

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

METRASENS, INC. and METRASENS, LTD.,
Petitioner,

v.

KEITH A. KOPP,
Patent Owner.

IPR2022-01224
Patent 7,489,128 B2

Before ULRIKE W. JENKS, ROBERT A. POLLOCK, and
JAMIE T. WISZ, *Administrative Patent Judges*.

JENKS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

On July 1, 2022, Metrasens, Inc. and Metrasens, Ltd. (collectively “Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–20 (“the challenged claims”) of U.S. Patent No. 7,489,128 B2 (Ex. 1001, “the ’128 patent”). Paper 2 (“Pet.”). On October 11, 2022, Keith A. Kopp (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”).

We have authority under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). Upon considering the argument and evidence presented in the Petition and Preliminary Response, we determine that Petitioner has established a reasonable likelihood that it would prevail in showing the unpatentability of at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of claims 1–20 of the ’128 patent.

A. Related Matters

Patent Owner has asserted the ’128 patent against Petitioner in a pending lawsuit styled *Kopp Development Inc. v. Metrasens, Inc.*, Civil Action No. 1-21-cv-01216 (ND.OH). Pet. 1; Prelim. Resp. 2.

B. The ’128 Patent (Ex. 1001)

The ’128 patent is titled “MRI Protector.” Ex. 1001, code (54). The ’128 patent issued from Application No. 10/095,543 (“the ’543 application”), filed Mar. 11, 2002. *Id.* at (21), (22).

The '128 patent relates to medical diagnostics and, specifically, to protection of personnel and equipment involved in magnetic resonance imaging (MRI) diagnosis. *Id.* at 1:5–7. The Specification of the '128 patent describes a detector for protecting personnel and the MRI apparatus from the introduction of ferrous articles into the magnetic field of the MRI unit. *Id.* at 2:33–35. In one embodiment, the detector has Hall effect sensors that use the magnetic field of the MRI, and that are connected to a central processing unit (CPU) that warns when the presence of ferrous articles affects the magnetic field of the MRI, as depicted in Figure 1, reproduced below.

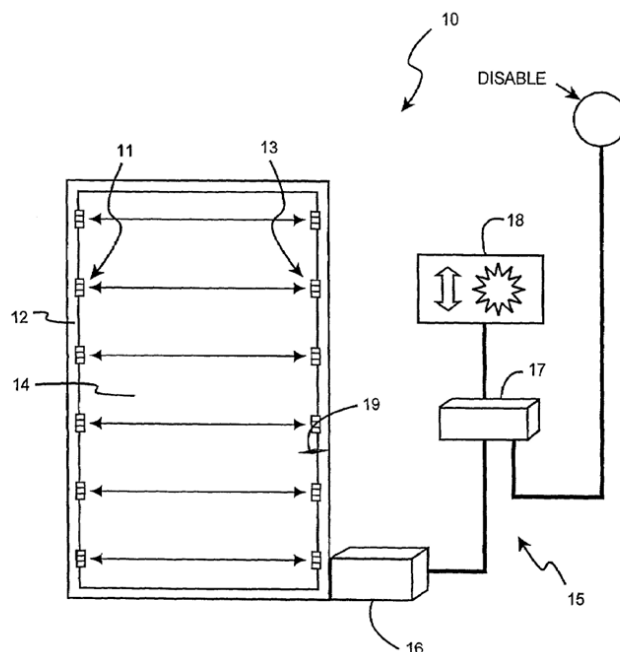


FIG. 1

Figure 1 is a diagrammatic representation of a detector. *Id.* at 3:7.

Ferrous detector 10 includes an array of Hall effect sensors 11, 13 located near the access opening 14 of doorway 12 of a shielded room housing the MRI apparatus (not shown). *Id.* at 3:12–14. Each of the sensors

11 and 13 are connected to CPU 15, which receives the output of the sensors. *Id.* at 3:19–22. The '128 patent explains that residual lines of magnetic force of the magnet in the MRI apparatus pass through access opening 14 generally normal to the scan of the Hall effect sensors. *Id.* at 3:23–25. Sensors 11 and 13 are sensitive to the magnetic force lines along one axis and produce a signal related to magnetic field strength. *Id.* at 3:25–28. As a ferrous object (not shown) approaches doorway 12, the residual magnetic field is disrupted. *Id.* at 3:28–30. According to the '128 patent, the output of sensors 11 and 13 changes in response to the change in the magnetic field depending on the size, spatial location, and speed of the ferrous object. *Id.* at 3:30–33.

CPU 15 includes pre-amp/pre-processor 16 connected to sensors 11 and 13, which eliminates interference and establishes a usable signal which is amplified into a stabilized signal from the sensors to signal processor and alarm generator 17. *Id.* at 3:34–39. Signal processor/alarm generator 17 analyses the incoming signals and determines whether to generate an alarm. *Id.* at 3:39–42.

C. Illustrative Claim

Claims 1 and 15 are the independent claims challenged by Petitioner in this proceeding. Independent claim 1, reproduced below is illustrative of the subject matter:

1. A protection arrangement for association with an operable MRI apparatus located within a room that has an access opening, the MRI apparatus providing a residual magnetic field that extends to a location of the opening, the arrangement including:

a detector for passively monitoring the residual magnetic field at the location of the opening, the detector includes an array of passive magnetic field sensors arranged about the periphery of the opening in a spaced arrangement such that each sensor is associated with a different portion of the access opening, the field changing in response to a presence of ferrous material at the opening, each of the sensors including means for outputting a signal indicative of the ferrous material responsive change in the magnetic field at the associated portion of the access opening; and

means for receiving the change indicative signals, for determining whether the change indicated by at least one of the change indicative signals exceeds a limit and for providing a safety response that addresses the condition of ferrous material at the opening of the room within which the MRI apparatus is located upon determination of at least one threshold being exceeded.

