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GARLICK & MARKISON
106 E. 6th Street, Suite 900
AUSTIN, TX 78701

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOHN W. HOWARD and RICHARD CUTLER

Appeal 2017-003191
Application 14/284,262
Technology Center 3700

Before DEMETRA J. MILLS, RICHARD M. LEBOVITZ, and TIMOTHY G. MAJORS, *Administrative Patent Judges*.

MILLS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134. The Examiner has rejected the claims for indefiniteness and obviousness. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

NATURE OF THE INVENTION

According to the Specification, page 1, the "present invention relates to wireless communication devices and further to protective headgear."

> In an embodiment of the present invention, power data can be determined based on a calculation of the mechanical power corresponding to an impact event. The mechanical power *P(t)* represents a rate of force applied through a distance and over an event window $t_1 \leq t \leq t_2$, and where force is calculated as the product of mass, *m,* and acceleration.

Spec. 21. "Mass in this case is the estimated mass of the entire system including the head and the protective headgear." Spec. 22.

In other embodiments, power data, different from mechanical power can be employed in favor of other power-related data that is not strictly dependent on the mass of the head helmet system. Spec. 22.

> Considering that the average density of the head helmet system is a constant, the power diffusion $q(t)$ is proportional to a related power diffusion term $Q(t)$ that is calculated as:
>
> $$Q(t) = \frac{P(t)}{m} = [a(t)v(t)]$$
>
> Expressing the kinetics of an impact based on either of the power diffusion terms *q(t)* or *Q(t)* allows the power data to be computed without accounting for the mass of the entire system, providing a normalized metric useful in assessing the severity of an impact event.

Spec. 23.

The following claims are representative:

1. A system comprising:
protective headgear;
a sensor module, coupled to the protective headgear that generates sensor data in response to an impact to the protective headgear, wherein the sensor module includes an accelerometer and a gyroscope and wherein the sensor data includes linear acceleration data and rotational velocity data;
a device processing module, coupled to the sensor module, that generates power diffusion data in response to the sensor data, wherein the power diffusion data indicates a mass independent power diffusion caused by the impact to the protective headgear, and wherein the device processing module further generates event data that includes the power diffusion data;
and
a device interface, coupled to the sensor module and the device processing module, that is coupleable to a monitoring device and that sends the event data to the monitoring device when the device interface is coupled to the monitoring device.

2. The system of claim 1 wherein the device interface includes a jack that is coupleable to the monitoring device via a standardized cable having a plug that mates with the jack.

3. The system of claim 2 wherein the standardized cable is a universal serial bus cable.

8. The system of claim 1 wherein the monitoring device includes a handheld communication device.

9. The system of claim 1 wherein the monitoring device includes a personal computer.

14. A method for use in a system for monitoring protective headgear, the method comprising:

generating, via a sensor module, sensor data in response to an impact to the protective headgear, wherein the sensor module includes an accelerometer and a gyroscope and wherein the sensor data includes linear acceleration data and rotational velocity data;

generating power diffusion data in response to the sensor data, wherein the power diffusion data indicates a mass independent power diffusion caused by the impact to the protective headgear;

generating event data that includes the power diffusion;

coupling, via a device interface, the protective headgear to a monitoring device; and

sending the event data to the monitoring device, when the device interface is coupled to the monitoring device.

Cited References

Berghash	US 3,448,738	June 10, 1969
Kittelsen	US 4,977,905	Dec. 18, 1990
Adell	US 5,063,940	Nov. 12, 1991
Socci	US 5,447,305	Sept. 5, 1995
Reuss	US 6,364,834 B1	Apr. 2, 2002
Krishnaswamy	US 2002/0060247 A1	May 23, 2002
Ramonowski	US 2002/0176330 A1	Nov. 28, 2002
Kai	US 2003/0158693 A1	Aug. 21, 2003
Rush	US 6,941,952 B1	Sept. 13, 2005
Vock	US 2006/0015287 A1	Jan. 19, 2006
Clapp	US 2008/0076971 A1	Mar. 27, 2008
Russell	US 2010/0083733 A1	Apr. 8, 2010
Quy	US 2010/0120585 A1	May 13, 2010
Kunjan	US 2010/0137778 A1	June 3, 2010
Larsen	US 2010/0312079 A1	Dec. 9, 2010
Mack	US 2011/0184663 A1	July 28, 2011
Shkolnikov	US 8,909,497 B1	Dec. 9, 2014

