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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PER JOHAN SLYCKE, PETRUS HERMANUS VELTINK, and DANIEL ROETENBERG[1]

Appeal 2015-005061
Application 12/093,914
Technology Center 2800

Before BEVERLY A. FRANKLIN, WESLEY B. DERRICK, and CHRISTOPHER C. KENNEDY, *Administrative Patent Judges*.

KENNEDY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the Examiner's decision to reject claims 1–16. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

BACKGROUND

The subject matter on appeal relates to a motion tracking system for tracking an object composed of object parts, such as a human body, in a three-dimensional space. *E.g.*, Spec. 1:1–4; Claim 1. Claim 1 is reproduced below from page 9 (Appendix A) of the Appeal Brief:

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[1] According to the Appellants, the real party in interest is Xsens Holding B.V. App. Br. 1.

1. A motion tracking system for tracking a composite object composed of object parts in a three-dimensional space, comprising:

one or more transmitter modules provided in fixed positional relationship with respect to at least one object part, that transmit magnetic fields, with mutually different main directions at a frequency less than a sampling frequency set by a motion resolution of the tracking system;

a magnetic measuring module for receiving the magnetic fields, wherein the magnetic measuring module has a fixed positional relationship with an object part of the composite object;

an inertial measurement unit for recording a linear acceleration and an angular velocity or angular acceleration, wherein the inertial measurement unit has a fixed positional relationship with an object part of the composite object; and

a processor for controlling the one or more transmitter modules and receiving signals coming from the magnetic measuring module and the inertial measurement unit;

the processor being configured to derive orientation and/or position information of the parts of the object via the information recorded by the inertial measurement unit and to periodically correct the derived orientation and/or position information with motion information from the magnetic measuring module.

REJECTIONS ON APPEAL

1. Claims 1, 2, 4–6, and 9–16 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hansen (US 5,744,953, issued Apr. 28, 1998) in view of Moriya et al. (US 6,691,074 B1, issued Feb. 10, 2004) and Pawlowski et al. (US 2005/0074078 A1, published Apr. 7, 2005).

2. Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hansen in view of Moriya and Pawlowski, further in view of Foxlin (US 2004/0143176 A1, published July 22, 2004).

3. Claim 3 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Hansen in view of Moriya and Pawlowski, further in view of Kolen (US 2006/0184336 A1, published Aug. 17, 2006).

ANALYSIS

The Appellants present arguments only for limitations appearing in claim 1. We therefore limit our discussion to that claim. The remaining claims on appeal will stand or fall with claim 1.

After review of the cited evidence in the appeal record and the opposing positions of the Appellants and the Examiner, we determine that the Appellants have not identified reversible error in the Examiner's rejections. Accordingly, we affirm the rejections for reasons set forth below, in the Final Action, and in the Examiner's Answer. *See generally* Final Act. 2–17; Ans. 2–7.

The Examiner finds that Hansen teaches a motion tracking system comprising each element of claim 1 except that Hansen does not expressly disclose (1) "a linear acceleration and an angular velocity or angular acceleration," Final Act. 7, (2) periodic correction of the derived orientation and/or position information, *id.*, and (3) transmission of magnetic fields at a frequency less than a sampling frequency set by a motion resolution of the tracking system, *id.* at 8. Concerning (1) linear acceleration and angular velocity/acceleration, and (2) periodic correction of orientation and position information, the Examiner finds that Moriya teaches a tracking system comprising an accelerometer that detects linear acceleration and angular velocity/acceleration, and that it also teaches periodic correction of position/orientation information. *Id.* at 7. The Examiner concludes that it would have been obvious to use an accelerometer capable of detecting linear

acceleration and angular velocity/acceleration, and to periodically correct position and orientation information, "for the purpose of having the capabilities of obtaining linear and angular acceleration in order to effectively identify the spatial and angular position of the object and increasing the accuracy of orientation and position of the object being t[r]acked." *Id.* at 8.

Concerning transmission of magnetic fields at a frequency less than a sampling frequency set by a motion resolution of the tracking system, the Examiner finds that "Pawlowski teaches a communication system includes a transmitter for transmitting a wireless signal at a frequency less than a sampling frequency of a receiver." *Id.* The Examiner concludes that it would have been obvious to modify the system of Hanson and Moriya in view of Pawlowski "for the purpose of preventing data drop by providing enough time for the receiver to process the received signals; therefore, ensuring the proper transmitting of magnetic fields." *Id.* at 8–9.

