



controlling law be maintained or defeated without a favorable finding on that issue.

Fed. R. Civ. P. 50.

In considering a motion for judgment as a matter of law under Rule 50, a court "must consider the evidence in the light most favorable to the non-movant, giving that party the benefit of all reasonable, favorable inferences the jury might have drawn from the evidence. The trial court is not to consider the credibility of the witnesses or otherwise assess the weight of conflicting evidence, since that function is given to the jury. Only when no evidence exists to support the jury's verdict and the verdict it reached could have been based on nothing more than surmise and conjecture or where there is such overwhelming evidence in favor of the movant that reasonable and fair-minded jurors could not arrive at a verdict against the movant, may a trial court properly grant a motion to set aside a jury verdict." Jones v. Spentonbush-Red Star Co., 155 F.3d 587, 591 (2d Cir. 1998) (citations omitted).

### **1. Metal Block**

In a Partial Ruling on Summary Judgment issued on February 13, 2004 [Doc. # 899], this Court held that the PTC-100-96agV sample holder depicted in a schematic attached to the Declaration of Michael Finney, and the ALS-1296 sample holder pictured in a photograph attached to the Declaration of Marcel Margulies – the only depictions of sample holders in the summary judgment record

– did not literally infringe the asserted claims of the '675 patent, because "the sample holder has metal tubular like protrusions or projections arising from a metal plate or platform and separated by air. It does not include the minimal shared limitations of the asserted claims of the '675 patent: a recess machined into a block and by definition surrounded by metal." Id. at 18-19. Applera subsequently sought clarification of the Court's summary judgment ruling, submitting a two dimensional cross section of the sample holder depicted in the earlier photograph, and the sample holder itself. After reviewing the new submissions, the Court noted that "[w]hile Applera's [new submissions] make[] literal infringement a closer question, the diagonal section of the same still reveals that it is not a metal block with a recess ('a solid body of metal with a receding or hollow place in its surface,' Ruling [Doc. # 899] at 18) but a metal plate or platform from which metal tubular like protrusions or projections arise which are not completely but only partially surrounded by metal." Ruling on Applera's Motion for Reconsideration and Request for Clarification [Doc. # 974] at 9. The non-literal infringement finding, however, was limited to the sample holders depicted in the schematic and photograph in the summary judgment record, and thus, as to "[t]hose sample holders not . . . before the Court, their likeness [to the sample holder found to not infringe] remained an issue for trial." Id. at 9-

10.

At a side-bar conference during trial, this Court reiterated its conclusion that any sample holders that were not included in the summary judgment record were properly at issue at trial, but invited defendant to raise the issue at the Rule 50 stage. Trial Tr. Vol. VII [Doc. # 1103] at 1216.<sup>1</sup>

MJ now argues that because the ALS-1296 sample holder "contains the most metal of all of the MJ sample holders, and since the ALS-1296 sample holder is not a metal block as that element is used in the asserted instrument patent claims, it must necessarily follow that none of the other MJ sample holders can be metal blocks either." Defendants' Resubmitted Memorandum in Support of Their Post Trial Motion as a Matter of Law [Doc. # 1353] at 7. Accordingly, MJ contends, judgment as a matter of law of no literal infringement is warranted.

Defendants conceded at trial, however, that two of MJ's

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<sup>1</sup>Applera argues that in its colloquy with counsel at trial, the Court "made clear that ALS-1296 could be infringing and was not the subject of any dispositive ruling." Plaintiffs' Opposition to Defendants' Post Trial Motion as a Matter of Law [Doc. # 1372] at 3. This is incorrect. While the Court told defense counsel "I don't understand why you say they lost, because what the summary judgment motion was on was a particular schematic," the Court also noted, "[a]nd then there was, in Applera's papers, a photograph." Trial Tr. at 1212. The photograph depicted the ALS-1296 sample holder. The Court's written summary judgment and clarification rulings clearly held that the sample holders included in the summary judgment record did not literally infringe the asserted patent claims, and nothing in the colloquy with counsel modified that holding.

sample holders satisfied the metal block requirement of the asserted patent claims. See Testimony of Michael Finney, Trial Tr. Vol. XI [Doc. # 1109] at 2384-85 (testifying that models PTC-0160 and ALS-1238 were metal blocks, and that a total of 5,735 out of 65,000 thermal cyclers sold used the ALS-1238 model sample holder); see also Trial Tr. Vol. VII [Doc. # 1103] at 1221-22 (Margulies' testimony on "Group one" metal blocks).

