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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte TY FAIRNENY¹

Appeal 2015-001310
Application 13/113,778
Technology Center 2800

Before JAMES C. HOUSEL, WESLEY B. DERRICK, and
JULIA HEANEY, *Administrative Patent Judges*.

DERRICK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134 from the Examiner's rejection under 35 U.S.C. § 103 of claims 1–3, 8–11, 13, 14, 16–19, and 21 over Griffin² in view of Cecchetti³ and claims 4–7, 15, and 20 over Griffin in view of Cecchetti and Vayser.^{4,5} We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

¹ The real party in interest is Boston Scientific Scimed, Inc. Appeal Br. 2.

² US 5,562,657, issued October 8, 1996.

³ Cecchetti et al, US 5,509,917, issued April 23, 1996.

⁴ Vayser et al., US 2009/0136177 A1, published May 28, 2009.

⁵ The ground of rejection includes Cecchetti. Ans. 3.

CLAIMED SUBJECT MATTER

The subject matter on appeal is related to an apparatus including an optical fiber disposed within a tube that includes a diffractive portion wherein the distal surface of the optical fiber is configured to emit a beam of energy at an angle relative to the longitudinal axis of the optical fiber such that the beam of energy emitted from the optical fiber passes through the diffractive portion of the tube. Spec. Abstract.

Independent claims 1 and 18 are directed to an apparatus and assembly, respectively. Independent claim 14 is directed to a method of using the apparatus.

Independent claim 1 is representative.

1. An apparatus comprising:
 - an optical fiber having a distal end with a distal surface configured to emit a beam of energy at an angle relative to a longitudinal axis of the optical fiber; and
 - a tube including a channel and a diffractive portion, the distal end of the optical fiber being disposed in the channel of the tube such that the beam of energy emitted from the optical fiber passes directly into the tube and through the diffractive portion,
 - wherein the beam of energy emitted from the diffractive portion has a greater beam angle than the beam of energy directed to the diffractive portion.

Appeal Br. (Claims Appendix) 18.

Claim 21, depending from claim 1, recites that “the distal surface of the optical fiber is configured to emit a beam at a zero beam angle.”

DISCUSSION⁶

Upon consideration of the evidence on this record and each of Appellant's contentions, we find that a preponderance of the evidence supports the Examiner's determination that one of ordinary skill in the art, armed with the knowledge provided in the applied prior art, would have been led to the subject matter recited in the claims.

To prevail in an appeal to this Board, Appellant must adequately explain or identify reversible error in the Examiner's rejection. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2012); *see also In re Jung*, 637 F.3d 1356, 1365–66 (Fed. Cir. 2011) (explaining that even if the Examiner had failed to make a prima facie case, it has long been the Board's practice to require an Appellant to identify the alleged error in the examiner's rejection); *In re Chapman*, 595 F.3d 1330, 1338 (Fed. Cir. 2010) (“[T]he burden of showing that the error is harmful normally falls upon the party attacking the agency's determination.” (quoting *Shinseki v. Sanders*, 556 U.S. 396, 409 (2009))).

The Examiner relies primarily on Griffin for its disclosure of side fire laser catheter elements that include a fiber optic element 12 disposed in a sleeve 14 and the optical fiber and sleeve are disposed within a tube/cap 30 where the tip of the fiber optic element 12 has a surface (reflective face 18) configured to emit a beam of energy at an angle from longitudinal and cap 30 can include a diffractive portion (lens 44). Final Act. 3–4 (citing Griffin Figs. 1–6). The Examiner maintains that the inclusion of sleeve 14 in

⁶ We refer to the Final Office Action mailed October 17, 2013, the Appeal Brief filed March 25, 2014, the Examiner's Answer mailed August 18, 2014, and the Reply Brief filed October 17, 2014.

Griffin provides no basis to distinguish the claims because the claims are open to including the sleeve as part of the recited tube. Ans. 2–3.

The Examiner relies on Cecchetti for its disclosure that the diffractive portion of such side firing laser catheters can be lenses that provide beam angles greater than the beam angle directed to the lens. Final Act. 4–5 (citing Cecchetti Fig. 6A–B).⁷

The Examiner *de facto* concludes it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Griffin’s side firing laser catheter to provide whatever lens was required to provide the desired beam angle, thereby optimizing the apparatus’ performance. Final Act. 5.

All claims

Appellant argues that none of the cited references teaches or suggests the specific arrangement of the optical fiber, tube, and diffractive portion, and the beam angle recited in claims 1, 14, and 18. Citing Griffin’s Figures, Appellant points out that lens 44 of Griffin is a convex lens so that emitted laser energy has a “converging spot cross-section.” Appeal Br. 12.

