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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHARLES EDWARD BAUMGARTNER,
GEORGE CHARLES SOGOIAN,
and ROBERT STEPHEN LEWANDOWSKI

Appeal 2011-002486
Application 10/814,830
Technology Center 3700

Before LORA M. GREEN, JEFFREY N. FREDMAN, and
ULRIKE W. JENKS, *Administrative Patent Judges*.

FREDMAN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to an ultrasound system. The Examiner rejected the claims as failing to satisfy the written description requirement and as obvious. We have jurisdiction under 35 U.S.C. § 6(b). We reverse, vacate and enter a New Grounds of Rejection.

Statement of the Case

Background

The Specification teaches an "ultrasound system including an ultrasound probe, which has an ultrasonic transducer and a physical sensor adapted to sense engagement with a subject to be scanned by the ultrasonic transducer" (Spec. 2 ¶ 0006).

The Claims

Claims 1, 3-21, 23, and 24 are on appeal. Claims 1 and 9 are representative and read as follows:

1. An ultrasound system, comprising:
an ultrasound probe, comprising
an ultrasonic transducer; and
a physical sensor adapted to sense engagement with a subject to be scanned by the ultrasonic transducer, wherein the physical sensor is independent from the ultransonic transducer; and
a control system coupled to the ultrasound probe and configured to control power modes of the ultrasound probe based on feedback from the physical sensor.

9. A method for controlling heat in an ultrasound system, the method comprising:
physically sensing engagement of an ultrasound module with a subject using a non-ultrasonic sensor; and
switching power modes of the ultrasound module based on the sensed engagement

The issues

A. The Examiner rejected claims 9-21 under 35 U.S.C. § 112, first paragraph as failing to satisfy the written description requirement (Ans. 5-6).

B. The Examiner rejected claims 1, 3, 7, 9, 12, 14, 15, 17, 18, 21, and 23 under 35 U.S.C. § 103(a) as obvious over Emery[1] (Ans. 3-4).

C. The Examiner rejected claims 4 and 19 under 35 U.S.C. § 103(a) as obvious over Emery and Chiang[2] (Ans. 4-5).

D. The Examiner rejected claims 5, 6, 20, and 24 under 35 U.S.C. § 103(a) as obvious over Emery and Akisada[3] (Ans. 5).

E. The Examiner rejected claims 8, 10, 11, 13, and 16 under 35 U.S.C. § 103(a) as obvious over Emery and Whitney[4] (Ans. 5).

A. 35 U.S.C. § 112, first paragraph, new matter

The Examiner finds that the "original disclosure fails to specify that the sensor is **non-ultrasonic** and detects proximity **non-ultrasonically** as now claimed. Therefore these limitations are considered to be new matter" (Ans. 6).

Appellants contend that figure 1 shows that "the physical sensor 20 is independent from the ultrasound sensor (e.g., piezoelectric transducer array 18). Furthermore, only the physical sensor 20 provides feedback (i.e., non-ultrasonic feedback) to the power mode processor 30, which in tum communicates with the control unit 32" (Reply Br. 6). Appellants contend that "the original specification clearly discloses that the ultrasound probe does not ultrasonically scan in association with the physical sensor" (Reply Br. 6).

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[1] Emery, C., US 6,610,011 B2, issued Aug. 26, 2003.
[2] Chiang et al., US 5,957,846, issued Sep. 28, 1999.
[3] Akisada et al., US 6,183,426 B1, issued Feb. 6, 2001.
[4] Whitney et al., US 5,396,891, issued Mar. 14, 1995.

The issue with respect to this rejection is: Does the evidence of record support the Examiner's conclusion that the limitation "physically sensing engagement of an ultrasound module with a subject using a non-ultrasonic sensor" in claim 9 represents new matter?

Findings of Fact

The following findings of fact ("FF") are supported by a preponderance of the evidence of record.

1. The Specification teaches that in the "ultrasound probe 12, the physical sensors 20 detect when the ultrasound probe 12 is in contact, close proximity, or generally approaching the subject to be ultrasonically scanned by the ultrasonic transducer array 18. For example, the physical sensors 20 may sense temperature, pressure, distance, or other physical characteristics of the subject 16" (Spec. 4 ¶ 0015).

2. The Specification teaches that the

> In the illustrated embodiment, the temperature sensing element 81 and the pressure sensing element 82 are disposed at outer peripheral portions of the front face or lens 80 of the ultrasound probe 58. For example, the sensing elements 81 and 82 may be embedded into the lens 80 or located next to the lens 80. Although not illustrated, other embodiments may include various other types of physical sensors, such as distance or proximity sensors, motion sensors, and so forth. As discussed above, these physical sensors, e.g., 81 and 82, facilitate detection of the subject 16, such that the ultrasound system 10 can power up or increase power modes when the ultrasound probe 58 is in a position to begin ultrasound scanning.