There was sufficient evidence, moreover, for the jury to find infringement under the doctrine of equivalents.<sup>2</sup> Dr.

Margulies testified:

A. As you can see from the pictures, we have a well which is recessed below the top surface of the block, but in addition to that, there is an additional structure above the top surface of the block.

Q. Are the differences insubstantial or substantial?

A. The differences are insubstantial.

Q. And why do you believe that?

A. Because the group two block<sup>3</sup> performs essentially

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<sup>2</sup>In its ruling on defendants' motion for a new trial, the Court has addressed MJ's argument that Applera should have been precluded from asserting infringement under the doctrine of equivalents because Applera never submitted an expert report alleging such infringement.

<sup>3</sup>Dr. Margulies classified MJ's sample holders into three groups. Group one included models ALS-1238, ALD 2238, and PTC-1160, and included those defendants conceded infringed the metal block element of the asserted patent claims. Group two included models ALD-1244, ALD-1233, ALD-1234, PTC-150, PTC-1196, ALS-1296, ALP-2296. Group three included model PTC-1197, which the Court found did not literally infringe on summary judgment, and which Dr. Margulies testified differed from the Group Two sample

substantially the same function in substantially the same way to achieve substantially the same result, and the function that it performs is to allow thermal contact between the block and the sample tube.

. . .  
It performs it in substantially the same way by receiving and supporting the sample tube in the sample block, and it achieves substantially the same result, which is to heat, or cool, the mixture which is inside of the sample tube.

. . .  
[U]nder normal operating conditions, the part of the tube that contains the PCR reaction mixture, which is typically between 20 and 30 microliters, is well below the surface of the tube and is certainly within the recess.

Trial Tr. Vol. VII [Doc. # 1103] at 1223-24.

Dr. Margulies also testified that the additional structure that extends up from the surface of the block "will contribute very little from a thermal point. It's only there to support the sample tube." Id. at 1359; see also id. at 1266, 1271-72 (testifying that his analysis of infringement of the metal block element of asserted claims of '493 and '675 patents was "exactly the same" as the metal block element of the '610 patent).

At trial, Michael Finney testified that MJ's sample holders performed the heating and cooling functions with faster results than models he conceded to be metal blocks, yet still uniformly heated and cooled. See Trial Tr. Vol. IX [Doc. # 1109] at 2405.

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holders because "[i]n the group two block, you actually have a real block into which recesses have been drilled, and these recesses are below the surface of the block, and above the surface of the block, you have some additional structure, which is support structure essentially." Trial Tr. at 1358.

This testimony, which compares products and does not address the patent claim itself, does not require a finding of no equivalence as a matter of law. "Equivalence does not require that the claimed invention and accused product have identical results; the results can be substantially the same and the accused product can be an improvement." Atlas Powder Co. v. E.I. du Pont De Nemours & Co., 750 F.2d 1569, 1580 n.3 (Fed. Cir. 1984) (citing Perkin-Elmer Corp. v. Computervision Corp., 732 F.2d 888, 901-02 (Fed. Cir. 1984)). "Infringement is determined by comparison with the patentee's claimed invention, not with its marketed product," Perkin-Elmer Corp., 732 F.2d at 902, and the metal block element claimed in plaintiff's patent does not require that the heating and cooling functions be performed at any particular rate of speed.

Dr. Margulies' testimony was thus sufficient for the jury to find infringement under the doctrine of equivalents. Because the sample holders performed a heating and cooling function identical to that in the patent claims, moreover, there was sufficient evidence on which the jury could find that the metal block was an equivalent structure under 35 U.S.C. § 112 ¶ 6.<sup>4</sup> As to claims 17 and 33 of the '675 patent and claim 16 of the '493 patent,

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<sup>4</sup>At the summary judgment stage, the Court concluded that Applera waived § 112 ¶ 6 infringement. Because summary judgment was strictly limited to the sample holders included in the summary judgment record, Applera was not precluded from relying on statutory equivalence at trial.

therefore, the evidence was sufficient to support the jury's infringement verdict.

MJ is correct, however, that this Court's summary judgment decision requires a finding of no literal infringement of all those sample holders "like" MJ model ALS-1296. Because plaintiff's expert did not distinguish the ALS-1296 model from other MJ sample holders he placed in "Group 2," and the Court's own review of the exhibits reveals little distinguishing the Group 2 holders, Applera's literal infringement argument must fail. The only claim affected by this conclusion is Claim 45 of the '675 patent, which cannot be infringed under the doctrine of equivalents by any heating and cooling means that does not have a metal block with a plurality of recesses. Ruling on Motion for Summary Judgment, Feb. 12, 2004 [Doc. # 899] (applying doctrine of prosecution history estoppel).<sup>5</sup>

The Court therefore grants MJ's motion as to claim 45.

