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3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			SOLTANZADEH, MARYAM	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DOUGLAS B. GUNDEL, ZULFIQAR A. KHAN, and
ALEXANDER W. BARR

Appeal 2019-002452
Application 14/406,796
Technology Center 2600

Before ELENI MANTIS MERCADER, CATHERINE SHIANG, and
JAMES W. DEJMEK, *Administrative Patent Judges*.

DEJMEK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from a Final Rejection of claims 1, 2, 11–14, 16–19, and 24–26. Appellant has canceled claims 3–10, 15, 20–23, and 27–30. *See* Amdt 3–6 (filed Oct. 17, 2017). We have jurisdiction over the remaining pending claims under 35 U.S.C. § 6(b).

We affirm in part.

¹ Throughout this Decision, we use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42 (2017). Appellant identifies 3M Company and its affiliate 3M Innovative Properties Company as the real parties in interest. Appeal Br. 2.

STATEMENT OF THE CASE

Introduction

Appellant's disclosed and claimed invention generally relates to a wireless connector comprising a first and second communication device and a telescopic waveguide disposed between the first and second communication devices. Spec. 1. A waveguide may be used to receive a signal emitted from a first communication device, guide the received signal from a first end of the waveguide to an opposite second end, and transmit the guided signal from the second end to the second communication device. Spec. 1. As described in the Specification, a telescopic waveguide may be expanded (or contracted) to increase (or decrease) the distance between the first and second communication devices. Spec. 7.

Claim 1 is exemplary of the subject matter on appeal and is reproduced below with the disputed limitation emphasized in *italics*:

1. A wireless connector comprising:
 - a first communication device configured to emit a modulated signal;
 - a second communication device configured to receive the emitted modulated signal; and
 - a telescopic waveguide disposed between the first and second communication devices and configured to wirelessly receive the emitted modulated signal from a first end of the telescopic waveguide, guide the received signal from the first end to an opposite second end of the telescopic waveguide, and wirelessly transmit the guided signal from the second end to the second communication device, the telescopic waveguide being centered on an axis and comprising a plurality of guiding sections, each guiding section being centered on the axis and configured to slide within or over an adjacent guiding section inwardly to reduce a length of the telescopic waveguide and outwardly to increase the length of the telescopic waveguide,

wherein the first and second communication devices are coupled through at least one wired connection via an uninterrupted path of conductive material between, and in physical contact with, the first and second communication devices.

The Examiner's Rejections

1. Claims 1, 2, 11–14, 16, 18, and 24–26 stand rejected under pre-AIA 102(b) as being anticipated by Hardacker et al. (US 2007/0270017 A1; Nov. 22, 2007) (“Hardacker”).² Final Act. 2–9.

2. Claim 17 stands rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Hardacker and Ober et al. (US 2,802,994; Aug. 13, 1957) (“Ober”). Final Act. 9–10.

3. Claim 19 stands rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Hardacker and Bartholomä et al. (US 6,394,690 B1; May 28, 2002) (“Bartholomä”). Final Act. 10–12.

ANALYSIS³

Rejection under pre-AIA 35 U.S.C. § 102(b)

a. Claims 1, 2, 11–14, 16, and 18

The Examiner finds Hardacker anticipates, *inter alia*, claim 1. Final Act. 2–3. We begin our analysis with a brief review of Hardacker.

² We note that the Examiner correctly states the application is being “under the pre-AIA first to invent provisions,” but refers to the AIA version of § 102 in the statement of rejection. *See* Final Act. 2. We treat the misstatement as a harmless typographical error and refer to the pre-AIA version of § 102 herein.

³ Throughout this Decision, we have considered the Appeal Brief, filed July 12, 2018 (“Appeal Br.”); the Reply Brief, filed January 28, 2019 (“Reply Br.”); the Examiner’s Answer, mailed November 28, 2018 (“Ans.”);

Hardacker is directed to “connectors and other devices for use in the transmission of millimeter wave RF signals.” Hardacker ¶ 1. Hardacker describes the connectors or housings as comprising “metallized, grounded shells or chambers having antenna pairs that are embedded therein.” Hardacker ¶ 7. Figure 1A of Hardacker is illustrative and is reproduced below:

