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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MICHAEL AARON KADAR-KALLEN, SHELLY ANN BUCHTER, NANCY LEE REESER, LALITKUMAR BANSAL, DONALD EUGENE DELLINGER, and DAVID DONALD ERDMAN

Appeal 2019-000373
Application 13/840,447
Technology Center 2800

Before LINDA M. GAUDETTE, DONNA M. PRAISS, and DEBRA L. DENNETT, *Administrative Patent Judges.*

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

Appellant[2] appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1 and 4.[3] We have jurisdiction over the appeal

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[1] Our Decision refers to the Specification ("Spec.") filed Mar. 15, 2013, Appellant's Appeal Brief ("Appeal Br.") filed May 24, 2017, the Examiner's Answer ("Ans.") dated Aug. 14, 2018, and Appellant's Reply Brief ("Reply Br.") filed Oct. 15, 2018.

[2] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies TE Connectivity Corporation as the real party in interest. Appeal Br. 2.

[3] Entry of Appellant's amendment cancelling claims 2, 3, and 5–21 leaves claims 1 and 4 in this appeal. Advisory Action dated July 3, 2017.

under 35 U.S.C. § 6(b).

We REVERSE.

STATEMENT OF THE CASE

The invention relates to a multi-fiber ferrule connector for interconnecting optical fibers. Spec. ¶¶ 1, 2. The Specification discloses multiple optical fibers are commonly terminated using multi-fiber connectors that interconnect the fibers and are core aligned and in physical contact using a ferrule to achieve optimal transmission. *Id.* ¶ 2. The Specification describes the use of an adhesive bonding agent between the fiber and ferrule during processing followed by cleaving and polishing for a geometry where the optical fibers extend by a predetermined distance beyond the end face of the ferrule to establish fiber-to-fiber contact between opposing optical fibers. *Id.* ¶ 3. The Specification discloses the use of lenses to expand the light and make the system less sensitive to dirt on the end faces such that each fiber is at the corresponding lens' focal point. *Id.* ¶ 4.

According to the Specification, providing an epoxy well near the ferrule wall against which the fibers abut serves to (1) maintain contact with the fiber ends even if the adhesive fails to affix the fibers to their grooves and (2) aid the pull strength in a -z direction shown in Figure 2 below. *Id.* ¶ 5.

Figure 2 is reproduced below:

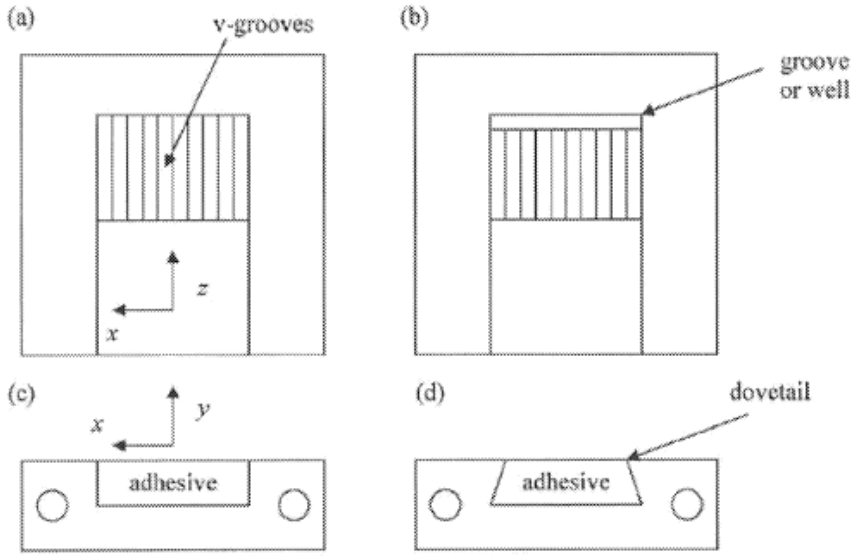


FIGURE 2

Figure 2 is a perspective view of Appellant's multi-fiber ferrule connector depicting grooves (that are v-shaped in a cross-sectional profile), an epoxy well to anchor both adhesive and fibers near the ends of the fibers along the back face of a front frame and perpendicular to a longitudinal axis of the ferrule's main surface. *Id.* ¶¶ 16, 25, 26. Figure 2 also depicts a dovetail shape of the channel and rear opening cross sections to achieve further retention of adhesive in the +y direction. *Id.* ¶ 27.

According to the Specification, cured adhesive pulls away from the epoxy well's edges, therefore circular wells depicted in Figure 6 below are provided to minimize the adverse effects of such shrinkage. *Id.* ¶ 28.