Ex. 1001, 4:9–31. Claim 15, the only other independent claim, is also directed to a protection arrangement, and includes similar limitations to those of claim 1, but does not use “means” terms. *Id.* at 5:39–6:15.

D. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–20 of the ’128 patent are unpatentable based on the following ground.¹ Pet. 21.

¹ Although Petitioner asserts a second ground of unpatentability with the order of *Votruba* and *Jaquet* reversed, where, as here, the relevant factual inquiries underlying an obviousness determination are otherwise clear, characterization of references as primary and secondary is merely a matter of presentation with no legal significance. *In re Mouttet*, 686 F.3d 1322, 1333 (Fed. Cir. 2012); *In re Bush*, 296 F.2d 491, 496 (CCPA 1961). Consequently, we will consider the Petition as presenting a single ground of unpatentability over the combination of *Votruba*, *Jaquet*, *Finn*, and *Seton*. Nonetheless, in reaching our decision, we have considered all of the

Claims challenged	35 U.S.C. §	References/Basis
1–20	103(a)	Votruba ² , Jaquet, ³ Finn ⁴ , Seton ⁵

Petitioner also relies upon the Declaration of Daniel W. van der Weide, Ph.D. (Ex. 1003) to support its contentions.

II. ANALYSIS

A. Discretionary Denial Under 35 U.S.C. § 314(a)

Patent Owner urges the Board to exercise discretion to deny institution of *inter partes* review under 35 U.S.C. § 314(a), because “the actions of the Petitioner in connection with the Petition are rather egregious.” Prelim. Resp. 46–49. According to Patent Owner, “this situation (i.e., the egregious behaviors of the Petitioner) transcends discussion of *Fintiv* Factors.” *See, e.g., Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 (PTAB May 13, 2020) (informative).

Patent Owner asserts that the Petition includes: 1) “assertion of one or more non-publication document(s), with such document(s) containing illegible and altered content and still further with no explanation or detail regarding: the origin, possible date(s) of creation, actual creator, veracity of

evidence and all of the arguments presented by the Petitioner in both of the asserted grounds.

² US 4,990,850 issued February 5, 1991. Ex. 1006.

³ US 3,971,983 issued July 27, 1976. Ex. 1005.

⁴ Edward J. Finn et al., *Ferromagnetic Materials in Patients: Detection before MR Imaging*, *Radiology* 1985; 156:139–141. Ex. 1008.

⁵ H.C. Seton et al., *Gradiometer pick-up coil design for a low field SQUID-MRI system*, *Magnetic Resonance Materials in Physics, Biology and Medicine* 8 (1999) 116–120. Ex. 1010.

content, freedom from possible alteration and/or actual alteration,” 2) “false statements regarding cited documents, assertions/reliance upon documents that are years after the critical date/filing date of the application underlying the ’128 patent,” and 3) “attempt[s] to improperly bias the USPTO Board against the Patent Owner via nefarious inclusion of a document identified by the USPTO as containing improper multiple inappropriate statements about the conduct of the Patent Owner.” Prelim. Resp. 47.

Based on current Board precedent and the record before us, we are not persuaded the circumstances before us warrant discretionary denial of institution. In certain circumstances, the Board has exercised its discretion to deny institution pursuant to § 314(a) based on the advanced state of a district court proceeding in which the challenged patent is asserted. *See, Fintiv*, IPR2020-00019, Paper 15. Here, even though there is a parallel district court proceeding, “Metrasens will not assert in the above-captioned litigation (1:21-cv-01216) the same invalidity grounds asserted in the IPR, or any other ground that Metrasens reasonably could have raised in the IPR petition, against the corresponding claims.” Ex. 1016; *see also* Pet. 74. In light of that stipulation, we decline to discretionarily deny institution under *Fintiv*. *See* Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation, at 3, 7–8, Memorandum, June 21, 2022.⁶

In certain situations, the Board also has exercised its discretion to deny institution of a later-filed petition after having considered a previously-

⁶ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

filed petition challenging the same patent (*see, e.g., Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 (PTAB Apr. 2, 2019) (precedential)) and when a petition demonstrates a reasonable likelihood of prevailing as to some, but not all, challenged claims (*see, e.g., Chevron Oronite Co. LLC v. Infineum USA L.P.*, IPR2018-00923, Paper 9 (PTAB Nov. 7, 2018) (informative)). Unlike these situations in which the Board has exercised its discretion to deny institution, this Petition is the first one challenging the '128 patent, and Petitioner demonstrates a reasonable likelihood of prevailing as to all of the challenged claims.

Patent Owner's arguments also fail to persuade us to exercise our discretion to deny institution based on "egregious behaviors." Patent Owner's assertions relate to Petitioner's submission of Exhibit 1012, "the Mednovus document."⁷ *See, e.g.* Prelim. Resp. 25. However, other than noting that the Mednovus document was submitted to the USPTO, but not made of record during patent prosecution (Pet. 7), the Petition does not rely on the Mednovus document. Petitioner's declarant, Dr. van der Weide, cites to the Mednovus document twice. *See* Ex. 1003 ¶¶ 27, 29. Petitioner's declarant cites the document for positioning the doorway of an MRI room based on the magnetic plot line of the device and the existence of a fringe magnetic field associated with an MRI machine. *See* Ex. 1003 ¶¶ 27, 29. The Petition, however, relies on Votruba for this limitation and not the Mednovus document. *See* Pet. 38; Ex. 1006, 7:33–35 (the machine

⁷ Exhibit 1012, Titled "Third Party Mednovus' First Emergency Protest Under 37 CFR 1.91 Against Kopp Pending U.S. Application Serial No. 10/095,543," submitted on Feb. 8, 2009, but not entered into the record during patent prosecution.

