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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte NATALIYA CHERNOVA

Appeal 2015-002021
Application 13/108,129
Technology Center 3700

Before ERIC B. GRIMES, ULRIKE W. JENKS, and
ROBERT A. POLLOCK, *Administrative Patent Judges*.

PER CURIAM

DECISION ON APPEAL

This is a decision on appeal[1] under 35 U.S.C. § 134 from the Examiner's rejection of claims 1–4, 6–9, 11, 12, and 15–18. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM, but designate our affirmances as NEW GROUNDS OF REJECTION pursuant to our authority under 37 C.F.R. § 41.50(b).

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[1] Appellant identifies the Real Party in Interest as Covidien LP (App. Br. 2).

STATEMENT OF THE CASE

The Specification discloses "a system and method of employing optical feedback for energy-based tissue sealing" (Spec. 1).

Claim 1 is representative of the claims on appeal and reads as follows:

> 1. A method of performing energy-based vessel sealing, comprising:
> *illuminating tissue with light to seal a vessel*;
> sensing light modified by the tissue structure;
> analyzing the light modified by the tissue structure to determine at least one optical parameter of the tissue structure;
> forming a control signal based on the at least one optical parameter; and
> generating the light based on the control signal,
> wherein illuminating the tissue with light includes:
> varying an incident angle of the light over a range of incident angles;
> selecting an incident angle that optimizes determination of the at least one optical parameter; and
> illuminating the tissue with the light at the selected incident angle with respect to an axis perpendicular to the vessel.

(Claims Appendix, emphasis added)

Issue

The Examiner has rejected claims 1, 3, 4, 6, 8, 9, 11, 12, and 15–18 under 35 U.S.C. 103(a) in view of Carlton,[2] Benaron,[3] and Litvak[4] (Ans. 2–7). The Examiner has also rejected claims 2, 7, 11, and 17 under 35 U.S.C.

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[2] John D. Carlton et al., US 2010/0049187 A1, published Feb. 25, 2010 ("Carlton").
[3] David A. Benaron et al., US 5,785,658, issued July 28, 1998 ("Benaron").
[4] Emil Litvak et al., US 2006/0189965 A1, published Aug. 24, 2006 ("Litvak").

§ 103(a) as obvious in view of Carlton, Benaron, and Litvak, and further in view of either Floume[5] (claims 2 and 7, Ans. 7–8) or Goldberger[6] (claims 11 and 17, Ans. 8).

The issue presented is: Does the evidence of record support the Examiner's conclusion that the cited references would have made obvious a method of performing energy-based vessel sealing that comprises "*illuminating tissue with light to seal a vessel*" in conjunction with sensing and analyzing light modified by the tissue structure to form a control signal, as required by claim 1 (emphasis added)?

Findings of Fact

1. Carlton discloses

> an electrosurgical system [that] includes an electrosurgical generator, an electrosurgical instrument, an optical clarity sensor and a control component. . . . The electrosurgical instrument . . . treats tissue. The optical clarity sensor . . . is adapted to measure tissue with at least two optical frequencies. The control component is operatively coupled to the optical clarity sensor and receives sensor data therefrom . . . [and] communicates control instructions to the electrosurgical generator to control the generation of the electrosurgical energy.
>
> (Carlton, ¶ 13; Ans. 2–3).

2. Carlton discloses that "control component **110** determines what properties the electrosurgical energy should have based upon sensor data,

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[5] Timmy Floume et al., WO 2009/005850 A1, published Jan. 8, 2009 ("Floume").
[6] Daniel S. Goldberger et al., US 5,772,597, issued June 30, 1998 ("Goldberger").

specifically, control component **110** can form a feed-back loop with sensor **128**. Sensor **128** may include . . . tissue hydration sensor **132**, and/or optical clarity sensor **134**" (Carlton, ¶ 36).

3. Carlton discloses that "[t]issue hydration sensor **132** can communicate to electrosurgical generator **102** a tissue hydration measurement. . . . [T]issue hydration sensor **132** can approximate tissue hydration of the tissue between jaw members **204** and **208** . . . The measurement of the tissue hydration may be accomplished using an optical based sensor" (Carlton, ¶ 45).

4. Carlton discloses that

> during electrosurgery[,] a surgeon may use surgical instrument **216** . . . to clamp onto a vessel between jaw members **204** and **208** . . . [and] then activate the electrosurgical energy . . . to start the vessel sealing. The initial tissue hydration measurement of tissue hydration sensor **132** may be . . . about 60% water content, and control algorithm **124** may have a predetermined threshold of 30% water content. . . . [T]issue hydration sensor **132** measures the reducing water content and instructs waveform controller **118** to continue to apply the electrosurgical energy until control algorithm **124** detects an approximate **30%** water content.

