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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JAIME ELLIOT NAHMAN, STEFAN MARTI, DAVIDE DI CENSO, and MIRJANA SPASOJEVIC

Appeal 2019-003144
Application 14/954,597
Technology Center 2600

Before JASON V. MORGAN, DEBORAH KATZ, and JOHN A. EVANS, *Administrative Patent Judges*.

KATZ, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] seeks our review[2], under 35 U.S.C. § 134(a), of the Examiner's decision to reject claims 1–6, 8–10, 13, and 18–19. We have jurisdiction under 35 U.S.C. § 6(b). We AFFIRM.

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[1] We use the word "Appellant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real party-in-interest as Harman International Industries. (Appeal Br. 3.)

[2] We consider the Final Office Action issued March 2, 2018 ("Final Act."), the Appeal Brief filed September 13, 2018 ("Appeal Br."), the Examiner's

Appellant's Specification is directed to human-machine interfaces, specifically a center of gravity shifting force device. (Spec. ¶ 1.) The Specification explains that force events can be used to communicate information to a user, without overwhelming the user's visual or auditory channels. (*See id.* at ¶¶ 8, 21.) The Specification explains further that based on sensory data, forces can be computed and exerted on the user via one or masses to convey information such as navigation instructions, alerts, and information associated with objects in the surrounding environment. (*See id.*)

The Examiner rejects claims 1–6, 8–10, 13, and 18–19 under 35 U.S.C. § 103 over Higashino[3] and Sieben.[4] (*See* Final Act. 3–9.)

Appellant's claim 1 is representative and recites:

> A system for exerting forces on a user, the system comprising:
>
> a user-mounted device including one or more masses;
>
> one or more sensors configured to acquire sensor data; and
>
> a processor coupled to the one or more sensors and configured to:
>
> > determine, based on the sensor data, at least one of an orientation and a position of the user-mounted device relative to a surrounding environment;
> >
> > compute a force to be exerted on the user via the one or more masses based on (i) a force direction associated with a force event, and (ii) at least one of the orientation and the position of the user-mounted device relative to the surrounding environment; and

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Answer issued on January 10, 2019 ("Ans."), and the Reply Brief filed March 11, 2019 ("Reply Br.").

[3] U.S. Patent Application Publication 2014/0272915 A1, published September 18, 2014.

[4] U.S. Patent 5,844,674, issued December 1, 1998.

> generate, based on the computed force, an actuator control signal to change a position of the one or more masses relative to the user-mounted device.

(Appeal Br. 16.) Thus, claim 1 recites a device with one or more masses, one or more sensors that acquire data, and a processor coupled to the sensors that determines an orientation and a position relative to the surrounding environment based on the sensor data. The processor computes a force based on (i) a force direction associated with a force event, and (ii) at least one of the orientation and the position of the device. The processor generates a signal to change the position of one or more of the masses relative to the user-mounted device based on the computed force.

The Examiner rejects claims 1–6, 8–10, 13, and 18–19 under 35 U.S.C. § 103 over Higashino[5] and Sieben.[6] (*See* Final Act. 3–9.) The Examiner indicates that claims 7, 11–12, 14–17, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. (*See id.* at 9.)

The Examiner finds that Higashino discloses a system for exerting forces with a user-mounted device that includes one or more masses. (*See* Final Act. 3, citing Higashino Abstract, Figs. 1–2.) According to the Examiner, Higashino teaches one or more sensors configured to acquire sensor data. (*See* Final Act. 4.) In support, the Examiner cites claim 14, which recites:

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[5] U.S. Patent Application Publication 2014/0272915 A1, published September 18, 2014.
[6] U.S. Patent 5,844,674, issued December 1, 1998.

> The acceleration sensation presentation apparatus according to claim 9, further comprising:
>
> a sensor configured to detect a motion of the user is provided to a predetermined location of the frame [worn on the head of the user];
>
> wherein the playing unit corrects the acceleration information according to sensor information obtained by the sensor, and supplies a driving signal based on the acceleration information after correction to the vibration driving unit.

