

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOSEPH B. SLATER

Appeal 2008-2380
Application 11/091,035
Technology Center 2800

Decided: August 21, 2008

Before THOMAS A. WALTZ, CATHERINE Q. TIMM, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

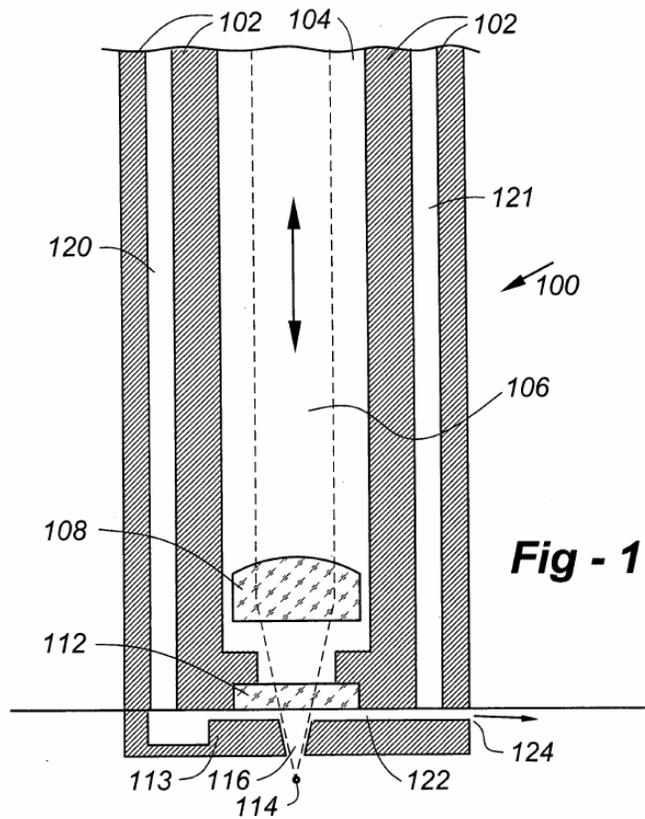
DECISION ON APPEAL

This is an appeal from the final rejection of claims 8-13. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

The invention relates to an optical probe having a self-cleaning capability. (Spec. 1, ll. 6-7.) Application Figure 1 is reproduced below:

Application Figure 1 is a cross-sectional view of a preferred embodiment of



the optical probe 100 of the invention. (Spec., ll. 4-5.) An optical channel 104 within the probe body 102 contains a sampling beam 106. (Spec. 3, ll. 16-17.) A lens 108 focuses the beam to a sampling zone 114 via sampling port 116. (Spec. 3, ll. 18-19.) One or more delivery tubes 120 deliver cleaning fluid into a gap 122 on the process side of window 112. (Spec. 4, ll. 3-4.)

Claim 8 is illustrative of the invention and is reproduced below:

8. An optical probe, comprising:
a probe body having a window with a surface oriented toward a sample under investigation;
an excitation beam following an excitation optical path through the probe body and the window to the sample under investigation;
a sampling beam carrying Raman or fluorescence wavelengths representative of the sample into the probe body through the window along a path generally counter-propagational to the excitation optical path; and
a structure operative to flood the window with fluid to keep it clean.

The Examiner relies on the following prior art references to show unpatentability:

Hayes	US 4,967,745	Nov. 6, 1990
Alfano	US 5,261,410	Nov. 16, 1993
Lemelson	US 5,845,646	Dec. 8, 1998
Slater	US 6,873,409 B1	Mar. 29, 2005

Appellant requests review of the following rejections:

- claims 8-13 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7-11¹ of U.S. Patent 6,873,409 B1 (“Slater”) in view of Hayes (Final Rejection² 2);

¹ See Ans. 5 for claim correspondence.

