United States District Court,
D. Colorado.

BAXA CORPORATION, a Colorado corporation,
Plaintiff.
v.
McGAW, INC., a Delaware corporation, Excelsior Medical Corporation, a New Jersey corporation,
Defendants.
EXCELSIOR MEDICAL CORPORATION,
Plaintiff.
v.
BAXA CORPORATION, a Colorado corporation, and Brian E. Baldwin,
Defendants.

Oct. 14, 1997.

Patentee brought action for infringement of patent relating to peristaltic pumps and methods for calibrating such pumps. Competitor moved for summary judgment. The District Court, Babcock, J., held that patent was not infringed, either literally or under doctrine of equivalents.

Motion for summary judgment granted.

Patent relating to peristaltic pumps and methods for calibrating such pumps was not infringed under doctrine of equivalents by accused pumps; during prosecution, patentee had disclaimed literal reading of its claims that would have included all algebraically equivalent methods for calculating number of pump revolutions actually necessary to produce desired volume after calibration.

Brian D. Smith, Fields, Lewis, Rost & Smith, Denver, CO, Eric R. Jonsen, Tasker, Dupree & Jonsen, P.C., Westminster, CO, John R. Mann, Heather F. Shore, Kennedy & Christopher, P.C., Gregory C. Smith, Fairfield and Woods, P.C., Denver, CO, for Baxa Corp. and Baldwin.

Gretchen L. Aultman, Richard W. Daily, Burns, Wall, Smith & Mueller, Denver, CO, Theodore Arnold Pianko, William J. O'Brien, Christie, Parker & Hale, LLP, Pasadena, CA, for McGraw Corp.

Stanley L. Garnett, Terence S. Gill, Brownstein, Hyatt, Farber & Strickland, P.C., Denver, CO, for Excelsior Medical Corp.

MEMORANDUM OPINION & ORDER

BABCOCK**, District Judge.**

Plaintiff, Baxa Corporation (Baxa), asserts claims for infringement of United States Patent No. 5,024,347

('347 patent) against defendants, McGaw, Inc. and Excelsior Medical Corporation (McGaw and Excelsior, respectively). Defendants plead the affirmative defense of noninfringement and move for summary judgment on that basis. Pursuant to Markman v. Westview Instruments, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), I held a hearing on August 25-26, 1997, and permitted the parties to submit briefs addressing interpretation of the claims in question. Having the benefit of the Markman hearing to construe properly the claims in question, and for the following reasons, I will grant defendants' motion for summary judgment of noninfringement.

The very purpose of a summary judgment motion is to assess whether trial is necessary. White v. York Int'l Corp., 45 F.3d 357, 360 (10th Cir.1995). Fed.R.Civ.P. 56 provides that summary judgment shall be granted if the pleadings, depositions, answers to interrogatories, admissions, or affidavits show that there is no genuine issue of material fact and the moving party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c). The nonmoving party has the burden of showing that there are issues of material fact to be determined. Celotex Corp. v. Catrett, 477 U.S. 317, 322, 106 S.Ct. 2548, 2552, 91 L.Ed.2d 265 (1986).

[1] Determining whether a patent claim has been infringed is a two-step process: "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." Carroll Touch, Inc. v. Electro Mechanical Sys., Inc., 15 F.3d 1573, 1576 (Fed.Cir.1993). To provide context for this analysis, I will describe generally plaintiff's invention and a key piece of prior art. I will then construe the claims at issue. Finally, I will compare the properly construed claims to defendants products. I conclude that neither defendant's products infringe the '347 patent.

I. ***General Explanation of Plaintiff's Invention and the "Wolff Patent"***

Before addressing the specific claim language at issue, I will generally describe: (1) the preferred embodiment of plaintiff's method as detailed in the written description of the '347 patent; and (2) the method described in United States Patent No. 4,715,786, issued to Wolff et. al.

A. ***Plaintiff's Method***

The '347 patent relates generally to the field of peristaltic pumps and methods for calibrating such pumps. Peristaltic pumps are well-suited for dispensing liquids in a pharmacy setting, and plaintiff and defendants are all competitors, marketing such pumps to pharmacies. Generally, a peristaltic pump has a rotor that carries rollers in a circular path. The rollers compress disposable, flexible tubing that is threaded between the rollers and the "race "-a semi-circular outer housing of the pump. As a roller is moved circularly by the rotor, compressing the tubing against the race, it forces liquid in the tubing to move ahead of it, and the compression of the tubing pulls more fluid through the tubing behind the roller.

The rotor may be controlled by a variety of mechanisms, including a stepping motor or a digitally incremental motor. The amount of rotor rotation may be expressed in several different units: rotations, steps of a stepping motor, pulses sent to a digitally incremental motor, etc. The volume output by the pump is almost exactly proportional to the amount of rotation of the rotor. Because of this proportionality, it is possible to pump a highly accurate volume of liquid, which makes peristaltic pumps ideal for pharmacy use.

The pump must be properly calibrated to achieve high accuracy. Hence, the pump must be capable of accurately calculating the number of rotor rotations necessary to pump a specified volume. Several variables can affect the volume of liquid per rotation that the pump will dispense, including: speed of rotation,

viscosity of the liquid, size of the tubing, etc. Therefore, ideally the user of a pump should be able to calibrate the pump under the exact conditions the pump will be used. Plaintiff's invention and defendants' products accomplish that goal.