(Higashino 11.) The Examiner finds that claim 14 recites using sensors to acquire sensor data and recites using that data to determine an orientation and a position of the user-mounted device. (*See* Final Act. 4, citing Higashino claim 14, Figs. 1 and 3, ¶¶ 12, 48.) The Examiner cites further to Figures 1 and 3, as well as paragraphs 12 and 48, to support the finding that Higashino teaches determining, based on the sensor data, at least one of an orientation and a position of the masses because it teaches determining angular positions of the device. (*See* Final Act. 4.) The Examiner cites elsewhere in Higashino, finding that it teaches computing a force to be exerted on the user through the masses mounted on the device. (*See* Final Act. 4, citing Higashino ¶¶ 6, 8, 25–26, 28–29, 40, and 63.)

We agree with the Examiner's findings and that Higashino teaches a device that can acquire sensor data and use it to determine an orientation or position and then generate a signal to move weights on the device and assert pressure on the user.

The Examiner finds that Higashino does not expressly teach a processor coupled to the one or more sensors and does not disclose that the position or orientation is relative to a surrounding environment or that the force to be exerted on the user is based on at least one of the orientation and

position of the user mounted device relative to the surrounding environment. (*See* Final Act. 4–5.)

Nevertheless, the Examiner finds that because the computation of angles, vibrations, etc., performed, as taught in Higashino, would require a processor and because Higashino teaches software, it inherently teaches a processor. (*See* Final Act. 5, citing Higashino ¶¶ 39, 40, 43.)

The Examiner also cites to Sieben, which teaches a virtual reality system with an optical position-sensing facility that provides a position or orientation relative to a surrounding environment by reference to a fixed reference point. (*See* Final Act. 5, citing Sieben, abstract, 1:11–20, 1:55–61, 3:35–39, Fig. 1.)

The Examiner determines that it would have been obvious to one of ordinary skill in the art to obtain position/orientation information relative to the environment as taught in Sieben and use it with a device as taught in Higashino in order to determine a force exerted on the user relative to the environment. (*See* Final Act. 6.) The Examiner's rejection is based on the determination that it would have been obvious to modify the device of Higashino to compute the force exerted on a user to change a position/orientation relative to the surrounding environment to enhance the user experience in a virtual reality environment in light of the teachings of Sieben. (*See id*.)

Appellant argues that Higashino fails to teach or suggest that a force to be exerted on the user is computed based on the position and/or orientation of the headset relative to the surrounding environment, as required by claim 1. (*See* Appeal Br. 10; *see* Reply Br. 3–4.) According to Appellant, Higashino is silent regarding a determination of the position or orientation of the headset relative to a surrounding environment, teaching

instead that the weights within the headset are moved to predetermined positions, without regard to the position or orientation of the headset relative to the surrounding environment. (*See id.*)

Although Higashino teaches that movement of the masses can be predetermined, such as through a game program (*see* Higashino ¶ 40), it also provides an embodiment in which sensors on the apparatus detect the motion of the user and provide information to correct acceleration and drive signals after correction to a vibration driving unit. (*See* Higashino claim 14; *see also* Final Act. 8, citing Higashino ¶ 106.) Thus, Higashino teaches providing signals to the headset other than predetermined signals. We are not persuaded by Appellant's argument regarding the origin of the signal that the Examiner erred.

We are not also persuaded by Appellant's argument that the Examiner erred because Higashino is silent regarding a determination of the position or orientation of the headset relative to a surrounding environment because the Examiner cites Sieben for a teaching of determinations of position or orientation relative to the environment. (*See* Appeal Br. 10.)

