption, by types, and principal sources, 1965-68

(In thousands of dollars)

Type and country	1965	1966	1967	1968
Calipers, micrometers and parts:				
Japan-----	770	1,525	1,666	1,649
West Germany-----	897	1,269	1,425	1,176
Switzerland-----	352	581	760	446
United Kingdom-----	20	67	148	62
Sweden-----	14	27	46	24
Poland-----	22	19	27	20
Italy-----	2	1	10	12
Spain-----	5	8	12	9
All other-----	21	25	10	23
Total-----	2,103	3,522	4,104	3,421
Gauges and gauge blocks:				
Japan-----	<u>1/</u>	535	789	1,028
United Kingdom-----	<u>1/</u>	518	567	569
West Germany-----	<u>1/</u>	477	580	456
Switzerland-----	<u>1/</u>	66	108	112
Sweden-----	<u>1/</u>	77	115	111
Canada-----	<u>1/</u>	58	29	100
Italy-----	<u>1/</u>	16	14	40
Poland-----	<u>1/</u>	5	12	20
France-----	<u>1/</u>	5	39	14
Belgium and Luxembourg-----	<u>1/</u>	4	1	8
All other-----	<u>1/</u>	10	17	12
Total-----	<u>2/</u> 1,300	1,771	2,271	2,470

1/ Not available. Prior to January 1, 1966, U.S. imports of gauges and gauge blocks were not separately reported.

2/ Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

OPTICAL MEASURING OR CHECKING INSTRUMENTS AND APPLIANCES, AND PARTS

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Optical measuring or checking instruments and appliances, and parts, not else- where enumerated:	
Profile projectors-----	710.86
Comparator benches and related articles----	710.88
Other-----	710.90

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

It is estimated, in terms of value, that the bulk of U.S. consumption of optical measuring or checking instruments and parts is supplied from domestic production. Exports were larger than imports in 1968.

Description and uses

The optical instruments discussed herein are used for measuring and checking materials and products in laboratories, machine shops, and inspection stations, and for similar technical requirements.

Item 710.86 includes: (1) profile projectors, used for checking the shape and dimensions of a wide variety of objects (pieces cut to shape, gears and pinions for small-sized mechanisms, screws, screw-taps, chasers, etc.) or for examining surfaces; and (2) optical or graduated scale comparators, for checking the dimensions of a part being manufactured against a standard piece; and parts thereof.

Item 710.88 includes: (1) comparator benches for checking elongation, lengths, surfaces, etc., (2) measuring benches for large parts, thread gauges, gear cutters, threaded shafts for lathes, cross members, etc., and (3) micrometer reading apparatus for checking movement of tables of machine tools; and similar instruments, and parts thereof.

Item 710.90 includes: (1) optical surface testers for gauging the condition of surfaces by means of a combination of a prism and a lens, (2) alignment telescopes for checking straightness of benches and machine slides and measuring metallic constructions, (3) optical goniometers or angle gauges for checking sharpening angles of teeth or blades during sharpening; and (4) other optical measuring or checking instruments, and parts thereof.

OPTICAL MEASURING OR CHECKING INSTRUMENTS AND APPLIANCES, AND PARTS

The instruments included in these categories all incorporate optical devices of various types, but instruments whose only optical element consists of a magnifying device for reading scales or for carrying out adjustments are not included here. Articles similar to those included here, but whose operation depends on electrical phenomena which vary according to the factors to be ascertained or automatically controlled (items 712.05 through 712.51), are covered by a separate summary.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate pursuant to concessions granted in 1964-67 trade conference		
		Rate as of Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Optical measuring or checking instruments and appliances not provided for elsewhere in subparts, C, D, or F of part 2 of Schedule 7, and parts thereof:			
710.86	Profile projectors and parts.	35% ad val.	28% ad val.	17.5% ad val.
710.88	Comparator benches, measuring benches, micrometric reading apparatus, and parts.	45% ad val.	36% ad val.	22.5% ad val.
710.90	Other optical measuring or checking instruments, appliances, and parts.	50% ad val.	40% ad val.	25% ad val.

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and

final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

Comment

Data are not available on U.S. consumption of the optical instruments discussed herein. It is believed, however, that the bulk of consumption is generally supplied from domestic production. Consumption of these articles is expected to increase as a result of the general trend to maintain close tolerance on work performed in factories, laboratories, and machine shops.

The optical measuring instruments included herein are produced domestically by more than 40 firms. The greater number of these firms are located in the State of New York. Most of them also produce articles other than those discussed in this summary.

U.S. exports of profile projectors, comparator benches, and other optical measuring or checking instruments, appliances and parts were valued at about \$1.4 million in 1965, increasing steadily to \$2.2 million in 1968 (table 1). It should be noted, however, that the value of exports is overstated due to the inclusion of optical analog computers in this export category.

The value of U.S. imports of the articles covered by this summary increased steadily from \$868,000 in 1965 to \$1.4 million in 1967, then declined to \$1.3 million in 1968 (table 2). Imports of comparator benches, measuring benches, and micrometric reading apparatus and parts and other optical instruments and parts accounted for most of the 50 percent overall increase. Most of the articles imported are expensive, the cost of many exceeding \$1,000 per unit. Principal sources of these imports during 1968 were Japan, the United Kingdom, Canada, and West Germany (table 3).

OPTICAL MEASURING OR CHECKING INSTRUMENTS AND APPLIANCES, AND PARTS

Table 1.--Optical measuring or checking instruments, and parts ^{1/}: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	578	483	647	783
Japan-----	29	116	32	222
Republic of China (Taiwan)-----	18	-	-	139
United Kingdom-----	105	65	116	106
Iceland-----	-	-	-	100
West Germany-----	87	72	30	91
France-----	112	191	40	83
Brazil-----	-	22	85	79
Italy-----	15	13	108	61
Chile-----	-	-	28	61
Australia-----	91	26	64	59
Mexico-----	63	50	16	50
Argentina-----	-	14	30	34
Netherlands-----	15	22	39	33
Republic of Korea-----	-	126	40	20
All other-----	274	271	265	295
Total-----	1,387	1,471	1,540	2,216

^{1/} Includes exports of optical analog computers and parts; the value of which is unknown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

159

OPTICAL MEASURING OR CHECKING INSTRUMENTS AND APPLIANCES, AND PARTS

Table 2.--Optical measuring or checking instruments, appliances, and parts: U.S. imports for consumption, by types, 1965-68

(In thousands of dollars)

Type	1965	1966	1967	1968
Profile projectors and parts-----	459	523	483	501
Comparator benches, measuring benches, micrometric reading apparatus, and parts-----	130	87	501	251
Other optical measuring or checking in- struments, appliances, and parts-----	279	316	440	534
Total-----	868	926	1,424	1,286

Source: Compiled from official statistics of the U.S. Department of Commerce.

OPTICAL MEASURING OR CHECKING INSTRUMENTS AND APPLIANCES, AND PARTS

Table 3.--Optical measuring or checking instruments, appliances, and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Japan-----	477	487	481	557
United Kingdom-----	206	275	439	396
Canada-----	34	70	388	164
West Germany-----	65	49	68	120
Switzerland-----	43	29	33	31
Italy-----	1/	2	6	5
All other-----	43	14	9	13
Total-----	868	926	1,424	1,286

1/ Less than \$500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Balances of a sensitivity of 5 centigrams or better, parts, and related balance weights:	
Jewelers' balances and parts thereof-----	711.04
Other-----	711.08

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

In terms of value, U.S. production of balances, weights, and parts supplied about 75 percent of domestic consumption of such articles in recent years. Exports were substantial though somewhat less than imports.

Description and uses

The articles dealt with in this summary are mechanical balances of a sensitivity of five centigrams or better, parts for these balances, weights suitable for use with such balances and sets of weights containing any such weights. By virtue of headnote 2, part 2, of schedule 7, cases, boxes, and containers of a type ordinarily sold with these balances or weights are also classifiable with such articles when imported therewith.

Balances discussed here include: analytical balances which are used principally in quantitative chemical analysis; assay balances, used in the assaying of precious metals; chemists' balances, yarn balances, samples balances, and similar balances used to establish the weight of paper, textile fabrics, etc.; and hydrostatic (or specific gravity) balances, for ascertaining the specific gravity of liquids or solids. Most of these balances are designed for precision work and are frequently made of non-corrosive metal or of light alloys, along with bearings (knife edges, planes, etc.) of agate. The balances may be enclosed in a glass case or built in a cabinet, as a protection from air currents and dust. The metric system of weights is generally employed for balances used in scientific and laboratory work. Jewelers' balances are of simple construction and are generally designed so that they may be held in the hand or set on a simple stand when in use and may be collapsed for carrying in the pocket.

Parts (including mounted or unmounted agate knife edges, planes, beams, trays, dials, magnifying lens, swing dampers, etc.) used solely or chiefly with the balances described above are also included in this summary as are weights designed for use with these balances or sets of

BALANCES AND PARTS

weights of all kinds which include any weights suitable for use with balances within the sensitivity range described above.

Excluded from discussion in this summary are balances the operation of which depends on an electrical phenomenon that varies according to the factor to be ascertained or automatically controlled (see the summary in this volume which discusses items 712.05-712.51).

Some instruments and apparatus of a type discussed in this summary, and repair components thereof, may be entered free of duty under TSUS item 851.60 or 851.65. (See the introduction to this volume, and the separate volume of summaries on Schedule 8 of the TSUS). Such duty-free imports are not included in the import data reported in this summary.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
711.04	Balances of a sensitivity of 5 centigrams or better, with or without their weights, and parts thereof; weights suitable for use with such balances and sets of weights containing any such weights:			
	Jewelers' balances and parts thereof-----	19% ad val.	15% ad val.	9.5% ad val.
711.08	Other-----	25% ad val.	20% ad val.	12.5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

The value of U.S. consumption of balances, parts of balances, and weights increased from an estimated \$7.9 million in 1964 to \$13.4 million in 1968 (table 1). This increase can be largely attributed to: (1) increased activity in the fields of research and development and (2) the widespread use of precision balances in the teaching of sciences in schools and colleges.

U.S. producers

The articles discussed in this summary are produced by probably less than 10 manufacturers, located mainly in the Northeast, most of whom also produce other types of products. Data concerning the extent to which these manufacturers produce their own parts are not available, but some are known to use imported parts. It is believed that two or three manufacturers account for most of the domestic production of balances, weights, and parts.

U.S. production

The value of U.S. shipments of the articles considered herein was approximately \$7.3 million in 1964 and increased to an estimated \$11.5 million in 1968 (table 1).

Increased emphasis on the sciences and the availability of federal funds for education has increased the demand for "classroom type" balances in schools and colleges. This type of balance is believed to have been responsible for a large share of the increase in domestic production.

U.S. exports

The value of U.S. exports of balances, weights, and parts increased from about \$1 million in 1964 to nearly \$2 million in 1968 (table 1). The technological superiority and the high quality of many U.S. balances have led foreign buyers to prefer them despite their usually higher cost. Principal foreign markets in 1968 were Canada, Australia, Ireland, and the United Kingdom (table 2).

U.S. imports

The value of U.S. imports of the articles discussed in this summary rose by about 115 percent during the period 1964-68, increasing from \$1.7 million in 1964 to \$3.7 million in 1968 (table 1). Imports of these articles supplied about a fourth of domestic consumption. Although data are not separately available on the volume of imports of parts, cases and weights, it is believed that most of the imports under item 711.08, which comprised about 98 percent of total imports in 1968, were parts which were subsequently incorporated in balances assembled in the United States.

Switzerland and West Germany have been the principal suppliers of balances, weights, and parts in recent years (table 3). In 1968, Switzerland accounted for about 65 percent of the total value of imports and West Germany, 30 percent.

Table 1.--Balances, weights, and parts: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Production	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
1964---	7,300	1,725	<u>1/</u> 1,095	7,930	22
1965---	8,200	2,204	1,428	8,976	25
1966---	9,200	2,613	1,687	10,126	26
1967---	10,000	3,052	1,636	11,416	27
1968---	11,500	3,710	1,810	13,400	28

1/ This value is overstated in comparison with those for production and imports because it includes electrical balances (see description and uses in summary text).

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Balances, weights and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	624	618	516	426
Australia-----	31	40	57	176
Ireland-----	-	-	-	143
United Kingdom-----	67	169	143	131
Mexico-----	57	120	95	94
New Zealand-----	-	14	-	92
West Germany-----	29	20	38	57
Republic of Korea-----	-	-	18	48
Republic of South Africa-----	23	33	42	48
Philippines-----	27	27	36	43
Brazil-----	23	41	44	40
Venezuela-----	51	39	43	38
All other-----	496	566	604	474
Total-----	1,428	1,687	1,636	1,810

Source: Compiled from official statistics of the U.S. Department of Commerce.

BALANCES AND PARTS

Table 3.--Balances, weights and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	:	1965	:	1966	:	1967	:	1968
Switzerland-----	:	1,059	:	1,246	:	1,946	:	2,354
West Germany-----	:	869	:	1,072	:	830	:	1,139
Canada-----	:	4	:	-	:	22	:	93
United Kingdom-----	:	68	:	98	:	76	:	34
Japan-----	:	97	:	82	:	80	:	33
Netherlands-----	:	100	:	86	:	77	:	31
All other-----	:	7	:	29	:	21	:	26
Total-----	:	2,204	:	2,613	:	3,052	:	3,710

Source: Compiled from official statistics of the U.S. Department of Commerce.

CommodityTSUS
item

Machines and appliances for determining the
strength of articles, and parts thereof----- 711.25

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Domestic producers supply all but a small part of U.S. consumption of these machines, appliances and parts. The annual value of exports has been about five times larger than that of imports.

Description and uses

The articles discussed in this summary consist of a variety of heterogeneous machines and appliances (hereinafter referred to as "machines" for convenience), and parts thereof, for mechanically determining the strength of articles or materials under compression, tension, torsion, or shearing stress. These machines test the tensile strength, hardness, rigidity, breaking point, and similar strength properties of a variety of materials and substances such as metals, textiles, paper, rubber, plastics, and wood. The machines range from very small and delicate precision instruments to heavy-duty equipment for testing the impact required for crushing stone or cement. In general, the machines are named after the tests they are designed to perform; e.g., abrasion-testers and wear-testers are used in wear and tear tests for textiles; bursting strength testers and fold testers for paper; elasticity meters, reboundimeters, tensile testers, abrasion machines and plastimeters for rubber or plastics materials; rotating bending machines (to rotate specimens at high speeds) and reversal torsional machines (in which the torsional direction is alternately reversed) are used in bending tests for metal.

Some machines of a type discussed in this summary and repair components therefor may be entered free of duty under TSUS item 851.60 or 851.65. (See the introduction to this volume, and the separate volume of summaries on Schedule 8 of the TSUS). Such duty-free imports are not included in the import data reported in this summary. Also excluded from consideration herein are machines the operation of which depends on an electrical phenomenon that varies according to the factor to be ascertained or automatically controlled (see summary on items 712.05-.51).

STRENGTH TESTING MACHINES AND PARTS

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
711.25	Machines and appli- ances for determin- ing the strength of articles or materi- als under compres- sion, tension, tor- sion, or shearing stress, and parts thereof-----	14.5% ad val.	11.5% ad val.	7% ad val.

The above tabulation shows the column 1 rate of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption, producers, and production

The value of U.S. consumption of mechanical strength-testing machines in the years 1964-68 is estimated to have ranged between \$15 million and \$25 million per year, supplied largely from domestic production (table 1). These machines and parts are produced by about 30 manufacturers, most of whom produce other types of apparatus for testing properties. They are located primarily in the New England, Middle Atlantic, and East North Central States; a lesser number are located along the Pacific Coast. Some of these producers are divisions of larger corporations which manufacture a variety of equipment; they account for a large part of strength-testing machine production. Most of the independent manufacturers are small and specialize in the production of particular types of testing machines, although their output is seldom limited to the articles discussed in this summary.

Domestic production has been even higher than consumption; its value is estimated to have ranged between \$20 million and \$30 million per year during 1964-68 (table 1). Although data are not available on U.S. production for 1967 and 1968, the boost in export sales in 1967 is believed to have raised 1967 production higher than the 1965 output. Also, estimated increased production in 1968 was due in part to expanding sales in all major export markets, with the exception of Japan.

U.S. exports

U.S. exports of mechanical strength-testing machines and parts have grown at about the same pace as imports during the period 1965-68; however, exports (including parts) were more than five times larger than were imports in each of those years (table 1). In 1968, U.S. exports of these articles went to 91 countries; Canada, the United Kingdom, France, West Germany, and Mexico were the principal markets (table 2).

U.S. imports

U.S. imports of mechanical strength-testing machines increased from a value of \$868,000 in 1965 to \$1,274,000 in 1967, but declined to \$1,118,000 in 1968 (table 3). Because of differences in units of measurement, standards, etc., foreign testing machines, in many cases, are not easily adaptable to U.S. industrial and laboratory specifications and requirements; for this reason, imports of these articles into the United States consist chiefly of unusual testing machines, i.e., machines which have special features not found on those produced domestically. Principal sources of imports of these machines and parts during 1965-68 were West Germany, Switzerland, the United Kingdom, and Japan; in 1968, these countries together accounted for about 85 percent of the total value of imports (table 3).

STRENGTH TESTING MACHINES AND PARTS

Table 1.--Strength testing machines and parts: U.S. shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Shipments <u>1/</u>	Imports	Exports <u>1/</u>	Apparent consumption	Ratio (percent) of imports to consumption
1964-----	26,928	757	<u>2/</u>	<u>2/</u>	<u>2/</u>
1965-----	25,445	868	4,614	21,699	4
1966-----	20,158	1,016	4,633	16,541	6
1967-----	<u>2/</u>	1,274	5,841	<u>2/</u>	<u>2/</u>
1968-----	<u>2/</u>	1,118	5,807	<u>2/</u>	<u>2/</u>

1/ Data for producers' shipments and exports do not include parts; estimates of the value of parts range between 10 and 15 percent of the value of machines for both shipments and exports.

2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Strength testing machines: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	829	975	1,150	1,170
United Kingdom-----	542	364	468	654
France-----	304	227	383	459
West Germany-----	258	223	336	448
Mexico-----	280	367	401	435
Japan-----	191	241	593	269
Brazil-----	85	276	151	266
Australia-----	122	108	222	266
Finland-----	31	13	14	169
Argentina-----	122	67	30	108
Turkey-----	17	21	57	105
All other-----	1,833	1,751	2,036	1,458
Total-----	4,614	4,633	5,841	5,807

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Strength testing machines and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
West Germany-----	338	382	353	343
Switzerland-----	233	184	327	251
United Kingdom-----	164	279	347	247
Japan-----	31	42	56	108
Austria-----	22	24	37	42
Italy-----	20	20	35	29
All other-----	60	85	119	98
Total-----	868	1,016	1,274	1,118

Source: Compiled from official statistics of the U.S. Department of Commerce.

HYDROMETERS, THERMOMETERS, BAROMETERS, AND SIMILAR INSTRUMENTS 173

<u>Commodity</u>	<u>TSUS item</u>
Hydrometers, thermometers, barometers, and similar instruments-----	711.30 and 711.36, -.67

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Virtually all of U.S. consumption of hydrometers, thermometers and similar instruments is supplied from domestic production. Exports, although larger than imports, have been negligible compared with production.

Description and uses

This summary includes hydrometers and similar floating instruments used to determine the density (specific gravity) of solids or liquids, or some arbitrary value related to density. They are generally made of glass, weighted at one end, and equipped with a graduated stem for direct reading; they may also incorporate a thermometer. Most of these instruments are named according to their use; for example, alcoholometers, used in determining the quantity of alcohol in aqueous solutions; salinometers, used for measuring the density of sea water; saccharometers, used to determine the concentration of sugar in a solution; and urinometers, for measuring the specific gravity of urine. Others are named after the inventor as, for example, the Nicholson hydrometer, used in determining the specific gravity of a solid.

Also included are thermometers which measure the temperature of a body or space by making use of the changes in volume or pressure of liquids, solids or gases when subjected to a change of temperature; pyrometers, which measure high temperatures up to the 500 and 600° C range; barometers, for determining atmospheric pressure; hygrometers, for determining the moisture content of the air or of gases; psychrometers, a special type of hygrometer utilizing the difference in temperatures indicated by a dry bulb thermometer and a wet bulb thermometer to determine humidity content; thermographs, barographs, and similar recording instruments which register on a drum or otherwise the variations in temperature or other phenomenon being measured; and combinations of these instruments.

HYDROMETERS, THERMOMETERS, BAROMETERS, AND SIMILAR INSTRUMENTS

This summary also includes combination articles in which one or more of the named instruments are incorporated as "significant integral parts and which are ordinarily used in the home or office where they are usually hung on the wall, or placed on mantels, shelves, or furniture". If such a combination article contains a watch or clock movement, the combination article is classifiable in the tariff provision considered here, but in determining the duties on the combination article, the movement (and its dial, if any) is dutiable at the same rate as would have applied if it had been imported separately (see headnote 5 to subpart 2E of schedule 7). Not included here are certain combination articles, such as meteorological instruments, to which more specific provisions apply. Also excluded from discussion in this summary are any instruments of which the operation depends on an electrical phenomenon that varies according to the factor to be ascertained or automatically controlled (see summary for items 712.05 to 712.51) and clinical thermometers, which are discussed in the summary for item 711.34 elsewhere in this volume.

Most of the instruments discussed herein are standardized instruments which have a wide range of uses for household, scientific, and industrial operations.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
711.30	Hydrometers and similar floating instruments, whether or not incorporating thermometers-----	42.5% ad val.:	34% ad val.	21% ad val.

HYDROMETERS, THERMOMETERS, BAROMETERS, AND SIMILAR INSTRUMENTS 175

ISUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Non-recording ther- mometers:			
11.36 <u>1/</u>	Liquid-filled, with the graduations on the tube on a scale enclosed within an outer shell, except clinical-----	42.5% ad val.	34% ad val.	21% ad val.
711.37	Other, except clini- cal-----	14% ad val.	11% ad val.	7% ad val.
711.40	Non-recording optical pyrometers-----	50% ad val.	40% ad val.	25% ad val.
711.42	Other non-recording pyrometers-----	16% ad val.	12.5% ad val.	8% ad val.
	Non-recording barom- eters:			
	Aneroid:			
711.45	Surveying, with altimeter setting-----	28% ad val.	22% ad val.	14% ad val.
711.47	Other-----	9.5% ad val.	7.5% ad val.	4.5% ad val.
711.49	Other-----	19% ad val.	15% ad val.	9.5% ad val.
711.55	Non-recording hygrom- eters and psychrom- eters-----	16% ad val.	12.5% ad val.	8% ad val.
711.60	Thermographs, baro- graphs, hygrographs, and other recording instruments (akin to the meters named above)-----	10% ad val.	8% ad val.	5% ad val.

See note at end of tabulation.

December 1969
7:2

HYDROMETERS, THERMOMETERS, BAROMETERS, AND SIMILAR INSTRUMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
711.67	Combinations of the foregoing instru- ments, and articles in which one or more of such instruments are incorporated as significant integral parts and which are ordinarily used in the home or office where they are usually hung on the wall, or placed on mantels, shelves, or furniture-----	14% ad val.	11% ad val.	7% ad val.

^{1/} As a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade (GATT), TSUS item 711.35, liquid-filled thermometers, was divided into 711.34, clinical liquid-filled thermometers, and 711.36, other liquid-filled thermometers.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the GATT. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption, producers, and production

The value of U.S. consumption of hydrometers, thermometers, and similar instruments in 1968 is believed to have exceeded \$131 million, almost all of which was supplied from domestic production. Consumption has steadily increased as a result of expanding scientific and industrial use of hydrometers, barometers, thermometers, and other temperature measuring instruments.

More than one hundred domestic producers manufacture the articles under consideration. The producers range in size from concerns having fewer than five employees to very large concerns with several hundred employees. The greatest number of producers are located in New York, Pennsylvania, and California. Many of these producers manufacture more than one of the types of instruments discussed here, and many also produce other articles, mostly scientific instruments.

Official statistics relative to domestic production of these articles are not available; it is believed, however, that the value of U.S. production has increased in recent years and exceeded \$135 million in 1968. The largest part of this value is probably made up of instruments for measuring and recording temperature.

U.S. exports

The value of U.S. exports of domestic merchandise of the articles discussed here was approximately \$6.7 million in 1968, compared with \$4.5 million in 1965. Although not strictly comparable with import data, the export data include all of the articles discussed in this summary. Hydrometers, thermometers, and similar instruments were exported to about 50 countries in 1968. Principal markets were Canada, Mexico, the United Kingdom, and Japan (table 1).

U.S. imports

The value of U.S. imports of these particular instruments increased from \$1.9 million in 1965 to \$3.2 million in 1968--an increase of over 68 percent (table 2). Despite this large increase, imports supplied less than 3 percent of domestic consumption in 1968. Although West Germany continues to supply the major part of imports (67 percent in 1965 and 55 percent in 1968), imports from Japan have been growing at a faster rate than those from West Germany; in 1968 almost 18 percent of the total value of imports were from Japan.

Barometers, thermometers, and combination articles comprised the bulk of U.S. imports of these articles in 1968. Imports of non-recording barometers other than aneroid barometers (mostly mercury barometers) and recording instruments (such as thermographs and barographs) have shown the greatest increase between 1965-68; imports of optical pyrometers and aneroid barometers with altimeter settings have declined during the same period (table 3).

178 HYDROMETERS, THERMOMETERS, BAROMETERS AND SIMILAR INSTRUMENTS

Table 1.--Hydrometers, thermometers 1/, barometers and similar instruments: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	2,088	2,434	2,145	2,522
Mexico-----	188	244	365	578
United Kingdom-----	233	148	147	339
Japan-----	150	161	174	276
France-----	74	100	169	224
Republic of China (Taiwan)-----	23	105	138	205
Republic of Korea-----	15	501	116	182
West Germany-----	124	138	196	158
Australia-----	175	132	170	146
Venezuela-----	137	126	101	133
Peru-----	30	49	51	126
Brazil-----	66	63	73	119
Netherlands-----	143	86	104	112
Turkey-----	21	84	38	111
All other-----	1,028	1,082	1,258	1,500
Total-----	4,495	5,453	5,245	6,731

1/ Includes negligible exports of clinical thermometers, estimated not to have exceeded \$5,000 in any of the years shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

HYDROMETERS, THERMOMETERS, BAROMETERS AND SIMILAR INSTRUMENTS 179

Table 2.--Hydrometers, thermometers, barometers, and similar instruments: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
West Germany-----	1,288	1,311	1,424	1,744
Japan-----	231	281	357	567
United Kingdom-----	262	231	161	258
Switzerland-----	40	62	64	212
Sweden-----	-	6	26	133
France-----	54	58	82	88
All other-----	36	61	95	160
Total-----	1,911	2,010	2,209	3,162

Source: Compiled from official statistics of the U.S. Department of Commerce.

180 HYDROMETERS, THERMOMETERS, BAROMETERS AND SIMILAR INSTRUMENTS

Table 3.--Hydrometers, thermometers, barometers, and similar instruments: U.S. imports for consumption, by types, 1965-68

(In thousands of dollars)

Type	1965	1966	1967	1968
Hydrometers and similar instruments-----	10	16	9	29
Thermometers, non-recording, liquid filled, graduated, except clinical-----	99	124	144	167
Thermometers, non-recording, other, except clinical-----	305	289	404	606
Pyrometers, non-recording, optical-----	18	3	8	13
Pyrometers, non-recording, other-----	39	18	17	54
Barometers, non-recording, aneroid, with altimeter setting-----	8	11	22	5
Barometers, non-recording, aneroid, other-----	642	699	615	740
Barometers, non-recording, other-----	61	65	40	353
Hygrometers and psychrometers, non-recording-----	29	77	47	73
Thermographs, barographs, hygrographs, and other recording instruments-----	46	94	145	157
Combinations of the instruments above-----	654	614	758	965
Total-----	1,911	2,010	2,209	3,162

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Clinical thermometers-----	711.34

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of clinical thermometers in 1968 amounted to about 26.8 million units, of which about 77 percent was supplied from domestic production. Imports have regularly accounted for between 18 and 26 percent of the quantity of domestic consumption in recent years. Exports are negligible.

Description and uses

This summary covers clinical thermometers or "fever" thermometers, as they are more popularly known. These thermometers are self-registering instruments for measuring body temperatures. This summary also includes so-called "blanks", which require further processing before being used. ^{1/}

A typical finished clinical thermometer consists of a glass capillary tube approximately 4 inches long to which is attached a small glass bulb. The opening of the bulb connects with one end of the bore of the tube; the other end of the bore is sealed. Mercury is sealed in the bulb and part of the tube. Magnification properties of the tube, resulting from the prismatic construction of its walls, enables the column of mercury to be read in conjunction with an engraved scale on the tube's surface. An enamel strip, usually white, is embedded in the glass to serve as a contrasting background for the mercury column. Thermometers used in the United States are usually calibrated in degrees and fifths of degrees, Fahrenheit, with a scale ranging from 96° to 106°. Clinical thermometers are made from several varieties of lens clinical tubing.

^{1/} The Bureau of Customs has held that General Headnote 10(ij) of the Tariff Schedules of the United States prevails over the specific limiting language preceding item 711.34 which reads "Liquid-filled thermometers with the graduations on the tube or on a scale enclosed within an outer shell."

In use, the bulb end of the the thermometer is inserted into a body cavity where heat from the body causes the mercury column to rise until the highest temperature to which the thermometer is exposed is reached. By means of a constriction in the bore of the tube, the expanded column is prevented from contracting back toward the bulb. Before reuse, the thermometer must be reset by shaking the mercury to a point several degrees below normal body temperature.

Other types of clinical thermometers are those for veterinary use and basal thermometers. The former are used for measuring the temperature of large animals; the latter for ovulation tests. These two types, however, account for an extremely small percentage of clinical thermometers sold in the United States.

U.S. tariff treatment

The column 1 (trade agreement) rate of duty applicable to imports (see general headnote 3 in the TSUSA-1969) of clinical thermometers is 42.5 percent ad valorem. This rate was not affected during the sixth round of trade negotiations under the GATT, concluded on June 30, 1967.

In 1958, following receipt of a report by the Tariff Commission of an investigation conducted pursuant to section 7 of the Trade Agreement Extension Act of 1951, the President, by issuance of proclamation 3235, withdrew the concession in the GATT on clinical thermometers; finished or unfinished, wholly or in chief value of glass provided for in paragraph 218(a) of the Tariff Act of 1930. This action resulted in an increase in duty on these articles from 42.5 percent ad valorem to 85 percent ad valorem, the rate originally fixed in the Tariff Act of 1930.

As a result of this presidential action, the Commission maintained a continuing annual review of developments with regard to clinical thermometers and made five annual reports to the President during the period 1960-1965; two under the provisions of Executive Order 10401 and three under the provisions of section 351(d) of the Trade Expansion Act of 1962.

Subsequent to the receipt of the fifth report by the Tariff Commission on developments in the trade of clinical thermometers, the President, on January 7, 1966, issued a proclamation (No. 3696) terminating the increased rate of duty on clinical thermometers which had been in effect since 1958. As a result of this action, the trade agreement rate of 42.5 percent ad valorem was restored. Effective January 1, 1968, the TSUSA item number applicable to clinical thermometers was changed from 711.3520 to 711.3400 (Pres. Proc. 3822, Dec. 16, 1967, 32 F.R. 19002).

U.S. consumption

The annual U.S. consumption of clinical thermometers, as measured by sales, increased from about 127,000 gross in 1964 to more than 186,000 gross in 1968 (table 1). In 1968, consumption was greater than in any year during the past 18 years and was more than 43 percent higher than in 1958, the year in which the duty was increased. Imports as a share of U.S. consumption, declined steadily from a high of about 26 percent in 1964 to about 18 percent in 1967 and then increased to almost 24 percent in 1968.

The buying of clinical thermometers by two U.S. Government agencies, the Defense Medical Supply Agency and the Veterans Administration, are probably the largest purchases made each year. Imports have supplied more than 75 percent of the annual requirements of these two agencies in recent years.

U.S. producers

About 18 firms produce clinical thermometers in the United States from domestic blanks. These firms produce thermometers in 20 plants; one firm makes thermometers in 2 plants and conducts the packaging and distributing operations in another. The 20 plants are situated as follows: 14 in New York, 2 in New Jersey, and 1 each in Nebraska, Florida, Tennessee, and Puerto Rico.

Four of the domestic producers are multiproduct companies; they accounted for more than 40 percent of the domestically produced clinical thermometers sold in 1967. The seven largest domestic producers at the time of the original escape clause investigation in 1958 were also the seven dominant producers in 1967.

Several U.S. manufacturers have made substantial capital outlays in recent years in order to lower production costs by mechanizing various operations formerly performed manually. The bulk of the investment in new machinery occurred in 1962-1964; such investment during this 3 year period totaled in excess of \$1 million compared with less than half a million dollars during the previous 4 years. Domestic producers invested about \$2 million during the years 1965-1966 in new equipment.

U.S. production (shipments) and exports

U.S. producers' shipments of clinical thermometers increased from about 94,000 gross in 1964 to more than 142,000 gross in 1968. The aforementioned partial mechanization, a higher level of medical care for an expanding population, and an aggressive marketing program are

three key factors that have contributed to a substantial increase in production during the period 1964-68.

Export statistics are not available. However, it is known that exports of clinical thermometers are negligible and probably have not exceeded 50 gross a year in recent years.

U.S. imports

U.S. imports of clinical thermometers were about 33,000 gross in 1964. They decreased sharply to less than 24,000 in 1965 and then rose from about 30,000 gross in 1966 to almost 44,000 gross in 1968. Japan supplies virtually all of the imports; small quantities are imported from West Germany and Panama (table 2).

Prior to June 1, 1959, imports of thermometers were almost all in the form of complete blanks (processed up to but not including calibration, engraving, pigmentation, and testing). Each finished instrument entering the United States was required, by section 304 of the Tariff Act of 1930, to be marked with the name of the country of origin. On the contrary, blanks were not required to be so marked as long as their immediate containers showed the country of origin.

On June 1, 1959, the Bureau of the Customs issued a ruling to the effect that unfinished clinical thermometers are required to be marked with the country of origin. This ruling made it more profitable for importers to bring in finished instruments than to bring in blanks and finish them in this country. Almost all thermometers imported into the United States in recent years, are in finished condition ready for sale.

Table 1.--Clinical thermometers: U.S. producers' shipments, imports for consumption, and apparent consumption, 1964-68 1/

(Quantity in gross)				
Year	Shipments	Imports	Apparent consumption	Ratio (percent) of imports to consumption
1964-----	93,637	33,206	126,843	26.2
1965-----	93,773	23,576	117,349	20.0
1966-----	127,420	29,941	157,361	19.0
1967-----	<u>2/</u> 133,957	29,237	163,194	17.9
1968-----	<u>2/</u> 142,361	43,802	186,163	23.5

1/ Export statistics are not available. However, it is known that exports are negligible and probably have not exceeded 50 gross in any of the years shown in this table.

2/ Partly estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Note.--Data are not available on the value of producers' shipments; U.S. imports for consumption of clinical thermometers were valued as follows (in thousands of dollars):

<u>Year</u>	<u>Value</u>
1964-----	555
1965-----	377
1966-----	609
1967-----	620
1968-----	957

CLINICAL THERMOMETERS

Table 2.--Clinical thermometers: U.S. imports for consumption, by sources, 1965-68

Country	1965	1966	1967	1968
	Quantity (gross)			
Japan-----	23,569	29,933	28,834	43,398
Panama-----	-	-	-	312
West Germany-----	7	8	55	88
United Kingdom-----	-	-	-	4
Canal Zone-----	-	-	348	-
Total-----	23,576	29,941	29,237	43,802
	Value (1,000 dollars)			
Japan-----	376	606	606	947
Panama-----	-	-	-	6
West Germany-----	1	3	8	4
United Kingdom-----	-	-	-	<u>1/</u>
Canal Zone-----	-	-	6	-
Total-----	377	609	620	957

1/ Less than \$500.

Source: Compiled from official statistics of the U.S. Department of Commerce.

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

<u>Commodity</u>	<u>TSUS item</u>
Apparatus for measuring, checking, or automatic control of liquids or gases, or automatic control of temperature, and parts thereof:	
Flow meters, heat meters incorporating liquid supply meters, and anemometers---	711.82, -.83
Other-----	711.84
If Canadian article and original motor- vehicle equipment-----	711.85

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Virtually all of U.S. consumption of the articles covered in this summary is supplied from domestic production. The United States is a net exporter of these articles; in 1968, the value of its exports of such apparatus was almost eight times as large as the corresponding imports.

Description and uses

The nonelectrical instruments and apparatus discussed in this summary are utilized in homes, factories, laboratories, and other places where the flow, depth, pressure, heat, or other variables of gases or liquids are to be measured, checked, or automatically controlled.

All of the instruments or apparatus for measuring, checking, or automatically controlling variables of liquids or gases or for automatically controlling temperatures that are included in this summary are nonelectrical in that the instruments or apparatus do not depend on an electrical phenomenon which varies according to the factor to be ascertained or automatically controlled. For example, a gauge in which the measurement of the variations in a tank of liquid from empty to full is brought about by electrical variations in voltage, resistance, capacitance, or other electrical factors owing to the varying level of the liquid would not be included in this summary. With respect to method of operation, the instruments or apparatus covered here are those of a mechanical, pneumatic, or nonelectrical optical type--mechanical or pneumatic instruments or apparatus constituting

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

the bulk of them. The term "nonelectrical" as used here, however, does not preclude, for instance, the operation in the system of an electric switch or the use of electricity as a source of power. Electrical instruments and apparatus which would be provided for by the tariff provisions considered here if not specifically excluded, whether optical instruments or otherwise, are included in the summary on items 712.05 to 712.51. (Note headnotes 1 and 2 of part 2D of schedule 7 of the TSUS.)

Automatic control or regulating instruments and apparatus usually form part of a complete automatic control system consisting essentially of (1) a device for measuring the variable to be controlled, (2) a control device which compares the measured value with the desired value, (3) a starting, operating, or stopping device, and (4) an action device which restores the variable to the prescribed value. Such action devices as pumps, compressors, or valves, as separate articles, are provided for under items 660.92 to 660.95 (pumps), 661.09 to 661.16 (pumps and compressors), and 680.20 to 680.28 (taps, cocks, valves, and similar devices). However, where these and other articles form a combination with various devices, equipment, instruments, and apparatus, the essential characteristic of the whole being that of the instruments and apparatus provided for in items 711.82, 711.84, and 711.85, the combination is included within the appropriate tariff description and is covered by this summary.

The nonelectrical instruments and apparatus considered here for measuring, checking, or automatically controlling the pressure of liquids or gases include pressure gauges, pressure controllers, and pressure regulators. The pressure gauges include tire, fuel, or oil, and other pressure gauges; barometers measuring atmospheric pressure, however, are included under items 711.45 to 711.49. The gauges here are mainly of the liquid, metallic, and piston types and include gauges of the maximum and minimum pressure types, and gauges used to measure differences in pressure. Electrical pressure gauges based on such variations as electrical resistance, magnetic pressure, capacitance, and oscillation are not covered. These electrical gauges, including vacuum gauges for measuring very low pressure and other gauges of the electrical type, are covered in the summary on items 712.05 to 712.51. Nonelectrical pressure controllers and pressure regulators are automatic control instruments or apparatus, referred to in the preceding paragraph.

Nonelectrical instruments and apparatus for measuring, checking, or automatically controlling the level of liquids or gases include level indicators, regulators, and controllers for sewers, irrigation ditches, dams, canals, and harbors, and for open vessels or other containers, as well as for closed systems. The more important kinds of level indicators are the float type, pneumatic and hydrostatic types,

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

and the type used for boilers based on the difference in refractive indices of water and steam. Regulators and controllers are usually of either the float type, in which the float acts on a diaphragm or other device which operates an electric switch (connected with the action device) or are part of an electrode or probe system where the surface of the liquid coming into contact with the electrode closes a circuit actuating a relay.

Flow meters, which indicate the rate of flow of liquids or gases (in volume or weight per unit of time), are used for measurement of flow both through open channels, such as canals or irrigation systems, and in closed conduits, such as pipe lines. The majority of these use either fixed or variable apertures and operate on the principle of differential pressure; the remainder use turbines, pistons, or diaphragms. (Gas and liquid supply or production meters, meters designed to register the total amount of electricity or electrical energy produced or consumed, and standard meters for checking and calibrating the two foregoing types of meters are provided for under items 713.05 to 713.15. Electrical flow meters are discussed in the summary on electrical instruments--items 712.05 to 712.51.)

Anemometers of the special type used for recording the rate of flow of air currents in mines, tunnels, chimneys, furnaces, and other conduits are included here; however, other types of anemometers and the other instruments and apparatus provided for in part 2C of schedule 7 are excluded. Thus, nonelectrical anemometers which are meteorological instruments and nonelectrical hydrological instruments and apparatus, as well as other specified instruments, are provided for under items 710.04 to 710.50.

Humidity regulators (sometimes called humidistats) automatically controlling, for example, the humidity in steam cabinets, furnaces, or workshops by controlling an action device, are included in this summary, but instruments which merely determine or record the moisture content are discussed in the summary on items 711.55 to 711.60.

Thermostats automatically controlling temperature, including the temperature of air and other gases or of liquids, are provided for here if of the types in which the action of their sensitive element depends on such factors as the change in shape of a bimetallic strip, the vapor pressure of a liquid, or the expansion of a liquid or of a metal rod. Electrical thermostats and other temperature regulators which depend for their action on an electrical resistor or a thermocouple are excluded. Instruments which merely measure or record temperature are included in the summaries covering items 711.34 and 711.36 to 711.67.

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

The heat meters included in this summary measure in calories, therms, or other units the quantities of heat consumed, such as in a heating system of the hot-water type. These heat meters ordinarily include a liquid supply meter, a thermometer placed at both the intake and outlet of the conduit, and a counting and totaling mechanism. Some heat meters somewhat resemble thermometers containing a liquid; this type is sometimes used with radiators in apartments. Oven-draft regulators are generally used for automatic control of the air intake either in central heating or air-conditioning plants.

In addition to the instruments and apparatus covered by this summary, parts are included. However, in those instances where a specific provision of the TSUS provides for such articles, that provision prevails even though the articles are solely or chiefly used as parts of the instruments and apparatus considered here, and the parts so provided for are not covered by this summary but under the specific provisions.

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate pursuant to conces- sions granted in 1964-67 as of : <u>trade conference</u>		
		Dec. 31, 1967	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Pressure gauges, thermo- stats, level gauges, flow meters, heat me- ters, automatic oven- draught regulators, and other instruments and apparatus for measuring, checking, or automatically con- trolling the flow, depth, pressure, or other variables of liquids or gases, or for automatically con- trolling temperature, all the foregoing and parts thereof not pro- vided for in part 2C of schedule 7:			
	Flow meters, heat meters incorporating liquid supply meters, and anemometers, and parts thereof:			
711.82:	Instruments and appa- ratus.	\$2.25 each + 35% ad val.	\$1.80 each + 28% ad val.	\$1.12 each + 17.5% ad val.
711.83:	Parts-----	45% ad val.	36% ad val.	22.5% ad val.
711.84:	Other-----	14% ad val.	11% ad val.	7% ad val.
711.85:	If Canadian article and original motor- vehicle equipment.	Free	<u>1/</u>	<u>1/</u>

1/ Duty-free status not affected by trade conference.

December 1969
7:2

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

The provision for duty-free entry of Canadian articles which are original motor-vehicle equipment (item 711.85), pursuant to the enactment of the Automotive Products Trade Act of 1965, became retroactively effective to January 18, 1965. Such articles entered from Canada before that date were dutiable under item 711.84.

Some instruments and apparatus of the types discussed in this summary and the repair components therefor may be entered free of duty under item 851.60 or 851.65, pursuant to the provisions of Public Law 89-651. (See the introduction to this volume, and the separate volume of summaries on schedule 8 of the TSUS). Such duty-free imports are not included in the import data reported in this summary.

The average ad valorem equivalent of the compound duty on item 711.82 for the rate in effect in 1968 (\$2.02 each plus 31.5 percent ad valorem), based on imports entered in 1968, was 34.3 percent.

U.S. consumption, producers and production

U.S. consumption in 1968 of the articles covered in this summary, virtually all of which was supplied from U.S. production, is estimated to have been valued at about \$550 million. Trade in these articles is directly responsive to the level of construction and industrial activity and to the quality, reliability, and price of the individual instruments and apparatus. Consumption is expected to rise as building construction and industrial activity continue to increase.

More than 100 establishments in the United States produce these articles; the plants vary in size from those with five or fewer employees to very large establishments with more than a thousand employees. Most of these establishments also produce instruments and apparatus other than those discussed herein.

