

In the Matter of

**CERTAIN METHODS OF
MAKING CARBONATED
CANDY PRODUCTS**

Investigation No. 337-TA-292
(Commission Decision of
March 8, 1990)

USITC PUBLICATION 2390

JUNE 1991

**United States International Trade Commission
Washington, DC 20436**



UNITED STATES INTERNATIONAL TRADE COMMISSION

COMMISSIONERS

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Seeley G. Lodwick

David B. Rohr

Don E. Newquist

**Address all communications to
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United States International Trade Commission
Washington, DC 20436**

UNITED STATES INTERNATIONAL TRADE COMMISSION
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CERTAIN METHODS OF)
MAKING CARBONATED)
CANDY PRODUCTS)

Investigation No. 337-TA-292

**NOTICE OF TERMINATION OF INVESTIGATION ON THE BASIS OF A DETERMINATION OF
NO VIOLATION OF SECTION 337 OF THE TARIFF ACT OF 1930**

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: The Commission has determined to affirm, with modifications, the initial determination (ID) of the presiding administrative law judge (ALJ) in the above-captioned investigation. The investigation is therefore terminated on the basis that there is no violation of section 337.

FOR FURTHER INFORMATION CONTACT: Frances Marshall, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, DC 20436; telephone 202-252-1089. Hearing-impaired individuals are advised that information about this matter can be obtained by contacting the Commission's TDD terminal, 202-252-1810.

SUPPLEMENTARY INFORMATION: On January 31, 1989, General Foods Corporation, Carbonated Candy Ventures, and Pop Rocks, Inc., filed a complaint under section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) alleging infringement of two U.S. process patents for making carbonated candy by two proposed respondents, Zeta Espacial, S.A. of Barcelona, Spain and Confex, Inc. of Shrewsbury, New Jersey. The Commission instituted an investigation of the complaint and issued a notice of investigation which was published in the Federal Register on March 8, 1989 (54 Fed. Reg. 9903).

On December 8, 1989, the ALJ issued an ID finding no violation of section 337 in this investigation with regards to the importation and sale of carbonated candy products alleged to have been manufactured abroad by processes covered by the claims of U.S. Letters Patent 3,985,910 (the '910 patent) and U.S. Letters Patent 4,001,457 (the '457 patent).

On January 24, 1990, the Commission determined to review the issues of claim construction, infringement under the doctrine of equivalents, validity of the '910 patent (inventorship, indefiniteness, and best mode), and the existence of a domestic industry practicing the '910 patent. 55 Fed. Reg. 3281 (Jan. 31, 1990). The ALJ's findings on those issues addressed in the ID that the Commission determined not to review became the determinations of the Commission. All the parties submitted briefs, and later reply briefs,

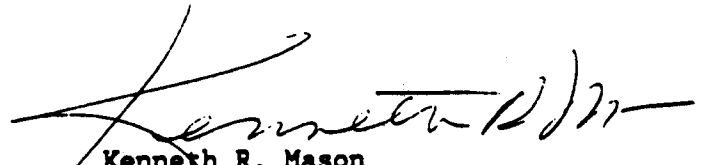
on the issues under review as well as on the issues of remedy, the public interest, and bonding. The Commission did not receive any other submissions.

Having examined the record in this investigation, including the ID, the Commission has determined that no violation of section 337 has taken place.

The authority for the Commission's disposition of this matter is contained in section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) and in section 210.56 of the Commission's Interim Rules of Practice and Procedure (19 C.F.R. § 210.56).

Copies of the Commission's Order, the nonconfidential versions of the Commission's Opinion and the ID, and all other nonconfidential documents filed in connection with this investigation are, or will be, available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436; telephone: 202-252-1000.

By order of the Commission.



Kenneth R. Mason
Secretary

Issued: March 8, 1990

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC 20436

In the Matter of)
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CERTAIN METHODS OF)
MAKING CARBONATED)
CANDY PRODUCTS)
_____)

Investigation No. 337-TA-292

COMMISSION ORDER

On January 31, 1989, General Foods Corporation, Carbonated Candy Ventures, and Pop Rocks, Inc., filed a complaint under section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) alleging infringement of two U.S. process patents for making carbonated candy by two proposed respondents, Zeta Espacial, S.A. of Barcelona, Spain and Confex, Inc. of Shrewsbury, New Jersey. The Commission instituted an investigation of the complaint and issued a notice of investigation which was published in the Federal Register on March 8, 1989 (54 Fed. Reg. 9903).

On December 8, 1989, the presiding administrative law judge (ALJ) issued an initial determination (ID) finding no violation of section 337 in this investigation with regard to the importation and sale of carbonated candy products alleged to have been manufactured abroad by processes covered by certain claims of U.S. Letters Patent 3,985,910 (the '910 patent) and U.S. Letters Patent 4,001,457 (the '457 patent).

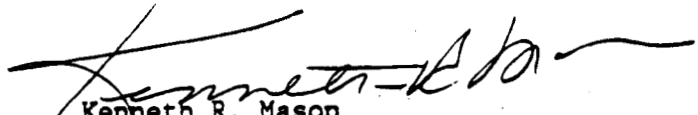
On January 24, 1990, the Commission determined to review the issues of claim construction, infringement under the doctrine of equivalents, validity of the '910 patent (inventorship, indefiniteness, and best mode), and the existence of a domestic industry practicing the '910 patent. 55 Fed. Reg. 3281 (Jan. 31, 1990). The ALJ's findings on those issues addressed in the

ID that the Commission determined not to review became the determinations of the Commission. All the parties submitted briefs, and later reply briefs, on the issues under review as well as on the issues of remedy, the public interest, and bonding. The Commission did not receive any other submissions.

Having examined the record in this investigation, it is hereby ORDERED:

1. The ID's conclusions concerning the issues of claim construction of the '910 and '457 patents, infringement of the '910 and '457 patents under the doctrine of equivalents, inventorship of the '910 patent, and the existence of a domestic industry practicing the '910 patent are affirmed with modifications;
2. The ID's conclusions concerning the issues of indefiniteness of the '910 patent and best mode of the '910 patent are reversed;
3. Investigation No. 337-TA-292 is terminated on the basis that there is no violation of section 337; and
4. The Secretary shall serve copies of this Order and the Opinion in support thereof upon each party of record in this investigation, and publish notice thereof in the Federal Register.

By order of the Commission.


Kenneth R. Mason
Secretary

Issued: March 8, 1990

PUBLIC INSPECTION

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC 20436

In the Matter of)

CERTAIN METHODS OF)
MAKING CARBONATED)
CANDY PRODUCTS)

Investigation No. 337-TA-292

COMMISSION OPINION 1/

Views of Chairman Brunsdale, Vice Chairman Cass,
Commissioner Lodwick, and Commissioner Newquist

I. INTRODUCTION

This investigation is based on a complaint alleging unfair acts in the importation and sale of certain carbonated candy products manufactured abroad. The complaint alleged direct infringement of a method for commercial production of carbonated candy covered by method claims 1-9 of U.S. Letters Patent 3,985,910 (the '910 patent) or by method claims 1-9 of U.S. Letters Patent 4,001,457 (the '457 patent). The complainants are General Foods Corporation, the owner of the patents, Pop Rocks, Inc., the exclusive licensee of the patents, and Carbonated Candy Ventures, a partnership established to manufacture, sell, and distribute carbonated candy in the United States under the Pop Rocks and Cosmic Candy trademarks. Respondents are Zeta Espacial, S.A., a Spanish manufacturer of carbonated candy products, and Confex, Inc., the importer and distributor of Zeta's carbonated candy sold in the United States under the names Fizz Whiz and Magic Gum.

1/ Commissioners Eckes and Rohr do not join in this opinion. They adopt the initial determination issued December 8, 1989, by the administrative law judge.

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On December 8, 1989, the presiding administrative law judge (ALJ) issued an initial determination (ID) finding no violation of section 337 of the Tariff Act of 1930. ^{2/} Complainants, respondents, and the Commission investigative attorney (IA) filed petitions for review. ^{3/} On January 24, 1990, the Commission determined to review the issues of claim construction, infringement under the doctrine of equivalents, validity of the '910 patent (inventorship, definiteness, and best mode), and domestic industry with respect to the '910 patent. ^{4/} The portions of the ID that were not reviewed became the Commission's determination pursuant to 19 C.F.R. § 210.53(h). For the reasons set out below we concur in the ALJ's conclusion that there has been no violation of section 337.

^{2/} 19 U.S.C. § 1337. For a discussion of the procedural background prior to the issuance of the initial determination (ID), see the ID at 1-4.

^{3/} Complainants petitioned for review of the ID on the issues of claim construction, infringement of the '910 and the '457 patents, validity of the '910 patent (definiteness and best mode), and domestic industry with respect to the '910 patent. Respondents petitioned for review of the ID on the issues of infringement, validity of the '910 patent (inventorship and enablement), laches, and estoppel. The IA petitioned for review of the ID on the issues of infringement of the '910 patent under the doctrine of equivalents by Zeta process B, validity of the '910 patent (definiteness and best mode), and domestic industry with respect to the '910 patent.

^{4/} 55 Fed. Reg. 3281 (Jan. 31, 1990).

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II. DISCUSSION

A. The patents and processes at issue 5/

The '910 patent is entitled "Method of Making a Gasified Confection." It was issued on October 12, 1976, to inventor Paul A. Kirkpatrick who assigned the patent to complainant General Foods. The patent will expire on October 12, 1993. The '910 patent claims a process or method for commercial production of carbonated candy, not the carbonated candy itself. The patented process allows for the production of commercial quantities of carbonated candy by transferring gasified molten candy to a second vessel where solidification occurs.

The '457 patent also is entitled "Method of Making A Gasified Confection." It was issued on January 4, 1977, to inventor Joseph A. Hegadorn who assigned the patent to General Foods. The patent will expire on January 4, 1994. The '457 patent claims an improvement on the process for producing carbonated candy on a commercial scale by employing a second vessel with a polished interior that aids in the complete discharge of the product.

Respondent Zeta uses two processes to produce carbonated candy, Zeta process A and Zeta process B. {

}. In Zeta process A {

5/ For a comprehensive description of the patented processes and Zeta's processes, see ID at 5-13.

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In Zeta process B {

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B. Summary of the ID

The ALJ determined that the '910 patent was not a pioneer patent. He then found that independent claim 1, and the following dependent claims, of the '910 patent were not infringed by either Zeta process A or Zeta process B because neither process contains a step that shock-treated the second pressure vessel so as to shatter the candy matrix into multiple fragments as claimed in step h of claim 1 of the '910 patent. The ALJ also determined that independent claim 1, and the following dependent claims, of the '457 patent were not infringed by either Zeta process A or Zeta process B because neither process uses a second pressure vessel with polished inner surfaces as claimed in step d of claim 1 of the '457 patent.

The ALJ found that the '910 patent is adequately enabled under 35 U.S.C. § 112 and that its inventor was correctly named. He found there was no prior use or on-sale bar to the validity of the '910 patent. However, he also found the '910 patent invalid for lack of definiteness and failure to reveal best mode under 35 U.S.C. § 112. The ALJ determined that the '457 patent is not invalid for failure to reveal best mode or for double patenting. The ALJ rejected respondents' laches defense and their

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equitable estoppel defense. He determined that complainants' carbonated candy product was not made in accordance with the '910 patent so he found that no domestic industry exists with respect to that patent. He determined that a domestic industry exists with respect to the '457 patent.

C. Claim construction

In determining whether a patent is infringed, if there is a dispute as to claim interpretation or construction, the Commission must first determine the scope of the claims as a matter of law. Then, the Commission must determine whether the properly construed claims encompass the accused structure or process. 6/ Claims are interpreted by analyzing the language of the claim, the patent documents, including the prosecution history ("the file wrapper") and expert testimony. 7/ Claims are construed as they would be by those of ordinary skill in the art. 8/

We agree with the ALJ that extensive analysis of the scope of the claims in both the '910 and the '457 patents is unnecessary because the claim language is clear for the most part. 9/ In the following subsections, we adopt the claim construction of the ID with some modification.

6/ Mannesmann Demag Corp. v. Engineered Metal Products Co., 793 F.2d 1279, 1282, 230 U.S.P.Q. 45, 46 (Fed. Cir. 1986); Caterpillar Tractor Co. v. Berco, S.P.A., 714 F.2d 1110, 1114, 219 U.S.P.Q. 185, 187 (Fed. Cir. 1983).

7/ Autogiro Company of America v. United States, 384 F.2d 391, 397-99, 155 U.S.P.Q. 697, 702-04 (Ct. Cl. 1967).

8/ Fromson v. Advance Offset Plate, Inc., 720 F.2d 1565, 1571, 219 U.S.P.Q. 1137, 1142 (Fed. Cir. 1983).

9/ ID at 38 n.10.

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1. The '910 patent: construction of the term "shock-treatment"

Independent claim 1 of the '910 patent contains ten distinctive steps, steps (a) through (j). These steps are prefaced by the term "comprising." There is no requirement in the claims that the ten steps follow any particular sequence. (FF 18). The meaning of one term in the '910 patent is at issue: "shock-treating." Complainants argued that shock-treating and venting are one and the same action. ^{10/} Respondents contend that shock-treating mandates hitting the second pressure vessel with a sledge hammer. ^{11/} We note that the prosecution history of the '910 patent does not contain a definition of the term "shock-treating." (FF 43 to 49).

Steps h and i of the '910 process found in claim 1 state:

h. shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments,

i. venting the second pressure vessel[.] (Emphasis added).

Dependent claims 2-6 and 8-9 of the '910 patent incorporate by reference step h of independent claim 1. Dependent claim 7 expands step h as follows:

the shock treatment of the second pressure vessel is effective to shatter the gas-containing solid matrix into granular particles which are relatively uniform in size. (Emphasis added).

Thus, all of the claims of the '910 patent explicitly call for shock treating the second pressure vessel in order to shatter the solid matrix of carbonated candy.

^{10/} Complainants' post-hearing brief at 27.

^{11/} Zeta's post-hearing brief at 17-18.

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We determine that "shock-treating" is not "venting." In support of this conclusion we note that within the '910 patent shock-treating and venting are two separate steps. The "Summary of the Invention" in the '910 patent states:

[w]hen the transfer is complete, the vent is closed and the second pressure vessel is isolated. Next, the second pressure vessel is cooled to a temperature below 70 degrees F. while maintaining superatmospheric pressure within the vessel so that the gasified hot melt becomes a gas-containing solid matrix. Next, the second pressure vessel is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments. The pressure in the second pressure vessel is released and the product is allowed to fall out. (Emphasis added) (FF 22).

The "Detailed Description of the Invention" in the '910 patent states:

[w]hen the cooling cycle is complete, the vent is again opened to allow any free gas to escape. Now the product exists in the cooling tube as a solid gas-containing matrix. Next, the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments. (Emphasis added) (FF 24).

In both the "Summary of the Invention" and the "Detailed Description of the Invention," the '910 patent teaches that shock-treating the second pressure vessel shatters the solid matrix of carbonated candy, an action distinct from venting the second pressure vessel.

Moreover, in the only example of the '910 patent, venting of the second pressure vessel, i.e., releasing any free gas in the vessel, is done before the sidewall of the second pressure vessel is struck with a sledgehammer:

The transfer, water and gas lines are disconnected from the cooling tube and any free gas in the tube is released by opening the vent valve. Next, the sidewall of the tube is struck with a 3-pound sledgehammer. the bottom flange of the cooling tube is removed and the product is allowed to fall out. (Emphasis added) (FF 25).

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Thus, we determine that the specification of the '910 patent teaches that shock-treating and venting are distinct physical actions. According to the "Summary of the Invention," the second pressure vessel is shock-treated so that the gas-containing solid matrix is shattered and then the pressure in the second pressure vessel is released through venting. According to the "Detailed Description," the second pressure vessel is vented by allowing any free gas to escape and next the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments. According to the only example, the second pressure vessel is vented by releasing any free gas and next the sidewall of the tube is struck with a sledgehammer. We find that the '910 patent specification, consistent with all of the claims of the '910 patent, teaches that venting the second pressure vessel and shock-treating the second pressure vessel are distinct steps.

Kirkpatrick, the inventor of the '910 patent testified at the evidentiary hearing that the claim "shock-treating the second pressure vessel" can be expanded to read on anything that caused the gas-containing solid matrix of carbonated candy to be shattered into multiple fragments. (FF 121). Of course, a patentee may be his own lexicographer. However, there is nothing in the '910 patent to suggest that the meaning of "shock-treating" is so broad as to include venting. Indeed, there is nothing in the '910 specification to suggest that venting the second pressure vessel, recited in step i of claim 1 of the '910 patent, and in each of the following claims in issue, would cause the gas-containing solid matrix of carbonated candy to shatter into multiple fragments. To the contrary, the

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'910 patent teaches that impacting the second pressure vessel results in the shattering of the candy matrix:

When the sidewalls of the cooling tube are impacted, lines of fracture are enveloped within the crystal structure of the candy. Thus, the walls of the cells containing many bubbles of pressurized carbon dioxide break completely and the gas within is exploded. The combination of impact and exploding bubbles of carbon dioxide reduce the solid mass within the tube into many fine particles. The bottom of the cooling tube can now be opened and the product removed. (Emphasis added) (FF 24).

This teaching is consistent with the claimed functional recitation "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments" found in step h of claim 1. To accept complainants' argument that venting fragments the candy in the '910 patent claims, one has to eliminate the functional recitation, viz. "so that the gas-containing solid matrix is shattered into multiple fragments", in step h of claim 1 and transpose that functional limitation to step i of claim 1. Moreover, as discussed above, one must ignore specific language in the '910 patent specification describing the "Summary of the Invention," the "Detailed Description of the Invention," and the only example.

The only support offered by complainants for their construction of claim 1 is the testimony of Mr. Kirkpatrick, the named '910 patent inventor, more than thirteen years after the '910 patent issued. Kirkpatrick testified repeatedly that venting and shock-treating are one and the same. 12/ We agree with the ALJ that crediting Kirkpatrick's 1989

12/ At the evidentiary hearing, the named inventor Kirkpatrick departed from the teaching of the '910 patent and took the position that venting the second pressure vessel and shock treating said vessel "are really all a combination together" (FF 120) and that the 'venting and shock treatment are very, very closely tied to being one and the same." (FF 121). However, (continued...)

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testimony would result in an expansion of claim 1 of the '910 patent, contrary to Perkin-Elmer Corp. v. Westinghouse Elec. Corp. 13/ and Texas Instruments, Inc. v. Int'l Trade Comm'n. 14/ While we are aware that the reduction in pressure caused by venting may actually shatter the candy, the process claimed in the '910 patent is to the contrary. Therefore, we determine that it is the shock-treating of the second pressure vessel claimed in step h of claim 1 that causes the gas containing solid matrix of carbonated candy to shatter into multiple fragments.

Having determined that "shock-treating" is not "venting," we turn to the question of what "shock-treating" is. We determine that the use of the term "shock-treated" in the '910 patent specification is consistent with the ordinary dictionary meaning of "shock." The Random House Dictionary of the English Language defines the noun "shock" as "a sudden and violent blow or impact; collision." 15/ Webster's Third New International Dictionary defines "shock" as "a violent shake or jar: blow, collision, concussion, or an oscillation, loss of equilibrium, or other effect of such violence." 16/ In relying on these definitions of "shock," it is evident that "shock-treating" requires a forceful impact or collision of the vessel. We noted above that the "Detailed Description of the Invention" found in the patent

12/ (...continued)

he also made it clear, in responding to a query from the bench, that "just the venting" of the second pressure vessel causes the solid matrix of carbonated candy to shatter. (FF 122, 123).

13/ 822 F.2d 1528, 3 U.S.P.Q.2d 1321 (Fed. Cir. 1987).

14/ 805 F.2d 1558, 231 U.S.P.Q. 833 (Fed. Cir. 1986).

15/ Random House Dictionary of the English Language 1767 (2d Ed. 1987).

16/ Webster's Third New International Dictionary 2099 (1976).

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specification uses the term "impact." Webster's Third New International Dictionary defines "impact" as:

the act of impinging or striking [...;] a forceful contact, collision or onset [...;] the force of impression of one thing on another.... 17/

Thus, we find that "shock-treating" requires that a fairly substantial shock must be transmitted to the portion of the vessel containing the cooled candy melt in order for the cooled solid carbonated candy matrix to shatter as a result of the shock imparted to the vessel.

Our construction of shock-treating finds support in the specification of the '457 patent as well. We note that both the '910 and the '457 patents are owned by General Foods and that the applications for the '910 and '457 patent overlapped in time at the U.S. Patent and Trademark Office. We find it significant that, in the specification of the '457 patent, inventor Hegadorn, a man having some skill in the carbonated candy art, stated:

U.S. Ser. No. 618,603 [the application that matured into the '910 patent] discloses a method of cooling the hot melt in a separate pressure vessel. The removal of the solidified candy is still a difficult task. The cooling vessel must be impacted to break the solidified mass. Such impact usually causes a major portion of the solid matrix to be reduced to granular form. However, much material remains adhering to the walls of the pressure vessel. Occasionally large amounts of product remain segmented or isolated within the tube. It is then necessary to manually remove the solidified product from the tube. Often the product is so tightly packed in the tube that the only viable method of removal is to wash down the entire cooling tube. (Emphasis added) (FF 32).

In another portion of the '457 patent specification, inventor Hegadorn stated:

17/ Id. at 1131 (1976).

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The candy melt in the second pressure vessel is allowed to cool to a temperature below 100 degrees F. and preferably below 70 degrees F., all the while maintaining the pressure at the original gasifying pressure, i.e., 600 p.s.i. At this point in the process, prior art workers would vent the cooling tube and next attempt to remove the product of the interior of the tube and reduce the matrix to multiple fragments by impacting the sidewalls of the tube typically with a sledge hammer. The product tenaciously adheres to the inner surfaces of the cooling tube. Removal of all product is difficult and often incomplete. The excessive shock treatment necessary to remove the candy has a detrimental effect on product quality. Typically, 50-60% of the product when shock treatment is employed is fines (particle sizes which are too small to be included with the final product). (Emphasis added) (FF 36).

Thus, in 1976, the inventor of the '457 patent (Hegadorn) recognized that the method of the '910 patent includes two distinct steps, viz. (1) venting the second pressure vessel, and (2) shock-treating the second pressure vessel. Shock-treating involved impacting the walls of the second pressure vessel. In addition, it was the shock-treating step that shattered the solid matrix of carbonated candy. Hegadorn's recognition is consistent with the teaching of the '910 patent.

Moreover, the '457 patent explicitly relies on venting to shatter the candy matrix, not shock-treating. Under the subheading "Summary of the Invention," the '457 patent teaches that:

the second pressure vessel is vented to atmosphere so that the sudden change in pressure causes the gas-containing solid matrix to shatter into multiple fragments and release from the inner polished surfaces of the cooling vessel. (FF 33).

Consistent with the above-quoted summary of the invention, the sole independent claim 1 of the '457 reads in pertinent part:

h. venting the second pressure vessel which causes the matrix to shatter into multiple fragments, and [...] (FF 27).

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There is no suggestion in the '457 patent that the claimed method of making carbonated candy in the '457 patent includes step h of the '910 patent, viz., "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments." To the contrary, the '457 patent teaches that such a step "has a detrimental effect on product quality." (FF 36). In the '457 patent, it is the venting of the second pressure vessel that causes the solid matrix of carbonated candy to shatter.

The testimony of complainants' expert Kleiner at the evidentiary hearing also supports our construction of the term "shock-treating." Kleiner testified that the '910 patent specification indicates that the shock-treating limitation of the '910 patent is distinct from venting:

[Counsel for respondent Zeta]: Then it [the '910 patent specification] says "next, the cooling tube is shock treated so that the gas containing solid matrix is shattered into multiple fragments." Does that indicate to you that that's another step other than venting?

* * *

[Kleiner]: What was that again? Yes, I remember. Yes. My answer would be yes. It implies that another step was taken. (FF 145)

Thus far, we have determined that "shock-treating," as claimed in step h of claim 1 of the '910 patent, must occur to the second pressure vessel, that "shock-treatment" is a distinct step from "venting" and, therefore, shock-treating is not venting, and that any "shock" must be transmitted to the portion of the vessel containing the cooled candy melt in order for the cooled solid carbonated candy matrix to shatter as a result of the shock imparted to the vessel. We further determine that "shock-treating" as taught in the '910 patent does not encompass manual removal of carbonated candy from the second pressure vessel.

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In discussing the prior art, specifically U.S. Letters Patent No. 3,012,893, the '910 specification states:

[T]he removal [of the candy from the prior art Parr reactor] is not an easy task. The product exists as a solid mass and within this mass is encased the agitator used to mix the product when it was in a liquid state. The product is manually removed by breaking it into small sections with means such as an ice pick. The pieces of carbonated candy thus removed vary greatly in size. Not only does the basic method of manually removing create size variations, but by the nature of the carbonated candy itself the gas within it tends to explode on impact and creates particle sizes which are quite random. (Emphasis added) (FF 21).

Thereafter, the specification states that one of the "highly desirable" objectives of the '910 patent was to remove the carbonated candy from the second pressure vessel, and that it would also be highly desirable to have a minimum of carbonated candy remain adhering to the interior walls of the second pressure vessel. (FF 21). According to the '910 patent, removal is accomplished when the second pressure vessel is shock-treated "so that the gas-containing solid [carbonated candy] matrix is shattered into multiple fragments." (FF 22, 24, 25). 18/ We find nothing in the '910 patent to suggest that inventor Kirkpatrick intended that any portion of the carbonated candy be manually removed from the second pressure vessel.

Hegadorn, the inventor of the '457 patent (FF 26), agreed with the characterization of the prior technology disclosed in the '910 patent to the effect that the carbonated candy had to be removed from the Parr

18/ Step h of claim 1 of the '910 patent refers to shattering "the gas-containing solid matrix." The antecedent of "the gas-containing solid matrix" in step h is "the gasified hot melt" in step g of claim 1 which upon cooling becomes a solid matrix. The gasified hot melt is transferred from the first pressure vessel to the second pressure vessel in step c of claim 1. (FF 18). Therefore, step h of claim 1 calls for shattering the entire solidified carbonated matrix.

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reactor "manually by breaking it into small sections with means such as an ice pick." (FF 31). The portion of the '457 patent specification entitled "Background of the Invention" also agreed with the statement in the '910 patent specification that the second pressure vessel "must be impacted to break the solidified [carbonated candy] mass," although the '457 patent specification states that after such impact:

much material remains adhering to the walls of the pressure vessel. Occasionally large amounts of product remain segmented or isolated within the tube. It is then necessary to manually remove the solidified product from the tube. Often the product is so tightly packed in the tube that the only viable method of removal is to wash down the entire cooling tube. (Emphasis added) (FF 32)

Thus, in 1976 Hegadorn considered manual removal of the carbonated candy from the second pressure vessel to be a step distinct from the step h of claim 1 of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments."

For these reasons, "shock-treating" does not include manual removal of the solid candy matrix from the second pressure vessel. As we have already found, "shock-treating" does not include venting the second pressure vessel. We construe "shock-treating" the second pressure vessel to require transmitting a "shock" to the portion of the second pressure vessel containing the cooled candy melt sufficient to shatter the hard candy matrix into multiple fragments.

2. The '457 patent: construction of the terms "polished inner surfaces"

The language of the '457 patent that is in dispute is found in step d of claim 1, which reads:

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d. introducing a gas at superatmospheric pressure into a second pressure vessel which has polished inner surfaces at a value equivalent to the pressure within the first pressure vessel, the first and second pressure vessels having a connecting line with valve means between the first vessel and the bottom of the second vessel[.]

The '457 patent contains no drawings and there is nothing relevant to the construction of the term "polished inner surfaces" in the patent's prosecution history. The '457 patent specification is nearly silent as to the meaning of polished. In fact, the only relevant language is found in the "Summary of Invention," which states:

[the] polished inner surfaces of the cooling tube permit the product to immediately be released from the sidewalls and break into multiple fragments simply by venting the tube to atmosphere. . . . The interior surfaces of the tube are plated and polished so that they are free from any irregularities. (FF 36).

Having examined all the relevant patent documents, 19/ we determine that we must give the terms "polished inner surfaces" their ordinary meaning. There is no evidence that the '457 patent employs the word "polished" in a manner different from the ordinary meaning associated with the word. 20/ According to the American Heritage Dictionary, the term "polish," as a verb, refers to an act of making smooth and shiny by rubbing or chemical action. The term "polished" refers to the condition subsequent to the act of polishing. 21/ Thus, we determine that "polished inner surfaces" as

19/ Autogiro Co. of America, 384 F.2d at 397-399.

20/ Pacific Technica Corp. v. United States, 3 U.S.P.Q.2d 1168, 1188 (Ct. 1986) ("A court should . . . [give] words their ordinary and accustomed meaning unless it appears the inventor used the words differently.")

21/ American Heritage Dictionary 960 (1982).

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used in the '457 patent denotes the inner surfaces of second pressure vessels that have been made smooth and shiny by rubbing or chemical action.

D. Infringement under the doctrine of equivalents

We adopt the conclusions and much of the reasoning of the ALJ on infringement, without relying on those portions of his construction of the '910 and '457 patents claims at issue that we have modified. 22/

1. Infringement of the '910 patent by Zeta process A

We agree with the ALJ that Zeta process A does not infringe the '910 patent under the doctrine of equivalents. The ALJ found, and we agree, that:

the position of { }
in Zeta Process A is equivalent to the position of transfer
as claimed in the '910 patent under the doctrine of
equivalents[.]

and:

Zeta Process A does not contain step h of independent claim
1 of the '910 patent under the doctrine of equivalents. 23/

We have construed the term "shock-treating" of the second pressure vessel found in step h to require transmission of a fairly substantial "shock" to the portion of the second pressure vessel containing the cooled candy melt sufficient to shatter the hard candy matrix into multiple

22/ Thus, we adopt the ALJ's conclusions and reasoning on the issue of infringement under the doctrine of equivalents in toto on the following pages: infringement of the '910 patent by Zeta process A (ID at 49, paragraph beginning "The ALJ agrees," 71-73 beginning "While complainants argued"); infringement of the '910 patent by Zeta process B (ID at 79, paragraph beginning "The administrative law judge", 81-83 beginning "The staff has argued"); infringement of the '457 patent by Zeta process A (ID at 75-76, beginning "The administrative law judge finds"); and infringement of the '457 patent by Zeta process B (ID at 83-84).

23/ ID at 49.

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fragments. Shock-treating does not include venting of the second pressure vessel or manual removal of the solid candy matrix from the second pressure vessel. We agree with the ALJ that the record does not show that Zeta's use of { } in Zeta process A shock-treats the second pressure vessel:

Complainants argued that an { } is commonly known to cause mechanical vibration to a workpiece due to its inherent manner of operation . . . [which] is equivalent to "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments." . . . [The record] does not support a finding that the use of { } by Zeta is the equivalents [sic, equivalent] of "shock-treating the second pressure vessel". There is no evidence which establishes that the use of { } transmits sufficient vibration to { } to constitute a shock to the vessel or even to the carbonated candy. 24/

Similarly, we agree with the ALJ that Zeta's use of { } in process A does not shock-treat the second pressure vessel:

Relying on a portion of a video tape, complainants argued that the use of { } in Zeta Process A creates a vibrational impact to { } [Complainants' proposed finding of fact 37]. The use of { } in Zeta Process A {

}). The administrative law judge finds that the evidence of record does not establish that { } shatters a gas-containing solid matrix of carbonated candy in { } into multiple fragments. 25/

Simply put, we agree with the ALJ that complainants did not carry their burden of establishing that Zeta process A operates in substantially the same way as the '910 patent invention and, thus, that they have not shown

24/ Id. at 71-72.

25/ Id. at 72-73.

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that Zeta process A infringes any claim at issue of the '910 patent under the doctrine of equivalents.

2. Infringement of the '457 patent by Zeta process A

We previously construed the meaning of the terms "polished inner surfaces" found in step d of claim 1 of the '457 patent to mean that the inner surfaces of a second pressure vessel that have been made smooth and shiny by rubbing or chemical action.

We agree with the ALJ's determination that Zeta process A does not contain a step equivalent to step d of claim 1 of the '457 patent:

While the candy in the second pressure vessel of the claimed process comes in direct contact with the cooled polished inner surfaces of the walls of the second pressure vessel to "permit the product to immediately be released from the sidewalls" (FF 36), {

} (FF

67, 95). Therefore {

}. In the Zeta Process A, {

} (FF 68). {

} (FF 70). {

} (FF 72, 73),

{
} (FF 95). Also uncontradicted is testimony
that {

} [to how the candy is released] (FF
72). What is required is a polished surface. 26/

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Complainants failed to show that Zeta process A infringes the '457 patent under the doctrine of equivalents because they failed to establish that an equivalent to step d of claim 1 of the '457 patent is present in Zeta process A. Thus, complainants did not prove that Zeta process A operates in substantially the same way as the claims at issue of the '457 invention. 27/

3. Infringement of the '910 patent by Zeta process B

We agree with the ALJ that Zeta process B does not infringe the '910 patent under the doctrine of equivalents. The ALJ found, and we agree, that:

the position of ()
in Zeta Process A is equivalent to the position of transfer
as claimed in the '910 patent under the doctrine of
equivalents. 28/

However, we also agree that the record does not show that Zeta's (

) is the equivalent of shock-treating the second pressure vessel as claimed in independent claim 1 of the '910 patent. 29/

We have construed "shock-treating" the second pressure vessel found in step h to require transmission of a fairly substantial "shock" to the portion of the second pressure vessel containing the cooled candy melt sufficient to shatter the hard candy matrix into multiple fragments.

Shock-treating does not include venting of the second pressure vessel or

27/ Penwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 939, 4 U.S.P.Q.2d 1737, 1743 (Fed. Cir. 1987), cert. denied, 108 S. Ct. 1226, cert. denied, 108 S. Ct. 1474 (1988).

28/ ID at 79.

29/ Id.

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manual removal of the solid candy matrix from the second pressure vessel.

Thus, to the extent {

} manual

removal is not equivalent to the shock-treating of step h of claim 1 of the

'910 patent.

In his petition for review, the IA argued:

{ } clearly is the equivalent of the shock-treating step of claim 1 of the '910 patent because the { } performs the same overall function { } in substantially the same way { } to obtain substantially the same result { } as impacting the sidewalls of the cooling vessel as disclosed in claim 1. 30/

The ALJ found that neither the IA nor complainants established that

{ } in Zeta process B is equivalent to shock-treating:

... the administrative law judge finds lacking any evidence in the record that would support a conclusion, to the extent that Zeta {

}, that such is equivalent to step h of claim 1 of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments." 31/

The IA believes that { }

shatters the candy matrix by a physical impact equivalent to manually striking the sidewalls of the second pressure vessel. We do not find sufficient evidence in the record to support a finding that {

} is equivalent to the impact required by step h's shock-treating. As we have construed the '910 patent claims, shock-treating

30/ Commission Investigation Staff's Petition for Review of the Initial Determination at 4.

31/ ID at 82-83.

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requires a more forceful action than ().

Moreover, step h of claim 1 clearly requires an action equivalent to shocking the second pressure vessel. As disclosed in the '910 patent, the shock passes through the second pressure vessel to the candy thereby shattering the candy. The record does not, in our view, contain sufficient evidence to establish that a (), that may incidentally transmit a vibration to the second pressure vessel, is equivalent to shock-treating the second pressure vessel.

Thus, we agree with the ALJ that neither complainants nor the staff established that Zeta process B operates in substantially the same way as the '910 patent invention. They did not establish that Zeta process B infringes independent claim 1 of the '910 patent and its dependent claims under the doctrine of equivalents.

4. Infringement of the '457 patent by Zeta process B

We agree with the ALJ that Zeta process B does not infringe the '457 patent under the doctrine of equivalents. We have construed the '457 patent as requiring a second pressure vessel with inner surfaces made smooth and shiny by rubbing or chemical action. We determine that complainants failed to meet their burden of proving that the tubes used by Zeta in process B were, in fact, polished.

As the ALJ noted, complainants argued that the cooling tubes for Zeta process B were ordered with a "smooth interior surface" and that there was evidence that the tubes have been worked. Complainants referred to the

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dictionary definition of "polished" that we have adopted above to conclude that Zeta process B infringes the claims in issue of the '457 patent. 32/

Each claim of the '457 patent requires that the second pressure vessel have "polished inner surfaces." However, complainants did not attempt to contradict technical expert Kelly at the evidentiary hearing after he examined the inner surface of a representative cooling tube used by Zeta in process B and concluded that the inside surface was not polished. (FF 146, 147). Zeta's technical director of carbonated candy production, Mr. Escola, also gave uncontradicted testimony about the cooling tube used in Zeta's process B. He stated that he gave no instructions as to polishing the process B tubes, that such tubes are standard tubes, and that he did not know whether the inside of the tubes were polished before the tube was installed. (FF147). 33/

This uncontradicted evidence in the record leads us to determine that complainants did not establish that Zeta process B operates in substantially the same way as the claimed invention. Therefore, complainants have not established that Zeta process B infringes any of the claims of the '457 patent in issue under the doctrine of equivalents.

E. Validity: Inventorship of the '910 patent

35 U.S.C. § 102(f) states:

A person shall be entitled to a patent unless --

(f) he did not himself^{...} invent the subject matter sought to be patented.

32/ Id. at 83.

33/ Id. at 84.

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The inventorship set out in the patent is presumed to be correct. To sustain an inventorship defense, respondents must establish improper inventorship by clear and convincing evidence. A technical defense such as improper inventorship is subject to close scrutiny. 34/ The inventorship defense includes misjoinder (incorrect naming of the inventor) and nonjoinder (failure to name a co-inventor). A patent with incorrect inventorship is unenforceable until the inventorship is corrected. 35/

In the ID, the ALJ found that Kirkpatrick did not invent anything to do with shock-treating the second pressure vessel, but that he was nonetheless correctly named as the inventor of the '910 patent. The ALJ determined that Kirkpatrick's noninventorship of the shock-treating taught in step h of claim 1 of the '910 patent was unimportant because that step is unnecessary in the production of carbonated candy by the domestic industry; the candy matrix is shattered by the venting of step i, not the shock-treatment of step h. 36/

Although we agree with the ALJ's conclusion that Kirkpatrick invented the invention claimed in the '910 patent, we disagree with his reasoning. We have found no authority to suggest that the Commission may exclude a step within a claim of a patent as unnecessary when determining correct inventorship. Instead, we find that respondents failed to show by clear

34/ Amax Fly Ash Corp. v. United States, 182 U.S.P.Q. 210, 215 (Ct.Cl. 1974).

35/ A federal district court may order correction of the patent by the Commissioner of the U.S. Patent and Trademark Office. 35 U.S.C. § 256. The Commission has no equivalent remedy available to it.

36/ ID at 90-91.

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and convincing evidence that Kirkpatrick did not invent step h of claim 1 of the '910 patent.

We disagree with the ALJ's finding that Kirkpatrick did not invent shock-treating. In his testimony Kirkpatrick did not deny inventing shock-treating per se; he denied inventing impacting as shock-treating. For example:

1. Judge Luckern: You don't need -- your testimony is you don't need the shock treatment?

Kirkpatrick: No. My testimony is you don't need to beat the tube to pieces.

Hearing transcript at 212; FF 123.

2. [Mr. Duty]: What other means did you use to break up candy in the tube?

[Mr. Kirkpatrick]: I never had to break up any carbonated candy in the tube. Now, there were (

itself, was (), the candy
I had to (), and
) , and that was in the learning
process. 37/

While Kirkpatrick testified numerous times that venting was shock-treating, he did not deny inventing shock-treating as he construed it. 38/

There is little other evidence in the record, besides Kirkpatrick's testimony, to support the statement that Kirkpatrick derived the shock-

37/ Hearing transcript at 108-09. See also respondent Zeta's Exhibit 69-C at 9 (Kirkpatrick testimony); hearing transcript at 211 (Kirkpatrick testimony).

38/ E.g., hearing transcript at 106("[Kirkpatrick]: [Shock-treating is] when you vent the gas out of the head space on the cooling tube, you can actually hear the product begin to shatter inside and that continues until the pressure is literally all gone from the tube"); hearing transcript at 160, 183, 192, 262 (Kirkpatrick testimony).

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treating of step h from (). 39/ The record includes a () memorandum of invention that states:

{
(
(Emphasis added). 40/

However, we do not believe that the memorandum contains strong evidence that () invented shock-treating as construed by the ALJ. This passage states that (

)." We attach little significance to this phrase in () memorandum and decline to find that this () is the genesis of the language found in step h claim 1 of the '910 patent: "shock-treating which shatters the solid candy matrix into multiple fragments."

Although the president of Pop Rocks, Inc., Richard Kornutik, testified that he had inspected the Canadian carbonated candy production process before drafting and prosecuting the '910 patent application, we do not believe that mere evidence of exposure to the Canadian operation provides sufficient proof that the shock-treatment step was derived from the Canadian operation. See FF 151.

39/ {

). FF 113B.

40/ Respondent Zeta's Exhibit 34-C at 1.

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In reaching our determination on inventorship we give minimal weight to Kirkpatrick's testimony on this validity issue, just as we gave it little weight in determining the infringement issues. In reviewing the record as a whole, it seems clear to us that Kirkpatrick's testimony was influenced by a desire to establish infringement by respondent Zeta. If shock-treating did not include venting, there would be little likelihood that Zeta infringed either of complainants' patents, because neither Zeta process A nor Zeta process B contains a step, other than venting, that could be equivalent to the shock-treating claimed in step h of claim 1 of the '910 patent. We also cannot ignore the fact that Kirkpatrick signed an oath on September 29, 1975, stating that he had read the '910 patent specification and claims and found that they accurately described his invention. We are not inclined to give much weight to testimony that directly contradicts sworn statements made at the time the invention was patented, years before the present investigation.

In addition, we cannot overlook the fact that Kirkpatrick has an interest in the outcome of this investigation. 41/ In 1979, the predecessor court to the Federal Circuit instructed the Commission that uncorroborated oral testimony of those with a demonstrated financial interest in the outcome of the litigation is insufficient to overcome the presumption of patent validity. 42/

41/ (

)

42/ See Stevenson v. Int'l Trade Comm'n, 612 F.2d 546, 550, 204 U.S.P.Q. 276, 280 (C.C.P.A. 1979) ("Proof of anticipating devices ... must be clear and convincing to overcome the presumption of validity.")

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Despite the fact that we do not put much weight on our finding that Kirkpatrick did not deny inventing shock-treating, respondents have failed to point out any significant evidence to sustain their lack of inventorship defense. We, therefore, believe that there is insufficient evidence on the record to rebut the statutory presumption that Kirkpatrick was the sole inventor of the '910 patent or to prove by clear and convincing evidence that he appropriated more than the use of { } services and ideas when perfecting the invention of the '910 patent. 43/

F. Validity: Definiteness of the '910 patent

35 U.S.C. § 112 (paragraph 2) reads in pertinent part:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. (Emphasis added). 44/

We determine that respondents have failed to prove by clear and convincing evidence that the '910 patent specification does not particularly point out or distinctly claim the subject matter that Kirkpatrick regarded as his invention.

There is little case law interpreting the "regards as his invention" language contained in section 112. Generally, absent evidence to the contrary, the subject matter set forth in the claim is presumed to be that which "the applicant regards as his invention." 45/ Courts have relied on

43/ Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 624, 225 U.S.P.Q. 634, 641 (Fed. Cir.), cert. dismissed, 474 U.S. 976 (1985) citing Hobbs v. U.S. Atomic Energy Comm'n, 451 F.2d 849, 864, 171 U.S.P.Q. 713, 724 (5th Cir. 1971).

44/ 35 U.S.C. § 112 (para. 2).

45/ Application of Miller, 441 F.2d 689, 692 (C.C.P.A. 1971).

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this language to reject a claim "where some material submitted by the applicant, other than his specification, shows that a claim does not correspond in scope with what he regards as his invention." 46/

We have not accorded Kirkpatrick's testimony much weight for the reasons discussed above with regard to inventorship. The record in this investigation does not contain any evidence other than Kirkpatrick's testimony to support the conclusion that Kirkpatrick did not particularly point out and distinctly claim the subject matter he regarded as his invention. Therefore, we determine that respondents have failed to prove by clear and convincing evidence that the '910 patent is invalid for indefiniteness. 47/

F. Validity: Best mode of the '910 patent

35 U.S.C. § 112 (paragraph 1) states in pertinent part:

The specification . . . shall set forth the best mode contemplated by the inventor of carrying out his invention. 48/

In order to succeed with a best mode defense, respondents must establish by clear and convincing evidence that the inventor knew of and concealed a preferred mode of carrying out the invention at the time of filing his patent application. 49/

46/ Application of Conley, 490 F.2d 972, 976 (C.C.P.A. 1974).

47/ See Radio Corp. v. Radio Laboratories, 293 U.S. 1, 10 (1934). We note that our conclusion finds support in the ID. The ALJ noted that absent Kirkpatrick's testimony, he would not have found the '910 patent invalid for indefiniteness. ID at 94 n.27.

48/ 35 U.S.C. § 112 (para. 1).

49/ Trio Process Corp. v. L. Goldstein's Sons, Inc., 641 F.2d 66, 74, 174 U.S.P.Q. 129, (3d Cir. 1972), cert. denied, 409 U.S. 997 (1973).

