

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SENKO ADVANCED COMPONENTS  
Petitioner

v.

US CONEC LTD.  
Patent Owner

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Case: PGR2024-00046  
Patent No. 11,808,994

**PETITION FOR POST-GRANT REVIEW  
OF U.S. PATENT NO. 11,808,994**

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| <i>KSR Int’l Co. v. Teleflex Inc.</i> ,<br>550 US 398 (2007).....                                                  | 212, 226       |
| <i>Nautilus, Inc. v. Biosig Instruments, Inc.</i> ,<br>572 U.S. 898 (2014).....                                    | 26             |
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| <i>Penumbra, Inc. v. Rapidpulse Inc.</i> ,<br>IPR2021-01466, Paper 34.....                                         | 246, 247       |
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| <i>Samsung Elecs. Co. v. Elm 3DS Innovations</i> ,<br>LLC, 925 F.3d 1373 (Fed. Cir. 2019).....                     | 62             |
| <i>In re Schreiber</i> ,<br>128 F.3d 1473 (Fed. Cir. 1997) .....                                                   | 64, 74         |
| <i>Vas-Cath Inc. v. Mahurkar</i> ,<br>935 F.2d 1555 (Fed. Cir. 1991) .....                                         | 28             |
| <b>Statutes</b>                                                                                                    |                |
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35 U.S.C. §325(d) .....250

35 U.S.C. §363 .....2

35 U.S.C. §371 .....2

**Other Authorities**

37 C.F.R. §42.200(b) .....25

## **EXHIBIT LIST**

| <b>Exhibit No.</b> | <b>Description</b>                                                     |
|--------------------|------------------------------------------------------------------------|
| 1001               | U.S. Patent No. 11,808,994                                             |
| 1002               | Declaration of Edward Lurie                                            |
| 1003               | U.S. Publication No. 2019/0018209 (“Takano’209”)                       |
| 1004               | U.S. Provisional Application No. 62/588,276                            |
| 1005               | U.S. Publication No. 2017/0205588 (“Lee”)                              |
| 1006               | U.S. Patent No. 6,450,695 (“Matsumoto”)                                |
| 1007               | U.S. Publication No. 2016/0202431 (“Hill”)                             |
| 1008               | English Translation of Japanese Patent No. 2573482 (“Shimozu”)         |
| 1009               | U.S. Patent No. 11,307,369 (“Takano’369”)                              |
| 1010               | U.S. Provisional Application No. 62/532,710                            |
| 1011               | U.S. Publication No. 2020/0285005 (“Watanabe”)                         |
| 1012               | U.S. Publication No. 2018/0217340 (“Wong”)                             |
| 1013               | U.S. Provisional Application No. 62/463,901                            |
| 1014               | English Translation of Japanese Publication No. 2012-053375 (“Toyama”) |
| 1015               | QSFP-DD Hardware Specification (“QSFP-DD”)                             |
| 1016               | SFP-DD Hardware Specification (“SFP-DD”)                               |
| 1017               | PCT Publication No. WO 2018/042775                                     |
| 1018               | U.S. Publication No. 2018/0224608                                      |

| <b>Exhibit No.</b> | <b>Description</b>                                                                       |
|--------------------|------------------------------------------------------------------------------------------|
| 1019               | U.S. Publication No. 2005/0136722                                                        |
| 1020               | U.S. Publication No. 2018/0106972                                                        |
| 1021               | U.S. Patent No. 11,733,466                                                               |
| 1022               | U.S. Patent No. 5,673,346                                                                |
| 1023               | U.S. Publication No. 2016/0161680                                                        |
| 1024               | U.S. Publication No. 2005/0135753                                                        |
| 1025               | U.S. Patent No. 9,366,829                                                                |
| 1026               | U.S. Patent No. 5,222,168                                                                |
| 1027               | PCT Publication No. 2012/174227                                                          |
| 1028               | Tutorials of Fiber Optic Products: Fiber Optic Connector Polishing                       |
| 1029               | UPC or APC – Which One to Chose                                                          |
| 1030               | APC vs. UPC: What’s the Difference                                                       |
| 1031               | Prosecution History of U.S. Application No. 17/327,197                                   |
| 1032               | Prosecution History of U.S. Patent No. 11,808,994                                        |
| 1033               | Stay Order                                                                               |
| 1034               | Claim Listing                                                                            |
| 1035               | QSFP-DD MSA Group Announces New Hardware Specification                                   |
| 1036               | Internet Archive WayBack Machine: QSFP-DD MSA Group Announces New Hardware Specification |
| 1037               | SFP-DD MSA Releases Specification for High-Speed, High-Density Interface                 |

| Exhibit No. | Description                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------|
| 1038        | Internet Archive WayBack Machine: SFP-DD MSA Releases Specification for High-Speed, High-Density Interface |

*Emphasis added throughout unless indicated otherwise.*

## **I. INTRODUCTION**

Senko Advanced Components, Inc. (“Petitioner” or “Senko”) requests *post-grant* review, seeking cancellation of claims 1-15 of U.S. Patent No. 11,808,994 (“the ‘994 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 fiber optic connector design. EX1002: ¶¶1-6.

## **II. IDENTIFICATION OF CHALLENGE**

### **A. Identification of Prior Art**

The ‘994 Patent claims priority to Provisional Application No. 62/607,555, filed December 19, 2017.

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

- Lee
- Matsumoto
- Hill
- Shimozu
- Toyama
- QSFP-DD
- SFP-DD

QSFP-DD and SFP-DD were published in September 2017. EX1035-1038.

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

- Takano’209

Takano’209 claims priority to U.S. Provisional App. No. 62/588,276 (“the ‘276 Provisional”; EX1004), filed November 17, 2017.

- Takano’369

Takano’369 claims priority to U.S. Provisional App. No. 62/532,710 (“the ‘710 Provisional”; EX1010), filed July 14, 2017.

- Wong

Wong claims priority to U.S. Provisional App. No. 62/463,901 (“the ‘901 Provisional”; EX1013), filed February 27, 2017.

Takano’209, Takano’369, and Wong are prior art under 35 U.S.C. §102(a)(2) because these references are considered effectively filed as of their provisional filing dates, as explained in Section XXII. 35 U.S.C. §102(d)(2).

- Watanabe

Watanabe is prior art under 35 U.S.C §102(a)(2) because Watanabe is a 35 U.S.C. §371 national stage entry of WO 2018/042775 (EX1017), which designated the United States and was filed June 23, 2017. 35 U.S.C. §363.

Takano’209, Lee, and Wong were cited during examination.

## **B. Statutory Grounds for Challenge**

Petitioner advances these unpatentability grounds. Claim 1 is independent.

| Ground | References                 | Basis   | Claims Challenged |
|--------|----------------------------|---------|-------------------|
| 1      |                            | §112(b) | 12, 13            |
| 2      |                            | §112(a) | 1-15              |
| 3      | Takano'209                 | §102    | 1-13              |
| 4      | Takano'209, Lee            | §103    | 3, 13             |
| 5      | Takano'209, Matsumoto      | §103    | 4, 11             |
| 6      | Takano'209, Hill           | §103    | 14, 15            |
| 7      | Takano'209, Shimozu        | §103    | 1-13              |
| 8      | Takano'209, Shimozu, Lee   | §103    | 3, 13             |
| 9      | Takano'209, Shimozu, Hill  | §103    | 14, 15            |
| 10     | Takano'369, Watanabe       | §103    | 1-5, 8-13         |
| 11     | Takano'369, Watanabe, Wong | §103    | 6, 7              |
| 12     | Takano'369, Watanabe, Hill | §103    | 14, 15            |
| 13     | Toyama, Shimozu            | §103    | 1-7, 10-13        |
| 14     | Toyama, Shimozu, QSFP-DD   | §103    | 8                 |
| 15     | Toyama, Shimozu, SFP-DD    | §103    | 9                 |
| 16     | Toyama, Shimozu, Hill      | §103    | 14, 15            |

### III. BACKGROUND OF THE '994 PATENT

#### A. Subject Matter of the '994 Patent

The '994 Patent pertains to small form factor fiber optic connectors.

EX1001: 1:28-30; EX1002: ¶27. The '994 Patent's first connector (100) embodiment includes a housing (102), two ferrule assemblies (120), a crimp body (106), a latch component (104), and a boot (110). EX1001: 4:55-67; EX1002: ¶27.

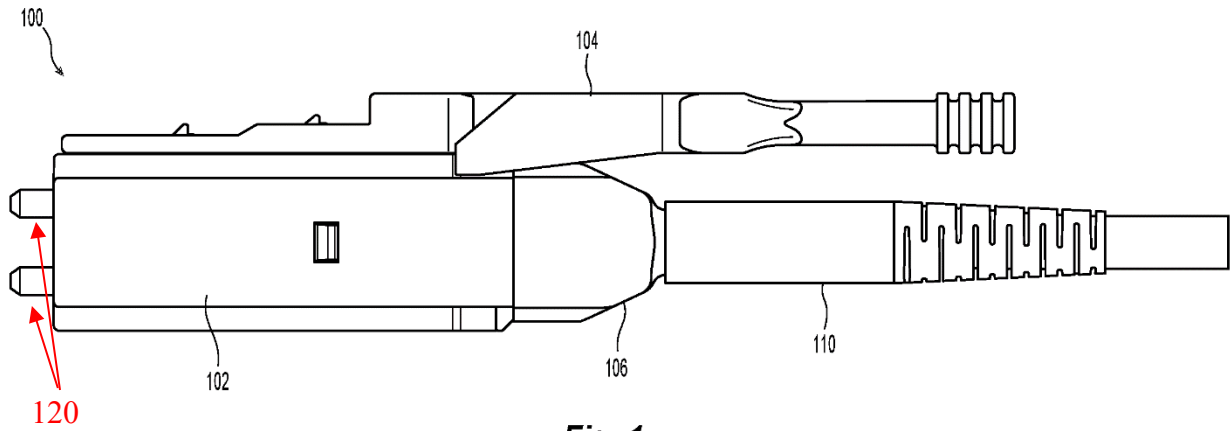


**Fig. 1**

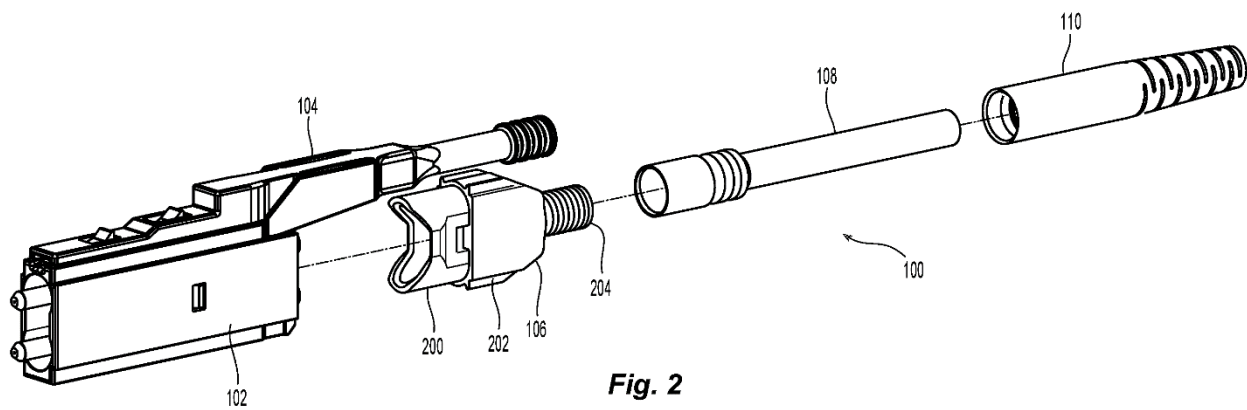


**Fig. 2**

EX1001: Figs. 1 and 2 (annotated).

The latch component (104) facilitates insertion and removal of the connector (100) from an adapter (400) and is attachable to the top or bottom of the housing (102) to set the polarity. EX1001: 8:23-50; EX1002: ¶28.

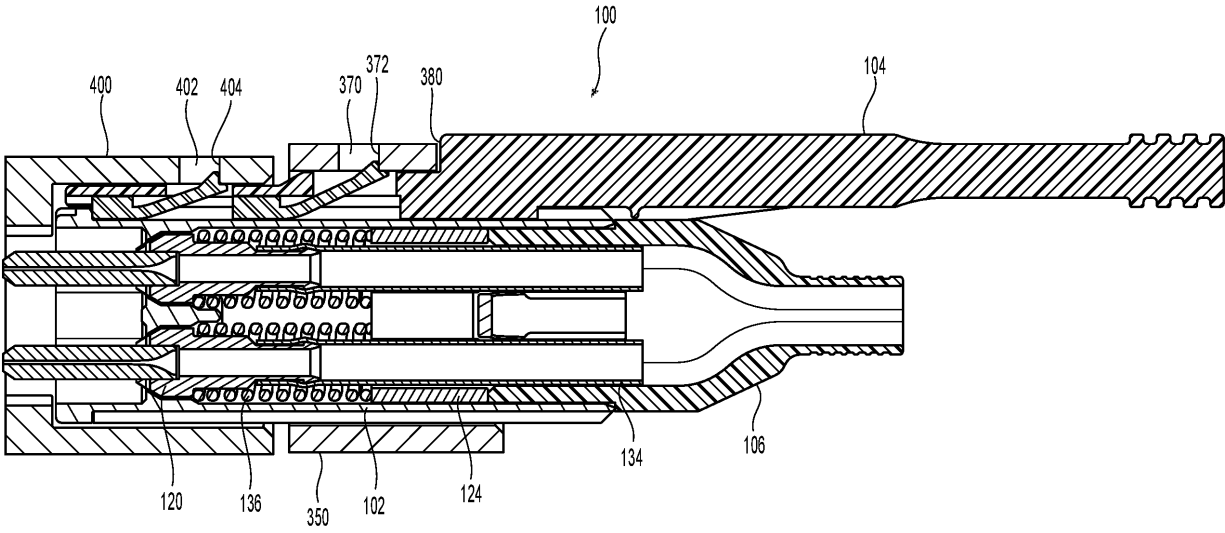


**Fig. 21**

EX1001: Fig. 21.

Other embodiments disclose variations of the latch component (1104, 2104).

EX1002: ¶29.

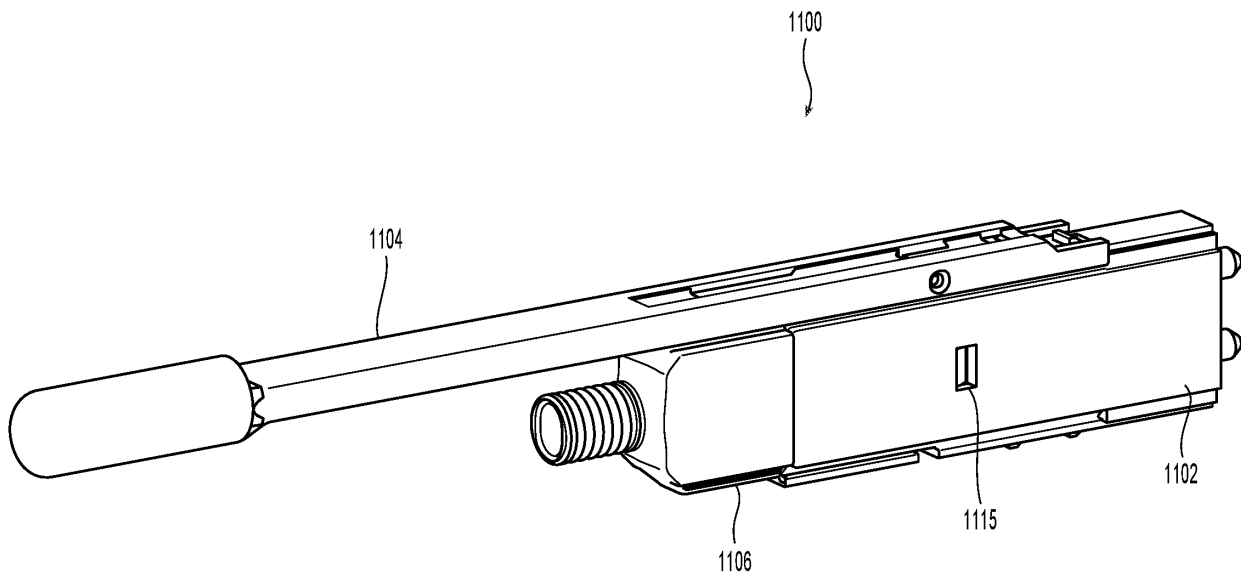


**Fig. 23**

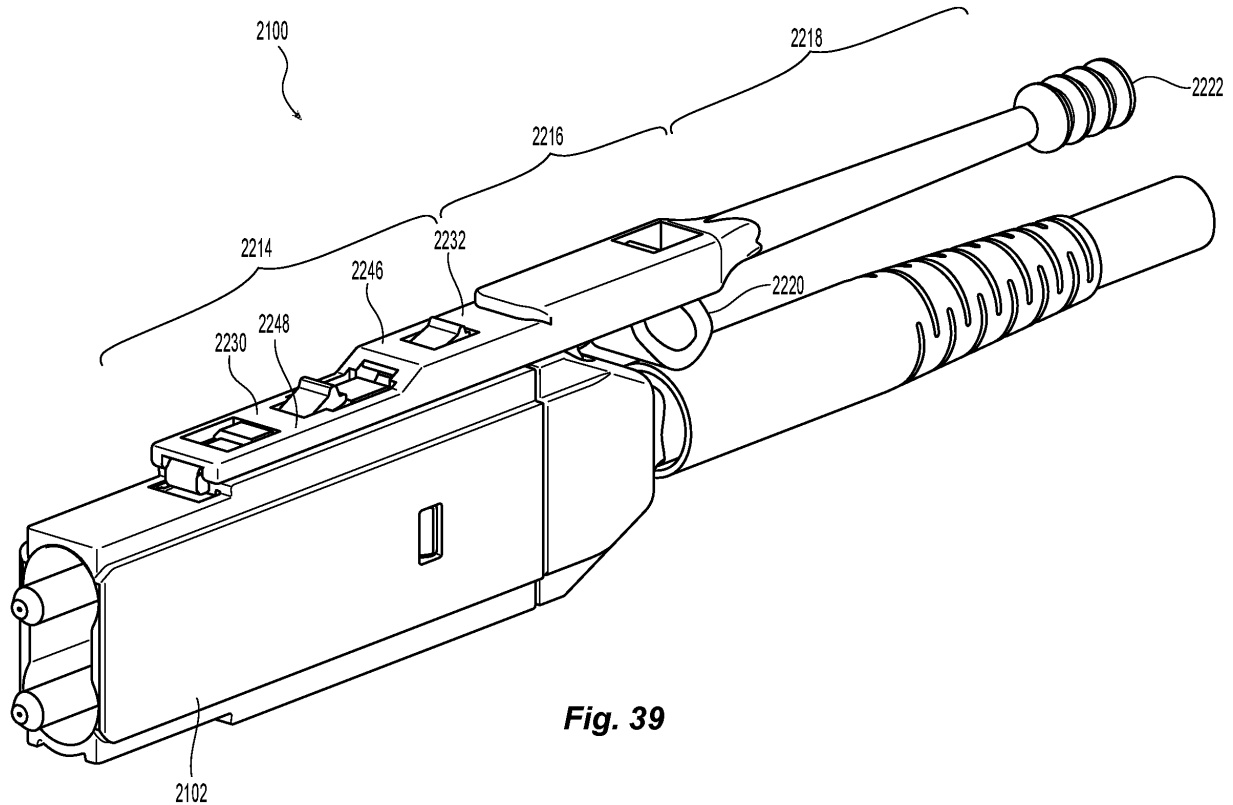


**Fig. 39**

EX1001: Figs. 23 and 39.

## **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 '994 Patent.

EX1001: 1:18-39; EX1003: ¶[0002]; EX1005: ¶[0002]; EX1006: 1:4-7; EX1007:

Abstract; EX1008: ¶[0001]; EX1009: 1:34-36; EX1011: ¶[0001]; EX1012:

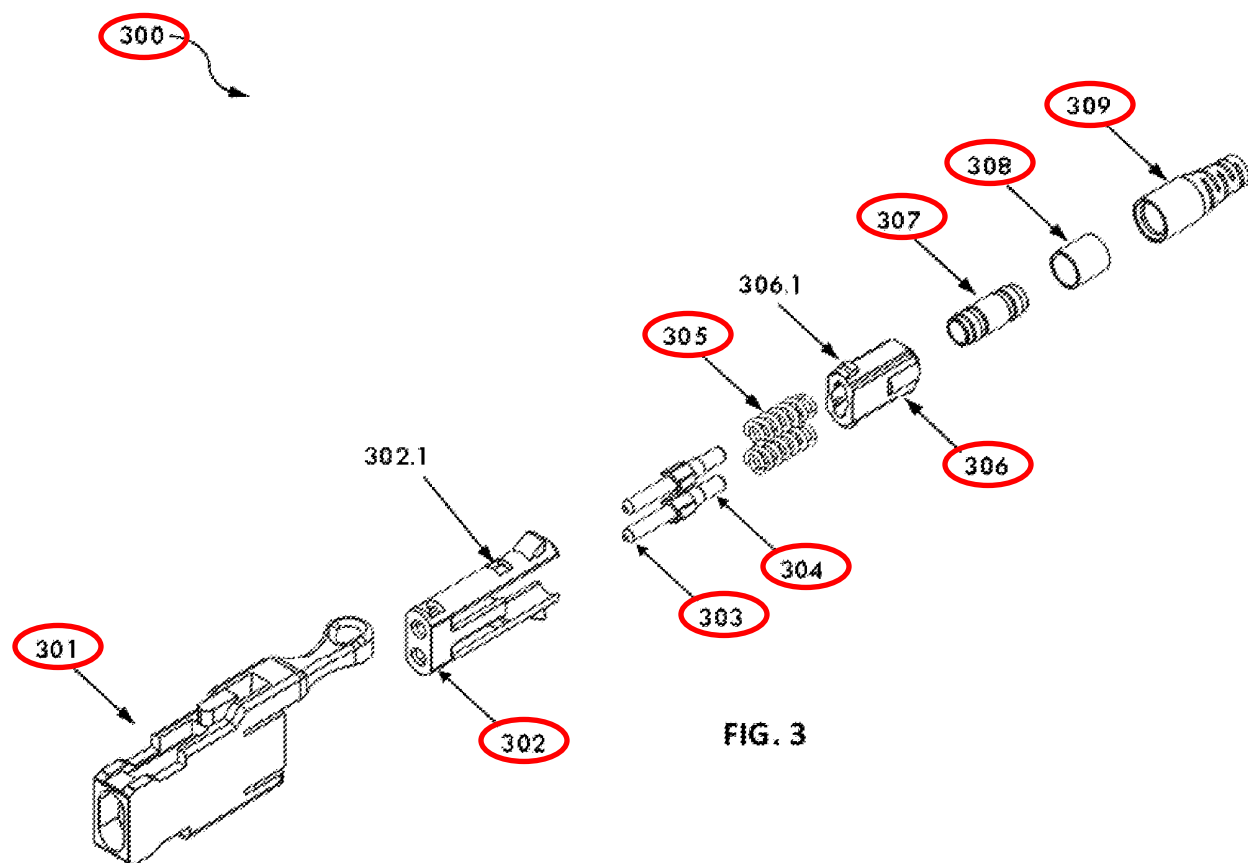
¶[0002]; EX1014: ¶[0001]; EX1015: 1; EX1016: 1; EX1002: ¶¶30-34.

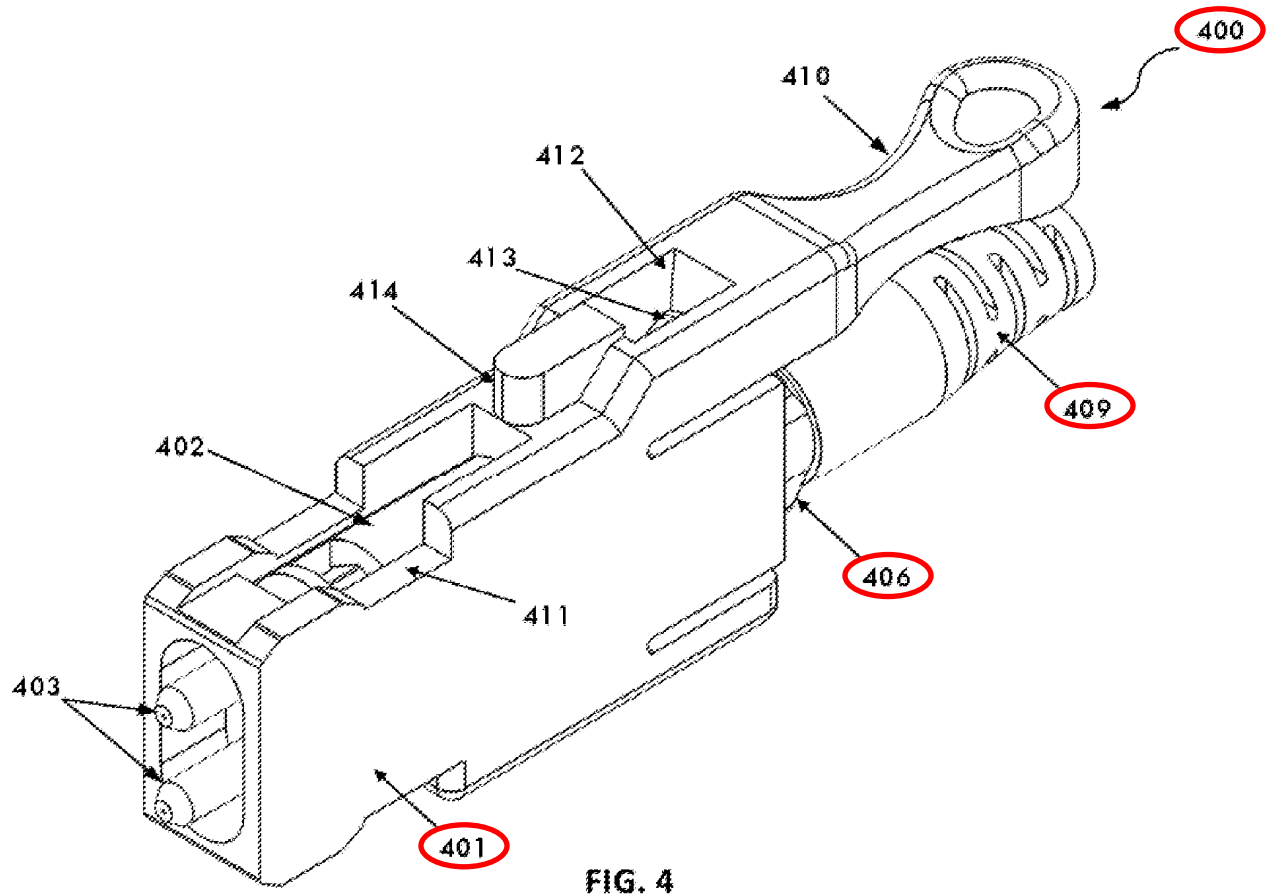
## 1. Takano'209

Takano'209 discloses multiple optical connector embodiments. EX1003: Figs. 3 and 21A; EX1002: ¶¶35-36. This Petition refers to two embodiments, called the “first embodiment” and the “second embodiment.” EX1002: ¶36.

### *i. First Embodiment*

Takano'209 discloses an optical connector (300, 400, 500, 1100A-B, 1200) having an outer housing (301, 401, 501, 1101, 1201), a front body (302, 402, 502, 1202), ferrules (303, 403), ferrule flanges (304), two springs (305), a back body (306, 406), a back post (307), a crimp ring (308), and a boot (309, 409). EX1003: ¶¶[0091]-[0093], [0105]-[0107]; EX1002: ¶37.





EX1003: Figs. 3 and 4 (annotated).

The connector includes a key (414) for orienting the connector relative to an adapter. EX1003: ¶[0092], Figs. 4, 11A, and 12B; EX1002: ¶38.

*ii. Second Embodiment*

Takano'209 discloses another optical connector (2100) having an outer housing (2110), a front body (2115), two ferrule assemblies (2120), two springs (2125), a back body (2130), a back post (2135), a crimp ring (2140), and a boot (2145). EX1003: ¶[0117]; EX1002: ¶39.

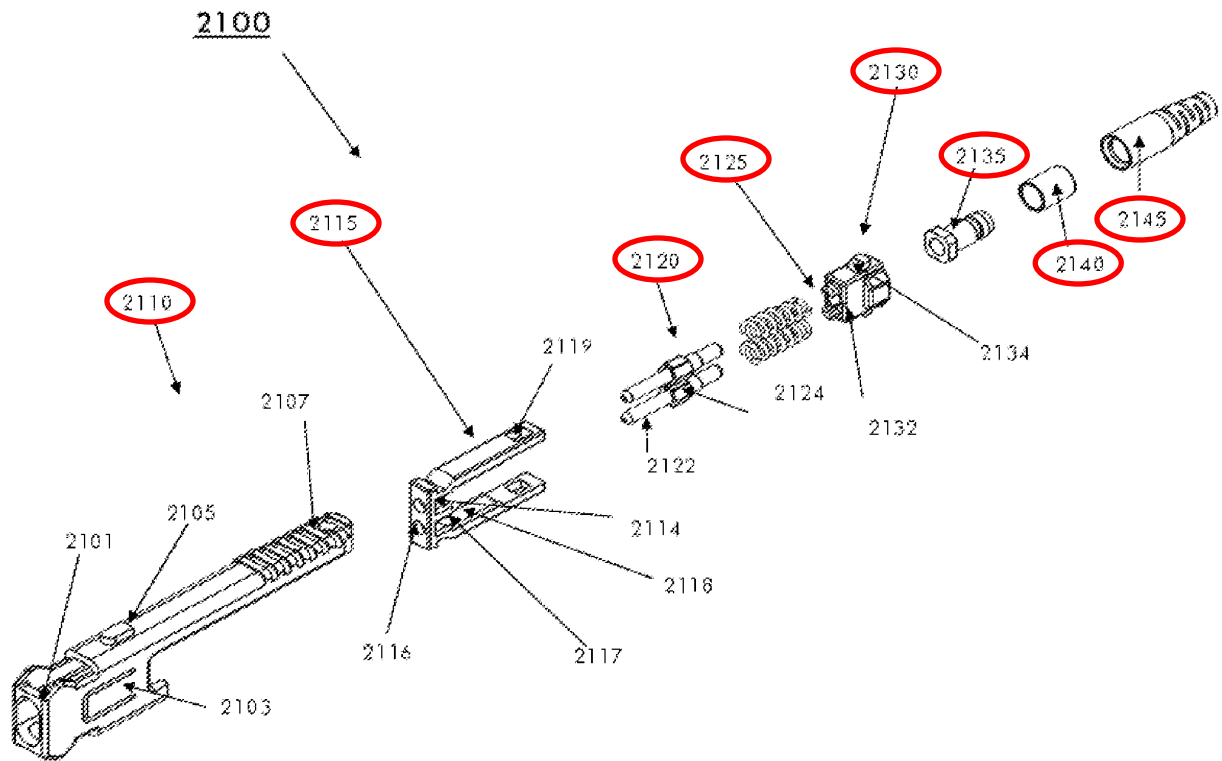


**FIG. 21A**

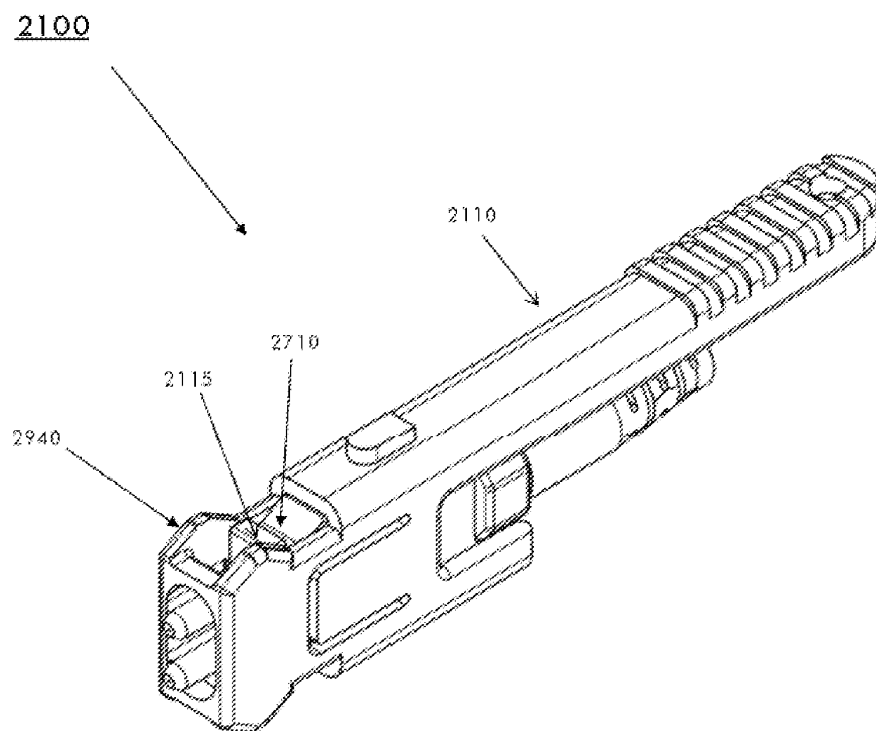


**FIG. 21B**

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

The outer housing (2110) includes a connector alignment key (2105) received in a corresponding connector alignment slot (2403) of the adapter (2400).

EX1003: ¶¶[0117], [0127]; EX1002: ¶40.

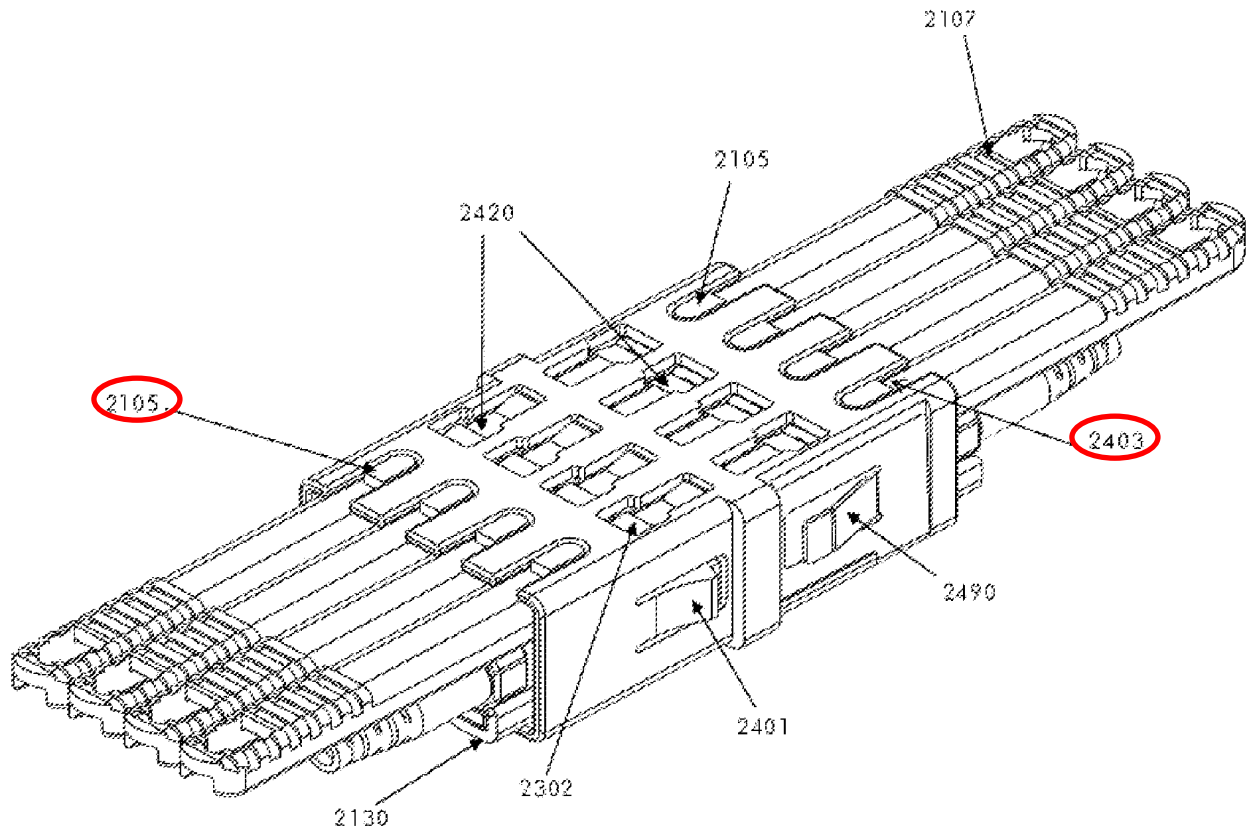


**FIG. 31**

EX1003: Fig. 31 (annotated).

## **2. Lee**

Lee teaches an optical connector (10) including two ferrules (20, 22), springs (100, 102), and a spring push (104). EX1005: Figs. 2 and 3, ¶¶[0029]-[0030], [0038]; EX1002: ¶¶41-43.

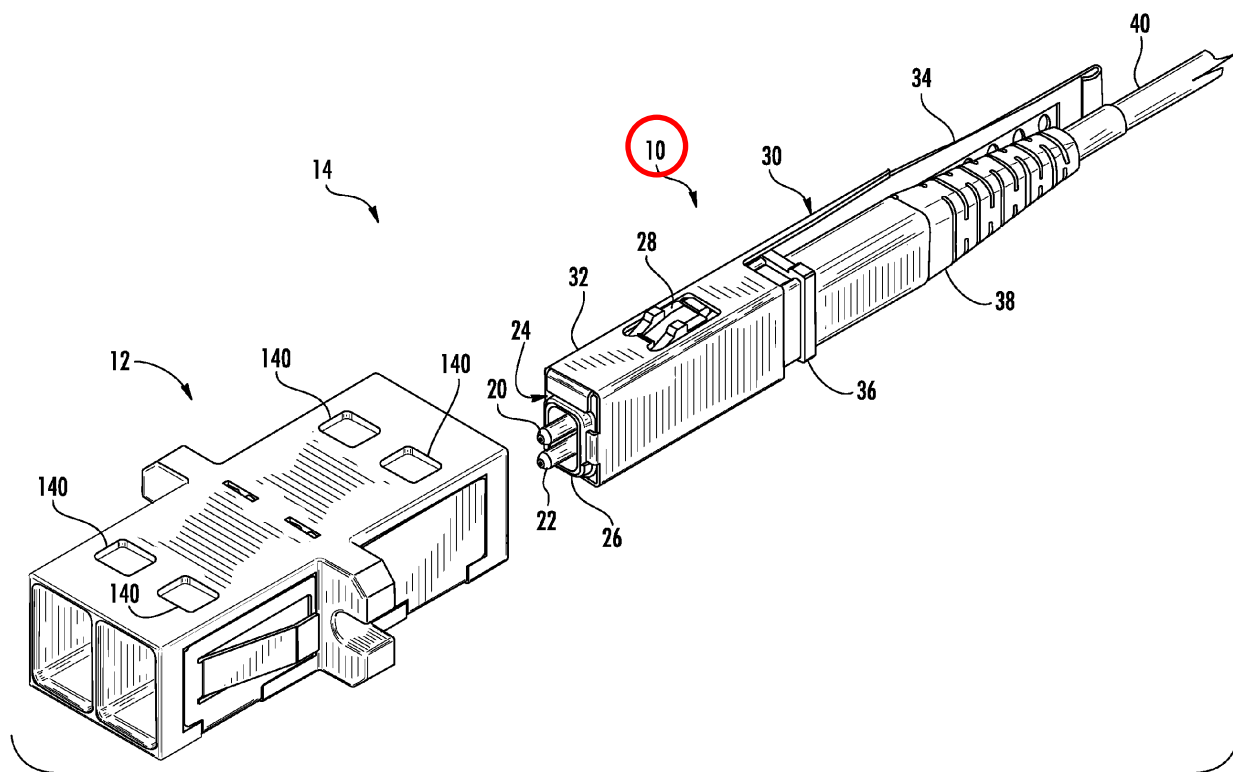


FIG. 1

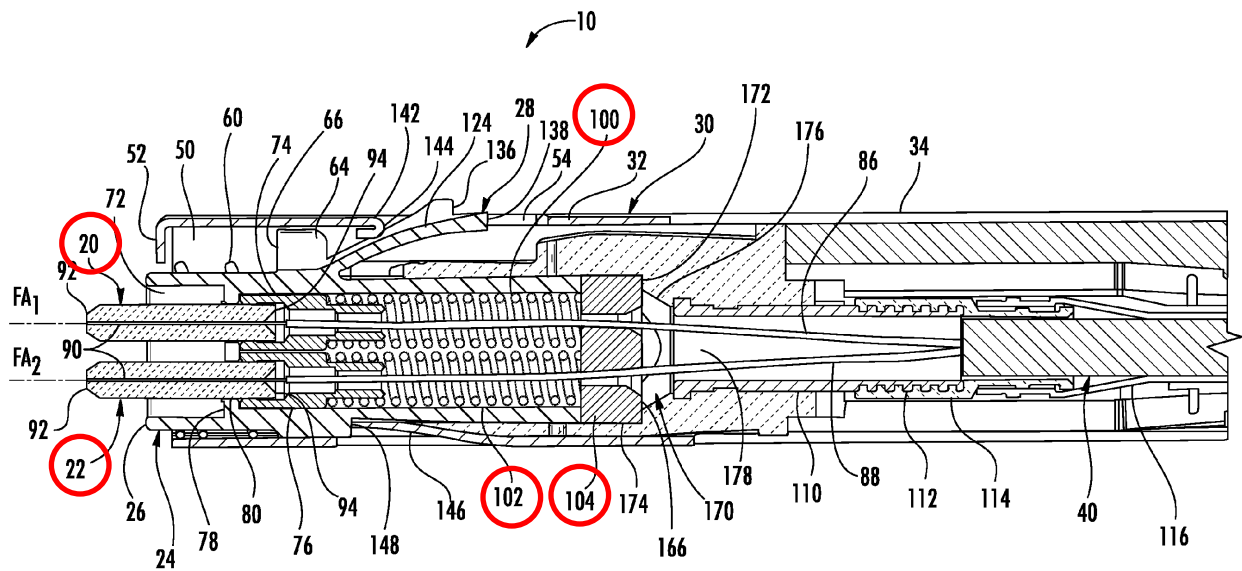
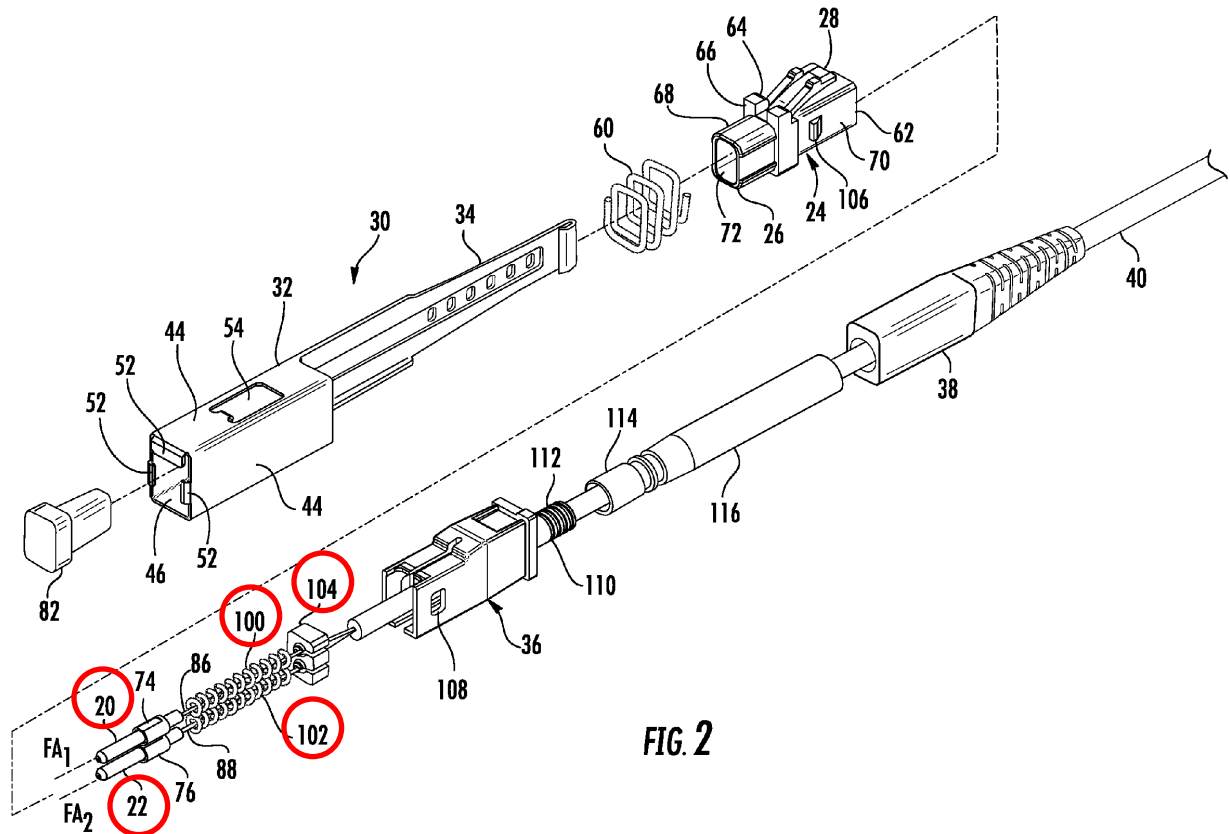


**FIG. 3**

EX1005: Figs. 1-3 (annotated).

### 3. Matsumoto

Matsumoto teaches an adapter (6) for optical connectors with guides (63) for aligning the connectors in ports for “high-density mounting.” EX1006: Fig. 4, 4:1-11; EX1002: ¶¶44-45.

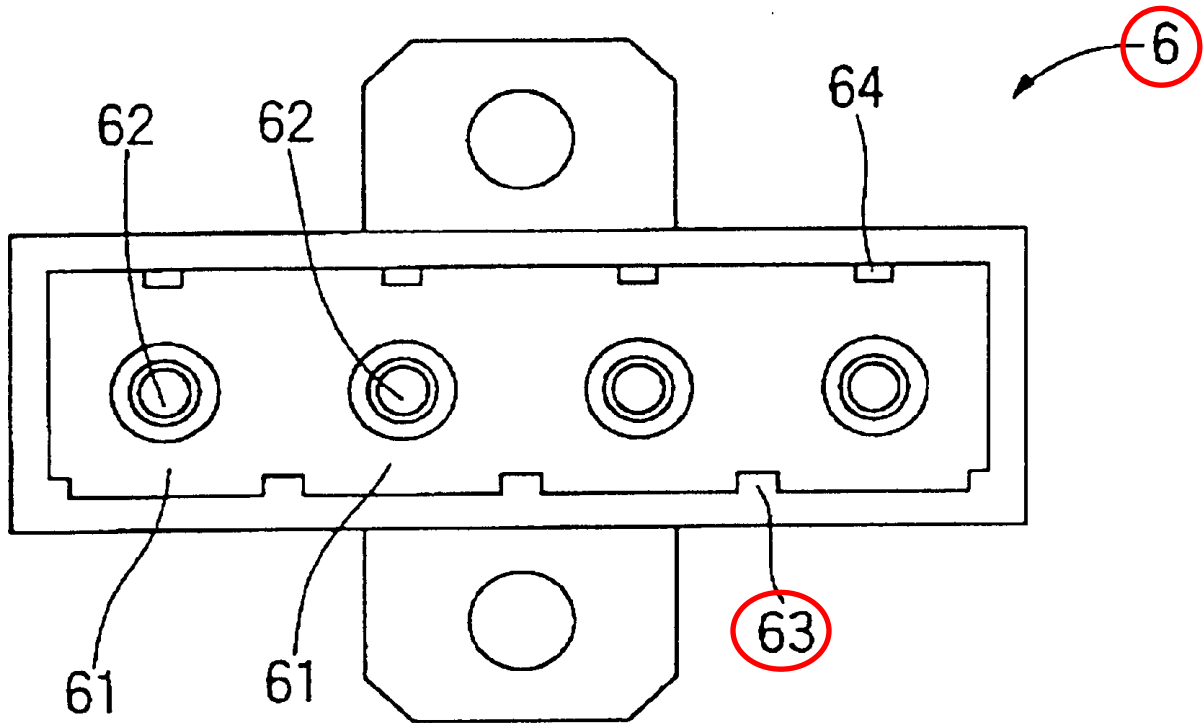


**FIG. 4**

EX1006: Fig. 4 (annotated).

#### 4. Hill

Hill discloses APC<sup>1</sup> and UPC<sup>2</sup> type optical ferrules. EX1007: Fig. 10C, ¶¶0058]; EX1002: ¶¶46-47.

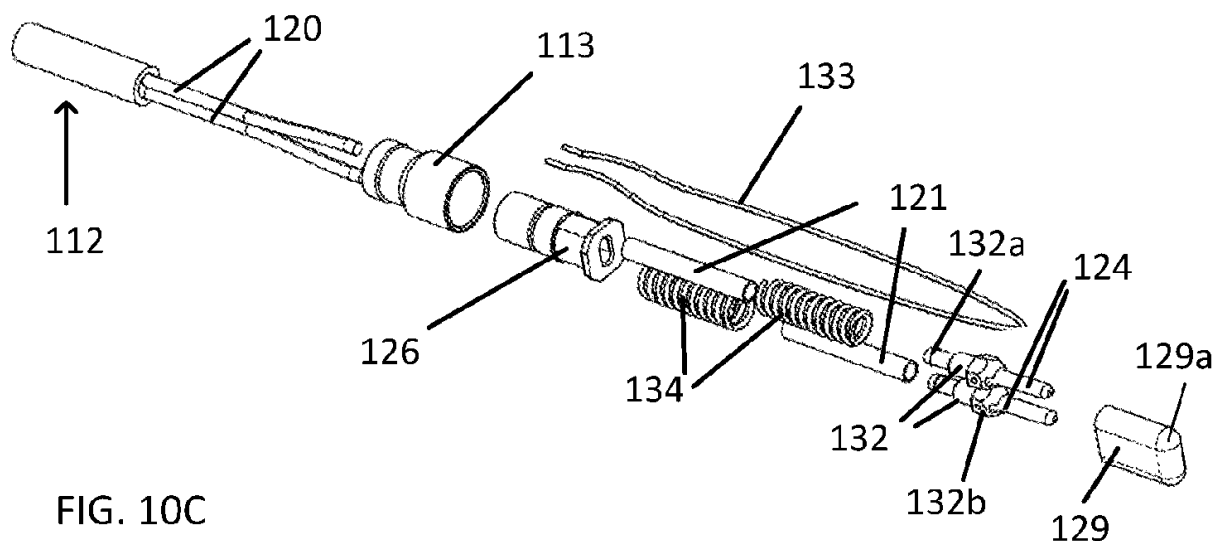


FIG. 10C

EX1007: Fig. 10C.

#### 5. Shimozu

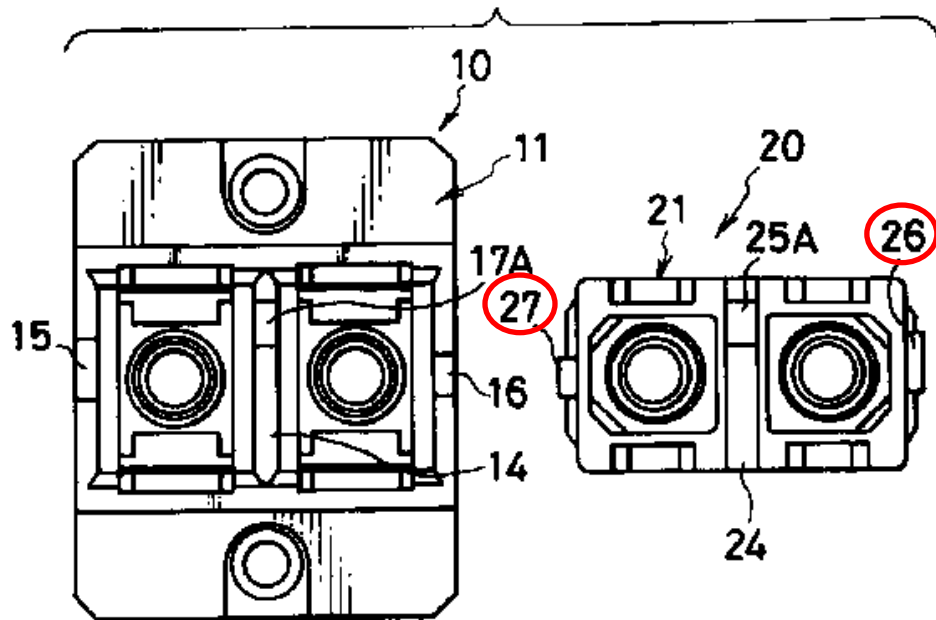
Shimozu discloses a double-core optical connector plug (20) with opposite first and second keys (26, 27), the first key being wider than and off-center from the second key. EX1008: ¶¶[0011]-[0012]; EX1002: ¶¶48-49. The keys fit into corresponding keyways (15, 16) of the adapter (10) for alignment. EX1008: ¶[0014]; EX1002: ¶50.

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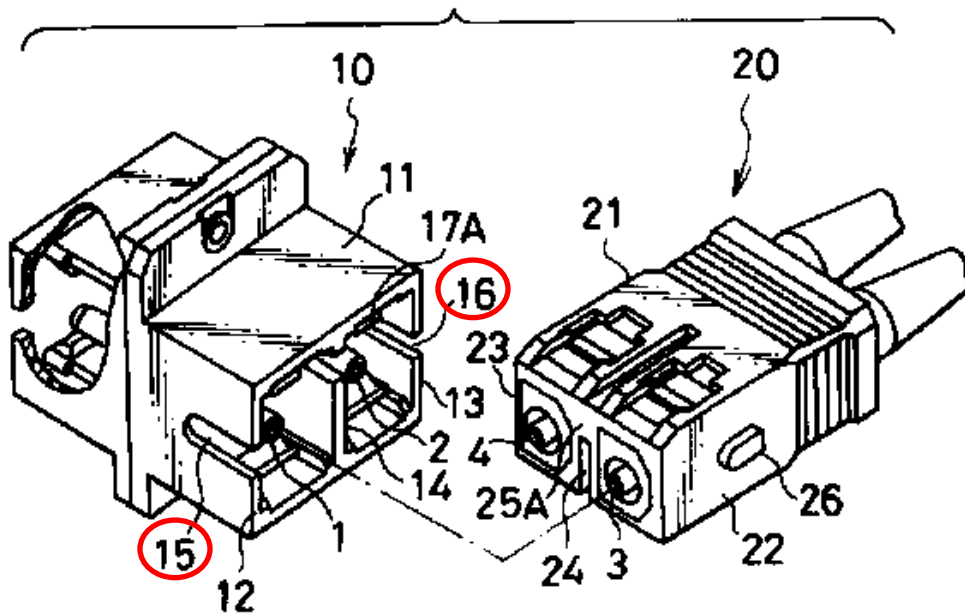
<sup>1</sup> “APC” stands for angle-physical contact. EX1002: ¶47.

<sup>2</sup> “UPC” stands for ultra-polished contact. EX1002: ¶47.

【図2】



【図1】



EX1008: Figs. 1 and 2 (annotated).

Shimozu teaches the keys and keyways can be implemented in other connector types. EX1008: ¶[0015]; EX1002: ¶51.

## **6. Takano'369**

Takano'369 discloses a fiber optic connector (10300, 10400, 10500) having outer housing (10301, 10401, 10501), ferrules (10303, 10403), ferrule holders (10304), ferrule springs (10305), a back body (10306, 10406), a back post (10307), a boot (10309, 10409, 10509), a locking tab (10411), and a push-pull tab (10310, 10410, 10510). EX1009: 18:66-19:50; EX1002: ¶¶52-53.

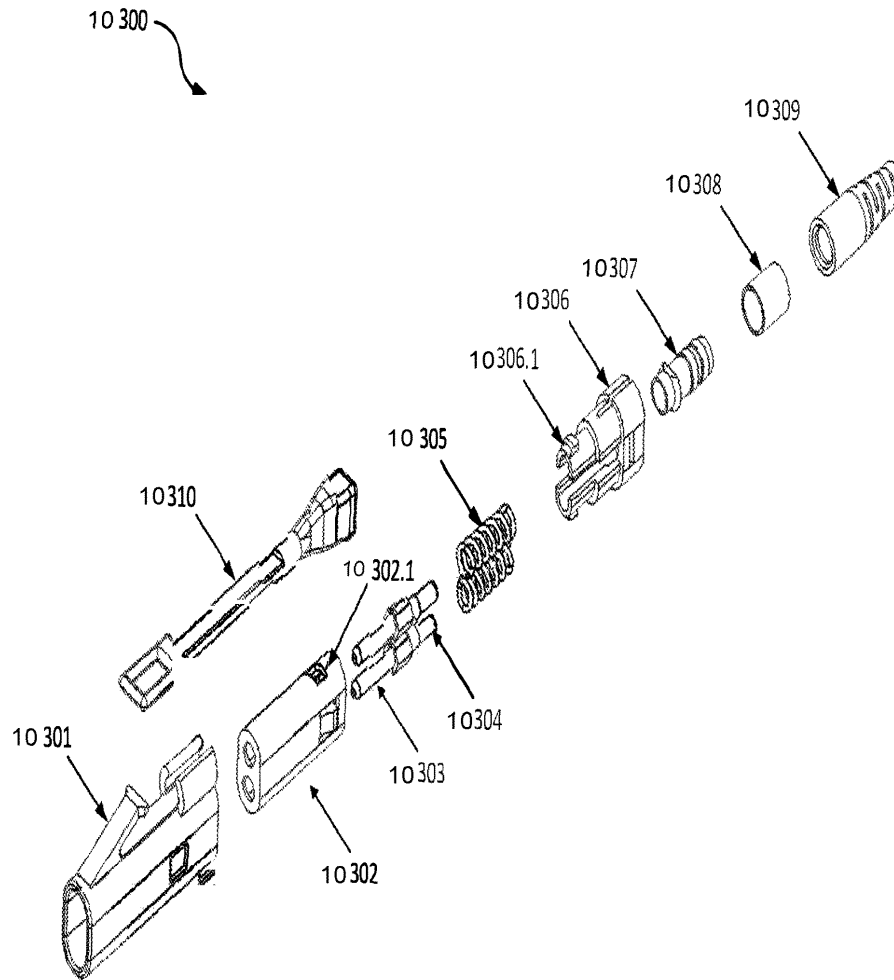


**FIG. 53**

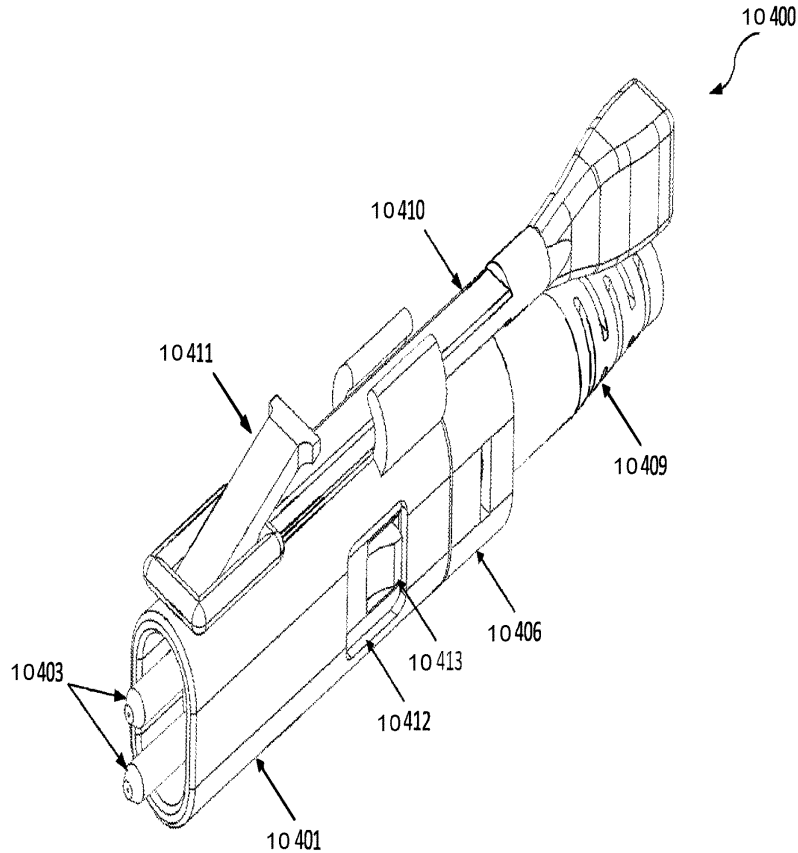


**FIG. 54**

EX1009: Figs. 53 and 54.

## 7. Watanabe

Watanabe discloses a plug connector (10A) with a latch (13) on top and a guide rail (21) on the bottom. EX1011: ¶¶[0032], [0038], [0040]; EX1002: ¶¶54-55. The guide rail fits into a guide rail fitting section (22) of an adapter (backplane housing (3)) to guide the plug connector into the adapter. EX1011: ¶[0042]; EX1002: ¶56.

**Fig.1**

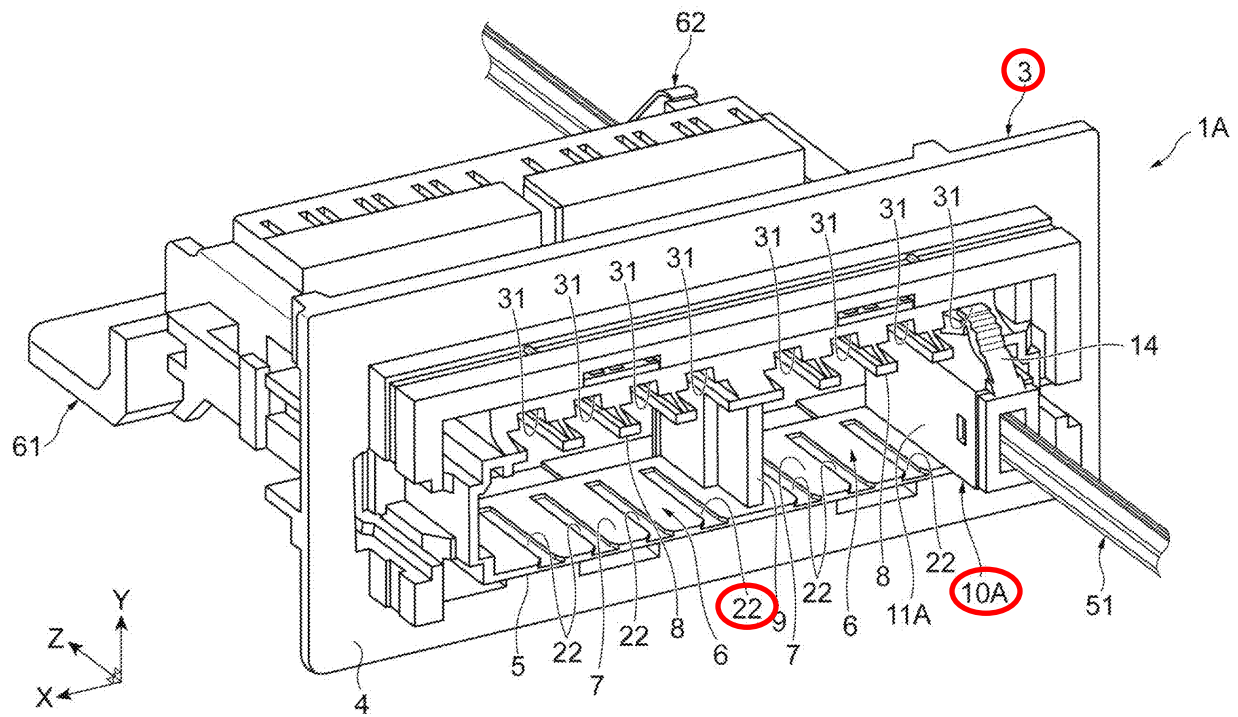
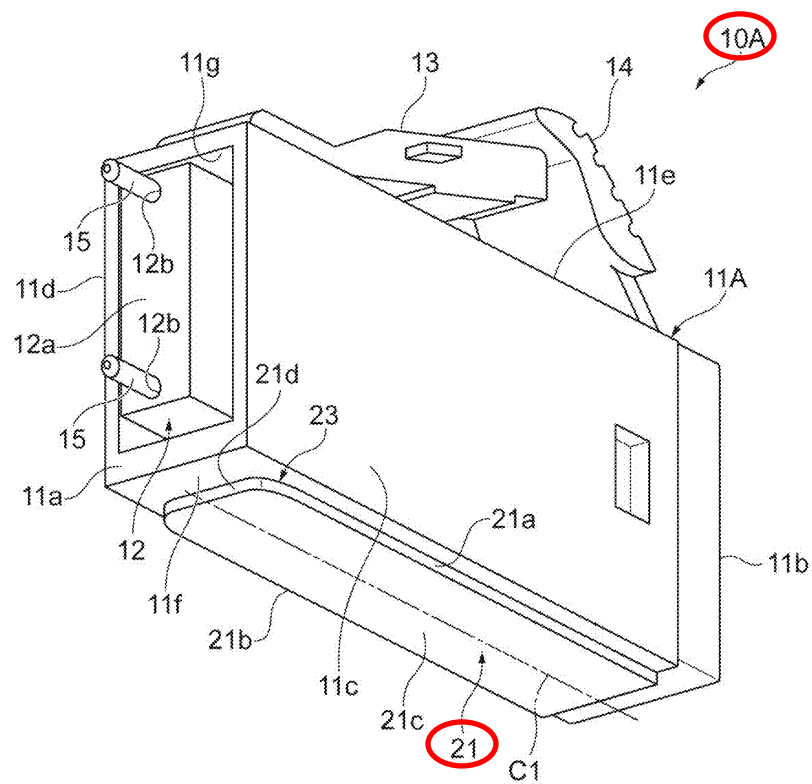


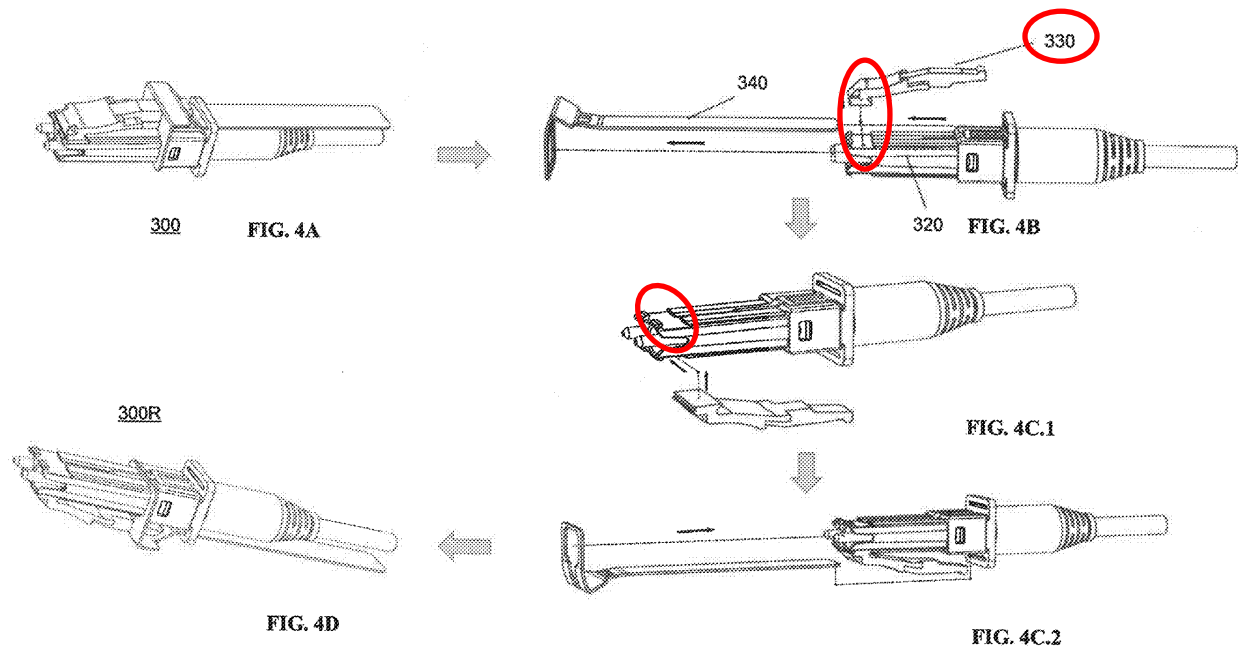
**Fig.3**



EX1011: Figs. 1 and 3 (annotated).

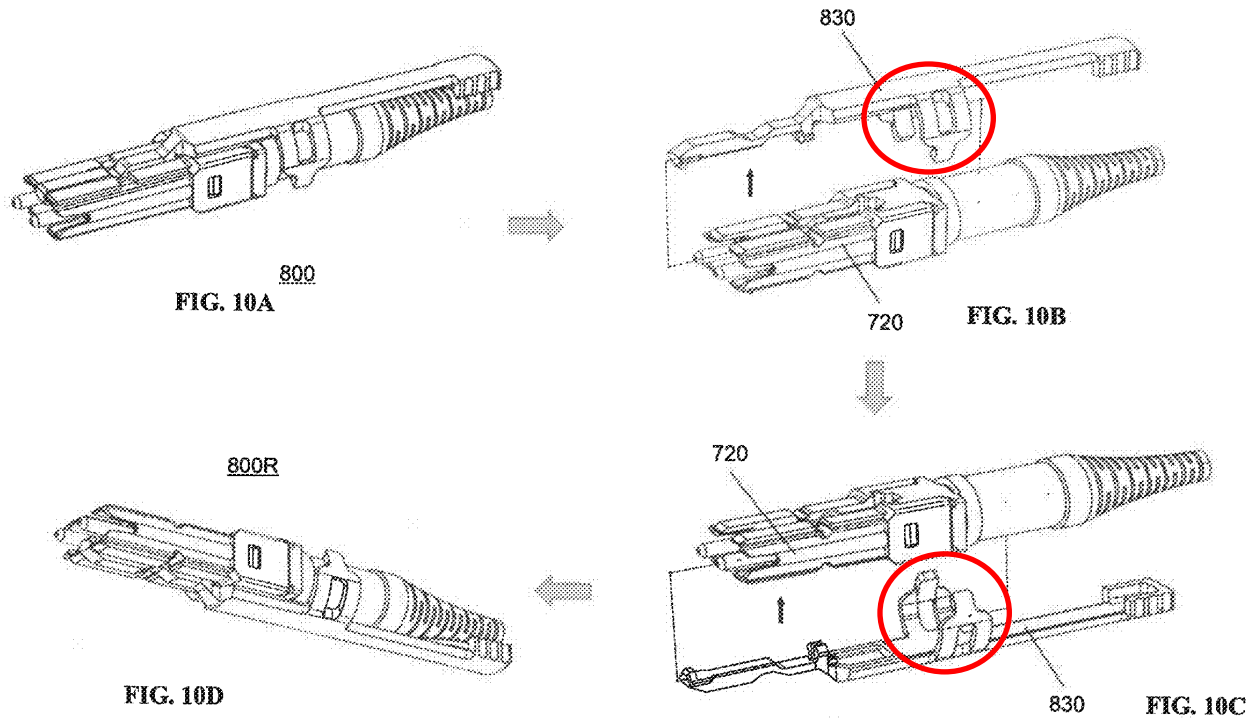
## 8. Wong

Wong discloses one embodiment of a connector (300) having latch couplings (e.g., dovetail slots) on top and bottom to selectively connect a latch (330) to set polarity. EX1012: ¶¶[0067], [0072], Figs. 1B, 4B, 4C.1; EX1002: ¶¶57-58.



EX1012: Figs. 4A-D (annotated).

Wong teaches another embodiment of a connector (800) with a pull tab (830) having a clip for clipping onto the boot and allows the pull tab to be selectively positioned along the top or bottom when changing polarity. EX1012: Figs. 8B.1-2, 10A-D, ¶¶[0085], [0088]; EX1002: ¶59.



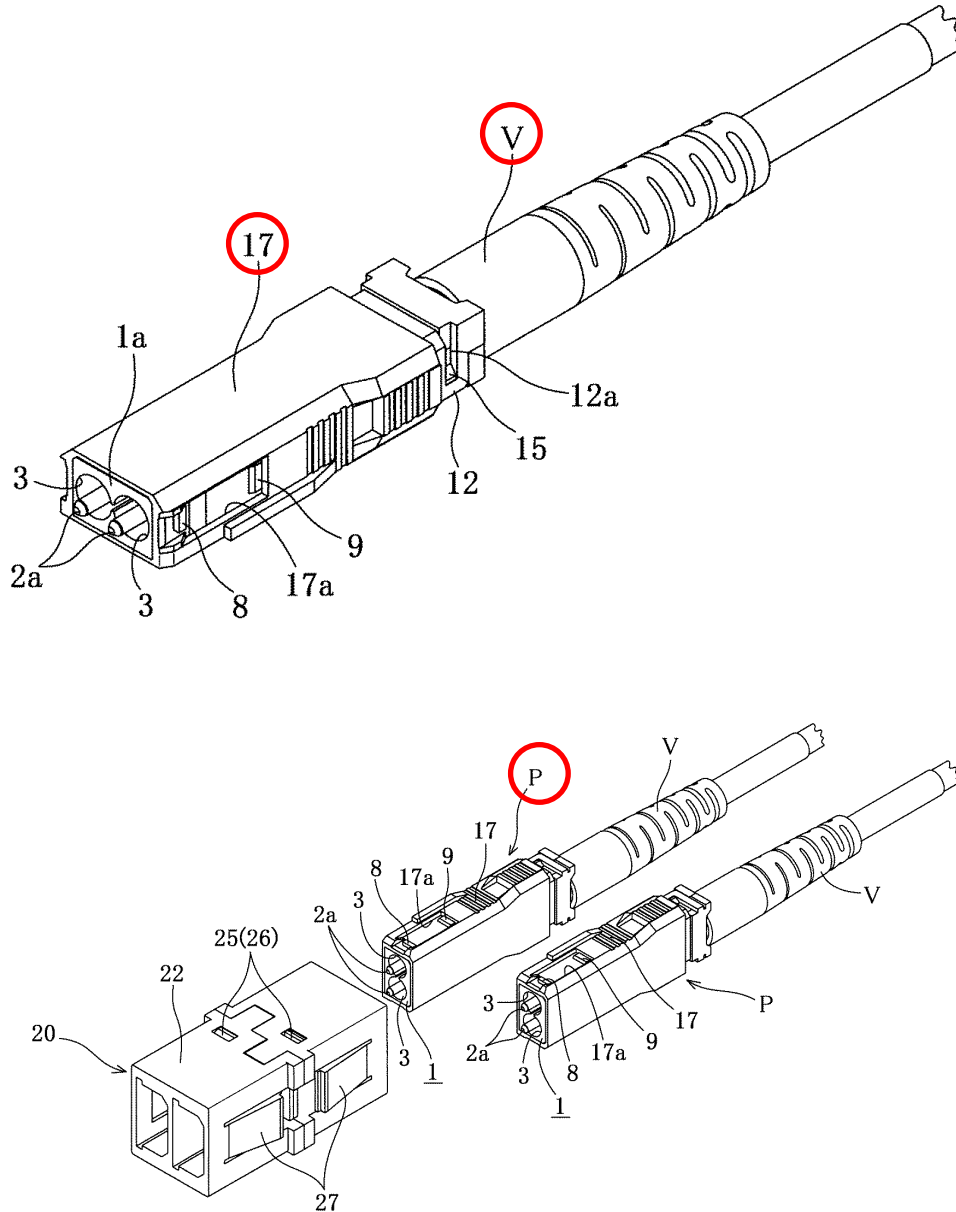
EX1012: Figs. 10A-D (annotated).

## 9. Toyama

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

EX1014: ¶[0022]; EX1002: ¶¶60-61.





EX1014: Figs. 1, 3, 6, and 11.

## 10. QSFP-DD

QSFP-DD is a technical specification setting forth the requirements for a QSFP-DD optical port for standard types of optical connectors, as shown below:

EX1015: 1, 59; EX1002: ¶¶62-63.

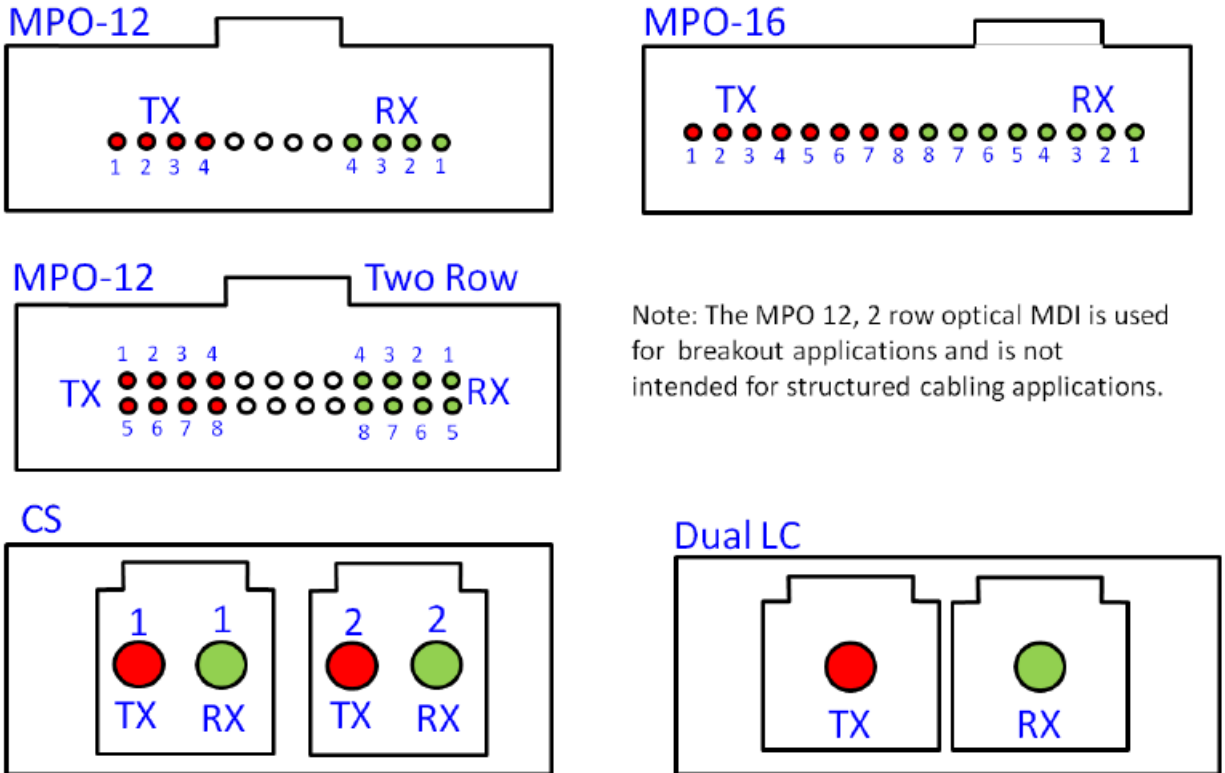


Figure 33: Optical Media Dependent Interface port assignments

EX1015: Fig. 33.

## 11. SFP-DD

SFP-DD is a technical specification setting forth the requirements for a SFP-DD optical port for standard types of optical connectors, as shown below:

EX1016: 1, 45; EX1002: ¶¶64-65.

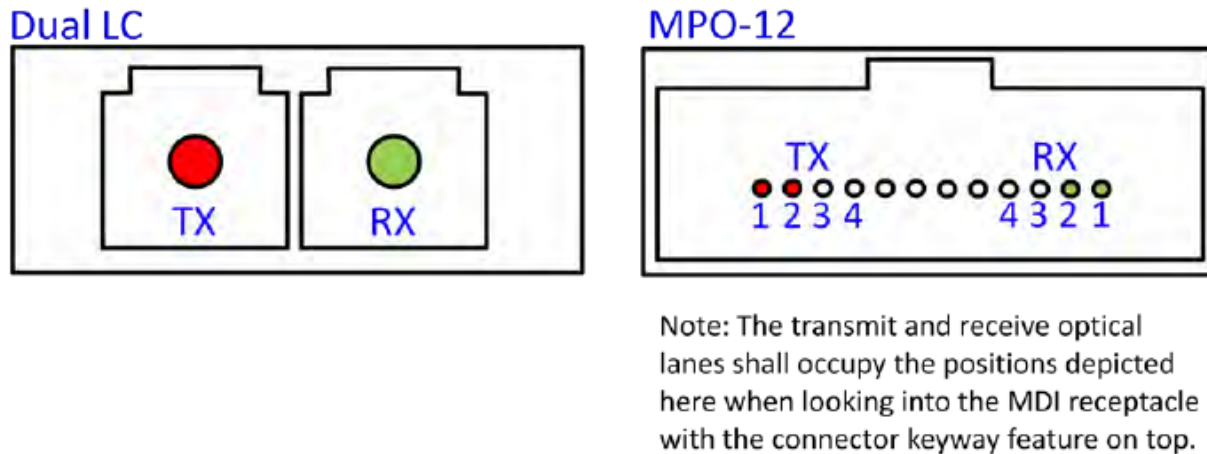


**Figure 22: Optical Media Dependent Interface port assignments**

EX1016: Fig. 22.

### **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 fields previously mentioned 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: ¶25.

The level of ordinary skill is not determinative, as those of less or more skill would also find the claims to be unpatentable. EX1002: ¶26.

## **IV. CLAIM CONSTRUCTION**

In a 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: ¶¶66-67.

## **V. GROUND 1: INDEFINITENESS**

A claim is indefinite when “read in light of the specification delineating the patent, and the prosecution history, fail[s] to inform, with reasonable certainty, [a POSA] about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014).

### **A. Claim 12 (and Dependent Claim 13) is Indefinite**

Claim 12’s recitation of “each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective *ferrule seats* of the fiber optic ferrules of each of the ferrule assemblies” is indefinite because it unclear what structure is required to correspond to the claimed “ferrule seats.” EX1002: ¶¶68-70.

The ‘994 Patent never uses the term “ferrule seat.” EX1001; EX1002: ¶71.

Further, the natural understanding of what a “ferrule seat” is, is inconsistent with the phrasing here. EX1002: ¶72. A POSA would understand “ferrule seat” to mean the structure that seats a ferrule or ferrule assembly in a connector housing. EX1018: ¶[0071]; EX1019: ¶[0027]; EX1020: ¶[0055]; EX1002: ¶72. The “ferrule seat” could be part of the connector housing or part of the ferrule

the ferrule in the housing. EX1002: ¶72.

the ferrule assemblies (120, 1120) in the housing. EX1002: ¶73.

