UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/908,469	10/20/2010	Juergen Zimmer	INFAP442US (2010P50883US	3956

51092 7590 01/25/2019

Eschweiler & Potashnik, LLC.
Rosetta Center
629 Euclid Ave., Suite 1000
Cleveland, OH 44114

EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2858	

NOTIFICATION DATE	DELIVERY MODE
01/25/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@eschweilerlaw.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JUERGEN ZIMMER and WOLFGANG RABERG

Appeal 2018-003387
Application 12/908,469
Technology Center 2800

Before JAMES C. HOUSEL, CHRISTOPHER C. KENNEDY, and BRIAN D. RANGE, *Administrative Patent Judges*.

HOUSEL, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellants[2] appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1–4, 6, 8, and 18.[3] We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

---

[1] Our decision refers to the Specification ("Spec.") filed October 20, 2010, the Examiner's Final Office Action ("Final") dated January 13, 2017, Appellants' Appeal Brief ("Br.") filed June 19, 2017, and the Examiner's Answer ("Ans.") dated November 8, 2017.

[2] Appellants identify Infineon Technologies AG as the real party in interest (Br. 1).

[3] Pending claim 10 has been withdrawn from consideration and is not before us on appeal (Non-Final Office Action dated July 18, 2016, 2–3).

STATEMENT OF THE CASE

The invention relates to anisotropic magnetoresistive (XMR) sensors with reduced discontinuities (Spec. 1, Title), particularly to magnetoresistive integrated circuit (IC) sensors for rotational speed sensing applications (id., Technical Field).

Claim 1, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative of the subject matter on appeal. The limitations at issue are italicized.

1. A magnetoresistive sensor element *sensitive to a magnetic field strength*, the sensor element comprising:

a magnetoresistive strip comprising a plurality of serial segments, *adjacent ones of the segments having different tilt angles that are associated with, in the presence of a rotating magnetic field, discontinuities at different magnetic field angles at which edge magnetization switching occurs*, wherein a tilt angle is an orientation between a shape anisotropy axis and an axis perpendicular to and in plane with a reference magnetization of a pinned layer for a given point on the magnetoresistive strip,

wherein a first plurality of the plurality of serial segments form a first substrip and a second plurality of the plurality of serial segments comprise a second substrip, *the first and second substrips being serially connected by non-magnetic metal connectors*.

REJECTIONS

The Examiner maintains, and Appellants request our review of, the following grounds of rejection:

1. Claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, second paragraph, as indefinite;

2. Claims 1–4, 6, 8, and 18[4] under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement; and

3. Claims 1–4, 6, 8, and 18 under 35 U.S.C. § 102(b) as anticipated by Bartos.[5]

ANALYSIS

Rejection 1: Indefiniteness[6]

The second paragraph of 35 U.S.C. § 112 requires the specification "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112 ¶ 2. This portion of the statute requires the claims "be cast in clear—as opposed to ambiguous, vague, indefinite—terms." *In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014). Although exact precision is not required, the claim language must be as reasonably precise as the subject matter permits. *Id.*; *see also In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971) (The first inquiry "is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity.").

The Examiner rejects claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, second paragraph, as indefinite. Specifically, the Examiner determines that, in claim 1, the phrase "adjacent ones of the segments having different tilt angles that are associated with, in the presence of a rotating magnetic field,

---

[4] The Examiner inadvertently included cancelled claims 5, 9, and 11 in the statement of this rejection

[5] Bartos et al., US 2007/0080683 A1, published April 12, 2007 ("Bartos").

[6] The Examiner withdrew the rejection with respect to the issue that the claims were indefinite because a single point does not have an axis or direction (Ans. 2).

discontinuities at different magnetic field angles at which edge magnetization switching occurs, wherein a tilt angle is an orientation between s shape anisotropy axis and an axis perpendicular to an in plane with a reference magnetization of a pinned layer for a given point on the magnetoresistive strip" is not clearly understood (Final 13, ¶ 25). The Examiner raises two issues with regard to this phrase: 1) that the tilt angle is not associated with discontinuities; and 2) that the discontinuities require the application of an external magnetic field (*id.* at 13–14, ¶ 25).

Regarding the first issue, the Examiner finds that while a discontinuity may occur for a tilt angle in a rotating magnetic field, "that does not mean that the tilt angle itself is associated with the discontinuity" (Final 13, ¶ 25). Also, although the Examiner finds Appellants disclose a relationship between field angle and edge magnetization, the Examiner finds the field angle is not the tilt angle and there is no stated relationship between the tilt angle and a discontinuity (*id.*). Regarding the second issue, the Examiner further determines that this phrase is unclear because discontinuities only occur in the presence of an external magnetic field which is not a part of the final product, but is directed to a use of the product (*id.* at 14). The Examiner rejects claim 18 as indefinite for similar reasons as above for claim 1, except with regard to different widths rather than of different angles (*id.* ¶ 27).