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Assuming arguendo that Kirkpatrick's testimony at the evidentiary hearing should be given significant weight in determining the best mode he contemplated at the time he filed his application, that best mode would include proper disbursement of the carbon dioxide bubbles within the candy melt, cooling, venting to shatter, and opening. Kirkpatrick testified that a good batch of carbonated candy () because such a batch () that must be removed by hammering. 50/

We believe that respondents have failed to provide clear and convincing evidence that Kirkpatrick concealed this best mode in the '910 patent. The '910 patent specification discloses the means to achieve the result of the invention through Kirkpatrick's best mode, unlike the situation present in Spectra-Physics v. Coherent, 51/ or Dana Corp. v. IPC Ltd. Partnership. 52/ That the '910 patent specification discloses other modes as well, such as shock-treating, does not mean that the inventor has not met the best mode requirement. 53/ Moreover, if we discount the weight given to

50/ See FF 113C, 117A, 123, 124, and 125.

51/ 827 F.2d 1524, 1535-37, 3 U.S.P.Q.2d 1737, 1744-46 (Fed. Cir.), cert. denied, 484 U.S. 954 (1987) (patent specification did not disclose details of six stage brazing cycle such that the quality of a general reference to the best mode was so poor as to result in effective concealment of the best mode).

52/ 860 F.2d 415, 418-20, 8 U.S.P.Q.2d 1692, 1695-96 (Fed. Cir. 1988), cert. denied, 109 S. Ct. 2068 (1989) (best mode using fluoride treatment was never disclosed in the patent specification).

53/ Randomex, Inc. v. Scopus Corp., 849 F.2d 585, 589-90, 7 U.S.P.Q.2d 1050, 1053-54 (Fed. Cir. 1988) (disclosure of an alternative inferior, and possibly dangerous, solution to be used with invention does not negate simultaneous disclosure of best mode; further, disclosure of name brand cleaner as a nonresidue detergent solution was not so poor as to

(continued...)

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Kirkpatrick's testimony for the reasons stated above, there is insufficient evidence to find that the inventor concealed a better mode than he disclosed. For these reasons, we believe that the '910 patent is not invalid for failure of the inventor to reveal his preferred mode for carrying out his invention.

G. Practice of the '910 patent by the domestic industry

We adopt the ALJ's finding that the domestic industry does not practice the '910 patent. In adopting this finding, we augment the ALJ's discussion of why the opening of the cooling tube flange is not shock-treatment within the meaning of the '910 patent, discuss complainants' essential element domestic industry argument, and clarify one of the ALJ's sentences in the ID to avoid a misconception about the domestic industry's practice of the '910 patent.

We do not agree with complainants assertion that they practice the '910 patent because, in their view, venting is shock-treating and they vent their second pressure vessels. As we have construed the shock-treating found in step h of claim 1 of the '910 patent, shock-treating does not encompass venting. Thus, the domestic industry cannot use its practice of venting to satisfy the shock-treatment step of the '910 patent.

We also do not believe that the (

) should be deemed shock-treatment, as we have

53/(...continued)

effectively result in concealment). Randomex quotes Ernsthausen v. Nakayama, 1 U.S.P.Q.2d 1539, 1549 (P.T.O. BD. Pat. App. & Int'f 1985), aff'd in unpublished opinion 809 F.2d 787 (Fed. Cir. 1986), in which the Patent and Trademark Office Board found no requirement in 35 U.S.C. § 112 that an applicant point out which of his embodiments he considers his best mode and that if the disclosure includes the best mode contemplated by the applicant that is enough to satisfy the statute. Randomex, 849 F.2d at 589.

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construed shock-treating. The record indicates that the domestic industry workers in (). However, () is not used to shatter the carbonated candy matrix, as taught in step h of claim 1 of the '910 patent, but rather to () the cooling tube. 54/ Furthermore, Kirkpatrick testified that () found on the production floor are to be used to open () when transferring liquid candy from the first to the second pressure vessel, not to impact the second pressure vessel. 55/

We also do not believe that the action of () provides a fractionating shock to the candy matrix. 56/ Complainants argue

54/ In the early phases of carbonated candy experimentation, () before the shattered carbonated candy ("good" candy) could exit the cooling tube. Kirkpatrick testified many times that he () in the past by impacting them directly with a hammer and chisel. See, e.g., FF 113A ("... it was frequently necessary to strike (

); FF 113C; FF 123. The record does not indicate that the process currently used by the domestic industry ().

55/ FF 206 citing the hearing transcript at 288 ("I am just trying to bring [to] your attention, Your Honor, to that () and when you see a better view, that is the object that () was originally bought for. ... It is a (

).")

56/ See Respondent Zeta's Physical Exhibit-C1 (videotape of the candy release at the Buffalo plant showing a forceful opening of the tube); Kirkpatrick testimony, hearing transcript at 267-68:

Judge Luckern: . . . I wrote down that when the bottom of this cooling tube can be opened, you open the bottom with quite a bit of force. Did I hear you say that or not ?

[Kirkpatrick]: Yes., Your Honor, I did.

(continued...)

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that the domestic industry practices the shock-treatment found in step h of claim 1 of the '910 patent by opening the flange at the bottom of the tube which impacts the tube, thereby shocking it. While the opening of the flange does indeed appear to "shock" the second pressure vessel as required

56/(...continued)

Judge Luckern: All right. What did you mean by that ?

[Kirkpatrick]: It's on that videotape, Your Honor, if we get to see it.

Judge Luckern: Well, maybe you can put it in words.

[Kirkpatrick]: All right. The bottom of this tube is a (

), the result is that you have this violent explosion -- you have this tube actually lifting in the air, about a matter of an inch, an inch and a half, from the (), and the candy explodes downward into the container. And that (). So you get a pretty violent discharge there.

Kirkpatrick testimony at 268-270

Judge Luckern: We referred to the second pressure vessel. Now, in your experience, does the opening of this second pressure vessel cause a shock to the candy or to the vessel or both ? [apologies for the triple question]

[Kirkpatrick]: It does cause a direct shock to both and I can explain that.

[the Judge asks Kirkpatrick to explain in words without reference to the physical exhibits]

[Kirkpatrick]: ... So when you (

) it comes out of there with a blast.

Kirkpatrick testimony, hearing transcript at 292:

[Kirkpatrick]: It's quite violent when () opens. Those are the hold-downs that keep the () from blowing that product drum all over the room. That's the (

).

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by step h of claim 1, there is no evidence in the present record to indicate that the carbonated candy matrix fractionates because of this shock. We agree with the ALJ that the evidence in the present record supports a finding that the venting has already caused the candy matrix to shatter. 57/ It would be mere speculation for us to find from the record that shock from the () also shatters the solid candy matrix.

Complainants also argue that the domestic industry practices the essential element of the '910 patent: engaging in the commercial production of carbonated candy. According to complainants, they get the candy out of the cooling tube and, thus, their practice satisfies the statutory domestic industry requirement. Complainants do not cite any authority in support of this "essential element" argument. In fact, all the relevant authority is to the contrary. Section 337(a)(3) reads in pertinent part:

For purposes of paragraph (2), an industry in the United States shall be considered to exist if there is in the United States, with respect to the articles protected by the patent, copyright, trademark, or mask work concerned....

This statutory language ties the domestic industry to exploitation of the intellectual property right being asserted. The language reflects the Commission's long-standing practice of holding that a domestic industry does not exist if the complainant, or its licensees, is not exploiting the

57/ FF 205 ("the candy ... is shattered by "this shock" [venting] into multiple fragments"); FF 209 ("venting of the superatmospheric pressure in the cooling tube pressure vessel causes the solid matrix of candy within the tube to shatter into multiple fragments"); hearing transcript at 262: [Kirkpatrick]: "After the pressure reduced slightly, it would begin to crackle and make loud noises, and then the tube would actually jump."

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asserted patent. 58/ Complainants have not sustained their burden of proving that the domestic industry is producing carbonated candy in accordance with claim 1 of the '910 patent.

Finally, we clarify one sentence in the ALJ's discussion on domestic industry. On page 139 of the ID, the ALJ states: "[t]he other steps of claim 1 and dependent claims 2-6 and 8-9 [of the '910 patent] plainly are satisfied by the domestic industry's process." In order to prevent a misinterpretation, we have changed this sentence to read "the other steps of claim 1 and dependent claims 2-6 and 8-9, absent step h, plainly are satisfied by the domestic industry's process."

58/ See Certain Stabilized Hull Units and Components Thereof and Sonar Units Utilizing Said Stabilized Hull Units, Inv. No. 337-TA-103, USITC Pub. 1260 (June 1982) at ID 35-38; Certain Electronic Portable Calculators, Inv. No. 337-TA-198, USITC 1732 (July 1985) at ID 85-86; Certain Electronic Chromatogram Analyzers, Inv. No. 337-TA-252, USITC Pub. 2012 (August 1987) at Commission opinion 22-23 (upheld in an unpublished opinion, Bioscan v. U.S. Int'l Trade Comm'n, Appeal No. 87-1599, slip op. (Fed. Cir. April 18, 1988). See also Commission rule 210.20(a)(9)(vii) (complainant must show domestic utilization of the process claimed by the U.S. patent at issue in the complaint), 19 C.F.R. § 210.20(a)(9)(vii); H.R. Rep. No. 571, 93d Cong., 1st Sess. 78 (1973) ("In cases involving the claims of U.S. patents, the patent must be exploited by production in the United States, and the industry in the United States generally consists of the domestic operations of the patent owner, ... devoted to such exploitation of the patent.")

PUBLIC VERSION 1/

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, DC 20436

In the Matter of)
)
CERTAIN METHODS OF MAKING)
CARBONATED CANDY PRODUCTS)

Investigation No. 337-TA-292

Initial Determination

Paul J. Luckern, Administrative Law Judge

SECRETARY
DOCKET/USITC

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Pursuant to the Notice of Investigation in this matter (54 Fed. Reg. No. 244 at 9903, 9904, March 8, 1989), this is the administrative law judge's initial determination, under Commission Rule 210.53 (19 C.R.F. 210.53). The administrative law judge hereby determines, after a review of the record developed, that there is no violation of section 337 (a)(1)(B) of the Tariff Act of 1930, as amended (19 U.S.C. §1337) (section 337), in the importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, and/or consignee of carbonated candy products allegedly made by certain patented methods.

1/ The Conclusions of Law in this initial determination are not confidential business information.

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ABBREVIATIONS

CPost	-	Complainants' Post Hearing Brief
CPF	-	Complainants' Proposed Finding
CPCL	-	Complainants' Proposed Conclusions of Law
CPost R	-	Complainant's Post Hearing Rebuttal Brief
FF	-	Finding of Fact
RCPost	-	Confex's Post Hearing Brief
SPost	-	Staff's Post Hearing Brief
SPostR	-	Staff's Post Hearing Reply Brief
Tr.	-	Transcript
ZPF	-	Zeta's Proposed Finding
ZPost	-	Zeta's Post Hearing Brief
ZPost RC	-	Zeta's Rebuttal Brief To Complainants
ZPRF	-	Zeta's Proposed Rebuttal Finding
ZPost RS	-	Zeta's Rebuttal Brief To Staff
ZPre	-	Zeta's Prehearing Statement

PROCEDURAL HISTORY

On January 31, 1989 a complaint was filed with the U.S. International Trade Commission under section 337 of the Tariff Act of 1930, as amended (19 U.S.C. §1337) on behalf of General Foods Corporation, 250 North Street, White Plains, New York 10625 (General Foods), Carbonated Candy Ventures, 1195 Niagara Street, Buffalo, New York 14240 (CCV) and Pop Rocks, Inc., 986 Bedford Street, Stamford, Connecticut 06905 (Pop Rocks). The complaint, as amended and supplemented on February 21, 1989, alleged violation of section 337 and related to the methods of making certain carbonated candy products. The complaint requested that the Commission institute an investigation and, after a full investigation, issue permanent general exclusion and cease and desist orders.

On March 1, 1989 the Commission instituted an investigation to determine whether there is a violation of subsection (a)(1)(B)(ii) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain carbonated candy products allegedly made by a method covered by method claims 1-9 of U.S. Patent No. 3,985,910 (the '910 patent) or method claims 1-9 of U.S. Patent No. 4,001,457 (the '457 patent); and whether there exists an industry in the United States as required by subsection (a)(2) of section 337.

The notice of investigation was published in the Federal Register on March 8, 1989 (54 Fed. Reg. No. 44 at 9903-04).

The respondents named in the notice which are alleged to be in violation of section 337, and the parties upon which the complaint was served, are according to the notice:

Zeta Espacial, S.A. (Zeta)

Apartado 140
Sant Boi (Barcelona), Spain

Confex, Inc. (Confex)
167 Avenue at the Common
Shrewsbury, New Jersey 07702.

Respondents Zeta and Confex (respondents) noticed appearances in the investigation through their respective attorneys and filed responses to the complaint and notice of investigation. Complainants, the staff, and the respondents participated at the preliminary conference held on Tuesday April 11, 1989.

Order No. 15, which issued on August 18, 1989 as an initial determination, rejected as a matter of law respondent Zeta's defense that complainants' failure to produce a carbonated candy and bubble gum mixture exempted Zeta's carbonated candy and bubble gum mixture product from Commission jurisdiction. The Commission on November 8, 1989 issued a notice of determination not to review that initial determination.

Order No. 19, which issued on September 1, 1989 as an initial determination, rejected as a matter of law respondents' affirmative defenses of an exception, pursuant to section 9006(h) of the Process Patent Legislation in the Omnibus Trade and Competitiveness Act of 1988, for their continuous importations begun prior to January 1, 1988. Such exception was found inapplicable under section 337. The Commission on October 2, 1989 issued a notice of determination not to review that initial determination, although the Commission stated in its notice that its action in not reviewing the initial determination should not be interpreted as holding that the Process Patent Legislation can never be applicable to section 337 investigations.

Order No. 25, which issued on September 18, 1989 denied complainants' motion to amend the protective order to allow complainants' in-house expert Kleiner to have access to certain designated Zeta confidential business information.

Order No. 26, which issued on September 20, 1989, granted in part Zeta's motion to amend its response to the complaint by adding certain affirmative defenses.

Order No. 33 which issued on December 8, 1989 denied complainants' motion for sanctions against respondent Zeta.

On September 27, 1989 a prehearing conference commenced followed by the hearing, with complainants, the staff, and the respondents participating. The hearing continued on September 28, 29, October 2 and October 3, 1989. The parties were put on notice at the hearing that initial proposed findings not specifically rebutted in reply submissions may be deemed uncontroverted and admitted in substance.

Posthearing submissions have been submitted by all of the parties. Closing arguments were held on November 1, 1989 at which all parties participated.

The matter is now ready for initial determination.

This initial determination is based on the entire record including the evidentiary record compiled at the hearing and the exhibits admitted into evidence. The administrative law judge has taken into account his observation of the witnesses that testified at the hearing. Proposed findings submitted by the parties, but not herein adopted, either in the form submitted or in substance, are rejected either as not supported by the evidence or as involving immaterial matters. The findings of fact include

references intended to serve as guides to the testimony and exhibits supporting the findings of fact. The references do not necessarily represent complete summaries of the evidence supporting each finding.

JURISDICTION

The Commission has in rem and subject matter jurisdiction. It also has in personam jurisdiction over the respondents in view of their general appearance and active participation in this investigation.

OPINION ON VIOLATION

This investigation involves certain methods of making carbonated candy products. Carbonated candy is a hard candy product (FF 13). The product patent for carbonated candy expired in December 1978 (FF 14). Complainant General Foods, the owner of the '910 and '457 method patents for making carbonated candy in issue in this investigation (FF 2), has

(FF 4).

, also a complainant (FF 5, 6).

carbonated candy products in the United States (FF 7).

Respondent Zeta, a Spanish Corporation, manufactures in Spain by Zeta Process A and Zeta Process B (FF 16), and sells for importation into the United States, certain carbonated candy products which methods are alleged to infringe the '910 and '457 method patents (FF 9). Respondent Confex is engaged in the distribution marketing and sale of carbonated candy products

in the United States which products are manufactured by the accused Zeta methods in Spain (FF 11, 12).

I. INFRINGEMENT OF THE '921 AND '457 PATENTS

Complainants bear the burden to establish infringement by a preponderance of the evidence. Uniroval v. Rudkin - Wiley Corp., 837 F.2d 1044, 5 U.S.P.Q. 2d 1434, 1441 (Fed. Cir. 1988); Hughes Aircraft Co. v. United States 717 F.2d 1351, 1361, 219 U.S.P.Q. 473, 480 (Fed. Cir. 1983).

1. The Claims In Issue

(a) '910 Patent

The '910 patent issued October 12, 1976 on an application filed October 1, 1975 and is titled "Method Of Making A Gasified Confection". The named inventor is Paul A. Kirkpatrick. The patent is assigned to General Foods (FF 2, 17).

The '910 patent contains nine method claims, all of which are in issue. The sole independent method claim reads:

1. A method of making a carbonated candy which comprises:
 - a. obtaining a hot candy melt,
 - b. introducing the hot melt into a first pressure vessel,
 - c. introducing a gas at superatmospheric pressure into the first pressure vessel so that the gas is dispersed within the hot melt,
 - d. introducing a gas at superatmospheric pressure into a second pressure vessel at a value equivalent to the pressure within the first pressure vessel, the first and second pressure vessels having a connecting line with valve means between the bottom of the first vessel and the bottom of the second vessel,
 - e. transferring the gasified hot melt to the second pressure vessel through the connecting line by opening said valve means and then creating a pressure differential being effected by regulating the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel,

- f. isolating the second pressure vessel while continuing to maintain a superatmospheric pressure,
- g. cooling the second pressure vessel so that the gasified hot melt becomes a gas-containing solid matrix.
- h. shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments,
- i. venting the second pressure vessel, and
- j. opening the second pressure vessel to allow the product to be removed. [Emphasis added]

(FF 18).

(b) '457 Patent

The '457 patent issued January 4, 1977 to inventor Joseph L. Hegadorn and is based on an application filed July 1, 1976. It is assigned to General Foods and is titled "Method of Making A Gasified Confection" (FF 2, 26).

The '457 patent contains nine method claims, all of which are in issue. The sole independent method claim reads:

1. A method of making a carbonated candy which comprises:
 - a. obtaining a hot candy melt,
 - b. introducing the hot melt into a first pressure vessel,
 - c. introducing a gas at superatmospheric pressure into the first pressure vessel so that the gas is dispersed within the hot melt,
 - d. introducing a gas at superatmospheric pressure into a second pressure vessel which has polished inner surfaces at a value equivalent to the pressure within the first pressure vessel, the first and second pressure vessels having a connecting line with valve means between the first vessel and the bottom of the second vessel.
 - e. transferring the gasified hot melt to the second pressure vessel through the connecting line by opening said valve means and then creating a pressure differential between the two vessels, said differential being effected by regulating the superatmospheric pressure in the second pressure vessel at a valve lower than the superatmospheric pressure in

- the first pressure vessel and venting the top of the second pressure vessel,
- f. isolating the second pressure vessel while continuing to maintain a superatmospheric pressure,
 - g. cooling the second pressure vessel so that the gasified hot melt becomes a gas-containing solid matrix,
 - h. venting the second pressure vessel which causes the matrix to shatter into multiple fragments, and
 - i. opening the second pressure vessel to allow the product to be removed. [Emphasis added]

(FF 27).

2. Accused Zeta Process A

Schematic diagrams of the Zeta Process A apparatus ^{is} shown at FF

52. In that process,

Pgs 8 and 9 blank - [confidential]

3. Accused Zeta Process B

Schematic diagrams of the Zeta Process B apparatus is shown at FF 75.

In that process

pages 11 and 12 blank [confidential]

4. The Federal Circuit and Infringement

Complainants, in alleging infringement of the '910 and '457 patents, have relied heavily on Texas Instruments, Inc. v. ITC, 805 F.2d 1558, 231

USPQ 833, (Fed. Cir. 1986) (Texas Instruments) (CPost at 21, closing argument, Tr. at 51, 52, 55, 119, 120 and 123).

A review of Texas Instruments and certain other Federal Circuit decisions sheds light on the applicable law of infringement. Texas Instruments was the outgrowth of In re Certain Portable Electronic Calculators, Inv. No. 337-TA-198, USITC Pub. No. 1732 (July 1985) (Calculators), where, at the hearing level more than five years ago, this administrative law judge held that patentee complainant Texas Instruments (TI) had not sustained its burden of proving that any of the '921 patent claims in issue were infringed by any of the imported calculators in issue. The Commission adopted that holding. The Commission decision and this administrative law judge's findings in Calculators were thereafter extensively commented on in decisions of the Federal Circuit involving the appeal.

Thus in Calculators, the Federal Circuit in the initial November 19, 1986 unanimous Texas Instruments decision concluded that the specification of the '921 patent contained a detailed description of the preferred means at the time of the filing of the '921 patent application, and of performing each means step of the claims in issue; ^{1/} that in the seventeen years between the filing of the '921 patent application and the filing of the complaint with the Commission, each such means had undergone technological

^{1/} . Representative claim 1 was to a miniature portable, battery operated electronic calculator, comprising a combination of several means. The Federal Circuit concluded that the '921 patent represented a pioneering invention for which the inventors and TI have been recognized and that the prototype calculator of the claimed invention was accepted for permanent collections of the Smithsonian's Museum of History and Technology. Texas Instruments 805 F.2d at 1558, 1559, 231 USPQ at 833, 834.

advance and that the Commission had adopted the "extensive findings and conclusions" of this administrative law judge wherein he construed the claims "in light of the specification" and found no claim infringed, either literally or in terms of the doctrine of equivalents. Id. 805 F.2d at 1558, 1561, 231 USPQ at 833, 834.

In Texas Instruments, the Federal Circuit did reiterate its caution against limiting a claimed invention to preferred embodiments or specific examples in the specification, citing Palumbo v. Don-Joy Co., 762 F.2d 969, 977, 226 USPQ 5, 10 (Fed. Cir. 1985) and stated that the details of performing each step need not be included in the claims unless required to distinguish the claimed invention from the prior art, or otherwise to point out specifically and claim distinctly the invention, citing In re Lundberg, 224 F.2d 543, 547-48, 113 USPQ 530, 534 (CCPA 1957) and In re Arbeit, 206 F.2d 947, 958, 99 USPQ 123, 131-32 (CCPA 1953). Those principles however were said to be limited in their application, and to reflect the equitable concept that claims should be read in a way that avoids enabling an infringer to "practice a fraud on a patent", citing Graver Tank & Manufacturing Co. v. Linde Air Products Co., 339 U.S. 605, 608, 85 USPQ 328, 330 (1950). The Court then referred to the long known recognition that the range of permissible equivalents depends upon the extent and nature of the invention, and may be more generously interpreted for a basic invention than for a less dramatic technological advance, citing Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405, 414 (1908) and Miller v. Eagle Manufacturing Co., 151 U.S. 186, 207 (1894). In Texas Instruments the question of claim interpretation turned on the issue of the breadth of equivalents to which the claims were entitled and as in

many aspects of patent law, the legal conclusions were intertwined with, and depended upon, the technological facts. Id. 805 F.2d at 1562, 1563, 231 USPQ at 835.

Also in Texas Instruments, the Court after analyzing each of the means of the representative combination means claim of the '921 patent concluded that the representative claim had been interpreted too narrowly "when he, in effect, limited each means [of the claim] to the embodiment shown in the specification." It noted that as an aid in determining the breadth of equivalents to be afforded means plus function clauses under section 112, the specification, the prosecution history, the other claims in the patent, expert testimony, and the language of the asserted claims may be considered, citing King Instrument Corp. v. Otari Corp. 767 F.2d 853. 862, 226 USPQ 402, 408 (Fed. Cir.), cert. denied., 106 S.Ct. 1197 (1986) and Palumbo, 762 F.2d at 975, 226 USPQ at 8, and that the pioneer status of the invention also requires consideration, citing Continental Paper Bag, 210 U.S. at 415. Moreover the Court concluded that it has long been recognized, as affirmed in Graver Tank, 339 U.S. at 609, 85 USPQ at 330-31:

Equivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum. It does not require complete identity for every purpose and in every respect. In determining equivalents, things equal to the same thing may not be equal to each other and, by the same token, things for most purposes different may sometimes be equivalents. Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with the other ingredients, and the function which it is intended to perform. [2/]

2/ In Graver Tank 339 U.S. at 610, 85 USPQ at 331 the patent claims in issue involved an electrical welding composition employing a combination of an alkaline earth metal silicate and any other silicate. The Court held that the use of manganese (a non-alkaline earth metal) instead of magnesium (an alkaline earth metal) was a sufficiently insubstantial change and thus applied the doctrine of equivalents formulating the now familiar rule that:

Texas Instruments, 805 F.2d at 1569, 231 USPQ at 839.

The Federal Circuit nevertheless, in its unanimous opinion in Texas Instruments, qualified the above language of Graver Tank by stating that it does not mean that there is no limit on changed means of performing a claimed function, such that literal infringement can never be avoided; that there must be outer boundaries to the scope of those rules, as for most rules, when the factual situation strains their rote application and requires a fresh look at the rules in the new context in which they are presented; that there is no abstract guide to determine when a modified device crosses the boundary with respect to the reasonable scope of patent claims; and that the extensive determination of infringement is not made in the abstract, but in the context of the claimed invention and the accused devices, citing Graver Tank, 339 U.S. at 607, 85 USPQ at 330, and Amstar Corp. v. Envirotech Corp., 730 F.2d at 1481-82, 221 USPQ at 652. Id.

The Federal Circuit in Texas Instruments thereafter reasoned that it is the claimed invention as a whole that must be considered in determining whether there is infringement by the accused devices, also considered as a whole; that it is not appropriate "in this case", where all of the claimed functions are performed in the accused devices by subsequently developed or improved means, to view each such change as if it were the only change from the disclosed embodiments of the invention; and that it is the entirety of the technology embodied in the accused devices that must be compared with

[i]f two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form or shape.

the patent disclosure, citing D.M.I. Inv. Deere & Co. 755 F.2d 1570, 1575, 225 USPQ 236, 239 (Fed. Cir. 1985), and Hughes Aircraft, 717 F.2d at 1363-64, 219 USPQ at 482-83. It concluded that the total of the technological changes beyond what the inventors disclosed transcended the equitable limits illustrated, for example, in Graver Tank, D.M.I., Hughes Aircraft, and Atlas Powder, and propelled the accused devices beyond a just scope of the '921 claims; and that the record contained substantial evidence to support the conclusion that TI did not sustain its burden of proving literal infringement by the accused calculators. Texas Instruments, 805 F.2d at 1571, 231 USPQ at 841.

In addressing TI's alternative argument that if the claims were not deemed literally infringed, they were infringed under the doctrine of equivalents, the Federal Circuit noted that the interplay between the doctrine of equivalents and the permissible scope of the claims may be limited by the prosecution history, citing Builders Concrete, Inc. v. Bremerton Concrete Products Co., 757 F.2d 255, 258, 225 USPQ 240, 242 (Fed. Cir. 1985), Caterpillar Tractor Co. v. Berco S.P.A., 714 F.2d 1110, 1115-16, 219 USPQ at 185, 187-88 (Fed. Cir. 1983), and Hughes Aircraft, 717 F.2d at 1362-63, 219 USPQ at 481-82; that while there was nothing in the prosecution history to constrain the breadth of claim interpretation which TI proposed, and TI was correct in its assertion that neither the prior art nor the prosecution history mandates exclusion of the accused devices from the reach of the claims, such did not of themselves control the breadth of equivalents available under the doctrine, citing Hughes Aircraft, 717 F.2d at 1363, 219 USPQ at 482; and that the extensive technological advances in all of the claimed functions support this administrative law judge's

finding that the accused devices were not equivalent to the claimed invention, applying the criteria of Graver Tank. The Court thereupon affirmed the decision of the Commission that the claims were not infringed under the doctrine of equivalents, 805 F.2d at 1571, 1572, 231 USPQ at 841, 842.

In a May 16, 1988 opinion denying a petition for rehearing of Texas Instruments the same panel of the Court, as in Texas Instruments, noted that in the case of the claimed "pocket-size" calculator in issue in Texas Instruments the panel did not share "the Commission's denigration of TI's contribution" but that even the "pioneer" status of the '921 patent did not change the way infringement is determined; and that the patentee's disclosure, the prosecution history, and the prior art still provided the background against which the scope of claims was to be determined. Texas Instruments v. ITC, 846 F.2d 1369, 6 USPQ 2d 1886, 1888 (1988).

Continuing the Texas Instruments saga, on July 6, 1988, Chief Judge Markey and Judges Cowen, Freidman, Rich, Smith, Newman, Mayer and Michel declined a suggestion for rehearing in banc of Texas Instruments. Judges Nies, Bissell and Archer would have reheard the case in banc. Texas Instruments v. ITC 851 F.2d 342, 7 USPQ 2d 1414 (Fed. Cir. 1988). Judge Nies, in dissenting from the denial of rehearing in banc, indicated that the briefs of appellant and amicus curiae had expressed concern that the decisions which had been issued by the Texas Instruments panel altered the legal standard for determining infringement of a patent claim adopted by the Federal Circuit, in banc, in Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 4 USPQ2d 1737 (Fed. Cir. 1987), cert. denied, 108 S.Ct. 1226, 1474 (1988) (Pennwalt); that it is now settled law that each element of a

claim is material and essential and, that in order to find infringement, the patent owner must show the presence of every element or its substantial equivalent in the accused device citing Pennwalt, 833 F.2d at 935, 4 USPQ2d at 1739-40; that the Pennwalt Court rejected the views of a minority that only literal infringement required an element-by-element analysis and that infringement under the doctrine of equivalents could be found under an "invention as a whole" standard, even though an element of the claim was not present, at least by an equivalent, in the accused device or process; and that the Texas Instruments panel overruled nothing in Pennwalt and did not purport to do so. Judge Nies stated that she had supported in banc rehearing only to clarify that, to the extent the original Texas Instruments opinion appeared to have adopted a different standard on infringement from that adopted in Pennwalt, Texas Instruments cannot be so interpreted. Id. 851 F.2d at 853, 7 USPQ2d at 1414, 1415.

In Pennwalt, cited by Judge Nies in her dissent on rehearing in banc in Texas Instruments the Federal Circuit, sitting in banc, did apply an "element-by-element" test in affirming the district court's judgement of noninfringement. The views of the seven-judge majority, which included Chief Judge Markey and Judges Friedman, Rich, Davis, Nies, Archer, and Bissell, were set forth in a 19-page majority opinion by Judge Bissell. Senior Circuit Judge Bennett filed a 23-page partial dissent in which he was joined by Judges Cowan, Smith, and Newman. Judge Nies filed a 15-page opinion expressing her "additional views," and Judge Newman filed a separate 46-page "commentary."

The representative claim in issue in Pennwalt was directed to an automatic sorter for things such as fruit, and comprised several means

elements. The district court found that the accused sorters could not be said to infringe literally the patent-in-suit, because those sorters did not use the "hardwired" components or elements which performed the identical functions as those described in the patent-in-suit, and because those sorters did not make the color decision until after the fruit had arrived at the electronic weight scale whereas the machine described in the patent-in-suit made the color comparison while the fruit was in transit from the color detectors to the electronic weight scale. Also the district court rejected the doctrine of equivalents on the ground that the average artisan in the sorting industry would not have known of the interchangeability of the accused sorters and their software with the electronic and logic circuitry disclosed in the patent-in-suit. Pennwalt Corp. v. Durand-Wayland, Inc. 225 USPQ 558, 569, 572 (N.D. Ga. 1984).

The Federal Circuit in the seven judge majority rejected Pennwalt's view that any means that performs the function of a claim element is encompassed within the literal breadth of a means-plus-function language and proceeded to hold that the district court did not err when it compared the accused structures to structures disclosed in the specification of the patent in suit for performing a particular function. The dissent agreed with the majority that the district court's finding of no literal infringement had not been shown to be clearly erroneous. Pennwalt 833 F.2d at 933,934, 4 USPQ2d at 1738, 1739, 1743.

On the doctrine of equivalents, the seven judge majority noted that infringement may be found (but not necessarily) if an accused device performs substantially the same overall function, or works in substantially the same way, to obtain substantially the same overall result as the

claimed invention, citing Perkin-Elmer Corp. v. Computervision Corp., 732 F.2d 888, 901-02, 221 USPQ 669, 679 (Fed. Cir.), cert. denied, 469 U.S. 857 225 USPQ 792 (1984), and Graver Tank, 339 U.S. at 608, 85 USPQ at 330. The Court stated that that formulation, however, does not mean one can ignore claim limitations.

Significantly the Federal Circuit in Pennwalt concluded that the "district court correctly relied on an element-by-element comparison to conclude that there was no infringement under the doctrine of equivalents because the accused devices did not perform substantially the same functions as the Pennwalt invention". Pennwalt, 833 F.2d² at 937, 4 USPQ2d at 1740. (Emphasis added). ^{3/} In holding that the district court's finding of no infringement under the doctrine of equivalents was not clearly erroneous, the seven judge majority further concluded that, contrary to Pennwalt's arguments, the district court did not disregard the need to consider a range of equivalent functions under the doctrine of equivalents. Rather, upon evaluation of the evidence, the court below had concluded as a fact that no component in the accused devices performed a function within the permissible range of equivalents for the functions of the first position indicating means, and thus that there could be no literal infringement; and that no means with an equivalent function was substituted in the accused devices, and hence there could be no infringement under the doctrine of equivalents. Id., 833 F.2d at 939, 4 USPQ2d at 1743.

^{3/} This analysis, viz. that every claim element or its equivalent must be present in an accused device for that claim to read on the accused device, has been termed the "All Elements" rule. See 4 D. Chisum, Patents §18.03 [4] 1988.

Judge Bennett, in his dissent in Pennwalt, criticized the majority for overruling the Federal Circuit's own precedents "sub silentio" and also for "overruling" Supreme Court precedent and accused the majority of paying lip service to the historical test in Graver Tank, while eviscerating Graver Tank's underlying rationale and expressed the following dissatisfaction with the element-by-element method for determining equivalents:

The majority in fact commends the district court for undertaking the proper doctrine of equivalents determination, which the majority describes as an element-by-element comparison of the accused device and the patent-in-suit. However, the purported "element-by-element comparison" was never the extent of the doctrine or equivalents analysis under our here-ignored precedents which also required that the analysis be undertaken in light of the entirety of the patent in suit.

Id 833 F.2d at 939, 940, 4 USPQ2d at 1744.

Judge Bennett would have vacated the district court's decision of noninfringement under the doctrine of equivalents, and remanded for consideration that question including an inquiry as to whether the accused devices considered as a whole satisfied the tripartite test or Graver Tank. Judge Newman's "commentary" enlarged upon Judge Bennett's dissenting views.

The thrust of both the dissent and Judge Newman's commentary in Pennwalt is that an element-by-element comparison of a claim's requirements with an accused device ignores the legal rule of viewing an invention "as a whole." However, in admonishing the majority for a perceived unjustified narrowing of the Graver Tank test, the dissent broadened the test so that infringement may be found even where an accused device does not include a particular claimed element or its equivalent as seen by the dissent's following restatement of the tripartite test to include the words "as a whole", which are not found in Graver Tank:

Thus, the proper inquiry was and should remain whether the devices considered as a whole satisfy the tripartite test of Graver Tank [Id. 833 F.2d at 948, 4 USPQ2d at 1750]

Judge Nies in her additional views correctly pointed out that the expression "invention as a whole" did not appear in Graver Tank and that the Supreme Court never suggested in Graver Tank that claim elements need not be satisfied in determining infringement. Id. 833 F.2d at 953, 4 USPQ2d at 1754. She also noted that it is axiomatic under the precedent of the Federal Circuit that one cannot obtain patent protection for an inventive concept or for the heart or "essence" of an invention or for an achieved result; that that basic principle cannot be avoided under the rubric of "protection of the invention as a whole;" that the statute requires that the inventor particularly point out and distinctly claim the subject matter of his invention, citing 35 U.S.C. §112, second paragraph (112-2) (1982); that a patent claim is not intended to be and cannot be only a general suggestion of an invention; that the invention is defined by the limitations set out in a claim which thereby fixes the scope of protection to which the patentee is entitled; that the limitations defining the invention tells the public what it cannot make, use, or sell; and that equally important, the limitations defining the invention tell the public what it can make, use, or sell without violating the patentee's rights. She further noted that the purpose of a claim has not changed since it was stated in White v. Dunbar, 119 U.S. 47, 52 (1886), as follows:

The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.

Judge Nies found it axiomatic that infringement requires that the claim "read on" the accused device which she had said in Pennwalt meant that the patent owner must show structure in the accused device that satisfies the limitations chosen by the inventor to define his invention; that any infringement analysis, thus, required that the courts look at each element of a claim, i.e. proceed through the claim element-by-element, and look for correspondence in the allegedly infringing device; and that if an accused device did not contain at least an equivalent for each limitation of the claim, there was no infringement because a required part of the claimed invention was missing. She further reiterated that infringement was not established where an element of a claim is missing, citing the following language of Lemelson v. United States, 752 F.2d, 1538, 224 USPQ 526 (Fed. Cir. 1985): "It is also well settled that each element of a claim is material and essential, and that in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device". Id. 833 F.2d at 952, 4 USPQ2d at 1751, 1753, 1754.

Perkin-Elmer Corp. v. Westinghouse Elec. Corp. 822 F.2d 1528, 3 USPQ2d 1321 (Fed. Cir. 1987) (Perkin-Elmer v. Westinghouse), which was referred to

4/ The independent claim 1 read:

- (a) A resonator coupler for coupling a source of r-f electrical power into an electrodeless discharge lamp for starting and operating the lamp comprising:
- (b) a grounded hollow cylinder of electrically conductive material open at one end, with a grounded base member at the other end;
- (c) a helically coiled wire conductor concentrically within the cylinder and spaced from the inner walls thereof;
- (d) means for mounting a discharge lamp substantially concentrically within one end position of the coil;
- (e) the wire of the coil being one quarter wave long relative to the free-space wavelength of r-f power intended to be applied for operating a lamp mounted therein;
- (f) the end of the coil at the end portion within which a lamp is adapted to be mounted being toward said base and being grounded, the other end of the coil being open circuited; and
- (g) electrical connecting means for connecting to the coil a source of r-f electrical power that is sufficient to maintain a discharge in a lamp mounted within the coil,
- (h) said connecting means being tapped into the coil at a point near, but spaced from, the grounded end thereof,
- (i) said point being selected such that, when a lamp mounted in the coil is in operation by r-f power connected to the coil, the coupler is tuned to the frequency of said r-f power and the impedance of said lamp and coupling means at said tap point substantially matches the impedance of said r-f power source,
- (j) whereby when said r-f power is applied to the coil, and before a discharge is ignited in the lamp, a voltage maximum occurs at the open circuited end of the coil and creates a potential extending through the lamp portion between said opened circuited end and said base member for ionizing the gas in the lamp. [Emphasis

Elmer v. Westinghouse 822 F.2d at 1529-30, 3 USPQ2d at 1322.

The district court did not expressly construe claim 1. Rather it clung to the literal language of the claim and found four fundamental differences between the claimed invention and the accused products of Westinghouse. Because of those differences, the district court found that the accused devices did not perform substantially the same function in substantially the same way to obtain the same result.

The majority in Perkin-Elmer v Westinghouse because of the differences found by the district court between the accused devices and the structure and operation set forth in claim 1 clauses (h) and (i) above, the interpretation of which the majority found undisputed, and because those differences sufficiently supported the district court's determination of noninfringement under the doctrine of equivalents, held that a remand was unnecessary and an affirmance was in order. Id. 822 F.2d at 1535, 3 USPQ2d at 1322, 1323. The majority rejected the patentee's claim that a pioneer invention was involved stating that the district court's view that the claimed invention devoted to the provision of light for atomic absorption spectroscopy (AAS) was not a pioneer invention was supported by the presence in the record or prior art devices also devoted to provision of light for AAS; that as specifically stated in the patent and undisputed on the record, the claimed invention constituted an improved means for providing such light; that Perkin-Elmer's statement in its brief that the invention is "more in the nature of a pioneer patent [sic, invention] than

added].

Lettering of claim 1 was added by the district court.

a mere improvement" cannot substitute for evidence establishing that the invention was a pioneer; and that an improvement while it enjoys commercial success and has some industry impact, as many do, cannot compel a finding that an improvement falls within the pioneer category. Id. 822 F.2d at 1532, 3 USPQ2d at 1324.

The majority in Perkin-Elmer v. Westinghouse in holding that it was inappropriate, under the guise of applying the doctrine of equivalents, to ignore meaningful structural and functional limitations of a claim on which the public is entitled to rely in avoiding infringement explained that while the doctrine of equivalents was founded in equity, it was not derived to permit total redrafting of a claim to protect non-equivalent devices, i.e. to permit a claim expansion that would encompass more than an substantial change. Id., 822 F.2d at 1532, 3 USPQ2d at 1324. In footnote 8 the majority stated:

We are aware of dicta that state consideration of the 'essence', 'gist', or 'heart' of the invention may be helpful in determining infringement under the doctrine of equivalents.... That dicta may not be read as implying that specific claim limitations can be ignored as insignificant or immaterial in determining infringement. It must be read as shorthand for the considerations set forth in Graver Tank, i.e., that the infringer should not appropriate the invention by making substitutions for those limitations, when the substitutions do not substantially change the function performed, or the way it is performed, by the invention. [822 F.2d at 1533, 3 USPQ2d at 1325 (citations omitted)].

In Universal v. ERWA Exercise 827 F.2d 1542, 4 USPQ 2d 1035, 1039 (Fed. Cir. 1987) the only infringement issue before the Court was whether the accused exercise machine functioned "in substantially the same way" as the patented machine. In holding that it did not, the district court found that the patent "lever arm" and the accused "link" function "in an entirely

different manner," particularly because the patent lever arm must be rigid while the accused link need not be, and further found that the accused "link" was not "pivotally mounted in said frame," as is the "lever arm" of the '170 patent in issue, because the link was not attached to the frame -- as the claim required. It concluded that "the [claim] language does not simply mean that the lever arm is somehow within the dimensions of the frame." Although the district court made those findings in connection with its analysis of literal infringement, it relied on said findings as the basis for its finding of no infringement under the doctrine of equivalents. The district court further rejected the contention that the patent in issue was a pioneer patent which was entitled to a broad range of equivalents, noting that there was a conflict in the expert testimony whether the patent in issue constituted a major advance in the variable resistance exercise machine field with the district court accepting the evidence that it did not. On appeal the Federal Circuit concluded that it would not say that the findings of the district court were clearly erroneous or that they did not support the court's ultimate finding of no infringement under the doctrine of equivalents. As to the argument that because of the "virtual identify of results" in the accused and patented machines, "there has to be at least substantial sameness in the way in which the result is achieved," the Federal Circuit stated that this argument turned equivalents analysis on its head; that the fact that the two devices achieved substantially the same result creates no presumption that they do so in substantially the same way, "much less one [a presumption] that the alleged infringer must destroy;" and that the patentee has the burden of proof to show that the accused device infringes the patent claims, and to do so under the doctrine

of equivalents required a showing that all three components of the equivalency test were met. It concluded that the district court had held that Universal had not carried that burden with respect to the "substantially-the-same-way" element, and that that it had no reason to reject that conclusion. Id. 827 F.2d at 1542, 4 USPQ2d at 1039.

In Spectra Corp. v. Lutz, 839 F.2d 1579, 5 USPQ2d 1867 (Fed. Cir. 1988), the question before the Federal Circuit was whether an accused toner "performs substantially the same way to obtain the same result" as the claimed toner. Chief Judge Markey writing for a unanimous court affirming the district court's finding of no infringement under the doctrine of equivalents, stated:

[t]he function (dyeing) and the result (dyed material) [in the accused composition and claimed developer] are broadly the same. The ways in which that function is performed and that result is obtained, however, are entirely distinct. In the claimed invention a polymer binds a dyestuff and wax facilitates the polymer's action. ... [T]here is in the Coates [accused] toner no polymer binding action [the accused composition contained no polymer] and no facilitating of that action by the wax. Thus the individual function of the wax in the claimed toner, i.e., solving the "over-affinity" problem of the polymer, is entirely absent and the way in which the dyeing function is performed by the Coates toner is not substantially the same as that in which it performed by the claimed toner. [Id. 839 F.2d at 1582, 5 USPQ2d at 1869-1870] [Emphasis added].

Less than a year later, a unanimous Federal Circuit in Corning Glass Works v. Sumitomo Electric, 868 F.2d 1251, 9 USPQ2d 1962 (Fed. Cir. 1989) (Corning Glass) again construed the "substantially the same way" part of the Graver Tank tripartite test for infringement under the doctrine of

equivalents. In issue was an independent claim of a '915 patent. ^{5/} What prevented that claim from literally reading on an accused fiber was the recitation in the claims that dopant material was added to the core to a degree in excess of that of the cladding layer. To the contrary in the accused fiber no dopant was added to the core but rather a fluorine dopant was added to the fused silica cladding layer to lower the refractive index of the cladding layer and thus to maintain a required core-cladding refractive index difference. Corning Glass v. Sumitomo Electric, 671 F.Supp. 1369, 5 USPQ2d 1545 (S.D.N.Y. 1987). ^{6/}

^{5/} That independent claim read:

An optical waveguide comprising

(a) a cladding layer formed of a material selected from the group consisting of pure fused silica and fused silica to which a dopant material on at least an elemental basis has been added, and

(b) a core formed of fused silica to which a dopant material on at least an elemental basis has been added to a degree in excess of that of the cladding layer so that the index of refraction thereof is a value greater than the index of refraction of said cladding layer, said core being formed of at least 85 percent by weight of fused silica and an effective amount up to 15 percent by weight of said dopant material [Emphasis added]

(paraphrasing and identification provided by the Federal Circuit).