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<sup>5</sup>Because Applera is estopped from arguing infringement under the common law doctrine of equivalents, it likewise cannot rely on statutory equivalence under § 112 ¶ 6. See Ballard Medical Products v. Allegiance Healthcare, 268 F.3d 1352, 1359 (Fed. Cir. 2001) ("[J]ust as prosecution history estoppel may act to estop an equivalence argument under the doctrine of equivalents, positions taken before the PTO may bar an inconsistent position on claim construction under § 112, ¶ 6 . . . . When a patentee advises the examiner (and the public after patent issuance) that a particular structure is not within his invention, the patentee is not permitted to assert in a subsequent infringement action that the same structure is equivalent to the structure described in the patentee's specification for purposes of section 112 paragraph 6.") (citations and internal quotation marks omitted).



Notwithstanding this outcome, there is no basis for adjusting or vacating the jury's damages award. The jury's verdict of induced infringement of claim 17 and 33 of the '675 patent supports the damage award, as there was no testimony at trial that a reasonable royalty rate for the '675 patent would be based on the number of infringing claims of the '675 patent. Cf. Harris Corp. v. Ericsson Inc., --- F.3d ---, 2005 WL 1845103 (Fed. Cir. 2005) ("Assuming that the royalty rate did not depend on whether all four, or fewer than four, of the asserted claims were infringed-and nothing in the record leads us to believe that it did so depend-then 0.5% is the applicable royalty rate, should infringement be found on remand."). In contrast to Dr. Frishberg's testimony on the '610 patent, for example, in which he proposed a \$25 royalty for each of the four features claimed in the '610 patent, see Trial Tr. Vol. IX [Doc. # 1102] at 1946-47 (recommending \$25 royalty for each one of the heated pressurized covers, the sample temperature control, the temperature overshoot algorithm, and thin-walled tube invention features), the testimony as to the '675 royalty was not contingent on particular features encompassed by some but not all of the asserted claims 17, 33, and 45. See id. at 1966 (testimony as to reasonable royalty for thermal cyclers infringing the '675 patent). A review of the testimony of defendants' damages expert, Franklin Fisher, similarly fails to

disclose any evidence that a reasonable royalty would be based on the number of '675 patent claims infringed. See Testimony of Franklin Fisher, Trial Tr. Vols. X-XI [Docs. ## 1108-09] at 2276-2310, 2349-2370.

Moreover, the undisputed testimony that over 5000 of MJ's sample holders literally infringed the metal block element of the asserted patent claims supports the jury's verdict that thermal cyclers containing these sample holders directly infringed, induced infringement, and contributorily infringed claim 45 of the '675 patent. Defendants have not identified any testimony suggesting that those thermal cyclers containing metal block sample holders were otherwise distinguishable from the thermal cyclers found to infringe the '675 patent.

## **2. Algorithm**

MJ argues that none of its thermal cyclers can infringe claims 1, 44 and 158 of the '610 patent, because its cyclers use a different algorithm than that included in the patent claims. There was sufficient evidence at trial, however, from which the jury could reasonably find instead that the algorithm was the same. Dr. Margulies testified that defendants' thermal cyclers "use the exact same temperature algorithm." Trial Tr. Vol. VII [Doc. # 1103] at 1238. He explained:

The code implements the same algorithm, but when you implement an algorithm, there are many, many different ways you can do that. You can combine terms in different ways, you can do things in a slightly different order, but you are

still using the same, fundamentally the same mathematical equation.

Id. at 1239.

In order to reach this conclusion, Dr. Margulies testified that he tested the algorithm by performing an algebraic proof and by testing the temperature profiles based on each algorithm:

I did two different things. First one, which is absolutely rigorous, it's one any mathematician would do, you take the algorithm and you perform algebraic manipulations, it's just algebra. You rearrange terms, you combine them, and when you do that, you find that, in fact, starting with either algorithm claimed in the patent, you can get to exactly what is performed in the MJ instrument, or vice versa, you can take what's in the MJ instrument, the code that was shown on the picture, and do these manipulations and get back exactly what's claimed in the patent. So this is an absolutely rigorous proof . . . .