Data on the value of domestic production are not separately reported in official statistics; it is estimated, however, that production in 1968 was valued in excess of \$600 million.

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

U.S. exports

The value of U.S. exports of gauges, meters, thermostats, and the other pertinent instruments and apparatus and parts in 1965-68, as compiled from official statistics of the U.S. Department of Commerce, was as follows (in thousands of dollars):

<u>Year</u>	<u>Value</u>
1965-----	61,966
1966-----	62,603
1967-----	57,247
1968-----	56,584

Although the total value of such exports declined after 1966, the value of exports of industrial processing instruments continued to increase and accounted for more than half of the total for 1968 (table 1). Canada was the market for about 25 percent of the total shipments; the United Kingdom and Japan were next in importance as markets.

U.S. imports

The value of U.S. imports of the articles covered here increased from \$2.5 million ^{1/} in 1964 to \$7.3 million in 1968 (table 2). Despite the substantial increase, imports accounted for less than 2 percent of the value of estimated U.S. consumption in 1968. West Germany, Canada, the United Kingdom, and Japan were the principal sources of imports of these articles in 1968, with Germany accounting for almost a third of the total value. Of the total of such imports from Canada in 1968, about 18 percent (327,000 dollars' worth) entered free of duty under item 711.85. According to official statistics of the U.S. Department of Commerce, the value of imports of these articles, by TSUS item, during 1968 was as follows (in thousands of dollars):

<u>TSUS item</u>	<u>Commodity</u>	<u>Value</u>
711.82	Flow meters, heat meters, and anemometers--	93
711.83	Parts of flow meters, heat meters, and anemometers-----	93
711.84	Other instruments, apparatus, and parts----	6,756
711.85	Instruments, apparatus, and parts, if Canadian article and original motor- vehicle equipment-----	327
	Total-----	<u>1/ 7,270</u>

^{1/} Figures do not add to the total, because of rounding.

^{1/} In 1964 there was no duty-free provision for Canadian articles (see section on tariff treatment).

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

Table 1.--Instruments and apparatus for measuring, checking, or automatically controlling the variables of liquids or gases, or for automatically controlling temperature, and parts thereof: U.S. exports of domestic merchandise, by principal markets and by kinds, 1968

(In thousands of dollars)

Country	Instruments and apparatus			Total
	Laboratory and scientific	Industrial processing	All other	
Canada-----	966	5,670	7,808	14,444
United Kingdom-----	137	2,117	2,439	4,693
Japan-----	126	2,398	1,450	3,974
West Germany-----	214	845	1,709	2,768
Netherlands-----	35	1,787	725	2,547
Mexico-----	65	1,790	645	2,500
France-----	81	918	662	1,661
Venezuela-----	62	1,020	172	1,254
Republic of South Africa-----	45	824	149	1,018
All other-----	1,787	12,706	7,232	21,725
Total-----	3,518	30,075	22,991	56,584

Source: Compiled from official statistics of the U.S. Department of Commerce.

APPARATUS FOR MEASURING, CHECKING, OR AUTOMATIC CONTROL OF VARIABLES
OF LIQUIDS OR GASES, OR AUTOMATIC CONTROL OF TEMPERATURE

Table 2.--Instruments and apparatus for measuring, checking,
or automatically controlling the variables of liquids or
gases, or for automatically controlling temperature, and
parts thereof: U.S. imports for consumption, by principal
sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
West Germany-----	755	793	864	1,596	2,124
Canada-----	733	1,056	686	752	1,844
United Kingdom-----	479	542	868	1,125	1,250
Japan-----	101	245	368	768	707
Netherlands-----	108	41	107	323	578
Switzerland-----	91	102	56	42	71
All other-----	231	295	414	542	696
Total-----	2,498	3,074	3,363	5,148	7,270

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
------------------	----------------------

Instruments or apparatus for physical or chemical analysis, for measuring or checking viscosity, porosity, expansion, surface tension, or similar properties, or for measuring or checking quantities of heat, light or sound; microtomes; and parts----- 711.86, -.88

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Virtually all U.S. consumption of the instruments, apparatus, and parts covered in this summary has been supplied by domestic production; in 1968, the value of exports was nearly 12 times as large as that of imports, and constituted about 17 percent of the value of domestic output.

Description and uses

The instruments and apparatus discussed in this summary are non-electrical (see next to last paragraph of this section) and have a wide range of hospital, laboratory, and industrial uses. With respect to method of operation, these articles are of a mechanical, pneumatic, or optical type--optical instruments making up the bulk of them. These instruments and apparatus are used to measure or check many physical or chemical properties, or quantities of heat or light.

Instruments of the optical type--which are stated in the TSUS to be those embracing "only instruments which incorporate one or more optical elements," but not including "any instrument in which the incorporated optical element or elements are solely for viewing a scale or for some other subsidiary purpose"--include such instruments as polarimeters (in which the optical activity of a substance is determined through the use of prisms placed in the path of a ray of light before and after traversing the substance), saccharimeters (special polarimeters designed for determining the strength of sugar solutions), spectrometers (used to measure the wavelength of emission or absorption spectra), and refractometers (for determining the refractive index of liquids or solids and thus assisting in ascertaining their composition). Refractometers are widely used in food industries

(for testing oils, butter, and other fatty substances and analyzing jam, fruit juices, and other food products), in oil refineries, in biology (for example, for measuring protein content of blood plasma or discharges), and for other purposes.

Gas analysis instruments and apparatus include the following: Those used to determine the quantity of carbon dioxide, carbon monoxide, oxygen, hydrogen, and other gases contained in combustible gases or combustion byproducts such as occur in coke ovens and blast furnaces; chromatographs, which use, for example, the elution method of gas chromatography; gas detection apparatus for use in mines, tunnels, sewers, or gas mains; and tyndallometers (an optical instrument) used to measure the amount of dust in the air and for testing dust masks and filters.

Also included in this summary are instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension, and similar properties. As with many instruments, the names for such articles are often derived from the variable to be ascertained or measured. Thus, viscometers (used in measuring, for instance, the consistency of paints) determine viscosity, or the internal friction of a fluid; porosimeters determine porosity, or the ease with which gases or liquids can pass through a material (such as paper, fabric, leather, or plastic); expansion meters measure the expansion or contraction of steel, metal alloys, and other products, caused by changes of temperature; and tensiometers measure surface or interfacial tension of liquids--a property possessed by liquid surfaces (or two non-miscible liquid surfaces) whereby they appear to be covered by a thin elastic membrane in a state of tension. However, instruments and apparatus which analyze such physical properties as the strength of articles or materials under compression, tension, torsion, or shearing stress are covered in the summary on item 711.25.

Instruments and apparatus for measuring or checking quantities of heat include calorimeters, which measure the amount of heat absorbed or given off by a substance; cryoscopes, for determining freezing points of a solution, i.e., the point at which each component crystallizes or freezes out (as in testing milk for detection of added water); and ebullioscopes or ebulliometers, for determining the absolute or differential boiling points of liquids (as in ascertaining the molecular weight of a solute in a liquid, the purity of liquids, or the alcoholic content of beverages). However, cryoscopes and ebullioscopes, as well as other instruments or apparatus which are essentially laboratory glassware, whether or not having supports, frames, or mounts of other materials, are provided for in the summary on items 547.53 to 547.55.

Instruments and apparatus for measuring or checking quantities of light (primarily optical instruments) include photometers (except photographic light meters, discussed under item 722.75) for measuring the intensity of light; spectrophotometers, for comparing the respective spectra of two light intensities; and milk-testing meters, used for visually checking cream separation efficiency, based on the translucence of separated milk.

Instruments and apparatus involving the measurement or the checking of quantities of sound, as included here, are based on the principle that the composition of a gas, liquid, or solid, especially binary systems, can be characterized and thus analyzed by the attenuation and/or change in velocity of propagation of sound waves through such gas, liquids, or solid. The propagation of sound is thus related to molecular structure and intermolecular interactions. Analysis is facilitated by utilization of these principles in such instruments and apparatus as audiometers, used in measuring the acuity of hearing in the individual ear for sounds of various frequencies with a view to determining deviations from normal hearing, and audiospectrometers, which record the relative intensities in a complex sound over a succession of equal frequency ranges.

Among the other instruments and apparatus included in this summary are colorimeters, used to determine the color of a substance--for instance, by matching its color against that produced by three primary colors--or to determine the concentration of a substance present in a liquid by comparison of the color of the liquid with that of a predetermined standard, as in a comparator which measures chlorine content and acidity of swimming pools.

The tariff provisions considered here also include microtomes, which are articles used for cutting sections or specimens of organic tissue for microscopic examination, and parts for microtomes, as well as parts of the instruments and apparatus covered by the pertinent tariff provisions.

Electrical instruments or apparatus, where the essential operation depends on an electrical phenomenon which varies according to the factor to be ascertained, are not covered in this summary but are provided for in items 712.05 to 712.51. (See headnote 1 and 2 of part 2D of schedule 7 of the TSUS and also note explanation in the "description and uses" section of the summary covering items 711.82 to 711.85.) These electrical instruments and apparatus include electronic polarimeters and other instruments equipped with a photoelectric cell; pH and rH meters, the most common type of which employ the electrometric system in which electrodes are used to set up a potential difference

INSTRUMENTS OR APPARATUS FOR PHYSICAL OR CHEMICAL
ANALYSIS AND RELATED ARTICLES

proportional to the acidity or oxidizing power of a solution; electrical gas or smoke analysis apparatus utilizing heat conductivity, infrared radiation, and magnetic differences; analytical instruments based on the dielectric constant of substances; and mass spectrographs and similar apparatus for analyzing such variables as the isotopic constitution of materials.

Microscopes are provided for in items 708.71 to 708.82; X-ray apparatus, in items 709.61 to 709.66; and precision balances, in items 711.04 to 711.08.

INSTRUMENTS OR APPARATUS FOR PHYSICAL OR CHEMICAL
ANALYSIS AND RELATED ARTICLES

201

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 as of : Second stage, effective Jan. 1, 1969	Rate pursuant to conces- sions granted in 1964-67 as of : Final stage, effective Jan. 1, 1972
	Polarimeters, refractometers, spectrometers, gas analysis apparatus and other instruments or apparatus for physical or chemical analysis; viscometers, porosimeters, expansion meters and other instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension, or similar properties; photometers (except photographic light meters), calorimeters, and other instruments or apparatus for measuring or checking quantities of heat, light, or sound; microtomes; all the foregoing, and parts thereof:			
711.86	Optical instruments or apparatus, and parts thereof.	50% ad val.	40% ad val.	25% ad val.
711.88	Other-----	22% ad val.	17.5% ad val.	11% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations

INSTRUMENTS OR APPARATUS FOR PHYSICAL OR CHEMICAL
ANALYSIS AND RELATED ARTICLES

under the General Agreement on Tariffs and Trade. Only the second and final stages of the annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

Some instruments and apparatus of a type discussed in this summary and repair components therefor may be entered free of duty under item 851.60 or 851.65, pursuant to the provisions of Public Law 89-651. (See the introduction to this volume, and the separate volume of summaries on schedule 8 of the TSUS.) Such duty-free imports are not included in the import data reported in this summary.

U.S. consumption, producers, and production

Scientific development demands an ever-increasing number of the instruments covered here to meet the needs for increased precision, as well as those of automation. The applicability, engineering, and accuracy of such instruments are usually more important than price to the purchaser. As a consequence, the value of U.S. consumption of these instruments and parts has been expanding annually and is estimated to have exceeded \$155 million in 1968; virtually all of this total was accounted for by domestic production.

More than 30 U.S. producers manufacture these articles. They are situated principally in California, Pennsylvania, Massachusetts, New York, Illinois, and New Jersey. Nearly all of them manufacture other articles, largely in the instrument field.

Although production data for these articles and parts are not separately reported in official statistics, the value of U.S. production is estimated to have exceeded \$185 million in 1968. Nearly all of the U.S. consumption is supplied by domestic producers because many of the instruments are specially designed for a particular operation, or a basic instrument is redesigned in close collaboration between buyer and seller to perform a particular function; this situation demands a closer tie in the market for the purpose of design and service than is usually possible for most foreign producers.

U.S. exports

During the period 1965-68, the value of U.S. exports ranged between \$32 million and \$34 million. The following tabulation, compiled from official statistics of the U.S. Department of Commerce, shows U.S. exports of these instruments and parts, by principal markets, for 1965-68 (in thousands of dollars):

<u>Country</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
Canada-----	5,898	6,535	7,232	5,614
United Kingdom-----	3,090	2,379	2,689	2,459
West Germany-----	2,350	1,934	2,540	2,271
Japan-----	2,878	2,180	2,252	2,256
France-----	2,516	2,436	2,282	1,879
All other-----	<u>16,252</u>	<u>16,270</u>	<u>17,283</u>	<u>17,710</u>
Total-----	32,984	31,734	34,278	32,189

In 1967 almost half of the exports consisted of optical instruments (item 711.86); a decline in exports of these instruments accounted for the decrease in total exports of instruments in 1968 (table 1).

U.S. imports

The value of U.S. imports of the articles discussed in this summary decreased almost steadily from \$5.4 million in 1964 to \$2.7 million in 1968 (table 2) when it was less than 2 percent of the value of U.S. consumption of such instruments and apparatus. Sweden, West Germany, the United Kingdom, and Japan were the principal sources of imports in 1968. As each of these countries--with the exception of Sweden--has been a net importer of instruments from the United States, it would seem that the imported instruments and those produced domestically have been somewhat different articles. More than 85 percent of the imports in both 1967 and 1968 consisted of nonoptical instruments (table 3).

INSTRUMENTS OR APPARATUS FOR PHYSICAL OR CHEMICAL
ANALYSIS AND RELATED ARTICLES

205

Table 2.--Instruments or apparatus for physical or chemical
analysis and related articles, and parts: U.S. imports
for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Sweden-----	93	70	256	720	754
West Germany-----	1,757	1,513	1,101	957	744
United Kingdom-----	1,583	1,263	1,006	827	528
Japan-----	938	589	990	626	175
Switzerland-----	213	141	188	72	96
Canada-----	442	61	253	106	77
All other-----	327	403	299	194	353
Total-----	5,353	4,040	4,093	3,502	2,727

Source: Compiled from official statistics of the U.S. Department of Commerce.

INSTRUMENTS OR APPARATUS FOR PHYSICAL OR CHEMICAL
ANALYSIS AND RELATED ARTICLES

Table 3.--Instruments or apparatus for physical or chemical analysis and related articles, and parts: U.S. imports for consumption, by principal sources and by types, 1967 and 1968

(In thousands of dollars)

Country	1967			1968		
	Op- tical type	Non- op- tical type	Total	Op- tical type	Non- op- tical type	Total
Sweden-----	66	654	720	55	699	754
West Germany-----	161	796	957	125	619	744
United Kingdom-----	104	723	827	56	472	528
Japan-----	116	510	626	65	110	175
Switzerland-----	19	53	72	-	96	96
Canada-----	12	94	106	8	69	77
All other-----	27	167	194	58	295	353
Total-----	505	2,997	3,502	367	2,360	2,727

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Revolution counters, speedometers, and similar counting devices; parts thereof-----	711.90, -.99

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

All but a small part of U.S. consumption of these articles and parts has been supplied from domestic production. U.S. exports have been smaller than imports.

Description and uses

This summary covers various counting devices (and parts thereof) such as (1) revolution counters, which count the number of revolutions of a mechanical part (e.g., a machine shaft); (2) production counters, which are similar to revolution counters but which are used in particular for measuring production in terms of length (e.g., the length of fabric produced on a loom), units (e.g., the number of sheets printed by a machine), movements of a machine, the output of an operator, or phone calls made by a subscriber; (3) counters for indicating the working hours of machines, motors, etc. (i.e., revolution counters calibrated in terms of working hours); (4) entry counters (for turnstiles); (5) mechanical scorekeepers (e.g., billiard or bowling meters); (6) taximeters, which indicate the fare payable in relation to time, mileage, or both; (7) odometers, which register the mileage of a car, and which may be combined with speedometers; (8) pedometers, which register the number of steps taken by an individual, from which the distance traversed may be calculated when the average length of the stride is known; and (9) traffic counters.

The summary also includes speedometers and tachometers (and parts thereof) which indicate the number of revolutions, speed, output, etc., per unit of time (e.g., revolutions per minute, miles per hour, or feet per second). They are usually used on vehicles (cars, motorcycles, bicycles, locomotives, etc.) or machines (motors, turbines, paper-making machines, printing machinery, textile machinery, etc.).

COUNTING DEVICES, SPEEDOMETERS, ETC.

Excluded from this summary are scientific and laboratory instruments of a type provided for in subpart 2C of schedule 7, meters for measuring the supply or production of gases, liquids, or electricity (see summary on items 713.05-.15); machometers, (because they do not literally measure the speed of a plane in relation to the ground--see summary on parts of planes, item 694.60); and stroboscopes (see summary on items 713.17-.19).

U.S. tariff treatment

The column 1 (trade agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Revolution counters, production count- ers, taximeters, odometers, pedom- eters, counters similar to the foregoing arti- cles, speedom- eters and tachom- eters, all the foregoing not provided for in subpart 2C of schedule 7; parts of the foregoing:			
711.90	Taximeters and parts-----	42.5% ad val.	34% ad val.	21% ad val.
711.91	If Canadian arti- cle and origi- nal motor vehi- cle equipment (see headnote 2, part 6B, schedule 6)----	Free	<u>1/</u>	<u>1/</u>
711.93	Bicycle speedom- eters and parts thereof-----	55% ad val.	44% ad val.	27.5% ad val.
711.98	Other-----	10% ad val.	8% ad val.	5% ad val.
711.99	If Canadian article and original mo- tor vehicle equipment-----	Free	<u>1/</u>	<u>1/</u>

1/ Duty-free status not affected by trade conference.

December 1969

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption, producers, and production

The value of U.S. consumption of the articles discussed in this summary is estimated to have been in excess of \$70 million in 1968--over 90 percent of which was represented by domestic merchandise. Consumption is believed to have increased significantly since 1965, due primarily to increased use of the various counting devices in industry and to expanded production and imports of automobiles, motorcycles, and bicycles utilizing meters as original equipment and replacement parts.

Counting devices, speedometers, and similar articles are produced by more than 150 domestic concerns. Such items as taximeters and pedometers are manufactured by fewer than ten producers, while tachometers are produced by more than fifty. Some of these concerns manufacture only these articles and parts, but most produce other products, principally in the instrument field. Most of these manufacturers are located in New York; however, a considerable number of them are also located in Illinois and Massachusetts.

The value of U.S. production of revolution counters, speedometers, and similar counting devices is not separately reported in official statistics, but is estimated to have exceeded \$65 million in 1968. Speedometers for automobiles and revolution counters accounted for most of this total; factory shipments of speedometers were valued at an estimated \$45 million in 1968. The value of factory shipments of revolution counters increased from \$11 million in 1963 to an estimated \$15 million in 1968. The value of annual production of the other articles discussed herein is also believed to have increased.

U.S. exports

U.S. exports of these articles and parts were valued at \$3.4 million in 1968--an increase of more than 36 percent over the \$2.5 million exported in 1965 (table 1). Nearly 40 percent of this value was composed of instruments, apparatus, and parts thereof for motor vehicles. Principal foreign markets for these domestically produced articles during 1965-68 were Canada, the United Kingdom, Mexico, West Germany, and Japan.

U.S. imports

U.S. imports of taximeters, speedometers, counters, and parts were valued at nearly \$9 million in 1968 when they supplied about 13 percent of domestic consumption (table 2). The value of these imports increased annually during 1965-68, except for 1967 when they declined slightly from the level of the previous year. In recent years, West Germany, Switzerland, Japan, and the United Kingdom have been the principal supplying countries.

The value of U.S. imports of these articles has grown at a faster rate than that of exports, more than doubling during 1965-68 (table 2). Although imports of taximeters and parts (item 711.90) and bicycle speedometers and parts (item 711.93) reflected a five-fold increase during the period 1966-68, imports of other speedometers, tachometers, and parts (item 711.9820) and revolution counters, production counters, odometers, pedometers, and similar articles and parts (item 711.9840) continued to account for all but a small share of total U.S. imports of articles included in this summary (table 3).

COUNTING DEVICES, SPEEDOMETERS, ETC.

Table 1.--Revolution counters, speedometers, and similar counting devices: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	1,464	1,525	1,493	1,595
United Kingdom-----	90	158	222	274
Mexico-----	117	312	169	239
West Germany-----	83	123	104	215
Japan-----	107	145	229	129
France-----	81	82	49	68
Nicaragua-----	-	-	-	52
Colombia-----	-	14	14	50
Australia-----	37	46	60	49
Brazil-----	-	17	41	43
All other-----	532	570	536	715
Total-----	2,511	2,992	2,917	3,429

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Revolution counters, speedometers, and similar counting devices: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
West Germany-----	1,095	1,751	1,676	2,424
Switzerland-----	1,378	1,886	1,839	1,761
Japan-----	346	586	769	1,227
United Kingdom-----	628	997	971	1,016
Israel-----	-	-	40	633
Canada-----	17	141	194	396
France-----	52	115	51	378
Belgium and Luxembourg-----	45	241	135	306
Mexico-----	-	132	40	217
Sweden-----	13	63	70	147
Italy-----	9	42	81	99
All other-----	24	54	80	179
Total-----	3,607	6,008	5,946	8,783

Source: Compiled from official statistics of the U.S. Department of Commerce.

COUNTING DEVICES, SPEEDOMETERS, ETC.

Table 3.--Revolution counters, speedometers, and similar counting devices: U.S. imports for consumption, by types, 1966-68

Type (TSUSA item)	1966	1967	1968
	Value (1,000 dollars)		
Taximeters and parts (711.9000)-----	55	55	297
Of Canadian origin and original motor			
vehicle equipment (711.9100)-----	-	1/	-
Bicycle speedometers and parts			
(711.9300)-----	81	78	426
Other speedometers and tachometers and			
parts (711.9820) 2/-----	1,347	1,652	2,259
Other counters, meters and parts			
(711.9840) 2/-----	4,399	4,007	5,528
If Canadian origin and original motor			
vehicle equipment (711.9900)-----	126	154	273
Total-----	6,008	5,946	8,783
	Percent of total value		
Taximeters and parts (711.9000)-----	1	1	3
Of Canadian origin and original motor			
vehicle equipment (711.9100)-----	-	3/	-
Bicycle speedometers and parts			
(711.9300)-----	1	1	5
Other speedometers and tachometers and			
parts (711.9820) 2/-----	23	28	26
Other counters, meters, and parts			
(711.9840) 2/-----	73	67	63
If Canadian origin and original motor			
vehicle equipment (711.9900)-----	2	3	3
Total-----	100	100	100

1/ Less than \$500.

2/ Prior to December 20, 1965, speedometers and tachometers and parts were included in the statistical classification (711.9800) with "other" counters, meters, and parts.

3/ Less than 0.5 percent.

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Electrical measuring, checking, analyzing or automatically-controlling instruments and apparatus, and parts thereof-----	712.05, -.51

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

The estimated value of U.S. consumption of the articles discussed in this summary was about \$2 billion in 1968. About 97 percent of this amount represented domestic merchandise; the value of exports was approximately 7 times that of imports.

Description and uses

The articles discussed in this summary consist of appliances, instruments, apparatus, and machines of the kinds discussed in the related summaries covering items 710.04 through 711.88, when the operation of such articles depends on an electrical phenomenon which varies according to the factor to be ascertained or automatically controlled. This summary also includes instruments or apparatus for measuring or checking electrical quantities; and instruments or apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic, or similar radiations.

Instruments, apparatus, appliances and machines of a kind like those described in items 710.04 through 711.88 are included in this summary, as stated above, only if their method of operation is such that: (1) the measurement, checking or automatic control is effected by means of an electrical phenomenon the variations of which are dependent on the factor to be ascertained or automatically controlled. (For example, variations in voltage, resistance, capacitance or conductance can be used to determine or translate variations in a non-electrical quantity such as temperature); or (2) the factor being sought or automatically controlled produces the electrical phenomenon (as, for example, the use of a pH meter to determine the hydrogen ion content of a solution); or (3) the factor being ascertained or automatically controlled influences a photo-electric cell (such as in the case of electrical polarimeters, luxmeters, smoke detectors, or densitometers). These electrical counterparts of articles described in items 710.04 through 711.88 may be used for measuring a nonelectrical quantity, for checking, for automatically controlling, or for

quantitative or qualitative analyses. Included are such instruments as anemometers, ships' logs, seismographs, balances, pressure gauges, thermostats, photometers, mass spectrographs, and comparators.

Instruments and apparatus for measuring or checking electrical quantities may be of the types for indicating or recording purposes in industrial operations or laboratories to perform the following kinds of electrical measurements of: (1) electric current, carried out generally by galvanometers or ammeters; (2) voltage, by voltmeters, potentiometers, electrometers, and similar instruments; (3) resistance and conductivity, usually by means of ohmmeters or measuring bridges; (4) power, by means of wattmeters; (5) capacitance and inductance, by measuring bridges; (6) frequencies, by frequency meters graduated in cycles per second; (7) wavelengths or radio frequencies, by wavemeters or by slotted line or slotted wave-guide instruments; (8) phase angles and power factors, carried out by phase meters calibrated in power factors; (9) the ratios of two electrical quantities, by ratiometers; (10) magnetic fields and magnetic fluxes, by galvanometers and fluxmeters; (11) electrical and magnetic properties of materials, by hysteresis testers, permeameters, etc.; and, (12) the measurement and recording of rapid variations of electrical quantities, by means of oscilloscopes and oscillographs.

Considering the method of operation, electrical quantity measuring and checking instruments and apparatus may be any of several types (such as moving-coil, moving-iron, electrodynamic, hot-wire, induction, thermocouple, electrostatic, or electronic instruments) that generally make direct measurements, or other types (such as measuring bridges or potentiometers) that supply data from which the quantity to be measured can be calculated. In addition, a wide range of special purpose electrical measuring and checking instruments and apparatus are used in telecommunications. These include instruments such as impedance testers and bridges, inductance bridges, nepermeters and decibel meters, fading indicators, cross talk meters, transmission level indicators, noise level meters, gain measuring instruments, interference measuring instruments, peak indicators, echo meters, and distortion factor meters.

Instruments and apparatus for detecting or measuring radiation covered by this summary include detection instruments incorporating ionization chambers, geiger counters, scintillation counters, dosimeters, and other apparatus for measuring cosmic and similar radiations.

Instruments and apparatus in which electricity serves merely as motive or transmission power or for lighting, switching, and other similar subsidiary functions, are not within the scope of this summary. Also excluded are instruments and apparatus which, though their operation may require the use of electricity, are primarily designed for purposes other than described in this summary. Apparatus based on

the use of radiations from radioactive substances (such as, for example, the use of artificial isotopes for measuring thickness of materials or for monitoring the contents of packages) are also excluded from this summary. They are included in the summary for item 709.66.

The electrical instruments and apparatus discussed here have numerous uses in industry and research laboratories and range from small hand-held or panel ammeters to huge analog computers which control the mechanical operations of entire steel mills.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Electrical measuring, checking, analyzing, or automatically-controlling instruments and apparatus, and parts thereof:			
712.05	Optical instruments, or apparatus, and parts thereof-----	50% ad val.	40% ad val.	25% ad val.
	Other:			
	Ships' logs, and depth-sounding instruments and apparatus, and parts thereof:			

Tabulation continued on next page.

ELECTRICAL MEASURING, TESTING AND CONTROLLING INSTRUMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	First stage, effective Jan. 1, 1972
	Electrical measuring, checking, analyzing, etc.--Con.			
712.10	Instruments and apparatus----	92¢ each + 14% ad val.	73¢ each + 11% ad val.	46¢ each + 7% ad val.
712.12	Parts-----	50% ad val.	40% ad val.	25% ad val.
712.15	Instruments and apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic or similar radia- tions, and parts thereof--	14% ad val.	11% ad val.	7% ad val.
712.20	Seismographs, and parts thereof--	15.5% ad val.	12% ad val.	7.5% ad val.
	Anemometers, and parts thereof:			
712.25	Anemometers----	\$2.25 each + 35% ad val.	\$1.80 each + 28% ad val.	\$1.12 each + 17.5% ad val.
712.27	Parts-----	45% ad val.	36% ad val.	22.5% ad val.

Tabulation continued on next page.

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
712.47	Electrical measuring, checking, analyzing, etc.--Con. Automatic flight instruments and apparatus designed for use in air- craft, and parts thereof--	12% ad val. <u>1/</u>	9.5% ad val.	6% ad val.
712.49	Other-----	12% ad val. <u>1/</u>	11% ad val.	10% ad val.
712.51	If Canadian article and original motor- vehicle equipment----	Free	<u>2/</u>	<u>2/</u>

1/ Former TSUS item 712.50 was divided into two items, 712.47 and 712.49, effective January 1, 1968, as a result of concessions granted by the United States in the General Agreement on Tariffs and Trade (GATT) concluded on June 30, 1967.

2/ Duty-free status not affected by 1964-67 trade conference.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the GATT. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

The average ad valorem equivalents of the compound rates of duty shown above for items 712.10 and 712.25, based on the rates in effect in 1968 and imports entered in 1968, were 13.28 percent and 37.15 percent respectively.

The provision for duty-free entry of Canadian articles for use as original motor-vehicle equipment (item 712.51) pursuant to the enactment of the "Automotive Products Trade Act of 1965", has been in effect since January 18, 1965. Previously, such articles were dutiable and were entered under the former item 712.50.

Some instruments and apparatus (and repair components therefor) of the types discussed in this summary may be entered free of duty under items 851.60 and 851.65. (See the introduction to this volume, and the separate volume of summaries on Schedule 8 of the TSUS). Such duty free imports are not included in the import data reported in this summary.

U.S. consumption

The value of U.S. consumption of these articles in 1968 is estimated to have approached \$2 billion. The consumption of scientific or laboratory electrical measuring and testing instruments depends on expenditures for facilities in such fields as research and development; the market for industrial electrical instruments is geared to expenditures for plant and equipment. Scientific and process-control instruments have been vital in the development of automation and in technological advance.

Technological developments within the scientific and process control fields since World War II have been significant--most of them occurring in the last decade. The continuing demand for new levels of measurement precision in both science and industry has generated research and development expenditures in some firms of up to 10 percent of sales revenue. As a result, about 50 percent of the instruments on the market today came into existence within the past few years.

U.S. producers

These articles are produced in the United States by over 1,000 concerns that range in size from those having one employee to some having thousands of employees. These producers are scattered throughout the country, but most of them are located near large urban areas. Most of the manufacturers produce other articles, chiefly in the electronic and scientific fields.

There is a tendency toward expansion of overseas facilities by U.S. producers, either through direct investment, joint-venture, or licensing agreements.

U.S. production

Official statistics showing total domestic production of electrical measuring, testing and controlling instruments are not available. However, the value of factory shipments of such articles and parts is estimated at more than \$2.3 billion in 1968, up almost \$300 million from the estimated \$2.0 billion of shipments in 1967. Production of electrical instruments and apparatus is believed to have expanded at about 14 percent annually between 1964-68. Over 50 percent of the total value of shipments of these articles in 1968 is believed to have been accounted for by equipment for testing, measuring, and analyzing electronic and electrical circuits and equipment.

U.S. exports

U.S. exports of electrical measuring, checking, analyzing, or automatically controlling instruments, apparatus and parts were valued at \$381 million in 1968, up almost 68 percent from the \$227 million reported in 1965 (table 1). This represented an average annual increase in exports of almost 19 percent compared to the estimated 14 percent per year expansion of production over the same period. In 1968, these exports accounted for more than 16 percent of domestic production and were about 7 times larger than imports of comparable articles.

Exports of instruments and apparatus for measuring or checking nonelectrical quantities (such as physical properties testing, industrial process, geophysical, and mineral prospecting instruments) accounted for half of the total value of electrical instrument exports in 1968 (table 1). Instruments and apparatus for measuring or checking electrical quantities (including circuit and motor testing, oscilloscope, indicating and nonrecording instruments, etc.) accounted for 30 percent of the total, and parts and accessories made up the remainder. Between 1965-68, exports of instruments for measuring or controlling electrical quantities have grown about one-third faster than those of instruments designed for nonelectrical quantities, while exports of parts and accessories have grown twice as fast. The major portion of exports in the latter category were shipments of components to foreign subsidiaries of U.S. firms--a result of the trend towards internationalization in the industry; the remaining portion consisted of replacement parts and accessories for previously-sold equipment.

U.S. exports of electrical instruments, apparatus and parts went to more than 100 countries in 1968. Canada, the United Kingdom, Japan, and West Germany were among the principal markets for these instruments (table 2).

U.S. imports

Imports of electrical measuring, checking, or automatically controlling instruments, apparatus and parts were valued at approximately \$24 million in 1965 and rose briskly to \$55 million in 1968 (table 3). Nearly all of the increase was in imports of ships' logs and depth-sounding instruments, and a "basket" category of "other" electrical instruments not separately designated. In terms of value, about 10 percent of the imports in 1968 were entered under the special provisions of item 807.00 of the TSUS, which, under certain conditions, permits an avoidance of duty on the cost of U.S. components contained in the imported article. Despite the more than two-fold increase in total value of imports between 1965-68, however, 1968 imports are estimated to supply less than 3 percent of domestic consumption.

More than 90 percent of the value of total imports of these articles is entered under the "other" electrical instruments category. Imports in this category range from small meters and gauges to instruments and apparatus such as mass spectrometers and analog computers. They include all types of instruments and apparatus for measuring electrical and nonelectrical quantities, automatic regulators and controllers, as well as telecommunication and telemetric instruments and apparatus. Their uses include both industry and laboratory. Some laboratory instruments are imported because they contain refinements not normally available on domestically produced articles; other smaller, less expensive meters compete chiefly on a price basis.

The large jump in imports of ships' logs, depth-sounding instruments, apparatus and parts during 1968 was due to the importation of parts for ships' logs (valued at \$2.8 million) by the United States Government. These parts were entered duty-free under the provisions of schedule 8, part 3, subpart A. Imports of electrical measuring and checking instruments, apparatus and parts were supplied primarily from the United Kingdom, Japan, West Germany, and Canada; these countries together accounted for over 75 percent of the total value of imports in 1968 (table 4).

Table 1.--Electrical measuring, checking, analyzing, or automatically-controlling instruments and parts: U.S. exports of domestic merchandise, by types, 1965-68

(In thousands of dollars)

Type of instrument	1965	1966	1967	1968
Instruments for measuring, checking, or testing electrical quantities:				
Circuit and motor testing----	18,167	21,567	27,812	37,972
Oscilloscopes-----	11,155	14,823	17,515	17,063
Indicating, nonrecording----	8,621	11,447	13,561	16,483
Recording-----	6,935	8,138	9,129	11,704
Waveform measuring-----	8,980	7,182	9,656	11,359
Frequency measuring-----	5,123	5,747	5,358	6,746
Portables and laboratory standards-----	1,414	1,565	2,234	2,276
Microwave test-----	1,428	812	1,144	1,781
Panel meters-----	555	1,012	1,310	903
Switchboard meters-----	223	150	472	260
Other recording and recording-controlling-----	2,767	4,723	5,121	5,930
Instruments for indicating, measuring, recording, testing, or controlling nonelectrical quantities:				
Physical properties testing--	1/25,396	1/33,379	1/39,892	46,674
Industrial process-----	2/33,200	2/41,159	36,221	36,064
Geophysical and mineral prospecting-----	20,788	25,304	29,968	25,904
Meteorological and navigation-----	7,472	9,905	14,268	17,207
Automatic temperature controls-----	2,936	3,751	11,331	10,135
Physical or chemical analysis (electro optical)-----	3/	3/	3/	4,352
Continuous type (on-stream) industrial process-----	3/	3/	4,338	4,065
Other nonelectrical quantity measuring instruments-----	20,922	27,575	36,077	31,460

See footnotes at end of table continued on next page.

ELECTRICAL MEASURING, TESTING AND CONTROLLING INSTRUMENTS

Table 1.--Electrical measuring, checking, analyzing, or automatically-controlling instruments and parts: U.S. exports of domestic merchandise, by types, 1965-68--Continued

(In thousands of dollars)

Type of instrument	1965	1966	1967	1968
Nuclear radiation detecting and measuring instruments----	18,108	19,194	22,346	23,770
Parts for:				
Circuits and motor testing instruments-----	5,478	6,204	7,425	7,860
Meteorological and navigation instruments-----	507	1,307	1,497	3,745
Electro optical instruments--	624	528	472	643
Other electrical measuring instruments-----	26,340	31,949	42,799	56,679
Total-----	227,139	277,421	339,946	381,035

1/ Includes value of exports of electro optical physical or chemical analysis instruments (see the separate listing of this class of articles and footnote 3).

2/ Includes value of exports of continuous (on-stream) industrial process instruments (see the separate listing of this class of articles and footnote 3).

3/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 2.--Electrical measuring, checking, analyzing, or automatically-controlling instruments, apparatus, and parts: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	43,996	56,011	61,186	69,089
United Kingdom-----	30,464	34,572	42,292	47,617
Japan-----	12,803	17,419	29,823	31,596
West Germany-----	21,004	25,247	28,443	30,916
France-----	21,231	26,077	32,663	29,237
Australia-----	9,649	12,855	18,440	18,075
Netherlands-----	7,064	10,618	14,085	15,005
Italy-----	11,215	10,166	12,535	14,189
Switzerland-----	9,937	10,632	10,777	11,067
Mexico-----	5,534	6,447	9,607	9,381
Brazil-----	1,783	3,304	5,343	8,653
Sweden-----	3,751	4,966	4,685	5,913
Belgium-----	3,394	3,799	4,532	5,092
Argentina-----	2,197	2,334	3,098	4,925
All other-----	43,117	52,974	62,437	80,280
Total-----	227,139	277,421	339,946	381,035

Source: Compiled from official statistics of the U.S. Department of Commerce.

ELECTRICAL MEASURING, TESTING AND CONTROLLING INSTRUMENTS

Table 3.--Electrical measuring, checking, analyzing, or automatically-controlling instruments, apparatus and parts: U.S. imports for consumption, by types, 1965-68

(In thousands of dollars)

Type of instrument	1965	1966	1967	1968
Ships' logs, depth-sounding instruments, apparatus and parts---	600	684	674	3,201
Automatic flight control instruments, apparatus and parts---	<u>1/</u>	<u>1/</u>	<u>1/</u>	1,044
Radiation measuring instruments, apparatus and parts-----	639	791	881	914
Optical instruments, apparatus and parts---	473	487	122	223
Anemometers and parts---	178	13	35	22
Seismographs and parts--	19	58	20	16
Other electrical instruments, apparatus and parts-----	<u>2/</u> 22,382	<u>2/</u> 34,415	<u>2/</u> 40,708	49,822
Total-----	24,351	36,448	42,440	55,242

1/ Not available; see footnote 2.

2/ Includes value of imports of automatic flight control instruments, apparatus and parts.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Electrical measuring, checking, analyzing, or automatically-controlling instruments, apparatus and parts: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
United Kingdom-----	5,506	9,666	9,823	12,576
Japan-----	4,095	198	7,330	11,432
West Germany-----	4,863	5,642	6,712	9,121
Canada-----	3,040	5,552	6,889	9,043
Sweden-----	1,542	1,973	1,811	2,875
Switzerland-----	1,277	1,979	1,985	2,254
France-----	726	1,226	1,083	1,784
Italy-----	291	448	1,674	1,080
Netherlands-----	253	369	408	483
Israel-----	65	49	39	99
All other-----	2,693	9,346	4,686	4,496
Total-----	24,351	36,448	42,440	55,242

Source: Compiled from official statistics of the U.S. Department of Commerce.

METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR
LIQUID, AND PARTS OF SUCH METERS

229

<u>Commodity</u>	<u>TSUS item</u>
Meters for registering the supply of electricity, gas, or liquid, and parts of such meters-----	713.05, -.15

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

In 1967, the value of U.S. consumption of the meters and parts here under consideration was almost \$261 million, virtually all of which was supplied from domestic production. The value of exports was many times larger than that of imports in 1968.

Description and uses

The most common types of meters included here are those used in private homes or in commercial establishments to indicate or register the quantity of electricity, gas, or water consumed in a given period of time. These meters, which are generally fitted with a device to operate at a speed proportional to the rate of fluid or gas flow, or to the electric current being measured, are often located in a by-pass or shunt off the main flow, but are calibrated to indicate the total quantity being supplied or produced. Included here are gas supply meters of the wet and dry types; liquid supply meters of the impeller (fan wheel), diaphragm, reciprocating piston, disc-piston, and rotary piston types; and electricity supply meters of the motor (moving coil-permanent magnet, dynamometer, and induction), mercury motor, electrolytic, and clock types. Such meters are long-lived, often lasting in service for a period of 20 or more years, with little or no maintenance.

Other types of meters included herein, designed for specific purposes, are as follows: Standard meters, which are extremely accurate meters specially designed for use in checking and calibrating the regular meters; pre-payment meters, in which a coin is inserted to make the meter dispense a measured amount of gas or electricity; multiple rate meters, in which, for example, the supply of electricity is calculated at two or more different rates; plant production or supply meters; maximum meters, which indicate the maximum value of the average load during a given period; peak meters, which indicate consumption above a certain value; and various other special purpose meters.

December 1969

7:2

230 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS

Gas and liquid supply or production meters measure the amount of fluid passing through a pipe in volumetric units. In electricity supply or production meters, the most frequently used unit of measurement is the ampere-hour, from which is derived the designation--ampere-hour meter. When the voltage is constant, however, electricity meters may be calibrated in watt-hours or in multiples of watt-hours; hence, the terms watt-hour meter and kilowatt-hour meter. Since all of these meters sum up the value of the quantity measured with respect to time, they are sometimes called integrating meters.

Flow meters, which measure the rate of flow but not the total amount of liquid delivered over a period, are discussed in the summary for items 711.82 through 711.85 elsewhere in this volume. Instruments such as voltmeters, ammeters or watt-meters, which simply measure electrical quantities and are not designed for registering the total amount of electricity or energy consumed, are treated in the summary for items 712.05 through 712.51, which is also included in this volume.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
:	:	:	:	:
:	:	:	:	:
:	:	:	:	:
:	Gas and liquid supply	:	:	:
:	or production	:	:	:
:	meters; watt-hour	:	:	:
:	meters, ampere-	:	:	:
:	hour meters, and	:	:	:
:	other electricity	:	:	:
:	supply or produc-	:	:	:
:	tion meters de-	:	:	:
:	signed to register:	:	:	:
:	the total amount	:	:	:

Tabulation continued on next page.

METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS 231

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Gas and liquid, etc.-- Con. of electricity or electrical energy produced or con- sumed; standard meters for check- ing and calibrat- ing any of the foregoing and parts therefor: Meters:			
713.05	Valued not over \$10 each-----	\$1.50 each + 32.5% ad val.	\$1.20 each + 26% ad val.	75¢ each + 16% ad val.
	Valued over \$10 each: Electricity supply or production meters and standard meters therefor:			
713.07	Valued not over \$15 each-----	\$2.25 each + 32.5% ad val.	\$1.80 each + 26% ad val.	\$1.12 each + 16% ad val.
713.09	Valued over \$15 each-----	\$2.25 each + 22.5% ad val.	\$1.80 each + 18% ad val.	\$1.12 each + 11% ad val.

Tabulation continued on next page.

232 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	First stage, effective Jan. 1, 1972
713.11	Other-----	\$2.25 each + 35% ad val.	\$1.80 each + 28% ad val.	\$1.12 each + 17.5% ad val.
713.15	Parts-----	45% ad val.	36% ad val.	22.5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

For each of the items shown above with compound rates of duty, the average ad valorem equivalents (a.v.e.) of such rates in effect in 1968, based on imports entered in 1968, were as follows:

<u>TSUS item</u>	<u>A.v.e. rate of duty (percent)</u>
713.05-----	44.3
713.07-----	48.5
713.09-----	22.5
713.11-----	35.6

U.S. consumption

The value of U.S. consumption of the meters and parts discussed in this summary amounted to \$261 million in 1967, an overall increase of about 4 percent compared with the \$251 million reported in 1964 (table 1). Since most of the demand for these meters and parts is directly derived from the demand for new construction of residential, commercial, and industrial establishments, the drop in meter consumption in 1967 reflected a slowdown in building construction activity, a trend expected to continue through 1968-69 due to higher interest rates and uncertainty regarding the investment tax credit.

U.S. producers

The domestic meter industry is comprised of about 12 manufacturers. Three firms produce gas and water meters; two produce gas meters only, and three produce water meters only. Four firms produce electric meters. Domestic meter manufacturers generally produce the bulk of the parts used in meter manufacture, but they sub-contract the manufacture of some parts and import others. Replacement parts are produced chiefly by the meter manufacturers.