“generates significant, wide-ranging ‘fringe’ fields extending to considerable distances from the machine”). Because the Petition does not rely on the Mednovus document in any ground, its existence does not affect our decision, and we need not consider whether it constitutes a printed publication. Under the circumstances here, we do not view Petitioner’s challenge to the ’128 patent as contrary to the AIA’s purposes. “The AIA was designed to encourage the filing of meritorious patentability challenges, by any person who is not the patent owner, in an effort to further improve patent quality.” *Coalition for Affordable Drugs VI, LLC v. Celgene Corp.*, IPR2015-01092, Paper 19 at 4 (PTAB Sept. 25, 2015).

For these reasons, we decline to exercise our discretion to deny institution under 35 U.S.C. § 314(a).

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art “would have had at least an undergraduate degree in electrical engineering or equivalent thereof, and at least approximately 2-4 years of practical work experience in the design and development of magnetic sensors and MRI magnetic fields.” Pet. 9–10 (citing Ex. 1003 ¶ 18). Alternatively, Petitioner contends that a person of ordinary skill in the art would have had “an M.S. degree in electrical engineering and at least 2-3 years of experience with magnetic sensors and MRI magnetic fields.” *Id.* at 10. Also, according to Petitioner, such a person “would have at least a general understanding of functional requirements of metal detectors including a variety of different sensors and magnetic fields caused by an MRI apparatus.” *Id.*

Patent Owner does not offer an alternate definition. *See generally* Prelim. Resp.

On this record, we adopt Petitioner’s first definition, because it encompasses Petitioner’s alternate definition of the level of skill in the art. We further note that the prior art itself demonstrates the level of skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)).

C. Claim Construction

Petitioner offers a discussion of claim constructions for the following terms and phrases: “residual magnetic field,” “array of passive magnetic field sensors,” “periphery.” Petition 11–14. Petitioner also asserts that the following terms are means-plus-function terms: “means for outputting a signal...,” “means for receiving the change indicative signals,” “means for determining ... a limit,” “means for providing a safety response ...,” “means for providing a warning alarm,” “means for providing an audible alarm,” “means for providing a visual alarm,” “means for disabling operation of the MRI apparatus,” “means to deactivate the detector,” “means for analyzing the change indicative signal,” “means for determining whether to provide the safety response based upon the analysis,” and “signal processor/safety response generator.” *Id.* at 14–21. Patent Owner does not comment on Petitioner’s proposed constructions. *See generally* Prelim. Resp.

For purposes of this decision on institution, at this stage of the proceeding, we need not construe these claim terms and phrases. *See, e.g., Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

D. Obviousness of Claims 1–20 over Votruba, Jaquet, Finn, and Seton

Petitioner contends that claims 1–20 are unpatentable as obvious over Votruba, Jaquet, Finn, and Seton. Pet. 35–67. Patent Owner opposes. Prelim. Resp. 8–45.

1. Overview of Votruba

Votruba is titled “Metal Detector with Two Magnetic Field Transducers Connected in Opposing Relationship and their Sensing Directions Orthogonal to the Magnetic Field” and relates to “detecting the presence of ferromagnetic materials.” Ex. 1006, code (54), 1:11–12. Votruba discloses that Hall effect transducers have been used for monitoring magnetic fields. *Id.* at 1:24–25. Votruba explains that Hall effect transducers provide an electrical signal which typically varies directly with the magnitude of the magnetic field component in one direction along a predetermined sensing axis. *Id.* at 1:25–29. Votruba discloses that as an improvement over the prior art, the transducers are mounted in pairs using “a first transducer which produces a signal which is directly related to the magnetic field component in a first sensing direction,” and “a second transducer disposed adjacent the first transducer, for producing a signal

directly related to the magnetic field component in a second sensing direction opposite to the first sensing direction.” *Id.* at 1:59–64. According to Votruba, in such an arrangement, “a magnetic field component in the first sensing direction will increase the first signal and decrease the second signal, whereas a magnetic field component in the opposite or second direction will decrease the first signal but increase the second signal.” *Id.* at 1:65–2:2. In one embodiment, Votruba discloses a transducer assembly that is mounted “in proximity to a separate machine 45 which generates a magnetic field” and that is adjustable to position the transducer assembly 24 so that “sensing directions are orthogonal to the magnetic field prevailing in the vicinity of the machine 45.” *Id.* at 7:11–25. According to Votruba, if machine 45 generates significant, wide-ranging ‘fringe’ fields extending to considerable distances from the machine,” the transducer assembly can be “mounted on the wall of a room enclosing a medical NMR scanner and can detect the field distortion caused by ferromagnetic material approaching the room from the outside.” *Id.* at 7:32–41.

2. Overview of Jaquet

Jaquet is titled “Ferromagnetic Metal Detector Utilizing Gradiometers Positioned on Opposite Sides of the Detection Area with Overlapping Sensitivity” and relates to a “passive ferromagnetic detection station in which the location or position of a ferromagnetic object carried through the station may be indicated or displayed.” Ex. 1005, code (54), 1:10–13. In Jaquet, a gradiometer “generates an output signal indicative of a change in the earth’s magnetic field in response to the presence of a ferromagnetic object within the sensitivity pattern of the gradiometer.” *Id.* at 3:19–23. An exemplary detection station is depicted in Figure 1, reproduced below.