^{6/} See Corning Glass Works v. ITC, 799 F.2d 1559, 230 USPQ 822 (Fed. Cir. 1986), a related case which involved the '915 patent and the parties involved in the district court proceeding, for background information. In that case the Commission did not review this administrative law judge's finding that the accused fiber infringed the '915 patent. See Certain Optical Waveguide Fibers Inv. No. 337-TA-189 USITC Publication 1754 (Sept. 1985). However, the Federal Circuit vacated the Commission's holdings as to the '915 patent in view of affirmance of the Commission's holding of no injury.

In Corning Glass Sumitomo challenged the district court's holding that the accused fiber was infringing under the doctrine of equivalents. There was no dispute that the accused fiber performed substantially the same function to produce the same overall result as the Corning fiber. The only issue was whether it did so in substantially the same way. While the district court found that the substitution of the fluorine dopant in the fused silica cladding, which negatively altered the refraction index of the cladding, equivalently met the limitation requiring the addition of a dopant to the core to positively alter the refraction index of the fused silica, 7/ Sumitomo maintained that an element of the claim of the patent was entirely missing from the accused fiber because that fiber substituted nothing in the core, as provided for in Corning's patented claim in issue. Thus, Sumitomo argued that the "all elements" rule for finding infringement under the doctrine of equivalents was not satisfied.

The Federal Circuit with Judge Nies writing the opinion, was not persuaded that an element was entirely "missing" and stated:

Sumitomo's analysis illustrates the confusion sometimes encountered because of misunderstanding or misleading uses of the term "element" in discussing claims. "Element" may be used to mean a single limitation, but it has also been used to mean a series of limitations which, taken together, make up a component of the

7/ Specifically the district judge found that Sumitomo maintained the refractive index difference between the core and cladding as required by the representative claim in issue by substituting fluorine (a dopant which negatively altered the index of refraction of fused silica) in the cladding for the germania (a dopant which positively altered the index of refraction of fused silica) which is removed from the core; and that the use of fluorine as a dopant in the cladding thus performed substantially the same function in substantially the same way as the use of a germania dopant in the core to produce the same result of creating the refractive index differential between the core and cladding of the fiber which was necessary for the fiber to function as an optical waveguide. 5 USPQ2d at 1558, 1559.

claimed invention. In the All Elements rule, "element" is used in the sense of a limitation of a claim. * * * Sumitomo's analysis is faulty in that it would require equivalency in components, that is, the substitution of something in the core for the absent dopant. However, the determination of equivalency is not subject to such a rigid formula. An equivalent must be found for every limitation of the claim somewhere in an accused device, but not necessarily in a corresponding component, although that is generally the case [868 F.2d at 1259, 9 USPQ2d at 1968]

In Corning Glass the Federal Circuit noted that it had not set out in its precedent a definitive formula for determining equivalency between a required limitation or combination of limitations and what has been allegedly substituted therefor in an accused device, and declined to adopt one. Judge Nies writing for the Federal Circuit did observe, however, that the district court's analysis of claim limitations "appears to be a helpful way to approach the problem" and to be entirely consistent with Graver Tank. Id., 868 F.2d at 1260, 9 USPQ2d at 1969. The district court had compared the function/way/result of the substitution with the function/way/result of the limitation -- a subsidiary analysis comparable to the overall function/way/result analysis for infringement of a claim under the doctrine of equivalents. 8/

8/ It has been said that Pennwalt appeared to resolve some major ambiguities regarding equivalent. (See Nieman "The Federal Circuit Resolves Ambiguities in the Doctrine of Equivalents", 70 JPTOS 153 (March 1988)). A later writer characterized the subsequent Corning Glass as adding to the uncertainty in the area of equivalence, because of the opposite function/same result elemental equivalence affirmed in Corning Glass and concluded not only that the impact of the "individual function" test for elemental equivalence enunciated in Spectra was made unclear but also that the effect of the "All Elements" rule confirmed in Pennwalt was questionable. It was that later writer's opinion that in view of such uncertainty, industry would have difficulty predicting what would be considered a non-equivalent element for purposes of designing around a patent and that adoption of the "All Elements" rule in Pennwalt was not an end to the controversy surrounding the "substantially the same way" test applied under the doctrine of equivalents. Player "Elemental Equivalence

In Diversitech Corp. v. Century Steps, Inc. 805 F.2d 675, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988) the district court found that an accused second version pad did not literally infringe the claims, ^{2/} due to the thin coating of cement on the bottom surface. The Federal Circuit affirmed because the claim required in its final clause that the cementitious material cover "the top and sides only", even though the alleged infringer admitted that the primary purpose in adding the coating of cement to the bottom of the second version pad was to avoid infringement. Id. 850 F.2d at 675, 7 USPQ2d at 1317, 1319.

In Environmental Instruments Inc. v. Sutron Corp., ___ F.2d ___, 11 USPQ2d 1132, 1134 (Fed. Cir. 1989) the Federal Circuit rejected a literal infringement argument stating that it agreed with the trial judge that the accused oval -- or racetrack-configured sensors did not fall within the first "figure eight" limitation of the claim; that claim 1 in issue defined "the conductors" as "being exposed to ventilation over at lease a majority of their surface", which requirement had meaning and must be given effect,

Interpreting 'Substantially the Same Way' under Pennwalt after Corning Glass", 71 JPTOS 546 (July 1989). A still later writer took issue with Player and concluded that Corning Glass was based on sound legal reasoning and was of "significant value" to claim drafters and litigators. Brooks "Corning Glass Works, Functional Limitations, and The All Elements Rule", 71 JPTOS 889 (November 1989).

2/ The following representative claim was in issue:

1. A base for the support of equipment, said base comprising: a foam core having a top, a bottom and a plurality of side surfaces; and a coating attached to at least said top and all of said side surfaces of said foam core, said coating comprising a cementitious material, said cementitious material covering the top and sides only of said foam core.

citing Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d at 935, 4 USPQ2d at 1739-40; that the district court made a finding, not shown to be clearly erroneous, that the conductors of the accused sensors "are not exposed to ventilation over a majority of their surface" which was required by the claim in issue, the import of which is that there can be no literal infringement and claim 1 did not read on Sutron's sensors because the conductors in them are not "exposed to ventilation over at least a majority of their surface;" that as to the suggestions that the district court should have found literal infringement because the accused sensor employs the "principal teachings of the '819 patent" and is with one exception virtually "a Chinese copy of Figure 13 of the '819 patent," the district court "prudently" rejected any such theories; that the disclosure of a patent is in the public domain save as the claims forbid; and that the claims alone delimit the right to exclude, and only the claims may be infringed, citing SRI International v. Matsushita Electric Corporation of America, 775 F.2d 1107, 1120-22, 227 USPQ 577, 585-86 (Fed. Cir. 1985).

5. Literal Infringement

(a) Zeta Process A

(i) The '910 and '457 Patents

Neither complainants nor the staff argued that Zeta's Process A literally infringes any of the claims of either the '910 patent or the '457 patent. (See CPost at 21, 22, SPost at 21, 24). The respondents have denied infringement. Hence the administrative law judge concludes that Zeta's Process A does not literally infringe the '910 nor the '457 patents because the burden for showing literal infringement has not been met.

and that literal infringement requires that the accused process embody every element of claim 1 of the '910 patent as properly interpreted (SPost R at 12).

With respect to the '457 patent the staff argued that, while only step d, requiring a second pressure vessel with a polished inner surface, is not utilized in Zeta Process B, complainants have failed to produce any evidence that [redacted] used in Zeta Process B is polished; that while Zeta's Escola testified that shipping documents from [redacted] used in Zeta Process B indicated that have a "smooth" inner surface, there is no evidence that [redacted] polished; that each of the witnesses that examined [redacted] used in Zeta Process B testified that it was not polished. Hence, it is argued that Zeta Process B does not literally infringe claim 1 of the '457 patent (SPost at 28; SPost R at 13).

(i) The '910 Patent

Analysis of patent infringement entails two inquiries: determination of the scope of the claims, as a matter of law; and the factual finding of whether properly construed claims encompass the accused structure or process. Mannesmann Demag Corp. v. Engineered Metal Products Co. 793 F.2d 1279, 1282, 230 USPQ 45, 46 (Fed. Cir. 1986); Caterpillar Tractor Co. v. Berco, S.P.A., 714 F.2d 1110, 1114, 219 USPQ 185, 187 (Fed. Cir. 1983). This analytical framework applies whether claims are asserted to be infringed literally or by application of the doctrine of equivalents. Literal infringement requires that the accused process embody every element of the claim as properly interpreted. Texas Instruments, 805 F.2d at 1562, 231 USPQ at 834, 835.

The meaning of the claimed term "shock-treating" (step h of claim 1, of the '910 patent) is in dispute. ^{10/} The sole named inventor Kirkpatrick testified in 1989, some thirteen years after the '910 patent issued on October 12, 1976 (FF 17), that "shock-treating" is "[a]nything that would cause the product to break apart and be exited from the tube as individual discrete particles" (FF 121). Respondents contend that the meaning of "shock-treating" requires impacting the cooling vessel with a sledge hammer (ZPre at 15-16).

Step h of claim 1 of the '910 patent states specifically:

shock-treating the second pressure vessel so
that the gas-containing solid matrix is
shattered into multiple fragments (Emphasis
added)

Kirkpatrick's testimony that the term "shock-treating" as used in step h is "anything" that caused the product to break apart and be exited from the vessel ignores the clear language of claim 1. Step h of claim 1 is not merely directed to breaking apart a gas-containing solid matrix of carbonated candy and causing the candy to exit from the vessel. Although claim 1 does not require impacting the second pressure vessel with a hammer, it does require shocking-treating "the second pressure vessel". In Zeta Process B after the candy mass has cooled down

^{10/} The administrative law judge agrees with the staff (SPost at 20) to the extent that an extensive analysis of the scope of the claims of both patents in issue is unnecessary since the language of the relevant claims is clear for the most part.

administrative law judge does not find in Zeta Process B any "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments" (Emphasis added) such that the Zeta Process B literally infringes independent claim 1 of the '910 patent.

In addition, step d of independent claim 1 of the '910 patent states that "the first and second pressure vessels [have]... a connecting line with valve means between the bottom of the first vessel and the bottom of the second vessel" (Emphasis added) while step e of said claim states that gasified hot melt is transferred to the second pressure vessel through said connecting line. An examination of the apparatus used in Zeta Process B does not show a transfer to the bottom of (FF 52). Hence for this additional reason, Zeta Process B does not literally infringe independent claim 1 of the '910 patent.

(ii) The '457 Patent

With respect to the '457 patent, step d of independent claim 1 states that gas is introduced at superatmospheric pressure into a second pressure vessel "which has polished inner surfaces". The administrative law judge finds that complainants have failed to produce any evidence to establish that the inner surface of of Zeta Process B are polished such that Zeta Process B literally infringes said claim 1.

In addition steps d and e of independent claim 1 of the '457 patent, like the corresponding steps of the '910 patent, recite a transfer to the bottom of the second pressure vessel. As found with respect to the '910

patent, the

in Zeta Process B is an

additional reason for finding that Zeta Process B does not literally infringe claim 1 of the '457 patent.

For the foregoing reasons, the administrative law judge finds that complainants have not sustained their burden in establishing that Zeta Process B literally infringes independent claim 1 of each of the '910 and '457 patents, nor the remaining dependent claims in issue.

6. Infringement Under The Doctrine of Equivalents

(a) The '910 Patent Is Not A Pioneer Patent

Complainants have argued that the '910 patent is a pioneer patent and entitled to a broad range of equivalents (CPCL 6). In support they argued that the invention, as set out in the '910 patent, was broadly filed and examined around the world and yet "no material prior art has been cited" referring to the complaint (CPF E2); that no promise of commercial production was offered using a single vessel for carbonating, cooling, and solidifying referring to an affidavit of the inventor (CPF B17); and that the '910 process enabled the production of carbonated candy on a commercial scale by gasifying a candy melt in a first pressure vessel and transferring the gasified candy, while maintaining under very high pressure, to a second pressure vessel for cooling without losing carbonation, (CPF B18). ^{11/}

In Texas Instruments v. ITC 846 F.2d at 1369, 6 USPQ2d at 1888, commenting on the concept of a pioneer invention, the Federal Circuit noted that the Supreme Court in Westinghouse v. Boyden Power Brake Co., 170 U.S. 537, 562 (1998), characterized a pioneering invention as "a distinct step

^{11/} Complainants have not argued that the '457 patent is a pioneer patent.

in the process of the art, distinguished from a mere improvement or perfection of what had gone before" and that courts early recognized that patented inventions vary in their technological or industrial significance. However, the Court concluded that there is not a discontinuous transition from "mere improvement" to "pioneer". History, it was said, shows that the rules of law governing infringement determinations are amenable to consistent application despite the variety of contexts that arise. Moreover, it noted that the judicially "liberal" view of both claim interpretation and equivalency accorded a "pioneer" invention, citing Morely Sewing Machine Co. v. Lancaster, 129 U.S. 263 (1889), is not a manifestation of a different legal standard based on an abstract legal concept denominated "pioneer". Rather, it concluded that a "liberal" view flows directly from the relative sparseness of prior art in nascent fields of technology. ^{12/}

The administrative law judge determines that there was not a relative sparseness of prior art in a "nascent" field of technology. Thus the '910 patent itself teaches that the claimed invention relates to "the production of carbonated candy which is a hard candy containing carbon dioxide gas as disclosed in U.S. Pat. No. 3,012,893" (the '893 patent) which issued on December 12, 1961 and has expired (FF 13, 14, 20, 37). The quality of the carbonated candy produced by the '893 patent and the '910 patent is generally similar (FF 42). Moreover not only was the '893 patent cited in

^{12/} Complainants relate the invention in issue to the claimed invention in Texas Inst. (Closing Argument Tr. at 51). In Texas Inst., as noted earlier in this opinion, a prototype of the claimed calculator in issue was accepted for the permanent collection of the Smithsonian's Museum of History and Technology.

the prosecution of the '910 patent but also cited were patents which issued in 1937, 1940 and 1970 and showed the preparation of a confection composition involving providing a flow of gas to a confection mixture (FF 44, 46, 47, 49). In addition the administrative law judge accepts the testimony of Ray Kelly, who was qualified as an expert in industrial food plant processes and in the development of processes for carbonated candy (FF 102), that at the time of the '910 patent application it was generally conventional in preparing confectionary candy products to use on external vessel or other external cooling system separate from the vessel in which the candy was cooked (FF 103, 104). There is testimony that carbonated candy could be made commercially by processes other than by the process of the '910 patent (FF 111, 112). The fact that an invention enjoys commercial success and has some industry impact, as many do, cannot compel a finding that an invention deserves pioneer status. See, Perkin-Elmer v. Westinghouse, 822 F.2d at 1532, 3 USPQ2d at 1324.

In Morley, cited by the Texas Instruments panel, the concept of a "pioneer" patent was first recognized by the Supreme Court. The Court reversed a finding that infringement of Morley's patent on a button-sewing machine was avoided by certain mechanical differences, stating:

"Morley, having been the first person who succeed in producing an automatic machine for sewing buttons of the kind in question upon fabrics, is entitled to a liberal construction of the claims of his patent. He was not a mere improver upon a prior machine, which was capable of accomplishing the same general result; in which case his claims would properly receive a narrower interpretation. This principle is well settled in the patent law, both in this country and in England. Where an invention is one of a primary character, and the mechanical functions performed by the machine are, as a whole, entirely new, all subsequent machines which employ substantially the same means to accomplish the same result are infringements, although the subsequent

machine any contain improvement in the separate mechanisms which go to make up the machine.: [129 U.S. at 273].

The '910 patent in issue was not the first patent that produced carbonated candy. Steps involved in producing the carbonated candy according to the '910 patent were known for the production of a confection mixture.

Based on the foregoing, the administrative law judge determines that the '910 patent is not a pioneer patent.

(b) Zeta Process A

Complainants assert that Zeta Process A infringes the '910 patent under the doctrine of equivalents in that the claimed step h of the '910 patent, viz.

- h. shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments,

is equivalent to the following alleged Zeta Process A step:

When the pressure in
is reduced the candy is shocked, and breaks into
fragments. [13/]

(CPost 25) Complainants also argued that Zeta's alleged "use of

cause shock"; that to the extent that shocking is considered of and not to the vessel, venting fragments the candy and is "the equivalent of a banging the vessel"; and that there is no

13/ Reference is made to the schematic diagrams of the Zeta Process Apparatus. Referring to CX-11, for Zeta Process A.

Thus while the claims of each of the '910 and '457 patents refer only to a first pressure vessel and a second pressure vessel, according to complainants the second pressure vessel in Zeta Process A comprises

evidence of difference in function, operation or result attributed to shocking as opposed to the vessel (CPost at 27 - 28).

Complainants also argued that while respondents indicated that the '910 patent requires that the hot candy melt be transferred from the bottom of the first pressure vessel to the bottom of the second pressure vessel and that Zeta Process A does not do this there is no testimony as to the importance of

in Zeta Process A or at the bottom of the second pressure vessel as in the claims of the '910 patent and that complainants have not asserted critically and respondents have offered no evidence on critically; that the transfer to

; and that the position of is attributed to nothing other than the shape of the container which cannot be basis for non-equivalence and non-infringement when complainants' expert Kleiner and Zeta's Bayes each testified that the function of is independent of shape (CPost at 26, 27).

Moreover, it is argued by complainants that the different shapes of

could not change their essential operation, or function, or change the product substantially and that the evidence shows simply that

and hence the position of is equivalent (CPost at 27).

With respect to the '457 patent, complainants argued that the '457 patent calls for polishing the interior surfaces of the second pressure vessel because these product contacting surfaces, if polished, release the product better; that the product contact surface employed by Zeta Process A is equivalent in that it performs the same function, in the same manner to achieve the same result; that the fact that is of no import in avoiding infringement in view of the testimony of Kleiner and Bayes that the shape of does not change its essential function (CPost at 30, 31).

The staff argued that Zeta Process A does not involve any impacting of the sidewalls of

and therefore does not literally infringe independent claim 1 of the '910 patent. It also argued that the evidence shows that Zeta Process A has no equivalent to step h of claim 1 of the '910 patent which requires shock-treating. Thus the staff argued that while Zeta Process A involves a step which performs the same overall function as shock-treating to obtain the same overall result, specifically, a step which serves to break a solid matrix of candy

in order to facilitate its removal, that step is not performed in substantially the same way as the shock-treating step described in claim 1 of the '910 patent; that whereas the shock-treating step of the '910 patent is performed by impacting the sidewalls of the second pressure vessel, shattering and discharge of the candy are accomplished automatically in Zeta Process A when

(CStaff at 23).

Referring to the '457 patent, the staff argued that the improvement step d of independent claim 1, viz. requiring that the second pressure vessel have a polished inner surface, is not utilized in Zeta Process A; that step d requires, inter alia, introduction of a gas into a second pressure vessel which has "polished inner surfaces" and that there is no evidence that Zeta Process A involves any second pressure vessel with a polished interior surface to aid in the discharge of product; that Zeta Process A employs

Hence
the staff argued that Zeta Process A does not literally claim 1 of the '457 patent (SPost at 24, 25).

The staff further argued that Zeta Process A contains no equivalent to step d of claim 1 of the '457 patent, requiring a second pressure vessel with a polished inner surface; that indeed, in Zeta Process A

Hence the staff contended that claim 1 of the '457 patent is not infringed under the doctrine of equivalents (SPost at 25).

Respondents argued that each of the '910 and '457 patents required that the hot candy melt be transferred from the bottom of its container to the bottom of the cooling container and that in Zeta Process A that

not occur. Respondents also argued that the '910 patent requires shock treating the pressure vessel; that in Zeta Process A

is not shock treated to release the candy; that the '457 patent requires that the second pressure vessel, namely, the cooling vessel, be polished to facilitate the release of the candy; that in Zeta Process A any second pressure vessel is not polished; that complainants try to ignore the limitations of the claims and contend that both the '910 and '457 patents have the same scope, viz. a two-vessel system having a hot vessel and a cooling vessel; and that there is no authority which allows complainants to ignore the specific limitations in the claims in issue, particularly where those limitations were disclosed in the specifications as being particular advantageous over the prior art (ZPost at 16).

Complainants in rebuttal, as to the '910 patent and the arguments of Zeta and the staff argued that complainants' witnesses Kirkpatrick and Kleiner made it clear that venting is also shock-treating just as depressurizing an aircraft shocks it; and that the word "shock" can be interpreted in two ways, i.e. one way as a physical banging and the other way as release of the pressure "which is required to open the tube in any case, and so, a shock would ensue without any physical treatment" (CPost R at 10 to 15).

Referring to the '457 patent, and to the argument of Zeta and the staff that the polished limitations is not met complainants in rebuttal argued that the product-contacting surfaces of both Zeta Process A and the second pressure vessel of the '457 patent are "prepared to release the product better" (CPost R at 17).

The staff in rebuttal, as to the '910 patent, argued that Zeta Process A achieves shattering and removal of the candy without physically impacting the sidewalls of _____; that the use of _____ in Zeta Process A merely _____ and is not used to shatter the candy; that _____ and is not used to shatter candy; and that venting of the second pressure vessel does not require any physical impact to the cooling vessel or to the candy itself (SPost R at 9, 10).

The staff, as to the '457 patent, argued that the surface of _____ employed in Zeta Process A does not perform the same function to obtain the same result as the polished inner surface described in the '457 patent; that in the process described by the '457 patent, the function of the polished inner surface is to prevent candy from sticking to the walls of the cooling second pressure vessel to aid in the discharge of product from that vessel; that in contrast, the function of

in Zeta Process A is to prevent candy from sticking to _____ (features it is argued which are not even present in the '457 patent) - not the walls of the cooling vessel -

not to allow candy to discharge from _____ pressure vessel; and that since there is no evidence that

in Zeta Process A perform the same function, in the same manner to achieve the same result as the polished inner surface of the cooling vessel described in the '457 patent, Zeta

Process A does not infringe the '457 patent under the doctrine of equivalents (SPost R at 11).

Respondents as to the '910 patent in rebuttal argued that the position of complainants on shock-treating is totally at variance with the clear description in the '910 patent that shock-treating and venting are separate steps, a fact said to be admitted not only by complainants' Kirkpatrick but also by complainants' Kleiner (ZPost RC at 3).

(i) The '910 Patent

The administrative law judge agrees with complainants that the position of _____ in Zeta Process A is equivalent to the position of transfer as claimed in the '910 patent under the doctrine of equivalents. However he finds that Zeta Process A does not contain the step h of independent claim 1 of the '910 patent under the doctrine of equivalents.

Complainants are correct in their argument that there is no requirement that those skilled in the art know, at the time a patent application is filed, of the asserted equivalent of performing a claimed function and that any equivalence is determined when the infringement takes place. See, Atlas Power Co. v. E.I. du Pont de Nemours & Co., 750 F.2d 1569, 1581, 224 USPQ 409, 417 (Fed. Cir. 1984) and American Hospital Supply Corp. v. Travenol Laboratories, Inc., 745 F.2d 1, 8, 223 USPQ 577, 583 (Fed. Cir. 1984). Technological "embellishment" made possible by a patent's disclosure "does not allow the accused [device] to escape the 'web of infringement'". Hughes Aircraft Co. v. United States, 717 F.2d at 1365, 219 USPQ at 483 (quoting Bendix Corp. v. United States, 600 F.2d 1364, 1382, 204 USPQ 617, 631 (Ct. Cl. 1979)). Devices that have been modified

to such an extent that the modification may be separately patented may nonetheless infringe the claims of the basic patent. See, Atlas Power, 750 F.2d at 1580, 224 USPQ at 417. Similarly, the modification of an accused device does not negate infringement when that device has adopted the features of the claims or their equivalents. See, Radio Steel & Manufacturing Co. v. MTD Products, Inc. 731 F.2d 840, 847-48, 221 USPQ 657, 663-64 (Fed. Cir.), cert. denied, 105 S. Ct. 119 (1984); Amstar Corp. v. Envirotech Corp. 730 F.2d 1476, 1482, 221 USPQ 649, 653 (Fed. Cir.), cert denied, 105 S. Ct. 306 (1984).

The Federal Circuit has not set out a definitive formula for determining equivalency between a required limitation or combination of limitations and what has been allegedly substituted therefor in an accused process. See, Corning Glass, supra. Complainants however bear the burden of establishing infringement under the doctrine of equivalents W.L. Gore & Associates, Inc. v. Garlock Inc., 842 F.2d at 1275, 6 USPQ2d at 1282.

It is fundamental that while the claims limit the invention, and specifications cannot be utilized to expand the patent monopoly, claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention. United States v. Adams, 383 U.S. 29, 48-49 (1966). The ordinary meaning of claim language is not dispositive and resort must be had not only to the specification but also to the prosecution history to determine if the inventor used the disputed terms differently than their ordinary accustomed meaning. ZMI Corp. v. Cardiac Resuscitator Corp., 844 F.2d 1576, 6 USPQ2d 1557, 1560 (Fed. Cir. 1988). Every patentee may be his own lexicographer. Shelcore, Inc. v. Durham Indus., Inc., 221 USPQ 891 (E.D. Pa. 1984), aff'd, 745 F.2d 621, 223

USPQ 584 (Fed. Cir. 1984). The presence of an express limitation in one claim negatives an intent similarly to limit by implication a claim in which the limitation is not expressed. See Rite-Hite Corp. v. Kelley Company, Inc. 819 F.2d 1120, 2 USPQ2d 1915 (Fed. Cir. 1987). The scope of a claim is not to be limited to a specific embodiment Locite Corp. v. Ultraseal Ltd., 781 F.2d 861, 867, 728 USPQ 90, 93 (Fed. Cir. 1985).

Independent claim 1 of the '910 patent contains ten distinct steps, viz. (a) thru (j) conclusive, which steps are prefaced by the term "comprising". There is no specific requirement in the claims that each of the ten steps follow any particular sequence (FF 18). Step h of claim 1 states:

"shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments"

Dependent claims 2 to 9 in issue, which are the remaining claims of the '910 patent, incorporate by reference step h of independent claim 1 with the exception of claim 7 which expands step h as follows:

"the shock treatment of the second pressure vessel is effective to shatter the gas-containing solid matrix into granular particles which are relatively uniform in size." [Emphasis added]

(FF 18). However, as seen from the above, all of the claims of the '910 patent thus explicitly call for shock treating the second pressure vessel in order to shatter the solid matrix of carbonated candy. Nevertheless while the administrative law judge has found that there is no literal infringement because there is no "shock-treating" of the second pressure vessel in Zeta Process A, the claims are to be construed in light of the '910 specification and both are to be read with a view to ascertaining the invention.

Referring to the '921 specification, under the subheading "Background of the Invention", the named inventor Kirkpatrick in 1975 teaches that not only would it be highly desirable if a simple method were desired for cooling the carbonated candy in a vessel separate from the one in which the candy was originally infused with gas, but also that it would be highly desirable if the product could be removed from that vessel in a relatively uniform particle size and that it would be desirable to have a minimum of product remain adhering to the interior walls of said vessel (FF 21). Hence Kirkpatrick specified three distinct objectives.

Thereafter Kirkpatrick under the subheading "Summary of the Invention", stated that the invention relates to a method of making a granular carbonated candy; that a hot candy melt is gasified in a first pressure vessel; that next while the melt is still at elevated temperature and pressure, it is transferred to a second pressure vessel; that the product is passed from the first pressure vessel through a line to the bottom of the second pressure vessel which is initially maintained at a temperature and pressure equivalent to the first vessel; that the transfer is effected by maintaining the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel to atmosphere; and that:

"[w]hen the transfer is complete, the vent is closed and the second pressure vessel is isolated. Next, the second pressure vessel is cooled to a temperature below 70°F. while maintaining superatmospheric pressure within the vessel so that the gasified hot melt becomes a gas-containing solid matrix. Next, the second pressure vessel is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments. The pressure in the second pressure vessel

is released and the product is allowed to fall out".
(Emphasis added) (FF 22)

Thus in the summary of the invention section Kirkpatrick teaches that the second pressure vessel is shock-treated to shatter the carbonated candy and then the vessel is vented.

Under the subheading "Detailed Description of the Invention", Kirkpatrick teaches that a first pressure vessel is charged with the hot candy melt; that the melt is maintained at a temperature above 200° and preferably between 315° and 325°F; that into the headspace between the top of the liquid level of the candy melt and the top of the pressure vessel a gas is admitted at superatmospheric pressure; that agitation of the melt, plus the pressure of the gas causes the gas to be incorporated within the candy melt; that a second pressure vessel is connected to the first pressure vessel by means of a line or manifold of lines, said line or lines having means to isolate the vessels from each other; that while the candy melt is being gasified in the first pressure vessel, the valve is in the closed position; that a gas is admitted to the second vessel so that there is no pressure differential between the two vessels; that additionally, the second vessel and transfer lines are heated to approximately the same temperature as the first vessel and thus, at the end of the mix cycle, when the valve and the line connecting the two vessels is opened, no transfer takes place; that the gas inlet on both vessels is located in their topmost portion; that the connecting line goes from the bottom of the first pressure vessel to the bottom of the second pressure vessel; that regulator valves are used on the gas lines to maintain particular pressures; that the second vessel has a venting means on its topmost portion; that to

accomplish the transfer between the vessels, the regulator of the first vessel is set to a value slightly higher than the second vessel and the vent on the second vessel opened; that the pressure differential and the venting causes the candy melt to transfer from the first vessel to the second vessel; that at all times the candy solution must be maintained at superatmospheric pressure prior to cooling and the subsequent transformation of the melt to a crystal structure; that the candy melt in the second pressure vessel is allowed to cool to a temperature below 100°F and preferably below 70°F, all the while maintaining the pressure at the original gasifying pressure, that:

"[w]hen the cooling cycle is complete, the vent is again opened to allow any free gas to escape. Now the product exists in the cooling tube as a solid gas-containing matrix. Next the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments. When the sidewalls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy. Thus, the walls of the cells containing many bubbles of pressurized carbon dioxide break completely and the gas within is exploded. The combination of impact [14/] and exploding bubbles of carbon dioxide reduce the solid mass within the tube into many fine particles. The bottom of the cooling tube can now be opened and the product removed. (Emphasis added) (FF 24).

Thus in the detailed description of the invention section Kirkpatrick again teaches that shock-treating the second pressure vessel shatters the solid matrix of carbonated candy. Here the venting is described as occurring before the shock-treating step.

14/ Impact is defined as -- n 1 a: the act of impinging or striking (as of one body against another or of a stream squarely against a fixed or moving surface), b: a forceful contact, collision or onset..., 2: the force of impression of one thing on another.... Webster's Third New International Dictionary at 1131 (1976).

The sole example of the '910 patent reads in pertinent part:

... When all of the candy melt is transferred to the cooling tube, the ball valve and then the vent needle is closed. Water, at 60°F., is circulated in the jacket of the cooling tube for 3 hours to reduce the temperature of the product to 70°F. The product at this temperature exists as a solid gas-containing matrix.

The transfer, water and gas lines are disconnected from the cooling tube and any free gas in the tube is released by opening the vent valve. Next, the sidewall of the tube is struck with a 3-pound sledgehammer, the bottom flange of the cooling tube is removed and the product is allowed to fall out.

The resultant product is a hard candy containing carbon dioxide gas which when placed in the mouth produces an entertaining popping sensation. The particles are granular in form and relatively uniform in size. [Emphasis added] (FF 25).

In the only example of the '910 patent venting of the second pressure vessel, i.e. releasing any free gas in the vessel, is done before the sidewall of the second pressure vessel is struck with a sledgehammer. ^{15/}

A patentee can be his own lexicographer. However nowhere is it suggested in the '910 patent that the claimed phrase "shock-treating the second pressure vessel" can be expanded to read on anything that caused the gas-containing solid matrix of carbonated candy to be shattered into multiple fragments as the named inventor Kirkpatrick testified in 1989 (FF 121). To the contrary the administrative law judge determines that in the detailed description of the invention, quoted above, the use of the term "shock-treated" is consistent with the ordinary dictionary meaning of shock ^{16/} which entails a forceful impact or collision of the vessel, and

^{15/} The file wrapper of the '910 patent gives no meaning to the term "shock-treating" (FF 43 to 49).

^{16/} Shock -- 1. a sudden and violent blow or impact; collision. Random House Dictionary of the English Language at 1767 (2d Ed. 1987). Shock absorber -- a device for damping sudden and rapid motion, as the recoil of a spring-mounted object from shock. Id. Shock -- 2 a(1): a violent

that the use of the term "impact" shows that there must be movement or vibration of the second pressure vessel transmitted to the cooled solidified candy melt matrix resulting in shattering of the carbonated candy matrix. While the named inventor Kirkpatrick does not clearly limit the term "shock-treating" to a shock whose point of impact is the sidewall of the vessel, and the language of step h does not state a requirement that the sidewall of the vessel be shocked, as indicated by the detailed description of the invention in the '910 patent, noted above, and the language of step h, any shock must be transmitted to the portion of the vessel contacting the cooled candy melt in order for the cooled solid carbonated candy matrix to shatter as a result of the shock imparted to the vessel.

Thus the '910 specification teaches that (1) according to the summary, the second pressure vessel is shock-treated so that the gas-containing solid matrix is shattered and then the pressure in the second pressure vessel is released or (2) according to the detailed description, the second pressure vessel is vented by allowing any free gas to escape and next the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments, and (3) according to the only example, the second pressure vessel is vented by releasing any free gas and next the

shake or jar: blow, collision, concussion, (2) an oscillation, loss of equilibrium, or other effect of such violence. Webster's Third New International Dictionary, at 2099 (1976). Shock absorber --1: any of several devices for absorbing the impact of sudden impulses or shocks: as (a) a spring, pneumatic or hydraulic device used on an automobile in addition to the regular springs to lessen the shocks from unevenness of the road, (b): a spring or damped elastic device interposed between the wheels, floats, or tail skid, and the rest of an airplane to secure resiliency in taxing and landing. Id.

sidewall of the tube is struck with a sledgehammer. There is nothing in the '910 specification which suggests that any venting of the second pressure vessel, recited in step i of independent claim 1 of the '910 patent and each of the dependent in issue, claims would cause the gas-containing solid matrix of carbonated candy to shatter into multiple fragments. To the contrary it is found that the '910 specification, consistent with all of the claims of the '910 patent, teaches that venting the second pressure vessel step and shock-treating the second pressure vessel step are distinct steps and that it is the shock-treating of the second pressure vessel steps which causes the gas-containing solid matrix of carbonated candy to shatter into multiple fragments. 17/

The teaching of the '910 patent, with respect to shattering a solid matrix of carbonated candy, is in distinct contrast to the teaching of the '457 patent which issued on January 4, 1977, less than three months after the October 12, 1976 issuance of the '910 patent and which was based on an application filed July 1, 1976 which is less than a year after the October 1, 1975 filing of U.S. Ser. No. 618,603 on which the '910 patent is based. As seen from those dates the pendency of the two applications in the Patent

17/ In 1989, some thirteen years after the October 12, 1976 issuance of the '910 patent (FF 17) the named inventor Kirkpatrick departed from the teaching of the '910 patent and took the position that venting the second pressure vessel and shocktreating said vessel "are really all a combination together" (FF 120) and that the "venting and the shock treatment are very, very closely tied to being one and the same" (FF 121). However, he also made it clear, in responding to a query from the bench, that "just the venting" of the second pressure vessel causes the solid matrix of carbonated candy to shatter (FF 122, 123).

Office was overlapping. The '457 patent is assigned to General Foods and the sole named inventor is Joseph L. Hegadorn (FF 26). 18/

Under the subheading "Background of the Invention", inventor Hegadorn in the '457 patent states that his invention relates to the production of carbonated candy which is a hard candy containing carbon dioxide gas as disclosed in the '893 patent and U.S. Ser. No. 618,603 (the '910 patent) which disclosures were said to be incorporated in the '457 patent by reference (FF 29).

The administrative law judge finds it significant that in the '457 patent inventor Hegadorn, a man having some skill in the carbonated candy art, stated:

U.S. Ser. No. 618,603 discloses a method of cooling the hot melt in a separate pressure vessel. The removal of the solidified candy is still a difficult task. The cooling vessel must be impacted to break the solidified mass. Such impact usually causes a major portion of the solid matrix to be reduced to granular form. However, much material remains adhering to the walls of the pressure vessel. Occasionally large amounts of product remain segmented or isolated within the tube. It is then necessary to manually remove the solidified product from the tube. Often the product is so tightly packed in the tube that the only viable method of removal is to wash down the entire cooling tube. The above problems result in non-uniform product quality and size and, of course, much waste and loss of production. (FF 32) [Emphasis added]

Still in another portion of the '457 patent, inventor Hegadorn under a detailed description of his invention stated in pertinent part:

The candy melt in the second pressure vessel is allowed to cool to a temperature below 100°F. and preferably below 70°F., all the while maintaining the pressure at the original gasifying pressure, i.e. 600 p.s.i. At this point in the process, prior

18/ The '910 and '457 patents on their face show that General Foods' Attorney Richard Kornutik, who is now president of complainant Pop Rocks, was involved in obtaining the patents (FF 3). Moreover Kornutik's deposition confirmed that he prosecuted the patent applications that led to the '910 and '457 patents (FF 151).

art workers would vent the cooling tube and next attempt to remove the product of the interior of the tube and reduce the matrix to multiple fragments by impacting the sidewalls of the tube typically with a sledge hammer. The product tenaciously adheres to the inner surfaces of the cooling tube. Removal of all product is difficult and often incomplete. The excessive shock treatment necessary to remove the candy has a detrimental effect on product quality. Typically, 50-60% of the product when shock treatment is employed is fines (particle sizes which are too small to be included with the final product). (FF 36)
(Emphasis added)

Hence General Food's inventor Hegadorn in the '457 patent in 1976 consistent with the teaching of the '910 patent recognized that the method of the '910 patent includes two distinct steps, i.e. (1) venting the second pressure vessel and (2) shock-treating the second pressure vessel which involved impacting walls of the second pressure vessel and also that it was the shock-treating step h which shattered the solid matrix of carbonated candy.

Under the subheading "Summary of the Invention" inventor Hegadorn teaches in the '457 patent that his invention relates to a method of making a granular carbonated candy; that a hot candy melt is gasified in a first pressure vessel; that next, while the melt is still at elevated temperature and pressure, it is transferred to a second pressure vessel which has polished inner surfaces; that the product is passed from the first pressure vessel through a line to the bottom of the second pressure vessel which is initially maintained at a temperature and pressure equivalent to the first vessel; that the transfer is effected by maintaining the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel to atmosphere; that when the transfer is complete, the vent is closed and the second pressure vessel is isolated;

that next the second pressure vessel is cooled to a temperature below 70°F. while maintaining superatmospheric pressure within the vessel so that the gasified hot melt becomes a gas-containing solid matrix; and that "next, the second pressure vessel is vented to atmosphere so that the sudden change in pressure causes the gas-containing solid matrix to shatter into multiple fragments and release from the inner polished surfaces of the cooling vessel (FF 33).

Consistent with the above summary teaching the sole independent claim 1 of the '457 reads in pertinent part:

1. A method of making a carbonated candy which comprises:

* * *

- h. venting the second pressure vessel which causes the matrix to shatter into multiple fragments, and.... [Emphasis added]

(FF 27). There is no suggestion in the '457 patent that the claimed method of making a carbonated candy in the '457 patent includes the step h of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments". To the contrary Hegadorn in the '457 patent teaches that such a step "has a detrimental effect on product quality" (FF 36) and as seen from the sole independent claim of the '457 patent it is the venting of the second pressure vessel which causes the solid matrix of carbonated candy to shatter.

The named sole inventor Paul Kirkpatrick of the '910 patent in 1989, some thirteen years after his '910 patent, in describing his "present day" understanding of the claimed invention of the '910 patent agrees with inventor's Hegadorn's statements in the '457 patent to the extent that

"venting the second pressure vessel" causes the gas-containing solid matrix to shatter into multiple fragments (FF 122). Implicit in Kirkpatrick's 1989 understanding of his claimed invention of the '910 patent is that the claim 1 physical step h of "shock-treating the second pressure vessel" is unnecessary because it is the venting step i of claim 1 which causes the shattering of the carbonated candy. Thus while Kirkpatrick in 1989 in answering a question posed by his attorney agreed that his patented process, as defined in claim 1 of his '910 patent is "literally followed in the " (FF 114), he testified in 1989 as to the process in the

:
... after permitting the candy to cool and solidify, the pressure in the tube is reduced by venting and the bottom of the cooling tube is opened. The gasified candy which is now solid and contains a large number of high pressure bubbles is shattered by this shock into multiple fragments. [FF 114]

He further testified in 1989 as to the :

A Yes, when you vent the gas out of the head space on the cooling tube, you can actually hear the product begin to shatter inside and that continues the breaking up of the product until the pressure is literally all gone from the tube.

When further, when you take that tube in, we have a

pounds,
possible, and when that cylinder opens, it brings a heavy steel door -- a stainless steel door open with tremendous force.

So, if the product is properly carbonated, the entire batch will discharge from the tube possibly with the exception of any small amount that might bridge that had broken up freely in the top of the tube and might bridge much like a product would do in a bin that you wanted to take out, flour, sugar, that type of thing.

Q What would you do next, then?

A That unit is provided with a
and usually breaks that right out.

Q Do you use any other procedures?

A There's no prescribed procedure other than that (FF
115)

As seen from the above testimony in 1989, it is the venting of the second pressure vessel called for by step i of claim 1 of the '910 patent that shatters the solid matrix of carbonated candy not the step h of the claim which calls for shock-treating the second pressure vessel.

Contrary to Kirkpatrick's teaching in the '910 patent under the subheading "Detailed Description of the Invention" that "[w]hen the sidewalls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy "(FF 24) and in the sole example that "[n]ext, the sidewall of the tube is struck with a 3-pound sledgehammer" (FF 25) inventor Kirkpatrick in 1989 in describing the invention of the '910 patent testified:

Q Did you ever impact the walls of the tube before you opened it?

A There's really no reason to impact the walls before you open it.

Q Did you ever impact the walls of the tube before you opened it?

A I did not. (FF 120)

In 1989 Kirkpatrick testified that the recitation in the only example of the '910 patent that "[n]ext, the sidewall of the tube is struck with a 3-pound sledgehammer" (FF 25) has no effect on properly carbonated candy. Thus he testified in 1989:

A I never had to break up any carbonated candy in the tube. Now, there were glass plugs of non-carbonated candy in the bottom of the tube

and those glass plugs, the candy itself, was impacted with a screw driver and a hammer, and I had to chip that glass out of the bottom. That was not carbonated candy, and that was in the learning process. [19/]

Q So you -- just so I have this clearly, you opened the bottom of the tube and you chipped away at it with a screw driver, you said?

A A screw driver and a hammer. [FF 116]. [Emphasis added] 20/

The named inventor Kirkpatrick further in 1989 in responding to queries from the bench testified:

JUDGE LUCKERN: Just to make sure I understand what you're saying. Are you saying that the step or whatever is said here, the next, the sidewall of the tube is struck with a three-pound sledge hammer, you say that is not necessary

THE WITNESS: Your Honor, that's the only time you would really have to hit anything. And if that flange arrangement were different and safe to remove, tapping that candy with a screwdriver would have been a lot easier and more productive than hitting that tube.

19/ The named inventor Kirkpatrick testified that a glass plug is a non-carbonated candy, a batch that literally for some physical reason did not get made properly; that the most common place for a glass plug to form is at the bottom or discharge end of the tube; and that if the entire batch was non-carbonated, the tube from top to bottom would be a glass plug (FF 117).

20/ This testimony is inconsistent with inventor Hegadorn's 1976 statements in the '457 patent that according to the '910 patent the second pressure vessel "must be impacted" to break the solidified carbonated candy (FF 32) and that workers, according to the teaching of the '910 patent, would attempt to remove carbonated candy from the interior of the second pressure vessel and reduce the matrix of said carbonated candy to multiple fragments by impacting the sidewalls of the second pressure vessel typically with a sledgehammer (FF 36).

JUDGE LUCKERN: I still don't -- you say this is the only time you'd have to do it. I don't know what you're saying when this is the only time. I thought I heard you say that --

THE WITNESS: The only part of the process that would require it is when you have a glass plug in the bottom of the tube from non-carbonation. That's how it got in as an example, to get rid of that before the good candy would come out. But, of course, assuming that we're making all good candy in the process, the shock treatment of just the venting is all you need to break that apart.

JUDGE LUCKERN: You mean, just the venting.

THE WITNESS: Yes, sir. [FF 123] [Emphasis added]

As seen from the following testimony, Kirkpatrick did testify that the cooling tube in his process as practiced in _____ was hit on occasion by lazy workers but only to get bridged carbonated material out at the top of the second pressure vessel:

THE WITNESS: Okay. After the plant was operating in _____, there was a need for safety instructions for the people in the plant. I told you the procedure to be followed to take out any carbonated candy that had bridged in the tube was _____. Those tubes were copied from a General Foods version that went to Korea that came back with that same metal plate on them that General Foods had, and the operators got into the habit of hitting it rather than _____. It seemed to be easier than to _____

When we were there, we would stop that, but just in the safety, I didn't want anyone to get hurt, and I didn't want the equipment damaged, so I said never, ever, ever strike it, because at time, the people don't know, they would hit it someplace where it was not be safe to hit it.

BY MR. DUTY:

Q So I understand your testimony, and correct me if I'm wrong, that in lieu of the -- I'm sorry, how you explain it -- _____ instead of using that process, you could hit the striker plate with a hammer and achieve the same results?