Appellants direct attention to Figure 2 and paragraph 31, which describe simulation data for five different tilt angles, wherein discontinuities are circled for each of these tilt angles (Br. 5). Appellants urge that different tilt angles are associated with discontinuities at different magnetic field angles, in the presence of a rotating magnetic field (*id.*). In addition,

Appellants contend that these features relate to properties of the sensor element and exist even without the application of an external magnetic field (*id.*).

Appellants' argument is persuasive of reversible error. The claim language at issue recites, with reasonable precision, properties of the sensor element: that, in the presence of a rotating magnetic field, adjacent ones of the segments have different tilt angles associated with discontinuities at different magnetic field angles. "From the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing." *In re Papesch*, 315 F.2d 381, 391 (CCPA 1963). Aspirin not only has a pain relief property, it also has a blood thinning property; however, both properties require that the aspirin actually be used for those properties to evidenced or seen. Likewise, a binary memory element in a logic circuit has the ability to be placed in one of two states (e.g., "0" or "1), but this property can only be achieved via an electrical "write" current. Nonetheless, reciting the properties for either aspirin or the binary memory element would not render claims to either indefinite, even though both require use of the product. Here, Figure 2 clearly depicts, in the presence of a rotating magnetic field, each segment displays discontinuities at a different tilt angles from adjacent segments. This property—the ability to have a discontinuity at a particular tilt angle—inherently exists in each of the serial segments, even in the absence of the rotating magnetic field.

Accordingly, for the reasons given by Appellants in the Appeal Brief, we will not sustain the Examiner's rejection of claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, second paragraph.

Rejection 2: New Matter

In rejecting a claim under the first paragraph of 35 U.S.C. § 112 for lack of adequate descriptive support, it is incumbent upon the Examiner to establish that the originally-filed disclosure would not have reasonably conveyed to one having ordinary skill in the art that Appellants had possession of the now claimed subject matter. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). Adequate description under the first paragraph of 35 U.S.C. § 112 does not require literal support for the claimed invention. *In re Herschler*, 591 F.2d 693, 701 (CCPA 1979); *In re Wertheim*, 541 F.2d 257, 262 (CCPA 1976). Appearance of a claim in the specification in *ipsis verbis* does not guarantee that the written description requirement is satisfied, *see, e.g.*, *Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 968 (Fed. Cir. 2002), nor does a failure to meet that standard require a finding that a claim does not comply with the written description requirement, *In re Edwards*, 568 F.2d 1349, 1351–52 (Fed. Cir. 1978). All that is required is that the specification demonstrate to a person of ordinary skill in the art that the inventor was in possession of the invention. *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008); *In re Anderson*, 471 F.2d 1237, 1242 (CCPA 1973).

The Examiner rejects claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner finds that the limitation that the metal connectors are non-magnetic is new matter that was not described in the Specification as originally filed (Final 11, ¶ 17). While acknowledging that the Specification discloses that the connectors may be a suitable metal,

the Examiner finds that Appellants fail to disclose the type of metal, e.g., magnetic or non-magnetic (*id.*). Further, the Examiner notes that the Specification discloses a non-magnetic layer between two other layers of a magnetic sensor, but finds this non-magnetic layer refers to a single sensor, rather than a connector (*id.*).

Appellants direct our attention to paragraphs 27 and 36 of the published application (US 2012/0098533 A1, published April 26, 2012) for written description support for the limitation that the metal connectors are non-magnetic in the Specification as originally filed (Br. 3–4). In paragraph 27, Appellants note that the Specification states that at least one non-magnetic metal, copper, is discussed in the context of magnetic decoupling (*id.*; "magnetically decoupled by a non-magnetic interlayer (e.g., Cu, etc.)"). Appellants further note that, in paragraph 38, the Specification states that the metal connectors also can function to magnetically decouple (*id.*).

After carefully considering the respective positions of the Examiner and Appellants and the originally filed Specification, we are persuaded that a person of ordinary skill in the art would have understood that the Inventors were in possession of the claimed invention, specifically that the metal connectors are non-magnetic. As Appellants note, the Specification recites that an averaging effect takes place in the sensor element because the plurality of serially coupled strip segments each have differing phase angles of the switching discontinuity (Spec. ¶ 38). The Specification recites that this averaging effect also occurs it a long strip is subdivided into substrips which are serially connected by connectors (*id.*). Decoupling of the magnetic properties, according to the Specification, allows the single substrips to react individually which leads to this averaging effect (*id.*). The

Specification discloses that such magnetic decoupling can be done using a non-magnetic layer, i.e., a non-magnetic material (id. ¶ 27). Therefore, the ordinary artisan would have understood that the magnetic decoupling discussed in paragraph 38 would involve a non-magnetic material for the metal connectors that connect each of the magnetic substrips.