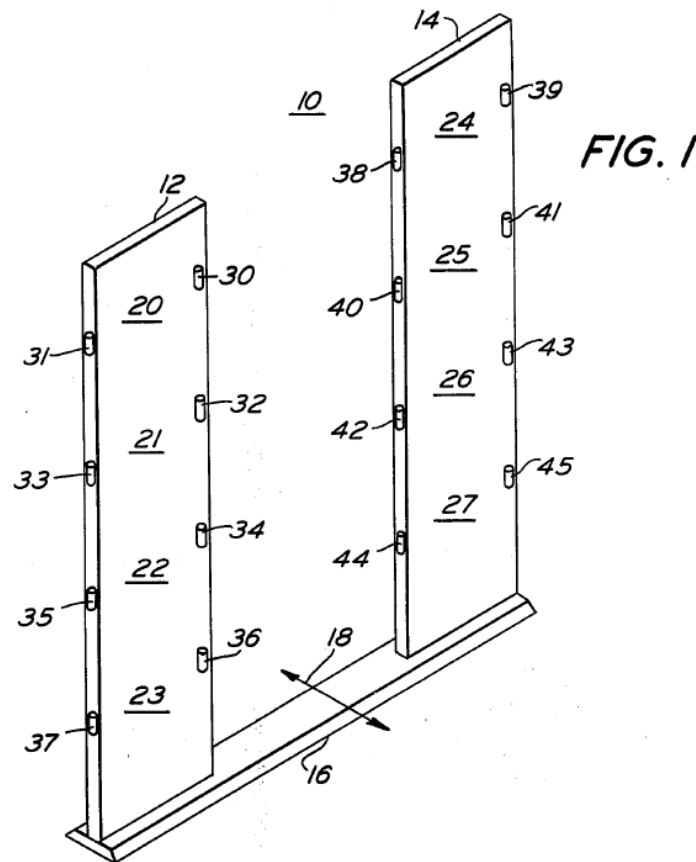


Figure 1 is a perspective drawing of a magnetometer and gradiometer array of a station. *Id.* at 3:63–64. Station 10 has first and second panels 12, 14 mounted on base 16, and in use, a person would “pass between first member 12 and second member 14 in the directions of double-headed arrow 18.” *Id.* at 4:35–41. The panels include a plurality of gradiometers 20–27, which have magnetometers 30–45 arranged such that gradiometer 20 has magnetometers 30 and 31 connected in opposition so that “the signal outputs of magnetometers 30 and 31 are subtracted from one another.” *Id.* at 4:44–50. Each of the other magnetometers are arranged in similar opposing pairs. *Id.* at 4:50–55. The patterns or areas of sensitivity to magnetic fields of gradiometers 20, 21, 24 and 25 are shown in Figure 8, reproduced below.

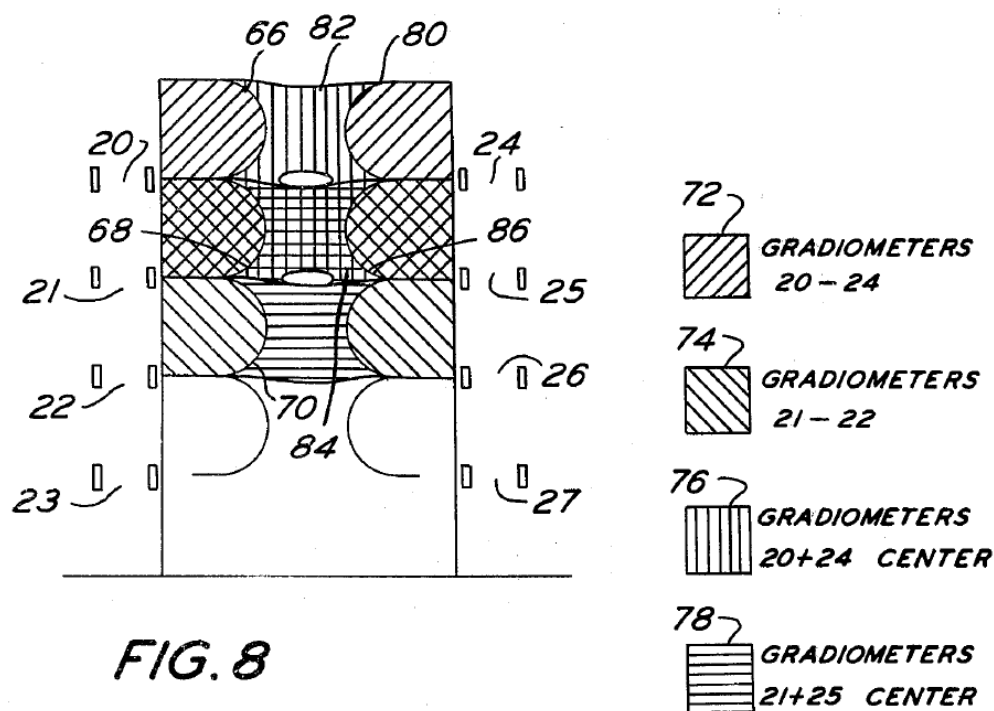


Figure 8 is a diagram showing one arrangement of overlapping patterns or areas of sensitivity to magnetic fields of the gradiometers. Ex. 1005, 4:16–18. Jaquet explains, “[t]he sensitivity or the output signal of each magnetometer 30–45 is proportional to the inverse of the distance raised to the third power between the magnetic phenomena or change to be detected and each respective magnetometer.” *Id.* at 5:6–10. Thus, according to Jaquet, “the output signal of gradiometer 20 in response to a set or fixed magnitude of variation in the magnetic field caused by a ferromagnetic object decreases very rapidly in proportion to the distance of the ferromagnetic object from gradiometer 20.” *Id.* at 5:15–19.

