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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte GERD BECHTEL, ARMIN WERNET, and KAJ UPPENKAMP

Appeal 2018-009108
Application 13/980,451
Technology Center 2800

Before MICHELLE N. ANKENBRAND, *Acting Vice Chief Administrative Patent Judge*, DONNA M. PRAISS, and JEFFREY R. SNAY, *Administrative Patent Judges.*

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellant[2] appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 12–17 and 19–22.[3] We have jurisdiction over the appeal under 35 U.S.C. § 6(b). We AFFIRM.

[1] Our Decision refers to the Specification ("Spec.") filed July 18, 2013, the Examiner's Final Office Action ("Final Act.") dated Aug. 15, 2017, Appellant's Appeal Brief ("Appeal Br.") filed Feb. 15, 2018 as corrected Apr. 2, 2018, the Examiner's Answer ("Ans.") dated July 26, 2018, and Appellant's Reply Brief ("Reply Br.") dated Sept. 26, 2018.

[2] Appellant identifies "Endress + Hauser GMBH + Co. KG" as the real party in interest. Appeal Br. 2.

[3] The Examiner indicates that dependent claim 18 would be allowable if rewritten in independent form. Final Act. 20.

STATEMENT OF THE CASE

The invention "relates to apparatus and method for capacitive determining and/or monitoring at least of the fill level of a medium in a container using a probe unit." Spec. 1:4–6. According to the Specification, measuring devices for determining the fill level of liquid media ascertain the capacitance that a probe electrode and a container wall or a second electrode form. *Id.* at 1:10–16. The Specification explains that a measuring frequency can be used that is suitable for all probe lengths, however, such a frequency is not optimal for shorter probes because the smaller the frequency, the longer the probe electrode must be. *Id.* at 1:26–33. The Specification also states that when a medium has a conductivity value lying in a transitional region between a permittivity dependent and a permittivity independent measuring range, a fill level cannot be determined reliably via capacitive fill level measurement. *Id.* at 2:1–5.

The stated object of the invention, therefore, is to provide a probe electrode with a frequency sweep for an electrical, transmitted signal that ascertains a measuring frequency optimal for the application parameters, thereby obviating the need for a user to choose between measurement frequencies as a function of a respective application. *Id.* at 2:10–19, 3:16–19. According to the Specification, the electronics unit determines an optimal measuring frequency based on the frequency sweep and determines fill level from the response signal belonging to the optimal measuring frequency. *Id.* at 2:18–21.

Claim 12, reproduced below from the Claims Appendix to the corrected Appeal Brief filed April 2, 2018, is illustrative of the subject matter on appeal (emphases added).

> 12. An apparatus for capacitive determining and/or monitoring at least a fill level of a medium in a container, comprising:
>
> a probe unit having at least one probe electrode; and
>
> an electronics unit, which supplies at least said probe electrode with an electrical, transmitted signal, and receives and evaluates an electrical, response signal from said at least one probe unit, wherein:
>
> *said electronics unit supplies said at least one probe electrode at least at times by means of a frequency sweep with a transmitted signal*, which has a plurality of discrete exciter frequencies following one another within a predeterminable frequency band, wherein present application parameters establish an optimal measuring frequency within said frequency band, in case of which the fill level is determinable most accurately,
>
> *said electronics unit, based on the frequency sweep, ascertains from the response signal characterized by the present application parameters said optimal measuring frequency optimal for the present application parameters*, and
>
> *said electronics unit determines the fill level from the response signal belonging to the optimal measuring frequency*.

Independent claim 13 recites "[a] method for capacitive determining and/or monitoring at least a fill level of a medium in a container with a probe unit having at least one probe electrode" comprising, among other things, supplying a probe electrode, by means of a frequency sweep, with an electrical, transmitted signal; based on the frequency sweep, ascertaining an optimal measuring frequency; and determining the fill level from a response signal belonging to the optimal measuring frequency.

ANALYSIS

We review the appealed rejections for error based upon the issues Appellant identifies and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (*cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections.")). After considering the argued claims in light of the case law presented in this Appeal and each of Appellant's arguments, we are not persuaded of reversible error in the Examiner's rejections.

Rejection 1: Obviousness over Wernet and Erazo

The Examiner rejects claims 12–17, 21 and 22 under 35 U.S.C. § 103(a) as unpatentable over Wernet[4] and Erazo[5] for the reasons provided on pages 9–17 of the Final Office Action.

Appellant argues the claims together. Appeal Br. 16–18. Therefore, we confine our discussion to claim 12, which we select as representative. Claims 13–17, 21, and 22 stand or fall with claim 12. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds Wernet discloses an apparatus for capacitive determining and/or monitoring at least a fill level of a medium in a container that includes, among other things, a probe unit and an electronics unit. Final Act. 9–10. The Examiner finds Wernet does not explicitly disclose that the electronics unit supplies the probe with a transmitted signal by means of a

[4] Wernet et al., US 2010/0141285 A1, published June 10, 2010 ("Wernet").