Generally, plaintiff calibrates its pump by first attempting to pump a desired test volume based on an assumed calibration value. Pursuant to plaintiff's method, the amount of fluid actually dispensed during the test is compared to the desired test volume and that ratio is used to calculate the number of pump rotations necessary to dispense a subsequently desired volume. Plaintiff's method is best expressed mathematically by reference to several variables, which I will define.

As the parties are inconsistent in their use of abbreviations for variables, I will use the following abbreviations throughout this order:

n = assumed calibration factor in terms of (# pump rev's/volume). For example, if n=2 rev's/ml, then it is assumed that 2 pump revolutions will produce one ml of liquid.

Vdt = volume desired to be dispensed for the calibration test.

Rt = # of pump revolutions estimated to be necessary to produce Vdt, the desired test volume. This is determined by multiplying n x Vdt, and it may also be expressed as a number of steps of a stepping motor or a number of pulses sent to a digitally incremental motor.

Vmt = volume of liquid actually measured to have been dispensed during the test through rotation of the pump Rt times in an effort to dispense Vdt of liquid.

Vd = volume desired to be dispensed after calibration.

Rass = # of pump revolutions that would be assumed to be necessary to produce Vd using only the original calibration factor, n. This is equal to n x Vd.

Rd = # of pump revolutions actually necessary to produce Vd after calibration.

In general, the written description of the '347 patent teaches the following three steps for calibration:

Step 1: Dispense a certain volume of liquid, Vdt, to be used as a test volume for the calibration of the machine. This is done by estimating the number of pump revolutions, Rt, necessary to produce Vdt. Rt = n x Vdt, where n is an assumed calibration factor, which may be set at the factory. The pump is then actuated through the number of revolutions equal to Rt in an effort to dispense Vdt. If the pump is perfectly calibrated by n, Vdt will be dispensed.

Step 2: Measure the volume of liquid actually dispensed, Vmt. The ' 347 patent does not specify how this is done, but there are a number of methods that would be apparent to one skilled in the art, including manual measurement, weighing the liquid and determining the volume based on the specific gravity of the liquid, etc. Presumably the user must enter Vmt into the machine, but the patent is not specific, and the machine itself could measure the actual volume dispensed.

Step 3 : The user determines how much volume, Vd, she actually wants to dispense. The machine calculates

how many revolutions are assumed to be necessary to dispense Vd based only on the original calibration factor, n. This is value Rass, and is determined by multiplying Vd x n. Then, the machine applies an adjustment factor, which equals Vdt/Vmt. This adjustment factor is intended to account for the inaccuracy of the original assumed calibration factor, n. The machine multiplies Vdt/Vmt x Rass to determine Rd, the exact number of revolutions actually necessary to dispense Vd.

The following is a concrete example of how plaintiffs method works: Assume that the assumed calibration factor, n, provided by the factory is equal to 200rev./100 ml. The user wants to calibrate the machine using a 100 ml test sample, and eventually wants to pump 1,000 ml of fluid. The user enters 100 ml into the machine as the desired test sample, Vdt. The computer within the machine calculates that to pump 100 ml, it needs to actuate through n x Vdt, or 200rev/100ml x 100ml = 200 revolutions, Rt.

The pump performs 200 revolutions and dispenses an actual volume, Vmt, which I will assume equals 50 ml. The user measures Vmt, and enters 50 ml into the machine's computer. The computer then calculates an "adjustment factor" of Vdt/Vmt = 100ml/50ml = 2.

Next, the user enters into the machine the volume of liquid she wishes to dispense, Vd, which in this case is 1,000 ml. The computer calculates the number of revolutions, Rass, it would assume to be required for a 1,000 ml dispensing based only on the factory-provided calibration factor, n. In this case, Rass would equal n x Vd or 200rev/100ml x 1,000ml = 2,000 revolutions. The computer would then apply the adjustment factor to Rass: 2,000 revolutions x 2 = 4,000 revolutions. Rd would then equal 4,000 revolutions and the pump, through that number of revolutions, would dispense the desired volume Vd = 1,000 ml.

B. *The Wolff Patent*

During the prosecution of the '347 patent, plaintiff made remarks to the examiner distinguishing the Wolff patent. Accordingly, the Wolff patent is relevant to my interpretation of the claims of the '347 patent. *See* Biodex Corp. v. Loredan Biomedical, Inc., 946 F.2d 850, 862 (Fed.Cir.1991), *cert. denied,* 504 U.S. 980, 112 S.Ct. 2957, 119 L.Ed.2d 579 (1992). Wolff's invention is similar to plaintiff's, except it does not employ an assumed calibration factor during calibration testing. Generally, the Wolff patent teaches the following three steps:

Step 1: With the machine in calibration mode, the user pushes start and the machine begins dispensing liquid into a receptacle. During step 1, the pump measures its revolutions. When a measurable amount has been dispensed, the user pushes stop.

Step 2: The user measures the amount of liquid actually dispensed, Vmt above, by any of the methods described in step 2 above. The user enters this amount into the machine.

Step 3: The machine determines a calibration factor based on the volume, Vmt, measured and entered by the user and the number of revolutions, Rmt, the pump measured while the test volume was being dispensed. From then forward, when the user enters a desired volume Vd to be dispensed, the machine calculates the number of revolutions necessary to dispense Vd, by multiplying (Rmt/Vdt) x Vd = Rd.

As another concrete example, assume again that the user eventually wants to pump 1,000 ml of liquid. The user puts the Wolff machine into calibration mode and pushes start. The pump begins dispensing fluid into a receptacle, and the machine keeps track of how many revolutions it is making. When the receptacle has a

measurable amount of fluid in it, the user pushes stop. The machine then notes the number of revolutions, Rmt, it has made during calibration, which I will assume to be 200 revolutions. The user then measures the amount of fluid dispensed, Vmt, assumed now to be 50 ml. She enters that number into the machine, which uses Vmt to calculate a new calibration factor. The new calibration factor equals Rmt/Vmt or 200 revolutions/50 ml.

