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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte RONALD G. MURDOCK, JOHN D. MACKAY, and
DOUGLAS A. CUMMINS

Appeal 2014-008355
Application 12/848,903
Technology Center 3600

Before JENNIFER D. BAHR, STEFAN STAICOVICI, and
AMANDA F. WIEKER, *Administrative Patent Judges*.

BAHR, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Ronald G. Murdock et al. (Appellants) appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1–29. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

THE CLAIMED SUBJECT MATTER

Claim 1, reproduced below, is illustrative of the claimed subject matter.

1. A method for locating an object, the method comprising:
establishing a bidirectional channel between the object and a first stationary node of a network;
using the bidirectional channel, synchronizing a clock maintained at the object with a common time base maintained by a clock at each of the first stationary node and a second stationary node of the network, the synchronizing including transmitting a synchronization message that includes a timestamp;
obtaining a first set of time-of-flight measurements using the common time base and one or more wireless signals sent between the object and the first and second stationary nodes; and
estimating a first position of the object using the first set of time-of-flight measurements and location information of the first and second stationary nodes.

REJECTIONS

- I. Claims 1, 3, 8, 9, 12, 13, 16, 17, 23, 26, 27, and 29 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara (US 6,477,380 B1, iss. Nov. 5, 2002) and Wu (Jiang Wu & Robert Peloquin, *Synchronizing Device Clocks Using IEEE 1588 and Blackfin Embedded Processors*, Analog Dialogue 43-11 (2009) (www.analog.com/analogdialogue)).
- II. Claims 2, 4, 5, 14, 15, 18–22, and 24 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Fontana (US 6,054,950, iss. Apr. 25, 2000).
- III. Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Dunn (US 5,600,706, iss. Feb. 4, 1997).

- IV. Claim 10 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Lupoli (US 2005/0092823 A1, pub. May 5, 2005).
- V. Claim 11 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, Dunn, and Myllymäki (US 7,228,136 B2, iss. June 5, 2007).
- VI. Claims 17 and 28 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Fattouche (US 5,890,068, iss. Mar. 30, 1999).
- VII. Claim 25 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, Lupoli, Eidson (John Eidson, *IEEE-1588 Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems 2*, 2–94 (Agilent Techs., Inc. 2005)), Dunn, and Fattouche.

DISCUSSION

Rejection I

Appellants argue for patentability of claims 1, 3, 8, 9, 12, 16, 17, 23, 27, and 29 subject to this ground of rejection as a group. Appeal Br. 3–5. We select claim 1 as representative of this group, and claims 3, 8, 9, 12, 16, 17, 23, 27, and 29 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv). Appellants present separate arguments for claims 13 and 26. Appeal Br. 5–7. Accordingly, we address these claims separately.

Claims 1, 3, 8, 9, 12, 16, 17, 23, 27, and 29:

The Examiner finds that Uehara discloses a method as called for in claim 1, including establishing a bidirectional channel between an object and a first stationary node of a network, synchronizing a clock maintained at the object with a common time base maintained by a clock at the first stationary node and a second stationary node of the network, obtaining a first set of time-of-flight measurements using the common time base and one or more wireless signals sent between the object and the first and second stationary nodes, and estimating a position of the object using the first set of time-of-flight measurements and location information of the first and second stationary nodes. Non-Final Act. 3–4 (citing Uehara, col. 3, ll. 61–67; col. 4, ll. 3–67; col. 5, ll. 1–35; col. 7, ll. 16–21; Fig. 3). The Examiner does not find that Uehara’s synchronizing includes transmitting a synchronization message that includes a time stamp, but, instead, relies on Wu for this feature. *See id.* at 3.

The Examiner determines that it would have been obvious to modify Uehara “by using the time synchronization of Wu . . . in order to provide a measurement of path delay for a more accurate synchronization at each clock in the system.” *Id.* at 4 (citing Wu, “Section entitled ‘What IEEE1588 Does’”).