In addition to that, what I did was to assume a block temperature profile, because after, all what this algorithm does is to calculate the sample temperature based on the block temperature, and not only the block temperature that you just measured, but in fact, all of the block temperature that existed prior to this instance of time. . . .

[A]ssuming that you started some temperature ramp-up and end up at some other temperature, and I said, okay, now that I have assumed that, let me calculate what the sample temperature would be that I would come out of this algorithm at every instant of time, and I did that using the claimed algorithms, and I got a series of numbers, and then I did it using the algorithm as implemented in the thermal cyler, and I got, lo and behold, exactly the same sequence of numbers. And I mean, not to one or two digits after the decimal point, but no matter how many digits after the decimal point you perform the calculation, at least to the accuracy that the computer is capable of achieving, because, of course, any computer achieves accuracy only to some number of digits, but to the degree of accuracy the computer can achieve, you get exactly the same numbers.

Id. at 1240-42.

In addition, Michael Nussbaum, the former MJ employee who wrote the algorithm used in MJ's thermal cyclers, testified that the algorithm he designed was the same as that described in claim 1 of the '610 patent. See Trial Tr. 1043-44, 1048-49, 1054.

During cross examination, Dr. Margulies was asked whether, "when calculating the temperature of the sample at time n, the MJ algorithm measures the temperature of the block at time n minus 1, not at time n," and responded in the negative, insisting that "it measures it at time n." Id. at 1305. While there was conflicting testimony on whether there was a time differential and whether the MJ algorithm was otherwise identical to that in the '610 claim, the jury reasonably could have credited plaintiff's expert, whose testimony was sufficient for the jury to find literal infringement of the '610 patent.<sup>6</sup>

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<sup>6</sup>This Court previously denied defendant's summary judgment motion of non-infringement, noting that:

Margulies' statement "[t]hat MJ's alternative expression waits one sample interval to perform the claim calculation . . .," Margulies Decl. [Doc. # 803] ¶ 31, is followed immediately by the conclusion: "What is key is the algorithm, the carefully prescribed relationship between calculated sample temperatures and block temperatures, and that algorithm in the *exact same form* (not merely in an equivalent form) is used and implemented by MJ in its thermal cyclers." Id. (emphasis in original).

Ruling on Defendants' Counterclaim Plaintiffs' Renewed Motion for Summary Judgment of Non-Infringement with respect to U.S. Patent 5,474,610 [Doc. # 899] at 11-12.

Dr. Margulies' testimony at trial was consistent with his earlier declaration.

### 3. Fluid Flow Cooling System

Claim 1 of the '610 patent provides for "heating and cooling means controlled by said computing apparatus for changing the temperature of said sample block." In its construction of claim 1 of the '610 patent, this Court construed the claim to require "a fluid flow cooling system having cooling channels in the block," and "may but is not required to include a bias cooling system, which in turn may be supplied by bias cooling channels, cooling fan and fins formed in the metal of the block, peltier junctions, or constantly circulating tap water." Claim Construction [Doc. # 715] at 31.

MJ argues that its thermal cyclers do not infringe claim 1 of the '610 patent because its cyclers use a Peltier device to accomplish the function of cooling, not a fluid flow cooling system having channels in the block. There was sufficient evidence in the record, however, for the jury to find that Peltier devices were the cooling structure equivalent to the fluid flow channels of the '610 patent. For example, Dr. Margulies testified:

Q. . . . [T]he claim also calls for fluid flow cooling system, and you've identified that in the MJ machine there is a Peltier device. Is the Peltier device the same as a fluid flow cooling system?

A. No, it is not.

. . .

Q. Are the differences between a Peltier device and a

fluid flow cooling system substantial or insubstantial?

- A. No, they're insubstantial, they're essentially equivalent. Any person in the ordinary skill of the art would know you could replace a fluid flow cooling system with a Peltier device, very commonly used in order to do cooling, so they're really interchangeable.

Trial Tr. Vol. VII [Doc. # 1103] at 1232.

The conclusion that a Peltier device is an equivalent structure to the fluid flow cooling system does not read elements out of the claim, because in this means-plus-function claim, the claim element at issue is a "heating and cooling means controlled by said computing apparatus for changing the temperature of said sample block." Such claims are construed to "cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112 ¶ 6. Thus, a device may literally infringe a mean-plus-function claim under § 112 ¶ 6 if it performs the identical function specified in the claims, and if it is insubstantially different from the corresponding structure in the patent specification. Ishida Co., Ltd. v. Taylor, 221 F.3d 1310, 1317 (Fed. Cir. 2000). The specification itself need not provide for equivalency. The testimony at trial supports the jury's finding that a Peltier device performs the identical cooling function in substantially the same way as the fluid flow control system, and produced substantially the same result. Such testimony, of course, also supports infringement under the common law doctrine of

equivalents.