Grounds of Rejection

1. Claims 1–20 are rejected under 35 U.S.C. § 112(b) or 35 U.S.C. § 112 (pre-AIA), second paragraph, as being indefinite.
2. Claims 1, 4–6, 10, 14, and 16–18 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock in view of Socci.
3. Claims 2, 3, 11, 12, and 15 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock, in view of Socci, Ramonowski or Quy.
4. Claim 7 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock, in view of Socci, Berghash, Kittelsen, or Adell.
5. Claims 8, 9, 19, and 20 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock, in view of Socci, Reuss, Clapp, or Larsen.
6. Claim 13 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock, in view of Socci, and any one of Ramonowski or Quy, and further in view of any one of Kunjan, Kai, or Krishnaswamy.
7. Claims 1, 2, 4–12, and 14–20 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Mack in view of any of Vock, Russell, Shkolnikov, or Rush.
8. Claims 2, 3, 11, 12, and 15 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Mack, in view of any of Vock, Russell, Shkolnikov, or Rush, and further in view of any one of Ramonowski or Quy.

9. Claim 13 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Mack, in view of any of Vock, Russell, Shkolnikov, or Rush, and further in view of any one of Kunjan, Kai, or Krishnaswamy.

FINDINGS OF FACT

The Examiner's findings of fact are set forth in the Final Action at pages 2–31.

PRINCIPLES OF LAW

In making our determination, we apply the preponderance of the evidence standard. *See, e.g.*, *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Office).

"The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007).

Section 112, second paragraph, requires the Specification to "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention." As our reviewing court has explained, § 112, second paragraph, requires the claims "to be cast in clear—as opposed to ambiguous, vague, indefinite—terms." *In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014). The rationale for requiring such "reasonable precision" in claim language is because "[i]t is the claims that notify the public of what is

within the protections of the patent, and what is not." *Packard*, 751 F.3d at 1313.

Accordingly, the language of the claims, when read in light of the Specification, must allow skilled artisans to distinguish, as clearly as possible, between activities that are covered by the claims, and activities that fall outside the claims. *See Miles Labs., Inc. v. Shandon Inc.*, 997 F.2d 870, 875 (Fed. Cir. 1993) ("The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification."). Thus, "[a] claim is indefinite if, when read in light of the specification, it does not reasonably apprise those skilled in the art of the scope of the invention." *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1342 (Fed. Cir. 2003).

Indefiniteness Rejections - §112, second paragraph

A. The Examiner finds that claim 1 recites

> a device processing module, coupled to the sensor module, that generates power diffusion data in response to the sensor data, wherein the power diffusion data indicates a mass independent power diffusion caused by the impact to the protective headgear, and wherein the device processing module further generates event data that includes the power diffusion data

which renders the claim indefinite. First, it is not clear what is meant by "a mass independent power diffusion caused by the impact to the protective headgear" since mass necessarily plays a part in the impact of any object and cannot be decoupled from it. By the same token, the power diffusion caused by the impact cannot be decoupled from the mass causing the impact. Thus, the meaning of "a mass independent power diffusion caused by the impact to the protective headgear" is not clear using the broadest

> reasonable interpretation of the words or even the plain and ordinary meaning of the words.

Ans. 2-3.

Appellants contend that pages 22–23 of the Specification describe ways, including specific equations for *Q(t)*, *q(t)*, and *p(t)*, used to generate such a mass independent power diffusion. App. Br. 3. Appellants further argue that, "the [S]pecification provides clear support that the event data can include other quantities besides just the power diffusion data. The Office is directed to the following portion of the [S]pecification from pages 23 and 24 that presents many examples of event data." App. Br. 5. Appellants argue that

> since $P(t) = m[+a(t)v(t)]$, the mass term *m* in the numerator of the equation cancels with the mass term *m* in the denominator yielding, as clearly indicated in the portions of the [S]pecification,
>
> $Q(t) = [a(t)v(t)]$
>
> a product of acceleration and velocity and <u>not a function of mass</u>.

Reply Br. 3.