Appellants argue that Uehara and Wu disclose “very different systems” and that using Wu’s time synchronization in Uehara’s system would require Uehara’s base stations and mobile stations to be “completely redesigned” to use Wu’s processor. Appeal Br. 4. According to Appellants, “[t]his would be an especially significant change to the structure of”

Uehara's mobile station "because Uehara does not disclose the existence of any processor in the mobile station." *Id.*

Appellants also point out that "there are fundamental differences in the sequence of synchronization between the Uehara and Wu systems." *Id.* More specifically, Uehara discloses a unification station or preselected base station maintaining a master clock, which "is first used to sync all base stations in the network before attempting to sync a mobile station," while, in contrast, Wu discloses, in the IEEE-1588 system, use of "a Best Master Clock (BMC) algorithm that 'negotiates' master clock status amongst all network devices." *Id.*

For the above reasons, Appellants submit that implementation of timestamp messaging as taught by Wu in Uehara's system would require "a significant amount of reconstruction and redesign of the Uehara system," which "extend far beyond the mere substitution of one known element for another in a common structure." *Id.* Appellants also contend that "the proposed combination of references would change the principle of operation in Uehara." *Id.* at 4–5. Thus, Appellants argue that "a person having skill in the art would not have been motivated to combine the teachings of [Uehara and Wu]." *Id.* at 5.

Even assuming that implementation of Wu's clock synchronization technique in Uehara's system would require structural changes to Uehara's base stations and mobile station, including the addition of a processor in the mobile station, as Appellants contend, Appellants do not provide adequate evidence or technical explanation to show that such changes would have been uniquely challenging to, or beyond the technical grasp of, a person having ordinary skill in the art. Moreover, we do not agree with Appellants

that the modification proposed by the Examiner would change the principle of operation of Uehara. As the Examiner points out (Ans. 17), both Uehara and Wu synchronize the clocks of a system. Employing Wu's technique to synchronize the clocks of the base stations of the network and to synchronize the clock of the mobile station to the clocks of the network, in place of the synchronization technique used by Uehara, would not change the principle of operation of Uehara. With either synchronization technique, the fundamental principle of operation of Uehara (i.e., establishing a bidirectional channel between an object and a first stationary node of a network, synchronizing a clock maintained at the mobile station with a common time base maintained by the clocks of the base stations, obtaining a set of time-of-flight measurements using the common time base and a radio wave transmitted by the mobile station, and estimating the location of the mobile station using the set of time-of-flight measurements and location information of the first and second stationary nodes) would remain the same. *See Uehara*, col. 3, l. 51–col. 8, l. 11.

For the above reasons, Appellants fail to apprise us of error in the rejection of claim 1. Accordingly, we sustain the rejection of claim 1, as well as claims 3, 8, 9, 12, 16, 17, 23, 27, and 29, which fall with claim 1, under 35 U.S.C. § 103(a) as unpatentable over Uehara and Wu.

Claim 13:

Claim 13 depends from claim 1, and further recites that the one or more wireless signals used for obtaining a first set of time-of-flight measurements “is a single location message broadcast from the object to the first and second stationary nodes.” Appeal Br. 8, 9 (Claims App.). The

Examiner finds that the radio wave radiated from Uehara's mobile station MS satisfies this limitation. Non-Final Act. 4.

Appellants argue that "Uehara discloses the object must send three signals to obtain a first set of time-of-flight measurements," including a cell notification message, the radio wave signal referenced by the Examiner, and "an 'enhanced radio wave' (understood to be a signal in which the power level has been optimized) for measuring signal arrival times." Appeal Br. 5 (citing Uehara, Fig. 5, steps 10, 20-4, 20-5; col. 5, ll. 42-45; col. 6, ll. 15-21; col. 7, ll. 11-21).

In response, the Examiner points out that Uehara discloses, in pertinent part, "The measurement of the distance is carried out using the radio wave radiated by the mobile station' (col. 6, lines 4-6) and further '...the base stations BS1-BS3 each measure the receipt levels of the radio wave' (col. 6, lines 17-18)." Ans. 17. Thus, the Examiner maintains that "there is one signal (radio wave is singular) broadcast from the object (mobile station) which is received by first and second stationary nodes (any two of BS1-BS3)," thereby satisfying the language of claim 13. *Id.*