3. Overview of Finn

Finn is an article titled “Ferromagnetic Materials in Patients: Detection before MR Imaging” and discloses that “surgical clips and other metallic materials embedded within patients have ferromagnetic properties”

that could present a hazard in an MRI, and investigates several types of magnetometers and metal detectors as possible pre-imaging screening devices. Ex. 1008, 139. In particular, Finn investigated magnetometers, which measure “magnetic fields and can detect materials with magnetic properties only in the presence of a magnetizing field,” and specifically, used “the SQUID (Superconducting Quantum Interference Device)” magnetometer. *Id.* Finn observed that when a particular clip, namely, a Schwartz clip, “was hung from a piece of thread and carried into the area of the imager, forces and torques could be sensed even at the doorway to the MR room, a distance of 3.5 m (11.5 ft) from the imager portal.” *Id.* at 140. Finn also investigated a DC Magnetometer, and determined that “[o]n its most sensitive scale, the magnetometer successfully detected the ferromagnetic clips at 12.5 cm but did not detect the nonmagnetic clips.” *Id.* Based on the investigation, Finn concluded that “all patients known to have metallic material within the body should be screened with a suitable detector before MR imaging is performed, to ensure that the embedded material is nonmagnetic.” *Id.* at 141.

4. *Overview of Seton*

Seton is an article titled “Gradiometer pick-up coil design for a low field SQUID-MRI system.” Ex. 1010. 116. Seton collected various images of the human forearm using: “a) room temperature surface coil and preamplifier b) 4.2 K axial gradiometer and SQUID preamplifier and c) 4.2 K figure-of-eight gradiometer and SQUID preamplifier,” and determined that “the SQUID-based receiver improves on the SNR [(signal-to-noise ratio)] of the room temperature coil’s arm image.” *Id.* at 119–120.

5. *Claim 1*

Petitioner contends that the combination of Votruba, Jaquet, Finn, and Seton teaches all the limitations of claim 1. Pet. 35–67. Patent Owner opposes. Prelim. Resp. 8–45.

a. *Preamble*

Claim 1 of the '128 patent recites “[a] protection arrangement for association with an operable MRI apparatus located within a room that has an access opening, the MRI apparatus providing a residual magnetic field that extends to a location of the opening.” Ex. 1001, 4:9–13.

Petitioner contends that Votruba teaches this portion of the claim. Pet. 36 (citing Ex. 1006, 1:9–23, 7:10–43, Figs. 1, 3, 4), 40–42 (citing Ex. 1003 ¶¶ 35–36, 71, 78–82; Ex. 1005, Fig. 1; Ex. 1006, Fig. 1; Ex. 1010, 1). On the present record, we agree.

Votruba discloses a transducer assembly that is mounted “in proximity to a separate machine 45 which generates a magnetic field” and that transducer assembly 24 is adjustable to be positioned for sensing “the magnetic field prevailing in the vicinity of the machine 45.” Ex. 1006, 7:11–25. Votruba states that the transducer assembly can be “mounted on the wall of a room enclosing a medical NMR scanner and can detect the field distortion caused by ferromagnetic material approaching the room from the outside.” *Id.* at 7:32–41. Given that a person would enter a room from an access opening, at least on the present record, Votruba discloses a protection arrangement for “an MRI apparatus located within a room that has an access opening,” and that detects a magnetic field of the MRI. Petitioner’s declarant, Dr. van der Weide testifies that a “residual magnetic field” is “the non-uniform magnetic field of the MRI apparatus passing through the open

doorway and that is outside the magnetic field involved with imaging.”

Ex. 1003 (citing Ex. 1001, 2:54–58, 3:23–30; Ex. 1002, 48–50). Thus, on the present record, Petitioner has shown sufficiently that Votruba teaches the first portion of claim 1.

b. Detector

Claim 1 next recites:

a detector for passively monitoring the residual magnetic field at the location of the opening, the detector includes an array of passive magnetic field sensors arranged about the periphery of the opening in a spaced arrangement such that each sensor is associated with a different portion of the access opening, the field changing in response to a presence of ferrous material at the opening, each of the sensors including means for outputting a signal indicative of the ferrous material responsive change in the magnetic field at the associated portion of the access opening.

Ex. 1001, 4:14–24.

Petitioner contends that the combination of Votruba, Jaques, and Finn teaches this portion of the claim. On the present record, we agree.

Specifically, Petitioner contends that “*Votruba* and *Jaquet* both describe using gradiometers to detect the magnetic field (i.e., sensors 32 and 36 in *Votruba* are configured as a gradiometer, and the sensors 30 and 31 in *Jaquet* are configured as a gradiometer).” Pet. 41 (citing Ex. 1003 ¶ 81); *see also* Pet. 37 (“*Jaquet* discloses a metal detector including an array of gradiometers on opposite longitudinal sides of an opening.” (citing Ex. 1005, 1:10–27)). Petitioner’s declarant, Dr. van der Weide testifies that a “*Votruba* discloses a transducer assembly 40’ mounted on a wall of an MRI room for detecting ferromagnetic objects. The assembly 40’ includes a transducer assembly 24’ comprised of Hall effect sensor pairs configured as

gradiometers.” Ex. 1003 ¶ 76 (citing Ex. 1006, 7: 10–41). “Votruba discloses a detector for passively monitoring the residual magnetic field at the location of the opening” of the room housing the MRI. Ex. 1003 ¶ 78 (citing Ex. 1006, 7:37–40, Fig. 3 and 4).

Petitioner asserts that Jaquet’s “array of sensors/gradiometers 20–27 are provided in a spaced arrangement such that each sensor is associated with a different portion of the access opening.” Pet. 37 (citing Ex. 1005 4:33–65). Petitioner asserts that Jaquet’s “field also changes in response to a presence of ferrous material at the opening.” *Id.*

Petitioner’s declarant avers that “*Votruba* and *Jaquet* both describe using gradiometers to detect the magnetic field (i.e., sensors 32 and 36 in *Votruba* are configured as a gradiometer, and the sensors 30 and 31 in *Jaquet* are configured as a gradiometer).” Ex. 1003 ¶ 81.

According to Petitioner, “Patent Owner disavowed using gradiometers in the claimed protection arrangement to distinguish his invention from the prior art,” but that because “Finn discloses using both gradiometers and non-gradiometers in an MRI field to detect ferromagnetic items,” Finn addresses Patent Owner’s disavowal. Pet. 37–38 (citing Ex. 1008, 139).

