

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

US CONEC LTD.,
Petitioner

v.

SENKO ADVANCED COMPONENTS, INC.,
Patent Owner

Case IPR2024-00122
Patent No. 11,061,190

**PATENT OWNER'S PRELIMINARY RESPONSE TO THE
PETITION FOR INTER PARTES REVIEW**

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EXHIBIT LIST

Exhibit No.	Description
2001	International Standard IEC 61754-20
2002	Universal LC Fiber Cable - Singlemode 9/125 - Plenum 4M with Uniboot LC Connectors (SKU: FODULC-SNG-4m)
2003	PolyPhaser Fiber Optic Patch Cord Duplex Uniboot LC to LC Single Mode Fiber, OFNR, Yellow 3.0mm Jacket, 5m (SKU: FPC2LCLC-USMRY30-05)
2004	Huber+Suhner LC-XD Connector
2005	L-com Fiber Coupler, LC Duplex Bronze Sleeve, Low Profile (SKU: FOA-802)
2006	Application Note: Understanding Duplex Polarity
2007	Declaration of Eric Pearson
2008	<i>Curriculum Vitae</i> of Eric Pearson
2009	Cambridge Dictionary Definition of Elongate
2010	U.S. Patent No. 11,428,875
2011	U.S. Patent No. 11,846,813
2012	U.S. Publication No. 2023/0393351
2013	U.S. Publication No. 2023/0213709
2014	Terminating and Crimping for Fiber Optics: Methods and Tips
2015	Proper Crimping Techniques are Critical When Terminating Fiber Optic Connectors
2016	The Importance of Proper Crimping in Fiber Optic Assemblies
2017	U.S. Patent No. 9,568,689
2018	U.S. Publication No. 2012/0213484
2019	U.S. Patent No. 11,525,965
2020	U.S. Patent No. 11,719,893

Emphasis added throughout unless otherwise indicated

I. INTRODUCTION

Patent Owner Senko Advanced Components, Inc. (“Patent Owner” or “Senko”) respectfully requests that the Board deny US Conec Ltd.’s (“Petitioner” or “US Conec”) Petition and decline to institute *Inter Partes* Review of claims 1-3, 6-16, 19 and 20 of U.S. Patent No. 11,061,190 (“the ‘190 Patent”).

US Conec’s obviousness contentions (Grounds 1-4) all fail. US Conec identifies two primary obviousness combinations: (1) Nakagawa/Raven (Ground 1) and (2) Veatch/Connelly (Ground 3). But these combinations fail because neither meets all the claim limitations of the sole independent claim of the ‘190 Patent being challenged by US Conec.¹ Because US Conec’s obviousness combinations do not teach each and every element of independent claim 1, US Conec’s obviousness Grounds 1-4 fail to demonstrate the unpatentability of any of the challenged claims.

II. BACKGROUND OF THE ‘190 PATENT

A. Overview of Duplex Fiber Optic Connectors

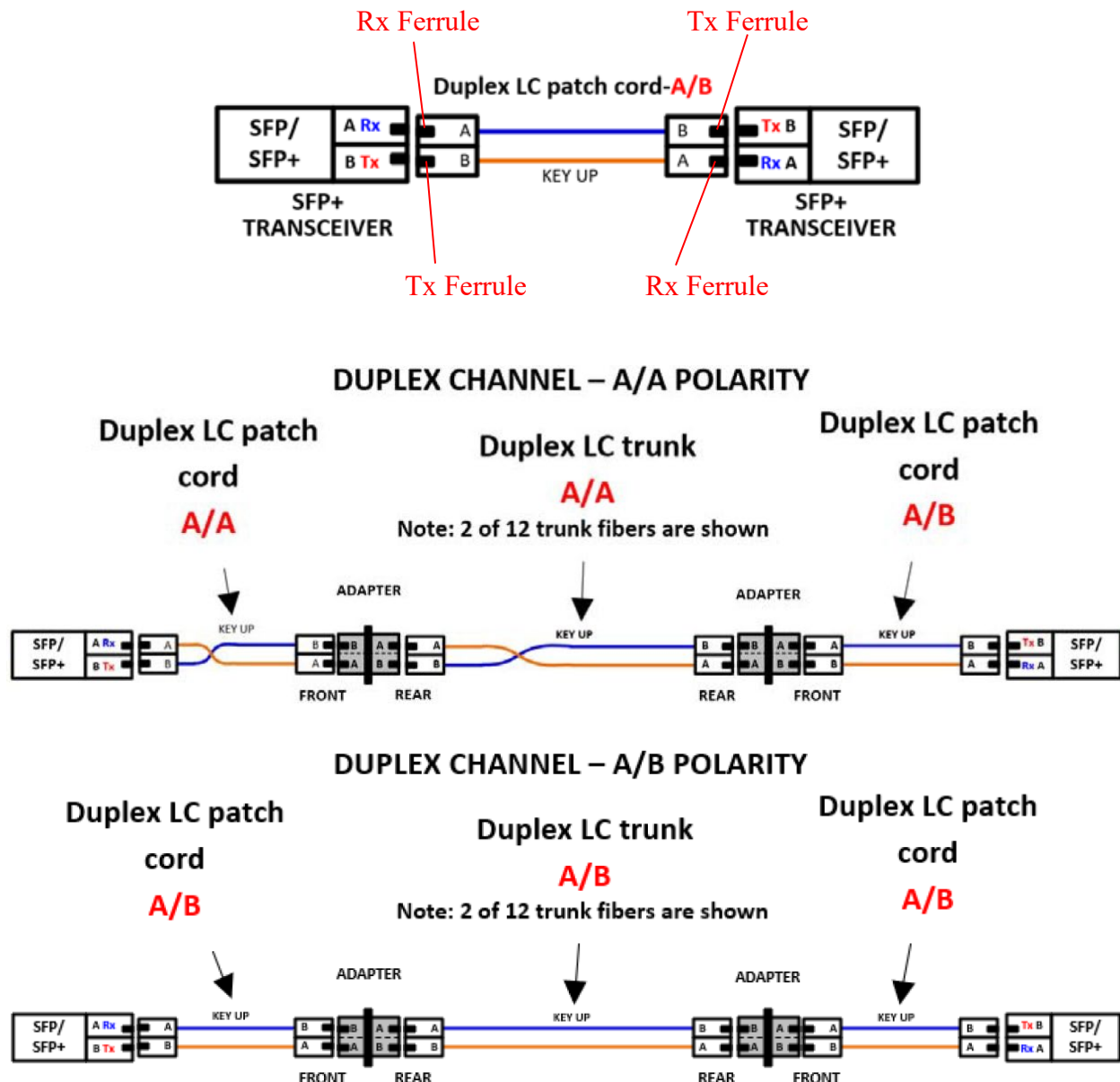
The ‘190 Patent pertains to a duplex fiber optic connector with two ferrules for terminating two optical fibers. EX1001: Abstract; EX2007: ¶18. Duplex fiber optic connectors mate with complementary duplex adapters and complementary

¹ The ‘190 Patent includes two independent claims: claim 1 and claim 5. But US Conec is not challenging independent claim 5.

duplex transceivers. EX2007: ¶19. Together a duplex fiber optic connector, complementary adapter(s), and the complementary transceiver(s) form an optical interconnect system. EX2007: ¶20. Duplex optical interconnect systems facilitate bi-directional communication over two optical fiber paths. One fiber path (e.g., an uplink fiber path) conveys an optical signal from a transmitter at a first location to a receiver at a second location, and the other fiber path (e.g., a downlink fiber path) conveys a signal from a transmitter at the second location to a receiver at the first location. *Id.*

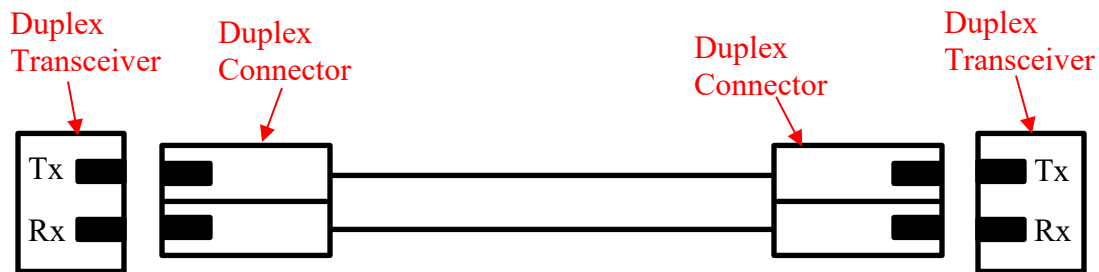
In the diagrams illustrated below, the transmitter and receiver at the first location are part of a first transceiver and the transmitter and receiver at the second location are part of a second transceiver. EX2006: 1, 2; EX2007: ¶21. The first transceiver at the first location has a transmit (Tx) port and a receive (Rx) port in communication with respective transmitter and receiver of the second transceiver at the second location. EX2007: ¶21. At each of the first and second locations, a duplex connector terminating a two-fiber cable has a Tx ferrule and an Rx ferrule. *Id.* To establish bi-directional communication, the Tx ferrule must be plugged into the Tx port and each Rx ferrule must be plugged into the Rx port, as shown in the schematic diagrams below. *Id.* This way, as can be traced below, one fiber path connects the transmitter of the first transceiver to the receiver of the second transceiver and the other fiber path connects the transmitter of the second

transceiver to the receiver of the first transceiver, thereby allowing the optical signals to be sent and received between the two transceivers. *Id.*



EX2006: 1, 2 (annotated).

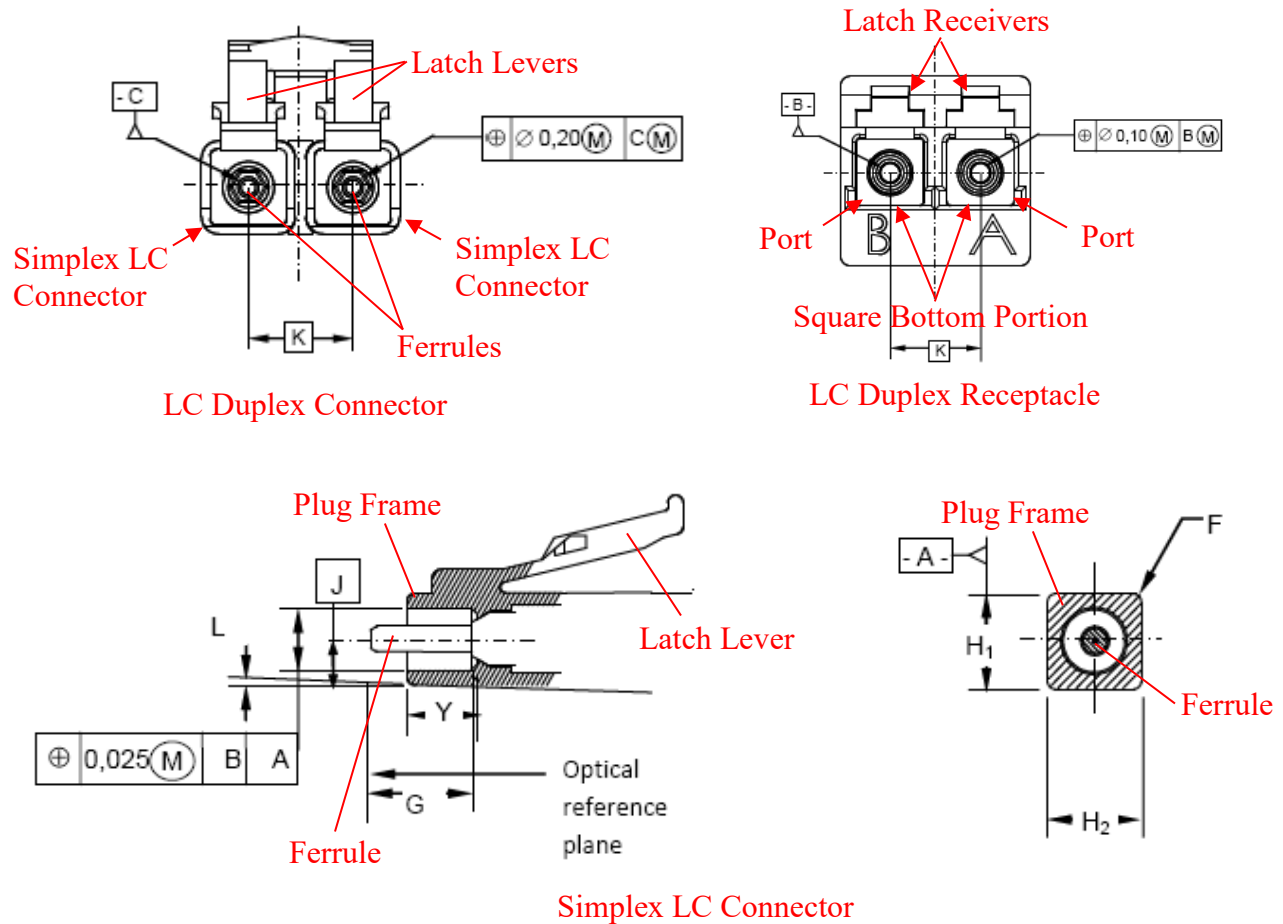
If Tx and Rx ferrules are plugged into the wrong ports (e.g., the Tx ferrule is plugged into the Rx port), no bi-directional communication link will be established between the two transceivers. EX2007: ¶¶22-23.