⁷ We find Cecchetti’s disclosure to be more comprehensive, however, as it teaches “using highly refractive optical materials . . . as the cap, and shaping a portion thereof into a lens in the main exit direction . . . [where] [t]he glass cap can be fused with the fiber at the point of the main beam exit thus effectively reducing Fresnel losses” (col. 1, ll. 56–63) and that lenses can be formed to provide converging beams (Figs. 4 and 5), collimated beams (Fig. 3, col. 3, ll. 30–39), and diverging beams (Fig. 6). We further find Cecchetti’s device has the same manner of operation as to reflection occurring at the interface of the obliquely cut tip and air due to the refractive index differences between the fiber optic core and that of air. Cecchetti col. 2, ll. 43–51; col. 3, ll. 1–3.

Appellant further points to the angled reflective face 56 that is separated from the reflective face 18 by gap 54 and contends that light may pass through air space 54 and reflect off the angled face 56. Appeal Br. 12–13. Appellant still further points to sleeve 14 (Fig. 2) and sleeve 120 (Fig. 5) and explains that laser energy emitted from optical fiber 12/112 (Fig. 2 / Fig. 5) passes through the sleeve when it reflects off the optical fiber’s reflective face 18/122 (Fig. 2 / Fig. 5). Appeal Br. 13–14. Appellant maintains that the sleeve is not a portion of the fiber or the tube. Reply Br. 2–3. Appellant argues it is, accordingly, “clear that Griffin teaches that laser energy emitted from an optical fiber does not pass directly into a tube and through a diffractive portion that is configured to increase a beam angle of the beam of energy” and that the configuration in Griffin “is structurally different from the claimed configuration” because in Griffin the “laser energy emitted from the optical fiber 12 travels at least through the sleeve 14 an [sic] gap 54 prior to exiting cap 30.” Appeal Br. 13–14.

Appellant further contends that neither Cecchetti nor Vayser remedy the alleged deficiencies of Griffin because there is an air gap between the optical fiber and the lens in Cecchetti (citing col. 4, ll. 1–6 and 18–22, and Figs. 6A, 6B) and the illumination fiber and end cap in Vayser (citing Fig. 1). Appeal Br. 14–15.

On this record, we are not persuaded the Examiner erred reversibly. As explained by the Examiner, the claims do not preclude the Examiner’s interpretation in which Griffin’s disclosed sleeve is considered a portion/section of the cap/tube (Ans. 2), and Appellant fails to direct our attention to any portion of the Specification contrary to the Examiner’s

position (*see generally* Appeal Br.; Reply Br.).⁸ Further, as also explained by the Examiner, the claims do not require that all of the beam be reflected at the configured distal end of the fiber and Griffin’s disclosed device includes an angled, polished surface—reflective face 18—that functions in the same manner as Appellant’s angled surface at the end of the optical fiber:

Reflection of the light necessarily occurs at the interface between the end of the glass fiber and the air gap according to physical principles . . . [and] Griffin teaches that the majority of the laser beam emitted from the fiber passed directly into the tube/cap 30 at the sleeve portion 14 of the cap 30, where the sleeve portion 14 is considered as part of the tube as explained above.

Ans. 2–3; *see also* Griffin col. 1, ll. 18–25; Spec. ¶¶ 25–26, Fig. 3. We also find Appellant’s further arguments that “Griffin clearly requires distinct and separate fiber (12), sleeve (14), and cap (30) components” (Reply Br. 2, citing Griffin col. 3, ll. 11–17) unpersuasive of any harmful error where Griffin explicitly teaches that the fiber, sleeve, and cap are fused together to form “a single, unitary element to the laser beam.” (*see, e.g.*, Griffin col. 4, ll. 15–19, 38–49).⁹

⁸ We further note that the Specification sets forth that “[t]he optical fiber 30 may include, for example, a core, one or more cladding layers about the core, a buffer layer about the cladding, a jacket, etc.” Spec. ¶ 23. In the event of further prosecution, both Appellant and Examiner should consider whether Griffin’s disclosure of a manufacturing process for his device in which an optical fiber 12 and sleeve 14 fused together prior to cutting and polishing (*see, e.g.*, col. 3, 40–64; Figs. 3A, 3B) does not constitute disclosure of an optical fiber according to the Specification.