Petitioner’s declarant, Dr. van der Weide testifies that “Finn includes a teaching, suggestion or motivation to use the DC non-gradiometer sensor instead of the more expensive flux-gate gradiometer sensor. Finn also includes a teaching, suggestion or motivation [that] both the gradiometer and non-gradiometers can be alternatively used in an MRI environment.” Ex. 1003 ¶ 89 (citing Ex. 1008, 140 (Table 2)). Specifically, Finn describes that “[t]he clips also were studied in the vicinity of a large block of magnetic material. Identification was still possible, although the continuous wave

instrument required readjustment. The pulsed instrument, however, needed no balancing of the ambient magnetic field, although the effective range was somewhat reduced.” Ex. 1008, 140. Finn “found that both metal detectors and magnetometers will detect small ferromagnetic objects, whether or not they are embedded within a patient.” *Id.* at 141.

Thus, on the present record, Petitioner has shown sufficiently that the combination of Votruba, Jaques, and Finn teaches the detector portion of claim 1.

c. Warning

Finally, claim 1 recites:

means for receiving the change indicative signals, for determining whether the change indicated by at least one of the change indicative signals exceeds a limit and for providing a safety response that addresses the condition of ferrous material at the opening of the room within which the MRI apparatus is located upon determination of at least one threshold being exceeded.

Ex. 1001, 4:25–31.

Petitioner contends that the combination of Votruba, Jaques, and Finn teaches this portion of the claim. On the present record, we agree.

Jaquet teaches “a passive detection system in which no active electromagnetic fields are generated, the apparatus . . . does not interfere with sensitive electronic circuitry contained in heart pacemakers worn by a number of persons today.” Ex. 1005, 2:58–63. By not generating an active magnetic field, Jaquet teaches that the power consumption of the apparatus is minimal. *Id.* at 2:5–8.

Votruba explains that devices known as Hall effect transducers have previously been used for monitoring magnetic fields. “A Hall effect device

provides an electrical signal which typically varies directly with the magnitude of the magnetic field component in one direction along a predetermined sensing axis.” Ex. 1006, 1:24–29. Votruba teaches an improved apparatus for monitoring a magnetic field.

[T]he apparatus includes mounting means arranged to hold the transducers so that the sensing directions are substantially perpendicular to the direction of the magnetic field prevailing when the magnetic field is in a reference or rest state. As the magnetic field component perpendicular to the sensing directions of the transducers does not produce a significant signal, the signal from each sensing element will be substantially zero while the magnetic field is in its reference or rest state. . . . Stated another way, the signals representing the change in the field will not be masked by a larger steady state signal. Thus, the signal processing means may include an amplifier with very high gain, to provide a large change in the output signal for even a small change in the direction of the magnetic field. As the output of the signal processing means represents the difference between the first and second signals, the first and second signals produced by the transducers upon any change in the field direction will reinforce one another. One of the signals will increase whereas the other will decrease upon any change in the magnetic field direction from the rest state.

Ex. 1006, 2:35–45.

Petitioner contends that “*Jaquet* discloses a signal processing means 92 receiving the outputs of the gradiometers included in the gradiometer array 90.” Pet. 42 (citing Ex. 1003 ¶ 84). Petitioner contends that Votruba also teaches measuring the difference between two sensors and that “zero output [between the sensors] is used to determine no ferromagnetic body is near the sensors.” Pet. 38 (citing Ex. 1006, 5:34–41). Petitioner contends that “*Votruba* includes a teaching, suggestion or motivation for using passive magnetic sensors at a doorway of an MRI apparatus . . . include sounding an

alarm before a safety hazard occurs and before valuable MRI data is lost.” Pet. 45 (citing Ex. 1006, &41–44; Ex. 1003 ¶ 87).

Petitioner contends that “*Votruba* describes gradiometers placed at a doorway of an MRI room. *Jaquet* discloses an array of sensors around the doorway to increase detection zones. *Finn* discloses passive magnetic sensors configured both as gradiometers and non-gradiometers to detect ferromagnetic items before a patient enters an MRI room. *Finn* further discloses the benefit of non-gradiometers as a cheaper alternative to gradiometers.” Pet. 38–39 (citing Ex. 1006, 5:34–41, Ex. 1005, 30–41; Ex. 1008, 1). Petitioner relies on Seton for establishing that “gradiometers working with MRI systems prior to 2001, and prior to the ’128 Patent.” Pet. 38 (citing Ex. 1010, 1).

Petitioner’s declarant, Dr. van der Weide testifies that “*Jaquet* discloses a signal processing means 92 receiving the outputs of the gradiometers included in the gradiometer array 90.” Ex. 1004 ¶ 84. Similarly, “*Votruba* also discloses a means for receiving the change indicative signals (see the IC₁ in Fig. 2 receiving the outputs of the sensors 32 and 36), for determining whether the change indicated by at least one of the change indicative signals exceeds a limit.” Ex. 1003 ¶ 85 (citing Ex. 1006, 2:38–46).

Thus, on the present record, Petitioner has shown sufficiently that the combination of *Votruba*, *Jaques*, and *Finn* teaches the warning portion of claim 1.

d. Patent Owner’s Contentions

Patent Owner opposes the Petition, presenting several arguments for denying institution. Specifically, Patent Owner contends that Petitioner

“incorrectly/falsely presented the content of Finn” (Prelim Resp. 5, 8), that Petitioner’s statement with respect to Seton “is somewhat misleading” (*id.* at 5, 18), and that the inclusion of the Mednovus document, a non-prior art document, with the Petition is highly prejudicial (*see id.* at 6–7, 24–45). We address Patent Owner’s arguments below.