Schematic Diagram Showing Tx-to-Tx and Rx-to-Rx Connections Resulting in No Bi-Directional Communication Link. EX2007: ¶22.

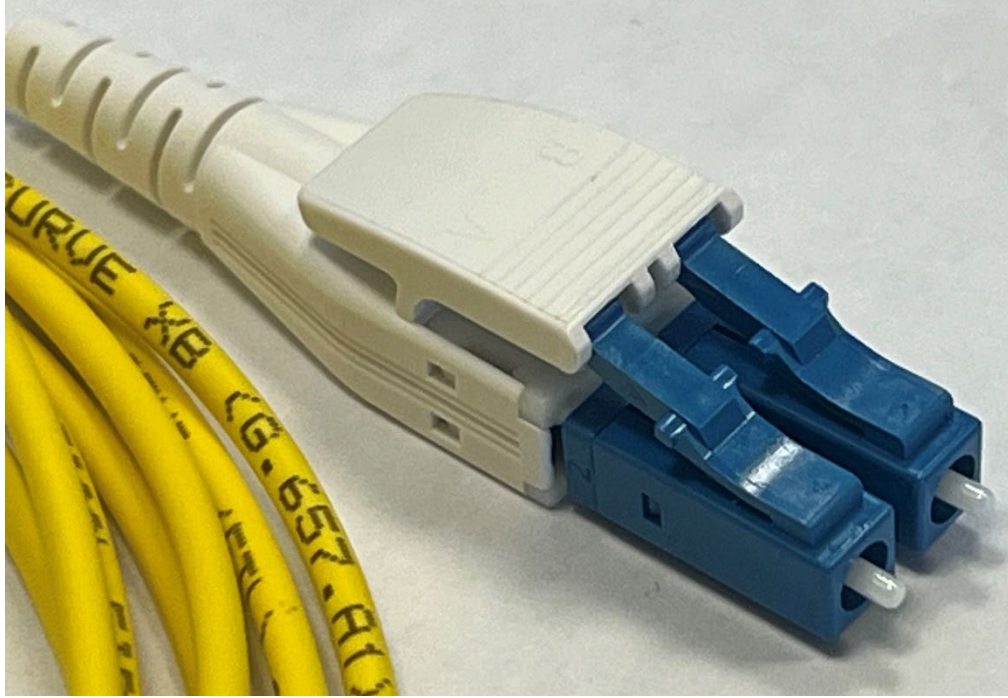
Duplex optical interconnect systems are designed with a keying feature to ensure that the connector can only plug into a mating receptacle of an adaptor or of a transceiver in one orientation to ensure the bi-directional communication link is established. EX1008: 1:27-32; EX2007: ¶27. One widely used duplex interconnect system is the standard LC duplex interconnect system, defined by the International Electrotechnical Commission (IEC). EX2001; EX2007: ¶28. As shown below, the standard LC duplex connector is made up of two simplex LC connectors held together. EX2007: ¶28. Each simplex LC connector includes a square plug frame that holds a spring-loaded single-fiber ferrule. *Id.* A latch lever is positioned on top of each plug frame. *Id.* The standard LC duplex receptacle includes two rectangular ports, one for each individual LC connector. *Id.* Each port has a square

bottom portion for mating with the square plug frame of the LC connector and an upper latch receiver configured for latching with the latch lever. *Id.*

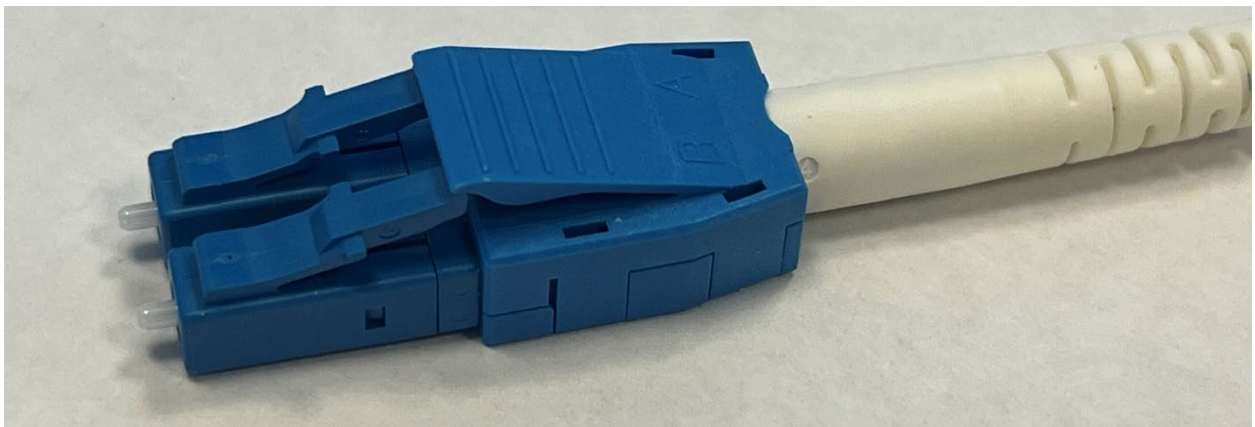


EX2001: Figs. 3, 5, and 8 (annotated).

Examples of various LC duplex connectors and an LC duplex adaptor are shown below:



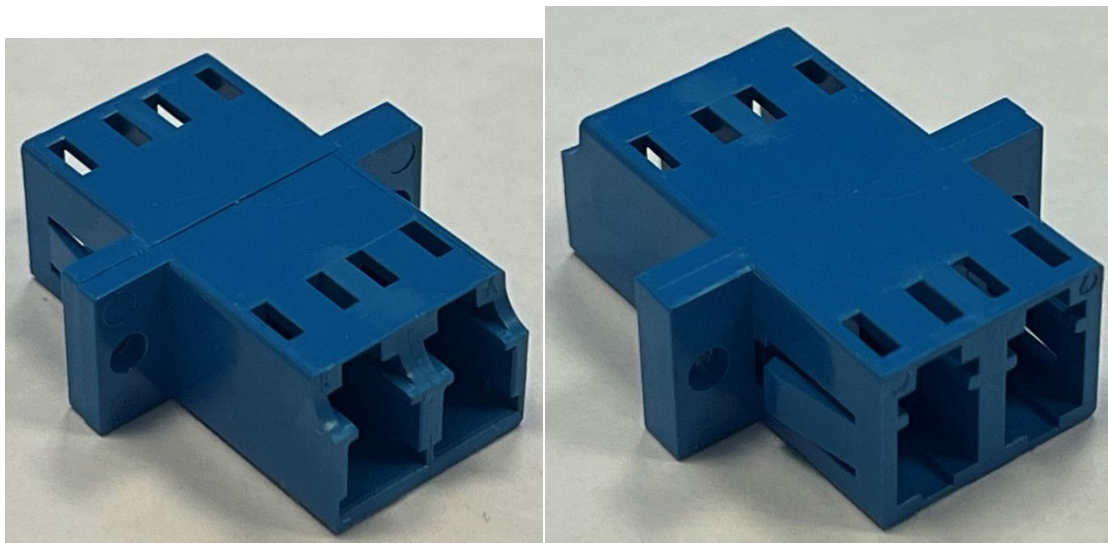
EX2002.



EX2003.



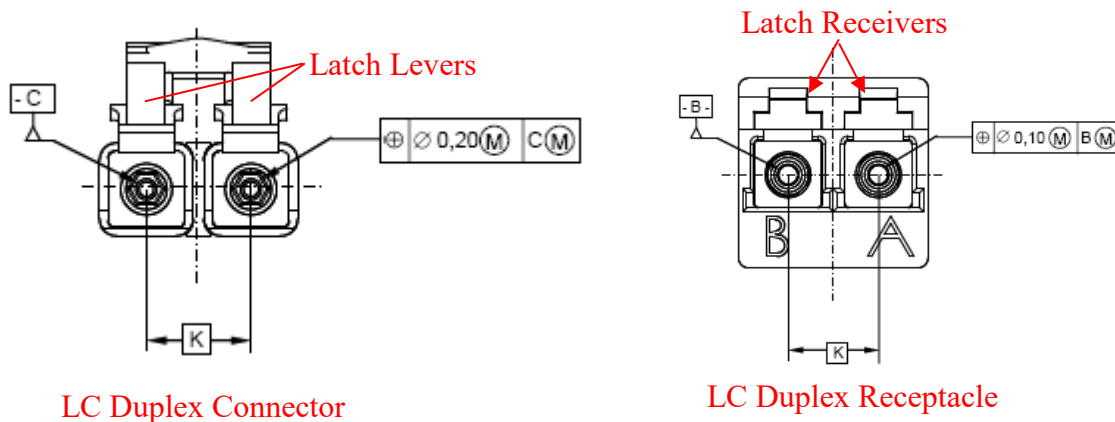
EX2004.



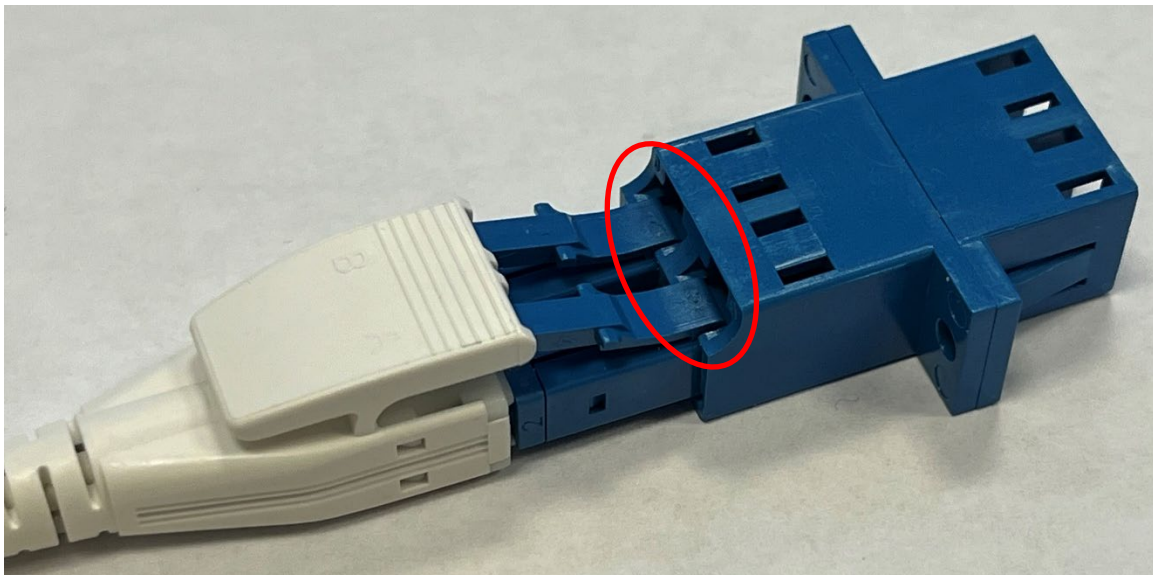
EX2005; EX2007: ¶¶32-45.

The LC duplex connector can only plug into the LC duplex adapter in one orientation, i.e., with the latch levers facing up to align with the latch receivers of the ports. EX2001: Figs. 3 and 8 (geometry of the adapter interface only allows the latch levers to be inserted in one orientation); EX2007: ¶46. The interface geometry blocks insertion of the LC duplex connector if it is upside down in

relation to the adapter. EX2001: Figs. 3 and 8; EX2007: ¶46. This interface geometry is shown below:



EX2001: Figs. 3 and 8 (annotated).



EX2002; EX2005 (annotated, a LC duplex connector partially inserted into a receptacle of a LC duplex adapter to show the alignment of the latch levers with the latch receivers); EX2007: ¶47.

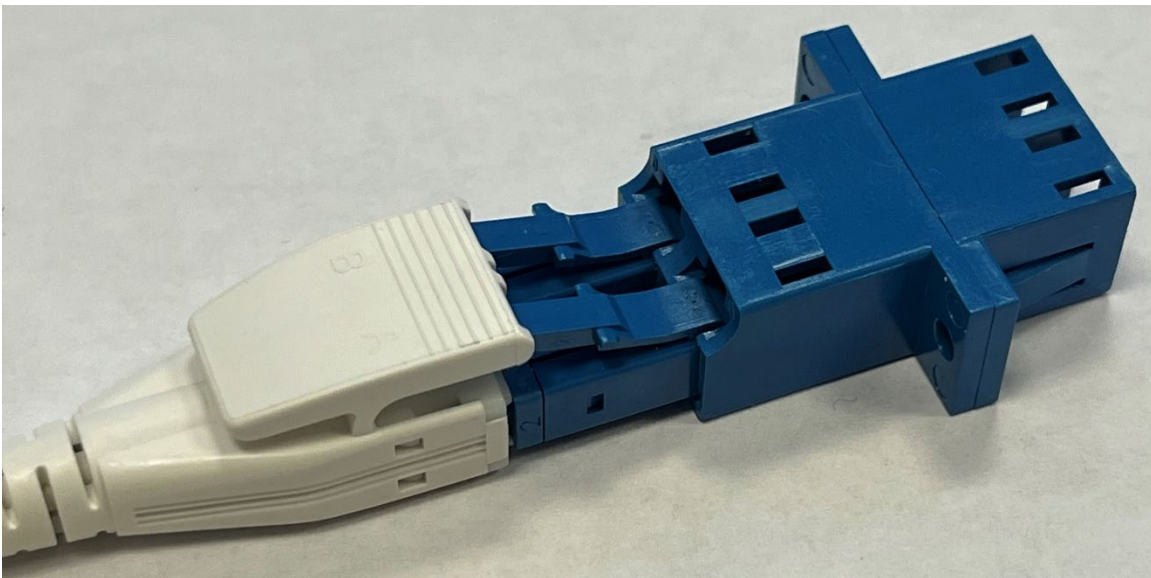
Thus, the latch levers function as keys that define a single proper mating orientation of the connector and restrict the LC duplex connector to being inserted into the LC duplex adapter in only this single proper mating orientation. EX2001: 6 (“plug has a single male key”); EX2007: ¶48.