(Carlton, ¶ 46; Ans. 9).

5. Carlton discloses

> an optical source may inject photons from jaw member **204** through tissue and to jaw member **208** where an absorption and/or transparency measurement can be made. Jaw member **204** may include an LED, a laser, a fiber optical coupling lens, or the like. . . [C]able **136** may include a fiber optic cable that carries light . . . that is focused to travel from jaw member **204**

> thorough [sic] tissue and to jaw member **208**. Jaw member **208** may include a fiber optic coupling lens to gather the photons.

(Carlton, ¶ 48).

6. Carlton discloses

> electrosurgical generator **102** may include a . . . laser that injects photons into a fiber optic cable . . . The photons travel down the core of the fiber optic cable to jaw member **204**, where a lens injects the photons into tissue contained within jaw members **204** and **208**. Jaw member **208** . . . contains a lens that couples the photons back into a fiber optic cable that carries the photons to . . . [a] photodetector.

(Carlton, ¶ 49).

7. Benaron discloses:

> A tool for nondestructive interrogation of the tissue including a light source emitter and detector which may be mounted directly on the surgical tool in a tissue contacting surface. . . . . The optical sensing elements can be built into a surgical tool end effector tip such as a tissue grasping tool which has cooperating jaws (bivalve or multi-element). In the preferred embodiment the light source . . . is mounted on one jaw and the detector . . . is mounted in the opposing jaw so that the light emitter and detector are facing one another either directly . . . or acutely (i.e., with intersecting optical axes so that the light emitted is detected).

(Benaron, Abstract).

8. Benaron discloses "a smart surgical tool that can perform a tissue heating function, using tips for electrocautery, thermally regulated heating and laser based heating, and control the heating to inhibit intervention in the presence of tissue identified as inappropriate" (Benaron, col. 17, ll. 36–41).

9. Benaron discloses that its invention

> is applicable to controlling bleeding during a surgical intervention . . . [F]or tissue to bleed: 1) There must be a hole in a blood vessel, and 2) there must be blood flow. It is known that . . . tissue welding can be used for closing a hole or for stopping the normal blood flow. Further, when preparing a tissue for surgical removal, it is necessary to shut off blood supply to the tissue. This is traditionally done with sutures, though suturing is time-consuming . . . and can be a focus of infection. Thus, alternative methods of closing blood vessels are being sought, such as electrocautery and thermally heated hemostatic devices. If done properly . . . larger vessels can be seared together, preventing bleeding during tissue removal.

(Benaron, col. 17, ll. 42–56).

10. Benaron discloses that the "same optical sensing technology also may be used for observing and controlling unipolar electrosurgical cautery, laser cautery, and laser welding of tissues" (Benaron, col. 27, ll. 59–61).

Analysis

The Examiner finds that Carlton discloses

> a method of performing energy-based vessel sealing, comprising: illuminating tissue with light to seal a vessel . . . sensing light modified by the tissue structure . . . analyzing the light modified by the tissue structure to determine at least one optical parameter of the tissue structure . . . [and] forming a control signal based on the at least one optical parameter.

(Ans. 2–3.) The Examiner finds that Carlton does not disclose "details regarding beam angle" (Ans. 3). The Examiner finds that Benaron discloses "illuminating the tissue with light at an incident angle with respect to an axis perpendicular to the tissue . . . but does not explicitly disclose details

regarding variable incident angles" (Ans. 3). The Examiner finds that Litvak discloses "varying an incident angle over a range of incident angles . . . selecting a scanning parameter . . . and calculation of a parameter" (Ans. 3).

The Examiner concludes that, in view of Carlton, Benaron, and Litvak, it would have been obvious to one of ordinary skill in the art "to illuminate the tissue at a specific angle to optimize determination of an optical parameter because this configuration would minimize light passing straight to the detector without passing through tissue" (Ans. 3). The Examiner concludes that "it would have been obvious to vary the incident angle to optimize the system for specific applications, such as penetrating hard tissue" (Ans. 3–4). The Examiner concludes that "it would have been obvious to select an angle that optimizes determination of an optical parameter in order to utilize the parameter as an accurate quantifier of system performance" (Ans. 4).