The Appellants present several arguments in opposition to the Examiner's rejection, which we address in turn below.

1. In the Final Action, the Examiner states that Moriya teaches "to periodically correct derived orientation and/or position information *coming from a magnetic measuring module*." *See, e.g.*, Final Act. 7. The Appellants point out that claim 1 requires correcting orientation and/or position information derived from the inertial measurement unit "with motion information from the magnetic measuring module." App. Br. 5. The Appellants argue that "the rejection of claim 1 does not even allege that the actual claim limitation is met; as such, the rejection of claim 1 is *per se* reversible." *Id.*

We are not persuaded by the Appellants' argument. As identified by the Appellants, certain language used by the Examiner suggests that the Examiner may have incorrectly believed that claim 1 requires correction of orientation/position information that comes from the magnetic measuring module. *See id.* However, other language used by the Examiner indicates a correct understanding that orientation/position information derived from the inertial measurement unit is periodically corrected with motion information that comes from the magnetic measuring module. *See* Ans. 2 ("Hansen in view of Moriya . . . teaches the processor is configured to periodically correct the derived orientation and/or position information *with motion information from the magnetic measuring module.*" (emphasis added)), 5 (explaining that accelerometer provides position and orientation information that is periodically corrected "with motion information from the magnetic measuring module").

The Examiner finds that Moriya's accelerometer detects linear acceleration and angular velocity/acceleration, thereby providing position and orientation information. *E.g.*, Ans. 3 (discussing linear and angular acceleration and their relationship to position and orientation). The Examiner's references to correcting position and orientation information "coming from a magnetic measuring module" appears simply to have omitted the words "*with information* coming from a magnetic measuring module," which, as noted above, the Examiner corrects in other statements about the prior art. *See* Ans. 2, 5. Despite the Examiner's apparent misunderstanding of the Appellants' argument, *see id.*; Reply Br. 1–2, we are not persuaded that the portions of the Final Action and Answer relied upon by the Appellants establish reversible error in the rejection; rather, they

appear simply to reflect inadvertent omissions in the language used by the Examiner.

The Appellants' argument principally focuses on form rather than substance, and it fails to persuasively allege that Moriya does not teach or suggest the disputed claim limitation. Consistent with the Examiner's rejection, column 24 of Moriya describes the benefits of using both magnetic and acceleration measurements in a tracking system. *See* Moriya at 24:25–51. Moriya explains that magnetic measurements may suffer from magnetic disturbances, and that acceleration measurements may suffer from "drifts that accumulate in time." *Id.* at 24:45–48. It further explains that magnetic measurements do not suffer from drift, and that acceleration measurements do not suffer from magnetic disturbances, suggesting that the two distinct systems provide a check on each other. *Id.* Moriya cites a reference, U.S. Patent No. 5,645,077, that expressly contemplates drift of acceleration measurements and explains the need to account for drift in motion tracking systems. *See* Moriya at 2:36–41. The Appellants fail to provide any persuasive evidence or reasoning as to why the disputed limitation would not have been obvious to a person of ordinary skill in the art in view of Moriya.

On the record before us, we are persuaded that a person of ordinary skill in the art, through the use of only ordinary creativity, would have been motivated to account for known drift problems in measurements taken by an inertial measurement unit such as the accelerometer of Moriya by the use of motion information from the magnetic measuring module of Moriya, which Moriya expressly teaches does not suffer from drift. *See* Moriya at 24:25–51; *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–19, 421 (2007) ("[T]he [obviousness] analysis need not seek out precise teachings directed

to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." / "A person of ordinary skill is also a person of ordinary creativity, not an automaton.").

2. The Appellants argue that "[o]ne could not combine an on-body magnetic source with inertial sensors without introducing significant technical challenges not addressed by either Hansen or Moriya." App. Br. 5. The Appellants then focus on various teachings of Moriya in support of their position. *See id.* at 5–6.