Although it is known that at least five of these manufacturers are engaged in production of articles not included in this summary, the products and extent of such manufacture are not known. The producers are located principally in Pennsylvania, Massachusetts, California, Ohio, New York, Illinois, Wisconsin, and Arizona.

U.S. production

The value of factory shipments of gas, liquid, and electricity supply and production meters, standard meters, and parts climbed steadily from \$258 million in 1964 to \$297 million in 1966, then declined to \$275 million in 1967 (table 1). Although data are not available, production in 1968 is expected to be even lower as a result of the declines in that year in both exports and domestic consumption.

In terms of value, shipments of non-electrical integrating meters accounted for most of the total shipments of all types of meters--water meters and gas meters comprised the major part of such shipments (table 2). In terms of quantity, shipments of electrical integrating meters were composed mostly of the low-priced, single phase, a.c. watt-hour meters. Average unit prices of non-electrical integrating meters have been increasing faster than those of the electrical meters.

U.S. exports

Between 1964-68, the value of U.S. exports of gas, liquid, and electricity supply and production meters, and parts reportedly ranged from a low of \$7 million in 1964 to a high of \$15 million in 1967 (table 1). In 1964, however, exports of certain recording types of electrical integrating meters and parts for electrical meters were not included in the relevant instrument category nor separately reported. In terms of value, 1967 exports accounted for about 5 percent of producers' shipments in that year.

234 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR
LIQUID, AND PARTS OF SUCH METERS

Exports of liquid supply meters accounted for more than half the total number of meters exported during 1968; exports of electricity supply meters accounted for nearly all of the remainder (table 3). On the other hand, a substantial portion of the total value of exports in 1968 was for parts of the various meters. A principal reason for the decline in total value of exports between 1967-68 was the drop in average unit prices of liquid supply meters exported in 1968. Exports of domestically produced meters went to a considerable number of countries during 1965-68; among the largest markets were Canada, the United Kingdom, and Mexico (table 4).

U.S. imports

The value of imported meters showed an upward trend in the period 1964-68 (table 1). The value of such imports rose from \$148,000 in 1964 to \$924,000 in 1968, more than six times larger, but the value of these imports continued to be negligible in comparison with domestic production and consumption.

All but a small part of the number of meters imported in 1968 were valued at \$10 or less each (table 5). Virtually all of the meters imported in this category (item 713.05) have been water meters. Average unit prices of these meters declined significantly in 1968 after registering increases approaching the category limit in earlier years. This decline is directly traceable to a devaluation of currency (during the latter part of 1967) in the United Kingdom, suppliers of by far the greatest share of U.S. imports in this category during 1968.

The next largest class of imported meters during 1968 were those other than electricity meters valued over \$10 each (item 713.11). Imports in this class comprised about 50 percent of water meters and the remainder of gas and other liquid meters. Average unit values for these meters show a steady downward trend over the last three years, primarily reflecting an increase in lower priced imports of such meters from Japan.

Imports during 1968 of electricity meters valued between \$10 and \$15 each under item 713.07 (the principal kind used in the United States) were negligible, presenting little competition to similarly priced domestic instruments. In general, the high cost of redesigning foreign meters to meet the standards for meters used in the United States has tended to limit the volume of imports. Principal sources of U.S. imports of supply, production and standard meters and parts during the period 1965-68 were the United Kingdom, Japan, and West Germany (table 6).

METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS 235

Table 1.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. producers' shipments, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Producers' shipments	Imports	Exports	Apparent consumption
1964-----	257,598	148	<u>1/</u> 6,867	250,879
1965-----	270,135	233	12,492	257,876
1966-----	296,545	671	14,109	283,107
1967-----	274,665	776	14,735	260,706
1968-----	<u>2/</u>	924	13,770	<u>2/</u>

1/ Excludes some recording types of electrical integrating meters and parts for all electrical meters. Exports of such meters are believed to have been negligible; the value of parts for electrical meters annually averaged about 15 percent of the total value of all meter exports during 1965-68.

2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--The ratio of imports to consumption is less than one percent.

236 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS

Table 2.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. producers' shipments, by types, 1965-67

Type	1965	1966	1967
	Quantity (1,000 units) <u>1/</u>		
Non-electrical integrating meters:			
Water meters-----	1,515	1,540	1,203
Gas meters-----	1,654	1,534	1,397
Gasoline dispensing meters-----	232	271	263
Other meters-----	204	225	190
Total <u>2/</u> -----	3,605	3,570	3,053
Electrical integrating meters: <u>3/</u>			
Watt-hour meters, a.c.:			
Single phase, <u>4/</u> detachable types----	2,975	2,880	2,744
Polyphase-----	279	246	229
Combined watt-hour and demand meters----	207	251	210
Total <u>2/</u> -----	3,461	3,377	3,183
	Value (1,000 dollars)		
Non-electrical integrating meters:			
Water meters-----	69,480	76,337	70,425
Gas meters-----	61,920	65,275	57,690
Gasoline dispensing meters-----	14,195	20,029	21,348
Other meters-----	14,453	22,547	19,887
Parts-----	11,701	15,043	9,713
Total-----	171,749	199,231	179,063
Electrical integrating meters:			
Watt-hour meters, a.c.:			
Single phase, <u>4/</u> detachable types----	41,428	40,433	38,708
Polyphase-----	11,306	8,949	8,977
Combined watt-hour and demand meters----	13,739	17,319	14,709
Other meters <u>5/</u> -----	9,485	8,888	7,957
Parts-----	22,428	21,725	25,251
Total-----	98,386	97,314	95,602

1/ Parts of meters excluded; not applicable.

2/ Excludes parts.

3/ "Other meters" are not listed under this heading because no quantity data are available for such meters.

4/ Data on other types of single phase a.c. watt-hour meters, such as base, house, and switchboard types, are included in the category "Other meters" of the electrical integrating type to avoid disclosing figures for individual companies.

5/ Includes d.c. watt-hour meters, demand meters, ampere-hour meters, and other miscellaneous electrical integrating instruments.

Source: Compiled from official statistics of the U.S. Department of Commerce.

December 1969

METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR
LIQUID, AND PARTS OF SUCH METERS

237

Table 3.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. exports of domestic merchandise, by types, 1965-68

Type	1965	1966	1967	1968
	Quantity (1,000 units) ^{1/}			
Liquid supply meters-----	86	92	125	145
Electricity supply meters-----	90	130	117	103
Gas supply meters-----	4	5	10	15
Total, meters-----	180	227	252	263
	Value (1,000 dollars)			
Liquid supply meters-----	4,452	4,756	4,945	3,839
Electricity supply meters-----	2,366	2,607	2,603	2,596
Gas supply meters-----	1,788	1,738	1,761	1,493
Total, meters-----	8,606	9,101	9,309	7,928
Parts for integrating meters, non-electrical-----	2,092	2,918	3,174	3,761
Parts for integrating meters, electrical-----	1,794	2,090	2,252	2,081
Total, meters and parts-----	12,492	14,109	14,735	13,770

^{1/} Parts of meters excluded under this heading; not applicable.

Source: Compiled from official statistics of the U.S. Department of Commerce.

238 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR
LIQUID, AND PARTS OF SUCH METERS

Table 4.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. exports of domestic merchandise, by principal markets, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Canada-----	3,705	4,399	3,788	4,167
United Kingdom-----	880	815	824	1,077
Mexico-----	738	728	874	857
France-----	643	728	836	588
Philippines-----	519	890	447	533
West Germany-----	243	320	437	524
Australia-----	369	385	337	461
Republic of China (Taiwan)-----	149	60	169	408
Brazil-----	46	95	244	339
Pakistan-----	181	122	302	278
Japan-----	408	225	296	263
Chile-----	265	75	196	246
Italy-----	211	249	340	237
Republic of South Africa-----	347	128	203	207
All other-----	3,788	4,890	5,442	3,585
Total-----	12,492	14,109	14,735	13,770

Source: Compiled from official statistics of the U.S. Department of Commerce.

METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR LIQUID, AND PARTS OF SUCH METERS 239

Table 5.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. imports for consumption, by types (TSUS items), 1965-68

Type (TSUS item)	1965	1966	1967	1968
Quantity (number) <u>1/</u>				
Valued not over \$10 each				
(713.05)-----	3,392	<u>2/</u> 22,148	<u>2/</u> 27,544	59,685
Valued over \$10 each:				
Electricity meters:				
Valued not over \$15 each				
(713.07)-----	-	-	-	286
Valued over \$15 each				
(713.09)-----	76	443	329	311
Other meters (713.11)-----	2,000	5,253	6,269	5,439
Total <u>3/</u> -----	5,468	27,844	34,142	65,721
Value (1,000 dollars)				
Valued not over \$10 each				
(713.05)-----	32	<u>2/</u> 215	<u>2/</u> 270	528
Valued over \$10 each:				
Electricity meters:				
Valued not over \$15 each				
(713.07)-----	-	-	-	3
Valued over \$15 each				
(713.09)-----	15	18	18	25
Other meters (713.11)-----	127	339	363	271
Parts for meters (713.15)-----	59	99	125	97
Total, meters and parts---	233	671	776	924
Unit value (each) <u>1/</u> <u>4/</u>				
Valued not over \$10 each				
(713.05)-----	\$9.41	<u>2/</u> \$9.68	<u>2/</u> 9.82	\$8.85
Valued over \$10 each:				
Electricity meters:				
Valued not over \$15 each				
(713.07)-----	-	-	-	10.38
Valued over \$15 each				
(713.09)-----	199.24	41.68	53.93	80.27
Other meters (713.11)-----	63.45	64.54	57.94	49.74
Average <u>3/</u> -----	42.68	24.03	22.74	14.06

1/ Parts for meters (713.15) excluded under this heading; not applicable.

2/ Data adjusted by the Tariff Commission to correct statistical misclassifications.

3/ Excludes parts.

4/ Calculated from the unrounded values.

Source: Compiled from official statistics of the U.S. Department of Commerce.

240 METERS FOR REGISTERING THE SUPPLY OF ELECTRICITY, GAS, OR
LIQUID, AND PARTS OF SUCH METERS

Table 6.--Meters for registering the supply of electricity, gas, or liquid, and parts of such meters: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
United Kingdom-----	42	222	287	524
Japan-----	49	187	241	155
West Germany-----	116	234	171	143
Canada-----	10	15	10	60
Switzerland-----	6	9	51	18
France-----	1	-	1	3
All other-----	9	4	15	21
Total-----	233	671	776	924

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Stroboscopes and parts thereof:	
Stroboscopes-----	713.17
Parts-----	713.19

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of stroboscopes and parts thereof (virtually all of domestic origin) is estimated to have been valued at \$3.5 million in 1968. U.S. exports of such articles in 1968 were valued at \$253,000.

Description and uses

Stroboscopes are instruments that utilize periodic, intermittent light or glimpses of an object for studying rotating or reciprocating objects. Their function is to make moving things appear to the eye to be standing still. They enable machines in operation to be observed as though they were moving slowly or as if stationary. When used to measure the speed of rotation, they are more generally known as stroboscopic tachometers.

Stroboscopes are used for reading rotating instruments and calibration markings; observing vibration, displacement and the action of gears and ball bearings; and for adjustment of cutting tools and other machinery. Stroboscopes are also used in medical practice as, for example, in examining the vibration of vocal chords. Electronic stroboscopic flash apparatus used in photography does not fall within the scope of this summary; it is discussed in the summary covering item 722.72 providing for photographic flash-lighting apparatus in volume 7:3.

STROBOSCOPES AND PARTS THEREOF

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Stroboscopes of all kinds, and parts thereof:			
713.17	Stroboscopes-----	\$2.25 each + 35% ad val.	\$1.80 each + 28% ad val.	\$1.12 each + 17.5% ad val.
713.19	Parts-----	45% ad val.	36% ad val.	22.5% ad val.

The tabulation above shows the column 1 rates of duty in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

The average ad valorem equivalent of the compound rate of duty in effect in 1968 for item 713.17 was 33 percent, based on imports entered in 1968.

Comment

The value of U.S. production (and thus consumption) of stroboscopes and parts is not available from official statistics. Based on information from industry sources, however, it is estimated that the value of domestic consumption of these articles approximated \$2.9 million in 1965 and then expanded at an average annual rate of almost 7 percent to about \$3.5 million in 1968 (table 1). The greatest demand for these devices is for use in trouble-shooting and servicing of all kinds of production machinery, data processing equipment, and internal combustion engines.

U.S. production of stroboscopes and parts is estimated to have kept pace with consumption. Production was valued at \$3.0 million in 1965, growing at a little over 7 percent per year to an estimated \$3.7 million output in 1968. Production of stroboscopes and parts has been spurred not only by enlargement of the domestic market, but also by increased exports of stroboscopes.

About ten domestic manufacturers produce stroboscopes and parts. All of these manufacturers also produce a variety of other types of instruments, and stroboscope production is generally a minor part of their operations. The principal producing states are Illinois, Massachusetts, and New York.

U.S. exports of stroboscopes amounted to 6,550 units, valued at \$253,000 in 1968, up about 50 percent in quantity and 80 percent in value from the exports of 4,347 units, valued at \$140,000 in 1965 (table 2). Exports of parts for stroboscopes, although not reported separately or included with stroboscopes, are believed to be negligible. In terms of value, exports equalled about 7 percent of domestic production in 1968. Principal foreign markets were Switzerland and Canada.

U.S. imports of stroboscopes in 1968 amounted to 229 units, valued at about \$31,000, accounting for less than 1 percent of domestic consumption (table 3). Imports of stroboscope parts, reported in terms of value only, were even smaller. Average unit values for the stroboscopes imported during 1965-68 ranged from a low of \$45 to a high of \$796. The supplying countries in 1968 were Denmark, West Germany, and the United Kingdom.

Table 1.--Stroboscopes and parts: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1965-68

(In thousands of dollars)

Year	Production <u>1/</u>	Imports	Exports <u>2/</u>	Apparent con- sumption
1965-----	3,000	6	140	2,866
1966-----	3,500	10	213	3,297
1967-----	3,660	16	252	3,424
1968-----	3,700	31	253	3,479

1/ Estimated on the basis of information received from the industry and indices published by the U.S. Department of Commerce.

2/ Data are not strictly comparable; parts for stroboscopes are not included.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Note.--The ratio of imports to consumption is less than one percent.

Table 2.--Stroboscopes: U.S. exports of domestic merchandise,
by principal markets, 1965-68

Country	1965	1966	1967	1968
	Quantity (number)			
Switzerland-----	362	758	572	1,917
Canada-----	3,367	519	707	1,469
All other-----	618	884	1,338	3,164
Total-----	4,347	2,161	2,617	6,550
	Value (1,000 dollars)			
Switzerland-----	36	76	77	100
Canada-----	51	52	74	66
All other-----	52	85	101	87
Total-----	140	213	252	253

Source: Compiled from official statistics of the U.S. Department of Commerce.

STROBOSCOPES AND PARTS THEREOF

Table 3.--Stroboscopes and parts: U.S. imports for consumption, by TSUS item, by principal sources, 1965-68

TSUS item and country	1965	1966	1967	1968
	Quantity (number)			
Stroboscopes (713.17):				
Denmark-----	-	-	5	28
West Germany-----	60	65	106	103
United Kingdom-----	1	22	61	98
All other-----	5	-	21	-
Total-----	66	87	193	229
	Value			
Stroboscopes (713.17):				
Denmark-----	-	-	\$2,574	\$14,284
West Germany-----	\$2,685	\$7,572	7,156	9,347
United Kingdom-----	796	2,182	4,522	7,676
All other-----	2,156	-	1,541	-
Total-----	5,637	9,754	15,793	31,307
	Value			
Parts for stroboscopes (713.19):				
Denmark-----	-	-	-	\$395
West Germany-----	-	\$384	\$673	-
United Kingdom-----	-	-	-	-
All other-----	-	-	-	-
Total-----	-	384	673	395

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Watches-----	715.05
Watch movements-----	716.08-719.36
Watch cases and parts thereof-----	720.20, -.30

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of watches in 1968 amounted to more than 44 million units. In recent years, imported watch movements have supplied more than half of domestic consumption and more than half of the watch movements consumed in the United States had imported cases. Exports are negligible--less than 1.0 percent of domestic production.

Description and uses

This summary covers watches, watch movements and cases, and parts of watch cases (except crystals or glasses). Watches are time-keeping devices to be worn or carried on or about a person. Watches are worn on the wrist by means of a strap or bracelet; carried in the pocket or in special leather carriers attached to clothing; set in rings and worn on the finger; pinned to the outer clothing; or worn on chains around the neck. Pendant watches and mod watches, those with wide, bright-colored bands and large dials, have been particularly popular in recent years as items of fashion. All watches are functional; many are items of fashion. (For a discussion of metal watch bands or metal watch bracelets and watch chains see volume 7:6; for leather straps, volume 7:1; for plastic straps, volume 7:7; for woven straps, volume 3:6; and for watch crystals or glasses, volume 5:4.)

A watch consists of two major components--movement and case. Consumption data are usually reported in terms of movements, but for all practical purposes a movement is equivalent to a watch except, of course, in terms of value. The movement (imported or domestic) is placed in a case (imported or domestic) to make a complete watch.

For tariff purposes, watch movements must measure less than 1.77 inches in width and less than 0.50 inch in thickness. They are of two principal types--pin-lever and jeweled-lever; pin-lever movements usually have not more than 1 jewel; jeweled-lever movements

employ two or more synthetic jewels as bearings to alleviate friction in moving parts. Jeweled movements are considered to be superior in quality to pin-lever movements, and in general are more accurate. Many movements have such features as day-calendar mechanisms or self-winding devices, and some are powered by electric cells.

Watch cases are made from various materials ranging from base metal to precious metal encrusted with gemstones; a few are made of plastics. In some instances the value of the case far exceeds that of the movement. Parts of watch cases include bezels, backs, and centers. (For a discussion of parts of watch movements see the summary on watch movement parts and sub-assemblies in this volume.)

U.S. tariff treatment

Rates of duty are provided separately for the individual components of watches, i.e., the movement and the case. Duties are assessed on each component.

Escape-clause (increased) rates of duty were made applicable to almost all imported 0-17 jewel watch movements by Presidential Proclamation 3062, effective July 27, 1954, pursuant to the provisions of section 7 of the Trade Agreements Extension Act of 1951, as amended.

Presidential Proclamation 3761 of January 11, 1967, effected an immediate termination of the escape-clause rates, reducing duties on almost all 0-17 jewel watch movements by one-third. (See appendix C at the end of this volume for the array of escape-clause rates on watch movements.) The rate of duty on over 17-jewel movements was changed as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade (GATT). This particular rate is being reduced 50 percent in five annual stages which began January 1, 1968. The rate of duty on C-1 jewel pocket watch movements was not affected by the escape-clause action nor by the recent GATT negotiations.

In addition to foreign imports, watches and watch movements are shipped into the United States from the U.S. insular possessions. A watch component--movement or case--produced or manufactured in a U.S. insular possession outside the customs territory of the United States is free of duty when imported into the U.S. customs territory if it does not contain foreign materials valued at more than 50 percent of the total value of the article (see general headnote 3(a) of the Tariff Schedules of the United States). Pursuant to this provision and previous similar provisions, watch movements (almost entirely uncased) assembled from foreign parts were shipped from the Virgin Islands beginning in 1959; shipments were initiated from Guam in late 1965.

Effective January 1, 1967, a statutory quota was established for watches and watch movements entering the customs territory of the United States free of duty from the Virgin Islands, Guam, and American Samoa. Under the statute, annual imports of watch movements from these insular possessions are limited to one-ninth of the apparent U.S. consumption of watch movements during the preceding calendar year. The quota is divided as follows: 87.5 percent for the Virgin Islands, 8.33 percent for Guam, and 4.17 percent for American Samoa. No watch assembly establishment has opened on American Samoa to date.

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
715.05	Watches-----	The column 1 rates applicable to the cases; plus the column 1 rates applicable to the movements, if such cases and movements were imported separately.	The column 1 rates applicable to the cases, plus the column 1 rates applicable to the movements, if such movements were imported separately.	The column 1 rates applicable to the cases, plus the column 1 rates applicable to the movements, if such cases and movements were imported separately.

250 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch movements, as- sembled, without dials or hands, or with dials or hands whether or not assembled thereon:			
716.08	Having over 17 jewels.	\$10.75 each	\$8.60 each	\$5.37 each
	Having no jewels or not over 17 jewels:			
	Not adjusted, not self-winding (or if a self- winding device: cannot be in- corporated therein), and not con- structed or designed to operate for a period in ex- cess of 47 hours without rewinding:			
	Having no jewels: or 1 jewel:			
716.10	Not over 0.6 inch in width.	90¢ each:	<u>1/</u>	<u>1/</u>
716.11	Over 0.6 but not over 0.8: inch in width.	75¢ each:	<u>1/</u>	<u>1/</u>

See footnotes at end of table.

WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES 251

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch movements, etc.			
	--Continued			
	Having no jewels or 1 jewel--Con.			
716.12	Over 0.8 but not over 0.9: inch in width.	75¢ each:	<u>1/</u>	<u>1/</u>
716.13	Over 0.9 but not over 1 inch in width.	75¢ each:	<u>1/</u>	<u>1/</u>
716.14	Over 1 but not over 1.2 inches in width.	75¢ each:	<u>1/</u>	<u>1/</u>
716.15	Over 1.2 but not over 1.5: inches in width.	75¢ each:	<u>1/</u>	<u>1/</u>
716.16	Over 1.5 but less than 1.77 inches in width.	75¢ each:	<u>1/</u>	<u>1/</u>
	Having over 1 jewel but not over 7 jewels:			
716.20	Not over 0.6 inch in width.	\$1.80 each	<u>1/</u>	<u>1/</u>
716.21	Over 0.6 but not over 0.8: inch in width.	\$1.35 each	<u>1/</u>	<u>1/</u>
716.22	Over 0.8 but not over 0.9: inch in width.	\$1.35 each	<u>1/</u>	<u>1/</u>

See footnotes at end of table.

252 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch movements, etc.			
	--Continued			
	Having over 1 jewel but not over 7 jewels--Con.			
716.23	Over 0.9 but not over 1 inch in width.	\$1.20 each	<u>1/</u>	<u>1/</u>
716.24	Over 1 but not over 1.2 inches in width.	90¢ each	<u>1/</u>	<u>1/</u>
716.25	Over 1.2 but not over 1.5 inches in width.	90¢ each	<u>1/</u>	<u>1/</u>
716.26	Over 1.5 but not over 1.77 inches in width.	90¢ each	<u>1/</u>	<u>1/</u>
	Having over 7 but not over 17 jewels:			
716.30	Not over 0.6 inch in width.	\$1.80 each <u>2/</u>	<u>1/</u>	<u>1/</u>
716.31	Over 0.6 but not over 0.8 inch in width.	\$1.35 each <u>2/</u>	<u>1/</u>	<u>1/</u>
716.32	Over 0.8 but not over 0.9 inch in width.	\$1.35 each <u>2/</u>	<u>1/</u>	<u>1/</u>
716.33	Over 0.9 but not over 1 inch in width.	\$1.20 each <u>2/</u>	<u>1/</u>	<u>1/</u>

See footnotes at end of table.

WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES 253

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch movements, etc.			
	--Continued			
	Having over 7			
	but not over:			
	17 jewels--			
	Continued.			
716.34	Over 1 but not:	90¢ each:	<u>1/</u>	<u>1/</u>
	over 1.2	<u>2/</u>		
	inches in			
	width.			
716.35	Over 1.2 but	90¢ each:	<u>1/</u>	<u>1/</u>
	not over 1.5:	<u>2/</u>		
	inches in			
	width.			
716.36	Over 1.5 but	90¢ each:	<u>1/</u>	<u>1/</u>
	not over	<u>2/</u>		
	1.77 inches			
	in width.			
	Having no jewels or			
	not over 17			
	jewels--Con.			
717.--	Adjusted, but not	Column 1:	<u>1/</u>	<u>1/</u>
<u>4/</u>	self-winding	base		
	(and if a self-	rate <u>3/</u> :		
	winding device	+ 50¢		
	cannot be incor-	for		
	porated therein):	each		
	and not con-	adjust-		
	structed or de-	ment		
	signed to oper-	<u>5/</u>		
	ate for a period:			
	in excess of 47			
	hours without			
	rewinding.			

See footnotes at end of table.

254 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch movements, etc.			
	--Continued			
	Having no jewels or not over 17 jewels--Con.			
718.-- <u>4/</u>	Self-winding (or if a self-wind- ing device can be incorporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewind- ing, but not ad- justed.	Column 1: base rate <u>3/</u> + 50¢ each.	<u>1/</u>	<u>1/</u>
719.-- <u>4/</u>	Adjusted and self- winding (or if a self-winding de- vice can be in- corporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewinding.	Column 1: base rate <u>3/</u> + 50¢ each + 50¢ for each adjust- ment. <u>5/</u>	<u>1/</u>	<u>1/</u>

See footnotes at end of table.

WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES 255

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Watch cases and parts thereof:			
	Wholly or almost wholly of gold or platinum or of both gold and platinum:			
720.20	Cases-----	75¢ each + + 30% ad val.	60¢ each + 24% ad val.	37¢ each + 15% ad val.
	Parts:			
720.21	Bezels, backs, and centers---	37.5¢ each + 30% ad val.	30¢ each + 24% ad val.	18¢ each + 15% ad val.
720.22	Other-----	40% ad val.	32% ad val.	20% ad val.
	Not wholly and not almost wholly of: gold or platinum: or of both gold and platinum:			
	Wholly or in part of silver; or containing gold or plati- num; or set, or prepared to be set, with precious or semiprecious stones or with imitation gem- stones:			
720.24	Cases-----	40¢ each + + 30% ad val.	32¢ each + 24% ad val.	20¢ each + 15% ad val.

256 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.25	Parts: Bezels, backs, and centers---	20¢ each + 30% ad val.	16¢ each + 24% ad val.	10¢ each + 15% ad val.
720.26	Other-----	30% ad val.	24% ad val.	15% ad val.
720.28	Other: Cases-----	10¢ each + 20% ad val.	8¢ each + 16% ad val.	5¢ each + 10% ad val.
720.29	Parts: Bezels, backs, and centers---	5¢ each + 20% ad val.	4¢ each + 16% ad val.	2.5¢ each + 10% ad val.
720.30	Other-----	19% ad val.	15% ad val.	9.5% ad val.

- 1/ Rates not affected by the 1964-67 trade conference.
- 2/ Plus 9¢ for each jewel over 7.
- 3/ The rates in column 1, including the specific rate for each jewel over 7, for articles described in items 716.10 through 716.36 are the "base rates" to be used for watch movements having the same width and number of jewels covered by items 717.--, 718.--, 719.--.
- 4/ The full item citation for the movement consists of the 3 digits shown plus the last 2 digits of the appropriate "base rate" shown above for the movement.
- 5/ Adjustment to temperature is treated as 2 adjustments, as provided in headnote 3(e), part 2E, schedule 7, of the TSUS.

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES 257

The average ad valorem equivalents of the specific duties on watches and watch movements, using 1967 trade statistics, for those items affected by the termination of the escape-clause rates (Jan. 11, 1967) are as follows:

<u>TSUS</u> <u>item</u>	<u>Rate prior to</u> <u>January 11, 1967</u> <u>(Percent)</u>	<u>Rate effective</u> <u>January 11, 1967</u> <u>(Percent)</u>
716.10-----	59.6	39.8
716.11-----	50.7	33.2
716.12-----	52.9	35.3
716.13-----	52.6	37.6
716.14-----	47.5	38.3
716.15-----	42.5	38.0
716.20-----	64.8	46.7
716.21-----	69.6	46.4
716.22-----	47.2	31.9
716.23-----	45.4	31.1
716.24-----	33.2	22.2
716.25-----	24.0	16.0
716.26-----	30.4	21.9
716.30-----	45.3	31.8
716.31-----	57.4	38.2
716.32-----	19.8	13.3
716.33-----	39.0	25.9
716.34-----	47.3	31.6
716.35-----	30.4	19.9
716.36-----	41.4	28.7
717.30-----	34.7	27.3
717.31-----	40.2	30.9
717.33-----	17.7	13.8
717.34-----	18.8	15.5
718.10-----	153.5	102.4
718.11-----	31.8	21.3
718.14-----	45.0	33.5
718.16-----	52.3	43.6
718.20-----	120.5	85.3
718.21-----	103.5	69.0
718.26-----	59.9	42.0
718.30-----	26.3	18.3
718.31-----	33.2	22.1
718.32-----	16.4	11.0
718.33-----	17.7	11.9
718.34-----	32.7	21.7
718.35-----	12.7	8.5
718.36-----	22.5	15.5
719.34-----	21.8	17.1
719.35-----	45.7	34.2

258 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

With the single exception of the rate applicable to TSUS item 716.16, which has remained at the statutory level, all other rates of duty on watches, watch movements, watch cases, and parts, have been reduced either as a result of the termination of an escape-clause action or by about fifty percent as a result of concessions granted by the United States in the sixth round of trade negotiations under the GATT. Employing 1968 trade data, the average ad valorem equivalents of the specific duties applicable to those articles--on which the rates were reduced by the sixth round--were computed as follows:

<u>TSUS</u> <u>item</u>	<u>Ad valorem</u> <u>equivalent</u> <u>(Percent)</u>
716.08-----	49.6
720.20-----	33.2
720.21-----	35.5
720.22-----	36.0
720.24-----	44.8
720.25-----	65.8
720.26-----	27.0
720.28-----	41.9
720.29-----	30.9
720.30-----	17.0

The average ad valorem equivalent of the statutory duty for item 716.16 is 41.9 percent, based on 1968 trade data.

U.S. consumption

Watch consumption in the United States expanded from 27 million units in 1964 to 44 million units in 1968--an increase of 62 percent (table 1). The rapid growth in watch consumption was attributable in large measure to rising consumer disposable income and population growth.

Increased customer acceptance and availability of inexpensive watches resulted in a larger share of sales in the low-price range. Other factors that influenced the domestic watch market in the period under consideration were: (1) the increased popularizing of Swiss-made, economically-priced, jeweled-lever watches in the United States; (2) the rapidly expanding shipments of duty-free jeweled-lever watch movements from U.S. insular possessions; (3) reductions in manufacturers' cost in most domestically-produced watches through the inclusion of more foreign-made parts; (4) heavy reliance on proven marketing techniques by domestic manufacturers and importers; and (5) the introduction of new styles and technological improvements.

While watch consumption increased by about 23 percent from 1965 to 1966, the rate of increase in 1967 and in 1968 was less than 3 percent. A number of factors were responsible for deceleration in the rate of growth of watch consumption in the two latest reporting years. The fad for women's pendant watches had reached its zenith by 1967 and had begun to decline. Mod wrist watch sales, fashion items with oversize dials and large, brightly-colored straps were growing; yet expanded sales of these "go-go" watches were not sufficient to overcome faltering sales of pendant watches. And a final factor affecting watch consumption--disposable personal income--did not climb as rapidly in the United States in 1967 or 1968 as it did in 1966.

By far the largest segment of watches consumed in the United States is accounted for by the pin-lever or inexpensive jeweled-lever watches selling at retail under \$30. The second most popular segment is the \$30 - \$74 category. It was estimated by one source that 5 million watches in the \$75-and-up category were consumed in the United States in 1968, suggesting that demand is increasing for more expensive timepieces. Although electric and electronic watch sales have increased, they still accounted for a relatively small portion of the entire market.

All segments of the population--from teenagers to retirees--have purchased more watches in recent years; more than half of those sold in recent years have been purchased as gifts. Purchases of watches for personal use have been based to a large extent on their use as a fashion item as well as their utility as a timepiece.

In recent years, more than half of the watch movements marketed in the United States were sold in imported cases; it is estimated that in 1968 about 58 percent of the movements sold were in such cases.

U.S. producers

Four producers manufacture or assemble watches in 10 establishments in the United States, and about 30 firms produce cases. Plants which produce watches are located in Connecticut, Illinois, Pennsylvania, Texas, Arkansas, North Carolina, and Puerto Rico. Two watch producers manufacture or assemble jeweled-lever wrist watches (one also manufactures jeweled-lever pocket watches). One manufacturer produces pin-lever wrist watches, and one produces pin-lever pocket watches. All the producers of wrist watches make special feature wrist watches such as those powered by storage batteries and those containing selfwinding attachments.

All domestic watch manufacturers import watch movements either from foreign subsidiaries or from independent foreign producers for incorporation into watches. The four U.S. manufacturers have affiliate concerns in the Virgin Islands engaged in assembling imported parts into movements for shipment to their domestic plants or to customer firms.

The watch case industry in the United States, which is located principally in Rhode Island, Connecticut, New York, and Michigan, is composed of two distinct categories of concerns: (1) About 20 small concerns produce high-grade karat-gold and platinum watch cases in addition to the manufacture of fine jewelry; and (2) six to ten larger firms fabricate all types of watch cases including karat-gold, platinum, gold-filled, rolled gold, sterling silver, and electroplated base-metal cases. This second category can be subdivided into two smaller groups: (a) firms that manufacture watch cases alone; and (b) watch case divisions of multi-product watch concerns. Several concerns specialize in watch case manufacture, but at least two of the domestic watch manufacturers and one large watch importer have watch case divisions that produce watch cases for proprietary items and sell watch cases to other manufacturers and importers. Watch case manufacture for these firms is adjunctive to the production and importation of watch movements and the marketing of complete timepieces. All three of these concerns are multi-product companies with foreign subsidiaries.

U.S. production

U.S. production of watch movements increased from 12 million units in 1964 to 17 million units in 1968--an average annual increase of 9.2 percent (table 1). Domestic production relative to aggregate consumption declined through 1966, but the trend was reversed in 1967-68 when there was a gradual increase in the ratio of production to consumption. Domestic production supplied 39 percent of total consumption in 1968.

Both pin-lever and jeweled-lever watches constitute the domestic output of the United States. Since 1964, production of pin-lever watches has increased in terms of absolute quantity, but decreased slightly relative to aggregate consumption. Domestic production of jeweled-lever watches has decreased in terms of both absolute quantity and relative to aggregate consumption.

Domestic production of watch cases increased from approximately 17 million units in 1964 to 19 million units in 1968; however, domestically produced watch cases constituted about 60 percent of total domestic consumption in the earlier year, but only about 40 percent

of consumption in the latter. A sizable part of such production consists of rolled-gold or gold-filled cases. These types are generally used to case jeweled-lever watch movements.

U.S. exports

Data concerning exports of domestic watches, unlike those for imports, are in terms of complete watches only--not in terms of watches and movements. Although watch movements are exported from the United States, they are not separately provided for in official statistics.

Annual exports of watches, which have been equivalent to less than 1 percent of total domestic output in recent years, in the period 1964-68, increased from a low of 63,000 units, valued at \$1.0 million in 1965 to 132,000 units, valued at \$1.5 million in 1968. Hong Kong, Mexico, Canada, and Italy have been the principal markets for watches (in terms of value) in recent years (table 2).

The tabulation below, compiled from official statistics of the U.S. Department of Commerce, gives the value of domestic watch cases and parts exported separately (excluding those exported as components of complete watches), by principal markets, 1965-68, in thousands of dollars:

Country	1965	1966	1967	1968
Canada-----	446	479	703	565
Switzerland-----	382	203	180	154
Hong Kong-----	122	84	97	92
West Germany-----	12	123	80	54
United Kingdom-----	178	70	44	54
Japan-----	513	205	46	52
All other-----	161	101	128	131
Total-----	1,814	1,265	1,278	1,102

The tabulation shows watch case exports declined from \$1.8 million in 1965 to \$1.1 million in 1968, for an average decrease of 11.6 percent per year. The decline in such exports probably was attributable in major part to increased competition from indigenous producers in the foreign markets involved.

262 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

U.S. imports

For tariff purposes, watch movements and cases are dutiable separately when imported, whether they are entered separately or in the form of complete watches. Therefore, the number of watches imported are referred to in terms of watch movements, whether cased or uncased.

In 1964, U. S. imports of watch movements amounted to 15 million units. The trend of imports was upward through 1966, dropped slightly in 1967, and reached a new peak of 27 million units in 1968. During 1964-68, the value of such movements increased from about \$74 million to \$137 million.

Imports of watch movements (in terms of quantity) account for more than half of the total consumption of such articles. In 1964 imports supplied 56 percent, and in 1968, 61 percent of watch sales (table 1). The ratio in the intervening years was erratic and showed no definite trend.

Coinciding with the increased flow of watch and watch movements imports into the United States, there has been a change in composition of such imports. As shown in the tabulation below, compiled from official statistics of the U.S. Department of Commerce, the ratio of pin-lever imports to total imports has changed from 44.5 percent to 57 percent during the period 1964-68:

Year	Jeweled-lever	Pin-lever	Total	Ratio of pin-lever imports to total imports
	<u>1,000 units</u>	<u>1,000 units</u>	<u>1,000 units</u>	<u>Percent</u>
1964-----	7,217	5,797	13,014	44.5
1965-----	8,154	8,966	17,120	52.4
1966-----	9,449	12,148	21,597	56.2
1967-----	10,682	12,231	22,913	53.4
1968-----	9,908	13,281	23,189	57.3

Switzerland, the Virgin Islands and Guam, Japan, and West Germany have been the principal suppliers of watch movements imported into the customs territory of the United States (table 3). Switzerland, which supplied most of the pin-lever movements, accounted for about 70 percent of total U.S. imports in 1968, and the Virgin Islands and Guam accounted for about 15 percent.

Several developments since the beginning of 1967 will have an impact, both short and long term, on the level of watch imports into the United States. Principal among these was the termination of the escape clause rates of duty on the most competitive watch movements being imported. (All but one of the O-17 jewel movements were affected.) Secondly, as a result of the Kennedy Round under GATT, the rate on over-17-jewel watch movements is being reduced by 50 percent in five stages over a four year period which began in 1968.

The first two developments have been accompanied by a third factor affecting the pattern of imports--the implementation of the statutory tariff-rate quota on duty-free watch movements from the U.S. insular possessions. With the implementation of the quota in 1967 and the adverse psychological impact on the assemblers in the insular possessions, resulting from the termination of the escape-clause rate increases on imported watch movements, shipments from the Virgin Islands and Guam declined in 1967, but made a partial recover in 1968. Even in 1968, however, shipments fell 725,000 units short of the maximum number of units that could have been shipped duty-free under the quota from all three U.S. insular possessions. In addition to the tariff-rate quota on such shipments, there was yet another less obvious factor that made assembly operations perhaps less appealing in the Virgin Islands. This was the increase in the minimum wage rates. The net result of all these developments was a depressing effect on shipments from both possessions to the United States. The adverse effect was particularly noticeable on some independent watch movement assemblers in the insular possessions. Concerns with parent companies on the mainland that had adequate marketing and distribution systems were not materially affected.

In recent years, about half of the total U.S. imports of watch movements have consisted of cased watches. Virtually all of the movements imported from the insular possessions have entered as uncased movements.

U.S. imports of watch cases (imported separately) increased from 6 million units, valued at \$2 million in 1965 to 12 million units, valued at \$5 million in 1968 (table 4). Virtually all such imports (in terms of quantity) were entered under item 720.28 (watch cases not specifically provided for). In recent years, the United Kingdom, France, and Hong Kong have been the principal suppliers of watch cases.

264 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

The following tabulation, compiled from official statistics of the U.S. Department of Commerce, shows the value of U.S. imports of parts of cases, by principal sources, for 1965-68 (in thousands of dollars):

Country	1965	1966	1967	1968
West Germany-----	214	391	426	502
Hong Kong-----	154	150	146	171
Japan-----	143	168	184	141
Switzerland-----	59	60	94	93
United Kingdom-----	345	523	210	27
France-----	181	284	83	15
All other-----	-	1	8	4
Total-----	1,096	1,578	1,151	953

About three-fourths of the above imports were entered under item 720.29 (watch bezels, backs and centers, n.s.p.f.). Virtually all of the remaining imports were entered under item 720.30 (watch case parts, n.s.p.f.).

World trade

World production and trade in watches more than doubled in the period 1954-67 (table 5). Production in Switzerland, by far the world's largest producer of watch movements, showed an upward trend during that period in absolute terms, but the ratio of its production relative to world production declined. Japan, the U.S.S.R. (including other Communist-dominated countries in Eastern Europe) and probably Communist China showed the greatest rate of growth both in absolute and relative terms. The trend of production in the United States followed the pattern of that in Switzerland--upward in absolute quantity but downward relative to world total.

World watch case production for the most part is carried on by the same countries that lead in the manufacture of watches and watch movements. Switzerland, the United States, the United Kingdom, France, West Germany, and Japan are foremost in watch case production in the free world; yet rapidly developing areas like Hong Kong, where wages are relatively low, are producing watch cases at an accelerated rate. The Communist bloc produces watch cases too; primarily for internal consumption.

WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES 265

Table 1.--Watch movements: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(Quantity in thousands of units)

Year	: Produc- : tion	: Imports : <u>1/</u>	: Exports : <u>2/</u>	: Apparent : consump- : tion	: Ratio : (percent) of : imports to : consumption
1964-----	12,075	15,383	105	27,353	56
1965-----	13,672	20,745	63	34,354	60
1966-----	15,280	27,045	88	42,237	64
1967-----	16,670	26,695	71	43,294	62
1968-----	17,242	27,274	132	44,384	61

1/ Includes uncased and cased movements (complete watches), and imports from Guam and the Virgin Islands (see import section of text).

2/ Exports in 1964 include cased and uncased movements, whereas data for 1965-68 represent cased movements only. (Exports of uncased movements are not reported separately from clock cases and clock or watch parts.) Many exports are sent to post exchanges of the U.S. Armed Services in foreign countries, from which places they are usually returned to the United States. Such exports are not reflected in these data.

Source: Production data from reports by manufacturers to the U.S. Tariff Commission; import and export data compiled from official statistics of the U.S. Department of Commerce.

266 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

Table 2.--Watches: U.S. exports of domestic merchandise, by principal markets, 1964-68 1/

Country	1964	1965	1966	1967	1968
	Quantity (1,000 units)				
Hong Kong-----	10	10	11	11	18
Mexico-----	13	4	6	7	10
Canada-----	15	9	10	7	16
Italy-----	5	1	4	3	8
West Germany-----	10	6	8	2	5
Netherlands Antilles----	1	<u>2/</u>	1	2	3
Brazil-----	1	-	-	-	14
Bahamas-----	1	1	1	-	5
Jamaica-----	2	2	1	1	2
Nansei and Nanpo Islands-----	2	4	2	2	2
Japan-----	9	6	9	5	2
United Kingdom-----	1	-	-	-	6
France-----	2	-	4	4	21
All other-----	33	20	31	27	20
Total-----	105	63	88	71	132
	Value (1,000 dollars)				
Hong Kong-----	156	143	131	203	276
Mexico-----	190	78	131	182	226
Canada-----	256	137	109	99	131
Italy-----	58	29	41	102	103
West Germany-----	77	64	92	58	99
Netherlands Antilles----	18	25	12	19	85
Brazil-----	23	-	-	-	85
Bahamas-----	2	14	21	-	47
Jamaica-----	24	34	16	17	36
Nansei and Nanpo Islands-----	23	61	40	53	35
Japan-----	191	110	119	70	34
United Kingdom-----	9	-	-	-	34
France-----	10	-	16	39	31
All other-----	328	269	289	264	260
Total-----	1,365	964	1,017	1,106	1,482

See notes and source on next page.

December 1969

7:2

1/ Data are not entirely comparable for all years. Exports in 1964 include cased and uncased movements, whereas data for 1965-68 represent cased movements only. However, exports of uncased movements in any year probably are negligible.

2/ Less than 500 units.

Source: Compiled from official statistics of the U.S. Department of Commerce.

268 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

Table 3.--Watch movements: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of units)

Country	1964	1965	1966	1967	1968
Switzerland-----	11,990	15,587	19,414	19,325	19,418
Virgin Islands and Guam-----	2,369	3,625	5,448	3,782	4,085
Japan-----	429	718	1,069	1,750	1,401
West Germany-----	356	366	470	891	1,266
France-----	162	301	446	802	781
Hong Kong-----	14	52	174	103	214
United Kingdom-----	56	75	16	35	43
All other-----	7	21	8	7	66
Total-----	15,383	20,745	27,045	26,695	27,274

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note:--The data provided above are net imports. Exports, with benefit of drawback, were subtracted from gross imports to obtain net imports. Comparable values of net imports cannot be ascertained with any accuracy because there is insufficient information on exports with benefit of drawback. It is estimated, however, that total net imports (with drawback removed) were valued at about \$74 million in 1964; \$97 million in 1965; \$131 million in 1966 and in 1967; and \$137 million in 1968.

