IN THE UNITED STATES DISTRICT COURT

FOR THE WESTERN DISTRICT OF WISCONSIN

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THOMAS INDUSTRIES, INC.,

Plaintiff,

v.

GAST MANUFACTURING, INC.,

Defendant.

OPINION AND ORDER

04-C-375-C

- -

Plaintiff Thomas Industries, Inc. and defendant Gast Manufacturing, Inc. compete in the air compressor business. Plaintiff filed this lawsuit against defendant, contending that two of defendant's air compressor products, the 75R and 82Rmodels, infringe its United States Patent No. 6,056,521 (the '521 patent). Defendant denies that its 82R compressor infringes the '521 patent literally or under the doctrine of equivalents and points out that it no longer makes or sells the 75R compressor. In addition, defendant contends that the '521 patent is invalid and that plaintiff's infringement claim is barred by the doctrines of equitable estoppel and laches. Jurisdiction is present. 28 U.S.C. §§ 1331 and 1338.

Presently before the court are the parties' cross motions for summary judgment on infringement and plaintiff's motion for summary judgment regarding defendant's affirmative

defenses of laches and equitable estoppel. The linchpin of this case is the definition of "monolithically formed head," the term in dispute in the '521 patent. I am persuaded that defendant is correct in defining "monolithically formed head" as requiring a cover over the inlet and exhaust chambers of the head member. I find that defendant's 82R compressor does not infringe the '521 patent. The parties agree that defendant no longer makes or sells the original 75R compressor and that the redesigned version of the 75R compressor does not infringe the '521 patent. Thus, there is no case or controversy with respect to plaintiff's claim of infringement by the 75R compressor. I will deny as moot plaintiff's motions for summary judgment with respect to infringement of the '521 patent by the 75R compressor and with respect to defendant's affirmative defenses of laches and equitable estoppel.

From the parties' proposed findings of fact and the record, I find the following facts to be material and undisputed.

UNDISPUTED FACTS

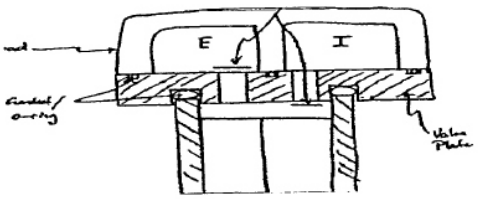
A. Background

Plaintiff Thomas Industries, Inc. manufactures and sells vacuum and compressor pump technology, including two-cylinder compressors for use with various devices, including copy machines, beverage dispensers and oxygen concentrators. Plaintiff is the assignee of the '521 patent, entitled "Two-Cylinder Air Compressor." Defendant Gast Manufacturing,

Inc. sells pumps for medical and other equipment. Both parties sell compressors for use in connection with oxygen concentrators, which separate oxygen from other components of air such as nitrogen and are used to deliver oxygen in concentrated form to patients.

B. Compressor Technology

The product at issue is a two-cylinder, piston-based compressor. In these products, each cylinder houses a piston that is driven up and down by a drive shaft powered by an electric motor situated between the cylinders. The '521 patent describes one form of this product as having two cylinders arranged at opposite ends of a motor with a through drive shaft that mounts a wobble piston on each end. Each cylinder has a valve plate with flapper inlet and exhaust valves mounted opposite the piston head. A cylinder head with inlet and exhaust chambers is mounted on each cylinder and provides inlet and outlet chambers to the cylinders. The inlet and exhaust chambers of the cylinder heads are typically connected by separate tubes. Plaintiff's 2600 series of compressors are examples of the two-cylinder in-line compressors. Before the '521 patent issued, compressor cylinder heads were manufactured separately and then connected to the tubes. Shawn Leu, inventor of the subject of the '521 patent, drew the following picture to depict a generalized compressor:



Dft.'s PFOF, dkt. #42, ¶126. The drawing shows separate head and valve plate parts. The area labeled with an "I" in the drawing shows an inlet chamber provided by the head; the area labeled "E" shows an exhaust chamber.

According to plaintiff's expert, an essential component of a compressor:

> is a surface or plate or plate portion immediately atop the piston-cylinder subassembly that resides directly over the "top-dead-center" position of the piston contained within the cylinder. The head can embody this surface in one typical construction or the surface can be a separate piece or subassembly in another construction. The head in its most fundamental mechanical sense is the physical structure that communicates with the cylinder through the fluid passages that are required to create an operational compressor and forms means to permit the compressed gas to be delivered or discharged to a desired location.

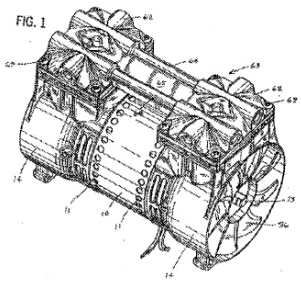
There are a number of ways to construct a header valve plate. There is nothing unusual about putting a cover on a head or valve plate.

From a technological perspective, the cylinder of the compressor must be enclosed to be able to compress air, yet means must be provided to route the air to the cylinder and out to the other cylinder or other desired location. In order to be operational, the portion of the compressor above the cylinder must perform three basic functions: 1) communicate with the

cylinder while enclosing the cylinder on its top; 2) provide inlet and exhaust chambers; and 3) close the chambers on top. Because of the need to open up the upper portion of the compressor for maintenance, neither the entire portion above the cylinder nor the actual valves that communicate with the cylinder can be monolithically formed.

C. The 1996 Application

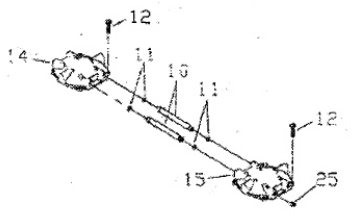
The application that resulted in the '521 patent was a continuation-in-part of Application No. 08/671,849, filed June 28, 1996. A "continuation-in-part" application adds new matter that was not contained in the previous application. Plaintiff's employees Shawn Leu and Mark A. Schuessler were the named inventors on the 1996 application, which contained eleven claims. The application contained references in the specification and in claims 3 and 7 to a "one-piece" cylinder head or head member with "integral" tubes connecting the heads, but did not contain the terms "monolithically formed head" or "single piece of continuous material." The 1996 application contained eleven drawings, labeled Figures 1 through 11. Several of the drawings depicted a portion of a cylinder head (or head member) and tubes. For example, Figure 1 in the 1996 application appeared as follows:



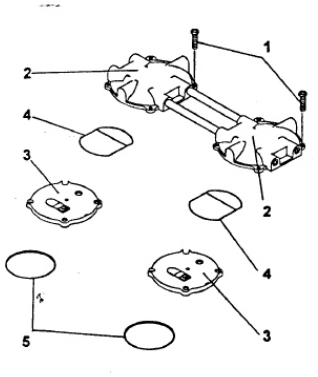
Dft.'s PFOF, dkt. #42, ¶23.

