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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/647,927	05/28/2015	Christopher Beers	ANA1167WOUS_SOU107409	7560
23266	7590	03/24/2020	EXAMINER	
Dept. GEN			BRUCE, FAROUK A	
DAUGHERTY & DEL ZOPPO CO., L.P.A.			ART UNIT	
38500 CHARDON ROAD			PAPER NUMBER	
WILLOUGBY HILLS, OH 44094			3793	
			NOTIFICATION DATE	
			DELIVERY MODE	
			03/24/2020	
			ELECTRONIC	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRISTOPHER BEERS

Appeal 2019-005073
Application 14/647,927
Technology Center 3700

Before JENNIFER D. BAHR, MICHELLE R. OSINSKI, and
SEAN P. O’HANLON, *Administrative Patent Judges*.

O’HANLON, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner’s decision to reject claims 1–19.² We have jurisdiction over this appeal under 35 U.S.C. § 6(b). We AFFIRM.

In explaining our Decision, we refer to the Specification filed May 28, 2015 (“Spec.”), the Final Office Action mailed September 14, 2018 (“Final Act.”), the Appeal Brief filed March 20, 2019 (“Appeal Br.”), the

¹ We use the term “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Sound Technology Inc. Appeal Br. 2.

² Claims 20–29 are withdrawn. Appeal Br. 9–11 (Claims App.).

Examiner's Answer mailed April 18, 2019 ("Ans."), and the Reply Brief filed June 18, 2019 ("Reply Br.").

SUMMARY OF THE INVENTION

Appellant's claimed invention relates to ultrasound transducers.

Spec. 1. Claims 1 and 14 are independent. Claim 1, reproduced below from page 7 (Claims Appendix) of the Appeal Brief, is illustrative of the claimed subject matter:

1. An imaging probe, comprising:
a transducer array, with transducer elements with parallel first and second planar surfaces in which an ultrasound signal is emitted from the first planar surface, a transducer element, including: a plurality of transducing sub-elements arranged along an elevation direction in which adjacent transducing sub-elements are separated from each other by kerfs of non-transducing material, wherein depths of the kerfs vary along the elevation direction, and kerf widths gradually decrease in size across elevation from larger widths at ends of the transducer element to smaller widths at a central region of the transducer element.

REFERENCES

The Examiner relies on the following prior art references in rejecting the claims on appeal:

'T Hoen	US 4,518,889	May 21, 1985
Bolorforosh	US 5,371,717	Dec. 6, 1994
Ogawa	US 2005/0261590 A1	Nov. 24, 2005

REJECTIONS

I. Claims 1–12 and 14–19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogawa and 'T Hoen.

II. Claim 13 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogawa, 'T Hoen, and Bolorforosh.

ANALYSIS

Rejection I – Obviousness based on Ogawa and 'T Hoen

In contesting this rejection, Appellant presents arguments for independent claim 1 (*see* Appeal Br. 3–5) and relies on the same arguments for independent claim 14 and dependent claims 2–12 and 15–19 (*see id.* at 5). We select claim 1 as representative, and claims 2–12 and 14–19 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2018).

The Examiner finds that Ogawa discloses

an ultrasonic probe with piezoelectric element, 12A, the transducer element of the instant application. The piezoelectric element 12A, has ultrasonic piezoelectric elements 15A, the sub-elements of the instant application arranged along a lens direction (elevation direction) where the elements are separated from adjacent elements by grooves that are filled with non-conducting material. *See* paragraph 33. Figs. 5A–5E show two surfaces of the piezoelectric block 53, a first surface (first planar surface) in contact with electrode 51 and a second surface (second planar surface) in contact with the electrode 51.

Final Act. 3–4 (emphasis omitted) (citing Ogawa ¶¶ 24–25, Figs. 1–2). The Examiner finds that “Ogawa does not teach that kerf widths gradually decrease in size across elevation from larger widths at ends of the transducer element to smaller widths at a central region of the transducer element.” *Id.* at 4 (emphasis omitted). However, the Examiner finds that 'T Hoen discloses

an apodized transducer with rods 80 (posts of the instant application) and inert resin binder 82 (kerfs of the instant application). In col. 7, lines 3–8, the inert resin binder is taught to vary in width as a function of position from a central point on

the transducer in an acoustic axis (elevation direction of the instant application).

