UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SALVATORE SABBATINO

Appeal 2008-3562
Application 10/809,298
Technology Center 2800

Decided: October 20, 2008

Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO, and JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 from the Examiner's rejection of claims 1, 2, and 7-9. Claims 3, 4, and 6 have been indicated as containing allowable subject matter, and claim 5 has been cancelled (App. Br. 2). We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellant's invention improves immunity of optical communications systems to electromagnetic emissions. Specifically, an electrically non-conductive electromagnetic absorber body at least partly covers electrical leads extending between electrical and optical subassemblies. As a result, crosstalk is reduced due to the electromagnetic fields either picked up or emitted by the leads.[1] Claim 1 is illustrative:

1. An arrangement including:

an electrical subassembly,

an optical subassembly,

said electrical, subassembly and said optical subassembly having an associated electrical connection including at least one electrical lead extending therebetween, and

at least electrically non-conductive absorber body arranged to at least partly cover said at least one electrical lead.

The Examiner relies on the following prior art reference to show unpatentability:

Fujieda	US 2004/0146452 A1	Jul. 29, 2004 (filed Jan. 14, 2004)

Claims 1, 2, and 7-9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Fujieda.

[1] *See generally* Spec. 2:10-4:18.

Rather than repeat the arguments of Appellant or the Examiner, we refer to the Briefs and the Answer[2] for their respective details. In this decision, we have considered only those arguments actually made by Appellant. Arguments which Appellant could have made but did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

Regarding representative claim 1,[3] Appellant argues that Fujieda fails to teach or suggest an electrically non-conductive absorber body arranged to at least partially cover at least one electrical lead extending between the electrical and optical subassemblies as claimed. According to Appellant, the cited passages in Fujieda relied upon by the Examiner simply do not teach or suggest this limitation (App. Br. 3-7). Appellant acknowledges Fujieda providing an electromagnetic wave absorbing layer in conjunction with various electrical devices, including a device with electrical and optical components as shown in Figure 11. Appellant, however, emphasizes that the only passage in Fujieda that indicates the location of the electromagnetic wave absorbing layer in this embodiment is Paragraph 0059 which merely teaches arranging the electromagnetic absorbing layer in a metal cap. This cap, Appellant contends, does not partially cover any of the portions of Figure 11 that are said to correspond to electrical leads (App. Br. 6) nor is the absorption material in this embodiment non-conductive (Reply Br. 6).

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[2] Throughout this opinion, we refer to (1) the Appeal Brief filed June 7, 2007; (2) the Examiner's Answer mailed June 25, 2007; and (3) the Reply Brief filed August 22, 2007.

[3] Appellant indicates that all claims on appeal stand or fall together (App. Br. 3; Reply Br. 4). Accordingly, we select claim 1 as representative to decide the appeal. *See* 37 C.F.R. § 41.37(c)(1)(vii).

The Examiner maintains that Fujieda teaches at least partially covering electrical circuits with electrical leads/wiring with an electrically non-conductive electromagnetic absorbing material. As such, the Examiner contends, such an absorptive covering material must be non-conductive to prevent short circuits (Ans. 6-8). Appellant, however, disagrees and notes that Fujieda's electromagnetic absorbing material is a mixture of resin and ore (i.e., a conductive material), and, as such, Fujieda actually teaches sealing the wiring part with a non-conductive resin prior to applying the conductive absorbing material (Reply Br. 5-6).

ISSUE

The issue before us, then, is whether Appellant has shown that the Examiner erred in finding that Fujieda teaches or suggests at least one electrically non-conductive absorber body arranged to at least partially cover at least one electrical lead extending between the electrical and optical subassemblies as claimed. For the following reasons, we find that Appellant has not shown such error.

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence:

1. Fujieda's electromagnetic absorption material comprises dispersions of multi-layer hollow globule of carbon mixed into electrically insulating organic material (Fujieda, ¶ 0012). As dispersions mixed in insulating material, Fujieda's absorption material can be applied to articles via various methods including coating or sheeting (Fujieda, ¶ 0019).

2. Preferably, multi-layer hollow globule and schungite carbon is dispersed in a substance with a higher electrical resistance. In such a dispersion, the quantity of the multi-layer hollow globule and schungite carbon is from 5-50% of the weight of the high-resistance substance (e.g., rubber, insulation high polymer, and insulating inorganic material) (Fujieda, ¶ 0015).

3. In one implementation, a sheet of Fujieda's absorbing material includes (1) carbon black; (2) a carbon nanotube; (3) a natural shungite ore; and (4) a liquid binder resin (Fujieda, ¶ 0044). The binders can include various resins, synthetic rubber, other similar polymeric insulating materials, and an inorganic insulating material, the main constituent of which is alumina, silica, etc. (Fujieda, ¶ 0047)

4. In Figure 8, Fujieda shows an optical transmission module 8 comprising an optical fiber 9, light guide 13, laser diode 10, and a transmission circuit 11 mounted on circuit board 12. This configuration is accompanied by lead-frames and wires, albeit not shown in the figure (Fujieda, ¶ 0062; Fig. 8).