However, as the Examiner explains, "Hansen . . . addresses the technical challenges that the Appellant pointed out, in particular, Hansen teaches an on-body magnetic source . . . with inertial sensors . . . and magnetic measuring module . . . ." Ans. 3–4. The Appellants' argument is not persuasive because it focuses on Moriya and fails to address the fact that the Examiner finds that Hansen appears to do exactly what the Appellants allege that the references do not address; i.e., combine an on-body magnetic source with inertial sensors. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981) ("[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.").

3. The Appellants argue that "the angular velocity and angular acceleration parameters in Moriya are in the state vector . . . and are derived from the magnetic system ***only***," rather than from the inertial measurement unit as recited by claim 1. *See* App. Br. 6 (emphasis in original).

The Appellants cite nothing persuasive in Moriya in support of their contention that angular velocity/acceleration are derived from the magnetic

system only. On the contrary, and as the Examiner explains, Moriya's Figure 7 teaches that "Acceleration measurements" are used for "Spatial and/or Angular Position finding." *See* Ans. 5; Moriya Fig. 7. The Examiner finds, and the Appellants do not dispute, that the "spatial" position of Figure 7 is equivalent to the position information of claim 1 and is obtained from linear acceleration. Ans. 5. The Examiner finds, and the Appellants do not dispute, that the "angular" position of Figure 7 is equivalent to the orientation information of claim 1 and is obtained from angular acceleration. *Id.* Thus, Figure 7 suggests that acceleration measurements, including linear and angular measurements, are used for spatial and angular position finding. That interpretation of Figure 7 is consistent with Moriya's teaching that "*at least one* characteristic of the acceleration as measured by the accelerometer" is used in connection with its tracking system. *See, e.g.*, Abstract, 4:26–27.

A preponderance of the evidence supports the Examiner's position. The Appellants fail to persuade us that Moriya's angular parameters are derived only from the magnetic system.

4. The Appellants argue that Moriya's preferred embodiment "describes a bi-axial accelerometer," with which "it is technically impossible to fully describe a 3D." App. Br. 6.

As the Examiner explains, that argument is untenable because Moriya expressly discloses that "acceleration measures can be performed by . . . [a] 3-axis accelerometer[]." *See* Moriya at 9:17–18; Ans. 4. The Appellants do not address that particular embodiment of Moriya or otherwise explain why Moriya's accelerometer "is not intended or enabled to provide full 3D

motion." *See* App. Br. 6; *see also* Moriya at Title ("System for *Three Dimensional* Positioning and Tracking" (emphasis added)).

5. The Appellants argue that Pawlowski teaches transmission of a signal having a *bit rate*, as opposed to a *frequency*, that is less than the receiver sampling frequency. *See* App. Br. 7.

Although the Appellants are correct that Pawlowski teaches "a bit rate that is less than the sampling rate of the receiver," *see* Pawlowski ¶ 18, their argument does not persuasively identify reversible error in the Examiner's rejection. In the Examiner's Answer, the Examiner expands on the rationale in the Final Action and explains:

> The higher the sampling frequency the faster the receiver samples data, and the lower the transmitting frequency the slower the transmitter transmit data. As a result, it is obvious to obtain more sample points by having a higher sample frequency.
>
> Therefore, it is obvious to have the transmitting frequency . . . less than the sampling frequency of the receiver of the tracking system in order to obtain more sample points and prevent data drops by providing enough time for the receiver to process the received signals; therefore, ensuring the proper transmitting and receiving of the magnetic fields.

Ans. 7.

While Pawlowski may not recite *ipsis verbis* the disputed claim limitation, the Examiner finds that a motion tracking system incorporating that limitation nevertheless would have been obvious in view of Pawlowski and the knowledge of a person of ordinary skill in the art, as discussed above. The Appellants do not persuasively refute the Examiner's rationale. *See KSR*, 550 U.S. at 418–19 ("[T]he [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a

person of ordinary skill in the art would employ."); *see also In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (even if the examiner failed to make a prima facie case, the Board would not have erred in framing the issue as one of reversible error because "it has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections").

* * *

In summary, we have carefully considered the Appellants' arguments and are not persuaded of reversible error in the Examiner's rejections.

CONCLUSION

We AFFIRM the Examiner's rejections of claims 1–16.

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