Table 4.--Watch cases: U.S. imports for consumption, by principal sources, 1965-68

Country	1965	1966	1967	1968
Quantity (1,000 units)				
United Kingdom-----	1,950	2,296	4,554	5,101
France-----	1,543	1,909	3,055	3,467
Hong Kong-----	1,984	2,443	2,665	2,384
Switzerland-----	236	429	537	429
West Germany-----	181	363	351	423
Japan-----	46	388	196	107
Italy-----	5	5	7	9
All other-----	2	21	28	12
Total-----	5,947	7,854	11,393	11,932
Value (1,000 dollars)				
United Kingdom-----	639	755	1,546	1,583
France-----	665	701	1,071	1,268
Hong Kong-----	492	684	843	794
Switzerland-----	387	617	844	587
West Germany-----	159	367	382	380
Japan-----	8	220	147	95
Italy-----	44	41	43	67
All other-----	2	22	14	10
Total-----	2,396	3,407	4,890	4,784

Source: Compiled from official statistics of the U.S. Department of Commerce.

270 WATCHES, WATCH MOVEMENTS, WATCH CASES, AND PARTS OF WATCH CASES

Table 5.--Watch movements: Annual production in selected countries and U.S. Insular Possessions, 1954 and 1965-67

Country	1954	1965	1966	1967
	Quantity (1,000 units)			
Switzerland-----	31,000	55,000	63,000	65,000
U.S.S.R.-----	6,000	15,000	16,000	18,000
United States-----	7,000	14,000	15,000	17,000
Japan-----	2,000	14,000	15,000	17,000
Communist China-----	-	2,000	5,000	8,000
West Germany-----	6,000	7,000	7,000	7,000
France-----	3,000	6,000	6,000	6,000
United Kingdom-----	3,000	4,000	4,000	4,000
Virgin Islands and Guam-----	-	4,000	5,000	4,000
Total-----	58,000	121,000	136,000	146,000
	Percentage of total quantity			
Switzerland-----	53.5	45.4	46.3	44.5
U.S.S.R.-----	10.3	12.4	11.8	12.3
United States-----	12.1	11.6	11.0	11.7
Japan-----	3.4	11.6	11.0	11.7
Communist China-----	-	1.6	3.7	5.5
West Germany-----	10.3	5.8	5.2	4.8
France-----	5.2	5.0	4.4	4.1
United Kingdom-----	5.2	3.3	2.9	2.7
Virgin Islands and Guam-----	-	3.3	3.7	2.7
Total-----	100.0	100.0	100.0	100.0

Source: Data for 1954 are from the Findings of Fact, United States v. The Watchmakers of Switzerland Information Center, Inc., Civil Action No. 96-170. Data for 1965 for Switzerland and Japan, reported by the foreign industries; for West Germany and United Kingdom, reported by The Engineering Industries, Organization for Economic Cooperation and Development, 1966; for the United States, by the domestic industry; for France, the United Kingdom, and Communist China, estimated by the U.S. Tariff Commission; and for the Virgin Islands and Guam, from the U.S. Department of Commerce. Data for years 1966 and 1967 for the United States, reported by domestic industry; for the Virgin Islands and Guam, from the U.S. Department of Commerce; for France, United Kingdom, West Germany, and Communist China, estimated by the U.S. Tariff Commission or from the Jewelers' Circular Keystone and the "Jeweler's Outlook"; for Switzerland, from the Swiss Watch and Jewelry Journal; for Japan, estimated by the U.S. Tariff Commission and

Notes continued on next page.

Notes continued--

from the Oriental Economist.

Data for 1965-1967 for the Soviet Union, from the National Economy of the U.S.S.R. in 1967, Statistical Yearbook, published by the Central Statistical Administration, Statistica, Moscow, 1968.

<u>Commodity</u>	<u>TSUS item</u>
Clocks-----	715.15, 715.25,-.33, 721.20(pt.)
Clock movements-----	720.02,-.18
Clock cases and parts thereof-----	720.32,-.34

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of clocks (movements, cased and uncased) in 1968 amounted to about 46 million units, of which 83 percent was supplied from domestic production. Exports were small, accounting for about 2 percent of production.

Description and uses

Clocks are timekeeping mechanisms equipped with dials for measuring and indicating time but are not intended for carrying on the person. All clocks containing watch or clock movements (except standard marine chronometers having spring detent escapements), all movements for use in any clock (except watch movements), and all clock cases and parts for all clock cases are included in this summary. Clock glasses, however, are not included (see the summary covering items 547.15-.16 in volume 5:4).

Clock movements are generally larger, much simpler, and more rugged in design than watch movements ^{1/}. Virtually all are powered by an electric motor or a wound coiled spring; pendulums are employed in some clocks. The speed at which most clocks operate is regulated by a balance wheel or by a constant speed electric motor.

Several principal types of electric clocks are in common use: (1) clocks with synchronous motors whose speed is controlled by the frequency of alternations (cycles) in the direction of the electric current; (2) clocks with battery powered motors, employing current which flows in one direction only and which does not have appreciable pulsations in its magnitude; and (3) automobile and other clocks with

^{1/} A "watch movement" is a timepiece movement measuring less than 1.77 inches in width and less than 0.50 inch in thickness; a clock movement is any other movement intended or suitable for measuring time.

274 CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES

movements powered by a main spring that is rewound at regular intervals by a small motor energized by the automobile battery or other power source.

Clocks vary widely in their appearance according to their styling and intended use. Clocks for use in the home include kitchen clocks, alarm clocks, decorator clocks, clock-radios, and other types. Clocks are frequently combined with other articles such as radios and weather instruments in a single case or cabinet. Clocks are made of plastics, wood, or metal.

This summary does not cover clock movements incorporated in combination with other articles at the time of importation. Such movements, if in combination with radios, desk barometers, etc., are dutiable as though imported separately but are statistically classified and reported as single entities elsewhere in the summaries. Movements incorporated as usual components of vehicles or craft or as internal and essential parts of laboratory, industrial, or commercial apparatus or equipment, are not treated for tariff purposes as separate entities. Their values are included in the dutiable value of the vehicles, crafts, apparatus, or equipment. See headnote 5, subpart 2E, of schedule 7 of the Tariff Schedules of the United States for details.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the Tariff Schedules of the United States Annotated (1969)) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
715.15	Clocks: With watch move- ments; or with clock movements measuring less than 1.77 inches in width.	The column 1 rates applica- ble to the cases; plus the column 1 rates ap- plicable to the movements; if such cases and movements were im- ported separate- ly.	The column 1 rates appli- cable to the cases, plus the column 1 rates appli- cable to the movements, if such cases and movements were import- ed separate- ly.	The column 1 rates appli- cable to the cases, plus the column 1 rates appli- cable to the movements, if such cases and movements were import- ed separate- ly.

276 CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Other clocks (except standard marine chronometers having spring detent escape- ments):			
715.25	Valued not over \$1.10 each.	27.5¢ each <u>1/</u>	22¢ each <u>2/</u>	13.5¢ each <u>3/</u>
715.27	Valued over \$1.10 but not over \$2.25 each.	50¢ each <u>1/</u>	40¢ each <u>2/</u>	25¢ each <u>3/</u>
715.29	Valued over \$2.25 but not over \$5.00 each.	75¢ each <u>1/</u>	60¢ each <u>2/</u>	37.5¢ each <u>3/</u>
715.31	Valued over \$5.00 but not over \$10.00 each.	\$1.50 each <u>1/</u>	\$1.20 each <u>2/</u>	75¢ each <u>3/</u>
715.33	Valued over \$10.00 each.	\$2.25 each <u>1/</u>	\$1.80 each <u>2/</u>	\$1.12 each <u>3/</u>
	Clock movements: Measuring less than 1.77 inches in width: Not constructed or designed to operate for over 47 hours with- out rewind- ing:			
720.02	Having no jewels or only 1 jewel:	75¢ each	60¢ each	37¢ each
720.04	Having over 1 jewel.	\$1.25 each + + 13.5¢ for each jewel over 7.	\$1 each + 10.8¢ for each jewel over 7.	62¢ each + 6.75¢ for each jewel over 7.

See footnotes at end of table.

December 1969

7:2

CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES 277

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Clock movements:			
	Measuring less			
	than 1.77			
	inches in			
	width:			
	Constructed or			
	designed to			
	operate for			
	over 47			
	hours with-			
	out rewind-			
	ing:			
720.06	Having no	\$1.50 each:	\$1.20 each	75¢ each
	jewels or			
	only 1			
	jewel.			
720.08	Having over	\$2 each +	\$1.60 each +	\$1 each +
	1 jewel.	13.5¢ for:	10.8¢ for:	6.75¢ for
		each	each jewel	each jewel
		jewel	over 7.	over 7.
		over 7.		
	Other:			
720.10	Valued not over	27.5¢ each:	22¢ each <u>2/</u>	13.75¢ each
	\$1.10 each.	<u>1/</u>		<u>3/</u>
720.12	Valued over \$1.10	50¢ each	40¢ each <u>2/</u>	25¢ each
	but not over	<u>1/</u>		<u>3/</u>
	\$2.25 each.			
720.14	Valued over \$2.25	75¢ each	60¢ each <u>2/</u>	37.5¢ each
	but not over	<u>1/</u>		<u>3/</u>
	\$5.00 each.			
720.16	Valued over \$5.00	\$1.50 each:	\$1.20 each	75¢ each
	but not over	<u>1/</u>	<u>2/</u>	<u>3/</u>
	\$10.00 each.			
720.18	Valued over \$10.00:	\$2.25 each:	\$1.80 each	1.125¢ each
	each.	<u>1/</u>	<u>2/</u>	<u>3/</u>

See footnotes at end of table.

The average ad valorem equivalents of the specific duties shown above, based on imports entered in 1968, were as follows:

<u>TSUS</u> <u>item</u>	<u>Ad valorem</u> <u>equivalent</u> <u>rate in 1968</u> <u>(Percent)</u>
715.25-----	52.7
715.27-----	59.2
715.29-----	49.6
715.31-----	46.8
715.33-----	38.8
720.02-----	35.2
720.04-----	28.8
720.06-----	23.1
720.08-----	17.5
720.10-----	53.2
720.12-----	56.9
720.14-----	49.5
720.16-----	47.7
720.18-----	39.5

The average ad valorem equivalent for clock movements in small clocks (item 715.15) cannot be calculated because the dutiable value and duty collected for such movements are not reported separately in U.S. import statistics.

U.S. consumption

The number of clocks sold in the United States averaged nearly 39 million per year during the 4-year span from 1964 to 1967, and attained a peak consumption rate of 46 million units in 1968 (table 1). In general, clock-movement consumption (allowing for movements used in time switches and timing apparatus, which are accounted for separately) is equivalent to clock consumption since few uncased movements are sold for replacement purposes. About three-fourths of the imported movements enter in cases; the remainder are placed in cases in the United States.

In addition to a generally upward trend in consumption of clocks during the five-year period, 1964-68, several factors resulted in a shifting pattern of consumption. Principal among them were: (1) a gradual decline in sales of key-wound clocks, except in late 1968 when consumer demand reversed the trend; (2) increasing demand for synchronous electric clocks in keeping with the population growth;

and (3) expanded consumption of battery-operated clocks which double as decorative items. Consumption of automobile clocks reflected a downward trend through 1967 but then recovered somewhat in 1968. Consumption of new cars increased in the latest reporting year, but some manufacturers omitted clocks as standard equipment on certain models which resulted in only a slight increase in automobile clock consumption.

U.S. producers

The domestic clock industry is comprised of five readily distinguishable segments as follows: (1) about 15 to 20 relatively small firms specialize in casing imported hand-wound, spring-driven clock movements; (2) four major producers make clock movements and clocks, including timing devices (one of these firms produces both hand-wound and battery-powered movements); (3) several electric appliance companies produce synchronous and sub-synchronous motors and other parts for clock movements which they assemble and case themselves; (4) about 50 concerns assemble hand-wound, battery-operated and synchronous-motor clocks; and (5) one multi-product concern produces only automobile clocks. Clock manufacturing establishments are located principally in Connecticut, Illinois, Massachusetts, and New York.

Relatively small concerns, in most instances, buy cases and movements, assemble them into complete timepieces, and ship them to distributors who, in turn, sell them to retail stores and concerns that exchange them for trading stamps or other premiums. Medium and large-size concerns involved in clock production usually make both components, or at least one, assemble them into complete timepieces, and sell them through distributors. Some clock firms sell direct to retail outlets.

Clock movement parts used by the larger clock producers may be derived from captive production or procured from other domestic suppliers, depending on the individual producers. Imports in the form of complete movements, sub-assemblies and parts are also utilized by domestic manufacturers. Clock cases are supplied principally from domestic sources.

U.S. production

U.S. production of clocks has been generally upward, increasing from an estimated 30 million units, valued at \$189 million in 1964 to an estimated 39 million units, valued at \$313 million in 1968 (table 1). The annual rise in production was due to expanding consumer demand.

Several major trends were discernible throughout the 1964-68 period. Key-wound clock production decreased during the early years of the period, but began to increase in late 1968. Synchronous clock production increased throughout the period as a result of increased demand on the part of consumers for alarm clocks, kitchen clocks, and clock-radios--reflecting the tendency to have more clocks in the home. The production of battery clocks and movements reflected a fifteen-fold increase in five years but such output did not attain the level forecast by industry for 1968.

Some cases are manufactured by clock producers or assemblers, but more often they are procured from outside sources. Frequently metal cases are received as forgings or castings and finished by the clock producer or assembler. Some of the larger clock companies mold their own plastic cases. The smaller companies own their molds and when plastic cases are needed they are shipped to custom molders who fill the order and return the molds plus the semi-finished cases. Often clock producers or assemblers buy wooden cases from outside and finish them in their own establishments.

U.S. exports

The number of clocks exported annually is small compared to domestic production, but exports have almost doubled since 1965. In that year, 424,000 units, valued at \$2.4 million, were shipped; in 1968, such exports increased and amounted to 825,000 units, valued at \$4.4 million (table 2). Clock exports consisted largely of shipments to Canada. The Republic of Korea, Japan, and West Germany were also notable markets. Although statistics on exports of U.S. clock movements are not separately available, it is believed that Canada is also the principal market for such exports.

Clock cases cannot be isolated from related items in official export statistics. It is believed, however, that the level of such exports is insignificant and has shown no drastic changes in the last several years.

U.S. imports

U.S. imports of clocks have grown in the last few years. In 1964, approximately 4.8 million clocks and movements, valued at \$10.5 million, were imported; in 1968, such imports increased and amounted to 7.9 million units, valued at \$18.2 million (table 3). Throughout the five-year period, aggregate U.S. imports of clocks and clock movements accounted for about 14 to 17 percent of annual domestic consumption of clocks (table 1). The increase in imports of clocks and clock movements was attributable, for the most part, to expanded import shipments of battery-operated clocks and movements, and hand-wound clocks. About three-fourths of the total imported clock movements entered as cased clocks.

Standard clocks and clock movements (movements over 1.77 inches in width) constituted the largest share of all imports in 1968. The following tabulation, compiled from official statistics, shows U.S. imports of standard-size clocks and clock movements, by value brackets and types, by quantity in thousands of units, and by value in thousands of dollars, for 1968:

<u>Value bracket and type</u>	<u>Quantity</u>	<u>Value</u>
Not valued over \$1.10 each:		
Electric-----	60	63
Other-----	3,458	3,487
Valued over \$1.10 but not over \$2.25 each:		
Electric-----	76	133
Other-----	300	441
Valued over \$2.25 but not over \$5 each:		
Electric-----	104	340
Other-----	325	1,084
Valued over \$5 but not over \$10 each:		
Electric-----	26	190
Other-----	104	795
Valued over \$10:		
Electric-----	12	274
Other-----	132	2,691
Total-----	4,597	9,495

Although aggregate imports of standard-size clocks and clock movements increased in 1968 the relative importance of the various types (the "electric" and "other" in each value bracket) reflected in the tabulation above remained relatively unchanged from 1967.

CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES 283

According to official statistics, U.S. imports of small clocks and small clock movements, by types, by quantity in thousands of units, and by value in thousands of dollars, for 1968, were as follows:

<u>Type</u>	<u>Quantity</u>	<u>Value</u>
Not constructed or designed to operate for over 47 hours without rewinding:		
Having 0-1 jewels:		
Electric:		
Battery operated-----	1,730	4,082
Other-----	224	503
Other-----	1,023	1,939
Having over 1 jewel:		
Electric:		
Battery operated-----	84	433
Other-----	13	98
Other-----	105	322
Constructed or designed to operate for over 47 hours without rewinding:		
Having 0-1 jewels-----	23	182
Having over 1 jewel-----	62	1,129
Total-----	3,264	8,688

Although imports of small clocks and movements for such clocks increased in the aggregate in 1968, the relative importance of the various types (as shown in the above tabulation) remained unchanged from 1967.

West Germany and Japan have been the principal sources of clocks and clock movements shipped to the United States in recent years. During this period Japan has increased her share of the total trade, principally at the expense of West Germany (table 3). In 1964, West Germany accounted for 72 percent of the total quantity of clock movements shipped to the United States; while in 1968, it accounted for only 52 percent. On the other hand, Japan, which accounted for 17 percent of the clocks and movements shipped to the United States in 1964, accounted for 33 percent in 1968. Similarly, Hong Kong has increased its shipments; they constituted 8 percent in 1968.

The value of U.S. imports of clock cases (imported separately) and parts increased from \$0.7 million in 1964 to \$1.3 million in 1968 (table 4). Virtually all such imports consisted of clock cases; however cases imported separately were used in only about 6 percent of the clocks cased in the United States in 1968. In 1968, 1.8 million outer cases for travel clocks, valued at \$832,000, were imported;

and 563,000 nonmetal clock cases (as provided for in item 720.34), valued at \$379,000, were imported. West Germany and Japan have been the principal suppliers.

World trade

Statistics on total world production of clocks and clock movements are not available because some of the producing countries do not publish their outputs. Nevertheless, it is known that Free World production has been increasing in recent years. Of the principal clock producing countries, the United States, Germany, and Japan increased their annual outputs by 32 percent, 28 percent, and 55 percent, respectively, from 1963 to 1967 (table 5). The United States continued to be the most significant producer of synchronous movements. Although production statistics for most Communist-dominated countries are not available, it is known that the Soviet Union has increased its production of clocks over the last several years; that country produced 16.6 million clocks in 1967.

CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES 285

Table 1.--Clocks and clock movements ^{1/}: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

Year	Production ^{2/}	Imports	Exports	Apparent consumption	Ratio (percent) of imports to consumption
Quantity (1,000 units)					
1964-----	30,000	4,778	268	34,504	14
1965-----	32,000	5,593	424	37,169	15
1966-----	35,000	6,662	527	41,135	16
1967-----	37,000	5,704	667	42,037	14
1968-----	39,000	7,861	825	46,036	17
Value (1,000 dollars)					
1964-----	189,000	10,540	^{3/} 2,000	197,540	5
1965-----	211,000	12,993	2,379	221,614	6
1966-----	250,000	16,821	2,701	264,120	6
1967-----	280,000	14,261	3,385	290,876	5
1968-----	313,000	18,184	4,392	326,792	6

^{1/} Covers clock movements cased or uncased; excludes clock movements not for timepiece use.

^{2/} Estimated from trade information.

^{3/} Estimated because reported export categories in 1965 are not comparable with those in succeeding years.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

286 CLOCKS, CLOCK MOVEMENTS, CLOCK CASES AND PARTS OF CLOCK CASES

Table 2.--Clocks ^{1/}: U.S. exports of domestic merchandise,
by principal markets, 1965-68

Country	1965	1966	1967	1968
Quantity (1,000 units)				
Canada-----	244	305	393	434
Republic of Korea-----	-	-	-	108
Japan-----	-	5	11	35
West Germany-----	27	22	49	55
Mexico-----	16	24	33	18
Philippines-----	3	3	15	27
Venezuela-----	10	21	16	19
Sweden-----	8	4	12	23
All other-----	116	143	138	106
Total-----	424	527	667	825
Value (1,000 dollars)				
Canada-----	1,314	1,567	1,973	2,100
Republic of Korea-----	-	-	-	882
Japan-----	-	76	105	280
West Germany-----	167	117	276	146
Mexico-----	92	175	110	115
Philippines-----	39	28	44	111
Venezuela-----	78	108	86	93
Sweden-----	40	29	57	81
All other-----	649	601	734	584
Total-----	2,379	2,701	3,385	4,392

^{1/} Uncased clock movements are not included in this table. U.S. exports of clock movements are not separately reported in official export statistics.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Clocks and clock movements ^{1/}: U.S. imports for consumption, by principal sources, 1964-68

Country	1964	1965	1966	1967	1968
Quantity (1,000 units)					
West Germany-----	3,423	3,665	3,971	3,126	4,104
Japan-----	817	1,299	2,159	1,996	2,603
Switzerland-----	167	205	162	115	175
Hong Kong-----	-	35	41	87	632
France-----	175	184	184	147	65
United Kingdom-----	34	31	80	85	75
All other-----	156	174	65	148	207
Total-----	4,772	5,593	6,662	5,704	7,861
Value (1,000 dollars)					
West Germany-----	7,472	8,790	10,191	7,853	9,732
Japan-----	852	1,538	3,271	3,347	4,638
Switzerland-----	1,268	1,511	1,909	1,538	1,646
Hong Kong-----	-	38	57	138	633
France-----	461	582	663	521	409
United Kingdom-----	256	269	309	290	348
All other-----	231	265	421	574	777
Total-----	10,540	12,993	16,821	14,261	18,183

^{1/} Includes clock movements, cased or uncased; excludes clock movements not for timepiece use.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Clock cases and parts ^{1/}: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
West Germany-----	505	702	635	536	724
Japan-----	99	231	387	275	382
Switzerland-----	19	51	57	83	75
Spain-----	7	15	26	16	18
France-----	16	18	12	23	12
Canada-----	7	5	21	61	12
Other-----	12	10	23	13	48
Total-----	665	1,032	1,161	1,007	1,271

^{1/} Includes clock cases without movements and clock case parts.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 5.--Clocks and clock movements: Production by major producing countries of the non-Communist world, 1963-67 ^{1/}

(In thousands of units)

Country	1963	1964	1965	1966	1967
United States-----	28,000	30,000	32,000	35,000	37,000
Germany-----	22,436	25,277	24,817	25,732	28,708
Japan-----	9,887	^{2/}	12,790	13,767	15,310
United Kingdom-----	6,313	6,257	6,294	5,748	5,373
France-----	3,775	3,927	3,580	3,515	3,209
Italy-----	1,100	1,360	1,200	1,250	1,350
Total-----	71,511	66,821	80,681	85,012	90,950

^{1/} Excluding Switzerland, for which data are not available.

^{2/} Not available.

Source: The Engineers Industries, OECD Paris, 1967 and 1969 except where otherwise indicated. United States output estimated by the Tariff Commission.

<u>Commodity</u>	<u>TSUS item</u>
Standard marine chronometers-----	715.20
Assemblies, subassemblies and certain other parts for standard marine chronometers-----	720.80, 720.84, 720.92, 721.10

Note.--For the statutory description, see the Tariff Schedules of the United States (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

There is no domestic production of marine chronometers. During the last several years, the small number installed in U.S. ships was supplied principally from stocks on hand; the remainder was supplied by imports. One U.S. manufacturer makes repair parts for marine chronometers in use by the U.S. Navy.

Description and uses

The standard marine chronometer is a clock equipped with a special type of escapement, a spring-detent escapement, permitting it to operate with a very high degree of accuracy. The marine chronometer is used in conjunction with a sextant, to determine the geographic position of a ship at sea. Virtually all ships using marine chronometers maintain several of them at different onboard locations. Although marine chronometers continue to be used on almost all new and old merchant marine and military ships, modern radio-radar navigation aids have reduced dependence on them.

This summary does not cover plates (item 720.67), jewels (item 720.60), dials and parts of dials (items 720.42-.44), nor cases (items 720.32-.36) for standard marine chronometers. Data thereon is included with data on such parts used with other clocks. Trade therein is believed to be insignificant.

STANDARD MARINE CHRONOMETERS AND CERTAIN PARTS THEREOF

U.S. tariff treatment

The column 1 (trade agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to concessions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
715.20	Standard marine chronometers having spring-detent escapements. Assemblies and sub-assemblies for standard marine chronometers, having spring-detent escapements, consisting of two or more parts or pieces fastened or joined together:	\$1.15 each + 17.5% ad val. + 7¢ for each jewel, if any.	92¢ each + 14% ad val. + 5.6¢ for each jewel, if any.	57¢ each + 8.5% ad val. + 3.5¢ for each jewel, if any.
720.80	Consisting in part of a plate or set of plates provided for in item 720.67.	The col. 1 rate specified in item 720.67 for the plate or plates + 25¢ for each jewel (if any)	The column 1 rate specified in item 720.67 for the plate or plates + 20¢ for each jewel (if any) + 4¢ for each	The column 1 rate specified in item 720.67 for the plate or plates + 12.5¢ for each jewel (if any)

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.80 --Con.	Consisting in part of a plate or set, etc.--Con.	+ 5¢ for each other part or piece (if any), but the total duty on the assem- bly or subassem- bly shall not exceed the column 1 duty for the com- plete movement.	other part or piece (if any), but the total duty on the as- sembly or subassembly shall not exceed the column 1 duty for the complete movement.	+ 2.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the com- plete move- ment.
720.84	Other-----	65% ad val. + 25¢ for each jewel (if any) + 3¢ for each other piece or part.	52% ad val. + 20¢ for each jewel (if any) + 2.4¢ for each other piece or part.	32.5% ad val. + 12.5¢ for each jewel (if any) + 1.5¢ for each other piece or part.
720.92	Other parts for standard marine chronometers having spring- detent escape- ments.	50% ad val.	40% ad val.	25% ad val.
721.10	Any of the fore- going parts for standard marine chronometers (except plates and jewels) im- ported in the same shipment, and entered, with complete clocks,	12.5% ad val.	10% ad val.	6¢ ad val.

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
:	:	:	:	:
:	Any of the foregoing	:	:	:
:	parts, etc.--Con.	:	:	:
:	:	:	:	:
:	clock movements,	:	:	:
:	apparatus, or time	:	:	:
:	switches provided	:	:	:
:	for in subpart 2E	:	:	:
:	(whether or not	:	:	:
:	suitable for use	:	:	:
:	in such complete	:	:	:
:	articles), but not	:	:	:
:	including any por-	:	:	:
:	tion of all the	:	:	:
:	parts in the ship-	:	:	:
:	ment which exceeds	:	:	:
:	in value 1.5 per-	:	:	:
:	cent of the value	:	:	:
:	of such complete	:	:	:
:	articles.	:	:	:
:	:	:	:	:

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

The average ad valorem equivalent of the compound rate of duty in effect on January 1, 1968, for item 715.20, based on imports in 1968, was 17.8 percent. The ad valorem equivalents for items 720.80 and 720.84 cannot be calculated because units of quantity are not reported for such imports.

Comment

An insignificant number of new marine chronometers are installed annually in vessels in the United States. This is attributable to several factors: the decline in shipbuilding; the increased

substitution of electronic devices as the primary navigational equipment onboard merchant marine vessels; and the long life of marine chronometers. Apparently, through a program of periodic overhaul and retention of an adequate inventory, the U.S. Navy has a number of marine chronometers sufficient to supply its needs. Further, electronic clocks in some instances have replaced marine chronometers.

The one U.S. watch manufacturer that produced marine chronometers during World War II ceased such production shortly after the end of hostilities, because demand was not sufficient to make domestic production profitable.

Except during World War II, the number of marine chronometers imported into the United States annually has been very small. Imports totaled 36 units, valued at \$13,900 in 1967 and 16 units, valued at \$5,793 in 1968 (see table). The United Kingdom supplied almost all of these chronometers.

According to official statistics of the U.S. Department of Commerce, the annual value of U.S. imports of parts for marine chronometers in 1964-68 were as follows:

<u>Year</u>	<u>Value</u>
1964-----	\$4,161
1965-----	896
1966-----	16,094
1967-----	972
1968-----	7,876

Switzerland has been the principal supplier of such parts in recent years.

The value of the imports of parts reflects the amount of repair work involved in maintaining chronometers installed in merchant marine vessels. Marine chronometers installed on U.S. naval vessels are repaired with parts produced by one U.S. manufacturer.

STANDARD MARINE CHRONOMETERS AND CERTAIN PARTS THEREOF

Standard marine chronometers: U.S. imports for consumption, by principal sources, 1964-68

Country	1964	1965	1966	1967	1968
Quantity (units)					
United Kingdom-----	3	2	29	30	13
Japan-----	-	-	-	-	3
West Germany-----	-	6	2	6	-
Switzerland-----	-	2	2	-	-
Total-----	3	10	33	36	16
Value					
United Kingdom-----	\$992	\$777	\$5,739	\$11,618	\$4,995
Japan-----	-	-	-	-	798
West Germany-----	-	1,877	654	2,282	-
Switzerland-----	-	568	758	-	-
Total-----	992	3,222	7,151	13,900	5,793

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Pigeon timers-----	715.40
Other apparatus with watch or clock movements or with synchronous motors, for recording the time of day, or for measuring, recording, or otherwise indicating intervals of time-----	715.45-.53
Time switches with watch or clock movements, or with synchronous or subsynchronous motors-----	715.60-.68
Cases for the articles described above-----	720.36

Note.--For the statutory description, see the Tariff Schedules of the United States (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. consumption of timing devices, which was valued at about \$169 million in 1968, is supplied almost entirely from domestic production. Exports are substantially larger than imports. Virtually all cases for timing devices are supplied from domestic production.

Description and uses

This summary covers pigeon timers, time switches, and other timing devices (except watches and clocks) and cases for such articles, but does not include other parts of such devices (which are discussed in a separate summary elsewhere in this volume). The timing apparatus are self-contained timing mechanisms while time switches are timing mechanisms that are components of larger systems. (For a discussion of marine chronometers, see summary on clocks in this volume; for discussion of metronomes (726.10), see summary on Miscellaneous Musical Instruments, Parts and Accessories, volume 7:4.)

Timing apparatus include a wide range of devices for measuring, recording, or otherwise indicating intervals of time. They are operated by a movement of the watch or clock type (including secondary or synchronous-motor clock movements) or by a synchronous motor (see summary volume 6:10) with reduction gears. Such apparatus usually have dials indicating hours, minutes or seconds; others register time by punching, printing, showing numbers, or making sounds or by transmitting impulses. Instruments included in this group may or may not possess dials. Time recorders for stamping the arrival time of documents or checks; master frequency control instruments for maintaining the cycle count of electrical generating equipment; watchman's tell-tales, kitchen and table timers, stadium

TIMING DEVICES (EXCEPT WATCHES AND CLOCKS) AND CASES

timers (clocks that indicate time intervals in sports events) and special purpose timers are included under these TSUS item numbers.

Pigeon timers, apparatus used in timing homing pigeon races, are specifically provided for in TSUS item 715.40. Such timers indicate on a printed tape the time of release of the birds and the time each bird arrives at the home loft. A combination article, with an inherent clock or watch-type movement, and its dial, if any, is classifiable under the provision applicable to such a combination article but in determining the duties on the combination article, the movement is constructively separated therefrom and assessed with the same rate as would have applied if it had been imported separately.

Time switches (items 715.60-715.68) are designed primarily to make or break electric circuits automatically at given times. A time switch consists of a mechanical or electrical movement of the watch or clock type or a synchronous motor, a dial, and a time-regulating device (levers and pins, systems of driving relays, switches, and commutators) with terminals. The dial, which is usually marked in hours and sometimes also in minutes, seconds, days and months, has levers and pins around its periphery which actuate the contact device at the desired time. Electrically activated time switches are employed to control heating and air conditioning systems, home appliances, pumps, lighting circuits, and similar items. Mechanically activated time switches are employed where electricity is not available or desirable.

Cases for timing devices (item 720.36) are of two basic types; they suggest the distinct differences between the uses of timing apparatus and time switches. The time switch case, when employed at all, is usually a light-weight cover that separates the timing component from the larger mechanism it controls. The case for the timing apparatus is usually fabricated out of heavier metal or plastic and infrequently of wood, and is usually more expensive and of better quality than one for a time switch.

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the Tariff Schedules of the United States Annotated 1969) are as follows:

TSUS item	Commodity	Rate		Rate pursuant to concessions granted in 1964-67 trade conference	
		as of Dec. 31, 1967	as of Jan. 1, 1969	Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	Apparatus with watch or clock movements or with synchronous motors, for recording the time of day, or for measuring, recording, or otherwise indicating intervals of time:				
715.40:	Pigeon timers-----	\$1.80 each	\$1.44 each	+ 90¢ each +	
		+ 26% ad	20.5% ad	13% ad	
		val. +	val. + 8¢	val. + 5¢	
		10¢ for	for each	for each	
		each	jewel, if	jewel, if	
		jewel, if	any.	any.	
		any.			
	Other:				
715.45:	Valued not over \$1.10.	27.5¢ each	22¢ each	+ 13.75¢ each	
		+ 32.5%	26% ad val.	+ 16% ad	
		ad val.	<u>2/</u>	val. <u>3/</u>	
		<u>1/</u>			
715.47:	Valued over \$1.10 but not over \$2.25 each.	50¢ each	+ 40¢ each	+ 25¢ each	
		32.5% ad	26% ad val.	16% ad	
		val. <u>1/</u>	<u>2/</u>	val. <u>3/</u>	
715.49:	Valued over \$2.25 but not over \$5 each.	75¢ each	+ 60¢ each	+ 37.5¢ each	
		32.5% ad	26% ad val.	16% ad val.	
		val. <u>1/</u>	<u>2/</u>	<u>3/</u>	
715.51:	Valued over \$5 but not over \$10 each.	\$1.50 each	+ \$1.20 each	+ 75¢ each	
		+ 32.5%	26% ad val.	16% ad val.	
		ad val.	<u>2/</u>	<u>3/</u>	
		<u>1/</u>			
715.53:	Valued over \$10 each.	\$2.25 each	+ \$1.80 each	+ \$1.12 each	
		+ 35% ad	28% ad val.	17.5% ad	
		val. <u>1/</u>	<u>2/</u>	val. <u>3/</u>	

See footnotes at end of table.

December 1969

7:2

TIMING DEVICES (EXCEPT WATCHES AND CLOCKS) AND CASES

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	:Time switches with watch : or clock movements, : or with synchronous : or subsynchronous : motors:			
715.60:	Valued not over \$1.10 : each.	27.5¢ each + : + 32.5% : ad val. <u>1/</u>	22¢ each + : 26% ad val.: : <u>2/</u>	13.75¢ each : + 16% ad : val. <u>3/</u>
715.62:	Valued over \$1.10 but : not over \$2.25 each.	50¢ each + : 32.5% ad : val. <u>1/</u>	40¢ each + : 26% ad val.: : <u>2/</u>	25¢ each + : 16% ad : val. <u>3/</u>
715.64:	Valued over \$2.25 but : not over \$5 each.	75¢ each + : 20% ad : val. <u>1/</u>	60¢ each + : 16% ad val.: : <u>2/</u>	37.5¢ each : + 10% ad : val. <u>3/</u>
715.66:	Valued over \$5 but not : over \$10 each.	\$1.50 each + : + 20% ad : val. <u>1/</u>	\$1.20 each + : 16% ad val.: : <u>2/</u>	75¢ each + : 10% ad : val. <u>3/</u>
715.68:	Valued over \$10 each---	\$2.25 each + : + 32.5% : ad val. <u>1/</u>	\$1.80 each + : 26% ad val.: : <u>2/</u>	\$1.12 each : + 16% ad : val. <u>3/</u>
720.36:	Cases for any of the : above articles.	30% ad : val.	24% ad val.	15% ad val.

1/ Plus 12.5¢ for each jewel.

2/ Plus 10¢ for each jewel.

3/ Plus 6.25¢ for each jewel.

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see the TSUSA-1969 for all the staged rates).

The average ad valorem equivalents of the duties shown above for the rates of duty in effect in 1968, based on imports entered in 1968, were:

<u>TSUS</u> <u>item</u>	<u>Ad valorem</u> <u>equivalents</u> (percent)
715.40	26.5
715.45	55.9
715.47	60.7
715.49	44.7
715.51	48.3
715.53	34.8
715.60	63.6
715.62	57.0
715.64	40.8
715.66	39.6
715.68	40.6
720.36	30.7

U.S. consumption

The value of U.S. consumption of timing devices (time apparatus and time switches) rose from about \$134 million in 1964 to \$169 million in 1968 (table 1). Time switches accounted for more than half of the total consumption. Augmented consumption was attributable in large measure to rising consumer disposable income, population growth, and expanding demand for home appliances with internal time switches and for timing apparatus.

Consumption of timing apparatus has expanded in the area of time clocks and stamps in the last few years; however, the use of electronic data-processing equipment may ultimately cause the level of domestic consumption of these items to reach a plateau or even decrease. At the present time electronic data processing equipment for this application is too expensive and sophisticated to be competitive. In addition there has been a growing demand for new parking meters on university campuses and in the smaller municipalities. A demand for replacement parking meters also exists. Consumption of other types of timing apparatus, including master frequency control instruments as well as self-contained timers of various types, has reflected moderate growth.

Cases for timing devices are overwhelmingly supplied by domestic sources; relatively few are imported either as housings for complete timing devices or as separate cases.

TIMING DEVICES (EXCEPT WATCHES AND CLOCKS) AND CASES

U.S. producers

Less than a hundred firms (excluding those that produce watches or clocks) constitute the domestic timing device industry. Of this total some 60-75 concerns produce timing apparatus; yet few concentrate on these items to the exclusion of other product lines. No domestic firms manufacture pigeon timers. There are probably 20 domestic concerns that fabricate time switches in addition to other items. Some of the time switch producers are among the largest corporations in the United States; several have branch offices and subsidiaries abroad. Production of timing devices is concentrated in New England, New Jersey, New York, Illinois, California, and several other states.

U.S. production

Aggregate production of timing devices grew from an estimated \$139 million in 1964 to an estimated \$179 million in 1968 for an average annual increase of 6.6 percent per annum (table 1). Of the two segments that constitute the timing device industry in the United States, the time switch portion is the larger from the standpoint of both quantity and value of output. The United States is believed to be the foremost in the manufacture of time switches. Since 1964 there has been an appreciable increase in the production of time switches as components of household appliances--for instance as sub-assemblies for clock-radios and for defrosting devices in refrigerators. There is some indication that other types of control mechanisms may supplant time switches in new-model refrigerators, but the requirement for time switches as components of other appliances will probably continue to expand.

Timing apparatus is the other segment of domestic timing device production. Master time control equipment and miscellaneous timing apparatus account for about half of the total value of domestic timing apparatus production while time recording equipment (time clocks, time stamps, watchmen's tell-tales) and parking meters account for the other half.

Timing apparatus and time switches are generally encased in metal or plastics covers. They are usually fabricated by the same concern that produces the complete timing device, although some are procured from independent specialty manufacturers on contract. More expensive quality cases are normally obtained by the timing device producer from suppliers who specialize in such items.

U.S. exports

The value of U.S. exports of timing devices increased from \$6 million in 1964 to nearly \$11 million in 1968 (table 1), an increase of 80 percent, by value, over the period. Time switches were responsible for the increase in dollar value of exports of timing devices; they accounted for three-fifths of the value of all timing device exports in 1968 (table 2). Time switch exports increased in value from \$1.6 million in 1965 to \$6.4 million in 1968. The Japanese market accounted for about 43 percent of the value of U.S. exports of time switches in 1968. Canada ranked second as an export market.

Exports of timing apparatus accounted for two-fifths of all timing device exports by value in 1968. In the last four years there has been a gradual decrease in the dollar value of timing apparatus exports; they were valued at \$4.2 million in 1968, compared with \$4.8 million in 1965 (table 3). Principal markets in the period covered were Canada and Mexico.

Exports of cases for timing devices are negligible.

U.S. imports

In terms of value, U.S. imports of timing devices have gradually increased in the last four years, except for 1965 when a slight dip occurred (table 1). At the beginning of the period, in 1964, timing devices valued at \$426,000 were imported; in 1968 the value was \$806,000. Imports are insignificant when compared to domestic production of timing devices; they supplied less than 1.0% of the value of U.S. consumption in each of the years covered. Japan and Germany were principal sources of imports of timing devices (table 4).

Imports of timing apparatus (including pigeon timers) were valued at \$637,000 in 1968. Pigeon timers accounted for \$29,000 of this total. Principal sources of timing apparatus imports were Japan, West Germany, the United Kingdom and Switzerland (table 5). Switzerland ranked third as a supplier in 1965, but dropped to fourth place after the United Kingdom in 1968. The average unit value was \$5.44 for timing apparatus imported in 1968.

TIMING DEVICES (EXCEPT WATCHES AND CLOCKS) AND CASES

Imports of time switches have been of little significance primarily because of the domestic industry's overriding preponderance in the field. Based on official statistics, imports of time switches, by principal sources, are given below for 1968:

<u>Country</u>	<u>Quantity</u> <u>(1,000 units)</u>	<u>Value</u> <u>(\$1,000)</u>
Japan-----	33	143
West Germany-----	2	11
United Kingdom-----	<u>1/</u>	6
Switzerland-----	<u>1/</u>	1
Other-----	<u>2</u>	8
Total-----	37	<u>169</u>

1/ Less than 500 units.

The average unit value was \$4.57 for time switches imported in 1968.

Imports of cases for time switches and other apparatus have been insignificant. During the five-year period, 1964-67, the value of imports of cases for timing devices averaged \$3,200 annually; in 1968 that value totaled \$8,082.

Table L.--Timing devices (except watches and clocks): U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Production	Imports	Exports	Apparent consumption
1964-----	139,000	426	5,855	133,571
1965-----	148,000	394	6,448	141,946
1966-----	163,000	427	6,803	156,624
1967-----	171,000	656	8,626	163,030
1968-----	179,000	806	10,631	169,175

Source: Production data are estimated. Import and export data compiled from official statistics of the U.S. Department of Commerce.

Note.--The ratio of imports to consumption was insignificant, averaging less than one percent in each year shown.

Table 2.--Time switches and similar timing mechanisms: U.S. exports of domestic merchandise, by principal markets, 1965-1968

(In thousands of dollars)

Market	1965	1966	1967	1968
Japan-----	21	323	846	2,769
Canada-----	588	628	1,161	855
West Germany-----	139	317	453	446
United Kingdom-----	201	234	296	418
Hong Kong-----	-	13	-	251
Italy-----	84	188	222	225
Belgium and Luxembourg-----	18	41	58	165
Australia-----	88	225	173	163
All other-----	494	602	817	1,127
Total-----	1,633	2,571	4,026	6,419

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 3.--Timing apparatus (except watches and clocks): U.S. exports of domestic merchandise, by principal markets, 1965-1968

Market	1965	1966	1967	1968
Quantity (1,000 units)				
Canada-----	36	41	30	52
Mexico-----	16	24	22	20
West Germany-----	8	6	8	20
France-----	4	10	10	15
United Kingdom-----	9	11	10	12
Japan-----	2	6	17	14
Australia-----	6	3	6	10
Italy-----	2	3	5	12
All other-----	38	38	36	97
Total-----	121	142	144	252
Value (1,000 dollars)				
Canada-----	1,588	1,530	1,422	1,025
Mexico-----	349	304	455	388
West Germany-----	204	221	224	292
France-----	183	277	278	286
United Kingdom-----	379	363	406	262
Japan-----	128	125	223	218
Australia-----	291	128	221	171
Italy-----	75	113	132	160
All other-----	1,618	1,171	1,239	1,410
Total-----	4,815	4,232	4,600	4,212

Source: Compiled from official statistics of the U.S. Department of Commerce.

TIMING DEVICES (EXCEPT WATCHES AND CLOCKS) AND CASES

Table 4.--Timing devices (except watches and clocks): U.S. imports for consumption, by principal sources, 1965-68

Country	1965	1966	1967	1968
	Quantity (1,000 units)			
Japan-----	66	22	33	42
West Germany-----	14	28	23	21
United Kingdom-----	1	1	1	6
Switzerland-----	72	32	70	80
All other-----	6	16	3	5
Total-----	159	99	130	154
	Value (1,000 dollars)			
Japan-----	133	141	260	346
West Germany-----	102	127	160	147
United Kingdom-----	33	30	102	115
Switzerland-----	90	41	87	92
All other-----	36	88	47	106
Total-----	394	427	656	806

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Imports of pigeon timers are included in the above table.

Table 5.--Timing apparatus (except watches and clocks): U.S. imports for consumption, by principal sources, 1965-1968

Country	1965	1966	1967	1968
	Quantity (1,000 units)			
Japan-----	59	4	14	9
West Germany-----	14	28	23	19
United Kingdom-----	1	1	1	6
Switzerland-----	70	31	70	80
All other-----	6	14	1	3
Total-----	150	78	109	117
	Value (1,000 dollars)			
Japan-----	123	105	215	203
West Germany-----	99	116	146	136
United Kingdom-----	31	26	96	109
Switzerland-----	77	36	86	91
All other-----	33	76	45	98
Total-----	363	359	588	637

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note.--Statistics on imports of pigeon timers included in above table.