The user then puts the machine back into dispensing mode and enters the desired volume, Vd, which I have assumed equals 1,000 ml. The machine then calculates the number of revolutions, Rd, necessary to pump Vd by multiplying Vd by the calibration factor: Rd = Vd x Rmt/Vmt = 1,000 ml x 200rev./50ml = 4,000 revolutions.

II. ***Construction of the Claims at Issue***

Baxa contends defendants infringe independent claims 1, 11, 14, and 19 and dependent claims 2 and 12 of the '347 patent. Independent claims 1, 11, and 14 are method claims that recite, in varying forms, the three basic steps outlined above. Claim 19 is a means-plus-function claim in which the claimed "functions" correspond to the three basic method steps outlined above.

[2] The parties have now identified the areas of the claims about which they disagree. Because the independent claims include similar and sometimes identical elements, I can construe the claims in parallel when addressing each area of dispute. In general, to construe a claim limitation, I look to the claim language, the written description, the prosecution history, and, if necessary, extrinsic evidence. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582-83 (Fed.Cir.1996).

A. " ***STEP 3*** **"**

The parties' dispute is focused mainly on the meaning of the language used to describe "step 3" in each independent claim. For comparison, the relevant portions of each independent claim relating to step 3 are as follows:

Claim 1:

applying an adjustment factor to the amount of pump activity which would be calculated to be required based on said assumed calibration factor, for further pumping activity at the same given pump speed to effect selected further pumped output quantity production, said adjustment factor when applied as a multiplier being equal to the ratio of said first selected output quantity of fluid pumped relative to said measured actual output quantity of fluid pumped, for further pumping of a said selected further output quantity.

Claim 11:

applying an adjustment factor to the amount of pump activity which would be calculated to be required based on said assumed calibration factor, for further pumping activity at the same given pump speed to effect selected further pumped output quantity production,

said adjustment factor when applied as a multiplier being equal to the ratio of said first selected output quantity of fluid pumped relative to said measured actual output quantity of fluid pumped as a result of said estimated number of increments of actuation of said pump, for further pumping of a said selected further

pumped output quantity,

and subsequently pumping a selected output quantity of said given fluid through said conduit by actuating said pump at the same given pump speed through a number of increments equal to the product of said estimated quantity of increments corresponding to said selected output quantity multiplied by said adjustment factor.

Claim 14:

subsequently pulsing said stepping motor-actuated pump at the same given pump speed for outputting any selected user quantity of said given fluid through said conduit by pulsing said stepping motor-actuated pump a number of pulses equal to the product of said selected user quantity of fluid multiplied by said first ratio and by a further second corrective adjustment factor which is the ratio formed by said first desired output quantity divided by said measured actual first output quantity.

Claim 19:

means for subsequently pulsing said digital pulse-actuated pump at the same given pump speed for outputting any selected user quantity of said given fluid through said conduit by pulsing said digital pulse actuated pump at the same given pump speed through a number of pulses equal to the product of said selected user quantity of fluid multiplied by said first ratio and by a further second corrective adjustment factor which is the ratio formed by said first desired output quantity divided by an actual first output quantity from said pump when said pump is actuated a number of pulses equal to said product of said desired quantity multiplied by said first ratio.

There are two central questions as to the meaning of the term "adjustment factor" used in step 3 of all four independent claims: (1) Does "adjustment factor" necessarily mean Vdt/Vmt precisely?; and (2) Must the adjustment factor be "applied" by "multiplying" the adjustment factor by Rass? The analysis of these two questions varies slightly depending on the independent claim, but the answers remain constant for each independent claim: (1) the term "adjustment factor" as used in the claims is limited to Vdt/Vmt; and (2) each claim requires the adjustment factor to be multiplied by Rass.

Plaintiff argues that all four independent claims can be construed to encompass any method or apparatus employing steps that are algebraically equivalent to the specific method and apparatus disclosed in the '347 patent-i.e., where Vdt/Vmt is used as a multiplier. The claim language, specification, and prosecution history demonstrate, however,that the independent claims of the '347 patent cannot be read so broadly.

[3] *Claim 1* requires "applying an adjustment factor to the amount of pump activity which would be calculated to be required based on said assumed calibration factor [i.e., Rass] ... said adjustment factor when applied as a multiplier being equal to ... [Vdt/Vmt]." It would appear from a plain reading of the claim that "applying" could be construed as a broader term than "multiplying" and that the claim defines the exact value of the adjustment factor only "when used as a multiplier." For example, a fair reading of the plain language of this claim could encompass the situation where the "adjustment factor" equals Vmt/Vdt (inverse of Vdt/Vmt) and "applying" constitutes dividing the adjustment factor into Rass. Recall that Rass is the assumed number of rotations necessary to dispense Vd based solely on the original calibration factor, n.

[4] Defendants argue, however, that the specification and prosecution history demand that "apply" means

"multiply" and "adjustment factor" means "Vdt/Vmt." The specification refers consistently to the "adjustment factor" as being used as a "multiplier." Col.5, 11. 1-4; Fig. 1, items 85,91. In addition, several references in the specification refer to the "adjustment factor" as "Vd/Vm," which I have labeled "Vdt/Vmt." Id.; Col. 2, 11. 19-22; Col. 4, 11.53-56. I am not persuaded that this alone narrows the scope of the claim, however. Although I may use the specification as a dictionary to explain the terms of the claims, I may not read in limitations from the specification not present in the claims. E.I. du Pont de Nemours & Co. v. Phillips Petroleum, 849 F.2d 1430, 1433 (Fed.Cir.), cert. *denied* 488 U.S. 986, 109 S.Ct. 542, 102 L.Ed.2d 572 (1988).