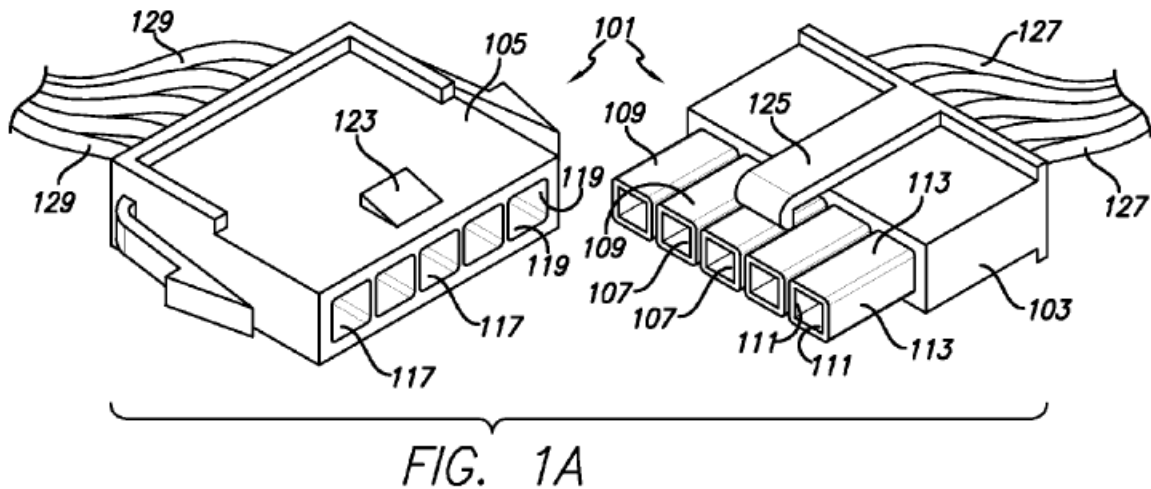


Figure 1A of Hardacker shows a perspective view of the connector assembly components. Hardacker ¶¶ 17, 30. As shown, Hardacker illustrates and describes a first housing (103) and a second housing (105). Hardacker ¶ 30. First housing (103) comprises a first plurality of chambers (107), wherein each chamber may be defined by a plurality of inner walls (111) and outer walls (113). Hardacker ¶ 30. Second housing (105) also comprises a plurality of chambers (117), wherein each chamber (117) may be defined by a plurality of inner walls (119). Hardacker ¶ 32. Hardacker describes each

and the Final Office Action, mailed January 23, 2018 (“Final Act.”), from which this Appeal is taken.

chamber (117) is adapted to receive a projection (109) (defined by outer walls (113)) of first housing (103). Hardacker ¶ 32.

Hardacker further describes that each interior wall (119) of the second housing (105) “is constructed of a conductive material, such as aluminum, which is electrically connected to ground.” Hardacker ¶ 32. Further, Hardacker describes that outer walls (113) of first housing (103) “could be constructed of the conductive material, or the entire chamber body could be constructed of the conductive material.” Hardacker ¶ 30.

Figure 1B of Hardacker is also illustrative and is reproduced below:

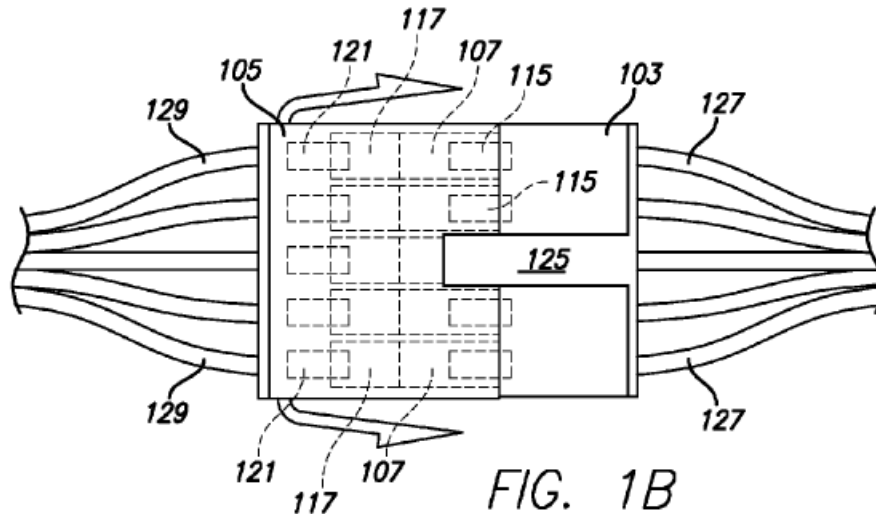


Figure 1B of Hardacker illustrates a view of the connector assembly when the first and second housings are mated. Hardacker ¶ 18. As shown, a plurality of first semiconductor devices (115) are embedded in first housing (103). Hardacker ¶ 31. Additionally, a second plurality of semiconductor devices (121) are embedded in second housing (105). Hardacker ¶ 32. Hardacker further describes the semiconductor devices (115, 121) comprise an antenna for communication at a frequency in the millimeter wave spectrum of frequencies. Hardacker ¶¶ 31–32.