B. Polarity in LC Duplex Connectors²

With this information in mind, we can now turn to the concept of “polarity” in LC duplex connectors. In general, “polarity” refers to the relative positions of the Tx and Rx ferrules in the connector when the connector is inserted into a corresponding adapter. EX2007: ¶50. Thus, *a frame of reference for the LC duplex connector* first needs to be established in order to talk about polarity and describe the relative positions of the Tx and Rx ferrules within the connector. EX2007: ¶51. Because the latch levers of an LC duplex connector allow insertion into a standard LC duplex adapter in *only one orientation* (e.g., a mating orientation), as explained above, a connector’s “polarity” is defined by the

² Senko is discussing “polarity” in terms of LC duplex connectors because the base references applied by US Conec in all the obviousness grounds are LC duplex connectors and 4 out of 5 references total applied by US Conec in the grounds are LC duplex connectors. EX2007: ¶49. And the one other reference (Connelly) is a variation of an LC duplex connector. *Id.*

positions of the Tx and Rx ferrules in relation to the latch levers. EX2007: ¶51. For simplicity, polarity will be discussed in terms of the positions of the Tx and Rx ferrules when the latch levers are on top of the connector. EX2007: ¶52. In other words, the connector positioned with the latch levers on top will be the frame of reference used to discuss the polarity of LC duplex connectors. *Id.* Orienting the LC duplex connector such that the latch levers are on the top side of the connector is the common mating orientation for inserting the connector into an LC duplex adapter. *Id.*

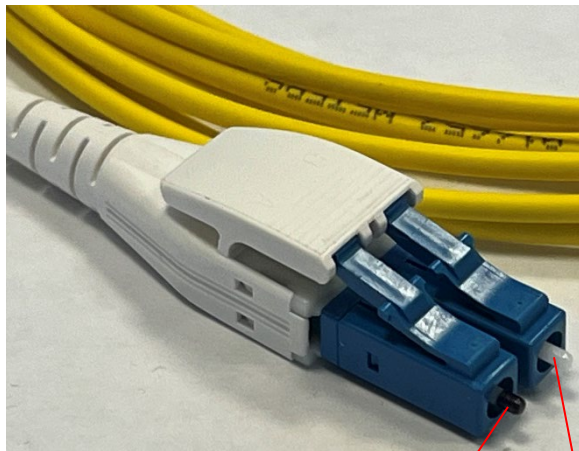


EX2002; EX2005 (a LC duplex connector partially inserted into a receptacle of a LC duplex adapter).

It is important for the LC duplex connector's polarity to match the polarity of the mating LC duplex adapter. EX2007: ¶53. That is, the Tx ferrule of the connector must mate with the Tx port of the adapter and the Rx ferrule of the

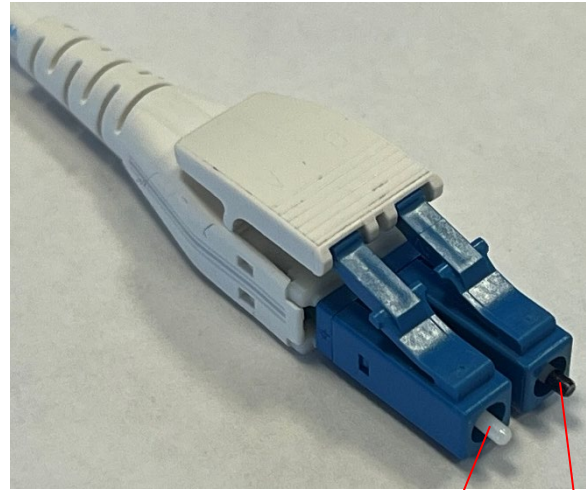
connector must mate with the Rx port of the adapter, or else optical communication will not be established. *Id.* Occasionally, the LC duplex connector will have the wrong polarity for the adapter in the field. EX1008: 1:23-27; EX2007: ¶53. For example, the position of the Tx and Rx ferrules in relation to the latch levers would cause the Tx ferrule to mate with the Rx port and the Rx ferrule to mate with the Tx port. EX2007: ¶53. In this scenario it is necessary to change the polarity of the LC duplex connector by changing the positions of the Tx and Rx ferrules in relation to the latch levers. *Id.*

An example of such a polarity change for an LC duplex connector is shown below. EX2007: ¶54. In this example, the positions of the Tx and Rx ferrules relative to the latch levers is different between the two polarities. *Id.* The LC duplex connector has a first polarity when the Tx ferrule (black) is on the left, the Rx ferrule (white) is on the right, and the latch levers are on the top. *Id.* The LC duplex connector has a second polarity when the Tx ferrule is on the right, the Rx ferrule is on the left, and the latch levers are on top. *Id.*



Tx Ferrule Rx Ferrule

First Polarity



Rx Ferrule Tx Ferrule

Second Polarity

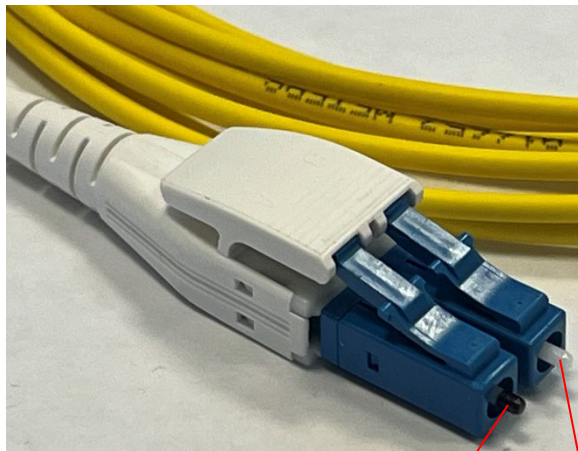
EX2002 (annotated).³

However, *it is not possible* to simply change the polarity of an LC duplex connector by flipping the entire connector over. EX1008: 1:27-32; EX1007: ¶[0012]; EX2007: ¶55. This is because LC duplex connectors can only be inserted into the LC duplex adapters in one orientation—and therefore the connector is not

³ These images show the same duplex LC connector in two different polarities.

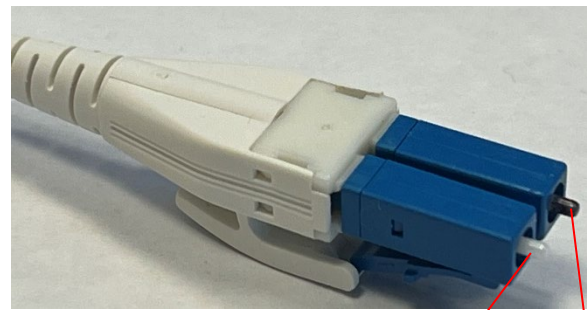
EX2007: ¶54. One ferrule has been colored black to clearly show the positions of the ferrules switching sides based on if the connector is in the first polarity or the second polarity. *Id.* The “first polarity” image shows the black-colored ferrule on the right-hand side of the connector and the “second polarity” image shows the same back-colored ferrule on the left-hand side of the connector. *Id.*

able to be connected to the adapter in this flipped over orientation. EX1008:27-32; EX1007: ¶[0012]; EX2007: ¶55. In other words, while the entire connector may have changed orientation in its flipped-over state, the positions of the Tx and Rx ferrules in relation to the latch levers (the frame of reference for polarity) have not changed, as shown below. EX2007: ¶55.



Tx Ferrule Rx Ferrule

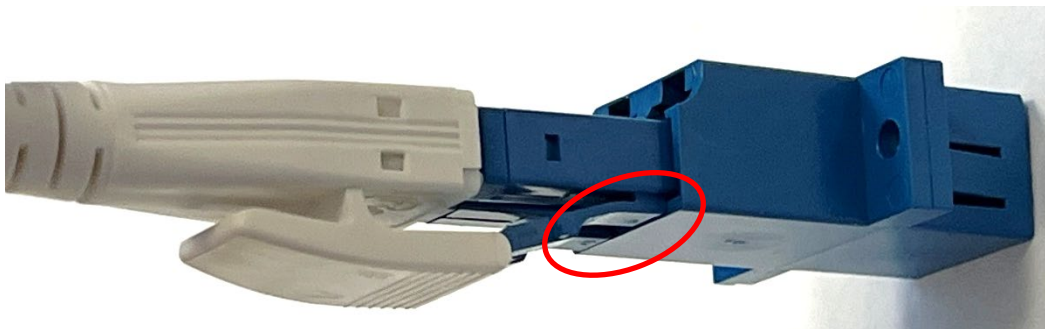
First Polarity (latch levers on top)



Rx Ferrule Tx Ferrule

First Polarity (latch levers on bottom)

EX2002 (annotated).⁴



⁴ See Footnote 3.

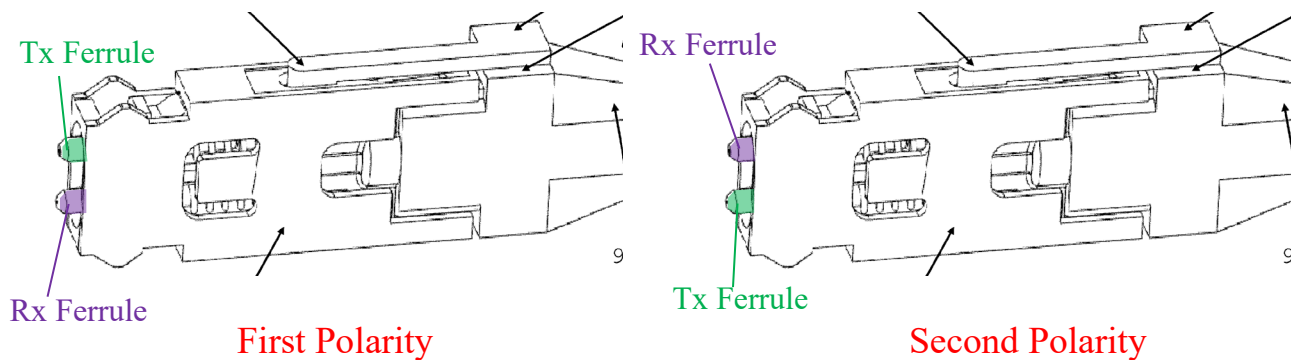
EX2002 (annotated, showing the interference between the latch levers of the LC duplex connector and the LC duplex adaptor that prevents the LC duplex connector from being connected to LC duplex adapter in the flipped-over state); EX2007: ¶56.

To allow an LC duplex connector to change polarity in the field, connector manufacturers developed various polarity change mechanisms that enable the end user to change the polarity of one of the connectors by switching the positions of the ferrules in relation to the connector's latch lever(s). EX2007: ¶¶57-59. The two primary references applied in the Petition, Nakagawa and Veatch (discussed in detail below), disclose polarity change systems for LC duplex connectors that facilitate switching the positions of the ferrules in relation to the connector's latch levers by separately repositioning multiple parts of the connector in a sequential series of steps. EX2007: ¶59. By contrast, the invention claimed in the '190 Patent provides a markedly improved polarity change mechanism that is easier and quicker to utilize in the field. EX1001: 7:4-10.

Furthermore, the prior art LC duplex connectors asserted by US Conec against the '190 Patent are considered "small form factor" ("SFF") connectors. EX2007: ¶60. By contrast, the drawings in the '190 Patent depict a next-generation "very small form factor" ("VSFF") connector roughly one-third the footprint of the LC duplex connector. *Id.* In contrast with the SFF LC duplex connector, most

VSFF duplex connectors are configured so that the first and second ferrules are spaced apart vertically when the keying feature is on the top side of the connector.

Id. Thus, a duplex VSFF connector has a first polarity when the Tx ferrule is above the Rx ferrule and a keying feature is on top. *Id.* The duplex VSFF connector has a second polarity when the Tx ferrule is below the Rx ferrule and the keying feature is on top. *Id.* Regardless of the type of duplex connector, the polarity is determined by the positions of the ferrules relative to the keying feature. *Id.*



EX1001: Fig. 16 (annotated to show first and second polarities).

III. OVERVIEW OF THE '190 PATENT

The '190 Patent is directed to optical connectors 9100 (Figs. 16-36) with a boot assembly 9109.1, 9209.1 that is rotatable for changing polarity. EX1001: Abstract; EX2007: ¶61. The same boot assembly 9109.1, 9209.1 is also configured to be pulled backward to unlatch the connector from a mating adapter. EX1001: Figs. 34-36, 8:58-9:23; EX2007: ¶61.