On September 22, 1997, the patent examiner issued an office action rejecting all eleven claims on grounds of obviousness (claims 1-6, 8-11) and anticipation (claim 7). The patent examiner cited Thomas Compressor Pump 2619CGHI47-932 ("the Thomas 2619 compressor") in support of the obviousness and anticipation rejections, stating that "Thomas has disclosed the invention substantially as claimed showing a two-cylinder air compressor (page 6) having a motor with a drive shaft and dual piston (2) chambers, valve plates (16) integral tubes (10) connecting the heads, and fans (23, 24) on the ends." The examiner rejected claim 7 as anticipated by the Thomas 2619 compressor, stating that the 2619 compressor had integral tubes.

Below is a portion of a figure that appears in the Thomas 2619 Field Service Manual, which shows an example of separately manufactured heads and tubes found in the prior art to the '521 patent:



Dft.'s PFOF, dkt. #42, ¶136. Parts 12 are screws for mounting the heads atop the cylinders, parts 14 and 15 are heads, parts 10 are connector tubes and parts 11 are O-rings. The following figure appears in the Thomas 2619 Field Service Manual, which labels part 2 as "heads:"



Plt.'s PFOF, dkt. #25, exh. 14, at 12.

On December 17, 1997, the applicants filed an amendment to the 1996 application,

requesting reconsideration of the rejection of the eleven claims. The applicants stressed that separate tubes assembled into separate heads did not constitute a one piece construction of a head member. Specifically, the applicants stated: "As noted previously, claims 7 et al call for a one-piece head member. The term one-piece certainly precludes that it can consist of more than one piece." In the 1996 application, the term "head member" referred to the overall component in which the tubes joined the inlet and exhaust chambers and heads were at each end. On February 13, 1998, the patent examiner affirmed the rejection of all eleven claims for obviousness and anticipation. Again, he cited the Thomas 2619 compressor in rejecting claim 7 as anticipated and the Thomas 2619 compressor and Panarti U.S. Patent No. 3,664,772, in rejecting the other claims as obvious. In affirming the rejection of the 1996 application, the patent examiner stated:

> Applicant's arguments filed 12-23-97 have been fully considered but they are not persuasive. Applicant argues on page 2 of the remarks, with regard to claim 7, that the prior art Thomas compressor shows "separate heads" and "separate connecting tubes." The applicant argues that the present invention claims a "one-piece head and connecting tubes." The Examiner has considered but rejects this argument. The Examiner must give the claims their broadest interpretation during examination. In the instant case, the prior art Thomas compressor may be considered "one integral piece" despite having different components assembled together. Note that the term "integral" is considered sufficient to embrace constructions united by such means as fastening or welding.

D. The 1998 Application

On November 24, 1998, plaintiff filed Application No. 09/199,123, as a continuation-in-part of the 1996 application. The named inventors on the 1998 application were Shawn Leu, Jeffrey W. Bergner, Gregg E. Meschler, William H. Lynn and Larry H. Panzer. Michael K. Gray was the patent examiner. The 1998 application contained 15 claims and added language to the patent abstract for the patent and nine new paragraphs of disclosure in the detailed description of the preferred embodiment section of the specification. The 1998 application did not contain the term "monolithically formed head" or the same claims set forth in the '521 patent, but did contain the same figures 1 through 11 that were found in the 1996 application, along with figures 12 through 17. On September 29, 1999, the patent examiner rejected all fifteen claims on grounds of anticipation (claim 13) and obviousness (claims 1-12 and 14-15), citing the Thomas 2619 compressor as one basis for the rejection. The examiner noted that claim 13 of the 1998 application was anticipated by the Thomas 2619 compressor because it had "a one piece cylinder head" in which "connector tubes are formed integral with the heads at the respective ends of the cylinder head members with tubes joining inlet and outlet chambers." The examiner stated that the term "integral" is sufficient to embrace construction united by such means as fastening and welding and considered the term "one-piece" to be analogous to the term "integral" for the purpose of examination.

On December 7, 1999, the patent examiner conducted an in-person interview with the applicants of the 1998 application. In his summary of the interview, he stated, "Tentatively it appears patentable subject matter exists in proposed claim 16. Applicants emphasized that one-piece head has no leaking in conjunction with impetus that construction of device is emphasized from top down as opposed to bottom up in industry, previously." On December 28, 1999, the applicants filed a response that cancelled claims 1-15 of the 1998 application "without prejudice" and added claims 16-23. Claim 16 eventually became claim 1 of the '521 patent. It reads as follows:

> In a pump comprising at least two separate cylinder housings, each cylinder housing defining a cylinder with an axis, the axis being parallel and spaced apart; a pair of pistons, each piston being reciprocable in a corresponding one of the cylinders so as to reciprocate along the axis of the corresponding cylinder to vary a working volume of the cylinder; a motor positioned between the cylinder housings and driving the pistons so as to reciprocate the pistons; a pair of head members, each head member being fastened to a different one of the cylinder housings, wherein the tube provides fluid communication between the head members;
>
> the improvement wherein:
>
> a monolithically formed head which is common to both of the cylinder housings and is a single piece of continuous material includes the head members and the tube so that the tube is joined to each head member with a fluid tight and fixed rigid connection provided by the material of the monolithic head continuously joining the tube to each head member, the head being rigid so as to assist securing the housings in a fixed orientation relative to one another.

