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EXAMINER

MOHAMMED, SHAHDEEP

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK L. PALMERI, DAVID B. MACLEOD,
JEREMY J. DAHL, STUART A. GRANT, and
KATHRYN R. NIGHTINGALE¹

Appeal 2018-004041
Application 12/407,979
Technology Center 3700

Before MICHAEL L. HOELTER, ANNETTE R. REIMERS, and
LISA M. GUIJT, *Administrative Patent Judges*.

HOELTER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is a decision on appeal, under 35 U.S.C. § 134(a), from the Examiner's final rejection of claims 1–27, which constitute all the claims pending in this application. *See* Br. 2. We have jurisdiction under 35 U.S.C. § 6(b). For the reasons explained below, we do not find error in the

¹ Duke University is identified as the real party in interest and as assignee to this application. *See* Br. 1. For purposes of this appeal, we understand Duke University is the Appellant.

Examiner's rejections of these claims. Accordingly, we AFFIRM the Examiner's rejections.

CLAIMED SUBJECT MATTER

The disclosed subject matter "relates to ultrasound methods, systems and computer program products, and more specifically to ultrasound imaging of fluids." Spec. ¶ 1. Claims 1, 7, and 15 are independent.

Claim 1 is illustrative of the claims on appeal and is reproduced below.

1. An ultrasound system for identifying a presence of injected fluid in a region of interest, the system comprising:
 - a controller configured to obtain first and second image data sets of a region of interest from an ultrasound transducer array; and
 - a decorrelation module configured to determine a correlation coefficient (ρ) of the first and second image data sets and to identify a decorrelation region of decorrelated data responsive to a magnitude of the correlation coefficient (ρ) of data that is decorrelated between the first and second image data sets, wherein the decorrelation region indicates a presence of injected fluid that is injected into soft tissue, wherein the controller is configured to generate an image of the region of interest, to generate a decorrelation map of the decorrelation region and to display the image of the region of interest together with the decorrelation map.

REFERENCES

Østensen	US 5,980,460	Nov. 9, 1999
Ogasawara	US 6,607,490 B2	Aug. 19, 2003
Zhao	US 6,775,400 B1	Aug. 10, 2004
Keenan	US 2007/0197954 A1	Aug. 23, 2007

Andrew T. Gray, *Ultrasound-guided Regional Anesthesia*, 104 ANESTHESIOLOGY 368–73 (2006).

THE REJECTIONS ON APPEAL

Claims 1, 2, 7–10, 12, 13, 15, 16, and 19–27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Østensen and Gray. Final Act. 4.

Claims 3–5, 11, 13, 17, and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Østensen, Gray, and Zhao. Final Act. 7.

Claims 6 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Østensen, Gray, and Ogasawara. Final Act. 8–9.

Claims 25–27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Østensen, Gray, and Keenan. Final Act. 10.

ANALYSIS

*The rejection of claims 1, 2, 7–10, 12, 13, 15, 16, and 19–27
as being obvious over Østensen and Gray*

Appellant argues all these claims (i.e., claims 1, 2, 7–10, 12, 13, 15, 16, and 19–27) together. Br. 4–6. We select claim 1 for review, with claims 2, 7–10, 12, 13, 15, 16, and 19–27 standing or falling therewith. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds that Østensen discloses the recited controller and decorrelation module and “shows that the image identifies [a] decorrelation region with a contrasting color added to the image” but acknowledges that Østensen “fails to explicitly state that the decorrelation region indicates fluid that is injected into soft tissue.” Final Act. 5 (citing Østensen, Abstract, 2:21–43, 3:5–60, 4:1–5, 5:49–64, claims 1 and 5). The Examiner relies on Gray as disclosing “using imaging to identify fluid that is injected into soft tissue around a nerve (fig. 1B shows ultrasound images that indicates injection and presence of fluid (arrow-heads) into soft tissue).” Final Act. 5–6. The Examiner reasons that it would have been obvious to “have

utilized indicating fluid that is injected into soft tissue in the invention of Ostensen, as taught by Gray, to be able to successfully perform neural blockade (see left column on page 368).” Final Act. 6.

The Examiner notes that the limitation “wherein the decorrelation region indicates a presence of injected fluid that is injected into soft tissue” is “not [a] positive limitation[] that actually limit[s] the system itself, and therefore, the claim limitation does not further limit the claim.” Final Act. 4–5. Appellant disputes this characterization by the Examiner. *See* Br. 4. The Examiner additionally states, “[h]owever, for compact prosecution, the [Examiner] has provided prior art[, i.e., Gray,] to address the claim limitation of injecting fluid into soft tissue.” Final Act. 5. For our purposes, we elect to address the Examiner’s alternative, express reliance on Gray for teaching this limitation.