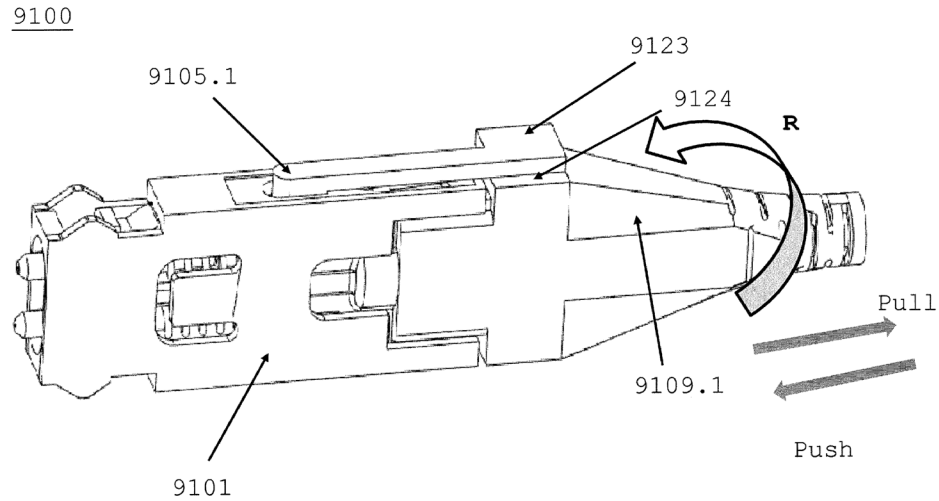


FIG. 16

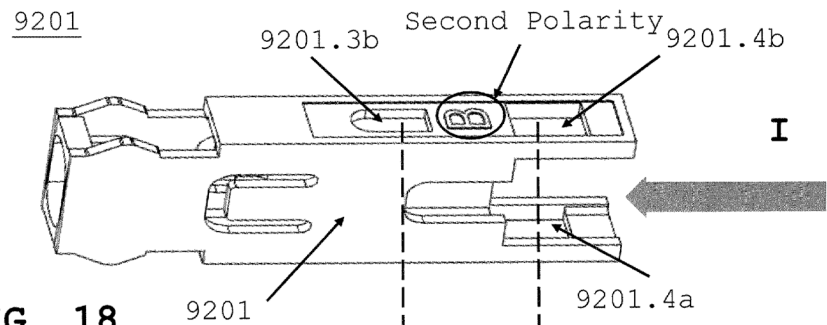


FIG. 18

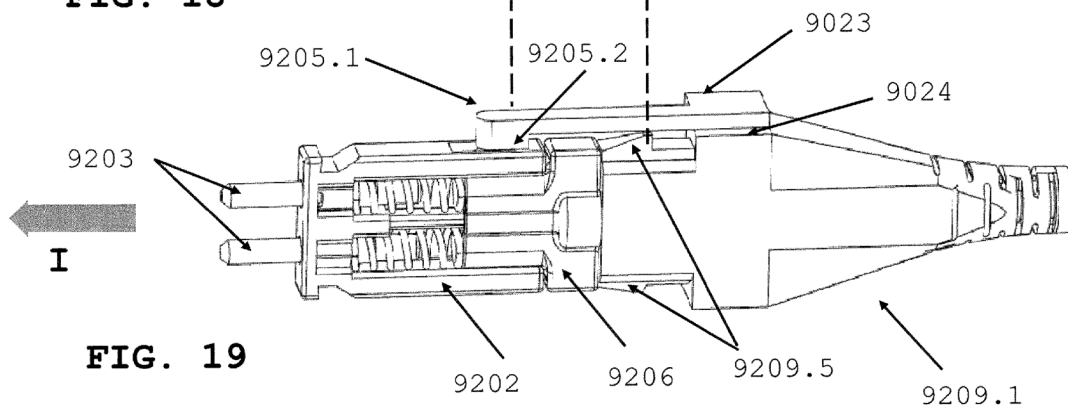


FIG. 19

The optical connector 9100 includes an outer housing 9101, 9201, a front body 9202, two ferrules 9203 supported by the front body, a back body 9206, a crimp ring 9207 (Fig. 34), and a rotatable boot assembly 9109.1, 9209.1, 9309.1,

9409.1. EX1001: Figs. 16-19, 6:13-16, 6:50-61, 8:48-51; EX2007: ¶62. The rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1 includes an alignment and offset key 9105.1, 9205.1, 9305.1, 9405.1 (broadly, a key) for setting the polarity of the optical connector 9100. EX1001: 6:19-22, 6:30-34, 6:50-51, 7:4-9; EX2007: ¶62. As shown below, the key 9105.1, 9205.1, 9305.1, 9405.1 is an elongate arm that extends forward along the longitudinal axis of the optical connector 9100:

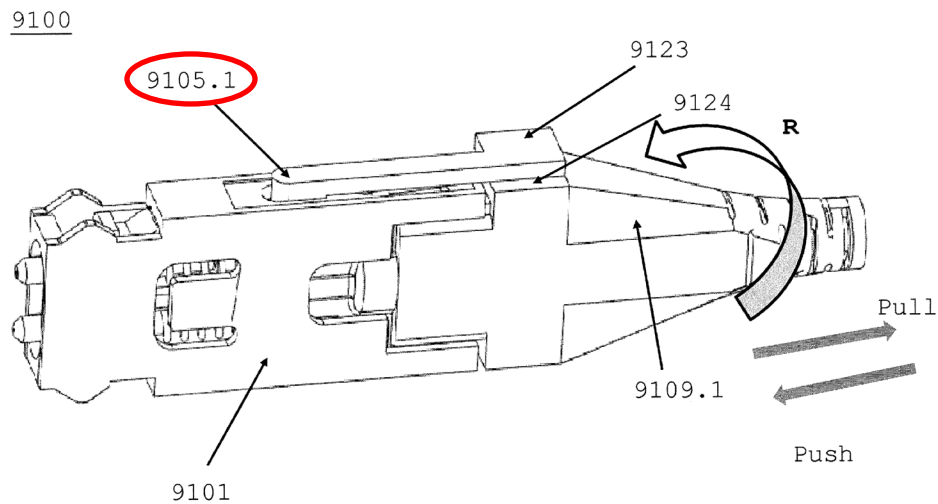


FIG. 16

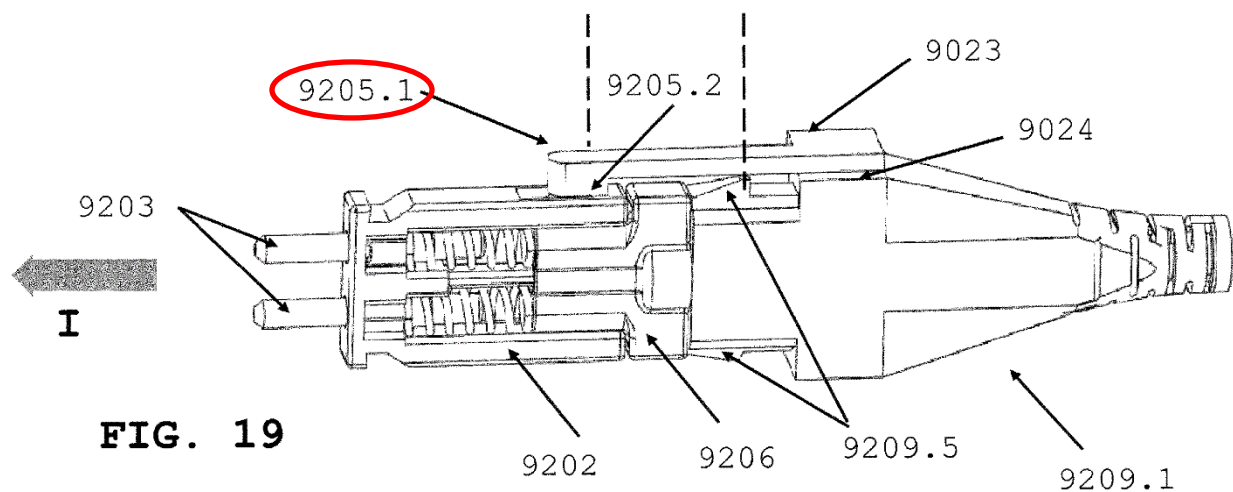


FIG. 19

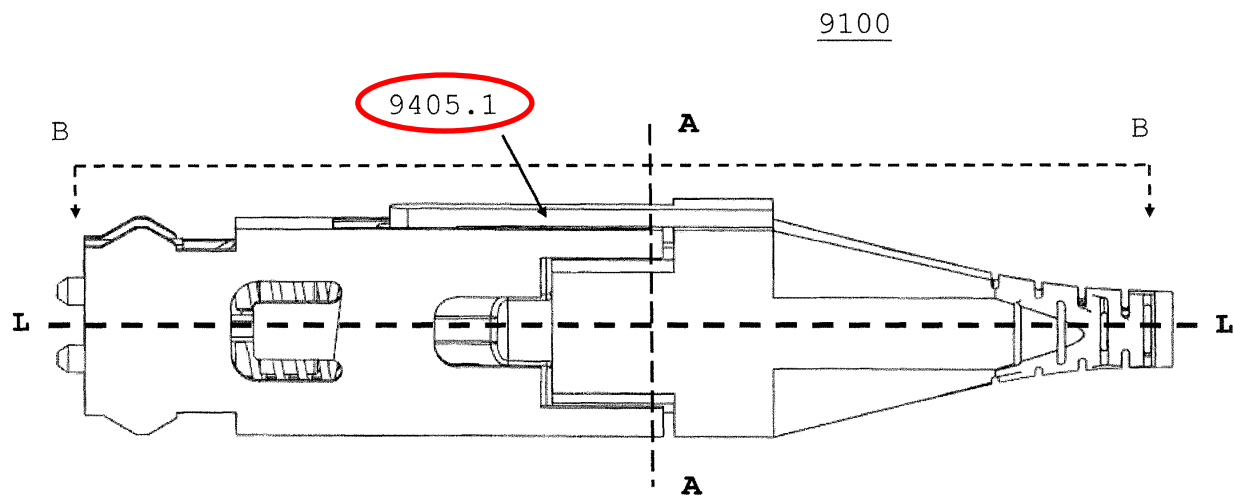
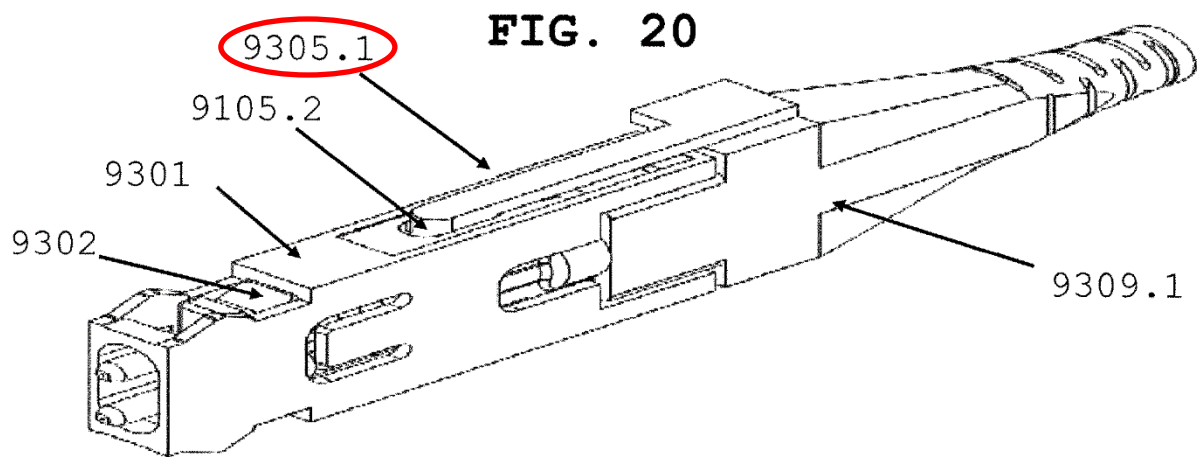


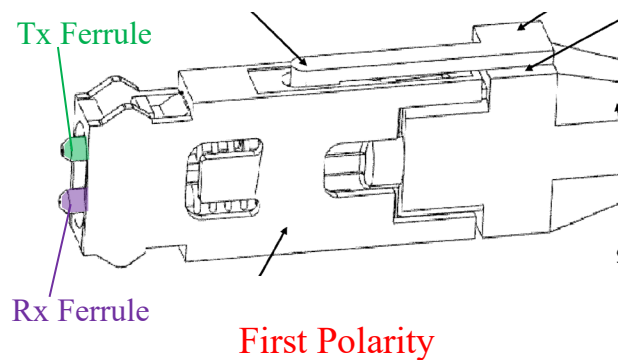
FIG. 24

EX1001: Fig. 16, 19, 20, and 24 (annotated); EX2007: ¶62.