2. claims 8, 10, and 12 under 35 U.S.C. § 103 as unpatentable over Lemelson in view of Hayes (Final Rejection 4³); and

3. claims 9 and 11 under 35 U.S.C. § 103 as unpatentable over Lemelson in view of Hayes as applied to claim 8 and further in view of Alfano (Final Rejection 7).

Rejection of claims 8-13 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of Slater in view of Hayes

The Examiner finds that claims 8-13 “are broader [than the Slater patent claims] except for the additional limitation of having the returning sampling beam traveling generally counter-propagational to the supplied excitation beam” (Ans. 4). The Examiner further finds that this additional limitation “is well known in the art as demonstrated by Hayes” which discloses the use of the same fiber to deliver intense light and collect returning light for analysis (Ans. 4). The Examiner concludes that “[a]t the time of the invention, one of ordinary skill would have used the same optical pathway (fiber) to both provide the excitation beam and returning [sic, return] the sampling beam, since a skilled artisan would recognize that optical fibers performing dual functions would save space in the probe compared to multiple optical fibers for each individual function” (Ans. 4-5).

² Mailed August 28, 2006.

³ The Final Rejection incorrectly identifies claim 11, rather than claim 10, as rejected on this ground. The Examiner acknowledges the error in the Answer, and notes that the Final Rejection properly discusses claim 10 in connection with this ground of rejection. (Ans. 3, ¶ (6).) Appellant has not presented separate arguments as to either claims 10 or 11 in their appeal of this ground of rejection (*see* App. Br. 3-5) and have not indicated that they were prejudiced by the error (*see generally* Reply Br.) Accordingly, we view the Examiner’s mistake as harmless error.

Appellant asserts that “according to claim 8, an excitation beam follows a path through a probe body and a window to a sample under investigation, and the sampling beam carrying Raman or Fluorescence wavelengths also travels through the window along the path generally counter-propogational [sic] the excitation optical path. Thus, there are at least portions of the counter-propagating [sic] excitation and sampling beam paths which are not in optical fibers; that is, they are in free space (or in the sample material).” (App. Br. 3.) Appellant contends that even if Hayes is properly relied on for a disclosure of counter-propagating excitation and sampling beam paths within optical fibers, the Examiner has not established a prima facie showing of obviousness. Appellant argues, more specifically, that the Examiner has not explained how the combined teachings of Slater and Hayes disclose or suggest an arrangement in which the excitation and sampling beam paths are counter-propagational when they are not traveling in optical fibers inside the probe body, e.g., when the beams are traveling through or outside the probe window. (*See* App. Br. 3.)

The contentions of the Examiner and the Appellant present the following issue on appeal: Has Appellant identified reversible error in the Examiner’s determination that use of the same optical fiber to both provide the excitation and sampling beams in the Slater claim 7 optical probe would result in the invention as claimed in claim 8 on appeal? We answer this question in the negative for the reasons discussed below.

As an initial matter, we note that the contentions of the Examiner and the Appellant are based on different interpretations of the claim phrase “generally counter-propagational.” The Examiner maintains that the claims are “of such breadth that the beams can almost counter-propagate such as

when one beam is close in proximity to the returning beam or when the returning beam is almost traveling back at the same angle.” (Ans. 11.) In contrast, Appellant argues that one of ordinary skill in the art would understand the phrase “generally counter-propagational” as requiring co-axial or overlapping sampling and excitation beams, i.e., beams that occupy the same path. (Reply Br.)

During examination, claims terms must be given their broadest reasonable construction consistent with the specification. *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007)(“[T]he PTO must give claims their broadest reasonable construction consistent with the specification. . . . Therefore, we look to the specification to see if it provides a definition for claim terms but otherwise apply a broad interpretation.”).

The present Specification does not expressly define the term “counter-propagational,” nor has Appellant provided us with evidentiary support for his proposed definition. However, even adopting Appellant’s proposed definition of the term “counter-propagational” as requiring co-axial or overlapping beam paths, we are in agreement with the Examiner that the term “generally” broadens the claim to include a sampling beam path which deviates, at least to some extent, from the identical path of the excitation beam. *See Anchor Wall Systems, Inc. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298, 1310 (Fed. Cir. 2003) (“Because the claim language itself expressly ties the adverb ‘generally’ to the adjective ‘parallel,’ the ordinary meaning of the phrase ‘generally parallel’ envisions some amount of deviation from exactly parallel.”); *Schoell v. Regal Marine Industries, Inc.*, 247 F.3d 1202, 1208 (Fed. Cir. 2001) (noting that “generally” means

“mostly” and interpreting “generally flat” as embracing configurations not perfectly flat).

Based on the foregoing claim interpretation, we now consider the issue of whether Appellant has identified reversible error in the Examiner’s determination that use of the same optical fiber to both provide the excitation and sampling beams in the Slater claim 7 optical probe would result in the invention recited in Appellant’s claim 8. We note that the following enumerated findings of fact (“FF”) are of particular relevance:

1) Slater claim 7 is reproduced below:

7. An optical probe with a self-leaning [sic] sampling window, comprising:

a probe body having a window with a surface oriented toward a sample under investigation;

a sampling beam carrying Raman or fluorescence [sic] wavelengths representative of the sample into the probe body through the window for analysis;

a conduit carrying a fluid to the surface of the window oriented toward the sample;

a structure operative to flood the window with the fluid, the structure further including an aperture through which the sampling wavelengths pass; and

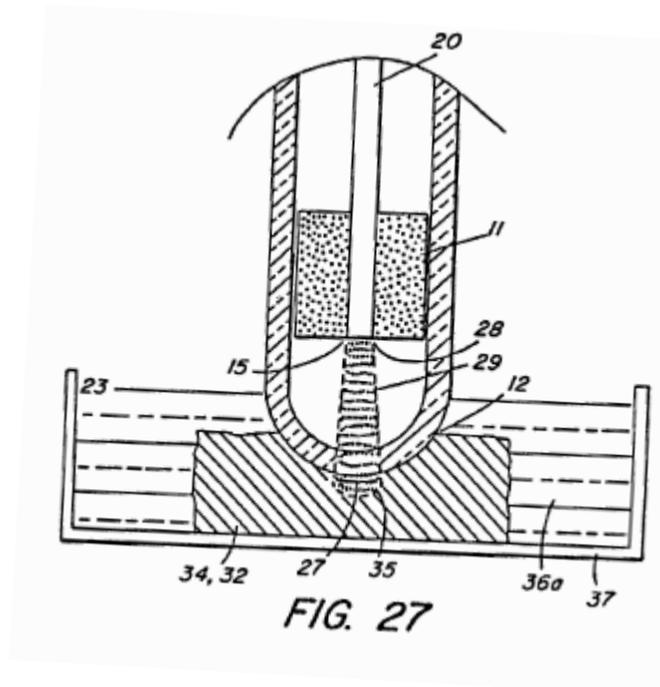
wherein at least a portion of the fluid pase [sic] though the aperture to ensure that the sample under investigation does not reach the window.

2) Hayes discloses a laser catheter assembly in which “an optical fiber, or fibers, which can carry laser radiation is mounted in a flexible

inert plastic catheter material with a transparent protective optical shield over the distal end.” (Hayes, col. 4, ll. 40-44.)

3) According to Hayes, “[l]ight can be delivered to the tissue via one fiber, and the reflected light returned by means of the same or another ‘sensing’ fiber for spectroscopic or other forms of analysis.” (Hayes, col. 4, ll. 61-64.)

4) Figure 27 of Hayes is reproduced below.



Hayes Figure 27 depicts a prototype of a single fiber catheter. A single optical fiber 20 with a carefully cleaved or polished output tip 28 is shown rigidly centered inside a transparent optical shield 12 (col. 22, ll. 45-48) by means of a plug 11 (col. 8, ll. 9-11). Output tip 28

“may be flush with or protrude from the securing plug 11.” (Col. 8, ll. 48-49.)

5) According to Hayes, optical shield 12 may be “a transparent enclosure made of fused silica, glass, or sapphire or other optically transparent material capable of withstanding heat, steam and high laser power. Optical transparency may include ultraviolet, visible and infrared light, depending on the light and laser sources used.” (Hayes, col. 7, ll. 58-64.) The distal end of optical shield 12 may be hemispherical, rectangular, flat, lens-shaped or of any other shape. (Hayes, col. 7, ll. 58-67.)

6) According to Hayes, Figure 27 shows a prototype in which “[t]he laser beam 29 emerging from the distal end 28 of the optical fiber 20 produced a distribution of light in the form of a circular spot 27 on the outer surface of the optical shield 12. The spot size, defined as the diameter at which the intensity of the spot decreased by half, was adjusted by choosing the appropriate distance between the tip 28 of optical fiber 20 and the outer surface of the optical shield 12.” (Col. 22, ll. 45-59.)

Claims are unpatentable under the doctrine of nonstatutory obviousness-type double patenting if the application claims merely define an obvious variation of the relied upon patent claims. *In re Berg*, 140 F.3d 1428, 1432 (Fed. Cir. 1998).

Where . . . the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. Whether the rejection is based on ‘inherency’ under

35 U.S.C. § 102, on 'prima facie obviousness' under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products.

In re Best, 562 F.2d 1252, 1255 (CCPA 1977) (citations omitted).

Appellant does not disagree with the Examiner's finding that Slater claim 7 (*see* FF 1) discloses an optical probe having the same structural features as Appellant's claim 8 optical probe, with the exception of an explicit disclosure of a structure which directs the excitation and sampling beams along generally counter-propagational paths. (*See* App. Br. 3.) Nor does Appellant disagree with the Examiner's finding that the path of a sampling beam would be counter-propagational to the path of an excitation beam traveling in the same optical fiber. (*See* App. Br. 3.) Rather, Appellant argues that the Examiner has not met the initial burden of establishing a prima facie case of obviousness-type double patenting because the Examiner has not explained how the combined teachings of Slater and Hayes disclose or suggest an arrangement in which the excitation and sampling beam paths are counter-propagational when they are not traveling in the same optical fiber inside the probe body. (App. Br. 3.)

We are not persuaded by Appellant's argument. Hayes clearly teaches that a single optical fiber may be used for delivery and return of light in a device of the type disclosed by Slater claim 7 (FF 2-3). Thus, it was reasonable for the Examiner to conclude that one of ordinary skill in the art would have employed a single optical fiber in the Slater claim 7 device for the purpose of transmitting both excitation and sampling beams (*see* Ans. 4-5). It was further reasonable for the Examiner to conclude that because the resultant structure would be the same as Appellants' claimed structure (*see*

Ans. 5), the Slater/Hayes optical probe would be capable of transmitting excitation and sampling beams along a generally counter-propagational path both through the optical probe window and the sample material (*see* Ans. 10-11). While there is no explicit disclosure in the references regarding the relationship between the paths of travel of sampling and excitation beams, Hayes suggests that the angle of the excitation beam entering the sample material in a single optical fiber configuration is a function of the distance between the end of the optical fiber and the sample material, e.g., diameter of the light spot on the material may be decreased by moving the end of the optical fiber closer, or even adjacent, to the probe window (*see* FF 6). It appears to us that the path of the excitation beam through the probe window and into sample material would not significantly deviate from the path traveled in the optical fiber and that return light traveling into the optical fiber from the sample would travel along a path generally counter-propagational to (i.e., with minimal deviation from) the path of the excitation beam both inside and outside the probe. (*See* FF 4-6 (*compare* beam 29 emerging from distal end 28 of optical fiber 20 *with* spot 27 on the outer surface of the optical shield 12)).

