

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SENKO ADVANCED COMPONENTS
Petitioner

v.

US CONEC LTD.
Patent Owner

Case: PGR2024-00037
Patent No. 11,906,794

**PETITION FOR POST-GRANT REVIEW
OF U.S. PATENT NO. 11,906,794**

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EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,906,794
1002	Expert Declaration of Edward Lurie
1003	U.S. Publication No. 2019/0243072 (“Takano”)
1004	U.S. Provisional Application No. 62/649,539 (“the ‘539 Provisional”)
1005	U.S. Publication No. 2012/0057826 (“Katoh”)
1006	U.S. Publication No. 2019/0204513 (“Davidson”)
1007	U.S. Patent No. 7,677,812 (“Castagna”)
1008	U.S. Patent No. 5,390,272 (“Repta”)
1009	U.S. Publication No. 2004/0247252 (“Ehrenreich”)
1010	Prosecution History of U.S. Patent No. 11,906,794
1011	Prosecution History of U.S. Publication No. 2019/0243072
1012	Prosecution History of U.S. Publication No. 2019/0204513
1013	U.S. Provisional Application No. 62/640,914 (“the ‘914 Provisional”)
1014	The Importance Of Proper Cleaving for Fiber Optic Connectors
1015	Guide to Connectorization and Polishing Optical Fibers
1016	U.S. Patent No. 7,001,081
1017	U.S. Publication No. 2013/0094816

Exhibit No.	Description
1018	U.S. Patent No. 5,673,346
1019	PCT Publication No. WO2019/126337
1020	Designerdata: Polypropylene
1021	Typical Engineering Properties of Polypropylene
1022	The Engineering ToolBox: Polymers
1023	Omnexus Plastics & Elastomers
1024	U.S. Patent No. 5,528,712
1025	U.S. Patent No. 7,628,545
1026	U.S. Patent No. 11,719,893
1027	U.S. Provisional Application No. 62/793,198
1028	U.S. Provisional Application No. 62/653,706
1029	U.S. Patent No. 7,150,567
1030	U.S. Publication No. 2019/0018201
1031	Claim Listing for U.S. Patent No. 11,906,794

Emphasis added throughout unless indicated otherwise.

I. INTRODUCTION

Senko Advanced Components, Inc. (“Petitioner” or “Senko”) requests *post-grant* review, seeking cancellation of claims 1-20 of U.S. Patent No. 11,906,794 (“the ‘794 Patent”; EX1001) assigned to US Conec Ltd. (“Patent Owner” or “US Conec”). Supporting this Petition is an expert declaration from Edward Lurie—an expert in the field of optical connector design. EX1002: ¶¶1-6.

II. IDENTIFICATION OF CHALLENGE

A. Identification of Prior Art

The ‘794 Patent claims priority to Provisional Application No. 62/653,706, filed April 6, 2018.

The following documents constitute prior art under §102(a)(1):

- U.S. Publication No. 2012/0057826 (“Katoh”)
- U.S. Patent No. 7,677,812 (“Castagna”)
- U.S. Patent No. 5,390,272 (“Repta”)
- U.S. Publication No. 2004/0247252 (“Ehrenreich”)

The following documents constitutes prior art under §102(a)(2):

- U.S. Publication No. 2019/0243072 (“Takano”)

Takano claims priority to U.S. Provisional App. No. 62/649,539 (“the ‘539 Provisional”; EX1004), filed March 28, 2018, before the ‘794 Patent’s earliest priority date.

- U.S. Publication No. 2019/0204513 (“Davidson”)

Davidson claims priority to U.S. Provisional App. No. 62/640,914 (“the ‘914 Provisional”; EX1013), filed March 9, 2018, before the ‘794 Patent’s earliest priority date.

Takano and Davidson are prior art to the ‘794 Patent under 35 U.S.C §102(a)(2) because these references are considered effectively filed as of their provisional filing dates, for reasons explained in Section XVIII. 35 U.S.C. §102(d)(2).

Takano¹, Davidson, and Katoh were cited during examination.

B. Statutory Grounds for Challenge

Petitioner advances these unpatentability grounds. Claims 1, 16, and 20 are independent.

Ground	References	Basis	Claims Challenged
1		§112	8, 16-20
2	Takano	§102	1-6, 8-12, 14, 16-18, 20
3	Takano	§102	1-7, 9-13, 16-19
4	Takano	§103	1-7, 9-13, 16-19
5	Takano, Katoh	§103	11
6	Takano, Repta	§103	15
7	Takano, Davidson	§103	13, 19
8	Takano, Davidson, Castagna	§103	13, 19
9	Takano, Castagna	§103	13, 19
10	Takano, Ehrenreich	§103	20
11	Takano, Ehrenreich	§103	20

¹ Takano’s issued patent is U.S. 10,705,300.

Ground	References	Basis	Claims Challenged
12	Takano, Davidson, Castagna, Ehrenreich (as needed)	§103	16-20

III. BACKGROUND OF THE ‘794 PATENT

A. Subject Matter of the ‘794 Patent

The ‘794 Patent pertains to fiber optic connectors with “a boot that can be used ... to insert into and remove” a connector from a receptacle and that “can also be detached ... and reinstalled in a different configuration to identify [] polarity.”

EX1001: 1:50-55; EX1002: ¶25.

The ‘794 Patent’s fiber optic connector (100) terminates a fiber optic cable and includes a housing (102), two ferrules (104), a crimp body (106), and a boot (112) including a front extension (110). EX1001: 3:63-4:2; EX1002: ¶26.

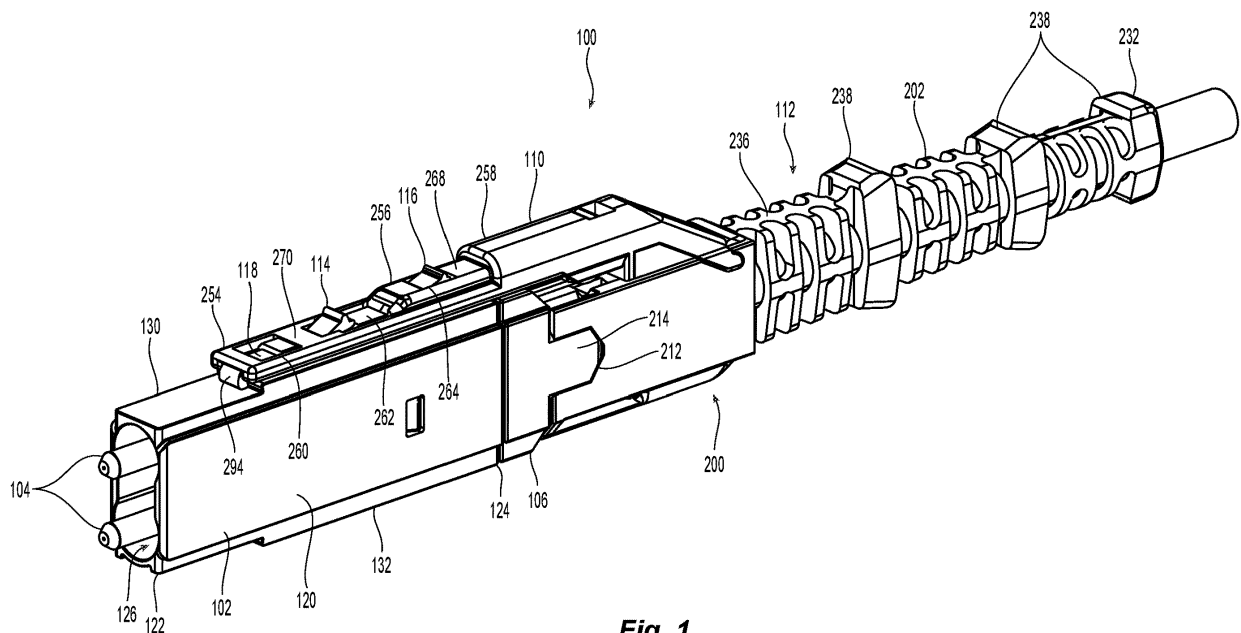


Fig. 1

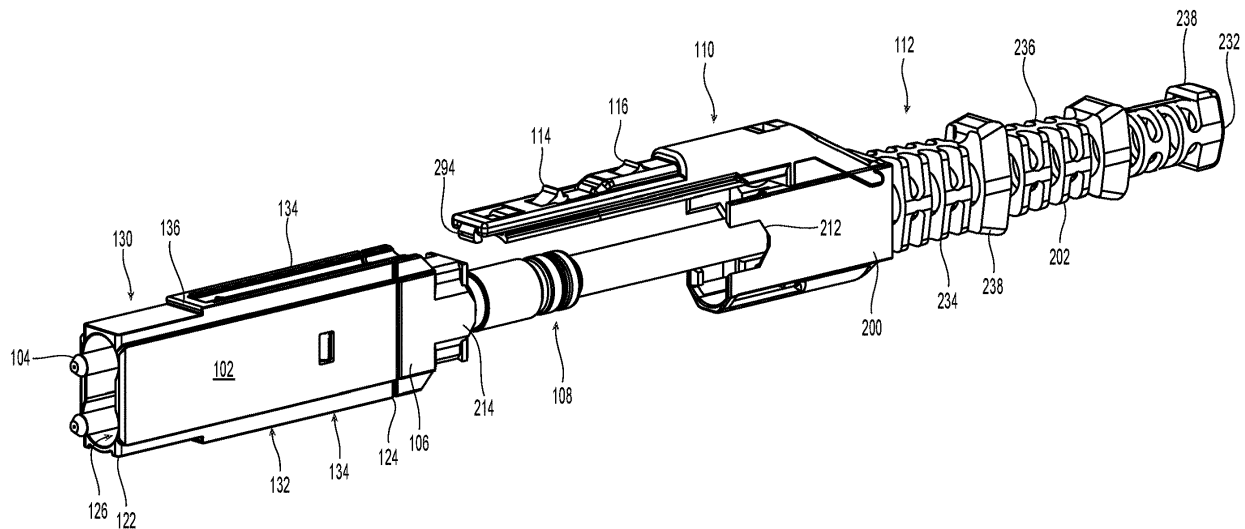


Fig. 6

EX1001: Figs. 1 and 6.

The front extension (110) of the boot (112) serves several functions.

EX1001: 4:4-20; EX1002: ¶27. The front extension includes latches (114, 116) to connect the connector (100) to a corresponding adapter. EX1001: 4:4-9; EX1002: ¶27. To disconnect the connector from the adapter, the boot is pulled rearward to depress the latches. EX1001: 8:40-67; EX1002: ¶27.

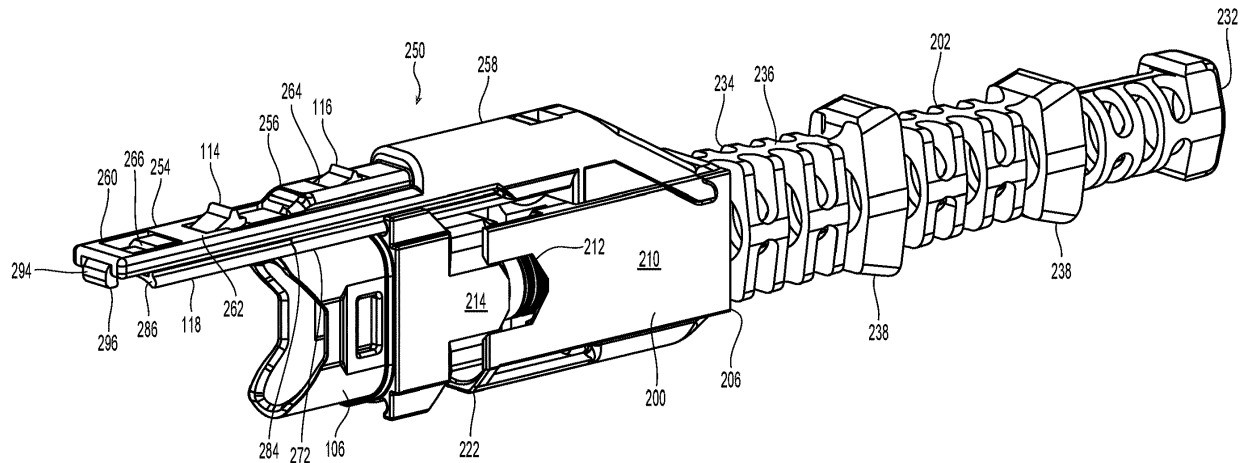


Fig. 14

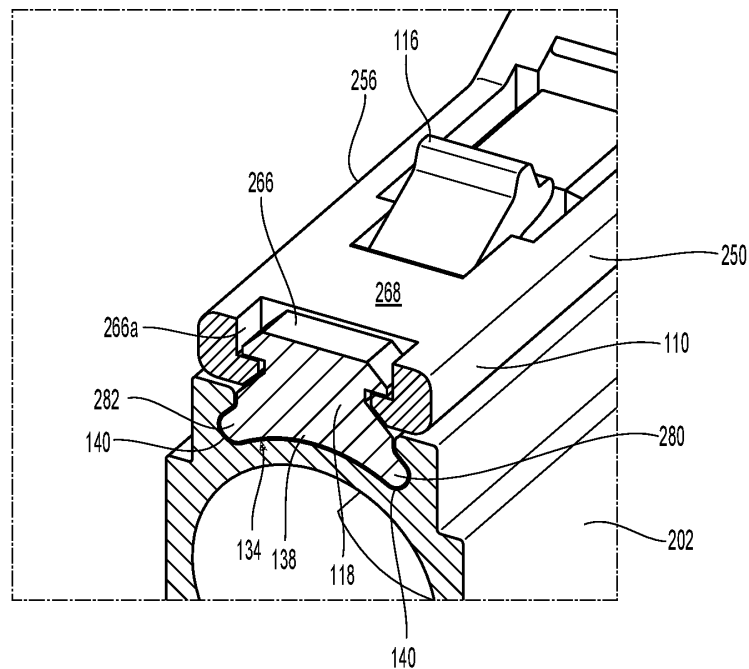


Fig. 7

EX1001: Figs. 7 and 14.

The front extension (110) is also a polarity key, limiting the connector (100) to be inserted in a single orientation where the front extension aligns with a corresponding keyway of the adapter. EX1001: 4:9-20; EX1002: ¶28. The front

extension can be attached to the top or bottom of the housing (102) to place the connector in a first or second polarity configuration, respectively. EX1001: 1:52-55, 2:8-10, 9:7-13; EX1002: ¶28.

The polarity of the connector (100) is changed by pressing on a bridge portion (222) to release latches (220) connecting the boot (112) to the crimp body (106). EX1001: 6:1-7; EX1002: ¶29.

B. Background of the Art

The prior art references in this petition each pertain to fiber optic connectors and are in the same field of endeavor with each other and with the ‘794 Patent.

EX1001: 1:15-55; EX1003: ¶[0002]; EX1005: ¶[0002]; EX1006: ¶[0002]; EX1007: 1:6-8; EX1008: 1:7-9; EX1009: ¶[0002]; EX1002: ¶¶30-34.

1. Takano

Takano discloses multiple different embodiments of optical connectors. EX1003: Figs. 1 and 16; EX1002: ¶¶35-36. This Petition refers to three embodiments in particular, called the “first embodiment,” the “second embodiment,” and the “third embodiment.”

i. First Embodiment

Figs. 16-36 illustrate a micro optical connector (9100), the first embodiment. EX1002: ¶37. The micro optical connector (9100) has an outer housing (9101, 9201, 9301, 9401), two ferrules (9203), a boot or boot assembly (9109.1, 9209.1,

9309.1, 9409.1), and a back body (9106, 9206). EX1003: ¶¶[0058], [0061];

EX1002: ¶37.

9100

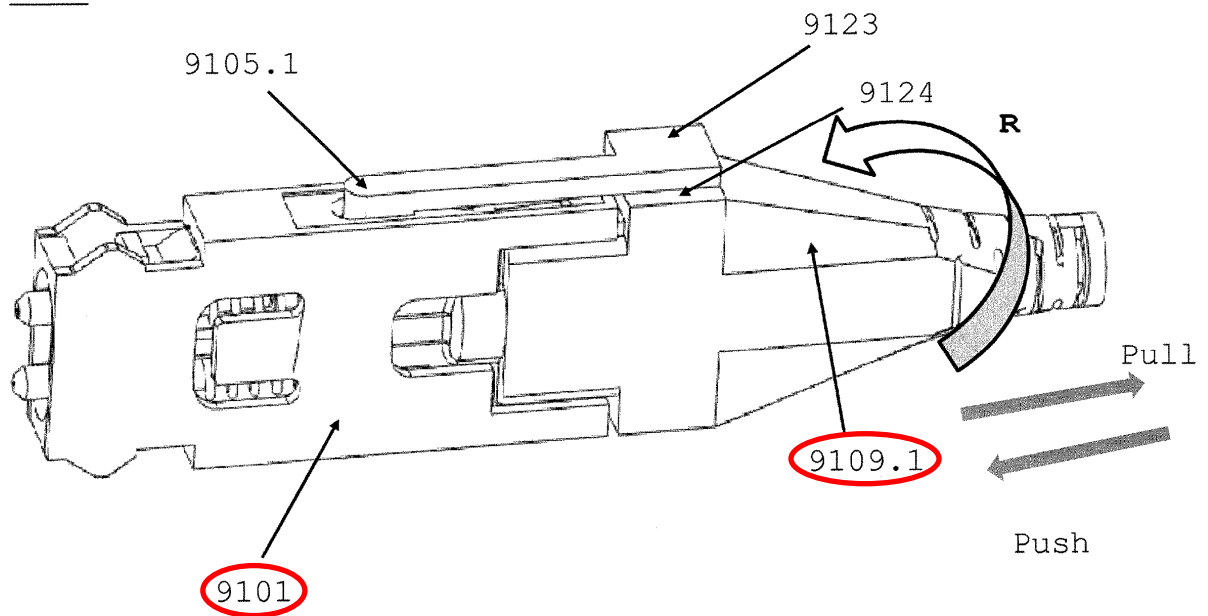
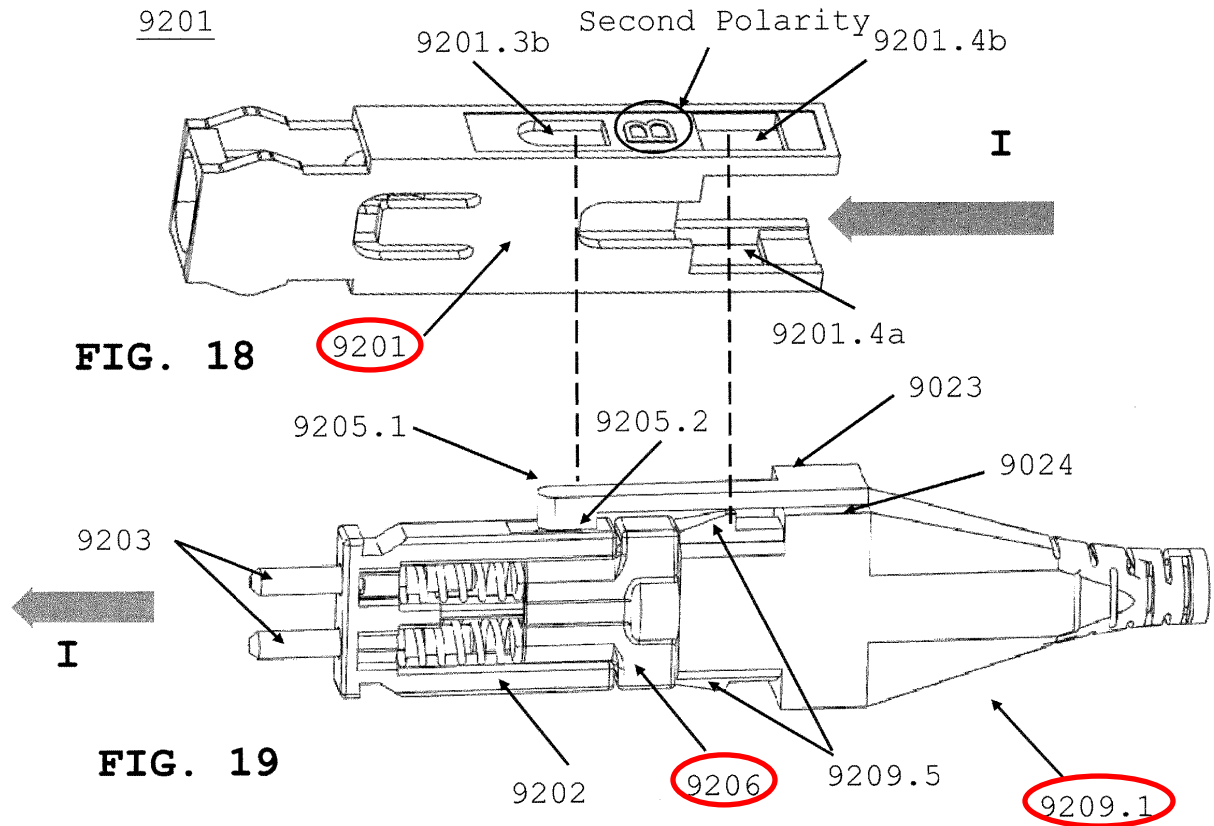


FIG. 16



EX1003: Figs. 16, 18, and 19 (annotated).

The boot includes an alignment and offset key (9105.1, 9205.1, 9305.1, 9405.1) for setting the polarity of the micro connector. EX1003: Figs. 16, 25, and 33 ¶[0059]; EX1002: ¶38.

9109.1

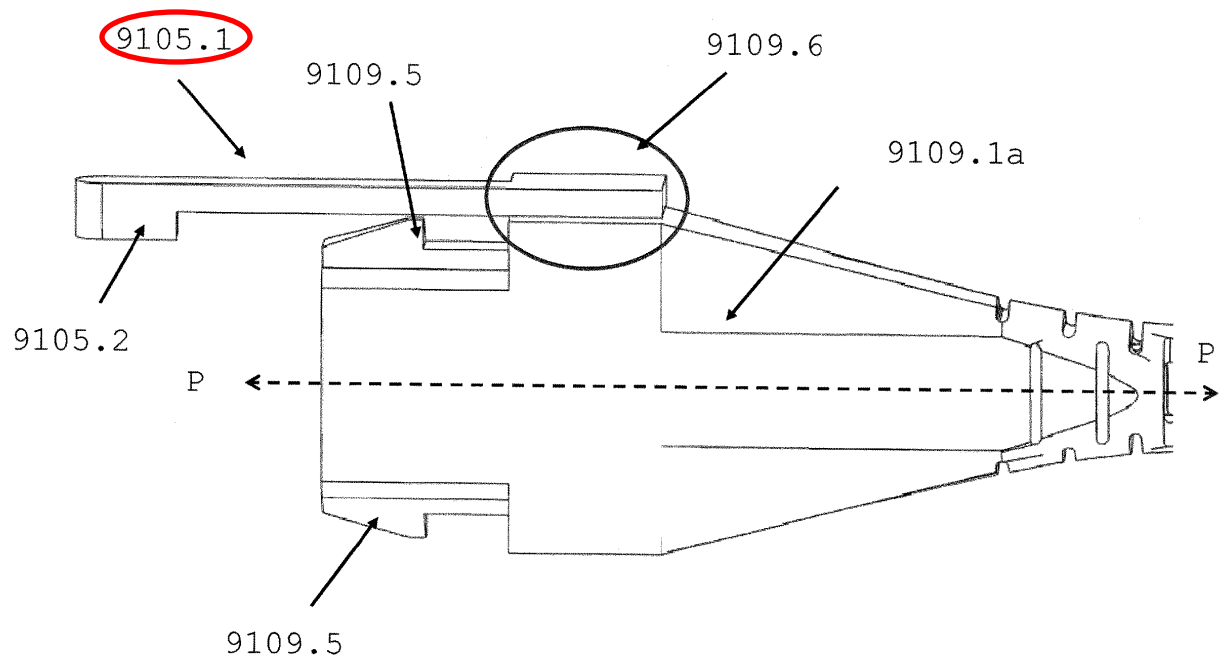
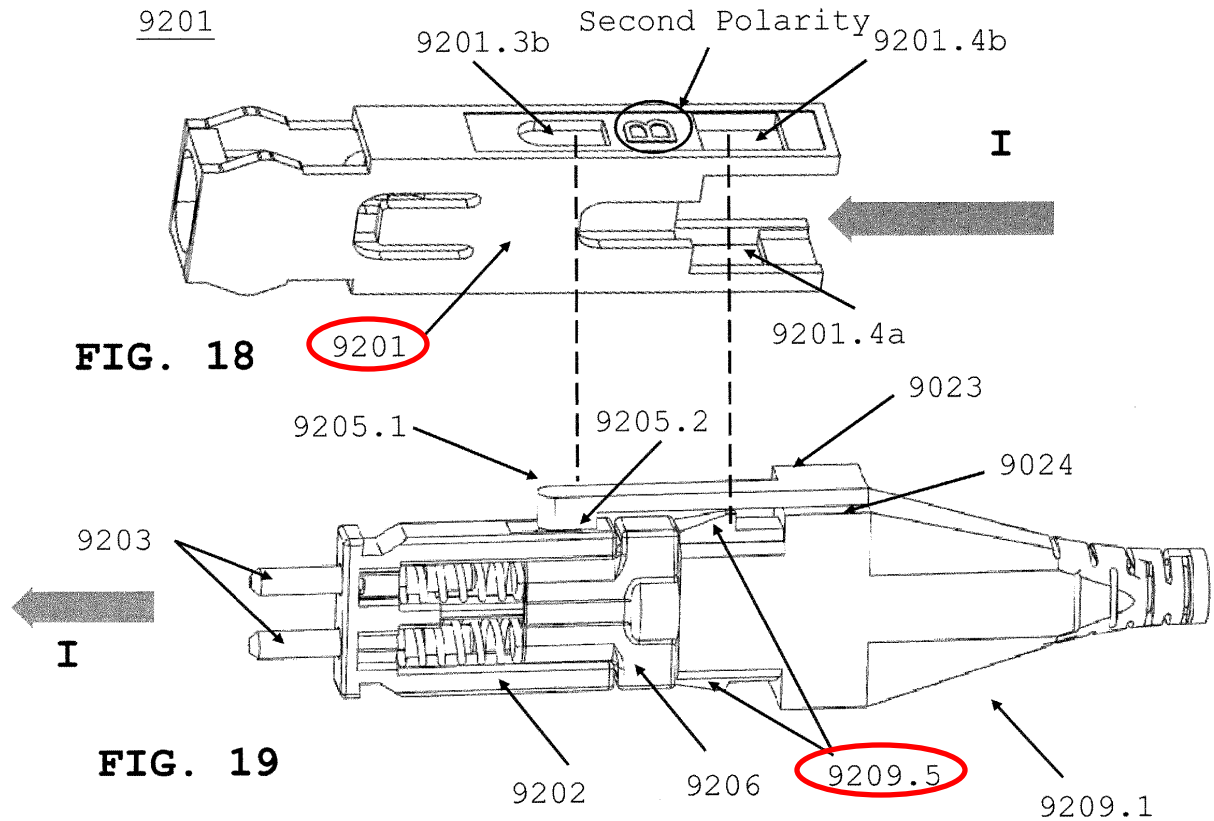


FIG. 17

EX1003: Fig. 17 (annotated).

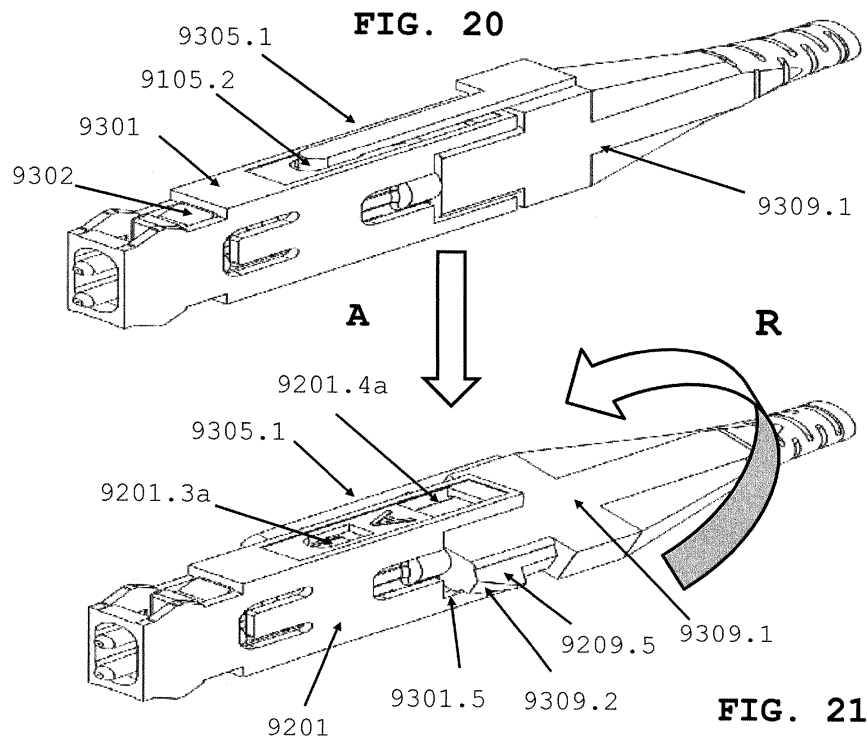
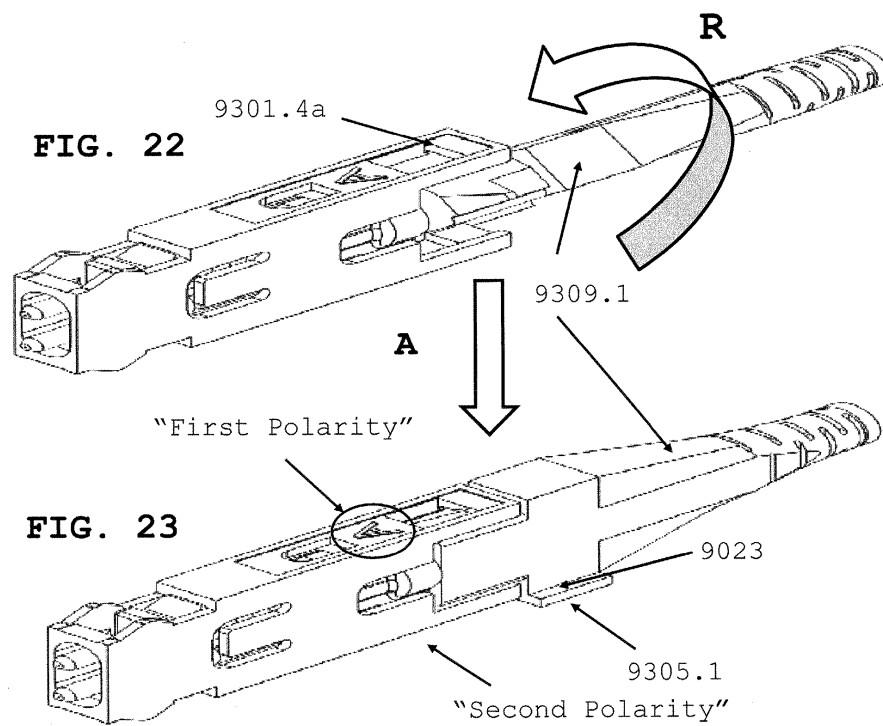
The boot includes boot hooks (9109.5, 9209.5) that releasably connect the boot to the outer housing. EX1003: ¶[0058]; EX1002: ¶39.



EX1003: Figs. 18 and 19 (annotated).

The boot hooks allow the boot to be rotated relative to the outer housing to move the key from the top to the bottom of the outer housing (and *vice versa*) to change the polarity of the micro connector, as shown in Figs. 20-23 and 25, 28-33.

EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶40.



EX1003: Figs. 20-23.

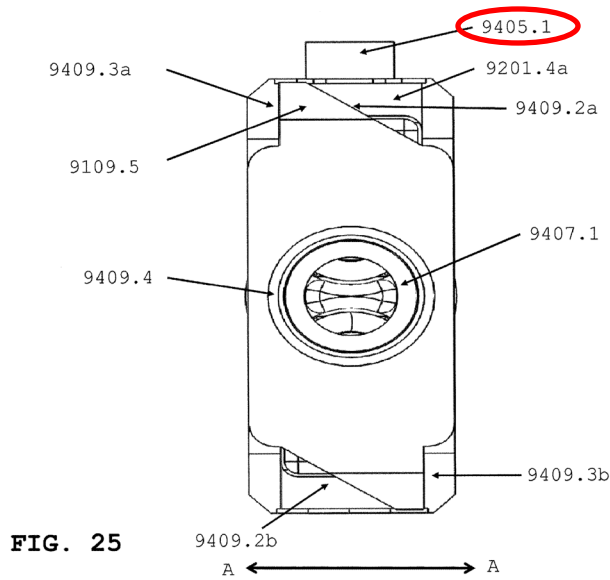


FIG. 25

First Polarity

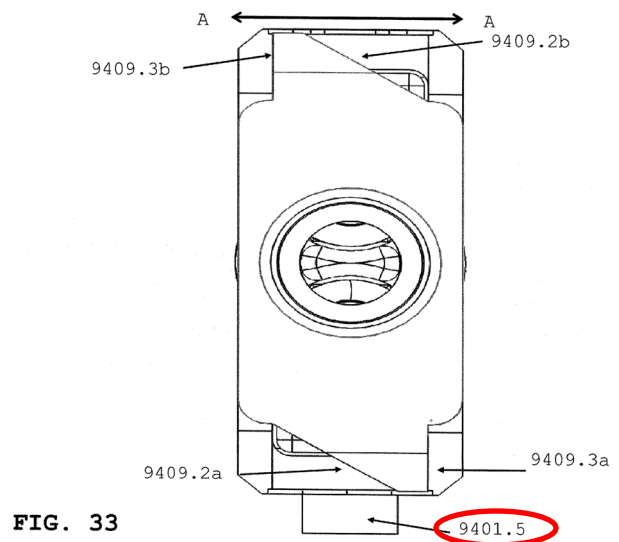


FIG. 33

Second Polarity

EX1003: Figs. 25 and 33 (annotated).

To detach the micro connector from the adapter (2400), the boot is pulled rearward to move the outer housing rearward to lift the hooks (2425) of the adapter out of recesses (9211), thereby allowing the entire micro connector to be removed.

EX1003: ¶¶[0073]-[0074]; EX1002: ¶41.

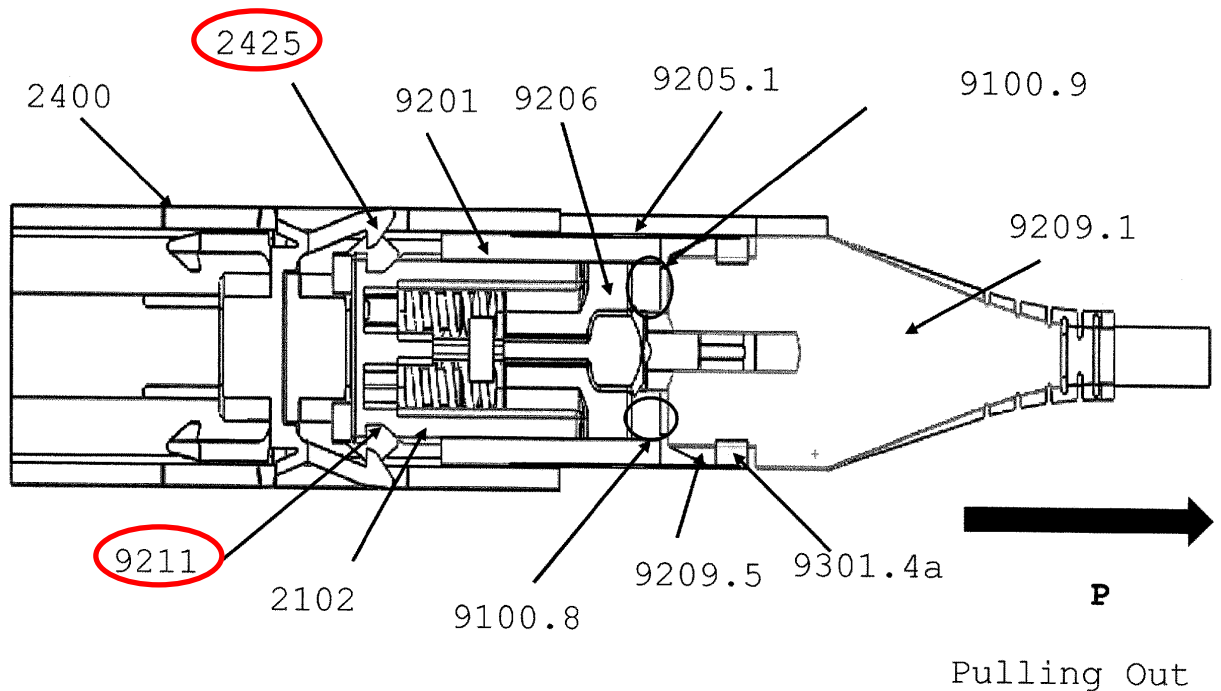


FIG. 35

EX1003: Fig. 35 (annotated).

ii. Second Embodiment

Takano discloses a variation (i.e., second embodiment) of the micro connector (9100) of Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector *does not include* the key (9105.1, 9205.1, 9305.1, 9405.1).

EX1003: ¶[0059]; EX1002: ¶42. Instead, the key is part of the outer housing (9101, 9201, 9301, 9401). EX1003: ¶[0059] (“Alignment and offset key 2105 may be fixed on connector outer housing, as shown in FIG. 1 or at alignment key 5305 disclosed in FIG. 37.”); EX1002: ¶42.

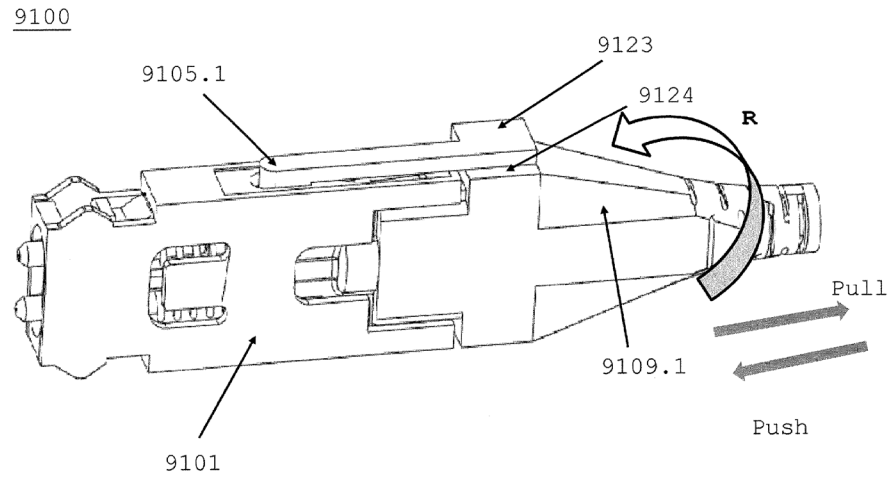


FIG. 16

EX1003: Fig. 16.

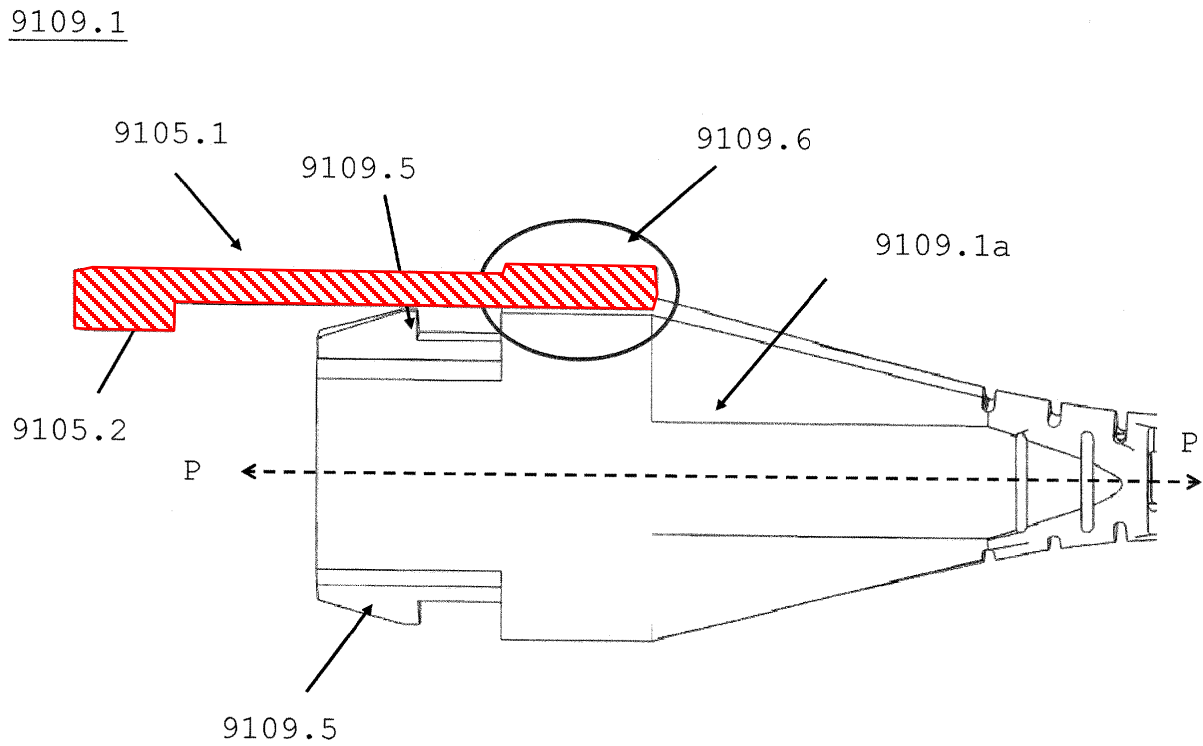


FIG. 17

EX1003: Fig. 17 (annotated).

iii. *Third Embodiment*

Figs. 1-4 illustrate another embodiment (i.e., third embodiment) of a micro optical connector (2100, 3700). EX1002: ¶43. The micro connector includes an outer housing (2101, 3701), two ferrules (2103), a front body (2102), a boot (2109), a back body (2106), and a back post (2107). EX1003: ¶¶[0050], [0061], Figs. 1-4; EX1002: ¶44.

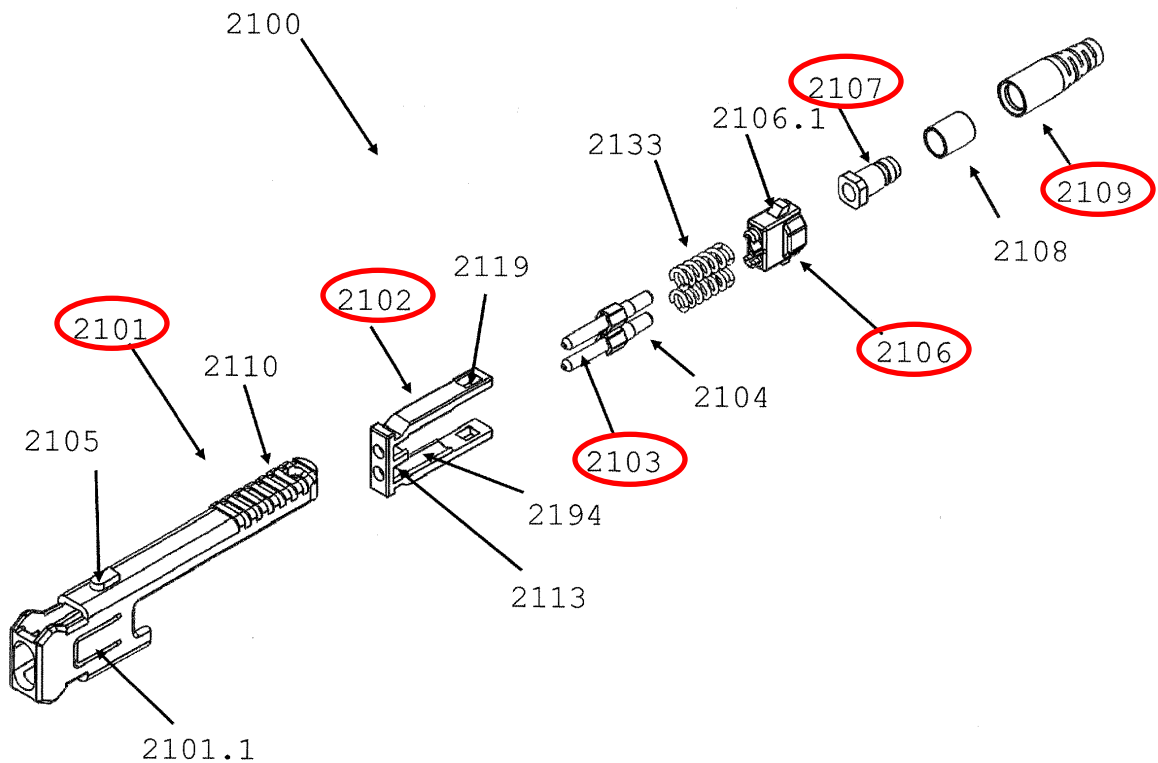
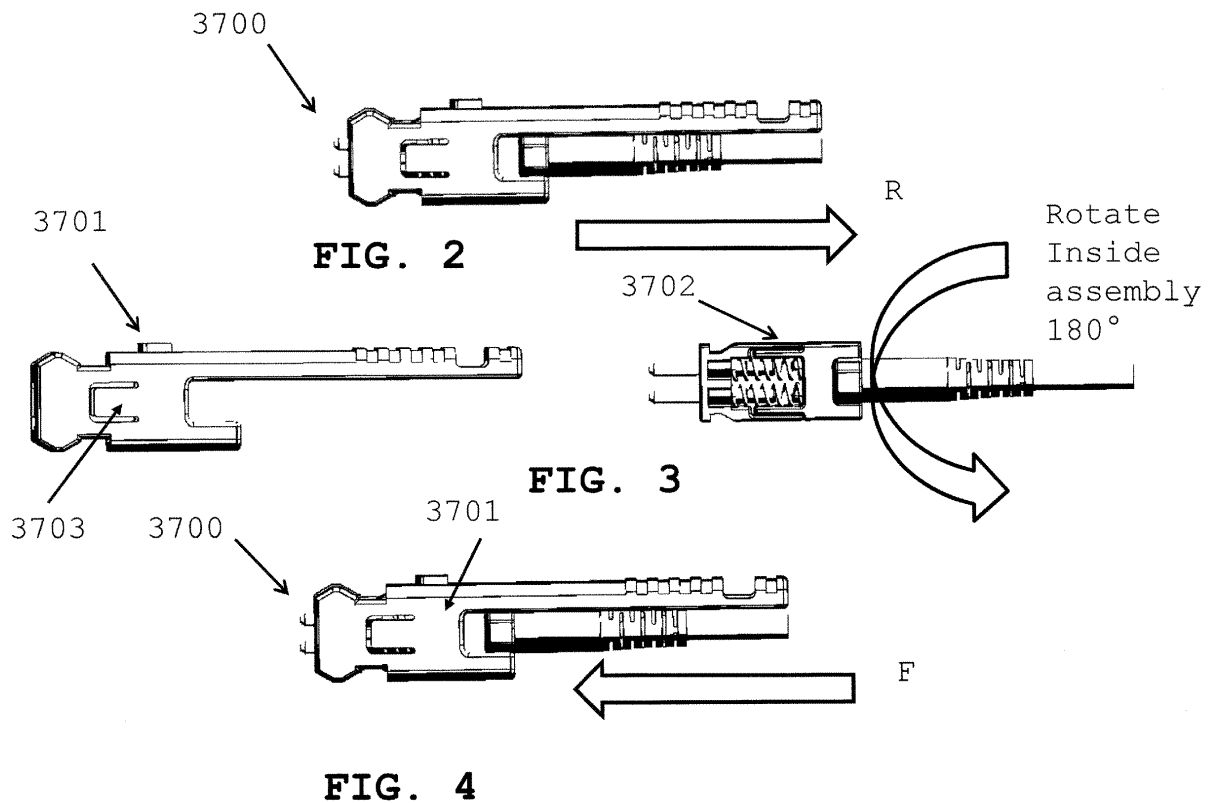


FIG. 1.

EX1003: Fig. 1 (annotated).

The outer housing includes a key (2105) to set the polarity of the micro connector. EX1003: ¶[0050]; EX1002: ¶45. To change the polarity of micro connector, the outer housing is detached from the inside assembly (i.e., ferrules,

boot, back body, back post, front body, etc.), the inside assembly is flipped over, and is then reattached to the outer housing. EX1003: ¶[0051]; EX1002: ¶45.



EX1003: Figs. 2-4.

To detach the micro connector from the adapter (2400), the outer housing is pulled rearward—via pull key (2110)—to lift the hooks of the adapter out of recesses in the front body, thereby allowing the entire micro connector to be removed. EX1003: ¶[0050]; EX1004: Figs. 32B, 34-35C, ¶[236]-[237]; EX1030: ¶[0106]; EX1002: ¶46.

2. Katoh

Katoh discloses an optical connector (10) having a boot (4) with a flared operation portion (43) to assist a user in pushing and pulling the boot to insert and remove the connector from an adapter (7). EX1005: ¶¶[0068], [0070], [0078], [0083], [0091]-[0092], claim 1; EX1002: ¶¶47-49.

FIG. 1

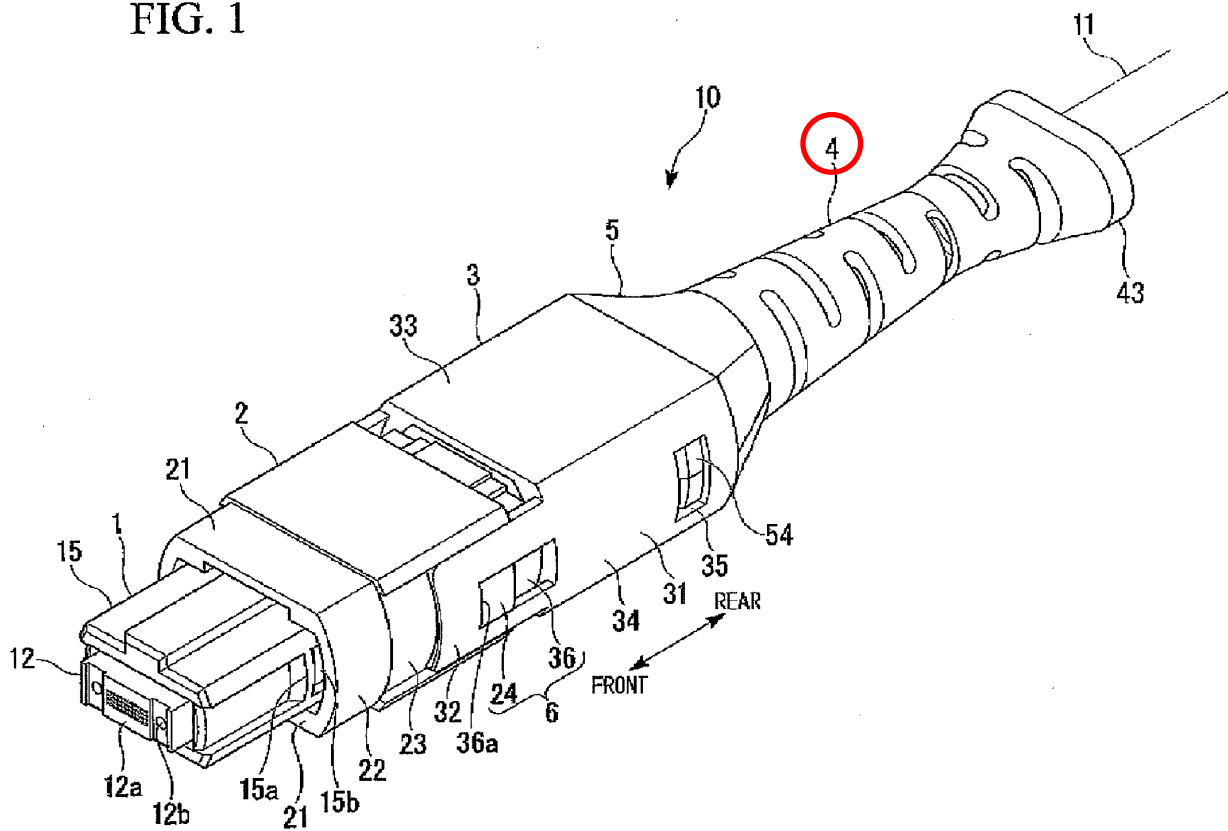


FIG. 4

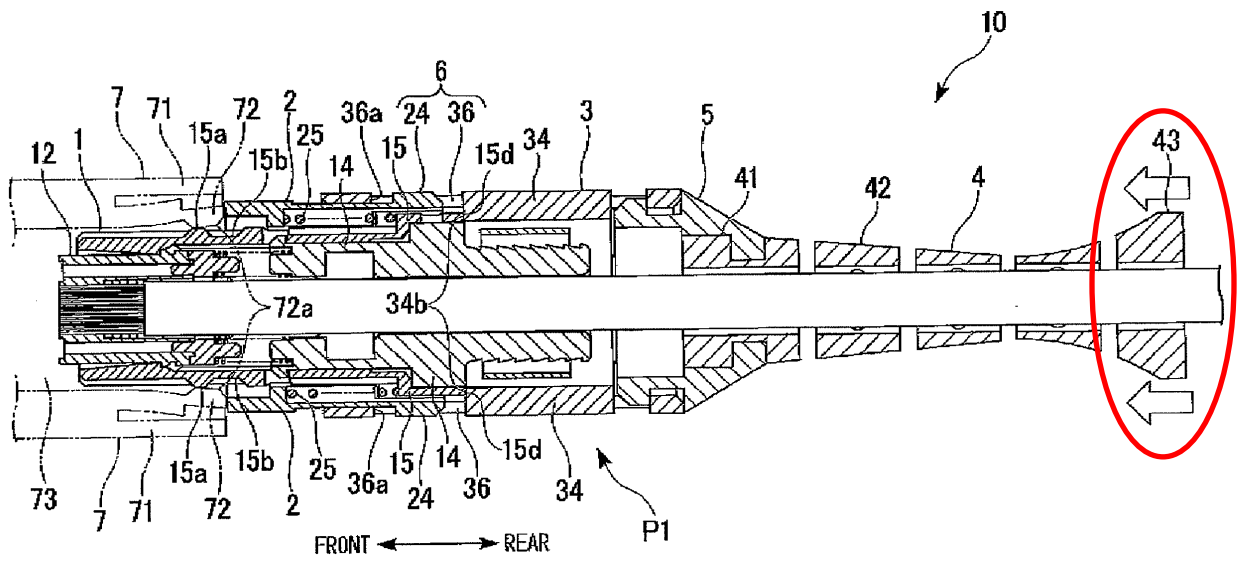
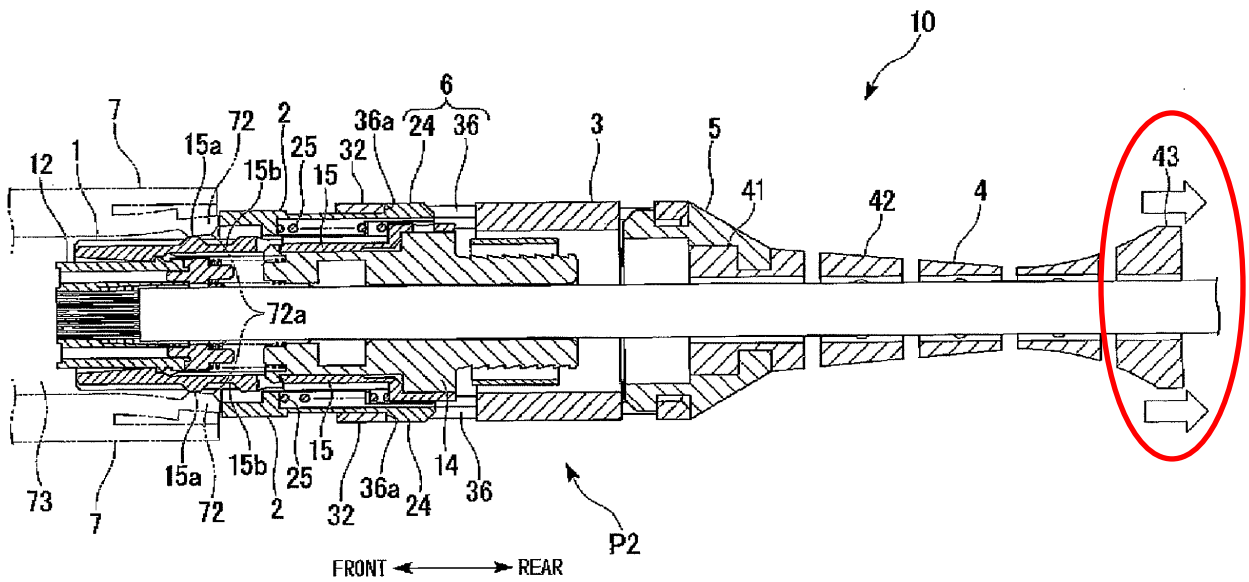


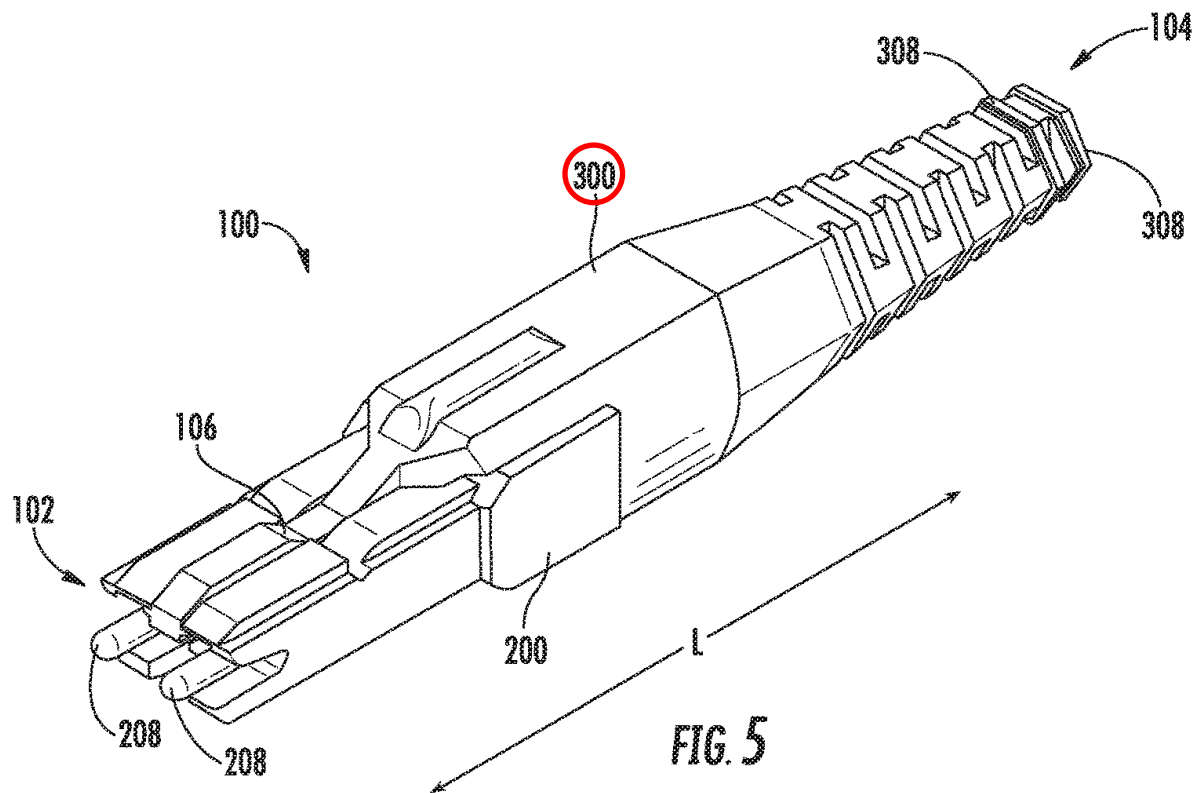
FIG. 6



EX1005: Figs. 1, 4, and 6 (annotated).

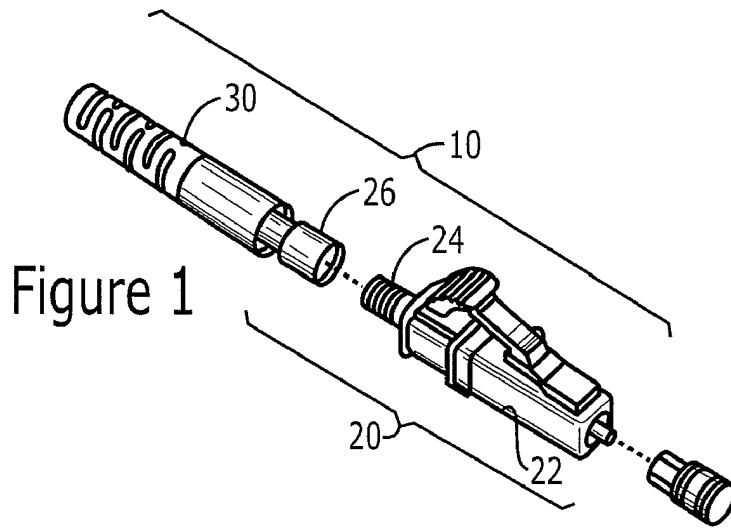
3. Davidson

Davidson discloses a push-pull boot connector (100) having a strain relief boot (300)—with an integral connector release arm (310)—that is pushed and pulled to insert and remove the connector from an adapter (400). EX1006: ¶¶[0038]-[0039]; EX1002: ¶¶50-52.



4. Castagna

Castagna discloses a fiber optic cable assembly (10) with a strain relief boot (30) made of injection molded polypropylene. EX1007: 3:58-61; EX1002: ¶¶53-54.



EX1007: Fig. 1.

5. Repta

Repta discloses an optical fiber connector with a boot (10) made of polypropylene. EX1008: 3:21-23, 4:10-15; EX1002: ¶¶55-56.

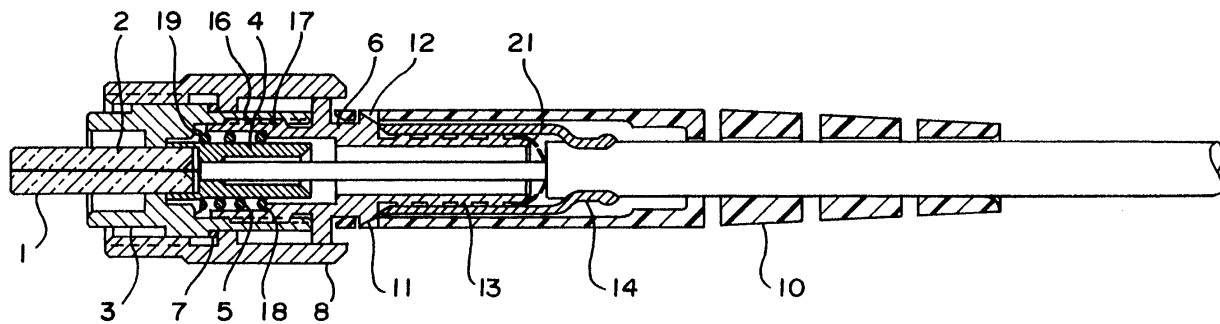


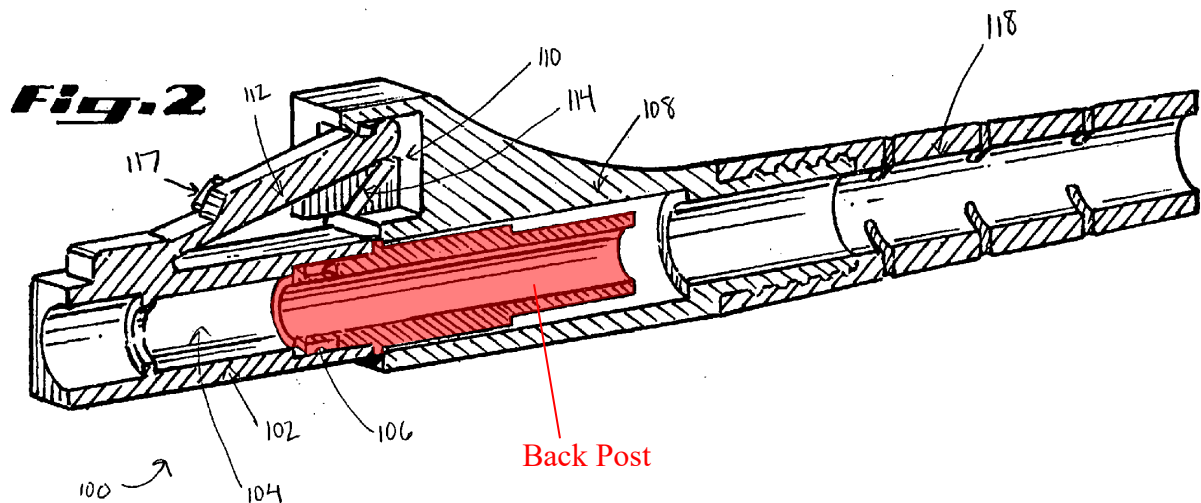
FIG. 1

EX1008: Fig. 1.

6. Ehrenreich

Ehrenreich teaches an optical connector (100) with a push/pull boot (118) and an extended back post for attaching to a fiber optic cable. EX1009: Fig. 2,

¶[0026]; EX1002: ¶¶57-58.



EX1009: Fig. 2 (annotated).

C. Level of Ordinary Skill

The person having ordinary skill in the art (“POSA”) 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. EX1002: ¶¶22-23.

The level of ordinary skill is not determinative, as those of less or more skill would also find the claims to be unpatentable. EX1002: ¶24.

IV. CLAIM CONSTRUCTION

In an PGR, the Board gives claim terms their ordinary meaning as understood by a POSA. 37 C.F.R. §42.200(b).

Petitioner has applied the plain and ordinary meaning, but reserves the right to rebut or demonstrate invalidity under any Patent Owner claim construction(s). EX1002: ¶¶59-60.

V. GROUND 1: Lack of Written Description

The specification must reasonably convey to a POSA that the inventor had possession of the subject matter as of the filing date. *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991).

A. Claim 8 Lacks Written Description

Claim 8 recites that “the center portion of the boot *engages* the rear portion of the housing.”

The ‘794 Patent contains no reference or indication that US Conec was in possession of a center portion of a boot engaging a rear portion of a housing.

EX1002: ¶¶61-65.

The ‘794 Patent’s fiber optic connector (100) includes a housing (102), a crimp body (106), and a boot (112) (among other components). EX1001: 3:63-4:2; EX1002: ¶66. As the ‘794 Patent’s claims and specification makes clear, the boot has different portions including a front extension (110), a center portion (200), and a back portion (202). EX1001: 5:21-24, claim 1; EX1002: ¶66. While the front extension is shown and described as engaging the housing, the center portion of the boot never is. EX1001: Figs. 1-6, 7:22-25; EX1002: ¶66.

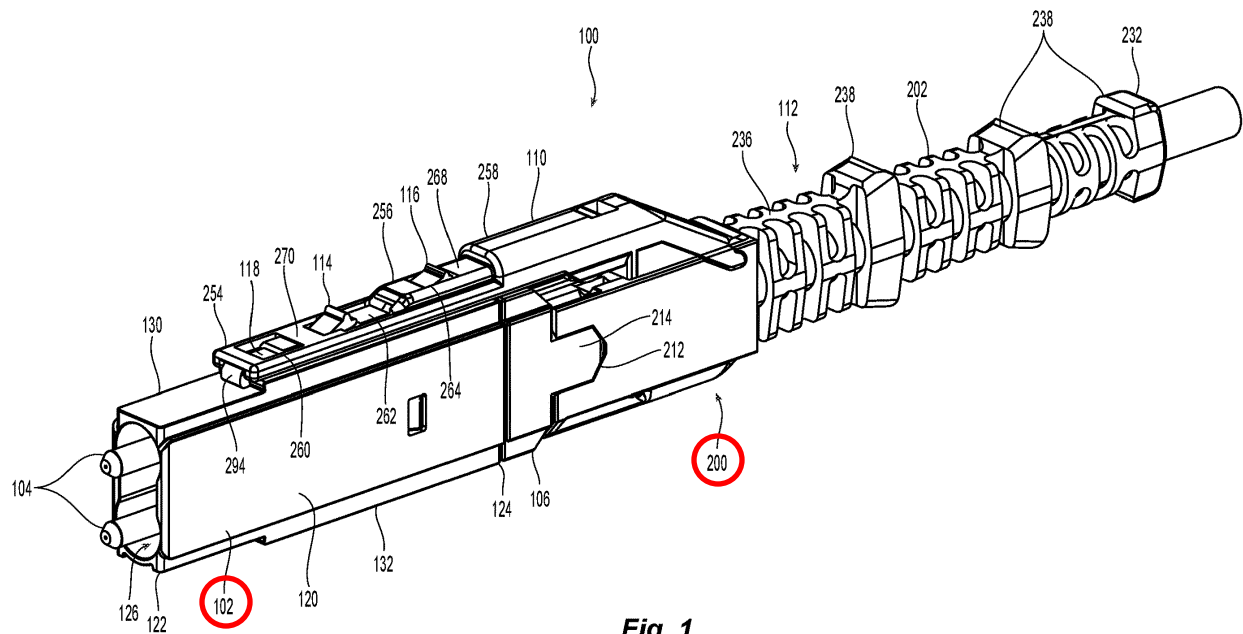


Fig. 1

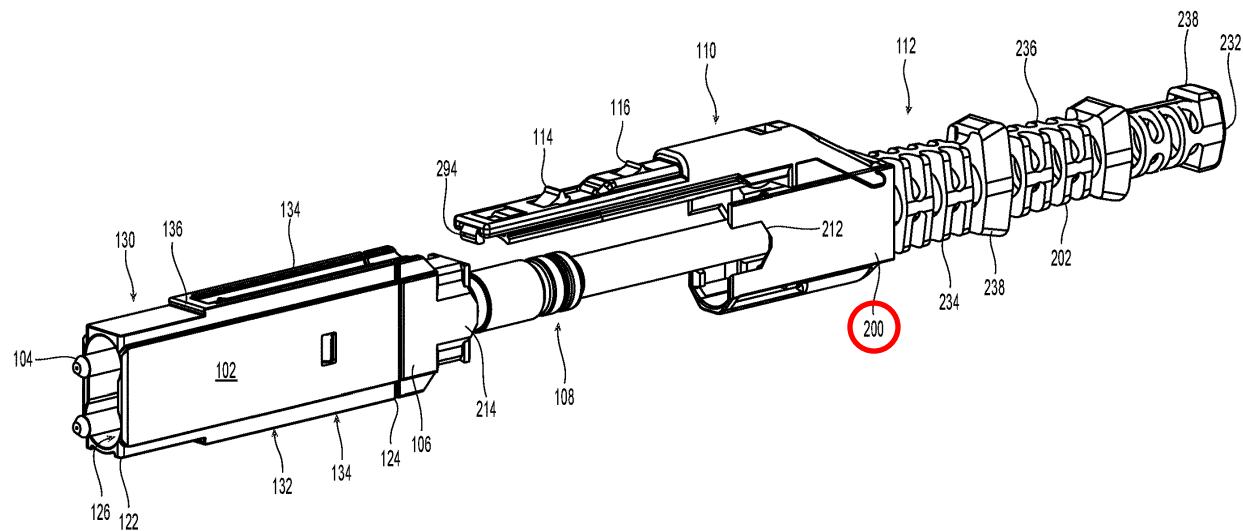


Fig. 6

EX1001: Figs. 1 and 6 (annotated).

No figure of '794 Patent shows the center portion (200) of the boot (112) engaging the housing (102), let alone a rear portion thereof. EX1002: ¶67.

Instead, the center portion of the boot is shown as engaging the crimp body (106).

EX1001: Figs. 1-6, 8, 9, and 15; EX1002: ¶67. In fact, the crimp body separates the center portion of the boot from the housing. EX1001: Figs. 1-6, 8, 9, and 15; EX1002: ¶67. Likewise, the written description describes the center portion of the boot as engaging only the crimp body, not any portion of the housing:

- “the front end 204 of the center portion 200 should be touching the first portion 154 of the central portion 152 of the crimp body 106.” EX1001: 5:56-58.
- “With the front end 204 of the center portion 200 disposed against the crimp body 106, the cut-outs 212 receive the portion 214 of the crimp body 106.” EX1001: 8:29-31.
- “the way of engagement between the center portion [504] [of the boot] and the crimp body 520 has changed.” EX1001: 9:39-40; EX1002: ¶68.²

Therefore, claim 8 lacks written description support. EX1002: ¶69.

B. Claim 16 (and Dependent Claims 17-19) Lacks Written Description

Claim 16 recites that “the front extension [is] attached to the housing *via at least one latch* forward of a center portion of the boot.” Use of the phrase “at least one” creates an open ended range covering a front extension attached to the housing via one latch, two latches, three latches, etc. EX1002: ¶¶70-71; *Rhine v. Casio*, 183 F.3d 1342, 1345 (Fed. Cir. 1999) (“Use of the phrase ‘at least one’ means that there could be only one or more than one.”).

² This passage is corrected to use reference numeral “504” instead of “500.”

EX1001: 9:14-17; EX1002: ¶68.

The written description requirement requires the inventor be in possession of the **full scope** of the claim limitation. *Juno Therapeutics, Inc. v. Kite Pharma, Inc.*, 10 F.4th 1330, 1337 (Fed. Cir. 2021) (“the written description must lead a person of ordinary skill in the art to understand that the inventors possessed the **entire scope** of the claimed invention”); *LizardTech Inc. v. Earth Resource Mapping Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005) (“Whether the flaw in the specification is regarded as a failure to demonstrate that the patentee possessed the **full scope** of the invention recited in [the claim] or a failure to enable the full breadth of that claim, the specification provides inadequate support for the claim under [§ 112(a)]”); *Rivera v. Int’l Trade Comm’n*, 857 F.3d 1315, 1319-21 (Fed. Cir. 2017) (affirming that “the specification did not provide the necessary written description support for the **full breadth** of the asserted claims”); *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, (Fed. Cir. 1998) (“claims may be no broader than the supporting disclosure”).

The ‘794 Patent³ demonstrates that US Conec was **not** in possession of the **full scope** of this claim limitation—i.e., a front extension attached to the housing via one latch, two latches, three latches, etc. EX1002: ¶¶72-73.

³ Including the patent documents in the priority chain of the ‘794 Patent. EX1026; EX1027; EX1028.

The specification shows and describes the front extension (110) of the boot (112) being attached to the housing (102) by a *single* latch (294) (i.e., connector latch), not two, nor three, nor four or more latches. EX1001: Figs. 1, 6, and 14, 7:53-62; EX1002: ¶74.

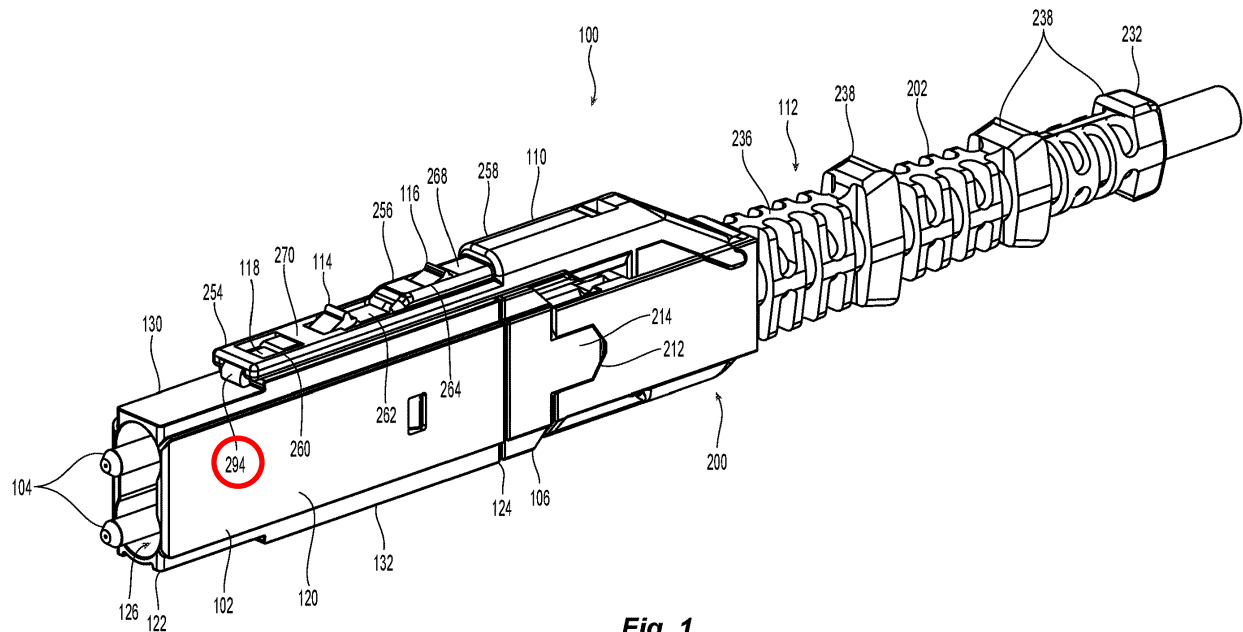


Fig. 1

EX1001: Fig. 1 (annotated).

The specification describes the front extension (110) as having only a single connector latch (294), not “at least one” connector latch that attaches the front extension to the housing (102). EX1001: 7:53-62; EX1002: ¶75.

The ‘794 Patent does describe the front extension (110) being attached to the housing (102) in other ways—i.e., extensions (280, 282) that are received in lobe sections (140) of the housing—, but not by additional latches. EX1001: 7:25-30; EX1002: ¶76.

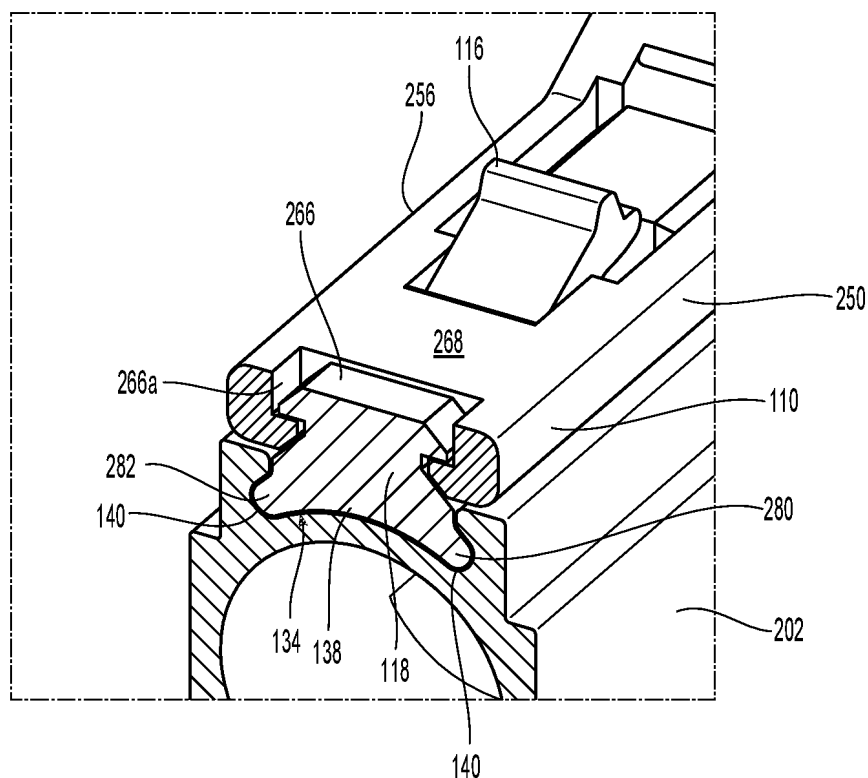


Fig. 7

EX1001: Fig. 7.

In addition, the '794 Patent explains the front extension (110) has other latches (114, 116), but these latches do not attach to the housing as recited by claim 16. EX1001: Fig. 1; EX1002: ¶77. Instead, these additional latches (114, 116) are for engaging the receptacle the connector (100) is inserted into. EX1001: 4:4-9; EX1002: ¶77. Lastly, the connectors (100, 500) have other the latches (220, 528, 530) but these latches attach the crimp body (106, 520) and the boot (112, 500) to one another. EX1001: Figs. 9, 13 and 18, 5:47-53, 9:41-47; EX1002: ¶77. These

other latches (220, 528, 530) do not attach the front extension to the housing and are not “forward of a center portion of the boot” as recited by claim 16. EX1001: 5:47-53, 9:41-47; EX1002: ¶77.

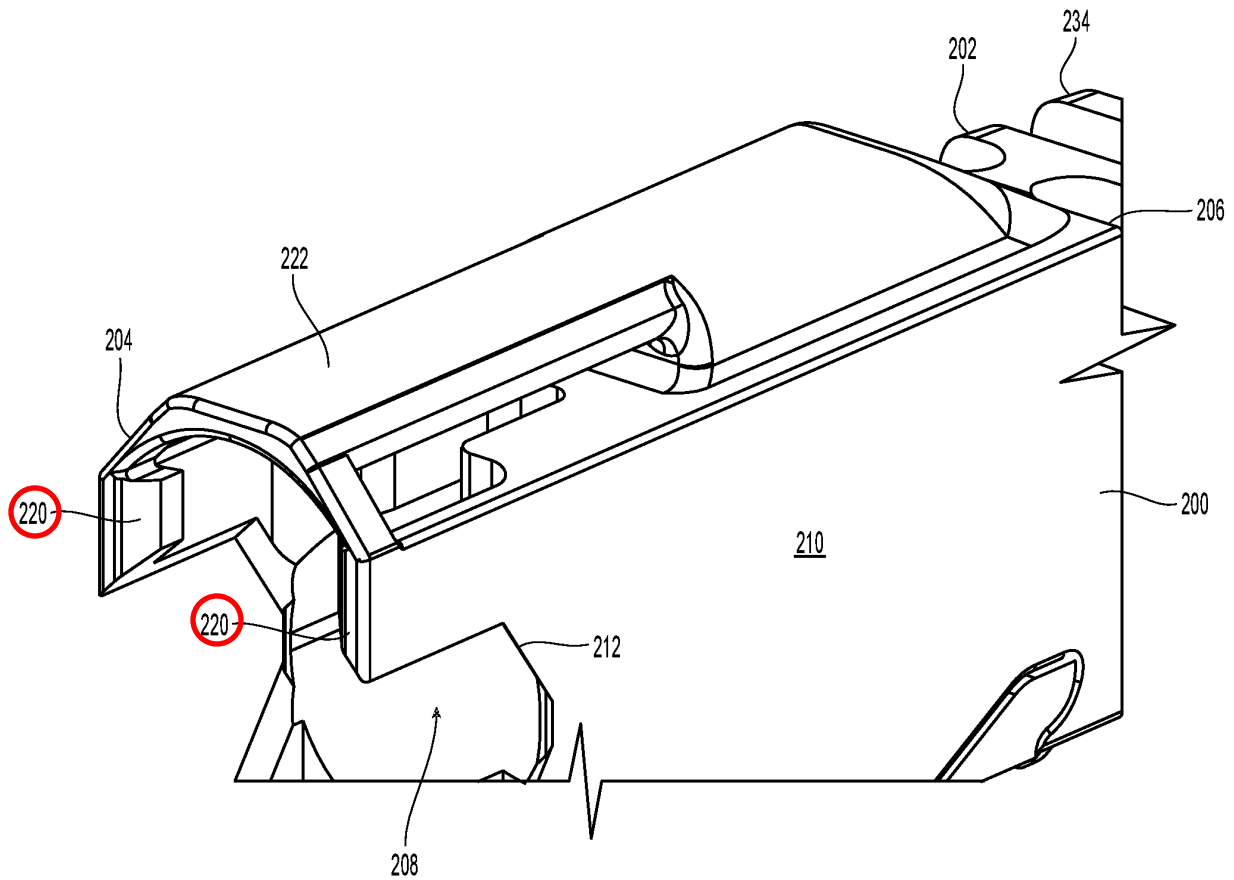


Fig. 13

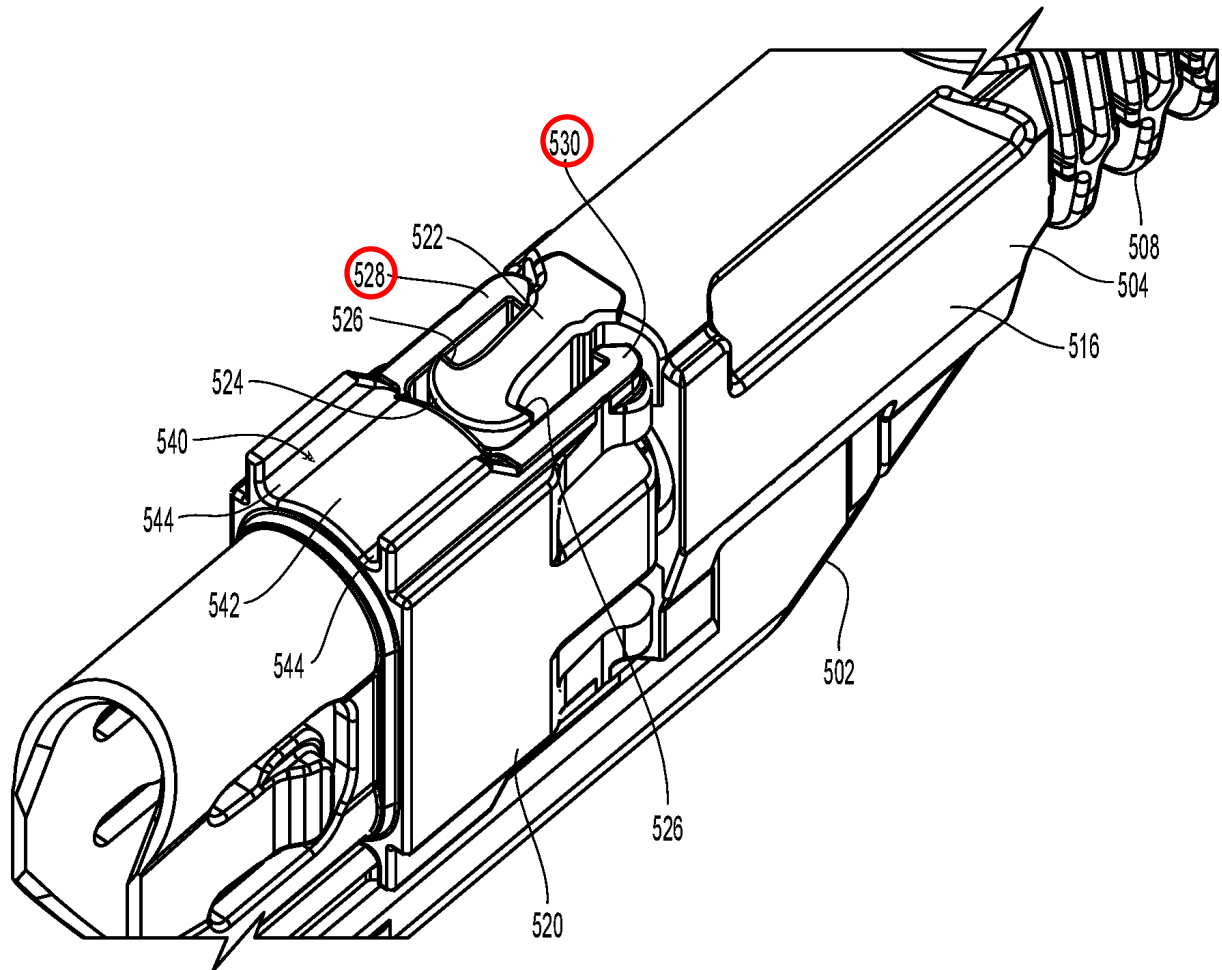


Fig. 18

EX1001: Figs. 9, 13 and 18 (annotated).

Therefore, US Conec was not in possession of the full scope of “the front extension [is] attached to the housing *via at least one latch* forward of a center portion of the boot” when the specification shows and describes only a single latch (294)—not two or more latches—attaching the front extension (110) to the housing

(102). EX1002: ¶78. Accordingly, claim 16 (and dependent claims 17-19) lacks written description support. EX1002: ¶¶78-79.

C. Claim 20 Lacks Written Description

Claim 20 recites that the “crimp body [is] engaged to the boot *forward of the boot.*”

The ‘794 Patent contains no reference or indication that US Conec was in possession of this limitation. EX1002: ¶¶80-81.

As explained in Section V(A), the boot (112) includes the front extension (110). EX1001: 5:21-24, claim 1; EX1002: ¶82. As shown below, the front extension forms the front of the boot. EX1001: Fig. 6; EX1002: ¶83. However, the crimp body (106) is not engaged with the front of the boot formed by the front extension. EX1001: Fig. 1; EX1002: ¶83. Instead, the crimp body (106) is located at an *intermediate* position along the boot, rearward of the front of the boot, when the boot is attached to the crimp body. EX1001: Fig. 1; EX1002: ¶83. As shown below, the front extension of the boot extends forward of the crimp body. EX1001: Fig. 1; EX1002: ¶83. Accordingly, the ‘794 Patent’s crimp body is not engaged to the boot forward of the boot. EX1002: ¶83.

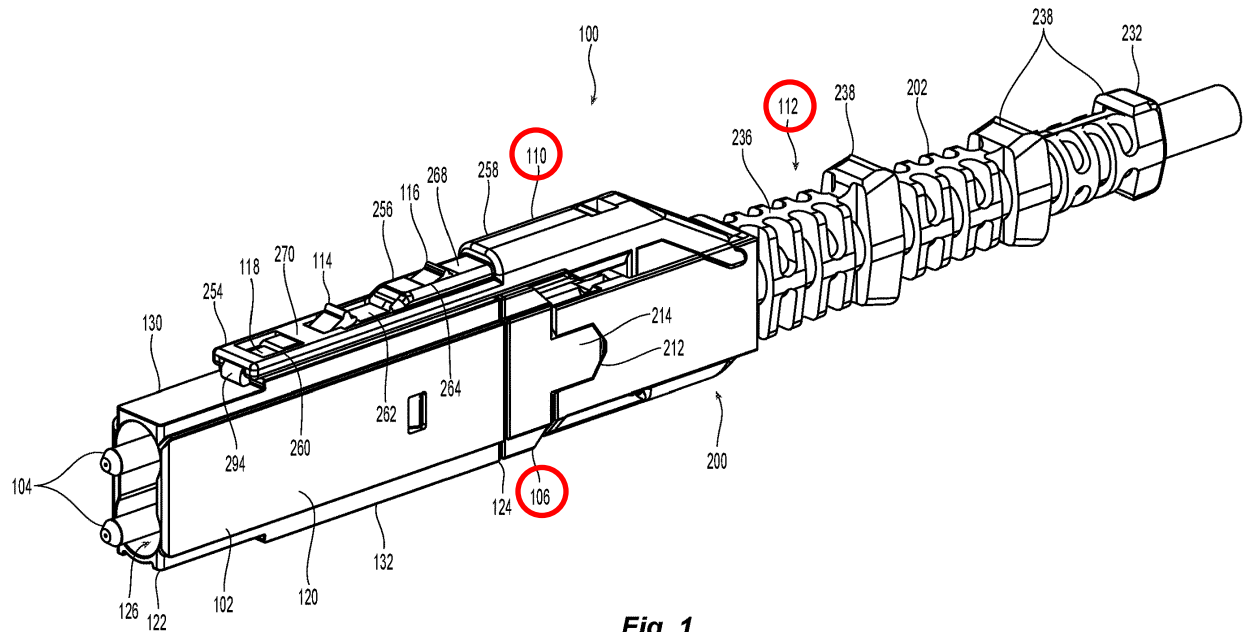


Fig. 1

EX1001: Fig. 1 (annotated).