[5] Erazo, US 2008/0060432 A1, published Mar. 13, 2008.

frequency sweep, wherein present application parameters establish an optimal measuring frequency and the electronics unit, based on the frequency sweep, and the electronics unit ascertains an optimal measuring frequency for the present application parameters and determines the fill level, as claim 12 requires. *Id.* at 10.

The Examiner finds Erazo discloses determining the level of a material in a vessel by coupling a probe to the vessel, using a variable frequency controller to apply a periodic signal to the probe at discrete frequencies within a range, and selecting an operating frequency. *Id.* at 11. The Examiner concludes it would have been obvious to modify Wernet in view of Erazo to optimize the sensitivity of the probe to changes in material level and to provide an apparatus that is adapted to be calibrated. *Id.* at 12.

Appellant asserts that Wernet is concerned with an apparatus having at least two electrodes, whereas Appellant's invention does not necessitate two electrodes. Appeal Br. 16–17. Appellant argues Wernet does not disclose or suggest a frequency sweep or an evaluation for determining an optimal frequency from a frequency sweep. *Id.* at 17–18; Reply Br. 2.

Appellant contends Erazo uses a fixed frequency during normal operation and "[o]nly for calibration purpose, the frequency is varied to optimize sensitivity at the probe." Appeal Br. 17; Reply Br. 2. Appellant asserts that Erazo's calibration is carried out with a reference impedance that "is not present in the present application." Appeal Br. 17–18; Reply Br. 2.

Appellant's arguments do not persuade us that the Examiner reversibly erred in rejecting the claims over the cited prior art references. Accordingly, we sustain the Examiner's rejection for essentially those

reasons expressed in the Answer, including the Response to Argument section, and we add the following primarily for emphasis.

As the Examiner's Answer indicates, Appellant's argument that its apparatus does not require two electrodes fails from the outset because it is not based on limitations set forth in the claim. Ans. 5–6; *see In re Self*, 671 F.2d 1344, 1348 (CCPA 1982). Claim 12 does not limit the claimed invention to a single electrode, but, rather, recites "a probe unit having at least one probe electrode," which permits multiple probe electrodes. This is consistent with the Specification's broader disclosure of "at least one probe electrode." Spec. 2:10–12. Although we interpret claims in light of the Specification, to the extent the Specification discloses an embodiment limited to a single electrode, we do not read those limitations into the claims. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Appellant's other arguments concerning Wernet are also unpersuasive because they do not address what the combination of the applied references would have suggested to one of ordinary skill in the art. *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) ("[T]he test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art.").

Wernet discloses an apparatus for determining and/or monitoring at least one process variable, such as the fill level of a medium. Wernet ¶ 1. Wernet discloses a measuring device for determining the fill level of a medium (e.g., a liquid) in a container. *Id.* ¶ 21. Wernet's measuring device includes an electronics unit and a probe unit having an inner electrode and outer electrodes. *Id.* ¶¶ 21, 24. The inner and outer electrodes can be

supplied with exciter signals in different sequences. *Id.* ¶ 24. To the extent Wernet does not explicitly disclose the claimed frequency sweep, Wernet nevertheless teaches sending different, varying frequencies to its probe unit in either continuous or discrete steps. *Id*.

Erazo relates to the indication of material level in a vessel as a function of the capacitance of the material within the vessel. Erazo ¶ 1. Erazo discloses a system that includes, among other things, a probe, a driver amplifier coupled to the probe for applying a periodic electrical signal, and a variable frequency generator for controlling the frequency of the signal. *Id.* ¶ 7. Erazo discloses a calibration mode in which the variable frequency controller applies a periodic electrical signal to the probe at discrete frequencies within a frequency range. *Id.* ¶¶ 10, 11. Admittance at the probe is measured both with and without a reference impedance in parallel with the probe and the admittance return signal is monitored to determine the operating frequency at which an admittance difference between the measurements is greatest. *Id.* ¶¶ 11, 12.

Erazo teaches that the calibration mode may be carried out to optimize sensitivity of the probe by identifying the frequency at which the probe is most sensitive to a change in capacitance at the probe. *Id.* ¶ 5. A fixed frequency used during a measurement mode of operation for determining the level of a material is set as the frequency identified by the calibration mode of operation. *Id.* ¶¶ 5, 9.