ANALYSIS

We do not find that the Examiner has adequately addressed the Appellants' arguments as to the asserted indefiniteness of the phrase "a mass independent power diffusion caused by the impact to the protective headgear." Appellants argue that their power diffusion calculation is independent of mass, which is confirmed by the cancellation of mass from their algorithm processed in the device processing module. Reply Br. 3. The Specification reasonably supports this claim interpretation. Spec. 23,

24. Accordinly, as Appellants' argument is consistent with the disclosure in the Specificationon, the claim indefiniteness rejection A. is reversed.

B. The Examiner argues that claim 3 recites

> "wherein the standardized cable is a universal serial bus cable" which renders the claim indefinite. The further description of the cable in claim 3 seems to connote that the cable is part of the claimed invention while claim 2 seems to connote that the cable is not part of the claimed invention. This apparent contradiction renders claim 3 indefinite.

Ans. 4.

Appellants contend that:

> Claim 2 indicates that the device interface includes a jack that is coupleable to the monitoring device via a standardized cable having a plug that mates with the jack. Claim 3 merely limits that the nature of the standardized cable that the jack is coupleable to. The Appellant[s] respectfully submit[] that this terminology is sufficiently definite to satisfy the statute.

App. Br. 6.

ANALYSIS

We find Appellants' response to the Examiner's indefiniteness rejection of the claim 3 language "wherein the standardized cable is a universal serial bus cable" (App. Br. 6) to be legally sufficient, and do not find the claim language indefinite for the reasons indicated. One of ordinary skill in the art can readily determine the scope of the subject matter of claims 1–3. The claim indefiniteness rejection B. is reversed.

C. The Examiner finds that

> Claim 8 recites "wherein the monitoring device includes a handheld communication device" which renders the claim indefinite. This recitation seems to connote that the monitoring device is part of the claimed invention while the recitation "a device interface . . . that is coupleable to a monitoring device" of claim 1, seems to connote that it is not. This apparent contradiction renders the claim 8 indefinite.

Ans. 4.

Appellants contend that, "a recital of the nature of the device that device interface couples to, does not render the claim indefinite." App. Br. 6.

ANALYSIS

We are not persuaded by the Examiner's argument. We find no inconsistency or indefiniteness in the claim language of claim 8, for the reasons indicated by Appellants. Essentially, claim 8 further defines the monitoring device of claim 1. The monitoring device includes a handheld communication device. The claim indefiniteness rejection C. is reversed.

D. The Examiner finds that

> Claim 9 recites "wherein the monitoring device includes a personal computer" which renders the claim indefinite. This recitation seems to connote that the monitoring device is part of the claimed invention while the recitation "a device interface . . . that is coupleable to a monitoring device" of claim 1, seems to connote that it is not. This apparent contradiction renders claim 9 indefinite.

Ans. 5.

With respect to indefiniteness Rejections C and D, Appellants contend that, "the Appellant[s] respectfully submit[] a recital of the nature of the device that that device interface couples to, does not render the claim indefinite for similar reasons." App. Br. 6.

The claim indefiniteness rejection D. is reversed.

E. The Examiner finds that

> Claim 14 recites "generating power diffusion data in response to the sensor data, wherein the power diffusion data indicates a mass independent power diffusion caused by the impact to the protective headgear; generating event data that includes the power diffusion" which renders the claim indefinite. First, it is not clear what is meant by "a mass independent power diffusion caused by the impact to the protective headgear" since mass necessarily plays a part in the impact of any object and cannot be decoupled from it. By the same token, the power diffusion caused by the impact cannot be decoupled from the mass causing the impact. Thus, the meaning of "a mass independent power diffusion caused by the impact to the protective headgear" is not clear using the broadest reasonable interpretation of the words or even the plain and ordinary meaning of the words. Claims 15–20 are rejected for being indefiniteness by virtue of their dependence from claim 14.

Ans. 5.

Appellants address the rejection of claim 14 with the same arguments presented for claim 1. App. Br. 4. We reverse the claim indefiniteness rejection E. of claim 14 for the same reasons given for claim 1.

Obviousness Rejection 2

Claims 1, 4–6, 10, 14, and 16–18 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Vock in view of Socci.