Figure 6 is reproduced below:

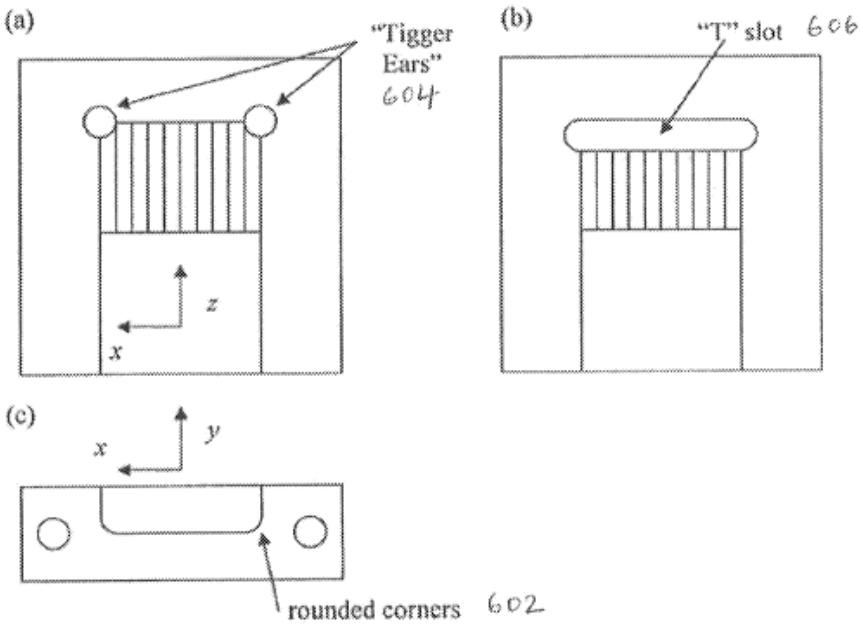


FIGURE 6

Figure 6 is a perspective view of Appellant's multi-fiber ferrule connector depicting rounded or curved corners on the back face, "Tigger Ears," and "T" slot. *Id.* ¶ 20.

Claims 1 and 4, reproduced below from the Claims Appendix to the Appeal Brief, are illustrative (disputed limitations italicized).

1. A ferrule assembly comprising:

a ferrule body defining a channel, a main surface at the bottom of said channel, a front frame forward of said channel, and a rear opening rearward of said channel,

wherein the front frame comprises a front face and a back face and a plurality of lens, said channel being configured to receive and secure fibers relative to said plurality of lens;

at least one well located adjacent the back face of the front frame, said at least one well being contiguous with said

channel and being in fluid communication with said channel such that liquid adhesive applied to said channel flows into said at least one well;

a restrictive opening between said at least one well and said channel, said restrictive opening limiting egress from said at least one well, thereby preventing, cured adhesive in said at least one well from passing through said restrictive opening to said channel, thereby anchoring said fibers in place on said main surface.

4. The ferrule assembly of claim 1, wherein said *ferrule body comprises first and second sides on each side of said channel, and wherein said at least one well comprises circular wells*, one of said wells disposed adjacent the intersection of said front frame and said first side, and another of said wells disposed adjacent the intersection of said front frame and said second side.

ANALYSIS

We review the appealed rejections for error based upon the issues Appellant identifies. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (*cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections.")). After considering the positions of both the Examiner and Appellant, we are persuaded the Examiner reversibly erred for the reasons set forth in Appellant's briefs and discussed below.

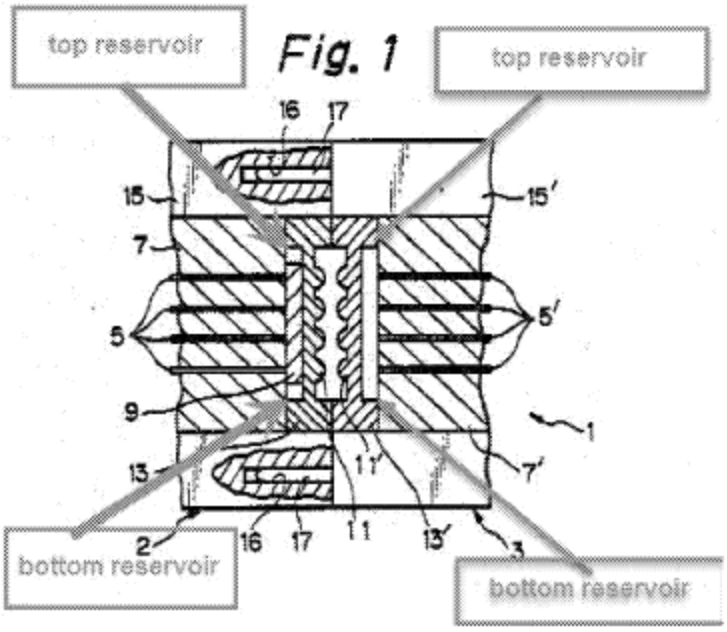
The Examiner rejects claims 1 and 4 under 35 U.S.C. § 103 as being unpatentable over the combination of Duis[4] and Iwama.[5] Final Act. 4–9. We separately address claims 1 and 4 below.