[5] [6] If I were required to review only the claim language and specification, I would agree with plaintiff. The prosecution history, however, must also be considered in determining the literal meaning of the claims. *Biodex, supra* at 862. Although the doctrine of prosecution history estoppel technically applies only to the doctrine of equivalents, a particular interpretation of claim language can be disclaimed during prosecution. *Id*. at 863 (citing ZMI Corp. v. Cardiac Resuscitator Corp., 844 F.2d 1576, 1580 (Fed.Cir.1988))("A disclaimer could be directed to interpretation."); *see also* Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 452 (Fed.Cir.1985) ("[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance."). Here, the prosecution history reveals that plaintiff disclaimed during prosecution the same broad reading of the independent claims it now seeks.

Plaintiff's arguments made in response to the first Office Action issued by the United States Patent and Trademark Office (PTO) are critical. The PTO originally rejected all of plaintiff's claims as either anticipated by the Wolff patent under 35 U.S.C. s. 102 or obvious in view of Wolff and two other patents under 35 U.S.C. s. 103. In response, plaintiff amended its claims and made several arguments pertinent here. Importantly, plaintiff's arguments in distinguishing Wolff and other prior art to the PTO were blanket arguments applicable to all independent claims. See First Resp. at p. 7 ("In Applicant's claimed apparatus and method invention, ..."). Plaintiff did not argue any nuances or differences among the independent claims.

In response to the PTO's first rejection, plaintiff explained its invention as follows:

In Applicant's claimed apparatus and method invention, a selected quantity of fluid is first attempted to be pumped by activating the pump an amount which is based on an assumed amount of pump activity per unit volume output. The pump output for this activity is then measured and an adjustment factor is then applied to what would be the amount of pump activity for a given desired volume output based on the previously assumed amount of pump activity per unit volume output. This adjustment factor is the ratio of the first selected volume of fluid output relative to the actual measured volume of fluid output. This single adjustment is applied once to the gross total amount of pump activity which would result from the original assumed amount of pump activity per unit volume output, and thus provides for a very high degree of accuracy in the total amount to be subsequently pumped.

First Resp. at p. 7. Consequently, plaintiff represented to the PTO without reservation that the "adjustment factor" appearing in every claim "is the ratio of the first selected volume of fluid output relative to the actual measured volume of fluid output," which is Vdt/Vmt. It follows then from the specification that the only way Vdt/Vmt can be "applied" to Rass to achieve the correct result is by multiplication.

Plaintiff argues that it should not be held to these express representations during prosecution because Wolff

is distinguishable on other grounds. It contends that it distinguished Wolff by arguing that Wolff did not perform step 1 of plaintiff's invention and, therefore, its statements regarding the adjustment factor should be ignored as mistaken or stray remarks. See First Resp. at pp. 7-8. I disagree.

The Federal Circuit has, under some circumstances, disregarded attorney statements made during prosecution when such statements were clearly mistaken. In Intervet America v. Kee-Vet Labs., 887 F.2d 1050, 1054 (Fed.Cir.1989), the court disregarded an undisputedly incorrect statement made by the patentee during prosecution that all of the independent claims had been amended to add a certain limitation. In fact, only one independent claim had been so amended. The court concluded, however, that the patent examiner had not been misled or deceived and rejected the district court's construction of the other independent claims that included the limitation. *Id*. Instead, the court concluded that the language of the claims should control and that the other independent claims should be read broadly. *Id*.

Intervet is not controlling here. Plaintiff's statements were not mistakes. Plaintiff argued that its claimed invention was distinguishable from Wolff based on both steps 1 and 3. For example, plaintiff stated that "Wolff does not make any assumption of pump activity per unit volume pumped, nor is any adjustment made to any such assumed value or amount, and *particularly the volume-desired/volume-measured ratio adjustment of Applicant's invention*. Wolff approaches the problems of accuracy in a *totally different manner*." First Resp. at p. 7 (emphasis added). Plaintiff then argued that " *nor does Wolff apply any adjustment to pump activity amount based on the ratio of desired output* relative to *measured output* as taught by Applicant's invention and as set forth in the Claims." *Id*. at 8 (emphasis in original).

Therefore, although plaintiff may have been able to distinguish Wolff on the basis of step 1 alone, it chose to argue distinctions in step 3 as well. In doing so, plaintiff limited permissible interpretations of the claims. *See* Southwall Technologies, Inc. v. Cardinal IG Co., 54 F.3d 1570 (Fed. Cir.1995) c *ert denied*, 133 L.Ed.2d 424 (1995) (limiting claims based upon attorney remarks made as an "alternative" argument). Unlike in *Intervet,* claim 1 and all of plaintiff's independent claims can be interpreted by their terms to require the use of Vdt/Vmt as a multiplier as represented to the PTO, and there was no clear mistake by the patent attorney. Neither I nor a member of the public trying to decipher the scope of the '347 patent can be expected to guess at the reasons why the examiner allowed the claims, and in the absence of a clear and harmless error by its patent attorney, plaintiff is bound by its arguments to the PTO. Although I agree with plaintiff that claim 1 could be read broadly in isolation, plaintiff's statements and arguments to the PTO during prosecution demand the narrow construction proposed by defendants.