When the housings are attached, the first and second pluralities of chambers **107, 117** are aligned with one another thereby in effect forming a plurality of unified, metallized chambers or shells which act as waveguides for millimeter wave frequency signals (such as, for example, 60 GHz band signals) that can travel between the antenna pairs. Thus the plurality of antennas in the first housing **103** is adapted to communicate with the plurality of antennas in the second housing **105** via wireless signals that travel in a plurality of paths that are substantially parallel, thus providing ultra-high bandwidth data transmission capabilities.

Hardacker ¶ 34.

Appellant disputes the Examiner's finding that Hardacker discloses "first and second communication devices are coupled through at least one wired connection via an uninterrupted path of conductive material between, and in physical contact with, the first and second communication devices," as recited in claim 1 (and commensurately recited in independent claim 2). Appeal Br. 4–6; Reply Br. 1.⁴ In particular, Appellant argues Hardacker merely discloses that when the mating chambers (*see* Figs. 1A and 1B, (107) and (117)) are attached, the structure acts a waveguide between semiconductor devices (115) and (121). Appeal Br. 5. However, Appellant argues Hardacker fails to disclose that the semiconductor devices (115) and (121) are coupled through at least one wired connection via an uninterrupted path of conductive material. Appeal Br. 5; Reply Br. 1. Moreover, Appellant asserts that the first and second semiconductor devices in Hardacker "are already wirelessly connected to each other and, as such,

⁴ The Reply Brief does not contain page numbers. For references purposes herein, we treat the page of the Reply Brief beginning with "**REMARKS**" as page 1.

there would have been no reason to provide a wired connection.”⁵ Appeal Br. 5. Further, Appellant asserts that the regions of mating or attachment between chambers (107) and (117) form an interruption in the conductive path. Appeal Br. 5; *see also* Reply Br. 1 (asserting the Examiner does not give patentable weight to the expression “uninterrupted path”).

Contrary to Appellant’s assertions, the Examiner explains that Hardacker discloses the first device and second device are coupled through at least one wired connection via an uninterrupted path of conductive material. Ans. 15. In particular, the Examiner finds first semiconductor device (115) is connected to first housing (103) and second semiconductor device (121) is connected to second housing (105) and when the first and second housings ((103) and (105)) are mated, chambers (107) and (117) are “aligned and form a unified metallized grounded shell,” thus “serving as a wire connecting the two devices via an uninterrupted path of conductive material between the two devices.” Ans. 15. The Examiner further notes that, as recited, claim 1 (or claim 2) does not require any signaling be present on the wired connection between the first and second devices. Ans. 17. Thus, when the first and second housings ((103) and (105)) of Hardacker are mated, the first and second semiconductor devices ((115) and (121)) are coupled through a wired connection (i.e., a ground connection) via an uninterrupted path of conductive material. Ans. 17.

⁵ To the extent that Appellant asserts there is no reason to have both a wireless and wired connection between two devices, we note that this is the same configuration of Appellant’s claim—namely, two communication devices wirelessly connected to each other and additionally comprising a wired connection.

In the Reply Brief, Appellant acknowledges that “there may be multiple ground connections, such as the ground for [(first semiconductor)] device 115 and the ground for [(second semiconductor)] device 121, [but that] does not necessarily mean that the multiple grounds are connected to each other via a wire, let alone a wire that is connected ‘via an uninterrupted path of conductive material between.’” Reply Br. 1. Rather, Appellant asserts that multiple grounds merely mean that the grounds of the first and second semiconductor devices are at zero potential. Reply Br. 1.

We disagree with Appellant. As Appellant acknowledges, Hardacker discloses each semiconductor device ((115) and (121)) has a ground connection. *See* Reply Br. 1. Further, Hardacker discloses the outer walls (113) of the first housing (103) and the walls (119) of the second housing (105) may be constructed from a conductive material and electrically connected to ground. Hardacker ¶¶ 30, 32. Thus, when the two housings ((103) and (105)) are mated, the ground connections of the outer walls (113) of the first housing (103), the walls (119) of the second housing (105), the first semiconductor device (115) and the second semiconductor device (121) are all coupled together.