Id. (emphasis omitted) (citing 'T Hoen, col. 6, ll. 48–55, Fig. 9). The Examiner determines that it would have been obvious “to provide inert resin binders with varying width[s] in between Ogawa’s sub-elements to improve the off-axis intensity characteristics of the transducer.” *Id.* (citing 'T Hoen, col. 2, ll. 3–6).

Appellant argues that the Examiner’s proposed modification of Ogawa based on the teachings of 'T Hoen

would require a substantial reconstruction and redesign of the elements of Ogawa, which would no longer include a single transducer element with sub-elements extending from a same block and with kerfs with varying depths, but, in stark contrast, would include multiple distinct transducer elements embedded in a matrix and separated/isolated from each other by spacings/binder having equal depths.

Appeal Br. 5 (citing 'T Hoen, Fig. 9); *see also* Reply Br. 3 (asserting that “[t]he substantial reconstruction and redesign would at least include replacing the single transducer element with sub-elements of Ogawa with the individual and isolated rods of ['T] Hoen”). Appellant contends that “[t]his would change the principle of operation of Ogawa at least because side lobes could no longer be reduced by forming deeper grooves 20E towards the sides relative to grooves towards the middle since all the grooves would have the same depth.” Appeal Br. 5; *see also* Reply Br. 3 (asserting that “the change in the basic principle would at least include employing some other technique to reduce side lobes since the disclosed approach of varying kerf depth would no[] longer be possible since all depth[s] would be the same, all the way through, and could not be varied”).

We are not persuaded by this line of argument because it is not responsive to the modification set forth in the rejection.

As discussed above, the Examiner proposes modifying Ogawa, based on 'T Hoen's disclosure, such that the grooves between the sub-elements in Ogawa's piezoelectric block have varying widths. *See* Final Act. 4 (determining that it would have been obvious "to provide inert resin binders with varying width[s] in between Ogawa's sub-elements to improve the off-axis intensity characteristics of the transducer"); *see also* Ans. 7 (explaining that "Ogawa teaches sub-elements extending out of a single block in at least figs. 2, 5A–5E, and 8–11," and "fig. 10 of Ogawa teaches the limitation directed to varying depths of the grooves, NOT 'T Hoen."). In other words, contrary to Appellant's assertion, the Examiner does not propose "replacing the single transducer element with sub-elements of Ogawa with the individual and isolated rods of ['T] Hoen." Reply Br. 3. Appellant's argument appears to improperly presume a bodily incorporation of 'T Hoen's structure into the transducer of Ogawa. However, "[i]t is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements." *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012); *see also In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (stating, "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference").

For the above reasons, Appellant does not apprise us of error in the Examiner's determination that the subject matter of claim 1 would have been obvious. Accordingly, we sustain the rejection of claim 1, and of claims 2–

12 and 14–19 falling therewith, as being unpatentable over Ogawa and 'T Hoen.

*Rejection II – Obviousness based on Ogawa, 'T Hoen,
and Bolorforosh*

In contesting the rejection of dependent claim 13, Appellant expressly relies on the arguments made for claim 1. Appeal Br. 6. For the reasons discussed above, Appellant's arguments do not apprise us of error in the rejection of claim 1, and, likewise, do not apprise us of error in the rejection of claim 13. Accordingly, we sustain the rejection of claim 13 as unpatentable over Ogawa, 'T Hoen, and Bolorforosh.

CONCLUSION

In summary,

Claim(s) Rejected	35 U.S.C. §	References	Affirmed	Reversed
1–12, 14–19	103(a)	Ogawa, 'T Hoen	1–12, 14–19	
13	103(a)	Ogawa, 'T Hoen, Bolorforosh	13	
Overall Outcome			1–19	

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

AFFIRMED