The Examiner finds that

> Vock teaches the use of a system . . . for using an accelerometer-based vibration and shock measurement system using in a football helmet so that the user can determine how much shock and vibration was endured for the duration of the event (paragraphs 0251-0265 of Vock). Vock further teaches that an accelerometer is used for measuring power, a measure of the amount of energy absorbed or experience by a user (paragraphs 0063-0070 of Vock). Socci teaches that a combination of gyroscopes and accelerometers would provide a more accurate picture of the angular and positional changes (col. 6 of Socci), which would, in turn, provide a more accurate picture of the amount of energy absorbed or experienced by a user. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the accelerometers and gyroscopes of Socci and their corresponding readings into the system and method of Vock since it would result in a more accurate picture of the amount of energy absorbed or experienced by the user.

Ans. 7.

Appellants contend that

> [w]hile these sections of Vock discuss power measurement, power as recognized by one skilled in the art and described in the present application, is a mass dependent quantity. In contrast to Vo[c]k's disclosure, claim 1 recites that a device processing module generates power diffusion data in response to the sensor data that "indicates <u>a mass independent power diffusion</u> caused by the impact to the protective headgear".

App. Br. 10. Appellants further argue that

> Vo[c]k merely disclose a calculation of acceleration or acceleration as a function of frequency. The use of the term "shock" or "vibration" used by Vo[c]k relates to the nature of the event and does not alter that fact that Vo[c]k relies an acceleration or acceleration as a function of frequency to determine the event. Vo[c]k fails to disclose that a device processing module generates power diffusion data in response to the sensor data that "indicates a mass independent power diffusion caused by the impact to the protective headgear". These deficiencies in Vo[c]k are not corrected by combination with Socci.

App. Br. 13–14.

ANALYSIS

We do not find that the Examiner has provided evidence sufficient to establish obviousness of the claimed subject matter. Appellants' claim 1 language requires "a device processing module, coupled to the sensor module, that generates power diffusion data in response to the sensor data, wherein the power diffusion data indicates *a mass independent power diffusion* caused by the impact to the protective headgear." Italics added. We have determined that this claim language is not indefinite in the discussion above, and that claim 1 requires that the power diffusion data is the result of a mass independent power diffusion calculation as described in the Specification.

Appellants argue that

> Vock discuss[es] power measurement, power as recognized by one skilled in the art and described in the present application, is a mass dependent quantity. In contrast to Vo[c]k's disclosure, claim 1 recites that a device processing module generates power diffusion data in response to the sensor data that "indicates a mass independent power diffusion caused by the impact to the protective headgear".

App. Br. 10 Appellants further argue that

> Vo[c]k merely disclose a calculation of acceleration or acceleration as a function of frequency. The use of the term "shock" or "vibration" used by Vo[c]k relates to the nature of the event and does not alter that fact that Vo[c]k relies an acceleration or acceleration as a function of frequency to determine the event. Vo[c]k fails to disclose that a device processing module generates power diffusion data in response to the sensor data that "indicates a mass independent power diffusion caused by the impact to the protective headgear".

App. Br. 13–14.

The Examiner argues that:

> The use of acceleration and vibration data in Vo[c]k (paragraphs 0063-0070 and 0251-0265 of Vock) is considered to be power diffusion data indicating "a mass independent power diffusion caused by the impact to the protective headgear" to the extent that acceleration and vibration data used in Vo[c]k indicative of power diffusion, but is not mass data (i.e., mass is a different variable and/or measurable quantity from the acceleration and vibration data of Vo[c]k).

Ans. 28. However, the Examiner fails to fully explain on this record why acceleration data and vibration data is considered power diffusion data within the meaning and scope of the claim.

The obviousness rejection over Vock in view of Socci is reversed.

Obviousness Rejections 3–6

Obviousness Rejections 3–7 as set forth in the grounds of rejection are reversed for the same reasons as Rejection 2. The Examiner has failed to explain how the additionally cited references for Rejections 3–7 make up for the deficiencies in the combination of Vock and Socci.

Obviousness Rejection 7

Claims 1, 2, 4–12, and 14–20 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Mack in view of any of Vock, Russell, Shkolnikov, or Rush.