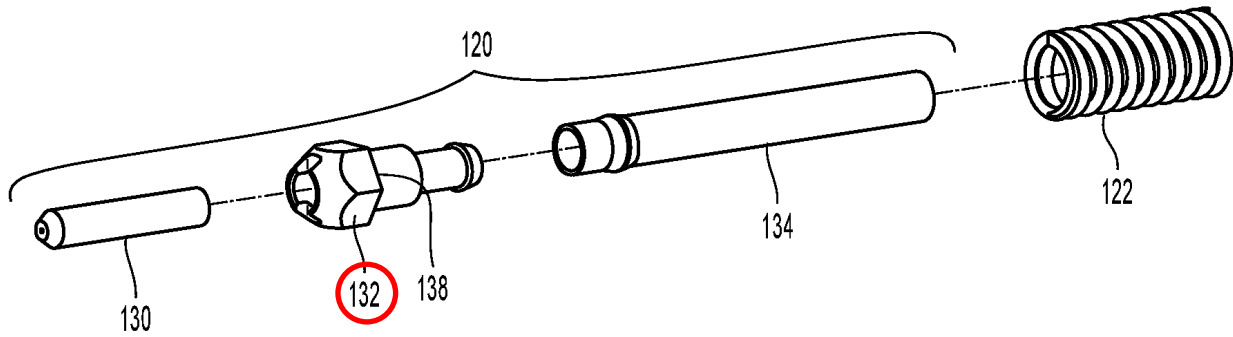


**Fig. 3A**

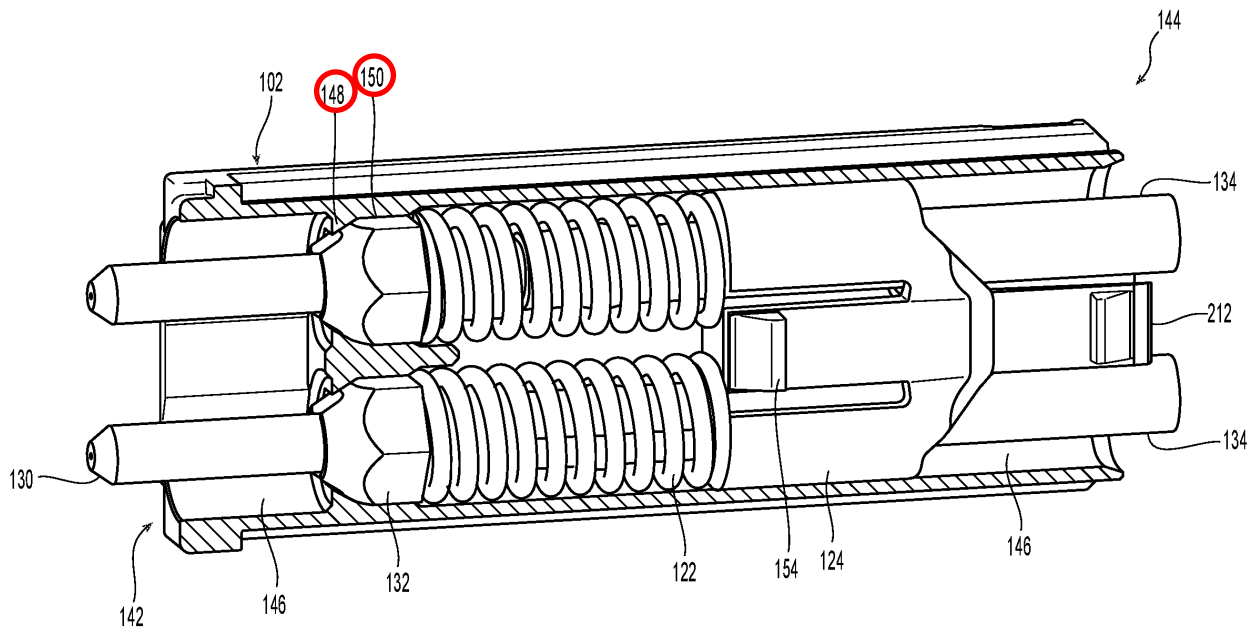


**Fig. 4**

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

However, claim 12 specifically recites the “ferrule seats” are neither part of the housing nor part of the ferrule holder, but rather, *are part of* the fiber optic ferrules themselves. Claim 1 recites ferrule assemblies comprising two distinct components—ferrules and ferrule holders. Here, claim 12 specifically recites the ferrule seats are a part “of the fiber optic ferrules of each of the ferrule assemblies.” The only grammatical interpretation of this phrase is the claimed ferrule seats are part of the ferrules, not the ferrule holders or connector housing. EX1002: ¶74. It is therefore unclear what structural feature a ferrule needs to have for the ferrule to have a “ferrule seat” as claimed. EX1002: ¶74.

Therefore, claim 12 (and dependent claim 13) is indefinite. EX1002: ¶¶75-76.

## **VI. GROUND 2: LACK OF WRITTEN DESCRIPTION**

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

### **A. Claim 1 (and Dependent Claims 2-15) Lacks Written Description**

Claim 1 recites “a first projection on the top surface and a second projection on the bottom surface of the housing, wherein the first projection is of a *different size* than the second projection.”



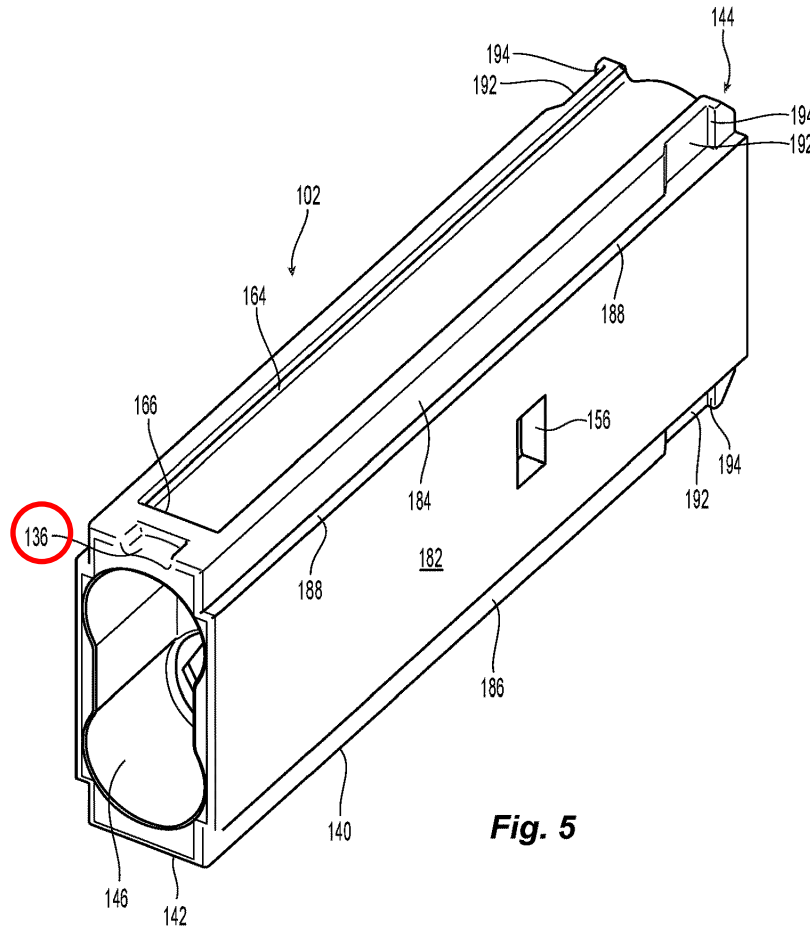


**Fig. 5**

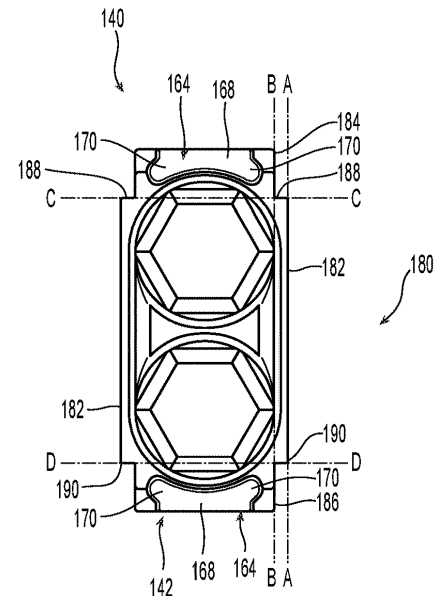
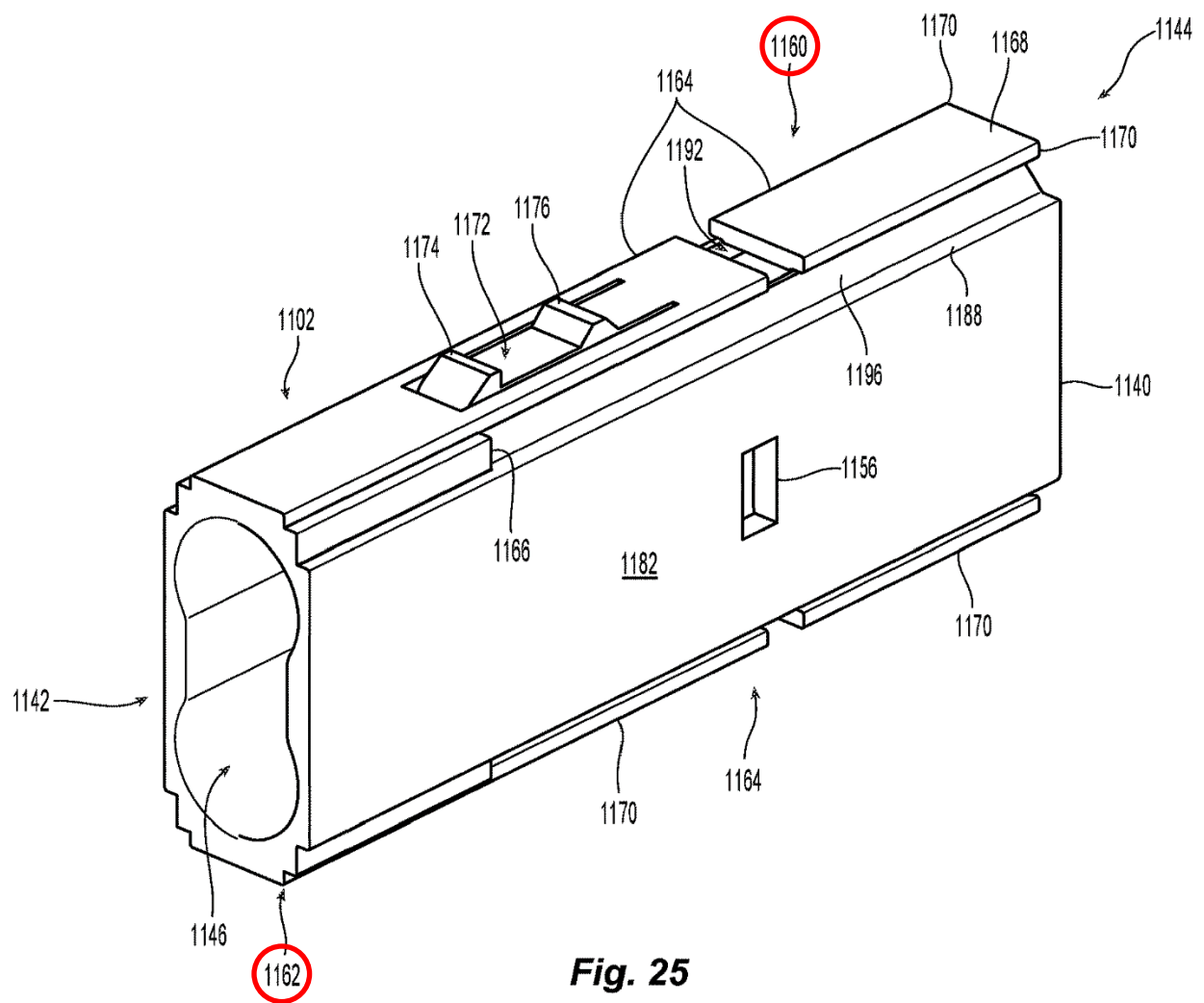


**Fig. 6**

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

Indeed, the ‘994 Patent explains “[t]he top and bottom surfaces 160, 162 are *preferably the same*, with the exception of the indicia 136, as one of the two surfaces 160, 162 would not have it.” EX1001: 5:57-60. However, the indicia (136) is a recess (not a projection) and is only on one of the surfaces. EX1002: ¶84.

The second embodiment of the housing (1102) has top and bottom surfaces (1160, 1162) each including a latch (1172) having an engagement surface (1174) and a release ramp (1176). EX1001: 11:50-51, 12:39-41; EX1002: ¶¶87-88.



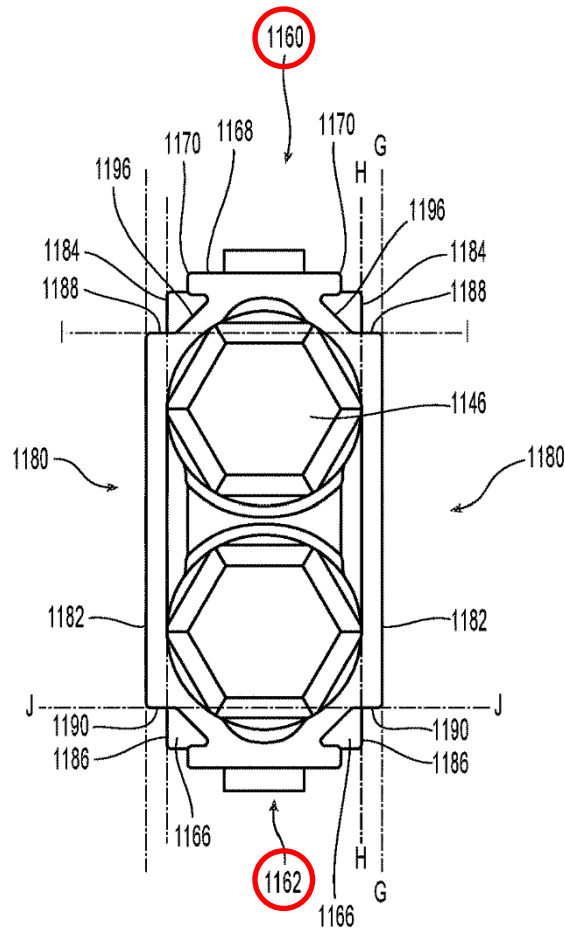


**Fig. 26**

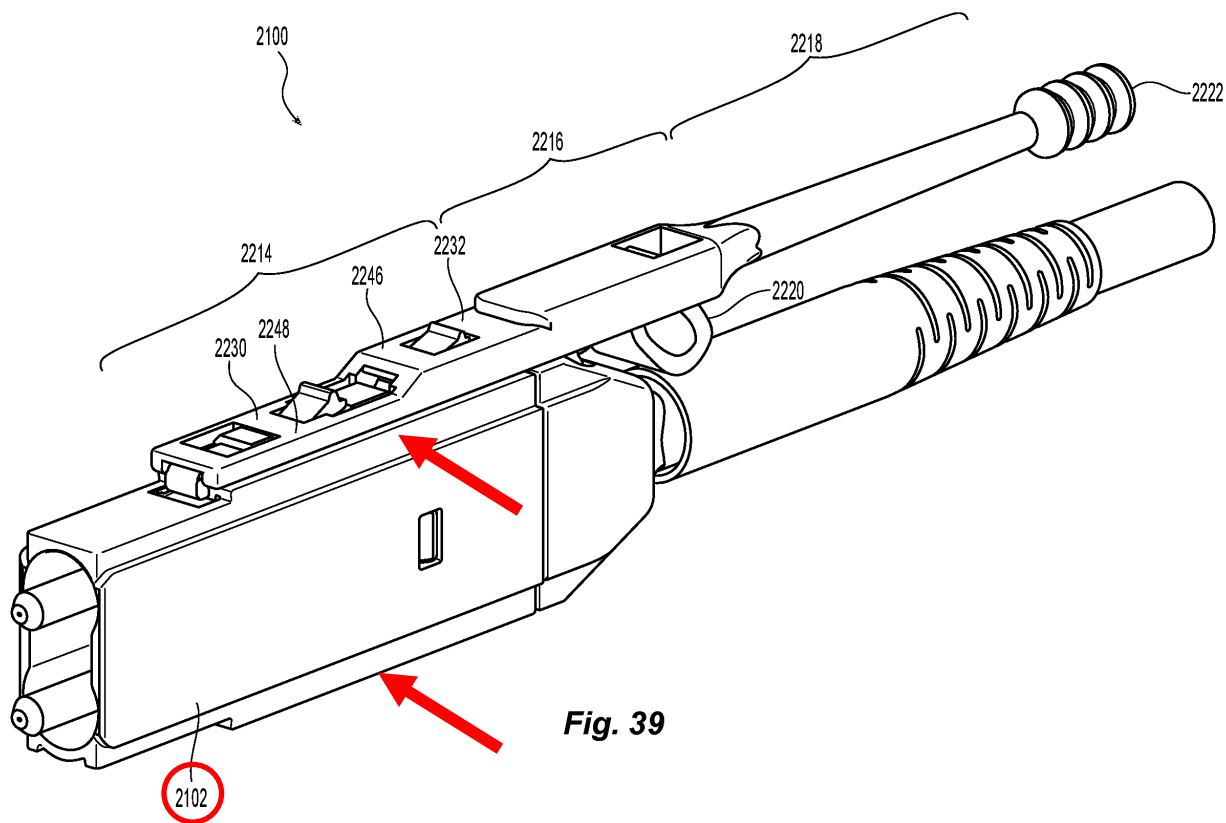
EX1001: Figs. 25 and 26 (annotated).

US Conec may argue the latches (1172) are projections. However, the latches (1172) on the top and bottom surfaces (1160, 1162) are identical, and not “a *different size*” as recited by claim 1. EX1001: Figs. 24, 26, and 33, 11:51-52; ¶89. Again, the ‘994 Patent explains “[t]he top and bottom surfaces 1160, 1162 are *preferably the same*.” EX1001: 11:51-52; EX1002: ¶91. Further, claim 4 states “the first projection and the second projection determine a *correct orientation* or

*polarity* of the housing during an insertion into an adapter.” The latches (1172) do not perform either of these functions. EX1002: ¶90.

For the third connector (2100) embodiment, the components “are the same” as the earlier embodiments, except for the latch component “and *small changes* to the housing 2102.” EX1001: 16:10-31; EX1002: ¶93.

Shown below, these “small changes” to the housing (2102) do not include different sized projections on the housing’s top and bottom surfaces. EX1002: ¶94. The “small changes” appear to mainly be shorter length rail receiving portions. EX1002: ¶94.



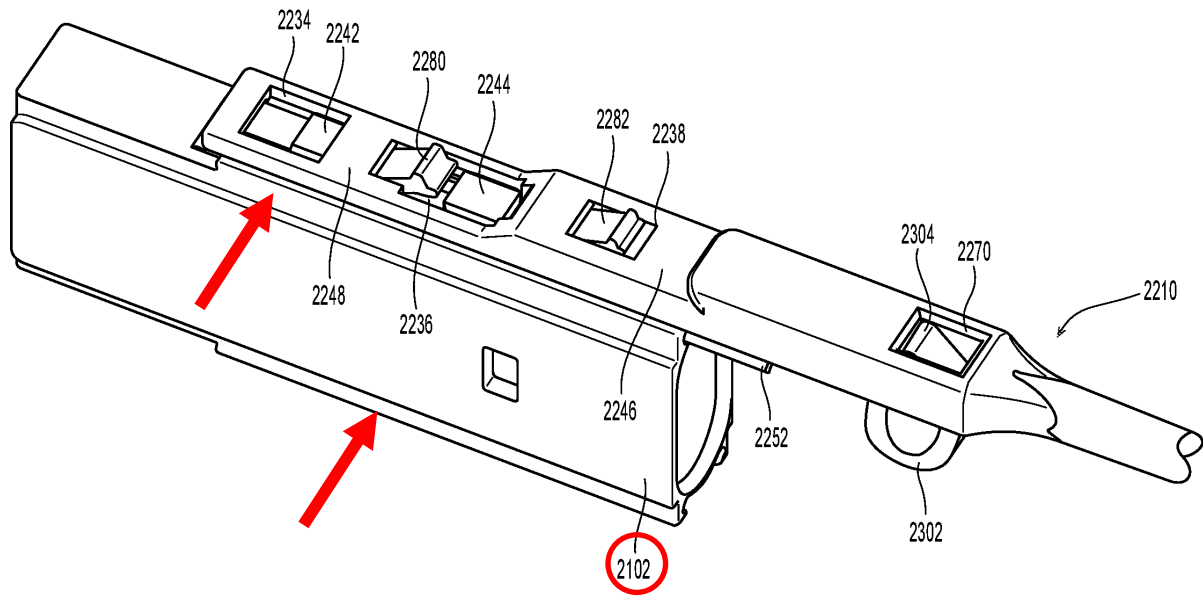


**Fig. 48**

EX1001: Figs. 39 and 48 (annotated).

Moreover, the specification is of no help as the term “projection” is never used as a name or description of any component on the top or bottom of any embodiment of the of the housing (102, 1102, 2102). EX1001; EX1002: ¶¶85, 91.

U.S. Conec may point to the latch component (104, 1104, 2104) as being a projection. However, each connector (100, 1100, 2100) embodiment only includes one latch component, connected to either the top or bottom of the housing (102, 1102, 2102). EX1001: 8:30-50, 12:39-50, 17:7-9; EX1002: ¶¶86, 92, 95. Again, the specification repeatedly teaches that the top and bottom walls of the housing are identical. EX1002: ¶95. The presence of a latch component on one of two

identical walls does not convey possession of this limitation—i.e., a first projection of a *different size* than a second projection. EX1002: ¶95.

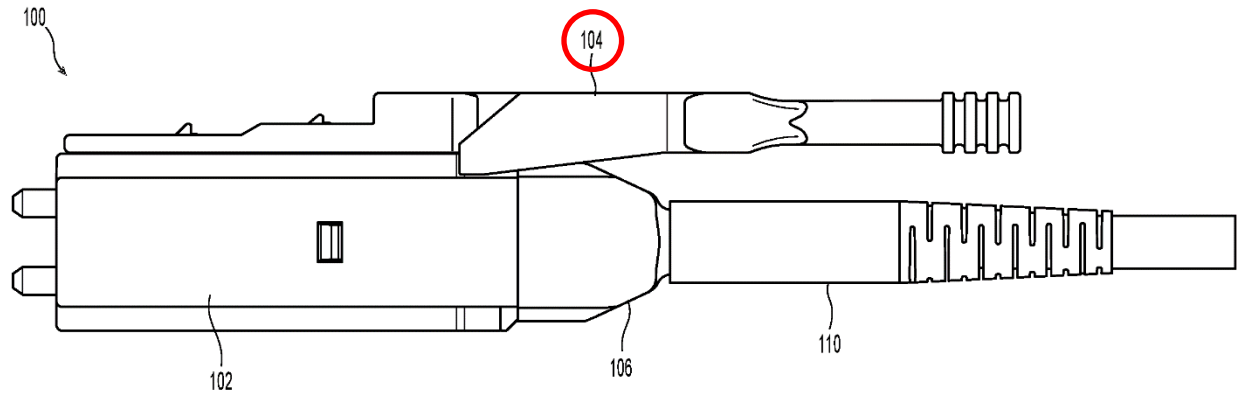


**Fig. 1**

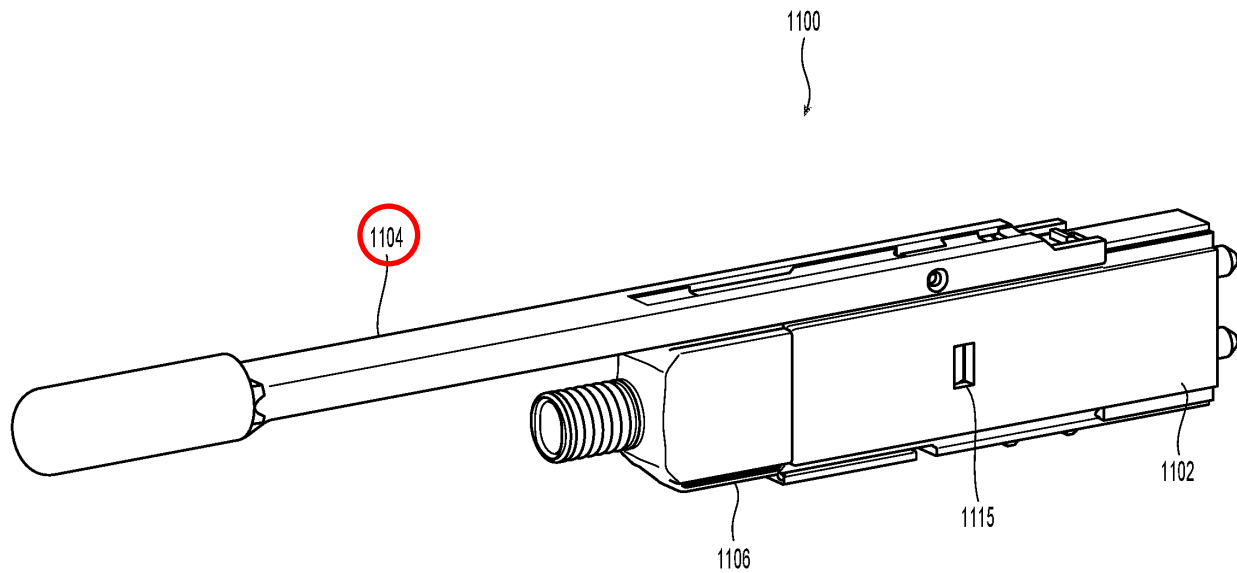
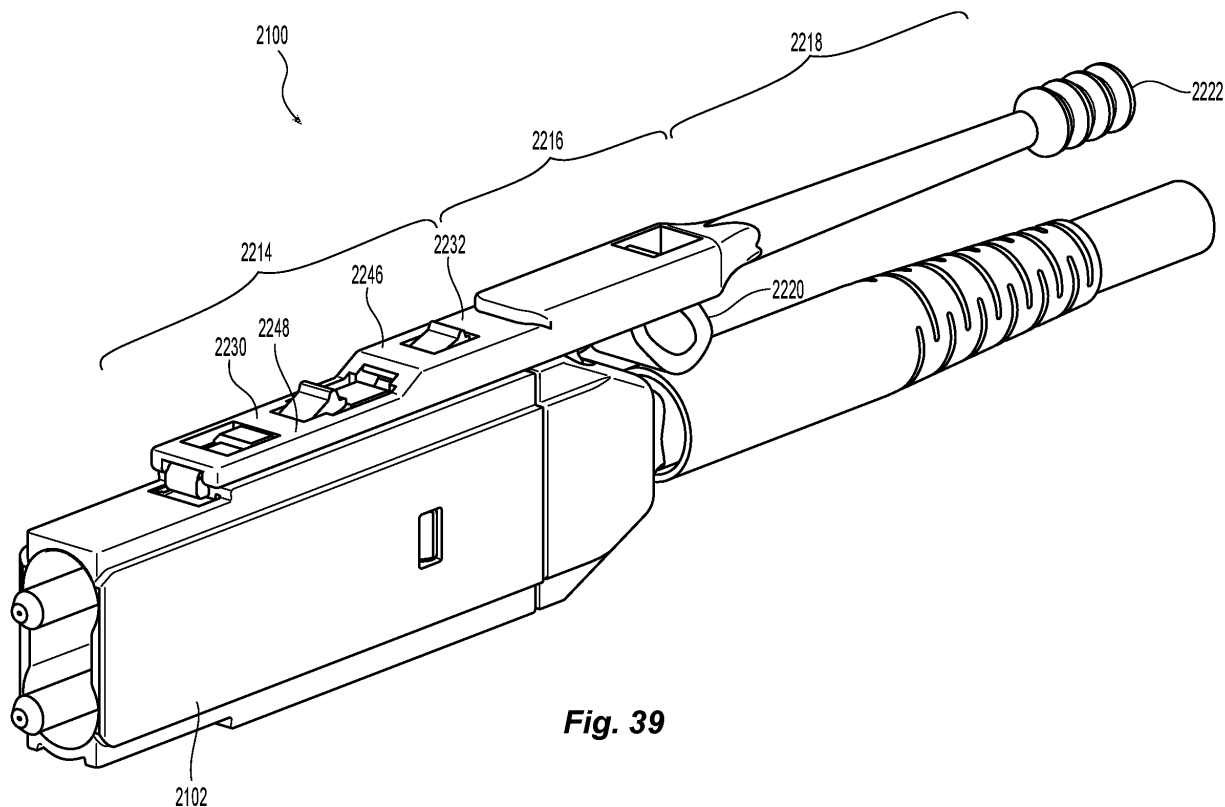


**Fig. 23**



EX1001: Figs. 1, 23, and 39 (annotated).

Therefore, claim 1 (and dependent claims 2-15) lacks written description support. EX1002: ¶¶96-98.

### B. Claim 12 (and Dependent Claim 13) Lacks Written Description

Claim 12 recites that “each of the ferrule assemblies is separated from the other ferrule assembly by a wall between respective *ferrule seats* of the fiber optic ferrules of each of the ferrule assemblies.” The ‘994 Patent contains no indication that US Conec was in possession of this limitation. EX1002: ¶¶99-100.

As explained in Section V(A), the plain grammatical interpretation of this claim is that the “ferrule seats” *are part of* the “ferrules,” not another component such as a ferrule holder. EX1002: ¶101.

The specification never uses the term “ferrule seat.” EX1002: ¶102.  
Further, the specification never shows or describes the ferrules (130, 1130) as including any additional component. EX1001: 4:65-5:5, 10:63-11:4. EX1002: ¶¶102-103.

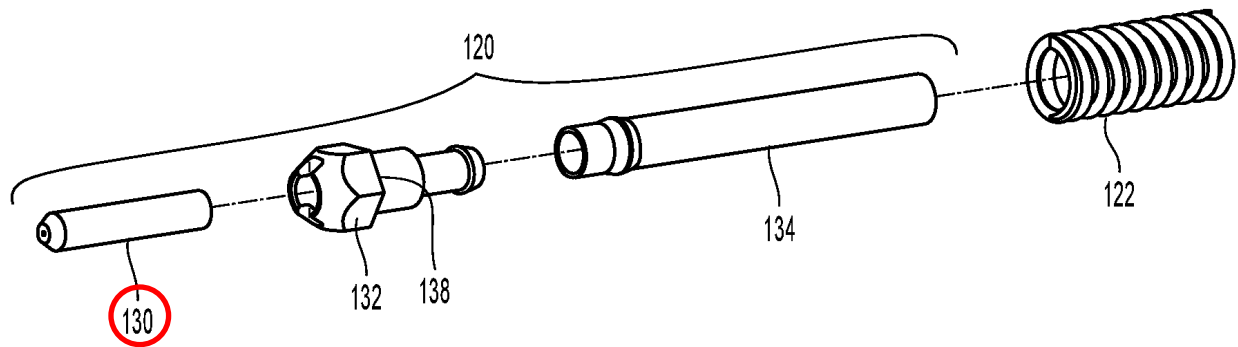


**Fig. 3A**

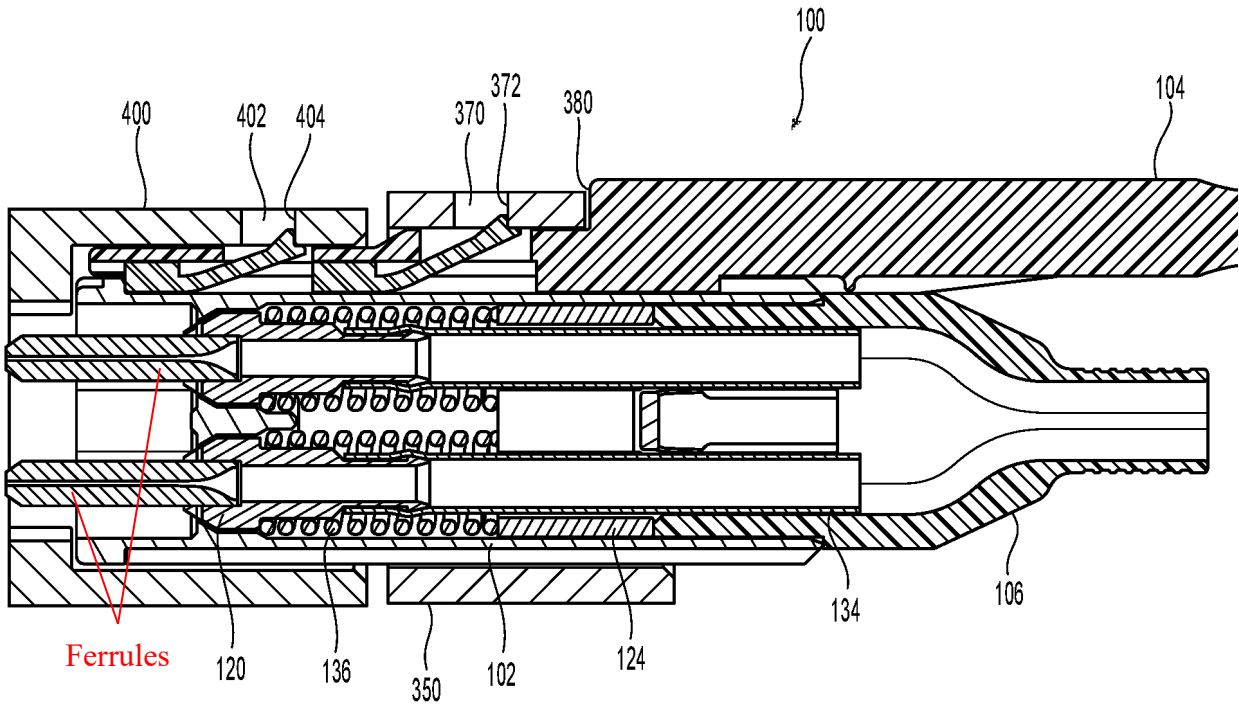


**Fig. 21**

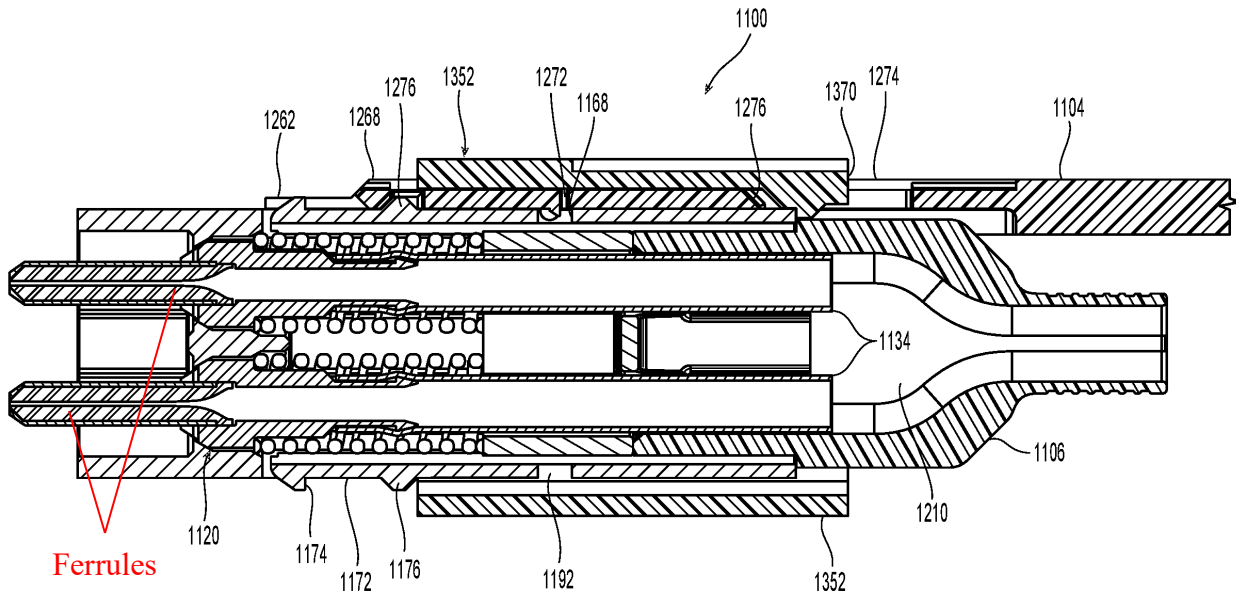


**Fig. 33**

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

Therefore, claim 12 (and dependent claim 13) lacks written description support. EX1002: ¶¶104-105.

## **VII. GROUND 3: Claims 1-13 are Anticipated by Takano’209**

This ground is based on the “first embodiment” optical connector (300, 400, 500, 1100A-B, 1200) from Takano’209’s Figs. 3-5 and 11A-12B. EX1002: ¶¶106-107.

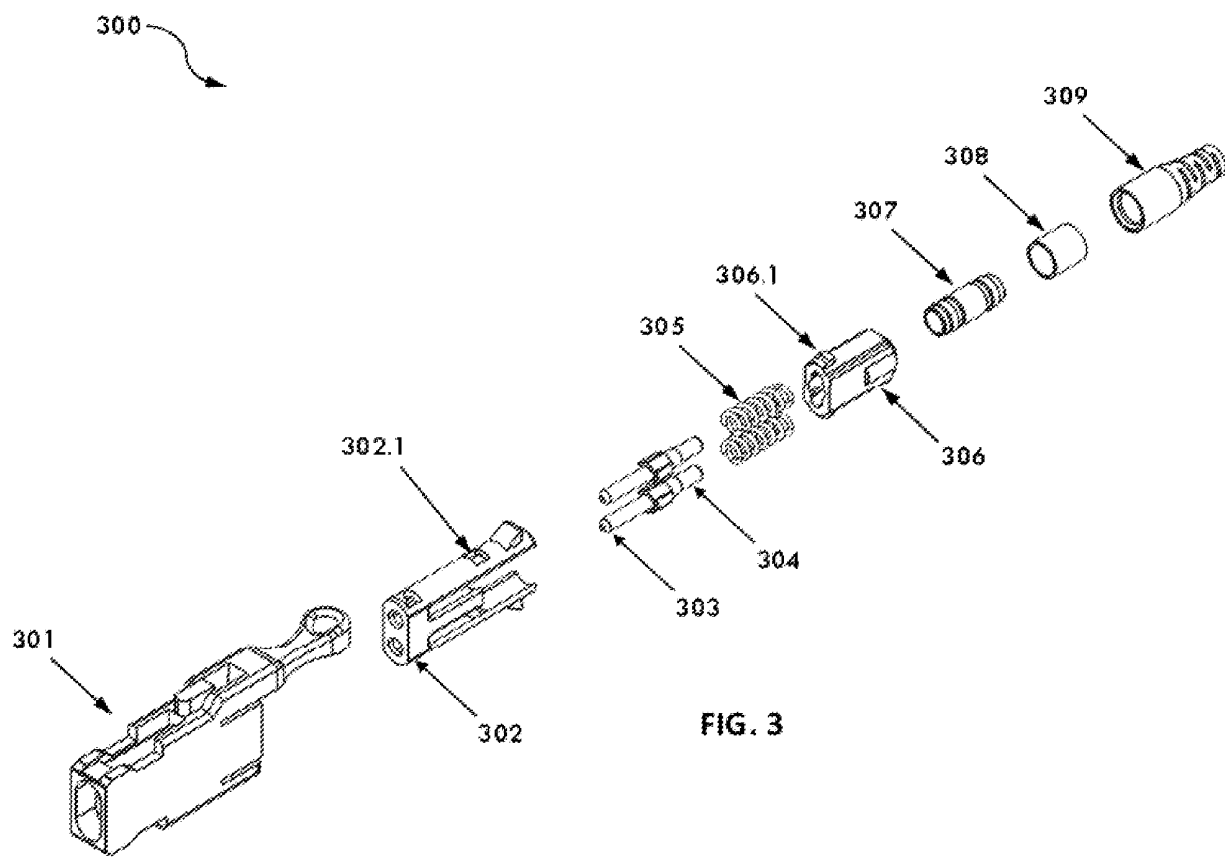
### **A. Independent Claim 1**

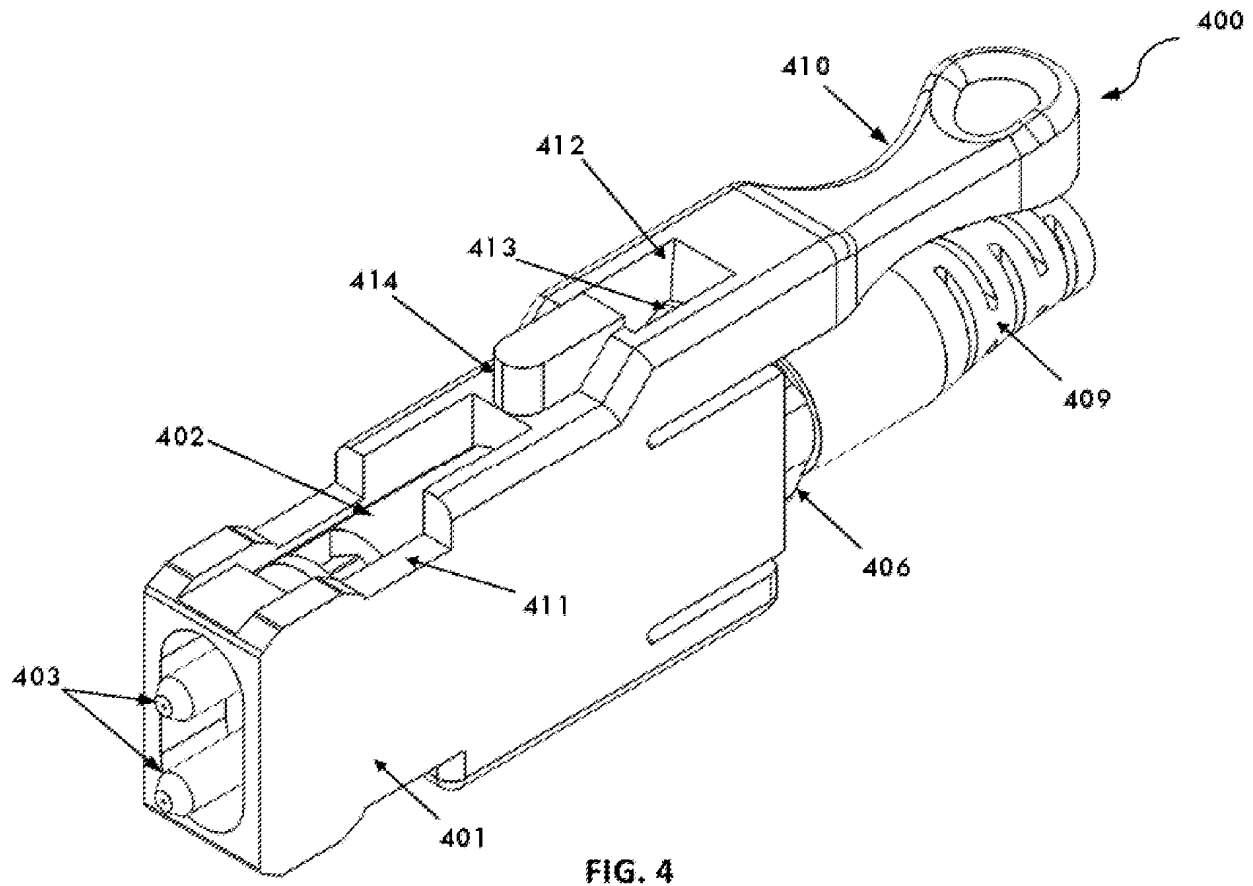
#### **1.P<sup>3</sup>**

Takano’209 discloses an optical connector (300, 400, 500, 1100A-B, 1200). EX1003: ¶¶[0091]-[0093], [0105]-[0107]; EX1002: ¶108. Although different reference numbers are used—e.g., 300, 400, 500, 1100A-B, 1200—, these reference numbers all indicate the same connector and components thereof. EX1003: ¶¶[0091]-[0093], [0105]-[0107]; Figs. 3-5, and 11A-12B; EX1002: ¶¶109-110.

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<sup>3</sup> Petitioner’s headings (1.P, 1.a.1, etc.) correspond to the claim limitations outlined in the Claim Listing (EX1034).





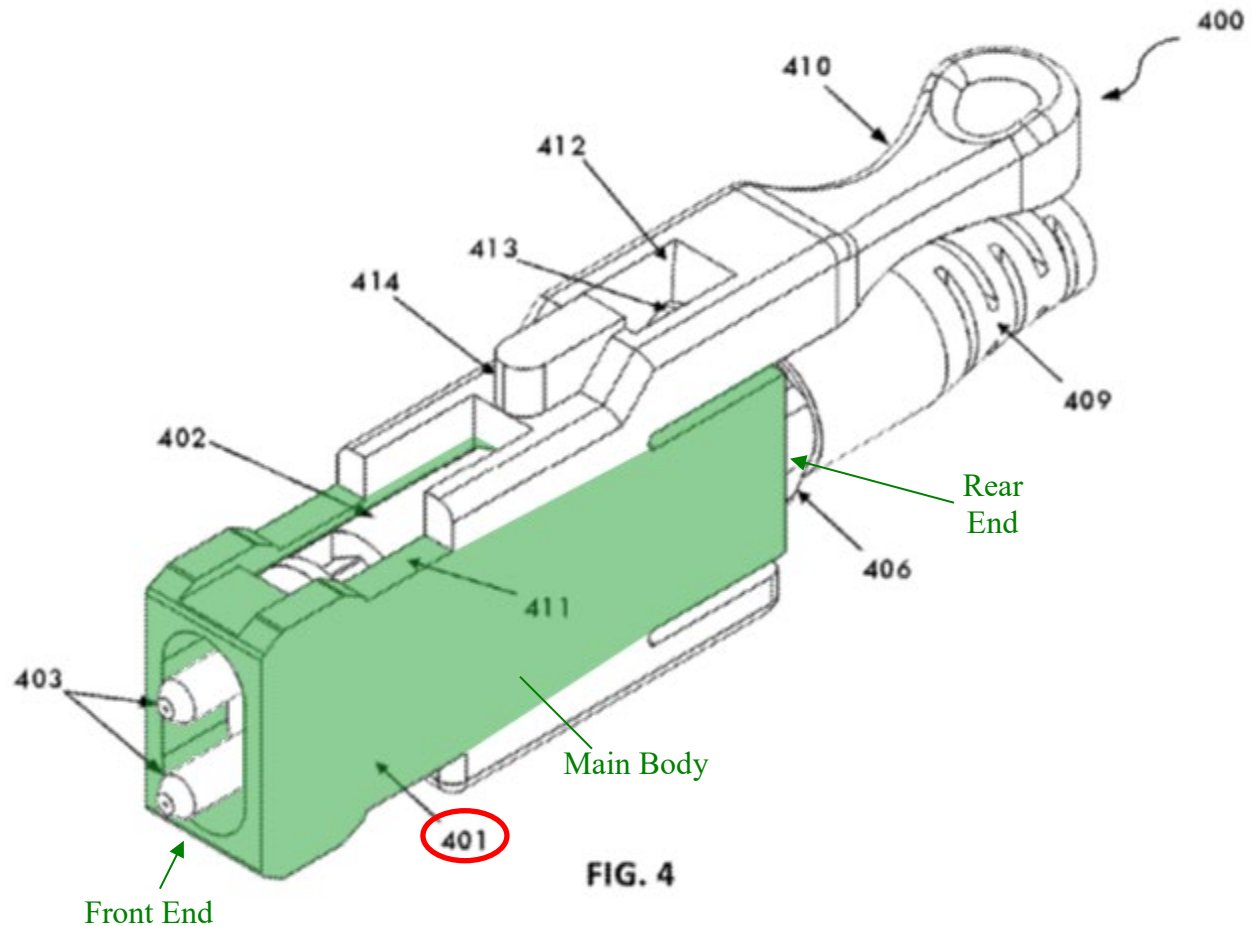
EX1003: Figs. 3 and 4.

Therefore, Takano'209 meets 1.P. EX1002: ¶113.

### 1.a.1

Takano'209's connector (300, 400, 500, 1100A-B, 1200) includes an outer housing (301, 401, 501, 1101, 1201). EX1003: ¶¶[0091]-[0093], [0105]-[0107];

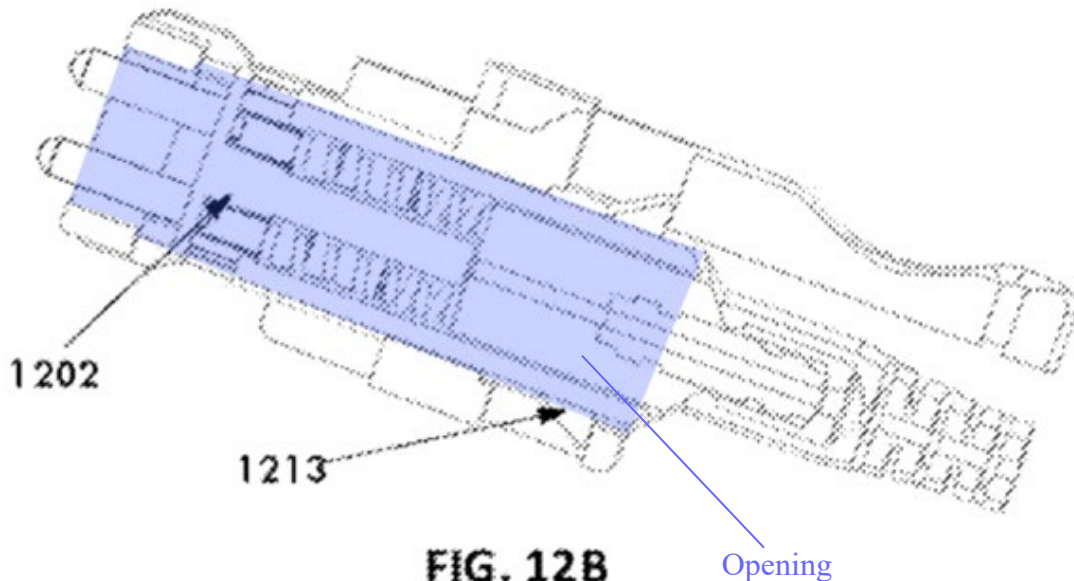
EX1002: ¶114. The outer housing includes a main body<sup>4</sup> that extends between front and rear ends. EX1003: Figs. 4 and 12B; EX1002: ¶114.



EX1003: Fig. 4 (annotated).

<sup>4</sup> The “main body” is the portion of the outer housing surrounding, protecting, and housing the internal components. EX1002: ¶115. The push-pull tab (410, 510, 1110) serves a different purpose and therefore is not considered part of the “main body.” EX1003: ¶¶[0092], [0106]; EX1002: ¶115. Further, the push-pull tab is optional. EX1003: ¶¶[0092], [0106]; EX1002: ¶115.

The outer housing (301, 401, 501, 1101, 1201) has an opening extending between the front and rear ends. EX1003: ¶[0093], Figs. 3-5, 12B; EX1002: ¶116.

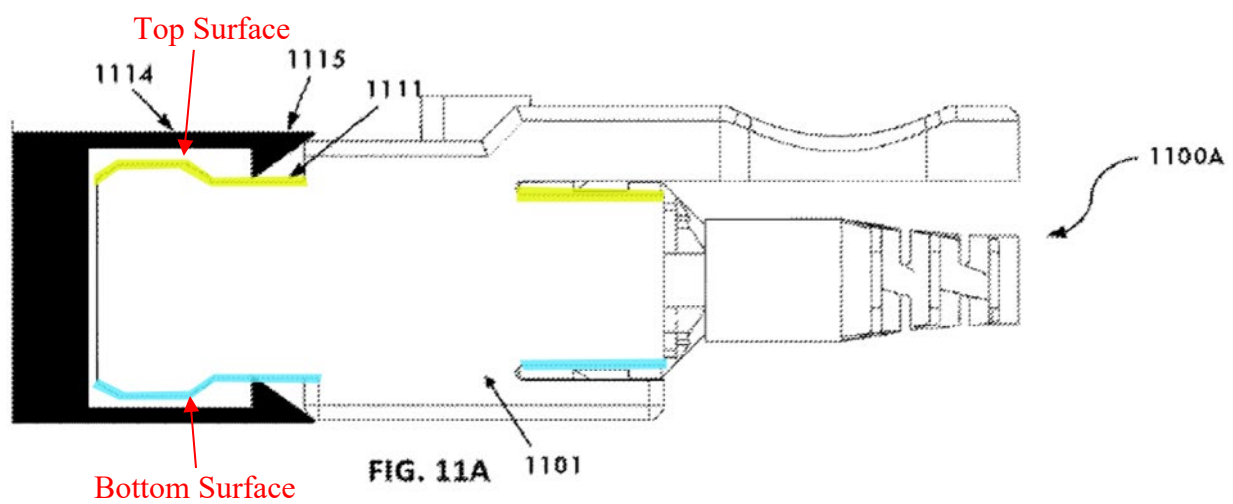
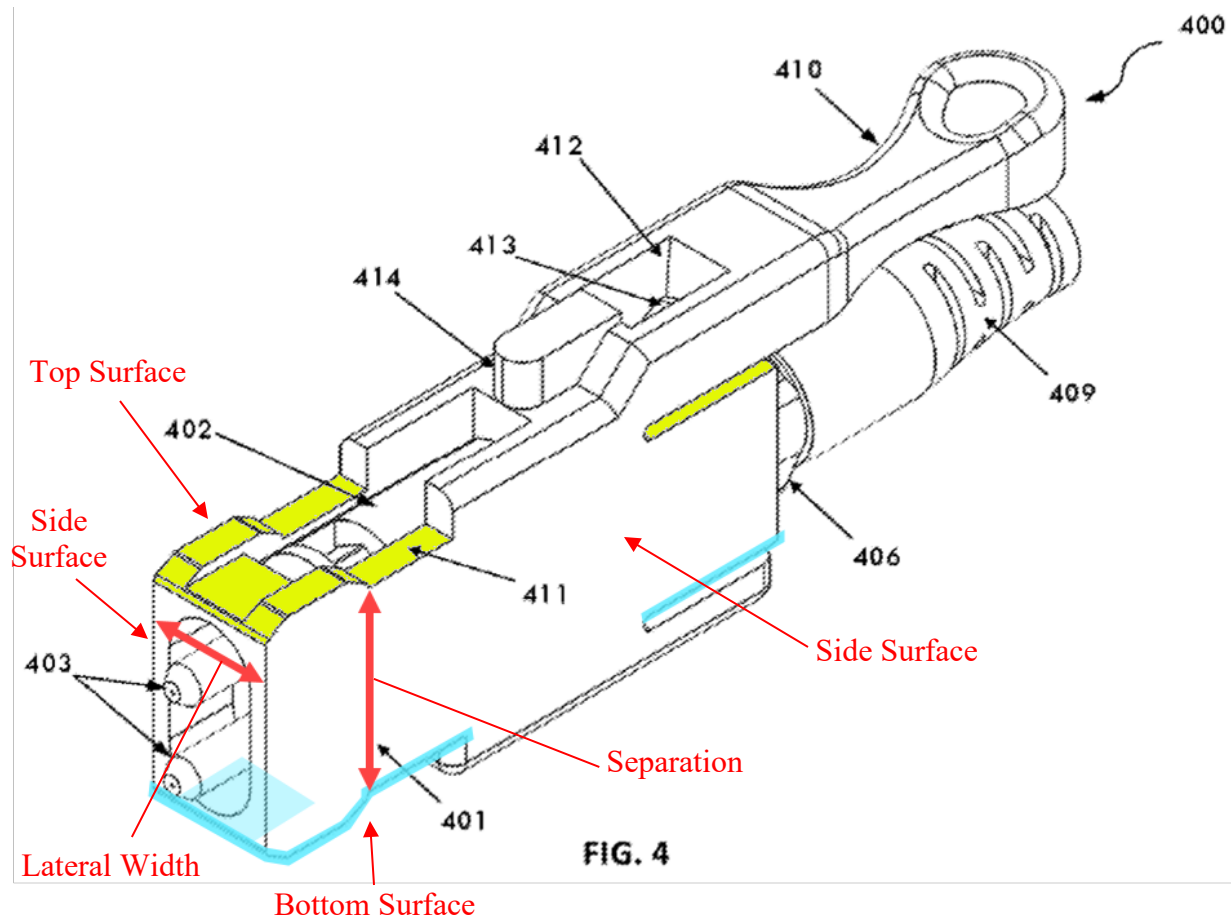


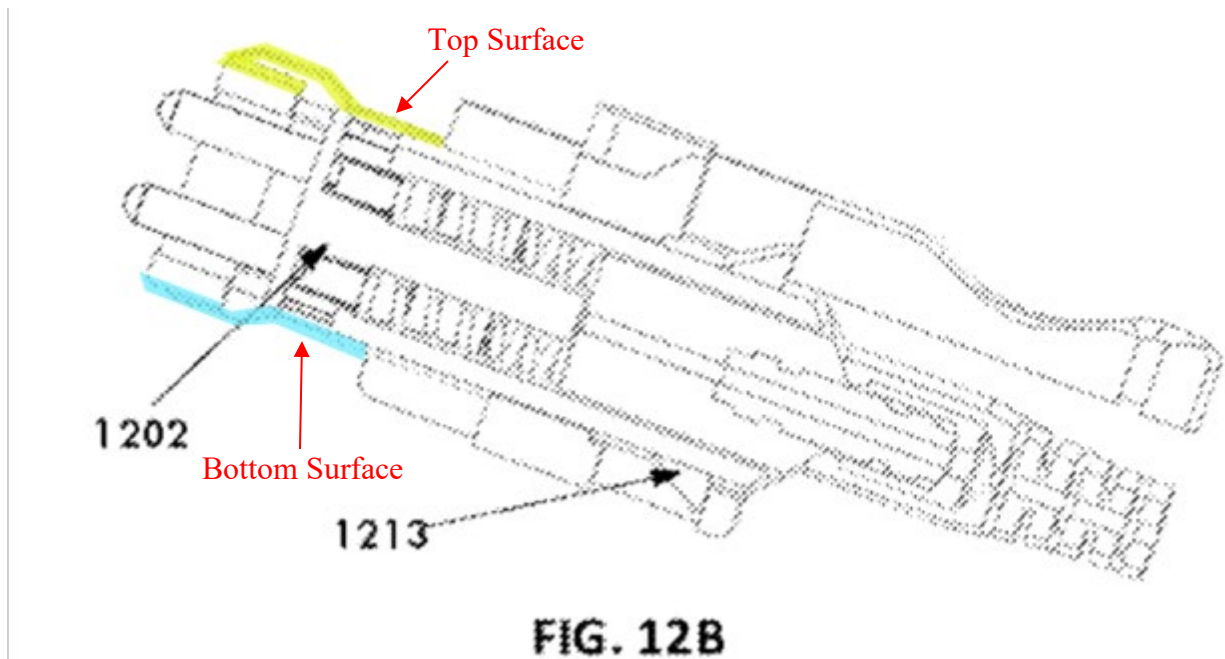
EX1003: Fig. 12B (annotated).

Therefore, Takano'209 meets 1.a.1. EX1002: ¶117.

### 1.a.2

The outer housing (301, 401, 501, 1101, 1201) has top and bottom surfaces bound by two opposing side surfaces such that a lateral width between the two opposing side surfaces is less than a separation between the top and bottom surfaces along a height of the main body. EX1002: ¶118.





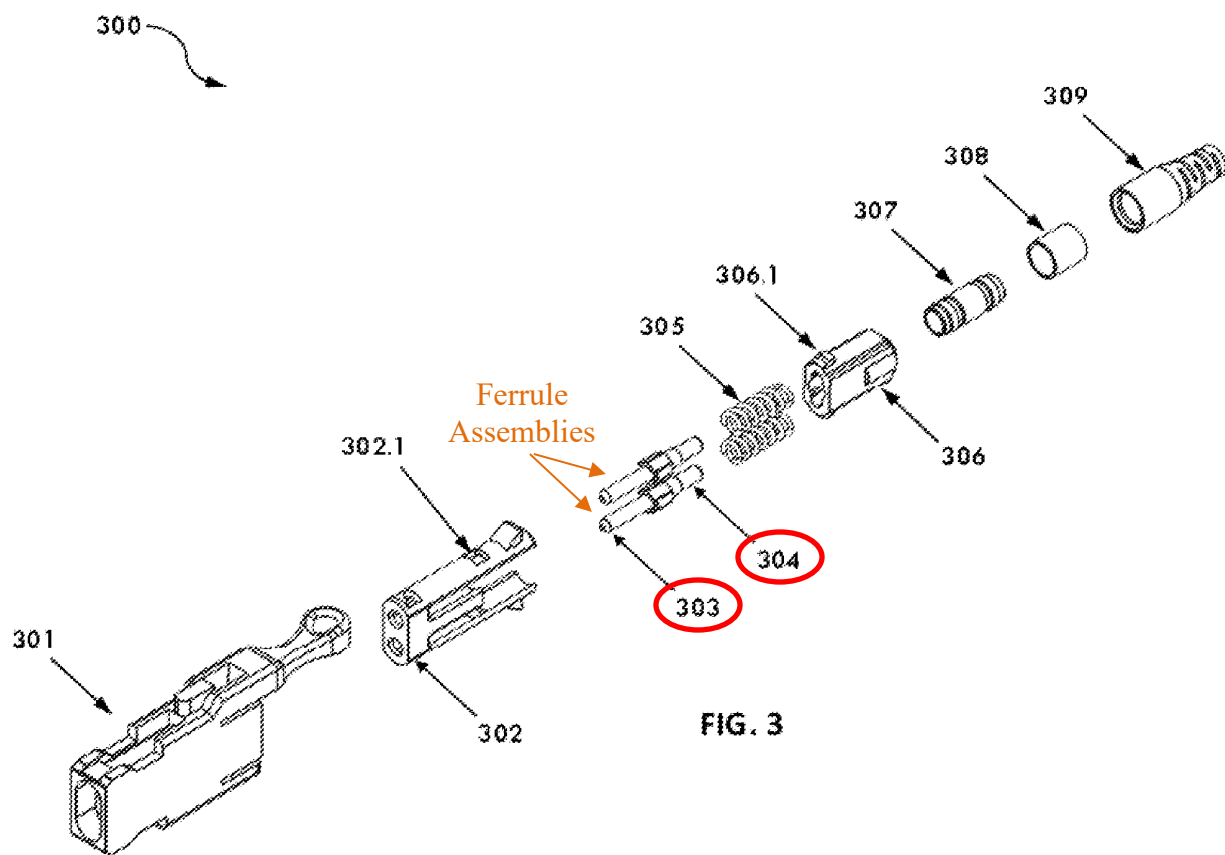
EX1003: Figs. 4, 11A, and 12B (annotated).

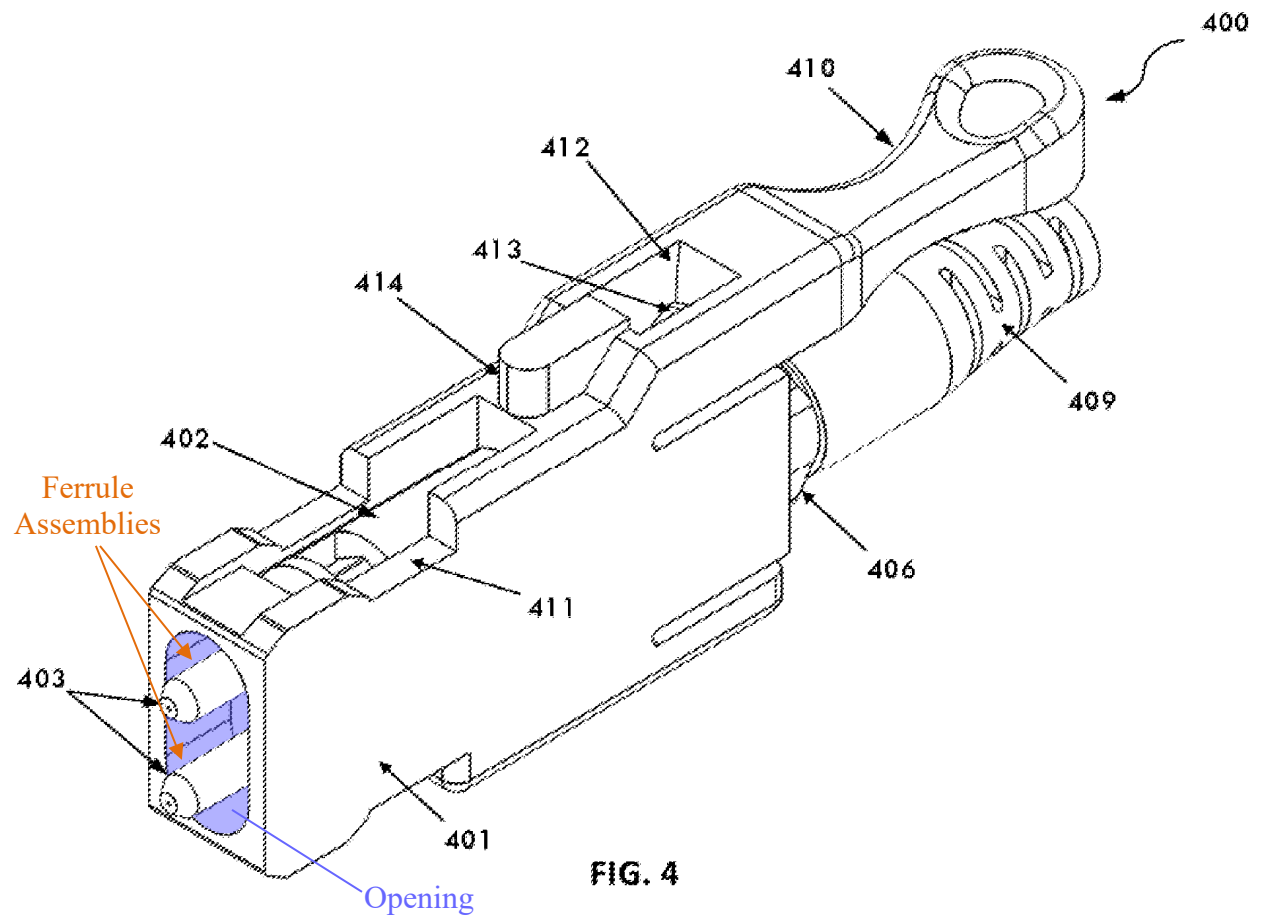
Therefore, Takano'209 meets 1.a.2. EX1002: ¶119.

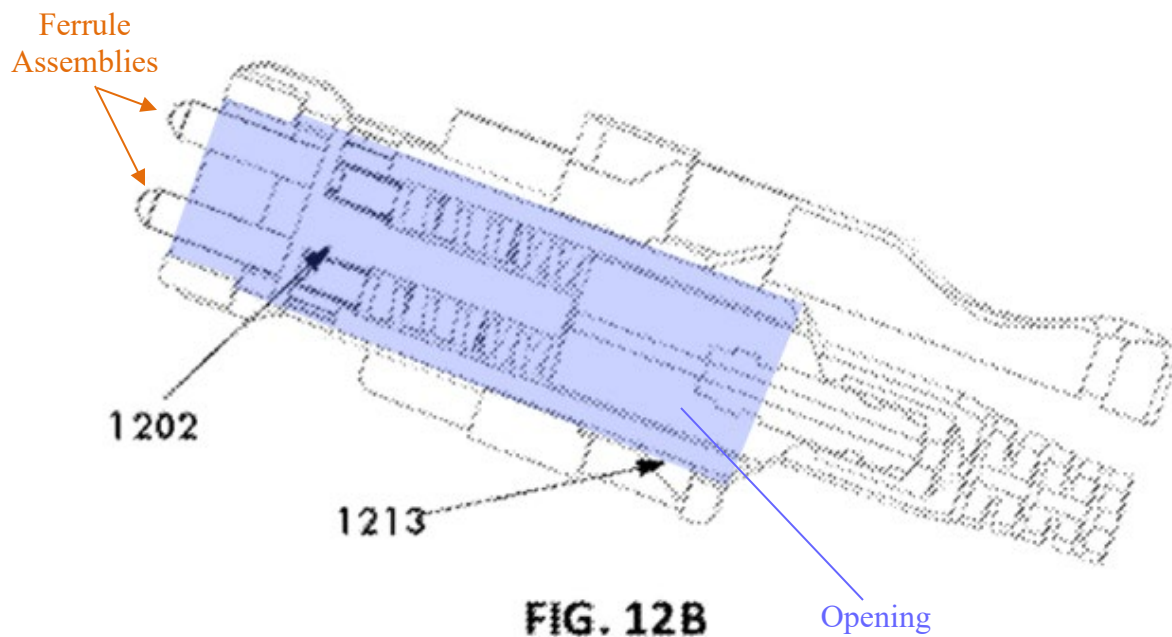
### 1.b.1

The connector (300, 400, 500, 1100A-B, 1200) includes two ferrule assemblies, each comprising a ferrule (303, 403) and a ferrule flange (304) (i.e., ferrule holder). EX1003: ¶¶[0091]-[0092]; EX1002: ¶120. Each ferrule assembly is disposed within the opening of the outer housing (301, 401, 501, 1101, 1201).

EX1003: Figs. 3 and 12B; EX1002: ¶120. The ferrules are spaced apart along the height of the main body. EX1003: Figs. 3, 4, and 12B; EX1002: ¶120.





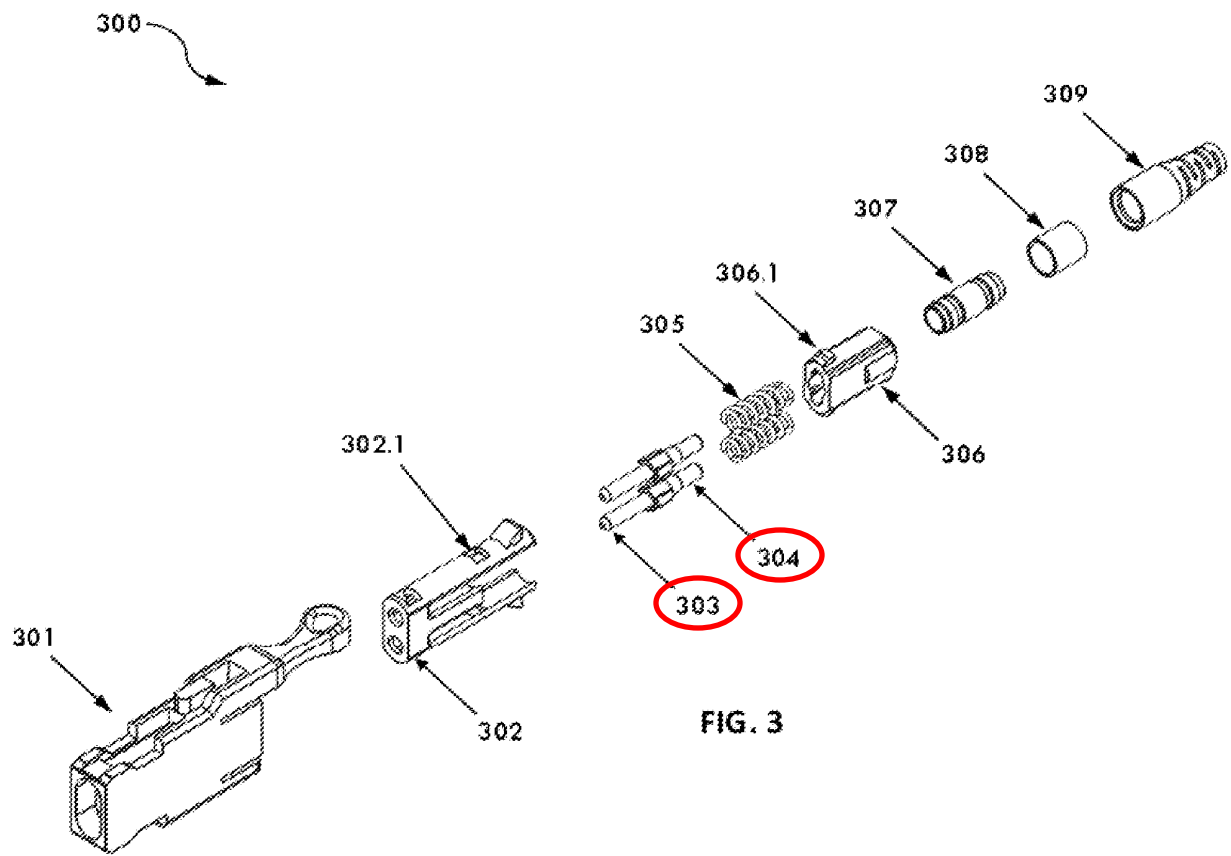


EX1003: Figs. 3, 4, and 12B (annotated).

Therefore, Takano'209 meets 1.b.1. EX1002: ¶121.

### 1.b.2

Each ferrule (303, 403) extends forward of and away from the front end of the respective ferrule holder (304). EX1003: Fig. 3; EX1002: ¶122.



EX1003: Fig. 3 (annotated).

Therefore, Takano'209 meets 1.b.2. EX1002: ¶123.

### 1.c

The connector (300, 400, 500, 1100A-B, 1200) includes two springs (305).

EX1003: ¶[0091]; EX1002: ¶124.

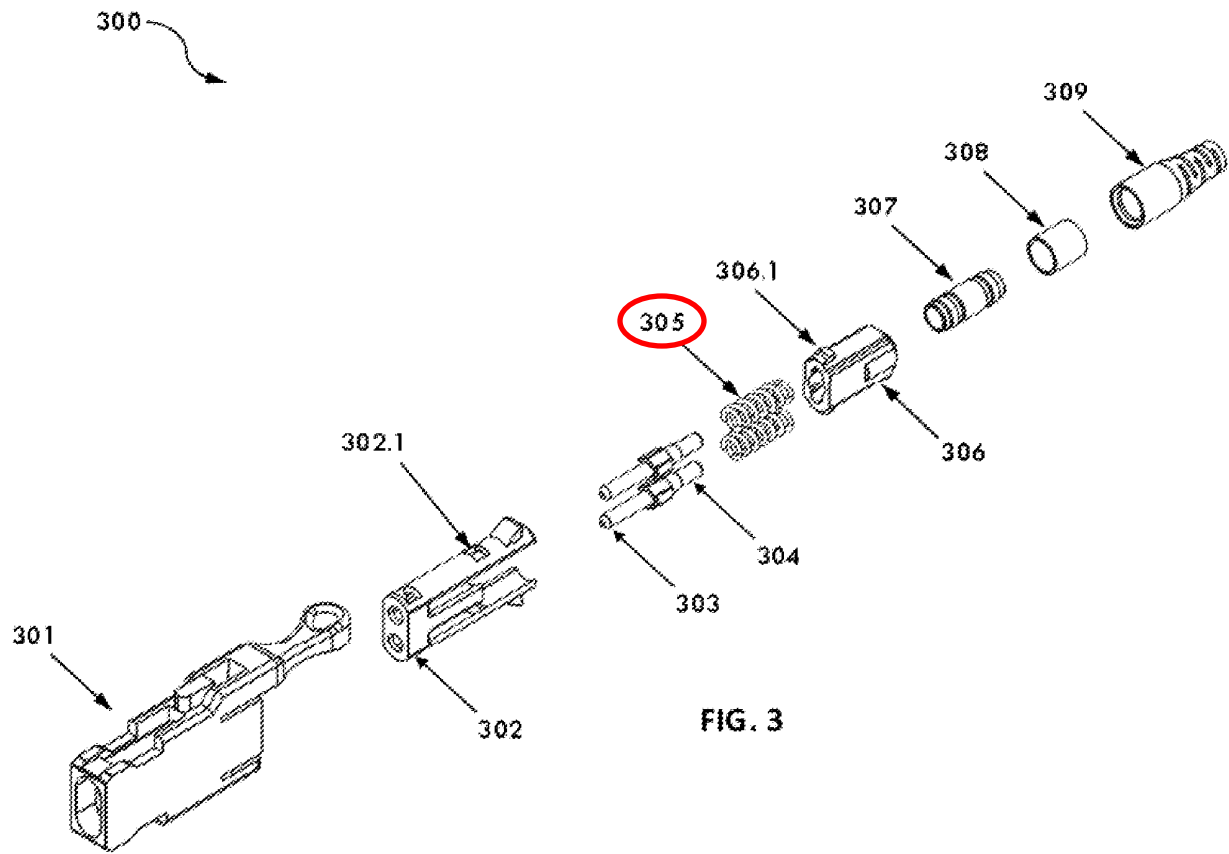
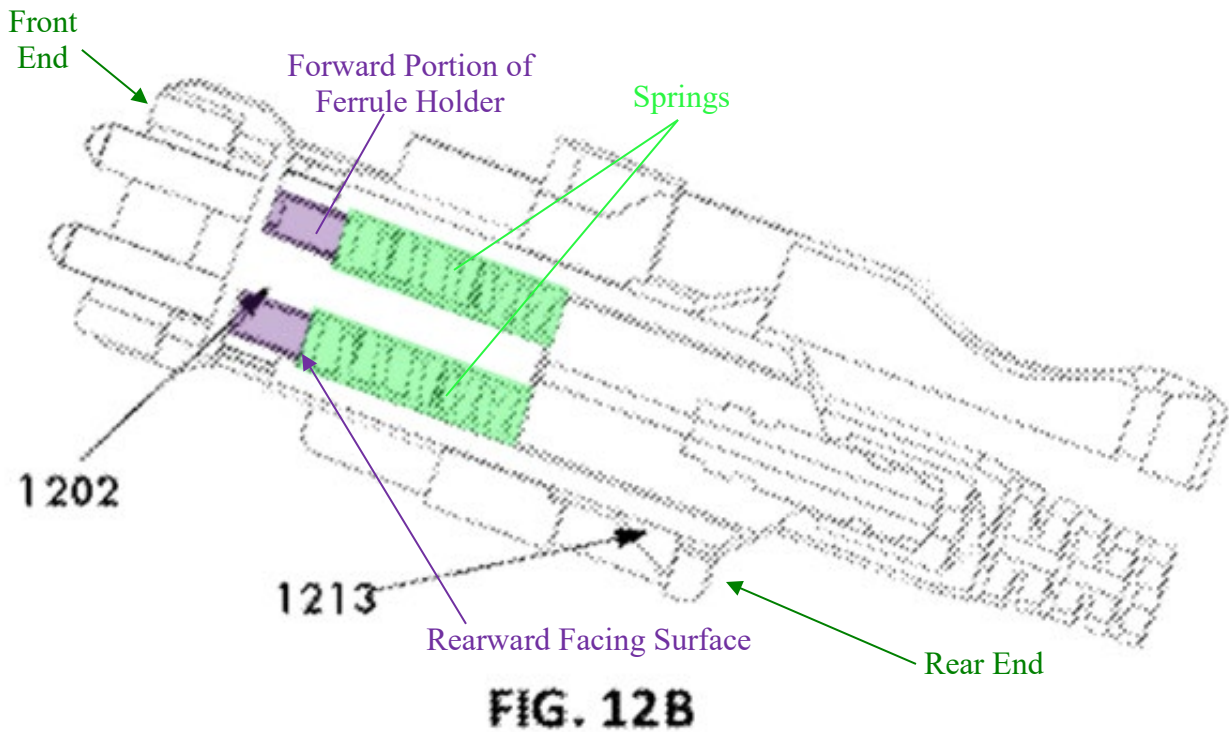


FIG. 3

EX1003: Fig. 3 (annotated).

Each spring (305) engages a rearward facing surface of the respective ferrule flange (304) at its front end and extends toward the rear end of the outer housing (301, 401, 501, 1101, 1201) to bias the ferrule assembly forward toward the front end of the outer housing. EX1003: ¶[0091], Fig. 12B; EX1002: ¶125. The ferrules (303, 403), the ferrule flanges, and the springs are secured between the front body (302, 402, 502, 1202) and the back body (306, 406). EX1003: ¶[0091]-[0093], [0107], Figs. 3-5, and 12B; EX1002: ¶125. Each spring is retained within the outer

housing, captured between the ferrule flange and back body. EX1003: ¶[0091]-[0093], [0107], Figs. 3-5, and 12B; EX1002: ¶125.



EX1003: Fig. 12B (annotated).

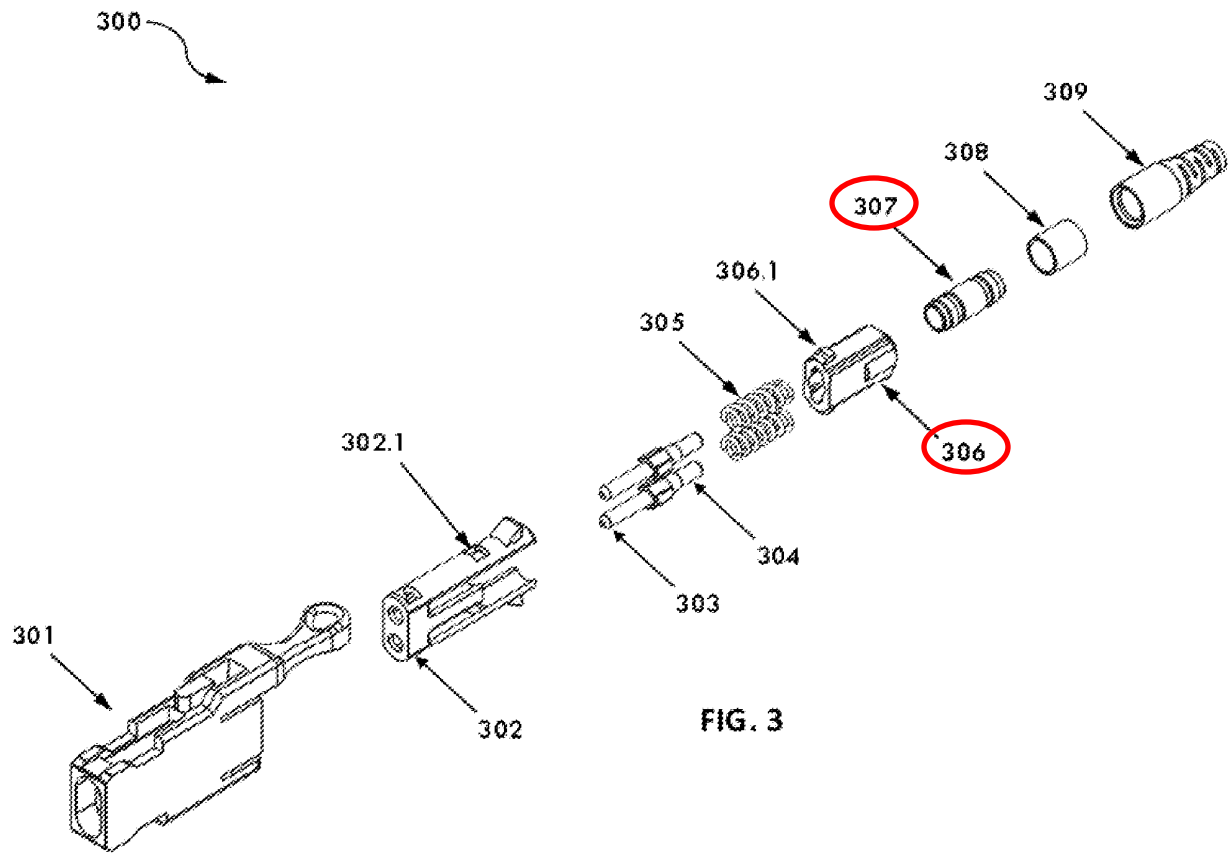
Therefore, Takano'209 meets 1.c. EX1002: ¶126.

#### 1.d

The connector has a two-piece<sup>5</sup> crimp body made of the back body (306, 406) and a back post (307) secured to one another. EX1003: ¶¶[0091]-[0092]; EX1002: ¶127.