Therefore, claim 20 lacks written description support. EX1002: ¶84.

VI. GROUND 2: Claims 1-6, 8-12, 14, 16-18, and 20 are Anticipated by Takano (First Embodiment)

As explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. EX1002: ¶85. This ground relies on the optical connector shown in Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the optical connector *includes* the key (9105.1, 9205.1, 9305.1, 9405.1).

EX1003: ¶[0059] (“multi-purpose rotatable boot 9109.1 comprises releasably attached alignment and offset key 9105.1, releasable at release point 9109.6”);

EX1002: ¶85.

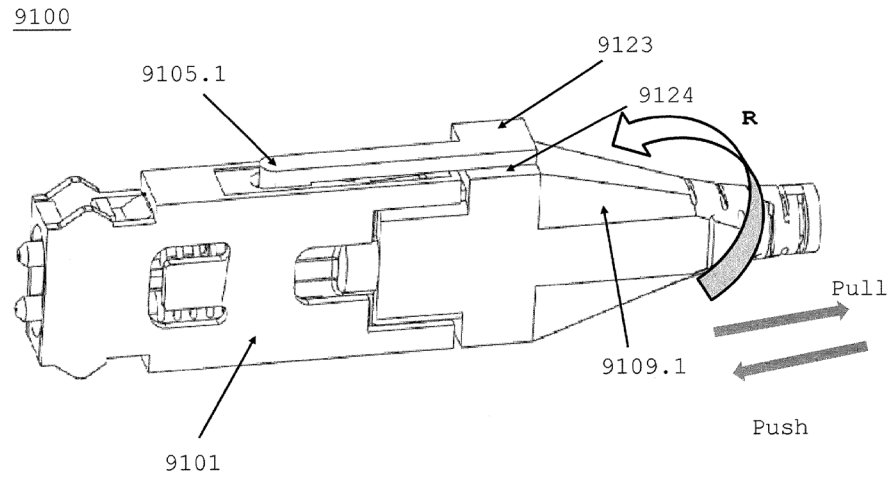
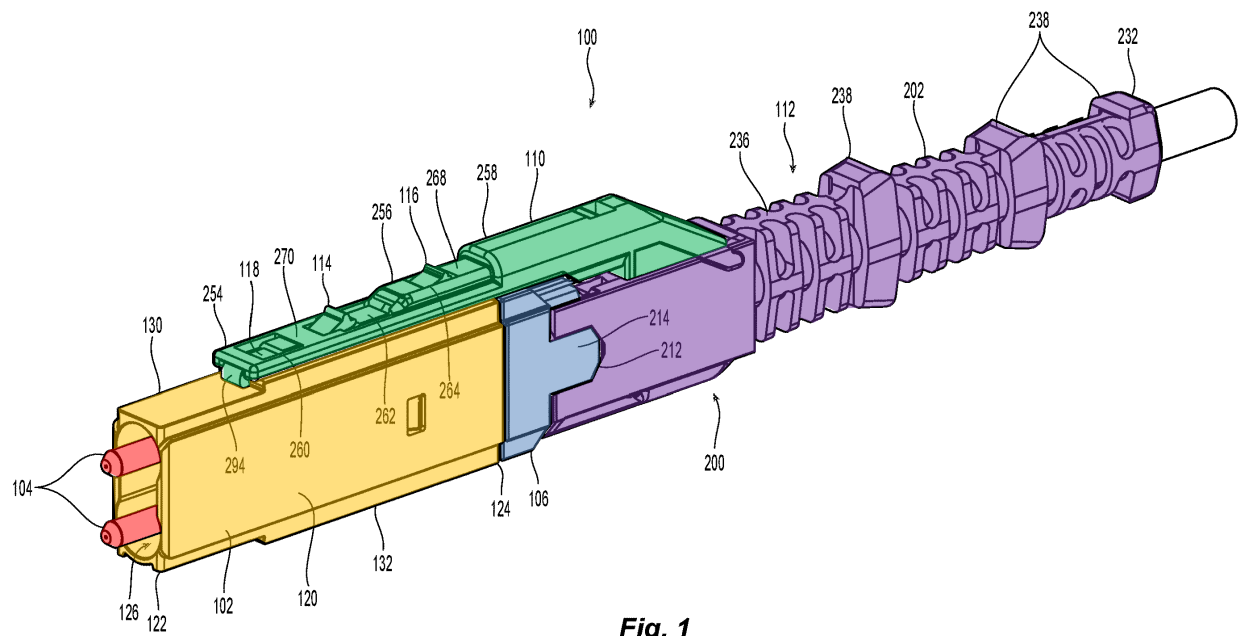
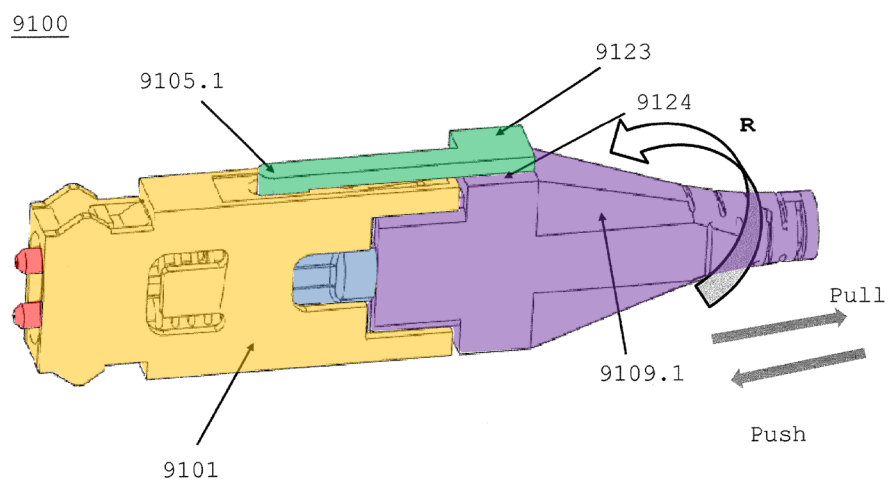


FIG. 16

EX1003: Fig. 16.

The similarities between Takano's and the '794 Patent's optical connectors are apparent. EX1002: ¶¶86-87.



EX1001: Fig. 1 (annotated); EX1003: Fig. 16 (annotated).

A. Independent Claim 1

1. 1.P⁴

Takano teaches a micro optical connector (9100) having an outer housing (9101, 9201, 9301, 9401), a boot or boot assembly (9109.1, 9209.1, 9309.1, 9409.1), and a back body (9106, 9206). EX1003: ¶¶[0058], [0061], Figs. 16 and 18; EX1002: ¶88. The back body is a “crimp body” as a crimp ring (9207) is crimped onto the back body. EX1003: ¶¶[0067], [0072], Figs. 27 and 34; EX1002: ¶88.

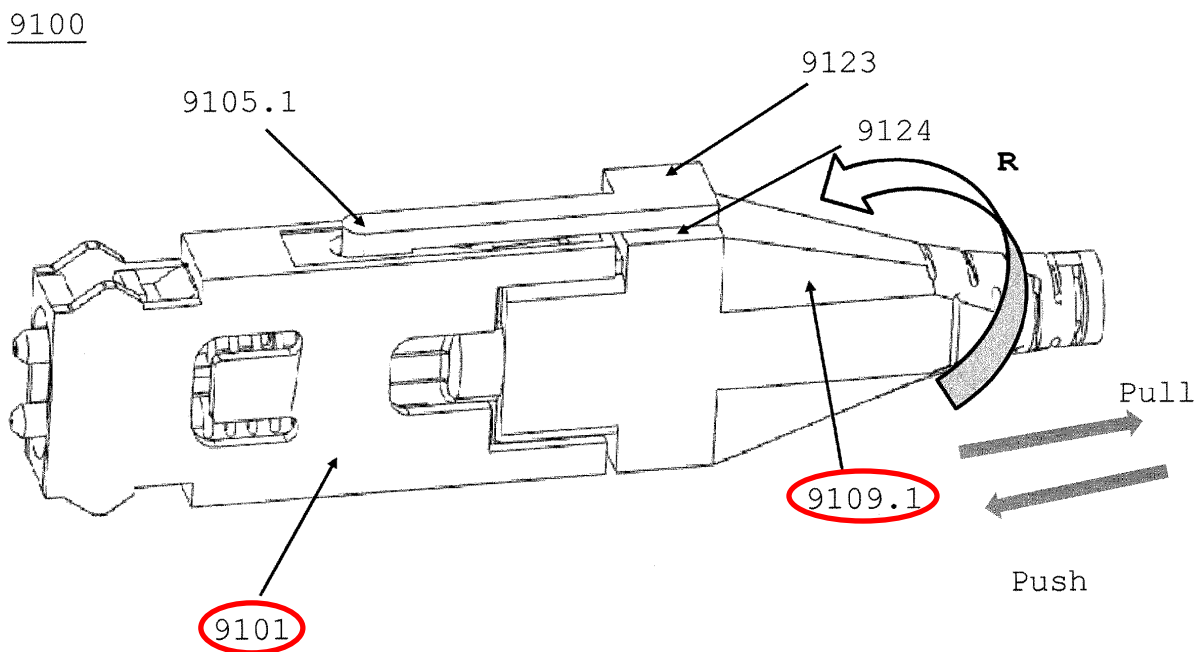
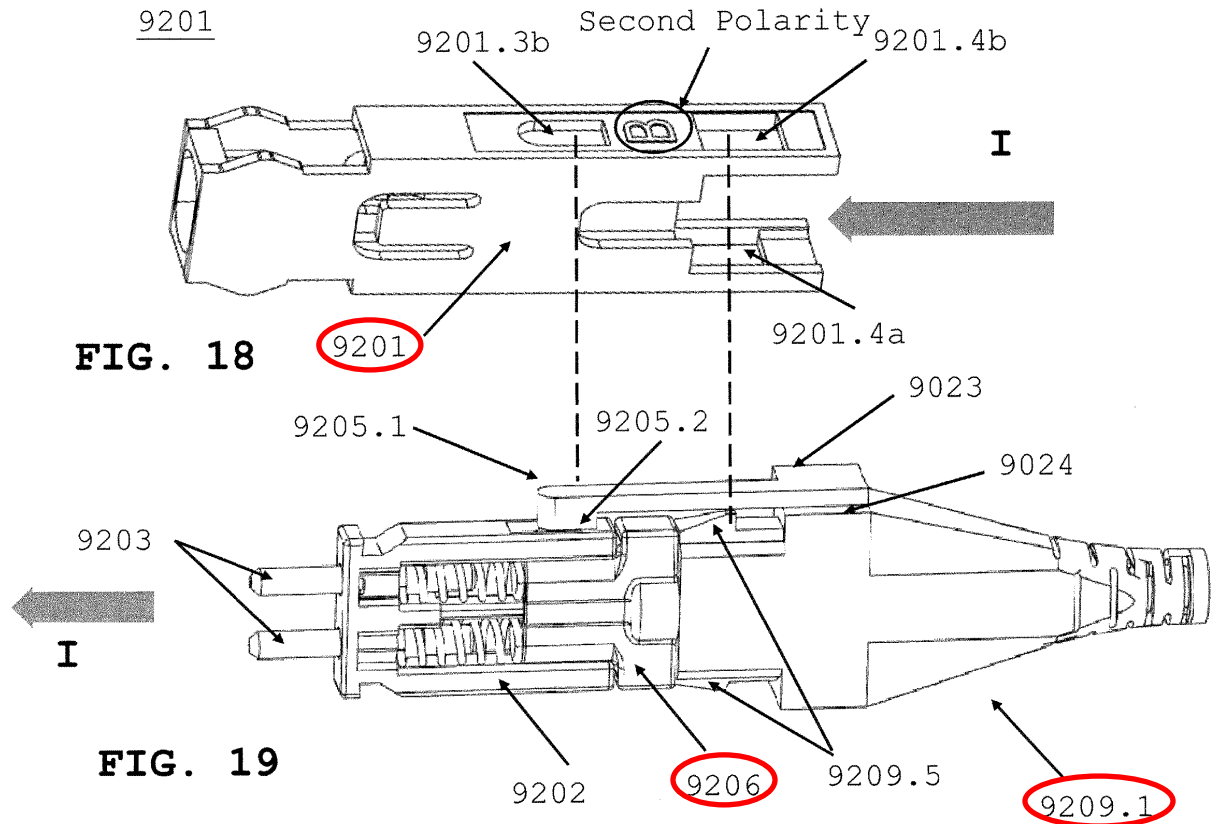


FIG. 16

⁴ Petitioner’s headings (1.P, 1.a.1, etc.) correspond to the claim limitations outlined in the Claim Listing (EX1031).



EX1003: Figs. 16, 18, and 19 (annotated).

The micro connector (9100) includes two ferrules (9203) partially within the outer housing (9101, 9201, 9301, 9401). EX1003: Fig. 16 and 19, ¶[0061];

EX1002: ¶89. Each ferrule terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector is attached to. EX1003: ¶[0048], [0059], [0065]; EX1002: ¶89. Fig. 36 below is annotated to include the optical fibers (red). EX1002: ¶89.

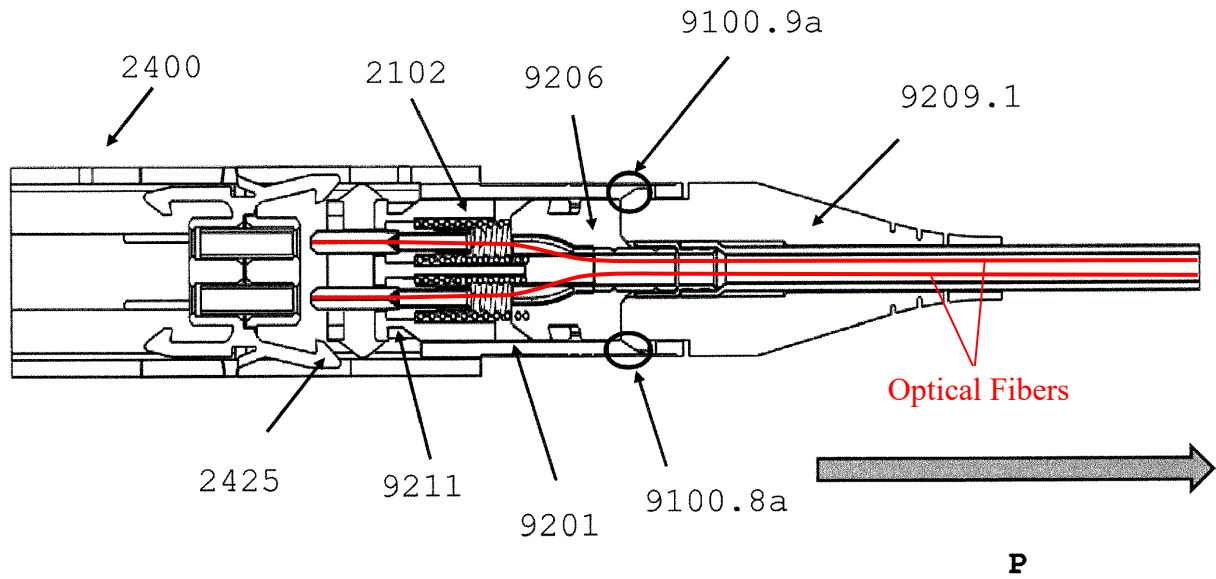


FIG. 36

EX1003: Fig. 36 (annotated).

Therefore, Takano meets 1.P. EX1002: ¶90.

2. 1.a.1

Takano's outer housing (9101, 9201, 9301, 9401) has a front end opening.

EX1003: Figs. 16 and 30; EX1002: ¶91.

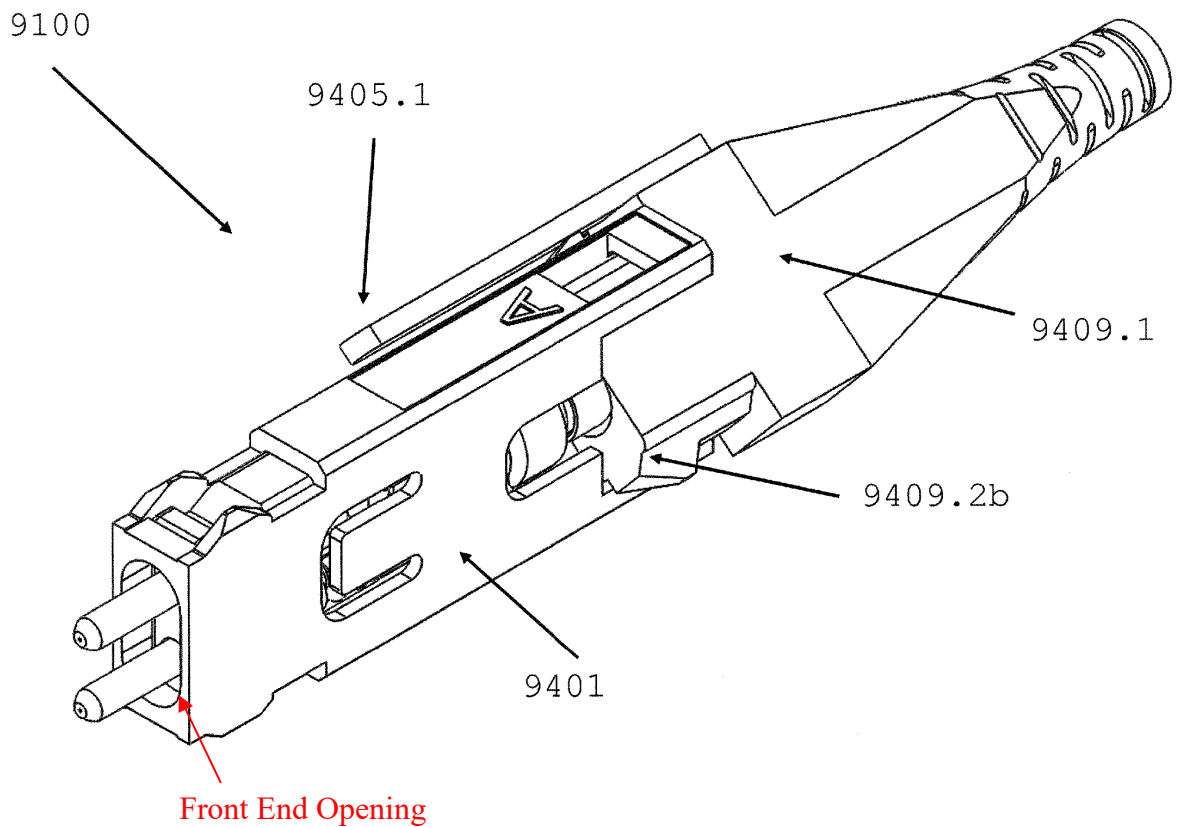


FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets 1.a.1. EX1002: ¶92.

3. 1.a.2

Takano's outer housing (9101, 9201, 9301, 9401) has a two short sides forming a top and a bottom. EX1003: Figs. 16, 29, and 30; EX1002: ¶93.

Takano's outer housing also has two long sides joining the top and bottom.

EX1003: Figs. 16, 29, and 30; EX1002: ¶93.

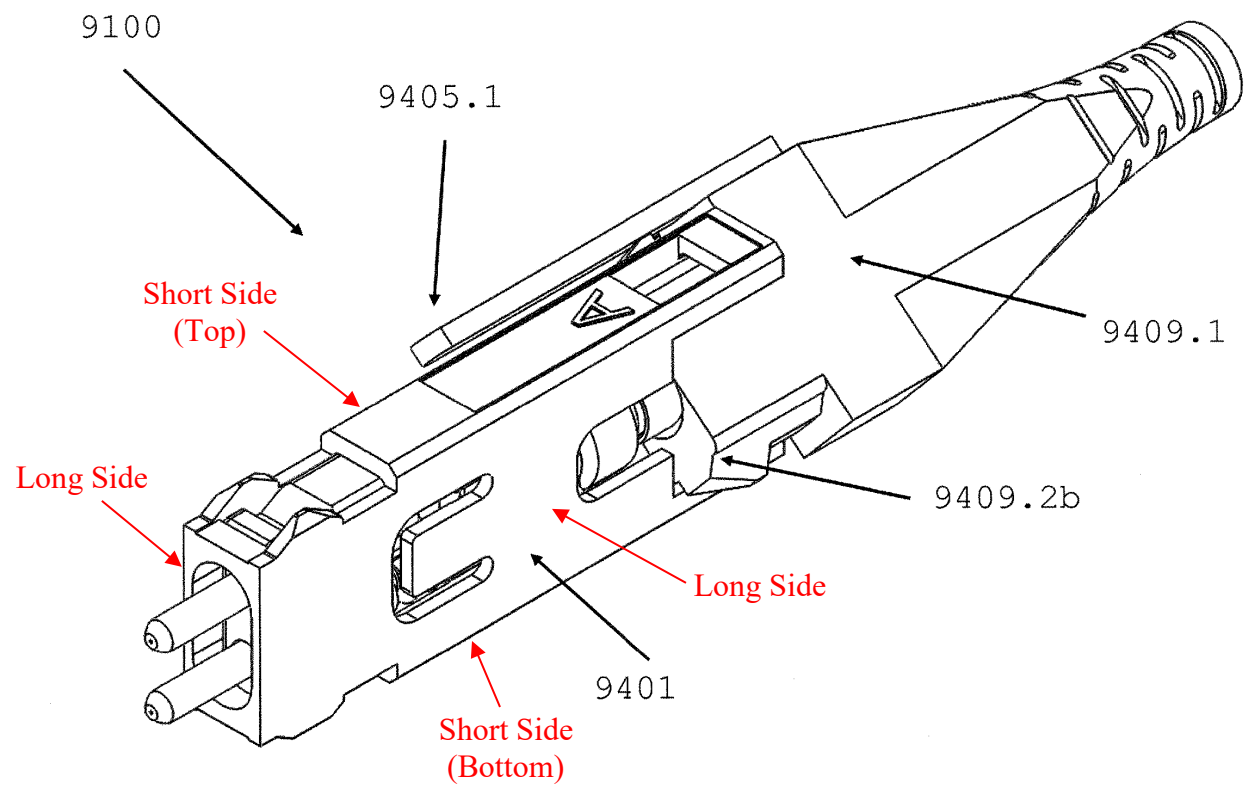
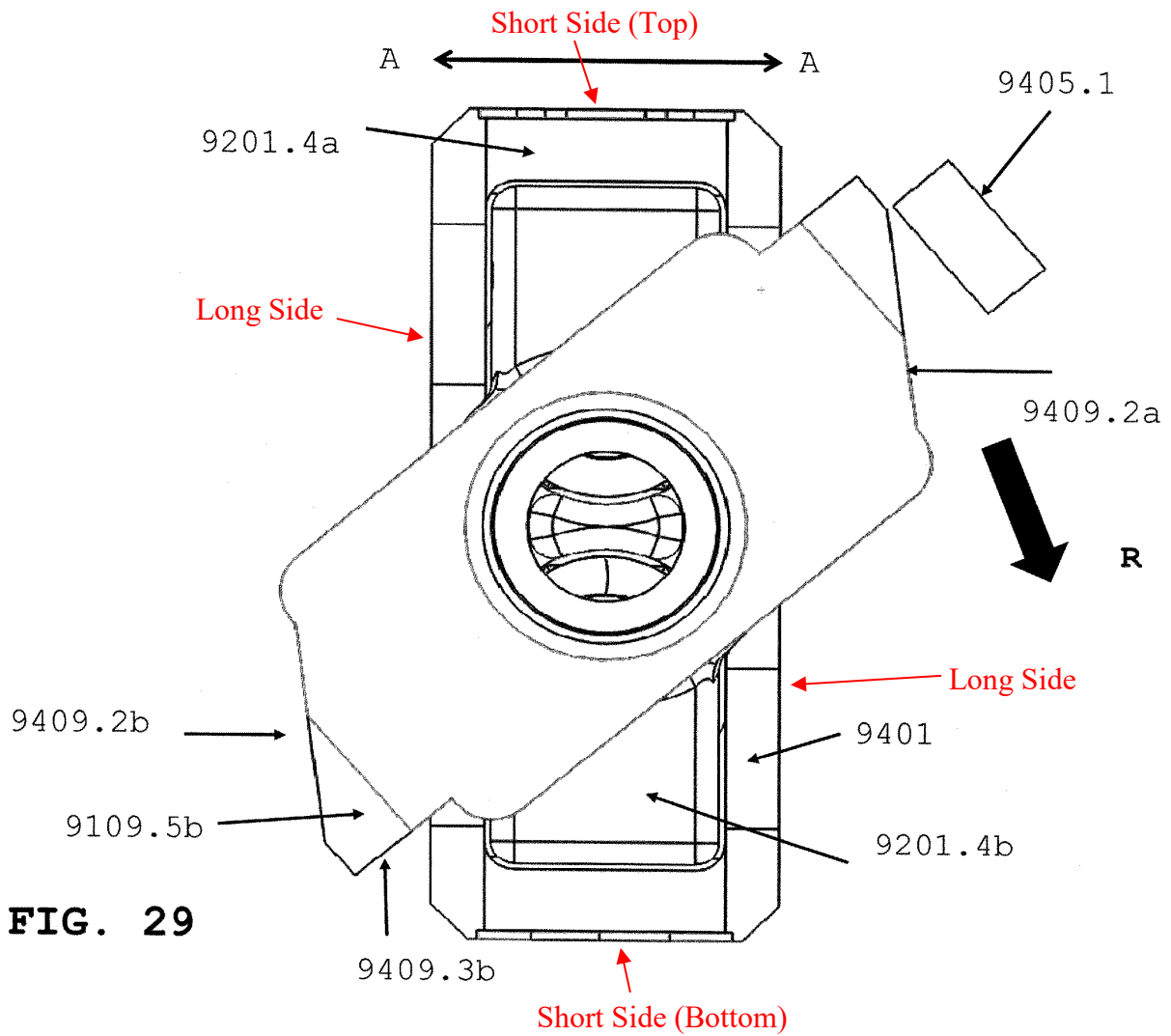


FIG. 30



EX1003: Figs. 29 and 30 (annotated).

Therefore, Takano meets 1.a.2. EX1002: ¶94.

4. 1.a.3

The micro connector (9100) includes two ferrules (9203) that are spaced apart between the top and bottom of the outer housing (9101, 9201, 9301, 9401).

EX1003: Fig. 16, 19, and 30, ¶[0061]; EX1002: ¶95.

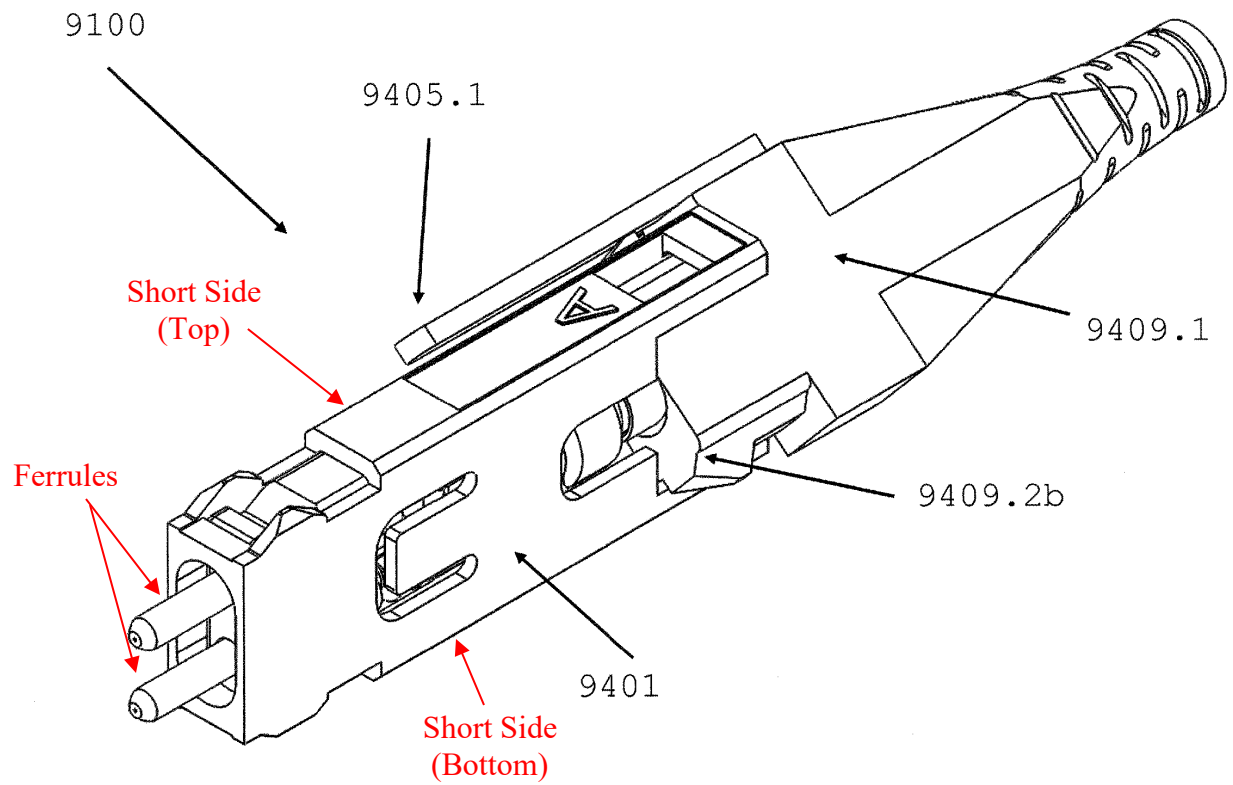


FIG. 30

EX1003: Fig. 30 (annotated).

Each ferrule (9203) terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector (9100) is attached to. EX1003:

¶¶[0048], [0059], [0065]; EX1002: ¶96.

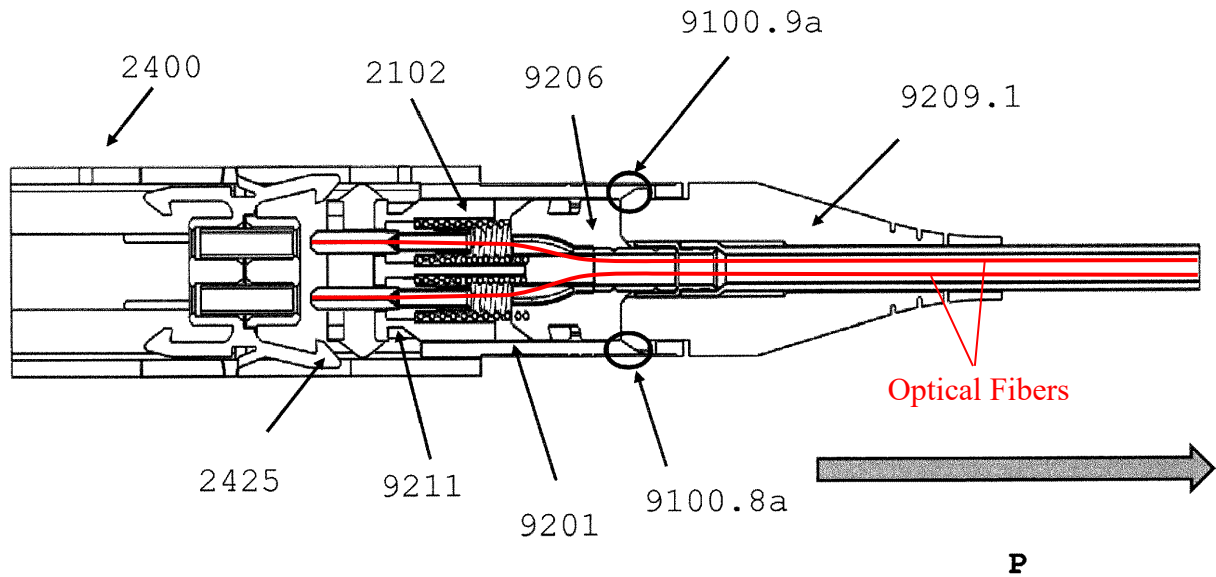
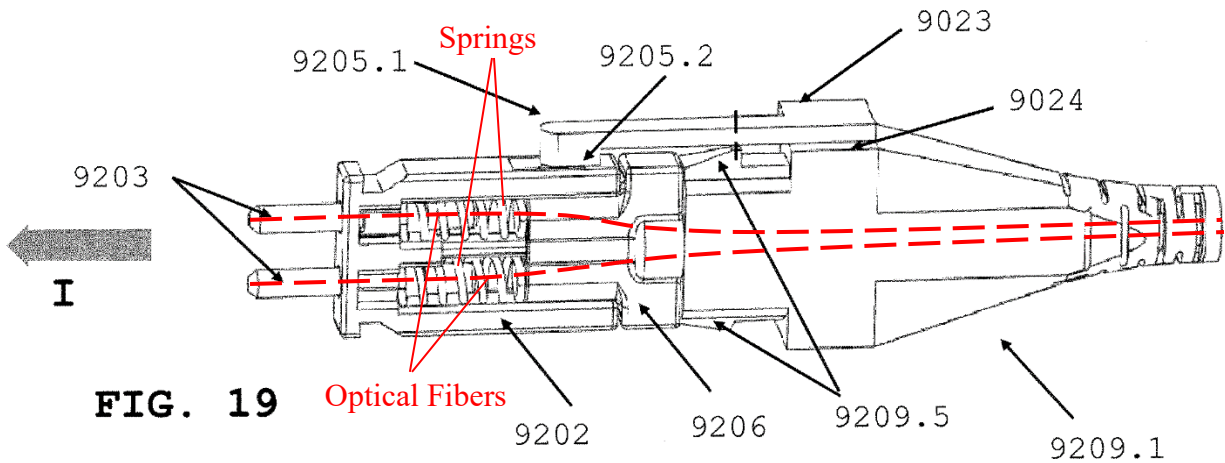


FIG. 36

EX1003: Fig. 36 (annotated).

Because the ferrules (9203) are spaced apart, the sections of the optical fibers in the ferrules would also be spaced apart between the top and bottom of the outer housing (9101, 9201, 9301, 9401). EX1003: Figs. 16, 19, 30, and 36, ¶[0061]; EX1002: ¶97. Further, the optical fibers would also be spaced apart when extending to each ferrule, as each optical fiber would pass through one of the springs (which are also spaced apart) biasing the ferrules. EX1002: ¶97.



EX1003: Fig. 19 (annotated).

Therefore, Takano meets 1.a.3. EX1002: ¶98.

5. 1.a.4

Takano explains the micro connector (9100) has a narrow width for use in a small form-factor pluggable transceiver footprint. EX1003: ¶[0049]; EX1002: ¶99. As a result, the width of the outer housing (9101, 9201, 9301, 9401) is smaller than the height of the outer housing. EX1003: Figs. 16, 29, and 30; EX1002: ¶99.

Therefore, the separation between the top and bottom is more than the separation between the long sides. EX1002: ¶99.

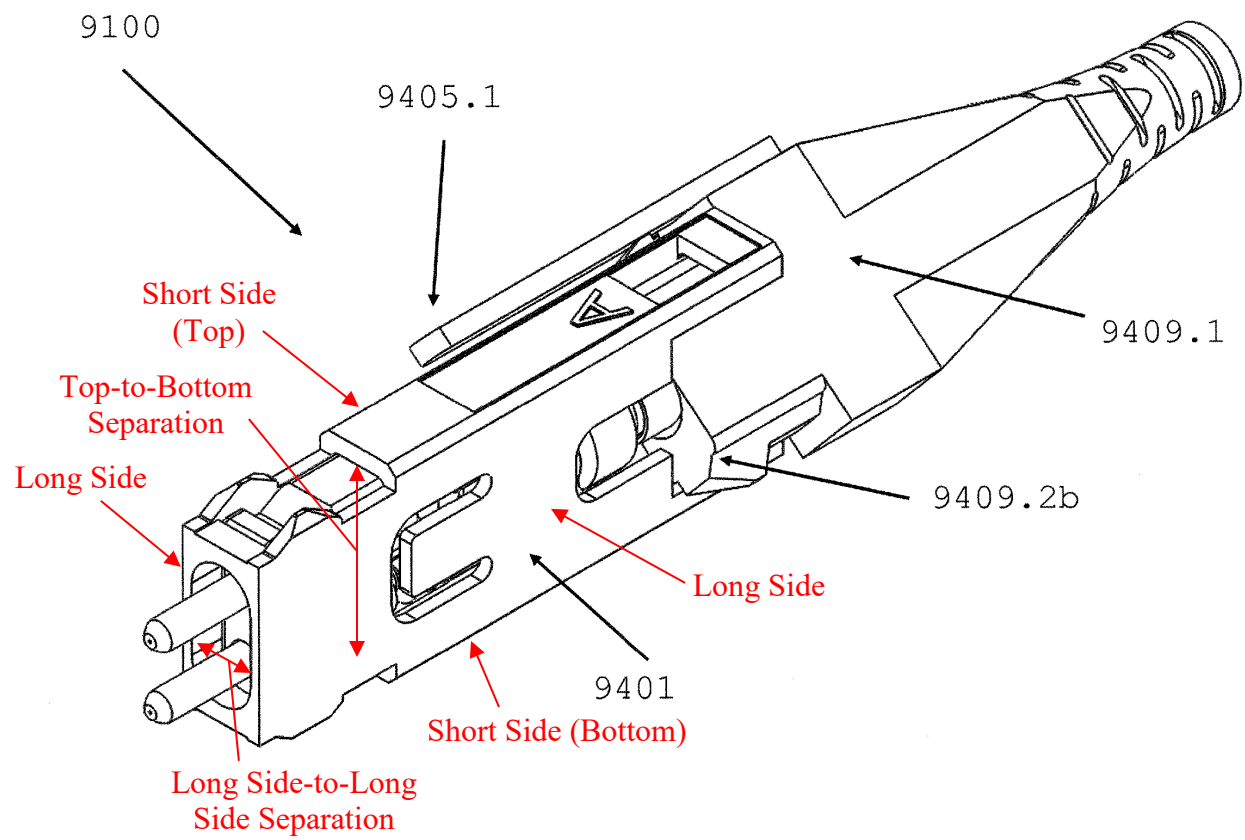
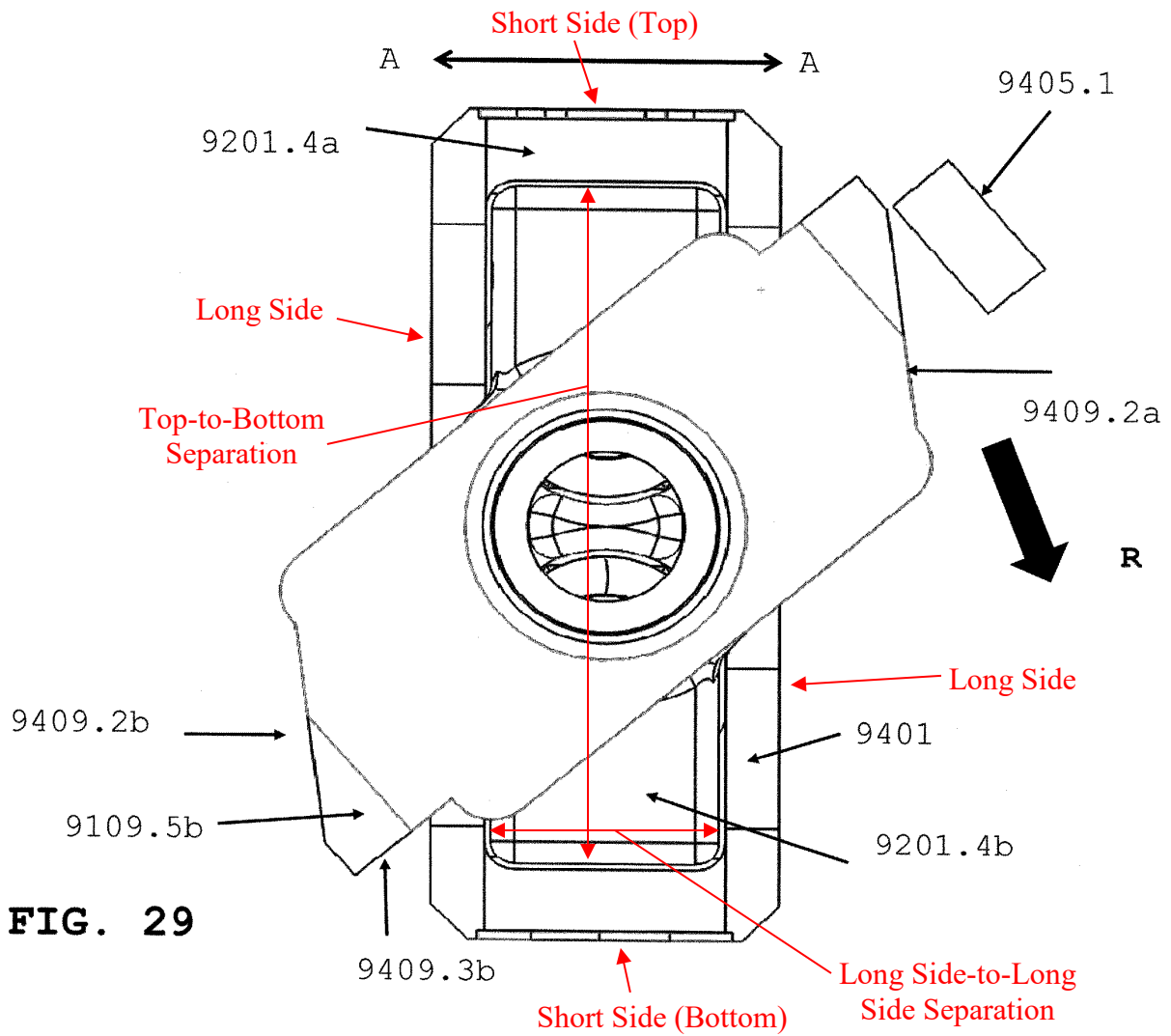


FIG. 30

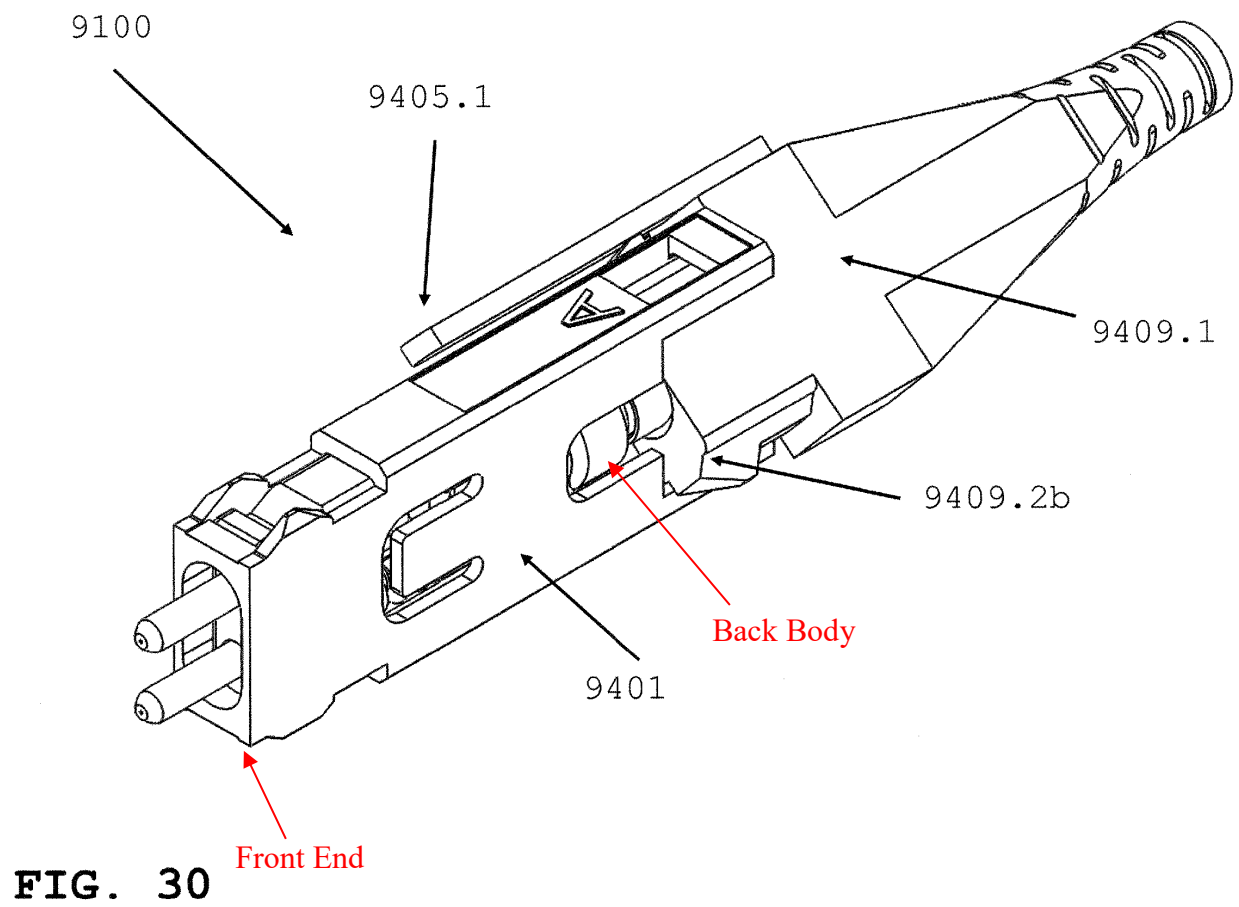
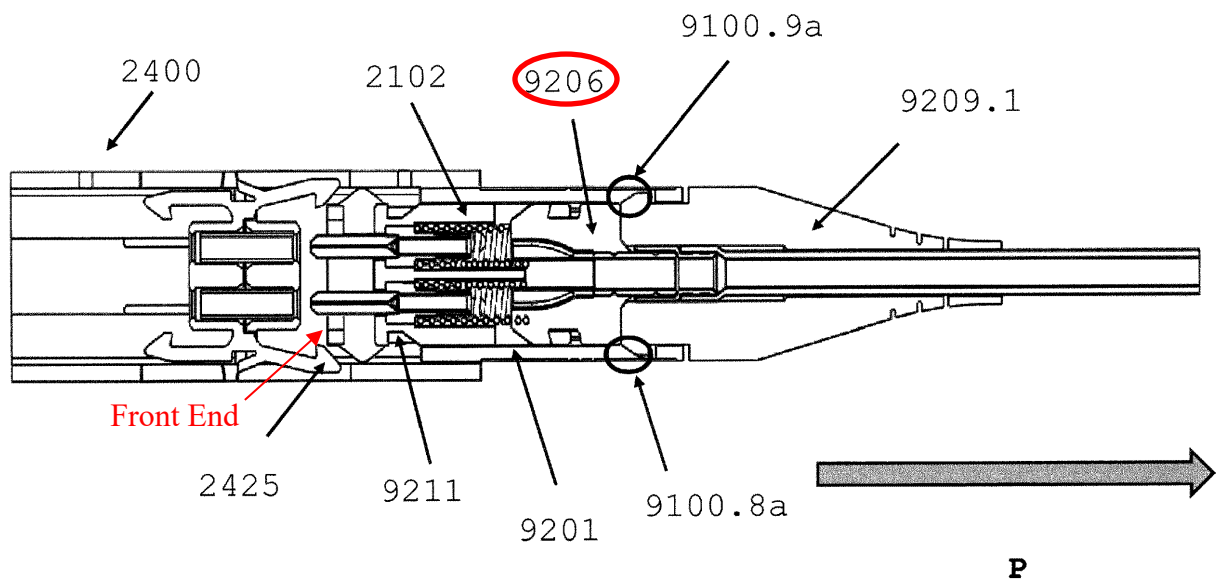


EX1003: Figs. 29 and 30 (annotated).

Therefore, Takano meets 1.a.4. EX1002: ¶100.

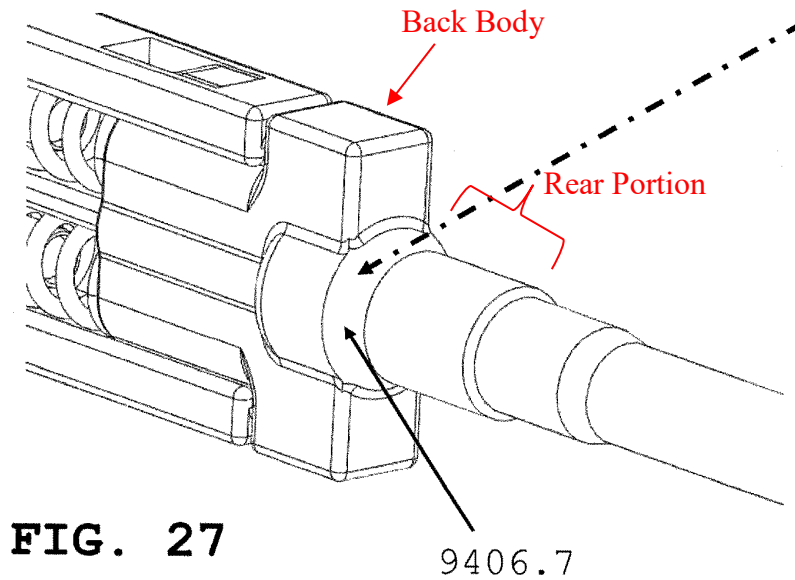
6. 1.b

The back body (9106, 9206) is positioned rearward of the front end of the outer housing (9101, 9201, 9301, 9401). EX1003: Figs. 30 and 36; EX1002: ¶101.



EX1003: Figs. 30 and 36 (annotated).

The back body (9106, 9206) has a rear portion in the form of a back post onto which the crimp ring (9207) is crimped onto. EX1003: ¶¶[0067], [0072], Figs. 27 and 34; EX1002: ¶102.



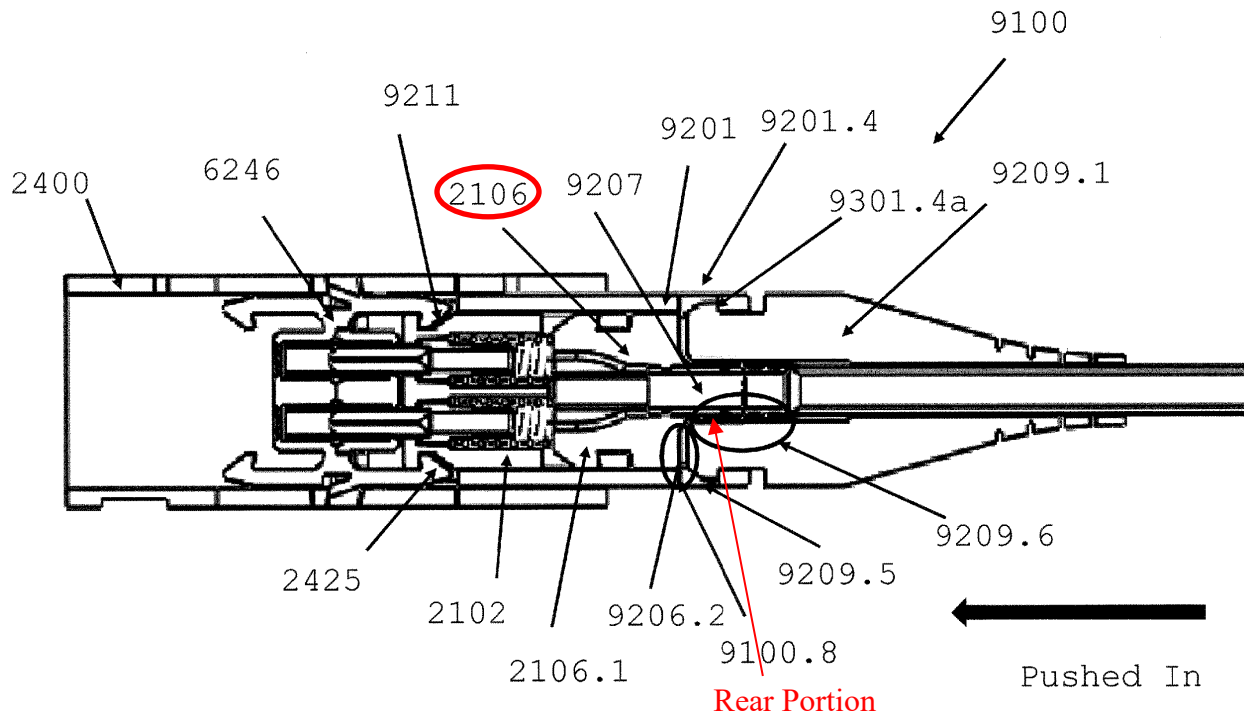


FIG. 34

EX1003: Figs. 27 and 34 (annotated).

Therefore, Takano meets 1.b. EX1002: ¶103.

7. 1.c.1

The boot (9109.1, 9209.1, 9309.1, 9409.1) includes an inner round (9409.4) that forms a cavity that receives the back post (i.e., rear portion) of the back body (9106, 9206). EX1003: Figs. 26, 27, 30, and 34, ¶[0067]; EX1002: ¶104.

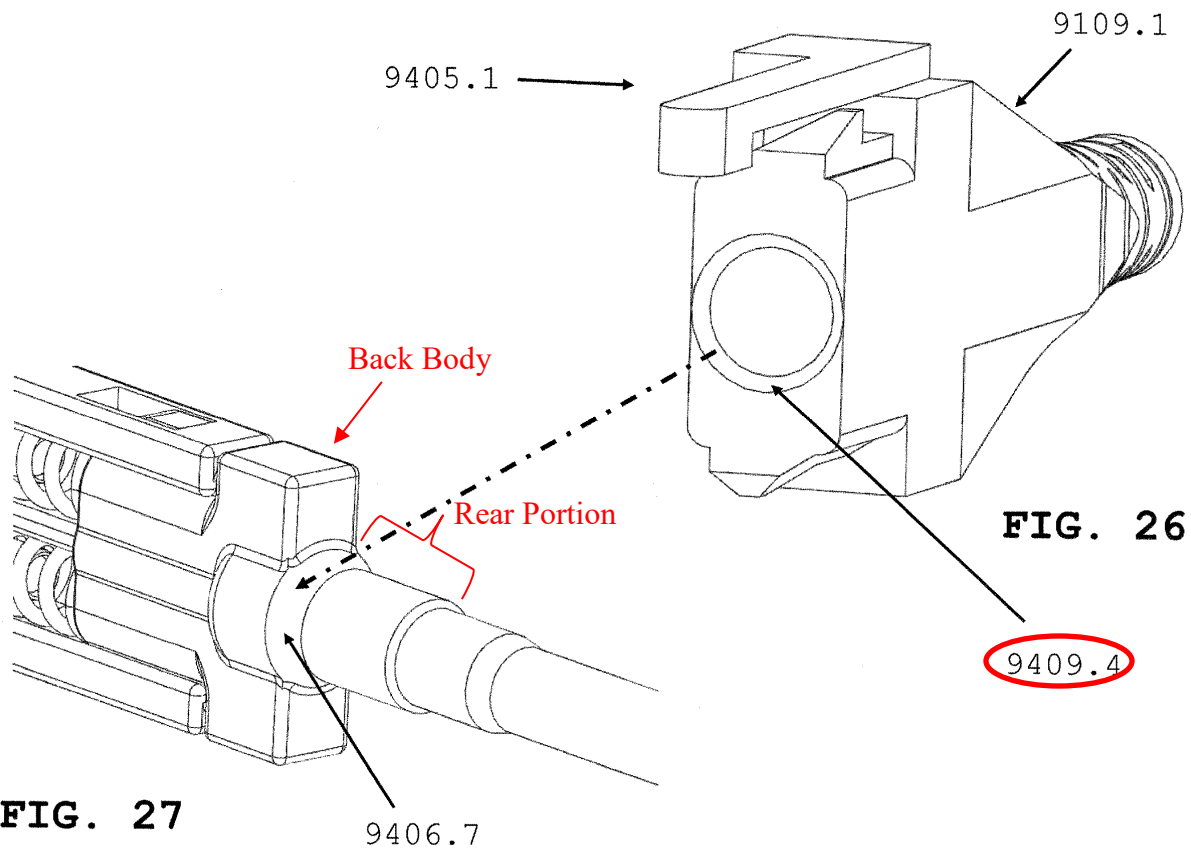
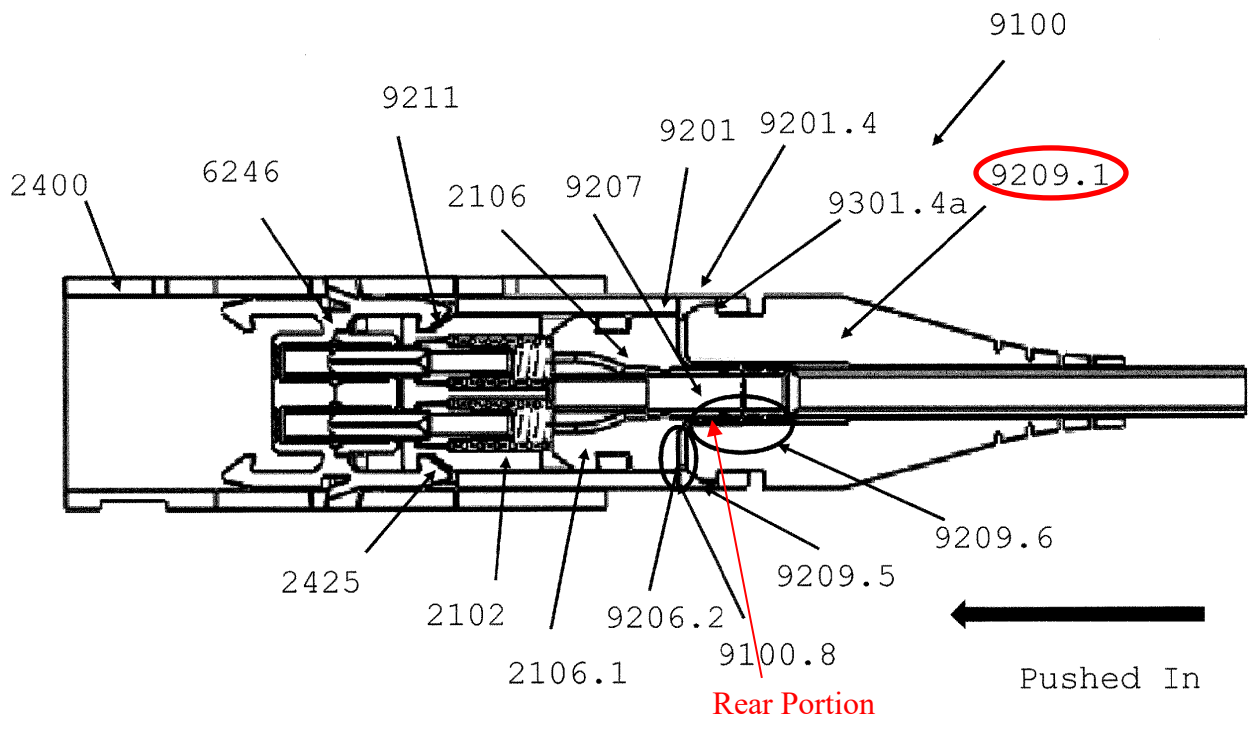


FIG. 34

EX1003: Figs. 27, 28, and 34 (annotated).

The boot (9109.1, 9209.1, 9309.1, 9409.1) includes an alignment and offset key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension). EX1003: Fig. 16, ¶[0059]; EX1002: ¶105. The key attaches to the rest of the boot at point (9109.6). EX1003: ¶[0059]; EX1002: ¶105.

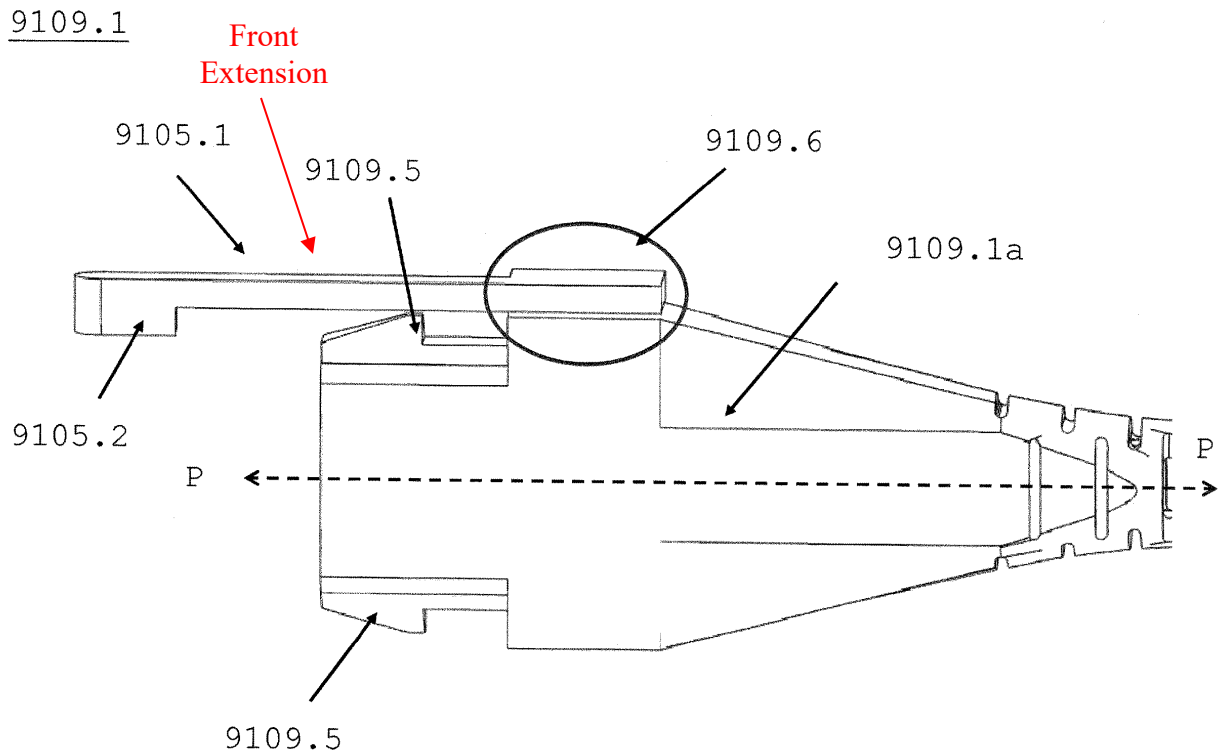


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano meets 1.c.1. EX1002: ¶106.

8. 1.c.2

The key (9105.1, 9205.1, 9305.1, 9405.1) extends towards the front end of the outer housing (9101, 9201, 9301, 9401) from point (9109.6). EX1003: Fig. 17, ¶[0059]; EX1002: ¶107.

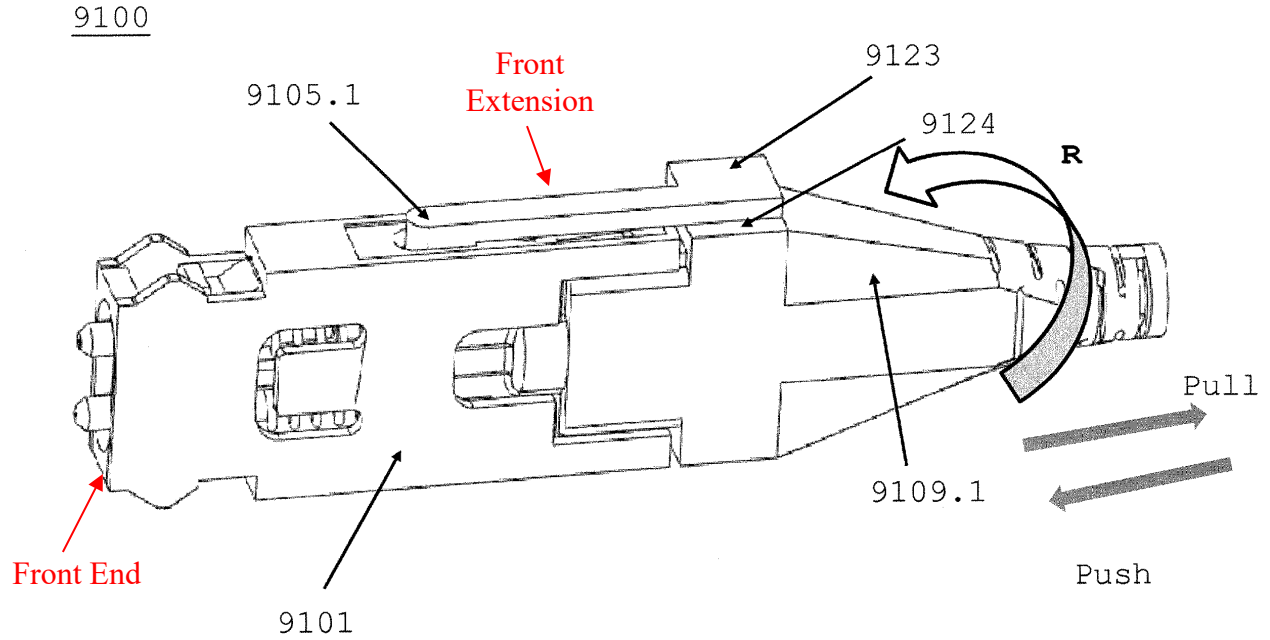


FIG. 16

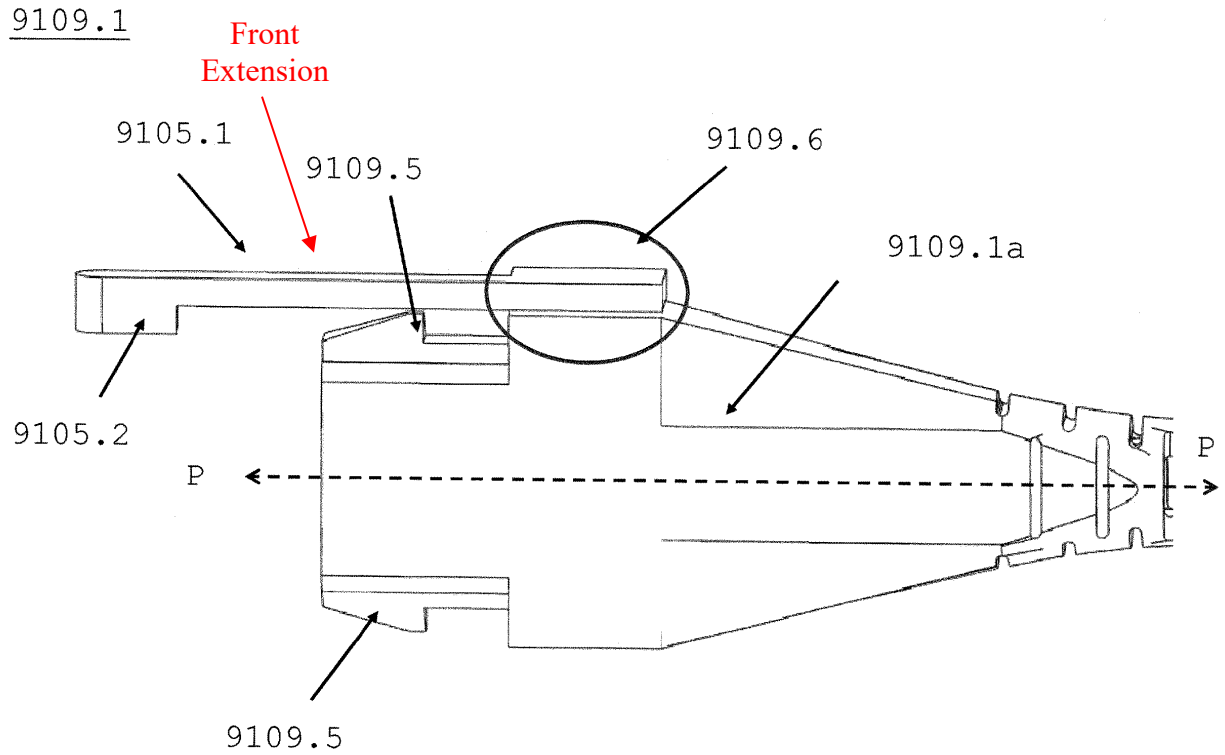
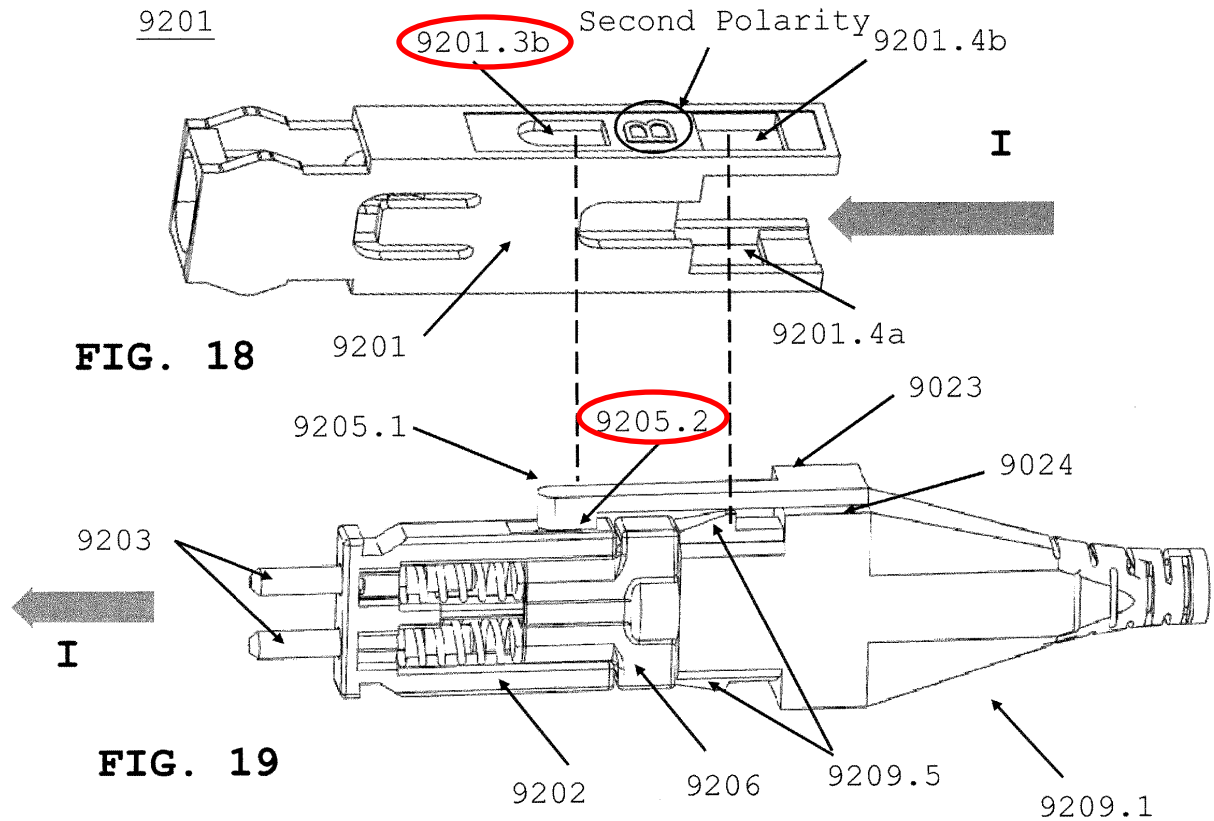


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

The outer housing (9101, 9201, 9301, 9401) includes a first slot (9201.3a) on the top and a second slot (9201.3b) on the bottom for receiving a securing protrusion (9105.2, 9205.2, 9405.2) of the key (9105.1, 9205.1, 9305.1, 9405.1).

EX1003: Figs. 17-19, ¶¶[0059]-[0060], [0067]; EX1002: ¶108.



EX1003: Figs. 18 and 19 (annotated).

Reception of the securing protrusion (9105.2, 9205.2, 9405.2) of the key (9105.1, 9205.1, 9305.1, 9405.1) in one of the slots (9201.3a, 9201.3b) attaches the key to the outer housing (9101, 9201, 9301, 9401). EX1003: ¶¶[0059], [0061], [0067]; EX1002: ¶110. The location of this attachment is forward of a center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1). EX1002: ¶110.

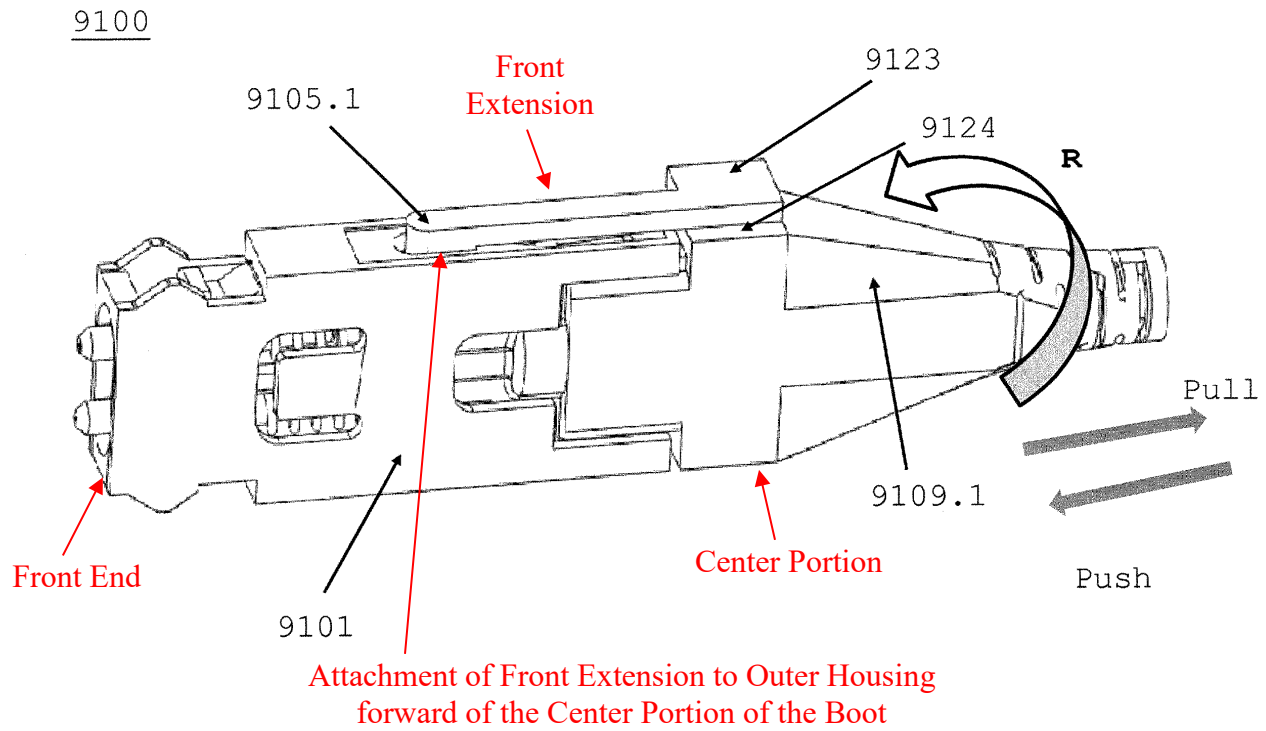


FIG. 16

9109.1

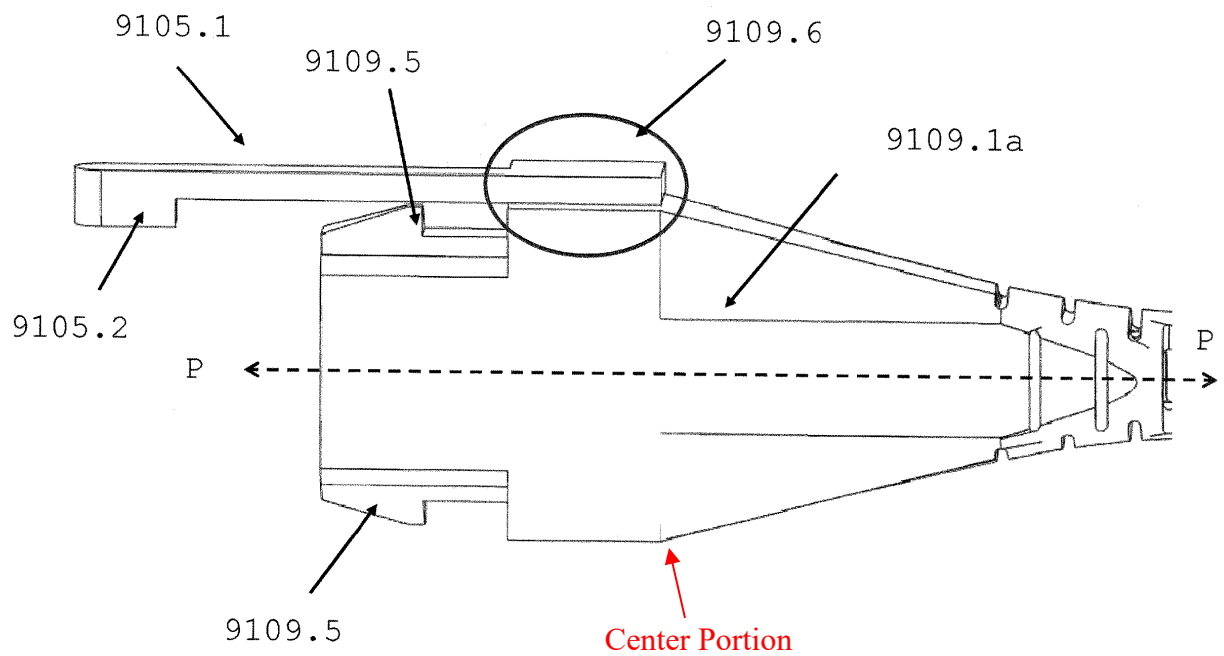


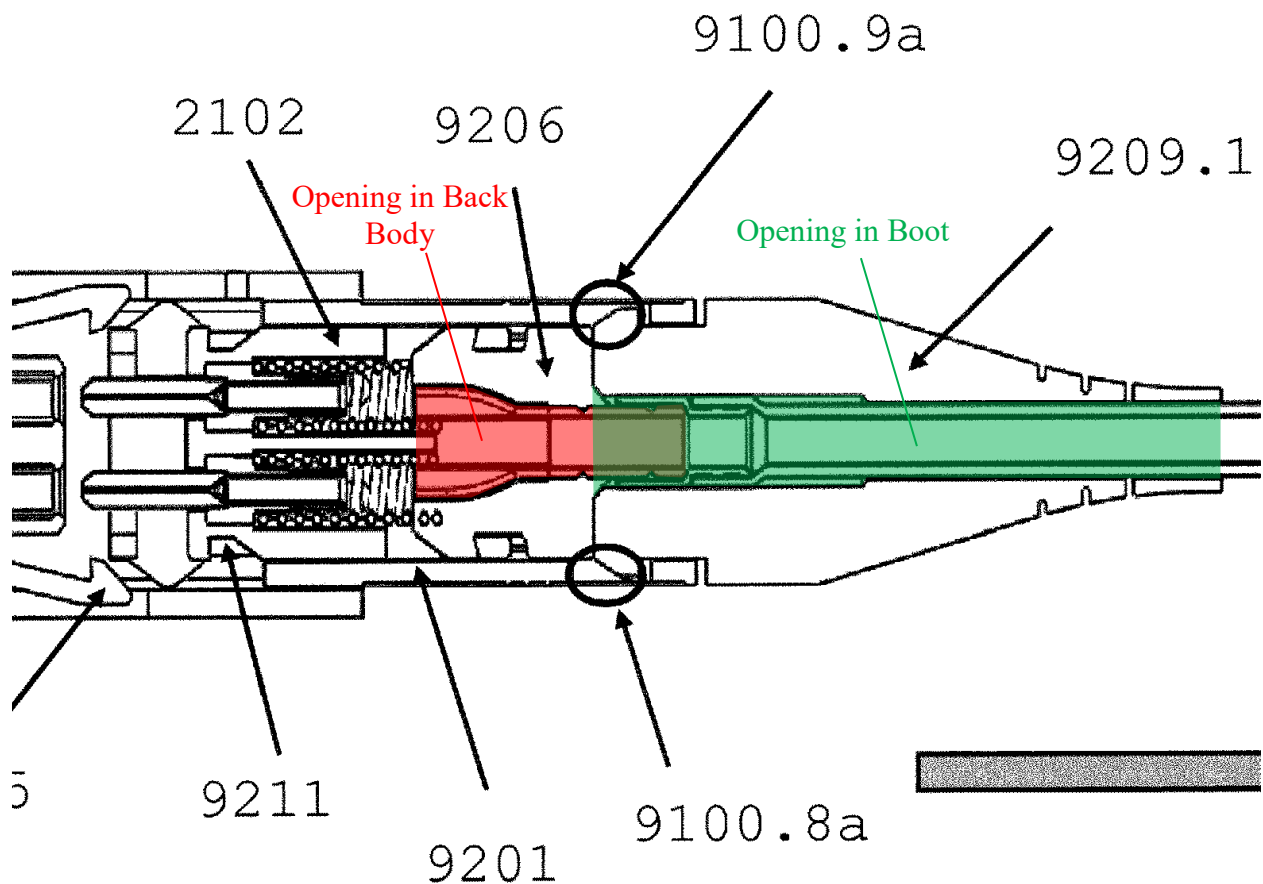
FIG. 17

EX1003: Figs. 16 and 17 (annotated).

Therefore, Takano meets 1.c.2. EX1002: ¶111.

9. 1.c.3

The back body (9106, 9206) and the boot (9109.1, 9209.1, 9309.1, 9409.1) each have a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶112. The openings are axially aligned and even overlap where the back post of the back body is received in the boot. EX1002: ¶112.



EX1003: Fig. 36 (annotated).

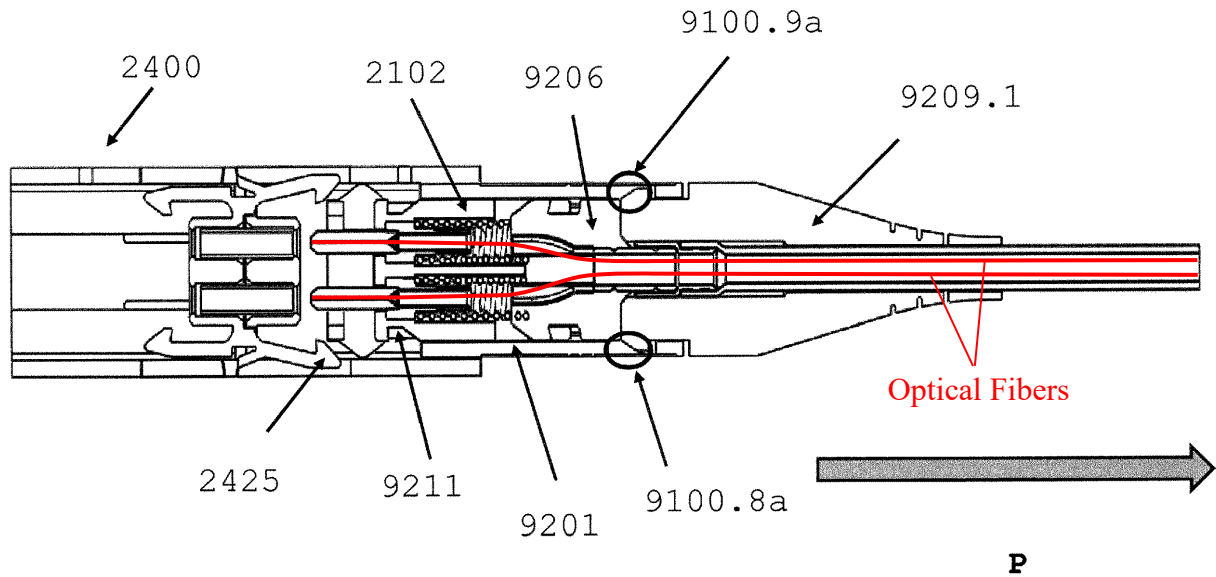


FIG. 36

EX1003: Fig. 36 (annotated).

The forward ends of the optical fibers terminated by each ferrule (9203) are flush with the forward end of the respective ferrule. EX1014: 1; EX1015: 17-24; EX1002: ¶113. Because the ferrules extend forward through the front end opening of the outer housing (9101, 9201, 9301, 9401), the front ends of the optical fibers also terminate forward of the front end opening of the housing. EX1003: Figs. 30 and 36; EX1002: ¶113.

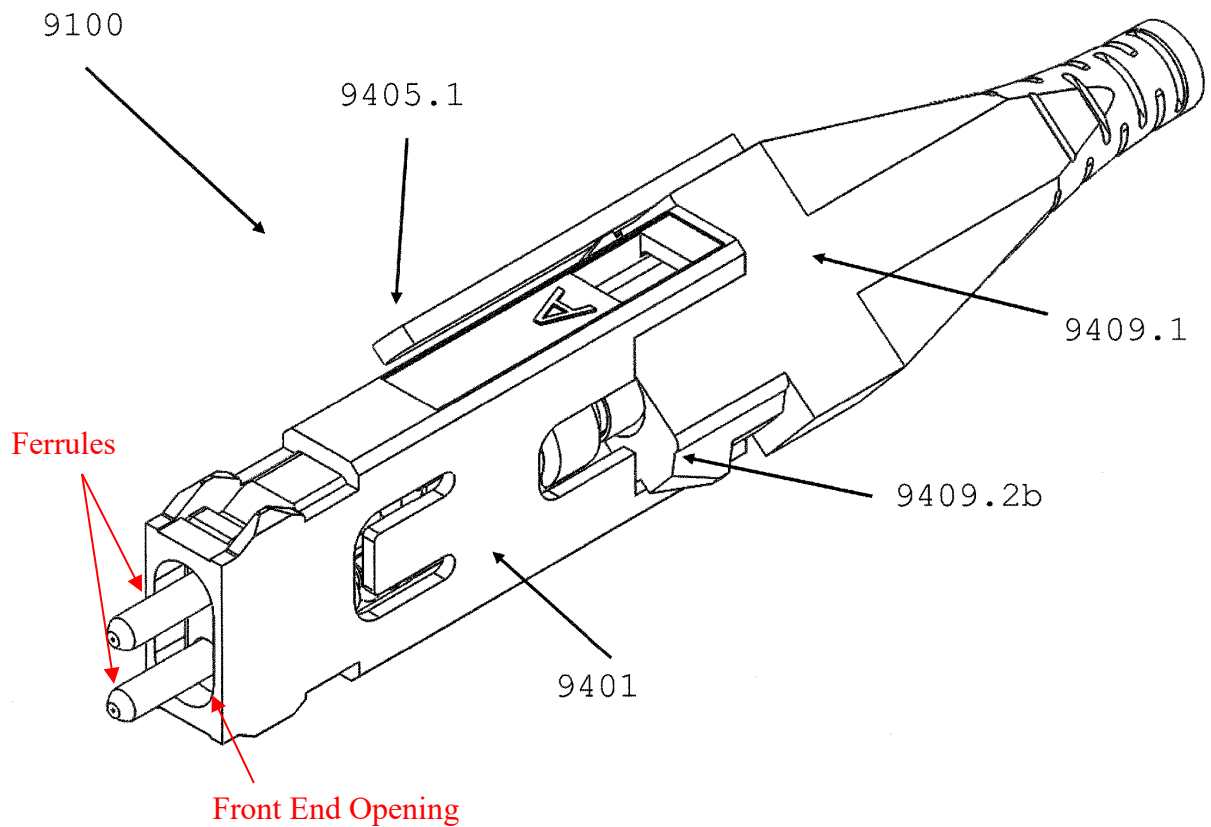


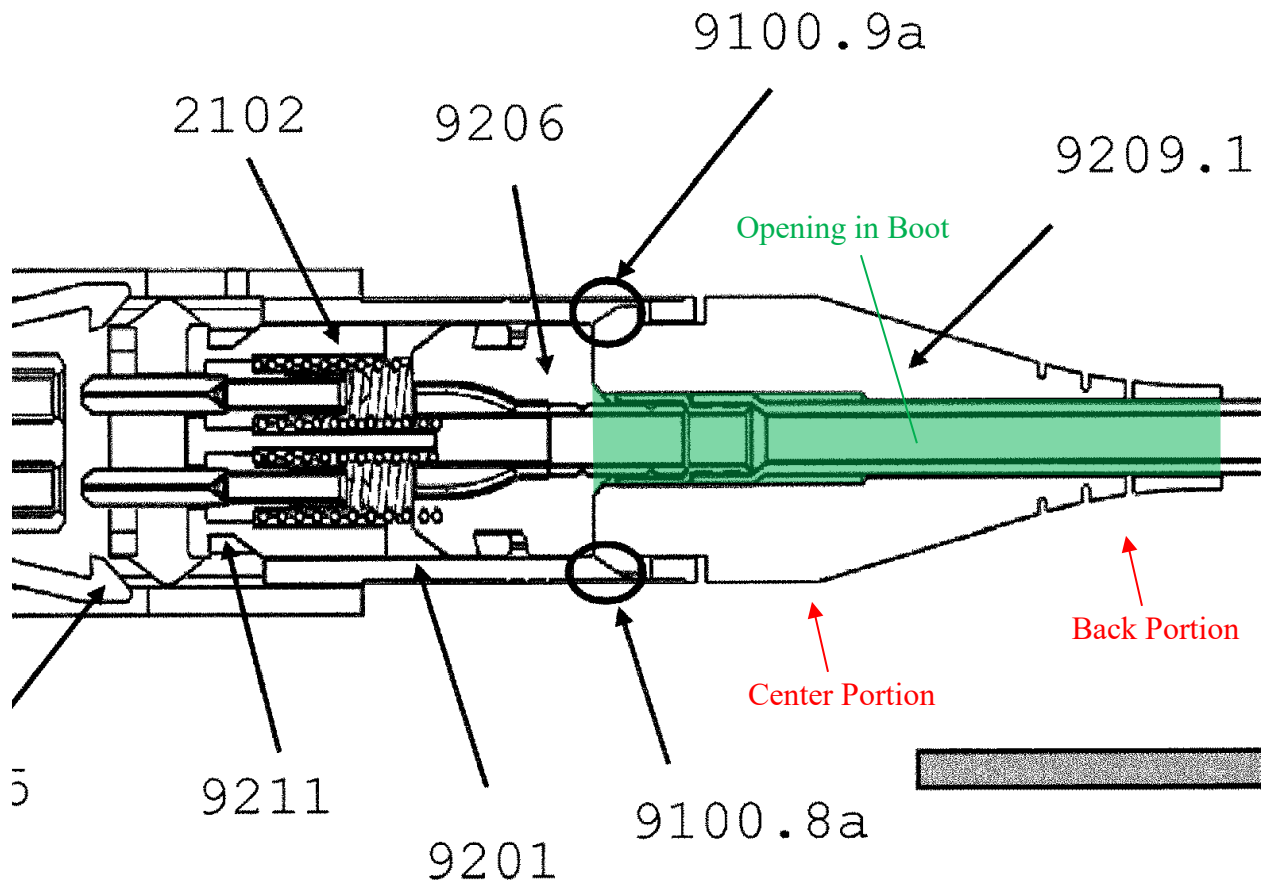
FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets 1.c.3. EX1002: ¶114.

10. 1.d

The opening in the boot (9109.1, 9209.1, 9309.1, 9409.1) for the optical fibers extends through the entire boot. EX1003: Figs. 26, 33, 34, and 36; EX1002: ¶115. Thus, the opening extends through a back portion of the boot rearward of the boot's center portion. EX1002: ¶115.



9100

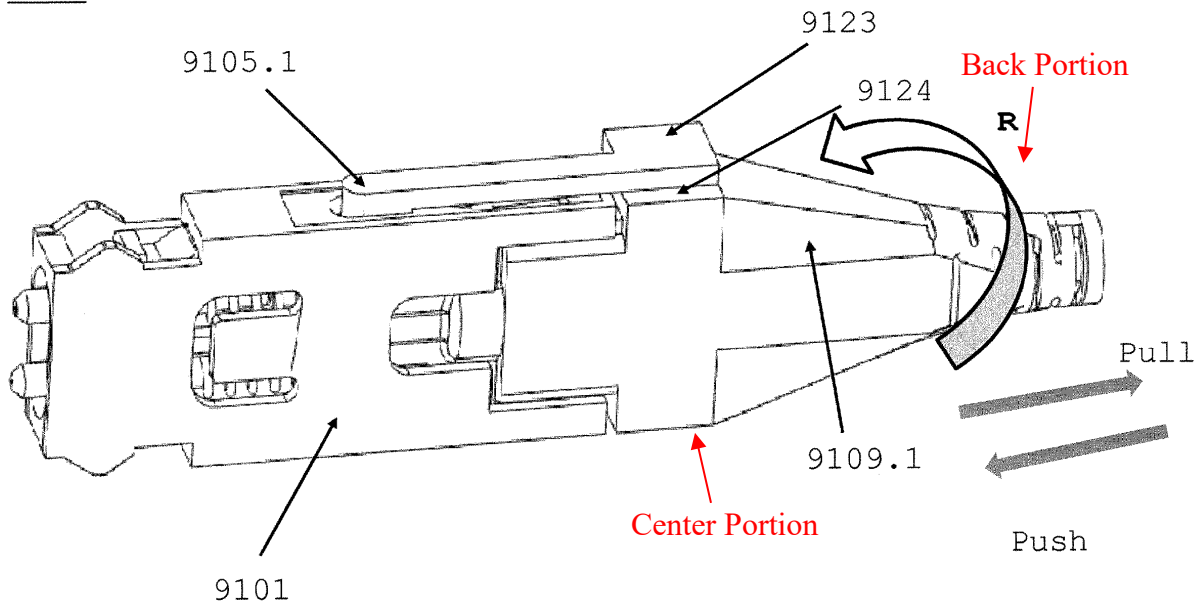


FIG. 16

EX1003: Figs. 16 and 36 (annotated).

Therefore, Takano meets 1.d. EX1002: ¶116.

B. Claim 2

As illustrated, the back portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) has a ribbed structure with openings on the outside surface along the length of the back portion. EX1003: Fig. 30; EX1002: ¶117. This configuration allows the back portion of the boot to bend so that the boot provides strain relief for the fiber optic cable and the optical fibers therein. EX1016: Fig. 1, 4:4-12; EX1017: Fig. 4, ¶[0022]; EX1002: ¶118.

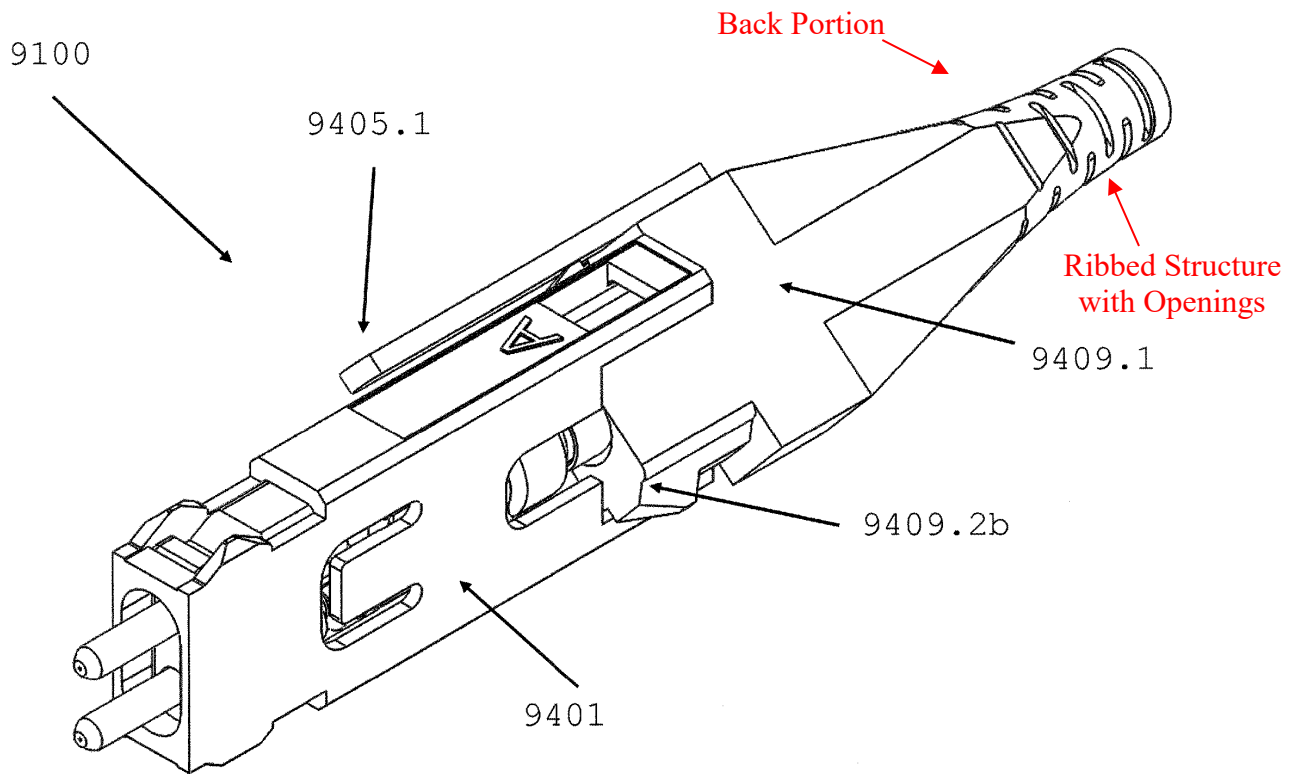


FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets this claim. EX1002: ¶119.

C. Claim 3

As explained in Sections VI(A)(1.P), (1.a.3), and (1.c.3), the two ferrules (9203) of the micro connector (9100) each terminate an optical fiber. EX1002: ¶120. And each ferrule is a single-fiber ferrule that terminates the fiber in the ferrule. EX1002: ¶120.

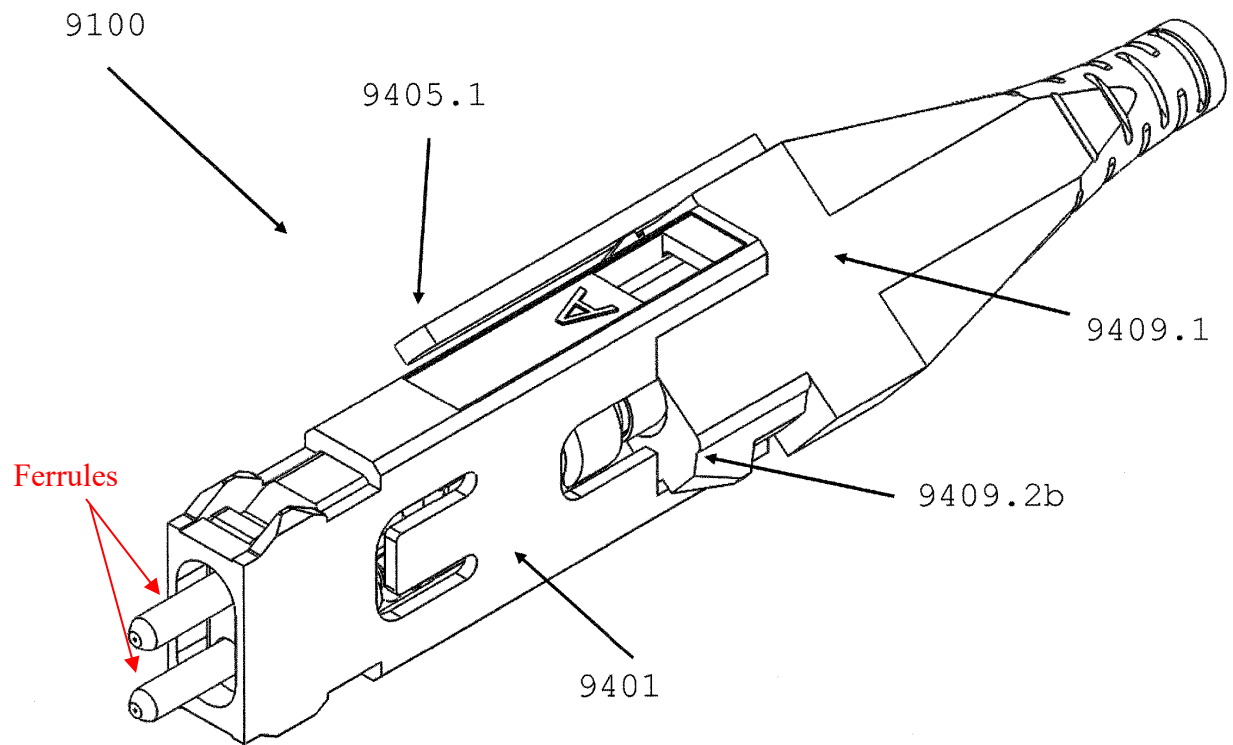


FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets this claim. EX1002: ¶121.

D. Claim 4

The ferrules (9203) extend forward through the front end opening of the outer housing (9101, 9201, 9301, 9401). EX1003: Figs. 30 and 36; EX1002: ¶122.

Thereby, the front ends of the ferrules are forward of the front end opening of the housing. EX1003: Figs. 30 and 36; EX1002: ¶122.

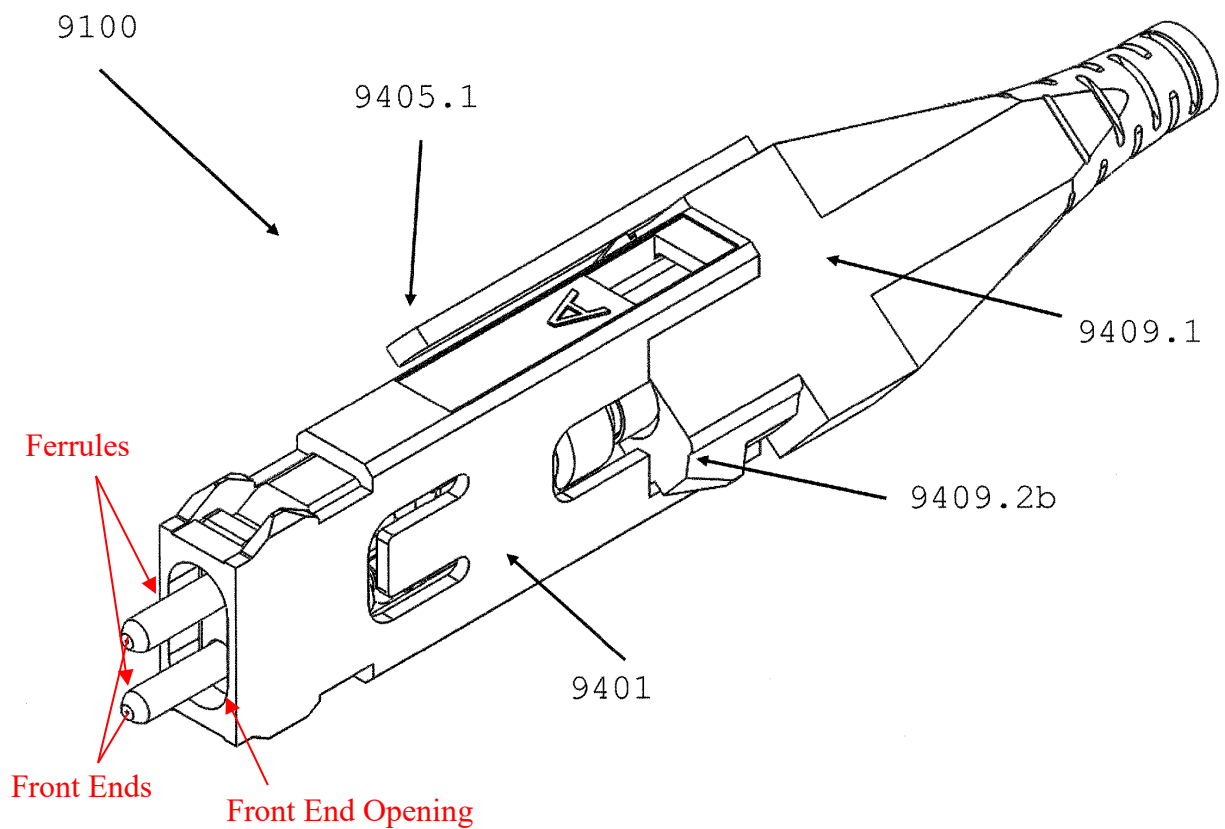


FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets this claim. EX1002: ¶123.

E. Claim 5

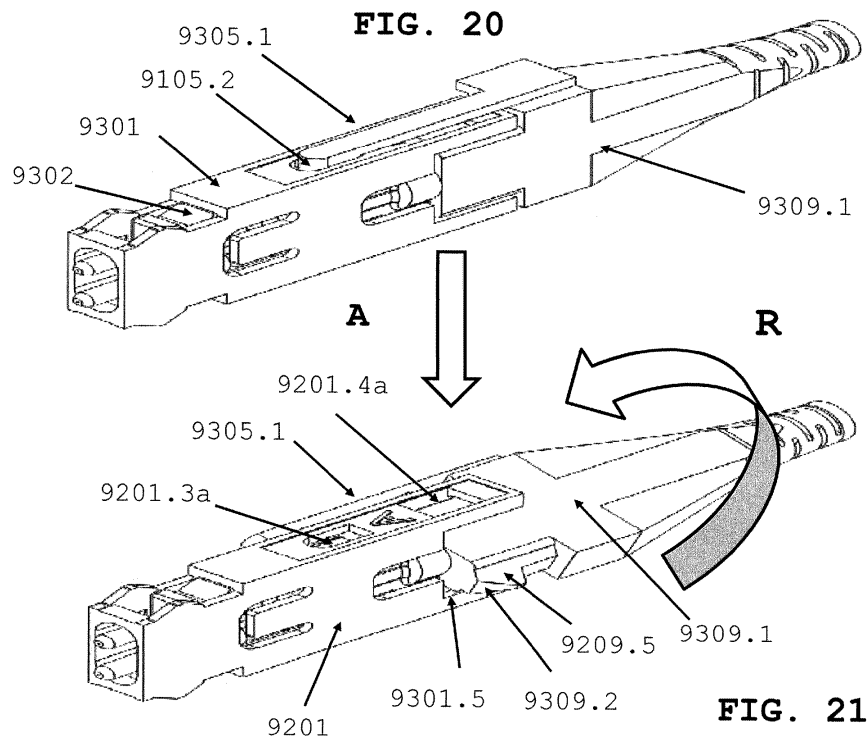
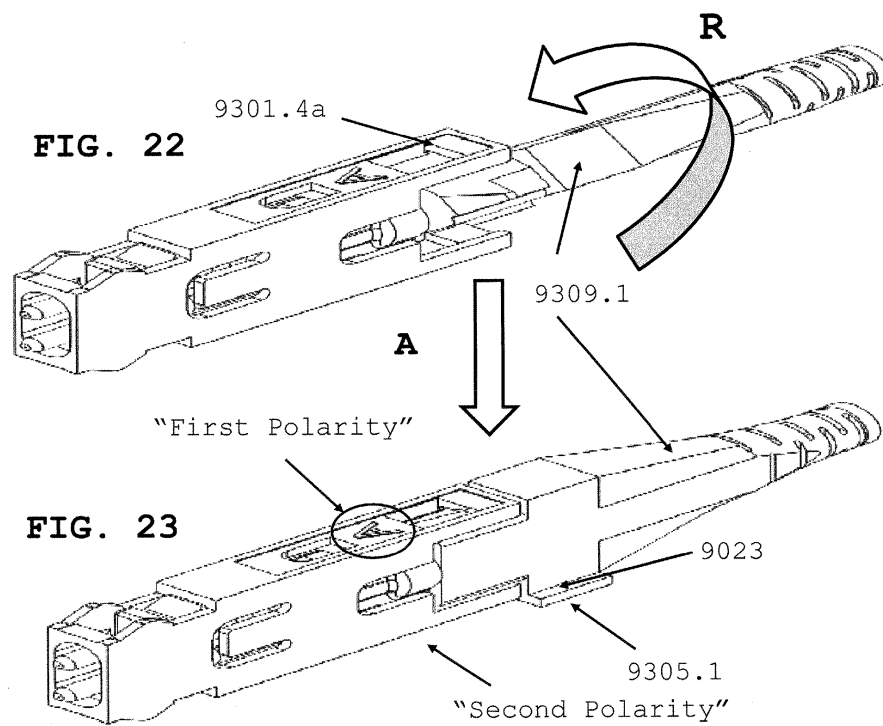
1. 5.a

Limitation 5.a—“wherein the boot is movable longitudinally relative to the housing upon application of a pull force”—recites an intended use of the claimed invention and is satisfied by any prior art structure *capable of* performing the intended use. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997); *see also Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997).

Takano's micro connector (9100) has structure capable of meeting the intended use recited in limitation 5.a.⁵ EX1002: ¶¶124-126.

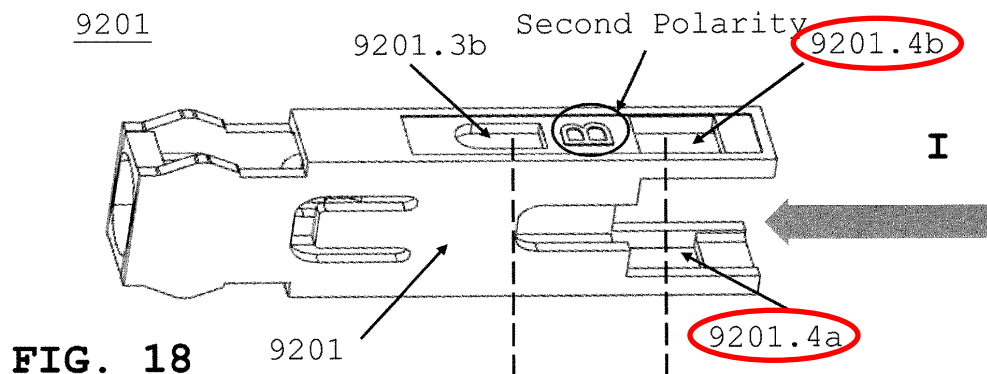
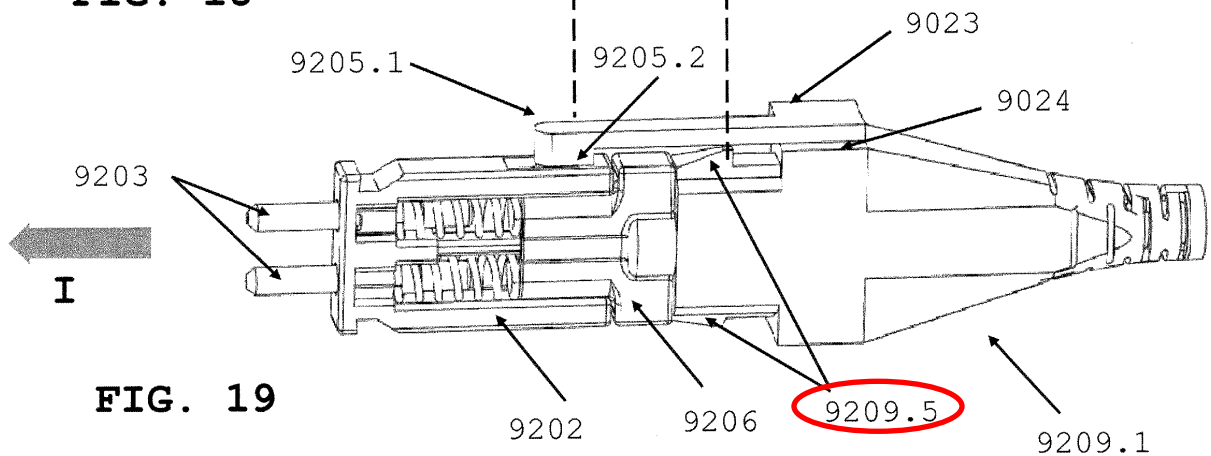
As shown in Figs. 20-23 and again in Figs. 25, 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable about the back body (9106, 9206) and fiber optic cable and relative to the outer housing (9101, 9201, 9301, 9401) to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top to the bottom of the outer housing (and *vise versa*) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶127.

⁵ The '794 Patent requires a connection of the boot (112) to the housing (102) first be released, and then the boot can be moved longitudinally to change polarity. EX1001: 6:1-7; 7:54-62; EX1002: ¶126.



EX1003: Figs. 20-23.

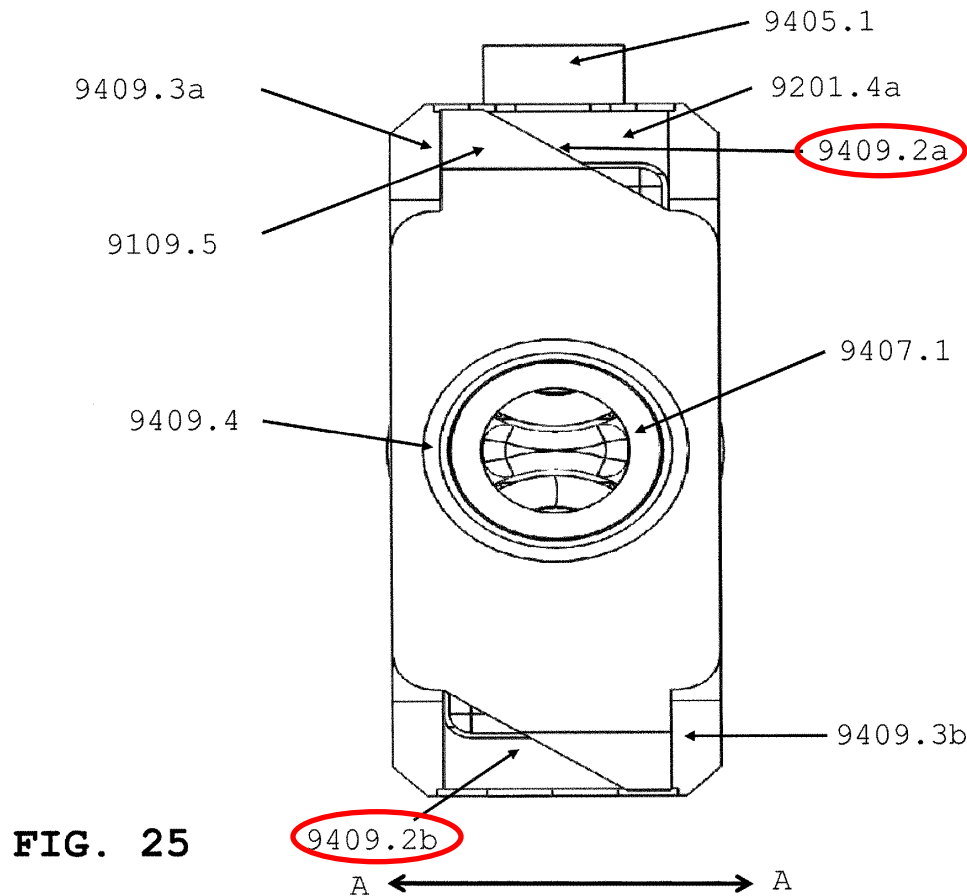
The boot (9109.1, 9209.1, 9309.1, 9409.1) includes boot hooks (9109.5, 9209.5) that are received in respective slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) when the boot is in the first and second polarity positions to secure the boot to the outer housing. EX1003: ¶[0058]; EX1002: ¶128.



EX1003: Figs. 18 and 19 (annotated).

The boot hooks (9109.5, 9209.5) include a chamfer (9309.2, 9409.2a, 9409.2b) that allow the boot hooks to leave their respective slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) when the boot (9109.1,

9209.1, 9309.1, 9409.1) is rotated to change polarity. EX1003: Figs. 28-33, ¶¶[0063], [0067]-[0068], [0070]-[0071]; EX1002: ¶129.



EX1003: Fig. 25 (annotated).

The boot (9109.1, 9209.1, 9309.1, 9409.1) is released from the outer housing (9101, 9201, 9301, 9401) prior to reaching its new polarity position. EX1002: ¶130. In this released position, the boot hooks (9109.5, 9209.5) are positioned relative to the outer housing such that the boot hooks would not engage the outer housing and prevent the boot from moving rearward relative to the outer housing.

EX1003: Figs. 21, 22, 29-32; EX1002: ¶130. Thus, in the release position, the boot is disconnected and moveable relative to the outer housing. EX1002: ¶130.

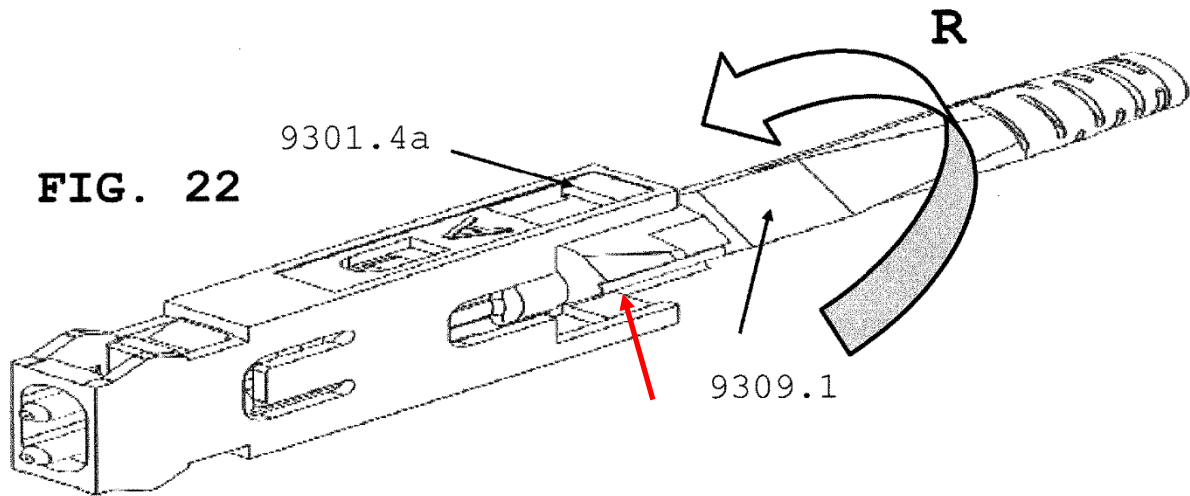
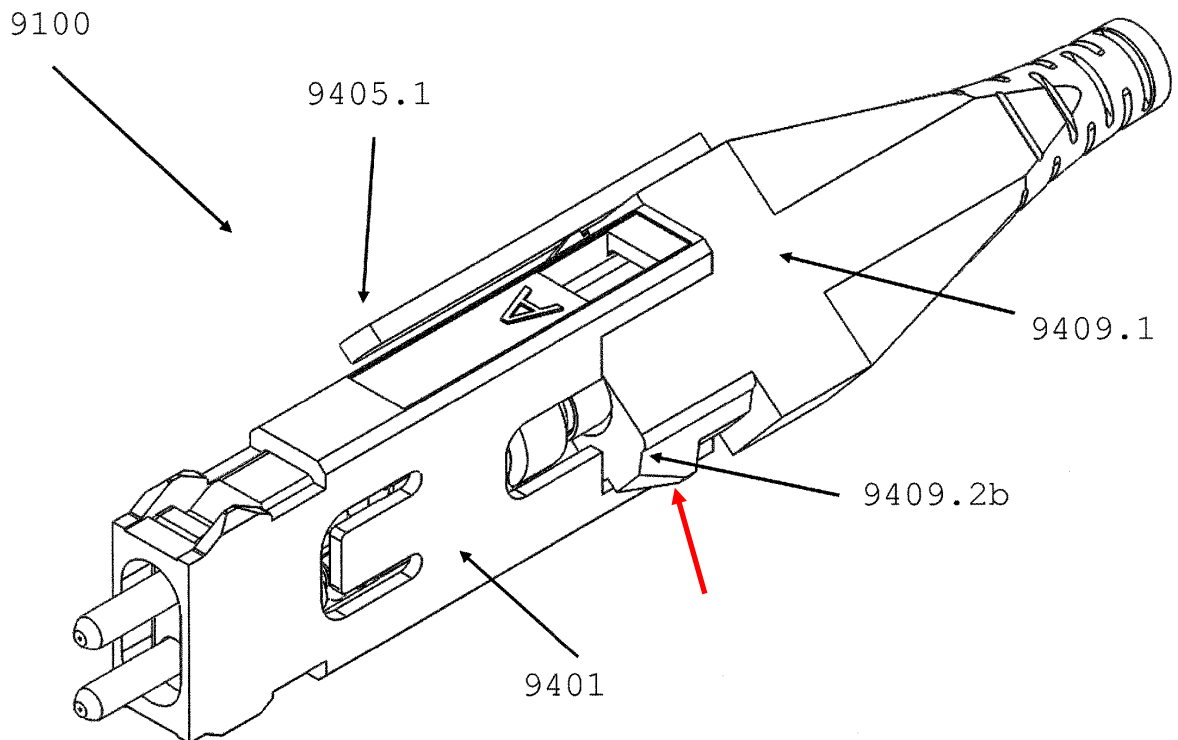
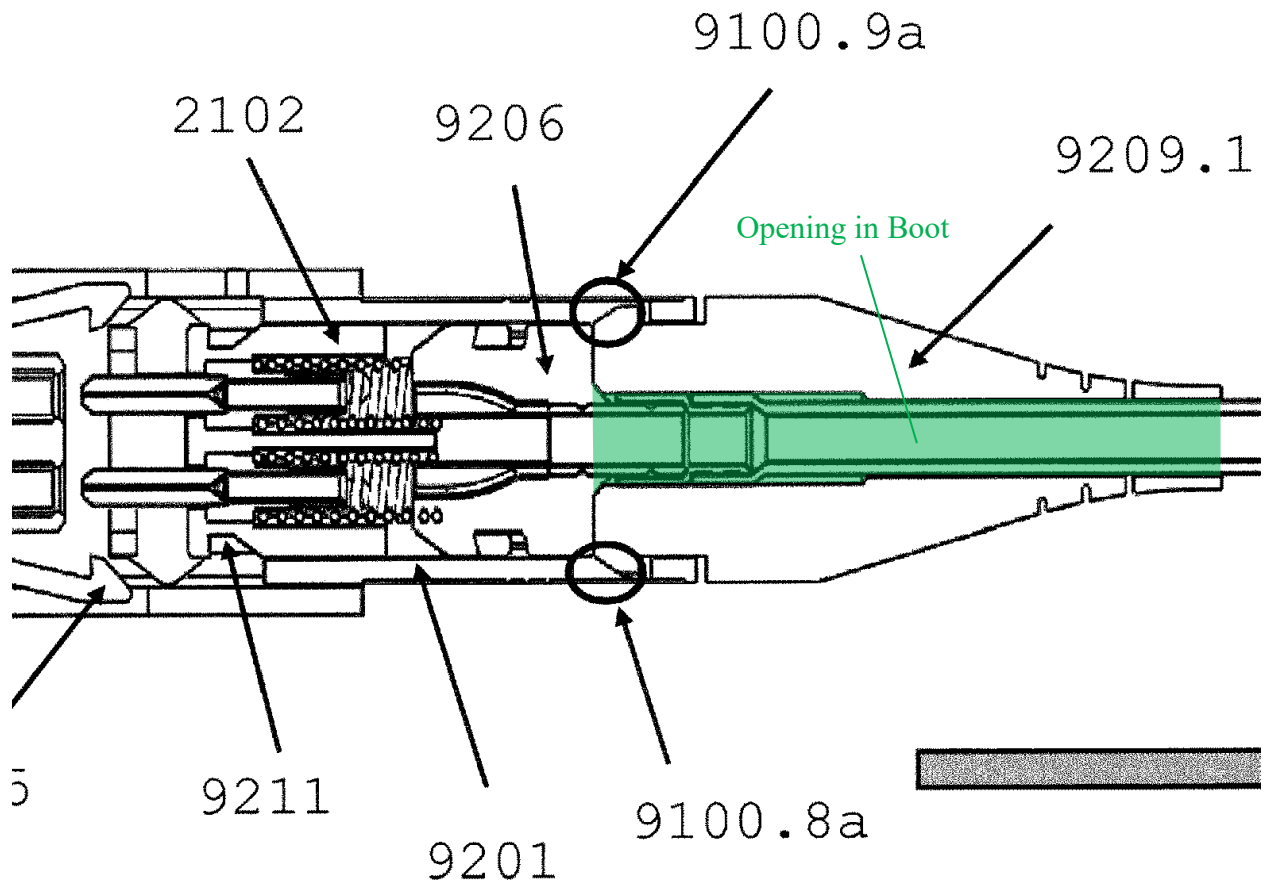


FIG. 30

EX1003: Figs. 22 and 30 (annotated).

Once in this release position, the boot (9109.1, 9209.1, 9309.1, 9409.1) is moveable rearward relative to the outer housing (9101, 9201, 9301, 9401).

EX1001: Figs. 22 and 30; EX1002: ¶131. This is evident based on how the micro connector (9100) operates when the boot is connected. EX1002: ¶131. For example, Takano explains the boot is slideable rearward along the fiber optic cable to pull the outer housing rearward to detach the micro connector from the adapter (2400). EX1003: Figs. 34-36, ¶¶[0073], [0076]; EX1002: ¶131. As illustrated below, the opening in the boot is shaped such that the opening allows the boot to slide along the fiber optic cable, whether or not the boot is attached to the outer housing. EX1002: ¶131.



EX1003: Fig. 36 (annotated).

As show in Figs. 34 and 35 below, when the boot (9109.1, 9209.1, 9309.1, 9409.1) is coupled to the outer housing (9101, 9201, 9301, 9401), pulling the boot rearward moves the boot rearward along the cable. EX1003: ¶¶[0072]-[0073];

EX1002: ¶132.

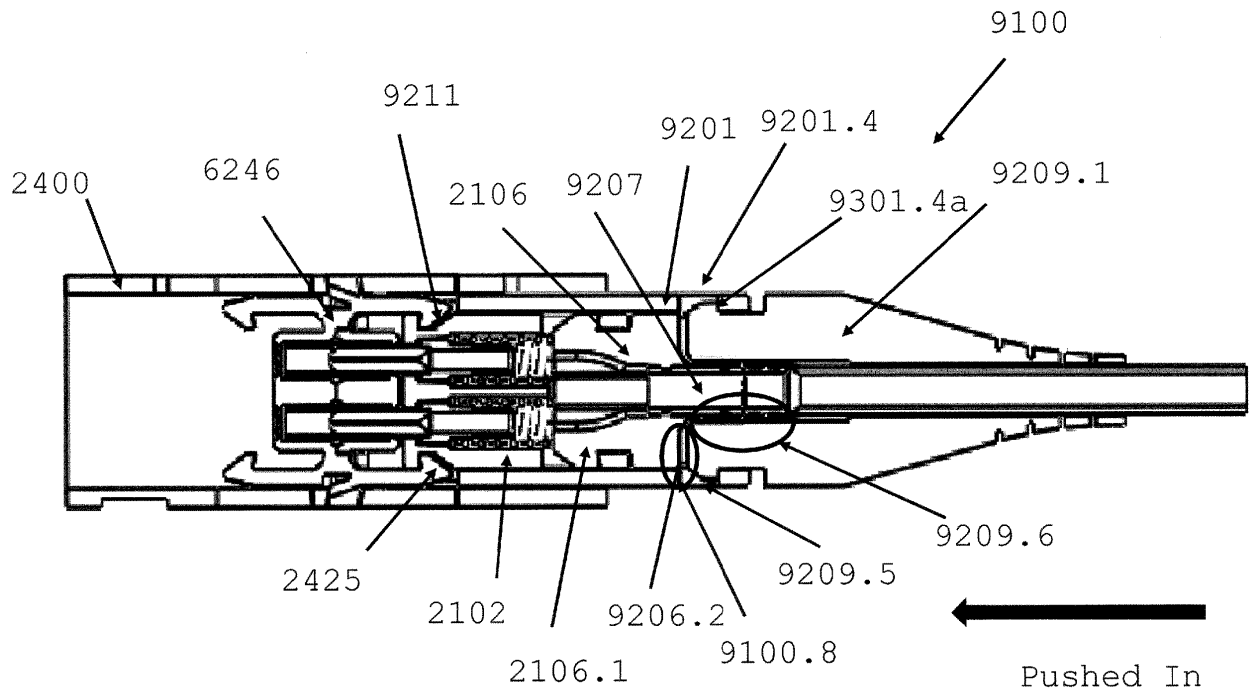


FIG. 34

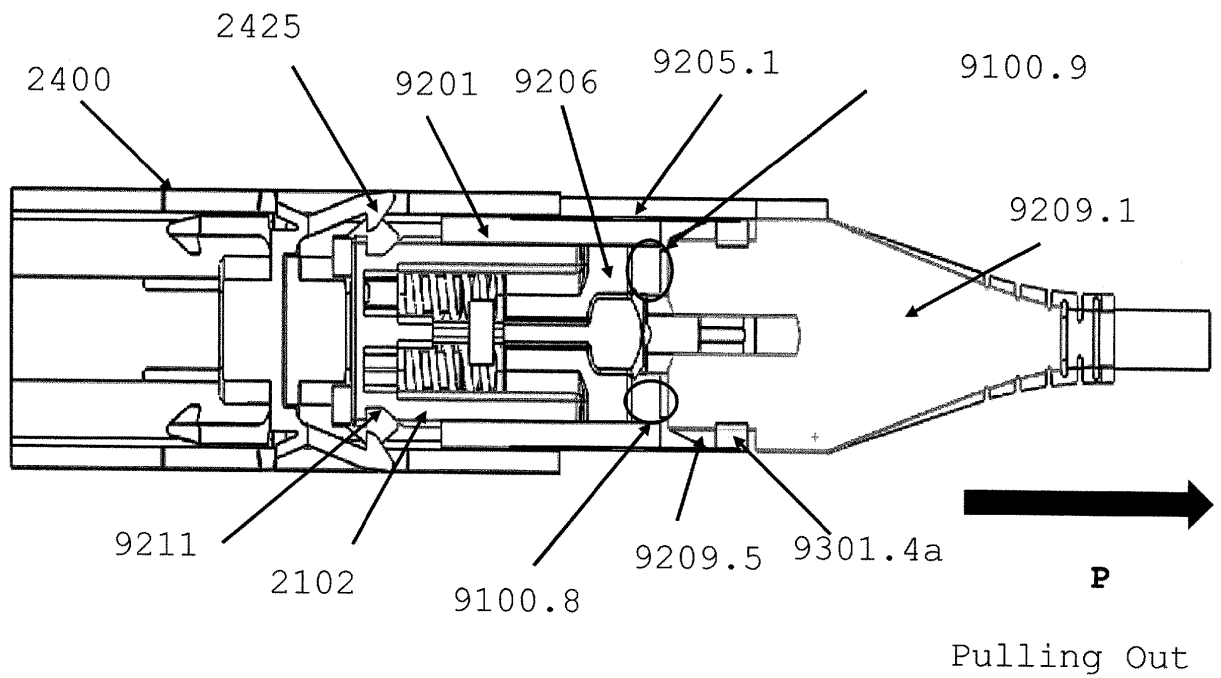


FIG. 35

EX1003: Figs. 34 and 35.

Therefore, *when* the boot (9109.1, 9209.1, 9309.1, 9409.1) is in the release position (*see* Figs. 22 and 30), a rearward pull force on the boot will also move the boot longitudinally rearward along the cable. EX1002: ¶133. But since the boot is decoupled from the outer housing (9101, 9201, 9301, 9401), the boot will also move rearward relative to the outer housing. EX1002: ¶133. Accordingly, the boot has structure capable of meeting the intended use of limitation 5.a. EX1002: ¶133.

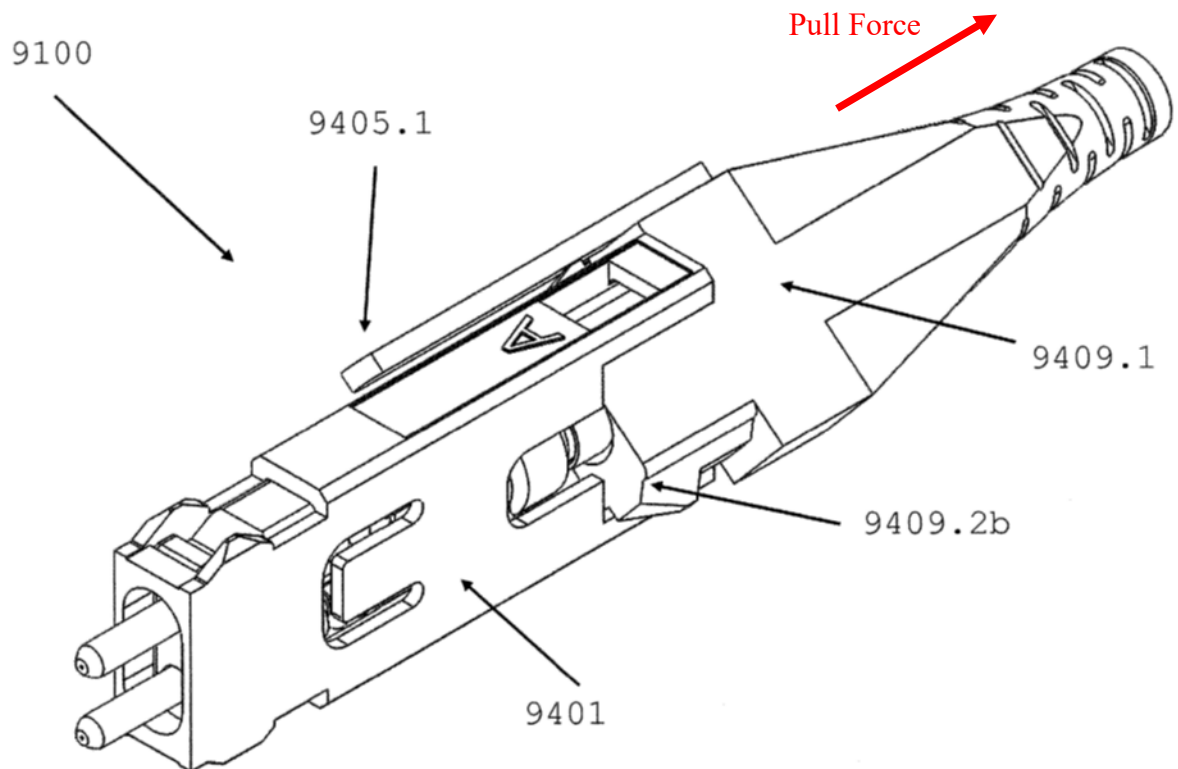


FIG. 30

EX1003: Fig. 30 (annotated).

Alternatively or in addition, the Takano shows a gap (annotated below) between the front of the boot hooks (9109.5, 9209.5) and the back body (9106, 9206). EX1003: Fig. 34; EX1002: ¶134. This gap allows the boot (9109.1, 9209.1, 9309.1, 9409.1) to move longitudinally forward and backward (e.g., wiggle a millimeter or two) relative to outer housing (9101, 9201, 9301, 9401) upon application of push and pull forces, respectively. EX1002: ¶134. This movement also meets the intended use of 5.a. EX1002: ¶134.

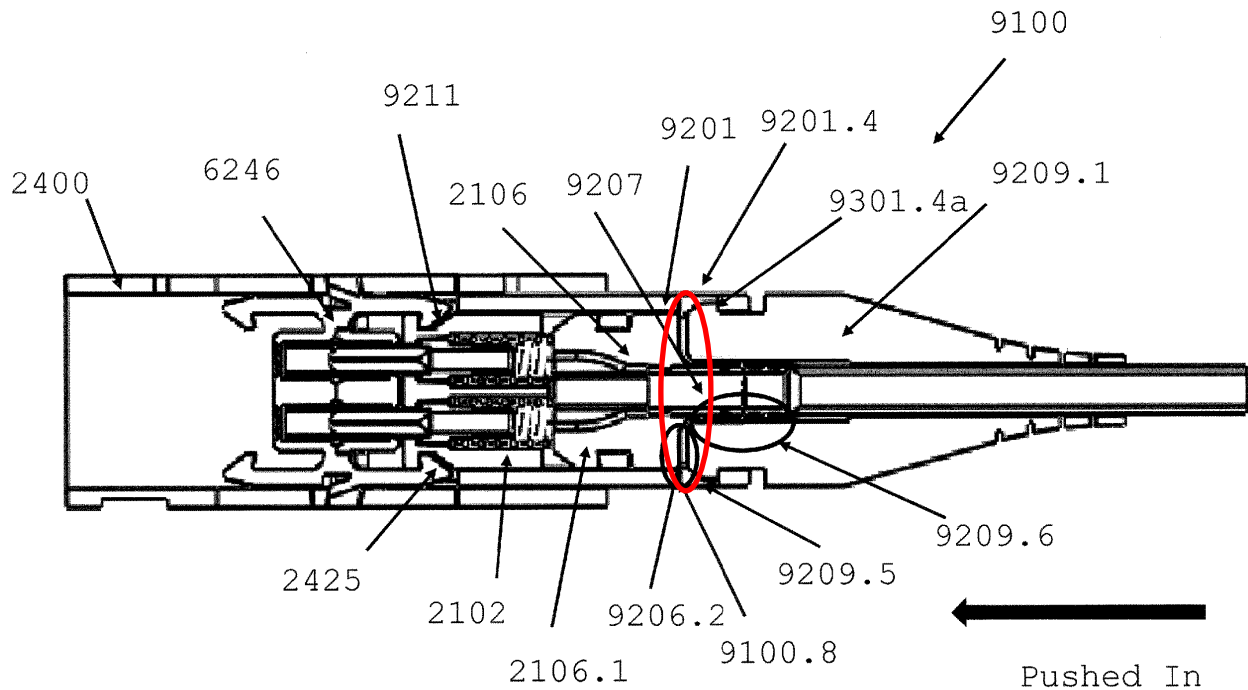


FIG. 34

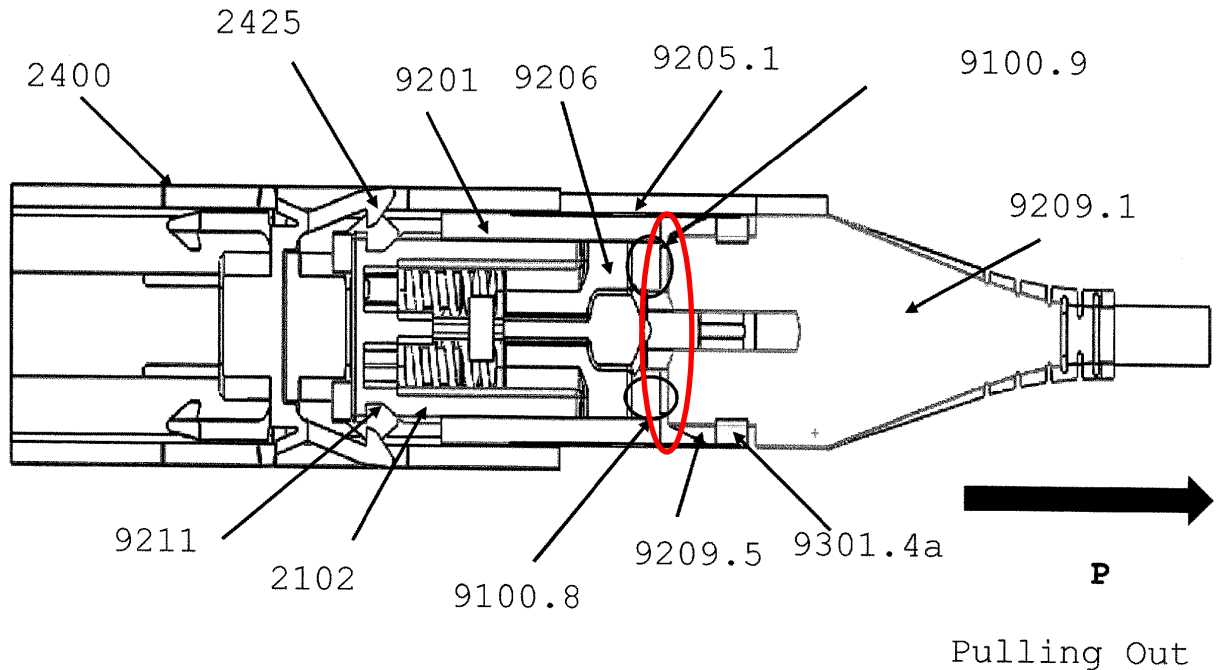


FIG. 35

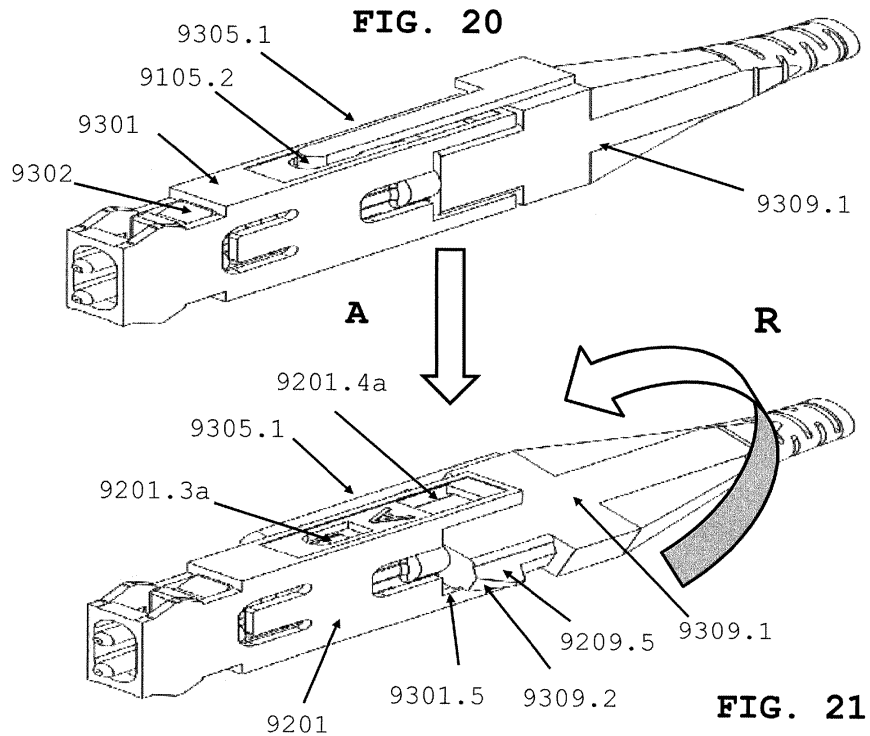
EX1003: Figs. 34 and 35 (annotated).

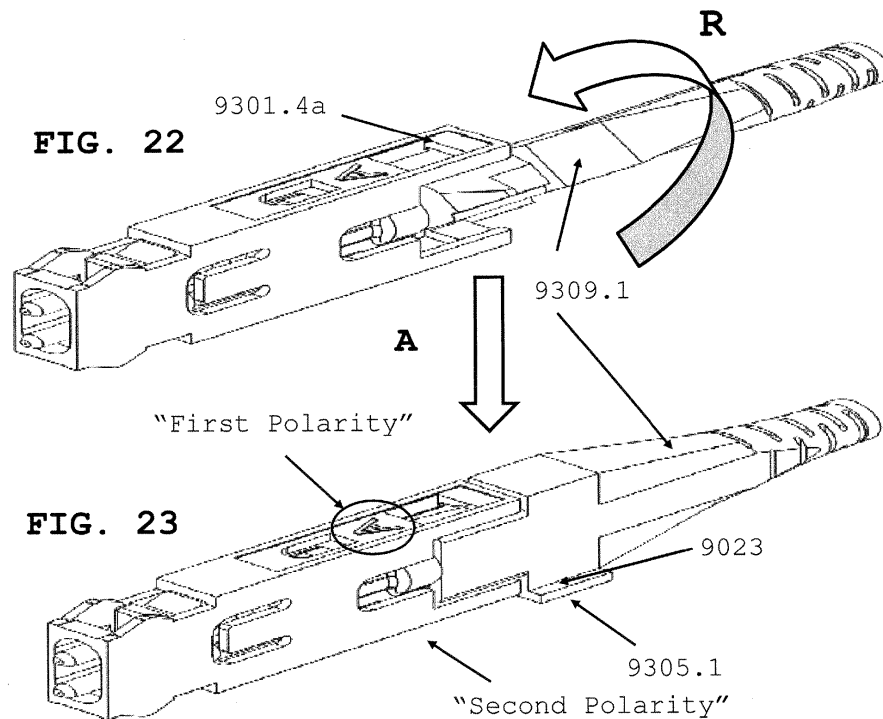
Therefore, Takano meets 5.a. EX1002: ¶135.

2. 5.b

Limitation 5.b—“wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector”—recites another intended use of the claimed invention and is satisfied by any prior art structure *capable of* performing the intended use. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997); *see also Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997).

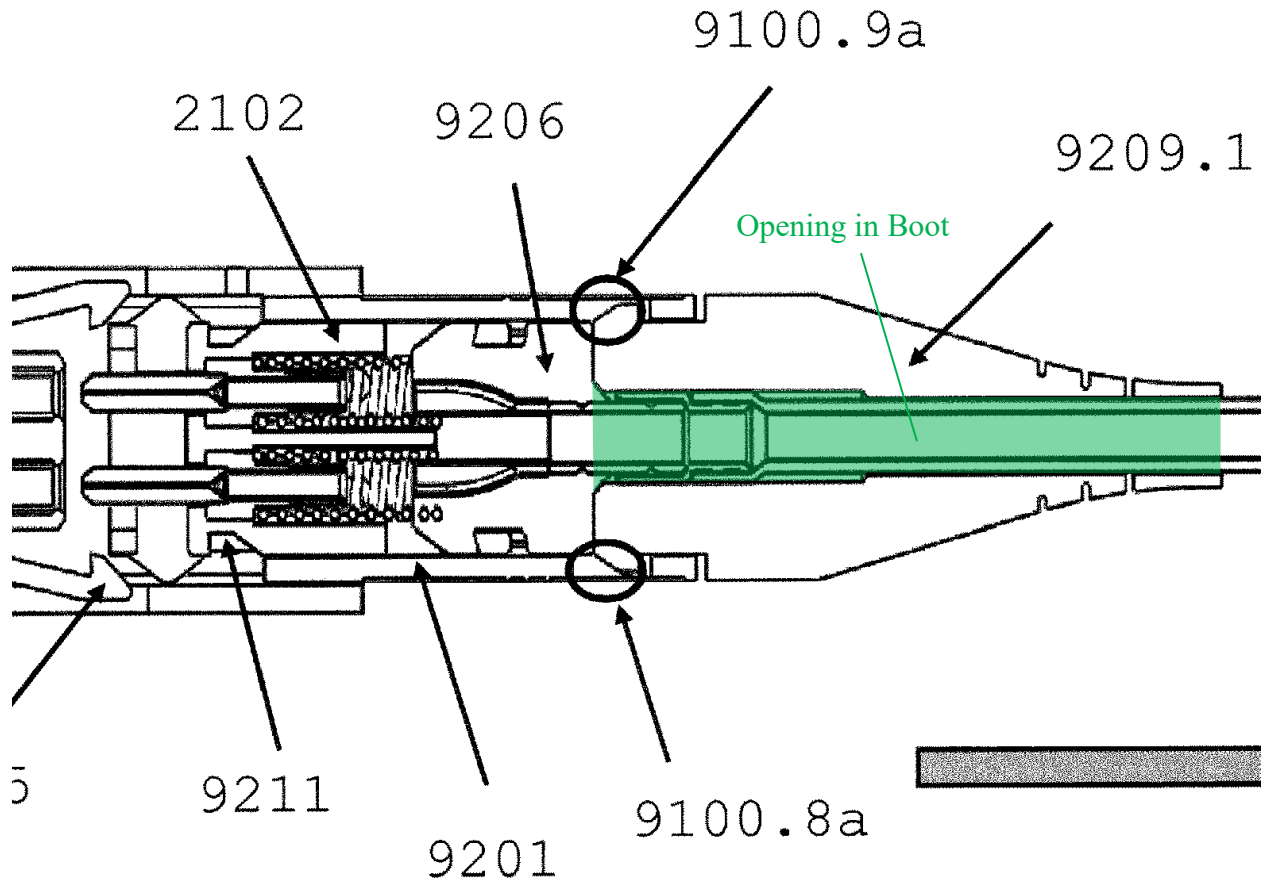
As previously explained, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable (about the back body (9106, 9206) and fiber optic cable) relative to the outer housing (9101, 9201, 9301, 9401) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶¶136-137.





EX1003: Figs. 20-23.

The boot (9109.1, 9209.1, 9309.1, 9409.1) is still able to rotate about the fiber optic cable and relative to the outer housing (9101, 9201, 9301, 9401) after the boot is moved longitudinally rearward along the cable by the application of the rearward pull force. EX1003: Fig. 36; EX1002: ¶138. The opening of the boot the fiber optic cable is disposed in allows the boot to rotate about the fiber optic cable regardless of the position of the boot along the fiber optic cable. EX1003: Figs. 34-36; EX1002: ¶138.



EX1003: Fig. 36 (annotated).

And as explained by Takano, rotating the boot (9109.1, 9209.1, 9309.1, 9409.1) moves the key (9105.1, 9205.1, 9305.1, 9405.1) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶139.

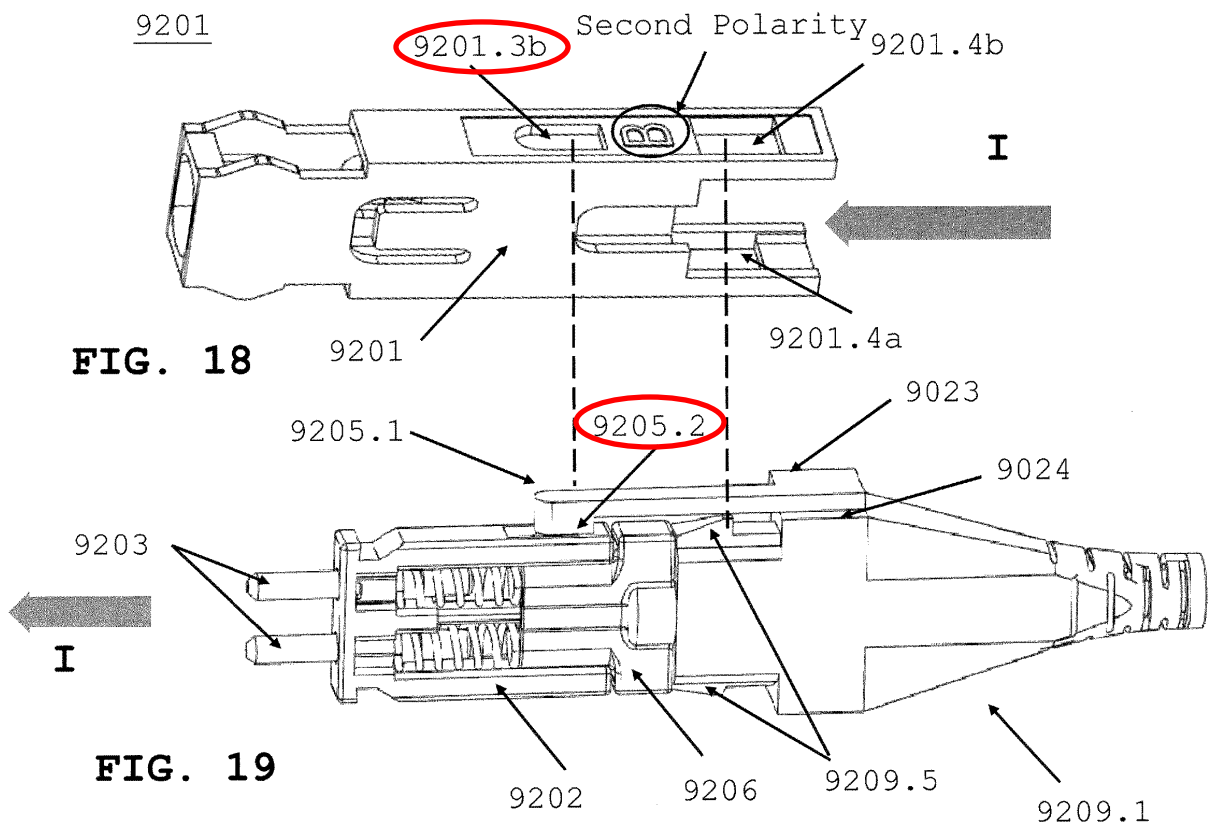
Thus, after the boot (9109.1, 9209.1, 9309.1, 9409.1) has been moved rearward along the fiber optic cable—as explained in Section VI(E)(5.a)—the boot can be rotated relative to the outer housing (9101, 9201, 9301, 9401) to change the

polarity of the micro connector (9100). EX1002: ¶140. Accordingly, the boot has structure capable of meeting the intended use of limitation 5.b. EX1002: ¶140.

Therefore, Takano meets 5.b. EX1002: ¶141.

F. Claim 6

As explained in Section VI(A)(1.c.2), the key (9105.1, 9205.1, 9305.1, 9405.1) includes a securing protrusion (9105.2, 9205.2, 9405.2) that is received in a first or second slot (9201.3a, 9201.3b) of the outer housing (9101, 9201, 9301, 9401). EX1003: Figs. 17-19, ¶¶[0059]-[0061], [0067]; EX1002: ¶142.



EX1003: Figs. 18 and 19 (annotated).

Within the context of the '794 Patent, the securing protrusion (9105.2, 9205.2, 9405.2) is a latch. EX1001: 7:53-62 ("connector latch 294"); EX1002: ¶143.

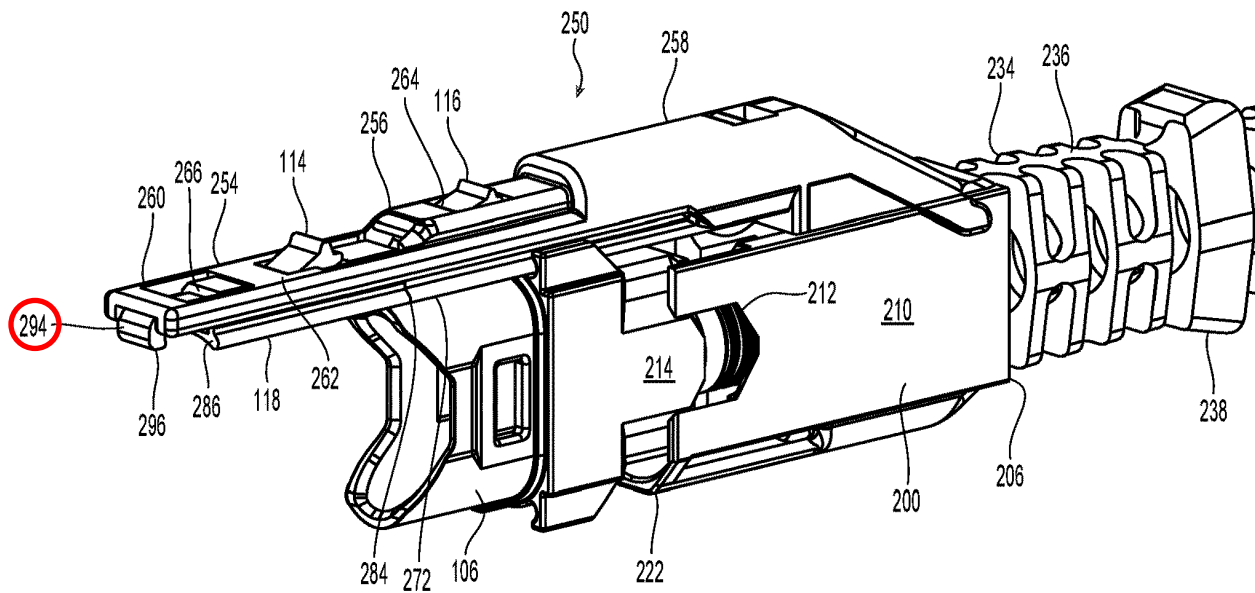


Fig. 14

EX1001: Fig. 14 (annotated).

Therefore, Takano meets this claim. EX1002: ¶144.

G. Claim 8

The center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) includes the boot hooks (9109.5, 9209.5), in this embodiment of Takano. EX1003: ¶[0058]; EX1002: ¶145.

9109.1

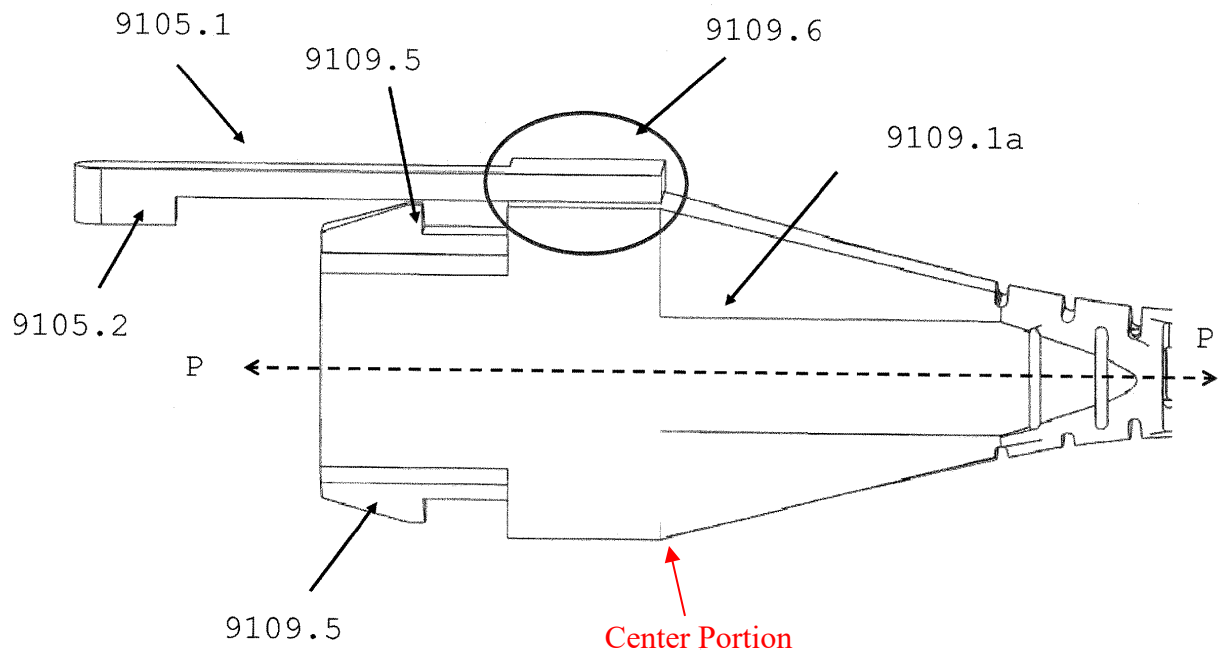


FIG. 17

EX1003: Fig. 17 (annotated).

The boot hooks (9109.5, 9209.5) engage the rear portion of the outer housing (9101, 9201, 9301, 9401) when exiting the slots (9201.4a, 9201.4b) of the outer housing as the boot is rotated. EX1003: ¶¶[0063], [0068]; EX1002: ¶146.

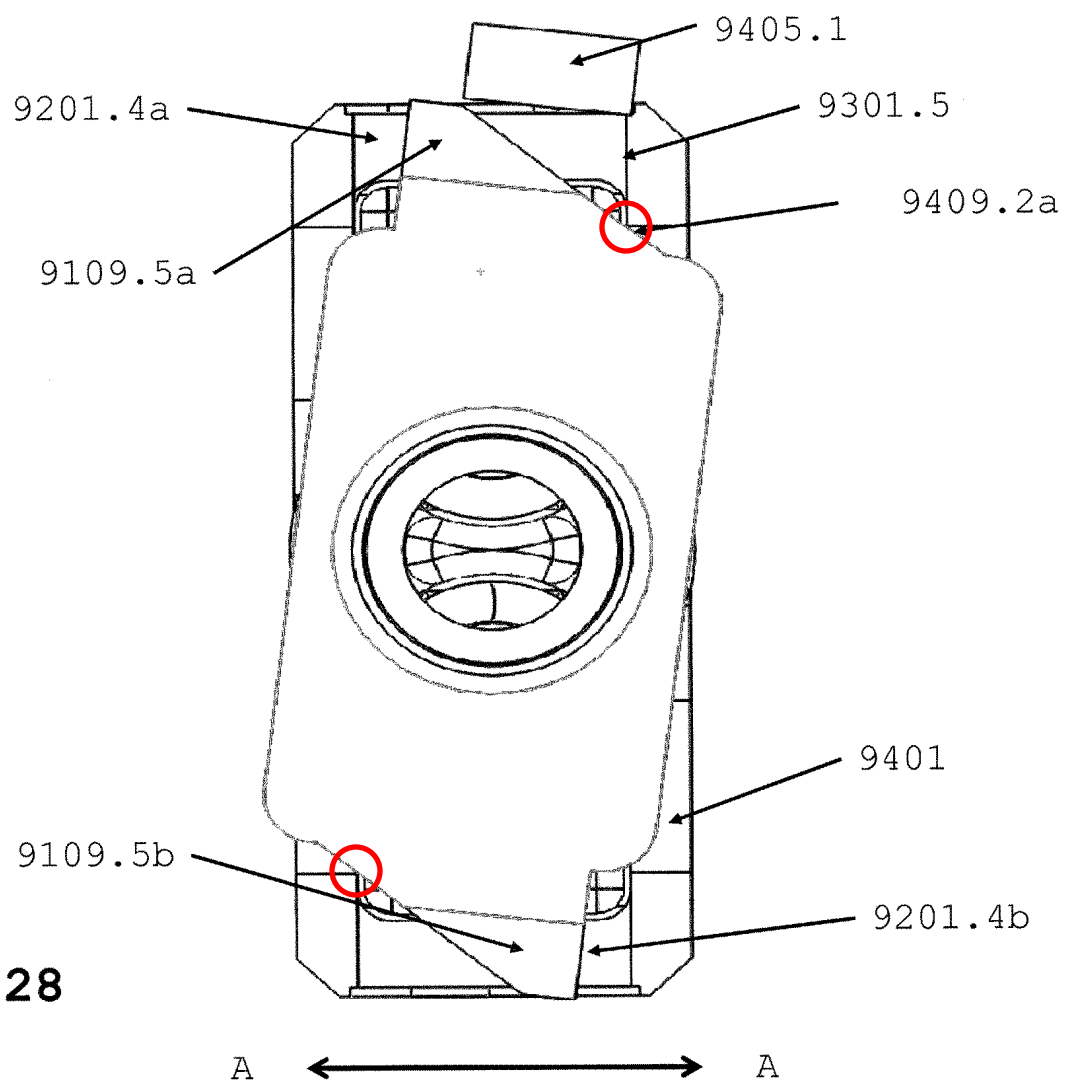


FIG. 28

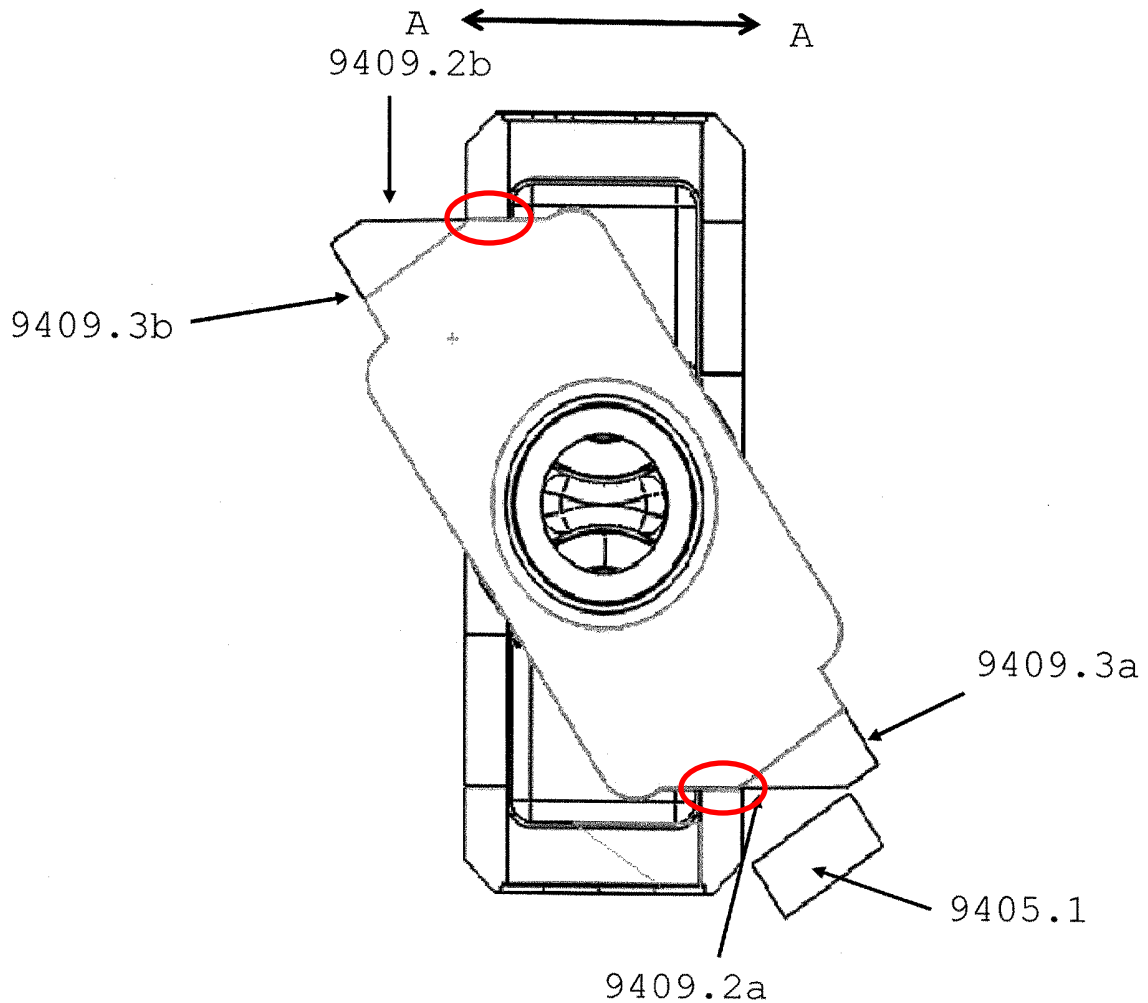


FIG. 31

EX1003: Figs 28 and 31 (annotated).

Alternatively or in addition, the boot hooks (9109.5, 9209.5) also engage the rear portion of the outer housing (9101, 9201, 9301, 9401) when the boot is pulled rearward to detach the micro connector (9100) from the adapter (2400). EX1003: Figs. 35 and 36, ¶[0073]; EX1002: ¶147. Takano explains the “boot wing 9209.5 *engages* outer housing face 9301.4a, and pulls outer housing 9201 rearward.”

EX1003: ¶[0073].

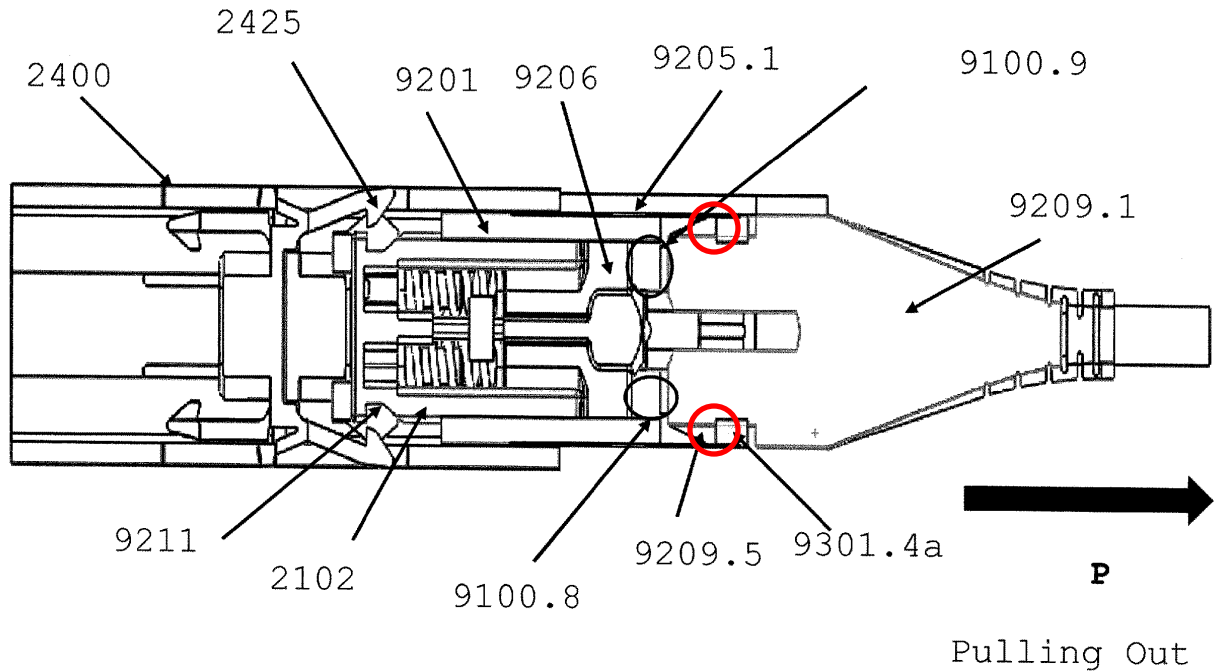


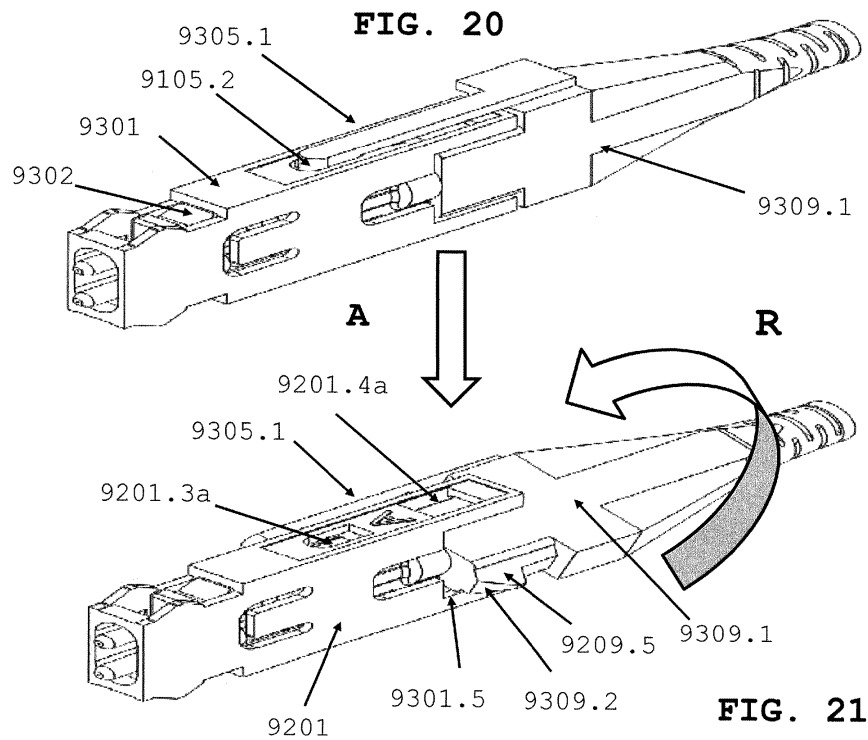
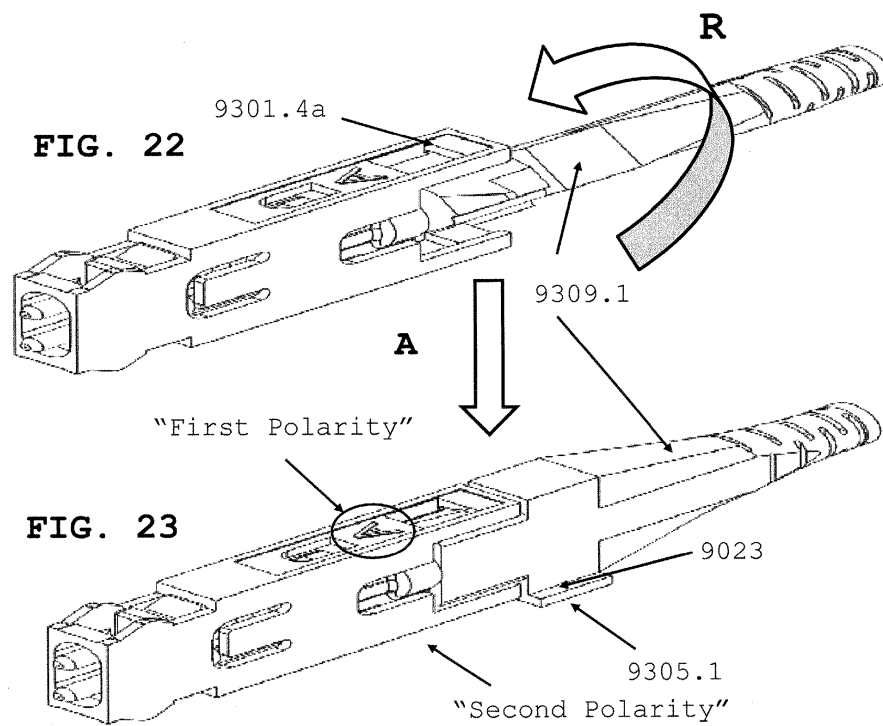
FIG. 35

EX1003: Fig. 35 (annotated).

Therefore, Takano meets this claim. EX1002: ¶148.

H. Claim 9

As previously explained, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable relative to the outer housing (9101, 9201, 9301, 9401) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶149.



EX1003: Figs. 20-23.

Further, the boot hooks (9109.5, 9209.5) connect the boot (9109.1, 9209.1, 9309.1, 9409.1) to the outer housing (9101, 9201, 9301, 9401) when the boot is in the first and second polarity positions. EX1003: ¶[0058] (“outer housing 9101 is secured to boot 9100.1 via boot hooks 9109.5”); EX1002: ¶150.

Thus, when the boot (9109.1, 9209.1, 9309.1, 9409.1) is connected to the outer housing (9101, 9201, 9301, 9401) in the orientation shown in Figs. 16, 20, 24, and 25, the micro connector (9100) is in a first polarity. EX1003: ¶¶[0025], [0063] (“first polarity ‘A’”), [0067]; EX1002: ¶151.

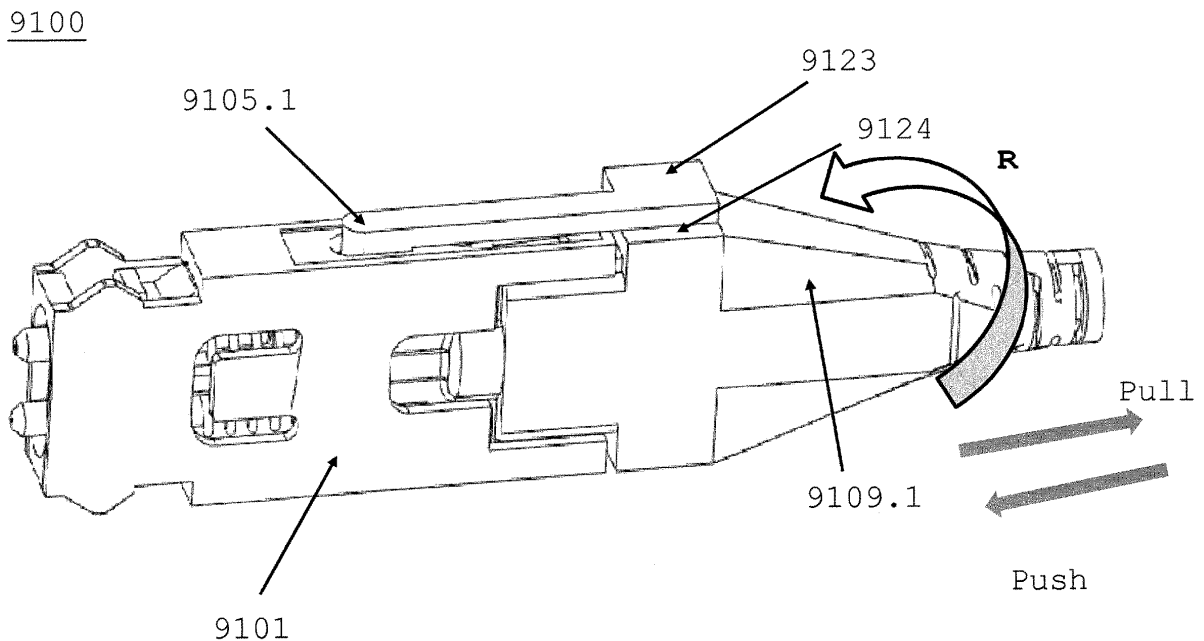
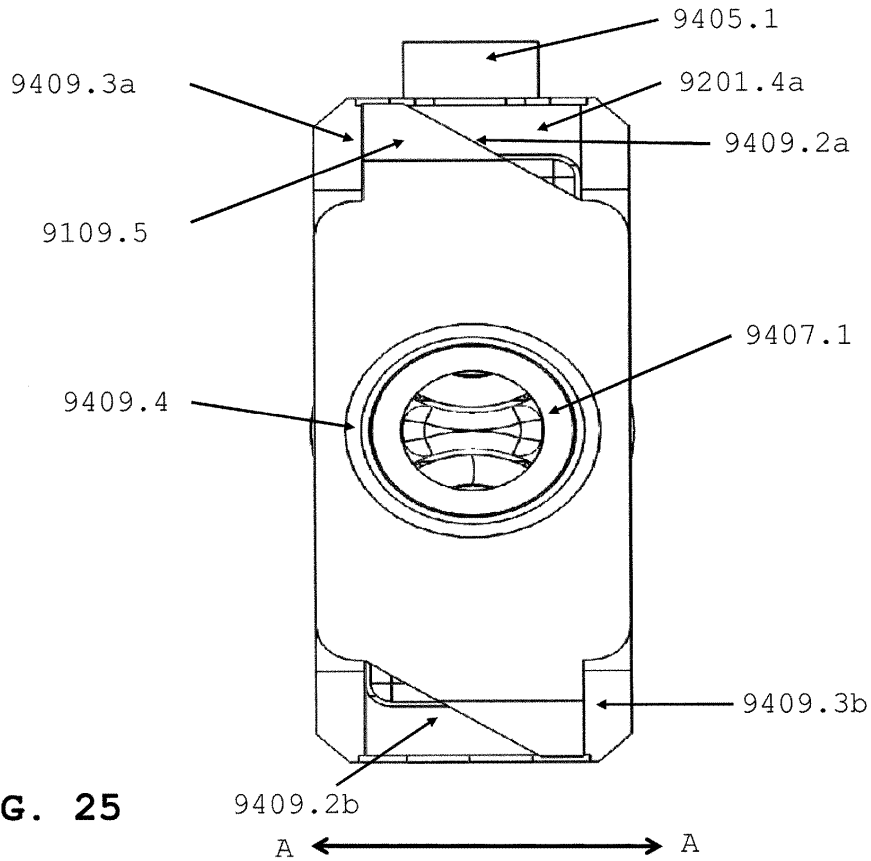


FIG. 16



EX1003: Figs. 16 and 25.

Similarly, when the boot (9109.1, 9209.1, 9309.1, 9409.1) is connected to the outer housing (9101, 9201, 9301, 9401) in the orientation shown in Figs. 23 and 33, the micro connector (9100) is in a second polarity. EX1003: ¶¶[0033], [0063] (“Second Polarity ‘B’”), [0065], [0067]; EX1002: ¶152.

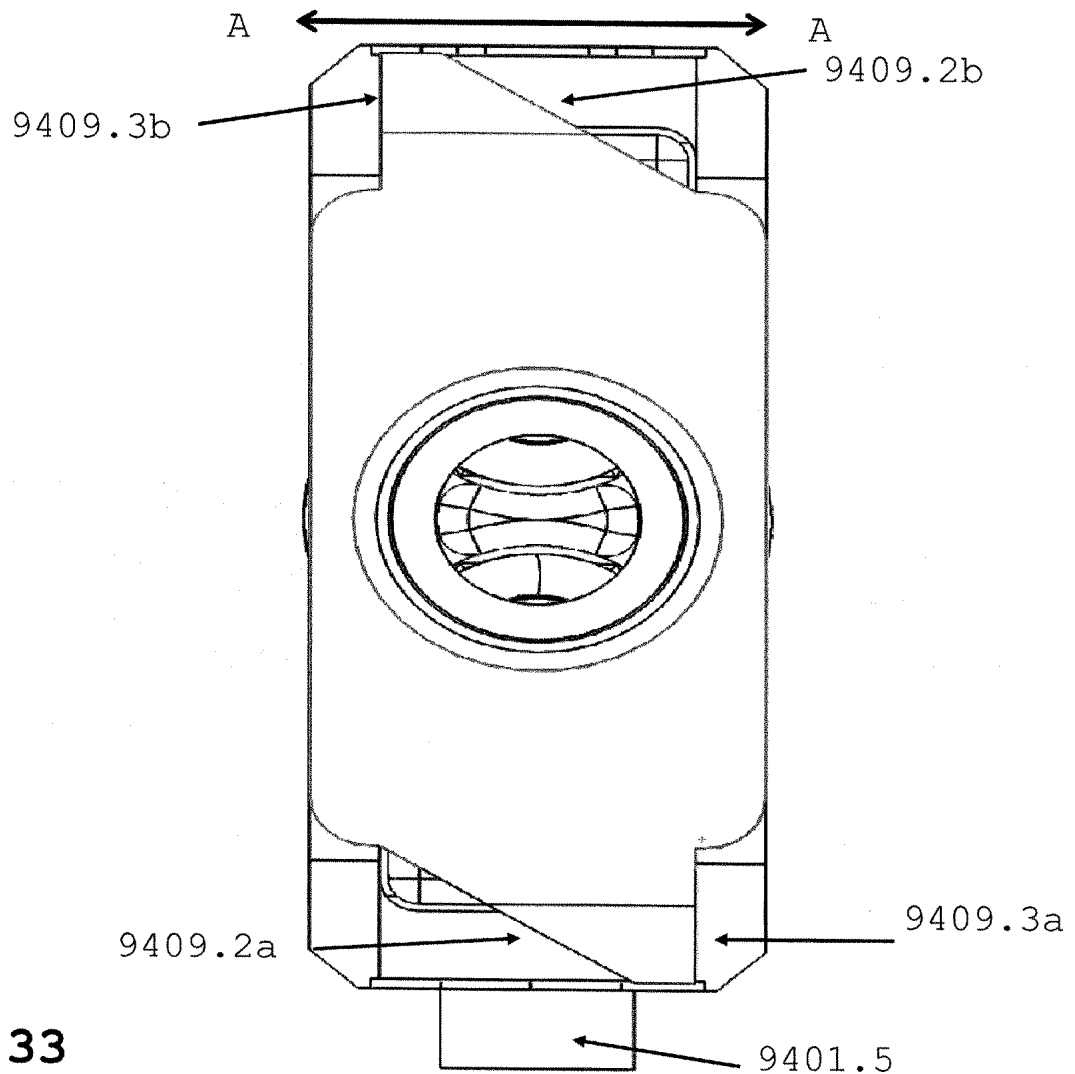


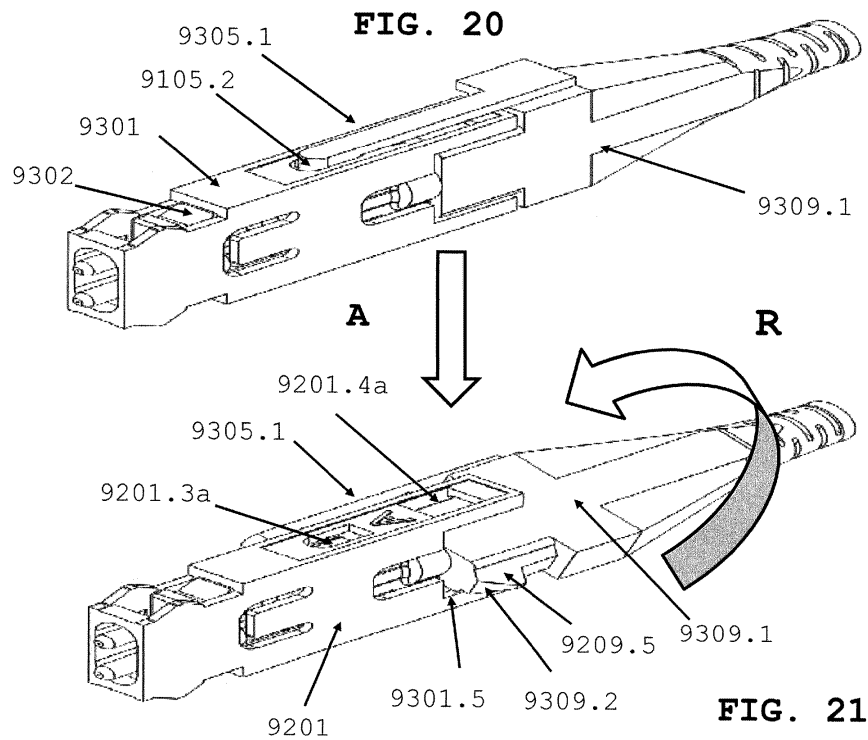
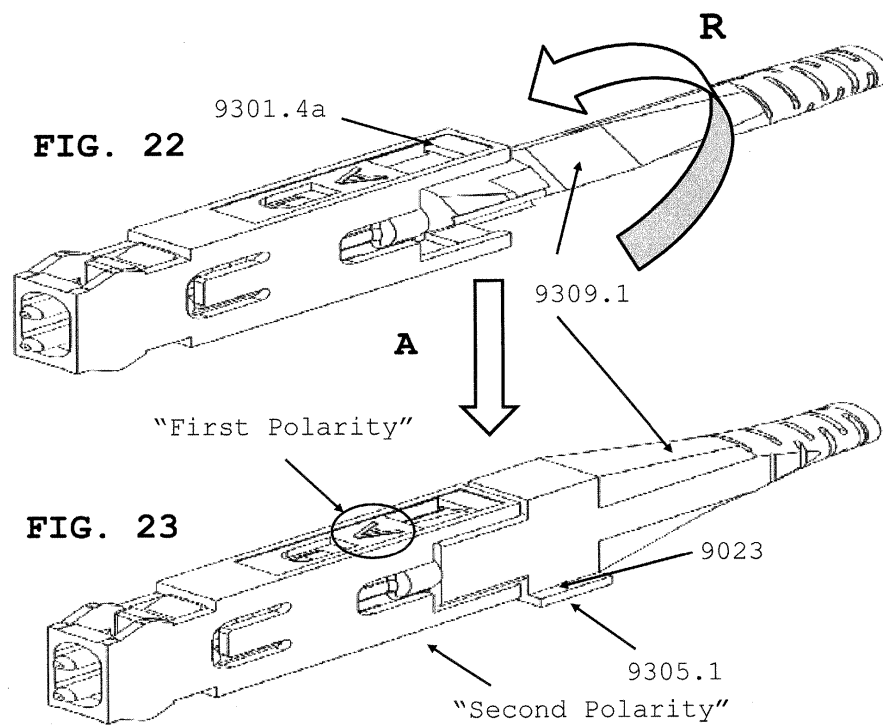
FIG. 33

EX1003: Fig. 33.

Therefore, Takano meets this claim. EX1002: ¶153.

I. Claim 10

As shown in Figs. 20-23 and again in Figs. 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotated 180-degrees about a longitudinal axis (L-L) (*see* Fig. 24) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063] (“**180 degrees**”), [0066], [0069] (“upon **180 degree** rotation”); EX1002: ¶154.



EX1003: Figs. 20-23.

Therefore, Takano meets this claim. EX1002: ¶155.

J. Claim 11

The back portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) includes a grasping portion (i.e., the rear portion of the back portion). EX1003: Figs. 16, 24, 30, 34-36; EX1002: ¶156. This grasping portion is freely accessible to an operator to grab the boot to push and pull on the boot, such as when inserting and removing the micro connector (9100) from the adapter (2400). EX1003: ¶¶[0072]-[0074]; EX1002: ¶156.

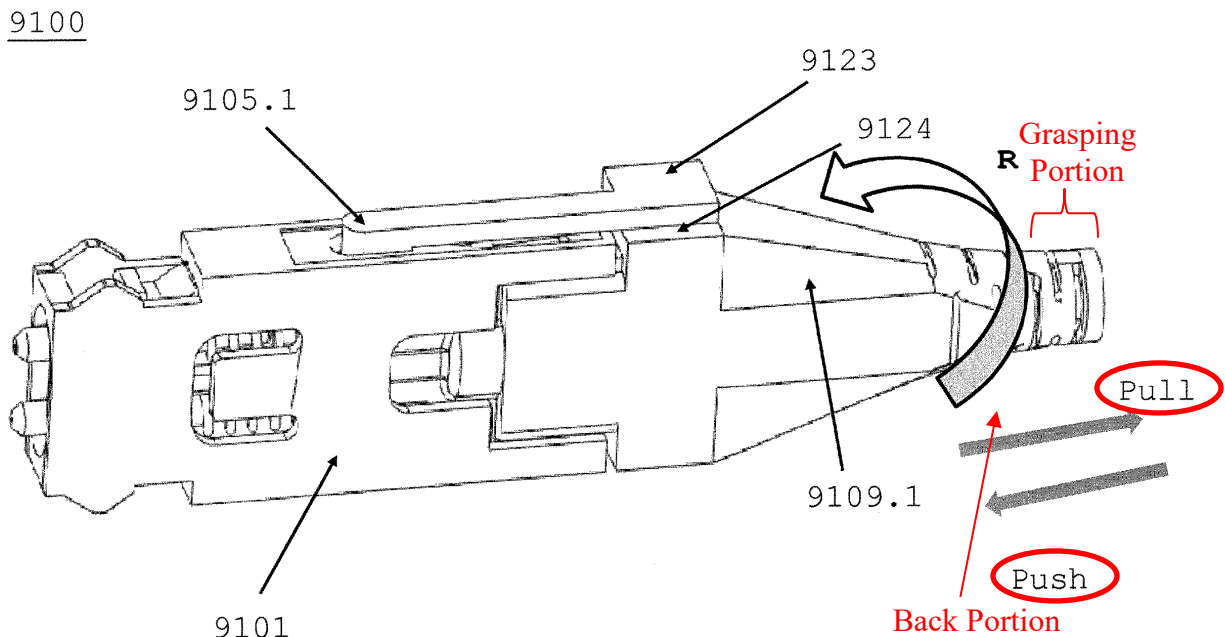


FIG. 16

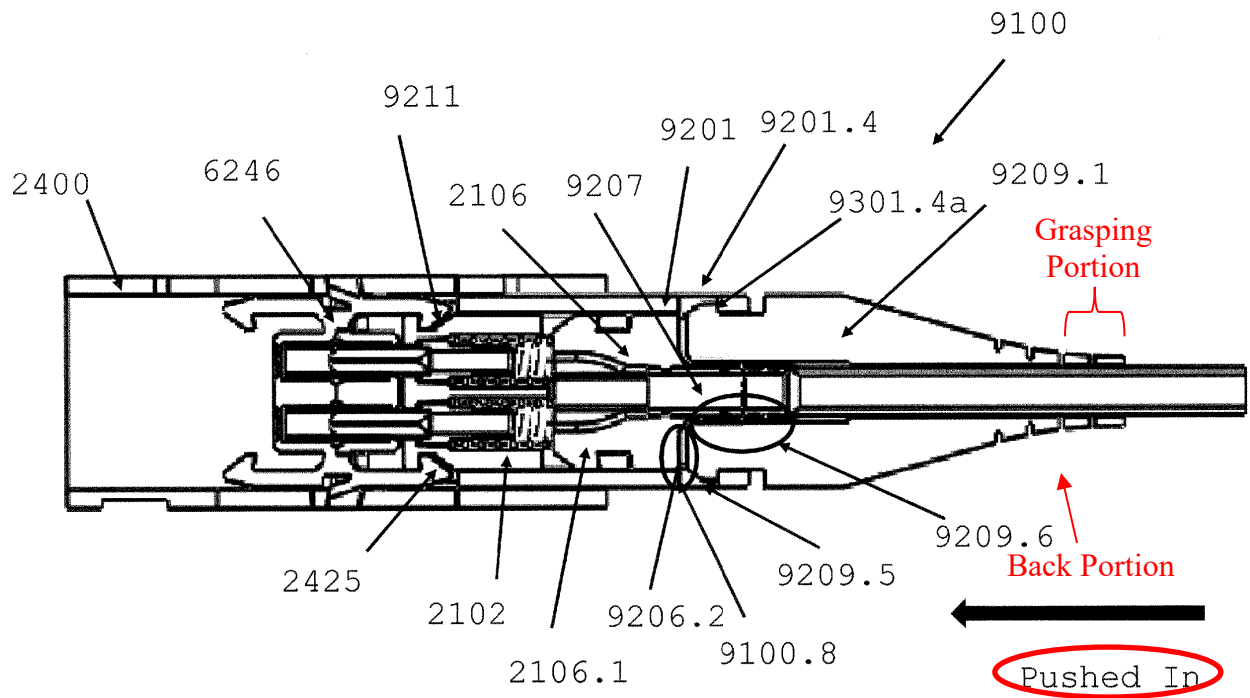


FIG. 34

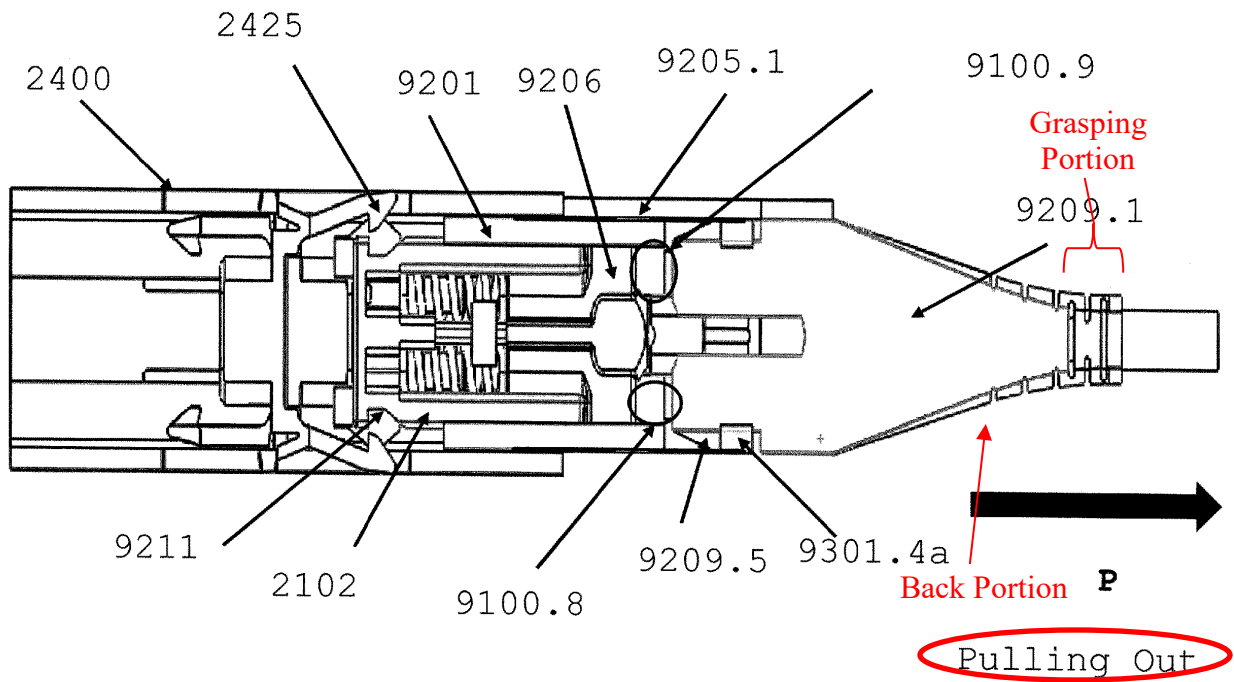


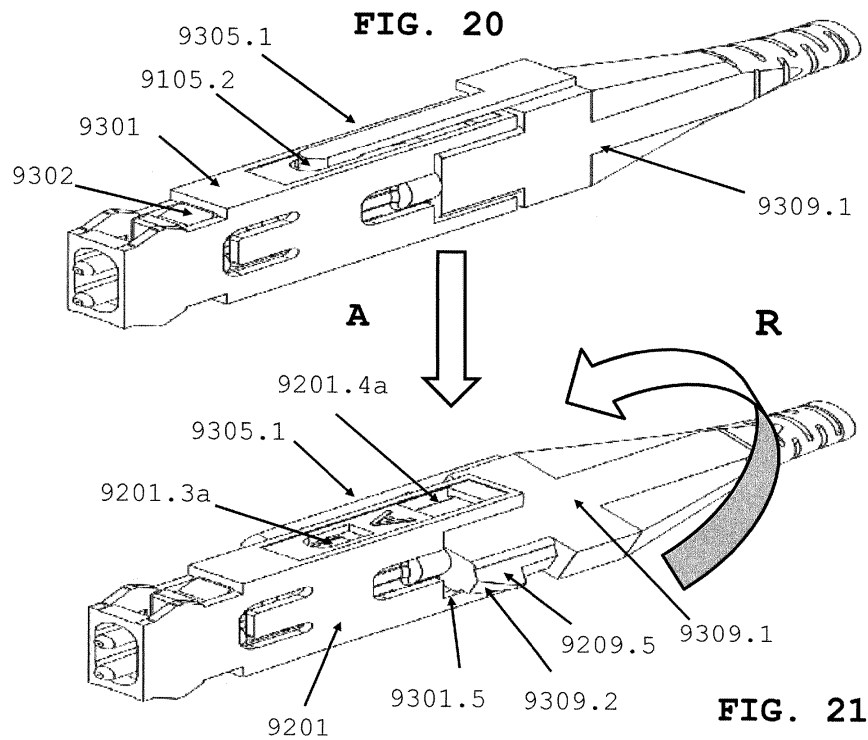
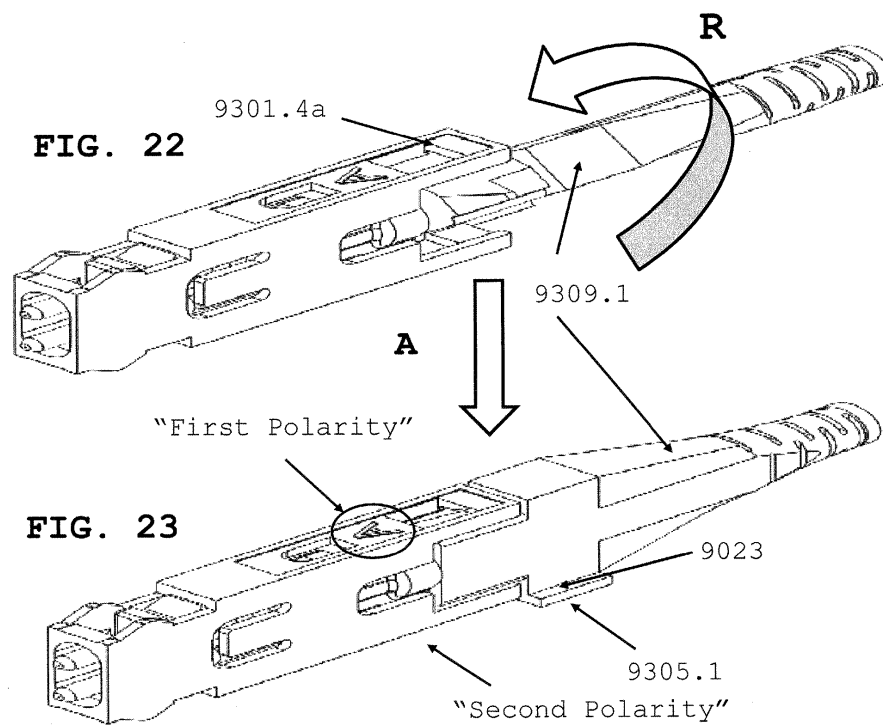
FIG. 35

EX1003: Figs. 16, 34, and 35 (annotated).

Therefore, Takano meets this claim. EX1002: ¶157.

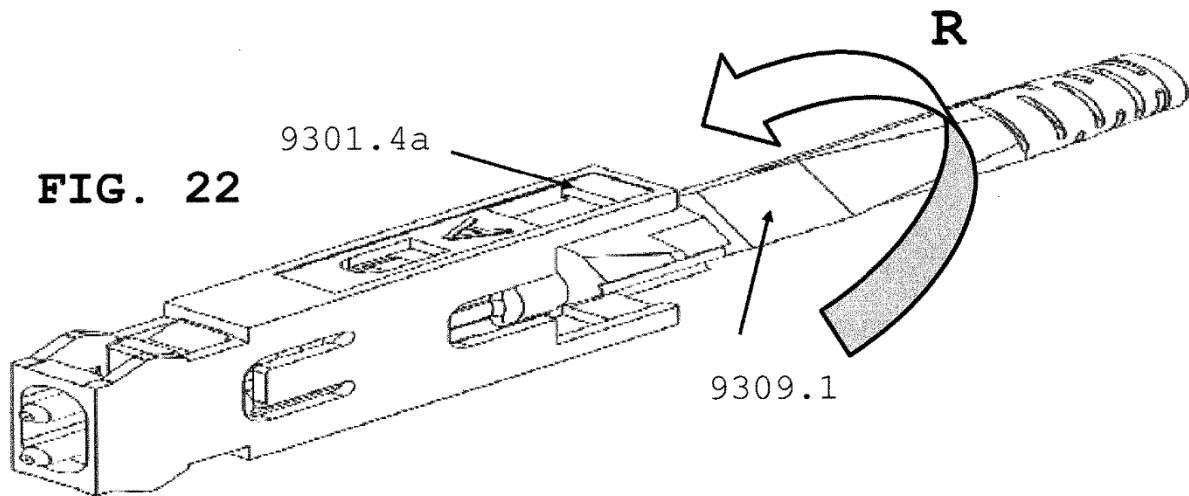
K. Claim 12

As explained in Section VI(E)(5.a), the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable relative to the outer housing (9101, 9201, 9301, 9401) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶158. This rotation of the boot is slidable movement relative to the outer housing. EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶158. For example, the chamfer (9309.2, 9409.2a, 9409.2b) of the boot hooks (9109.5, 9209.5) allows the boot hooks to slide out of the slots (9201.4a, 9201.4b) of the outer housing when the boot is being rotated. EX1003: Figs. 28-33, ¶¶[0063], [0067]-[0068], [0070]-[0071]; EX1002: ¶158.



EX1003: Figs. 20-23.

Alternatively or in addition, as explained in Section VI(E)(5.a), the boot (9109.1, 9209.1, 9309.1, 9409.1) is slidable longitudinally (i.e., rearward) relative to the outer housing (9101, 9201, 9301, 9401) along the fiber optic cable when in the release position (*see* Figs. 22 and 30); EX1002: ¶159.



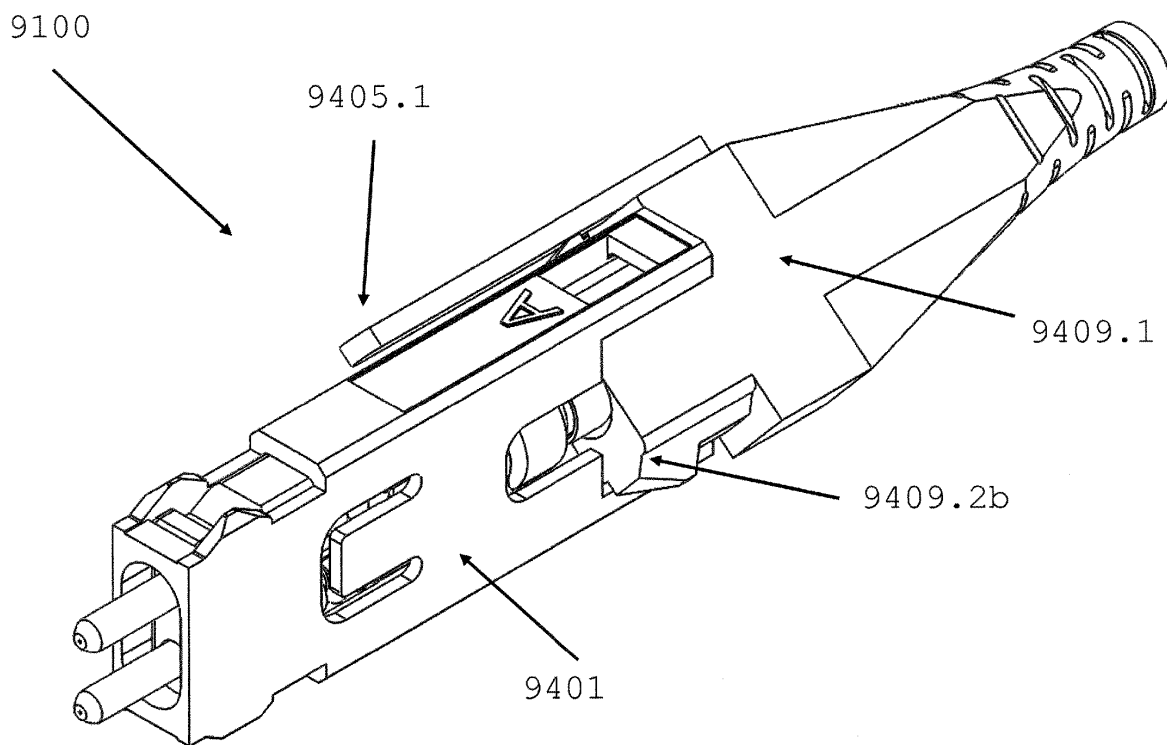


FIG. 30

EX1003: Figs. 22 and 30.

Therefore, Takano meets this claim. EX1002: ¶160.

L. Claim 14

As shown below, in this embodiment of Takano, the center portion has cutouts rearward of the boot hooks (9109.5, 9209.5). EX1003: Fig. 17, ¶[0058]; EX1002: ¶161. These cutouts are in the short sides (i.e., top and bottom) and long sides of the center portion. *See* EX1001: claim 1 (defining the top and bottom as short sides); EX1002: ¶161.

9109.1

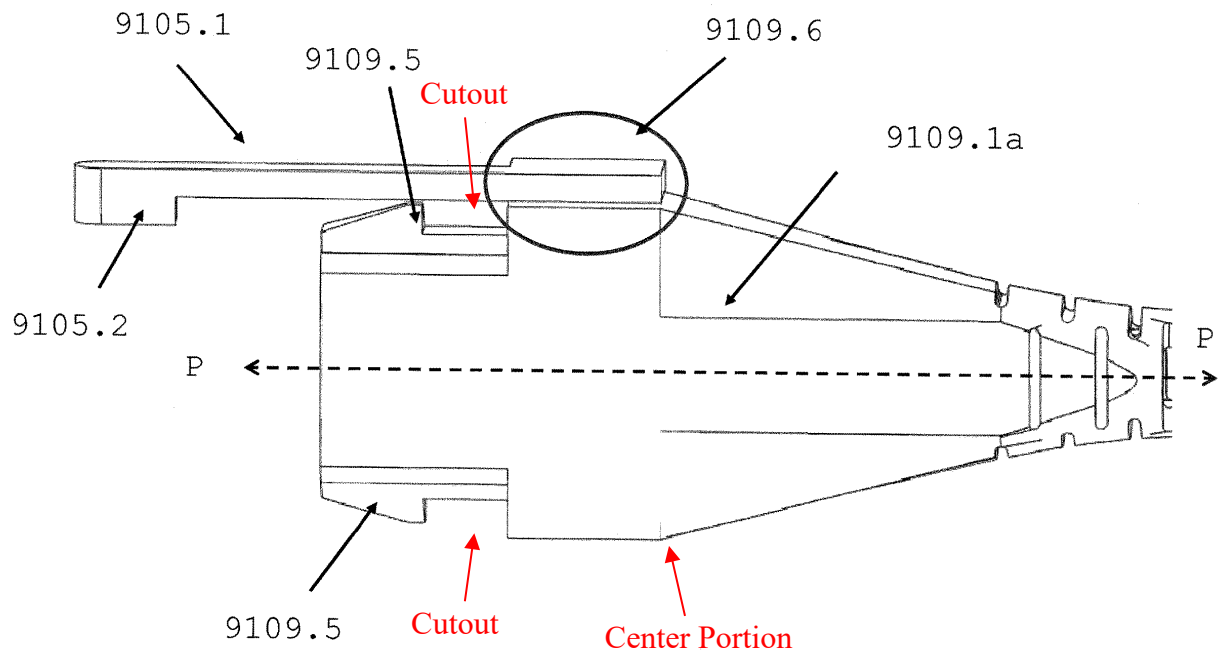


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano meets this claim. EX1002: ¶162.

M. Independent Claim 16

1. 16.P

For reasons discussed in Section VI(A)(1.P), Takano meets 16.P. EX1002: ¶163.

2. 16.a.1

Takano's outer housing (9101, 9201, 9301, 9401) has a front end opening for the two ferrules (9203). EX1003: Figs. 16 and 30, ¶[[0061]; EX1002: ¶164.

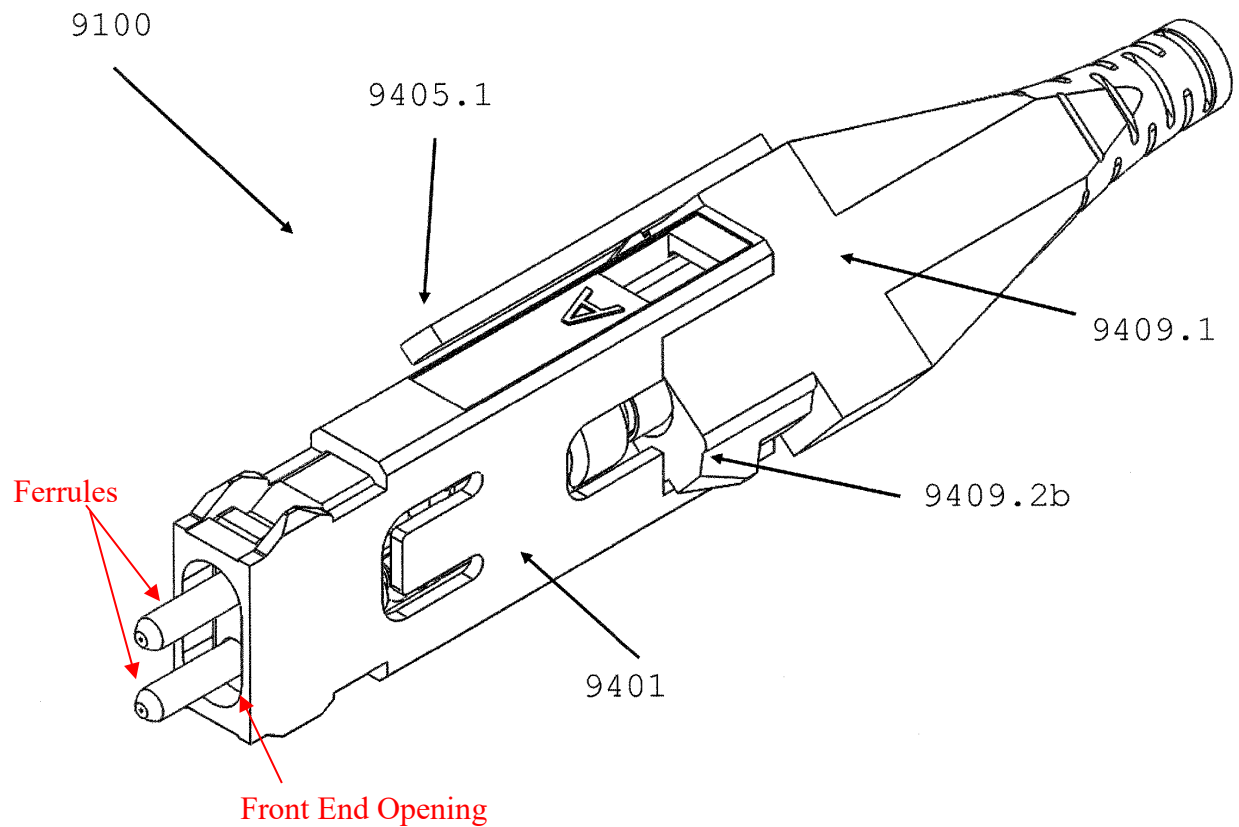


FIG. 30

EX1003: Fig. 30 (annotated).

Therefore, Takano meets 16.a.1. EX1002: ¶165.

3. 16.a.2

For reasons discussed in Section VI(A)(1.a.2), Takano meets 16.a.2.

EX1002: ¶166.

4. 16.a.3

For reasons discussed in Section VI(A)(1.a.4), Takano meets 16.a.3.

EX1002: ¶167.

5. 16.a.4

The micro connector (9100) includes two ferrules (9203) that are spaced apart between the top and bottom of the outer housing (9101, 9201, 9301, 9401).

EX1003: Fig. 16, 19, and 30, ¶[0061]; EX1002: ¶168.

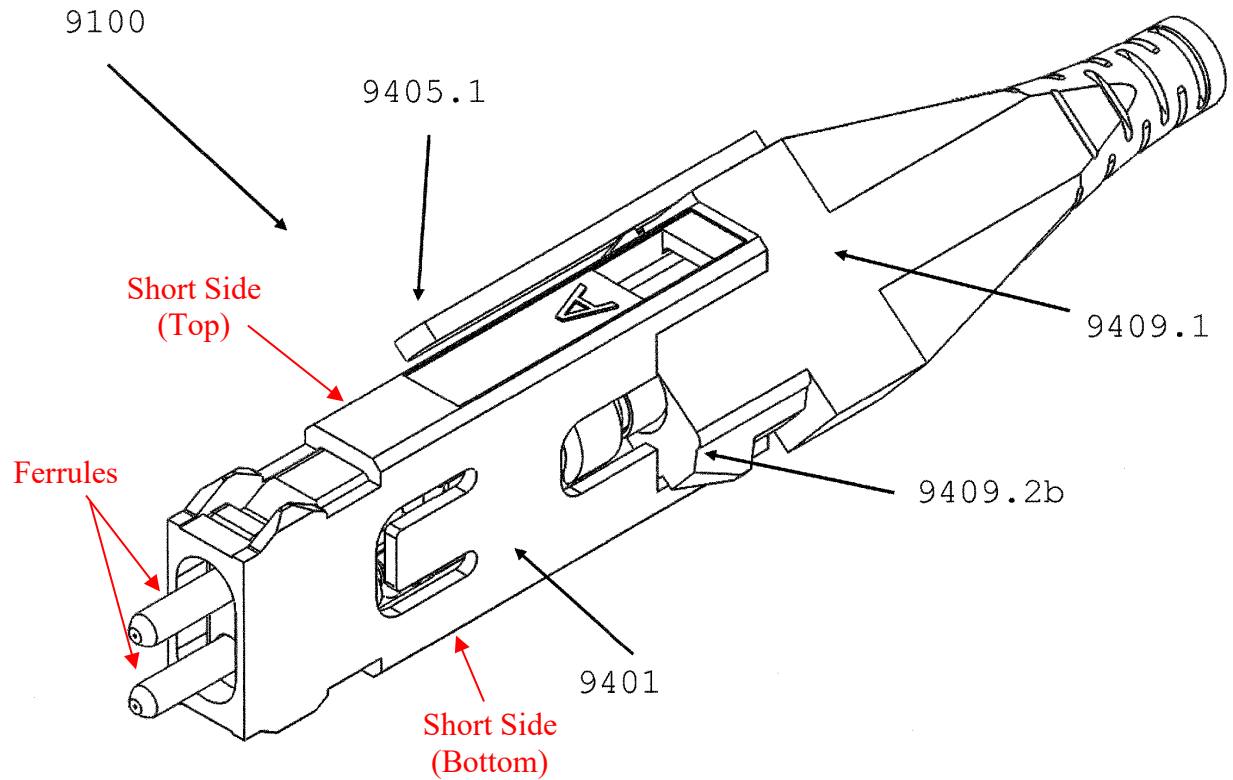


FIG. 30

EX1003: Fig. 30 (annotated).

As shown in Fig. 30, each ferrule (9203) is spaced equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401). EX1002: ¶169.

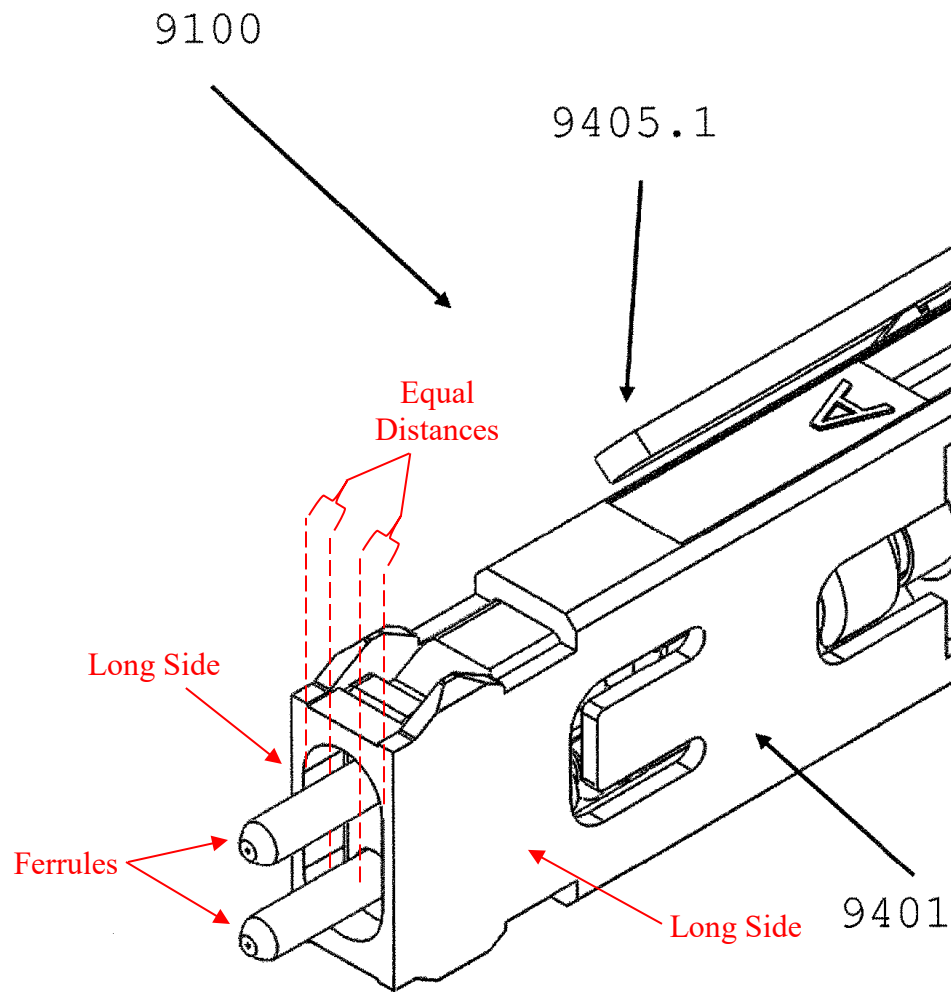
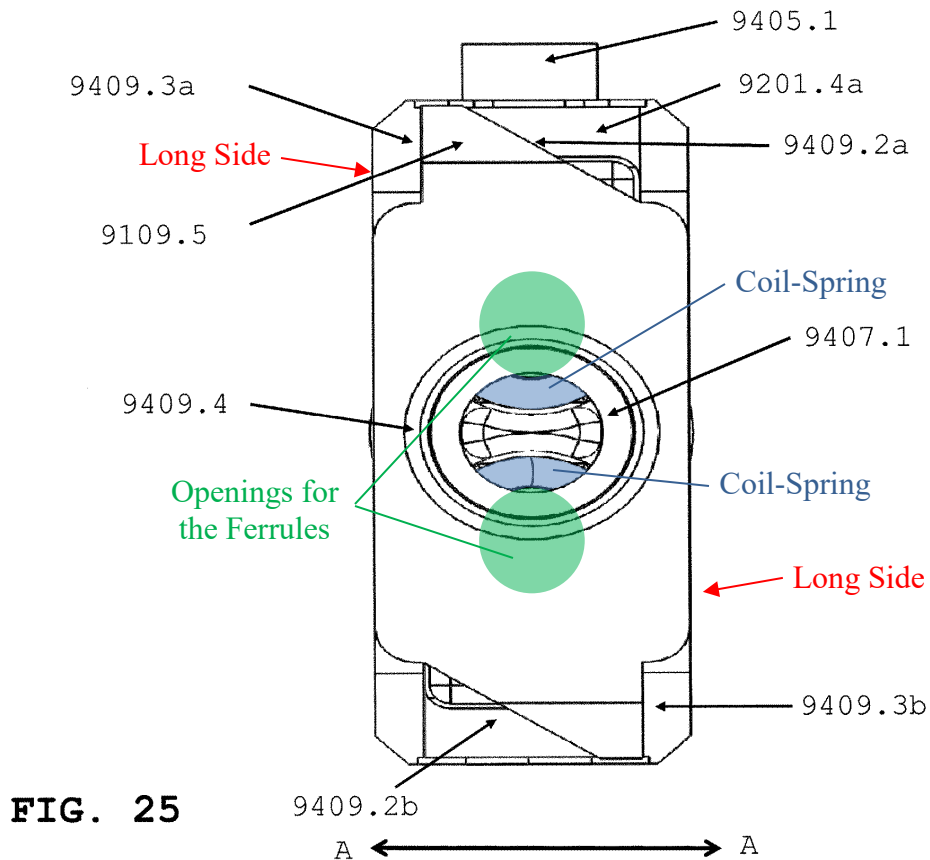


FIG. 30

EX1003: Fig. 30 (annotated).

The ferrules (9203) being spaced equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401) is also indicated by Fig. 25 (below), which shows the openings in the front body (9102, 9202) (and shows the coil-springs) that receive the ferrules as being centered between the long sides. EX1002: ¶170.



EX1003: Fig. 25 (annotated).

Alternatively or in addition, the ferrules (9203) being spaced equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401) would be an inherent property of the micro connector (9100). EX1002: ¶¶171-179.

The adapter (2400) for the micro connector (9100) includes two alignment sleeves that each receive one of the ferrules (9203) when the micro connector is inserted into the adapter. EX1003: Figs. 34 and 36; EX1002: ¶180. Alignment sleeves form a cylindrical bore in which ferrules inserted from opposite ends meet therein to form an optical connection therebetween. EX1003: Figs. 34 and 36; EX1004: ¶¶[224], [233]; EX1018: 30:18-21; EX1002: ¶180.

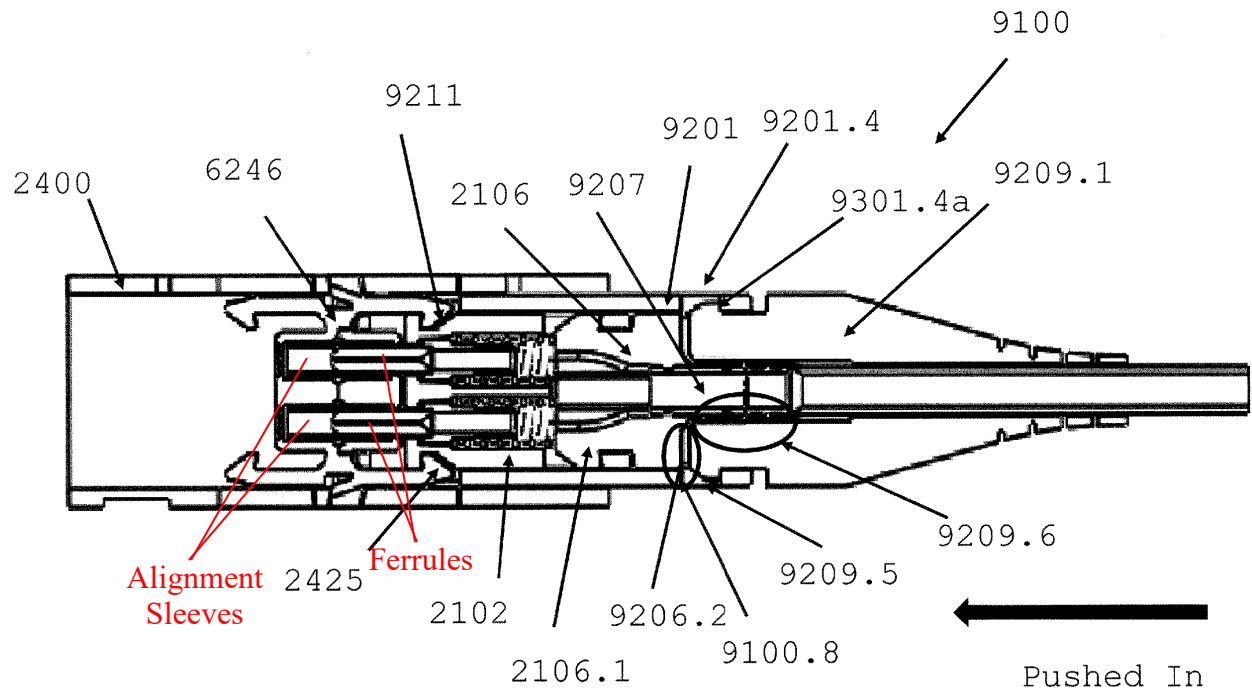


FIG. 34

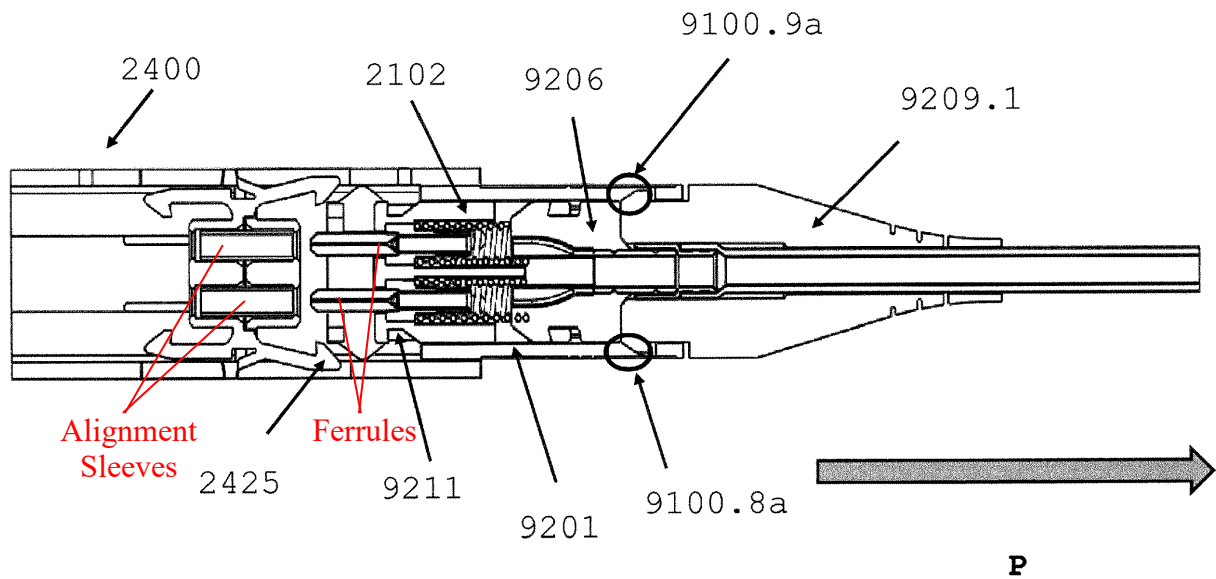


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

Additional description and drawings of the adapter (2400) are provided in the '539 Provisional, which is incorporated by reference into Takano. EX1003: ¶[0001]; EX1002: ¶181. As shown, the adapter (2400) includes alignment slots (2447) along the top of the adapter housing (2440) that receive the respective keys of the micro connectors (9100) inserted therein. EX1004: ¶¶[224], [288]; EX1002: ¶181.

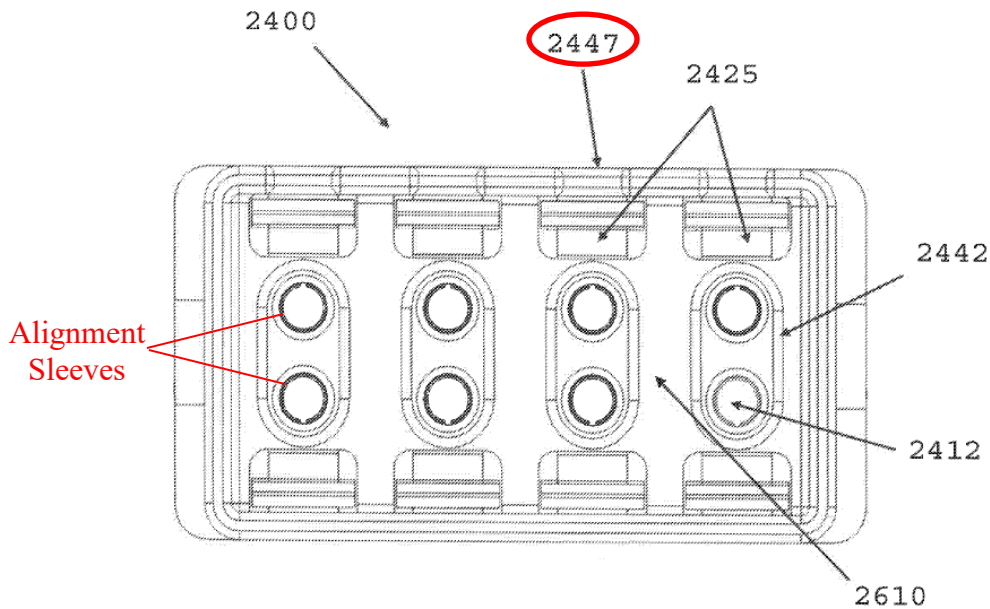


FIG. 26

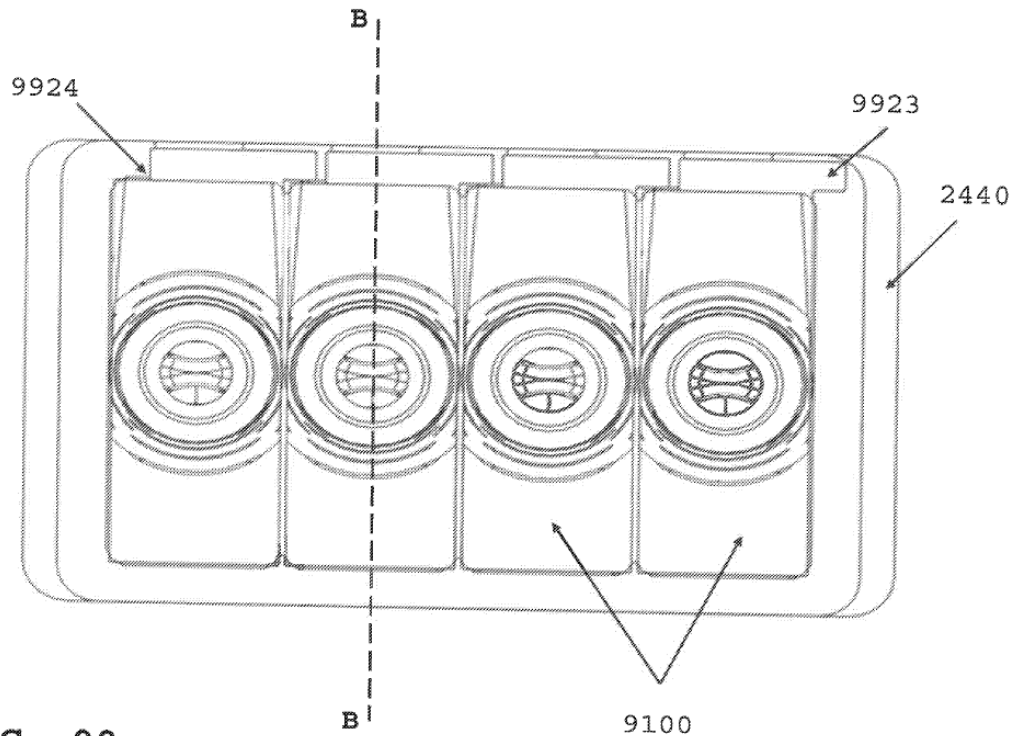


FIG. 99

EX1004: Figs. 26 (annotated) and 99.

The micro connector (9100) can be inserted into the adapter (2400) when in the first polarity configuration and when in the second polarity configuration.

EX1003: ¶[0065]; EX1002: ¶182. Regardless of which polarity configuration the micro connector (9100) is in, the ferrules (9203) are each received by one of the alignment sleeves when inserted into the adapter (2400). EX1003: Fig. 34;

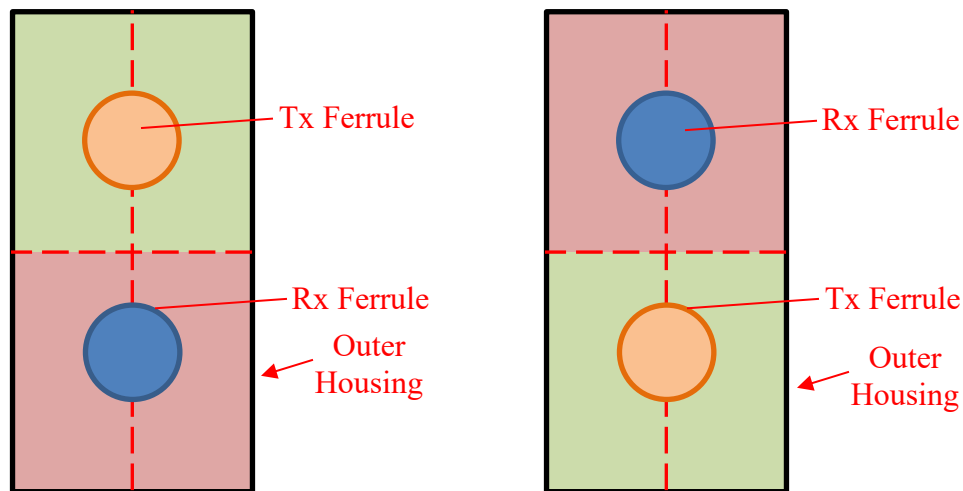
EX1002: ¶182. In order for the ferrules of the micro connector to *align* with the alignment sleeves of the adapter when the micro connector is in the first polarity *and* when the micro connector is in the second polarity, the ferrules must be symmetrically arranged relative to the outer housing (9101, 9201, 9301, 9401)—

both horizontally and vertically. EX1002: ¶182. The vertical symmetry between the ferrules and outer housing is shown in Figs. 34 and 36. EX1002: ¶182.

The '794 Patent itself recognizes polarity change connectors like those in Takano need to be symmetrical. EX1001: 4:14-20 ("housing 102 is symmetric"); EX1002: ¶183.

Such horizontal and vertical symmetry is necessary because the orientation of the outer housing (9101, 9201, 9301, 9401) relative to the adapter (2400) when the micro connector (9100) is in the first polarity configuration is *flipped over* from the orientation of the outer housing relative to the adapter when the micro connector is in the second polarity configuration. EX1002: ¶184. If the ferrules (9203) are not symmetrically arranged relative to the outer housing, then the ferrules will not align with the alignment sleeves of the adapter when the polarity of the micro connector is changed. EX1002: ¶184.

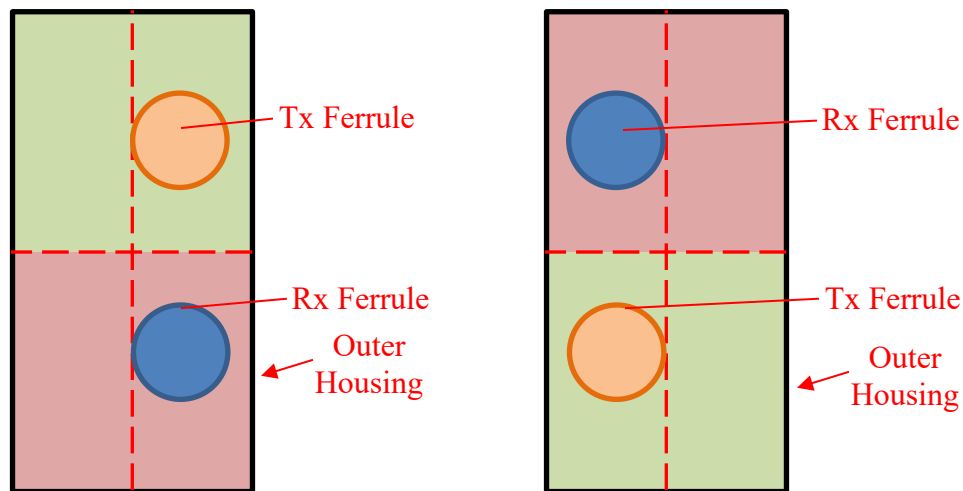
For example, the schematic diagrams below show that two ferrules symmetrically arranged relative to the outer housing simply switch places when the entire outer housing is flipped over to switch between the first polarity and the second polarity. EX1002: ¶185.



First Polarity Configuration

Second Polarity Configuration (outer housing flipped over from First Polarity Configuration)

However, the schematic diagrams below show that two ferrules asymmetrically arranged relative to the outer housing will not simply switch places when the entire outer housing is flipped over to switch between the first polarity and the second polarity. EX1002: ¶186. Instead, the horizontal positions of the two ferrules in the overall connector have completely changed and, therefore, will not align with the alignment sleeves of the adapter. EX1002: ¶186.



First Polarity Configuration

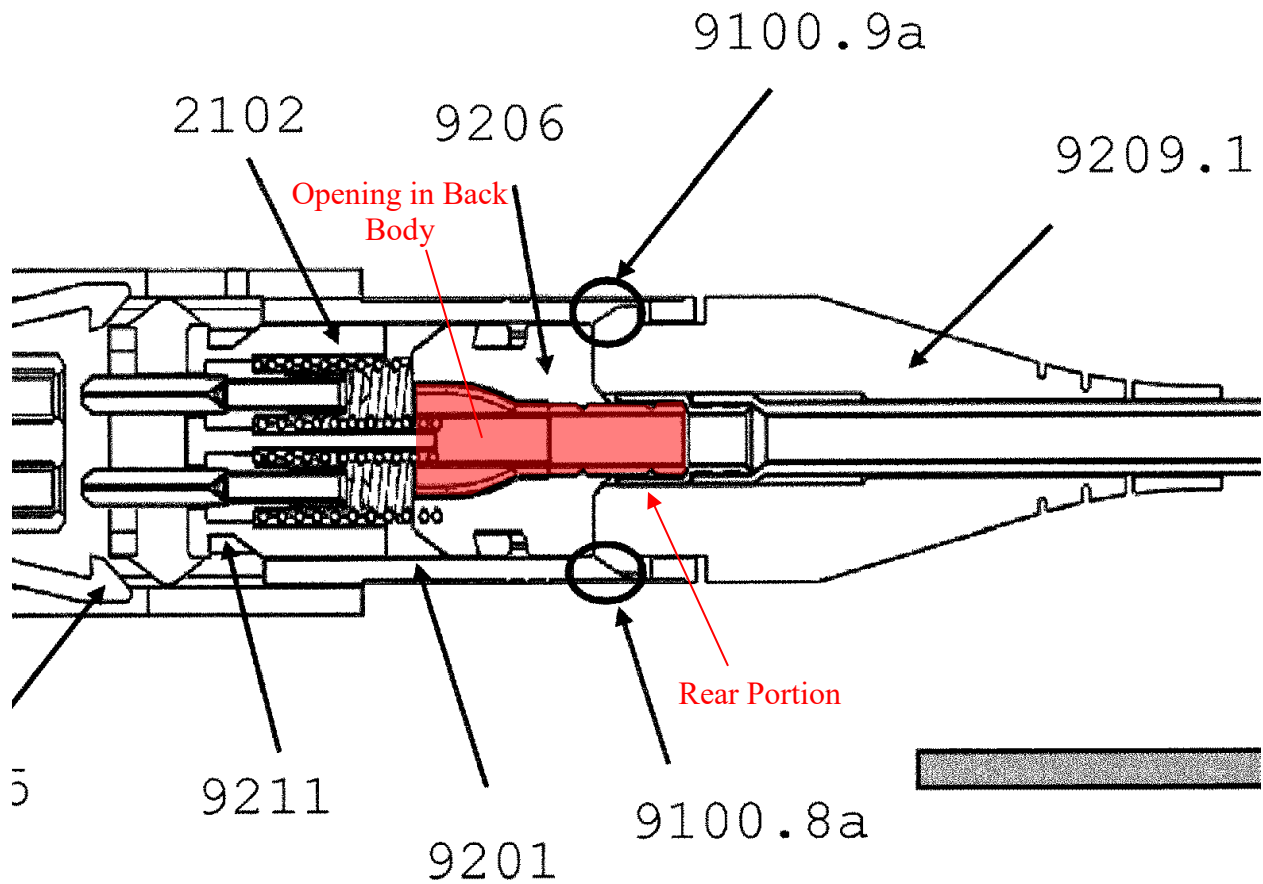
Second Polarity Configuration (outer housing flipped over from First Polarity Configuration)

Because the ferrules (9203) are symmetrically arranged horizontally and vertically relative to the outer housing (9101, 9201, 9301, 9401), the ferrules are inherently spaced equidistant from the long sides of the outer housing. EX1002: ¶187.

Therefore, Takano meets 16.a.4. EX1002: ¶188.

6. 16.b

For reasons discussed in Section VI(A)(1.b), Takano meets 16.b. EX1002: ¶189. Further, as explained in Section VI(A)(1.c.3), the back body (9106, 9206)—including the back post (i.e., rear portion)—has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶189.



EX1003: Fig. 36 (annotated).

7. 16.c.1

For reasons discussed in Section VI(A)(1.c.1), Takano meets 16.c.1.

EX1002: ¶191.

8. 16.c.2

For reasons discussed in Sections VI(A)(1.c.2) and VI(F), Takano meets

16.c.2. EX1002: ¶192.

9. 16.c.3

For reasons discussed in Section VI(A)(1.c.3), Takano meets 16.c.3.

EX1002: ¶193.

10. 16.d

For reasons discussed in Section VI(A)(1.d), Takano meets 16.d. EX1002:

¶194.

N. Claim 17

For reasons discussed in Section VI(B), Takano meets this claim. EX1002:

¶195.

O. Claim 18

For reasons discussed in Section VI(E), Takano meets this claim. EX1002:

¶196.

P. Independent Claim 20

1. 20.P

For reasons discussed in Section VI(A)(1.P), Takano meets 20.P. EX1002:

¶197.

2. 20.a

For reasons discussed in Section VI(A)(1.P), Takano meets 20.a. EX1002:

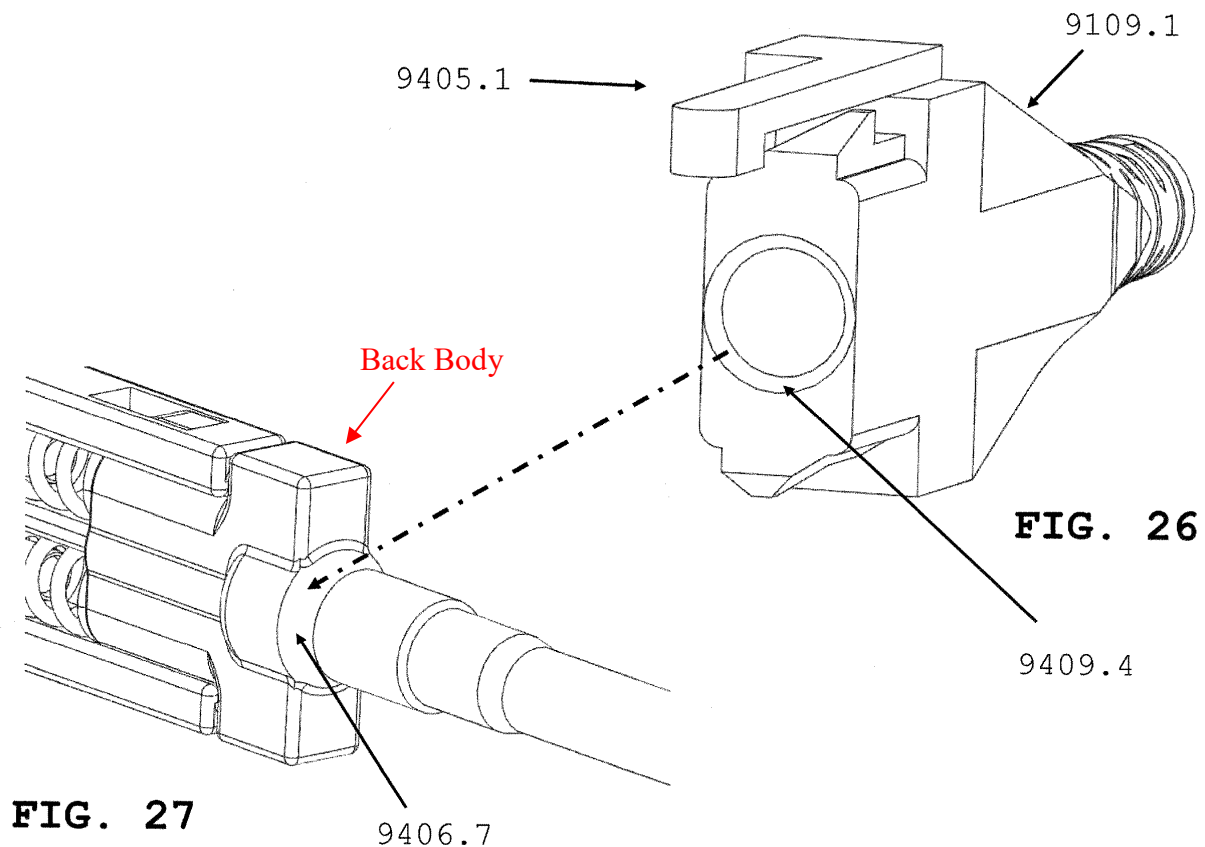
¶198.

3. 20.b

As explained in Section VI(A)(1.P), Takano's micro connector (9100) includes a back body (9106, 9206) (i.e., crimp body). EX1002: ¶199. The back

body engages the boot (9109.1, 9209.1, 9309.1, 9409.1) forward of the boot.⁶

EX1003: Figs. 26 and 27, ¶¶[0067] (“inner round 9409.4 *engages* a back post surface 9406.7”), [0072] (“inner round 9409.4 *engages* back post face surface 9406.7,” “boot assembly wing 9209.5 facing surface *is in contact* with facing surface 9206.2 of back post 2106,” “boot assembly 9209.1 *is up against* back body 2106”); EX1002: ¶199.



⁶ If 20.b has written description support, then Takano meets 20.b for at least the same reasons 20.b has written description support. EX1002: ¶201.

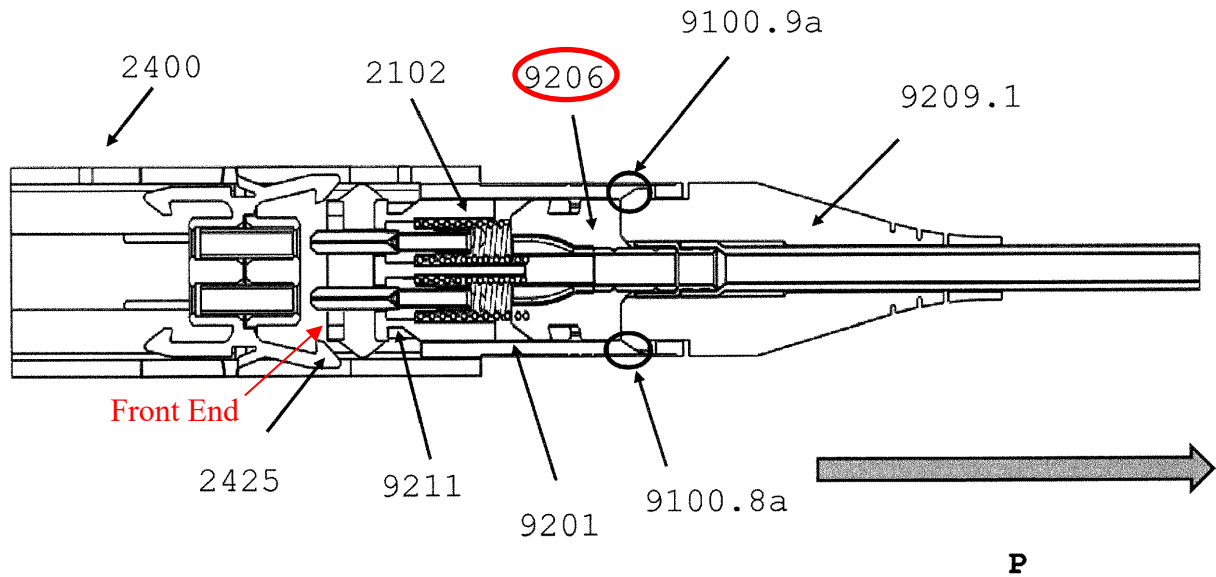


FIG. 36

EX1003: Figs. 26, 27, and 36 (annotated).

Therefore, Takano meets 20.b. EX1002: ¶200.

4. 20.c.1

For reasons discussed in Sections VI(A)(1.P)&(1.c.3), Takano meets 20.c.1.

EX1002: ¶202.

5. 20.c.2

For reasons discussed in Sections VI(A)(1.a.1)&(M)(16.a.1), Takano meets 20.c.2. EX1002: ¶203.

6. 20.c.3

For reasons discussed in Section VI(A)(1.a.2), Takano meets 20.c.3. EX1002: ¶204.

7. 20.c.4

For reasons discussed in Section VI(A)(1.a.4), Takano meets 20.c.4.

EX1002: ¶205.

8. 20.c.5

For reasons discussed in Section VI(M)(16.a.4), Takano meets 20.c.5.

EX1002: ¶206.

9. 20.d

For reasons discussed in Sections VI(A)(1.b)&(M)(16.b), Takano meets

20.d. EX1002: ¶207.

10. 20.e.1

As explained in Section VI(A)(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a center portion. EX1002: ¶208. The center portion has front and rear ends. EX1003: Fig. 17; EX1002: ¶208.

9100

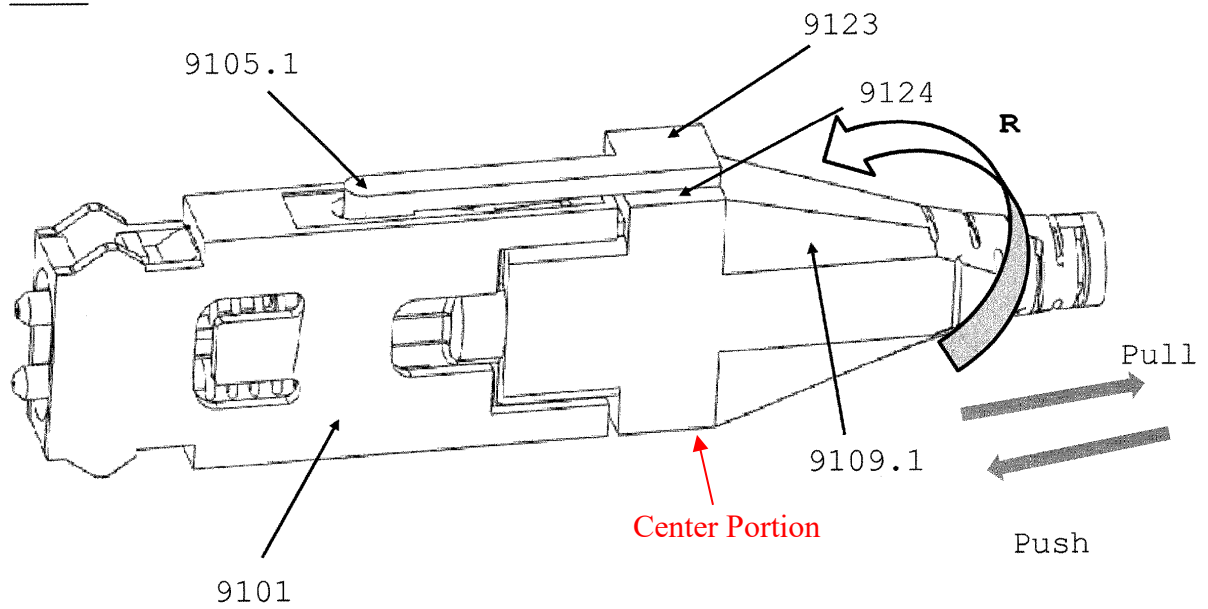


FIG. 16

9109.1

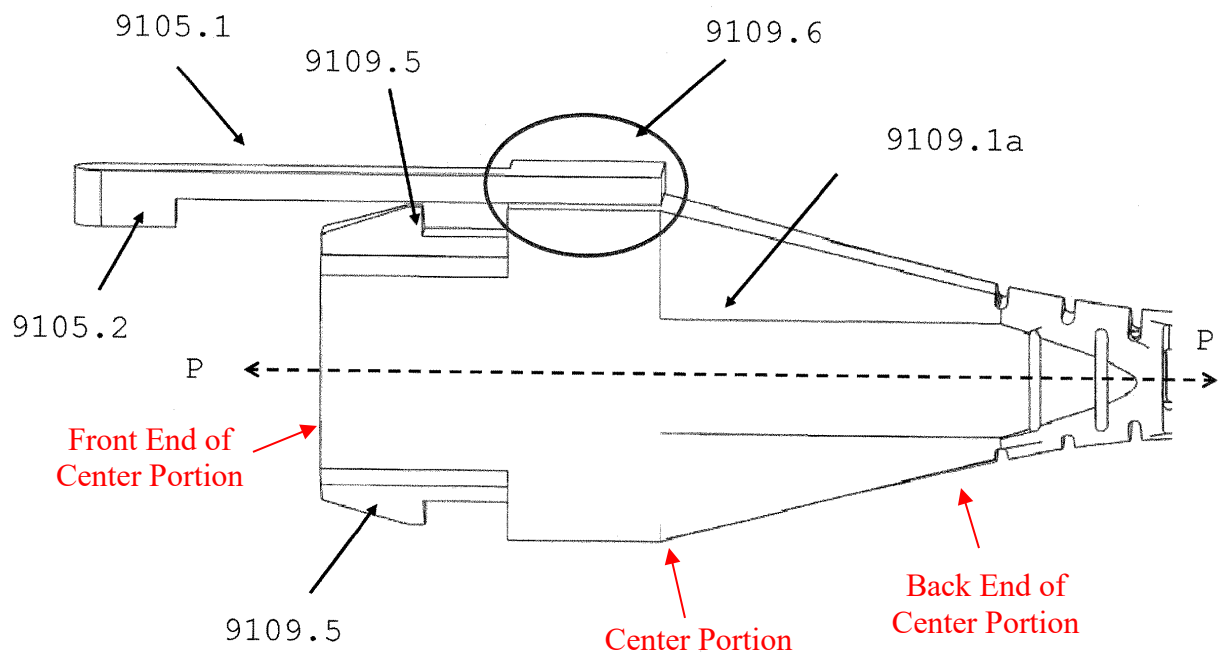
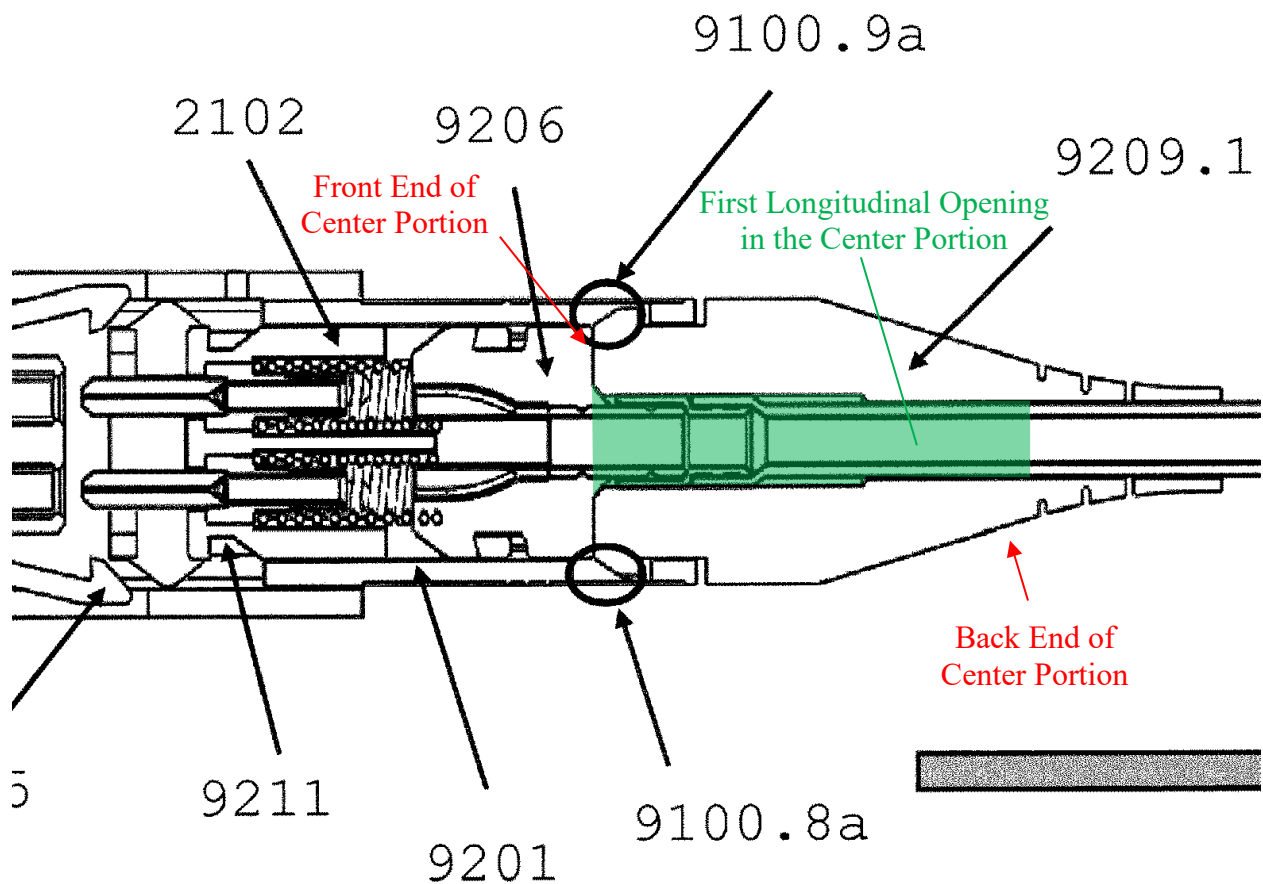


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

As explained in Section VI(A)(1.c.3), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶209. This opening includes a section (i.e., a first longitudinal opening) extending between the front and back ends of the central portion. EX1002: ¶209.



EX1003: Fig. 36 (annotated).

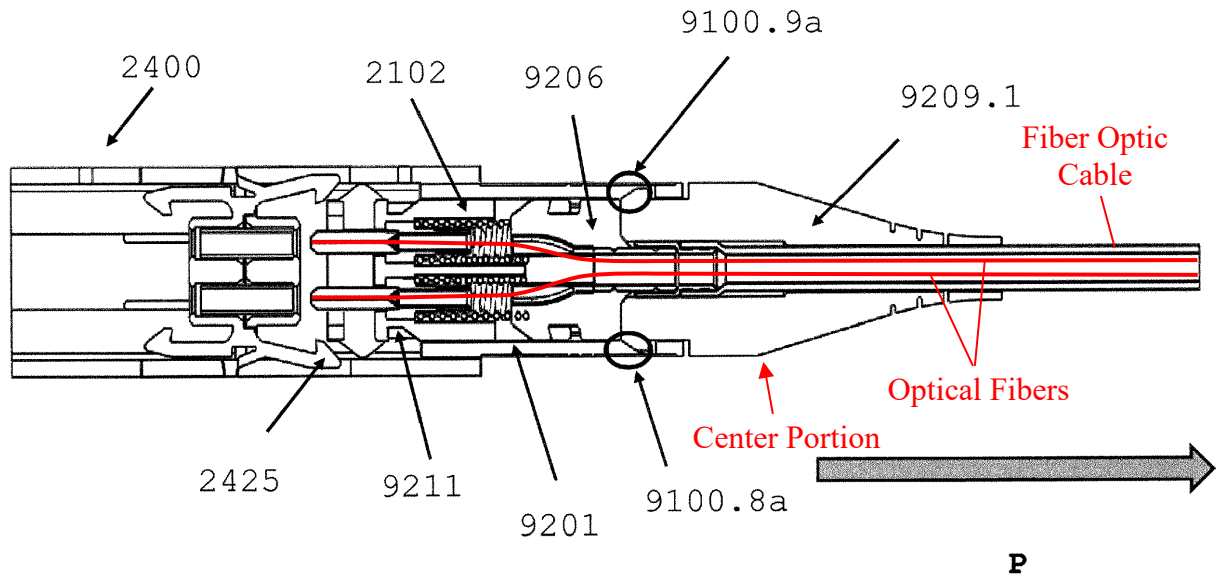


FIG. 36

EX1003: Fig. 36 (annotated).

The front portion of the first longitudinal opening is defined by the inner round (9409.4) of the boot (9109.1, 9209.1, 9309.1, 9409.1) that receives the back post (i.e., rear portion) of the back body (9106, 9206), as explained in Section VI(a)(1.c.1). EX1003: Figs. 26, 27, 30, and 34, ¶[0067]; EX1002: ¶210. Further, as shown in Fig. 36 (above), the fiber optic cable (with its two optical fibers) is also received in this first longitudinal opening in the central portion. EX1002: ¶210.

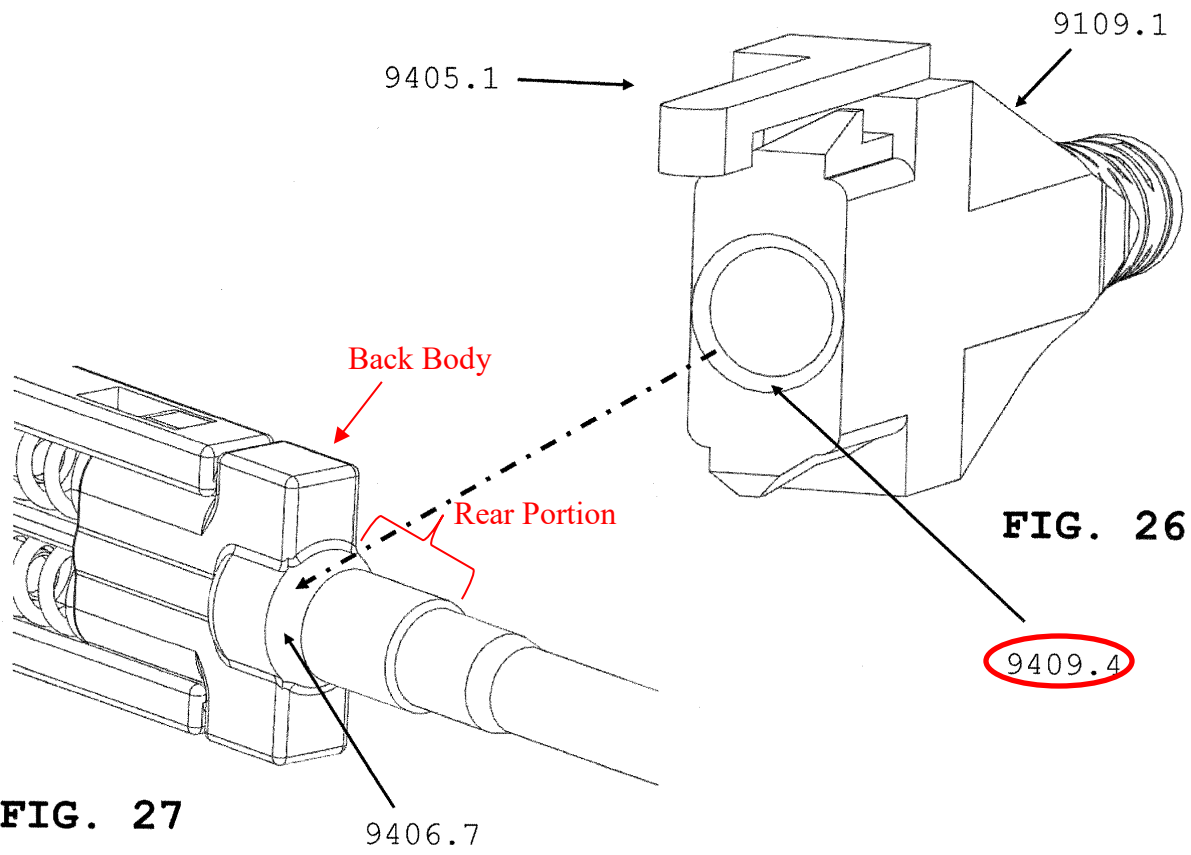
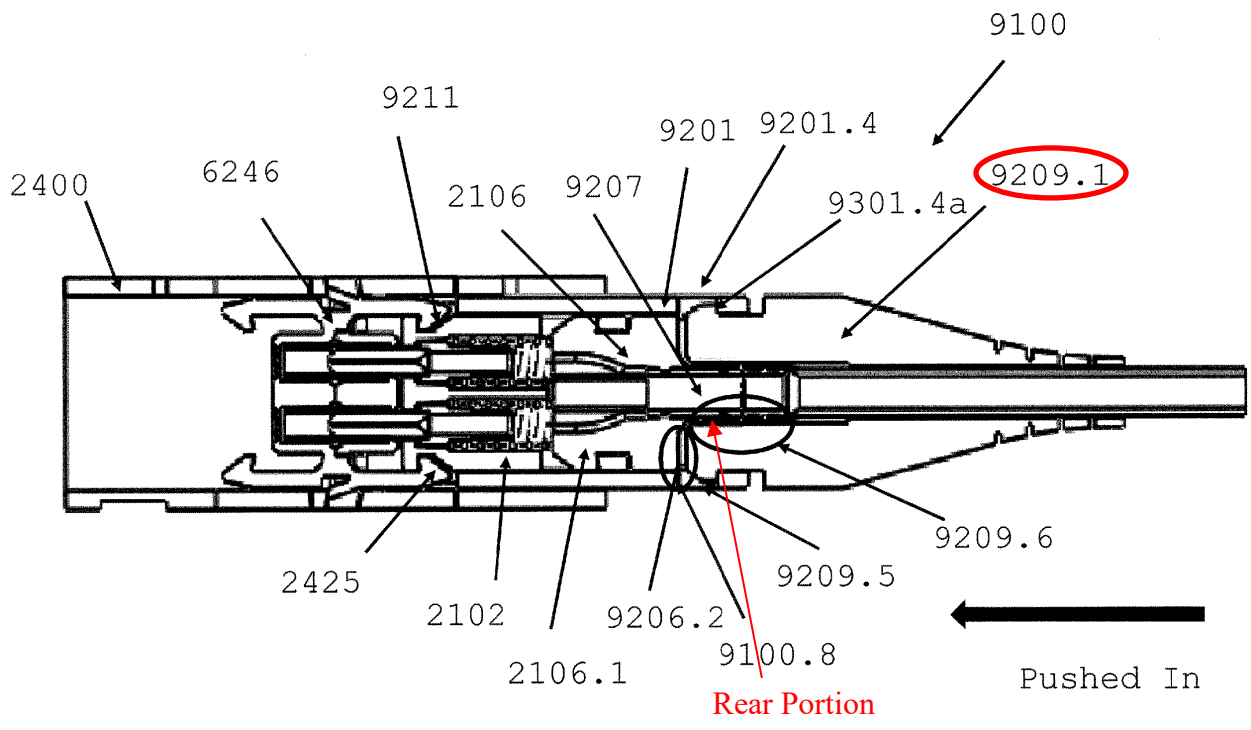


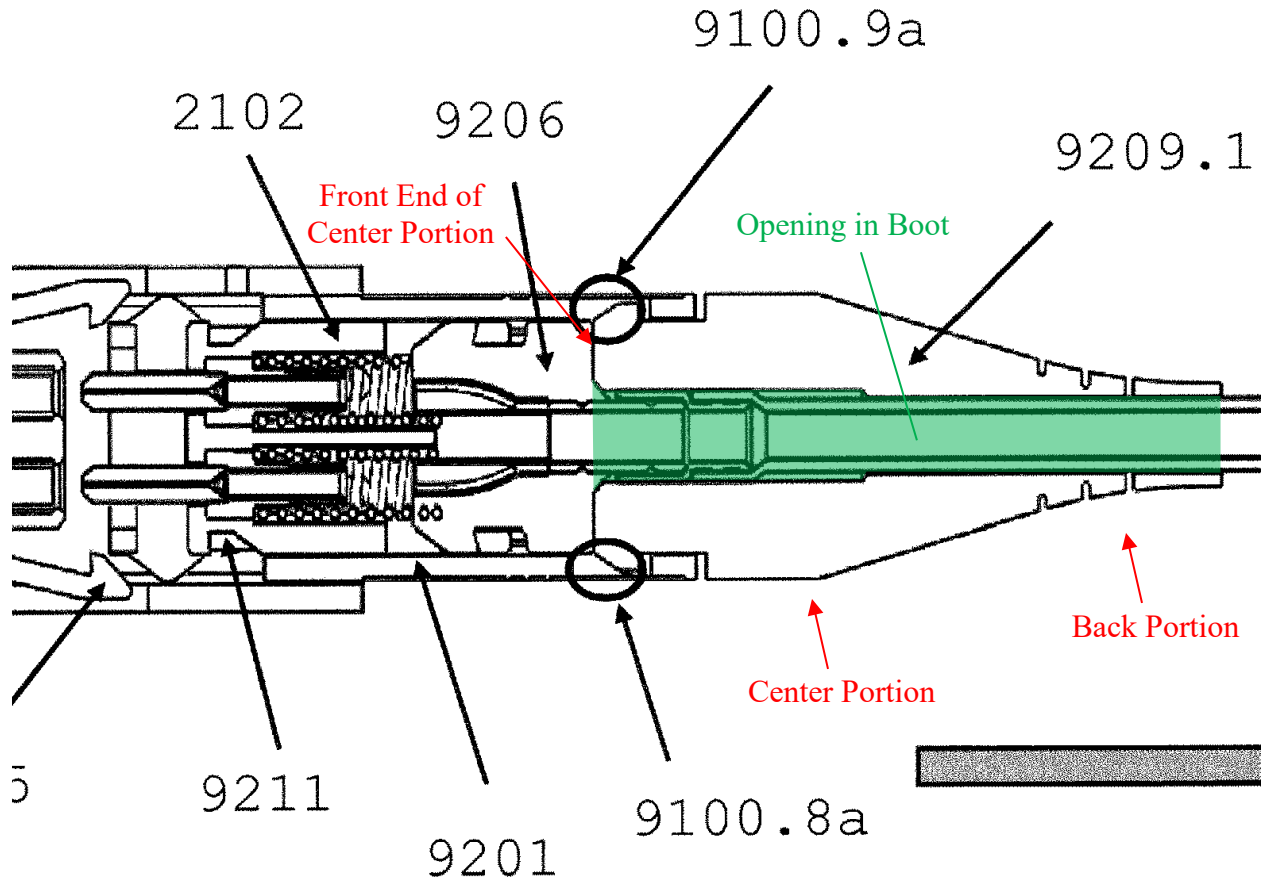
FIG. 34

EX1003: Figs. 27, 28, and 34 (annotated).

Therefore, Takano meets 20.e.1. EX1002: ¶211.

11. 20.e.2

As explained in Section VI(A)(1.d), the boot (9109.1, 9209.1, 9309.1, 9409.1) includes a back portion. EX1002: ¶212. The back portion is attached to the center portion and extends rearward away from the front end of the central portion. EX1002: ¶212.



9100

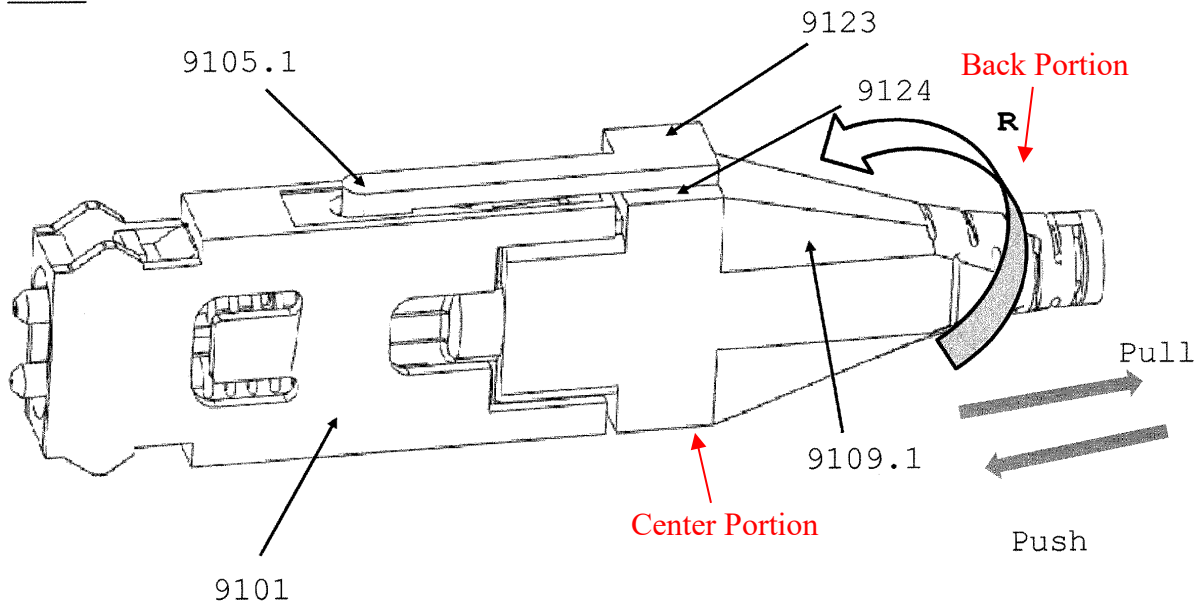
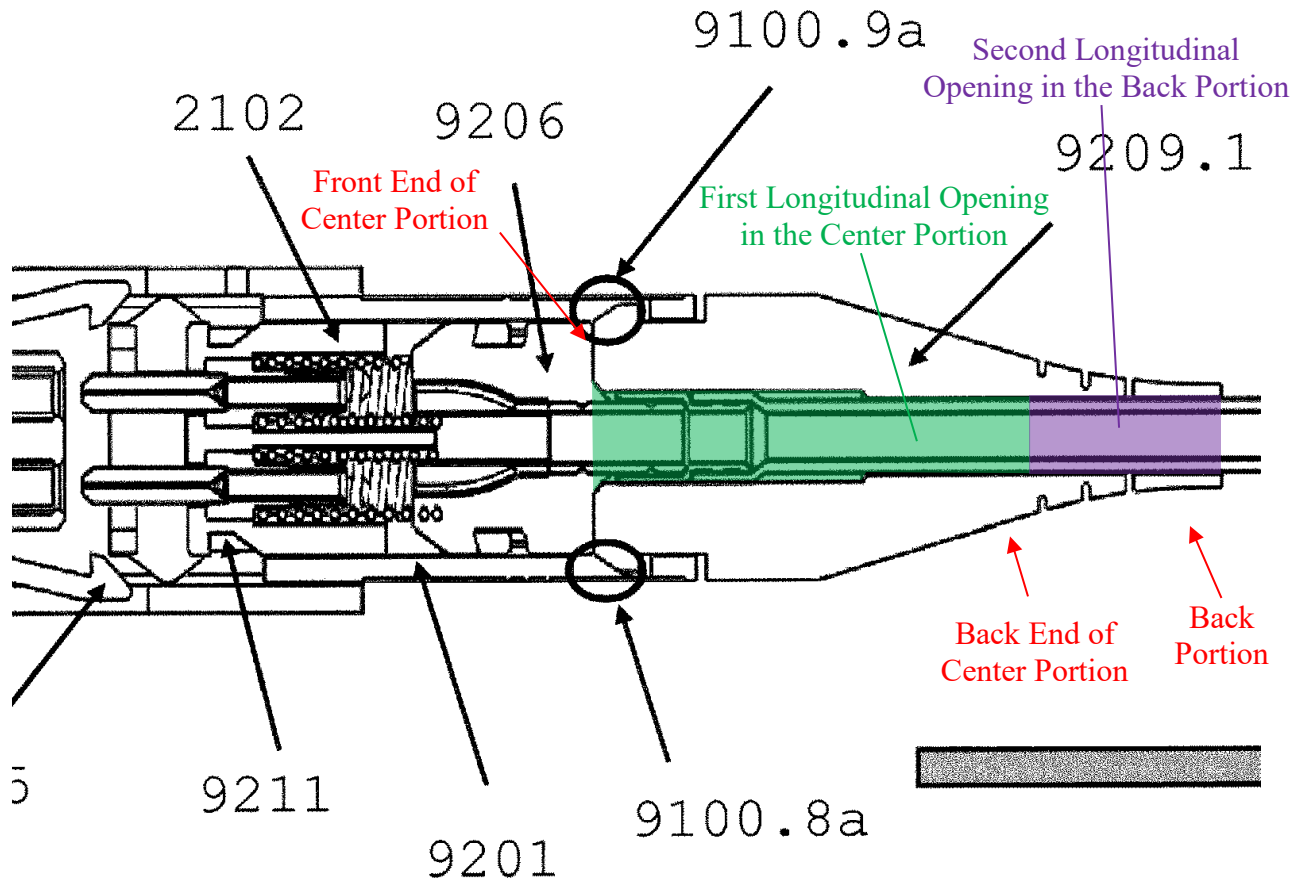


FIG. 16

EX1003: Figs. 16 and 36 (annotated).

As explained in Section VI(A)(1.c.3), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶213. This opening includes another section (i.e., a second longitudinal opening) in the rear portion that is in communication with the first longitudinal opening of the center portion. EX1002: ¶213.



EX1003: Fig. 36 (annotated).

Therefore, Takano meets 20.e.2. EX1002: ¶214.

12. 20.e.3

As explained in Sections VI(A)(1.c.1)&(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) includes a key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) attached to the central portion at point (9109.6). EX1003: Fig. 17, ¶[0059]; EX1002: ¶215. The key extends forward beyond the front end of the central portion. EX1002: ¶215.

9100

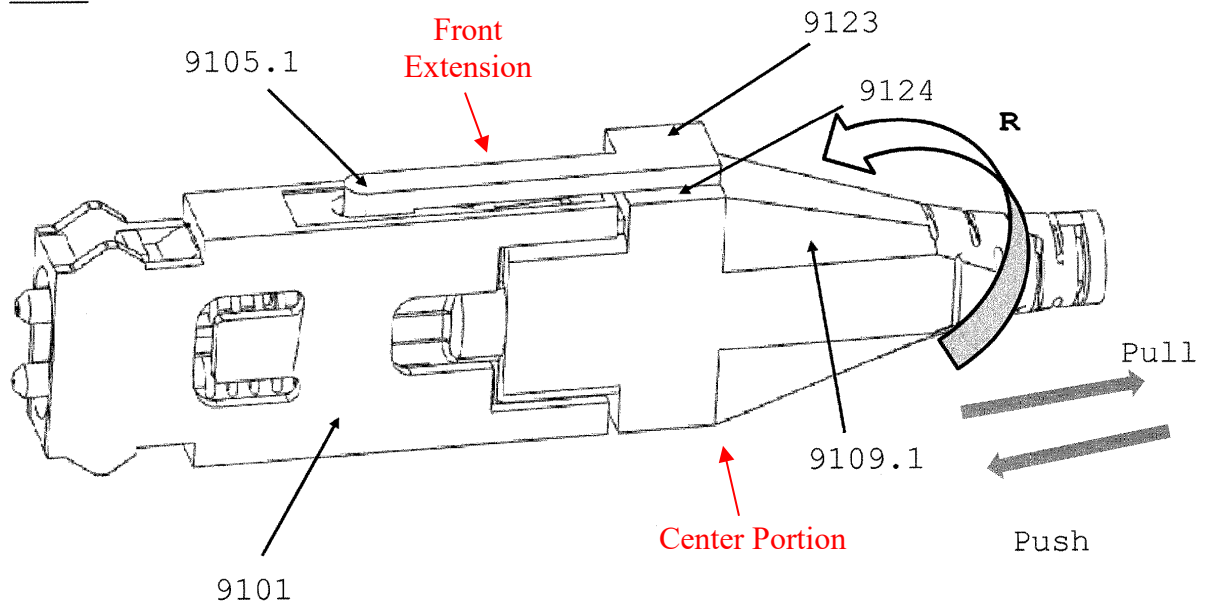


FIG. 16

9109.1

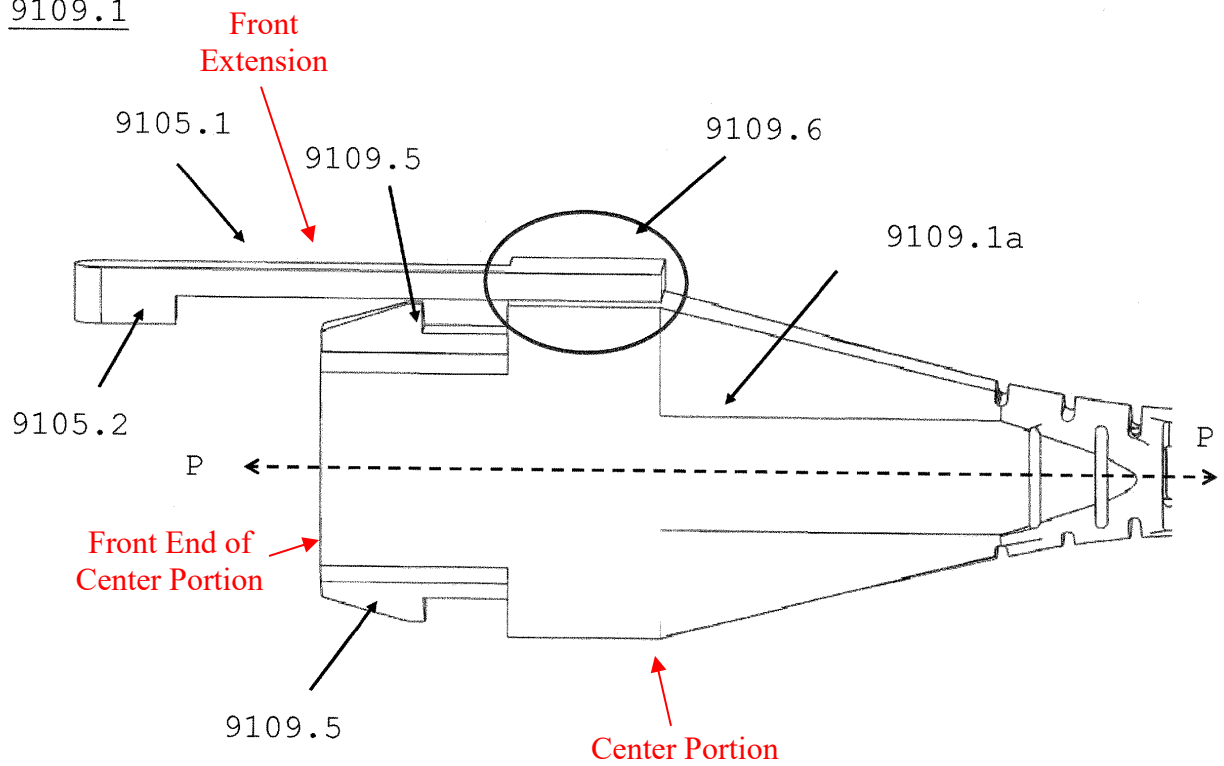


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

Therefore, Takano meets 20.e.3. EX1002: ¶216.

13. 20.f

For reasons discussed in Section VI(E), Takano meets 20.f. EX1002: ¶217.

VII. GROUND 3: Claims 1-7, 9-13, and 16-19 are Anticipated by Takano (Second Embodiment)

As explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. EX1002: ¶218. This ground relies on the optical connector shown in Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) *does not include* the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059]; EX1002: ¶218.

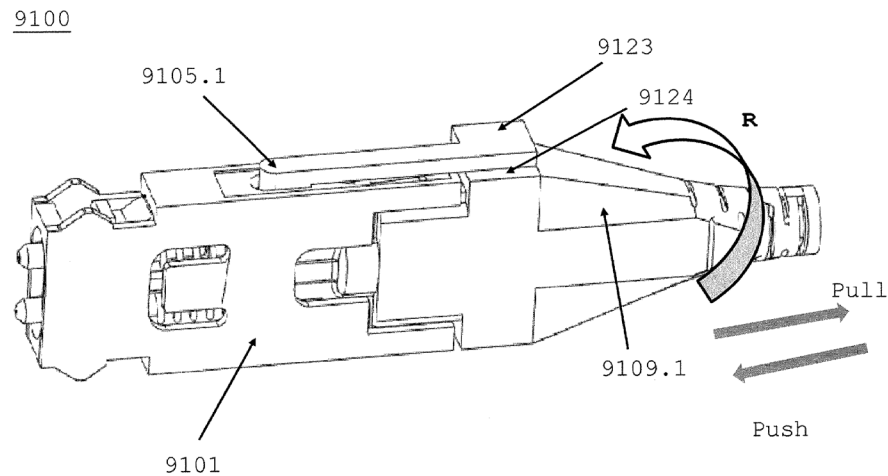


FIG. 16

EX1003: Fig. 16.

9109.1

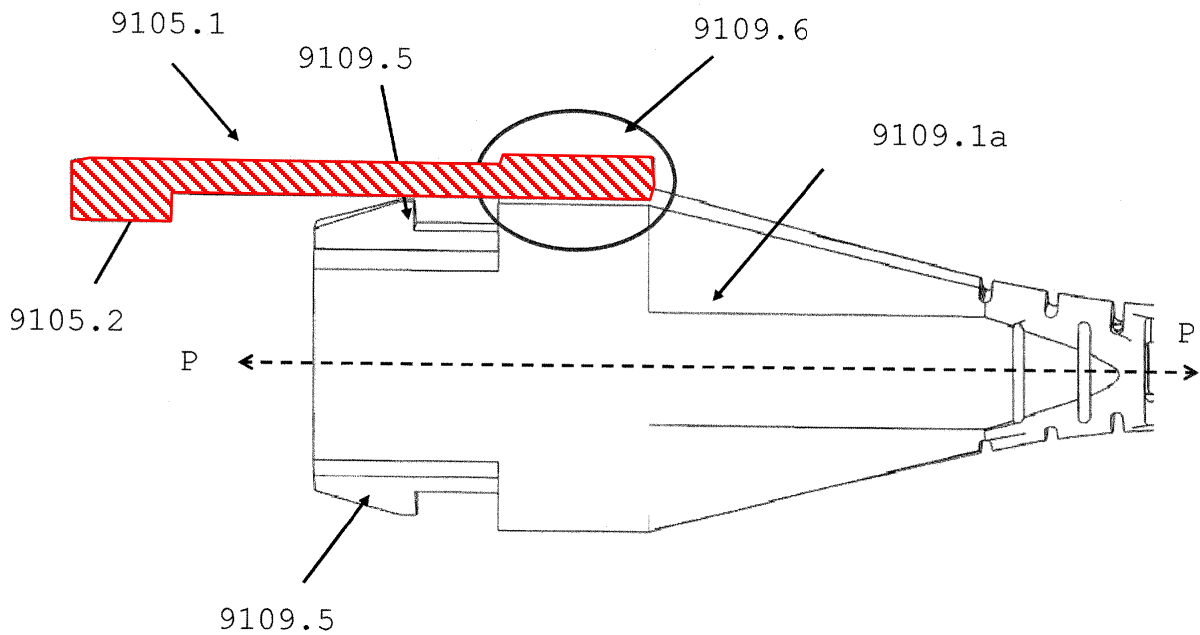


FIG. 17

EX1003: Fig. 17 (annotated).

Takano explains instead of the boot (9109.1, 9209.1, 9309.1, 9409.1) including the key (9105.1, 9205.1, 9305.1, 9405.1), the “[a]lignment and offset key 2105 may be fixed on connector outer housing, as shown in FIG. 1 or at alignment key 5305 disclosed in FIG. 37.” EX1003: ¶[0059]; EX1002: ¶¶219-220.

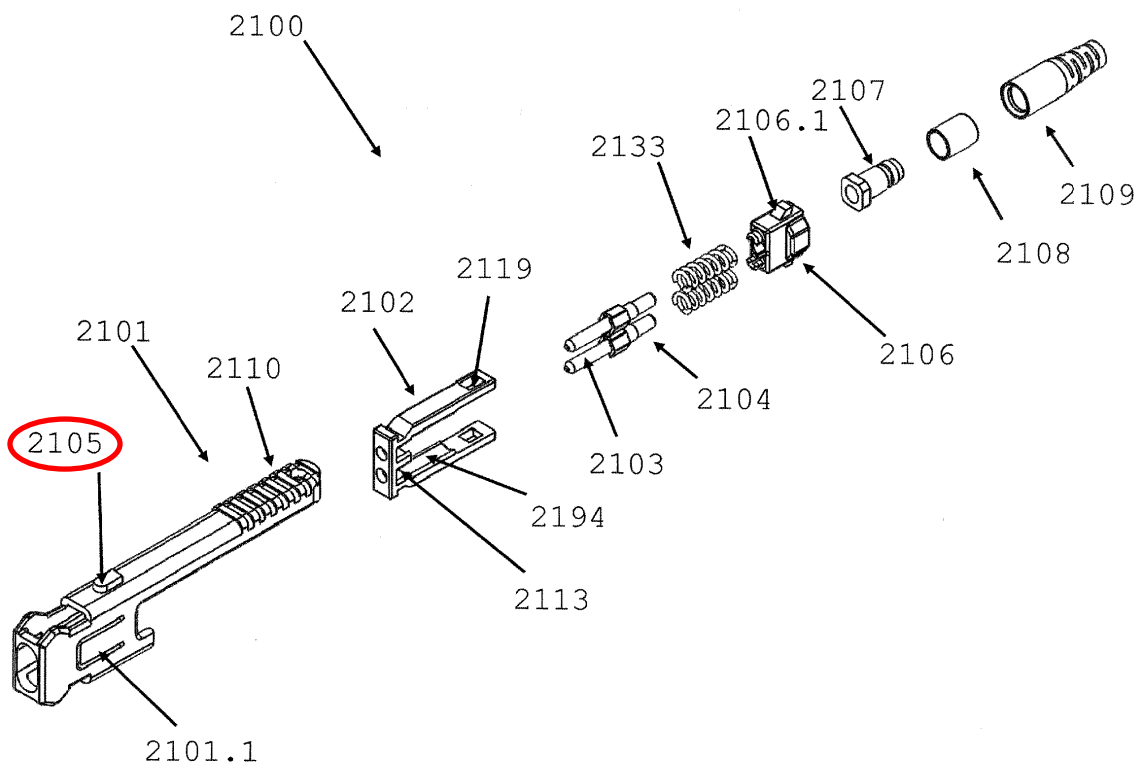


FIG. 1.

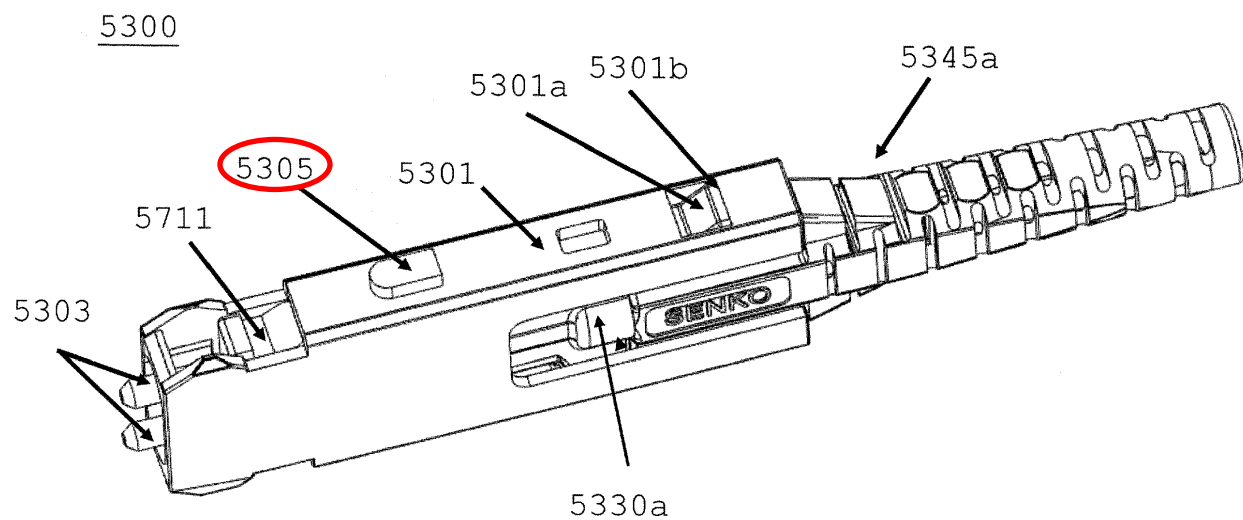


FIG. 37

EX1003: Figs. 1 and 37 (annotated).

A. Independent Claim 1

1. 1.P

For reasons discussed in Section VI(A)(1.P), Takano meets 1.P. EX1002: ¶221.

2. 1.a.1

For reasons discussed in Section VI(A)(1.a.1), Takano meets 1.a.1.
EX1002: ¶222.

3. 1.a.2

For reasons discussed in Section VI(A)(1.a.2), Takano meets 1.a.2.
EX1002: ¶223.

4. 1.a.3

For reasons discussed in Section VI(A)(1.a.3), Takano meets 1.a.3.
EX1002: ¶224.

5. 1.a.4

For reasons discussed in Section VI(A)(1.a.4), Takano meets 1.a.4.
EX1002: ¶225.

6. 1.b

For reasons discussed in Section VI(A)(1.b), Takano meets 1.b. EX1002:
¶226.

7. 1.c.1

As explained in Section VI(A)(1.c.1), the boot (9109.1, 9209.1, 9309.1, 9409.1) receives the back post (i.e., rear portion) of the back body (9106, 9206).

EX1003: Figs. 26, 27, 30, and 34, ¶[0067]; EX1002: ¶227.

In this embodiment, the boot (9109.1, 9209.1, 9309.1, 9409.1) has a front extension that includes the boot hooks (9109.5, 9209.5); EX1002: ¶228.

9109.1

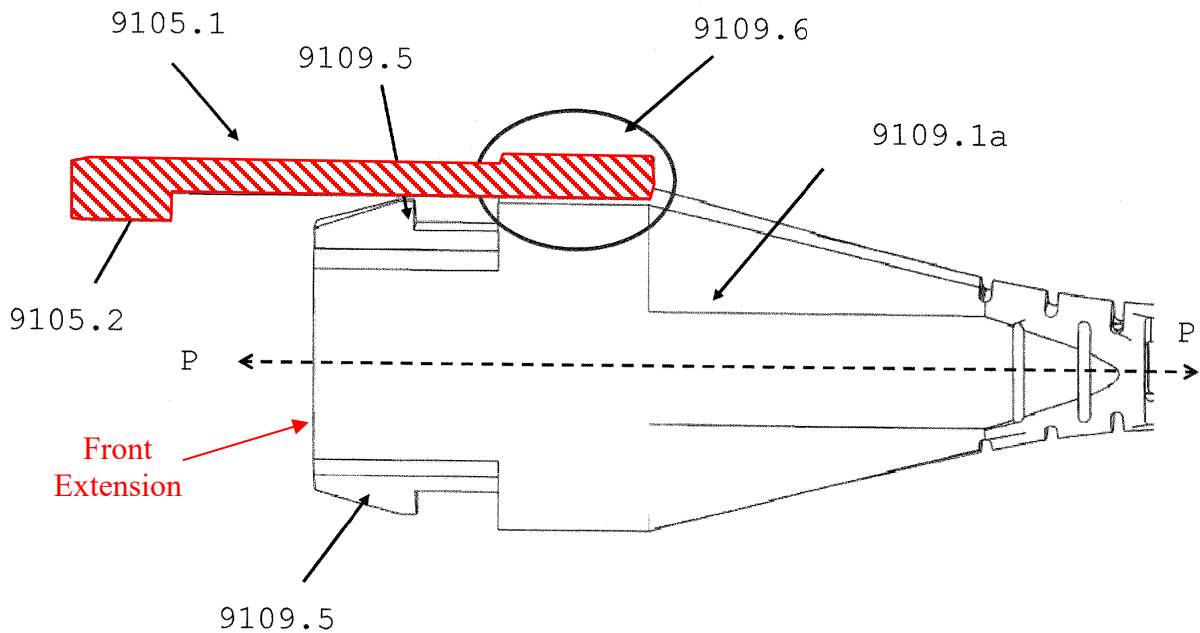


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano meets 1.c.1. EX1002: ¶229.

8. 1.c.2

The front extension extends forward toward the front end of the outer housing (9101, 9201, 9301, 9401) from point (9109.6). EX1002: ¶230.

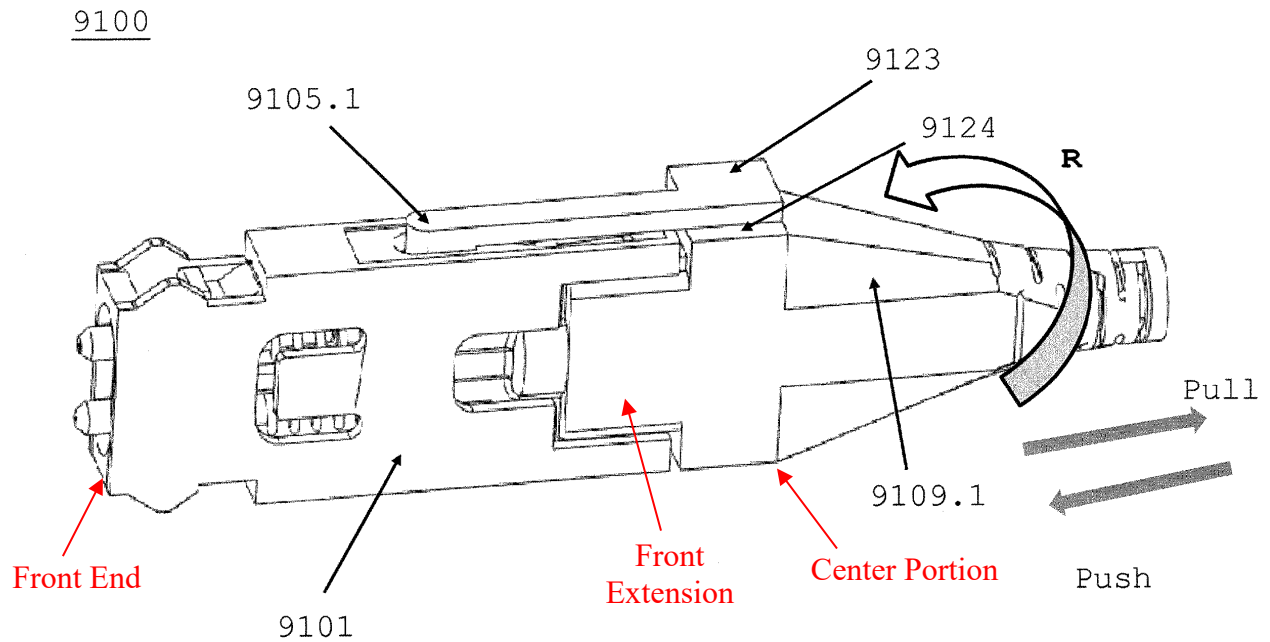


FIG. 16

9109.1

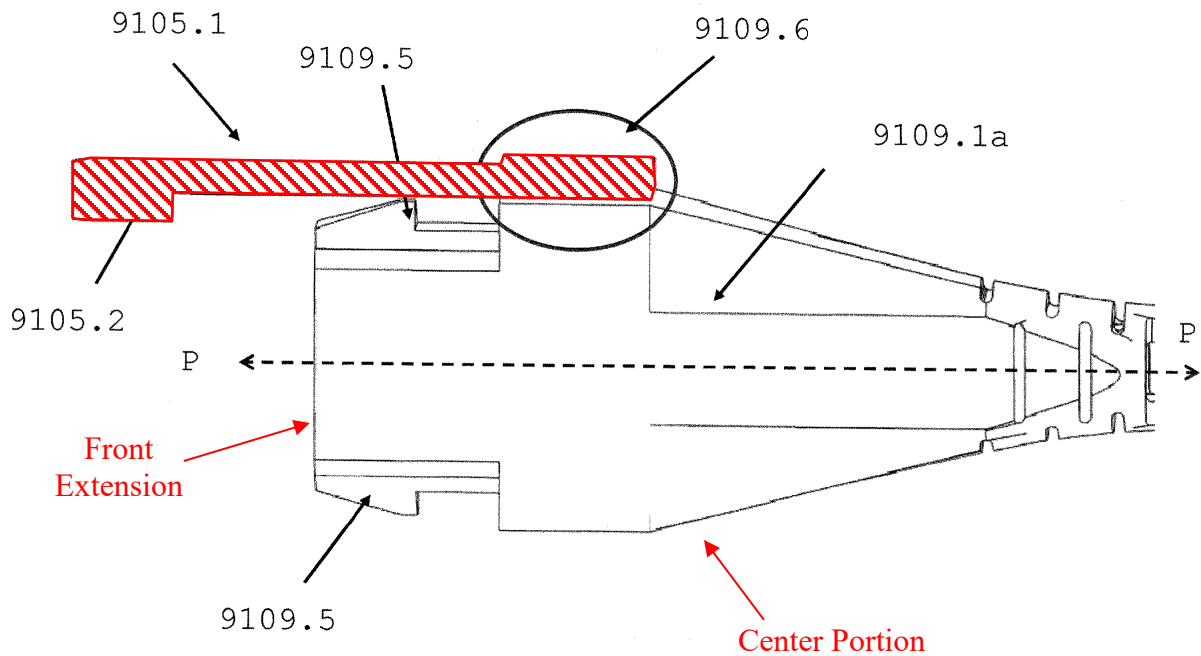
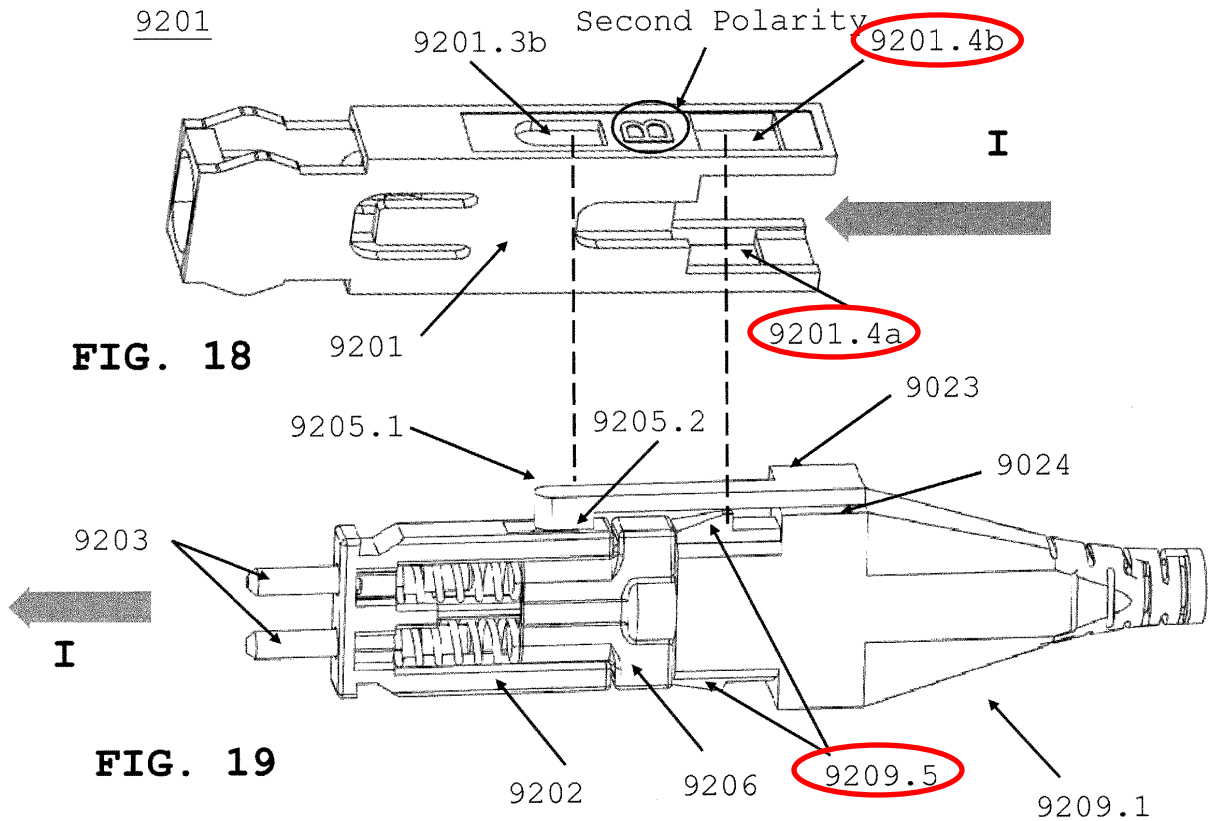


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

The boot hooks (9109.5, 9209.5) are received in respective slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) when the boot is in the first and second polarity positions to secure the boot to the outer housing.

EX1003: ¶[0058]; EX1002: ¶231. As shown above, the attachment of the boot hooks to the outer housing is forward of a center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1). EX1003: Figs. 16 and 34-36; EX1002: ¶231.



EX1003: Figs. 18 and 19 (annotated).

Therefore, Takano meets 1.c.2. EX1002: ¶232.

9. 1.c.3

For reasons discussed in Section VI(A)(1.c.3), Takano meets 1.c.3.

EX1002: ¶233.

10. 1.d

For reasons discussed in Section VI(A)(1.d), Takano meets 1.d. EX1002:

¶234.

B. Claim 2

For reasons discussed in Section VI(B), Takano meets this claim. EX1002:

¶235.

C. Claim 3

For reasons discussed in Section VI(C), Takano meets this claim. EX1002:

¶236.

D. Claim 4

For reasons discussed in Section VI(D), Takano meets this claim. EX1002:

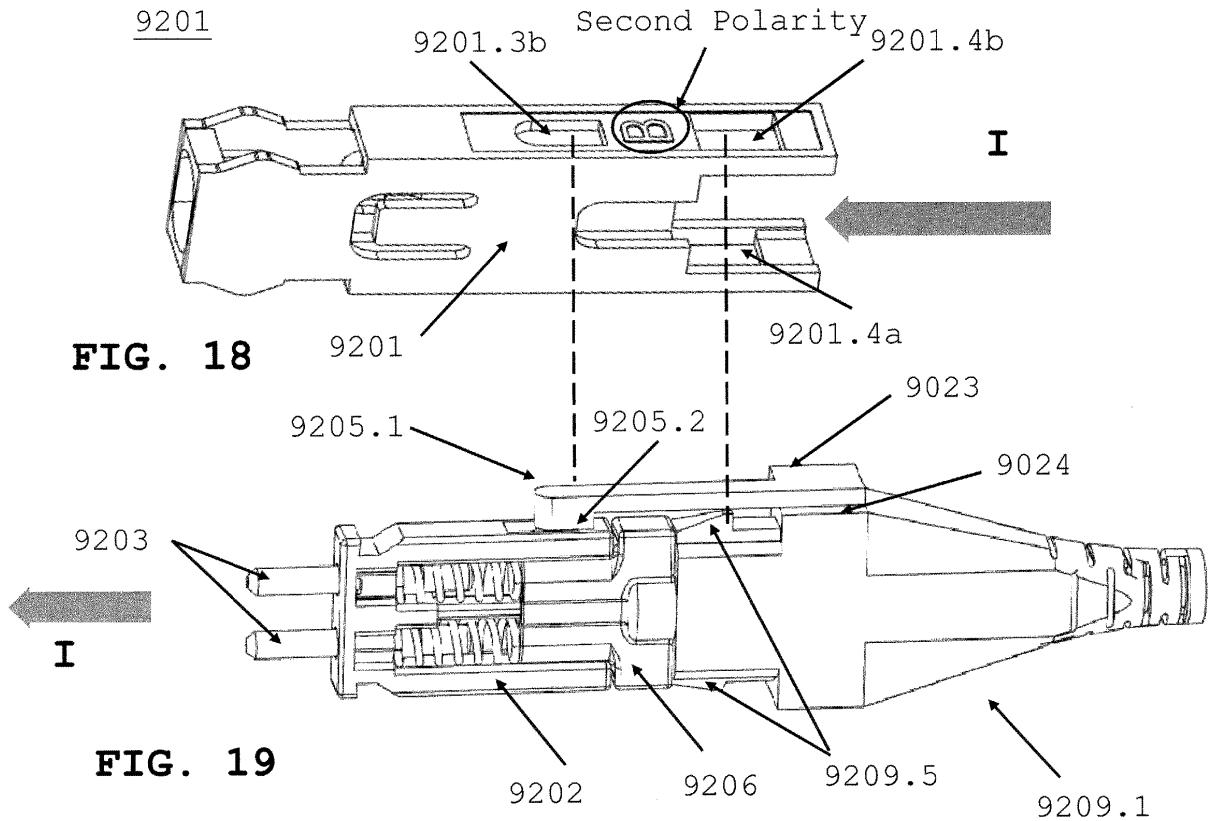
¶237.

E. Claim 5

For reasons discussed in Section VI(E), Takano meets this claim. EX1002:

¶238.

Further, in this embodiment, rotation of the boot (9109.1, 9209.1, 9309.1, 9409.1) and outer housing (9101, 9201, 9301, 9401) relative to one another occurs to change polarity. EX1002: ¶239. Because the key (9105.1, 9205.1, 9305.1, 9405.1) is part of the outer housing, in this embodiment of the micro connector (9100) the outer housing has to be separated from the boot, the front body (9102, 9202), and the back body (9106, 9206)—as described in Section VI(E)—in order to *rotate* the outer housing relative to the ferrules to move the key and change polarity. EX1003: Figs. 2-8, 18, and 19, ¶¶[0051]-[0052]; EX1002: ¶239.



EX1003: Figs. 18 and 19.

Therefore, Takano meets this claim. EX1002: ¶240.

F. Claim 6

As explained in Section VII(A)(1.c.1), the front extension includes the two boot hooks (9109.5, 9209.5). EX1002: ¶241.

9109.1

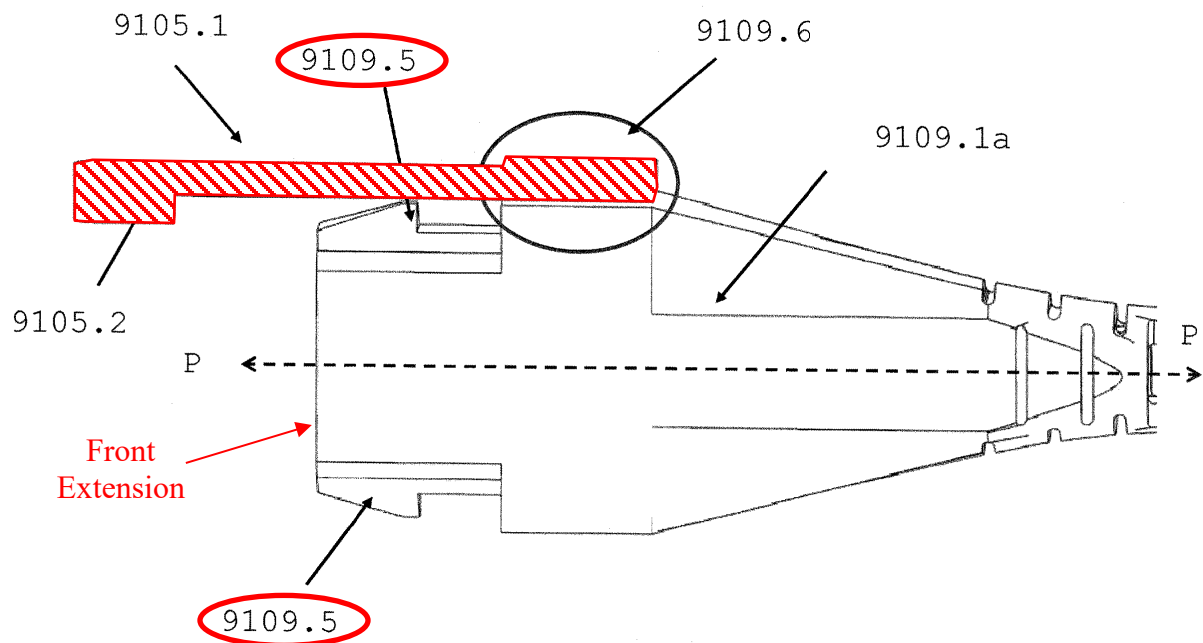


FIG. 17

EX1003: Fig. 17 (annotated).

Within the context of the '794 Patent, each boot hook (9109.5, 9209.5) is a latch. EX1001: Fig. 14, 7:53-62 ("connector latch 294"). EX1002: ¶242.

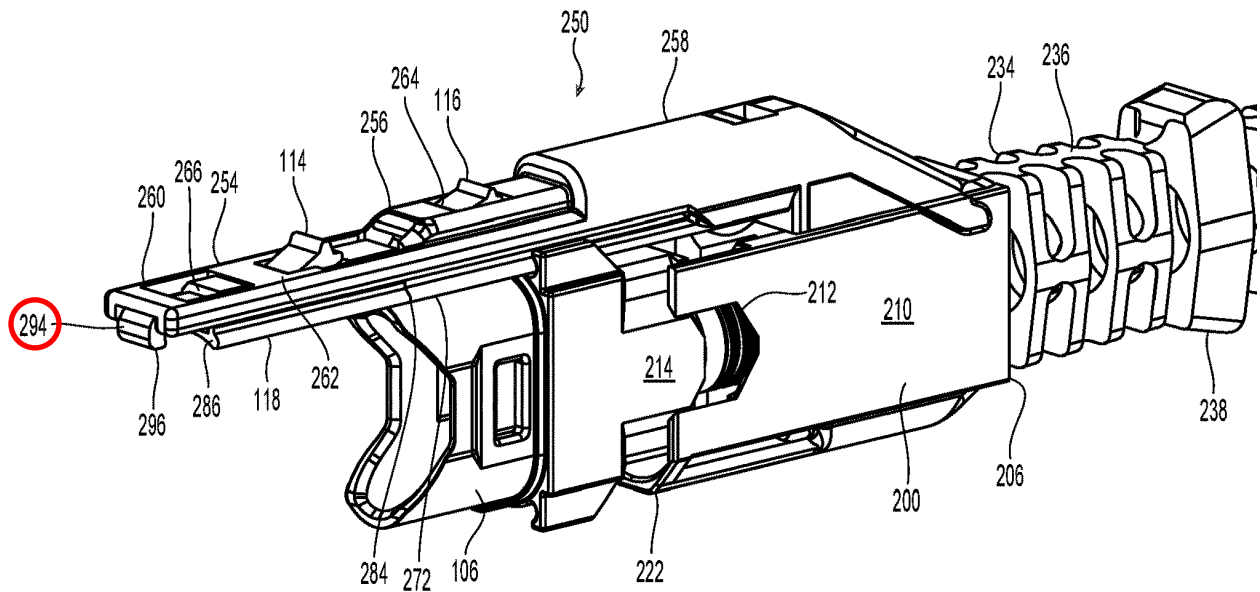


Fig. 14

EX1001: Fig. 14 (annotated).

Therefore, Takano meets this claim. EX1002: ¶243.

G. Claim 7

As explained in Section VII(F), the front extension includes the two boot hooks (9109.5, 9209.5) (i.e., two latches). EX1002: ¶244. The two boot hooks are separated from each other on the front extension. EX1002: ¶244.

9109.1

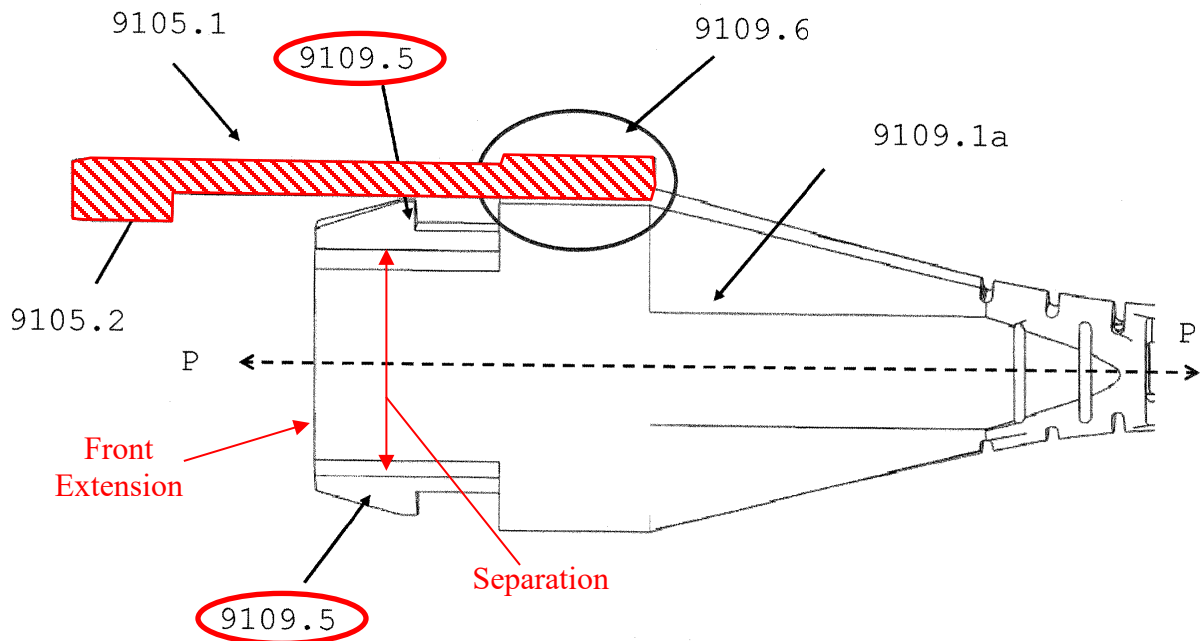


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano meets this claim. EX1002: ¶245.

H. Claim 9

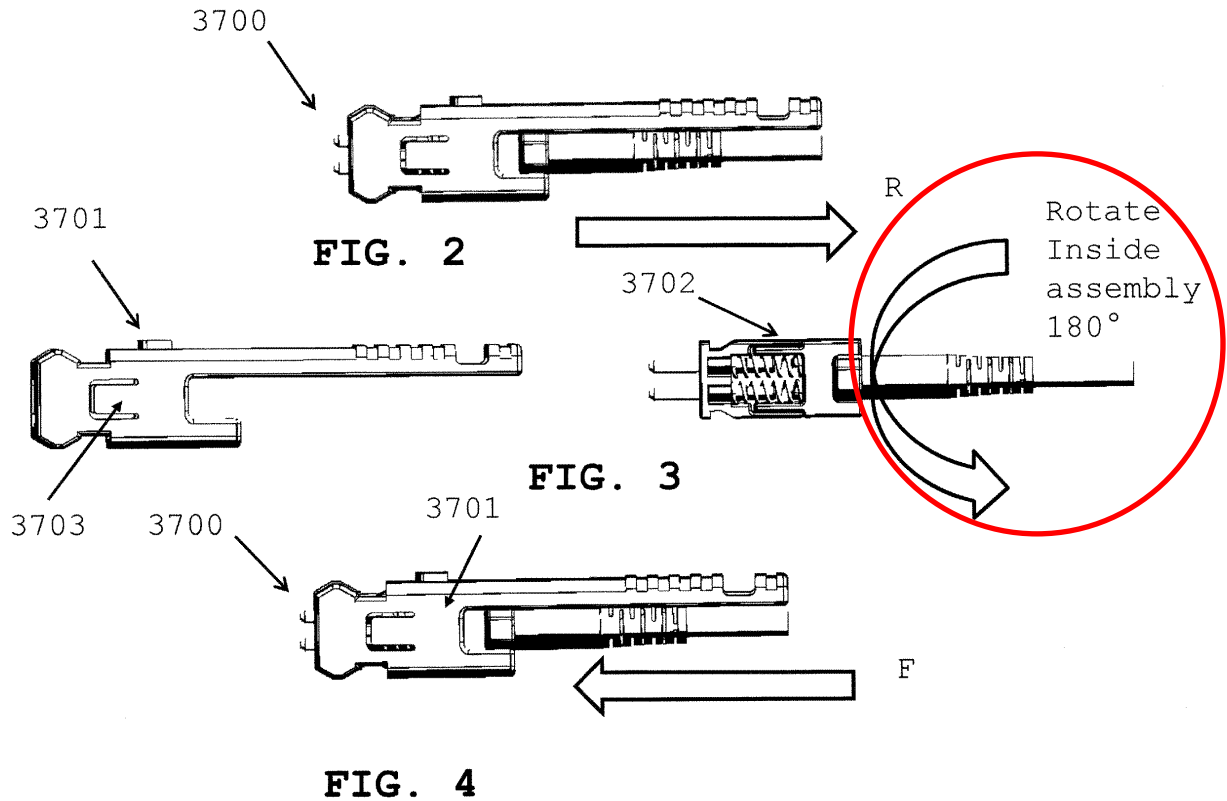
As discussed in Section VI(H), the boot (9109.1, 9209.1, 9309.1, 9409.1) connects to the outer housing (9101, 9201, 9301, 9401), via the boot hooks (9109.5, 9209.5), in two different orientations. EX1002: ¶246. In this embodiment, with the key (9105.1, 9205.1, 9305.1, 9405.1) being part of the outer housing, to change the polarity the boot, the front body (9102, 9202) and the back body (9106, 9206) are disconnected from and then rotated relative to the outer housing to move the key relative to the ferrules (9203). EX1003: Figs. 2-8, 18, and

polarity. EX1003: Figs. 2-8, ¶¶[0051]-[0052]; EX1002: ¶248. Similarly, when the boot—and the front body and the back body—is connected to the outer housing in the other (i.e., flipped over) orientation, the micro connector is in a second polarity. EX1003: Figs. 2-8, ¶¶[0051]-[0052]; EX1002: ¶248.

Therefore, Takano meets this claim. EX1002: ¶249.

I. Claim 10

For reasons discussed in Section VII(H), Takano meets this claim. EX1002: ¶¶250-251. The relative positions of the boot (9109.1, 9209.1, 9309.1, 9409.1) and the outer housing differs by 180-degrees in the first and second polarity orientations. EX1003: Figs. 2-8, ¶¶[0051] (“**180 degrees**”), [0052] (“**180 degrees**”), [0063], [0066], [0069]; EX1002: ¶250.



EX1003: Figs. 2-4 (annotated).

J. Claim 11

For reasons discussed in Section VI(J), Takano meets this claim. EX1002: ¶252.

K. Claim 12

For reasons discussed in Section VI(K), Takano meets this claim. EX1002: ¶¶253-254. Further, the boot (9109.1, 9209.1, 9309.1, 9409.1) is slidable relative to the outer housing (9101, 9201, 9301, 9401) when the boot—and the front body (9102, 9202) and the back body (9106, 9206)—is being disconnected and

reconnected to the outer housing when changing polarity, as discussed in Section VII(H). EX1002: ¶253.

L. Claim 13

As illustrated by the cross-sections in Figs. 34-36, the front extension is an integral part of the center portion. EX1003: ¶¶[0034], [0036]; EX1002: ¶255.

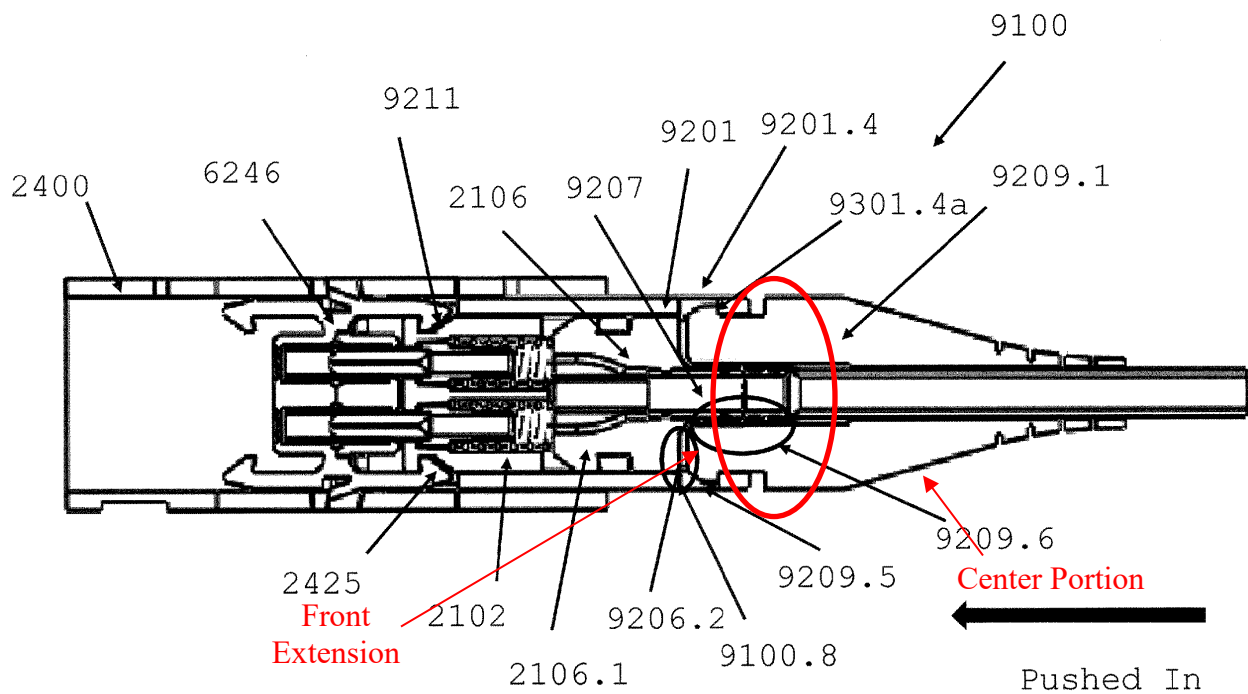


FIG. 34

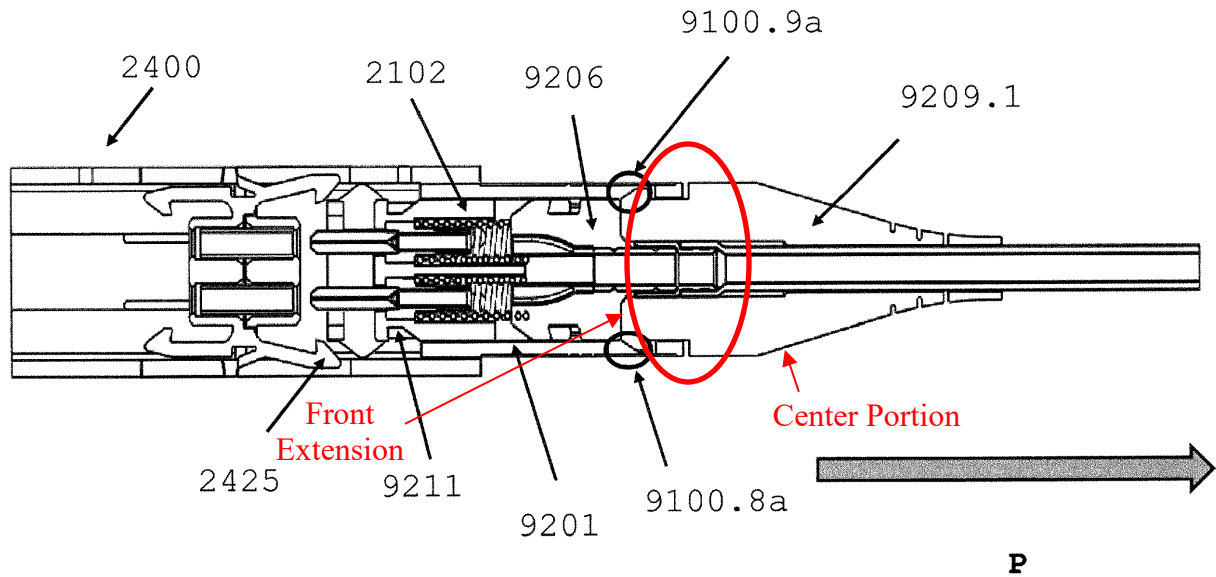


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

Therefore, Takano meets this claim. EX1002: ¶256.

M. Independent Claim 16

1. 16.P

For reasons discussed in Section VI(A)(1.P), Takano meets 16.P. EX1002: ¶257.

2. 16.a.1

For reasons discussed in Section VI(M)(16.a.1), Takano meets 16.a.1. EX1002: ¶258.

3. 16.a.2

For reasons discussed in Section VI(A)(1.a.2), Takano meets 16.a.2. EX1002: ¶259.

4. 16.a.3

For reasons discussed in Section VI(A)(1.a.4), Takano meets 16.a.3.

EX1002: ¶260.

5. 16.a.4

For reasons discussed in Section VI(M)(16.a.4), Takano meets 16.a.4.

EX1002: ¶261.

6. 16.b

For reasons discussed in Section VI(M)(16.b), Takano meets 16.b. EX1002:
¶262.

7. 16.c.1

For reasons discussed in Section VI(A)(1.c.1), Takano meets 16.c.1.
EX1002: ¶263.

8. 16.c.2

For reasons discussed in Sections VII(A)(1.c.2) and VII(F), Takano meets
16.c.2. EX1002: ¶264.

9. 16.c.3

For reasons discussed in Section VI(A)(1.c.3), Takano meets 16.c.3.
EX1002: ¶265.

10. 16.d

For reasons discussed in Section VI(A)(1.d), Takano meets 16.d. EX1002:
¶266.

N. Claim 17

For reasons discussed in Section VI(B), Takano meets this claim. EX1002: ¶267.

O. Claim 18

For reasons discussed in Section VI(E), Takano meets this claim. EX1002: ¶268.

P. Claim 19

As explained in Section VII(L), the front extension is integral with the center portion. EX1002: ¶269. The use of the term “molded” in claim 19 is a product-by-process limitation, which offers no patentable weight because the patentability is based on the product itself, not its method of production. *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985) (“If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.”); *see also Amgen Inc. v. F. Hoffman-La Roche Ltd.*, 580 F.3d 1340, 1370 n.14 (Fed. Cir. 2009) and *Purdue Pharma. v. Epic Pharma.*, 811 F.3d 1345 (Fed. Cir. 2016).

Here, the front extension of Takano is integral with the center portion, and therefore anticipates a front extension being integral with a center portion due to the components being formed by molding. *Amgen Inc. v. F. Hoffman-La Roche Ltd.*, 580 F.3d 1340, 1370 n.14 (Fed. Cir. 2009) (“[b]ecause validity is determined based on the requirements of patentability, a patent is invalid if a product made by

the process recited in a product-by-process claim is anticipated by or obvious from prior art products, even if those prior art products are made by different processes.”); EX1002: ¶¶270-272. And to the extent “molded” is not considered a product-by-process limitation, the structural meaning imparted by molded (i.e., integrally molded) further emphasizes “integral”—i.e., is that of an integral structure—, which as explained in Section VII(L) Takano discloses. *In re Nordt Dev. Co.*, 881 F.3d 1371, 1375-76 (Fed. Cir. 2018) (holding “‘injection molded’ connotes an integral structure”); EX1002: ¶273.

As explained in Section VII(F), Takano’s front extension has two latches.⁷ EX1002: ¶274.

Therefore, Takano meets this claim. EX1002: ¶275.

VIII. GROUND 4: Claims 1-7, 9-13, and 16-19 Would Have Been Obvious Over Takano (Third Embodiment)

As explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. EX1002: ¶¶276-277. This ground relies on the embodiment of the optical connector (2100, 3700) shown in Figs. 1-4 modified in view of the optical connector (9100) shown in Figs. 16-36.

⁷ Takano meets claim 19 whether or not claim 19 requires the front extension to have at minimum one or two latches. EX1002: ¶274.

A. Motivation to Modify Micro Connector of Figs 1-4 Based on the Micro Connector of Figs. 16-36

The micro connector (2100, 3700) of Figs. 1-4 has the same form factor as the micro connector (9100) of Figs. 16-36 discussed above and mates with essentially the same types of adapters. EX1003: ¶[0049]; EX1004: Figs. 24, 99, 100B, ¶¶[224], [282], [287] (“plural of connectors 9100 are inserted into an adapter similar to FIG. 24”); EX1002: ¶¶278-279. The micro connector of Figs. 1-4 differs from the micro connector of Figs. 16-36 in that the outer housing (2101, 3701) has an optional pull key (2110) and is pulled relative to the boot (2109) to extract the micro connector from the mating adapter. EX1003: ¶[0050]; EX1002: ¶280. Pulling the pull key rearward displaces the outer housing rearward relative to the front body (2102, 3702), ferrules (2103), ferrule springs (2133), back body (2106), and boot, to unlatch the adapter hooks (2425) of the adapter (2400) from the micro connector. EX1030: ¶[0106]; EX1002: ¶280. The pull key may also be used to push the micro connector of Figs. 1-4 into the adapter. EX1002: ¶280.

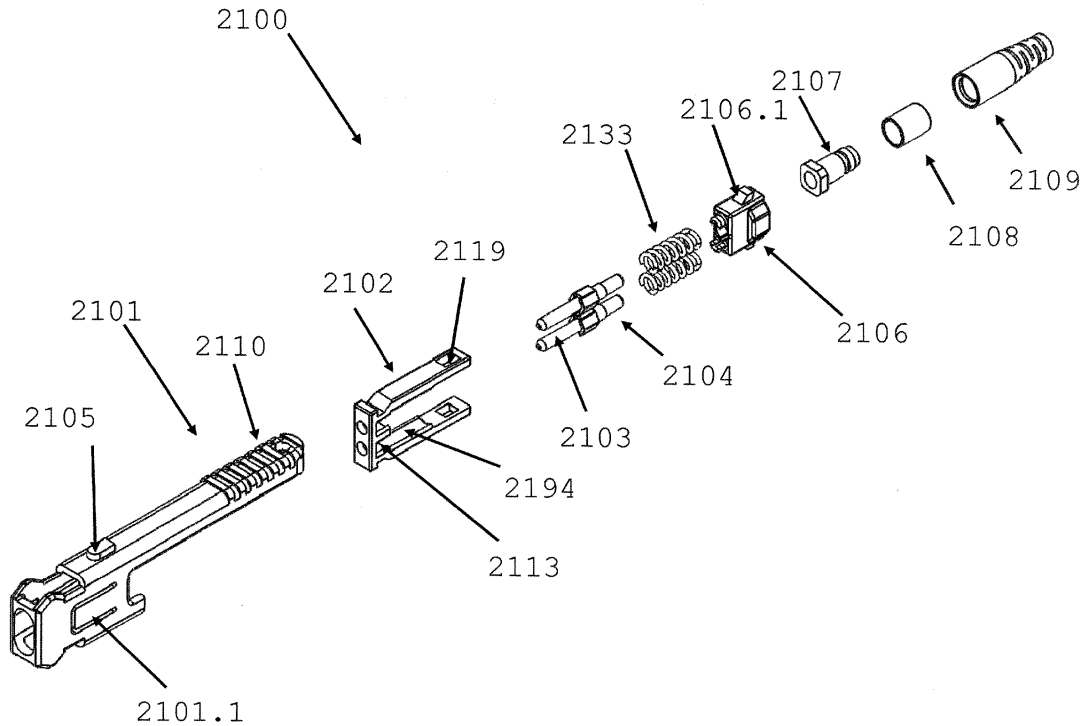


FIG. 1.

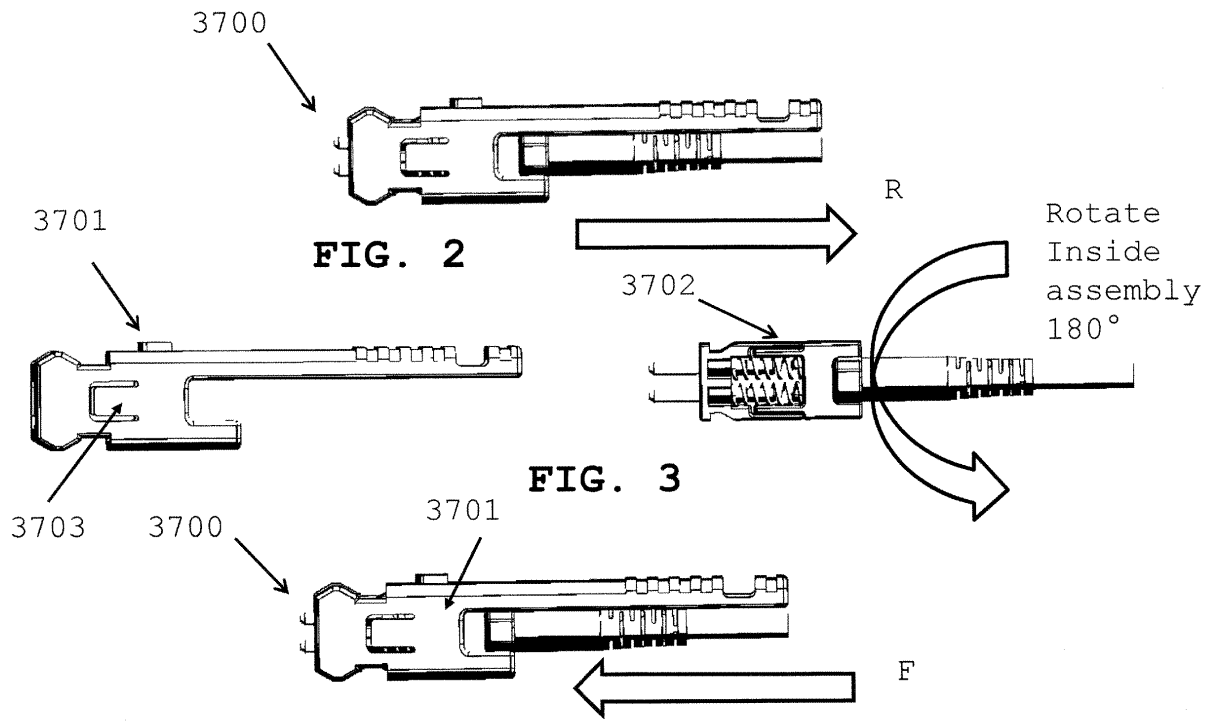
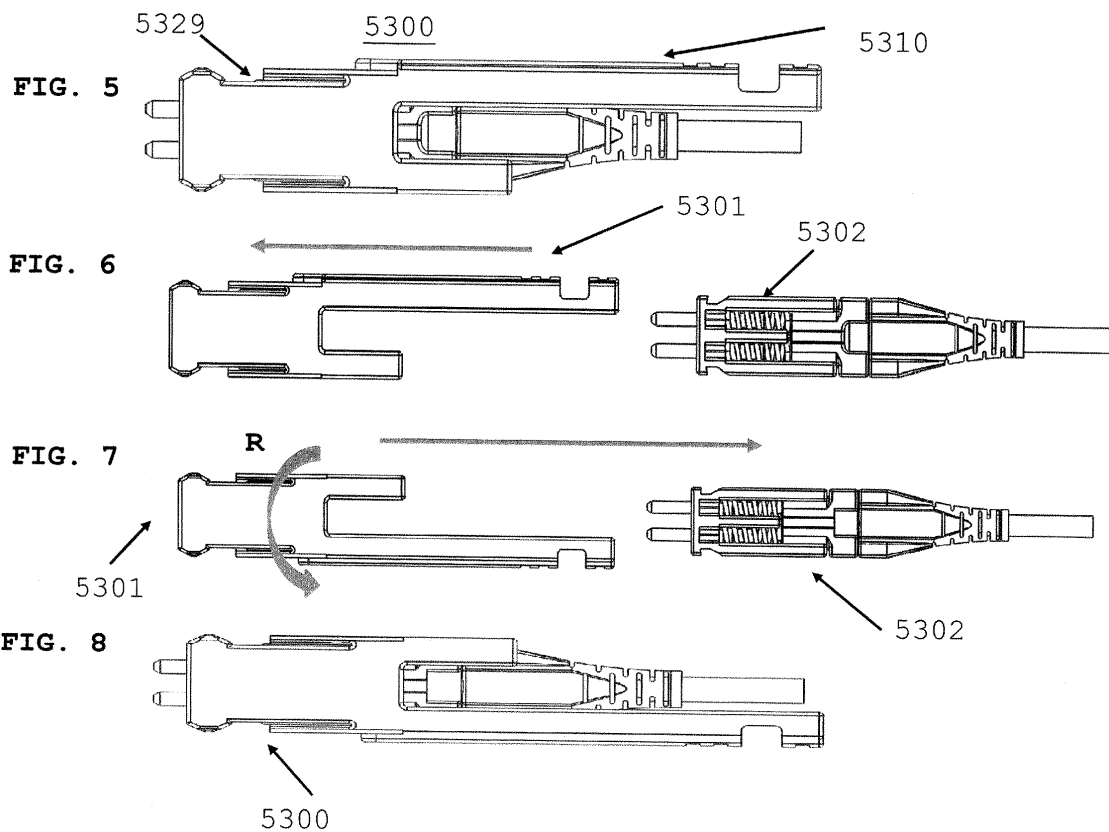
EX1003: Fig. 1.

The micro connector (2100, 3700) of Figs. 1-4 also differs from the micro connector (9100) of Figs. 16-36 in how the outer housing (2101, 3701) releases from the remainder of the connector in order to facilitate polarity change.

EX1002: ¶281. Whereas the outer housing (9101, 9201, 9301, 9401) of micro connector of Figs. 16-36 is releasable by simply twisting the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1), releasing the outer housing of Figs. 1-4 requires a more complex effort. EX1002: ¶281. The user must lift at least one flap (2101.1, 3703) of the outer housing of Figs. 1-4 or, in a variation thereof, insert a tool into an access slot (5329) of the outer housing (5301) (if the flaps are omitted).

EX1003: ¶¶[0050]-[0052], Figs. 1-8; EX1002: ¶282. Both the flap-lift and tool-insertion methods are more complex and less user-friendly than the simple quarter-turn method of releasing the outer housing (9101, 9201, 9301, 9401) using the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) from Figs. 16-36. EX1002: ¶282.

As shown in Figs. 2-4 and again in Figs. 5-8, once the outer housing (2101, 3701) is released from the remainder of the connector, the micro connector (2100, 3700) can change polarity by (1) separating the outer housing from the front body (2102, 3702), the back body (2106), and the boot (2109), then (2) rotating the front body/back body/boot assembly relative to the outer housing (*see* Fig. 2), and then (3) reattaching the front body/back body/boot assembly into the outer housing (while maintaining the flipped over orientation). EX1003: ¶[0051]; EX1002: ¶283.



EX1003: Figs. 2-8.

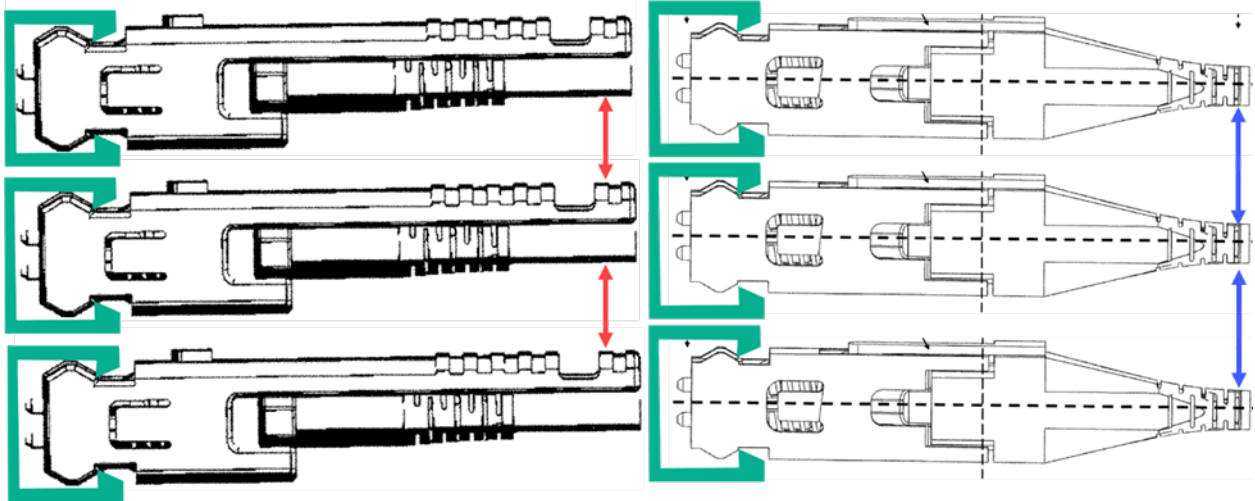
It would have been obvious to replace the boot (2109) and optional pull key (2110) of the micro connector (2100, 3700) of Figs. 1-4 with the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector (9100) of Figs. 16-36.

EX1002: ¶284. Because the outer housing (2101, 3701) of Figs. 1-4 already has an integrated alignment key, the detachable boot-mounted alignment key (9105.1, 9205.1, 9305.1, 9405.1) is not needed in the modified version of the micro connector of Figs. 1-4. EX1003: ¶[0059]; EX1002: ¶284.

This modification would make it easier to insert and remove the micro connector in high density environments. EX1002: ¶285. Push-pull boots like the boot (9109.1, 9209.1, 9309.1, 9409.1) in Figs. 16-36 are widely understood to improve connector access in high density connection environments. EX1003: ¶[0049] (“a remote release mechanism such that a user can remove cable assembly connectors that are closely spaced together on a high density panel without damaging surrounding connectors, accidentally disconnecting surrounding connectors, disrupting transmissions through surrounding connectors, and/or the like”); EX1002: ¶285. In fact, Takano’s micro connectors are intended for “high-density interconnect panels.” EX1003: ¶[0004]; EX1002: ¶285. Such panels fit as many connectors as possible onto fiber optic rack equipment by arranging adapters

in horizontal rows that are spaced apart vertically by the smallest possible spacing distance. EX1002: ¶285.

For example, in the schematic illustration below, the green claw shapes schematically represent closely spaced rows of adapters on a high density panel. EX1002: ¶286. As shown, each micro connector is in very close proximity to the micro connector above and/or below it. *Id.* Micro connectors (2100, 3700) of Figs. 1-4 are shown on the left and micro connectors (9100) of Figs. 16-36 are shown on the right. *Id.* Because of the way the pull keys (2110) overlap the cables, the micro connector of Figs. 1-4 (left) have relatively small vertical space for finger access (red arrows). *Id.* By contrast, because the pull keys are eliminated in the micro connectors (9100) of Figs. 16-36 (right), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36 provides more vertical space for finger access (blue arrows). *Id.* Eliminating the optional pull key from the micro connector of Figs. 1-4 and replacing its functionality with a push-pull boot of Figs. 16-36 provides better finger access for inserting/extracting the connector in high density connection environments. EX1003: ¶[0049]; EX1006: ¶[0042] (explaining push-pull boots provide “[e]ase of access to install or remove the ... connector[,] ... instead of needing access to the connector housing” and result in “[n]o remote pulling latch to hinder cable routing or finger access is included.”); EX1002: ¶286.



Micro Connectors of Figs. 1-4

Micro Connectors of Figs. 16-36

In addition, this modification would make it easier to detach the front body/back body/boot assembly from the outer housing (2101, 3701) to change polarity; EX1002: ¶287. Instead of having to pry open the flaps (2101.1, 3703) or insert a tool into the access slot (5329), this modification allows a user to make a quick quarter turn of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) to disconnect the boot from the outer housing and allow the outer housing and front body/back body/boot assembly to be separated to change the polarity. EX1002: ¶287.

Regarding the design choice to utilize the integrated alignment key (2105) on the outer housing (2101, 3701) instead of the boot-mounted alignment key (9105.1, 9205.1, 9305.1, 9405.1) used in some embodiments of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36, Takano already teaches the boot-mounted key is releasable (i.e., removable) from the push-pull boot of Figs. 16-36.

EX1003: ¶[0059]; EX1002: ¶288. The push-pull boot of Figs. 16-36 can be used without the alignment key to: (1) push and pull the outer housing of Figs. 1-4 to connect and disconnect the micro connector of Figs. 1-4 with the adapter (both outer housings of Figs. 1-4 and Figs. 16-36 are pushed/pulled to connect/disconnect the micro connectors with the adapter); and (2) secure the inner components of the micro connector of Figs. 1-4 within the outer housing of Figs. 1-4. EX1002: ¶288. The key in Figs. 16-36 is not needed to perform function (1) nor (2). EX1002: ¶289

The modification would have been nothing more than the application of a known technique (Takano's push-pull boot of Figs. 16-36 that releasably attaches to the outer housing using quarter-turn chamfered boot hooks) to improve a similar device (Takano's micro connector of Figs. 1-4) in the same way to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change). EX1002: ¶290.

This modification would have also been nothing more than combining known prior art elements (Takano's push-pull boot of Figs. 16-36 and Takano's micro connector) according to known methods (connection to the outer housing as shown in Figs. 16-36) to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change via chamfered boot hooks). EX1002: ¶291.

This modification would have also been nothing more than a simple substitution of one known alternative (Takano's boot and pull key of Figs. 1-4) with another (Takano's push-pull boot of Figs. 16-36) to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change). *Sparton Corp. v. U.S.*, 89 Fed. Cl. 196, 237 (Fed. Cl. 2009) ("The variation of known mechanical designs to achieve an alternative solution to the same problem solved by the known mechanical designs in generally the same manner is obvious, especially where one skilled in the art could easily implement the variation."); EX1002: ¶292.

In making this modification, the POSA would make minor structural changes to the micro connector of Figs. 1-4 for compatibility with the push-pull boot of Figs. 16-36. EX1002: ¶293. For example, the POSA would add the slots (9201.4a, 9201.4b) of the outer housing of Figs. 16-36 to the outer housing of Figs. 1-4. EX1003: ¶[0058], Fig. 38. To add the slot to the bottom side of the outer housing of Figs. 1-4, the POSA would extend the bottom side of the outer housing rearward a sufficient distance to accommodate the bottom slot. EX1003: Fig. 18; EX1002: ¶293. Such minor structural changes are within the POSA's capabilities. EX1002: ¶293. Further, the way to modify the rear end portion of the outer housing of Figs. 1-4 is already shown in the outer housing of Figs. 16-36. *Id.*

With the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) attachable to the outer housing (2101, 3701), the push-pull boot secures the front body (2102, 3702) and the back body (2106) within the outer housing. EX1002: ¶294. This eliminates the need for the other connections between the front body/back body and the outer housing (i.e., the flaps (2101.1, 3703) or insertion of a tool into the access slot (5329)). EX1002: ¶294. The POSA would thereby remove these connections from the micro connector (2100, 3700) to facilitate the quick disconnection and separation of the outer housing from the front body/back body/boot assembly to change the polarity. EX1002: ¶294.

There would have been a reasonable expectation of success in replacing the boot and pull key of Figs. 1-4 with the releasable push-pull boot of Figs. 16-36. EX1002: ¶295. As shown below, Takano and Takano's provisional application (EX1004, the '539 Provisional) have different drawings depicting a blueprint for how to make the structural modifications required for compatibility between the outer housing (2102, 3701) of Figs. 1-4 and the push-pull boot of Figs. 16-36. Fig. 37 of Takano and Fig. 97.1 of the '539 Provisional are clear indications that (1) the minor structural modifications needed to support the basic change to the micro connector (2100, 3700) of Figs. 1-4 would have been well-within a POSA's capabilities and (2) the POSA would have had a reasonable expectation that the

modification could successfully yield a desirable micro connector.⁸ EX1002:

¶295.

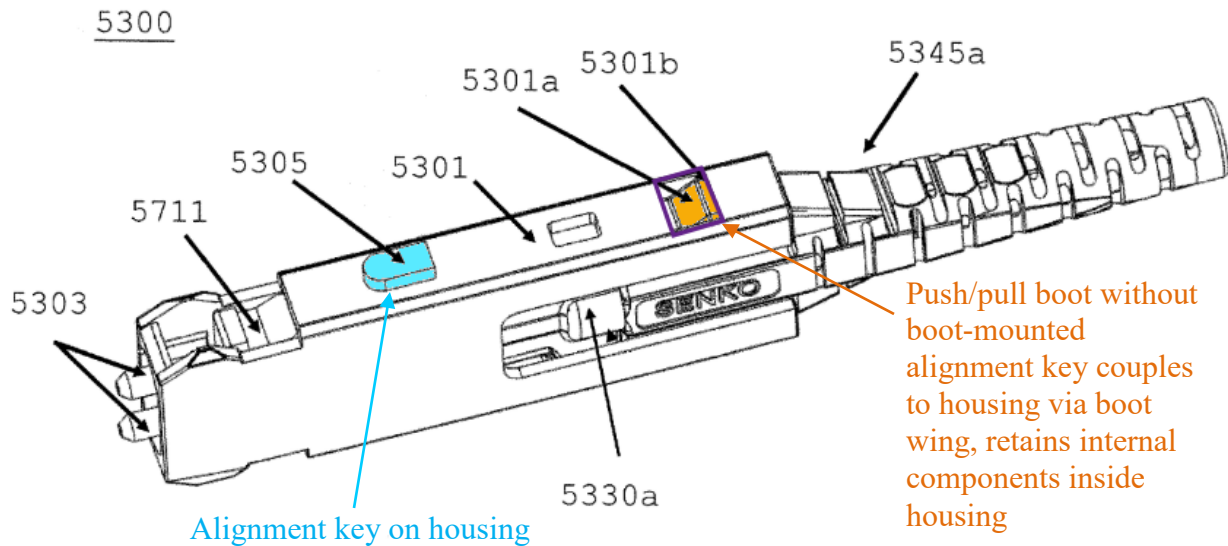


FIG. 37

EX1003: Fig. 37 (annotated).

⁸ The difference between the modified connector of this ground and the connectors in Takano's Fig. 37 and the '539 Provisional's Fig. 97.1, is that the way the boot couples to the outer housing does not appear to facilitate quarter-turn release (e.g., the boot hooks in these drawings are missing the circumferential chamfers (9409.2a, 9409.3b)). EX1002: ¶295.

9700

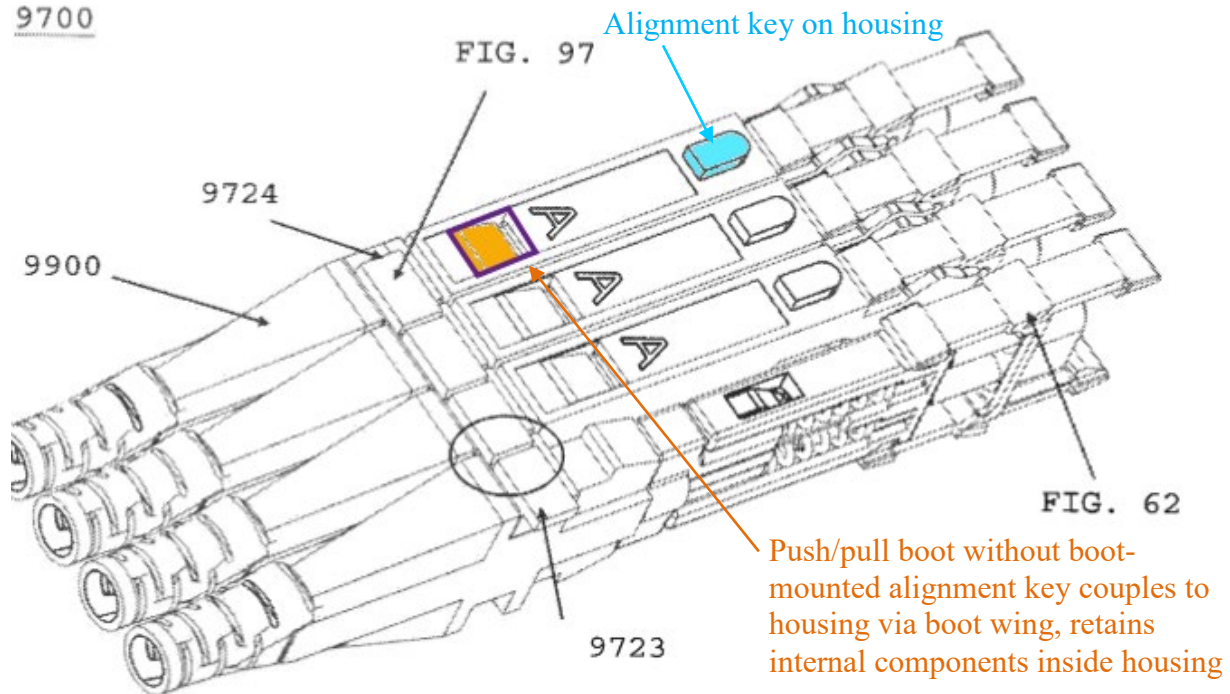


FIG. 97.1

B. Independent Claim 1

1. 1.P

The Takano combination results in the micro connector (2100, 3700) of Figs. 1-4 having an outer housing (2101, 3701), a push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36, a back body (2106), and a back post (2107).

EX1003: ¶¶[0050], [0061], Figs. 1-4 and 17; EX1002: ¶296. The back post attaches to the back body. EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 23B; EX1002: ¶296. A crimp ring (2108) is crimped onto the back post. EX1003: ¶[0050];

EX1004: Fig. 23B; EX1002: ¶296. Together the back post and the back body form a crimp body.⁹ EX1002: ¶296.

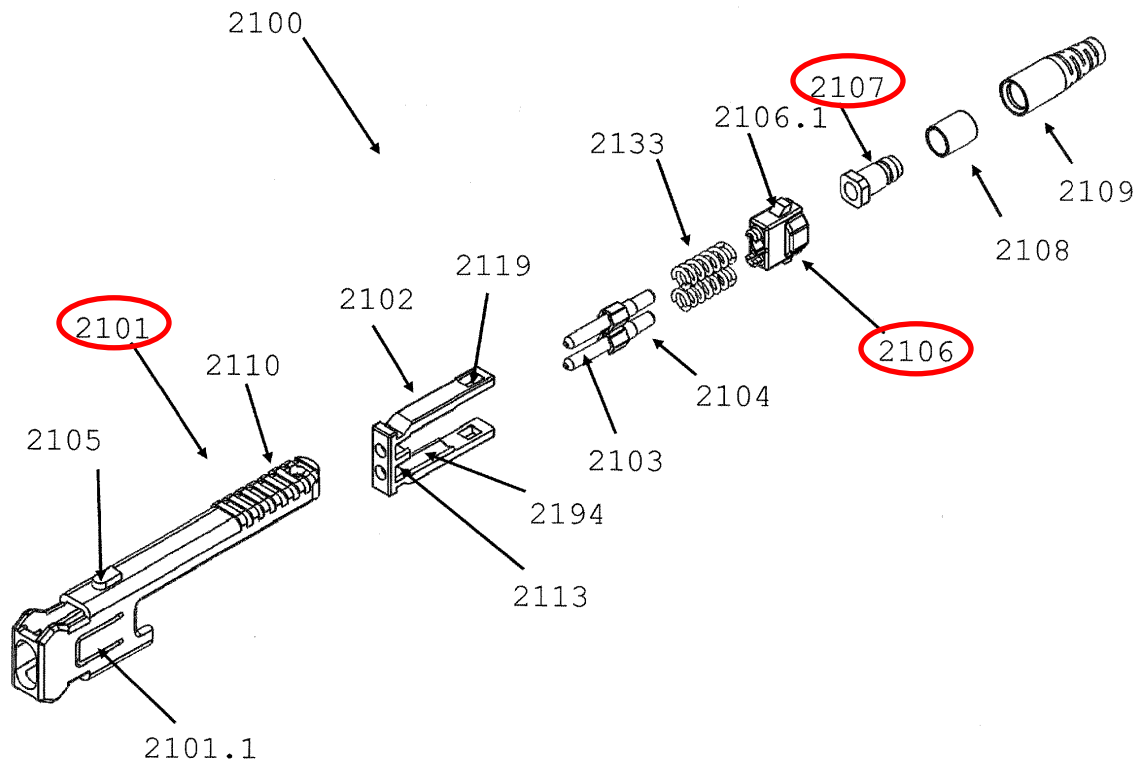


FIG. 1.

⁹ PCT Application No. PCT/US2018/066523, incorporated by reference into the ‘794 Patent, explains the “crimp body 106” can be “a single, unitary body ... [or] it could also be molded as two pieces [which are then] secured [together].” EX1019: ¶¶0078]; EX1001: 3:65-67, 7:16-18; EX1002: ¶296.

9100

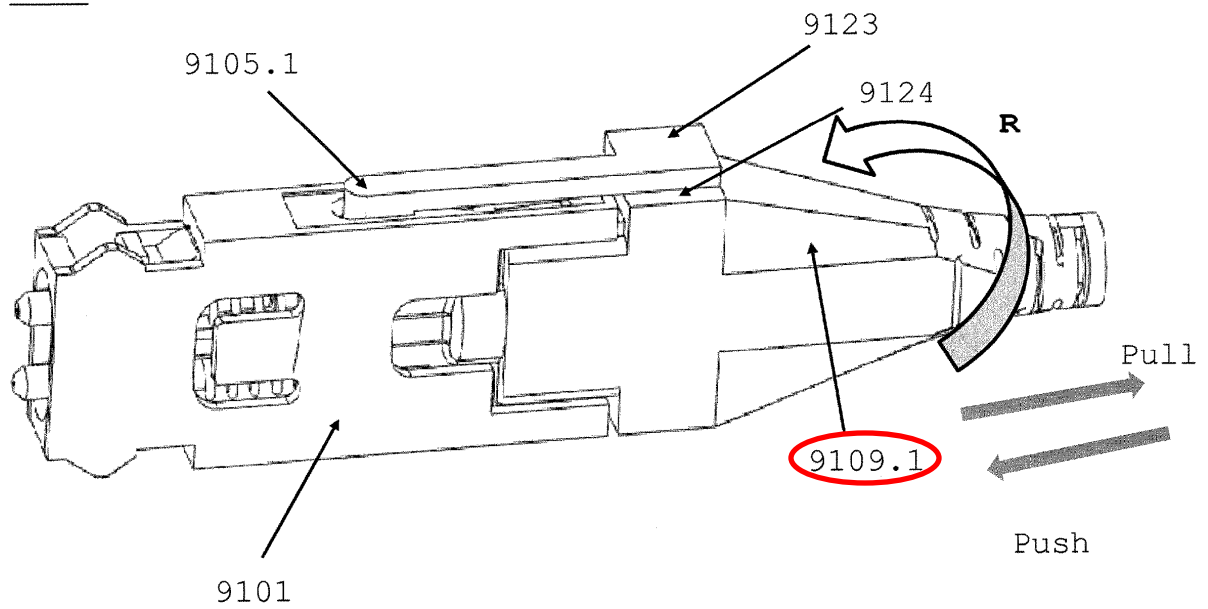


FIG. 16

9109.1

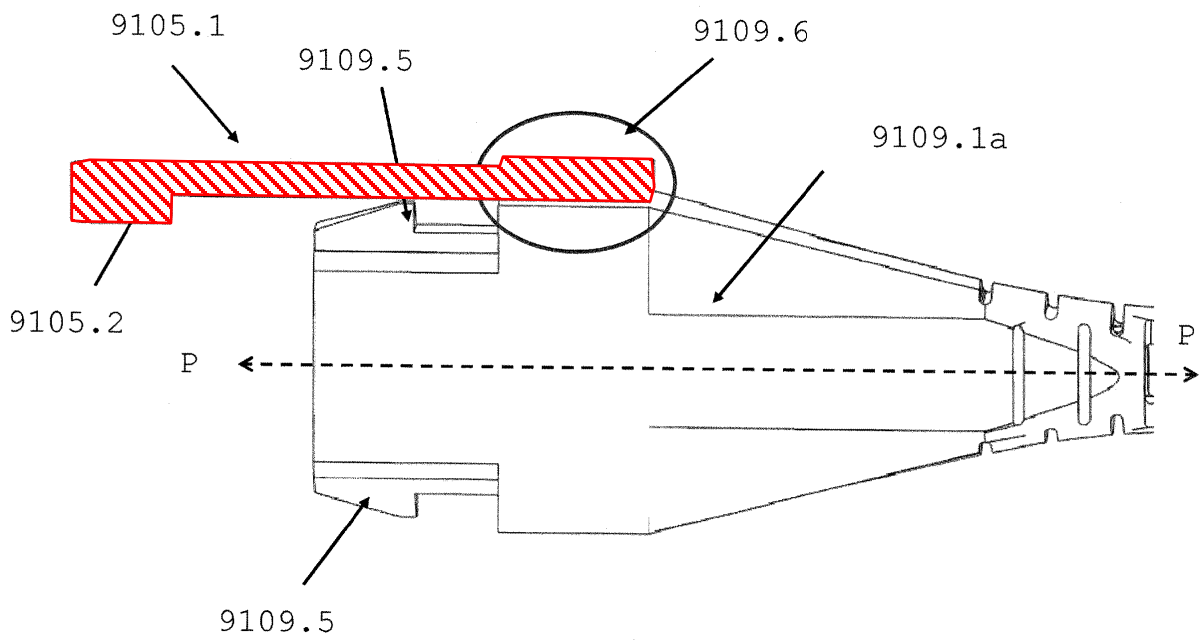


FIG. 17

EX1003: Figs. 1, 16, and 17 (annotated).

The micro connector (2700, 3700) includes two ferrules (2103) partially within the outer housing (2101, 3701). EX1003: Figs. 1-4, ¶[0050]; EX1002: ¶297. Each ferrule terminates an optical fiber (two optical fibers total) from the fiber optic cable. EX1003: ¶¶[0048], [0050]; EX1002: ¶297.

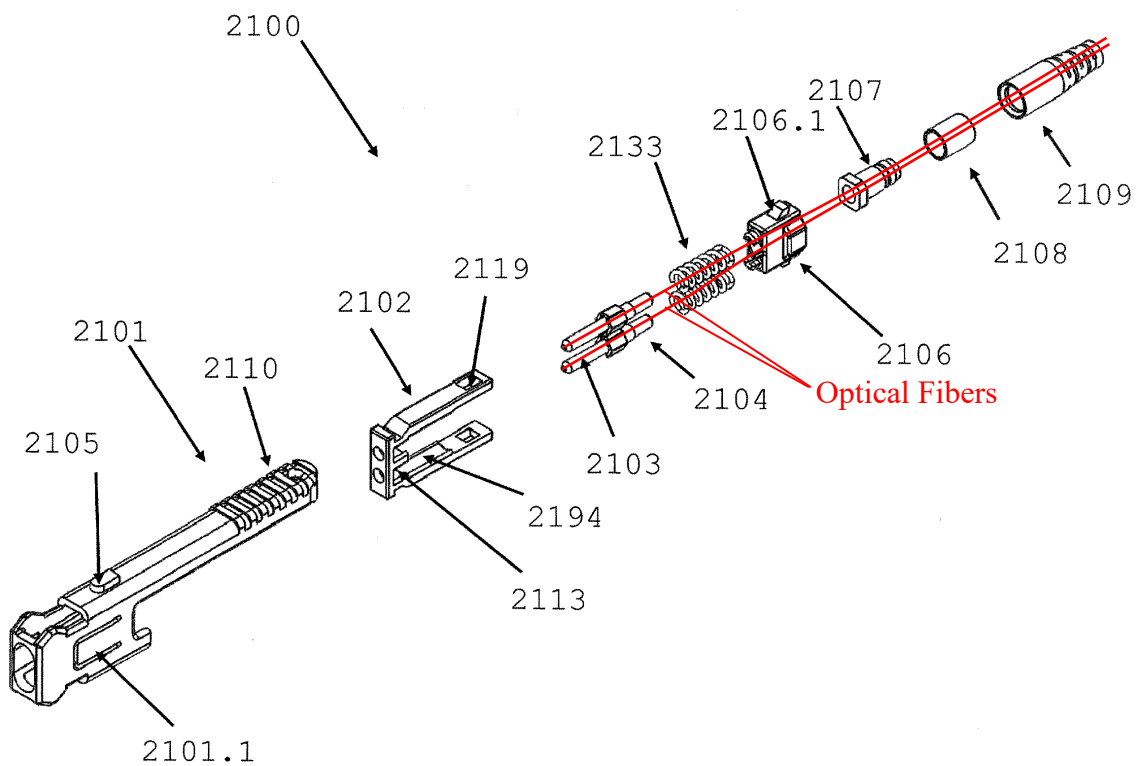
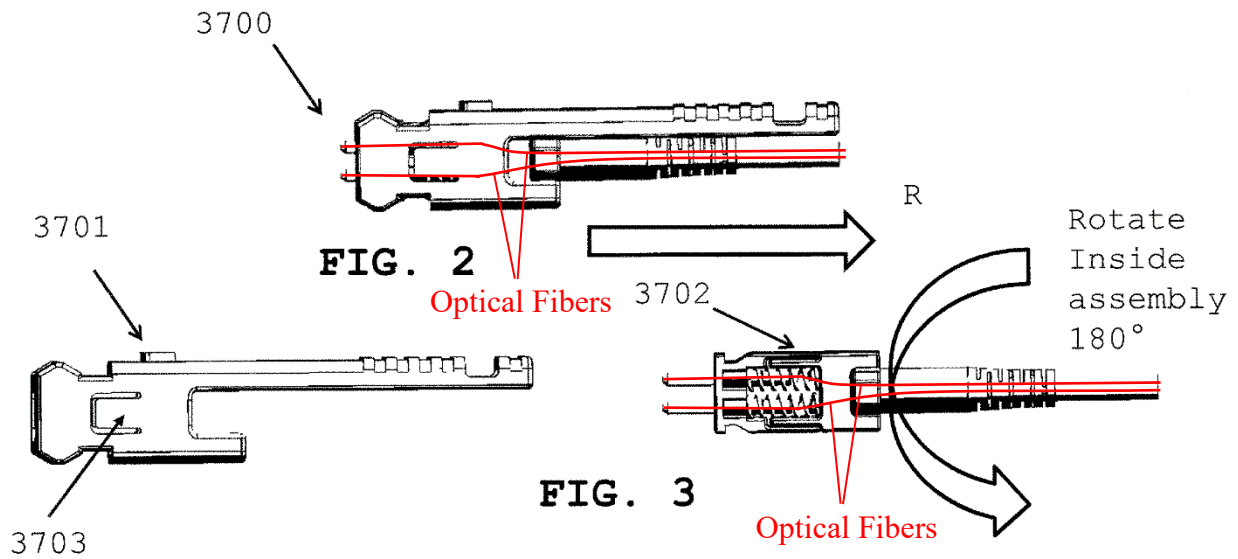


FIG. 1.



EX1003: Figs. 1-3 (annotated).

Additional figures of the micro connector (2100, 3700) are provided in the ‘539 Provisional, incorporated by reference. EX1003: ¶[0001]; EX1002: ¶298.

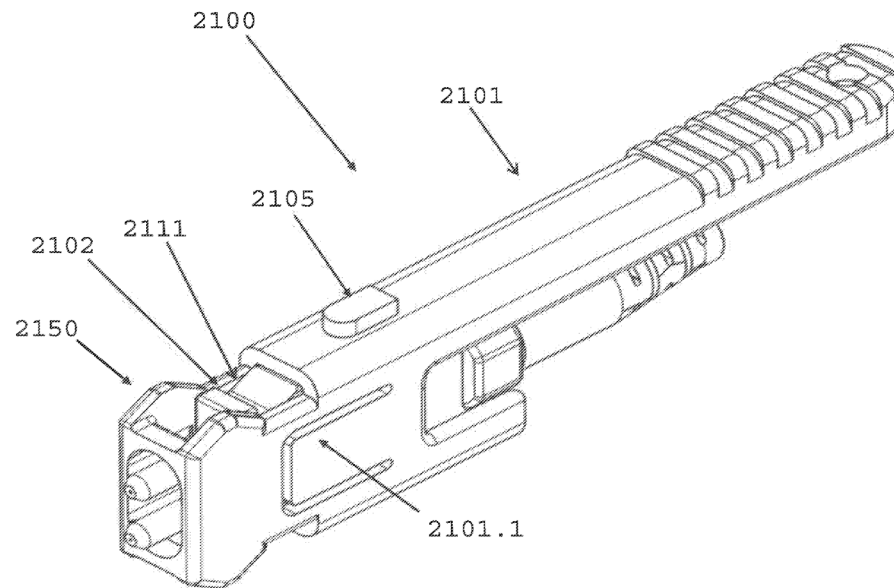


FIG. 21B

EX1004: Fig. 21B.

Therefore, Takano renders 1.P obvious. EX1002: ¶299.

2. 1.a.1

Takano's outer housing (2101, 3701) has a front end opening. EX1002: ¶300.

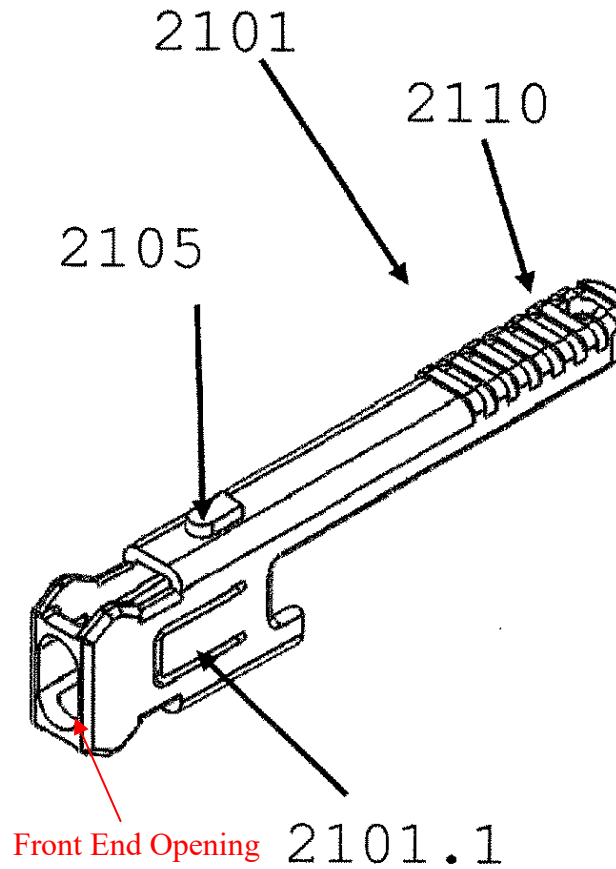


FIG. 1.

EX1003: Fig. 1 (annotated).

Therefore, Takano renders 1.a.1 obvious. EX1002: ¶301.

3. 1.a.2

Takano's outer housing (2101, 3701) has a two short sides forming a top and a bottom. EX1003: Fig. 1; EX1002: ¶302. Takano's outer housing also has two long sides joining the top and bottom. EX1002: ¶302.

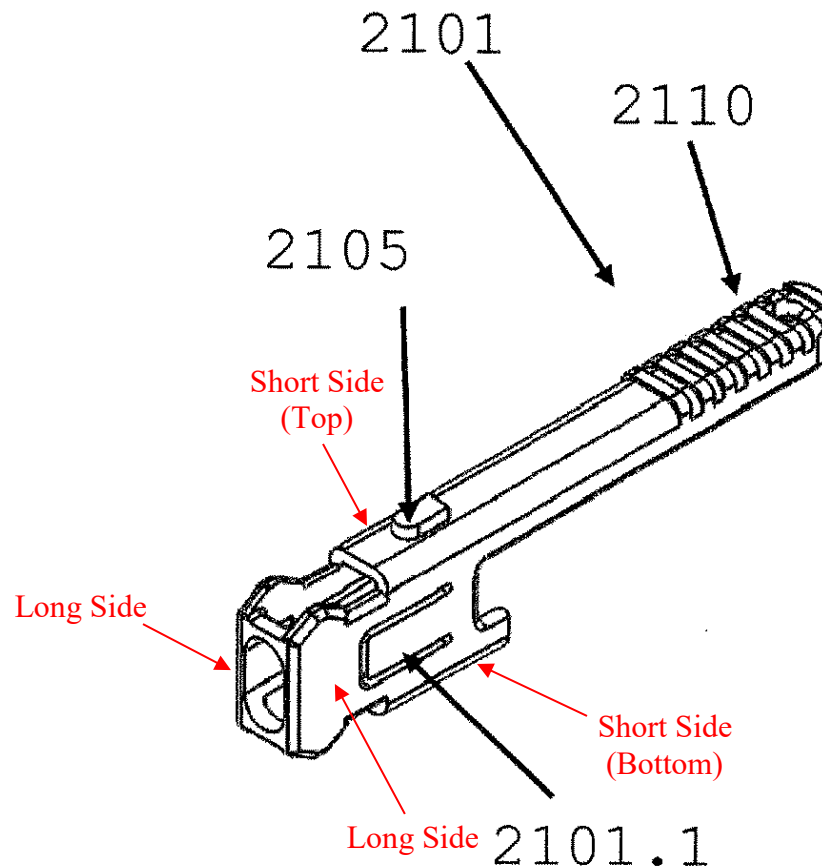


FIG. 1.

EX1003: Fig. 1 (annotated).

This is confirmed by Fig. 22 of the '539 Provisional, incorporated by reference. EX1003: ¶[0001]; EX1002: ¶303.

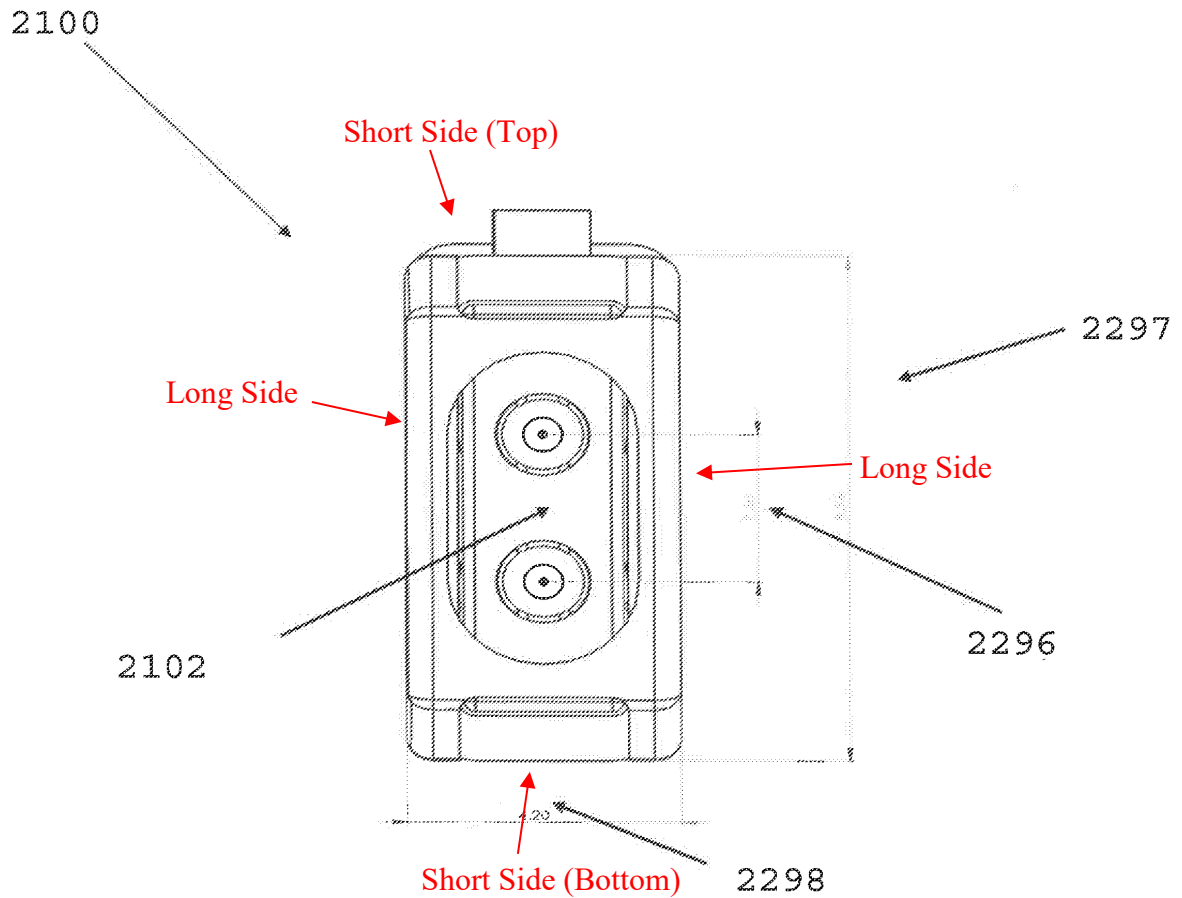


FIG. 22

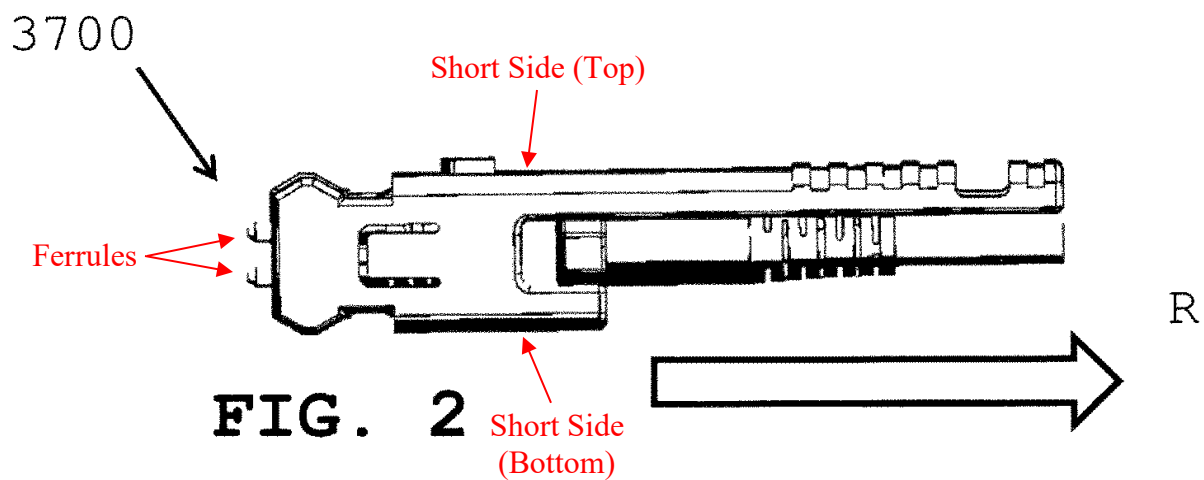
EX1004: Fig. 22 (annotated).

Therefore, Takano renders 1.a.2 obvious. EX1002: ¶304.

4. 1.a.3

The micro connector (2100, 3700) includes two ferrules (2103) that are spaced apart between the top and bottom of the outer housing (2101, 3701).

EX1003: Figs. 1-4, ¶[0050]; EX1002: ¶305.



EX1003: Fig. 2 (annotated).

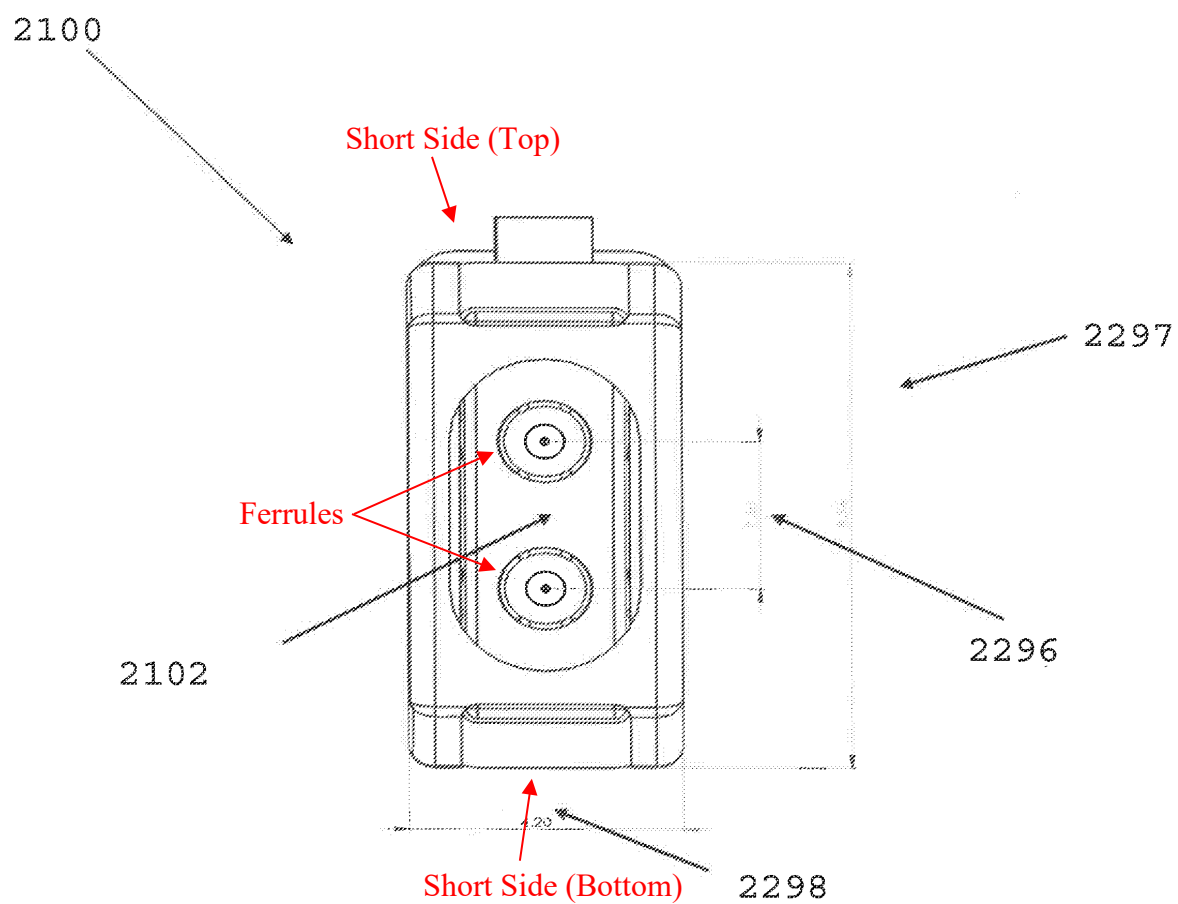


FIG. 22

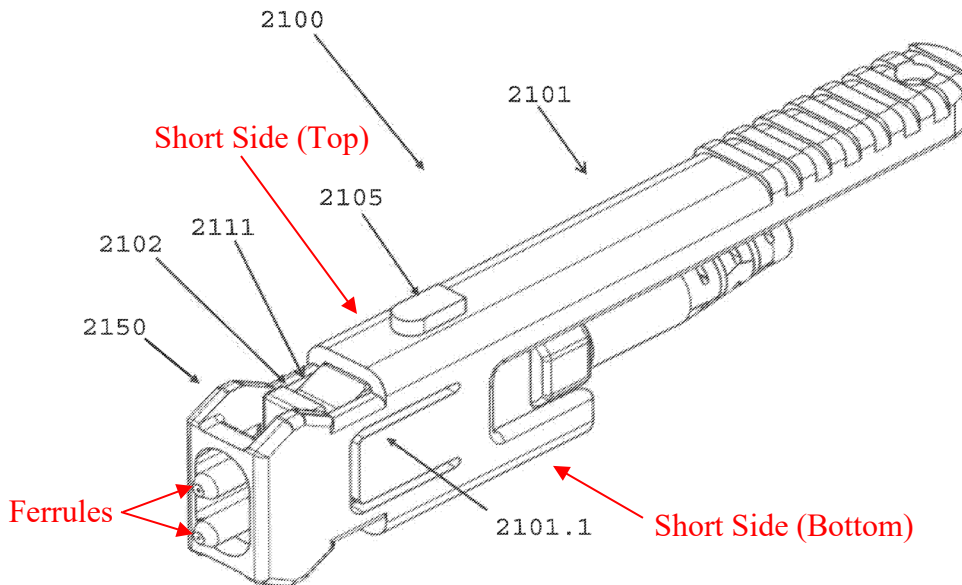


FIG. 21B

EX1004: Figs. 21B and 22 (annotated).

Each ferrule (2103) terminates an optical fiber (two optical fibers total) from the fiber optic cable the micro connector (2100, 3700) is attached to. EX1003:

¶¶[0048], [0050]; EX1002: ¶306. Figs. 1-3 below are annotated to include the optical fibers (red). EX1002: ¶306.

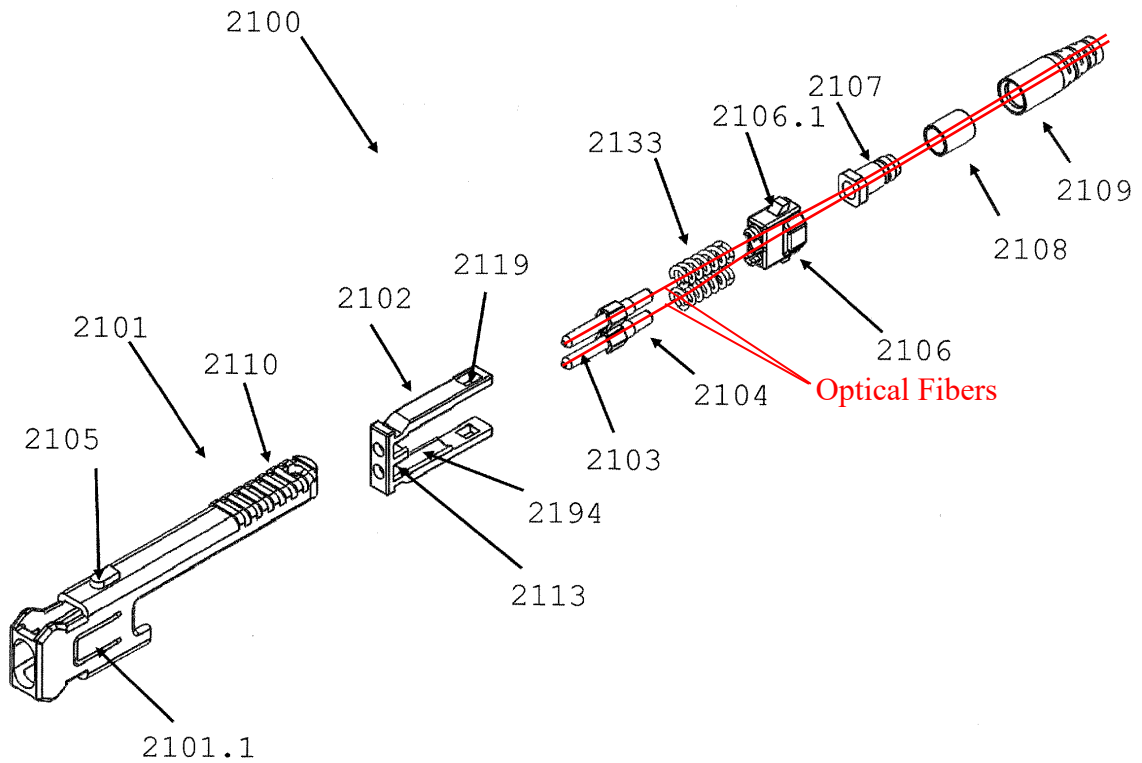


FIG. 1.

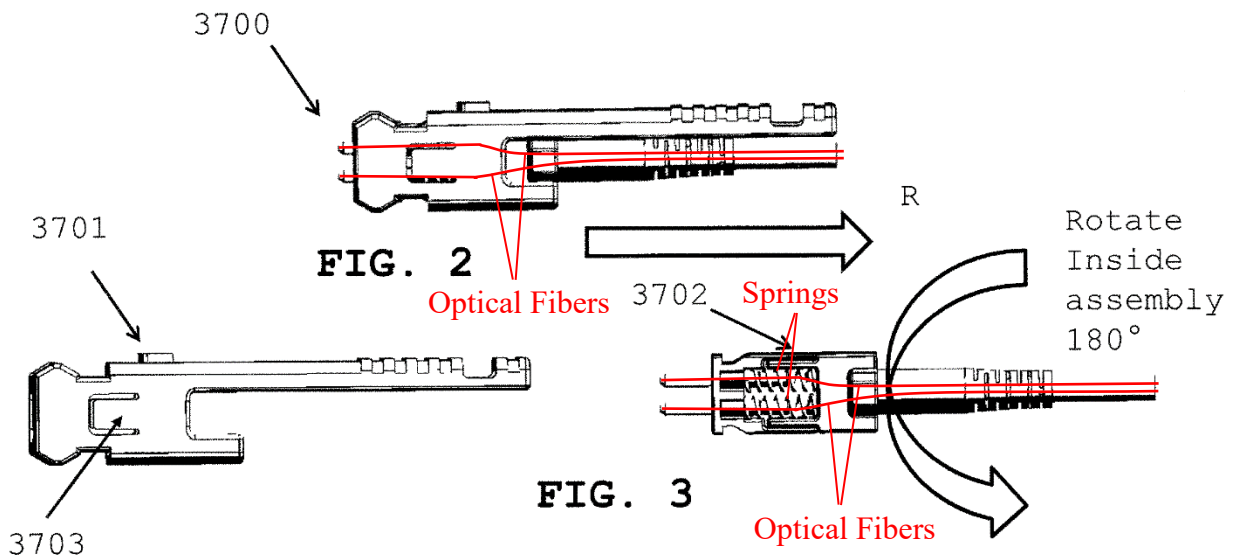


FIG. 2

FIG. 3

EX1003: Figs. 1-3 (annotated).

Because the ferrules (2103) are spaced apart, the sections of the optical fibers in the ferrules would also be spaced apart between the top and bottom of the

outer housing (2101, 3701). EX1003: Figs. 1-4, ¶[0050]; EX1002: ¶307. Further, the optical fibers would also be spaced apart when extending to each ferrule, as each optical fiber would pass through one of the springs (which are also spaced apart) biasing the ferrules, as shown above in Fig. 3. EX1002: ¶307.

Therefore, Takano renders 1.a.3 obvious. EX1002: ¶308.

5. 1.a.4

Takano explains the micro connector (2100, 3700) has a narrow width for use in a small form-factor pluggable transceiver footprint. EX1003: ¶[0049]; EX1002: ¶309. As a result, the width of the outer housing (2101, 3701) is smaller than its height. EX1003: Figs. 1-4; EX1004: Fig. 22; EX1002: ¶309. Therefore, the separation between the top and bottom is more than the separation between the long sides. EX1002: ¶309.

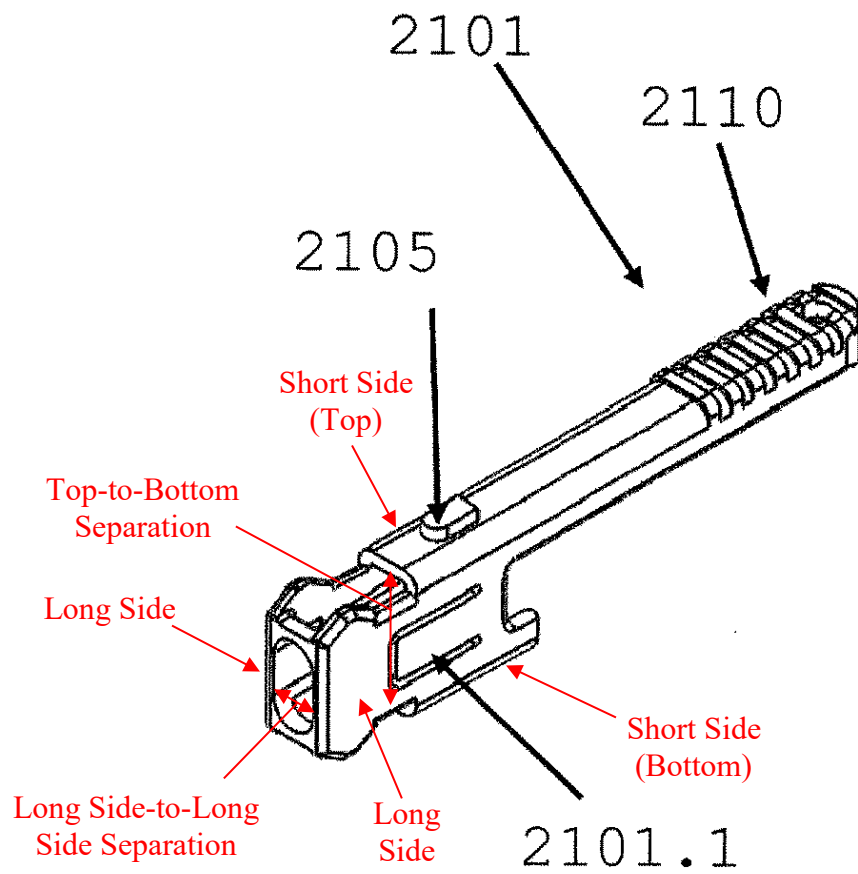


FIG. 1.

EX1003: Fig. 1 (annotated).

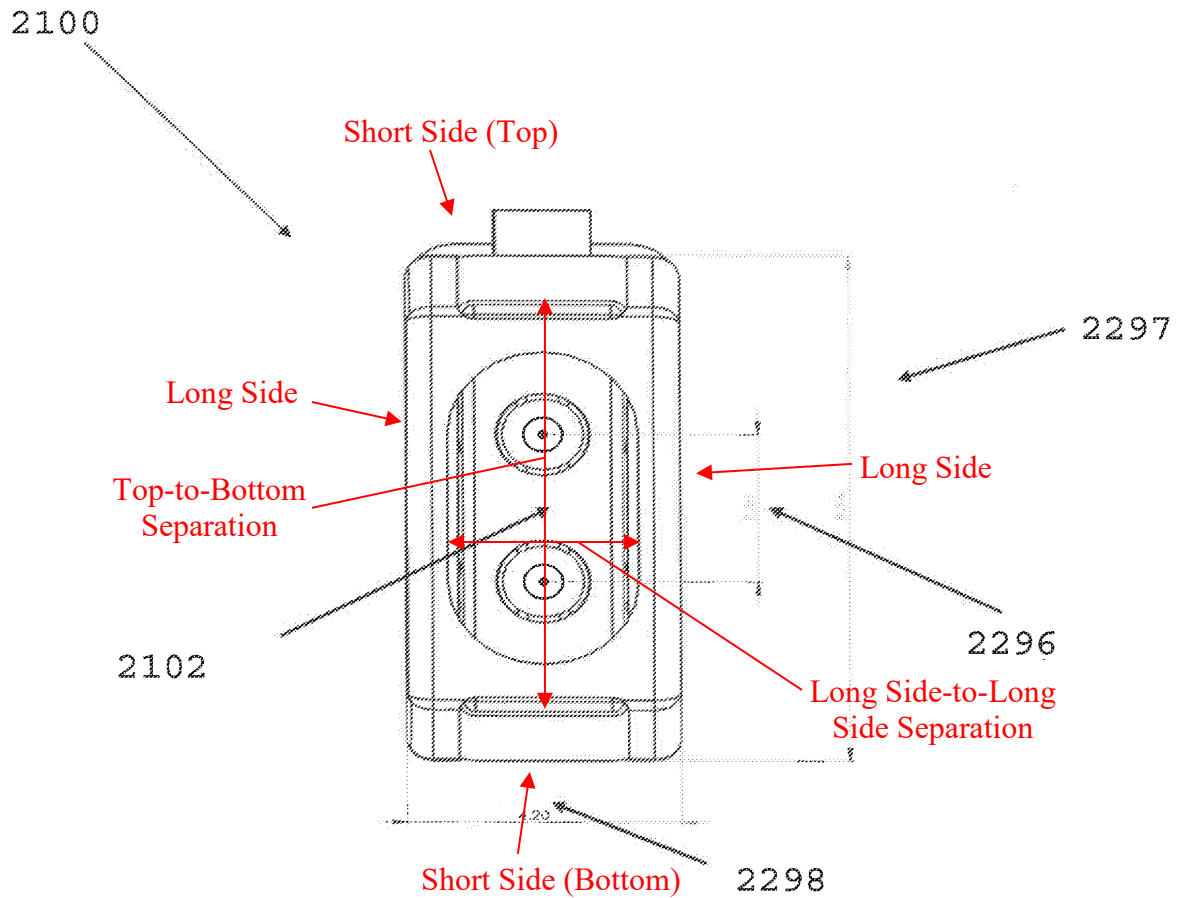


FIG. 22

EX1004: Fig. 22 (annotated).

Therefore, Takano renders 1.a.4 obvious. EX1002: ¶310.

6. 1.b

The back post (2107) and the back body (2106) are positioned rearward of the front end of the outer housing (2101, 3701). EX1003: Figs. 1-4; EX1002: ¶311.

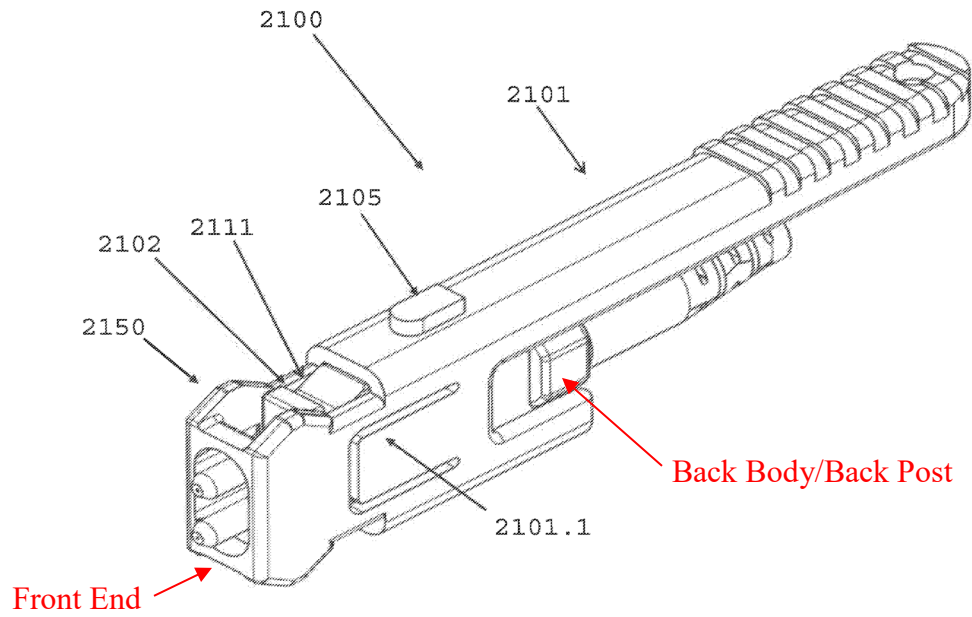


FIG. 21B

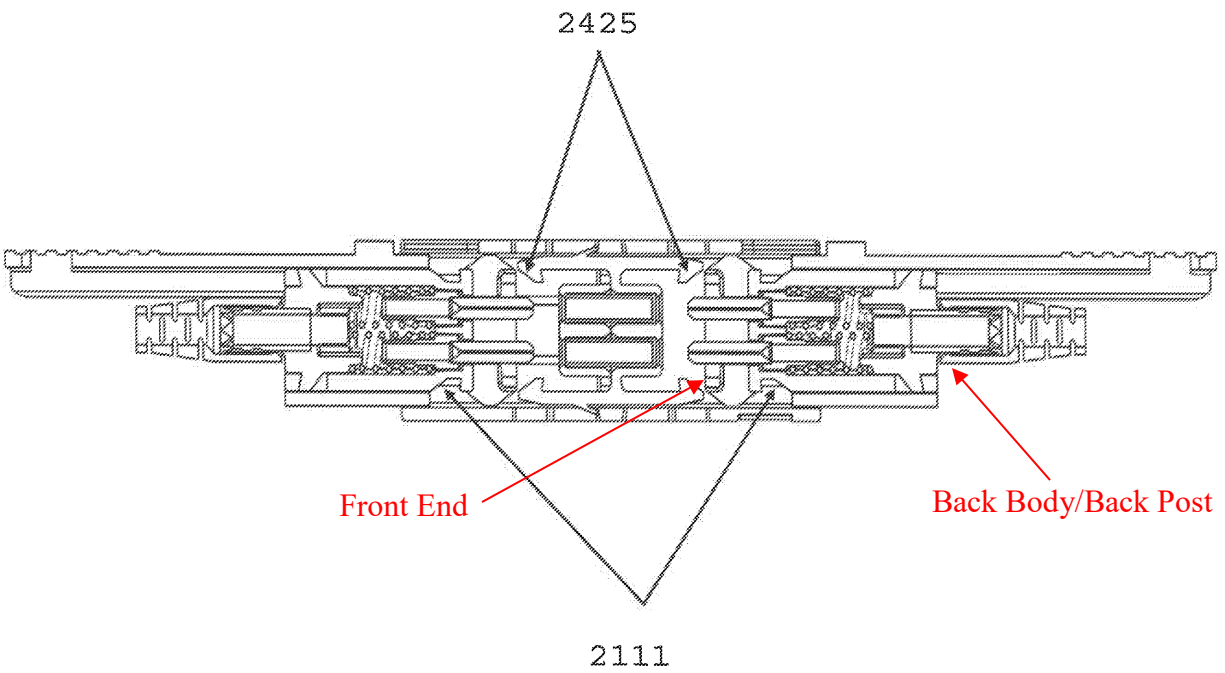


FIG. 23B

EX1004: Figs. 21B and 23B (annotated).

The back post (2107) forms a rear portion onto which the crimp ring (2108) is crimped. EX1003: ¶[0050]; EX1004: Fig. 23B; EX1002: ¶312.

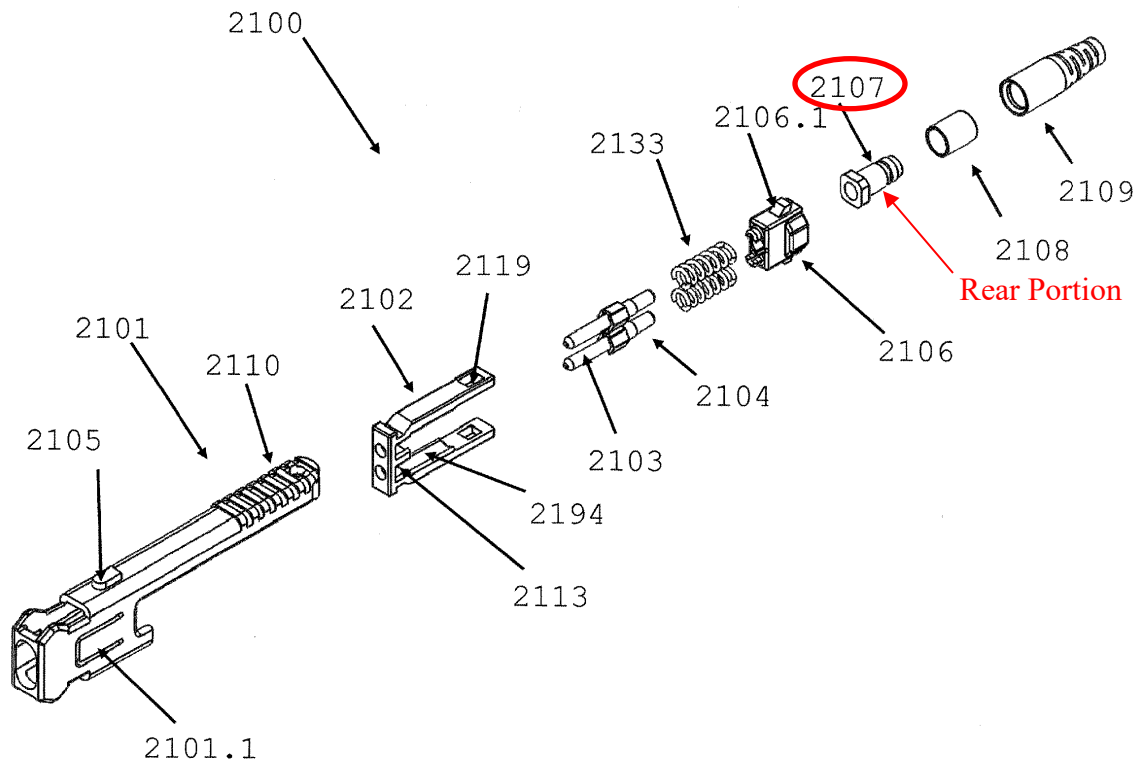


FIG. 1.

EX1003: Fig. 1 (annotated).

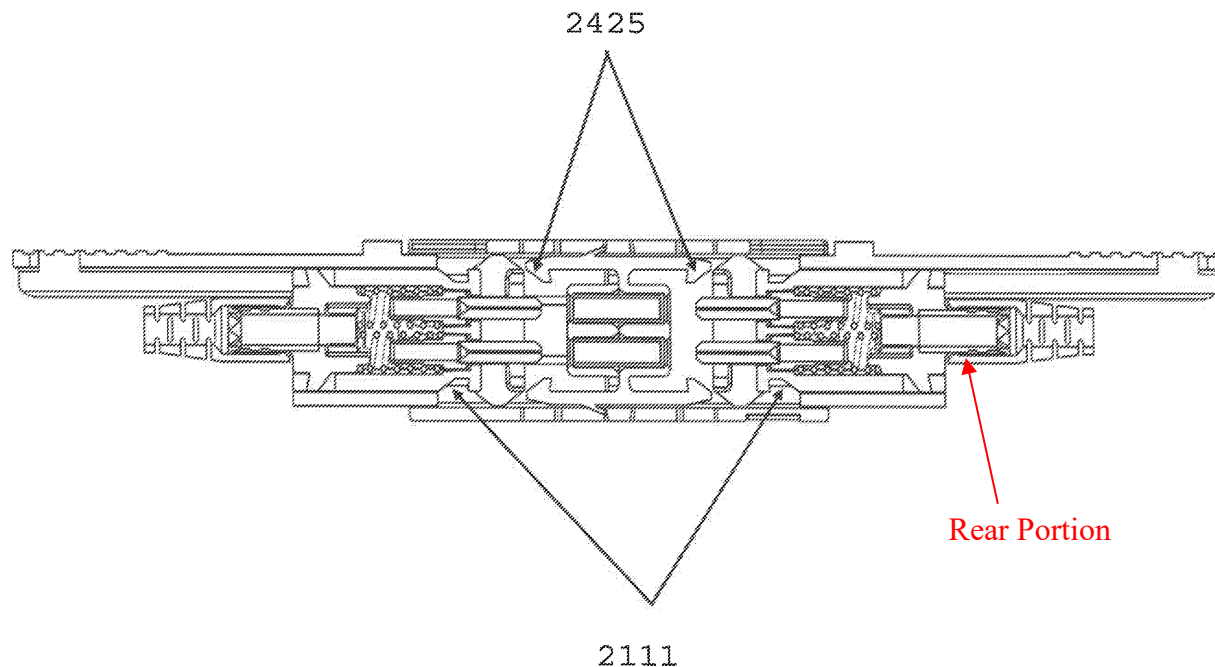


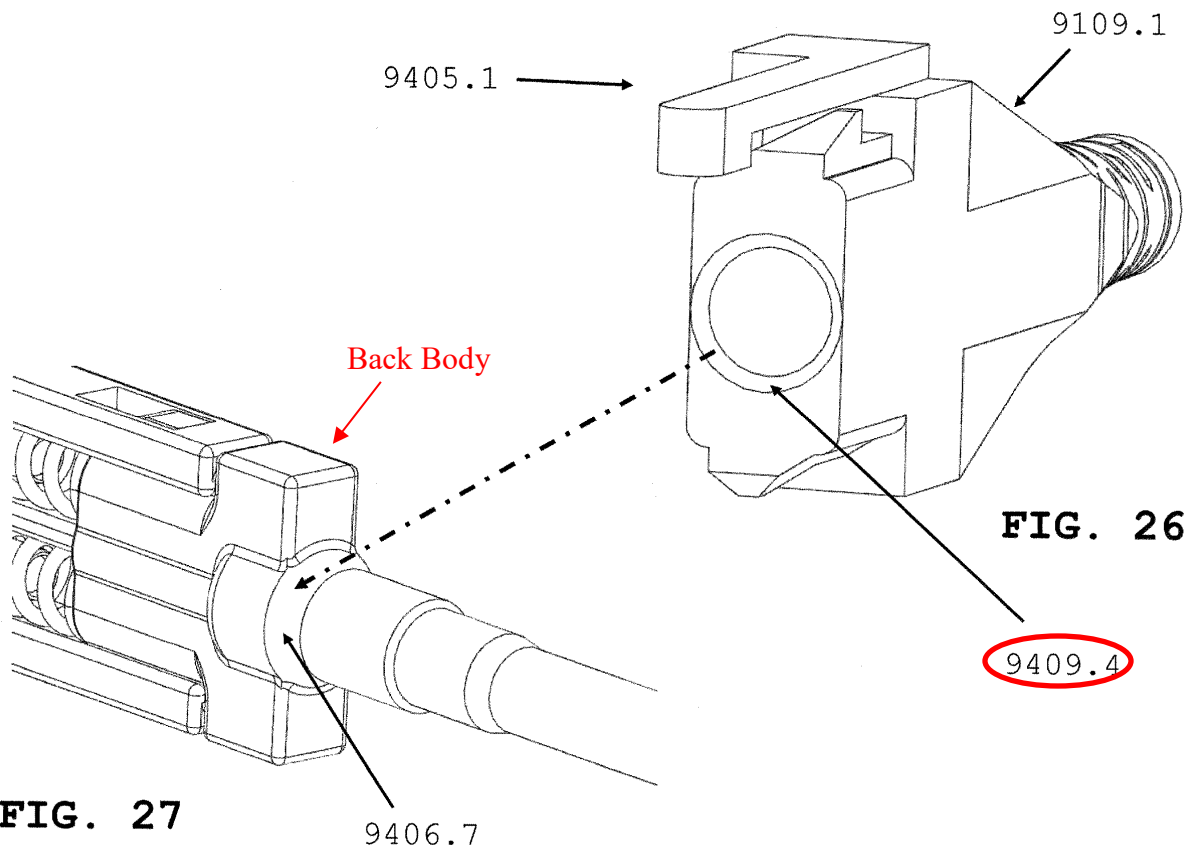
FIG. 23B

EX1003: Fig. 23B (annotated).

Therefore, Takano renders 1.b obvious. EX1002: ¶313.

7. 1.c.1

The push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) includes an inner round (9409.4) that forms a cavity that receives the back post of the back body (9106, 9206). EX1003: Figs. 26, 27, 30, and 34, ¶[0067]; EX1002: ¶314. When implemented in the Takano combination, the push-pull boot would receive the back post (2107) (i.e., rear portion), as the boots in each respective Takano embodiment do. EX1003: Figs. 1-4; EX1004: Fig. 23B; EX1002: ¶314.



EX1003: Figs. 26 and 27 (annotated).

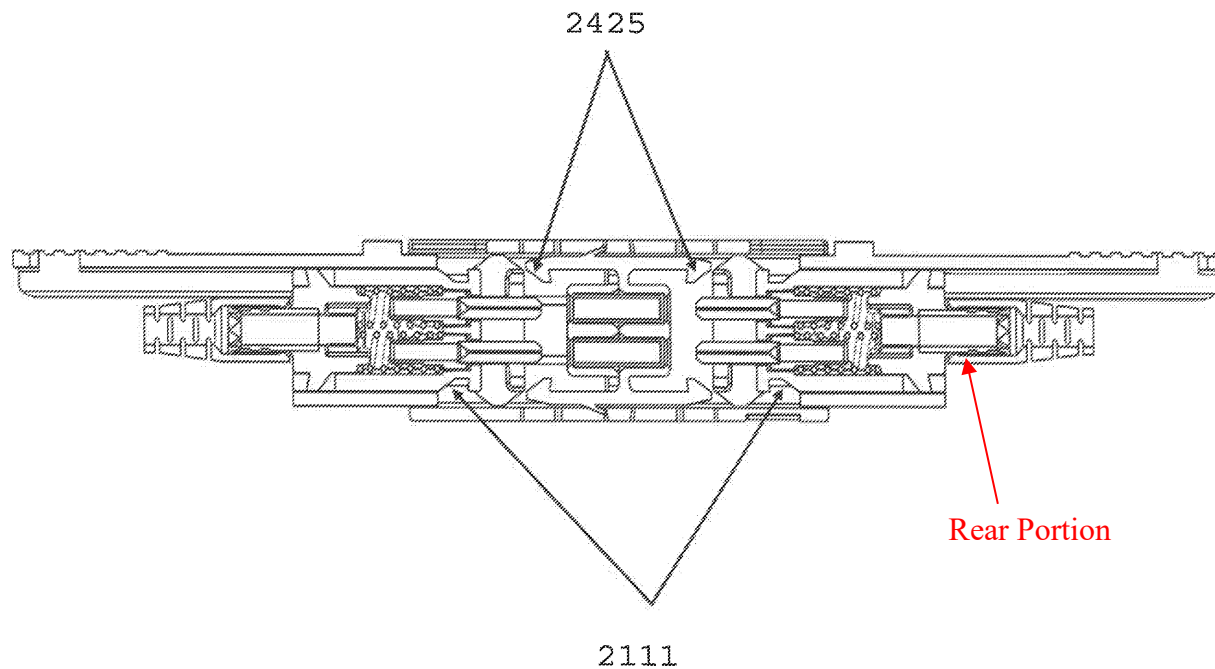


FIG. 23B

EX1003: Fig. 23B (annotated).

As explained in Section VII(A)(1.c.1), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a front extension that includes the boot hooks (9109.5, 9209.5).

EX1002: ¶315.

9109.1

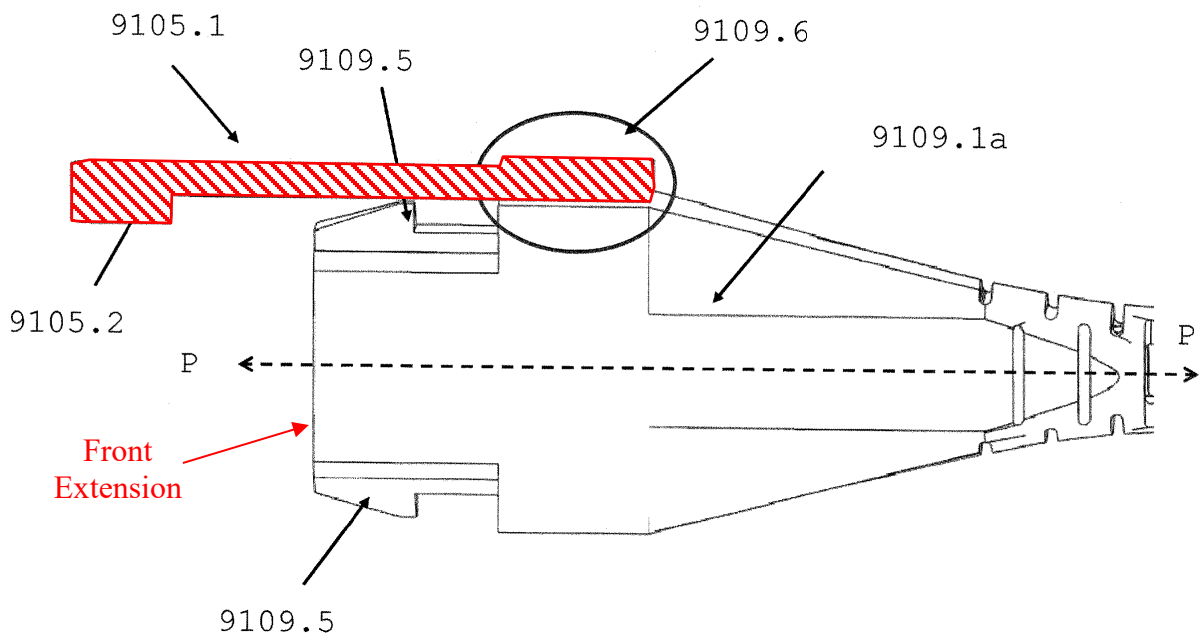


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano renders 1.c.1 obvious. EX1002: ¶316.

8. 1.c.2

The Takano combination results in the front extension extending forward toward the front end of the outer housing (2101, 3701) from point (9109.6).

EX1003: Figs. 1-4, 16 and 17; EX1002: ¶317.

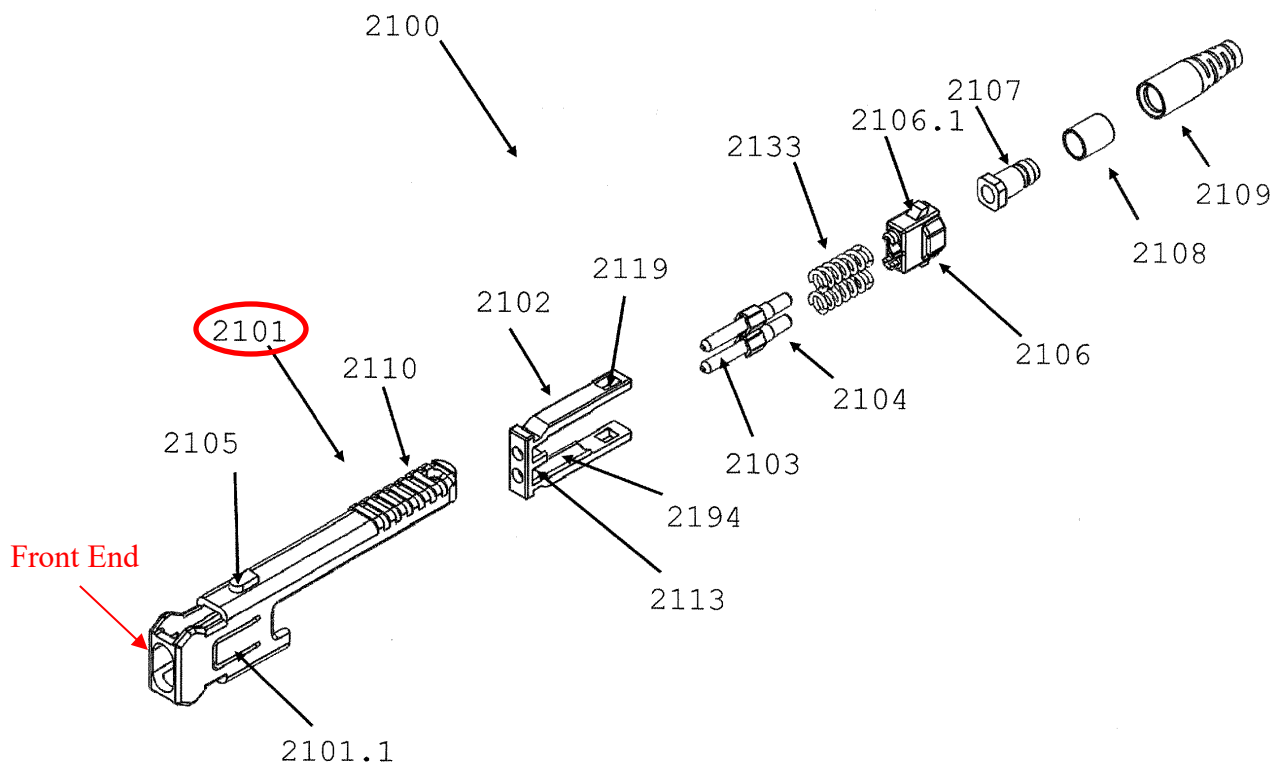


FIG. 1.

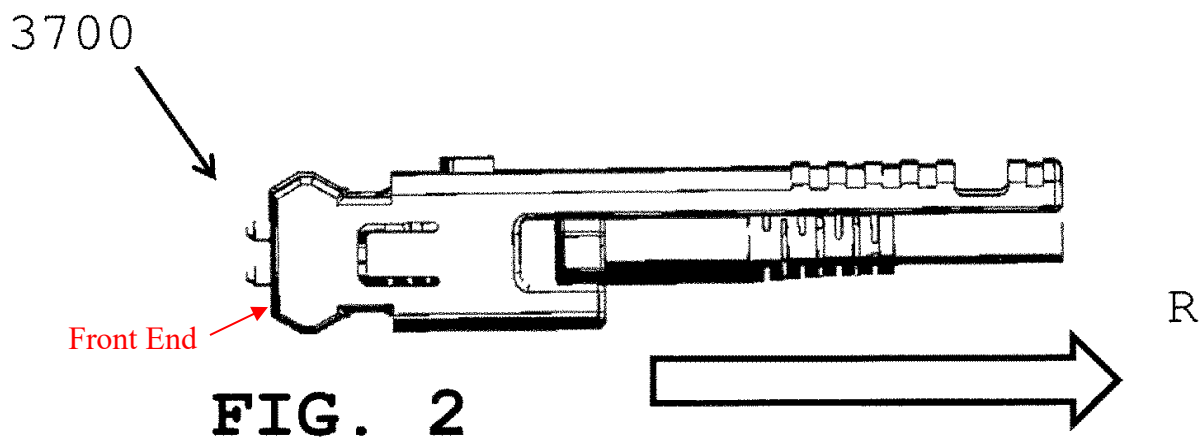


FIG. 2

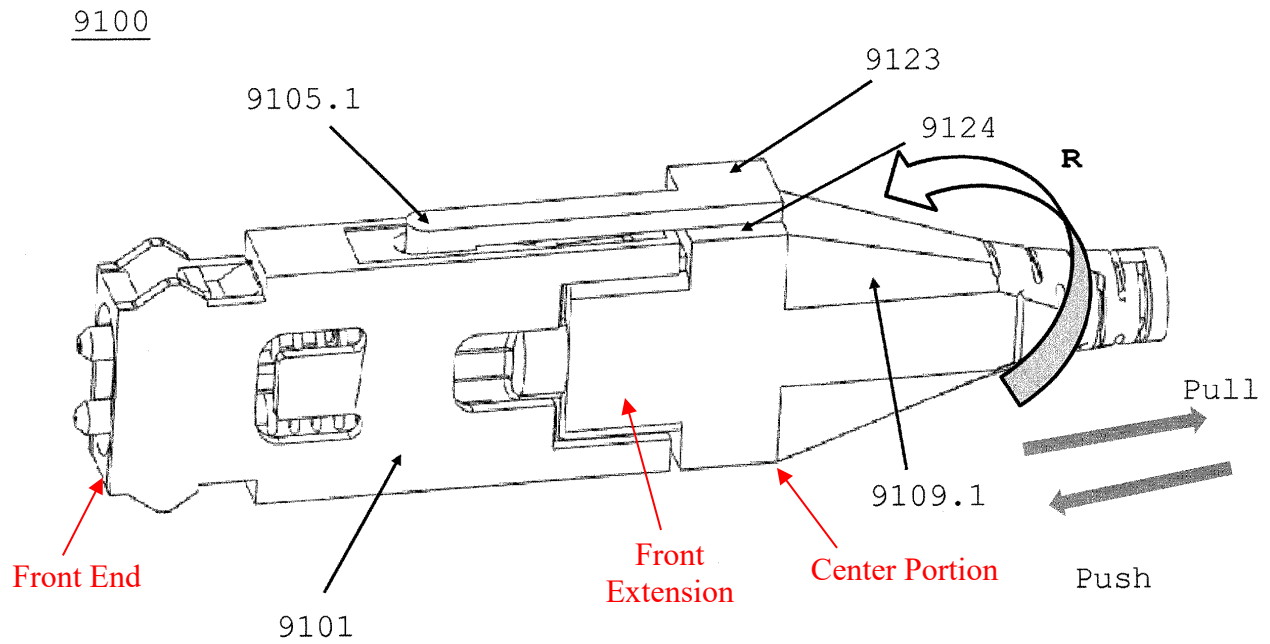


FIG. 16

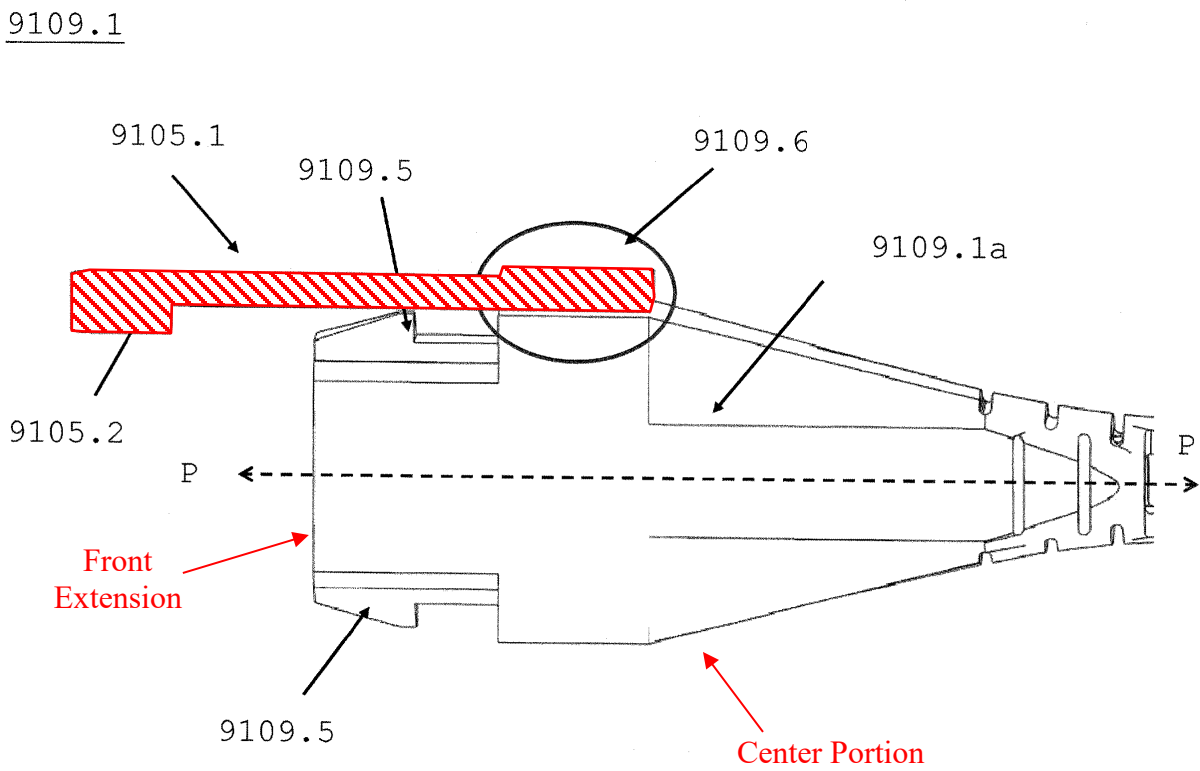


FIG. 17

EX1003: Figs. 1, 2, 16 and 17 (annotated).

As explained in Section VIII(A), the Takano combination would result in the outer housing (2101, 3701) of Figs. 1-4 including the slots (9201.4a, 9201.4b) for the boot hooks (9109.5, 9209.5); EX1002: ¶318. The attachment of the boot hooks (9109.5, 9209.5) to the outer housing (2101, 3701) would be forward of a center portion of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1), just like in the embodiment shown in Figs. 16-36 as explained in Section VII(A)(1.c.2). EX1003: Figs. 1-4, 16 and 34-36; EX1002: ¶318.

Therefore, Takano renders 1.c.2 obvious. EX1002: ¶319.

9. 1.c.3

Together, the back body (2106) and the back post (2107) define a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (2103). EX1003: ¶[0050]; EX1002: ¶320.

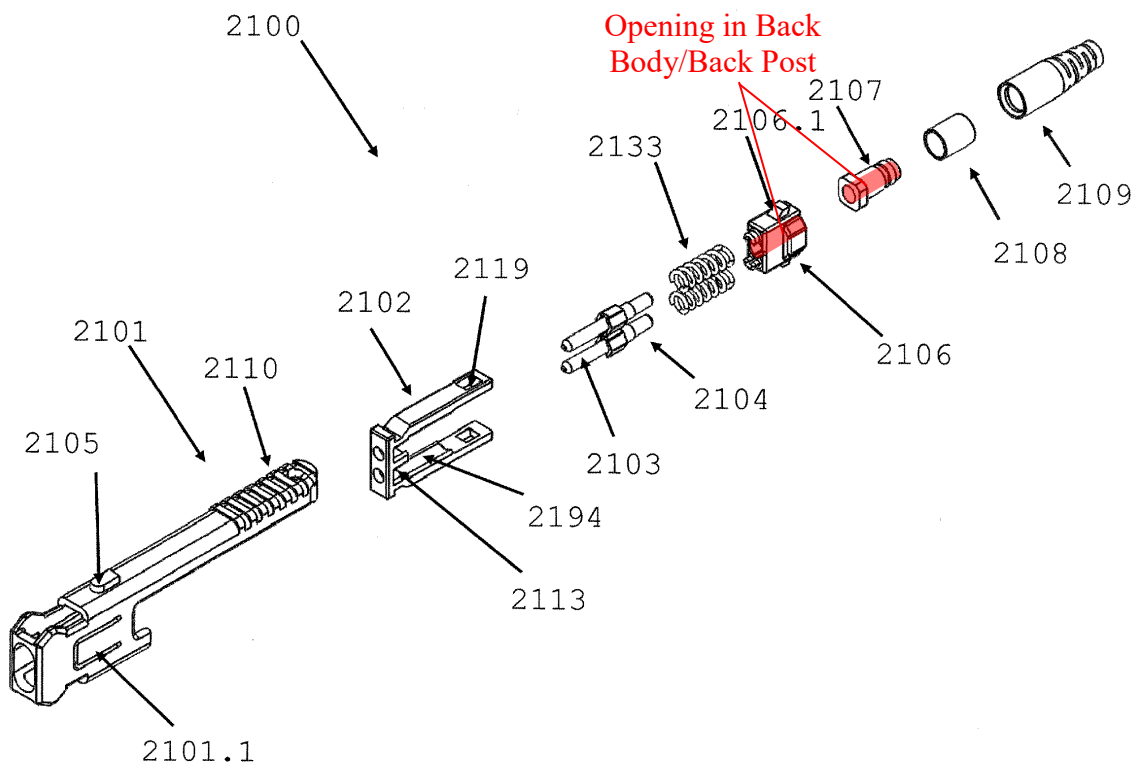


FIG. 1.

EX1003: Fig. 1 (annotated).

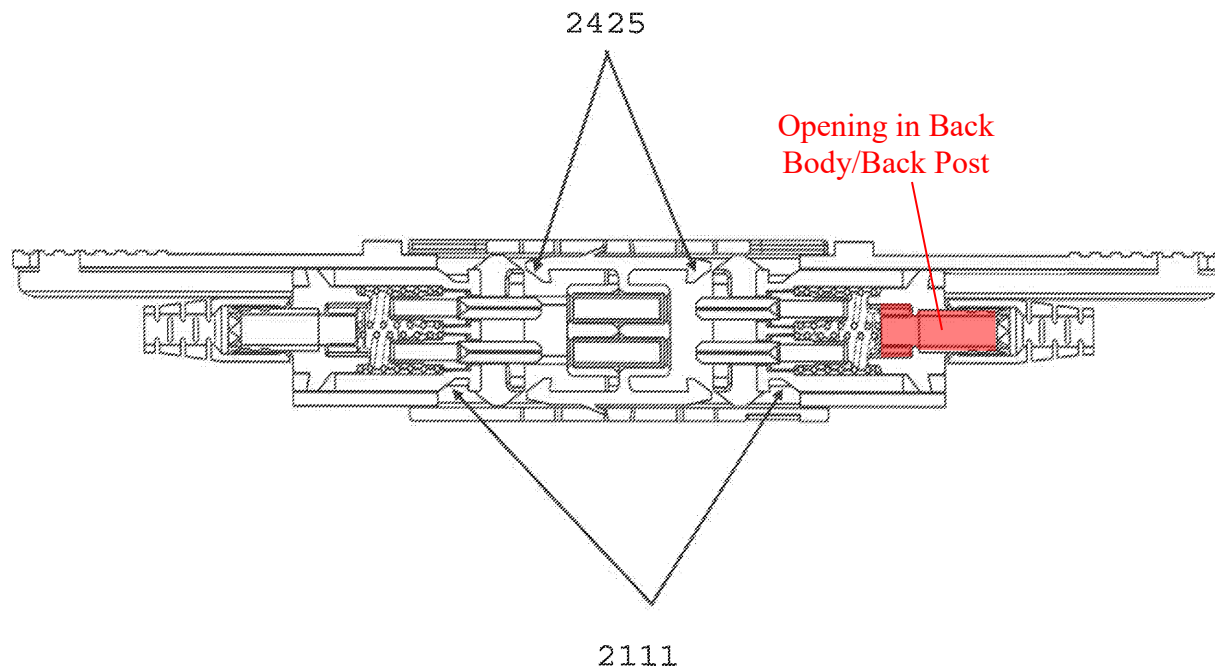
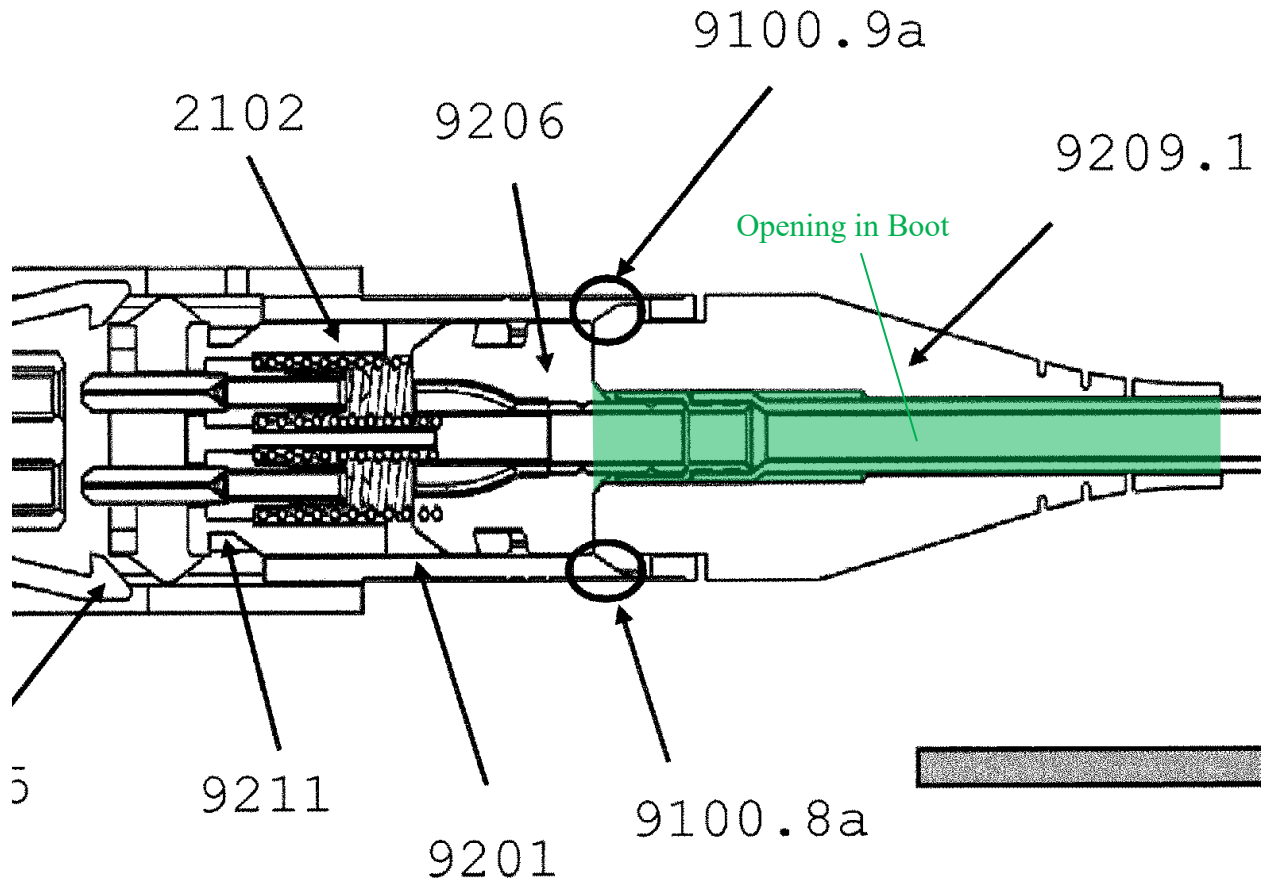


FIG. 23B

EX1003: Fig. 23B (annotated).

As explained in Section VI(A)(1.c.3), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) also has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶321. In the Takano combination, the longitudinal openings of the back body/back post (2106/2107) and the push-pull boot would be axially aligned and contiguous. EX1003: Fig. 36; EX1002: ¶321. This is the same arrangement in each embodiment of micro connectors (2100, 3700, 9100) of Figs. 1-4 and 16-36; EX1002: ¶321.



EX1003: Fig. 36 (annotated).

As explained in Section VI(A)(1.c.3), the forward ends of the optical fibers terminated by each ferrule (2103) are flush with the forward end of the respective ferrule. EX1002: ¶322. Because the ferrules extend forward through the front end opening of the outer housing (2101, 3701), the front ends of the optical fibers also terminate forward of the front end opening of the outer housing. EX1003: Figs. 1-4; EX1002: ¶322.

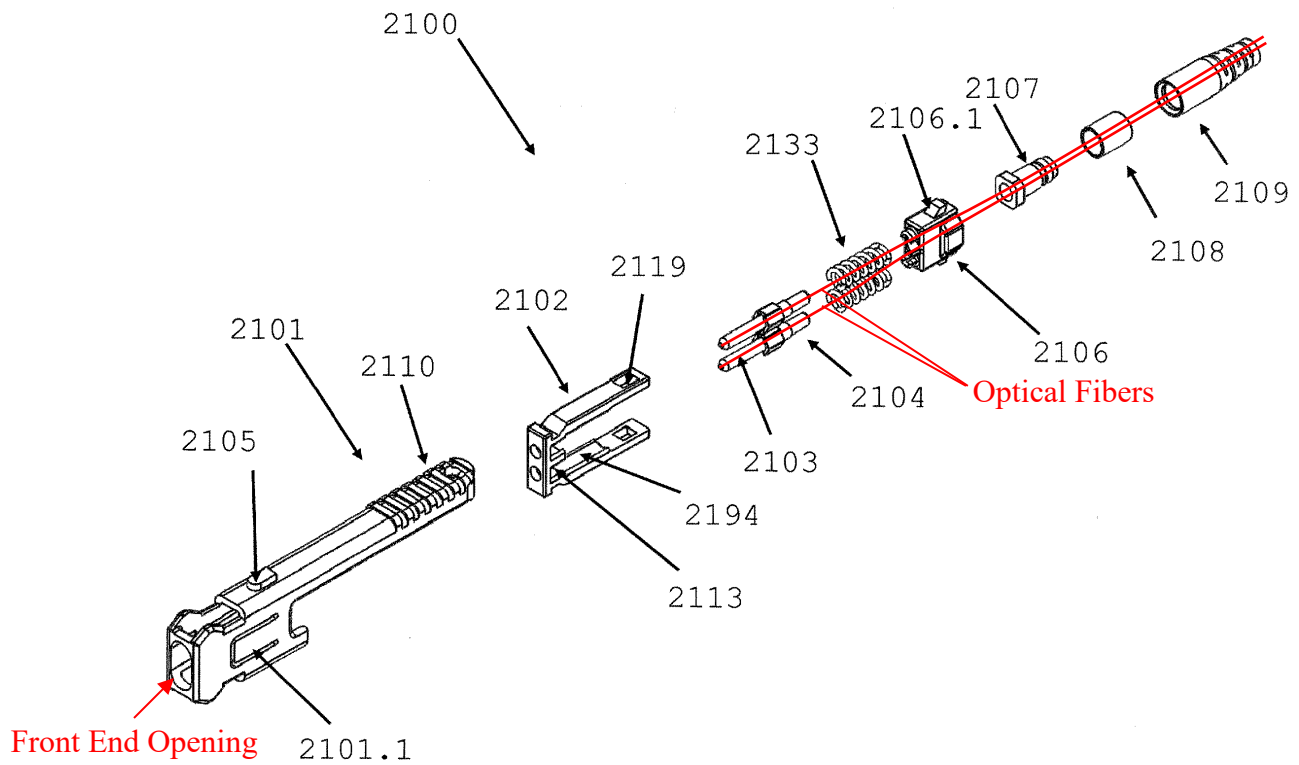


FIG. 1.

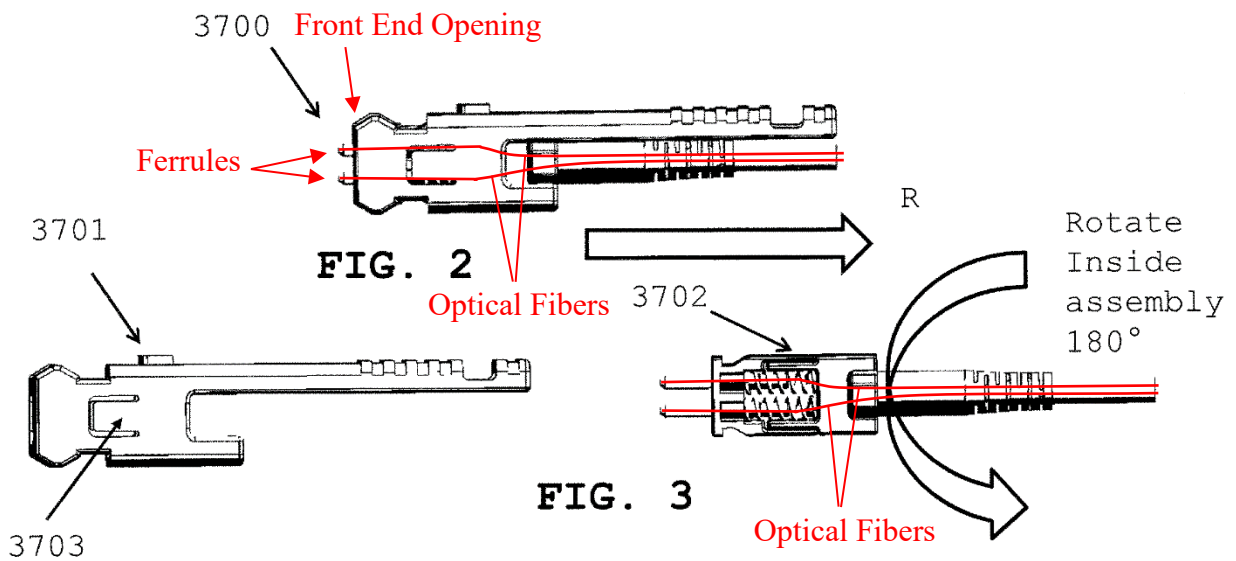


FIG. 3

EX1003: Figs. 1-3 (annotated).

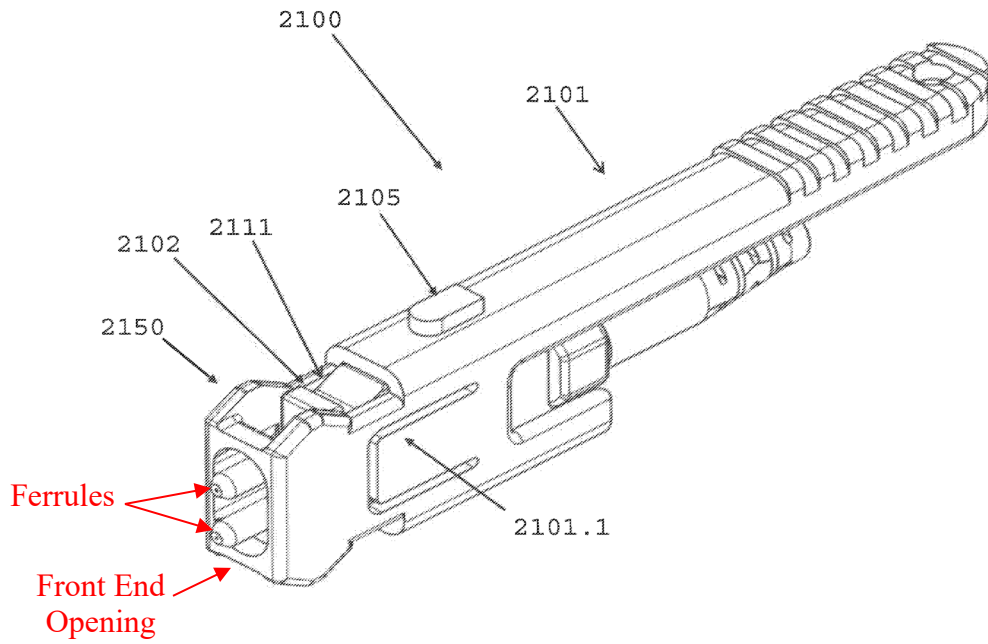


FIG. 21B

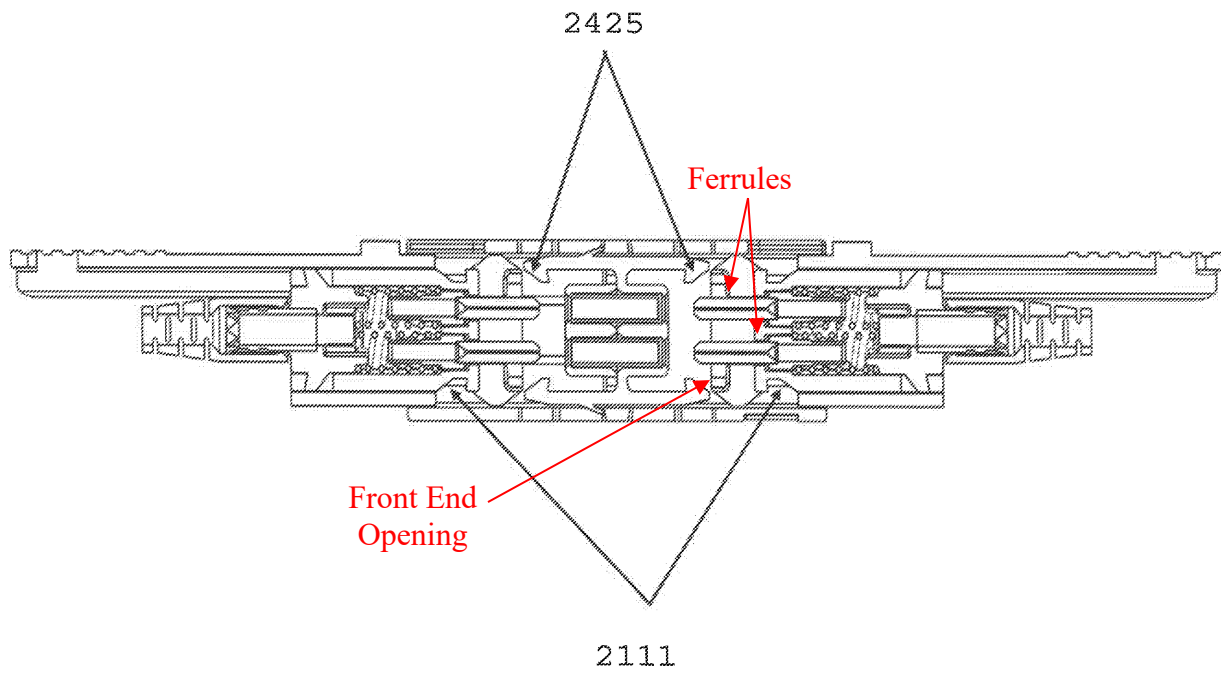


FIG. 23B

EX1004: Figs. 21B and 23B (annotated).

Therefore, Takano renders 1.c.3 obvious. EX1002: ¶323.

10. 1.d

For reasons discussed in Section VI(A)(1.d), Takano renders 1.d obvious.

EX1002: ¶324.

C. Claim 2

For reasons discussed in Section VI(B), Takano renders this claim obvious.

EX1002: ¶325.

D. Claim 3

As explained in Sections VIII(B)(1.P),(1.a.3)&(1.c.3), the two ferrules (2103) of the micro connector (2100, 3700) each terminate an optical fiber.

EX1002: ¶326. And each ferrule is a single-fiber ferrule, as each ferrule has a single opening at the front end thereof. EX1002: ¶326.

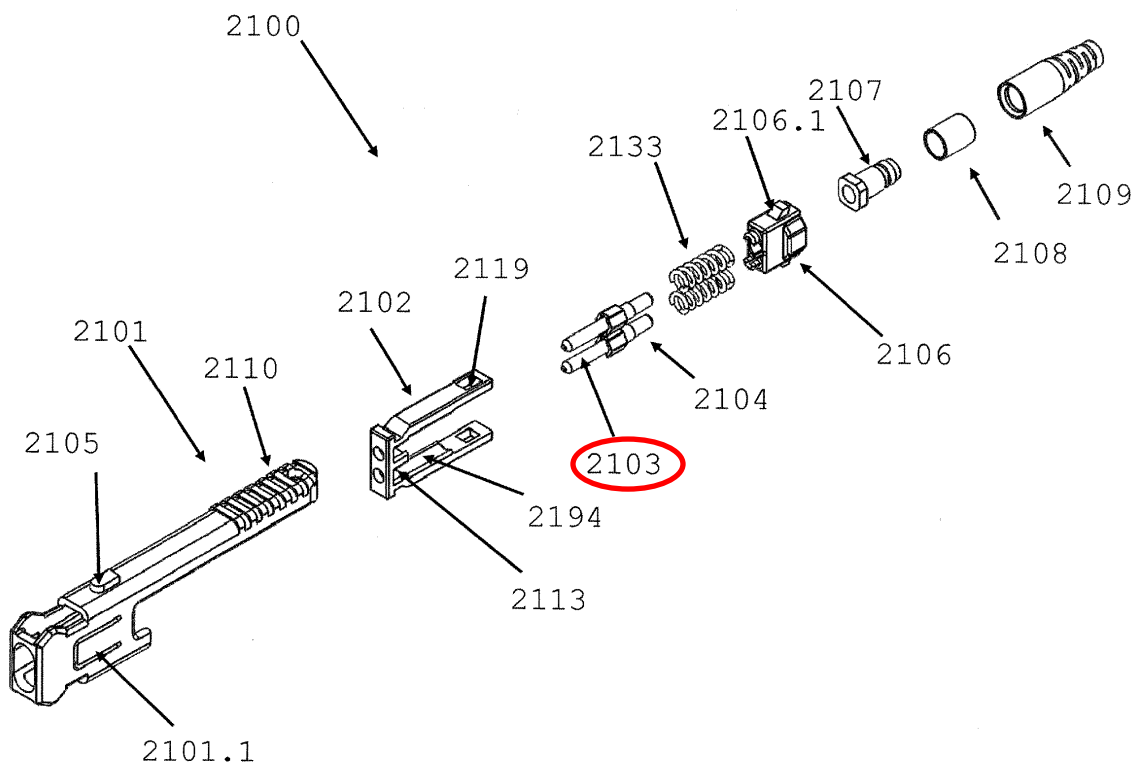


FIG. 1.

EX1003: Fig. 1 (annotated).

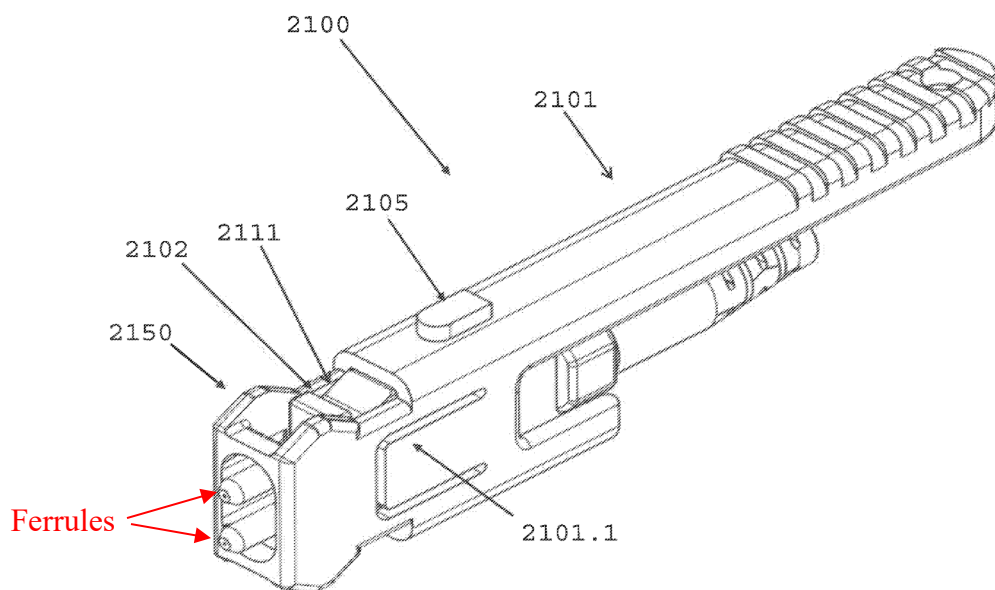


FIG. 21B

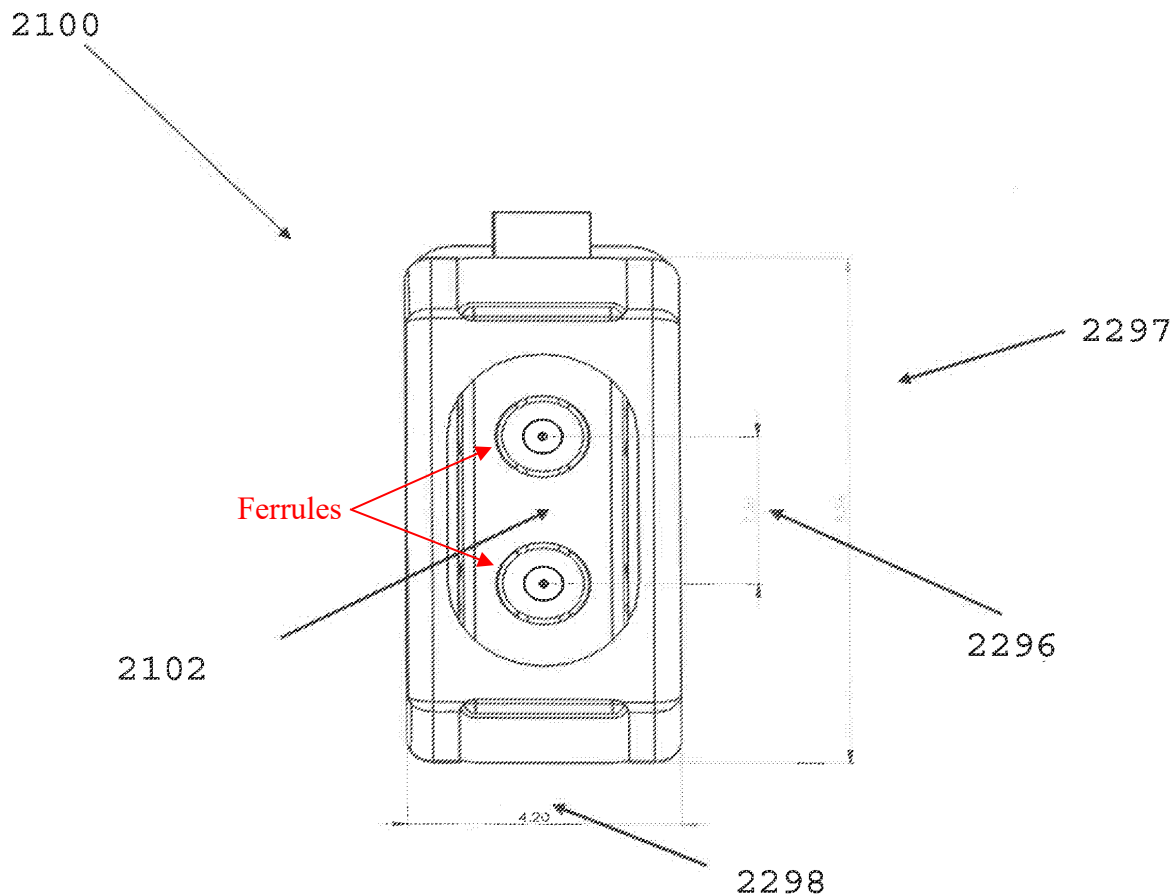


FIG. 22

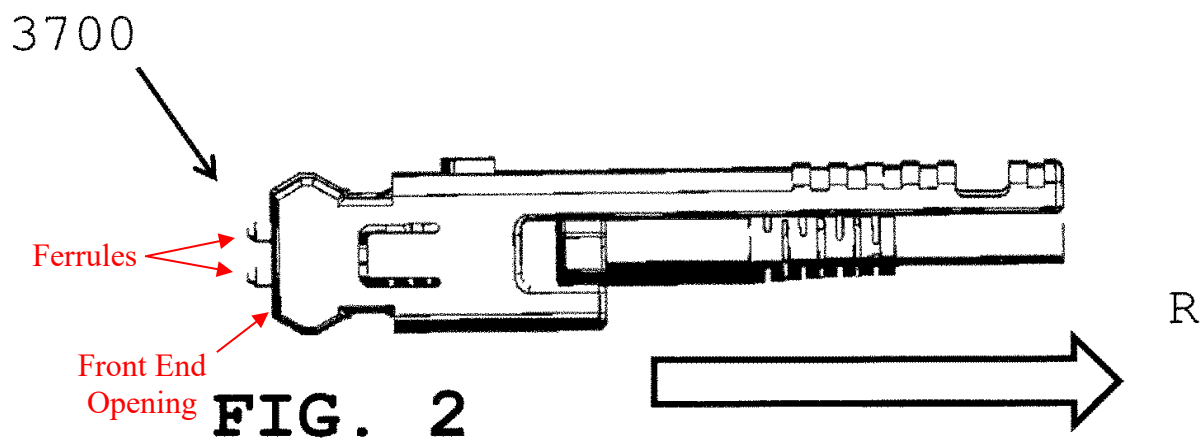
EX1004: Figs. 21B and 22 (annotated).

Therefore, Takano renders this claim obvious. EX1002: ¶327.

E. Claim 4

The ferrules (2103) extend forward through the front end opening of the outer housing (2101, 3701). EX1003: Figs. 2-4; EX1002: ¶328. Thereby, the front ends of the ferrules are forward of the front end opening of the outer housing.

EX1003: Figs. 2-4; EX1004: Figs. 21B and 23B; EX1002: ¶328.



EX1003: Fig. 2 (annotated).

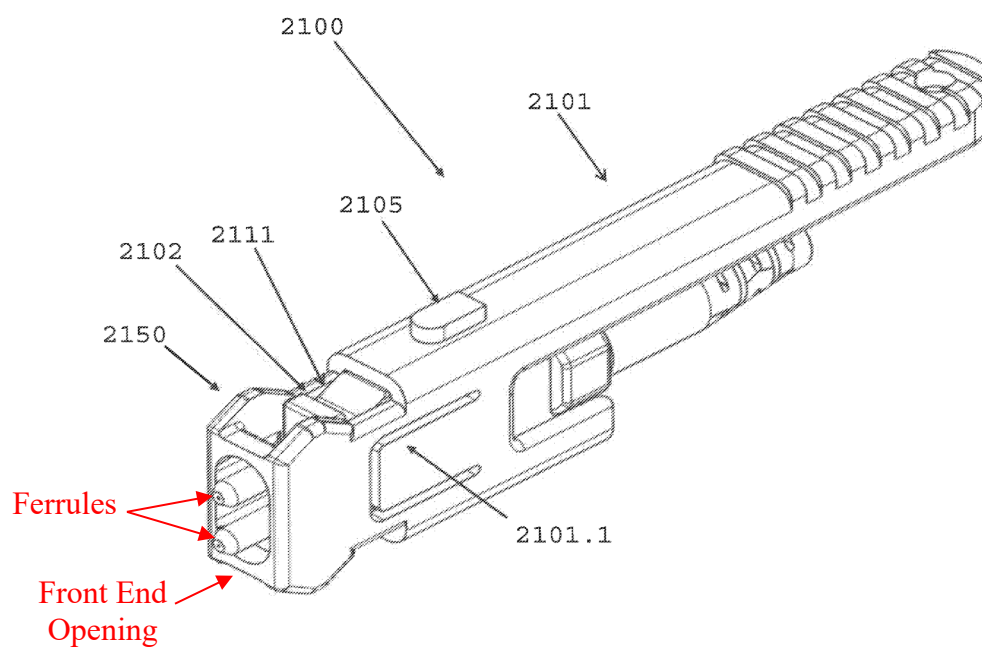


FIG. 21B

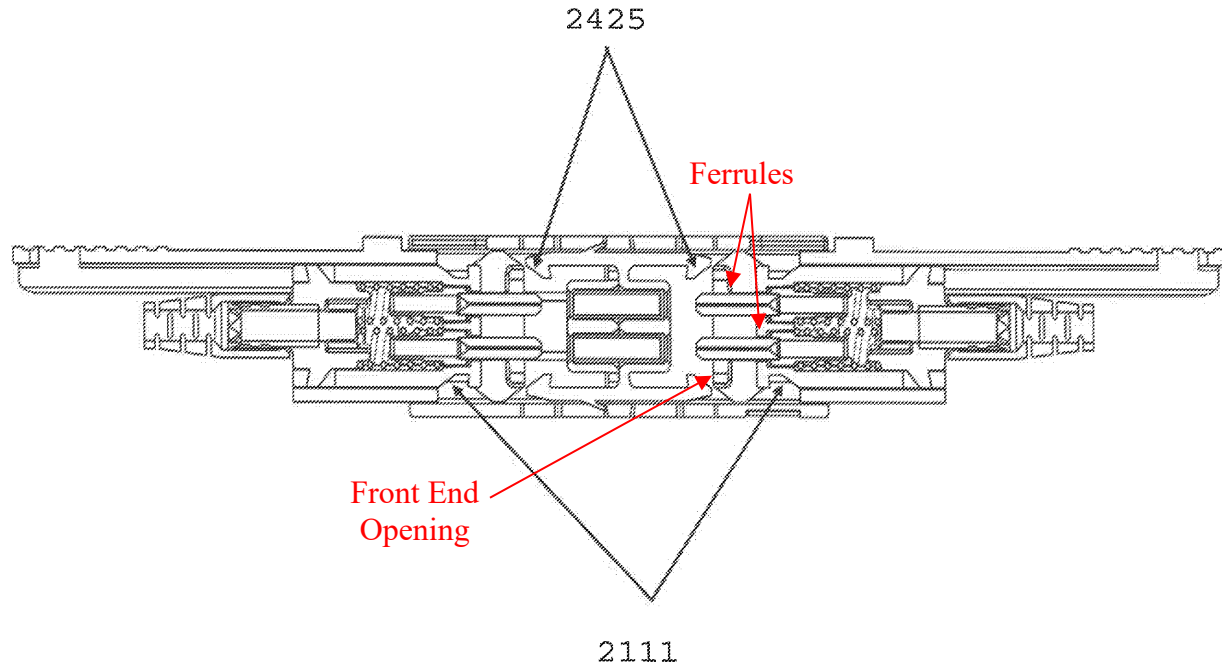


FIG. 23B

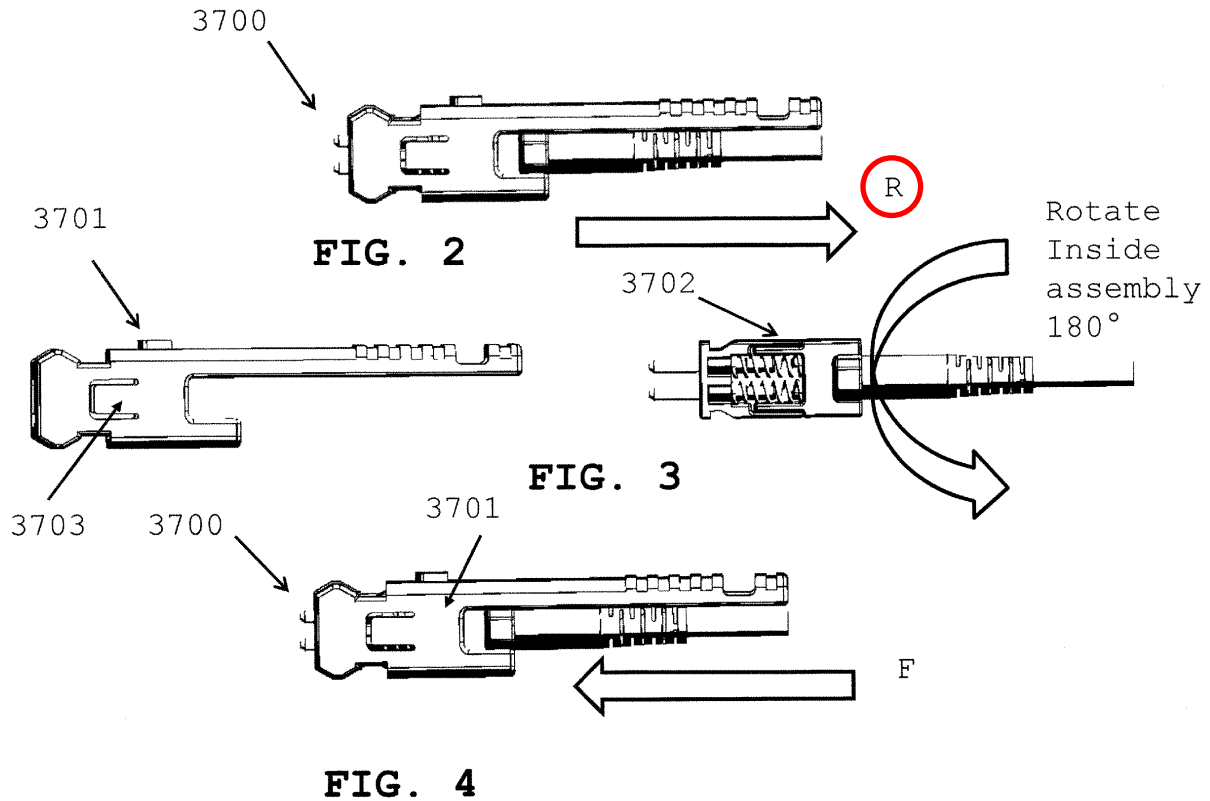
EX1004: Figs. 21B and 23B (annotated).

Therefore, Takano renders this claim obvious. EX1002: ¶329.

F. Claim 5

1. 5.a

In order to change the polarity of unmodified micro connector (2100, 3700) of Figs. 1-4, the front body/back body/boot assembly is disconnected from the outer housing (2101, 3701) and moved longitudinally rearward relative to the outer housing as shown in Figs. 2 and 3 (to flip over the front body/back body/boot assembly). EX1003: ¶[0051]; EX1002: ¶330. This concept remains in the Takano combination. EX1002: ¶330.



EX1003: Figs. 2-4 (annotated).

The Takano combination results in the micro connector (2100, 3700) of Figs. 1-4 having the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36. Section VIII(A); EX1002: ¶331. To disconnect the front body/back body/boot assembly of the Takano combination from the outer housing (2101, 3701) to change polarity, the push-pull boot is rotated to the release position to disconnect the boot from the outer housing, in the same manner as explained in Section VI(E); EX1002: ¶331. With the push-pull boot in the release position, the boot is free to move rearward relative to the outer housing, for the reasons explained in Section VI(E); EX1002: ¶331. Thus, with the push-pull boot in the release position, a

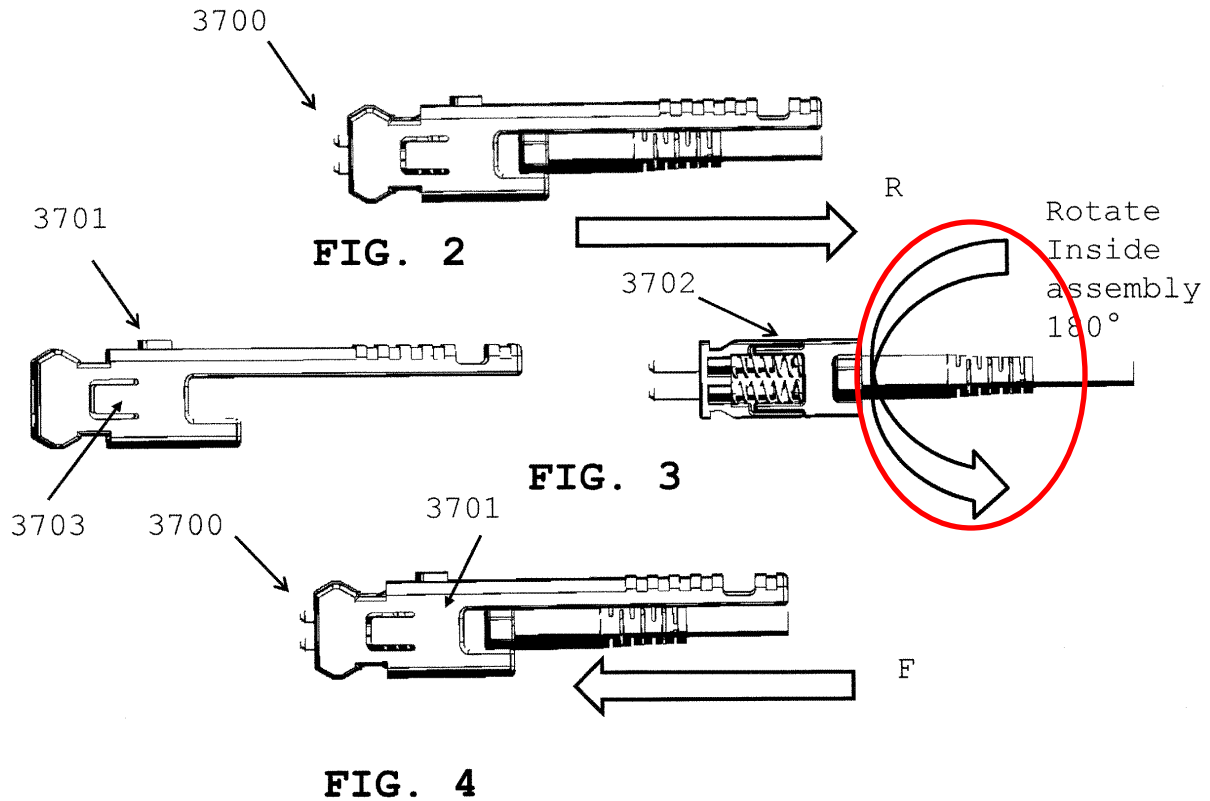
rearward pull force (R) will move the front body/back body/boot assembly of the Takano combination longitudinally rearward relative to the outer housing as shown in Fig. 2 (above). EX1003: ¶[0051]; EX1002: ¶331.

Alternatively or in addition, the Takano combination would also have the gap (*see* Section VI(E)(5.a)) between the front of the boot hooks (9109.5, 9209.5) and the back body (2106) that allows the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) to move longitudinally forward and backward (e.g., wiggle a millimeter or two) relative to outer housing (2101, 3701) of Figs. 1-4 upon application of push and pull forces, respectively. EX1002: ¶332.

Therefore, Takano renders 5.a obvious. EX1002: ¶333.

2. 5.b

In order to change the polarity of unmodified micro connector (2100, 3700) of Figs. 1-4, after the front body/back body/boot assembly is disconnected from the outer housing (2101, 3701), the front body/back body/boot assembly is flipped over relative to the outer housing as shown in Fig. 3 before being reattached to the outer housing. EX1003: ¶[0051]; EX1002: ¶334. This concept remains unchanged in the Takano combination. EX1002: ¶334.



EX1003: Figs. 2-4 (annotated).

After the front body/back body/boot assembly of the Takano combination is separated from the outer housing (2101, 3701)—Section VIII(F)(5.a)—, the front body/back body/boot assembly of the Takano combination is rotated or flipped over relative to the outer housing—as shown in Fig. 3 (above)—to change the polarity. EX1003: ¶[0051]; EX1002: ¶335. Thus, the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of the Takano combination is rotatable relative to the outer housing after application of the rearward pull force (R). EX1002: ¶335.

Therefore, Takano renders 5.b obvious. EX1002: ¶336.

G. Claim 6

For reasons discussed in Section VII(F), Takano renders this claim obvious.

EX1002: ¶337.

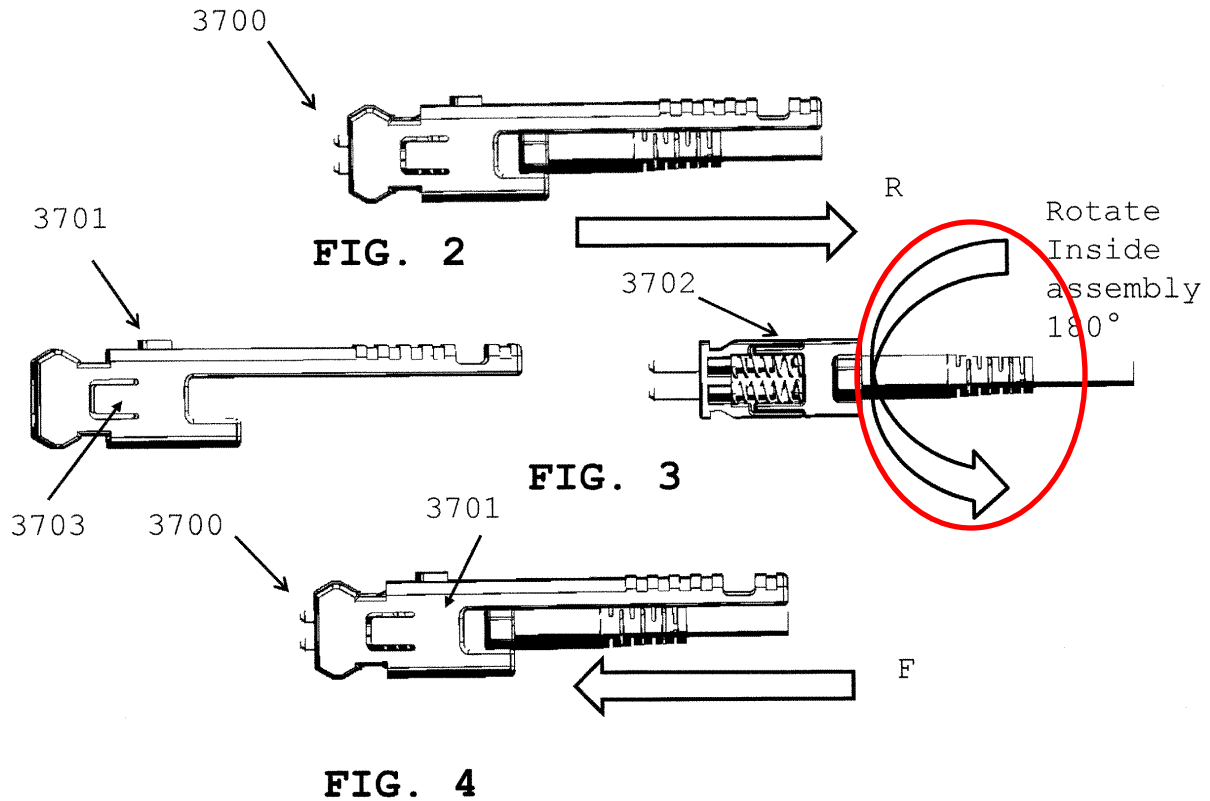
H. Claim 7

For reasons discussed in Section VII(G), Takano renders this claim obvious.

EX1002: ¶338.

I. Claim 9

As shown in Figs. 2-4, the unmodified micro connector (2100, 3700) of Figs. 1-4 has a first polarity when the front body/back body/boot assembly is connected to the outer housing (2101, 3701) in one orientation (Fig. 2), and a second polarity when the front body/back body/boot assembly is connected to the outer housing in another orientation (Fig. 4). EX1003: ¶[0051]; EX1002: ¶339. This concept remains unchanged in the Takano combination. EX1002: ¶339.



EX1003: Figs. 2-4 (annotated).

For reasons discussed in Section VI(H), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of the Takano combination connects to the outer housing (2101, 3701), via the boot hooks (9109.5, 9209.5), in the two different orientations.

EX1002: ¶340. In the Takano combination, to change the polarity the push-pull boot, the front body (2102, 3702), the back body (2106), and the back post (2107) are disconnected from and then rotated relative to the outer housing to move the key (2105) relative to the ferrules (2103). EX1003: Figs. 1-4, ¶[0051]; EX1002: ¶340. After this rotation, the push-pull boot, the front body, the back body, and the

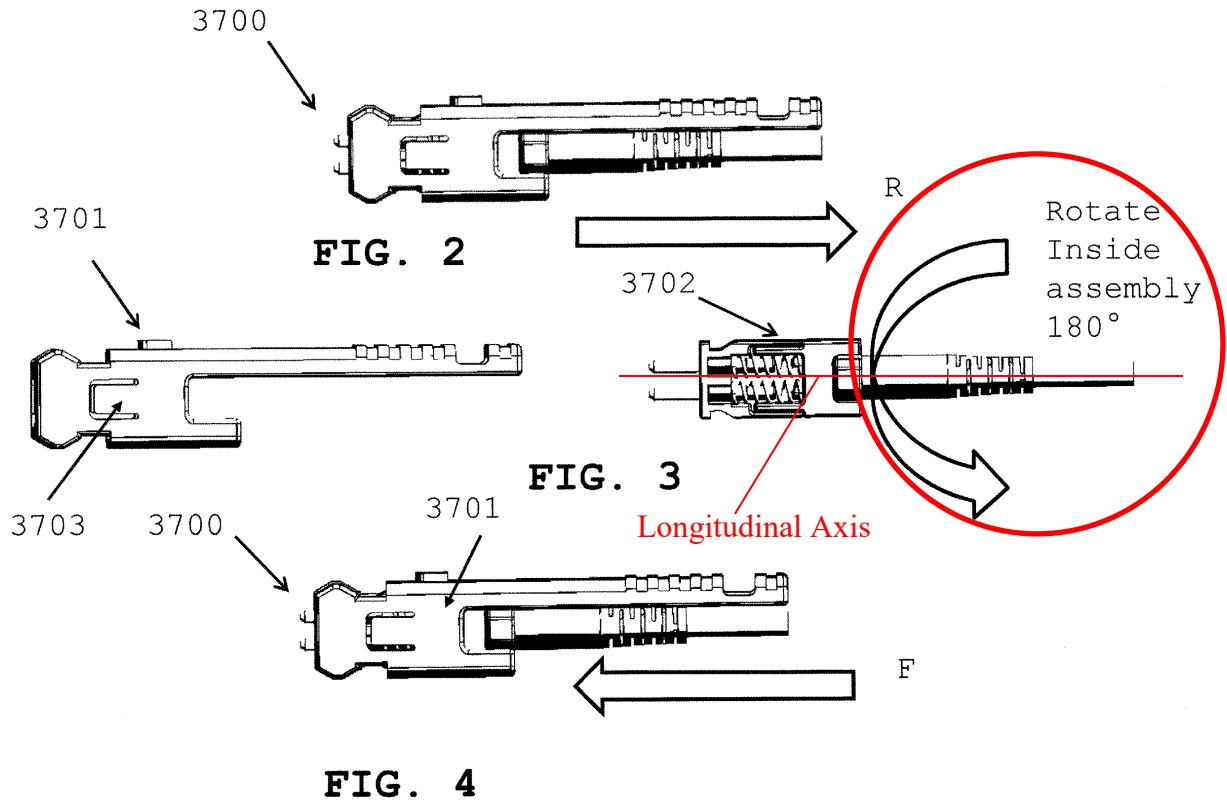
back post are then reconnected to the outer housing (while maintaining the flipped over orientation). EX1003: Figs. 2-4, ¶[0051]; EX1002: ¶340.

Thus, when the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1)—i.e., the front body/back body/boot assembly of the Takano combination—is connected to the outer housing (2101, 3701) in one orientation (Fig. 2), the micro connector (2100, 3700) is in a first polarity. EX1003: Figs. 2-4, ¶[0051]; EX1002: ¶341. Similarly, when the boot—i.e., the front body/back body/boot assembly of the Takano combination—is connected to the outer housing in the other (i.e., flipped over) orientation (Fig. 4), the micro connector is in a second polarity. EX1003: Figs. 2-4, ¶[0051]; EX1002: ¶341.

Therefore, Takano renders this claim obvious. EX1002: ¶342.

J. Claim 10

For reasons discussed in Section VIII(I), Takano renders this claim obvious. EX1002: ¶¶343-344. The push-pull boot (9109.1, 9209.1, 9309.1, 9409.1)—i.e., the front body/back body/boot assembly of the Takano combination—is flipped over 180-degrees about a longitudinal axis between the two orientations. EX1003: ¶¶[0051] (“*180 degrees*”), [0052] (“*180 degrees*”); EX1002: ¶343.



EX1003: Figs. 2-4 (annotated).

K. Claim 11

For reasons discussed in Section VI(J), Takano renders this claim obvious.

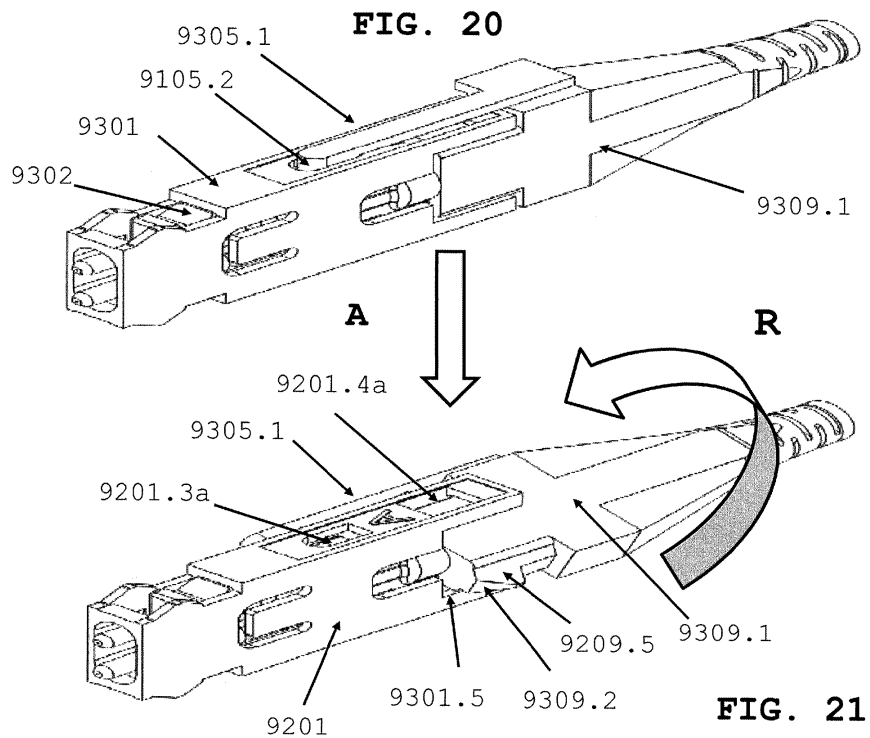
EX1002: ¶345.

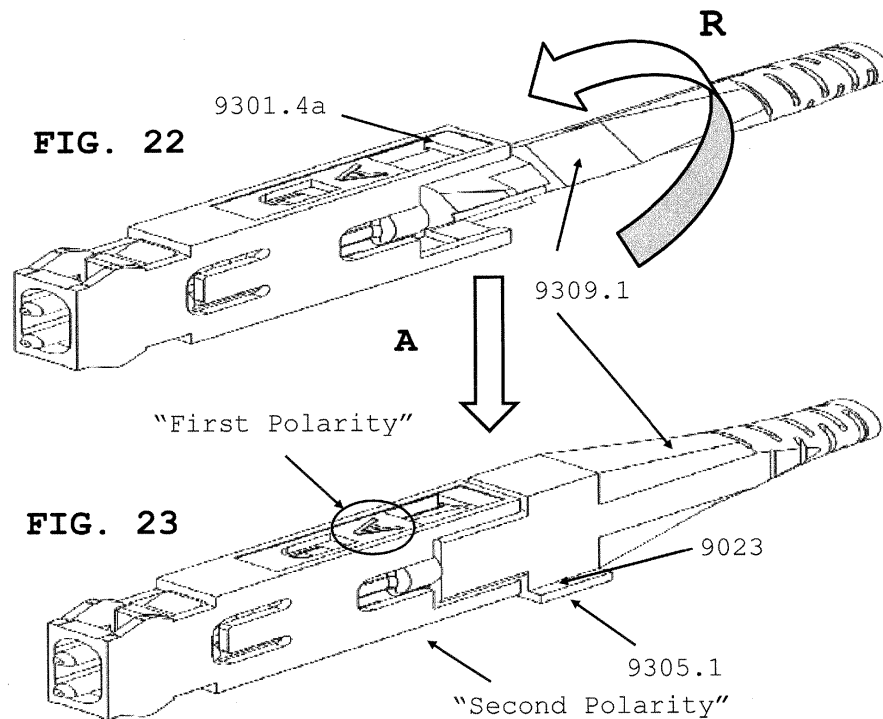
L. Claim 12

As explained in Section VIII(F)(5.a), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable relative to the outer housing (2101, 3701) to disconnect the boot from the outer housing in order to change the polarity.

EX1003: ¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶346. This rotation of the push-pull boot is slidable movement relative to the outer housing. EX1003:

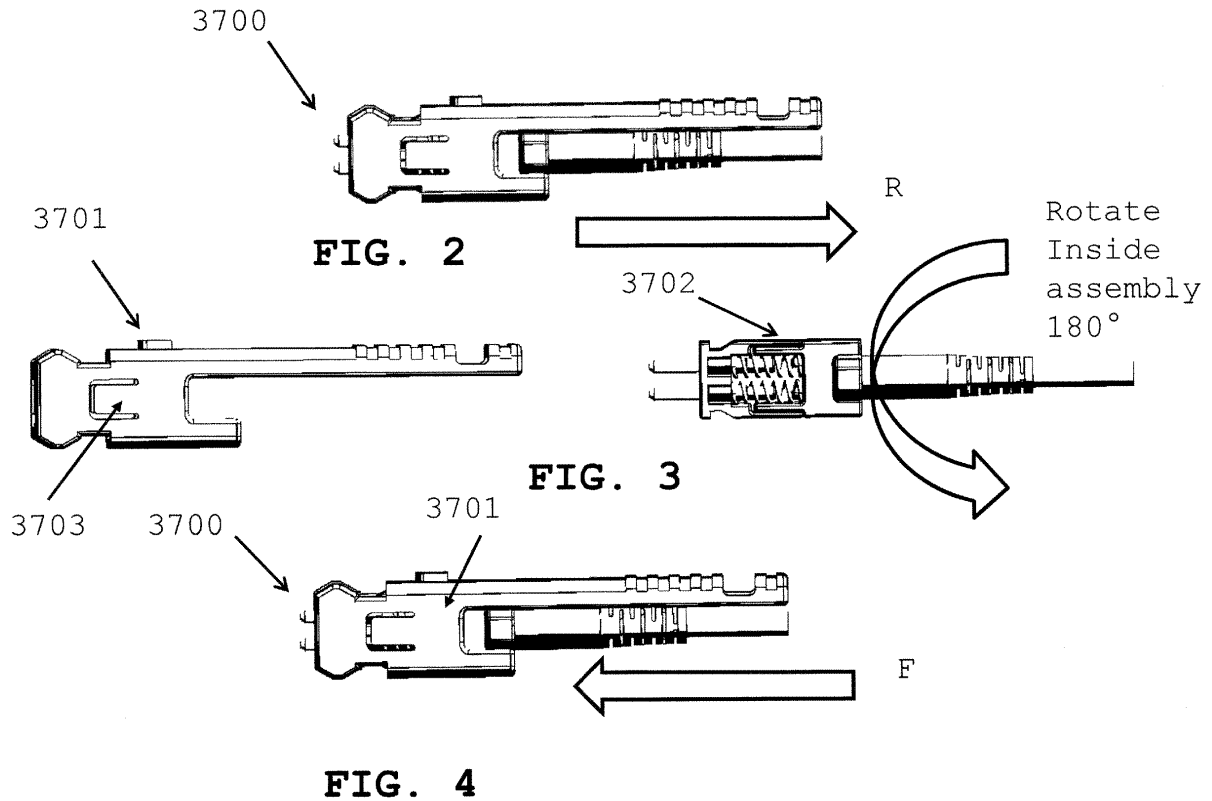
¶¶[0063]-[0065], [0067]-[0071]; EX1002: ¶346. For example, the chamfer (9309.2, 9409.2a, 9409.2b) allows the boot hooks (9109.5, 9209.5) to slide out of the slots (9201.4a, 9201.4b) of the outer housing when the push-pull boot is being rotated. EX1003: Figs. 28-33, ¶¶[0063], [0067]-[0068], [0070]-[0071]; EX1002: ¶346.





EX1003: Figs. 20-23.

Alternatively or in addition, the boot (9109.1, 9209.1, 9309.1, 9409.1) is slidable relative to the outer housing (2101, 3701) when the boot—i.e., the front body/back body/boot assembly of the Takano combination—is being disconnected and reconnected to the outer housing when changing polarity, as discussed in Sections VIII(F)(5.a)&(I). EX1002: ¶347.



EX1003: Figs. 2-4.

Therefore, Takano renders this claim obvious. EX1002: ¶348.

M. Claim 13

For reasons discussed in Section VII(L), Takano renders this claim obvious.

EX1002: ¶349.

N. Independent Claim 16

1. 16.P

For reasons discussed in Section VIII(B)(1.P), Takano renders 16.P obvious.

EX1002: ¶350.

2. 16.a.1

Takano's outer housing (2101, 3701) has a front end opening for the two ferrules (2103). EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 21B; EX1002: ¶351.

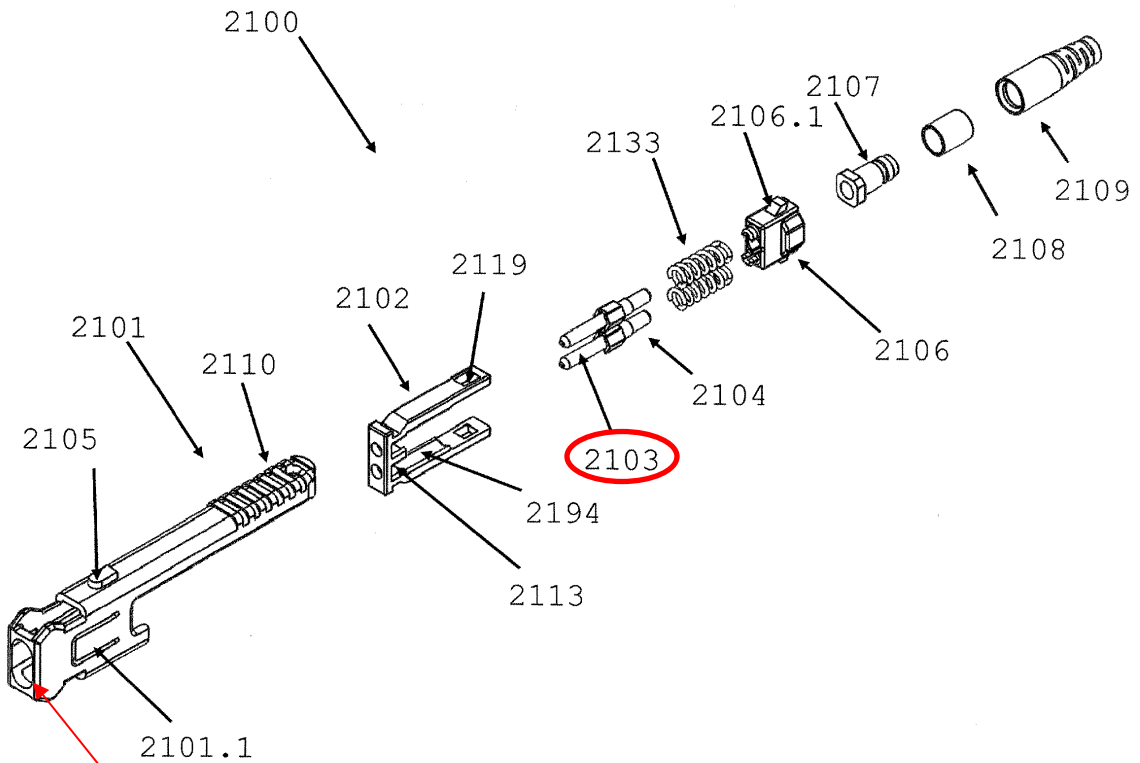
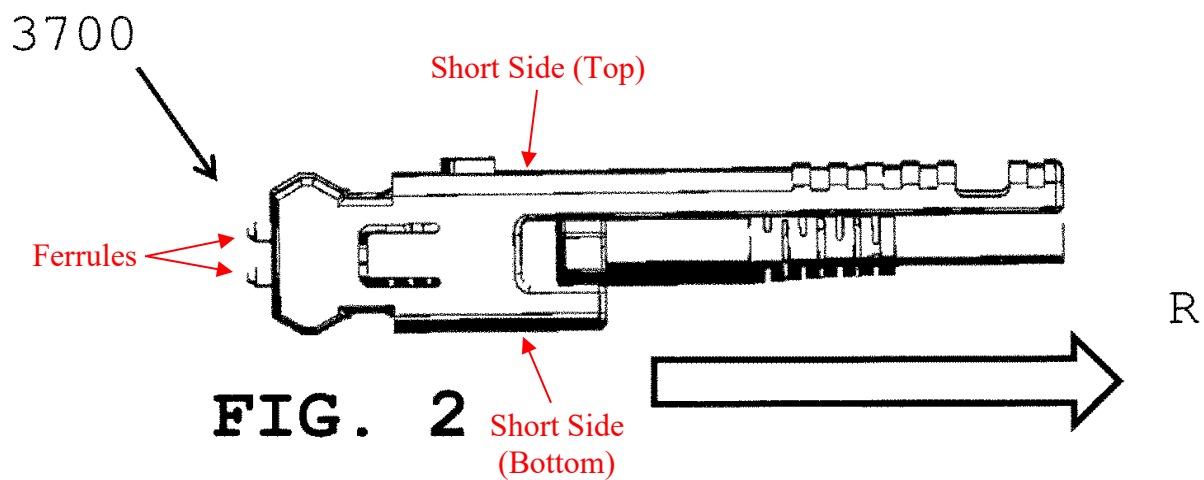


FIG. 1. Front End Opening

EX1001: Fig. 1.



EX1003: Fig. 2 (annotated).

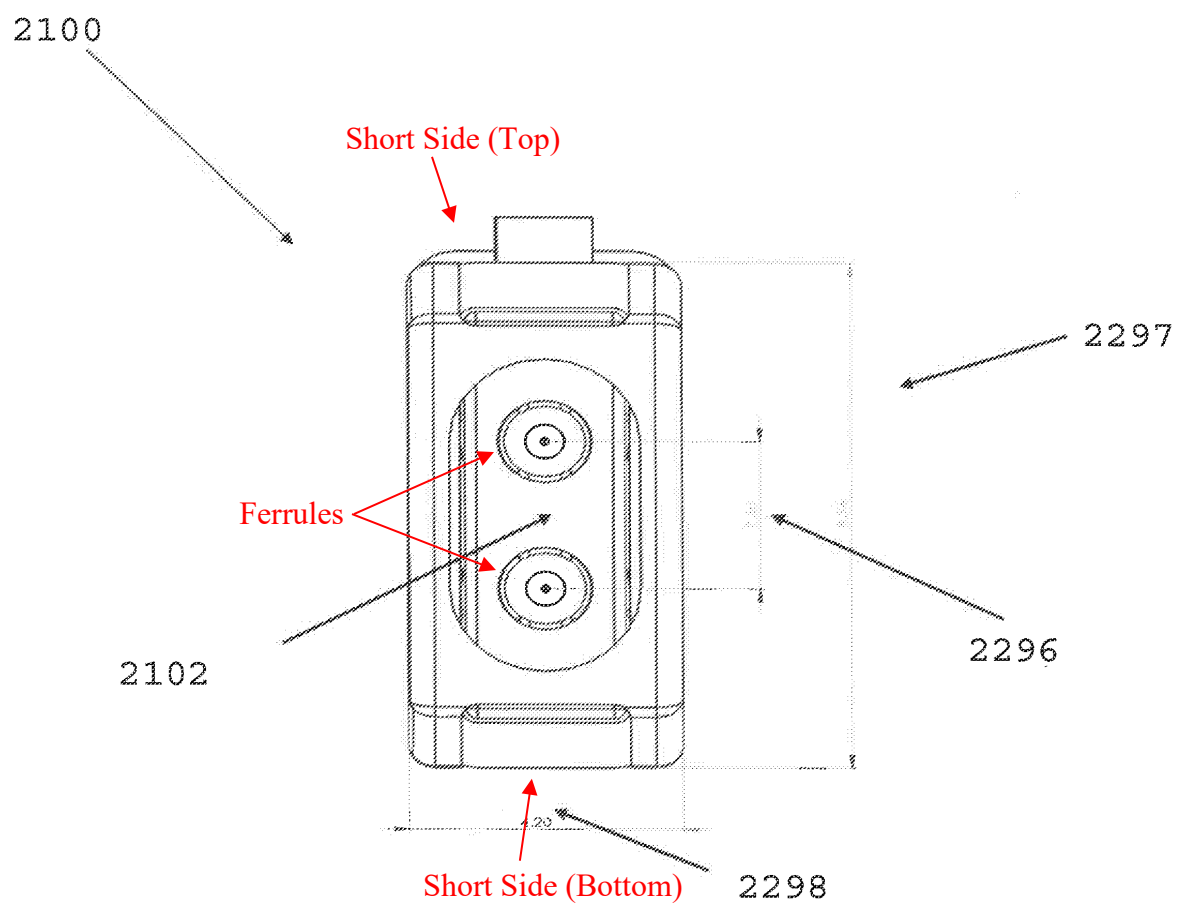


FIG. 22

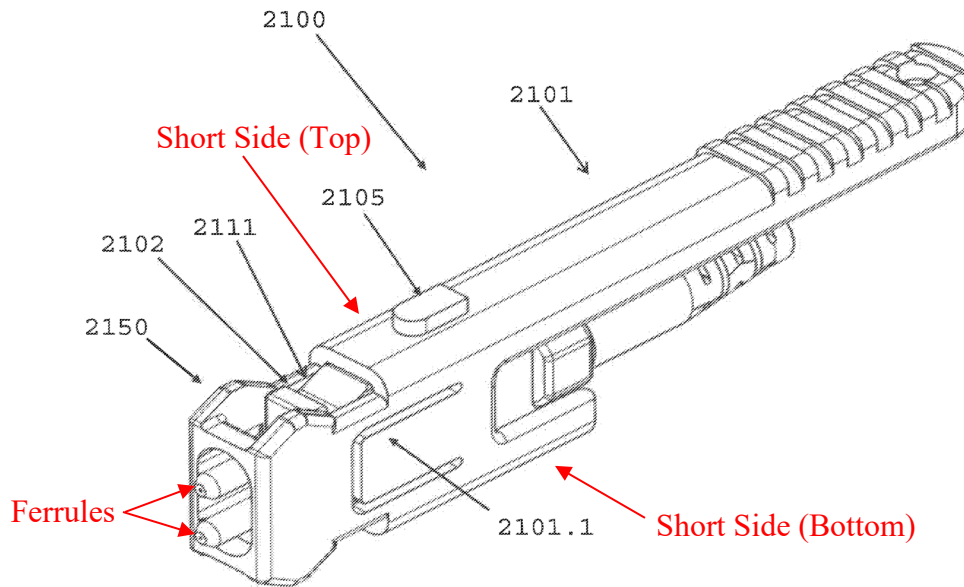


FIG. 21B

EX1004: Figs. 21B and 22 (annotated).

As shown in Fig. 22 of the '539 Provisional, each ferrule (2103) is spaced equidistant from the long sides of the outer housing (2101, 3701). EX1002: ¶356.

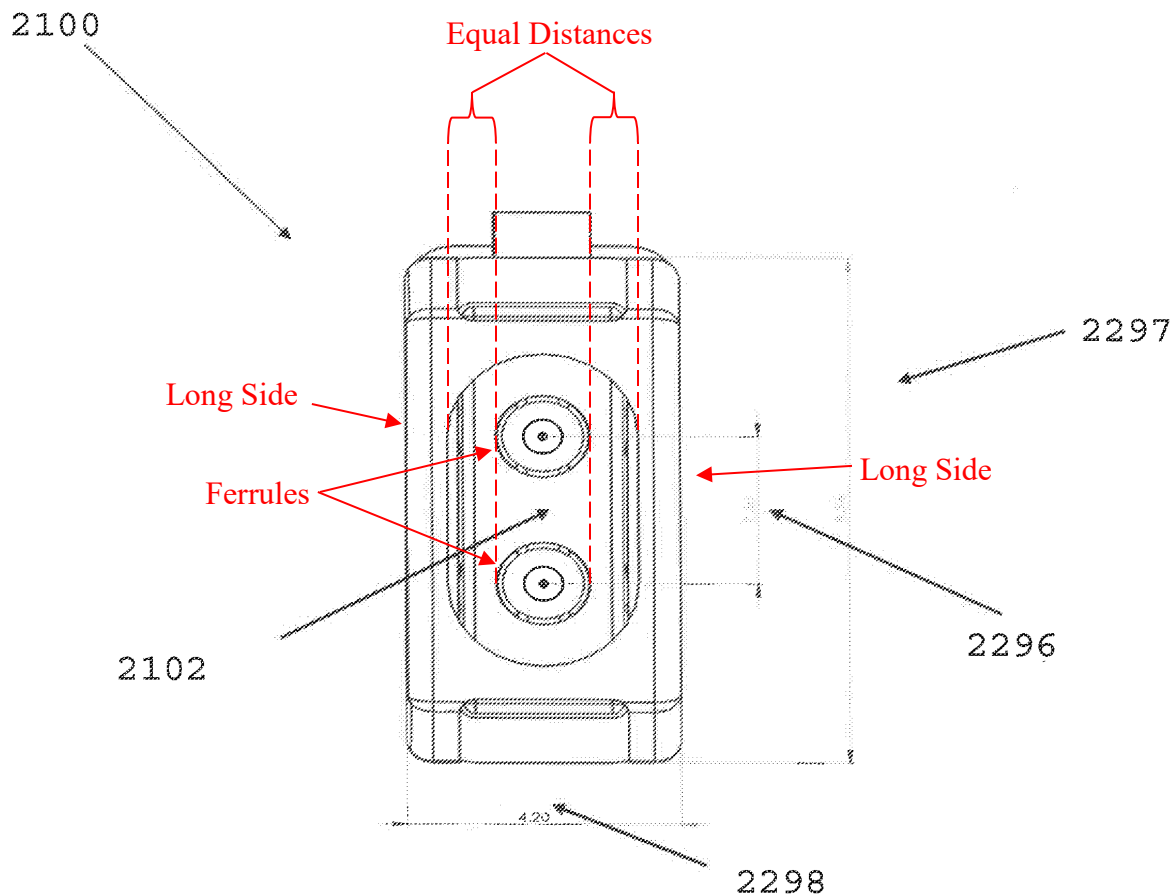


FIG. 22

EX1004: Fig. 22 (annotated).

Moreover, the ferrules (2103) being spaced equidistant from the long sides of the outer housing (2101, 3701) would be an inherent property of the micro connector (2100, 3700) for the same reasons explained in Section VI(M)(16.a.4).

EX1002: ¶357.

Therefore, Takano renders 16.a.4 obvious. EX1002: ¶358.

6. 16.b

For reasons discussed in Section VIII(B)(1.b), Takano renders 16.b obvious.

EX1002: ¶¶359-360. Further, as explained in Section VIII(B)(1.c.3), the back body (2106) and the back post (2107) (which forms the rear portion) has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (2103). EX1003: ¶[0050]; EX1004: Fig. 23B; EX1002: ¶359.

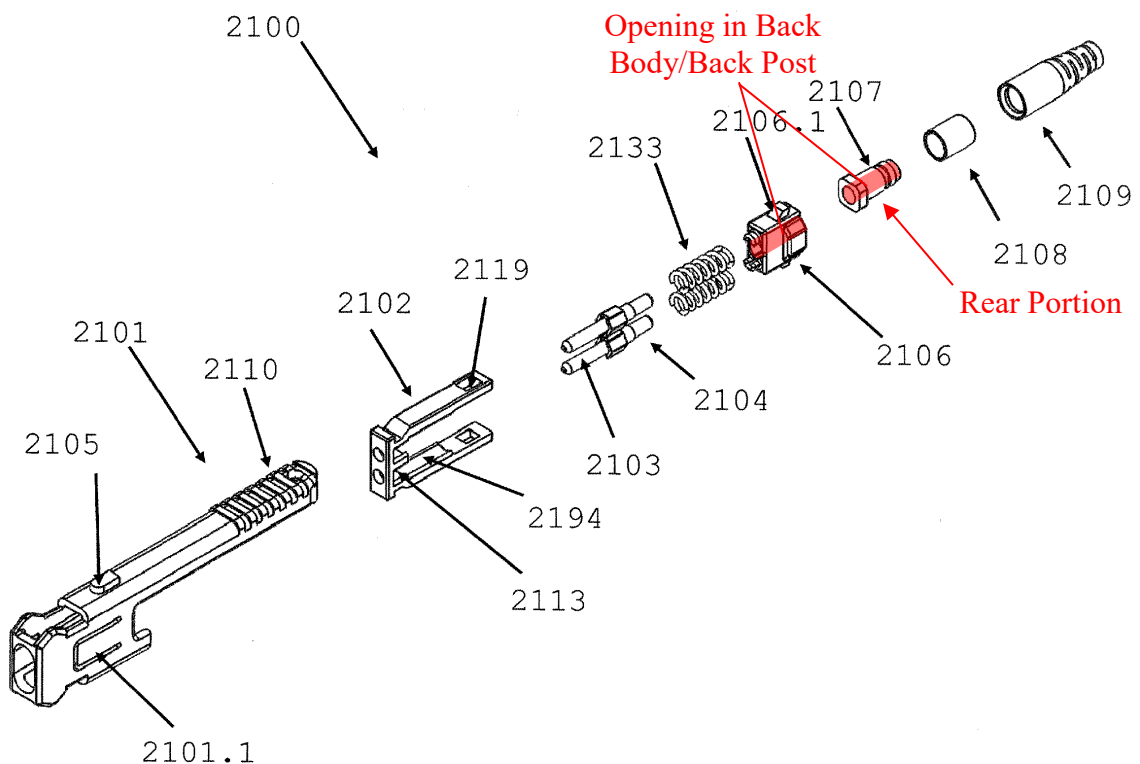


FIG. 1.

EX1003: Fig. 1 (annotated).

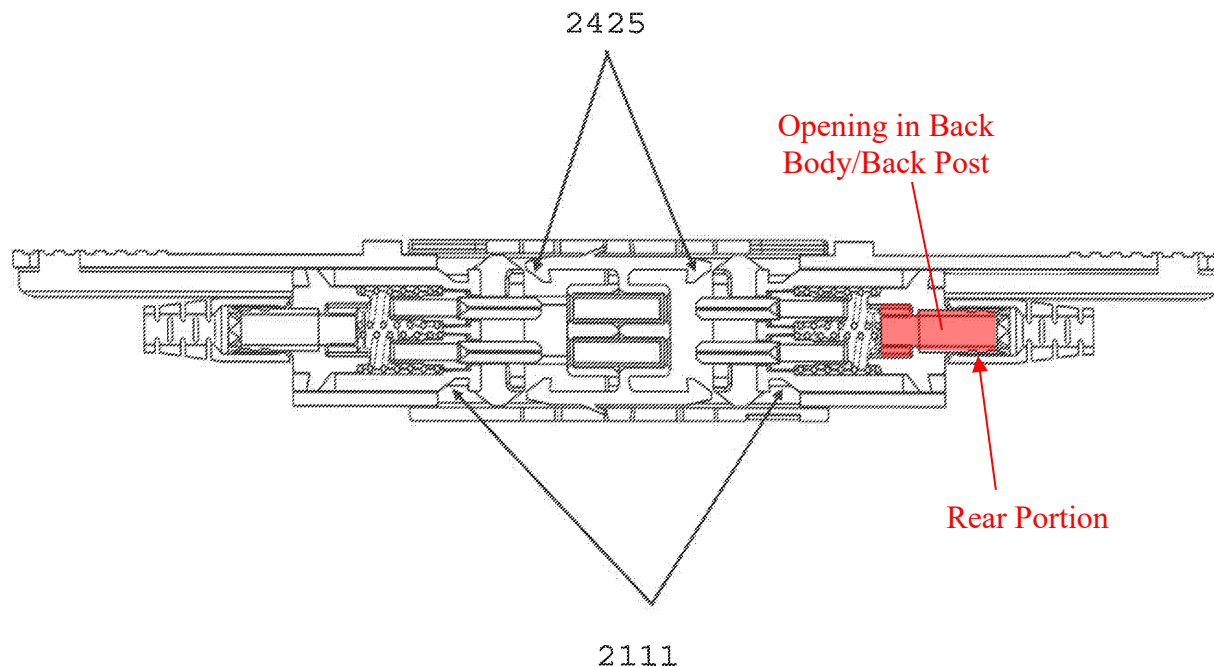


FIG. 23B

EX1003: Fig. 23B (annotated).

7. 16.c.1

For reasons discussed in Section VIII(B)(1.c.1), Takano renders 16.c.1 obvious. EX1002: ¶361.

8. 16.c.2

For reasons discussed in Sections VIII(B)(1.c.2)&VII(F), Takano renders 16.c.2 obvious. EX1002: ¶362.

9. 16.c.3

For reasons discussed in Section VIII(B)(1.c.3), Takano renders 16.c.3 obvious. EX1002: ¶363.

10. 16.d

For reasons discussed in Section VI(A)(1.d), Takano renders 16.d obvious.
EX1002: ¶364.

O. Claim 17

For reasons discussed in Section VI(B), Takano renders this claim obvious.
EX1002: ¶365.

P. Claim 18

For reasons discussed in Section VIII(F), Takano renders this claim obvious.
EX1002: ¶366.

Q. Claim 19

For reasons discussed in Sections VII(P), VII(L)&VII(F), Takano renders
this claim obvious. EX1002: ¶367.

**IX. GROUND 5: Claim 11 Would Have Been Obvious Over Takano In
View of Katoh**

A. Motivation to Modify Takano Based on Katoh

Takano discloses a boot (9109.1, 9209.1, 9309.1, 9409.1) that is pushed and
pulled to insert and remove the micro connector (9100) from the adapter (2400).

EX1003: Abstract, ¶¶[0072]-[0074]; EX1002: ¶¶368-369.

9100

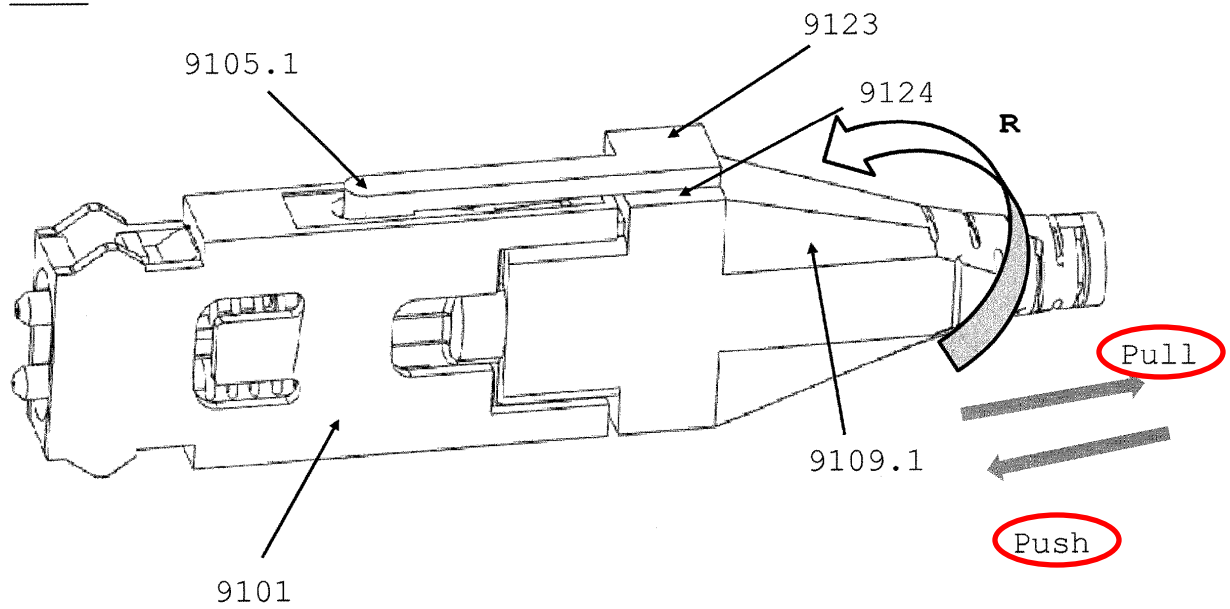


FIG. 16

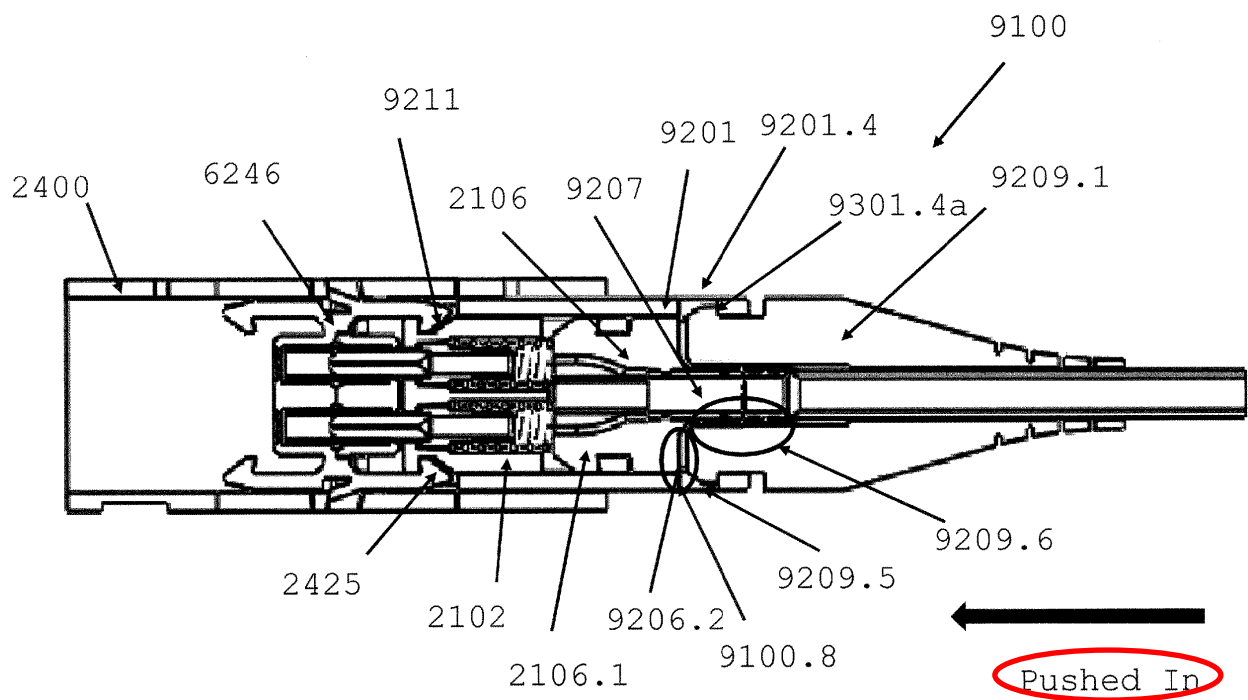


FIG. 34

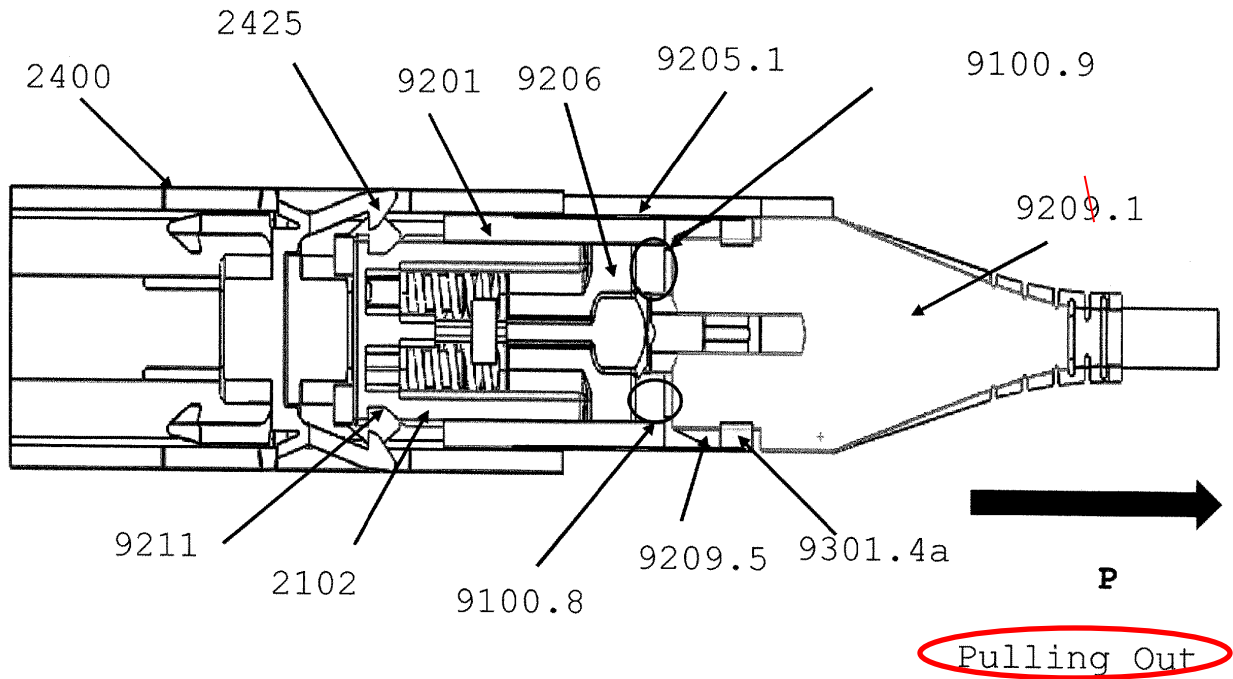


FIG. 35

EX1003: Figs. 16, 34, and 35 (annotated).

Similarly, Katoh discloses an optical connector (10) with a boot (4) that is pushed and pulled to insert and remove the optical connector from an optical connector adapter (7). EX1005: ¶¶[0078], [0083] (“boot 4 is pressed forward”), [0092] (“boot 4 is pulled rearward”), claim 1; EX1002: ¶370.

FIG. 1

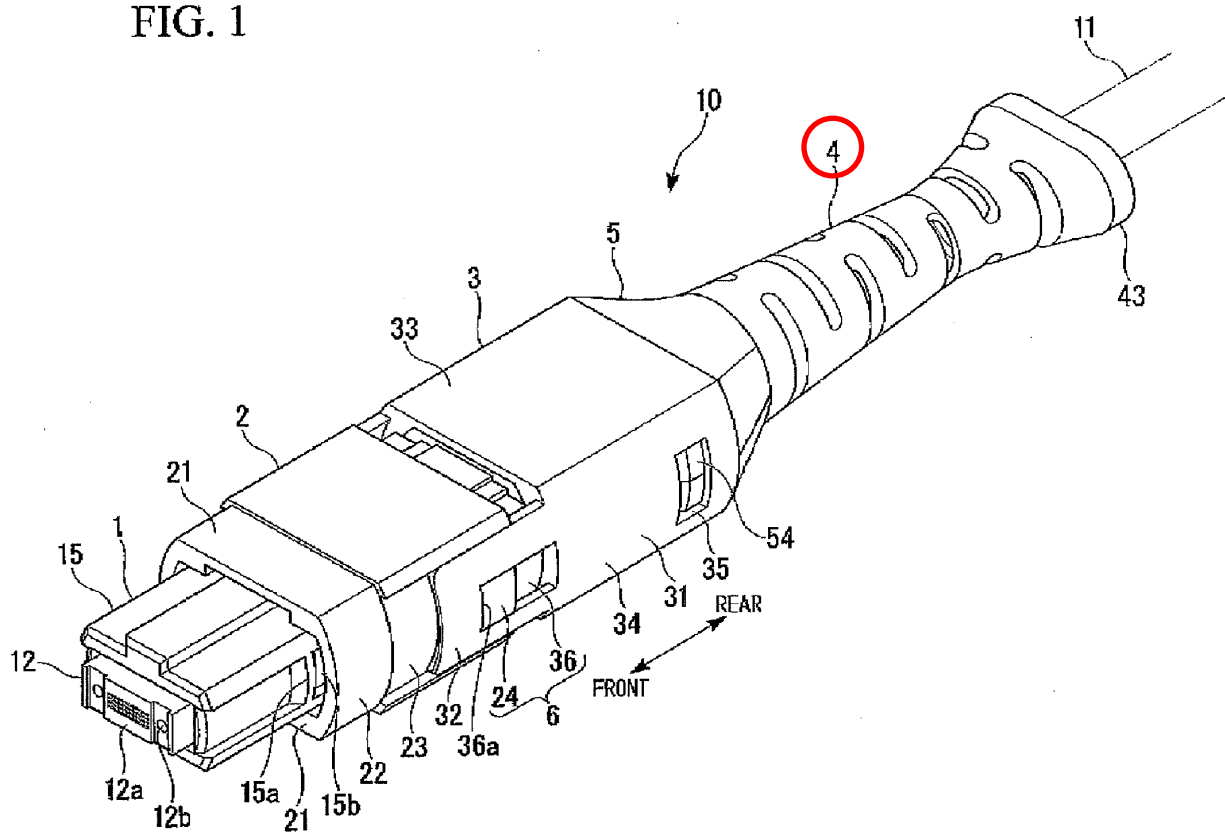


FIG. 4

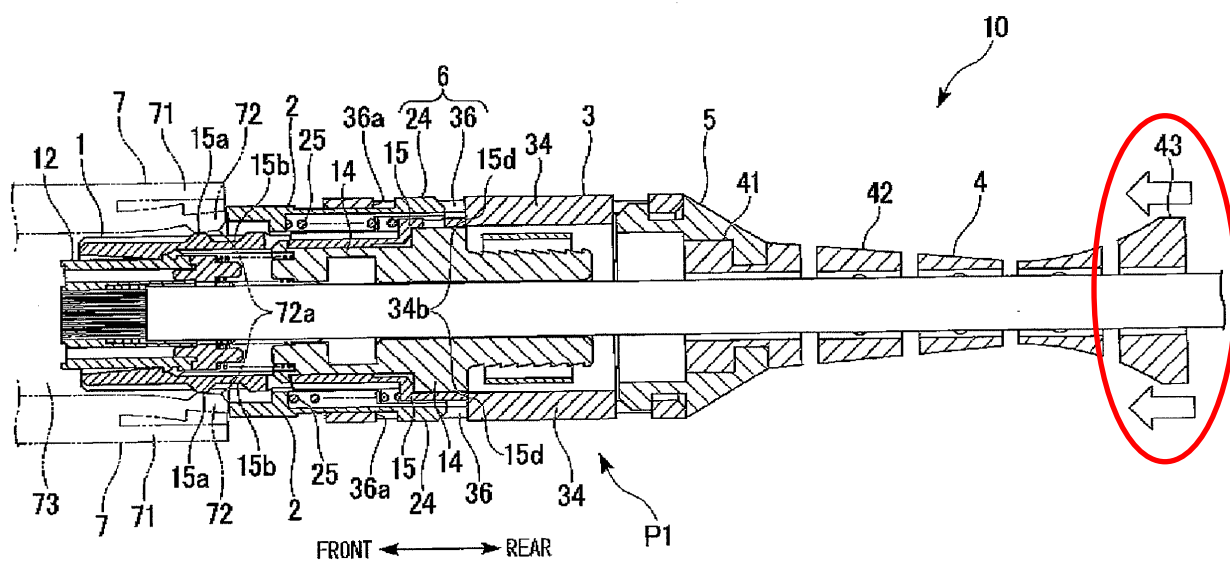
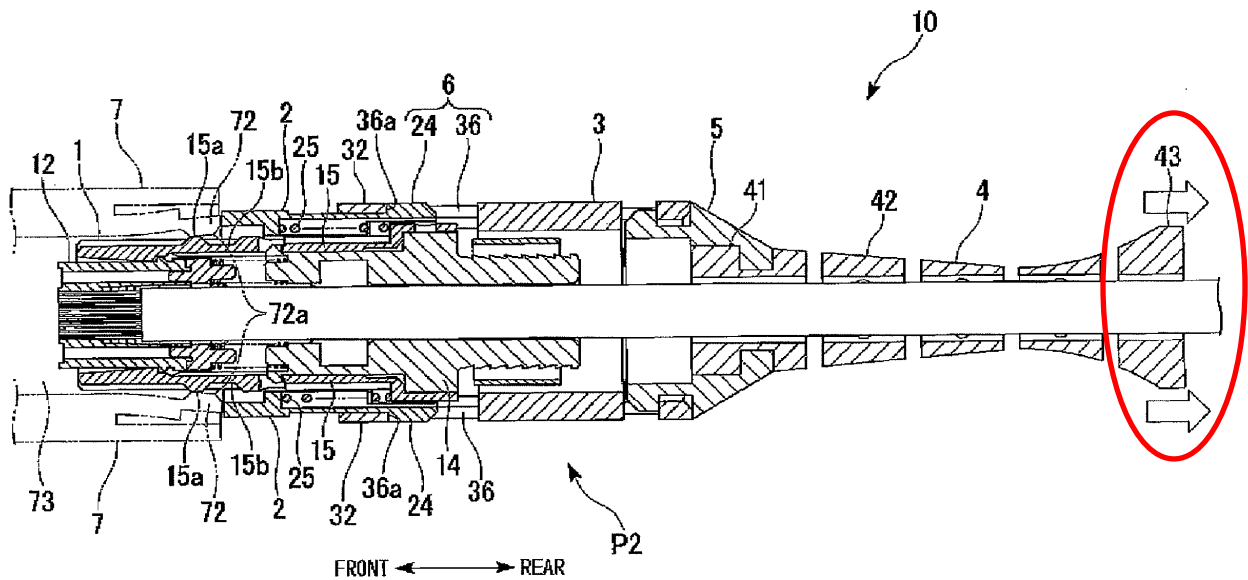


FIG. 6



EX1005: Figs. 1, 4, and 6 (annotated).

The boot (4) includes a flared operation portion (43) at the rear end of the boot. EX1005: Fig. 1, ¶[0068]; EX1002: ¶371. “The operation portion 43 makes it easy to apply a pressing force to the boot 4 when an operator presses the boot 4 in the front-back direction for insertion and removal operation of the optical connector 10.” EX1005: [0070].

It would have been obvious to add the operation portion (43) of Katoh’s boot (4) to the boot (9109.1, 9209.1, 9309.1, 9409.1) of Takano to “make it easy to apply a pressing force to the boot” when inserting and removing Takano’s micro connector (9100) from the adapter (2400), as explained by Katoh. EX1005: ¶[0070]; EX1002: ¶372.

This modification would have been nothing more than modifying known elements (the operation portion of Katoh's boot and Takano's boot) according to known methods (the arrangement taught by Katoh) to yield predictable results (Takano's boot with Katoh's operation portion to make it easy to push/pull Takano's boot). *Sparton Corp. v. U.S.*, 89 Fed. Cl. 196, 237 (Fed. Cl. 2009); EX1002: ¶373.

This modification would have also been nothing more than the application of a known technique (the operation portion of Katoh's boot) to improve a similar device (Takano's boot) in the same way to yield predictable results (Takano's boot with Katoh's operation portion to make it easy to push/pull Takano's boot). EX1002: ¶374.

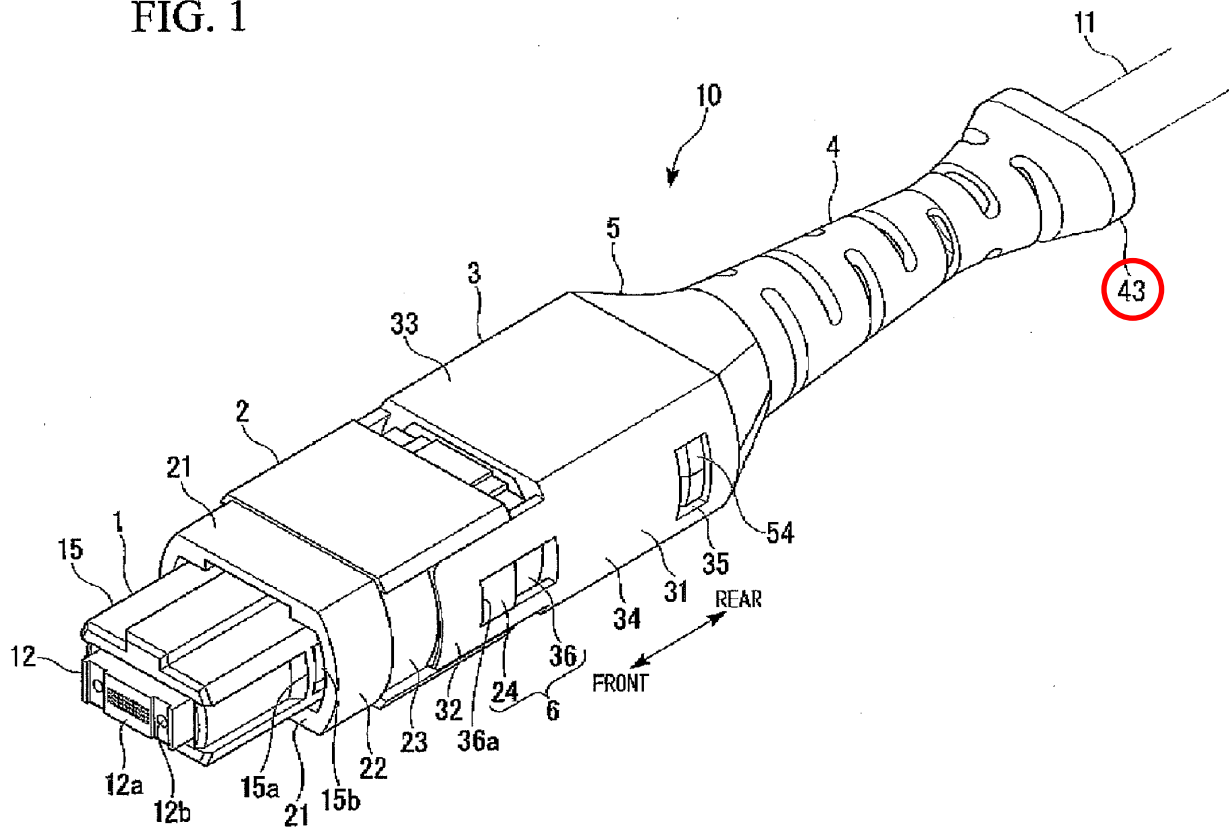
A POSA would have had a reasonable expectation of success in adding the operation portion of Katoh's boot to the boot of Takano because Katoh's operation portion would retain the same functionality when incorporated into Takano's boot that it has as part of Katoh's boot. EX1002: ¶375.

B. Claim 11

Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) modified in view of Katoh includes Katoh's operation portion (43), which is a grasping portion. EX1005: ¶[0070]; EX1002: ¶376. The operation portion (43) would be freely accessible to an operator to grab to push and pull on the boot when inserting and removing the

micro connector (9100) from the adapter (2400). EX1003: ¶¶[0072]-[0074]; EX1005: ¶¶[0070], [0083], [0092]-[0095]; EX1002: ¶376.

FIG. 1



EX1005: Fig. 1 (annotated).

Therefore, Takano/Katoh renders this claim obvious. EX1002: ¶377.

Claim 11 depends from claim 1. Takano/Katoh renders claim 11 obvious regardless of which Takano invalidity ground—Grounds 2-4—renders claim 1 invalid, as each of these invalidity grounds relies on Takano's boot of Figs. 16-36 that is being modified in view of Katoh. EX1002: ¶378.

X. GROUND 6: Claim 15 Would Have Been Obvious Over Takano In View of Repta

A. Motivation to Modify the Takano Based on Repta

Takano does not expressly disclose what material its boot (9109.1, 9209.1, 9309.1, 9409.1) is made of. EX1003; EX1002: ¶¶379-380. However, making a boot of an optical connector out of polypropylene has been known for decades. EX1008: 4:10-15; EX1007: 3:58-61; EX1002: ¶380. For example, Repta discloses making the boot of an optical connector out of polypropylene for its “tensile flexibility” and “compressive rigidity.” EX1008: 4:10-15; EX1002: ¶380.

It would have been obvious to make Takano’s boot (9109.1, 9209.1, 9309.1, 9409.1) out of polypropylene so that the boot has “tensile flexibility to allow bending under loading and compressive rigidity to maintain form once the minimum bend radius is achieved,” as taught by Repta. EX1008: 4:10-15; EX1002: ¶381. Moreover, it would have been obvious to try to make Takano’s boot out of polypropylene, as the POSA knows polypropylene to be a suitable material for boots of optical connectors. EX1007: 3:58-61; EX1008: 4:10-15; EX1002: ¶381.

This modification would have been nothing more than combining known elements (Repta’s polypropylene and Takano’s boot) according to known methods (the construction taught by Takano) to yield predictable results (a boot with the necessary tensile flexibility and compressive rigidity). EX1002: ¶382.

This modification is also nothing more than the use of a known technique (making components out of polypropylene as taught by Repta) to improve a similar device (Takano’s boot) in the same way to yield predictable results (a boot with the necessary tensile flexibility and compressive rigidity). EX1002: ¶383.

This modification is also a simple substitution of one known alternative (Repta’s polypropylene) with another (whatever material Takano’s boot is made out of) to obtain predictable results (a boot with the necessary tensile flexibility and compressive rigidity). EX1002: ¶.

Moreover, selecting between known boot materials is an obvious matter of design choice. *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1341 (Fed. Cir. 2020) (“because [solution A] and [solution B] would have been two of a finite number of known, predictable solutions at the time of the invention of the [] patent, a [POSA] would have faced a simple design choice between the two”); *In re Leshin*, 277 F.2d 197, 199 (C.C.P.A. 1960) (“Mere selection of known plastics to make a [device] of a type made of plastics prior to the invention, the selection of the plastics being on the basis of suitability for the intended use, would be entirely obvious”); *Ex parte Gehring*, Appeal No. 2014-004556 at 6 (P.T.A.B. June 14, 2016) (“the selection of a suitable material is a matter of obvious design choice”); EX1002: ¶385.

B. Claim 15

Takano's boot modified in view of Repta is made of polypropylene. Section X(A); EX1002: ¶386. Polypropylene has a Young's modulus of about 1300 MPa, greater than 500 MPa. EX1020; EX1021; EX1022; EX1023; EX1002: ¶386.

Therefore, Takano/Repta renders this claim obvious. EX1002: ¶387.

Claim 15 depends from claim 1. Takano/Repta renders claim 15 obvious regardless of which Takano invalidity ground—Grounds 2-4—renders claim 1 invalid, as each of these invalidity grounds relies on Takano's boot of Figs. 16-36 that is being modified in view of Repta. EX1002: ¶388.

XI. GROUND 7: Claims 13 and 19 Would Have Been Obvious Over Takano (First Embodiment) In View of Davidson

Ground 7 builds on Ground 2 and is based on Takano's embodiment of the micro connector (9100) of Figs. 16-36 in which the boot *includes* the key.

EX1003: ¶[0059]; EX1002: ¶¶389-390.

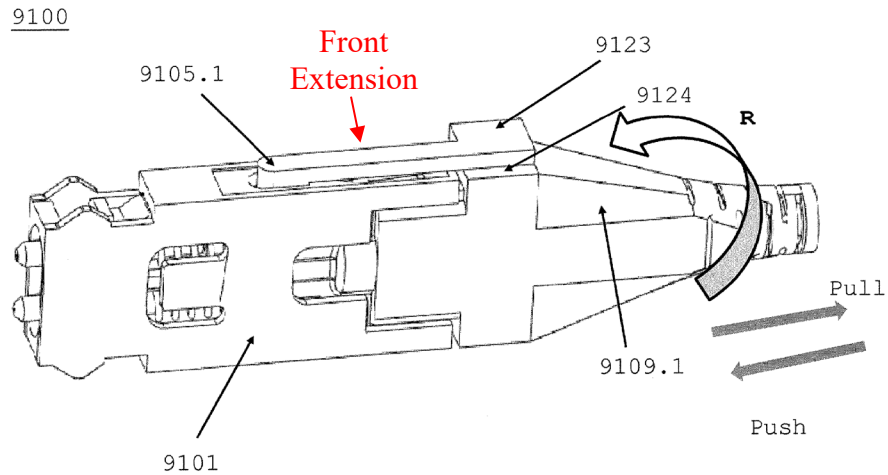


FIG. 16

EX1003: Fig. 16.

A. Motivation to Modify Takano Based on Davidson

Takano discloses a boot (9109.1, 9209.1, 9309.1, 9409.1) that is pushed and pulled to insert and remove the micro connector (9100) from the adapter (2400).

EX1003: Abstract, ¶¶[0072]-[0074]; EX1002: ¶391. The boot includes the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) that is releasably attached to the rest of the boot at point (9109.6). EX1003: ¶[0059]; EX1002: ¶391.

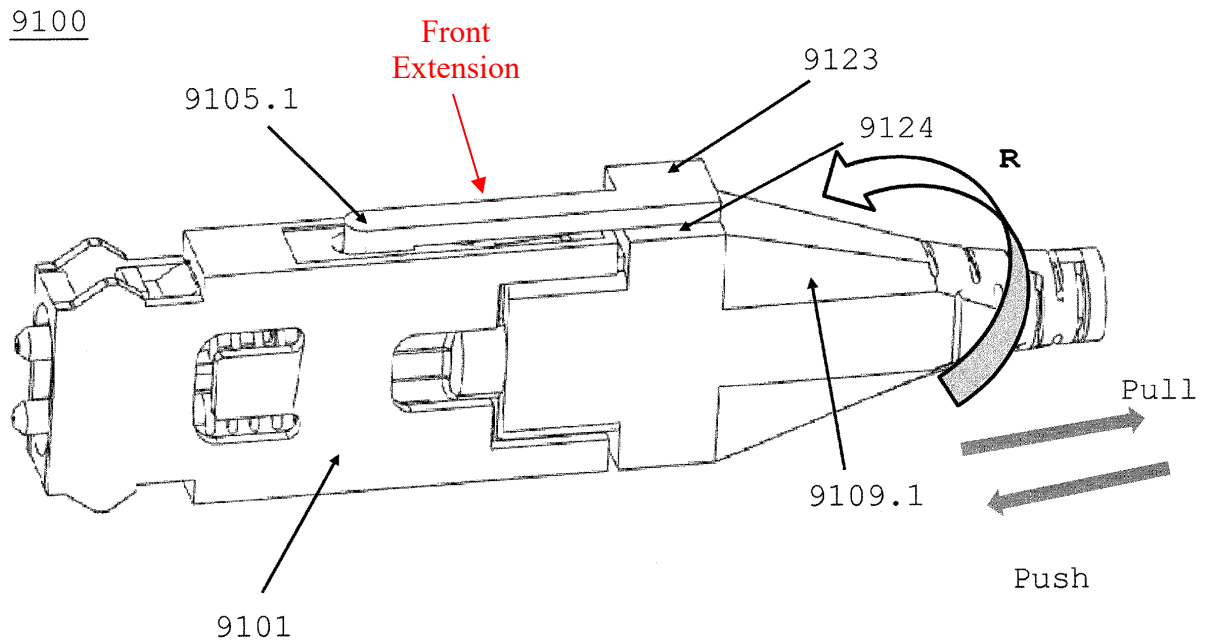


FIG. 16

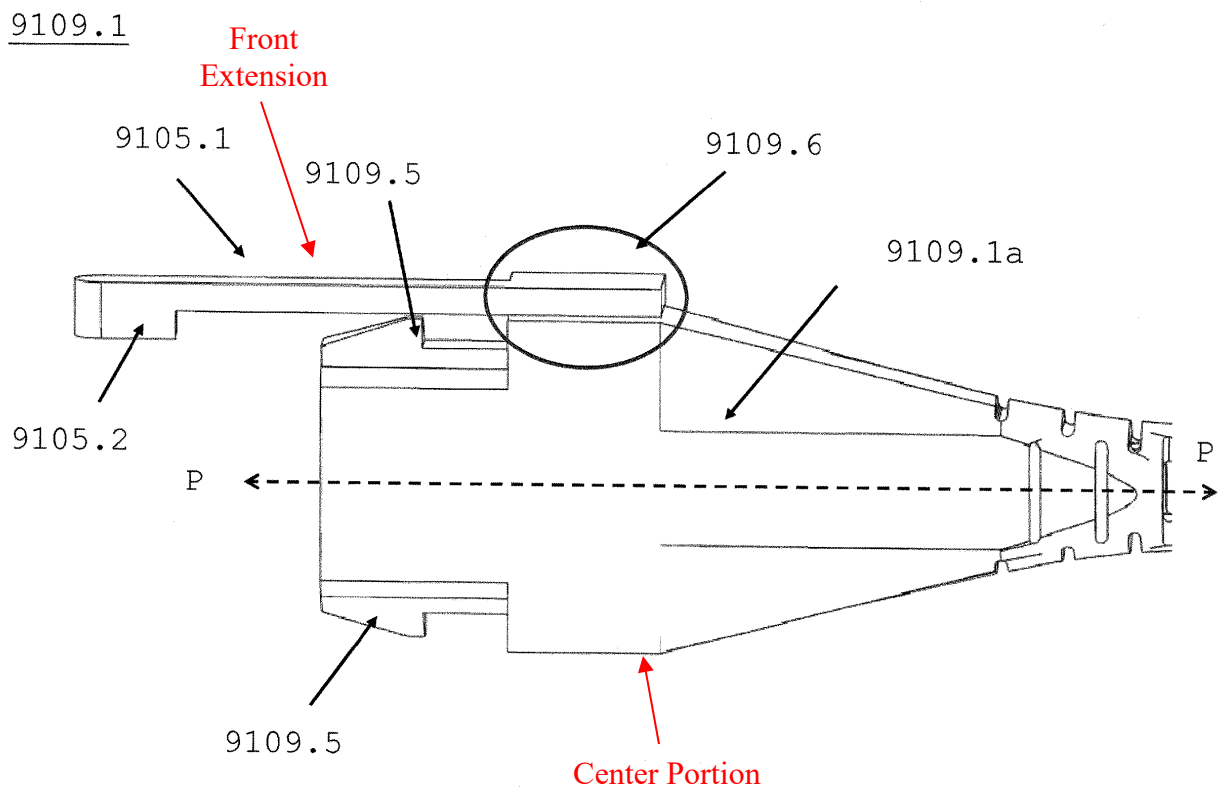
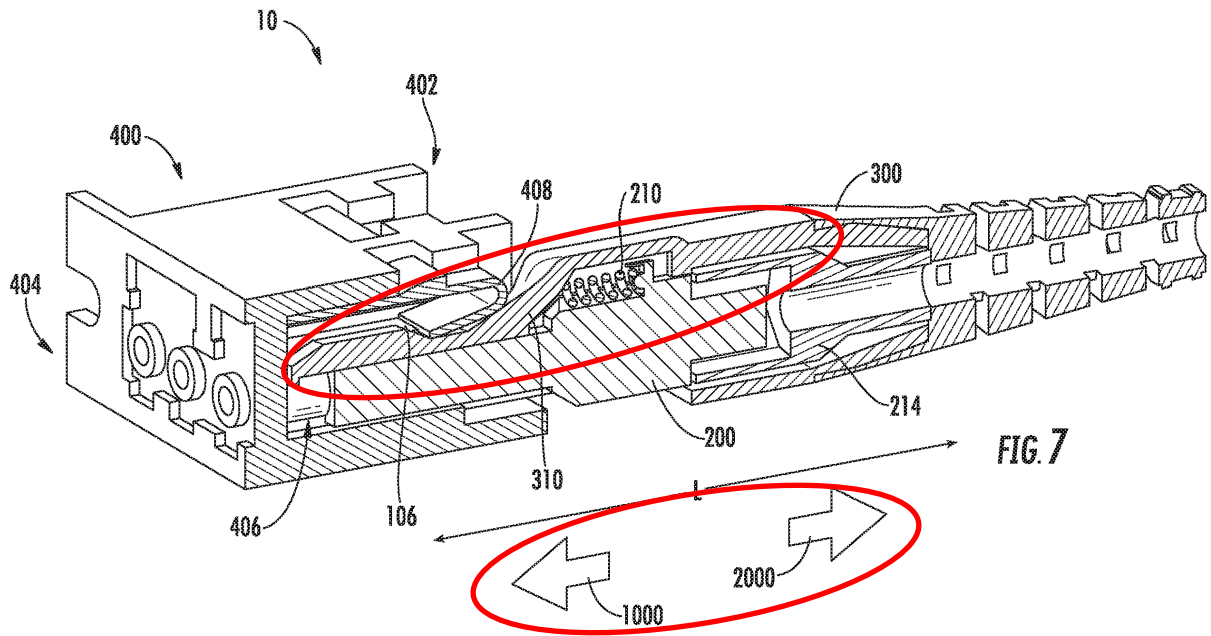


FIG. 17

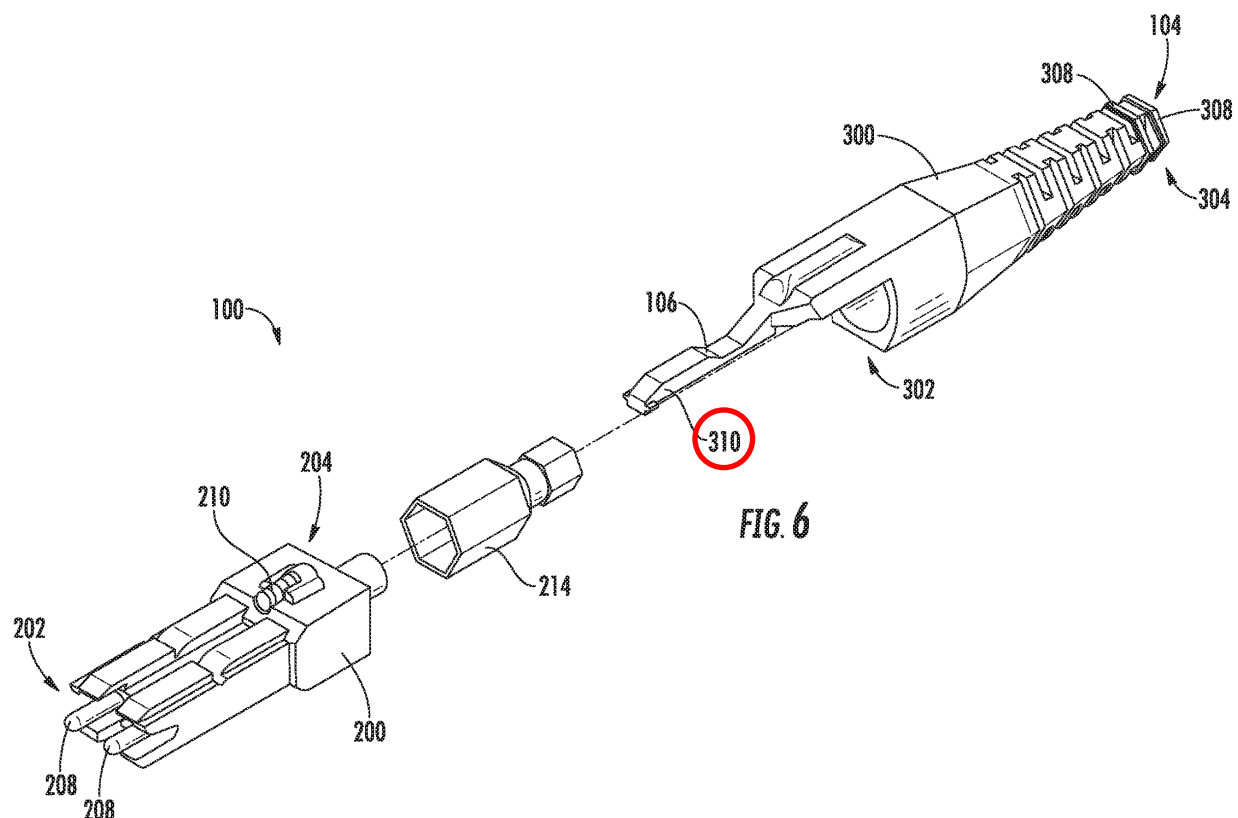
Similarly, Davidson discloses a push-pull boot connector (100) with a push/pull strain relief boot (300). EX1006: ¶¶[0038]-[0039]; EX1002: ¶392.