Appellant argues that Sieben fails to teach computing a force based on the position and/or orientation of the device relative to the surrounding environment teaching, instead, a conventional virtual reality system in which images are presented to a user. (*See* Appeal Br. 11; *see* Reply Br. 4.) Appellant argues that Sieben is entirely silent regarding computing forces or applying forces on a user. (*See id*.)

This argument, like Appellant's argument that Higashino does not teach changing a position or orientation relative to the environment, is unpersuasive because it addresses the teachings of the references separately, not as a combination as recited in the Examiner's rejection. "The test for

obviousness is not . . . that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

We are also not persuaded by Appellant's arguments about the combination of Higashino and Sieben for the same reasons we are not persuaded by the arguments about the references individually. For example, Appellant argues that combining the teachings of Higashino and Sieben would result only in a system that includes a headset that generates accelerations in *predetermined* directions and which displays conventional virtual reality images to a user, not a system that computes forces to exert on a user based on the orientation or position of the headset relative to the surrounding environment. (*See* Appeal Br. 11; *see* Reply Br. 4–5.) According to Appellant, combining the teachings of Higashino and Seiben does not teach computing forces to exert on a user based on the orientation or position the headset relative to the environment because neither reference teaches a connection between forces to be exerted on the user and the orientation or position of the user device relative to the environment. (*See id*.)

As explained above, at least claim 14, as supported by paragraph 48 of Higashino (describing Figure 3, which is an example of a method for obtaining the center of gravity) teaches computing forces to exert on a user based on an orientation or position of the user and Sieben teaches determining the orientation and position of a user in relation to the environment. (*See* Ans. 4.) The Examiner finds that even though Higashino may not explicitly state that the force applied depends on the orientation and position relative to the surrounding environment, one of ordinary skill in the

art could have used the position of the center of gravity and the orientation as defined by the angles with information relative to the reference point disclosed by Sieben to compute and generate a force to change the position of one or more weights according to the surrounding environment. (*See* Ans. 12.) Appellant does not direct us to evidence that this finding is incorrect or that one of ordinary skill would not have been able to use information relative to a reference point in this way.

Accordingly, we are not persuaded by Appellant's arguments that the Examiner erred in rejecting claim 1 over Higashino and Sieben.

Appellant argues separately for the patentability of claim 2. (*See* Appeal Br. 13.) Claim 2 recites: "The system of claim 1, wherein the processor is further configured to determine that at least one of the orientation and the position has changed, and, in response, generate a second actuator control signal to reposition at least one mass relative to the user-mounted device." (Appeal Br. 16.)

Appellant acknowledges that the weights in Higashino may be turned to particular turning angles, and the center of gravity of the head-mounted device changes depending on the angles at which the weights are positioned. *See* Appeal Br. 13, citing Higashino**,** ¶¶ 51–59, Fig. 3.) But Appellant argues that Higashino does not disclose or suggest determining that the position or orientation of the head-mounted device is changed and then, in response, moving the weights to different turning angles, as required by claim 2. As against the rejection of claim 1, Appellant argues that Higashino is entirely silent regarding determining the position or orientation of the head-mounted device relative to a surrounding environment and so cannot be properly interpreted as meeting the above limitations of claim 2. (*See* Appeal Br. 13.)

For the reasons stated above, including that the combination of Higashino and Sieben teaches determining a position or orientation of a head-mounted device to a surrounding environment, we are not persuaded by Appellant's argument. Accordingly, we are not persuaded that the Examiner erred in rejecting claim 2 over Higashino and Sieben.

Appellant does not put forth separate arguments regarding any of Appellant's other rejected claims. Accordingly, we are not persuaded that the Examiner erred in rejecting them.

Conclusion

Upon consideration of the record and for the reasons given, we affirm the Examiner's rejection.

In summary:

Claims Rejected	**35 U.S.C. §**	**References**	**Affirmed**	**Reversed**
1–6, 8–10, 13, 18–19	103	Higashino, Sieben	1–6, 8–10, 13, 18–19	

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

AFFIRMED