The other eight claims added to the December 28, 1999 response became claims 2-9

of the '521 patent. These new claims contained no reference to a "one-piece cylinder head member," a "one-piece head assembly" or a "one-piece cylinder head." In the remarks section of the December 28, 1999 response, the applicants stated:

> It is respectfully submitted that none of the prior art of record discloses or suggests a monolithic head in a compressor of the type which has cylinder housings at opposite ends of a motor, which is the subject matter of claim 16. As stated in Mr. Leu's declaration submitted herewith, the practice in the industry was to make pumps with two cylinders at opposite ends of a motor with separate heads and separate tubes. It was thought that this was needed to be done because the length of the pump, between the cylinders, differed with different horsepower requirements, because making the heads and tubes separate made the pump versatile and because it was thought that casting both heads in one piece was not practical. Thus, the predominant practice was to make pumps with tubes separate from the heads.
>
> The separate heads and tube design worked, but had problems. The tubes had to fit closely within the heads to create a good seal. The seal also was subject to failure, or leakage, particularly if the tubes were used as a handle, as they often were. With Thomas Industries' Quantum Quest project, it set out to address these leakage problems.
>
> Thomas Industries initial inclination was to keep making the head with separate heads and tubes, and work harder in assembly and quality control to solve the leakage problems. Casting the whole head in one piece was considered not practical, because of the relatively long tubes and the holes which would have to be formed in them. Also, the one-piece head, to make it practical, would have to be used with different horsepower pumps, and so the variability in length of the pumps was a problem.
>
> In spite of these difficulties, Thomas recognized the advantages of the invention and determined to try making a monolithic head. This was a significant break from the common wisdom in the industry.
>
> The one-piece head solved the leakage problems in this type of

compressor, much to the satisfaction of the compressors' customers.

> Over time, the realization emerged that the monolithic head had other advantages. It was realized that the head acted as a structural component of the pump, to make the pump more robust. In particular, the head, being monolithic, can resist moments in all three dimensions. This is particularly advantageous to resist "clocking." This is what can occur from rough handling, when one of the cylinders get twisted relative to the other.

In addition, plaintiff stated in the remarks section, "It is noted that easy accessibility, noted on pp. 15, 17 and 19 of the Office Action, is not an objective or advantage of the present invention. The easy access of the Panariti construction is antithetical to the present invention, since making the heads in one piece hampers easy access . . . [A] desire to provide easy accessability [sic] would have lead [sic] away from the present invention."

The patent examiner for the 1998 application allowed the nine claims submitted in the applicants' response of December 28, 1999, for the following reasons:

> A search of the prior art has not disclosed references which individually or in combination anticipate or make obvious the combination of elements claimed in claim 16, which elements include in a pump comprising at least two separate cylinder housings as recited in the preamble of claim 16:
>
> a monolithically formed head which is common to both cylinder housings and is a single piece of continuous material which includes the head members and a tube spanning the head members so that the tube is joined to each head member with a fluid tight and fixed rigid connection provided by the material of the monolithic head continuously joining the tube to each head member, the head being rigid so as to assist securing the housings in a fixed orientation relative to one another.
>
> In combination with the elements claimed above, the monolithically

> formed head which serves to assist in securing the housings in a fixed orientation relative to one another is considered patentably distinguishable over the prior art.
>
> Further, the affidavits of Shawn Leu and James G. Gartman, which were filed with applicants' response on January 4, 2000 are considered supportive as to the patentability of the claimed invention.

E. The '521 Patent

The United States Patent and Trademark Office issued the '521 patent on May 2, 2000. The '521 patent contains one independent claim, claim 1, and eight dependent claims, claims 2-9. Claim 1 is written in Jepson format, which means that it contains a preamble that describes the prior art and a subsequent portion that describes a claimed improvement made on the prior art. Claim 1 was identical to claim 16 of the 1998 application. The only claim terms in dispute in this case are the terms "monolithically formed head" and "head members" in claim 1 of the '521 patent. The parties do not dispute any of the language in any asserted dependent claims.

The '521 patent describes and then distinguishes prior art "two-cylinder in line oilless compressors." Id., col. 1, lns. 9-10. Among other elements, the prior art had a "cylinder head with inlet and exhaust chambers . . . mounted on each cylinder and provide[d] inlet and outlet chambers to the cylinders." Id., col. 1, lns. 29-31. "The inlet and exhaust chambers of the cylinder heads [were] typically connected by separate tubes." Id., col. 1, lns.

32-34. An object of the invention in the '521 patent is "to provide such an air compressor having a one-piece cylinder head member which includes the cylinder heads for both cylinders and the integral tube connector between the chambers of the heads . . ." Id., col. 1, lns. 48-51.

Plaintiff thought that combining the heads (or head sub-assemblies) of the separate cylinders monolithically assures that gas leakage cannot occur at the location of the cross-over or connecting tubes that communicate between head members of each of the cylinders. Also, one can avoid the problem of physical handling of the compressors that plagued prior art compressors. The cross-over or connecting tubes invite grabbing and handling in the assembly process, thus potentially aggravating the leakage problem, as well as creating physical alignment issues among the two cylinders and their common electric drive motor. The monolithic head assembly offers both a convenient and safe means of physically handling the entire dual-cylinder compressor product (the monolithic embodiment becomes a strong de facto "handle") that can be used when the compressor assembly is integrated within a particular system without fear of exacerbating or generating leakage problems.

The '521 patent abstract states, "The one-piece cylinder head serves as the final retention member, clamping the housings axially while maintaining radial orientation." The '521 patent specification states, "The assembly is complete by joining the two housings 14a and 14b with the one-piece head 63," id., col. 4, lns. 58-59, referring to the assembly of the

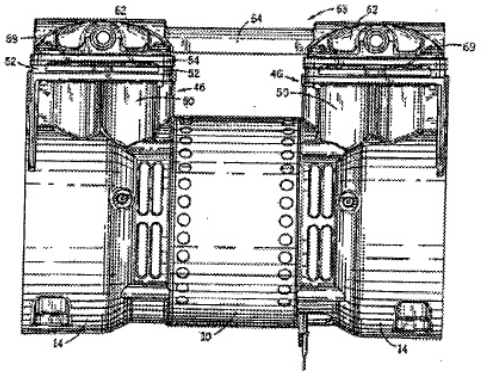
compressor. In addition, the description of the prior art states "A cylinder head with inlet and exhaust chambers is mounted on each cylinder and provides inlet and outlet chambers to the cylinders," id., col. 1, lns. 29-32, and the summary of the invention states "It is yet another object of this invention to provide such an air compressor having a one-piece cylinder head member which includes the cylinder heads for both cylinders and the integral tube connector between the chambers of the heads, the integral connectors being capable of acting as a handle or hook for the air compressor." Id., col. 1, lns. 48-52.

The following language in the '521 patent was not included in the 1996 application:

> The one-piece head 63 is the principal attachment for the assembly because it requires the greatest load to completely separate the parts. The one-piece head 63 also serves to keep the housings from rotating with respect to each other, which could happen during shipment.