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Parts of watch movements-----	720.40(pt.), -.44(pt.), -.65, -.70, -.75, -.90, and 721.05

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

In 1968, U.S. production of parts of watch movements, valued at about \$21 million, supplied most of the parts consumed. Exports, much smaller than imports, probably were valued at less than \$1 million.

Description and uses

The parts of watch movements included herein are hands, dials, plates, bridges, springs, levers, pinions, stems, wheels, assemblies, and subassemblies. Excluded from this summary are screws (see volume 6:10), and jewel bearings (see the summary on item 720.60 in this volume).

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate as of Jan. 1, 1969	Rate pursuant to conces- sions granted in 1964-67 trade conference Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.40(pt.)	: Watch dials under	: 2.5¢ each	: 2¢ each + 36%	: 1.2¢ each +	
	: 1.77 inches in	: + 45% ad	: ad val.	: 22.5% ad	
	: width.	: val.	:	: val.	
720.44(pt.)	: Parts of watch	: 50% ad	: 40% ad val.	: 25% ad val.	
	: dials.	: val.	:	:	
	:	:	:	:	

Tabulation continued on next page.

PARTS OF WATCH MOVEMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.65	Watch movement bottom or pillar plates or their equivalent.	One-half the col- umn 1 duty for the com- plete movement for which suitable.	One-half the column 1 duty for the complete movement for which suit- able.	One-half the column 1 duty for the complete movement for which suit- able.
720.70	Balance assemblies for watch move- ments, consist- ing of a balance staff, balance wheel, and hair- spring, with or without other parts commer- cially known as parts of a bal- ance assembly.	35¢ each assembly.	28¢ each assembly.	17.5¢ each assembly.

Tabulation continued on next page.

PARTS OF WATCH MOVEMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.75	Other assemblies and subassemblies for watch movements, consisting of two or more parts or pieces fastened or joined together.	9¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 2¢ for each other part or piece therein (if any) but the total duty on the assembly or subassembly shall not exceed the column 1 duty for	7.2¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.6¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for	4.5¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 22.5% ad val. unless said 22.5% rate exceeds the column 1 duty for the complete movement.

Tabulation continued on next page.

PARTS OF WATCH MOVEMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.75	:Continued	: the com- plete movement for which suitable, nor be less than 45% ad val. un- less said 45% rate exceeds the col- umn 1 duty for the com- plete movement.	: column 1 duty for the complete movement.	:
720.90	:Other parts for watch movements.	:55% ad val.	:44% ad val.	:27.5% ad val.
721.05	:Any of the fore- going parts of watch movements (except bottom or pillar plates or their equiva- lent, bridges or their equiva- lent, and jewels) imported in the same shipment, and entered with complete watch movements (whe- ther or not suitable for use in such movements) but	:45% ad val.	:36% ad val.	:22.5% ad val.

Tabulation continued on next page.

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
721.05	:Continued--	:	:	:
	: not including	:	:	:
	: any portion of	:	:	:
	: all the parts in	:	:	:
	: such shipment	:	:	:
	: which exceeds in	:	:	:
	: value 4 percent	:	:	:
	: of the value of	:	:	:
	: such movements.	:	:	:
	:	:	:	:

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A to this volume for all the staged rates).

The average ad valorem equivalents (a.v.e.) of the compound duties shown above for the rates of duty in effect in 1968 (excluding items 720.65 and 720.75 1/), based on imports entered in 1968, were:

<u>TSUS</u> <u>item</u>	<u>A.v.e. rate</u> <u>of duty</u> <u>(percent)</u>
720.40-----	59.5
720.70-----	42.6
720.90-----	49.0
721.05-----	40.0

1/ The average ad valorem equivalents for these TSUS items cannot be computed from available statistics.

U.S. consumption

Annual U.S. consumption of parts, in terms of value, increased by about 50 percent between 1964 and 1968. The value of parts consumed in this country in 1968 was probably over \$25 million. In terms of value, about four-fifths of such consumption was produced domestically. All but a small portion of domestic and imported parts were destined for inclusion in new watch movements; the remainder were used in watch repairs. The growth in U.S. consumption of parts between 1964 and 1968 was due to both increased production of watch movements and an increase in parts consumed through repair of both imported and domestic movements.

U.S. producers

By far the largest share of the parts produced in the United States, whether for new watch movement assembly or repair purposes, has been captive production by three domestic manufacturers of jewel-lever and pin-lever wrist and pocket watches. (One domestic producer stopped producing watch movements in the United States in 1967; another concern stopped producing parts in 1968 and became an assembler of watch movements with foreign parts.) These firms buy a few types of parts from several small specialized independent domestic producers of parts (e.g., pinions or springs) particularly when production runs are small and it would be advantageous from the standpoint of cost to utilize outside domestic sources. They also procure parts from subsidiaries and independent firms abroad. Repair parts are received from domestic and foreign sources but primarily the latter. Domestic establishments that produce watch parts are located primarily in New York, Connecticut, Illinois, and North Carolina.

U.S. production

The estimated value of U.S. production of parts increased from about \$16 million in 1964 to \$21 million in 1968 (table 1). Although the value of U.S. production of parts has expanded over the last four years, some of this is attributable to price increases as well as increased demand for parts for production of movements and for repair purposes. U.S. producers have supplied a decreasing share of parts produced on screw machines (e.g., pinions and gears)--such parts being increasingly imported by U.S. watch movement producers. Stamped-out parts for watch movements continue to be produced in quantity in this country. Significant quantities of mainsprings, hair-springs, dials, and hands are supplied from both domestic and foreign sources for use in U.S. watch movement production.

U.S. exports

It is estimated that exports of parts decreased in value from the reported \$3.1 million in 1964 (table 1) to less than \$1 million in 1968. Exports of parts were reported as a separate category in official statistics through 1964, but beginning with 1965, such shipments have been reported in a combined statistical category which includes complete watch movements, clock cases, and other clock parts; however, it is believed that the decline in exports probably occurred after 1965.

Canada is the principal market for U.S. exports of parts. Two U.S. watch and clock companies have subsidiaries in Canada where they assemble watches.

In addition to the exports to foreign countries, one or two domestic watch manufacturers ship parts to their subsidiaries located in U.S. insular possessions. Such parts, together with foreign made parts, are incorporated into movements, which are then forwarded to the mainland to be cased, timed, boxed, and sold.

U.S. imports

The value of U.S. imports of parts rose from \$3.8 million in 1964 to \$4.7 million in 1968, an increase of nearly 25 percent (table 2). Such imports accounted for an appreciable part of domestic consumption. Much of this increase is attributable to expanded procurement of foreign parts by domestic watch producers; increased prices of domestic parts has been a secondary factor. Prices of imported parts for U.S. watch production have increased for domestic companies, but one or two firms have found that volume procurement and automation of parts production in the watch establishments abroad helped to minimize price increases for imported parts. The trend to use more imported screw-machine made parts was noticeable throughout the 1964-68 period. Imported parts include principally springs, stems, pinions, staffs, hands, wheels, and dials.

PARTS OF WATCH MOVEMENTS

The following tabulation shows U.S. imports of parts, by types (TSUS items), in 1968 (in thousands of dollars):

<u>Type</u>	<u>Value</u>
Watch and clock dials <u>1</u> / under 1.77 inches in width (720.40)-----	644
Watch bottom or pillar plates (720.65)-----	2
Watch balance assemblies (720.70)-----	92
Other watch movement assemblies and sub- assemblies (720.75)-----	175
Watch parts (720.90)-----	2,934
Watch parts imported with complete move- ments (721.05)-----	<u>844</u>
Total-----	4,691

As shown above, imports of parts, not specifically provided for (item 720.90) constituted 63 percent of the total; parts imported with complete movements (item 721.05), 18 percent; and watch and clock dials under 1.77 inches (item 720.40), 14 percent.

Switzerland has remained the principal source of imported parts, but during 1964-68, France and the United Kingdom became increasingly important sources (table 2). France and Great Britain are principal sources for parts for pin-lever watch movements; parts for jeweled-lever movements are imported principally from Switzerland. In addition to supplying parts for domestic production of watches, these sources supply most of the parts required to repair foreign watches in this country.

1/ Separate data on imports of watch and clock dials under 1.77 inches in width are not available. However, a random examination of entries indicates that the major part of such imports is watch dials rather than small clock dials. Conversely, imports of parts of watch dials (item 720.44) are not shown above, but are included in the data in the summary for dials for clocks and other timing devices because the data covers mostly the latter dials, imports of which are nevertheless negligible.

World production and trade

World production of watch parts is reflected in the production of watch movements. In order of decreasing importance, the producers of watch parts in the free world are Switzerland, Japan, United States, West Germany, France, and the United Kingdom. These countries produce virtually all of the parts made in the free world.

Japan, West Germany, France, the Soviet Union, and Hong Kong exported a sizeable amount of watch parts to the Virgin Islands for assembly into movements to be shipped into the customs territory of the United States (table 3). Probably the same countries were also principal suppliers of parts to Guam, but no official statistics are available on exports to Guam by source country.

Communist countries produced parts for over 25 million watch movements in 1967. The Soviet Union was by far the largest producer; Communist China and perhaps some of the Eastern European countries produced smaller amounts of parts.

PARTS OF WATCH MOVEMENTS

Table 1.--Watch movement dials, plates, assemblies and subassemblies, and other parts: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Production <u>1/</u>	Imports	Exports	Apparent consumption	:Ratio (per- cent) of im- ports to consumption
1964-----	16,000	3,757	3,115	16,642	22.6
1965-----	17,000	3,577	<u>2/</u>	<u>2/</u>	<u>2/</u>
1966-----	18,000	4,175	<u>2/</u>	<u>2/</u>	<u>2/</u>
1967-----	20,000	4,683	<u>2/</u>	<u>2/</u>	<u>2/</u>
1968-----	21,000	4,691	<u>2/</u>	<u>2/</u>	<u>2/</u>

1/ Estimated by the Tariff Commission.

2/ Not available.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Watch movement dials, plates, assemblies and subassemblies, and other parts: U.S. imports for consumption, by principal sources, 1964-68

(In thousands of dollars)

Country	1964	1965	1966	1967	1968
Switzerland-----	1,718	1,393	1,806	1,955	1,715
France-----	987	988	1,159	1,290	1,687
United Kingdom-----	903	1,061	1,035	1,274	1,034
West Germany-----	122	113	124	102	179
Japan-----	22	17	47	56	61
Italy-----	2	2	2	1	10
All other-----	3	3	2	5	5
Total-----	3,757	3,577	4,175	4,683	4,691

Source: Compiled from official statistics of the U.S. Department of Commerce.

PARTS OF WATCH MOVEMENTS

Table 3.--Watch parts: Imports into the Virgin Islands
from foreign countries, 1965-68

(In thousands of dollars)

Country	1965	1966	1967	1968
Japan-----	5,498	7,628	6,586	5,032
West Germany-----	1,773	1,221	1,277	2,278
France-----	1,741	1,536	1,185	854
U.S.S.R.-----	686	545	726	833
Hong Kong-----	285	561	604	519
Switzerland-----	43	141	92	159
All other-----	21	4	12	14
Total-----	10,047	11,636	10,482	9,689

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS item</u>
Dials and parts thereof-----	720.40(pt.), 720.42, 720.44(pt.)
Plates-----	720.67
Assemblies and subassemblies-----	720.82, 720.86
Other parts-----	720.94, 721.12, 721.20(pt.)

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

U.S. production supplied, in terms of value, nearly 93 percent of the parts for these timing devices consumed in the United States in 1968. Exports accounted for about 10 percent of domestic production.

Description and uses

This summary covers parts, including assemblies and subassemblies, for clocks and other timing devices, except watches and standard marine chronometers and movements thereof. It includes plates, pinions, wheels, pivots, hands, dials, reducing gears and other parts for such timing devices. Excluded are parts for synchronous and sub-synchronous motors employed in electric clocks; parts of d.c. motors used in cordless clocks; and screws, nuts, and bolts. (The motors and parts are covered in volume 6:10, and screws, nuts, and bolts in volume 6:5.) Also excluded are clock glasses and crystals (see volume 5:4) and anti-friction jewel bearings, clock and timing device cases and parts thereof, all of which are discussed elsewhere in this volume. Parts for timing mechanisms employed in military items, such as fuses for artillery shells, although covered herein, are not included in the trade data reported in this summary because complete statistics on them are not available.

PARTS FOR TIMING DEVICES OTHER THAN WATCH MOVEMENTS

U.S. tariff treatment

The column 1 (trade-agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.40(pt.)	Clock dials under 1.77 inches in width.	2.5¢ each + 45% ad val.	2¢ each + 36% ad val.	1.2¢ each + 22.5% ad val.
720.42	Clock dials 1.77 inches or more in width.	25% ad val.	20% ad val.	12.5% ad val.
720.44(pt.)	Parts of clock dials and dials for other timing devices.	50% ad val.	40% ad val.	25% ad val.
720.67	Any plate, or set of plates, suitable for assembling thereon a clock move- ment.	One-half the column 1 duty for the com- plete movement for which suitable.	One-half the column 1 duty for the complete movement for which suit- able.	One-half the column 1 duty for the com- plete move- ment for which suitable.
720.82	Assemblies and subassemblies for clock movements (other than marine chro- nometers) con- sisting of two or more parts or pieces fas- tened or join- ed together	The column 1 rate specified in item 720.67 for the plate or plates + 12.5¢ for each jewel (if any) + 2.5¢ for	The column 1 rate speci- fied in item 720.67 for the plate or plates + 10¢ for each jewel (if any) + 2¢ for each other part or piece (if	The column 1 rate speci- fied in item 720.67 for the plate or plates + 6.25¢ for each jewel (if any) + 1.25¢ for each other

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	and consisting in part of a plate or set of plates provided for in item 720.67.	each other: part or piece (if any), but the total duty on the assem- bly or subassem- bly shall not exceed the column 1 duty for the com- plete movement.	any) but the total duty on the as- sembly or subassembly shall not exceed the column 1 duty for the complete movement.	part or piece (if any) but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the com- plete movement.
720.86	Other assemblies and subassemblies for clock move- ments (other than marine chronom- eters).	32.5% ad val. + 12.5¢ for each jewel (if any) + 1.5¢ for each other piece or part.	26% ad val. + 10¢ for each jewel (if any) + 1.2¢ for each other piece or part.	16% ad val. + 6.25¢ for each jewel (if any) + 0.75¢ for each other piece or part.
720.94	Other parts for clock movements (other than ma- rine chronom- eters).	32.5% ad val.	26% ad val.	16% ad val.
721.12	Any of the fore- going parts of clock movements (except plates and jewels and excluding those	22.5% ad val.	18% ad val.	11% ad val.

PARTS FOR TIMING DEVICES OTHER THAN WATCH MOVEMENTS

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
	for 721.10, standard ma- rine chronom- eters) import- ed in the same shipment, and entered with complete clocks, clock movements, ap- paratus, or time switches provided for in subpart 2E (whether or not suitable for use in such complete articles), but not including any portion of all the parts in the ship- ment which ex- ceeds in value 1.5 percent of the value of such complete articles.			
721.20(pt.)	Any article in the foregoing items, if Canadian ar- ticle and o- riginal motor- vehicle equip- ment.	Free	<u>1/</u>	<u>1/</u>

1/ Duty-free status not affected by trade conference of 1964-67

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see the appendix A in this volume for all the staged rates).

The average ad valorem equivalents (a.v.e.) of the compound duties shown above for the rates of duty in effect in 1968 (excluding items 720.67 and 720.82 ^{1/}, based on imports entered in 1968, were:

<u>TSUS</u> <u>item</u>	<u>A.v.e. rate</u> <u>of duty</u> <u>(percent)</u>
720.40-----	59.5
720.86-----	29.0

U.S. consumption

Apparent U.S. consumption of the articles considered in this summary increased from an estimated value of \$17.4 million in 1964 to \$23.2 million in 1968 (table 1). The expanding consumption of parts was attributable to increasing demand for complete clocks. Population growth, better standard of living, national advertising, innovations of style, technological changes in clocks and increased exports of clock parts, particularly to Canada, account in large measure for growing consumption in clock parts. Increased demand for the electric- and battery-operated clock parts was evident throughout 1964-68; demand for hand-wound clock parts decreased during most of the period, but increased in 1968. Overall domestic consumption of parts for timing apparatus and time switches also reflected growth throughout the period.

U.S. producers

Most of the parts and assemblies discussed in this summary are manufactured in the domestic clock and timing device industry which is composed of the producers of the three types of clocks--hand-wound and electric-and battery-operated--plus several screw machine parts

^{1/} The average ad valorem equivalents for these TSUS items cannot be computed from available import statistics.

manufacturers that act as subcontractors to the clock producers. There are between 70 and 80 clock producers in the United States, one-third of whom are major concerns. The principal clock manufacturing concerns are multi-product companies; some produce related items like watches, time switches, and timing apparatus in addition to other product lines; others fabricate unrelated items. Less than a dozen of the large producers derive a major portion of their income from the production and sale of clocks.

Manufacturing establishments that produce clock and timing device assemblies, subassemblies, and parts are dispersed throughout the United States. The largest concentration of these establishments is in Connecticut, Illinois, Massachusetts, and New York.

U.S. production

Estimated annual production of parts and assemblies for clocks and timing devices increased in value from about \$18 million to \$24 million in the period 1964-68 (table 1). The average annual rate of increase was 7.4 percent. In 1968, probably 60 percent of the parts production was used in the manufacture of clocks; the remainder was used in making timing devices consisting of timing apparatus or time switches. The parts used in the repair of clocks and timing devices in the United States account for a minor portion of production.

Parts are fabricated in the United States for hand-wound clocks, battery-operated clocks and synchronous motor clocks. With regard to hand-wound clocks, by far the greatest share of parts used in the assembly of such timepieces are from captive production--fabricated by the same firm that assembles the article. Some parts are produced on order by other domestic suppliers; other parts, including dials, hands, pinions, and springs, are imported. Domestic concerns ordinarily procure battery-operated movements from overseas sources and assemble them into cordless clocks here. One domestic concern produces battery operated movements from parts it fabricates in its own establishments. Frequently, dials, hands, reducing gears and other parts are fabricated by the manufacturer of the clock or timing device, or purchased from domestic distributors or importers.

Most of the large producers (concerns engaged in the manufacture of timing apparatus and time switches) usually fabricate parts and subassemblies, and assemble the mechanisms, but the smaller concerns may act only as assemblers, procuring parts and subassemblies from other firms.

U.S. exports

It is estimated that the annual value of U.S. exports of the articles considered herein increased from about \$1.4 million in 1964 to \$2.5 million in 1968 (table 1). A large portion of the increase reflected exports of parts to Canada where subsidiaries of at least two American companies have been assembling and merchandising clocks. Other markets have been the United Kingdom, Switzerland, West Germany, and Japan, in that order of importance.

U.S. imports

The annual value of imported parts for clocks and timing devices (including assemblies and subassemblies) varied considerably between 1964 and 1968, but reflected an increase from \$854,000 in 1964 to \$1,686,000 in 1968 (table 1). Imports accounted for an annual average of 7.8 percent of the value of clock and timing device parts consumed in the United States during this period. Principal sources of imports during 1965-68 were Switzerland, West Germany, and Japan (table 2).

The value of imports of parts for clocks and timing devices, by principal types, as compiled from official statistics of the U.S. Department of Commerce, was as follows in 1968:

<u>Type</u>	<u>Value</u>
Dials for clocks and other timing devices-----	\$550,157
Clock movement plates-----	4,757
Assemblies and subassemblies for clock movements----	132,023
Other clock movement and timing device parts-----	998,766
Total-----	<u>1,685,703</u>

It should be noted that although TSUS item 720.40 provides for both watch and clock dials, the totals of such imports entered under that provision were reported in the summary on watch parts (elsewhere in this volume) since watch dials account for most of the imports and there is no way to accurately separate the data as between watch and clock dials. Conversely, the bulk of the imports entered under item 720.42 is believed to consist of clock dials; hence import data for that item are reported in this summary. In the case of Canadian articles for original motor vehicle equipment entered under TSUS item 721.20, import data are allocated between this summary and the one on clocks, clock movements, and clock cases elsewhere in this volume.

Table 1.--Parts for clocks and timing devices: U.S. production, imports for consumption, exports of domestic merchandise, and apparent consumption, 1964-68

(In thousands of dollars)

Year	Pro- duction <u>1/</u>	Imports <u>2/</u>	Exports <u>1/</u>	Apparent con- sumption	Ratio (percent) of imports to consumption
1964-----	18,000	854	1,400	17,454	4.9
1965-----	21,000	1,155	1,800	20,355	5.7
1966-----	22,000	3,097	2,200	22,897	13.5
1967-----	23,000	1,763	2,000	22,763	7.7
1968-----	24,000	1,686	2,500	23,186	7.3

1/ Estimated by the Tariff Commission.

2/ Data do not include value of imports entered under TSUS item 720.40, and only part of those entered under TSUS item 721.20.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 2.--Parts for clocks and timing devices: U.S. imports for consumption, by principal sources, 1965-68

(In thousands of dollars)

Country	:	1965	:	1966	:	1967	:	1968
Switzerland-----	:	665	:	2,164	:	913	:	704
West Germany-----	:	418	:	614	:	448	:	619
Japan-----	:	12	:	171	:	173	:	126
Canada-----	:	10	:	5	:	50	:	94
United Kingdom-----	:	5	:	29	:	88	:	69
France-----	:	25	:	47	:	36	:	56
Other-----	:	20	:	67	:	55	:	18
Total-----	:	1,155	:	3,097	:	1,763	:	1,686

Source: Compiled from official statistics of the U.S. Department of Commerce.

<u>Commodity</u>	<u>TSUS</u> <u>item</u>
Unset antifriction jewel bearings-----	720.60

Note.--For the statutory description, see the Tariff Schedules of the United States Annotated (TSUSA-1969) (pertinent sections thereof are reproduced in appendix A to this volume).

U.S. trade position

Unset antifriction jewel bearings consumed in the United States (60.7 million units in 1968, valued at approximately \$2.5 million) are supplied almost wholly by imports; those produced domestically are not exported.

Description and uses

Antifriction jewel bearings which are made principally from synthetic sapphires and rubies are used to reduce friction in watch and clock movements, meters, compasses, or other similar mechanisms used in a variety of military, industrial, and consumer-type precision instruments having moving parts. Such bearings are employed in aircraft and missile instruments, space vehicles, quality control devices, and electrical measuring and controlling devices. The largest domestic user of jewel bearings is the watch and clock industry, which accounts for over 80 percent of the annual consumption of such bearings in the United States. Bearings of crystal, garnet, glass, and metal are employed in less expensive mechanisms where precision and wearing qualities are less critical factors.

Jewel bearings are more satisfactory than burnished holes drilled in watch plates or bronze bushings (both used in lieu of jewel bearings) because of their oil retention and wear resistant qualities. Jewel bearing blanks are cut from sapphire and ruby rods and boule. These blanks are finished into a number of shapes and sizes according to manufacturers' specifications. A recent report indicated that Swiss producers are starting to use lasers in the fabrication of some types of jewel bearings. Types of jewel bearings include conical, roller (pin), hole, pallet, end stone, cup, and ring.

JEWEL BEARINGS

U.S. tariff treatment

The column 1 (trade agreement) rates of duty applicable to imports (see general headnote 3 in the TSUSA-1969) are as follows:

TSUS item	Commodity	Rate as of Dec. 31, 1967	Rate pursuant to conces- sions granted in 1964-67 trade conference	
			Second stage, effective Jan. 1, 1969	Final stage, effective Jan. 1, 1972
720.60	Jewels, unset, suitable for use for antifriction purposes in any watch or clock movement, or in any meter, compass, or similar precision mechanism.	10% ad val.	8% ad val.	5% ad val.

The tabulation above shows the column 1 rates in effect as of December 31, 1967, and modifications therein as a result of concessions granted by the United States in the sixth round of trade negotiations under the General Agreement on Tariffs and Trade. Only the second and final stages of the five annual rate modifications are shown above (see appendix A in this volume for all the staged rates).

U.S. consumption

In recent years, the quantity of jewel bearings consumed in the United States has varied from year to year. During the period 1964-68, consumption ranged from a peak of 87 million units in 1964 to a low of 55 million units in 1967 (table 1). By far the greatest share of such consumption has consisted of jewel bearings for use by the domestic watch and clock industries.

U.S. producers, production, and exports

The William Langer Ordnance Plant at Rolla, North Dakota, operated under a government contract by a private concern, accounts for over 90 percent of the total output of jewel bearings. Six

much smaller domestic establishments produce an insignificant quantity of such bearings. All seven concerns produce the bearings from rods or boule imported from Germany, Italy, Switzerland, and France.

U.S. production of jewel bearings (excluding bearings destined for the strategic stockpile) declined from 1.8 million units in 1964 to 1.5 million units in 1968 (table 1); the value of production in 1968 was about \$1 million. Virtually all of the production of the William Langer Ordnance Plant, which assures a minimal source of strategic antifriction jewels in case of national emergency, consists of expensive high-grade jewel bearings for various types of precision instruments. Jewel bearings produced at this plant are manufactured to exact specifications in short production runs and such bearings range from 3 cents in price to \$2 each. Domestic production costs for jewel bearings are several times as high as those for similar manufacture in the major producing countries abroad. There are two principal reasons for this--the wage differential and the size of production runs.

A small portion of domestic production is allocated for use in watches and clocks produced under government contract. (Jewel bearings for watches and clocks generally have greater tolerances and sell from 3 to 4 cents each.)

There are no known exports of U.S.-made jewel bearings.

U.S. imports

Most jewel bearings consumed by the domestic watch and clock industries are imported because of their much lower cost.

In recent years the quantity of jewel bearings imported annually, which supplied virtually all of the domestic consumption of such articles, has fluctuated widely with no discernible trend. Peaks in imports occurred in 1964 and 1966, but the supply declined appreciably in each of the years that followed (table 2); approximately 59 million units, valued at \$1.4 million, were imported in 1968. Fluctuations in imports were attributable in part to heavy carry-over inventories in alternate years. Other factors included the decline in use of jewel bearings in several models of domestically produced watches, and expanding demand for taut-band suspension electrical indicating instruments which do not employ jewel bearings to reduce friction.

The contraction in demand for imported jewel bearings for use in some models of watches and in certain electrical indicating instruments, on the other hand, was compensated for in small part by

the growth in demand for imported jewel bearings for certain types of clocks, aircraft instruments, and other mechanical measuring instruments produced in the United States.

Switzerland, Italy, and Canada have been the principal suppliers of unset antifriction jewel bearings in recent years (table 2). In 1968, Switzerland accounted for about 52 percent (in terms of quantity) of the total imports; Italy, 26 percent; and Canada, 19 percent.

Table 1.--Unset antifriction jewels: U.S. production, imports for consumption, and apparent consumption, 1964-68

(In thousands of units)

Year	Pro- duction	Imports	Apparent consump- tion	Ratio (per- cent) of im- ports to con- sumption
1964-----	1,800	85,357	87,157	98
1965-----	1,700	59,400	61,100	97
1966-----	1,600	74,986	76,586	98
1967-----	1,700	53,154	54,854	97
1968-----	1,500	59,218	60,718	98

Source: Domestic production (excluding antifriction jewel bearings entering stockpile each year) is estimated. Imports are compiled from official statistics of the U.S. Department of Commerce.

Note.--There are no known exports of these articles.

JEWEL BEARINGS

Table 2.--Unset antifriction jewels: U.S. imports for consumption, by principal sources, 1964-68

Country	1964	1965	1966	1967	1968
Quantity (1,000 units)					
Switzerland-----	59,204	37,042	46,749	33,447	30,587
Italy-----	15,598	14,958	16,647	12,860	15,259
Canada-----	10,282	6,435	9,227	5,519	11,337
Other countries-----	273	965	2,363	1,328	2,035
Total-----	85,357	59,400	74,986	53,154	59,218
Value (1,000 dollars)					
Switzerland-----	2,102	1,317	1,549	1,060	917
Italy-----	294	256	281	222	288
Canada-----	142	78	137	80	112
Other countries-----	5	20	36	33	39
Total-----	2,543	1,671	2,003	1,395	1,356

Source: Compiled from official statistics of the U.S. Department of Commerce.

A P P E N D I X A

**Tariff Schedules of the United States Annotated (1968):
General headnotes and rules of interpretation, and
excerpts relating to the items included in this
volume.**

**NOTE: The shaded areas in this appendix cover
headnotes and TSUS items not included in the
summaries in this volume.**

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

GENERAL HEADNOTES AND RULES OF INTERPRETATION

Page 3

1. Tariff Treatment of Imported Articles. All articles imported into the customs territory of the United States from outside thereof are subject to duty or exempt therefrom as prescribed in general headnote 3.

2. Customs Territory of the United States. The term "customs territory of the United States", as used in the schedules, includes only the States, the District of Columbia, and Puerto Rico.

3. Rates of Duty. The rates of duty in the "Rates of Duty" columns numbered 1 and 2 of the schedules apply to articles imported into the customs territory of the United States as hereinafter provided in this headnote:

(a) Products of Insular Possessions.

(i) Except as provided in headnote 6 of schedule 7, part 2, subpart E, [and] except as provided in headnote 4 of schedule 7, part 7, subpart A, articles imported from insular possessions of the United States which are outside the customs territory of the United States are subject to the rates of duty set forth in column numbered 1 of the schedules, except that all such articles the growth or product of any such possession, or manufactured or produced in any such possession from materials the growth, product, or manufacture of any such possession or of the customs territory of the United States, or of both, which do not contain foreign materials to the value of more than 50 percent of their total value, coming to the customs territory of the United States directly from any such possession, and all articles previously imported into the customs territory of the United States with payment of all applicable duties and taxes imposed upon or by reason of importation which were shipped from the United States, without remission, refund, or drawback, such duties or taxes, directly to the possessor from which they are being returned by direct shipment, are exempt from duty.

(ii) In determining whether an article produced or manufactured in any such insular possession contains foreign materials to the value of more than 50 percent, no material shall be considered foreign which, at the time such article is entered, may be imported into the customs territory from a foreign country, other than Cuba or the Philippine Republic, and entered free of duty.

(b) Products of Cuba. Products of Cuba imported into the customs territory of the United States, whether imported directly or indirectly, are subject to the rates of duty set forth in column numbered 1 of the schedules. Preferential rates of duty for such products apply only as shown in the said column 1. /

(c) Products of the Philippine Republic.

(i) Products of the Philippine Republic imported into the customs territory of the United States, whether imported directly or indirectly, are subject to the rates of duty which are set forth in column numbered 1 of the schedules or to fractional parts of the rates in the said column 1, as hereinafter prescribed in subdivisions (c)(ii) and (c)(iii) of this headnote.

(ii) Except as otherwise prescribed in the schedules, a Philippine article, as defined in subdivision (c)(iv) of this headnote, imported into the customs

territory of the United States and entered on or before July 3, 1974, is subject to that rate which results from the application of the following percentages to the most favorable rate of duty (i.e., including a preferential rate prescribed for any product of Cuba) set forth in column numbered 1 of the schedules:

(A) 20 percent, during calendar years

1963 through 1964,

(B) 40 percent, during calendar years

1965 through 1967,

(C) 60 percent, during calendar years

1968 through 1970,

(D) 80 percent, during calendar years

1971 through 1973,

(E) 100 percent, during the period from

January 1, 1974, through July 3, 1974.

(iii) Except as otherwise prescribed in the schedules, products of the Philippine Republic, other than Philippine articles, are subject to the rates of duty (except any preferential rates prescribed for products of Cuba) set forth in column numbered 1 of the schedules.

(iv) The term "Philippine article", as used in the schedules, means an article which is the product of the Philippines, but does not include any article produced with the use of materials imported into the Philippines which are products of any foreign country (except materials produced within the customs territory of the United States) if the aggregate value of such imported materials when landed at the Philippine port of entry, exclusive of any landing cost and Philippine duty, was more than 20 percent of the appraised customs value of the article imported into the customs territory of the United States.

(d) Products of Canada.

(i) Products of Canada imported into the customs territory of the United States, whether imported directly or indirectly, are subject to the rates of duty set forth in column numbered 1 of the schedules. The rates of duty for a Canadian article, as defined in subdivision (d)(ii) of this headnote, apply only as shown in the said column numbered 1.

(ii) The term "Canadian article", as used in the schedules, means an article which is the product of Canada, but does not include any article produced with the use of materials imported into Canada which are products of any foreign country (except materials produced within the customs territory of the United States), if the aggregate value of such imported materials when landed at the Canadian port of entry (that is, the actual purchase price, or if not purchased, the export value, of such materials, plus, if not included therein, the cost of transporting such materials to Canada but exclusive of any landing cost and Canadian duty) was --

(A) with regard to any motor vehicle or automobile truck tractor entered on or before December 31, 1967, more than 60 percent of the appraised value of the article imported into the customs territory of the United States; and

(B) with regard to any other article (including any motor vehicle or automobile truck tractor entered after December 31, 1967), more than 50 percent of the appraised value of the article imported into the customs territory of the United States.

(e) Products of Communist Countries. Notwithstanding any of the foregoing provisions of this headnote, the rates of duty shown in column numbered 2 shall apply to products, whether imported directly or indirectly, of the following countries and areas pursuant to section 401 of the Tariff Classification Act of 1962, to section 231 or 257(a) (2) of the Trade Expansion Act of 1962, or to

1/ By virtue of section 401 of the Tariff Classification Act of 1962, the application to products of Cuba of either a preferential or other reduced rate of duty in column 1 is suspended. See general headnote 3(e), *infra*. The provisions for preferential Cuban rates continue to be reflected in the schedules because, under section 401, the rates therefor in column 1 still form the bases for determining the rates of duty applicable to certain products, including "Philippine articles".

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

General Headnotes and Rules of Interpretation

action taken by the President thereunder:

- Albania
- Bulgaria
- China (any part of which may be under Communist domination or control)
- Cuba 1/
- Czechoslovakia
- Estonia
- Germany (the Soviet zone and the Soviet sector of Berlin)
- Hungary
- Indochina (any part of Cambodia, Laos, or Vietnam which may be under Communist domination or control)
- Korea (any part of which may be under Communist domination or control)
- Kurile Islands
- Latvia
- Lithuania
- Outer Mongolia
- Rumania
- Southern Sakhalin
- Tanna Tuva
- Tibet
- Union of Soviet Socialist Republics and the area in East Prussia under the provisional administration of the Union of Soviet Socialist Republics.

(f) Products of All Other Countries. Products of all countries not previously mentioned in this headnote imported into the customs territory of the United States are subject to the rates of duty set forth in column numbered 1 of the schedules.

(g) Effective Date; Exceptions - Staged Rates of Duty. 2/ Except as specified below or as may be specified elsewhere, pursuant to section 501(a) of the Tariff Classification Act of 1962 (P.L. 87-455, approved May 24, 1962), the rates of duty in columns numbered 1 and 2 become effective with respect to articles entered on or after the 10th day following the date of the President's proclamation provided for in section 102 of the said Act. If, in column numbered 1, any rate of duty or part thereof is set forth in parenthesis, the effective date shall be governed as follows:

(i) If the rate in column numbered 1 has only one part (i.e., 8¢ (10¢) per lb.), the parenthetical rate (viz., 10¢ per lb.) shall be effective as to articles entered before July 1, 1964, and the other rate (viz., 8¢ per lb.) shall be effective as to articles entered on or after July 1, 1964.

(ii) If the rate in column numbered 1 has two or more parts (i.e., 5¢ per lb. + 50% ad val.) and has a parenthetical rate for either or both parts, each part of the rate shall be governed as if it were a one-part rate. For example, if a rate is expressed as "4¢ (4.5¢) per lb. + 8% (9%) ad val.", the rate applicable to articles entered before July 1, 1964, would be "4.5¢ per lb. + 9% ad val."; the rate applicable to articles entered on or after July 1, 1964, would be "4¢ per lb. + 8% ad val."

(iii) If the rate in column numbered 1 is marked with an asterisk (*), the foregoing provisions of (i) and (ii) shall apply except that "January 1, 1964" shall be substituted for "July 1, 1964", wherever this latter date appears.

1/ In Proclamation 3447, dated February 3, 1962, the President, acting under authority of section 620(a) of the Foreign Assistance Act of 1961 (75 Stat. 445), as amended, prohibited the importation into the United States of all goods of Cuban origin and all goods imported from or through Cuba, subject to such exceptions as the Secretary of the Treasury determines to be consistent with the effective operation of the embargo.

2/ The purpose of headnote 3(g) was to provide for an effective date for the rates of duty initially contained in the Tariff Schedules of the United States. By Presidential Proclamation 3548 of August 21, 1963, these rates of duty, except as noted in subparagraphs (i), (ii), and (iii) of headnote 3(g), became effective on August 31, 1963.

4. Modification or Amendment of Rates of Duty. Except as otherwise provided in the Appendix to the Tariff Schedules --

(a) a statutory rate of duty supersedes and terminates the existing rates of duty in both column numbered 1 and column numbered 2 unless otherwise specified in the amending statute;

(b) a rate of duty proclaimed pursuant to a concession granted in a trade agreement shall be reflected in column numbered 1 and, if higher than the then existing rate in column numbered 2, also in the latter column, and shall supersede but not terminate the then existing rate (or rates) in such column (or columns);

(c) a rate of duty proclaimed pursuant to section 336 of the Tariff Act of 1930 shall be reflected in both column numbered 1 and column numbered 2 and shall supersede but not terminate the then existing rates in such columns; and

(d) whenever a proclaimed rate is terminated or suspended, the rate shall revert, unless otherwise provided, to the next intervening proclaimed rate previously superseded but not terminated or, if none, to the statutory rate.

5. Intangibles. For the purposes of headnote 1 --

(a) corpses, together with their coffins and accompanying flowers,

(b) currency (metal or paper) in current circulation in any country and imported for monetary purposes,

(c) electricity,

(d) securities and similar evidences of value, and

(e) vessels which are not "yachts or pleasure boats" within the purview of subpart D, part 6, of schedule 6,

are not articles subject to the provisions of these schedules.

6. Containers or Holders for Imported Merchandise.

For the purposes of the tariff schedules, containers or holders are subject to tariff treatment as follows:

(a) Imported Empty: Containers or holders if imported empty are subject to tariff treatment as imported articles and as such are subject to duty unless they are within the purview of a provision which specifically exempts them from duty.

(b) Not Imported Empty: Containers or holders if imported containing or holding articles are subject to tariff treatment as follows:

(i) The usual or ordinary types of shipping or transportation containers or holders, if not designed for, or capable of, reuse, and containers of usual types ordinarily sold at retail with their contents, are not subject to treatment as imported articles. Their cost, however, is, under section 402 or section 402a of the tariff act, a part of the value of their contents and if their contents are subject to an ad valorem rate of duty such containers or holders are, in effect, dutiable at the same rate as their contents, except that their cost is deductible from dutiable value upon submission of satisfactory proof that they are products of the United States which are being returned without having been advanced in value or improved in condition by any means while abroad.

(ii) The usual or ordinary types of shipping or transportation containers or holders, if designed for, or capable of, reuse, are subject to treatment as imported articles separate and distinct from their contents. Such holders or containers are not part of the dutiable value of their contents and are separately subject to duty upon each and every importation into the customs territory of the United States unless within the scope of a provision specifically exempting them from duty.

(iii) In the absence of context which requires otherwise, all other containers or holders are subject to the same treatment as specified in (ii) above for usual or ordinary types of shipping or transportation containers or holders designed for, or capable of, reuse.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

General Headnotes and Rules of Interpretation

7. Commingling of Articles. (a) Whenever articles subject to different rates of duty are so packed together or mingled that the quantity or value of each class of articles cannot be readily ascertained by customs officers (without physical segregation of the shipment or the contents of any entire package thereof), by one or more of the following means:

(i) sampling,
 (ii) verification of packing lists or other documents filed at the time of entry, or
 (iii) evidence showing performance of commercial settlement tests generally accepted in the trade and filed in such time and manner as may be prescribed by regulations of the Secretary of the Treasury,
 the commingled articles shall be subject to the highest rate of duty applicable to any part thereof unless the consignee or his agent segregates the articles pursuant to subdivision (b) hereof.

(b) Every segregation of articles made pursuant to this headnote shall be accomplished by the consignee or his agent at the risk and expense of the consignee within 30 days (unless the Secretary authorizes in writing a longer time) after the date of personal delivery or mailing, by such employee as the Secretary of the Treasury shall designate, of written notice to the consignee that the articles are commingled and that the quantity or value of each class of articles cannot be readily ascertained by customs officers. Every such segregation shall be accomplished under customs supervision, and the compensation and expenses of the supervising customs officers shall be reimbursed to the Government by the consignee under such regulations as the Secretary of the Treasury may prescribe.

(c) The foregoing provisions of this headnote do not apply with respect to any part of a shipment if the consignee or his agent furnishes, in such time and manner as may be prescribed by regulations of the Secretary of the Treasury, satisfactory proof --

(i) that such part (A) is commercially negligible, (B) is not capable of segregation without excessive cost, and (C) will not be segregated prior to its use in a manufacturing process or otherwise, and
 (ii) that the commingling was not intended to avoid the payment of lawful duties.

Any article with respect to which such proof is furnished shall be considered for all customs purposes as a part of the article, subject to the next lower rate of duty, with which it is commingled.

(d) The foregoing provisions of this headnote do not apply with respect to any shipment if the consignee or his agent shall furnish, in such time and manner as may be prescribed by regulations of the Secretary of the Treasury, satisfactory proof --

(i) that the value of the commingled articles is less than the aggregate value would be if the shipment were segregated;
 (ii) that the shipment is not capable of segregation without excessive cost and will not be segregated prior to its use in a manufacturing process or otherwise; and
 (iii) that the commingling was not intended to avoid the payment of lawful duties.

Any merchandise with respect to which such proof is furnished shall be considered for all customs purposes to be dutiable at the rate applicable to the material present in greater quantity than any other material.

(e) The provisions of this headnote shall apply only in cases where the schedules do not expressly provide a particular tariff treatment for commingled articles.

8. Abbreviations. In the schedules the following symbols and abbreviations are used with the meanings respectively indicated below:

\$	-	dollars
¢	-	cents
%	-	percent
+	-	plus
ad val.	-	ad valorem
bu.	-	bushel
cu.	-	cubic
doz.	-	dozen
ft.	-	feet
gal.	-	gallon
in.	-	inches
lb.	-	pounds
oz.	-	ounces
sq.	-	square
wt.	-	weight
yd.	-	yard
pcs.	-	pieces
prs.	-	pairs
lin.	-	linear
I.R.C.	-	Internal Revenue Code

9. Definitions. For the purposes of the schedules, unless the context otherwise requires --

(a) the term "entered" means entered, or withdrawn from warehouse, for consumption in the customs territory of the United States;

(b) the term "entered for consumption" does not include withdrawals from warehouse for consumption;

(c) the term "withdrawn for consumption" means withdrawn from warehouse for consumption and does not include articles entered for consumption;

(d) the term "rate of duty" includes a free rate of duty; rates of duty proclaimed by the President shall be referred to as "proclaimed" rates of duty; rates of duty enacted by the Congress shall be referred to as "statutory" rates of duty; and the rates of duty in column numbered 2 at the time the schedules become effective shall be referred to as "original statutory" rates of duty;

(e) the term "ton" means 2,240 pounds, and the term "short ton" means 2,000 pounds;

(f) the terms "of", "wholly of", "almost wholly of", "in part of" and "containing", when used between the description of an article and a material (e.g., "furniture of wood", "woven fabrics, wholly of cotton", etc.), have the following meanings:

(i) "of" means that the article is wholly or in chief value of the named material;

(ii) "wholly of" means that the article is, except for negligible or insignificant quantities of some other material or materials, composed completely of the named material;

(iii) "almost wholly of" means that the essential character of the article is imparted by the named material, notwithstanding the fact that significant quantities of some other material or materials may be present; and

(iv) "in part of" or "containing" mean that the article contains a significant quantity of the named material.