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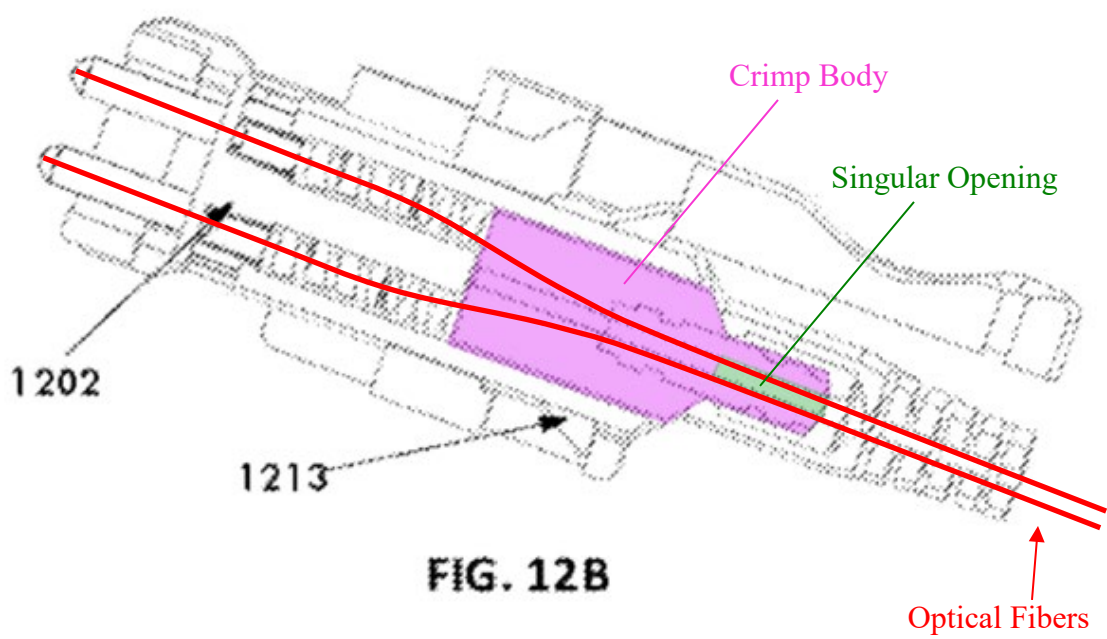
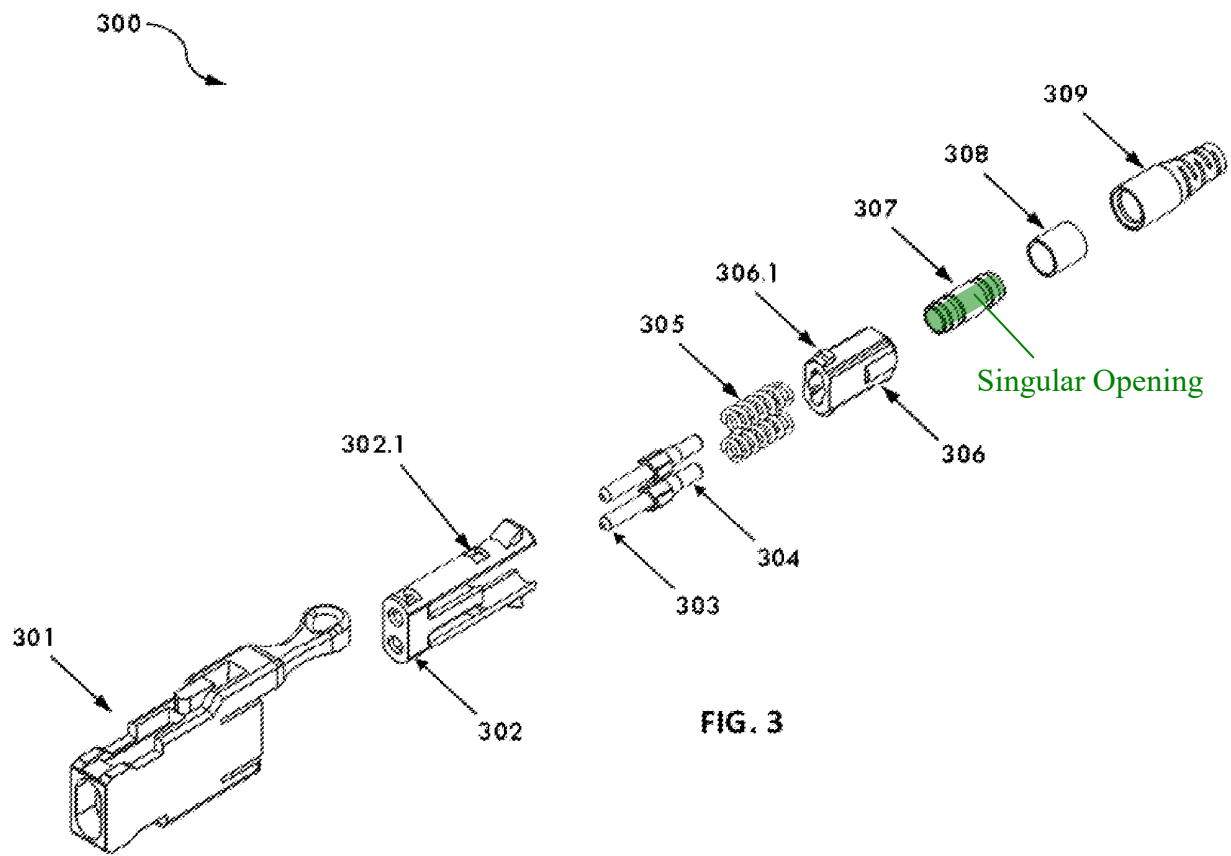
<sup>5</sup> A crimp body can be two-pieces secured together. EX1001: 7:20-23; EX1002: ¶127.



EX1003: Fig. 3 (annotated).

The crimp body (306, 406, 307) is secured to the connector via protrusions (306.1) interlocking with a cutout (302.1) in the front body. EX1003: ¶[0091]; EX1002: ¶128.

The back post (307) of the crimp body has a singular opening for optical fibers at the crimp body's rear end. EX1004: Figs. 3 and 12B; EX1002: ¶129.



EX1003: Figs. 3 and 12B<sup>6</sup> (annotated).

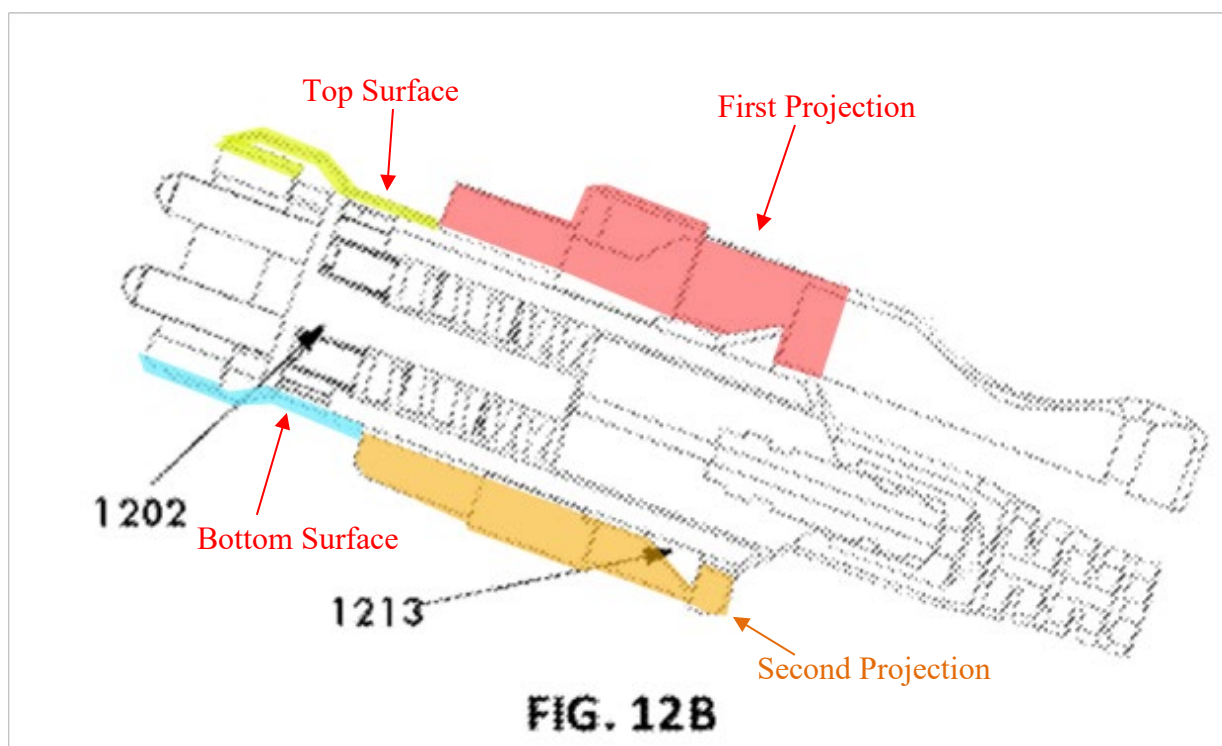
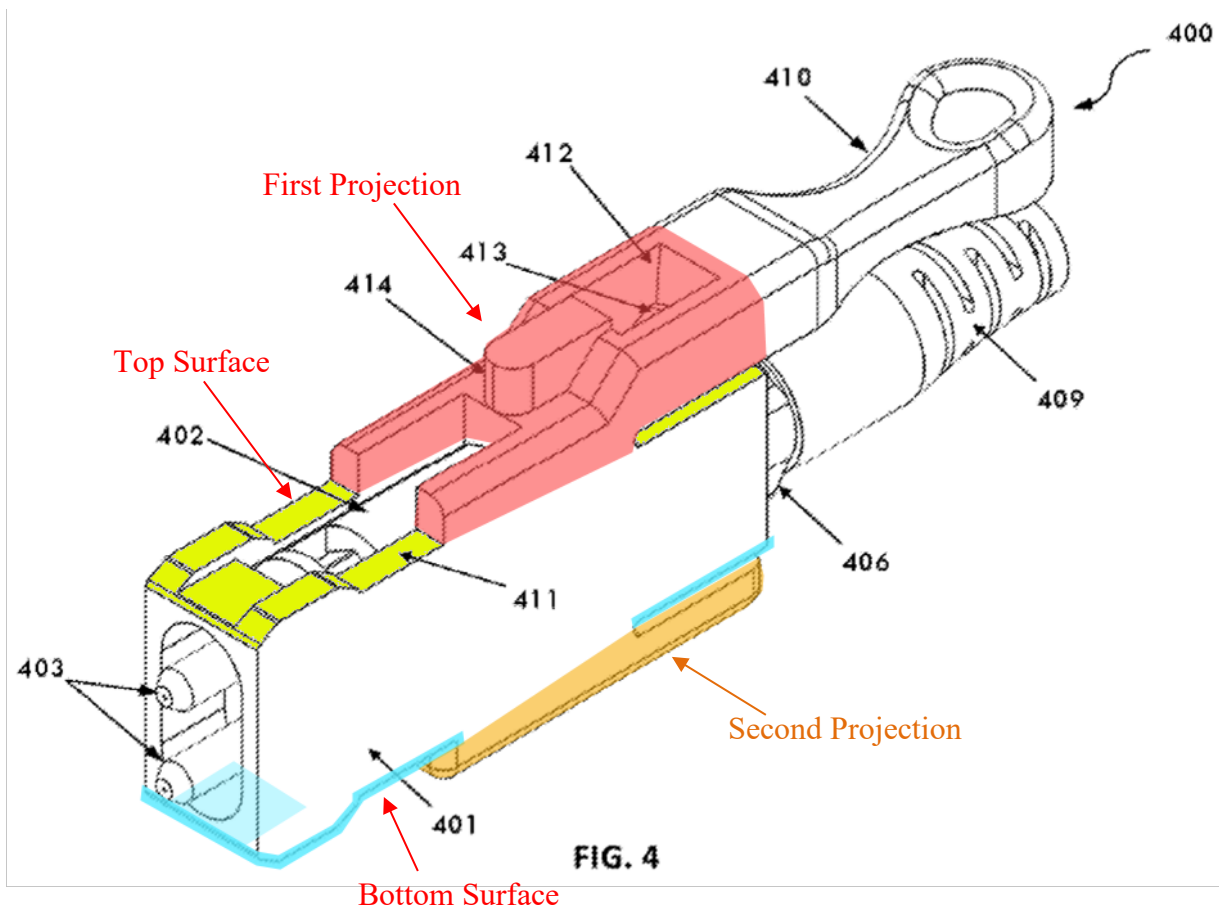
Therefore, Takano'209 meets 1.d. EX1002: ¶130.

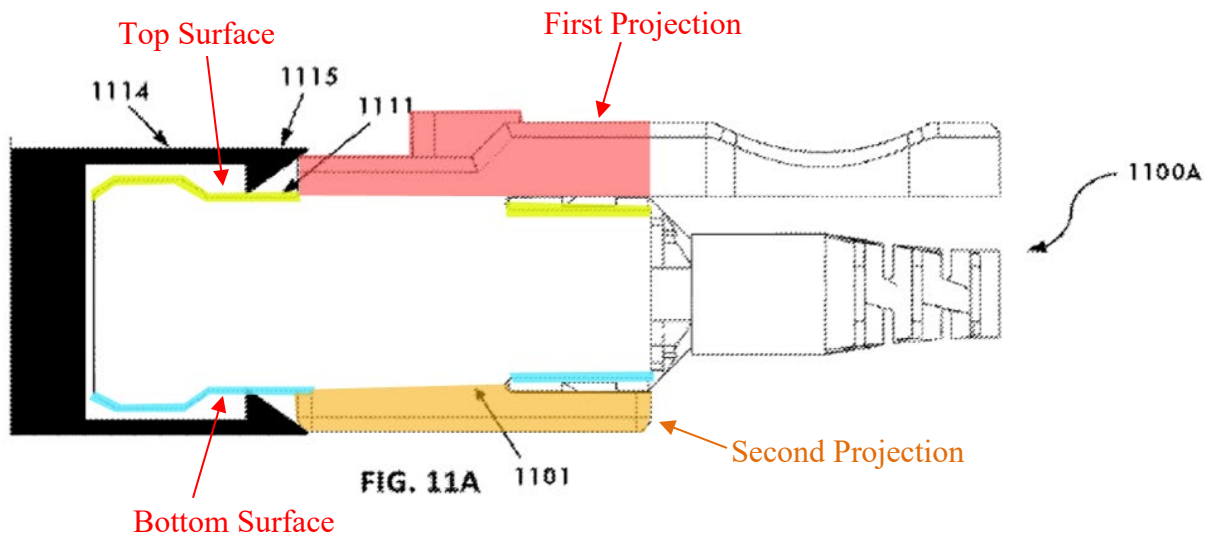
**1.e**

Takano'209 discloses a first projection (red) on the top surface (yellow) of the outer housing (301, 401, 501, 1101, 1201) and a second projection (orange) on the bottom surface (cyan) of the outer housing. EX1003: Figs. 4, 11A, and 12B; EX1002: ¶131. The first projection projects upward from the top surface, and the second projection projects downward from the bottom surface. EX1003: Figs. 4, 11A, and 12B; EX1002: ¶131.

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<sup>6</sup> Fig. 12B's cross-section is offset from the center, resulting in only a narrow segment of the singular opening being visible. The opening is larger at the connector's center. EX1002: ¶129.





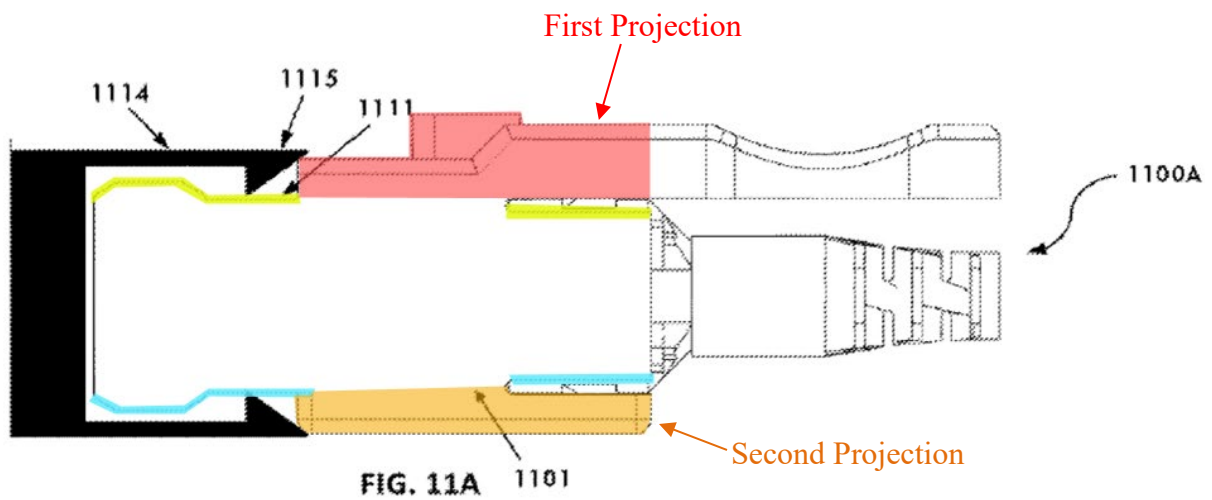
EX1003: Figs. 4, 11A, and 12B (annotated).

Therefore, Takano'209 meets 1.e. EX1002: ¶132.

### 1.f

The key (414) makes the first projection a different size than the second projection. EX1003: ¶[0092], Figs. 4, 11A, and 12B; EX1002: ¶133. The key (414) “keep[s] the connector in a given orientation when inserted into a receptacle.” EX1003: ¶[0092]; EX1002: ¶133.



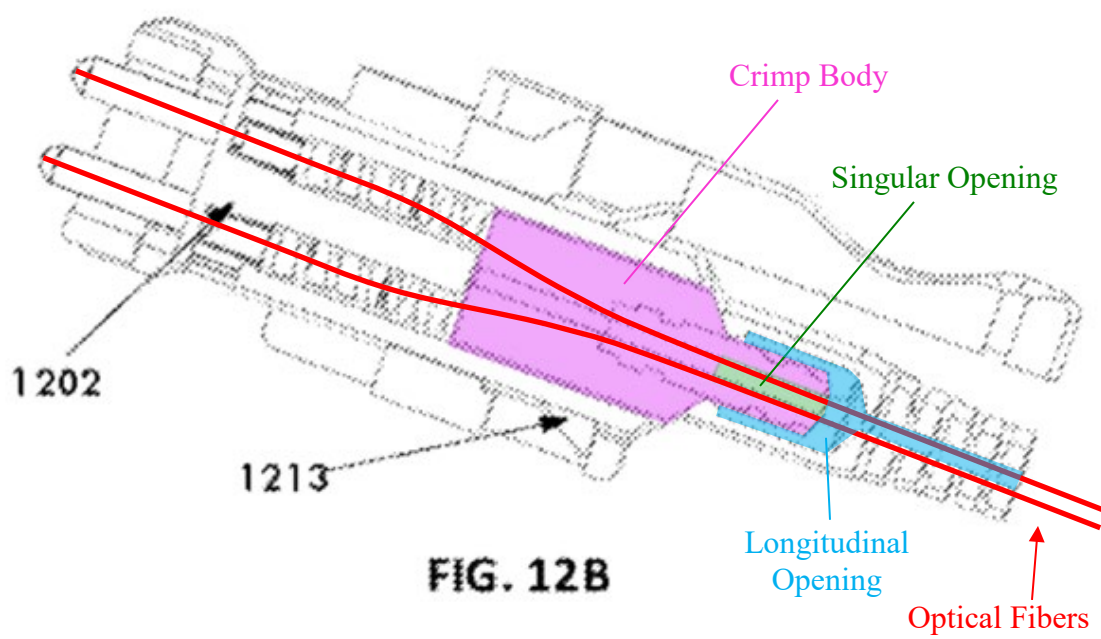
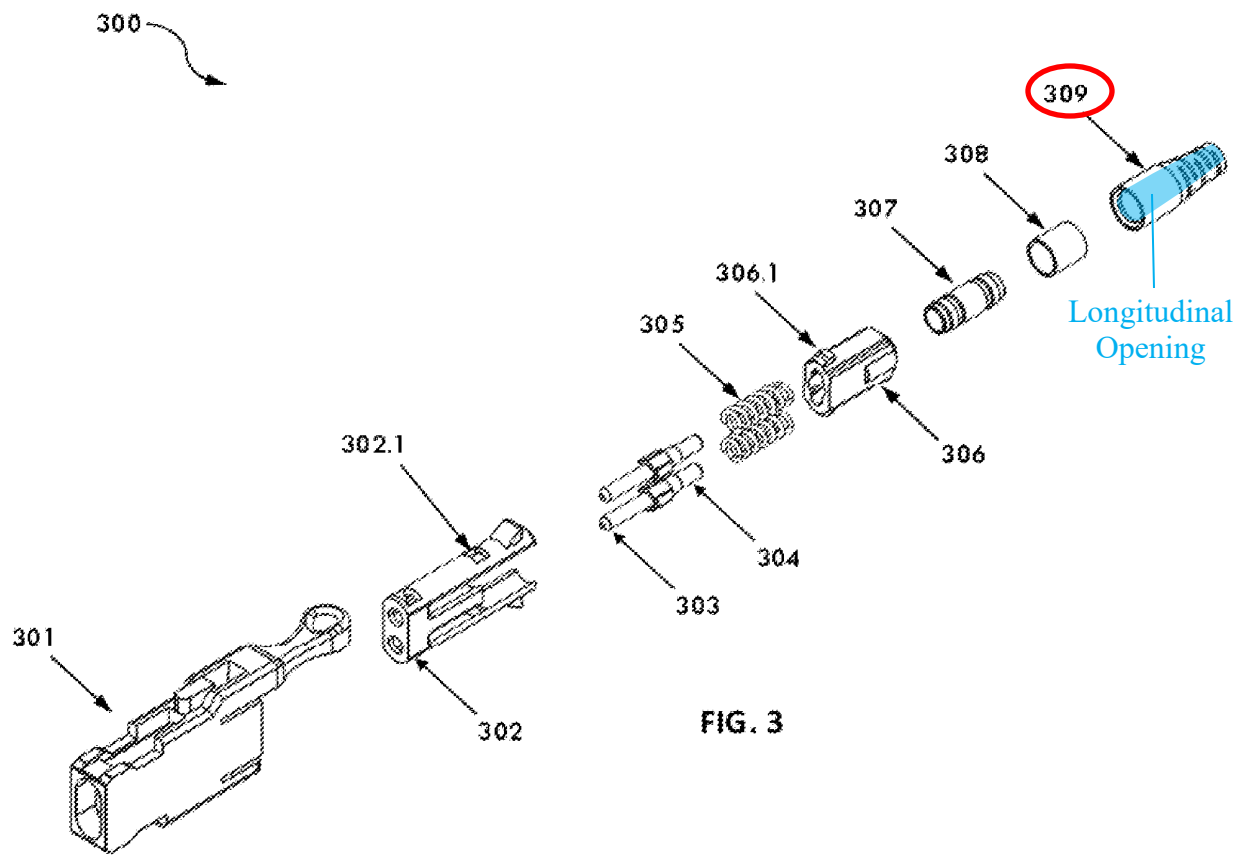


EX1003: Figs. 4, 11A, and 12B (annotated).

Therefore, Takano'209 meets 1.f. EX1002: ¶134.

### 1.g

The connector (300, 400, 500, 1100A-B, 1200) includes a boot (309, 409) having a longitudinal opening in continuum with the singular opening of the crimp body through which fibers pass from a cable to the ferrules. EX1003: ¶¶[0091]-[0092], Figs. 3, 4, 12B, 14B; EX1002: ¶135.

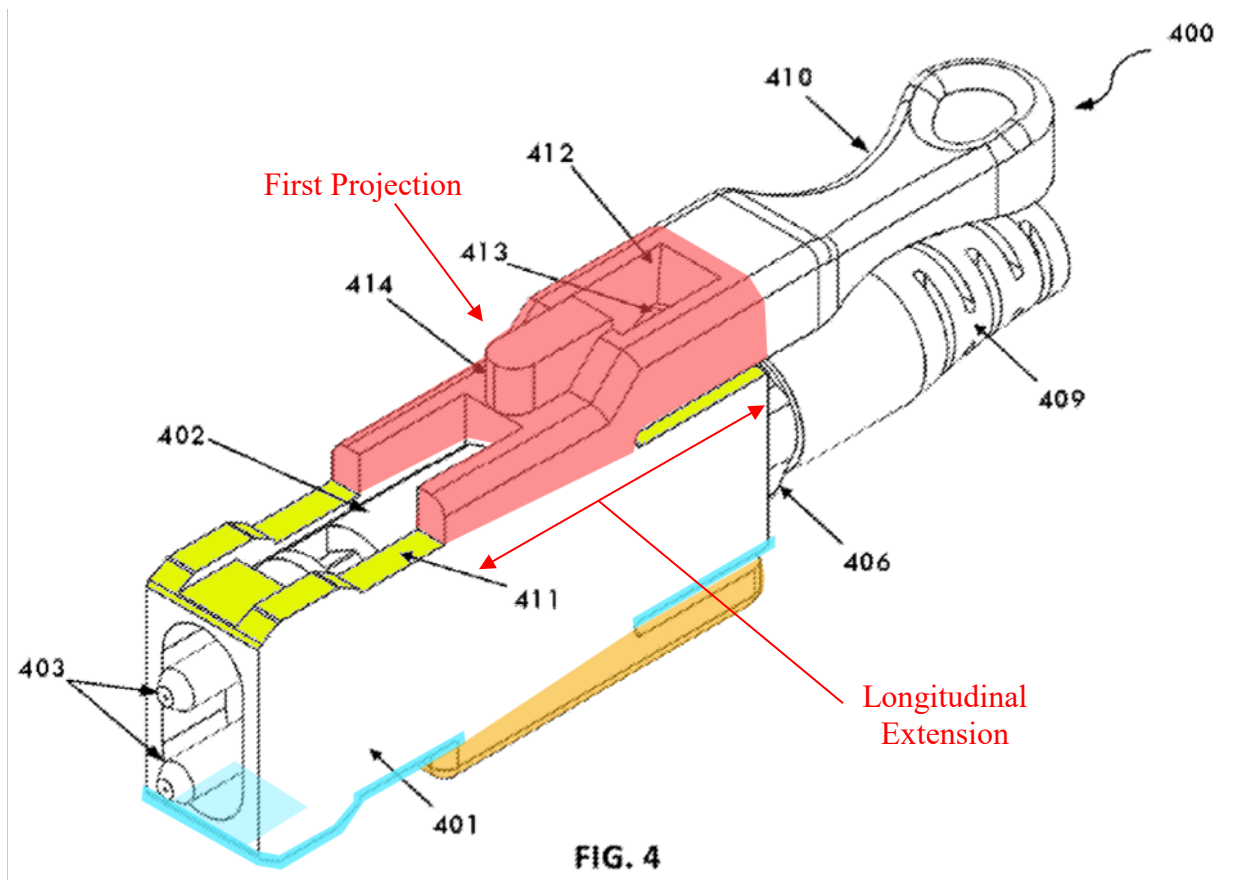


EX1003: Figs. 3 and 12B (annotated).

Therefore, Takano’209 meets 1.g. EX1002: ¶136.

### B. Claim 2

The first projection extends longitudinally along the top surface of the outer housing (301, 401, 501, 1101, 1201). EX1003: Figs. 4, 11A, and 12B; EX1002: ¶137.



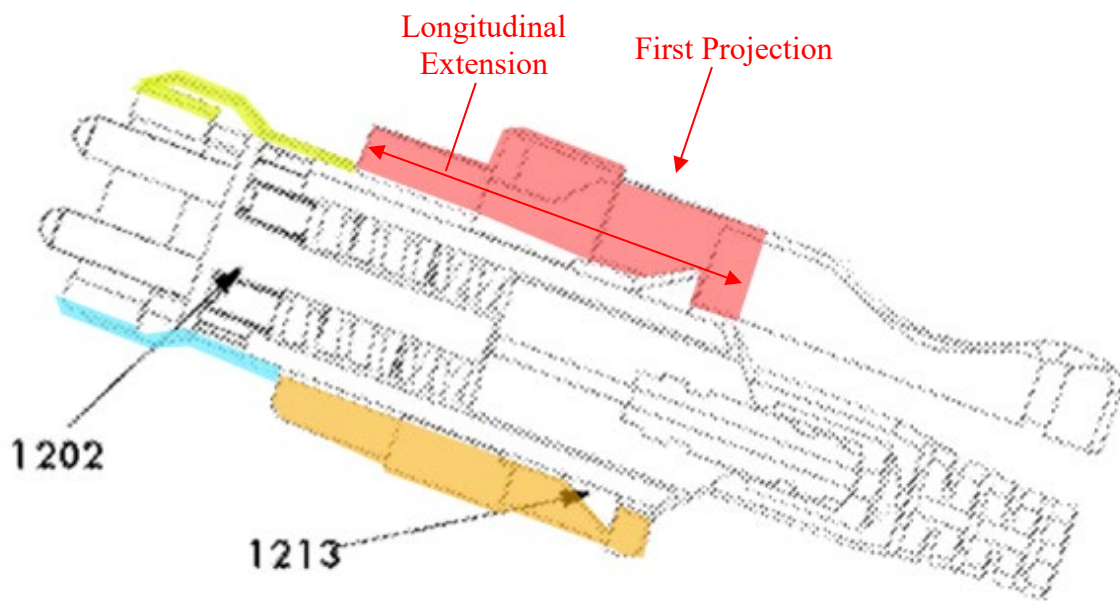


FIG. 12B

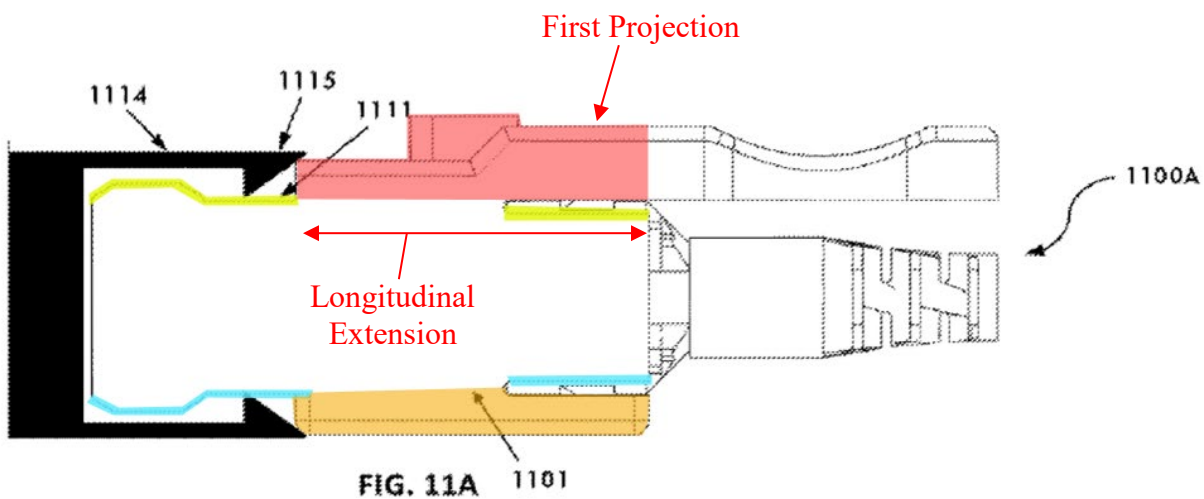


FIG. 11A

EX1003: Figs. 4, 11A, and 12B (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶138.

### C. Claim 3

The crimp body (particularly, the front portion of the back body (306, 406)) forms a spring push engaging a rear portion of each of the two springs (305).<sup>7</sup>

EX1003: Fig. 12B; EX1002: ¶139.

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<sup>7</sup> Through claim differentiation in U.S. Patent No. 11,733,466 (the parent to the ‘994 Patent), the spring push can be part of the crimp body. EX1021: claims 3 and 4; *Samsung Elecs. Co. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373, 1378 (Fed. Cir. 2019) (“Where multiple patents derive from the same parent application and share many common terms, [the Court] must interpret the claims consistently across all asserted patents.”); EX1002: ¶¶140-143.



Therefore, Takano’209 meets this claim. EX1002: ¶144.

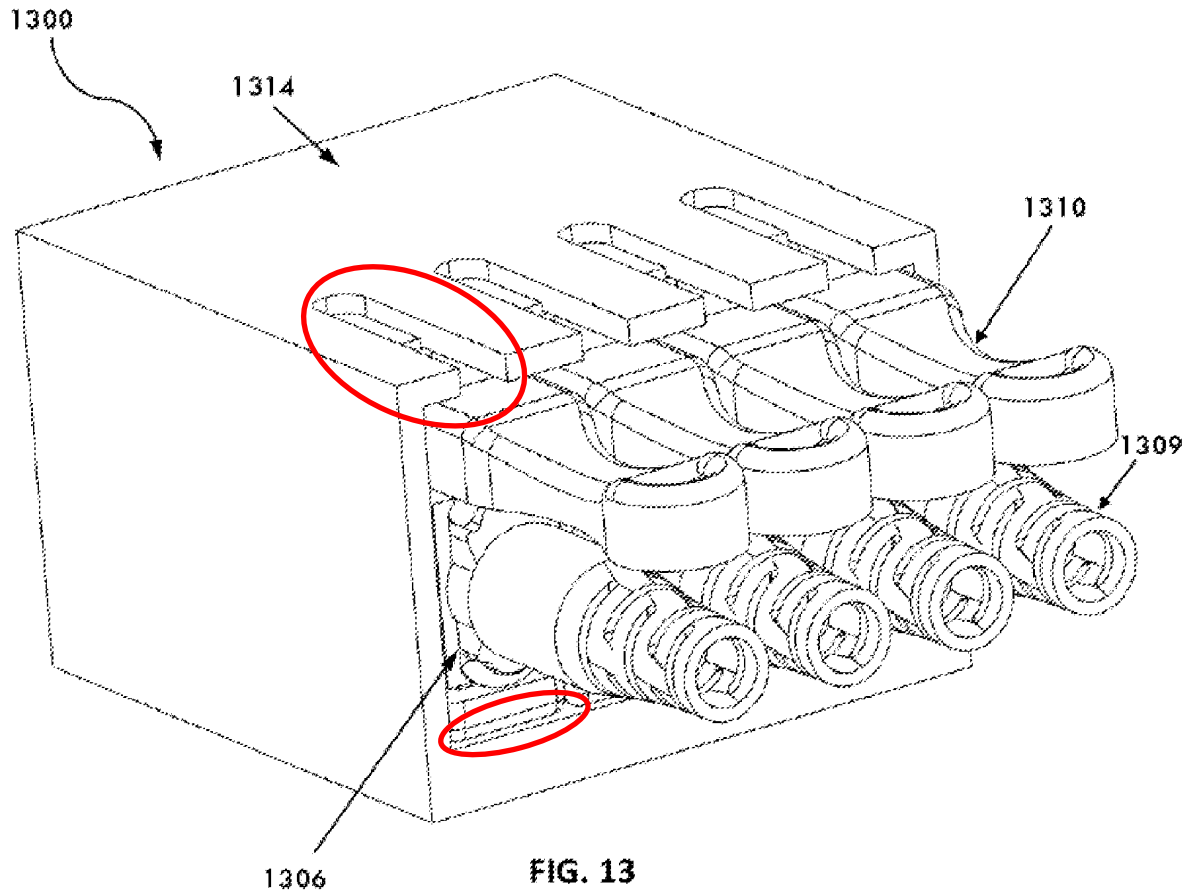
**D. Claim 4**

Claim 4—“wherein the first projection and the second projection determine a correct orientation or polarity of the housing during an insertion into an adapter”—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).

The first and second projections of the connector (300, 400, 500, 1100A-B, 1200) are capable of meeting claim 4’s intended use. EX1002: ¶¶145-147.

For example, the first and second projections determine a correct orientation and/or polarity of the outer housing (301, 401, 501, 1101, 1201) during insertion into an adapter because the key (414) is formed on the first projection but not the second projection. EX1003: ¶[0092]; EX1002: ¶148. The key (414) is received in a corresponding keyway or groove in an adapter to set the correct orientation and polarity of the outer housing. EX1003: Fig. 13; EX1002: ¶148.





EX1003: Fig. 13 (annotated).<sup>8</sup>

Therefore, Takano'209 meets this claim. EX1002: ¶151.

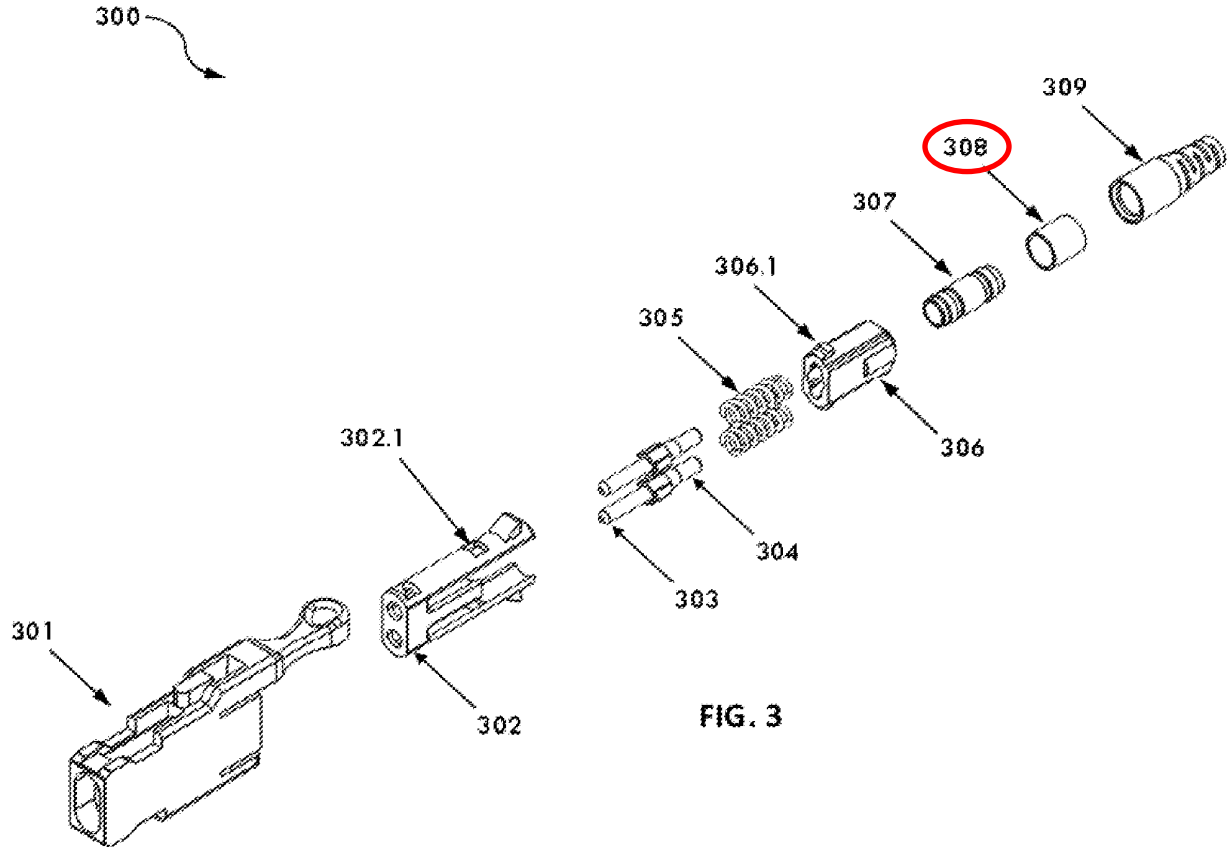
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<sup>8</sup> Fig. 13 shows an adapter that would have a similar if not identical configuration—i.e., the same keyway and a flat bottom wall—to an adapter for four connectors (300, 400, 500, 1100A-B, 1200) of Figs. 3-5 and 11A-12B. EX1002: ¶¶111, 150. In fact, the adapter (1314) of Fig. 13 may be for four connectors of Figs. 3-5 and 11A-12B. EX1002: ¶¶112, 150.

**E. Claim 5**

**5.a**

The connector (300, 400, 500, 1100A-B, 1200) includes a crimp ring (308), which is a crimp band. EX1003: ¶[0091]; EX1002: ¶152.



EX1003: Fig. 3 (annotated).

The crimp ring (308) is secured around an outer surface of the rear end of the crimp body (306, 406, 307), specifically crimped to the back post (307).

EX1003: Figs. 3 and 12B; EX1002: ¶153.

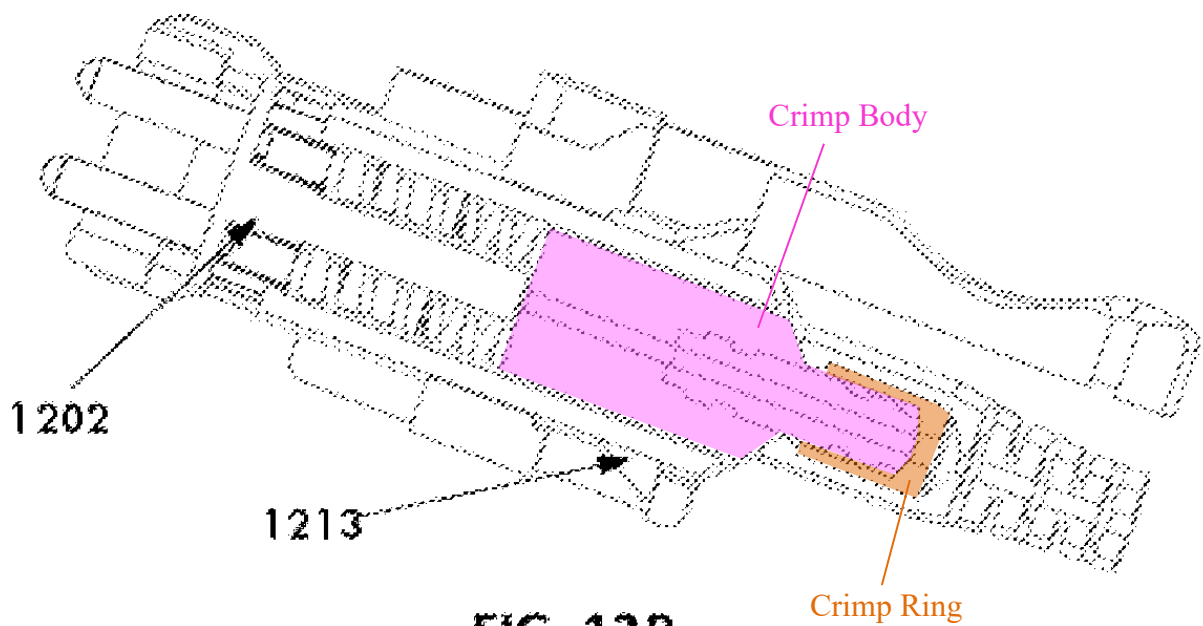


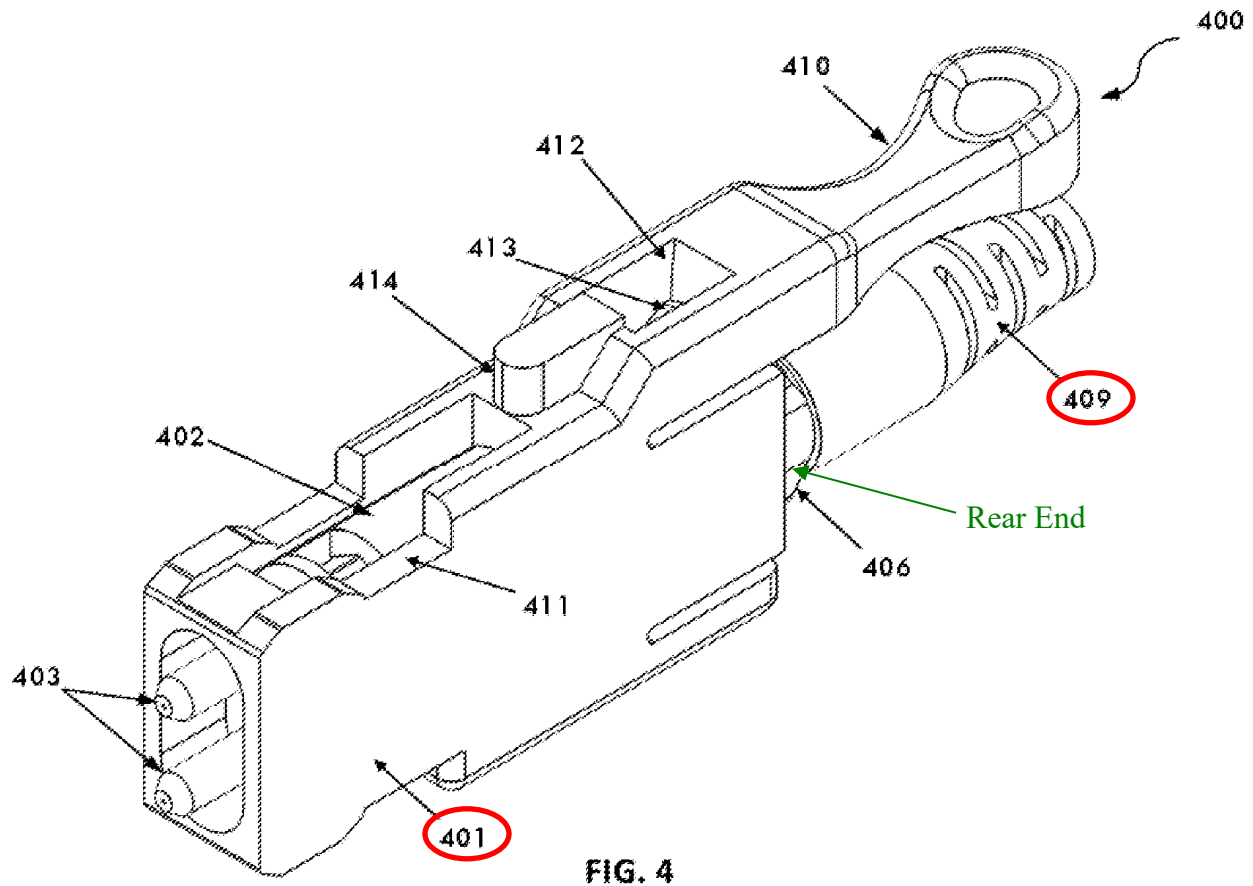
**FIG. 12B**

EX1003: Fig. 12B (annotated).

Therefore, Takano'209 meets 5.a. EX1002: ¶154.

### **5.b**

The boot (309, 409) extends rearwardly away from the main body of the outer housing (301, 401, 501, 1101, 1201). EX1003: Figs. 4, 11A-B, and 12A-B; EX1002: ¶155.



EX1003: Fig. 4 (annotated).

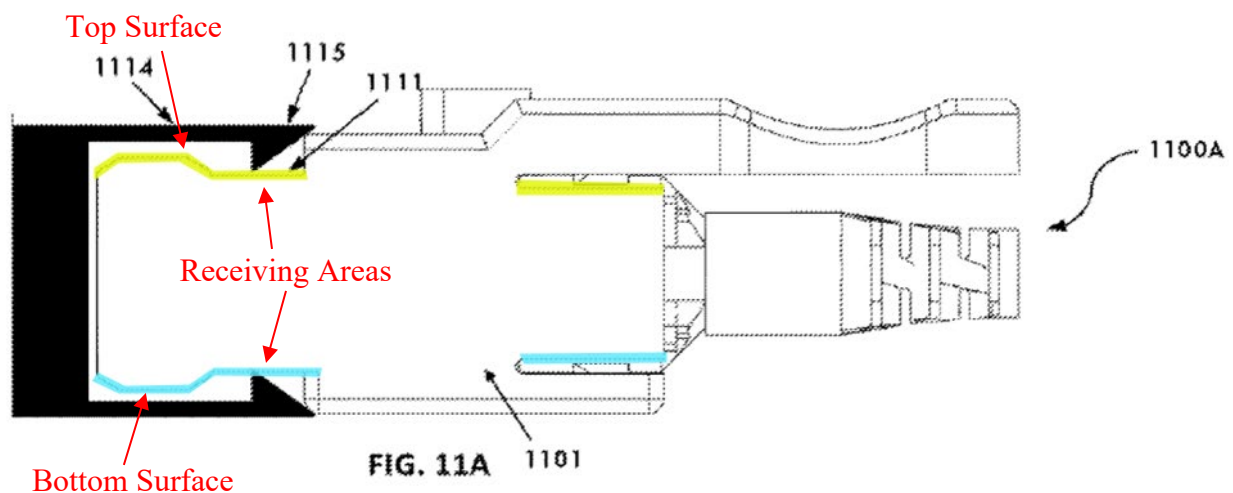
To the extent US Conec alleges the push-pull tab (410, 510, 1110) prevents Takano’209 from meeting this limitation, Takano’209 teaches an embodiment where the outer housing (301, 401, 501, 1101, 1201) does not have the push-pull tab. EX1003: ¶¶[0092], [0106]; EX1002: ¶156. Takano’209 states the push-pull tab is *optional*. EX1003: ¶¶[0092] (“the assembled connector may have ... a push-pull tab 410”) (“the push-pull tab may be eliminated”), [0106] (“when a push-pull tab is not present”). The top portion of the outer housing would be cut off in-line with where the rear-bottom end of the main body is. EX1002: ¶156. In this

embodiment, the boot would extend rearward beyond the rearmost point of the outer housing. EX1002: ¶156.

Therefore, Takano'209 meets 5.b. EX1002: ¶157.

#### **F. Claim 6**

The top and bottom surfaces each have a receiving area (recess (1111)) for receiving flexible receptacle hook (1115) of the adapter—a latch component securing the connector to the adapter. EX1003: ¶¶[0105]-[0106], Figs. 11A-B; EX1002: ¶158.



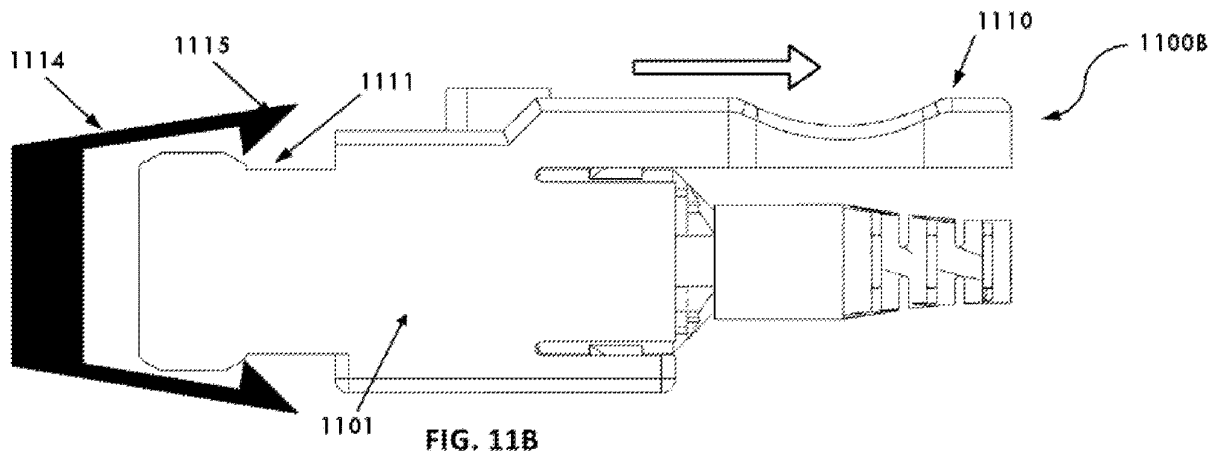
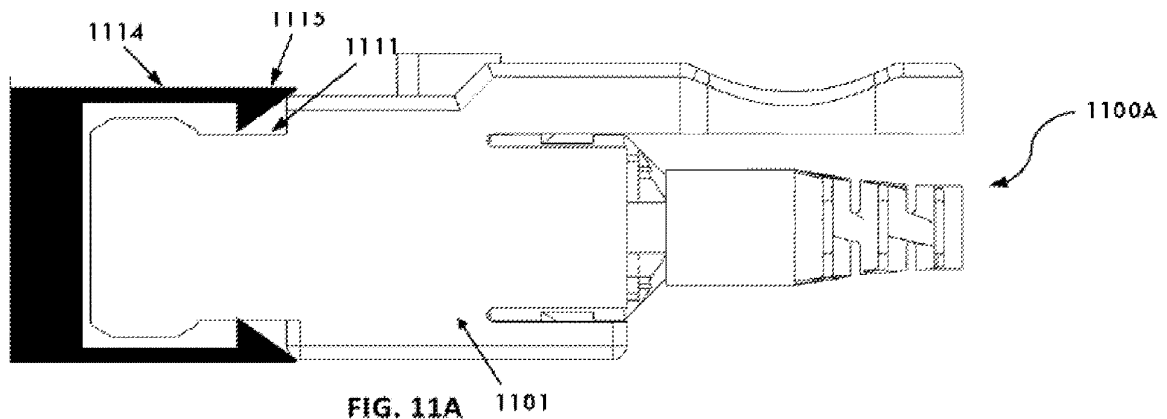
EX1003: Fig. 11A (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶159.

#### **G. Claim 7**

The connector (300, 400, 500, 1100A-B, 1200) receives a push force to insert the connector into an adapter and a pull force to release the receptacle hooks

(1115) from the adapter. EX1003: ¶¶[0105]-[0106]; EX1002: ¶160. “[T]he outer housing 1101 is *pushed* forward into the receptacle.” EX1003: ¶[0105]. The connector is “removed ... by *pulling* the connector away from the adapter” to cause the hooks (1115) to separate “for removal of the connector from the receptacle.” EX1003: ¶[0106].



EX1003: Figs. 11A-B.

Therefore, Takano’209 meets this claim. EX1002: ¶161.

## **H. Claim 8**

Takano'209 explains four connectors (300, 400, 500, 1100A-B, 1200) “may be accommodated in a quad small form-factor pluggable (QSFP) transceiver footprint.” EX1003: ¶[0091]. Therefore, the front end of the outer housing (301, 401, 501, 1101, 1201) of the connector fits in a QSFP footprint. EX1003: ¶[0091]; EX1002: ¶162.

Therefore, Takano'209 meets this claim. EX1002: ¶163.

## **I. Claim 9**

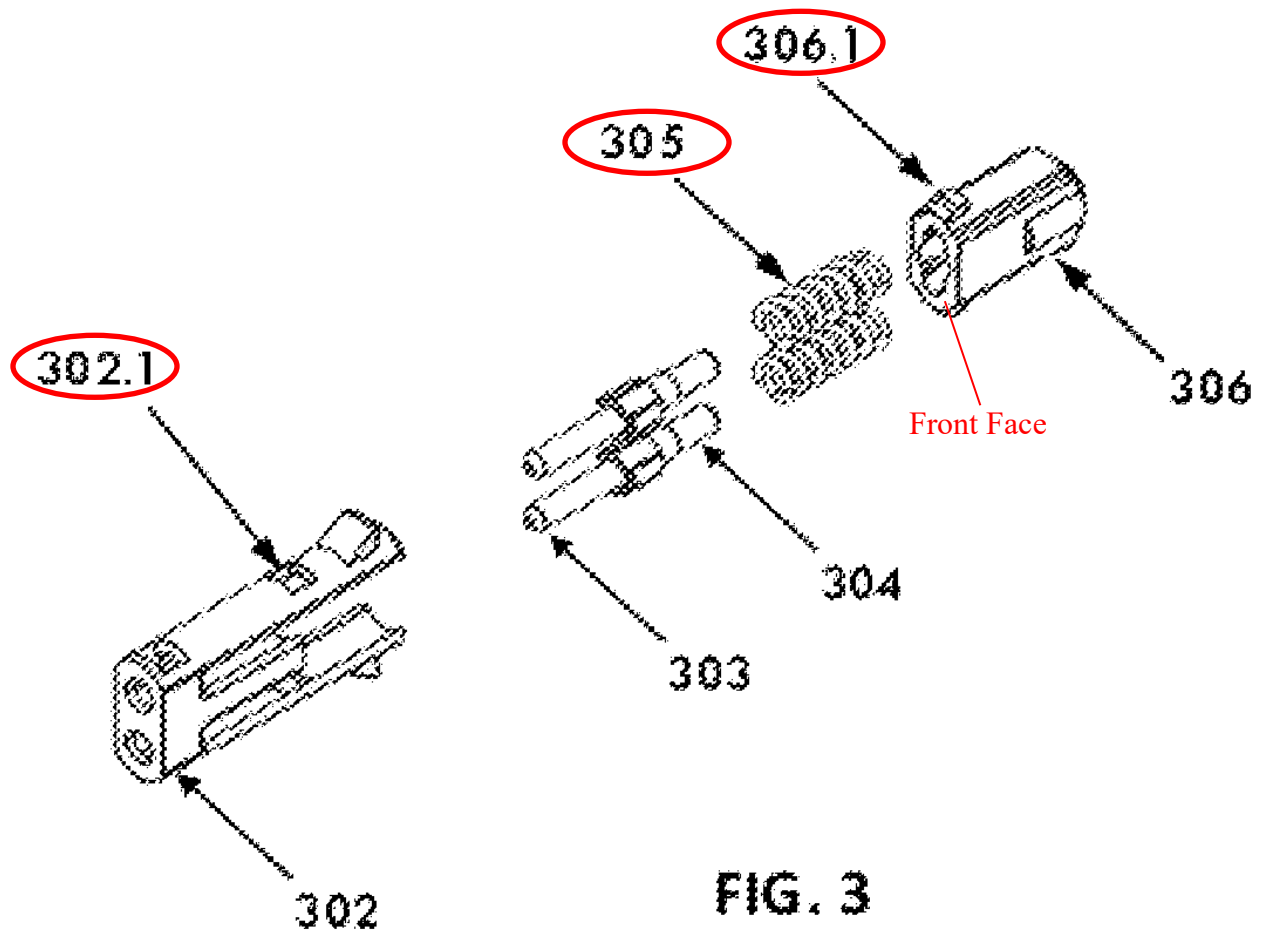
Takano'209 explains two connectors (300, 400, 500, 1100A-B, 1200) “may be accommodated in a small form-factor pluggable (SFP) transceiver footprint.” EX1003: ¶[0091]. Therefore, the front end of the outer housing (301, 401, 501, 1101, 1201) of the connector fits in a SFP footprint. EX1003: ¶[0091]; EX1002: ¶164.

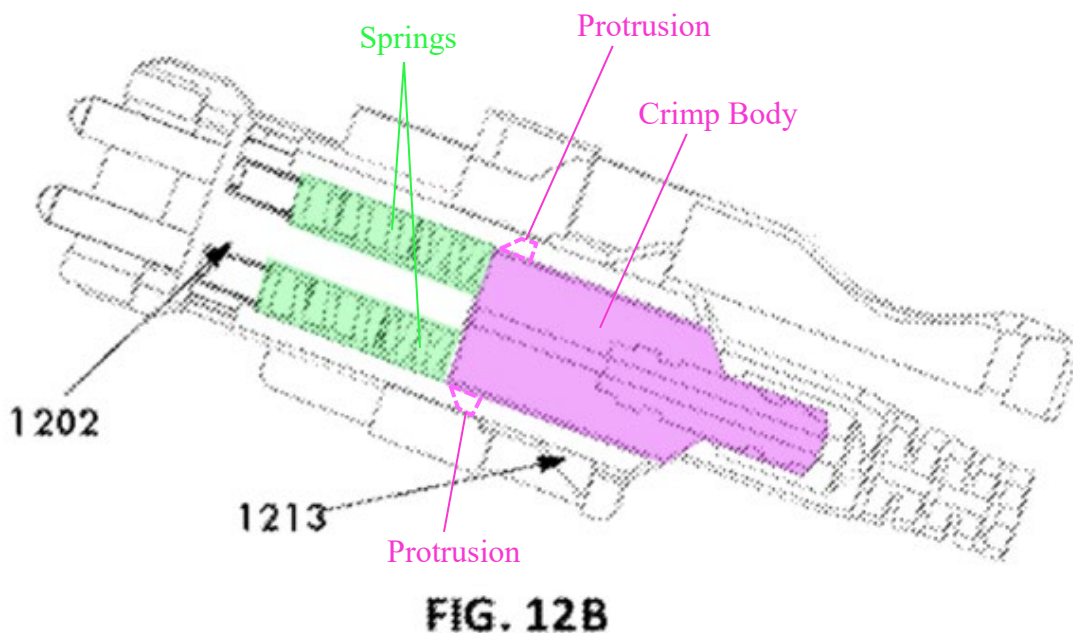
Therefore, Takano'209 meets this claim. EX1002: ¶165.

## **J. Claim 10**

The back body (306, 406) of the crimp body has upper and lower protrusions (306.1) received in corresponding windows/cutouts (302.1) in the top and bottom of the front body (302, 402, 502, 1202). EX1003: Fig. 3, ¶¶[0091]-[0092]; EX1002: ¶166. The upper protrusion (306.1) is a top portion of the crimp body and the lower protrusion (306.1) is a bottom portion of the crimp body. EX1003: Fig. 3, ¶¶[0091]-[0092]; EX1002: ¶166. In the assembled connector, the springs

(305) engage the front face of the back body (306, 406) between the upper and lower protrusions (306.1). EX1003: Figs. 3 and 12B, ¶¶[0091]-[0092]; EX1002: ¶166. Therefore, the two springs (305) are positioned between the top and bottom portions (e.g., protrusions (306.1)) of the crimp body. EX1003: Figs. 3 and 12B, ¶¶[0091]-[0092]; EX1002: ¶¶166-167.





EX1003: Figs. 3 and 12B (annotated).

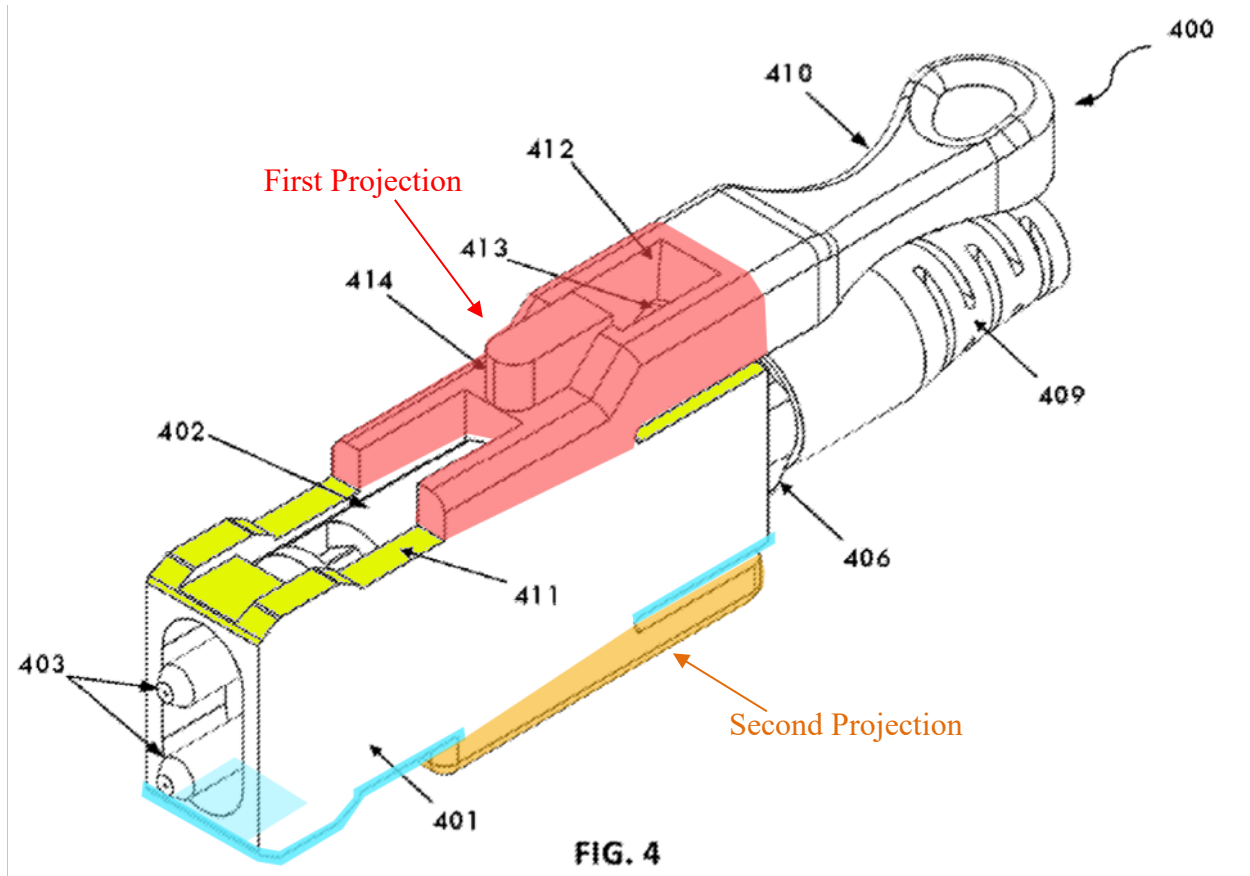
Therefore, Takano'209 meets this claim. EX1002: ¶168.

#### K. Claim 11

Claim 11—“wherein the first projection and the second projection are sized to fit inside respective grooves of an adapter<sup>9</sup>”—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 at 1477; *see also Rowe*, 112 F.3d at 478.

<sup>9</sup> The adapter is not positively claimed.

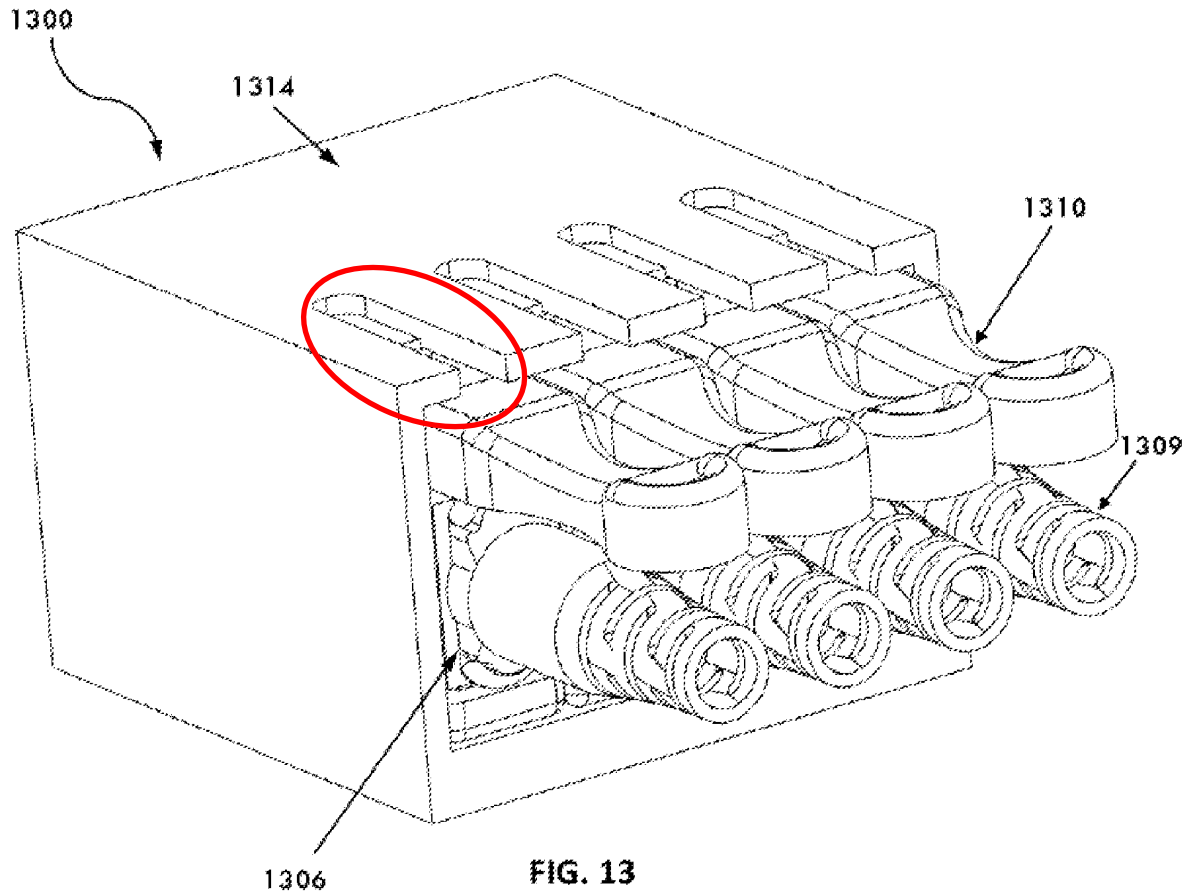
The first and second projections of the connector (300, 400, 500, 1100A-B, 1200) are capable of meeting this intended use of claim 11, because such a feature is entirely dependent on the construction of the corresponding adapter for a given connector. EX1002: ¶¶169-171.



EX1003: Fig. 4 (annotated).

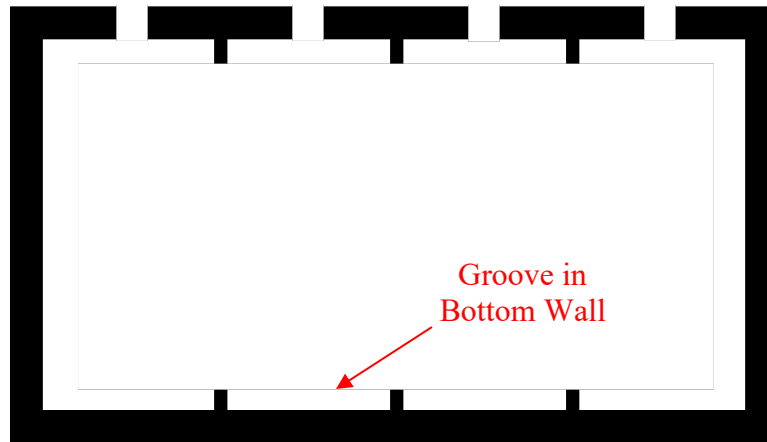
The key (414) of the first projection is received in a corresponding keyway or groove in a corresponding adapter (1314) to set the correct orientation and polarity of the outer housing (301, 401, 501, 1101, 1201). EX1003: Fig. 13,

¶[0092]; EX1002: ¶172. Thus, the first projection (specifically, the key (414) thereof) is sized to fit inside a groove of an adapter. EX1002: ¶172.

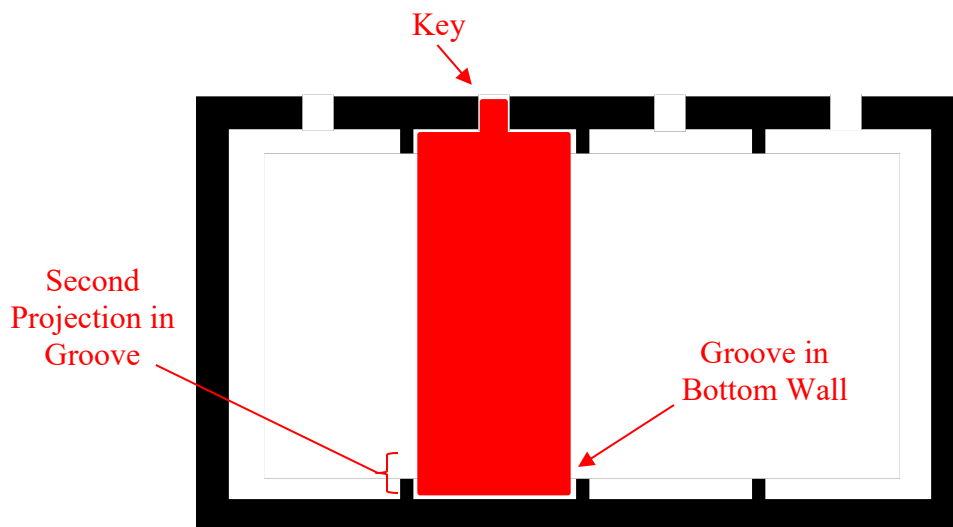


EX1003: Fig. 13 (annotated).

Further, the second projection is capable of fitting inside a groove in a bottom wall of an adapter. EX1002: ¶173. For example, schematic illustrations of an adapter having grooves in the bottom wall the second projection of the connector (300, 400, 500, 1100A-B, 1200) is capable of fitting inside are shown below. EX1002: ¶173.



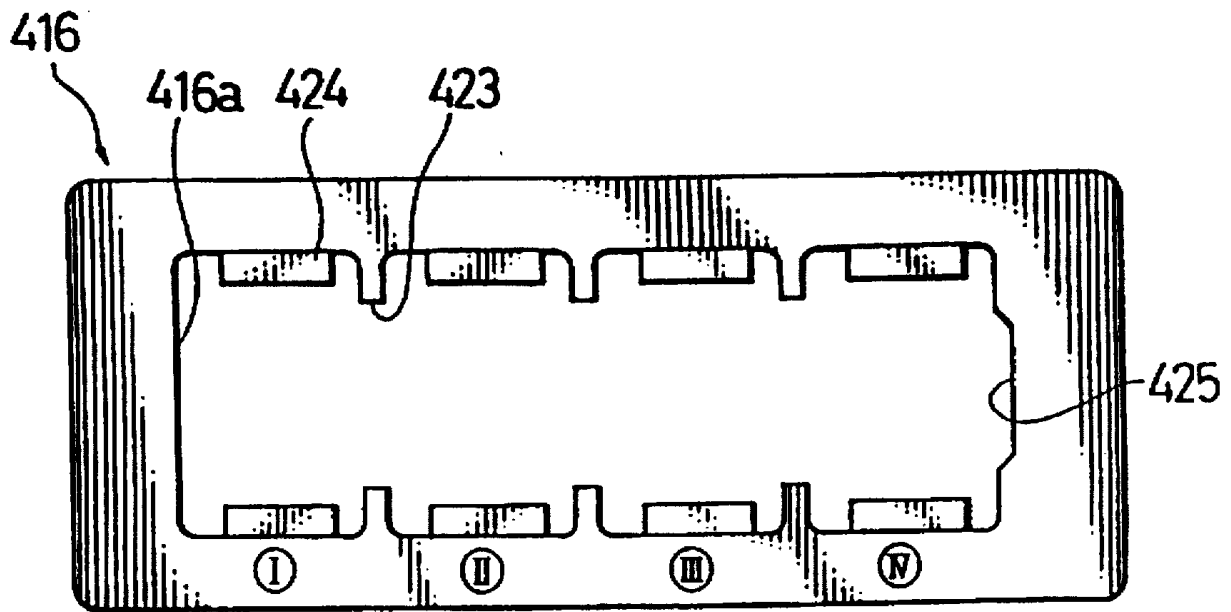
Schematic Illustration of an Adapter for Four Takano'209 Connectors



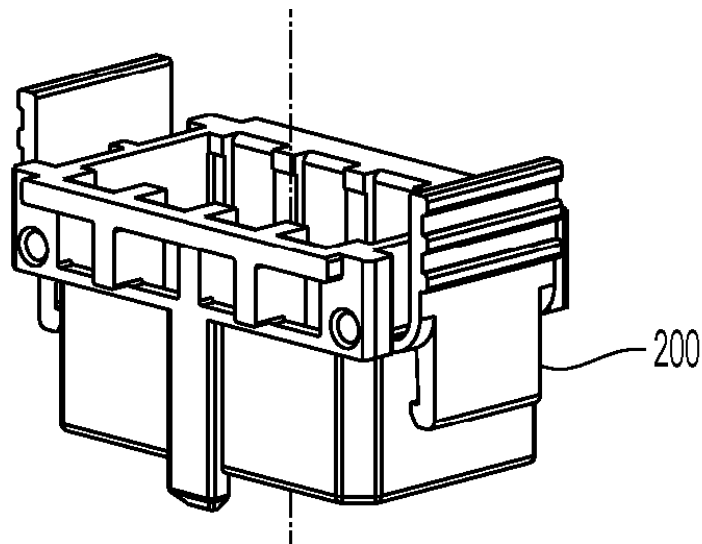
Schematic Illustration of an Adapter with a Takano'209 Connector

Shown below, adapters with grooves in the bottom wall (and top wall) were commonplace in the art before the '994 Patent. EX1002: ¶174.

# FIG.30



EX1022: Fig. 30.



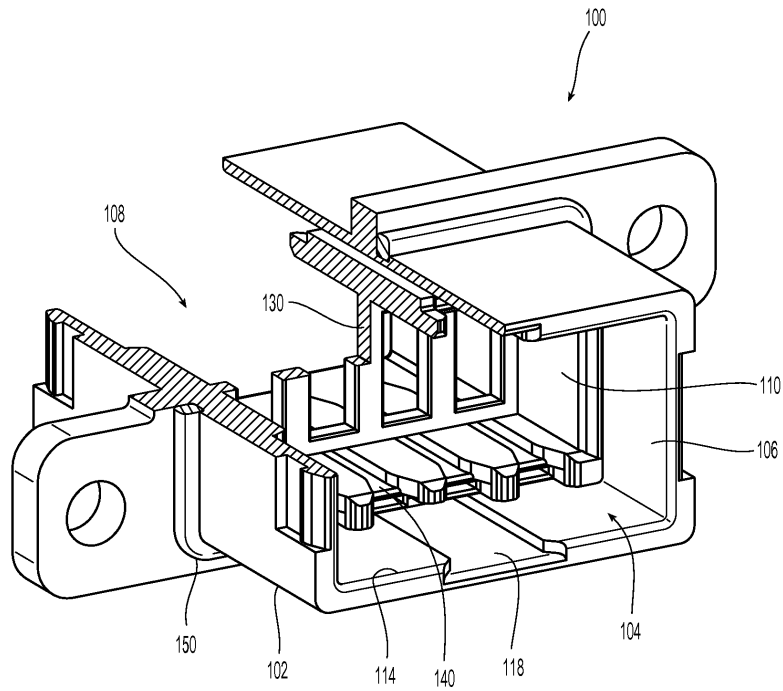
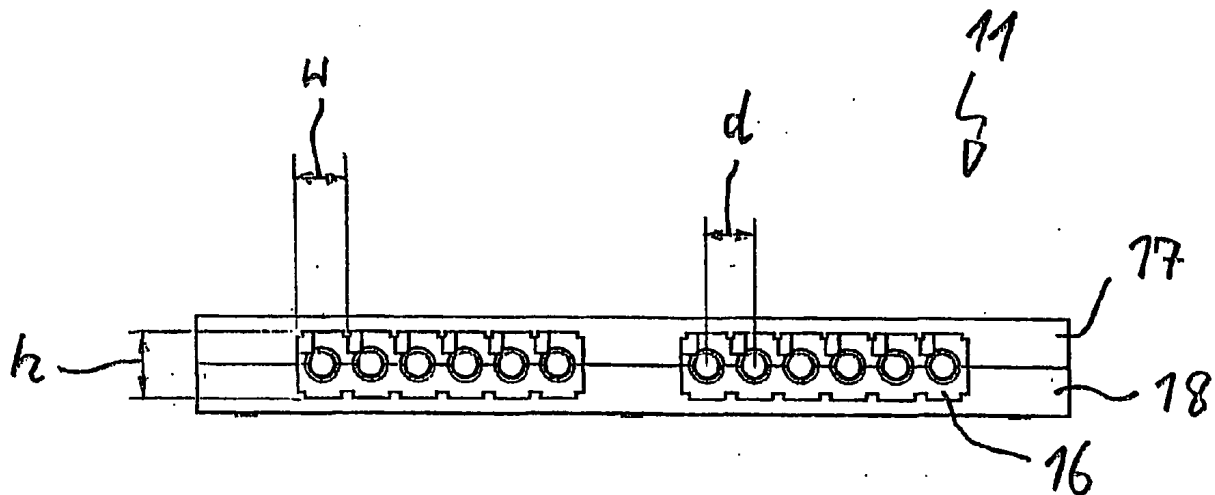


**Fig. 3**

EX1023: Figs. 2 and 3.



EX1024: Fig. 5.

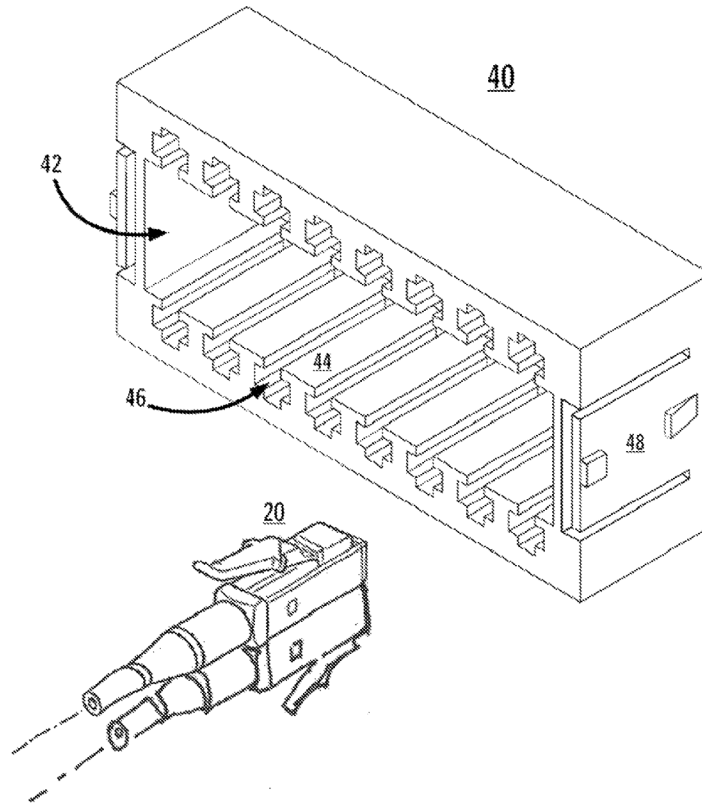
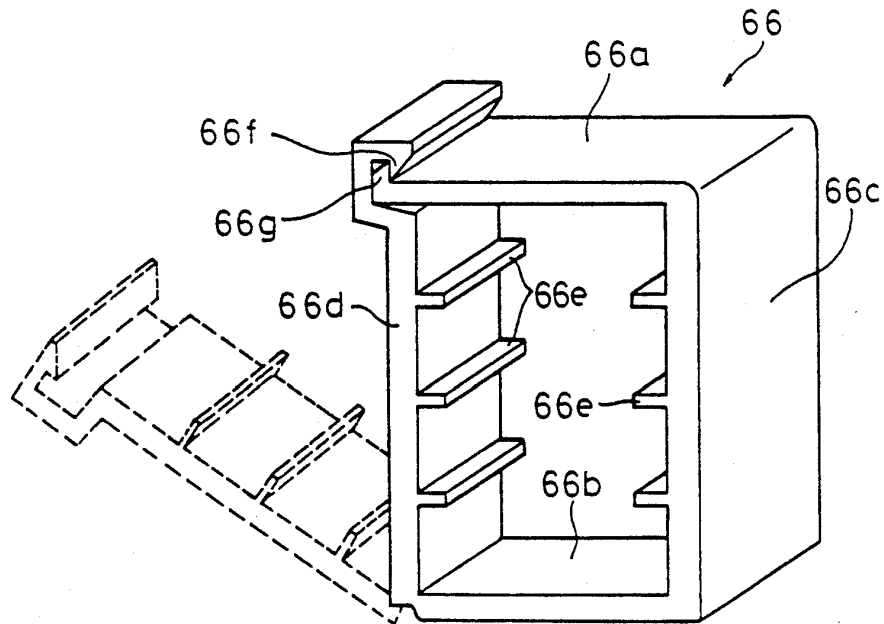


**FIG. 4**

EX1025: Fig. 4.

FIG. 23



EX1026: Fig. 23.

Therefore, Takano'209 meets this claim. EX1002: ¶175.

**L. Claim 12**

Under any construction of this claim, the two ferrule seats are located in the circled areas below. Section V(A); EX1002: ¶176.

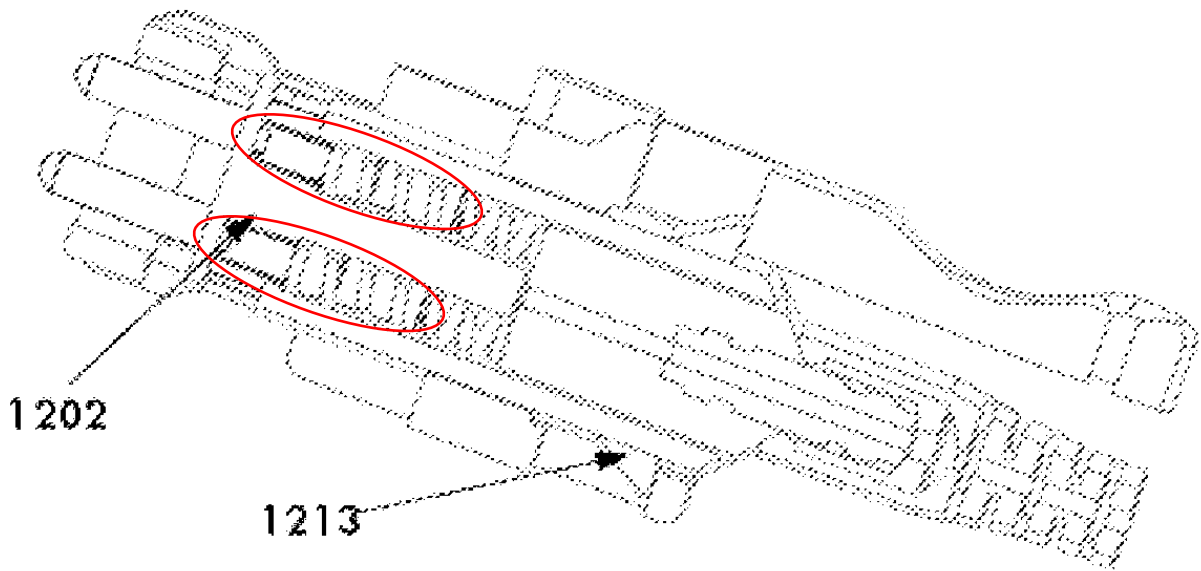


**FIG. 12B**

EX1003: Fig. 12B(annotated).

The front body (302, 402, 502, 1202) includes a wall separating the ferrule assemblies between the locations where the ferrule assemblies are seated in the outer housing (301, 401, 501, 1101, 1201). EX1003: Fig. 12B; EX1002: ¶177.

The wall is located between the top and bottom surfaces of the outer housing.

EX1003: Fig. 12B; EX1002: ¶177.