Furthermore, plaintiff cannot now contend that claim 1 should be interpreted to encompass any method that is algebraically equivalent to its specifically disclosed method because, with regard to step 3, plaintiff's particular method of using Vdt/Vmt as a multiplier is algebraically equivalent to Wolff. Thus, when plaintiff distinguished Wolff on the basis of its use of a particular mathematical formula, it limited its claims.

There is no algebraic difference between the methods of plaintiff and Wolff. In plaintiff's specifically disclosed method, Rd, the ultimate number of pump revolutions needed to produce a desired volume, Vd, is determined by the following equation:

$$n \times (Vdt/Vmt) \times Vd = Rd.$$

In Wolff, it is undisputed that Rd is determined as follows:

(Rmt/Vmt) x Vd = Rd.

Algebraically, Rd in plaintiff's method will always equal Rd in Wolff's method because:

n x (Vdt/Vmt) x Vd = (Rmt/Vmt) x Vd.

The Vd and Vmt on either side of the equation drop out, leaving:

n x Vdt = Rmt, which is a true equation because Rmt is simply the measure of revolutions actually performed during the test in Wolff's method, and (n x Vdt) = Rt in plaintiff's method. Rt is the number of revolutions plaintiff's machine performs in an attempt to produce Vdt during the calibration test.

In addition, although plaintiff's specified method is algebraically equivalent to Wolff's, plaintiff argued to the PTO that its particular method was "superior" to that of Wolff because it resulted in less "rounding off error." First Resp. at p. 9. Although neither I nor any expert witness who testified at the *Markman* hearing can explain how plaintiff's method is *superior* to Wolff's in terms of rounding errors, it is clear that the two methods will produce at least *different* rounding errors when implemented by computers.

As McGaw's expert, Norman Jacobson, testified without contradiction at the *Markman* hearing, computers operate using a discrete amount of memory space. As a natural consequence, during a computation, computers cannot store values to an infinite degree of precision and must either "round off" or "truncate" numbers after a certain number of decimal places. Because plaintiff's and Wolff's methods perform different calculations in different orders (even though they are algebraically equivalent), when implemented by real-world computers, they will produce different results. Jacobson demonstrated that typical truncation by a microprocessor can result in as much as a three percent difference in results between the two methods. *See* Markman Exh. 56,58-59.

Thus, although there is no evidence that plaintiff's method is actually superior to Wolff's in eliminating rounding error, it is clear that they are different. Plaintiff argued that real-world distinction to the PTO, and it cannot now ignore it. Contrary to its current position, plaintiff argued that its particular method of calibration, multiplying Vdt/Vmt by Rass, was patentable. Plaintiff obtained that patent and now must live with its limited scope.

Reference to dependent claims also supports defendants' claim construction. Claim 3 is dependent on claim 1 and includes several further steps. One such step is "adjusting the said further given amount of pump activity of said pump ... by *a second adjustment factor multiple* ...." That language implies that there is a first "adjustment factor multiple." The only other adjustment factor mentioned in claim 3, which includes all of the elements of claim 1, is the "adjustment factor" in claim 1. It follows, therefore, that the "adjustment factor" in claim 1 must also be a "multiple."

Accordingly, after reviewing the claims, specification, and prosecution history of the '347 patent, I construe claim 1 to require the use of a specific value, Vdt/Vmt, which is used as a multiplier.

Finally, I will address one other aspect of claim 1 that was not briefed specifically by the parties but is important to make clear. It is undisputed that claim 1 requires the adjustment factor, whatever its definition, be applied to "the amount of pump activity which would be calculated to be required based on said assumed calibration factor [i.e., Rass]." This limitation was added as an amendment after the first rejection by the

PTO. First Resp. at p. 2. During its arguments to the PTO, plaintiff relied specifically upon this language, stating that a "single adjustment is applied once to the gross total amount of pump activity which would result from the original assumed amount of pump activity per unit volume output, and thus provides for a very high degree of accuracy in the total amount to be subsequently pumped." First Resp. at p. 7. Accordingly, it is clear that claim 1 requires the calculation and use of Rass, the "gross total amount of pump activity which would result from the original assumed amount of pump activity per unit volume output."

Claim 11 contains the same language as claim 1 to define step 3. In addition, plaintiff made the same blanket arguments to the PTO during prosecution with regard to claim 11 as for claim 1. Accordingly, I conclude that step 3 of claim 11 should be construed identically to step three in claim 1.

Moreover, claim 11 includes additional language lending support to the construction requiring that the "adjustment factor" must be equal to "Vdt/Vmt," and that "applying" means "multiplying." The final paragraph of claim 11 requires that the pump be actuated through a number of "increments" (Rd) "equal to the product of said estimated quantity of increments [Rass] corresponding to said selected output quantity [Vd] multiplied by said adjustment factor." This means that to pump Vd, the pump must actuate through a number of increments equal to Rd, and Rd equals Rass x adjustment factor. For that to be accurate, according to the method disclosed in the '347 patent, the adjustment factor *must* equal Vdt/Vmt, and, therefore, must be used as a multiplier.

Accordingly, I will interpret claim 11 as I have claim 1-requiring the multiplication of Vdt/Vmt x Rass.

Claim 14 contains different requirements, and is broader on its face than either claim 1 or 11. Indeed, the literal reading of this claim advanced by plaintiff is extremely broad. Claim 14 requires "subsequently pumping said stepping motor-actuated pump ... a number of pulses *equal to* the product of [Vd] multiplied by said first ratio [n] and by a further second corrective adjustment [Vdt/Vmt]." (emphasis and bracketed language added). Arguably, the plain language of this claim does not require that any number of pulses actually be calculated, only that the number of pulses transmitted to the pump equal the product of Vd x n x Vdt/Vmt. Recall that Vd x n = Rass.

