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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/447,889	07/31/2014	Russell E. Calvarese	102442US01	4174
126568	7590	11/26/2019	EXAMINER	
Zebra Technologies Corporation 3 Overlook Point Lincolnshire, IL 60069			ARMSTRONG, JONATHAN D	
			ART UNIT	PAPER NUMBER
			3645	
			NOTIFICATION DATE	DELIVERY MODE
			11/26/2019	ELECTRONIC

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RUSSELL E. CALVARESE and RICHARD J. LAVERY

Appeal 2019-003361
Application 14/447,889
Technology Center 3600

Before MICHAEL L. HOELTER, ANNETTE R. REIMERS, and
SUSAN L. C. MITCHELL, *Administrative Patent Judges*.

HOELTER, *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 1–16. Appeal Br. 7. We have jurisdiction under 35 U.S.C. § 6(b). For the reasons explained below, we do not conclude the Examiner erred in rejecting certain claims. Accordingly, we AFFIRM IN PART the Examiner's rejections.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as “Symbol Technologies, LLC, a wholly indirectly owned company of Zebra Technologies Corporation.” Appeal Br. 2.

CLAIMED SUBJECT MATTER

The disclosed subject matter relates to “[a] pulsed ranging system [that] can be used to determine the position of a device with respect to pulse sources at known locations.” Spec. ¶ 1. Independent system claim 1 and similar independent method claim 11 are illustrative of the claims on appeal and are reproduced below. Both independent claims contain limitations that require a condition precedent to first be met, i.e., “wherein if” and “upon.”

1. A system for non-echo pulsed ranging, the system comprising:

a plurality of emitters at fixed locations within an environment, the emitters operable to transmit signal pulses of a predefined frequency; and

a mobile device operable to:

receive at least one of the signal pulses from the plurality of emitters,

convert the at least one of the signal pulses into a digital waveform,

store the digital waveform into a buffer having a predetermined length of time, and

perform a first analysis to analyze the digital waveform to detect a detected signal pulse at the predefined frequency;

wherein if the detected signal pulse is detected, the mobile device is further operable to perform a second analysis to re-analyze the digital waveform to attempt to detect another signal pulse at the predefined frequency, a presence of the another signal pulse indicating an existence of a reflected signal pulse, and

wherein if the another signal pulse is detected, the mobile device is further operable to select a selected signal pulse that was received first in time for use in ranging of the mobile device, the selected signal pulse being one of the detected signal pulse or the another signal pulse.

11. A method for non-echo pulsed ranging, the method comprising:
 - providing a plurality of emitters at fixed locations within an environment;
 - transmitting signal pulses of a predefined frequency by the plurality of emitters;
 - receiving, by a mobile device, at least one the signal pulses from the plurality of emitters;
 - converting the at least one of the signal pulses into a digital waveform;
 - storing the digital waveform into a buffer having a predetermined length of time;
 - perform a first analysis to analyze the digital waveform to detect a detected signal pulse at the predefined frequency;
 - upon detecting the detected signal pulse, performing a second analysis to re-analyze the digital waveform to attempt to detect another signal pulse at the predefined frequency, a presence of the another signal pulse indicating an existence of a reflected signal pulse, wherein if another signal pulse is detected;
 - and
 - upon detecting the another signal pulse, selecting a selected signal pulse that was received first in time for use in ranging of the mobile device, the selected signal pulse being one of the detected signal pulse or the another signal pulse.

REFERENCED RELIED ON BY THE EXAMINER

- Van Loenen et al. WO 2004/095056 A1 Nov. 4, 2004
- Jörg et al., *First Results in Eliminating Crosstalk & Noise by Applying Pseudo-Random Sequences to Mobile Robot Sonar Sensing*, IEEE/RSJ International Conference, vol. 1 IEEE, 1996.
- Borriello et al., *WALRUS: Wireless Acoustic Location with Room-Level Resolution using Ultrasound*, Proceedings of the 3rd International Conference on Mobile Systems, Applications, and Services, ACM, 2005.
- Douglas L. Jones, *EFFICIENT FFT ALGORITHM AND PROGRAMMING TRICKS*, Connexions, 2007.

THE REJECTIONS ON APPEAL

Claims 1–4, 7, 10–12, and 14–16 are rejected under 35 U.S.C. § 102(b) as anticipated by Van Loenen. Final Act. 2.

Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as unpatentable over Van Loenen and Borriello. Final Act. 8.