(Spec. 8 ¶ 0026).

3. The Specification teaches that the "temperature sensing element 81 senses any heat transfer between the ultrasound probe 58 and the subject 16. When the ultrasound probe 58 is in contact with the body of the subject 16, the temperature sensing element 81 senses the heat transferred from the ultrasound probe 58 to the subject 16, or vice-versa" (Spec. 8-9 ¶ 0027).

Principles of Law

> [T]he hallmark of written description is disclosure…. [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed.

Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010).

Analysis

While the Examiner is correct that the specific language of the claims was not disclosed *ipsis verbis* in the Specification, *ipsis verbis* support is not required. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570 (Fed. Cir. 1996). We agree with Appellants that the term "non-ultrasonic sensor" is simply a change in nomenclature and is reasonably supported by the Specification. The Specification never specifically teaches an ultrasonic sensor which is used to sense the presence or absence of a subject, but rather teaches the use of physical sensors of temperature, pressure, distance, or motion to detect a subject's location (FF 1-2). Even in the situation where the temperature sensor is detecting energy applied by the ultrasonic probe itself, the

temperature sensor does not detect the ultrasonic waves, but independently measures the temperature of the subject (FF 3).

Conclusion of Law

The evidence of record does not support the Examiner's conclusion that the limitation "physically sensing engagement of an ultrasound module with a subject using a non-ultrasonic sensor" in claim 9 represents new matter.

B-E. 35 U.S.C. § 103(a) over Emery

We vacate the obviousness rejection over Emery and the further obviousness rejections over Emery and Chiang, Emery and Akisada, and Emery and Whitney and enter the following new grounds of rejection

New Grounds of Rejection

Under the provisions of 37 C.F.R. § 41.50(b), we enter the following new grounds of rejection.

Claims 1, 3-5, 7-21, 23, and 24 are rejected under 35 U.S.C. § 103(a) as obvious over Emery and Akisada.

Findings of Fact

4. Emery teaches that an "ultrasound system **50** includes a pulse generator **52** that generates a series of electronic signals that are optimized to excite the ultrasonic transducer **56**" (Emery, col. 2, ll. 40-43).

5. Emery teaches that "[c]ontrolling the operation of the ultrasound system **50** is a central processing unit **76** having its own internal

memory in which data and the operating instructions for the CPU are stored" (Emery, col. 3, ll. 5-8).

6. Emery teaches that "[a]dditional control mechanisms may be added to the system or probe to determine whether a probe is in use. The additional mechanisms may be used separately or in conjunction with the algorithm stated above for increased accuracy" (Emery, col. 5, ll. 59-63).

7. Emery teaches that "electro-optical or electromechanical or physical switches added to the probe holder on the system notifies the system if the probe has been picked up by the user" (Emery, col. 5, ll. 63-66).

8. Emery teaches that "sensors in the probe may detect when the probe is in use. The sensors may include: (1) motion detectors (2) optical emitter/detector pairs (3) thermal sensors. The motion detector would simply detect movement of the probe, which primarily occurs during scanning. An optical emitter/detector pair would sense the amount of light reflected by the tissue" (Emery, col. 5, l. 66 to col. 6, l. 8).

9. Emery teaches that "[o]bviously, both techniques could be used separately or in combination with the process shown in FIG. 4 to reduce the transmit power to the probe elements" (Emery, col. 6, ll. 7-9).

10. Emery teaches, in claim 1, "determining if a probe is coupled to a body to be imaged" (Emery, col. 6, ll. 31-32).

11. Akisada teaches an "ultrasonic wave applying device . . . includes an hand-held applicator having a vibration element which is, in use, contact with a skin of a user to apply ultrasonic waves to the skin . . . and a load detecting circuit which monitors whether the vibration element is

loaded such as by contact with the skin and provides a load detection signal when the vibration element is so loaded" (Akisada, col. 1, ll. 45-55).

12. Akisada teaches that the "apparatus can detect the motion of the vibration element whether it is moving in contact with the human body and is so made to apply the ultrasonic waves continuously only while the vibration element is so moving, thereby disabling to apply the ultrasonic waves to a portion of the human body over a long period which would otherwise incur cold burn" (Akisada, col. 2, ll. 1-7).