Contrary to Appellant’s assertion, the claims do not require “a wire” to connect the grounds together, but rather first and second communication devices are coupled through at least “a wired connection.” *Compare* Reply Br. 1, *with* claim 1. As the Examiner explains, the claims do not require any specific shape or signaling of the wired connection. Ans. 15, 17. In addition, we note the Specification defines a wired connection as one that “requires *an uninterrupted path of conductive material* between two communication devices, where *the path* is in physical contact with the two

communication devices.” Spec. 7 (emphases added). Contrary to Appellant’s arguments (*see* Appeal Br. 5), we do not find that *the path of conductive material* is interrupted just because two structures are mated to each other. In addition, we note the Specification does not limit the term “uninterrupted.”

For the reasons discussed *supra*, we are unpersuaded of Examiner error. Accordingly, we sustain the Examiner’s rejection of independent claim 1. For similar reasons, we also sustain the Examiner’s rejection of independent claim 2, which recites commensurate limitations and for which Appellant advances similar arguments. *See* Appeal Br. 4–6. In addition, we also sustain the Examiner’s rejection of claims 11–14, 16, and 18, which depend directly or indirectly therefrom and were not argued separately. *See* Appeal Br. 6; *see also* 37 C.F.R. § 41.37(c)(1)(iv).

b. Claims 24–26

Independent claim 24 is directed to a wireless communication system comprising, *inter alia*, a plurality of waveguides wherein “at least one waveguide in the plurality of waveguides compris[es] a pair of opposing first slots defined in opposing walls of the waveguide at the first end of the waveguide.”

Appellant asserts that Hardacker, as relied on by the Examiner fails to disclose a slot in any of the walls of the chamber (i.e., waveguide). Appeal Br. 6; Reply Br. 1–2. In addition, to the extent the Examiner suggests the portion of Hardacker’s waveguide that is inserted into its mating half discloses the claimed slots, Appellant argues that this would still not disclose

a pair of opposing first slots defined in opposing walls of the waveguide at the first end of the waveguide. Reply Br. 1–2 (responding to Ans. 18–19).

In response, the Examiner relies on the same figures of Hardacker (i.e., Figs. 1A and 1B) as illustrating the claimed pair of opposing slots defined in opposing walls of the waveguide. Ans. 18. The Examiner explains “the housing 103 has a plurality of projections that move like fingers through a matching set of slots with a matching plurality of antennas disposed in the bottom of the slots.” Ans. 19.

As recited in claim 24, a plurality of communication devices are disposed on a substrate and “a portion of the first substrate being slidably inserted into the first slots; wherein the waveguides each define a cavity along a length of the waveguide.” We agree with Appellant that Hardacker, as relied on by the Examiner, fails to disclose the claimed pair of opposing slots defined in opposing walls of the waveguide. In addition, the Examiner does not provide persuasive evidence or technical reasoning that although Hardacker discloses a communication device is embedded in the housing and is partially disposed within the chamber (*see, e.g.*, Hardacker ¶ 31), that the device is slidably inserted into slots in the chamber.

For the reasons discussed *supra*, we are persuaded of Examiner error. Accordingly, we do not sustain the Examiner’s rejection of independent claim 24. For similar reasons we do not sustain the Examiner’s rejection of claims 25 and 26, which depend therefrom.

Rejections under pre-AIA 35 U.S.C. § 103(a)

Claims 17 and 19 depend from independent claim 1. Appellant relies on the arguments advanced with respect to claim 1 regarding claims 17 and

19. Appeal Br. 6. Thus, for similar reasons discussed above with respect to claim 1, we are unpersuaded of Examiner error and sustain the Examiner's rejections of claims 17 and 19.

CONCLUSION

We affirm the Examiner's decision rejecting claims 1, 2, 11–14, 16, and 18 under pre-AIA 35 U.S.C. § 102(b).

We reverse the Examiner's decision rejecting claims 24–26 under pre-AIA 35 U.S.C. § 102(b).

We affirm the Examiner's decision rejecting claims 17 and 19 under pre-AIA 35 U.S.C. § 103(a).

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 2, 11–14, 16, 18, 24–26	102(b)	Hardacker	1, 2, 11–14, 16, 18	24–26
17	103(a)	Hardacker, Ober	17	
19	103(a)	Hardacker, Bartholomä	19	
Overall Outcome			1, 2, 11–14, 16–19	24–26

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TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 41.50(f).

AFFIRMED IN PART