Claims 8, 9, and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Van Loenen, Borriello, and Jones. Final Act. 9.

Claims 1–7, 10–12, and 14–16 are rejected under 35 U.S.C. § 103(a) as unpatentable over Borriello and Jörg. Final Act. 10.

Claims 8, 9, and 13 are rejected under 35 U.S.C. § 103(a) as unpatentable over Borriello, Jörg, and Jones. Final Act. 15.

ANALYSIS

*The rejection of claims 1–4, 7, 10–12, and 14–16
as anticipated by Van Loenen*

MPEP § 2111.04(II), entitled “Contingent Limitations,” states as follows:

The broadest reasonable interpretation of a *method* (or process) claim having contingent limitations requires only those steps that must be performed and does not include steps that are not required to be performed because the condition(s) precedent are not met. . . .

The broadest reasonable interpretation of a *system* (or apparatus or product) claim having structure that performs a function, which only needs to occur if a condition precedent is met, requires structure for performing the function should the condition occur. The system claim interpretation differs from a method claim interpretation because the claimed structure must be present in the system regardless of whether the condition is met and the function is actually performed.

Emphasis added. *See also Ex parte Schulhauser*, Appeal No. 2013-007847

(PTAB Apr. 28, 2016) (precedential). Because the assessment of conditional limitations differ between system claims and method claims, we address system claim 1 (and its dependent claims) separately from method claim 11 (and its dependent claims).

System claims 1–4, 7, and 10

As noted above, MPEP § 2111.04(II) explains that for a system claim having a conditional limitation, the claimed structure must be present regardless of whether the condition is met and the function is actually performed. In regard to claim 1, the Examiner finds that Van Loenen discloses the recited system comprising a mobile device operable to, if a detected signal pulse is detected, perform a second analysis to re-analyze the temporarily stored digital waveform. Final Act. 4–5 (citing Van Loenen 2:20–25, 2:10–3:16, 13:30–34).

Appellant contends that “a close review of the cited text reveals nothing with regard to performing any type of re-analysis following the initial analysis.” Appeal Br. 9; *see also* Reply Br. 1–3. Instead, Appellant asserts that Van Loenen discloses “the signal received by the object will include multiple peaks (with some of those peaks being generated as a result of reflections) arriving at separate times.” Appeal Br. 9; *see also* Reply Br. 2. Thus, in essence, Van Loenen’s system performs a single analysis and “detects whatever peaks are present (three in case of Fig. 3a)” in real time. Appeal Br. 9; *see also* Reply Br. 2–3; Van Loenen Figs. 3a–3c and the time scale illustrated therein.

Claim 1 requires a mobile device operable to “receive at least one of the signal pulses . . . , convert the at least one of the signal pulses into a digital waveform, *store* the digital waveform into a *buffer* . . . , and perform

a first analysis to analyze the digital waveform.” Appeal Br. 12 (Claim App.; emphasis added). Claim 1 continues reciting that if a “signal pulse is detected, the mobile device is further operable to perform a second analysis to re-analyze the digital waveform” stored in the aforesaid buffer.

Van Loenen states, “the detected ultrasound signal may comprise a strong first peak corresponding to the direct transmission,” “a weak first reflection peak” and “a relatively strong second reflection peak.” Van Loenen 2:18–20; *see also id.* Fig. 3a. Van Loenen further states, “[i]f the same object is positioned in the middle of the room, the second reflection peak may firstly not be present or at least not so pronounced.” Van Loenen 2:21–23. Thus, Van Loenen discloses analyzing data received in real-time and performing an analysis of a waveform comprising direct and reflected signal peaks. *See also* Van Loenen 2:10–3:16, 13:30–34, Fig. 3a.

In view of the above, it is not made clear how Van Loenen teaches the re-analysis of a stored waveform. As such, the evidence presented for review does not support the Examiner’s finding that Van Loenen teaches this limitation. Accordingly, we conclude that the Examiner has not established by a preponderance of the evidence that Van Loenen anticipates the system limitations of claim 1. Thus, we do not sustain the Examiner’s rejection of claim 1, and dependent claims 2, 3, 4, 7, and 10.

Method claims 11, 12, and 14–16

Appellant argues claims 11, 12, and 14–16 together. *See* Appeal Br. 7–10. We select claim 11 for review, with claims 12, and 14–16 standing or falling therewith. *See* 37 C.F.R. § 41.37(c)(1)(iv).