In sum, we find that the Examiner has established a prima facie case of obviousness, thereby shifting the burden to the Appellant to establish that the proposed combination would not necessarily or inherently be capable of producing generally counter-propagational sampling and excitation beam paths as claimed. *See, Best, supra*. Appellant has not presented persuasive arguments or evidence to meet this burden. Accordingly, we sustain the rejection of claims 8-13 on the ground of nonstatutory obviousness-type double patenting as unpatentable over claims of Slater in view of Hayes.

*Rejection of claims 8, 10, and 12 under 35 U.S.C. § 103
as unpatentable over Lemelson in view of Hayes*

The Examiner finds that Lemelson discloses an embodiment of an optical probe having Appellant's claimed probe body, excitation beam, and structure operative to clean the probe window. (Ans. 6-7 (referencing Lemelson Fig. 11).) The Examiner further finds that Lemelson suggests that both the excitation beam and sample beam can travel through a single optical fiber since Lemelson states that the optical fiber arrangements disclosed by Hayes may be used for illumination of tissue and transmission of information back to a sensor. (Ans. 8⁴.) The Examiner concedes that the Lemelson Fig. 11 embodiment does not use Raman wavelengths as claimed in claim 8. (Ans. 7.) However, the Examiner determines that it would have been obvious to the ordinary artisan at the time of the invention to use Raman wavelengths for analysis because, as indicated by Lemelson (Ans. 11 and 12), certain body constituents produce distinguishable Raman spectra when illuminated with the proper wavelength. (Ans. 7.)

Appellant argues that Lemelson's discussion of using Raman spectra is unrelated to the Figure 11 embodiment. (App. Br. 3 (B).) Appellant further argues that Lemelson fails to disclose or suggest a counter-propagating beam arrangement. (App. Br. 4.) Rather, Appellant contends that because the Lemelson Figure 11 embodiment requires a plurality of fiber optic cables, one of ordinary skill in the art would understand that some of the fibers are used to illuminate, while other fibers are used to image.

⁴ The Examiner incorrectly references "column 21, lines 49+". The disclosure actually appears in Lemelson, column 14, ll. 12-25.

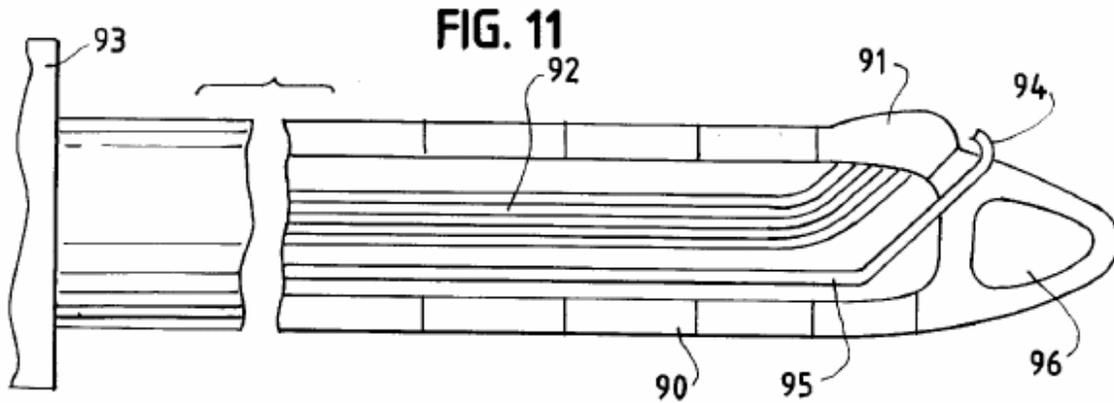
(App. Br. 4.) Appellant further argues that even if the teachings of Lemelson and Hayes were combined, the Examiner has not established a prima facie showing of obviousness because the Examiner has not explained how the combined teachings of Lemelson and Hayes disclose or suggest an arrangement in which the excitation and sampling beam paths are counter-propagational when they are not traveling in optical fibers inside the probe body, e.g., when the beams are traveling through or outside the probe window. (See App. Br. 5.)

