

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte BRUNO HANS HAIDER

Appeal 2020-006196
Application 15/287,318
Technology Center 3700

Before BIBHU R. MOHANTY, MICHAEL C. ASTORINO, and
MICHAEL L. HOELTER, *Administrative Patent Judges*.

MOHANTY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–6, 8–11, 13, 14, and 16–20. We have jurisdiction under 35 U.S.C. § 6(b). Oral arguments were presented on May 10, 2021 by telephone.

SUMMARY OF THE DECISION

We REVERSE.

¹ We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as General Electric Company. (Appeal Br. 3).

CLAIMED SUBJECT MATTER

The Appellant's claimed invention relates to multiplexing for ultrasound imaging systems (Spec., para 1). Claim 1, reproduced below, is representative of the subject matter on appeal.

1. A system, comprising:
 - an ultrasound probe comprising a transducer array and a multiplexer, wherein for a first signal and a second signal originating at the transducer array, the multiplexer multiplexes a sum signal and a difference signal formed from the first and second signals into a multiplexed signal;
 - a console coupled to the ultrasound probe via a cable, the console including a processor, wherein the console receives the multiplexed signal via the cable, the multiplexed signal sent via the cable being an analog signal, and wherein the processor is configured with instructions in non-transitory memory that, when executed, cause the processor to generate an image from the first signal and the second signal recovered from the multiplexed signal.

THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

| Name | Reference | Date |
|-------------|--------------------|---------------|
| Holt | US 4,803,727 | Feb. 7, 1989 |
| Van Stralen | US 6,506,160 B1 | Jan. 14, 2003 |
| Phelps | US 2004/0002652 A1 | Jan. 1, 2004 |

The following rejections are before us for review:

1. Claims 1–6, 9, and 10 are rejected under 35 U.S.C. § 103 as unpatentable over Van Stralen and Holt.
2. Claims 8 and 16–20 are rejected under 35 U.S.C. § 103 as unpatentable over Van Stralen, Holt, and Phelps.

3. Claims 11, 13, and 14 are rejected under 35 U.S.C. § 103 as unpatentable over Van Stralen and Phelps².

FINDINGS OF FACT

We have determined that the findings of fact in the Analysis section below are supported at least by a preponderance of the evidence³.

ANALYSIS

The Appellant argues that the rejection of claim 1 under 35 U.S.C. § 103 as unpatentable over Van Stralen and Holt is improper because the Holt reference emphasizes that a digital version of the difference signal is used (Appeal Br. 10, Reply Br. 3–6). The Appellant further argues that the rejection using Holt fails to show how the multiplexed information would utilize “analog signal[s]” in the combination (Appeal Br. 11). The Appellant also argues that the record fails to provide evidence that the cited combination would “reduce aliasing” if analog signals were used instead of digital signals (Appeal Br. 11). The Appellant also argues that the Van Stralen reference is directed to avoiding A/D conversion (Appeal Br. 12, Reply Br. 9, 10).

We agree with the Appellant. Van Stralen does disclose multiplexing analog signals into a single coaxial cable (Abstract). The rejection of record

² The Answer at pages 15 and 16 indicates that the Holt reference is not included in the rejection of claims 11, 13, and 14 and that its citation in the Final Action was a typographical error.

³ See *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Patent Office).

acknowledges that Van Stralen does not disclose that “the multiplexer multiplexes a sum signal and a difference signal formed from the first and second signals into a multiplexed signal” but cites to the Holt reference as disclosing this (Final Act. 7, 8). Holt at column 3, lines 4–6 disclose that “sum and difference signals may . . . be multiplexed together in multiplexer 17 before transmission over the digital transmission link” but fails to show the multiplexed signal sent via the cable being an “analog signal” in the manner claimed. The rejection of record cites to Van Stralen at column 6, lines 24–32 as showing the multiplexed signal sent as an “analog signal” but the reference at this cited portion fails to disclose that. The rationale for the cited combination in the Final Action at page 8 was that the use of multiplexing of sum and difference signals of Holt would allow one to “remove aliasing” with a citation to Holt at column 3, lines 24–37, but this citation leaves it unclear as to whether the removal of aliasing is due to the sum and difference signals or some combination with or without the signals being “band limited, down-sampled, upsampled, and filtered” to remove the aliasing.

In *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) the Supreme Court at 418 noted that in an obviousness analysis “[r]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” Here, the cited rejection fails to provide an articulated reasoning with rational underpinnings for after the multiplexing for “the multiplexed signal [being] sent via the cable being an analog signal.” Further, the rejection of record fails to show that the use of multiplexing of sum and difference signals of

Holt would allow one to “remove aliasing” independently in the cited combination. For these above reasons the rejection of claim 1 and its dependent claims is not sustained.

Independent claim 11 was rejected under 35 U.S.C. § 103 as unpatentable over Van Stralen and Phelps and requires a “second multiplexer configured to de-multiplex the multiplexed signal into the first signal and the second signal *after analog transmission of the multiplexed signal* through the cable.” The rejection of record cites to Van Stralen at Figure 2, 128, Figure 6, column 4, lines 30–51, and column 6, lines 45–46, as disclosing this (Final Act. 13, 14) but these cited portions fail to disclose the analog transmission in the sequence and manner claimed. The rejection of claim 11 also relies on the Phelps reference to teach the use of “analog-to-digital converter” to be synchronized via a test signal “so that the receive[d] signals are undistorted or inter-symbol interference removed or diminished” (Final Act. 14). Here, the rejection of record lacks articulated reasoning with rational underpinnings to support a conclusion of obviousness to show an analog transmission of the multiplexed signal and why a test signal would be used in the cited combination without impermissible hindsight. For these reasons, the rejection of claim 11 and its dependent claims is not sustained.

Independent claim 17 contains limitations similar to claims 1 and 11, and the rejection of this claim and its dependent claims is not sustained for the same reasons given above in relation to claims 1 and 11. In particular, here there is no articulated reasoning with rational underpinnings to show the using of the test signal of Phelps in the cited combination in the manner cited in the rejection without improper hindsight. Accordingly, the rejection of claim 17 and its dependent claims is not sustained

CONCLUSIONS OF LAW

We conclude that Appellant has shown that the Examiner erred in rejecting claims 1–6, 9, and 10 under 35 U.S.C. § 103 as unpatentable over Van Stralen and Holt.

We conclude that Appellant has shown that the Examiner erred in rejecting claims 8 and 17–20 under 35 U.S.C. § 103 as unpatentable over Van Stralen, Holt, and Phelps.

We conclude that Appellant has shown that the Examiner erred in rejecting claims 11, 13, and 14 under 35 U.S.C. § 103 as unpatentable over Van Stralen and Phelps.

DECISION SUMMARY

In summary:

| Claims Rejected | 35 U.S.C. § | Reference(s)/Basis | Affirmed | Reversed |
|------------------------|--------------------|---------------------------|-----------------|--------------------------|
| 1–6, 9, 10 | 103 | Van Stralen, Holt | | 1–6, 9, 10 |
| 8, 16–20 | 103 | Van Stralen, Holt, Phelps | | 8, 16–20 |
| 11, 13, 14 | 103 | Van Stralen, Phelps | | 11, 13, 14 |
| Overall Outcome | | | | 1–6, 8–11, 13, 14, 16–20 |

REVERSED