Having reviewed Uehara's disclosure in light of Appellants' contentions, we discern no error in the Examiner's finding that Uehara discloses obtaining a first set of time-of-flight measurements using the common time base and a single location message broadcast from the object (mobile station MS) to the first and second stationary nodes (any two of base stations BS1-BS3). Even assuming that the notification of the entrance of mobile station MS to base station BS3 carried out "by the access of the mobile station MS to the base station BS3 using an access channel and by a hand-off from the peripheral base station BS to the base station BS3 during

conversation or idling” entails a cell notification message broadcast from mobile station MS, as Appellants contend, this message merely triggers the process of measuring distances; it is not used for obtaining the measurements. Uehara, col. 5, ll. 36–54 (boldface omitted). As pointed out by the Examiner (Ans. 17), “[t]he measurement of the distance is carried out using the radio wave radiated by the mobile station MS.” Uehara, col. 6, ll. 4–6.

We appreciate that once this radio wave is received at base stations BS1–BS3 and the receipt levels thereof have been reported, position manage center PMC compares the receipt levels to a predetermined threshold determined to be sufficient for measuring distances. *Id.*, col. 6, ll. 38–46. We also appreciate that if all the receipt levels are not larger than the threshold, position manage center PMC sends a notification to mobile station MS, under which notification mobile station MS “executes the enhancement of the transmission power on the frames.” *Id.*, col. 7, ll. 2–5. However, if the receipt levels at base stations BS1–BS3 all are larger than the threshold, no enhancement of the transmission power is necessary. *Id.*, col. 6, ll. 46–48. Consequently, at least where the receipt levels all exceed the threshold, the measurements are obtained using the radio wave (a single message), as called for in claim 13, without transmission of an enhanced radio wave from mobile station MS. Moreover, even if enhancement of transmission power is ordered, the base stations are ordered to receive the enhanced radio wave, and the measurements are obtained using the enhanced radio wave (a single message), as called for in claim 13. *Id.*, col. 7, ll. 9–21.

For the above reasons, Appellants fail to apprise us of error in the rejection of claim 13. Accordingly, we sustain the rejection of claim 13 under 35 U.S.C. § 103(a) as unpatentable over Uehara and Wu.

Claim 26:

In contesting the rejection of claim 26, Appellants argue that the Examiner failed to consider the steps of the claim directed to non-location data. Appeal Br. 6–7. Appellants point out correctly that the Examiner’s rejection is silent with respect to the last three steps of claim 26 dealing with the non-location data. *Id.*; *see* Non-Final Act. 6–7. In response, the Examiner states that “the claimed subject matter regarding the *reception and transferring* of non-location data is clearly met via the use of a message including ‘sync’ and ‘followup’ in the synchronization technique of Wu.” Ans. 17 (emphasis added). The Examiner’s response does not address the claimed “storing” step of claim 26. The Examiner does not make any finding regarding disclosure in either Wu or Uehara directed to storing the non-location data, including associating the non-location data with the first position, as required in claim 26. *See* Appeal Br. 14 (Claims App.). Thus, the Examiner fails to establish the requisite factual basis to support the legal conclusion of obviousness of the subject matter of claim 26. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988) (pointing out the examiner’s burden to establish a factual basis to support the legal conclusion of obviousness).

Accordingly, we do not sustain the rejection of claim 26 under 35 U.S.C. § 103(a) as unpatentable over Uehara and Wu.

Rejections II–VII

In contesting these rejections, Appellants rely on the arguments presented for claim 1. *See* Appeal Br. 5. For the same reasons discussed

above in addressing the rejection of claim 1, these arguments fail to apprise us of error in Rejections II–VII. Accordingly, we sustain the rejection of claims 2, 4, 5, 14, 15, 18–22, and 24 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Fontana; the rejection of claims 6 and 7 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Dunn; the rejection of claim 10 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Lupoli; the rejection of claim 11 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, Dunn, and Myllymäki; the rejection of claims 17 and 28 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, and Fattouche; and the rejection of claim 25 under 35 U.S.C. § 103(a) as unpatentable over Uehara, Wu, Lupoli, Eidson, Dunn, and Fattouche.

DECISION

The Examiner’s decision rejecting claims 1–29 is affirmed as to claims 1–25 and 27–29, and reversed as to claim 26.

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-IN-PART