Appellant argues that "none of the cited references . . . teach or reasonably suggest 'illuminating tissue with light to seal a vessel,' as recited in independent claim 1" (App. Br. 7). Appellant argues that the cited portions of Carlton are "silent about **sealing the vessel using light** as recited in claim 1" (App. Br. 8). Appellant argues that the Examiner did not rely on Benaron and Litvak "to address the deficiencies of Carlton with respect to illuminating tissue with light to seal a vessel" (App. Br. 8). Appellant argues that "Benaron discloses electrocautery and thermally heated hemostatic devices and the use of current to seal blood vessels," but does not disclose or suggest using light to seal a vessel (Reply Br. 3–4). Appellant argues that "Carlton, Benaron, and Litvak, whether considered alone or in

any proper combination, fail to teach or reasonably suggest, 'illuminating tissue with light to seal a vessel,' as recited in claim 1" (App. Br. 10).

We are not persuaded by Appellant's contentions and agree with the Examiner that the combination of Carlton, Benaron, and Litvak would have made obvious the method of claim 1. "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.*, 550 U.S. 398, 416 (2007). Both Carlton and Benaron disclose using optical interrogation systems with surgical tools to improve accuracy in surgical procedures, including vessel sealing (FFs 1–7 and 10). Benaron discloses that cauterizing tissues, including laser welding, is a known procedure of vessel sealing (FF 8–10). Thus, we agree with the Examiner that it would have been obvious to one of skill in the art to apply an optical interrogation system to a laser vessel sealing procedure to optimally control the laser cautery or laser welding of tissues (*see* FF 10). We affirm the rejection of independent claim 1 under 35 U.S.C. § 103(a).

Appellant also argues the rejection of independent claims 8 and 15 (App. Br. 10). Independent claim 8 is directed to system that comprises "a sealing energy source configured to generate light to seal a vessel." Independent claim 15 is directed to an instrument that comprises "a light source configured to illuminate at least a portion of the tissue deformed by the pair of jaw members with light to seal a vessel." Appellant argues that the Examiner erred in rejecting claims 8 and 15 as obvious in view of Carlton, Benaron, and Litvak for the same reasons as discussed above (App. Br. 10). Appellant's argument is not persuasive for the same reasons

discussed above with respect to claim 1. We affirm the rejection of independent claims 8 and 15 under 35 U.S.C. § 103(a). Dependent claims 3, 4, 6, 9, 11, 12, and 16–18 have not been argued separately from the independent claims and therefore fall with independent claims 1, 8, and 15. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Because we have included the finding that Benaron teaches that the optical system can detect the results of laser welding (FF 10) our conclusions with respect to these rejections include an additional a fact from those relied on by the Examiner. Accordingly, we designate our affirmance a new ground of rejection under 37 C.F.R. § 41.50(b) to provide Appellant with a full and fair opportunity to respond to these rejections, as modified.

The Examiner also rejects dependent claims 2, 7, 11, and 17 under 35 U.S.C. § 103(a) as obvious in view of Carlton, Benaron, Litvak, and either Floume (claims 2 and 7, Ans. 7–8) or Goldberger (claims 11 and 17, Ans. 8). For these rejections, Appellant argues that Floume and Goldberger do not cure the deficiencies of Carlton, Benaron, and Litvak in making obvious independent claims 1, 8, and 15 (App. Br. 10–11). For the reasons discussed above with respect to claim 1, Appellant's argument is not persuasive, and we affirm the rejections of claims 2, 7, 11, and 17 for the reasons discussed above and as set forth by the Examiner (Ans. 7–8).

Conclusion of Law

The evidence of record supports the Examiner's conclusion that the cited references would have made obvious a method of performing energy-based vessel sealing that comprises "*illuminating tissue with light to seal a vessel*" in conjunction with sensing and analyzing light modified by the

tissue structure to form a control signal, as required by claim 1 (emphasis added).

SUMMARY

We affirm the rejection of claims 1, 3, 4, 6, 8, 9, 11, 12, and 15–18 under 35 U.S.C. 103(a) over Carlton, Benaron, and Litvak.

We affirm the rejection of claims 2 and 7 under 35 U.S.C. § 103(a) over Carlton, Benaron, Litvak, and Floume.

We affirm the rejection of claims 11, and 17 under 35 U.S.C. § 103(a) over Carlton, Benaron, Litvak, and Goldberger.

We designate our affirmance of each of these rejections as new grounds of rejection under 37 C.F.R. § 41.50(b) because we include portions of Benaron not relied on by the Examiner.

TIME PERIOD FOR RESPONSE

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new grounds of rejection to avoid termination of the appeal as to the rejected claims:

> (1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner . . .

> (2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same Record . . .
>
> No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED, 37 C.F.R. § 41.50(b)