Plaintiff, in fact, has advocated that the "equal to" language indicates that the claim is not limited to the specific calculation of Vd x n x Vdt/Vmt, but any calculation that yields that result. I agree that, in isolation, step 3 in this claim could be interpreted to encompass any method by which the user pulses a stepping motor-actuated pump a number of pulses equal to Vd x n x Vdt/Vmt. Here again, however, the prosecution history narrows the scope of this claim. As discussed, plaintiff made the same blanket arguments to the PTO regarding all of its independent claims, and plaintiff effectively disclaimed any construction where Vdt/Vmt is not used as a multiplier of Rass.

[7] In addition, plaintiff's broad interpretation would likely result in the invalidity of claim 14. For example, plaintiff's proposed construction would include the situation where the user simply uses trial and error to send the correct number of pulses to yield Vd. I am obligated to interpret claims to uphold their validity when a fairly possible reading will permit it. Becton Dickinson & Co. v. C.R. Bard, Inc., 922 F.2d 792, 799 n. 6 (Fed.Cir.1990). Interpreting this claim as I have claims 1 and 11 in light of the specification and prosecution history avoids clear invalidity of claim 14. Accordingly, I conclude that the step of "subsequently pulsing said stepping motor-actuated pump ... a number of pulses equal to the product of said selected user quantity of fluid multiplied by said first ratio and by a further second corrective adjustment

factor" actually requires the multiplication of Vdt/Vmt x Rass.

[8] *Claim 19* contains two means-plus-function clauses, the second of which embodies step 3. A patentee is permitted to use means-plus-function clauses without recitation of all the possible means that might be used in a claimed apparatus. 35 U.S.C. s. 112 para. 6. "The price that must be paid for use of that convenience is limitation of the claim to the means specified in the written description and equivalents thereof." O.I. Corp. v. Tekmar Co., 115 F.3d 1576, 42 U.S.P.Q.2d 1777, 1782 (Fed.Cir.1997). Pursuant to 35 U.S.C. s. 112 para. 6:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Accordingly, to interpret claim 19, I must look to the "corresponding structure, material, or acts described in the specification and equivalents thereof." *See* In re Donaldson Co., 16 F.3d 1189, 1193 (Fed.Cir.1994).

Although the plain language of claim 19 is broad, the specification is not. Claim 19 requires "means for subsequently pulsing said digital pulse-actuated pump ... through a number of pulses equal to the product of [Vd x n x Vdt/Vmt]." Plaintiff argues that Claim 19 should be construed to include all means for pulsing a digital pulse-actuated pump a number of pulses *equal to* Vd x n x Vdt/Vmt, whether or not that calculation is actually performed. However, the only means provided in the specification for pulsing the pump a number of times equal to Vd x n x Vdt/Vmt is the hardware described in Figure 1 that actually performs that exact calculation.

[9] Nor can the inclusion of structural equivalents under s. 112, para. 6 expand the scope of this claim to the extent plaintiff desires. Equivalents to means disclosed in the specification might be extended to, for example, the use of a divider rather than a multiplier to apply the adjustment factor to Rass. However, as with the other independent claims, plaintiff cannot escape the effect of its arguments to the PTO. The prosecution history must be considered in determining the literal scope of means-plus-function claims, including equivalents under s. 112, para. 6. *See Biodex, supra* at 862-63; Senmed, Inc. v. Richard-Allan Medical Indus., 888 F.2d 815, 819 (Fed.Cir.1989); Medtronic Inc. v. Intermedics, Inc., 799 F.2d 734, 742 (Fed.Cir.1986), cert. *denied,* 479 U.S. 1033, 107 S.Ct. 882, 93 L.Ed.2d 836 (1987). Accordingly, I will construe claim 19, consistent with the other independent claims, to include the limitation of using Vdt/Vmt as a multiplier of Rass.

[10] The parties also disagree whether claim 19 includes a limitation only to a hardware embodiment of plaintiff's invention. To that end, the specification includes the following statement:

While the foregoing system and method has been illustrated and described generally in hardware form and terms, it will be appreciated that such may be, and in a given instance may preferably be, effected in large measure by suitable corresponding software and/or firmware programming and operation of a computer or computers by such programming in conjunction with such hardware of the system as may be deemed desirable.

I agree that the use of software or programmable firmware is both disclosed in the specification and "equivalent" within the meaning of s. 112, para. 6 to the hardware set forth in Figure 1 and the rest of the

specification. Therefore, I will interpret the means described in claim 19 to include software and programmable firmware.

B. *AUTOMATION*

[11] Plaintiff argues that the claims must be interpreted to require that certain steps in the method claims be performed automatically by a computer or suitable electronic circuitry. In particular, plaintiff asserts that the following language should be interpreted to require performance by a computer or electronic circuitry to the exclusion of manual performance:

1. "actuating a pump ... through a first given amount of pump activity" (Claim 1 and corresponding language in Claims 11 and 14.) Plaintiff argues that because the specification discloses only a means and method for actuating the pump automatically via computer or hardware controls, the claim should be so limited. This question raises the line-drawing issue always present in claim interpretation between properly using the specification to "interpret what the patentee meant by a word or phrase in the claim" and improperly "adding an extraneous limitation appearing in the specification." *See* E.I du Pont de Nemours & Co. v. Phillips Petroleum, 849 F.2d 1430, 1433 (Fed.Cir.1988) (discussing the distinction between the two).