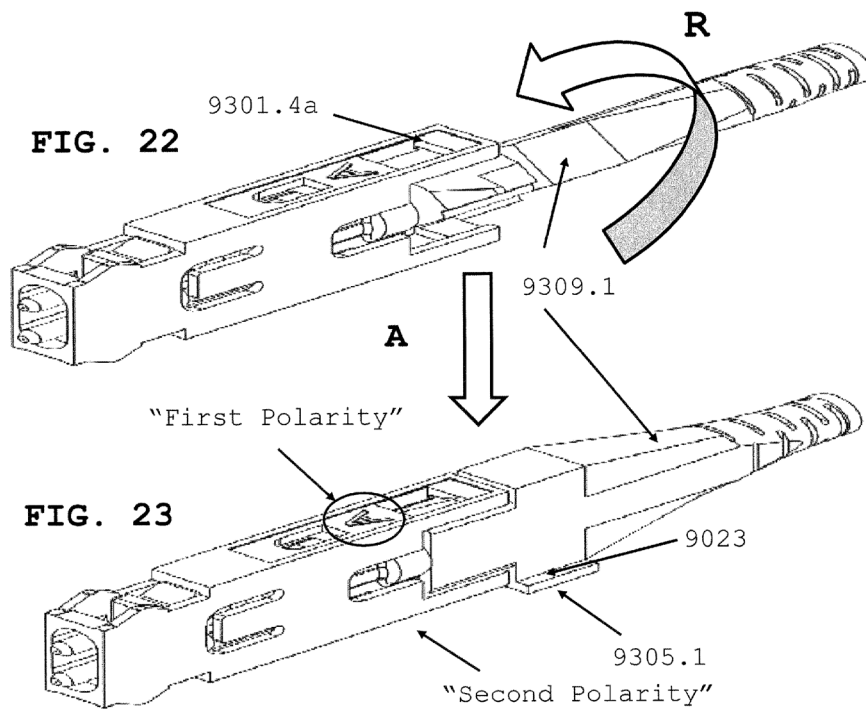
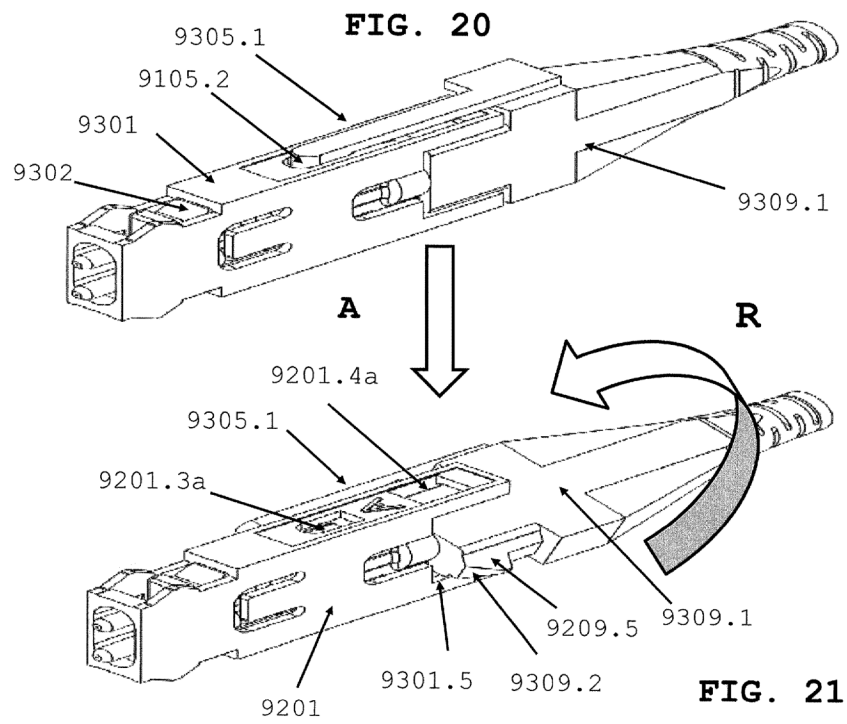
The key 9105.1, 9205.1, 9305.1, 9405.1 functions as the keying structure that defines the reference mating orientation for the connector 9100 to be inserted into the mating adapter. EX2007: ¶63. Because of the key 9105.1, 9205.1, 9305.1, 9405.1, the optical connector 9100 can only be inserted into a mating adapter in one orientation—i.e., the orientation in which the key aligns with a corresponding

keyway in the adapter. EX1001: 4:51-67, 7:4-26; EX2007: ¶63. The elongate shape of the key 9105.1, 9205.1, 9305.1, 9405.1 is critical because it allows the key to extend from the boot member along the narrow wall of the VSFF connector housing 9101, 9201 to a forward position such that the key is received in a corresponding keyway in the adapter when the connector 9100 is fully plugged into the adapter. EX2007: ¶63.

By rotating the rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1, the position of the key 9105.1, 9205.1, 9305.1, 9405.1 can be changed (relative to the ferrules 9203) from one side (e.g., the top side in Fig. 24 above) of the optical connector 9100 to the opposite side (e.g., the bottom side in Fig. 24) to set the connector in one of a first polarity or a second polarity. EX1001: 4:51-67, 6:28-34, 7:4-26; EX2007: ¶64. This simple process for changing polarity is illustrated in Figs. 20-23 and again in Figs. 25, 28, 29, 31, and 33. EX2007: ¶64.

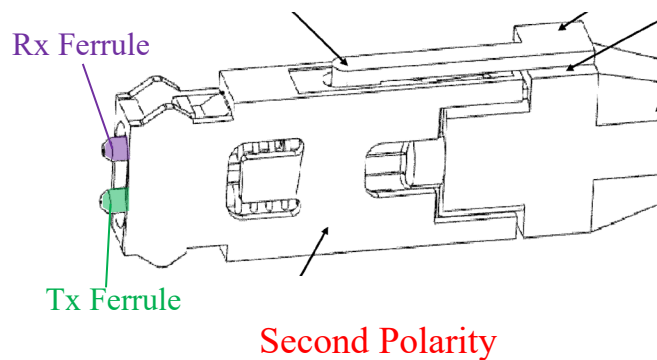


EX1001: Fig. 16 (annotated).



EX1001: Figs. 20-23.

After the position of the key is moved from the top side to the bottom side of the connector via rotating the rotatable boot assembly (Figs. 20-23), the entire connector is flipped over to re-orient the connector in the mating orientation with the key on the top side of the connector, thereby switching the positions of the Tx ferrule and Rx ferrule, as shown below:



EX1001: Fig. 16 (annotated); EX2007: ¶65.

The optical connector 9100 of the '190 Patent improves on prior art polarity change mechanisms—such as Nakagawa and Veatch—in that a simplified solution for changing polarity is provided, i.e., an operator only needs to move one component, the rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1, in order to change the polarity of the optical connector 9100. EX1001: 6:28-34, 7:4-26; EX2007: ¶66. Because the key 9105.1, 9205.1, 9305.1, 9405.1 is part of the rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1, the key moves with the rotatable boot assembly to set the polarity of the optical connector 9100. EX1001: 6:19-22, 6:30-34, 6:50-51, 7:4-9; EX2007: ¶66. This makes changing the polarity of the optical connector 9100 of the '190 Patent quicker and easier than

conventional optical connectors such as Nakagawa and Veatch. EX2007: ¶66.

Furthermore, since the rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1 is rotatable with respect to the cable terminated by the connector 9100 and the rest of the connector, the entire polarity change operation can take place without any portion of the connector detaching from another portion of the connector. EX2007: ¶66. This minimizes the risk that loose pieces will be lost or damaged.

The '190 Patent describes the rotatable boot assembly 9109.1, 9209.1, 9309.1, 9409.1 as being a "multi-purpose" component of the connector 9100. EX1001: 6:10-13; EX2007: ¶67. In addition to facilitating polarity change, the multi-purpose boot assembly also facilitates extraction of the connector 9100 when latched in a mating adapter. EX1001: Figs. 34-36, 8:58-9:23; EX2007: ¶67. When the connector 9100 is latched in an adapter, a user simply pulls backward on the boot member of the boot assembly 9109.1, 9209.1, 9309.1, 9409.1. The boot assembly slides backward in relation to the back body 9206 and thereby causes the connector 9100 to release from the adapter. EX1001: Figs. 34-36, 8:58-9:23; EX2007: ¶67.

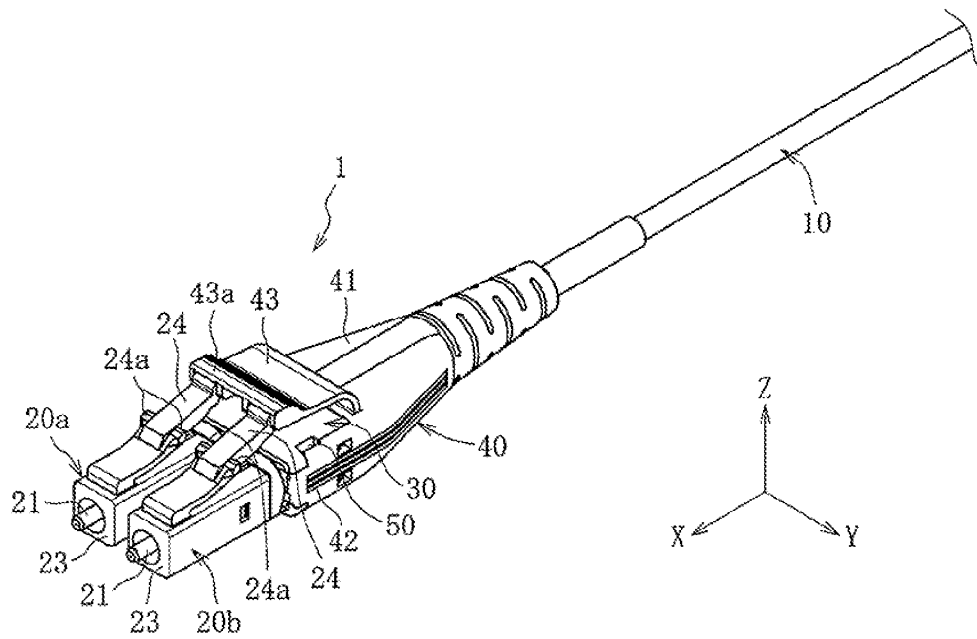
IV. PETITIONER’S ASSERTED PRIOR ART REFERENCES

A. U.S. Publication No. 2011/0299814 to Nakagawa (EX1007)

Nakagawa discloses a LC duplex optical connector unit 1 having the ability to change polarity.⁵ EX1007: ¶¶[0011], [0062]-[0064]; EX2007: ¶69. The optical connector unit 1 includes optical connectors 20a, 20b, a holder 30, and a boot 40. EX1007: Fig. 1, ¶[0046]; EX2007: ¶70. Each optical connector 20a, 20b includes a locking lever 24. EX1007: Fig. 1, ¶[0047]; EX2007: ¶70. As explained above, the locking lever 24 functions as the key that sets the orientation in which the LC duplex connector unit 1 is inserted into a corresponding LC duplex adapter. Section II(A)&(B); EX2007: ¶70.

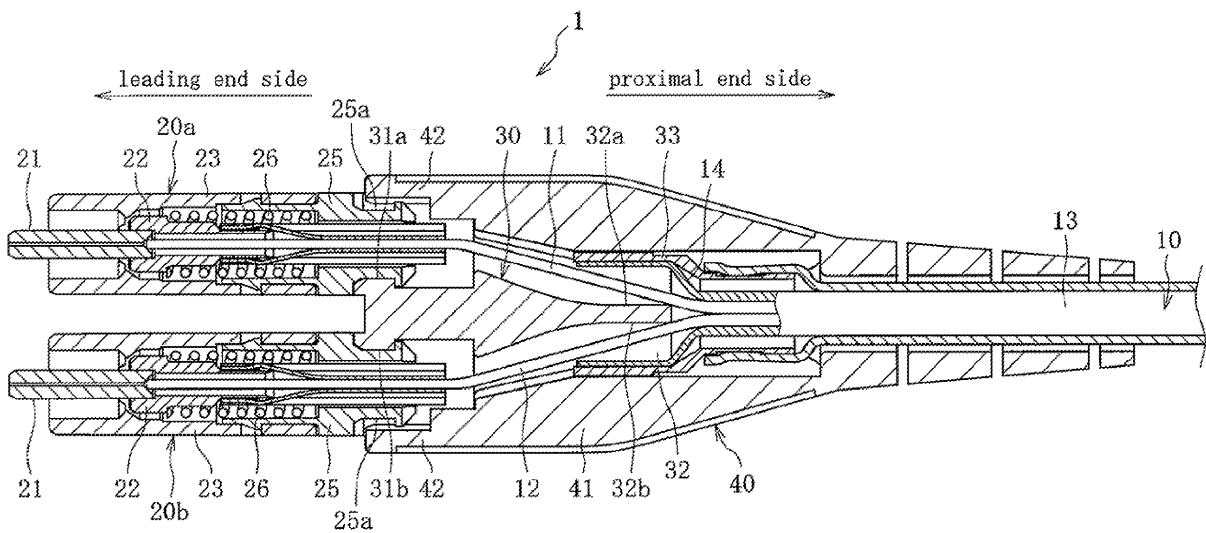
⁵ While Nakagawa does not recite the term “polarity,” Nakagawa does explain the positions of its “optical connectors 20a, 20b can be easily exchanged”. EX1007: ¶[0060]; EX2007: ¶69. The PHOSITA understands this as changing polarity. EX2007: ¶69.