The contentions of the Examiner and the Appellant present the following issue on appeal: Has Appellant identified reversible error in the Examiner's determination that it would have been obvious to have modified the Lemelson Figure 11 embodiment to use Raman wavelengths and to substitute a single optical fiber for the plurality of optical fibers, and that such modifications would have resulted in Appellant's claimed invention? We answer this question in the negative for the reasons discussed below.

The following additional enumerated findings of fact are relevant:

7) Lemelson "relates to systems for endoscopic treatment of select tissue in living beings" (col. 1, ll. 7-8) and "employs a computerizing imaging system (such as . . . UV/visible light fluorescence, Raman spectroscopy or microwave imaging)" (col. 1, ll. 12-15).

8) Figure 11 of Lemelson is reproduced below:



Lemelson Fig. 11 illustrates a steerable diagnostic imaging catheter. (Lemelson, col. 13, l. 60.)

9) Lemelson describes Figure 11 as follows:

“The catheter . . . includes a lens 91 transpiercing the wall of the catheter and a plurality of fiber optic cables 92 operably attached to the lens, to transmit images or visual information back to external sensor 93 located outside the body. Visible light or laser energy also can be transmitted through the optical fibers for purposes of illumination and/or ablation of select tissue such as cancerous tissue and tumors. A flushing nozzle 94 supplied through a lumen 95 may be used to keep the lens 91 clear, if desired, by flushing with saline or some other benign, inert clear fluid, under computer control. (various specific optical fiber arrangements are known in the art, as shown for example in U.S. Pat. No. 4,967,745 (Hayes, et al.), the disclosure of which is incorporated by reference herein.)” (Lemelson, col. 14, ll. 12-25.)

The test for obviousness is what the collective teachings of the prior art would have suggested to one of ordinary skill in the art. *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991). A reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in this art would have reasonably been expected to draw therefrom. *In re Fritch*, 972 F.2d 1260, 1264-65 (Fed. Cir. 1992). “The combination of familiar

elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739 (2007). The substitution of one known element for a known equivalent is prima facie obvious. *In re Mayne*, 104 F.3d 1339, 140 (Fed. Cir. 1997).

Contrary to Appellant’s contention, we find that the facts and reasons relied on by the Examiner provide a reasonable basis for concluding that the invention, as claimed in claims 8, 10, and 12 would have been obvious to one of ordinary skill in the art at the time of the invention based on the combined teachings of Lemelson and Hayes (*see* Ans. 6-9). Like the Examiner, we find that one of ordinary skill in the art, considering the collective teachings of Lemelson and Hayes, would have understood that the Lemelson Figure 11 embodiment could be utilized (or readily modified) for analysis of Raman wavelengths. (Ans. 11-12; FF 7); *see Young and Fritch, supra*. We are further in agreement with the Examiner that one of ordinary skill in the art would have been aware that a single fiber optic cable, as taught by Hayes, could be substituted for the plurality of cables used in the Lemelson Figure 11 embodiment. (Ans. 8; FF 8-9); *see KSR and Mayne, supra*. Moreover, for essentially the same reasons discussed above in connection with the first ground of rejection, we are not persuaded by Appellant’s argument that the Examiner has not established a prima facie showing of obviousness because the Examiner has not explained how the combined teachings of Lemelson and Hayes disclose or suggest an arrangement in which the excitation and sampling beam paths are counter-propagational when they are not traveling in optical fibers. As pointed out by the Examiner, because the proposed Lemelson/Hayes structure is

substantially the same as the claimed structure, it would appear that, in use, the path of the excitation beam through the window and into sample material would not significantly deviate from the path traveled in the optical fiber and that return light traveling through the probe window and into the optical fiber from the sample would travel along a path generally counter-propagational to the excitation beam path. (Ans. 13-14; *see also*, p. 11, *supra* (discussing expected beam paths in the Slater/Hayes structure).)