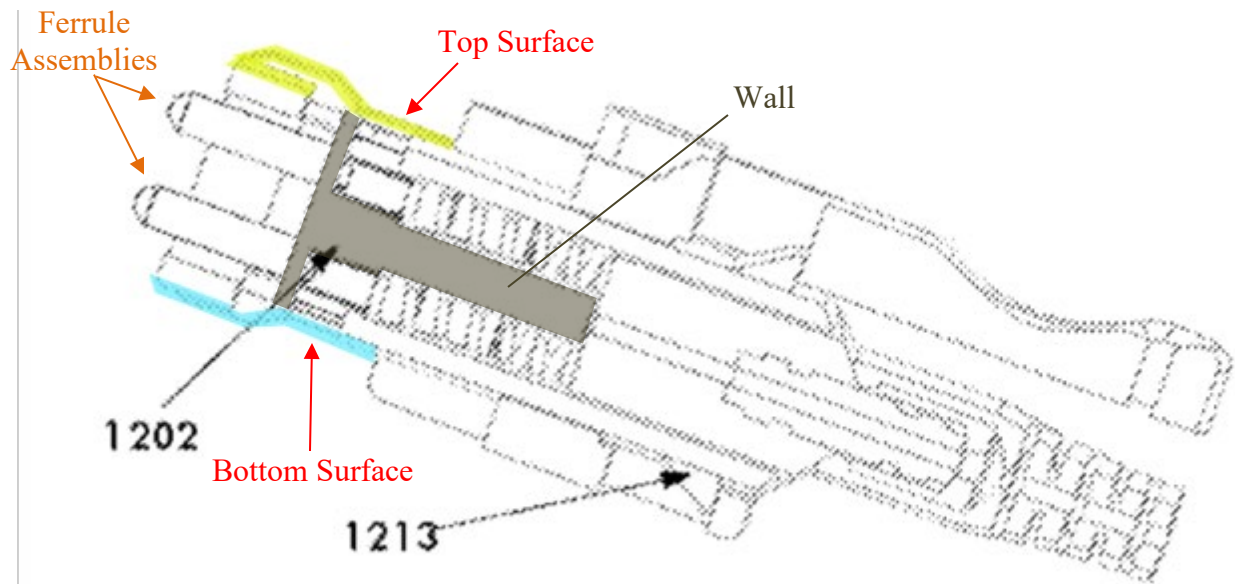


**FIG. 12B**

EX1003: Fig. 12B (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶178.

### **M. Claim 13**

As explained in Section VII(C), the front portion of the back body (306, 406) forms a spring push. EX1002: ¶179. The spring push simultaneously compresses the two springs (305) between the crimp body and the ferrule flanges (304) engaged with the wall. EX1003: Fig. 12B, ¶[0091]; EX1002: ¶179.

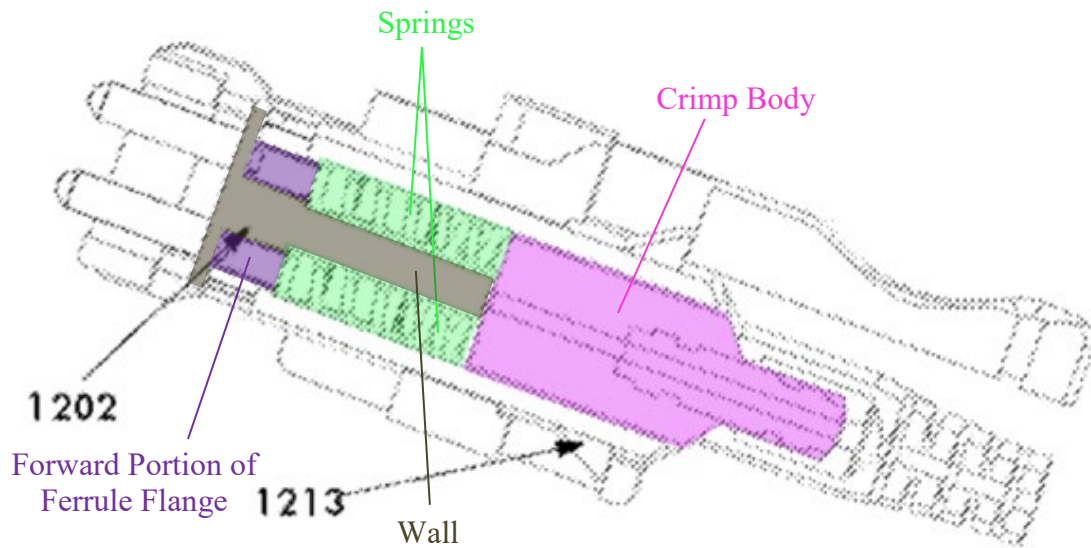


**FIG. 12B**

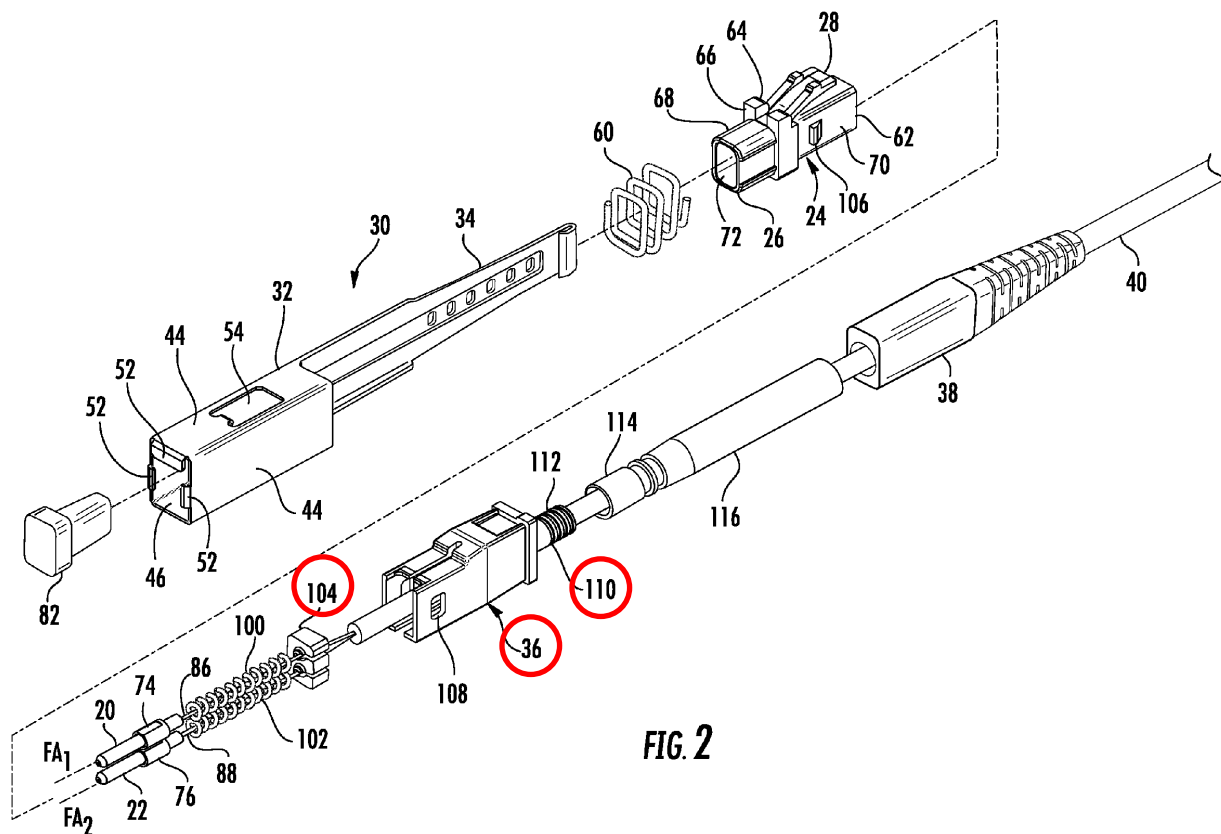
EX1003: Fig. 12B (annotated).

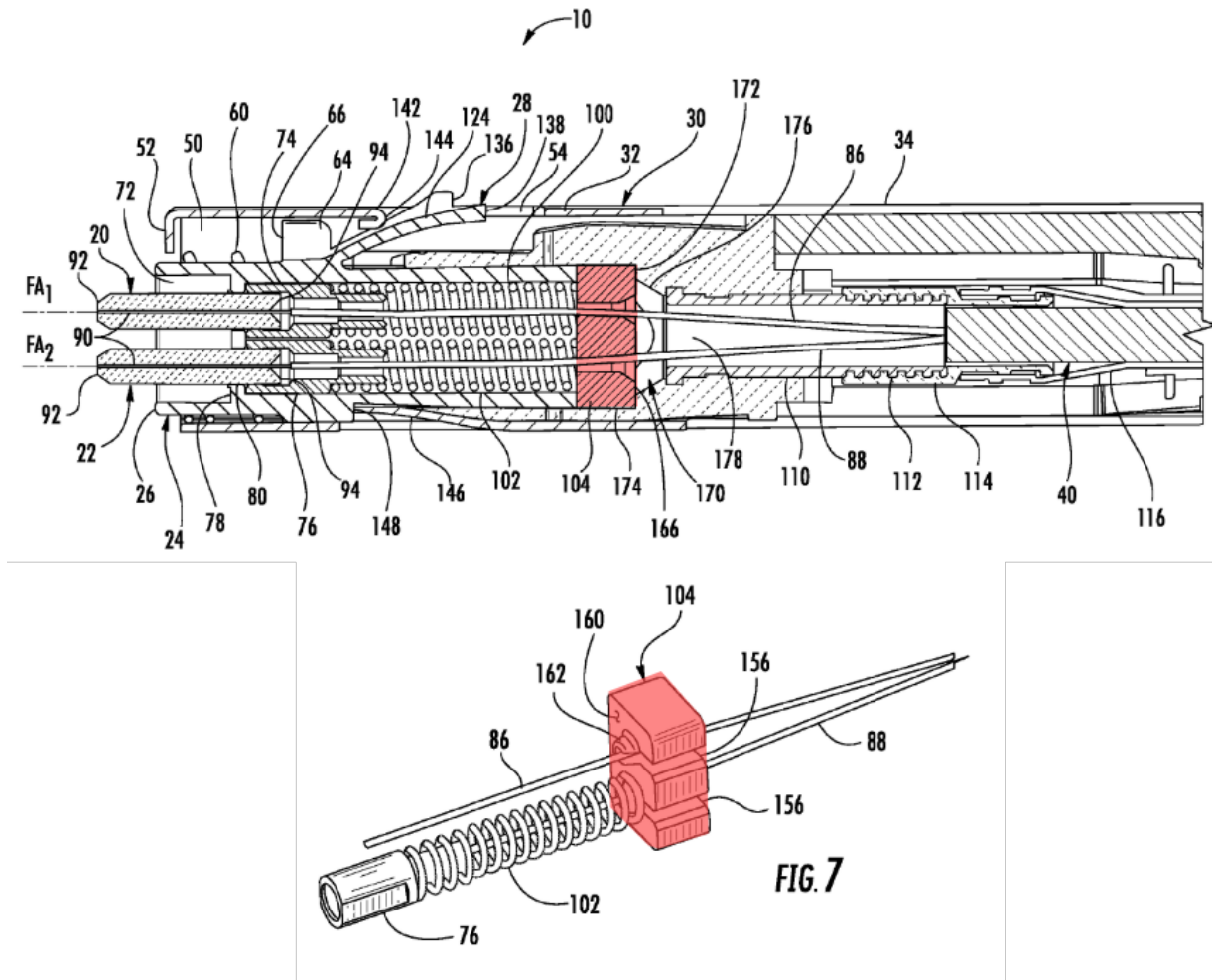
Therefore, Takano'209 meets this claim. EX1002: ¶180.

#### **VIII. GROUND 4: Claims 3 and 13 Would Have Been Obvious Over Takano'209 in view of Lee**

##### **A. Claim 3**

Lee teaches an optical connector (10) that, like Takano'209, is taller than it is wide and holds two vertically spaced ferrules (20, 22). EX1005: Figs. 2 and 3, ¶¶[0029]-[0030]; EX1002: ¶¶181-183. Between a crimp body (36, 110) and springs (100, 102) is a separate spring push (104). EX1005: Figs. 2 and 3, ¶¶[0038], [0040]. EX1002: ¶183.





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

It would have been obvious to modify Takano'209's connector (300, 400, 500, 1100A-B, 1200) to include Lee's spring push (104) to (1) help position the fibers close to the longitudinal axes of the ferrules; (2) protect the fibers from relative movement in relation to the ferrule springs by aligning spring seats (162, 164) with the slots (156, 158); and/or (3) provide improvements in the process of terminating a cable with the connector by allowing for placement of the spring

push (104) onto the cable after the fibers have been installed in the ferrules, all expressly taught by Lee. EX1005: ¶¶[0053], [0055]; EX1002: ¶184.

This modification would have been nothing more than combining known prior art elements (Takano'209's connector and Lee's spring push) according to known methods (arrangement taught by Lee) to yield predictable results (a connector with an independently mountable spring push). EX1002: ¶185.

This modification would have also been nothing more than the application of a known technique (Lee's spring push) to improve a similar device (Takano'209's connector) in the same way to yield predictable results (a connector with an independently mountable spring push). EX1002: ¶¶186-187.

The POSA would have had a reasonable expectation of success given the function and general placement of Lee's spring push would not change in Takano'209's connector. EX1002: ¶188. Further, the POSA would have made only minor structural changes to facilitate this modification, as it would only require minor changes in dimensions and shapes well within the POSA's capabilities. EX1002: ¶188.

A schematic illustration of this modification is shown below:

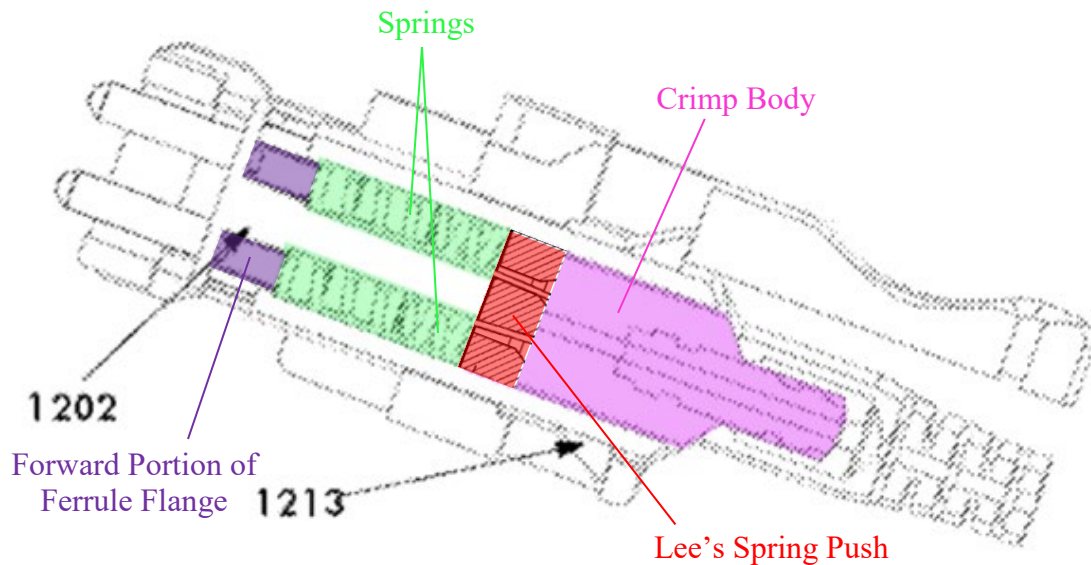


**FIG. 12B**

EX1003: Fig. 12B (annotated, modified); EX1002: ¶189.

As modified, Takano’209’s connector includes Lee’s spring push, which would engage the rear portions of each of Takano’209’s springs and simultaneously compress them between the crimp body and the ferrule flanges.

EX1005: Fig. 3, ¶¶[0038], [0053]; EX1002: ¶190.

Therefore, the Takano’209/Lee combination renders this claim obvious.

EX1002: ¶191.

## **B. Claim 13**

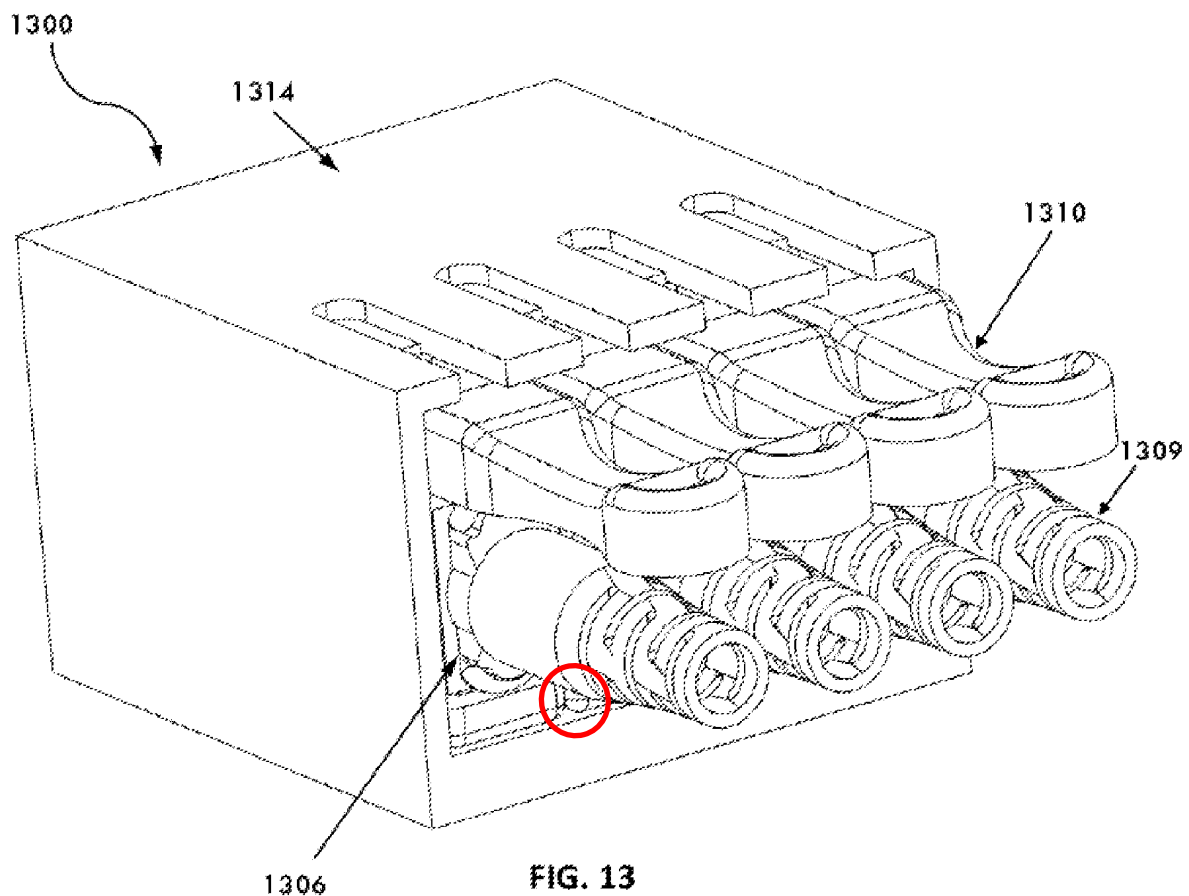
The Takano’209/Lee combination renders the “spring push” limitation of this claim obvious for the reasons discussed in Section VIII(A). EX1002: ¶192.

Claim 13's remaining limitations are met by Takano'209 as explained in Section VII(M). EX1002: ¶192.

**IX. GROUND 5: Claims 4 and 11 Would Have Been Obvious Over Takano'209 in view of Matsumoto**

**A. Motivation to Modify Takano'209 Based on Matsumoto**

Takano'209's Fig. 13 shows an adapter that would have a similar if not identical configuration to an adapter for four connectors (300, 400, 500, 1100A-B, 1200) of Figs. 3-5 and 11A-12B. EX1003: Fig. 13; EX1002: ¶¶111-112, 194-195. In fact, the adapter (1314) of Fig. 13 may be for four connectors of Figs. 3-5 and 11A-12B. EX1002: ¶¶112, 195.



EX1003: Fig. 13 (annotated).

The upper surface of the adapter's (1314) bottom wall appears to be flat.

EX1003: Fig. 13; EX1002: ¶196.

Matsumoto teaches an adapter (6) of similar shape to Takano'209's adapter (1314). EX1006: Fig. 4, 4:1-3; EX1002: ¶197. Matsumoto's adapter has guides (63) defining four grooves along the bottom wall that receive the bottom portion of a respective connector housing (2). EX1006: Fig. 4, 4:5-7; EX1002: ¶197. The guides ensure proper connector alignment for "high-density mounting." EX1006: 4:5-11; EX1002: ¶197.

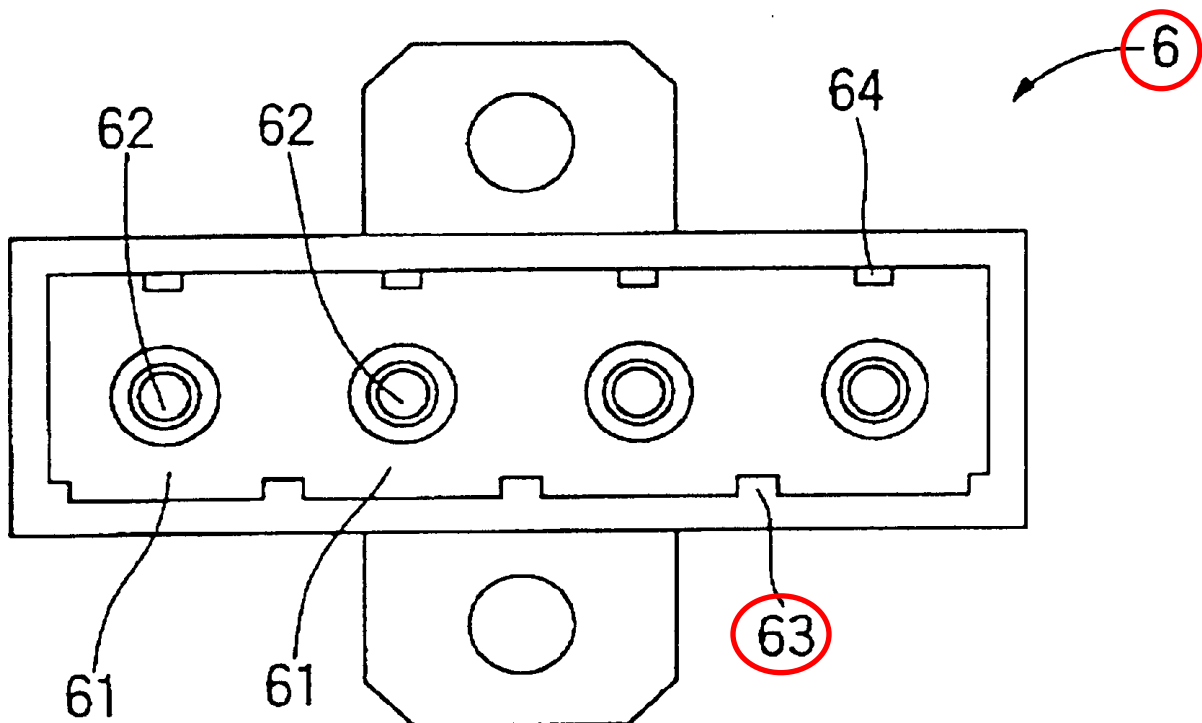


**FIG. 4**

EX1006: Fig. 4 (annotated).

It would have been obvious to add Matsumoto's guides (63) to the bottom wall of the Takano'209's adapter (1314) to facilitate high-density fiber optic interconnects while still ensuring proper alignment of an individual connector into its port, as taught by Matsumoto. EX1003: 4:5-11; EX1002: ¶198.

Adding Matsumoto's guides (63) to the bottom wall of Takano'209's adapter (1314) improves alignment of Takano'209's connector (300, 400, 500, 1100A-B, 1200) into the adapter. EX1002: ¶199. Because Takano'209's adapter

lacks partition walls for guiding insertion, an individual connector could become misaligned if a user does not exercise care during plug-in. *Id.* Because the bottom wall of Takano'209's adapter is flat, nothing keeps the bottom of Takano'209's connector in proper lateral position during insertion. *Id.* A careless user could twist Takano'209's connector such that the bottom shifts laterally during insertion. *Id.* This would cause misalignment. *Id.*

Adding Masumoto's guides to the bottom wall of the Takano'209's adapter that complement the geometry of the lower projection on Takano'209's outer housing would ensure proper lateral alignment of the bottom portion during insertion. EX1002: ¶200. This improvement would have been apparent to the POSA given the well-known teachings in the art of having guides for the connectors on the top and bottom of partition-less mating adapters. EX1011: ¶[0050] (describing how adding a guide rail to the bottom side of a connector with a latch structure or other guide rail on the top side aids in properly aligning the connector into a port or a partition-less adapter); EX1023: ¶[0027] (describing how projections on top and bottom walls of a ferrule holder align the ferrule holder with an adapter along horizontal and vertical axes and eliminates the need for side walls in adapters); EX1002: ¶200.

The guides (63) would also provide a further visual indication of where each connector (300, 400, 500, 1100A-B, 1200) should be positioned relative to Takano'209's adapter (1314) for insertion. EX1002: ¶201.

This modification would have been nothing more than combining known prior art elements (Takano'209's adapter and Matsumoto's guides) according to known methods (arrangement taught by Matsumoto) to yield predictable results (adapter with guides for guiding connector insertion to ensure proper alignment). EX1002: ¶202.

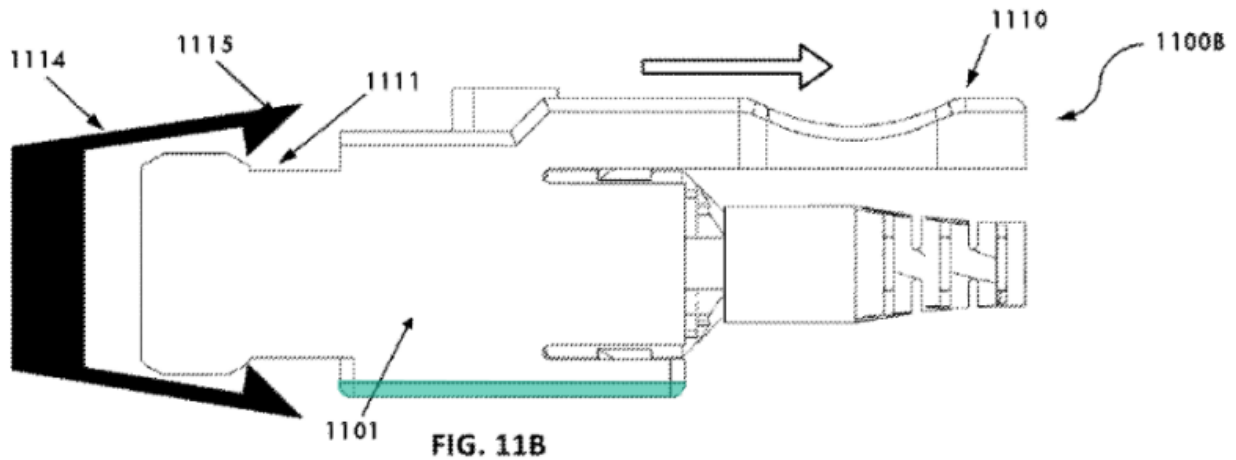
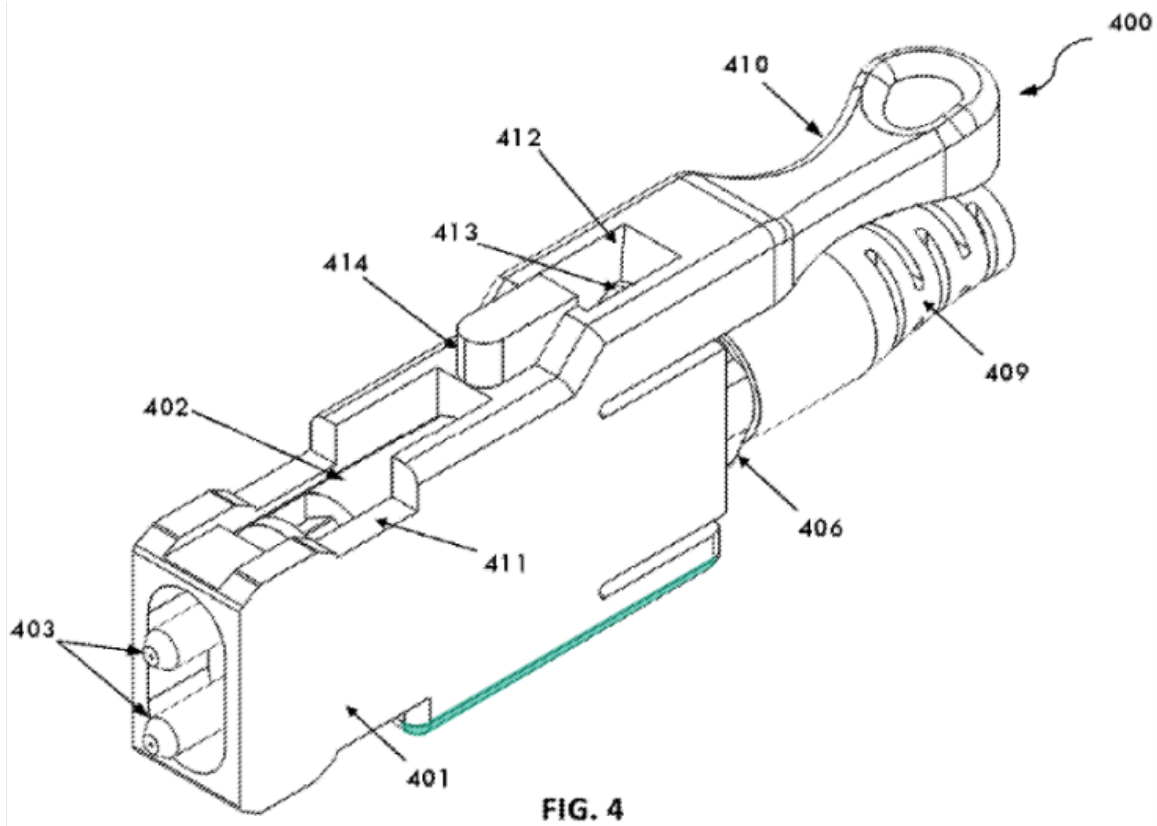
This modification would have also been nothing more than the application of a known technique (Matsumoto's guides for an adapter) to improve a similar device (Takano'209's adapter) in the same way to yield predictable results (adapter with guides for guiding connector insertion to ensure proper alignment). EX1002: ¶203.

This modification would have also been nothing more than the use of a known technique (Matsumoto's guides) to a known device (Takano'209's adapter) ready for improvement to yield predictable results (adapter with guides for guiding connector insertion to ensure proper alignment). EX1002: ¶204.

The POSA would have had a reasonable expectation of success given the function and general placement of Matsumoto's guides would not change in Takano'209's adapter. EX1002: ¶205. Further, this modification is nothing more

than minor changes in molded part geometry, which are entirely predictable. *Id.* The changes could be made without effecting any aspect of the connection system besides the shape of the bottom wall of the adapter (and, optionally, the shape of the corner regions of the bottom projection of the connector for reasons explained below). *Id.* This modification would require only minor changes in dimensions and shapes of molded parts, well within the POSA capabilities. *Id.*

This modification can be made with negligible or no enlarging of the width of Takano'209's adapter. EX1002: ¶206. For example, Matsumoto's added guides (63) can be sized and shaped (e.g., triangular) to fit between the rounded/chamfered corners (annotated below) of Takano'209's connectors (300, 400, 500, 1100A-B, 1200), without substantial or any modification of the connector. EX1002: ¶207.



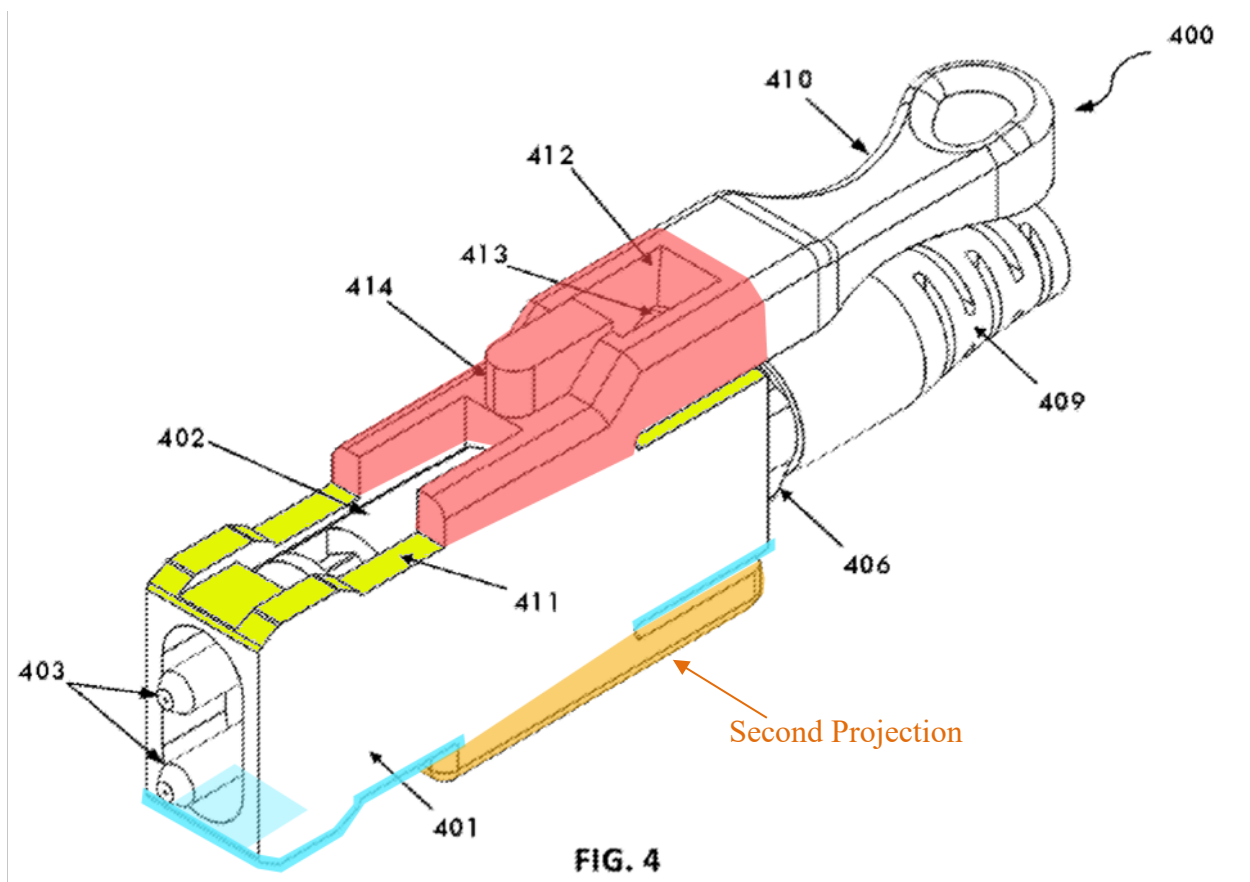
EX1003: Figs. 4 and 11B (annotated).

Alternatively, the shape of the rounded/chamfered corner regions can be changed to define small rectangular shoulders to accept Matsumoto's square-

shaped guides as known in the art. EX1026: Figs. 23 and 28; EX1027: Fig. 1; EX1002: ¶207.

#### **B. Claim 4**

The Takano'209/Matsumoto combination results in Takano'209's adapter including Matsumoto's guides along Takano'209's adapter's bottom wall for receiving the second projection of Takano'209's connector. EX1002: ¶208. This reception sets the correct orientation of the outer housing relative to Takano'209's adapter. EX1002: ¶208.



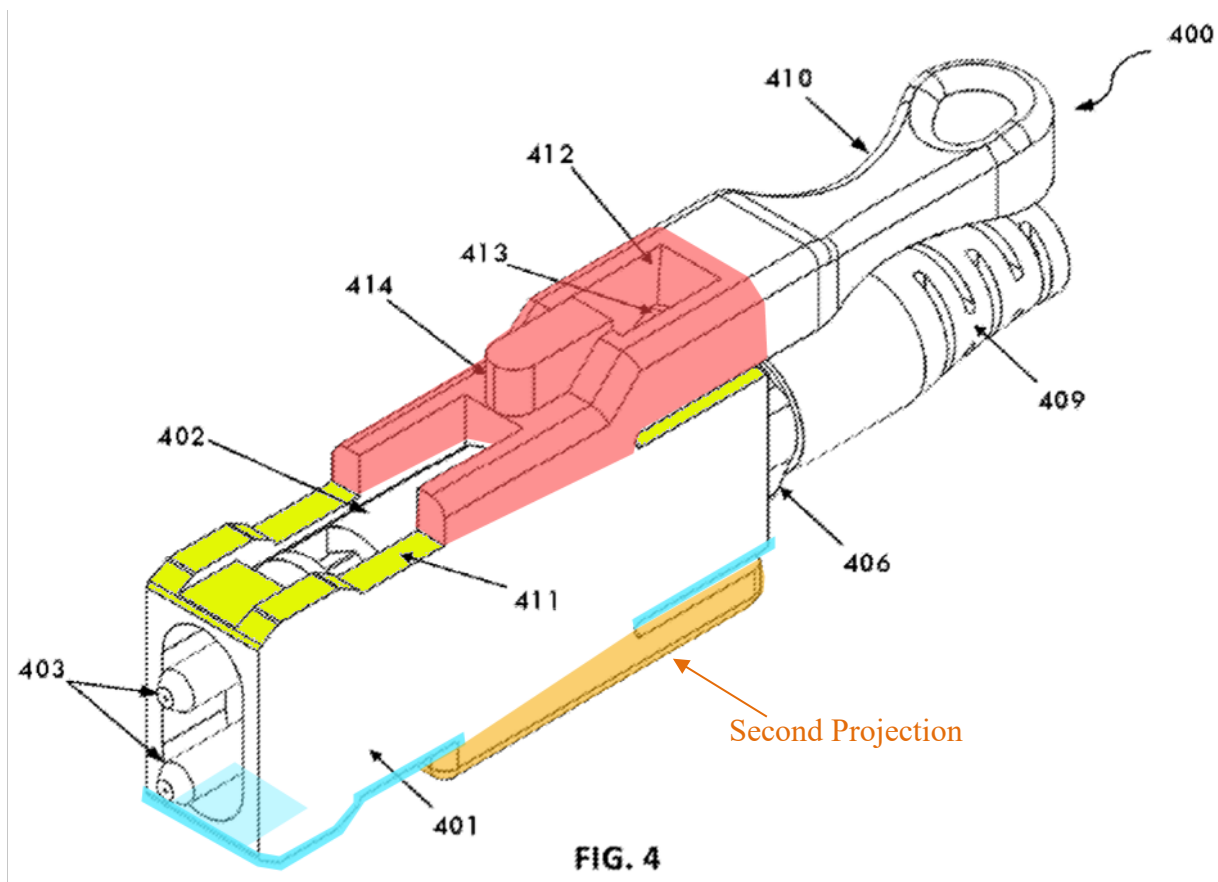
EX1003: Fig. 4 (annotated).

Takano'209's first projection meets the limitations of this claim as explained in Section VII(D). EX1002: ¶209.

Therefore, the Takano'209/Matsumoto combination renders this claim obvious. EX1002: ¶210.

### C. Claim 11

Mastumoto's added guides to Takano'209's adapter define grooves that receive the second projection of Takano'209's connector. EX1002: ¶211. Thus, the second projection of Takano'209's connector is sized to fit inside the groove formed by adjacent guides added to Takano'209's adapter. EX1002: ¶211.



EX1003: Fig. 4 (annotated).

Takano'209's first projection meets the limitations of this claim as explained in Section VII(K). EX1002: ¶212.

Therefore, the Takano'209/Matsumoto combination renders this claim obvious. EX1002: ¶213.

**X. GROUND 6: Claims 14 and 15 Would Have Been Obvious Over Takano'209 in view of Hill**

**A. Claim 14**

“Angled physical contact” or APC is a common polish type for the end of fiber optic ferrules. EX1028: 3-4; EX1002: ¶215. APC type polish offers the lowest return loss (amount of light reflected back by the end face of the optical fiber). EX1029: 3; EX1002: ¶215.

Takano'209's optical connector has “LC-type optical ferrules” but is silent as to their polish type. EX1003: ¶[0091]; EX1002: ¶¶216-217.

Hill discloses a two-ferrule optical fiber connector with ferrules “of the type LC APC.” EX1007: Fig. 10C, ¶[0058]; EX1002: ¶218.

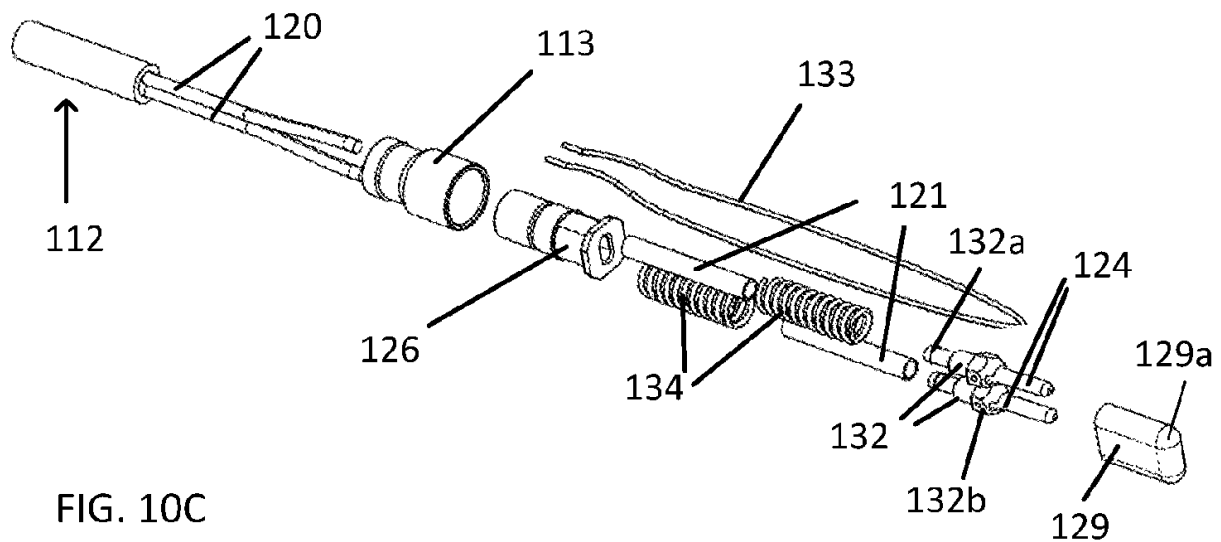


FIG. 10C

EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano’209’s connector an “angled physical contact” type of ferrule in view of Hill. EX1002: ¶219.

Takano’209’s ferrules are LC-type (same as Hill), and the modification is nothing more than selecting one of the most common types of LC ferrules, which has well-known utility for minimizing return loss. EX1029: 3; EX1030: 2; EX1002: ¶219.

Making Takano’209’s ferrules of “angled physical contact” type makes

Takano’209’s connector suitable for “high bandwidth applications and long haul

links” sensitive to return loss, such as “FTTx (fiber to the x), passive optical

network (PON) and wavelength-division multiplexing” applications. EX1029: 3;

EX1002: ¶219.

This modification is nothing more than a simple substitution of one known element (Hill's APC ferrule) for another (Takano'209's ferrule) to yield predictable results (APC connector for lowest return loss applications). EX1002: ¶¶220-221.

This modification would have also been obvious to try as APC is one of a finite number of polish types for LC ferrules. There are four polish types for LC ferrules—flat polish, physical contact, ultra-physical contact, and angled physical contact. EX1028: 3-4. EX1002: ¶222.

There would have been a reasonable expectation of success as both Takano'209's and Hill's ferrules are of LC-type. EX1003: ¶[0091]; EX1007: ¶[0058]; EX1002: ¶223.

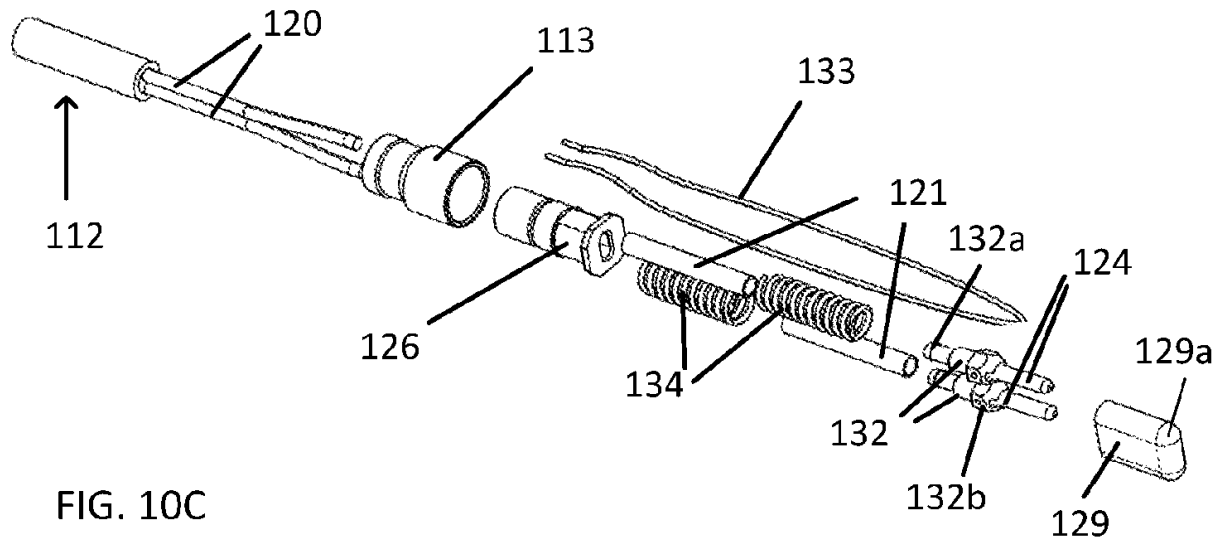
This modification results in the ferrules in Takano'209's connector being APC ferrules. EX1002: ¶224.

Therefore, the Takano'209/Hill combination renders this claim obvious. EX1002: ¶225.

## **B. Claim 15**

“Ultra-physical contact” or UPC is another common polish type for the end of fiber optic ferrules. EX1028: 3; EX1002: ¶226. UPC type polish offers low return loss at low cost. EX1029: 3; EX1002: ¶226.

Hill also teaches that the ferrules can be “of the type LC UPC.” EX1007:  
Fig. 10C, ¶[0058]; EX1002: ¶¶227-229.



EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano’209’s optical connector an “ultra-physical contact” type of ferrule in view of Hill. EX1002: ¶230. Takano’209’s ferrules are LC-type (same as Hill), and the modification is nothing more than selecting one of the most common types of LC ferrules, which is well known to be particularly useful for applications requiring low return loss at a lower cost than APC. EX1029: 3; EX1002: ¶230. This modification economically provides low return loss. EX1029: 3; EX1030: 2; EX1002: ¶230.

This modification is nothing more than a simple substitution of one known element (Hill’s UPC ferrule) for another (Takano’209’s ferrule) to yield

predictable results (UPC connector for low return loss and budget applications).

EX1002: ¶¶231-232.

This modification would have also been obvious to try as UPC is one of a finite number (i.e., four) of polish types for LC ferrules. EX1028: 3-4; EX1002: ¶233.

There would have been a reasonable expectation of success as both Takano’209’s and Hill’s ferrules are of LC-type. EX1003: ¶[0091]; EX1007: ¶[0058]; EX1002: ¶234.

This modification results in the ferrules in Takano’209’s connector being UPC ferrules. EX1002: ¶235.

Therefore, the Takano’209/Hill combination renders this claim obvious. EX1002: ¶236.

## **XI. GROUND 7: Claims 1-13 Would Have Been Obvious Over Takano’209 in view of Shimozu**

This ground is based on the “second embodiment” optical connector (2100) from Takano’209 Figs. 21A-36B. EX1002: ¶¶237-238.

### **A. Motivation to Modify Takano’209 Based on Shimozu**

Takano’209 discloses an optical connector (2100) having an outer housing (2110) and a single connector alignment key (2105) on a top surface of the outer housing that is received in a connector alignment slots (2403) of the adapter (2400). EX1003: ¶¶[0117], [0127]; EX1002: ¶239.

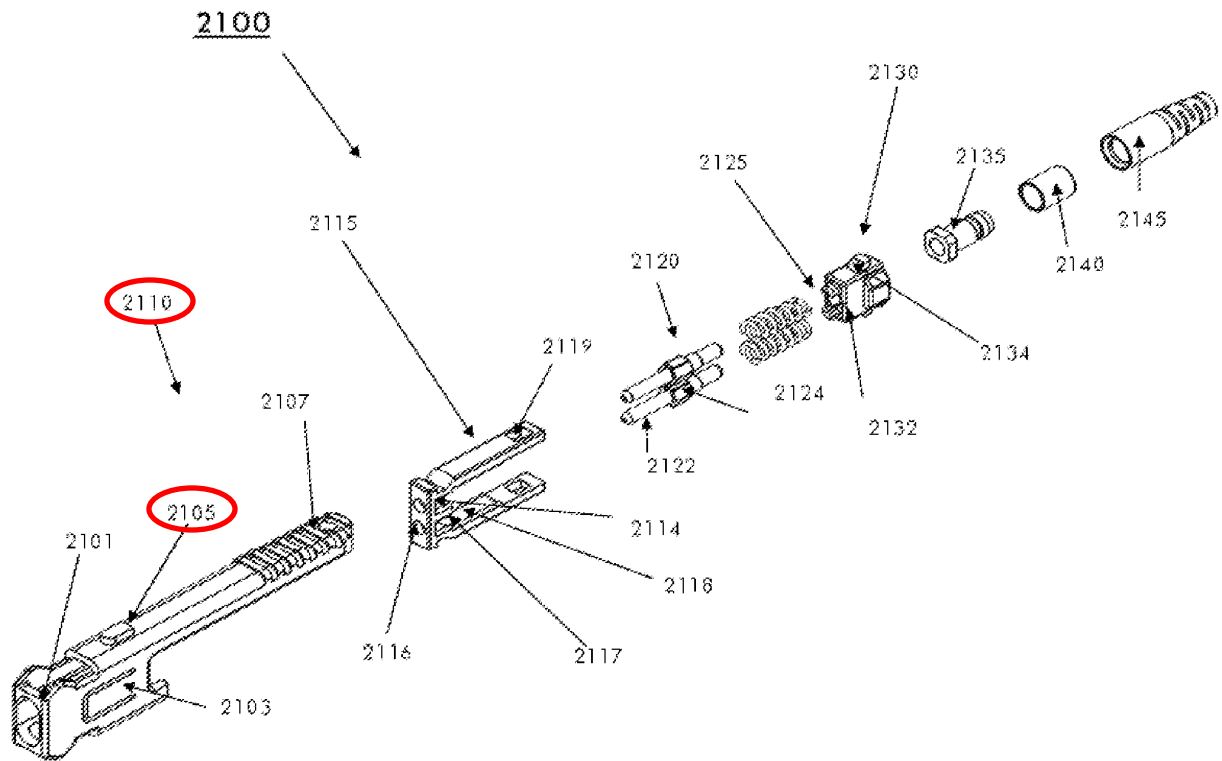


**FIG. 21A**

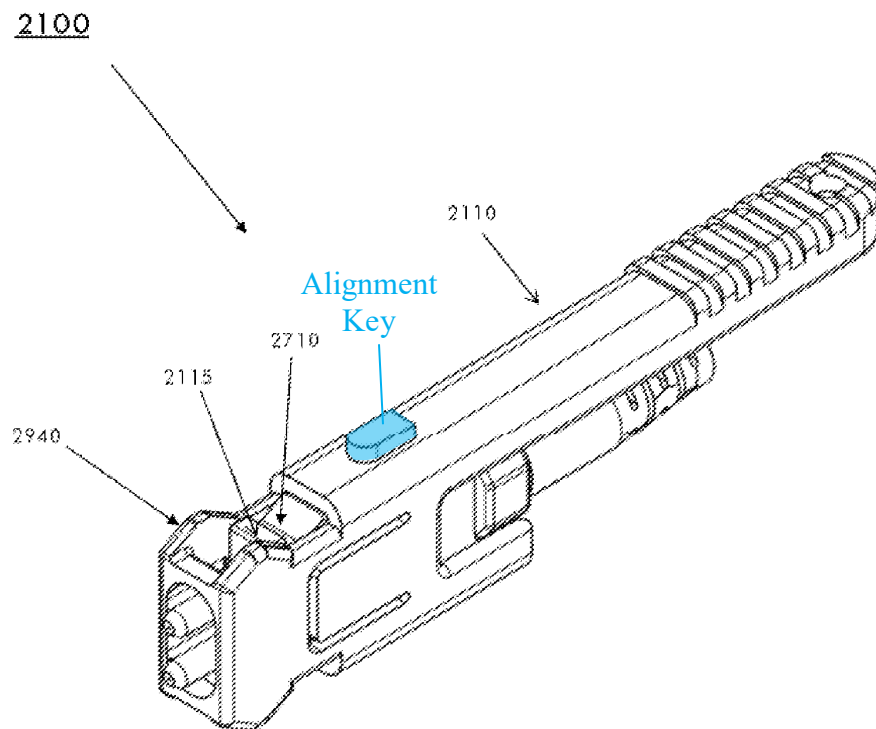


**FIG. 21B**

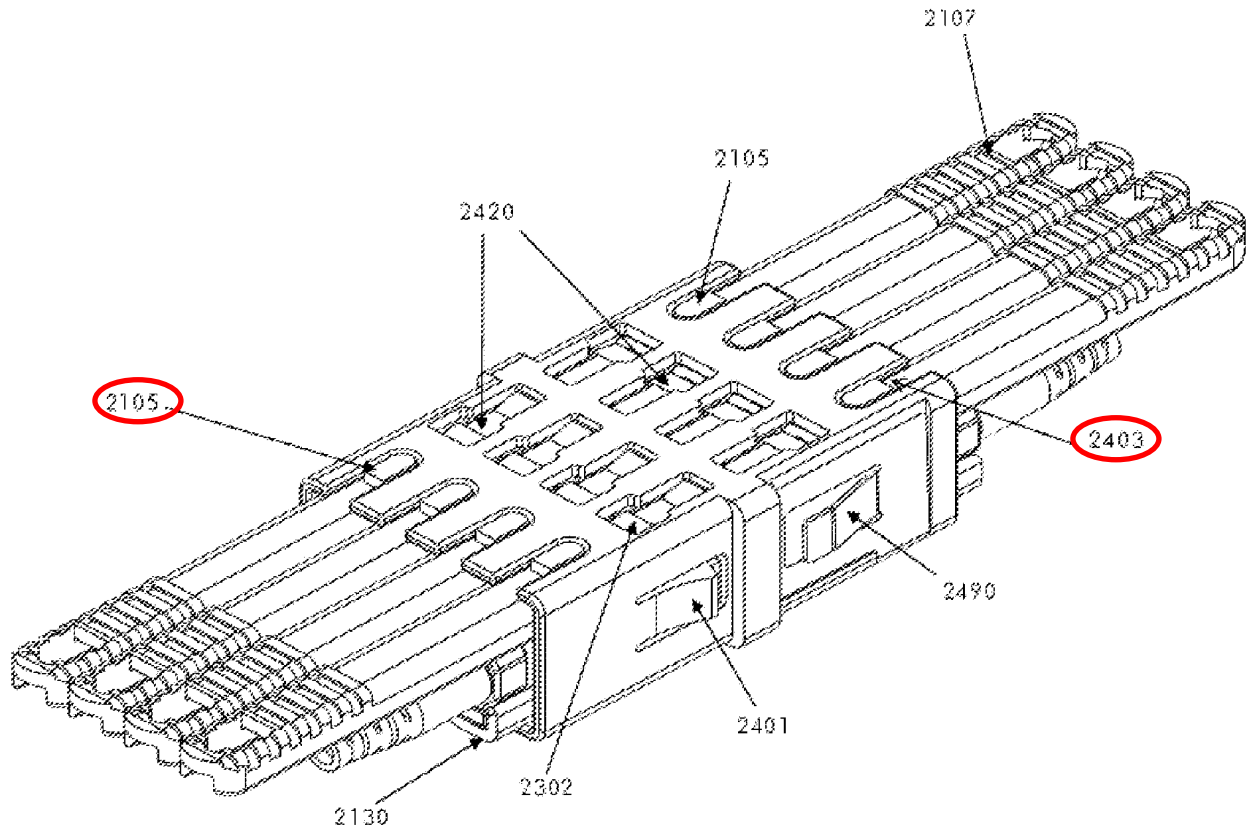
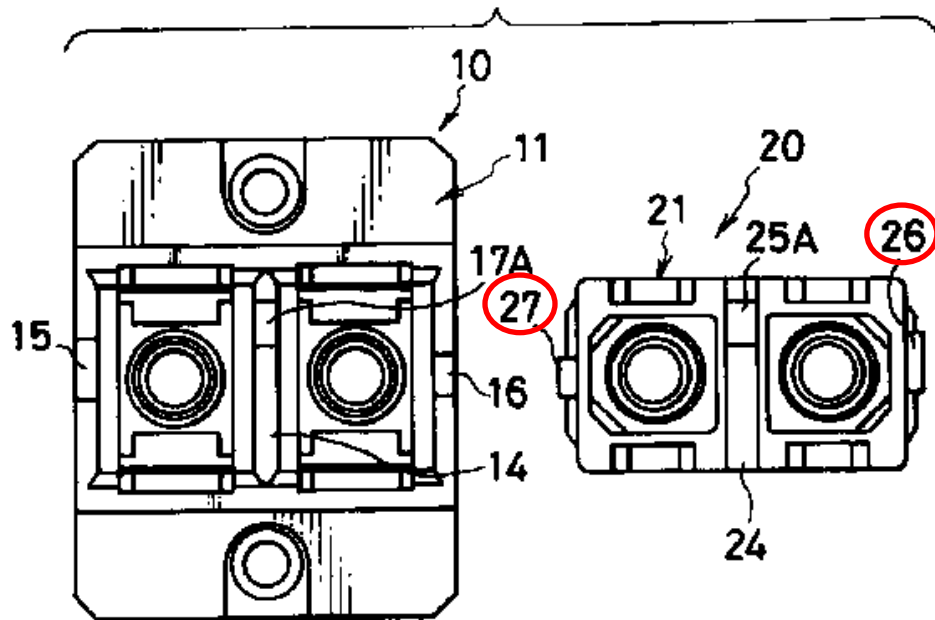


**FIG. 31**

EX1003: Figs. 21A-B and 31 (annotated).

Shimozu discloses a double-core optical connector plug (20) with first and second keys (26, 27) on opposite side walls (22, 23). EX1008: ¶[0011]; EX1002: ¶240. The second key is located in a center of the side wall, and the first key is offset from center. EX1008 ¶[0012]. The first key is wider than the second key. EX1008: ¶[0012]; EX1002: ¶240.

【図2】

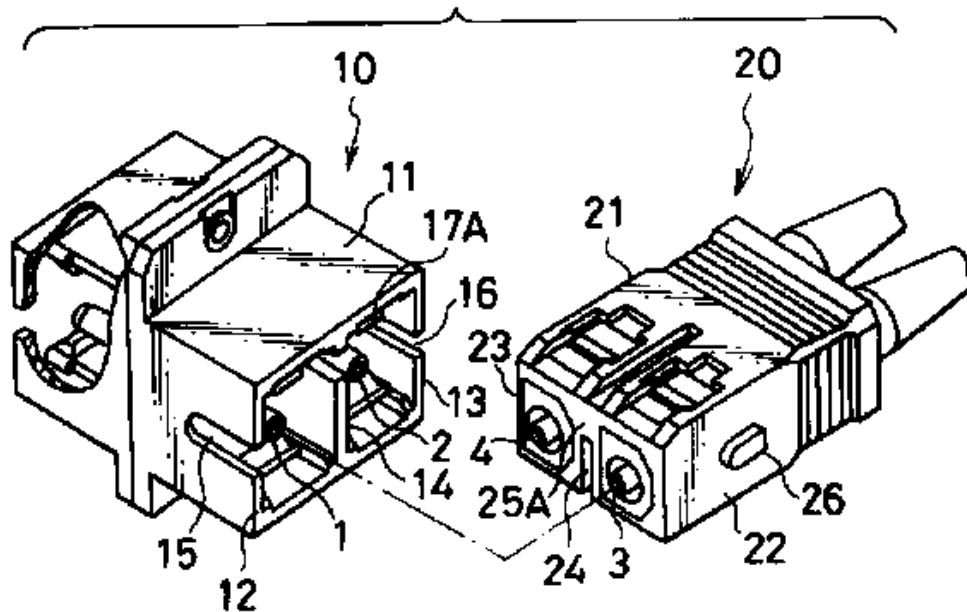


EX1008: Fig. 2 (annotated).

The different size keys (26, 27) fit into corresponding first and second keyways (15, 16) formed on opposite sides of a housing (11) of an adapter (10).

EX1008: ¶[0014]; EX1002: ¶241. The connector plug (20) will only fit in the adapter if the wider first key is aligned with the wider first keyway and the narrower second key is aligned with the narrower second keyway. EX1008: ¶[0014]; EX1002: ¶241. The keys will not fit into the keyways if the connector plug is inserted upside down. EX1008: ¶[0014]; EX1002: ¶241.

【図 1】



EX1008: Fig. 1.

Shimozu teaches the positions of the keys (26, 27) and corresponding keyways (15, 16) can be shifted for similar connectors terminating different types of optical fibers. EX1008: ¶[0015]; EX1002: ¶242. This would create keyed fiber type-specific connections, so a connector of one fiber type could not be inadvertently plugged into an adapter meant for a different fiber type. EX1002: ¶242.

It would have been obvious to add a second alignment key on the bottom side of Takano'209's outer housing, opposite Takano'209's first alignment key, in view of Shimozu. EX1002: ¶243.

This modification would facilitate high-density fiber optic interconnects while still ensuring proper alignment of an individual connector into its port. EX1003: 4:5-11; EX1002: ¶244. Adding a second alignment key to the bottom of Takano’209’s outer housing—which would be inserted into a corresponding keyway added to the bottom of Takano’209’s adapter—would improve alignment of the connector into the adapter. EX1002: ¶244. Because Takano’209’s adapter lacks partition walls, an individual connector can become misaligned if the user does not exercise care during insertion. *Id.* Because the bottom wall of Takano’209’s adapter is flat, nothing keeps the bottom of Takano’209’s connector in proper lateral position during insertion. EX1003: Fig. 24; EX1002: ¶244. A careless user could twist Takano’209’s connector such that the bottom of the connector shifts laterally during insertion, especially for the first connector inserted. EX1002: ¶244. This would cause misalignment. *Id.*

Providing a second alignment key on the bottom of Takano’209’s connector received in a complementary groove added to the bottom wall of Takano’209’s adapter ensures proper lateral alignment of the bottom portion of Takano’209’s connector during insertion. EX1002: ¶245. This improvement would have been apparent given prior art teachings to provide connector guides on the top and bottom of partition-less adapters. EX1011: ¶[0050] (describing how adding a guide rail to the bottom side of a connector with a latch structure or other guide rail

on the top side aids in properly aligning the connector into a port or a partition-less adapter); EX1023: ¶[0027] (describing how projections on top and bottom walls of a ferrule holder align the ferrule holder with an adapter along horizontal and vertical axes and eliminates the need for side walls in adapters); EX1002: ¶245.

This modification would have been nothing more than combining known prior art elements (Takano'209's outer housing and Shimozu's wider, off-center key) according to known methods (arrangement taught by Shimozu) to yield predictable results (connector with dual alignment keys for guiding insertion into and ensuring ensure proper alignment in the adapter). EX1002: ¶246.

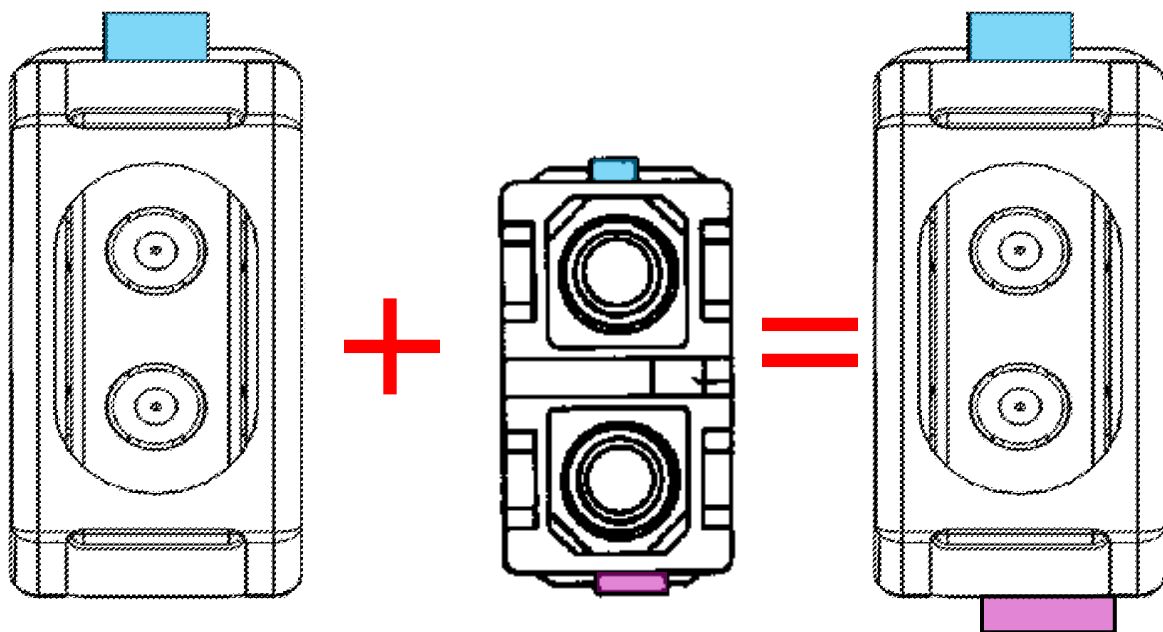
This modification would have also been nothing more than the application of a known technique (Shimozu's two identification guide keys) to improve a similar device (Takano'209's connector) in the same way to yield predictable results (connector with dual alignment keys for guiding insertion into and ensuring ensure proper alignment in the adapter). EX1002: ¶247.

There would have been reasonable expectation of success given the similarities between the Takano'209's and Shimozu's connectors: (1) two ferrules in an integrated outer housing (EX1003: Fig. 21B; EX1008: Fig. 2); (2) similar push/pull latch mechanisms (EX1003: Fig. 34B; EX1008: Fig. 1); and (3) a key on one of the narrow walls of the outer housing (EX1003: Fig. 34B; EX1008: Fig. 2). EX1002: ¶¶248-249. Shimozu's second key can be added to the bottom wall of

Takano'209's connector opposite the first alignment key (2105) using conventional manufacturing techniques, would only change how Takano'209's connector aligns to the mating adapter, and are entirely predictable. EX1002: ¶249.

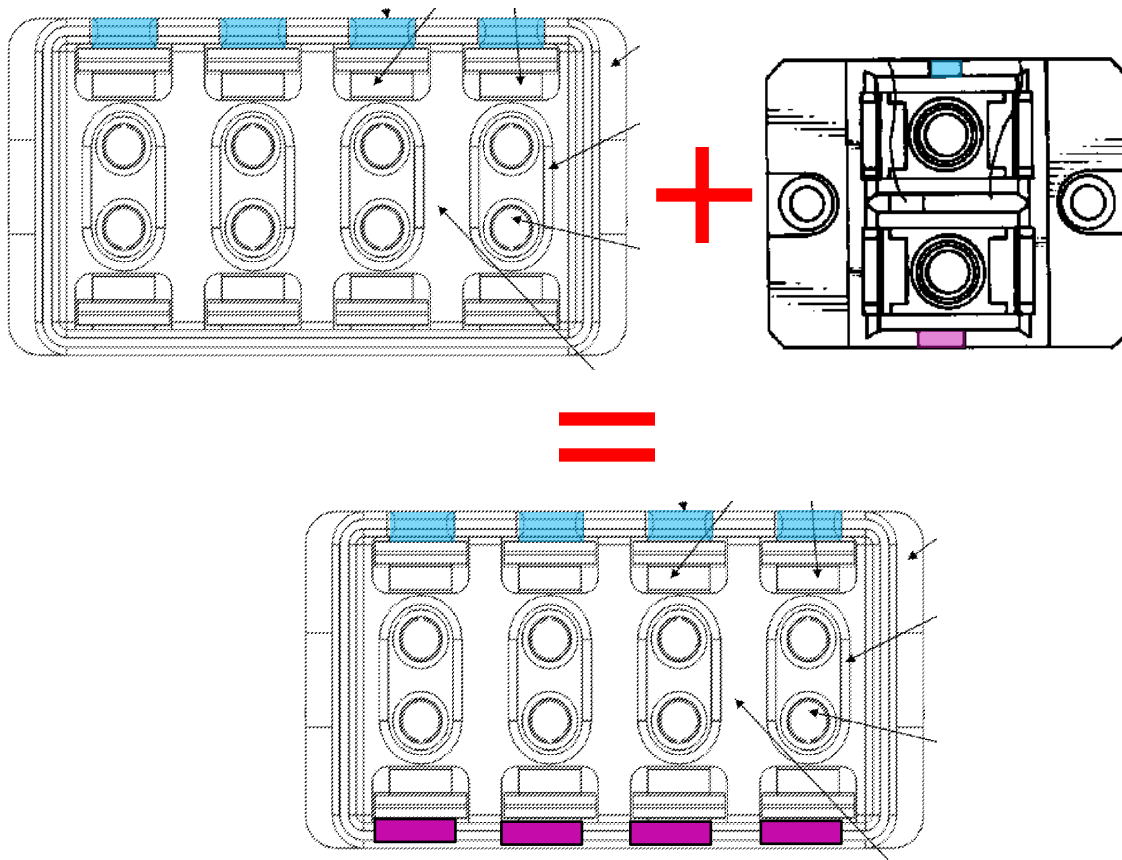
Further, modification of Takano'209's connector in view of Shimozu would allow for several keyed fiber type-specific connection systems that prevent inadvertent insertion of a connector of one fiber type into an adapter meant for a different fiber type. EX1002: ¶250. As explained above, Shimozu teaches the keys and keyways can be shifted for similar connectors terminating different types of optical fibers. EX1008: ¶[0015]. By adding the second key to the bottom side of Takano'209's connector, the POSA could similarly shift the position of the alignment keys and keyways to provide several keyed fiber type-specific connection systems based on Takano'209's connector. EX1002: ¶250.

This modification results in a second alignment key being added on the bottom side of Takano'209's outer housing that is wider and offset from the Takano'209's existing first alignment key, as taught by Shimozu. EX1008: Fig. 2; EX1002: ¶251. A schematic illustration of Takano'209's modified connector is shown below:



EX1003: Fig. 22 (annotated, modified); EX1008: Fig. 2 (annotated); EX1002:  
¶251.

In modifying Takano’209’s connector, a corresponding modification to Takano’209’s adapter would have been made—adding second alignment slots along the bottom wall of the adapter housing corresponding in size and shape with the second alignment keys added to the bottom wall of the connector, as indicated below:



EX1003: Fig. 26 (annotated, modified); EX1008: Fig. 1 (annotated); EX1002: ¶252.

## **B. Independent Claim 1**

### **1.P**

Takano'209 discloses an optical connector (2100). EX1003: ¶[0117]; EX1002: ¶253.

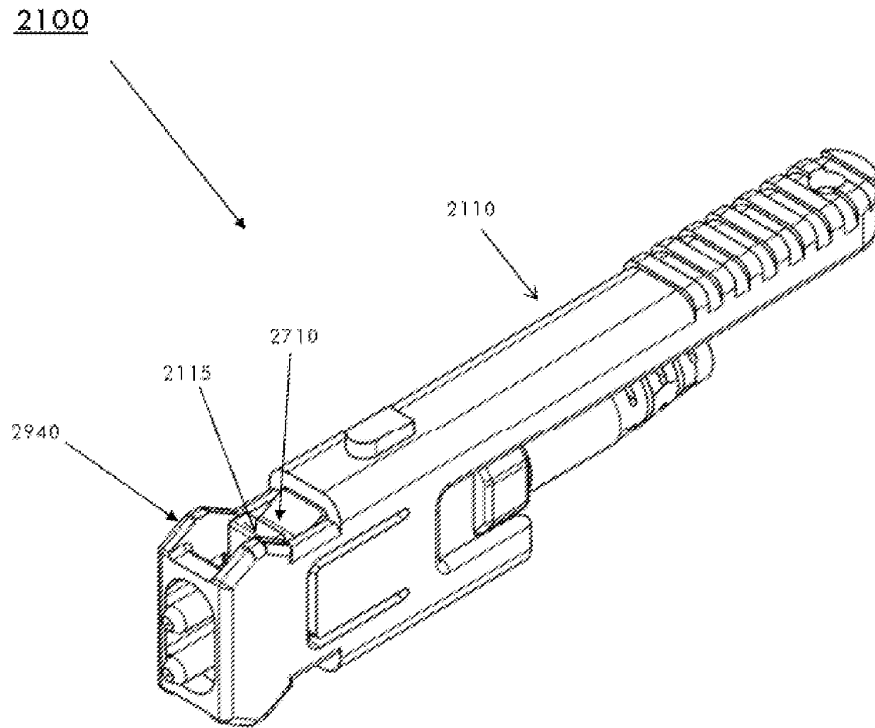


**FIG. 21B**

EX1003: Fig. 21B.

Therefore, Takano'209 meets 1.P. EX1002: ¶254.

### **1.a.1**

Takano'209's connector includes an outer housing (2110). EX1003: ¶[0117]; EX1002: ¶255. The outer housing includes a main body<sup>10</sup> that extends between front and rear ends. EX1002: ¶255.

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<sup>10</sup> See Footnote 4, and note, Takano'209 teaches pull tab (2107) is optional.

EX1003: ¶¶[0117], [0124]; EX1002: ¶256.

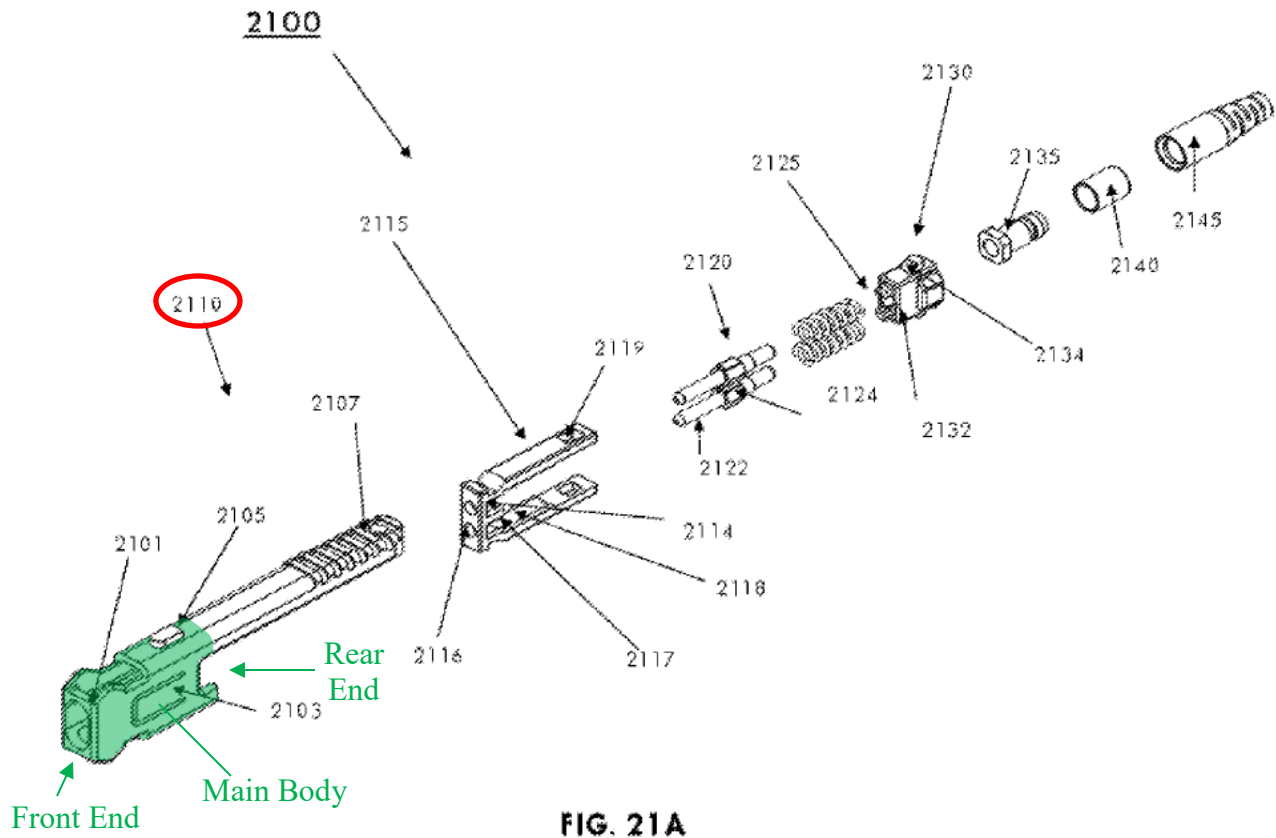
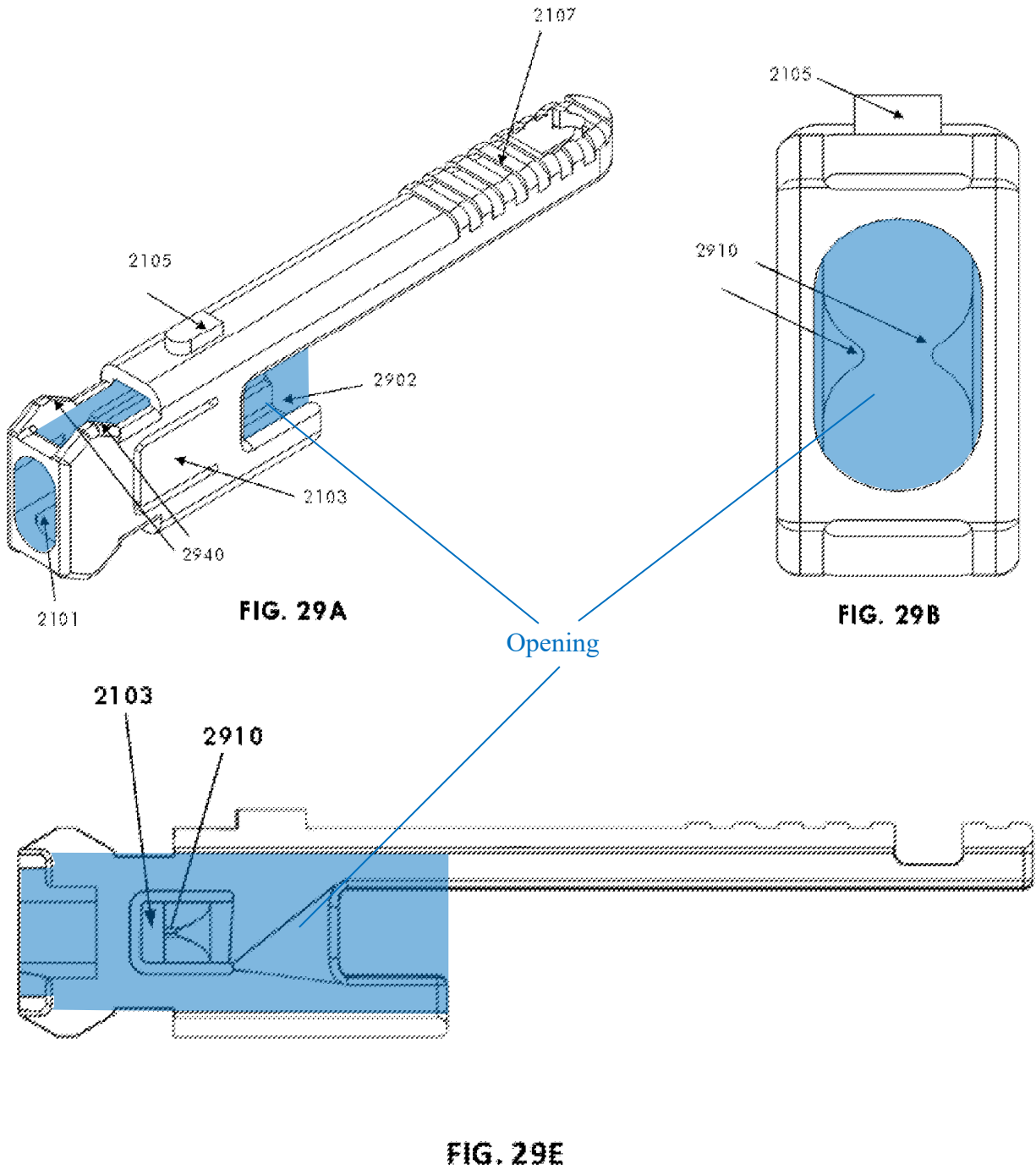


**FIG. 21A**

EX1003: Fig. 21A (annotated).

The outer housing (2110) has an opening extending between the front and rear ends of the main body. EX1003: ¶¶[0117], ¶[0120]; EX1002: ¶257.



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

Therefore, Takano'209 meets 1.a.1. EX1002: ¶258.

### 1.a.2

The outer housing (2110) has a top bottom surfaces bound by two opposing side surfaces such that a lateral width between the two side surfaces is less than a separation between the top and bottom surfaces along a height of the main body.

EX1003: ¶[0124]; EX1002: ¶259. Takano'209 states a lateral width of 4.2mm and a separation of 8.96mm. EX1003: ¶[0124]; EX1002: ¶259.

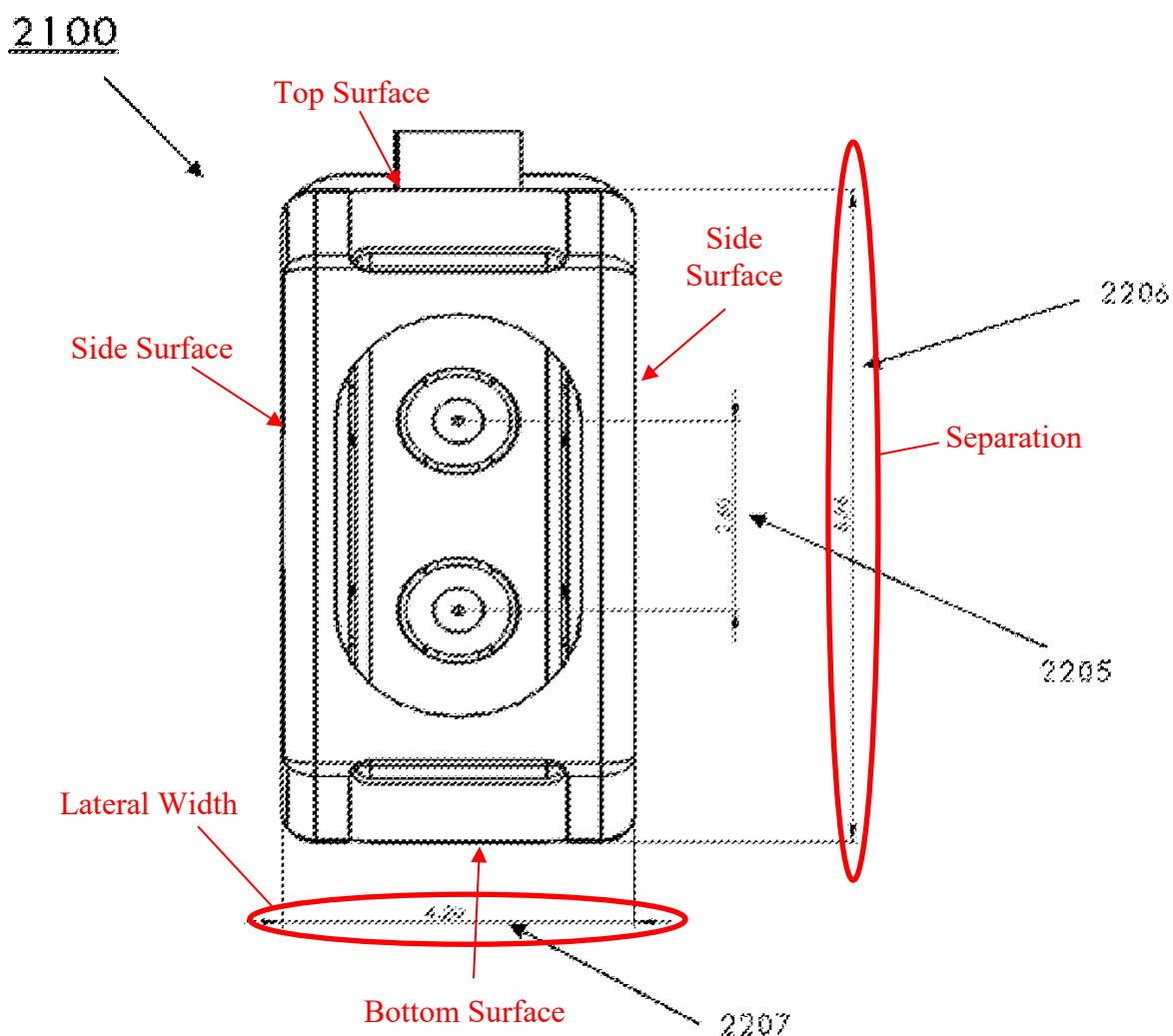


**FIG. 22**

EX1003: Fig. 22 (annotated).