Fig. 1

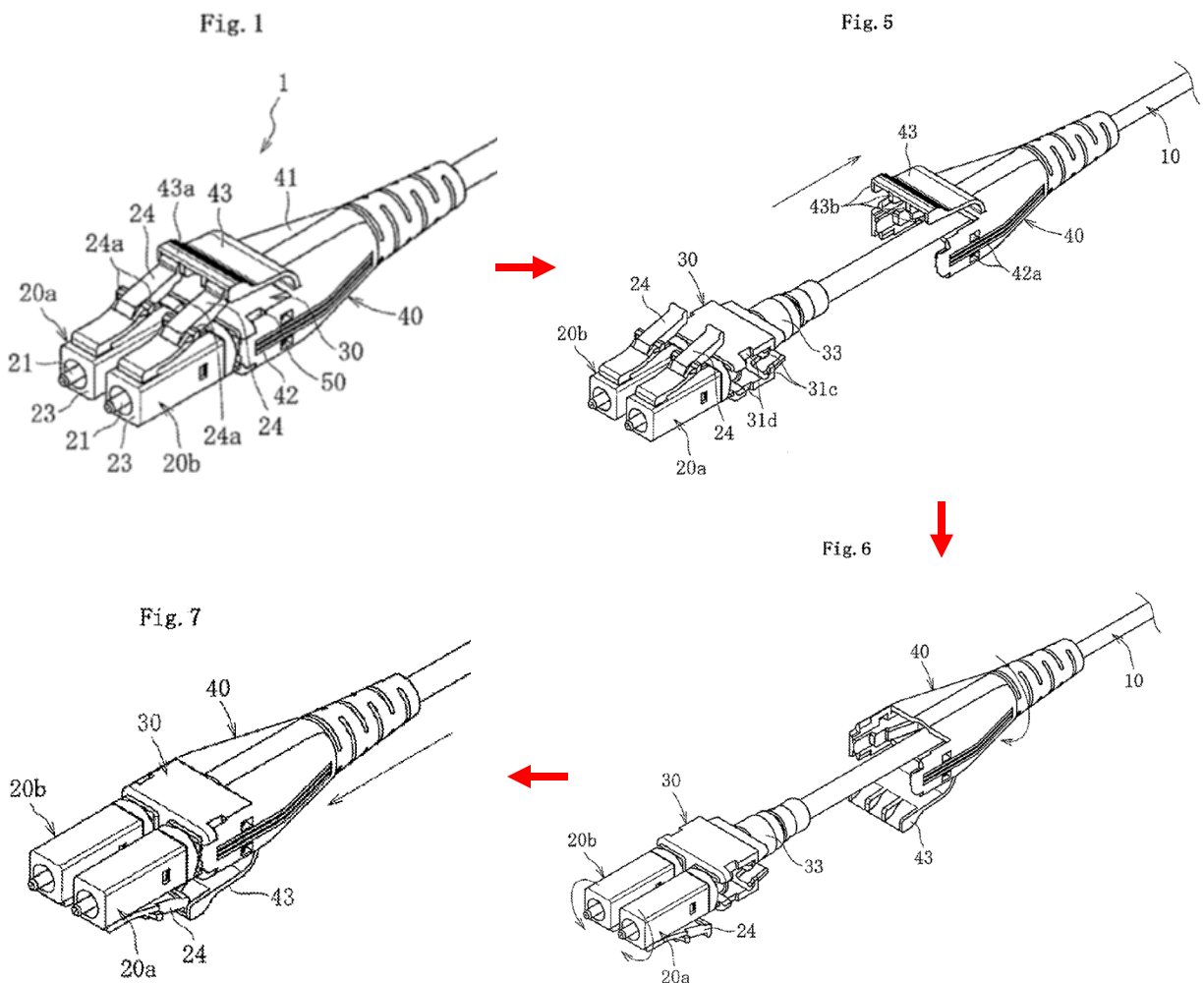


The optical connector unit 1 also includes a caulking member 33 for securing the cable 10 to the holder 30. EX1007: Fig. 2, ¶[0055]; EX2007: 71.

Fig. 2

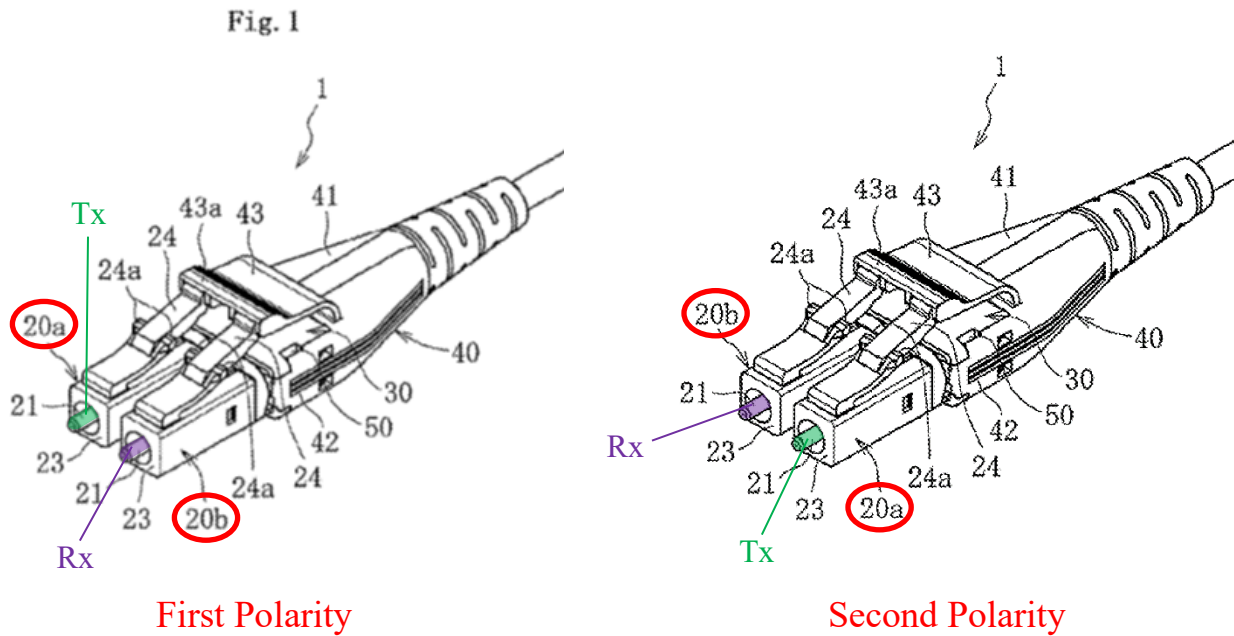


Nakagawa discloses a four-step polarity change operation: (1) the boot 40 is disconnected from the holder 30 and slid rearward along the cable 10, (2) each optical connector 20a, 20b is rotated 180° to relocate the locking levers 24 from the top side to the bottom side of the optical connector unit, (3) the boot 40 is rotated 180° about the cable, and (4) the boot 40 is reattached to the holder 30. EX1007: Figs. 1, 5-7, ¶¶[0060]-[0063]; EX2007: ¶72. This process requires each optical connector 20a, 20b to be individually rotated to change polarity. EX2007: ¶72.



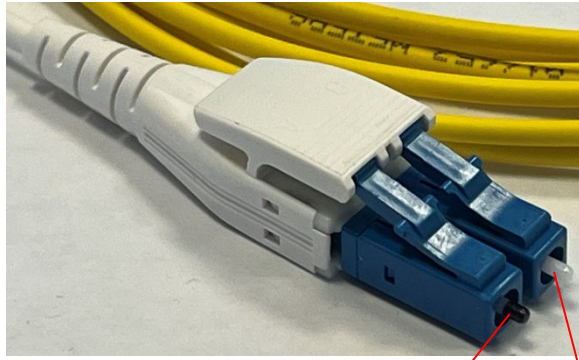
EX1007: Figs. 1 and 5-7, ¶[0017].

After step (4), the whole optical connector is then flipped over to reposition the locking levers 24 on the top side of the connector. EX1007: ¶[0063] (“the entire optical connector unit 1 is reversed upside down”); EX2007: ¶73. As shown below, the position of the ferrules is switched:

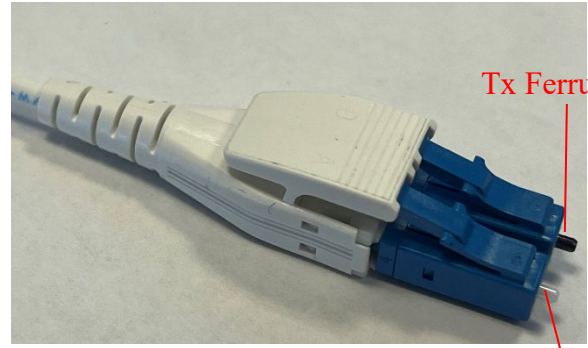


EX1007: Fig. 1 (annotated); EX2007: ¶73.

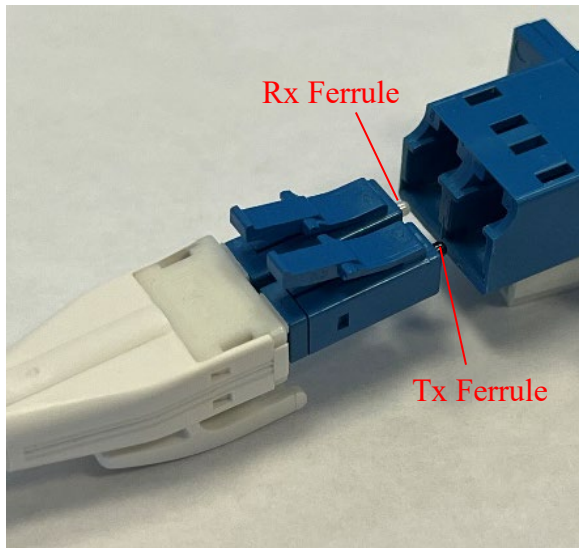
Although the four-step polarity change process disclosed in Nakagawa involves rotating the boot, the position of the boot does not set the polarity. EX2007: ¶74. In Nakagawa, it is the locking levers 24 that form the key that establishes the mating orientation in which the connector will mate with a LC duplex adapter. EX2007: ¶74. Hence, as shown below, rotating the simplex connectors 20a, 20b sets the polarity of the duplex optical connector unit 1, irrespective of the rotational orientation of the boot. EX2007: ¶74.



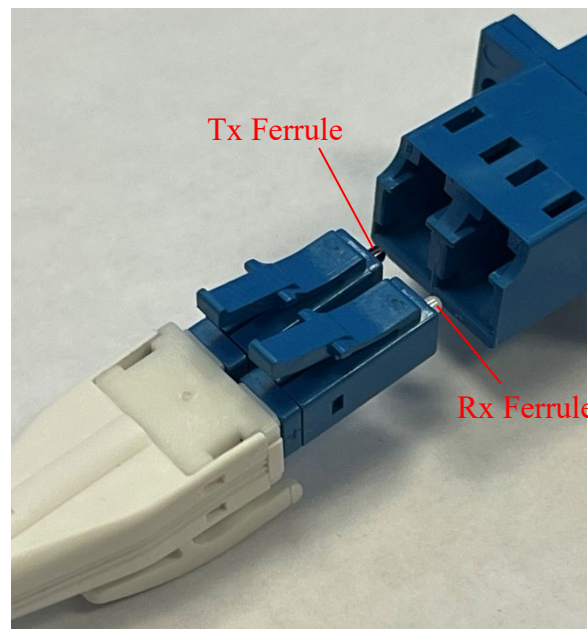
Tx Ferrule Rx Ferrule



Tx Ferrule
Rx Ferrule



First Polarity



Second Polarity

EX2002 (showing the polarity does not change because the boot was rotated)⁶⁷; EX2005; EX2007: ¶75.

⁶ See Footnote 3.

⁷ EX2002 is a physical duplex LC connector that embodies Nakagawa. EX2007: ¶76.

Nakagawa's boot 40 does not slide rearward to unlatch the optical connector unit 1 from a mating adapter. EX2007: ¶77. Instead, Nakagawa discloses an operation lever 43 that may be depressed to depress the locking levers 24 and unlatch the connector. EX1007: ¶[0058]; EX2007: ¶77.

Nakagawa was applied and distinguished during prosecution of the '190 Patent. EX1003: 88-89, 146; EX2007: ¶68.