EX1006: Figs. 5 and 7 (annotated).

Davidson's strain relief boot (300) includes a front extension in the form of a connector release arm (310). EX1006: ¶[0039]; EX1002: ¶393. As shown by Fig. 7's cross-section (above), the connector release arm (310) is integral or one-piece with the middle or central portion of the strain relief boot. EX1006: Fig. 7; EX1002: ¶393.



EX1006: Fig. 6 (annotated).

It would have been obvious to make the key (9105.1, 9205.1, 9305.1, 9405.1) of Takano integral with the central portion of Takano's boot (9109.1, 9209.1, 9309.1, 9409.1), as taught by Davidson. EX1006: Fig. 7; EX1002: ¶394. Such a modification would make the manufacture and assembly of Takano's micro connector (9100) simpler and easier by reducing the number of parts and assembly steps, thereby saving time and reducing costs. EX1002: ¶394. This modification would also prevent the key from inadvertently separating from the central portion of Takano's boot, such as during rotation of the boot during a polarity change. EX1002: ¶394.

This modification would have been nothing more than modifying known elements (the key and central portion of Takano's boot) according to known methods (Davidson's integral construction) to yield predictable results (the key and central portion of Takano's boot being of one-piece construction). *Sparton Corp. v. U.S.*, 89 Fed. Cl. 196, 237 (Fed. Cl. 2009); EX1002: ¶395.

This modification would have also been nothing more than the application of a known technique (Davidson's integral construction) to improve a similar device (Takano's boot) in the same way to yield predictable results (the key and central portion of Takano's boot being of one-piece construction). EX1002: ¶396.

Moreover, making the Takano's key integral with the central portion of Takano's boot is an obvious matter of an unpatentable design choice. *Howard v. Detroit Stove Works*, 150 U.S. 164, 170 (1893) ("it involves no invention to cast in one piece an article which has formerly been cast in two pieces"); *In re Larson*, 340 F.2d 965, 968 (CCPA 1965) ("the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice"); *In re Wolf*, 251 F.2d 854, 855-56 (CCPA 1958) ("[i]t [is] scarcely necessary to point out that merely making a two-piece handle in one piece is not patentable because it is an obvious thing to do"); EX1002: ¶397.

A POSA would have had a reasonable expectation of success in making the key of Takano integral with the central portion of Takano's boot because the key would still function to set the polarity in the same manner. EX1002: ¶398.

B. Claim 13

As explained in Section XI(A), the Takano/Davidson combination results in the key (i.e., front extension) being integral with the center portion. EX1002: ¶399.

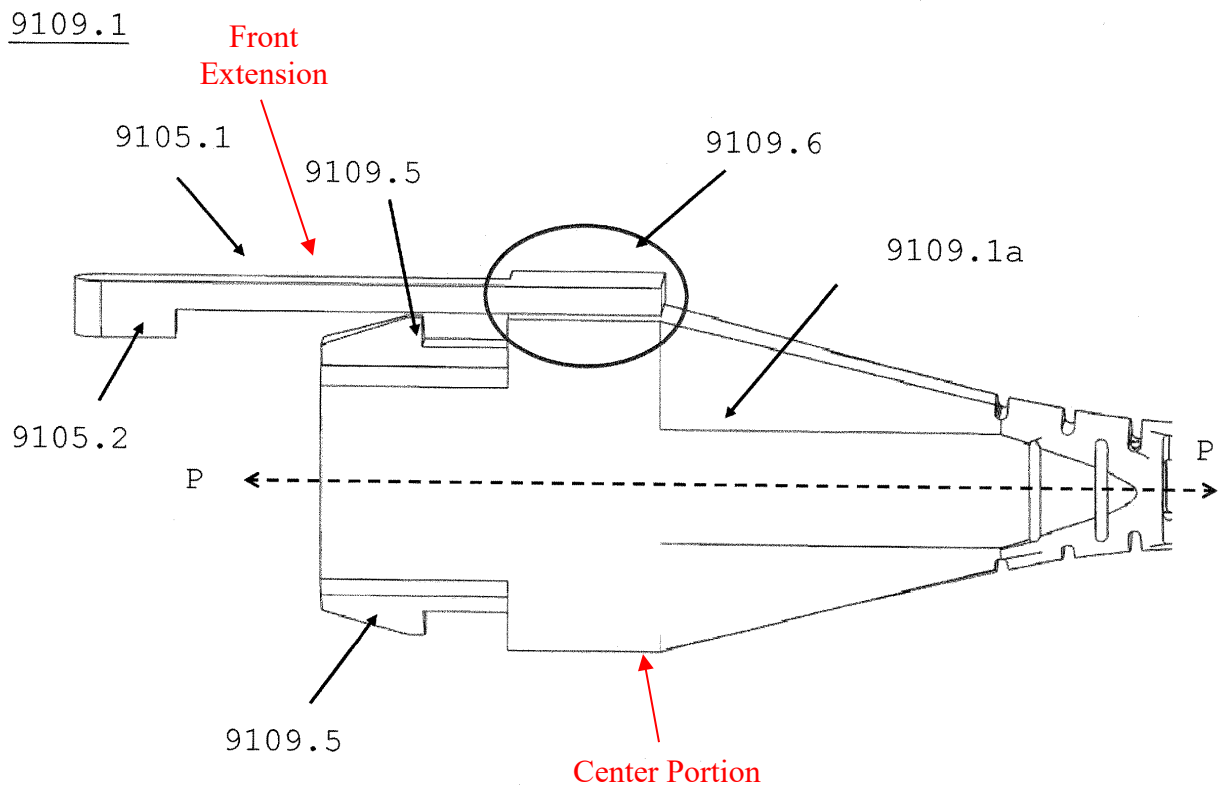


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano/Davidson renders this claim obvious. EX1002: ¶400.

C. Claim 19

If claim 19 requires the front extension to have at minimum one latch¹⁰, then Takano/Davidson renders this claim obvious. EX1002: ¶401.

As explained in Section VI(F), Takano's key has a latch. EX1002: ¶402.

As explained in Section XI(A), the Takano/Davidson combination results in the key being integral with the center portion, which meets the “integrally molded” part of claim 19 for the reasons discussed in Section VII(P). EX1002: ¶403.

Therefore, Takano/Davidson renders this claim obvious. EX1002: ¶404.

XII. GROUND 8: Claims 13 and 19 Would Have Been Obvious Over Takano (First Embodiment) In View of Davidson and in Further View of Castagna

Ground 8 builds on Grounds 2&7 and is based on the embodiment of Takano's micro connector (9100) of Figs. 16-36 in which the boot *includes* the key. EX1003: ¶[0059]; EX1002: ¶¶405-406.

¹⁰ If the “latch” recited by claim 19 is considered to be part of the “at least one latch” recited by claim 16.

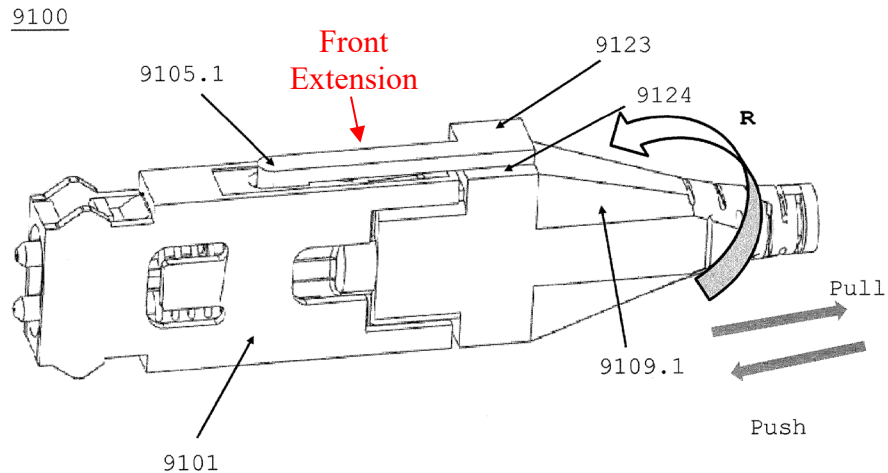


FIG. 16

EX1003: Fig. 16.

A. Motivation to Modify the Takano/Davidson Combination Based on Castagna

If “molded” is entitled to patentable weight, such a limitation would have been obvious in view of Castagna. EX1002: ¶407.

The Takano/Davidson combination results in Takano’s key (i.e., front extension) being integral with the center portion of Takano’s boot. Section XI(A); EX1002: ¶408.

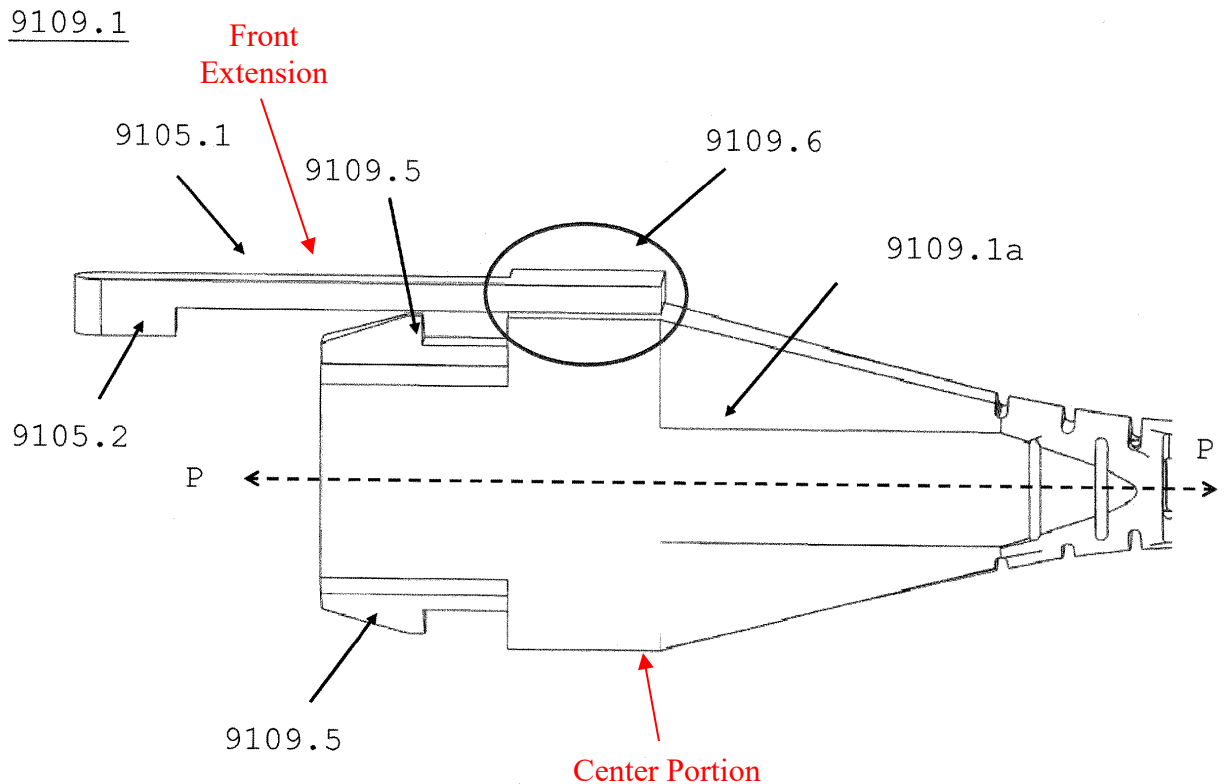
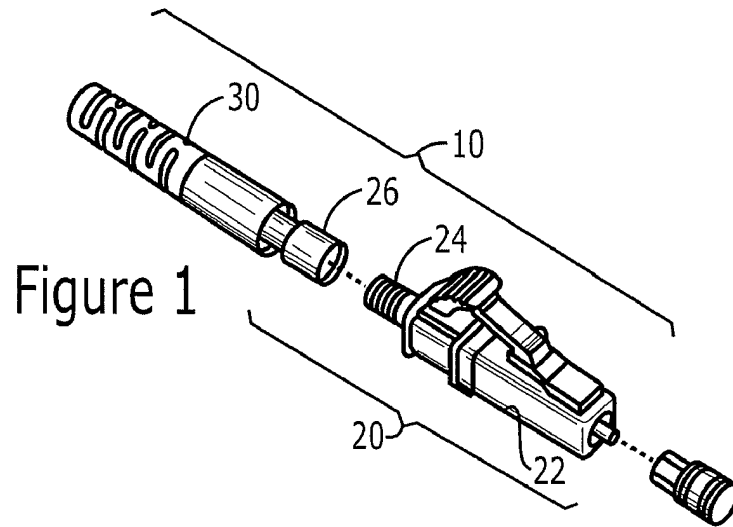


FIG. 17

EX1003: Fig. 17 (annotated).

Making boots out of “molded” materials has been around for decades. EX1007: 3:58-61; EX1024: 3:35-38 (“boot structure 26 is unitarily molded of plastic”); EX1025: 5:22 (“a pre-molded boot”); EX1029: 6:18-19 (“boot 44 may be pre-manufactured (e.g., molded)”); EX1002: ¶409. For example, Castagna discloses a fiber optic cable assembly (10) with a strain relief boot (30) made of injection molded polypropylene. EX1007: 3:58-61; EX1002: ¶409.



EX1007: Fig. 1.

It would have been obvious to make the boot of the Takano/Davidson combination—with the key integral to the center portion—out of “conventional materials, such as polypropylene, using conventional manufacturing methods, such as a conventional injection molding process,” as taught by Castagna. EX1007: 3:58-61; EX1002: ¶410. Castagna states that injection molded polypropylene is a suitable material for boots of optical connectors, while Takano and Davidson are silent as to the material of their respective boots. EX1007: 3:58-61; EX1002: ¶410. Further, injection molded polypropylene boot provides “tensile flexibility to allow bending under loading and compressive rigidity to maintain form once the minimum bend radius is achieved.” EX1008: 4:10-15; EX1002: ¶410.

This modification would have been nothing more than combining known elements (Castagna’s injection molded materials and Takano’s boot) according to

known methods (the construction taught by Takano/Davidson) to yield predictable results (a boot with tensile flexibility and compressive rigidity). EX1002: ¶411.

This modification is also nothing more than the use of a known technique (making components out of injection molded materials as taught by Castagna) to improve a similar device (Takano’s boot) in the same way to yield predictable results (a boot with tensile flexibility and compressive rigidity). EX1002: ¶412.

This modification is also a simple substitution of one known alternative (Castagna’s boot material) with another (whatever material Takano’s boot is made out of) to obtain predictable results (a boot with tensile flexibility and compressive rigidity). EX1002: ¶413.

Moreover, selecting between known boot materials is an obvious matter of design choice. *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1341 (Fed. Cir. 2020) (“because [solution A] and [solution B] would have been two of a finite number of known, predictable solutions at the time of the invention ..., a [POSA] would have faced a simple design choice between the two”); *In re Leshin*, 277 F.2d 197, 199 (C.C.P.A. 1960) (“Mere selection of known plastics to make a [device] of a type made of plastics prior to the invention, the selection of the plastics being on the basis of suitability for the intended use, would be entirely obvious”); *Ex parte Gehring*, Appeal No. 2014-004556 at 6 (P.T.A.B. June 14, 2016) (“the selection of a suitable material is a matter of obvious design choice”); EX1002: ¶414.

B. Claim 13

If the Board disagrees that the Takano/Davidson combination results in the key being integral with the center portion, this claim would have been obvious in further view of Castagna. EX1002: ¶415. As explained in Section XII(A), the Takano/Davidson/Castagna combination results in the key being integrally molded with the center portion, which results in the key being “an integral part” of the center portion. EX1002: ¶415.

C. Claim 19

If claim 19 requires the front extension to have at minimum one latch¹¹, then Takano/Davidson renders this claim obvious. EX1002: ¶416.

As explained in Section VI(F), Takano’s key has a latch. EX1002: ¶417.

As explained in Section XII(A), the Takano/Davidson/Castagna combination results in the key being integrally molded with the center portion. EX1002: ¶418.

Therefore, Takano/Davidson renders this claim obvious. EX1002: ¶419.

XIII. GROUND 9: Claims 13 and 19 Would Have Been Obvious Over Takano (Second/Third Embodiments) In View of Castagna

Ground 9 builds on Grounds 3 and 4, in which the boot (9109.1, 9209.1, 9309.1, 9409.1) is without the key. EX1002: ¶¶420-421.

¹¹ See Footnote 7.

9109.1

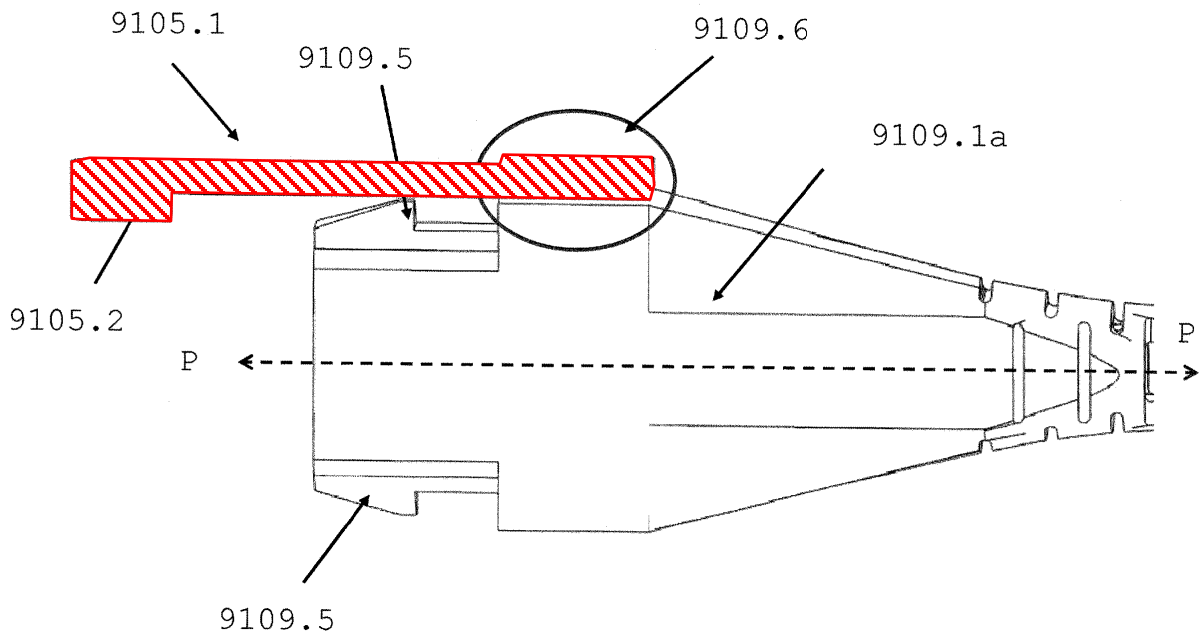


FIG. 17

EX1003: Fig. 17 (annotated).

If the Board determines the front extension is not “integrally molded,” claim 19 would have been obvious in further view of Castagna. EX1002: ¶422. Section XII(A) explains it would have been obvious to make Takano’s boot out of “integrally molded” (claim 19) material, in view of Castagna such that the front extension would have been integrally molded with the center portion. EX1002: ¶422. This also results in the front extension being “an integral part” (claim 13) of the center portion. EX1002: ¶422.

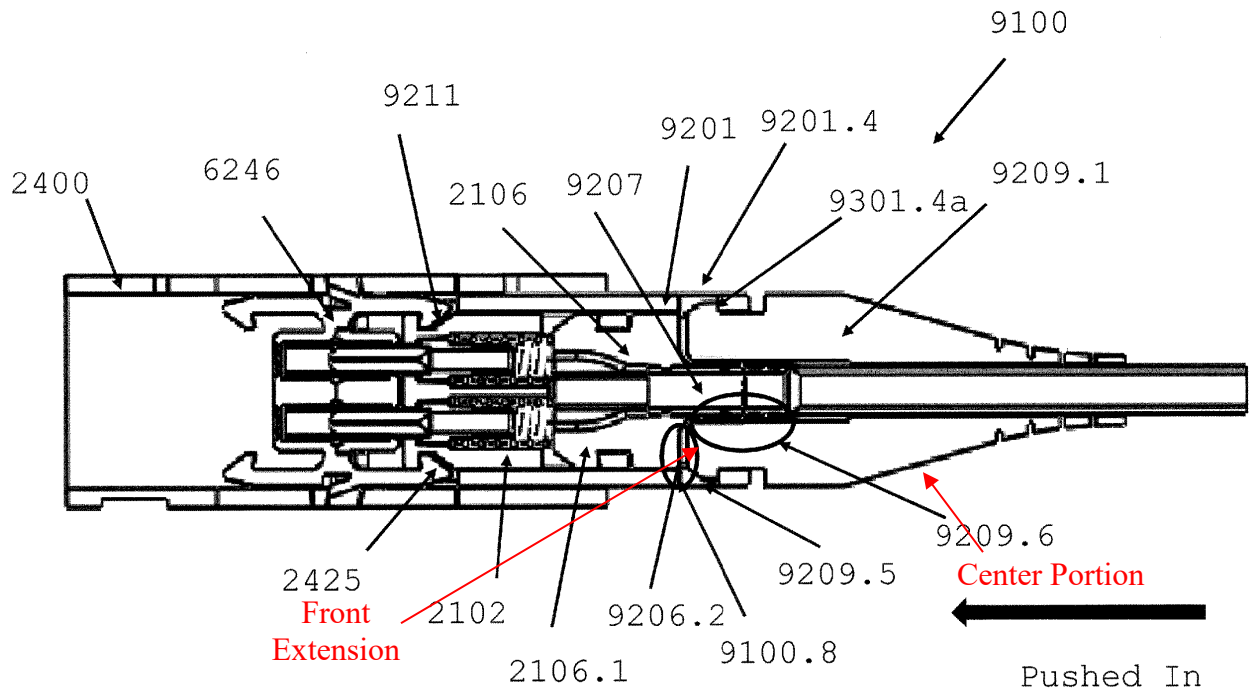


FIG. 34

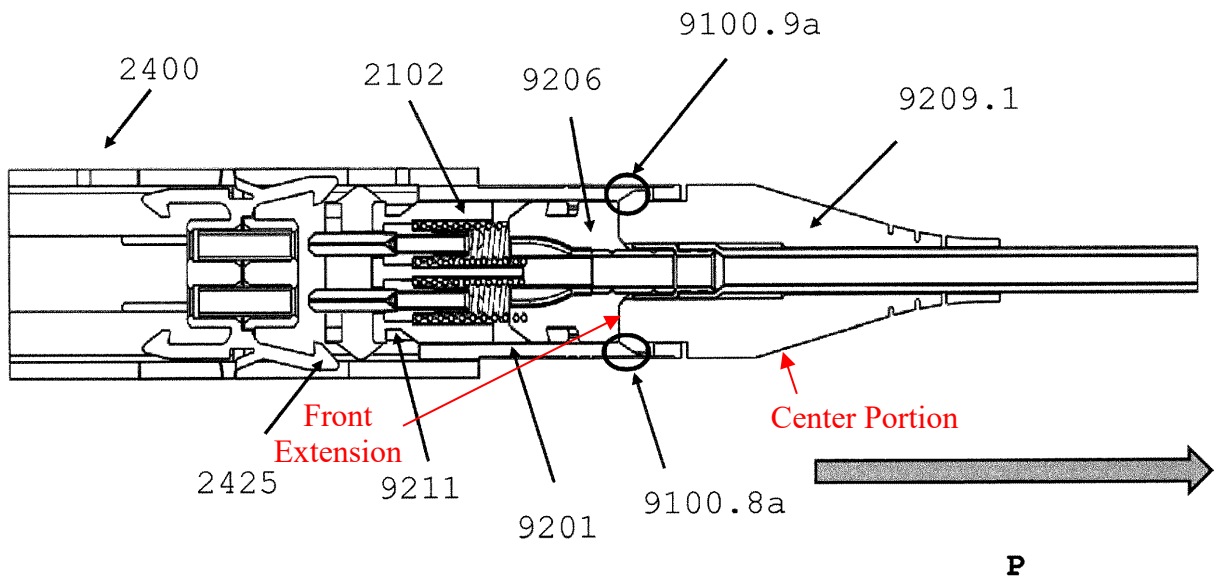


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

The remaining limitations of the claims are met by Takano as explained in Sections VII-VIII. EX1002: ¶423.

XIV. GROUND 10: Claim 20 Would Have Been Obvious Over Takano (Second Embodiment) in View of Ehrenreich

This ground (like Ground 3) relies on Takano's second embodiment, the optical connector of Figs. 16-36 in which the boot *does not include* the key.

EX1003: ¶[0059]; EX1002: ¶¶424-425.

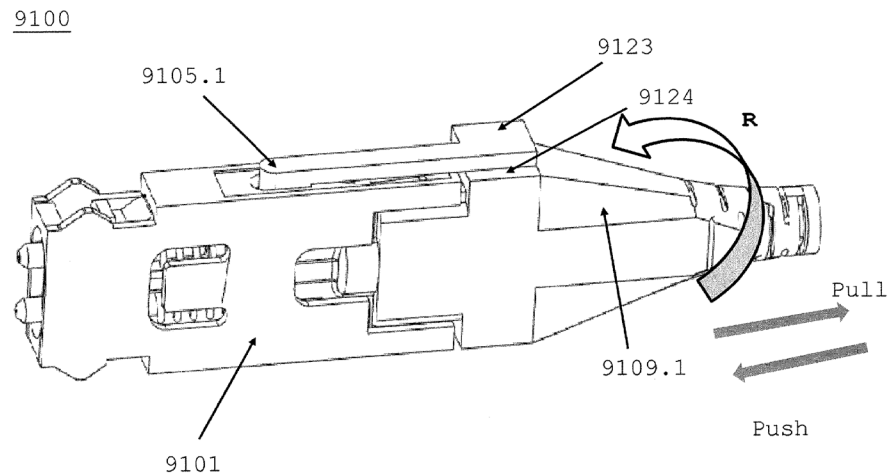


FIG. 16

EX1003: Fig. 16.

9109.1

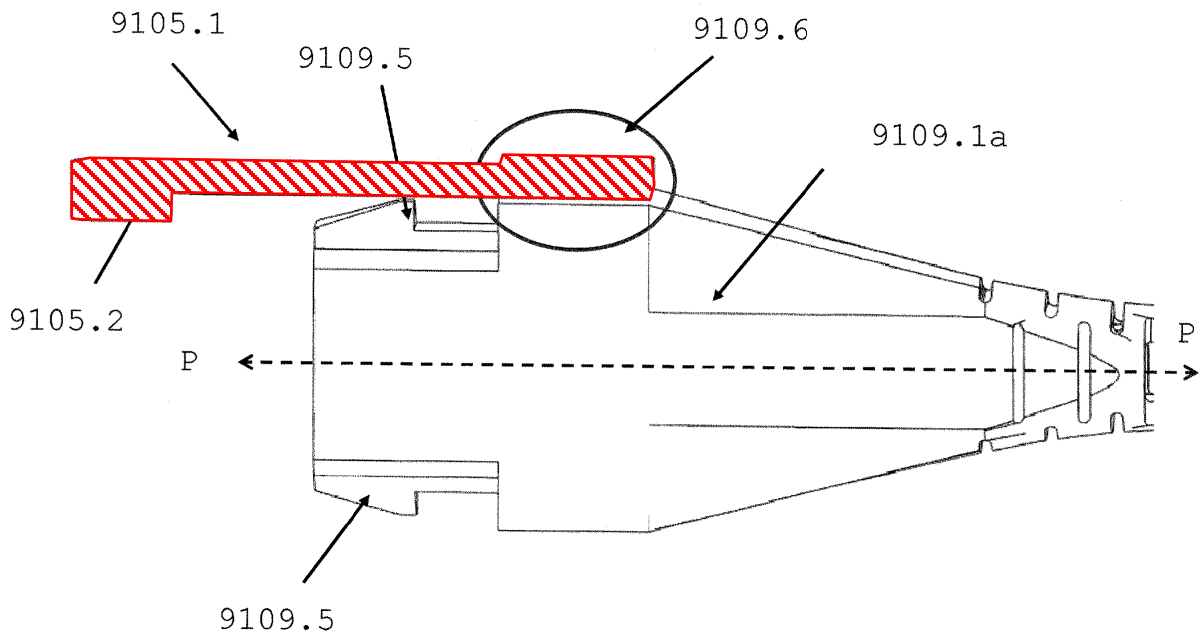
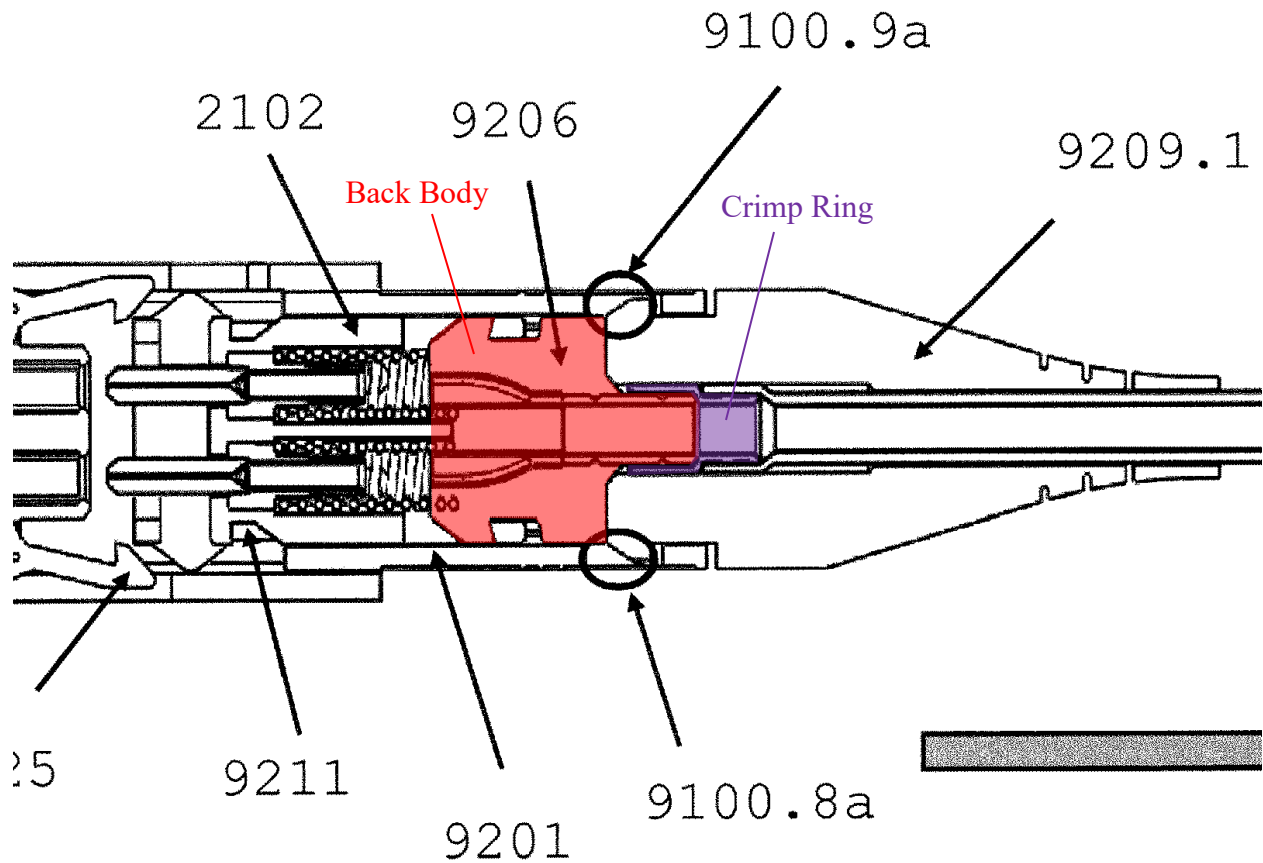


FIG. 17

EX1003: Fig. 17 (annotated).

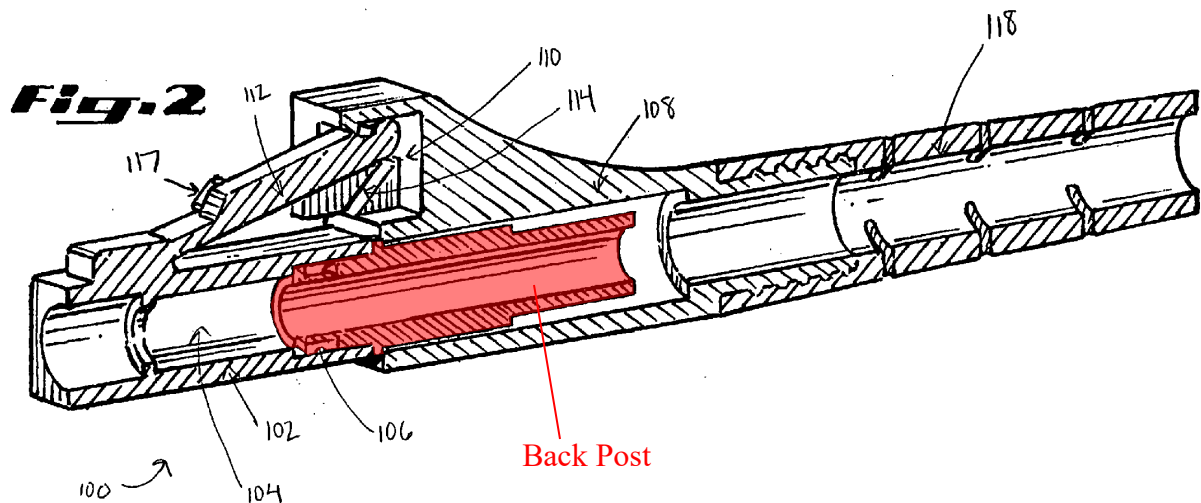
A. Motivation to Modify Takano Based on Ehrenreich

Takano's back body (9106, 9206) has a rear portion in the form of a back post onto which the crimp ring (9207) is crimped. EX1003: ¶¶[0067], [0072], Figs. 27 and 34; EX1002: ¶426. The back post is relatively short, such that about half the crimp ring does not overlap and crimp against the back post. EX1003: Figs. 34 and 36; EX1002: ¶426.



EX1003: Fig. 36 (annotated).

Ehrenreich teaches an optical connector (100) with a push/pull boot (118) and a long back post for attaching to a fiber optic cable. EX1009: Fig. 2; EX1002: ¶427.



EX1009: Fig. 2 (annotated).

It would have been obvious to lengthen the back post of Takano's back body (9106, 9206) to provide additional area for the crimp ring (9207) to crimp onto, thereby providing a strong connection between the fiber optic cable and the back post. EX1002: ¶428. Ehrenreich shows it was known in the art to use long back posts with push/pull boots (118), like Takano's boot (9109.1, 9209.1, 9309.1, 9409.1). EX1009: Fig. 2; EX1002: ¶428. Further, lengthening the back post of Takano's back body would provide additional support and guiding for Takano's boot, making it easier to pull Takano's boot rearward to detach the micro connector (9100) from the adapter. EX1003: Fig. 36, ¶¶[0073]-[0074]; EX1002: ¶428. Lengthening the back post also strengthens the connection between the back post and the boot, thereby making the micro connector stronger, such as against side pulling (tested via the side pull test). EX1002: ¶429.

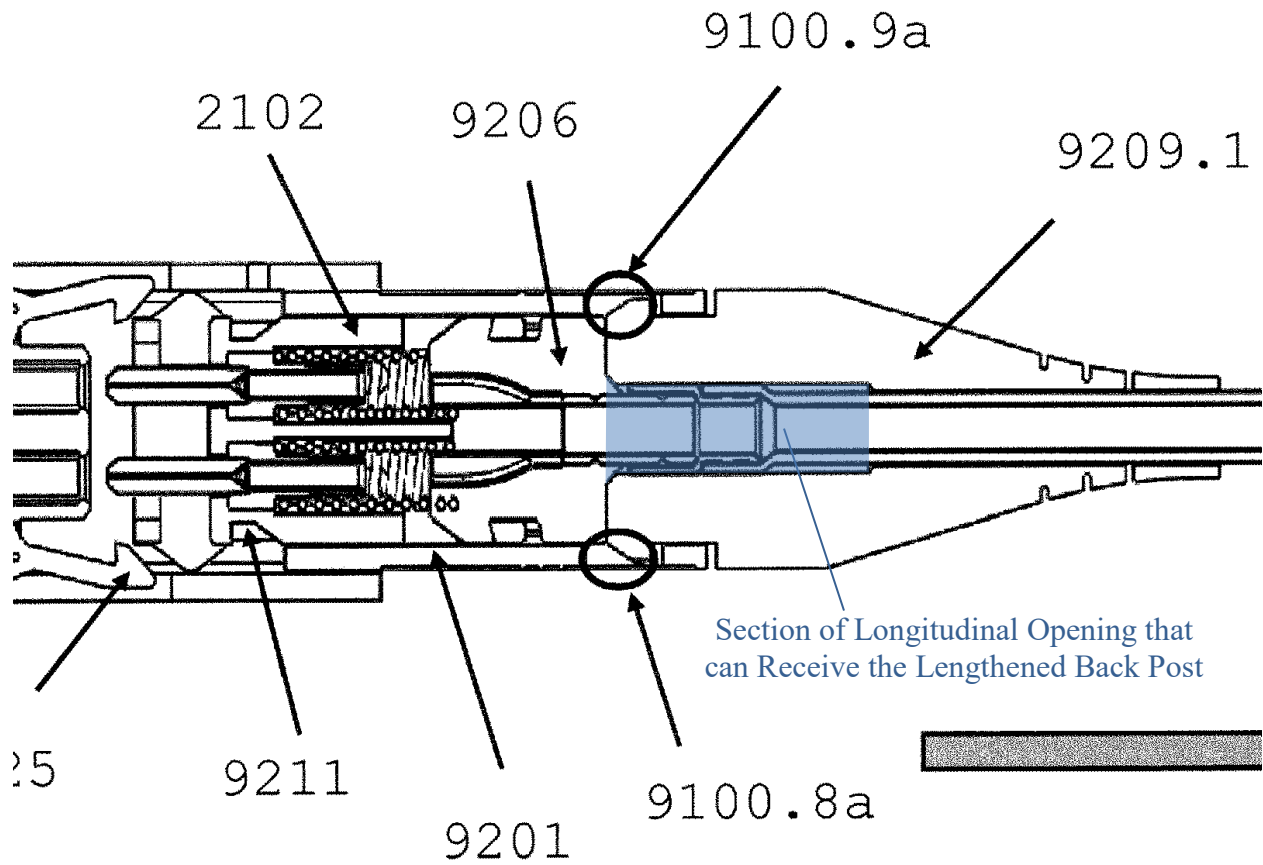
This modification is also nothing more than the use of a known technique (Ehrenreich long back post) to improve a similar device (Takano's back post) in the same way to yield predictable results (more secure connection between the fiber optic cable and the back post and better supporting of Takano's boot).

EX1002: ¶430.

Further, lengthening the back post is a mere design choice well within the level of a POSA. *Gardner v. TEC Sys.*, 725 F.2d 1338, 1345-49 (Fed. Cir. 1984) (where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device); *In re Hunter*, 286 F.2d 619, 621 (CCPA 1961) (“we consider it would be an obvious expedient to lengthen [the prior art element]”); *Valve Corp. v. Ironburg Inventions Ltd.*, IPR2016-00949, Paper 45 at 45 (P.T.A.B. Sep. 22, 2017) (finding “it would have been obvious to lengthen [the prior art components]”); *Ex parte Daves*, Appeal No. 2009-012342 at 6-7 (P.T.A.B. May 25, 2011) (finding it obvious to “lengthen the main portion of [the prior art’s] carrying bag”); EX1002: ¶431.

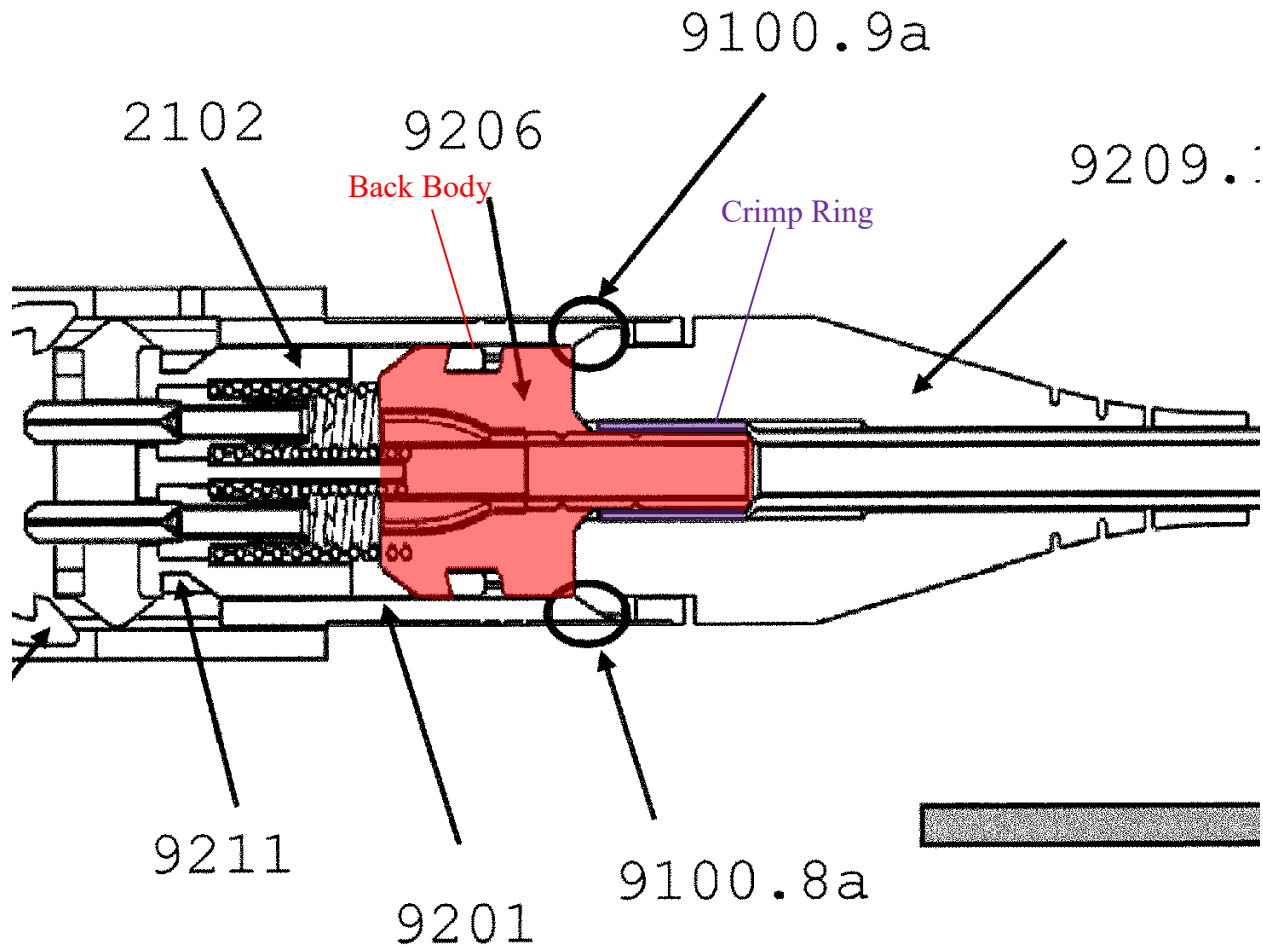
There would have been a reasonable expectation of success in lengthening the back post of Takano's back body (9106, 9206) because the longer back post would still serve the same function (attaching to the fiber optic cable) and

Takano's boot already includes a longitudinal opening section long enough for the extended back post. EX1003: Fig. 36; EX1002: ¶432.



EX1003: Fig. 36 (annotated).

An illustration of this modification is shown below:



EX1003: Fig. 36 (annotated, modified); EX1002: ¶433.

B. Independent Claim 20

1. 20.P

For reasons discussed in Section VI(A)(1.P), Takano/Ehrenreich renders 20.P obvious. EX1002: ¶434.

2. 20.a

For reasons discussed in Section VI(A)(1.P), Takano/Ehrenreich renders 20.a obvious. EX1002: ¶435.

3. 20.b

For reasons discussed in Sections VI(A)(1.P)&VI(P)(20.b), Takano/Ehrenreich renders 20.b obvious. EX1002: ¶436.

4. 20.c.1

For reasons discussed in Sections VI(A)(1.P)&(1.c.3), Takano/Ehrenreich renders 20.c.1 obvious. EX1002: ¶437.

5. 20.c.2

For reasons discussed in Sections VI(A)(1.a.1)&(M)(16.a.1), Takano/Ehrenreich renders 20.c.2 obvious. EX1002: ¶438.

6. 20.c.3

For reasons discussed in Section VI(A)(1.a.2), Takano/Ehrenreich renders 20.c.3 obvious. EX1002: ¶439.

7. 20.c.4

For reasons discussed in Section VI(A)(1.a.4), Takano/Ehrenreich renders 20.c.4 obvious. EX1002: ¶440.

8. 20.c.5

For reasons discussed in Section VI(M)(16.a.4), Takano/Ehrenreich renders 20.c.5 obvious. EX1002: ¶441.

9. 20.d

For reasons discussed in Sections VI(A)(1.b)&(M)(16.b), Takano/Ehrenreich renders 20.d obvious. EX1002: ¶442.

10. 20.e.1

As explained in Section VII(A)(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a center portion. EX1002: ¶443. The center portion has front and rear ends. EX1002: ¶443.

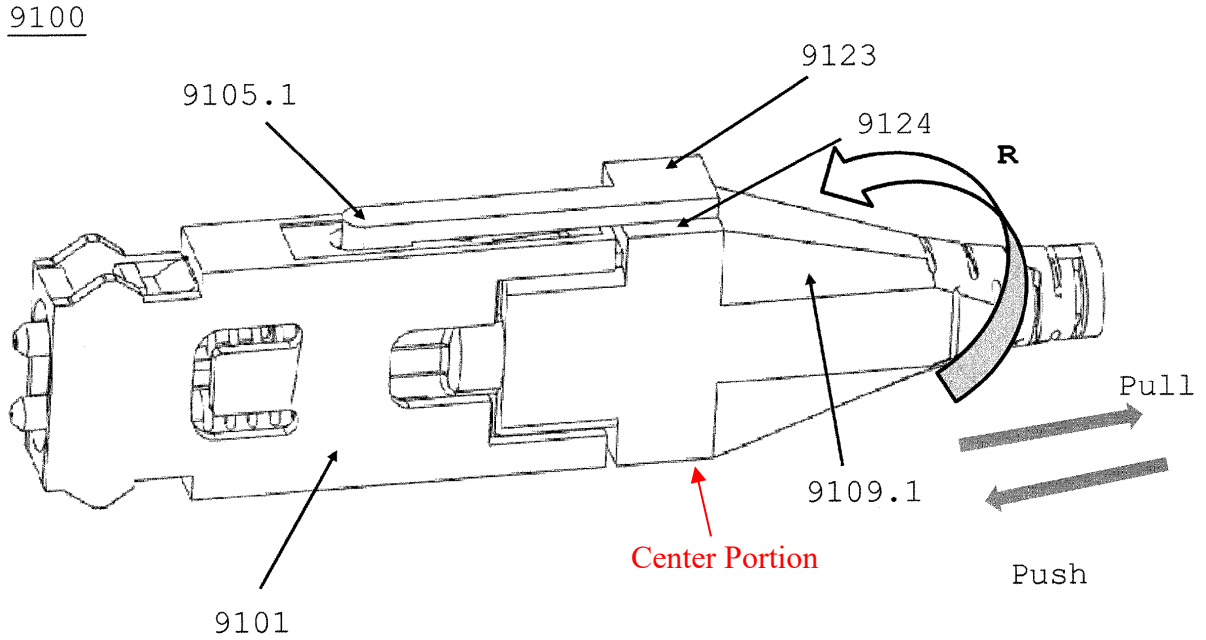


FIG. 16

9109.1

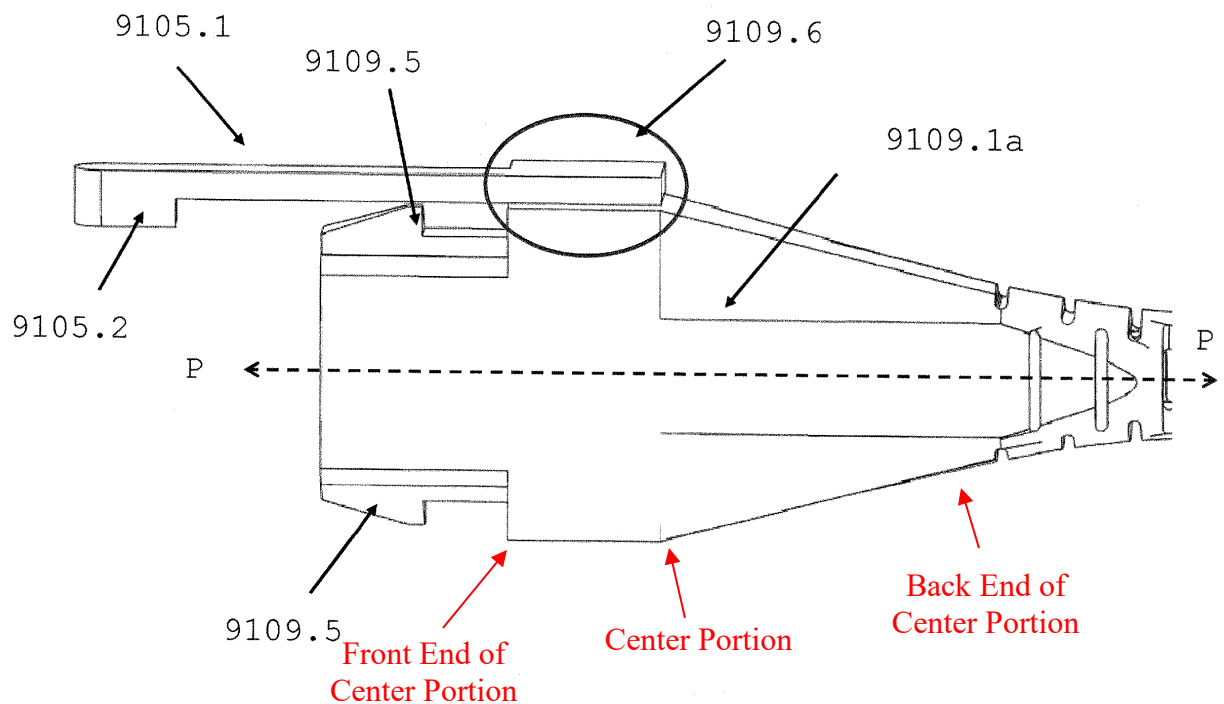
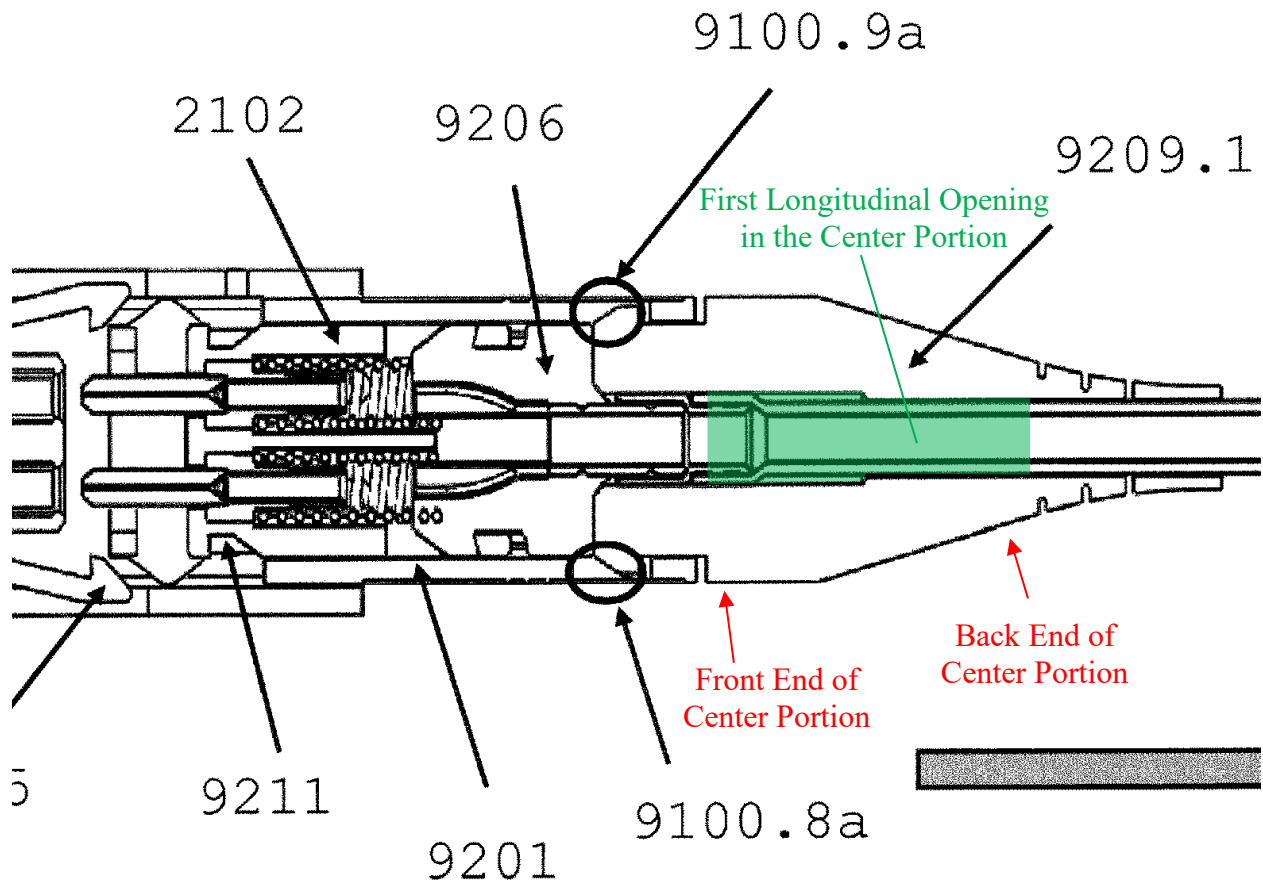


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

As explained in Section VI(A)(1.c.3), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059]; EX1002: ¶444. This opening includes a section (i.e., a first longitudinal opening) extending between the front and back ends of the central portion. EX1002: ¶444.



EX1003: Fig. 36 (annotated).

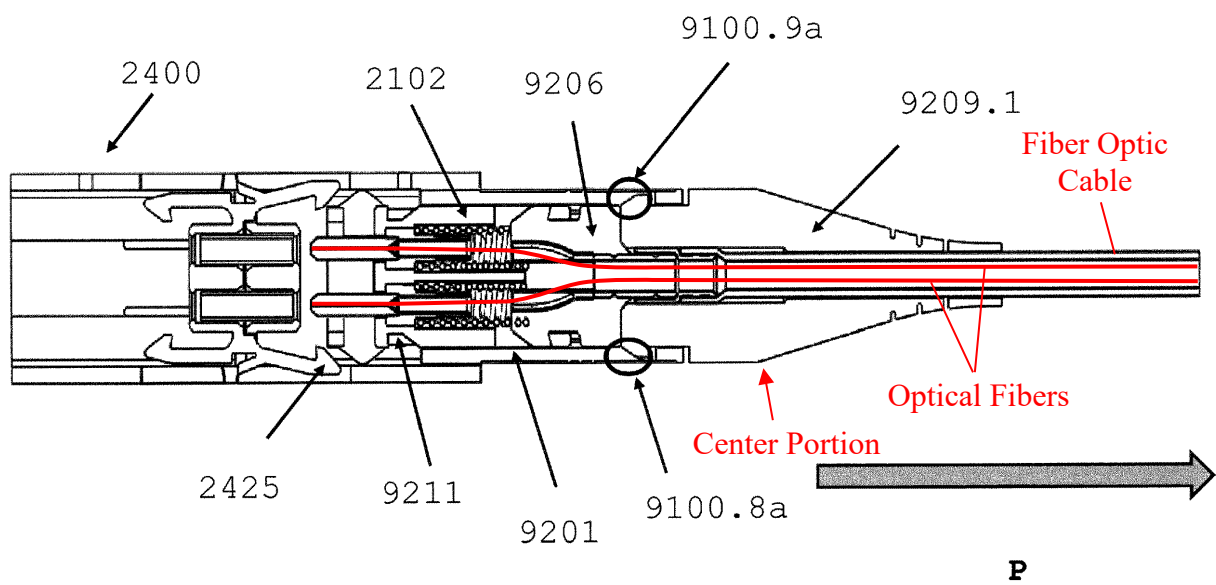


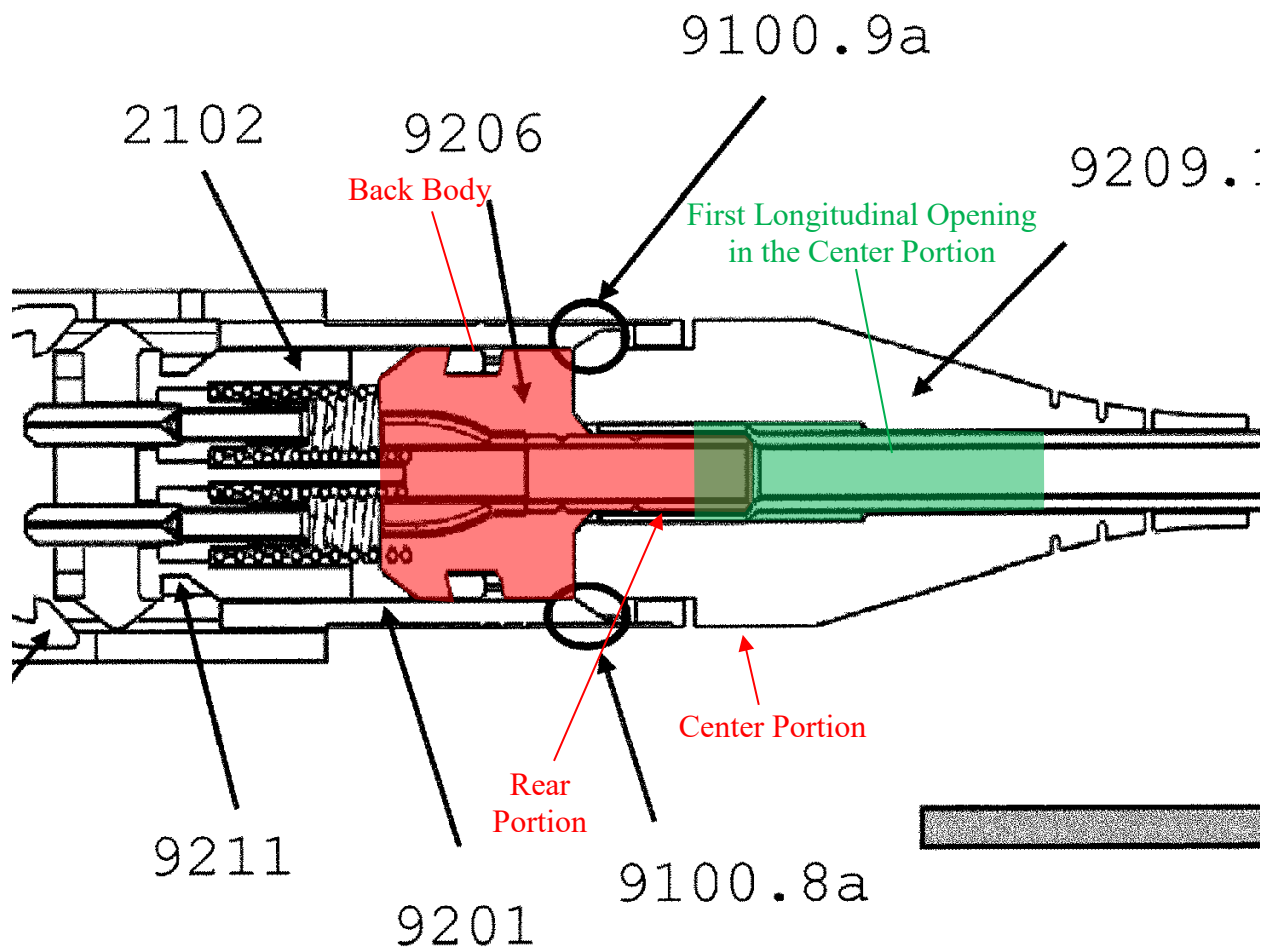
FIG. 36

EX1003: Fig. 36 (annotated).

As shown in Fig. 36 (above), the fiber optic cable (with its two optical fibers) is also received in this first longitudinal opening in the central portion.

EX1003: Fig. 36; EX1002: ¶445.

Further, the Takano/Ehrenreich combination results in the back post (i.e., rear portion) of the back body (9106, 9206) being received by the central portion of the boot (9109.1, 9209.1, 9309.1, 9409.1). Section XIV(A); EX1002: ¶446.



EX1003: Fig. 36 (annotated, modified).

Therefore, Takano/Ehrenreich renders 20.e.1 obvious. EX1002: ¶447.

11. 20.e.2

For reasons discussed in Section VI(P)(20.e.2), Takano/Ehrenreich renders 20.e.2 obvious. EX1002: ¶448.

12. 20.e.3

As explained in Sections VII(A)(1.c.1)&(1.c.2), the boot includes a front extension attached to the central portion. EX1003: Fig. 17, ¶[0059]; EX1002: ¶449. The front extension extends forward beyond the front end of the central portion. EX1002: ¶449.

9109.1

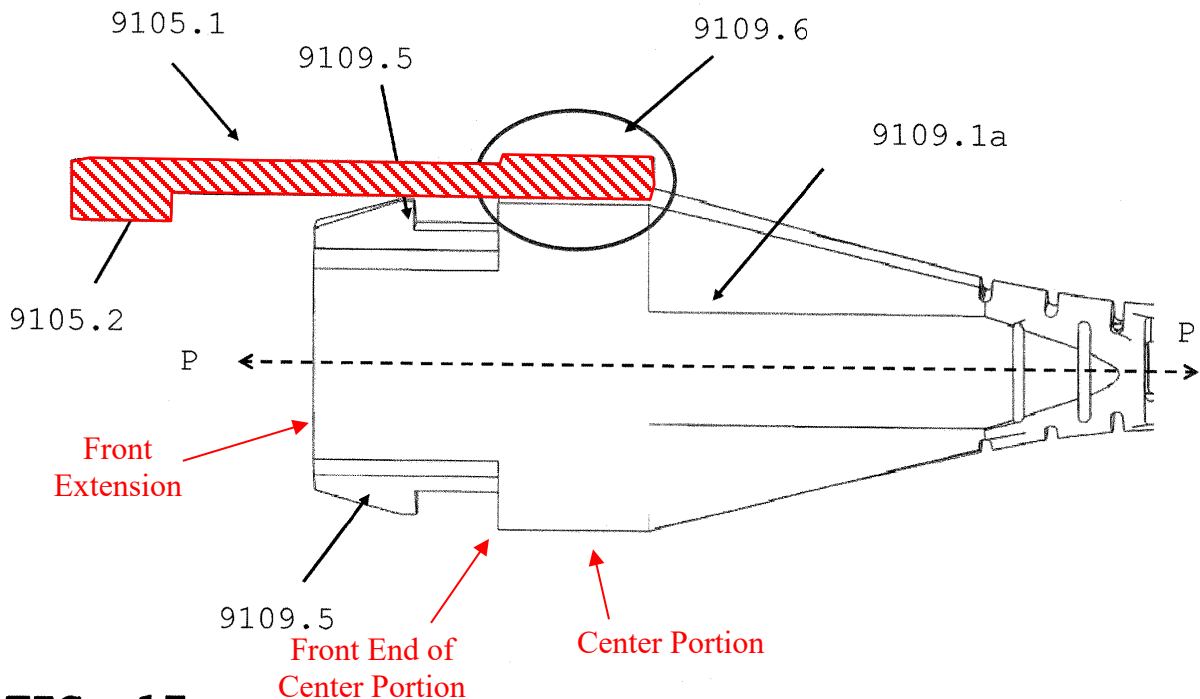


FIG. 17

EX1003: Fig. 17 (annotated).

Therefore, Takano/Ehrenreich renders 20.e.3 obvious. EX1002: ¶450.

13. 20.f

For reasons discussed in Sections VI(E)&VII(E), Takano/Ehrenreich renders 20.f obvious. EX1002: ¶451.

XV. GROUND 11: Claim 20 Would Have Been Obvious Over Takano (Third Embodiment) in View of Ehrenreich

This ground (like Ground 4) relies on the optical connector (2100, 3700) of Figs. 1-4 modified in view of the optical connector (9100) of Figs. 16-36.

EX1003: ¶[0059]; EX1002: ¶¶452-453.

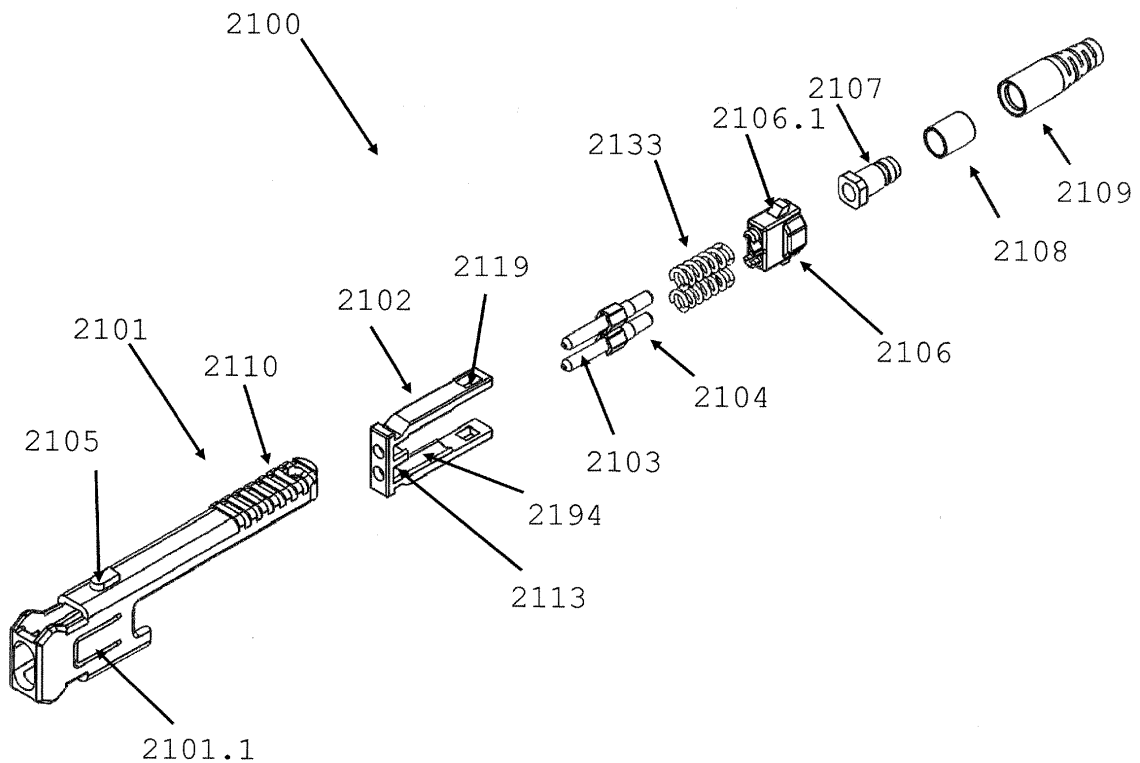


FIG. 1.

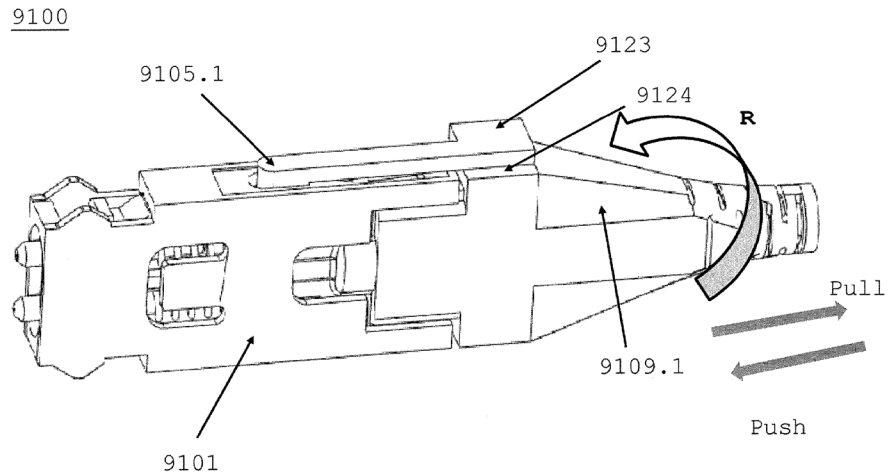


FIG. 16

EX1003: Figs. 1 and 16.

A. Motivation to Modify Micro Connector of Figs 1-4 Based on the Micro Connector of Figs. 16-36

For reasons stated in Section VIII(A), it would have been obvious to replace the boot of the micro connector of Figs. 1-4 with the embodiment of the boot of the micro connector of Figs. 16-36. EX1002: ¶454.

B. Motivation to Modify Takano Based on Ehrenreich

For reasons stated in Section XIV(A), it would have been obvious to lengthen Takano's back post of Figs. 1-4. EX1002: ¶455.

C. Independent Claim 20

1. 20.P

For reasons discussed in Section VIII(B)(1.P), Takano/Ehrenreich renders 20.P obvious. EX1002: ¶456.

2. 20.a

For reasons discussed in Section VIII(B)(1.P), Takano/Ehrenreich renders 20.a obvious. EX1002: ¶457.

3. 20.b

As explained in Sections VIII(B)(1.P)&XV(A), the Takano//Ehrenreich combination includes the push-pull boot of Figs 16-36. EX1002: ¶458. As explained in Section VI(P)(20.b), the back body in Figs. 16-36 engages the push-pull boot forward of the push-pull boot. EX1002: ¶458. This would also be the case when the push-pull boot of Figs 16-36 is implemented in the micro connector of Figs. 1-4—i.e., the back body and/or back post of Figs. 1-4 would be engaged by the push-pull boot of Figs 16-36. EX1002: ¶458.

Therefore, Takano/Ehrenreich renders 20.b obvious. EX1002: ¶459.

4. 20.c.1

For reasons discussed in Sections VIII(B)(1.P)&(1.c.3), Takano/Ehrenreich renders 20.c.1 obvious. EX1002: ¶460.

5. 20.c.2

For reasons discussed in Sections VIII(B)(1.a.1)&(N)(16.a.1), Takano/Ehrenreich renders 20.c.2 obvious. EX1002: ¶461

6. 20.c.3

For reasons discussed in Section VIII(B)(1.a.2), Takano/Ehrenreich renders 20.c.3 obvious. EX1002: ¶462.

7. 20.c.4

For reasons discussed in Section VIII(B)(1.a.4), Takano/Ehrenreich renders 20.c.4 obvious. EX1002: ¶463.

8. 20.c.5

For reasons discussed in Section VIII(N)(16.a.4), Takano/Ehrenreich renders 20.c.5 obvious. EX1002: ¶464.

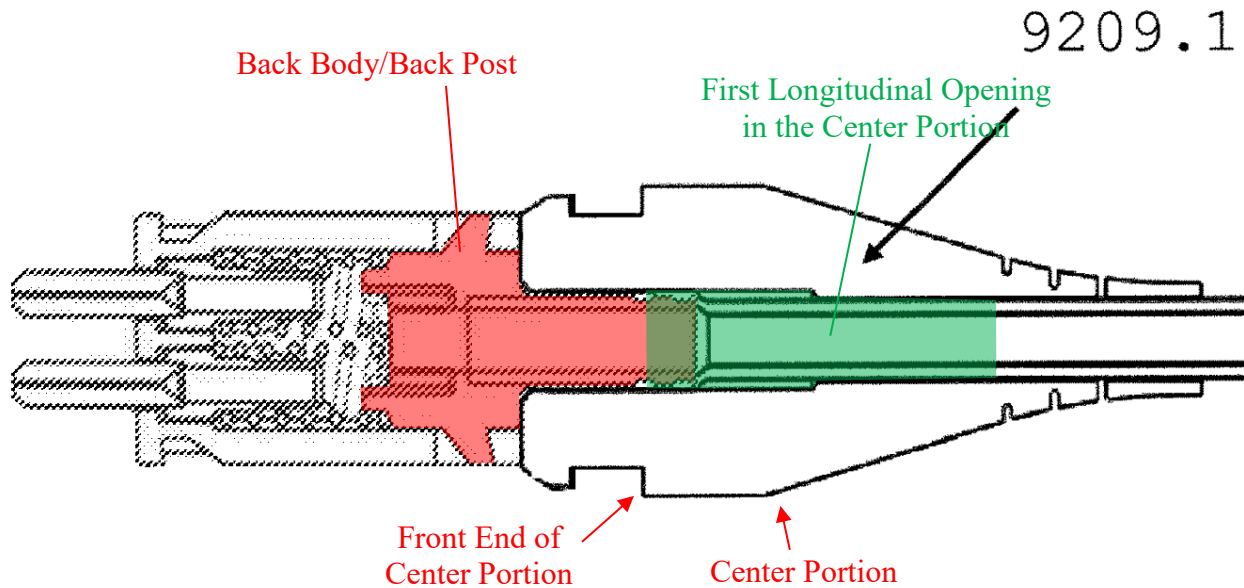
9. 20.d

For reasons discussed in Sections VIII(B)(1.b)&(N)(16.b), Takano/Ehrenreich renders 20.d obvious. EX1002: ¶465.

10. 20.e.1

As explained in Section XIV(B)(20.e.2), the push-pull boot of Figs. 16-36 has a center portion with front and back ends and a first longitudinal opening extending between the front and back ends that receives the fiber optic cable and its two optical fibers. EX1002: ¶466. This would also be the case when the push-pull boot of Figs 16-36 is implemented in the micro connector of Figs. 1-4. EX1002: ¶466.

Further, with the back post (2107) of the Takano/Ehrenreich combination lengthened, per Section XV(B), the back post would extend into the central portion. EX1002: ¶467. This is shown below:



EX1003: Fig. 36 & EX1004: Fig. 23B (annotated, modified to show the boot of EX1003: Fig. 36 with the front body, back body, and back post of EX1004: Fig. 23B).

Therefore, Takano/Ehrenreich renders 20.e.1 obvious. EX1002: ¶468.

11. 20.e.2

For reasons discussed in Section VI(P)(20.e.2), Takano/Ehrenreich renders 20.e.2 obvious. EX1002: ¶469.

12. 20.e.3

For reasons discussed in Sections VII(B)(1.c.1)&(1.c.2), and XIV(B)(20.e.2), Takano/Ehrenreich renders 20.e.3 obvious. EX1002: ¶470.

13. 20.f

For reasons discussed in Section VIII(F), Takano/Ehrenreich renders 20.f obvious. EX1002: ¶471.

XVI. GROUND 12: Claims 16-20 Would Have Been Obvious Over Takano (First/Second Embodiments) and in View of Davidson, Castagna, and/or Ehrenreich (as Needed)

Ground 12 builds on Grounds 2 and 3 based on the micro connector (9100) of Takano's Figs. 16-36. EX1002: ¶¶472-473.

If the Board determines Takano's micro connector of Figs. 16-36 does not disclose the ferrules being equidistance from the outer housing's long sides—limitations 16.a.4 and 20.c.5—this arrangement would have been obvious in view of Takano's micro connector of Figs. 1-4. EX1002: ¶474. As explained in Section VIII(N)(16.a.4), the ferrules (2103) of Takano's micro connector (2100, 3700) of Figs. 1-4 are spaced equidistant from the outer housing's (2101, 3701) long sides. EX1002: ¶474.

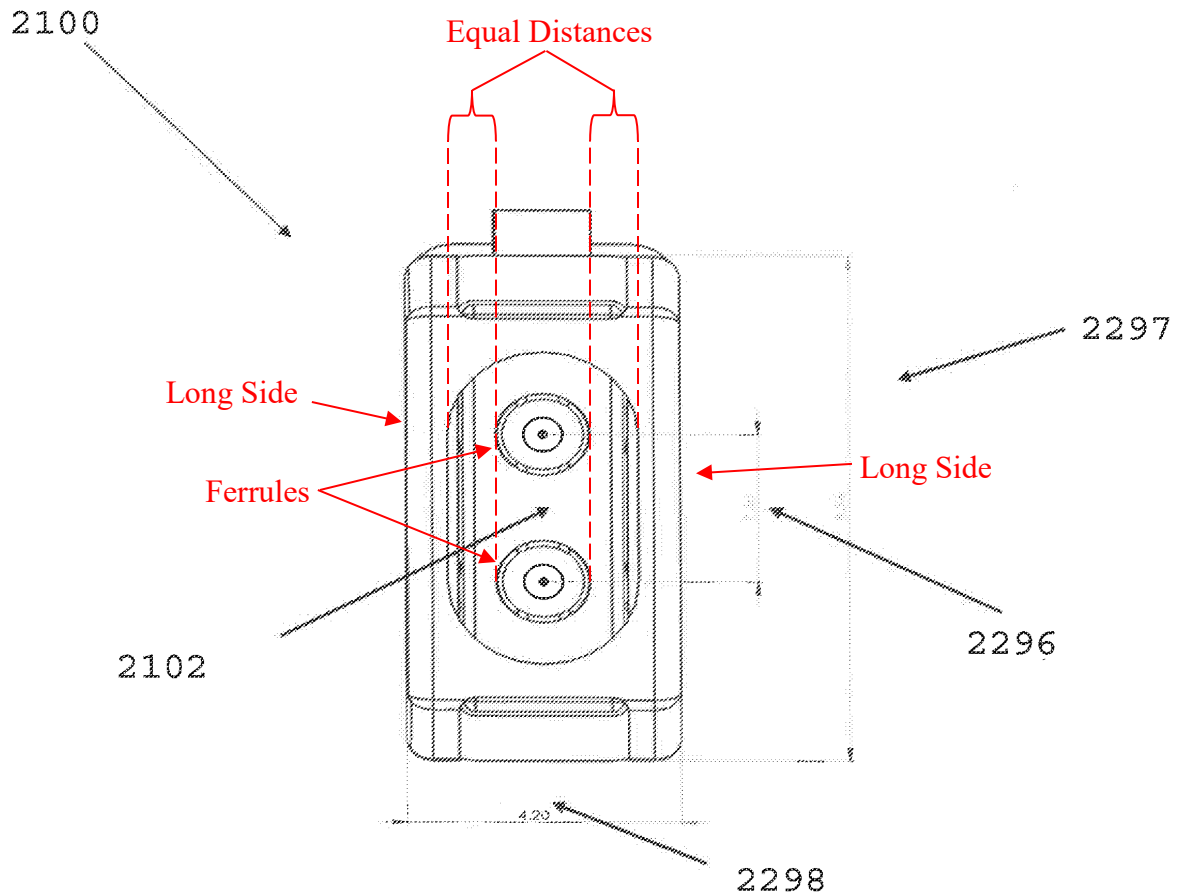


FIG. 22

EX1004: Fig. 22 (annotated).

It would have been obvious to arrange the ferrules to be equidistant from the long sides of the outer housing of micro connector of Figs. 16-36 to enable the micro connector to be receivable by the adapter when in both the first and second polarity configurations. EX1002: ¶475. As understood by a POSA, this arrangement results in the ferrules being symmetrically positioned between the long sides of the outer housing so that no matter the orientation of the housing relative to the ferrule or relative to the adapter, the ferrules will be aligned with and

inserted into the alignment sleeves of the adapter—regardless of the polarity configuration—when the micro connector is inserted into the adapter. EX1002: ¶475.

This modification would have been nothing more than the application of a known technique (equidistant ferrules) to improve a similar device (Takano’s micro connector of Figs. 16-36) in the same way to yield predictable results (a micro connector receivable in an adapter in its two different polarity configurations). *Sparton Corp. v. U.S.*, 89 Fed. Cl. 196, 237 (Fed. Cl. 2009); EX1002: ¶476.

A POSA would have had a reasonable expectation of success in making this modification as Takano’s micro connector of Figs. 1-4 demonstrates such an arrangement of the ferrules is possible. EX1002: ¶477.

The remaining limitations of the claims are met by Takano alone or in view of Davidson, Castagna, and/or Ehrenreich, as needed, as explained in Sections VI, VII, and XI-XV. EX1002: ¶478.

XVII.SECONDARY CONSIDERATIONS

Any secondary considerations will not overcome the invalidity positions herein. *Newell Cos., Inc. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988). EX1002: ¶479.

XVIII. TAKANO AND DAVIDSON ARE PRIOR ART TO THE ‘794 PATENT

Pursuant to *Penumbra*, “a reference patent document need only meet the “ministerial requirements” of §§ [] 120, and the provisional [] to which the reference patent document claims a right of priority must ‘describe[] the subject matter’ relied upon in the reference patent document as prior art.” *Penumbra, Inc. v. Rapidpulse Inc.*, IPR2021-01466, Paper 34 a 32 (P.T.A.B. Mar. 10, 2023) (precedential).

Penumbra is currently under appeal and Senko reserves the right to demonstrate Takano and Davidson are prior art under any test established.

A. Takano is Effectively Filed as of the ‘539 Provisional’s Filing Date

Takano claims the benefit of the ‘539 Provisional (EX1003: ¶[1001]; EX1011: 296); Takano was filed co-pending with the ‘539 Provisional (EX1003: (22)), and Takano shares common inventors with the ‘539 Provisional (EX1003: (72); EX1011: 294; EX1004: 10). EX1002: ¶¶480-484.

Further, the ‘539 Provisional describes the subject matter in Takano forming the grounds of this Petition. EX1002: ¶485. For example, Figs. 21-40C and 91A-102B and paragraphs [218]-[242] and [280]-[293] of the ‘539 Provisional describe the subject matter in Figs. 1-4 and 16-36 and paragraphs [0050]-[0051] and [0058]-[0074] of Takano. Significantly, ‘539 Provisional’s Figs. 21, 40-40C, 91A-94E, and 100A-C are identical to Takano Figs. 1-4 and 16-36. EX1002: ¶¶485-488.

B. Davidson is Effectively Filed as of the ‘914 Provisional’s Filing Date

Davidson claims the benefit of the ‘914 Provisional (EX1006: ¶[1001]; EX1012: 255); Davidson was filed co-pending with the ‘914 Provisional (EX1006: (22)), and Davidson shares common inventors with the ‘914 Provisional (EX1006: (72); EX1012: 253; EX1013: 7). EX1002: ¶¶489-490.

Further, the ‘914 Provisional describes the subject matter in Davidson forming the grounds of this Petition. EX1002: ¶491. For example, drawing sheets 5-7 from the ‘914 Provisional describe the subject matter in Figs. 5-9 and paragraphs [0038]-[0039] of Davidson. Significantly, the Davidson’s Figs. 5-9 are generally identical with the figures on ‘914 Provisional’s drawing sheets 5-7. EX1002: ¶¶491-493.

XIX. THE BOARD SHOULD NOT DENY INSTITUTION

The ‘794 Patent is currently in a district-court case and an ITC investigation. Institution should not be denied under 35 U.S.C. §314(a) because the related district-court proceeding is in its early stages and trial has yet to be set. Further, this Petition sets forth compelling unpatentability challenges. Accordingly, the *Fintiv* factors favor institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential).

Institution should not be denied under 35 U.S.C. §325(d). While Takano, Davidson, and Katoh were cited, these references were never applied. EX1010:

48-54, 84-91. *Advanced Bionics* favors institution because “the Office [has] erred in a manner material to the patentability of challenged claims.” *Advanced Bionics, LLC v. Med-El Elektr. Geräte GmbH*, IPR2019-01469, DI, 8 (P.T.A.B. Feb. 13, 2020) (precedential). The Examiner did not reject the claims based on Takano, Davidson, or Katoh. EX1010: 48-54. In fact, no prior art was applied against the claims. EX1010: 48-54. Thus, the Examiner made a material error not applying these references, such as Takano which anticipates most of the claims.

XX. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

A. Real Parties-In-Interest under 37 C.F.R. §42.8(b)(1)

Senko Advanced Components, Inc. is the real party-in-interest for this Petition.

B. Related Matters under 37 C.F.R. §42.8(b)(2)

The ‘794 Patent is involved a civil action in *US Conec Ltd. v. Senko Advance Co., Ltd. et al*, 2-24-cv-00202, currently pending in the United States District Court for the Eastern District of Texas. The ‘794 Patent is also being asserted by US Conec Ltd. in *Fiber-Optic Connectors, Adapters, Jump Cables, Patch Cords, Products Containing the Same, and Components Thereof*, Inv. No. 337-TA-3733 before the International Trade Commission.

C. Designation of Lead and Back-Up Counsel under 37 C.F.R. §42.8(b)(3)

Pursuant to 37 C.F.R. §§42.8(b)(3) and 42.10(a), Senko Advanced

Components, Inc. provides the following designation of counsel:

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D. Service Information (37 C.F.R. §42.8(b)(4)):

Senko Advanced Components, Inc. consents to service by email to lead and backup counsel, using the email addresses above.

E. Payment Information Under 37 C.F.R. §§42.15(a) and 42.203(a)

The *post-grant* review fees have been submitted herewith pursuant to 37 C.F.R. §42.203(a) and 42.15(a).

XXI. GROUNDS FOR STANDING

The ‘794 Patent is eligible for *post-grant* review. Petitioner is not barred or estopped from petitioning for *post-grant* review. This Petition is filed within nine months from the ‘794 Patent’s grant date (February 20, 2024).

XXII. CONCLUSION

For these reasons, *post-grant* review of the ‘794 Patent is requested.

Dated: June 20, 2024

Respectfully submitted,

/Kurt F. James/

Kurt F. James, Reg. No. 33,716

Counsel for Petitioner

CERTIFICATE OF SERVICE

Under 37 C.F.R. § 42.6(e), the undersigned certifies that on June 20, 2024, a copy of the PETITION FOR POST-GRANT REVIEW OF U.S. PATENT NO. 11,906,794 and associated exhibits was served via FedEx pursuant to 37 C.F.R. § 42.205 on the following attorneys of record for Patent Owner:

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Lead Counsel for Petitioner
Kurt F. James
Reg. No. 33,716

**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME
REQUIREMENTS UNDER 37 C.F.R. §42.24**

Under 37 C.F.R. § 42.24(d), the undersigned certifies that this Petition for *Post-Grant* Review complies with the type-volume limitation of 37 C.F.R. § 42.24(a)(1) because it contains 18,694 words, excluding the parts of the Petition exempted by 37 C.F.R. §42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(2)(ii) and the type style requirements of 37 C.F.R. § 42.6(a)(2)(iii) and (iv).

/Kurt F. James/

Kurt F. James, Reg. No. 33,716
Lead Counsel for Petitioner