A This was only the bridged material. If the product was so solid that it wouldn't come out upon opening of the bottom door, then you had to chip that candy away, or you had to steam the tube. In other words, you had made a faulty or a defective batch. A good batch of candy will exit the tube when the door opens.

* * *

Q Was the tube hit in order to get additional material out of it, as far as you know?

A The tube has been hit to get the bridged material out of the top by people who were too lazy to

Q And you used the word "bridged" material. Is bridge another glass plug?

A Bridge is not a glass plug. Just like flour bridging in a huge hopper over a dough mixer bridges, and they simply put a vibrator on a dough hopper, a flour hopper and clear that.

* * *

THE WITNESS: What I refer to as bridging is free-flowing material that has packed due to its own nature.

* * *

Q So they would hit the tube -- as I understand it, they would hit the tube in order to get that bridged material out on occasion.

A On occasion. [FF 116, 117A]

As seen from the above 1989 testimony of the sole named inventor on the '910 patent, any impacting of the second pressure vessel done by lazy workers on occasion at the Buffalo plant had nothing to do with shattering a carbonated solid matrix into multiple fragments. It is the named inventor Kirkpatrick's testimony in 1989 when describing the claimed invention of the '910 patent that "When you vent the gas out of the tube, you do the shocking, Your Honor" (FF 122). Step i of independent claim 1 of the '910 patent states "venting the second pressure vessel". Hence in

1989 according to inventor Kirkpatrick, when one does step i, one does the shocking. If follows that step h of claim 1 of the '910 patent "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments" is unnecessary and moreover only necessary to shatter non-carbonated candy.

The 1989 testimony of complainants' technical expert Kleiner is to the same effect as the named inventor Kirkpatrick's testimony, viz. it is only the venting that causes the shattering by the solid carbonated candy. Thus Kleiner testified:

Q You testified that the development took place in stages. First there was a stage when you struck the tube in order to shock treat it, and the later on, because of the development of the process, it was no longer necessary to shock the tube; is that right?

A I believe that's what I said. When I -- the one time I was in I was somewhat amused by the fact that the tubes had to be struck with a hammer to release the Pop Rocks, but it's my understanding that that didn't always need to be done.

I spent three years in making Pop Rocks in both a laboratory setting and a pilot scale setting, which is kind of a scaled down version of a commercial operation, but otherwise quite similar, and never in my experience, had a need to physically hit a tube to release the candy.

If the candy is made properly or under the precise conditions on which it is best made, simply releasing the pressure in the tube is sufficient so-called shock to break up the structure into fine granules so that they release freely flowing when the tube is opened.
[FF 144]

Implicit in the 1989 testimony of complainants' technical expert Kleiner is that step h of independent claim 1 of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments" is not only unnecessary but indicative

that the carbonated candy is not properly made. Also complainants' expert Kleiner in 1989 testified that the '910 patent specification indicates that the shock-treating recitation of the '910 patent is distinct from any venting, as follows:

Q Then it says "next, the cooling tube is shock treated so that the gas containing solid matrix is shattered into multiple fragments." Does that indicate to you that that's another step other than venting?

* * *

A THE WITNESS: What was that again? Yes, I remember. Yes. My answer would be yes. It implies that another step was taken. [FF 145]

In Texas Instruments, the Federal Circuit did reiterate its caution against limiting a claimed invention to preferred embodiments or specific examples in the specification. Significant to the Court's affirmance of no infringement under the doctrine of equivalents is its following cautionary language:

The determination of equivalency by its nature is inimical to the basic precept of patent law that the claims are the measure of the grant. Aro Manufacturing Co. v. Convertible Top Replacement Co., 365 U.S. 336, 339, 128 USPQ 354, 356-57 (1961). The doctrine of equivalents, ubiquitous since its origin in Winans v. Denmead, 56 U.S. (15 How.) 330 (1853), exists solely for the equitable purpose or "prevent[ing] an infringer from stealing the benefit of an invention." Graver Tank, 339 U.S. at 608, 85 USPQ at 330. To achieve this purpose, equivalency is judicially determined by reviewing the content of the patent, the prior art, and the accused device, and essentially redefining the scope of the claims. This constitutes a deviation from the need of the public to know the precise legal limits of patent protection without recourse to judicial ruling. For the occasional pioneering invention, devoid of significant prior art -- as in the case before us -- whose boundaries probe the policy behind the law, there are no immutable rules. We caution that the incentive to innovation that flows from "inventing around" an adversely held patent must be preserved. To the extent that the doctrine of equivalents represents an exception to the requirement that the claims define the metes and bounds of the patent protection, we harken to the wisdom of the Court in Graver

Tank, that the purpose of the rule is "to temper unsparing logic" and thus to serve the greater interest of justice. [Emphasis added]

Texas Instruments 805 F.2d at 1572, 231 USPQ at 841-842.

The majority in Pennwalt, which affirmed a holding of no infringement under the doctrine of equivalents, referred to the following language of

Perkin-Elmer v Westinghouse:

One must start with the claim, and though a "non-pioneer" invention may be entitled to some range of equivalents, a court may not, under the guise of applying the doctrine of equivalents, erase a plethora of meaningful structural and functional limitations of the claim of which the public is entitled to rely in avoiding infringement Though the doctrine of equivalents is designed to do equity, and to relieve an inventor from a semantic strait jacket when equity requires, it is not designed to permit wholesale redrafting of a claim to cover non-equivalent devices, i.e., to permit a claim expansion that would encompass more than an insubstantial change. (Citations omitted).

...[I]n applying the doctrine of equivalents, each limitation must be viewed in the context of the entire claim ... "It is ... well settled that each element of a claim is material and essential, and that in order for a court to find infringement, the plaintiff must show the presence of every element or its substantial equivalent in the accused device." Lemelson v. United States, 752 F.2d 1538, 1551, 224 USPQ 524, 533 (Fed. Cir. 1985) (footnote omitted). To be a "substantial equivalent," the element substituted in the accused device for the element set forth in the claim must not be such as would substantially change the way in which the function of the claimed invention is performed. [Emphasis added]

Id. 833 F.2d at 931, 4 USPQ2d at 1739, 1749.

While an equivalent must be found for every limitation of a claim somewhere in an accused process it need not necessarily be in a corresponding component. However in Corning Glass, supra, the Federal Circuit noted that the claim of a '915 patent in issue (see supra) required the particular structural relationship defined in the 915 patent specification for the core and cladding to function as an optical waveguide

and that the '915 specification had set forth in detail "the complex equation for the structural dimensions and refractive index differential necessary, in accordance with the invention", for an optical waveguide fiber that comprised a fused silica core and cladding to transmit preselected modes of light. Corning Glass, 868 F.2d at 1251, 9 USPQ2d at 1966. Thereafter the Federal Circuit noted that when the limitations of paragraph (b) of the claim in issue (see supra) were analyzed individually, the accused fibers literally met the limitation that the fiber be composed of a core of fused silica as well as the limitation that "the index of refraction [of the core] is of a value greater than the index of refraction of said cladding layer". The questions of equivalency then centered according to the Federal Circuit on the part of the claim in issue following the word "core", namely, "to which a dopant material ... has been added to a degree in excess of that of the cladding layer". If those limiting words were met equivalently, no "element", i.e. limitation of the claims in issue, was missing Id., 868 F.2d at 1251, 9 USPQ2d at 1968. The Federal Circuit observed that the district court in particular, after explaining how the negative dopant of the accused fiber work, had found:

[t]he use of fluorine as a [negative] dopant [the district court having noted in the same paragraph that fluorine was a dopant which negatively alters the index of refraction] in the cladding thus performs substantially the same function in substantially the same way as the use of a [positive] dopant in the core to produce the same result of creating the refractive index differential between the core and cladding of the fiber which is necessary for the fiber to function as an optical waveguide (and which was so taught in the '915 specification).

Id. 868 F.2d at 1251, 9 USPQ2d at 1969. In Corning Glass the "substantially the same way" requirement of the doctrines of equivalents

was met when the claimed "structural elements" were read in light of the functional claimed limitation "so that the index of refraction thereof is a value greater than the index of refraction of said cladding layer" and the structural elements and functional limitations taken together were found equivalently in the accused fiber. In Corning Glass the decision rested on the index of refraction differential between the cladding layer element in what the Federal Circuit designated as paragraph (a) of the claim in issue and remaining core layer element in paragraph (b) of said claim which the '915 patent specification taught was essential for an optical waveguide fiber.

In this investigation there is nothing in the specification of the '910 patent describing the claimed functional recitation "so that the gas-containing solid matrix is shattered into multiple fragments" of step h of claim 1 other than the teaching that impacting the second pressure vessel results in the shattering which is consistent with "shock-treating the second pressure vessel" of step h. In this investigation to accept complainants' argument that in the '910 patent claims it is the venting that fragments the candy, one has to eliminate the functional recitation, viz. "so that the gas-containing sold matrix is shattered into multiple fragments", in step h of claim 1 and transpose that functional limitation to step i of said claim. Moreover one has to eliminate not only the remaining portion of step h of said claim but in addition ignore specific language in the '910 specification describing the "summary of the invention", the "detailed description of the invention" and the only example. For example in addition to the sole example indicating a need to use a 3-pound sledgehammer, the detailed description states that after

venting the second pressure vessel," the product exists in the cooling tube as a solid gas-containing matrix" (FF 24, 25). Such is inconsistent with inventor Kirkpatrick's testimony of 1989 that venting shatters the matrix (FF 122, 123).

The only support offered by complainants for such revision of claim 1 is testimony of the sole named inventor and complainants' technical expert some thirteen years after the '910 patent issued. Such 1989 testimony is found to result in a claim expansion of claim 1 of the '910 patent which Perkin-Elmer v Westinghouse and Texas Instruments have condemned.

For the foregoing reasons the administrative law judge finds that venting is not the equivalent of the claimed step h of independent claim 1 of the '910 patent, viz: "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments."

While complainants argued that the use of an impact wrench cause shock, complainants admit that is employed in Zeta Process

A (CPF F39, F40).

Complainants argued that

is commonly known to cause mechanical vibration to a workpiece due to its inherent manner of operation and relies in their CPF P42 on certain testimony of Zeta's Bayes to support their allegation that Zeta's use of

is equivalent to "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments." Complainants' reliance of the testimony of Bayes is taken out of context. Thus Bayes testified:

Q

A

Q

[Translation follows:]

A [As translated:]

Q

[Translation follows:]

A [As translated:]

Q Thank you. [Tr. at 830, 831] [Emphasis added]

The administrative law judge finds that the above testimony of Bayes does not support a finding that the use of _____ by Zeta is the equivalent of "shock-treating the second pressure vessel". There is no evidence which establishes that the use of _____ transmits sufficient vibration to _____ to constitute a shock to the vessel or even to the carbonated candy.

Relying on a portion of a video tape, complainants argued that the use of _____ in Zeta Process A creates a vibrational impact to _____ (CPF F37). The _____ in Zeta Process A

The administrative law judge finds

that the evidence of record does not establish that shatters
a gas-containing solid matrix of carbonated candy in
into multiple fragments.

Based on the foregoing the administrative law judge finds that complainants have not satisfied their burden in establishing that Zeta Process A operates in substantially the same way as the claimed invention and hence that they have not established that said process infringes any claim of the '910 patent through application of the doctrine of equivalents.

(ii) The '457 Patent

Complainants, in support of their argument that Zeta Process A infringes the claims of the '457 patent under the doctrine of equivalents proposed that

is the equivalent of a polished surface in that it performs the same function, in the same way, to get the same result (CPF F54 to F60, F62).

Referring to the "polished inner surfaces" of the second pressure vessel claimed in the '457 patent, Hegadorn in the '457 patent states that

it would be highly desirable if a simple method were devised which would permit complete uniform removal of the carbonated candy from the second pressure vessel (FF 32). He teaches that according to the process of his invention, a first pressure vessel is charged with the hot candy melt. The melt is maintained at a temperature above 200°. Into the first pressure vessel is admitted a gas at superatmospheric pressure, between 50 p.s.i. and 1,000 p.s.i. Agitation of the melt, plus the pressure of the gas then causes the gas to be incorporated within a candy melt. A second pressure vessel which has "polished inner surfaces" is connected to the first pressure vessel by means of a line, said line having means to isolate the vessels from each other. While the candy melt is being gasified in the first pressure vessel, a valve between the first and second vessels is in the closed position and a gas is admitted to the second vessel so that there is no pressure differential between the two vessels. Thus, at the end of the mix cycle, when the valve and the line connecting the two vessels is opened, no transfer takes place. To accomplish the transfer between the vessels, a regulator pressure valve on the first vessel is set to a value slightly higher than the second vessel opened. The pressure differential and the venting causes the candy melt to transfer from the first vessel to the second vessel (FF 34).

Hegadorn teaches further that according to his process, polished inner surfaces of the cooling tube (the second pressure vessel) permit "the product to immediately be released from the sidewalls and break into multiple fragments simply by venting the tube to atmosphere;" that the "interior surfaces of the tube are plated and polished so that they are smooth and free from any irregularities." The amount of fines from the

finished product is then said to be greatly reduced according to claimed process (FF 36).

The administrative law judge finds no equivalent to step d of claim 1 of the '457 patent. While the candy in the second pressure vessel of the claimed process comes in direct contact with the cooled polished inner surfaces of the walls of the second pressure vessel to "permit the product to immediately be released from the sidewalls" (FF 36),

(FF 67, 95). Therefore

In

the Zeta Process A,

(FF 68).

(FF 70).

(FF 72, 73),

(FF 95). Also

uncontradicted is testimony that

(FF 72). What is required is a polished surface.

Based on the foregoing the administrative law judge finds that complainants have not established that Zeta Process A operates in

substantially the same way as the claimed invention and hence that they have not established that said process infringes any claim of the '457 patent under the doctrine of equivalents.

(c) Zeta Process B

Complainants argued that shock-treating a vessel is established as an ordinary manner of removing product and that

is the full equivalent of shock-treating the vessel (CPost at 33).

With respect to the '457 patent, complainants argued that any difference in the inner surface on Zeta Process B and the statement of independent claim 1 that the second pressure vessel has "polished inner surfaces" is so insubstantial as to produce no difference in function, operation or result and to fall fully within the doctrine of equivalents (CPost at 36).

The staff argued that although Zeta Process B does not contain a step which literally complies with step h of claim 1 of the '910 patent, Zeta Process B does have a step which is the equivalent thereof in that there is a step in that process which performs substantially the same overall function in substantially the same way to obtain substantially the same overall result as step h of claim 1 of the '910 patent; that Zeta's Escola testified to the details of Zeta Process B, viz.

It is argued that _____ is the equivalent of the shock-treating step h of claim 1 of the '910 patent, i.e., _____ performs the same overall function _____ in substantially the same way _____ to obtain substantially the same result as impacting the sidewalls of the cooling vessel in claim 1 (SPost at 26-28).

In closing argument the staff elaborated on its portion with respect to infringement of Zeta Process B of claim 1 of the '910 patent as follows (Tr. at 130):

MR. DUTY: Yes, Your Honor,

It's substantially the same way. The same result is achieved.

With respect to the '457 patent the staff argued that Zeta Process B lacks an equivalent of step d, because there is no evidence that Zeta uses a second pressure vessel with any particular surface to perform the same overall function to obtain the same overall result in substantially the same way as the polished inner surface disclosed in claim 1 of the '457 patent; and that therefore, Zeta Process B does not infringe the '457 patent under the doctrine of equivalents (SPost at 28, 29).

Respondents, as they did with Zeta Process A, argued that Zeta Process B does not transfer the hot candy melt from the bottom of its container, does not shock treat the candy in _____ and does not have a second pressure vessel which is polished (ZPost at 16).

Referring to the '457 patent complainants in rebuttal argued that

(CPost R at 19, 20).

Zeta in rebuttal argued that

(ZPost RS at 7).

The staff in rebuttal of Zeta's contentions argued that there is no evidence that a Parr reactor is in any way similar to a cooling tube and

that their functions are disparate and that there is no evidence which would indicate that chipping away at candy in a Parr reactor is equivalent to (SPost R at 14).

(i) The '910 Patent

The administrative law judge agrees with complainants that the position of transfer in Zeta Process B is equivalent to the position of transfer as claimed in the '910 patent under the doctrine of equivalents. However he finds that Zeta Process B does not contain the step h of independent claim 1 of the '910 patent under the doctrine of equivalents.

Thus the '910 patent specification in discussing the prior art '893 patent stated:

[T]he removal [of the candy from the Parr reactor] is not an easy task. The product exists as a solid mass and within this mass is encased the agitator used to mix the product when it was in a liquid state. The product is manually removed by breaking it into small sections with means such as an ice pick. The pieces of carbonated candy thus removed vary greatly in size. No only does the basic method of manually removing create size variations, but by the nature of the carbonated candy itself the gas within it tends to explode on impact and creates particle sizes which are quite random. [Emphasis added] (FF 21).

Thereafter Kirkpatrick stated that one of the "highly desirable" objectives of the '910 patent was to remove the carbonated candy from the second pressure vessel and that it would also be highly desirable to have a minimum of carbonated candy remain adhering to the interior walls of the second pressure vessel (FF 21). According to Kirkpatrick in the '910 patent, such is accomplished when the second pressure is shock-treated so that the gas-containing solid [carbonated candy] matrix is shattered into

multiple fragments" (FF 22, 24, 25). 21/ The administrative law judge can find nothing in the '910 patent that even suggests that Kirkpatrick intended that any portion of the carbonated candy be manually removed from the second pressure vessel.

Based on the foregoing, the administrative law judge determines that Kirkpatrick, at least as taught in of the '910 patent, desired to avoid any manual removing of the carbonated candy from the second pressure vessel by "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments".

Kirkpatrick's coworker Hegadorn in the General Foods' '457 patent in 1976 (FF 26) agreed with Kirkpatrick characterization in the '910 patent that in the technology disclosed in the '910 patent the carbonated candy must be removed from the Parr reactor "manually by breaking it into small sections with means such as an ice pick" (FF 31). Hegadorn also in the '457 patent agreed with Kirkpatrick's statement in the '910 patent that with respect to the teaching of the '910 patent, the second pressure vessel "must be impacted to break the solidified [carbonated candy] mass" although he stated that after such impact:

much material remains adhering to the walls of the pressure vessel. Occasionally large amounts of product remain segmented or isolated within the tube. It is then necessary to manually remove the solidified product from the tube. Often the product is so tightly packed in the tube that the only viable method of

21/ The claimed step h of claim 1 of the '910 patent refers to shattering "the gas-containing solid matrix". The antecedent of "the gas-containing solid matrix" in step h is "the gasified hot melt" in the claim's step g which by cooling becomes a solid matrix. The gasified hot met is what in the claim's step c has been transferred from the first pressure vessel to the second pressure vessel (FF 18). Hence the claim's step h calls for shattering the entire solidified carbonated matrix.

removal is to wash down the entire cooling tube. [FF 32] [Emphasis added]

Hence in 1976 Hegadorn considered manual removal of the carbonated candy from the second pressure vessel a step distinct from the step h of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments".

The staff has argued that in Zeta Process B

is the equivalent of the shock-treating step h of claim 1 of the '910 patent; and that

(Closing argument Tr. at 130).

The staff in its argument implies that in Zeta Process B

The testimony is to the contrary.

(FF 96).

(FF 96). In addition the administrative law judge finds nothing in the record to support the staff's conclusionary statements that

The staff has argued that there is no evidence that a Parr reactor is in any way similar to a cooling tube and that the functions of a cooling tube and a Parr reactor are disparate; and that there is no evidence which would indicate that chipping away at candy in a Parr reactor is equivalent to

Respondents however have not contended that a Parr reactor is equivalent to the second pressure vessel of the '910 patent. It is notoriously old in the prior art to manually remove a solid matrix of carbonated candy from a container as illustrated by the '893 patent and as admitted by Kirkpatrick and Hegadorn (FF 21, 31). Complainants have stated that Zeta employees in the Zeta Process B

(CPF F78). Kirkpatrick in the '910 acknowledges that it

22/ Complainants rely on "the testimony of Zeta that in Zeta Process B (CPost R at 20) [Emphasis added]. It follows that is not equivalent to impacting the tube sidewalls because no in Zeta Process B.

23/ While complainants have relied on testimony of the named inventor Kirkpatrick and their technical expert Kleiner to support their allegations that Zeta Process A and Zeta Process B infringe independent claim 1 of the '910 patent and the '457 patent, the record establishes that neither Kirkpatrick nor Kleiner has any knowledge of Zeta Process A or Zeta Process B.

is old to remove manually carbonated candy from a container with means such as a pick (FF 31).

In view of the foregoing to the extent that

a manual removal of carbonated candy from a vessel is taught in the prior art. In addition the administrative law judge finds lacking any evidence in the record that would support a conclusion, to the extent that Zeta

that such is equivalent to step h of claim 1 of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments". Finally the administrative law judge concludes that equating a manual removal of cooled carbonated candy from a container, which the '910 patent teaches is avoided, to the claimed step h would result in a claim expansion of claim 1 of the '910 of the type which Perkin-Elmer v. Westinghouse, supra, and Texas Instruments supra have emphatically condemned.

Based on the foregoing, the administrative law judge determines that it has not been established that Zeta Process B operates in substantially the same way as the claimed invention and hence it has not been established that the process infringes independent claim 1 of the '910 patent and its dependent claims under the doctrine of equivalents.

(ii) The '457 Patent

Complainants have argued that

and that there is evidence that

They further referred to a dictionary definition

of "polished" ^{24/} for concluding that Zeta Process B infringes the claims in issue of the '457 patent, each of which requires that the second pressure vessel has "polished inner surfaces." Regardless uncontradicted is the testimony of technical expert Kelly who at the hearing examined the inner surface of _____ used by Zeta in Zeta Process B and concluded that the inside surface is absolutely not polished (FF 146, 147). Also uncontradicted is the testimony of Zeta's Escola that he gave no instructions as to polishing

(FF 147).

Based on the foregoing the administrative law judge determines that complainants have not established that Zeta Process B operates in substantially the same way as the claimed invention and hence that they have not established that said process infringes any of the claims of the '457 patent in issue through the doctrine of equivalents.

II. INVENTORSHIP ('910 PATENT)

Respondent Zeta argued that Kirkpatrick at the hearing confirmed his prior testimony that he did not invent the claimed invention of the '910 patent; that Kirkpatrick grudgingly admitted that shock-treating is a separate and distinct step from the step of venting; that when it came time to remove the candy from the cooling tube in his pilot plant, he used a screwdriver against the candy material rather than impact the tube with any implement; that _____ at Hostess, not Kirkpatrick,

^{24/} The term "polish", as a verb refers to an act of making smooth and shiny by rubbing or chemical action. American Heritage Dictionary at 960 (1982). The term "polished" refers to the subsequent condition of the result of the polishing action. Id.

invented the step of shock-treating the second pressure vessel; that the patent attorney Kornutik described and claimed the , and failed to give the inventors credit for the invention, even though they had written the first and only memorandum of invention which claimed that step (ZPost at 26-27). Zeta further argued that the general and evasive testimony of Kirkpatrick that he invented the '910 claimed processes conflicts with his testimony that he did not know what shock-treating was and that he had not invented it (ZPostR at 12-15).

Complainants argued that the '910 patent is not invalid for incorrect inventorship; that the fact that Kirkpatrick asserts that he did not invent "hitting the second pressure vessel with a hammer" does not establish that he is not the inventor of the claimed process, when that step is not set forth in the claim (CPost at 17). It was further argued that Zeta has mischaracterized the facts because Kirkpatrick clearly stated that he did invent the subject matter of the '910 patent; and that to the extent that the work of others is included in the '910 patent, such is permitted, citing Shatterproof Glass Corp. v. Libby-Owens Ford Co., 758 F.2d 613, 225 USPQ 634 (Fed. Cir. 1985) (CPostR at 6-7).

The staff argued that Zeta's 102(f) inventorship defense is without merit, as the shock-treating step h of claim 1 of the '910 patent does not require a hammer pad on a cooling tube. Hence it argued that it is not relevant that were the first persons to place a hammer pad on cooling tubes. The staff further argued that step h requires the sidewalls of the cooling vessel to be impacted, but does not require that that the sidewalls be impacted in any particular manner (SPost at 12-13). It also argued that the fact that Kirkpatrick

used a screwdriver to remove candy in his pilot plant, and the fact that he views shock-treating and venting as separate does not establish non-inventorship; and that there is no evidence of record to support the assertion that _____ invented the step of shock-treating, and were given no credit for the invention by Kornutik (SPostR at 1-2).

Section 102(f) of title 35 is as follows:

A person shall be entitled to a patent unless--

(f) he did not himself invent the subject matter sought to be patented.

Pertinent section 116 of title 35 regarding joint inventorship is as follows:

When an invention is made by two or more persons jointly, they shall apply for patent jointly and each make the required oath, except as otherwise provided in this title. Inventors may apply for a patent jointly even though (1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent.

Whenever through error a person is named in an application for patent as the inventor, or through an error an inventor is not named in an application, and such error arose without any deceptive intention on his part, the Commissioner may permit the application to be amended accordingly, under such terms as he prescribes.

Applicable section 256 of title 35 is also as follows:

Whenever through error a person is named in an issued patent as the inventor, or through error an inventor is not named in an issued patent and such error arose without any deceptive intention on his part, the Commissioner may, on application of all the parties and assignees, with proof of the facts and such other requirements as may be imposed, issue a certificate correcting such error.

The error of omitting inventors or naming persons who are not inventors shall not invalidate the patent in which such error occurred if it can be corrected as provided in this section. The court before which such matter is called in question may order correction of the patent on notice and hearing of all parties concerned and the Commissioner shall issue a certificate accordingly.

The defense of improper inventorship under section 102(f) applies to both misjoinder, i.e. the incorrect naming as an inventor one who was not an actual inventor, and nonjoinder, i.e. the failure to include as a named inventor one who was a co-inventor. Such misjoinder or nonjoinder renders the patent unenforceable, unless and until the inventorship in the patent is corrected. If the misjoinder or nonjoinder occurred as a result of fraudulent intent, rather than the mere error correctable by the Patent Office or a district court under section 256 of title 35, then the patent is invalid. Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 225 USPQ 634, 640-41 (Fed. Cir. 1985); Certain Apparatus for Continuous Production of Copper Rod, 206 USPQ 138, 153 (Comm. Opin. 1979); Certain Nonwoven Gas Filter Elements Inv. No. 337-TA-275 (unreviewed ID May 1988).

The inventorship set out in the patent is presumed valid, and clear and convincing evidence of improper inventorship of the claimed invention must be shown to satisfy a respondent's burden of persuasion, with such a technical defense subject to the closest scrutiny. Amax Fly Ash Corp. v. United States, 182 USPQ 210, 215 (Ct. Cl. 1974). In Morgan v. Hirsch, 728 F.2d 1449, 221 USPQ 193, 195 (Fed. Cir. 1984), the Court rejected the contention of invention by the junior party to an interference who had requested the senior party's fabrication of a certain type of fabric on a certain type of machine, reasoning that the party had merely posed a problem for another's solution, rather than conceiving the solution of the claimed method, and that the contention confused entrepreneurship with invention.

In Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d at 617, 225 USPQ at 640-41 the jury determination of proper inventorship was upheld despite claims of nonjoinder of employees of defendant who designed the specific claimed conveyor means ^{25/} after submission of several alternatives from the named inventors. Specifically it was asserted that the named inventors did not themselves invent the substrate, the poppet valves, or the conveyor design, but that those contributions originated with other engineers or with equipment manufacturers. There was extensive testimony and argument on this issue at trial. It was pointed out that the claims in suit recite no specific conveyor design and that they recite only a "conveyor means." While it was asserted that the conveyor was designed, built, and installed by the other engineers, a named inventor Chambers testified to the effect that the basic system had been designed at Battelle, where the named inventors were before vendors were selected for various components of the design; that the other engineers had designed the conveyor from several alternatives provided by the named inventors and with their approval; and that the idea of using a substrate holder originated with the named Battelle inventors.

As for the poppet valves, the Federal Circuit stated that they were mentioned only in Apparatus patent claims 13 and 14, neither of which was asserted nor brought into the case. The Court noted that the issue of inventorship was pursued in examination of each of the named inventors and others and to the extent that conflicting viewpoints were presented, this was within the province of the jury and concluded that there was

^{25/} The claims at issue included an apparatus claimed in a series of means plus function elements, and method claims with a series of separate steps.

substantial evidence on which a reasonable jury could have found that the inventors were correctly named. Id.

In Copper Rod, certain patents at issue were held to be both invalid and unenforceable due to the nonjoinder of two employees of the respondents who developed the patented method with complainant in a joint development project between the two companies. In Certain Nonwoven Gas Filter Elements, this administrative law judge rejected the claimed nonjoinder of certain employee contributors in the development work for the patented gas filter, despite payments to them by the patent assignee designated as "inventor compensation", on the basis that such employees merely suggested a certain type of desired end result integral filter without specifying the means for the accomplishment of the result, that the suggested type of filter was obvious without more, and that the subsequent involvement in the development project by such employees and their compensation therefor reflected their managerial and entrepreneurial participation in facilitating communication between inventors in different technical departments of the company.

Kirkpatrick, without contradiction, testified in 1989 that he originated a process of making carbonated candy using two pressure vessels, one an autoclave and another a cooling vessel, which allowed the transfer of a fully carbonated melt under very high pressure from one vessel into another without losing that carbonation, with corresponding efficiencies in use of the autoclave to make more carbonated candy faster and with less expense (FF 124B). He also testified in 1989 that he removed the carbonated candy from the second vessel by venting the pressure (FF 124A). Kirkpatrick also conceived such a system alone and had a working autoclave

of step h in the process of claim 1 in the '910 patent, which requires the physical step of "shock-treating the second pressure vessel". However, the testimony in 1989 is to the effect that shock-treating the second pressure vessel when done before the filing of the '910 patent application only broke up glass plugs of non-carbonated candy and, which is inconsistent with the teachings of the '910 patent, that it was the venting of the second pressure vessel that shattered the solid matrix of carbonated candy.

Accordingly based upon the foregoing, the administrative law judge finds that the inventorship of the '910 patent is not in error. This finding is based on the 1989 testimony that step h of claim 1 of the '910 patent, viz. "shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments", contrary to the clear teaching of the '910 patent, is not only unnecessary but inaccurate because it is the venting step i of claim 1, not the step h which causes the shattering of the solid matrix of carbonated candy. 26/

III. 35 U.S.C. §112 (2nd PARAGRAPH) ('910 PATENT)

26/ If it is accepted that shock-treating the second pressure vessel shatters the gas-containing solid matrix of carbonated candy which is clearly taught in the '910 patent, Kirkpatrick's testimony at the hearing establishes that he did not conceive step h of the claimed invention but rather derived the step h from the (FF 123). Under such a circumstance the '910 patent would be at least unenforceable until there is proper joinder of the person involved in the shock-treating of the second pressure vessel because conception of a claimed invention requires the mental possession of the complete and operative invention sufficient for its reduction to practice by one of ordinary skill in the art, without further invention. Coleman v Dines 754 F.2d 353, 224 USPQ 857, 862-63 (Fed. Cir. 1985). Under such a circumstance the administrative law judge would find insufficient evidence to conclude that the naming of Kirkpatrick as the sole inventor of the claimed subject matter was done other than by mere error.

Zeta argued that the claims of the '910 patent fail to point out particularly and to claim the subject matter which the inventor regards as his invention, in that the process claimed orders the steps (h), (i) and (j) such that the second vessel is "shock-treated" before it is vented to atmospheric pressure; that it is critical to shock treat after venting off the pressure; and that the named inventor Kirkpatrick testified that they were not able to shatter the product when the tubes were impacted prior to venting (ZPost 29, 30).

Complainants argued that the evidence shows that claim 1, as written, does not require that the steps contained therein be executed in any particular order; that the sequence in which the steps of claim 1 are to be executed is adequately defined in the disclosure portion of the specification of the patent, rendering it definite; and that there is no evidence that the sequence is critical and the evidence is to the contrary (CPost 17, 18).

The staff argued that the section 112 requirement in issue is commonly referred to as the "definiteness" requirement citing Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 227 U.S.P.Q. 293 (Fed. Cir. 1985); that the purpose of the definiteness requirement of section 112 is to ensure that others will be informed of the boundaries of the claimed invention so that infringement may be avoided citing Evans v. Eaton, 20 U.S. (7 Wheat. 356) 161 (1822); that while Zeta argued that the '910 patent is invalid for indefiniteness because the named inventor Kirkpatrick did not know the meaning of the term "shock-treating" as found in claim 1 of the '910 patent, Kirkpatrick testified at great length at the hearing as to his understanding of the term shock-treating; and that claim 1, as written,

does not require that the steps contained therein be executed in the particular order in which they are set out citing Special Metals Corp. v. Teledyne Indus. Inc., 717 F.2d 128, 219 USPQ 953 (4th Cir. 1983) (SPost at 13, 14). The staff further argued that Kirkpatrick's interpretation at the bearing of a claimed term is not relevant to the definiteness of a claim and that the sequence in which the steps of claim 1 are to be executed is adequately defined in the detailed description of the invention section of the '910 patent (SPost R at 6, 7).

The second paragraph of 25 U.S.C. §112 reads:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

As the administrative law judge stated in an unreviewed initial determination at 38, 39 in Certain Spherical Roller Bearings, Inv. No. 337-TA-179 (October 12, 1984) aff'd, SKF Industries v. U.S. International Trade Commission (Fed. Cir. unpublished opinion Sept. 30, 1985):

The primary importance of the second paragraph of 35 U.S.C. §112 is its absolute requirement that the claims must particularly point out and distinctly claim the subject matter which the inventor regards as his invention. The second paragraph pertains only to claims. In re Borkowski, In re Hammack, 427 F.2d 1378, 1266 U.S.P.Q. 204 (C.C.P.A. 1970). In Borkowski, Judge Rich stated that the first sentence of the second paragraph of §112 is essentially a requirement for precision and definiteness of claim language; that if the scope of subject matter embraced by a claim is clear, and if the applicant has not indicated that he intends the claim to be of a different scope, then the claim does particularly point out distinctly claim the subject matter which the applicant regards as his invention. Judge Rich also pointed out that if the "enabling" disclosure of a specification is not commensurate in scope with the claimed subject matter, that fact does not render the claim imprecise or indefinite, or otherwise not in compliance with the second paragraph of §112; rather, the claim is said to be based on an insufficient disclosure under the first paragraph of 35 U.S.C. §112. [Emphasis added]

While the administrative law judge agrees with complainants and the staff that independent claim 1 of the '910 patent does not require that the steps contained therein be executed in any particular sequence and that the sequence in which the steps of said claim are to be executed is adequately defined in the '910 specification, the administrative law judge finds that the '910 specification does not conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which Kirkpatrick at the filing of the '910 patent application "regards as his invention" in view of inventor Kirkpatrick's testimony in 1989 that he knew before the filing of the '910 patent application that resulted in the '910 patent that it was the venting of the second pressure vessel (step i of independent claim 1 of the '910 patent) which shatters the solid carbonated candy matrix in the second pressure vessel into multiple fragments and that the shock-treating the second pressure vessel step of step h only breaks up non-carbonated candy or/and frees bridged carbonated candy from the top of the second pressure vessel (FF 113A, 113C, 123, 124A, 124B).

Based on the foregoing the administrative law judge finds the '910 patent invalid under the second paragraph of section 112 because the claims do not particularly point out and distinctly claim the subject matter which inventor Kirkpatrick regarded as his invention when the application for the '910 patent was filed in 1975. 27/

IV. 35 U.S.C. §112-(1st PARAGRAPH) ENABLING DISCLOSURE ('910 PATENT)

27/ Absent the 1989 testimony of Kirkpatrick, the administrative law judge would find that the specification does conclude with one or more claims which particularly point out and distinctly claims the subject matter which Kirkpatrick regarded as his invention.

Zeta argued that the specification of the '910 patent does not state at any point that merely opening the bottom of the cooling vessel is "shock-treating the second pressure vessel..." that will cause the solid matrix to fragment and fall out; that to the contrary, the specification of the '910 patent describes impacting the sidewalls of the second pressure vessel as a step of shock-treating which is performed before the bottom of the cooling vessel is opened in order to fragment the solid candy matrix and allow the candy to fall out; and that consequently, there is not an enabling disclosure in the '910 patent which would support the step in the claims in which opening the bottom of the pressure vessel is the shock-treating to fragment the candy and allow it to fall out (ZPF 160 to 162).

The pertinent portion of the first paragraph of section 112 reads:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same....

Enablement is a legal issue which involves subsidiary questions of fact or of law. The basic question is whether the disclosure is sufficient to enable those skilled in the art to practice the invention as it is claimed. Lindermann Manufacturing GMBH v. American Hoist & Derrick, 730 F.2d at 1463, 221 USPQ at 489 (Fed. Cir. 1984); Quaker City Gear Works, Inc. v. Skil Corp. 747 F.2d 1446, 1453-56, 223 USPQ 1161, 1166 (Fed. Cir. 1984).

The evidence of record establishes that the disclosure of the '910 patent, even though it incorrectly asserts that shock-treating the second pressure vessel shatters the gas-containing solid matrix of carbonated candy, would enable a person skilled in the art to produce the overall result of the claimed method for carbonated candy (FF 113B, 113C).

Accordingly the administrative law judge determines that the '910 patent is not invalid due to the lack of an enabling disclosure.

V. BEST MODE ('910 PATENT)

Zeta argued that the '910 patent is invalid for failure to disclose the best mode contemplated by the inventor to carry out the invention, as the specification and its described example describe a sequential process in which the second vessel is vented to atmospheric pressure, then hammered, and then the bottom opened to remove candy. Zeta argued that this sequence, while it differs from the claimed sequence, was not the actual best mode known to Kirkpatrick and General Foods (ZPost at 30-31).

Complainants argued that Zeta's defense of best mode is meritless as no evidence supports the assertion that the best mode preferred by the inventor of carrying out his invention was not provided, and the language of section 112 is clear that it is the best mode contemplated by the inventor which is important, citing DeGeorge v. Bernier, 768 F.2d 1318, 1324 (Fed. Cir. 1985) (CPost at 18).

The staff argued that the steps of claim 1 of the '910 patent may be practiced in an order different from the order in which they were written and there is no evidence that Kirkpatrick concealed a preferred mode for making carbonated candy which is different from the mode actually disclosed by that patent. The staff further argued that there is no evidence that Kirkpatrick's picking at the candy is part of the "preferred" mode for producing carbonated candy, and that Kirkpatrick testified that when the carbonated candy is properly made there is no reason to pick at the candy (SPost at 15-16).

The best mode defense to patentability is grounded in the following requirement for a patent specification under 35 U.S.C. §112 (first paragraph):

The specification...shall set forth the best mode contemplated by the inventor of carrying out his invention.

The best mode defense amounts to "concealing the preferred mode contemplated by the applicant [inventor] at the time of filing", and for this defense to be established "it must be shown that the applicant knew of and concealed a better mode than he disclosed." Hybritech v. Monoclonal Antibodies, Inc., 231 USPQ 81, 94 (Fed. Cir. 1986). The Federal Circuit has emphasized that the best mode requirement is directed to prohibiting concealment of the best mode of practicing the claimed invention. Randomex v. Scopus Corp., 7 USPQ2d 1050, 1053-54 (Fed. Cir. 1988). Compliance with the best mode requirement is a question of fact and depends on the evaluation of the testimony of the witnesses as well as the technological significance of the structure. Diversitech Corp. v. Century Steps Inc., 7 USPQ2d 1315, 1319 (Fed. Cir. 1988). No objective standard is used in determining the adequacy of the specification's disclosure under the best mode requirement. Compliance is not adjudged by reference to the level of skill in the art, but is considered by comparing the disclosure with the facts concerning the invention known at the time the application was filed. Only evidence of subjective concealment (accidental or intentional) is to be considered of preferred embodiments which the inventor had conceived of his invention. Compliance exists when the inventor discloses his preferred embodiment. Dana Corp v. IPC Limited Partnership, 850 F.2d 415 8 USPQ2d 1692, 1695 (Fed. Cir. 1988); DeGeorge v. Bernier, 768 F.2d 1318 226 USPQ 758, 763 (Fed. Cir. 1985). Concealment entails that the applicant inventor

did not disclose what he considered to be the best mode of the invention. In re Bundy, 209 USPQ 48, 52 (CCPA 1981). The best mode requirement of section 112 is separate and distinct from the enablement requirement of section 112, which does consider the level of skill in the art. Id.; Bigham v. Godtfredsen, 8 USPQ2d 1266, 1269 (Fed. Cir. 1988). However, the disclosure is directed to persons skilled in the art, and patent specifications need not be production specifications. Randomex, supra; In re Gay, 309 F.2d 769, 135 USPQ 311 (CCPA 1962).

Depending on the facts of the case, non-compliance can be shown even if there is a general reference in the patent to the best mode where it is shown that the quality of the disclosure is inadequate and so poor and lacking in detail as to effectively result in concealment. Randomex, 899 F.2d 585 7 USPQ2d at 1054; General Motors, Inc. v. U.S. International Trade Commission, 687 F.2d 476, 215 USPQ 484, 490 (CCPA 1982); Spectra-Physics v. Coherent, 3 USPQ2d 1737, 1745 (Fed. Cir. 1987). The specificity of disclosure required for compliance must be determined by knowledge of the facts within the possession of the inventor at the time of filing the application. Spectra-Physics Inc., 3 USPQ2d at 1745. The fact that an assignee of the patent may have used or manufactured a better or different version of the product covered by the claimed invention than that disclosed in the patent application does not itself establish a failure to comply with the best mode requirement. Texas Instruments v. U.S. International Trade Commission, 10 USPQ2d 1257, 1262 (Fed. Cir. 1989); Atlas Powder Co. v. Du Pont, 750 F.2d 1569, 224 USPQ 409 (Fed Cir. 1984).

Ample evidence establishes that Kirkpatrick did not consider the '910 patent's disclosure of hammering disclosed in the only specific example of

the '910 patent (FF 25) to be a disclosure of his invented process, and in fact he ~~emphatically~~ disapproved with the disclosures regarding hammering and impacting the second pressure vessel, and stated that he did not know how the patent specification should have been written (FF 113C, 117A, 123, 124, 125). When directly asked when he came to the realization that hitting the tube with a hammer was the best way to get candy material out of the cooling tube, Kirkpatrick specifically testified that he never came to that realization. Id. He repeatedly testified that his procedure was not to hammer on the tube, and that hammering on the tube was harmful to the equipment, and he did not approve of it. Kirkpatrick stated that his procedure involved opening the vessel after venting, and in those instances where the candy did not fall out by itself, then there was a glass plug of non-carbonated candy at the bottom in the tube. Only if there was such a plug would he then place a screwdriver against the glass plug itself through the opening at the bottom of the tube and hit the screwdriver with a hammer to break up the plug and allow the candy to discharge from the tube. Id. Thus, his own preferred mode of practicing the method claimed in the '910 patent involved a sequence of venting, opening to determine whether the product would discharge by itself, and then, if necessary, using a screwdriver to break up non-carbonated candy. Also it did not involve impacting the vessel with a hammer as disclosed in the sole example of the '910 patent. To the contrary Kirkpatrick characterized hitting the tube as being real lazy,"

Id.

Kirkpatrick also indicated in his testimony that the '910 patent specification in part was written to take into account the operation in

and observed a banging on the tubes. It is established by admission and documentation that the process involved a sequence of venting, opening and impacting the tube with a hammer (FF 113B). Kirkpatrick's testimony that hammering was "usually" required on "virtually" every batch indicates his knowledge that opening there preceded shock-treating (FF 113E), and avoided the impact to the equipment which he considered disadvantageous (FF 113D). Regardless, Kirkpatrick never testified that at the time of filing his '910 patent application he ever regarded the practice, or any part of it, as the best mode of practicing his invention, and his testimony establishes the contrary.

Since the best mode requirement under the first paragraph of §112 inherently is a subjective requirement regarding whether the inventor at the time of the filing knew what he considered to be a better mode of practicing his invention than that disclosed in his specification, Dana Corp, supra; DeGeorge, supra, the inventor's testimony in this investigation establishes that he did not disclose the best mode of his process in the '910 patent's specification concerning impacting the tube with a hammer, nor of the sequence of the shock-treating and opening steps. An inventor is in compliance with the best mode requirement if he does not conceal what he feels is a preferred embodiment of his invention. In re Gay 369 F.2d at 773, 135 USPQ at 315. Kirkpatrick did conceal what he felt was a preferred embodiment of this invention although the evidence does not show an intentional concealment. However for a concealment of the best mode, the evidence need not have been to show an intentional concealment.

The concealment can be merely accidental. In re Sherwood, 204 USPQ 537, 544 (CCPA 1980), Dana Corp. supra, DeGeorge supra.

Based on the foregoing respondents have established by clear and convincing evidence the invalidity of the '910 patent under the best mode requirement of 35 U.S.C. §112, first paragraph.

VI. BEST MODE ('457 PATENT)

Respondent Zeta argued that the '457 patent is invalid for failure to disclose the best mode known to General Foods, viz. the polish specification of . Zeta argued that the '457 patent does not even disclose an acceptable range of polishing to achieve the desired results, although this information was clearly known at the time of filing the application (ZPost at 12).

Complainants argued that there is no evidence that inventor Hegadorn thought this to be the best mode and then decided against disclosure, and there is no assertion of a date when this degree of finish was known to the inventor (CPost at 18; CPostR at 9).