The Examiner finds that

> Mack teaches a device for monitoring head impacts using reading from accelerometers and gyroscopes in a helmet and comparing them to previous readings (FIGS. 12-13 of Mack). It is known in the art to use dissipation/absorption/distribution of impact/force/power/energy as an indicator of impact (paragraphs 0251-0265 of Vock; paragraphs 0001, 0103, and 0107 of Russell; cols. 5-6 and 11 of Shkolnikov; cols. 4-5 of Rush). It would have been obvious to one of ordinary skill in the art at the time of invention to use the dissipation/absorption-/distribution of impact/force/power/energy as an indicator of impact since it is a simple substation [sic] of one known element for another to obtain predicable results, and/or since the amount of impact is of interest in Mack and such a parameter is embodied by values based on the dissipation/absorption/-distribution of impact/force/power/energy.

Ans. 14–15.

Thus, Mack, Russell, Shkolnikov, and Rush are relied upon for their disclosure of accelerometers and gyroscopes to measure impact forces. Vock and Socci are relied upon for the same disclosures as Rejection 2. The Examiner finds that Mack further discloses "the sensor data includes linear acceleration data and rotational velocity data (paragraphs 0011 and 0041 of Mack)." Ans. 15.

ANALYSIS

We are not persuaded by the Examiner's argument. Appellants' Specification indicates that power data, different from mechanical power, can be employed in favor of other power-related data that is not strictly dependent on the mass of the head helmet system. Spec. 22. Appellants argue that:

> The Appellant[s] respectfully disagree[] with this rejection and the reasoning thereof. This alternative rejection again cites Vock, but also portions of Mack, Russell, Shkolnikov and Rush as to "dissipation/absorption/distribution of impact/force/power/energy". Absent from these references however, is a disclosure of mass independent power diffusion.

App. Br. 15. Appellants further argue that, "[i]n contrast to claim 1 Mack merely detects that an acceleration or rotational event has exceeded a predefined threshold. Mack fails to disclose generating event data that indicates a mass independent power diffusion caused by the impact to the protective headgear." App. Br. 16. Appellants argue that, "[w]hile Russell detects the compression of an impact via change in distance between the conductive layers. Russell fails to disclose generating event data that indicates a mass independent power diffusion caused by the impact to the protective headgear." App. Br. 17. Regarding Shkolnikov, Appellants argue that, "[a]s discussed above, Shkolnikov calculates the energy of an impact. Shkolnikov fails to disclose generating event data that indicates a mass independent power diffusion caused by the impact to the protective headgear." App. Br. 17.

In conclusion with respect to this rejection, Appellants argue that:

> The reference by the Office to "dissipation/absorption/-distribution of impact/force/power/energy" also fails to shed

> any light on how five references that disclose specifically different impact criteria can render obvious of an entirely novel use of mass independent power diffusion, as claimed.

App. Br. 18.

We agree with Appellants that the Examiner has not adequately explained how reference to "dissipation/absorption/distribution of impact/force/power/energy" in the additional disclosures of Mack, Russel, Shkolnikov, and Rush correlates with a specifically different impact criteria than mechanical power which is not strictly dependent on the mass of the head helmet system. The Examiner has provided inadequate analysis of the impact calculating algorithms in the cited references to show that the calculation is a mass independent calculation. Conclusory statements on the part of the Examiner are insufficient to support a prima facie case of obviousness. "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

Rejection 7 is reversed.

Obviousness Rejections 8 and 9

Obviousness Rejections 8 and 9 add additional references Ramonowski or Quy which disclose that, "[t]he use of a USB cable and port is a known type of wired interface (paragraph 0057 of Ramonowski; paragraph 0020 and 0101 of Quy)." Ans. 19.

Rejection 9 adds additional references Kunjan, Kai, or Krishnaswamy for the disclosure that, "[i]t is well known in the art to have automatic

transmission through a cable when the cable connects two interconnecting modules (paragraph 0098 of Kunjan; abstract and paragraph 0057 of Kai; paragraph 0027 of Krishnaswamy)." Ans. 14.

The additionally cited references for Rejections 8 and 9 fail to overcome the deficiencies of the primary combination of references of Mack, Vock, Russell, Shkolnikov, and Rush.

Rejections 8 and 9 are also reversed.

CONCLUSION OF LAW

The cited references do not support the Examiner's obviousness rejections, which are reversed. The Examiner's claim indefiniteness rejections are also reversed.

REVERSED