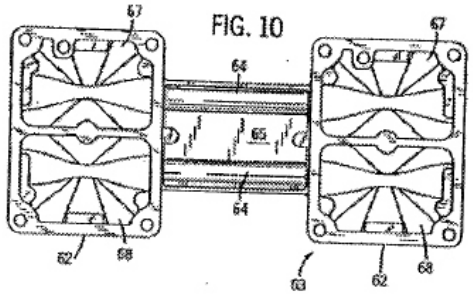
The '521 patent has 17 drawings, representing the preferred embodiment of the patent. The following drawing appears as Fig. 2 in the '521 patent:

FIG. 2



'521 pat., Fig. 2.

Fig. 2 shows the cylinder head attached as the final and uppermost part of the compressor. Fig. 10, shown below, shows the inlet and exhaust chambers formed in the cylinder head.



'521 pat., Fig. 10.

None of the drawings in the '521 patent depicts a head that is not the final and uppermost part of the compressor.

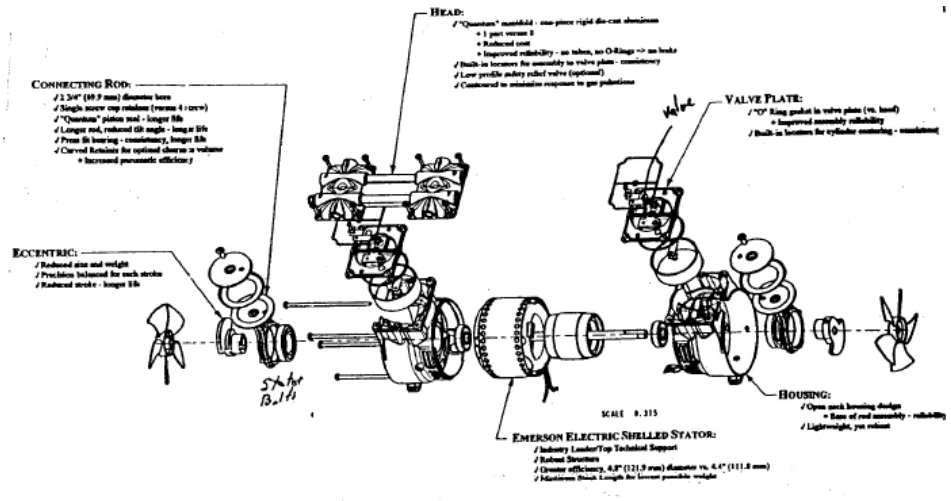
The written description in the '521 patent states:

> The head portion[s] 62 are joined by an integral connector which includes spaced hollow tubes 64 and a web 65 joining the tubes 64. The hollow tubes 64 connect to the inlet and exhaust chambers 67 and 68 of the head portions 62.

Id., col. 3, lns. 64-67.

F. Plaintiff's Compressor Sales

Plaintiff began shipping samples or prototypes of a compressor modeled on claim 1 of the '521 patent to customers in late 1995 or early 1996. The first compressor model to incorporate the monolithic head feature was the Model 2650. An illustration of the Model 2650 appears below:

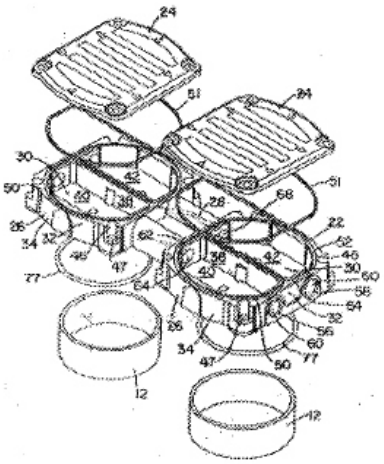


Plt.'s Resp. to Dft.'s PFOF, dkt. #37, exh. 47.

Plaintiff began offering the 2650 compressor for sale in late 1995 or early 1996. It sold at least 627 of the model 2650 compressors in 1996. Today, plaintiff sells a next-generation model called the 2660, which embodies the '521 patent claims, although there is no difference between models 2650 and 2660 with respect to the head and valve plate configuration.

G. Defendant's '845 Patent and Compressors

Defendant is the assignee of U.S. Patent No. 6,431,845 (the '845 patent), entitled "Head Cover Assembly with Monolithic Valve Plate," which was issued on August 13, 2002. The '521 patent was considered as prior art during the prosecution of the '845 patent. Head covers were known in the art prior to the '521 patent. Michael K. Gray was one of the patent examiners for the '845 patent. The following drawing, labeled Fig. 2, appears in the '845 patent:



'845 pat., Fig. 2. According to the '845 patent, part 22 is described as a "one piece valve plate." Parts 24 are described as "a pair of heads." Regarding the '845 patent, plaintiff's employee, Shawn Leu, agreed that the one piece valve plate (part 22), was not the final retaining member on the compressor and that other parts have to be put on top of the

compressor. The part labeled 32 is the chamber portion of the head component.

At the time the '845 patent was issued, defendant did not have its 82R compressor in the marketplace. Defendant's 82R compressor embodies the claimed invention in the '845 patent. Its compressor is a two-cylinder air compressor with reciprocating pistons. It uses covers as the uppermost part of the compressor. The covers are not formed monolithically together with a section spanning them. In April 2004, defendant began shipping commercial quantities of its 82R compressor to Invacare, one of plaintiff's largest customers at the time. The first draft of the contract between defendant and Invacare prepared in late 2003 referred to the 82R design as "the single head design."

Plaintiff accused an original version of defendant's Model 75R compressor of infringing the '521 patent, but defendant voluntarily ceased making the 75R compressor within weeks of the issuance of the '521 patent in May 2000. In the original design of the 75R compressor, defendant called the monolithically formed head a "one piece head." After the United States Patent and Trademark Office issued the '521 patent, plaintiff immediately sent defendant a letter requesting that it cease and desist sales of its infringing 75R model and any other infringing pumps having monolithic heads. Defendant's Vice President of Engineering, Robert Dowsett, wrote one of its major customers, SeQual Technologies, on June 2, 2000, stating:

We have been served with a letter from Thomas Industries stating that we are

> infringing on their one piece design patent . . . After careful review of the Thomas patent by our attornies [sic] it has been determined that our one piece head design used on the 75R Series compressor is possibly infringing upon Thomas' patent. The Thomas design is a continuation of a design submitted in 1996 and reapplied for in November 1998. Even though our 75R patent application was filed in February 1998, the patent examiner working with Thomas documented that the one piece head design was part of the original application.