The staff argued that the application on which the '457 patent issued was filed on July 1, 1976, and the manufacturing specification which calls for a cooling tube with a polished inner surface of is dated March 16, 1978, so hence is no evidence that the inventor Hegadorn was aware of and concealed the fact that a finish would be appropriate at the time the application was filed. The staff also argued that there is no evidence that a finish is necessary to secure the release of product from the cooling tubes, and an applicant is not required to describe every possible future embodiment, but only the best mode known to him at the time of filing, citing Texas Instruments (SPost at 16, 17).

The administrative law judge determines that there is insufficient evidence that the named inventor Hegadorn knew the specific polish specification of _____ at the time of the July 1, 1976 filing of his patent application which resulted in the issuance of the '457 patent. The inventor Hegadorn's testimony is that his concern at the time, as conveyed to others for fabrication of the pipe, was to have a smooth, polished inner surface (FF 154). There is in evidence a General Foods

_____ engineering drawing, RZX-19, dated well before the patent application filing date, which specifies the specific degree of polish, _____, for the inner surface of the cooling tube (FF 156). Hegadorn identified it only as "apparently" an engineering drawing for the construction of cooling tubes, and "probably" a _____ (FF 156). Such testimony by its terms does not show that Hegadorn had contemporaneous knowledge of the drawing or the specific degree of finish of the inner diameter of the cooling tube. Hegadorn was not asked if he had an awareness of that drawing before his application was filed. Id. Consequently, respondents have not shown by clear and convincing evidence that Hegadorn did not disclose a previously known, preferred mode of his invention in a specific degree of polishing of the inner surface of the cooling tube, in his filed application.

Zeta's proposed finding on the issue states that at the time of filing General Foods polished the inner surface of the cooling tube to a smoothness of _____. ZPF F155. The pertinent issue is the inventor's own knowledge in the description in his application, not the knowledge of General Foods. Federal Circuit precedent establishes that the knowledge of the company which is the assignee of the inventor's patent is not

attributed to the inventor for the purposes of satisfying of the best mode requirement. Texas Instruments v. U.S. International Trade Commission, 871 F.2d 1054, 10 USPQ2d 1257, 1262 (Fed. Cir. 1989).

Zeta additionally indicated that General Foods had failed to disclose the best mode through its failure to include disclosure of a quick release opening device for the cooling tube which it had previously developed because of safety concerns in manual opening of the tube (ZPF F152-154). The administrative law judge determines that Zeta in its belated contentions has not proven concealment by the inventor Hegadorn of a mode of opening preferred by him in the use of . Zeta points in its proposed finding 153 to exhibits RZX-37 and RZX-38 which are General Foods memoranda identifying a

, respectively. Both of the memoranda are dated after the pertinent filing date of July 1, 1976, and so do not indicate that Hegadorn had knowledge of the information at the time of filing (FF 159, 160). Only the later memorandum is stated to be copied to Hegadorn (FF 160). The testimony Zeta relies on in its ZPF F152-154 is that given by Kirkpatrick, ^{28/} and no testimony by the '457 inventor Hegadorn is referenced on this issue. Since the "best mode" is a subjective requirement applicable to the inventor at the time of filing (Dana Corp supra and DeGeorge supra), the administrative law judge determines that respondents have not established a failure of the Hegadorn to disclose his best mode in the '457 patent.

^{28/} Kirkpatrick's testimony that evidence (FF 158 to 161).

is not credited in view of contrary

VII. §102(b) PUBLIC USE AND ON SALE

(a)

Zeta argued that in the year before the on-sale bar date of September 30, 1974, complainants demonstrated Kirkpatrick's pilot plant autoclave with three tubes to

; that there was an existing agreement between the
and General Foods to license patents and technology; that the
went to General Foods' research facility in and viewed
the pilot plant, and thereafter the pilot plant equipment was sent to
to produce carbonated candy for a ; and that the '910
patent is accordingly invalid under §102(b), citing In re Caveney, 761 F.2d
671, 226 USPQ 1 (Fed. Cir. 1985) (ZPost at 28-29). Zeta emphasized that

;

that ; that

; and that the equipment
used in was the pilot plant equipment which
operated in accord with the '910 patent, as Kirkpatrick attested (ZPost RS
2-7). At closing argument counsel for Zeta stated that there was no
evidence that

(Tr. at 83).

Complainants argued that the allegation that General Foods'
to representatives of
does not invalidate the patent under §102(b); that is
not public; and that where all use of the process was in
, there was no use or sale in the United States,
citing Gandy v. Main Belting Co., 143 U.S. 587, 12 S.Ct. 598 (1892) and

Hunt Industries, Inc. v. Fibra Boats, Inc., 299 F. Supp. 1145, 1149-50 (D.C. S.D.Fla. 1969) (CPost at 14-15). Complainants also argued that Zeta has the burden of establishing this defense but has failed to do so by clear and convincing evidence; that Caveney makes it clear that the sale or offer to sell must be between two separate entities; that Caveney involved entities controlled separately which acted independently, unlike Union Carbide v. Filtrol Corp., 170 USPQ 482, 521 (C.D. Ca. 1971), aff'd, 179 USPQ 209 (9th cir. 1973), which involved a sale between separate divisions of the same corporation; that Zeta has not alleged or proven that

(CPostR at 4-5).

The staff argued that the process for making carbonated candy by General Foods to employees of is not a public use but rather that there was merely a shipment of equipment from , which cannot be considered a sale (SPost at 10-11). The staff also argued that Zeta offered no evidence that the entire process for producing carbonated candy was ever disclosed to ; that the was not a public use; that the and no evidence that General Foods sought to make a profit from Hostess; that there is no evidence that the invention was placed on sale since Zeta has not demonstrated the existence of any contract between

which transferred any property right in exchange for any kind of consideration (SPostR at 4-5).

Section 102(b) of title 23 in pertinent part is as follows:

A person shall be entitled to a patent, unless--

(b) the invention was...in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

In re Cavaney, 761 F.2d 671, 226 USPQ 1 (Fed. Cir. 1985), held that the claimed invention was "on sale" under §102(b) when shipments of the claimed cable ties were made by a British manufacturing company to a related U.S. distributor before the critical date. In Cavaney the U.S. distributor was a joint venture which was 49% owned by the British manufacturing company, with the remainder owned by a third party. The Court stated that a sale or offer to sell under §102(b) must be between two separate entities, citing Union Carbide Corp. v. Filtrol Corp., 170 USPQ 482, 521 (S.D. Ca. 1971, aff'd), 179 USPQ 209 (9th Cir. 1973), noting that one cannot contract with oneself and the mere fact that a product is delivered to a distributor does not exempt the transaction from §102(b). The Court ruled that although the U.S. distributor and British manufacturer shared a common owner, control of the entities was different, since the controlling interest in the U.S. distributor was held by a third party, and the common owner was a minority owner in the U.S. distributor; that the line of demarcation was unclear principally between the U.S. distributor and its third party controlling owner; and that the U.S. distributor acted independently in the transaction. The Court further found the fact of independent control of the corporations critical despite the relatedness of the parties involved in the asserted bar. The British parent company and its wholly-owned subsidiary were viewed as a common entity in the Court's analysis. It is plain that the fact that two companies were legally separate entities was not indicative of whether the companies were in fact separate and

separately controlled for purposes of §102(b), nor was the fact that the U.S. and British companies were incorporated in different countries.

While the administrative law judge has found no specific evidence establishing that [redacted] is a wholly-owned subsidiary of General Foods Corporation, and complainant has cited no such evidence in its submissions, the record does show that General Foods and [redacted] are very closely related entities. Thus the General Foods Corporation Technical Research Manual in evidence indicates that its directives in part concern the [redacted] which includes (FF 163). Complainant's Clausi in his testimony, offered by Zeta, referred to the [redacted] operation as "our" [redacted] operation, and stated that the head of the [redacted] research operation was under Clausi's supervision (FF 164). A research report drafted by [redacted] personnel is headed General Foods Corporate, [redacted] and then confidential -- property of General Foods Corporation (FF 165). That [redacted] report refers to the [redacted] operation of General Foods as "Corporate Research." Id. The memorandum of invention drafted by the [redacted] employees for developments in cooling tube design is under the heading "General Foods Corporation", not a heading listing [redacted] (FF 167). The deposition of [redacted] was offered by Zeta and received into evidence as an admission of a party, viz. complainant General Foods, as the deponent was preferred by complainant General Foods pursuant to notice for designation under FRCP 30(b)(6). [redacted] is specifically identified in that deposition and in documents only as being or having been [redacted] (FF 168). While Zeta has shown that [redacted] are separately

incorporated and that during the pertinent period they had

, including carbonated candy, and the

to General Foods for sales use

of such technology (FF 166), no other evidence was supplied by Zeta regarding whether General Foods and should be considered separate entities under §102(b). No direct evidence was submitted on the ownership of . Zeta has not presented evidence that commonly controlled entities do not enter into royalty and license agreements.

Based in the foregoing the administrative law judge does not find the evidence relied upon by Zeta sufficient to establish that General Foods and are not commonly owned or controlled entities under the circumstances, and determines that Zeta has not sustained its burden of proof in establishing its asserted on-sale bar regarding the demonstration to the division of .

(b)

Zeta argued that the '910 patent is invalid under §102(b) because its disclosed method was used by General Foods to produce candy

more than a year prior to the October 1, 1975 filing of the '910 application; that in 1968 Kirkpatrick's autoclave with three cooling tubes (the pilot plant equipment) were sent

installed, and run by Kirkpatrick; that the steps used were the same as those claimed in the '910 patent, except for hammering on the cooling tube; that thereafter,

material with this setup and used it to conduct a
to determine consumer preferences; and that this

(ZPost at 27-28).

Complainants argued that respondents have presented no reliable evidence that there was a product prepared by the Kirkpatrick '910 invention and/or

; that this defense is built upon speculation and surmise; that Touher in deposition testified

, an inventor of the '893 patent, which

; that a review
of the evidence supports the proposition that

; that experimental use is not a public
use; and that it is not established

(CPost at 13-14).

Complainants also argued that there is no evidence that carbonated candy made by the Kirkpatrick process was prior to the critical date; that Zeta presented no direct evidence and no basis for inferring that this happened, and does not address the contrary evidence; that Touher, RZX-29 and RZX-39 made it clear

; that here there is evidence of only one test which test was unsuccessful (RZX-40); that there is no evidence of any

; that RZX-39 stated that the project was abandoned; and that RZX-40 stated that a

; and that the evidence fails to show that

(CPostR at 3-4).

The staff argued that there is no evidence that the process for making carbonated candy used by the in 1968 was the same process disclosed in the '910 patent; that Kirkpatrick testified that he did not know whether ; and that there is no evidence of record which demonstrates that the claimed invention of the '910 invention as a whole was practiced before the critical date of September 30, 1974, and indeed Zeta admits that the shock-treating step requiring impacting . (SPost at 8-9; SPostR at 3-4).

Respondents, as the proponents of the defense, continually bear the burden of proof by clear and convincing evidence of a prior public use under §102(b). Baker Oil Tools, Inc. v. Geo. Vann, Inc., 828 F.2d 1558, 4 USPQ2d 1210 (Fed. Cir. 1987). If respondents had come forward with evidence

establishing a public use it would then be up to the complainants to come forward with some evidence establishing the non-public character or experimental nature of the use. Harrison Mfg. Co. v. Powell Mfg. Co., 815 F.2d 1478, 2 USPQ2d 1364, 1368; UMC Electronics Co. v. United States, 816 F.2d 647, 2 USPQ2d 1465 (Fed. Cir. 1987); Hycor Corp. v. Schlueter Co., 740 F.2d 1529 222 USPQ 553, 557 (Fed. Cir. 1984); Barmag Barner Maschinenfabrik AG v. Murata Machinery, Ltd., 731 F.2d 831, 221 USPQ 561 (Fed. Cir. 1984); Certain Surveying Devices, 208 USPQ 36, 41 (Comm. 1980).

Where the patentee or the inventor commercializes the product of a patented process before the year preceding the filing date of the patent application, such action results in a statutory public use or sale forfeiture and bar under §102(b), even where the patented process itself has not been exposed to the public. W.L. Gore & Assoc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ at 312. The assertions at issue here involve actions by the patentee General Foods,

of a product
are not "experimental" uses under §102(b), since are not
experimentation aimed at testing the functional attributes of the patented
subject matter. In re Mann, 861 F.2d 1581, 8 USPQ2d 2030 (Fed. Cir. 1988);
Western Marine Electronics, Inc. v. Powell Mfg. Co., 764 F.2d 840, 226 USPQ
1 (Fed. Cir. 1985); In re Smith, 714 F.2d 1127, 218 USPQ 976 (Fed. Cir.
1983); In re Theis, 610 F.2d 786, 204 USPQ 188 (CCPA 1979); In re Bertram,
88 F.2d 834, 33 USPQ 152 (CCPA 1937). In re Smith found that a consumer
test, involving 76 persons, and which allowed use of two different versions
of a patented product in homes without restriction as to confidentiality

constituted a public use under §102(b), and that the testing was done to determine how well the product would sell, not to isolate technical problems with the product.

Anticipation under §102(b) has a precise meaning requiring that all of the elements of the claimed invention be present within the cited use or sale. E.g., W.L. Gore & Assoc. v. Garlock, Inc., 721 F.2d at 1540 220 USPQ at 312. No anticipation has been shown under the circumstances, in view of Kirkpatrick's specific testimony that he did not impact the pressure vessel in his production run of making carbonated candy plant which step is called for by independent claim 1 of the '910 patent (FF 168).

The issue of the status of the _____ as prior art due to public use, in addition, stems on whether the carbonated candy which Kirkpatrick made at _____ was used in _____ and specifically whether, as Zeta proposes (ZPF F122), a _____ Zeta relies on the testimony of Kirkpatrick, Touher and Clausi to establish such use. It is not contested that

(FF 169).

There was at _____ a small pilot plant operation using equipment designed by Kirkpatrick, and that plant did produce some product (FF 168, 169). Kirkpatrick did not have knowledge of what was done with the batch of product he produced (FF 168, 175). While the testimony of General Foods' Touher and Clausi establish that

_____ (FF 169-170) and Touher attested that _____ Touher

attested to his belief that

(FF

169). Clausi similarly attested that

but

that the product did not reach the test market (FF 174).

Based on the foregoing, the administrative law judge determines that respondents have not met their burden of establishing by clear and convincing evidence that there was

assuming the carbonated candy was made by the claimed method of the '910 patent. Accordingly the '910 patent is not found to be invalid under 35 U.S.C. §102(b) due to

29/

VIII. DOUBLE PATENTING ('457 PATENT) 30/

29/ In view of the administrative law judge's findings with respect to public use and sale, respondents' defense that the '910 patent is invalid under 35 U.S.C. §103, permitted by Order No. 26 (see next footnote) is found to be moot.

30/ In respondent Zeta's prehearing statement under the heading "Invalidity", Zeta limited the invalidity issues to invalidity under 35 U.S.C. §102(f), prior public use or sale under 35 U.S.C. §102(b), invalidity under 35 U.S.C. §112 and double patenting. Under the heading "Unenforceability" Zeta alleged that the patents in issue are unenforceable in view of laches and estoppel and also because of a failure to inform the Patent Office during prosecutions of the applications for the '910 and '457 patents of "their prior public use and sale" (ZPre at 28, 29). Zeta in its initial response to the complaint at 19, 20 had alleged invalidity of the '910 patent under 35 U.S.C. §112 and invalidity of said patents for double patenting "and/or unenforceable because of patent misuse . . . in attempting to circumvent the claim limitations of these patents, broaden their coverage to include Zeta's process, and extend their monopoly rights". Order No. 26 which issued September 20, 1989 did grant Zeta's motion to amend its response to include invalidity under 35 U.S.C. §102(b) by virtue of prior public use and placing on sale, invalidity under 35 U.S.C. §103 in view of prior public use and invalidity for failure to name the correct inventor "to the extent that exhibits have been offered into evidence and are in the present possession of the administrative law judge and will be received into evidence at the prehearing conference on September 27, 1989." Respondent Zeta for the first time in its proposed findings of facts and conclusions of law received October 25, 1989 alleged at 38, 39 inequitable conduct because General Foods misrepresented material

Zeta argued that despite the language of the '457 patent specification which distinguishes over the '910 patent on the grounds that polished tubes allow the candy to be removed by merely venting, "without shock-treating the tube," complainants have argued an interpretation of "shock-treating the second vessel" in the '910 patent to include merely opening the bottom; ^{31/} that if this interpretation is accepted, then the '457 patent is invalid on the ground of double patenting; that if merely opening the "prior art" cooling tube of the '910 patent was sufficient to fragment the candy and allow it to fall out, then there is no distinction between it and the claimed invention of the '457 patent; that the result is merely to illegally extend the monopoly of the '910 patent beyond its term; and thus the '457 patent claims would be invalid because of double patenting, citing In re Longi, 759 F.2d 887; 225 USPQ 645 (Fed. Cir. 1985), and Hartness Int'l v. Simplimatic, 819 F.2d 1100; 2 USPQ2d 1826 (Fed. Cir. 1987) (ZPost at 31, 32).

Zeta also argued that a reading of both patents in issue shows that the '910 patent used "shock-treatment (beyond just venting) to release candy, and '457 accomplish[es] this with polishing" and that "[s]ince, both processes 'vent', if that also releases the candy, then neither

prior art to the Patent Office in the application for the '910 and '457 patents "with an intent to mislead the U.S.P.T.O. with respect to a material feature of the claimed invention". In view of the lack of any basis in the responses of respondents to the complaint for that allegations, the administrative law judge will not consider said defense. The assertion of a new affirmative defense only in post-hearing submissions precludes timely notice for the presentation of rebuttal evidence.

^{31/} The staff has noted that it has found no indication that complainants have argued such an interpretation (SPostR at 8).

'improvement' is needed to carry out the claimed process, and the patents are of equal scope" (ZPostRC at 5).

Complainants and the staff argued that Zeta's contention that the '457 patent is invalid over the '910 patent under the doctrine of double patenting, is legally incorrect; that the test of double patenting is whether the patent claims cross read, citing Carman Indus., Inc. v. Wahl, 724 F.2d 932, 220 USPQ 48 (Fed. Cir. 1983); that a finding of patent invalidity under the doctrine of double patenting involves a two-step analysis: (1) is the same invention being claimed twice and, if not, (2) does any claim in the application define merely an obvious variation of an invention disclosed and claimed in the patent citing In re Vogel, 422 F.2d 438, 441, 164 USPQ 619 (C.C.P.A. 1970); and that the test for "same invention" is "whether one of the claims could be literally infringed without literally infringing the other", citing Vogel, 422 F.2d at 441. It is argued that the requirements of Vogel cannot be met because the same invention is not claimed twice by complainants but rather that the '457 patent discloses an element not contained nor even suggested in the '910 patent, viz. the use of a cooling tube with polished inner surfaces and because the claims of the '457 patent do not define merely an obvious variation of the invention disclosed and claimed in the '910 patent but rather the evidence confirms that the polished inner surfaces of the cooling tube does not represent an obvious variation of the invention of that patent and respondents have waived any argument that such is obvious by failure to present it with particularity; that there must be clear evidence to establish that a variation would have been obvious, citing In re Kaplan. 789 F.2d 1574, 229 USPQ 678 (Fed. Cir. 1986); and that Zeta has

produced no evidence that using cooling tubes with polished inner surfaces would have been an obvious variation over the method for making carbonated candy disclosed in the '910 patent (CPost at 16; SPost at 17, 18).

The administrative law judge finds that the '457 patent does not claim the same invention as the invention claimed in the '910 patent for the reasons set forth by complainants and the staff. Respondents have not established that the claimed invention of the '457 patent is merely an obvious variation of the invention claimed in the '910 patent. Accordingly because respondents have not satisfied the requirements of Vogel, the administrative law judge determines that the '457 patent is not invalid for double patenting.

IX. LACHES AND ESTOPPEL

(a) Laches

Respondent Confex argued that equitable principles of laches are applicable to section 337 investigations; that while a finding of laches will not preclude prospective relief, the unreasonable delay of complainants and the resulting loss of substantial evidence because of their delay should be considered in determining whether sufficient certainty exists to find the patents in issue to be valid and enforceable; and that doubts concerning those issues should be resolved with an eye toward the impact of the lengthy delay on the evidence, the destruction of 117 boxes of relevant documents and the faulty memories of key witness, citing Gillons v. Shell Co. of California, 86 F.2d 600, 609 (9th Cir. 1936) (RCPost at 1, 2).

Complainants and the staff argued that laches is a doctrine which prevents recovery of damages where there is unreasonable and inexcusable

delay in asserting one's rights, and that this doctrine is inapplicable, as laches does not bar prospective or injunctive relief, citing Jamesbury Corp. v. Litton Industrial Products, Inc., 839 F.2d 1544, 5 USPQ2d 1779 (Fed. Cir. 1988), cert. den., 109 S.Ct. 80; Leinoff v. Louis Milona & Sons, Inc., 726 F.2d 734, 741, 220 USPQ 245 (Fed. Cir. 1984); Certain Multi-Level Touch Control Lighting Switches, Inv. No. 337-TA-225 (Unreviewed ID 1986) (Harris) at 53-54 (CPost at 40); Certain Unitary Electromagnetic Flowmeters, Inv. No. 337-TA-230 (Unreviewed portion of ID July 30, 1986) (Luckern) at 73 (SPost at 32).

The administrative law judge determines that clear, controlling Federal Circuit precedent compels the result that laches in patent-based litigation applies only to recovery of pre-filing monetary damages, and does not apply to prospective relief. E.g., Leinoff, 726 F.2d at 737, 220 USPQ at 850; Jamesbury, 839 F.2d at 1547, 5 USPQ2d at 1785. The rule regarding application of laches only to retrospective relief stems from Supreme Court precedent. McLean v. Fleming, 96 U.S. 245 (1878); Menendez v. Holt, 128 U.S. 514 (1888); Chisum, Patents §19.05[1]. Commission precedent additionally clearly precludes the applicability of the laches defense to a determination of violation under section 337, as the only remedies available under section 337 are non-monetary and prospective in character. Touch-Control Lighting Switches, supra; Certain Unitary Electromagnetic Flowmeters, Inv. No. 337-TA-230 (Unreviewed portion of ID July 30, 1986) at 73. The provision of section 337(c) that "[a]ll legal and equitable defenses may be presented in all cases" authorizes the presentation of defenses where applicable under the law, and laches is

inapplicable to the prospective non-damage relief for patent-based unfair acts under section 337.

(b) Estoppel

The parties recognized that application of the defense of equitable estoppel in patent litigation requires four elements: unreasonable delay in bringing suit, prejudice to respondents from the delay, detrimental reliance by respondents and affirmative conduct by the patentee inducing a belief that it had abandoned its claim.

Respondent Confex argued that there has been unreasonable delay by complainants in filing their complaint in this proceeding on January 31, 1989, more than nine years after complainant General Foods advised respondent Zeta that it would protect its patent rights "by any legal means", and nearly eight years after Zeta and Confex began importing and openly selling commercial quantities of Zeta's gasified candy in the United States, with no action or communication from complainants in the intervening years. Confex cited a presumption of unreasonable delay after six years, citing Leinoff, supra. and contended that it was also unreasonable for General Foods to fail to enforce its Spanish patent rights to the same invention in Spanish forums, arguing that the foreign proceedings have been recognized by American courts in connection with the excuse of pending litigation, citing Mainland Ind. Inc. v. Standal's Patents Ltd., 799 F.2d 746, 230 USPQ 772, 774 (Fed. Cir. 1986); Siemens AG v. Beltone Elec. Corp., 381 F. Supp. 57, 184 USPQ 433 (N.D. Ill. 1974). (RCPost at 4-5).

According to Confex, in order to overcome the presumption of unreasonable delay, courts have required patent owners to come forward with

specific evidence excusing the delay and to communicate their basis for their excuse to the alleged infringer, citing Jamesbury Corp. v. Litton Industrial Products, Inc., 839 F.2d at 1553. Confex argued that no evidence was submitted at the hearing that supported the assertion that General Foods even considered seeking relief under section 337 before initiating the present action; that this excuse is not justified since the lack of domestic industry was entirely of General Foods' own making due to its self-imposed, voluntary abandonment of the gasified candy market, and could have been remedied at any time during the nine year period of delay; that this excuse is also not justified since section 1337(a) reached imports whose effect or tendency is to prevent the establishment of a domestic industry, and existence of injury to an existing domestic industry was not required; that General Foods' Clausi testified that General Foods had set up an office to vigorously promote the licensing of its patents, and stated that General Foods was actively in the carbonated candy business or actively seeking foreign and domestic licenses at all times relevant to the issue of delay; that General Foods could have argued that respondents' allegedly infringing activities had the tendency to prevent the establishment of a domestic industry; and that concern over the impact of such alleged infringement was voiced by General Foods' Korean licensee in 1984 (RCPost at 5-8).

Complainants argued that there has been no delay by complainants, as no action was possible under the facts known until the passage of the recent amendment to section 337 and complainants did not have both a legal remedy and knowledge of Zeta's activities sufficient to bring a legal action; that General Foods had no way in 1980 of knowing whether or not

Zeta was doing something in addition to what they represented to General Foods; that it was reasonable for General Foods to rely on Zeta's representations of non-infringement, in view of the small known volume of Zeta product, consistent with Zeta's assertion that Zeta's patent, apparently covering a single vessel process, was employed; that in 1980 General Foods did not have a remedy with regard to infringement in the United States, as section 337 required damage to a domestic industry, and there was no protection against foreign use of a patented process under title 35; that in 1981 when Confex began sales in the United States General Foods had no domestic industry; that in 1983 General Foods entered into a technological agreement with a Korean company, but that did not create a domestic industry as defined by section 337; that in 1985 Pop Rocks was licensed, but this did not create a domestic industry and no damage was then provable; that in 1986 CCV started manufacturing products under the patent although volumes were still low and the extent of the market was such that damage could not be established; that in 1987-88 volumes and market were increased to the level that respondents' presence in the market was being felt; that in the fall of 1988 for the first time General Foods/ Pop Rocks could enforce their U.S. patent rights with this damage and the passage of the amendments to section 337, and this investigation is the result; that there has been no delay and even if delay should be found it has been reasonable; and that it would be incorrect to categorize as delay all periods of inaction, even where there is no existent right to enforcement (CPost at 41-43).

Complainants also argued that the effect of any delay by General Foods in taking action to enforce its Spanish rights under Spanish law is not

transferable to the enforcement of U.S. legal rights; that Mainland Industries, Inc. v. Standal's Patents Ltd., 799 F.2d 746, 748-49, 230 USPQ 772, 774 (Fed. Cir. 1986), distinguishably dealt with whether a delay in enforcing an existing U.S. right was justified by foreign litigation; that Zeta understood the General Foods letters to relate solely to Spain; that Zeta's response regarding its own Spanish patent disclosing no more than a single pressure vessel was made at a time when Zeta was practicing Zeta Process B using two pressure vessels; and that Zeta's Escola testified that the Spanish patent gave Zeta the right to make carbonated candy in Spain, but its citation would also be sufficient to deter General Foods from enforcing its Spanish patent covering a two vessel process (CPostR at 22).

The staff argued that there has not been any unreasonable or inexcusable delay by complainants in filing an action to assert their patent rights and that complainants had no cause of action against Zeta until at least 1986 when CCV began producing carbonated candy under its license agreement with General Foods (SPost at 35).

Confex further argued that the facts of this case show an intentionally misleading silence, and that in cases applying estoppel due to misleading silence, the patent owner has similarly threatened immediate enforcement, but then does nothing for an unreasonably long period of time, citing Hottel Corp. v. Seaman Corp., 833 F.2d 1570, 1574 (Fed. Cir. 1987). Confex also argued that General Foods' Spanish patent agent's letter to Zeta dated Dec. 21, 1979, and the letter of General Foods' chief patent counsel dated January 3, 1980 enclosed the Spanish Kirkpatrick and Hegadorn patents and asserted that General Foods' patents would be enforced by any legal means; that said letters represented the last and only

communications from complainants to either respondents for over nine years, despite open, public and notorious sales and vigorous promotion of carbonated candy products by both respondents during that period; that both the failure to respond to resistance by an alleged infringer and voluntary abandonment of efforts to exploit patents, constitute conduct inducing the belief that the accused infringer's business will remain unmolested, citing Continental Coatings Corp. v. Metco, Inc., 464 F.2d 1375, 1378, n. 9 (7th Cir. 1972); Olympia Werke AG v. General Electric Co., 219 USPQ 107, 112 (4th Cir. 1983).

Confex also argued that the communications on behalf of General Foods in 1979 and 1980, the failure to respond to Zeta Escola's letter of January 3, 1980, General Foods' abandonment of the carbonated candy market, and the nine years of defining silence in the face of open and aggressive U.S. marketing of Zeta's products on a commercial scale constitute sufficient affirmative conduct and misleading silence to justify the belief held by Zeta and Confex on January 30, 1989 that their business would remain unmolested. Confex in addition argued that the equitable requirements of what constitutes sufficiently misleading conduct have never required that a specific charge of infringement be made as to the specific patent sued upon, and the misleading conduct may predate the acts of infringement alleged or proved, citing Geo. J. Meyer Co. v. Miller Mfg. Co., 24 F.2d 505, 508 (7th Cir. 1928); A.C. Aukerman Co. v. Miller Formless Co., Inc., 216 USPQ 863, 865, n. 4 (7th Cir. 1982); Leinoff v. Louis Milona & Sons, Inc., 726 F.2d 734, 742 (Fed. Cir. 1984). Thus, Confex argued that the fact that the acts complained of by General Foods in 1979-80 occurred in Spain, is immaterial, and the same reasonable inference concerning

manufacture in Spain, and manufacture in Spain for export to the United States, is warranted under the circumstances (RCPostR at 1 to 8).

Complainants argued that letters sent to Zeta in 1979 and 1980 by General Foods were responded to by Zeta's denial of infringement and enclosing a patent allegedly covering their own process for producing carbonated candy; that this evidence and the fact that complainants had no cause of action in the United States from 1980-86 mitigates against construing complainant's silence as bad faith affirmative conduct (CPost at 43-44). Complainants further argued that they engaged in no inducing affirmative conduct since silence with regard to nonexistent rights in the United States is not an affirmative act, and that the record is devoid of evidence showing that the silence was sufficiently misleading to amount to bad faith, citing Hottel Corp. v. Seaman Corp., 833 F.2d 1570, 1573, 4 USPQ2d 1939 (Fed. Cir. 1987); TWM Mfg. Co., Inc. v. Duro Corp., 592 F.2d 346, 350 (6th Cir. 1979); that respondents do not deny that no domestic industry existed between 1980 and at least 1986, but without citation contend that the lack of a domestic industry was entirely of General Foods' own making; that General Foods had every right to stop making carbonated candy in 1980 and pursue its own licensing activity; that prior to 1986 General Foods was not attempting to establish a domestic industry, and so could not have pursued a section 337 action in good faith (CPostR at 22-23).

The staff argued that there was no affirmative conduct by complainants which induced respondents to believe that complainants had abandoned any cause of action against respondents with regard to the process for producing carbonated candy; that in 1979-80 General Foods first asserted

its rights to a process for producing carbonated candy under two Spanish patents, but at no time did General Foods threaten Zeta with suit in the United States predicated on infringement of the '457 and '910 patents; that there was no available cause of action in the United States under the patent laws of title 35 to assert a claim of infringement by reason of unauthorized use of a patented process abroad; that from 1980 through 1986 complainants could not bring an action under section 337 because there was no domestic industry producing carbonated candy; that generally silence alone will not create an estoppel, citing Certain Lighting Switches, Inv. No. 337-TA-225, and the silence must be sufficiently misleading to amount to bad faith, citing Jamesbury Corp., 839 F.2d at 1554; Hottel Corp., 833 F.2d at 1573-74; that Zeta's response to General Foods' letter of denying infringement and enclosing a patent allegedly covering their own process for producing carbonated candy; and that this information and the fact that complainants had no United States cause of action from 1980-86 militates against construing complainants' silence as bad faith (SPost at 33-34).

(i) Unreasonable Delay and Affirmative Conduct Elements

As an initial matter the application of equitable estoppel in this matter depends on when the pertinent delay begins, and whether complainant General Foods' 1979-80 correspondence to Zeta began a period of delay by General Foods in asserting its patent rights in the '910 and '457 patents.

In late 1979 and early 1980 General Foods gave notice, in two letters to Zeta, of General Foods' asserted intent to protect its Spanish patent rights (FF 178, 179). The first letter from General Foods' Spanish patent agent, dated December 21, 1979, enclosed copies of three identified Spanish patents, including two patents which are the Spanish counterparts to the

U.S. '910 and '457 patents, the patents which are at issue in this litigation. That letter explicitly states that it is regarding those identified Spanish patents, and that General Foods intended to "protect by any legal means within range the inventions protected by legal register rights" (emphasis added), indicating only General Foods' intent regarding enforcement of registered Spanish patent rights. No statement was made concerning any kind of patent protection in countries other than Spain, and no notice is given here regarding enforcement in any country other than Spain (FF 178). The letter indicates only that General Foods had notice that Zeta intended within a short space of time to manufacture carbonated candy. Id. The second letter, dated January 3, 1980, from General Foods' patent counsel to Zeta, just as clearly is limited solely to the announced intention of General Foods "to enforce its patent rights in Spain" (FF 179). In a response to the Spanish patent agents' letter, Zeta in its letter also of January 3, 1980 acknowledged receipt and correspondingly enclosed its Spanish patent (FF 180).

This 1979-80 correspondence between Zeta and complainant General Foods gives no clear indication that anything other than Spanish patent rights were the subject of this notification. There is no evidence of any communications between complainants and Zeta from then on until after the January 31, 1989 filing of the complaint which instituted this investigation (FF 183, 194). Through this correspondence General Foods demonstrated its awareness only of Zeta's intent to manufacture carbonated candy in Spain (FF 178). Zeta's Escola attested that Zeta had not sold any carbonated candy at this point but had only just begun manufacture (FF 181). Zeta did not begin exportation of carbonated candy to the United

States until early 1981, after it contacted and arranged with Confex for its importation and marketing of Zeta-made carbonated candy in the United States (FF 184, 192). No discussion was had in the 1979-80 correspondence about any intent of Zeta to market carbonated candy in other countries. Escola initially attested to his assumption and belief gathered from Zeta's correspondence with General Foods, and the failure of General Foods to respond to his letter or take legal action within a year of the correspondence, that this indicated that General Foods had no opposition to Zeta's exports to the United States. That testimony is unpersuasive bare assumption, unsupported as to the contents of the correspondence, that Zeta gave notice or General Foods' then had notice, of Zeta's subsequent exportation of carbonated candy from Spain to the United States (FF 185).

The substance of this correspondence between Zeta and General Foods, therefore, was limited to possible violation of Spanish patent rights and Zeta's activity which occurred outside the United States. Respondents' principal reliance on this correspondence, and subsequent silence by General Foods, therefore, depends on the question whether notice and correspondence regarding possible violation of rights in a foreign (counterpart) patent can begin a period of delay for purposes of applying equitable principles relating to the assertion of infringement of a United States patent in a domestic tribunal. The administrative law judge finds respondents' reliance on the Federal Circuit decision of Mainland Industries, Inc. v. Standal's Patents Ltd., *supra*, for the relevance of foreign patent disputes to the issues of estoppel here, to be wholly misplaced.

Mainland upheld a jury verdict of no laches and estoppel, with the Federal Circuit refusing to hold as a matter of law that litigation in non-U.S. forums may not be considered in determining whether a delay by the patentee in asserting in court its claim of infringement of the United States patent was excused under the circumstances. Mainland did not hold that notice of acts committed only in a foreign country is sufficient to constitute notice for purposes of determining delay in filing claims for infringement of a related United States patents in suit. Instead, the Federal Circuit noted that the jury had been instructed that other such patent litigation could not excuse the delay involved in the assertion of the claim for infringement at issue, unless the accused infringer [the U.S. subsidiary] understood the patentee's intent to pursue its patent rights, plainly referring to United States patent rights. The Canadian litigation there included a suit by the patentee against the accused infringer's parent company based on a patent by the same inventor. The district court's opinion in Mainland, 229 USPQ 43, 44 (D. Ore. 1985), indicates that the six plus years of delay by the patentee found in that case in the assertion of its infringement counterclaim in the district court began from the time the patentee noticed such infringement by the accused infringer (not the infringer's parent). Thus, Mainland provides support for the position that it is notice regarding the claim of infringement of United States patent rights which is a touchstone in determining the application of equitable defenses relating to delay in filing suit for infringement. Siemens AG v. Beltone Elec. Corp., 381 F. Supp. 57, 184 USPQ 433 (N.D. Ill. 1974), also relied on by respondents, similarly considered the same issue of excuse due to foreign litigation in the delay period, where the delay

period was counted from notice of U.S. infringing activity. Delay results not merely from any kind of notice, but from notice of allegedly infringing activity of the type at issue. A long line of controlling precedent consistently supports the principle that unreasonable delay in equity cannot begin until notice chargeable to the patentee of infringing actions. Young Engineers, Inc. v. U.S. ITC, 219 USPQ 1142, 1153 (Fed. Cir. 1983) (delay in "assert[ing] the patent"); Studiengesellschaft Kohle, mbH v. Dar Ind. Inc., 220 USPQ 841, 843-44 (Fed. Cir. 1984) ("delay in bringing suit"); Bott v. Four Star Corp., 1 USPQ2d 1210, 1217 (Fed. Cir. 1986) (delay began only upon issuance of patent even though patentee had prior notice of defendant's product); Leinoff v. Louis Milona & Sons, Inc., 220 USPQ 845, 850-51 (Fed. Cir. 1984) ("delay in filing suit" "after infringement is noticed" "known infringers"); Hottel Corp. v. Seaman Corp., 4 USPQ2d 1939, 1940-41 (Fed. Cir. 1987) ("delay in filing the law suit" "delay in commencing this action" "delay in assertion of the claim" "delay in asserting patent infringement"); Jamesbury Corp. v. Litton Ind. Products Inc., 5 USPQ2d 1779, 1785-88 (Fed. Cir. 1988) ("delay in filing the suit" "delay in the assertion of the claim" "at the time the patentee knew, or in the exercise of reasonable diligence should have known, of the infringing activity"); Fromson v. Western Litho Plate and Supply Co., 7 USPQ2d 1606, 1610 (Fed. Cir. 1988) ("no means of learning of infringement"); MCV Inc. v. King-Sealey Thermos Co., 10 USPQ2d 1287, 1290-92 (Fed. Cir. 1989) ("delay in filing suit" "in infringement situations an assertion of right"); Sun Studs, Inc. v. ATA Equipment Leasing Inc., 10 USPQ2d 1338, 1350 (Fed. Cir. 1989). The requirement of patent issuance before notice can begin to constitute delay for equity purposes further indicates that the pertinent

delay is after notice of the allegedly infringing acts at issue in the later claimed assertion of infringement. Bott, supra; Hottel, supra.

Leinoff, relied on by respondents, does not stand for the proposition that delay in equity can begin before infringement of the patent at issue has begun; instead, Leinoff presented the situation, acknowledged as "simple" by the Court, where the mere failure of the defendant to present evidence that it had at an early date engaged in the allegedly infringing acts was not determinative, in view of the patentee's early correspondence with the defendant alleging infringement of the patent. A.C. Auckerman Co. v. Miller Formless Co., Inc., 216 USPQ 863 (7th Cir. 1982), also relied on respondents, distinguishably counted the time period of delay from the issuance of the first of two patents which occurred after notice of the infringer's activity, the court reasoning that the suit was essentially concerning the first patent.

That notice of possible foreign violation of a foreign patent cannot in equity begin a patentee's delay in asserting a cause of action for infringement of a United States patent is further supported by precedent holding that prior delay ends and a new period of delay begins when the accused alters the nature of his infringing activity, such as by significant modification to his product or process. See, Chisum, Patent Law §19.05[2]. The administrative law judge believes that an even more significant "alteration" of the nature of an accused party's activity is presented by an extension of its commercial activity to reach the United States and become subject to the United States patent laws when previously the party's activity was practiced solely in a foreign country. In such a situation different markets and different commercial investments, risks and

rewards are involved. More importantly, different patents and patent laws are necessarily involved, with infringement of the U.S. patent beginning only upon contact with the U.S. market.

While delay in equity requires at least notice of acts which would allegedly constitute infringement of the patent at issue, an even stricter rule applies to equitable estoppel. The Federal Circuit in Jamesbury, supra, clearly and directly held that the pertinent delay for purposes of equitable estoppel only begins from the time of a patentee's misrepresentation, or the beginning of the misleading silence, which induces the belief that the patentee had abandoned its claim of infringement against the alleged infringer. This rule again emphasizes that there must be notice chargeable to the patent owner regarding infringing activities, which excludes wholly foreign activity which cannot constitute domestic infringement.

Therefore, the administrative law judge determines that General Foods' notice in 1979-80 of Zeta's intent to produce carbonated candy in Spain did not give General Foods' legal notice for purposes of determining pertinent delay in equity for General Foods' assertion of its claim of infringement under investigation of the '910 and '457 patents at issue based on respondents' subsequent allegedly infringing activity directed at the United States. Similarly, General Foods' notice through its foreign affiliates, its Brussels' office and its Korean licensee (FF 186, 187), regarding Zeta's foreign sales of carbonated candy are insufficient notice to complainants of infringing action directed to the United States.

The legal claim at issue in this investigation is based on the United States patent rights of complainant, and not on Spanish or other foreign

law. Any rights under Spanish patent law derived from the Spanish counterparts to the '910 and '457 patents, and the national scope and effectiveness of such counterparts under Spanish law, are matters not at issue which would be appropriate for resolution in Spain by Spanish tribunals, rather than by the administrative law judge. A critically necessary element of the legal claims at issue is the importation or sale of articles directed towards the United States. 19 U.S.C.

§1337(a)(1)(B)(ii). While the process patent protection provided by section 337 obviously has an effect on foreign processing activities, the legal claims at issue in this investigation are grounded fundamentally on enforcement of United States patent rights within the United States against unfair imports to the United States. Patent rights are only national in scope. See, Deepsouth Packing Co., Inc. v. Laitram Corp., 406 U.S. 518 (1972). Section 337 was initially amended to apply to foreign use of processes solely for the purpose of granting protection against unfair imports to U.S. process patents comparable to that already enjoyed by United States product patents. Certain Recombinant Erythropoietin, Inv. No. 337-TA-281 (Adopted Portion of ID Jan. 10, 1989) at 17-21 & Appendix A. Consequently, section 337's purpose is not to regulate the wholly foreign activity of using a process abroad when its product is not directed to the United States.

Since neither General Foods nor Zeta made any mention in their 1979-80 correspondence regarding any allegedly infringing activity in the United States, and mentioned only activity in Spain (FF 178, 179, 185), there was no affirmative conduct by virtue of this correspondence inducing a reasonable belief that a claim for infringing activity within the United

States was being asserted, and then abandoned. No claim for infringement of the '910 and '457 patents then was possible. General Foods' assertion only of its Spanish patent rights against merely foreign activity is the same as silence for purposes of determining delay in its assertion of its claims against infringement activities directed towards the United States. Respondents' mere citation of the term "misleading silence" does not change the fact that there was absolute silence, and no communication between Zeta and General Foods, regarding allegedly infringing activity in the United States (FF 183, 194). There was no other contact between Zeta, Confex, and any representatives of complainants which would have affirmatively represented to respondents that they were to believe that complainant had asserted and was ignoring allegedly infringing activity in the United States. Id. There has been no intentionally "misleading silence" by complainants which affirmatively communicated to the accused infringers both the patentee's knowledge of the allegedly infringing activity, which by definition must be activity directed to the United States, and communicated that the infringing character of the activity was under consideration by complainants. See, Jamesbury, supra; TWM Mfg. Co. v. Dura Corp., 201 USPQ 433 (6th Cir. 1979); Continental Coatings Corp. v. Metco, Inc., 464 F.2d 1375, (7th Cir. 1972) (Stevens, Cir. J.). No notice of intent to enforce United States patent rights was initially stated, and then followed by silence. Id.

Even apart from the absence of affirmative conduct of complainants, the administrative law judge determines that the complainants' failure to file suit up through 1986 legally could not be result of any delay by complainants in asserting any claim that they had in the United States for

infringement. Complainants had no such United States claim until at least 1986, since no applicable legal remedy was available until then.

Until passage of the Omnibus Trade and Competitiveness Act in August 1988 there was no right of action in the district courts against imports made by foreign use of a patented process. The only relief available then against such imports and sales of imports was under §337a, the predecessor to current §337(a)(1)(B)(ii) which is at issue in this investigation. It is uncontested that complainant General Foods ceased manufacturing and production of carbonated candy before Confex's purchase and importation of Zeta-made carbonated candy beginning in March 1981 (FF 193). No authorized domestic production of carbonated candy began until the 1986 domestic production acting pursuant to

(FF 196). Since relief under §337a required a domestic industry, and the domestic industry requirement mandated significant production activities in the United States related to the patented process, no domestic industry could have existed until 1986.