As noted above, MPEP § 2111.04(II) explains that for a method claim having a conditional limitation, only those steps that must be performed are

to be evaluated. Thus, because claim 11 can be practiced without certain conditions occurring, we do not evaluate those steps which include a conditional limitation, i.e., the steps of “upon detecting the detected signal pulse, performing a second analysis to re-analyze the digital waveform . . .,” and “upon detecting the another signal pulse, selecting a selected signal pulse”

In rejecting claim 11, the Examiner identifies where Van Loenen discloses the remaining steps of (a) “providing a plurality of emitters . . .;” (b) “transmitting signal pulses . . .;” (c) “receiving, by a mobile device, at least one [] signal pulse[] . . .;” (d) “converting the at least one . . . signal pulse[] . . .;” (e) “storing the digital waveform . . .;” and, (f) “perform a first analysis” Final Act. 2–4 (citations to Van Loenen omitted).

Appellant does not dispute these findings by the Examiner concerning these remaining steps. Appeal Br. 7–10. Instead, Appellant contends that Van Loenen does not disclose the conditional limitation of “performing any type of re-analysis following the initial analysis.” Appeal Br. 9; *see also id.* at 7–10; Reply Br. 1–3. In other words, Appellant addresses a conditional step that need not be performed, which we need not analyze as explained above. As such, Appellant does not apprise us of Examiner error. We sustain the Examiner’s rejection of claims 11, 12, and 14–16 as being anticipated by Van Loenen.

*The rejection of claims 5 and 6
as unpatentable over Van Loenen and Borriello*

System claims 5 and 6 depend indirectly from claim 1. Appeal Br. 13 (Claims App.). The Examiner relies on Borriello for disclosing the use of a Goertzel algorithm and a higher order filtering operation, and does not rely

on Borriello to cure the deficiency of Van Loenen discussed above. Final Act. 8–9. Thus, the rejection of system claims 5 and 6 as being obvious over Van Loenen and Borriello is not sustained.

*The rejection of claims 8, 9, and 13
as unpatentable over Van Loenen, Borriello, and Jones*

Claims 8 and 9

System claims 8 and 9 depend directly or indirectly from claim 1. Appeal Br. 13 (Claims App.). The Examiner relies on Jones for disclosing the use of a Fast Fourier Transform operation and wakeup circuitry, and does not rely on Jones to cure the deficiency of Van Loenen discussed above. Final Act. 9–10. Thus, the rejection of system claims 8 and 9 as being obvious over Van Loenen, Borriello, and Jones is not sustained.

Claim 13

Method claim 13 depends directly from claim 11. Appeal Br. 14 (Claims App.). Appellant does not present arguments for claim 13, but instead relies on arguments previously presented with respect to claim 11. *See* Appeal Br. 7–10. As we do not find error in the Examiner’s rejection of method claim 11, the rejection of claim 13 as being obvious over Van Loenen, Borriello, and Jones is sustained for the same reasons discussed above.

*The rejection of claims 1–7, 10–12, and 14–16
as unpatentable over Borriello and Jörg*

Claims 1–7 and 10

As discussed above, for system claim 1, we consider its conditional limitations setting forth required structure in our analysis. In regard to claim 1, the Examiner relies on both Borriello and Jörg for disclosing a mobile

device. *See* Final Act. 10, 11. The Examiner specifically relies on Jörg for disclosing a mobile device that is operable to perform a second analysis to re-analyze the digital waveform, i.e., a digital waveform that is stored in the aforesaid buffer. *See* Final Act. 11 (citing Jörg p. 293). Appellant contends that Jörg’s “discussion relates to the applications of filters, and lacks any direct discussion of the claimed subject matter” and that “[i]n essence, there is no re-analysis of the digital waveform” in Jörg. Appeal Br. 11. The Examiner responds that “re-analysis is analogous to repeated detection of peaks” and that Jörg “is attempting to make use of multiple echoes.” Ans. 8–9 (citing Jörg p. 293).

The Examiner’s cited passage of Jörg states that “[m]any of these approaches are grid-based, i.e. they interpret each individual sonar range reading by using a specific sonar sensor model, while accepting the first echo per measurement, only.” Jörg p. 293. We fail to see how it can be said that this passage discloses “a second analysis to re-analyze the digital waveform” previously stored as claimed. We thus reject the Examiner’s determination that “re-analysis is analogous to repeated detection of peaks” in which Jörg “is attempting to make use of multiple echoes.” Even if Jörg’s system combines multiple echoes and detects peaks belonging thereto, that is not the same as performing a second analysis to re-analyze the digital waveform that is stored in a buffer.