Plaintiff argues that the specification as a whole makes it clear that its invention relates to controlling automatically a pump. For example, the patent states: "It is an object and feature of the invention to enable achievement of high accuracy with ease, by entering the actual first cycle delivered volume into the controls of the pump...." Col. 1, 11.50-52. In addition, no suggestion is made in the specification or claims that actuation of the pump should be performed manually.

Lemelson v. United States, 752 F.2d 1538, 1551-52 (Fed.Cir.1985), however, is persuasive. There, the claim at issue could fairly be read to require either manual or automatic "prepositioning" of a workpiece on a measuring device. The district court concluded that the claim required automatic prepositioning because the specification repeatedly referred to such automatic prepositioning. The Federal Circuit reversed and "emphasize[d], instead, that nowhere does the specification *require* automatic prepositioning.... Even if the specification only disclosed apparatus directed to executing automatic prepositioning of the workpiece or the measurement device or both, this does not dictate reading such a limitation into the claim."

Nowhere in the specification of the '347 patent does it require that the step of "actuating" be done automatically. Therefore, I conclude that even though the specification does not disclose any manual method for actuating the pump, claims 1, 11, and 14 cannot be limited to automatic actuation of the pump. As discussed above, however, claim 19, because it is a means-plus-function claim, is limited to the electronic control means disclosed in the specification and their equivalents.

2. "a first given amount of pump activity which is estimated will yield a first selected output quantity of a given fluid ... based upon an assumed calibration factor of a selected amount of pump activity per unit volume dispensed." (Claim 1 and corresponding language in claims 11 and 14.) Plaintiff also contends that this language requires use of electronic or computer means to calculate the first given amount of pump activity, Rt. Again, pursuant to *Lemelson, supra,* I disagree.

3. "applying an adjustment factor to the amount of pump activity" (Claims 1 and 11.) Here again, I conclude that *Lemelson, supra,* controls and the use of electronic means to accomplish this step is not required by the claims.

4. "subsequent pulsing ... by said stepping motor-actuated pump a number of pulses equal to the product of ..." (Claim 14.) Plaintiff argues that this language requires use of a computer or electronics to calculate the proper number of pulses. Pursuant to the analysis above, use of a computer or electronics to accomplish this calculation is not required by the claim.

C. *DEFINITION OF PUMP*

[12] Plaintiff argues that the word "pump" as used in each of the independent claims should be interpreted to mean a "rotary peristaltic pump" because that is the particular pump discussed throughout the specification. Again, I disagree. Rather, I conclude that plaintiff is attempting to read into the '347 patent claims an extraneous limitation from the specification not required to understand the claims as written. A "pump" as used in the claims can be any type of pump.

D. *PREAMBLES*

Plaintiff argues that the preamble to each claim contains limitations. Specifically, each preamble includes language similar to that in claim 1, which reads: "The method of reducing inaccuracy in a total quantity of fluid pumped by a pump.... " Plaintiff contends that this language requires that the claims be limited to methods or pump arrangements which, in fact, reduce inaccuracy in the total quantity of fluid pumped. I disagree.

[13] "Generally, ... the preamble does not limit the claims." DeGeorge v. Bernier, 768 F.2d 1318, 1322 n. 3 (Fed.Cir.1985). The preamble should not be regarded as a limitation unless it is "necessary to give meaning to the claim and properly define the invention." *Id.* (quoting Perkin-Elmer Corp. v. Computervision Corp., 732 F.2d 888, 896 (Fed.Cir.), *cert. denied,* 469 U.S. 857, 105 S.Ct. 187, 83 L.Ed.2d 120 (1984)). Where the effect of the preamble language is "at best ambiguous ... a compelling reason must exist before the language can be given weight." *Id.*

[14] The language of the preambles in the '347 patent is ambiguous. Indeed, considering the preambles in each claim to be limitations could result in the invalidity of each as indefinite under 35 U.S.C. s. 112, para. 2. There is no indication how one could measure whether a certain method or pump arrangement actually "reduces" inaccuracy because there is no indication as to what initial inaccuracy the resulting inaccuracy would be compared. Therefore, I conclude that the preambles contain no limitations.

III. *Infringement of the Claims as Properly Construed*

[15] As judges and commentators warned during the *Markman* litigation and in its wake, to decide what the claims mean will almost always decide the case. *See* Markman v. Westview Instruments, 52 F.3d 967, 989 (Fed.Cir.1995) (Mayer, J., concurring in the judgment), *aff'd* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996); Gregory D. Leibold, *In* Juries We Do Not Trust: Appellate Review of Patent-Infringement Litigation, 67 U. Colo. L.Rev. 623, 64546 (1996). This case is no exception. Generally, infringement, both literal and under the doctrine of equivalents, is a question of fact. *Southwall, supra* at 1575. However, now that I have construed properly the claims as a matter of law, there is no genuine issue of fact whether defendants' products infringe the claims. I hold they do not.

A. *LITERAL INFRINGEMENT*

[16] [17] "To establish literal infringement, every limitation set forth in a claim must be found in an accused product, exactly." *Southwall, supra* at 1575. It is undisputed that neither defendant's products employ Vdt/Vmt as a multiplier. Nor do they calculate Rass. Rather, similar to Wolff, both defendants' products calculate a new calibration constant. Accordingly, neither defendants' products literally infringe the '347 patent.