13. Claim 14 of Akisada is reproduced below:

> An ultrasonic wave applying apparatus comprising:
> a hand-held applicator device having a vibration element for contacting a skin of a user;
> a power source;
> an oscillator circuit energized by said power source that generates an oscillating output for driving said vibration element;
> a skin contacting detecting circuit for monitoring whether said vibrating element is in contact with a skin of a user;
> a motion detecting circuit for monitoring whether said vibrating element is moving and providing a detection signal when movement of the vibration element occurs;
> a control circuit connected to said skin contacting detecting circuit and said motion detecting circuit to lower said oscillating output when a signal from said skin contacting detecting circuit is not received within a first time period or when said motion detection signal is discontinuous over a critical time duration within a second time period.

14. Akisada teaches that the "ultrasonic wave applying device in accordance with the present invention includes an hand-held applicator

having a vibration element which is, in use, contact with a skin of a user to apply ultrasonic waves to the skin" (Akisada, col. 1, ll. 45-48).

15. Akisada teaches that "[o]peration of the ultrasonic apparatus is now explained . . . After turning on a power switch, pressing of a start button actuates the oscillator circuit **20**, causing the vibration plate **12** to start the ultrasonic vibration, and starts the timer" (Akisada, col. 8, ll. 55-59).

16. Akisada teaches a "ringshaped sensor disk **150** made of pressure sensitive electroconductive rubber which deforms in response to a force applied to the vibration plate. The sensor disk **150** is . . . capable of deforming as a consequence of the lo vibration plate **12**E being subject to a force when the vibration plate **12**E comes into contact with the human body" (Akisada, col. 10, ll. 54-62).

Principles of Law

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) secondary considerations of nonobviousness, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

"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). "If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability." *Id*. at 417. As noted by the Court in *KSR*, "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton." 550 U.S. at 421.

Analysis

With regard to claims 1 and 15, Emery teaches that an "ultrasound system **50** includes a pulse generator **52** that generates a series of electronic signals that are optimized to excite the ultrasonic transducer **56**" (Emery, col. 2, ll. 40-43; FF 4).

Emery teaches that "sensors in the probe may detect when the probe is in use. The sensors may include: (1) motion detectors (2) optical emitter/detector pairs (3) thermal sensors" (Emery, col. 5, l. 66 to col. 6, l. 3; FF 8).

Emery teaches that "[a]dditional control mechanisms may be added to the system or probe to determine whether a probe is in use" (Emery, col. 5, ll. 59-60; FF 6). Emery teaches that "[o]bviously, both techniques could be used separately or in combination with the process shown in **FIG. 4** to reduce the transmit power to the probe elements" (Emery, col. 6, ll. 7-9; FF 9).

Akisada teaches an "ultrasonic wave applying device . . . includes an hand-held applicator having a vibration element which is, in use, contact with a skin of a user to apply ultrasonic waves to the skin . . . and a load detecting circuit which monitors whether the vibration element is loaded such as by contact with the skin and provides a load detection signal when the vibration element is so loaded" (Akisada, col. 1, ll. 45-55; FF 11).

Applying the *KSR* standard of obviousness to the findings of fact, we conclude that the person of ordinary creativity would have predictably combined the load detecting circuit for detecting contact with the skin of Akisada with the ultrasonic transducer of Emery since Emery is interested in

"determining if a probe is coupled to a body to be imaged" (Emery, col. 6, ll. 31-32; FF 10). Such a combination is merely a "predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

With regard to claims 3, 4, 13, and 19, Akisada teaches that the "ultrasonic wave applying device in accordance with the present invention includes an hand-held applicator having a vibration element which is, in use, contact with a skin of a user to apply ultrasonic waves to the skin" (Akisada, col. 1, ll. 45-48; FF 14). The hand-held applicator satisfies claims 3 and 19. Akisada's teaching that the applicator has the vibration element which forms a portion of the beamformer satisfies the requirement of claims 4 and 19 (FF 14). The teaching to sense contact using a physical sensor with the skin of the subject satisfies claims 13 and 19 (FF 14).

With regard to claims 5, 11, 16, 20 and 24, Akisada teaches a pressure sensor, specifically teaching a "ringshaped sensor disk **150** made of pressure sensitive electroconductive rubber which deforms in response to a force applied to the vibration plate. The sensor disk **150** is . . . capable of deforming as a consequence of the vibration plate **12**E being subject to a force when the vibration plate **12**E comes into contact with the human body" (Akisada, col. 10, ll. 54-62; FF 16).

With regard to claims 7, 12, 17, and 21, Emery teaches a temperature sensor (FF 8). The ordinary artisan would have found it obvious to use a temperature sensor to monitor thermal proximity to ensure proximity of the patient to the device since Emery is interested in "determining if a probe is coupled to a body to be imaged" (Emery, col. 6, ll. 31-32; FF 10).