5. As shown in Figure 8, absorption material 1 completely surrounds the circuit board and the components by molding the absorption material within casing 14 (Fujieda, ¶ 0063; Fig. 8).

6. A similar arrangement is shown in Figure 9, but without the casing (Fujieda, ¶ 0064; Fig. 9).

7. In the embodiment of Figure 10, the wiring is sealed "for assured prevention of short circuit[s] between wirings." To this end, the absorber 1 in Figure 10 has a resin-mix formulation and envelops non-conductive areas

16 that are likewise formed of resin without ore powder mixed therein (Fujieda, ¶ 0065; Fig. 10).

8. In Figure 11, optical transmission and reception modules are formed on a circuit board 12, where the transmission portion includes an optical fiber 9, light guide 13, LD 10, and a transmitter circuit 11. This configuration is accompanied by lead-frames and wires, albeit not shown in the figure (Fujieda, ¶ 0067; Fig. 11).

9. An absorbing material is used in connection with the embodiment of Figure 11 (Fujieda, ¶ 0070).

10. As shown in Figures 6(a) and 6(b), the absorbing material 1 is placed inside metal cap 5 (Fig. 6(a)) or the absorbing material itself forms a cap (Fig. 6(b)) such that the cap envelops a noise generating source (e.g., a microprocessor or system LSI) (Fujieda, ¶ 0059; Figs. 6(a) and 6(b)).

PRINCIPLES OF LAW

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

Discussing the question of obviousness of claimed subject matter involving a combination of known elements, *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007), explains:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103

> likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* [*v. AG Pro, Inc.*, 425 U.S. 273 (1976)] and *Anderson's-Black Rock*[, *Inc. v. Pavement Salvage Co*., 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740.

If the Examiner's burden is met, the burden then shifts to the Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

ANALYSIS

Based on the structure and functionality of Fujieda noted in the Findings of Fact section above, we find ample evidence on this record that supports the Examiner's obviousness conclusion. First, we find that Fujieda's absorber fully meets an "*at least* electrically non-conductive absorber body" as claimed (emphasis added). Such an open-ended limitation calling for the absorber to have *at least* electrically non-conductive characteristics does not preclude the absorber to also have at least some electrically conductive characteristics.

In fact, Appellant's Specification all but confirms this point. On Page 5, the Specification notes that the term "electromagnetic absorber material" denotes

> any material exhibiting the capability of absorbing electromagnetic fields/waves. . . . . More to the point, *electrically non-conductive (i.e., insulating)* absorber materials will be considered. . . . Typical formulations include magnetically loaded, flexible silicone or urethane sheets. Alternative arrangements include variations in the loading material . . . and/or variations in the sheet structure, such as e.g. multilayered, *carbon impregnated polyurethane foam sheets*, open cell foam sheets *with controlled conductivity gradient*, vinyl plastic or *silicone rubber sheets*.

(Spec. 5:1-23; emphases added).

The clear import of this discussion is that while electrically non-conductive materials are utilized for the absorber of the disclosed invention, they nonetheless can have at least some degree of electrical conductivity (e.g., in the form of carbon impregnated polyurethane foam sheets, open cell foam sheets with controlled conductivity gradient, etc.).

Turning to the prior art, Fujieda's electromagnetic absorption material comprises dispersions of multi-layer hollow globule of carbon mixed into electrically insulating organic material (Fujieda, ¶ 0012) (FF 1). As noted in the Findings of Fact section, the quantity of the electrically conductive component of Fujieda's absorber body can be as low as 5% of the weight of the high-resistance (i.e., insulating) substance (FF 2). We find that this formulation fully meets an "*at least* electrically non-conductive absorber body" as claimed since 95% of Fujieda's absorber body constitutes high-resistance (i.e., insulating) material.

We also find that this absorber body at least partly covers at least one electrical lead between optical and electrical subassemblies as claimed. In Figure 8, Fujieda shows an optical transmission module 8 comprising an

optical fiber 9, light guide 13, laser diode 10, and a transmission circuit 11[4] mounted on circuit board 12. This configuration is accompanied by lead-frames and wires, albeit not shown in the figure (Fujieda, ¶ 0062; Fig. 8) (FF 4). As shown in Figure 8, absorption material 1 completely surrounds the circuit board and the components by molding the absorption material within casing 14 (FF 5). A similar arrangement is shown in Figure 9, but without the casing (FF 6).

These embodiments, in our view, amply teach at least partly covering at least one electrical lead with the absorption material. Although the lead-frames and wires are not shown in these figures, they are nonetheless present (FF 4) and indeed *enveloped* by the absorption material (as is the circuit board). As such, the gravamen of the Examiner's point regarding electrical conductivity of Fujieda's absorption material (Ans. 8) is well-taken. That is, if this absorption material had a high degree of electrical conductivity, then short circuits in the electrical connections would inevitably result due to the sheer proximity of the material to the connections.