B. U.S. Patent No. 9,557,495 to Raven (EX1008)

Raven discloses a LC duplex fiber optic cable assembly 1 having the ability to change polarity. EX1008: 1:5-9; EX2007: ¶78. The LC duplex fiber optic cable assembly 1 includes a leading end unit 3, a housing 5, a boot 7, and a duplex fiber optic cable 9. EX1008: Fig. 1, 9:51-53; EX2007: ¶78. The leading end unit 3 is detachable from the housing 5. EX1008: 12:35-52; EX2007: ¶78. The leading end unit 3 covers the LC duplex ferrule holders but does not itself hold the ferrules. EX2007: ¶78. Instead, the housing 5 includes two ferrule holders 25, 31 that fit inside the two fiber optic connectors 47, 49 of the leading end unit 3. EX1008: Fig. 3. EX2007: ¶78. The leading end unit 3 carries the latch levers 51. *Id.*

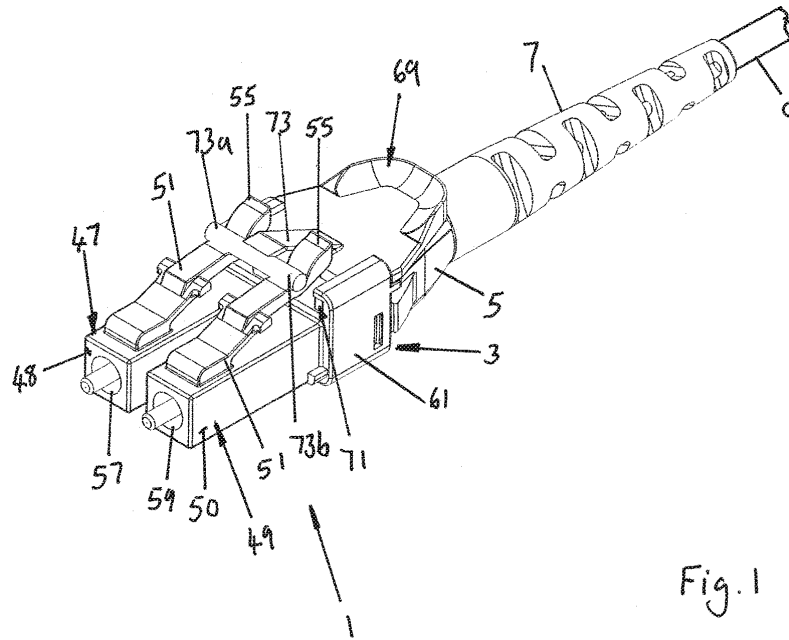
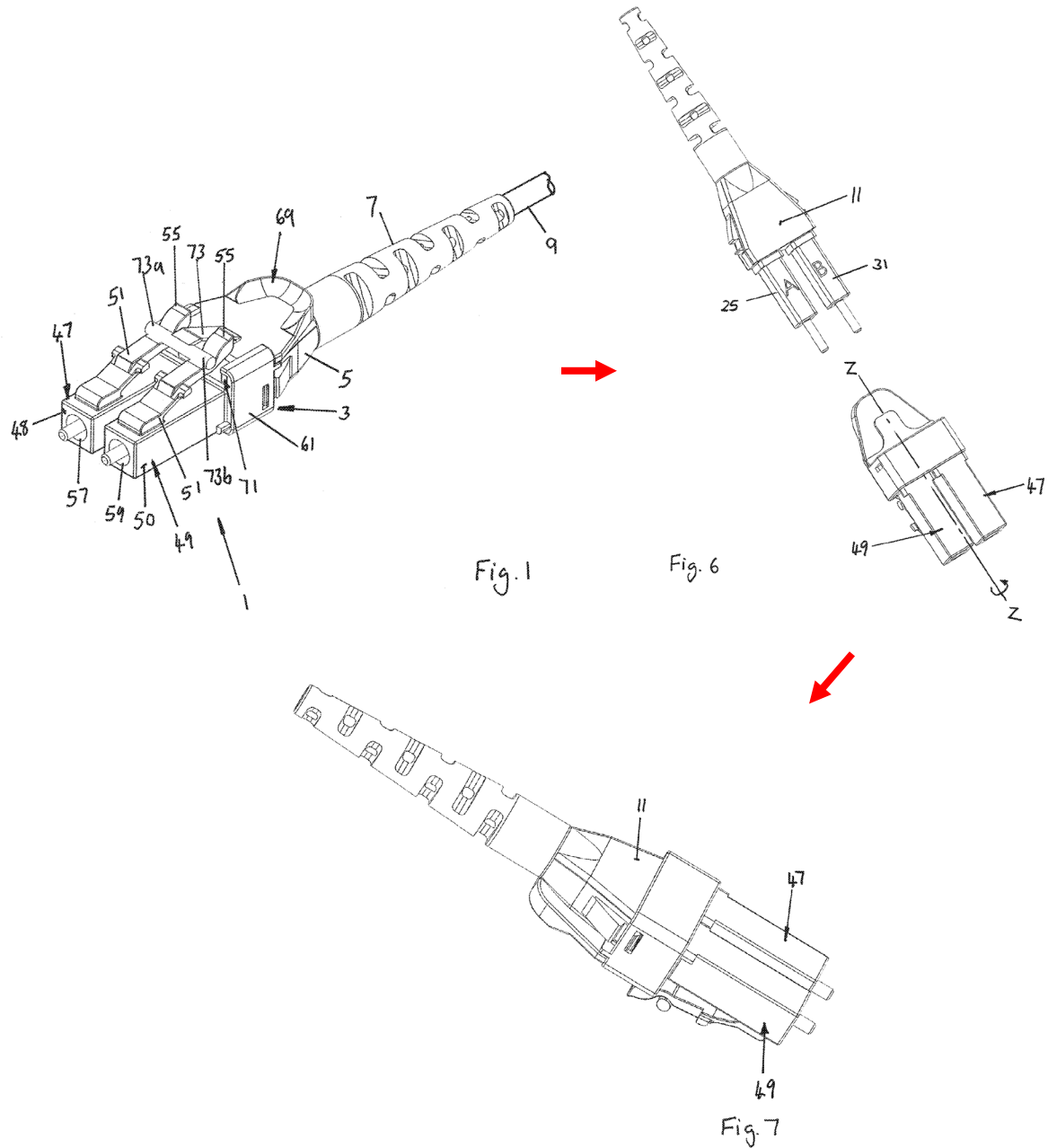


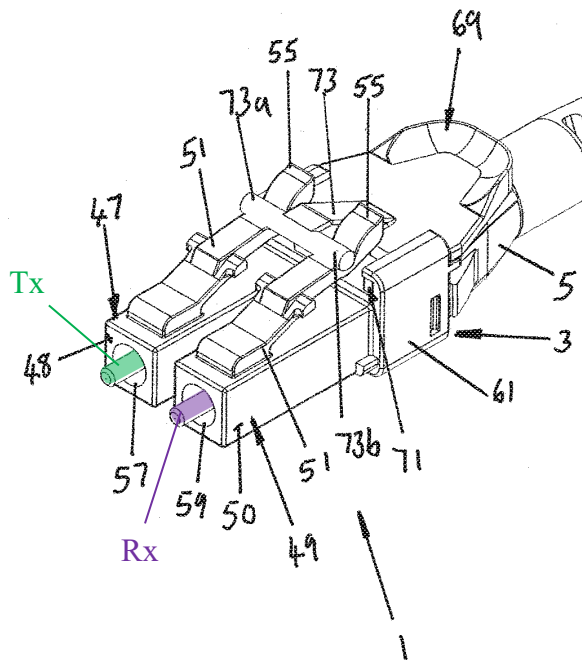
Fig. 1

Raven discloses a three-step polarity change process: (1) the leading end unit 3 is moved forward off the housing 5 (the two ferrule holders 25, 31 are moved out of the two fiber optic connectors 47, 49, respectively), (2) the leading end unit 3 is rotated 180° relative to the housing, and (3) the leading end unit 3 is reattached to the housing 5 by sliding the leading end unit rearward onto the housing (inserting the ferrule holders 25, 31 into the respective fiber optic connectors 47, 49).

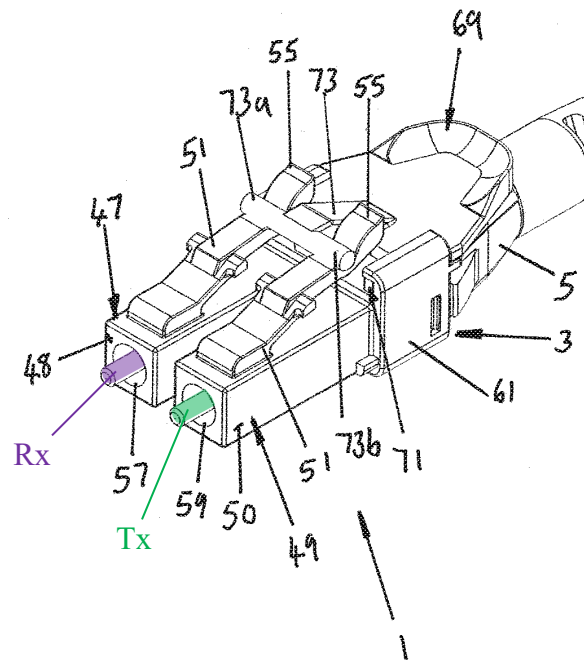
EX1008: Figs. 1, 6 and 7, 12:35-52; EX2007: ¶79.



After step (3), the whole assembly 1 can be flipped over to reposition the latching levers 51 on the top side of the connector. EX2007: ¶80. The position of the ferrules is switched, as shown below:



First Polarity



Second Polarity

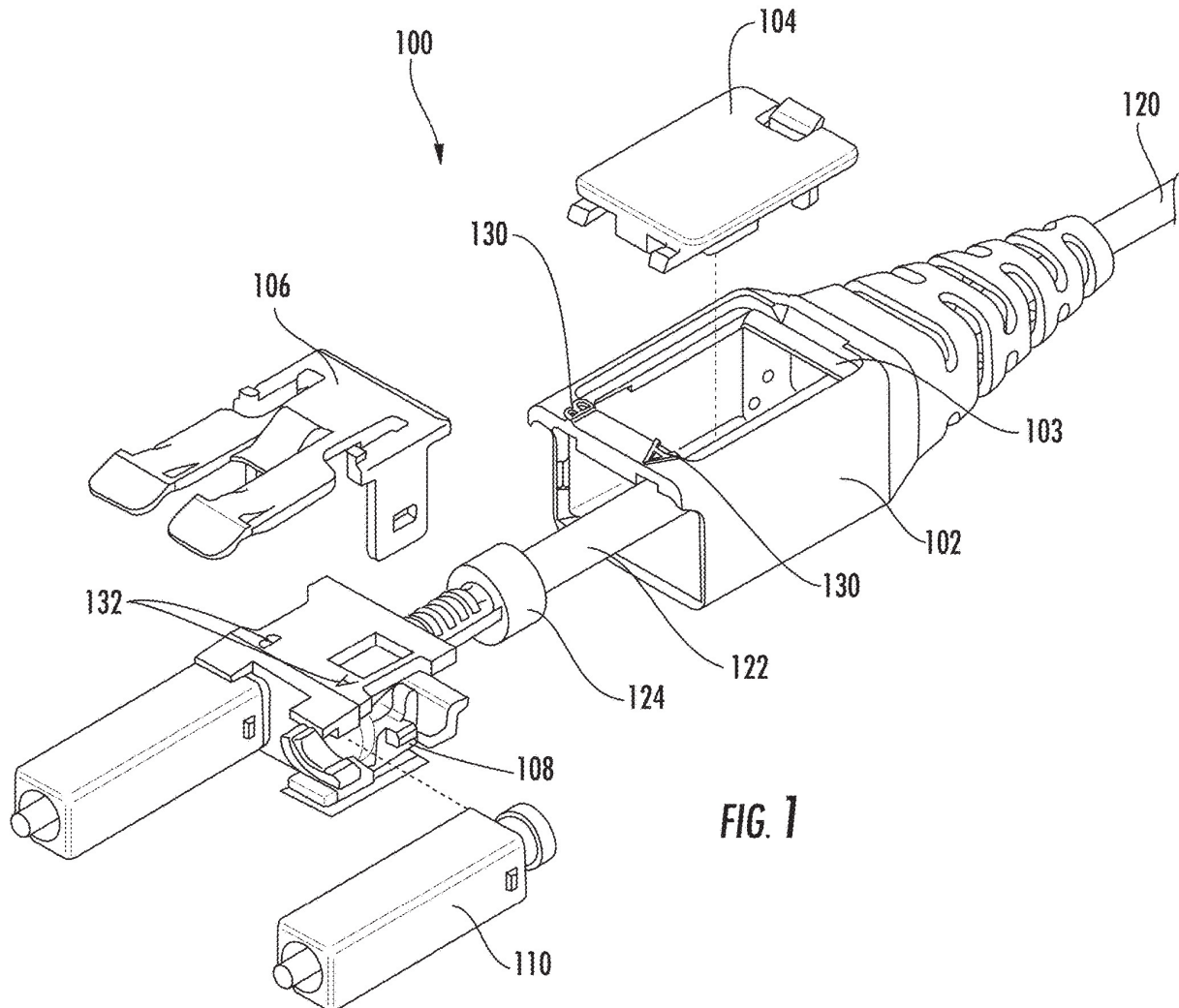
EX1008: Fig. 1 (annotated); EX2007: ¶80.

Raven's boot 7 does not slide rearward to unlatch the assembly 1 from a mating adapter. EX2007: ¶81 Instead, Raven discloses a separate release element 69 that slides backward in relation to the remainder of the assembly 1 (including the boot 7) to depress the latching levers 51 by camming action. EX1008: 11:63-12:3; EX2007: ¶81.