During the *Markman* hearing, plaintiff's expert, George Eilers, stated that with slight variations, both defendants' products perform the following steps:

Step 1: The user inputs a desired test volume, Vdt. Based on an assumed calibration factor, n, the pump calculates Rt, the number of pump rotations presumed necessary to pump Vdt. A test volume is then dispensed.

Step 2: The test volume, Vmt, is measured.

Step 3: The machine calculates a new calibration factor by dividing Rt/Vmt. The machine then multiplies the desired volume to be dispensed, Vd, by the new calibration factor, Rt/Vmt, to determine the number of revolutions, Rd, necessary to produce Vd. McGaw's pump has two slight variations in this third step. First, its machine averages the last three ratios of Vmt/Rt to generate a new calibration factor. Second, McGaw's machine divides the average of the past three Vmt/Rt ratios into Vd to determine Rd. Those distinctions are not important here.

Thus, it is undisputed by plaintiff that neither defendant's products employ the ratio of Vdt/Vmt as required by each independent claim. Nor do defendants' products calculate Rass based on the original assumed calibration factor. Rather, once the test volume is dispensed, the original assumed calibration factor is replaced by a new calibration factor. Therefore, defendants' products do not include several limitations of the independent claims 1, 11, 14, and 19, and there can be no literal infringement of those claims. In addition, it is axiomatic that dependent claims cannot be infringed unless the independent claims upon which they depend have also been infringed. Wahpeton Canvas Co. v. Frontier, Inc., 870 F.2d 1546, 1553 (Fed.Cir.1989). Accordingly, I conclude that defendants' products do not literally infringe the '347 patent as a matter of law.

B. *DOCTRINE OF EQUIVALENTS*

[18] An accused product that does not literally infringe the claims of a patent may infringe under the doctrine of equivalents if "it performs substantially the same function in substantially the same way to achieve substantially the same result." Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 608, 70 S.Ct. 854, 856-57, 94 L.Ed. 1097 (1950). As the Supreme Court recently cautioned, however:

Each element contained in a patent claim is deemed material to defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to individual elements of the claim, not to the invention as a whole. It is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to effectively eliminate that element in its entirety.

Warner-Jenkinson Co. v. Hilton Davis Chemical Co., --- U.S. ----, ----, 117 S.Ct. 1040, 1049, 137 L.Ed.2d 146 (1997).

[19] [20] [21] In addition, the doctrine of prosecution history estoppel bars a patentee from reclaiming subject matter surrendered during prosecution to obtain the patent. Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 452 (Fed.Cir.1985). Prosecution history estoppel applies both "to claim amendments made to overcome prior art and to arguments submitted to obtain the patent." Hughes Aircraft v. United States, 717 F.2d 1351, 1362 (Fed.Cir.1983). For an argument made to the PTO to estop the patentee, it is not necessary that the argument was the only one made by the patentee or that it was relied upon by the examiner in allowing the claims. *Southwall, supra* at 1581-83.

[22] [23] "The application of prosecution history estoppel is a question of law." Colgate Palmolive Co. v. W.L. Gore & Assoc., 919 F.Supp. 767, 771 (D.N.J.1996). "[I]f prosecution history estoppel would apply or if a theory of equivalence would entirely vitiate a particular claim element, partial or complete [summary] judgment should be rendered by the court, as there would be no further material issue for the jury to resolve." *Warner-Jenkinson, supra* at 1053, n. 8.

I agree with plaintiff that, as with Wolff, there is no algebraic difference between defendants' methods and plaintiff's because:

Rd (plaintiff) = n x (Vdt/Vmt) x Vd

Rd(Excelsior) = Vd x (Rt/Vmt)

Rd (McGaw) = Vd/(VmtURt) = Vd x Rt/Vmt

The Vd and Vmt drop out, again leaving:

n x Vdt = Rt, which is a true statement because Rt is determined by multiplying the desired test volume by the assumed calibration factor.

[24] Nevertheless, I cannot agree that defendants' products infringe the ' 347 patent under the doctrine of equivalents because plaintiff is estopped from expanding the scope of the independent claims in the manner it proposes.

As discussed, during prosecution plaintiff disclaimed a literal reading of its claims that would encompass any method or apparatus employing a step 3 that did not involve multiplying Vdt/Vmt x Rass. See First Resp. pp. 7-9 and discussion, supra. By the same token, plaintiff cannot recapture via the doctrine of equivalents that which it surrendered to obtain the patent. In particular, the doctrine of equivalents cannot, as proposed by plaintiff, be used to expand the scope of step 3 in each independent claim to include all algebraically equivalent methods for calculating Rd. Plaintiff plainly argued to the patent examiner that its invention was different than, and even superior to, Wolff in that it applied (1) an adjustment factor of Vdt/Vmt (2) as a multiplier (3) with Rass. Id. Therefore, defendants' products, which employ neither Vdt/Vmt nor Rass, cannot infringe the '347 patent either literally or under the doctrine of equivalents.

Because I have decided as a matter of law that defendants' products do not infringe the '347 patent, I will dismiss plaintiff's claim for infringement against all defendants. In addition, plaintiff's second claim for relief alleges that defendants induced others to infringe the '347 patent. Because that claim is derivative and dependent upon a judgment of infringement, I will also dismiss plaintiff's second claim for relief.

Accordingly, it is ORDERED that:

1. The motions of defendants, McGaw and Excelsior, for summary judgment of noninfringement is GRANTED;

2. Baxa's claims for patent infringement and inducement to infringe are DISMISSED with prejudice;

3. Determination of an award of costs is HELD IN ABEYANCE.

D.Colo.,1997.
Baxa Corp. v. McGaw, Inc.