#### **4. Dr. Mullis as Sole Inventor**

MJ argues that it is entitled to judgment as a matter of law that Dr. Mullis is not the sole inventor of claims 17, 33 and 45 of the '675 patent or claim 16 of the '493 patent, because these claims require computer programming to be patentable over prior art and to avoid obviousness-type double patenting, and Dr. Mullis testified that he never programmed a computer to cycle temperatures or to perform PCR, and because there was no contact between Dr. Mullis and the engineers who built the thermal cyclers which are the subject of the asserted claims. This Court has addressed these arguments in its double patenting and inequitable conduct rulings, see [Doc. # 1296] at 16-17, [Doc. # 1297] at 7-14, and for the reasons set forth therein, concludes that there was sufficient evidence for the jury to reasonably find that the defendants failed to meet their burden of proving that Dr. Mullis was not the sole inventor of the asserted claims of the '675 and '493 patents. See also Trial Tr. Vol. II [Doc. # 1099] at 250, 252-53 (testimony by Dr. Mullis that he was the sole inventor and that writing the programming code itself was not inventive); Trial Tr. Vol. I [Doc. # 1100] at 178-181 (testimony by Dr. Mullis that he indirectly conveyed his ideas to the engineers who built the first PCR machine, and met with the engineers regarding use of a Peltier device).

## 5. Ford Surveys

MJ argues that the testimony of Dr. Ford that 96 percent of MJ's customers used their thermal cyclers to perform PCR should have been excluded, and that absent Dr. Ford's testimony, there was insufficient evidence of direct infringement of the PCR process patents and the '493 patent by end users of MJ thermal cyclers to support a finding that MJ induced infringement of these patents. For the reasons set forth in this Court's Ruling of Defendant's Motion for New Trial, and in its earlier decision set forth on the record of March 9, 2004, see Trial Tr. Vol. IV [Doc. # 1106] at 682-83, 687-88, Dr. Ford's survey evidence was properly admitted at trial.

This Court also previously addressed, and now declines to reconsider, MJ's argument as to the proper causation standard for inducement of infringement. For example, at the March 24, 2004 Charge Conference, this Court stated:

The causation is in the nature of the actions, that they are actions of such a nature or characteristic that they caused, urged, encouraged or aided customers to use a product in an infringing manner, and that the customers used the product in an infringing manner and that defendants knew of the infringed patent and that they knew or should have known that their actions would induce the actual infringement. I think the causation is there with respect to the characterization of the conduct, but there is no but for causation because having sold the thermal cycler or having done – having done the act that has started the chain of the causal connection, the only question is, is this conduct that is of that character.

Transcript of Charge Conference [Doc. # 1144] at 17-18.



The jury instruction on inducement was consistent with standard set forth in Manville Sales Corp. v. Paramount Sys., Inc., 917 F.2d 544 (Fed. Cir. 1999),<sup>7</sup> and as this Court has previously found, there was ample evidence at trial to support the inducement of infringement verdict, see, e.g., Ruling on Plaintiffs' Motion to Enhance Damages and For Attorneys' Fees Based on Defendants' Willful Infringement [Doc. # 1299] at 16-21.

## **II. Conclusion**

For the foregoing reasons, defendants' Post Trial Motion for Judgment as a Matter of Law [Doc. # 1316] is GRANTED in part as to claim 45 of the '675 patent, and DENIED in all other respects.

IT IS SO ORDERED.

/s/

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Janet Bond Arterton, U.S.D.J.

**Dated at New Haven, Connecticut, this 25th day of August 2005.**

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<sup>7</sup>The jury was instructed, in part, that: Applera must show by a preponderance of the evidence: 1) that MJ took actions that caused, urged, encouraged, or aided MJ's customers to use a product in a manner that you find infringes a claim of the thermal cyclers patents, or to perform a process in a manner that you find infringes a claim of the PCR process patents; 2) that MJ knew of the infringed patent; and 3) that MJ knew or should have known that its actions would induce actual infringement of the patent. Applera must prove that MJ possessed specific intent to encourage its customers' infringement, not merely that it had knowledge of the customers' acts which Applera claims constitute infringement. In addition, there can be no inducement of infringement unless MJ's customers directly infringed a claim of the thermal cyclers or PCR process patents.