⁹ We further note that the Specification sets forth a conventional side fire laser assembly 100 including capillary 150 fused to optical fiber 130 and acknowledges it to be within the prior art (Spec. ¶ 4, Fig. 1), where including

As to Appellant’s nascent argument that lens 44 of Griffin is convex and so results in emitted laser energy having a “converging spot cross-section” (Appeal Br. 12), it is without persuasive merit because it fails to address the basis of the rejection in which Cecchetti was relied on for teaching lenses which provided collimated or diverging beams. *In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (It is axiomatic that “one cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references.”).¹⁰

As to Appellant’s contention that Cecchetti’s disclosure fails to teach any device where the configuration is such that “the beam of energy emitted from the optical fiber passes directly into the tube and through the diffractive portion” (claim 1), we find it wholly unfounded. *See, e.g.*, Cecchetti col. 1, ll. 56–63 (expressly teaching “using highly refractive optical materials . . . as the cap, and shaping a portion thereof into a lens in the main exit direction . . . [where] [t]he glass cap can be fused with the fiber at the point of the main beam exit thus effectively reducing Fresnel losses.”).

a diffractive surface 58 appears to be the primary difference (*compare* Fig. 1 to Fig. 3). In the event of further prosecution, both Appellant and Examiner should consider whether including or omitting a sleeve, as in Griffin, is of import where direct beam output at a fusing of the optical fiber and capillary is expressly acknowledged as being within the prior art.

¹⁰ We further note that Griffin teaches “[i]t will be understood that any desirable lens configuration may be formed on the flat to provide the desired output beam” (Griffin col. 6, ll. 24–26) and Appellant directs us to no evidence that lens configurations meeting the claim limitations could not be formed on Griffin’s flat (*see generally* Appeal Br.; Reply Br.).

Claim 21

In the Appeal Brief, Appellant argues that the Examiner erred in finding Cecchetti's Figures 3A and 3B disclosed the limitation of claim 21 that the "distal surface of the optical fiber is configured to emit a beam at a zero beam angle" because "Cecchetti describes an angle alpha of 40 degrees, '[t]he fiber tip 43 was exposed and cut with a prismatic angle of alpha=40 degrees to obtain the total side deflection of the radiation 45.'" Appeal Br. 16 (quoting Cecchetti col. 3, ll. 18–20).

On this record, we do not find Appellant's argument persuasive of reversible error where, as explained by the Examiner, the alpha angle of 40 degrees refers not to the beam angle, but rather to the angle of the fiber end surface. Ans. 4.

In the Reply Brief, Appellant further argues that "the cap lens 51 of Cecchetti is a converging lens that does not output at a non-zero angle" and for this reason "Cecchetti fails to recite the features of claim 21." Reply Br. 3 (citing Figs. 3A, 3B).

We find this argument to be waived because it could have been raised in the Appeal Brief and a showing of good cause explaining why the argument could not have been presented in the Appeal Brief has not been made. 37 C.F.R. § 41.41(b)(2).

Furthermore, on this record, we discern no harmful error where Appellant fails to direct us to any meaningful structural difference between the polished oblique end of Appellant's fiber (Spec. ¶¶ 25–26, Fig. 3) and that of the acknowledged prior art (Spec. Fig. 1) or that cited by the

Examiner in the rejection as discussed above.¹¹ *In re Kubin*, 561 F.3d 1351, 1357 (Fed. Cir. 2009) (“Even if no prior art of record explicitly discusses the [limitation], [applicants’] application itself instructs that [the limitation] is not an additional requirement imposed by the claims on the [claimed invention], but rather a property necessarily present in [the claimed invention].”).

Claims 4–7, 15, and 20

As to the claims rejected over Griffin, Cecchetti, and Vayser, Appellant only argues separately that the rejection did not include Cecchetti and is therefore deficient as Cecchetti was relied on in the rejection of the independent claims from which these claims depend. Appeal Br. 17.

The Examiner maintains that omission of Cecchetti in the rejection statement headline of claims 4–7, 15, and 20 (Final Act. 6) was an inadvertent typographical error (Ans. 3). We determine this to be harmless error, particularly where the Examiner, in indicating that it was an inadvertent omission, has explained that the rejection is grounded on the further combination of Vayser with the prior combination of Griffin and Cecchetti. Critically, Appellant has had a full opportunity to respond to the rejection grounded on Griffin in view of Cecchetti and Vayser, either by petition as being an improper new ground, or by addressing the merits of the

¹¹ To the extent Appellant relies on the distal surface of the optical fiber being configured to emit a beam at a zero beam angle prior to the beam reaching the diffractive portion as distinguishing the claimed apparatus, we suggest that the question of whether the claim is enabled under 35 U.S.C. § 112, first paragraph, be considered in the event of further prosecution.

Appeal 2015-001310
Application 13/113,778

rejection, which Appellant has done in arguing against the rejection of all the claims, discussed above.

For these reasons, on this record, we are not persuaded that the Examiner erred in concluding that one of ordinary skill in the art at the time of the invention, armed with the knowledge of the cited prior art, would have been led to the claimed subject matter.

Accordingly, we sustain the Examiner's obviousness rejections.

CONCLUSION

We affirm the Examiner's obviousness rejections of claims 1–11 and 13–21.

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