1. Finn’s content

Patent Owner argues that “Petitioner has incorrectly/falsely presented the content of Finn.” Prelim. Resp. 5. According to Patent Owner, Finn performed two separate tests, one on clips, and another on types of detectors, whereas Petitioner implies they were performed at the same time. *Id.* at 8–15.

Finn explains that in “the magnetic resonance (MR) imaging of patients who have surgical or nonsurgical material embedded within their bodies. Concern is raised because these materials may be ferromagnetic and may be acted on by the strong and fluctuating magnetic fields of the MR imager.” Ex. 1008, Abstract. Finn teaches that “[n]ot all stainless steel clips were found to be nonmagnetic.” *Id.* Table 1 of Finn shows “the magnetic forces and torques for the 11 clips when brought into the magnetic fields of the NIH scanner and SQUID [(Superconducting QUantum Interference Device)]” *Id.* at 140. Table 1 of Finn shows that some but not all surgical clips are acted on by the magnetic field of the instruments. *Id.*

Finn also studied metal detectors and magnetometers for their ability to discriminate between magnetic and nonmagnetic materials. Ex. 1008, 139. Table 2 of Finn compares a ferromagnetic staple with the most magnetic clip, clip 2 (the Schwartz clip) in the presence of a metal detector or magnetometer. *Id.* at 140 (Table 2). According to Finn, “[a] metal detector

consists of a tuned electronic circuit; the resonant frequency of the circuit is chosen to give the best sensitivity for the specific metal or metals under scrutiny.” *Id.* While “[a] magnetometer measures magnetic fields and can detect materials with magnetic properties only in the presence of a magnetizing field.” *Id.* Petitioner’s declarant, Dr. van der Weide explains that “Table 2 [of Finn] describes flux-gate gradiometer . . . , Direct Current (DC) sensor, and a SQUID sensor, where DC and SQUID sensors are not configured as gradiometers. Passive magnetic sensors not configured as gradiometers used to detect ferrous objects in an MRI residual magnetic field are described in Table 2.” Ex. 1003 ¶ 73. Petitioner’s declarant avers that

Finn discloses using cheaper detectors, such as DC detectors, not configured as gradiometers, as an acceptable alternative to gradiometers such as the more expensive flux-gate. . . . Finn summarizes the use of Coil, Continuous wave, and Pulsed metal detectors as well as flux-gate, Direct current and SQUID magnetometers to detect presence of and effect of the MR field on test clips that represent what might be implanted in a patient’s body (Table 2)

Ex. 1003 ¶ 74 (citing Ex. 1008, 140). Finn “found that both metal detectors and magnetometers will detect small ferromagnetic objects, whether or not they are embedded within a patient.” Ex. 1008, 141. Additionally, Finn describes that “[t]he clips also were studied in the vicinity of a large block of magnetic material. Identification was still possible, although the continuous wave instrument required readjustment. The pulsed instrument, however, needed no balancing of the ambient magnetic field, although the effective range was somewhat reduced.” Ex. 1008, 140. Finn, therefore, reasonably

supports Petitioner's contention that the detectors can function in the magnetic field of an MRI.

Even if Petitioner does not accurately characterize the sequence of Finn's testing as argued by Patent Owner, Petitioner only relies on Finn for "using both gradiometers and non-gradiometers in an MRI field to detect ferromagnetic items." Pet. 38 (citing Ex. 1008, 139). During prosecution of the application that became the '128 patent, Patent Owner had argued "the gradiometers of the Jaquet '983 patent are not going to work," in an MRI field. Ex. 1002, 25. And, according to Petitioner, the "Examiner allowed the claims solely based on Applicant's arguments gradiometers could not work in an MRI residual magnetic field." Pet. 7. Given that Finn is titled "Ferromagnetic Materials in Patients: Detection before MR Imaging," Petitioner's reliance on Finn appears to be reasonable. Moreover, Petitioner relies on Votruba for detecting a residual magnetic field and relies on Jaquet for detectors at an opening (*see* Pet. 37), and Patent Owner does not mention Votruba or Jaquet at all. *See generally* Prelim. Resp.

Votruba discloses that a transducer assembly can be "mounted on the wall of a room enclosing a medical NMR scanner and can detect the field distortion caused by ferromagnetic material approaching the room from the outside." Ex. 1006, 7:32–41. Jaquet discloses a plurality of "gradiometers 20–27 mounted on a pair of panels 12, 14 that form an opening through which a person "to be monitored by detection station 10 may pass." Ex. 1005, 4:38–46. Jaquet also discloses that a digital logic circuit "conditions the output indication on the condition that all or a predetermined number of gradiometers having a magnetic pattern of sensitivity to magnetic fields in that area sense the ferromagnetic object." *Id.* at 3:52–57.

Based on the current record, the Petition has reasonably established that the combination of Votruba and Jaquet discloses “a detector for passively monitoring the residual magnetic field at the location of the opening” to a room containing an MRI as claimed. Based on the disclosure of Jaquet, the Petition has reasonably established that “the detector includes an array of passive magnetic field sensors arranged about the periphery of the opening in a spaced arrangement such that each sensor is associated with a different portion of the access opening,” as also claimed. Also based on the disclosure of Jaquet, the Petition has reasonably established that “the field chang[es] in response to a presence of ferrous material at the opening, each of the sensors including means for outputting a signal indicative of the ferrous material responsive change in the magnetic field at the associated portion of the access opening,” as claimed.

Because Patent Owner only address Finn and not the combination of Votruba, Jaquet, and Finn, we are not persuaded by Patent Owner’s contention that Finn is falsely presented.

2. Seton’s content

Patent Owner argues that “Petitioner has misleadingly, summarily and incorrectly deemed that a person of ordinary skill in the art would use the teaching of a liquid helium cooled gradiometer coil from inside an MRI machine,” as disclosed by Seton at the “entrance to an MRI room to detect ferrous material.” Prelim. Resp. 5, 18–24. We are not persuaded by Patent Owner’s contentions.