Regarding Gray, Appellant contends that “Gray discusses nerve imaging with ultrasound, and does not disclose a decorrelation region that indicates that a fluid is injected into soft tissue.” Br. 5 (emphasis omitted). As indicated above, the Examiner does not rely on Gray for disclosing a decorrelation region as Appellant argues. Instead, the Examiner relies on Østensen for “show[ing] that the image identifies [a] decorrelation region with a contrasting color added to the image”² and on Gray for “using imaging to identify fluid that is injected into soft tissue around a nerve.” *See* Final Act. 5–6; *see also* Ans. 10. Thus, Appellant’s argument is

² “The entire image may be scanned . . . to generate a display of the presence of intravascular ultrasound contrast agent, e.g., as a coloured or pseudo-coloured overlay image.” Østensen 3:64–4:5.

unpersuasive because it does not address the Examiner's rejection, or the reasons for which Østensen and Gray were relied upon.

Appellant also argues that “Gray does not discuss any techniques for enhancing the visibility of fluid injected into soft tissue and instead relies on a standard ultrasound image.” Br. 5. However, as the Examiner explains, claim 1 “do[es] *not* recite any limitation that is directed to *enhancing* the visibility of fluid injected into soft tissue;” rather, claim 1 is “merely directed to identifying a decorrelation region that is decorrelated between first and second image data sets, and the decorrelation region indicates a *presence* of injected fluid that is injected into soft tissue.” Ans. 11 (emphasis added). *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (Limitations not appearing in the claims cannot be relied upon for patentability).

Appellant further contends that, as expressed in Østensen, Østensen's invention is “based on the finding that temporal variations in the backscatter from an ultrasound contrast agent induced by movement of individual scatterers can be used as a valuable tool for detecting the presence of the agent.” Br. 5 (emphasis added) (referencing Østensen 2:11–15). Thus, according to Appellant, “Østensen uses low levels of correlation to visualize the presence of contrast agent, such as gas bubbles.” Br. 5 (emphasis omitted). On the other hand, “Gray uses an unagitated solution to serve as a reverse contrast to outline the borders of the anesthetized nerve, and teaches away from using contrast agents, such as bubbles.” Br. 5.

This contention is also unpersuasive as it again does not address the Examiner's rejection. As the Examiner explains, “the [Examiner] has not relied on prior art Gray to teach any specific type of contrast agent such as

bubble contrast agent” and that “the [Examiner] merely relied on prior art Gray to show that is well known in the art that ultrasound imaging can be used to detect the presence of fluid that is injected into soft tissue.” Ans. 12. The Examiner further points out that “the independent claims are not directed to any contrast agents; claims 1, 7 and 15 merely recited the injected solution is a fluid.” Ans. 12.

Appellant also contends that although “Gray discusses that some solutions may serve as reverse contrast to outline the borders of an anesthetized nerve,” Gray, nevertheless, “teaches away from using contrast agents, such as bubbles.” Br 5. Appellant’s contention is not persuasive because Gray teaches that “[n]erves will often be easier to identify after injection” and that nerves “sometimes can be seen to float freely within the injected solution.” Gray 369³. Further, to the extent that Appellant seeks to differentiate Østensen’s disclosure from the claimed invention because Østensen forms an image based on *stationary* bulk tissue instead of the *movement* of fluid within the tissue (*see* Br. 4), claim 1 does not preclude such a distinction.

Finally, Appellant contends that “[t]here is no motivation to combine the identification of low levels of correlation of contrast agents in Ostensen with the unagitated, bubble-free solutions in the standard ultrasound images of Gray.” Br. 5. This argument is not persuasive because the motivation expressed by the Examiner is that it would have been obvious to “have utilized indicating fluid that is injected into soft tissue in the invention of

³ Gray lacks line or paragraph numbering, hence reference to Gray will be by page number only.

Ostensen, as taught by Gray, to be able to successfully perform neural blockade.” Final Act. 6. As stated by the Examiner, obviousness “may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” Ans. 12 (citations omitted). As such, Appellant does not explain why the Examiner’s proffered reason for modifying the method of Østensen is erroneous.

Accordingly, and based on the record presented, we are not persuaded the Examiner erred in rejecting claims 1, 2, 7–10, 12, 13, 15, 16, and 19–27 as being obvious over Østensen and Gray. We thus sustain the rejection of claims 1, 2, 7–10, 12, 15, 16, and 19–27.

*The rejection of claims 3–5, 11, 13, 17, and 18
as being obvious over Østensen, Gray, and Zhao*

*The rejection of claims 6 and 14
as being obvious over Østensen, Gray, and Ogasawara*

*The rejection of claims 25–27
as being obvious over Østensen, Gray, and Keenan*

Appellant does not present separate arguments for these rejections, but instead states, “[f]or at least the[] reasons” discussed above, “Appellant respectfully requests that all rejections be reversed.” Br. 6.

As we find no deficiencies in the Examiner’s rejection of independent claim 1 being obvious over Østensen and Gray, we likewise sustain the Examiner’s rejections of claims 3–6, 11, 13, 14, 17, 18, and 25–27 over the variously indicated combinations of cited art.

Appeal 2018-004041
Application 12/407,979

DECISION

The Examiner's rejections of claims 1–27 are affirmed.

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