Accordingly, for the reasons given by Appellants in the Appeal Brief, we will not sustain the Examiner's rejection of claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, first paragraph.

Rejection 3: Anticipation

The Examiner rejects claims 1–4, 6, 8, and 18 under 35 U.S.C. § 102(b) as anticipated by Bartos. The Examiner finds Bartos discloses a magnetoresistive strip as claimed (Final 15–17). Appellants argue that Bartos fails to teach 1) serially connected substrips; 2) adjacent segments having different tilt angles; and 3) that the magnetoresistive strip has sensitivity to magnetic field strength (Br. 7–9).

In particular, Appellants contend that Bartos' strips are arranged in a Wheatstone bridge arrangement, which is distinct from a serial arrangement as recited in claim 1 (Br. 7). Alternatively, Appellants contend that individual portions of strip 12 are not serially connected by non-magnetic metal connectors that inherently magnetically decouple them (*id.*). Appellants urge that each strip in Bartos is a magnetically coupled whole that cannot be connected by non-magnetic metal connectors (*id.*). These arguments are not persuasive of reversible error in the Examiner's finding of anticipation.

As the Examiner notes, Appellants fail to explain why the presence of a Wheatstone bridge arrangement in Bartos prevents the presence of a

magnetoresistive strip comprising a plurality of serial segments (Ans. 17). Indeed, even if a Wheatstone bridge does not itself have serially connected strips such as shown in Bartos, Figure 4, those strips each contain serially connected segments as required by Appellants' claim 1. Bartos teaches magnetoresistive sensor elements, such as shown in Figures 4, 7, and 9, comprising four strips (or substrips), wherein the leftmost two strips are serially connected to each other and the rightmost two strips are serially connected to each other (Bartos ¶ 32; "The positive pole of the operating voltage of the bridge is connected to the connecting contacts **6**, and the negative pole is connected to the connecting contact **5**."). Further, Bartos discloses that these strips are electrically connected to one another via conductive, non-magnetic connections (*id.* ¶ 43; "Four GMR strips **12** are located on a chip surface **4** and have been supplemented by conductive, non-magnetic connections . . . .").

As to the second argument, Appellants contend that "the only magnetization that could be considered a reference magnetization of a pinned layer is magnetization M2 of the strip, the direction of which is coupled to that of the third antiferromagnetic component" (Br. 8). Appellants urge that Bartos discloses that the direction of magnetization is at right angles to the edges in all cases, which Appellants contend means that adjacent ones of the segments do not have different tilt angles (*id.*).

As the Examiner finds, the magnetization M2 follows the shape of the substrip thereby providing a different tilt angle for each element along the substrip (Ans. 19–20). Bartos discloses that edges 2, 3 of the substrips may

follow sinusoidal curves,[7] such that the angle of magnetization M2 varies along the substrip (Bartos ¶ 30; "In the illustrated case, both edges 2; 3 run parallel and are sinusoidal."). Because the direction of magnetization M2 is at right angles to the edges 2, 3 at all points along the substrip, the angle of this magnetization continuously varies along the length of the substrip due to its sinusoidal shape. Thus, Bartos teaches each substrip has adjacent serial segments having different tilt angles.

As to the third argument, Appellants contend that Bartos' sensors are for determining angles or positions which a rotatable magnet assumes with respect to the sensor (Br. 9.). However, the Examiner finds that all magnetoresistive elements are sensitive to a magnetic field strength (Ans. 21). Further, as the Examiner notes, though Appellants argue that Bartos' sensors may determine angles and positions of a rotatable magnet relative to the sensors, Appellants fail to explain how or why this functionality would prevent Bartos' sensors from being sensitive to a magnetic field strength (*id.*). As the Examiner notes, Bartos' sensors are structurally identical to those of Appellants, as XMR sensors, and would be expected to be sensitive to a magnetic field strength (*compare* Bartos ¶¶ 42–43 *with* Spec. ¶ 27). In addition, Bartos discusses the importance of magnetic field strength in designing these sensors, and indicates that the inventive sensors operate even when the magnetic field strengths are relatively weak (Bartos ¶ 12).

[7] Bartos further teaches that the edges may be represented by any desired mathematical function so long as the function varies continuously in the *x*-direction (Bartos ¶ 30).

DECISION

Upon consideration of the record, and for the reasons given above and in the Appeal Brief, the decision of the Examiner rejecting claims 1–4, 6, 8, and 18 under 35 U.S.C. § 112, second paragraph, as indefinite, and under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement, is *reversed*.

However, upon consideration of the record, and for the reasons given above and in the Final Office Action and the Examiner's Answer, the decision of the Examiner rejecting claims 1–4, 6, 8, and 18 under 35 U.S.C. § 102(b) as anticipated by Bartos is *affirmed*.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED