UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

SENKO ADVANCED COMPONENTS
Petitioner

v.

US CONEC LTD.
Patent Owner

_____

Case: PGR2024-00032
Patent No. 11,733,466

DECLARATION OF EDWARD LURIE

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1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;" 70

1.b.1 "two ferrule assemblies disposed within the opening of the housing," 72

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;" 73

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1.b.1 "two ferrule assemblies disposed within the opening of the housing," 141

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;" 143

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;" 144

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1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and" 152

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers pass." 156

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1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"..... 202

1.b.1 "two ferrule assemblies disposed within the opening of the housing," 203

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;" 204

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;" 204

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"..... 207

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;" 209

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and" 210

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers pass." 211

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7.b "wherein the strain relief boot extends rearwardly away from the housing." 218

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B. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs." 225

C. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously." 225

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B. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats." ..232

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housing and configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body." 238

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A. Independent Claim 1 240

1.P A fiber optic connector comprising: 240

1.a.1 "a housing having a main body extending between a front end and a rear end and having an opening extending therebetween,"241

1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"..... 243

1.b.1 "two ferrule assemblies disposed within the opening of the housing," 244

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;" 244

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;" 245

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"..... 247

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;" 249

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and" 249

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers pass." 251

B. Claim 2 "The fiber optic connector according to claim 1, wherein the alignment feature is positioned rearward of the front end of the housing and extends away from the front end of the housing."..... 252

C. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs." 253

D. Claim 4 "The fiber optic connector according to claim 3, wherein the spring push is separate from the crimp body." 255

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7.b "wherein the strain relief boot extends rearwardly away from the housing." 260

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I. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats."..262

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DECLARATION OF EDWARD LURIE

I, Edward Lurie, hereby declare as follows:

I. INTRODUCTION

1. Although I continue to provide consulting, I retired from full time work in Sept. 2019, after a 36-year career in new product design & development in the field of optical fiber connectivity. I worked for 34 years for 3M in the Telecom, Interconnect Solutions (ISD), and Communication Markets (CMD) Divisions. I worked the last two years of my career for Corning in the Optical Connector Systems (OCS) Division, after 3M sold its CMD Division to Corning.

2. I currently have a number issued US Patents in fiber optics, in both discrete and multi-fiber interconnects. I also developed dozens of proprietary processes that are held confidentially as trade secrets.

3. I received a BS Degree from Franklin & Marshall College in 1980, and did post graduate study at the Institute of Optics in Rochester, NY. My qualifications are enumerated in detail in my curriculum vitae, along with a list of issued patents, which is attached as Appendix A to this declaration.

4. I have been a member of the Optical Society of America (OSA), and have contributed to Telcordia, IEC, and TIA/EIA Standards Bodies for Intermatability Standards for Discrete and Multi-Fiber Connectors. My research interests have included F.O. Connectors, Adapters, Field Installation Kits,

Precision Cleaving Tools, and Cable Assembly. I have published papers on various topics related to all of the above.

5. Through many years of working and research, I have gained extensive knowledge, experience and expertise in the field of fiber optic connector design. Having worked on fiber optic connector design for most of my career, I have an extensive background and understanding of the principles and processes involved with the field of technology of U.S. Patent No. 11,733,466 ("the '466 Patent").

6. I have gained general experience with patents as an inventor. I am a lead named inventor on a number of patents in fiber optic interconnects. I assisted in the prosecution of the aforementioned patents including writing the records of invention, assisting counsel in preparing the patent applications, and assisting counsel in responding to communications received from the U.S. Patent and Trademark Office.

7. I am being compensated at $450/hour. My compensation is in no way dependent on the outcome of this proceeding, and my compensation in no way affects the substance of my statements and opinions in this Declaration.

8. In providing the testimony set out in this declaration, I have reviewed the figures, specification, and claims of the '466 Patent and the file history of the '466 Patent. I have also reviewed the following documents:

Exhibit No.	Description
1001	U.S. Patent No. 11,733,466
1003	U.S. Publication No. 2019/0018209 (“Takano’209”)
1004	U.S. Provisional Application No. 62/588,276
1005	U.S. Publication No. 2017/0205588 (“Lee”)
1006	U.S. Publication No. 2016/0161680 (“Nguyen”)
1007	U.S. Patent No. 9,684,130 (“Veatch”)
1008	U.S. Publication No. 2013/0322826 (“Henke”)
1009	U.S. Patent No. 11,307,369 (“Takano’369”)
1010	U.S. Provisional Application No. 62/532,710
1011	English Translation of Chinese Publication No. 201740886 ("Chen")
1012	U.S. Publication No. 2017/0205587 ("Chang")
1013	U.S. Publication No. 2016/0327756 ("Raven")
1014	QSFP-DD Hardware Specification (“QSFP-DD”)
1015	U.S. Publication No. 2008/0037938 (“Kiani”)
1016	English Translation of Japanese Publication No. 2012-053375 ("Toyama")
1017	U.S. Publication No. 2018/0224608
1018	U.S. Publication No. 2005/0136722
1019	U.S. Publication No. 2018/0106972
1020	U.S. Patent No. 10,156,683

Exhibit No.	Description
1021	U.S. Publication No. 2019/0243072
1022	U.S. Patent No. 7,500,790
1023	Prosecution History of U.S. Application No. 17/327,197
1024	Prosecution History of U.S. Patent No. 11,733,466
1025	Claim Listing
1026	U.S. Patent No. 5,181,267
1027	Fiber Optic Connector Intermateability Standard - Type LC

9. In forming my opinions, I have relied upon various legal principles as explained to me by Senko's counsel. My understanding of these principles is summarized below.

10. I understand that in patent law, a patent's claims define the scope of protection for the claimed invention.

11. I understand that the validity of a patent's claims is determined on a claim-by-claim basis.

12. I understand that in this proceeding, Senko has the burden of proving that the challenged claims would have been unpatentable over the prior art by a preponderance of the evidence.

13. Ground 1 asserts that claims 1-17 of the '466 Patent should be invalidated for being indefinite.

14. I understand that a claim is unpatentable for being indefinite if the claim, read in light of the specification and prosecution history of the patent, fails to inform with reasonable certainty, those skilled in the art about the scope of the invention.

15. Ground 2 asserts that claims 1-17 of the '466 Patent should be invalidated for lacking written description support.

16. I understand that a claim is unpatentable for lacking written description support if the specification of the challenged patent does not reasonably convey to a person of ordinary skill in the art ("POSA") that the inventor or inventors had possession of the claimed subject matter as of the filing date of the challenged patent.

17. Grounds 3-22 assert that the claims of the '466 Patent should be invalidated as anticipated by one or more prior art references or obvious over one or more combinations of prior art references.

18. I understand that a claim is unpatentable as anticipated if the prior art reference teaches the claimed subject matter.

19. I understand that a claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to a hypothetical person having

ordinary skill in the art at the time of the invention and who is presumed to have known the relevant prior art.

20. I understand that the question of obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness.

21. I further understand that for each of the obviousness grounds, Senko must demonstrate a person of ordinary skill would have: (1) a motivation to combine the teachings of the relevant references and (2) a reasonable expectation of success of developing the claimed invention.

22. I understand that a motivation to combine the teachings of the relevant references may come from, but is not limited to: teachings, suggestions, or motivations found in the prior art; the nature of the problem; or the knowledge of a person having ordinary skill in the art.

23. I understand that the United States Patent and Trademark Office ("USPTO") will interpret the claims of the '466 Patent as they would have been understood by those of ordinary skill in the art as of the filing date of the '466 Patent in view of the claim language itself, the specification and figures of the '466 Patent, the prosecution history of the '466 Patent, and other relevant evidence showing how one of ordinary skill would have understood the language.

24. In forming my opinions, I have applied the understanding of one of ordinary skill in the art working at the time of the invention claimed in the '466 Patent, i.e., shortly prior to December 19th, 2017.

25. It is my opinion that a person having ordinary skill in the art ("POSA") at that time would have: (1) at least a bachelor's degree in mechanical engineering, electrical engineering, physics, or a related field and three years of experience in fiber optics and fiber optic connectors; (2) a master's degree in mechanical engineering, electrical engineering, physics, or a related field and at least one year of experience in fiber optics and fiber optic connectors; or (3) industry experience (at least three years) designing fiber optic connectors in lieu of a formal degree.

26. In my opinion, the level of ordinary skill is not determinative because those of less or more skill would also find the claims to be unpatentable.

II. BACKGROUND OF THE '466 PATENT

27. The '466 Patent pertains to small footprint fiber optic connectors. EX1001: 1:28-30. The '466 Patent's first embodiment of a fiber optic connector (100) includes a housing (102), two ferrule assemblies (120), a crimp body (106), a latch component (104), and a boot (110). EX1001: 4:55-67.

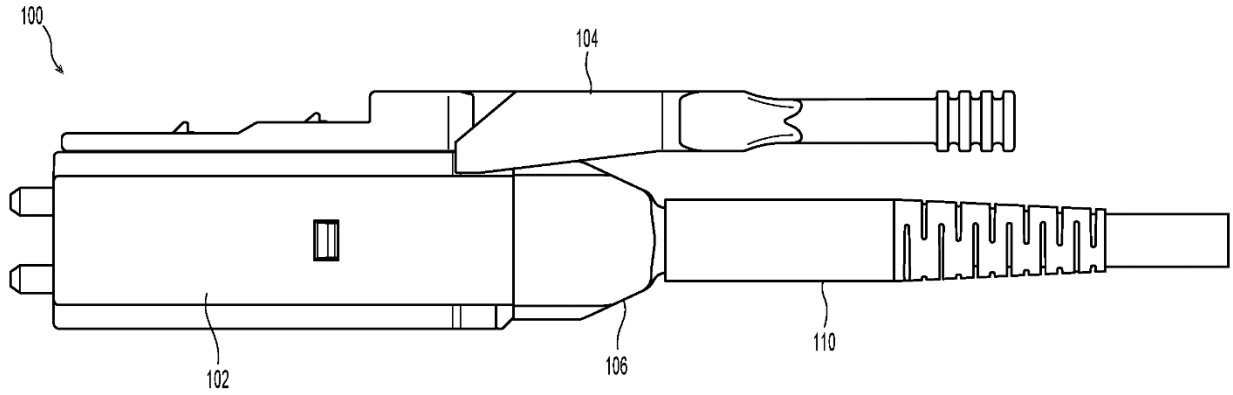


Fig. 1

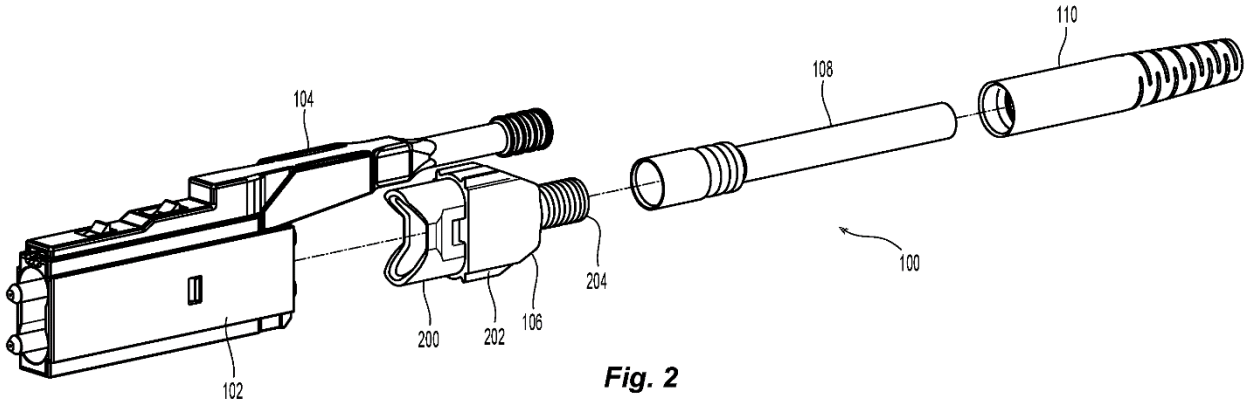


Fig. 2

EX1001: Figs. 1 and 2.

28. The latch component (104) is used to insert and remove the connector (100) from an adapter (400) and is attachable to the top or bottom of the housing (102) to set the polarity of the connector. EX1001: 8:30-50.

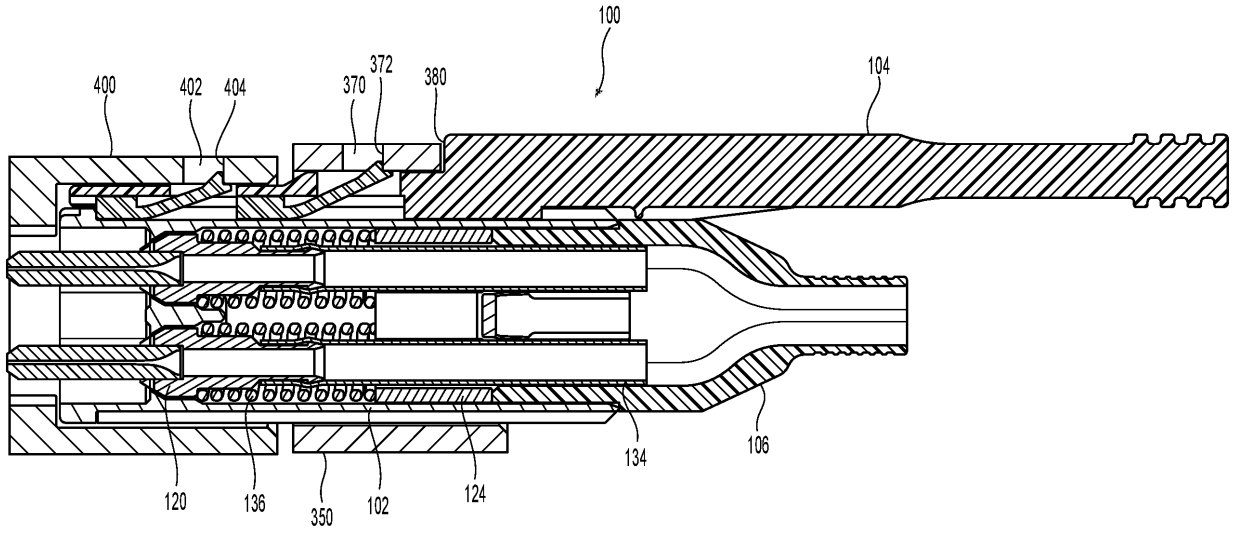


Fig. 21

EX1001: Fig. 21.

29. The other embodiments of the fiber optic connectors (1100, 2100) disclose different variations of the latch component (1104, 2104).

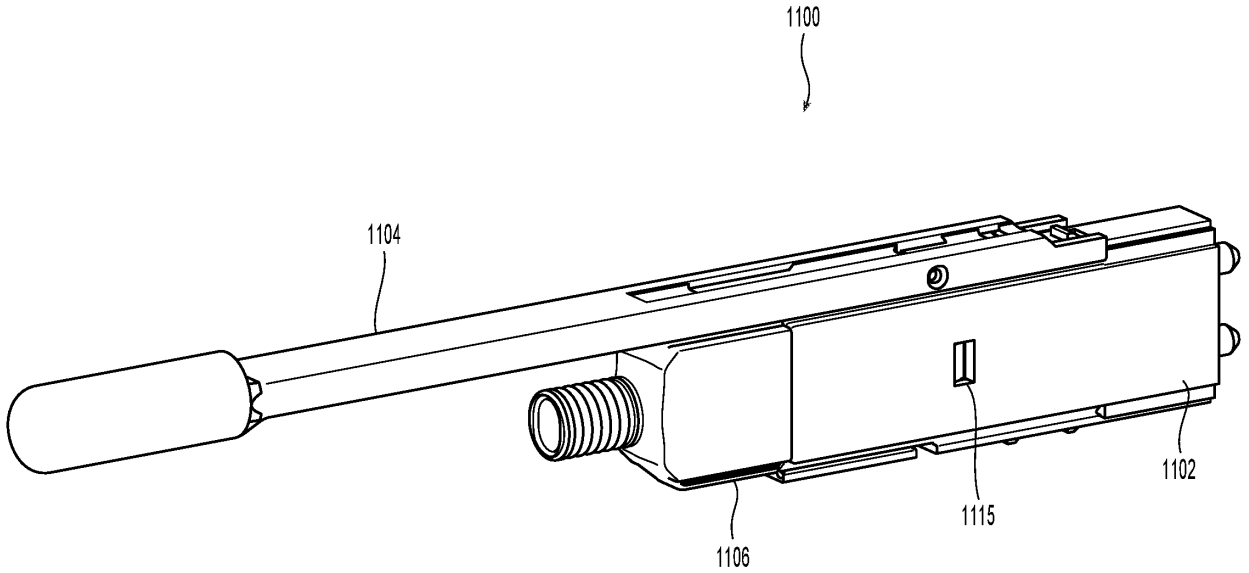


Fig. 23

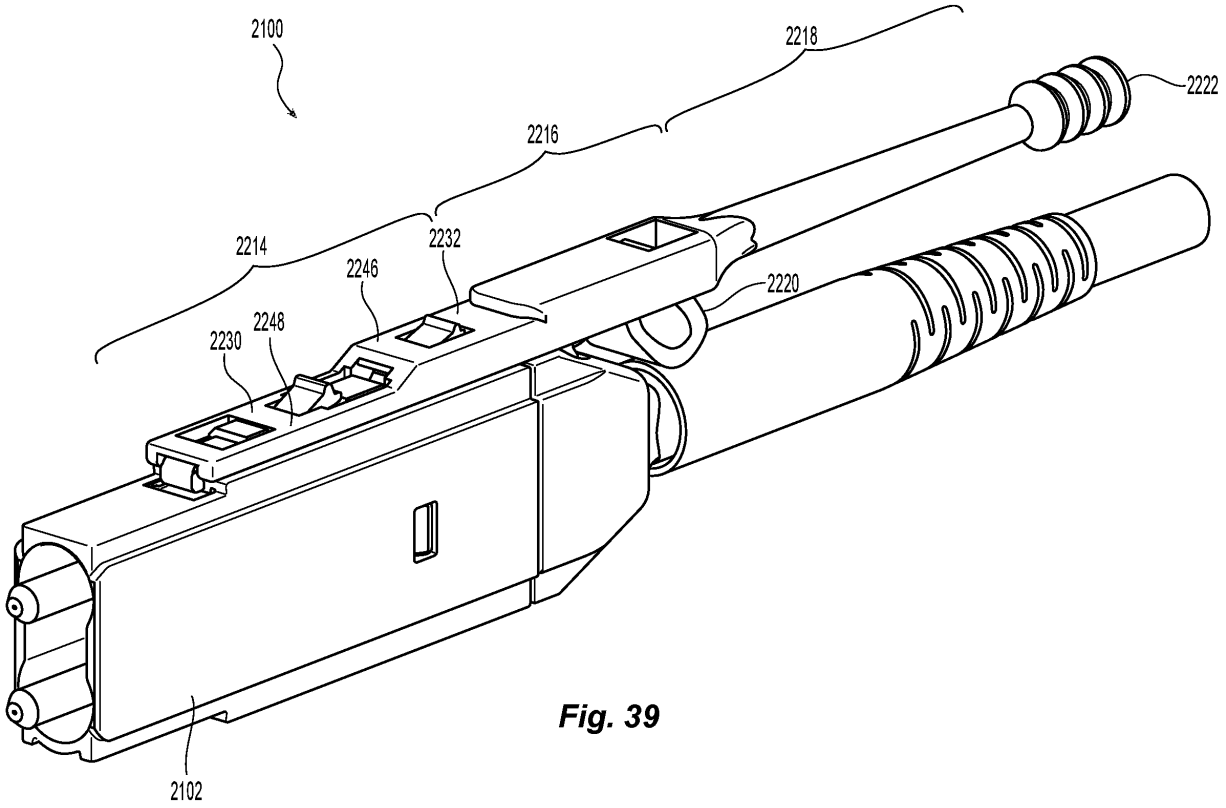


Fig. 39

EX1001: Figs. 23 and 39.

III. BACKGROUND OF THE PRIOR ART

30. While there have been evolving standards for fiber optic connectors and increasing demands for higher pitch densities, fiber optic connection systems have been well known in the art for decades.

31. Fiber optic connectors are commercially available in multiple industry standardized varieties and ferrule types, including FC, SC, ST, LC, MU (primarily in Japan), E-2000 (primarily in parts of Europe), MPO/MTP, and MTRJ:



FC/UPC



ST Multi-mode



SC/APC



LC/UPC



LC/UPC Duplex



LC/APC



MT-RJ



MPO

32. The ceramic ferrule types listed are available in single fiber (simplex) and dual fiber (duplex) configurations. The MT ferrule types have been developed for higher density ribbon fiber (& cable) - from 2-fiber in the case of MT-RJ, to 8-fiber, 12-fiber, 24-fiber, 48-fiber, and up to 72-fiber ribbon in a single, rectangular MT ferrule that was first commercialized in the MPO/MTP connector footprint. The MT ferrules and MPO/MTP connectors are utilized in the highest data/bandwidth applications, such as singlemode telephony, cell towers for mobile communications, and data centers that power the internet and the ever expanding broadband needs for on-demand 'video streaming' and 'big data.' Today's data center customers are pressing for even higher density, more compact connector designs.

33. The claims of the ‘466 Patent are not specific to a singular fiber optic connector or ferrule type, and in theory would be compatible with a number of the common fiber optic connector and ferrule types. However, the specification of the ‘466 Patent shows and describes a Very (or ultra) Small Form Factor (“VSSF”) duplex optical connector that utilizes 1.25mm diameter ceramic ferrules, which are conventionally deployed in LC and MU Connectors. EX1001: Fig. 1.

34. The references outlined below, and other references elsewhere herein, disclose features of fiber optic connection systems, and those of ordinary skill in the art would consider them all to be in the same field of endeavor with each other and with the ‘466 Patent. EX1001: 1:18-39; EX1003: ¶[0002]; EX1005: ¶[0002]; EX1006: ¶[0008]; EX1007: 2:6-13; EX1008: ¶[0002]; EX1009: 1:34-36; EX1011: ¶[0001]; EX1012: ¶[0002]; EX1013: ¶[0002]; EX1014: 1; EX1015: ¶[0002]; EX1016: ¶[0001].

A. U.S. Publication No. 2019/0018209 (“Takano’209”)

35. Takano’209 “relates generally to optical receptacles within adapters and optical transceivers and to ultra-small form factor optical connectors received within the optical receptacles.” EX1003: ¶[0002].

36. Takano’209 discloses an optical connector (2100) having an outer housing (2110), a front body (2115), two ferrule assemblies (2120), two springs

(2125), a back body (2130), a back post (2135), a crimp ring (2140), and a boot (2145). EX1003: ¶[0117].

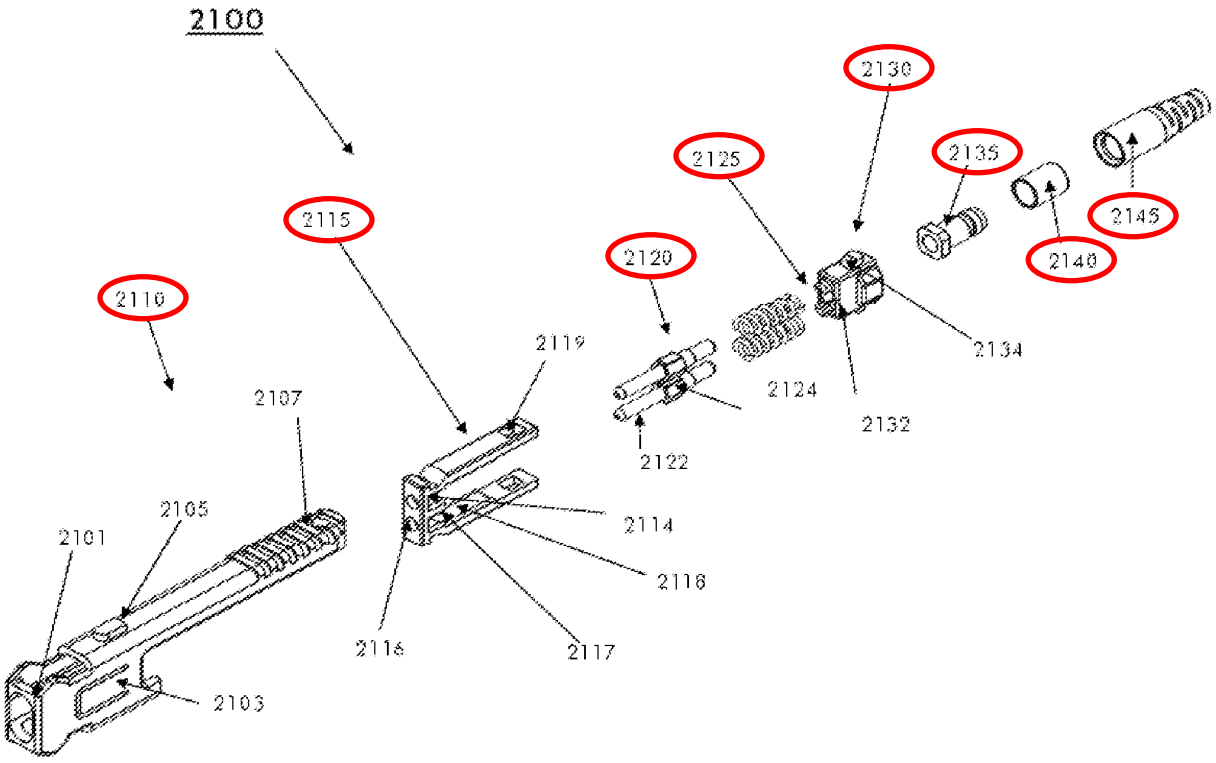


FIG. 21A

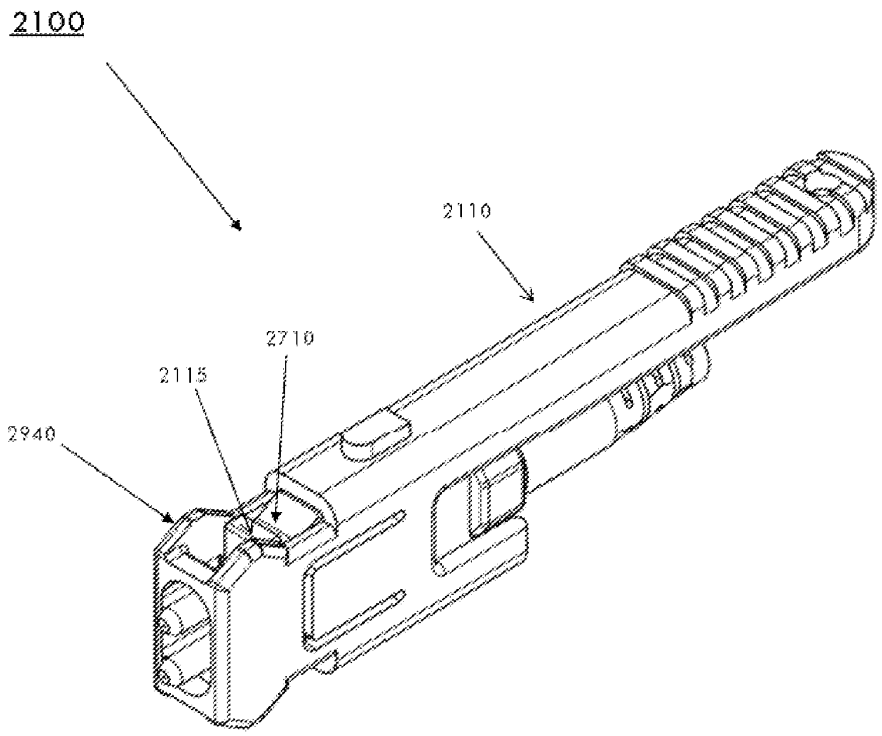


FIG. 21B

EX1003: Figs. 21A-B (annotated).

37. The outer housing (2110) includes a connector alignment key (2105) received in a corresponding connector alignment slot (2403) of the adapter (2400). EX1003: ¶¶[0117], [0127].

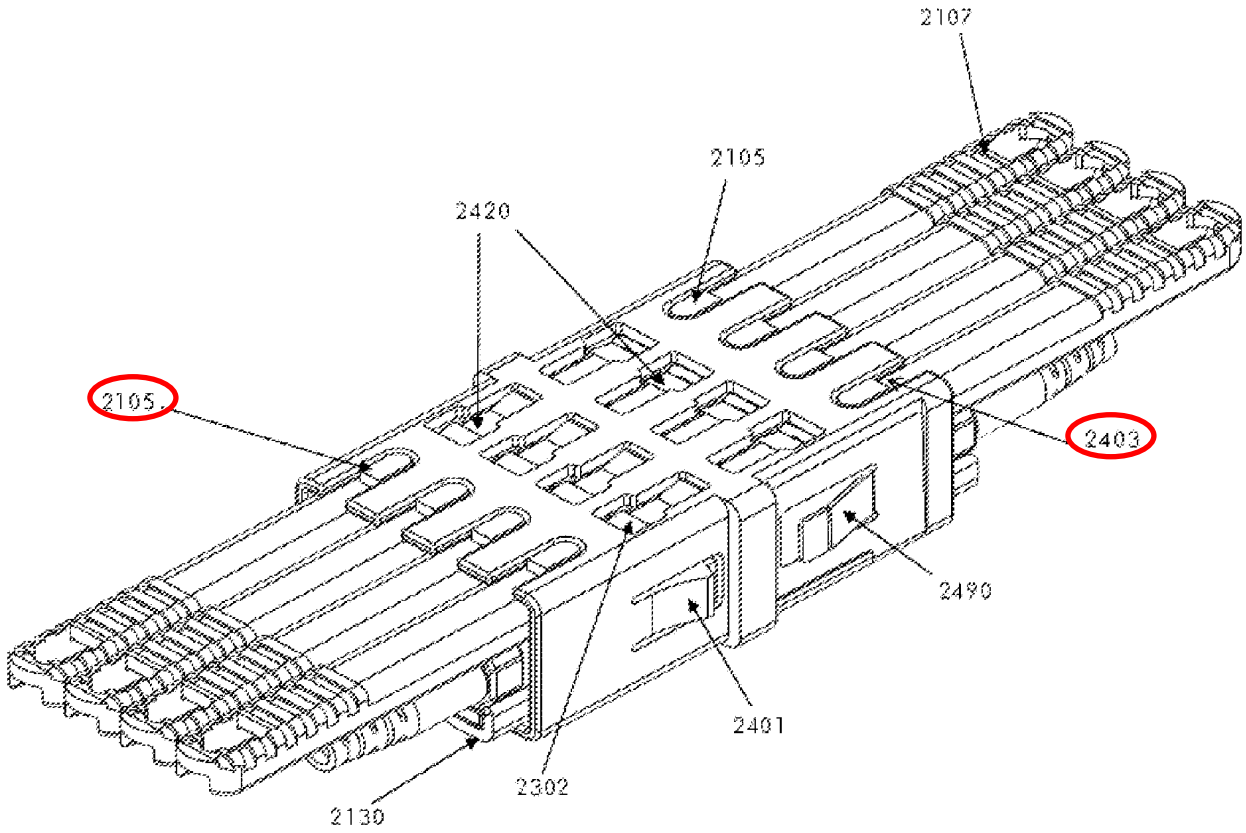


FIG. 31

EX1003: Fig. 31 (annotated).

B. U.S. Publication No. 2017/0205588 ("Lee")

38. Lee—published in July 2017—"relates generally to fiber optic connectors, and more particularly fiber optic connectors suitable for use in data centers or the like." EX1005: ¶[0002].

39. Lee teaches an optical connector (10) that is taller than it is wide and holds two spring-loaded single-fiber ferrules (20, 22) at vertically spaced apart positions. EX1005: Figs. 2 and 3, ¶¶[0029]-[0030]. Fibers (86, 88) enter the optical connector (10) through a single opening in a two-piece crimp body (36,

110) at a rear end and extend forward through ferrule springs (100, 102) to the ferrules (20, 22). EX1005: Figs. 2 and 3, ¶¶[0030], [0037], [0038], [0040]. Between the two-piece crimp body (36, 110) and the ferrule springs (100, 102) is a separate spring push (104). EX1005: Figs. 2 and 3, ¶[0038].

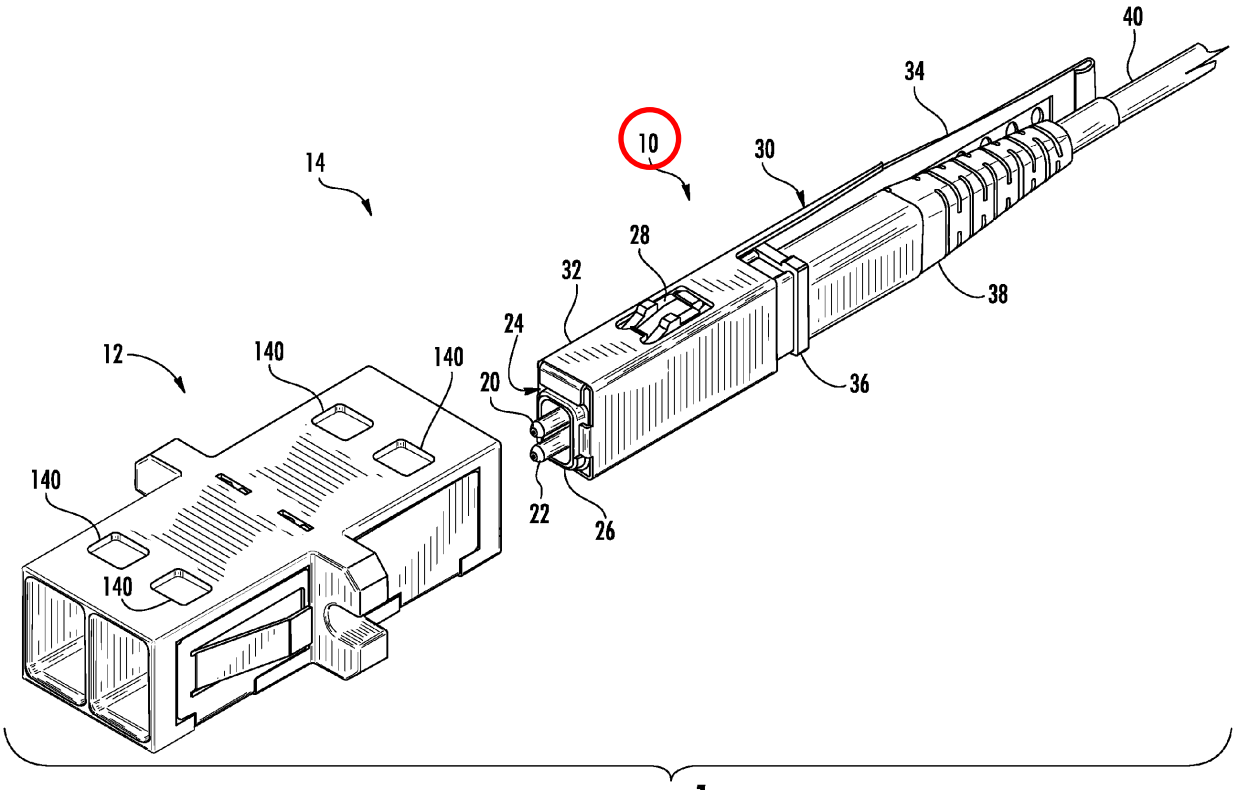


FIG. 1

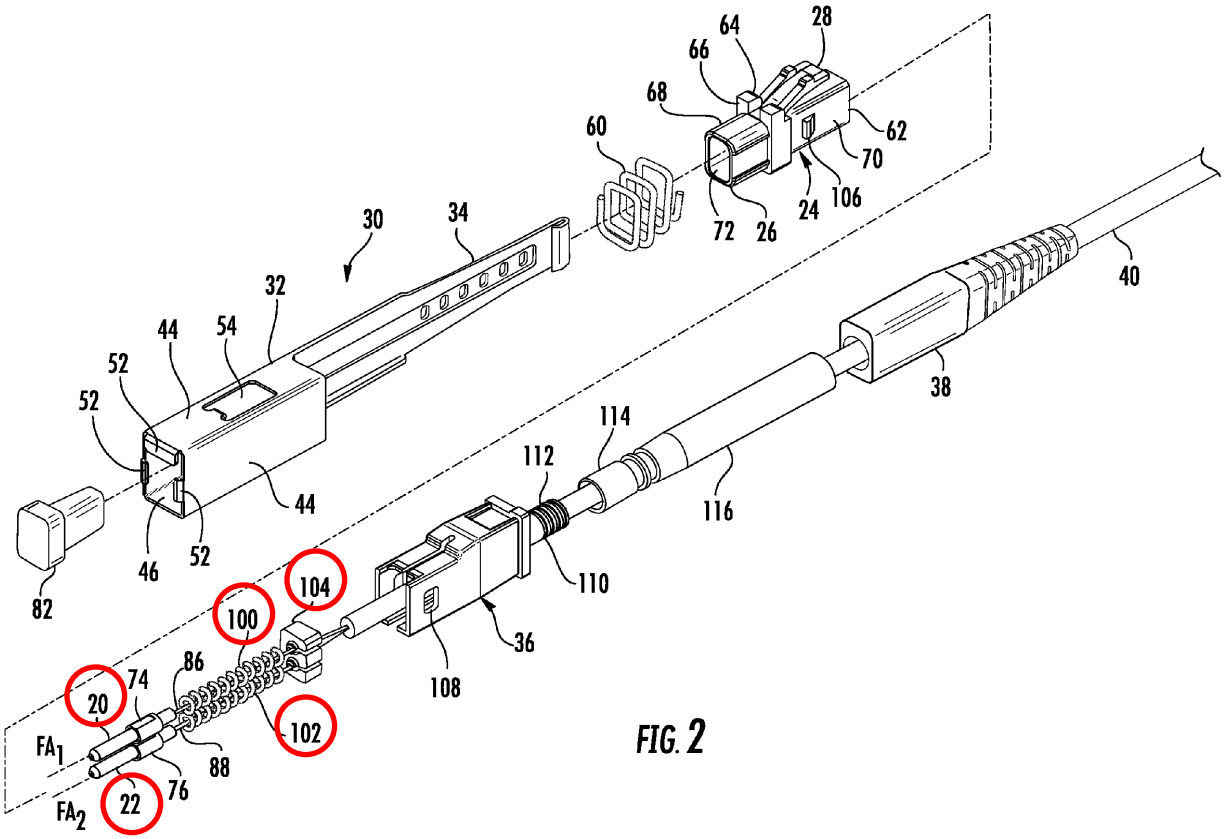


FIG. 2

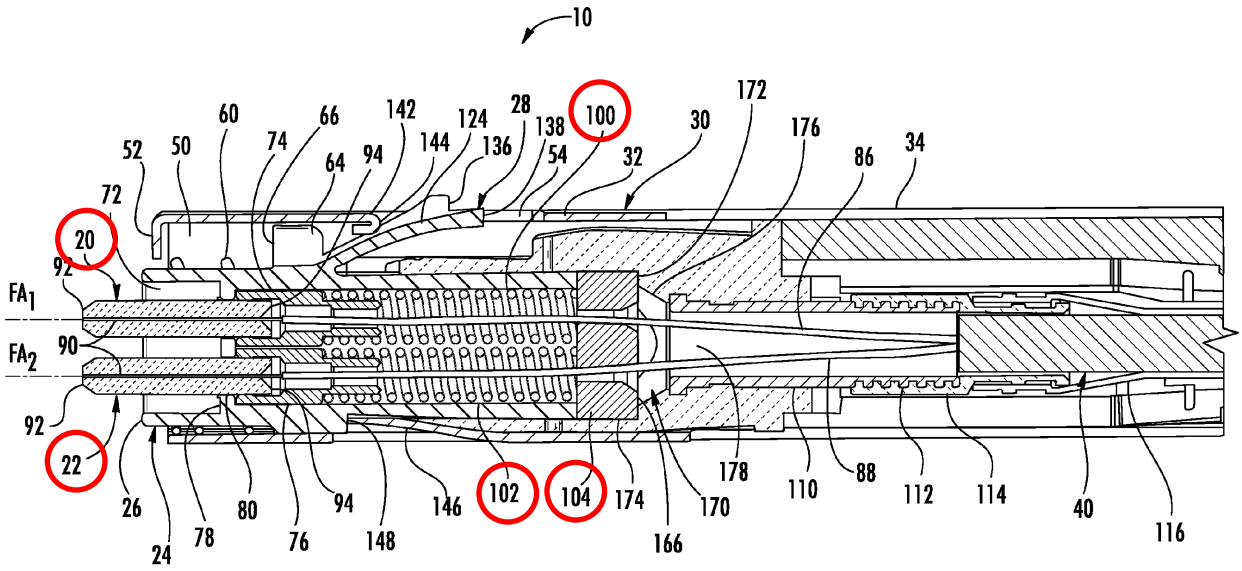


FIG. 3

EX1005: Figs. 1-3 (annotated).

40. Lee teaches that the spring push (104) is an E-shaped body with first and second slots (156, 158) for receiving the fibers (86, 88). EX1005: ¶[0052]. The slots (156, 158) are "kept relatively small to help position the first and second optical fibers 86, 88 on or close to the longitudinal axes FA1, FA2 of the first and second ferrules 20, 22." EX1005: ¶[0052]. Spring seats (162, 164) are positioned around the slots (156, 158) on the front side of the spring push. EX1005: ¶[0056]. The spring seats (162, 164) retain the rear ends of the ferrule springs (100, 102) and help "prevent the first and second inner springs 100, 102 from moving laterally on the spring push 104 and contacting the first and second optical fibers 86, 88." EX1005: ¶[0053]. Lee further teaches that the separate spring push (104) facilitates an improved connectorization assembly of a fiber optic cable by allowing for placement of the spring push onto the cable after the fibers (80, 86) have been installed in the ferrules (20, 22). EX1005: ¶¶[0055]-[0058].

C. U.S. Patent No. 9,684,130 ("Veatch")

41. Veatch—issued in June 2017—relates to "a push-pull LC duplex fiber connector that allows the connector to be more easily unlatched from its mating adapter when compared with a traditional LC connector." EX1007: 2:6-13.

42. Veatch discloses a polarity change fiber optic connector (100) that includes a boot (102), a cover (104), a latch (106), a fiber holder (108), and connector bodies (110). The connector (100) includes polarity indicia (130, 132)

on the boot (102) and the fiber holder (108) in the form of letters “A” and “B” to “indicate the polarity of the connector.” EX1007: Fig. 1, 2:26-39.

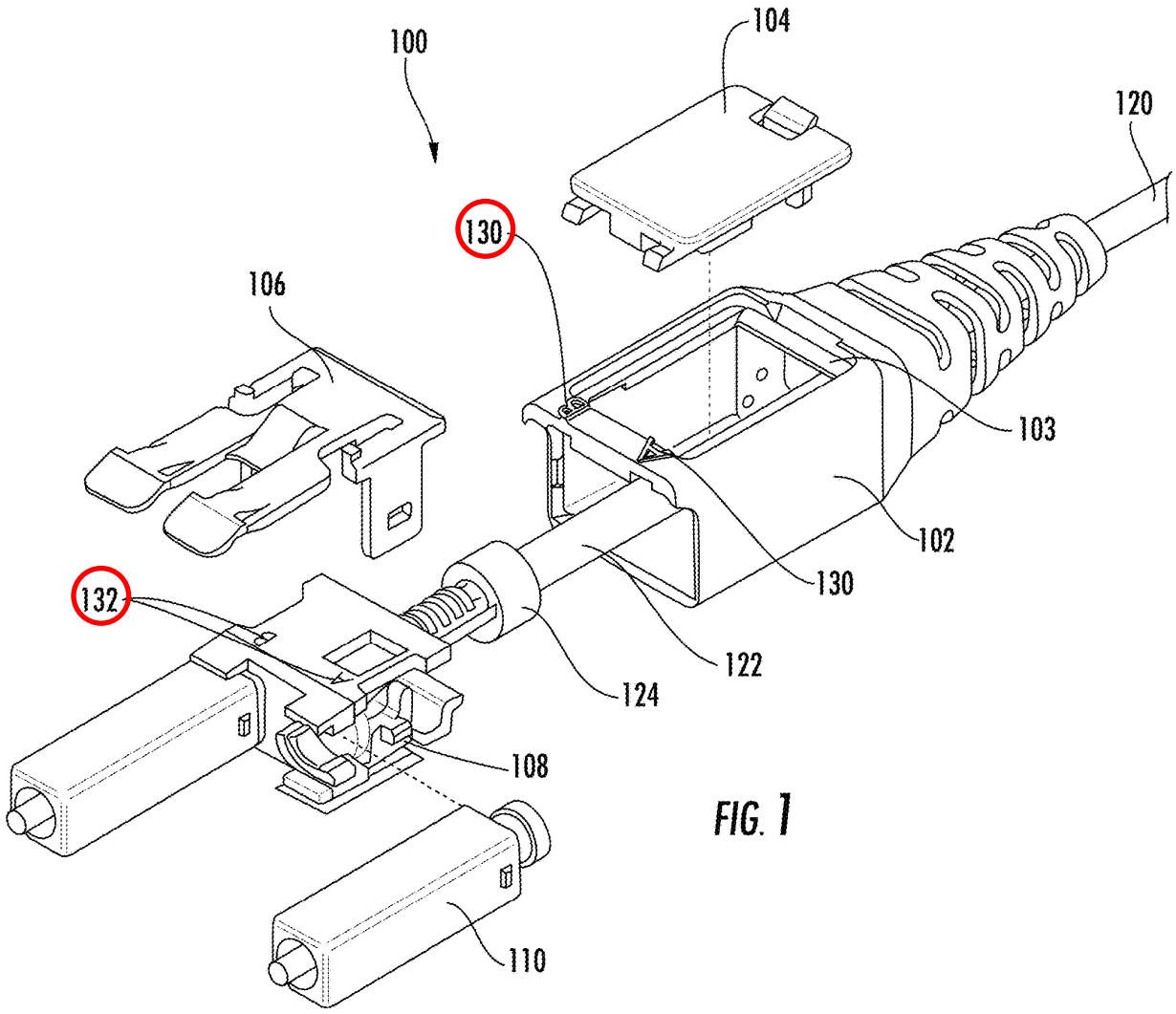


FIG. 1

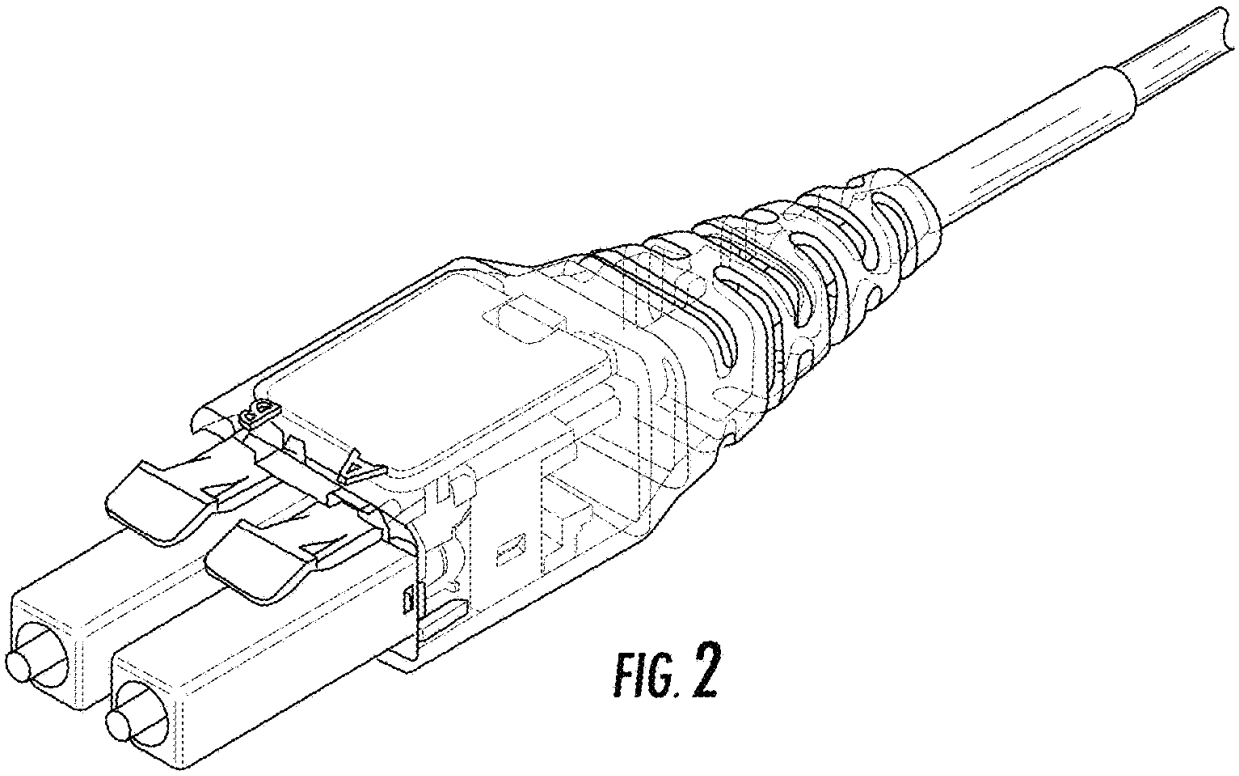


FIG. 2

EX1007: Figs. 1 and 2 (annotated).

D. U.S. Publication No. 2013/0322826 ("Henke")

43. Henke—published in 2013—"relates to ferrule holders supporting ferrules in fiber optic connector assemblies for providing optic connectors for establishing fiber optic connections." EX1008: ¶[0002].

44. Henke discloses a fiber optic connector subassembly (40(1)) having an inner housing (80) and a crimp body (88) secured to the inner housing. EX1008: ¶[0054]. A ferrule assembly comprising a ferrule (42), a ferrule holder (32(1)) and a lead-in tube (28(1)) is positioned in the fiber optic connector subassembly (40(2)). EX1008: ¶[0041]. A ferrule spring (86) is loaded between

the crimp body (88) and the ferrule holder (32(1)) to urge the ferrule assembly forward so the front end of the ferrule holder (32(1)) abuts an abutment surface (82) in inner housing (80). EX1008: ¶¶[0054-0055]. The lead-in tube (28(1), 28(2)) is "made of a relatively inexpensive, very flexible and resilient material with high surface lubricity." EX1008: ¶[0063]. The lead-in tube (28(1), 28(2)) has a front end (114) integrated with the rear end (30) of the ferrule holder body (32(1)) and extends rearward through the interior of the ferrule spring (86) and crimp body to a rear end immediately adjacent the rear tip of the crimp body's back post. EX1008: ¶¶[0041], [0059].

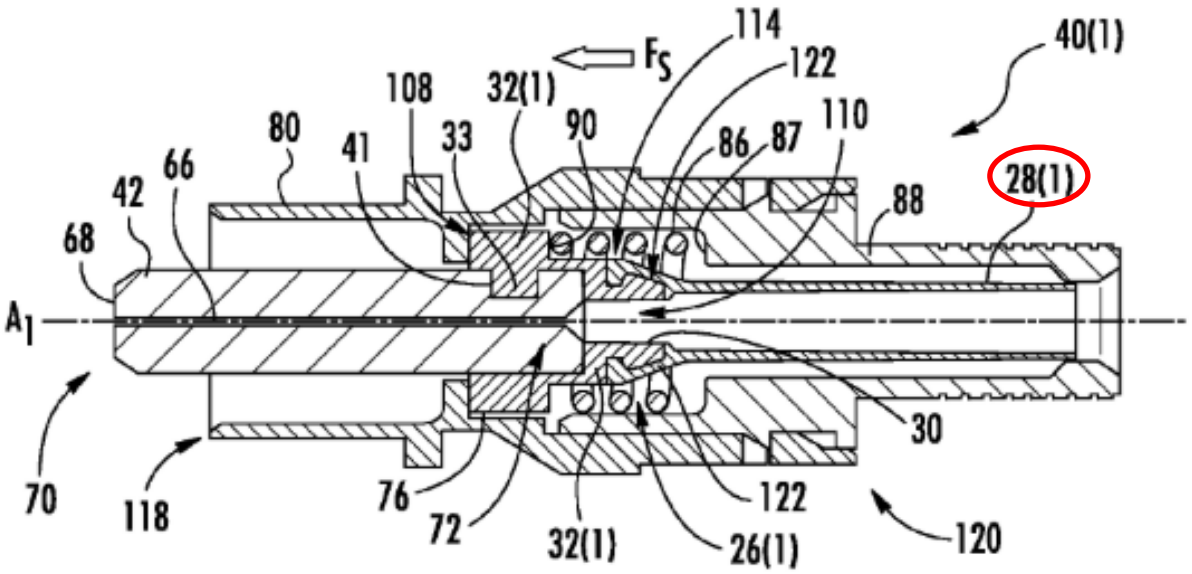


FIG. 1C

EX1008: Fig. 1C (annotated).

45. Henke teaches that the integrated lead-in tube (28(1)) "generally restricts a location of a bonding agent used during installation of the optical fiber 34 and prevents the bonding agent from escaping. Otherwise, the bonding agent may come into contact with other areas of the fiber optic connector 12(1), such as a spring (discussed later) which must be free to move unfettered by the bonding agent. The integral lead-in tube 28(1) also facilitates guiding an end portion 44 of the optical fiber into the ferrule holder body 32(1), where the optical fiber 34 can then be guided to a ferrule (42). The integral lead-in tube 28(1) may also prevent sharp bends from occurring in the optical fiber 34 during insertion that could damage the optical fiber 34 as the optical fiber 34 is disposed in the ferrule body and into the ferrule 42." EX1008: ¶¶[0041]; [0006] (describing how these benefits were well known prior to Henke).

46. In an alternative embodiment shown in Fig. 7A, the connector sub-assembly is modified in that lead-in tube (28(2)) extends further rearward so the rear end (146) of the lead-in tube protrudes slightly beyond the rear tip of the back post. EX1008: ¶[0079]. Henke teaches that the protruding rear "portion 146 may enable the optical fiber 34 to be more easily inserted into the lead-in bore 112." EX1008: ¶[0079].

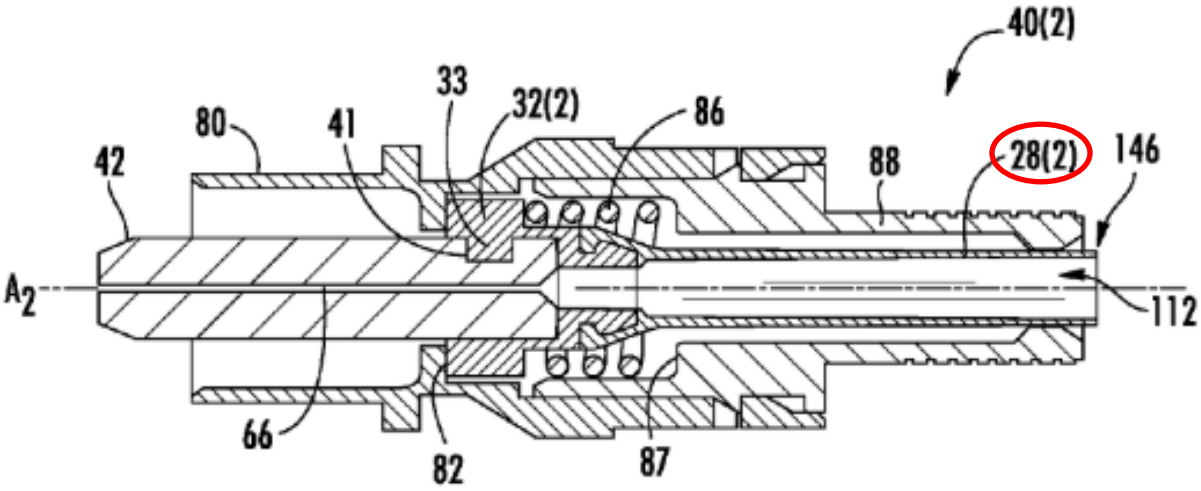


FIG. 7A

EX1008: Fig. 7A (annotated).

47. Although the drawings depict an SC-type connector, Henke teaches that its ferrule holders with integrated lead-in tubes may be used with other types of connectors, including, specifically, LC-type connectors. EX1008: ¶[0107].

E. U.S. Publication No. 2016/0161680 ("Nguyen")

48. Nguyen—published in 2016—relates to "a fiber optic connector that includes a plurality of ferrule holders, each of the plurality of ferrule holders having a central opening extending from a first end to a second end to resiliently retain a fiber optic ferrule therein, …, each of the plurality of ferrule holders having a projection on opposite outside surfaces to engage a corresponding groove in the adapter." EX1006: ¶[0008].

49. Nguyen teaches a ferrule holder (300) having a main body (302) that is taller than it is wide that includes a first projection (320) on its (narrow) top side and different size projection (322) on its narrow bottom side "used to position the ferrules 12 in the adapter in the x [horizontal] and y [vertical] directions, eliminating the need for side walls to position the ferrule holders and the ferrules 12." EX1006: ¶[0027]. The mating adapter (100) comprises three-sided grooves (140, 142) for engaging the projections (320, 322) of the ferrule holder (300). EX1006: Fig. 7B, ¶[0034]. "The positioning of the projections 320,322 on the ferrule holders 300 relative to the plurality of grooves 140, 142 is important. With reference to FIGS. 7A and 7B, the projections 320,322 are used to control the x and y locations of the ferrule holders 300. The surfaces 350 of the projections 320,322 (FIG. 7A) align with the surfaces 150 in the adapter (FIG. 7B) to control the x direction of the ferrule holder 300 relative to the adapter 100. The surfaces 352 of the ferrule holder 300 align with the surfaces 352 of the raised bottom portion 132 and the dropped top portion 134 of the center portion 110 to control the y direction of the ferrule holder 300 relative to the adapter 100. The surfaces of the projections 320,322 could also align in the y direction, given that they are parallel to the surfaces 352." EX1006: ¶[0036].

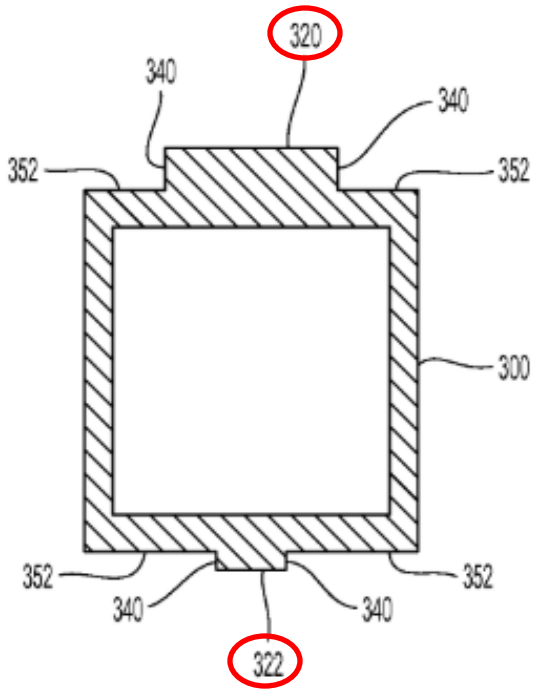


Fig. 7A

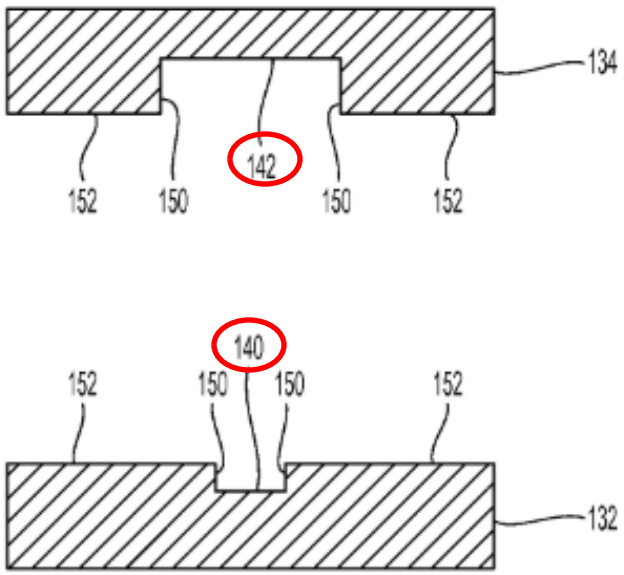


Fig. 7B

EX1006: Figs. 7A-B (annotated).

F. U.S. Patent No. 11,307,369 ("Takano'369")

50. Takano'369 "relates generally to ultra-small form factor optical connectors and related connections within adapters and optical transceivers." EX1009: 1:34-36.

51. Takano'369 discloses a fiber optic connector (10300, 10400, 10500) having outer housing (10301, 10401, 10501), ferrules (10303, 10403), ferrule holders (10304), ferrule springs (10305), a back body (10306, 10406), a back post (10307), a boot (10309, 10409, 10509), a locking tab (10411), and a push-pull tab (10310, 10410, 10510). EX1009: 18:67-19:50.

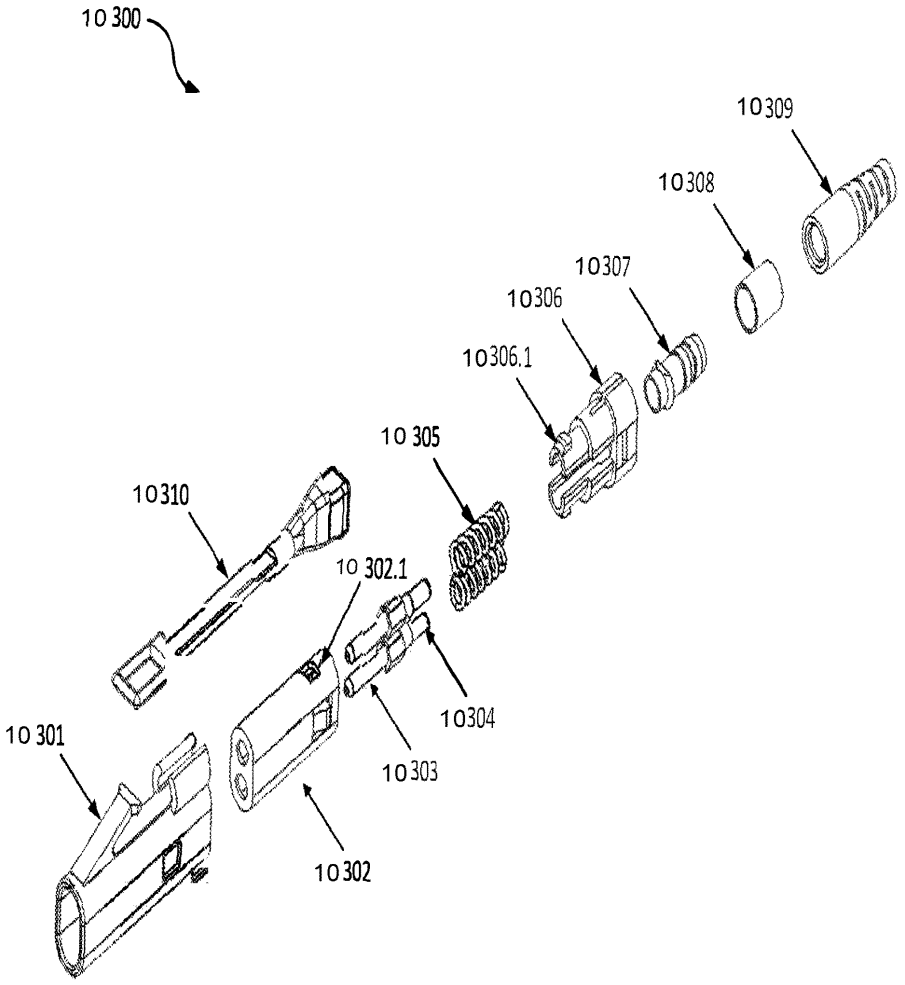

10 300
10309
10308
10307
10306
10306.1
10 305
10310
10 302.1
10304
10 301
10303
10302

FIG. 53

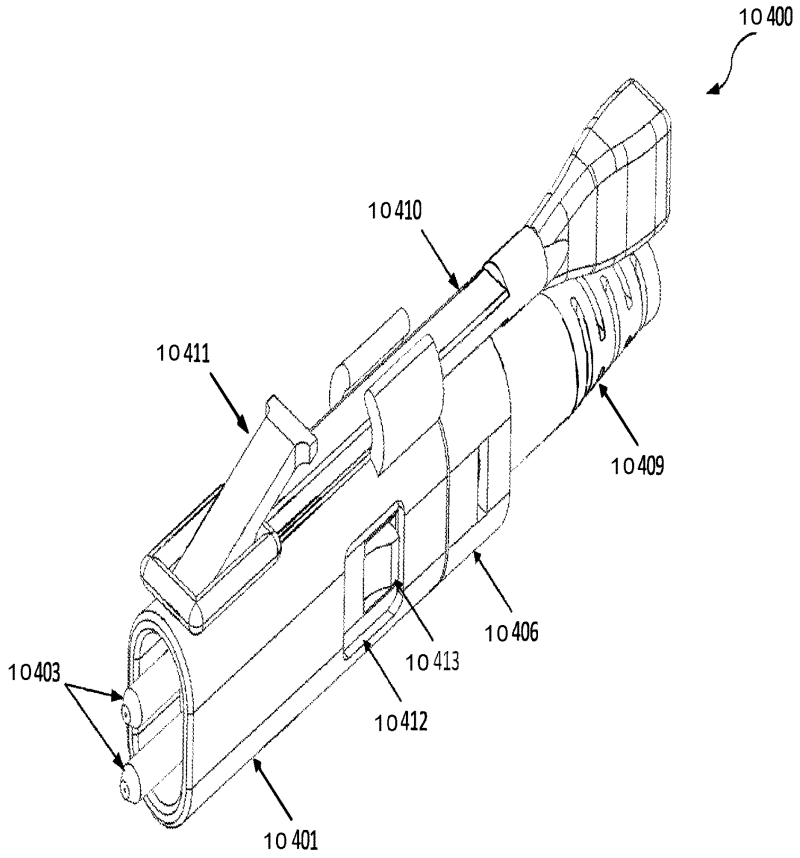


FIG. 54

EX1009: Figs. 53 and 54.

G. Chinese Publication No. 201740886 ("Chen")

52. Chen—published in 2011—"relates to the field of communication technology, and in particular relates to a dual-core optical fiber connector." EX1011: ¶[0001].

53. Chen discloses an optical fiber connector including two ceramic ferrules (1), each supported by a block piece (3), elastic elements (2), a casing (4),

a sleeve body (5) with a dual-barrel back post (6), and a strain relief boot.

EX1011: ¶¶[0026]-[0027].

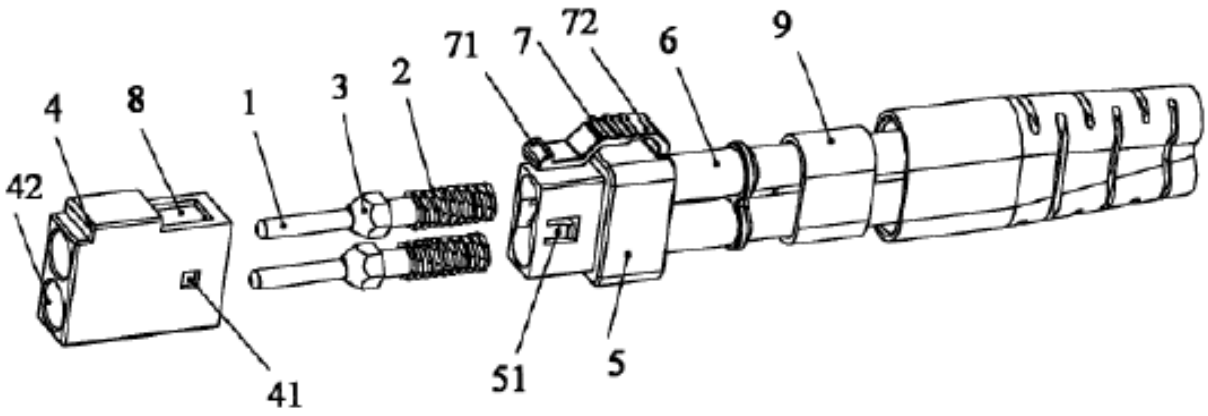


FIG. 3A

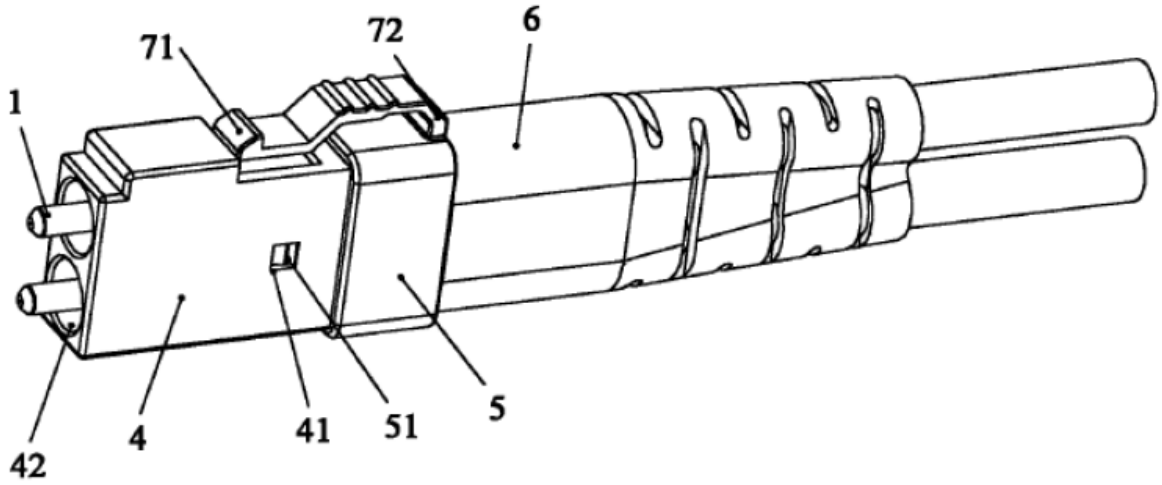


FIG. 3B

EX1011: Figs. 3A-B.

H. U.S. Publication No. 2017/0205587 ("Chang")

54. Chang—published in July 2017—"relates to components for connecting data transmission elements and, more specifically, to connector

assemblies configured to facilitate the efficient changing of a polarity of the connector assembly without disassembling or substantially disassembling the connector assembly." EX1012: ¶[0002].

55. Chang discloses a fiber optic connector assembly (400) that holds two spring-loaded single-fiber ferrules (155a, 155b) in one integrated plug frame made up of a front body (405) and a locking component (430) (e.g., a crimp body). EX1012: ¶¶[0029]-[0030]. The locking component (430) has a single cylindrical back post for the crimp ring (125). EX1012: ¶[0030], Fig. 4B.

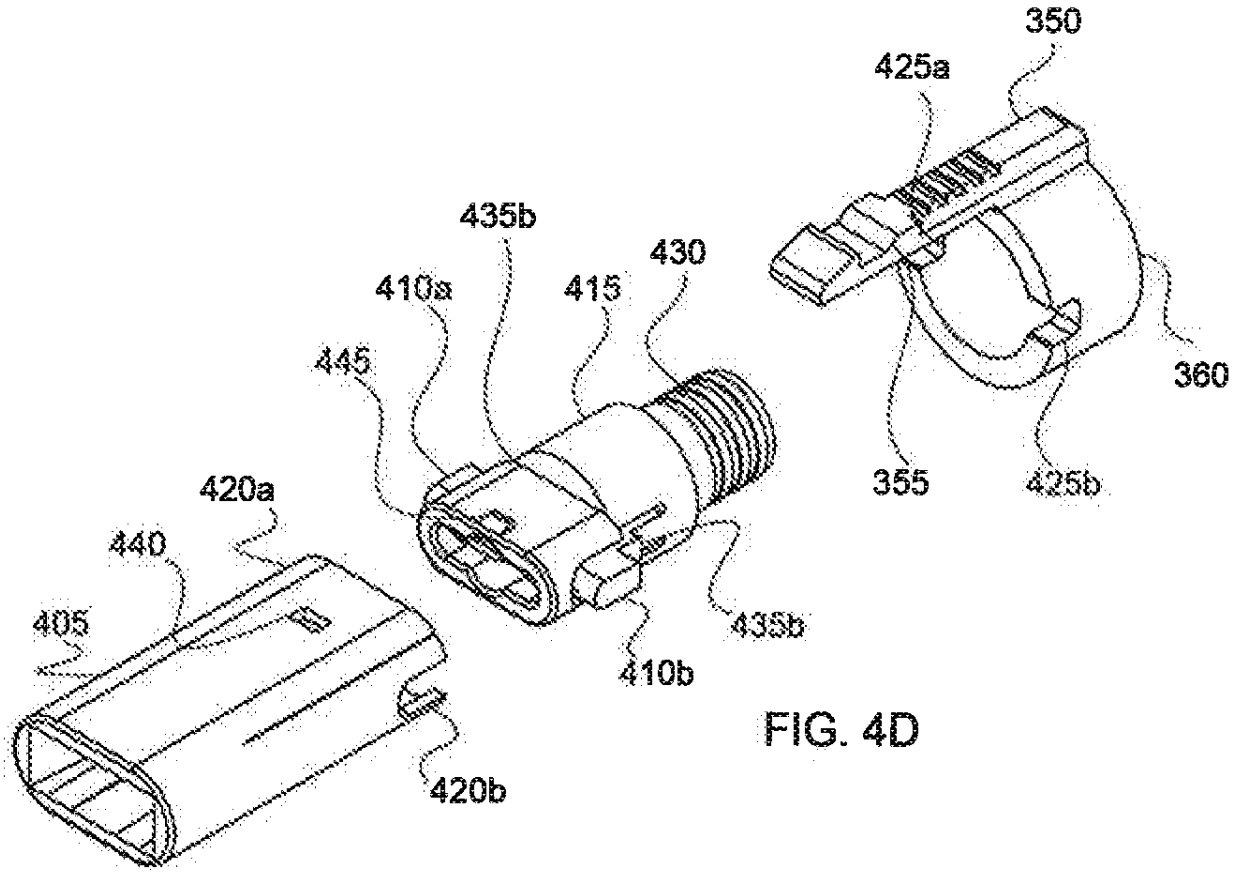


FIG. 4D

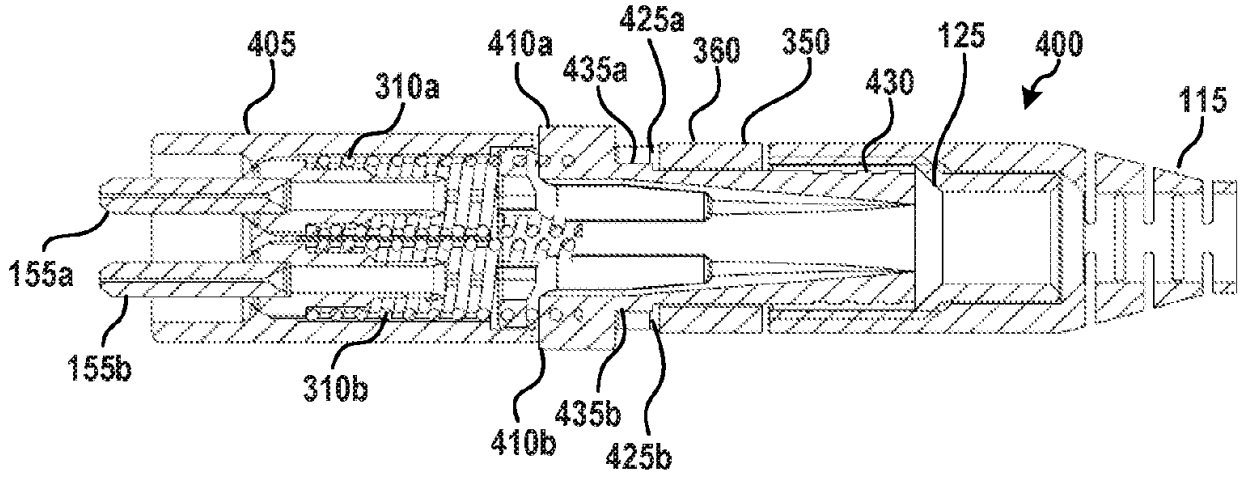


FIG. 4B

EX1012: Figs. 4B&D.

I. U.S. Publication No. 2016/0327756 ("Raven")

56. Raven—published in 2016—"relates to a fibre optic cable assembly." EX1013: ¶[0002].

57. Raven discloses fiber optic connectors (45a, 45b) having latch levers (55a, 55b) cantilevered at the rear and a guide element (51a, 51b) formed on the upper surface (53a, 53b) of the connector body (47a, 47b) in front of the unrestrained front end of the respective latch lever. EX1013: ¶¶[0095], [0098], [0101], [0102]. Each cuboidal "guide element 51a, 51b is arranged to engage with a guide formation, such as a recess or slot, in a socket, for example in a patch panel or adapter," and further, that each "guide element ... guides onward insertion of the fibre optic connector, including the latch ensuring the correct location and/or

orientation of the connector with respect to the socket." EX1013: ¶¶[0098], [0039].

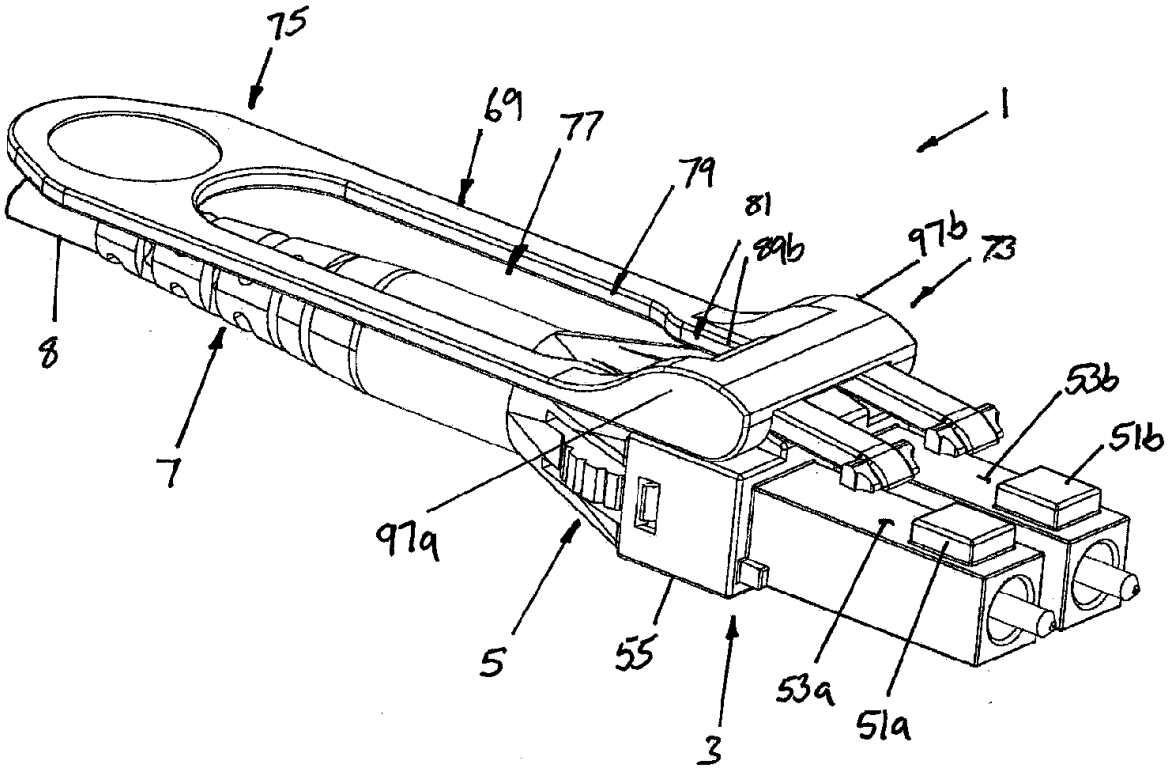


Fig. 1

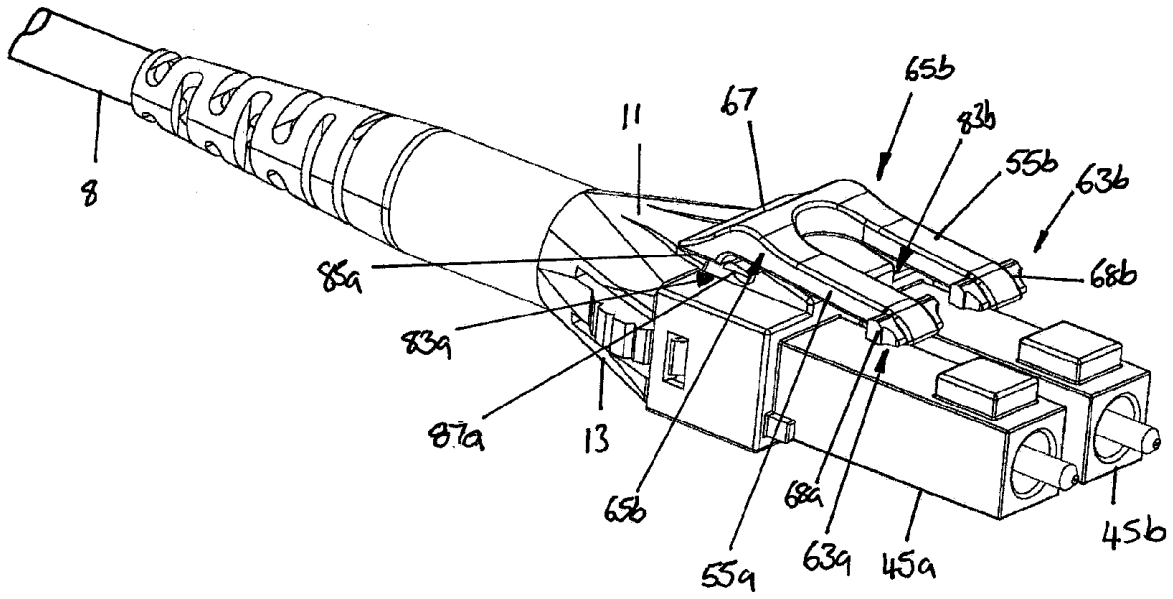


Fig. 2

EX1013: Figs. 1 and 2.

J. QSFP-DD Hardware Specification("QSFP-DD")

58. QSFP-DD—published in September 2017—is a technical specification delineating the "requirements of the pluggable QSFP Double Density (QSFP-DD) module, connector and cage system." EX1014: 1. In particular, QSFP-DD sets forth the requirements for a QSFP-DD high density, 8 Channel optical module, cage and connector system, supporting up to 400 Gb/s transmission in aggregate, over an 8 x 50Gb/s electrical interface. It also provides backwards compatibility for (pre-existing) QSFP28 modules, which can be inserted into a QSFP-DD port, and connected to 4 of the 8 electrical channels. EX1014: 59.

59. QSFP-DD Section 5.10 defines the optical interface port for QSFP-DD applications for three receptacle options: either a male MPO Receptacle (to accept a female MPO Connector), a dual LC Receptacle (to accept a dual LC Connector), or two CS Receptacles (to accept two CS Connectors). Transmit (TX) and receive (RX) channel locations are defined for each connector/module footprint in Fig. 33 below. For the dual LC Receptacle and the CS Receptacle, the transmit (TX) and receive (RX) channel locations are where the corresponding 1.25mm diameter ceramic ferrules from the dual LC Connector and CS Connector, respectively, are generally positioned when the dual LC Connector is inserted into the dual LC Receptacle and the CS Connector is inserted into the CS Receptacle.

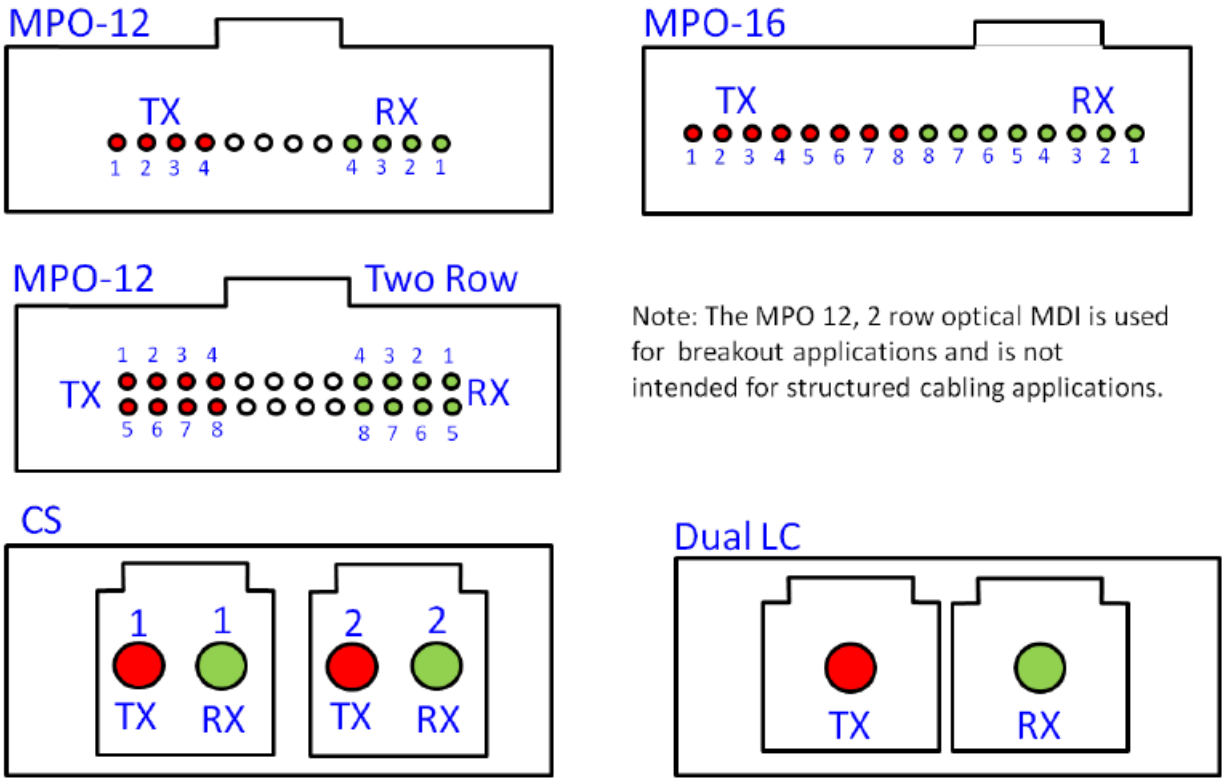


Figure 33: Optical Media Dependent Interface port assignments

EX1014: Fig. 33.

K. U.S. Publication No. 2008/0037938 ("Kiani")

60. Kiani—published in 2008—"relates generally to electronic systems and more specifically to electronic systems using optical fibers to carry data between components of the system." EX1015: ¶[0002].

61. Kiani teaches ferrule carrier (810) with a rib (924) separating two springs (954) to prevent entanglement of the springs. EX1015: ¶¶[0059], [0074].

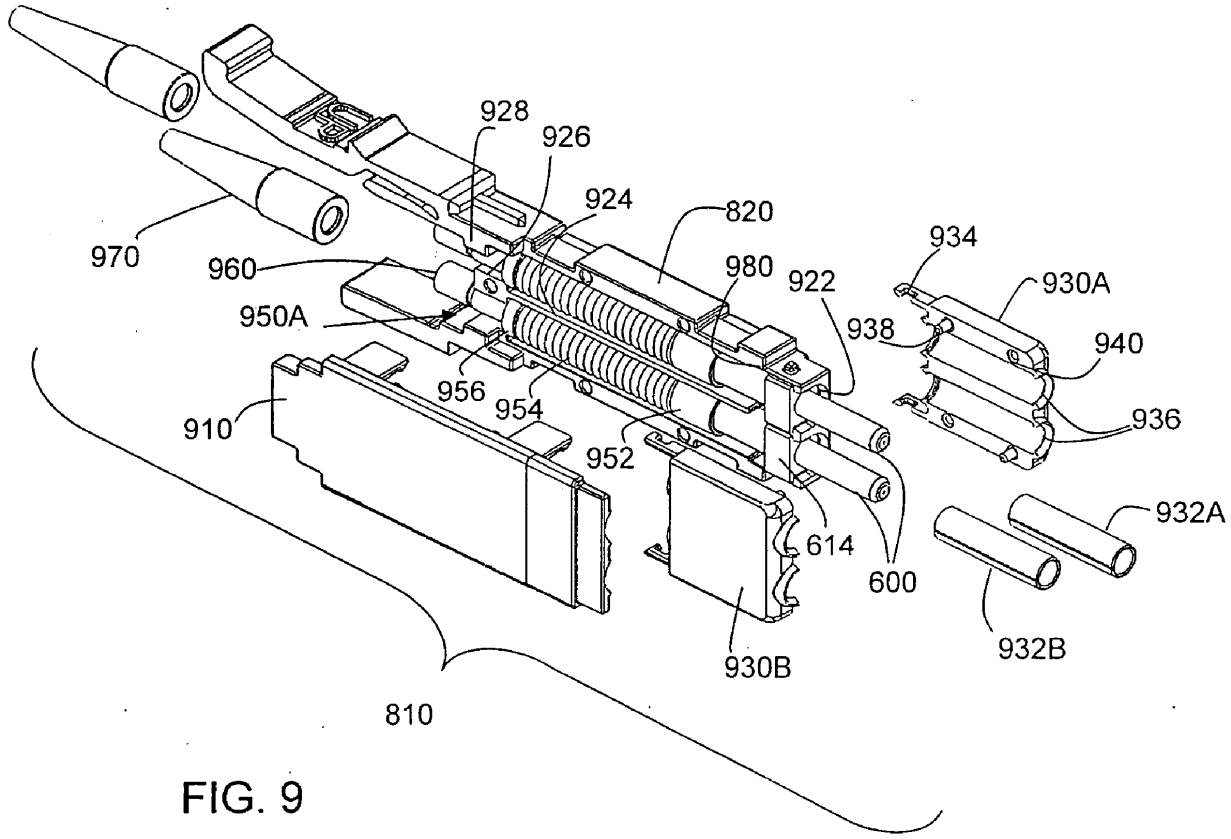


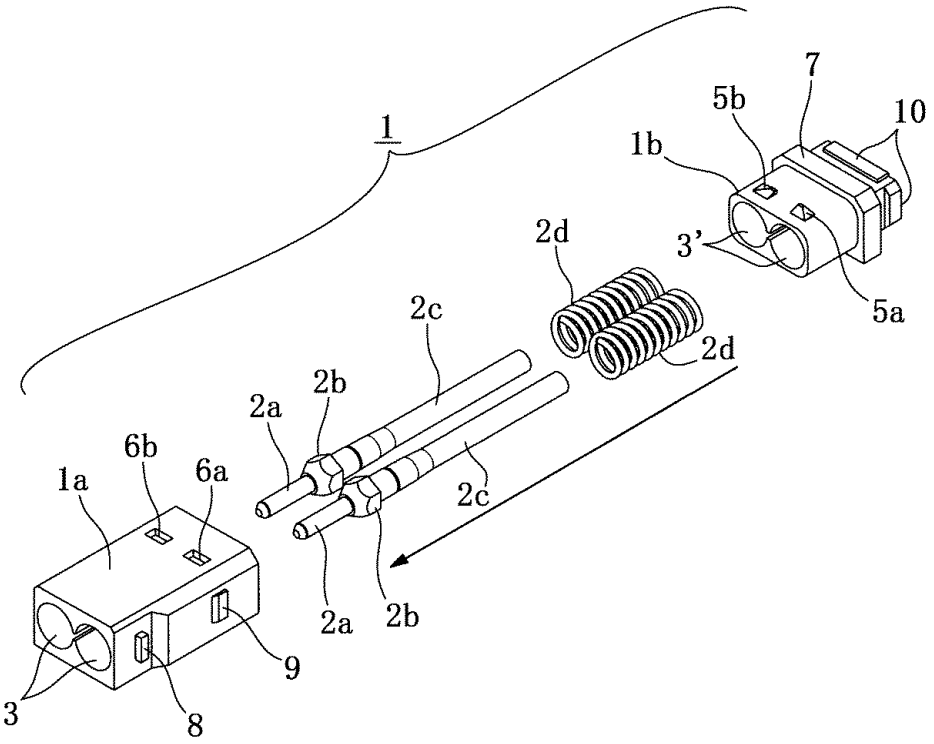
FIG. 9

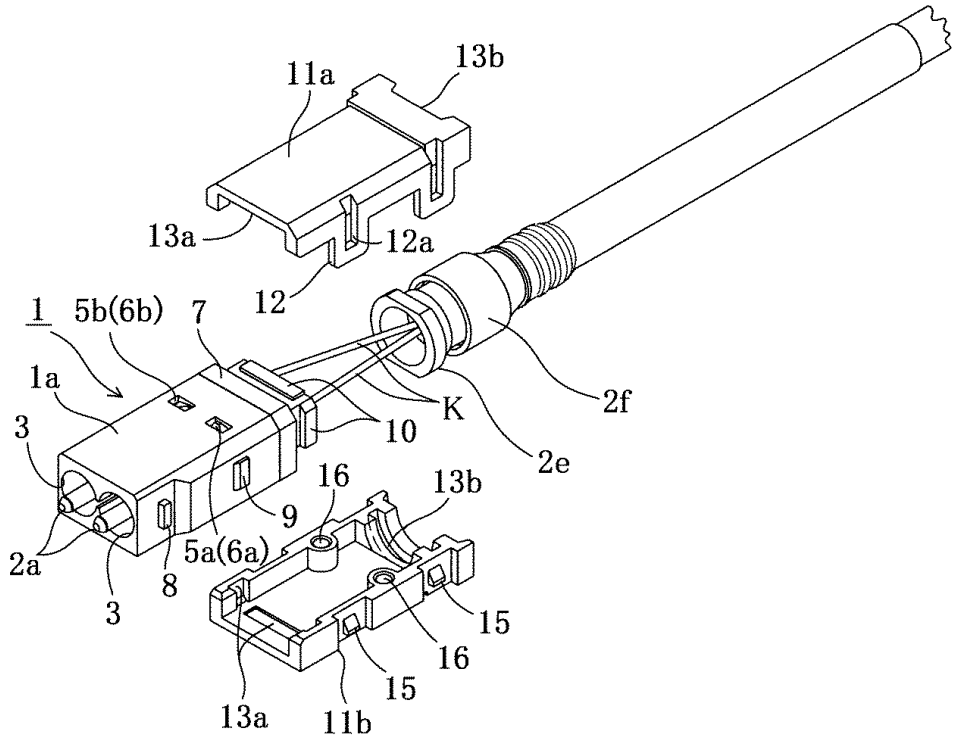
EX1015: Fig. 9.

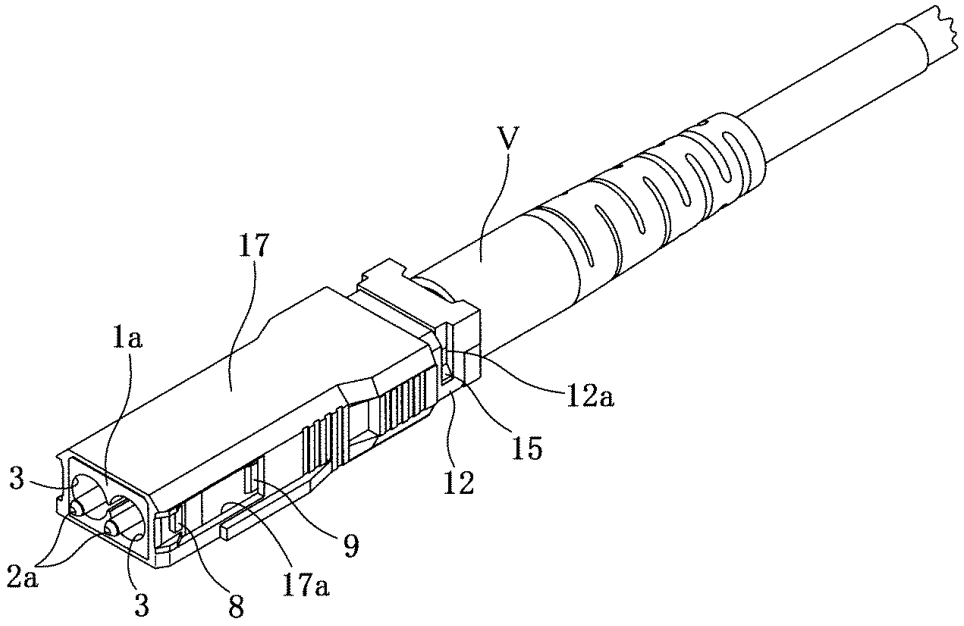
L. Japanese Publication No. 2012-53375 ("Toyama")

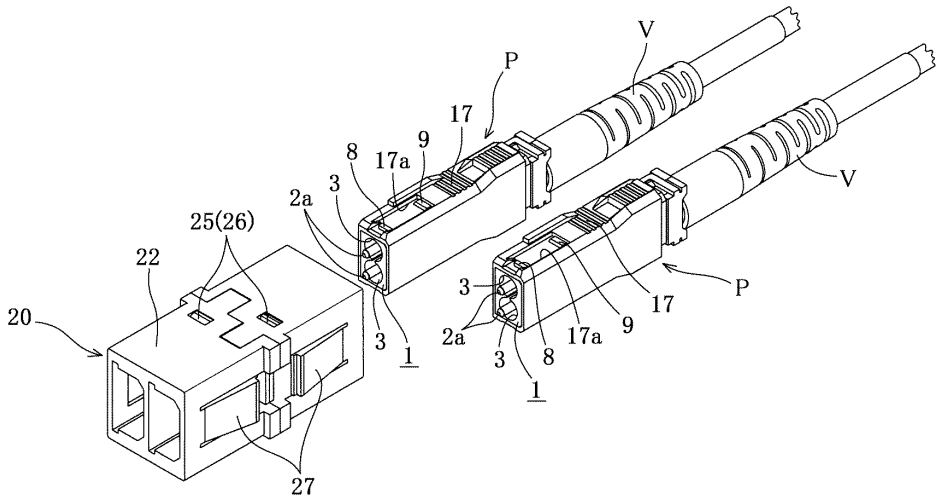
62. Toyama—published in 2012—"relates to a multi-connection type optical connector in which a plurality of optical connector plugs are connected in parallel to enable use as a multi-core connector plug." EX1016: ¶[0001].

63. Toyama discloses an optical fiber connector (e.g., a plug body (P)) including two ferrules (2a), each supported by a ferrule holder (2b), two springs (2d), a knob (17), holder portions (11a, 11b), a stop ring (2e), and a strain relief boot (V). EX1016: ¶[0022].




11a
13b
13a
12a
12
1
5b(6b)
7
1a
K
2f
10
2e
3
16
13b
9
2a
5a(6a)
8
3
15
16
15
13a
11b


V
17
1a
12a
15
12
3
9
2a
17a
3
8



EX1016: Figs. 1, 3, 6, and 11.

IV. CLAIM CONSTRUCTION

64. As I stated in Paragraph 23 above, it has been explained to me that the Board will interpret the claims of the '466 Patent as they would have been understood by those of ordinary skill in the art as of the filing date of the '466 Patent in view of the claim language itself, the specification and figures of the '466 Patent, the prosecution history of the '466 Patent, and other relevant evidence showing how one of ordinary skill would have understood the language.

65. In my opinions discussed below, I have applied the plain and ordinary meaning of the claim terms within the grounds below.

V. INDEFINITENESS (GROUND 1)

66. As I stated in Paragraph 14 above, it has been explained to me that a claim is invalid for being indefinite if the claim, read in light of the specification

and prosecution history of the patent, fails to inform with reasonable certainty, those skilled in the art about the scope of the invention.

A. Claim 1 (and Dependent Claims 2-17) is Indefinite

67. In my opinion, claim 1 is indefinite.

68. Claim 1 recites that "an alignment feature on at least one of the top surface and the bottom surface of the housing." In my opinion, this claim limitation is indefinite because this limitation is subject to multiple different interpretations, making it unclear what the claim covers.

69. This limitation of claim 1 is subject to the following different meanings:

1. An alignment feature that is on either the top surface, OR on the bottom surface, OR on both the top and bottom surfaces; or
2. A first alignment feature on the top surface, OR a different second alignment feature on the bottom surface, OR a first alignment feature on the top surface and a second different alignment feature on the bottom surface.

70. I have reviewed the specification of the '466 Patent and, in my opinion, the specification is of no help in deciphering the intended meaning. Further, the prosecution history is also of no help in deciphering the intended meaning as claim 1 was never rejected by the Examiner, and thus, no arguments regarding the scope of claim 1 were made during examination. EX1024.

71. The specification uses the term "alignment feature" twice:

- "The central portion 234 and the two outer trough portions 236 function as an ***alignment feature*** of the rail receiving portion 164." EX1001: 7:13-15.

- "The area 1234 functions as an ***alignment feature*** of the rail receiving portion 1164." EX1001: 13:16-18.

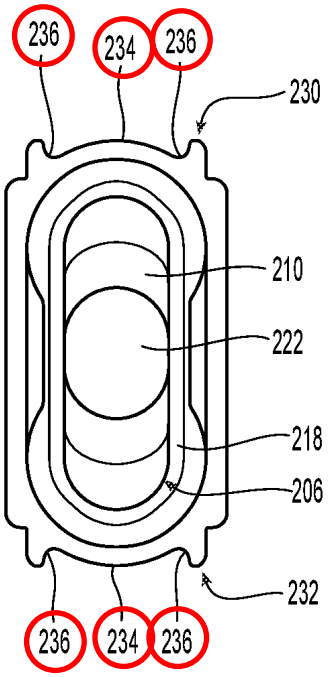


Fig. 8

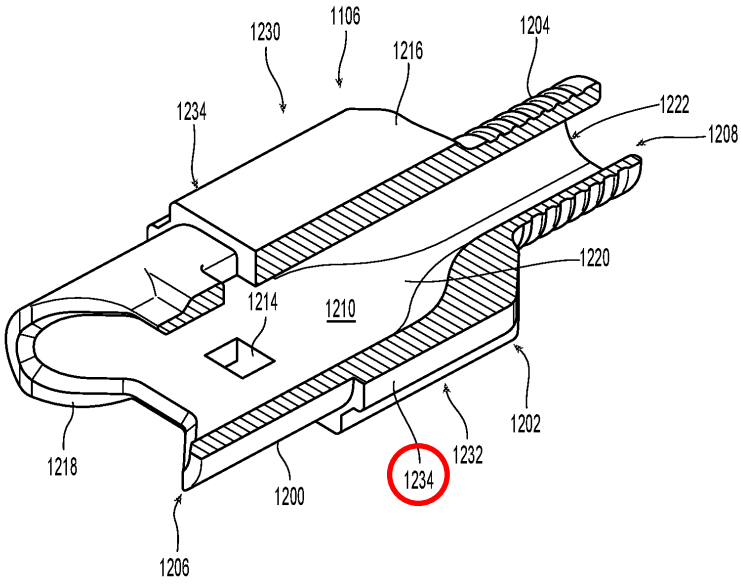


Fig. 27

EX1001: Figs. 8 and 27 (annotated).

72. In each of these recitations, the discussed "alignment feature" is part of the crimp body (106, 1106). However, claim 1 states that the alignment feature is "on at least one of the top surface and the bottom surface ***of the housing***." Thus, these referenced "alignment features" of the crimp body (106, 1106) are not the same alignment feature(s) referenced in claim 1 and offer no help in deciphering the limitation's meaning.

73. The housing (102) does include surfaces (184, 186) for aligning the connector (100) in a horizontal direction and surfaces (188, 190) for aligning the connector in the vertical direction, but all of these surfaces are on the lateral sides of the housing, not ***the top or bottom surfaces*** (160, 162) ***of the housing*** as recited by claim 1. EX1001: 6:30-36, 9:22-41. The specification calls out "160" as the top surface and "162" as the bottom surface of the housing (102). EX1001: 5:55-57. And the specification states the horizontal/vertical aligning surfaces (184, 186, 188, 190) are on the side surfaces (180) of the housing (102). EX1001: 6:11-29. The housings (1102, 2102) of the other embodiments of the '466 Patent include similar surfaces. EX1001: Figs. 25, 26, and 39.

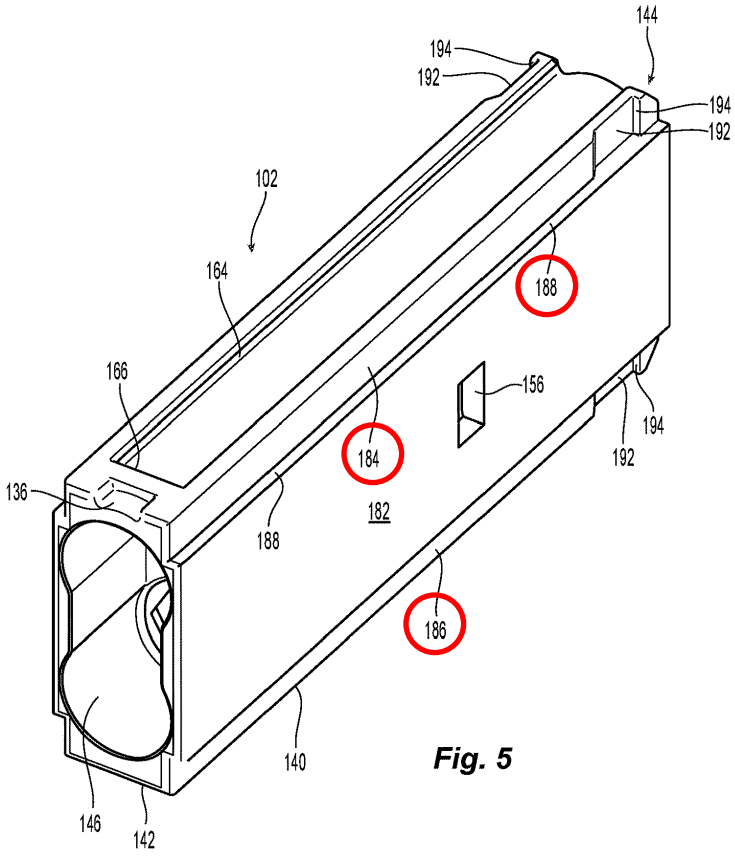


Fig. 5

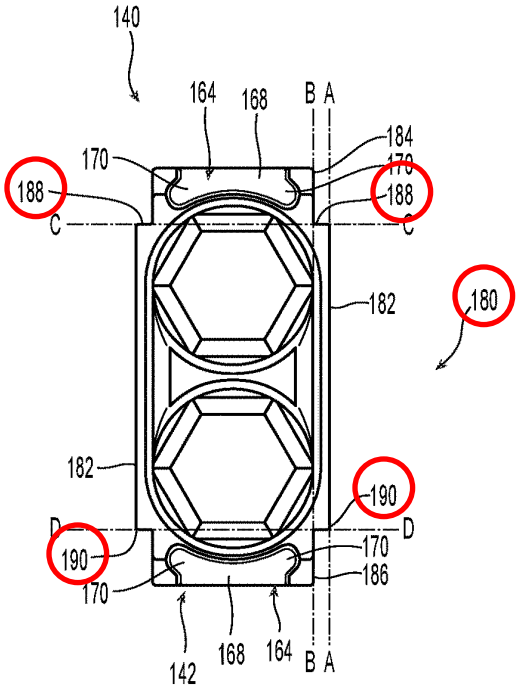


Fig. 6

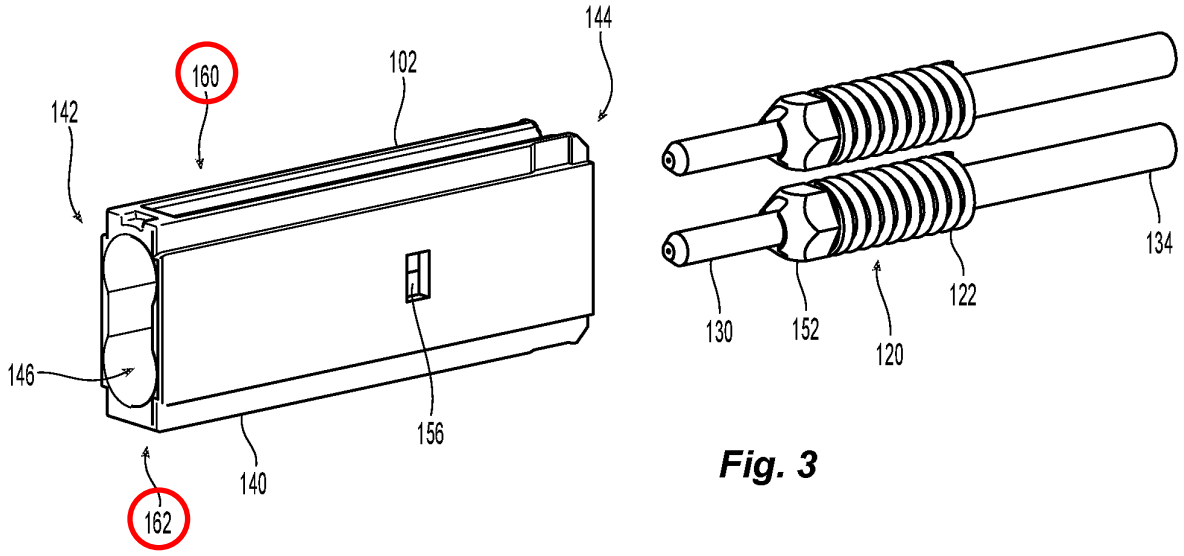


Fig. 3

EX1001: Figs. 3, 5 and 6 (annotated).

74. Thus, these surfaces (184, 186, 188, 190) are not the same alignment feature(s) referenced in claim 1 and again offer no help in deciphering the limitation's meaning.

75. Claim 9 does recite that "the alignment feature includes the rail receiving portion" of the housing but this also does not help in deciphering the limitation's meaning. The '466 Patent always shows and describes the housing (102, 1102, 2102) having two rail receiving portions (164, 1164), one on the top and one on the bottom of the housing (102, 1102, 2102). EX1001: 5:60-62, 11:54-56, 16:10-12, Figs. 39 and 48.

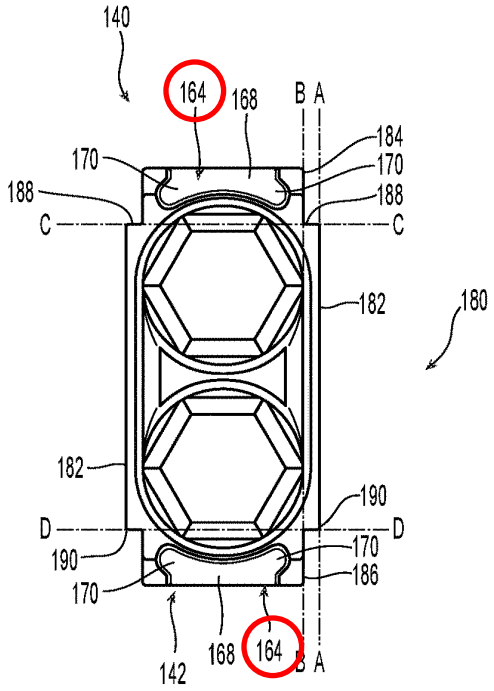

140
164
168
B A
184
170
170
188
188
C
C
182
180
182
190
D
D
190
170
170
186
142
168
164
B A

Fig. 6

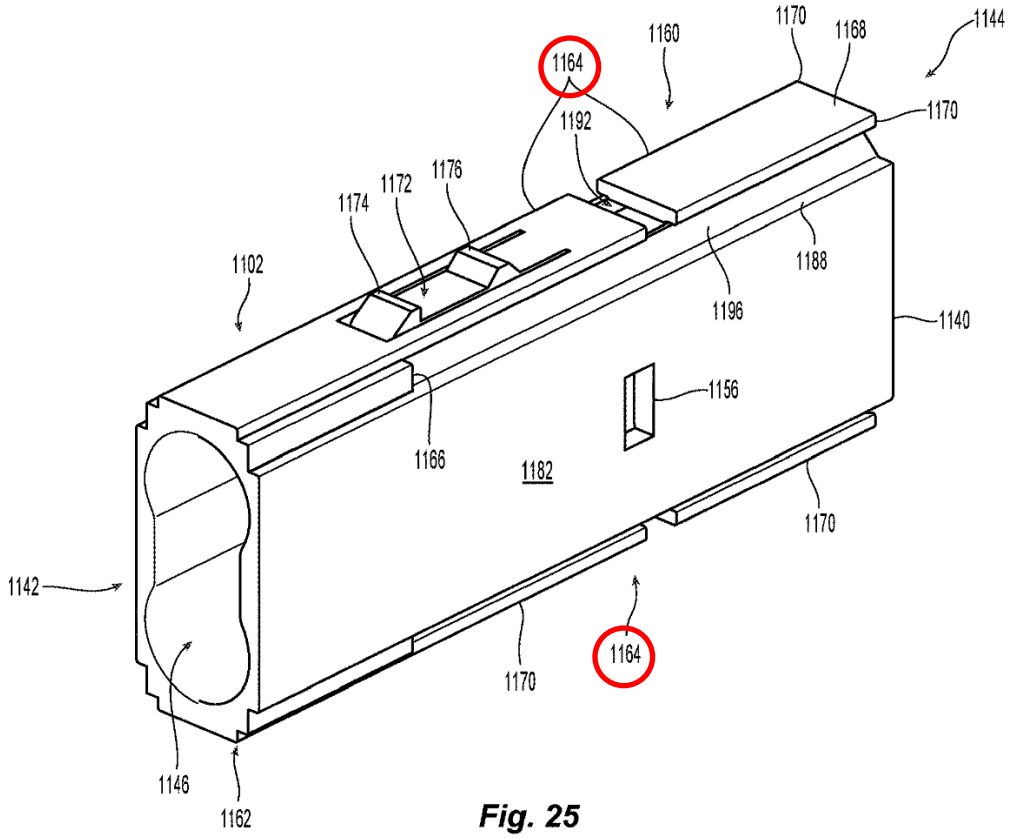

1144
1160
1170
1168
1164
1170
1192
1176
1172
1174
1188
1102
1196
1140
1156
1166
1182
1170
1142
1164
1170
1146
1162

Fig. 25

EX1001: Figs. 6 and 25 (annotated).

76. The ‘466 Patent never describes the two rail receiving portions (164, 1164) as being optional—e.g., only one of the top or bottom surfaces of the housing (102, 1102, 2102) includes a rail receiving portions (164, 1164). Thus, the rail receiving portions (164, 1164) again offer no help in deciphering the limitation’s meaning.

77. Therefore, in my opinion claim 1 is indefinite because it is unclear which meaning of this limitation US Conec intended.

78. I have been informed that dependent claims also are invalid for being indefinite if the claim the dependent claims depend from is indefinite. Dependent claims 2-17 depend from independent claim 1. Therefore, in my opinion, dependent claims 2-17 are invalid for being indefinite because they depend from claim 1.

B. Claim 14 is Indefinite

79. In my opinion, claim 14 is indefinite.

80. Claim 14 recites that “the alignment feature includes a vertical alignment feature and a horizontal alignment feature.” In my opinion this claim is indefinite because it is subject to multiple different interpretations, making it unclear what the claim covers.

81. It is unclear what a "vertical alignment feature" is. For example, is a "vertical alignment feature" a feature that (1) extends vertically and performs an alignment function, or (2) a feature that simply performs a vertical alignment function? Likewise, it is unclear what a "horizontal alignment feature" is. For example, is a "horizontal alignment feature" a feature that (1) extends horizontally and performs an alignment function, or (2) a feature that simply performs a horizontal alignment function?

82. I have reviewed the specification of the '466 Patent and, in my opinion, the specification of the '466 Patent is of no help in deciphering the intended meaning. The specification never uses the terms "vertical alignment feature" and "horizontal alignment feature." Further, the prosecution history is also of no help in deciphering the intended meaning as claim 14 was never rejected by the Examiner and, thus, no arguments regarding the scope of claim 14 were made during examination. EX1024.

83. What descriptions of alignment that occur in the '466 Patent are also of no help in my opinion. As I explained in Section V(A), the "alignment feature" recited by the '466 Patent is part of the crimp body (106, 1106), not located on the housing (102, 1102) as required by claim 14 (via depending from claim 1). EX1001: 7:13-15; 13:16-18. Similarly, the surfaces (184, 186, 188, 190) of the housing (102) for horizontal and vertical aligning are not on the top or bottom

surfaces (160, 162) of the housing as recited by claim 1. EX1001: 6:30-36, 9:22-41. Thus, none of these features can be the alignment feature(s) referenced in claim 14 and, therefore, offer no help in deciphering the meaning of claim 14.

84. Again, claim 9 indicates that alignment feature includes the rail receiving portions (164, 1164). However, the rail receiving portions (164, 1164) are never described as performing any kind of alignment function with an adapter in the '466 Patent. Recall that claim 1 (from which claim 14 depends) states that the alignment feature "guide[s] the fiber optic connector *into an adapter*." Thus, the rail receiving portions (164, 1164) again offer no help in deciphering the limitation's meaning.

85. Therefore, in my opinion, claim 14 is indefinite.

C. Claim 15 (and Dependent Claim 16) is Indefinite

86. In my opinion, claim 15 is indefinite.

87. Claim 15 recites that "each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ***ferrule seats*** of the fiber optic ferrules of each of the ferrule assemblies." In my opinion, this limitation is indefinite because it is unclear what structure is required to correspond to the claimed "ferrule seats."

88. I have reviewed the specification of the '466 Patent and, in my opinion, the specification of the '466 Patent is of no help in deciphering the

intended meaning. The specification of the ‘466 Patent never uses the term “ferrule seat.” Further, the prosecution history is also of no help in deciphering the intended meaning, as claim 15 was never rejected by the Examiner, and thus, no arguments regarding the scope of claim 15 were made during examination. EX1024.

89. Further, the natural understanding of what a “ferrule seat” is, is inconsistent with the phrasing here. A POSA would understand "ferrule seat" to mean the structure that seats a ferrule or ferrule assembly in a connector housing. EX1017: ¶[0071]; EX1018: ¶[0027]; EX1019: ¶[0055]. The “ferrule seat” could theoretically be part of the connector housing or part of the ferrule assembly, but it would need to be structure that performs the function of "seating" the ferrule in the connector housing.

90. In the '466 Patent, the potential seating structures include (1) the ferrule holders (132, 1132) or (2) the structures (148, 1148) of the housing (102, 1102) that orient the ferrule assemblies (120, 1120) in the housing and the corresponding flat surfaces (150, 1150) of the ferrule holders (132, 1132).

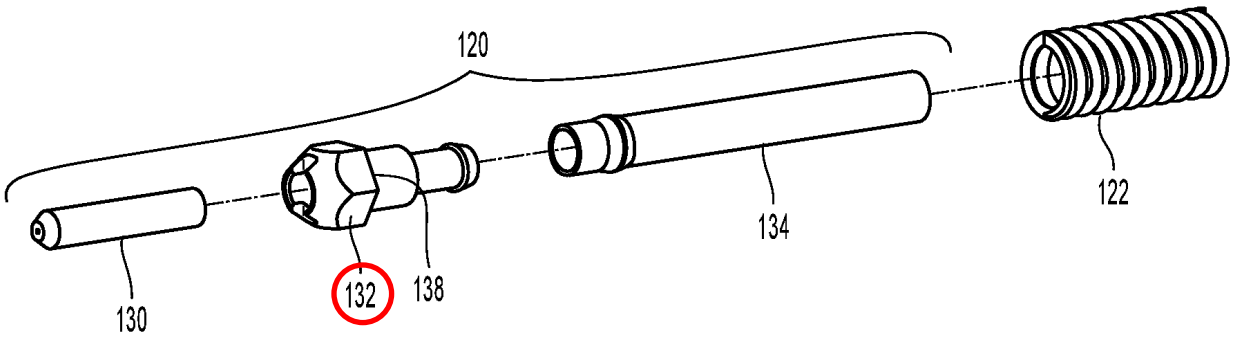


Fig. 3A

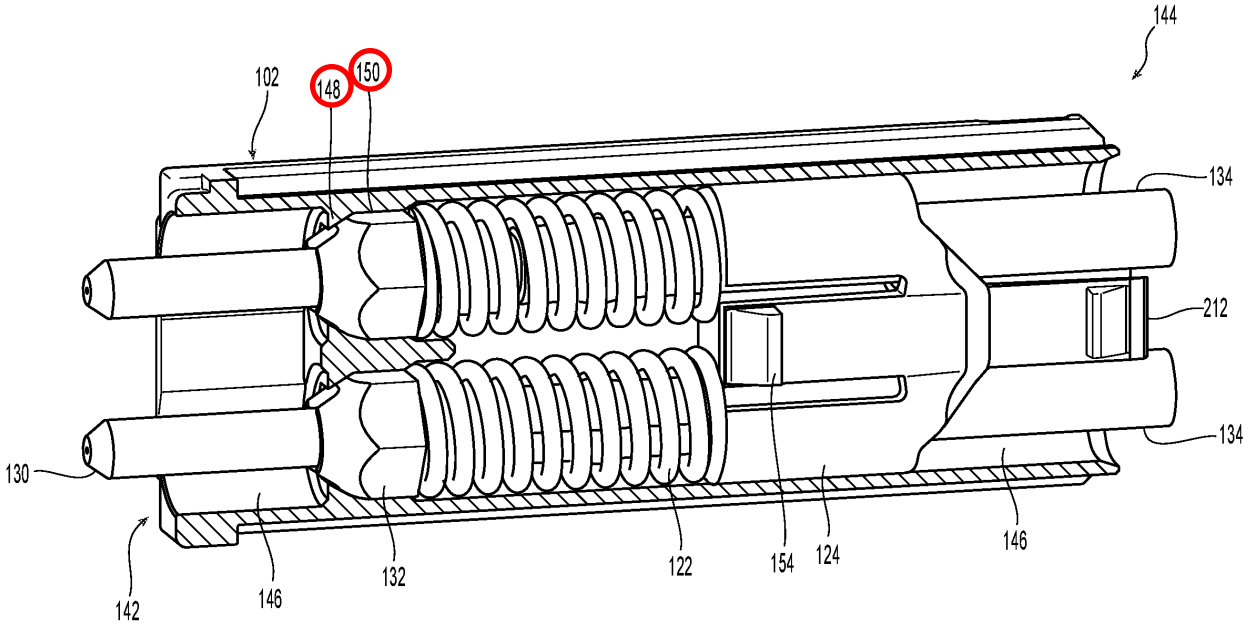


Fig. 4

EX1001: Figs. 3A and 4 (annotated).

91. However, claim 15 specifically recites that the "ferrule seats" are neither part of the housing nor part of the ferrule holder, but rather, ***are part of*** the fiber optic ferrules themselves—"ferrule seats ***of the*** fiber optic ferrules." Again, claim 1 recites that the ferrule assemblies comprise two distinct components—ferrules and ferrule holders. Here, claim 15 specifically recites that the ferrule

seats are a part "of the fiber optic ferrules of each of the ferrule assemblies." I have been informed that I am to interpret and apply the claims as they are written and that I cannot take a construction different than the plain meaning of the claim language. The only grammatical interpretation of this phrase is that the claimed ferrule seats are part of the ferrules, not the ferrule holders or connector housing. It is therefore unclear to a POSA what structure feature a ferrule needs to have in order for the ferrule to have a "ferrule seat" as claimed.

92. Therefore, in my opinion, claim 15 is indefinite.

93. I have been informed that dependent claims also are invalid for being indefinite if the claim the dependent claims depend from is indefinite. Dependent claim 16 depends from claim 15. Therefore, in my opinion, dependent claim 16 is invalid for being indefinite because it depends from claim 15.

VI. LACK OF WRITTEN DECRIPTION (GROUND 2)

94. As I stated in Paragraph 16 above, it has been explained to me that a claim is invalid for lacking written description support if the specification of the '466 Patent does not reasonably convey to a person of ordinary skill in the art that the inventors had possession of the claimed subject matter as of the filing date of the '466 Patent.

95. In my opinion, claims 1-17 are invalid for lack of written description support.

A. Claim 1 (and Dependent Claims 2-17) Lacks Written Description

96. In my opinion, claim 1 is invalid for lack of written description support.

1. The Limitation "a front end [of the crimp body] at least partially disposed in the opening at the rear end of the housing" of Claim 1 Lacks Written Description

97. Claim 1 recites that "a front end [of the crimp body] ***at least partially*** disposed in the opening at the rear end of the housing."

98. The use of the phrase "at least partially" means "partially" or "fully" based on the plain and ordinary meaning. Thus, within the context of this claim limitation, the phrase "at least partially" means the claim covers both (1) a front end of the crimp body ***partially*** disposed in the opening at the rear end of the housing, and (2) a front end of the crimp body ***fully*** disposed in the opening at the rear end of the housing.

99. I have been informed that in order for a claim to have written description support, the specification of the '466 Patent must show that the inventors were in possession of the ***full scope*** of the claim limitation.

100. In my opinion, the specification of the '466 Patent contains no reference or indication that US Conec was in possession of a front end of the crimp body ***partially*** disposed in the opening at the rear end of the housing. Thus, in my opinion, the '466 Patent lacks written description support for the portion of the

limitation that covers "a front end of the crimp body [being] ***partially*** disposed in the opening at the rear end of the housing."

101. The fiber optic connectors (100, 1100, 2100) of the '466 Patent include a housing (102, 1102, 2102) and a crimp body (106, 1106). EX1001: 4:55-60, 10:51-55, 16:8-14. Each housing (102, 1102, 2102) includes an opening (146, 1146) extending between a front end (142, 1142) and a rear end (144, 1144) of the housing. EX1001: 5:6-8, 11:5-7, 16:8-14.

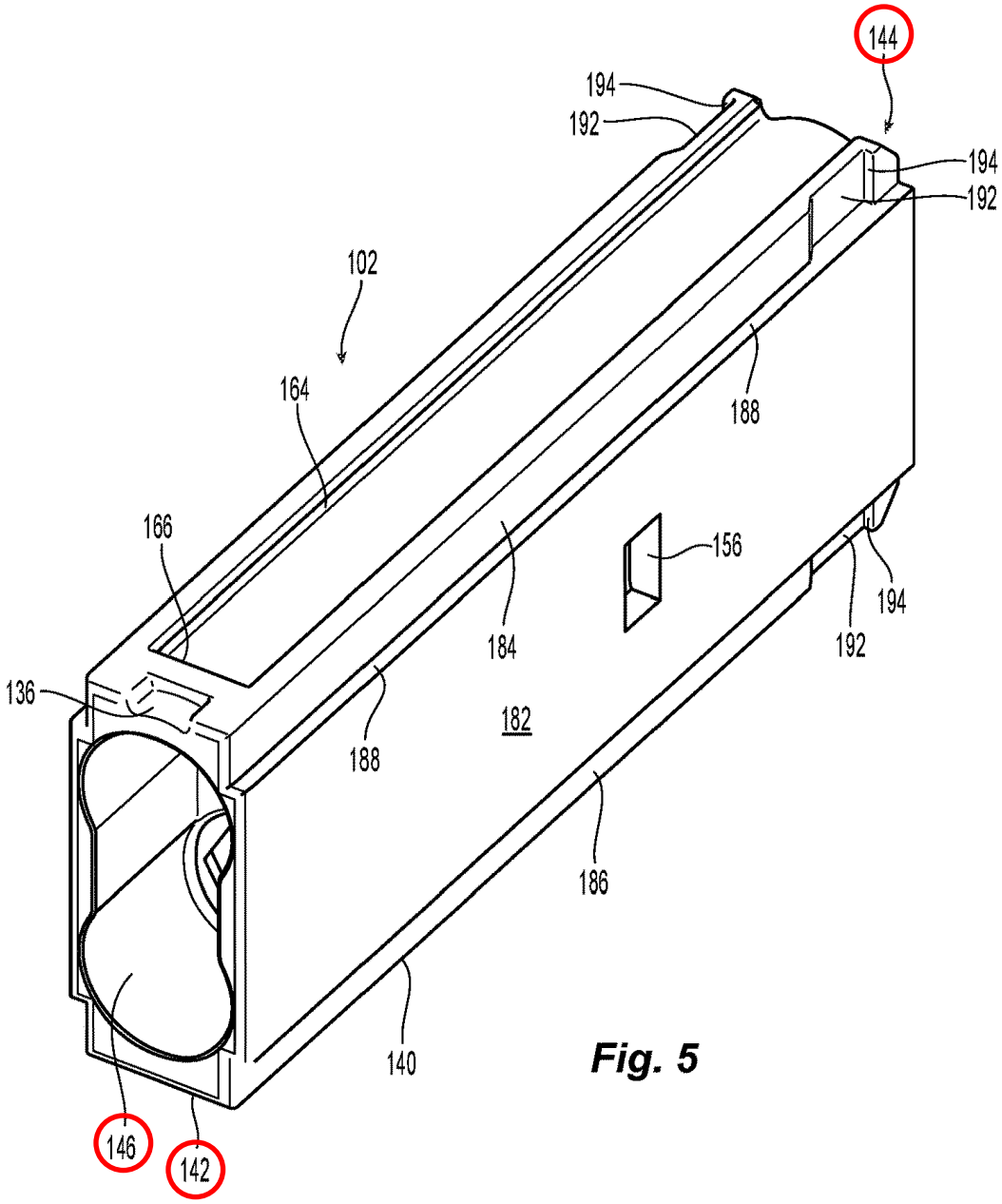

144
194
192
194
192
102
164
188
166
156
184
194
192
136
182
188
186
140
146
142

Fig. 5

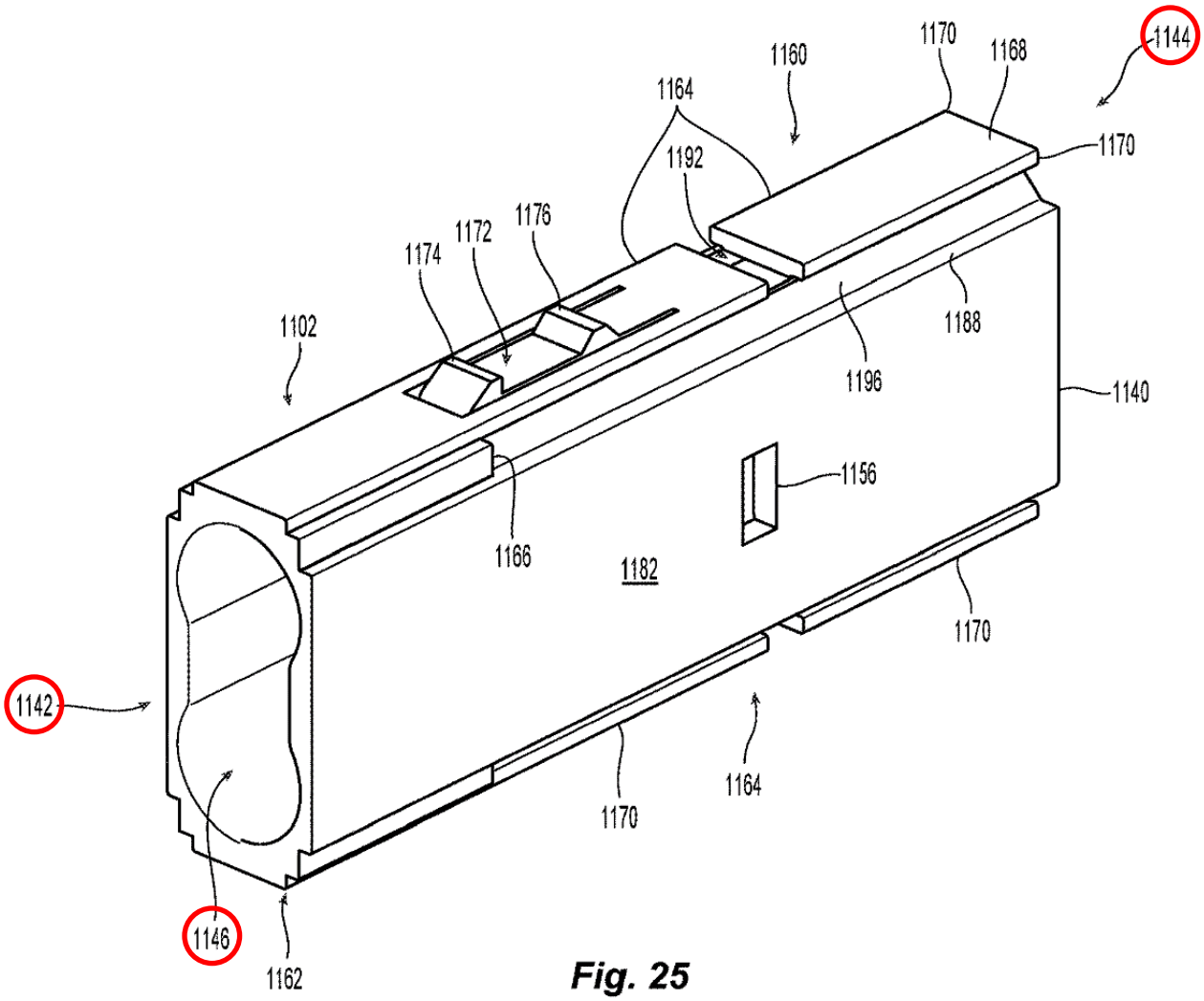


Fig. 25

EX1001: Figs. 5 and 25 (annotated).

102. The crimp body includes a front portion (200, 1200) with a front end (206, 1206). EX1001: 6:46-53, 12:51-60.

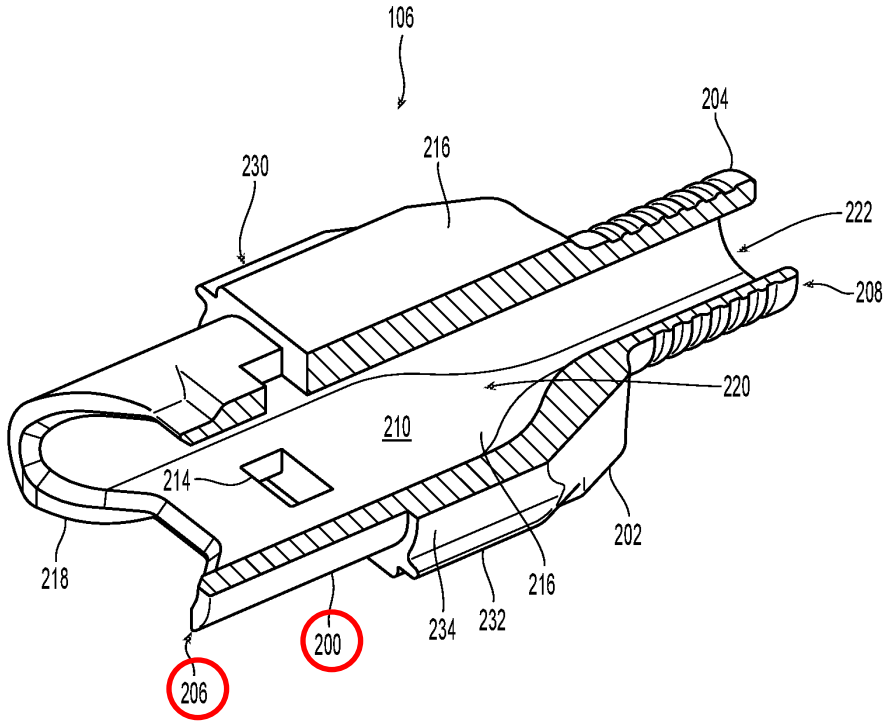

106
204
216
230
222
208
220
210
214
202
218
216
234
232
200
206

Fig. 9

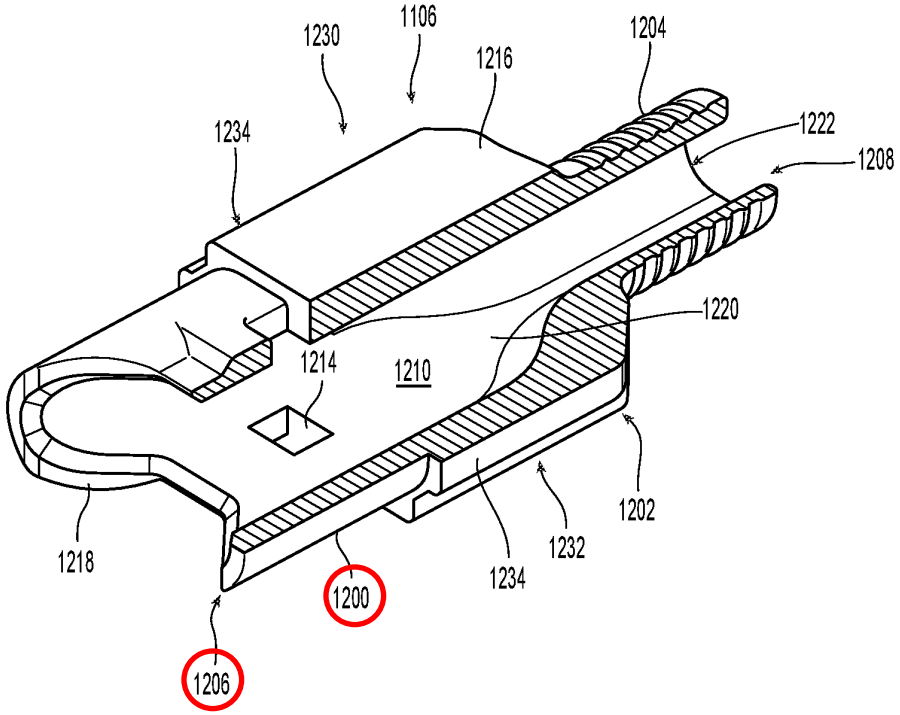

1230
1106
1216
1204
1234
1222
1208
1220
1214
1210
1218
1202
1232
1234
1200
1206

Fig. 27

EX1001: Figs. 9 and 27 (annotated).

103. The specification of the '466 Patent only shows the front end (206, 1206) of each crimp body (106, 1106) being ***fully*** disposed in the opening (146, 1146) of the respective housings (102, 1102, 2102). No part of the specification of the '466 Patent shows a front end (206, 1206) of each crimp body (106, 1106) being ***partially*** disposed in the opening (146, 1146) of the respective housings (102, 1102, 2102).

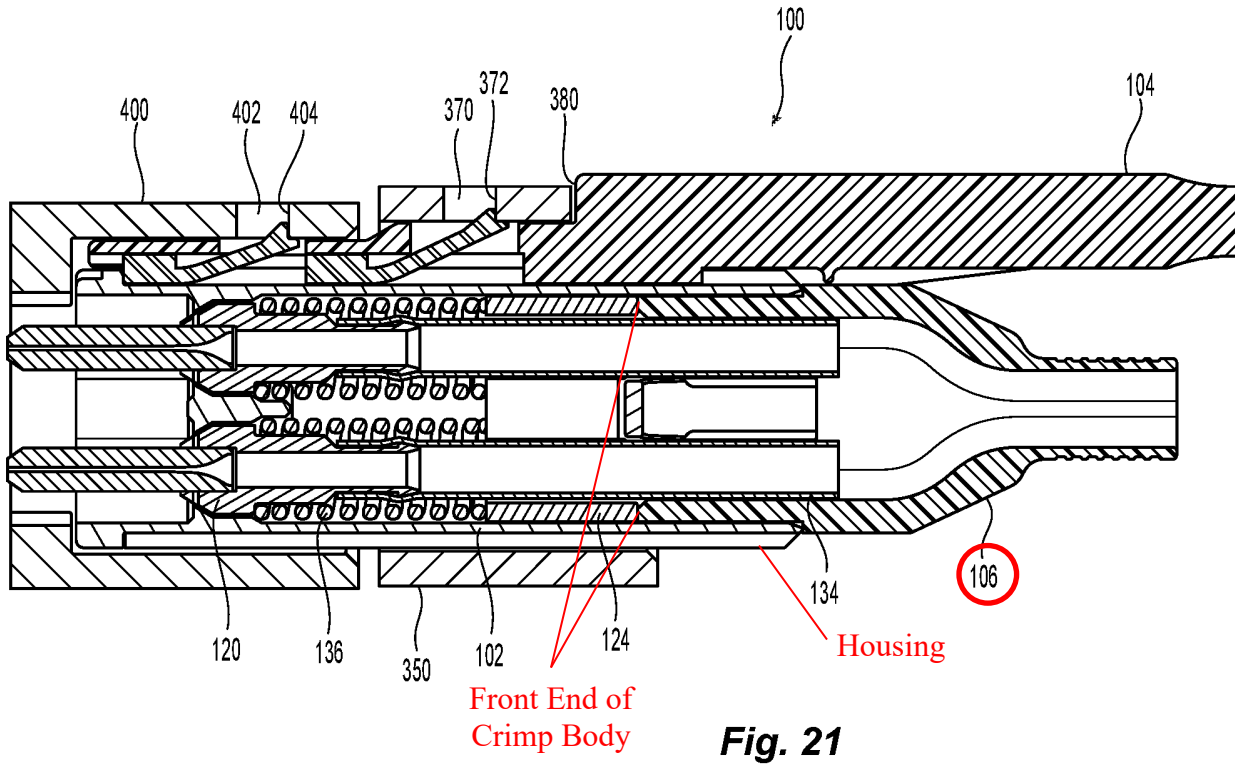


Fig. 21

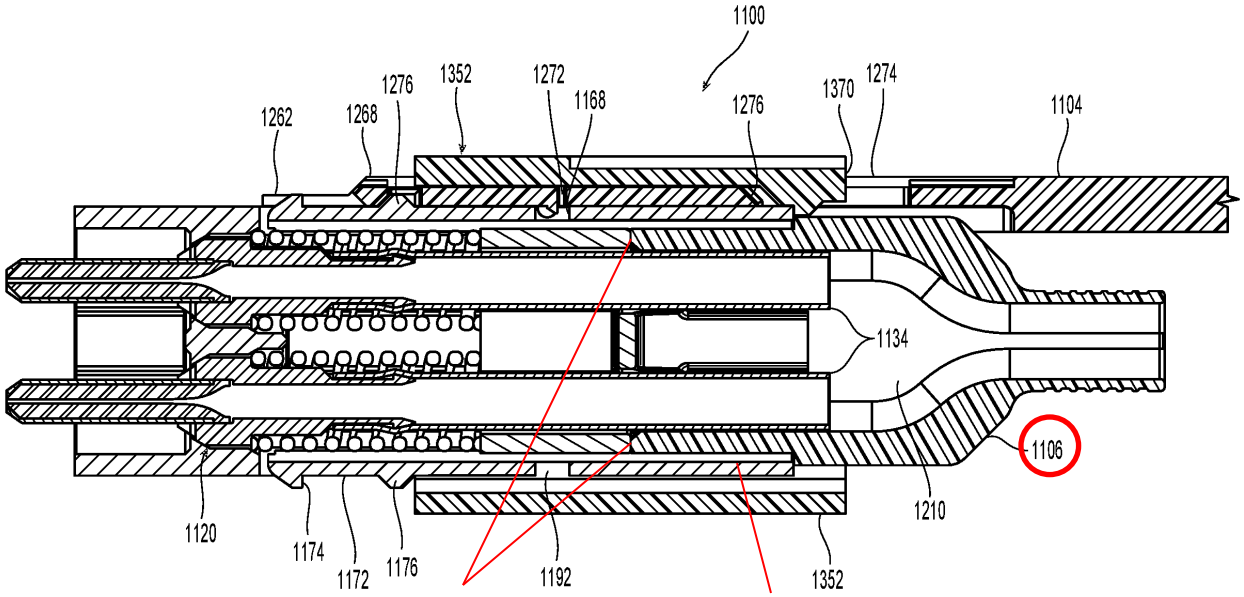


Fig. 33

EX1001: Figs. 21 and 33 (annotated).

104. Likewise, the specification of the '466 Patent only describes the front end (206, 1206) of each crimp body (106, 1106) being ***fully*** disposed in the opening (146, 1146) of the respective housings (102, 1102, 2102), not ***partially*** disposed. For example, the specification explains the front end of each crimp body engages the spring push (124, 1124) in the housing. EX1001: 6:46-49 ("The crimp body 106 has a front portion 200 that is designed to interact and connect with the spring push 124"), 6:58-62 ("The front end 206 also has a forward facing surface 218 that complements the rear of the spring push"), 12:51-54 ("The crimp body 1106 has a front portion 1200 that is designed to interact and connect with the spring push 1124"), 12:65-13:2 ("The front end 1206 also has a forward facing

surface 1218 that complements the rear of the spring push 1124"), 16:8-14. In another example, the specification explains the front portion (200, 1200) of each crimp body is inserted into the housing. EX1001: 6:46-49 ("The crimp body 106 has a front portion 200 that is … disposed within the opening 146 of the housing 102 when installed", 12:51-54 ("The crimp body 1106 has a front portion 1200 that is … disposed within the opening 1146 of the housing 1102 when installed"), 16:8-14.

105. The specification only shows and describes the ***entire*** front portion (200, 1200) of each crimp body, including the front portion's leading front end (206, 1206), in the opening. EX1001: Figs. 21 and 33, 6:46-49, 6:58-62, 12:51-54, 12:65-13:2, 16:8-14.

106. Thus, US Conec was not in possession of the ***full scope*** of this claim limitation—i.e., "a front end [of the crimp body] [] ***partially*** disposed in the opening at the rear end of the housing."

107. Therefore, in my opinion, claim 1 is invalid for lack of written description support.

108. I have been informed that dependent claims also are invalid for lack of written description support if the claim the dependent claims depend from lacks written description support. Claims 2-17 depend from independent claim 1.

Therefore, in my opinion, dependent claims 2-17 are invalid for lack of written description support because these claims depend from independent claim 1.

2. The Limitation "an alignment feature on at least one of the top surface and the bottom surface of the housing" of Claim 1 Lacks Written Description

109. Claim 1 recites that "an alignment feature on at least one of the top surface and the bottom surface of the housing."

110. As I explained in Section V(A), this limitation of claim 1 is subject to the following different meanings:

1. An alignment feature that is on either the top surface, OR on the bottom surface, OR on both the top and bottom surfaces; or

2. A first alignment feature on the top surface, OR a different second alignment feature on the bottom surface, OR a first alignment feature on the top surface and a second different alignment feature on the bottom surface.

111. In my opinion, the specification of the '466 Patent contains no reference or indication that US Conec was in possession of the full scope of this limitation under either of these possible meanings.

112. As I previously explained, the specification uses the term "alignment feature" twice:

- "The central portion 234 and the two outer trough portions 236 function as an ***alignment feature*** of the rail receiving portion 164." EX1001: 7:13-15.

- "The area 1234 functions as an ***alignment feature*** of the rail receiving portion 1164." EX1001: 13:16-18.

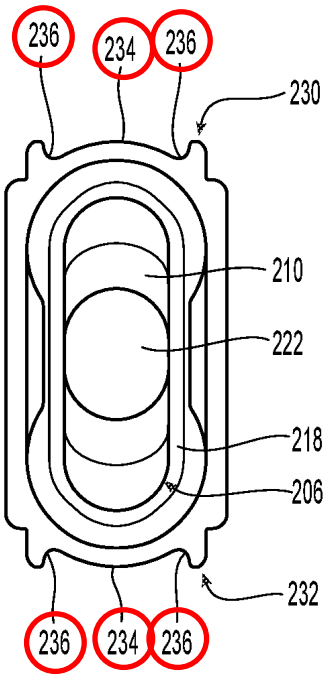


Fig. 8

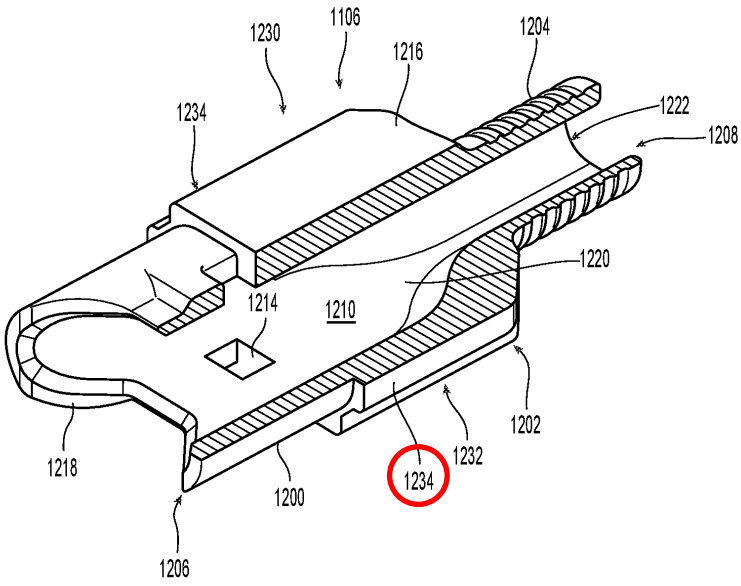


Fig. 27

EX1001: Figs. 8 and 27 (annotated).

113. In each of these recitations, the discussed "alignment feature" is part of the crimp body (106, 1106). However, claim 1 states that the alignment feature is "***on*** at least one of the top surface and the bottom surface ***of the housing***." Thus, these referenced "alignment features" of the crimp body (106, 1106) do not provide written description support for an alignment feature(s) on the housing as recited by independent claim 1.

114. In addition, as I mentioned earlier, the housing (102) does include surfaces (184, 186) for aligning the connector (100) in a horizontal direction and surfaces (188, 190) for aligning the connector in the vertical direction. EX1001: 6:30-36, 9:22-41. However, all of these surfaces (184, 186, 188, 190) are on the

lateral sides of the housing (102), not the top or bottom surfaces (160, 162) of the housing as recited by independent claim 1. EX1001: 6:30-36, 9:22-41. The housings (1102, 2102) of the other embodiments of the '466 Patent include similar surfaces. EX1001: Figs. 25, 26, and 39.

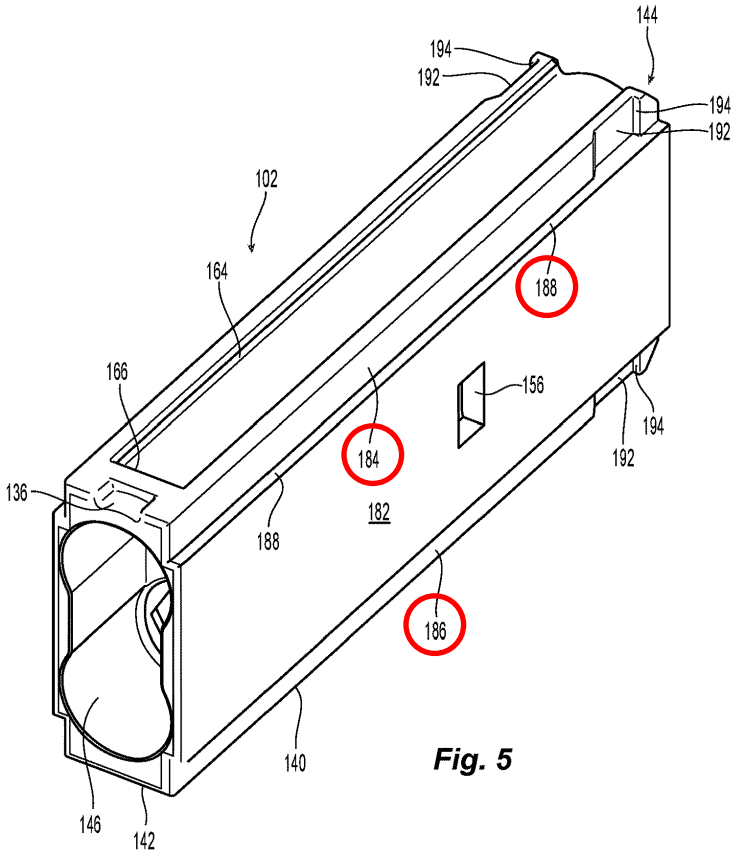


Fig. 5

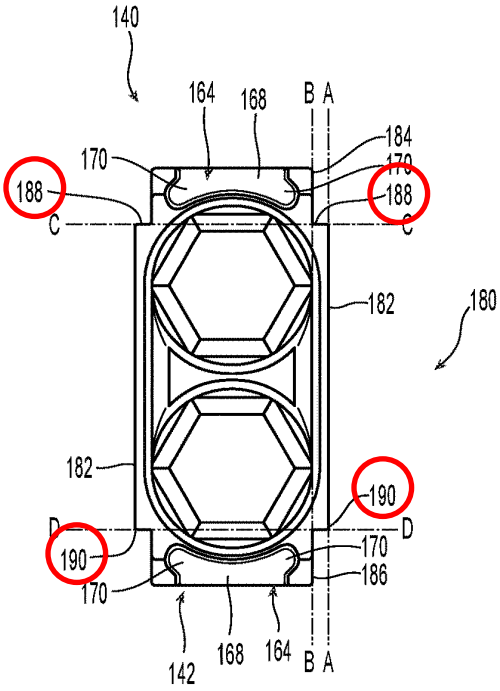


Fig. 6

EX1001: Figs. 5 and 6 (annotated).

115. Thus, these surfaces (184, 186, 188, 190) do not provide written description support for an alignment feature(s) ***on*** at least one of ***the top surface and the bottom surface of the housing*** as recited by independent claim 1.

116. Claim 9 does recite that "the alignment feature includes the rail receiving portion." However, the description of the rail receiving portion (164,

1164) in the ‘466 Patent does not support the full scope of this claim limitation under either interpretation. The ‘466 Patent always shows and describes the housing (102, 1102, 2102) having two rail receiving portions (164, 1164), one on the top of the housing (102, 1102, 2102) and one on the bottom of the housing. EX1001: 5:60-62, 11:54-56, 16:10-12, Figs. 39 and 48. The ‘466 Patent ***never*** describes the two rail receiving portions (164, 1164) as being ***optional***—e.g., only one of the top or bottom surfaces of the housing (102, 1102, 2102) includes a rail receiving portion (164, 1164).

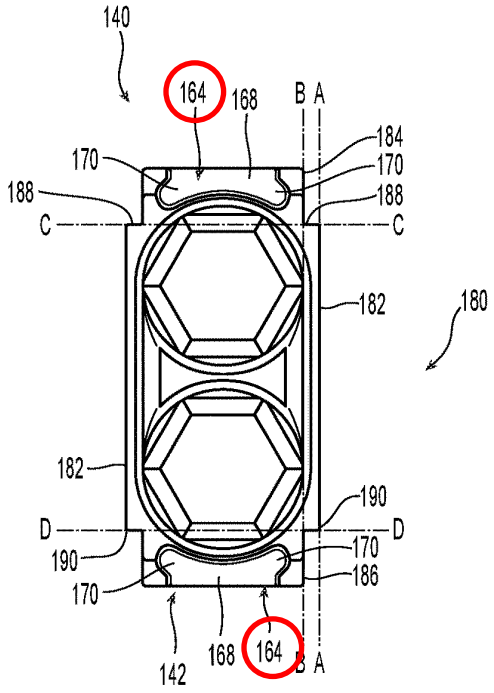


Fig. 6

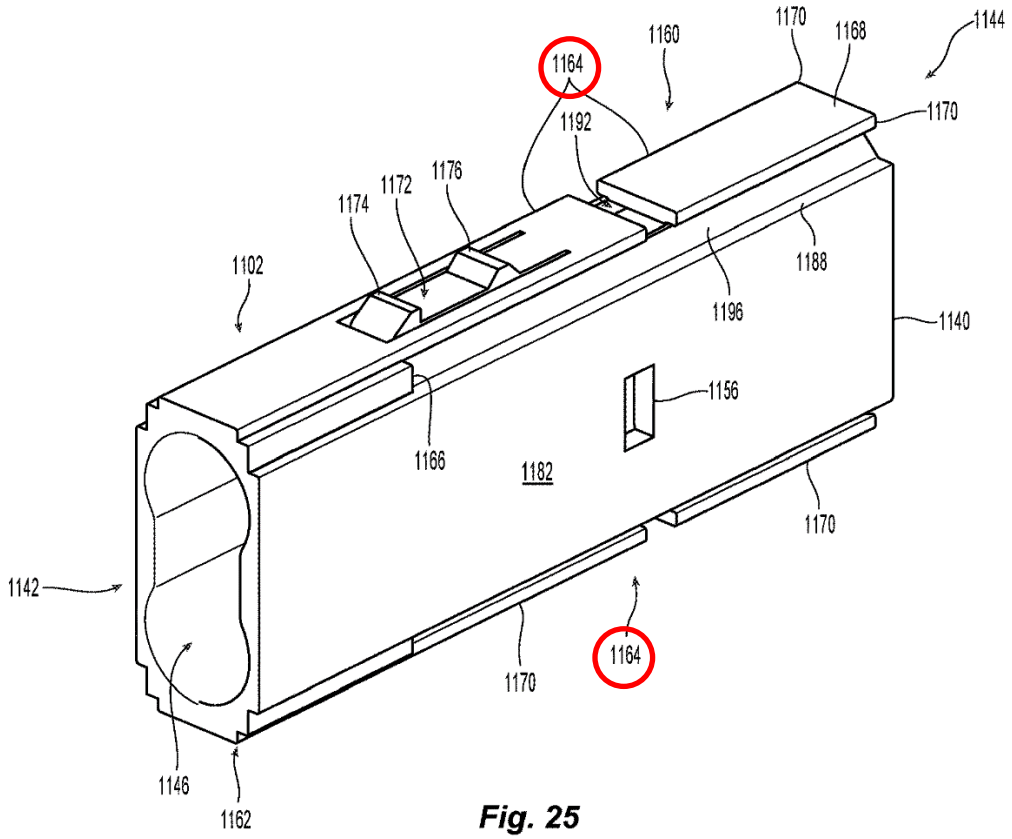


Fig. 25

EX1001: Figs. 6 and 25 (annotated).

117. Thus, the description of the rail receiving portions (164, 1164) does not support the full scope of this claim limitation under the first interpretation for two reasons. First, the '466 Patent does not teach a rail receiving portion on just the top surface of the housing (and not the bottom surface of the housing) or a rail receiving portion on just the bottom surface of the housing (and not the top surface of the housing). Second, each rail receiving portion is only on either the top or bottom surface of the housing. No single rail receiving portion is on both the top and bottom surfaces of the housing.

118. Moreover, the the description of the rail receiving portions (164, 1164) does not support the full scope of this claim limitation under the second interpretation. Again, the '466 Patent does not teach a rail receiving portion on just the top surface of the housing (and not the bottom surface of the housing) or a rail receiving portion on just the bottom surface of the housing (and not the top surface of the housing).

119. Therefore, in my opinion, claim 1 is invalid for lack of written description support.

120. I have been informed that dependent claims also are invalid for lack of written description support if the claim the dependent claims depend from lacks written description support. Claims 2-17 depend from independent claim 1. Therefore, in my opinion, dependent claims 2-17 are invalid for lack of written description support because these claims depend from independent claim 1.

B. Claim 14 Lacks Written Description

121. In my opinion, claim 14 is invalid for lack of written description support.

122. Claim 14 recites that "the alignment feature includes a vertical alignment feature and a horizontal alignment feature." In my opinion, the specification of the '466 Patent contains no reference or indication that US Conec was in possession of this limitation.

123. As I explained in Section VI(A)(2), the "alignment feature" recited by the '466 Patent is part of the crimp body (106, 1106), not on the housing (102, 1102) as required by claim 14 (via depending from claim 1). EX1001: 7:13-15; 13:16-18. Similarly, the surfaces (184, 186, 188, 190) of the housing (102) for horizontal and vertical aligning are not on the top or bottom surfaces (160, 162) of the housing as recited by claim 1. EX1001: 6:30-36, 9:22-41. Thus, none of these features provide written description support for claim 14.

124. Again, Claim 9 does recite that "the alignment feature includes the rail receiving portion."

125. However, the rail receiving portions (164, 1164) are never described as performing any kind of alignment function—e.g., horizontal or vertical alignment—with an adapter. Recall that claim 1 (from which claim 14 depends) states that the alignment feature "guide[s] the fiber optic connector *into an adapter*." Performing an alignment function is a minimum requirement of any possible interpretation of this claim as explained in Section V(B). Instead, the rail receiving portions (164, 1164) are used to connect the latch component (104) to the housing (102). EX1001: 6:1-10. Thus, the rail receiving portions (164, 1164) provide no written description support for claim 14.

126. Therefore, in my opinion, claim 14 is invalid for lack of written description support.

C. Claim 15 (and Dependent Claim 16) Lacks Written Description

127. In my opinion, claim 15 is invalid for lack of written description support.

128. Claim 15 recites that "each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ***ferrule seats of the fiber optic ferrules*** of each of the ferrule assemblies." In my opinion, the specification of the '466 Patent contains no reference or indication that US Conec was in possession of this limitation.

129. I have been informed that I am to interpret and apply the claims as they are written and that I cannot take a construction different than the plain meaning of the claim language. As I explained in Section V(A), the plain grammatical interpretation of this claim is that the "ferrule seats" ***are part of*** the "ferrules," not another component such as a ferrule holder or collar.

130. The specification of the '466 Patent never uses the term "ferrule seat." Further, the specification of the '466 Patent never shows or describes the ferrules (130, 1130) themselves as including any additional component. EX1001: 4:65-5:5, 10:63-11:4. Instead, the specification states:

> The two ferrule assemblies 120 each include a fiber optic ferrule 130 (generally a 1.25 mm LC fiber optic ferrule), a ferrule holder 132, and a lead-in tube 134. The spring 122 is added later. The ferrule assemblies 120 are preferably preassembled and are inserted into the housing 102 without needing any further processing. EX1001: 4:67-5:5.

131. In addition, the specification of the ‘466 Patent never shows the ferrules (130, 1130) themselves as including any additional component. EX1001: 4:65-5:5, 10:63-11:4.

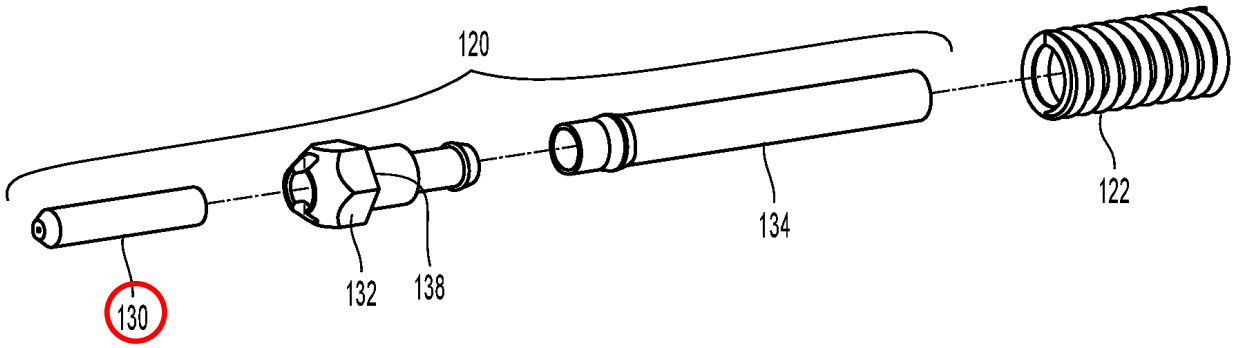


Fig. 3A

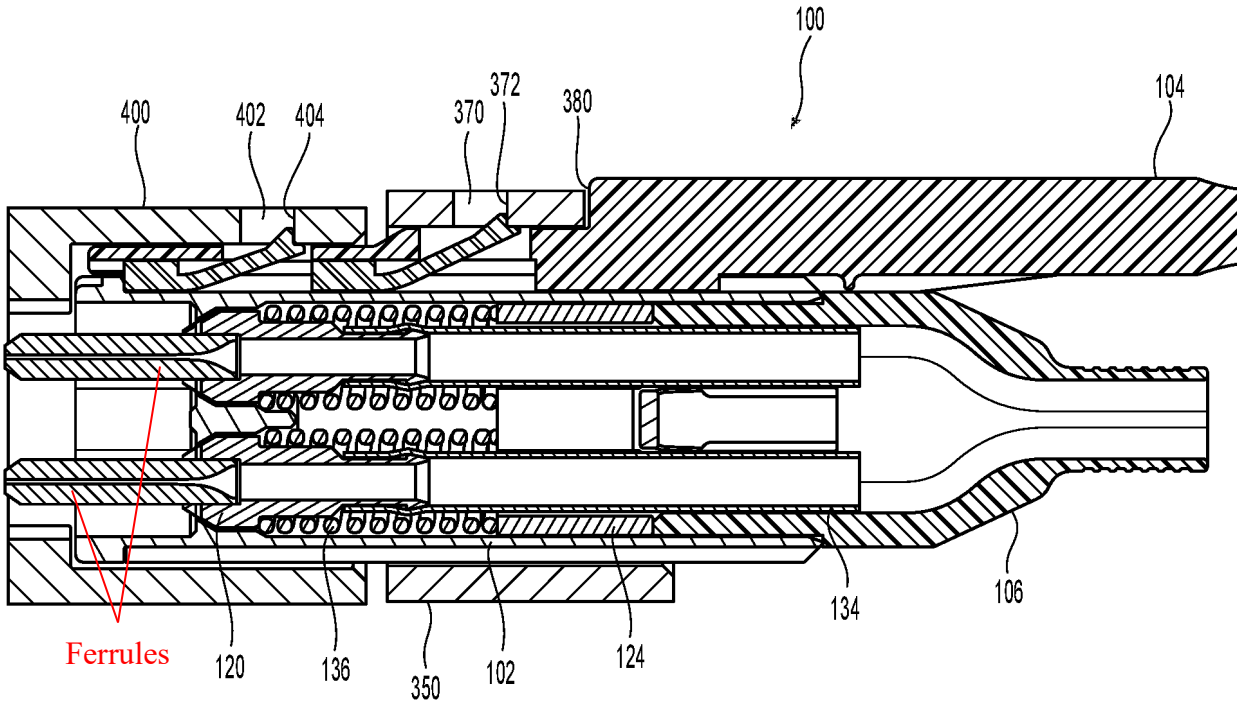


Fig. 21

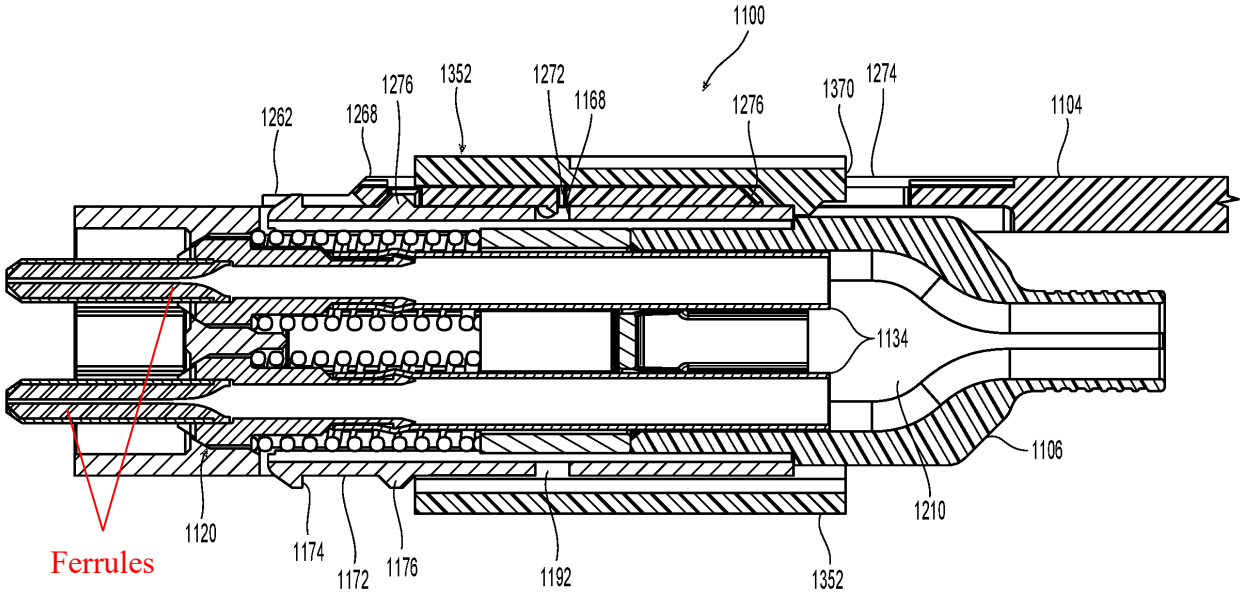


Fig. 33

EX1001: Figs. 3A, 21, and 33 (annotated).

132. Therefore, in my opinion, claim 15 is invalid for lack of written description support.

133. I have been informed that dependent claims also are invalid for lack of written description support if the claim the dependent claims depend from lacks written description support. Dependent claim 16 depends from claim 15. Therefore, in my opinion, dependent claim 16 is invalid for lack of written description support because it depends from claim 15.

VII. ANTICIPATION: TAKANO'209 (GROUND 2)

134. In my opinion, claims 1-3, 5-7, and 12-16 are anticipated by Takano'209.

A. Independent Claim 1

1.P A fiber optic connector comprising:

135. Takano'209 discloses an optical connector (2100). EX1003: ¶[0117] ("21B depicts the optical connector 2100 in an assembled view"); EX1004: ¶[111], Fig. 21B.

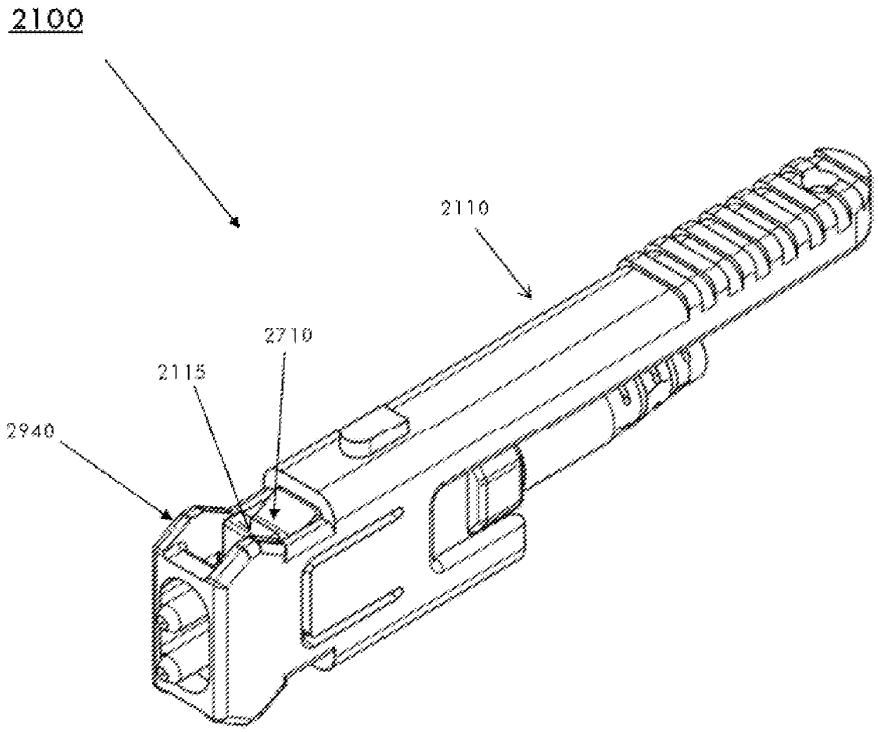


FIG. 21B

EX1003: Fig. 21B.

136. Therefore, in my opinion, Takano'209 meets this limitation.

1.a.1 "a housing having a main body extending between a front end and a rear end and having an opening extending therebetween,"

137. Takano'209's optical connector (2100) includes an outer housing (2110). EX1003: ¶[0117] ("Optical connector 2100 may include an outer housing

2110”). The outer housing (2110) includes a main body that houses the internal components of the optical connector (2100). EX1003: Fig. 21A. The main body of the outer housing (2110) extends between a front end and a rear end. EX1003: Fig. 21A.

138. The POSA would understand that the "main body" of the outer housing (2110) is the portion of the housing piece that surrounds, protects, and houses the internal components. The pull tab (2107) extending rearward from the main body serves a different purpose and therefore would not be considered part of the "main body" of a housing as set forth in claim 1. In addition, the Takano'209 repeatedly teaches that the pull tab (2107) is optional. EX1003: ¶¶[0117], [0124]; EX1004: ¶¶[111], [118]. So Takano'209 expressly teaches an outer housing (2110) consists of the green-highlighted main body and an alignment key (2105) that is devoid of a pull tab (2107), and in this embodiment, the "main body" is the entire outer housing (2110), save for the alignment key (2105).

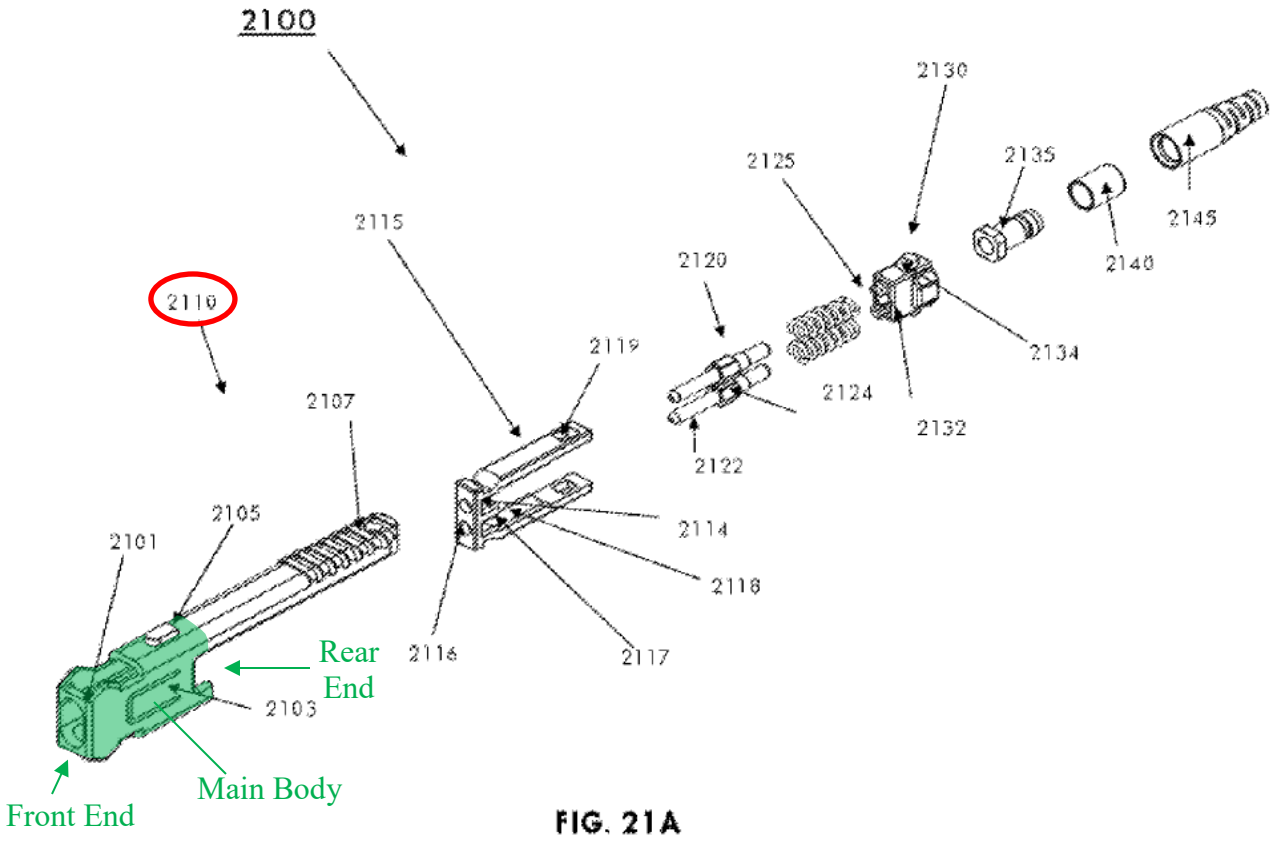


FIG. 21A

EX1003: Fig. 21A (annotated).

139. The outer housing (2110) has an opening (which Takano'209 calls a "longitudinal bore") extending between the front end and the rear end of the main body. EX1003: ¶[0117] ("The outer housing 2110 may include a longitudinal bore for accommodating the front body 2115 and a ferrule assembly 2120"), ¶[0120] ("the front body is inserted within the longitudinal bore 2101 of outer housing 2110"); EX1004: ¶¶[111], [114], Figs. 29A, 29B, and 29E.

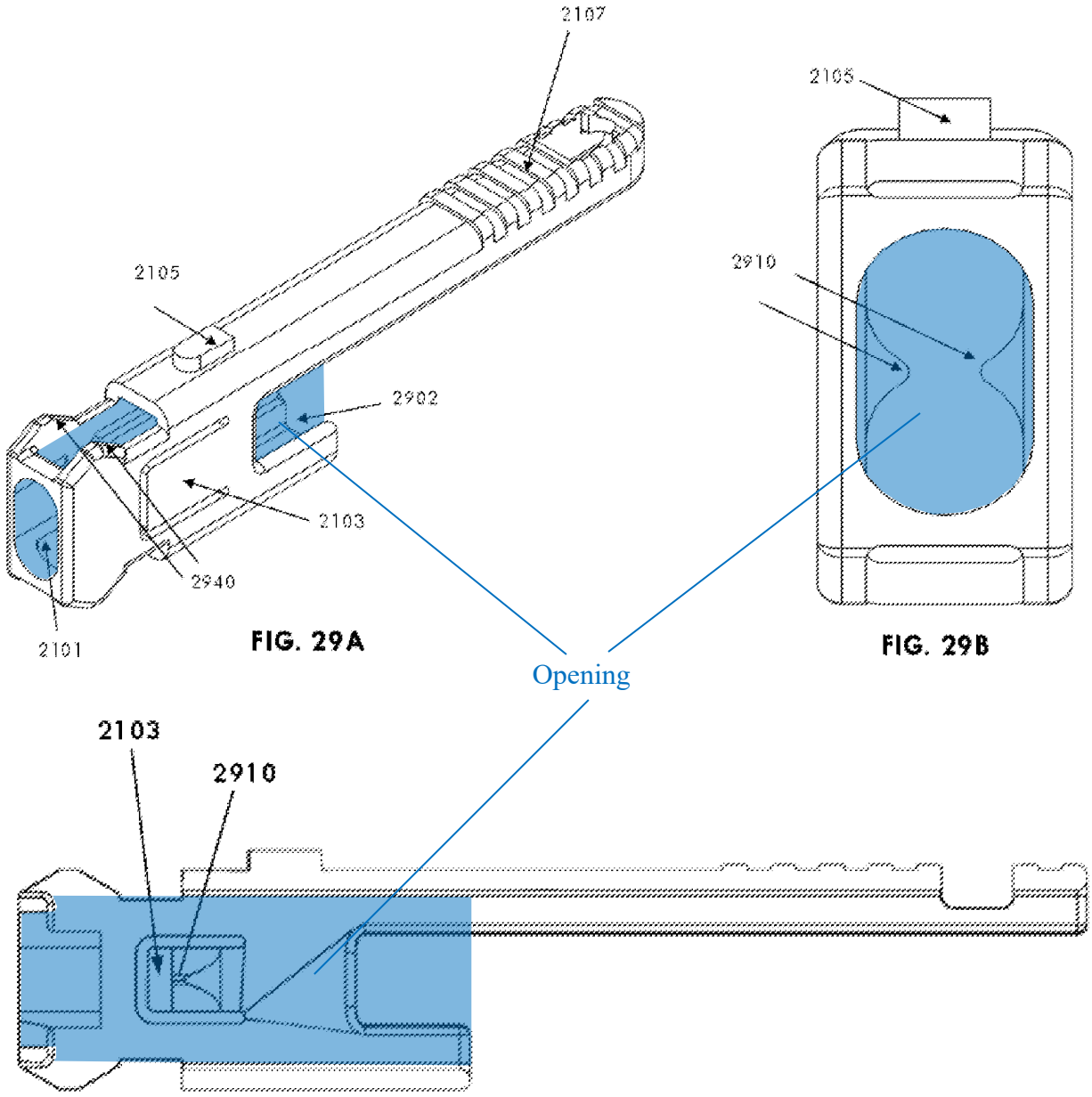


FIG. 29A

FIG. 29B

FIG. 29E

EX1003: Figs. 29A, 29B, and 29E (annotated).

140. Therefore, in my opinion, Takano'209 meets this limitation.

1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral

width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"

141. The outer housing (2110) has a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface. EX1003: ¶[0124]: ("The connector size 4.2×8.96×30.85 mm (excluding optional pull tab 2107 and connector alignment key 2105)"); EX1004: ¶[118], Fig. 22. Takano'209 specifically teaches a lateral width between the opposing side surfaces of 4.2mm that is less than the separation between the top and bottom surfaces of 8.96mm. EX1003: ¶[0124].

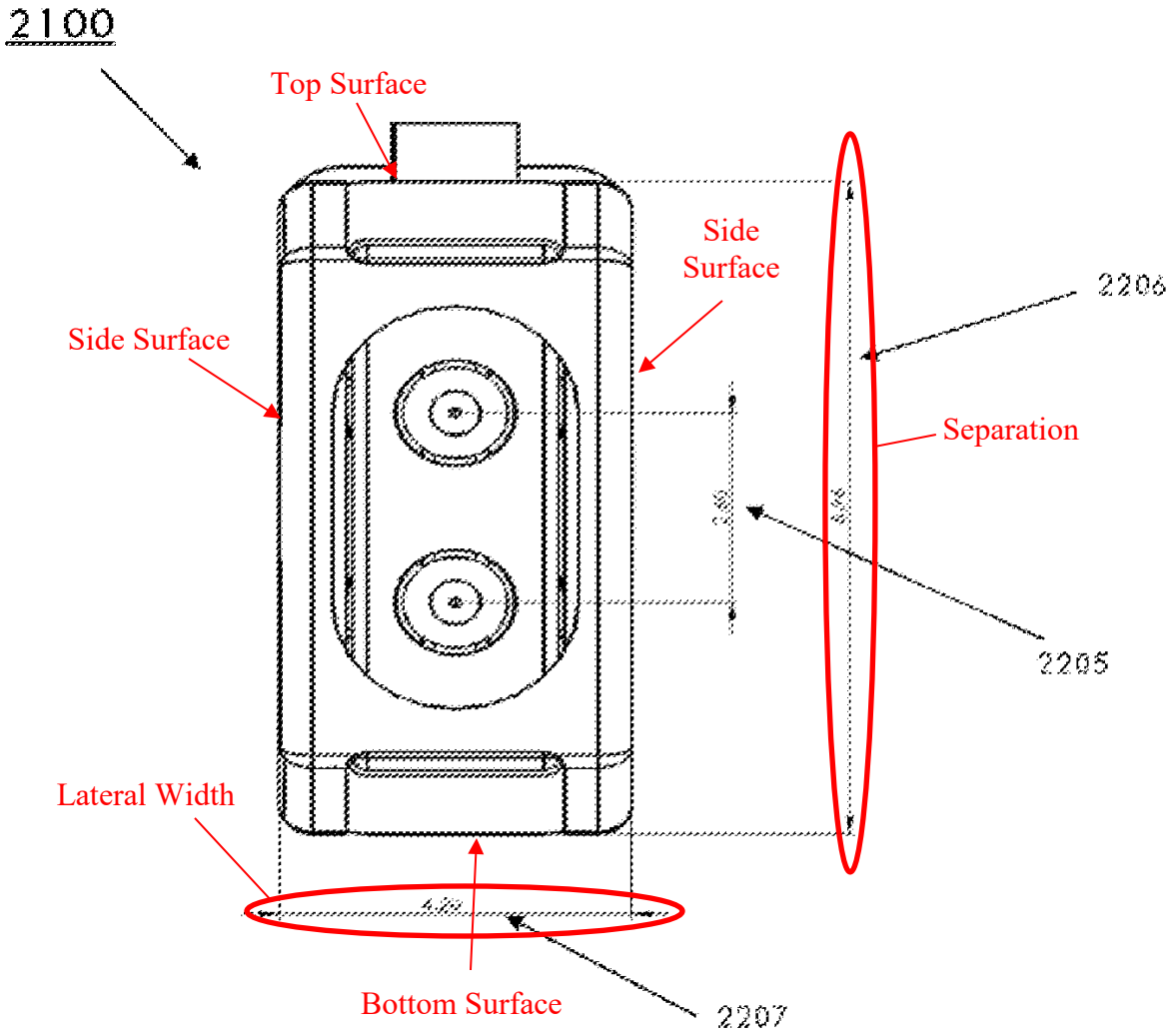


FIG. 22

EX1003: Fig. 22 (annotated).

142. Therefore, in my opinion, Takano'209 meets this limitation.

1.b.1 "two ferrule assemblies disposed within the opening of the housing,"

143. The optical connector (2100) includes two ferrule assemblies (2120) disposed within the opening of the outer housing (2110). EX1003: ¶[0117] ("The

housing 2110 may include a longitudinal bore for accommodating . . . a ferrule assembly 2120."); EX1004: ¶[111], Fig. 21B.

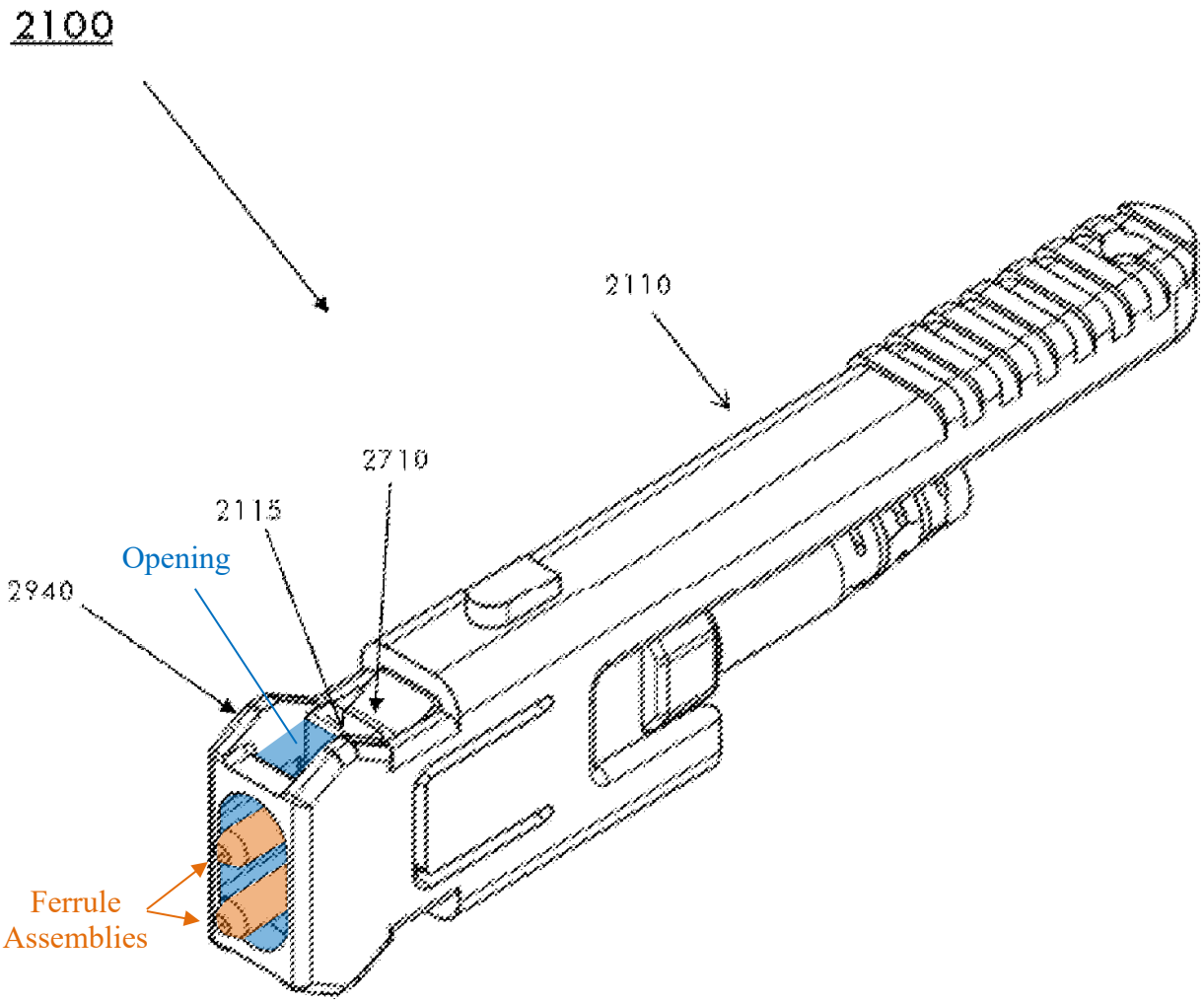


FIG. 21B

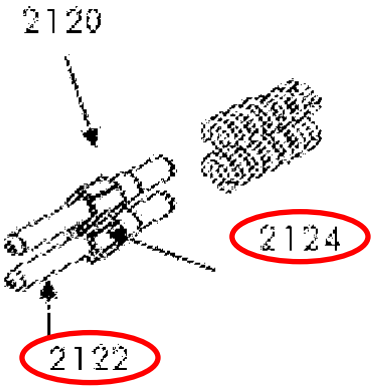
EX1003: Fig. 21B (annotated).

144. Therefore, in my opinion, Takano'209 meets this limitation.

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule,

the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;"

145. Each ferrule assembly (2120) includes a fiber optic ferrule (2122) and a ferrule holder (2124) (e.g., ferrule flange) to precisely hold the fiber optic ferrule. EX1003: ¶[0117]: ("Optical connector 2100 may include ... one or more ferrules 2122, one or more ferrule flanges 2124"); EX1004: ¶[111], Fig. 21A. As shown below, each fiber optic ferrule (2122) extends forward of and away from the front end of the respective ferrule holder (2124). EX1003: Fig. 21A; EX1004: Fig. 21A.



EX1003: Fig. 21A (annotated).

146. Therefore, in my opinion, Takano'209 meets this limitation.

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;"

147. The optical connector (2100) includes two springs (2125). EX1003: ¶[0117]; EX1004: Fig. 21A.

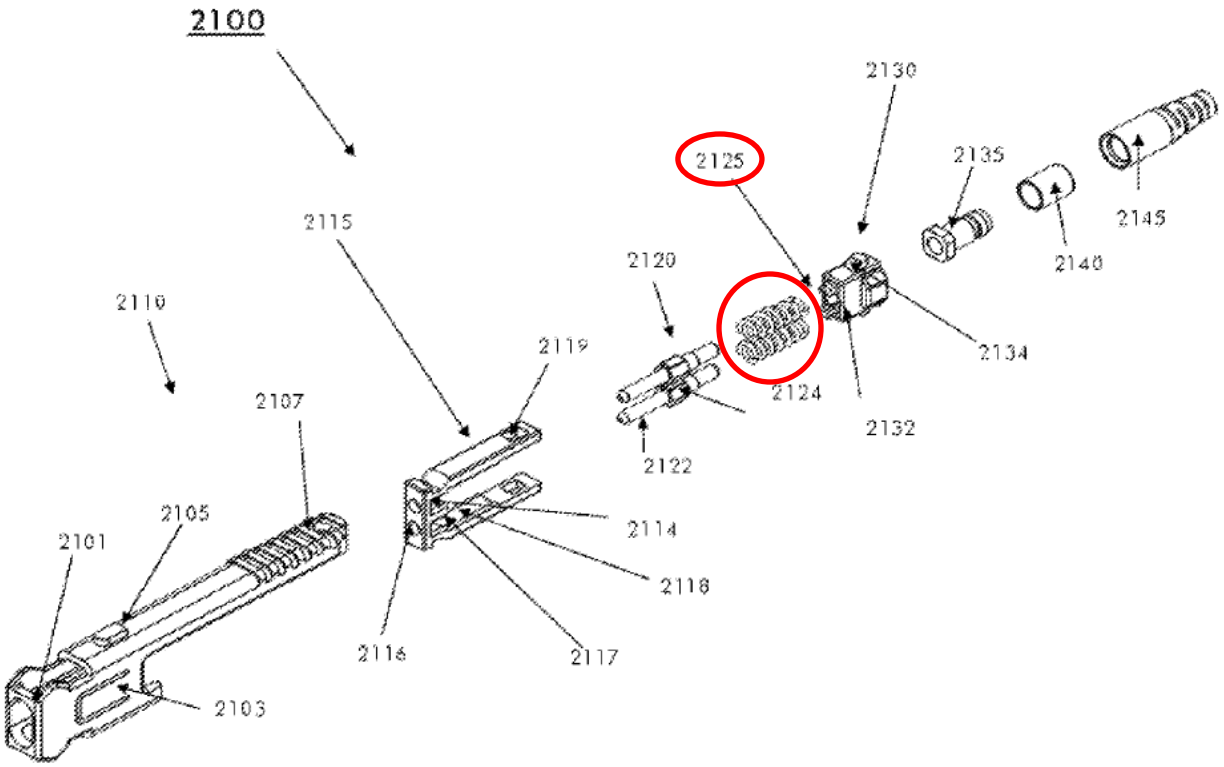
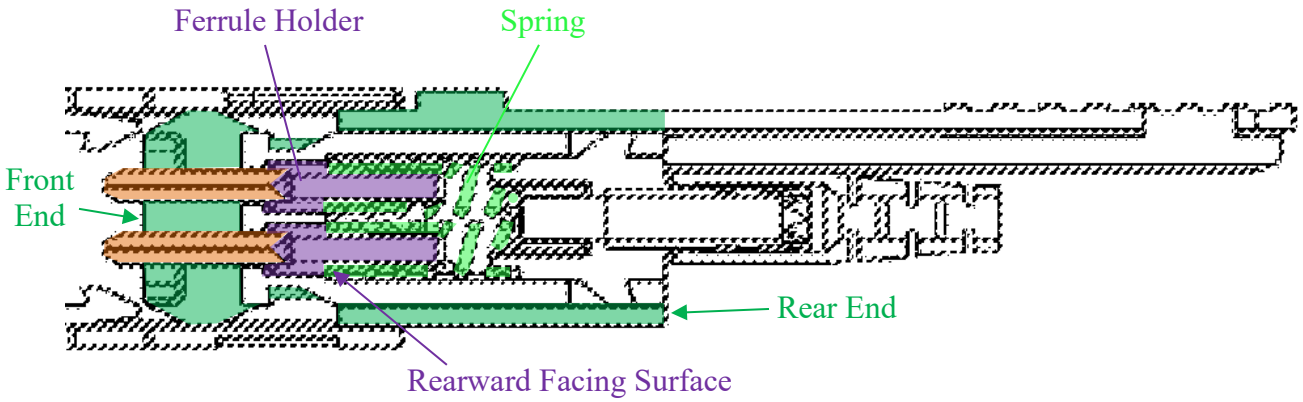


FIG. 21A

EX1003: Fig. 21A (annotated).

148. Each spring (2125) engages a rearward facing surface of the respective ferrule holder (2124) at its front end and extends toward the rear end of the outer housing (2110) to bias the ferrule assembly forward toward the front end of the outer housing. EX1003: Fig. 23B. Each spring (2125) is retained within the outer housing (2110), specifically by being captured between the ferrule holders (2124) (fitted into ferrule alignment slots (2117) of front body (2115)) and the back body (2130). EX1003: ¶[0123] ("During assembly, the ferrule flanges 2124 fit into ferrule flange alignment slots 2117 (see FIGS. 27A and 27B) adjacent the ferrule openings 2116 of the front body, compressing the springs 2125 (preload). . . . As

seen in the assembled cross-sectional views of FIGS. 23A and 23B, the springs 2125 are positioned to urge the ferrules 2122 into contact with mating connectors or transceiver optics, ensuring minimum insertion loss."); EX1004: ¶[117], Fig. 21A.



EX1003: Fig. 23B (annotated).

149. Therefore, in my opinion, Takano'209 meets this limitation.

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"

150. The optical connector (2100) has a two-piece crimp body made up of the back body (2130) and a back post (2135) that are secured to one another. EX1003: ¶[0117]; EX1004: Fig. 21A. The '466 Patent explains a crimp body can be two pieces secured together. EX1001: 7:20-23 ("While the crimp body 106 is illustrated as a single, unitary body (i.e., molded at one time with one material), it could also be molded as two pieces and then later the two pieces secured to one another.").

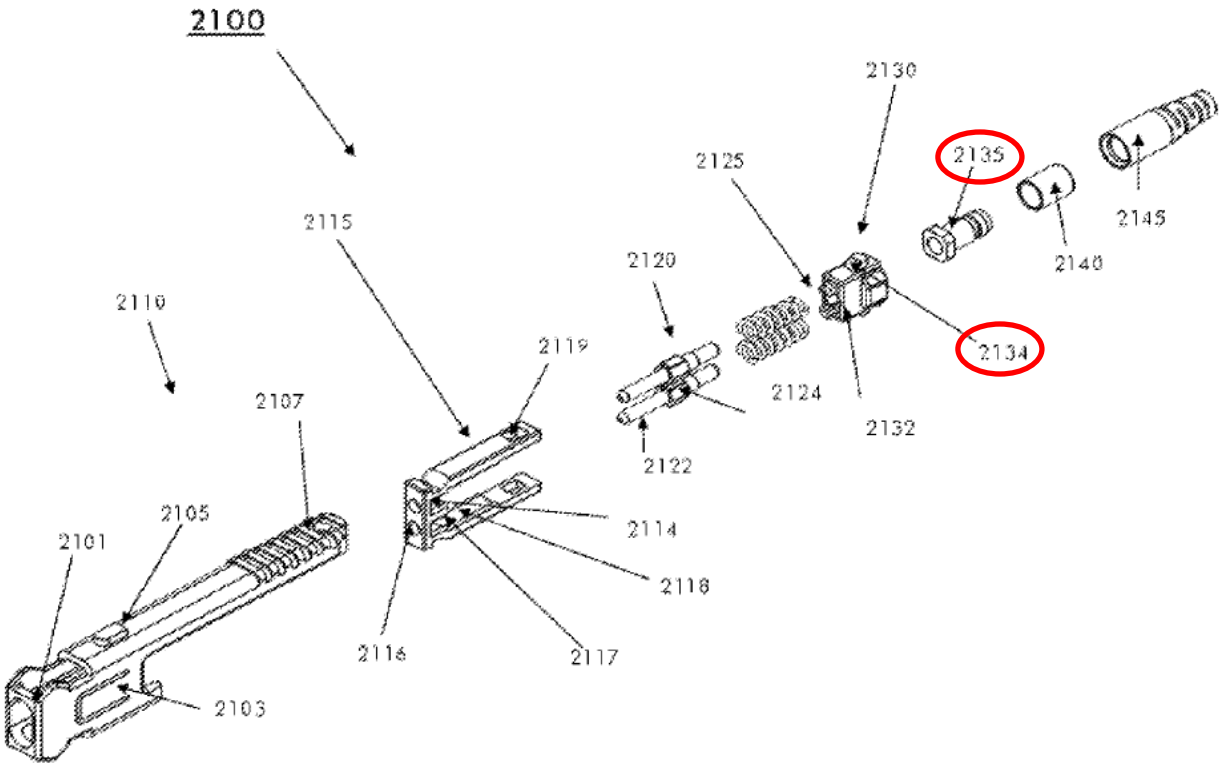
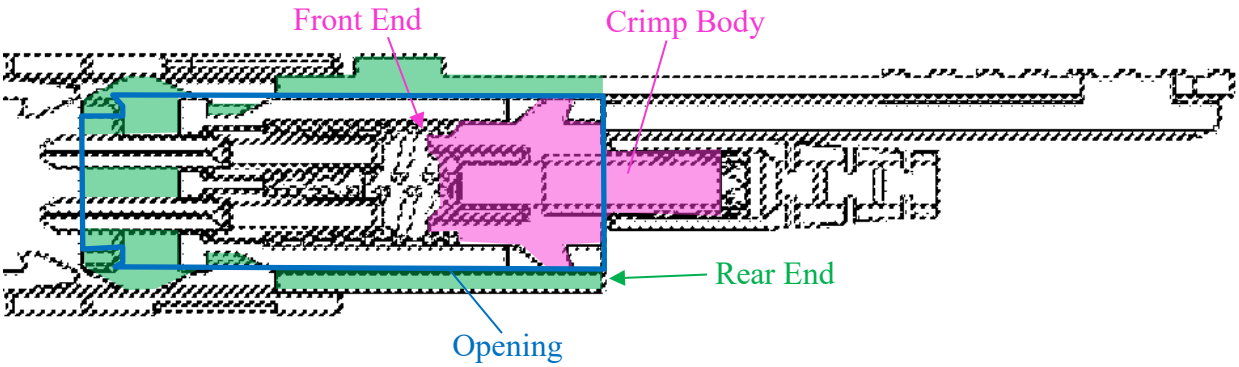


FIG. 21A

EX1003: Fig. 21A (annotated).

151. The crimp body (2130, 2135) is secured to the optical connector (2100) via protrusions (2134) that "interlock with a back body hook window/cutout 2119 in the front body 2115." EX1003: ¶[0122]; EX1004: ¶[116]. As shown in FIG. 23B below, the front end of the crimp body (2130, 2135) is disposed in the opening at the rear end of the outer housing (2110). EX1003: Fig. 23B.

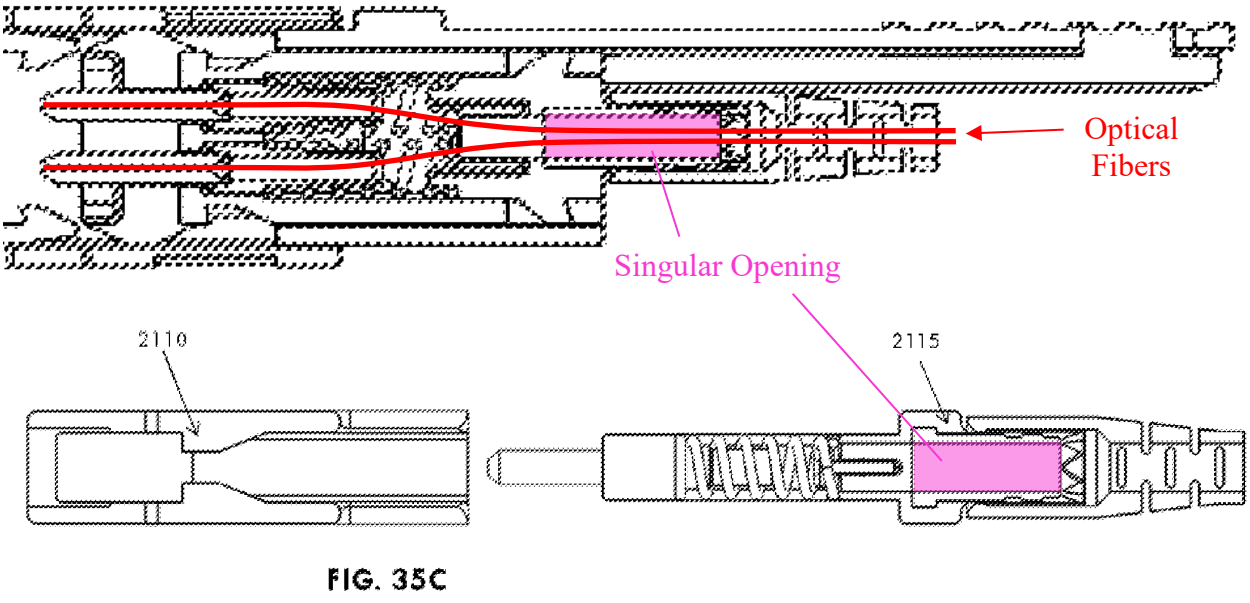


EX1003: Fig. 23B (annotated).

152. Therefore, in my opinion, Takano'209 meets this limitation.

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;"

153. The back post (2135) of the crimp body has a singular opening for optical fibers at the rear end of the crimp body. EX1003: Figs. 23B and 35C.



EX1003: Figs. 23B and 35C (annotated).

154. Therefore, in my opinion, Takano'209 meets this limitation.

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and"

155. The "outer housing 2110 may include . . . a connector alignment key 2105 used during interconnection." EX1003: ¶[0117]; EX1004: ¶[111]. Takano'209 explains the "adapter housing 2402 further includes connector alignment slots 2403 that mate with the connector alignment key 2105." EX1003: [0127]; EX1004: ¶[121]. Accordingly, the alignment key (2105) is "an alignment feature on . . . the top surface . . . of the housing configured to guide the fiber optic connector into an adapter" (2400), as recited by limitation 1.e, by mating with the alignment slot (2403) in the adapter. EX1003: Fig. 31; EX1004: Figs. 21B and 31.

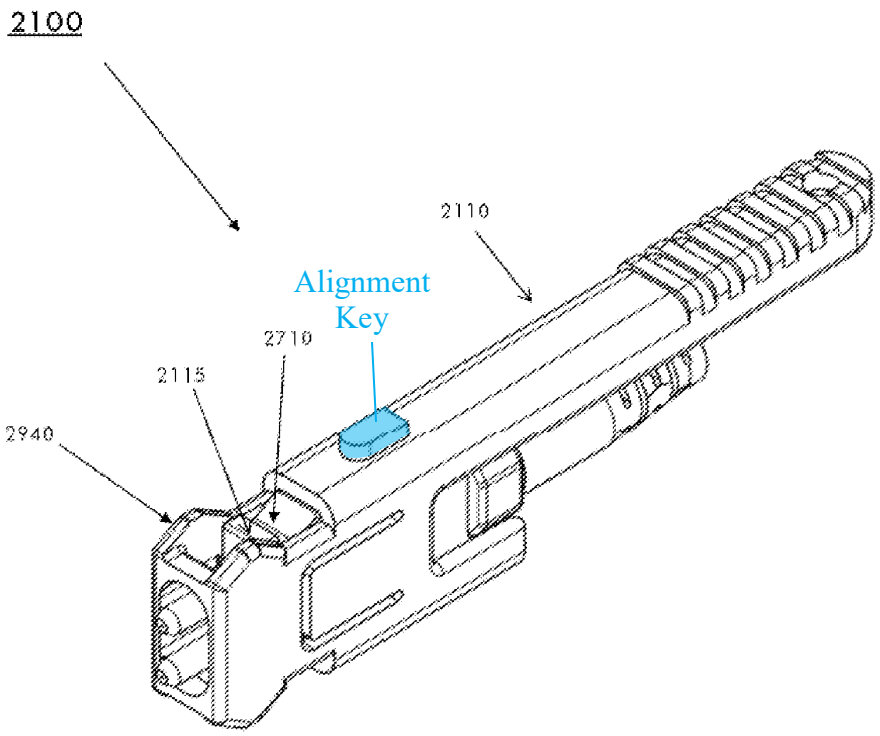


FIG. 21B

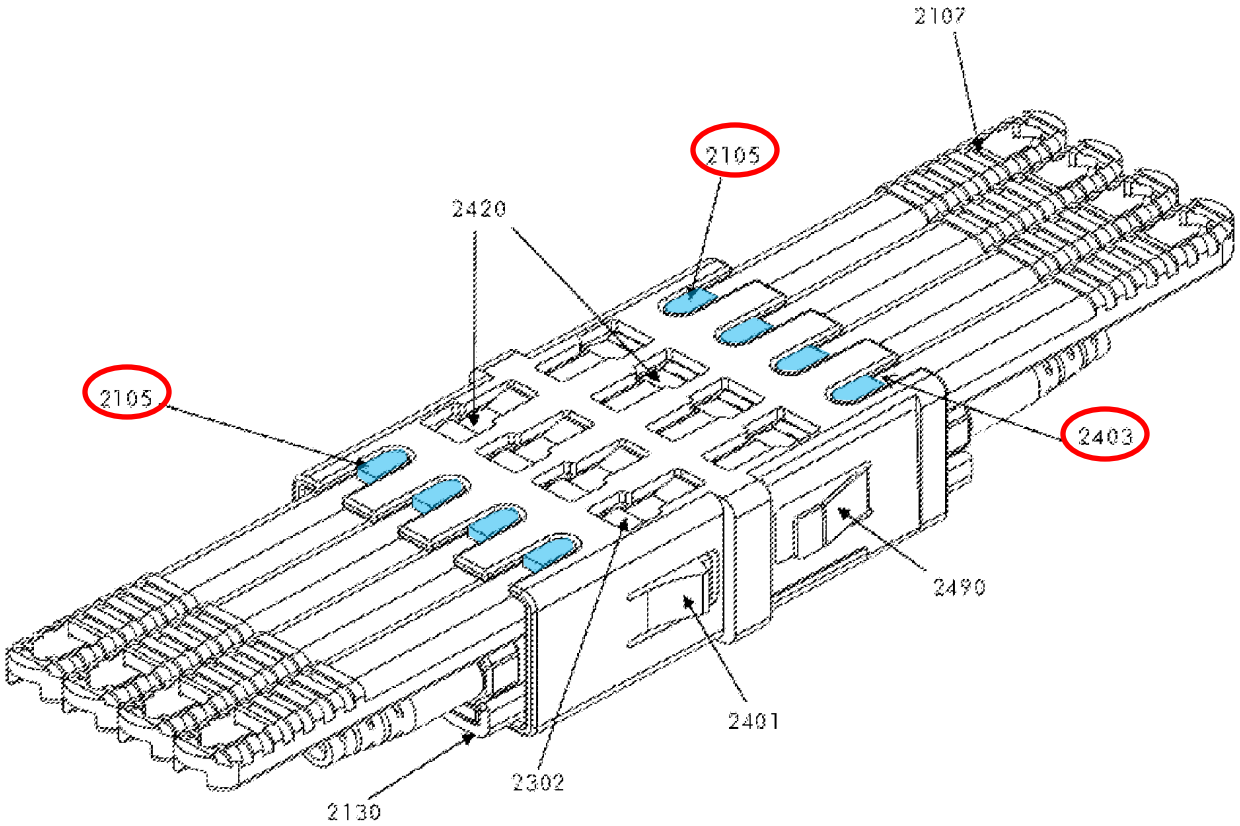


FIG. 31

EX1003: Figs. 21B and 31.

156. Therefore, in my opinion, Takano'209 meets this limitation. Takano'209 meets this limitation under either interpretation of this limitation—Section V(A)—as both interpretations at a minimum require an alignment feature on the top surface of the housing, which Takano'209 has as explained above.

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with

the singular opening of the crimp body through which optical fibers pass."

157. The optical connector (2100) includes a boot (2145) coupled to the rear end of the crimp body (specifically, back post (2135)). EX1003: ¶[0117]. The boot (2145) has a longitudinal opening visible in Fig. 21A.

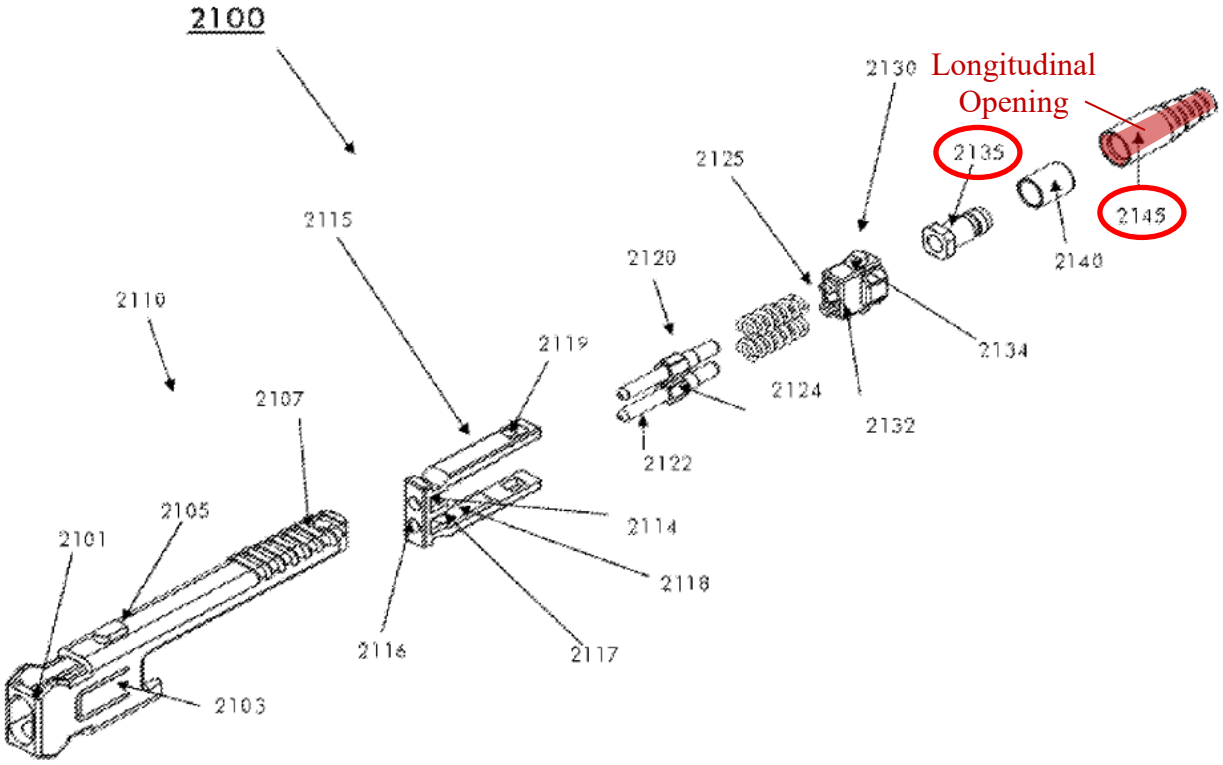
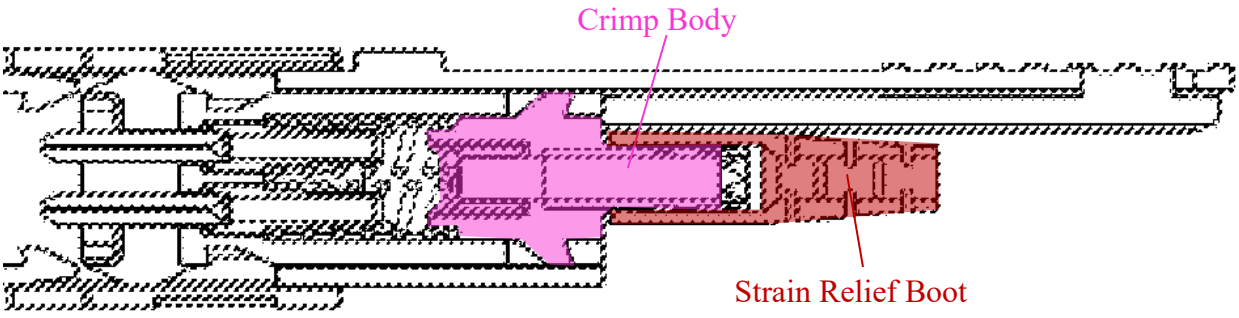


FIG. 21A



EX1003: Figs. 21A and 23B (annotated).

158. The longitudinal opening of the boot (2145) is in continuum with the singular opening of the crimp body through which optical fibers pass from a cable to the ferrules. EX1003: Figs. 23B and 35C; EX1004: Figs. 23B and 35C.

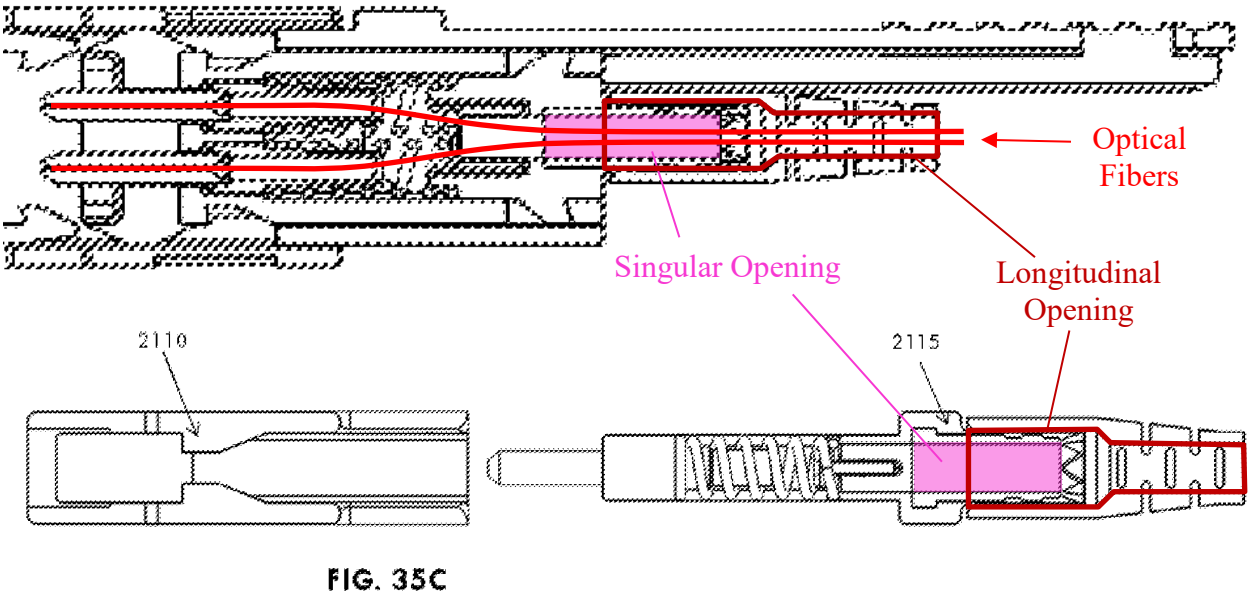


FIG. 35C

EX1003: Figs. 23B and 35C (annotated).

159. Therefore, in my opinion, Takano'209 meets this limitation.

B. Claim 2 "The fiber optic connector according to claim 1, wherein the alignment feature is positioned rearward of the front end of the housing and extends away from the front end of the housing."

160. The alignment key (2105) of the connector (2100) is positioned rearward of the front end of the outer housing (2110) and extends longitudinally from a front end in a rear direction away from the front end of the outer housing. EX1003: Fig. 21B; EX1004: Fig. 21B.

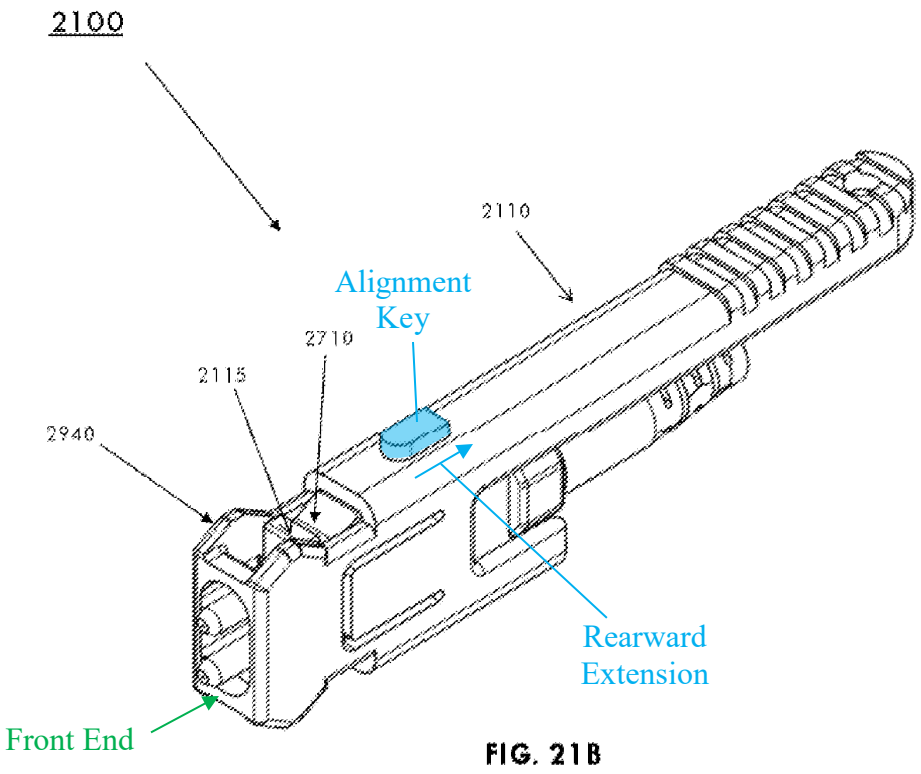


FIG. 21B

EX1003: Fig. 21B (annotated).

161. Therefore, in my opinion, Takano'209 meets this claim.

C. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

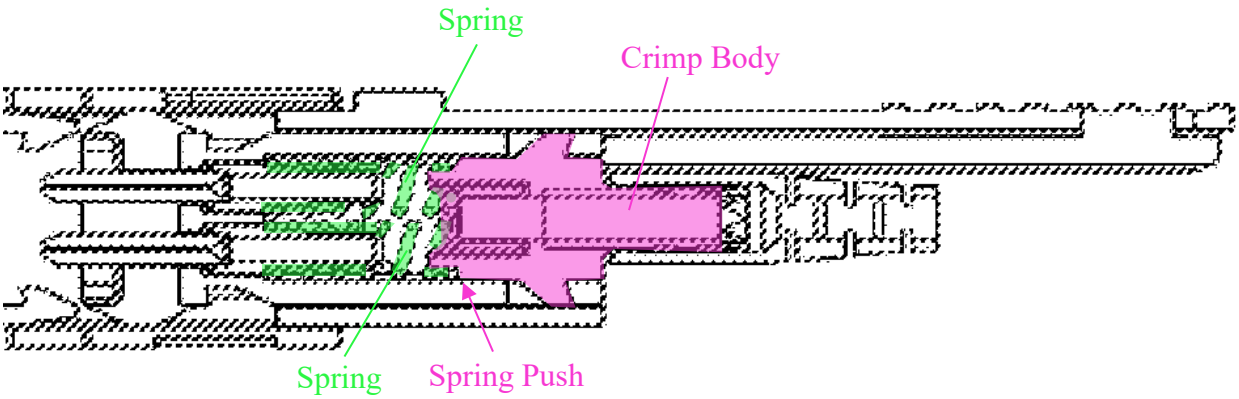
162. I have been informed that there is a presumption that claims having different claim elements have different scope. The difference in meaning and scope between claims is presumed to be significant to the extent that the absence of such difference would render a claim superfluous. This doctrine is especially strong when applied to a dependent claim and the claim from which it depends. The presence of a dependent claim that adds a particular element gives rise to the

presumption that the element in question is not present in the parent claim. This doctrine of claim differentiation is not absolute, however, and it cannot broaden claims beyond their proper scope or alter a definition that is otherwise clear from the claim language, specification, and prosecution history.

163. Claim 4—which depends from claim 3—recites that "the spring push is separate from the crimp body." Based on the concept of claim differentiation—i.e., claim 4 narrows the scope of claim 3—the "spring push" recited in claim 3 is not excluded from being part of the crimp body because claim 4 will then narrow this scope of claim 3 by stating "the spring push is separate from the crimp body."

164. Therefore, using the concept of claim differentiation as it has been explained to me, in my opinion, claim 3 covers a spring push that could be part of the crimp body.

165. The crimp body (particularly, back body (2130)) forms a spring push engaging a rear portion of each of the two ferrule springs (2125). EX1003: Fig. 23B, ¶[0123] ("The ends of the springs are secured on spring guides (FIGS. 28A, 28B) of back body 2130 by spring tension. As seen in the assembled cross-sectional views of FIGS. 23A and 23B, the springs 2125 are positioned to urge the ferrules 2122 into contact with mating connectors or transceiver optics, ensuring minimum insertion loss."); EX1004: ¶[117], Fig. 23B.

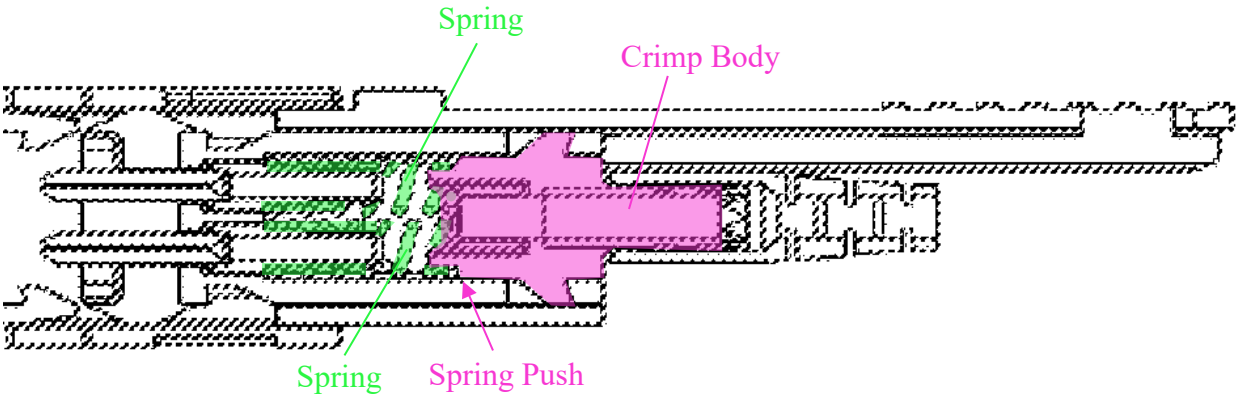


EX1003: Fig. 23B (annotated).

166. Therefore, in my opinion, Takano'209 meets this claim.

D. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously."

167. As shown below, the back body (2130) engages the rear portion of each of the two springs (2120) simultaneously. EX1003: Fig. 23B; EX1004: Fig. 23B.



EX1003: Fig. 23B (annotated).

168. Therefore, in my opinion, Takano'209 meets this claim.

E. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

169. The pull tab (2107) provides an indicia of polarity. The pull tab (2107) is affixed to the top side of the main body and provides a clear indication to the user of which side is the top side (there is no pull tab on the bottom), i.e., which side has the alignment key (2105) that can only mate with the adapter (2400) when properly aligned to the alignment slot (2403). EX1003: Fig. 21B; EX1004: Fig. 21B.

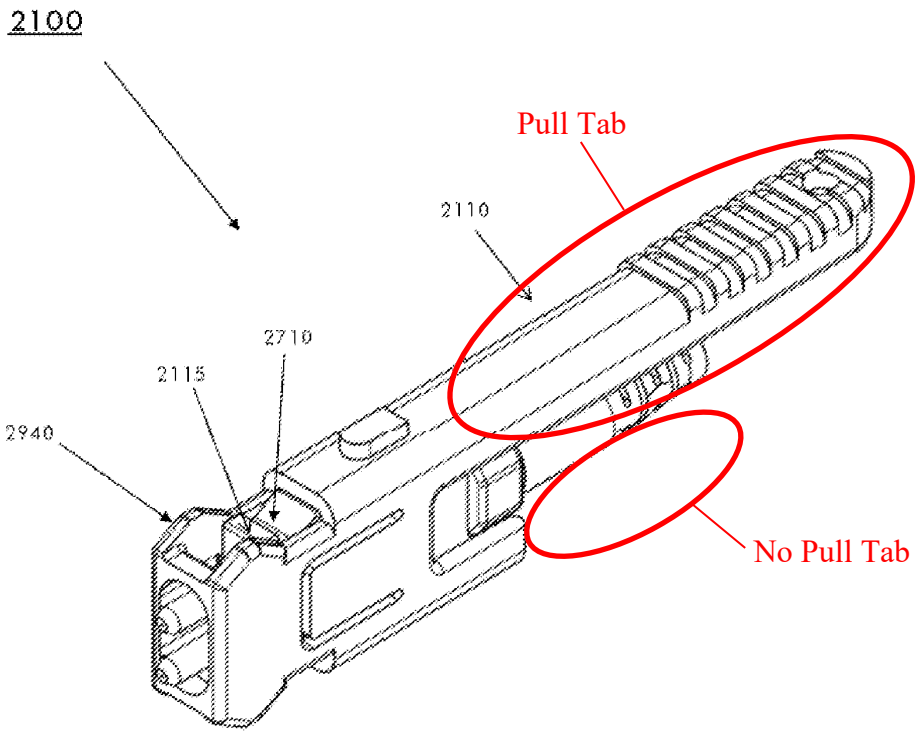


FIG. 21B

EX1003: Fig. 21B (annotated).

170. Alternatively or in addition, the alignment key (2105) is also an indicia of polarity because it is only found on one side of the outer housing (2105)

(but not the other) and it indicates the orientation in which the connector must be plugged into a mating receptacle. EX1003: Fig. 22; EX1004: Fig. 22.

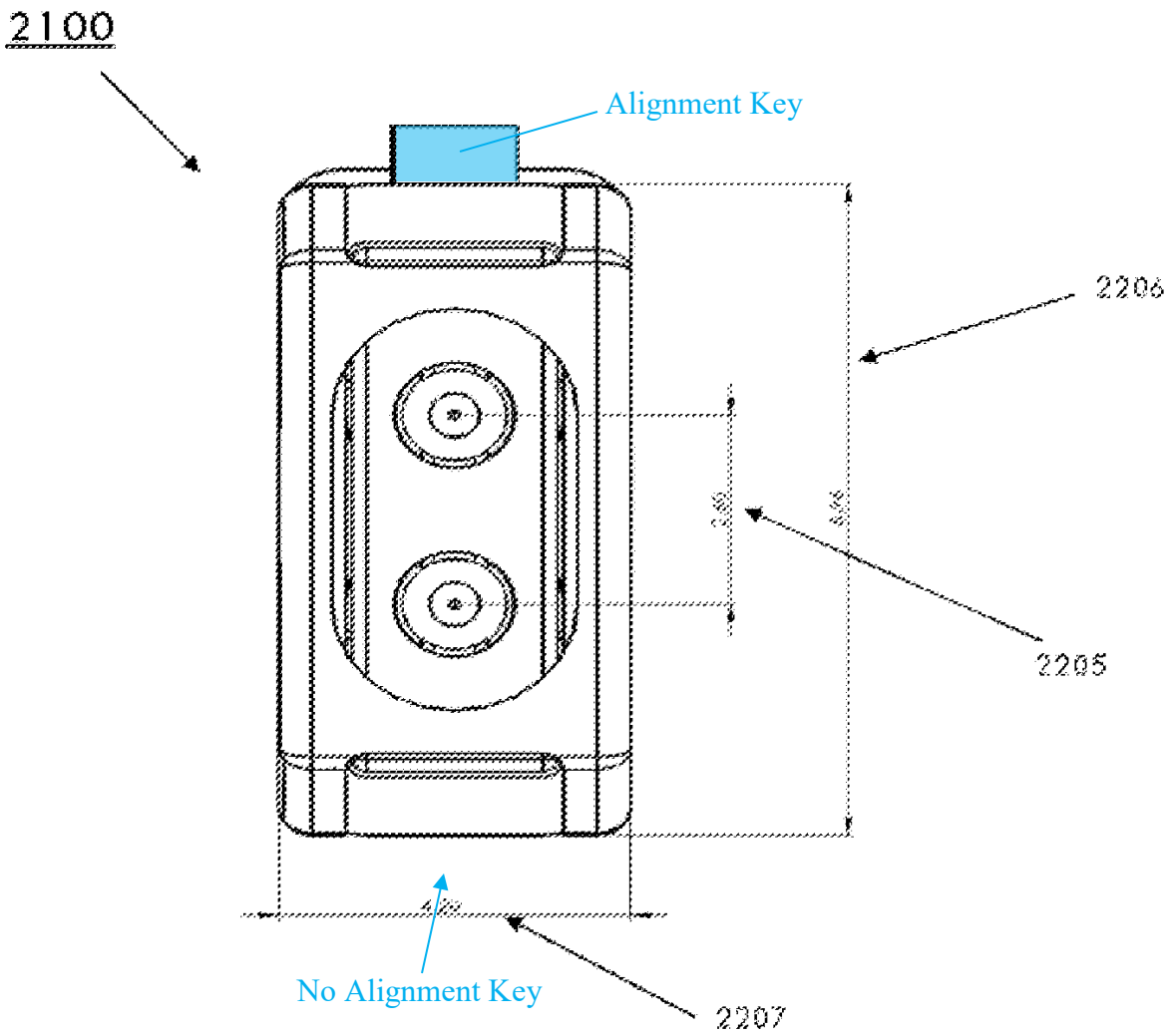


FIG. 22

EX1003: Fig. 22 (annotated).

171. Therefore, in my opinion, Takano'209 meets this claim.

F. Claim 7

7.a "The fiber optic connector according to claim 1, further comprising: a crimp band secured around an outer surface of the rear end of the crimp body, and"

172. The optical connector (2100) includes a crimp ring (2140), which meets "a crimp band" recited in claim 7. EX1003: ¶[0117]; EX1004: ¶[111], Fig. 21A.

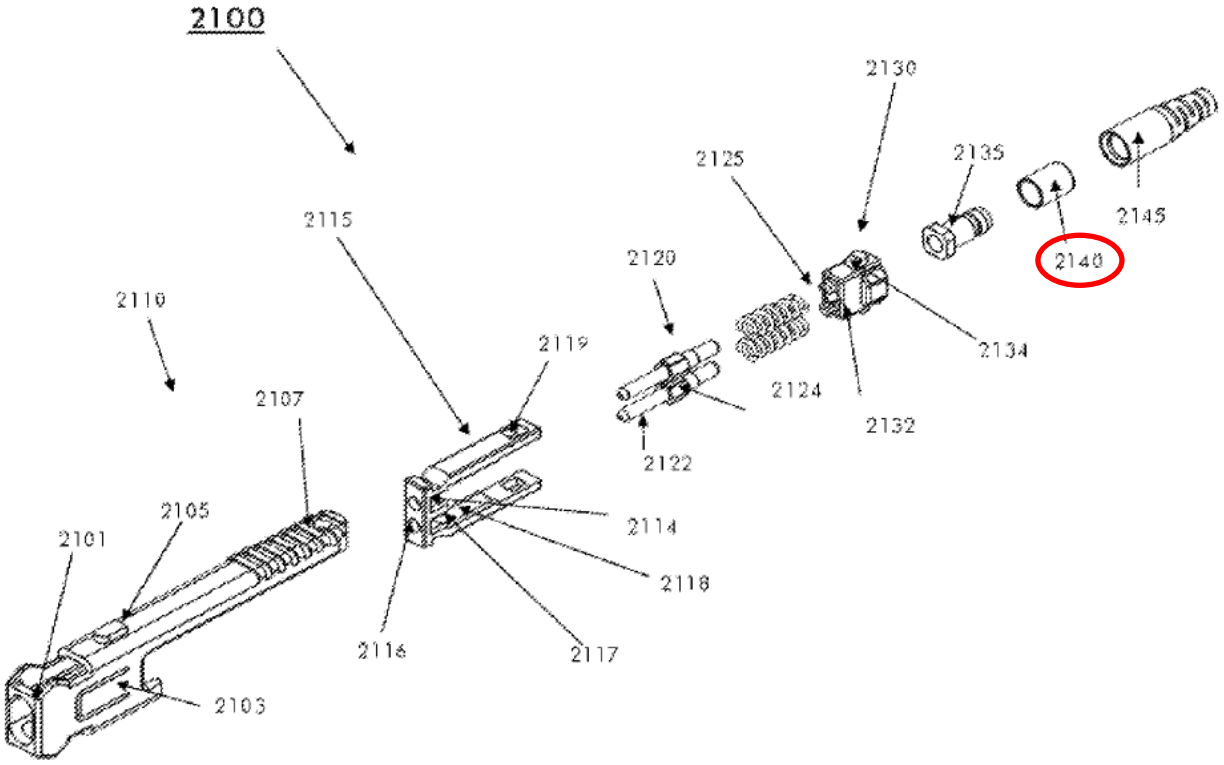
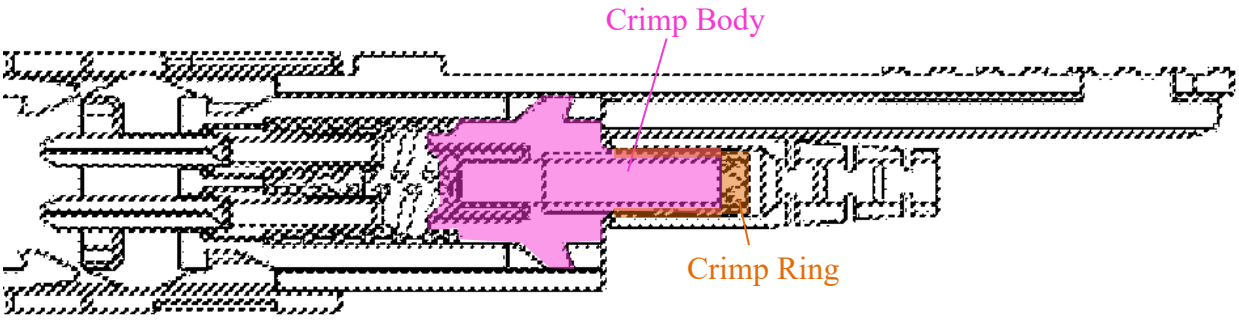


FIG. 21A

EX1003: Fig. 21A (annotated).

173. The crimp ring (2140) is secured around an outer surface of the rear end of the two-piece crimp body (2130, 2135), specifically by being crimped onto the back post (2135) of the crimp body. EX1003: Fig. 23B; EX1004: Fig. 23B.



EX1003: Fig. 23B (annotated).

174. Therefore, in my opinion, Takano'209 meets this limitation.

7.b "wherein the strain relief boot extends rearwardly away from the housing."

175. The boot (2145) extends rearward away from the rear end of the main body of the outer housing (2110), which meets "strain relief boot extends rearwardly away from the housing" as recited by limitation 7.b. EX1003: Fig. 21B; EX1004: Fig. 21B.

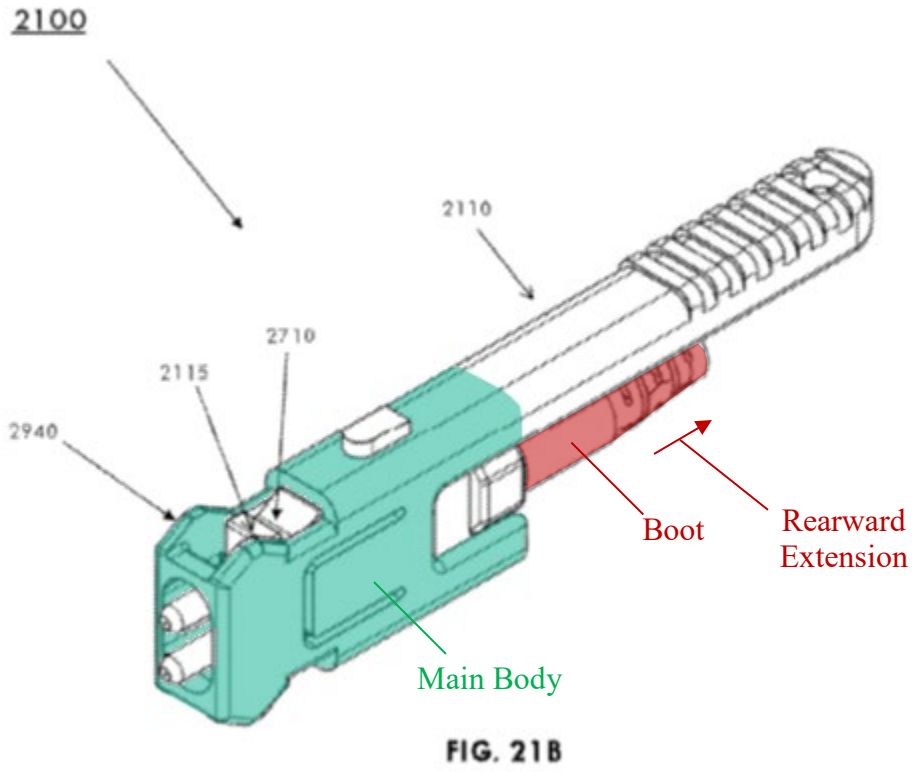


FIG. 21B

EX1003: Fig. 21B (annotated).

176. In my opinion, the presence of the pull tab (2107) does not prevent Takano'209's optical connector (2100) from meeting this limitation.

177. Takano'209 teaches an embodiment where the pull tab is removed from the optical connector. Takano'209 repeatedly states that the pull tab (2107) is an ***optional*** feature of the optical connector (2100). EX1003: ¶¶[0117] ("The outer housing 2110 ***may*** include … an ***optional*** pull tab 2107 to facilitate removal of the connector 2100 when connected in a dense array of optical connectors."), [0124] ("***optional*** pull tab 2107"); EX1004: ¶¶[111], [118]. In other words, Takano'209

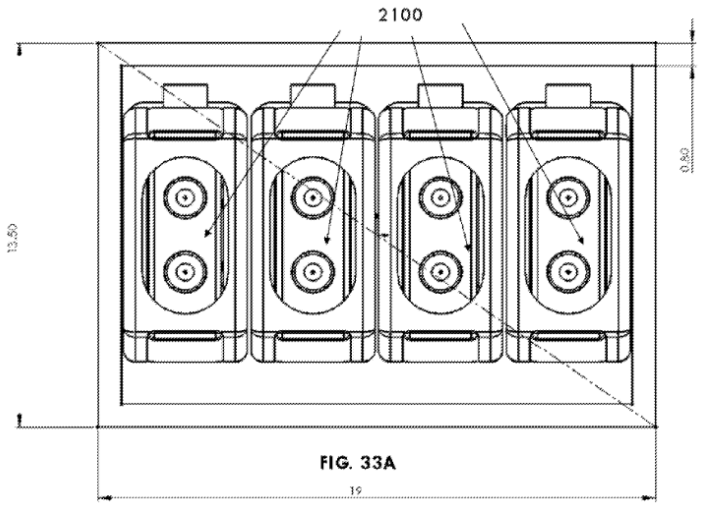
expressly teaches an embodiment where the outer housing (2110) does not have a pull tab (2107). EX1003: ¶¶[0117], [0124]; EX1004: ¶¶[111], [118].

178. Following Takano'209's teaching to remove the pull tab (2107), the top portion of the outer housing (2110) would be cut off in-line with where the bottom portion of the connector is (i.e., the outer housing above would only include the green main body and the alignment key (2105)). In this embodiment, the boot (2145) extends rearward beyond the rearmost point on any piece of the outer housing (2110). In this embodiment, a user would still be able to grab the outer housing (2110) to remove the optical connector (2100) from the adapter because the outer housing extends out of the adapter and therefore can be grabbed by the user, such as by squeezing the top and bottom surfaces of the outer housing.

179. Therefore, in my opinion, Takano meets this limitation.

G. Claim 12 "The fiber optic connector according to claim 1, wherein the front end of the housing fits in a QSFP footprint."

180. Takano'209 explains the optical connector (2100) fits within a "quad small form factor pluggable (QSFP) footprint." EX1003: ¶[0132] ("in a quad small form factor pluggable (QSFP) footprint of 13.5×19 mm, four connectors 2100 having a total of eight LC-type ferrules 2122 may be accommodated as seen in FIG. 33A"). Therefore, the front end of the outer housing (2110) of the optical connector (2100) fits in the QSFP footprint.



EX1003: Fig. 33A.

181. Therefore, in my opinion, Takano'209 meets this claim.

H. Claim 13 "The fiber optic connector according to claim 1, wherein the crimp body is a two-piece crimp body."

182. The optical connector (2100) includes a two-piece crimp body made up of the back body (2130) and the back post (2135). EX1003: Fig. 21A; EX1004: Fig. 21A.

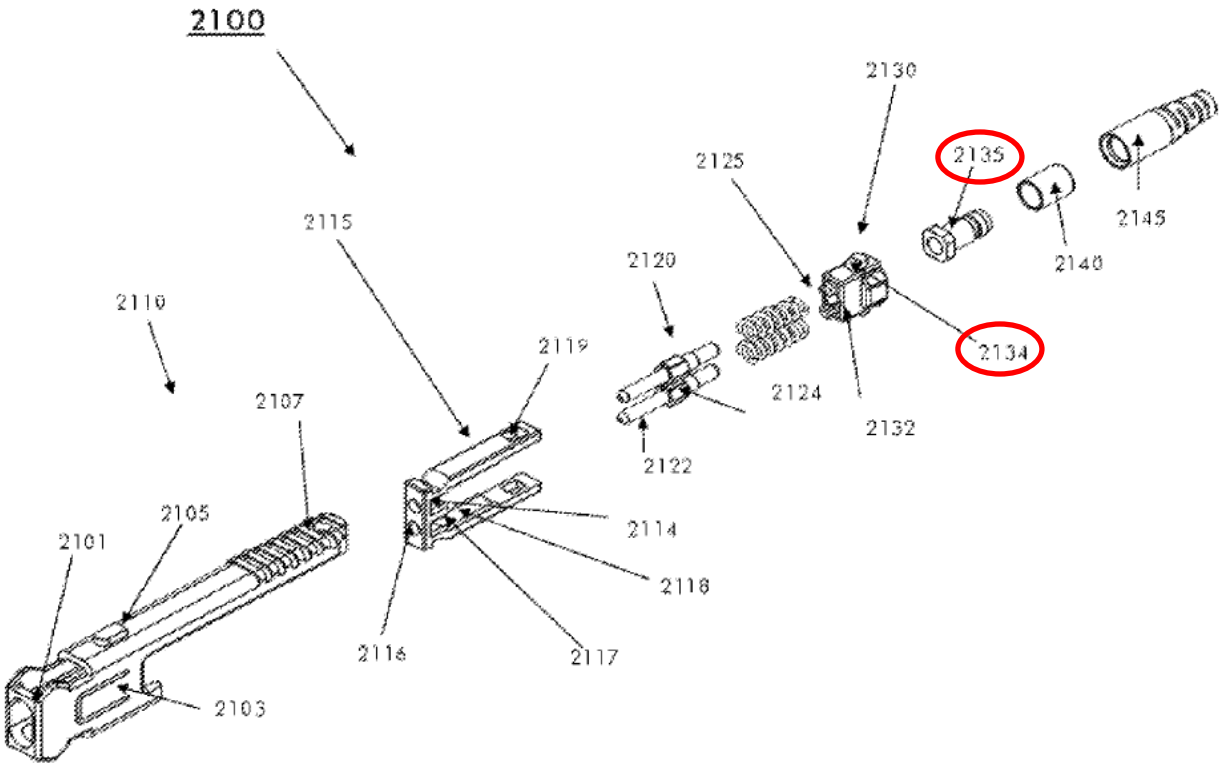


FIG. 21A

EX1003: Fig. 21A (annotated).

183. Therefore, in my opinion, Takano'209 meets this claim.

I. Claim 14 "The fiber optic connector according to claim 1, wherein the alignment feature includes a vertical alignment feature and a horizontal alignment feature."

184. The alignment key (2105) of the optical connector (2100) is an alignment feature that includes a vertical alignment feature and a horizontal alignment feature, regardless of how these terms are construed, (*see* Section V(B)).

185. If "vertical alignment feature" is construed to mean a feature that extends vertically and "horizontal alignment feature" is construed to mean a feature that extends horizontally, then the "vertical alignment feature" is met by surfaces A

of the alignment key (2105) and the "horizontal alignment feature" is met by surface B of the alignment key (2105), both shown below in Fig. 22 (annotated).

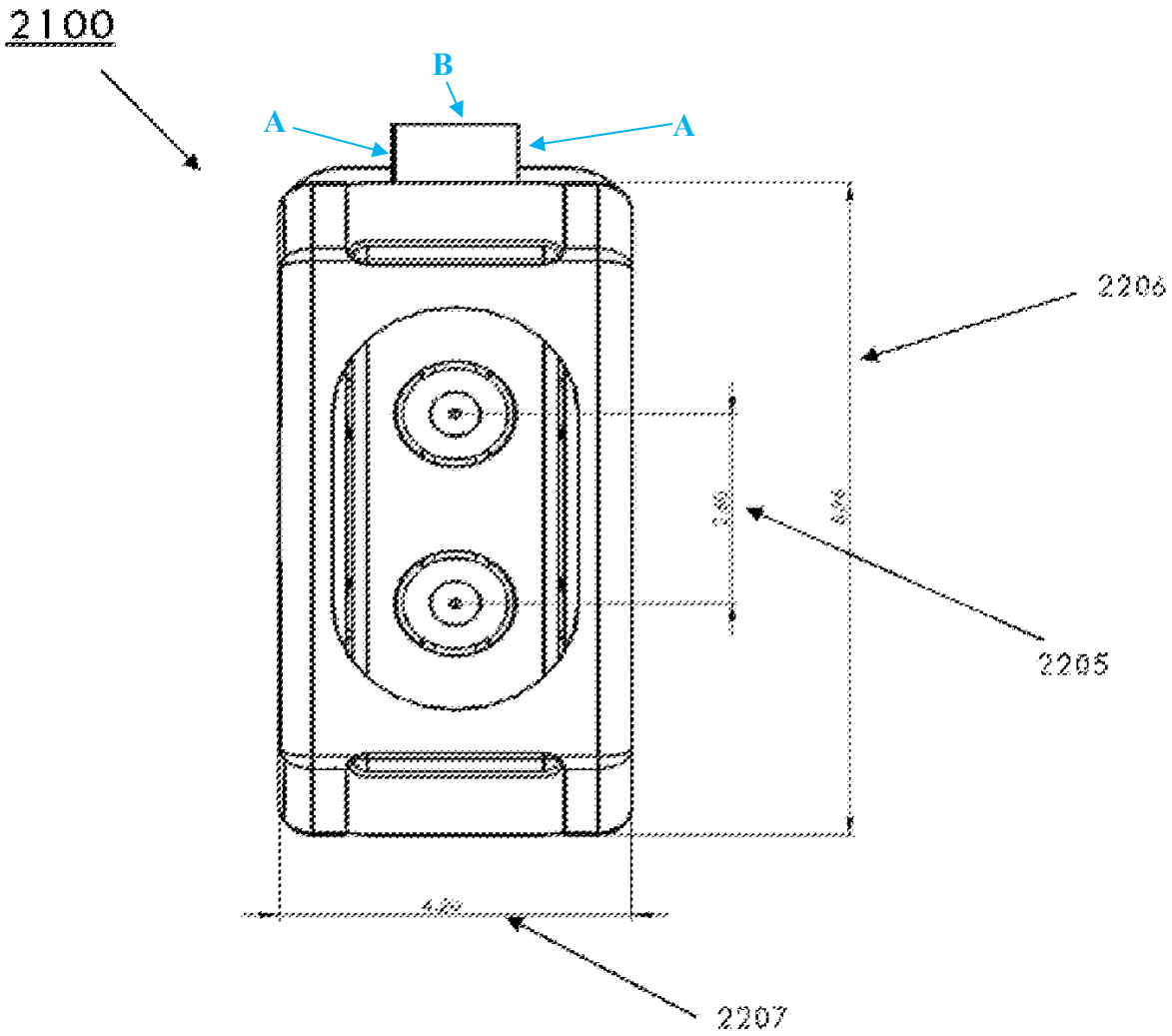


FIG. 22

EX1003: Fig. 22 (annotated).

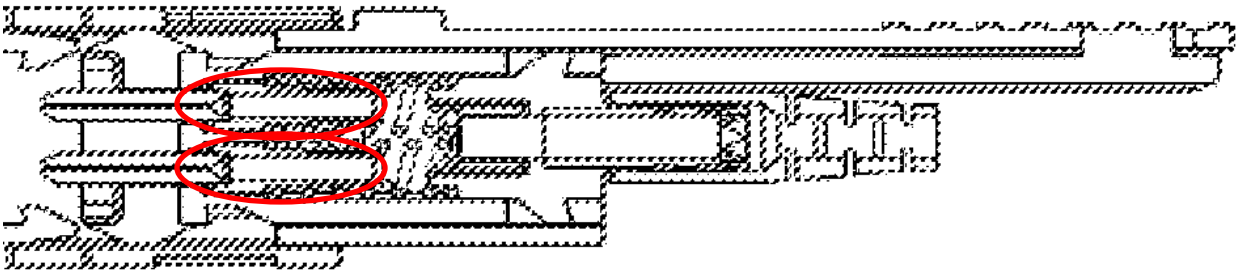
186. If "vertical alignment feature" is construed to mean a feature that is capable of engaging a mating alignment structure to align the connector vertically and "horizontal alignment feature" is construed to mean a feature that is capable of

engaging a mating alignment structure to align the connector horizontally, then the "vertical alignment feature" is met by surface B and the "horizontal alignment feature" is met by surfaces A, both shown above in Fig. 22 (annotated). EX1003: Fig. 22; EX1004: Fig. 22. Surface B is capable of engaging a portion of an adapter to vertically align the connector relative to an adapter. Similarly, surfaces A are capable of engaging a portion of an adapter, such as the sides of the alignment slots or keyways, to horizontally align the connector relative to an adapter.

187. Therefore, in my opinion, Takano'209 meets this claim.

J. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats."

188. Under any construction of this claim, the two ferrule seats are located somewhere in the circled areas below. Section V(C).



EX1003: Fig. 23B (annotated).

189. Each connector orientation protrusion (2910) of the outer housing (2110) meets the requirement of the wall in claim 15, as best I can understand,

because it forms a wall between the locations where two ferrule assemblies (2150) are seated in the outer housing and it extends rearward relative to the ferrule alignment slots (2117) where the ferrule holders (2124) are seated in the front body (2115). EX1003: ¶¶[0117], [0120]; EX1004: Figs. 23B, 27B, and 29E.

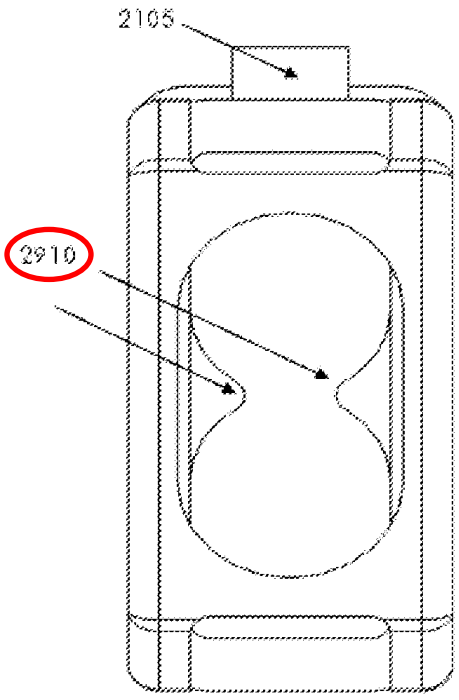


FIG. 29B

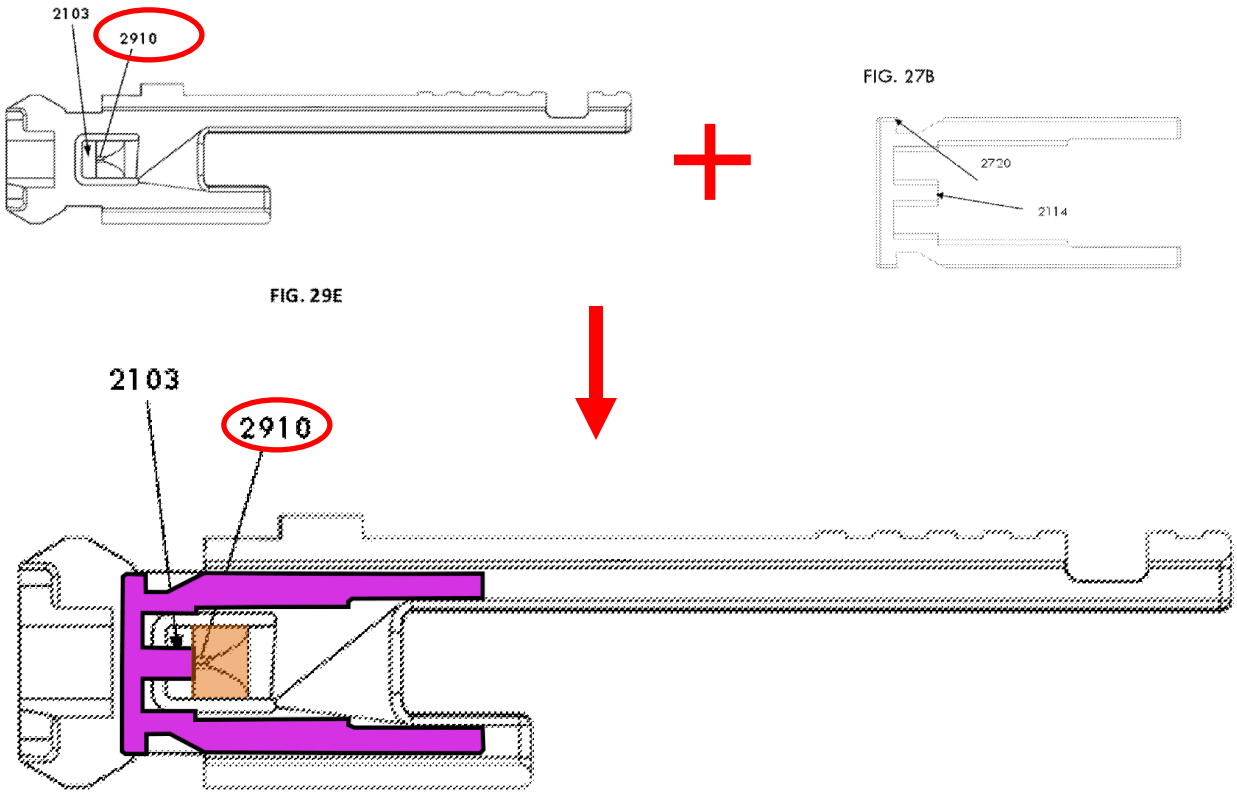
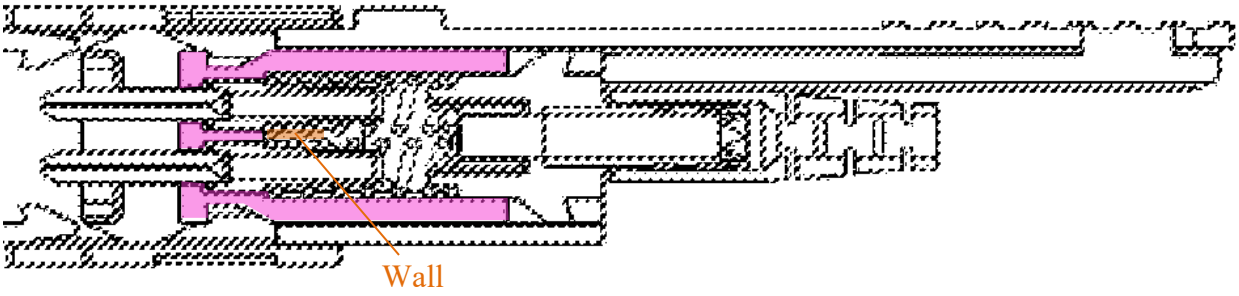


FIG. 29E



EX1003: Figs. 23B, 27B, and 29B&E (annotated).

190. Alternatively or in addition, the front body (2115) includes a wall separating the ferrule assemblies (2150) between the locations where the ferrule assemblies are seated in the outer housing and the wall extends rearward relative to

the ferrule alignment slots (2117) where the ferrule holders (2124) are seated in the front body (2115).

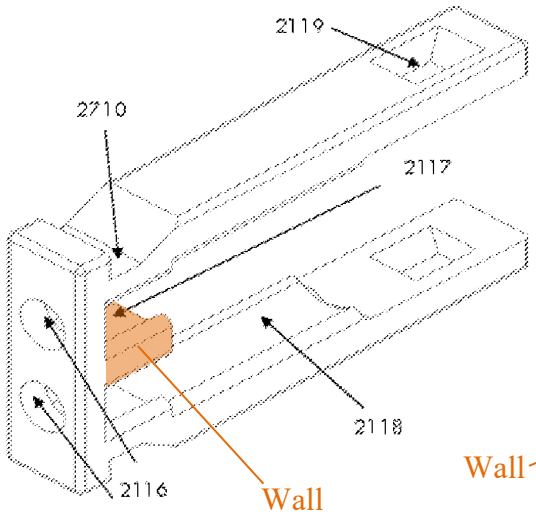
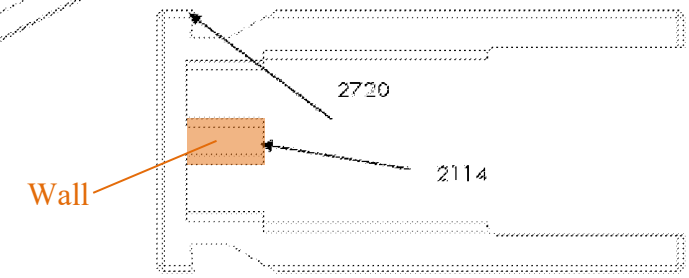
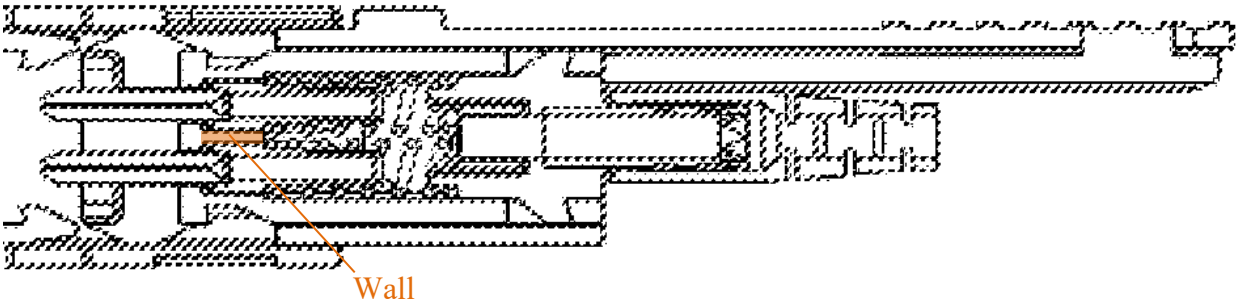


FIG. 27A

FIG. 27B





EX1003: Figs. 27A&B and 23B (annotated).

191. Therefore, in my opinion, Takano'209 meets this claim.

K. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

192. There is a radial gap between each connector orientation protrusion (2910) of the outer housing (2110) and each ferrule holder (2124) sufficient to

accommodate the portion of the ferrule spring (2124) received over the rear end of the ferrule holder. EX1003: Fig. 23B and 29C; EX1004: Fig. 23B and 29C.

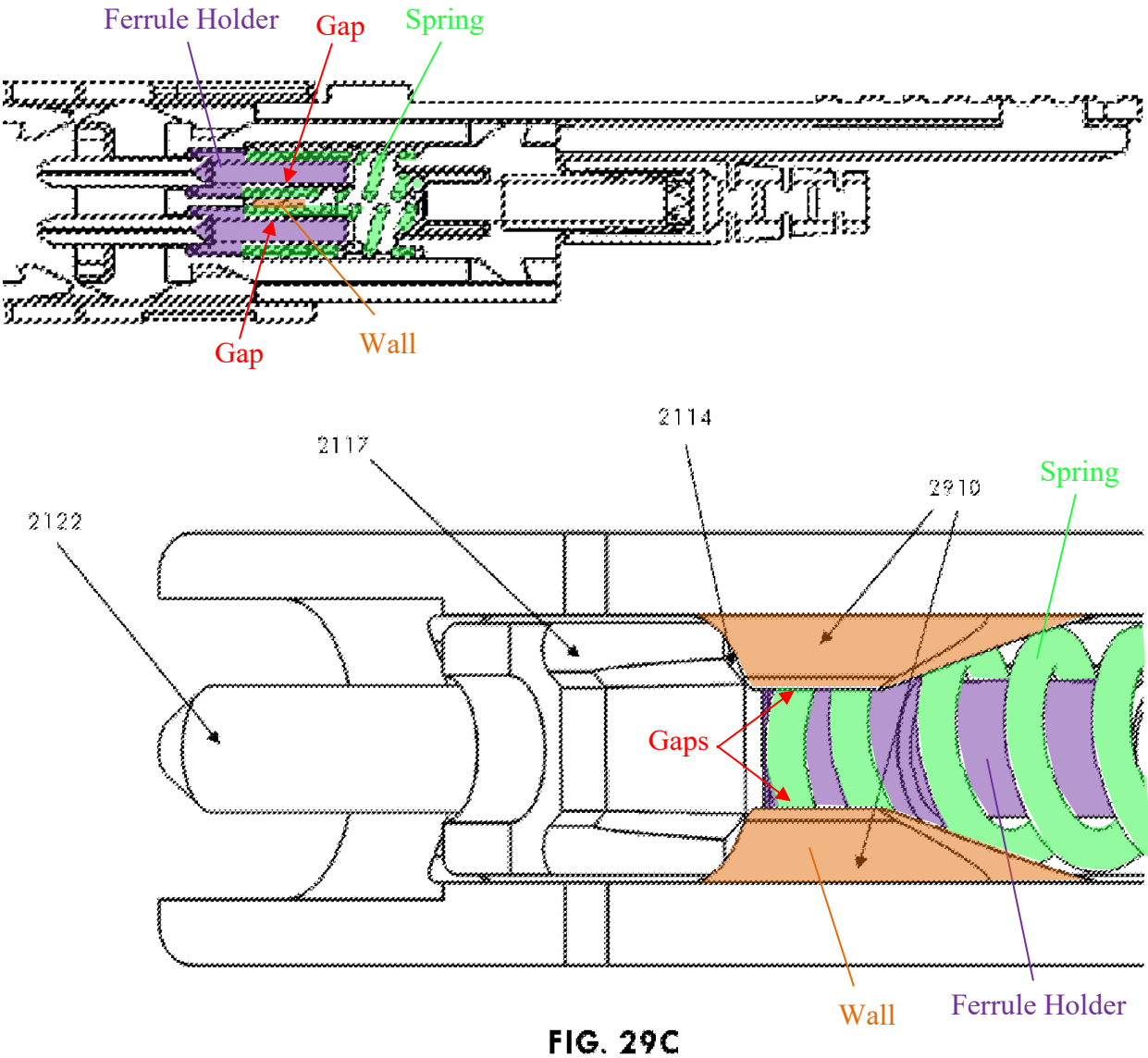


FIG. 29C

EX1003: Fig. 23B and 29C (annotated).

193. Therefore, in my opinion, Takano meets this claim.

VIII. OBVIOUS: TAKANO'209 (GROUND 4)

194. In my opinion, claims 15 and 16 would have been obvious over Takano'209.

A. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats."

195. If it is argued the optical connector (2100) does not meet this claim and/or claim 16 for the reasons I discussed in Section VII(J)&(K), in my opinion, these claims would have been obvious in view of Takano'209's optical connector (4100) of Fig. 41.

196. Takano'209's optical connector (4100) of Fig. 41 includes a front body (4015) with an elongated middle wall (4260). EX1003: ¶¶[0137]-[0138].

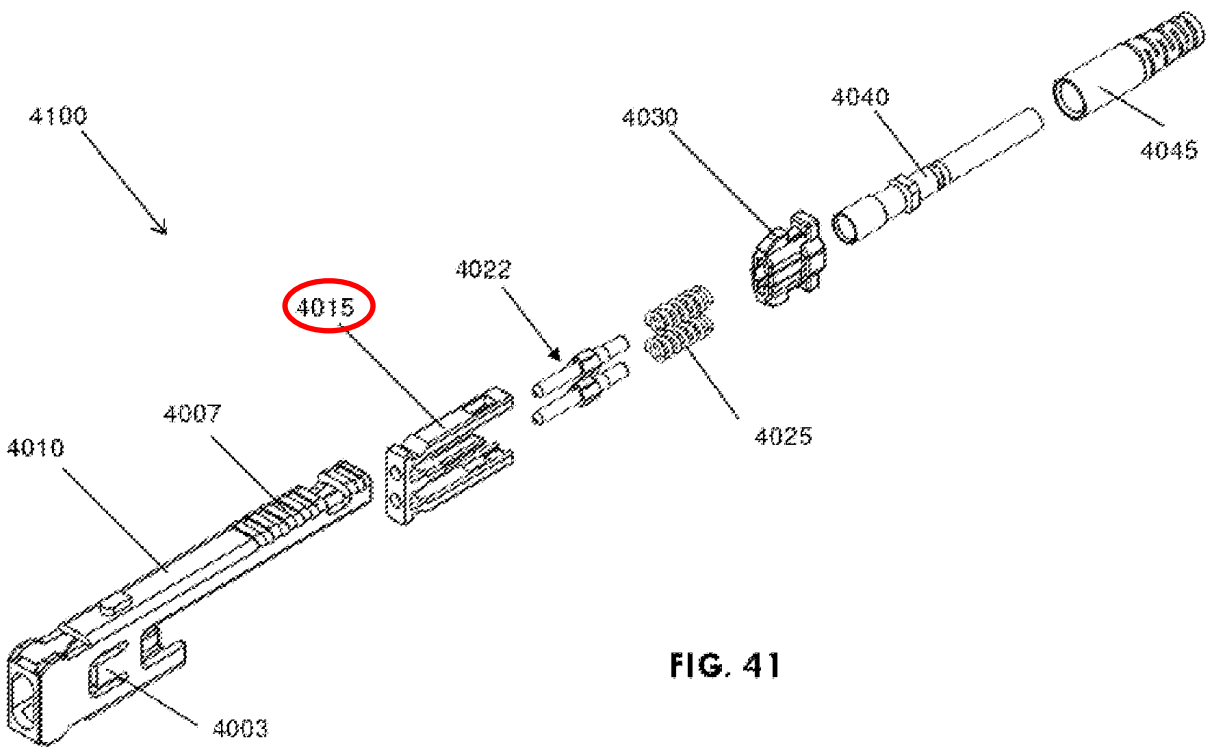


FIG. 41

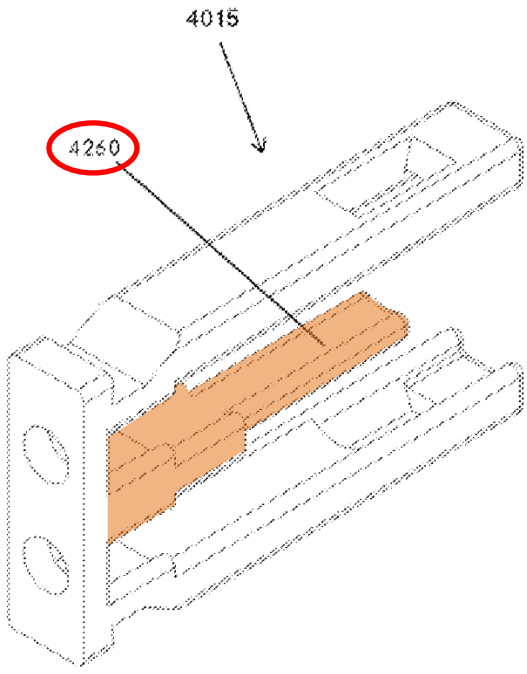


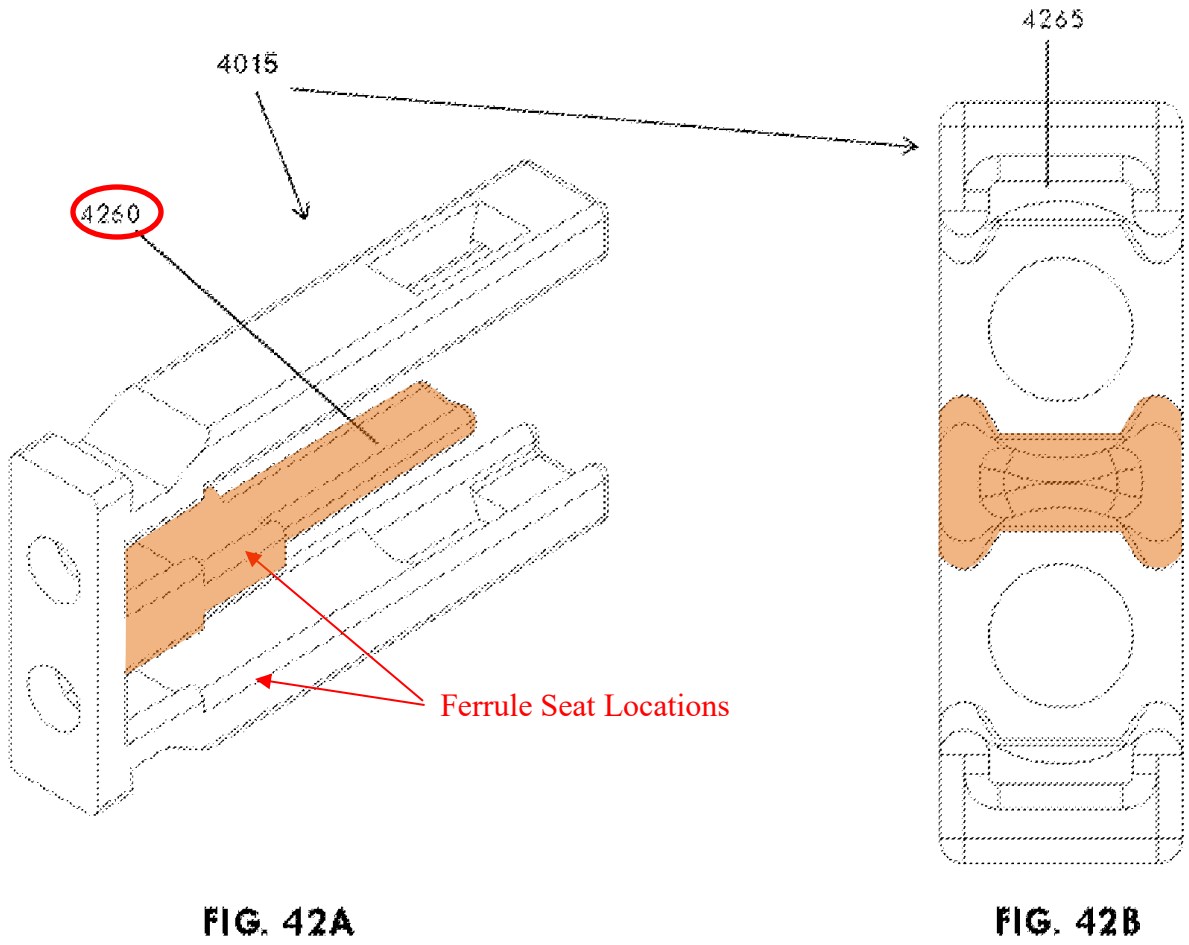
FIG. 42A

EX1003: Figs. 41 and 42A (annotated).

197. In my opinion, it would have been obvious to incorporate the elongated middle wall (4260) from the optical connector (4100) of Fig. 41 into the front body (2115) of the optical connector (2100) of Fig. 21A to separate and prevent entanglement of the two springs (2124). EX1003: Figs. 42A-42B; EX1004: Figs. 42A-42B. Takano'209 expressly teaches that the elongated wall (4260) prevents entanglement of the ferrule springs, binding of the connector and breaking of optical fibers. EX1003: ¶[0138] ("middle wall reduces the possibility of the springs becoming entangled with each other, binding the connector and breaking the optical fibers"); EX1004: ¶[131]. Moreover, my understanding of Takano'209 is that the distinguishing features of the optical connector (4100) of Fig. 41 are optional modifications of the optical connector (2100) of Fig. 21A.

198. There would have had a reasonable expectation of success in making this modification because Fig. 41 discloses an optical connector (4100) that incorporates all the same basic features as the optical connector (2100) of Fig. 21A, except for the extended middle wall (4260) and a redesigned interface between the front body (4015) and the back body (4030). One way to implement this modification would be to simply replace the front body (2015) and back body (2030) of the optical connector (2100) of Fig. 21A with the front body (4015) and the back body (4030) of the optical connector (4100) of Fig. 41 and making any additional dimensional adjustments needed to accommodate the change.

199. This modification results in the optical connector (2100) of Fig. 21 having the middle wall (4260), which meets the requirement of the wall in claim 15, as best I can understand, because it forms a wall between the locations where two ferrule assemblies (2150) are seated in the outer housing and it extends rearward relative to the ferrule alignment slots (2117) where the ferrule holders (2124) are seated in the front body (2115). EX1003: Figs. 42A-B; EX1004: Figs. 42A-B.



EX1003: Figs. 42A-B (annotated).

200. Therefore, in my opinion, Takano'209 renders this claim obvious.

B. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

201. In the optical connector (2100) of Fig. 21A modified in view of the optical connector (4100) of Fig. 41 as I explain in Section VIII(A), the elongated middle wall (4260) is "interposed between the ferrules and springs when the front body is assembled." EX1003: ¶[0138]; EX1004: ¶[131]. The springs (2125) and ferrule holders (2124) would have essentially the same positions as in the unmodified optical connector (2100). This requires a radial gap between the middle wall (4260) and the ferrule holders to accommodate the portion of each ferrule spring received around the rear portion of the ferrule holder and abutting the ferrule flange.

202. Annotated Fig. 42B illustrates how the middle wall (4260) is understood by a POSA to provide a gap for accommodating the ferrule spring between the middle wall (4260) and the rear portion of the ferrule holder. This gap would be present in the modified optical connector (2100) of Fig. 21A.

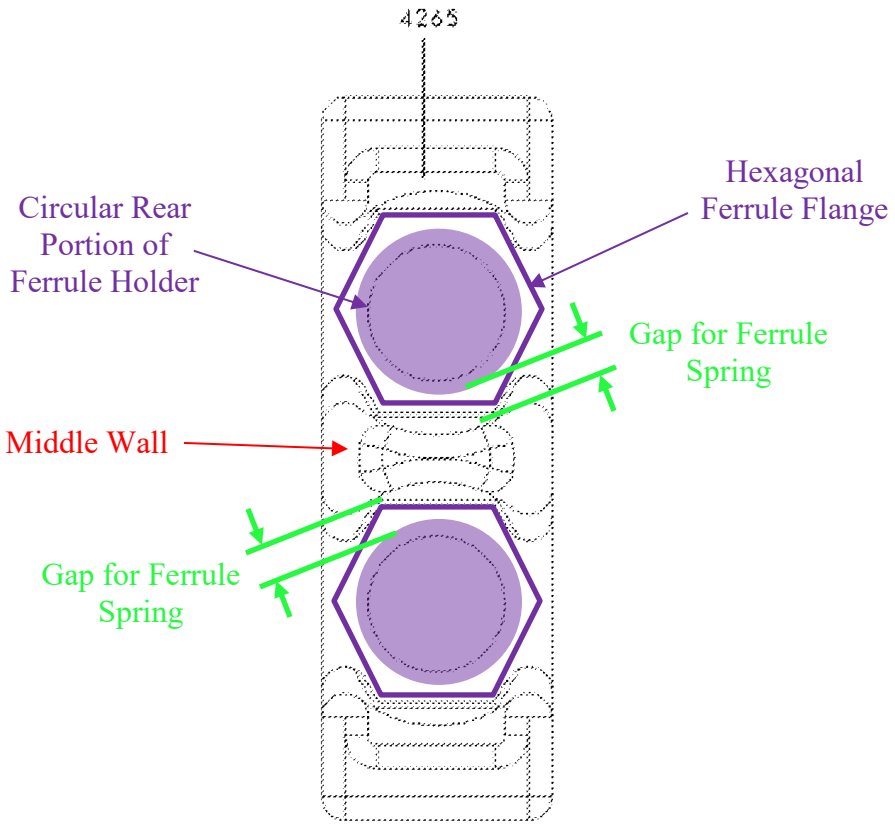


FIG. 42B

EX1003: Fig. 42B (annotated).

203. Therefore, in my opinion, Takano'209 renders this claim obvious.

IX. OBVIOUS: TAKANO'209 & LEE (GROUND 5)

204. In my opinion, claims 3-5 would have been obvious over Takano'209 in view of Lee.

A. Claim 4 "The fiber optic connector according to claim 3, wherein the spring push is separate from the crimp body."

205. In my opinion, it would have been obvious to modify Takano'209's optical connector (2100) to include a spring push separate from the crimp body as taught by Lee.

206. Lee teaches an optical connector (10) that, like Takano'209's optical connector (2100), is taller than it is wide and holds two spring-loaded single-fiber ferrules (20, 22) at vertically spaced apart positions. EX1005: Figs. 2 and 3, ¶¶[0029]-[0030]. Fibers (86, 88) enter the optical connector (10) through a single opening in a two-piece crimp body (36, 110) at a rear end and extend forward through ferrule springs (100, 102) to the ferrules (20, 22). EX1005: Figs. 2 and 3, ¶¶[0030], [0037], [0038], [0040]. Between the two-piece crimp body (36, 110) and the ferrule springs (100, 102) is a separate spring push (104). EX1005: Figs. 2 and 3, ¶[0038]. Lee teaches that the spring push (104) is an E-shaped body with first and second slots (156, 158) for receiving the fibers (86, 88). EX1005: ¶[0052]. The slots (156, 158) are "kept relatively small to help position the first and second optical fibers 86, 88 on or close to the longitudinal axes FA1, FA2 of the first and second ferrules 20, 22." EX1005: ¶[0052]. Spring seats (162, 164) are positioned around the slots (156, 158) on the front side of the spring push. EX1005: ¶[0056]. The spring seats (162, 164) retain the rear ends of the ferrule springs (100, 102) and help "prevent the first and second inner springs 100, 102 from moving laterally on the spring push 104 and contacting the first and second optical fibers 86, 88." EX1005: ¶[0053]. Lee further teaches that the separate spring push (104) facilitates an improved connectorization of a fiber optic cable by allowing for

placement of the spring push onto the cable after the fibers (80, 86) have been installed in the ferrules (20, 22). EX1005: ¶¶[0055]-[0058].

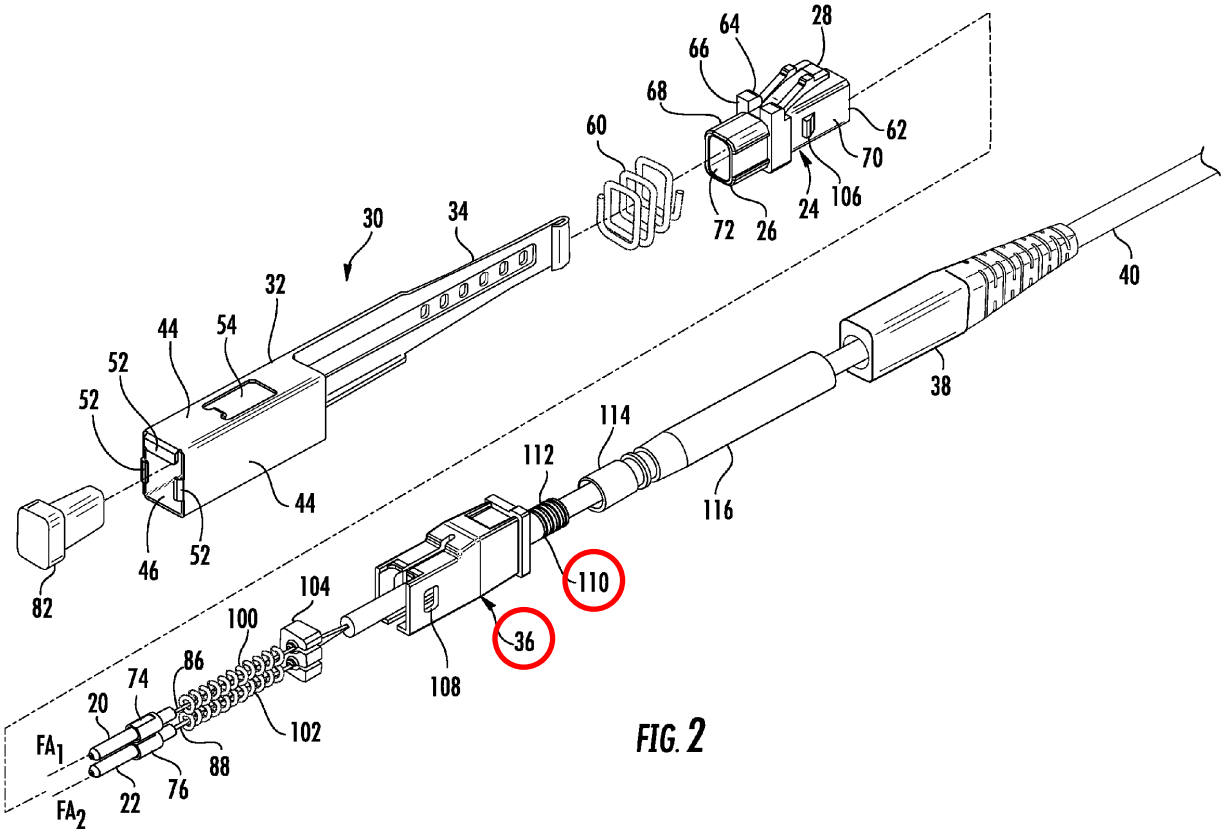
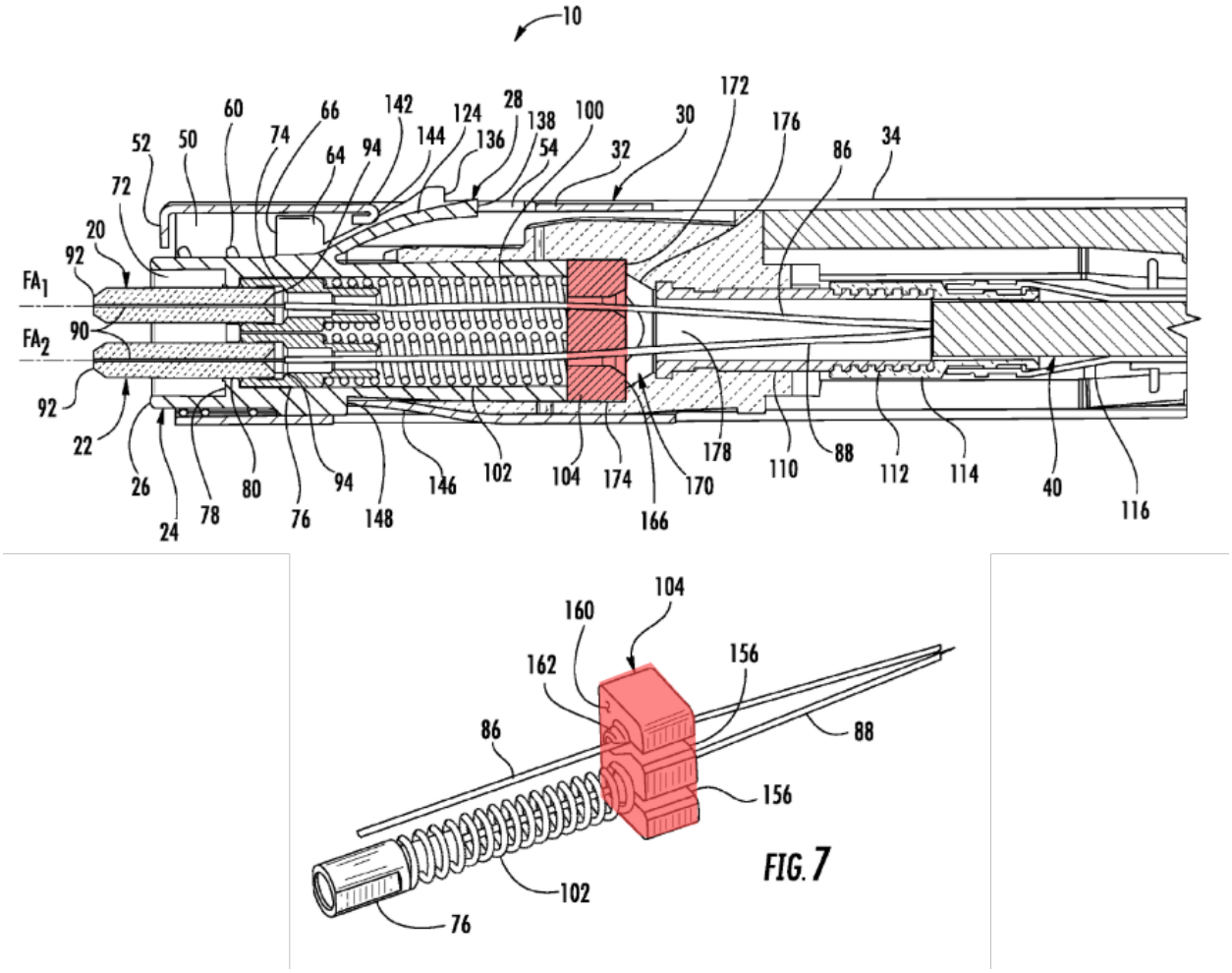


FIG. 2



EX1005: Figs. 2, 3, and 7 (annotated).

207. In my opinion, it would have been obvious to modify Takano'209's optical connector (2100) to include Lee's spring push (104). A POSA would have been motivated to make the combination based on the express teachings of Lee regarding the advantages of the separate spring push (104). For example, each of the following advantages that are expressly taught by Lee would have served as an independent motivation for the combination: (i) to help position the fibers close to the longitudinal axes of the ferrules; (ii) to protect the fibers from relative

movement in relation to the ferrule springs by aligning spring seats (162, 164) with the slots (156, 158); and (iii) to provide improvements in the process of terminating a fiber optic cable with the connector by allowing for placement of the spring push (104) onto the cable after the fibers have been installed in the ferrules. EX1005: ¶¶[0053], [0055].

208. This modification would have been nothing more than combining known prior art elements (Takano'209's optical connector (2100) and Lee's spring push (104)) according to known methods (arrangement taught by Lee) to yield predictable results (an optical connector with an independently mountable spring push).

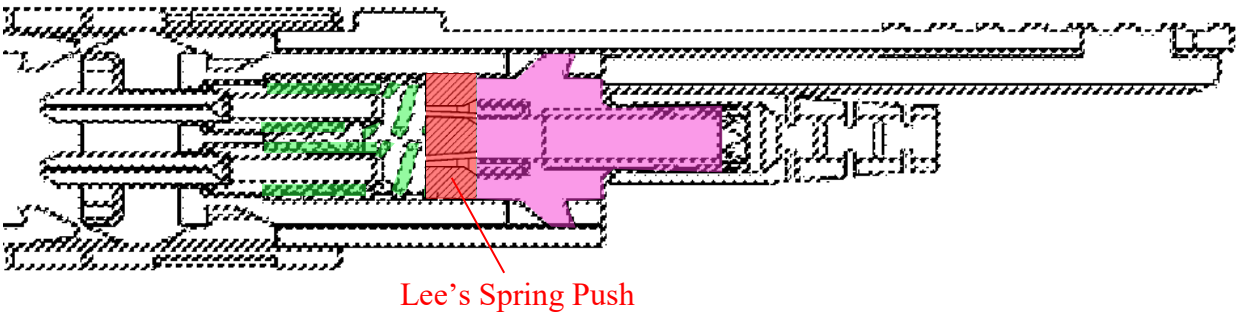
209. This modification would have also been nothing more than the application of a known technique (Lee's spring push (104)) for an optical connector that is taller than it is wide and holds two spring-loaded single-fiber ferrules at vertically spaced apart positions) to improve a similar device (Takano'209's optical connector (2100)) in the same way to yield predictable results (an optical connector with an independently mountable spring push).

210. This modification would have also been nothing more than the use of a known technique (Lee's separate spring push (104)) to a known device (Takano'209's optical connector (2100)) ready for improvement to yield predictable results (an optical connector with an independently mountable spring

push). For example, the POSA would recognize that the E-shaped spring push (104) with narrow fiber slots would function better to align the individual fibers with their respective ferrules and ferrule springs than the singular opening formed in the back body (2103).

211. There would have been a reasonable expectation of success in making this modification given the function and general placement of Lee's spring push (104) would not change in Takano'209's optical connector (2100). Further, the POSA would have made any minor structural changes to facilitate this modification such as making the font end of the back body (2130) flat and changing the dimensions of the front body (2115) and/or back body slightly to accommodate an E-shaped spring push between the ferrule springs (2125) and the front end of the back body and between upper and lower portions of the front body. This modification would only require minor changes in dimensions and shapes of molded parts and is well within the level of ordinary skill in the art.

212. As schematic illustration of this modification is shown below:



EX1003: Fig. 23B (annotated, modified).

213. As a result of this modification, Takano'209's optical connector (2100) includes Lee's spring push (104), which is separate from the crimp body (back body (2130) and back post (2135)). Just like in Lee, the spring push (104) would engage the rear portions of each of Takano'209's springs (2125) simultaneously. EX1005: Fig. 3, ¶[0053].

214. Therefore, in my opinion, the Takano'209/Lee combination renders this claim obvious.

B. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

215. If claim 3 requires the recited spring push to be separate from the crimp body, then, in my opinion, the Takano'209/Lee combination renders this claim obvious for the reasons I discussed above in Section IX(A).

C. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously."

216. If claim 5 requires the recited spring push to be separate from the crimp body, then, in my opinion, the Takano'209/Lee combination renders this claim obvious for the reasons I discussed above in Section IX(A).

X. OBVIOUS: TAKANO'209 & VEATCH (GROUND 6)

217. In my opinion, claim 6 would have been obvious over Takano'209 in view of Veatch.

A. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

218. If it is argued that Takano'209's optical connector (2100) does not meet this claim for the reasons I discussed in Section VII(E), in my opinion, this claim would have been obvious in view of Veatch.

219. Veatch discloses a polarity change fiber optic connector (100), like Takano'209's optical connector (2100) (EX1003: ¶[0121]), with polarity indicia (130, 132) in the form of letters "A" and "B" to "indicate the polarity of the connector." EX1007: Fig. 1, 2:26-39.

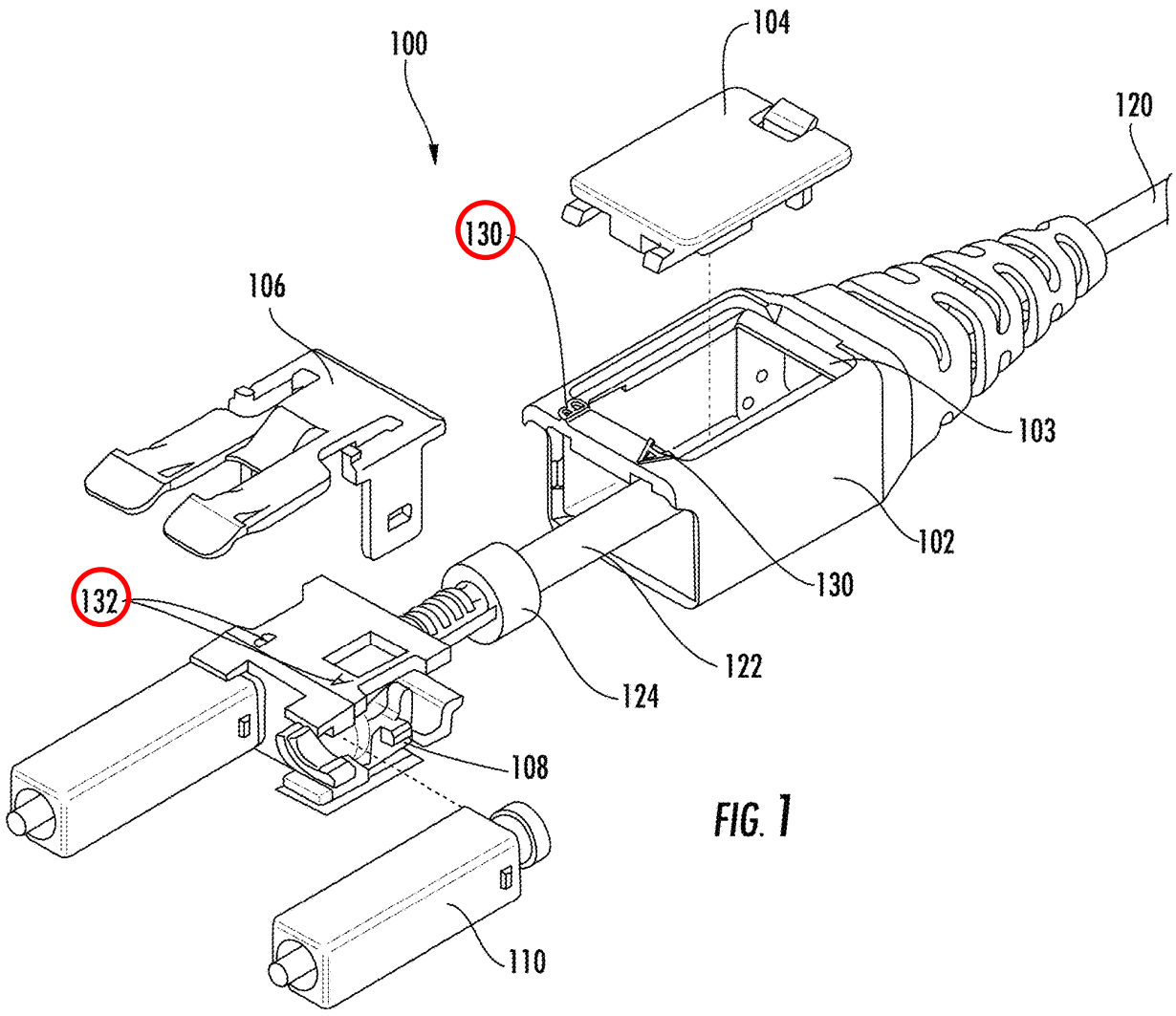


FIG. 1

EX1007: Fig. 1 (annotated).

220. In my opinion, it would have been obvious to modify Takano'209's outer housing (2110) to include Veatch's polarity indicia (130, 132). A POSA would have been motivated to make the combination based on the express teachings of Veatch, to "indicate the polarity of the connector." EX1007: 2:33-34. Such polarity indicia (130, 132) "assist[s] [the] user in identifying the currently polarity configuration of the assembled connector[]." EX1020: 14:39-46; *see*

EX2021: ¶[0050]. In fact, using polarity indicia (130, 132) such as Veatch's is standard "industry practice." EX2022: 1:60-63, 6:20-25. Polarity letters "A" and "B" have been an industry standard convention since the ratification of TIA/EIA 604-10-A FOCIS-10 Type LC. EX1027: Fig. 2.2.1c (showing letters "A" and "B" on the adapter, which resulted in also adding corresponding letters on the duplex yoke of the connector).

221. This modification would have been nothing more than combining known prior art elements (Takano'209's optical connector (2100) and Veatch's polarity indicia (130, 132)) according to known methods (arrangement taught by Veatch or otherwise known in the art) to yield predictable results (an indication of polarity for Takano'209's optical connector).

222. This modification would have also been nothing more than the application of a known technique (Veatch's polarity indicia (130, 132)) to improve a similar device (Takano'209's optical connector (2100)) in the same way to yield predictable results (an indication of polarity for Takano'209's optical connector).

223. The POSA would have had a reasonable expectation of success in making this modification given the function of Veatch's polarity indicia (130, 132) would not change in Takano'209's optical connector (2100). In making this modification, the POSA would place the polarity indicia on Takano's outer housing (2110) to be easily and readily viewable by a user. Moreover, placing

polarity indicia on a housing was a known placement in the art. EX1020: Fig. 8B, 14:39-46. For example, the POSA may place the letter "A" on the top surface of the outer housing (2110) and the letter "B" on the bottom surface of the outer housing, as shown representationally below.

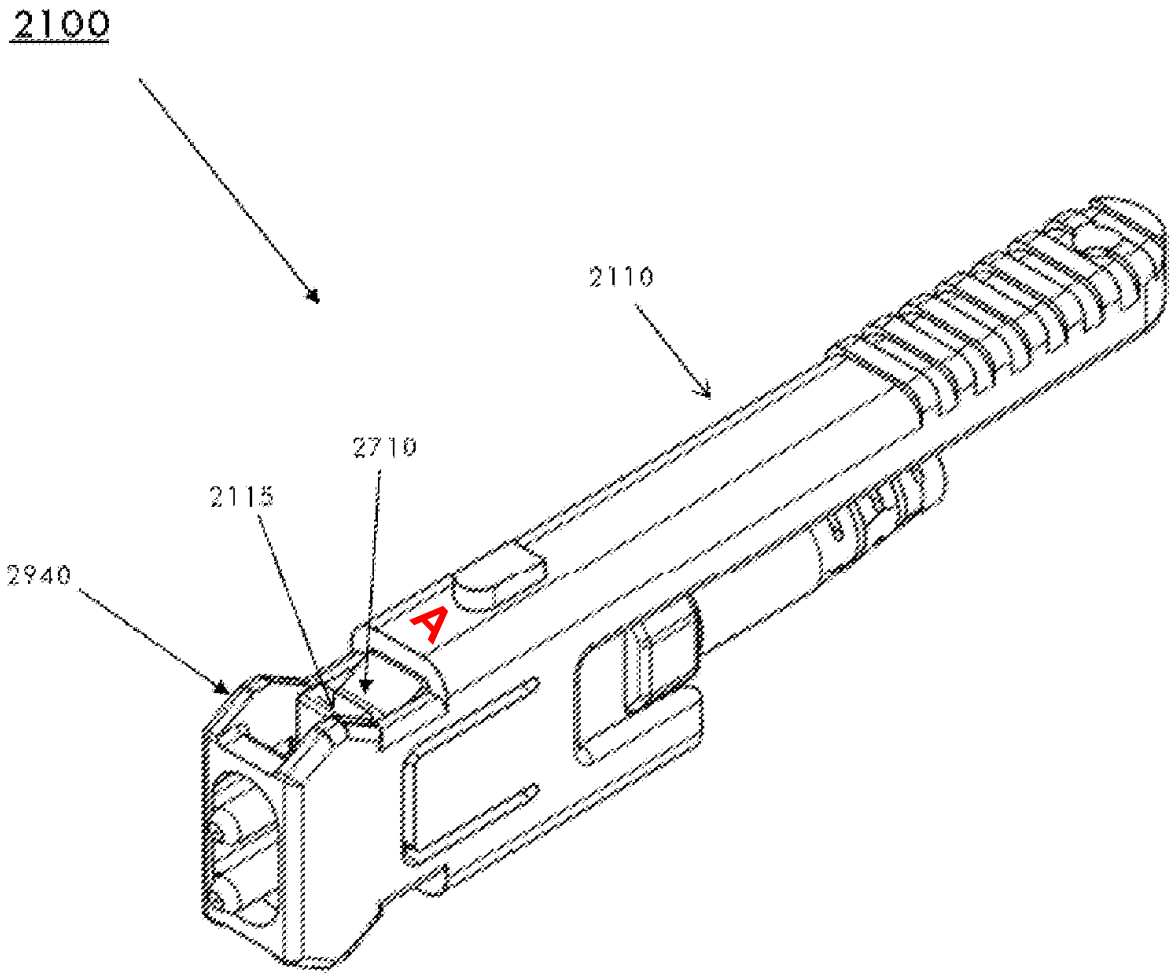


FIG. 21B

EX1003: Fig. 21B (modified).

224. As a result of this modification, Takano'209's optical connector (2100) includes Veatch's polarity indicia (130, 132) on the outer housing (2110).

225. Therefore, in my opinion, the Takano'209/Veatch combination renders this claim obvious.

XI. OBVIOUS: TAKANO'209 & NGUYEN (GROUND 7)

226. In my opinion, claim 14 would have been obvious over Takano'209 in view of Nguyen.

A. Claim 14 "The fiber optic connector according to claim 1, wherein the alignment feature includes a vertical alignment feature and a horizontal alignment feature."

227. In my opinion, it would have been obvious to modify Takano'209's optical connector (2100) in view of Nguyen.

228. Nguyen teaches a ferrule holder (300) having a main body (302) that is taller than it is wide that includes a first projection (320) on its (narrow) top side and different size projection (322) on its narrow bottom side "used to position the ferrules 12 in the adapter in the x [horizontal] and y [vertical] directions, eliminating the need for side walls to position the ferrule holders and the ferrules 12." EX1006: ¶[0027]. The mating adapter (100) comprises three-sided grooves (140, 142) for engaging the projections (320, 322) of the ferrule holder (300). EX1006: Fig. 7B, ¶[0034].

229. "The positioning of the projections 320,322 on the ferrule holders 300 relative to the plurality of grooves 140, 142 is important. With reference to FIGS. 7A and 7B, the projections 320,322 are used to control the x and y locations of the

ferrule holders 300. The surfaces 350 of the projections 320,322 (FIG. 7A) align with the surfaces 150 in the adapter (FIG. 7B) to control the x direction of the ferrule holder 300 relative to the adapter 100. The surfaces 352 of the ferrule holder 300 align with the surfaces 352 of the raised bottom portion 132 and the dropped top portion 134 of the center portion 110 to control the y direction of the ferrule holder 300 relative to the adapter 100. The surfaces of the projections 320,322 could also align in the y direction, given that they are parallel to the surfaces 352." EX1006: ¶[0036].

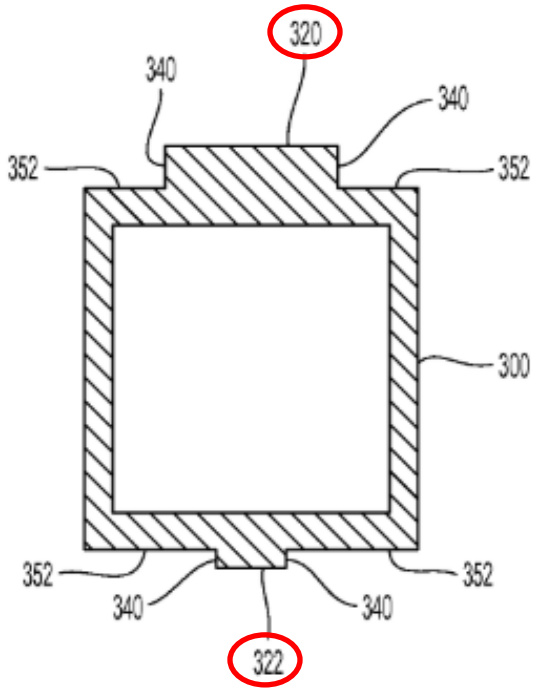


Fig. 7A

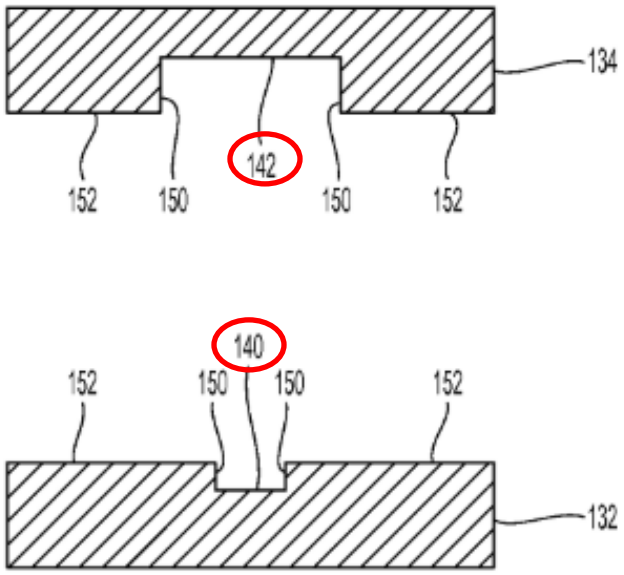


Fig. 7B

EX1006: Figs. 7A-B (annotated).

230. In my opinion, it would have been obvious to modify Takano'209's fiber optic connector (2100) to include Nguyen's projections (320, 322) and modify Takano'209's mating adapter (2400) to include Nguyen's three-sided grooves (140, 142). Nguyen teaches the advantages of the alignment projections (320, 322) and alignment grooves (140, 142) for x-y alignment of the ferrule holders (300) in the adapter. EX1006: ¶[0027], [0036]. For example, Nguyen expressly teaches that the surfaces (350) of the projections (320, 322) engage the surfaces (150) of the alignment grooves (140, 142) to align the ferrule holders into the adapter in the x-axis direction, and that the surfaces (352) engage the surfaces (152) to align the ferrule holders into the adapter in the y-axis direction. EX1006: ¶[0036]. Nguyen further teaches that the x-y alignment achieved by the engagement of these complementary alignment features eliminates the need for internal adapter side walls to position the ferrule holders 300 in the adapter. EX1006: ¶[0027]. Notably, Takano'209's adapter (2400) is devoid of internal side walls, such that the POSA would have immediately recognized the benefit of employing the x-y alignment features of Nguyen in the "ultra-small form factor" optical connector (2100) and its mating adapter (2400) of Takano'209. EX1003: title.

231. This modification would have been nothing more than combining known prior art elements (Takano'209's optical connector (2100) and adapter

(2400)) and Nguyen's x-y alignment features (320, 322, 140, 142)) according to known methods (arrangement taught by Nguyen) to yield predictable results (x-y alignment of Takano'209's optical connector (2100) in its adapter (2400)).

232. This modification would have also been nothing more than the application of a known technique (Nguyen's x-y alignment features (320, 322, 140, 142)) to improve a similar device (Takano'209's optical connector (2100) and adapter (2400)) in the same way to yield predictable results (x-y alignment of Takano'209's optical connector (2100) in its adapter (2400)).

233. This modification would have also been nothing more than the use of a known technique (Nguyen's x-y alignment features (320, 322, 140, 142)) to a known device (Takano'209's optical connector (2100) and adapter (2400)) ready for improvement to yield predictable results (x-y alignment of Takano'209's optical connector (2100) in its adapter (2400)). For example, the POSA would recognize that the dual alignment keys on Takano'209's optical connector (2100) and three-sided grooves of Nguyen on the top and bottom walls of Takano'209's adapter (2400) would provide precision horizontal and vertical alignment of Takano'209's optical connector into the adapter or device receptacle.

234. There would have been a reasonable expectation of success in making this modification given the function and general arrangement of Nguyen's x-y alignment features (320, 322, 140, 142) would not change in Takano'209's optical

connector (2100) and adapter (2400). In making this modification, the POSA would have modified Takano'209's outer housing (2110) to include a second, smaller alignment key on the bottom side, opposite the existing alignment key (2105). In addition, the POSA would have modified Takano'209's adapter (2400) to replace each connector alignment slot (2403) with a three-sided groove sized and arranged for receiving the alignment key (2105) in the same manner that Nguyen's three-sided groove (142) receives the projection (320) of the ferrule holder (300). In addition, the POSA would modify the bottom wall of Takano'209's adapter (2400) to include three-sided grooves opposite the modified alignment slots (2403) sized and arranged for receiving the added alignment keys on the bottom wall of Takano'209's outer housing (2110) in the same manner that Nguyen's three-sided groove (140) receives the alignment projection (322) of the ferrule holder (300).

235. As a result of this modification, the Takano'209's alignment key (2105) on the top of the outer housing (2110) and the added second alignment key (e.g., Nyugen's projection (322)) are each alignment features that includes a vertical alignment feature and a horizontal alignment feature.

236. If "vertical alignment feature" is construed to mean a feature that extends vertically and "horizontal alignment feature" is construed to mean a feature that extends horizontally, then the "vertical alignment feature" is met by the

vertical side surfaces of the alignment key (2105) and second alignment key and the "horizontal alignment feature" is met by the top horizontal surface of the alignment key (2105) and the bottom horizontal surface of the second alignment key.

237. If "vertical alignment feature" is construed to mean a feature that engages a mating alignment structure to align the connector vertically and "horizontal alignment feature" is construed to mean a feature that engages a mating alignment structure to align the connector horizontally, then the "vertical alignment feature" is met by the horizontal surfaces of the alignment key (2105) and second alignment key that engage the bases of the three-sided grooves added to Takano'209's adapter (2400), as this engagement would vertically align the optical connector (2100) relative to the adapter. Likewise, the "horizontal alignment feature" is met by the vertical side surfaces of the alignment key (2105) and second alignment key that engage the sides of the three-sided grooves added to Takano'209's adapter (2400), as this engagement would horizontally align the optical connector (2100) relative to the adapter. EX1006: ¶[0036].

238. Therefore, in my opinion, the Takano'209/Nguyen combination renders this claim obvious.

XII. OBVIOUS: TAKANO'209 & HENKE (GROUND 8)

239. In my opinion, claim 17 would have been obvious over Takano'209 in view of Henke.

A. Claim 17 "The fiber optic connector according to claim 1, further comprising a lead-in tube attached to each of the ferrule holders, the lead-in tube extending past the rear end of the main body of the housing and configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body."

240. In my opinion, it would have been obvious to modify Takano'209's optical connector (2100) in view of Henke.

241. Henke discloses a fiber optic connector subassembly (40(1)) having an inner housing (80) and a crimp body (88) secured to the inner housing. EX1008: ¶[0054]. A ferrule assembly comprising a ferrule (42), a ferrule holder (32(1)) and a lead-in tube (28(1)) is positioned in the fiber optic connector subassembly (40(2)). EX1008: ¶[0041]. A ferrule spring (86) is loaded between the crimp body (88) and the ferrule holder (32(1)) to urge the ferrule assembly forward so the front end of the ferrule holder (32(1)) abuts an abutment surface (82) in inner housing (80). EX1008: ¶¶[0054-0055]. The lead-in tube (28(1)) is "made of a relatively inexpensive, very flexible and resilient material with high surface lubricity." EX1008: ¶0063. The lead-in tube (28(1)) has a front end (114) integrated with the rear end (30) of the ferrule holder body (32(1)) and extends rearward through the interior of the ferrule spring (86) and crimp body to a rear

end immediately adjacent the rear tip of the crimp body's back post. EX1008: ¶[0041].

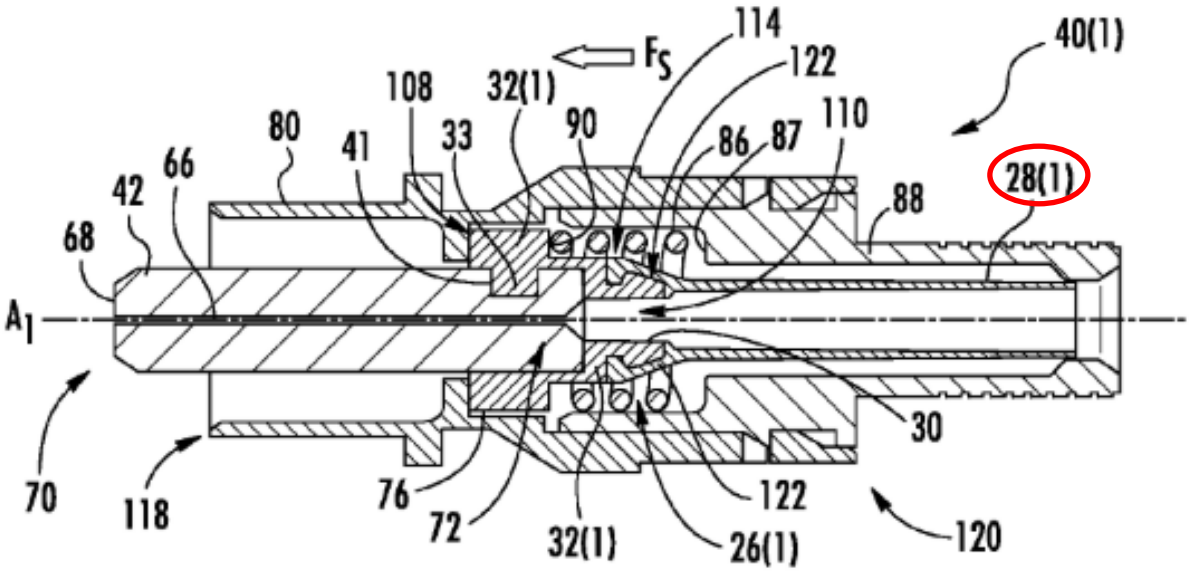


FIG. 1C

EX1008: Fig. 1C (annotated).

242. Henke teaches that the integrated lead-in tube (28(1)) "generally restricts a location of a bonding agent used during installation of the optical fiber 34 and prevents the bonding agent from escaping. Otherwise, the bonding agent may come into contact with other areas of the fiber optic connector 12(1), such as a spring (discussed later) which must be free to move unfettered by the bonding agent. The integral lead-in tube 28(1) also facilitates guiding an end portion 44 of the optical fiber into the ferrule holder body 32(1), where the optical fiber 34 can then be guided to a ferrule (42). The integral lead-in tube 28(1) may also prevent

sharp bends from occurring in the optical fiber 34 during insertion that could damage the optical fiber 34 as the optical fiber 34 is disposed in the ferrule body and into the ferrule 42." EX1008: ¶¶[0041]; [0006] (describing how these benefits were well known prior to Henke); EX1026: Abstract (describing how a lead-in tube called a sheath prevents leaking of adhesive from a ferrule holder).

243. In an alternative embodiment shown in Fig. 7A, the connector sub-assembly is modified in that lead-in tube (28(2)) extends further rearward so the rear end (146) of the lead-in tube protrudes slightly beyond the rear tip of the back post. EX1008: ¶[0079]. Henke teaches that the protruding rear "portion 146 may enable the optical fiber 34 to be more easily inserted into the lead-in bore." EX1008: ¶[0079].

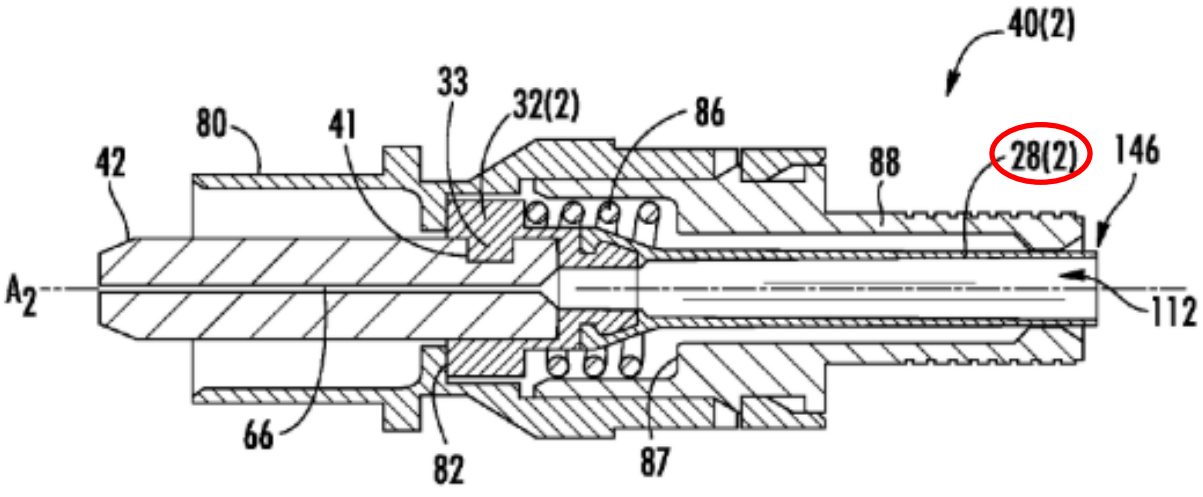


FIG. 7A

EX1008: Fig. 7A (annotated).

244. Although Henke's drawings depict an SC-type connector, Henke teaches that its ferrule holders with integrated lead-in tubes may be used with other types of connectors, including, specifically, LC-type connectors. EX1008: ¶[0107].

245. In my opinion, it would have been obvious to modify Takano'209's optical connector (2100) so that each ferrule holder (2124) includes an integral lead-in tube like the lead-in tube (28(2)) in Fig. 7A of Henke. The POSA would have been motivated to make this modification based on Henke's express teachings regarding the advantages of integrated lead-in tubes, such as (1) preventing the bonding agent used to secure the fiber in the ferrule from escaping and interfering with the ferrule springs; (2) to facilitate guiding the end portion of each optical fiber into the respective ferrule holder body (2124) and further to the ferrules (2122); and/or (3) preventing sharp bends that could damage the optical fiber from occurring as the optical fiber is inserted into the ferrule. EX1008: ¶¶[0041], [0079],

246. This modification would have been nothing more than combining known prior art elements (Takano'209's optical connector (2100) and Henke's lead-in tube (28(2))) according to known methods (arrangement taught by Henke)

to yield predictable results (Takano'209's optical connector (2100) with a lead-in tube for an optical fiber).

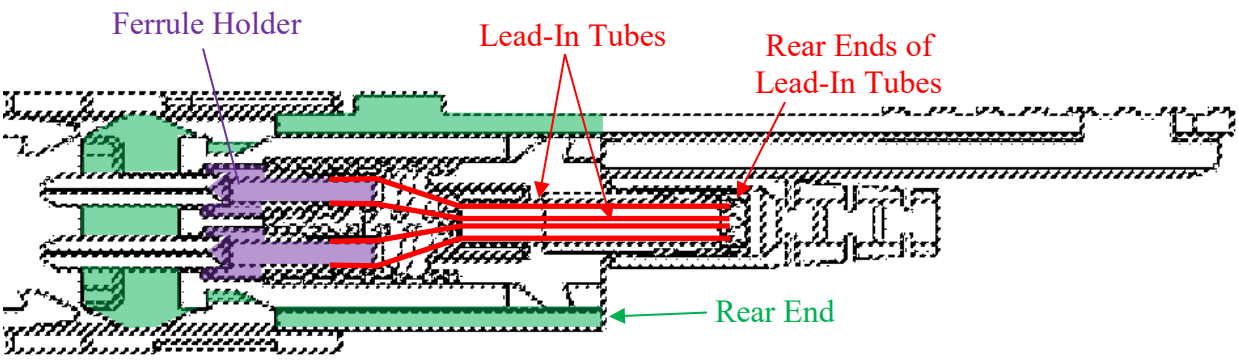
247. This modification would have also been nothing more than the application of a known technique (Henke's ferrule holder body 32(1) with integral lead-in tube (28(2)) on spring loaded ferrules contained between an inner housing and a crimp body) to improve a similar device (Takano'209's optical connector (2100) which are likewise spring loaded ferrules contained between an inner housing (front body 2115) and a crimp body (2130, 2135)) in the same way to yield predictable results (Takano'209's optical connector (2100) with a lead-in tube for an optical fiber).

248. This modification would have also been nothing more than the use of a known technique (Henke's lead-in tube (28(2))) to a known device (Takano'209's optical connector (2100)) ready for improvement to yield predictable results (Takano'209's optical connector (2100) with a lead-in tube for an optical fiber). For example, the POSA would recognize that the integrated lead-in tubes would assist with guiding the fibers into the ferrules (2122) during assembly and prevent adhesive from leaking onto the ferrule springs (2125) when the fibers are adhered and cured in place.

249. The proposed modification would have been well within the capabilities of a POSA, and there would have had a reasonable expectation of

success. Henke specifically teaches that the integrated lead-in tubes could be used with LC ferrule/holder assemblies, which is the same type of ferrule assembly used in the connector 2100. EX1008: ¶[0107]; EX1003: ¶[0117]. Further, Henke teaches that the integrated lead-in tubes are formed from flexible material, which would naturally conform to and fit within the interior geometry of the connector (e.g. to press-fit over the tail of the ferrule/holder, and to bend inward toward the center between the rear ends of the ferrule springs (2125) and the back post (2135)). At most, the proposed modifications would have required minor changes in the dimensions of parts to accommodate the two integrated lead-in tubes in the interior of Takano'209's optical connector (2100). Such changes are well-within the capabilities of the POSA and their results would have been entirely predictable.

250. As illustrated below, in the Takano'209/Henke combination, the integrated lead-in tubes would extend from front end portions integrated with the ferrule holders (2124), through the ferrule springs (2125) and the interior of the two-piece crimp body (2130, 2135), to rear ends protruding slightly beyond the rear end of the back post (2135). In the Takano'209/Henke connector, the lead-in tubes extend past the rear end of the main body and are configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body, as taught by Henke. EX1008: ¶[0041].



EX1003: Fig. 23B (annotated, modified).

251. Therefore, in my opinion, the Takano'209/Henke combination renders this claim obvious.

XIII. ANTICIPATION (or OBVIOUS): TAKANO'369 (GROUND 9)

252. In my opinion, claims 1-3 and 5-14 are anticipated by (or would have been obvious over) Takano'369.

A. Independent Claim 1

1.P A fiber optic connector comprising:

253. Takano'369 discloses a fiber optic connector (10300, 10400, 10500).

EX1009: Figs. 53-55, 18:63-64, 19:12-13, 19:32-34.

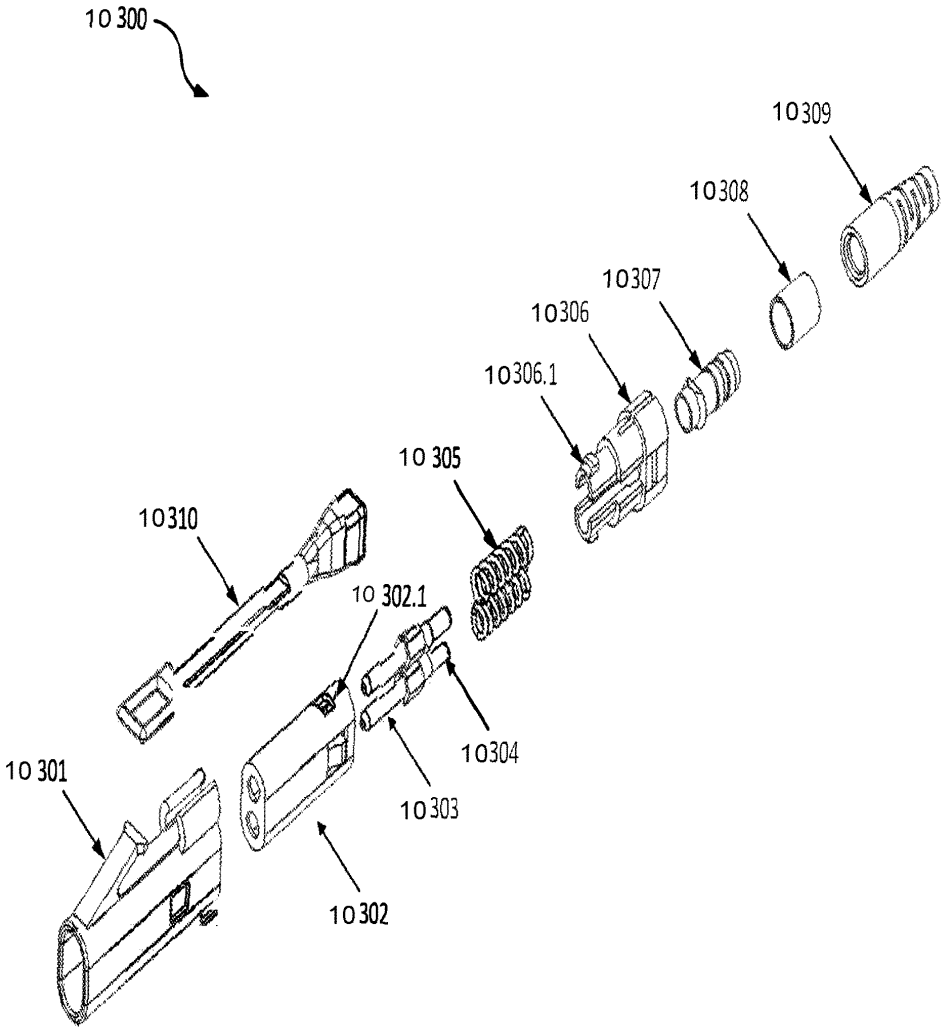

10 300
10309
10308
10307
10306
10306.1
10 305
10310
10 302.1
10304
10 301
10303
10302

FIG. 53

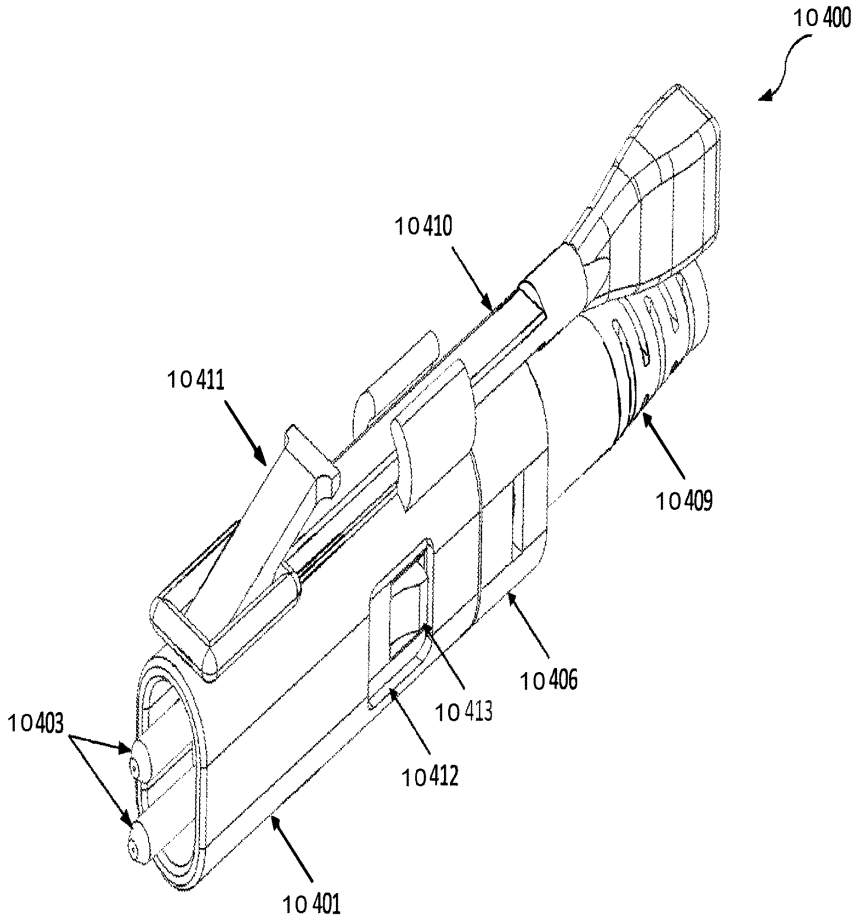


FIG. 54

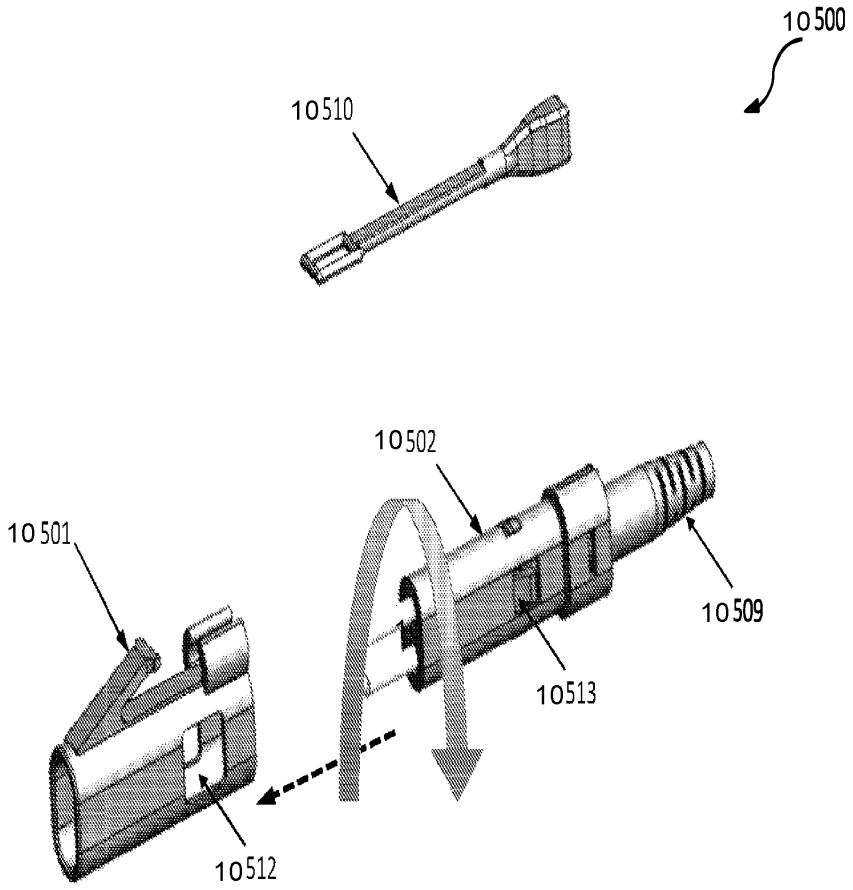


FIG. 55

EX1009: Fig. 54.

254. Although different reference numbers are used in Figures 53-55, the POSA would recognize that each of the connectors (10300, 10400, 10500) is the same connector, just shown in a different configuration. As illustrated, the components of the connectors (10300, 10400, 10500) are essentially identical. Likewise, the description of these connectors (10300, 10400, 10500) uses the same

names for identical component parts. EX1009: 18:63-10:50. The description also builds on itself when describing these connectors (10300, 10400, 10500). EX1009: 18:63-10:50. For example, when explaining the connector (10400) of Fig. 54, the description explains its front body can be seen in Figs. 53 and 55. EX1009: 19:15. Likewise, when explaining the connection of the front body to the outer housing for the connector (10500) of Fig. 55, the description states to "refer to FIG. 54 for an illustrated example of the outer housing being attached to the front body via the latching mechanism." EX1009: 19:39-41. Further, when introducing the connector (10300) of Fig. 53, the description states "a connector 10300." EX1009: 18:65. But when introducing the subsequent connectors (10400, 10500) of Figs. 54 and 55, the description states "an embodiment is shown wherein the connector 10400" and "in some embodiments, the latching mechanism of the connector 10500" thereby telling the reader that the description is referencing and adding more description pertaining to the earlier described connectors.

255. The POSA would understand that Fig. 61 shows a connection system (101100) and illustrates how four of the same connector (10300, 10400, 10500) would mate with a quad adapter (101114). While described in relation to the connector (10800) of Fig. 58, the POSA understands that Fig. 61 also illustrates how four connectors (10300, 10400, 10500) of Figs. 53-55 would look when mounted in the adapter (101106). EX1009: 21:19-28. This is apparent given the

similar construction of the connector (10300, 10400, 10500) of Figs. 53-55 and the connector (101100), especially with respect to the push-pull tabs, the back bodies, and the boot. EX1009: 20:33-37, 21:19-28. And upon closer examination, Fig. 61 may in fact show four separate duplex connectors (10300, 10400, 10500) of Figs. 53-55 mounted in the adapter (101106), given that the adapter is shown with bottom partitions between the back bodies of adjacent connectors and there is no corresponding negative space on the front end of the connector (10800) of Fig. 58 that would allow the outer quad-connector housing (10801) of Fig. 58 to be inserted past these bottom partitions.

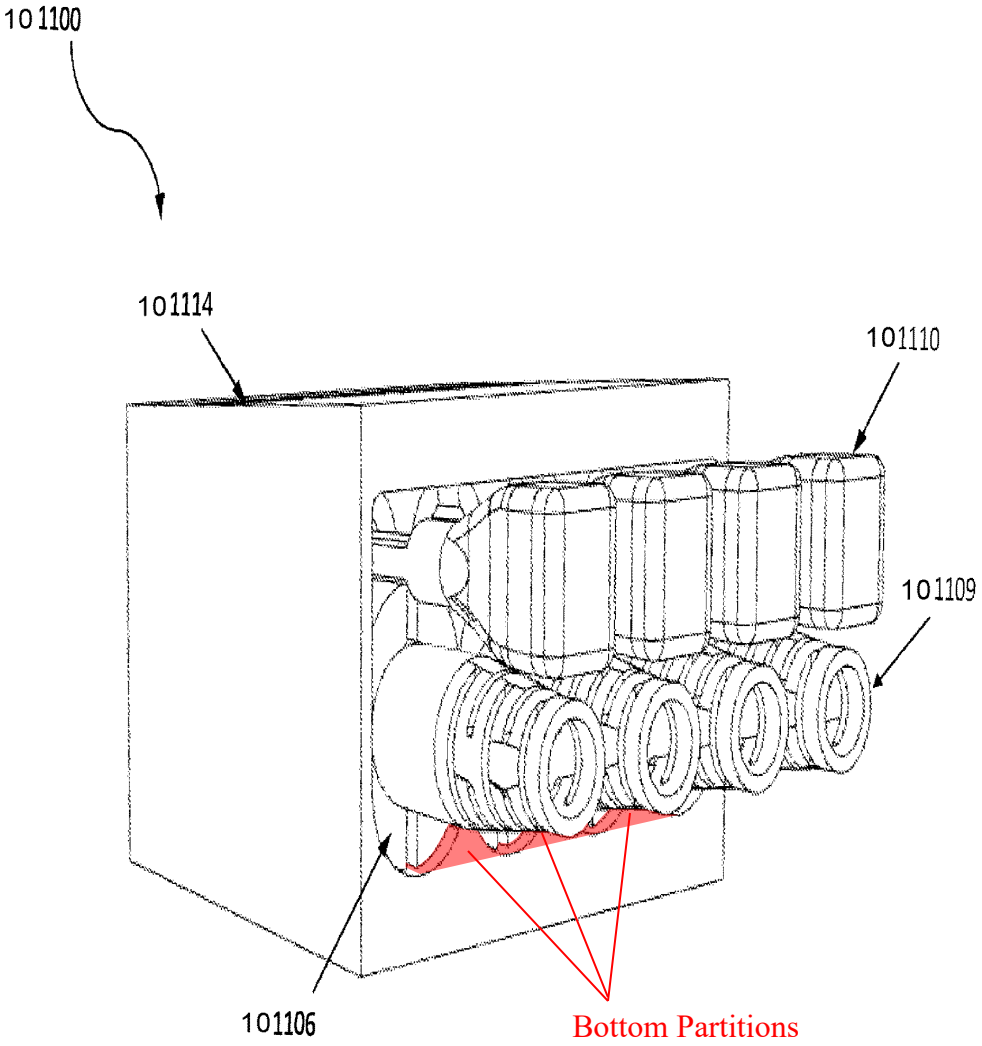


FIG. 61

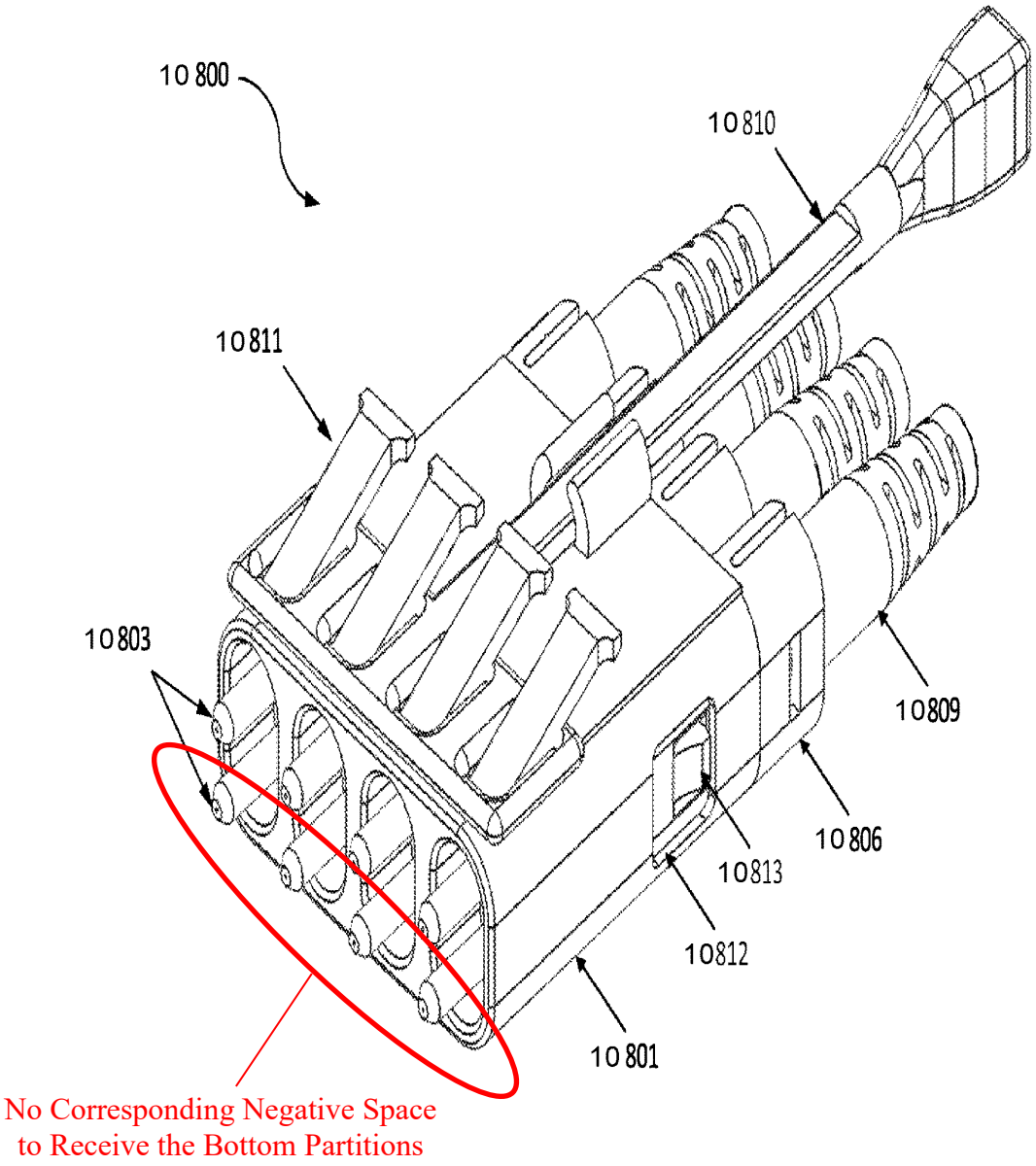


FIG. 58

EX1009: Figs. 58 and 61 (annotated).

256. In Figs. 64 and 65, the POSA would appreciate that the connectors labeled "Mini CS Simplex" are examples of the connector (10300, 10400, 10500)

of Figs. 53-55. The connectors labeled "Mini CS Simplex" in Figs. 64 and 65 are visually identical to the connector (10300, 10400, 10500) of Figs. 53-55.

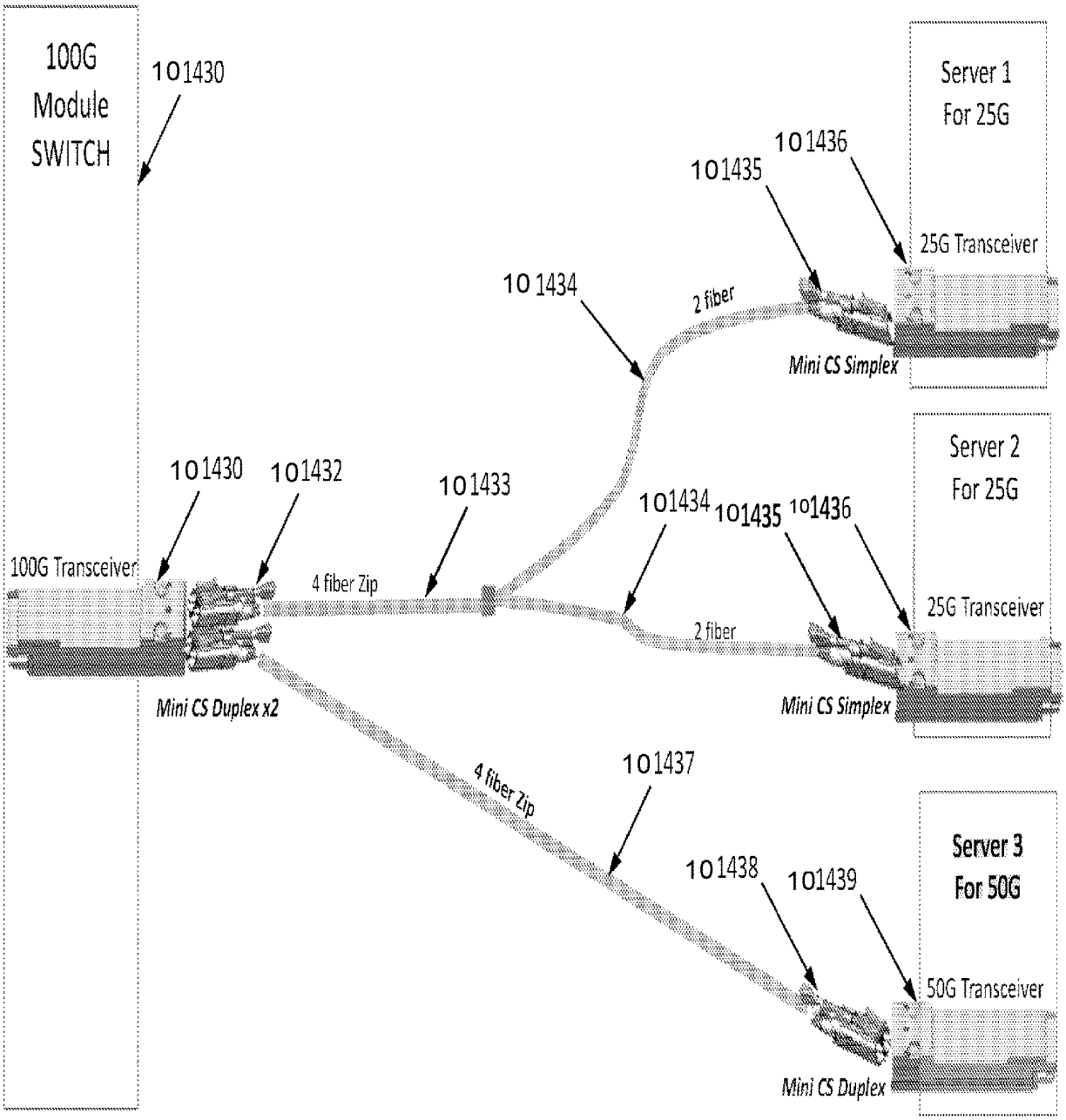


FIG. 64

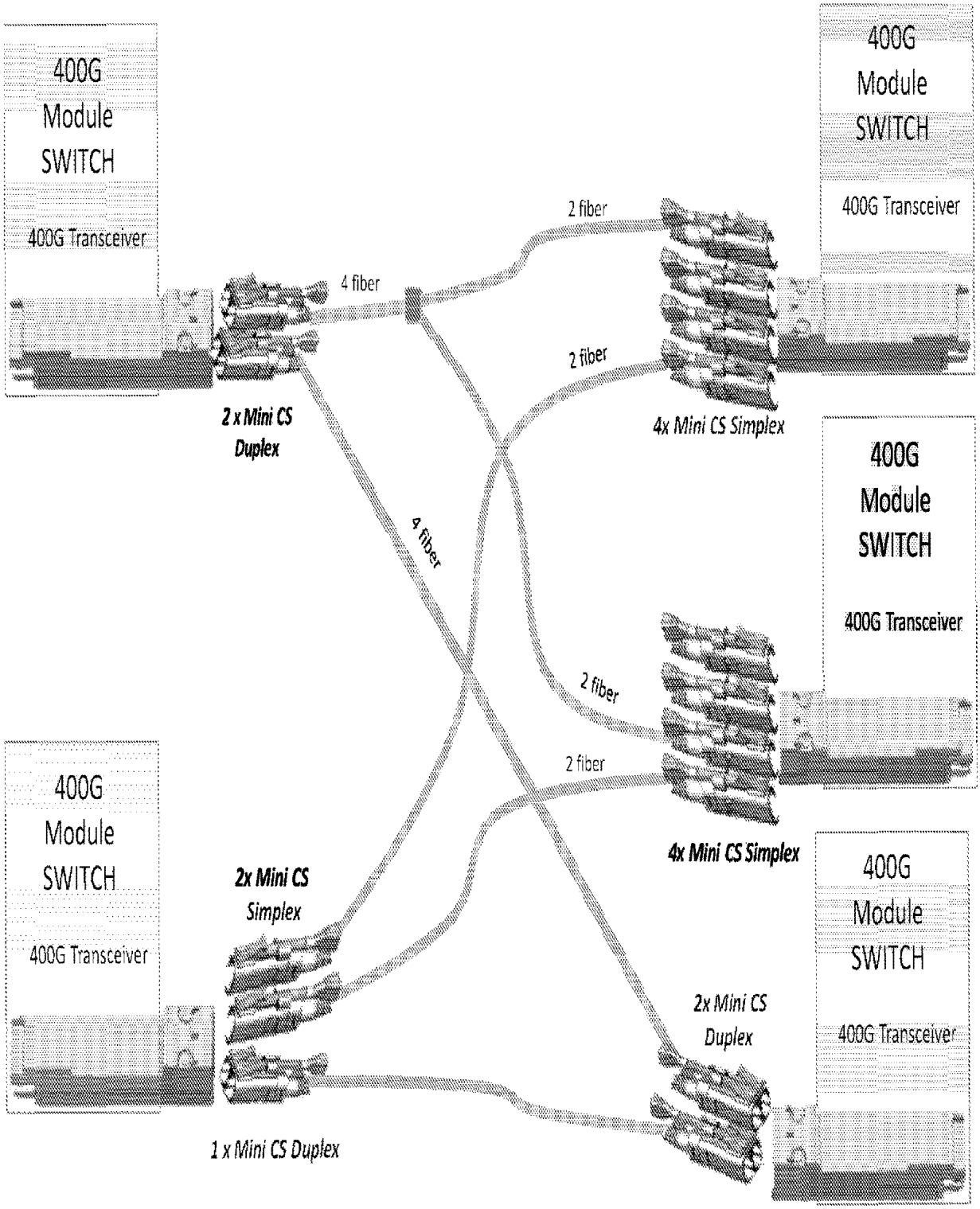


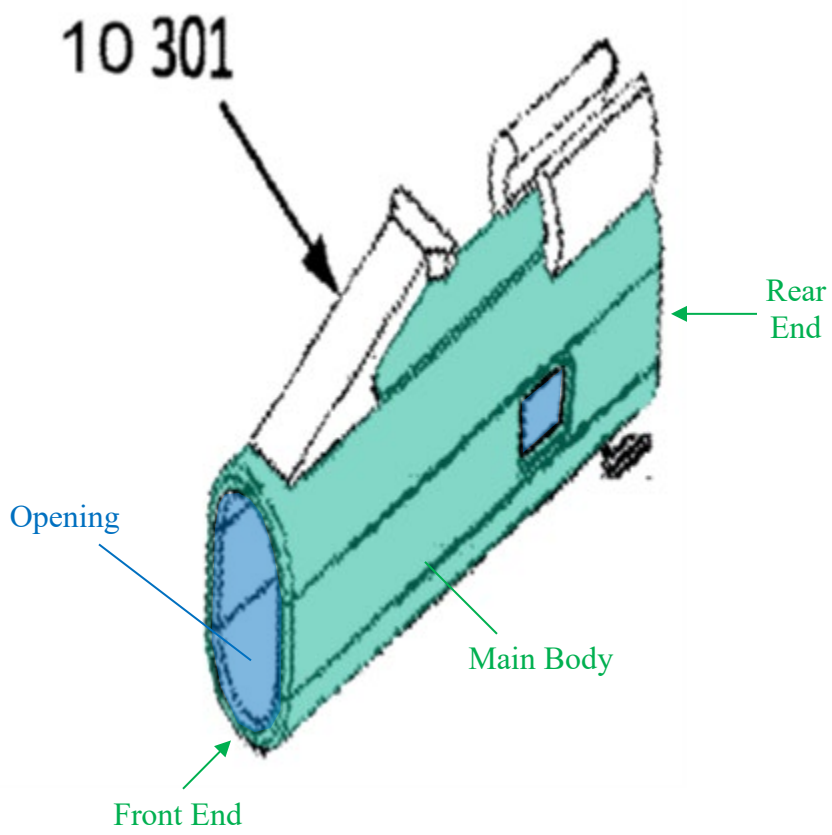
FIG. 65

EX1009: Figs. 64 and 65.

257. Therefore, in my opinion, Takano'369 meets this limitation.

1.a.1 "a housing having a main body extending between a front end and a rear end and having an opening extending therebetween,"

258. Takano'369's connector (10300, 10400, 10500) includes an outer housing (10301, 10401, 10501). EX1009: 19:1, 14-15, 34-41. The outer housing (10301, 10401, 10501) is the main body. As shown below, the main body has a front end and a rear end, and an opening extending between the front end and the rear end. The front portion of the opening is visible below. It is clear that the opening extends through the rear end of the main body based on Takano'369's description of how "the outer housing 10501 can slide on to or be removed from the front body 10502," by insertion/withdrawal of the front body (10502) through the open rear end as depicted in Fig. 55. EX1009: 19:35-36.

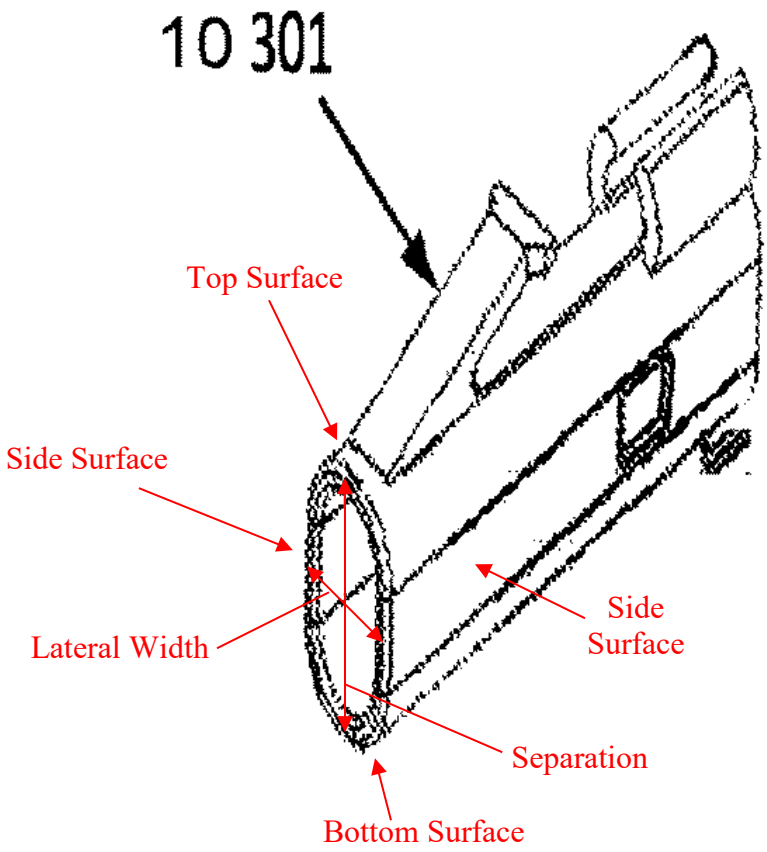


EX1009: Fig. 53 (annotated).

259. Therefore, in my opinion, Takano'369 meets this limitation.

1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"

260. The outer housing (10301, 10401, 10501) has a top surface, a bottom surface, and two opposing side surfaces. EX1009: Fig. 53. The lateral width between the two opposing side surfaces is less than the separation between the top and bottom surfaces. EX1009: Fig. 53.



EX1009: Fig. 53 (annotated).

261. Therefore, in my opinion, Takano'369 meets this limitation.

1.b.1 "two ferrule assemblies disposed within the opening of the housing,"

262. Takano'369's connector (10300, 10400, 10500) includes two ferrule assemblies disposed within the opening of the outer housing (10301, 10401, 10501). EX1009: 19:14-17.

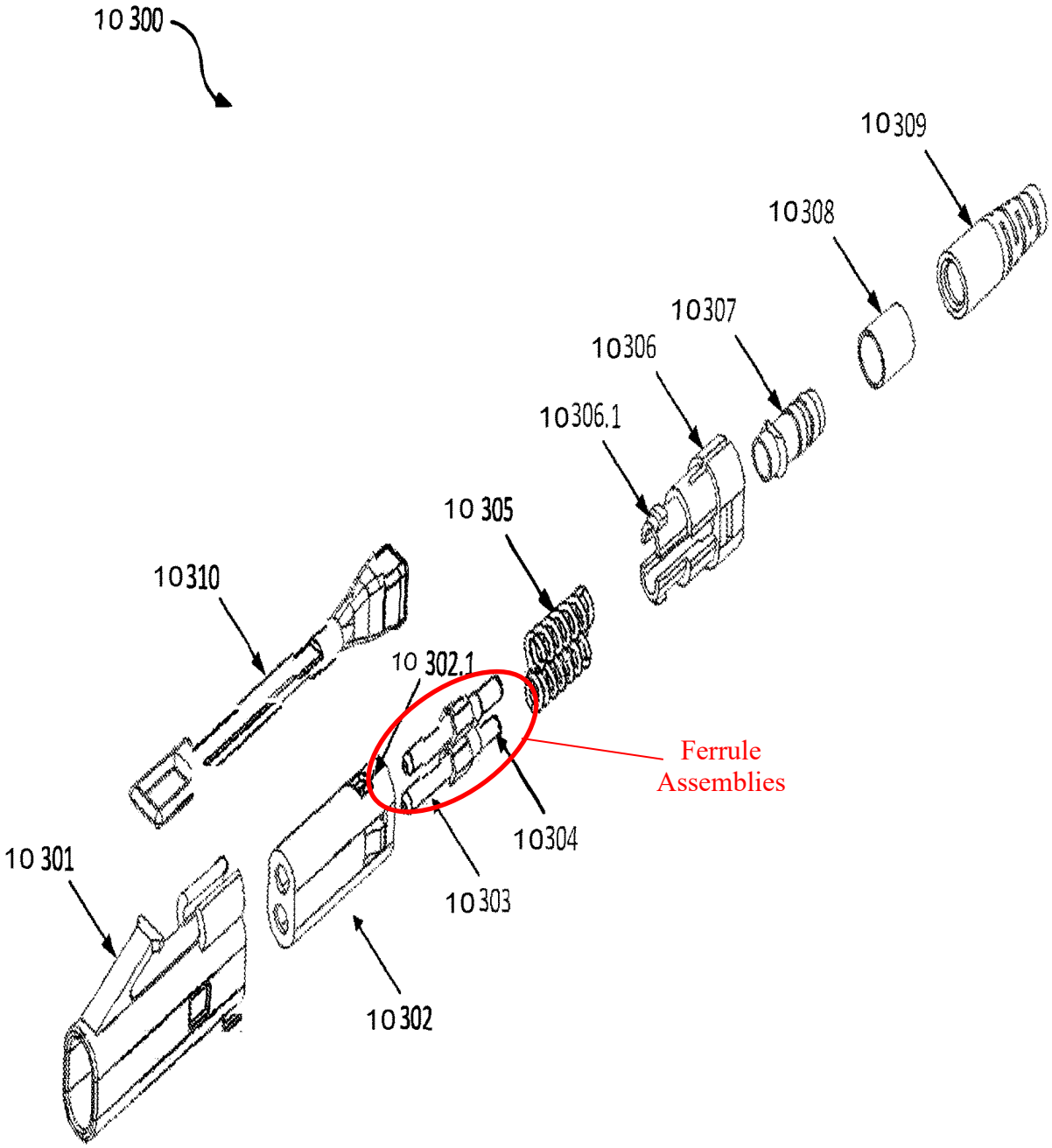
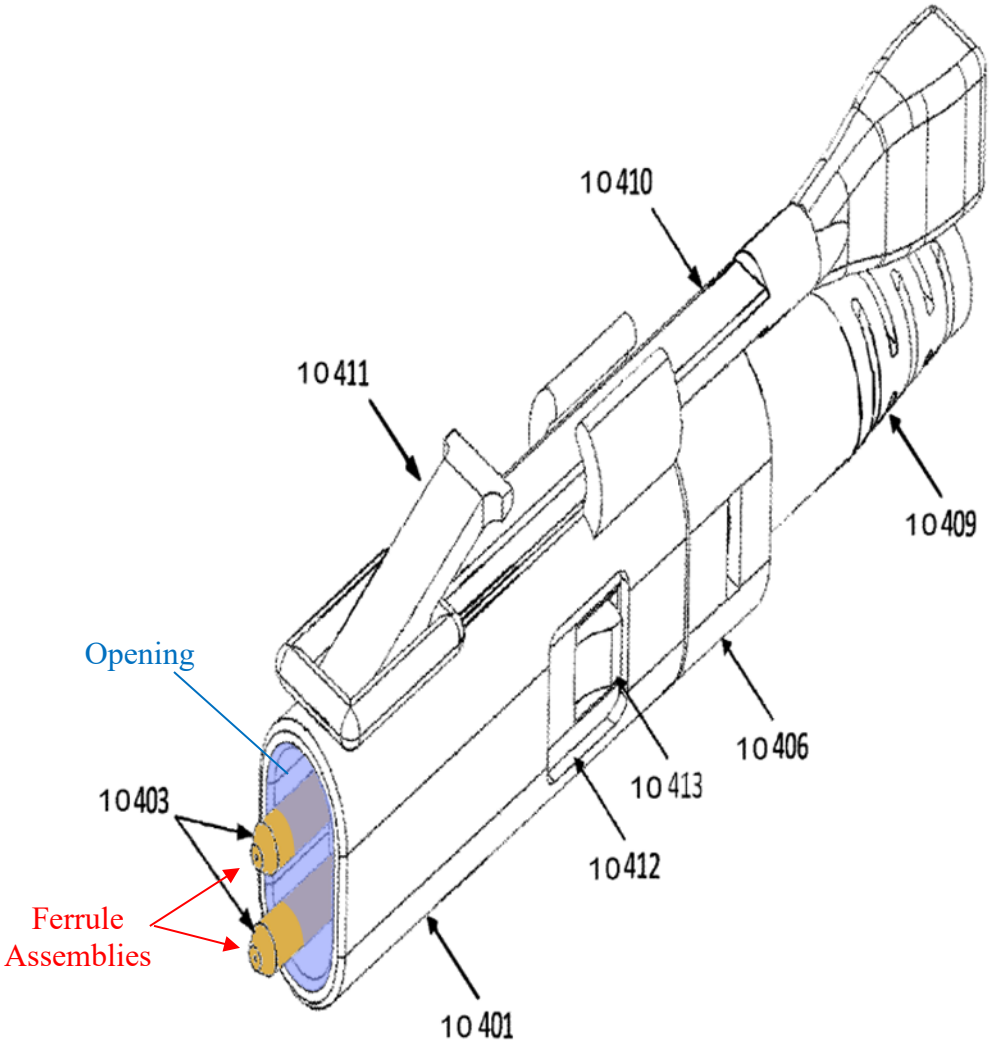

10 300
10309
10308
10307
10306
10306.1
10 305
10310
10 302.1
Ferrule
Assemblies
10304
10 301
10303
10302

FIG. 53



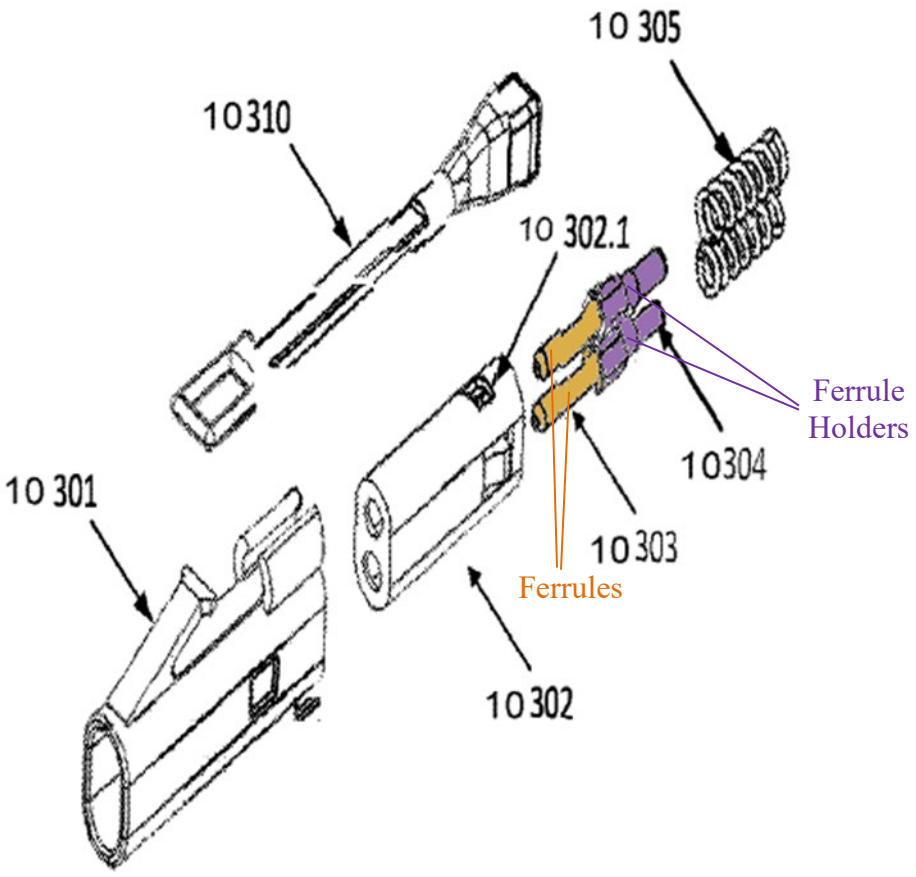
EX1009: Figs. 53 and 54 (annotated).

263. Therefore, in my opinion, Takano'369 meets this limitation.

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;"

264. Each ferrule assembly includes a fiber optic ferrule (10303, 10403) and a ferrule holder (10304) (e.g., ferrule flange) to hold the fiber optic ferrule.

EX1009: 19:2-3, 19:15-17. Each fiber optic ferrule (10303, 10403) extends forward away from the front end of the ferrule holder (10304). EX1009: Fig. 54.



EX1009: Fig. 53 (annotated).

265. Therefore, in my opinion, Takano'369 meets this limitation.

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;"

266. Takano'369's connector (10300, 10400, 10500) includes two ferrule springs (10305). EX1009: 19:3, 19:17. Takano'369 teaches that "the back body

10306 and the front body 10302 [can] be securely fastened together around the ferrule(s) 10303, ferrule flange(s) 10304, and the spring(s) 10305." EX1009: 19:8-11. Based on this teaching and what is shown in Fig. 53, as indicated below, the POSA would understand that the springs (10305) fit over the rear cylindrical portions of the ferrule flanges (10304) and the front ends of the springs engage the rearward facing surfaces of the larger hexagonal portions of the ferrule flanges. From their front ends, the springs (10305) extend rearward. The POSA would further understand that the springs (10305) are used to bias the ferrule assemblies toward the front end of the housing. EX1009: Abstract ("ferrule springs for urging the optical ferrules towards a mating receptacle"). Last, Takano'369 discloses that the springs (10305) are retained within the connector housing (10301, 10401, 10501). Specifically, the springs are securely fastened between the front body (10302, 10502) and the back body (10306), and in turn, the front body (10302, 10503) is attached to the outer housing (10301, 10401, 10501). EX1009: 19:8-11, 19:34-41.

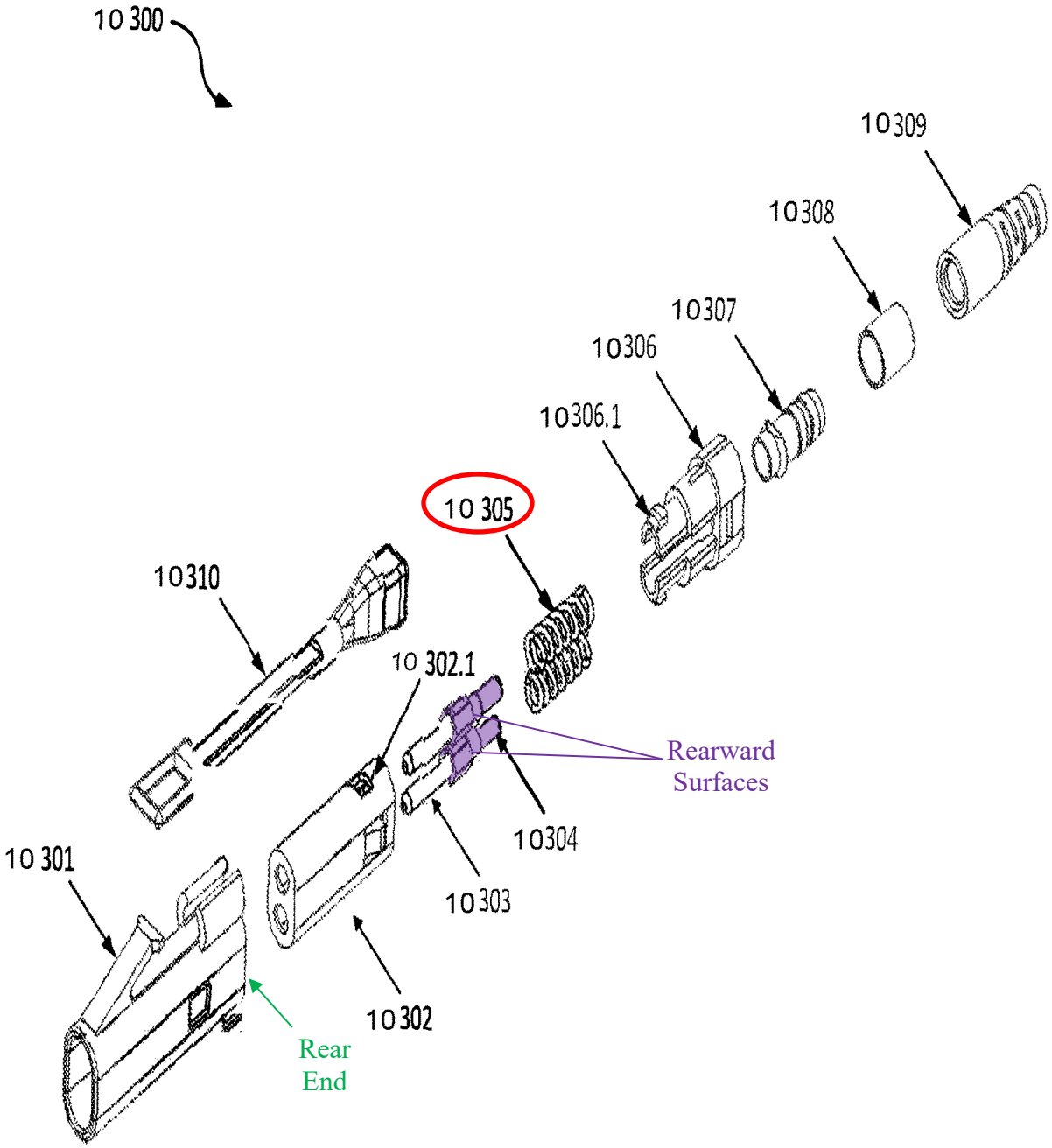


FIG. 53

EX1009: Fig. 53 (annotated).

267. If it is asserted that Takano'369 does not expressly teach this limitation, this limitation would have been obvious in view of Takano’369’s other

teachings—Fig. 23A for example—that show this limitation is nothing more than the conventional way ferrule springs are arranged in these types of connectors. Fig. 23A of Takano'369 depicts how the ferrule springs (2125) are loaded in a connector (2100) between a front body (2115) and a back body (2130) to contact rearward facing surfaces of ferrule flanges and thereby bias the ferrule assemblies forward in the housing. EX1009: 14:19-29. It would have been obvious to load the ferrule springs (10305) of the Takano'369 connector against the ferrule flanges (10304) in the same way to bias the ferrules in the forward direction using the components already part of the Takano'369 connector. This is nothing more than the conventional way of employing such ferrule springs in fiber optic connectors.

268. Therefore, in my opinion, Takano'369 meets this limitation or renders this limitation obvious.

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"

269. Takano'369's connector (10300, 10400, 10500) includes a two-piece crimp body made up of a back body (10306, 10406) and a back post (10307). EX1009: 19:1-4, 19:13-18. As explained above, the front end portion of the back body (10306, 10406) is secured to the front body (10302, 10502), and in turn, the front body (10302, 10502) is secured to the outer housing (10301, 10401, 10501). EX1009: 19:8-11, 19:34-41. Further, by comparing Figs. 53 and 54, it can be seen

that the front end portion of the back body (10306, 10406) protrudes into the rear end portion of the outer housing. Hence, Takano'369 has "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing."

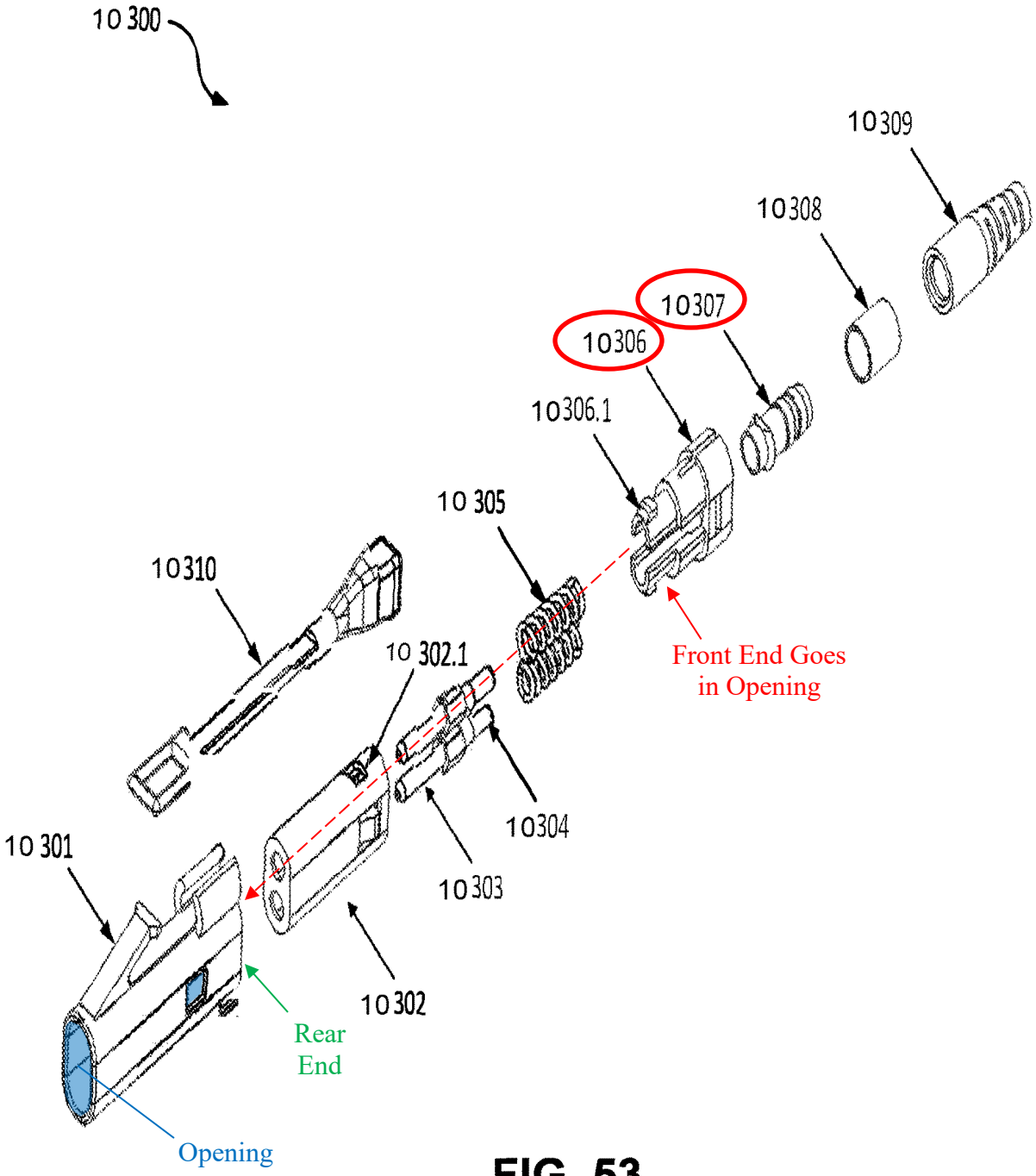

10 300
10309
10308
10307
10306
10306.1
10 305
10310
10 302.1
Front End Goes
in Opening
10304
10 301
10303
10 302
Rear
End
Opening

FIG. 53

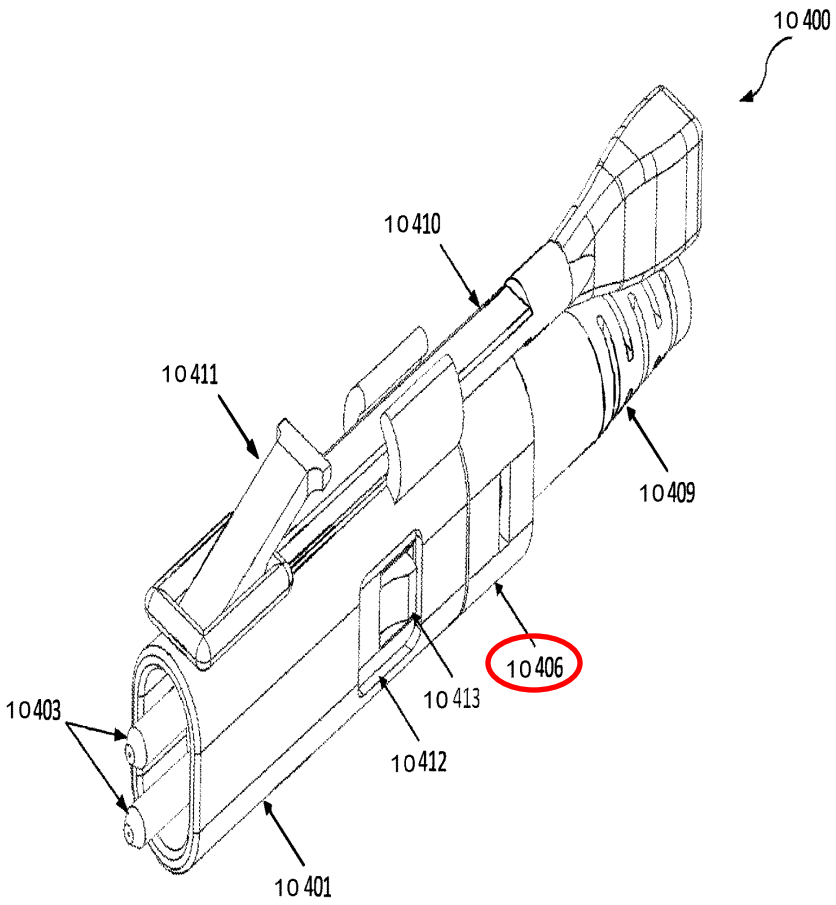


FIG. 54

EX1009: Figs. 53 and 54 (annotated).

270. Therefore, in my opinion, Takano'369 meets this limitation.

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;"

271. As indicated in the annotated version of Fig. 53 below, the POSA would recognize that the back post (10307) defines a singular opening for optical fibers at the rear end of the crimp body. This is apparent because Figs. 64 and 65

depict singular jacketed cables entering each simplex Takano'369's connector (10300, 10400, 10500) through the boot. EX1009: 21:50-54, 22:3-6.

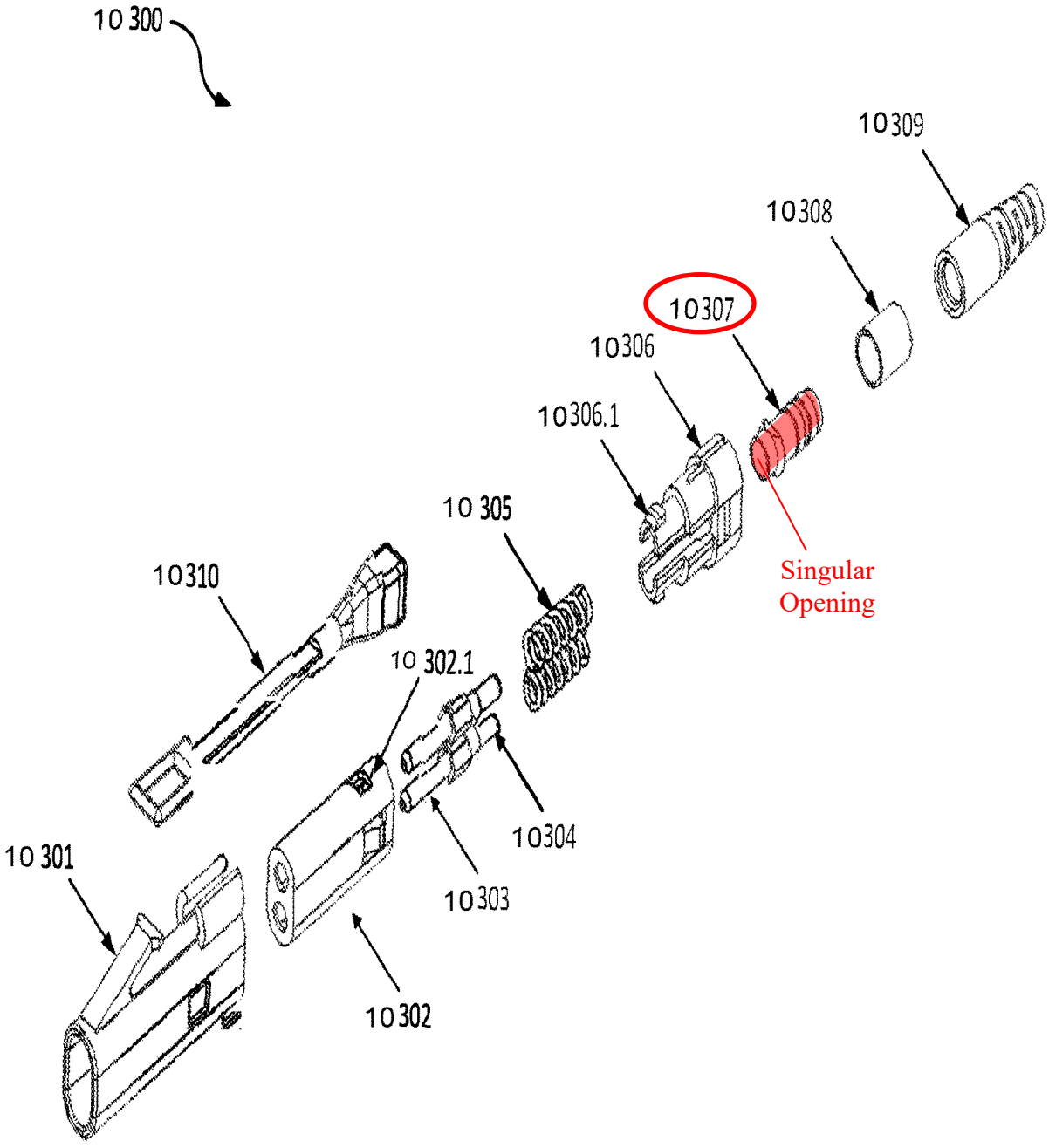


FIG. 53

EX1009: Fig. 53 (annotated).

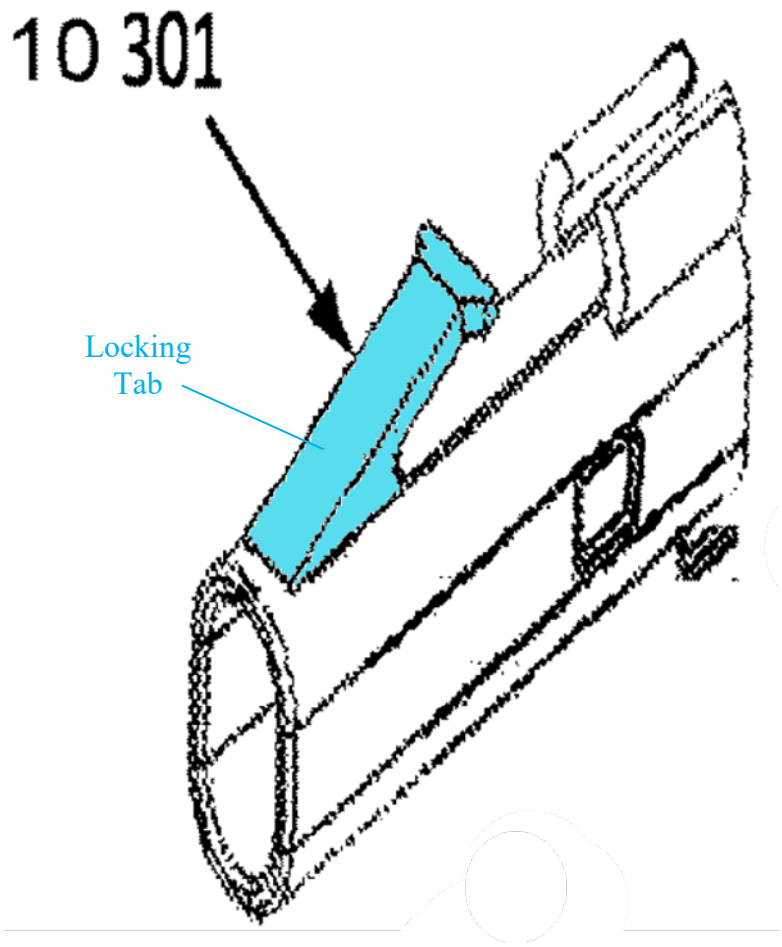
272. If it is asserted that Takano'369 does not expressly teach this limitation, this limitation would have been obvious in view of Takano'369's other teachings—Fig. 23A for example—that show this limitation (e.g., a singular opening) is nothing more than the conventional configuration of crimp bodies in these types of connectors. Fig. 23A of Takano'369 depicts how a similar two-piece crimp body made up of a back body (2130) and a cylindrical pack post defines a singular opening for passing two fibers to the ferrules (2122). EX1009: 13:22-25; Fig. 48; 18:33-39. In the same way, it would have been obvious to form a singular opening at the rear end of the back post (10307) to receive multiple optical fibers from a single cable jacket using the components already part of the Takano'369 connector. This is nothing more than the conventional configuration for a cylindrical back post that receives a two-fiber, single-jacket cable like the two fiber cable used with the Takano'369 connector. EX1009: 21:50-54.

273. Therefore, in my opinion, Takano'369 meets this limitation or renders this limitation obvious.

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and"

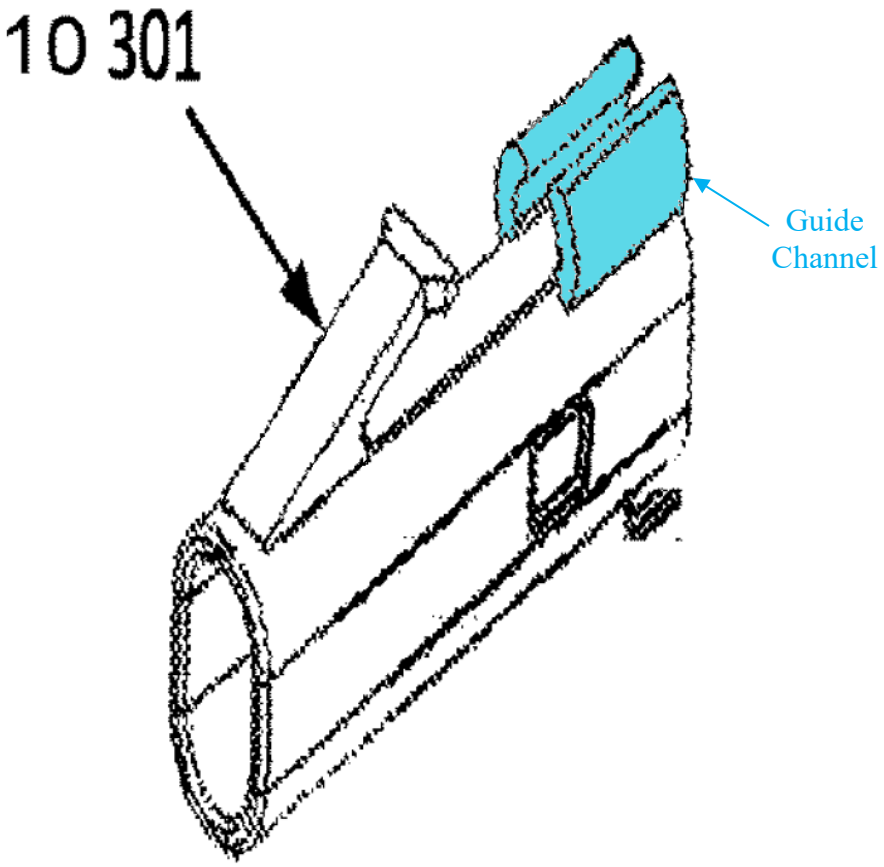
274. Takano'369's connector (10300, 10400, 10500) has a locking tab (10411) "used to interlock with an adapter (not shown) to secure the connector in to the adapter." EX1009: 19:25-27. The locking tab (10411) is on the top surface

of the outer housing (10411), and because it is used to both (i) "interlock with an adapter" and (ii) "secure the connector in to the adapter," it is understood to "guide the fiber optic connector into an adapter" as set forth in claim 1. EX1009: 19:25-27.



EX1009: Fig. 53 (annotated).

275. In addition, Takano'369's connector (10300, 10400, 10500) includes a guide channel on the top surface of the outer housing (10301). EX1009: Fig. 54.



EX1009: Fig. 53 (annotated).

276. As shown in Fig. 61, the guide channel is configured to fit into a mating adapter (101114). It can be seen that the top surface of the guide channel engages the top wall of the adapter, which means that the guide channel is "configured to guide the Takano'369 connector into an adapter."

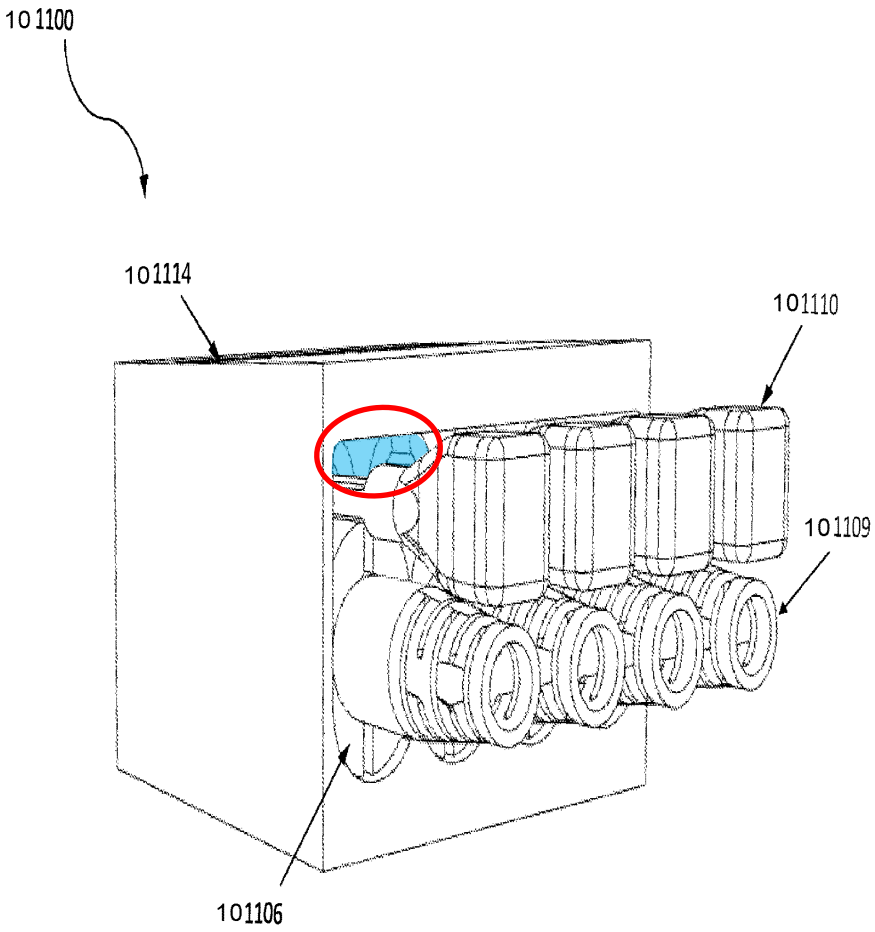


FIG. 61

EX1009: Fig. 61 (annotated).

277. Takano'369's connector (10300, 10400, 10500) also comprises a bottom curvature, which forms an alignment feature on the bottom surface of the housing.

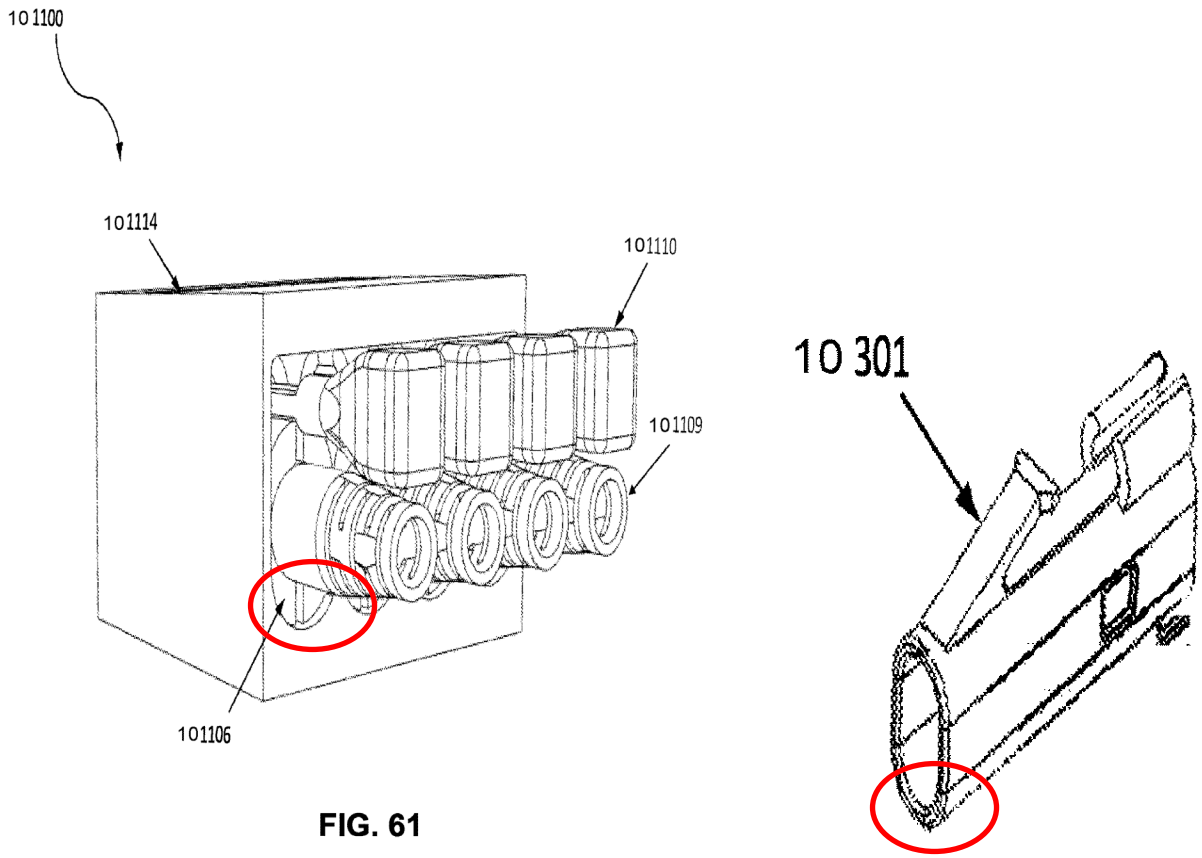


FIG. 61

EX1009: 53 and 61 (annotated).

278. As shown in Fig. 61, the bottom curvature is configured to engage a mating arcuate recess formed in the bottom wall of the adapter (101114). It can be seen that the way the bottom curvature of the connector fits within the arcuate recesses on the bottom wall of the adapter helps guide each of Takano'369's connectors (10300, 10400, 10500) into an individual position of the four-connector or quad-adapter (101114).

279. Therefore, in my opinion, Takano'369 meets this limitation.

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with

the singular opening of the crimp body through which optical fibers pass."

280. Takano'369's connector (10300, 10400, 10500) includes a strain relief boot (10309, 10409, 10509) coupled to the rear end of the two-piece crimp body (10306, 10306). EX1009: 19:4, 19:13-19, Fig. 55. The front end of a longitudinal opening through the boot (10309, 10409, 10509) is visible in Fig. 53. By comparing Figs. 53 and 54, it can be seen that in the assembled connector, the boot (10309, 10409, 10509) is fitted over the back post (10307) such that the longitudinal opening is in continuum with the singular opening of the crimp body. The simplex Takano'369 connectors in Figs. 64 and 65 are shown terminating two-fiber cables, indicating that two fibers pass from the cables through the longitudinal opening in the boot and the singular opening of the crimp body to the ferrules. EX1009: 21:50-54, 22:3-6.

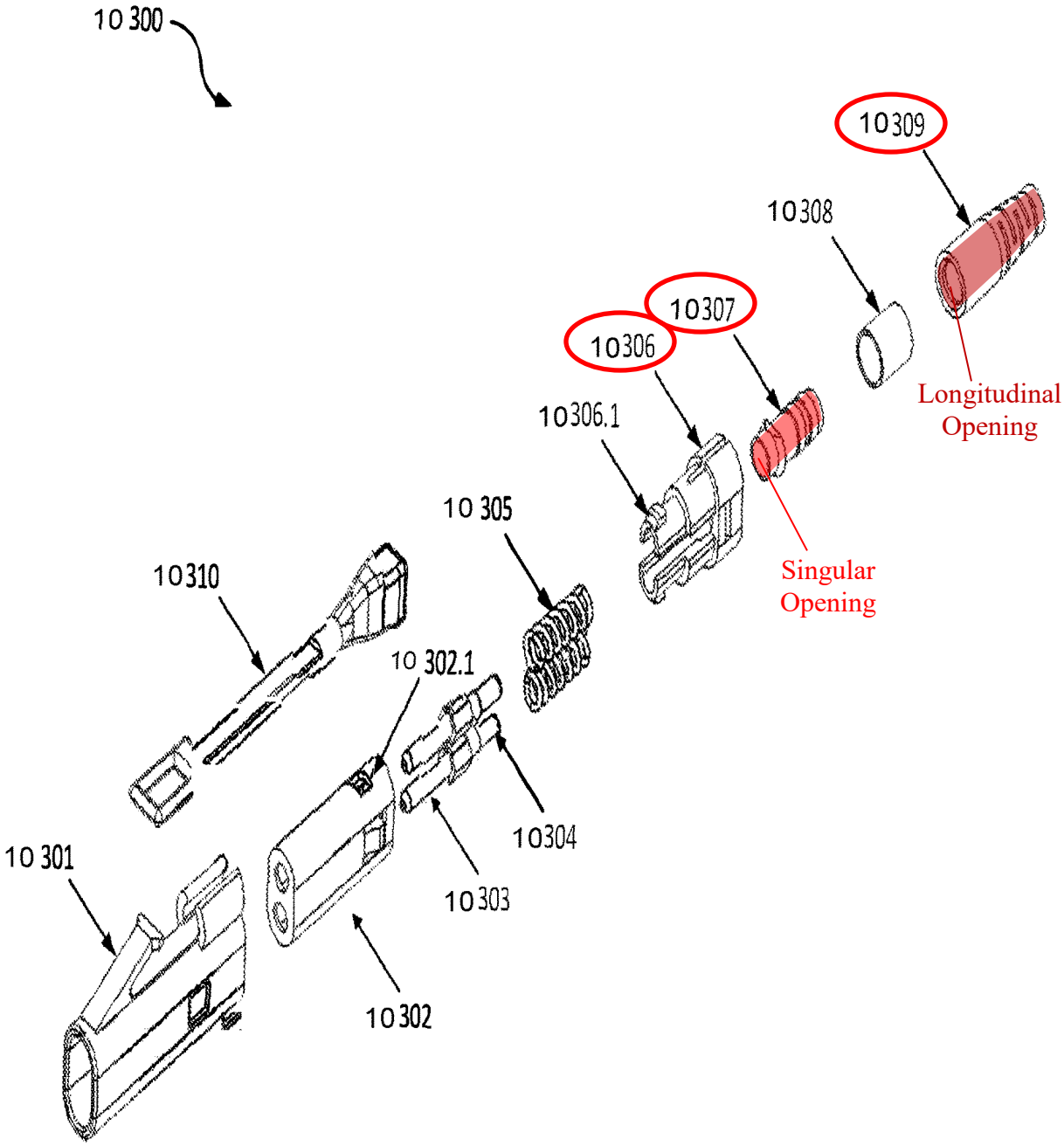


FIG. 53

EX1009: Fig. 53 (annotated).

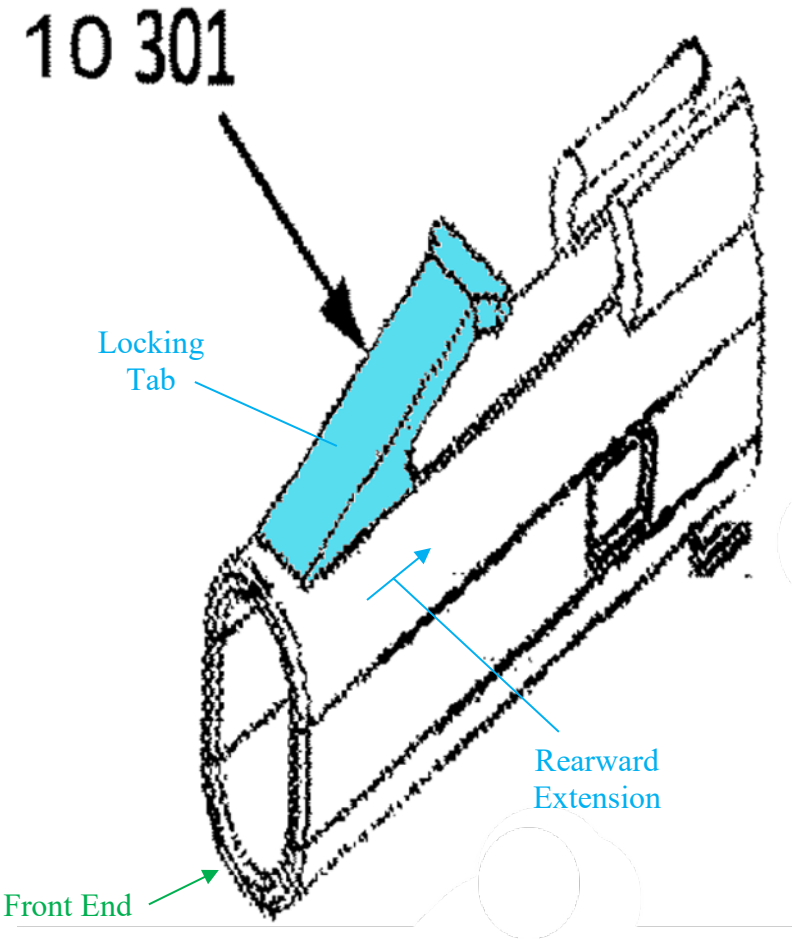
281. If it is asserted that Takano'369 does not expressly teach this limitation, this limitation would have been obvious in view of Takano’369’s other

teachings—Fig. 23A for example—that show this limitation (e.g., aligned openings) is nothing more than the conventional configuration of boots and crimp bodies in these types of connectors. Fig. 23A of Takano'369 depicts how the longitudinal opening of a similar boot (2145) aligns with the singular opening in a similar cylindrical back post (2135) for passing two fibers to the ferrules (2122). In the same way, it would have been obvious to align the longitudinal opening in the boot (10309) with the singular opening at the rear end of back post (10307) for the passage of fibers to the ferrules from the fiber optic cable to the ferrules using the components already part of the Takano'369 connector. This is nothing more than the conventional configuration for a boot mounted over a cylindrical back post in a duplex connector that terminates a two-fiber, single-jacket cable like the Takano'369 connector. EX1009: 21:50-54.

282. Therefore, in my opinion, Takano’369 meets this limitation or renders this limitation obvious.

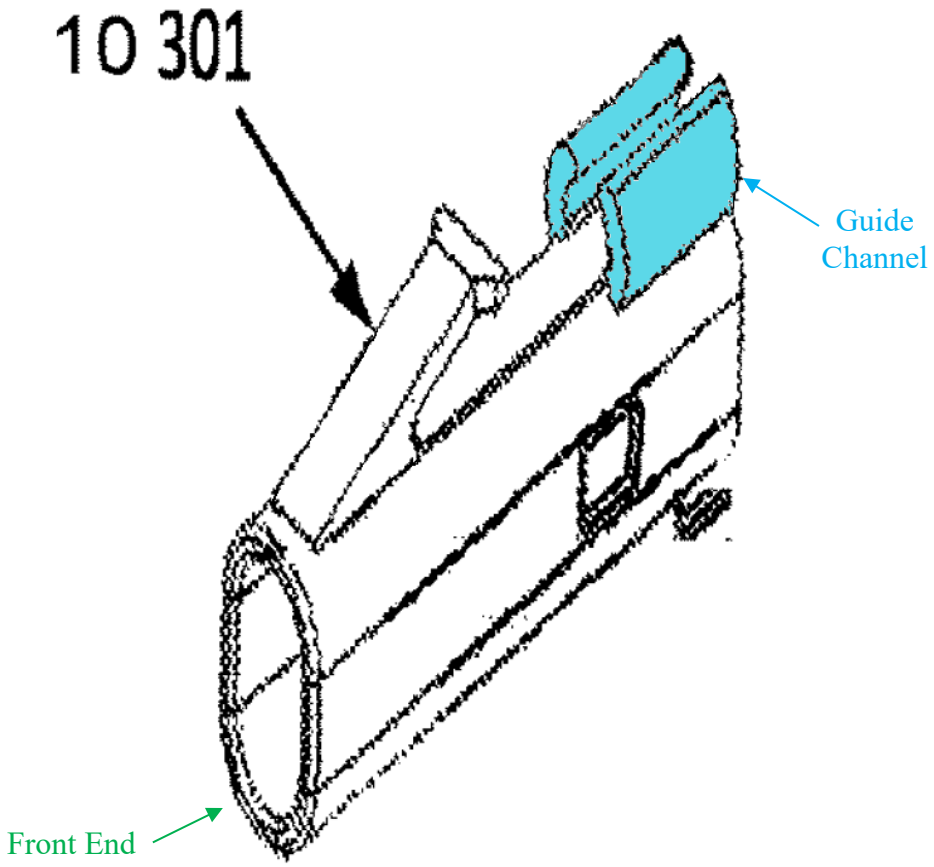
B. Claim 2 “The fiber optic connector according to claim 1, wherein the alignment feature is positioned rearward of the front end of the housing and extends away from the front end of the housing.”

283. As shown below the locking tab (10411) starts rearward of the front end of the housing and extends further rearward. As explained above (Section XIII(A)(1.e)), the locking tab (10411) is an alignment feature. Hence the locking tab meets the requirements of claim 2.



EX1009: Fig. 53 (annotated).

284. As shown below the guide channel starts rearward of the front end of the housing and extends further rearward. As explained above (Section XIII(A)(1.e)), the guide channel is an alignment feature. Hence the guide channel meets the requirements of claim 2.



EX1009: Fig. 53 (annotated).

285. Therefore, in my opinion, Takano'369 meets this claim.

C. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

286. As I explained in Section VII(C), the claimed "spring push" recited in claim 3 may be part of the crimp body.

287. The POSA would recognize that the front end of the back body (10306, 10406) is a spring push for engaging a rear portion of each of the two springs (10305). Section XIII(A)(1.c).

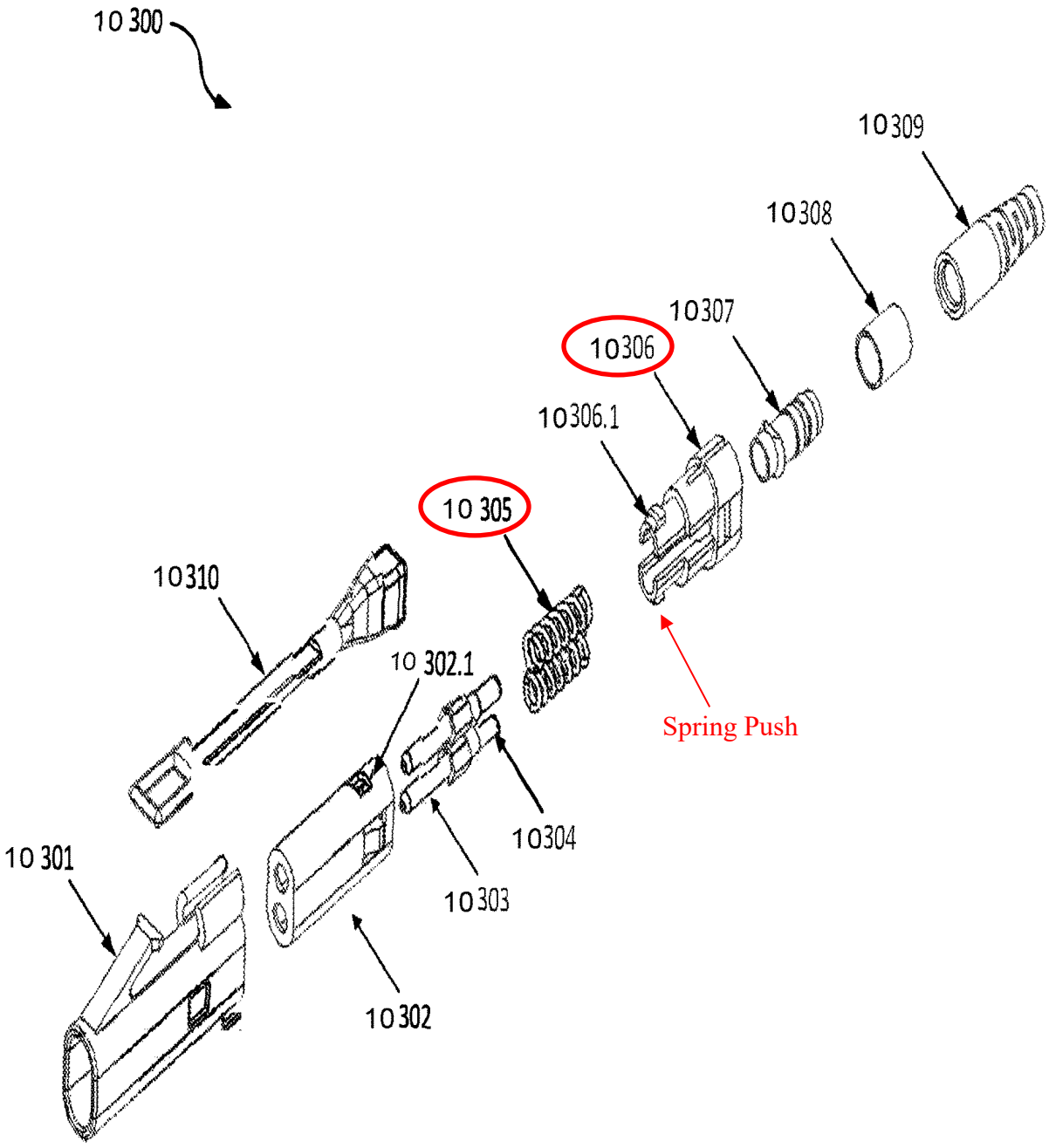


FIG. 53

EX1009: Fig. 53 (annotated).

288. If it is asserted that Takano'369 does not expressly teach this limitation, this limitation would have been obvious in view of Takano’369’s other

teachings—Fig. 23A for example—that show this limitation is nothing more than the conventional way ferrule springs are engaged by a spring push in these types of connectors. Fig. 23A of Takano'369 depicts how the back body (2130) engages the rear portion of each of the two ferrule springs (2125) in the connector (2100). EX1009: 14:19-29. It would have been obvious to use the back body (10306) the same way as the back body (2130) in order to preload the ferrule springs (10305) against the ferrule flanges using the components already part of the Takano'369 connector. This is nothing more than the conventional way of employing such ferrule springs in fiber optic connectors.

289. Therefore, in my opinion, Takano’369 meets this claim or renders this claim obvious.

D. Claim 5 “The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously.”

290. The POSA would recognize that the front end of the back body (10306, 10406) is a spring push that simultaneously engages the rear portion of each of the two springs. Section XIII(A)(1.c).

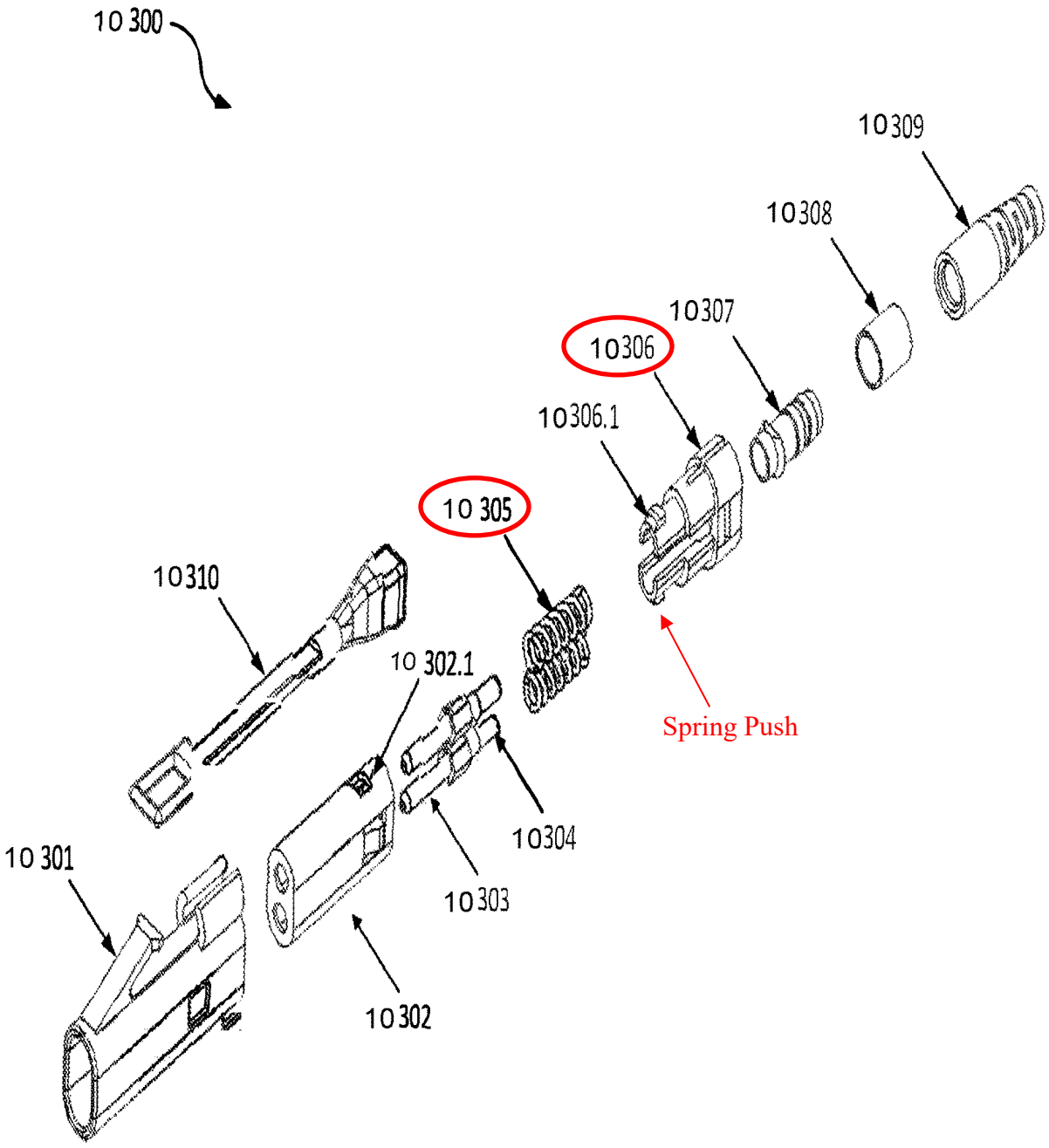


FIG. 53

EX1009: Fig. 53 (annotated).

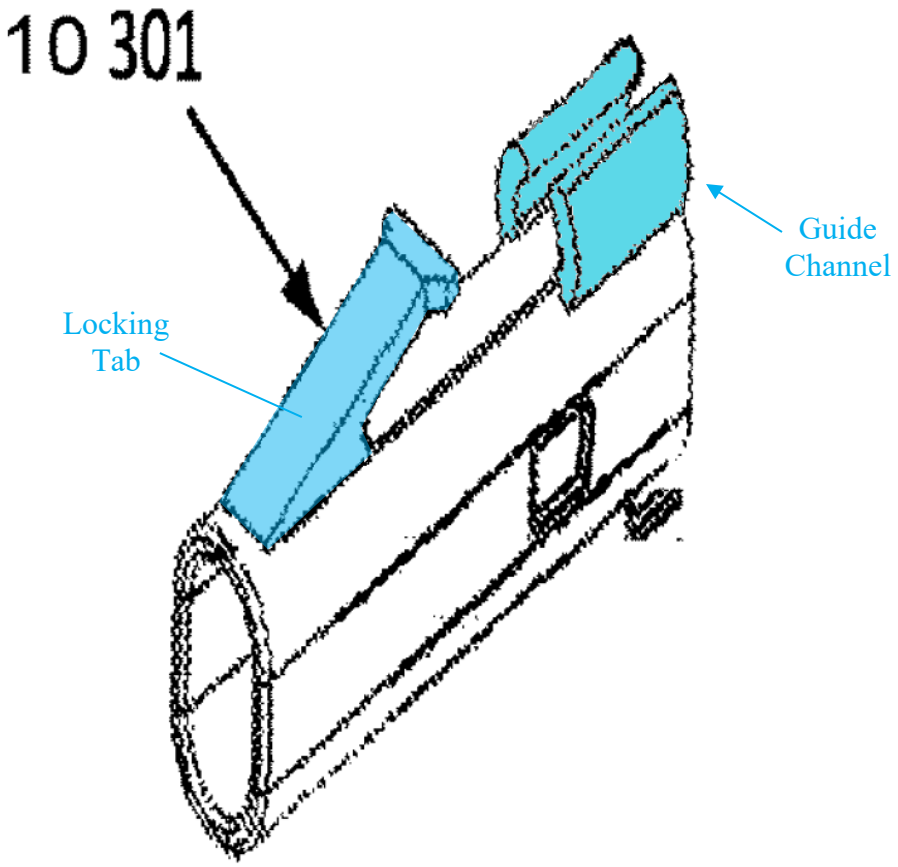
291. If it is asserted that Takano'369 does not expressly teach this limitation, this limitation would have been obvious in view of Takano’369’s other

teachings—Fig. 23A for example—that show this limitation is nothing more than the conventional way ferrule springs are engaged by a spring push in these types of connectors. Fig. 23A of Takano'369 depicts how the back body (2130) simultaneously engages the rear portion of each of the two ferrule springs (2125) in the connector (2100). EX1009: 14:19-29. It would have been obvious to use the back body (10306) the same way as the back body (2130) in order to simultaneously preload both ferrule springs (10305) using the components already part of the Takano'369 connector. This is nothing more than the conventional way of employing such ferrule springs in fiber optic connectors.

292. Therefore, in my opinion, Takano’369 meets this claim or renders this claim obvious.

E. Claim 6 “The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing.”

293. The locking tab (10411) and the guide channel are both "indicia of polarity" on the connector housing (10301, 10401, 10501) in that both features indicate to the user the correct orientation for plugging the connector (10300, 10400, 10500) into a mating adapter. As noted below, these features are found on the top of the connector housing (10301, 10401, 10501) but not the bottom, so they clearly distinguish the top side from the bottom side.



EX1009: Fig. 53 (annotated).

294. Further, as shown in Fig. 61, the adapter (101114) has a flat top wall and a scalloped bottom wall. The locking tab (10411) and guide channel both indicate to the user the proper orientation of Takano'369's connector (10300, 10400, 10500) relative to the adapter (101114)—i.e., with the locking tab and guide channel facing up toward the flat top wall and the arcuate bottom feature facing down for reception in the scalloped recess along the bottom wall.

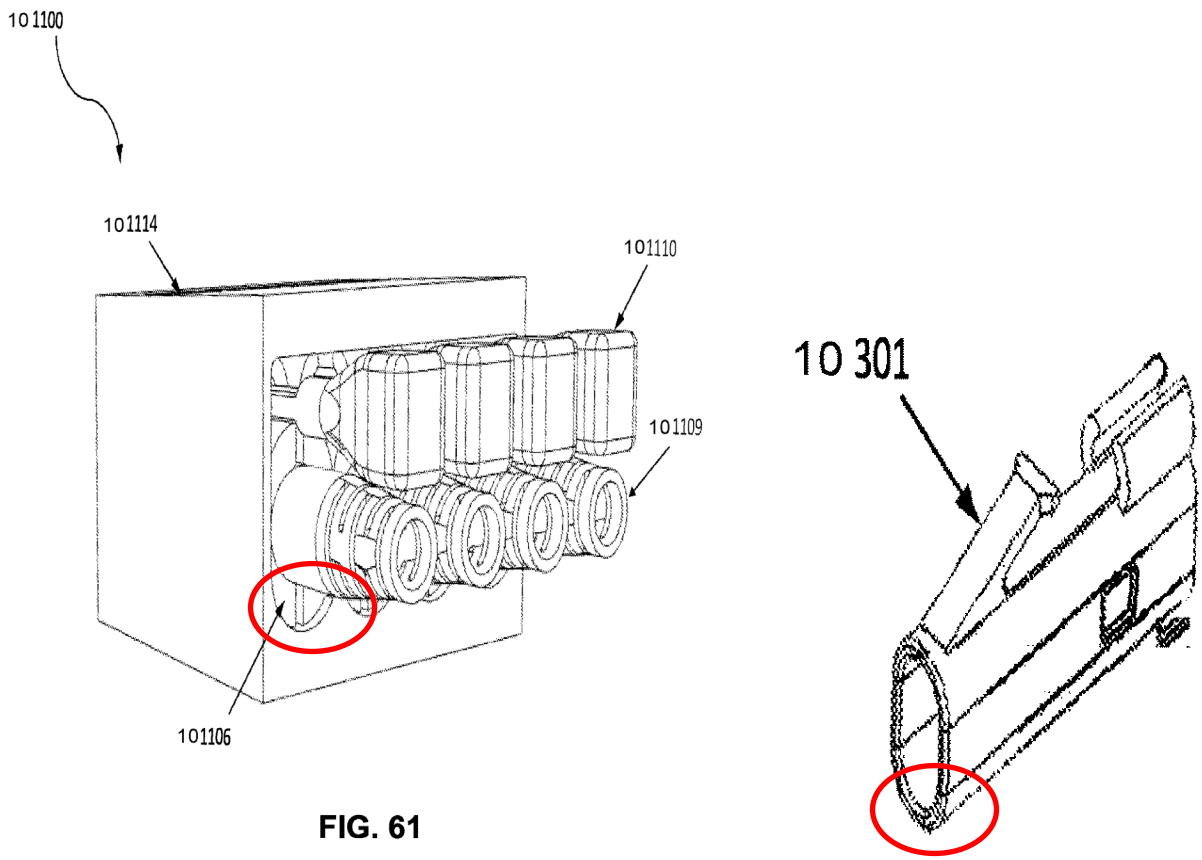


FIG. 61

EX1009: 53 and 61 (annotated).

295. Therefore, in my opinion, Takano'369 meets this claim.

F. Claim 7

7.a "The fiber optic connector according to claim 1, further comprising: a crimp band secured around an outer surface of the rear end of the crimp body, and"

296. Takano'369's connector (10300, 10400, 10500) includes a crimp ring (10308). EX1009: 19:4. By its name and by what is shown in Figs. 53 and 54, the POSA would understand that the crimp ring (10307) is "a crimp band secured around an outer surface of the rear end of the crimp body," namely, the outer surface of the back post (10307).

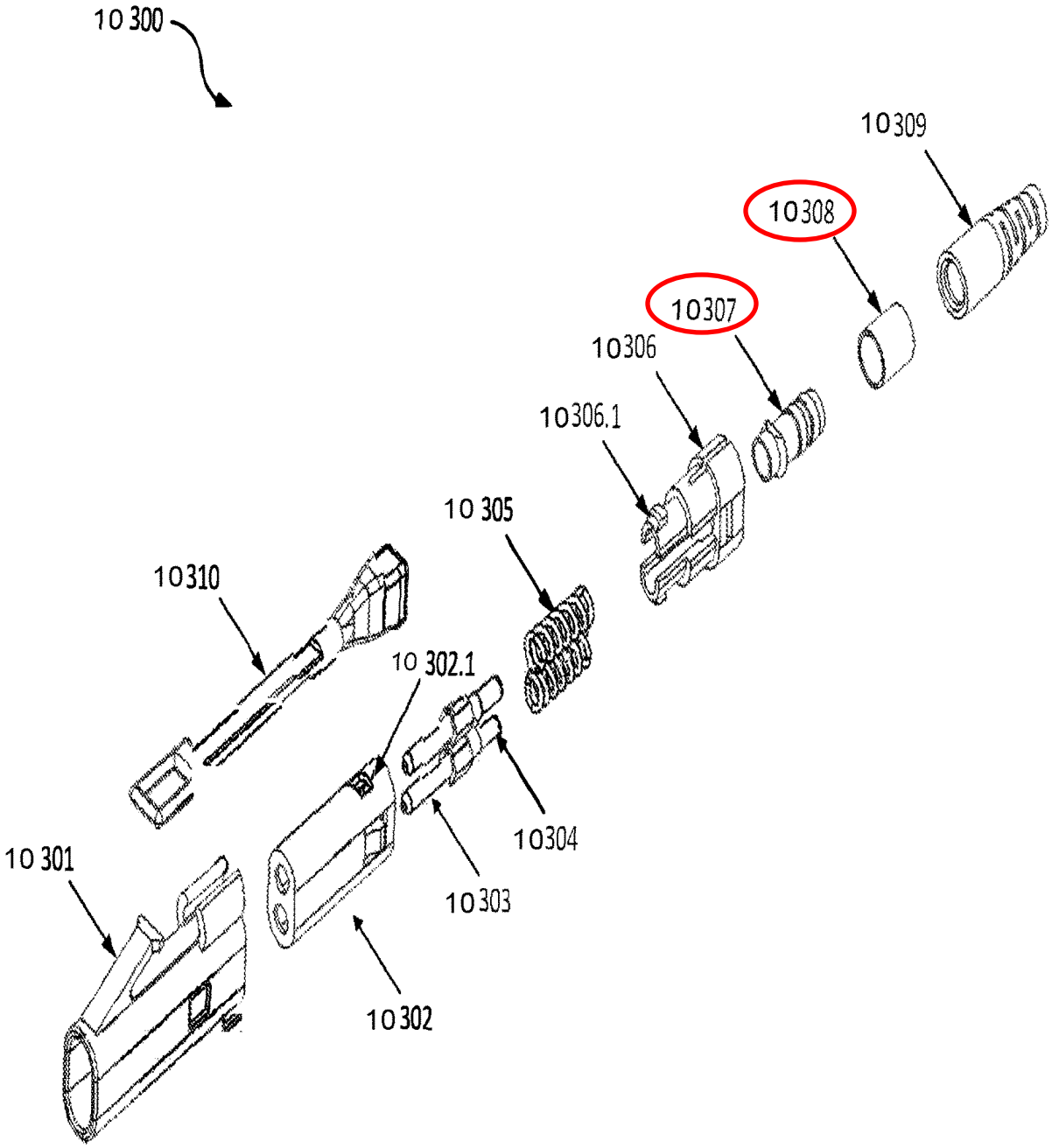


FIG. 53

EX1009: Fig. 53 (annotated).

297. Therefore, in my opinion, Takano'369 meets this limitation.

7.b "wherein the strain relief boot extends rearwardly away from the housing."

298. The boot (10309, 10409) is a strain relief boot that "extends rearwardly away from the housing" (10301, 10401, 10501). EX1009: Figs. 53 and 54.

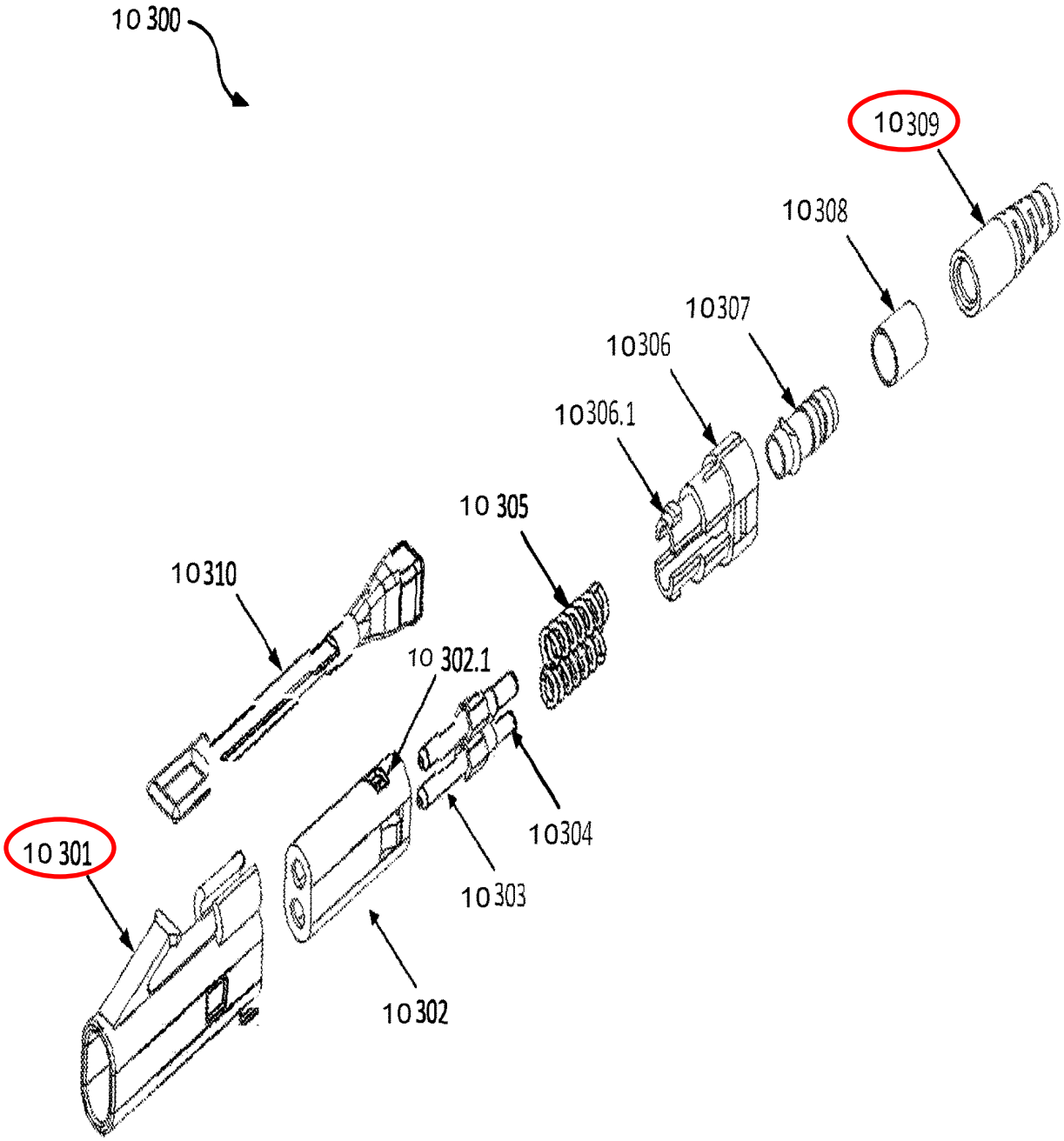

10 300
10309
10308
10307
10306
10306.1
10 305
10310
10 302.1
10304
10 301
10303
10302

FIG. 53

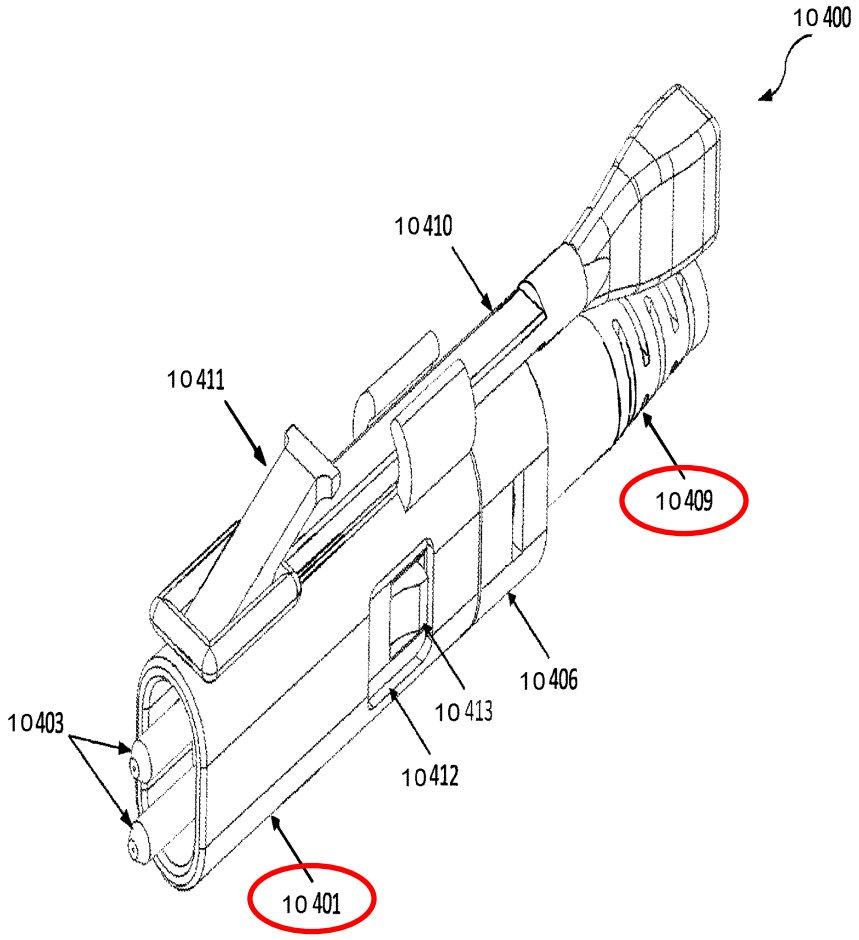


FIG. 54

EX1009: Figs. 53 and 54 (annotated).

299. Therefore, in my opinion, Takano'369 meets this limitation.

G. Claim 8 "The fiber optic connector according to claim 1, wherein the top surface of the housing includes a rail receiving portion extending along at least a portion of the housing."

300. The guide channel on the top surface of the connector housing (10301, 10401, 10501) is a "rail receiving portion" in that it receives the rail-shaped arm of

a push-pull tab (10310, 10410, 10510). Further, the guide channel extends along at least a portion of the housing.

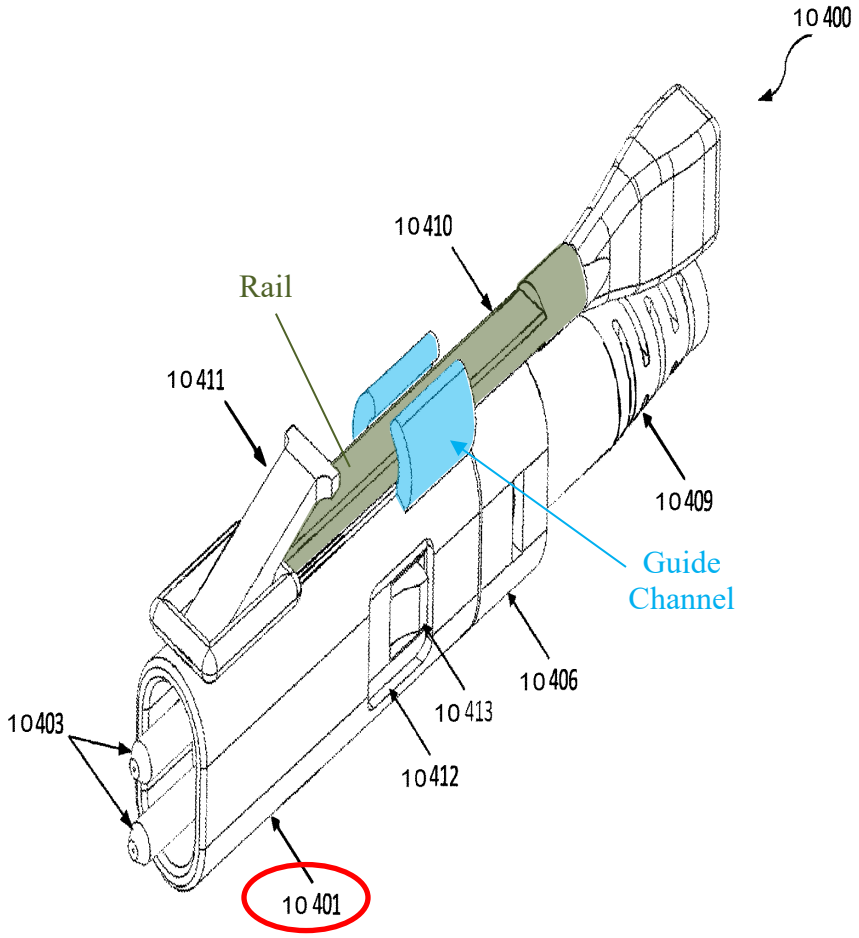


FIG. 54

EX1009: Fig. 54 (annotated).

301. Therefore, in my opinion, Takano'369 meets this claim.

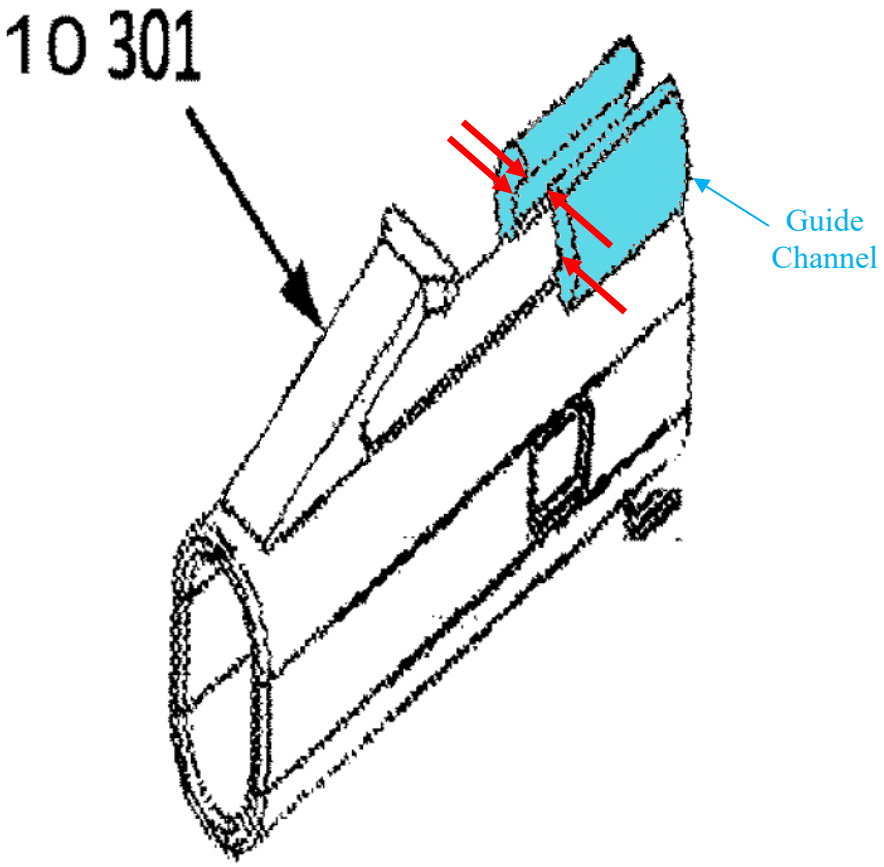
H. Claim 9 "The fiber optic connector according to claim 8, wherein the alignment feature includes the rail receiving portion."

302. As I explained in Section XIII(A)(1.e), the guide channel is an "alignment feature" as set forth in claim 1. As I explained in Section XIII(G), the guide channel is also a rail receiving portion. Hence, the guide channel is an alignment feature that includes the rail receiving portion.

303. Therefore, in my opinion, Takano'369 meets this claim.

I. Claim 10 "The fiber optic connector according to claim 6, wherein the rail receiving portion has a dove tail configuration or an undercut configuration to receive a latch component."

304. The guide channel has a dovetail or undercut configuration in that it has a narrow opening at the top and a wider space below the narrow top opening. Further, the guide channel receives the push-pull tab (10310, 10410, 10510), which is a latch component. EX1009: 19:27-30.



EX1009: Fig. 53 (annotated).

305. Therefore, in my opinion, Takano'369 meets this claim.

J. Claim 11 "The fiber optic connector according to claim 7, wherein the latch component is a push-pull mechanism."

306. The push-pull tab (10310, 10410, 10510) is a push-pull latch mechanism. EX1009: 18:66-19:5, 19:25-31.

307. Therefore, in my opinion, Takano'369 meets this claim.

K. Claim 12 "The fiber optic connector according to claim 1, wherein the front end of the housing fits in a QSFP footprint."

308. Takano'369 explains its connectors are "narrow-pitch LC duplex connectors ... for use, for example, with future narrow pitch LC SFPs." EX1009:

6:22-25; EX1010: ¶[0037]. As a result, Takano'369's connector (10300, 10400, 10500) fits in an SFP footprint, which is 14x12.25 mm. EX1009: 16:44-45. Hence, the same connector also would fit in the larger QSFP footprint, which is 13.5x19 mm, such as if oriented so that the long sides of Takano'369's connector are parallel to the long sides (19mm) of the QSFP footprint. EX1009: 16:47-49. Therefore, the front end of the outer housing (10301, 10401, 10501) of the connector (10300, 10400, 10500) fits in a QSFP footprint.

309. Therefore, in my opinion, Takano'369 meets this claim.

L. Claim 13 "The fiber optic connector according to claim 1, wherein the crimp body is a two-piece crimp body."

310. The crimp body is a two-piece crimp body made up of the back body (10306, 10406) and the back post (10307).

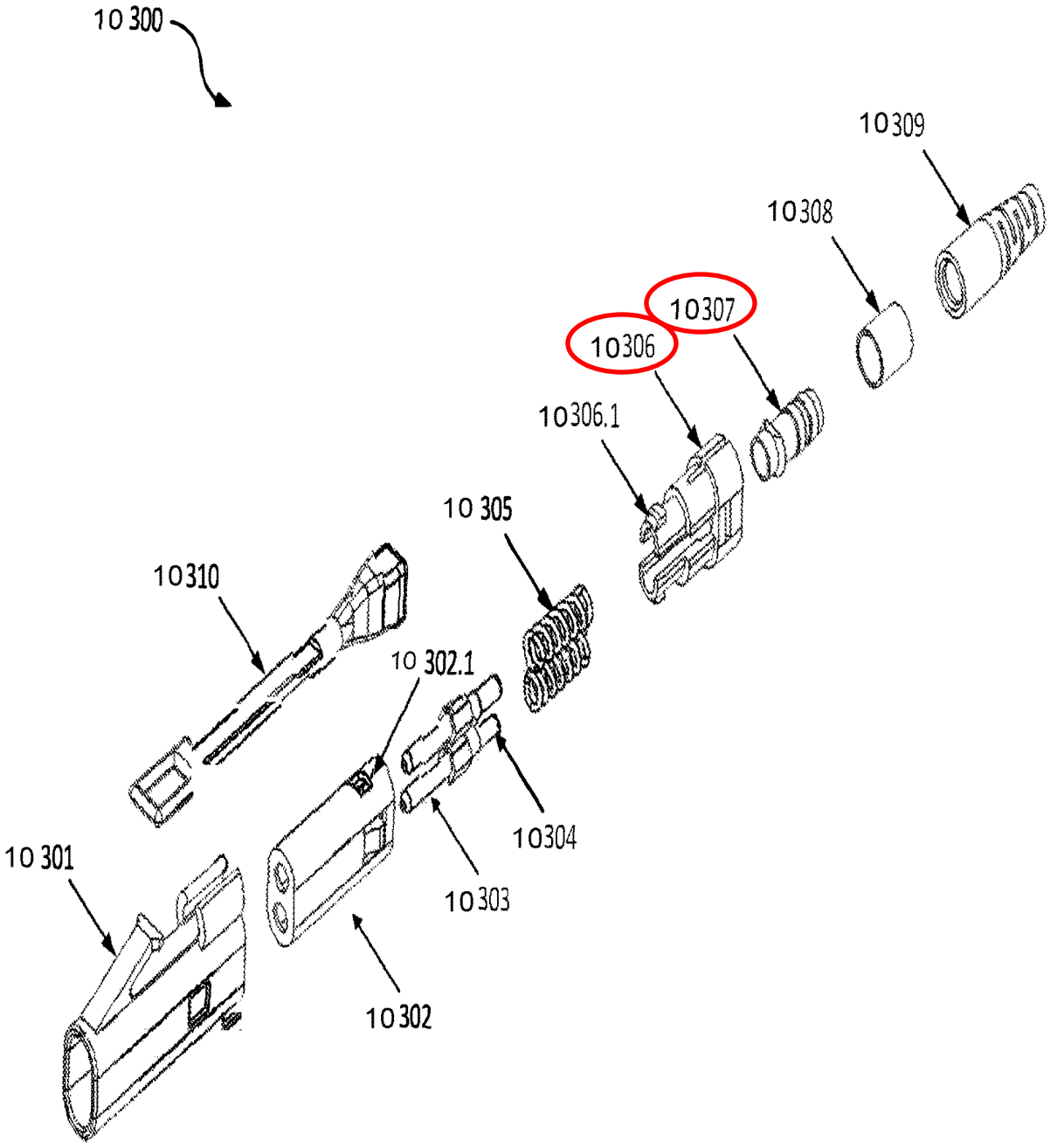


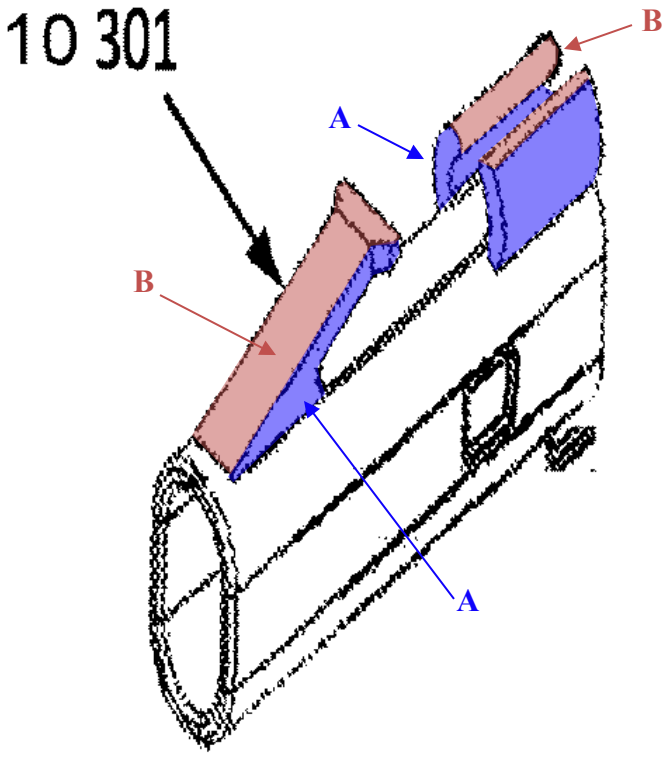
FIG. 53

EX1009: Fig. 53 (annotated).

311. Therefore, in my opinion, Takano'369 meets this claim.

I. Claim 14 "The fiber optic connector according to claim 1, wherein the alignment feature includes a vertical alignment feature and a horizontal alignment feature."

312. The locking lever (10114), guide channel, and/or bottom curvature are an alignment feature that includes a vertical alignment feature and a horizontal alignment feature, regardless of how these terms are construed (Section V(B)). If "vertical alignment feature" is construed to mean a feature that extends vertically and "horizontal alignment feature" is construed to mean a feature that extends horizontally, then the "vertical alignment feature" is met by surfaces A below of the locking lever (10114) and guide channel and "horizontal alignment feature" is met by surfaces B below.



EX1009: Fig. 53 (annotated).

313. If "vertical alignment feature" is construed to mean a feature that is capable of engaging a mating alignment structure to align the connector vertically and "horizontal alignment feature" is construed to mean a feature that is capable of engaging a mating alignment structure to align the connector horizontally, then the "vertical alignment feature" is met by the top surface of the guide channel and by the bottom curvature feature, and the "horizontal alignment feature" is met by the bottom curvature feature. As shown below, the top surface of the guide channel would engage the flat top wall of the adapter (101114) to align the connector vertically in the adapter. The bottom curvature feature engages a scalloped recess along the bottom wall of the adapter to align the connector horizontally and vertically within an individual port of the adapter.

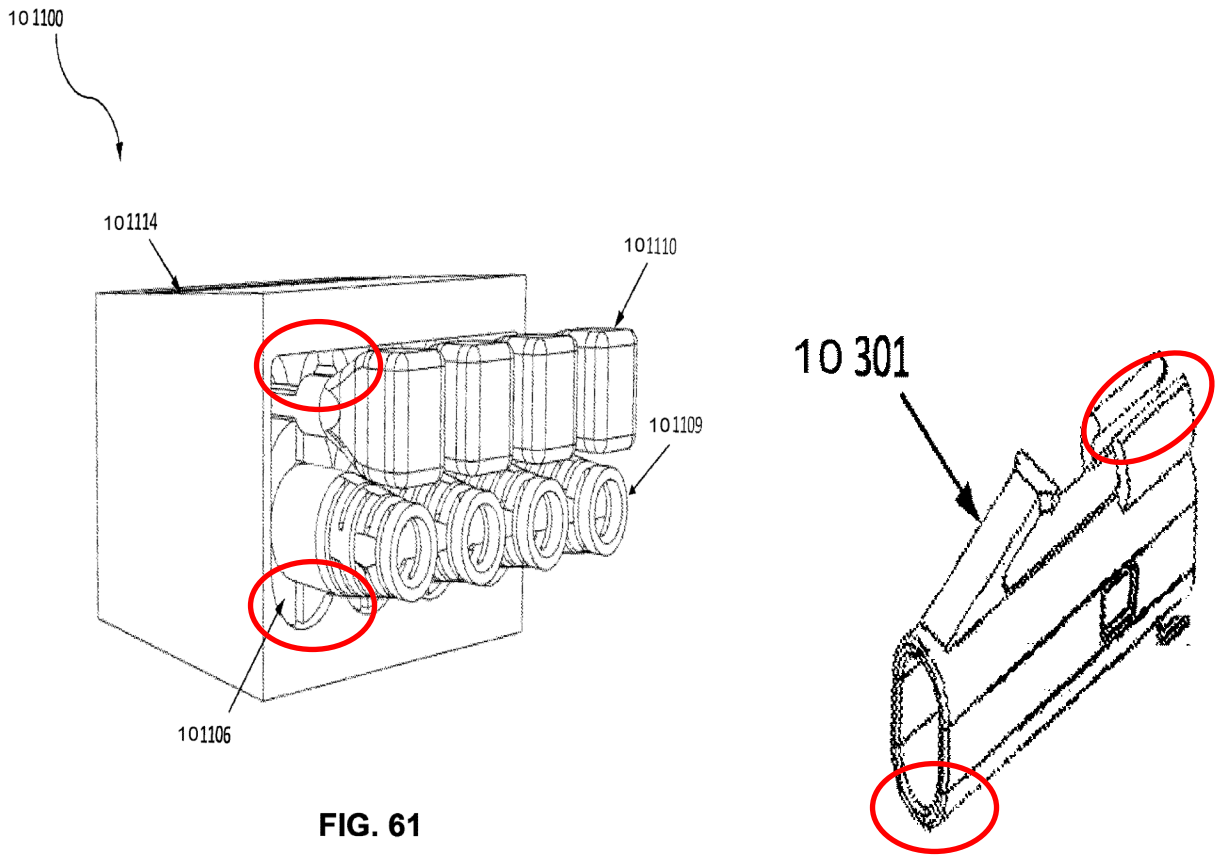


FIG. 61

EX1009: Figs. 53 and 61 (annotated).

314. Therefore, in my opinion, Takano'369 meets this claim.

XIV. OBVIOUS: TAKANO'369 & VEATCH (GROUND 10)

315. In my opinion, claims 6 and 10 would have been obvious over Takano'369 and Veatch.

A. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

316. If it is argued that Takano'369's optical connector (10300, 10400, 10500) does not meet this claim for the reasons I discussed in Section XIII(E), in my opinion, this claim would have been obvious in view of Veatch.

317. Veatch discloses a polarity change fiber optic connector (100), like Takano'369's optical connector (10300, 10400, 10500) (EX1009: 19:44-50), with polarity indicia (130, 132) in the form of letters "A" and "B" to "indicate the polarity of the connector." EX1007: Fig. 1, 2:26-39.

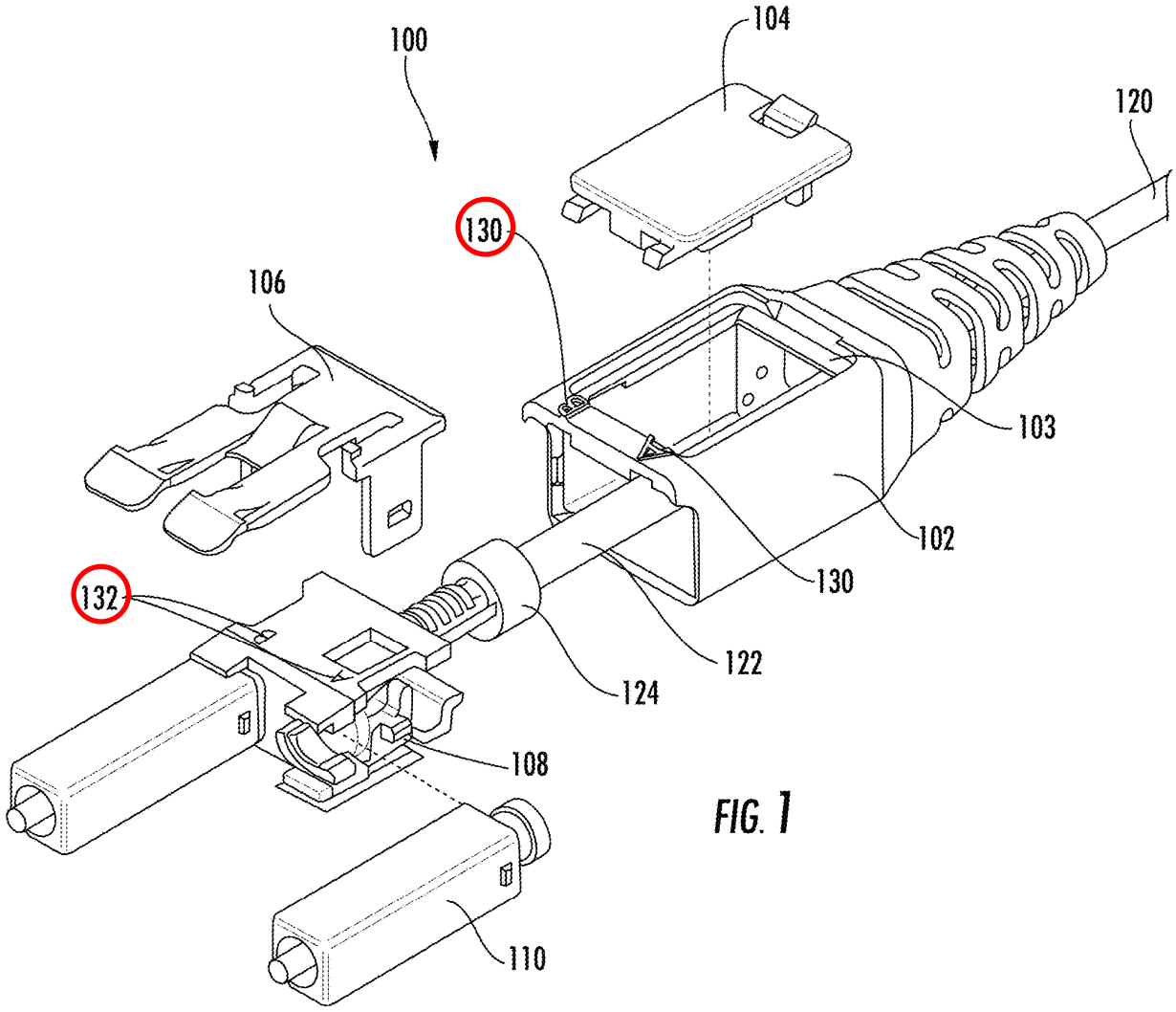


FIG. 1

EX1007: Fig. 1 (annotated).

318. In my opinion, it would have been obvious to modify Takano'369's outer housing (10301, 10401, 10501) to include Veatch's polarity indicia (130,

132). The POSA would have also added Veatch's polarity indicia to Takano'369's front body (10302, 10503) as taught by Veatch. EX1007: 2:30-32. A POSA would have been motivated to make the combination based on the express teachings of Veatch, to "indicate the polarity of the connector." EX1007: 2:33-34. Such polarity indicia (130, 132) "assist[s] [the] user in identifying the currently polarity configuration of the assembled connector[]." EX1020: 14:39-46; *see* EX1021: ¶[0050]. In fact, using polarity indicia (130, 132) such as Veatch's is standard "industry practice." EX1022: 1:60-63, 6:20-25. Polarity letters "A" and "B" have been an industry standard convention since the ratification of TIA/EIA 604-10-A FOCIS-10 Type LC. EX1027: Fig. 2.2.1c (showing letters "A" and "B" on the adapter, which resulted in also adding corresponding letters on the duplex yoke of the connector).

319. This modification would have been nothing more than combining known prior art elements (Takano'369's optical connector (10300, 10400, 10500) and Veatch's polarity indicia (130, 132)) according to known methods (arrangement taught by Veatch or otherwise known in the art) to yield predictable results (an indication of polarity for Takano'369's optical connector).

320. This modification would have also been nothing more than the application of a known technique (Veatch's polarity indicia (130, 132)) to improve a similar device (Takano'369's optical connector (10300, 10400, 10500)) in the

same way to yield predictable results (an indication of polarity for Takano'369's optical connector).

321. There would have been a reasonable expectation of success in making this modification, given the function of Veatch's polarity indicia (130, 132) would not change in Takano'369's optical connector (10300, 10400, 10500). In making this modification, the POSA would place the polarity indicia on Takano's outer housing (10301, 10401, 10501) to be easily and readily viewable by a user. Moreover, placing polarity indicia on a housing was a known placement in the art. EX1020: Fig. 8B, 14:39-46. For example, the POSA may place the letter "A" on the top round of the outer housing (10301, 10401, 10501) and the letter "B" on the bottom round of the outer housing, as shown representationally below.

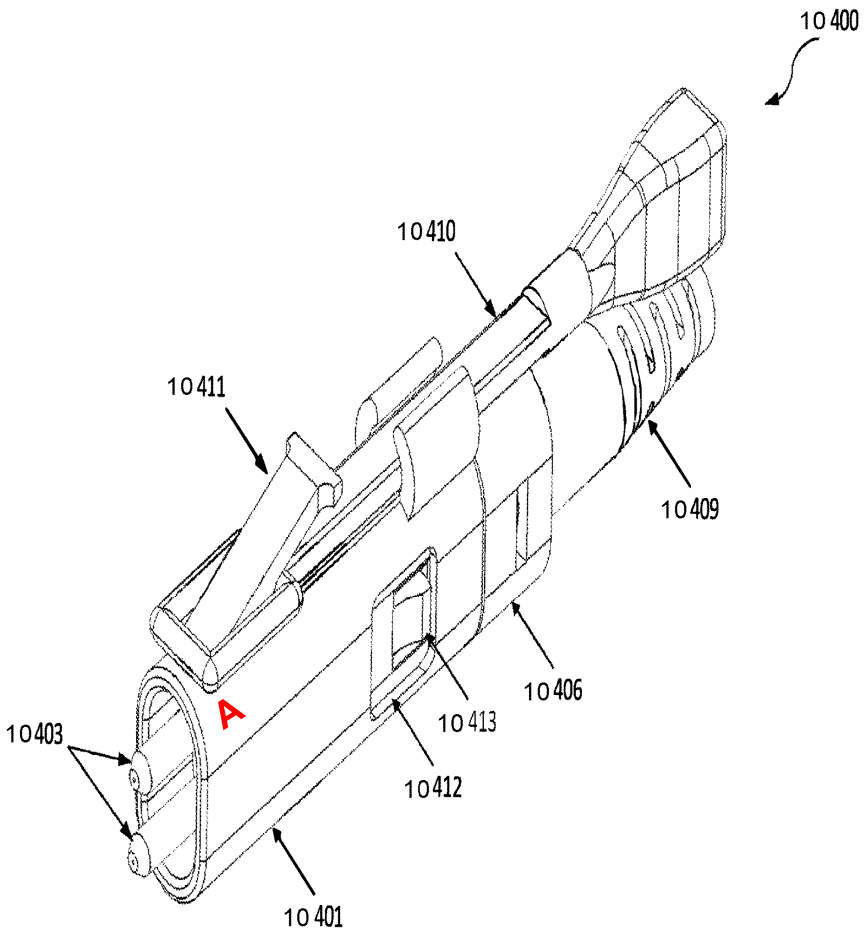


FIG. 54

EX1009: Fig. 54 (modified).

322. As a result of this modification, Takano'369's optical connector (10300, 10400, 10500) includes Veatch's polarity indicia (130, 132) on the outer housing (10301, 10401, 10501).

323. Therefore, in my opinion, the Takano'369/Veatch combination renders this claim obvious.

B. Claim 10 "The fiber optic connector according to claim 6, wherein the rail receiving portion has a dove tail configuration or an undercut configuration to receive a latch component."

324. Claim 10 depends from claim 6. Therefore, for the reasons I explained in Section XIII(I), in my opinion, the Takano'369/Veatch combination renders this claim obvious.

XV. OBVIOUS: TAKANO'369 (GROUND 11)

325. In my opinion, claims 15 and 16 would have been obvious over Takano'369.

A. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats."

326. Takano'369's optical connector (4100) of Fig. 41 includes a front body (4015) with an elongated middle wall (4260). EX1009: 17:44-49.

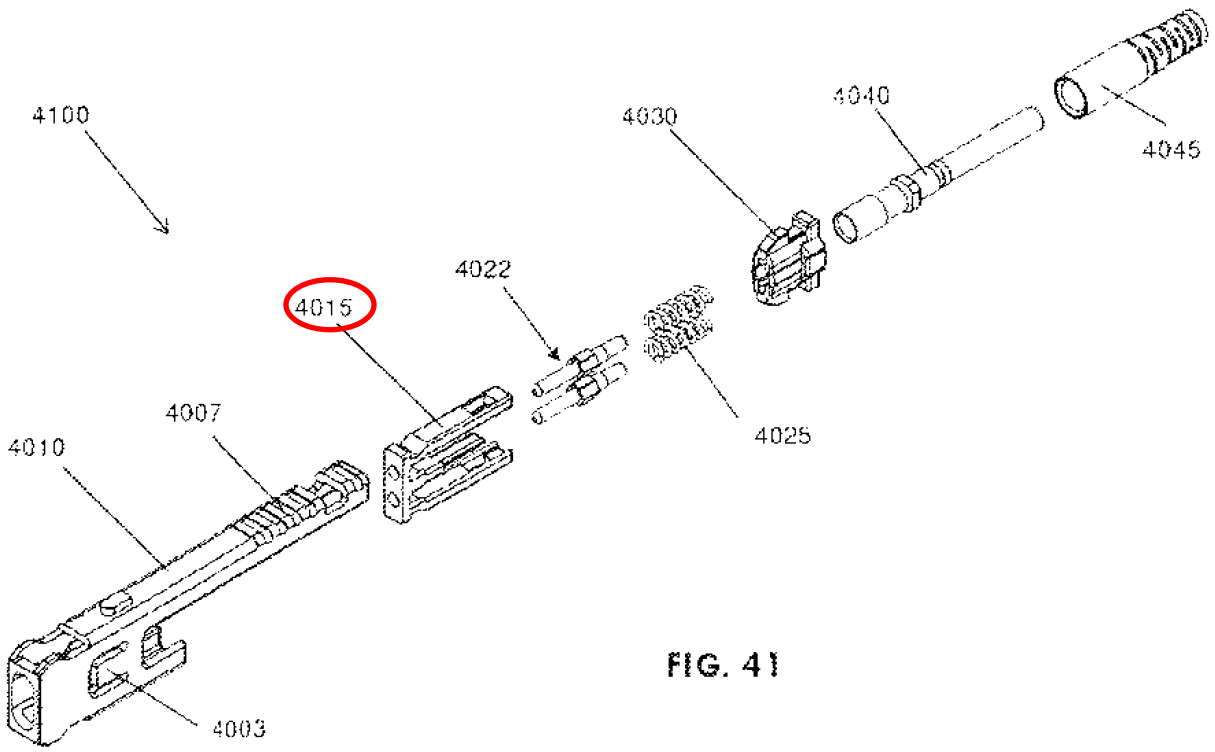


FIG. 41

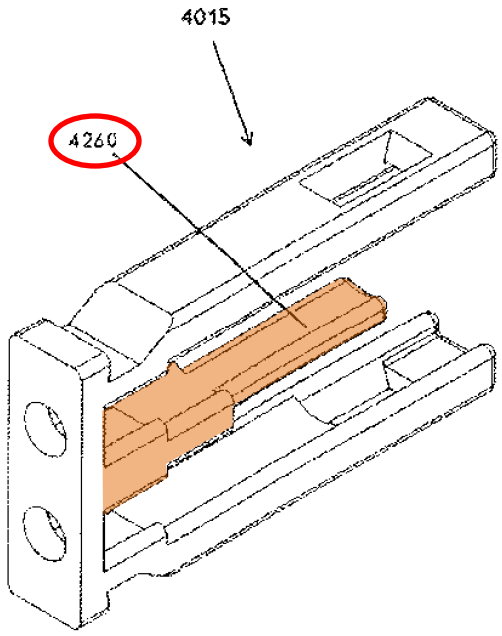


FIG. 42A

EX1009: Figs. 41 and 42A (annotated).

327. In my opinion, it would have been obvious to modify the front body (10302, 10503) of the optical connector (10300, 10400, 10500) of Figs. 53-55 in view of the optical connector (4100) of Fig. 41 to provide the front body (10302, 10503) with the elongated middle wall (4260) to separate the two ferrule springs (10305). EX1009: Figs. 42A-42B. The elongated wall (4260) would prevent entanglement of the ferrule springs, binding of the connector and breaking of optical fibers. EX1009: 17:46-49 ("middle wall reduces the possibility of the springs becoming entangled with each other, binding the connector and breaking the optical fibers").

328. This modification would have been nothing more than combining known prior art elements (optical connector (10300, 10400, 10500) and elongated middle wall (4260)) according to known methods (arrangement taught by Takano'369) to yield predictable results (a wall separating the springs to prevent entanglement).

329. This modification would have also been nothing more than the application of a known technique (elongated middle wall (4260)) to improve a similar device (optical connector (10300, 10400, 10500) with two spring-loaded ferrules) in the same way to yield predictable results (a wall separating the springs to prevent entanglement).

330. A POSA would have had a reasonable expectation of success in making this modification because the elongated middle wall (4260) would perform the same function and be generally arranged in the optical connector (10300, 10400, 10500) of Figs. 53-55 as it was in the optical connector (4100) of Fig. 41.

331. This modification results in the optical connector (10300, 10400, 10500) of Figs. 53-55 having the middle wall (4260), which meets the requirement of the wall in claim 15, as best I can understand, because it forms a wall between the locations where two ferrule assemblies are seated in the outer housing and the wall extends rearward from where the ferrule holders (10304) are seated against the front body (10302, 10503). EX1009: Figs. 42A-B.

332. Therefore, in my opinion, Takano'369 renders this claim obvious.

B. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

333. In the optical connector (10300, 10400, 10500) of Figs. 53-55 modified in view of the optical connector (4100) of Fig. 41 (Section XV(B)), the elongated middle wall (4260) is "interposed between the ferrules and springs when the front body is assembled." EX1009: 17:44-46. The springs (10305) and ferrule holders (10304) would have essentially the same positions as in the unmodified optical connector (10300, 10400, 10500). This requires a radial gap between the middle wall (4260) and the ferrule holders to accommodate the portion of each

ferrule spring received around the rear portion of the ferrule holder and abutting the ferrule flange. Annotated Fig. 42B illustrates how the middle wall (4260) is understood by a POSA to provide a gap for accommodating the ferrule spring between the middle wall (4260) and the rear portion of the ferrule holder. This gap would be present in the modified optical connector (10300, 10400, 10500) of Figs. 53-55.

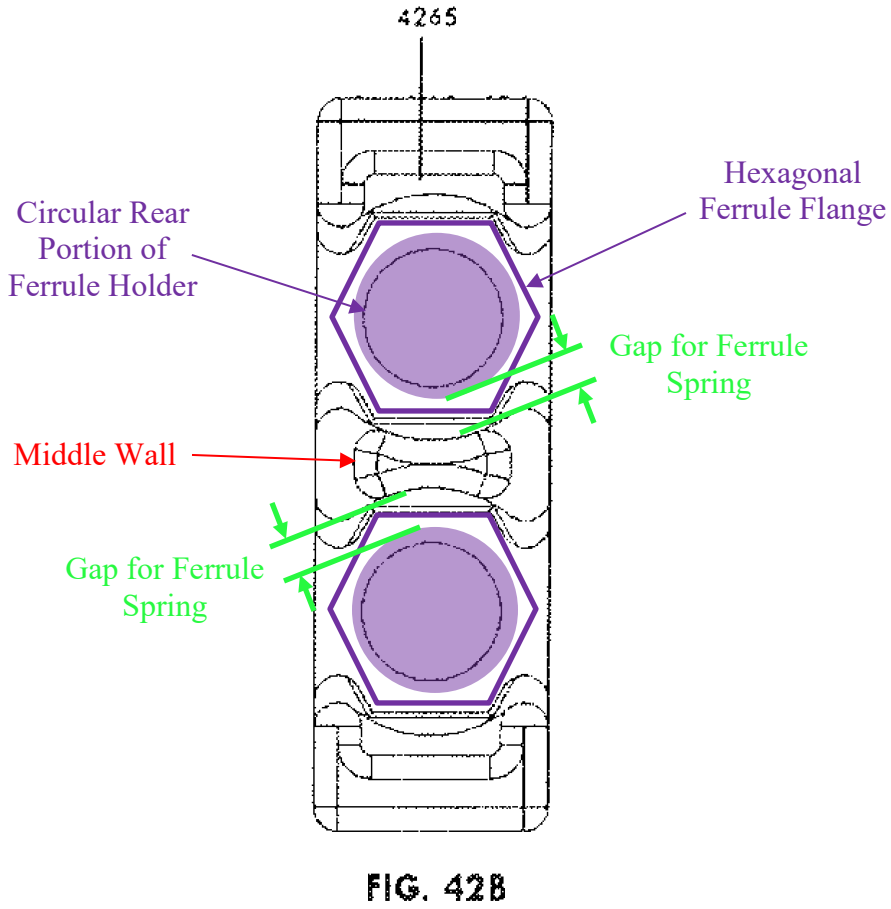


FIG. 42B

EX1009: Fig. 42B (annotated).

334. Therefore, in my opinion, Takano'369 renders this claim obvious.

XVI. OBVIOUS: TAKANO'369 & HENKE (GROUND 12)

335. In my opinion, claim 17 would have been obvious over Takano'369 and Henke.

A. Claim 17 "The fiber optic connector according to claim 1, further comprising a lead-in tube attached to each of the ferrule holders, the lead-in tube extending past the rear end of the main body of the housing and configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body."

336. In my opinion, it would have been obvious to modify Takano'369's optical connector (10300, 10400, 10500) of Figs. 53-55 so that each ferrule holder (10304) includes an integral lead-in tube like the lead-in tube (28(2)) in Fig. 7A of Henke. The POSA would have been motivated to make this modification based on Henke's express teachings regarding the advantages of integrated lead-in tubes, such as (1) preventing the bonding agent used to secure the fiber in the ferrule from escaping and interfering with the ferrule springs; (2) to facilitate guiding the end portion of each optical fiber into the respective ferrule holder body (10304) and further to the ferrules (10303, 10403); and/or (3) preventing sharp bends that could damage the optical fiber from occurring as the optical fiber is inserted into the ferrule. EX1008: ¶¶[0041], [0079]; EX1026: Abstract (describing how a lead-in tube called a sheath prevents leaking of adhesive from a ferrule holder).

337. This modification would have been nothing more than combining known prior art elements (Takano'369's optical connector (10300, 10400, 10500)

and Henke's lead-in tube (28(2))) according to known methods (arrangement taught by Henke) to yield predictable results (Takano'369's optical connector (10300, 10400, 10500) with a lead-in tube for an optical fiber).

338. This modification would have also been nothing more than the application of a known technique (Henke's ferrule holder body 32(1) with integral lead-in tube (28(2)) on spring loaded ferrules contained between an inner housing and a crimp body) to improve a similar device (Takano'369's optical connector (10300, 10400, 10500) which are likewise spring loaded ferrules contained between an inner housing (front body (10302, 10502)) and a crimp body (10306, 10406, 10307)) in the same way to yield predictable results (Takano'369's optical connector (10300, 10400, 10500) with a lead-in tube for an optical fiber).

339. For example, the POSA would recognize that the integrated lead-in tubes would assist with guiding the fibers into the ferrules (10303, 10403) during assembly and prevent adhesive from leaking onto the ferrule springs (10305) when the fibers are adhered and cured in place.

340. The proposed modification would have been well within the capabilities of a POSA, and the POSA would have had a reasonable expectation of success. Henke specifically teaches that the integrated lead-in tubes could be used with LC ferrule/holder assemblies, which is the same type of ferrule assembly used in Takano'369's optical connector (10300, 10400, 10500). EX1008: ¶[0107];

EX1009: 5:62-6:4. Further, Henke teaches that the integrated lead-in tubes are formed from flexible material, which would naturally conform to and fit within the interior geometry of the connector (e.g. to press-fit over the tail of the ferrule/holder, and to bend inward toward the center between the rear ends of the ferrule springs (10305) and the back post (10307)). At most, the proposed modifications would have required minor changes in the dimensions of parts to accommodate the two integrated lead-in tubes in the interior of Takano'369's optical connector (10300, 10400, 10500). Such changes are well-within the capabilities of the POSA and their results would have been entirely predictable.

341. In the Takano'369/Henke combination, the integrated lead-in tubes would extend from front end portions integrated with the ferrule holders (10304), through the ferrule springs (10305) and the interior of the two-piece crimp body (10306, 10406, 10307), to rear ends protruding slightly beyond the rear end of the back post (10307). In the Takano'369/Henke connector, the lead-in tubes extend past the rear end of the main body and are configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body, as taught by Henke. EX1008: ¶[0041].

342. Therefore, in my opinion, the Takano'369/Henke combination renders this claim obvious.

XVII. OBVIOUS: CHEN, CHANG, & RAVEN (GROUND 13)

343. In my opinion, claims 1-3, 5-7, and 14 would have been obvious over Chen in view of Chang and Raven.

A. Modification of Chen Based on Chang

344. Chen's connector includes a sleeve body (5) that depicts a double-barrel back post (6) for receiving two cables. EX1011: Abstract ("a pair of optical fibers passes through the sleeve body").

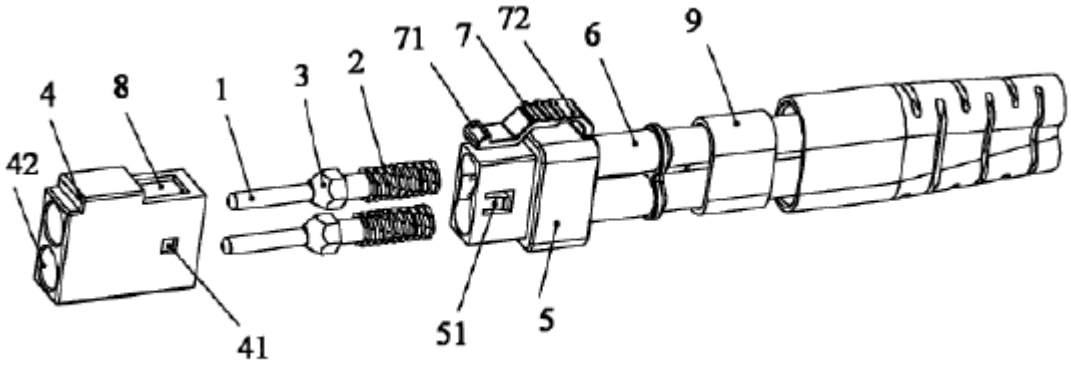


FIG. 3A

EX1011: Fig. 3A.

345. Chang discloses a fiber optic connector assembly (400) that holds two spring-loaded single-fiber ferrules (155a, 155b) in one integrated plug frame made up of a front body (405) and a crimp body. EX1012: ¶[0030]. The crimp body in Chang has a single cylindrical back post (labeled "single-barrel") forming a singular opening at the rear end so that a single cable containing two fibers may be used instead of two separate cables. EX1012: ¶[0019].

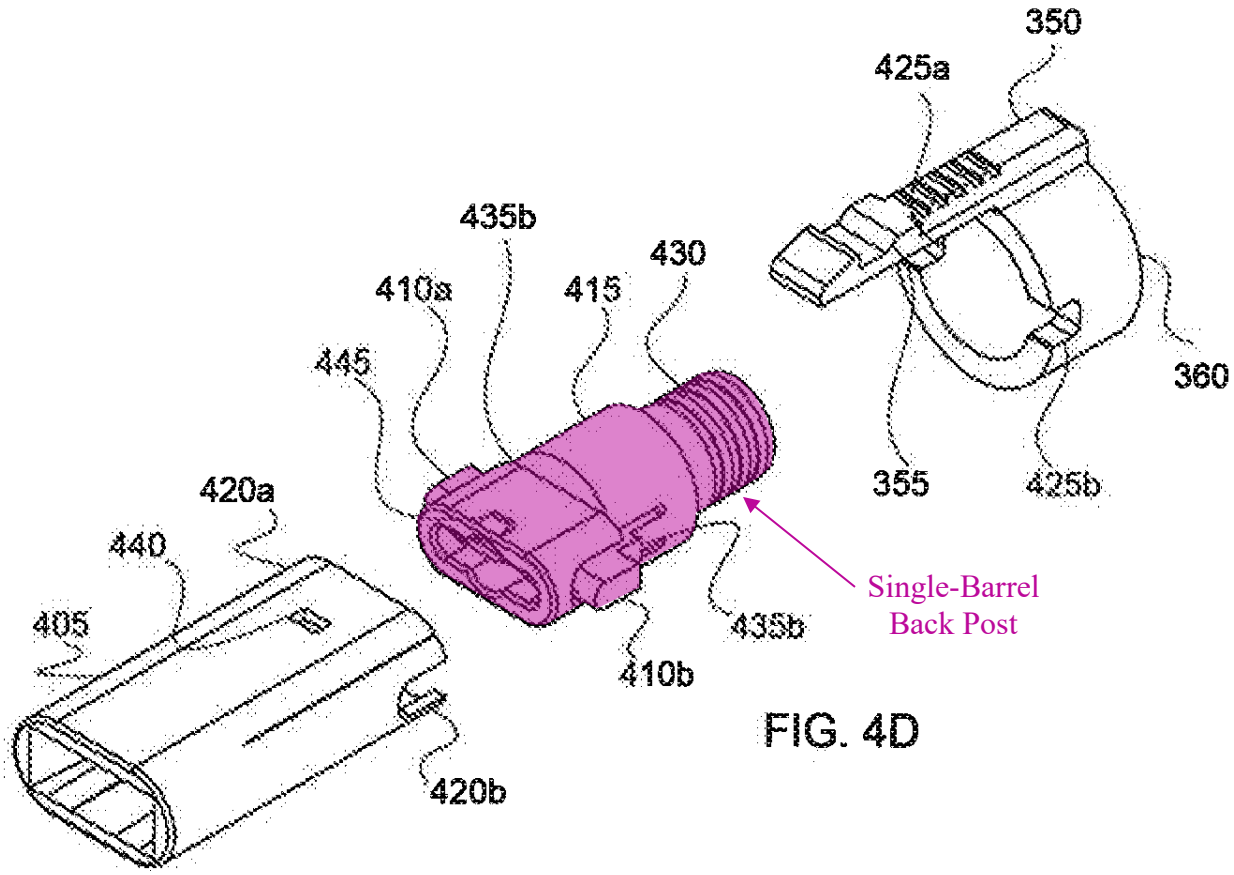


FIG. 4D

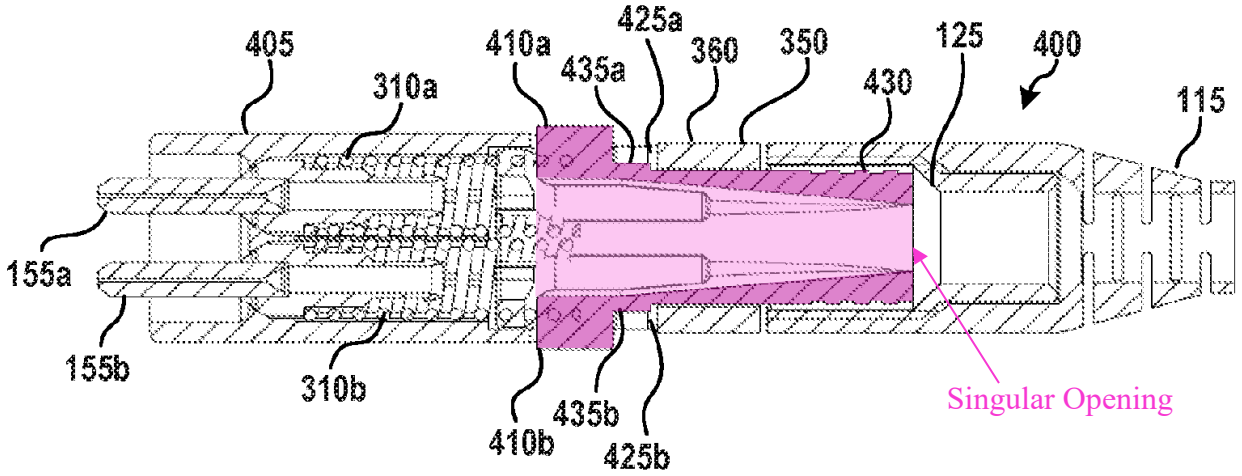


FIG. 4B

EX1012: Figs. 4B&D (annotated).

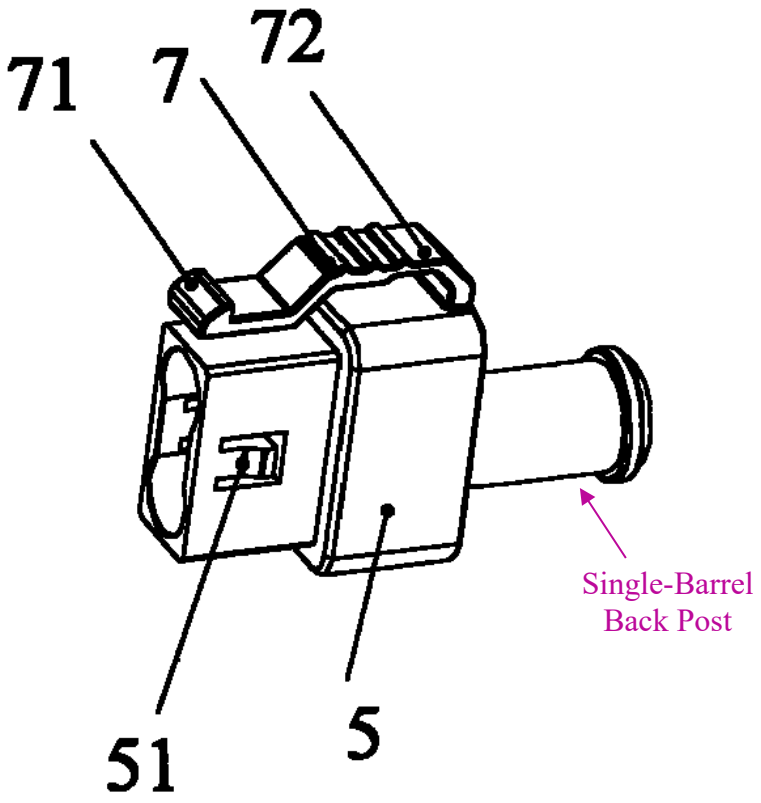
346. In my opinion, it would have been obvious to modify Chen's sleeve holder (5) in view of Chang to replace the double-barrel back post with a single-barrel back post (430). The POSA would have been motivated to modify Chen's sleeve body (5) to have single-barrel back post to enable Chen's connector to terminate a single two-fiber cable, which is a conventional cable type widely used for duplex connectors like duplex LC connectors. EX1013: Figs. 1, 2, and 4 (two fiber cable (8)); EX1012: ¶¶[0019], [0024] (describing such a two-fiber cable). The POSA would recognize that using a single two-fiber cable in place of Chen's two single-fiber cables would reduce the number of cables used in a given fiber optic installation by half. This substantial reduction in cabling would improve cable management and organization a high density fiber optic network environment, furthering Chen's goal of saving space in the fiber optic network system. EX1011: Abstract, ¶¶[0016], [0030], [0037].

347. This modification would have also been nothing more than the application of a known technique (Chang's single barrel back post) to improve a similar device (Chen's sleeve holder (5)) in the same way to yield predictable results (Chen's sleeve holder terminating a two-fiber cable).

348. The POSA would have had a reasonable expectation of success in making this modification given that both references disclose crimp bodies for duplex connectors that fit into the rear end of a duplex connector front body, and

both also provide a back post onto which a crimp band may secure the reinforcement material from one or more fiber optic cables. The POSA would merely need to change the double-barrel back post in Chen to a single-barrel back post, which is well-within the capabilities of the POSA and the results of such a modification would have been entirely predictable.

349. A representative illustration of this modification is shown below:

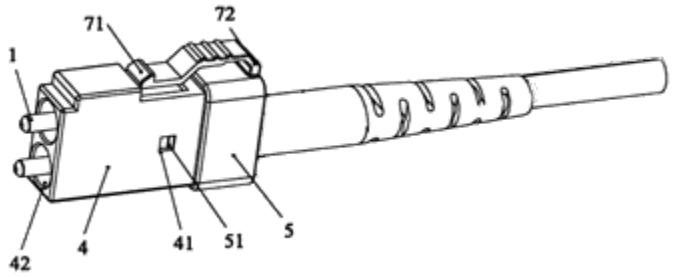


EX1011: Fig. 3A (annotated, modified).

350. In making this modification, the POSA would have also reconfigured the strain relief boot of Chen to fit over the modified single-barrel back post, for example, by using a cylindrical strain relief boot like the boot (115) of Chang. The

modification to the shape of the strain relief boot stems from the underlying modification to the crimp body and there would have been motivation for the same underlying reasons. The modification is merely changing the size and shape of a strain relief boot from the oval shape (taught by Chen) to a more compact and conventional cylindrical shape (taught by Chang). This minor constructional change is well-within the level of skill in the art.

351. A representative illustration of Chen's connector assembly with a cylindrical boot is shown below:



EX1011: Fig. 3B (modified).

352. In making this modification, the POSA would have also resized the crimp band (9) of Chen to fit over the modified single-barrel back post, for example, by using a cylindrical crimp band like the crimp ring (120) of Chang. The modification to the shape of the crimp band stems from the underlying modification to the sleeve body's back post and there would have been ample motivation for the same underlying reasons. Moreover, the modification merely involves changing the size and shape of a crimp band to a conventional cylindrical

shape, which is also more cost effective. This minor constructional change is well-within the level of skill in the art.

B. Modification of Chen Based on Raven

353. Chen discloses a feature (cuboid projection, highlighted light blue) on the top surface of the casing (4). The as known in the art, Chen's cuboid projection is an alignment feature that can guide the connector into a mating adapter by being inserted into a corresponding slot or keyway in the mating adapter, even though Chen is silent as to this feature.

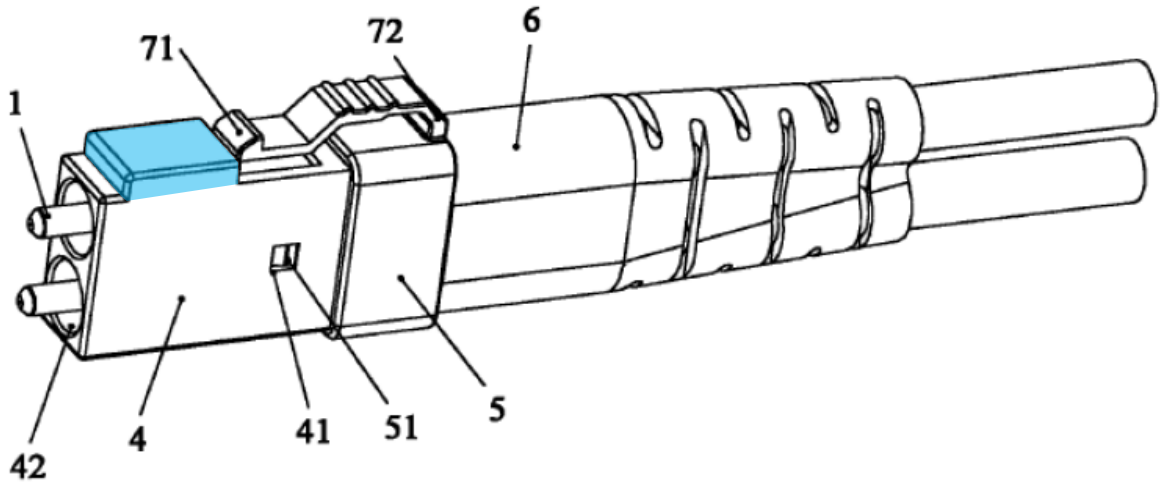


FIG. 3B

EX1011: Fig. 3B (annotated).

354. Raven discloses fiber optic connectors (45a, 45b) that, like Chen's connector, include latch levers (55a, 55b) cantilevered at the rear and a guide element (51a, 51b) formed on the upper surface (53a, 53b) of the connector body

(47a, 47b) in front of the unrestrained front end of the respective latch lever. EX1013: ¶¶[0095], [0098], [0101], [0102]. Moreover, Raven specifically teaches that each cuboidal "guide element 51a, 51b is arranged to engage with a guide formation, such as a recess or slot, in a socket, for example in a patch panel or adapter," and further, that each "guide element ... guides onward insertion of the fibre optic connector, including the latch ensuring the correct location and/or orientation of the connector with respect to the socket." EX1013: ¶¶[0098], [0039].

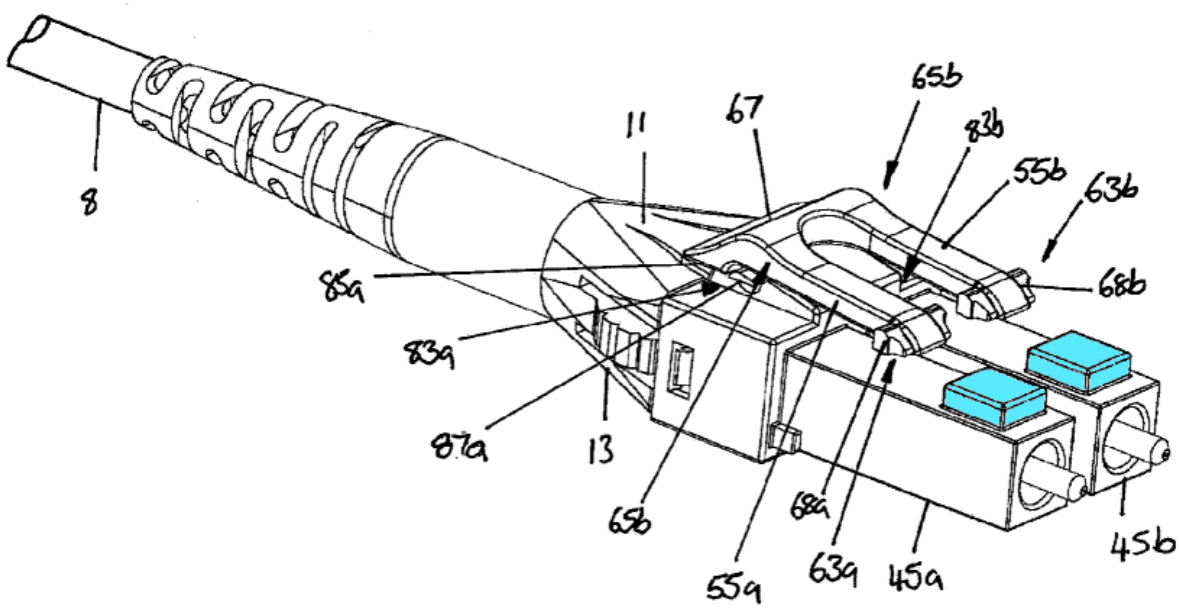


Fig. 2

EX1013: Fig. 2 (annotated).

355. To the extent it is argued Chen's cuboid projection is not an alignment feature, in my opinion, it would have been obvious to make Chen's cuboid projection on top of the connector housing (4) a guide element that "interacts with a socket receiving formation such as at least one of a slot and recess, and guides onward insertion of the fiber optic connector, including the latch, ensuring the correct location and/or orientation of the connector with respect to the socket," in view of Raven's teachings that similar cuboid projections are alignment features. EX1013: ¶[0039]. The POSA would have been motivated to make the modification in order to ensure correct location and/or orientation of the connector with respect to the socket, as expressly taught by Raven. EX1013: ¶[0039].

356. This modification would have also been nothing more than the application of a known technique (Raven's guide elements (51a, 51b)) to improve a similar device (Chen's cuboid projection) in the same way to yield predictable results (limiting Chen's connector to be inserted into a corresponding socket in its proper orientation).

357. The proposed modification would have been well within the level of skill in the art. First, the cuboid projection in Chen is almost identical to the guide elements (51a, 51b) in Raven. Chen's cuboid projection projects upward from the top surface near the leading end of the connector, in front of the unrestrained locking buckle (71) located at the unrestrained leading end of a locking buckle

handle (7), which is a type of latch lever cantilevered from the rear. At most, modifying Chen in view of Raven would require resizing the cuboid projection to be slightly narrower than the overall width of the casing (4) (as shown in Raven) and providing a mating adapter that includes a slot or recess for receiving the cuboid projection as taught by Raven. EX1013: ¶¶[0098], [0039]. Such modifications are only minor constructional changes and well-within the level of skill in the art. Further, the results of any such modification are entirely predictable given Raven's express teachings. EX1013: ¶[0039].

C. Independent Claim 1

1.P A fiber optic connector comprising:

358. Chen discloses a "dual-core optical fiber connector." EX1011: Abstract.

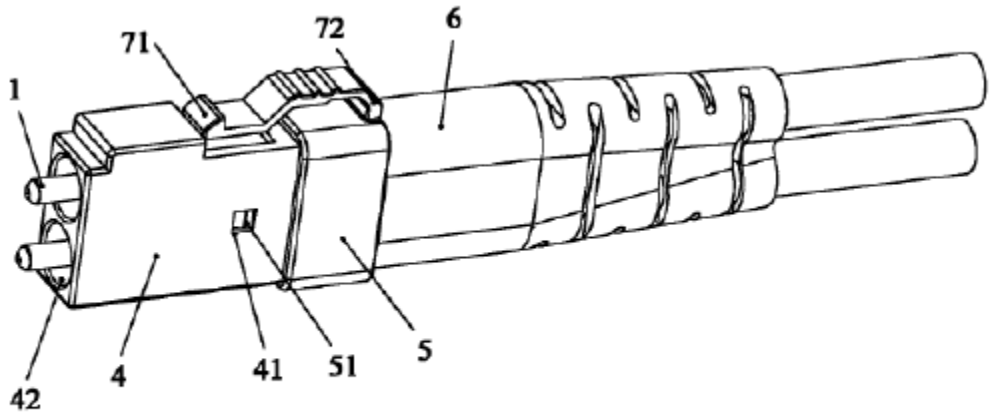


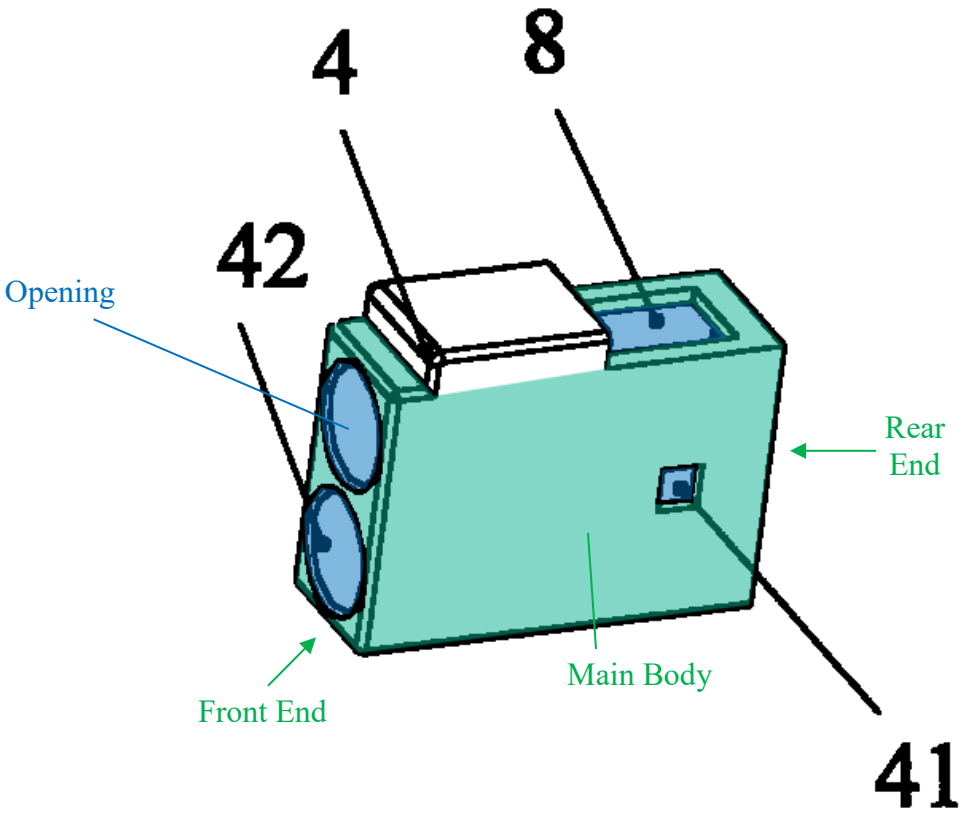
FIG. 3B

EX1011: Fig. 3B.

359. Therefore, in my opinion, Chen meets this limitation.

1.a.1 "a housing having a main body extending between a front end and a rear end and having an opening extending therebetween,"

360. Chen's connector includes a housing comprising a casing (4), which is a main body (highlighted green), extending between a front end and a rear end. EX1011: ¶¶[0027], [0031]. An opening (blue) extends between the front end and the rear end of the main body, which is apparent based on how the fibers enter from the rear and are terminated in the ferrules (1), which protrude from the front. EX1011: ¶[0029].

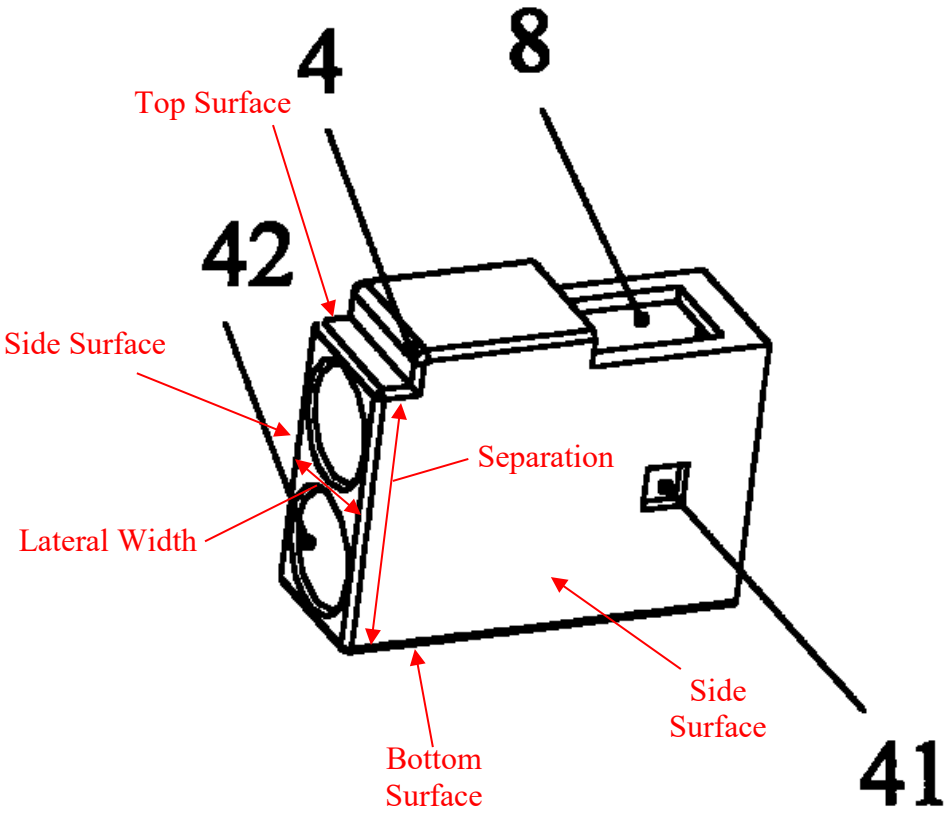


EX1011: Fig. 3A (annotated).

361. Therefore, in my opinion, Chen meets this limitation.

1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"

362. The casing (4) has a top surface and a bottom surface bound by two opposing side surfaces. EX1011: Figs. 3A-B. The lateral width between the two opposing side surface is less than the separation between the top surface and bottom surface. EX1011: Figs. 3A-B.



EX1011: Fig. 3A (annotated).

363. Therefore, in my opinion, Chen meets this limitation.

1.b.1 "two ferrule assemblies disposed within the opening of the housing,"

364. Chen's connector includes two ferrule assemblies (1, 3) disposed in the opening. EX1011: Fig. 3B, ¶[0029].

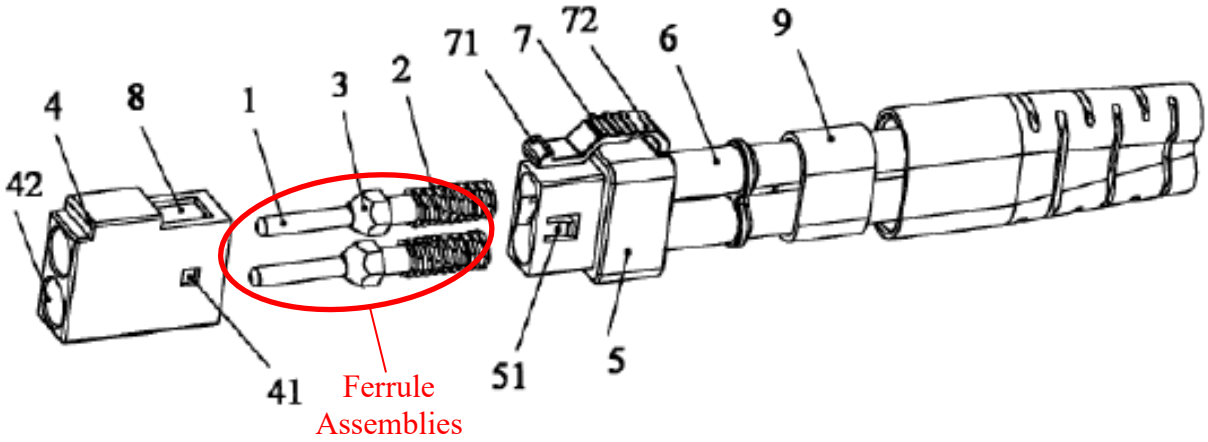


FIG. 3A

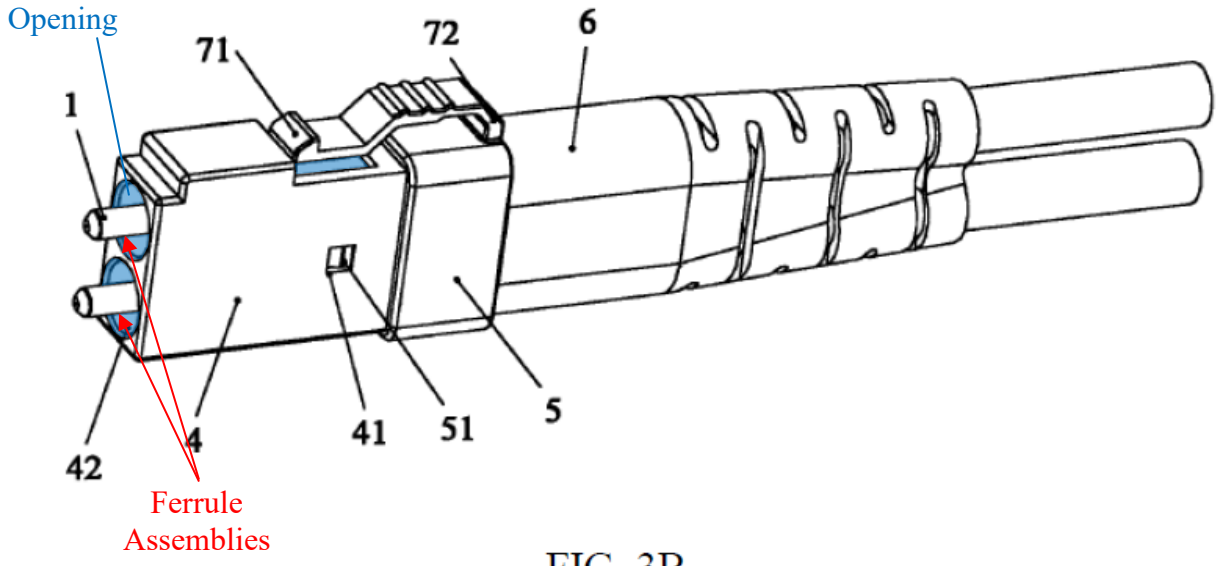


FIG. 3B

EX1011: Figs. 3A-B (annotated).

365. Therefore, in my opinion, Chen meets this limitation.

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule, the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;"

366. Each ferrule assembly is made up of a ceramic ferrule (1) (i.e., a "fiber optic ferrule") and a block piece (3) (i.e., a "ferrule holder"). EX1011: ¶[0028]. The block piece (3) holds the ferrule (1) so it extends forward (to the left) and away from the front (left) end of the block piece. EX1011: ¶[0028].

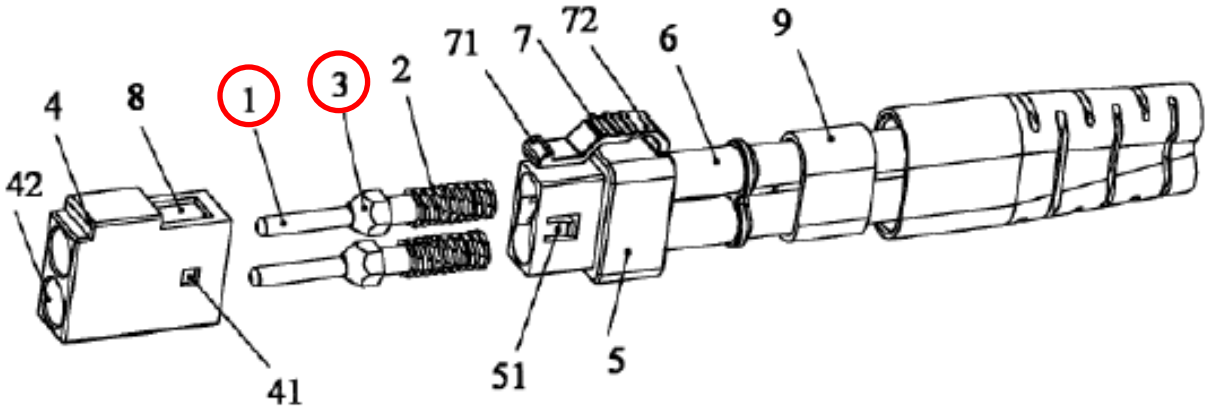


FIG. 3A

EX1011: Fig. 3A (annotated).

367. Therefore, in my opinion, Chen meets this limitation.

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule assemblies toward the front end of the housing and retained within the housing;"

368. Chen's connector includes two elastic elements (2), such as springs. EX1011: ¶[0028]. The elastic elements (2) are retained within the housing.

EX1011: ¶[0029]. Each elastic element (2) engages a rearward facing surface of a respective ferrule holder (and extends rearward toward the rear end of the housing) to bias the respective ferrule assembly toward the front end of the housing. EX1011: ¶[0028]. This is what is meant when Chen states "the elastic element 2 is blocked by the block piece 3." EX1011: ¶[0028].

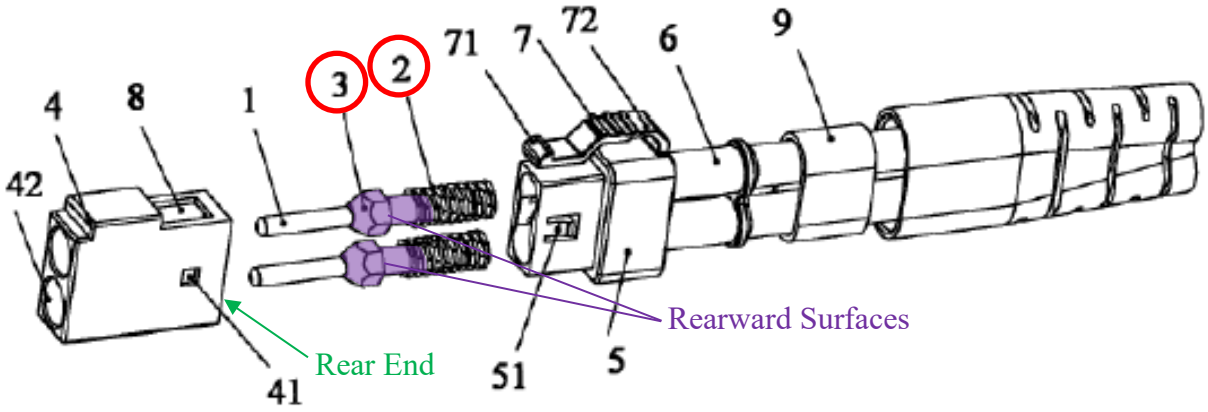


FIG. 3A

EX1011: Fig. 3A (annotated).

369. If it is asserted that Chen does not expressly teach this limitation, this limitation would have been obvious in view of Chang and Raven which both show this limitation is nothing more than the conventional way ferrule springs are arranged in these types of connectors. Both Chang and Raven provide cross-sectional drawings to show how the two springs engage rearward facing surfaces of respective ferrule holders and extend rearward to bias the ferrule assemblies toward the front end of the housing. It would have been obvious to load the elastic elements (2) of Chen against the block pieces (3) in the same way to bias the

ferrules in the forward direction using the components already part of the Chen connector. This is nothing more than the conventional way of employing such ferrule springs in fiber optic connectors.

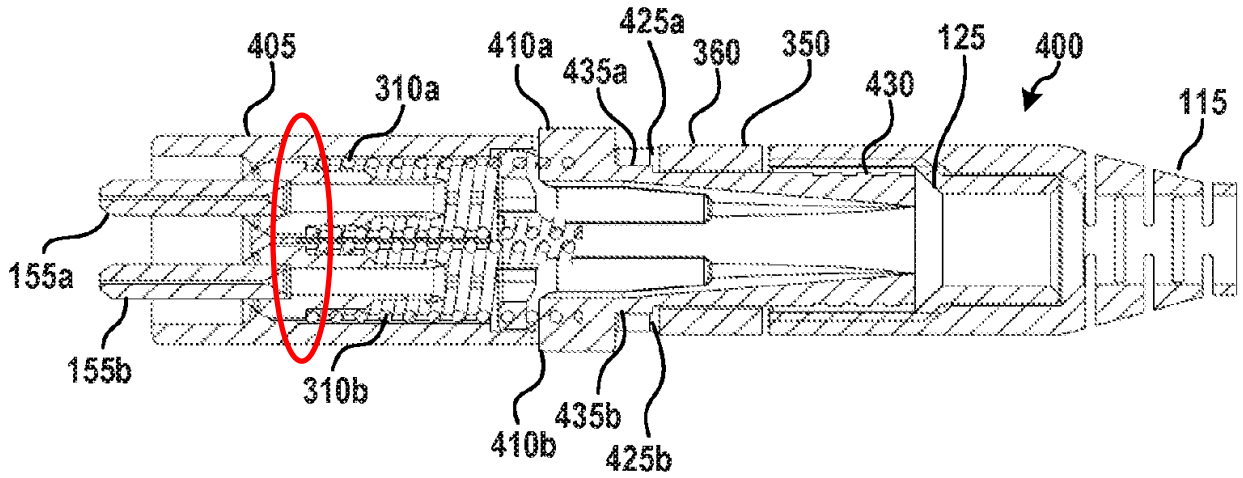


FIG. 4B

EX1012: Fig. 4B (annotated).

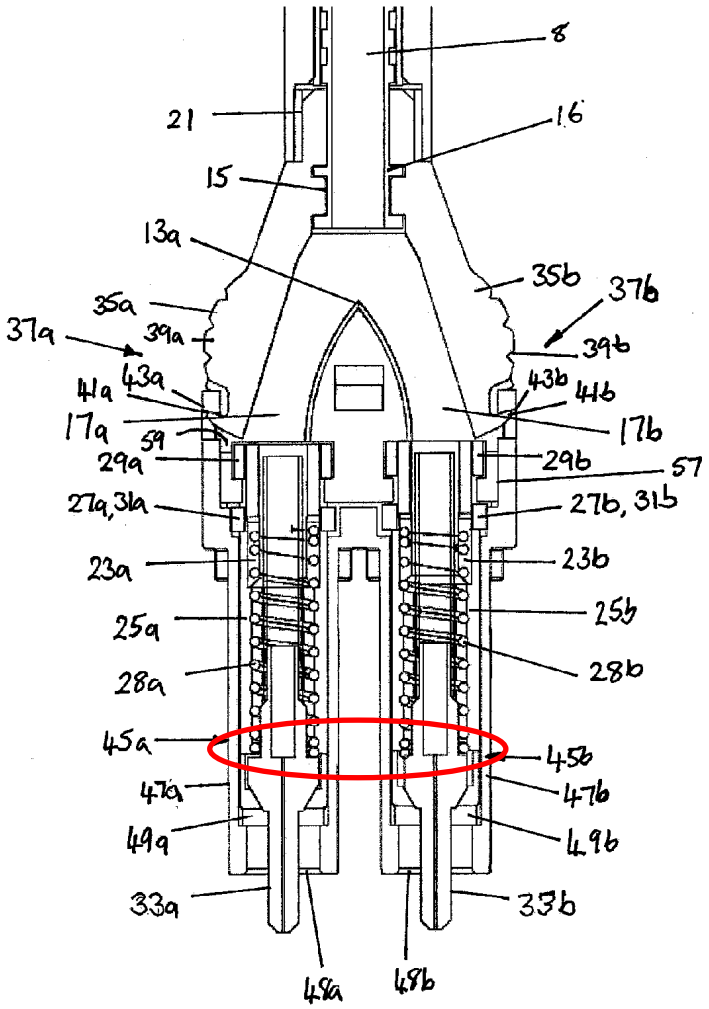


Fig. 4

EX1013: Fig. 4 (annotated).

370. Therefore, in my opinion, Chen meets this limitation or the Chen/Chang/Raven combination renders this limitation obvious.

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"

371. Chen's connector includes a sleeve body (5), which is a "crimp body." EX1011: ¶[0026]. The front end of sleeve body (5) is disposed in the opening at

the rear end of casing (4) (so that latch feature (51) latches with recess (41)).

EX1011: ¶¶[0034]-[0035].

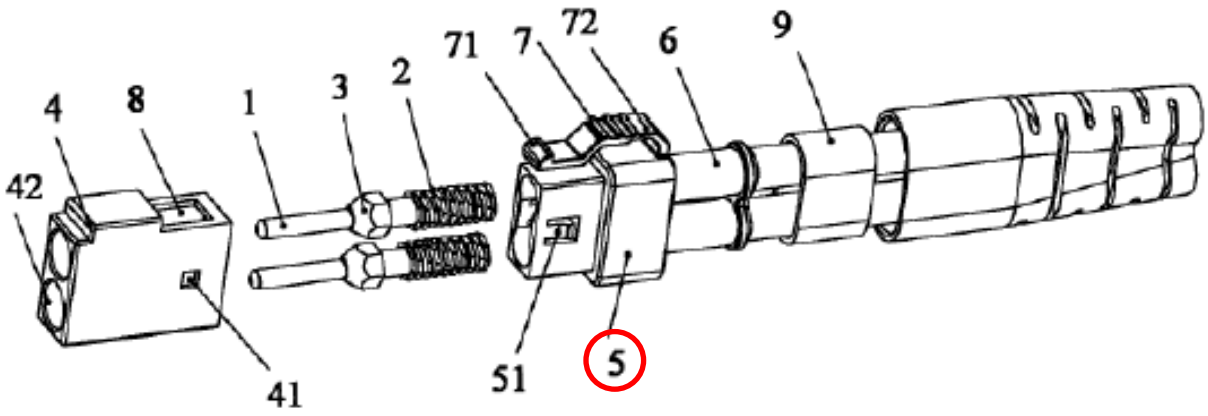


FIG. 3A

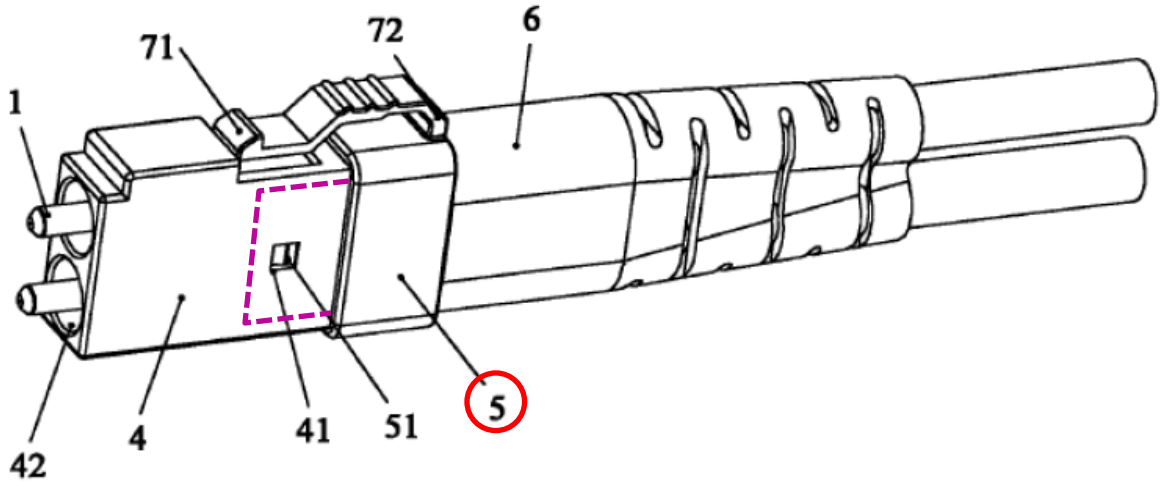


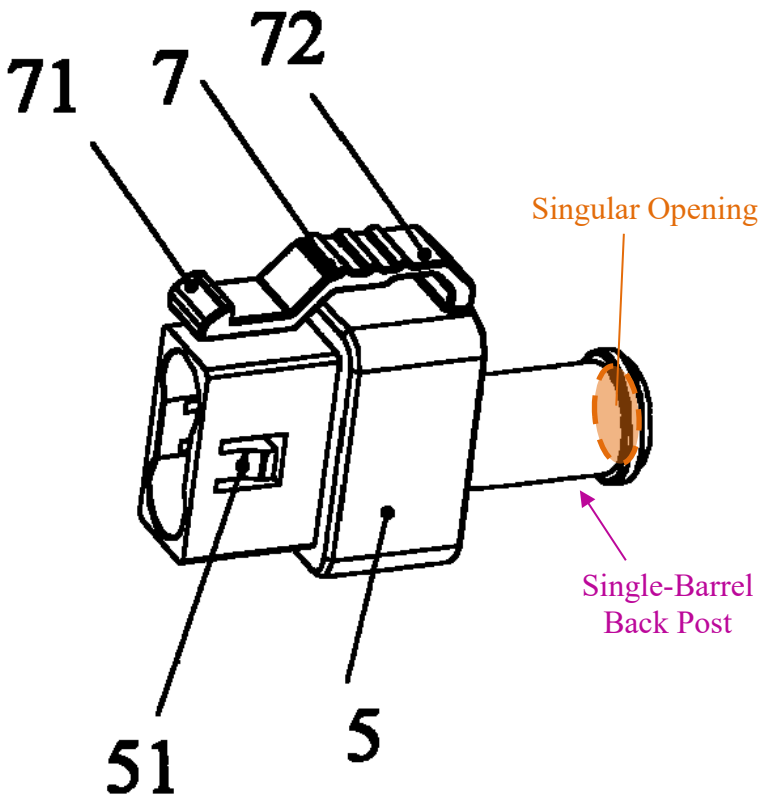
FIG. 3B

EX1011: Figs. 3A-B (annotated).

372. Therefore, in my opinion, Chen meets this limitation.

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;"

373. Chen's sleeve holder (5) modified in view of Chang has a single-barrel back post. Section XVII(A). As a result, the rear end of the modified sleeve body (5) forms a singular opening.



EX1011: Fig. 3A (annotated, modified).

374. Therefore, in my opinion, the Chen/Chang/Raven combination renders this limitation obvious.

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and"

375. Chen discloses a feature (cuboid projection, highlighted light blue) on the top surface of the casing (4). As known in the art, Chen's cuboid projection is an alignment feature that can guide the connector into a mating adapter by being inserted into a corresponding slot or keyway in the mating adapter. Chen's cuboid projection extends asymmetrically outward from the front housing (4) and ferrule datums, and is co-aligned with the latch, so as to limit Chen's connection to only be inserted into it's corresponding adapter in one orientation by aligning with the adapter's corresponding slot or keyway.

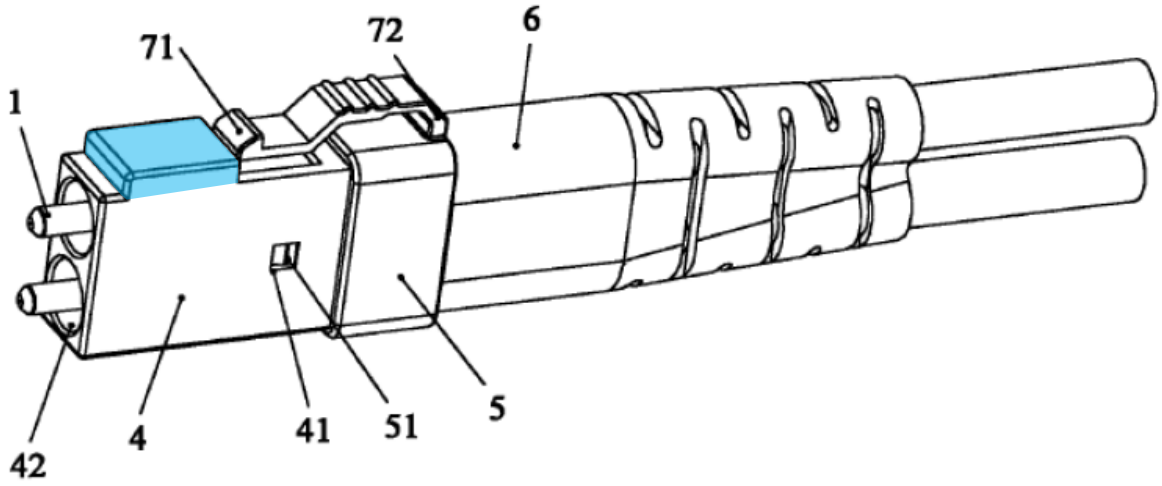


FIG. 3B

EX1011: Fig. 3B (annotated).

376. Alternatively or in addition, this limitation would have been obvious in view of Raven. Section XVII(B). As a result of the modification of Chen in view of Raven, Chen's cuboid projection on the top surface of the casing (4) serves to guide Chen's connector into a corresponding socket of an adapter. Section XVII(B).

377. Therefore, in my opinion, Chen meets this limitation and/or the Chen/Chang/Raven combination renders this limitation obvious.

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers pass."

378. Chen depicts a strain relief boot coupled to the rear end of sleeve body (5). EX1011: Fig. 3A. As shown below, the boot has longitudinal opening in continuum with the opening of the sleeve body (5) through which two optical fibers pass. EX1011: ¶[0014].

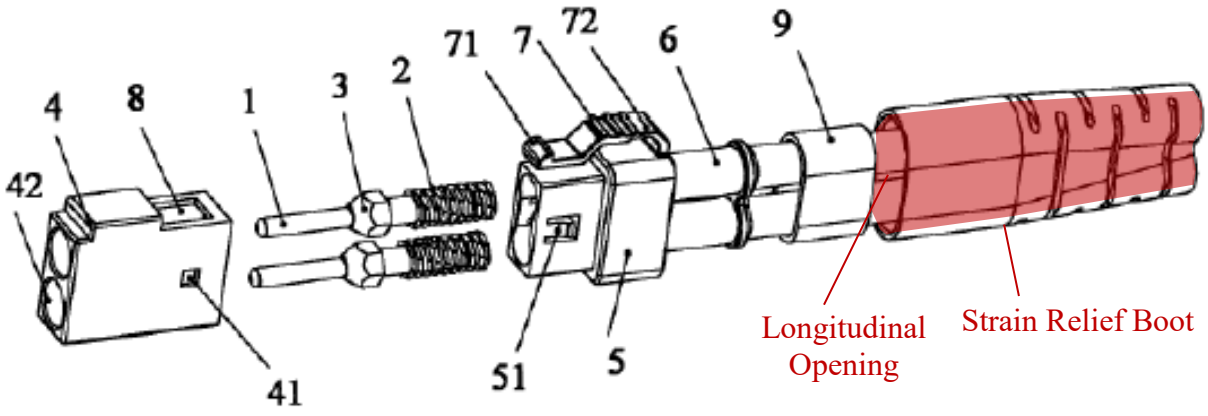


FIG. 3A

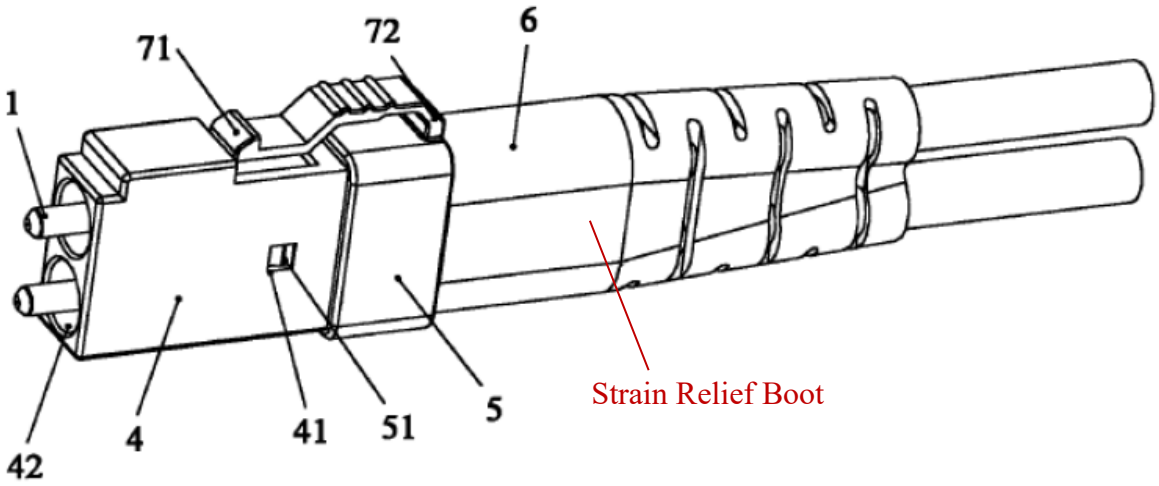
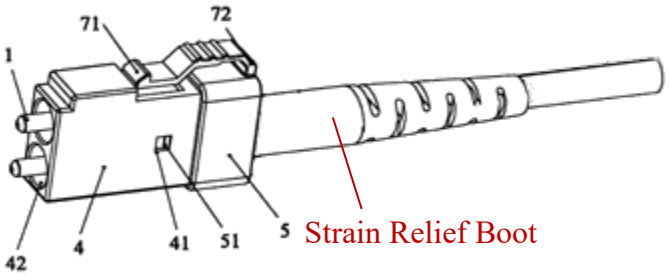
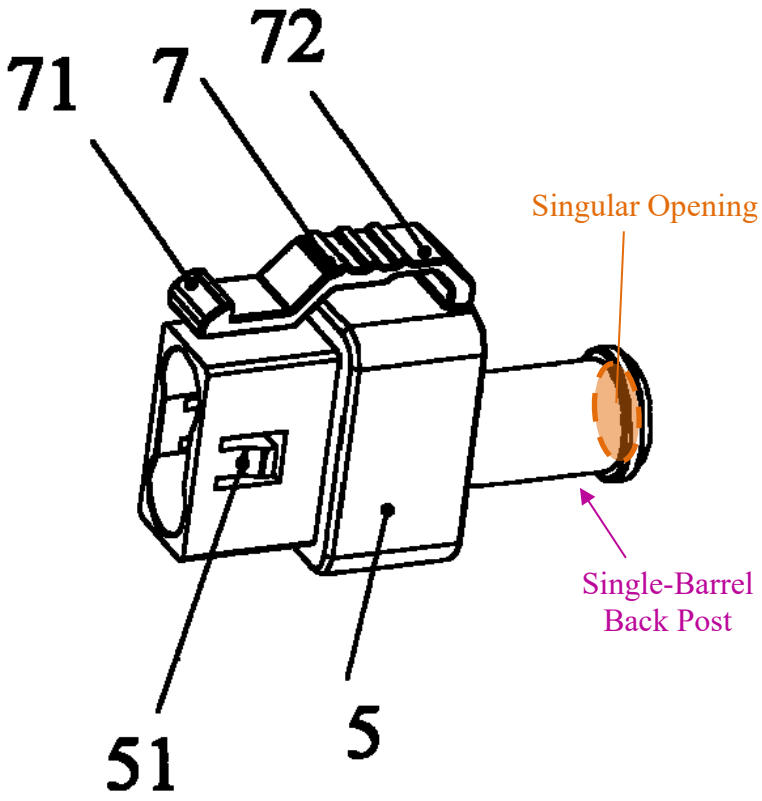


FIG. 3B

EX1011: Figs. 3A-B (annotated).

379. As a result of Chen's sleeve body (5) and boot being modified in view of Chang—Section XVII(A)—the longitudinal opening of Chen's modified boot would be in continuum with the singular opening of Chen's modified sleeve body (5) for the optical fibers to pass through.





EX1011: Figs. 3A-B (annotated, modified).

380. Therefore, in my opinion, the Chen/Chang/Raven combination renders this limitation obvious.

D. Claim 2 "The fiber optic connector according to claim 1, wherein the alignment feature is positioned rearward of the front end of the housing and extends away from the front end of the housing."

381. In Chen's alignment feature, alone and/or as modified in view of Raven, is positioned rearward of the front end of the housing and extends away from the front end of the housing, as taught by both Chen and Raven.

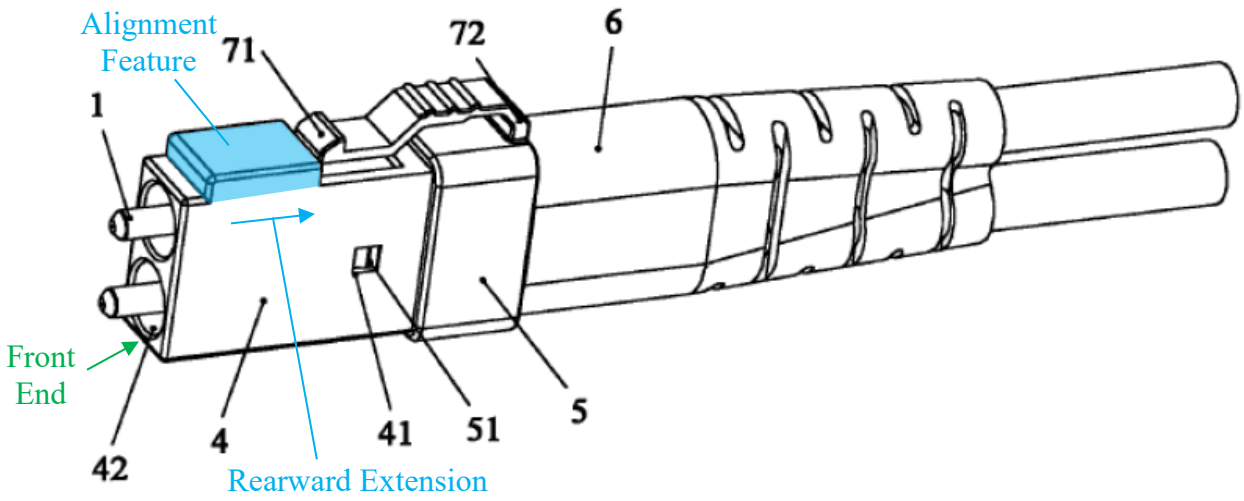


FIG. 3B

EX1011: Fig. 3B (annotated).

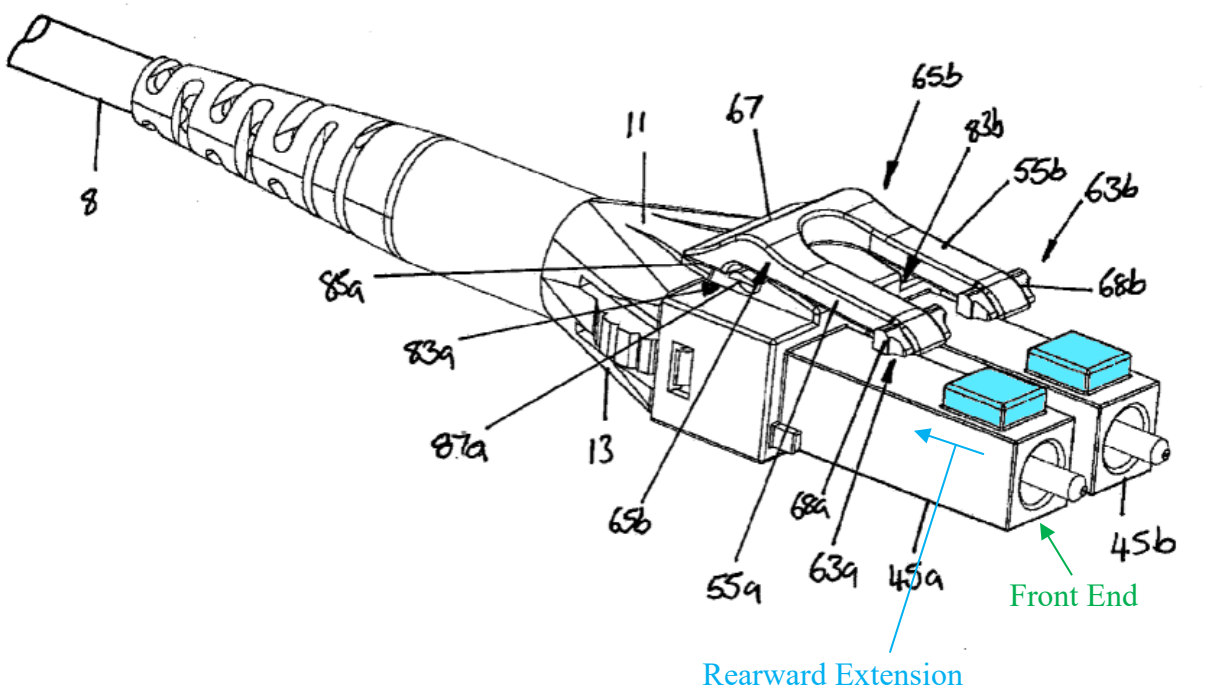


Fig. 2

EX1013: Fig. 2 (annotated).

382. Therefore, in my opinion, Chen meets this limitation and/or the Chen/Chang/Raven combination renders this claim obvious.

E. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

383. As I explained in Section VII(C), the claimed "spring push" recited in claim 3 may be part of the crimp body.

384. Chen's sleeve body (5) includes internal structure that engages the rear portion of both elastic elements (2) to engage the elastic elements with the block pieces (3). EX1011: ¶¶[0027]-[0028]. Hence, the sleeve body (5) comprises "a spring push engaging a rear portion of each of the two springs."

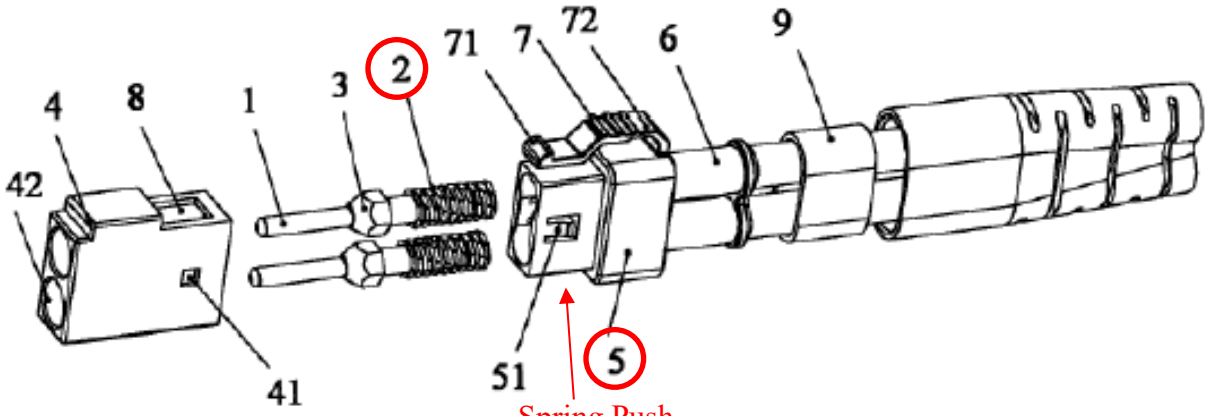


FIG. 3A

EX1011: Fig. 3A.

385. Therefore, in my opinion, Chen meets this claim.

F. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously."

386. As I explained above in Section XVII(E), the POSA would recognize that the sleeve body (5) of Chen is a spring push that simultaneously engages the rear portion of each of the two springs (2).

387. Therefore, in my opinion, Chen meets this claim.

G. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

388. The cuboid projection on the top side of the casing (4) of Chen (alone or as modified in view of Raven) provides an indicia of polarity in that it is located on only the top side of the connector and provides a clear indication of the orientation in which the connector must be plugged into an adapter. Section XVII(B)&(C)(1.e). Chen's cuboid projection also extends asymmetrically outward from the front housing (4) and ferrule datums, and is co-aligned with the latch, so as to limit Chen's connection to only be inserted into it's corresponding adapter in one orientation.

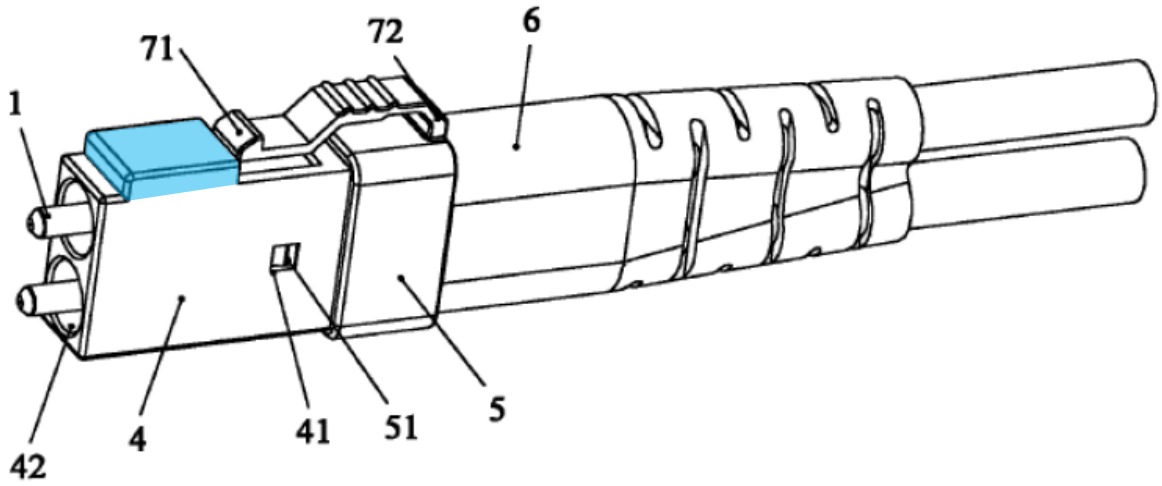


FIG. 3B

EX1011: Fig. 3B (annotated).

389. Therefore, in my opinion, Chen meets this claim and/or the Chen/Chang/Raven combination renders this claim obvious.

H. Claim 7

7.a "The fiber optic connector according to claim 1, further comprising: a crimp band secured around an outer surface of the rear end of the crimp body, and"

390. Chen's connector includes a tail jacket (9), which is understood to be an oval crimp band secured around an outer surface of the double-barrel back post of the sleeve body (5). EX1011: ¶[0036].

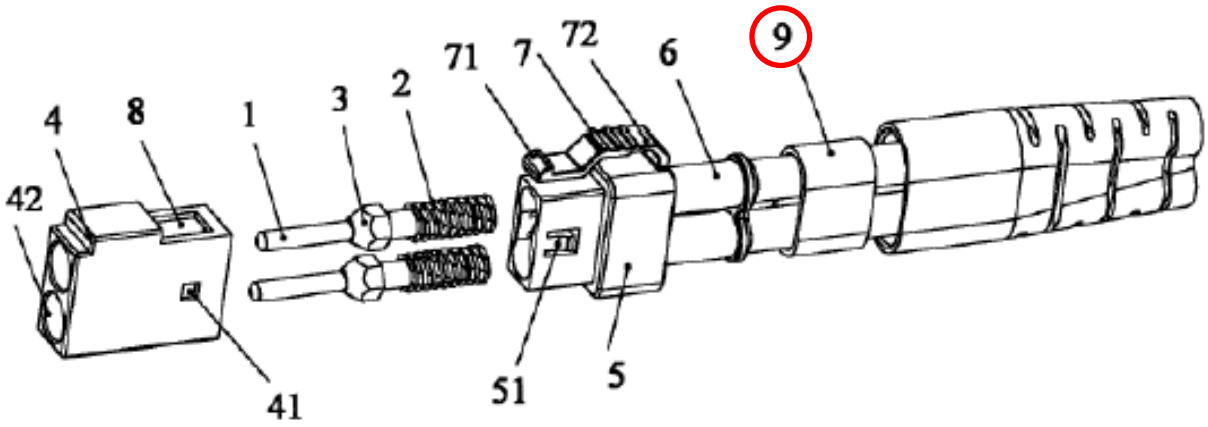


FIG. 3A

EX1011: Fig. 3A.

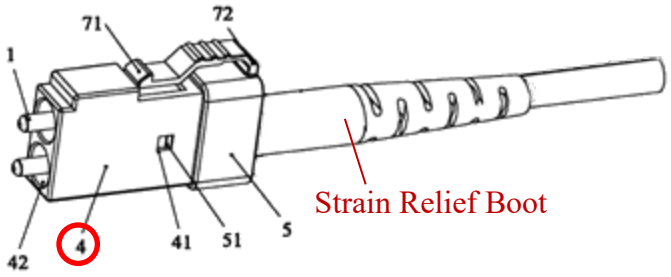
391. As a result of Chen's sleeve body (5) and tail jacket (9) being modified in view of Chang—as I explained in Section XVII(A)—Chen's modified tail jacket (9) would be secured around an outer surface of the single-barrel back post of Chen's modified sleeve body (5).

392. Therefore, in my opinion, the Chen/Chang/Raven combination renders this limitation obvious.

7.b "wherein the strain relief boot extends rearwardly away from the housing."

393. The modified boot as shown below (Section XVII(A)) would have extended rearwardly away from the casing (4), same as Chen's unmodified boot.

EX1011: Fig. 3B.



EX1011: Fig. 3B (annotated, modified).

394. Therefore, in my opinion, the Chen/Chang/Raven combination renders this limitation obvious.

I. Claim 14 "The fiber optic connector according to claim 1, wherein the alignment feature includes a vertical alignment feature and a horizontal alignment feature."

395. The cuboid projection on top of Chen's connector, alone or as modified in view of Raven, is an alignment feature that includes a vertical alignment feature and a horizontal alignment feature, regardless of how these terms are construed (Section V(B)). If "vertical alignment feature" is construed to mean a feature that extends vertically and "horizontal alignment feature" is construed to mean a feature that extends horizontally, then the "vertical alignment feature" is met by the vertical surfaces A of the cuboid projection on top of the connector and the "horizontal alignment feature" is met by the horizontal top surface B of the cuboid projection.

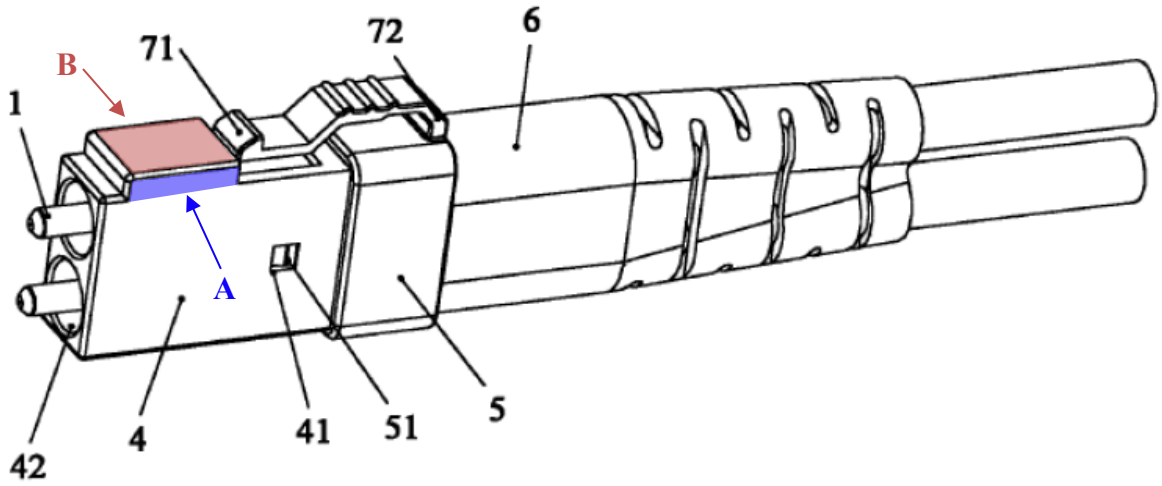


FIG. 3B

EX1011: Fig. 3B (annotated).

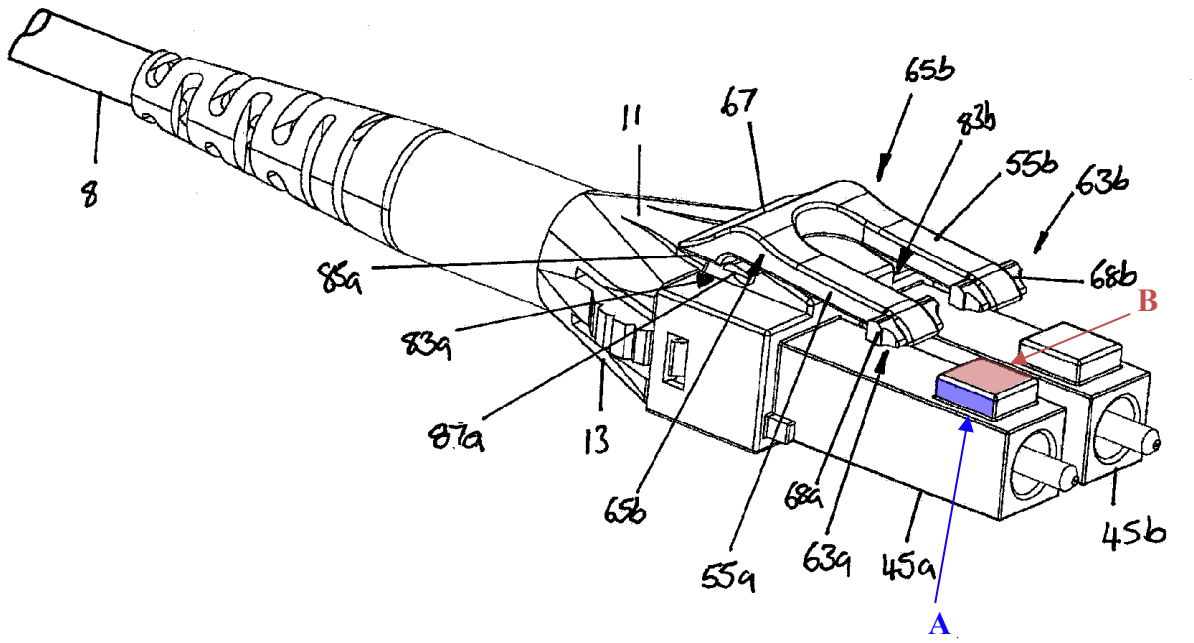


Fig. 2

EX1013: Fig. 2 (annotated).

396. If "vertical alignment feature" is construed to mean a feature that is capable of engaging a mating alignment structure to align the connector vertically and "horizontal alignment feature" is construed to mean a feature that is capable of engaging a mating alignment structure to align the connector horizontally, then the "vertical alignment feature" is met by surface B and the "horizontal alignment feature" is met by surface A.

397. As explained above, Raven teaches that the cuboid projection fits into a slot in a mating adapter in order to guide the connector into the adapter. EX1013: ¶¶[0098], [0039]. When modifying Chen to follow Raven's teaching that the cuboid projection forms a guide element that "interacts with a socket receiving formation ... and guides onward insertion of the fiber optic connector ..., ensuring the correct location ... of the connector with respect to the socket," the POSA would size the cuboid projection of Chen so that the top surface B engages an upper horizontal surface defining the socket receiving formation to vertically align the connector and surfaces A engage opposing side surfaces of the socket receiving formation to align the connector horizontally as it is inserted into the connector. Accordingly, top surface B would form a vertical alignment feature and side surfaces A would form horizontal alignment features.

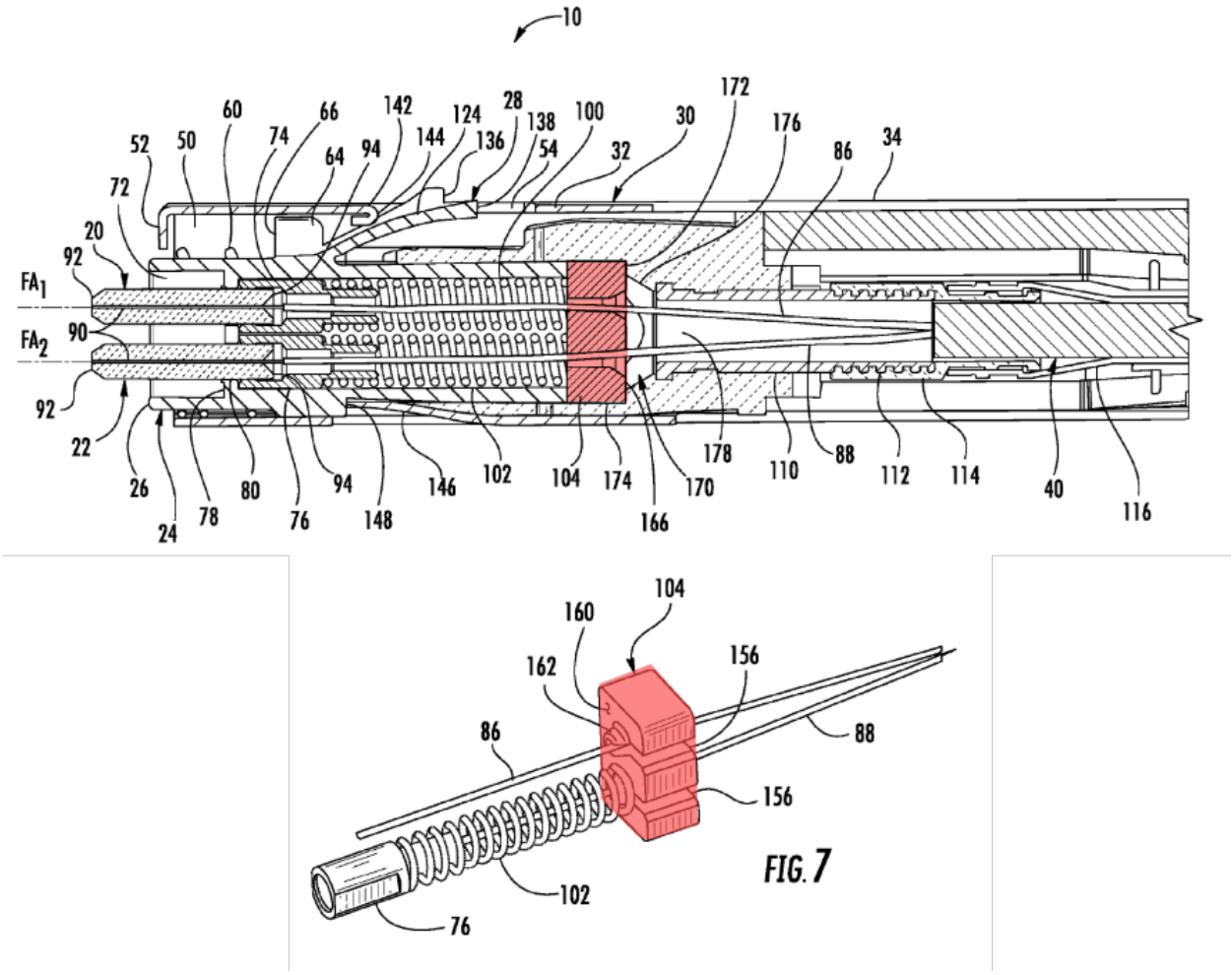
398. Therefore, in my opinion, Chen meets this claim and/or the Chen/Chang/Raven combination renders this claim obvious.

XVIII. OBVIOUS: CHEN, CHANG, RAVEN, LEE (GROUND 14)

399. In my opinion, claims 3-5 would have been obvious over Chen in view of Chang, Raven, and Lee.

A. Claim 4 "The fiber optic connector according to claim 3, wherein the spring push is separate from the crimp body."

400. Lee teaches a spring push (104) for engaging the rear ends of the ferrule springs (100, 102). EX1005: ¶¶[0052]-[0053].



EX1005: Figs. 3 and 7 (annotated).

401. In my opinion, it would have been obvious to modify the Chen/Chang/Raven combination to include Lee's spring push (104). A POSA would have been motivated to make the combination based on the express teachings of Lee regarding the advantages of the separate spring push (104). For example, each of the following advantages that are expressly taught by Lee would have served as an independent motivation for the combination: (i) to help position the fibers close to the longitudinal axes of the ferrules; (ii) to protect the fibers from relative movement in relation to the ferrule springs by aligning spring seats (162, 164) with the slots (156, 158); and (iii) to provide improvements in the process of terminating a fiber optic cable with the connector by allowing for placement of the spring push (104) onto the cable after the fibers have been installed in the ferrules. EX1005: ¶¶[0053], [0055].

402. This modification would have been nothing more than combining known prior art elements (the optical connector of the Chen/Chang/Raven combination and Lee's spring push (104)) according to known methods (arrangement taught by Lee) to yield predictable results (an optical connector with an independently mountable spring push).

403. This modification would have also been nothing more than the application of a known technique (Lee's spring push (104)) for an optical connector that is taller than it is wide and holds two spring-loaded single-fiber

ferrules at vertically spaced apart positions) to improve a similar device (the optical connector of the Chen/Chang/Raven combination) in the same way to yield predictable results (an optical connector with an independently mountable spring push). For example, the POSA would recognize that the E-shaped spring push (104) with narrow fiber slots would function better to align the individual fibers with their respective ferrules and ferrule springs.

404. The POSA would have had a reasonable expectation of success in making this modification given the function and general placement of Lee's spring push (104) would not change in the optical connector of the Chen/Chang/Raven combination. Further, the POSA would simply change the dimensions of the casing (4) and sleeve body (5) of Chen to accept an E-shaped spring push, as taught by Lee, in the interior of the casing (4) at the ends of the elastic elements (2). This modification would only require minor changes in dimensions and shapes of molded parts and is well within the level of ordinary skill in the art.

405. As a result of this modification, the optical connector of the Chen/Chang/Raven combination includes Lee's spring push (104), which is separate from the sleeve body (5). Just like in Lee, the spring push (104) would engage the rear portions of each of Chen's elastic elements (2) simultaneously. EX1005: Fig. 3, ¶[0053].

406. Therefore, in my opinion, the Chen/Chang/Raven/Lee combination renders this claim obvious.

B. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

407. If claim 3 requires the recited spring push to be separate from the crimp body, then the Chen/Chang/Raven/Lee combination renders this claim obvious in my opinion for the reasons I discussed in Section XVIII(A).

C. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously."

408. If claim 5 requires the recited spring push to be separate from the crimp body, then the Chen/Chang/Raven/Lee combination renders this claim obvious in my opinion for the reasons I discussed in Section XVIII(A).

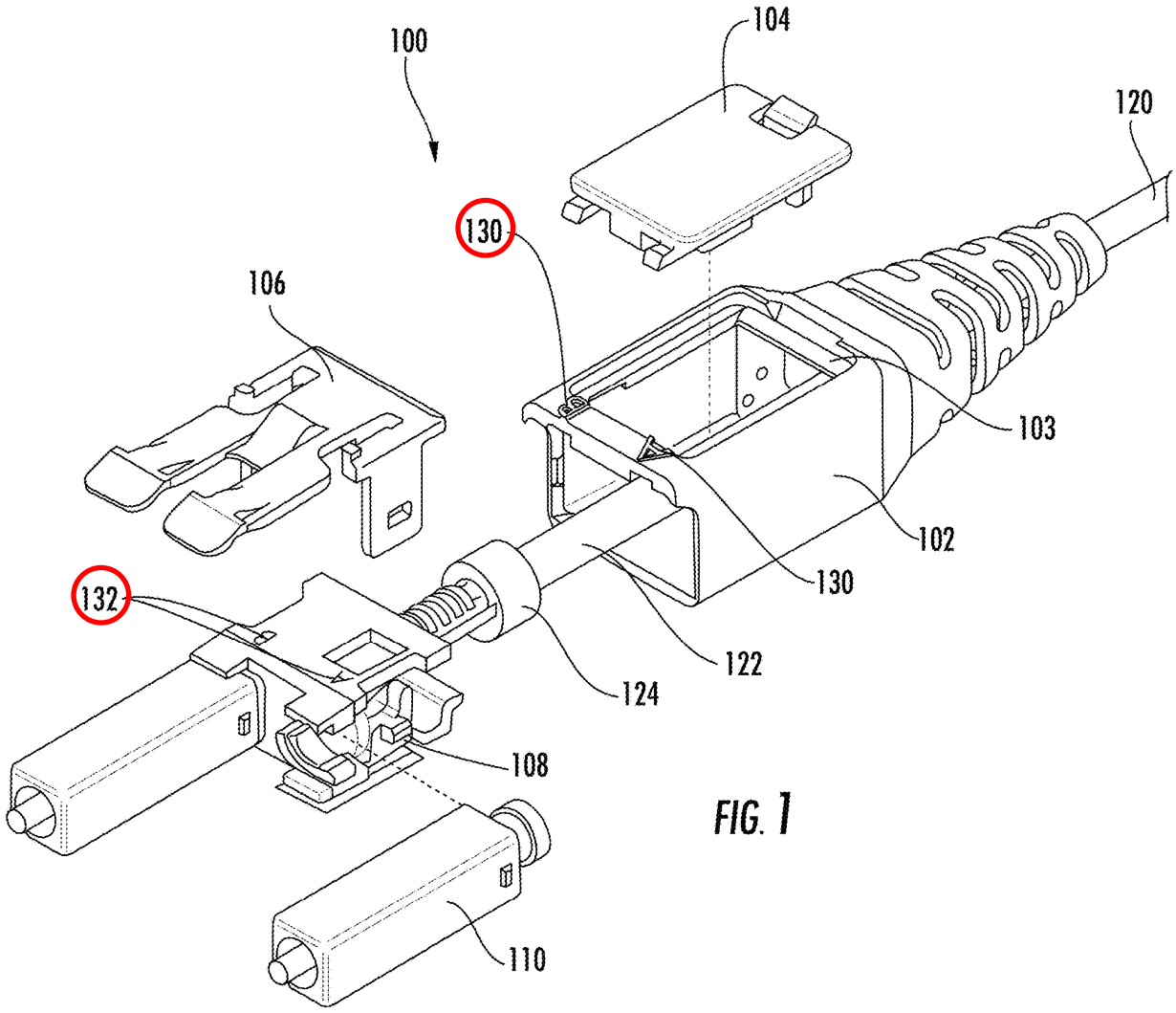
XIX. OBVIOUS: CHEN, CHANG, RAVEN, VEATCH (GROUND 15)

409. In my opinion, claim 6 would have been obvious over Chen in view of Chang, Raven, and Veatch.

A. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

410. If it is argued that Chen's optical connector does not meet this claim for the reasons discussed in Section XVII(G), this claim would have been obvious in view of Veatch.

411. Veatch discloses a polarity change fiber optic connector (100) with polarity indicia (130, 132) in the form of letters "A" and "B" to "indicate the polarity of the connector." EX1007: Fig. 1, 2:26-39.



EX1007: Fig. 1 (annotated).

412. In my opinion, it would have been obvious to modify Chen's casing (4) to include Veatch's polarity indicia (130, 132). A POSA would have been motivated to make the combination based on the express teachings of Veatch, to

"indicate the polarity of the connector." EX1007: 2:33-34. Such polarity indicia (130, 132) "assist[s] [the] user in identifying the currently polarity configuration of the assembled connector[]." EX1020: 14:39-46; *see* EX2021: ¶[0050]. In fact, using polarity indicia (130, 132) such as Veatch's is standard "industry practice." EX2022: 1:60-63, 6:20-25. Polarity letters "A" and "B" have been an industry standard convention since the ratification of TIA/EIA 604-10-A FOCIS-10 Type LC. EX1027: Fig. 2.2.1c (showing letters "A" and "B" on the adapter, which resulted in also adding corresponding letters on the duplex yoke of the connector). Having polarity letters "A" and "B" was standard practice regardless of whether the polarity of the connector was changeable in the field or not.

413. This modification would have been nothing more than combining known prior art elements (Chen's optical connector and Veatch's polarity indicia (130, 132)) according to known methods (arrangement taught by Veatch or otherwise known in the art) to yield predictable results (an indication of polarity for Chen's optical connector).

414. This modification would have also been nothing more than the application of a known technique (Veatch's polarity indicia (130, 132)) to improve a similar device (Chen's optical connector) in the same way to yield predictable results (an indication of polarity for Chen's optical connector).

415. The POSA would have had a reasonable expectation of success in making this modification given the function of Veatch's polarity indicia (130, 132) would not change in Chen's optical connector. In making this modification, the POSA would place the polarity indicia on Chen's casing (4) to be easily and readily viewable by a user. Moreover, placing polarity indicia on a housing was a known placement in the art. EX1020: Fig. 8B, 14:39-46. For example, the POSA may place the letter "A" adjacent the top of the casing (4) and the letter "B" adjacent the bottom casing, as shown representationally below.

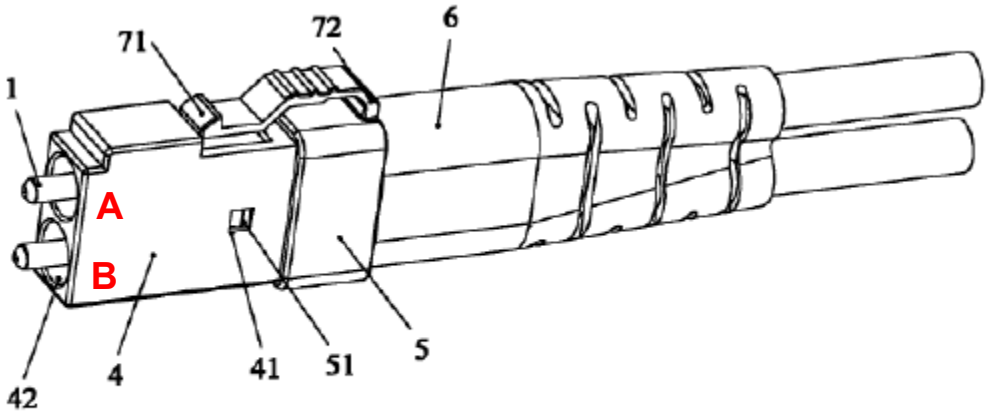


FIG. 3B

EX1011: Fig. 3B (modified).

416. As a result of this modification, Chen's optical connector includes Veatch's polarity indicia (130, 132) on the casing (4).

417. Therefore, in my opinion, the Chen/Chang/Raven/Veatch combination renders this claim obvious.

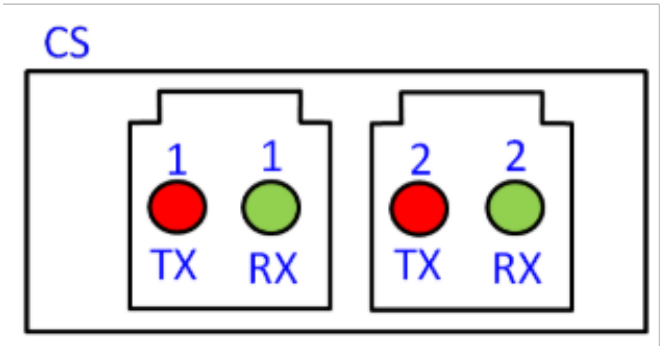
XX. OBVIOUS: CHEN, CHANG, RAVEN, QSFP-DD (GROUND 16)

418. In my opinion, claim 12 would have been obvious over Chen in view of Chang, Raven, and QSFP-DD.

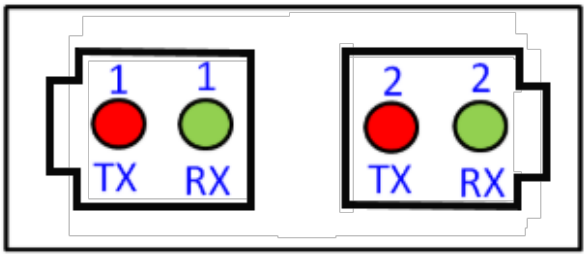
A. Claim 12 "The fiber optic connector according to claim 1, wherein the front end of the housing fits in a QSFP footprint."

419. Chen explains the "connector has a small volume ... and saves system space to increase the number of optical fibers loaded in the system." EX1011: ¶[0016].

420. In my opinion, it would have been obvious in view of QSFP-DD to size Chen's connector to fit within a QSFP footprint. For example, it would be obvious to size Chen's connector so that two dual-core Chen connectors could fit within one QSFP-DD optical interface in a similar way to how two CS connectors are shown to fit within a QSFP-DD optical interface, as shown below.



EX1014: Fig. 33.



EX1014: Fig. 33 (modified to fit two Chen connectors).

421. The POSA would have been motivated to make the modification for compatibility with QSFP-DD applications, e.g., as an alternative to the CS connector.

422. The POSA would have had a reasonable expectation of success because both the CS connector and Chen's connector are fiber optic connectors that integrate two spring-loaded single-fiber ferrules into a common duplex connector housing with a latch mechanism located on one side of the connector housing. Thus, the POSA would have a reasonable expectation that Chen's casing (4) could be configured to have roughly the same footprint as a CS connector so that two Chen connectors could fit side-by-side in the orientation indicated above. Hence, the front end of Chen's casing (4) would fit in a QSFP footprint.

423. Therefore, in my opinion, the Chen/Chang/Raven/QSFP-DD combination renders this claim obvious.

XXI. OBVIOUS: CHEN, CHANG, RAVEN, TAKANO'209 (KIANI) (GROUND 17)

424. In my opinion, claims 12, 15, and 16 would have been obvious over Chen in view of Chang, Raven, and Takano'209 (or Kiani if needed). I am applying Kiani as back up in case it is determined Takano'209 does not qualify as prior art.

A. Claim 13 "The fiber optic connector according to claim 1, wherein the crimp body is a two-piece crimp body."

425. Two-piece crimp bodies were well known to those skilled in the art. For example, Takano'209 shows multiple different connectors with a two-piece crimp body made up of back body and back post. EX1003: Figs. 3, 21A, 37, 41, 47, and 48.

426. In my opinion, it would have found it obvious to further modify Chen's sleeve body (5) (as already modified in view of Chang) in view of Takano'209 to make Chen's sleeve body two pieces—i.e., (1) the single-barrel back post and (2) the remainder of the sleeve body. Motivation for the modification includes the POSA's knowledge that two-piece crimp bodies allow the back post to be formed from a more robust material than the back body, which greatly improves long term crimping of cable strength members to the connector crimp body, without diminished crimp strength due to creep. For example, a highly glass filled engineered thermoplastic resin, such as 40% glass filled PES has

high temperature resistance, high tensile and high compressive strength, and therefore will not creep over time. Additionally, separate modular back post designs can be offered for different cable types, having various outside diameters (OD's) and jacket wall thicknesses. This allows a manufacturer to select the desired modular back post based on the type of optical cable and attach the selected modular back post to the rest of the crimp body to set up the crimp body based on the type of optical cable being attached.

427. The modification is the simple substitution of one known element (a two-piece crimp body) for another (a one-piece crimp body) to yield predictable results (a crimp body with a robust back post for crimping). *See also* EX1005: ¶[0040] (disclosing that one- and two-piece crimp bodies are known equivalent alternatives).

428. The POSA would have had a reasonable expectation of success in making this modification as one-piece and two-piece crimp bodies are known alternatives and each connect to the fiber optic cable by crimping. EX1005: ¶[0040].

429. Therefore, in my opinion, the Chen/Chang/Raven/Takano'209 combination renders this claim obvious.

B. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall

extending rearward into the housing and away from each of the respective ferrule seats."

430. Chen teaches positioning chambers (42) "for fixing the pair of ceramic ferrules 1 may be provided in the inner chamber of the casing 4, so that after the pair of ceramic ferrules 1 enters the inner chamber of the casing 4, the position thereof is relatively fixed." EX1011: ¶[0032]. Accordingly, the positioning chambers (42) are taught to comprise ferrule seats for seating the ferrules (1) in position within the casing (4).

431. Takano'209's optical connector (4100) of Fig. 41 includes a front body (4015) with an elongated middle wall (4260). EX1003: ¶¶[0137]-[0138].

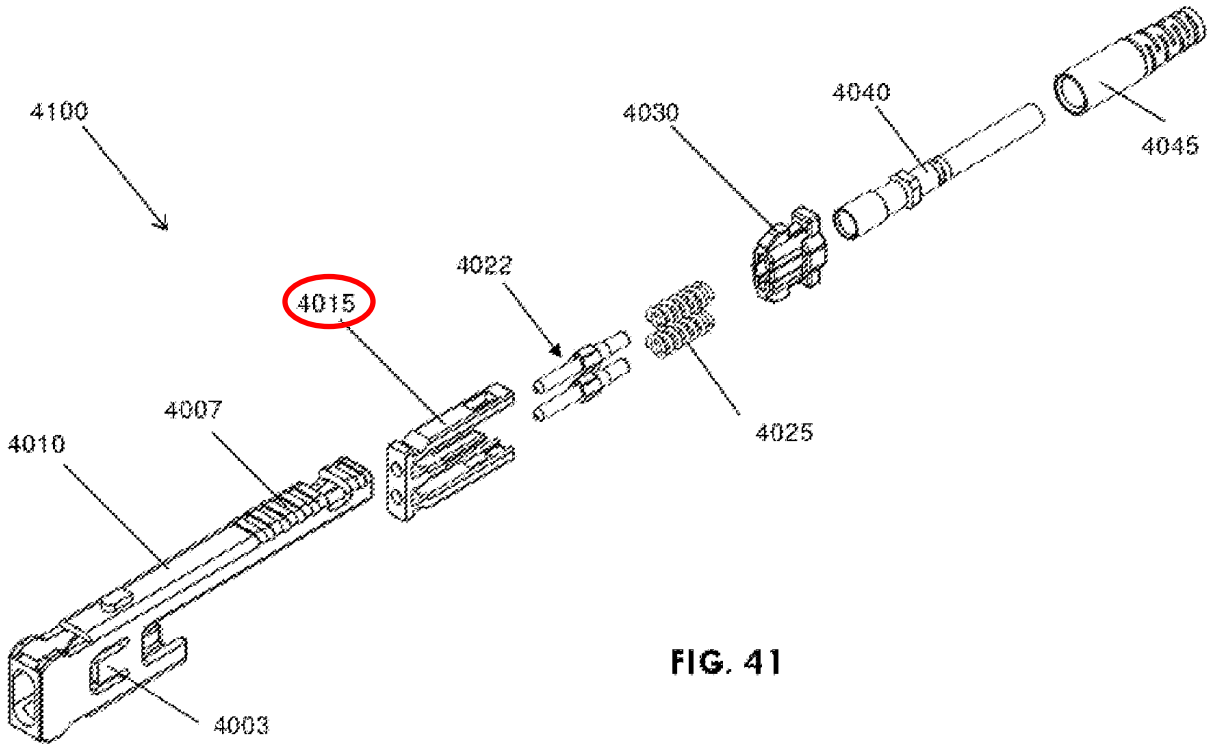


FIG. 41

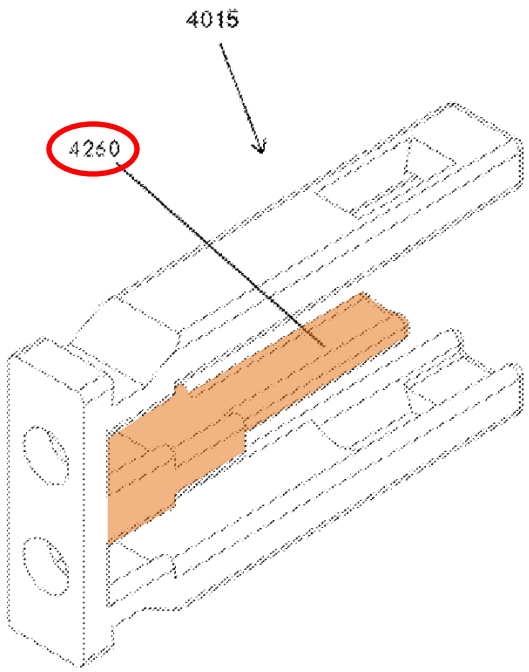


FIG. 42A

EX1003: Figs. 41 and 42A (annotated).

432. Kiani also teaches ferrule carrier (810) with a rib (924). EX1015: ¶¶[0069], [0074].

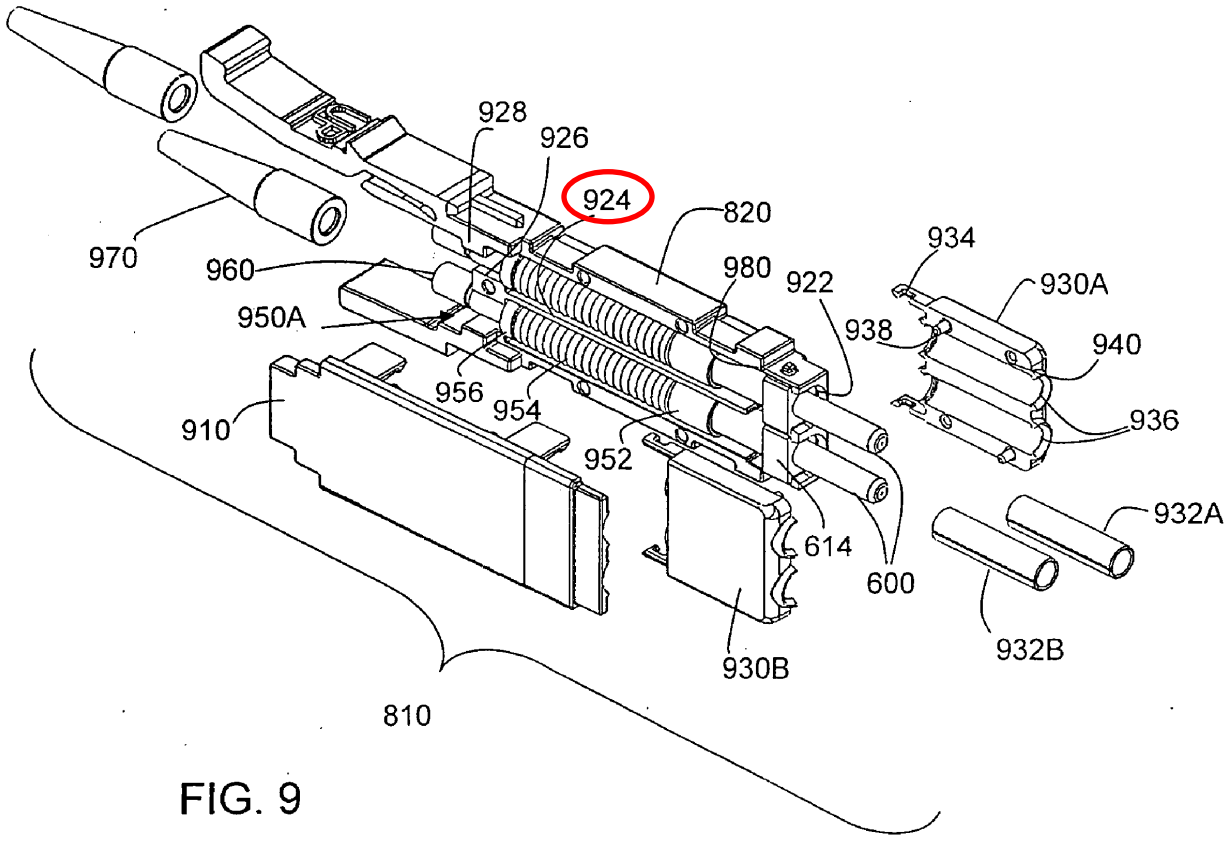


FIG. 9

EX1015: Fig. 9 (annotated).

433. In my opinion, it would have been obvious to modify Chen's casing (4) in view of Takano'209 to add the elongated middle wall (4260) (or Kiani's rib) to separate the two elastic elements (2). EX1003: Figs. 42A-42B. Takano'209 expressly teaches that the elongated wall (4260) prevents entanglement of the ferrule springs, binding of the connector and breaking of optical fibers. EX1003: ¶[0138] ("middle wall reduces the possibility of the springs becoming entangled with each other, binding the connector and breaking the optical fibers"); EX1015: ¶[0074] (teaching to provide a rib 924 between the ferrule assemblies 600 that

divides the interior of the support 820 in two "to ensure that spring(s) 954 stay positioned.").

434. This modification would have also been nothing more than the application of a known technique (Takano'209's middle wall (4260) (or Kiani's rib)) to improve a similar device (the optical connector of the Chen/Chang/Raven combination) in the same way to yield predictable results (preventing entanglement of the elastic elements (2)).

435. In making this modification, the POSA would have added Takano'209's middle wall (4260) (or Kiani's rib) between Chen's ferrule assemblies and positioning chambers (42). The added middle wall (4260) (or Kiani's rib) would extend rearward into the casing (4)—either stopping short of the orifice (41) or being narrower than the central portion of the front opening in the sleeve body (5) so as not to interfere with insertion of the sleeve body (5) into the casing (4).

436. A POSA would have had a reasonable expectation of success in making this modification because the middle wall (4260) (or Kiani's rib) would serve the same function and be in generally the same position in Chen that it had in Takano'209 (or Kiani). This modification would require only minor changes in dimensions and shapes of molded parts (e.g., casing (4)) and is well within the level of ordinary skill in the art.

437. This modification results in the optical connector of the Chen/Chang/Raven combination having the middle wall (4260) (or Kiani's rib), which meets the requirement of the wall in claim 15, as best I can understand, because it forms a wall between the locations where two ferrule assemblies are seated in the casing (4) and it extends rearward relative to where the ferrule assemblies are seated in the positioning chambers (42).

438. Therefore, in my opinion, the Chen/Chang/Raven/Takano'209 (or Kiani) combination renders this claim obvious.

C. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

439. In the optical connector of the Chen/Chang/Raven combination modified in view of Takano'209 (or Kiani) (Section XXI(B)), the elongated middle wall (4260) (or Kiani's rib) is "interposed between the ferrules and springs when the front body is assembled." EX1003: ¶[0138]. The elastic elements (2) and the block pieces (3) would have essentially the same positions as in the unmodified Chen connector. This requires a radial gap to accommodate the elastic elements between the added middle wall and the cylindrical rear portions of each block piece (3), which each elastic element (2) "fits over." EX1011: ¶[0028].

440. Therefore, the Chen/Chang/Raven/Takano'209(or Kiani) combination renders this claim obvious.

XXII. OBVIOUS: CHEN, CHANG, RAVEN, HENKE (GROUND 18)

441. In my opinion, claim 17 would have been obvious over Chen in view of Chang, Raven, and Henke.

A. Claim 17 "The fiber optic connector according to claim 1, further comprising a lead-in tube attached to each of the ferrule holders, the lead-in tube extending past the rear end of the main body of the housing and configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body."

442. In my opinion, it would have been obvious to modify the optical connector of the Chen/Chang/Raven combination so that each block piece (3) includes an integral lead-in tube like the lead-in tube (28(2)) in Fig. 7A of Henke. The POSA would have been motivated to make this modification based on Henke's express teachings regarding the advantages of integrated lead-in tubes, such as (1) preventing the bonding agent used to secure the fiber in the ferrule from escaping and interfering with the ferrule springs; (2) to facilitate guiding the end portion of each optical fiber into the respective block piece (3) and further to the ferrules (1); and/or (3) preventing sharp bends that could damage the optical fiber from occurring as the optical fiber is inserted into the ferrule. EX1008: ¶¶[0041], [0079]; EX1026: Abstract (describing how a lead-in tube called a sheath prevents leaking of adhesive from a ferrule holder).

443. This modification would have been nothing more than combining known prior art elements (Chen's block piece (3) and Henke's lead-in tube (28(2)))

according to known methods (arrangement taught by Henke) to yield predictable results (optical connector with a lead-in tube for an optical fiber).

444. This modification would have also been nothing more than the application of a known technique (Henke's ferrule holder body 32(1) with integral lead-in tube (28(2)) on spring loaded ferrules contained between an inner housing and a crimp body) to improve a similar device (Chen's connector which are likewise spring loaded ferrules (1) contained between the casing (4) and sleeve body (5)) in the same way to yield predictable results (optical connector with a lead-in tube for an optical fiber). For example, the POSA would recognize that the integrated lead-in tubes would assist with guiding the fibers into the ferrules (1) during assembly and prevent adhesive from leaking onto the elastic elements (2) when the fibers are adhered and cured in place.

445. The proposed modification would have been well within the capabilities of a POSA, and the POSA would have had a reasonable expectation of success. Henke specifically teaches that the integrated lead-in tubes could be used with LC ferrule/holder assemblies, which is the same type of ferrule assembly used in Chen's connector. EX1008: ¶[0107]; EX1011: Fig. 3A. Further, Henke teaches that the integrated lead-in tubes are formed from flexible material, which would naturally conform to and fit within the interior geometry of the connector (e.g. to press-fit over the tail of the ferrule/holder, and to bend inward toward the center

between the rear ends of the elastic elements (2) and the sleeve body (5)). At most, the proposed modifications would have required minor changes in the dimensions of parts to accommodate the two integrated lead-in tubes in the interior of Chen's connector. Such changes are well-within the capabilities of the POSA and their results would have been entirely predictable.

446. In the Chen/Chang/Raven/Henke combination, the integrated lead-in tubes would extend from front end portions integrated with the block piece (3), through the elastic elements (2) and the interior of the modified sleeve body (5), to rear ends protruding slightly beyond the rear end of the single-barrel back post of the modified sleeve body. In the Chen/Chang/Raven/Henke connector, the lead-in tubes extend past the rear end of Chen's casing and are configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body, as taught by Henke. EX1008: ¶[0041].

447. Therefore, in my opinion, the Chen/Chang/Raven/Henke combination renders this claim obvious.

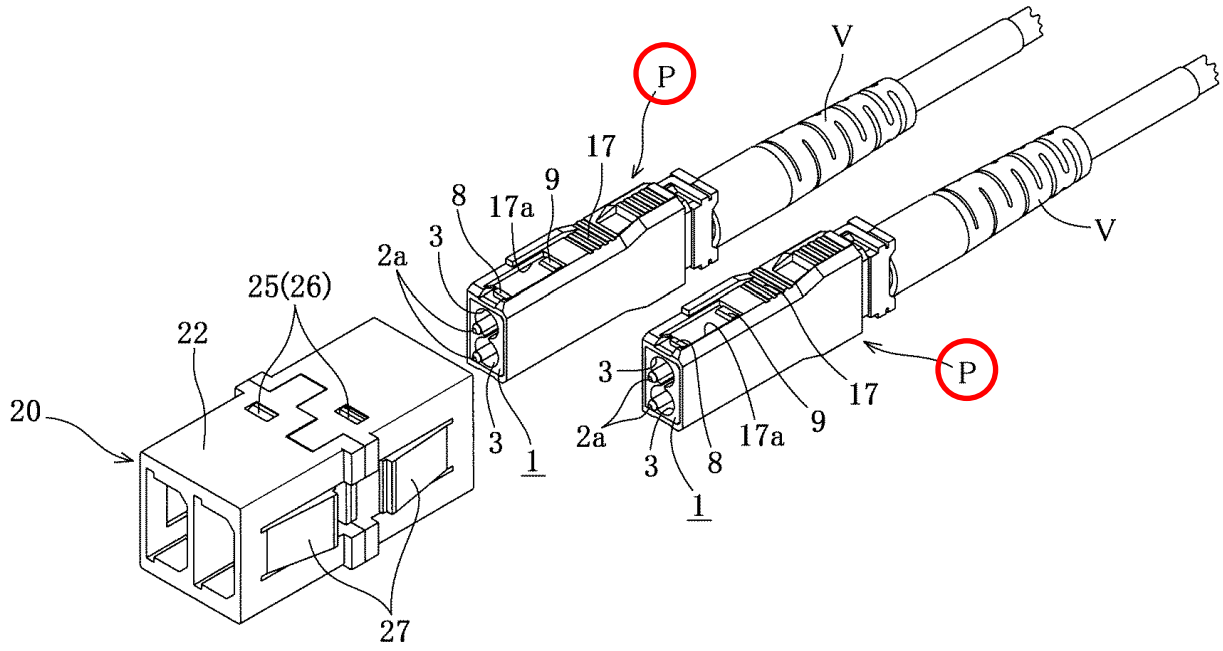
XXIII. ANTICIPATION: TOYAMA (GROUND 19)

448. In my opinion, claims 1-7 and 14-16 are anticipated by Toyama.

A. Independent Claim 1

1.P A fiber optic connector comprising:

449. Toyama discloses a plug body (P), which is "a fiber optic connector." EX1016: ¶[0022].



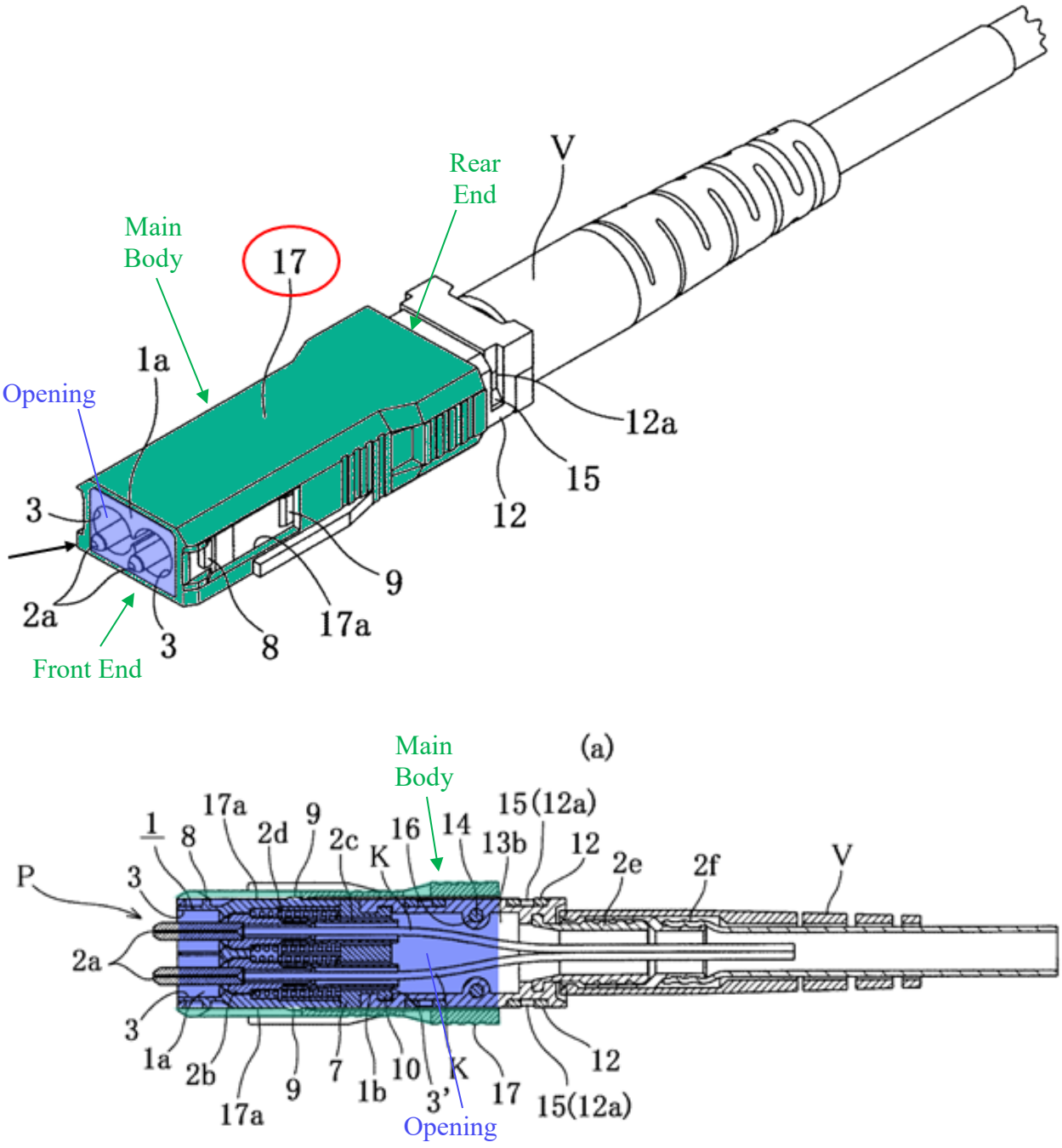
EX1016: Fig. 11 (annotated).

450. Therefore, in my opinion, Toyama meets this limitation.

1.a.1 "a housing having a main body extending between a front end and a rear end and having an opening extending therebetween,"

451. Toyama's knob (17) is a housing having a main body (green) extending between a front end and a rear end and having an opening (blue) extending therebetween. EX1016: ¶¶[0022], [0032] (describing knob (17) as "forming an angular cylindrical shape that can cover the entire plug frame").

【図６】

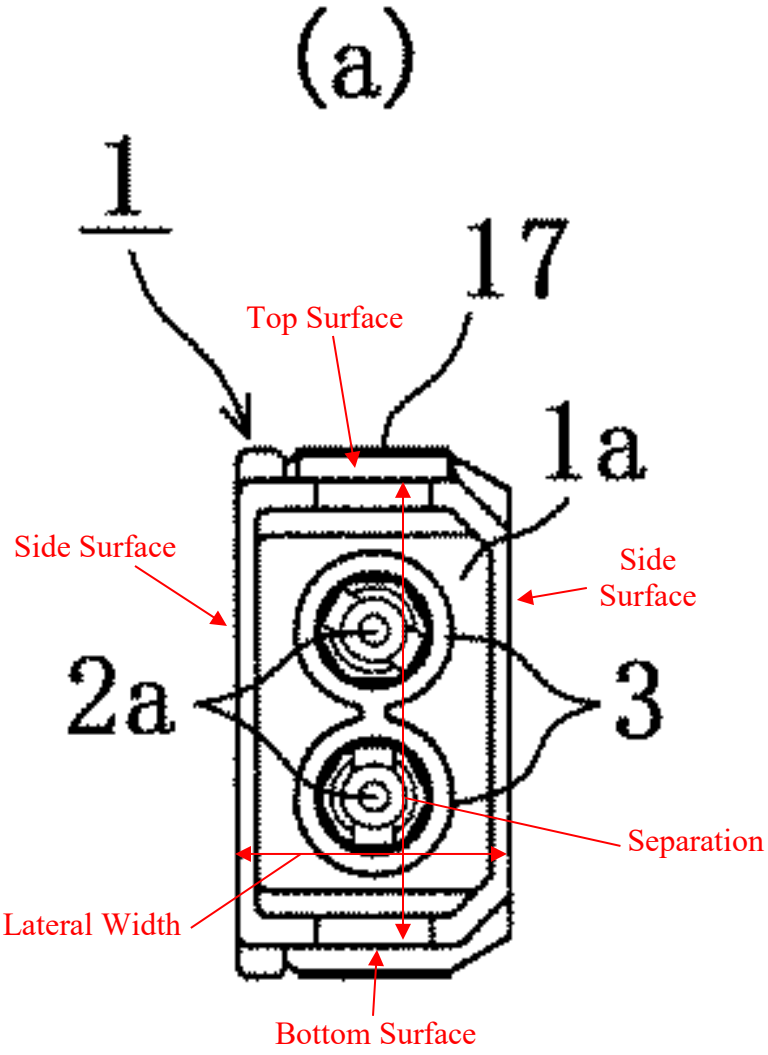


EX1016: Figs. 6 and 8(a) (annotated).

452. Therefore, in my opinion, Toyama meets this limitation.

1.a.2 "the housing having a top surface and a bottom surface bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top surface and the bottom surface;"

453. Toyama's knob (17) has top and bottom surfaces bound by two opposing side surfaces with a lateral width between the two side surfaces being less than a separation between the top and bottom surfaces.

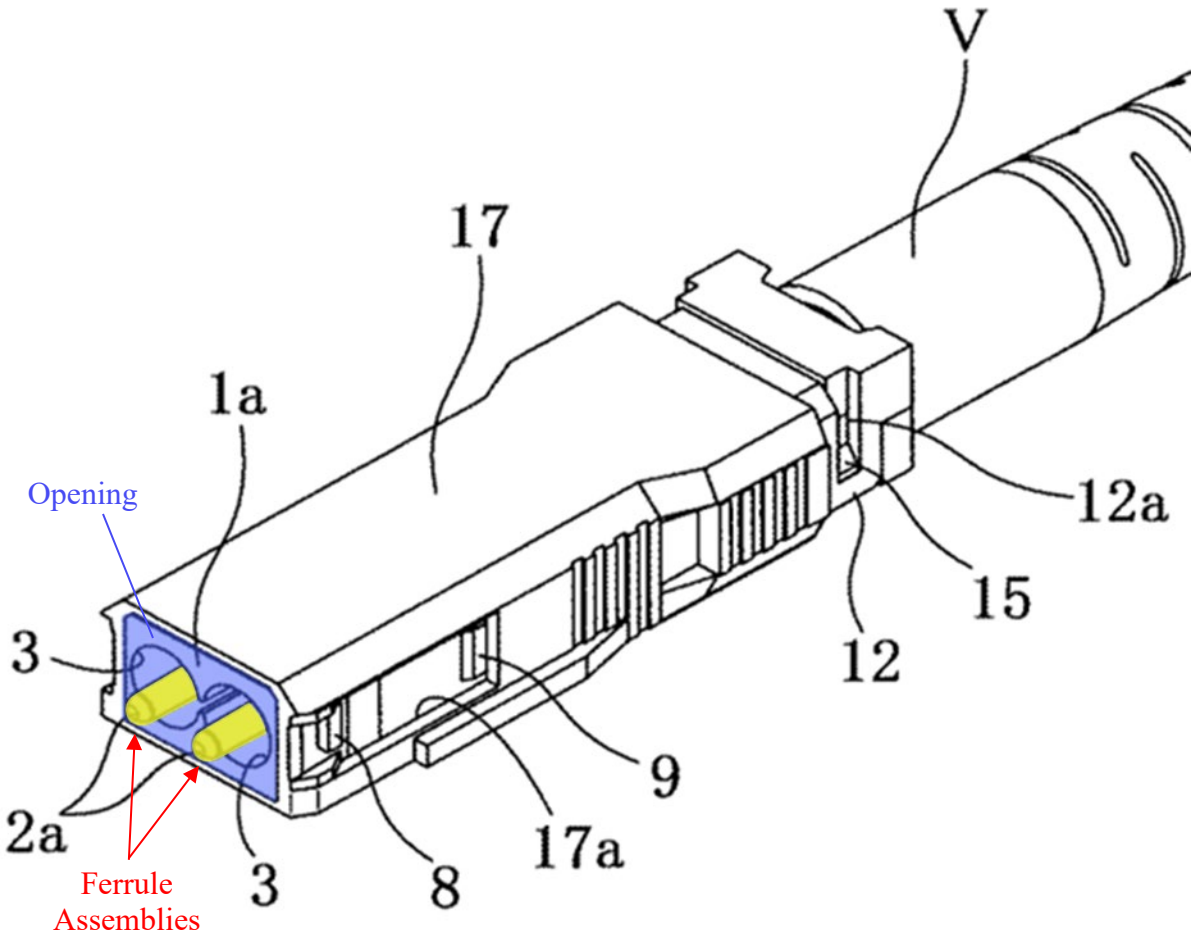


EX1016: Fig. 7(a) (annotated).

454. Therefore, in my opinion, Toyama meets this limitation.

1.b.1 "two ferrule assemblies disposed within the opening of the housing,"

455. Toyama discloses two ferrule assemblies disposed within the opening of the knob (17).



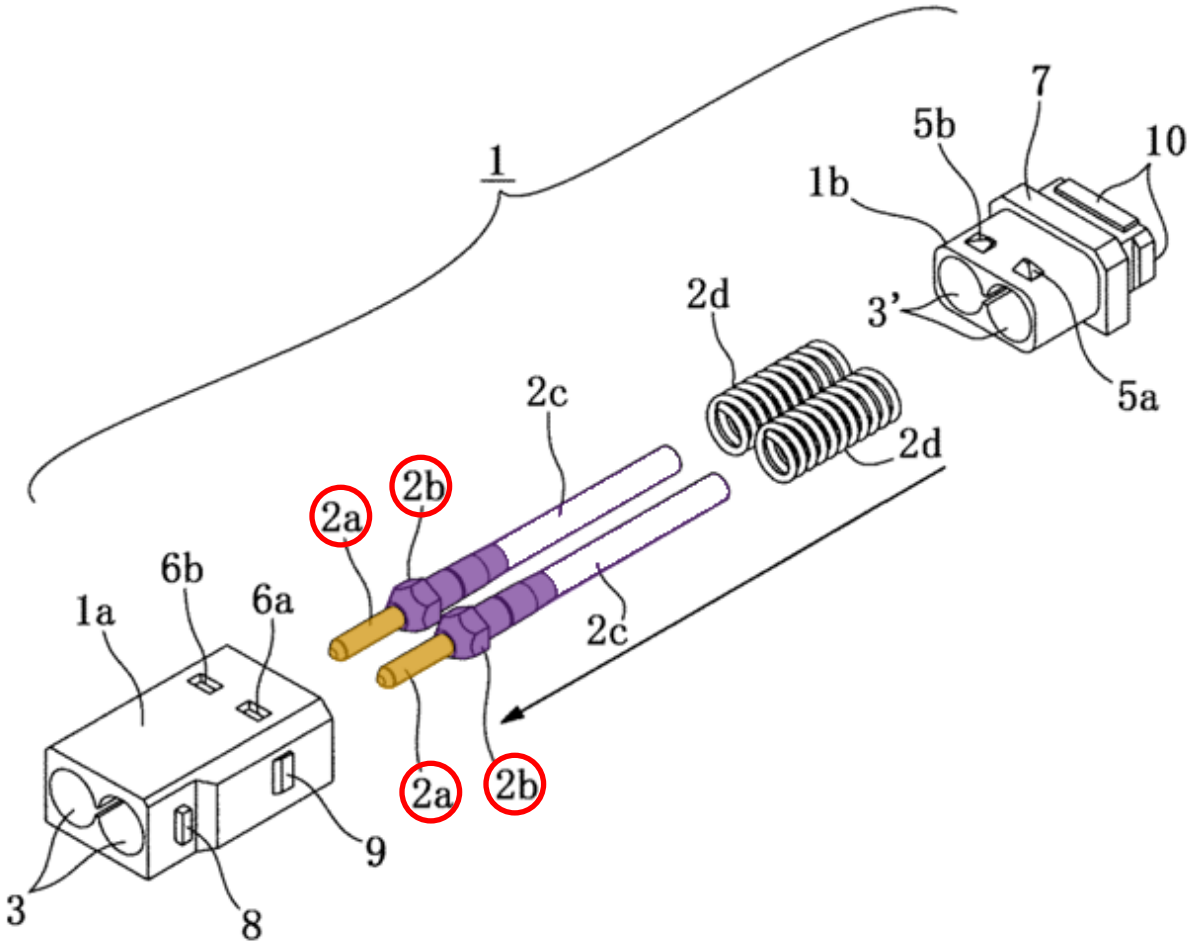
EX1016: Fig. 6 (annotated).

456. Therefore, in my opinion, Toyama meets this limitation.

1.b.2 "each of the ferrule assemblies comprising a fiber optic ferrule and a ferrule holder to hold the fiber optic ferrule,

the fiber optic ferrule extending forwardly of and away from the front end of the ferrule holder;"

457. Each ferrule assembly includes a ferrule (2a) held by a ferrule holder (2b). EX1016: ¶[0022]. Each ferrule (2a) extends forwardly away from the front end of the ferrule holder (2b).



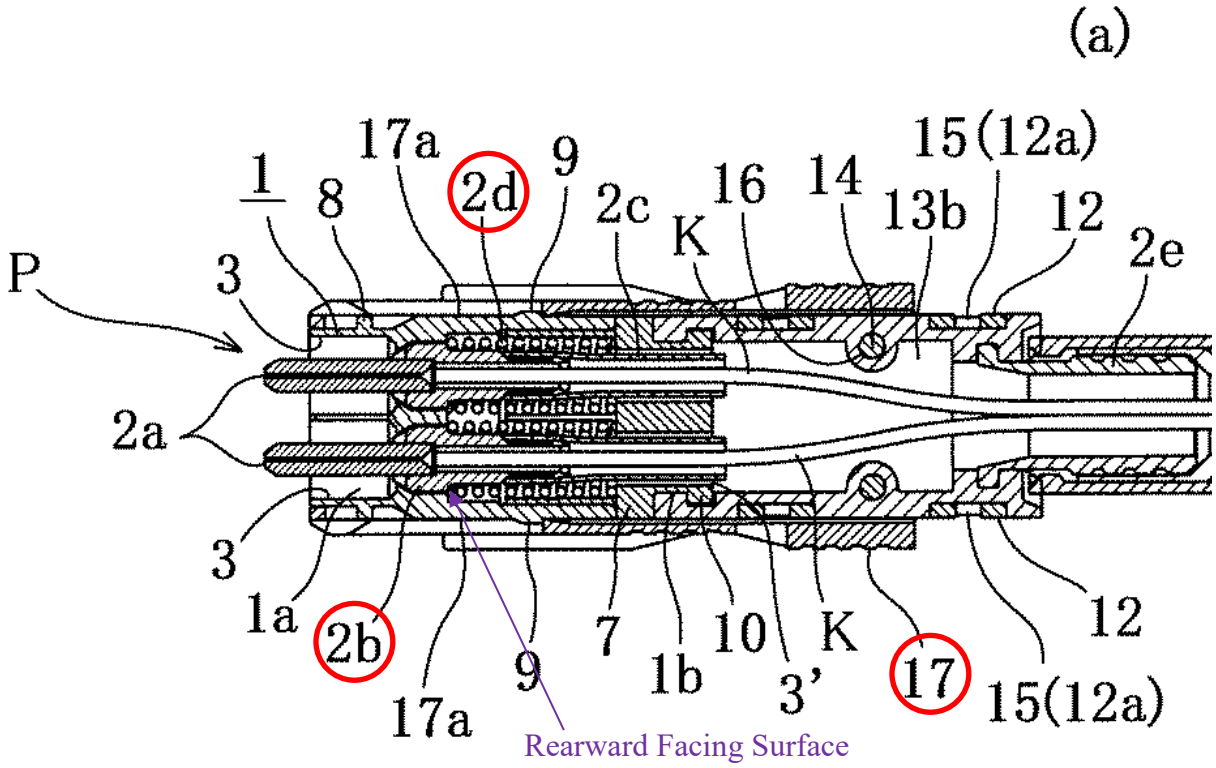
EX1016: Fig. 1 (annotated)

458. Therefore, in my opinion, Toyama meets this limitation.

1.c "two springs, each of the two springs engaging a rearward facing surface of a respective ferrule holder and extending towards the rear end of the housing to bias the ferrule

assemblies toward the front end of the housing and retained within the housing;"

459. Toyama discloses two springs (2d) retained within the knob (17). EX1016: ¶[0024]. Each spring (2d) engages a rearward facing surface of a ferrule holder (2b) and extends towards the rear end of the knob (17) to bias the ferrule assemblies toward the front end of the knob (17). EX1016: ¶[0024].

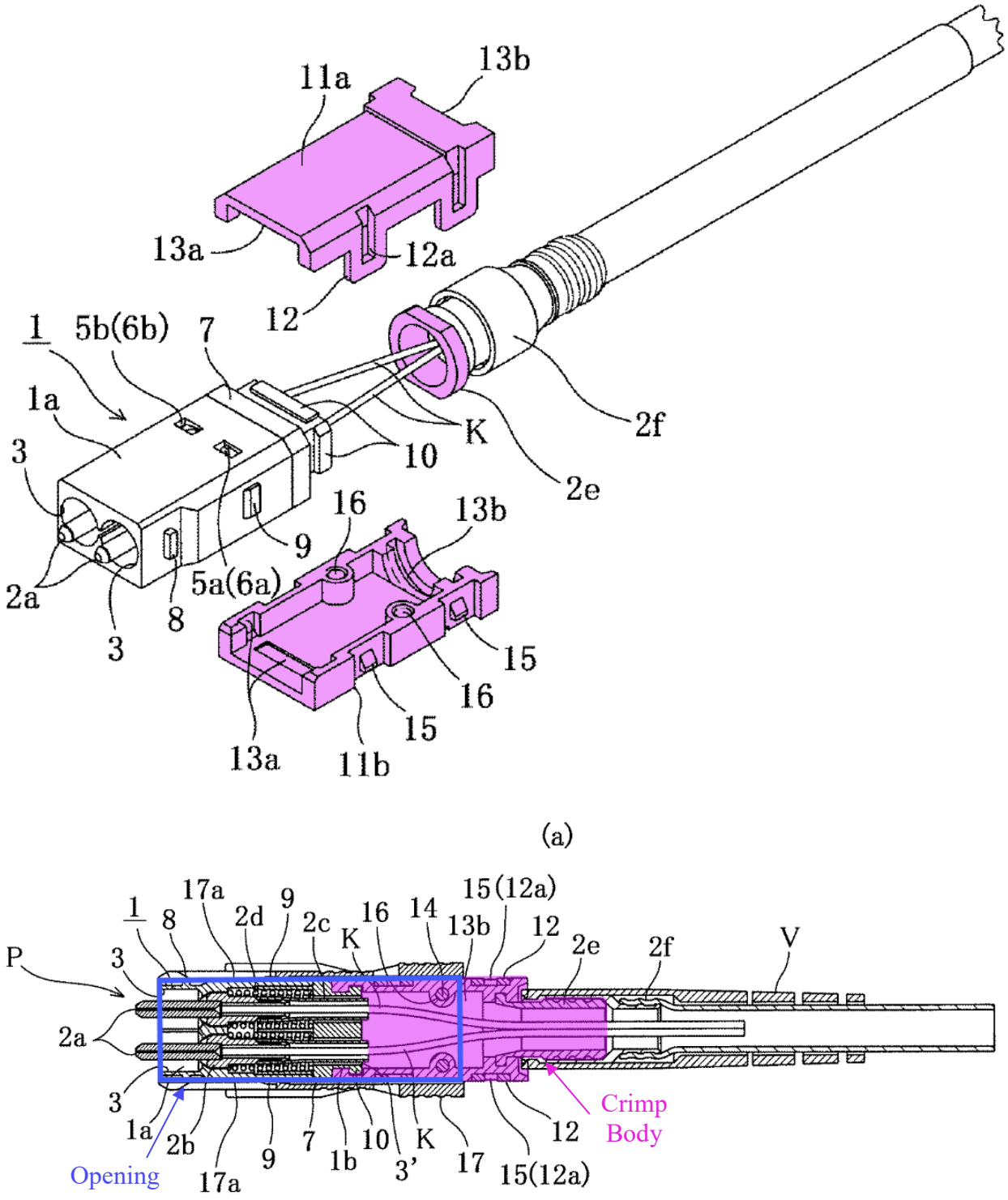


EX1016: Fig. 8(a) (annotated).

460. Therefore, in my opinion, Toyama meets this limitation.

1.d.1 "a crimp body secured to the fiber optic connector having a front end at least partially disposed in the opening at the rear end of the housing,"

461. Toyama discloses a three-piece crimp body made up of stop ring (2e) (which is back post for crimped engagement with a crimping ring (2f)) and the holder portions (11a, 11b) clamped onto the case (1) and the stop ring (2e) from the outside. EX1016: ¶[0022]. The three parts (2e, 11a, 11b) form "a crimp body" and are secured to the plug body (P), specifically the case (1). The three-piece crimp body is partially disposed in the opening at the rear end of the knob (17). EX1016: ¶[0022].

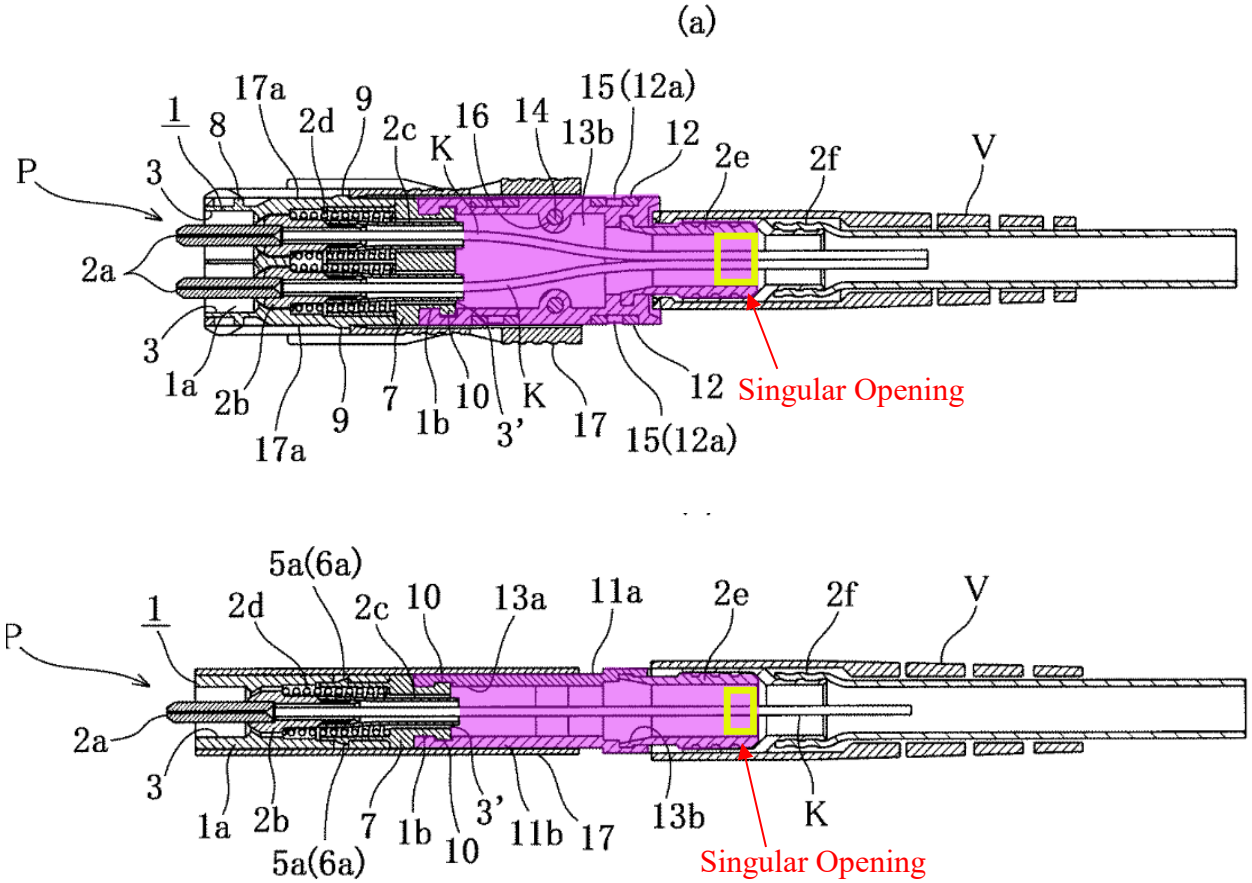


EX1016: Figs. 3 and 8(a) (annotated).

462. Therefore, in my opinion, Toyama meets this limitation.

1.d.2 "the crimp body having a rear end forming a singular opening for optical fibers;"

463. The stop ring (2e) forms a singular opening at the rear end of Toyama's three-piece crimp body.



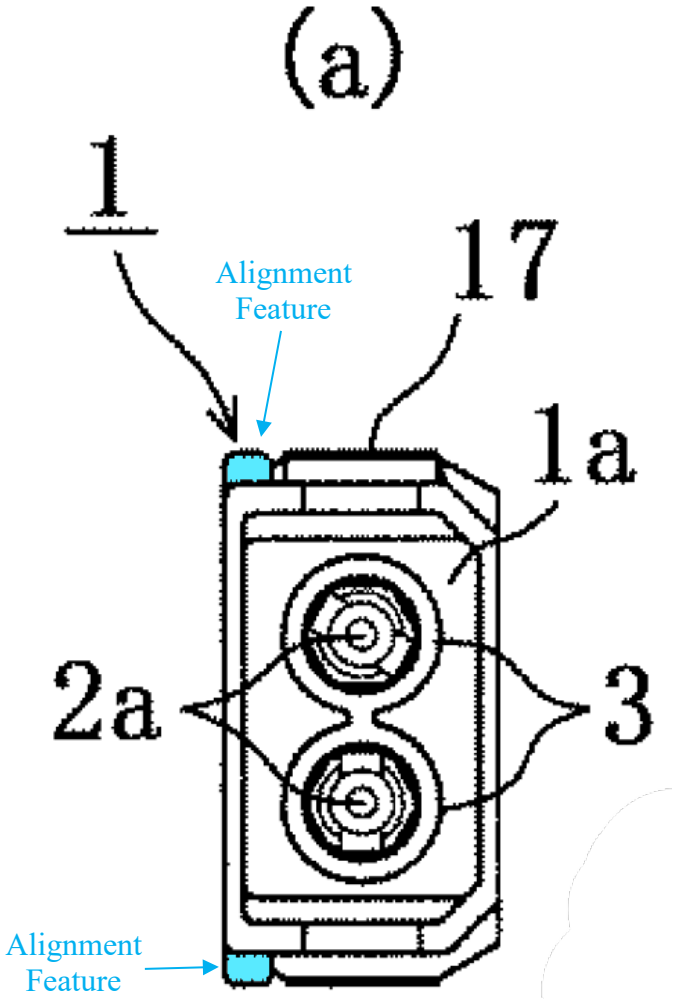
EX1016: Figs. 8(a)&(b) (annotated).

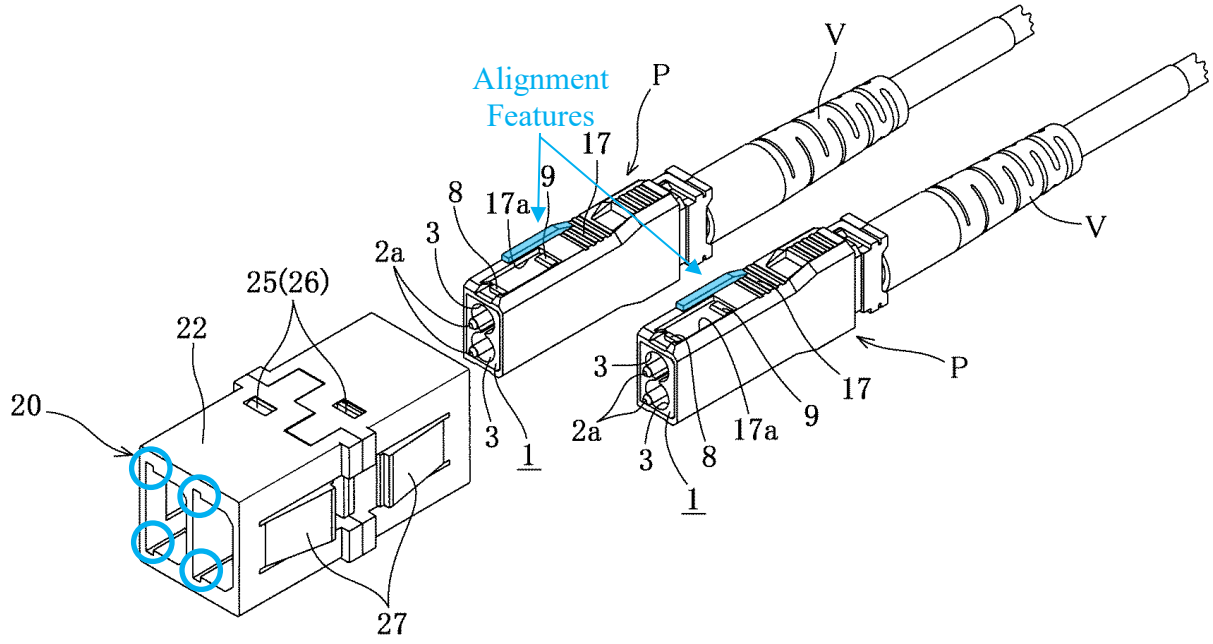
464. Therefore, in my opinion, Toyama meets this limitation.

1.e "an alignment feature on at least one of the top surface and the bottom surface of the housing configured to guide the fiber optic connector into an adapter; and"

465. Toyama discloses alignment features on the top surface and the bottom surface of the knob (17). The alignment features are keys that fit within

keyways of the adapter (20) to guide the connector into the adapter. Toyama teaches that the connector has "a locking structure like an MU connector." EX1016: ¶[0019]. The labeled alignment features below correspond to the alignment keys used in standard MU connectors.



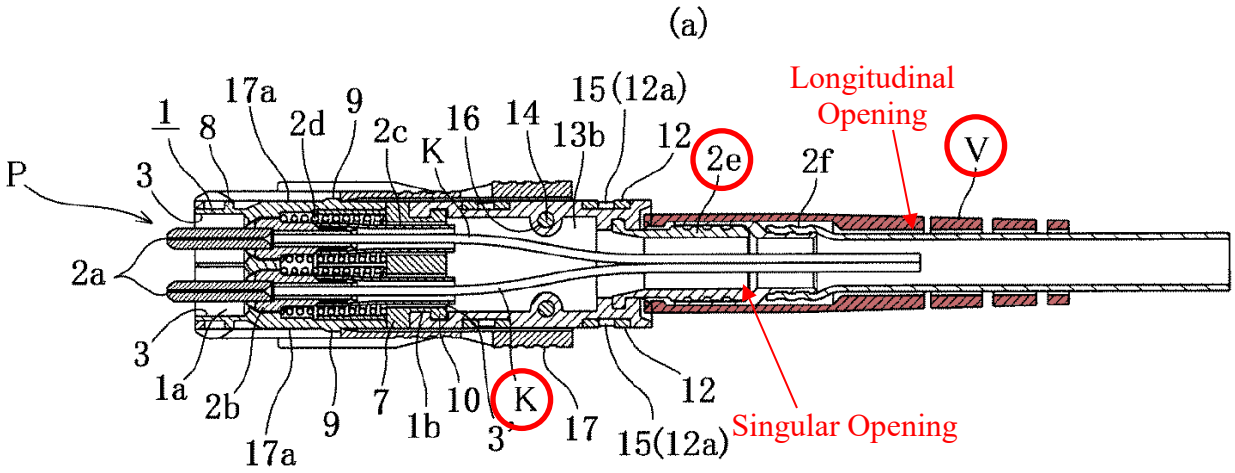


EX1016: Figs. 7(a) and 11 (annotated).

466. Therefore, in my opinion, Toyama meets this limitation.

1.f "a strain relief boot coupled to the rear end of the crimp body and having a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers pass."

467. Toyama discloses a strain relief boot (V) connected to the stop ring (2e). EX1016: ¶[0022]. The boot (V) has a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers (K) pass.

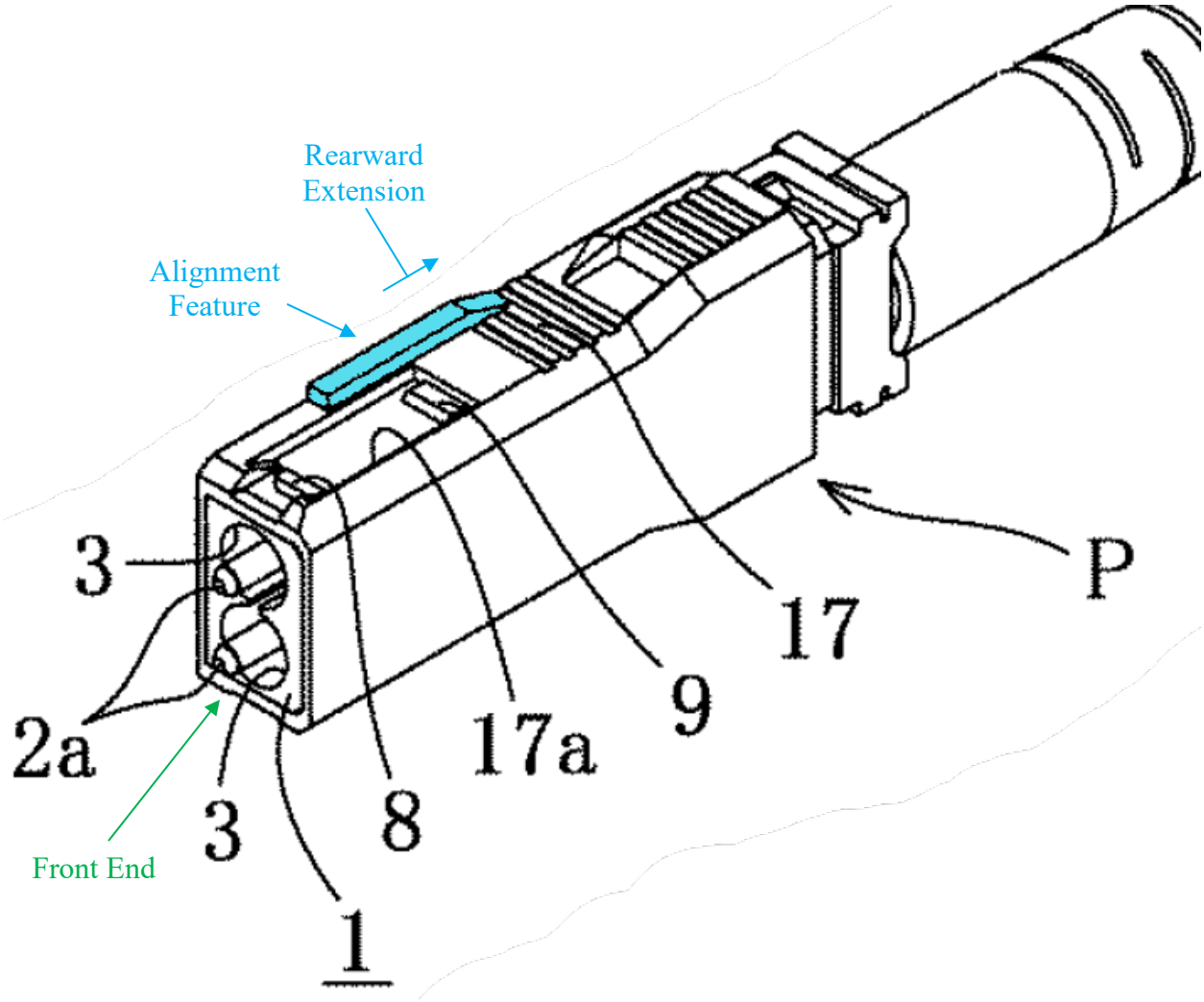


EX1016: Fig. 8(a) (annotated).

468. Therefore, in my opinion, Toyama meets this limitation.

B. Claim 2 "The fiber optic connector according to claim 1, wherein the alignment feature is positioned rearward of the front end of the housing and extends away from the front end of the housing."

469. Each alignment feature is positioned rearward of the front end of the knob (17) and extends rearward away from the front end of the knob (17).

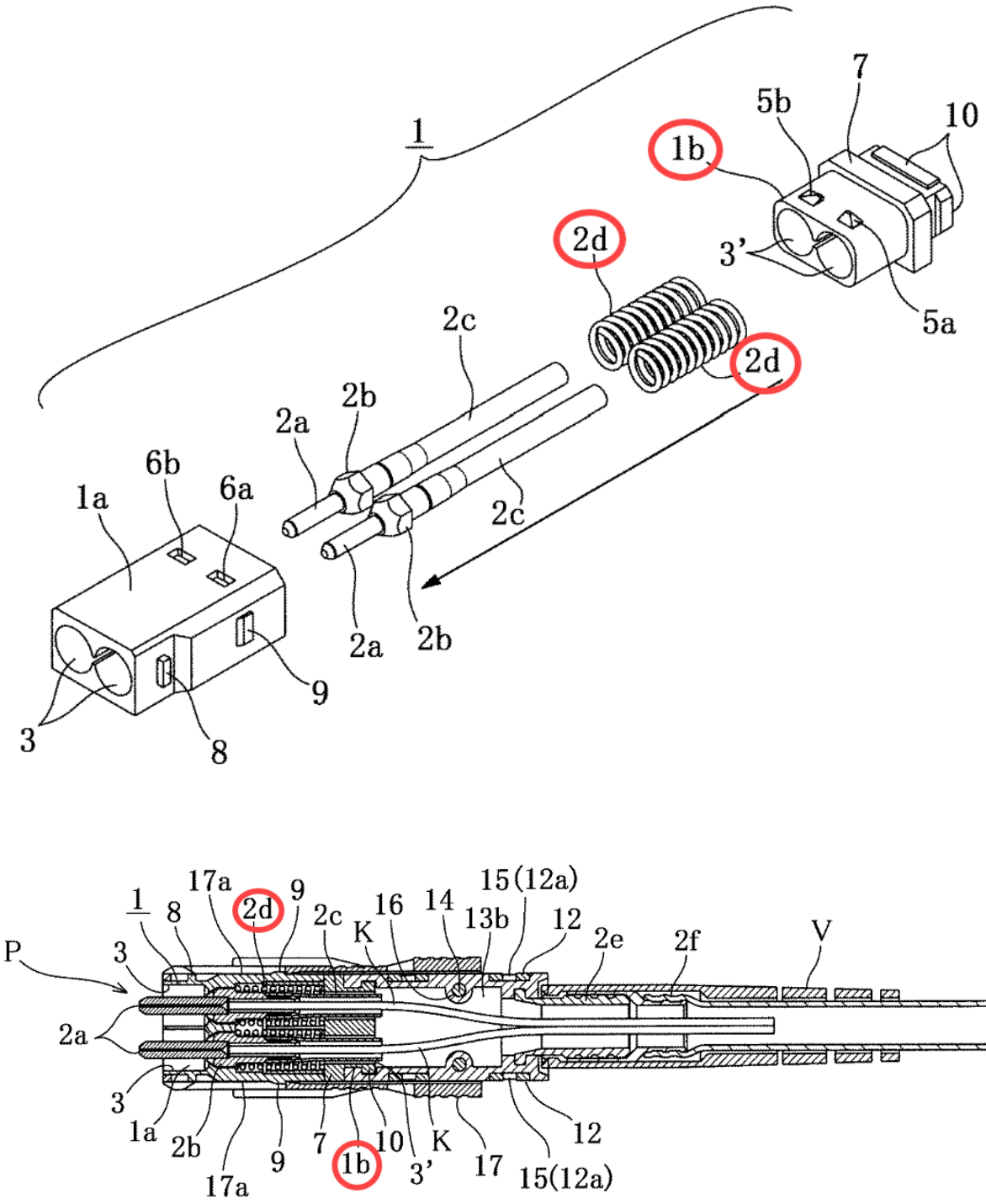


EX1016: Fig. 11 (annotated).

470. Therefore, in my opinion, Toyama meets this claim.

C. Claim 3 "The fiber optic connector according to claim 1, further comprising a spring push engaging a rear portion of each of the two springs."

471. Toyama discloses a rear case portion (1b), which is a spring push, that engages rear portions of the springs (2d). EX1016: ¶[0022].

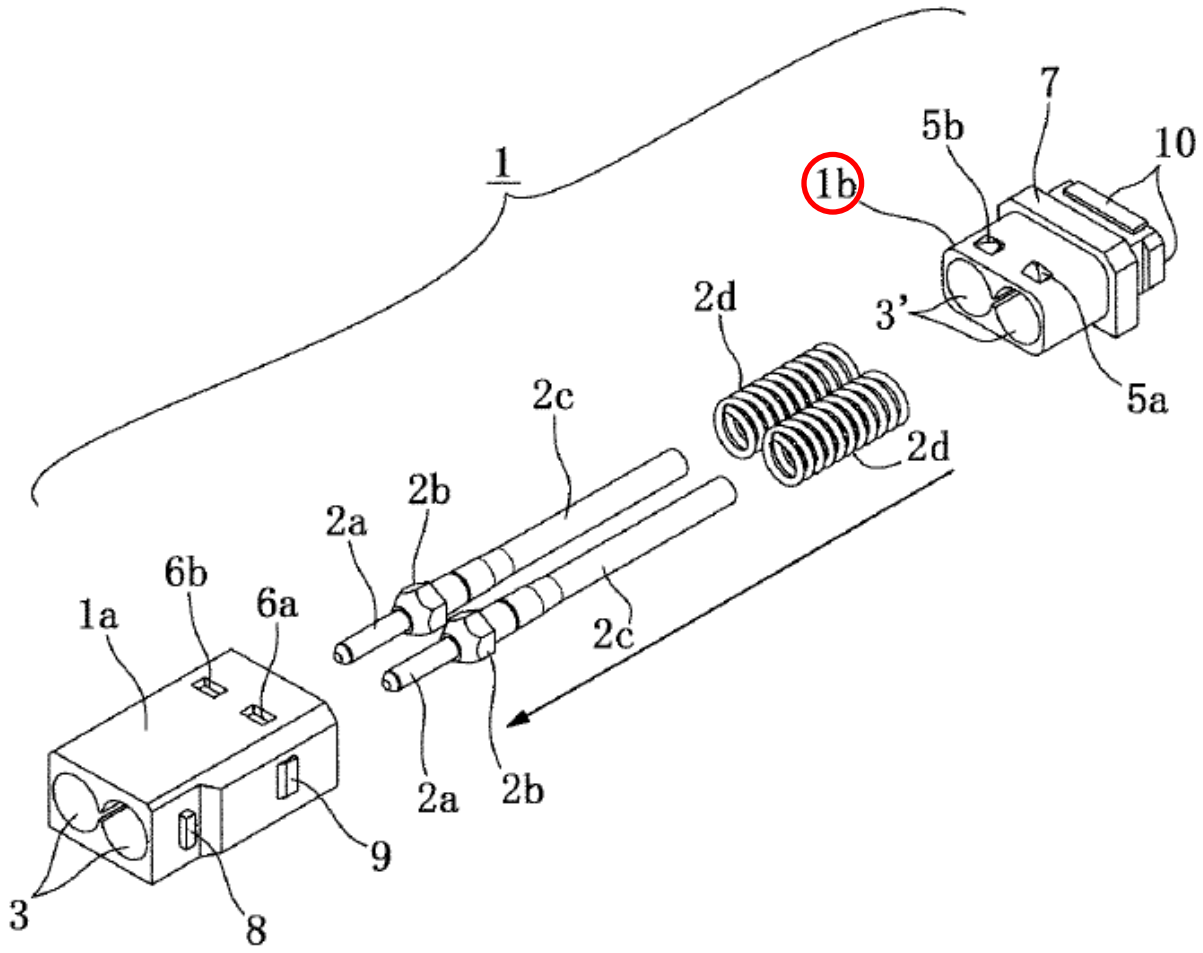


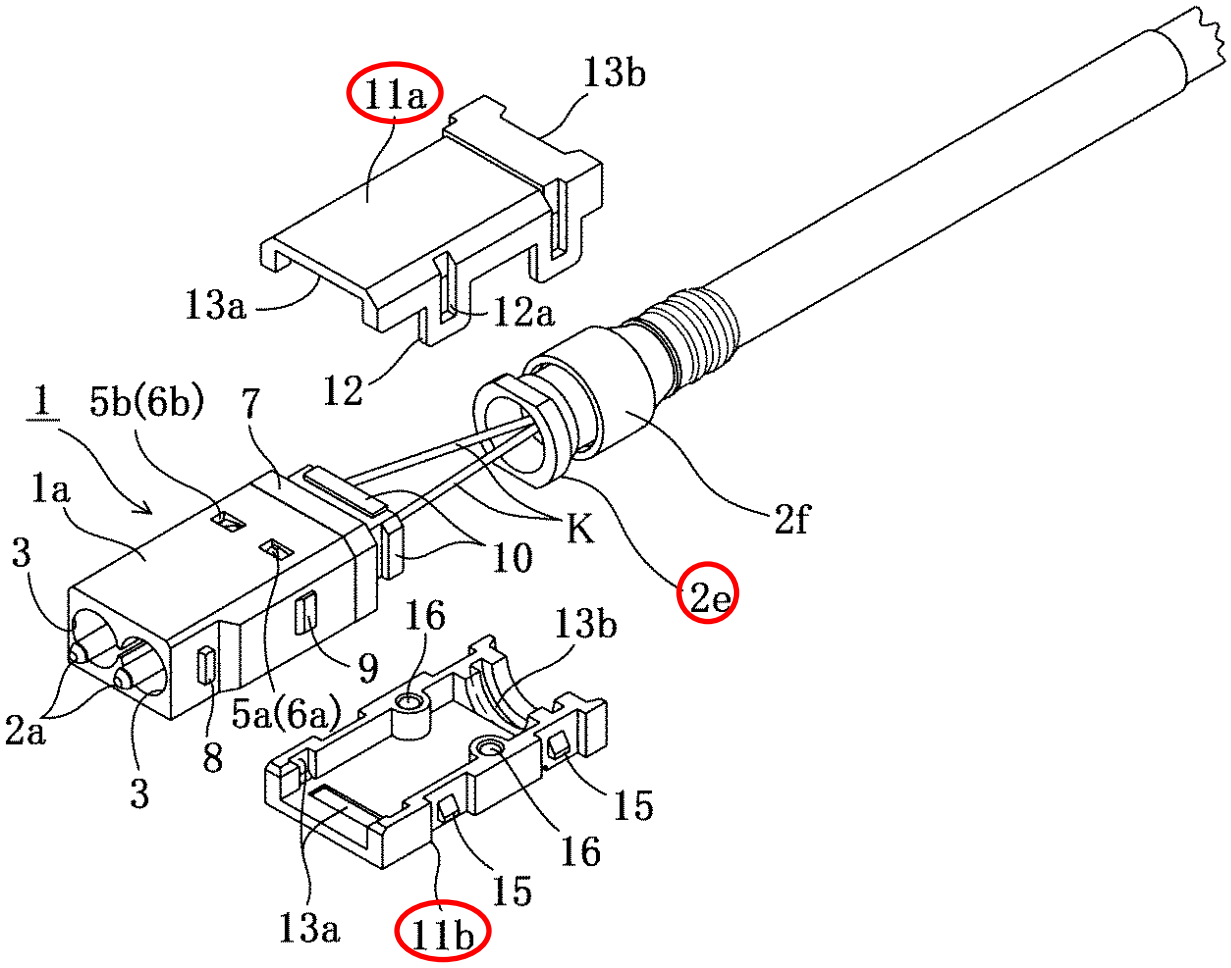
EX1016: Figs. 1 and 8(a) (annotated).

472. Therefore, in my opinion, Toyama meets this claim.

D. Claim 4 "The fiber optic connector according to claim 3, wherein the spring push is separate from the crimp body."

473. The rear case portion (1b) is separate from the three-piece crimp body (2e, 11a, 11b).



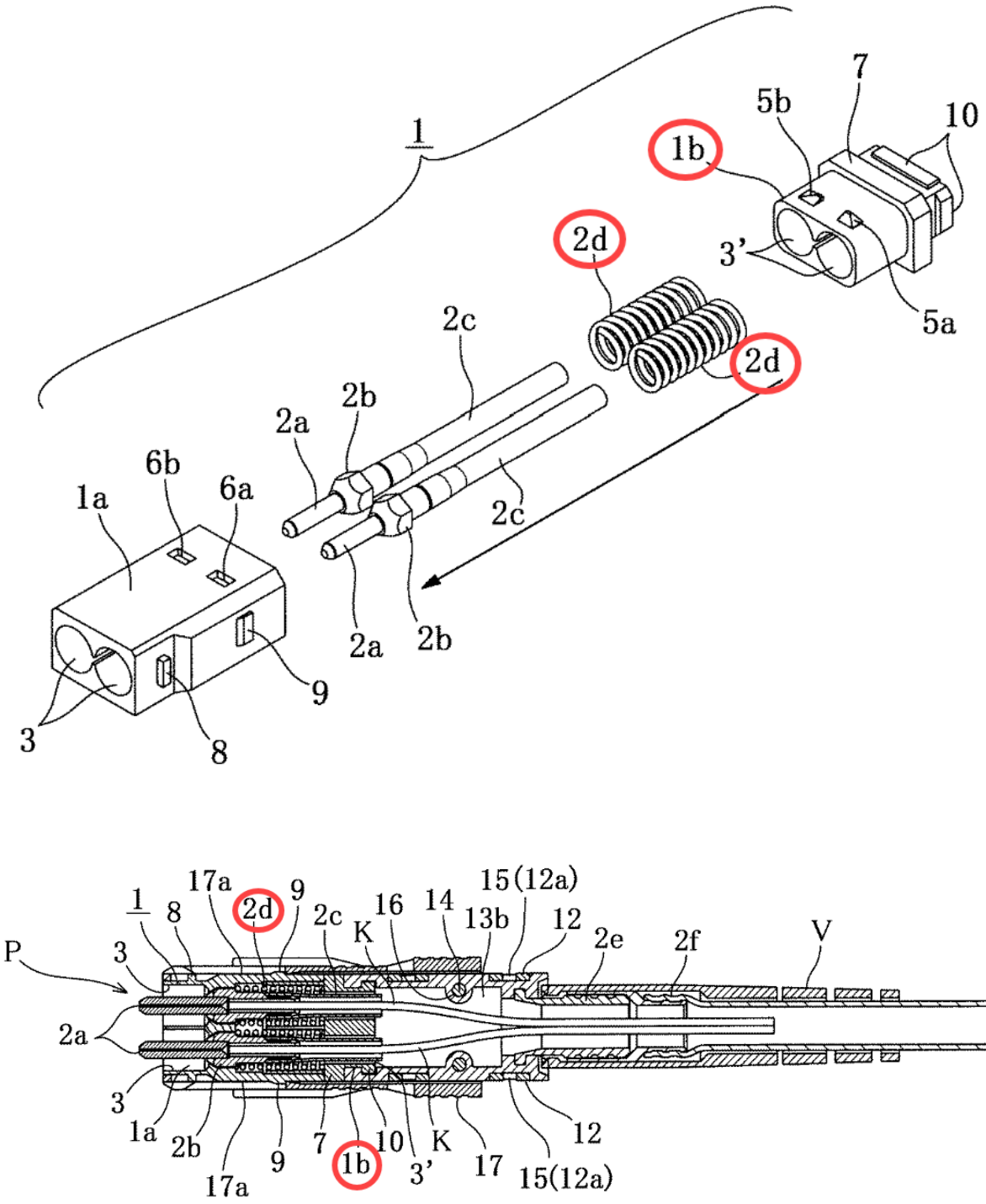


EX1016: Figs. 1 and 3 (annotated).

474. Therefore, in my opinion, Toyama meets this claim.

E. Claim 5 "The fiber optic connector according to claim 3, wherein the spring push engages the rear portion of each of the two springs simultaneously."

475. The rear case portion (1b) simultaneously engages rear portions of the springs (2d). EX1016: ¶[0022].

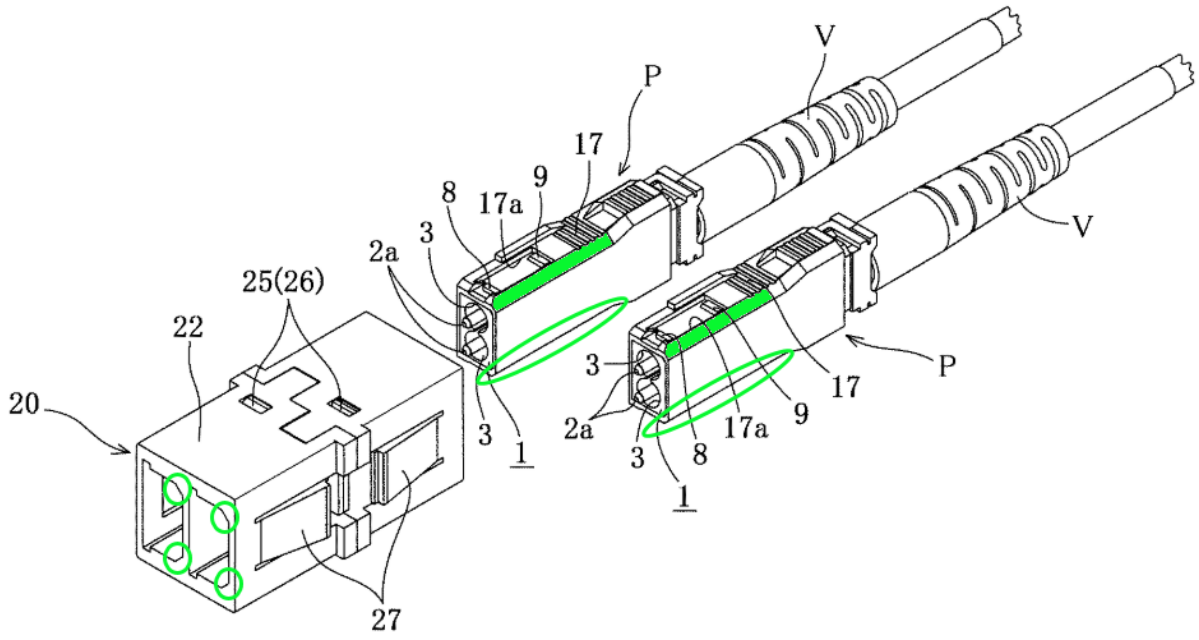


EX1016: Figs. 1 and 8(a) (annotated).

476. Therefore, in my opinion, Toyama meets this claim.

F. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

477. The corner chamfers on the narrow sides of the knob (17) are "an indicia of polarity" as they indicate in which direction the plug body (P) must be inserted into the adapter (20) (with the outside corner chamfers of the plug body (P) aligned to the inside corner chamfers of the adapter (20).



EX1016: Fig. 11 (annotated).

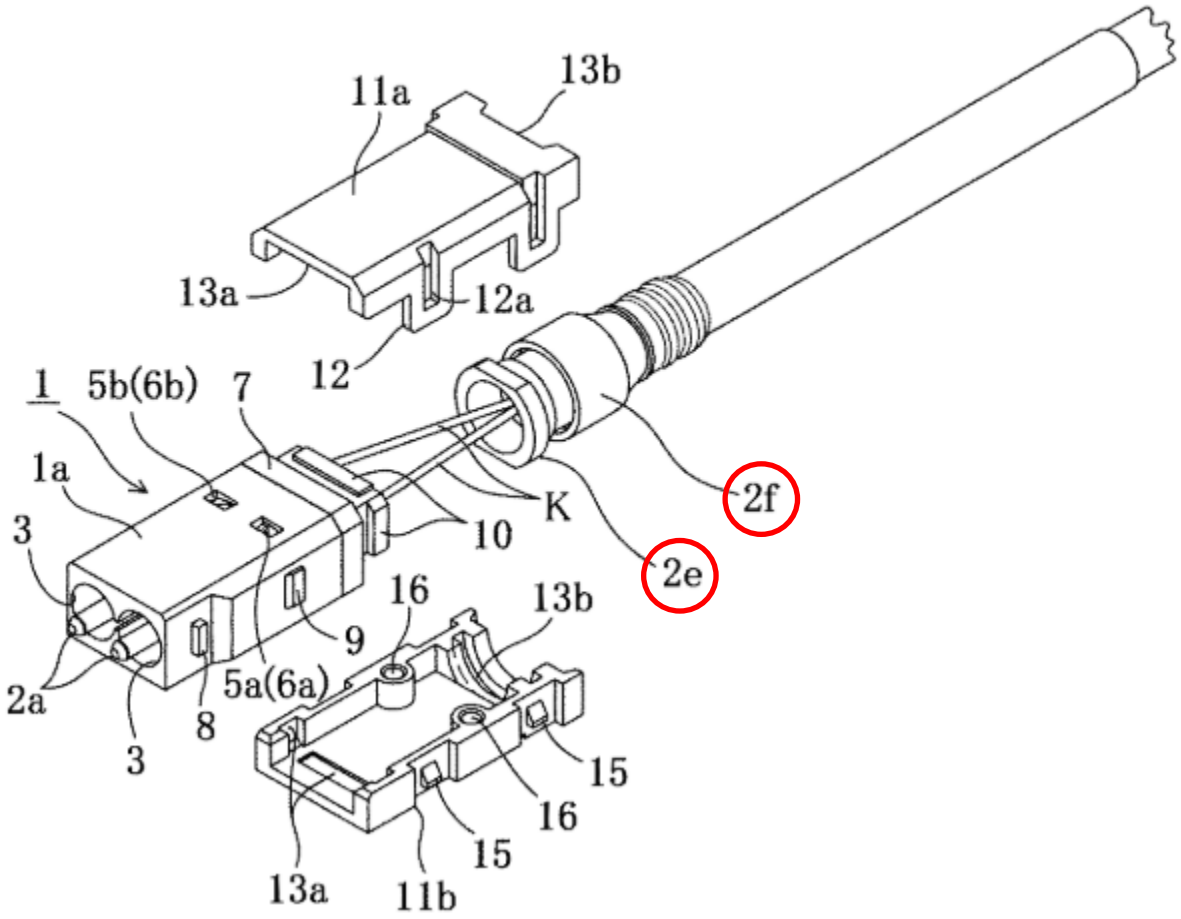
478. Therefore, in my opinion, Toyama meets this claim.

G. Claim 7

7.a "The fiber optic connector according to claim 1, further comprising: a crimp band secured around an outer surface of the rear end of the crimp body, and"

479. Toyama discloses a crimping ring (2f), which is "a crimp band." EX1016: ¶[0022]. The crimping ring (2f) is secured around an outer surface of the stop ring (2e). EX1016: ¶[0022].

【図３】

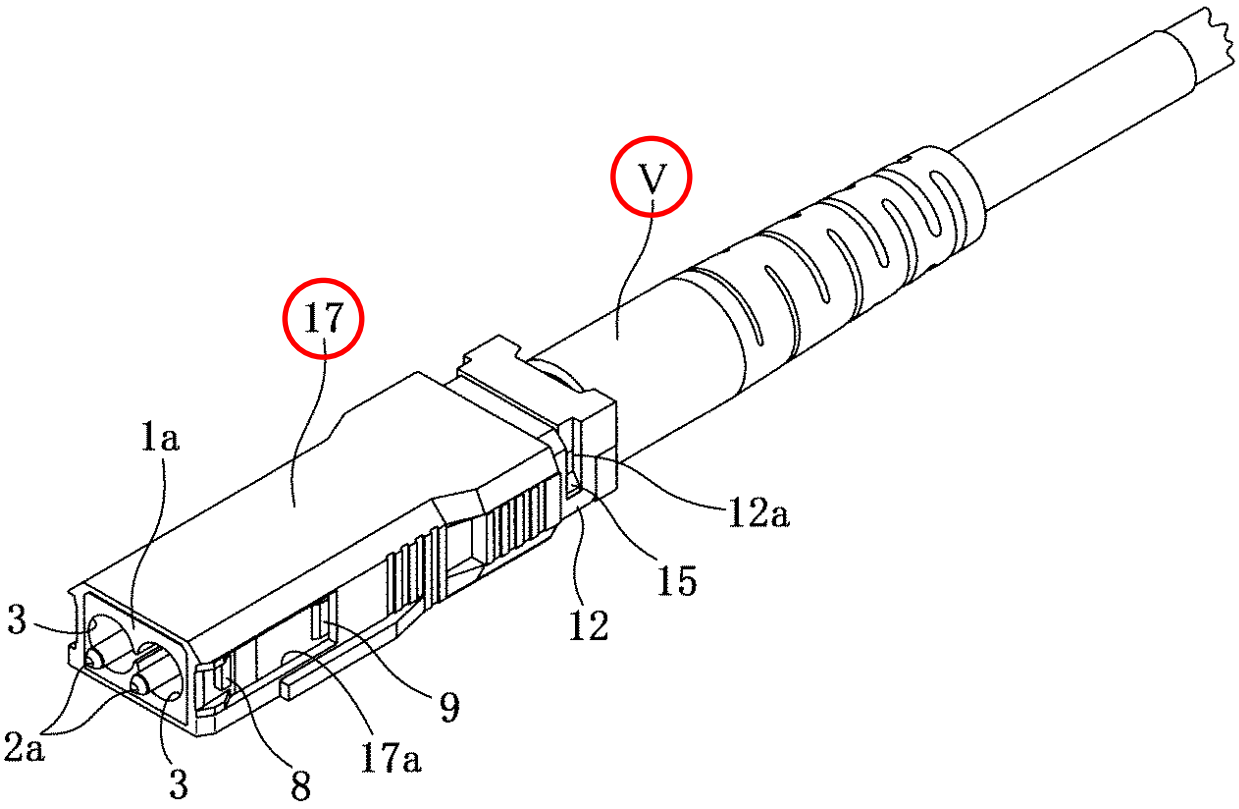


EX1016: Fig. 3 (annotated).

480. Therefore, in my opinion, Toyama meets this limitation.

7.b "wherein the strain relief boot extends rearwardly away from the housing."

481. The boot (V) extends rearwardly away from the rear end of the knob (17).



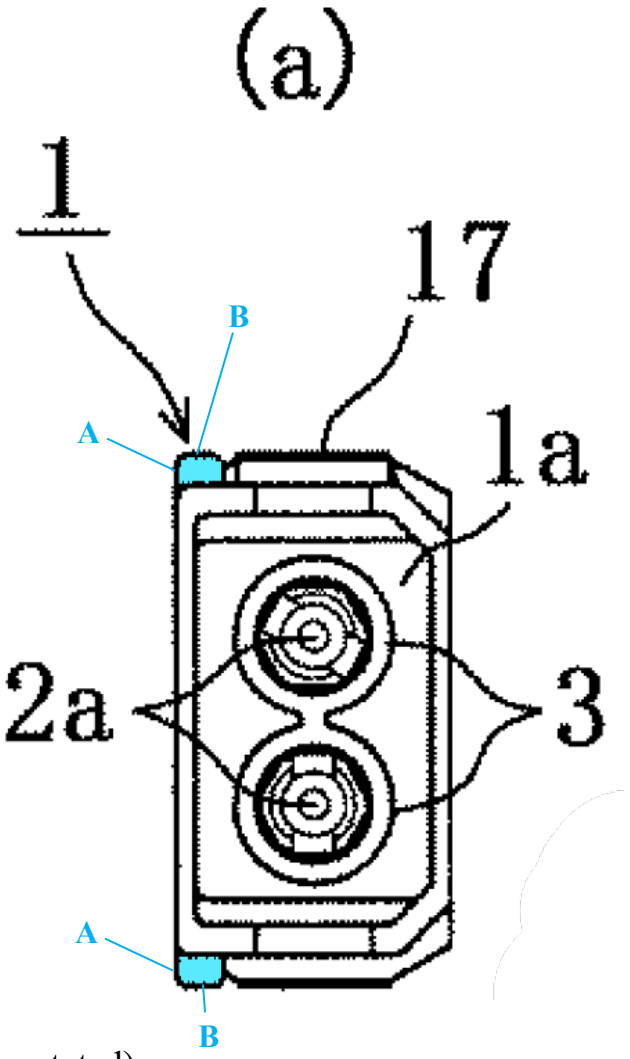
EX1016: Fig. 6 (annotated).

482. Therefore, in my opinion, Toyama meets the limitation.

H. Claim 14 "The fiber optic connector according to claim 1, wherein the alignment feature includes a vertical alignment feature and a horizontal alignment feature."

483. Each alignment feature has vertical side surfaces A and a horizontal surface B. If "vertical alignment feature" and "horizontal alignment feature" are

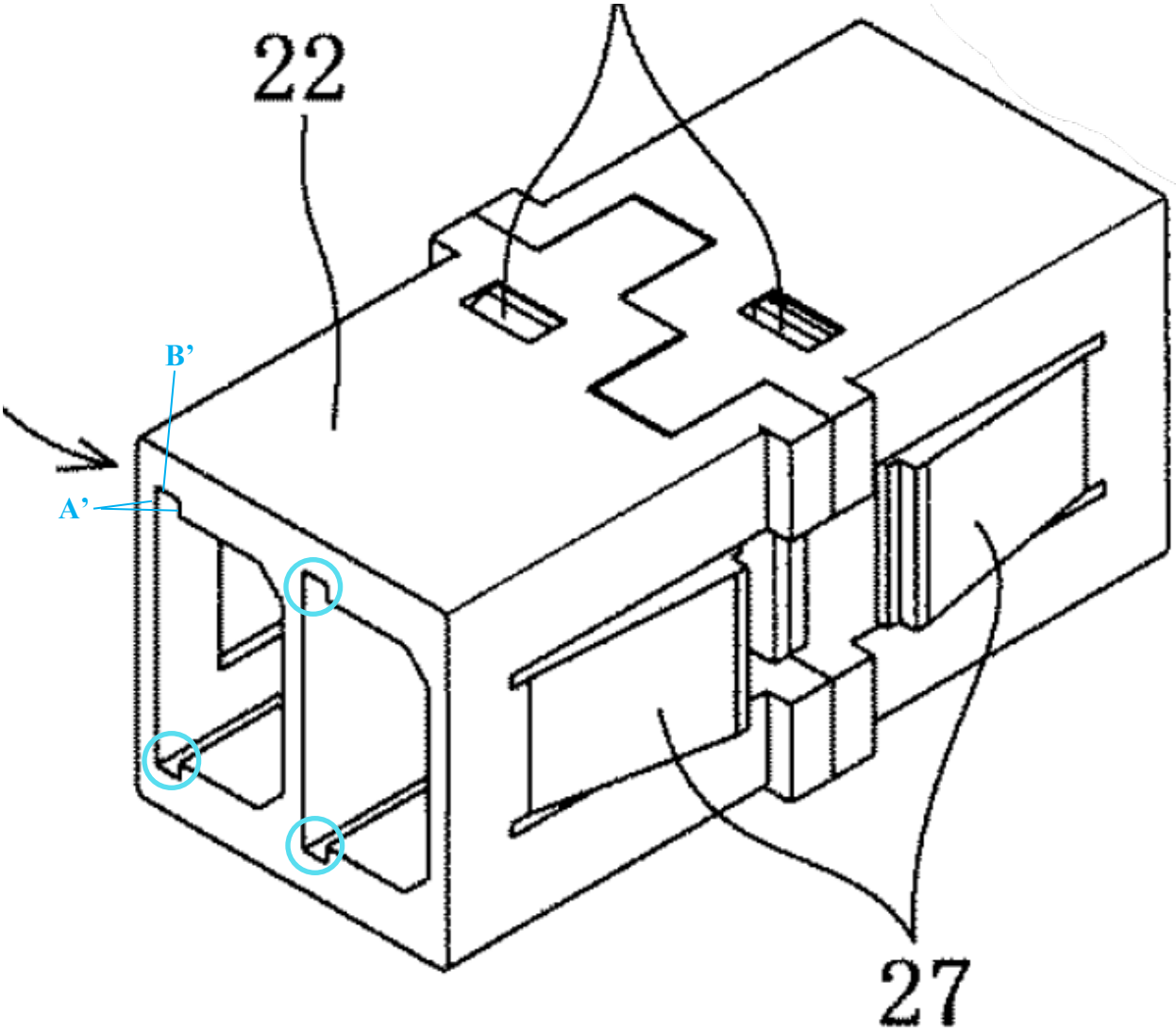
construed to mean a feature that extends vertically or horizontally, respectively, then surfaces A meet "vertical alignment feature" and surface B meets "horizontal alignment feature."



EX1016: Fig. 7(a) (annotated).

484. If "vertical alignment feature" and "horizontal alignment feature" are construed to mean a feature capable of engaging a mating alignment structure to align the connector vertically or horizontally, respectively, then surface B meets "vertical alignment feature" because it engages/aligns to surface B' of adapter (20),

and surfaces A meets "horizontal alignment feature" because they engage/align to surfaces A' of adapter (20).



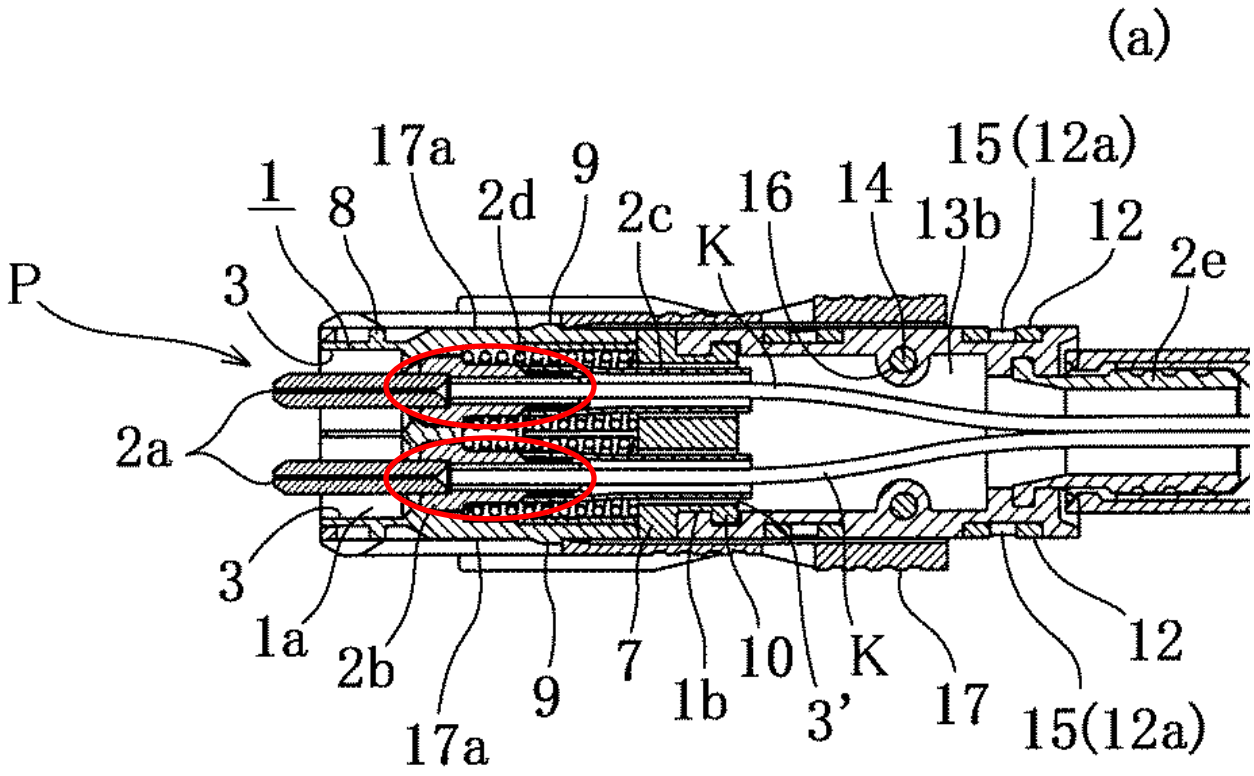
EX1016: Fig. 11 (annotated).

485. Therefore, in my opinion, Toyama meets this claim.

I. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall

extending rearward into the housing and away from each of the respective ferrule seats."

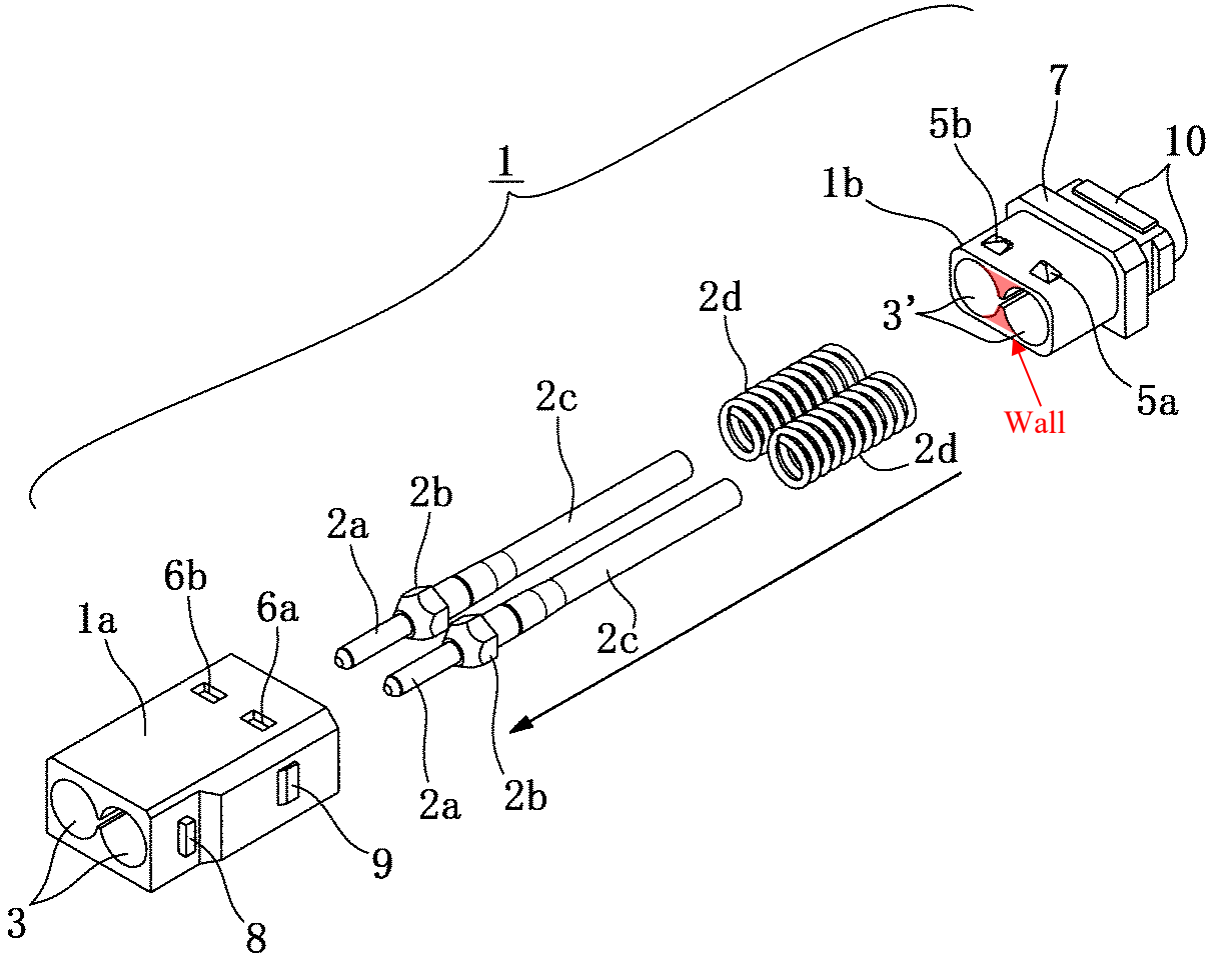
486. Toyama discloses ferrules (2a) seated in respective ferrule holders (2b), which are seated in respective openings (3) in the front case portion (1a). EX1016: ¶¶[0022]-[0023]. Under any possible construction of "respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies," two ferrule seats are located in the circled areas below.

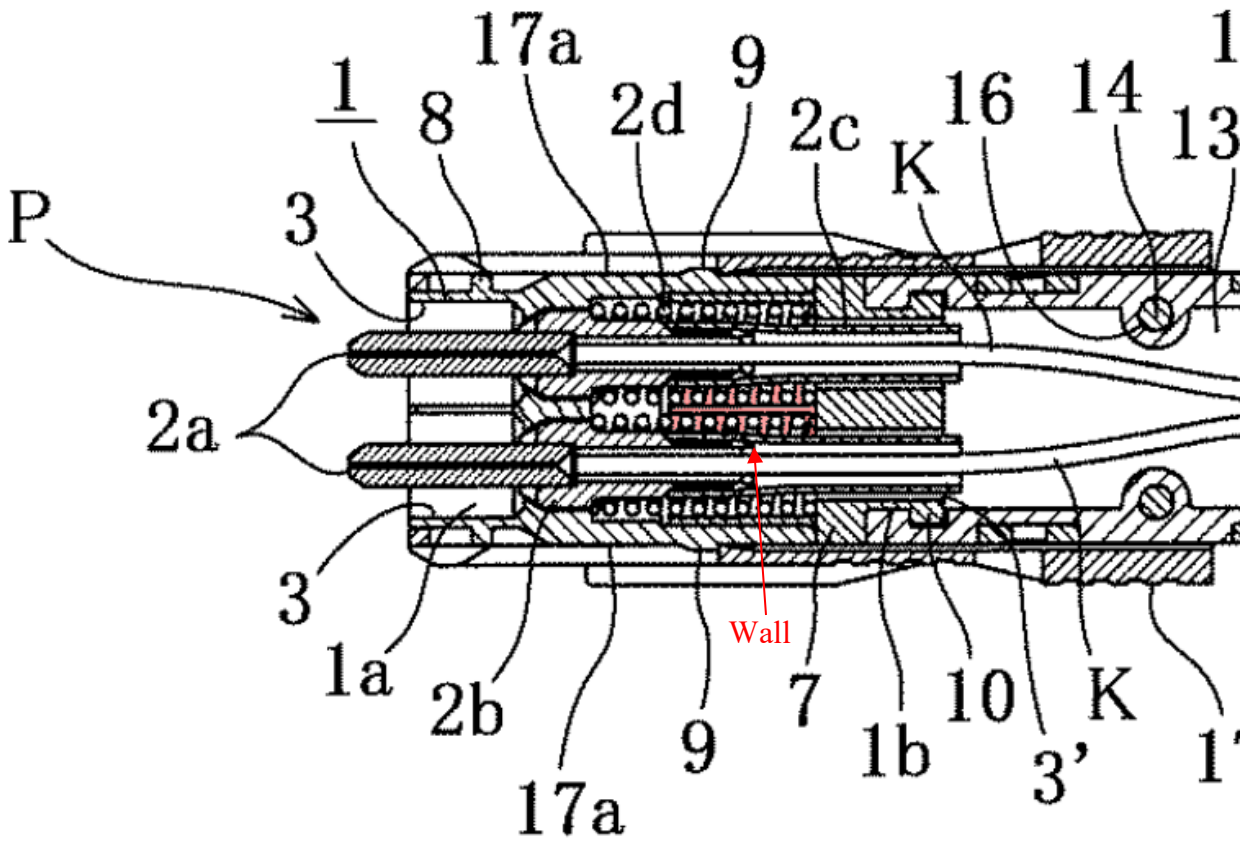


EX1016: Fig. 8a (annotated).

487. Toyama discloses "the rear case portion 1b of the case 1 has two insertion holes 3', 3' into which the tube 2c at the rear end of each ferrule 2a is

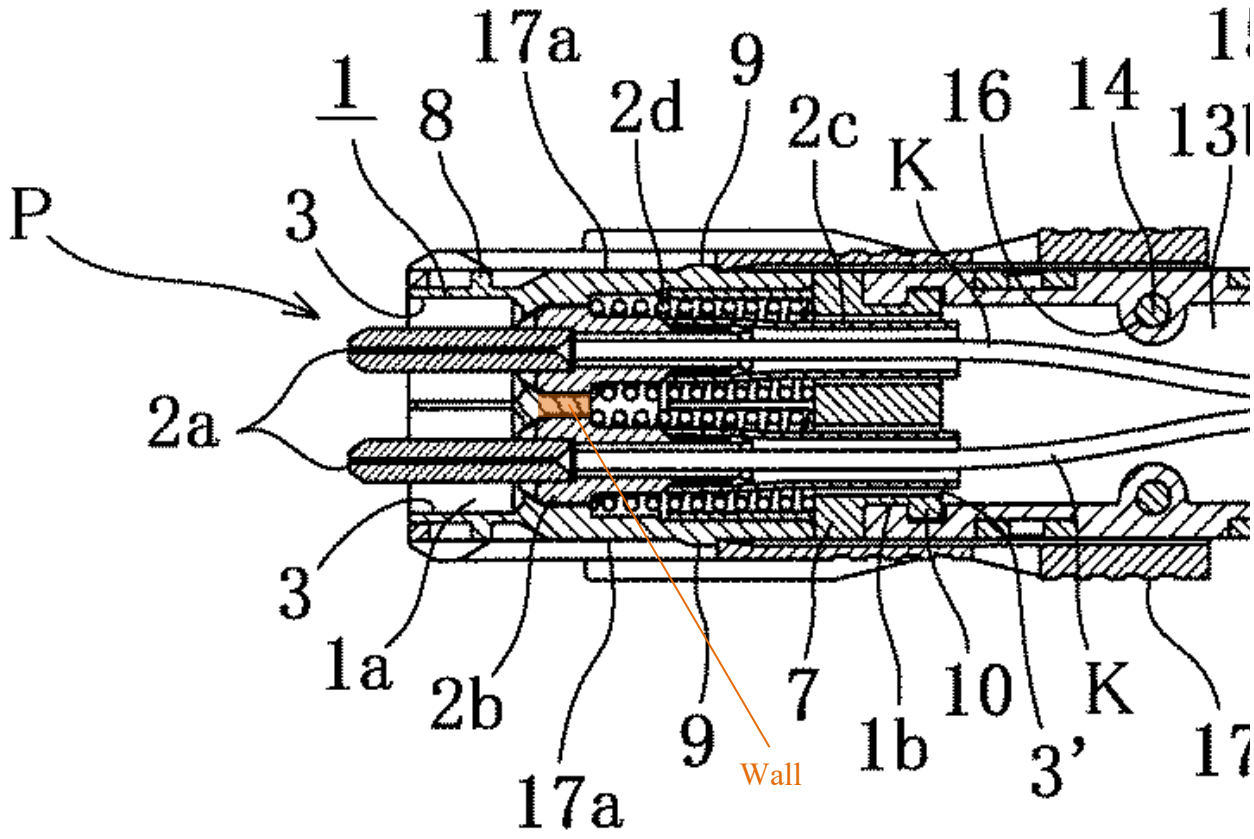
inserted via a coil spring 2b." EX1016: ¶[0023]. The rear case portion (1b) includes a wall between the insertion holes (3'). Since the springs (2d) are accepted in the openings (3'), the wall between the openings (3') is positioned between the springs (2d) in the assembled plug body (P). Hence, the wall is located between the ferrule seats identified above. The front end of the wall is clearly shown in Fig. 1. From this front end, the wall extends rearward away from the respective ferrule seats.





EX1016: Figs. 1 and 8(a) (annotated).

488. Alternatively or in addition, the case (1) includes a wall separating the ferrule assemblies between the locations where the ferrule assemblies are seated in the case and the wall extends rearward and away from where the ferrule assemblies are seated in the case.

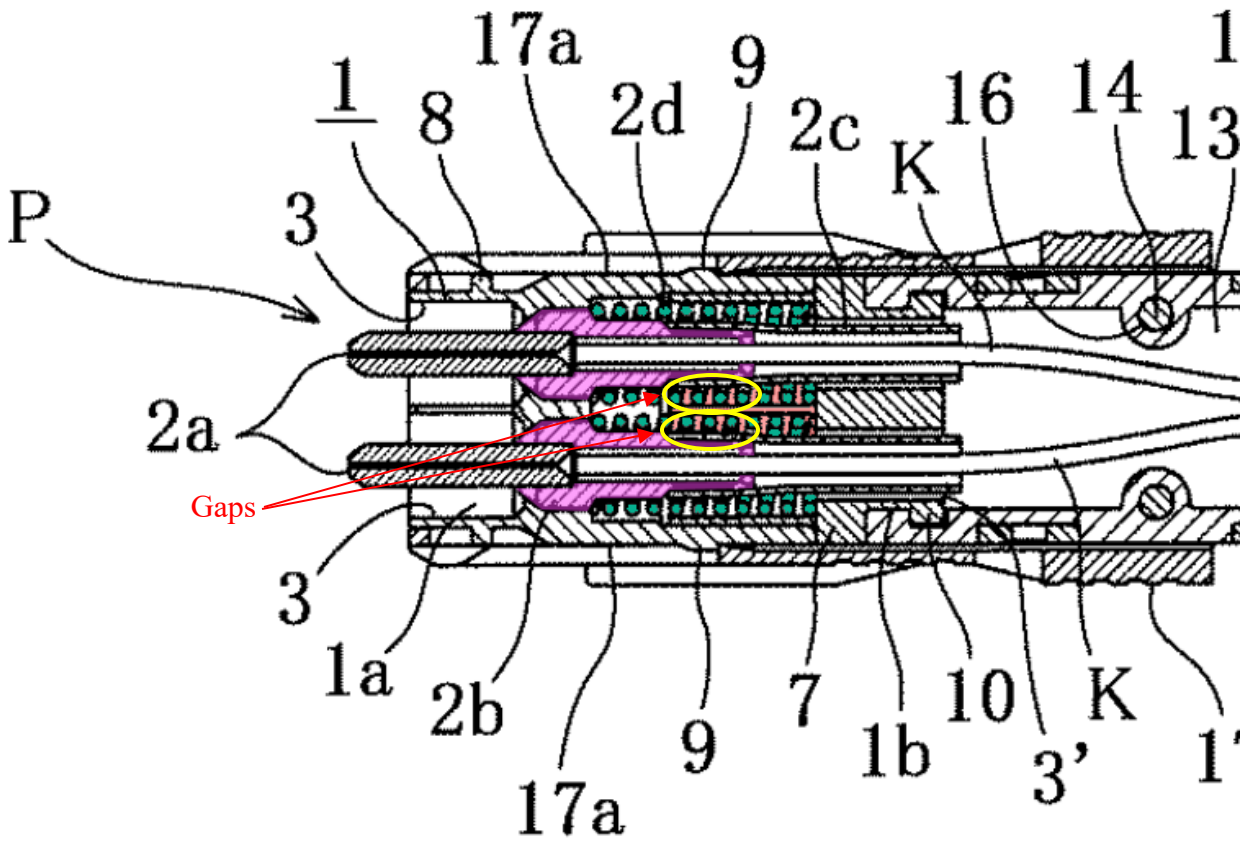


EX1016: Fig. 8a (annotated).

489. Therefore, in my opinion, Toyama meets this claim.

J. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

490. There is a gap between the wall and the ferrule holders (2b) to accommodate portions of the springs (2d) and tubes (2c).



EX1016: Fig. 8(a) (annotated).

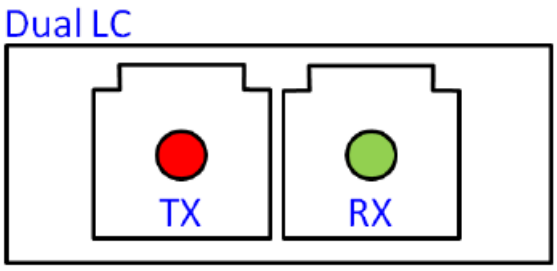
491. Therefore, in my opinion, Toyama meets this claim.

XXIV. OBVIOUS: TOYAMA AND QSFP-DD (GROUND 20)

492. In my opinion, claim 12 would have been obvious over Toyama alone or in view of QSFP-DD.

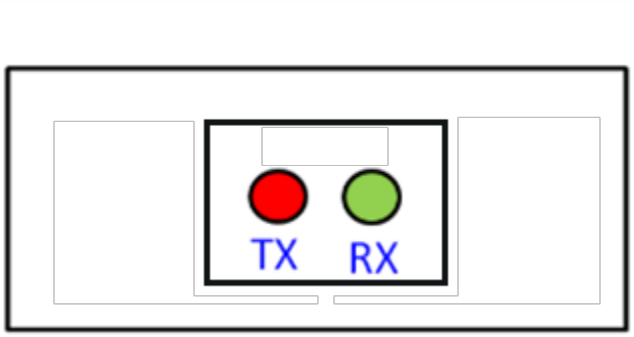
A. Claim 12 "The fiber optic connector according to claim 1, wherein the front end of the housing fits in a QSFP footprint."

493. Toyama discloses that, in comparison with standard LC components, its connection system "doubles the number of core wires that can be installed in communication equipment over the same area." EX1016: ¶[0015]. As shown below, QSFP-DD discloses that a QSFP footprint can accommodate two LC connectors containing a total of two LC core wires. (EX1014: Fig. 33). Therefore, since Toyama teaches that its connection system accommodates double the number of core wires in the same area, Toyama is understood to teach that its connector would fit two double-core plug bodies (P) in the same QSFP footprint that accommodates two single-core LC plug bodies.



EX1014: Fig. 33.

494. If it is contested whether two Toyama plug bodies (P) could fit in a QSFP footprint, as shown below, it is beyond dispute that one Toyama plug body (P) would fit in a QSFP footprint if oriented so that the long sides of the plug body (P) are parallel to the long sides of the QSFP footprint, which meets the requirements of claim 12.



EX1014: Fig. 33 (modified to show how a single Toyama connector would easily fit within the QSFP footprint).

495. Therefore, in my opinion, Toyama meets this claim or the Toyama/QSFP-DD combination renders this claim obvious.

XXV. OBVIOUS: TOYAMA AND HENKE (GROUND 21)

496. In my opinion, claim 17 would have been obvious over Toyama in view of Henke.

A. Claim 17 "The fiber optic connector according to claim 1, further comprising a lead-in tube attached to each of the ferrule holders, the lead-in tube extending past the rear end of the main body of the housing and configured to avoid leakage of an adhesive inserted into the lead-in tube into the main body."

497. Toyoma discloses "tube[s] 2c at the rear end of each ferrule 2a." EX1016: ¶[0023]. During assembly, "a core wire stripped at the end of the optical cable is inserted into the fiber hole at the center of each ferrule 2a via each tube 2c." EX1016: ¶[0041]. Hence, the tubes (2c) are lead-in tubes. Fig. 8(a) shows the tubes (2c) are "attached to each of the ferrule holders 2b."

498. In my opinion, it would have been obvious to extend Toyama's tubes (2c) to protrude out of the rear end of the stop ring (2e), like the lead-in tube in Fig. 7A of Henke. The POSA would have been motivated to make this modification based on Henke's express teachings regarding the advantages of integrated lead-in tubes, such as (1) preventing the bonding agent used to secure the fiber in the ferrule from escaping and interfering with the ferrule springs; (2) to facilitate guiding the end portion of each optical fiber into the respective block piece (3) and further to the ferrules (1); and/or (3) preventing sharp bends that could damage the optical fiber from occurring as the optical fiber is inserted into the ferrule. EX1008: ¶¶[0041], [0079]; EX1026: Abstract (describing how a lead-in tube called a sheath prevents leaking of adhesive from a ferrule holder).

499. This modification would have also been nothing more than the application of a known technique (Henke's long lead-in tube that protrudes out the rear end of a back post) to improve a similar device (Toyama's plug body (P)) in the same way to yield predictable results (assembled optical connector with an exposed lead-in tube for guiding the optical fiber).

500. For example, the POSA would recognize that the longer, protruding lead-in tubes make it easier to guide the fibers into the ferrules (2a) in the assembly process described in Toyama. EX1016: ¶[0041]. Further, the POSA would understand that the longer lead in tubes would allow for injecting adhesive to

adhere the fibers in the ferrules (2a) while preventing adhesive from leaking into the interior of the holders (11a, 11b).

501. The proposed modification would have been well within the capabilities of a POSA, and the POSA would have had a reasonable expectation of success. Henke specifically teaches that the integrated lead-in tubes could be used with LC ferrule/holder assemblies, which is the same type of ferrule assembly used in Toyama's optical connector. EX1008: ¶[0107]; EX1016: Fig. 6. Further, Henke teaches that the integrated lead-in tubes are formed from flexible material, which would naturally conform to and fit within the interior geometry of the connector (e.g. to press-fit over the tail of the ferrule/holder, and to bend inward toward the center between the rear ends of the ferrule springs (2d) and the stop ring (2e)). At most, the proposed modifications would have required minor changes in the dimensions of parts to accommodate the two integrated lead-in tubes in the interior of Toyama's optical connector. Such changes are well-within the capabilities of the POSA and their results would have been entirely predictable.

502. In the Toyama/Henke combination, the tubes would extend from the ferrule holders (2b), through the springs (2d) and the interior of the three-piece crimp body (2e, 11a, 11b), to rear ends protruding slightly beyond the rear end of the stop ring (2e). In the Toyama/Henke connector, the lead-in tubes extend past

the rear end of Toyama's knob (17) and avoid leakage of an adhesive inserted into the lead-in tube into the main body, as taught by Henke. EX1008: ¶[0041]

503. Therefore, in my opinion, the Toyama/Henke combination renders this claim obvious.

XXVI. OBVIOUS: TOYAMA AND TAKANO'209 (KIANI) (GROUND 22)

504. To the extent it is argued Toyama does not meet claims 15 and 16 for the reasons I discussed in Sections XXIII(I)&(J), in my opinion, claims 15 and 16 would have further been obvious over Toyama in view of Takano'209 (or Kiani if needed). I am applying Kiani as back up in case it is determined Takano'209 does not qualify as prior art.

A. Claim 15 "The fiber optic connector according to claim 1, wherein each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective ferrule seats of the fiber optic ferrules of each of the ferrule assemblies, the wall extending rearward into the housing and away from each of the respective ferrule seats."

505. Takano'209's optical connector (4100) of Fig. 41 includes a front body (4015) with an elongated middle wall (4260). EX1003: ¶¶[0137]-[0138].

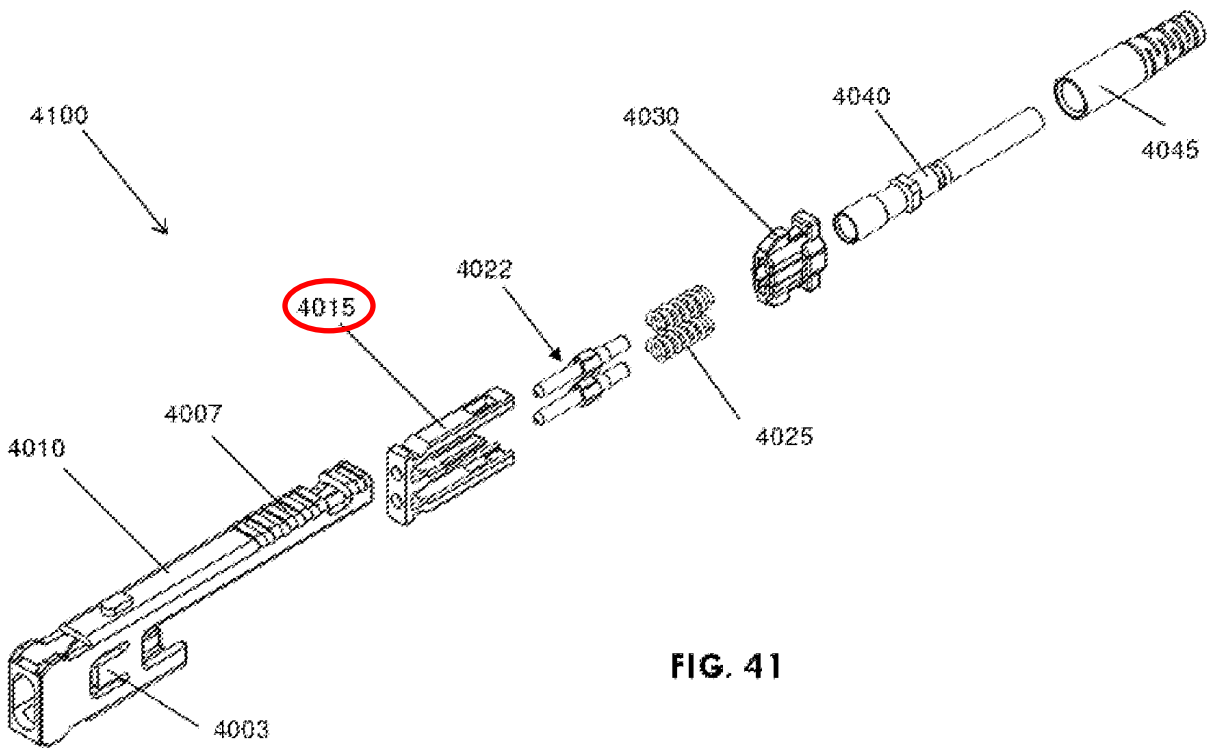


FIG. 41

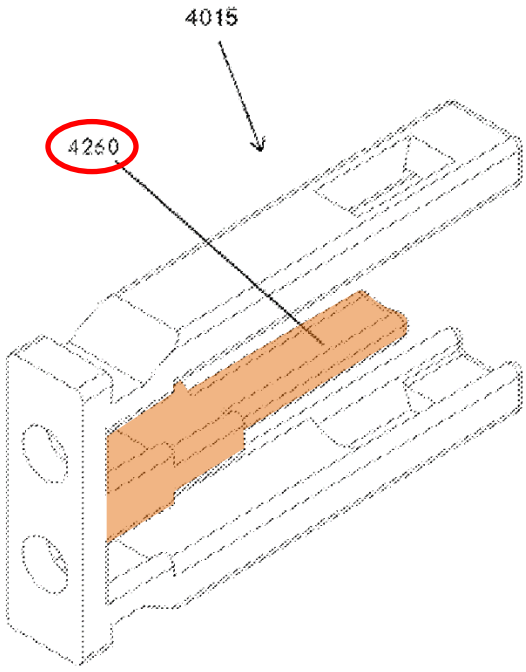


FIG. 42A

EX1003: Figs. 41 and 42A (annotated).

506. Kiani also teaches ferrule carrier (810) with a rib (924). EX1015: ¶¶[0069], [0074].

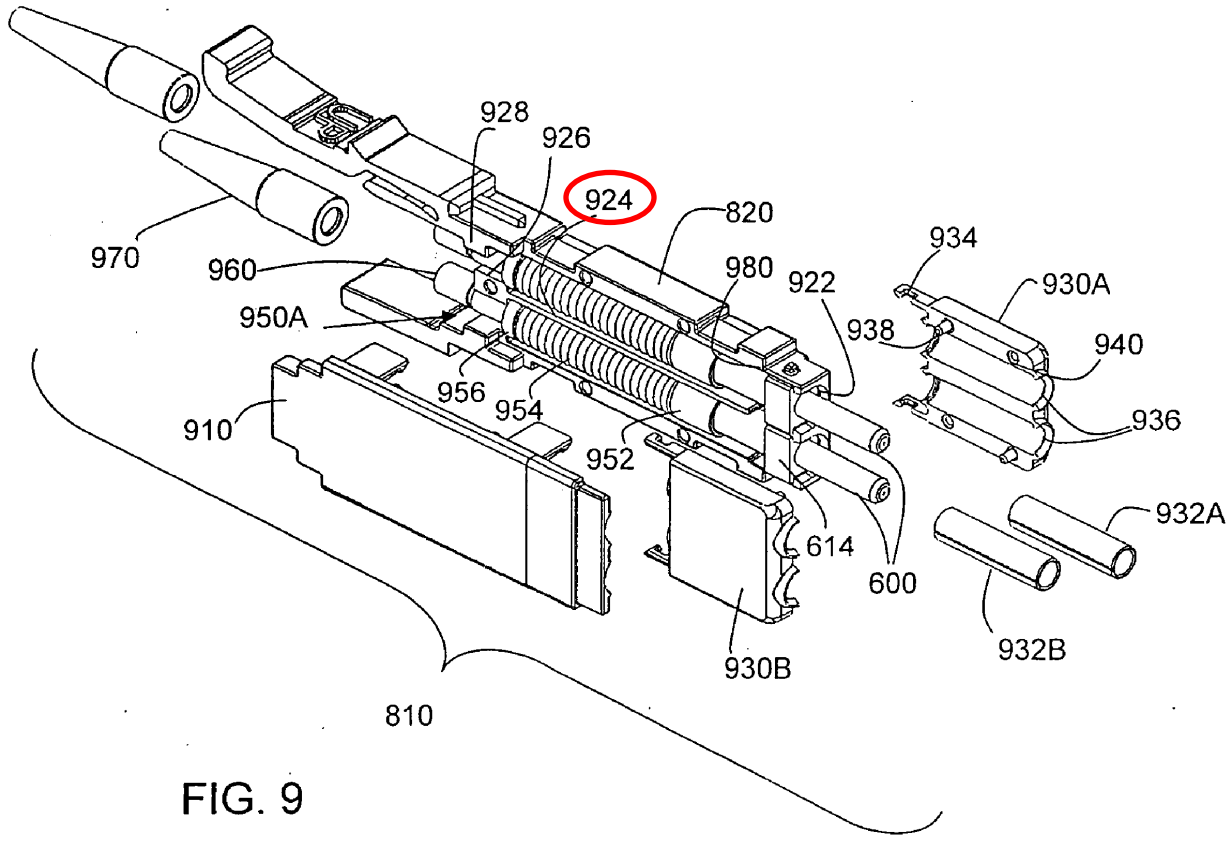


FIG. 9

EX1015: Fig. 9 (annotated).

507. In my opinion, it would have been obvious to Toyama's front case portion (1a) in view of Takano'209 (or Kiani) to incorporate the elongated middle wall (4260) (or Kiani's rib) to separate the two elastic elements (2). EX1003: Figs. 42A-42B. Takano'209 expressly teaches that the elongated wall (4260) prevents entanglement of the ferrule springs, binding of the connector and breaking of optical fibers. EX1003: ¶[0138] ("middle wall reduces the possibility of the springs becoming entangled with each other, binding the connector and breaking

the optical fibers"); EX1015: ¶[0074] (teaching to provide a rib 924 between the ferrule assemblies 600 that divides the interior of the support 820 in two "to ensure that spring(s) 954 stay positioned.").

508. This modification would have also been nothing more than the application of a known technique (Takano'209's middle wall (or Kiani's rib)) to improve a similar device (Toyama's optical connector) in the same way to yield predictable results (preventing entanglement of the elastic elements).

509. In making this modification, the POSA would have added Takano'209's middle wall (4260) (or Kiani's rib) between Toyama's ferrule assemblies. The extended middle wall (4260) (or Kiani's rib) would extend rearward in Toyama's knob (17), stopping short of the rear case portion (1b) so as not to interfere with connection of the front and rear case portions (1a, 1b).

510. A POSA would have had a reasonable expectation of success in making this modification because the middle wall (4260) (or Kiani's rib) would serve the same function and be in generally the same position in Toyama that it had in Takano'209 (or Kiani). This modification would require only minor changes in dimensions and shapes of molded parts (e.g., case (1)) and is well within the level of ordinary skill in the art.

511. This modification results in Toyama's optical connector having the middle wall (4260) (or Kiani's rib), which meets the requirement of the wall in

claim 15, as best I can understand, because it forms a wall between the locations where two ferrule assemblies are seated in Toyama's case (1) and it extends rearward relative to where the ferrule assemblies are seated in Toyama's case.

512. Therefore, in my opinion, the Toyama/Takano'209 (or Kiani) combination renders this claim obvious.

B. Claim 16 "The fiber optic connector according to claim 15, wherein there is a gap between a ferrule holder of each of the fiber optic ferrules and the wall."

513. In Toyama's optical modified in view of Takano'209 (or Kiani) (Section XXVI(A)), the elongated middle wall (4260) (or Kiani's rib) is "interposed between the ferrules and springs when the front body is assembled." EX1003: ¶[0138]. The springs (2d) and the ferrule holders (2b) would have essentially the same positions as in the unmodified Toyama's connector. This requires a radial gap to accommodate Toyama's springs (2d) between the added middle wall and the cylindrical rear portions of each ferrule holder (2b), which each spring fits over.

514. Therefore, the Toyama/Takano'209 (or Kiani) combination renders this claim obvious.

XXVII. OBVIOUS: TOYAMA & VEATCH (GROUND 23)

515. In my opinion, claim 6 would have been obvious over Toyama in view of Veatch.

A. Claim 6 "The fiber optic connector according to claim 1, further comprising an indicia of polarity on the housing."

516. If it is argued that Toyama's optical connector does not meet this claim for the reasons I discussed in Section XXIII(F), this claim would have been obvious in view of Veatch.

517. Veatch discloses a polarity change fiber optic connector (100) with polarity indicia (130, 132) in the form of letters "A" and "B" to "indicate the polarity of the connector." EX1007: Fig. 1, 2:26-39.

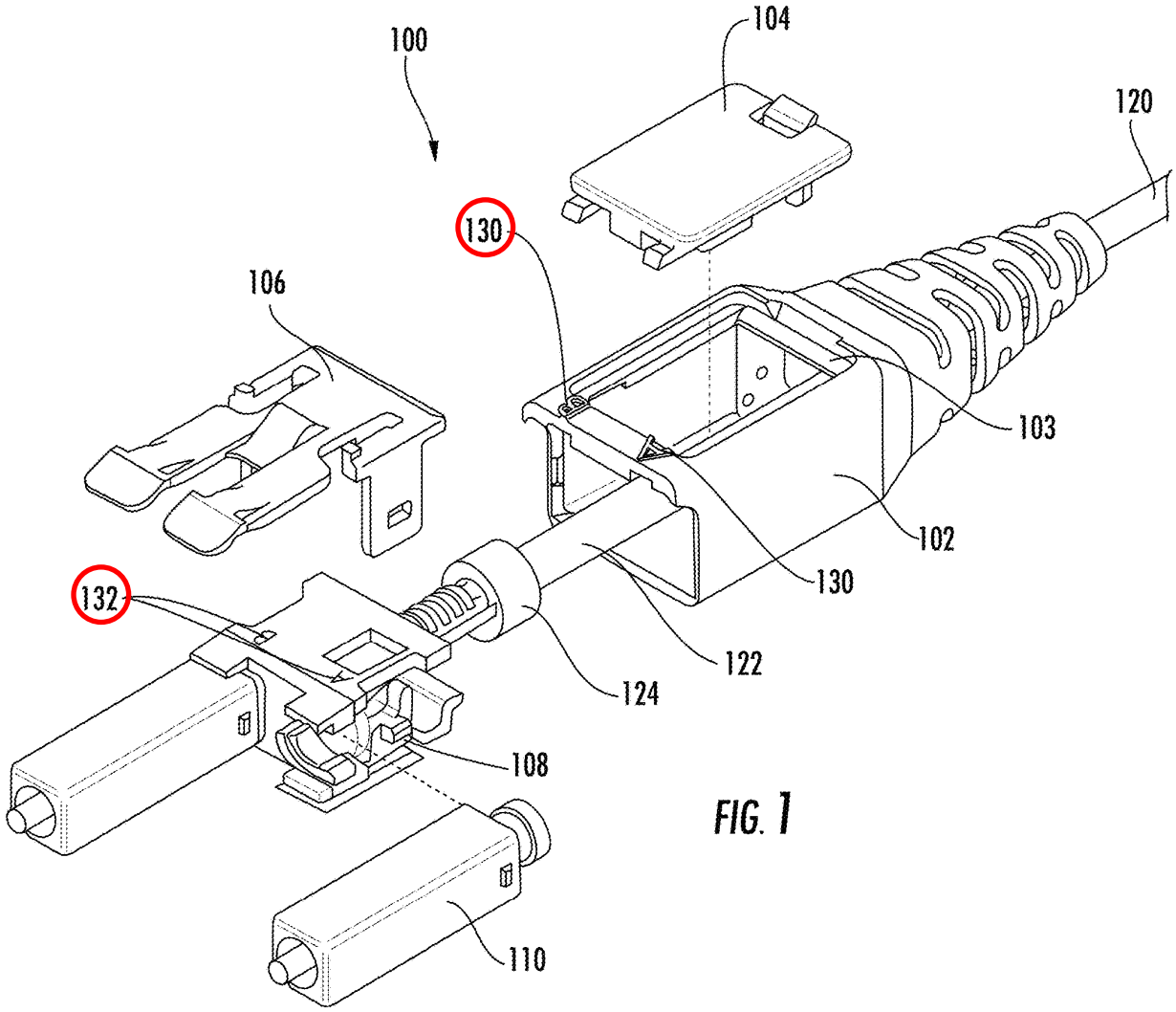


FIG. 1

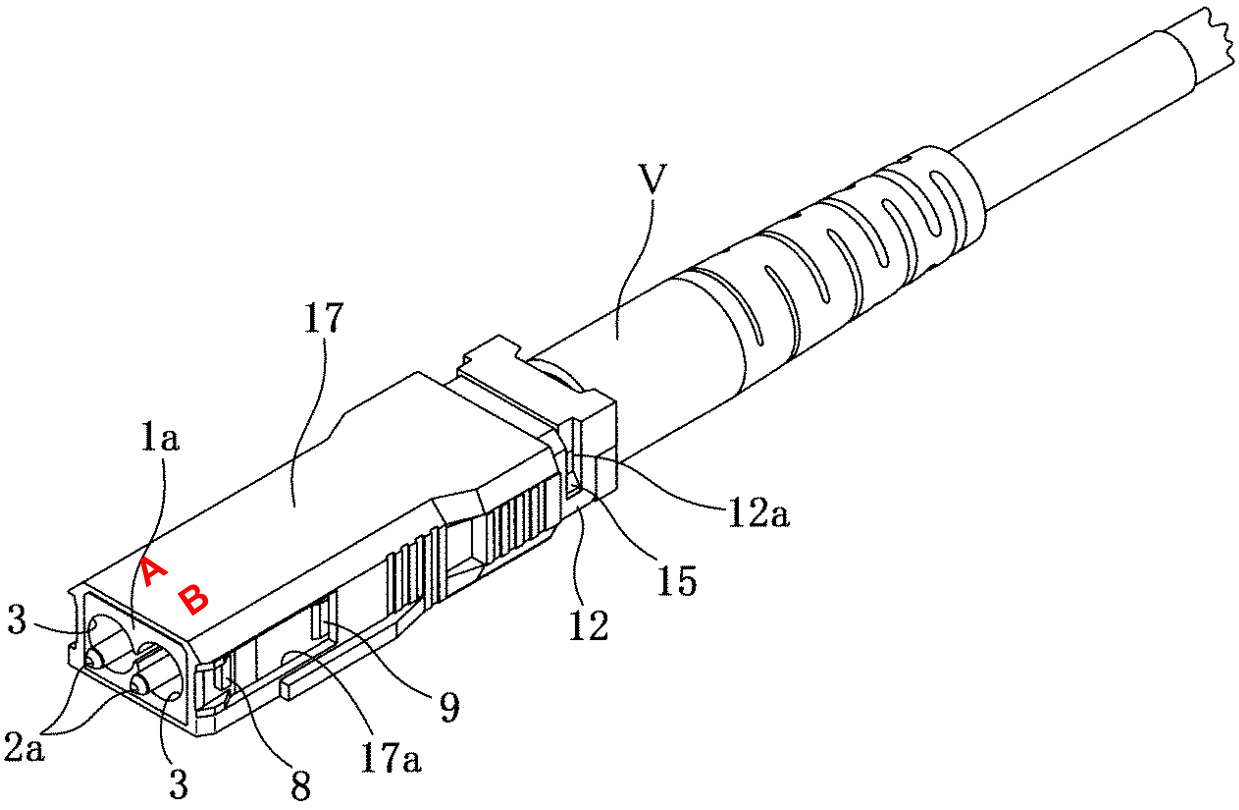
EX1007: Fig. 1 (annotated).

518. In my opinion, it would have been obvious to modify Toyama's knob (17) to include Veatch's polarity indicia (130, 132). A POSA would have been motivated to make the combination based on the express teachings of Veatch, to "indicate the polarity of the connector." EX1007: 2:33-34. Such polarity indicia (130, 132) "assist[s] [the] user in identifying the currently polarity configuration of the assembled connector[]." EX1020: 14:39-46; *see* EX2021: ¶[0050]. In fact, using polarity indicia (130, 132) such as Veatch's is standard "industry practice." EX2022: 1:60-63, 6:20-25. Polarity letters "A" and "B" have been an industry standard convention since the ratification of TIA/EIA 604-10-A FOCIS-10 Type LC. EX1027: Fig. 2.2.1c (showing letters "A" and "B" on the adapter, which resulted in also adding corresponding letters on the duplex yoke of the connector). Having polarity letters "A" and "B" was standard practice regardless of whether the polarity of the connector was changeable in the field or not.

519. This modification would have been nothing more than combining known prior art elements (Toyama's optical connector and Veatch's polarity indicia (130, 132)) according to known methods (arrangement taught by Veatch or otherwise known in the art) to yield predictable results (an indication of polarity for Toyama's optical connector).

520. This modification would have also been nothing more than the application of a known technique (Veatch's polarity indicia (130, 132)) to improve a similar device (Toyama's optical connector) in the same way to yield predictable results (an indication of polarity for Toyama's optical connector).

521. The POSA would have had a reasonable expectation of success in making this modification given the function of Veatch's polarity indicia (130, 132) would not change in Toyama's optical connector. In making this modification, the POSA would place the polarity indicia on Toyama's knob (17) to be easily and readily viewable by a user. Moreover, placing polarity indicia on a housing was a known placement in the art. EX1020: Fig. 8B, 14:39-46. For example, the POSA may place the letter "A" adjacent the top of the knob (17) and the letter "B" adjacent the bottom knob, as shown representationally below.



EX1016: Fig. 6 (modified).

522. As a result of this modification, Toyama's optical connector includes Veatch's polarity indicia (130, 132) on the knob (17).

523. Therefore, in my opinion, the Toyama/Veatch combination renders this claim obvious.

XXVIII. SECONDARY CONSIDERATIONS

524. I understand that to date Patent Owner has not identified any secondary considerations of non-obviousness. In the event that the Patent Owner identifies any secondary considerations in the future, I may supplement my opinion to address them.

XXIX. TAKANO'209 AND TAKANO'369 ARE SUPPORTED BY THEIR RESPECTIVE PROVISIONAL APPLICATIONS

525. I understand that the non-provisional applications that published as Takano'209 and issued as Takano'369 were filed after the earliest priority date of the '466 Patent. I also understand that Takano'209 claims priority to U.S. Provisional App. No. 62/588,276 ("the '276 Provisional"; EX1004), filed November 17, 2017, before the earliest priority date of the '466 Patent. I also understand that Takano'369 claims priority to U.S. Provisional App. No. 62/532,710 ("the '710 Provisional"; EX1010), filed July 14, 2017, before the earliest priority date of the '466 Patent. I also understand that Takano'369 claims priority to the '276 Provisional as well.

526. I have been informed that in order for Takano'209 and Takano'369 to qualify as prior art against the '466 Patent, Takano'209 and Takano'369 must be considered as effectively filed as of the date of their respective provisional applications. I have been informed that in order for a non-provisional application (like the non-provisional applications that published as Takano'209 and issued Takano'369) to be considered effectively filed as of the filing date of a provisional application, the non-provisional application must (1) claim priority to the provisional application, (2) be filed 1 year or less from the filing date of the provisional application or during the pendency of another application that claims

priority to the provisional application, and (3) share a common inventor with the provisional application.

527. I have further been informed that for a non-provisional application to be considered effectively filed as of the filing date of the provisional application, the provisional application must also describe the subject matter relied upon in the non-provisional application.

A. Takano'209 is Prior Art to the '466 Patent

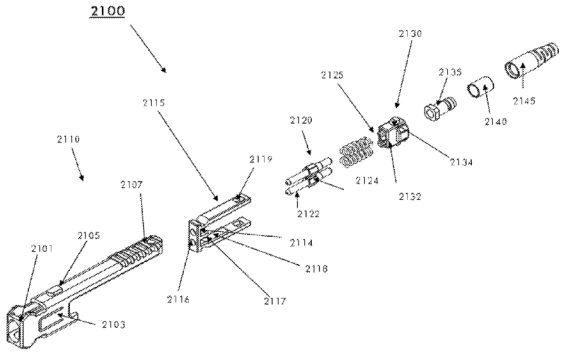
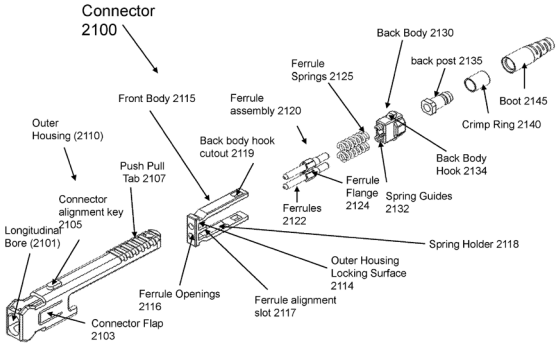
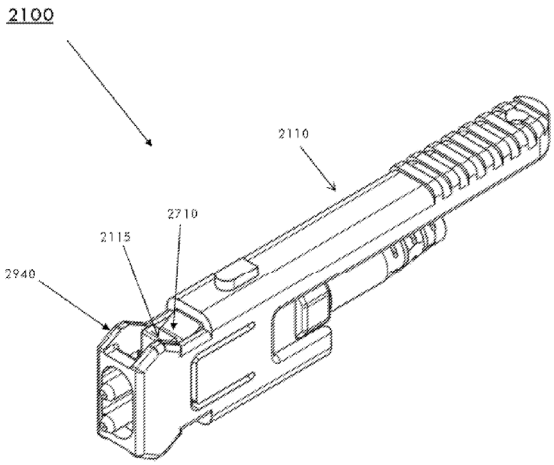
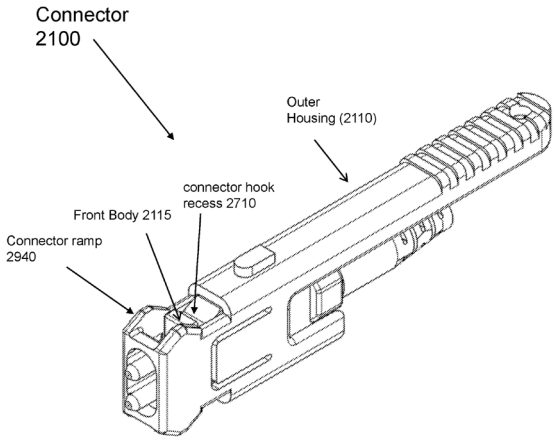
528. In my opinion, Takano'209 qualifies as prior art against the '466 Patent.

529. In my opinion, Takano'209 meets the first part of the test because Takano'209 claims the benefit of the '276 Provisional (EX1003: ¶[1001]); Takano'209 was filed co-pending with the '276 Provisional (EX1003: (22)), and Takano'209 shares common inventors with the '276 Provisional (EX1003: (72); EX1004: 17).

530. In my opinion, Takano'209 meets the second part of the test because the '276 Provisional describes the subject matter in Takano'209 forming the prior art invalidity positions described herein. The correspondence between the specification of Takano'209 and the '276 Provisional is summarized in the following chart:

Takano'209's Disclosure	'276 Provisional's Corresponding Disclosure
¶¶[0117]-[0132]	¶¶[111]-[125]
Figs. 21A-36B	Figs. 21A-36B
¶¶[0137]-[0138]	¶¶[130]-[131]
Figs. 41-42B	Figs. 41-42B

531. In particular, the figures identified in the chart above are generally identical between Takano'209 and the '276 Provisional. A select sampling of these corresponding figures is provided below, which shows the figures being identical or nearly identical:

Takano'209 Figures	'276 Provisional Figures
 FIG. 21A	 FIG. 21A: Connector Assembly Exploded View
 FIG. 21B	 FIG. 21B: Connector Assembled

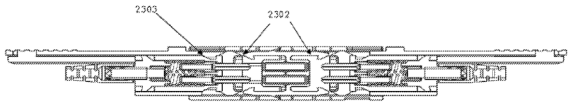


FIG. 23B

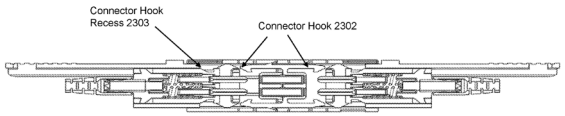


FIG. 23B Cross Section View of Connectors Unlatched from Adapter of FIG. 24 Assembled.

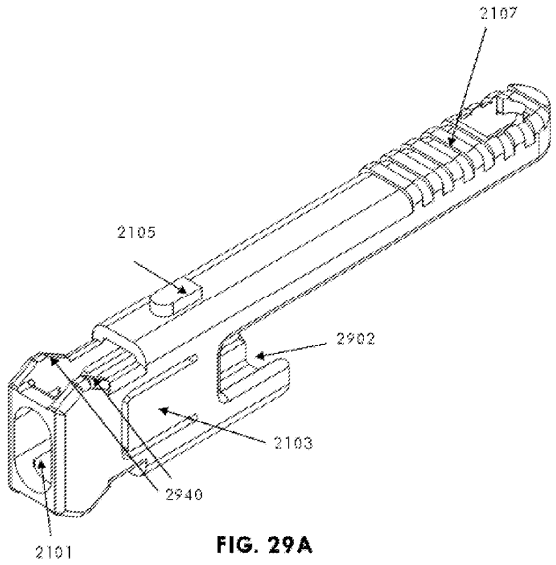


FIG. 29A

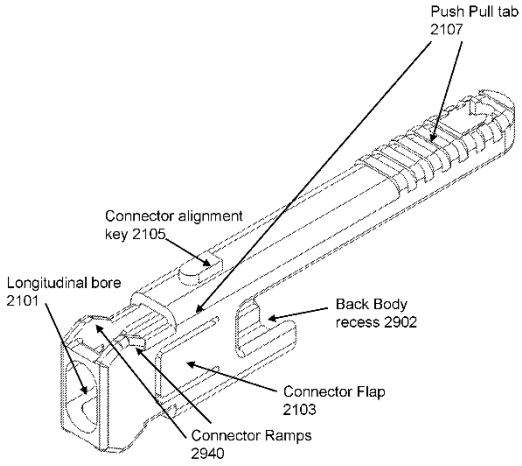


FIG. 29A Isometric View Outer Housing of FIG. 21.

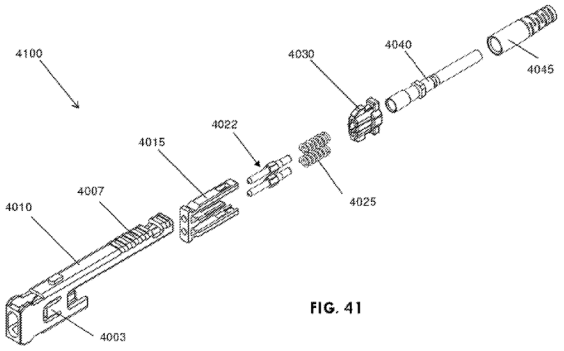


FIG. 41

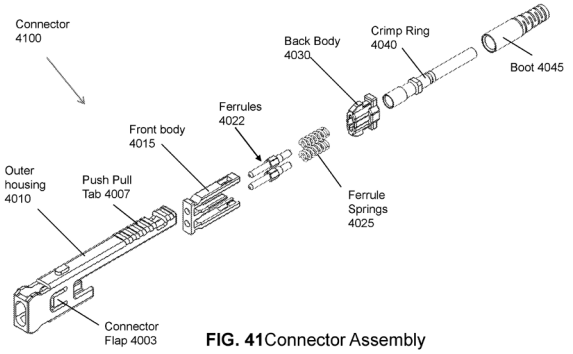


FIG. 41 Connector Assembly

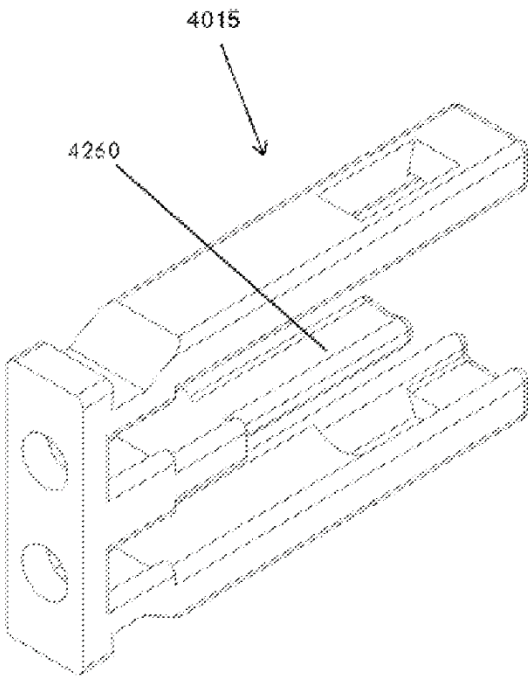


FIG. 42A

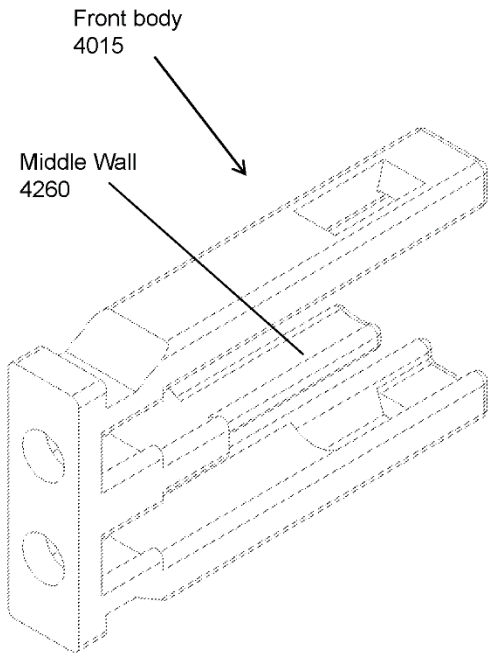


FIG. 42A Front Body Isometric View

532. Therefore, in my opinion, the '276 Provisional describes the subject matter relied upon in Takano'209 establishing the invalidity positions described herein.

B. Takano'369 is Prior Art to the '466 Patent

533. In my opinion, Takano'369 qualifies as prior art against the '466 Patent.

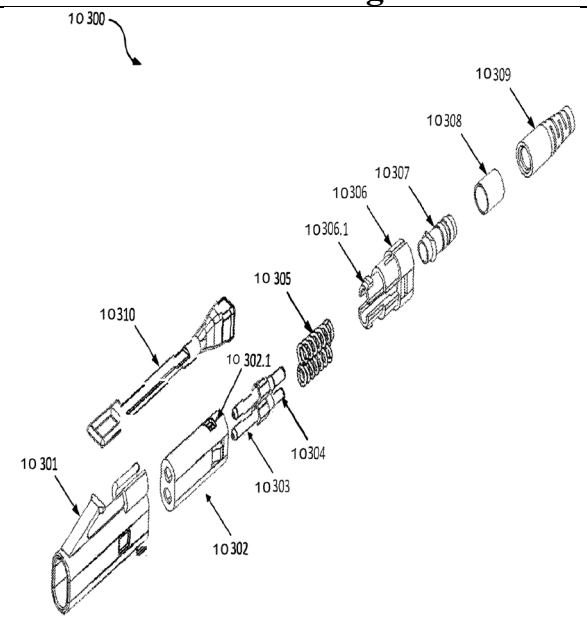
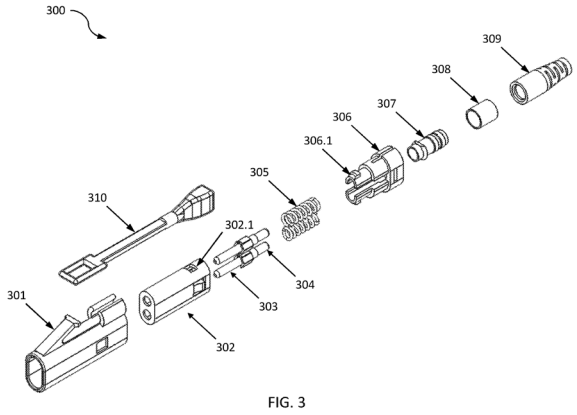
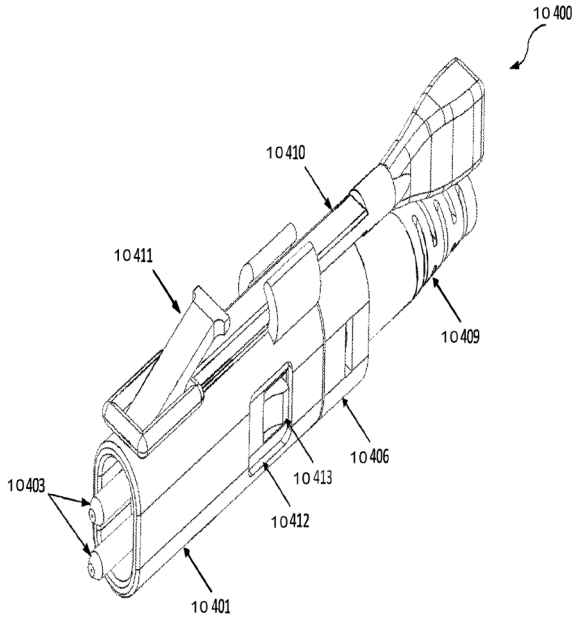
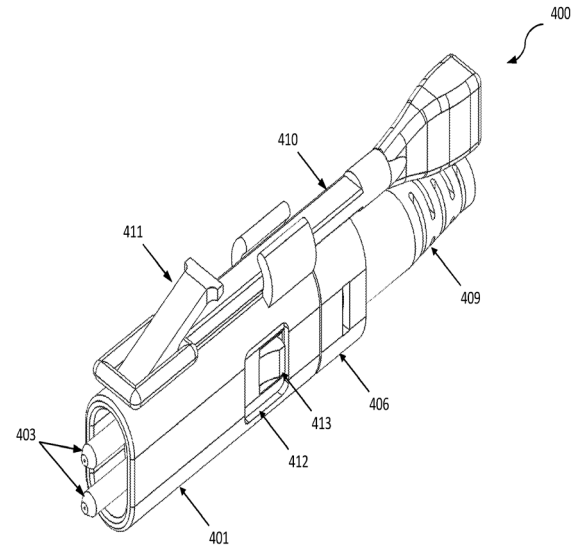
534. In my opinion, Takano'369 meets the first part of the test because Takano'369 claims the benefit of the '710 Provisional (EX1009: 1:26-28); Takano'369 was filed co-pending with U.S. App. No. 17/327,197 which also claims priority to the '710 Provisional (EX1009: (22); EX1023: 358), and

Takano'369 shares common inventors with the '710 Provisional (EX1009: (72); EX1010: 30).

535. In my opinion, Takano'369 meets the second part of the test because the '710 Provisional describes the subject matter in Takano'369 forming the prior art invalidity positions described herein. The correspondence between the specification of Takano'369 and the '710 Provisional is summarized in the following chart:

Takano'369's Disclosure	**'710 Provisional's Corresponding Disclosure**
18:63-19:50	¶¶[0041]-[0044]
Figs. 53-55, 61, 64, 65	Figs. 3-5, 11, 14, 15

536. In particular, the figures identified in the chart above are generally identical between Takano'369 and the '710 Provisional. A select sampling of these corresponding figures is provided below, which shows the figures being identical or nearly identical:

Takano'369 Figures	'710 Provisional Figures
 FIG. 53	 FIG. 3
 FIG. 54	 FIG. 4

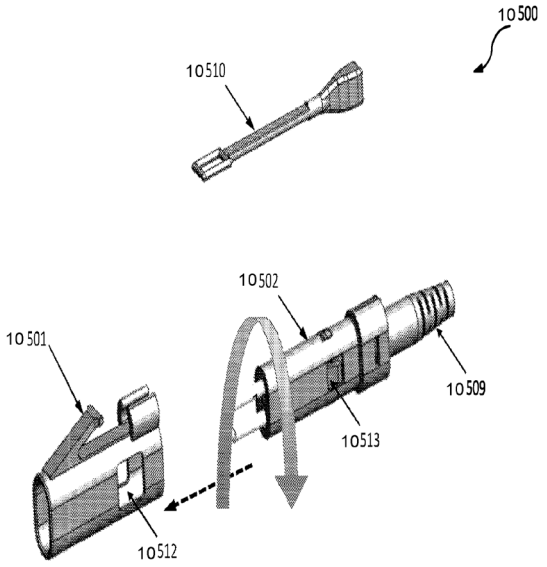


FIG. 55

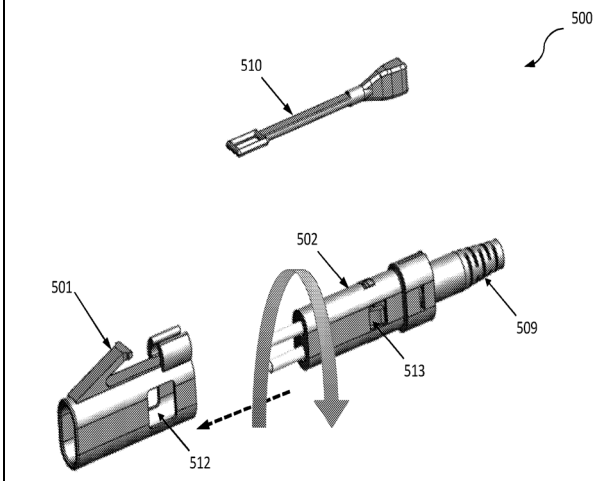


FIG. 5

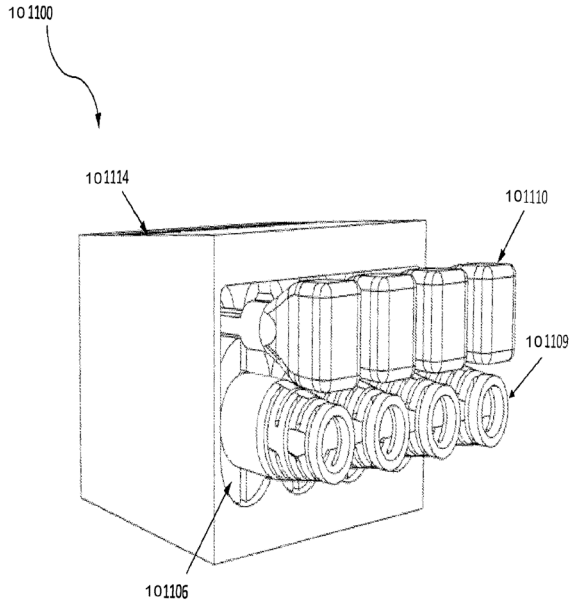


FIG. 61

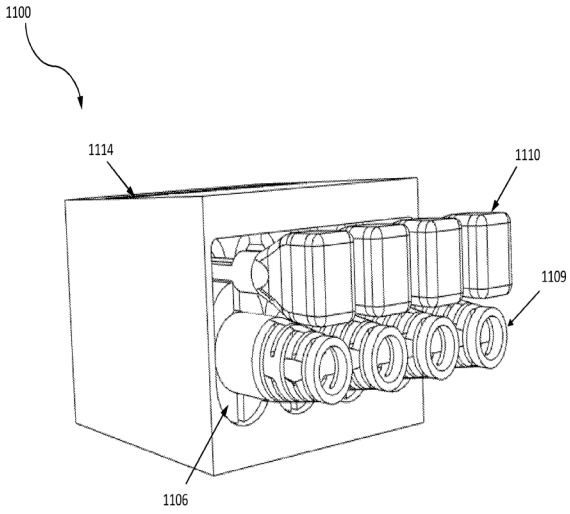


FIG. 11

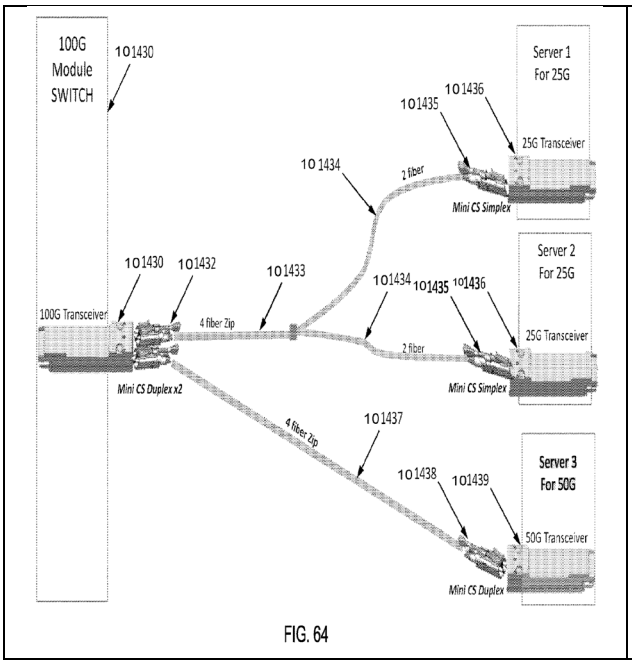


FIG. 64

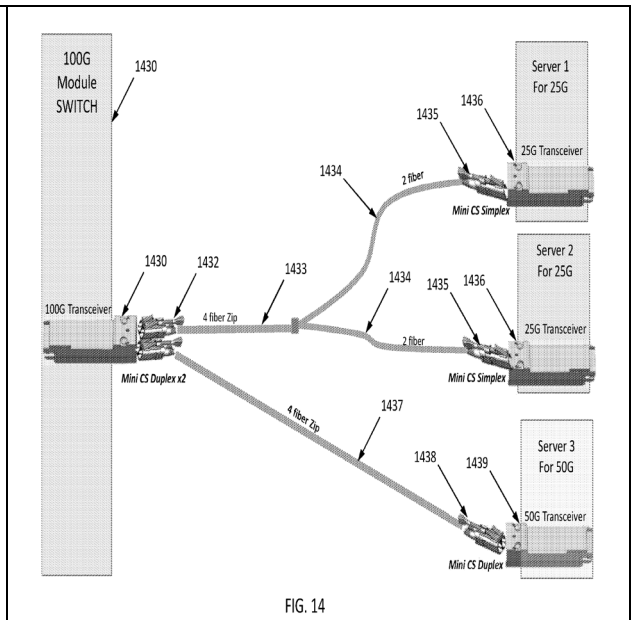


FIG. 14

537. Therefore, in my opinion, the '710 Provisional describes the subject matter relied upon in Takano'369 establishing the invalidity positions described herein.

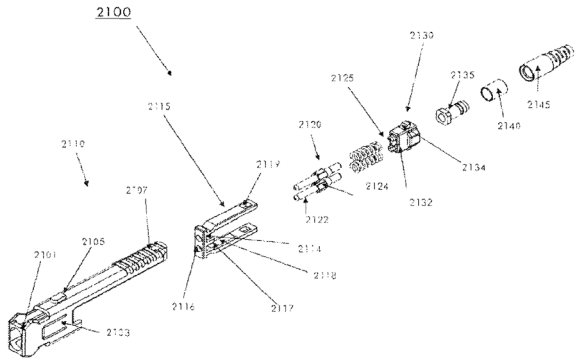
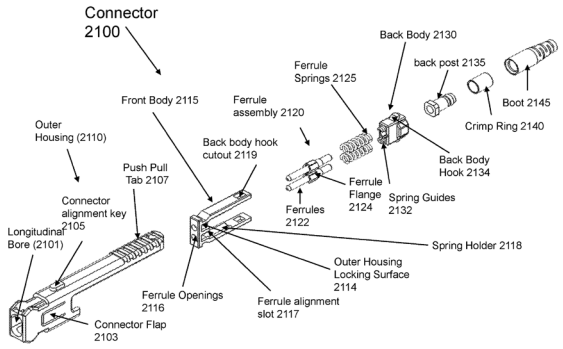
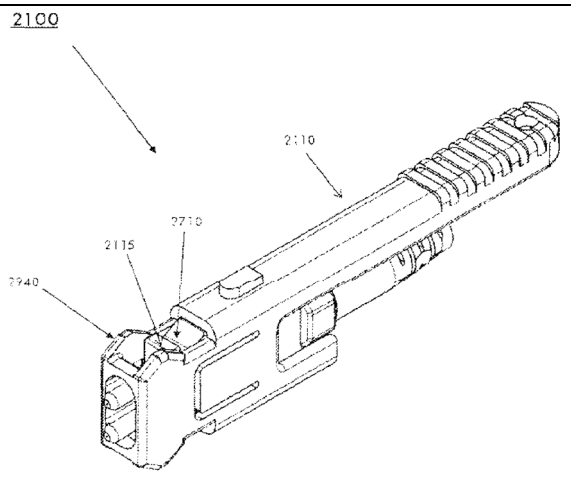
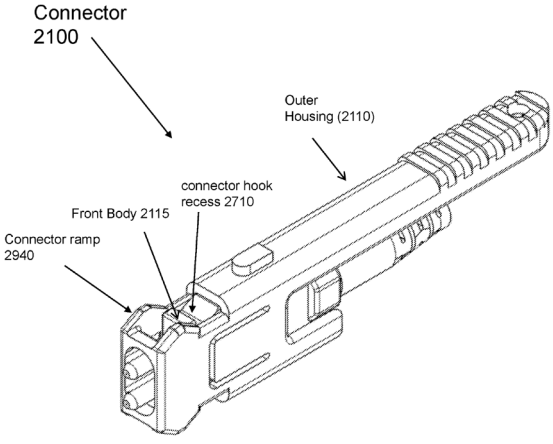
538. Regarding the '276 Provisional, in my opinion, Takano'369 meets the first part of the test because Takano'369 claims the benefit of the '276 Provisional (EX1009: 1:26-28); Takano'369 was filed co-pending with U.S. App. No. 17/327,197 which also claims priority to the '276 Provisional (EX1009: (22); EX1023: 358), and Takano'369 shares common inventors with the '276 Provisional (EX1009: (72); EX1004: 17).

539. Still with regard to the '276 Provisional, in my opinion, Takano'369 meets the second part of the test because the '276 Provisional describes the subject matter in Takano'369 forming the prior art invalidity positions described herein.

The correspondence between the specification of Takano'369 and the '276 Provisional is summarized in the following chart:

Takano'369's Disclosure	'276 Provisional's Corresponding Disclosure
12:61-22:10	¶¶[111]-[138]
Figs. 21A-52	Figs. 21A-52

540. In particular, the figures identified in the chart above are generally identical between Takano'369 and the '276 Provisional. A select sampling of these corresponding figures is provided below, which shows the figures being identical or nearly identical:

Takano'369 Figures	'276 Provisional Figures
 FIG. 21A	 **FIG. 21A:** Connector Assembly Exploded View
 FIG. 21B	 **FIG. 21B:** Connector Assembled

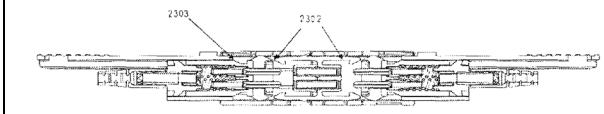


FIG. 23B

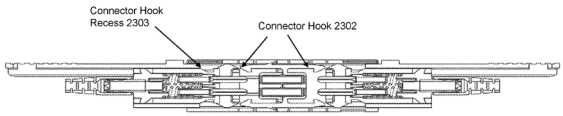


FIG. 23B Cross Section View of Connectors Unlatched from Adapter of FIG. 24 Assembled.

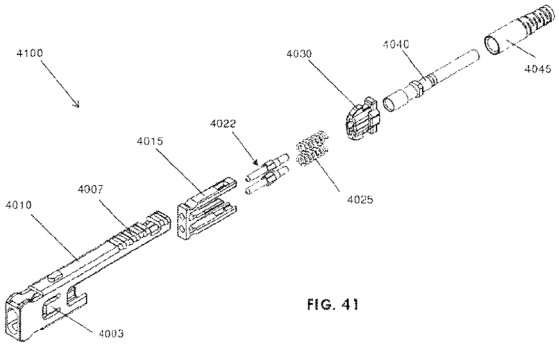


FIG. 41

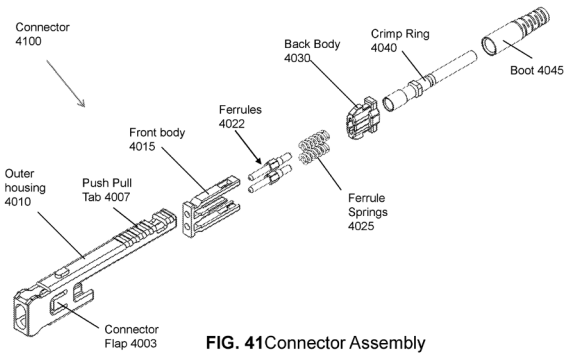


FIG. 41 Connector Assembly

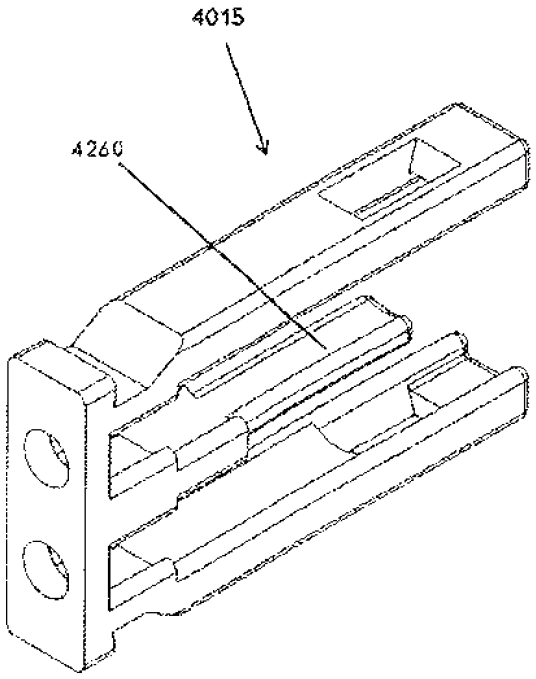


FIG. 42A

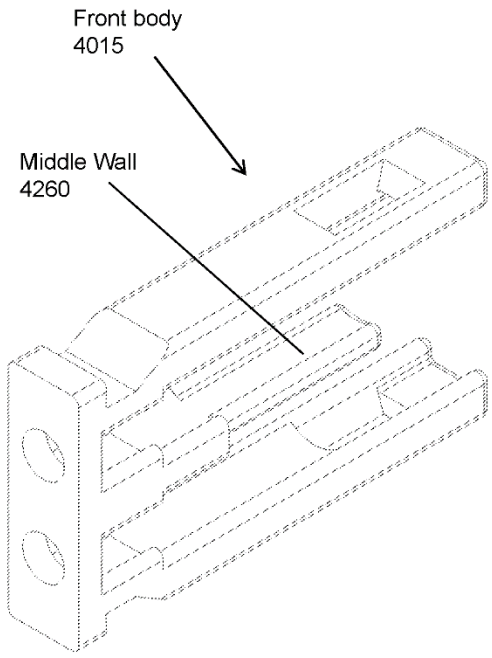


FIG. 42A Front Body Isometric View

541. Therefore, in my opinion, the '276 Provisional describes the subject matter relied upon in Takano'369 establishing the invalidity positions described herein.

542. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in this post grant review and that cross examination will take place within the United States. If cross examination is required of me, I will be available for any such cross examination.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 19th day of May, 2024.

By Edward Lurie**:** /Edward B. Lurie/

Appendix A

Edward Lurie | Sr. Fiber Optic Interconnect Developer

- **Remote from Haiku, HI**
- **512-689-3664**
- **eblurie@sbcglobal.net**

Professional Profile

Proven Track record designing & developing Fiber Optic Interconnect Products: Connectors, CableAssemblies, Fanouts, Multifiber Connectors, and related Field Installation Kits & Tools. I successfully launched dozens of FO new products, leading development teams. My background in Precision Optical Mfg. has given me a unique perspective re: FO Product & Process Devel. Process development, Sub-micron machining, Injection Molding, Optical inspection, Precision Metrology, Tool Design and Fixturing are also areas of expertise. I have over 18 US Patents in FO Interconnect, listed below.

Core Skills

• FO Interconnect Design & Development
• Project Management
• Concurrent Engineering - DFM
• High yield manufacturing - 6 Sigma
• Invention submission & IP
• Problem solving
• Creativity • Process development
• Ideation • Prototype development

Career Summary

Sep 1983 - Aug 2019 3M Co and Corning, Inc, Austin, TX
Sr Product Development Specialist

Outline:

Developed Industry Standard and novel FO Interconnect Products for Telecom, Datacom, Enterprise (LANs) & Wireless markets. I was a Sr. Product Development Specialist (Chief Engineer - Technical SME) and concurrently served as Project Manager.

Key Responsibilities:

• FO Interconnect product Design & development from concept to Launch,
• Design for high yield manufacturing,
• Support to Customers & Application Engineering
• Concurrent process engineering.
• Manufacturing interface & support.

Key Achievements:

• Developed a large portfolio of FO Simplex, Duplex, and Multifiber Interconnect products over a 36yr Career (Biconic, ST Epoxy, ST, SC & LC Hotmelt, SC/UPC and SC/APC Epoxy, 8F -24F MTP/MPO,OGI, SC/No-Polish Mechanical Splice, Crimplok+, Crimplok+ Extreme, and SC/APC Shuttered Connectors).
• Developed dozens of proprietary manufacturing processes for polishing and Cable Assembly, thatare held as Trade Secret.
• Developed novel field installable FO Interconnects and Field Termination Kits for both Key Account Customers and the general Market.
• I am known widely as an industry expert in FO Connector Design and Process Development.
• Contributed to Telcordia, IEC, and TIA/EIA Industry Standards FO Interconnect over 85% of my career.
• Managed the Manufacturing Engineering group for several years in the early 1990's.

Apr 1980 - Apr 1983 Republic Lens Co, Englewood, NJ
Production Manager

Outline:

Production and Plant Manager for Precision OEM Optical Manufacturer. Oversaw precision optical manufacturing of custom lenses, mirrors, prisms, and optical assemblies, including in-house Thin-film coatings. Had P&L responsibility for the company.

Education

• **BS in Business Administration** | Franklin & Marshall College | Jul 1976 - Apr 1980 | Post Graduate Study at the Institute of Optics, University of Rochester, NY

Additional

Hobbies & Interests
Swimming, Tennis, Downhill Skiing, Hiking, Golf, Fitness , Tropical fruit & vegetable farming

Software
Microsoft Office, Excel, Word, PowerPoint, Skype, Microsoft Teams, Adobe Illustrator, Microsoft Windows, Microsoft Project

Languages
Proficient in German, mid-level Japanese

Publications
I have published several articles for OFC (Optical Fiber Conference), and other industry Magazines eg: Fiber Optic Product News, etc.

Patent Awards

I have been awarded the following US Patents, most are also filed Internationally:

US-20210405304-A1 - Fiber optic connectors with funnel-shaped boots and methods of installing the same
US-10663679-B2 - Assembly tool and optical fiber connector assembly method
US-10502919-B2 - Cable assembly with a removable installation device
US-20180299633-A1 - Cable assembly with a removable installation device

Patent Awards (continued)

US-10001619-B2 - Cable assembly with a removable installation device
US-20180081130-A1 - Assembly tool and optical fiber connector assembly method
US-20170261716-A1 - Cable assembly with a removable installation device
US-20140299645-A1 - Low cost, disposable optical fiber cleaver
US-8292699-B2 - Optical fiber polishing apparatus and method
US-20100029180-A1 - Optical fiber polishing apparatus and method
US-7255486-B2 - Field termination apparatus and method for small form factor optical connectors with thermoplastic adhesive
US-7147384-B2 - Small form factor optical connector with thermoplastic adhesive
US-7149402-B2 - Device for holding field termination load adapter for optical connectors
US-7108431-B2 - Ferrule for use in fiber optic connectors
US-20060105684-A1 - Fiber polishing apparatus and method for field terminable optical connectors
US-20060103039-A1 - Heat shrink device and method
US-20060104574-A1 - Field termination apparatus and method for small form factor optical connectors with thermoplastic adhesive
US-20060104588-A1 - Device for holding field termination load adapter for optical connectors
US-7001081-B2 - Strain relief boot with flexible extension for guiding fiber optic cable
US-6973242-B2 - Apparatus useful for guiding fiber optic ribbons into ferrules
US-20050213891-A1 - Small form factor optical connector with thermoplastic adhesive
US-6850684-B2 - Three dimensional optical circuits
US-6832032-B2 - In-line shuffle modules utilizing three dimensional optical circuits
US-20040234209-A1 - Strain relief boot with flexible extension for guiding fiber optic cable
US-20040208455-A1 - Apparatus useful for guiding fiber optic ribbons into ferrules
US-20040208456-A1 - Ferrule for use in fiber optic connectors
US-6556754-B2 - Three dimensional optical circuit
US-6549710-B2 - Method of making a three dimensional optical circuit
US-20030031436-A1 - Three dimensional optical circuit
US-20030031437-A1 - In-line shuffle modules utilizing three dimensional optical circuits
US-20030031452-A1 - Method of making a three dimensional optical circuit
US-20030031448-A1 - Optical manifold
US-5458528-A - Method for polishing fiber optic ferrules
US-5351327-A - Polished fiber optic ferrules
US-5109983-A - Package for an optical fiber jumper