Therefore, Takano'209 meets 1.a.2. EX1002: ¶260.

### 1.b.1

The connector includes two ferrule assemblies (2120) disposed within the opening of the outer housing (2110). EX1003: ¶[0117]; EX1002: ¶261.

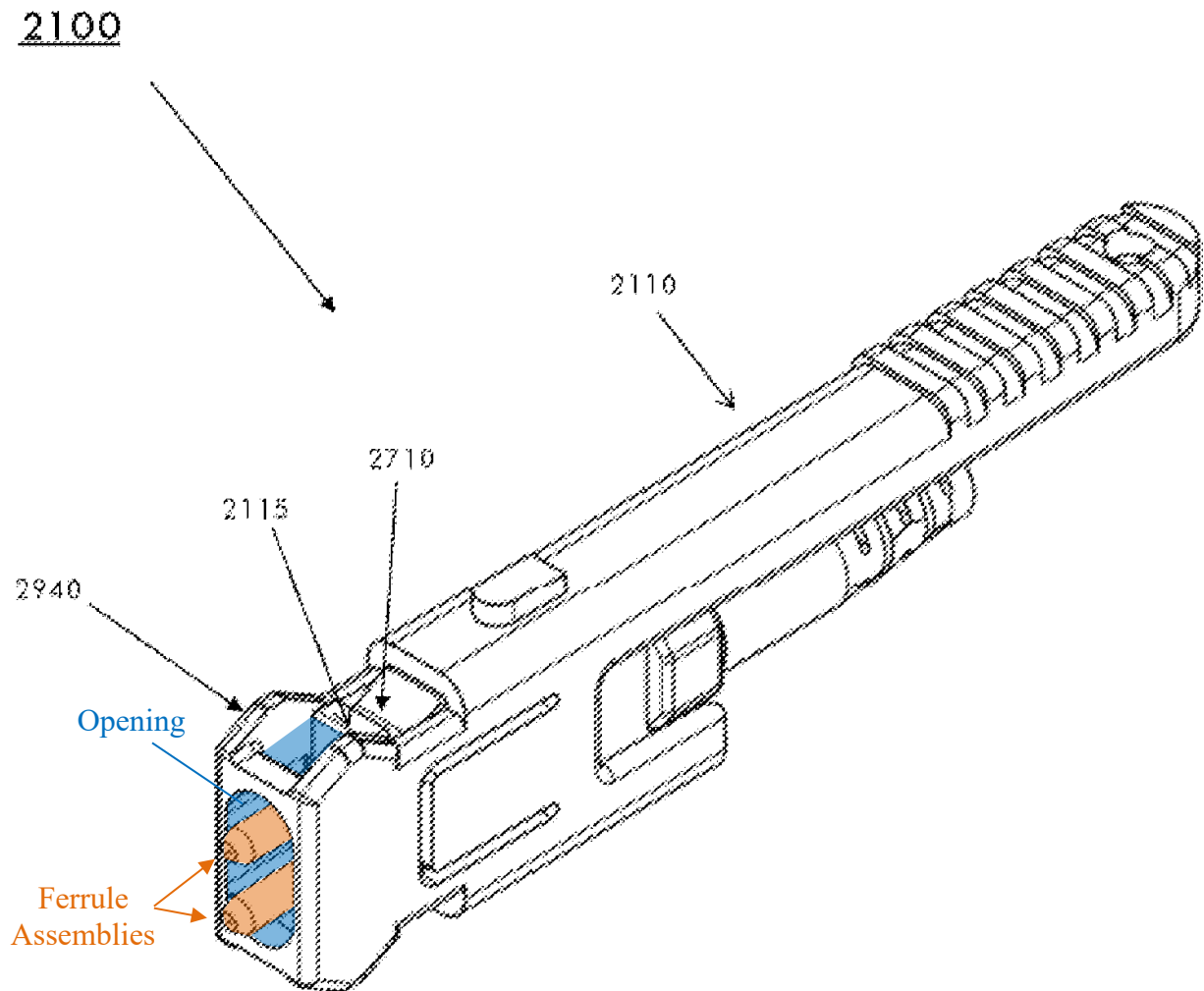
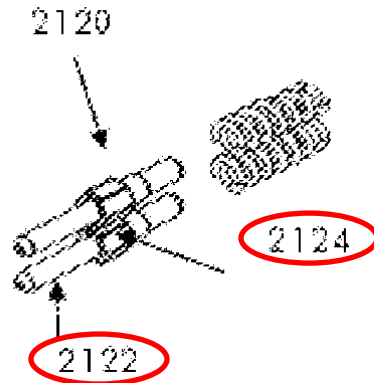


**FIG. 21B**

EX1003: Fig. 21B (annotated).

Each ferrule assembly (2120) includes a ferrule (2122) and a ferrule flange (2124) (e.g., ferrule holder) to hold the ferrule. EX1003: ¶[0117]; EX1002: ¶262. The ferrules are spaced apart from each other along the height of the main body. EX1003: Fig. 21B; EX1002: ¶262.

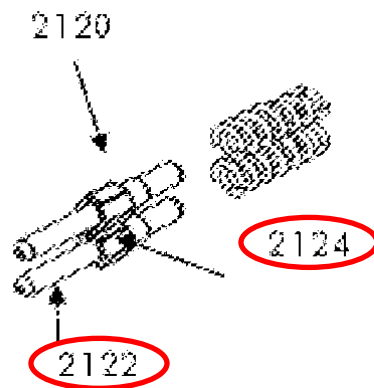


EX1003: Fig. 21A (annotated).

Therefore, Takano'209 meets 1.b.1. EX1002: ¶263.

### 1.b.2

Each ferrule (2122) extends forward of and away from the front end of the respective ferrule holder (2124). EX1003: Fig. 21A; EX1002: ¶264.



EX1003: Fig. 21A (annotated).

Therefore, Takano'209 meets 1.b.2. EX1002: ¶265.

**1.c**

The connector includes two springs (2125). EX1003: ¶[0117]; EX1002: ¶266.

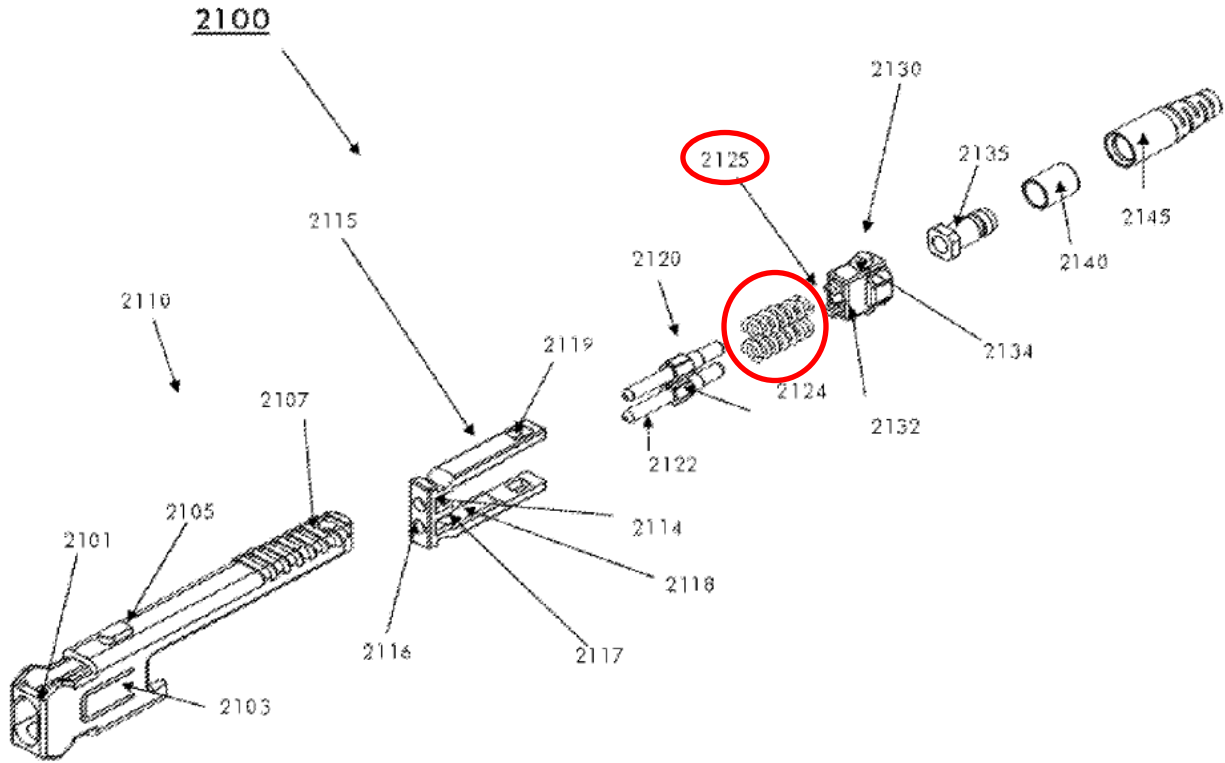
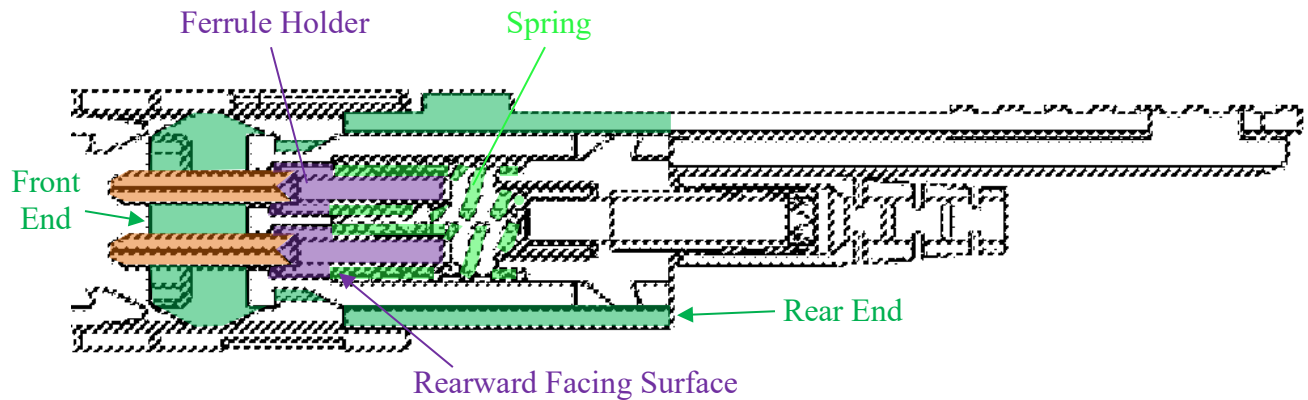


FIG. 21A

EX1003: Fig. 21A (annotated).

Each spring (2125) engages a rearward facing surface of the respective ferrule holder (2124) at its front end and extends toward the rear end of the outer housing (2110) to bias the ferrule assembly forward toward the front end of the outer housing. EX1003: Fig. 23B; EX1002: ¶267. Each spring (2125) is retained

within the outer housing, captured between the ferrule holders and the back body (2130). EX1003: ¶[0123]; EX1002: ¶267.



EX1003: Fig. 23B (annotated).

Therefore, Takano'209 meets 1.c. EX1002: ¶268.

#### 1.d

The connector has a two-piece<sup>11</sup> crimp body made of the back body (2130) and a back post (2135) secured to one another. EX1003: ¶[0117]; EX1002: ¶269.

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<sup>11</sup> See Footnote 5.

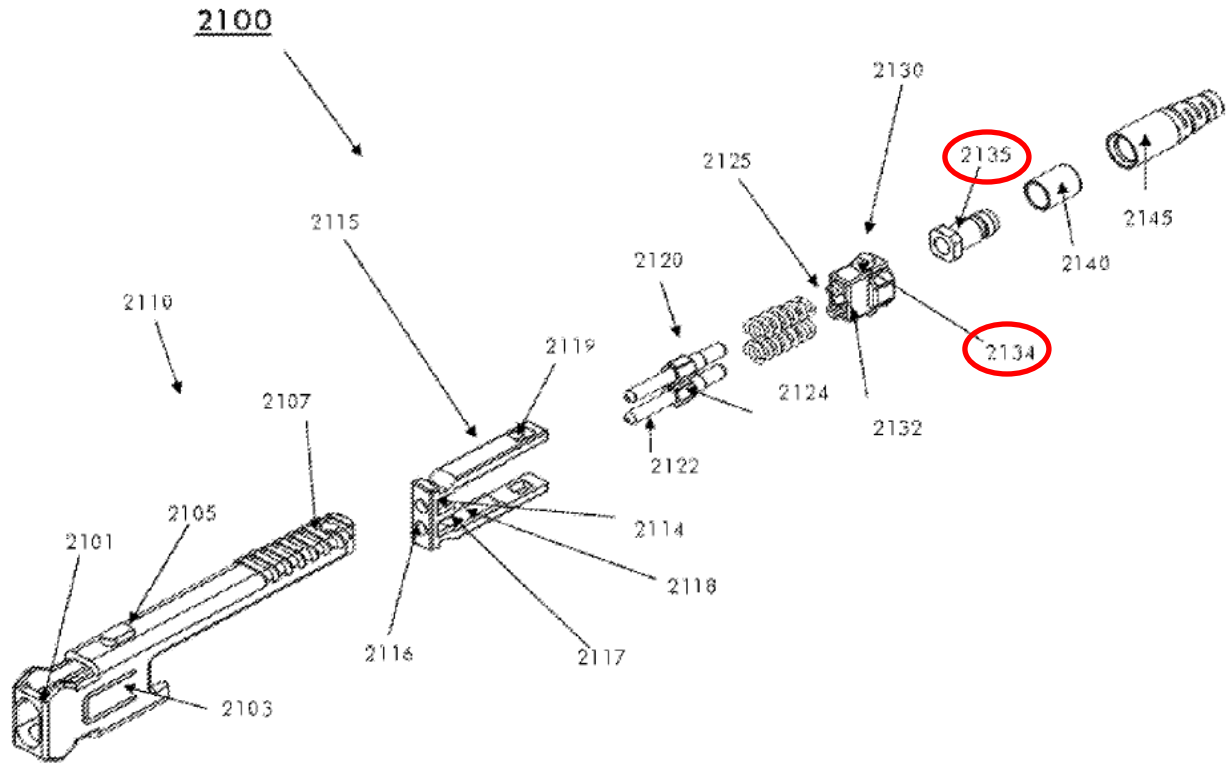


**FIG. 21A**

EX1003: Fig. 21A (annotated).

The crimp body (2130, 2135) is secured to the connector via protrusions (2134) interlocking with a cutout (2119) in the front body. EX1003: ¶[0122]; EX1002: ¶270.

The back post (2135) of the crimp body has a singular opening for optical fibers at the rear end of the crimp body. EX1002: ¶271.

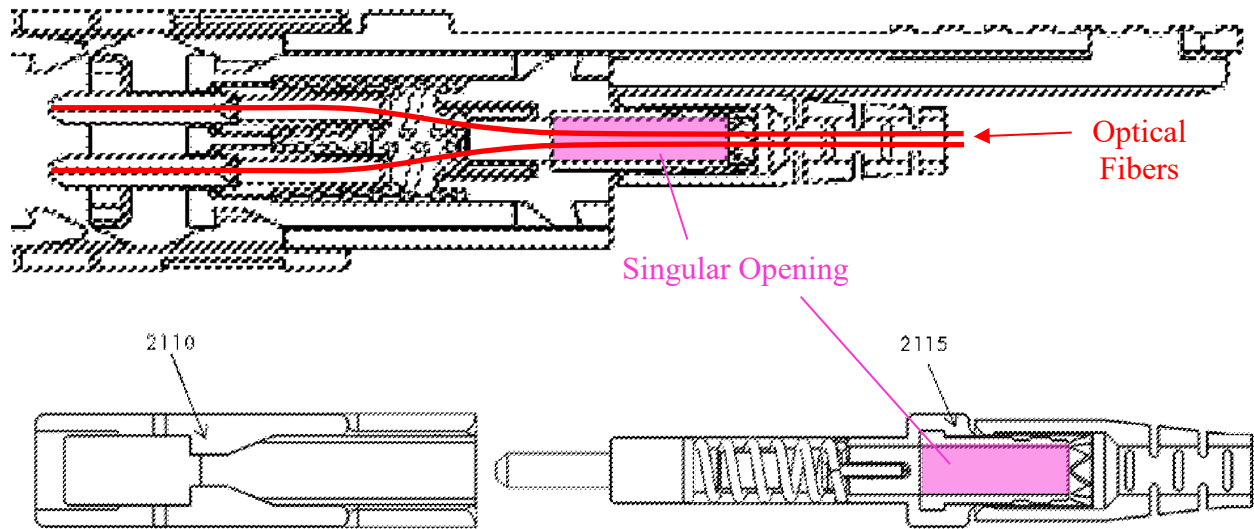


**FIG. 35C**

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

Therefore, Takano'209 meets 1.d. EX1002: ¶272.

### 1.e

The connector includes a connector alignment key (2105), a first projection on the top surface of the outer housing (2110). EX1003: ¶[0117], Fig. 21B; EX1002: ¶273. The “adapter housing 2402 further includes connector alignment slots 2403 that mate with the connector alignment key 2105.” EX1003: [0127].

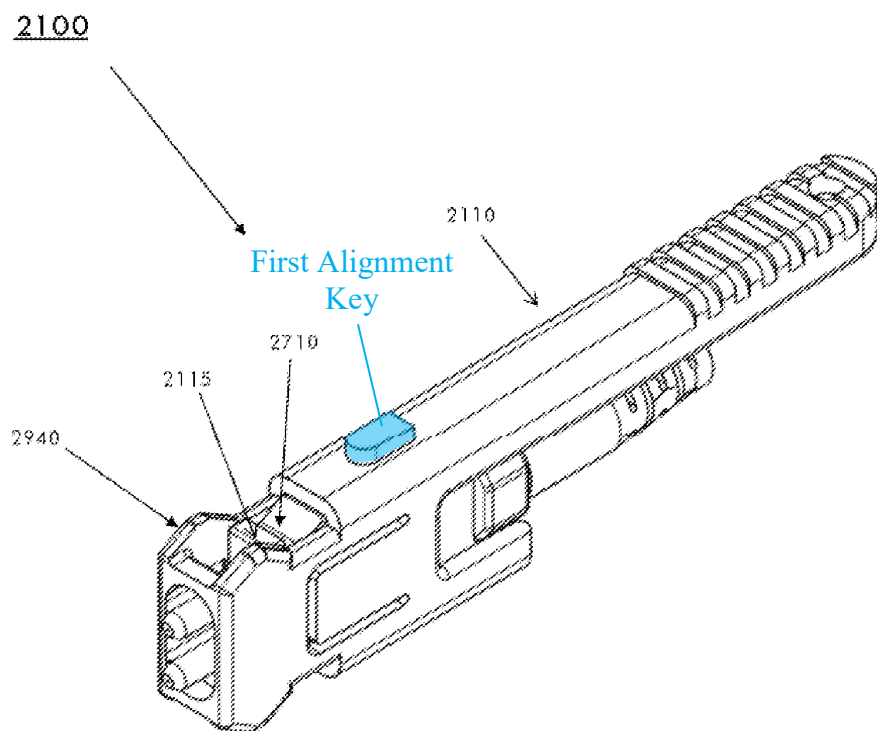


**FIG. 21B**

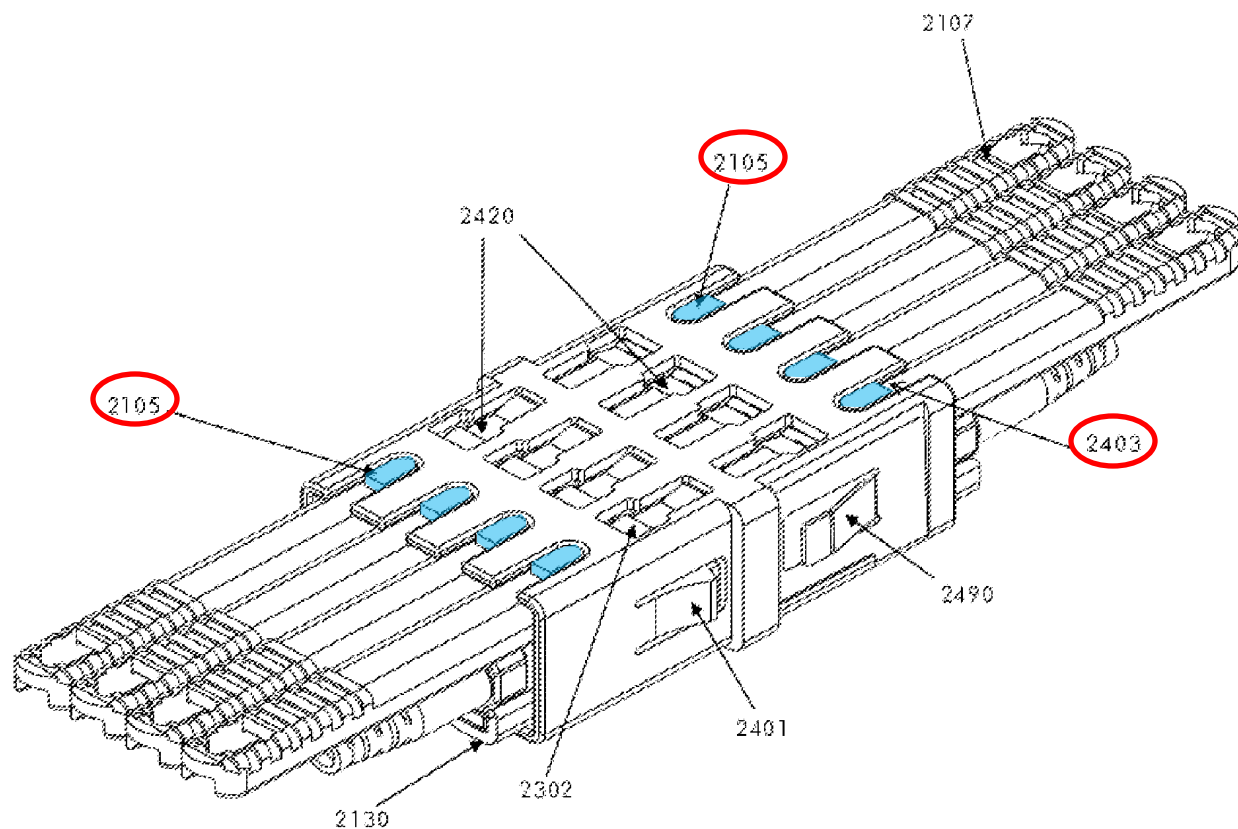
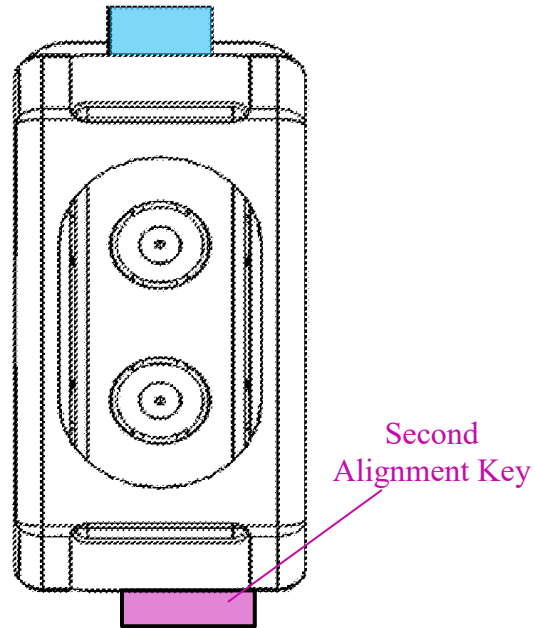


**FIG. 31**

EX1003: Figs. 21B and 31 (annotated).

As a result of the modification of Takano'209 in view of Shimozu (Section XI(A)), Takano'209's modified connector (2100) includes a second alignment key on the bottom surface of the outer housing (2110). EX1002: ¶274.



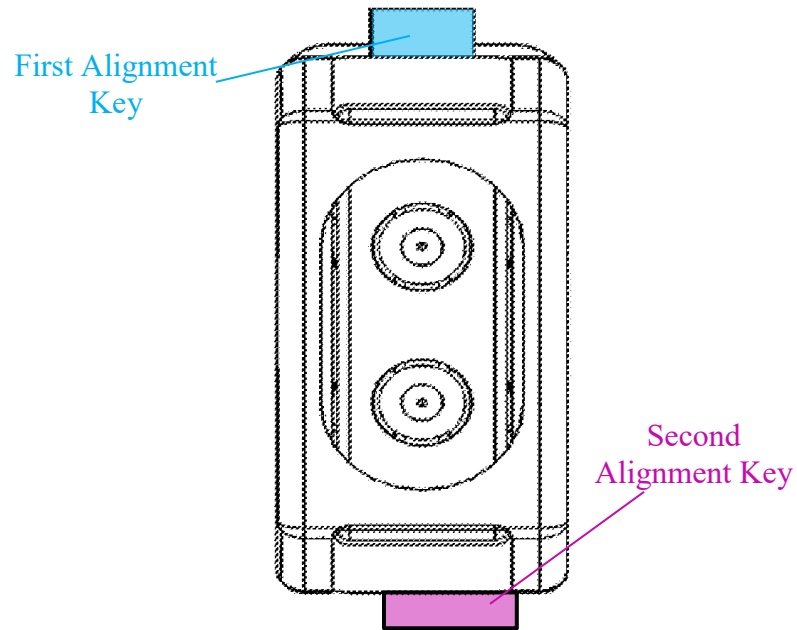
EX1003: Fig. 22 (annotated, modified).

Therefore, the Takano'209/Shimozu combination renders 1.e obvious.

EX1002: ¶275.

### 1.f

As explained in Section XI(A), the added second alignment key has a different size (i.e., width) than the first alignment key (2105). EX1002: ¶276.



EX1003: Fig. 22 (annotated, modified).

Therefore, the Takano'209/Shimozu combination renders 1.f obvious.

EX1002: ¶277.

### 1.g

The connector includes a boot (2145) with a longitudinal opening. EX1003:

¶[0117], Fig. 21A; EX1002: ¶278.

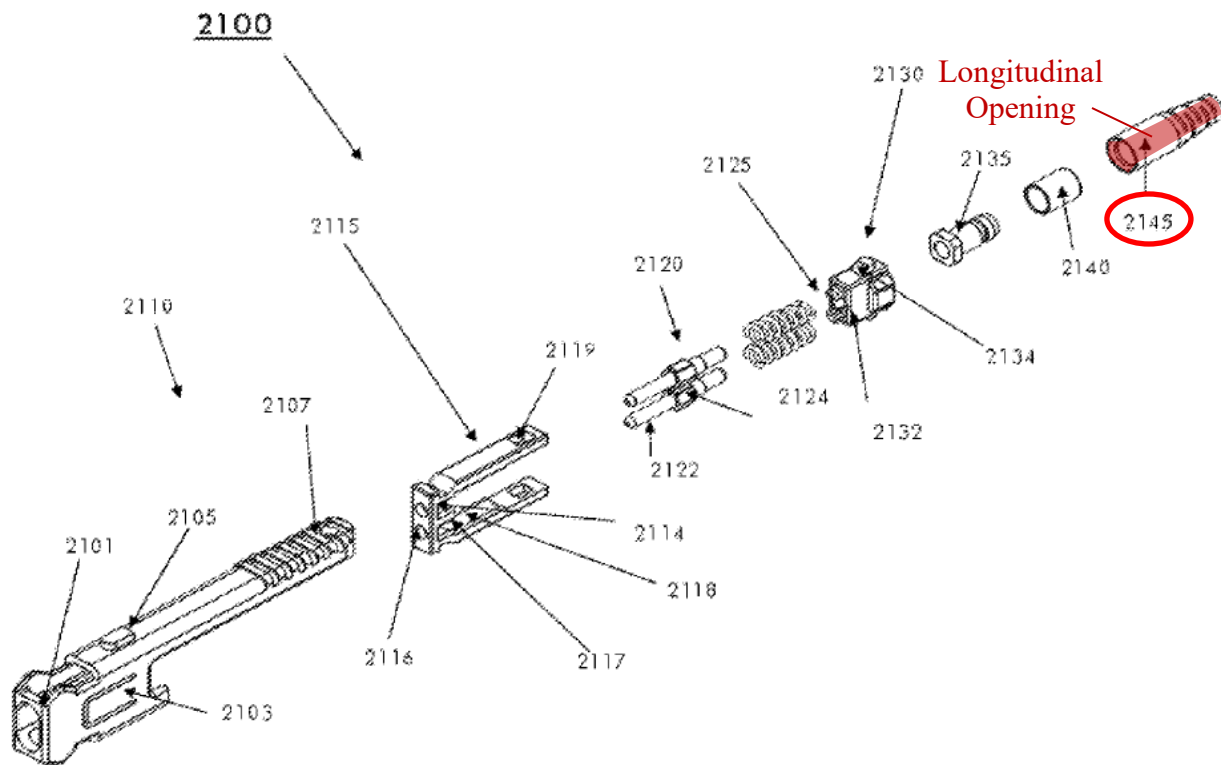
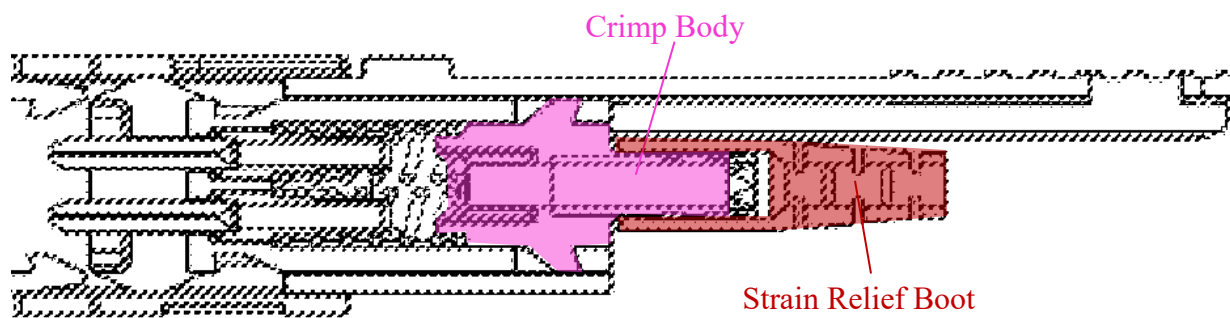


FIG. 21A



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

The boot's longitudinal opening is in continuum with the singular opening of the crimp body through which fibers pass from a cable to the ferrules. EX1002: ¶279.

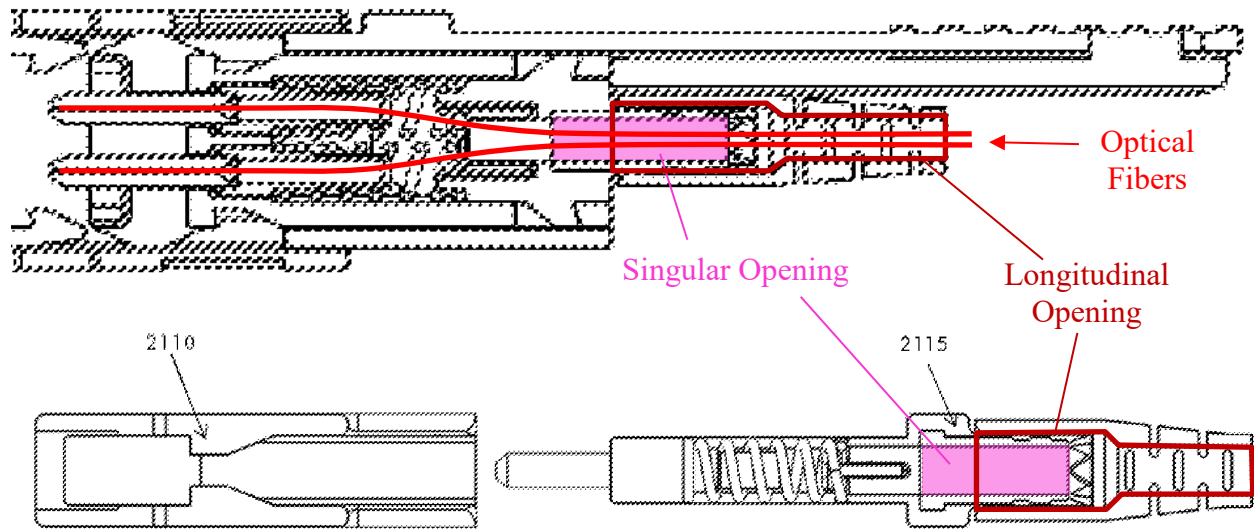


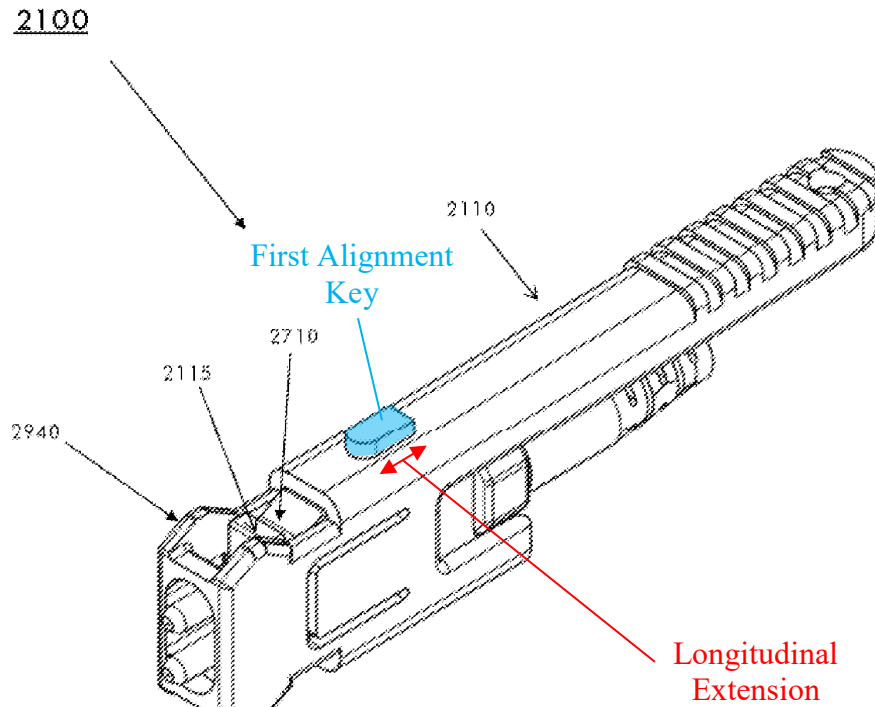
**FIG. 35C**

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

Therefore, Takano'209 meets 1.g. EX1002: ¶280.

### **C. Claim 2**

The first alignment key (i.e., first projection) extends longitudinally along the top surface of the outer housing (2110). EX1003: Fig. 21B; EX1002: ¶281.



EX1003: Fig. 21B (annotated).

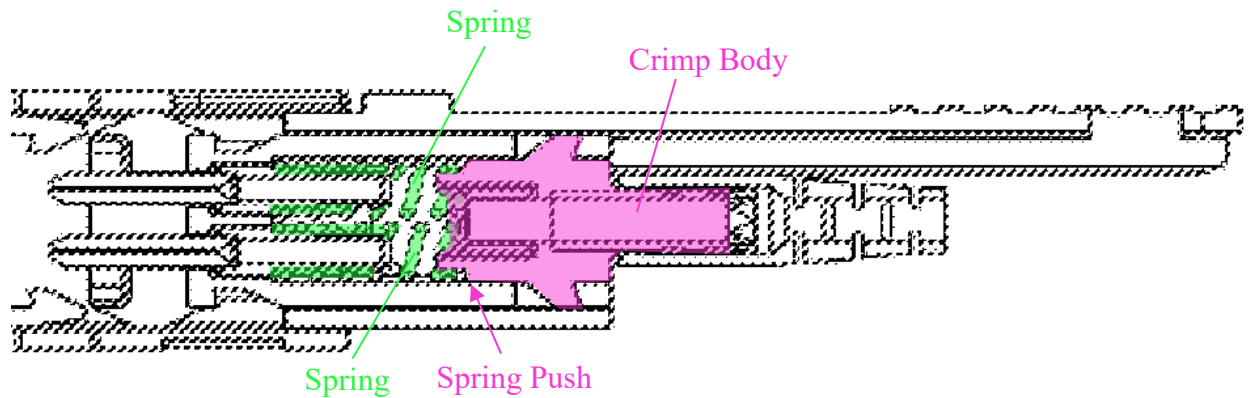
Therefore, Takano'209 meets this claim. EX1002: ¶282.

#### D. Claim 3

The crimp body<sup>12</sup> (particularly, the front portion of the back body (2130)) forms a spring push engaging a rear portion of each of the two springs (2125).

EX1003: ¶[0123]; EX1002: ¶284.

<sup>12</sup> See Footnote 7. EX1002: ¶283.

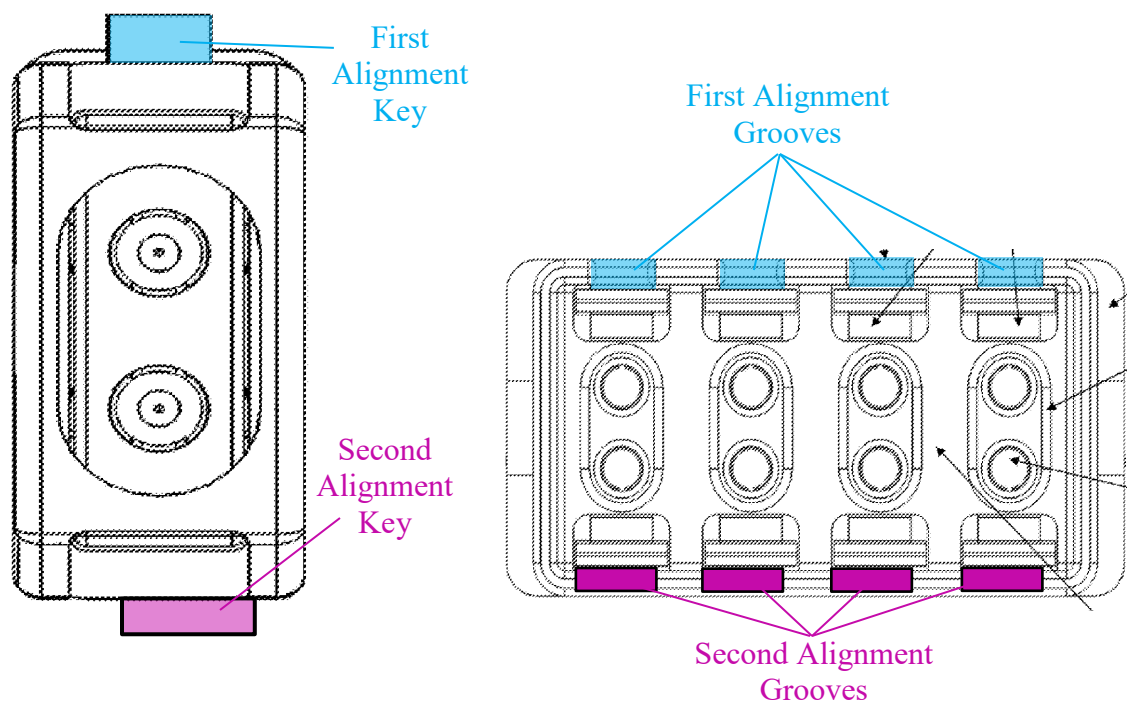


EX1003: Fig. 23B (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶285.

#### E. Claim 4

The first alignment key (2105) and the added second alignment key of the modified Takano'209 connector (2100) determine a correct orientation and/or polarity of the outer housing (2110) during insertion into the modified adapter (2400). EX1003: ¶¶[0117], [0127]; EX1008: ¶¶[0011]-[0012], [0014]; EX1002: ¶286.



EX1003: Figs. 22 and 26 (annotated, modified).

The first and second alignment keys must be oriented so the top (first) alignment key (2105) fits into a narrower centered alignment groove (2403) of the adapter (2400) and the bottom (second) alignment key is oriented to fit in an opposite alignment groove on the bottom wall of the adapter. EX1008: ¶[0014]; EX1002: ¶287. If the modified connector (2100) is inserted upside down, the alignment keys will not fit in the alignment grooves. EX1008: ¶[0014]; EX1002: ¶287.

Therefore, the Takano'209/Shimozu combination renders this claim obvious. EX1002: ¶288.

**F. Claim 5**

**5.a**

The connector includes a crimp ring (2140), which is “a crimp band.”

EX1003: ¶[0117]; EX1002: ¶289.

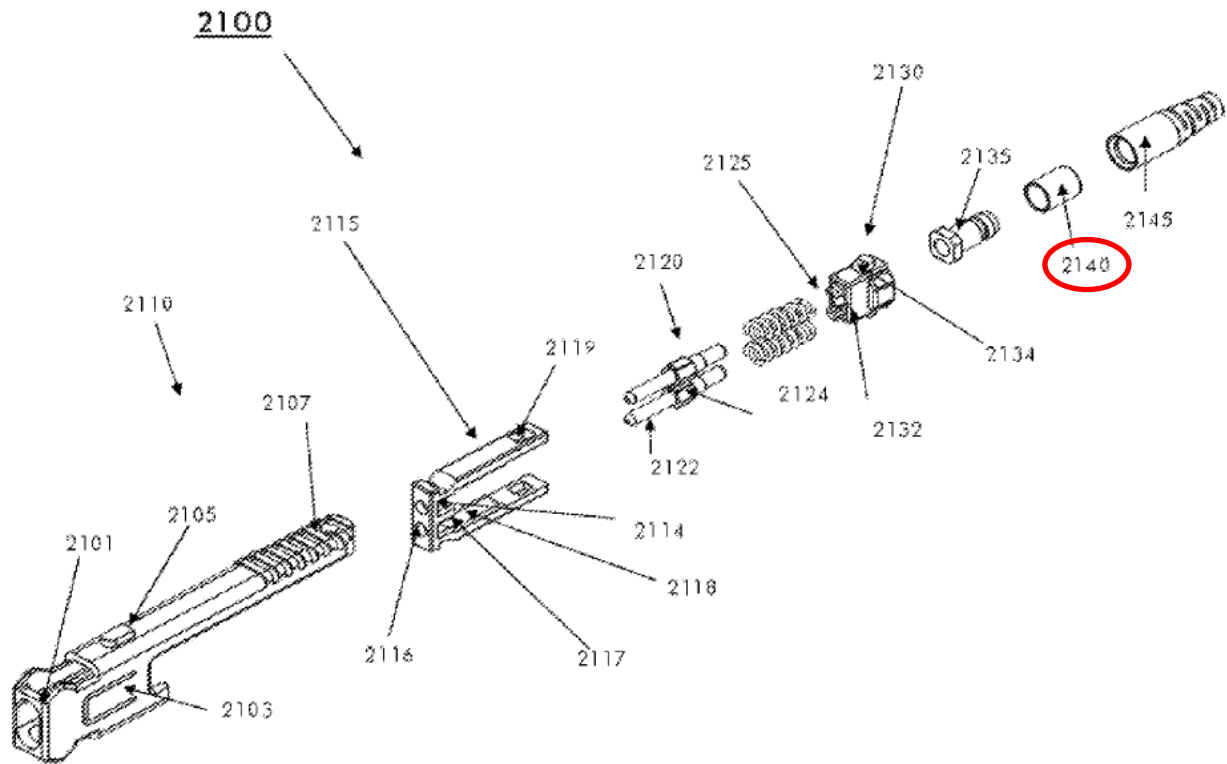
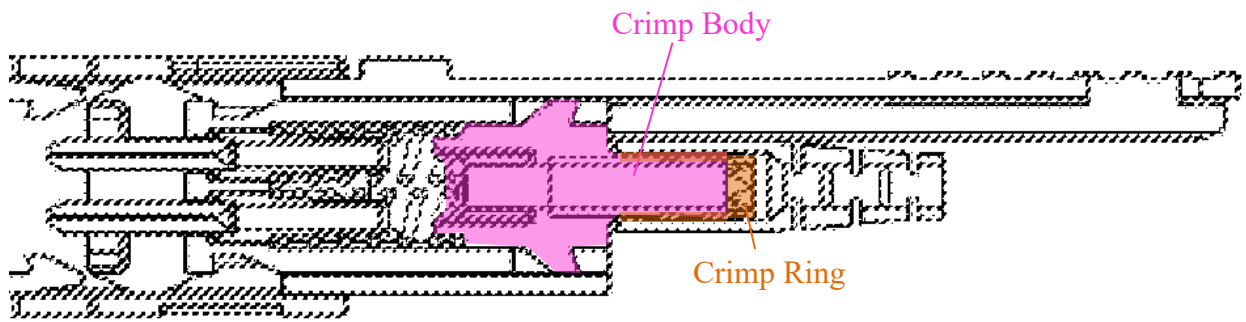


**FIG. 21A**

EX1003: Fig. 21A (annotated).

The crimp ring is secured around an outer surface of the rear end of the back post (2135). EX1002: ¶290.

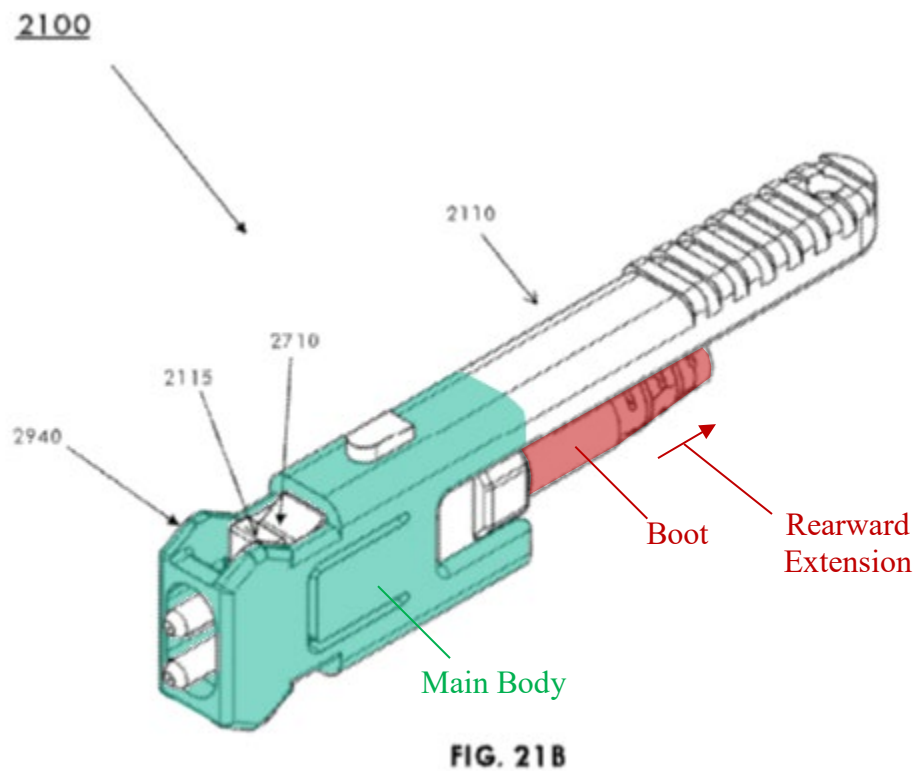


EX1003: Fig. 23B (annotated).

Therefore, Takano'209 meets 5.a. EX1002: ¶291.

### 5.b

The boot (2145) extends rearward away from the rear end of the main body of the outer housing (2110). EX1002: ¶292.



EX1003: Fig. 21B (annotated).

To the extent US Conec alleges the presence of the pull tab prevents Takano'209 from meeting this limitation, Takano'209 teaches an embodiment where the outer housing (2110) does not have the pull tab. EX1003: ¶¶[0117], [0124]; EX1002: ¶¶293-294. Takano'209 states the pull tab is *optional*. EX1003: ¶¶[0117] (“*optional* pull tab”), [0124] (“*optional* pull tab 2107”). The top portion of the outer housing would be cut off in-line with where the rear-bottom end of the main body is. EX1002: ¶295. In this embodiment, the boot would extend rearward beyond the rearmost point of the outer housing. *Id.*

Therefore, Takano'209 meets 5.b. EX1002: ¶296.

#### **G. Claim 6**

The top and bottom surfaces each have a receiving area (e.g., recess) for receiving flexible receptacle hook (2302) of the adapter (2400), which secures the connector (2100) to the adapter. EX1003: ¶¶[0129]-[0106], Figs. 21B, 29E, and 34C; EX1002: ¶297.

2100

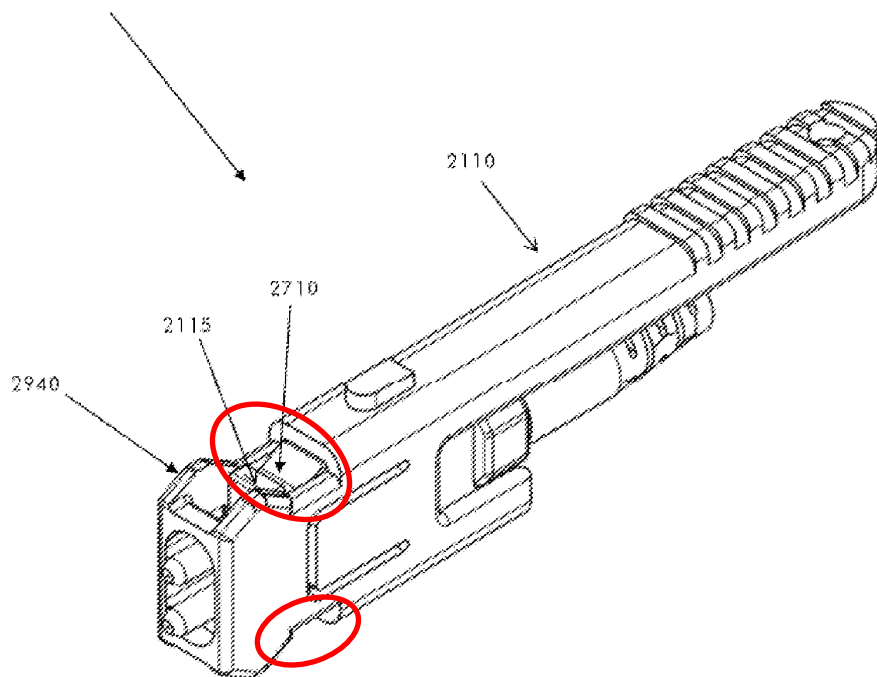


**FIG. 21B**

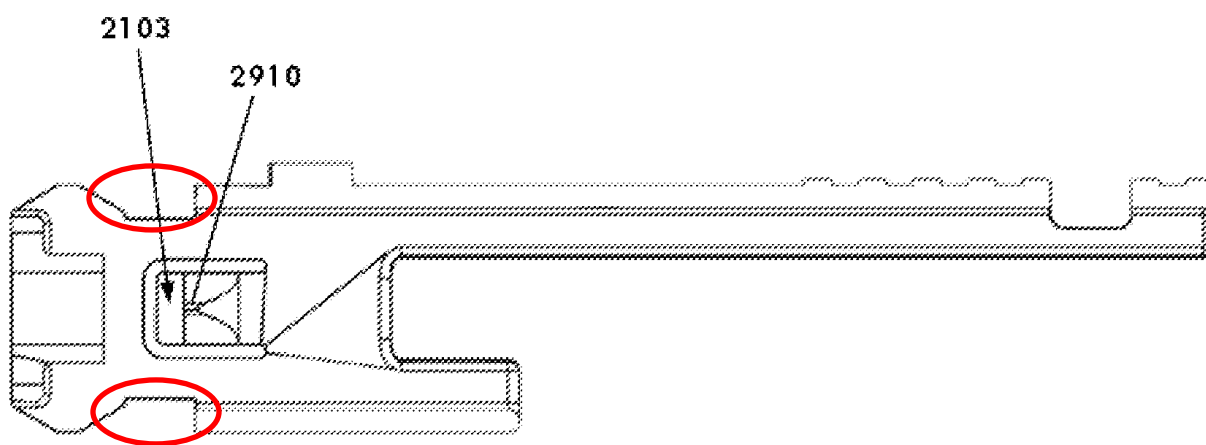
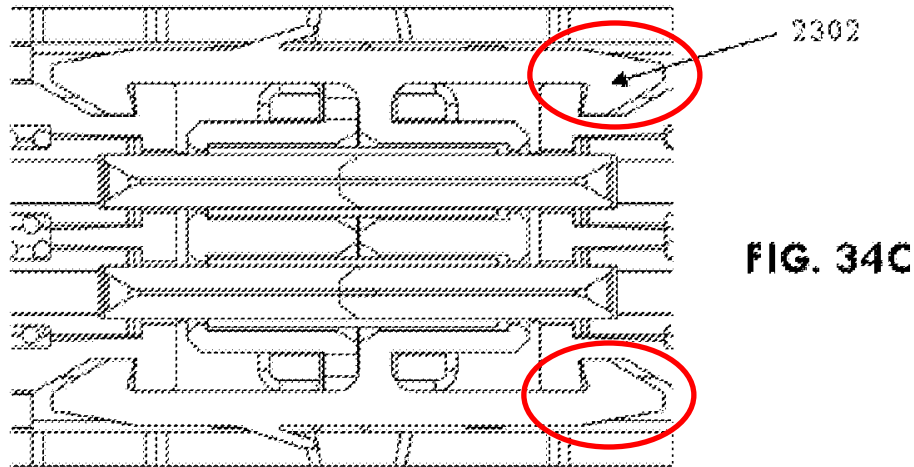


**FIG. 29E**



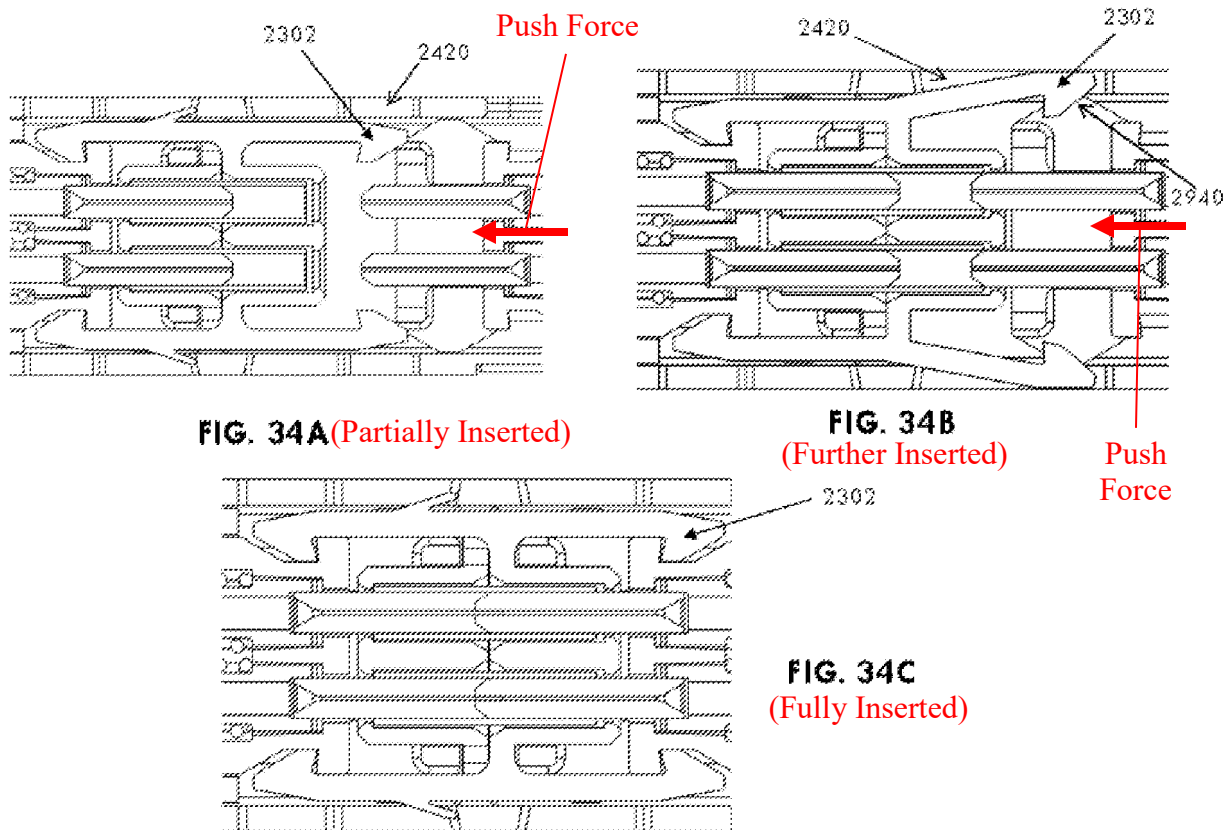
EX1003: Figs. 21B, 29E, and 34C (annotated).

When the connector (2100) is fully inserted and latched in the adapter (2400), as shown in Figs. 34C above, the receptacle hooks (2302) are in the receiving areas of the outer housing (2110). EX1002: ¶298.

Therefore, Takano'209 meets this claim. EX1002: ¶300.

#### **H. Claim 7**

Takano'209's connector receives a push force to insert the connector into the adapter (2400). EX1003: Figs. 34A-C, ¶¶[0117], [0129]; EX1002: ¶¶301-302.



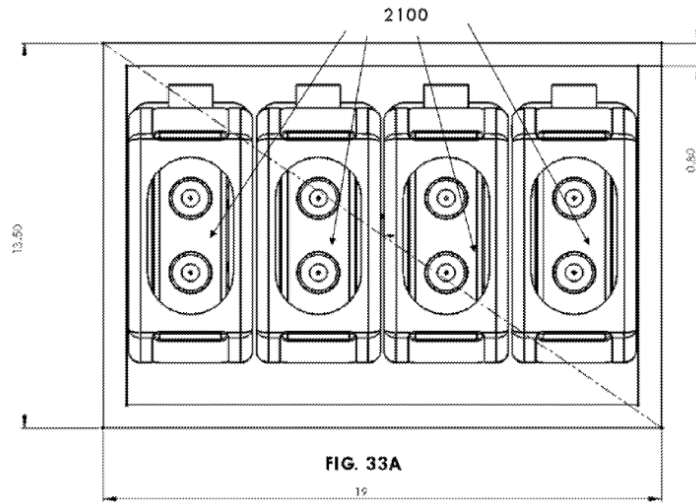
EX1003: Figs. 34A-C (annotated).

The connector also receives a pull force to release the latch component from the adapter (2400): “an optional pull tab 2107 to facilitate removal of the connector 2100.” EX1003: ¶[0117]; EX1002: ¶¶303-304.

Therefore, Takano’209 meets this claim. EX1002: ¶305.

## I. Claim 8

Takano’209’s connector (2100) fits within a “quad small form factor pluggable (QSFP) footprint.” EX1003: ¶[0132]. Therefore, the front end of the outer housing (2110) fits in a QSFP footprint. EX1002: ¶306.



EX1003: Fig. 33A.

Therefore, Takano'209 meets this claim. EX1002: ¶307.

#### J. Claim 9

Takano'209's connector (2100) fits within a “small form factor pluggable (SFP) footprint.” EX1003: ¶[0132]. Therefore, the front end of the outer housing (2110) fits in a SFP footprint. EX1002: ¶308.

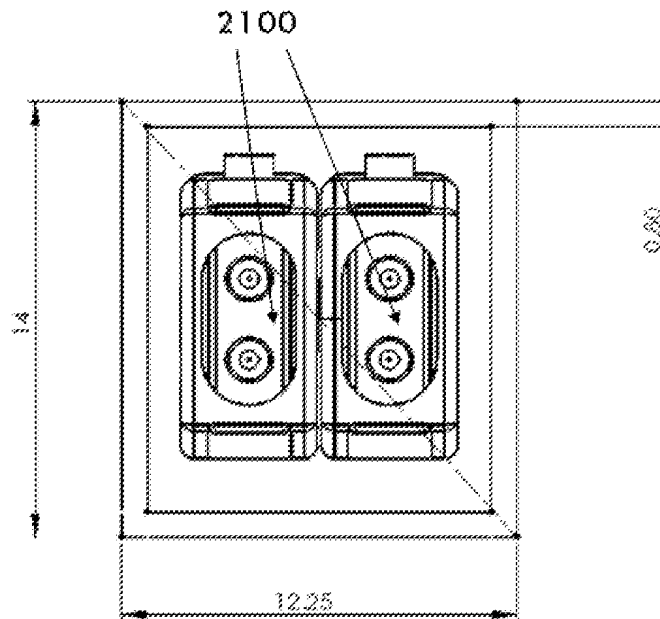


**FIG. 33B**

EX1003: Fig. 33B.

Therefore, Takano'209 meets this claim. EX1002: ¶309.

### **K. Claim 10**

The back body (2130) of the crimp body has upper and lower protrusions (2134) (i.e., respective top and bottom portions) received in corresponding windows/cutouts (2119) in the top and bottom of the front body (2115). EX1003: Figs. 27A and 28B, ¶[0122]; EX1002: ¶310.

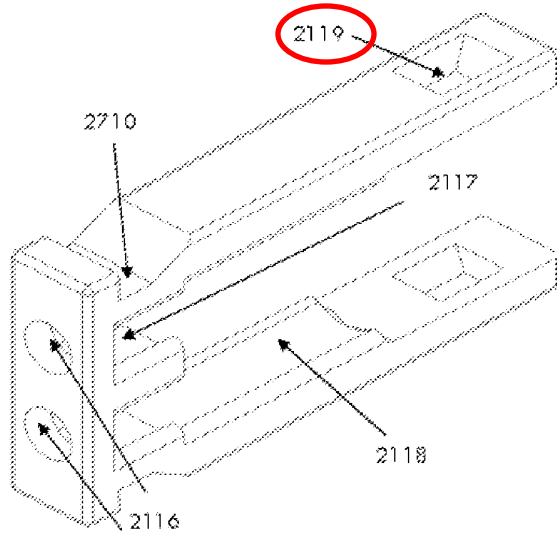


**FIG. 27A**

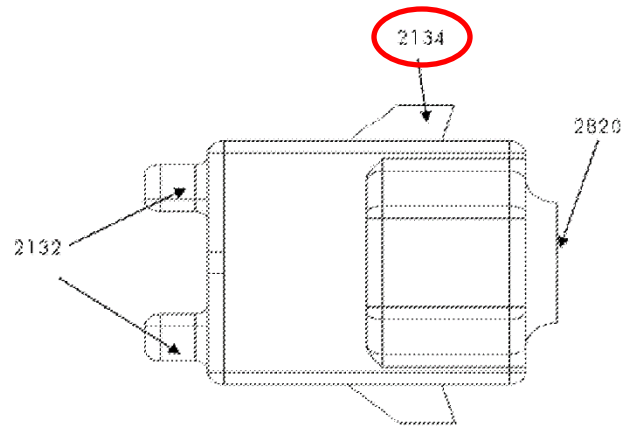
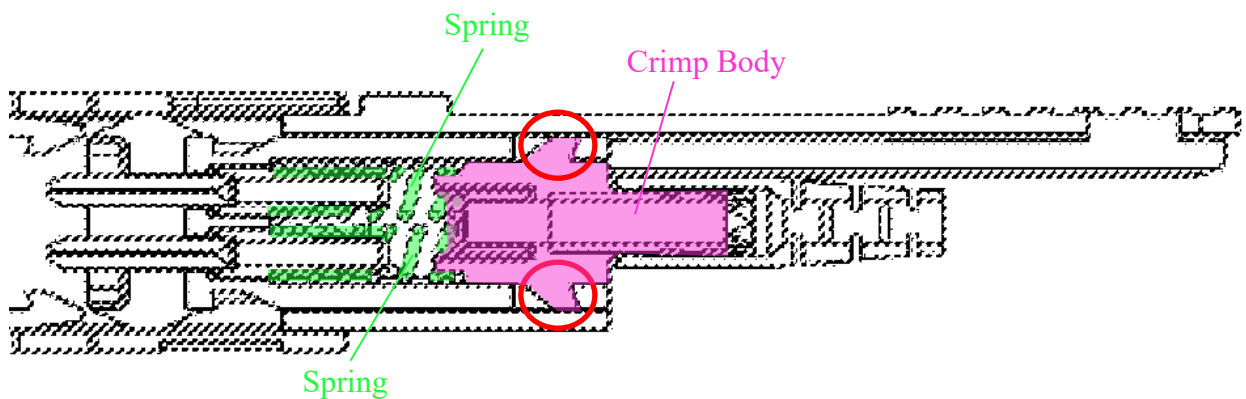


**FIG. 28B**

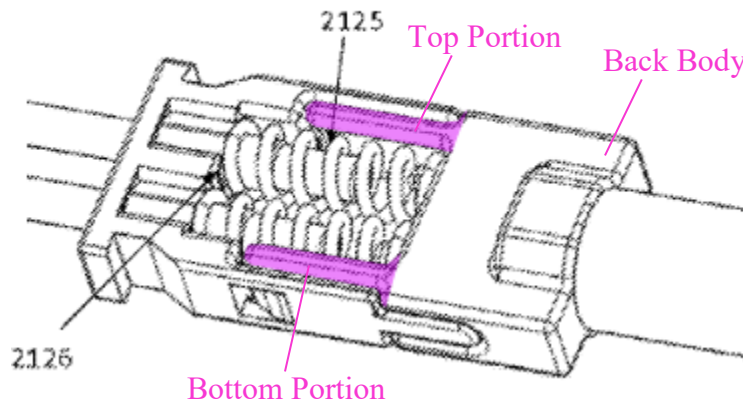
EX1003: Figs. 27A and 28B (annotated).

As assembled, the rear ends of the springs (2125) engage the front face of the back body (2130) between the upper and lower protrusions (2134)—i.e., the springs are positioned between the protrusions. EX1003: Figs. 27A and 28B, ¶[0122]; EX1002: ¶¶311-312.



EX1003: Fig. 23B (annotated).

Alternatively or in addition, in an alternative embodiment, the back body (2130) has top and bottom portions (annotated below) with the springs (2125) therebetween. EX1002: ¶¶313.



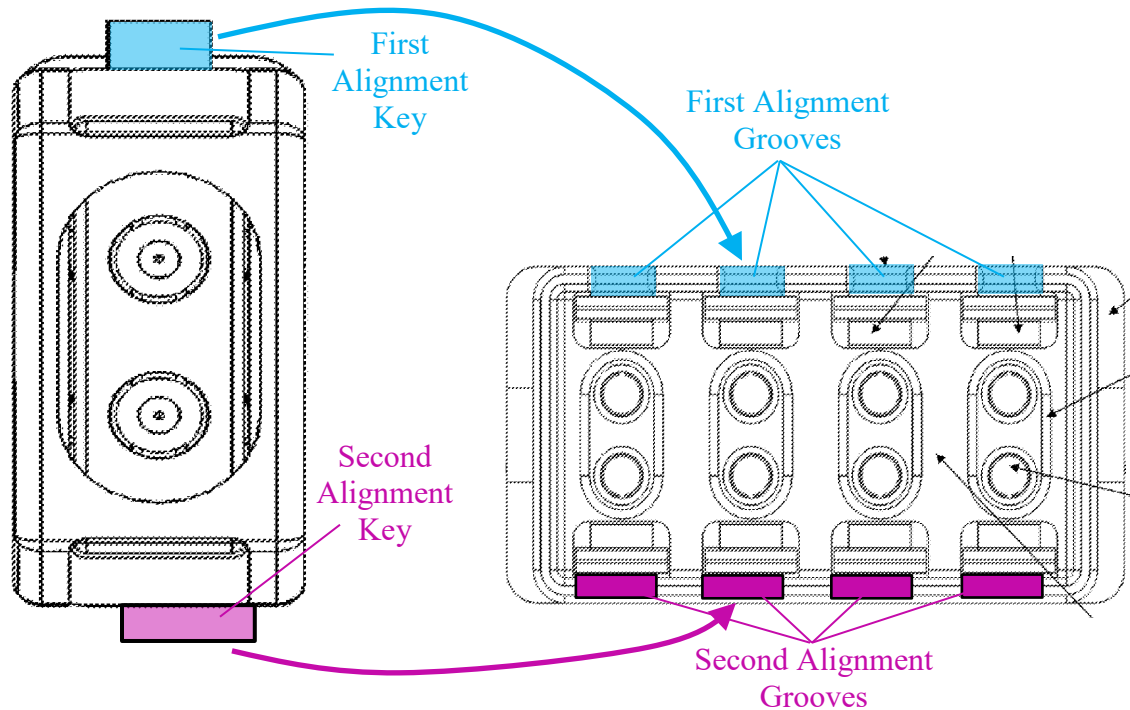
EX1003: Fig. 29D (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶314.

#### **L. Claim 11**

As explained in Section XI(A), the result of the modified Takano'209 connector (2100) and adapter (2400) is that the first alignment key (2105) (i.e., first projection) is received in one of the first alignment grooves of the adapter and the added second alignment key (i.e., second projection) is received in one of the

added second alignment grooves of the modified adapter.<sup>13</sup> EX1003: ¶¶[0117], [0127]; EX1008: ¶¶[0011]-[0012], [0014]; EX1002: ¶315.



EX1003: Figs. 22 and 26 (annotated, modified).

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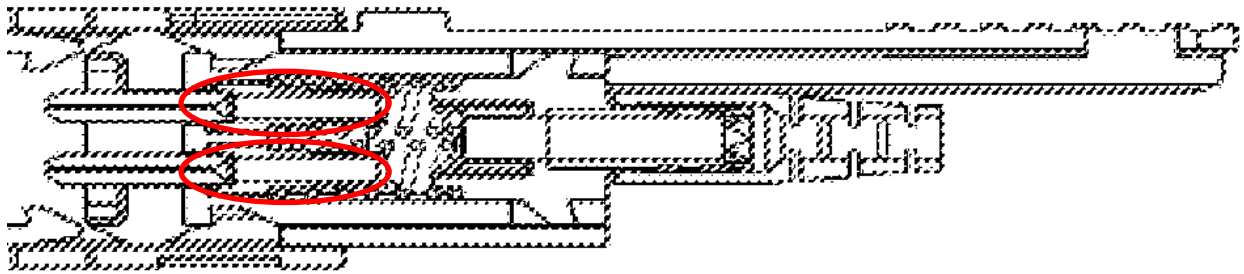
<sup>13</sup> If US Conec argues Takano’209’s modified adapter does not have “grooves”, “grooves” is not entitled to any patentable weight because “grooves” is part of claim 11’s intended use. Section VII(K). The adapter is not positively claimed. The keys of Takano’209’s modified connector are capable of being fitted in any corresponding receiving structure of an adapter, whether that corresponding receiving structure is a “slot,” “groove,” “recess,” “channel,” “bore,” “depression,” “cut,” etc. EX1002: ¶316.

Therefore, the Takano'209/Shimozu combination renders this claim obvious.

EX1002: ¶317.

**M. Claim 12**

Under any construction of this claim, the two ferrule seats are located in the circled areas below. Section V(A); EX1002: ¶318.



EX1003: Fig. 23B (annotated).

The front body (2115) includes a wall separating the ferrule assemblies (2150) between the locations where the ferrule assemblies are seated in the outer housing (2110). EX1003: Figs. 27A-B and 23B, ¶[0123]; EX1002: ¶319. The wall is located between the top and bottom surfaces of the outer housing. EX1003: Fig. 23B; EX1002: ¶319.

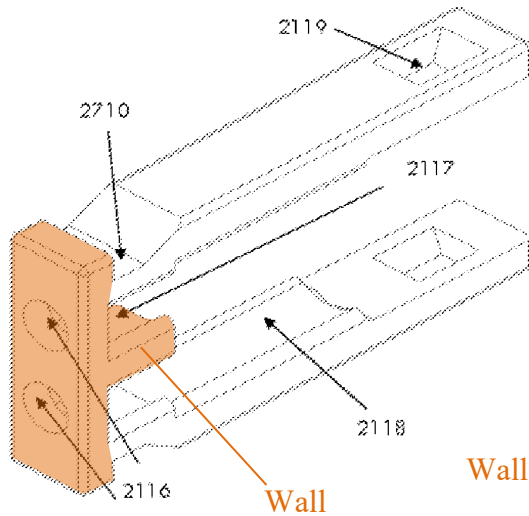
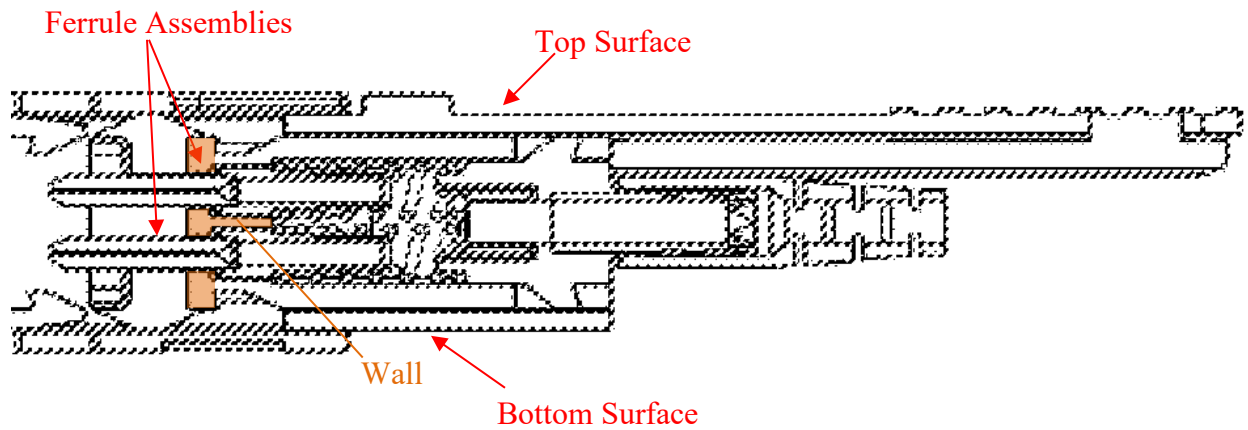
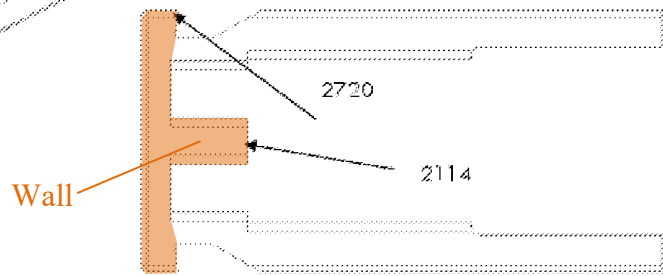


FIG. 27A

FIG. 27B



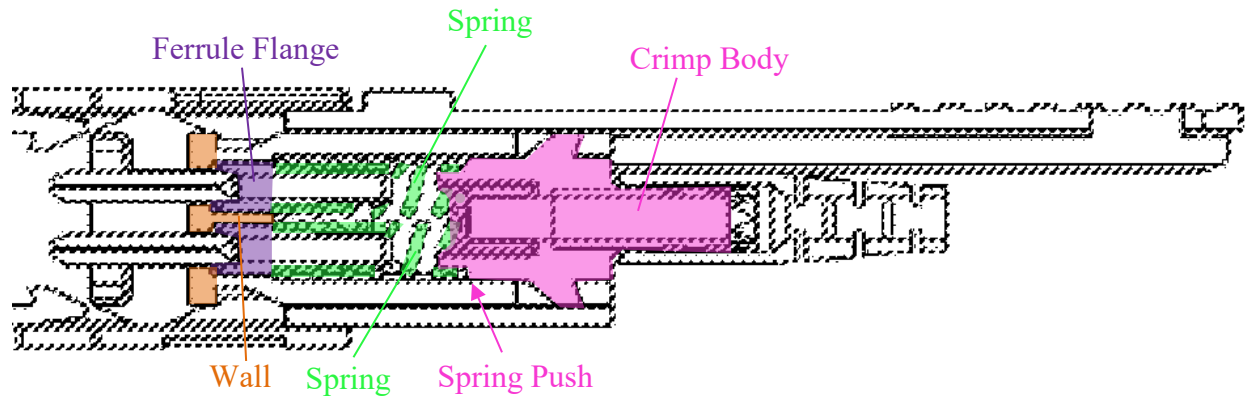
EX1003: Figs. 27A&B and 23B (annotated).

Therefore, Takano'209 meets this claim. EX1002: ¶320.

### N. Claim 13

As explained in Section VII(C), the crimp body (particularly, the front portion of the back body (2130)) forms a spring push. EX1002: ¶321. The spring push simultaneously compresses the two springs (2125) between the crimp body

and the ferrule flanges (2124) engaged with the wall. EX1003: Fig. 23B, ¶[0123]; EX1002: ¶321.



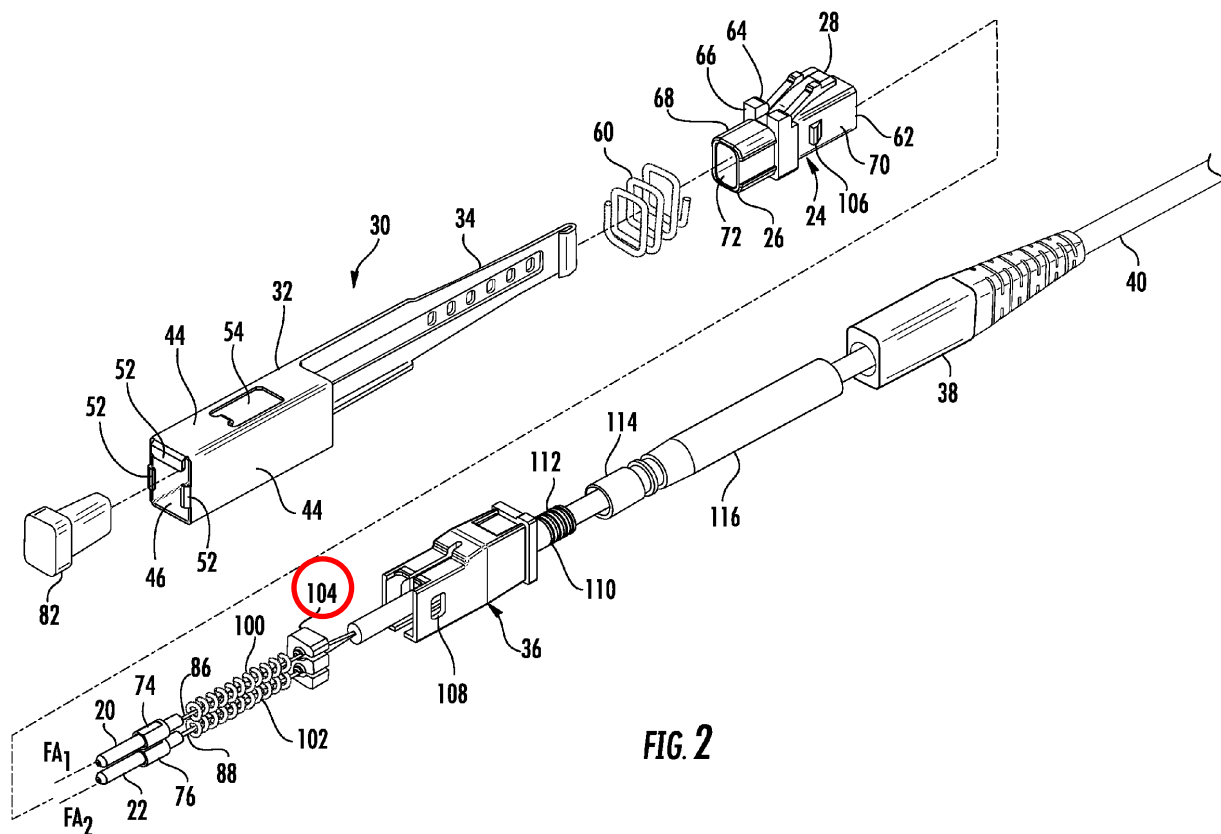
EX1003: Fig. 23B (annotated).

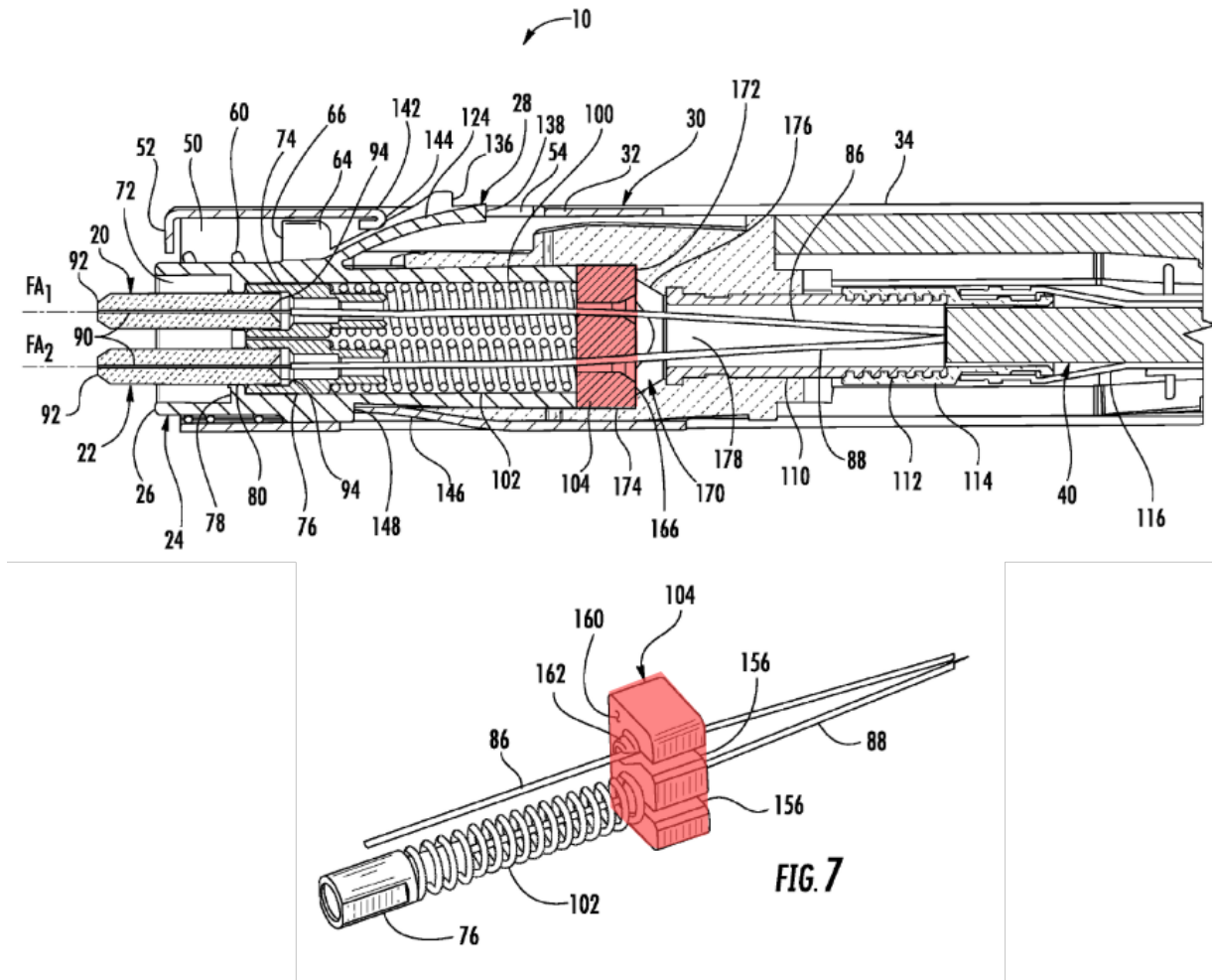
Therefore, Takano'209 meets this claim. EX1002: ¶322.

## **XII. GROUND 8: Claims 3 and 13 Would Have Been Obvious Over Takano'209 in view of Shimozu and Lee**

### **A. Claim 3**

As discussed in Sections III(B)(2)&VIII(A), Lee's connector (10) has a separate spring push (104). EX1005: Figs. 2 and 3, ¶¶[0038], [0040]; EX1002: ¶¶324-325.





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

It would have been obvious to modify Takano'209's connector (2100) to include Lee's spring push (104) for the reasons explained in Section VIII(A).

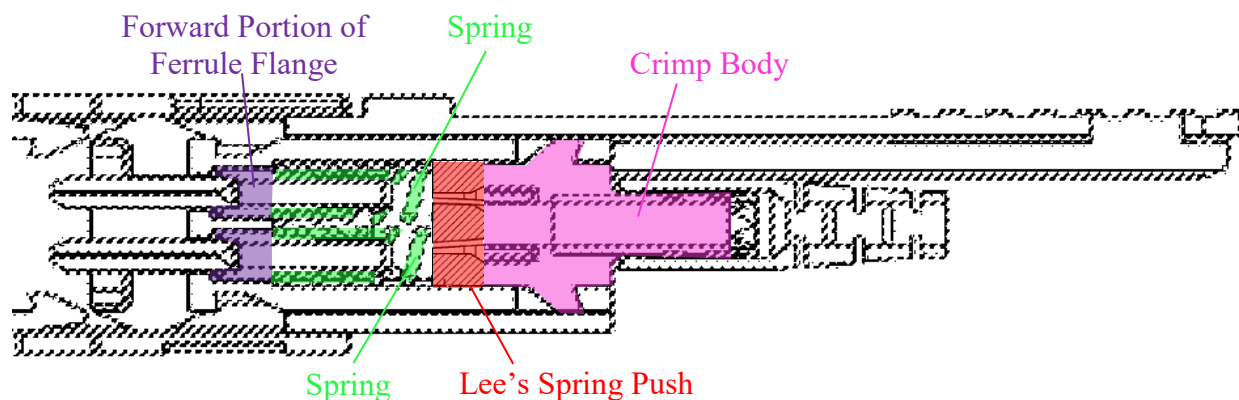
EX1005: ¶¶[0053], [0055]; EX1002: ¶326.

This modification would have been nothing more than combining known prior art elements (Takano'209's connector and Lee's spring push) according to known methods (arrangement taught by Lee) to yield predictable results (connector with an independently mountable spring push). EX1002: ¶327.

This modification would have also been nothing more than the application of a known technique (Lee's spring push) to improve a similar device (Takano'209's connector) in the same way to yield predictable results (a connector with an independently mountable spring push). EX1002: ¶¶328-329.

The POSA would have had a reasonable expectation of success given the function and general placement of Lee's spring push would not change in Takano'209's connector. EX1002: ¶330. Further, the POSA would have made only minor structural changes to facilitate this modification, as it would only require minor changes in dimensions and shapes well within the POSA's capabilities. *Id.*

A schematic illustration of this modification is shown below:



EX1003: Fig. 23B (annotated, modified); EX1002: ¶331.

As modified, Takano'209's connector includes Lee's spring push, which would engage the rear portions of each of Takano'209's springs (2125) and

simultaneously compress them between the crimp body and the ferrule flanges (2124). EX1005: Fig. 3, ¶¶[0038], [0053]; EX1002: ¶332.

Therefore, the Takano’209/Shimozu/Lee combination renders this claim obvious. EX1002: ¶333.

### **B. Claim 13**

The Takano’209/Shimozu/Lee combination renders the “spring push” limitation of this claim obvious for the reasons discussed in Section XII(A). EX1002: ¶334. Claim 13’s remaining limitations are met by Takano’209 for the reasons explained in Section XI(N). *Id.*

## **XIII. GROUND 9: Claims 14 and 15 Would Have Been Obvious Over Takano’209 in view of Shimozu and Hill**

### **A. Claim 14**

Takano’209’s optical connector has “LC-type ferrules” but is silent as to their polish type. EX1003: ¶[0117]; EX1002: ¶¶335-338.

Hill discloses ferrules “of the type LC APC.” EX1007: Fig. 10C, ¶[0058]; EX1002: ¶339.

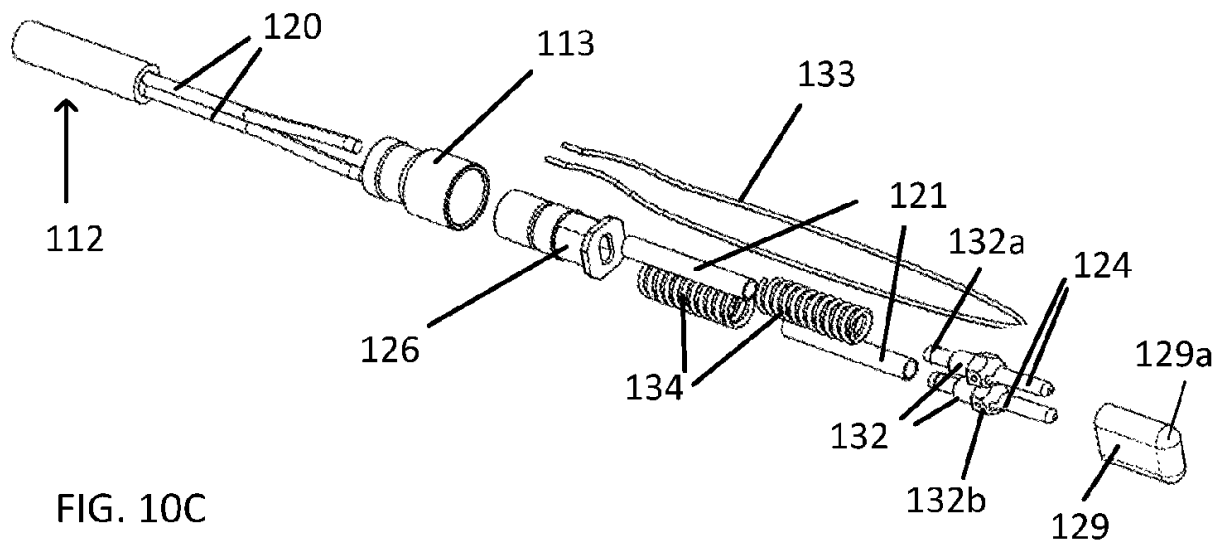


FIG. 10C

EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano’209’s connector an “angled physical contact” type of ferrule in view of Hill for the reasons explained in Section X(A). EX1002: ¶340.

This modification is nothing more than a simple substitution of one known element (Hill’s APC ferrule) for another (Takano’209’s ferrule) to yield predictable results (APC connector for lowest return loss applications). EX1002: ¶¶341-342.

This modification would have also been obvious to try for the reasons explained in Section X(A). EX1002: ¶343.

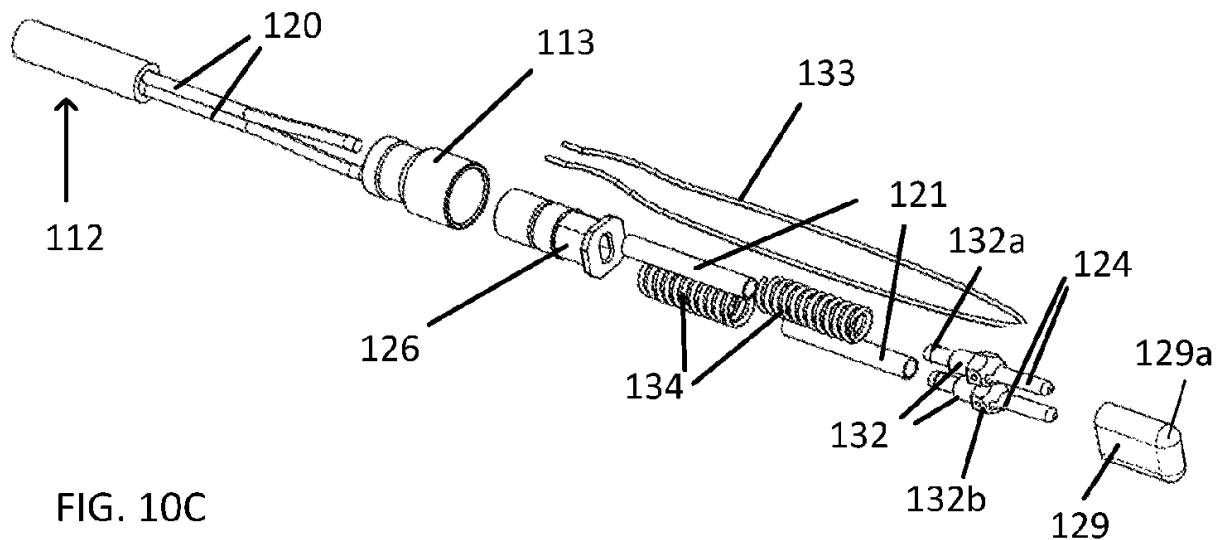
There would have been a reasonable expectation of success as both Takano'209's and Hill's ferrules are of LC-type. EX1003: ¶[0117]; EX1007: ¶[0058]; EX1002: ¶344.

This modification results in the ferrules in Takano'209's connector being APC ferrules. EX1002: ¶345.

Therefore, the Takano'209/Shimozu/Hill combination renders this claim obvious. EX1002: ¶346.

#### **B. Claim 15**

Hill also teaches that the ferrules can be “of the type LC UPC.” EX1007: Fig. 10C, ¶[0058]. EX1002: ¶¶347-350.



EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano'209's connector an "ultra-physical contact" type of ferrule in view of Hill for the reasons explained in Section X(B). EX1002: ¶351.

This modification is nothing more than a simple substitution of one known element (Hill's UPC ferrule) for another (Takano'209's ferrule) to yield predictable results (UPC connector for low return loss and budget applications). EX1002: ¶¶352-353.

This modification would have also been obvious to try for the reasons explained in Sections X(A)&(B). EX1002: ¶354.

There would have been a reasonable expectation of success as both Takano'209's and Hill's ferrules are of LC-type. EX1003: ¶[0117]; EX1007: ¶[0058]; EX1002: ¶355.

This modification results in the ferrules in Takano'209's connector being UPC ferrules. EX1002: ¶356.

Therefore, the Takano'209/Shimozu/Hill combination renders this claim obvious. EX1002: ¶357.

#### **XIV. GROUND 10: Claims 1-5 and 8-13 Would Have Been Obvious Over Takano'369 in view of Watanabe**

##### **A. Motivation to Modify Takano'369 Based on Watanabe**

Takano'369's connector (10300, 10400, 10500) has an outer housing (10301, 10401, 10501) with symmetrically curved top and bottom walls. EX1009:

Fig. 53, 19:1, 14-15, 34-41; EX1002: ¶¶358-359. The bottom wall's curvature accommodates small triangular dividers of the adapter (101114) so that four connectors can be inserted side-by-side into the adapter without being separated by full-height partition walls. EX1009: Fig. 61; EX1002: ¶359.

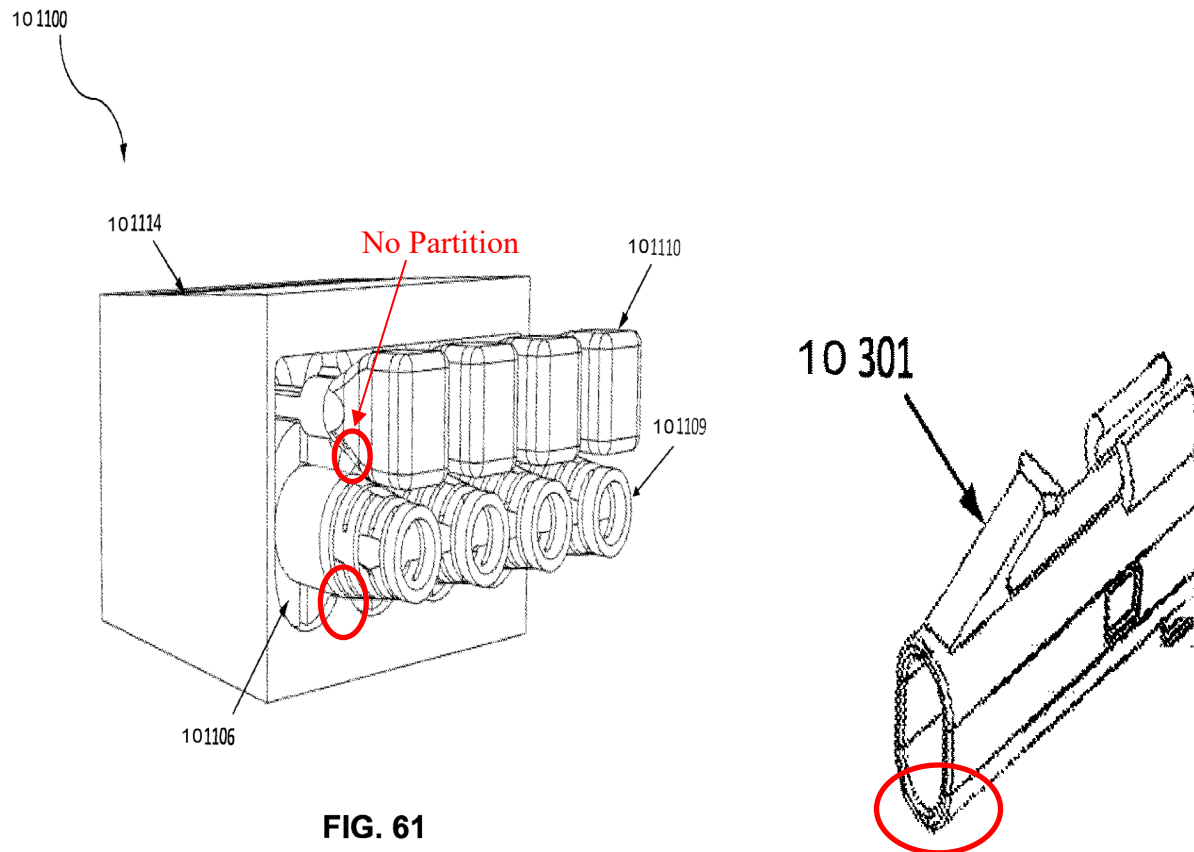


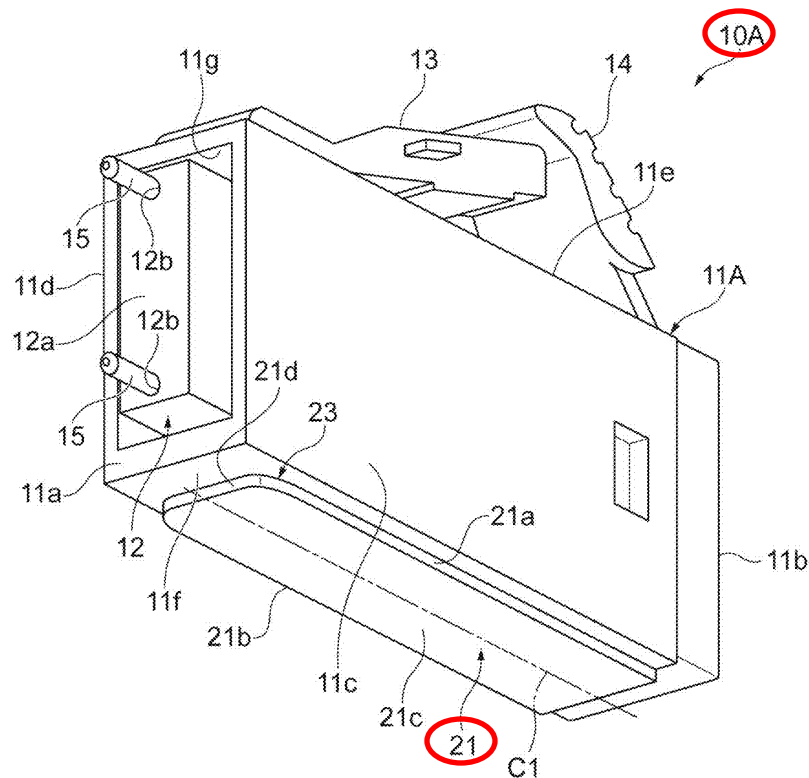
**FIG. 61**

EX1009: Figs. 53 and 61 (annotated).

Watanabe discloses an optical connector with alignment features that are easier to manufacture at tight tolerances and still allow for high density arrays with no partition walls between adjacent connectors. EX1011: Figs. 1-3, ¶[0050]; EX1002: ¶360. In particular, Watanabe discloses a plug connector (10A) with a latch (13) on the top wall and a guide rail (21) on the bottom wall. EX1011:



**Fig.3**

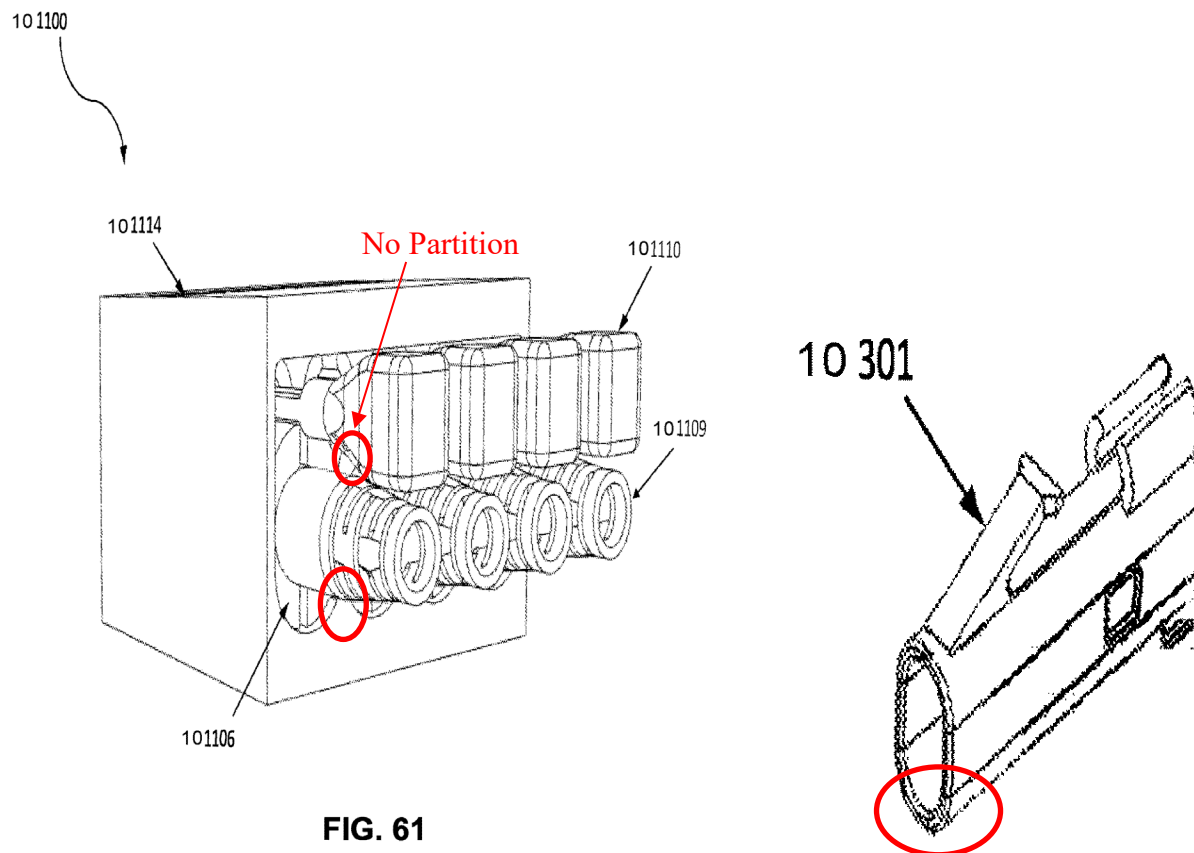


EX1011: Figs. 1 and 3 (annotated).

It would have been obvious to alter Takano'369's outer housing (10301, 10401, 10501) to be rectangular and to include a guide rail (21) on the bottom surface, in view of Watanabe. EX1002: ¶361.

This turns Takano'369's outer housing (10301, 10401, 10501) into a shape easier to manufacture at tight tolerances while still allowing for high density interconnects (without adapter partition walls). EX1011: ¶[0050]; EX1002: ¶362. Arcuate structures, like Takano'369's outer housing's curved top and bottom walls, are difficult to manufacture at the tight tolerances required for precision

optical interconnects. EX1002: ¶362. Takano’369’s curved bottom wall is the primary reference surface for alignment to the adapter, so tight tolerances are critical for the bottom wall. *Id.* The POSA would have recognized the benefit of Watanabe’s housing geometry being easier to manufacture at tight tolerances while also still providing high-density arrays via adapters without partition walls. *Id.*



EX1009: Figs. 53 and 61 (annotated).

This modification would have also been nothing more than the application of a known technique (Watanabe’s rectangular connector housing with a bottom guide rail for a connector) to improve a similar device (Takano’369’s connector) in

the same way to yield predictable results (connector for high density applications).

EX1002: ¶363.

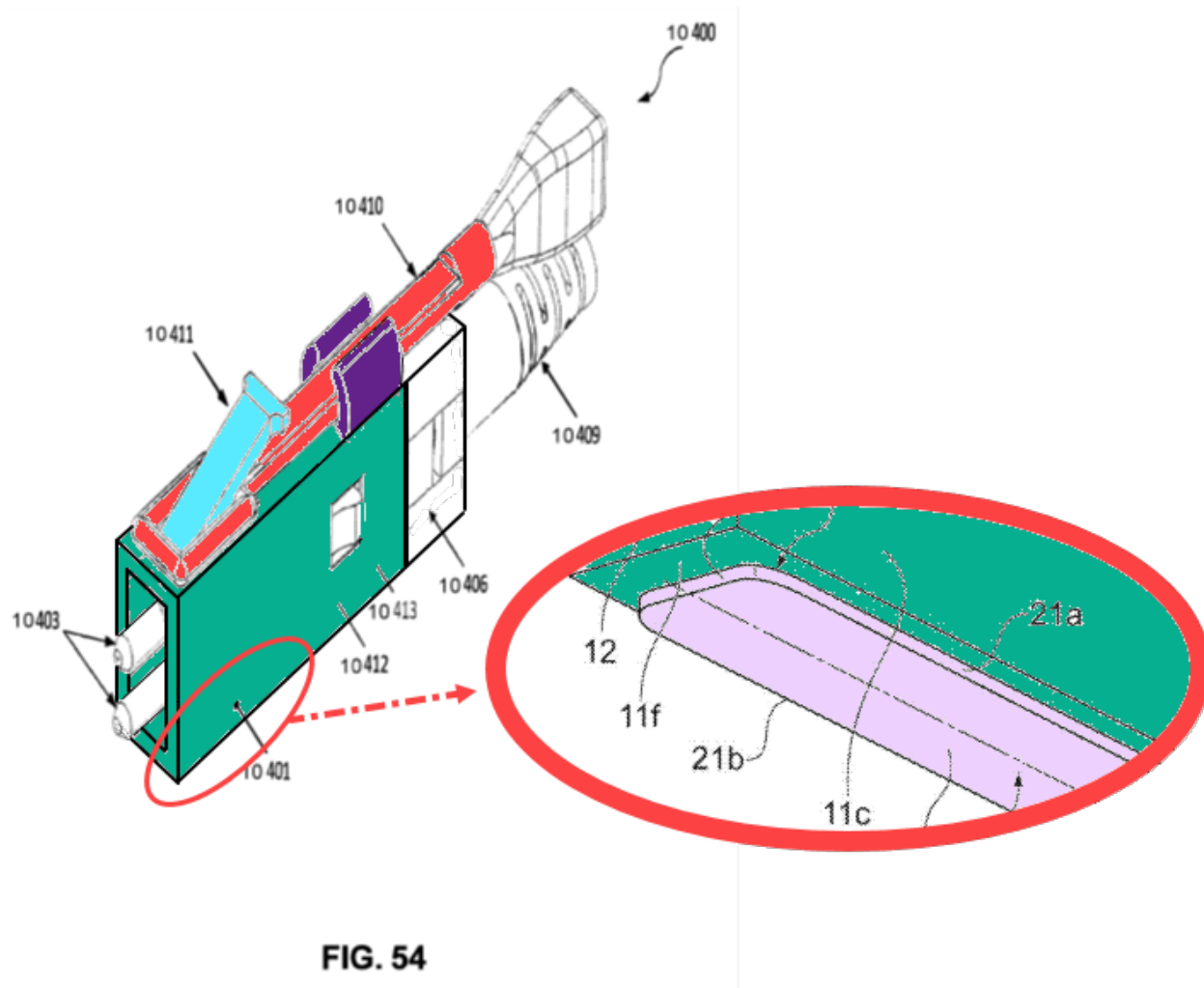
This modification would have also been nothing more than the use of a known technique (Watanabe's rectangular connector housing with a bottom guide rail for a connector) to a known device (Takano'369's connector) ready for improvement to yield predictable results (connector for high density applications).

EX1002: ¶364.

This modification would have had a reasonable expectation of success as it requires only changes in the geometry of Takano'369's connector and its components. For example, Takano'369's back body would be modified so that the exposed rear portion maintains the same cross-sectional shape as the now rectangular outer housing, as taught by Takano'369. EX1009: Figs. 53 and 54; EX1002: ¶365. The changes to the shape of Takano's outer housing's bottom wall do not have a significant impact on any other component of the connector.

EX1002: ¶365. And the changes to the shape of the top wall of Takano'369's outer housing at most result in minor modifications the locking tab, push-pull tab, and/or the guide (dark purple, below). *Id.* These changes amount to minor adjustments in part geometry to ensure proper fit atop the new connector housing shape. *Id.* They are well within a POSA's capabilities and are entirely predictable. *Id.*

A schematic illustration of Takano'369's modified connector (10300, 10400, 10500) is shown below:



EX1009: Fig. 54 (annotated, modified); EX1002: ¶366.

Corresponding modifications to Takano'369's adapter would also have been made to accept Takano'369's modified connector. EX1002: ¶367. The bottom wall of Takano'369's adapter would be become flat with recessed guide rail fitting sections (as taught by Watanabe). *Id.*

## **B. Independent Claim 1**

### **1.P**

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

EX1009: Figs. 53-55, 18:63-64, 19:12-13, 19:32-34; EX1002: ¶368. Although different reference numbers are used in Figures 53-55, the illustrated connectors are the same connector, just shown in different configurations. EX1002: ¶369.

Further, Fig. 61 shows a connection system (101100) and demonstrates how four of the same connector of Figs. 53-55 would mate with a quad adapter (101114).

EX1002: ¶370. In Figs. 64 and 65, the connectors labeled “Mini CS Simplex” are examples of the connector of Figs. 53-55. EX1002: ¶371.

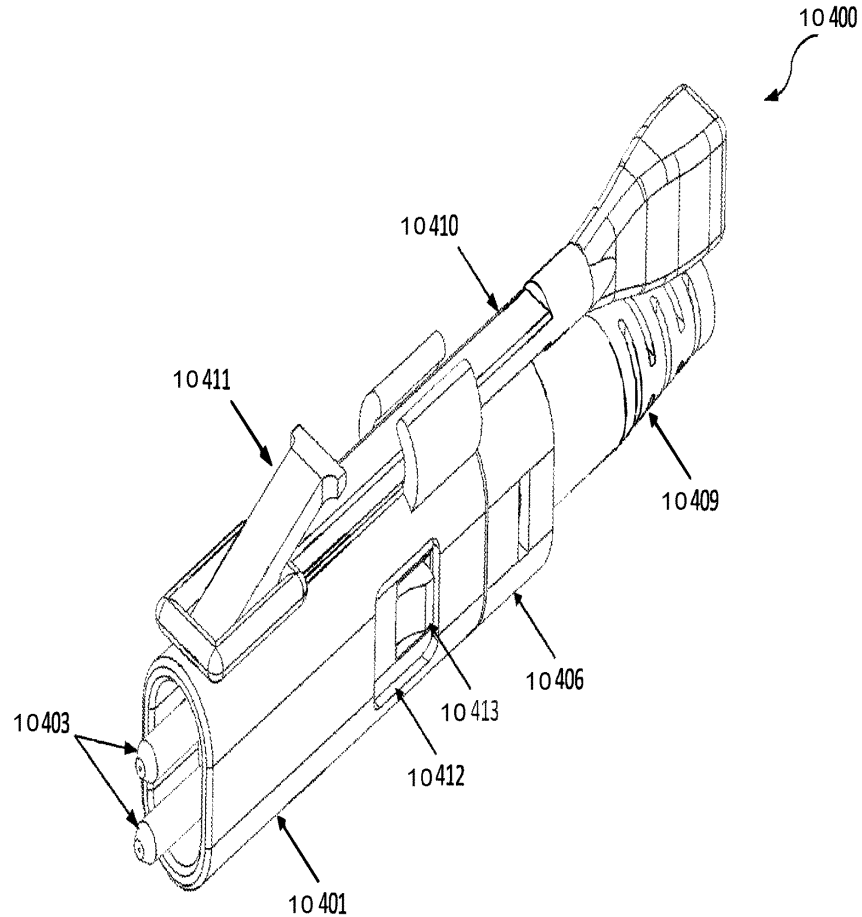


**FIG. 54**

EX1009: Fig. 54.

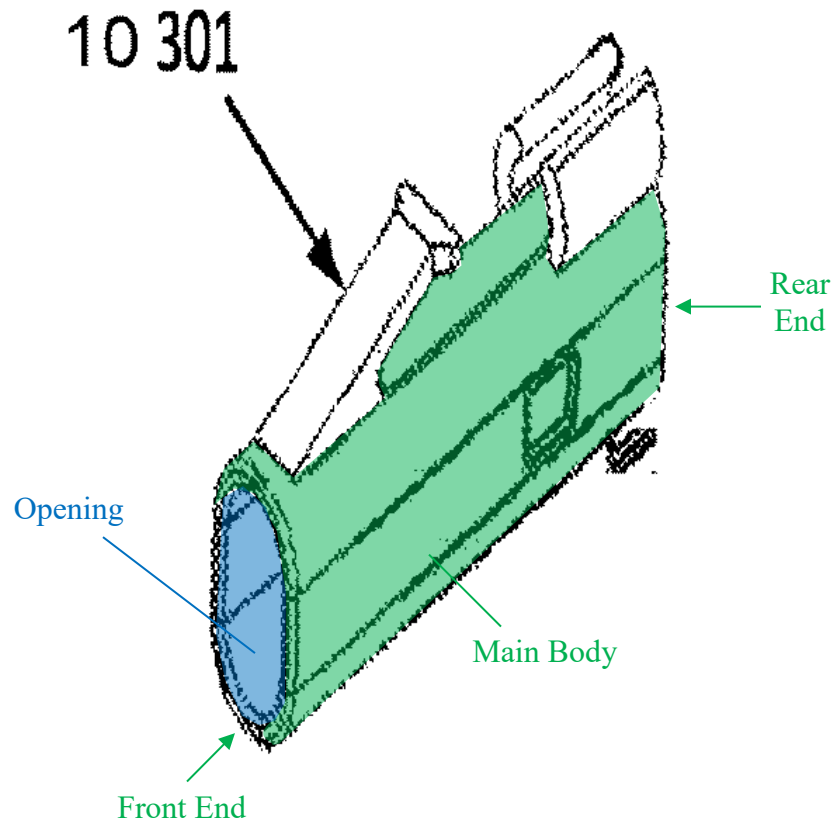
Therefore, Takano'369 meets 1.P. EX1002: ¶372.

### **1.a.1**

Takano'369's connector includes an outer housing (10301, 10401, 10501).

EX1009: 19:1, 14-15, 34-41; EX1002: ¶373. The outer housing comprises a main

body with front and rear ends, and an opening extending therebetween. EX1009: 19:35-36; EX1002: ¶373.

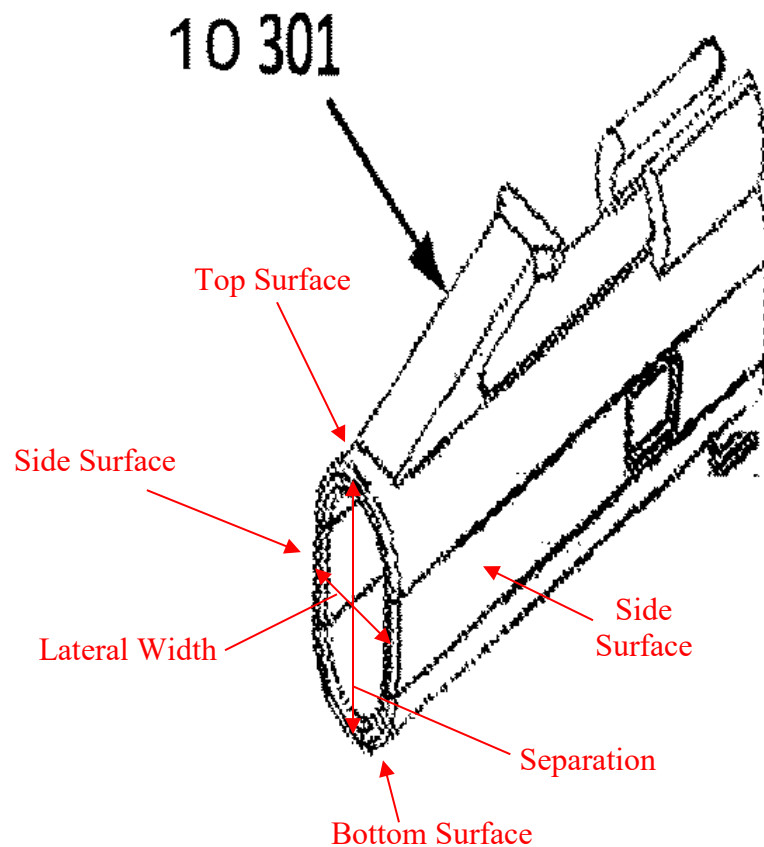


EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.a.1. EX1002: ¶374.

### 1.a.2

The outer housing has a top surface, a bottom surface, and two opposing side surfaces. EX1009: Fig. 53; EX1002: ¶375. The lateral width between the side surfaces is less than the separation between the top and bottom surfaces along the height of the main body. EX1002: ¶375.



EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.a.2. EX1002: ¶376.

### 1.b.1

Takano'369's connector includes two ferrule assemblies disposed within the opening of the outer housing. EX1009: 19:14-17; EX1002: ¶377.

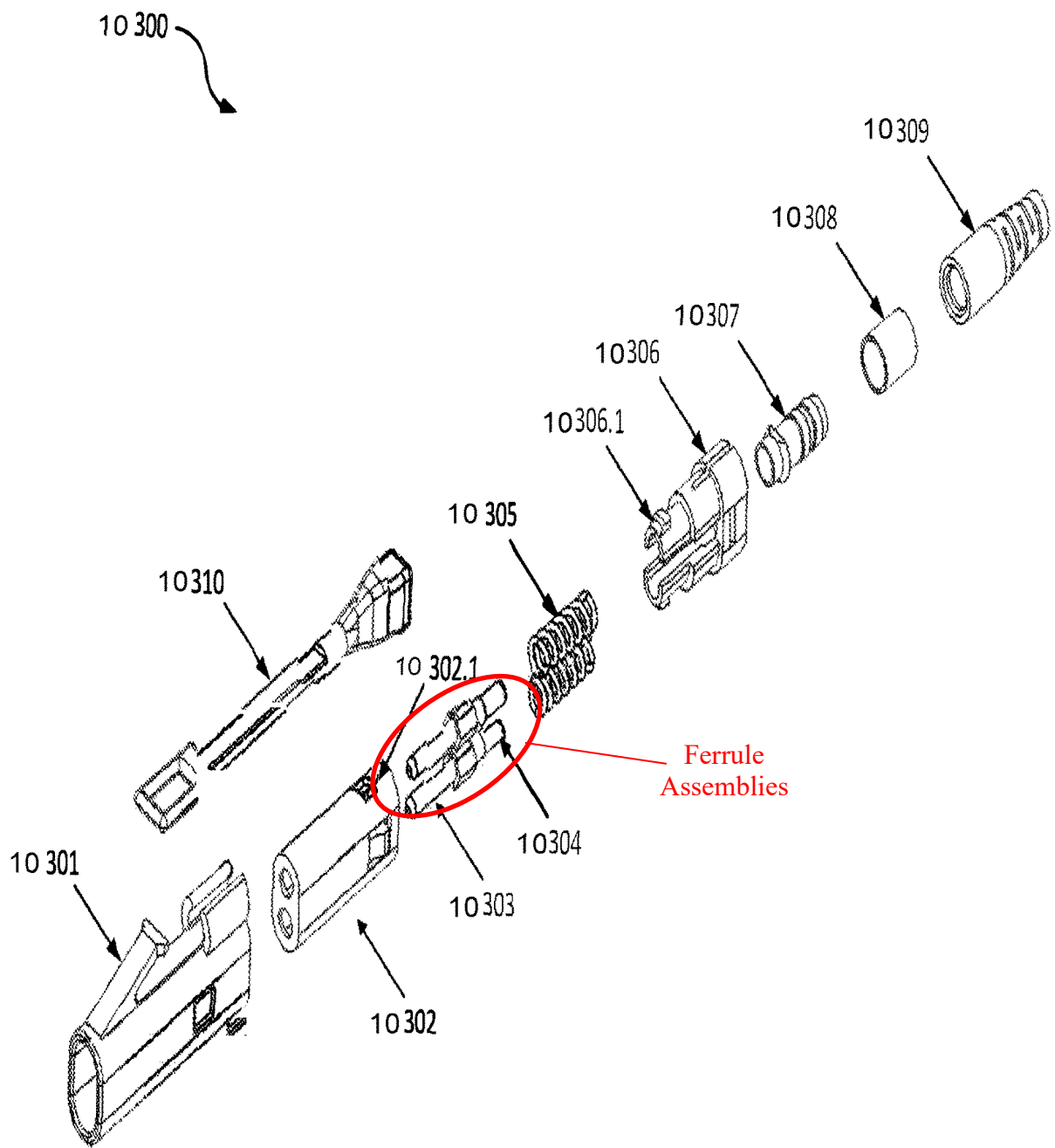
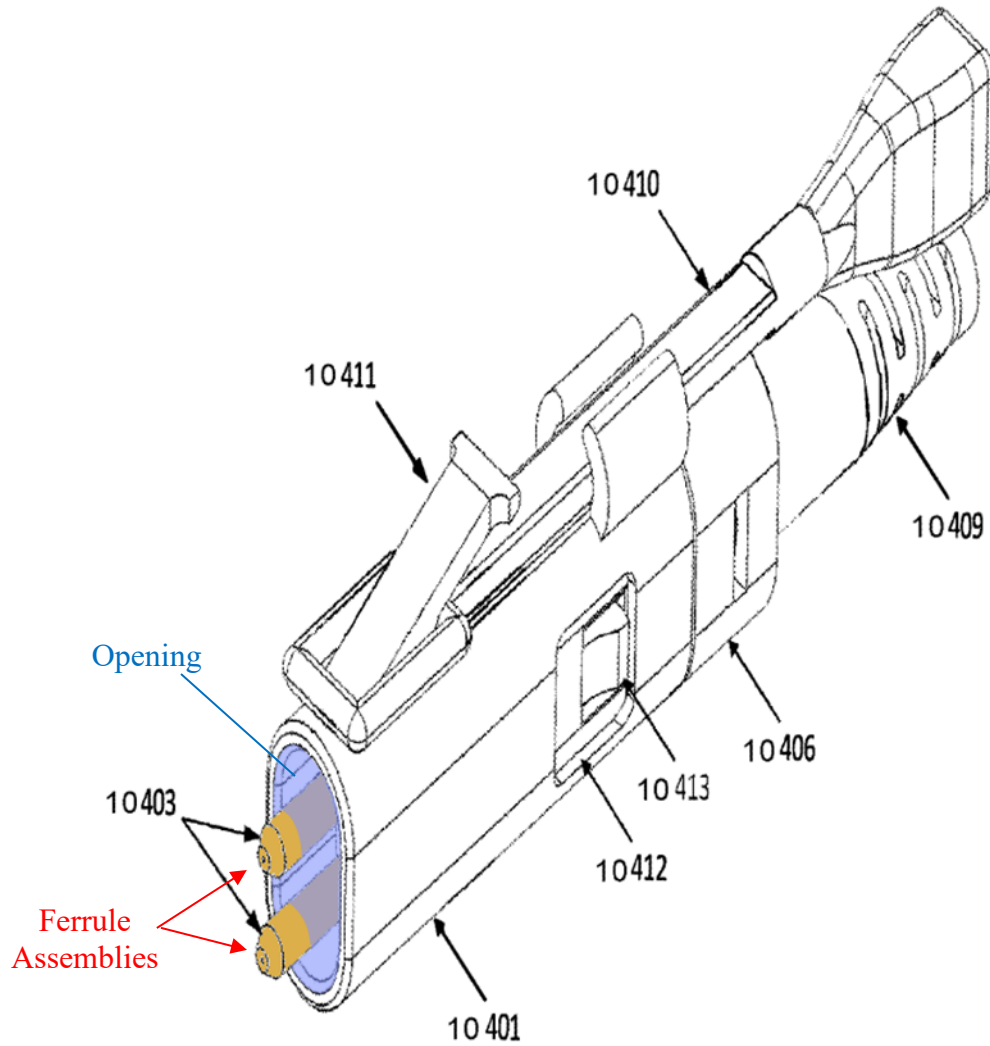


**FIG. 53**

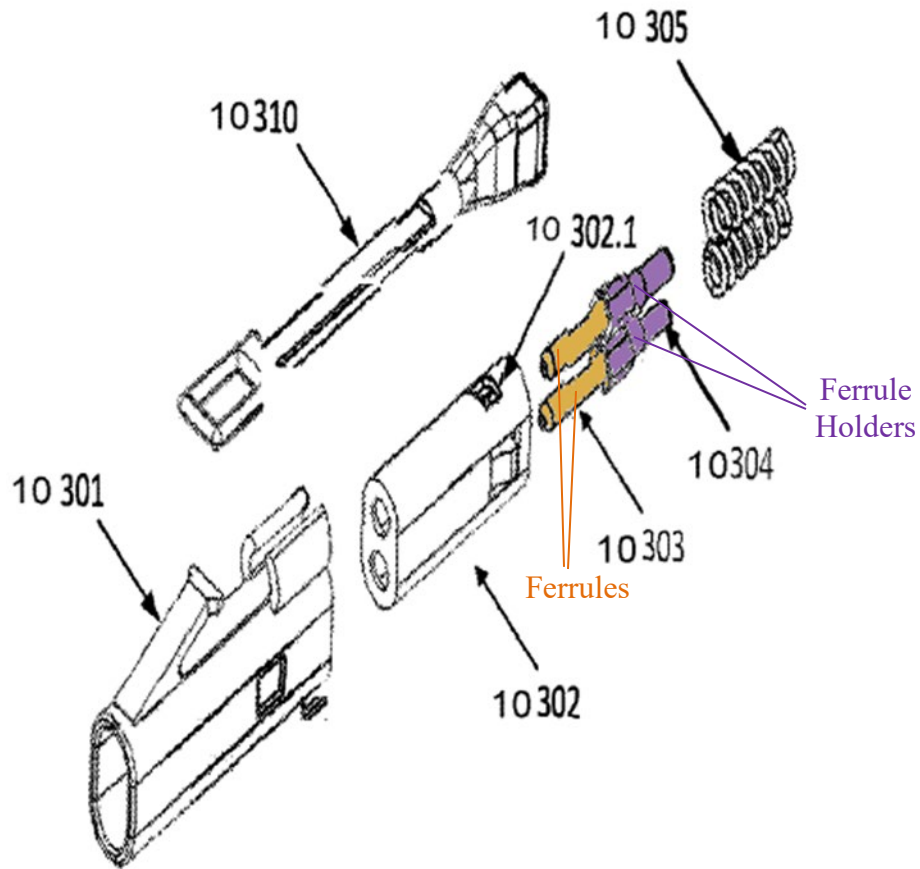


EX1009: Figs. 53 and 54 (annotated).

Each ferrule assembly includes a ferrule (10303, 10403) and a ferrule holder (10304) (e.g., ferrule flange) to hold the ferrule. EX1009: 19:2-3, 19:15-17;

EX1002: ¶378. The ferrules are spaced apart along the height of the main body.

EX1009: Fig. 54; EX1002: ¶378.

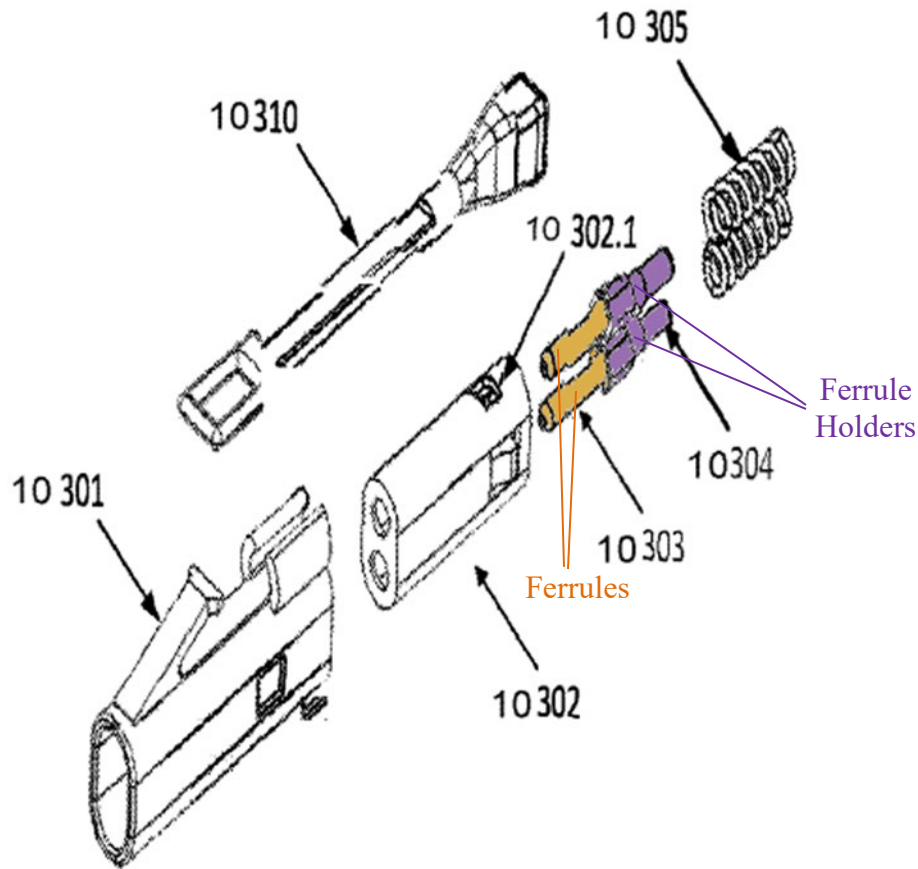


EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.b.1. EX1002: ¶379.

### 1.b.2

Each ferrule (10303, 10403) extends forward away from the front end of the ferrule holder (10304). EX1002: ¶380.



EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.b.2. EX1002: ¶381.

### 1.c

Takano'369's connector includes two springs (10305). EX1009: 19:3, 19:17; EX1002: ¶382. The springs fit over the rear cylindrical portions of the ferrule flanges (10304) and the front ends of the springs engage the rearward facing surfaces of the larger hexagonal portions of the ferrule flanges. EX1002: ¶382. From their front ends, the springs extend rearward. *Id.* The springs bias the ferrule assemblies toward the front end of the outer housing. EX1009: Abstract;

EX1002: ¶382. The springs are retained within the connector housing, between the front body (10302, 10502) and the back body (10306). EX1009: 19:8-11, 19:34-41; *See* Fig. 23A (providing internal view of another connector indicating how ferrule springs are likewise positioned in assembled Takano'369 connector); EX1002: ¶¶382-383.

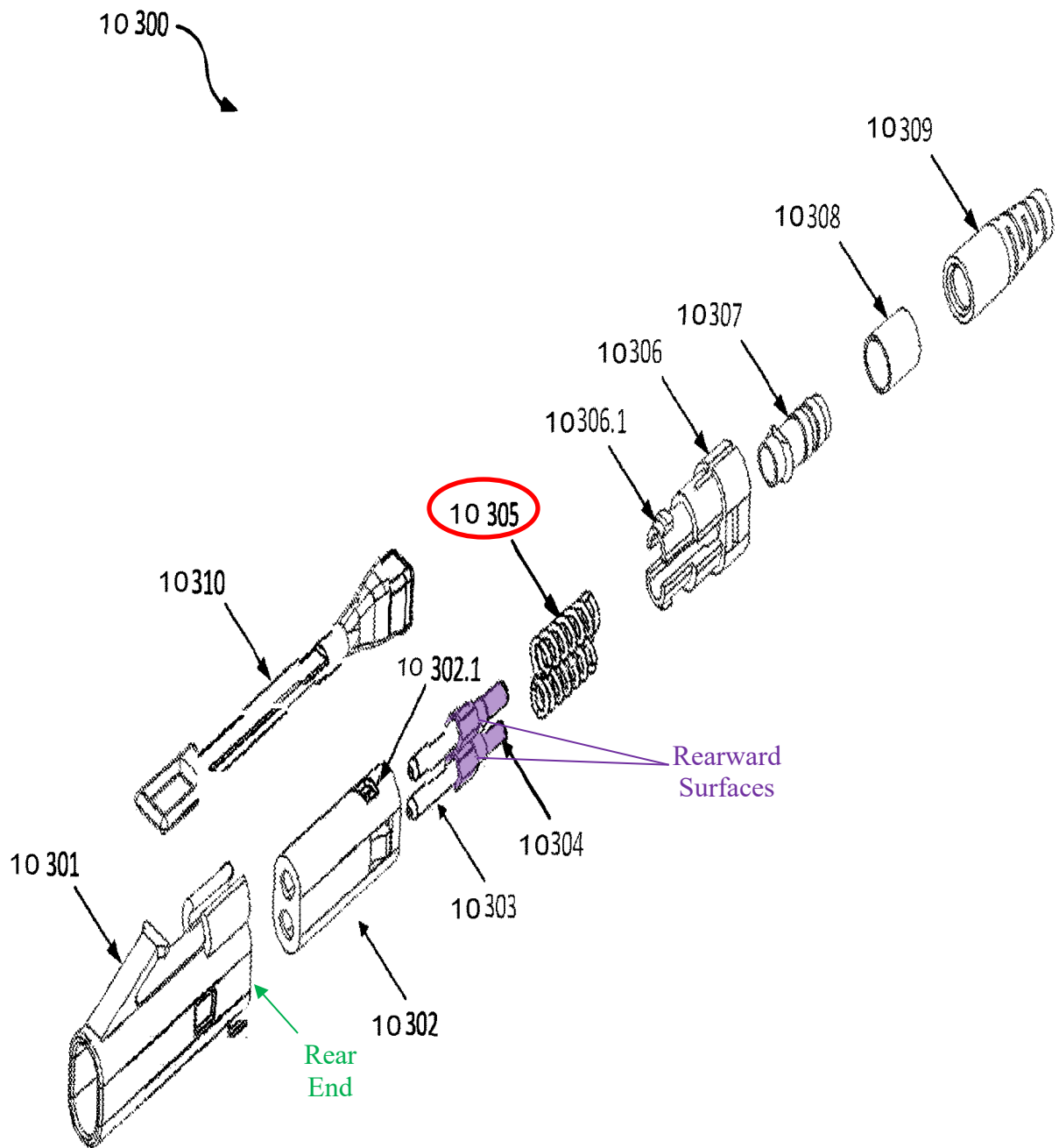


**FIG. 53**

EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.c. EX1002: ¶384.

#### 1.d

Takano'369's connector includes a two-piece crimp body made up of a back body (10306, 10406) and a back post (10307). EX1009: 19:1-4, 19:13-18; EX1002: ¶385. The front end portion of the back body is secured to the front body (10302, 10502), and in turn, the front body is secured to the outer housing (10301, 10401, 10501). EX1009: 19:8-11, 19:34-41; EX1002: ¶385. The back post defines a singular opening for optical fibers at the rear end of the crimp body. EX1009: 21:50-54, 22:3-6; *See* Fig. 23A (providing internal view of another connector indicating how a similar crimp body has a single opening); EX1002: ¶¶385-386.

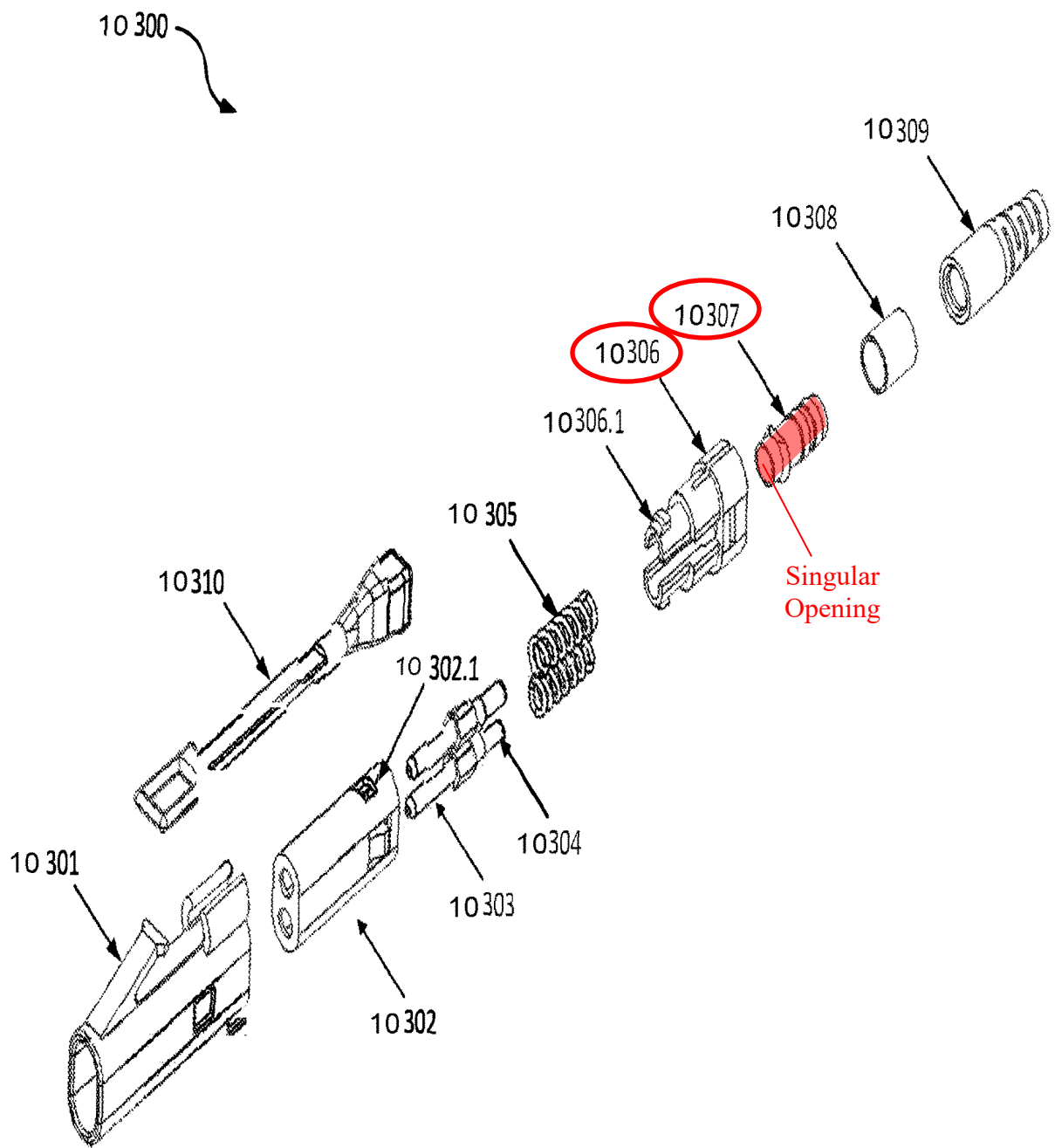


**FIG. 53**

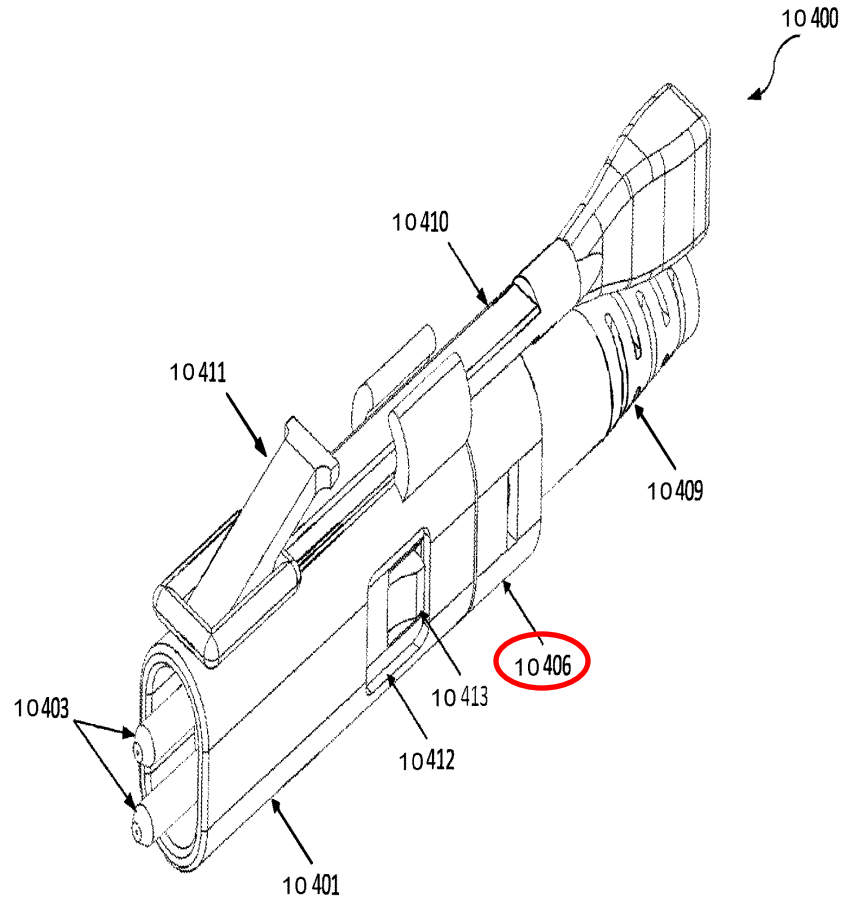


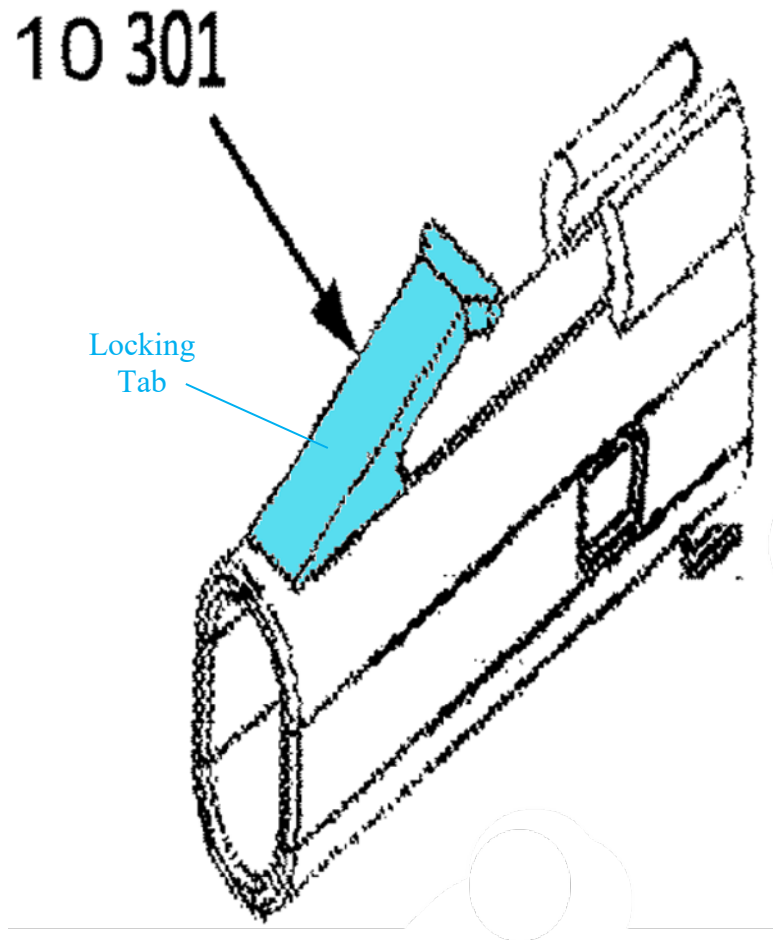
**FIG. 54**

EX1009: Figs. 53 and 54 (annotated).

Therefore, Takano'369 meets 1.d. EX1002: ¶387.

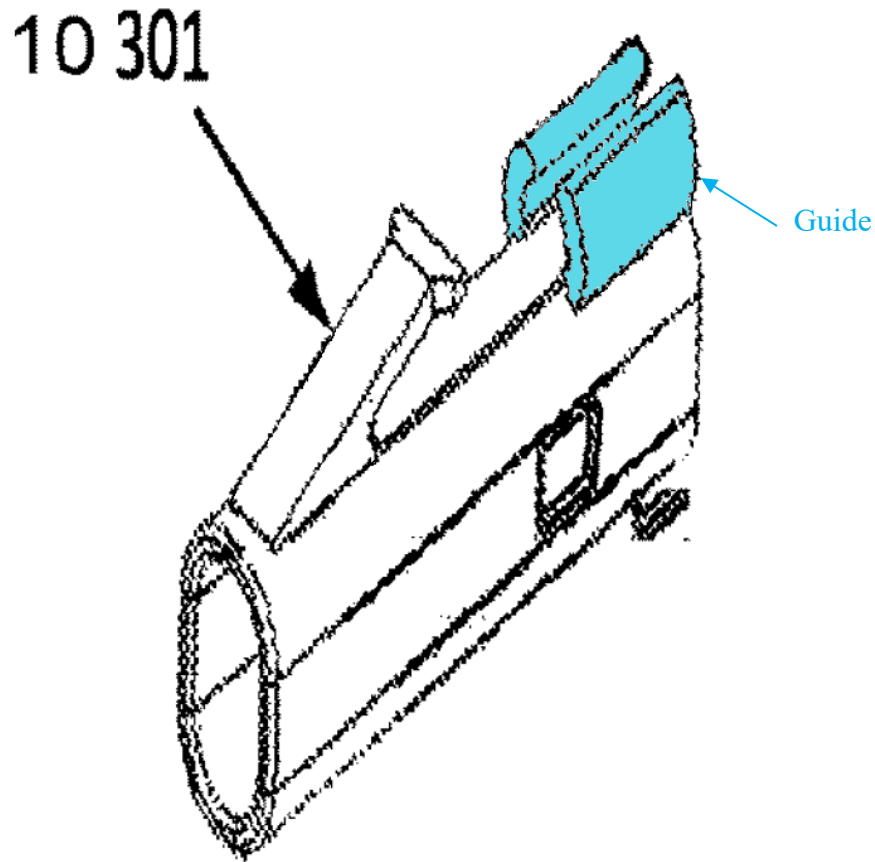
**1.e**

Takano'369's connector has a locking tab (10411) to secure the connector in the adapter. EX1009: 19:25-27; EX1002: ¶388. The locking tab is on the top surface of the outer housing (10301, 10401, 10501). EX1002: ¶388.



EX1009: Fig. 53 (annotated).

Takano'369's connector also includes a guide on the top surface of the outer housing. EX1009: Fig. 54; EX1002: ¶389.



EX1009: Fig. 53 (annotated).

Shown below, in Takano’369’s modified connector, the locking tab (10411) (cyan) and guide (dark purple below) each form a “first projection on the top surface.” EX1002: ¶390. Alternatively, the “first projection on the top surface” is the entire push/pull latch mechanism above the top wall of the main body (green), i.e., the combination of the locking tab, guide, and front portion of the push-pull tab (10310, 10410, 10510).<sup>14</sup> EX1002: ¶390.

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<sup>14</sup> To the extent the push-pull latch mechanism of the ‘994 patent is considered any part of a projection on the top surface of a main body, the push-pull latch

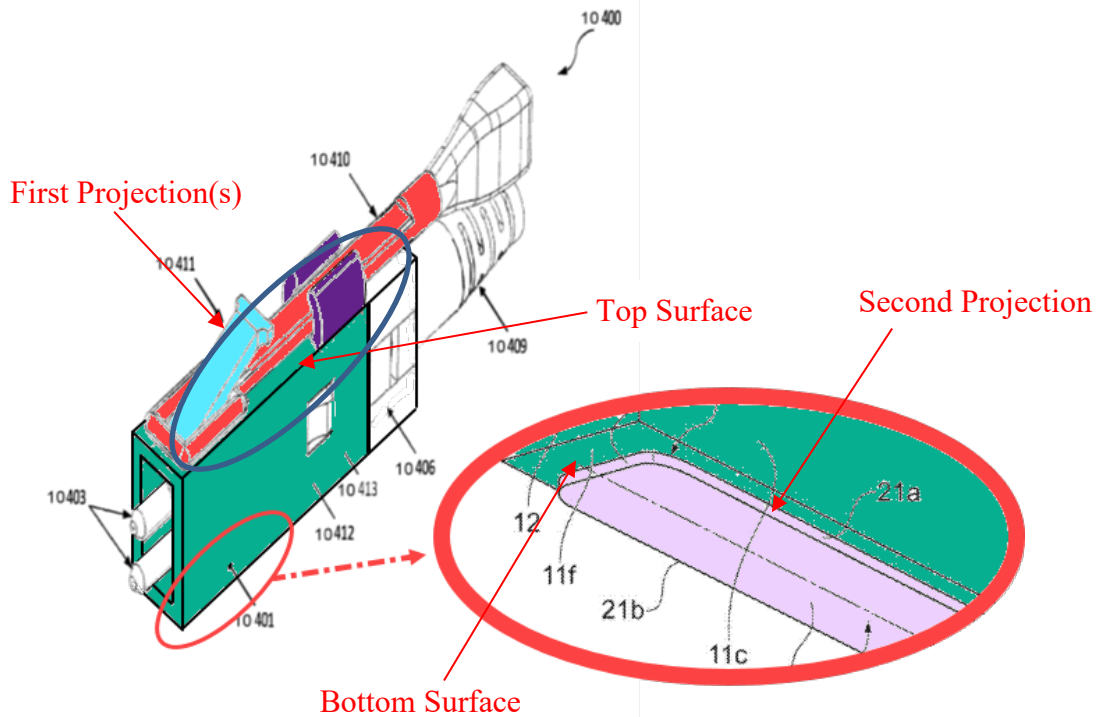


FIG. 54

EX1009: Fig. 54 (annotated, modified).

Shown above, the added guide rail to the bottom wall of the modified outer housing (10301, 10401, 10501) of Takano’369 is a second projection on the bottom surface of the outer housing. EX1002: ¶391.

Therefore, the Takano’369/Watanabe combination renders 1.e obvious.

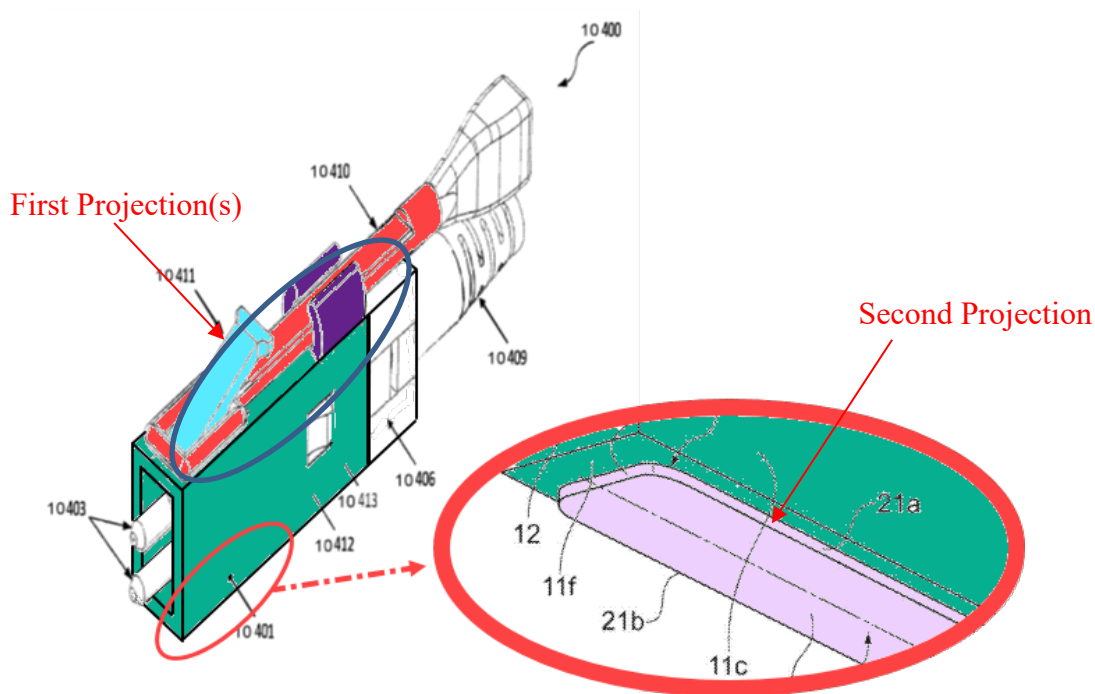
EX1002: ¶392.

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mechanism of the Takano’369/Watanabe connector is likewise a “first projection on the top surface.” EX1002: ¶390.

### 1.f

The first projection (i.e., the locking tab (10411), guide (dark purple), the front portion of the push-pull tab (10310, 10410, 10510), and/or a combination thereof) of Takano'369's modified connector is a different size than the second projection (i.e., added guide rail). EX1002: ¶393



EX1009: Fig. 54 (annotated, modified).

Therefore, the Takano'369/Watanabe combination renders 1.f obvious.

EX1002: ¶394.

### 1.g

Takano'369's connector includes a strain relief boot (10309, 10409, 10509). EX1009: 19:4, 19:13-19, Fig. 55; EX1002: ¶395. The boot has a longitudinal opening. EX1002: ¶395. As assembled, the boot fits over the back post (10307) such that the longitudinal opening is in continuum with the singular opening of the crimp body. EX1002: ¶395. The simplex Takano'369 connectors in Figs. 64 and 65 are shown terminating two-fiber cables, indicating that two fibers pass from the cables through the longitudinal opening in the boot and the singular opening of the crimp body to the ferrules. EX1009: 21:50-54, 22:3-6; *See* Fig. 23A (providing internal view of another connector showing how a similar crimp body and boot have aligned openings); EX1002: ¶¶395-396.

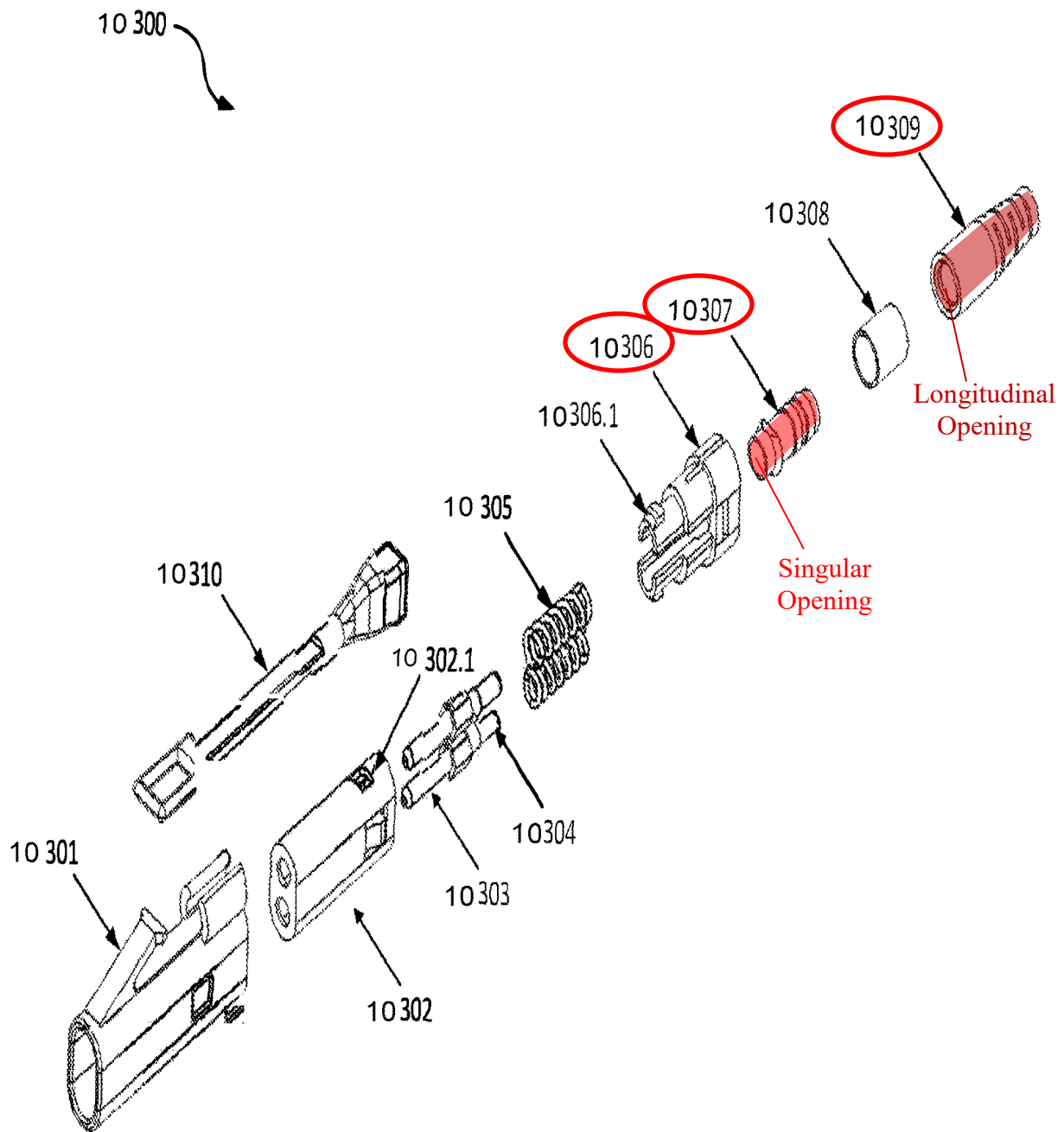


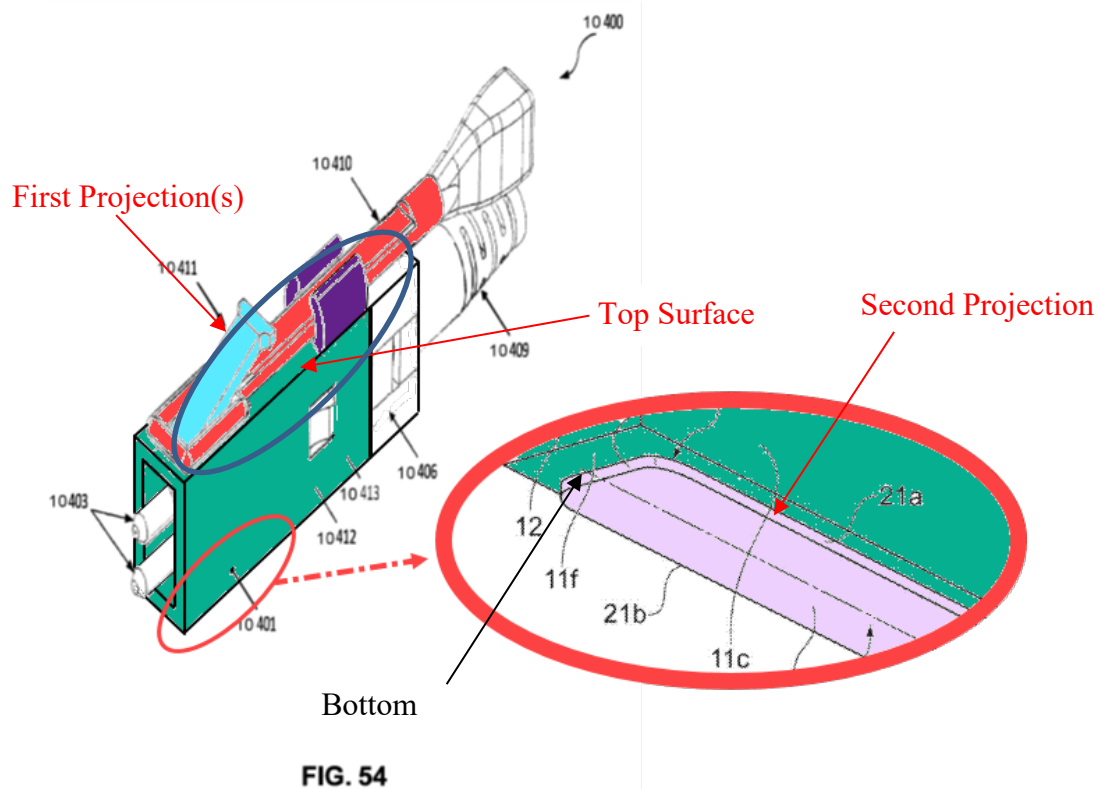
**FIG. 53**

EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 1.g. EX1002: ¶397.

### C. Claim 2

The locking tab (10411) and guide (dark purple) each extend longitudinally along the top surface and/or the three-part push-pull latch mechanism (as a collective projection) extends longitudinally along the top surface. EX1009: Fig. 54; EX1001: Fig. 1; EX1002: ¶398.



EX1009: Fig. 54 (annotated, modified).

Therefore, Takano'369 meets this claim. EX1002: ¶399.

**D. Claim 3**

The crimp body<sup>15</sup> (particularly, the front portion of the back body (10306, 10406)) forms a spring push engaging a rear portion of each of the two springs (10305). Section XIV(B)(1.c); *See* Fig. 23A (providing internal view of another connector indicating how crimp body likewise forms spring push in assembled Takano'369 connector); EX1002: ¶¶400-402.

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<sup>15</sup> *See* Footnote 7.

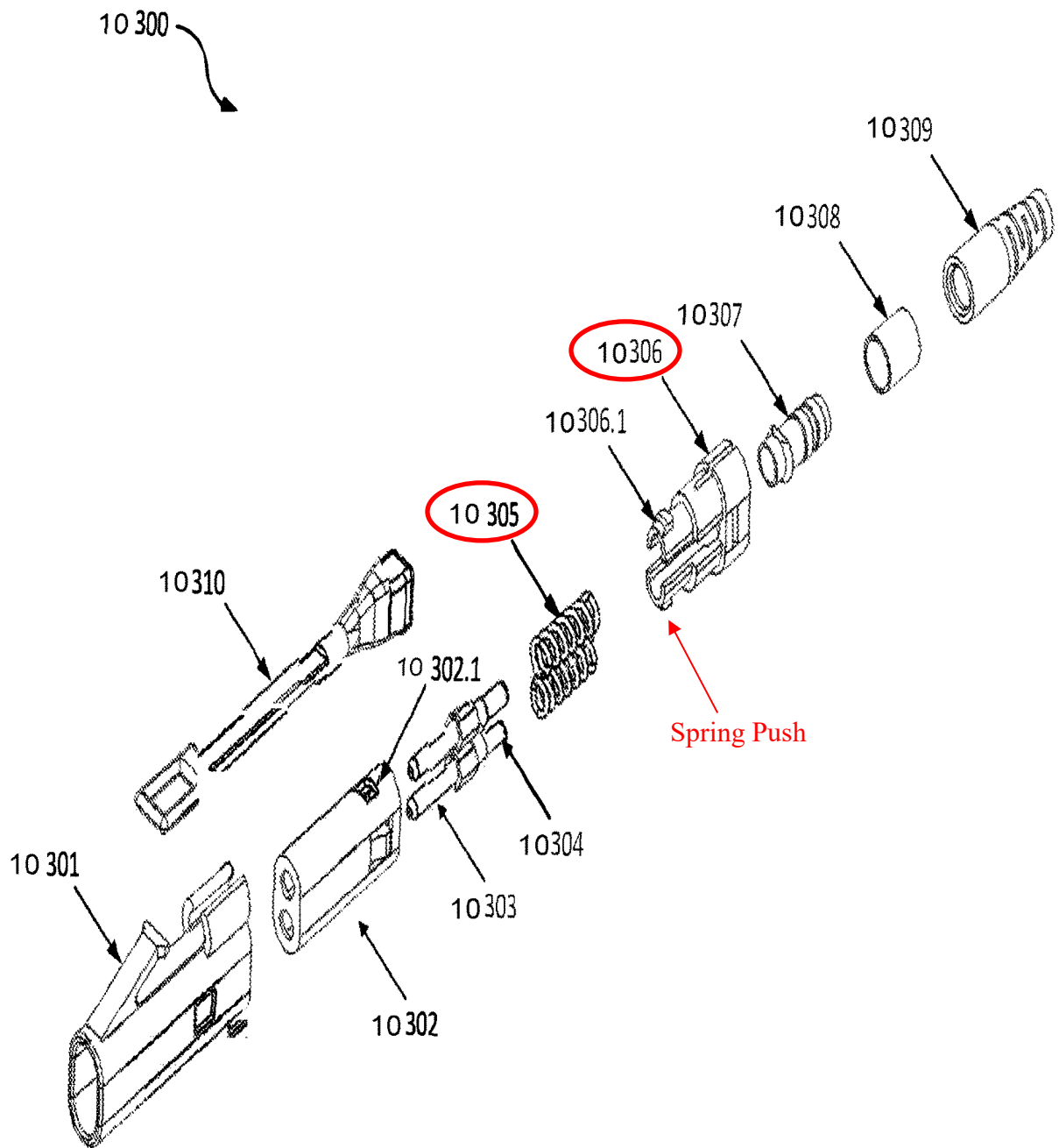


**FIG. 53**

EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets this claim. EX1002: ¶403.

**E. Claim 4**

In Takano'369's modified connector, the first projection (i.e., the locking tab (10411), guide (dark purple), the front portion of the push-pull tab (10310, 10410, 10510), and/or a combination thereof) and the second projection (i.e., added guide rail) determine a correct orientation and/or polarity of the outer housing (10301, 10401, 10501) during an insertion into Takano'369's modified adapter (101114).

EX1002: ¶404. The push-pull latch mechanism (and components thereof) must align with the top wall of Takano'369's modified adapter having latch receiving structure, and the added bottom guide rail must align with Watanabe's added rail fitting section (22) on the bottom wall of Takano'369's modified adapter.

EX1002: ¶404. Takano'369's modified connector will not mate with Takano'369's modified adapter if inserted upside down. EX1002: ¶405.

Therefore, the Takano'369/Watanabe combination renders this claim obvious. EX1002: ¶406.

**F. Claim 5**

**5.a**

Takano'369's connector includes a crimp ring (10308), which is a crimp band, secured around the outer surface of the back post (10307). EX1009: 19:4; EX1002: ¶407.