On July 13, 2000, defendant's attorney advised plaintiff's attorney that he understood that defendant "has stopped making and selling pumps having monolithic heads for all customers." On August 29, 2000, defendant provided plaintiff's counsel written confirmation that it had stopped making and selling pumps having monolithic heads for two-cylinder compressors and that it had no plans to resume production of such heads or to attack the '521 patent. Following defendant's August 2000 correspondence, plaintiff dismissed its patent infringement complaint without prejudice. Defendant thereafter introduced a modified, redesigned 75R product that did not contain a monolithic head. Plaintiff does not contend that the new 75R product infringes the '521 patent.

OPINION

A. Claim Construction

Before addressing questions of infringement, a court must first construe the claim

terms of the patent, because infringement hinges on whether every limitation recited in the properly construed claim either is or is not found in the accused device. Chimie v. PPG Industries, Inc., 402 F.3d 1371, 1376 (Fed. Cir. 2005). "Courts construe claim terms in order to assign a fixed, unambiguous, legally operative meaning to the claim." Id. at 1377. "Claim construction begins with the intrinsic evidence of the record, looking first to the claim language itself to define the scope of the patented invention." Id. (citing Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)). If the claim language is too unclear to allow the court to ascertain the scope of the claims, a court may look to the written description for guidance. Chimie, 402 F.3d at 1376 (specification acts as dictionary when it expressly defines terms used in claims or when it defines terms by implication); see also AstraZeneca AB v. Mutual Pharmaceutical Company, Inc., 384 F.3d 1333, 1336 (Fed. Cir. 2004) (primary source for determining claim meaning is specification, including inventors' statutorily-required written description of invention). Finally, when the prosecution history is in the record, a court may refer to it to "discern the applicant's express acquiescence with or distinction of the prior art as further indication of the scope of the claims." Chimie, 402 F.3d at 1377 (citing Liquid Dynamics Corp. v. Vaughan Co., 355 F.3d 1361, 1368 (Fed. Cir. 2004)). Evidence extrinsic to the patent document, such as dictionaries, "'can shed useful light on the relevant art,' but is less significant than the intrinsic record in determining the 'legally operative meaning of the disputed claim

language.'" C.R. Bard, Inc. v. United States Surgical Corp., 388 F.3d 858, 862-63 n.2 (Fed. Cir. 2004) (noting that court may be about to resolve question of precise relationship among ordinary and customary meaning, dictionary definitions and intrinsic record in Phillips v. AWH Corp., 376 F.3d 1382 (Fed. Cir. 2004) (granting petition for en banc rehearing to address law of claim construction)).

The parties' dispute involves only two claim terms: "monolithically formed head" and "head members." Both parties appear to agree that the term "monolithic" means "cast as a single piece," as defined in Merriam Webster's Collegiate Dictionary. Dft.'s Reply to Plt.'s Resp. to Dft.'s PFOF, dkt. #42, ¶109. The language in claim 1 requires the "monolithically formed head" to be common to both cylinder housings and to include the "head members" and tube "so that the tube is joined to each head member with a fluid tight and fixed rigid connection." I understand the parties to use the term "head member" interchangeably with the term "cylinder head," and that the head member in combination with the tube forms the "monolithically formed head" in the '521 patent. It is undisputed that in the type of compressor technology at issue, a "cylinder head" with inlet and exhaust chambers is mounted on each cylinder and provides inlet and outlet chambers to the cylinders. It is undisputed also that to be operational, the portion of the compressor above the cylinder must: 1) communicate with the cylinder while enclosing the cylinder on its top; 2) provide inlet and exhaust chambers; and 3) close the chambers on top. Therefore, in order for the

compressor to work correctly, the chambers inside the "cylinder head" must be closed, presumably with a "cover" or "cap." However, because of the need to open up the upper portion of the compressor for maintenance, the entire portion above the cylinder cannot be monolithically formed. There must be at least one separate piece in the upper portion of the compressor; it may be the "cover" that sits on top of the chamber portion of the compressor or it may be the bottom portion upon which the chamber portion rests. The crucial question is whether the term "head member" as used in the '521 patent includes a "cover" over the top of the inlet and exhaust chambers as part of the monolithic formation, as shown in the preferred embodiment of the '521 patent, or whether the '521 patent encompasses something more than the preferred embodiment. According to plaintiff, the head member of the monolithically formed head does not include a cover or cap over the inlet and exhaust chambers. Plaintiff would define "monolithically formed head" as "A portion of a pump including head members and a tube, wherein the head members and the tube are formed into a single piece of continuous material."

Defendant asserts and plaintiff does not deny that defendant's proposed definition of "monolithically formed head" encompasses the concept of a cover over the head members. Defendant would define "monolithically formed head" as "a single piece of continuous material comprising the uppermost part of a compressor that includes head members completing the inlet and exhaust chambers."

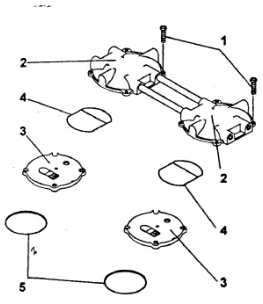
The question is whether the '521 patent requires the "head" to have a cover over the inlet and exhaust chambers as part of its monolithic formation, as defendant argues, or whether the chambers in the "head member" could be covered by a *separate piece* on top. In plaintiff's view, the preferred embodiment in the '521 patent shows a mere design choice, that is, a cover formed monolithically with the inlet and exhaust chamber portions of the head members. It contends that the "monolithic" term of the '521 patent refers to the improvement over the prior art that makes the tubes and chamber portions of the head member one piece, instead of separately manufactured and fastened tubes and chamber portions of the compressor. The crux of plaintiff's argument is that the '521 patent did not explain whether the inlet and exhaust chambers were to be enclosed by a *separate* cover or cap or by a cover *monolithically formed* with the chamber portions because the different ways of doing so were well known in the art at the time the '521 patent was issued. Plaintiff limits the term "head member" to a portion of a compressor "in fluid communication with a cylinder that provides cavities or chambers which *when enclosed* facilitate or permit the flow of gases (air or liquid) into the cylinder and out from the cylinder to another head member or other desired location." Plt.'s Br., dkt. #27, at 8 (emphasis added).