Petitioner only relies on Seton to teach “gradiometers working with MRI systems prior to 2001, and prior to the ’128 Patent.” Pet. 38, 42 (citing Ex. 1010, 1; Ex. 1003 ¶ 36); Ex. 1003 ¶ 91. Petitioner does not rely on the

specific type of gradiometer disclosed by Seton or the location of the gradiometer with respect to the MRI. Rather, as discussed above, the Petition relies on the combination of Votruba and Jaquet for the detectors and their location, which we find to be reasonable. Accordingly, we are not persuaded by Patent Owner's contention that Seton is misleadingly presented.

3. *Mednovus document*

Patent Owner asserts that “[t]he Petition, and included Declaration of Daniel W. van der Weide (Ex. 1003), provide opinion concerning patentability that relies upon a specific document (i.e., the Mednovus document, Ex 1012).” Prelim. Resp. 6, *see also id.* at 25 (“the Mednovus document is not part of the prosecution history of the ‘128 patent and as such did not become publicly available via being part the prosecution history.”).

Petitioner's declarant, Dr. van der Weide, cites the Mednovus document in only two paragraphs of the Declaration and solely for the position that an MRI machine produces a fringe/residual magnetic field. *See* Ex. 1003 ¶¶ 27, 29. We note that support for the position that an MRI produces a fringe/residual magnetic field is also found in other references cited in the Petition and Declaration. Ex. 1003 ¶¶ 30 (citing Ex. 1008, 140; Ex. 1006, Fig. 1 (two Hall effect sensors 32 and 36)), 31, 35; *see also* Ex. 1006, 7:12–41 (mounting “a transducer assembly 24' . . . in proximity to a separate machine 45 which generates a magnetic field, . . . Where machine generates significant, wide-ranging ‘fringe’ fields extending to considerable distances from the machine, the transducer assembly 24' can [also] be mounted at a significant distance from the machine.”).

Furthermore, for the reasons discussed above in Section II.A, because the Petition does not rely on the Mednovus document in any ground, its existence as a document in the file does not affect our decision. Nonetheless, Patent Owner may file an objection to the evidence in accordance with 37 C.F.R. § 42.64.

e. Summary claim 1

Based upon our review of the current record, and consideration of the parties' arguments and evidence, we determine that Petitioner has demonstrated sufficiently that, if unrebutted, it is more likely than not that claim 1 of the '128 patent is unpatentable as obvious over Votruba, Jaquet, Finn, and Seton.

6. Claims 2–14

Claims 2–14 depend directly or indirectly from claim 1. Ex. 1001, 4:32–5:38. Petitioner points out where each of the limitations of dependent claims 2–14 are disclosed by the references. Pet. 59–65. Petitioner supports its assertions with the testimony of Dr. van der Weide. *Id.* Patent Owner argues the claims as a group and does not provide arguments for claim 2–14 separate from those discussed above for claim 1. Prelim. Resp. 8–45.

We are persuaded, for the reasons stated in the Petition, which findings we adopt as our own for the purpose of institution, that Petitioner's arguments and evidence have established a reasonable likelihood that each limitation of claims 2–14 would have been rendered obvious over the teachings of Votruba, Jaquet, Finn, and Seton. *See* Pet. 59–65.

7. Claim 15

Independent claim 15 recites “[a] protection arrangement for association with an operable MRI apparatus located within a room that has

an access opening, the MRI apparatus providing a residual magnetic field that extends to a location of the opening.” Ex. 1001, 5:39–42.

Next claim 15 recites:

an array of passive magnetic field sensors, mounted about the periphery of the opening in a spaced arrangement such that each sensor is associated with a different portion of the access opening, each sensor for monitoring the residual magnetic field at the associated portion of the access opening, the field changing in response to a presence of ferrous material at the opening, the array of passive magnetic field sensors provides signals indicative of the ferrous material responsive change in the magnetic field.

Ex. 1001, 5:43–6:8.

Finally, claim 15 recites:

a signal processor/safety response generator receives the change indicative signals, determines whether the change indicated by at least one of the change indicative signals exceeds a limit and indicates a need for a safety response, and provides a safety response that addresses the condition of ferrous material at the opening of the room within which the MRI apparatus is located.

Ex. 1001, 6:9–15.

Petitioner points out where each of the limitations of claim 15 is disclosed by the references, and contends “[s]imilar comments apply to claim 15 as that discussed above regarding claim 1.” Pet. 52–59.

Patent Owner does not provide separate arguments for claim 15 relying instead on the arguments discussed above for claim 1. Prelim. Resp. 8–45.

Based upon our review of the current record, and consideration of the parties’ arguments and evidence, there is a reasonable likelihood that

claim 15 of the challenged '128 patent is unpatentable and rendered obvious over Votruba, Jaquet, Finn, and Seton for similar reasons as for claim 1.

8. *Claims 16–20*

Claims 16–20 depend from claim 15. Ex. 1001, 6:16–45. Petitioner points out where each of the limitations of dependent claims 16–20 are disclosed by the references. Pet. 65–67. Petitioner supports its assertions with the testimony of Dr. van der Weide. *Id.* Patent Owner argues the claims as a group and does not provide arguments for claim 16–20 separate from those discussed above for claim 1. Prelim. Resp. 8–45.

We are persuaded, for the reasons stated in the Petition, which findings we adopt as our own for the purpose of institution, that Petitioner's arguments and evidence have established a reasonable likelihood that each limitation of claims 16–20 would have been rendered obvious over the teachings of Votruba, Jaquet, Finn, and Seton. *See* Pet. 65–67.

III. CONCLUSION

We conclude that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertion that claims 1–20 of the '128 patent are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '128 patent is instituted with respect to all grounds set forth in the Petition;

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this Decision.

IPR2022-01224
Patent 7,489,128 B2

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