With regard to the application of the quantitative concepts specified in subparagraphs (ii) and (iv) above, it is intended that the de minimis rule apply.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

General Headnotes and Rules of Interpretation

Page 6

10. General Interpretative Rules. For the purposes of these schedules --

(a) the general, schedule, part, and subpart headnotes, and the provisions describing the classes of imported articles and specifying the rates of duty or other import restrictions to be imposed thereon are subject to the rules of interpretation set forth herein and to such other rules of statutory interpretation, not inconsistent therewith, as have been or may be developed under administrative or judicial rulings;

(b) the titles of the various schedules, parts, and subparts and the footnotes therein are intended for convenience in reference only and have no legal or interpretative significance;

(c) an imported article which is described in two or more provisions of the schedules is classifiable in the provision which most specifically describes it; but, in applying this rule of interpretation, the following considerations shall govern:

(i) a superior heading cannot be enlarged by inferior headings indented under it but can be limited thereby;

(ii) comparisons are to be made only between provisions of coordinate or equal status, i.e., between the primary or main superior headings of the schedules or between coordinate inferior headings which are subordinate to the same superior heading;

(d) if two or more tariff descriptions are equally applicable to an article, such article shall be subject to duty under the description for which the original statutory rate is highest, and, should the highest original statutory rate be applicable to two or more of such descriptions, the article shall be subject to duty under that one of such descriptions which first appears in the schedules;

(e) in the absence of special language or context which otherwise requires --

(i) a tariff classification controlled by use (other than actual use) is to be determined in accordance with the use in the United States at, or immediately prior to, the date of importation, of articles of that class or kind to which the imported articles belong, and the controlling use is the chief use, i.e., the use which exceeds all other uses (if any) combined;

(ii) a tariff classification controlled by the actual use to which an imported article is put in the United States is satisfied only if such use is intended at the time of importation, the article is so used, and proof thereof is furnished within 3 years after the date the article is entered;

(f) an article is in chief value of a material if such material exceeds in value each other single component material of the article;

(g) a headnote provision which enumerates articles not included in a schedule, part, or subpart is not necessarily exhaustive, and the absence of a particular article from such headnote provision shall not be given weight in determining the relative specificity of competing provisions which describe such article;

(h) unless the context requires otherwise, a tariff description for an article covers such article, whether assembled or not assembled, and whether finished or not finished;

(ij) a provision for "parts" of an article covers a product solely or chiefly used as a part of such article, but does not prevail over a specific provision for such part.

11. Issuance of Rules and Regulations. The Secretary of the Treasury is hereby authorized to issue rules and regulations governing the admission of articles under the provisions of the schedules. The allowance of an importer's claim for classification, under any of the provisions of the schedules which provide for total or partial relief from duty or other import restrictions on the basis of facts which are not determinable from an examination of the article itself in its condition as imported, is dependent upon his complying with any rules or regulations which may be issued pursuant to this headnote.

12. The Secretary of the Treasury is authorized to prescribe methods of analyzing, testing, sampling, weighing, gauging, measuring, or other methods of ascertainment whenever he finds that such methods are necessary to determine the physical, chemical, or other properties or characteristics of articles for purposes of any law administered by the Customs Service.

General statistical headnotes:

1. Statistical Requirements for Imported Articles. Persons making customs entry or withdrawal of articles imported into the customs territory of the United States shall complete the entry or withdrawal forms, as provided herein and in regulations issued pursuant to law, to provide for statistical purposes information as follows:

(a) the number of the Customs district and of the port where the articles are being entered for consumption or warehouse, as shown in Statistical Annex A of these schedules;

(b) the name of the carrier or the means of transportation by which the articles were transported to the first port of unloading in the United States;

(c) the foreign port of lading;

(d) the United States port of unloading;

(e) the date of importation;

(f) the country of origin of the articles expressed in terms of the designation therefor in Statistical Annex B of these schedules;

(g) a description of the articles in sufficient detail to permit the classification thereof under the proper statistical reporting number in these schedules;

(h) the statistical reporting number under which the articles are classifiable;

(ij) gross weight in pounds for the articles covered by each reporting number when imported in vessels or aircraft;

(k) the net quantity in the units specified herein for the classification involved;

(l) the U.S. dollar value in accordance with the definition in Section 402 or 402a of the Tariff Act of 1930, as amended, for all merchandise including that free of duty or dutiable at specific rates; and

(m) such other information with respect to the imported articles as is provided for elsewhere in these schedules.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

General Headnotes and Rules of Interpretation

Page 7

2. Statistical Annotations. (a) The statistical annotations to the Tariff Schedules of the United States consist of --

- (i) the 2-digit statistical suffixes,
- (ii) the indicated units of quantity,
- (iii) the statistical headnotes and annexes, and
- (iv) the italicized article descriptions.

(b) The legal text of the Tariff Schedules of the United States consists of the remaining text as more specifically identified in headnote 10(a) of the general headnotes and rules of interpretation.

(c) The statistical annotations are subordinate to the provisions of the legal text and cannot change their scope.

3. Statistical Reporting Number. (a) General Rule: Except as provided in paragraph (b) of this headnote, and in the absence of specific instructions to the contrary elsewhere, the statistical reporting number for an article consists of the 7-digit number formed by combining the 5-digit item number with the appropriate 2-digit statistical suffix. Thus, the statistical reporting number for live monkeys dutiable under item 100.95 is "100.9520".

(b) Wherever in the tariff schedules an article is classifiable under a provision which derives its rate of duty from a different provision, the statistical reporting number is, in the absence of specific instructions to the contrary elsewhere, the 7-digit number for the basic provision followed by the item number of the provision from which the rate is derived. Thus, the statistical reporting number of mixed apple and grape juices, not containing over 1.0 percent of ethyl alcohol by volume, is "165.6500-165.40".

4. Abbreviations. (a) The following symbols and abbreviations are used with the meanings respectively indicated below:

s. ton	-	short ton
C.	-	one hundred
Cwt.	-	100 lbs.
mg.	-	milligram
M.	-	1,000
bd. ft.	-	board feet
M. bd. ft.	-	1,000 board feet
mc.	-	millicurie
cord	-	128 cubic feet
square	-	amount to cover 100 square feet of surface
sup. ft.	-	superficial foot
oz.	-	ounces avoirdupois
fl. oz.	-	fluid ounce
oz. troy	-	troy ounce
pf. gal.	-	proof gallon

(b) An "X" appearing in the column for units of quantity means that no quantity (other than gross weight) is to be reported.

(c) Whenever two separate units of quantity are shown for the same article, the "v" following one of such units means that the value of the article is to be reported with that quantity.

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

HISTORICAL NOTES

Notes p. 1
General
HeadnotesAmendments and ModificationsPROVISIONS

Gen Hdnte--Language "Except as provided in headnote 6 of 3(a)(i) schedule 7, part 2, subpart E," added; language "except that all articles" deleted and language "except that all such articles" inserted in lieu thereof. Pub. L. 89-805, Secs. 1(a), (c), Nov. 10, 1966, 80 Stat. 1521, 1522, effective date Jan. 1, 1967.

Language "Except as provided in headnote 4 of schedule 7, part 7, subpart A," added. Pub. L. 89-806, Secs. 2(b), (c), Nov. 10, 1966, 80 Stat. 1523, effective date March 11, 1967.

PROVISIONS

Gen Hdnte--Headnotes 3(d), (e), and (f) redesignated as 3(d), (e), headnotes 3(e), (f), and (g), respectively, (f) and (g) and new headnote 3(d) added. Pub. L. 89-283, Secs. 401(a), 403, Oct. 21, 1965, 79 Stat. 1021, 1022; entered into force Oct. 22, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68.

Gen Hdnte--Language "and containers of usual types ordinarily sold at retail with their contents," 6(b)(1) added. Pub. L. 89-241, Secs. 2(a), 4, Oct. 7, 1965, 79 Stat. 933, 934, effective date Dec. 7, 1965.

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND
NONENUMERATED PRODUCTS

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND
NONENUMERATED PRODUCTS

410

<p>Part 1 - Footwear; Headwear and Hat Brims; Gloves; Luggage; Handbags, Briefcases, and Other Flat Goods</p> <p>A. Footwear B. Headwear and Hat Brims C. Gloves D. Luggage, Women's and Children's Handbags, and Briefcases, Case Cases, Coin Purses, and Similar Flat Goods</p>	<p>Part 7 - Buttons, Buckles, Pins, and Other Fastening Devices; Artificial and Preserved Flowers and Foliage; Millinery Ornaments; Trimmings; and Feather Products</p> <p>A. Buttons, Buckles, Pins, Hooks and Eyes, and Slide Fasteners B. Artificial and Preserved Flowers and Foliage; Millinery Ornaments; Trimmings; and Feather Products</p>
<p>Part 2 - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media</p> <p>A. Optical Elements, Spectacles, Microscopes, and Telescopes; Optical Goods Not Elsewhere Provided For B. Medical and Surgical Instruments and Apparatus; X-Ray Apparatus C. Surveying, Navigational, Meteorological, Drawing, and Mathematical Calculating Instruments; Measuring and Checking Instruments Not Specially Provided For D. Measuring, Testing, and Controlling Instruments E. Watches, Clocks, and Timing Apparatus F. Photographic Equipment and Supplies G. Motion Pictures; Tape Recordings, Phonograph Records, and Other Recordings; Recording Media; Scrap and Waste Photographic Film</p>	<p>Part 8 - Combs, Hair Ornaments, Brushes and Paint Rollers; Umbrellas and Canes</p> <p>A. Combs, Hair Ornaments, Brushes and Paint Rollers B. Umbrellas, Walking Sticks, Whips, Riding Girths, and Parts Thereof</p> <p>Part 9 - Matches and Pyrotechnics; Candles; Blasting Caps; Smokers' Articles</p> <p>A. Matches; Pyrotechnics; Candles; Blasting Caps B. Cigar and Cigarette Lighters and Holders; Tobacco Pipes</p> <p>Part 10 - Fans, Pencils, Leads, Crayons, and Chalks</p> <p>Part 11 - Works of Art; Antiques</p> <p>A. Works of Art B. Antiques</p>
<p>Part 3 - Musical Instruments, Parts and Accessories</p> <p>A. Musical Instruments B. Musical Instrument Parts and Accessories</p> <p>Part 4 - Furniture; Pillows, Cushions, and Mattresses; Nonresilient Floor Coverings</p> <p>A. Furniture, Pillows, Cushions, and Mattresses B. Nonresilient Floor Coverings</p>	<p>Part 12 - Rubber and Plastic Products</p> <p>A. Reinforced or Laminated Plastics, Foam or sponge Rubber and Plastics B. Rubber and Plastic Waste and Scrap; Rubber and Plastic Film, Strips, Sheets, Plates, Slabs, Blocks, Filaments; Hoses, Tubing and Other Profile shapes C. Specified Rubber and Plastic Products D. Articles Not Specially Provided For, of Rubber or Plastic</p>
<p>Part 5 - Arms and Ammunition; Fishing Tackle; Novel Goods; Sporting Goods; Games and Toys</p> <p>A. Arms and Ammunition B. Fishing Tackle C. Novel Goods D. Games and Sporting Goods E. Models; Dolls, Toys, Tricks, Party Favors</p>	<p>Part 13 - Products Not Elsewhere Enumerated</p> <p>A. Miscellaneous Products B. Articles of Fur and of Leather C. Articles of Ostrich, Gilt, Cat, Bear, Bone, Hair, Horn, Hoof, Whalebone, Quill, Shell, Ivory, or Spungy D. Waste and Scrap</p> <p>Part 14 - Miscellaneous Products</p>
<p>Part 6 - Jewelry and Related Articles; Gemstones, Natural, Cultured, and Imitation; Pearls; Imitation Gemstones, Beads and Articles of Beads</p> <p>A. Jewelry and Related Articles B. Gemstones, Natural, Cultured, and Imitation; Pearls; Imitation Gemstones, Beads and Articles of Beads</p>	

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Page 425

7 - 2 - A

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
		<p>PART 2. - OPTICAL GOODS; SCIENTIFIC AND PROFESSIONAL INSTRUMENTS; WATCHES, CLOCKS, AND TIMING DEVICES; PHOTOGRAPHIC GOODS; MOTION PICTURES; RECORDINGS AND RECORDING MEDIA</p> <p><u>Part 2 headnotes:</u></p> <p>1. This part does not cover --</p> <ul style="list-style-type: none"> (i) measuring cups, graduates, or other measuring containers; (ii) laboratory and industrial chemical ware, and sanitary ware, of ceramic ware (see part 2D of schedule 5); (iii) pharmaceutical, hygienic, and laboratory glassware (see part 3C of schedule 5); (iv) toilet and sanitary wares of metal (see part 3F of schedule 6); (v) tuning forks (see part 3B of this schedule); (vi) furniture provided for in part 4A of this schedule; (vii) toys (see part 5E of this schedule); or (viii) articles of rubber or plastics provided for in items 772.40 and 772.42 of part 12 of this schedule. <p>2. Cases, boxes, and containers of types ordinarily sold at retail with the instruments or other articles provided for in this part are classifiable with such articles if imported therewith.</p> <p>3. The term "optical instruments", as used in this part, embraces only instruments which incorporate one or more optical elements, but does not include any instrument in which the incorporated optical element or elements are solely for viewing a scale or for some other subsidiary purpose.</p> <p style="text-align: center;">-----</p> <p>Subpart A. - Optical Elements, Spectacles, Microscopes, and Telescopes; Optical Goods Not Elsewhere Provided For</p> <p><u>Subpart A headnotes:</u></p> <p>1. The provisions for optical elements in this subpart do not cover --</p> <ul style="list-style-type: none"> (i) unmounted optical elements of glass or synthetic optical crystals unless such elements have been optically worked (see part 3A of schedule 5); (ii) plates or sheets of polarizing material unless cut to shape or mounted (see part 3A of schedule 5); (iii) photographic filters (see subpart F of this part). 			

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1989)

Page 426

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

7 - 2 - A
 708.01 - 708.47

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		2. The term "optically worked", as used in this subpart, means that the glass or the synthetic optical crystals have been subjected to grinding or polishing incident to surface shaping for producing optical properties. 3. The provisions for mounted optical elements cover such elements when in a permanent frame or other mounting suitable for fitting to an apparatus or instrument and do not include mounted elements which are themselves separate instruments or apparatus such as spectacles, medical or dental mirrors, and hand magnifying glasses. 4. Sets comprised of tools, implements, and other articles fitted into and imported with cases containing microscopes provided for in item 708.71, and ordinarily sold at retail, and used, in conjunction with such microscopes, are classifiable therewith.			
		Lenses, prisms, mirrors, and other optical elements, all of the foregoing whether mounted or not mounted:			
		Not mounted:			
		Lenses:			
708.01	00	Ophthalmic.....	Prs.....	15% ad val.	40% ad val.
708.03	00	Other.....	No.....	22% ad val.	45% ad val.
708.05	00	Prisms.....	X.....	32% ad val.	65% ad val.
708.07	00	Mirrors.....	X.....	32% ad val.	45% ad val.
708.09	00	Other.....	X.....	34% ad val.	85% ad val.
		Mounted:			
		Lenses:			
708.21	00	Projection.....	No.....	28% ad val.	45% ad val.
708.23	00	Other.....	.....	20% ad val.	45% ad val.
	20	Photographic.....	No.		
	40	Other.....	No.		
708.25	00	Prisms.....	X.....	32% ad val.	65% ad val.
708.27	00	Mirrors.....	X.....	32% ad val.	45% ad val.
708.29	00	Other.....	X.....	34% ad val.	65% ad val.
		Eyeglasses, lorgnettes, goggles, and similar articles, all the foregoing whether used for corrective, protective, or other purposes; frames and mountings for any of the foregoing, and parts of such frames and mountings:			
708.41	00	Lorgnettes.....	X.....	36% ad val.	45% ad val.
		Other (except frames and mountings, and parts thereof):			
708.43	00	Valued not over \$2.50 per doz.....	Doz.....	24% ad val.	60% ad val.
708.45	00	Valued over \$2.50 per doz.....	.....	16% ad val.	40% ad val.
	20	Sunglasses and sun goggles.....	Doz.		
	50	Other.....	Doz.		
708.47	00	Frames and mountings, and parts thereof.....	.....	16% ad val.	50% ad val.
	20	Frames and mountings (complete units).....	Doz.		
	40	Other.....	X		

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Page 427

7 - 2 - A
 708.51 - 708.93

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Refracting or reflecting telescopes, whether monocular or binocular; astronomical instruments not specially provided for; frames and mountings for any of the foregoing articles, and parts of such frames and mountings:			
		Telescopes:			
		Not designed for use with infra-red light:			
708.51	00	Field glasses and opera glasses (except prism binoculars).....	No.....	14% ad val.	45% ad val.
708.52	00	Prism binoculars.....	No.....	26% ad val.	60% ad val.
708.53	00	Other.....	No.....	21% ad val.	45% ad val.
708.55	00	Designed for use with infra-red light.....	No.....	9% ad val.	35% ad val.
708.57	00	Astronomical instruments not specially provided for.....	No.....	36% ad val.	45% ad val.
708.59	00	Frames and mountings, and parts thereof.....	X.....	The column 1 rate applicable to the article of which the frames and mountings are parts	The column 2 rate applicable to the article of which the frames and mountings are parts
		Compound optical microscopes; electron, proton, and similar microscopes and diffraction apparatus; all the foregoing whether or not provided with means for photographing or projecting the image; frames and mountings for the foregoing articles, and parts of such frames and mountings:			
		Compound optical microscopes:			
		Not provided with means for photographing or projecting the image:			
708.71	00	Valued not over \$25 each.....	No.....	23% ad val.	45% ad val.
708.72	00	Valued over \$25 but not over \$50 each....	No.....	27% ad val.	45% ad val.
708.73	00	Valued over \$50 each.....	No.....	36% ad val.	45% ad val.
708.75	00	Provided with means for projecting the image.....	No.....	36% ad val.	45% ad val.
708.76	00	Other.....	No.....	12% ad val.	20% ad val.
708.78	00	Electron, proton, and similar microscopes and diffraction apparatus.....	X.....	17.5% ad val.	40% ad val.
		Frames and mountings, and parts thereof:			
708.80	00	For compound optical microscopes.....	X.....	24% ad val.	45% ad val.
708.82	00	Other.....	X.....	17.5% ad val.	40% ad val.
		Optical appliances and instruments not provided for elsewhere in part 2 of this schedule; frames and mountings for such articles, and parts of such frames and mountings:			
708.85	00	Hand magnifiers, magnifying glasses, loupes, thread counters, and similar articles.....	No.....	20% ad val.	45% ad val.
708.87	00	Door viewers (door eyes).....	No.....	16% ad val.	60% ad val.
708.89	00	Other appliances and instruments.....	X.....	36% ad val.	45% ad val.
		Frames and mountings, and parts thereof:			
708.91	00	For articles provided for in item 708.85.....	X.....	24% ad val.	45% ad val.
708.93	00	Other.....	X.....	36% ad val.	45% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

7 - 2 - B
 709.01 - 709.45

Item	Stat. Su?-fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Subpart B. - Medical and Surgical Instruments and Apparatus; X-Ray Apparatus			
		<u>Subpart B headnote:</u>			
		i. This subpart does not cover --			
		(i) medical supplies provided for in part 13C of schedule 4;			
		(ii) spectacles, lorgnettes, goggles, and similar articles; microscopes and diffraction apparatus (see subpart A of this part);			
		(iii) clinical thermometers and laboratory instruments and appliances (see subpart D of this part); or			
		(iv) cameras (see subpart F of this part).			
		Medical, dental, surgical and veterinary instruments and apparatus (including electro-medical apparatus and ophthalmic instruments), and parts thereof:			
		Optical instruments and appliances, and parts thereof:			
709.01	00	Mirrors and reflectors.....	X.....	36% ad val.	45% ad val.
709.03	00	Binocular loupes for eye examinations.....	No.....	20% ad val.	45% ad val.
709.05	00	Other.....	X.....	40% ad val.	60% ad val.
		Other:			
709.06	00	Anesthetic apparatus and instruments (except syringes), and parts thereof.....	X.....	15% ad val.	45% ad val.
709.07	00	Basal metabolism apparatus, and parts thereof.....	X.....	17.5% ad val.	40% ad val.
709.09		Bougies, catheters, drains, and sondes, and parts thereof.....		10% ad val.	30% ad val.
	20	Rubber catheters.....	Doz.		
	40	Other.....	X		
709.10	00	Percussion hammers and stethoscopes.....	No.....	15% ad val.	45% ad val.
709.11	00	Sphygmomanometers, tensimeters, and oscillometers, and parts thereof.....	X.....	7% ad val.	27.5% ad val.
709.13	00	Syringes, including hypodermic syringes, and parts thereof (except needles).....	X.....	34% ad val.	60% ad val.
		Electro-medical apparatus, and parts thereof:			
709.15	00	Electro-surgical apparatus, and parts thereof.....	X.....	28.5% ad val.	55% ad val.
709.17	00	Other.....	X.....	9.5% ad val.	35% ad val.
709.19	00	Dental burs.....	Gross..	18% ad val.	35% ad val.
		Needles:			
709.21	00	Dental hypodermic needles.....	No.....	14% ad val.	35% ad val.
709.23		Other.....		25.5% ad val.	55% ad val.
	20	Hypodermic (except dental).....	No.		
	40	Other.....	No.		
		Other:			
709.25	00	Dental instruments, and parts thereof....	X.....	11% ad val.	35% ad val.
709.27	00	Other.....	X.....	28.5% ad val.	55% ad val.
709.40	00	Mechano-therapy appliances and massage apparatus, and parts thereof.....	X.....	8% ad val.	35% ad val.
709.45	00	Artificial respiration, ozone therapy, oxygen therapy, aerosol therapy or similar apparatus; breathing appliances, including gas masks and similar respirators; parts of the foregoing.....	X.....	8% ad val.	35% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1989)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
709.50	20 40	Hearing aids and parts thereof..... Hearing aids..... Parts.....	..... No, X	9.5% ad val.	35% ad val.
		Orthopedic appliances, surgical belts, trusses, and similar articles; artificial limbs, eyes, teeth, and other prosthetic articles; splints and other fracture appliances: Artificial teeth and dentures:			
709.54	00	Wholly or almost wholly of plastics.....	X.....	8% ad val.	20% ad val.
709.55	00	Other.....	X.....	36% ad val.	70% ad val.
709.56	00	Bone and joint prostheses, bone plates, screws, and nails, and other internal fixation devices and appliances.....	X.....	28.5% ad val.	55% ad val.
709.57	00	Other.....	X.....	16% ad val.	40% ad val.
		Apparatus based on the use of X-rays or of the radiations from radioactive substances, whether for medical, industrial, or other uses, and parts thereof: X-ray apparatus and parts thereof:			
709.61	00	X-ray tubes, and parts of tubes.....	X.....	5% ad val.	35% ad val.
709.63	00	Other.....	X.....	4% ad val.	35% ad val.
709.66	00	Apparatus based on the use of radiations from radioactive substances, and parts thereof.....	X.....	9.5% ad val.	35% ad val.
Subpart C. - Surveying, Navigational, Meteorological, Drawing, and Mathematical Calculating Instruments; Measuring and Checking Instruments Not Specially Provided For					
Subpart C headnote:					
1. This subpart does not cover -- (i) radio navigational aid apparatus, radar apparatus, and radio remote control apparatus (see item 685.60, part 5, schedule 6); (ii) thermometers, barometers, hygrometers, and psychrometers, or combinations thereof (see subpart D of this part); (iii) instruments or apparatus for measuring, checking, or automatically controlling the flow, depth, pressure, or other variables of liquids or gases, or for automatically controlling temperature (see subpart D of this part); (iv) revolution counters (see subpart D of this part); (v) electrical measuring, checking, analyzing or automatically controlling instruments and apparatus (see subpart D of this part); (vi) watches, clocks, and timing apparatus (see subpart E of this part); (vii) cameras (see subpart F of this part); or (viii) photographic rangefinders (see subpart F of this part).					

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 430

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - C

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

710.04 - 710.80

Item	Sect. Sub-fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Surveying (including photogrammetrical surveying), hydrographic, navigational, meteorological, hydrological, and geophysical instruments; compasses; rangefinders; parts of the foregoing instruments:			
710.04	00	Optical instruments and parts thereof: Photogrammetrical instruments, and parts thereof.....	X.....	22% ad val.	40% ad val.
710.06	00	Rangefinders (except surveying rangefinders).....	No.....	36% ad val.	45% ad val.
710.08	00	Other.....	X.....	22% ad val.	45% ad val.
		Other instruments and parts: Compasses, and parts thereof:			
710.12	00	Surveying compasses, and parts thereof...	X.....	22% ad val.	35% ad val.
710.14	00	Gyroscopic compasses, and parts thereof.....	X.....	9% ad val.	35% ad val.
710.16	00	Other.....	X.....	15% ad val.	45% ad val.
		Ships' logs, and parts thereof: Logs.....	No.....	73¢ each + 11% ad val.	\$4.50 each + 65% ad val.
710.20	00	Parts.....	X.....	40% ad val.	65% ad val.
710.21	00	Anemometers, and parts thereof: Anemometers.....	No.....	\$1.80 each + 28% ad val.	\$4.50 each + 65% ad val.
710.26	00	Parts.....	X.....	36% ad val.	65% ad val.
710.27	00	Automatic pilots, and parts thereof.....	X.....	9% ad val.	35% ad val.
710.30	00	Seismographs, and parts thereof: Portable or field type.....	X.....	9% ad val.	35% ad val.
710.34	00	Other.....	X.....	17.5% ad val.	40% ad val.
710.36	00	Other: Surveying and hydrographic instruments, and parts thereof: Not of metal.....	X.....	13% ad val.	35% ad val.
710.40	00	Of metal.....	X.....	22% ad val.	40% ad val.
710.42	00	Navigational instruments, and parts thereof.....	X.....	8% ad val.	30% ad val.
710.46	00	Other.....	X.....	17.5% ad val.	40% ad val.
710.50	00	Drafting machines, compasses, dividers, ruling pens, lettering pens (including fountain-pen type) used by draftsmen, pantographs, drawing curves, rulers, scribes, straight edges, disc calculators, slide rules, and other instruments, all the foregoing which are drawing, marking-out or mathematical calculating instruments; hand styluses; micrometers, calipers, gauges, balancing machines, and non-optical measuring or checking instruments, apparatus, and machines not specially provided for; and parts of the foregoing articles: Disc calculators, slide rules, and other mathematical calculating instruments, all the foregoing and parts thereof: Not of metal.....	X.....	10.5% ad val.	40% ad val.
710.60	00	Of metal.....	X.....	17.5% ad val.	40% ad val.
710.61	00	Protractors, and parts thereof.....	X.....	17.5% ad val.	40% ad val.
710.63	00	Calipers and micrometers, and parts thereof.....	X.....	16% ad val.	45% ad val.
710.65	00	Folding rules, and parts thereof: Of aluminum.....	X.....	20.5% ad val.	65% ad val.
710.67	00	Of wood.....	X.....	19% ad val.	60% ad val.
710.68	00	Other.....	X.....	14% ad val.	45% ad val.
710.70	00	Rules (except folding rules).....	X.....	14% ad val.	45% ad val.
710.72	00	Lettering pens (including fountain-pen type) used by draftsmen, and parts thereof.....	X.....	16% ad val.	45% ad val.
710.76	00	Hand styluses.....	Doz.....	6% ad val.	45% ad val.
710.78	00	Other.....		12% ad val.	45% ad val.
710.80	20	Drafting and drawing machines, instruments, and apparatus.....	X		
	40	Gauges and gauge blocks.....	X		
	60	Other.....	X		

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
710.86	00	Optical measuring or checking instruments and appliances not provided for elsewhere in subpart C, D, or F of this part, and parts thereof:			
710.88	00	Profile projectors and parts thereof.....	X.....	28% ad val.	45% ad val.
		Comparator benches, measuring benches, and micrometric reading apparatus, all the foregoing and parts thereof.....	X.....	36% ad val.	45% ad val.
710.90	00	Other.....	X.....	40% ad val.	50% ad val.
Subpart D. - Measuring, Testing, and Controlling Instruments					
<u>Subpart D headnotes:</u>					
1. The provisions of this subpart covered by items 711.00 to 711.88, inclusive, do not apply to electrical measuring, checking, analyzing, or automatically-controlling instruments or apparatus, as defined in headnote 2 below.					
2. For the purposes of this subpart, the provisions herein (items 712.00 to 712.99, inclusive) for "electrical measuring, checking, analyzing, or automatically-controlling instruments and apparatus" apply only to the following articles:					
(a) appliances, instruments, apparatus, or machines of kinds described in subpart C of this part or in the provisions of this subpart (subpart D) covered by items 711.00 to 711.88, inclusive, the operation of which depends on an electrical phenomenon which varies according to the factor to be ascertained or automatically controlled;					
(b) instruments or apparatus for measuring or checking electrical quantities; and					
(c) instruments or apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic, or similar radiations.					

711.04	00	Balances of a sensitivity of 5 centigrams or better, with or without their weights, and parts thereof; weights suitable for use with such balances and sets of weights containing any such weights:			
711.08	00	Jewelers' balances and parts thereof.....	X.....	15% ad val.	45% ad val.
		Other.....	X.....	20% ad val.	40% ad val.
711.25	00	Machines and appliances for determining the strength of articles or materials under compression, tension, torsion, or shearing stress, and parts thereof.....	X.....	11.5% ad val.	40% ad val.
711.30	00	Hydrometers and similar floating instruments; thermometers, pyrometers, barometers, hygrometers, and psychrometers, whether or not recording instruments; any combination of the foregoing instruments; and articles in which one or more of such instruments are incorporated as significant integral parts and which are ordinarily used in the home or office where they are usually hung on the wall, or placed on mantels, shelves, or furniture: Hydrometers and similar floating instruments, whether or not incorporating thermometers.....	X.....	34% ad val.	85% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 452

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - D

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing

711.34 - 711.88

Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Hydrometers and similar floating instruments, etc. (con.):			
		Thermometers, pyrometers, barometers, hygrometers, and psychrometers, whether or not recording instruments:			
		Non-recording instruments:			
		Thermometers:			
		Liquid-filled thermometers with the graduations on the tube or on a scale enclosed within an outer shell:			
711.34	00	Clinical.....	No.....	42.5% ad val.	85% ad val.
711.36	00	Other.....	No.....	34% ad val.	85% ad val.
711.37	00	Other.....	X.....	11% ad val.	40% ad val.
		Pyrometers:			
711.40	00	Optical pyrometers.....	X.....	40% ad val.	50% ad val.
711.42	00	Other.....	X.....	12.5% ad val.	45% ad val.
		Barometers:			
		Aneroid:			
711.45	00	Surveying, with altimeter setting.....	X.....	22% ad val.	40% ad val.
711.47	00	Other.....	X.....	7.5% ad val.	40% ad val.
711.49	00	Other.....	X.....	15% ad val.	45% ad val.
711.55	00	Hygrometers and psychrometers.....	X.....	12.5% ad val.	45% ad val.
711.60	00	Thermographs, barographs, hygrographs, and other recording instruments.....	X.....	8% ad val.	35% ad val.
711.67	00	Other.....	X.....	11% ad val.	50% ad val.
		Pressure gauges, thermostats, level gauges, flow meters, heat meters, automatic oven-draught regulators, and other instruments and apparatus for measuring, checking, or automatically controlling the flow, depth, pressure, or other variables of liquids or gases, or for automatically controlling temperature, all the foregoing and parts thereof not provided for in subpart C of this part:			
		Flow meters, heat meters incorporating liquid supply meters, and anemometers, and parts of the foregoing:			
711.82	00	Instruments and apparatus.....	No.....	\$1.80 each + 28% ad val.	\$4.50 each + 65% ad val.
711.83	00	Parts.....	X.....	36% ad val.	65% ad val.
711.84	00	Other.....	X.....	11% ad val.	35% ad val.
711.85	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....	X.....	Free	
		Polarimeters, refractometers, spectrometers, gas analysis apparatus and other instruments or apparatus for physical or chemical analysis; viscometers, porosimeters, expansion meters and other instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension, or similar properties; photometers (except photographic light meters), calorimeters, and other instruments or apparatus for measuring or checking quantities of heat, light, or sound; microtomes; all the foregoing, and parts thereof:			
711.86	00	Optical instruments or apparatus, and parts thereof.....	X.....	40% ad val.	50% ad val.
711.88	00	Other.....	X.....	17.5% ad val.	40% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Page 433
 7 - 2 - D
 711.90 - 713.15

Item	Stat. Suf- fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Revolution counters, production counters, taximeters, odometers, pedometers, counters similar to the foregoing articles, speedometers and tachometers, all the foregoing not provided for in subpart C of this part; parts of the foregoing:			
711.90	00	Taximeters and parts.....	X.....	34% ad val.	85% ad val.
711.91	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....	X.....	Free	
711.93	00	Bicycle speedometers and parts thereof.....	X.....	44% ad val.	110% ad val.
711.98		Other.....		8% ad val.	35% ad val.
	20	Speedometers and tachometers, and parts.....	X		
	40	Other.....	X		
711.99	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....	X.....	Free	
		Electrical measuring, checking, analyzing, or automatically-controlling instruments and apparatus, and parts thereof:			
712.05	00	Optical instruments or apparatus, and parts thereof.....	X.....	40% ad val.	50% ad val.
		Other:			
		Ships' logs, and depth-sounding instruments and apparatus, and parts thereof:			
712.10	00	Instruments and apparatus.....	No.....	73¢ each + 11% ad val.	\$4.50 each + 65% ad val.
712.12	00	Parts.....	X.....	40% ad val.	65% ad val.
712.15	00	Instruments and apparatus for measuring or detecting alpha, beta, gamma, X-ray, cosmic or similar radiations, and parts thereof.....	X.....	11% ad val.	40% ad val.
712.20	00	Seismographs, and parts thereof.....	X.....	12% ad val.	40% ad val.
712.25	00	Anemometers, and parts thereof:			
		Anemometers.....	No.....	\$1.80 each + 28% ad val.	\$4.50 each + 65% ad val.
712.27	00	Parts.....	X.....	36% ad val.	65% ad val.
712.47	00	Automatic flight control instruments and apparatus designed for use in aircraft, and parts thereof.....	X.....	9.5% ad val.	40% ad val.
712.49	00	Other.....	X.....	11% ad val.	40% ad val.
712.51	00	If Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....	X.....	Free	
		Gas and liquid supply or production meters; watt-hour meters, ampere-hour meters, and other electricity supply or production meters designed to register the total amount of electricity or electrical energy produced or consumed; standard meters for checking and calibrating any of the foregoing meters; all the foregoing and parts therefor:			
		Meters:			
713.05	00	Valued not over \$10 each.....	No.....	\$1.20 each + 26% ad val.	\$3 each + 65% ad val.
		Valued over \$10 each:			
		Electricity supply or production meters and standard meters therefor:			
713.07	00	Valued not over \$15 each.....	No.....	\$1.80 each + 26% ad val.	\$4.50 each + 65% ad val.
713.09	00	Valued over \$15 each.....	No.....	\$1.80 each + 18% ad val.	\$4.50 each + 65% ad val.
713.11	00	Other.....	No.....	\$1.80 each + 28% ad val.	\$4.50 each + 65% ad val.
713.15	00	Parts.....	X.....	36% ad val.	65% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 434

7 - 2 - D, E
713.17 - 713.19

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
713.17	00	Stroboscopes of all kinds, and parts thereof: Stroboscopes.....	No.....	\$1.80 each + 28% ad val.	\$4.50 each + 65% ad val.
713.19	00	Parts.....	X.....	36% ad val.	65% ad val.
<p>Subpart E. - Watches, Clocks, and Timing Apparatus</p> <p><u>Subpart E headnotes:</u></p> <p>1. This subpart covers watches and clocks, time switches and other timing apparatus with clock or watch movements, and parts of these articles. This subpart, however, does not cover --</p> <ul style="list-style-type: none"> (i) synchronous or subsynchronous motors (see part 5 of schedule 6); (ii) screws, nuts, and bolts (see part 3D of schedule 6); (iii) music boxes and their mechanisms (see part 3 of schedule 7); (iv) combination articles provided for elsewhere in the tariff schedules; or (v) clock and watch glasses and glass domes (see part 3 of schedule 5). <p>2. For the purposes of this subpart --</p> <ul style="list-style-type: none"> (a) the term "watches" embraces timepieces (including timepieces having special features, such as chronographs, calendar watches, stopwatches, and watches designed for use in skydiving) suitable for wearing or carrying on or about the person, whether or not the movement therein is within the definition of "watch movement" in headnote 2(b), below, (b) the term "watch movement" means a timepiece movement measuring less than 1.77 inches in width and less than 0.50 inch in thickness; (c) the term "clock movement" means any movement or mechanism, other than "watch movements" as defined in headnote 2(b), above, intended or suitable for measuring time; (d) the term "cases" embraces inner and outer cases, containers, and housings for movements, together with parts or pieces, such as, but not limited to, rings, feet, posts, bases, and outer frames, and any auxiliary or incidental features, which (with appropriate movements) serve to complete the watches, clocks, time switches, and other apparatus provided for in this subpart; and (e) the term "jewels" includes substitutes for jewels. <p>3. (a) In this subpart, column 1 of the Rates of Duty columns with respect to watch movements having not over 7 jewels has been divided into two columns, viz., 1-a and 1-b. The rates of duty in column 1-a apply to watch movements which have 7 jewels or which, if having less than 7 jewels, do not have a bushing or its equivalent (other than a substitute for a jewel) in any position customarily occupied by a jewel. The rates of duty in column 1-b apply to watch movements having under 7 jewels and having a bushing or its equivalent (other than a substitute for a jewel) in any position customarily occupied by a jewel.</p> <p>(b) The complete citation for watches covered by item 715.05 and clocks covered by item 715.15 shall be each of such item numbers, followed by the appropriate item numbers for the respective movements and cases comprising such watches or clocks. Thus, item 715.05-716.08-720.20 is the correct citation for a watch in a gold case having over 17 jewels.</p>					

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Surfix	Articles	Units or Quantity	Rates of Duty	
				1	2
		<p>(c) In this subpart, each of the rates of duty provided for watch movements, having no jewels or not over 17 jewels, not adjusted, not self-winding, and not constructed or designed to operate for a period in excess of 47 hours without rewinding (items 716.10 through 716.36, inclusive) is also the "base rate" for watch movements having the same width and number of jewels covered by items 717.--, 718.--, and 719.--. For citation purposes, the two blanks on the end of each of the latter item numbers shall be filled in with the last two digits of the item number for the applicable base rate. Thus, "item 717.31" would be the citation for an adjusted watch movement, 0.7 inch wide, having 17 jewels, but not self-winding and not constructed or designed to operate for a period in excess of 47 hours without rewinding.</p> <p>(d) The width of a watch or clock movement, as defined in headnote 2(b) and (c) of this subpart, is the shortest surface dimension through the center of the pillar or bottom plate, or its equivalent, not including in the measurement any portion not essential to the functioning of the movement; and the thickness of a "watch movement", as so defined, is the maximum thickness between the outside surfaces of the plate and bridges, or their equivalents.</p> <p>(e) The additional duty for adjustments to watch movements applies to each adjustment of whatever kind (treating adjustment to temperature as two adjustments), in accordance with the marking as hereinafter provided for.</p> <p>(f) Bimetallic balance wheels which are not part of balance assemblies, and mainsprings with riveted ends, are each to be considered as one part or piece, for the purposes of assessing duties on assemblies and subassemblies provided for in items 720.75, 720.80, 720.82, 720.84, and 720.86.</p> <p>4. <u>Special Marking Requirements:</u> Any movement, case, or dial provided for in this subpart, whether imported separately or attached to an article provided for in this subpart, shall not be permitted to be entered unless conspicuously and indelibly marked by cutting, die-sinking, engraving, or stamping, as specified below:</p> <p>(a) Watch movements shall be marked on one or more of the bridges or top plates to show --</p> <ul style="list-style-type: none"> (i) the name of the country of manufacture, (ii) the name of the manufacturer or purchaser, (iii) in Arabic numerals and in words, the number of jewels, if any, serving a mechanical purpose as frictional bearings; and (iv) in Arabic numerals and in words, the number and classes of adjustments, or, if unadjusted, the word "unadjusted". <p>(b) Clock movements shall be marked on the most visible part of the front or back plate to show --</p> <ul style="list-style-type: none"> (i) the name of the country of manufacture, (ii) the name of the manufacturer or purchaser, and (iii) the number of jewels, if any. <p>(c) Watch cases shall be marked on the inside or outside of the back cover to show --</p> <ul style="list-style-type: none"> (i) the name of the country of manufacture, and (ii) the name of the manufacturer or purchaser. 			