Resolving this question requires review of the '521 patent's preamble to claim 1, written description and prosecution history.

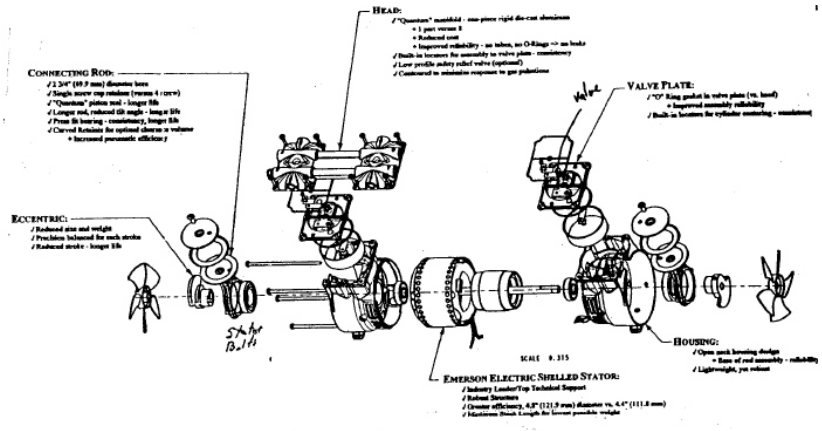
1. Preamble

Both parties agree that claim 1 of the '521 patent is written in Jepson format, which means that the claim contains a preamble describing the prior art and a subsequent portion that describes a claimed improvement made on the prior art. When a patentee employs a Jepson format, "the claim preamble defines not only the context of the claimed invention, but also its scope." Rowe v. Dror, 112 F.3d 473, 479 (Fed. Cir. 1997). Moreover, the application that resulted in the '521 patent was a continuation-in-part of the 1996 application and the patent examiner cited the Thomas 2619 compressor as a basis for rejecting the 1996 application. Furthermore, the background section of the '521 patent cites plaintiff's 2600 series of compressors as examples of two-cylinder, in-line compressors and the '521 patent relates to an improved version of those compressors. '521 pat., col.1 lns. 9-10, 34-36. Therefore, defendant argues, one should read the term "head member" in the preamble consistently with its use in the Thomas 2619 compressor.

It is undisputed that the head of the Thomas 2619 compressor appears as follows:



Plt.'s PFOF, dkt. #25, exh. 14, at 12. It is undisputed also that parts 2 are "heads." The picture shows that the heads include covers over the chamber portions, making the covers monolithically-formed as part of the heads. In addition, the illustration of plaintiff's 2650 model compressor shows a cover formed monolithically with the head, as shown below:



Plt.'s Resp. to Dft.'s PFOF, dkt. #37, exh. 47. Taking into consideration the facts that the preamble defines the scope of claim 1 and the patent examiner and '521 patent specified as prior art plaintiff's 2600 series of compressors, which had covers formed monolithically with the head, one could conclude that the applicant assumed in the preamble that the improved version claimed in the '521 patent would also have a cover formed monolithically with the head. Defendant's proposed definition for "monolithically formed head" includes the function of a cover by describing the head as a component that completes the inlet and exhaust chambers. However, unlike plaintiff's proposed definition, defendant's definition

does not specify the tube that joins the head members as part of the monolithic formation. Claim 1 of the '521 patent requires the monolithically formed head to include both the head members and tube. Therefore, any definition of the monolithically formed head would have to specify both the head members and tube.

2. Written description

Although the written description in the patent does not mention the term "monolithically formed head," the parties seem to agree that it refers to synonymous terms like "one-piece cylinder head" or "one-piece head." Plt.'s Br., dkt. #35, at 22; Dft.'s Br., dkt. #20, at 16. Defendant argues that the language in the written description supports its definition of "monolithically formed head" because 1) the abstract of the '521 patent states that the "one-piece cylinder head serves as the *final retention member*, clamping the housings axially while maintaining radial orientation" (emphasis added); 2) the figures in the '521 patent show the head attached as the final and uppermost part in the compressor; and 3) the '521 patent specification states that the "assembly [of the compressor] *is complete* by joining the two housings 14*a* and 14*b* with the one-piece head." '521 pat., col. 5, lns. 58-59 (emphasis added). Plaintiff notes that having the head as the final retention member does not rule out the possibility that the patent encompasses products with a separate cover for the head. In fact, according to plaintiff, the language in the abstract supports the idea that

a separate cover would not act as the final retention member because a cover could not clamp the housings and maintain them in a fixed orientation. Plt.'s Br., dkt. #35, at 22.

Plaintiff is correct when it argues that the phrase "final retention member" would not necessarily rule out a head member with a separate cover. However, when this term is read together with other language in the written description, the '521 patent appears to limit the head members as including a cover in their monolithic formation. Plaintiff notes that the intrinsic evidence does not expressly limit the '521 patent to the preferred embodiment and that it is legal error to do so. The patent does not mention the need for a cover. According to plaintiff, this omission means that the '521 patent encompasses different methods of enclosing the chambers. Citing Teleflex, Inc. v. Ficosa North America Corp., 299 F.3d 1313, 1327 (Fed. Cir. 2002), plaintiff argues that an invention should not be limited to the preferred embodiment unless the specification or prosecution history includes "an expression of manifest exclusion or restriction demonstrating an intent" to impose such a limitation. Plaintiff fails to mention that in Teleflex the court added that "[w]hether an invention is fairly claimed more broadly than the 'preferred embodiment' in the specification is a question specific to the content of the specification, the context in which the embodiment is described, the prosecution history, and if appropriate the prior art . . ." Id. For example, in Bell Atlantic Network Services, Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1273 (Fed. Cir. 2001), the court found that because the patentees used the word

"mode" consistently throughout the patent specification, they limited the word by implication. In the '521 patent, plaintiff uses the word "head" and "head member" to imply that a cover is already part of the head. Every figure shows a cover formed monolithically with the head. The specification states that the assembly is *complete* when the two housings are joined with the one-piece head. Indeed, it is undisputed that the compressor will not work unless the chambers are closed by something. Nothing in the written description suggests that the patented invention may require a separate cover for the head. It is logical to assume that if the '521 patent contemplated a head that required a separate cover for operation, the patent would disclose the need for such a cover somewhere. See, e.g., 3 Donald S. Chisum, Chisum on Patents § 7.03 (2000) ("Since 1790, the patent laws have required that the inventor set forth in a patent specification sufficient information to enable a person skilled in the relevant art to *make* and *use* the invention.") (Emphasis added.)

3. Prosecution history

The prosecution history of the '521 patent provides additional support for the limitation that the cover is formed monolithically with the head. Plaintiff states that neither the prosecution history nor the language in the patent discusses covers or any methods to enclose the inlet and exhaust chambers but focuses instead on the way the tubes connect the chamber portions in one continuous piece of material. However, defendant points out that

there was no need to discuss covers for the inlet and exhaust chambers because that function was performed by the monolithically formed head. It is undisputed that the patent examiner cited the Thomas 2619 compressor as a basis for rejecting both the 1996 and 1998 applications and that the 2619 compressor had a cover formed monolithically with the head. It is undisputed that plaintiff called the cover formed monolithically with the head in the 2619 compressor a "head" and that the patent examiner referred to these "separate heads" and tubes in the 2619 compressor as indistinguishable from the proposed invention in the 1996 application. The patent examiner's use of the word "head" in reference to a part that included a cover as part of the monolithic formation helps define the term as it is used in the '521 patent. See, e.g., Chimie, 402 F.3d at 1380-81 (prosecution history can and should be used to understand language used in claims) (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 980 (Fed. Cir. 1995)).

Because the intrinsic evidence, including the preamble, written description and prosecution history, supports defendant's argument that a "monolithically formed head" includes a cover, I am persuaded to include that part in defining the term. Plaintiff's argument that extrinsic evidence supports adoption of its proposed definition is not persuasive. Plaintiff cites three types of extrinsic evidence to give the claim terms meaning as they would be understood by persons in the field of invention: 1) prior art not cited in the patent or during prosecution; 2) expert testimony; and 3) technical dictionaries, especially

as those dictionaries help to define the term "cylinder head." "[I]ntrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." Vanderland Industries Nederland v. International Trade Commission, 366 F.3d 1311, 1322 (Fed. Cir. 2004). Prior art not cited in the patent and expert testimony holds little value when compared to intrinsic evidence.

Even if I considered plaintiff's proposed definition for "cylinder head," a term that the '521 patentees use throughout the specification and plaintiff defines as "The *cap* that serves to close the end of the piston chamber of a reciprocating engine, pump or compressor," The McGraw-Hill Dictionary of Scientific and Technical Terms, (6th ed. 2003) at 538 (emphasis added), I would still include the concept of a cover in the definition for "monolithically formed head." According to Webster's New World College Dictionary (4th ed. 2001) at 216, a "cap" is a "cover or top." Similarly, The Oxford English Dictionary Online defines "cap" as "a cap-like covering; a cover or case." Both the intrinsic and extrinsic evidence support the inference that the monolithically formed head in the '521 patent includes a cover, which would be the uppermost portion of the compressor and would complete the inlet and exhaust chambers. Therefore, I will adopt the language of defendant's proposed definition for "monolithically formed head" that the head members complete the inlet and exhaust chambers of the compressor; in other words, they act as covers. However, I will add language to the definition that specifies that the tube is also part of the

monolithically formed head. The resulting definition of "monolithically formed head" is: "A single piece of continuous material comprising the uppermost part of a compressor that includes head members that complete the inlet and exhaust chambers and a tube."

B. Infringement

Once claim construction is complete, an infringement analysis requires "a comparison of the properly construed claims with the allegedly infringing device or method to determine whether the device or method embodies every limitation in the claims." IMS Technology, Inc. v. Haas Automation, Inc., 206 F.3d 1422, 1429 (Fed. Cir. 2000). Whether infringement of an accused product occurs either literally or under the doctrine of equivalents is a question of fact, id.; because it is, summary judgment can be granted only if the court finds that no reasonable jury could find in favor of the party asserting infringement.

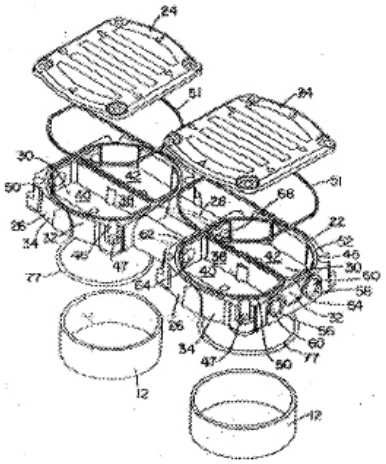
1. Literal infringement

"To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." Southwall Technologies v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed. Cir. 1995); see also Allen Engineering Corp. v. Bartell Industries, Inc., 299 F.3d 1336, 1345 (Fed. Cir. 2002) ("Literal infringement of a claim exists when each of the claim

limitations 'reads on,' or in other words is found in, the accused device.").

Plaintiff argues that defendant's original 75R and 82R compressors literally infringe claim 1 of the '521 patent. Defendant admits that its original 75R compressor infringed the '521 patent and that it voluntarily ceased making the 75R compressor within weeks after plaintiff's '521 patent issued in May 2000. I will address infringement only as it relates to defendant's 82R compressor and discuss the status of defendant's 75R compressor in section C, below.

It is undisputed that 82R compressor is a two-cylinder air compressor with reciprocating pistons, that it uses covers as the uppermost part of the compressor and the covers are not formed monolithically with a section spanning them. Also, it is undisputed that the 82R compressor is embodied in defendant's '845 patent. According to Fig. 2 of the '845 patent, the covers, parts 24, rest on top of the one-piece valve plate, part 22, which creates the chamber portions of the compressor, part 32:



'845 pat., Fig. 2. Because I have construed the claim 1 term "monolithically formed head" as "a single piece of continuous material comprising the uppermost part of a compressor that includes head members that complete the inlet and exhaust chambers and a tube," because the chambers must be covered to be complete and because the covers on the 82R compressor are not part of a "single piece of continuous material," I conclude that no reasonable jury could find that defendant's 82R compressor infringes the '521 patent literally.

2. Doctrine of equivalents

Under the doctrine of equivalents, "a product or process that does not literally infringe upon the express terms of a patent claim may nonetheless be found to infringe if there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." Warner-Jenkinson Co. v. Hilton Davis Chemicals Co., 520 U.S. 17, 21 (1997). The doctrine requires plaintiff to demonstrate more than a broad, overall equivalence between an accused product and a patented invention. Rather, "[e]ach element contained in a patent claim is deemed material to defining the scope of a patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole." Id. at 29. "An element in the accused product is equivalent to a claim limitation if the differences between the two are 'insubstantial' to one of ordinary skill in the art. Insubstantiality may be [established by

showing that] the accused device 'performs substantially the same function in substantially the same way to obtain the same result' as the claim limitation." Catalina Marketing Int'l v. Coolsavings.com, Inc., 289 F.3d 801, 812-13 (Fed. Cir. 2002) (citations omitted).