Claim 1

Appellant contends the Examiner's combination of Duis and Iwama fails to disclose or suggest the claimed restrictive opening that locks the adhesive in the well once the adhesive cures. Appeal Br. 6–7. Appellant argues that the front frame and channel of Duis's device as modified with Iwama's frame and lens array does not provide a restrictive opening between any region. *Id.* at 7. Appellant asserts that even if the top and bottom reservoirs identified in the Examiner's annotated Figure 1 of Iwama provide flow orthogonal to the fiber/waveguide axes, the Examiner has failed to identify restrictive openings. *Id.* at 8. Annotated Figure 1 of Iwama is shown below. *Id.*; Final Act. 7.

[4] US 2012/0014648 A1, published Jan. 19, 2012.
[5] US 5,241,612, issued Aug. 31, 1993.

Figure 1 of Iwama is reproduced below:



Iwama's annotated Figure 1 depicts multicore optical connector 1 comprising first connector part 2 and second connector part 3 opposed and connected by pins 17 fitting holes 16 in the end face of holder 15, plurality of lenses 11, 11′, holders 15, 15′ for holding fiber arrays 7, 7′ in which optical fibers 5, 5′ are embedded, and refractive index matching plate 9. Iwama 2:4–37.

Appellant further argues that the rejection fails to give patentable weight to the functional language in claim 1 that recites "said at least one well and said channel are in fluid communication" and "thereby preventing, cured adhesive in said at least one well from passing through said restrictive opening to said channel, thereby anchoring said fibers in place on said main surface." Appeal Br. 9–10.

The Examiner responds that all of the claimed elements have been accounted for in the combination of Duis and Iwama because when the opposing walls of Duis's longitudinal cavity 114 holds Iwama's lens array

13′ in the same way Iwama's "arms" 15′ hold lens array 13′, the bottom of longitudinal cavity 114 forms a floor for the open-ended area that may hold a curable fluid such as epoxy. Ans. 5. The Examiner also finds that in the absence of the refractive index matching plate as 9 on the left hand side of Iwama's Figure 1, the right hand side provides a well that is then located on the main surface along the back face of the front frame and the well is capable of accommodating an epoxy. *Id.* (citing Iwama 2:35–38).

Regarding a restrictive opening, the Examiner finds flow only occurs vertically with respect to the connector plane, therefore the opening in the prior art combination is restrictive as to the direction of flow. *Id.* at 6. Regarding claim 1's functional language, the Examiner finds cured adhesive does not flow, therefore no structure is given by the claimed "thereby preventing, cured adhesive in said at least one well from passing through said restrictive opening to said channel." *Id.* at 9. The Examiner determines that claim 1 does not describe specific shapes and that functional language does not impart specific shapes to the claim. *Id.* at 10.

Appellant's arguments are persuasive of harmful error. The Examiner's rejection does not adequately explain how Duis's device as modified by Iwama provides a restrictive opening between the identified well and the identified channel. We agree with Appellant (Reply Br. 2) that the functional language recited in the claim provides structure to the recitation "restrictive opening" such that the interconnection between the well and the channel serves to mechanically anchor a cured adhesive. Such structures are described in Appellant's Specification as acting as "a mechanical latch" and to minimize adverse effects of shrinkage of the cured adhesive at the edges of the ferrule. Spec. ¶ 28. The Examiner does not

adequately explain how the modification of Duis's device with Iwama's lens array would constrain the cured adhesive such that it acts as an anchor. Simply providing walls to define the direction of flow does not sufficiently explain how the intersection of the well and channel would provide a mechanical restraint on the cured adhesive.

In view of the above and for the reasons provided in the Appeal Brief and the Reply Brief, we reverse the Examiner's rejection of claim 1 over Duis and Iwama.

Claim 4

The Examiner rejects claim 4 under 35 U.S.C. § 103 over the combination of Duis and Iwama, but concedes that the combination does not disclose at least one well comprising circular wells. Final Act. 8–9. The Examiner determines that it would have been obvious to use circularly-shaped wells because Duis provides circular wells with left and right alignment holes, therefore circular is a known shape for wells. *Id.* at 9.

Appellant contends that the Examiner erred in rejecting claim 4 because Duis's alignment holes are not in fluid communication with the channel. Appeal Br. 10. Appellant also argues that if Duis's alignment holes were in fluid communication with the channel, the holes would not be capable of receiving the alignment pin, thus the suggested modification to Duis would render it unsuitable for its intended purpose. *Id.*

The Examiner responds that Duis's alignment holes teach a known geometry for holes in general, which the Examiner determines is applicable to other holes, apertures, openings, foramens, wells or the like. Ans. 12. The

Examiner also finds that the geometry of Iwama's wells is determined by the shape of the front face/lens 13, and therefore is "not particularly limited." *Id.*

The Examiner's additional findings regarding the geometry of holes does not cure the deficiencies discussed above with regard to claim 1. Therefore, we do not sustain the Examiner's rejection of claim 4 under § 103.

CONCLUSION

For these reasons, we reverse the Examiner's rejection of claims 1 and 4 under 35 U.S.C. § 103.

DECISION SUMMARY

In summary:

Claim(s) Rejected	**35 U.S.C. §**	**Reference(s)/Basis**	**Affirmed**	**Reversed**
1, 4	103	Duis, Iwama		1, 4

REVERSED