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 436

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - E

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Surfix	Articles	Units of Quantity	Rates of Duty	
				1	2
		<p>(d) Clock cases and other cases provided for in this subpart shall be marked on the most visible part of the outside of the back to show the name of the country of manufacture, and</p> <p>(e) Dials shall be marked to show the name of the country of manufacture, which marking, if the dial is imported attached to any of the articles provided for in this part, shall be placed on the face of the dial in such manner as not to be obscured by any part of the case.</p> <p>5. <u>Combination Articles Containing Watch or Clock Movements.</u>--A watch or clock movement (and its dial, if any) in a combination article is classifiable under the provision applicable to such combination article, but, in determining the duties on the combination article, the movement (and its dial, if any) shall be constructively separated therefrom and assessed with the same rate as would have applied if it had been imported separately. In such circumstances, the movement and its dial shall also be subject to the same marking requirements provided for in headnote 4 of this subpart. However, such separate assessment and special marking shall not be applicable to movements which, when imported, are installed as the usual equipment of vehicles or craft provided for in part 6 of schedule 6 or as integral and essential parts of laboratory, industrial, or commercial apparatus or equipment.</p> <p>6. <u>Products of Insular Possessions.</u>--(a) Except as provided in paragraph (b) of this headnote, any article provided for in this subpart which is the product of an insular possession of the United States outside the customs territory of the United States and which contains any foreign component shall be subject to duty--</p> <p>(i) at the rates set forth in column numbered 1, if the countries of origin of more than 50 percent in value of the foreign components are countries to products of which column numbered 1 rates apply, and</p> <p>(ii) at the rates set forth in column numbered 2, if the countries of origin of 50 percent or more in value of the foreign components are countries to products of which column numbered 2 rates apply.</p> <p>(b) If the requirements for free entry set forth in general headnote 3(a) are complied with, watches (provided for in item 715.05) and watch movements (provided for in items 716.08 through 719.--) which are the product of the Virgin Islands, Guam, or American Samoa and which contain any foreign component may be admitted free of duty, but the total quantity of such articles entered free of duty during each calendar year shall not exceed a number equal to 1/9 of the apparent United States consumption of watch movements during the preceding calendar year (as determined by the Tariff Commission), of which total quantity--</p> <p>(i) not to exceed 87.5 percent shall be the product of the Virgin Islands,</p> <p>(ii) not to exceed 8.33 percent shall be the product of Guam, and</p> <p>(iii) not to exceed 4.17 percent shall be the product of American Samoa.</p> <p>(c) On or before April 1 of each calendar year (beginning with 1967), the Tariff Commission shall determine the apparent United States consumption of watch movements during the preceding calendar year, shall report such determination to the Secretary of the Treasury, the Secretary of the Interior, and Secretary of Commerce, and shall publish such determination in the Federal Register, together with the number of watches and watch movements which are the product of the Virgin Islands, Guam, and American Samoa which may be entered free of duty under paragraph (b) during the calendar year.</p>			

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
		<p>(d) The Secretary of the Interior and the Secretary of Commerce, acting jointly, shall allocate on a fair and equitable basis among producers of watches and watch movements located in the Virgin Islands, Guam, and American Samoa the quotas for each calendar year provided by paragraph (b) for articles which are the product of the Virgin Islands, Guam, and American Samoa, respectively. Allocations made by the Secretaries shall be final. The Secretaries are authorized to issue such regulations as they determine necessary to carry out their duties under this paragraph.</p> <p><u>Subpart E statistical headnote:</u></p> <p>1. (a) The statistical reporting numbers for watches (item 715.05) and for clocks containing movements measuring less than 1.77 inches in width (item 715.15) are a combination of three 7-digit numbers, viz., the 7-digit number for the imported watch (715.0500) or clock (715.1500), and the 7-digit numbers which would have applied to the movement and to the case if they had been imported separately. Thus, the correct reporting number for a watch with a 15-jewel adjusted but not self-winding movement not over 0.6 inch in width and a gold case is "715.0500-717.3015-720.2000".</p> <p>(b) The number and value of imported watches or clocks, and of their movements and cases must be reported separately with their respective 7-digit numbers.</p> <p>(c) For the statistical reporting of watch movements under items 715.30-.36 the 2-digit statistical suffix shall be the actual number of jewels in the movement. For example, the suffix for a movement having 9 jewels would be "09"; similarly, the suffix for a 15-jewel movement would be "15".</p>			

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty		
				1	2	
715.31		Clocks (con.):				
		With other movements (con.):				
		Other clocks (con.):				
		Valued over \$5 but not over \$10 each.....	No.	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$3 each + 65% ad val. + 25¢ for each jewel, if any	
		<i>Electric (including battery operated):</i>				
		<i>Containing jewels.....</i>	No. v			
		<i>jewels contained..</i>	No.			
		<i>Not containing jewels.....</i>	No.			
		<i>Other:</i>				
		<i>Containing jewels.....</i>	No. v			
	<i>jewels contained..</i>	No.				
	<i>Not containing jewels.....</i>	No.				
715.33		Valued over \$10 each.....	No.	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$4.50 each + 65% ad val. + 25¢ for each jewel, if any	
		<i>Electric (including battery operated):</i>				
		<i>Containing jewels.....</i>	No. v			
		<i>jewels contained..</i>	No.			
		<i>Not containing jewels.....</i>	No.			
		<i>Other:</i>				
		<i>Containing jewels.....</i>	No. v			
		<i>jewels contained..</i>	No.			
		<i>Not containing jewels.....</i>	No.			
	715.40	00	Apparatus with watch or clock movements or with synchronous motors, for recording the time of day, or for measuring, recording, or otherwise indicating intervals of time:			
		Pigeon timers.....	No.	\$1.44 each + 20.5% ad val. + 8¢ for each jewel, if any	\$4.50 each + 65% ad val. + 25¢ for each jewel, if any	
715.45	00	Other:				
		Valued not over \$1.10 each.....	No.	22¢ each + 26% ad val. + 10¢ for each jewel, if any	55¢ each + 65% ad val. + 25¢ for each jewel, if any	
715.47	00	Valued over \$1.10 but not over \$2.25 each.....	No.	40¢ each + 26% ad val. + 10¢ for each jewel, if any	\$1 each + 65% ad val. + 25¢ for each jewel, if any	
715.49	00	Valued over \$2.25 but not over \$5 each.....	No.	60¢ each + 26% ad val. + 10¢ for each jewel, if any	\$1.50 each + 65% ad val. + 25¢ for each jewel, if any	
715.51	00	Valued over \$5 but not over \$10 each.....	No.	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$3 each + 65% ad val. + 25¢ for each jewel, if any	
715.53	00	Valued over \$10 each.....	No.	\$1.80 each + 28% ad val. + 10¢ for each jewel, if any	\$4.50 each + 65% ad val. + 25¢ for each jewel, if any	
715.60	00	Time switches with watch or clock movements, or with synchronous or subsynchronous motors:				
		Valued not over \$1.10 each.....	No.	22¢ each + 26% ad val. + 10¢ for each jewel, if any	55¢ each + 65% ad val. + 25¢ for each jewel, if any	
	715.62	00	Valued over \$1.10 but not over \$2.25 each.....	No.	40¢ each + 26% ad val. + 10¢ for each jewel, if any	\$1 each + 65% ad val. + 25¢ for each jewel, if any
	715.64	00	Valued over \$2.25 but not over \$5 each.....	No.	60¢ each + 16% ad val. + 10¢ for each jewel, if any	\$1.50 each + 65% ad val. + 25¢ for each jewel, if any
	715.66	00	Valued over \$5 but not over \$10 each.....	No.	\$1.20 each + 16% ad val. + 10¢ for each jewel, if any	\$3 each + 65% ad val. + 25¢ for each jewel, if any
	715.68	00	Valued over \$10 each.....	No.	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$4.50 each + 65% ad val. + 25¢ for each jewel, if any

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 440

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - E

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

716.08 - 716.36

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
716.08	00	Watch movements, assembled, without dials or hands, or with dials or hands whether or not assembled thereon: Having over 17 jewels.....	No.....	\$8.60 each	\$10.75 each
		Having no jewels or not over 17 jewels: Not adjusted, not self-winding (or if a self-winding device cannot be incorporated therein), and not constructed or designed to operate for a period in excess of 47 hours without rewinding: Having no jewels or only 1 jewel:		1-a	1-b
716.10	00	Not over 0.6 inch in width.....	No.....	90¢ each	\$1.50 each
716.11	00	Over 0.6 but not over 0.8 inch in width.....	No.....	75¢ each	\$1.35 each
716.12	00	Over 0.8 but not over 0.9 inch in width.....	No.....	75¢ each	\$1.20 each
716.13	00	Over 0.9 but not over 1 inch in width.....	No.....	75¢ each	\$1.05 each
716.14	00	Over 1 but not over 1.2 inches in width.....	No.....	75¢ each	93¢ each
716.15	00	Over 1.2 but not over 1.5 inches in width.....	No.....	75¢ each	84¢ each
716.16	00	Over 1.5 but not over 1.77 inches in width.....	No.....	75¢ each	75¢ each
		Having over 1 jewel but not over 7 jewels:			
716.20	00	Not over 0.6 inch in width.....	No.....	\$1.80 each	\$2.50 each
716.21	00	Over 0.6 but not over 0.8 inch in width.....	No.....	\$1.35 each	\$2.25 each
716.22	00	Over 0.8 but not over 0.9 inch in width.....	No.....	\$1.35 each	\$2 each
716.23	00	Over 0.9 but not over 1 inch in width.....	No.....	\$1.20 each	\$1.75 each
716.24	00	Over 1 but not over 1.2 inches in width.....	No.....	90¢ each	\$1.55 each
716.25	00	Over 1.2 but not over 1.5 inches in width.....	No.....	90¢ each	\$1.40 each
716.26	00	Over 1.5 but not over 1.77 inches in width.....	No.....	90¢ each	\$1.25 each
		Having over 7 but not over 17 jewels:			
716.30	1/	Not over 0.6 inch in width.....	No.....	\$1.80 each + 9¢ for each jewel over 7	\$2.50 each + 15¢ for each jewel over 7
716.31	1/	Over 0.6 but not over 0.8 inch in width.....	No.....	\$1.35 each + 9¢ for each jewel over 7	\$2.25 each + 15¢ for each jewel over 7
716.32	1/	Over 0.8 but not over 0.9 inch in width.....	No.....	\$1.35 each + 9¢ for each jewel over 7	\$2 each + 15¢ for each jewel over 7
716.33	1/	Over 0.9 but not over 1 inch in width.....	No.....	\$1.20 each + 9¢ for each jewel over 7	\$1.75 each + 15¢ for each jewel over 7
716.34	1/	Over 1 but not over 1.2 inches in width.....	No.....	90¢ each + 9¢ for each jewel over 7	\$1.55 each + 15¢ for each jewel over 7
716.35	1/	Over 1.2 but not over 1.5 inches in width.....	No.....	90¢ each + 9¢ for each jewel over 7	\$1.40 each + 15¢ for each jewel over 7
716.36	1/	Over 1.5 but not over 1.77 inches in width.....	No.....	90¢ each + 9¢ for each jewel over 7	\$1.25 each + 15¢ for each jewel over 7

1/ See subpart E statistical headnote 1(c).

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Page 441

7 - 2 - E
 717.-- - 720, 08

Item	Stat. Surfix	Articles	Units of Quantity	Rates of Duty	
				1	2
717.-- (see head-note 3(c))		Watch movements, assembled, etc. (con.): Having no jewels, etc. (con.): Adjusted, but not self-winding (and if a self-winding device cannot be incorporated therein), and not constructed or designed to operate for a period in excess of 47 hours without rewinding..... <i>dutiable adjustments..</i>	No.....v No.	Column 1 base rate + 50¢ for each adjustment	Column 2 base rate + \$1 for each adjustment
718.-- (see head-note 3(c))		Self-winding (or if a self-winding device can be incorporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewinding, but not adjusted.....	No.....	Column 1 base rate + 50¢ each	Column 2 base rate + \$1 each
719.-- (see head-note 3(c))		Adjusted and self-winding (or if a self-winding device can be incorporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewinding..... <i>dutiable adjustments..</i>	No.....v No.	Column 1 base rate + 50¢ each + 50¢ for each adjustment	Column 2 base rate + \$1 each + \$1 for each adjustment
720.02		Clock movements, assembled, without dials or hands, or with dials or hands whether or not assembled thereon: Measuring less than 1.77 inches in width: Not constructed or designed to operate for over 47 hours without rewinding: Having no jewels or only 1 jewel..... <i>Electric:</i> <i>Battery operated.....</i> <i>Other.....</i>	No. No. No.	60¢ each	75¢ each
720.04	10 20 30	Having over 1 jewel..... <i>Electric:</i> <i>Battery operated:</i> <i>Containing dutiable jewels.....</i> <i>dutiable jewels..</i> <i>Not containing dutiable jewels.....</i> <i>Other:</i> <i>Containing dutiable jewels.....</i> <i>dutiable jewels..</i> <i>Not containing dutiable jewels.....</i> <i>Other:</i> <i>Containing dutiable jewels.....</i> <i>dutiable jewels..</i> <i>Not containing dutiable jewels.....</i>	No. v No. No. No. No. v No. No. No. v No. No. No.	\$1 each + 10.8¢ for each jewel over 7	\$1.25 each + 15¢ for each jewel over 7
720.06 720.08	00 50 60	Constructed or designed to operate for over 47 hours without rewinding: Having no jewels or only 1 jewel..... Having over 1 jewel..... <i>Containing dutiable jewels.....</i> <i>dutiable jewels..</i> <i>Not containing dutiable jewels.....</i>	No..... No. No. v No. No.	\$1.20 each \$1.60 each + 10.8¢ for each jewel over 7	\$1.75 each \$2.25 each + 15¢ for each jewel over 7

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 442

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - E

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing

720.10 - 720.22

Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty		
				1	2	
720.10		Clock movements, assembled, etc. (con.):				
		Other clock movements:				
		Valued not over \$1.10 each.....	.....	22¢ each + 26% ad val. + 10¢ for each jewel, if any	55¢ each + 65% ad val. + 25¢ for each jewel, if any
	10	Electric (including battery operated):				
		Containing jewels.....	No. v			
		jewels contained.....	No.			
	20	Not containing jewels.....	No.			
		Other:				
	30	Containing jewels.....	No. v			
		jewels contained.....	No.			
720.12	40	Not containing jewels.....	No.			
		Valued over \$1.10 but not over \$2.25 each.....	.....	40¢ each + 26% ad val. + 10¢ for each jewel, if any	\$1 each + 65% ad val. + 25¢ for each jewel, if any
		Electric (including battery operated):				
	10	Containing jewels.....	No. v			
		jewels contained.....	No.			
	20	Not containing jewels.....	No.			
		Other:				
	30	Containing jewels.....	No. v			
		jewels contained.....	No.			
	720.14	40	Not containing jewels.....	No.		
		Valued over \$2.25 but not over \$5 each.....	.....	60¢ each + 26% ad val. + 10¢ for each jewel, if any	\$1.50 each + 65% ad val. + 25¢ for each jewel, if any
		Electric (including battery operated):				
10		Containing jewels.....	No. v			
		jewels contained.....	No.			
20		Not containing jewels.....	No.			
		Other:				
30		Containing jewels.....	No. v			
		jewels contained.....	No.			
720.16		40	Not containing jewels.....	No.		
		Valued over \$5 but not over \$10 each.....	.....	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$3 each + 65% ad val. + 25¢ for each jewel, if any
		Electric (including battery operated):				
	10	Containing jewels.....	No. v			
		jewels contained.....	No.			
	20	Not containing jewels.....	No.			
		Other:				
	30	Containing jewels.....	No. v			
		jewels contained.....	No.			
	720.18	40	Not containing jewels.....	No.		
		Valued over \$10 each.....	.....	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$4.50 each + 65% ad val. + 25¢ for each jewel, if any
		Electric (including battery operated):				
10		Containing jewels.....	No. v			
		jewels contained.....	No.			
20		Not containing jewels.....	No.			
		Other:				
30		Containing jewels.....	No. v			
		jewels contained.....	No.			
720.20		00	Watch cases and parts thereof: Wholly or almost wholly of gold or platinum or of both gold and platinum: Cases.....	No.....	60¢ each + 24% ad val.	75¢ each + 45% ad val.
		Parts:				
	720.21	00	Bezels, backs, and centers.....	No.....	30¢ each + 24% ad val.	75¢ each + 45% ad val.
	720.22	00	Other.....	X.....	32% ad val.	65% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suf-fix	Articles	Units of Quantity	Rates of Duty	
				1	2
		Watch cases and parts thereof (con.): Not wholly and not almost wholly of gold or platinum or of both gold and platinum: Wholly or in part of silver; or containing gold or platinum; or set, or prepared to be set, with precious or semiprecious stones or with imitation gemstones:			
720.24	00	Cases.....	No.....	32¢ each + 24% ad val.	40¢ each + 45% ad val.
		Parts:			
720.25	00	Bezels, backs, and centers.....	No.....	16¢ each + 24% ad val.	20¢ each + 45% ad val.
720.26	00	Other.....	X.....	24% ad val.	65% ad val.
		Other:			
720.28	00	Cases.....	No.....	8¢ each + 16% ad val.	20¢ each + 45% ad val.
		Parts:			
720.29	00	Bezels, backs, and centers.....	No.....	4¢ each + 16% ad val.	10¢ each + 45% ad val.
720.30	00	Other.....	X.....	15% ad val.	45% ad val.
		Clock cases, cases for time switches or for other apparatus provided for in this subpart, and parts of the foregoing cases:			
		Clock cases and parts thereof:			
		Over 50 percent of metal by weight and wholly or in part of precious metal.....		30% ad val.	60% ad val.
720.32	20	Cases.....	No.		
	40	Parts.....	X		
		Other:			
720.33	00	Outer cases for travel clocks.....	No.....	16% ad val.	45% ad val.
720.34	00	Other.....		22% ad val.	45% ad val.
	20	Cases.....	No.		
	40	Parts.....	X		
720.36	00	Other cases and parts.....	X.....	24% ad val.	45% ad val.
		Dials and parts thereof:			
		Watch and clock dials:			
720.40	00	Under 1.77 inches in width.....	No.....	2¢ each + 36% ad val.	5¢ each + 45% ad val.
720.42	00	1.77 inches or more in width.....	No.....	20% ad val.	50% ad val.
720.44	00	Other.....	X.....	40% ad val.	50% ad val.
720.60	00	Jewels, unset, suitable for use for antifriction purposes in any watch or clock movement, or in any meter, compass, or similar precision mechanism.....	No.....	8% ad val.	10% ad val.
		Plates:			
720.65	00	Watch movement bottom or pillar plates or their equivalent.....	No.....	One-half the column 1 duty for the complete movement for which suitable	One-half the column 2 duty for the complete movement for which suitable
720.67	00	Any plate, or set of plates, suitable for assembling thereon a clock movement.....	No.....	One-half the column 1 duty for the complete movement for which suitable	One-half the column 2 duty for the complete movement for which suitable
		Assemblies and subassemblies for watch movements, consisting of two or more parts or pieces fastened or joined together:			
720.70	00	Balance assemblies, consisting of a balance staff, balance wheel, and hairspring, with or without other parts commercially known as parts of a balance assembly.....	No.....	28¢ each assembly	50¢ each assembly

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 444

SCHEDULE 7. - SPECIFIED PRODUCTS, MISCELLANEOUS AND NONENUMERATED PRODUCTS

7 - 2 - E

Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing

720.75 - 720.82

Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
720.75		Assemblies and subassemblies for watch movements, etc. (con.):			
	10	Other assemblies and subassemblies.....		7.2¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.6¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 36% ad val. unless said 36 percent rate exceeds the column 1 duty for the complete movement.	15¢ for each jewel (if any) + the column 2 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 3¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 2 duty for the complete movement for which suitable, nor be less than 45% ad val. unless said 45 percent rate exceeds the column 2 duty for the complete movement.
	20	Dutiable at 40 percent ad valorem..... Dutiable at other than 40 percent ad valorem..	X X		
720.80	00	Assemblies and subassemblies for clock movements, consisting of two or more parts or pieces fastened or joined together: Consisting in part of a plate or set of plates provided for in item 720.67: For standard marine chronometers having spring-detent escapements.....	X.....	The column 1 rate specified in item 720.67 for the plate or plates + 20¢ for each jewel (if any) + 4¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement.	The column 2 rate specified in item 720.67 for the plate or plates + 25¢ for each jewel (if any) + 5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 2 duty for the complete movement.
		720.82	00	For other movements.....	X.....	The column 1 rate specified in item 720.67 for the plate or plates + 10¢ for each jewel (if any) + 2¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement.	The column 2 rate specified in item 720.67 for the plate or plates + 25¢ for each jewel (if any) + 5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 2 duty for the complete movement.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

Page 445

SCHEDULE 7. - SPECIFIED PRODUCTS; MISCELLANEOUS AND NONENUMERATED PRODUCTS
 Part 2. - Optical Goods; Scientific and Professional Instruments; Watches, Clocks, and Timing
 Devices; Photographic Goods; Motion Pictures; Recordings and Recording Media

7 - 2 - E
 720.84 - 721.20

Item	Stat. Suffix	Articles	Units of Quantity	Rates of Duty	
				1	2
720.84	00	Assemblies and subassemblies for clock movements, etc. (con.): Other assemblies and subassemblies: For standard marine chronometers having spring-detent escapements.....	X.....	52% ad val. + 20¢ for each jewel (if any) + 2.4¢ for each other piece or part	65% ad val. + 25¢ for each jewel (if any) + 3¢ for each other piece or part
720.86	00	For other movements.....	X.....	26% ad val. + 10¢ for each jewel (if any) + 1.2¢ for each other piece or part	65% ad val. + 25¢ for each jewel (if any) + 3¢ for each other piece or part
720.90	00	Other parts for watch or clock movements: For watch movements.....	X.....	44% ad val.	65% ad val.
720.92	00	For clock movements: For standard marine chronometers having spring-detent escapements.....	X.....	40% ad val.	65% ad val.
720.94	00	For other movements.....	X.....	26% ad val.	65% ad val.
721.05	00	Any of the foregoing parts of watch movements (except bottom or pillar plates or their equivalent, bridges or their equivalent, and jewels) imported in the same shipment, and entered, with complete watch movements (whether or not suitable for use in such movements) but not including any portion of all the parts in such shipment which exceeds in value 4 percent of the value of such movements.....	X.....	36% ad val.	45% ad val.
721.10	00	Any of the foregoing parts of clock movements (except plates and jewels) imported in the same shipment, and entered, with complete clocks, clock movements, apparatus, or time switches provided for in this subpart (whether or not suitable for use in such complete articles), but not including any portion of all the parts in the shipment which exceeds in value 1.5 percent of the value of such complete articles: For any standard marine chronometers, if imported with any such articles.....	X.....	10% ad val.	45% ad val.
721.12	00	For any clock, clock movement, apparatus, or time switch, if imported with any complete articles except standard marine chronometers.....	X.....	18% ad val.	45% ad val.
721.20	00	Any article in the foregoing items covering clocks, clock movements, clock cases and dials and parts thereof, plates (720.67), assemblies and subassemblies for clock movements, and other parts for clock movements, if Canadian article and original motor-vehicle equipment (see headnote 2, part 6B, schedule 6).....	X.....	Free	

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 1
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3744 (Japanese Compensation), Sept. 13, 1966, 3 CFR, 1966 Comp., p. 75, as modified by Pres. Proc. 3818, Nov. 6, 1967, 32 F.R. 18487:

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after October 1 --				
		1966	1967	1968	1969	1970
708.72	35% ad val.	33% ad val.	33% ad val.	1/8% ad val.	1/7% ad val.	1/6% ad val.
709.40	12% ad val.	10.5% ad val.	9.5% ad val.			

1/ See Kennedy Round staged rates, infra.

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002:

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
708.01	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
708.03	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
708.05	40% ad val.	36% ad val.	32% ad val.	28% ad val.	24% ad val.	20% ad val.
708.07	40% ad val.	36% ad val.	32% ad val.	28% ad val.	24% ad val.	20% ad val.
708.09	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
708.21	35% ad val.	31% ad val.	28% ad val.	24% ad val.	21% ad val.	17.5% ad val.
708.23	25% ad val.	22% ad val.	20% ad val.	17% ad val.	15% ad val.	12.5% ad val.
708.25	40% ad val.	36% ad val.	32% ad val.	28% ad val.	24% ad val.	20% ad val.
708.27	40% ad val.	36% ad val.	32% ad val.	28% ad val.	24% ad val.	20% ad val.
708.29	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
708.41	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
708.43	30% ad val.	27% ad val.	24% ad val.	21% ad val.	18% ad val.	15% ad val.
708.45	17% ad val.	16.5% ad val.	16% ad val.	15.5% ad val.	15% ad val.	15% ad val.
708.47	17% ad val.	16.5% ad val.	16% ad val.	15.5% ad val.	15% ad val.	15% ad val.
708.51	17.5% ad val.	15.5% ad val.	14% ad val.	12% ad val.	10% ad val.	8.5% ad val.
708.52	30% ad val.	28% ad val.	26% ad val.	24% ad val.	22% ad val.	20% ad val.
708.53	22.5% ad val.	22% ad val.	21% ad val.	21% ad val.	20% ad val.	20% ad val.
708.55	11.5% ad val.	10% ad val.	9% ad val.	8% ad val.	6.5% ad val.	5.5% ad val.
708.57	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
708.71	25% ad val.	24% ad val.	23% ad val.	22% ad val.	21% ad val.	20% ad val.
708.72	33% ad val.	30% ad val.	27% ad val.	25% ad val.	22% ad val.	20% ad val.
708.73	45% ad val.	40% ad val.	35% ad val.	31% ad val.	27% ad val.	22.5% ad val.
708.75	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
708.76	15% ad val.	13% ad val.	12% ad val.	10% ad val.	9% ad val.	7.5% ad val.
708.78	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
708.80	30% ad val.	27% ad val.	24% ad val.	21% ad val.	18% ad val.	15% ad val.
708.82	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
708.85	25% ad val.	22% ad val.	20% ad val.	17% ad val.	15% ad val.	12.5% ad val.
708.87	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
708.89	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
708.91	30% ad val.	27% ad val.	24% ad val.	21% ad val.	18% ad val.	15% ad val.
708.93	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
709.01	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
709.03	25% ad val.	22% ad val.	20% ad val.	17% ad val.	15% ad val.	12.5% ad val.
709.05	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
709.06	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
709.07	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
709.09	12.5% ad val.	11% ad val.	10% ad val.	8.5% ad val.	7% ad val.	6% ad val.
709.10	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
709.11	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.	4.5% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 2
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
709.13	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
709.15	36% ad val.	32% ad val.	28.5% ad val.	25% ad val.	21.5% ad val.	18% ad val.
709.17	12% ad val.	10.5% ad val.	9.5% ad val.	8% ad val.	7% ad val.	6% ad val.
709.19	22.5% ad val.	20% ad val.	18% ad val.	15.5% ad val.	13% ad val.	11% ad val.
709.21	17.5% ad val.	15.5% ad val.	14% ad val.	12% ad val.	10% ad val.	8.5% ad val.
709.23	32% ad val.	28.5% ad val.	25.5% ad val.	22% ad val.	19% ad val.	16% ad val.
709.25	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.	7% ad val.
709.27	36% ad val.	32% ad val.	28.5% ad val.	25% ad val.	21.5% ad val.	18% ad val.
709.45	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.
709.50	12% ad val.	10.5% ad val.	9.5% ad val.	8% ad val.	7% ad val.	6% ad val.
709.54	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.
709.55	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
709.56	36% ad val.	32% ad val.	28.5% ad val.	25% ad val.	21.5% ad val.	18% ad val.
709.57	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
709.61	6.5% ad val.	5.5% ad val.	5% ad val.	4.5% ad val.	3.5% ad val.	3% ad val.
709.63	5.5% ad val.	4.5% ad val.	4% ad val.	3.5% ad val.	3% ad val.	2.5% ad val.
709.66	12% ad val.	10.5% ad val.	9.5% ad val.	8% ad val.	7% ad val.	6% ad val.
710.04	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
710.06	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
710.08	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
710.12	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
710.14	11.5% ad val.	10% ad val.	9% ad val.	8% ad val.	6.5% ad val.	5.5% ad val.
710.16	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
710.20	92¢ each + 14% ad val.	82¢ each + 12.5% ad val.	73¢ each + 11% ad val.	64¢ each + 9.5% ad val.	55¢ each + 8% ad val.	46¢ each + 7% ad val.
710.21	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
710.26	\$2.25 each + 35% ad val.	\$2.02 each + 31.5% ad val.	\$1.80 each + 28% ad val.	\$1.57 each + 24.5% ad val.	\$1.35 each + 21% ad val.	\$1.12 each + 17.5% ad val.
710.27	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
710.30	11.5% ad val.	10% ad val.	9% ad val.	8% ad val.	6.5% ad val.	5.5% ad val.
710.34	11.5% ad val.	10% ad val.	9% ad val.	8% ad val.	6.5% ad val.	5.5% ad val.
710.36	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
710.40	16-2/3% ad val.	15% ad val.	13% ad val.	11.5% ad val.	10% ad val.	8% ad val.
710.42	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
710.46	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.
710.50	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
710.60	13.5% ad val.	12% ad val.	10.5% ad val.	9% ad val.	8% ad val.	6.5% ad val.
710.61	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
710.63	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
710.65	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
710.67	26% ad val.	23% ad val.	20.5% ad val.	18% ad val.	15.5% ad val.	13% ad val.
710.68	24% ad val.	21.5% ad val.	19% ad val.	16.5% ad val.	14% ad val.	12% ad val.
710.70	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
710.72	17.5% ad val.	15.5% ad val.	14% ad val.	12% ad val.	10% ad val.	8.5% ad val.
710.76	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
710.78	11.25% ad val.	10% ad val.	9% ad val.	7.5% ad val.	6.5% ad val.	5.5% ad val.
710.80	15% ad val.	13% ad val.	12% ad val.	10% ad val.	9% ad val.	7.5% ad val.
710.86	35% ad val.	31% ad val.	28% ad val.	24% ad val.	21% ad val.	17.5% ad val.
710.88	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
710.90	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
711.04	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
711.08	25% ad val.	22% ad val.	20% ad val.	17% ad val.	15% ad val.	12.5% ad val.
711.25	14.5% ad val.	13% ad val.	11.5% ad val.	10% ad val.	8.5% ad val.	7% ad val.
711.30	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
711.36	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
711.37	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.	7% ad val.
711.40	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 3
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
711.42	16% ad val.	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.
711.45	28% ad val.	25% ad val.	22% ad val.	19.5% ad val.	16.5% ad val.	14% ad val.
711.47	9.5% ad val.	8.5% ad val.	7.5% ad val.	6.5% ad val.	5.5% ad val.	4.5% ad val.
711.49	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
711.55	16% ad val.	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.
711.60	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.
711.67	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.	7% ad val.
711.82	\$2.25 each + 35% ad val.	\$2.02 each + 31.5% ad val.	\$1.80 each + 28% ad val.	\$1.57 each + 24.5% ad val.	\$1.35 each + 21% ad val.	\$1.12 each + 17.5% ad val.
711.83	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
711.84	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.	7% ad val.
711.86	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
711.88	22% ad val.	19.5% ad val.	17.5% ad val.	15% ad val.	13% ad val.	11% ad val.
711.90	42.5% ad val.	38% ad val.	34% ad val.	29.5% ad val.	25% ad val.	21% ad val.
711.93	55% ad val.	49% ad val.	44% ad val.	38% ad val.	33% ad val.	27.5% ad val.
711.98	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.
712.05	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
712.10	82¢ each + 14% ad val.	82¢ each + 12.5% ad val.	73¢ each + 11% ad val.	64¢ each + 9.5% ad val.	55¢ each + 8% ad val.	46¢ each + 7% ad val.
712.12	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
712.15	14% ad val.	12.5% ad val.	11% ad val.	9.5% ad val.	8% ad val.	7% ad val.
712.20	15.5% ad val.	13.5% ad val.	12% ad val.	10.5% ad val.	9% ad val.	7.5% ad val.
712.25	\$2.25 each + 35% ad val.	\$2.02 each + 31.5% ad val.	\$1.80 each + 28% ad val.	\$1.57 each + 24.5% ad val.	\$1.35 each + 21% ad val.	\$1.12 each + 17.5% ad val.
712.27	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
712.47	12% ad val.	10.5% ad val.	9.5% ad val.	8% ad val.	7% ad val.	6% ad val.
712.49	12% ad val.	11.5% ad val.	11% ad val.	10.5% ad val.	10% ad val.	10% ad val.
713.05	\$1.50 each + 32.5% ad val.	\$1.35 each + 29% ad val.	\$1.20 each + 26% ad val.	\$1.05 each + 22.5% ad val.	90¢ each + 19% ad val.	75¢ each + 16% ad val.
713.07	\$2.25 each + 32.5% ad val.	\$2.02 each + 29% ad val.	\$1.80 each + 26% ad val.	\$1.57 each + 22.5% ad val.	\$1.35 each + 19% ad val.	\$1.12 each + 16% ad val.
713.09	\$2.25 each + 22.5% ad val.	\$2.02 each + 20% ad val.	\$1.90 each + 18% ad val.	\$1.57 each + 15.5% ad val.	\$1.35 each + 13% ad val.	\$1.12 each + 11% ad val.
713.11	\$2.25 each + 35% ad val.	\$2.02 each + 31.5% ad val.	\$1.80 each + 28% ad val.	\$1.57 each + 24.5% ad val.	\$1.35 each + 21% ad val.	\$1.12 each + 17.5% ad val.
713.15	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
713.17	\$2.25 each + 35% ad val.	\$2.02 each + 31.5% ad val.	\$1.80 each + 28% ad val.	\$1.57 each + 24.5% ad val.	\$1.35 each + 21% ad val.	\$1.12 each + 17.5% ad val.
713.19	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
715.20	\$1.15 each + 17.5% ad val. + 7¢ for each jewel, if any	\$1.03 each + 15.5% ad val. + 6.3¢ for each jewel, if any	92¢ each + 14% ad val. + 5.6¢ for each jewel, if any	80¢ each + 12% ad val. + 4.9¢ for each jewel, if any	69¢ each + 10% ad val. + 4.2¢ for each jewel, if any	57¢ each + 8.5% ad val. + 3.5¢ for each jewel, if any
715.25	27.5¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	24.5¢ each + 29% ad val. + 11.25¢ for each jewel, if any	22¢ each + 26% ad val. + 10¢ for each jewel, if any	19¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	16¢ each + 19.5% ad val. + 7.5¢ for each jewel, if any	13.5¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.27	50¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	45¢ each + 29% ad val. + 11.25¢ for each jewel, if any	40¢ each + 26% ad val. + 10¢ for each jewel, if any	35¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	30¢ each + 19% ad val. + 7.5¢ for each jewel, if any	25¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.29	75¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	67¢ each + 29% ad val. + 11.25¢ for each jewel, if any	60¢ each + 26% ad val. + 10¢ for each jewel, if any	52¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	45¢ each + 19% ad val. + 7.5¢ for each jewel, if any	37.5¢ each + 16% ad val. + 6.25¢ for each jewel, if any

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 4
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
715.31	\$1.50 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$1.35 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$1.05 each + 22.5% ad val. + 8.75¢ for each jewel, if any	90¢ each + 19% ad val. + 7.5¢ for each jewel, if any	75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.33	\$2.25 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$2.02 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$1.57 each + 22.5% ad val. + 8.75¢ for each jewel, if any	\$1.35 each + 19% ad val. + 7.5¢ for each jewel, if any	\$1.12 each + 16% ad val. + 6.25¢ for each jewel, if any
715.40	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$1.62 each + 23% ad val. + 9¢ for each jewel, if any	\$1.44 each + 20.5% ad val. + 8¢ for each jewel, if any	\$1.26 each + 18% ad val. + 7¢ for each jewel, if any	\$1.08 each + 15.5% ad val. + 6¢ for each jewel, if any	90¢ each + 13% ad val. + 5¢ for each jewel, if any
715.45	27.5¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	24.7¢ each + 29% ad val. + 11.25¢ for each jewel, if any	22¢ each + 26% ad val. + 10¢ for each jewel, if any	19.2¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	16.5¢ each + 19% ad val. + 7.5¢ for each jewel, if any	13.75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.47	50¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	45¢ each + 29% ad val. + 11.25¢ for each jewel, if any	40¢ each + 26% ad val. + 10¢ for each jewel, if any	35¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	30¢ each + 19% ad val. + 7.5¢ for each jewel, if any	25¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.49	75¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	67¢ each + 29% ad val. + 11.25¢ for each jewel, if any	60¢ each + 26% ad val. + 10¢ for each jewel, if any	52¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	45¢ each + 19% ad val. + 7.5¢ for each jewel, if any	37.5¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.51	\$1.50 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$1.35 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$1.05 each + 22.5% ad val. + 8.75¢ for each jewel, if any	90¢ each + 19% ad val. + 7.5¢ for each jewel, if any	75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.53	\$2.25 each + 35% ad val. + 12.5¢ for each jewel, if any	\$2.02 each + 31.5% ad val. + 11.25¢ for each jewel, if any	\$1.80 each + 28% ad val. + 10¢ for each jewel, if any	\$1.57 each + 24.5% ad val. + 8.75¢ for each jewel, if any	\$1.35 each + 21% ad val. + 7.5¢ for each jewel, if any	\$1.12 each + 17.5% ad val. + 6.25¢ for each jewel, if any
715.60	27.5¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	24.5¢ each + 29% ad val. + 11.25¢ for each jewel, if any	22¢ each + 26% ad val. + 10¢ for each jewel, if any	19¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	16.5¢ each + 19% ad val. + 7.5¢ for each jewel, if any	13.75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.62	50¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	45¢ each + 29% ad val. + 11.25¢ for each jewel, if any	40¢ each + 26% ad val. + 10¢ for each jewel, if any	35¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	30¢ each + 19% ad val. + 7.5¢ for each jewel, if any	25¢ each + 16% ad val. + 6.25¢ for each jewel, if any
715.64	75¢ each + 20% ad val. + 12.5¢ for each jewel, if any	67¢ each + 18% ad val. + 11.25¢ for each jewel, if any	60¢ each + 16% ad val. + 10¢ for each jewel, if any	52¢ each + 14% ad val. + 8.75¢ for each jewel, if any	45¢ each + 12% ad val. + 7.5¢ for each jewel, if any	37.5¢ each + 10% ad val. + 6.25¢ for each jewel, if any
715.66	\$1.50 each + 20% ad val. + 12.5¢ for each jewel, if any	\$1.35 each + 18% ad val. + 11.25¢ for each jewel, if any	\$1.20 each + 16% ad val. + 10¢ for each jewel, if any	\$1.05 each + 14% ad val. + 8.75¢ for each jewel, if any	90¢ each + 12% ad val. + 7.5¢ for each jewel, if any	75¢ each + 10% ad val. + 6.25¢ for each jewel, if any
715.68	\$2.25 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$2.02 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$1.57 each + 22.5% ad val. + 8.75¢ for each jewel, if any	\$1.35 each + 19.5% ad val. + 7.5¢ for each jewel, if any	\$1.12 each + 16% ad val. + 6.25¢ for each jewel, if any
716.08	\$10.75 each	\$9.67 each	\$8.60 each	\$7.52 each	\$6.45 each	\$5.37 each
720.02	75¢ each	67¢ each	60¢ each	52¢ each	45¢ each	37¢ each

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 5
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
720.04	\$1.25 each + 13.5¢ for each jewel over 7	\$1.12 each + 12.15¢ for each jewel over 7	\$1 each + 10.8¢ for each jewel over 7	87¢ each + 9.45¢ for each jewel over 7	75¢ each + 8.1¢ for each jewel over 7	62¢ each + 6.75¢ for each jewel over 7
720.06	\$1.50 each	\$1.35 each	\$1.20 each	\$1.05 each	90¢ each	75¢ each
720.08	\$2 each + 13.5¢ for each jewel over 7	\$1.80 each + 12.15¢ for each jewel over 7	\$1.60 each + 10.8¢ for each jewel over 7	\$1.40 each + 9.45¢ for each jewel over 7	\$1.20 each + 8.1¢ for each jewel over 7	\$1 each + 6.75¢ for each jewel over 7
720.10	27.5¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	24.5¢ each + 29% ad val. + 11.25¢ for each jewel, if any	22¢ each + 26% ad val. + 10¢ for each jewel, if any	19¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	16.5¢ each + 19% ad val. + 7.5¢ for each jewel, if any	13.75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
720.12	50¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	45¢ each + 29% ad val. + 11.25¢ for each jewel, if any	40¢ each + 26% ad val. + 10¢ for each jewel, if any	35¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	30¢ each + 19% ad val. + 7.5¢ for each jewel, if any	25¢ each + 16% ad val. + 6.25¢ for each jewel, if any
720.14	75¢ each + 32.5% ad val. + 12.5¢ for each jewel, if any	67¢ each + 29% ad val. + 11.25¢ for each jewel, if any	60¢ each + 26% ad val. + 10¢ for each jewel, if any	52¢ each + 22.5% ad val. + 8.75¢ for each jewel, if any	45¢ each + 19% ad val. + 7.5¢ for each jewel, if any	37.5¢ each + 16% ad val. + 6.25¢ for each jewel, if any
720.16	\$1.50 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$1.35 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.20 each + 26% ad val. + 10¢ for each jewel, if any	\$1.05 each + 22.5% ad val. + 8.75¢ for each jewel, if any	90¢ each + 19% ad val. + 7.5¢ for each jewel, if any	75¢ each + 16% ad val. + 6.25¢ for each jewel, if any
720.18	\$2.25 each + 32.5% ad val. + 12.5¢ for each jewel, if any	\$2.02 each + 29% ad val. + 11.25¢ for each jewel, if any	\$1.80 each + 26% ad val. + 10¢ for each jewel, if any	\$1.57 each + 22.5% ad val. + 8.75¢ for each jewel, if any	\$1.35 each + 19% ad val. + 7.5¢ for each jewel, if any	\$1.125 each + 16% ad val. + 6.25¢ for each jewel, if any
720.20	75¢ each + 30% ad val.	67¢ each + 27% ad val.	60¢ each + 24% ad val.	52¢ each + 21% ad val.	45¢ each + 18% ad val.	37¢ each + 15% ad val.
720.21	37.5¢ each + 30% ad val.	33¢ each + 27% ad val.	30¢ each + 24% ad val.	26¢ each + 21% ad val.	22¢ each + 18% ad val.	18¢ each + 15% ad val.
720.22	40% ad val.	36% ad val.	32% ad val.	28% ad val.	24% ad val.	20% ad val.
720.24	40¢ each + 30% ad val.	36¢ each + 27% ad val.	32¢ each + 24% ad val.	28¢ each + 21% ad val.	24¢ each + 18% ad val.	20¢ each + 15% ad val.
720.25	20¢ each + 30% ad val.	18¢ each + 27% ad val.	16¢ each + 24% ad val.	14¢ each + 21% ad val.	12¢ each + 18% ad val.	10¢ each + 15% ad val.
720.26	30% ad val.	27% ad val.	24% ad val.	21% ad val.	18% ad val.	15% ad val.
720.28	10¢ each + 20% ad val.	9¢ each + 18% ad val.	8¢ each + 16% ad val.	7¢ each + 14% ad val.	6¢ each + 12% ad val.	5¢ each + 10% ad val.
720.29	5¢ each + 20% ad val.	4.5¢ each + 18% ad val.	4¢ each + 16% ad val.	3.5¢ each + 14% ad val.	3¢ each + 12% ad val.	2.5¢ each + 10% ad val.
720.30	19% ad val.	17% ad val.	15% ad val.	13% ad val.	11% ad val.	9.5% ad val.
720.32	37.5% ad val.	33.5% ad val.	30% ad val.	26% ad val.	22% ad val.	18.5% ad val.
720.33	20% ad val.	18% ad val.	16% ad val.	14% ad val.	12% ad val.	10% ad val.
720.34	27.5% ad val.	24.5% ad val.	22% ad val.	19% ad val.	16% ad val.	13.5% ad val.
720.36	30% ad val.	27% ad val.	24% ad val.	21% ad val.	18% ad val.	15% ad val.
720.40	2.5¢ each + 45% ad val.	2.25¢ each + 40% ad val.	2¢ each + 36% ad val.	1.75¢ each + 31% ad val.	1.5¢ each + 27% ad val.	1.2¢ each + 22.5% ad val.
720.42	25% ad val.	22% ad val.	20% ad val.	17% ad val.	15% ad val.	12.5% ad val.
720.44	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
720.60	10% ad val.	9% ad val.	8% ad val.	7% ad val.	6% ad val.	5% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1939)

STAGED RATES AND HISTORICAL NOTES

Notes p. 6
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
720.70	35¢ each assembly	31.5¢ each assembly	20¢ each assembly	24.5¢ each assembly	21¢ each assembly	17.5¢ each assembly
720.75	9¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 2¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 45% ad val. unless said 45 percent rate exceeds the column 1 duty for the complete movement	8.1¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.8¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 40% ad val. unless said 40 percent rate exceeds the column 1 duty for the complete movement	7.2¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.6¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 36% ad val. unless said 36 percent rate exceeds the column 1 duty for the complete movement	6.3¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.4¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 31% ad val. unless said 31 percent rate exceeds the column 1 duty for the complete movement	5.4¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1.2¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 27% ad val. unless said 27 percent rate exceeds the column 1 duty for the complete movement	4.5¢ for each jewel (if any) + the column 1 rate specified in item 720.65 for bottom or pillar plates or their equivalent therein (if any) + 1¢ for each other part or piece therein (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement for which suitable, nor be less than 22.5% ad val. unless said 22.5 percent rate exceeds the column 1 duty for the complete movement
720.80	The column 1 rate specified in item 720.67 for the plate or plates + 25¢ for each jewel (if any) + 5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 22.5¢ for each jewel (if any) + 4.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 20¢ for each jewel (if any) + 4¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 17.5¢ for each jewel (if any) + 3.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 15¢ for each jewel (if any) + 3¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 12.5¢ for each jewel (if any) + 2.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement

APPENDIX A

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 7
Schedule 7,
Part 2

Staged Rates

Modifications of column 1 rates of duty by Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002 (con.):

TSUS item	Prior rate	Rate of duty, effective with respect to articles entered on and after January 1 --				
		1968	1969	1970	1971	1972
720.82	The column 1 rate specified in item 720.67 for the plate or plates + 12.5¢ for each jewel (if any) + 2.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 11.25¢ for each jewel (if any) + 2.25¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 10¢ for each jewel (if any) + 2¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 8.75¢ for each jewel (if any) + 1.75¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 7.5¢ for each jewel (if any) + 1.5¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement	The column 1 rate specified in item 720.67 for the plate or plates + 6.25¢ for each jewel (if any) + 1.25¢ for each other part or piece (if any), but the total duty on the assembly or subassembly shall not exceed the column 1 duty for the complete movement
720.84	65% ad val. + 25¢ for each jewel (if any) + 3¢ for each other piece or part	58% ad val. + 22.5¢ for each jewel (if any) + 2.7¢ for each other piece or part	52% ad val. + 20¢ for each jewel (if any) + 2.4¢ for each other piece or part	45% ad val. + 17.5¢ for each jewel (if any) + 2.1¢ for each other piece or part	39% ad val. + 15¢ for each jewel (if any) + 1.8¢ for each other piece or part	32.5% ad val. + 12.5¢ for each jewel (if any) + 1.5¢ for each other piece or part
720.86	32.5% ad val. + 12.5¢ for each jewel (if any) + 1.5¢ for each other piece or part	29% ad val. + 11.25¢ for each jewel (if any) + 1.35¢ for each other piece or part	26% ad val. + 10¢ for each jewel (if any) + 1.2¢ for each other piece or part	22.5% ad val. + 8.75¢ for each jewel (if any) + 1.05¢ for each other piece or part	19% ad val. + 7.5¢ for each jewel (if any) + 0.9¢ for each other piece or part	16% ad val. + 6.25¢ for each jewel (if any) + 0.75¢ for each other piece or part
720.90	55% ad val.	49% ad val.	44% ad val.	38% ad val.	33% ad val.	27.5% ad val.
720.92	50% ad val.	45% ad val.	40% ad val.	35% ad val.	30% ad val.	25% ad val.
720.94	32.5% ad val.	29% ad val.	26% ad val.	22.5% ad val.	19% ad val.	16% ad val.
721.05	45% ad val.	40% ad val.	36% ad val.	31% ad val.	27% ad val.	22.5% ad val.
721.10	12.5% ad val.	11% ad val.	10% ad val.	8.5% ad val.	7% ad val.	6% ad val.
721.12	22.5% ad val.	20% ad val.	18% ad val.	15.5% ad val.	13% ad val.	11% ad val.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 9
Schedule 7,
Part 2Other Amendments and Modifications--(con.)PROVISION

710.88---"Comparators," preceding "comparator benches" deleted from article description. Pub. L. 89-241, Secs. 2(a), 62, Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.

Subpt D--Headnote 1 amended by deleting "711.99" and inserting hdntes "711.88" in lieu thereof; headnote 2(a) amended by 1 and deleting "711.99, inclusive (except magnetic speedometers)," and inserting "711.88, inclusive," in lieu 2(a) thereof. Pub. L. 89-241, Secs. 2(a), 36(k)(1), Oct. 7, 1965, 79 Stat. 933, 941, effective date Dec. 7, 1965.

711.34---Item 711.35 (column 1 rate--42.5% ad val.; column 2 711.35 rate--85% ad val.) deleted and items 711.34 and 711.36 711.36 and heading immediately preceding item 711.34 added in lieu thereof. Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002, effective date Jan. 1, 1968. The column 1 rate of duty for clinical thermometers had been temporarily increased by former item 930.00.