Erazo's disclosure supports the Examiner's finding that Erazo discloses an electronics unit that supplies a probe electrode with a transmitted signal by means of a frequency sweep, as claim 12 recites. Final Act. 11; Ans. 4–5. Erazo's disclosure also supports the Examiner's finding

that the prior art discloses an electronics unit that ascertains an optimal measuring frequency based on a frequency sweep, as claim 12 requires. Erazo ¶¶ 5, 12. As a result, Appellant's arguments that Wernet alone does not disclose or suggest a frequency sweep or an evaluation to ascertain an optimal frequency from a frequency sweep are unpersuasive because the teachings of Wernet and Erazo, taken as a whole, would have suggested these limitations of claim 12. Further, Appellant's argument regarding Erazo's use of a reference impedance is unpersuasive because claim 12 does not exclude a reference impedance.

As discussed above, Appellant contends that Erazo only varies the frequency during the calibration operation, not during normal operation. Appeal Br. 17–18; Reply Br. 2. Claim 12, however, encompasses the calibration mode of operation and the measurement mode of operation Erazo discloses. More specifically, an electronics unit supplying at least one probe electrode with a transmitted signal by means of a frequency sweep and ascertaining an optimal measuring frequency from a response signal, as claim 12 recites, reads upon the calibration mode of operation Erazo discloses. Claim 12's electronics unit that determines a fill level from a response signal belonging to an optimal measuring frequency therefore reads upon Erazo's electronics unit, which uses the frequency identified during the calibration mode of operation in a measurement mode of operation.[6]

Appellant also contends that one of ordinary skill in the art would not have modified Wernet in view of Erazo to arrive at the claimed invention

[6] Claim 13's method similarly reads upon Erazo's calibration and measurement modes of operation.

because there would have been no motivation or suggestion to change Wernet's fixed frequency to a frequency sweep. Reply Br. 3. According to Appellant, "[a]ny such modification might, at best, result in a calibration mode just like Erazo's that is separate and apart from a normal 'measurement mode of operation" and the Examiner's asserted motivation "can only lead to addition of Erazo's calibration mode." *Id.*

This argument was not presented in the Appeal Brief, and Appellant has not proffered a showing of good cause explaining why the argument could not have been presented in the Appeal Brief. Therefore, we will not consider this new and untimely argument in our assessment of the Examiner's rejections. 37 C.F.R. § 41.41(b)(2) (2014). Even if we were to consider Appellant's new argument, we do not find it persuasive of error. As noted above, the Examiner provided a reason that a person of ordinary skill in the art would have modified Wernet with the teachings of Erazo, namely, to optimize the probe's sensitivity to changes in material level and provide an apparatus that is adapted to be calibrated. Final Act. 12. The record on appeal supports the Examiner's reasoning. Erazo ¶ 5.

In addition, Appellant's description of the combination resulting in Erazo's calibration mode of operation as a separate operation from a measurement mode of operation in Wernet's apparatus (Reply Br. 3) is consistent with the Examiner's stated reason that the combination would adapt the apparatus for calibration using Erazo's method (Final Act. 12). In other words, one of ordinary skill in the art would have performed Erazo's calibration mode to identify an operating frequency, as Erazo teaches, and would have used the identified frequency as Wernet's fixed frequency to determine the fill level of medium, much like Erazo does. *See* Wernet ¶¶ 1,

24; Erazo ¶¶ 3, 5. As discussed above, the claimed invention reads on the combination of Wernet and Erazo because the independent claims encompass an apparatus and method comprising a calibration mode of operation and a measurement mode of operation as the disclosures of Wernet and Erazo teach. *Id.*

For these reasons, and those the Examiner provides, we uphold the Examiner's rejection of claims 12–17, 21, and 22 under 35 U.S.C. § 103(a) as obvious over Wernet and Erazo.

Rejections 2 and 3: Obviousness over Wernet, Erazo, and Additional References

The Examiner rejects claim 19 under 35 U.S.C. § 103(a) as unpatentable over Wernet and Erazo and further in view of Lundstrom[7] for the reasons provided on pages 17–19 of the Final Office Action.

The Examiner rejects claim 20 under 35 U.S.C. § 103(a) as unpatentable over Wernet and Erazo and further in view of Zimmermann[8] for the reasons provided on pages 19–20 of the Final Office Action.

Appellant does not present separate arguments for the rejections of claims 19 and 20. Appeal Br. 18. Therefore, for the reasons discussed above, and those the Examiner provides, we uphold the Examiner's rejections of claims 19 and 20 under 35 U.S.C. § 103(a).

[7] Lundstrom, US 2008/0295569 A1, published Dec. 4, 2008.

[8] Zimmermann et al., EP 2 128 587 A1, published Feb. 12, 2009.

DECISION

Upon consideration of the record, and for the reasons given above, in the Final Office Action, and in the Examiner's Answer, the decision of the Examiner rejecting claims 12–17 and 19–22 under 35 U.S.C. § 103(a) is *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).

AFFIRMED