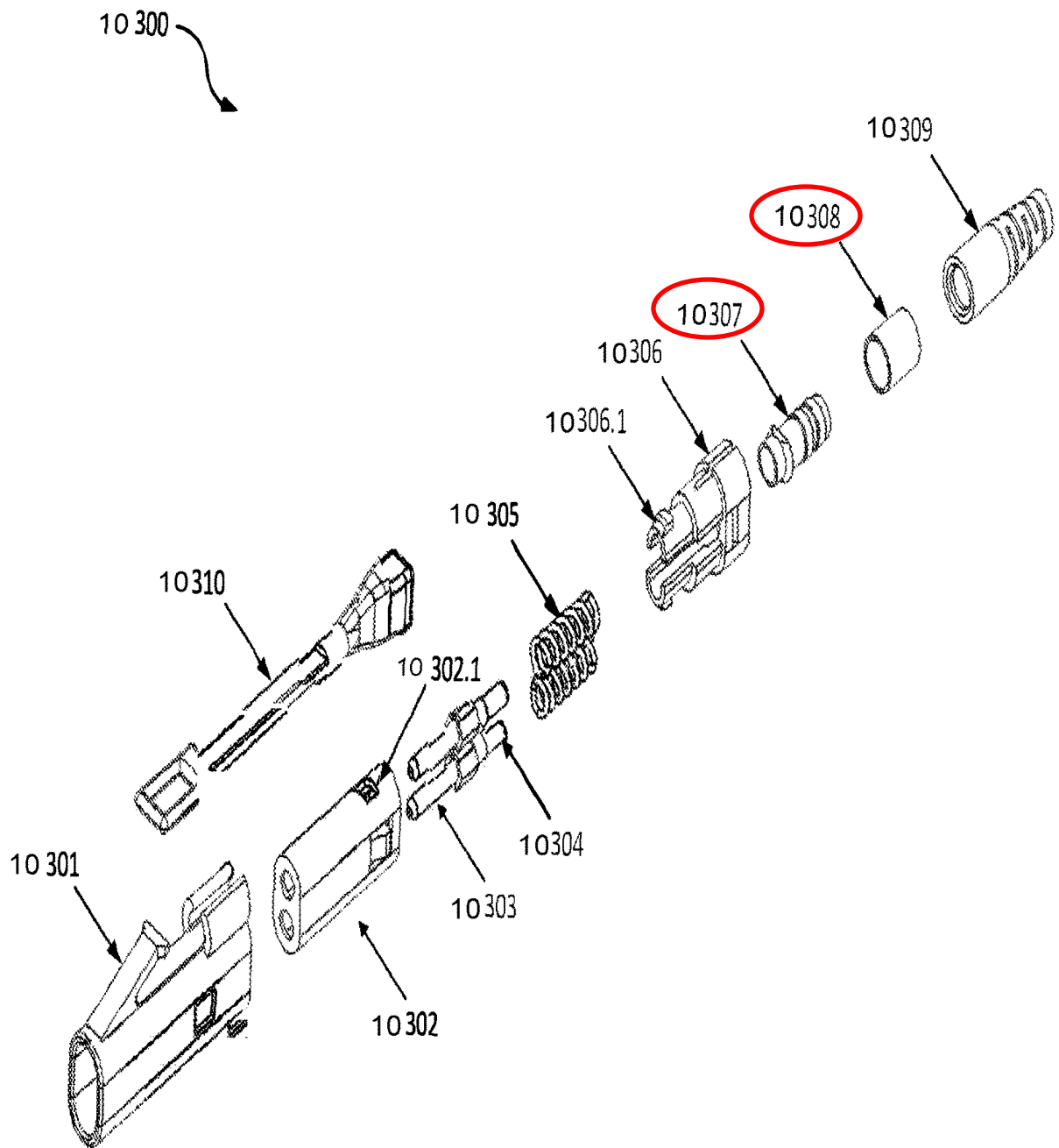


**FIG. 53**

EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets 5.a. EX1002: ¶408.

## **5.b**

The boot (10309, 10409) is a strain relief boot extending rearwardly away from the outer housing (10301, 10401, 10501). EX1009: Figs. 53 and 54; EX1002: ¶409.

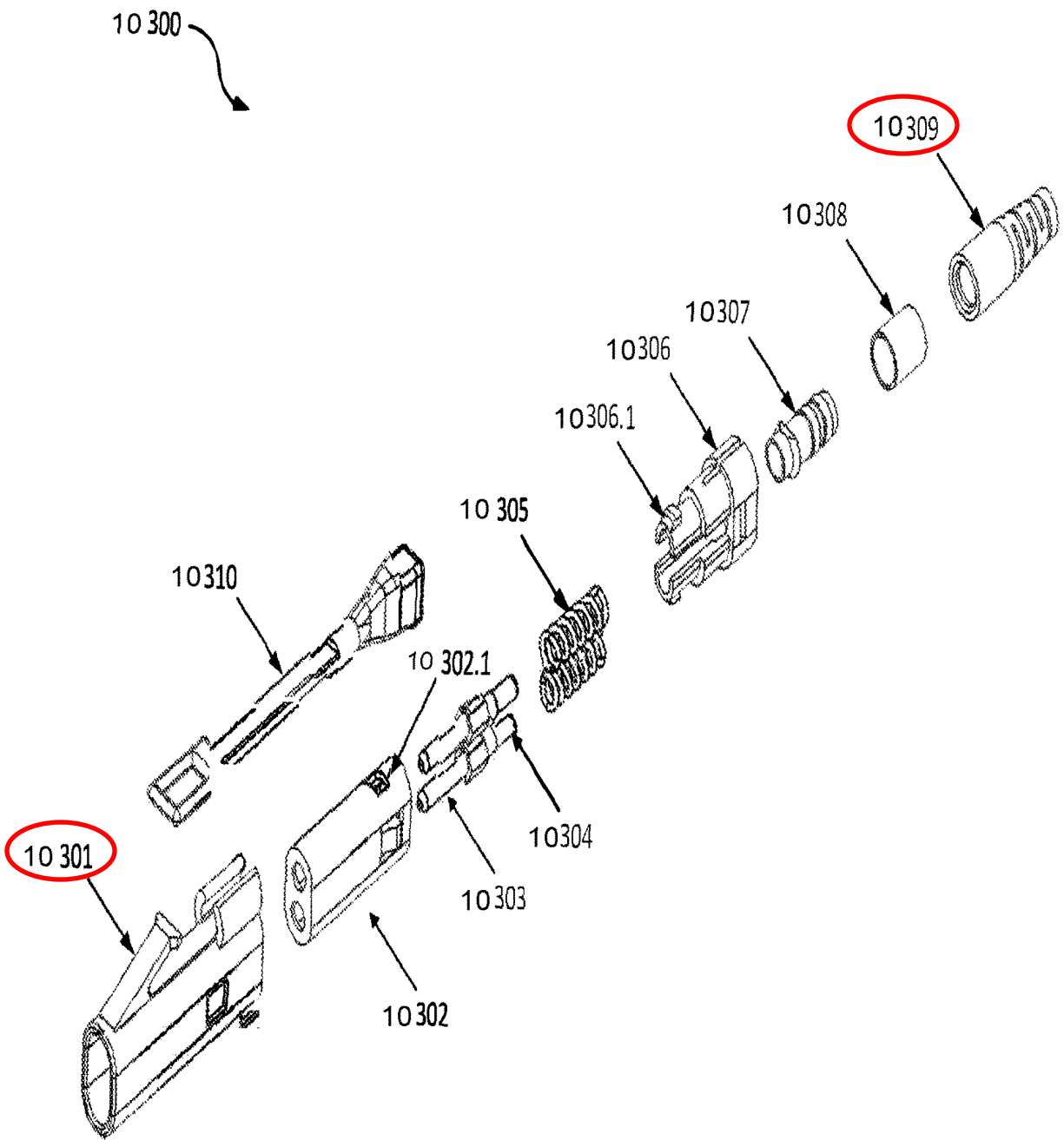


**FIG. 53**

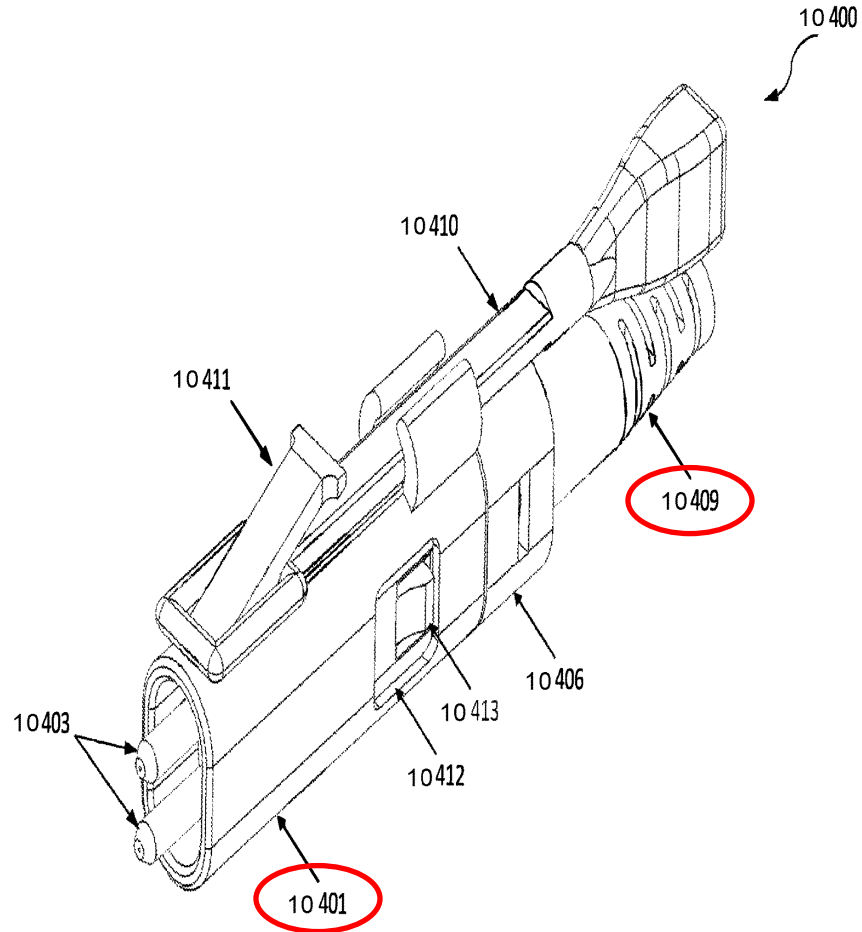


**FIG. 54**

EX1009: Figs. 53 and 54 (annotated).

Therefore, Takano’369 meets 5.b. EX1002: ¶410.

### **G. Claim 8**

Takano’369’s connectors fit within “narrow pitch LC SFPs.” EX1009: 6:22-25; *see also* EX1010: ¶[0037]. An SFP footprint is 14x12.25 mm. EX1009: 16:44-45. A QSFP footprint is 13.5x19 mm. EX1009: 16:47-49. Takano’369’s

connector fits within a QSFP footprint if rotated 90-degrees so that the long sides of Takano’369’s connector are parallel to the long sides (19mm) of the QSFP footprint. EX1002: ¶411. Therefore, the front end of Takano’369’s outer housing fits in a QSFP footprint. *Id.*

The modifications to Takano’369 in view of Watanabe would not require increasing the footprint of the connector. EX1002: ¶412.

Therefore, Takano’369 meets this claim. EX1002: ¶413.

#### **H. Claim 9**

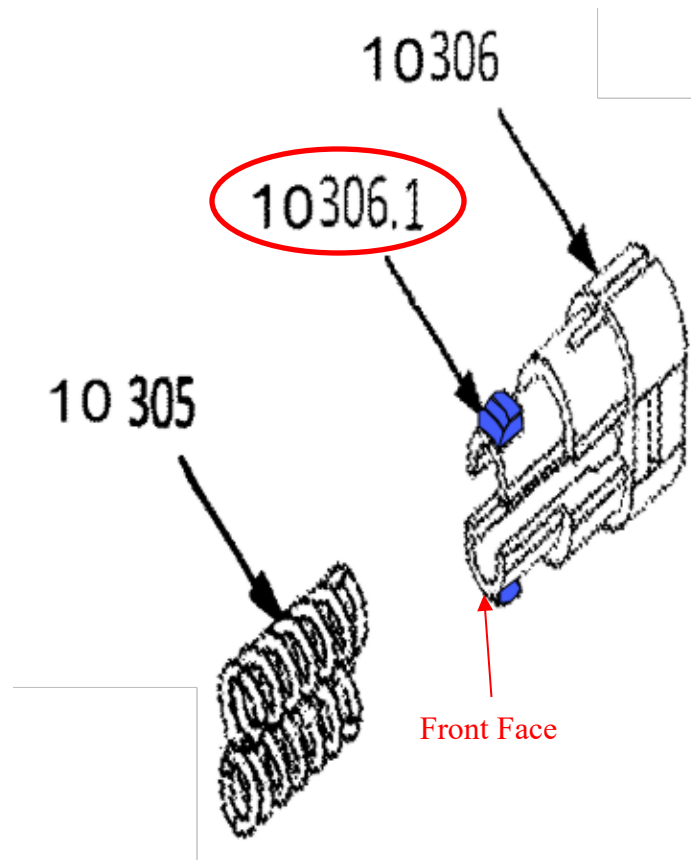
Takano’369’s connector fit within “narrow pitch LC SFPs.” EX1009: 6:22-25, 16:44-45; *see also* EX1010: ¶[0037]. Therefore, the front end of Takano’369’s outer housing fits in a SFP footprint. EX1002: ¶414.

The modifications of Takano’369 in view of Watanabe would not require increasing the footprint of the connector. EX1002: ¶415.

Therefore, Takano’369 meets this claim. EX1002: ¶416.

#### **I. Claim 10**

The back body (10306, 10406) of the crimp body comprises upper and lower protrusions (10306.1) (i.e., respective top and bottom portions). EX1009: 19:5-8; EX1002: ¶417. As assembled, the rear ends of the springs (10305) engage a front face the back body between the upper and lower protrusions—i.e., the springs are positioned between the protrusions. EX1002: ¶¶417-418.



EX1009: Fig. 53 (annotated).

Therefore, Takano'369 meets this claim. EX1002: ¶419.

#### J. Claim 11

The Takano'369/Watanabe combination is capable of meeting the intended use of claim 11. EX1002: ¶¶420-422. As explained in Section XIV(A), the bottom wall of Takano'369's adapter is modified to include Watanabe's recessed guide rail fitting sections (grooves) for receiving the bottom guide rails (second projection) of the modified Tkanao'369 connector. EX1002: ¶423. Further, the latch mechanism (specifically, the locking tab) (first projection) of Takano'369's modified connector is capable of fitting in grooves of an adapter. EX1002: ¶424.

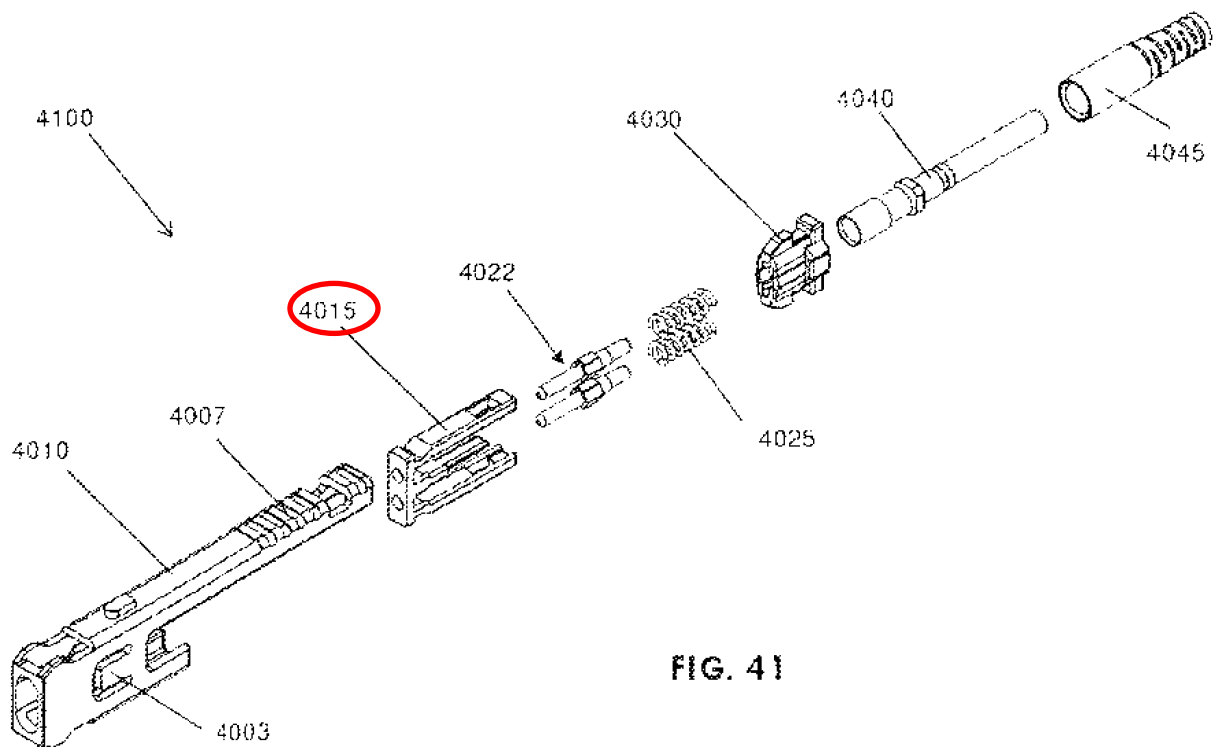
Shown in Fig. 61, Takano'369's latch mechanism is inserted into an adapter.

EX1002: ¶424. It would have been obvious to modify the top wall of Takano'369's adapter to have Watanabe's latch engagement sections (31) for Takano'369's push-pull latch mechanism. EX1002: ¶424.

Therefore, the Takano'369/Watanabe combination renders this claim obvious. EX1002: ¶425.

### K. Claim 12

Takano'369 discloses another optical connector (4100) embodiment (Fig. 41) which includes a front body (4015) with an elongated middle wall (4260). EX1009: 17:44-49; EX1002: ¶426.



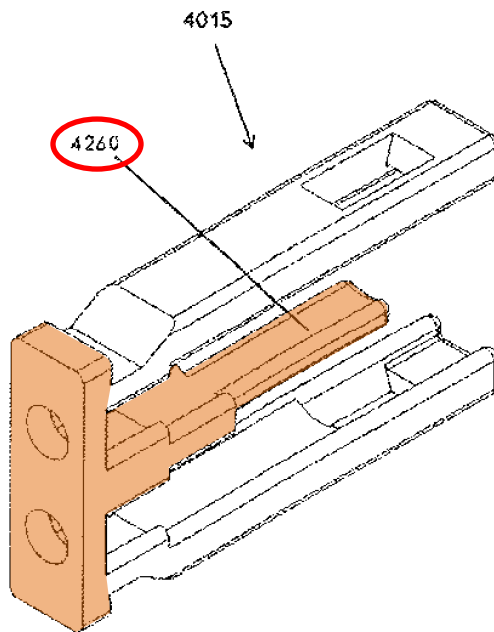


**FIG. 42A**

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

It would have been obvious to modify the front body (10302, 10503) of the connector (10300, 10400, 10500) of Figs. 53-55 in view of the connector (4100) of Fig. 41 to provide the front body (10302, 10503) with the elongated middle wall (4260) to separate the two springs (10305). EX1009: Figs. 42A-42B; EX1002: ¶427. This would prevent spring entanglement, binding the connector and breaking fibers. EX1009: 17:46-49; EX1002: ¶427.

This modification would have been nothing more than combining known prior art elements (Takano'369's connector and middle wall) according to known methods (arrangement taught by Takano'369) to yield predictable results (wall separating springs to prevent entanglement). EX1002: ¶428.

This modification would have also been nothing more than the application of a known technique (middle wall) to improve a similar device (connector) in the same way to yield predictable results (wall separating springs to prevent entanglement). EX1002: ¶429.

A POSA would have had a reasonable expectation of success because the middle wall would perform the same function and be generally arranged in the connector of Figs. 53-55 as it was in the connector of Fig. 41. EX1002: ¶430.

This modification results in the connector of Figs. 53-55 having the middle wall, which meets the requirement of the wall in claim 15 because it forms a wall between the locations where two ferrule assemblies are seated in the outer housing and is between the top surface and bottom surface of the main body. EX1009: Figs. 42A-B; EX1002: ¶431.

Therefore, Takano'369 renders this claim obvious. EX1002: ¶432.

#### **L. Claim 13**

As explained in Section XIV(D), the crimp body (particularly, the front portion of the back body (10306, 10406)) forms a spring push. EX1002: ¶433. The spring push simultaneously compresses the two springs (10305) between the crimp body and the ferrule flanges (10304) engaged with the wall (4260). Section XIV(B)(1.c); *See* Fig. 23A (providing internal view of another connector

indicating how crimp body compresses ferrule springs in assembled Takano'369 connector); EX1002: ¶¶433, 435.

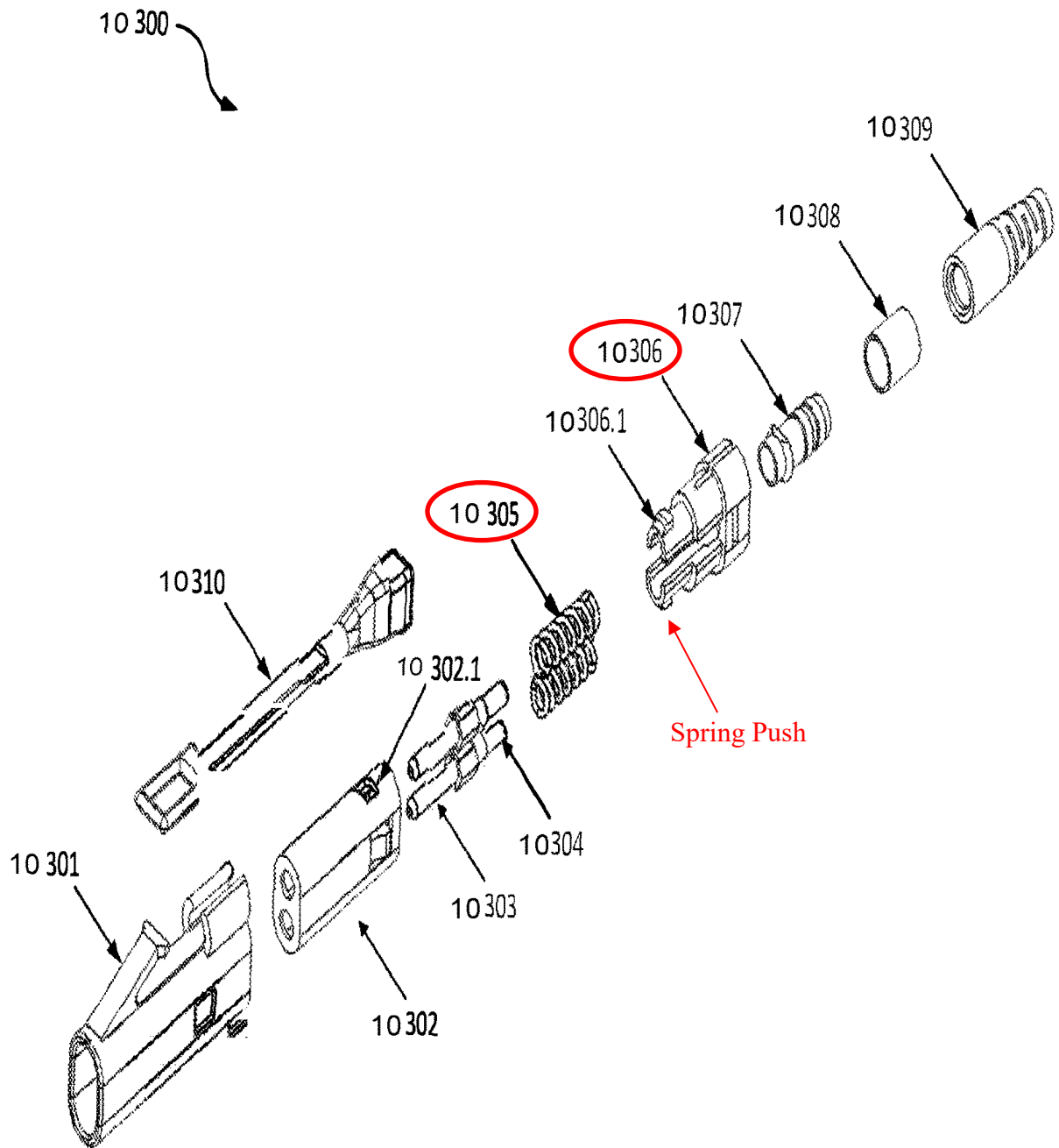
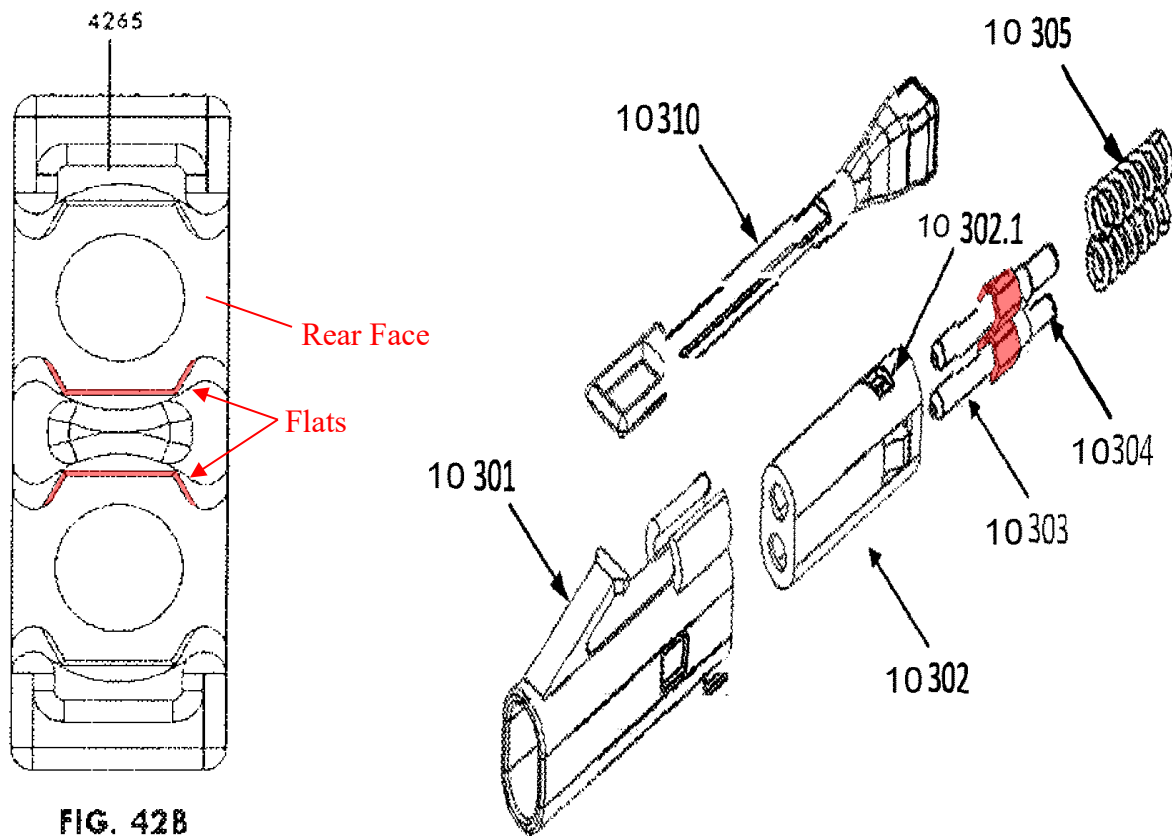


**FIG. 53**

EX1009: Fig. 53 (annotated).

Shown below, the ferrule flanges (10304) would engage a rear face of the wall. EX1002: ¶434. Further, the elongated middle wall (4260) includes flats that match and engage the hexagonal collar of the ferrule holders (10304) to inhibit the ferrule assemblies from rotating within the connector (10300, 10400, 10500). EX1002: ¶434.



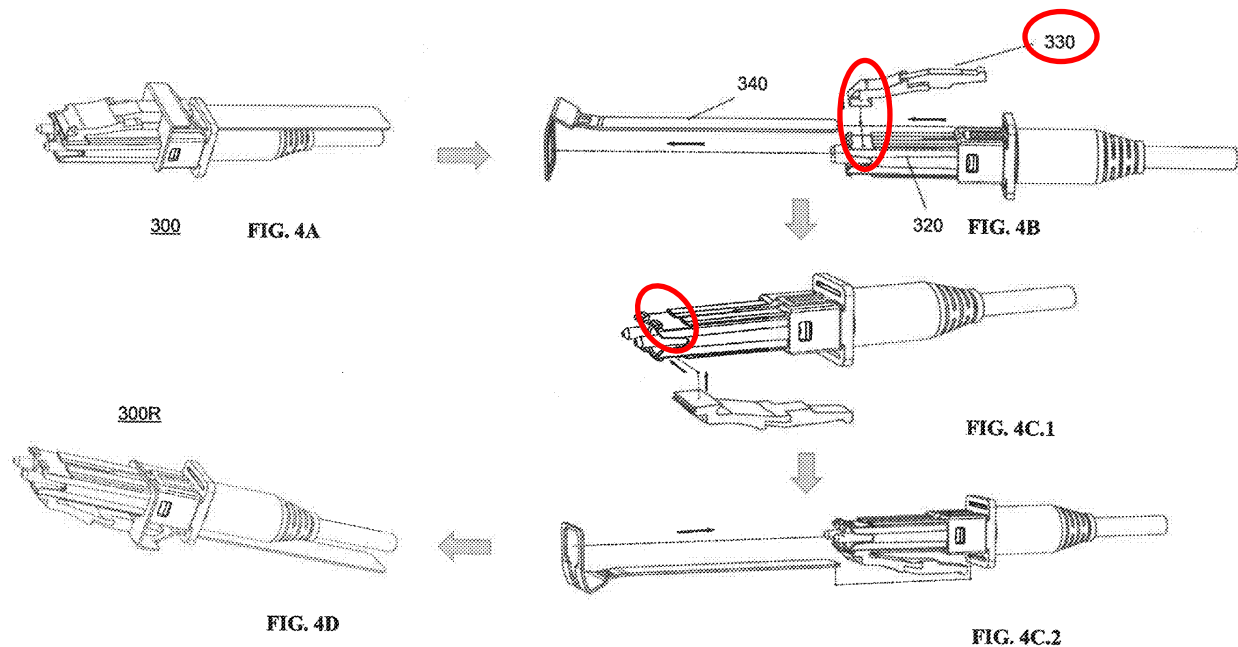
EX1009: Fig. 42B and 53 (annotated).

Therefore, Takano'369 renders this claim obvious. EX1002: ¶436.

**XV. GROUND 11: Claims 6 and 7 Would Have Been Obvious Over Takano'369 in view of Watanabe and Wong**

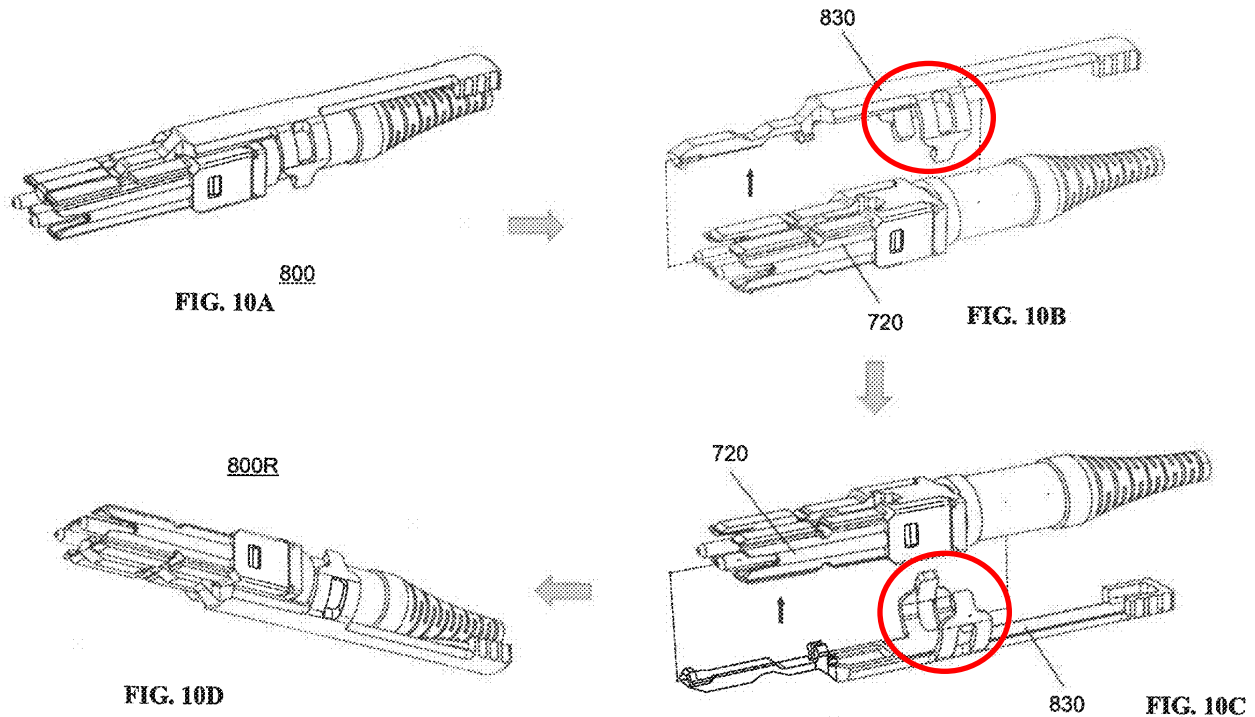
**A. Claim 6**

Wong discloses a reversible polarity fiber optic connector (300) that addresses demand “for smaller fiber optic connectors ... and are reconfigurable for flexible deployment.” EX1012: ¶[0007]. The connector comprises a connector housing (320) with latch couplings (e.g., dovetail slots) on top and bottom exterior walls for receiving a dovetail-shaped fitting of a latch (330) for selectively mounting the latch to the top or bottom of the housing to change polarity. EX1012: ¶¶[0067], [0072], Figs. 1B, 4B, 4C.1; EX1002: ¶¶437-438. The housing is also symmetrical to change polarity. EX1012: Figs. 4C.1, 4D, and 10A-D; EX1002: ¶438.



EX1012: Figs. 4A-D (annotated).

Wong also teaches a pull tab (830) with a clip for clipping onto the boot. EX1012: Figs. 8B.1-2, 10A-D, ¶¶[0085], [0088]; EX1002: ¶439. The clip allows the pull tab (830) to be positioned along the top or bottom of the housing when changing polarity. EX1012: Figs. 10A-D; EX1002: ¶439.



EX1012: Figs. 10A-D (annotated).

It would have been obvious to modify the Takano'369's connector—already modified in view of Watanabe—to (1) provide Wong's latch couplings on the top exterior wall and bottom exterior wall, (2) separate Takano'369's locking tab from the rest of the outer housing and add Wong's dovetail fitting to the bottom of the separated locking tab, and (3) add Wong's clip to Takano'369's push-pull tab to couple the push-pull tab to the top or bottom of Takano'369's boot (depending on

latch placement) to facilitate polarity change, in view of Wong. EX1012:

¶¶[0067], [0072], Figs. 10A-D; EX1002: ¶440. The added clip replaces the guide (see Section XIV(B)(1.e)) and enables Takano'369's push-pull tab to be arranged on the top or bottom depending on the polarity configuration. EX1002: ¶440.

Takano'369 already explains the push-pull tab is detachable, and Wong's clip is an alternative way of detachably connecting Takano'369's push-pull tab. EX1009: 19:41-43, FIG. 55; EX1002: ¶440.

When implementing this modification, Takano'369's outer housing would need to be modified to be symmetrical, as taught by Wong, to change polarity. EX1012: Figs. 4C.1, 4D, and 10A-D; EX1002: ¶441. For the reasons explained in Section XIV(A), the rail along the narrow side of the connector opposite the push-pull latch mechanism needs to be maintained for purposes of aligning the connector into a partition-free adapter. EX1002: ¶441. Thus, in view of the symmetry taught by Wong, Takano'369's outer housing would be modified to include another guide rail on the top side of the outer housing to maintain the symmetry. EX1012: Figs. 4C.1, 4D, and 10A-D; EX1002: ¶441. As a result, Takano'369's modified outer housing includes Watanabe's guide rails on both the top and bottom sides. EX1002: ¶441. This way, regardless of which side (e.g., top or bottom) the push-pull latch mechanism is secured to, the opposing side has a

Watanabe guide rail to facilitate guiding the modified Takano'369 connector into the modified adapter. *Id.*

Wong's polarity change does not require removing the ferrules from the outer housing, unlike Takano'369. EX1009: Fig. 55, 19:44-50; EX1002: ¶442. Takano'369's housing provides a measure of protection for the ferrules and sensitive fibers, as they are more protected when contained in the housing than not. EX1002: ¶442. Removing the assembly containing the ferrules from Takano'369's housing subjects the ferrules to handling and greater risk of damage. *Id.* In contrast, the Wong polarity change keeps the ferrules protected throughout the polarity change operation, thereby better protecting the ferrules and fibers. *Id.*

Further, this modification allows the overall size of the Takano'369's connector to be reduced, increasing connection density. EX1011: ¶[0050]; EX1006: 4:9-11; EX1003: 4:5-11; EX1002: ¶443. Because the front body is not needed to change polarity, it can be eliminated. EX1002: ¶443. The outer housing then can be reduced in size. *Id.* The back body can be attached directly to the outer housing, such as by protrusions. *Id.*

This modification would have been nothing more than combining known prior art elements (Takano'369's connector, Watanabe's guide rail, and Wong's latch couplings and push-pull tab clip) according to known methods (arrangement

taught by Wantanabe and Wong) to yield predictable results (connector with a moveable push-pull latch mechanism to change polarity). EX1002: ¶444.

This modification would have also been nothing more than the application of a known technique (Watanabe's guide rail and Wong's latch couplings and push-pull tab clip) to improve a similar device (Takano'369's connector) in the same way to yield predictable results (connector with a moveable push-pull latch mechanism to change polarity). EX1002: ¶245.

This modification would have also been nothing more than the use of a known technique (Watanabe's guide rail and Wong's latch couplings and push-pull tab clip) to a known device (Takano'369's connector) ready for improvement to yield predictable results (connector with a moveable push-pull latch mechanism to change polarity). EX1002: ¶246.

There would have been a reasonable expectation of success because these are all straightforward changes in mechanical design, applying features from prior art connectors for their same purposes in the modified connector. EX1002: ¶447.

The removable latch and latch couplings added to the top and bottom of Takano'369's connector have the same functions as in Wong, and the additional Watanabe guide rail added to the top side of Takano'369's outer housing is simply a duplication of the same feature added previously in the first modification based on Watanabe. *Id.* Further, based on Wong, there would have been a reasonable

expectation the added clip for Takano'369's push-pull tab would successfully couple the push-pull tab to Takano'369's boot. *Id.* At most, the modifications would required minor changes in the dimensions of parts to accommodate the altered or additional elements well-within the POSA's capabilities and their results would have been entirely predictable. *Id.*

A schematic illustration of this modification is shown below:

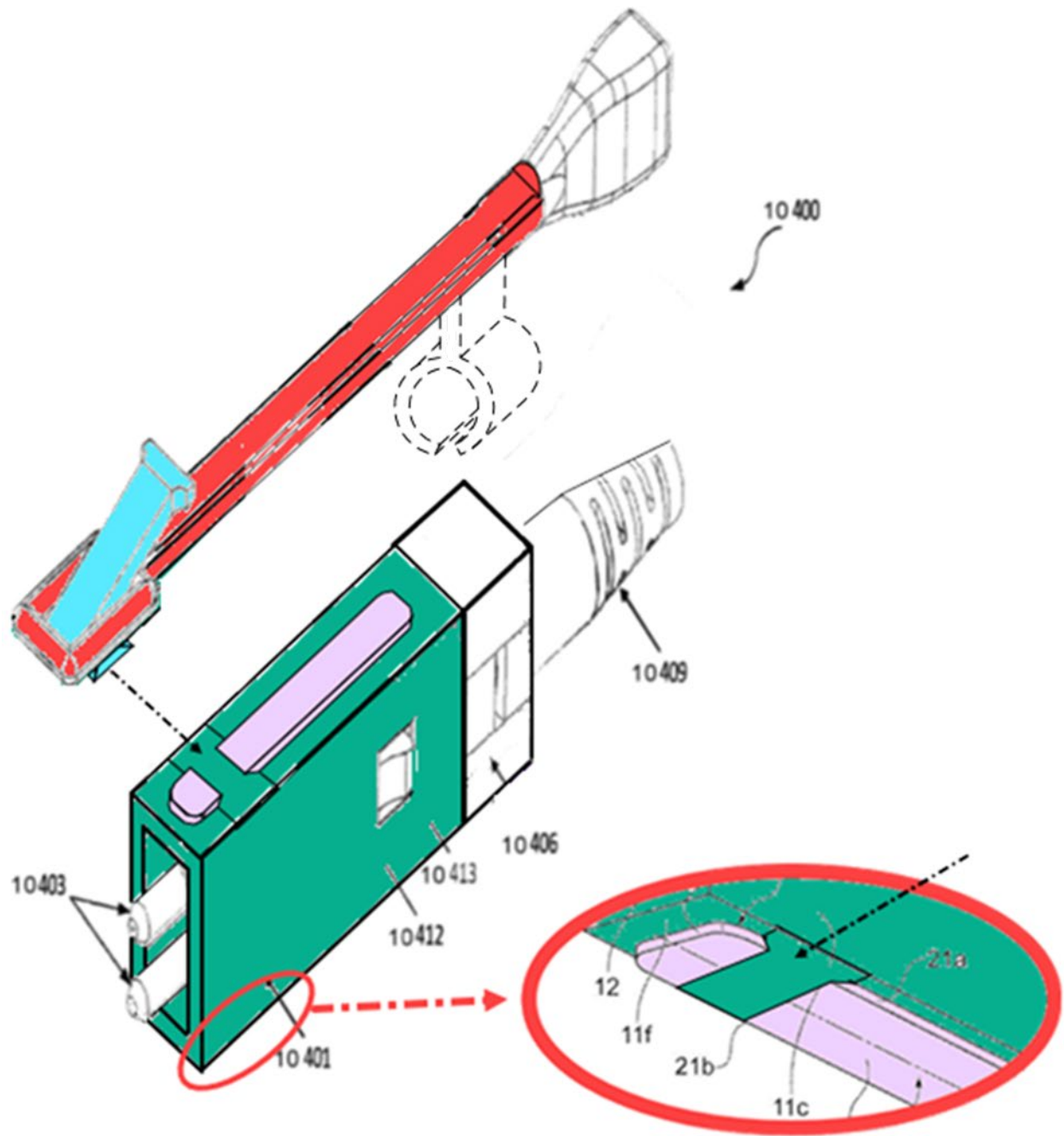


**FIG. 54**

EX1009: Fig. 54 (annotated, modified); EX1002: ¶448.

As modified, the top and bottom surface of Takano'369's modified outer housing each has a Wong latch coupling (i.e., a receiving area) for selectively receiving the Wong dovetail fitting added to the bottom of Takano'369's locking tab. EX1002: ¶449.



Therefore, the Takano'369/Watanabe/Wong combination renders this claim obvious. EX1002: ¶450.

**B. Claim 7**

Takano'369's modified connector receives a push force to insert the connector into Takano'369's modified adapter. EX1009: 10:27-29, 19:25-30; EX1002: ¶451. Takano'369's push-pull tab also receives a pull force to release the locking tab and allow Takano'369's modified connector to be removed from the modified adapter (101114). EX1009: 19:25-30; EX1002: ¶451.

Therefore, the Takano'369/Watanabe/Wong combination renders this claim obvious. EX1002: ¶452.

**XVI. GROUND 12: Claims 14 and 15 Would Have Been Obvious Over Takano'369 in view of Watanabe and Hill**

**A. Claim 14**

Takano'369's optical connector has "LC-type optical ferrules" but is silent as to their polish type. EX1009: 2:42, 6:22-25; EX1002: ¶¶453-456.

Hill discloses ferrules "of the type LC APC." EX1007: Fig. 10C, ¶[0058]; EX1002: ¶457.

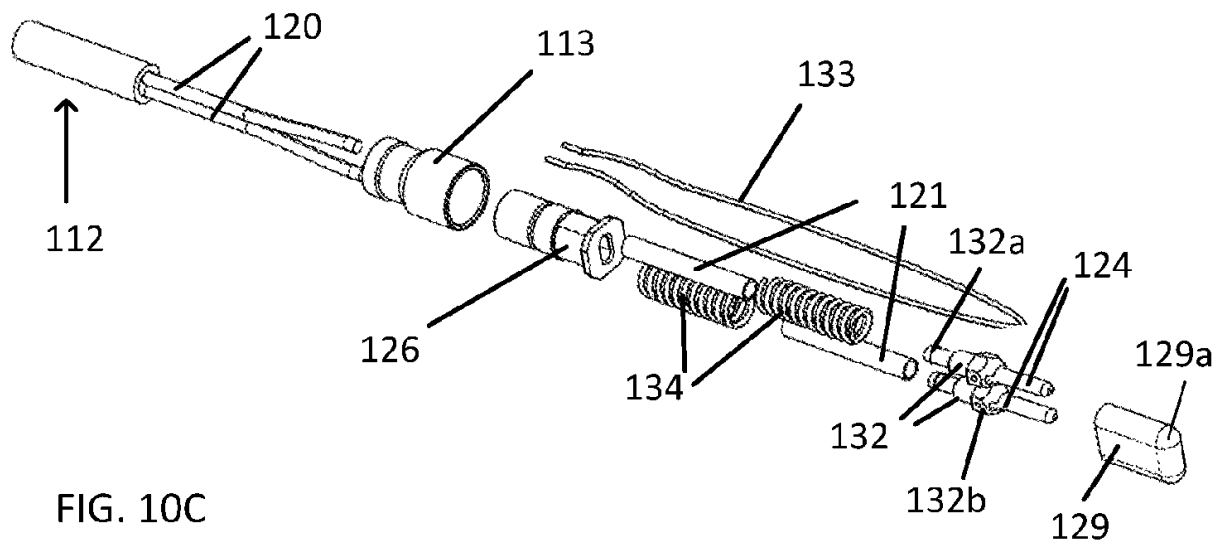


FIG. 10C

EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano’369’s connector an “angled physical contact” type of ferrule in view of Hill for the reasons explained in Section X(A). EX1002: ¶458.

This modification is nothing more than a simple substitution of one known element (Hill’s APC ferrule) for another (Takano’369’s ferrule) to yield predictable results (APC connector for lowest return loss applications). EX1002: ¶¶459-460.

This modification would have also been obvious to try for the reasons explained in Section X(A). EX1002: ¶461.

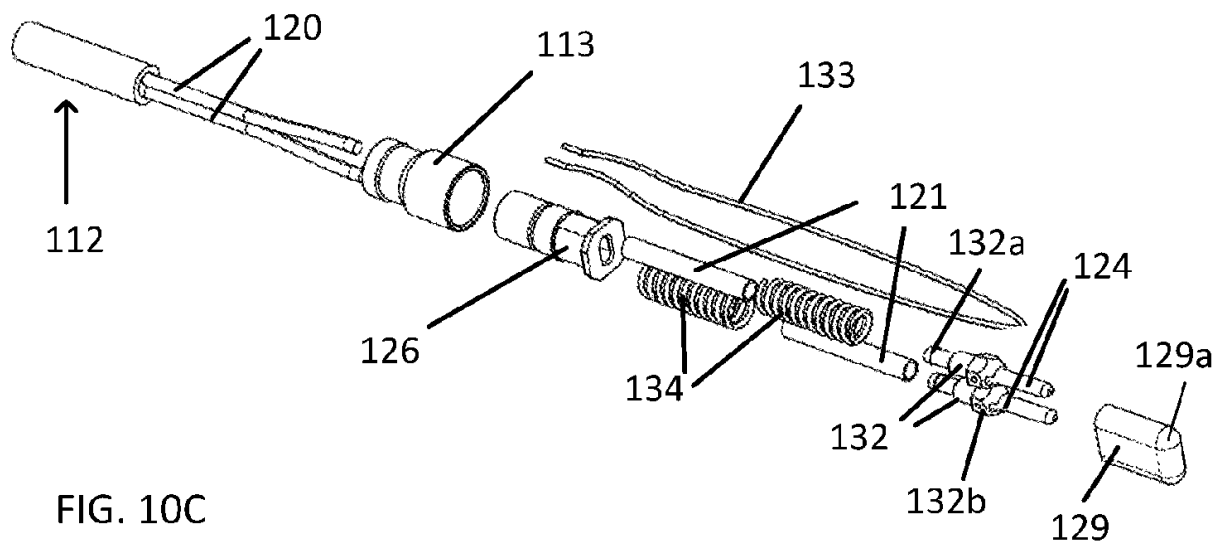
There would have been a reasonable expectation of success as both Takano'209's and Hill's ferrules are of LC-type. EX1009: 2:42; EX1007: ¶[0058]; EX1002: ¶462.

This modification results in the ferrules in Takano'369's connector being APC ferrules. EX1002: ¶463.

Therefore, the Takano'369/Watanabe/Hill combination renders this claim obvious. EX1002: ¶464.

#### **B. Claim 15**

Hill also teaches that the ferrules can be “of the type LC UPC.” EX1007: Fig. 10C, ¶[0058]; EX1002: ¶¶465-468.



EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Takano'369's connector an "ultra-physical contact" type of ferrule in view of Hill for the reasons explained in Section X(B). EX1002: ¶469.

This modification is nothing more than a simple substitution of one known element (Hill's UPC ferrule) for another (Takano'369's ferrule) to yield predictable results (UPC connector for low return loss and budget applications). EX1002: ¶¶470-471.

This modification would have also been obvious to try for the reasons explained in Sections X(A)&(B). EX1002: ¶472.

There would have been a reasonable expectation of success as both Takano'369's and Hill's ferrules are of LC-type. EX1009: 2:42; EX1007: ¶[0058]; EX1002: ¶473.

This modification results in the ferrules in Takano'369's connector being UPC ferrules. EX1002: ¶474.

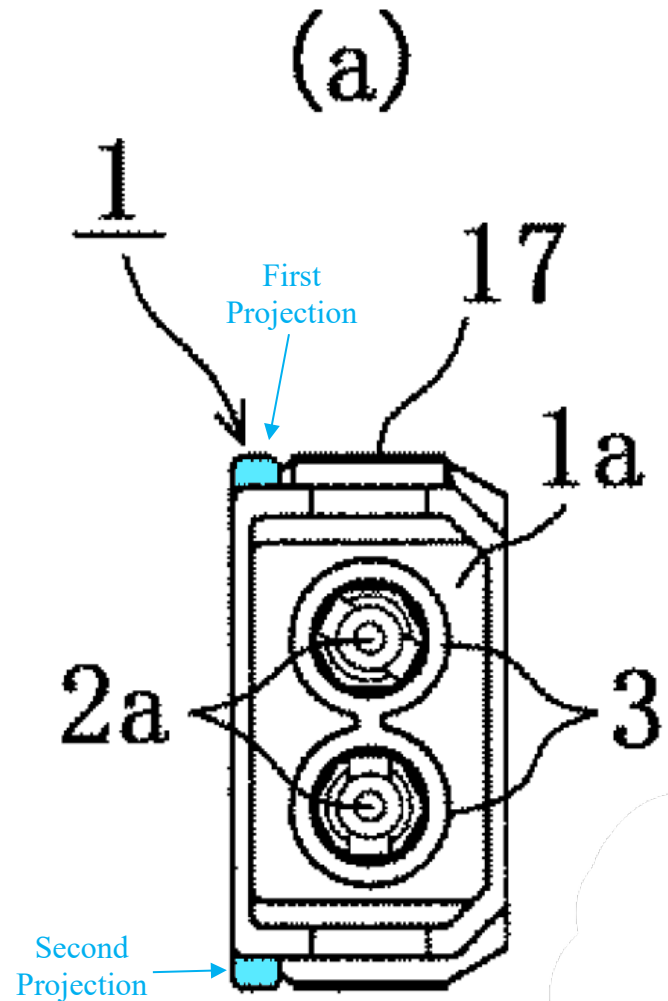
Therefore, the Takano'369/Watanabe/Hill combination renders this claim obvious. EX1002: ¶475.

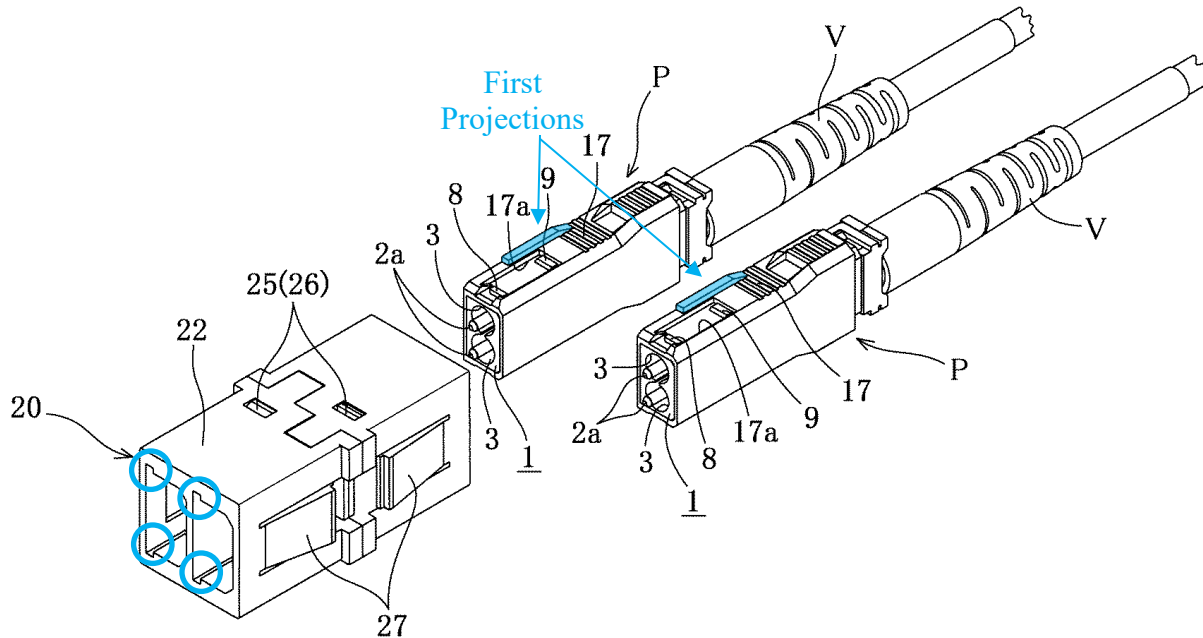
## **XVII.GROUND 13: Claims 1-7 and 10-13 Would Have Been Obvious Over Toyama in view of Shimozu**

### **A. Motivation to Modify Toyama Based on Shimozu**

Toyama discloses a first key on the top surface of the knob (17) and a second key the bottom surface of the knob. EX1014: Fig. 7(a); EX1002: ¶477.

The keys fit within keyways of the adapter (20) to indicate the correct orientation for inserting the connector into the adapter. EX1002: ¶477.

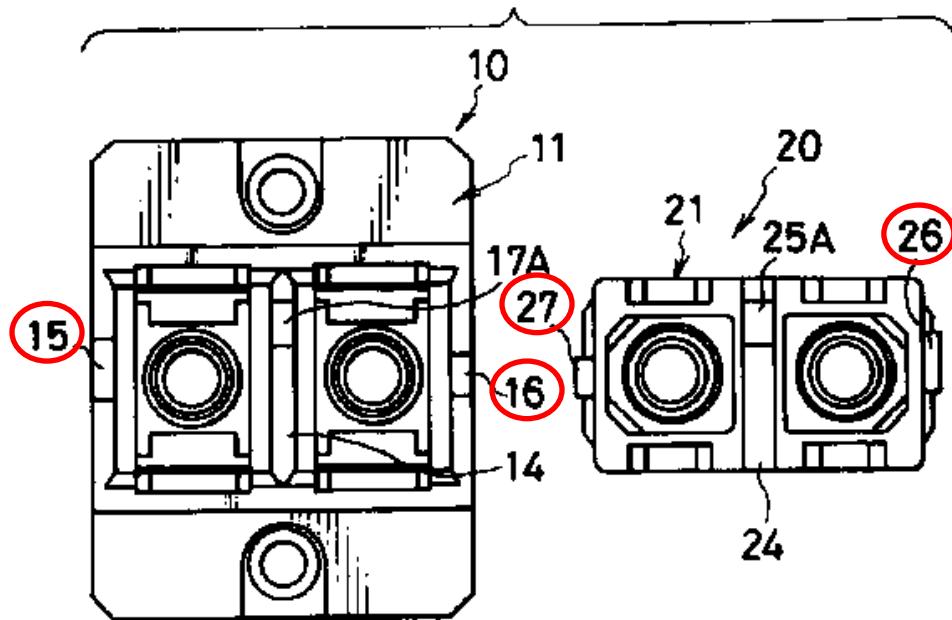




EX1014: Figs. 7(a) and 11 (annotated).

Shimozu discloses a double-core optical connector plug (20) with first and second keys (26, 27), the first key being wider than and off-center from the second key. EX1008: ¶¶[0011]-[0012]; EX1002: ¶478. The keys fit into corresponding keyways (15, 16) of the adapter (10) to ensure proper alignment. EX1008: ¶[0014]; EX1002: ¶478. Shimozu teaches the keys and keyways can be implemented in other types of connectors. EX1008: ¶[0015]; EX1002: ¶478.

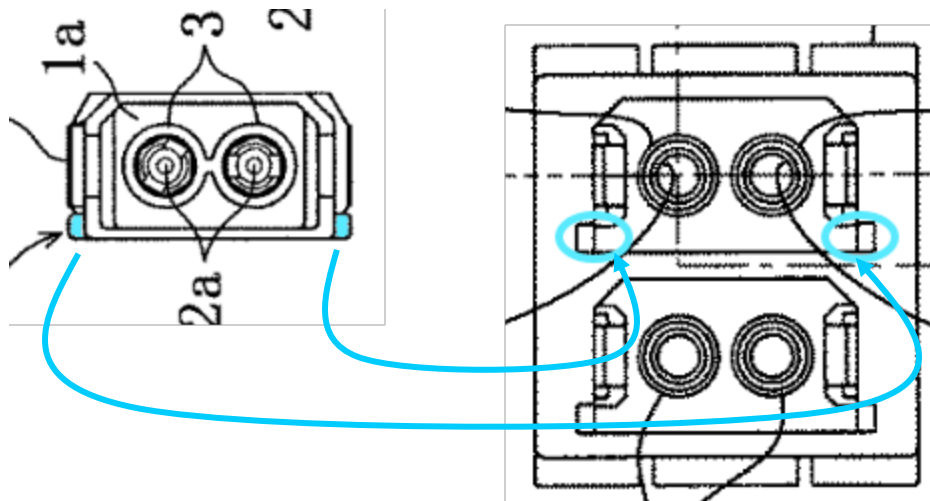
【図2】



EX1008: Fig. 2 (annotated).

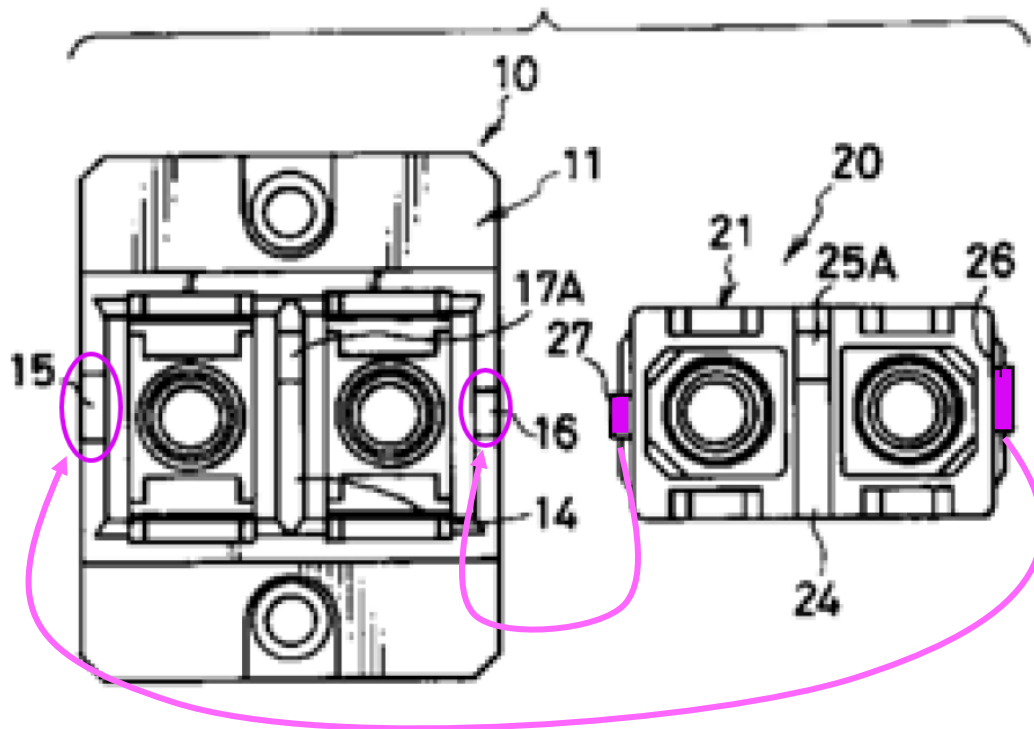
It would have been obvious to replace the Toyama's keys with Shimozu's keys (26, 27). EX1002: ¶479. This would give a more obvious visual cue how to insert the connector into the adapter. EX1002: ¶480.

The same-size keys of Toyama and the different-size keys of Shimozu are prior art structures easily and predictably substituted for one another. EX1002: ¶481. Both keying structures indicate the correct orientation for inserting the connector into the mating adapter (i.e., the orientation in which each key will fit into the corresponding keyway of a mating adapter). *Id.*



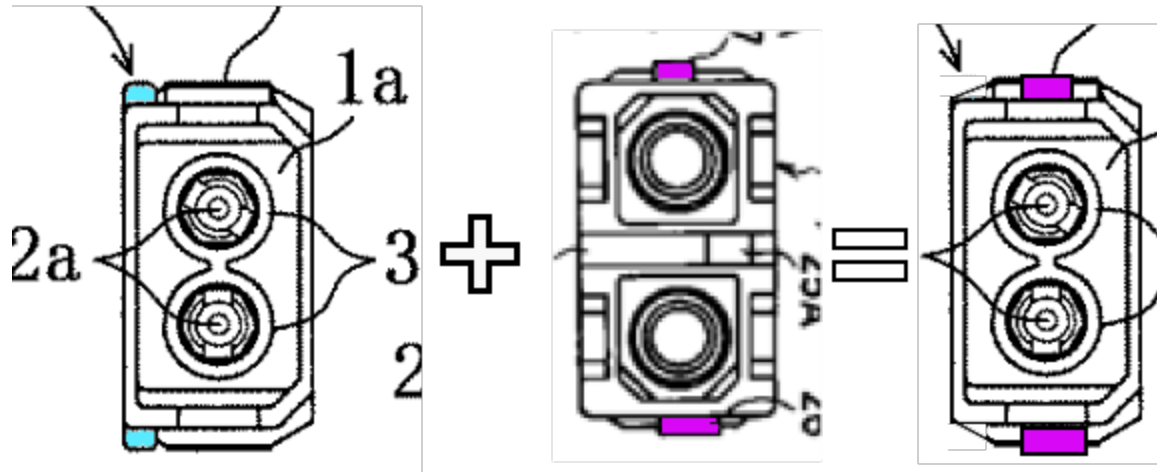
EX1014: Figs. 7(a) and 10(a) (annotated).

[FIG. 2]



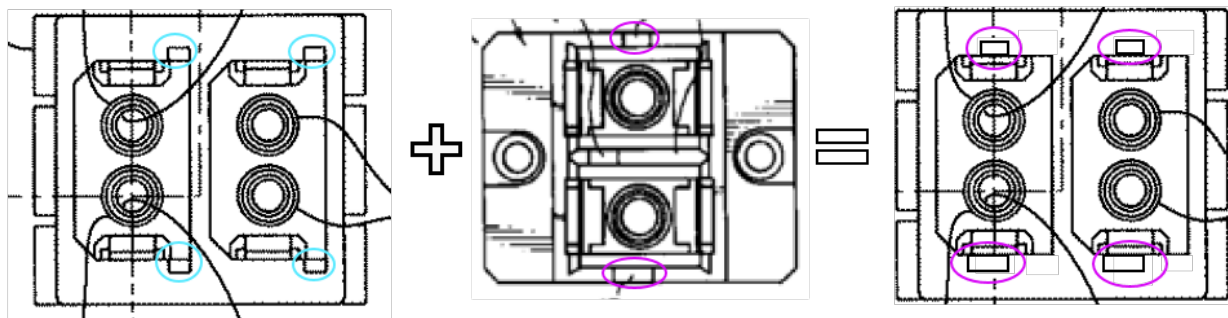
EX1008: Fig. 2 (annotated).

A schematic illustration of Toyama's modified plug body (P) is shown below:



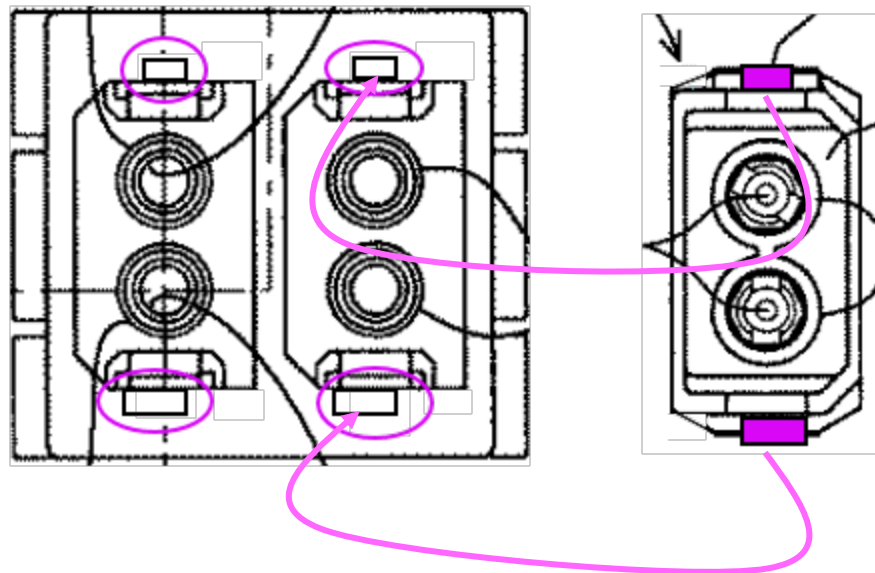
EX1014: Fig. 7(a) (annotated, modified); EX1008: Fig. 2 (annotated); EX1002: ¶482.

In modifying Toyama's plug body (P), a corresponding modification to Toyama's adapter (20) would have been made by replacing the existing keyways with Shimozu's different sized keyways, sized and positioned for accepting the added keys to Toyama's plug body, as indicated below:



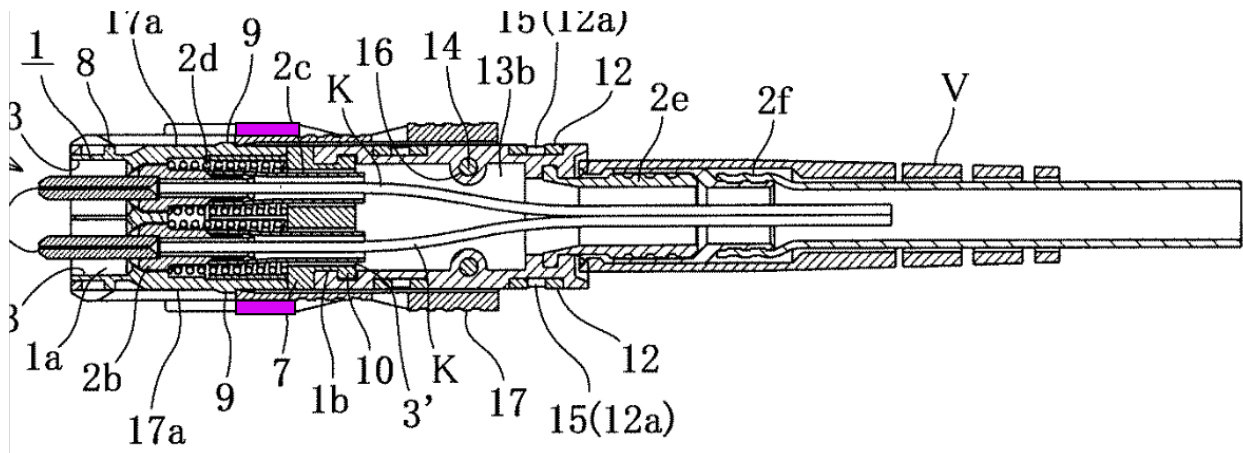
EX1014: Fig. 10(a) (annotated, modified); EX1008: Fig. 1 (annotated); EX1002: ¶483.

Substituting the different-size keys from Shimozu for the same-size keys of Toyama (and making corresponding modifications to Toyama's adapter) would yield the predictable result of providing a different keying structure to indicate the proper orientation in which to insert the connector into a mating adapter, as shown below:



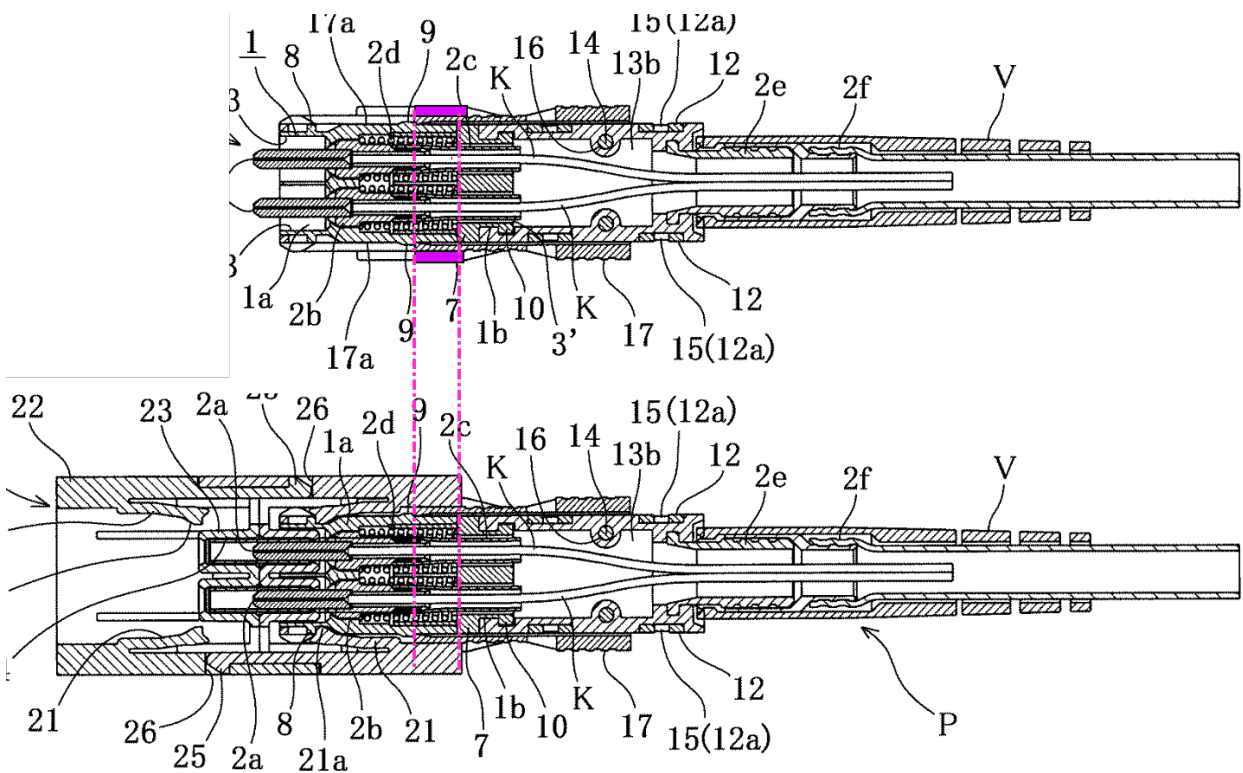
EX1014: Figs. 7(a) and 10(a) (annotated, modified); EX1002: ¶484.

Toyama and Shimozu both teach locating the keys on the narrow walls of a duplex connector housing used as an extraction knob for unlatching the connector from an adapter. EX1002: ¶486. In implementing the modification, the different-size keys would remain located on narrow walls of the outer housing (17), positioned behind the openings (17a), as shown below:



EX1014: Fig. 8(a) (annotated, modified); EX1002: ¶486.

In this more rearward key position, the different-size keys would still indicate proper insertion orientation by fitting into corresponding keyways in the adapter. EX1002: ¶487. At this more rearward position, the keys still fit into the keyways in the adapter. *Id.*



EX1014: Figs. 8(a) and 9(a) (annotated, modified).

Accordingly, there is a reasonable expectation Toyama could be successfully modified in view of Shimozu by simply removing the existing same-size keys and replacing them with different-size keys located at the existing flat surfaces behind the openings (17a) of the Toyama's knob (17). EX1002: ¶488.

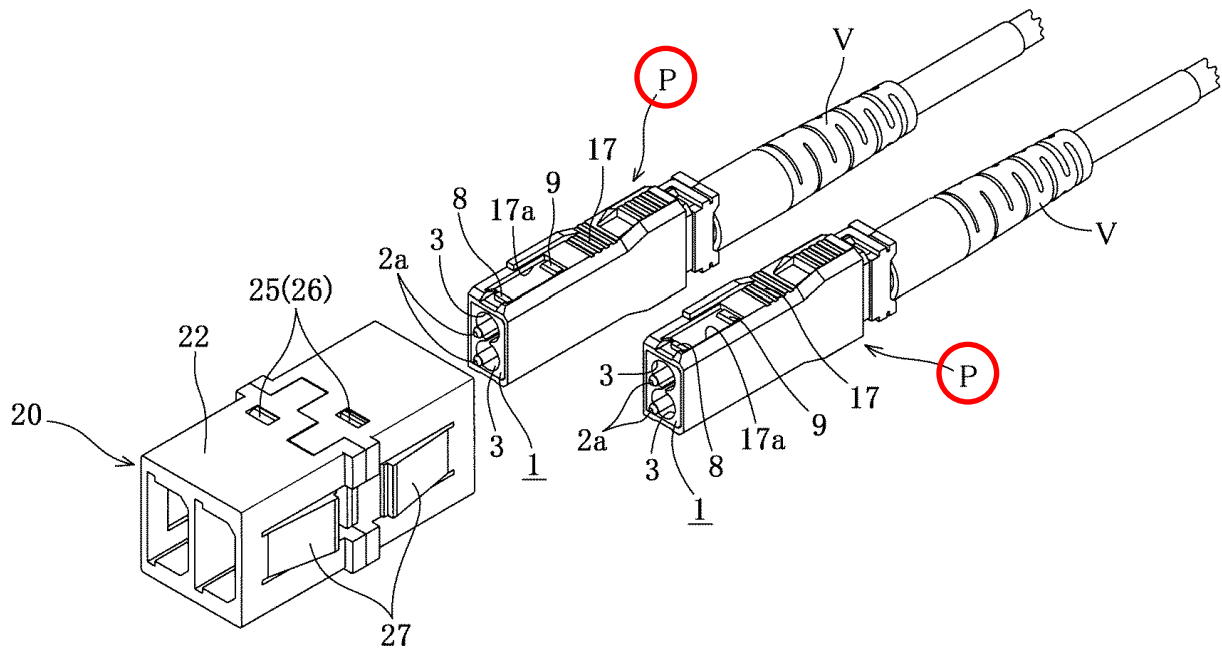
As explained above, Toyama and Shimozu are analogous fiber optic connectors that both use keys on the narrow sides of the outer housing to indicate the proper connector insertion orientation. EX1002: ¶489. The proposed modification of Toyama in view of Shimozu would have been nothing more than a simple substitution of one known equivalent (Shimozu's different-size keys) for another (Toyama's same-size keys) to yield predictable results (Toyama's connector with a different arrangement of keys for aligning the connector into a mating adapter). EX1002: ¶489. The Supreme Court has held "when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *KSR Int'l Co. v. Teleflex Inc.*, 550 US 398, 416 (2007) (citing *United States v. Adams*, 383 U.S. 39, 40, (1966)). Accordingly, under Supreme Court precedent, the mere substitution of Shimozu's different size keys for Toyama's same size keys to yield a predictable result is obvious. EX1002: ¶489.

## B. Independent Claim 1

### 1.P

Toyama discloses a plug body (P), which is “a fiber optic connector.”

EX1014: ¶[0022]; EX1002: ¶490.



EX1014: Fig. 11 (annotated).

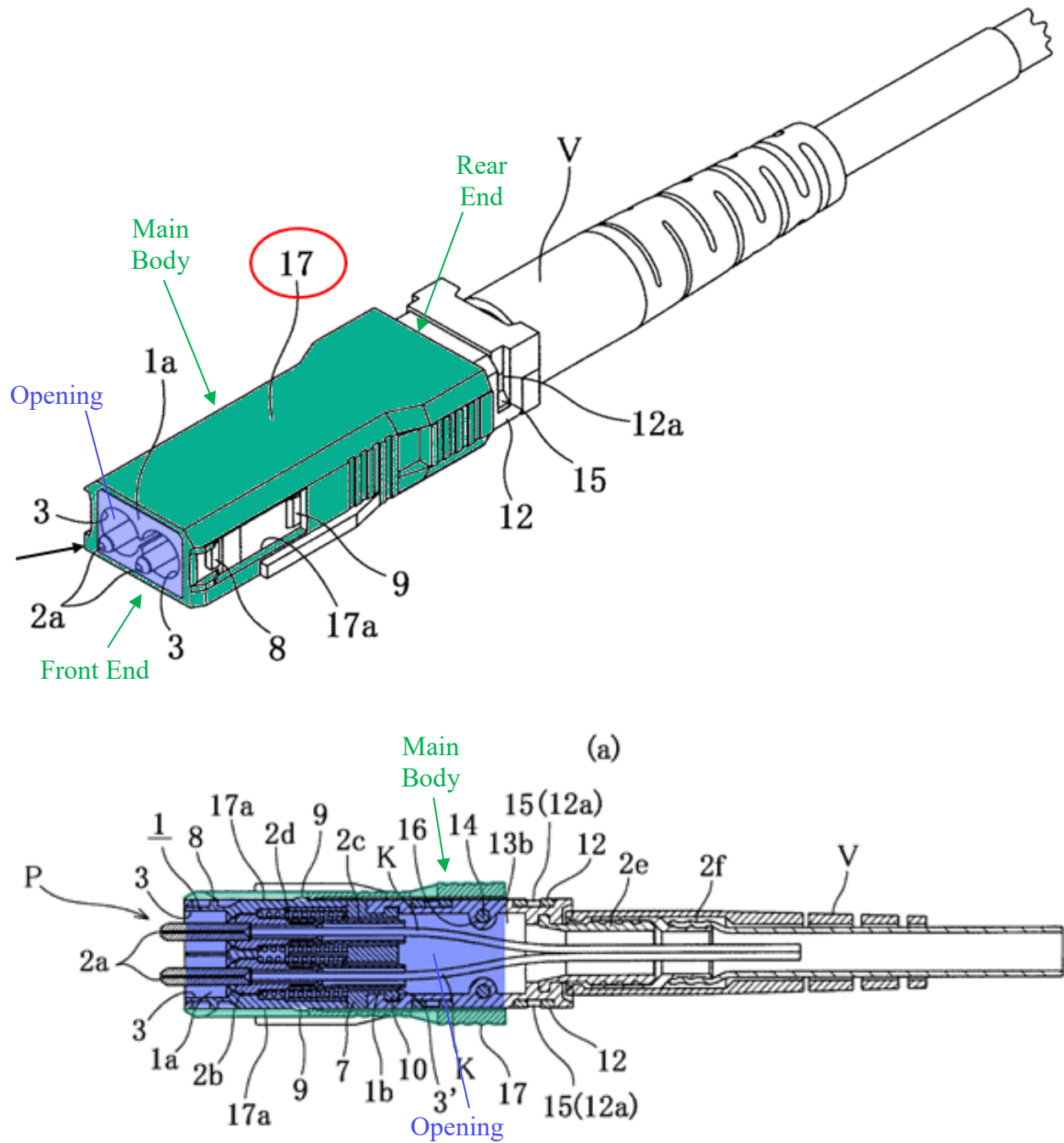
Therefore, Toyama meets 1.P. EX1002: ¶491.

### 1.a.1

Toyama’s knob (17) is a housing having a main body extending between front and rear ends and having an opening extending therebetween. EX1014:

¶¶[0022], [0032]; EX1002: ¶492.

【 図 6 】



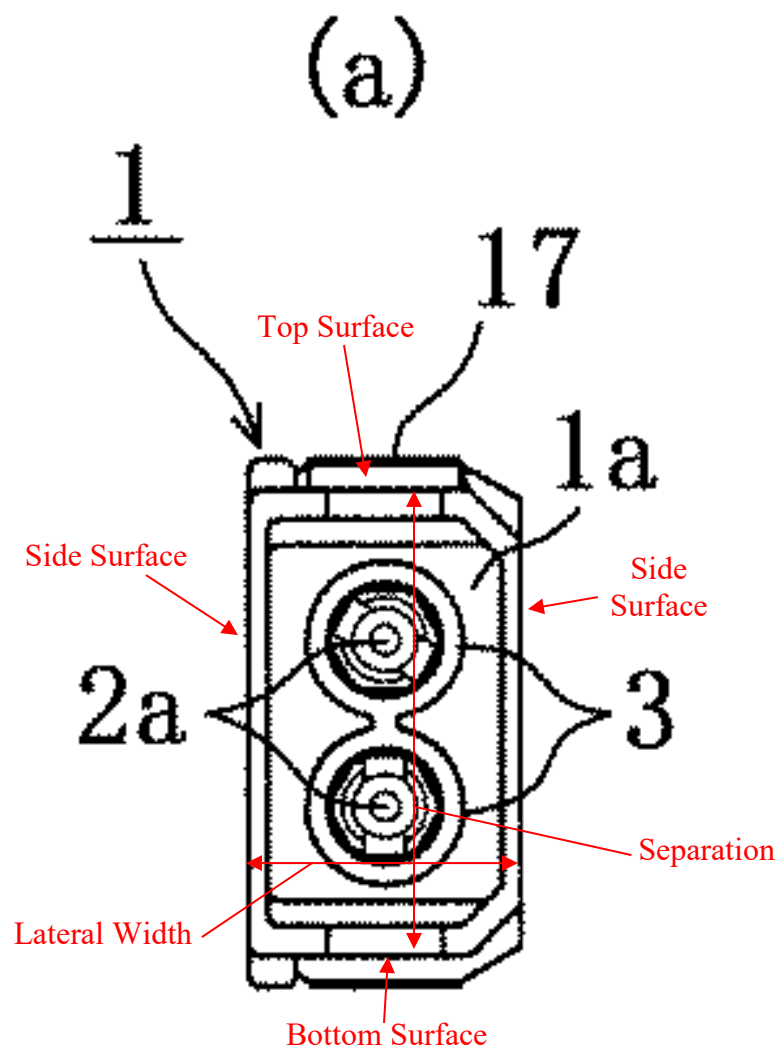
EX1014: Figs. 6 and 8(a) (annotated).

Therefore, Toyama meets 1.a.1. EX1002: ¶493.

### 1.a.2

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

EX1002: ¶494.

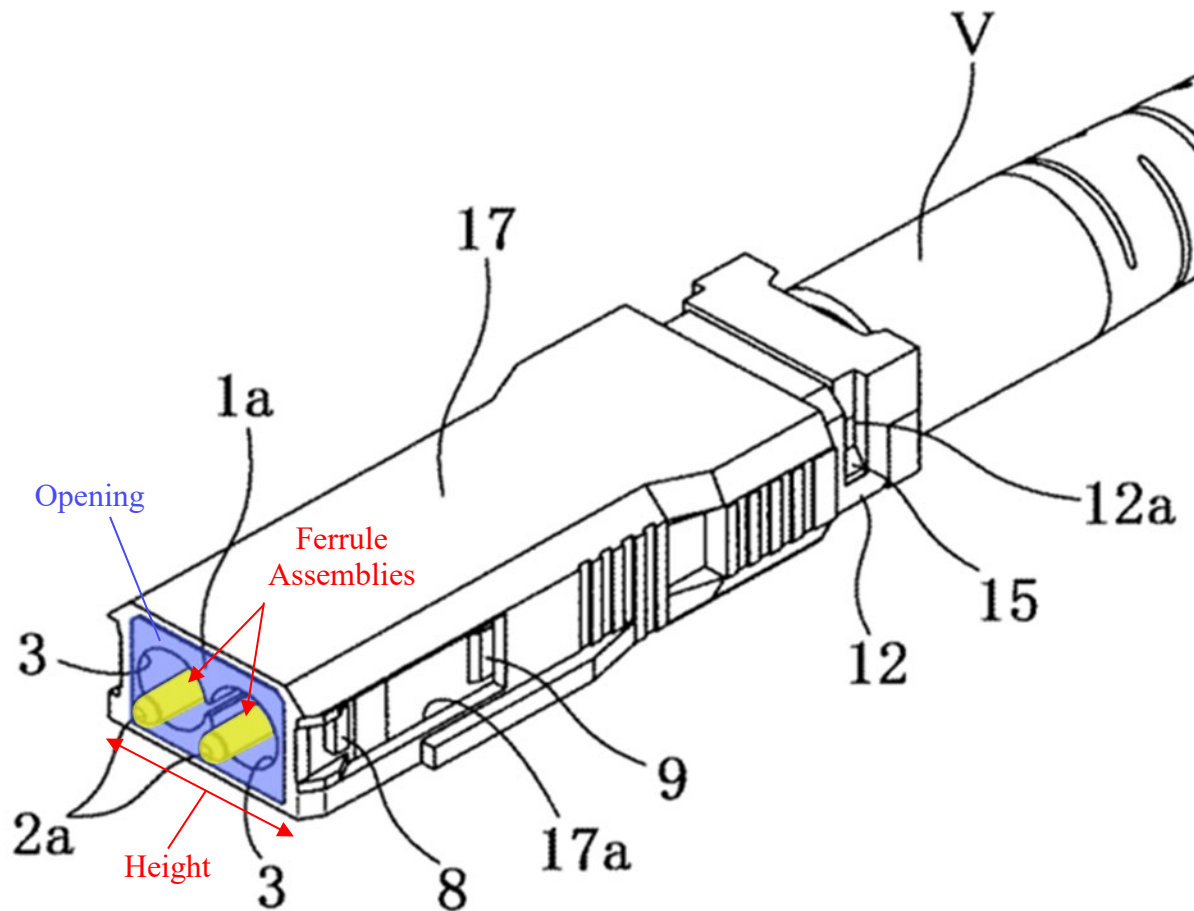


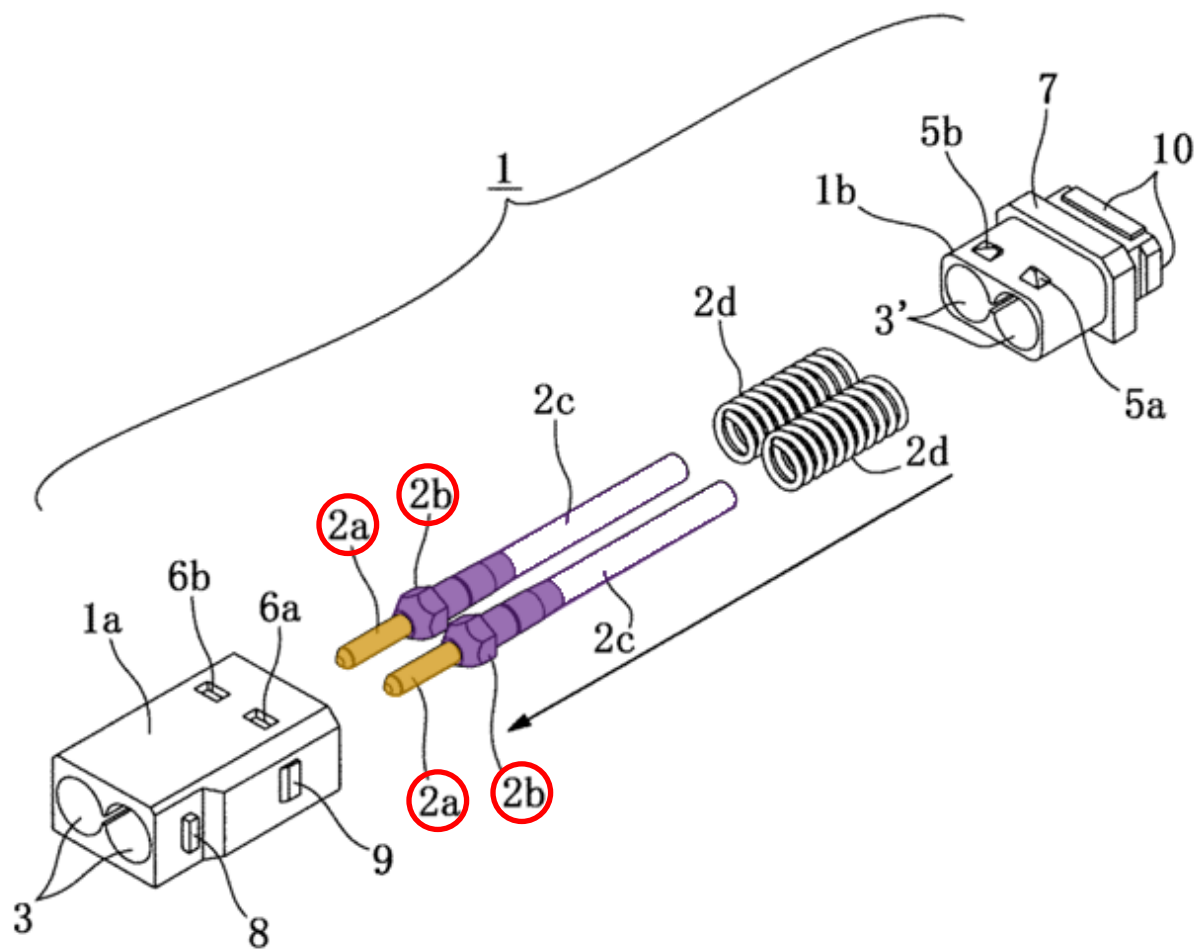
EX1014: Fig. 7(a) (annotated).

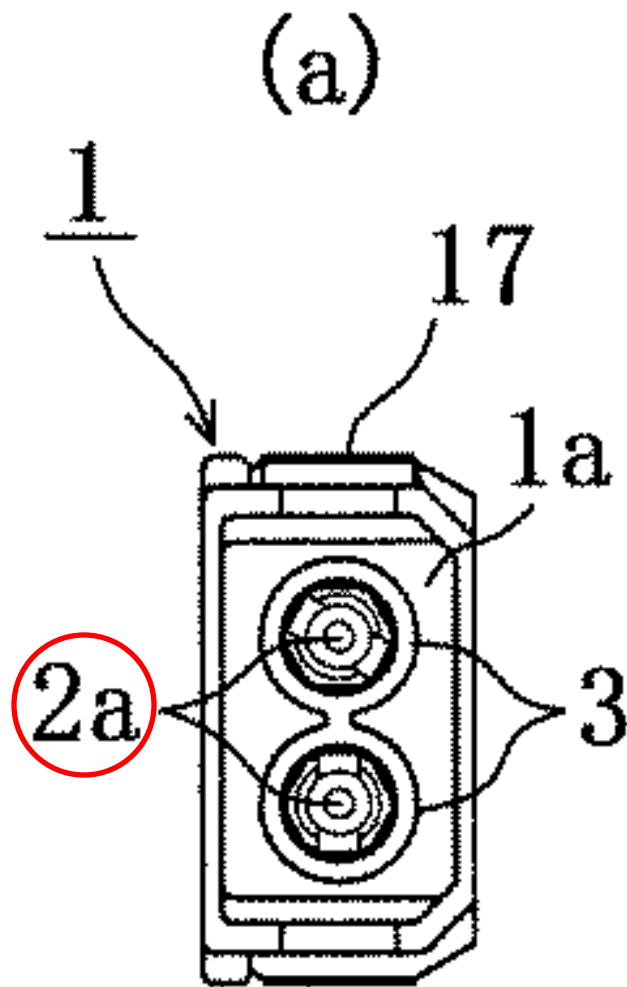
Therefore, Toyama meets 1.a.2. EX1002: ¶495.

### 1.b.1

Toyama discloses two ferrule assemblies disposed within the opening of the knob (17). EX1002: ¶496. Each ferrule assembly includes a ferrule (2a) held by a ferrule holder (2b). EX1014: ¶[0022]; EX1002: ¶496. The ferrules are spaced apart along the height of the main body. EX1014: Fig. 7(a); EX1002: ¶496.





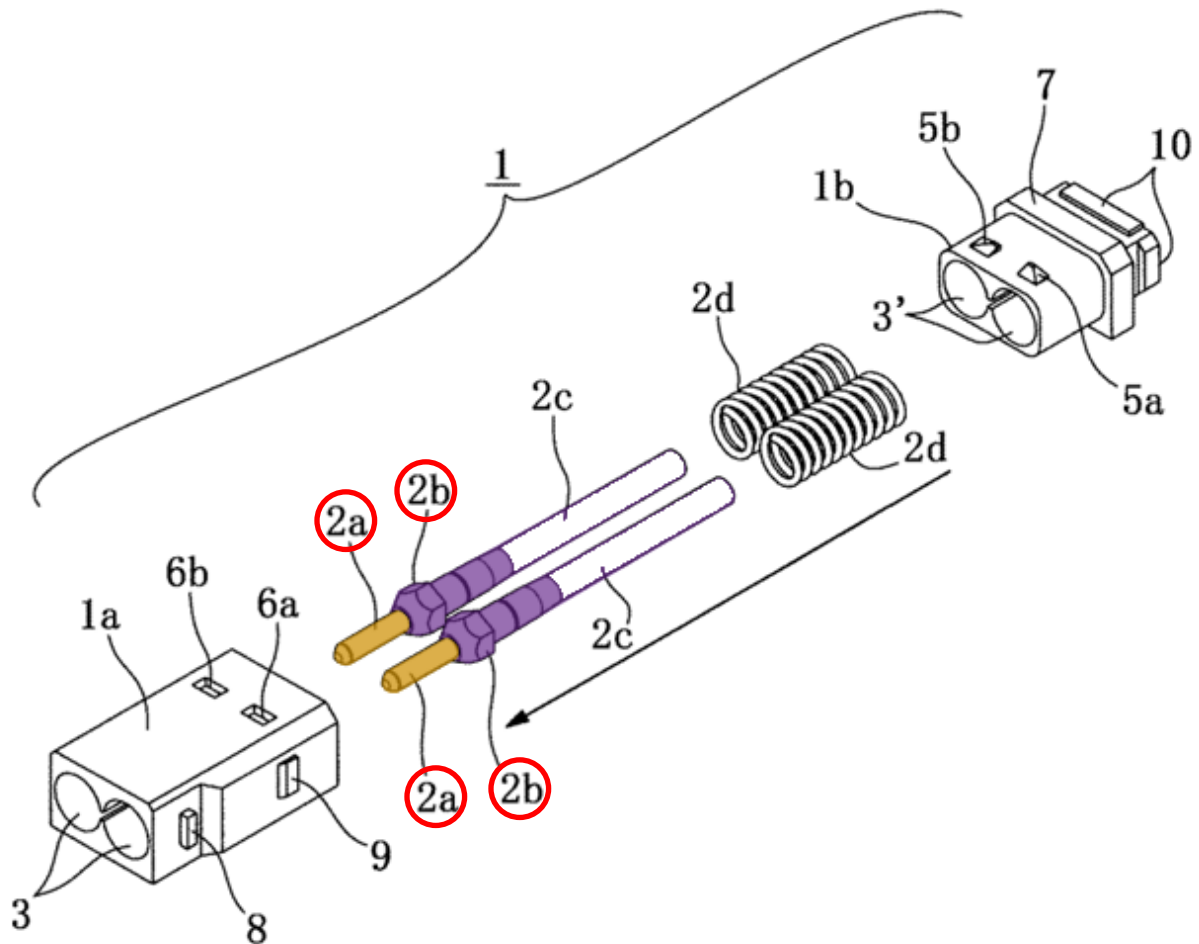


EX1014: Figs. 1, 6, and 7(a) (annotated).

Therefore, Toyama meets 1.b.1. EX1002: ¶497.

### 1.b.2

Each ferrule (2a) extends forwardly away from the front end of the ferrule holder (2b). EX1002: ¶498.

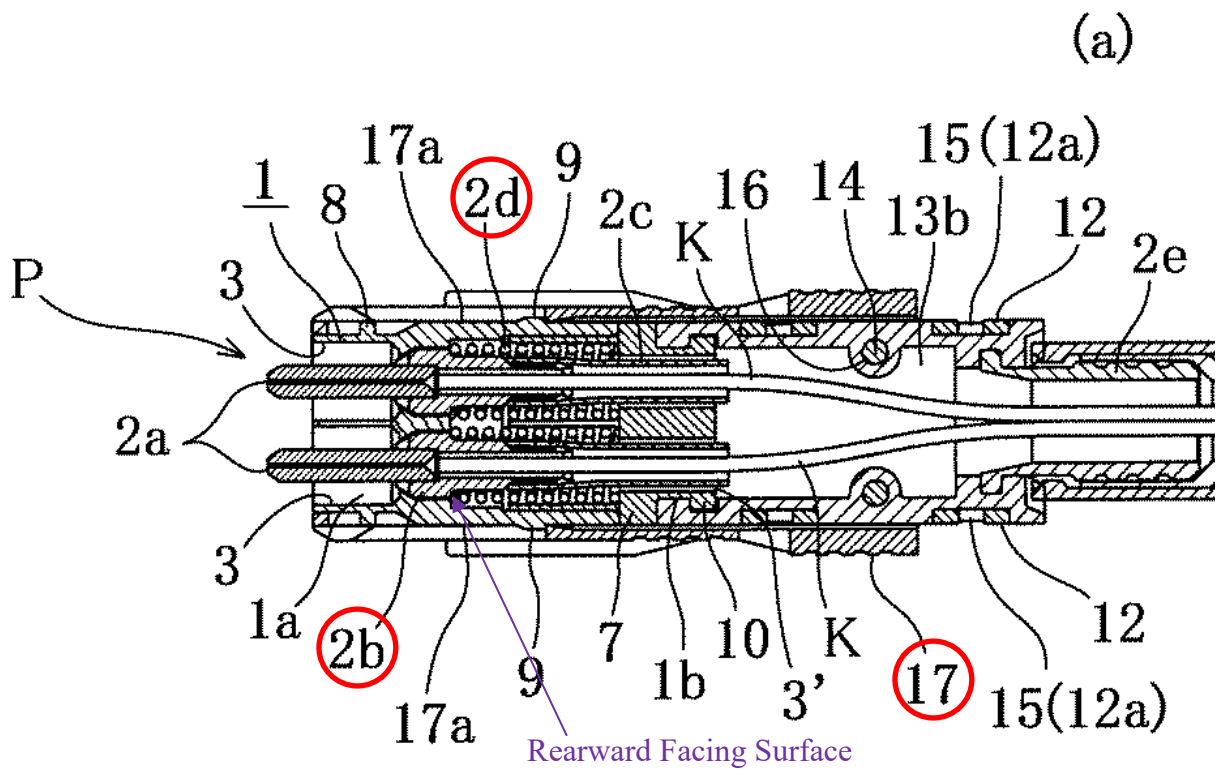


EX1014: Fig. 1 (annotated)

Therefore, Toyama meets 1.b.2. EX1002: ¶499.

### 1.c

Toyama discloses two springs (2d) retained within the knob (17). EX1014: ¶[0024]; EX1002: ¶500. Each spring engages a rearward facing surface of the ferrule holder (2b) and extends towards the rear end of the knob to bias the ferrule assemblies toward the front end of the knob. EX1014: ¶[0024]; EX1002: ¶500.

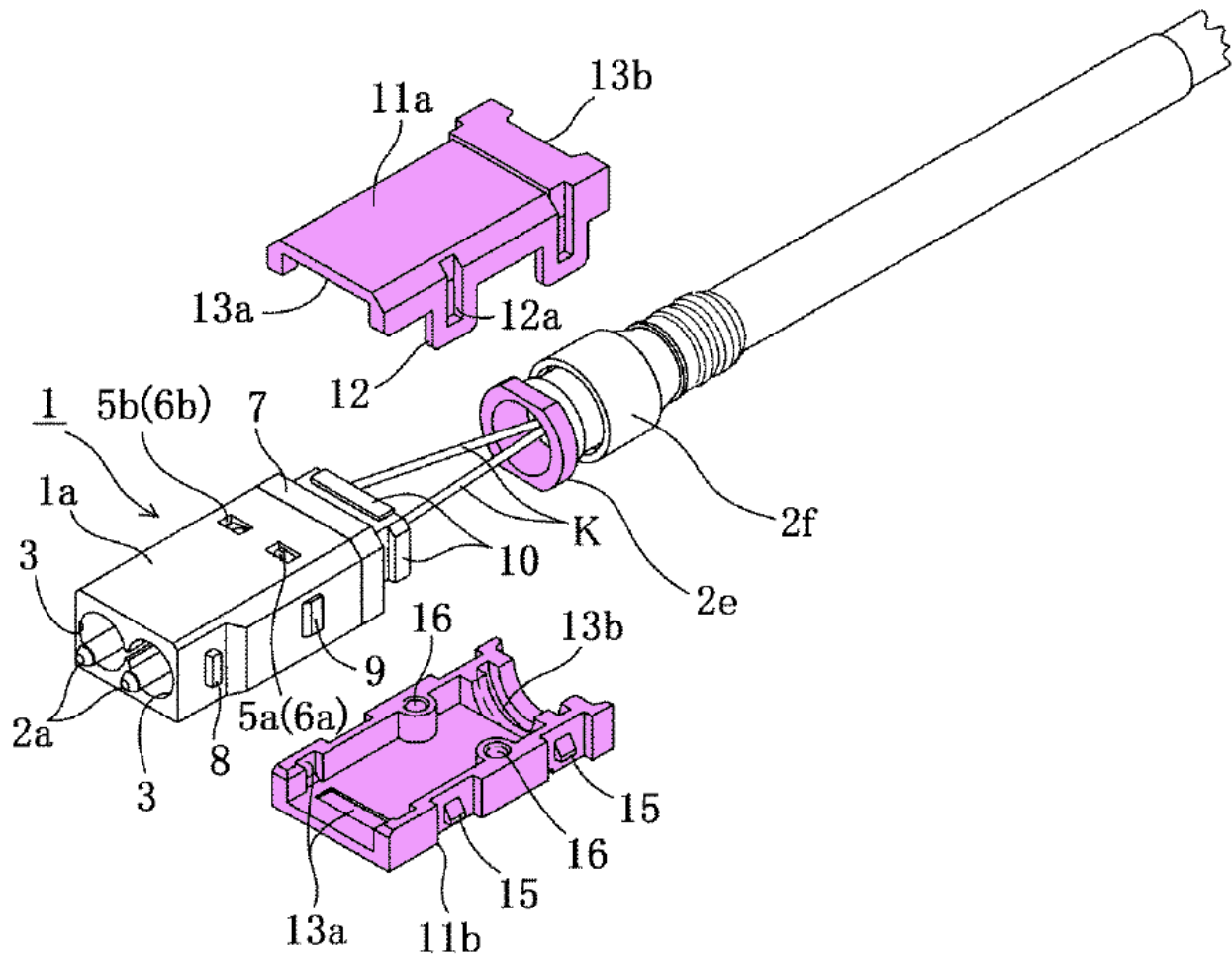


EX1014: Fig. 8(a) (annotated).

Therefore, Toyama meets 1.c. EX1002: ¶501.

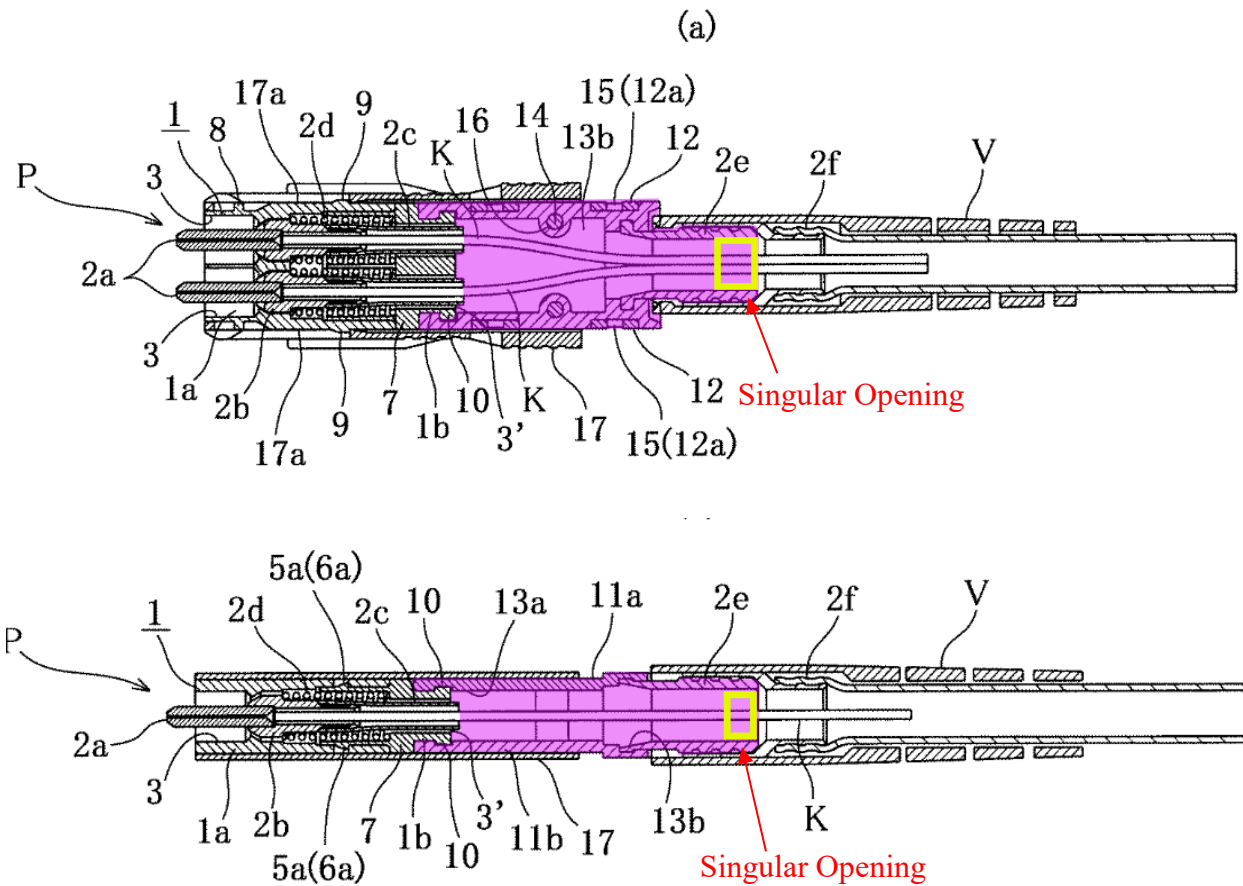
#### 1.d

Toyama discloses a three-piece crimp body formed by the stop ring (2e) (a back post for crimping ring (2f)) and, the holder portions (11a, 11b) clamped onto the case (1) and the stop ring. EX1014: ¶[0022]; EX1002: ¶502. The three parts (2e, 11a, 11b) are secured to the plug body (P), specifically the case (1). EX1014: Fig. 8(a); EX1002: ¶502.



EX1014: Fig. 3 (annotated).

The stop ring (2e) forms a singular opening at the rear end of Toyama's three-piece crimp body. EX1002: ¶503.

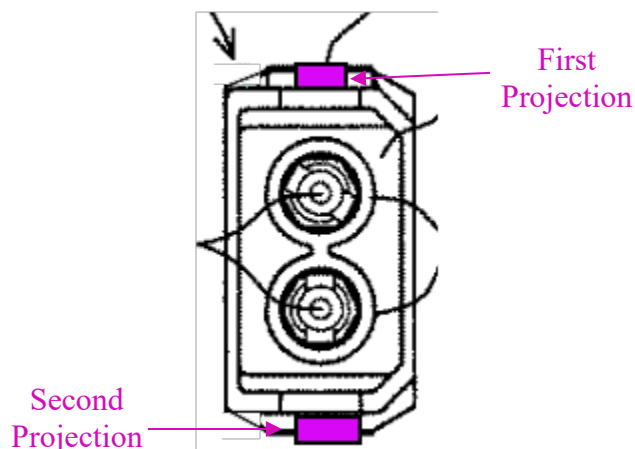


EX1014: Figs. 8(a)&(b) (annotated).

Therefore, Toyama meets 1.d. EX1002: ¶504.

### 1.e

As modified (Section XVII(A)), Toyama's modified plug body (P) includes a first key (i.e., first projection) on the top surface and a second key (i.e., second projection) on the bottom surface. EX1002: ¶505.



EX1014: Fig. 7(a) (annotated, modified).

Therefore, the Toyama/Shimozu combination renders 1.e obvious. EX1002: ¶506.

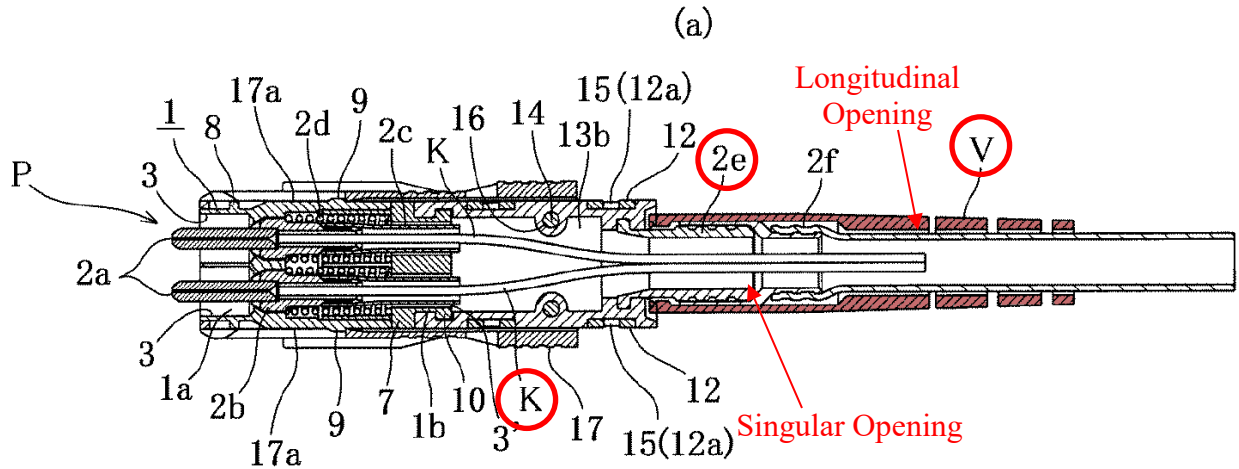
### 1.f

As explained in Section XVII(A), the added bottom key (i.e., second projection) to Toyama's plug body (P) has a different size (i.e., width) than the added first key (i.e., first projection). EX1002: ¶507.

Therefore, the Toyama/Shimozu combination renders 1.f obvious. EX1002: ¶508.

### 1.g

Toyama discloses a strain relief boot (V) connected to the stop ring (2e). EX1014: ¶[0022]; EX1002: ¶509. The boot has a longitudinal opening in continuum with the singular opening of the crimp body through which optical fibers (K) pass. EX1002: ¶509.

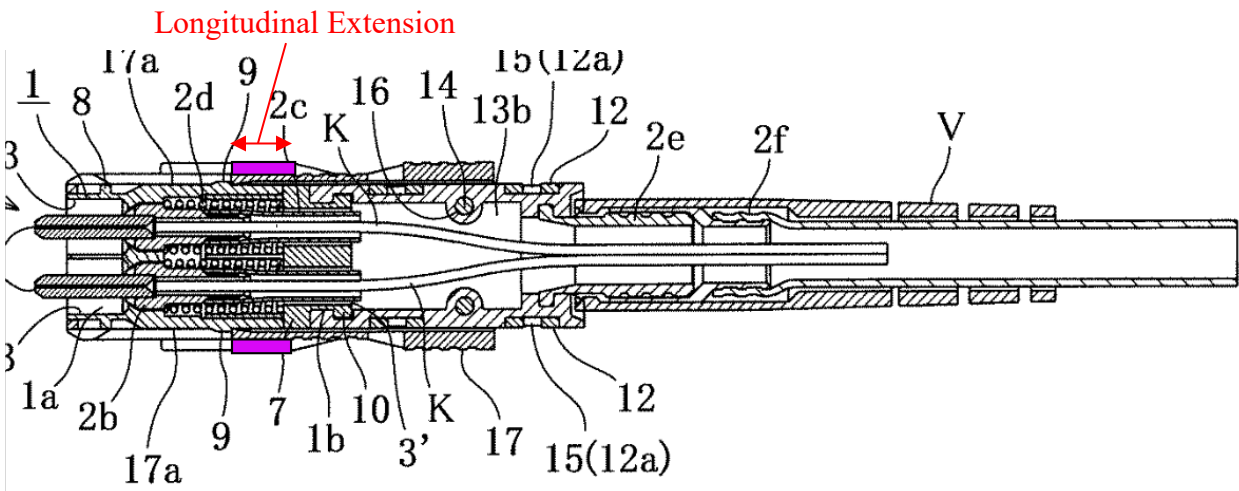


EX1014: Fig. 8(a) (annotated).

Therefore, Toyama meets 1.g. EX1002: ¶510.

### C. Claim 2

The added first key extends longitudinally along the top surface of the knob (17). EX1002: ¶511.



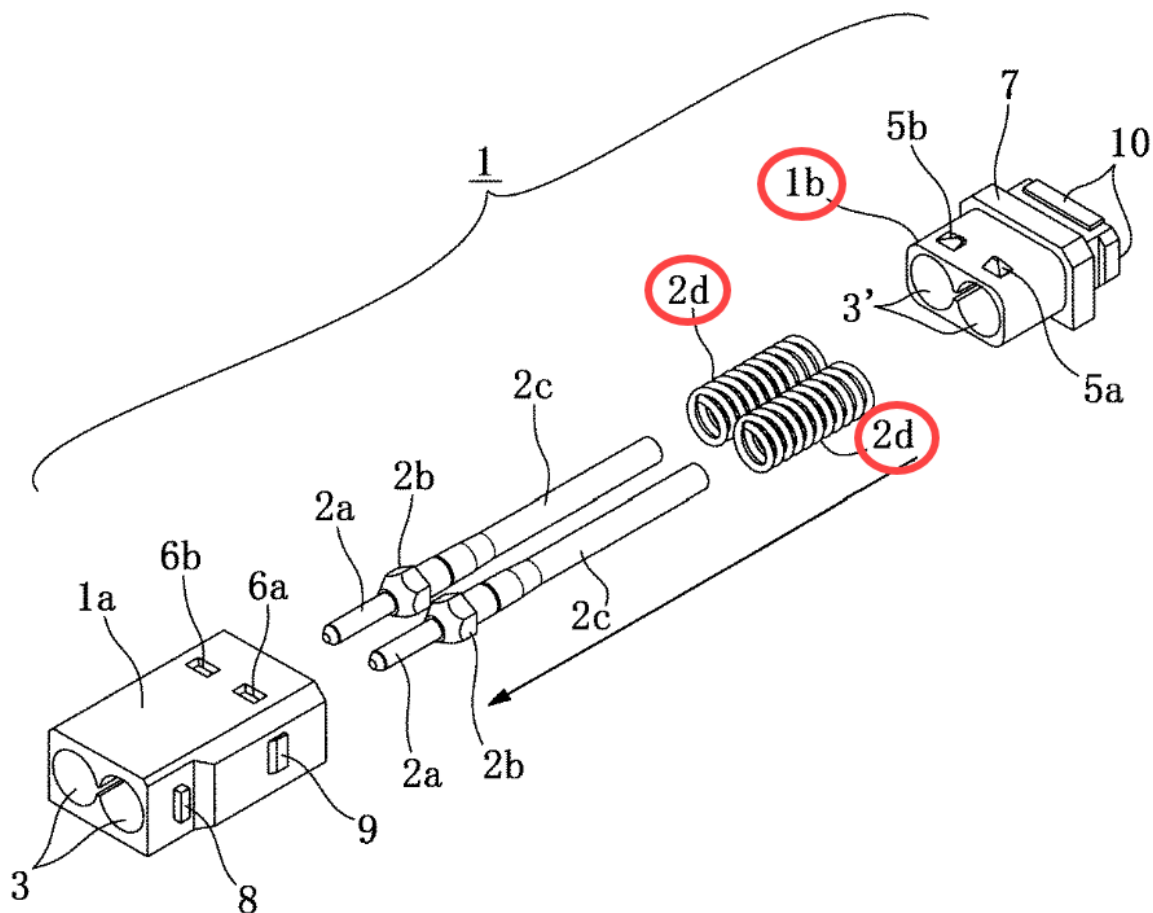
EX1014: Fig. 8(a) (annotated, modified).

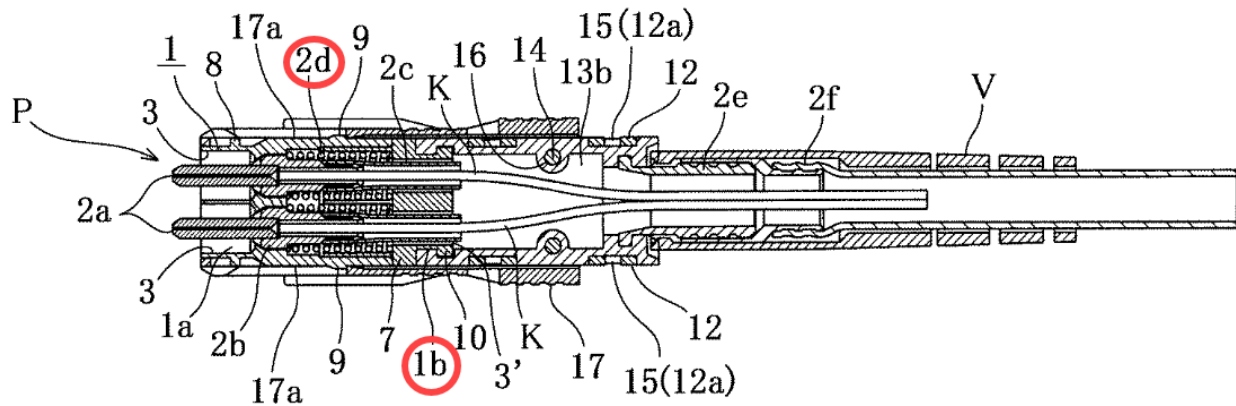
Therefore, the Toyama/Shimozu combination renders this claim obvious.

EX1002: ¶512.

**D. Claim 3**

Toyama discloses a rear case portion (1b), a spring push, that engages rear portions of the springs (2d). EX1014: ¶[0022]; EX1002: ¶513.



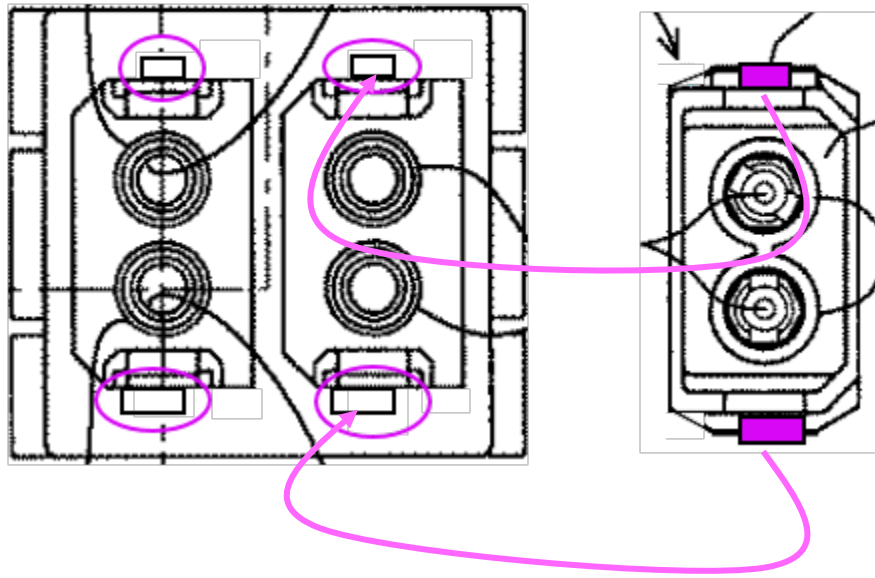


EX1014: Figs. 1 and 8(a) (annotated).

Therefore, Toyama meets this claim. EX1002: ¶514.

#### E. Claim 4

In Toyama's modified plug body (P), the first key (i.e., first projection) and the second key (i.e., second projection) determine a correct orientation and/or polarity of the knob (17) during an insertion into Toyama's modified adapter (20). EX1002: ¶515. The narrow first key must align with the narrow keyway, and the wider second key must align with the wider keyway. *Id.* Toyama's modified plug body will not mate with Toyama's modified adapter if inserted upside down. *Id.*



EX1014: Figs. 7(a) and 10(a) (annotated, modified).

Therefore, the Toyama/Shimozu combination renders this claim obvious.

EX1002: ¶516.

## F. Claim 5

### 5.a

Toyama discloses a crimping ring (2f), which is “a crimp band,” secured around an outer surface of the stop ring (2e). EX1014: ¶[0022]; EX1002: ¶517.

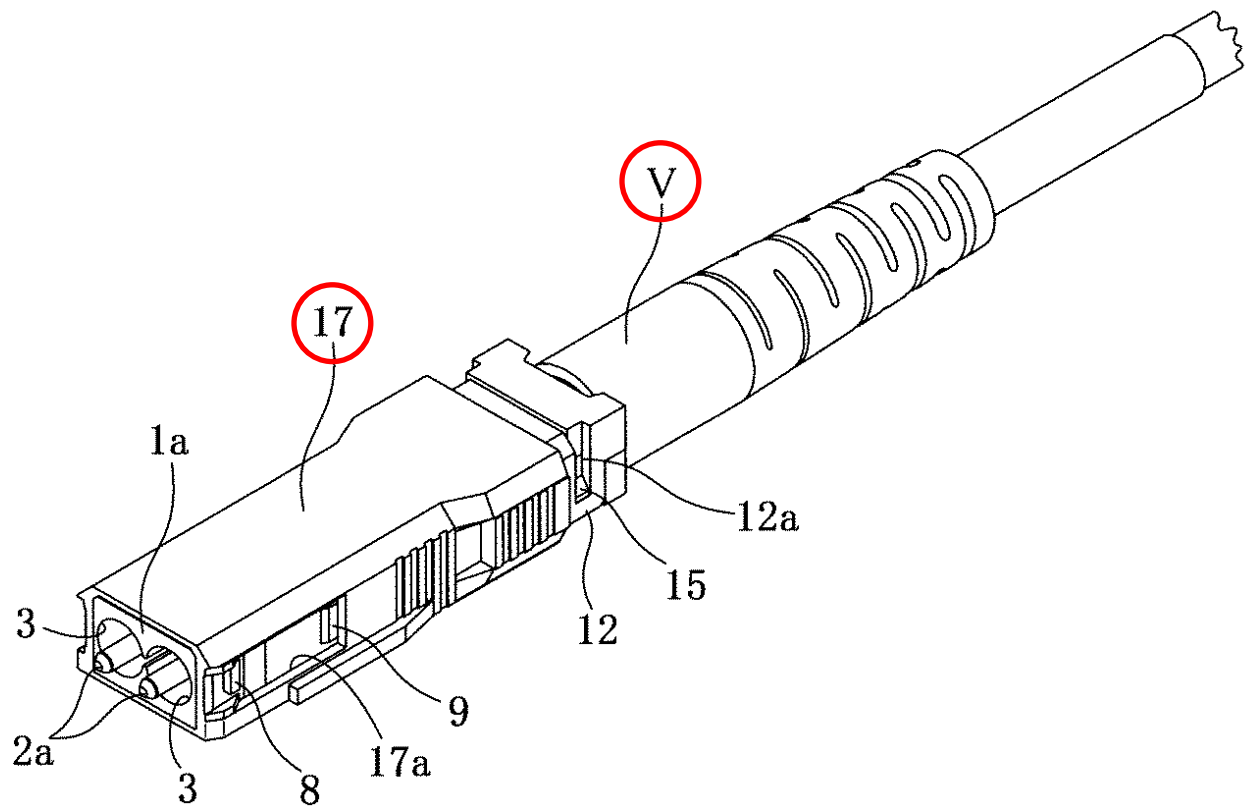
This diagram shows an exploded perspective view of a cable connector assembly. The main components are:

- Connector Housing (1):** A rectangular housing with a front face (1a) and a rear face (1b). It features a front face (1a) with two circular ports (2a) and a rear face (1b) with a rectangular opening (3). The housing is divided into two main sections (5a(6a) and 5b(6b)) by a central partition (7). The rear face (1b) has a rectangular opening (3) and a small rectangular feature (8).
- Internal Components:**
  - 10:** A central pin or probe extending from the front face (1a) through the housing.
  - 11a, 11b:** Small rectangular components located on the front face (1a) and rear face (1b) respectively.
  - 12:** A component located inside the housing, near the front face (1a).
  - 13a, 13b:** Components located on the front face (1a) and rear face (1b) respectively, near the central partition (7).
  - 15, 16:** Small rectangular components located on the front face (1a) and rear face (1b) respectively, near the central partition (7).
- Cable (2e):** A cable with a braided shield (2f) and an inner conductor (2g). The cable is connected to the rear face (1b) of the housing (1) via a connector (K).
- Other Labels:**
  - 2a:** A small rectangular component on the front face (1a).
  - 3:** A small rectangular component on the rear face (1b).
  - 5a(6a), 5b(6b):** The two main sections of the housing (1).
  - 7:** The central partition of the housing (1).
  - 8:** A small rectangular component on the rear face (1b).
  - 9:** A small rectangular component on the rear face (1b).
  - 10:** A central pin or probe extending from the front face (1a) through the housing.
  - 11a, 11b:** Small rectangular components located on the front face (1a) and rear face (1b) respectively.
  - 12:** A component located inside the housing, near the front face (1a).
  - 13a, 13b:** Components located on the front face (1a) and rear face (1b) respectively, near the central partition (7).
  - 15, 16:** Small rectangular components located on the front face (1a) and rear face (1b) respectively, near the central partition (7).
  - 17:** A small rectangular component on the rear face (1b).

Therefore, Toyama meets 5.a. EX1002: ¶518.

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

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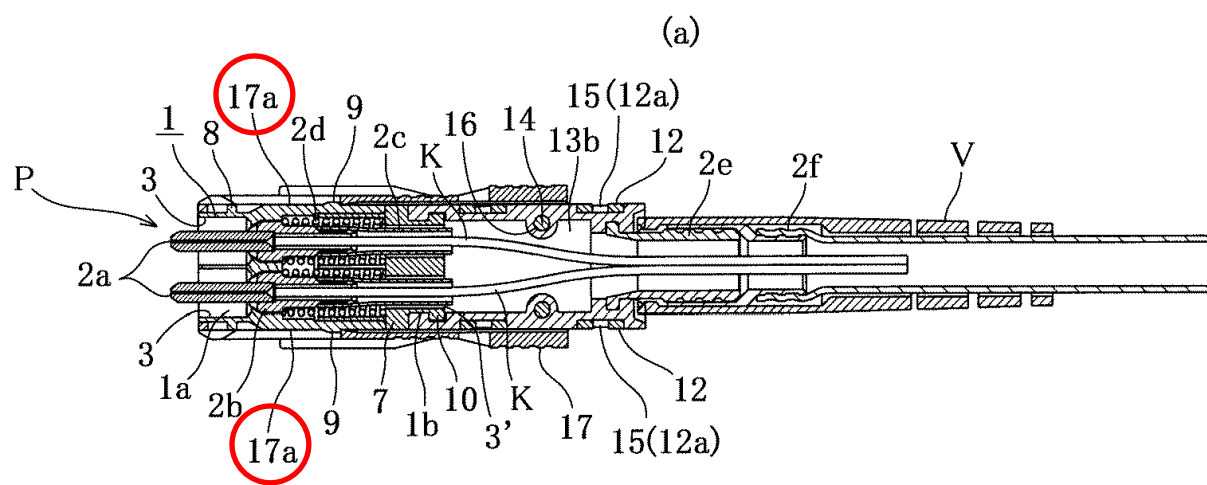
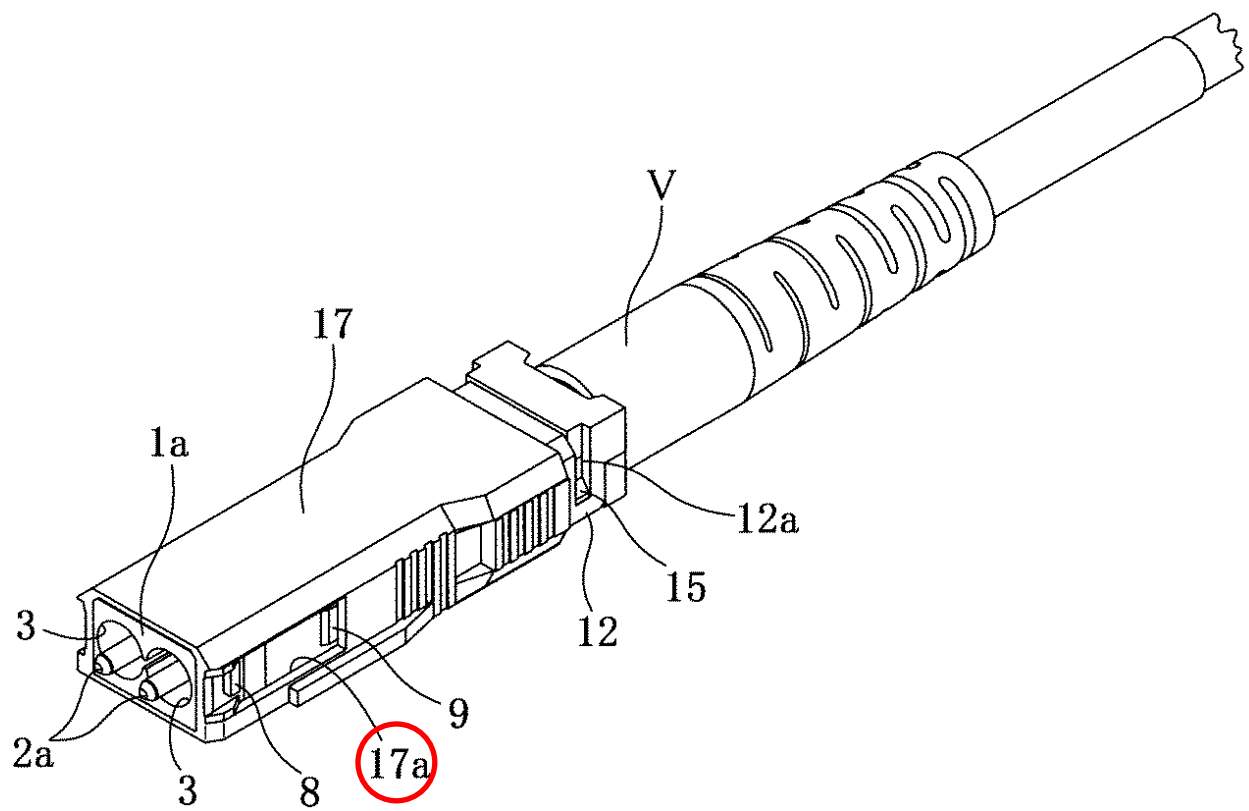


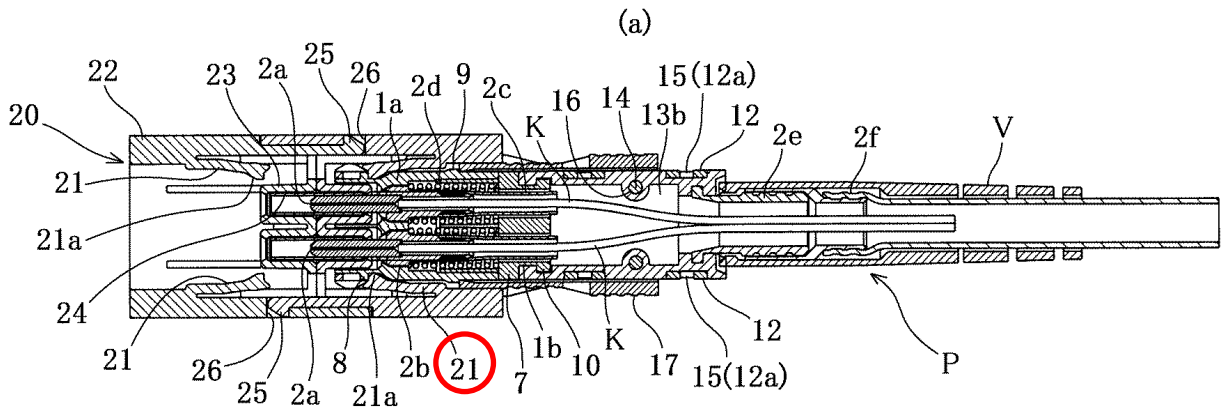
EX1014: Fig. 6 (annotated).

Therefore, Toyama meets 5.b. EX1002: ¶520.

### G. Claim 6

Each of Toyama's knob's (17) top and bottom surfaces includes openings (17(a)) (i.e., a receiving area), for elastic pieces (21) (i.e., a latch component) of the adapter (20) to secure the plug body (P) to the adapter. EX1014: ¶¶[0035], [0045]-[0047]; EX1002: ¶521.

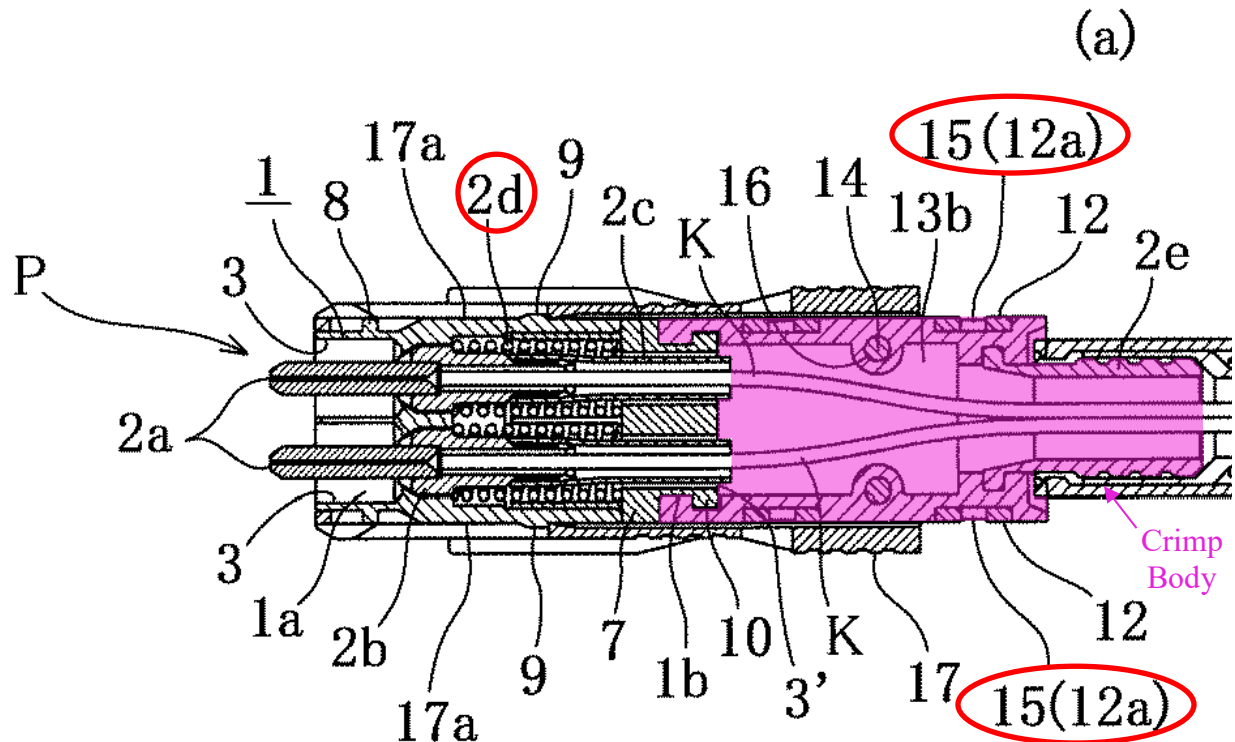




Therefore, Toyama meets this claim. EX1002: ¶524.

### I. Claim 10

Toyama's springs (2d) are positioned between top and bottom portions of Toyama's three-piece crimp body (2e, 11a, 11b), such as the mating pieces (12) and locking protrusions (15) thereof. EX1014: ¶¶[0029]-[0030]; EX1002: ¶¶525-526.



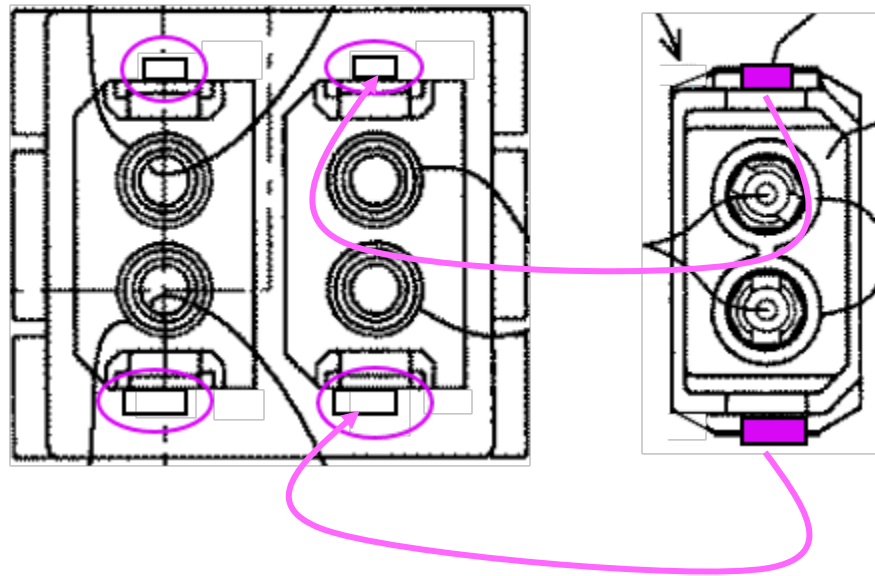
EX1014: Fig. 8(a) (annotated)

Therefore, Toyama meets this claim. EX1002: ¶527.

### J. Claim 11

As explained in Section XVII(A), in Toyama's modified plug body (P), the first and second keys (i.e., first and second projections) are sized to fit within

respective keyways (i.e., grooves) of Toyama's modified adapter (20). EX1002: ¶528.



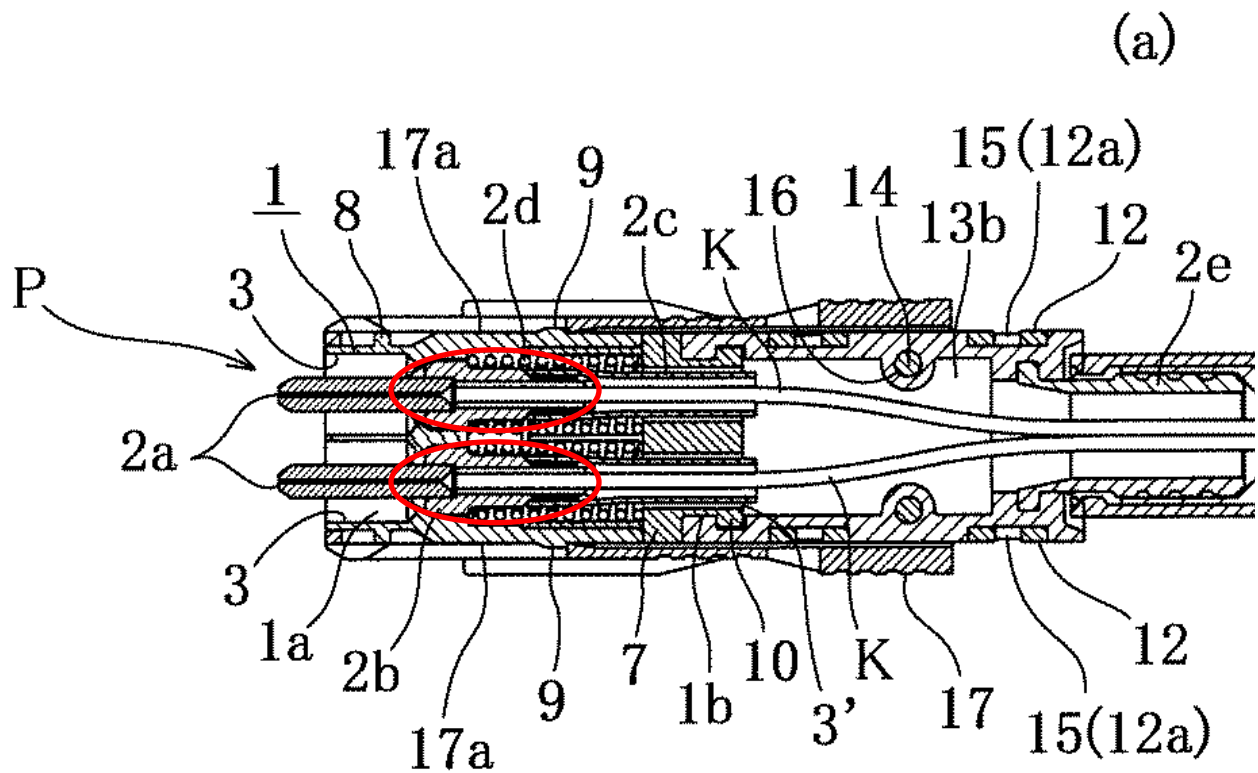
EX1014: Figs. 7(a) and 10(a) (annotated, modified).

Therefore, the Toyama/Shimozu combination renders this claim obvious.

EX1002: ¶529.

#### **K. Claim 12**

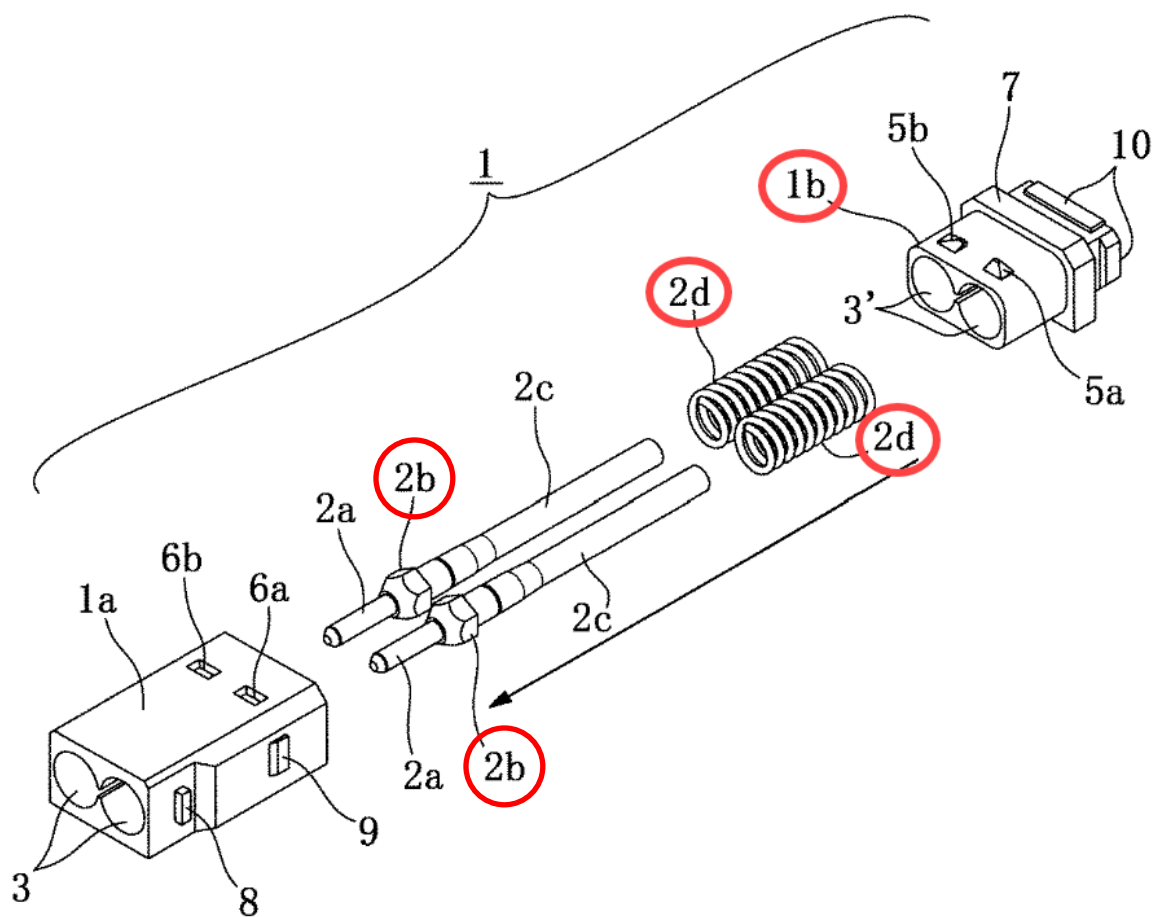
Toyama discloses ferrules (2a) seated in respective ferrule holders (2b), which are seated in respective openings (3) in the front case portion (1a). EX1014: ¶¶[0022]-[0023]; EX1002: ¶530. Under any construction of this claim, the two ferrule seats are located in the circled areas below. EX1002: ¶530.



EX1016: Fig. 8a (annotated).

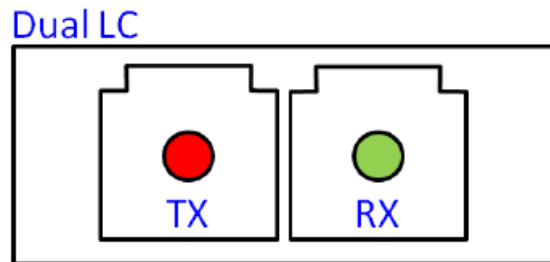
The front case portion (1a) includes a wall separating the ferrule assemblies between the locations where the ferrule assemblies are seated in the case and this wall is between the top and bottom surfaces of the knob (17). EX1002: ¶531.



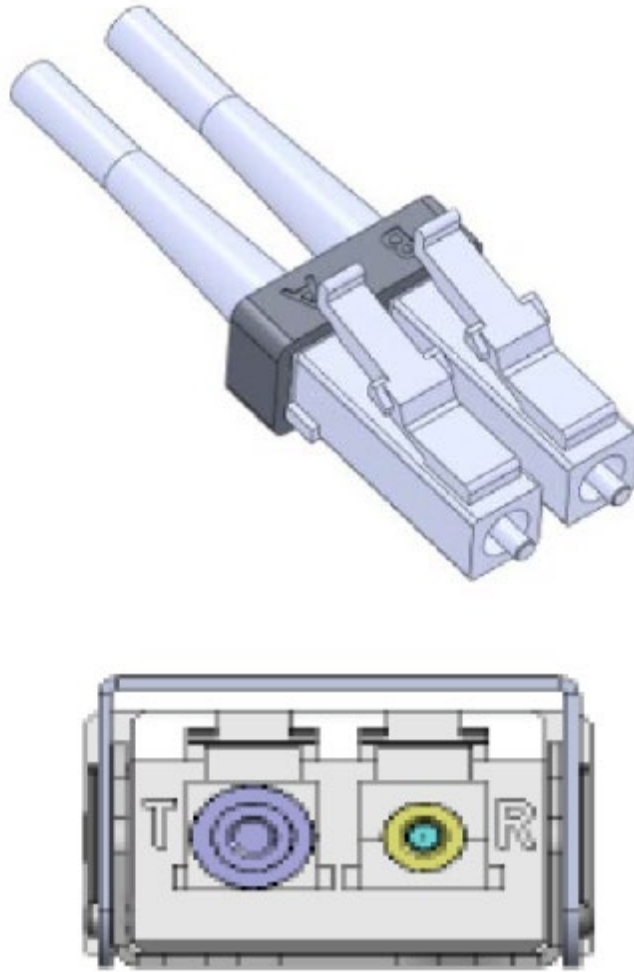




QSFP-DD discloses a QSFP footprint accommodates two LC connectors containing a total of two LC core wires. EX1015: Fig. 33; EX1002: ¶¶535-536. Therefore, since Toyama teaches its connection system doubles the number of wires in the same area, Toyama is understood to teach its connector would fit two double-core plug bodies (P) in the same QSFP footprint that accommodates two single-core LC plug bodies. EX1002: ¶536.

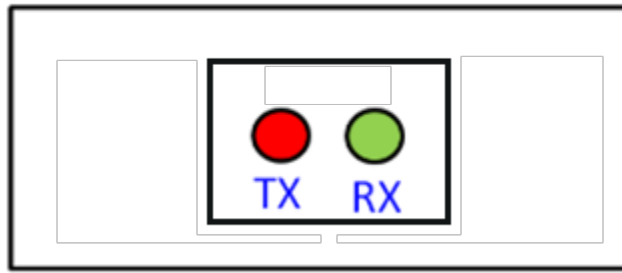


EX1015: Fig. 33.



EX1015: Fig. 37 (showing a conventional LC duplex connector and receptacle (called an “LC two-core slim-pack adapter” in Toyama) (EX1014: ¶[0015])).

To the extent US Conec contests whether two Toyama plug bodies (P) could fit in a QSFP footprint, as shown below, it is beyond dispute that one Toyama plug body would fit in a QSFP footprint if oriented so the long sides of the plug body are parallel to the long sides of the QSFP footprint. EX1002: ¶537.



EX1015: Fig. 33 (modified to show how a single Toyama connector would easily fit within the QSFP footprint).

Thus, the front end of Toyama’s knob (17) fits in a QSFP footprint.

EX1002: ¶538.

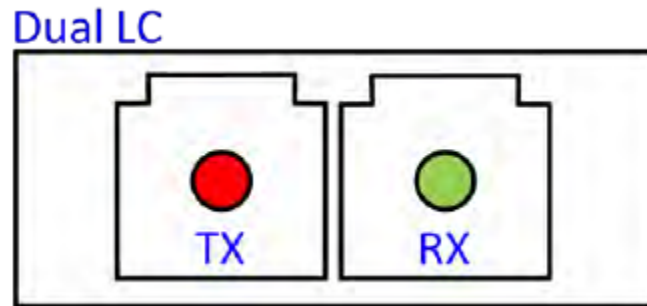
Therefore, Toyama/Shimozu/QSFP-DD (if needed) renders this claim obvious. EX1002: ¶539.

**XIX. GROUND 15: Claim 9 Would Have Been Obvious Over Toyama in view of Shimozu and SFP-DD (if needed).**

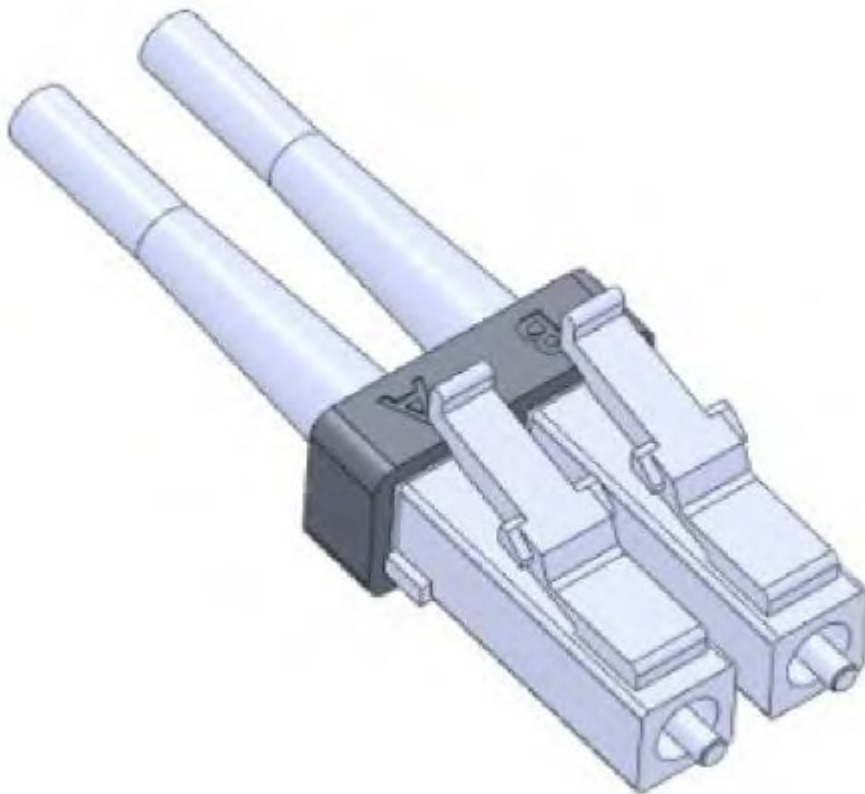
**A. Claim 9**

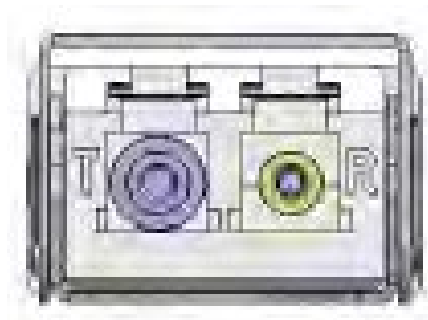
Toyama discloses, in comparison with standard LC components, its connection system “doubles the number of core wires that can be installed in communication equipment over the same area.” EX1014: ¶[0015]. Shown below, SFP-DD discloses a SFP footprint can accommodate two LC connectors containing a total of two LC core wires. EX1016: Fig. 22. Therefore, since Toyama teaches its connection system accommodates double the number of core wires in the same area, Toyama is understood to teach its connector would fit two

double-core plug bodies (P) in the same SFP footprint that accommodates two single-core LC plug bodies. EX1002: ¶541.



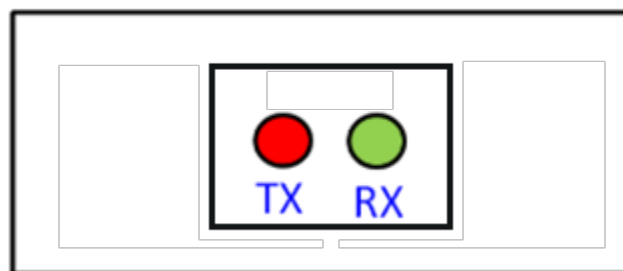
EX1016: Fig. 22.





EX1016: Fig. 24 (showing a conventional LC duplex connector and receptacle (called an “LC two-core slim-pack adapter” in Toyama) (EX1014: ¶[0015])).

To the extent US Conec contests whether two Toyama plug bodies (P) could fit in a SFP footprint, as shown below, it is beyond dispute that one Toyama plug body would fit in a SFP footprint if oriented so the long sides of the plug body are parallel to the long sides of the SFP footprint. EX1002: ¶542.



EX1016: Fig. 22 (modified to show how a single Toyama connector would easily fit within the SFP footprint).

Thus, the front end of Toyama’s knob (17) fits in a SFP footprint. EX1002: ¶543.

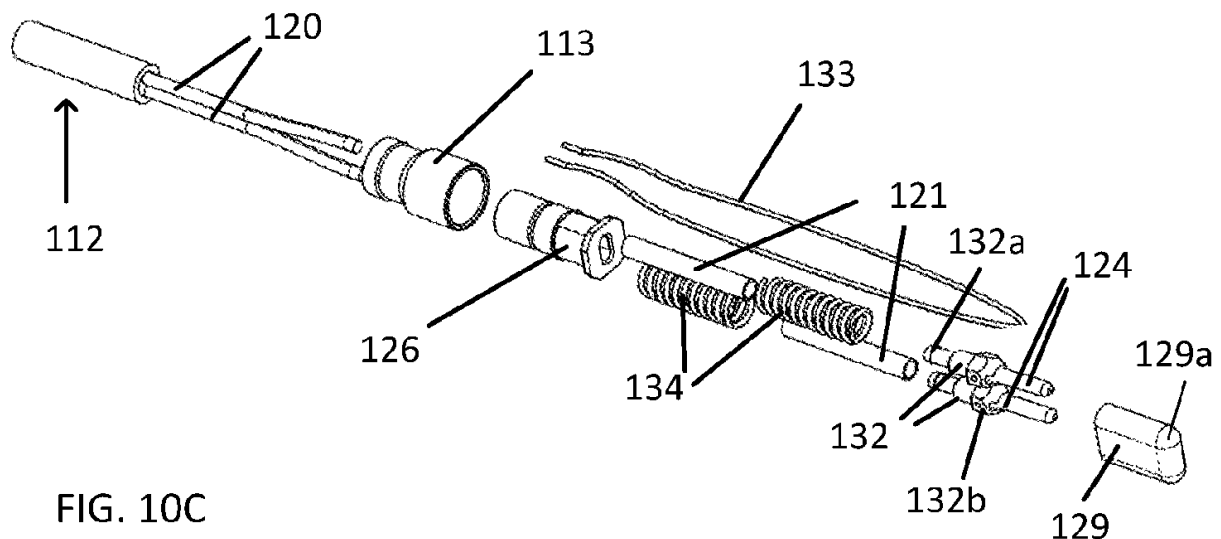
Therefore, Toyama/Shimozu/SFP-DD (if needed) renders this claim obvious. EX1002: ¶544.

**XX. GROUND 16: Claims 14 and 15 Would Have Been Obvious Over Toyama in view of Shimozu and Hill**

**A. Claim 14**

Toyama's plug body has LC-type ferrules but is silent as to their polish type. EX1014: ¶[0015], Fig. 1; EX1002: ¶¶545-548.

Hill discloses another two-ferrule optical fiber connector with ferrules "of the type LC APC (angle-polished connectors)." EX1007: Fig. 10C, ¶[0058]; EX1002: ¶549.



EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Toyama's plug body an "angled physical contact" type of ferrule in view of Hill for the reasons explained in Section X(A). EX1002: ¶550.

This modification is nothing more than a simple substitution of one known element (Hill's APC ferrule) for another (Toyama's ferrule) to yield predictable results (APC connector for lowest return loss applications). EX1002: ¶¶551-552.

This modification would have also been obvious to try for the reasons explained in Section X(A). EX1002: ¶553.

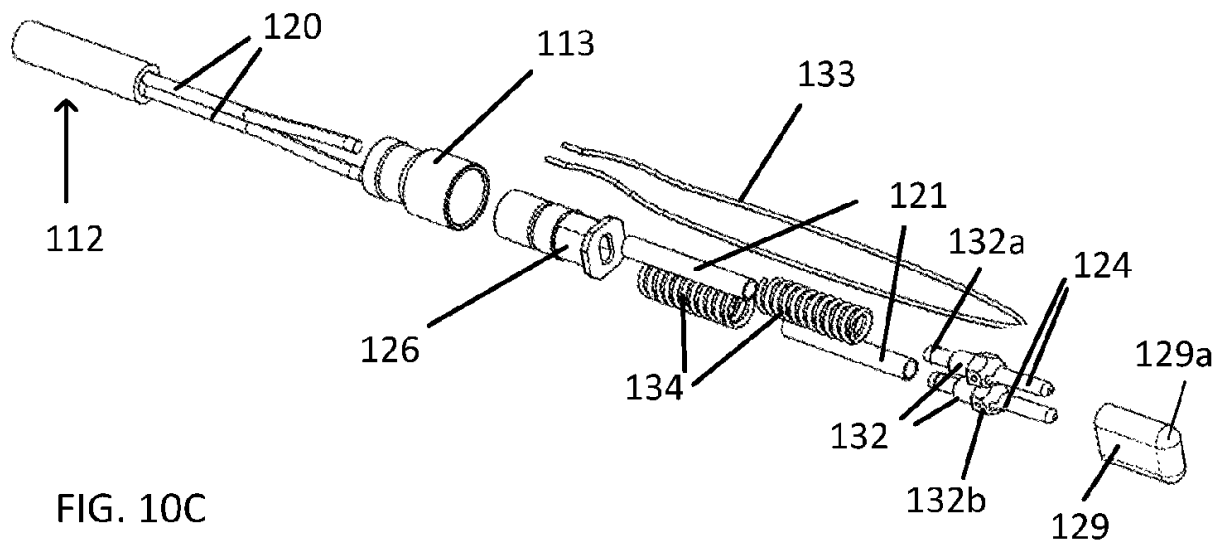
There would have been a reasonable expectation of success as both Toyama's and Hill's ferrules are of LC-type. EX1014: ¶[0015], Fig. 1; EX1007: ¶[0058]; EX1002: ¶554.

This modification results in the ferrules in Toyama's plug body being APC ferrules. EX1002: ¶555.

Therefore, the Toyama/Shimozu/Hill combination renders this claim obvious. EX1002: ¶556.

## **B. Claim 15**

Hill also teaches that the ferrules can be "of the type LC UPC (ultra-polished ferrules)." EX1007: Fig. 10C, ¶[0058]; EX1002: ¶¶557-560.



EX1007: Fig. 10C.

It would have been obvious to make the ferrules of Toyama’s plug body an “ultra-physical contact” type of ferrule in view of Hill for the reasons explained in Section X(B). EX1002: ¶561.

This modification is nothing more than a simple substitution of one known element (Hill’s UPC ferrule) for another (Toyama’s ferrule) to yield predictable results (UPC connector for low return loss and budget applications). EX1002: ¶¶562-563.

This modification would have also been obvious to try for the reasons explained in Sections X(A)&(B). EX1002: ¶564.

There would have been a reasonable expectation of success as both Toyama’s and Hill’s ferrules are of LC-type. EX1014: ¶[0015], Fig. 1; EX1007: ¶[0058]; EX1002: ¶565.

This modification results in the ferrules in Toyama’s plug body being UPC ferrules. EX1002: ¶566

Therefore, the Toyama/Shimozu/Hill combination renders this claim obvious. EX1002: ¶567.

## **XXI. 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: ¶568.

## **XXII. TAKANO’209, TAKANO’369, AND WONG ARE PRIOR ART TO THE ‘994 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’209, Takano’369, and Wong are prior art under any test established.

**A. Takano’209 is Effectively Filed as of the ‘276 Provisional’s Filing Date**

Takano’209 meets the “ministerial requirements” to claim priority to the ‘276 Provisional, as Takano’209 claims the benefit of the ‘276 Provisional (EX1003: ¶[1001]); Takano’209 was filed co-pending with the ‘276 Provisional (EX1003: (22)), and Takano’209 shares common inventors with the ‘276 Provisional (EX1003: (72); EX1004: 17). EX1002: ¶¶569-573.

Further, the ‘276 Provisional describes the subject matter in Takano’209 forming the grounds of this Petition. EX1002: ¶574. The correspondence between the specification of Takano’209 and the ‘276 Provisional is summarized in the following chart:

| <b>Takano’209’s Disclosure</b>                      | <b>‘276 Provisional’s Corresponding Disclosure</b> |
|-----------------------------------------------------|----------------------------------------------------|
| ¶¶[0091]-[0094], [0105]-[0108]<br>Figs. 3-5, 11A-13 | ¶¶[89]-[92], [102]-[105]<br>Figs. 3-5, 11A-13      |
| ¶¶[0117]-[0132]<br>Figs. 21A-36B                    | ¶¶[111]-[125]<br>Figs. 21A-36B                     |
| ¶¶[0137]-[0138]<br>Figs. 41-42B                     | ¶¶[130]-[131]<br>Figs. 41-42B                      |

Significantly, the figures identified in the chart above are generally identical between Takano’209 and the ‘276 Provisional. EX1002: ¶¶575-576.

**B. Takano’369 is Effectively Filed as of the ‘710 Provisional’s Filing Date**

Takano’369 meets the “ministerial requirements” to claim priority to the ‘710 Provisional, as Takano’369 claims the benefit of the ‘710 Provisional (EX1009: 1:26-28); Takano’369 was filed co-pending with U.S. App. No. 17/327,197 which also claims priority to the ‘710 Provisional (EX1009: (22); EX1031: 358), and Takano’369 shares common inventors with the ‘710 Provisional (EX1009: (72); EX1010: 30). EX1002: ¶¶577-578.

Further, the ‘710 Provisional describes the subject matter in Takano’369 forming the grounds of this Petition. EX1002: ¶579. The correspondence between the specification of Takano’369 and the ‘710 Provisional is summarized in the following chart:

| <b>Takano’369’s Disclosure</b> | <b>‘710 Provisional’s Corresponding Disclosure</b> |
|--------------------------------|----------------------------------------------------|
| 18:63-19:50                    | ¶¶[0041]-[0044]                                    |
| Figs. 53-55, 61, 64, 65        | Figs. 3-5, 11, 14, 15                              |

Significantly, the figures identified in the chart above are generally identical between Takano’369 and the ‘710 Provisional. EX1002: ¶¶580-581.

Takano’369 also meets the “ministerial requirements” to claim priority to the ‘276 Provisional, which describes Figs. 21A-52 of Takano’369. EX1009: (22), (72), 1:8-30; EX1004: Figs. 21A-52, 17. EX1002: ¶¶582-585.

**C. Wong is Effectively Filed as of the ‘901 Provisional’s Filing Date**

Wong meets the “ministerial requirements” to claim priority to the ‘901 Provisional, as Wong claims the benefit of the ‘901 Provisional (EX1012: ¶[0001]); Wong was filed co-pending with the ‘901 Provisional (EX1012: (22)), and Wong shares a common inventor with the ‘901 Provisional (EX1012: (72); EX1013: 19). EX1002: ¶¶586-587.

Further, the ‘901 Provisional describes the subject matter in Wong forming the grounds of this Petition. EX1002: ¶588. The correspondence between the specification of Wong and the ‘901 Provisional is summarized in the following chart:

| <b>Wong’s Disclosure</b>                | <b>‘901 Provisional’s Corresponding Disclosure</b>               |
|-----------------------------------------|------------------------------------------------------------------|
| ¶¶[0007], [0067]-[0072], [0085], [0088] | ¶¶[0003]-[0007], [0118]-[0126]                                   |
| Figs. 1A-4D, 8B.1-2, 10A-D              | Figs. 16A-17E, 19-22B, 24-27B, 29-33, 43A-D, 45A-D, 52A-B, 54B-C |

Significantly, the figures of Wong and the ‘901 Provisional identified in the chart above show generally identical latch couplings, dovetail fittings, and push-pull tab clips, the features of Wong relied upon in this Petition. EX1002: ¶¶589-590.

**XXIII. THE BOARD SHOULD NOT DENY INSTITUTION**

No denial under 35 U.S.C. §314(a) is warranted because the related district-court proceeding is already stayed. EX1033. 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). Takano’209, Lee, and Wong were cited but never applied. EX1032: 13-35. *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’209, Lee, or Wong. EX1032: 13-22. In fact, no prior art was applied against the claims. EX1032: 13-22. Thus, the Examiner made a material error not applying these references, such as Takano’209 which anticipates many of the claims as demonstrated herein.

#### **XXIV. 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 ‘994 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 ‘994 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. Senko is currently requesting *post-grant* review of U.S. Patent No. 11,733,466, the parent of the ‘994 Patent, in PGR2024-00032.

**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:

| <b>LEAD COUNSEL</b>                                                                                                                                                                | <b>BACK-UP COUNSEL</b>                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| <b>BACK-UP COUNSEL</b>                                                                                                                                                             | <b>BACK-UP COUNSEL</b>                                                                                                                                                                        |
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| <b>BACK-UP COUNSEL</b>                                                                                                                                                             |                                                                                                                                                                                               |
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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).

**XXV. GROUNDS FOR STANDING**

The ‘994 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 ‘994 Patent’s grant date (November 7, 2023).

**XXVI. CONCLUSION**

For these reasons, *post-grant* review of the ‘994 Patent is requested.

Dated: July 23, 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 July 23, 2024, a copy of the PETITION FOR POST-GRANT REVIEW OF U.S. PATENT NO. 11,808,994 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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By: /Kurt F. James/  
Lead Counsel for Petitioner  
Kurt F. James  
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**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 18,689 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