Confex has argued, and it is found, that General Foods was continuously and actively engaged in efforts to license its carbonated candy patents and trademarks domestically from 1980-86 (FF 200). Confex concluded from this that General Foods' licensing efforts could have been considered a domestic industry during that time for purposes of bringing suit under section 337. Under the interpretation of the domestic industry requirement utilized by the Commission before the amendments by the Omnibus Act, licensing activities and attempts to license were not considered production related activities sufficient to confer domestic industry

status. E.g., Certain Gremlin Character Depictions, Inv. No. 337-TA-201 (Comm. 1985); Certain Miniature, Battery-Operated All Terrain, Wheeled Vehicles, 4 ITRD 1920 (Comm. 1982), aff'd sub nom., Schaper Mfg. Co. v. U.S. I.T.C., 219 USPQ 665, 668 (Fed. Cir. 1983). Section 337a also contained an alternative requirement that, instead of already being in existence, the domestic industry could be in the process of being established (at the time of the investigation). ^{32/} This alternative aspect of the domestic industry requirement under the Commission's interpretation was limited to "embryo industries" which had just commenced domestic production or were ready and able to commence domestic production. Certain Ultra-Microtome Freezing Attachments, 195 USPQ 653, 656-658 (Comm. 1976); Certain Caulking Guns, 223 USPQ 388, 409-411 (Unreviewed ID 1984). Thus, the domestic industry requirement under section 337a necessarily could not have been satisfied by the complainant General Foods' licensing efforts from 1981 through 1985.

Respondents' argument that General Foods voluntarily ceased domestic production of carbonated candy in 1980, and so voluntarily abandoned its remedy under section 337a, is again misplaced. Abandonment is the voluntary, knowing relinquishment of a right. E.g., Associated Press v. Walker, 388 U.S. 130 (1967). Respondents' importation and sale began after General Foods had ceased domestic production and sale (FF 193), so that it cannot be said that General Foods knowingly relinquished any known or existing rights against respondents under section 337a when it ceased

^{32/} The "prevention of establishment" clause in section 337 contained essentially two requirements, one directed to injury, and one directed to the establishment of an industry.

production. It is attested that General Foods had an unprofitable experience with its own production and sale of this product (FF 200). Additionally, it is axiomatic under the patent laws that there is no requirement that a patentee produce a commercial device or practice a process under his patent. Perkin Elmer Corp. v. Computervision Corp., 221 USPQ at 680 (Fed. Cir. 1984). The same principles of equity applicable to a district court infringement action are applicable in this investigation under §337(c). Therefore, there was no special legal or equitable obligation for complainants to have earlier restarted a domestic industry in the production of carbonated candy, nor for General Foods to have somehow continued its unprofitable sales of carbonated candy after 1980, merely in order to be eligible under section 337a to obtain relief against alleged domestic infringement from imports allegedly made abroad by patented processes.

Based on the foregoing the administrative law judge determines that the defense of equitable estoppel has not been established, due to the failure to show unreasonable delay in filing the complaint in this investigation for the claimed infringement, and the failure to show affirmative conduct by or on behalf of the patentee inducing a belief that it had asserted and abandoned claims against the accused infringement.

X. IMPORTATION OR SALE

An element of a violation under section 337 is that the unfair act be in the importation, or sale, of imported articles. The evidence has established that Zeta from 1981 to 1988 has manufactured and exported to Confex in the United States commercial quantities of allegedly infringing carbonated candy. Confex, the domestic importer, has engaged in

attributable to work with the carbonated candy business (SPost at 29-31).

The respondents did not address the issue of the existence of a domestic industry in their post-hearing briefs. Zeta in its proposed rebuttal findings and conclusions argued that CCV does not manufacture carbonated candy but contracts with

(ZPRF F188); that shock-treats the tube prior to its opening (ZPRF F208); that does not practice a process according to the claims of the '457 and '910 patents (ZPRF F206, 220); and that the inner surfaces of the cooling tube are not polished (ZPRF F210) with all product not-being released upon opening of the cooling tube (ZPRF F211).

(a) Claim Coverage on the Domestic Process

Complainants bear the burden of establishing that the claims of the patents cover the process used by the domestic industry to produce carbonated candy. Neither complainants nor the staff addressed the issue of claim coverage on the domestic industry's process of producing carbonated candy in their posthearing briefs, and both have proposed essentially conclusory findings on this issue.

(i) Application of the '457 Patent Claims

The administrative law judge finds that the domestic industry literally practices independent claim 1 of the '457 patent in its production of carbonated candy. In its manufacture of Pop Rocks brand carbonated candy for utilizes first and second pressure vessels, the first an autoclave, and the second any one of a number of connected cooling tubes (or pipes) which are used in sequence.

It is established that the cooling tubes contain polished inner surfaces, as required by the claims. Hot candy melt is introduced from a kettle into a first pressure vessel, an autoclave, and carbon dioxide gas is introduced into the autoclave at superatmospheric pressure so that the gas is dispersed throughout the melt by mixing. An equivalent superatmospheric level of carbon dioxide is introduced into a second pressure vessel, one of a number of cooling tubes, the tubes having polished inner surfaces. The hot gasified candy melt is transferred to the cooling tube through a connecting line between the bottom of the autoclave and cooling tube and a valve in that connecting line, by creating a pressure differential between the two vessels by means of injecting added carbon dioxide into the top of the autoclave and venting the top of the cooling tube. The cooling tube then is isolated from the autoclave. The cooling tube is then cooled by means of an exterior jacket with circulating water which cools the gasified hot melt so that it becomes a carbonated solid matrix (FF 200 to 210).

The administrative law judge determines that the domestic industry's venting of the superatmospheric pressure of carbon dioxide causes the solid matrix of cooled gasified melt to shatter into multiple fragments, even while the candy is compressed inside the cooling tube. Thereafter the cooling tube is opened to allow the product to fall out into a container, with the carbonated candy expanding and forcefully "exploding" out of the cooling tube.

Kirkpatrick testified that the crackling sound accompanying venting indicates the fragmentation of the solid matrix of cooled candy (FF 209). There is evidence from the plant inspection at the plant conducted during discovery in this investigation that after the venting step a worker at the plant used a hammer to strike

the side wall of the cooling tube, hitting a metal hammer pad or striker pad specially fabricated on each of the cooling tubes for the purpose of shattering the cooled candy melt (FF 206). Such striking of the cooling tube is not done to shatter a solid matrix of carbonated candy as disclosed in the '910 patent but rather has been done to unplug non-carbonated candy or merely free bridged, already-fragmented carbonated candy (FF 116, 117A, 210).

written by Kirkpatrick indicates that "occasionally the product will not discharge" from a cooling tube upon opening, due to "a 'glass' plug of non-carbonated candy blocking the exit opening, and a few sharp taps on the striker plate of the tube will dislodge or crack the plug", exploding the candy from the tube. The focus of the is to rule out striking the tube on any place other than the striker pad (FF 210). Additionally, both the

and testimony established that striking is not an authorized part of the domestic industry's production process for carbonated candy (FF 212).

(ii) Application of the '910 Patent Claims

Due to the overlap in many of the requirements of the '910 patent claims with those of the '457 patent, the principle issue presented by complainants' proof is whether the domestic industry's carbonated candy production process practices step (h) of the '910 patent, which is as follows:

h. shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments.

The other steps of claim 1 and dependent claims 2-6 and 8-9 plainly are satisfied by the domestic industry's process. Complainants seek to apply both this claimed step h of shock-treating to its process, while also

contending that the '457 step of venting causing the matrix to shatter into fragments is also practiced. To resolve that inconsistency in their contentions, complainants proposed that the venting step practiced in their process satisfies the claimed shock-treating step above.

The administrative law judge, as described above in the section on infringement, rejects the contention that venting by claim construction "shock treats" the cooling tube vessel itself according to the '910 patent.

Kirkpatrick at the hearing explained that the opening step practiced at the _____ the candy. However, Kirkpatrick also attested that it is the previous venting step which caused the solid matrix of carbonated candy to fracture or shatter and that the fractured candy is thereafter merely compressed in the tube, so that upon opening the candy explodes out (FF 205, 206, 209).

Based on the foregoing, the administrative law judge finds that the domestic industry does not practice the step of shock-treating the second pressure vessel so that the solid matrix of carbonated candy is shattered as called for by the '910 patent. To the contrary the solid matrix of carbonated candy is fragmented in the domestic industry through venting of the second pressure vessel. Accordingly the administrative law judge finds that the domestic industry does not practice claims 1-9 of the '910 patent.

b) Significant Investment and Employment

The administrative law judge determines that, assuming that the domestic process of producing carbonated candy is covered by the pertinent claims of the '910 and '457 patents, there is an industry in the United States within the meaning of 19 U.S.C. §1337(a)(3) through significant

employment of labor and capital and significant investment in plant and equipment. The legislative history to the Omnibus Trade and Competitiveness Act of 1988 (Omnibus Act) which added §337(a)(3) to the statute indicates that domestic production of the protected article is sufficient, although not a strict necessity, for domestic industry status under the statute. The legislative history plainly indicates that §337(a)(3) was added solely to ensure that the domestic industry requirement of section 337 is not interpreted in an unduly narrow manner by the Commission, and the Congress endorsed Commission previous holdings finding a domestic industry using essentially the factors in the first two subsections of §337(a)(3). Report of the House Committee on Ways and Means on H.R. 3, H. Rep. 100-40, 100th Cong., 1st Sess. at 157 (April 1987). The legislative history of the Omnibus Act provides no indication that Congress had any intent to require that a domestic industry under §337 be of any particular absolute size of investment or employment in order to qualify, and in fact Congress stated that the previously existing protection under section 337 had become "too cumbersome and costly." §1341(a). Prior Commission precedent supports the conclusion that the domestic production of the articles involved constitutes significant domestic operations sufficient for domestic industry status, including significant employment of labor, and use of capital goods, and investment represented in plant and equipment. Certain Airtight Cast Iron Stoves, 215 USPQ 963, 3 ITRD 1168 (Comm. 1980); Certain Cube Puzzles, 219 USPQ 322, 4 ITRD 2102 (Comm. 1982); Certain Miniature, Battery-Operated All Terrain, Wheeled Vehicles, Inv. No. 337-TA-122, USITC Publ. 1300 (Comm. Opin. 1982), aff'd sub nom., Schaper Mfg. Co. v. U.S. International Trade Commission, 219 USPQ 665, 667 (Fed.

Cir. 1983). The administrative law judge has recently held that the "significant" investment and employment subparts of §337(a)(3) does not set an absolute standard of a certain level of investment expenditures or employment. Certain Concealed Cabinet Hinges and Mounting Plates, Inv. No. 337-TA-289 (ID Sep. 1989) (Luckern) at 128-144. Where substantial production occurs abroad, section §337(a)(3) compels a comparative assessment of domestic versus foreign operations to determine whether the industry is sufficiently domestic in character through significant domestic activities. Where, as here, the industry at issue is engaged in continuous production of the protected articles in a plant located in the United States and that production is authorized under license through the patentee (FF 200-204), the industry is necessarily sufficiently domestic in character and the investment in plant and equipment and employment of labor and capital are significant under the statute.

The fact that complainant _____ the carbonated candy, and that this is done by _____

_____, does not affect the existence of a domestic industry.

_____ employs capital and labor and has related investments pursuant to 19 U.S.C. §1337 (a)(3)(A) and (B). Production _____ is included within a domestic industry. E.g., Certain Feathered Fur Coats, Inv. No. 337-Ta-260 (Unreviewed ID 1987).

FINDINGS OF FACT

A. The Parties

1. Complainant General Foods is a Delaware corporation with its principal place of business at 250 North Street, White Plains, New York, 10625 (SX-4 at 1).
2. General Foods is the owner of the '910 and '457 patents at issue in this investigation by assignment from the named inventors (CX-1).
3. Complainant Pop Rock, is a New Jersey corporation with its principal place of business at Wildlife Run, Harding, New Jersey, 07976. Richard Kornutik is the president of Pop Rocks. The '910 and '457 patents on their face show that General Foods' attorney Richard Kornutik was the attorney involved in obtaining the patents (CX-20 at 1; SX-6 at 1, 2; SX-6 at 1; CX-1; CX-2).
4. Pop Rocks is the sole licensee of the '910 and '457 patents (CX-3).
5. Pop Rocks is a partner with Niagara-Ferry, Inc. in the partnership known as Carbonated Candy Ventures (CCV) (CX-4).
6. Complainant CCV is a New York partnership with its principal place of business at 1195 Niagara Street, Buffalo, New York, 14213 (SX-2 at 1).
7. CCV is engaged in the manufacture through Rich Products Corporation, distribution, marketing and sale of carbonated candy products allegedly covered by the claims of the '910 and '457 patents. Carbonated candy is sold by CCV under the registered trademark POP ROCKS. Thus Rich

Products Corporation produces Pop Rocks brand carbonated candy for CCV (SX-2 at 2, 5, 25-26; CX-21 at 3; Kirkpatrick CX-22 at 2).

8. Respondent Zeta is a Spanish corporation with its principal place of business at Apartado de Correos No. 140, CA Valencia, 6 - Poligono Industrial Las Salinas, 08830 Sant Boi De Llobregat (Barcelona), Spain (SX-8 at 1).

9. Zeta manufactures in Spain and sells for importation into the United States certain carbonated candy products alleged to be made by a process covered by claims 1 to 9 of the '910 patent and claims 1 to 9 of the '457 patent (SX-12; SX-8 at 8).

10. Respondent Confex, is located at 167 Avenue at the Common, Shrewsbury, New Jersey, 07702 (SX-11 at 1).

11. Confex imports into, and sells in, the United States carbonated candy products alleged to infringe claims 1 to 9 of the '910 patent and claims 1 to 9 of the '457 patent (SX-12; SX-8 at 8).

12. Confex is engaged in the distribution, marketing and sale in the United States of carbonated candy products manufactured by Zeta in Spain (SX-11 at 3).

B. The Products And Processes At Issue

13. Carbonated candy is a hard candy product (RCX-36).

14. The first U.S. patent for carbonated candy and for the original process for producing carbonated candy expired on December 11, 1978 (RCX-36).

15. Zeta manufactures products consisting only of carbonated candy and other products which are a mixture of bubble gum and carbonated candy (SPX-8).

16. Zeta manufactures the carbonated candy it uses in its products according to two processes which have been designated as "Process A" and "Process B" in this investigation (RZX-54; RZX-55).

C. The '910 Patent

17. The '910 patent issued on October 12, 1976 on application Serial No. 618,603 filed October 1, 1975 and is titled "Method Of Making A Gasified Confection". The named inventor is Paul A. Kirkpatrick. The patent is assigned on its face to General Foods Corporation (CX-1).

18. The issued patent contains nine claims, all of which are in issue and which read:

1. A method of making a carbonated candy which comprises:
 - a. obtaining a hot candy melt,
 - b. introducing the hot melt into a first pressure vessel,
 - c. introducing a gas at superatmospheric pressure into the first pressure vessel so that the gas is dispersed within the hot melt,
 - d. introducing a gas at superatmospheric pressure into a second pressure vessel at a value equivalent to the pressure within the first pressure vessel, the first and second pressure vessels having a connecting line with valve means between the bottom of the first vessel and the bottom of the second vessel,
 - e. transferring the gasified hot melt to the second pressure vessel through the connecting line by opening said valve means and then creating a pressure differential being effected by regulating the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel,
 - f. isolating the second pressure vessel while continuing to maintain a superatmospheric pressure,
 - g. cooling the second pressure vessel so that the gasified hot melt becomes a gas-containing solid matrix.
 - h. shock-treating the second pressure vessel so that the gas-containing solid matrix is shattered into multiple fragments.
 - i. venting the second pressure vessel, and
 - j. opening the second pressure vessel to allow the product to be removed.

2. The method of claim 1 wherein the gas is carbon dioxide.
3. The method of claim 2 wherein the superatmospheric pressure is maintained between 50 p.s.i. and 1000 p.s.i.
4. The method of claim 3 wherein the pressure differential maintained during transfer is 10 p.s.i. to 150 p.s.i.
5. The method of claim 4 wherein the temperature of the melt is at least 212°F.
6. The method of claim 5 wherein the amount of gas dispersed within each gram of melt is 0.5 ml. to 15.0 ml.
7. The method of claim 6 wherein the shock treatment of the second pressure vessel is effective to shatter the gas-containing solid matrix into granular particles which are relatively uniform in size.
8. The method of claim 7 wherein the second pressure vessel is vented to atmosphere through means which permit precise control over the exiting gas.
9. The method of claim 8 wherein the pressure in the second pressure vessel is maintained at a constant value from steps (d) through (f).

(CX-1, col. 4, lines 15 to 68).

19. The abstract of the '910 patent reads:

This invention relates to incorporating a gas into a hot candy (sugar) melt within a pressure vessel at superatmospheric pressure. The gasified hot melt is transferred from the pressure vessel to a cooling tube, through a line or lines connecting the bottom of the pressure vessel to the bottom of the tube, by creating pressure differential between the cooling tube and the pressure vessel while venting the top of the tube to the atmosphere. When the transfer is complete, the cooling tube is isolated and the pressure within it is maintained at superatmospheric and it is cooled to a temperature below 70°F. whereby the gasified hot melt becomes a gas-containing solid matrix. Next, the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments.

(CX-1).

20. Under the subheading "Background of the Invention", the patentee states that the "invention relates to the production of carbonated candy which is a hard candy containing carbon dioxide gas as disclosed in U.S. Pat. No. 3,012,893" (the '893 patent) which patent is "herein" incorporated

by reference; and that such a candy is made by the process which comprises fusing a fusible sugar, contacting such fusible sugar with gas at a pressure of 50--1000 p.s.i.g for a time sufficient to permit absorption in said sugar of 0.5-15 milliliters of gas per gram of sugar, maintaining the temperature of said sugar during said absorption above the solidification temperature of said fused sugar and cooling said sugar under pressure to a temperature less than its fusing temperature thereby obtaining a gas-containing solid. It is stated that typically the above process is carried out within a Parr reactor (a thick-shelled pressure vessel having a stirrer); that the temperature of the mixture in the Parr reactor is generally maintained above 212°F; that carbon dioxide, which is the preferred gas, is admitted to the reactor to pressurize it to 600 p.s.i.g.; that the mixture is then agitated for 5 to 10 minutes and that the 600 p.s.i.g. is maintained within the reactor and it is cooled to about 70°F, that the Parr reactor is now opened; and that the product within the reactor must be removed (CX-1, col. 1, lines 5-28).

21. The patentee states that:

[T]he removal [of the candy from the Parr reactor] is not an easy task. The product exists as a solid mass and within this mass is encased the agitator used to mix the product when it was in a liquid state. The product is manually removed by breaking it into small sections with means such as an ice pick. The pieces of carbonated candy thus removed vary greatly in size. Not only does the basic method of manually removing create size variations, but by the nature of the carbonated candy itself the gas within it tends to explode on impact and creates particle sizes which are quite random. Additionally, amounts of product will remain adhered to the walls of the reactor and such product must be scraped off or remelted to effect its removal. Further, it has been found to take 1-1/2 to 2-1/2 or more hours to cool the product to 70°C. The reactor vessel, a major piece of equipment in the process, could potentially produce 15 to 25 times more product within a given time period if it were not necessary to cool the product within the reactor. Obviously,

such procedures and results have a negative effect on any attempts to produce a carbonated candy in any great amounts.

Therefore, it will be highly desirable if a simple method were devised for cooling the carbonated candy in a vessel separate from the one in which the candy was originally infused with gas. It would also be highly desirable if the product could be removed from that vessel in a relatively uniform particle size. Further, it would be desirable to have a minimum of product remain adhering to the interior walls of said vessel.

(CX-1, col. 1, lines 29-58).

22. Under the subheading "Summary of the Invention", it is stated that the invention relates to a method of making a granular carbonated candy; that "a hot candy melt is gasified in a first pressure vessel; that "[n]ext while the melt is still at elevated temperature and pressure, it is transferred to a second pressure vessel;" that the product is passed from the first pressure vessel through a line to the bottom of the second pressure vessel which is initially maintained at a temperature and pressure equivalent to the first vessel; that the transfer is effected by maintaining the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel to atmosphere; that when the transfer is complete, the vent is closed and the second pressure vessel is isolated; that "[n]ext the second pressure vessel is cooled to a temperature below 70°F." while maintaining superatmospheric pressure within the vessel so that the gasified hot melt becomes a gas-containing solid matrix; and that "[n]ext the second pressure vessel is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments". It is then disclosed that the pressure in the second pressure vessel is released and the product is allowed to fall out (CX-1, col. 1, lines 62-68, col. 2, lines 1 to 15).

23. Under the subheading "Detailed Description of the Invention", a first pressure vessel is charged with the hot candy melt. The melt is maintained at a temperature above 200° and preferably between 315° and 325°F. Into the headspace between the top of the liquid level of the candy melt and the top of the pressure vessel a gas is admitted at superatmospheric pressure, between 50 p.s.i. 1,000 p.s.i., and preferably between 550 p.s.i. to 650 p.s.i. Agitation of the melt, plus the pressure of the gas, preferably carbon dioxide, causes the gas to be incorporated within a candy melt. A second pressure vessel is connected to the first pressure vessel by means of a line or manifold of lines, said line or lines having means to isolate the vessels from each other. Typically, a ball valve is placed in a line connecting the two vessels. While the candy melt is being gasified in the first pressure vessel, the valve is in the closed position. A gas, preferably the same as in the first vessel, is admitted to the second vessel so that there is no pressure differential between the two vessels. Additionally, the second vessel and transfer lines are heated to approximately the same temperature as the first vessel. Thus, at the end of the mix cycle, when the valve and the line connecting the two vessels is opened, no transfer takes place. The gas inlet on both vessels is located in their topmost portion. The connecting line goes from the bottom of the first tank to the bottom of the second tank. Regulator valves are used on the gas lines to maintain particular pressures. The second vessel has a venting means on its topmost portion. To accomplish the transfer between the vessels, the regulator of the first vessel is set to a value slightly higher than the second vessel, i.e., 650 p.s.i. vs. 600 p.s.i., and the vent on the second vessel opened. The exact pressure

differential selected may, of course, vary and is typically with the range of say 10 p.s.i. to 150 p.s.i. The pressure differential and the venting causes the candy melt to transfer from the first vessel to the second vessel (CX-1, col. 2, lines 18 to 56).

24. The patentee teaches that in the preferred embodiment the configuration of the second pressure is a cylindrical tube or pipe with a diameter ranging from 2 inches to 12 inches and the length from 24 inches to 72 inches; that it is constructed to withstand pressures of at least 1000 p.s.i. at temperature up to about 400°F; that the exterior is jacketed to provide for the circulation of an appropriate cooling medium such as water, propylene glycol or liquid ammonia; that the top and bottom of the tube are provided with flanges to provide access and to permit the removal of the product and subsequent cleaning of the tube; and that additional cooling means may be provided within the interior of the tube to facilitate more rapid cooling of the product (CX-1, col. 2, lines 57 to 68, col. 3, lines 1-2). The patentee discloses that it is important that the pressures between the two tubes be equalized prior to opening the valve and the line connecting them and that this prevents flashing of the melt or boiling of the mixture; that at all times the candy solution must be maintained at superatmospheric pressure prior to cooling and the subsequent transformation of the melt to a crystal structure; that it is preferable to maintain the pressure in the cooling tube at a constant value prior to removing the cooled product from the tube; that it is most preferable to maintain the pressure in the cooling tube at least as high as the original gasifying pressure and if this is not done, the product will lose the entrapped gas; that the transfer line allows the candy melt to exit the

bottom of the first vessel and enter the bottom of the second vessel; that the venting means is typically a needle valve or other such means which permits precise control over the exiting gas; that the amount of gas vented is equivalent to the volume of the candy melt which is transferred and thus at the end of the transfer cycle, the valve in the connecting line between the vessels is closed; and that the first vessel can now be depressurized and used to begin gasifying another charge of candy melt that one mixing pressure vessel can thus be used to supply gasified product to a number of cooling tubes. It is taught that the candy melt in the second pressure vessel is allowed to cool to a temperature below 100°F and preferably below 70°F, all the while maintaining the pressure at the original gasifying pressure, i.e. 600 p.s.i.; that when the cooling cycle is complete, the vent is again opened to allow any free gas to escape; that now the product exists in the cooling tube as a solid gas-containing matrix; that "[n]ext the cooling tube is shock-treated so that the gas-containing solid matrix is shattered into multiple fragments;" that when the sidewalls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy and thus, the walls of the cells containing many bubbles of pressurized carbon dioxide break completely and the gas within is exploded; and that the combination of impact and exploding bubbles of carbon dioxide reduce the solid mass within the tube into many fine particles. The patentee then discloses that the bottom of the cooling tube can "now be opened" and the product removed (CX-1, col. 2, lines 57 to 68, col. 3, lines 1-42).

25. The sole example of the '910 patent reads:

Candy melt is prepared by mixing 34-3/4 pounds of sucrose, 19 - 1/4 pounds of corn syrup, 13 pounds of water and 8 grams of food

coloring in a 15-gallon kettle. The mixture is heated to between 315°F. to about 325°F to remove water to a level below about 2%. The melt is charged to a preheated Dependable Welding Service autoclave and 31.5 milliliters of artificial flavor is added. The autoclave is sealed and carbon dioxide at a pressure of 600 p.s.i. is introduced to the headspace between the liquid level of the candy melt and the top of the autoclave. An agitator which is vertically mounted through the top portion of the autoclave is operated for 5 minutes. A jacketed cooling tube, which is 6 inches in diameter and 60 inches in height, is vertically mounted adjacent to the autoclave. A 1-inch jacketed line with a ball valve at its mid-point connects the bottom of the autoclave with the bottom of the cooling tube. The ball valve is in a closed position. The tube is pressurized with CO₂ to 600 p.s.i. With both vessels at 600 p.s.i. and the mixing complete, the ball valve is opened. Next, the pressure in the autoclave is increased to 650 pounds and a needle valve which vents the top of the cooling tube to atmosphere is slowly opened. When all of the candy melt is transferred to the cooling tube, the ball valve and then the vent needle is closed. Water, at 60°F., is circulated in the jacket of the cooling tube for 3 hours to reduce the temperature of the product to 70°F. The product at this temperature exists as a solid gas-containing matrix.

The transfer, water and gas lines are disconnected from the cooling tube and any free gas in the tube is released by opening the vent valve. Next, the sidewall of the tube is struck with a 3-pound sledgehammer, the bottom flange of the cooling tube is removed and the product is allowed to fall out.

The resultant product is a hard candy containing carbon dioxide gas which when placed in the mouth produces an entertaining popping sensation. The particles are granular in form and relatively uniform in size.

(CX-1, col. 3, lines 45 to 68, col. 4, lines 1-14).

D. The '457 Patent

26. The '457 patent in issue issued on January 4, 1977 to inventor Joseph L. Hegadorn. It is assigned on its face to General Foods Corporation and is titled "Method of Making A Gasified Confection". It is based on application Serial No. 701, 835 filed July 1, 1976 (CX-2).

27. Claims 1 to 9 in issue, which are all of the claims of the '457 patent, read:

1. A method of making a carbonated candy which comprises:

- a. obtaining a hot candy melt,
- b. introducing the hot melt into a first pressure vessel,
- c. introducing a gas at superatmospheric pressure into the first pressure vessel so that the gas is dispersed within the hot melt,
- d. introducing a gas at superatmospheric pressure into a second pressure vessel which has polished inner surfaces at a value equivalent to the pressure within the first pressure vessel, the first and second pressure vessels having a connecting line with valve means between the first vessel and the bottom of the second vessel.
- e. transferring the gasified hot melt to the second pressure vessel through the connecting line by opening said valve means and then creating a pressure differential between the two vessels, said differential being effected by regulating the superatmospheric pressure in the second pressure vessel at a valve lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel,
- f. isolating the second pressure vessel while continuing to maintain a superatmospheric pressure,
- g. cooling the second pressure vessel so that the gasified hot melt becomes a gas-containing solid matrix,
- h. venting the second pressure vessel which causes the matrix to shatter into multiple fragments, and
- i. opening the second pressure vessel to allow the product to be removed.

2. The method of claim 1 wherein the gas is carbon dioxide.

3. The method of claim 2 wherein the superatmospheric pressure is maintained between 50 p.s.i. and 1000 p.s.i.

4. The method of claim 3 wherein the pressure differential maintained during transfer is 5 p.s.i. to 150 p.s.i.

5. The method of claim 4 wherein the temperature of the melt is at least 212°F.

6. The method of claim 5 wherein the amount of gas dispersed within each gram of melt is 0.5 ml. to 15.0 ml.

7. The method of claim 6 wherein the shock treatment of the second pressure vessel is effective to shatter the gas-containing solid matrix into granular particles which are relatively uniform in size.

8. The method of claim 7 wherein the second pressure vessel is vented to atmosphere through means which permit precise control over the exiting gas.

9. The method of claim 8 wherein the pressure in the second pressure vessel is maintained at a constant value from steps (d) through (f).

(CX-2, col. 4, lines 15 to 68).

28. The abstract of the '457 patent reads:

Preparing a gasified confection by incorporating a gas into a hot candy (sugar) melt within a pressure vessel at superatmospheric pressure. The gasified hot melt is transferred from the pressure vessel to a cooling tube which has a polished inner surface, through a line or lines connecting the bottom of the pressure vessel to the bottom of the tube, by creating pressure differential between the cooling tube and the pressure vessel while venting the top of the tube to the atmosphere. When the transfer is complete, the cooling tube is isolated and the pressure within it is maintained at superatmospheric and it is cooled to a temperature below 70°F. whereby the gasified hot melt becomes a gas-containing solid matrix. Next, the cooling tube is vented to atmospheric conditions.

(CX-2).

29. Under the subheading "Background of the Invention", Hegadorn states that the invention relates to the production of carbonated candy which is a hard candy containing carbon dioxide gas as disclosed in U.S. Pat. No. 3,012,893 and U.S. Ser. No. 618,603 (the '910 patent in issue) which are said to be incorporated in the '457 patent by reference (CX-2, col. 1, lines 5-8).

30. The '457 specification states that the candy of U.S. Pat. No. 3,012,893 and U.S. Ser. No. 618,063 is made by the process which comprises fusing a fusible sugar, contacting such fusible sugar with gas at a pressure of 50-1000 p.s.i.g. for a time sufficient to permit absorption in said sugar of 0.5.-15 milliliters of gas per gram of sugar, maintaining the

temperature of said sugar during said absorption above the solidification temperature of said fused sugar and cooling said sugar under pressure to a temperature less than its fusing temperature thereby obtaining a gas-containing solid (CX-2, col. 1, lines 9 to 18).

31. U.S. Pat. No 3,012,893 is described as follows:

In U.S. Pat. No. 3,012,893, the process is carried out within a Parr reactor (a thick-shelled pressure vessel having a stirrer). The temperature of the mixture in the Parr reactor is generally maintained above 212°F. Carbon dioxide, which is the preferred gas, is admitted to the reactor to pressure it to 600 p.s.i.g. The mixture is then agitated for 5 to 10 minutes. The 600 p.s.i.g is maintained within the reactor and it is cooled to about 70°F. The Parr reactor is now opened and the product within must be removed manually by breaking it into small sections with means such as an ice pick. Pieces of carbonated candy thus removed vary greatly in size.

(CX-2, col. 1, lines 18 to 31).

32. Referring to U.S. Ser. No. 618,603 the '457 patent specification stated:

U.S. Ser. No. 618,603 discloses a method of cooling the hot melt in a separate pressure vessel. The removal of the solidified candy is still a difficult task. The cooling vessel must be impacted to break the solidified mass. Such impact usually causes a major portion of the solid matrix to be reduced to granular form. However, much material remains adhering to the walls of the pressure vessel. Occasionally large amounts of product remain segmented or isolated within the tube. It is then necessary to manually remove the solidified product from the tube. Often the product is so tightly packed in the tube that the only viable method of removal is to wash down the entire cooling tube. The above problems result in non-uniform product quality and size and, of course, much waste and loss of production.

Therefore, it would be highly desirable if a simple method were devised which would permit complete uniform removal of the product from the cooling tube.

(CX-2, col. 1, lines 32 to 49).

33. Under the subheading "Summary of the Invention" it is disclosed that the invention relates to a method of making a granular carbonated

candy; that a hot candy melt is gasified in a first pressure vessel; that next, while the melt is still at elevated temperature and pressure, it is transferred to a second pressure vessel which has polished inner surfaces; that the product is passed from the first pressure vessel through a line to the bottom of the second pressure vessel which is initially maintained at a temperature and pressure equivalent to the first vessel; that the transfer is effected by maintaining the superatmospheric pressure in the second pressure vessel at a value lower than the superatmospheric pressure in the first pressure vessel and venting the top of the second pressure vessel to atmosphere; that when the transfer is complete, the vent is closed and the second pressure vessel is isolated; that next the second pressure vessel is cooled to a temperature below 70°F. while maintaining superatmospheric pressure within the vessel so that the gasified hot melt becomes a gas-containing solid matrix; and that next the second pressure vessel is vented to atmosphere so that the sudden change in pressure caused the gas-containing solid matrix to shatter into multiple fragments and release from the inner polished surfaces of the cooling vessel (CX-2, col. 1, lines 52-68, col. 2, lines 1-8).

34. Under the subheading "Detailed Description of the Invention", it is stated:

According to the process of this invention, a first pressure vessel is charged with the hot candy melt. The melt is maintained at a temperature above 200° and preferably between 315° and 325°F. Into the vessel is admitted a gas at superatmospheric pressure, between 50 p.s.i. and 1,000 p.s.i., and preferably between 550 p.s.i. to 650 p.s.i. Agitation of the melt, plus the pressure of the gas, preferably carbon dioxide, causes the gas to be incorporated within a candy melt. A second pressure vessel which has polished inner surfaces is connected to the first pressure vessel by means of a line or manifold of lines, said line or lines having means to isolate the vessels from each other. Typically, a ball valve is placed in a line

connecting the two vessels. While the candy melt is being gasified in the first pressure vessel, the valve is in the closed position. A gas, preferably the same as in the first vessel, is admitted to the second vessel so that there is no pressure differential between the two vessels. Thus, at the end of the mix cycle, when the valve and the line connecting the two vessels is opened, no transfer takes place.

The gas inlet on both vessels is located in their topmost portion. The connecting line goes from the bottom of the first tank to the bottom of the second tank. Regulator valves are used on the gas lines to maintain particular pressures. The second vessel has a venting means on its topmost portion. To accomplish the transfer between the vessels, the regulator on the first vessel is set to a value slightly higher than the second vessel, i.e., 650 p.s.i. v. 600 p.s.i., and the vent on the second vessel opened. The exact pressure differential selected may, of course, vary and is typically within the range of say 5 p.s.i. to 150 p.s.i. The pressure differential and the venting causes the candy melt to transfer from the first vessel to the second vessel.

(CX-2, col. 2, lines 10 to 45).

35. The patentee teaches that in the preferred embodiment of the invention, the configuration of the second pressure is a cylindrical tube or pipe with a diameter of 4 1/2 inches and a length of 144 inches which is constructed to withstand pressure of at least 1000 p.s.i. at temperature up to about 400° F; that the exterior of the tube or pipe is jacketed to provide for the circulation of an appropriate cooling medium such as water, propylene glycol or liquid ammonia; that the top and bottom of the tube are provided with flanges to provide access and to permit the removal of the product; and that the interior walls are nickel plated and polished to a smooth surface (CX-2, col. 2, lines 45-55).

36. The patentee teaches that:

It is important that the pressures between the two tubes be equalized prior to opening the valve and the line connecting them. This prevents flashing of the melt or boiling of the mixture. At all times the candy solution must be maintained at superatmospheric pressure prior to cooling and the subsequent transformation of the melt to a crystal structure. It is

preferable to maintain the pressure in the cooling tube at a constant value prior to removing the cooled product from the tube. It is most preferable to maintain the pressure in the cooling tube at least as high as the original gasifying pressure. If this is not done, the product will lose the entrapped gas. The transfer line allows the candy melt to exit the bottom of the first vessel and enter the bottom of the second vessel. The venting means is typically a needle valve or other means which permits precise control over the exiting gas. The amount of gas vented in [sic] equivalent to the volume of the candy melt which is transferred. Thus, at the end of the transfer cycle, the valve in the connecting line between the vessels is closed. The first vessel can now be depressurized and used to begin gasifying another charge of candy melt. One mixing pressure can thus be used to supply gasified product to a number of cooling tubes.

The candy melt in the second pressure vessel is allowed to cool to a temperature below 100°F. and preferably below 70°F., all the while maintaining the pressure at the original gasifying pressure, i.e. 600 p.s.i. At this point in the process, prior art workers would vent the cooling tube and next attempt to remove the product of the interior of the tube and reduce the matrix to multiple fragments by impacting the sidewalls of the tube typically with a sledge hammer. The product tenaciously adheres to the inner surfaces of the cooling tube. Removal of all product is difficult and often incomplete. The excessive shock treatment necessary to remove the candy has a detrimental effect on product quality. Typically, 50-60% of the product when shock treatment is employed is fines (particle sizes which are too small to be included with the final product).

According to the process of the instant invention, polished inner surfaces of the cooling tube permit the product to immediately be released from the sidewalls and break into multiple fragments simply by venting the tube to atmosphere. The design of the cooling tube should be such that the width/length ratio is at least 20 to 1. Ratios between 20 to 1 and 60 to 1 may be employed with the preferred range of between 40 to 1 and 50 to 1. The interior surfaces of the tube are plated and polished so that they are smooth and free from any irregularities. The amount of fines from the finished product is greatly reduced according to the process of the instant invention.

(CX-2, col. 1, lines 57-68; col. 3, lines 1 to 41).

36A. The sole example of the '457 patent in issue reads:

Candy melt is prepared by mixing 35 pounds of sucrose, 19 1/4 pounds of corn syrup, 13 pounds of water and 8 grams of food coloring in a 15-gallon kettle. The mixture is heated to between 315°F. to about 325°F. to remove water to a level below about 2%. The melt is charged to a preheated Dependable Welding Service

autoclave and 31.5 milliliters of artificial flavor is added. The autoclave is sealed and carbon dioxide at a pressure of 600 p.s.i. is introduced to the headspace between the liquid level of the candy melt and the top of the autoclave. An agitator which is vertically mounted through the top portion of the autoclave is operated for 5 minutes. A jacketed cooling tube, which is 4 1/2 inches in diameter and 170 inches in height, is vertically mounted adjacent to the autoclave. A 1-inch jacketed line with a ball valve at its mid-point connects the bottom of the autoclave with the bottom of the cooling tube. The ball valve is in a closed position. The tube is pressurized with CO₂ to 600 p.s.i. With both vessels at 600 p.s.i. and the mixing complete, the ball valve is opened. Next, the pressure in the autoclave is increased to 650 pounds and a needle valve which vents the top of the cooling tube to atmosphere is slowly opened. When all of the candy melt is transferred to the cooling tube, the ball valve and then the vent needle valve is closed. Water, at 60°F., is circulated in the jacket of the cooling tube for 3 hours to reduce the temperature of the product to 70°F. The product at this temperature exists as a solid gas-containing matrix.

The cooling water and gas lines are disconnected and the cooling tube is vented to atmosphere. This sudden change in pressure within the tube causes the matrix to shatter into granular particles which are relatively uniform in size.

The resultant product is a hard candy containing carbon dioxide gas which when placed in the mouth produces an entertaining popping sensation. The particles are granular in form and relatively uniform in size.

(CX-2, col. 3, lines 44 to 68, col. 4, lines 1 to 14).

E. The '893 Patent

37. The '893 patent, which is incorporated by reference in the '910 and '457 patents in issue, issued to Leon Kremzner and William A. Mitchell on Dec. 12, 1961 from on Ser. No. 785,115 filed Jan. 6, 1959. It is to a "Gasified Confection And Method of Making the Same" and is assigned on its face to General Foods Corporation (RCX-36). It contains twenty-five claims. Each of thirteen of those claims is to a method of enclosing a gas within a solid matrix. Each of the remaining claims is to a gas-containing solid or to a gasified confection.

38. The invention of the '893 patent relates to a technique for enclosing a gas within a solid matrix and to the gas-containing solid so prepared. It is a feature of the invention that the gasified product may be used as a "carbonated hard candy" (RCX-36, col. 1, lines 10-15, col. 3, lines 60-67).

39. The '893 patent teaches that the incorporation of the gas into the fusible sugar under fusion-producing conditions may be effected by various techniques; extrusion, followed by hardening and release of pressure; molding under pressure; and various agglomerating techniques where fusion is effected by pressure preferably by mixing the gas with agitated fused sugar; that when the reaction is conducted batchwise and the carbon dioxide is to be added in gaseous form, the fusible sugar at temperature above its fusing point, is agitated and the carbon dioxide gas under desired pressure is admitted to the reaction chamber; that although the pressure of the gas may be varied somewhat depending upon prevailing conditions, it is preferred to maintain a superatmosphere pressure, i.e., a pressure of at least 50 p.s.i.g. and less than 1000 p.s.i.g. with preferred pressure from 400 p.s.i.g to 800 p.s.i.g.; that the time of contact of the liquid and the gas and the other conditions noted may vary somewhat depending on the particular characteristics of the system in which the reaction is carried out; that typically, however, the time of reaction will be controlled to give the desired amount of gas in the product--varying from e.g. 0.5-2.5 to about 15 ml. per gram of product. Typically the time of reaction will be of the order of 2-6 minutes, say 3.5 minutes; that at the end of the desired reaction time, the reaction mixture may be cooled under pressure to a temperature below that of the fusion temperature of the

mixture. Preferably this will be done rapidly i.e. sufficiently quickly to minimize the crystallization of the sugar with rapid cooling increasing the fragility, minimizing inversion, and reducing hygroscopic tendencies of the product (RCX-36, col. 3, lines 15-46).

40. The '893 patent contains seven examples for making a gasified confection. The confection is made in a Parr reactor, described as a thick-shelled pressure vessel having a stirrer, in each of six of the examples. In Example II a "pressurized reactor" is used (RCX-36).

41. Representative Example I reads;

70 parts by weight of sucrose were mixed with 30 parts (dry base) by weight of 42 D.E. corn syrup. The liquid mixture was cooked at 160°C., the resulting mixture having a moisture content of 2%. This mixture was placed within a Parr reactor (a thick-shelled pressure vessel having a stirrer) wherein it was maintained in fused condition at temperature above 100°C. Carbon dioxide gas to 600 p.s.i.g. was admitted and the mixture agitated for six minutes.

The reactor was rapidly cooled to 25°C. and opened. The product contained therein was hard and friable. It was found to contain 4.5 ml. of carbon dioxide per gram of product.

(RCX-36, col. 3, lines 68 to 75, col. 4, lines 1-10).

42. The quality of carbonated candy produced by the process developed by Kremzner and Mitchell by the '893 patent with the Parr reactor and the quality of the carbonated candy produced by the '910 patent is generally similar (Kirkpatrick Tr. at 229).

F. Prosecution Of The '910 Patent

43. In a first Patent Office action dated December 29, 1975, claims 1 to 9 in issue were allowed (ALJ Ex. 1).

44. The followed patents were cited by the Examiner in the first Office action:

Oakes U.S. Patent No. 2,600,569 (6/52)
Bowman U.S. Patent No. 2,197,919 (4/40)
Rubenstein U.S. Patent No. 3,503,757 (3/70)
Kremzner U.S. Patent No. 3,012,893 (12/61)
Todd U.S. Patent No. 2,082,313 (6/37)

(ALJ Ex. 1).

45. Notice of Allowance issued on April 21, 1976 (ALJ Ex. 1).

46. U.S. Patent No. 2,197,919 which issued on April 23, 1940 describes a method of making candy or the like comprising producing a molten candy mixture, providing a regulated flow of said mixture to a mixing device while the mixture is at an elevated temperature and has a relatively low viscosity, providing a regulated flow of gas to said mixing device, the amount of gas bearing a substantially constant ratio to the amount of said mixture, producing a substantially uniform suspension of said gas in the form of small bubbles in said mixture, cooling said mixture with its suspended gas to a temperature at which the mixture will become viscous to the extent that the gas will not substantially separate therefrom, maintaining agitation of the suspension during the cooling until the aforementioned viscosity is obtained, and extruding the cooled mixture (ALJ Ex. 1).

47. U.S. Patent No. 2,082,313 which issued on June 1, 1937 describes a method of treating an essentially fatty non-extensible confection composition which as an entirety has a melting temperature in the neighborhood of 90°F. which consists in subjecting the composition to a temperature above its melting temperature to render it fluid, introducing into and distributing under pressure throughout the composition while in its fluid state, parts of an agent selected from the class consisting of an expansible gas and expansible gas forming substances, lowering the external

pressure, while the composition is still fluid, to cause the parts of said agent to expand without breaking through the surface of the fluid composition and to impart thereto a puffed cellular form, and subsequently maintaining the lowered pressure on the composition, while subjecting the same to a temperature below its melting temperature to cause it to set in its puffed cellular form (ALJ Ex. 1).

48. U.S. Patent No. 2,600,569 which issued in June 1952 describes a method of making marshmallow which comprises preparing a marshmallow mixture containing substantially the quantity of water desired in the finished marshmallow, forcing the marshmallow mixture at a pressure substantially above atmospheric pressure along a path, at least a portion of which is tortuous and is between two relatively moving surfaces to work and agitate the mixture, introducing a gas at a pressure substantially above atmospheric into said mixture as it moves along said path, to incorporate said gas into said mixture in the form of finely divided bubbles, and reducing the pressure on the marshmallow mixture at the end of said path to about atmospheric pressure to permit the bubbles to expand and produce a sponge-like marshmallow having the desired moisture content (ALJ Ex. 1).

49. U.S. Patent No. 3,503,757 which issued in March 1970 describes a method of manufacturing a frozen confection comprising preparing a conventional chilled mix and moving it unidirectionally in the form of a stream through a treatment zone, introducing into the stream, in the treatment zone, a quantity of gas with which the mix is to be gasified, said gas being introduced in finely divided streams, directly into and confluent with the mix passing through the zone, whereby the distribution

of the gas in the mix is uniform throughout and is retained therein in finely divided form, then freezing the gasified mix (ALJ Ex. 1).