711.65---Items 711.65 (column 1 rate--26.5% ad val.; column 2 711.67 rate--65% ad val.) and 711.70 (column 1 rate--14% 711.70 ad val.; column 2 rate--50% ad val.) and heading immediately preceding item 711.65 deleted and item 711.67 added in lieu thereof. Pub. L. 89-241, Secs. 2(a), 63(b), Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.

711.85---Item 711.85 added. Pub. L. 89-283, Secs. 401(a), 405(d), Oct. 21, 1965, 79 Stat. 1021, 1025; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

711.91---Items 711.92 (column 1 rate--9% ad val.; column 2 711.92 rate--25% ad val.), 711.94 (column 1 rate--\$2.25 711.94 each + 35% ad val.; column 2 rate--\$4.50 each + 65% 711.96 ad val.), and 711.96 (column 1 rate--45% ad val.; column 2 rate--65% ad val.) and heading immediately preceding item 711.92 deleted and item 711.91 (Bicycle speedometers and parts thereof) added in lieu thereof. Pub. L. 89-241, Secs. 2(a), 36(k)(2), Oct. 7, 1965, 79 Stat. 933, 941, effective date Dec. 7, 1965.

711.91---Item 711.91 redesignated as item 711.93. Pub. L. 711.93 89-283, Secs. 401(a), 405(d), Oct. 21, 1965, 79 Stat. 1021, 1025; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

711.91---New item 711.91 added. Pub. L. 89-283, Secs. 401(a), 405(d), Oct. 21, 1965, 79 Stat. 1021, 1025; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

711.99---Item 711.99 added. Pub. L. 89-283, Secs. 401(a), 405(d), Oct. 21, 1965, 79 Stat. 1021, 1025; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

712.12---Column 1 rate of duty of 55% ad val. reduced to 50% ad val. on July 1, 1964. General headnote 3(g).

PROVISION

712.25---Language "Tachometers and" preceding the word 712.27 "anemometers" in item 712.25 and in the heading immediately preceding item 712.25 deleted. Pub. L. 89-241, Secs. 2(a), 36(k)(3), Oct. 7, 1965, 79 Stat. 933, 941, effective date Dec. 7, 1965.

712.47---Item 712.50 (column 1 rate--12% ad val.; column 2 712.49 rate--40% ad val.) deleted and items 712.47 712.50 and 712.49 added in lieu thereof. Pres. Proc. 3822 (Kennedy Round), Dec. 16, 1967, 32 F.R. 19002, effective date Jan. 1, 1968.

712.51---Item 712.51 added. Pub. L. 89-283, Secs. 401(a), 405(d), Oct. 21, 1965, 79 Stat. 1021, 1025; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

Subpt E--Headnote 5 added. Pub. L. 89-241, Secs. 2(a), 63(a), hdnte 5 Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.

Subpt E--Headnote 6 added. Pub. L. 89-805, Secs. 1(b), (c), hdnte 6 Nov. 10, 1966, 80 Stat. 1521, 1522, effective date Jan. 1, 1967.

716.10---Column 1 rates of duty for the enumerated items 716.11 temporarily increased until Jan. 11, 1967 716.12 by former items 932.10 through 935.--. 716.13 716.14 716.15 716.16 716.20 716.21 716.22 716.23 716.24 716.25 716.26 716.30 716.31 716.32 716.33 716.34 716.35 716.36 717.-- 718.-- 719.--

720.92---Column 1 rate of duty of 55% ad val. reduced to 50% ad val. on July 1, 1964. General headnote 3(g).

721.20---Item 721.20 added. Pub. L. 89-283, Secs. 401(a), 405(b), Oct. 21, 1965, 79 Stat. 1021, 1024; entered into force Dec. 20, 1965, by Pres. Proc. 3682, Oct. 21, 1965, 3 CFR, 1965 Supp., p. 68; effective with respect to articles entered on and after Jan. 18, 1965.

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 10
Schedule 7,
Part 2

Other Amendments and Modifications--(cont.)

PROVISION	PROVISION
722.52--Column 1 and 2 rates of duty increased from 11.5% ad val. and 35% ad val., respectively, to 35% ad val. and 45% ad val., respectively. Pub. L. 89-241, Secs. 2(a), 64, Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.	723.35--Column 1 rate of duty of 15% ad val. reduced to 7.5% ad val. Pub. L. 89-241, Sect. 2(a), 64, Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.
722.83--Item 722.84 (column 1 rate--27.5% ad val.; column 2 rate--35% ad val.) deleted and item 722.85 and 722.85 and heading immediately preceding item 722.85 added in lieu thereof. Pub. L. 89-241, Sect. 2(a), 64, Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.	724.40--Column 1 and 2 rates of duty reduced from 0.15¢ per sq. in. and 1¢ per sq. in., respectively, to 4¢ per sq. ft. and 5¢ per sq. ft., respectively. Pub. L. 89-241, Secs. 2(a), 67, Oct. 7, 1965, 79 Stat. 933, 946, effective date Dec. 7, 1965.

Statistical Notes

PROVISION	Effective date	PROVISION	Effective date
708.43--		711.65--See Other Amendments and Modifications	
00--Estab. (transferred from 708.4320 & 40).....	Jan. 1, 1966	00--Disc. (transferred to 711.6700).....	Dec. 7, 1965
20--Disc. (transferred to 708.4300).....	do		
40--Disc. do	do	711.67--See Other Amendments and Modifications	
708.45--		00--Estab. (transferred from 711.6500 & 711.7000).....	Dec. 7, 1965
40--Disc. (transferred to 708.4550).....	Jan. 1, 1966	Unit of quantity changed from "No." to "X".....	Jan. 1, 1966
50--Estab. (transferred from 708.4540 & 60)....	do		
60--Disc. (transferred to 708.4550).....	do	711.70--See Other Amendments and Modifications	
708.59--		00--Disc. (transferred to 711.6700).....	Dec. 7, 1965
00--Estab. (transferred from 708.5910-50).....	Jan. 1, 1966		
10--Disc. (transferred to 708.5900).....	do	711.85--See Other Amendments and Modifications	
20--Disc. do	do	00--Estab. (transferred from 711.8400pt).....	Dec. 20, 1965
30--Disc. do	do		
40--Disc. do	do	711.90--	
50--Disc. do	do	00--Estab. (transferred from 711.9020 & 40)....	Dec. 7, 1965
709.06--See Other Amendments and Modifications		20--Disc. (transferred to 711.9000).....	do
00--Estab. (transferred from 709.2700pt).....	Dec. 7, 1965	40--Disc. do	do
709.10--See Other Amendments and Modifications		711.91--See Other Amendments and Modifications	
710.12--See Other Amendments and Modifications		00--Estab. (transferred from 711.9000pt).....	Dec. 20, 1965
710.80--		711.92--See Other Amendments and Modifications	
00--Disc. (transferred to 710.8020-60).....	Jan. 1, 1966	00--Disc. (transferred to 711.9820).....	Dec. 7, 1965
20--Estab. (transferred from 710.8000pt).....	do		
40--Estab. do	do	711.93--See Other Amendments and Modifications	
60--Estab. do	do	00--Estab. (transferred from 711.9820pt).....	Dec. 20, 1965
710.88--See Other Amendments and Modifications		711.94--See Other Amendments and Modifications	
711.34--See Other Amendments and Modifications		00--Disc. (transferred to 711.9820).....	Dec. 7, 1965
00--Estab. (transferred from 711.3520).....	Jan. 1, 1968	711.96--See Other Amendments and Modifications	
711.35--See Other Amendments and Modifications		00--Disc. (transferred to 711.9820).....	Dec. 7, 1965
20--Disc. (transferred to 711.3400).....	Jan. 1, 1968	711.98--	
40--Disc. (transferred to 711.3600).....	do	00--Disc. (transferred to 711.9840).....	Dec. 7, 1965
711.38--See Other Amendments and Modifications		20--Estab. (transferred from 711.9200, 711.9400, 711.9600, 712.2500pt & 712.2700pt).....	do
00--Estab. (transferred from 711.3540).....	Jan. 1, 1968	Bicycle speedometers and parts transferred to 711.9300; articles subject to Automotive Products Trade Act (APTA) transferred to 711.9900.....	Dec. 20, 1965
		40--Estab. (transferred from 711.9800).....	Dec. 7, 1965
		Articles subject to APTA transferred to 711.9900.....	Dec. 20, 1965

TARIFF SCHEDULES OF THE UNITED STATES ANNOTATED (1969)

STAGED RATES AND HISTORICAL NOTES

Notes p. 11
Schedule 7,
Part 2

Statistical Notes--(con.)

PROVISION	Effective date	PROVISION	Effective date
711.99--See Other Amendments and Modifications 00--Etab.(transferred from 711.9820pt & 40pt).....	Dec. 20, 1965	712.99--See Other Amendments and Modifications 00--Etab.(transferred from 712.9820pt).....	Dec. 7, 1966
712.12--See Other Amendments and Modifications		712.94--See Other Amendments and Modifications 00--Etab.(transferred to 712.9220 & 712.9500).....	Dec. 7, 1966
712.25--See Other Amendments and Modifications 00--Tachometers transferred to 711.9820.....	Dec. 7, 1965	712.93--See Other Amendments and Modifications 00--Etab.(transferred from 712.9300pt).....	Dec. 7, 1966
712.27--See Other Amendments and Modifications 00--Parts of tachometers transferred to 711.9820.....	Dec. 7, 1965	712.91-- 10--Disc.(transferred to 722.0535).....	Jan. 1, 1968
712.47--See Other Amendments and Modifications 00--Etab.(transferred from 712.5000pt).....	Jan. 1, 1968	16--Etab.(transferred from 722.0510 & 20).....	do
712.49--See Other Amendments and Modifications 00--Etab.(transferred from 712.5000pt).....	Jan. 1, 1968	20--Disc.(transferred to 722.0516).....	do
712.50--See Other Amendments and Modifications 00--Disc.(transferred to 712.4700 & 712.4900).....	Jan. 1, 1968	24--Disc.(transferred to 722.0535).....	do
712.51--See Other Amendments and Modifications 00--Etab.(transferred from 712.5000pt).....	Dec. 20, 1965	28--Etab.(transferred from 722.0530 & 40).....	do
713.05-- 00--Etab.(transferred from 713.0520 & 40).....	Jan. 1, 1968	32--Disc.(transferred to 722.0535).....	do
20--Disc.(transferred to 713.0500).....	do	36--Disc.(transferred to 722.0535).....	do
40--Disc. do do	do do	40--Etab.(transferred from 722.0550 & 80).....	do
Subpt.E--See Other Amendments and Modifications for rate of duty changes covering items 716.10-719.--(items 932.10-935.--)		44--Disc.(transferred to 722.0556).....	do
720.84-- 00--Etab.(transferred from 720.8410 & 20).....	Jan. 1, 1964	722.92-- 20--Unit of quantity changed from "lb." to "sq. ft.".....	Jan. 1, 1968
10--Disc.(transferred to 720.8400).....	do	40-- do do	do
20--Disc. do do	do do	60-- do do	do
720.86-- 00--Etab.(transferred from 720.8610 & 20).....	Jan. 1, 1964	722.91--See Other Amendments and Modifications 00--Unit of quantity changed from "lb." to "sq. ft.".....	Jan. 1, 1968
10--Disc.(transferred to 720.8600).....	do	722.93-- 20--Certain recorded video tapes transferred to 432.0030, 531.0030, 540.1030 & 551.1030.....	Feb. 1, 1967
20--Disc. do do	do do	722.94--See Other Amendments and Modifications	
720.92--See Other Amendments and Modifications			
721.20--See Other Amendments and Modifications 00--Etab.(transferred from 715.1500pt-715.6800pt, 720.0210pt-720.1840pt, 720.3220pt-720.6700pt, 720.8200pt, 720.8600pt, 720.9400pt & 721.1200pt).....	Dec. 20, 1965		

A P P E N D I X B

Value of U.S. imports for consumption, by TSUS
items included in the individual summaries
of this volume, total and from the 3 prin-
cipal suppliers, 1968

Value of U.S. imports for consumption, by TSUS items included in the individual summaries of this volume, total and from the 3 principal suppliers, 1968

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per-cent change from 1967	Country	Value	Country	Value	Country	Value
Ophthalmic lenses, unmounted (p. 7)								
708.01	2,426	32	Japan	1,066	France	672	U.K.	226
Lenses, prisms, mirrors, and other optical elements (except ophthalmic lenses) (p. 13)								
708.03	2,390	-8	Japan	1,890	W. Germany	207	France	190
708.05	113	-63	Japan	61	W. Germany	38	U.K.	6
708.07	48	-52	Japan	26	W. Germany	10	U.K.	4
708.09	80	6	Japan	38	W. Germany	18	U.K.	15
708.21	2,655	16	Japan	2,428	W. Germany	147	Switzerland	35
708.23	21,097	23	Japan	13,308	W. Germany	4,782	France	1,159
708.25	331	185	France	216	Japan	43	W. Germany	30
708.27	74	42	France	26	Japan	25	Switzerland	11
708.29	50	14	Japan	21	W. Germany	16	U.K.	12
Eyeglasses and similar articles (p. 23)								
708.41	10	-44	Hong Kong	6	France	2	Japan	2
708.43	974	34	Italy	759	Japan	99	Hong Kong	67
708.45	13,276	19	France	5,050	Italy	4,509	Japan	2,646
708.47	10,928	20	France	5,232	Italy	2,194	W. Germany	1,800
Telescopes (including prism binoculars and field and opera glasses) and other astronomical instruments, frames and mountings for any of the foregoing and parts thereof (p. 31)								
708.51	1,540	12	Japan	1,208	Italy	182	Canada	47
708.52	15,305	17	Japan	14,260	Hong Kong	453	W. Germany	410
708.53	7,710	30	Japan	7,477	W. Germany	157	Canada	33
708.55	7	-69	Japan	3	W. Germany	3	U.K.	1
708.57	18	113	Japan	18	-	-	-	-
708.59	508	57	Japan	275	W. Germany	139	Canada	76
Microscopes and diffraction apparatus (p. 39)								
708.71	2,428	45	Japan	2,417	W. Germany	6	Hong Kong	4
708.72	509	5	Japan	427	W. Germany	80	Sweden	1
708.73	693	46	Japan	430	W. Germany	177	U.K.	47
708.75	184	-3	W. Germany	87	Austria	51	Japan	16
708.76	4,193	-5	W. Germany	2,852	Japan	722	Austria	520
708.78	3,830	51	Japan	1,901	U.K.	1,059	Netherlands	603
708.80	4,941	21	W. Germany	2,592	Japan	1,585	Switzerland	493
708.82	1,105	81	Japan	572	Netherlands	224	W. Germany	164
Magnifiers, door viewers, and optical appliances and instruments not specially provided for (p. 53)								
708.85	1,196	8	Japan	878	W. Germany	106	Hong Kong	104
708.87	238	42	Japan	131	France	92	W. Germany	12
708.89	206	12	U.K.	66	Japan	64	Canada	41
708.91	87	83	Japan	84	Israel	2	Italy	1
708.93	29	-23	Japan	15	U.K.	6	Switzerland	3
Medical, dental, surgical, and veterinary instruments (p. 59)								
709.01	25	-58	Ireland	7	France	7	W. Germany	6
709.03	4	27	Japan	2	W. Germany	1	Mexico	1
709.05	1,579	-15	W. Germany	677	Switzerland	505	Japan	173
709.06	428	24	U.K.	288	W. Germany	95	Australia	35
709.07	18	64	Korea Rep.	7	U.K.	6	Netherlands	5
709.09	1,401	16	W. Germany	790	U.K.	491	Sweden	37

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries
of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per- cent change from 1967	Country	Value	Country	Value	Country	Value
Medical, dental, surgical, and veterinary instruments--Con. (p. 59)								
709.10	128	38	Japan	58	W. Germany	51	Canada	12
709.11	547	32	W. Germany	296	Japan	215	U.K.	20
709.13	309	-53	Japan	166	U.K.	48	W. Germany	42
709.15	190	-27	Netherlands	142	U.K.	25	Japan	10
709.17	2,629	52	W. Germany	1,142	U.K.	511	Japan	280
709.19	994	10	W. Germany	685	Canada	227	Japan	41
709.21	41	46	Japan	39	W. Germany	2	-	-
709.23	257	-22	Japan	133	U.K.	91	Switzerland	12
709.25	4,119	39	W. Germany	2,836	Switzerland	449	Japan	376
709.27	5,130	20	W. Germany	3,940	U.K.	214	Sweden	192
Therapeutic appliances and respiratory equipment (p. 69)								
709.40	797	179	Japan	536	France	201	Hong Kong	45
709.45	483	11	U.K.	182	Mexico	59	Sweden	45
Hearing aids (p. 79)								
709.50	2,519	-13	Denmark	799	W. Germany	665	Austria	312
Orthopedic appliances, prostheses, and related articles (p. 87)								
709.54	783	51	Trinidad	305	Italy	263	Spain	49
709.55	396	9	Switzerland	150	Israel	113	W. Germany	57
709.56	123	28	Switzerland	106	U.K.	13	W. Germany	3
709.57	508	3	W. Germany	401	U.K.	40	France	35
X-ray apparatus (p. 95)								
709.61	1,853	13	W. Germany	835	Austria	507	Netherlands	244
709.63	19,455	31	W. Germany	8,322	Netherlands	3,510	France	3,041
709.66	770	47	Canada	301	W. Germany	190	U.K.	100
Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments (p. 105)								
710.04	1,178	11	Italy	681	Switzerland	299	W. Germany	190
710.08	3,016	12	Switzerland	1,834	W. Germany	384	U.K.	97
(pt.) 1/	:	:	:	:	:	:	:	:
710.12	150	226	Canada	127	Japan	15	Finland	3
710.40	88	35	U.K.	48	Japan	16	Italy	14
710.42	488	-68	W. Germany	278	Japan	154	Switzerland	26
710.60	801	21	Japan	674	W. Germany	46	Hong Kong	28
710.61	541	11	W. Germany	238	U.K.	130	Japan	92
710.63	101	38	W. Germany	46	Japan	17	U.K.	14
710.76	852	29	W. Germany	818	Japan	19	U.K.	7
710.78	1	-93	U.K.	1	-	-	-	-
710.80	2,827	-10	W. Germany	1,722	Japan	488	Switzerland	226
(pt.) 2/	:	:	:	:	:	:	:	:
Rangefinders, rules, balancing machines, and non-optical measuring or checking instruments (p. 117)								
710.06	2	408	Japan	2	-	-	-	-
710.08	-	-	-	-	-	-	-	-
(pt.) 3/	:	:	:	:	:	:	:	:
710.67	2	10	Italy	1	France	4/	-	-
710.68	110	26	W. Germany	34	Japan	27	U.K.	24
710.70	10	-41	W. Germany	9	U.K.	1	-	-
710.72	875	3	W. Germany	357	Japan	300	U.K.	97
710.80	5,274	-10	W. Germany	1,494	U.K.	1,057	Japan	998
(pt.) 2/	:	:	:	:	:	:	:	:

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries
of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in
the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per- cent change from 1967	Country	Value	Country	Value	Country	Value
Navigational instruments and parts (p. 127)								
710.08	-	-	-	-	-	-	-	-
(pt.) 3/	:	:	:	:	:	:	:	:
710.14	361	17	W. Germany	133	Italy	101	Canada	85
710.16	937	9	Japan	569	Sweden	184	W. Germany	122
710.20	29	-21	W. Germany	24	U.K.	5	-	-
710.21	1,736	3,340	Canada	1,674	Norway	60	U.K.	2
710.30	313	-14	Denmark	224	W. Germany	41	Norway	23
710.46	3,140	-25	Canada	1,593	Japan	610	U.K.	426
Meteorological, hydrological, and geophysical instruments (p. 137)								
710.08	-	-	-	-	-	-	-	-
(pt.) 3/	:	:	:	:	:	:	:	:
710.26	22	38	Italy	14	U.K.	5	Japan	2
710.27	4	-62	Switzerland	4	-	-	-	-
710.34	11	-72	Canada	7	Hong Kong	3	New Zealand	1
710.36	-	-	-	-	-	-	-	-
710.50	3,429	-13	Canada	3,091	Switzerland	273	W. Germany	19
Calipers, gauges, and micrometers (p. 147)								
710.65	3,421	-17	Japan	1,649	W. Germany	1,176	Switzerland	446
710.80	2,470	9	Japan	1,028	U.K.	569	W. Germany	456
(pt.) 2/	:	:	:	:	:	:	:	:
Optical measuring or checking instruments and appliances, and parts (p. 155)								
710.86	501	4	Japan	456	W. Germany	24	Switzerland	10
710.88	251	-50	Canada	150	U.K.	69	Japan	18
710.90	535	22	U.K.	321	Japan	83	W. Germany	96
Balances and parts (p. 161)								
711.04	41	19	W. Germany	24	Switzerland	12	Belgium	4
711.08	3,669	22	Switzerland	2,342	W. Germany	1,115	Canada	93
Strength testing machines and parts (p. 167)								
711.25	1,118	-12	W. Germany	343	Switzerland	251	U.K.	247
Hydrometers, thermometers, barometers, and similar instruments (p. 173)								
711.30	29	222	Austria	15	Japan	8	Netherlands	4
711.36 5/	167	16	Japan	99	W. Germany	60	U.K.	3
711.37	606	50	Japan	356	W. Germany	124	France	46
711.40	13	73	W. Germany	7	U.K.	2	Belgium	2
711.42	54	212	W. Germany	39	U.K.	6	Austria	5
711.45	5	-77	Italy	3	U.K.	1	W. Germany	4/
711.47	740	20	W. Germany	563	U.K.	120	France	22
711.49	353	794	Sweden	106	U.K.	71	Switzerland	62
711.55	74	57	W. Germany	44	U.K.	16	Switzerland	7
711.60	157	8	Switzerland	66	W. Germany	39	U.K.	22
711.67	965	27	W. Germany	810	Japan	57	Switzerland	45
Clinical thermometers (p. 181)								
711.34 6/	957	54	Japan	947	Panama	6	W. Germany	4

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per-cent change from 1967	Country	Value	Country	Value	Country	Value
Apparatus for measuring, checking, or automatic control of variables of liquids or gases, or automatic control of temperature (p. 187)								
711.82	93	66	U.K.	53	Canada	20	W. Germany	10
711.83	93	135	W. Germany	36	Netherlands	29	U.K.	9
711.84	6,756	40	W. Germany	2,078	Canada	1,492	U.K.	1,188
711.85	327	1,581	Canada	327	-	-	-	-
Instruments or apparatus for physical or chemical analysis and related articles (p. 197)								
711.86	367	-27	W. Germany	125	Japan	65	U.K.	56
711.88	2,360	-21	Sweden	699	W. Germany	619	U.K.	472
Counting devices, speedometers, etc. (p. 207)								
711.90	297	438	W. Germany	185	Sweden	89	Japan	8
711.91	-	-	-	-	-	-	-	-
711.93	426	442	France	343	Japan	36	Netherlands	29
711.98	7,788	38	W. Germany	2,237	Switzerland	1,755	Japan	1,184
711.99	273	78	Canada	273	-	-	-	-
Electrical measuring, testing and controlling instruments (p. 215)								
712.05	223	83	W. Germany	84	France	37	Switzerland	31
712.10	288	-17	U.K.	119	W. Germany	114	Japan	39
712.12	2,913	790	Canada	2,896	U.K.	9	W. Germany	6
712.15	914	4	Canada	324	W. Germany	266	France	79
712.20	16	-18	Hong Kong	8	Canada	5	Netherlands	3
712.25	21	-29	Japan	16	U.K.	3	Italy	1
712.27	1	-75	Mexico	1	-	-	-	-
712.47)	7/	25	U.K.	12,363	Japan	11,301	W. Germany	8,650
712.49)	50,860	-	-	-	-	-	-	-
712.51	5	589	Canada	5	-	-	-	-
Meters for registering the supply of electricity, gas, or liquid, and parts of such meters (p. 229)								
713.05	528	95	U.K.	451	W. Germany	68	Japan	9
713.07	3	592	Canada	3	Japan	4/	-	-
713.09	25	41	Switzerland	7	Canada	4	W. Germany	4
713.11	271	-26	Japan	103	W. Germany	66	U.K.	52
713.15	97	-22	Japan	42	U.K.	19	Canada	14
Stroboscopes and parts thereof (p. 241)								
713.17	31	98	Denmark	14	W. Germany	9	U.K.	8
713.19	4/	-41	Denmark	4/	-	-	-	-
Watches, watch movements, watch cases, and parts of watch cases (p. 247)								
715.05	62,210	13	Switzerland	55,115	W. Germany	3,680	France	2,111
716.08	128	-88	Switzerland	89	Japan	30	W. Germany	5
716.10	40	331	Switzerland	22	Japan	13	W. Germany	4
716.11	2,343	-14	Switzerland	2,306	Japan	21	Netherlands	10
716.12	11	-28	Switzerland	11	-	-	-	-
716.13	133	-11	Switzerland	119	Netherlands	6	W. Germany	5
716.14	997	-8	Switzerland	938	Hong Kong	24	W. Germany	11
716.15	268	39	Switzerland	211	W. Germany	26	Hong Kong	16
716.16	442	142	W. Germany	214	Japan	147	Switzerland	44

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per-cent change from 1967	Country	Value	Country	Value	Country	Value
Watches, watch movements and watch cases--Con. (p. 247)								
716.20	13	1,449	Japan	12	W. Germany	1	-	-
716.21	1,705	-24	Japan	1,015	Switzerland	661	France	29
716.22	5	34	Switzerland	5	-	-	-	-
716.23	280	40	Switzerland	263	W. Germany	17	-	-
716.24	5,029	-3	France	1,721	Japan	1,485	W. Germany	1,008
716.25	6	-73	W. Germany	5	U.K.	1	-	-
716.26	583	8/	Japan	450	Switzerland	91	W. Germany	35
716.30	9,143	5	Switzerland	9,033	W. Germany	60	France	32
716.31	8,871	-11	Switzerland	7,664	W. Germany	843	U.K.	275
716.32	110	5	Switzerland	110	-	-	-	-
716.33	424	-38	Switzerland	423	W. Germany	1	France	4/
716.34	10,287	-3	Switzerland	7,990	France	1,043	Japan	991
716.35	105	82	Switzerland	84	Japan	11	France	9
716.36	91	48	Switzerland	91	France	4/	-	-
717.08	-	-	-	-	-	-	-	-
717.10	-	-	-	-	-	-	-	-
717.11	-	-	-	-	-	-	-	-
717.12	-	-	-	-	-	-	-	-
717.13	-	-	-	-	-	-	-	-
717.14	-	-	-	-	-	-	-	-
717.15	-	-	-	-	-	-	-	-
717.16	-	-	-	-	-	-	-	-
717.20	-	-	-	-	-	-	-	-
717.21	-	-	-	-	-	-	-	-
717.22	-	-	-	-	-	-	-	-
717.23	-	-	-	-	-	-	-	-
717.24	-	-	-	-	-	-	-	-
717.25	-	-	-	-	-	-	-	-
717.26	-	-	-	-	-	-	-	-
717.30	17	72	Switzerland	17	-	-	-	-
717.31	3	20	Switzerland	3	-	-	-	-
717.32	8	-	Switzerland	8	-	-	-	-
717.33	2	13	Switzerland	2	-	-	-	-
717.34	-	-	-	-	-	-	-	-
717.35	-	-	-	-	-	-	-	-
717.36	-	-	-	-	-	-	-	-
718.08	-	-	-	-	-	-	-	-
718.10	-	-	-	-	-	-	-	-
718.11	-	-	-	-	-	-	-	-
718.12	-	-	-	-	-	-	-	-
718.13	1	-	Switzerland	1	-	-	-	-
718.14	1	242	Switzerland	1	-	-	-	-
718.15	1	-	Switzerland	1	-	-	-	-
718.16	6	-2	W. Germany	5	Switzerland	4/	-	-
718.20	-	-	-	-	-	-	-	-
718.21	-	-	-	-	-	-	-	-
718.22	-	-	-	-	-	-	-	-
718.23	-	-	-	-	-	-	-	-
718.24	-	-	-	-	-	-	-	-
718.25	4	-	France	4	-	-	-	-
718.26	57	144	Switzerland	33	W. Germany	16	France	?

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per-cent change from 1967	Country	Value	Country	Value	Country	Value
Watches, watch movements and watch cases--Con. (p. 247)								
718.30	118	84	Switzerland	117	France	1	-	-
718.31	935	18	Switzerland	934	W. Germany	1	-	-
718.32	3	128	Switzerland	3	-	-	-	-
718.33	76	-37	Switzerland	76	-	-	-	-
718.34	8,943	1	Switzerland	8,378	Japan	307	W. Germany	210
718.35	8	-85	Switzerland	8	-	-	-	-
718.36	24	12	Switzerland	24	-	-	-	-
719.08	-	-	-	-	-	-	-	-
719.10	-	-	-	-	-	-	-	-
719.11	-	-	-	-	-	-	-	-
719.12	-	-	-	-	-	-	-	-
719.13	-	-	-	-	-	-	-	-
719.14	-	-	-	-	-	-	-	-
719.15	-	-	-	-	-	-	-	-
719.16	-	-	-	-	-	-	-	-
719.20	-	-	-	-	-	-	-	-
719.21	-	-	-	-	-	-	-	-
719.22	-	-	-	-	-	-	-	-
719.23	-	-	-	-	-	-	-	-
719.24	-	-	-	-	-	-	-	-
719.25	-	-	-	-	-	-	-	-
719.26	-	-	-	-	-	-	-	-
719.30	-	-	-	-	-	-	-	-
719.31	-	-	-	-	-	-	-	-
719.32	-	-	-	-	-	-	-	-
719.33	-	-	-	-	-	-	-	-
719.34	1,126	284	Switzerland	1,126	-	-	-	-
719.35	10	3,419	Switzerland	10	-	-	-	-
719.36	-	-	-	-	-	-	-	-
720.20	185	28	Italy	67	Switzerland	66	France	39
720.21	7	46	Switzerland	6	Canada	1	W. Germany	4/
720.22	6	60	Japan	3	Switzerland	3	W. Germany	4/
720.24	154	26	Switzerland	112	W. Germany	30	France	7
720.25	16	44	Switzerland	11	W. Germany	4	France	4/
720.26	21	-10	U.K.	8	Switzerland	7	Japan	4/
720.28	4,444	-4	U.K.	1,579	France	1,222	Hong Kong	791
720.29	607	-24	W. Germany	494	Hong Kong	46	Switzerland	37
720.30	297	-3	Japan	135	Hong Kong	121	Switzerland	30
Clocks, clock movements, clock cases and parts of clock cases (p. 273)								
715.15	6,160	10	W. Germany	3,110	Japan	1,607	Switzerland	1,125
715.25	2,911	49	W. Germany	1,680	Japan	895	Hong Kong	284
715.27	404	91	W. Germany	275	Japan	62	Hong Kong	31
715.29	864	77	W. Germany	557	Japan	239	France	28
715.31	678	13	W. Germany	511	Italy	40	Netherlands	40
715.33	2,142	52	W. Germany	1,372	U.K.	184	Netherlands	130
720.02	1,868	-6	Japan	1,118	W. Germany	553	Hong Kong	54
720.04	294	97	W. Germany	124	Japan	89	Switzerland	67
720.06	65	66	W. Germany	63	Japan	2	-	-
720.08	301	-11	Switzerland	278	W. Germany	16	U.K.	4

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries
of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in
the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page; TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per- cent change from 1967	Country	Value	Country	Value	Country	Value
Clocks, clock movements, clock cases and parts of clock cases--Con. (p. 273)								
720.10	639	106	W. Germany	269	Hong Kong	223	Japan	139
720.12	170	66	Japan	72	W. Germany	47	Nan. Is.	36
720.14	557	300	W. Germany	202	Japan	279	Taiwan	31
720.16	307	60	W. Germany	209	Japan	79	Switzerland	5
720.18	823	28	W. Germany	744	Switzerland	43	Netherlands	8
720.32	14	-28	Switzerland	11	Japan	1	France	1
720.33	832	35	W. Germany	497	Japan	321	Hong Kong	8
720.34	419	25	W. Germany	227	Switzerland	59	Japan	60
721.20	8	-96	Canada	8	-	-	-	-
(pt.) 9/								
Standard marine chronometers and certain parts thereof (p. 291)								
715.20	6	-58	U.K.	5	Japan	1	-	-
720.80	2	-	Switzerland	2	-	-	-	-
720.84	-	-	-	-	-	-	-	-
720.92	4	-	Switzerland	4	-	-	-	-
721.10	2	60	Japan	2	-	-	-	-
Timing devices (except watches and clocks) and cases (p. 297)								
715.40	29	42	W. Germany	16	Switzerland	9	Norway	2
715.45	69	14	Switzerland	62	W. Germany	5	Japan	1
715.47	30	98	Switzerland	12	W. Germany	6	Japan	5
715.49	49	-45	W. Germany	40	Switzerland	4	U.K.	3
715.51	9	-40	U.K.	4	Japan	2	Canada	1
715.53	452	16	Japan	193	U.K.	97	Argentina	87
715.60	1	-	Japan	1	-	-	-	-
715.62	15	40	Japan	14	W. Germany	1	-	-
715.64	49	46	Japan	43	W. Germany	3	Italy	2
715.66	33	1,673	Japan	30	Italy	2	U.K.	1
715.68	71	231	Japan	55	W. Germany	6	U.K.	5
720.36	8	80	Spain	3	U.S.S.R.	2	Italy	1
Parts of watch movements (p. 311)								
720.40								
(pt.) 10/	644	-4	Switzerland	400	U.K.	203	W. Germany	28
720.44	-	-	-	-	-	-	-	-
(pt.) 11/								
720.65	2	-	Japan	2	-	-	-	-
720.70	92	22	France	38	W. Germany	26	Switzerland	19
720.75	175	-29	Switzerland	142	W. Germany	17	Japan	8
720.90	2,934	5	France	1,604	U.K.	818	Switzerland	391
721.05	844	-6	Switzerland	763	France	34	W. Germany	22
Parts for timing devices other than watch movements (p. 323)								
720.40	-	-	-	-	-	-	-	-
(pt.) 12/								
720.42	481	52	W. Germany	443	Japan	27	Italy	3
720.44	69	54	U.K.	49	W. Germany	9	Japan	5
(pt.) 13/								
720.67	5	-	Japan	4	France	1	-	-
720.82	11	6	Japan	10	W. Germany	1	-	-
720.86	121	6	Switzerland	70	W. Germany	30	France	12
720.94	913	-25	Switzerland	626	W. Germany	133	Japan	71
721.12	9	29	Japan	5	W. Germany	2	Switzerland	1
721.20	76	55	Canada	76	-	-	-	-
(pt.) 9/								

See footnotes at end of table.

Value of U.S. imports for consumption, by TSUS items included in the individual summaries of this volume, total and from the 3 principal suppliers, 1968--Continued

(In thousands of dollars. The dollar value of imports shown is defined generally as the market value in the foreign country and therefore excludes U.S. import duties, freight, and transportation insurance)

Summary title and page: TSUS item	All countries		First supplier		Second supplier		Third supplier	
	Amount in 1968	Per-cent change from 1967	Country	Value	Country	Value	Country	Value
Jewel bearings (p. 333)								
720.60	1,356	-3	Switzerland	917	Italy	288	Canada	112

1/ Only a part of the imports entered in item 710.08 falls within the scope of this summary. See summary on "Rangefinders, rules, balancing machines, non-optical measuring or checking instruments", summary on "Navigational instruments and parts" and summary on "Meteorological, hydrological, and geophysical instruments."

2/ The imports entered under item number 710.80 are reported in appendix B under three different summaries: (1) imports reported under 710.8020 are shown under the summary on "Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments"; (2) imports reported under 710.8040 are shown under the summary on "Calipers, gauges, and micrometers"; and (3) imports reported under 710.8060 are shown under the summary on "Rangefinders, rules, balancing machines, and non-optical measuring or checking instruments."

3/ Only a part of the imports entered in this item falls within the scope of this summary. Statistics on imports in item under 710.08 are reported in appendix B under the summary on "Surveying, hydrographic, drawing, marking-out, and mathematical calculating instruments."

4/ Less than \$500.

5/ This item number was established effective January 1, 1968; prior to that date imports entered under item 711.3540.

6/ This item number was established effective January 1, 1968; prior to that date imports entered under item 711.3520.

7/ These item numbers were established effective January 1, 1958; prior to that date imports entered under item 712.5000.

8/ Less than 1%.

9/ Imports entered under item 721.20 are reported in appendix B under two different summaries: "Clocks, clock movements, clock cases and parts of clock cases"; and "Parts for timing devices other than watch movements."

10/ Only a part of the imports entered in this item number falls within the scope of this summary. See the summary on "Parts for timing devices other than watch movements."

11/ Only a part of the imports entered in this item number falls within the scope of this summary. Statistics on imports in item 720.44 are reported in appendix B under the summary on "Parts for timing devices other than watch movements."

12/ Only a part of the imports entered in this item number falls within the scope of this summary. Statistics on imports in item number 720.40 are reported in appendix B under the summary on "Parts of watch movements."

13/ Only a part of the imports entered in this item number falls within the scope of this summary. See the summary on "Parts of watch movements."

Source: Compiled from official statistics of the U.S. Department of Commerce.

A P P E N D I X C

Watches and watch movements: TSUS items affected by the escape clause action, and the rates of duty in effect from July 28, 1954 to January 10, 1967, pursuant to such action.

APPENDIX C

Watches and watch movements: TSUS items affected by the escape clause action, and the rates of duty in effect from July 28, 1954 to January 10, 1967, pursuant to such action 1/

TSUS item	TSUS appendix item	Article	Rate of duty
		Watch movements, assembled, without dials or hands, or with dials or hands whether or not assembled thereon:	
716.08	<u>2/</u>	Having over 17 jewels-----	<u>2/</u>
		Having no jewels or not over 17 jewels:	
		Not adjusted, not self-winding (or if a self-winding device cannot be incorporated therein), and not constructed or designed to operate for a period in excess of 47 hours without rewinding:	
		Having no jewels or only 1 jewel:	
716.10	932.10	Not over 0.6 inch in width-----	\$1.35
716.11	932.11	Over 0.6 but not over 0.8 inch in width-----	\$1.125
716.12	932.12	Over 0.8 but not over 0.9 inch in width-----	\$1.125
716.13	932.13	Over 0.9 but not over 1 inch in width-----	\$1.05
716.14	932.14	Over 1 but not over 1.2 inches in width-----	93¢
716.15	932.15	Over 1.2 but not over 1.5 inches in width-----	84¢
716.16	932.16	Over 1.5 but less than 1.77 inches in width-----	<u>2/</u>
		Having over 1 jewel but not over 7 jewels:	
716.20	932.20	Not over 0.6 inch in width-----	\$2.50
716.21	932.21	Over 0.6 but not over 0.8 inch in width-----	\$2.025
716.22	932.22	Over 0.8 but not over 0.9 inch in width-----	\$2.00
716.23	932.23	Over 0.9 but not over 1 inch in width-----	\$1.75
716.24	932.24	Over 1 but not over 1.2 inches in width-----	\$1.35
716.25	932.25	Over 1.2 but not over 1.5 inches in width-----	\$1.35
716.26	932.26	Over 1.5 but less than 1.77 inches in width-----	\$1.25
		Having over 7 but not over 17 jewels:	
716.30	932.30	Not over 0.6 inch in width-----	\$2.50)
716.31	932.31	Over 0.6 but not over 0.8 inch in width-----	\$2.025) plus
716.32	932.32	Over 0.8 but not over 0.9 inch in width-----	\$2.00) 13.5¢
716.33	932.33	Over 0.9 but not over 1 inch in width-----	\$1.75) for each
716.34	932.34	Over 1 but not over 1.2 inches in width-----	\$1.35) jewel
716.35	932.35	Over 1.2 but not over 1.5 inches in width-----	\$1.35) over 7
716.36	932.36	Over 1.5 but less than 1.77 inches in width-----	\$1.25)
717.--3/	933.--3/	Adjusted, but not self-winding (and if a self-winding device cannot be incorporated therein), and not constructed or designed to operate for a period in excess of 47 hours without rewinding.	<u>2/</u>
718.--3/	934.--3/	Self-winding (or if a self-winding device can be incorporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewinding, but not adjusted.	Base rate + 75¢
719.--3/	935.--3/	Adjusted and self-winding (or if a self-winding device can be incorporated therein), or constructed or designed to operate for a period in excess of 47 hours without rewinding.	Base rate + 75¢ + 50¢ for each adjustment <u>4/</u>

1/ The temporary rates of duty became effective on July 28, 1954, by Presidential Proclamation No. 3062 and terminated January 11, 1967 by Presidential Proclamation No. 3761.

2/ No change in the rate of duty was made by the escape action.

3/ The full item citation for the movement is the 3 digits shown plus the last 2 digits of the appropriate base rate shown.

4/ Adjustment to temperature is treated as 2 adjustments, as provided in TSUS headnote 3(e), pt. 2, schedule 7.

Source: Compiled by U.S. Tariff Commission staff.

OTHER AVAILABLE VOLUMES OF THE SUMMARIES SERIES

<i>Schedule</i>	<i>Volume</i>	<i>Title</i>
1	1	Animals and Meats
1	2	Fish: Fresh, Chilled, Frozen, or Cured
1	3	Fish Products, Shellfish, and Shellfish Products
1	4	Dairy Products and Birds' Eggs
1	5	Live Plants and Seeds
1	6	Cereal Grains, Malts, Starches, and Animal Feeds
1	7	Vegetables and Edible Nuts
1	8	Edible Fruit
1	9	Sugar, Cocoa, Confectionery, Coffee, Tea and Spices
1	10	Beverages
1	11	Tobacco and Tobacco Products
1	12	Animal and Vegetable Fats and Oils
1	13	Hides, Skins, Leather, Feathers, and Miscellaneous Articles of Animal Origin
1	14	Edible Preparations, Natural Resins, and Miscellaneous Articles of Vegetable Origin
2	1	Wood and Related Products I
2	2	Wood and Related Products II
2	3	Paper and Related Products I
2	4	Paper and Related Products II
2	5	Books and Other Printed Matter
3	2	Fibers, Yarns, Waste, and Intermediate Products of Silk, Manmade Fiber, Metalized, Paper, Certain Hair, and Yarns, N. S. P. F.
3	4	Felts, Batting, Nonwoven Fabrics, Fish Nets, Machinery Belts and Clothing, Hose, Coated Fabrics, and Other Fabrics for Special Purposes
3	5	Textile Furnishings and Apparel
3	6	Cordage, Braids, Elastic Yarns and Fabrics, Trimmings, Packing, Polishing Cloths, Sacks, Labels, Lacings, Rags, and Other Miscellaneous Textile Products
4	2	Inorganic Chemicals I
4	3	Inorganic Chemicals II
4	4	Inorganic Chemicals III
4	6	Organic Chemicals II
4	9	Glue, Gelatin, Aromatic Substances, Toilet Preparations, Surface-Active Agents, Soaps, Dyes, and Tannins
4	10	Pigments, Inks, Paints, and Related Products
4	12	Fatty Substances, Waxes, and Miscellaneous Chemical Products

OTHER AVAILABLE VOLUMES OF THE SUMMARIES SERIES

<i>Schedule</i>	<i>Volume</i>	<i>Title</i>
5	1	Cement, Concrete, Lime, Gypsum, Stone, Mica, Graphite, Asbestos, Abrasives, and Products Thereof
5	2	Gems, Gemstones, Industrial Diamonds, Clays, Fluorspar, Talc, and Miscellaneous Nonmetallic Minerals and Products Thereof
5	4	Pressed and Blown Glassware
6	1	Nonferrous Metals I
6	4	Iron and Steel
6	5	Containers, Wire Products, Foil, Fasteners, and Specified Hardware
6	6	Hand Tools, Cutlery, Forks, and Spoons
6	8	Machinery: General-Purpose, Construction, Mining, Agricultural, Food Industries, Paper Industries, and Printing
6	10	Certain Electrical Appliances, Special-Industry Machinery, Machinery Parts and Electrical Apparatus
7	3	Photographic Equipment and Supplies, Recordings, and Musical Instruments
7	4	Arms and Ammunition; Fishing Tackle; Wheel Goods; Sporting Goods; Toys and Games
7	5	Furniture, Buttons, and Other Fastening Devices, Brooms, Brushes, Umbrellas, Canes, and Clothespins
7	6	Jewelry and Related Articles, Decorative Materials, Combs, Smokers's Articles, Pens, Pencils, Works of Art, and Antiques
7	7	Rubber and Plastic Products
7	8	Pyrotechnics and Products Not Elsewhere Enumerated