The doctrine of equivalents exists to insure fairness to both patent holders and competitors. Limiting the scope of a patent claim to its literal meaning could allow others to escape from liability for patent infringement on the most technical grounds. In light of language's inability to "capture the essence" of innovation, it is sometimes necessary to go beyond the literal meaning of a claim's terms to determine whether a patent has been infringed. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 535 U.S. 722, 731-33 (2002). At the same time, the doctrine of equivalents is not to be applied so liberally that it traps competitors who believed reasonably that they were acting lawfully. Charles Greiner & Co., Inc. v. Mari-Med Manufacturing, Inc., 962 F.2d 1031 (Fed. Cir. 1992) ("[C]areful confinement of the doctrine of equivalents to its proper equitable role . . . promotes certainty and clarity in determining the scope of patent rights.").

Defendant contends that its 82R compressor does not infringe the '521 patent under the doctrine of equivalents because the claims in the '521 patent do not encompass head assemblies formed from separate components and because the same examiner from the '521 patent prosecution history reviewed the design set forth in the '845 patent and concluded that the two designs were patentably different. It is undisputed that the 82R compressor has

covers separate from the one-piece valve plate, as shown in Fig. 2 of the '845 patent, supra, and that the one-piece valve plate, part 22, includes the chamber portion, part 32.

It is undisputed that the monolithic head design of the '521 patent was a key improvement over the prior art. In his Notice of Allowability of the '521 patent, the patent examiner noted that the monolithically formed head element of claim 16, which became claim 1 of the '521 patent, was patently distinguishable from the prior art. It is undisputed also that in order for the compressor to work, the chambers inside the "cylinder head" must be closed. No reasonable juror could find that the chamber portions of the 82R compressor's cylinder heads are enclosed in substantially the same way as the inventor claimed the enclosure of the chamber portions in the '521 patent.

Moreover, as defendant points out, the same patent examiner from the '521 patent concluded that the invention set forth in the '845 patent was patentably different. Michael K. Gray was a patent examiner on both the 1998 application for the '521 patent and the '845 patent and considered the '521 patent as prior art during the prosecution of the '845 patent. Although plaintiff is correct that separate patentability does not eliminate the possibility of infringement, it is entitled to weight. National Presto Industries, Inc. v. West Bend Co., 76 F.3d 1185, 1192 (Fed. Cir. 1996) ("The fact of separate patentability is relevant, and is entitled to due weight.") No reasonable jury could find that defendant's 82R compressor is not substantially different from the invention covered by the '521 patent.

Therefore, I conclude that defendant's 82R compressor does not infringe the '521 patent under the doctrine of equivalents. Defendant's motion for summary judgment will be granted as to plaintiff's infringement claim. Given the finding of no infringement, it is unnecessary to consider defendant's argument of the invalidity of the '521 patent. Phonometrics, Inc. v. Northern Telecom Inc., 133 F.3d 1459, 1468 (Fed. Cir. 1998) (district court has discretion to dismiss counterclaims of patent invalidity and unenforceability as moot where it finds no infringement).

C. Defendant's 75R Compressor

With the conclusion that defendant's 82R compressor does not infringe the '521 patent, the only issue remaining is the status of defendant's 75R compressor. Plaintiff has moved for summary judgment with respect to literal infringement of the '521 patent by the 75R compressor and to defendant's laches and equitable estoppel defenses. In a footnote, defendant expresses confusion why plaintiff continues to litigate issues relating to its original 75R compressor when defendant has not sold any of those compressors since mid-2000 and plaintiff seeks no damages for the minimal sales of the compressor in 2000. Defendant contends that a request for an injunction is moot. In response, plaintiff agrees that defendant stopped making and selling the original 75R compressor, but that defendant's introduction of the 82R compressor was the effective resumption of production of a

compressor with a monolithic head. It is undisputed that defendant voluntarily ceased making the 75R compressor within weeks after plaintiff's '521 patent issued in May 2000 and that on August 29, 2000, defendant provided plaintiff with written confirmation that it would no longer make and sell pumps having monolithic heads for two cylinder compressors and that it had no plans to resume production of such heads or to attack the '521 patent. Following defendant's August 2000 correspondence, plaintiff dismissed its patent infringement complaint without prejudice. It is undisputed also that defendant thereafter introduced a modified, redesigned 75R product that did not contain a monolithic head and did not infringe the '521 patent.

A federal court cannot exercise subject matter jurisdiction over a claim unless the litigant asserting the claim has suffered or is threatened with an actual injury for which the defendant is responsible and which can be redressed by a favorable decision. Lewis v. Continental Bank Corp., 494 U.S. 472, 477 (1990). When the relief sought would no longer make a difference to the legal interests of the parties, a case or relevant portion thereof becomes moot. De Funis v. Odegaard, 416 U.S. 312, 319-20 (1974); Gray v. Dane County, 854 F.2d 179, 185 (7th Cir. 1988) (citing "the familiar proposition that 'federal courts are without power to decide questions that cannot affect the rights of litigants in the case before them'"). Given the parties' agreement that defendant no longer makes or sells the original 75R compressor and that the redesigned 75R compressor does not infringe the

'521 patent, there is no case or controversy regarding plaintiff's claim that the 75R compressor infringes the '521 patent. Therefore, I will deny as moot plaintiff's motions for summary judgment regarding its claim of infringement against defendant's 75R compressor and regarding defendant's equitable estoppel and laches affirmative defenses.

ORDER

IT IS ORDERED that

1. Defendant Gast Manufacturing, Inc.'s motion for summary judgment is GRANTED and plaintiff Thomas Industries, Inc.'s motion for summary judgment is DENIED with respect to plaintiff's claim that defendant's 82R and 75R compressors infringe the '521 patent;

2. Plaintiff's motion for summary judgment with respect to defendant's affirmative defenses of laches and equitable estoppel is DENIED as moot;

3. The clerk of court is directed to enter judgment in favor of defendant and close this case.

Entered this 14th day of June, 2005.

BY THE COURT:
/s/
BARBARA B. CRABB
District Judge