G. Prosecution Of The '457 Patent

50. In a first Patent Office action dated September 20, 1976, prosecution on the merits was closed. The following references were cited:

Kremzner U.S. Patent No. 3,012,893 (12/61)
Farley U.S. Patent No. 1,601,302 (9/26)

(ALJ Ex. 2).

51. Notice of Allowance issued on September 29, 1976 (ALJ Ex. 2).

H. Accused Zeta Process A

52. Zeta's Process A is shown schematically in the following figures denoted by complainants as CX-11C or Fig. 1.

[

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(Escola CX-24 at 268, CX-11; RX-55)

53. [

CONFIDENTIAL INFORMATION DELETED

](Escola CX-24 at 268-1269; RZPX-9, counter 1190-1200; CX-

11).

54. [

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](Escola CX-

24 at 264-269; CX-11).

55. [

CONFIDENTIAL INFORMATION DELETED

(Escola CX-24 at 271-271).

56. [

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](Escola CX-24 at 271-273; RZPX-4,

counter 57-66).

57. [

CONFIDENTIAL INFORMATION DELETED

L

RZX-55 at 3, 4).

J (Escola

58.

(CX-11; Escola CX-24 at 265-273).

59.

(Escola CX-24 at 266-278).

60.

(Escola Cx-24 at 267-268).

61.

(Escola CX-24 at 268-270).

62.

(Escola CX-24 at 270-271).

63.

(Escola CX-24 at 272, 273).

64.

(Escola CX-24 at 272 to 274).

65.

(Escola CX-24 at 274-275).

66.

(Escola CX-24 at 275 to 278).

67.

(Escola CX-24 at 277-279).

68.

(Escola CX-24 at 280 to 282).

69.

CX-24 at 283 to 288).

70.

290-291).

71.

(Escola

(Escola CX-24 at

(Escola CX-24 at 291-

293).

72.

(Escola CX-24 at 296-299).

73.

(Escola CX-24 at 299).

74. -

(Escola CX-24 at 303, 312).

I. Accused Zeta Process B

75. Zeta's Process B is shown schematically in the following Fig. 2

or in what complainants identified as CX-12 C in the following:

(CX-12, Escola CX-24 at 321, RX-55).

76.

(Escola CX-24 at 321).

77.

(Escola CX-24 at 322).

78.

(Escola CX-24 at 322).

79.

(Escola

CX-24 at 324; CX-12).

80.

(Escola RX-55 at 5).

81.

(Escola CX-24 at 321-323).

82.

(Escola CX-24 at 323-324).

83.

(Escola CX-24 at 324, 325).

84.

(Escola CX-24 at 325 to

327).

85.

(Escola CX-24 at 327).

86.

(Escola CX-24 at 328 to 330).

87.

(Escola

CX-24 at 332).

88.

(Escola CX-24 at 333 to 337).

89.

(Escola CX-24 at 337 to 339).

90.

(Escola CX-24 at 340 to 341).

91.

(Escola CX-24 at 340 to 348).

92.

(Escola CX-24 at 351, 352).

93.

(Escola CX-24 at 353).

94.

(Escola CX-24 at 354).

95.

A

(Escola Tr. at 594).

Moreover in deposition as to Zeta Process A, Escola testified:

A.

(Escola CX 24 at 26, 27).

96.

Thus Zeta's Escola testified:

Q

A

Q

[Translation follows.]

A [As translated.]

Q

[Translation follows.]

A [As translated.]

JUDGE LUCKERN: Okay. Go ahead, Mr. Guth.

BY MR. GUTH:

Q

[Translation follows.]

A [As translated.]

Q

[Translation follows.]

A [As translated.]

* * *

BY MR. GUTH:

Q

[Translation follows.]

A [As translated.]

[Translation follows.]

Q

A [As translated.]

Q

A [As translated.]

JUDGE LUCKERN:

[Translation follows.]

THE WITNESS: [As translated.]

BY MR. GUTH:

Q

[Translation follows.]

A [As translated.]

(Escola Tr. at 450 to 454).

J. Infringement

(i) Ray Kelly

97. Ray G. Kelly from 1964 until 1984 was involved in work related to the manufacture and production of candy products (Kelly RCX-3 at 1, 2).

98. Kelly received a Bachelor of Science degree in Mechanical Engineering from Carnegie - Mellon University in 1958 (Kelly RCX 3 at 2).

99. Kelly received a patent on a formulation for a high protein candy bar which enabled the bar to have higher protein levels than previously available, while retaining desirable qualities of taste and texture. He also received two patents regarding candies which did not cause cavities. One involved a unique formulation of ingredients which allowed the pH of the plaque in the mouth to remain high during the consumption of the candies. In one case the candy did not, therefor, cause cavities. In the

other case, it allowed an anti-cariogenic additive to operate in a therapeutic fashion (Kelly RCX 3 at 3).

100. Kelly after he graduated from college, from 1958 until 1964, worked for Proctor and Gamble in their Central Engineering Division in Cincinnati. He was assigned to a variety of jobs with increasing responsibility. This work related to products such as toothpaste, deodorant, mouthwash, and products like that. In 1964, he went to Sunline, which became Sunmark Corp. as Chief Engineer. As Chief Engineer at Sunmark, he was in charge of all engineering for Sunmark's seven plants and their plant equipment. Five of the seven plants were candy manufacturing plants. The other two plants were involved with sunflower seed products. Two of the candy plants operated extensive equipment operating processes devoted to candies that were principally sugar confections that would be cooked or melted, and then cooled and solidified. Kelly's engineering responsibilities started when he began in 1964 and ended about 1981. His position at Sunmark expanded as the company grew, and his title eventually became Vice President of Corporate Development. In about 1966 or 1967 Sunmark established a Product Development Department and Sunmark started hiring food and candy technologists to develop new product formulations. Kelly's position then grew to include market research and also grew to include market development which was developing new products for market. Finally Kelly's position included what is called corporate development, which was seeking new product lines outside the company by either acquisition or by joint ventures (Kelly RCX-3 at 4, 5).

101. Kelly at Sunmark had responsibility for new product development from 1967 to about 1981. As part of this work, he would investigate and

study new candy products as well as processes for manufacturing candy products. During the work that he undertook as supervisor of new product development for Sunmark there came a time when he became personally involved with a product known as carbonated candy and that was the summer of 1973, when he received an unlabeled package in the mail from a gentleman named Herb Knechtel, who ran a laboratory in Chicago. Knechtel was then one of the foremost candy consultants in the country. Kelly received a phone call from Mr. Knechtel saying that there would be a package coming to Kelly and that after Kelly received it he should call Knechtel and discuss it. Soon thereafter Kelly received a small package in the mail with perhaps a few ounces of an unusual sugar substance in it. When Kelly tasted it, the candy fizzed and popped. The product was carbonated candy (Kelly RCX-3 at 5, 6).

102. After extensive voir dire (Tr. at 838 to 863), Kelly, offered by Confex, was qualified as an expert in industrial food plant processes and in the development of processes for carbonated candy (Tr. at 864).

103. With confectionery candy products, it was generally conventional at the time of the '910 patent application to use an external vessel or other external cooling system separate from the vessel in which the candy was cooked. There were virtually a limitless number of processes that would have incorporated that general concept. Originally, candy making was done principally by cooking and dumping candy out on a steel or marble table in slab and allowing it to cool there. That was time consuming. Exposing it to the atmosphere was also a problem. Accordingly, the conventional process moved to the point of cooling the candy in a closed or controlled container. Very commonly the candy, the cooked candy mass is

transferred from the cooker into a vessel such as a Votator scraped-surface heat exchanger set up to refrigerate the candy. Such a heat exchanger was advertised in 1973-1974. The Votator heat exchanger, during the cooling process is generally held under pressure other than at atmospheric, i.e. it could either be below atmospheric or above atmospheric pressure and both were in general public use well before 1974. Most widely known was the process of pressurizing the Votator heat exchanger unit for cooling the product and for other purposes such as for pressurizing air into the product to expand the candy for better texture and size impression. This was available from Votator at least as early as 1970 and probably considerably before that (Kelly RCX-3 at 12, 13, 17).

104. Kelly testified that another example of a process for making sugar melt products which was in existence prior to 1974 which utilized an external cooling vessel or other unit was at Fern Brothers Candy Co. of South Dakota. That process utilized a process in the late sixties using equipment known as a Press-Whip designed by an equipment manufacturer known as ter Braak. This technology was publicly available. Sunmark adopted the system to make several candy products in approximately 1970, 1971. The basic Ter Braak process involves a pre-mixing kettle wherein the sugars and corn syrups and the other minor ingredients and water were mixed together to dissolve the sugar. This mixture was then passed, by pump or by gravity, into the Ter Braak cooker, which was a fairly conventional vacuum cooker or vacuum changer with a steam coil inside it. The chamber heated the mixture to a desired temperature and level of vacuum as a means of cooking it or bringing it to the desired final moisture content. When that condition had been reached, a valve on the bottom of the cooker was opened

and the cooked sugar mass was transferred to what was called the Press-Whip. The candy mass flowed down into the Press-Whip, which was a pressurized vessel. It had an agitator in it for beating air or whipping gas into the product, and it had a scraper in it. The candy melt was then agitated and aerated in the Press-Whip under pressure to introduce gas into the candy. The desired degree of gasification was controlled by a mechanism of the agitator motor which measured the resistance plus the stiffness of the candy. The Press-Whip also functioned to cool the candy melt by approximately 100° F. When gasification to specifications was achieved, the valve on the bottom of the Press-Whip was opened and the super atmospheric pressure in the press-whip pushed the candy out of the Press-Whip into another cooling chamber, where it would undergo further cooling and be molded into a desired shape (Kelly RCX-3 at 14, 15, 16).

105. Fenn Brothers made with their systems using the equipped designed by Ter Braak and described in the previous finding a product called "Cool Nougat" which was a sugar product (Kelly RCX-3 at 16).

106. At the time the original Kremzner patent expired which was in December 1978, Sunmark developed its own process for manufacturing carbonated candy. That process is embodied in a Barnes, et al. patent assigned to Sunmark, and which issued in 1981. Sunmark was successful in developing a commercially suitable process for manufacturing carbonated candy which process is reflected in the Barnes et al. U.S. Patent No. 4,282,263 (the '263 patent). Such work that was undertaken and completed in reality, as Kelly recalled it, did not require a long period of time. He did not know the exact dates but remembered it as being a fairly straightforward development project. According to Kelly the only real

distinction of the process for producing a carbonated candy product, as compared to other sugar confections, was the higher pressures involved and other than that, making carbonated candy generally involved the conventional principles of candy making applicable to any sugar melt product. Sunmark installed a pilot plant in 1979 and conducted consumer tests for Sunmark on the product but determined not to invest any further effort into marketing the carbonated candy product (Kelly RCX-3 at 9, 10).

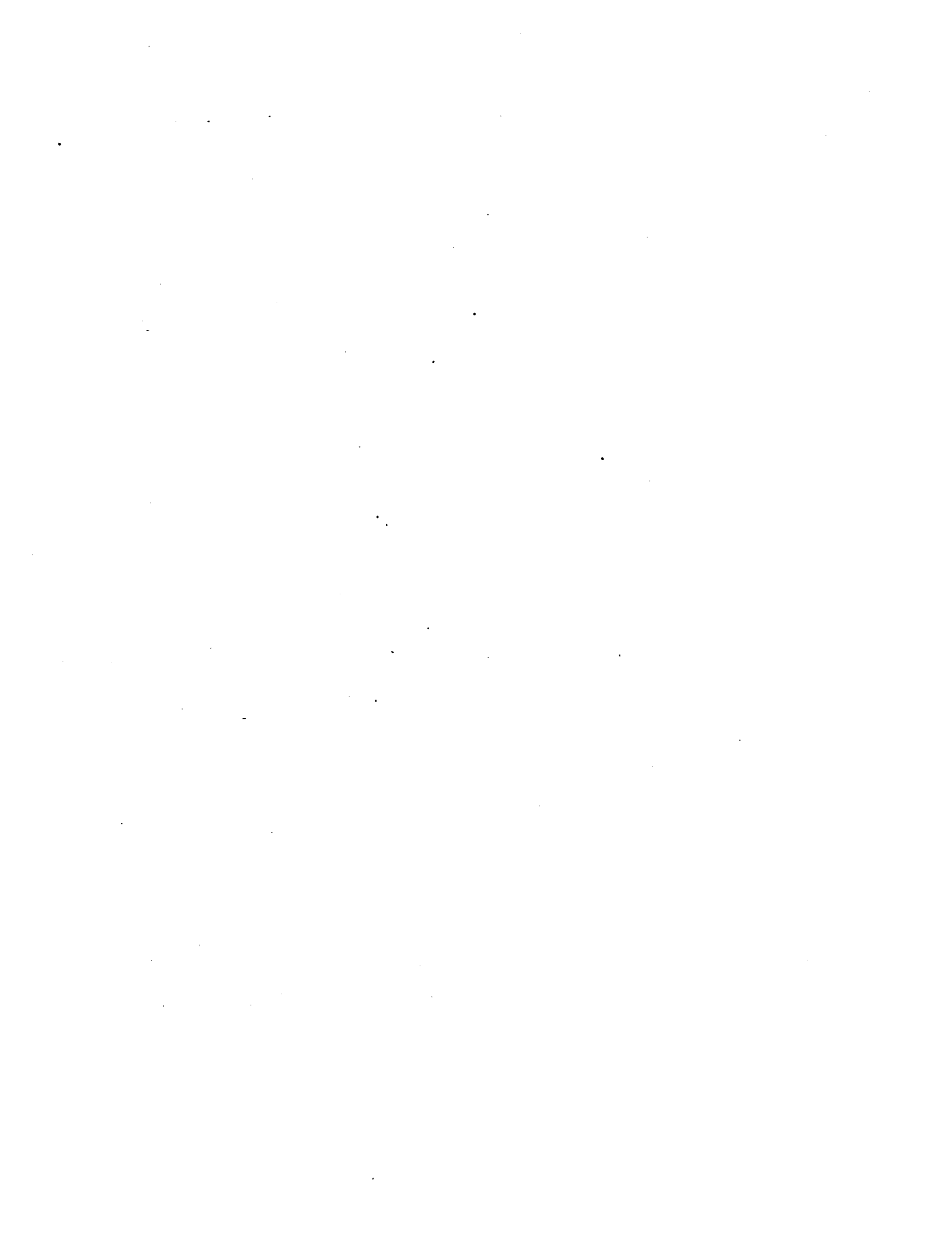
107. The Barnes '263 patent issued on August 4, 1981 on an application filed May 10, 1979 and is assigned on its face to Sunmark, Inc. The invention of the '263 patent relates to a continuous process for concentrating an aqueous sugar solution and introducing gas ~~to~~ to the resultant fused concentrated sugar composition. Solidification of the gasified fused sugar composition is said to produce a gasified solid product (RCX-13, col, 1, lines 5 to 12).

108. According to the Barnes '263 patent, the Kremzner '893 patent describes a technique for enclosing a gas within a solid matrix of fusible sugar in which a sugar melt is prepared and placed in a Parr reactor wherein it is maintained in a fused condition while carbon dioxide gas is admitted and the mixture agitated with a stirrer. It described such technique as entirely a batch operation. Subsequent U.S. patents of Kirkpatrick, viz. U.S. Pat. No. 3,985,909, and the two patents in issue, were said to describe refinements to the Kremzner et al. method for producing a carbonated candy product although it is said that in each of those references, the process described remains an entirely batch process in which gas is introduced into the headspace of an autoclave containing a fused sugar composition and mixed by stirring of the contents in an

autoclave. It is said that in those batch processes mixing requires stirring for a significant period of time, during which the melted sugar is exposed to temperatures in the range of 300° to 325° F; that such exposure can lead to both the production of invert sugar by hydrolysis of sucrose and to browning of the sugar composition due to thermal degradation thereof; that inasmuch as the gas component is simply introduced into the headspace of an autoclave filled with an amount of melted sugar that is determined primarily by payload and agitation considerations, there is no positive control over the relative proportions of gas and liquid and, consequently, no positive control over the gas content of the gasified sugar product; that additionally, the productivity of the batch process is limited by the significant mixing time requirement as well as by the autoclave charging and discharging operations which are necessary parts of the batch cycle but constitute dead time so far as the gasification operation is concerned; that moreover, the processes known to the art have not been adapted for the incorporation of volatile or thermally sensitive additives such as, for example, certain natural flavors and colors; and hence there was a need in the art for an improved process for producing gasified solid sugar products, and particularly for an improved process which is adapted to overcome the various limitations which are experienced with the batch processes described in the aforesaid references (RCX-13, col. 1, lines 14 to 64).

109. Kelly testified as to the Sunmark processes:

THE WITNESS: There are several processes involved. I think the easiest way would be to describe in detail really the creation of a factory including selecting the process equipment but also extending to bricks and mortar.



(Kelly Tr. at 866-870).

110. Kelly further testified as to the process described in the preceding finding:

A

* * *

THE WITNESS:

BY MR. CARVIS:

Q

A

Intentionally Left Blank

Q

A

(Kelly Tr. at 871-874).

111. According to Kelly, the '910 and '457 patents in issue are not the only processes by which carbonated candy could be made commercially. He testified that the two patents in issue merely describe a rather narrowly defined batch operation for manufacturing carbonated candy and there are many different processes, both batch and continuous, which could be devised, including the Sunmark process, which was nothing like the processes of the patents in issue. The Sunmark process that Kelly helped develop was fundamentally a continuous process, as opposed to a batch process as described by the patents in issue. A mechanical engineer distinguishes a batch from a continuous process and that is a major distinction concerning the study of processing as undertaken by mechanical engineers. It characterizes whether the candy is moved through the process step in discrete batches with the batch moving from one stage to another as an entire batch, that is, a batch operation for whatever process is going on, such as, heating, mixing, cooling etc. In a continuous operation, the product materials are constantly flowing through the process so that there are no stopping points in the particular process step. According to Kelly the process described in the '910 and '457 patents would be a batch operation as opposed to a continuous operation because as described in the claims and specifications, the processes transfer the entire batch of the hot melt to the second vessel by opening a valve between the two by regulating the pressure. Then the second pressure vessel is isolated.

Then the second vessel is cooled, "they shock treat it, they release the pressure in the vessel and allow the product to be removed." This whole description, according to Kelly, describes a batch operation in every phase from melting, to gasifying to cooling, fracturing and removing the product. As to process advantages which a continuous operation has over a batch operation, in general, where it is possible to effect a continuous operation, of any phase of a process, it is more cost effective to do so. Continuous operations produce higher output for each invested dollar of capital and usually lower labor costs associated with the product. Generally, the evolution of technology has moved from batch processing to continuous processing in virtually every product field (Kelly RCX-3 at 20, 21).

112. According to Kelly, the process steps in the '910 and '457 patents that related to shock treating the vessel, venting and opening the vessel and removing the candy would not have an equivalent in a continuous cooling system because those steps would not be there in a continuous cooling operation in that they are totally directed to a batch process, because it involves the material being contained in a sealed container and everything in the operation relates to handling the product in that container, which is then opened. In a continuous cooling process, the material is continually moving in one end of the cooling unit, and then it is cooling but still moving through it and then comes out the other end. The process steps according to Kelly described by the patents in issue are not directed to such a continuous cooling procedure (Kelly RCX-3 at 22, 23).

(ii) Paul Kirkpatrick

113. The named inventor of the '910 patent, Paul Kirkpatrick, testified in his witness statement that "shock-treating" under the '910 patent occurs when the pressure in the cooling tube is vented and the bottom of the tube is opened. Kirkpatrick on September 29, 1975 signed the Oath, Power of Attorney and Petition for the patent application which resulted in the '910 patent, attesting that he was "the original, first and sole inventor" of the applied for invention. From 1964 through 1969 Kirkpatrick was a laboratory technician and then a senior technician (CX-1; ALJ-1; Kirkpatrick Tr. at 223-24; CX-22 at 6).

113A. In answer to interrogatories complainant General Foods admitted that Kirkpatrick conceived and reduced the invention of the '910 patent to practice

It was admitted that the first set of cooling tubes were designed by Kirkpatrick,

(RCX-31; RZX-24).

113B. In answer to an interrogatory, General Foods admitted that the second set of cooling tubes it used

(RCX-31; RZX-36).

113C. Kirkpatrick designed certain equipment for making carbonated candy to overcome the limits imposed by making such candy solely in an autoclave, namely external cooling tubes to which the product could be transferred from the autoclave, as he attested in deposition. He worked totally alone on that project of designing the original scaled up autoclave plus cooling tube equipment and its operation. Kirkpatrick attested that his first design of such equipment was with one tube, and then with three tubes. In this process Kirkpatrick attested that the release of pressure often fractionated the product, and this could be seen when the tube was opened and the product fell out. As he testified in deposition upon being asked if tapping the tubes with a hammer was something that he invented, Kirkpatrick did not hit the tube, he hit the candy itself. Kirkpatrick testified that he had to remove a glass plug because the bottom of that tube had no cooling on it and so the uncooled portion became like a hard glass, so he hit the glass plug itself with a hammer to break it and the product then exploded out of the tube. As he testified in deposition,

hitting the tube damages the metal, and he hit the candy instead. He attested that he never had to do so hit unless there was a glass plug at the bottom. He stated that the people in Canada

Kirkpatrick stated that he would put a screwdriver beneath the opening directly against the plug and hit that or tap that with a hammer, with his hands being at the side and his gloves on, to break the glass. Once the glass plug was cracked the candy would blow right out. Kirkpatrick attested that there never came a time when he realized that the best way to get material out of the cooling tube was to hit it with a hammer, and he always hit the glass plug itself at the bottom, rather than the tube. He characterized hitting the tube as being real lazy,

He specifically denied that he invented anything about hitting the cooling tube with a hammer. He stated that his procedure was to avoid hitting the equipment. Again Kirkpatrick stated that he doesn't beat on tubes and doesn't approve of that at all. Kirkpatrick confirmed that

He attested that he opened the bottom very carefully and if the candy had cracked itself completely apart upon venting, then the candy would just pour out. Otherwise Kirkpatrick would release it by tapping it with a screwdriver to start it, by tapping the candy underneath with the blade of a screwdriver, like an ice pick. Kirkpatrick again confirmed, despite RZX-29, that when he made carbonated candy it was not removed by tapping the tubes with a

hammer. Kirkpatrick's cooling tubes first had pipe fittings vertically connected on the bottom of the tube, a pipe cap at the bottom with a pipe going through that, and then he found out quickly that it was not safe to open a threaded fitting, so a flange was welded on and flange belts were released very slowly so that any cracking would be absorbed by the long bottoms. As the flange dropped down to a safe level it was still held by one bolt, and the bottom flange would be rotated 180° so that the flow of candy would not be obstructed. (Kirkpatrick Dep. RZX-68 at 29-31, 75-102; CX-32 at 22-24).

113D. At his deposition Kirkpatrick testified that out of general frustration when things did not go right and he made glass plugs in his pilot plant, he had beaten on the tubes. The glass plugs resulted from a heat sink from the heavy solid metal flanges, and the jacket around the main portion of the tube and he tried to get away from that as much as he could in his lab tests by immersion of the bottom of the cooling tube in water. Kirkpatrick was adamant that such hammering was done only to break glass plugs, not to take out good carbonated candy, and was not part of his process. Kirkpatrick testified that at no time during the modification or designing of the cooling tubes did he intentionally design them to be impacted or struck to release product (Kirkpatrick Dep. RZX-70 at 26-30; Kirkpatrick Dep. RZX-69 at 9).

113E. After development of the cooling tubes he designed, the work of equipment development and refinement of the process proceeded with the next set of cooling tubes as Kirkpatrick attested in deposition. Kirkpatrick admitted that he had no idea who designed that equipment, and had nothing to do with the design, fabrication or

installation of
deposition that he did see

Kirkpatrick admitted in his

formed there before they could get the candy out, and he saw them up there
beating on tubes with glass plugs. The

(Kirkpatrick Dep RZX-70 at 20-23).

113F. A memorandum of General Foods' Earle dated December 18, 1974
recounts a day-trip to

(RZX-32).

114. Kirkpatrick agreed, in his witness statement that his patented
process, as defined in claim 1 of his '910 patent is "literally followed in
the .". However as to steps h, i and j of claim 1, he
testified:

Is this done in the ?

A. Yes, after permitting the candy to cool and
solidify, the pressure in the tube is reduced
by venting and the bottom of cooling tube is
opened. The gasified candy which is now
solid and contains a large number of high
pressure bubbles is shattered by this shock
into multiple fragments.

Q. Step i of claim 1 of your patent states:

"i. venting the second pressure vessel, and"

Is this done in the ?

A. Yes.

Q. Step j of claim 1 of your patent states:

"j. opening the second pressure vessel to allow the product to be removed."

Is this done in the ?

A. Yes.

(Kirkpatrick CX-22 at 6, 7).

115. With respect to the shock-treating step h of the '910 patent, inventor Kirkpatrick testified:

A

Q What would you do next, then?

A

Q Do you use any other procedures?

A There's no prescribed procedure other than that.

This was the only operating procedure in the (Kirkpatrick Tr. at 106, 110).

116. Kirkpatrick testified with respect to the following sentence that starts at col. 3, line 34 of the '910 patent:

When the sidewalls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy

and how this sentence fits into the process which is employed by CCV. He stated that the cooling tube is shock-treated "[a]bout the same as a jet liner that depressurizes in flight" and he would consider that a shock. Kirkpatrick agreed that shock treating refers to candy breaking up inside of the tube. Kirkpatrick further testified:

Q Have you ever used, either now or when you were experimenting with processes for making carbonated candy in the past, ever used any other methods to break up candy?

A There was a study done, not by me, and I did not witness it, to see if there was benefit from other methods. I don't know the results of it.

Q What other means did you use to break up candy in the tube?

A To break up candy in the tube?

Q Yes.

A I never had to break up any carbonated candy in the tube. Now, there were glass plugs of non-carbonated candy in the bottom of the tube prior to the time when

to set that melt and those glass plugs, the candy itself, was impacted with a screw driver and a hammer, and I had to chip that glass out of the bottom. That was not

carbonated candy, and that was in the learning process.

Q So you -- just so I have this clearly, you opened the bottom of the tube and you chipped away at it with a screw driver, you said?

A A screw driver and a hammer.

* * *

THE WITNESS:

BY MR. DUTY:

Q

A

(Kirkpatrick Tr. at 108, 109, 112, 113).

117. A glass plug is non-carbonated candy in a batch that literally for some physical reason did not get made properly. The most common place for a glass plug to form is at the bottom or discharge end of the tube. If

the entire batch was non-carbonated, the tube from top to bottom would be a glass plug (Kirkpatrick Tr. at 138, 139).

117A. As to hitting the tube in the , Kirkpatrick testified:

Q

A

Q

A

* * *

THE WITNESS: What I refer to as bridging is free-flowing material that has packed due to its own nature.

* * *

Q

A

(Kirkpatrick Tr. at 139, 140).

118. Kirkpatrick is his work for the '910 patent first worked with a single vessel called a Parr reactor and his work after that was a 5-gallon autoclave with no tubes and then he went to a 5-gallon autoclave connected to a single tube and after that Kirkpatrick simply added more tubes (a total of three). All of this was done - (Kirkpatrick Tr. at 144).

119. With respect to the '910 recitation at col. 3, lines 29-31, viz.

"When the cooling cycle is complete, the vent is again opened to allow any free gas to escape", Kirkpatrick testified:

THE WITNESS: Yes, Your Honor, when you open that vent, you hear this exploding, crackling sound all the way until the gas is no longer coming out and the candy is actually breaking itself apart because if you remove the upper flange, it's totally loose, clack carbonated candy and this has been done.

Now, if you open the bottom the minute you open the bottom, it will explode out. Now, we open the bottom with quite a bit of impact, quite a bit of force, and the candy explodes out the bottom but I sort of compare that to what you would do in a popcorn popper that's full. If you start to pop and you have a cover on and you hold that cover, when your popcorn gets to the top of that cover like the candy expanding and exploding, fills that void at the top. That popcorn gets all the way to the top, you can't change the density of those kernels at the bottom anymore and while they'll explode open or they'll crack apart and the steam will escape from them, they will not pop. They will not expand.

Neither can that candy expand in that tube. So the candy exits when you open the bottom of the tube with quite a bit of force.

(Kirkpatrick Tr. at 160-161).

120. With respect to the recitation in the '910 patent at col. 3, line 31, viz. "Now the product exists in the cooling tube as a solid, gas-containing matrix", Kirkpatrick testified:

A Well, to the best of my knowledge candy explodes itself apart in the tube at the top and that's as fast as it can explode with the vent open. It can't expand but just so far but it's a shattered matrix inside the tube.

Also there was the following testimony:

THE WITNESS: It's my understanding that that is correct but you have to qualify that because we are dealing with a product inside a closed steel tube.

It explodes out from the bottom of the tube when you open it.

* * *

Q So you don't know -- is that what you are trying to say? What's the point of that added material at the end of your answer?

A I am just saying that I can't see inside of that tube to guarantee what I am saying.

Q So you don't know whether it is a solid, gas-containing matrix or not, is that what you are saying?

A I think it is.

Q And it's a solid gas-containing matrix after you've vented it, is that right?

A It's not liquid. It's still -- it's fractured but it's still packed solid in the tube because it has nowhere to expand to, Your Honor.

BY MR. BENASUTTI:

Q The next sentence reads, "Next the cooling tube is shock treated so that the gas-containing solid matrix is shattered into multiple fragments." [referring to the '910 patent]

Do you see that sentence?

A Yes, I do.

Q Is that what happens next in your process?

A When you open the tube with that opening device I think it imparts a lot of shock to that tube. It is a simultaneous happening with the opening of the tube.

Q So that the gas-containing solid matrix is shattered into multiple fragments?

A It's totally shattered when it comes out of the tube.

Q So you would say that sentence is correct, according to your patent, that the next thing you do is shock-treat the tube so that the gas-containing solid matrix is shattered into multiple fragments, is that right?

A It gets the shock treatment at the same time that it opens the tube.

Q And those multiple fragments are different than the

gas-containing solid matrix referred to right before those words?

A I could answer that if I could see inside the tube.

Q Well, what is your understanding, technically?

A The compacted candy simply blows itself apart on exiting the tube. You can't have something packed densely in a tube and then come out into the atmosphere without some abrasion and breaking.

This think [sic] is travelling at the same speed probably that pellets leave a shotgun barrel.

Q The next sentence [in the '910 patent] says "When the side walls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy. Thus the walls of the cells containing many bubbles of pressurized carbon dioxide break completely and the gas within is exploded. The combination of impact and exploding bubbles of carbon dioxide reduce the solid mass within the tube into many fine particles."

Is that your understanding of what is going on in your process?

A The fines generated that we are making are from the collision of the particles exiting the tube. We make

Q I am not sure you answered the question. Do you want it read back?

A It makes many fine particles -- and it does.

Q Let's start at the beginning of the sentence and we'll read it again.

"When the side walls of the cooling tube are impacted, lines of fracture are developed within the crystal structure of the candy."

Is that the solid matrix we were talking about, the crystal structure of the candy?

A Yes, it is.

Q And when you impact the side walls you develop lines of fracture in that crystal structure, is that right?

A You are doing it as the product is exiting the tube.

Q Now I am not asking you that. I am asking you whether or not when you impact the side walls here are lines of fracture developing in the candy.

A These are not separate steps.

Q So is your answer no, that that is not occurring?

I am not sure what your answer is, Mr. Kirkpatrick.

* * *

Q So in accordance with the method in 1975, the first thing you did was vent the tube to allow any free gas to escape. At that point the candy in the tube was a solid, gas-containing matrix.

The next thing you did was shock treat the tube so that the solid gas-containing matrix was shattered into multiple fragments and then you opened the tube and let the candy out.

Is that correct?

A They are really all a combination together.

* * *

Q Did you ever impact the walls of the tube before you opened it?

A There's really no reason to impact the walls before you open it.

Q Did you ever impact the walls of the tube before you opened it?

A I did not.

Q Don't the sentences that we've just been reading say that you impact the walls of the tube before you open it?

* * *

THE WITNESS: The literal language in the patent says that that sentence appears there. I don't know if it's in the right order or not.

(Kirkpatrick Tr. at 162, 165 to 172).

121. Referring to the '910 patent, Kirkpatrick's testimony was:

Q We'll focus in again on the portion of the paragraph that we were talking about which begins at line 30 [of the '910 patent]: "When the cooling cycle's complete, the vent is again opened to allow any free gas to escape."

As that paragraph progresses it tells you that next the cooling tube is shock treated so that the gas-containing matrix is shattered.

Mr. Kirkpatrick, from a technical standpoint do you understand that to mean that those two events are separate steps?

* * *

THE WITNESS: The venting and the shock treatment are very, very closely tied to being one and the same, Your Honor.

* * *

Q Mr. Kirkpatrick, do you know what shock treating means?

A I know what it means to me.

* * *

A Anything that would cause the product to break apart and be exited from the tube as individual discrete particles.

(Kirkpatrick Tr. at 180 to 182).

122. Kirkpatrick testified: "When you vent the gas out of the tube, you do the shocking, Your Honor" (Kirkpatrick Tr. at 192).

123. With respect to the only example in the '910 patent and its statements at col. 4, lines 5: "The transfer, water and gas lines are disconnected from the cooling tube and any free gas in the tube is released by opening the vent valve. Next, the sidewalls of the tube is struck with a 3-pound sledgehammer, the bottom flange of the cooling tube is removed and the product is allowed to fall out", Kirkpatrick testified:

THE WITNESS: Okay. Your Honor, the first -- on Line 5, the transfer of water and gas line, to disconnect it from the cooling tube and any free gas in the tube is released by opening the vent valve. Number one, that takes it to atmospheric pressure. It is no longer under super-atmospheric pressure. The crackling takes place and, as far as I know, the candy was carbonated. This was written in the very, very early development of that six-inch tube.

The six-inch diameter prevented us from cooling the bottom of that tube rapidly enough to really do a good job of increasing the viscosity of the melt to hold in the gasification. The bottom flange on that the tube probably weighed close to 100 pounds. It had no cooling on the flange. It became -- it was a tremendous heat sink. The impacting they're talking about here was what we had to do to get rid of the glass plug in the bottom of the tube.

JUDGE LUCKERN: When you say the impacting that they're talking about here, are you talking about the next sentence, the next, the sidewall of the tube is struck?

THE WITNESS: Yes sir.

JUDGE LUCKERN: I just want to make sure I understand. Go ahead.

THE WITNESS:

JUDGE LUCKERN: Again, I want to make sure what I -- I just want to -- you say you suppose it was put in this -- what was put in as an example? That's all I'm trying -- I want to make sure I can read your testimony and understand it.

THE WITNESS:

It's not necessary when candy is properly carbonated and cooled.

JUDGE LUCKERN: Just to make sure I understand what you're saying. Are you saying that the step or whatever is said here,

the next, the sidewall of the tube is struck with a three-pound sledge hammer, you say that is not necessary when it's properly cooled.

THE WITNESS: Your Honor, that's the only time you would really have to hit anything. And if that flange arrangement were different and safe to remove, tapping that candy with a screwdriver would have been a lot easier and more productive than hitting that tube.

JUDGE LUCKERN: I still don't -- you say this is the only time you'd have to do it. I don't know what you're saying when this is the only time. I thought I heard you say that --

THE WITNESS: The only part of the process that would require it is when you have a glass plug in the bottom of the tube from non-carbonation. That's how it got in as an example, to get rid of that before the good candy would come out. But, of course, assuming that we're making all good candy in the process, the shock treatment of just the venting is all you need to break that apart.

JUDGE LUCKERN: You mean, just the venting.

THE WITNESS: Yes, sir.

JUDGE LUCKERN: You don't need -- your testimony is you don't need the shock treatment.

THE WITNESS: No. My testimony is you don't need to beat the tube to pieces.

(Kirkpatrick Tr. at 209 to 212).

124. Kirkpatrick made one batch of carbonated candy pursuant to his '910 patent As to making that batch, Kirkpatrick testified?

Q When you ran that batch, if you remember, did you impact the walls of the cooling tube with a hammer?

A No, I did not.

Q Did you remove candy from the tube?

A Yes, I did.

Q How was it removed?

A That tube was made with a bottom called a Huber-Coupling, and that coupling disconnects with a hammer,

quarter turn, and when they vented the pressure off the tube and it finished crackling, you open that flange, remove it, and the candy fell out.

Q Could you have achieved the same result by hitting the tube with a hammer, the removal of candy?

A I never hit the tube unless it had a glass plug in the bottom.

(Kirkpatrick Tr. at 261).

124A. Kirkpatrick testified at the hearing that he set up the autoclave and cooling pipe system which he had designed for production of carbonated candy

(Kirkpatrick Tr. at 144-

151, 260-61).

124B. Kirkpatrick testified at the hearing that he originated a system that permitted the transfer of a fully carbonated melt under very high pressure from one vessel into another without losing carbonation. His system permitted candy to be made in a single autoclave and transferred as a gasified candy melt into a very inexpensive cooling pipe vessel, thus enabling use of the autoclave for making other batches of gasified melt, and resulting in greater, faster and cheaper production of carbonated candy (Kirkpatrick Tr. at 263-64).

125. Kirkpatrick testified as to the '910 patented process:

Q On your pilot plant equipment, you mentioned a type of valve that was used at the bottom. Is that right?

A I mentioned one type of coupling that was used. That was one of the designs I went through in the development of those tubes.

Q And where was that used exactly?

A That equipment was first built in --

Q Excuse me. Where was the coupling used, Sir?

A At the base.

Q Through the bottom of the tube?

A Correct.

Q And was that for putting liquid candy in or for removing solid candy?

A It was both.

Q And is that the same type of coupling that we saw in this videotape?

A It was identical.

Q And you'd hit with a hammer in order to get it open?

A That's the only way you can get it open.

Q And that was the only way you could get that equipment open. Is that right?

A That's correct.

Q So, if someone wanted to get candy out of that tube, they'd have to hit that coupling with a hammer. Is that right?

A In order to open it, they had to.

Q Could you have used your equipment to produce candy without venting it prior to opening it?

A I think I would have killed myself, but I'm sure candy would come out if you opened it. It's under an awful lot of pressure.

Q But the way to practice your invention was to vent it first and then open it.

A Absolutely.

* * *

Q

A Yes, I did.

Q And when you set it up and ran it, you vented it first and then opened it. Is that right?

A

Q

A That was opened by a bolted-on, high-pressure flange.

Q What do you mean "high-pressure flange"?

A It was a 600-pound rated -- one of the Ladish or whoever made the flange.

Q And how did you remove it?

A Take the bolts out very slowly. That lets the flange down away from the candy and gives the pressure a chance to vent out while the flange is still held by the bolts. Then you pivot the flange around 180 degrees, so it's safely out from under the candy, then you remove the last bolt from it.

Q And did letting that pressure vent out shock the candy?

A The candy on the top was always carbonated when the batch was done right, and due to lack of cooling at the bottom, there was almost always a glass plug on that product. See, there was no jacket on the bottom

portion of the tube itself. I had to leave room, after the flange was welded on, so that the bolts could go through and had to be room for the nuts. so it precluded putting a jacket at that portion.

Q And how did they remove the glass plug?

A By hitting it with a screwdriver and a hammer.

That's the way I did it when I went out there and showed them.

(Kirkpatrick Tr. at 397 to 400).

(iii) The '029 Patent and Fredric Kleiner

126. On April 14, 1981 U.S. Pat. No. 4,262,029 (the '029 patent) issued to Fredric Kleiner on an application 88,510 filed October 26, 1979 and titled "Apparatus and Process For the Preparation Of Gasified Confectionaries by Pressurized Deposit Molding". The patent on its face is assigned to General Foods Corporation (CX-14).

127. Under the heading "Background of the Invention" the '029 patent states:

1. Field of the Invention

The present invention relates generally to a process and system for molding gasified candy pieces from a gasified confectionery solution. More particularly, the present invention pertains to a process and system for deposit molding a carbonated sugar solution into suitably shaped pieces of carbonated confectionery.

(CX-14, col. 1, lines 8 to 15).

128. Under the subheading "2. Description of the Prior test", the '029 patent states in part:

Kremzner et al. U.S. Pat. No. 3,012,893 relates to hard candy which has carbon dioxide absorbed therein. In accordance with the teachings of the prior art, a candy of this kind is made by a process which comprises melting crystalline sugar to form a sugar solution, subjecting the melted sugar solution to pressurized carbon dioxide at a pressure of from 50-1000 psig for a

sufficient time to permit absorption of from 0.5-15 ml of gas per gram of solution, and cooling the solution under pressure to produce a solid amorphous product which is carbonated. Depressuring the carbonated candy to atmospheric pressure results in its fracturing randomly into granules of assorted sizes. The resultant product is then sieved to remove the smaller fines. The larger sized pieces are packaged for commercial sale, but a suitable commercial usage has not yet been found for the smaller carbonated candy fines.

The larger pieces sold as a commercial product are irregularly and randomly sized, and have the appearance of broken glass or sharp-edged pieces of gravel. Carbon dioxide is entrained within the carbonated candy as solidified bubbles having a diameter ranging from 3-1000 microns with more than 50% of the bubbles having a diameter greater than 60 microns.

(CX-14, col. 1, lines 40 to 64).

129. Under the hearing "Summary Of The Invention", the '029 patent states in part:

Pursuant to the teachings herein, an arrangement and process is disclosed for preparing gasified candy by pressurized deposit molding. A confectionery solution is produced, and is then subjected to a superatmospheric gas pressure in a pressuring vessel for a sufficient length of time to cause absorption of the gas into the confectionery solution. A plurality of deposit molds for forming the solution into suitably shaped pieces of candy are prepressurized at a superatompsheric gas pressure in a pressurized housing. The confectionery solution is then deposited in the plurality of prepressurized molds. The solution is then allowed to cool and solidify in the molds, producing regularly shaped pieces of gasified confectionery product, which are emptied from the molds as they are inverted.

Furthermore in accordance with the teachings herein, the pressuring vessel has a mixer therein which assists in absorption of gas into the solution, and also results in a significant decrease in the average diameter size of bubbles. The smaller average bubble size results in a clarified, more translucent confectionery product, as the clarity of the product is related to the size of the bubbles entrained therein.

(CX-14, col. 2, lines 30-55).

130. The sole independent apparatus claim 1 reads:

1. Apparatus for the preparation of regularly shaped pieces of gasified hard candy which gives a prolonged sizzling feeling in the mouth by pressurized deposit molding, comprising:

- (a) means for preparing a heated confectionery solution;
- (b) pressuring vessel and mixing means for subjecting the prepared confectionery solution to a superatmospheric gas pressure for a sufficient length of time to cause absorption of an amount of gas into the solution;
- (c) a plurality of individual surface mold cavities linked together for common transport;
- (d) means for conveying said plurality of mold cavities;
- (e) means for depositing the pressurized confectionery solution containing absorbed gas into the plurality of moving mold cavities to form regularly shaped pieces;
- (f) a pressuring housing surrounding said moving mold cavities, including means to remove the regular shaped pieces from the pressurized housing to atmospheric pressure.

(CX-14, col. 6).

131. The sole independent method claim 10 reads:

10. A method for preparing regularly shaped pieces of gasified hard candy which gives a prolonged sizzling feeling in the mouth by pressurized deposit molding, comprising:

- (a) preparing a heated confectionery solution;
- (b) mixing the confectionery solution in a pressurized vessel under superatmospheric gas pressure for a sufficient length of time to cause absorption of an amount of gas into the solution;
- (c) pressuring a plurality of deposit molds at a superatmospheric pressure; and
- (d) depositing the pressurized gasified confectionery solution into said plurality of superatmospherically pressurized deposit molds.

(CX-14, col, 7, 8).

132. Frederic Kleiner, offered by complainants was qualified as an expert in food science and with expertise in physical chemistry and carbonated candy (Tr. at 361).

133. Kleiner received the degree of B.S., M.S. and Ph.D. in chemical engineering. He received the B.S. in 1960 from the University of Pennsylvania, the M.S. in 1962 from Columbia University and the Ph.D. in 1967 from Penn State. Chemical engineering is an application of physical chemistry. Chemical engineering, or engineering in general, deals with process equipment and production of products and conversion of raw materials into finished goods. Physical chemistry is a science, a basic science that offers the theory and fundamentals behind the understanding of the operation of the various engineering processes (Kleiner Tr. at 351).

134. Frederic Kleiner the named patentee of the '029 patent, worked 22 years for General Foods as a chemical engineer, as a supervisor, as a manager, as a senior scientist in research and development of food process and spent 2 1/2 years as head of General Foods' physical chemistry section (Kleiner Tr. at 344, 345).

135. From 1978 until the '029 patent issued in 1981, Kleiner was in an engineering development group at General Foods working in research and development on food processes, including the development of Pop Rocks and other carbonated processes (Kleiner Tr. at 345).