With regard to claims 8 and 10, we interpret these claims to require that the physical sensor is turned on using a manual power switch, but the claims do not require that the switch solely function to turn on the physical sensor, but may be a switch which activates the entire ultrasound system. *See In re Zletz*, 893 F.2d 319, 322 (Fed. Cir. 1989) ("[D]uring patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed."). Akisada teaches that "[o]peration of the ultrasonic apparatus is now explained . . . After turning on a power switch, pressing of a start button actuates the oscillator circuit **20**, causing the vibration plate **12** to start the ultrasonic vibration, and starts the timer" (Akisada, col. 8, ll. 55-59; FF 15).

With regard to claim 9, Akisada teaches an

> ultrasonic wave applying device . . . includes an hand-held applicator having a vibration element which is, in use, contact with a skin of a user to apply ultrasonic waves to the skin . . . and a load detecting circuit which monitors whether the vibration element is loaded such as by contact with the skin and provides a load detection signal when the vibration element is so loaded

(Akisada, col. 1, ll. 45-55; FF 11). Akisada also teaches the switching power step based on sensing skin contact, teaching "a control circuit connected to said skin contacting detecting circuit and said motion detecting circuit to lower said oscillating output when a signal from said skin contacting detecting circuit is not received" (Akisada, claim 14; FF 13).

With regard to claims 14 and 18, Akisada and Emery render obvious the device of claim 1 (FF 4-13) and Akisada teaches that the power for the transducer increases from zero to some higher value after sensing skin

engagement with the subject (FF 11, 13), satisfying the requirement of increasing power upon sensing engagement, i.e., feedback, in claims 14 and 18.

With regard to claim 23, the claim uses two phrases "means for sensing non-ultrasonic signals to detect proximity" and "means for switching power modes", which invoke 35 U.S.C. § 112, sixth paragraph. We therefore look to the Specification to interpret these phrases. Regarding these phrases, the Specification teaches

> embodiments may include various other types of physical sensors, such as distance or proximity sensors, motion sensors, and so forth. As discussed above, these physical sensors, e.g., 81 and 82, facilitate detection of the subject 16, such that the ultrasound system 10 can power up or increase power modes when the ultrasound probe 58 is in a position to begin ultrasound scanning.

(Spec. 8 ¶ 0026; FF 2). Thus, the Specification teaches that proximity and distance sensors satisfy the requirements of the "means for sensing" and allowing the system to "power up" represents a "means for switching power modes".

Therefore, when Akisada teaches "a skin contacting detecting circuit for monitoring whether said vibrating element is in contact with a skin of a user" (Akisada, claim 14; FF 13), Akisada teaches a "means for sensing" with a proximity sensor which is reasonably interpreted as consistent with the Specification as required by 35 U.S.C. § 112, sixth paragraph.

Further, when Akisada teaches that "[o]peration of the ultrasonic apparatus is now explained . . . After turning on a power switch, pressing of a start button actuates the oscillator circuit **20**, causing the vibration plate **12**

to start the ultrasonic vibration" (Akisada, col. 8, ll. 55-59; FF 15), Akisada teaches a "means for switching power modes" by powering up, this is reasonably interpreted as consistent with the Specification as required by 35 U.S.C. § 112, sixth paragraph.

Consequently, Emery and Akisada render claim 23 obvious.

As the Board's function is primarily one of review and not search, we leave to the Examiner the determination of whether there is prior art to address dependent claim 6 to a piezoelectric pressure sensor in view of the new ground of rejection to independent claim 1 from which dependent claim 6 directly depends.

SUMMARY

In summary, we reverse the rejection of claims 9-21 under 35 U.S.C. § 112, first paragraph as failing to satisfy the written description requirement.

We vacate the obviousness rejections.

We reject claims 1, 3-5, 7-21, 23, and 24 under 35 U.S.C. § 103(a) as obvious over Emery and Akisada

This decision contains new grounds of rejection pursuant to 37 C.F.R. § 41.50(b) (effective September 13, 2004, 69 Fed. Reg. 49960 (August 12, 2004), 1286 Off. Gaz. Pat. Office 21 (September 7, 2004)). 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."

Claims 1, 3-5, 7-21, 23, and 24 are subject to the new grounds of rejection as discussed above. Claim 6 is not subject to any grounds of rejection.

37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground 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 proceeding 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. . .

<u>REVERSED, VACATED, 37 C.F.R. § 41.50(b)</u>

dm