Although Appellant is correct (Reply Br. 5-6) that the wiring is sealed in the embodiment of Figure 10 "for assured prevention of short circuit[s] between wirings" (FF 7), this embodiment is nevertheless distinct from the embodiments of Figures 8 and 9.[5] In any event, although Fujieda's absorber does have some degree of electrical conductivity, this conductivity can be far outweighed by the degree of electrical *non-conductivity* depending on the

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[4] The Examiner equates this transmission circuit to the recited "electrical subassembly" (Ans. 4)—a finding that is undisputed.

[5] *Compare* Fujieda, ¶¶ 0036-37 (identifying the embodiments of Figures 8 and 9) *with* Fujieda, ¶ 0038 (identifying the embodiment of Figure 10 as "the *other* embodiment of the present invention") (emphasis added).

specific formulation. As such, ordinarily skilled artisans would readily understand that, given the preponderance of non-conductive material in these formulations, enveloping the circuit board and wiring with absorbing material in the embodiments of Figures 8 and 9 would likely not result in electrical shorting. Otherwise, these embodiments would be inoperative: a result that hardly would have been intended by Fujieda.

While the embodiment of Figure 10 may provide additional protection against short circuits (FF 7), this embodiment does not otherwise detract from the functionality of the embodiments of Figures 8 and 9. Additionally, the embodiment of Figure 10 also fully meets the disputed limitations of claim 1. Nothing in the claim precludes the recited "*at least* electrically non-conductive absorber body" to include both conductive and non-conductive components. Thus, even assuming, without deciding, that the absorber 1 in Figure 10 has a resin-mix formulation with the highest ratio of electrically conductive material to non-conductive material, the absorber body still envelops non-conductive areas 16 that are likewise formed of resin, albeit without the ore powder mixed therein (Fujieda, ¶ 0065; Fig. 10) (FF 7).

As such, the absorber structure of Figure 10 therefore includes electrically non-conductive components, namely the non-conductive areas 16 that are contained within the surrounding absorption material 1. These components collectively form an "at least electrically non-conductive absorber body" as claimed. And as we discussed previously, such an enveloping structure at least partly covers at least one electrical lead as claimed.

But even if we were to assume that the intervening non-conductive areas 16 were not part of the absorber body (a finding that we do not reach), we nevertheless note that the Specification expressly states that "covering" the metallic leads with the absorber material does not require the absorber to directly contact the leads (i.e., there can be intervening materials between the leads and the absorber) (Spec. 8:23-31). As such, the absorber material 1 would—like the embodiments of Figures 8 and 9—"cover" the underlying lead frames and wires notwithstanding the presence of intervening insulative material.

In addition, we also find the embodiment of Figure 11 considered with the teachings of other embodiments of Fujieda likewise reasonably suggests the disputed limitations of claim 1. In Figure 11, optical transmission and reception modules are formed on a circuit board 12, where the transmission portion includes an optical fiber 9, light guide 13, LD 10, and a transmitter circuit 11.[6] As with previous embodiments, this configuration is accompanied by lead-frames and wires, albeit not shown in the figure (Fujieda, ¶ 0067; Fig. 11) (FF 8). Like previous embodiments, an absorbing material is used in connection with this embodiment (FF 9).

Appellant acknowledges that Fujieda's Figure 11 embodiment uses an absorbing material, but nonetheless argues that it would be arranged inside a metal cap 5 as discussed in Paragraph 0059. This arrangement, Appellant contends, would not at least partly cover any of the portions in Figure 11 identified as electrical leads (App. Br. 6; Reply Br. 6).

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[6] The Examiner equates this transmission circuit to the recited "electrical subassembly" (Ans. 4)—a finding that is undisputed.

We disagree. As shown in Figures 6(a) and 6(b), the absorbing material 1 is placed inside metal cap 5 (Fig. 6(a)) or the absorbing material itself forms a cap (Fig. 6(b)) such that the cap envelops a noise generating source (e.g., a microprocessor or system LSI) (Fujieda, ¶ 0059; Figs. 6(a) and 6(b)) (FF 10). As shown in these figures, the caps extend well beyond the periphery of the enveloped components. In view of this extension, we see no reason why such a cap could not envelop the electrical leads associated with the components as well. Indeed, the bump-like protrusions directly underneath the components in these figures all but suggest that at least some of the associated electrical connections are likewise enveloped.

Based on this teaching, we see no reason why ordinarily skilled artisans could not likewise envelop the associated electrical connections in the embodiment of Figure 11. Such an enhancement would be tantamount to the predictable use of prior art elements according to their established functions—an obvious improvement. *See KSR*, 127 S. Ct. at 1740.

For the foregoing reasons, Appellant has not persuaded us of error in the Examiner's rejection of representative claim 1. Therefore, we will sustain the Examiner's rejection of that claim, and claims 2 and 7-9 which fall with claim 1.

CONCLUSION OF LAW

Appellant has not shown that the Examiner erred in rejecting claims 1, 2, and 7-9 under § 103.

DECISION

The Examiner's decision rejecting claims 1, 2, and 7-9 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)(iv).

AFFIRMED

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