Because Appellant has not presented persuasive arguments or evidence to refute the Examiner's prima facie case of obviousness, we sustain the rejection of claims 8, 10, and 12 as unpatentable over Lemelson in view of Hayes.

*Rejection of claims 9 and 11 under 35 U.S.C. § 103
as unpatentable over Lemelson in view of Hayes
as applied to claim 8 and further in view of Alfano*

The Examiner finds that the combined teachings of Lemelson/Hayes disclose the invention as claimed with the exception of the fluid used to clean the probe window being a solvent or gas as claimed in claims 9 and 11. (Ans. 9.) The Examiner contends that it would have been obvious to have used a solvent or gas in the Lemelson/Hayes device in view of Alfano's teaching that a liquid, gas, or solvent may be used in an endoscope used for detection of malignant tissue. (Ans. 9.)

Appellant argues that Lemelson only contemplates the use of "saline or some other benign, inert clear liquid." (App. Br. 5 (quoting Lemelson, col. 14, ll. 21-22).) Appellant thus contends that the Examiner's proposed modification of Lemelson/Hayes is based on improper hindsight reasoning. (App. Br. 5.)

The issue thus presented is: Has Appellant shown that the Examiner relied on impermissible hindsight reasoning in concluding that it would have been obvious to have used a solvent or gas as the fluid for cleaning the probe window? We answer this question in the negative.

The following additional enumerated findings of fact are relevant:

10) Alfano “relates to a method for determining if a tissue is a malignant tumor tissue, a benign tumor tissue, or a normal or benign tissue using Raman spectroscopy.” (Alfano, col. 1, ll. 8-11.)

11) Alfano discloses passing a beam of monochromatic light onto a sample such that the beam of light is scattered in accordance with the Raman effect upon striking the sample. (Alfano, col. 4, ll. 18-19.)

The scattered light is collected in an interferometer and the resultant interference pattern is detected with a liquid nitrogen-cooled indium-gallium arsenide photodiode-type detector 43. (Alfano, col. 4, ll. 32-34.)⁵

In *KSR*, the Supreme Court explained that while “[a] fact finder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning . . . [r]igid preventative rules that deny fact finders recourse to common sense . . . are neither necessary under our case law nor consistent with it.” 127 S.Ct. at 1742-43.

Appellant’s hindsight argument is not without merit in that the references do not use fluids for the same purpose: Lemelson’s use of clear liquid is for the purpose of cleaning the device window (FF 9), while Alfano utilizes fluid for sample collection and analysis (FF 11). However, we are

⁵ The Examiner incorrectly references “column 11, lines 35-40”.

not convinced of reversible error on the part of the Examiner because it is clear that the Examiner's rejection is also based on an unrefuted finding that the use of various solvents was well known in the art at the time of Appellant's invention (Ans. 9 and 15) and that Lemelson's "benign liquid" is properly viewed as a solvent (Ans. 15 (explaining that saline is a solvent in that it dissolves blood, yet is benign to living tissue)). Thus, the Examiner properly relied on the background knowledge possessed by the ordinary artisan in concluding that it would have been obvious to substitute a known equivalent solvent for Lemelson's liquid.

Accordingly, we sustain the rejection of claims 9 and 11 as unpatentable over Lemelson and Hayes and further in view of Alfano.

CONCLUSION

We affirm the decision of the Examiner rejecting claims 8-13 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of U.S. Patent 6,873,409 B1 ("Slater") in view of Hayes; claims 8, 10, and 12 under 35 U.S.C. § 103 as unpatentable over Lemelson in view of Hayes; and claims 9 and 11 under 35 U.S.C. § 103 as unpatentable over Lemelson in view of Hayes as applied to claim 8 and further in view of Alfano.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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