Accordingly, we conclude that the Examiner fails to render a prima facie case in that the Examiner has not established that the combination of Borriello and Jörg renders claim 1 obvious. We do not sustain the rejection of claim 1, and dependent claims 2–7 and 10, as being obvious over Borriello and Jörg.

Claims 11, 12 and 14–16

Appellant argues method claims 11, 12, and 14–16 together. *See* Appeal Br. 10–11. We select claim 11 for review, with claims 12, and 14–16 standing or falling therewith. As discussed above, for method claim 11, we need not include its conditional limitations in our analysis as they are not required steps.

The Examiner finds that Borriello discloses a method comprising the steps of providing a plurality of emitters at fixed locations within an environment and transmitting signal pulses of a predefined frequency by the plurality of emitters. Final Act. 10 (citing Borriello Abstr., p. 192, Fig. 4). The Examiner also finds that Borriello discloses the steps of receiving, by a mobile device, at least one of the signal pulses from the plurality of emitters and converting the at least one of the signal pulses into a digital waveform. Final Act. 10 (citing Borriello Abstr., p. 197). The Examiner further finds that Borriello discloses the steps of storing the digital waveform into a buffer having a predetermined length of time and performing a first analysis to analyze the digital waveform to detect a detected signal pulse at the predefined frequency. Final Act. 10–11 (citing Borriello Abstr., pp. 191, 197, 199).

Appellant does not contest these findings, except in regard to the limitation “storing the digital waveform into a buffer having a predetermined length of time,” Appellant argues that “there is no particular link between the microphone interface and the limited memory” and “the mere mention of that memory cannot be equated with the claimed feature.” Appeal Br. 10. Appellant submits that “it is unclear to the Applicants whether the Office Action is relying on an inherency argument, whether the Office Action is

taking official notice, or whether there is some other basis for making the alleged claim.” Appeal Br. 10–11.

The Examiner responds that Borriello discloses “using a ‘digital signal processing algorithm . . . similar to a narrow bandpass filter . . . Goertzel algorithm . . .’ (Pg. 197) on a ‘PDA carried by a user’ (Abstract) (i.e., a handheld computer)” and that “[c]learly[,] digital signals must be stored somewhere (i.e., memory) so that digital signal processing algorithms may be performed on the same signals.” Ans. 8.²

Appellant does not dispute the Examiner’s response. *See* Reply Br. 4. Thus, Appellant does not apprise us of Examiner error.

For these reasons, the rejection of method claims 11, 12, and 14–16 as being obvious over Borriello and Jörg is sustained.

*The rejection of claims 8, 9, and 13
as unpatentable over Borriello, Jörg, and Jones*

Claims 8 and 9

System claims 8 and 9 depend directly or indirectly from claim 1. Appeal Br. 13 (Claims App.). The Examiner relies on Jones for disclosing using a Fast Fourier Transform operation and using wakeup circuitry, and does not rely on Jones to cure the deficiency of Borriello and Jörg discussed

² We note that Appellant also discloses that a Goertzel algorithm is used. *See* Spec. ¶ 22.

above. Final Act. 15. Thus, the rejection of system claims 8 and 9 as being obvious over Borriello, Jörg, and Jones is not sustained.

Claim 13

Method claim 13 depends directly from claim 11. Appeal Br. 14 (Claims App.). Appellant does not present arguments for claim 13 and instead relies on arguments previously presented with respect to claim 11. Appeal Br. 10–11. As we do not find error in the rejection of claim 11, the rejection of claim 13 as being obvious over Borriello, Jörg, and Jones is sustained for the same reasons discussed above.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–4, 7, 10–12, 14–16	102	Van Loenen	11, 12, 14–16	1–4, 7, 10
5, 6	103	Van Loenen, Borriello		5, 6
8, 9, 13	103	Van Loenen, Borriello, Jones	13	8, 9
1–7, 10–12, 14–16	103	Borriello, Jörg	11, 12, 14–16	1–7, 10
8, 9, 13	103	Borriello, Jörg, Jones	13	8, 9
Overall Outcome			11–16	1–10

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

AFFIRMED IN PART