136. Between 1978 and 1981, Kleiner was following the Pop Rocks activity, interested in producing a product that was called at that time, carbonated ice, which was a frozen product that contained within it enough carbonation that a consumer could prepare at home, their own carbonated beverages and drinks such as soda water by buying flavoring and mixing in a

specially designed vessel so that one could make carbonated beverages at home. The product was strictly ice. It has the appearance of ice and it would be sold in small pieces which contains within it, the carbon dioxide gas, physically entrapped and held so that when it's added to water, it would dissolve, melt and release the carbonation to the liquid. The '029 patent titled, "Apparatus and Process for the Preparation of Gasified Confectioneries by Pressurized Deposit Molding" preceded the carbonated ice activity. Exactly what year one stopped and the other one started, Kleiner did not recall, but it was in that timeframe between '78 and '81. These were two distinct, different, completely unrelated products. The only way they were related is that they both involved carbonation. They were made totally differently. Kleiner spent three and a half years working on developing alternative processes to make carbonated candy, as well as understanding the fundamental basis of the conventional Pop Rocks carbonated candy product. Kleiner was making measurements on the candy and trying to understand the basis of how to make a good carbonated candy both from a processing standpoint and physical measurements on the product itself. This was done probably from '76 to '79 (Kleiner Tr. at 354 to 356).

137. The '029 patent represented laboratory and pilot-scale development, not commercial development (Kleiner Tr. at 346).

138. Kleiner's experience in the candy industry, as opposed to his specific work with the '029 patent concerning carbonated candy, is only on Pop Rocks type of candy products (Kleiner Tr. at 346).

139. Kleiner has had conferences and visits to candy-manufacturing sites or candy-equipment manufactures in which some aspects of the

carbonated candy-making field of art were demonstrated (Kleiner Tr. at 347).

140. Kleiner testified that, as to his understanding of the meaning of "shock-treating" as that term "is used in the '910 patent", when "this process" was first developed within General Foods, the first candy was made in Canada at one of our production sites. At that time,

that simply

releasing the pressure in the tube after the candy has solidified would provide sufficient shock due to the stresses and the change in the stresses of the candy, so that it would crumble spontaneously and release itself when the tube was opened; that the reference to the word "shock" can be interpreted in two ways, viz. one is a physical banging and the other is simply the release of the pressure, which is required to open the tube in any case, and so, a shock would ensue without any physical treatment (Kleiner Tr. at 364, 365).

141. As to the processes described in the '029 patent and the '910 patent, Kleiner testified that the processes of the two patents have totally different objectives in terms of the type of product that each is directed to; that the '910 patent is designed to produce conventional Pop

Rocks, as "we knew it then", which were randomly-sized, irregularly-shaped, angular pieces of an unpredefined shape, and the product, when consumed and put in the mouth, released a high crackling popping sensation along with a lower-level, what was termed "sizzling" sensation in the mouth; that the objective of the '029 patent was to produce a totally different product, one that had a predetermined, defined exact shape for each piece and a product that only sizzled in the mouth; that the two patents and the two processes are quite different in the second half of the processes and the different cooling chamber in the '029 patent has a total different application; that one couldn't make a predefined, uniform shape in a cooling tube, as the '910 patent employs; that the cooling aspect in the two patents does not operate in a different way because one is removing heat by contacting a metal surface with a cooling medium but the shape of the cooling surface and the entire cooling chamber in which the cooling is done is different (Kleiner Tr. at 368, 369).

142. Kleiner was not personally aware of General Foods' carbonated candy developments prior to the Canadian work (Kleiner Tr. at 369).

143. Kleiner was personally exposed to the product from the '910 patent in 1973 when he was in the physical chemistry department and asked to assess the physical safety of Pop Rocks, which at that time, he believed was termed _____ and it was not yet a commercial product but Kleiner did not believe it was in development

_____ he can't attest as to whether Mr. Kirkpatrick was involved at all yet at that time but for all he knows, Kirkpatrick may well have been;

(Kleiner Tr. at 373, 374).

144. Kleiner further testified that he was not really aware of exactly what went on in

Q

A

This is the nature of research and very often, when it's well understood in research and a development project is moved into a commercial setting, that the people operating the plant are not as -- have not been associated with it from the beginning and are not as well versed in the finer points of operating it carefully enough to operate it in its optimum way.

So, occasionally, things don't run as they are planned and other alternatives have to be taken to take care of it.

(Kleiner Tr. at 376 to 378).

145. The '910 patent, col. 3, line 30 reads:

"when the cooling cycle is complete, the vent is again opened to allow any free gas to escape".

According to Kleiner that is the venting that causes the shock.

Thereafter the testimony was:

Q All right. Now, the next sentence [of the '910 patent] says "now the product exists in the cooling tube as a solid gas containing matrix."

A Yes.

Q So is that at variance with what you're talking about?

A Whether the matrix exist in fragmented form or all in one piece, it would still be solid at that temperature of 70 degrees.

Q Then it [the '910 patent] says "next, the cooling tube is shock treated so that the gas containing solid matrix is shattered into multiple fragments." Does that indicate to you that that's another step other than venting?

* * *

A THE WITNESS: What was that again? Yes, I remember. Yes. My answer would be yes. It implies that another step was taken.

(Kleiner Tr. at 381, 382).

iv. Zeta Process B

146. RZPX-6C is (Prehearing

conference Tr. at 290).

147. As to RXPX-6C, Kelly testified:

MR. BENASUTTI: Mr. Kelly, would you come down from the stand, please, and take a look at Exhibit RZPX-6C, and if you would, examine the inside surface. When you've completed that, you may take the stand again.

[Pause.]

* * *

BY MR. BENASUTTI:

Q Mr. Kelly, from the inspection, have you formed an opinion as to whether or not the inside surface is polished?

A Absolutely not. I mean I have formed an opinion that it is absolutely not polished.

Q Okay. And your opinion is it's not polished?

A Definitely. [Kelly Tr. at 907]

148. As to the Zeta Process B, Zeta's Escola testified:

Q What are the surface characteristics of the inside ?

[Translation follows.]

A [As translated.]

Q

[Translation follows.]

A [As translated.]

Q

[Translation follows.]

* * *

THE WITNESS: [As translated.]

JUDGE LUCKERN: Okay.

BY MR. BENASUTTI:

Q

A [As translated.]
642, 643].

[Escola Tr. at

K. Inventorship of the '910 Patent

148.

34; RCX-27).

149.

(RZX-

(RZX-29; RZX-77 at 64-66).

150.

(RZX-47; RZX-4, answer to interrogatory no. 11; RZX-24 at 7).

151. Richard Kornutik, president of Pop Rocks, Inc., who drafted and prosecuted the patent applications which resulted in the '910 and '457 patents, testified at his deposition that he inspected a process used in Canada for production of carbonated candy sometime before the application for the '910 patent was filed (Kornutik Dep. RZX-67 at 22; ALJ Ex-1; ALJ Ex-2).

152.

(RCX-22 at Bates No. 010544, 010670-010674; RCX-21):

L. Best Mode-'457 Patent

153. The '457 patent resulted from an application filed on July 1, 1976. The patent does not disclose a _____ or other specified degree of polishing, of the inner surfaces of the second pressure vessel/cooling pipe. The specification principally states:

In the preferred embodiment of this invention, the configuration of the second pressure vessel is a cylindrical pipe with a diameter of 4 1/2 inches and a length of 144 inches. ...The interior walls are nickel plated and polished to a smooth surface. (Col. 2, 1. 45-56).

According to the process of the instant invention, polished inner surfaces of the cooling tube permit the product to immediately be released from the sidewalls and break into multiple fragments simply by venting the tube to atmosphere. ... The interior surfaces of the tube are plated and polished so that they are smooth and free from irregularities. (Col. 3, 1. 30-39).

(CX-2).

154. As Hegadorn attested in his deposition, the degree of polish is an engineering term set forth in handbooks. Hegadorn's concern at the time of his application in terms of finish on the cooling tube was that it have a polished, smooth inner surface. Regarding the degree of polish he then specified only that the degree of polish be a practical one that could be achieved within normal engineering terms, so it would be as smooth as possible. Hegadorn confirmed that the

Polishing is a separate step after fabrication of the tubes, and it was effective in achieving release of the product from the tube, as compared to earlier practice (Hegadorn Dep. RZX-71 at 39-51; CX-30).

155. The inventor of the '457 patent Hegadorn testified in his deposition regarding deposition exhibit 23, RZX-20, an oversized engineering drawing for "Cooling Tube Weldment", the drawing containing a date of 3-16-78. The Notes on the drawing include in part:

Hegadorn attested at his deposition that the drawing gives a finishing specification of

the interior surface (Hegadorn Dep. RZX-71 at 36-38).

156. Hegadorn in his deposition also testified that deposition exhibit 24, RZX-19 apparently is an engineering drawing for the fabrication or construction of cooling tubes. RZX-19 contains a date of 12-1-75, a designation identifying General Foods Equipment Engineering Department, Tarrytown, New York, and the title "Cooling Tube Weldment." The Notes on the drawing include in part on the bottom:

Hegadorn stated that it is probably

In the deposition transcript of record Hegadorn was not asked if he had contemporaneous knowledge of this engineering drawing, or had had knowledge of this prior to July 1, 1976 (Hegadorn Dep. RZX-71 at 39-41).

157. In his deposition testimony on behalf of complainant General Foods, Robert Bardsley attested that he was manager of equipment engineering for General Foods, and that his first connection with carbonated candy was in 1975-76 with that being produced by

Bardsley recalled that at some point one of the things done with the

cooling tube was to nickel plate the inner surfaces to provide a highly polished surface, with the nickel plating being FDA approved, to get better release of the candy from the tube. He attested that the first tubes made,

Bardsley attested that there was a standard of smoothness,

(Bardsley Dep.

RZX-72 at 6-7, 39-48).

158. As General Foods' Marks testified in his deposition, in 1975 he had his first involvement with carbonated candy, and was asked by Bardsley to go up and visit with

(Marks Dep. RZX-75 at 12-23,

54-55; Marks Dep. CX-28 at 58).

159. RZX-38 is a memorandum of General Foods' personnel (to Miller from Banta) dated 12/21/76,

(RZX-38).

160. RZX-37 is a memorandum of General Foods' personnel (from Banta to the files) dated 12/20/76, headed Comparative Tube Testing

(RZX-37).

161. Kirkpatrick testified at the hearing in answer to a general question regarding the purpose of shock-treating as claimed in his patent, that the description of the process tried to describe everything that was occurring while the patent application came out. He stated that by the time the patent was written

(Kirkpatrick Tr. at 208-211, 261-71, 279-95; Marks Dep. RZX-75 at 19-59; RZX-37; RZX-38).

162. General Foods' patent file

An illegible signature appears in that box next to a handwritten date of 7/16/76 (RZX-18; RZX-71).

M. Hostess Division of General Foods, Limited

163.

(RCX-22 at Bates No. 010544,

010670-010674).

164. General Foods' Clausi attested in his deposition that the

(Clasi Dep. CX-31 at 83-84; RCX-25).

165. In evidence is a research report authored by Canadian General Foods, Limited personnel,

(RCX-

21 at 1-4).

166. As of

(RZX-47; RZX-4, answer to

interrogatory no. 11; RCX-21).

167. The

(RCX-27).

N.

168. As Kirkpatrick testified in his deposition, his research into scaling up the process for producing carbonated candy involved his design of external cooling tubes into which the product from the 5 gallon autoclave was transferred. He designed a system wherein 3 cooling tubes were used with an autoclave. The original 3 inch diameter tubes

(Kirkpatrick Dep. RZX-68 at 29-31, 235-36; Kirkpatrick Tr. at 144-151, 260-61, 302).

169. In his deposition testimony on behalf of complainants, Paul Touher attested that

(Touher

Dep. RZX-76 at 9-44; CX-29 at 27-46).

170. RZX-29, a memorandum

, states that their experience

with the carbonated candy product and process included

(RZX-29).

171. RZX-39, a May 1, 1972 memorandum by McGuire under the stationery of the General Foods Corp., Technical Center in Tarrytown ~~states~~

(RZX-39).

172. RZX-40, a December 20, 1972 memorandum from Henderson to Nelson of General Foods, Limited in Canada, states some technical information on carbonated candy said to be

RZX-40

(RZX-40).

173. As Kirkpatrick testified, he has performed a bench top process for producing carbonated candy, which was performed in a two-liter Parr reactor, with a couple of pounds capability of product that can be made in there. He also performed a pilot plant process producing 25 pounds a day

(Kirkpatrick Tr. at 297-98).

174. In a deposition on behalf of complainant General Foods, Adolph Clausi testified with reference to RZX-29, General Foods memorandum dated June 15, 1972. He attested that at that time of

(Clausi Dep. RZX-77 Tr. at 68 and 64-84; RZX-29).

175. In his deposition on behalf of complainant General Foods, Kirkpatrick testified that he took the equipment he designed, a five gallon autoclave and three cooling tubes to

(Kirkpatrick Dep. RZX-68 at 63-64, 156-158).

0. Estoppel

176. As stated in FF 17 and FF 26, on October 12, 1976 the '910 patent issued in the name of the inventor Paul A. Kirkpatrick and to General Foods as the assignee. On January 4, 1977 the '457 patent issued

in the name of the inventor Joseph L. Hegadorn with General Foods as the assignee (CX-1; CX-2).

177. A counterpart application to the '910 patent application was filed in Spain and issued as Spanish patent No. 452,040 on June 21, 1977. A counterpart to the '457 patent was filed in Spain and issued as Spanish patent No. 460,324 on February 15, 1978 (RZX-64; RZX-65).

178. A letter dated December 21, 1979 was sent by the firm of Spanish patent agents Elzaburu to Zeta Espacial S.A. of Barcelona, which represented General Foods Corporation in 1979-80. The letter stated that it was sent according to instructions received by General Foods Corporation and its associated firms, which Elzaburu represents, and that its client has been advised that Zeta "intends to manufacture within a short space of time 'a product with a carbonated sugar base.'" The letter then informed Zeta that the General Foods companies own three patents in force in Spain, including Spanish patent No. 452,040 and 460,324. The letter advises that the companies "think it is convenient to inform you that they firmly intend to protect by any legal means within range the inventions protected by legal register rights, and if necessary to this respect they would use these legal channels to avoid any eventual damage to their rights." The Elzaburu letter states that they would like to have Zeta's opinion on the matters set forth in the letter. At the top of the letter is the notation "Re: Patents nos. 452,039, 452,040 and 460,324", referring to the identified Spanish patents enclosed with the letter (RZX-57; RZX-56).

179. In a letter dated January 3, 1980 and sent to Zeta Espacial S.A. of Barcelona, Spain, from B.P. Struzzi, chief patent counsel of General Foods Corporation, it was confirmed that Elzaburu was acting as General

Foods' patent agent in Spain, and that "General Foods intends to enforce its patent rights in Spain." The letter was received by Zeta. The letter recited, due to Zeta's possible interest "in the manufacture and sale of carbonated candy in Spain", that copies of Spanish patents 452,040 and 460,324 issued to General Foods Corporation were enclosed in the letter to Zeta (RZX-58; Escola Tr. at 644-45).

180. In a letter addressed and sent to Elzaburu dated January 3, 1980 Zeta's Escola acknowledged receipt of Elzaburu's letter, the contents of which Zeta has transmitted to Zeta's patent agent for him to get in contact with Elzaburu. The letter enclosed a photocopy of Zeta's Spanish patent of invention for the manufacture of gasified candy (RZX-59; Escola Tr. at 652; Translator Tr. at 649-52).

181. Zeta's Escola attested that as of the time of Elzaburu's December 1979 letter Zeta had not sold gasified candy, but was just beginning to manufacture gasified candy. Escola understood the letter as an attempt to have Zeta discontinue the manufacture of the gasified candy. Escola attested that he understood General Foods' January 3, 1980 letter as a similar letter requesting discontinuation of the manufacture of that candy (Escola Tr. at 649-52).

182. Zeta has admitted in this litigation that on January 3, 1980 Zeta (CX-17, answer to interrogatory no. 33).

183. Zeta Espacial never received any communication or response from Elzaburu, nor from General Foods after the January 3, 1980 letter of General Foods' Struzzi, up until the Zeta's receipt of the ITC process in this investigation (Escola Tr. at 726).

184. Approximately one year after Zeta's January 3, 1980 letter to Elzaburu, Zeta began export of carbonated candy to the United States. (Escola Tr. at 726-27).

185. Zeta's Escola initially testified that because Zeta did not receive a response to its letter to Elzaburu, and General Foods did not take legal action then against Zeta, he assumed and believed that there was no opposition, and he considered that Zeta's patent was sufficiently important to enable us to export to the United States without infringing on General Foods' patents. He stated that General Foods had cited Spanish patents, as Zeta had, and one was as valid as the other. In answer to the repeated direct question regarding whether he had any understanding that United States rights were involved in the communications he received from General Foods, he merely stated that Elzaburu was a representative for General Foods, and he imagined that Elzaburu would sent that letter on to the central office or technicians of the firm they were representing. Escola's testimony concerning involvement regarding United States patent rights by its terms indicates merely his assumption, and it is unpersuasive, undetailed, and unsupported to the extent it purports to indicate that the correspondence between Zeta and General Foods made any clear reference to United States patents or any activity or intended activity by Zeta in the United States (Escola Tr. at 728-30; RZX-56; RZX-57; RZX-59).

186. A June 5, 1980 report of the technical research report of General Foods, Ltd. of England recites that a product purchased in Spain under the name Peta Zeta was analyzed to assess the product's composition. The report recited that G.F. Brussels requested the analysis of the product

to assess its composition and draw conclusions on probable production process, to check for any patent infringement. The Peta Zeta product is then compared in the report to the Pop Rocks product, with the formula for the product concluded to be basically the same (RZX-60).

187. A May 25, 1984 memorandum from complainant General Foods Corp.'s Bahoshy

(RCX-19; RCX-31, answer to interrogatory no. 27; Clausi Dep. RCX-31 Tr. at 96; SX-4 at 3).

188. General Foods' schedule of privileged documents indicates that a memorandum dated June 18, 1984 regarding patent protection held by General Foods and Zeta Especial, S.A. for carbonated candy in Spain. The schedule additionally states that two memoranda dated in 1980 concerned bringing suit against Zeta Especial, S.A.; it is not assumed under the circumstances

that such documents concerned bringing suit in the United States for infringement (RCX-30).

189. In answer to an interrogatory requesting the circumstances when complainants first became aware of Confex's sale of carbonated candy, complainant General Foods admitted that it was known at about the time the patents were licensed (RCX-28 at 14).

190. U.K. published patent application No. GB 2,048,643A is entitled "New procedure for manufacturing an effervescing sweet". On its face the application states that it is based on a priority Spanish application No. 480775 filed in Spain on 21 May 1979 on behalf of Zeta-Esapcial, S.A. of Barcelona, with Messrs. Escola and Bayes named as inventors. The application recites that procedures are known whereby a mass of melted sugar is placed inside a pressure reactor, gas at above atmospheric pressure is fed into the top, with a stirrer being put in motion afterwards, whose effect causes the gas to become distributed throughout the mass of molten sweet in bubbles. The subject procedure is described as basically comprising the following stages: (1) charging a reactor with a mixture of molten sugars; (2) a stirrer is put into motion to stir the molten sugars, while almost simultaneously; (3) the gas is added slowly through a porous plate located at the bottom of the reactor and beneath the stirrer, so as to attain a pressure of above 15 atmospheres inside the reactor; (4) the mixture is rapidly cooled down to a temperature in the range between air temperature and -25°C . The application specifically describes the porous plate bottom mechanism for admitting and dispersing the gas into the first pressure vessel or gasification reactor, which is the focus of the application's description. The first illustrative Example

refers to and describes the gasification reactor and subsequent steps in the reactor and states:

Once the pressure of 50 atmospheres has been achieved, stirring is stopped, and the mass is cooled down as quickly as possible by means of a cooling system in which the coolant is kept at a temperature of below 0°C. This allows the sweet to become as least hygroscopic as possible, since any possible hydrolysis is avoided.

The cooling step is not referred to in the second Example of the application, and the patent does not give any specific description of a "cooling system." Claim 1 of the application in part recites a process in which the pressure inside the reactor rises to above 15 atmospheres, and subsequently the molten mixture is cooled quickly down to a temperature between the air temperature and -25°C. Absent sufficient direct testimony, the administrative law judge does not find that the above description states or clearly indicates that the cooling step and cooling system referred to in this application is done in the same pressure vessel. The other steps are identified specifically as occurring within the pressure reactor vessel (CX-18).

191. In this investigation complainants have asserted that the processes claimed in the '910 and '457 patents, and the use of two separate pressure vessels--one to cool and solidify the molten candy and the other to carbonate the melt, enabled and were required for any commercial scale production of carbonated candy, and so asserted their claims of infringement in this investigation on information and belief (Kirkpatrick Aff. CX-5A at 3-8; SX-2, answer to interrog. 19, 20, 21, 22, 27; SX-4, answer to same no. interros.; SX-6, answer to same no. interros.).

192. In the early months of 1981 Confex was approached by Zeta, a Spanish manufacturer of carbonated candy, concerning the proposed purchase

of Zeta's carbonated candy products manufactured in Spain, for marketing and sale in the United States, as attested by Confex's John Sullivan, Sr. Confex began selling, marketing and distributing childrens' confectionary products throughout the United States (Sullivan Witness Statement RCX-1 at 1-2).

193.

(John Sullivan, Sr. Witness Statement RCX-1 at 2, 5; Sullivan Tr. at 928-32).

194. Until receipt of the complaint filed in this investigation Confex had no communication with General Foods, its licensees, or anyone acting on its behalf, indicating that Confex's Zeta manufactured carbonated candy might infringe an active patent of General Foods. From March 1981 onward Confex openly and publicly sold, marketed, promoted, and distributed Magic Gum and other carbonated candy products obtained from Zeta throughout the United States on a year-round basis (Witness Statement of Sullivan Sr. RCX-1 at 3).

195. In the course of Confex's efforts in the marketing, promotion and sale of Magic Gum and other Zeta manufactured carbonated candy, Confex invested heavily in the marketing and promotion of this product line, acting in reliance on Zeta's assurance of no legal problems as well as the inaction of General Foods in the face of Confex's open and public promotion of Zeta's carbonated candy products (Witness Statement of Sullivan Sr. RCX-1 at 4).

196. On June 18, 1985 for certain carbonated candy products made under the '910 and '457 patents went into effect between the patentee General Foods and

thereafter in October 1985 entered into a

The partnership was named

Carbonated Candy Ventures commenced sales and marketing of

carbonated candy produced on its behalf in mid-1986. Carbonated Candy Ventures produced about

(CX-3; CX-

4; SX-2, answer to interrog. 5; Torgersen Witness Statement CX-21 at 5).

197. Zeta manufactured and exported to Confex, Inc. the following commercial quantities of carbonated candy for the following years. Confex, Inc. imported and openly and publicly sold the following for the following years:

<u>Year</u>	<u>Quantity in Cartons (12x48)</u>	<u>Net Sale \$ by Confex</u>
1981		
1982		
1983		
1984		
1985		
1986		
1987		
1988		

(SX-11, answer to interrog. 6, Ex. D; CX-8; CX-9).

198. Confex, Inc. has expended nearly total since 1981 in marketing and promoting Zeta-made carbonated candy products, developing substantial goodwill for this particular line of products, such as Magic Gum and Fizz Wiz brand products. The expenditures constitute an investment in the product line's goodwill. Expenditures include line items for promotion at

Additionally,

including payroll, office overhead, and related fixed expenses, are attributable to expenses connected with the

development, planning, and execution of marketing and promotional efforts carried out by Confex. Confex has in its sales of carbonated candy (Sullivan, III Witness Statement RCX-2 at 2-4; RCX-5 through RCX-12; Sullivan, III Tr. at 941-43).

199. The expenditure of resources by Confex in developing its market for carbonated candy in the United States could have been employed and invested to support other product lines, although it could not accurately be said whether other such lines would be

Had

Confex been earlier notified by General Foods regarding legal action against Confex, sales of carbonated candy products, the expenditures made by Confex on marketing and promoting the Zeta-made carbonated candy products could have been avoided, and spent by Confex on alternative product lines (Sullivan, III Tr. at 942-43).

200. As General Foods' Clausi attested in his deposition, General Foods' own production and sale of carbonated candy was on the whole unprofitable, and losses sustained General Foods made active promotional efforts to seek licensees for its carbonated candy technology after General Foods' marketing ended, and

The main reason that

General Foods ceased its production of carbonated candy products was that General Foods was unable to adapt to adjusting their large scale inventory sales orientation with a confectionary business operating on a much shorter make to sell kind of manufacturing, marketing and distribution, ending up in over-inventories. The carbonated candy business was just a different

kind of business than General Foods traditionally is in. General Foods had no question that the product was very popular and profitable on a unit basis. General Foods did not see manufacturing as its problem in the carbonated candy business, instead marketing, distribution, inventorying and trade relations were the issue. Therefore, General Foods decided to license the technology and make a profit on a license, rather than take a loss on using the technology themselves (Clausi Dep. RCX-39 at 87-97; Clausi Dep. CX-31 at 116-18).

P. Domestic Industry

200A. General Foods Corporation, the owner by assignment of the '910 and '457 patents, has by written license dated June 18, 1985

under the '910 and '457 patents, and other U.S. and Canadian patents, to make, use and sell carbonated candy within

The license provides for
as well as a

The license additionally provides for authorized use of the Pop Rocks and Cosmic Candy trademarks in connection with carbonated candy.

(Kornutik

Witness Statement CX-20 at 1-3; CX-1; CX-2; CX-3).

201.

dated October 30, 1985, formed a

under the Pop Rocks and Cosmic

Candy trademarks in

(Kornutik CX-20 at 1-3; Torgersen Witness Statement CX-21 at 2-4; CX-4).

202. The partnership Carbonated Candy Ventures sells and markets in carbonated candy in granular form under the trademark Pop Rocks. Carbonated Candy's labor costs include the salaries of a number of individuals who are on the payroll of

(its affiliate), whose time is substantially devoted to the marketing and production of carbonated candy. The payroll for those individuals for

(Kirkpatrick CX-5AC; Torgersen Witness Statement at 3; Torgersen Tr. at 64-69).

203.

(Torgersen Witness Statement at 3-5; Torgersen Tr. at 64-66; Kirkpatrick Witness Statement CX-5A).

204. As attested by Kirkpatrick, the inventor of the '910 patent and vice president for technical development for the carbonated candy complainant Carbonated Candy Ventures

plant. Kirkpatrick is familiar with the process, and that he bought most of the equipment there himself, built the controls, had a say as to everything that went into the plant there, and generally designed the operation there (Kirkpatrick Tr. at 279; Kirkpatrick Witness Statement CX-22 at 1-3).

205. As Kirkpatrick testified,

(Kirkpatrick

Witness Statement CX-22 at 3-9; CX-27; RZPX-1).

206. As Kirkpatrick testified, a videotape, RZPX-1, taken of the

(Kirkpatrick Tr. at 267, 284-296, 392; RZPX-1).

207. The

(Kirkpatrick Tr. at 285-294).

208. The inner surface of the cooling tubes used

The drawing
contains the following direction regarding the inner cooling tube: "Hone
and Polish Inner Surface of (1-2) Tube After Welding" (Kirkpatrick Tr. at
213-214, 303; Kirkpatrick Witness Statement CX-22 at 11; CX-15; Kirkpatrick
Witness Statement CX-22 at 11).

209. As attested by Kirkpatrick, in the carbonated candy production
process

(Kirkpatrick Witness Statement CX-22 at
10-15; Kirkpatrick Tr. at 262).

210. The cooling tubes at

(Kirkpatrick Tr. at
108, 109, 112, 113, 137-140, 394-396).

211. The

(RZX-13; Kirkpatrick Dep. RZX-70 at 4).

212. The written authorized procedures for producing Pop Rocks at

(CX-27; Wrazen Dep.

CX-26 at 11, 17-26, 37-38).

CONCLUSIONS OF LAW

1. The Commission has in rem jurisdiction and subject matter jurisdiction.
2. The Commission has in personam jurisdiction over each of the respondents.
3. Claims 1-9 of the '910 patent are invalid under section 112 (second paragraph) of Title 35 for failure to point out particularly and to claim distinctly the subject matter which the inventor Kirkpatrick regarded as his invention.
4. Claims 1-9 of the '910 patent are invalid under section 112 (first paragraph) of Title 35 for failure to set forth the best mode of the invention contemplated by the inventor Kirkpatrick for carrying out his invention.
5. Claims 1-9 of the '910 patent are not invalid under section 102(b) of Title 35.
6. Claims 1-9 of the '910 patent are not invalid nor unenforceable under section 102(f) of Title 35.
7. Claims 1-9 of the '457 patent are not invalid.
8. Complainants have not sustained their burden in establishing that each of the respondents has infringed the claims in issue of the '910 or the '457 patents.
9. Complainants have sustained their burden in establishing that each of the respondents have imported and/or sold articles alleged to infringe the '910 and '457 patents.
10. Laches and equitable estoppel have not been established in this investigation.

11. There is no domestic industry as required by subsection (a) (2) of section 337 with respect to the '910 patent. There is a domestic industry with respect to the '457 patent.

12. There is no violation of section 337.

INITIAL DETERMINATION AND ORDER

Based on the foregoing findings of fact, conclusions of law, the opinion, and the record as a whole, and having considered all of the pleadings and arguments presented orally and in briefs, as well as proposed findings of fact, it is the administrative law judge's determination that there is no violation of section 337 in the importation into, and sale in, the United States of carbonated candy products allegedly made by certain patented methods.

The administrative law judge hereby CERTIFIES to the Commission this initial determination, together with the record in this investigation consisting of the following:

1. The transcript of the hearing;
2. The Exhibits admitted into evidence and the Exhibits as to which objections have been sustained; and
3. ALJ Exhibits 1 and 2.

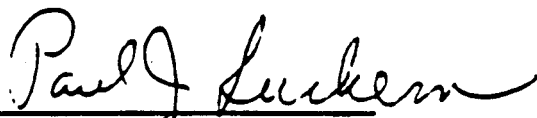
The pleadings of the parties are not certified, since they are already in the Commission's possession in accordance with Commission Rules of Practice and Procedure.

Further it is ORDERED that:

1. In accordance with Rule 210.44(b), all material heretofore marked in camera because of business, financial, and marketing data found by the administrative law judge to be cognizable as confidential business information under Rule 201.6(a), is to be given in camera treatment continuing after the date this investigation is terminated.

2. Counsel for the parties shall have in the hands of the administrative law judge those portions of the initial determination which contain bracketed confidential business information to be deleted from the public version of the initial determination no later than Friday December 29, 1989. Such bracketed version shall not be served by telecopy on the administrative law judge. If no comments are received from a party it will mean that the party has no objection in removing the confidential status, in the entirety, from this initial determination.

3. This initial determination shall become the determination of the Commission forty-five (45) days after the service thereof, unless the Commission, within forty-five (45) days after the date of filing of the initial determination shall have ordered review of the initial determination of certain issues therein pursuant to 19 C.F.R. 210.54(b) or 210.55 or by order shall have changed the effective date of the initial determination.


Paul J. Luckern
Administrative Law Judge

Issued: December 8, 1989

RCX# Documentary Exhibits


- 10.C Confex, Inc.'s Exhibit B - Schedule I to Oct. 31, 1986 Financial Statement: Comparative Schedule of Expenses
- 11.C Confex, Inc.'s Comparative Schedule of Expenses to Oct. 31, 1987 Financial Statement
- 12.C Confex, Inc.'s Comparative Schedule of Expenses to Oct. 31, 1988 Financial Statement
13. United States Patent 4,282,263 (August 4, 1981), J Ray Barnes, et al patentees; "Process for Producing a Gasified Fusible Sugar Composition," (the "Sunmark" patent).
- 14.C Statement of Confex, Inc.'s Net Sales of Carbonated Candy Products in the United States
15. This Exhibit was withdrawn
16. This Exhibit was withdrawn
17. This Exhibit was withdrawn
- 18.C General Foods [] Bates Nos. GF 225-234
- 19.C General Foods [] June, 1984, Bates Nos. GF 11388-11397.
20. This Exhibit was withdrawn
- 21.C General Foods [] Bates Nos. GF 8317-8332.
- 22.C General Foods [] Bates Nos. GF 10538-10688, 10748-10774.
- 23.C General Foods Memorandum, March 14, 1986. []
- 24.C July 31, 1989 Letter of Ted Carvis, Counsel for Complainants.
- 25.C General Foods [] March 5, 1973, Bates Nos. GF 8119-8130.

RCX# Documentay Exhibits

26. This Exhibit was withdrawn
27. C General Foods Bates Nos. GF 1901-1905.
28. C Complainants' Response to Confex, Inc.'s First Set of Interrogatories.
29. Complainants' Response to Confex, Inc.'s Document Requests.
30. C Complainant General Foods Corporation's Supplemental Response to Zeta Espacial's Second Request for Documents From Complainants.
31. C Complainant General Foods' Response to Respondent, Confex, Inc.'s Second Set of Interrogatories to Complainants.
32. Ter Braak Brochure for Presswhip.
33. This Exhibit was withdrawn
34. This Exhibit was withdrawn
35. This Exhibit was withdrawn
36. Kremzner patent
37. No Exhibit was submitted
38. C Designated portions of deposition transcript of Paul Anthony Kirkpatrick taken July 18, 1989.
39. C Designated portions of deposition transcript of Adolph S. Clausi taken July 20, 1989.

Respectfully submitted,

SENNIGER, POWERS, LEAVITT & ROEDEL



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Attorneys for Respondent

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing document was served upon the following by express mail on the 13~~th~~ day of October, 1989:

The Honorable Paul J. Luckern
U.S. International Trade Commission
500 E Street, S.W.
Washington, DC 20436

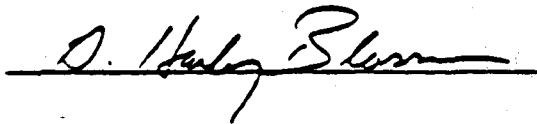
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United States International Trade Commission
Washington, D.C. 20436

In the matter of

CERTAIN METHODS OF MAKING CARBONATED
CANDY PRODUCTS

)
) Investigation No.
) 337-TA-292

)
) Hon. Paul J. Luckern
)

COMPLAINANTS' POST-HEARING EXHIBIT LIST

<u>EXHIBIT NO.</u>	<u>DESCRIPTION</u>	<u>STATUS</u>	<u>TRANSCRIPT PAGE</u>
CX-1	Certified Copy of U.S. Patent No. 3,985,910	ADMITTED	PT ¹ 96
CX-2	Certified Copy of U.S. Patent No. 4,001,910	ADMITTED	PT ^r . 96
CX-3C	General Foods' []	ADMITTED	PT ^r . 96
CX-4C	Carbonated Candy Ventures []	ADMITTED	PT ^r . 96
CX-5C	Kirkpatrick Affidavit with Complainants' deletions	REJECTED	PT ^r . 172
CX-5AC	Kirkpatrick Affidavit with Complainants' and Judge Luckern's deletions	ADMITTED	PT ^r . 173
CX-6C	[] Plant Photos	ADMITTED	PT ^r . 96
CX-7C	Confex Price List	ADMITTED	PT ^r . 96
CX-8C	Confex Sales Data	ADMITTED	PT ^r . 96
CX-9C	Zeta Product Information	ADMITTED	PT ^r . 96

¹ Prehearing Conference Transcript

EXHIBIT NO.	DESCRIPTION	STATUS	TRANSCRIPT PAGE
CX-10C	Zeta Process A Photos	ADMITTED	Ptr. 96
CX-11C	Zeta Process A Diagram	ADMITTED	Ptr. 96
CX-12C	Zeta Process B Diagram	ADMITTED	Ptr. 96
CX-14	Certified Copy of U.S. Patent No. 4,262,029	ADMITTED	Ptr. 96
CX-13	(renumbered CPX-1C)		
CX-15C	☐ Cooling Tube Drawings and Cover Memo	ADMITTED	Ptr. 162
CX-16C	Zeta's Order No. 21 Responses	ADMITTED	Order No. 32
CX-17C	Zeta's Order No. 34 Responses	ADMITTED	Order No. 32
CX-18	GB 2 028 643A	ADMITTED	Ptr. 251
CX-19C	Kleiner W.S.	ADMITTED	Ptr. 221
CX-20C	Kornutik W.S.	ADMITTED	Ptr. 102
CX-21C	Torgersen W.S.	ADMITTED	Ptr. 102
CX-22C	Kirkpatrick W.S.	ADMITTED	Ptr. 102
CX-23C	Sullivan, III W.S.	ADMITTED	Ptr. 102
CX-24C	Escola W.S.	ADMITTED	Ptr. 102
CX-24AC	Escola Errata Sheets	ADMITTED	Tr. 553
CX-25C	Bayes W.S.	ADMITTED	Ptr. 102
CX-25AC	Bayes Errata Sheets	ADMITTED	Tr. 553
CX-26C	Wrazen Excerpts	ADMITTED	Tr. 966
CX-27C	POP ROCKS ☐	ADMITTED	Tr. 966
CX-28C	Marks Excerpts	ADMITTED	Tr. 966
CX-29C	Touher Excerpts	ADMITTED	Tr. 966

EXHIBIT NO.	DESCRIPTION	STATUS	TRANSCRIPT PAGE
CX-30C	Hegadorn Excerpts	ADMITTED	Tr. 966
CX-31C	Clausi-Excerpts	ADMITTED	Tr. 966
CX-32C	Kirkpatrick Excerpts	ADMITTED	Tr. 966
CPX-1C	Video Tape of Zeta Plant Inspection	WITHDRAWN	Tr. 976
CPX-2C	Video Tape of Zeta Process A	ADMITTED	PTr. 162
CPX-3C	Zeta Process A	ADMITTED	Tr. 717

Respectfully submitted,

GENERAL FOODS CORPORATION
CARBONATED CANDY VENTURES
POP ROCKS, INC.

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 William J. Speranza
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Attorneys for Complainants

RZX-15C Letter [] GF003297

RZX-16C Excerpt of the deposition testimony of Raphael Caballos taken June 5, 1989

RZX-17C Withdrawn

RZX-17AC Complainants' Answer to Interrogatory No. 20

RZX-18C [] GF003548

RZX-19C [] CCV002298 (Deposition Ex. 24)

RZX-20C [] (Deposition Ex. 23)

RZX-21C Documents GF001857-60 (CX-28)

RZX-22C Diagrams and Photographs (CX-29)

RZX-23C Photograph

RZX-24C [] GF008317-32 (Staff Deposition Ex. 1)

RZX-25C []

RZX-26C []

RZX-27C [] (Deposition Ex. 17)

RZX-28C Sketch (Deposition Ex. 18)

RZX-29C [] (Deposition Ex. 14) [] 6/15/72 GF008132-35

RZX-30C [] 4/18/73, GF008302-3

RZX-31C [] GF008269

RZX-32C [] GF008337-39

RZX-33C [] GF008271

RZX-34C [] GF007902-5

RZX-35C [] GF002426

RZX-36C []

RZX-37C [] GF008347

RZX-38C [] GF012946-48 12/20/76

RZX-39C Retrieval Report, GF010775 12/21/76, GF012949-50

RZX-40C (Deposition Ex. 21) 12/20/72, GF008130-31

RZX-41C [] GF000580

RZX-42C [] GF008291-93

RZX-43C [] GF008262-65

RZX-44C [] GF008294-300

RZX-45C Document, two pages, GF000578-79

RZX-46C [] 10/20/71 GF011431,32

RZX-47C [] GF011593-608

RZX-48C [] GF008121-22

RZX-49C [] GF008308

RZX-50C [] GF008307

RZX-51C [] GF008244-48

RZX-52C [] 4/23/74 GF008366

RZX-53C Withdrawn

RZX-54C Ramon Bayes - Witness Statement and translation

RZX-55C Ramon Escola - Witness Statement and translation

RZX-56 Letter Elzaburu to Zeta Espacial, S.A. , 12/21/79, 001002

RZX-57 Translation of RZX-56

RZX-58 Letter General Foods to Zeta Espacial, S.A., 1/3/80,
001003

RZX-59 Letter Zeta to Elzaburu, 1/3/80, 001001

RZX-60C _____, GF000226-232

RZX-61C _____ GF011389-90

RZX-62C _____
with photo attachment GF011394-GF011393

RZX-63C _____, 8/24/84 GF011392

RZX-64C Memorandum re: "Pop Rocks" patent estate, B.P. Struzzi to
Mr. R. Laster, 7/19/78 GF011260

RZX-65C _____ GR003742;
Excerpt from Complaint (page 11)

RZX-66C Withdrawn

RZX-67C Designated portions of deposition transcript of Richard
Kornutik taken July 21, 1989

RZX-68C Designated portions of deposition transcript of Paul
Anthony Kirkpatrick taken July 18, 1989

RZX-69C Designated portions of deposition transcript of Paul
Kirkpatrick taken July 19, 1989

RZX-70C Designated portions of deposition transcript of Paul A.
Kirkpatrick taken August 22, 1989

RZX-71C Designated portions of deposition transcript of Joseph
Hegadorn taken July 19, 1989

RZX-72C Designated portions of deposition transcript of Robert
Bardsley taken August 25, 1989

RZX-73C Designated portions of deposition transcript of Stuart Cairnes taken August 25, 1989

RZX-74C Designated portions of deposition transcript of Robert C. Hughes taken August 25, 1989

RZX-75C Designated portions of deposition transcript of William Marks taken August 25, 1989

RZX-76C Designated portions of deposition transcript of Paul Touher taken August 25, 1989

RZX-77C Designated portions of deposition transcript of Adolph Clausi taken July 20, 1989

RZX-78C List of videotapes used in RZPX-4C

RZX-79C List of videotapes used in RZPX-5C

RZX-80C Not Admitted

RZX-81C Designated portions of plant inspection transcript taken June 5, 1989

RZX-82C Designated portions of deposition transcript of Ramon Bayes taken June 8, 1989

RZPX-1C _____ (Deposition Ex. 50)

RZPX-2C Hammer (Deposition Ex. 43)

RZPX-3C _____

RZPX-4C Excerpts of videotapes of Zeta Process A

RZPX-5C Excerpts of videotapes of Zeta Process B

RZPX-6C _____ Zeta Process B

RZPX-7 Not Admitted

RZPX-8C Excerpts of videotape of Paul Kirkpatrick deposition taken July 13, 1989


RZPX-3C is in the possession of counsel for respondent Zeta.

- RZX-9C Videotape of Zeta Plant Inspection, exhibits 2 and 3
- RZX-10C Videotape of Zeta Processes A and B
- RZX-11C Videotape of Zeta Process A
- RZX-12C Videotape of Zeta Process A (Exhibit E)
- RZX-13C Videotape of Zeta Plant Inspection, exhibit 3 (Beta)
- RZX-14C Portion of equipment used in Zeta Process A

Respectfully submitted,

Zeta Espacial, S.A.

By



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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436
Before Paul J. Luckern
Administrative Law Judge

In The Matter of)
)
CERTAIN METHODS OF MAKING)
CARBONATED CANDY PRODUCTS)
)
)
)

Inv. No. 337-TA-292

EXHIBITS OF THE
COMMISSION INVESTIGATIVE STAFF

<u>Exhibit No.</u>	<u>Title</u>
1. SPX-1	Proposed Exhibits of the Commission Investigative Staff
2. SPX-2(C)	Complainant Carbonated Candy Ventures' Response to the First Set of Interrogatories of the Commission Investigative Staff
3. SPX-3(C)	Complainant Carbonated Candy Ventures' Response to the Second Set of Interrogatories of the Commission Investigative Staff
4. SPX-4(C)	Complainant General Foods Corporation's Response to the First Set of Interrogatories of the Commission Investigative Staff
5. SPX-5(C)	Complainant General Foods Corporation's Response to the Second Set of Interrogatories of the Commission Investigative Staff
6. SPX-6(C)	Complainant Pop Rocks, Inc.'s Response to the First Set of Interrogatories of the Commission Investigative Staff
7. SPX-7(C)	Complainant Pop Rocks, Inc.'s Response to the Second Set of Interrogatories of the Commission Investigative Staff

8. SPX-8(C) Respondent Zeta Espacial's Answers to the Commission's First Set of Interrogatories
9. SPX-9(C) Response by Zeta Espacial, S.A. to the Second Set of Interrogatories of the Commission Investigative Staff
10. SPX-10(C) Supplemental Response to Second Set of Interrogatories of the Commission Investigative Staff Propounded to Respondent Zeta Espacial, S.A.
11. SPX-11(C) Respondent Confex, Inc.'s Answers to the First Set of Interrogatories of the Commission Investigative Staff Propounded to Respondents.

SX-12

Stipulations

SX-13

Dictionary Entry

CERTIFICATE OF SERVICE

I, Daniel Morgan Duty, hereby certify that the foregoing PROPOSED EXHIBITS OF THE COMMISSION INVESTIGATIVE STAFF and accompanying exhibits was served by hand upon the Administrative Law Judge Paul J. Luckern and upon the following parties on September 7, 1989 by AIRBORNE EXPRESS:

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Daniel Morgan Duty

UNITED STATES INTERNATIONAL TRADE COMMISSION
WASHINGTON, DC 20436

In the Matter of)
)
CERTAIN METHODS OF MAKING)
CARBONATED CANDY PRODUCTS)
)

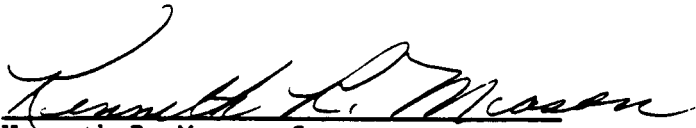
Investigation No. 337-TA-292

ALJ EXHIBIT LIST

- ALJ-1 - File History to '910 Patent
- ALJ-2 - File History to '457 Patent

CERTIFICATE OF SERVICE

I, Kenneth R. Mason, hereby certify that the attached PUBLIC INITIAL DETERMINATION was served upon the investigative staff attorneys David A. Guth, Esq., Daniel M. Duty, Esq. and upon the following parties via first class mail, and air mail where necessary, on January 19, 1990.


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