C. U.S. Patent No. 9,684,130 to Veatch (EX1004)

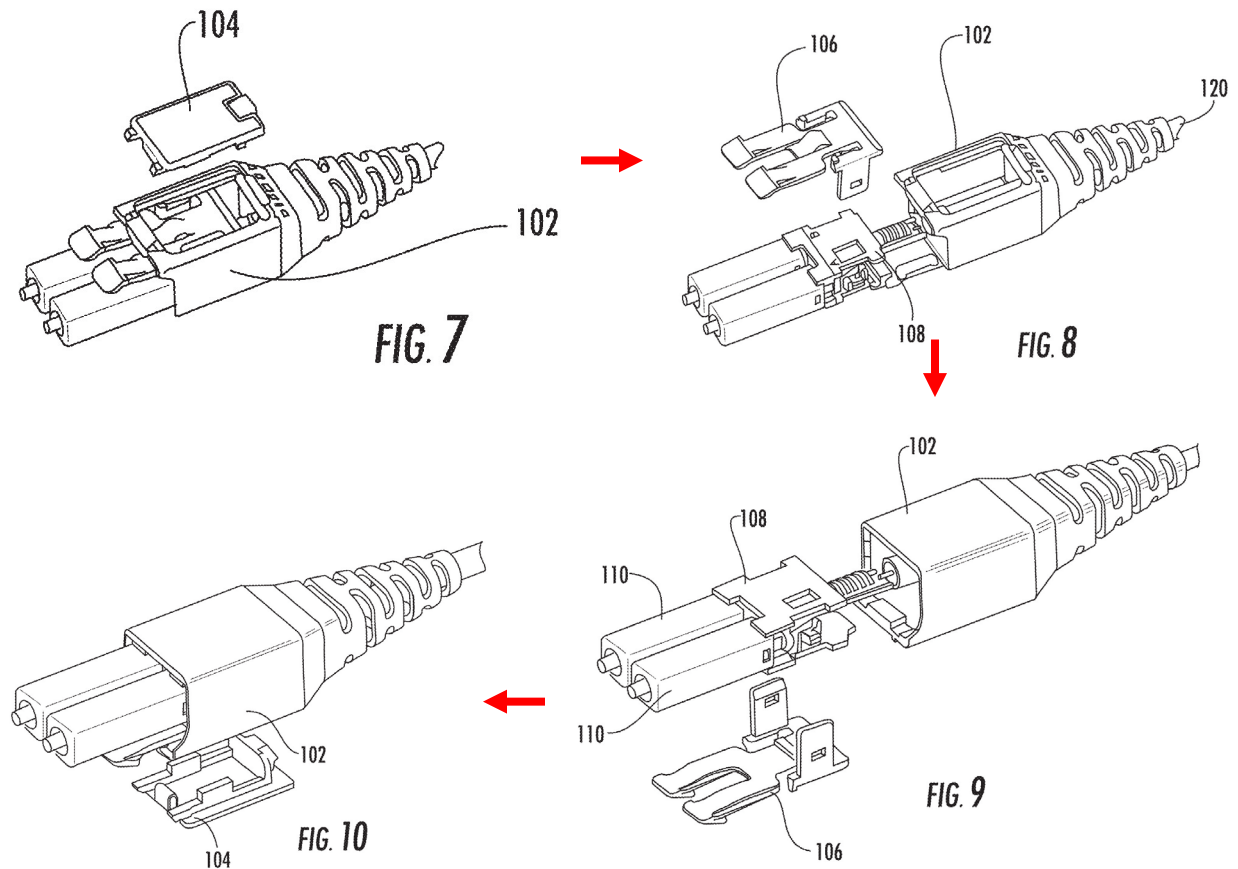
Veatch discloses a LC duplex connector 100 with a complex polarity change mechanism. EX1004: 2:6-13; EX2007: ¶83. The connector 100 includes a boot 102, a cover 104 releasably attached to the boot, a fiber holder 108, a latch 106

releasably attached to the fiber holder, and connector bodies 110 supported by the fiber holder. EX1004: Fig. 1, 2:14-16, 2:42-43, 3:18-20; EX2007: ¶83. A crimp ring 124 and heat shrink material 122 secure the cable 120 to the fiber holder 108. EX1004: Fig. 1, 2:19-22, 4:34-36; EX2007: ¶83.

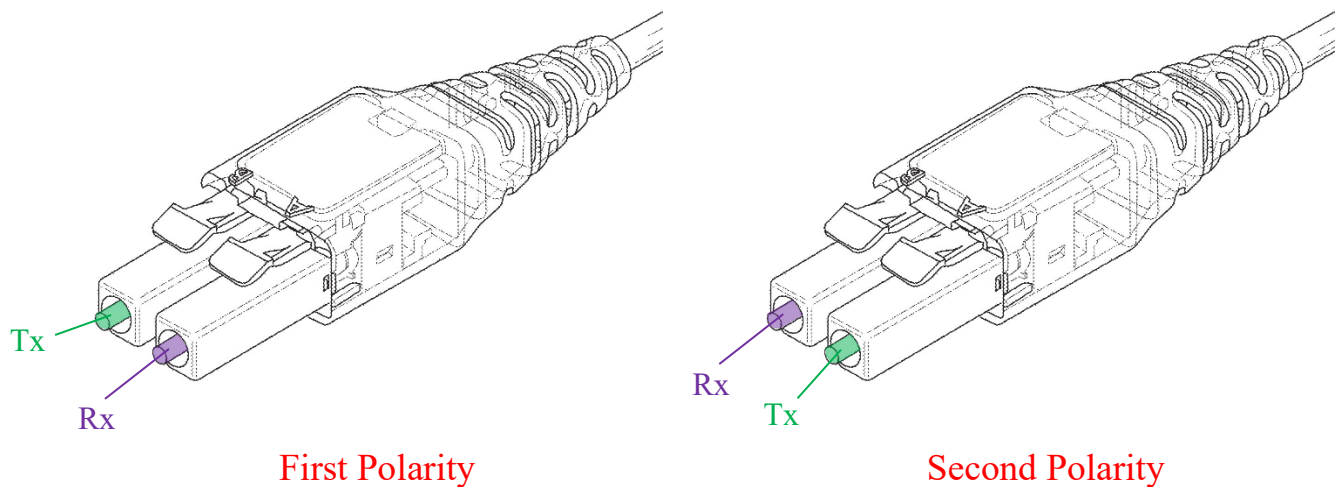


To change polarity, the following seven steps are required: (1) the cover 104 is removed from the boot 102, (2) the boot 102 slides rearward along the cable 120, (3) the boot 102 rotates 180° about the cable, (4) the latch 106 is removed from the

top of the fiber holder 108, (5) the latch 106 is reattached to the bottom of the fiber holder, (6) the boot 102 slides forward over the fiber holder 108, (7) the cover 104 is reattached to the boot 102. EX1004: Figs. 7-10, 3:10-36; EX2007: ¶84.



After step (7), the whole optical connector can be flipped over to reposition the latch 106 on the top side of the connector. EX2007: ¶85. The position of the ferrules is switched, as shown below:



EX1004: Fig. 2 (annotated); EX2007: 85.

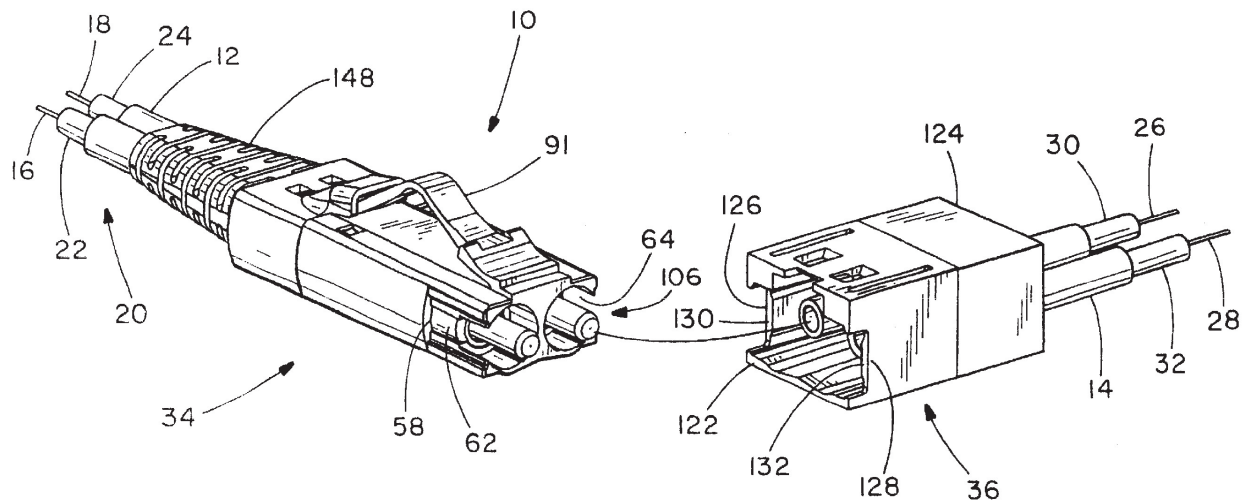
Although the seven-step polarity change process disclosed in Veatch involves rotating the boot 102, the rotation of the boot does not set the polarity. EX2007: ¶86. Instead, it is the latch 106 that determines the mating orientation for insertion into an adapter and sets polarity. EX1004: Abstract (“the latch repositionable relative to the connector body to enable polarity change of the fiber optic connector”); EX2007: ¶86. Veatch requires that the boot 102 and the latch 106 are repositioned in separate steps because the boot must be decoupled from the latch in order to change the position of the latch 106 with respect to the connector bodies 110 and fiber holder 108. EX2007: ¶86.

In Veatch, the boot 102 slides rearward to depress the latch 106 by cam action. EX1004: 2:64-3:7; EX2007: ¶87.

Veatch was applied and distinguished during prosecution of the ‘190 Patent. EX1003: 88-89, 146; EX2007: ¶82.

D. U.S. Patent No. 6,575,640 to Connelly (EX1005)

Connelly discloses a fiber optic connection system 10 for coupling first and second fiber optic cables 12, 14. EX1005: 2:8-11; EX2007: ¶88. The system 10 includes a fiber optic plug 34 attached to the end of the first fiber optic cable 12. EX1005: Fig. 1; EX2007: ¶88. The fiber optic plug 34 includes a housing 38, a strain relief boot 148, and an insert 44 coupling the housing 38 and strain relief boot 148. EX1005: 2:27-29, 4:35-38; EX2007: ¶88.



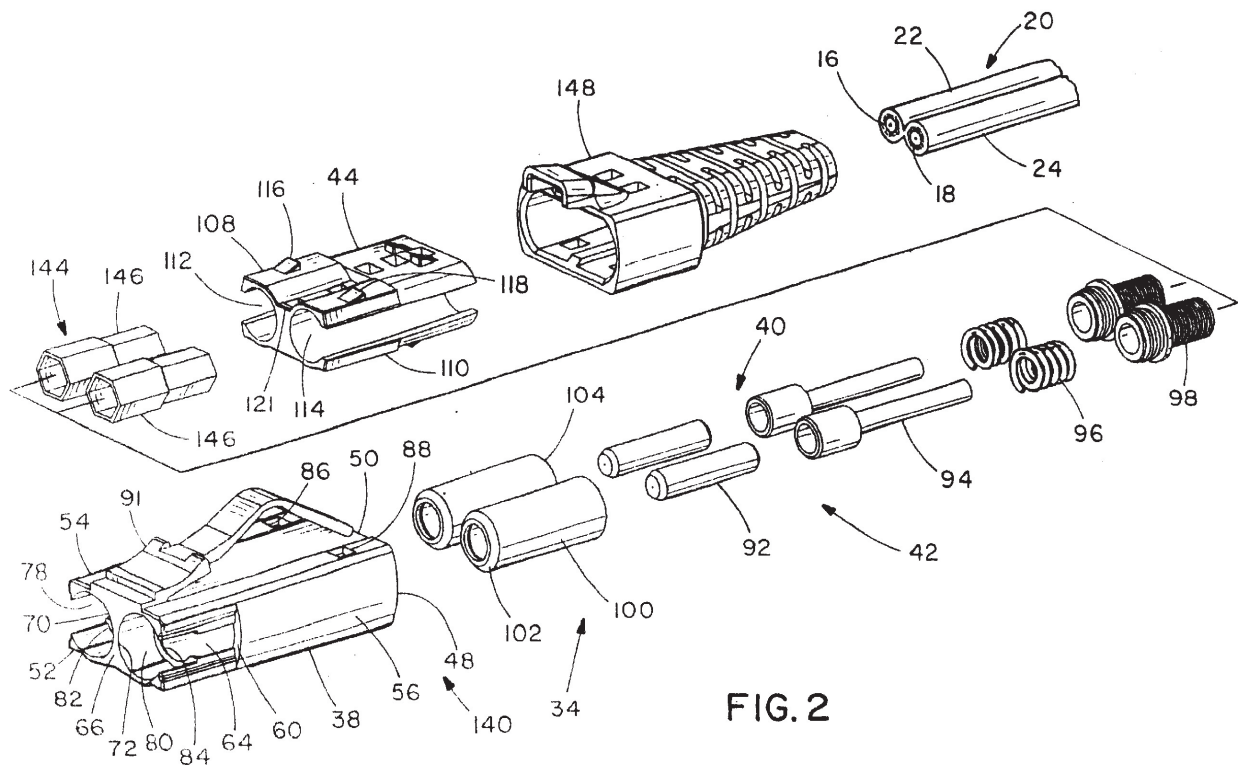


FIG. 2

EX1005: Figs. 1 and 2.

E. U.S. Patent No. 8,662,760 to Cline (EX1006)

Cline is used as an additional secondary reference by US Conec against dependent claim 20. Petition: 74, 122. Cline teaches a LC duplex fiber optic connector 10 having a connector housing 30 shaped as shown in Figs. 1 and 3.

EX1006: Figs. 1 and 3, 3:22-23, 3:42-42; EX2007: ¶89. The connector sub-assemblies 38A, 38B include respective ferrules 40A, 40B that support optical fibers 12A, 12B. EX1006: Fig. 3, 4:29-34; EX2007: ¶89.

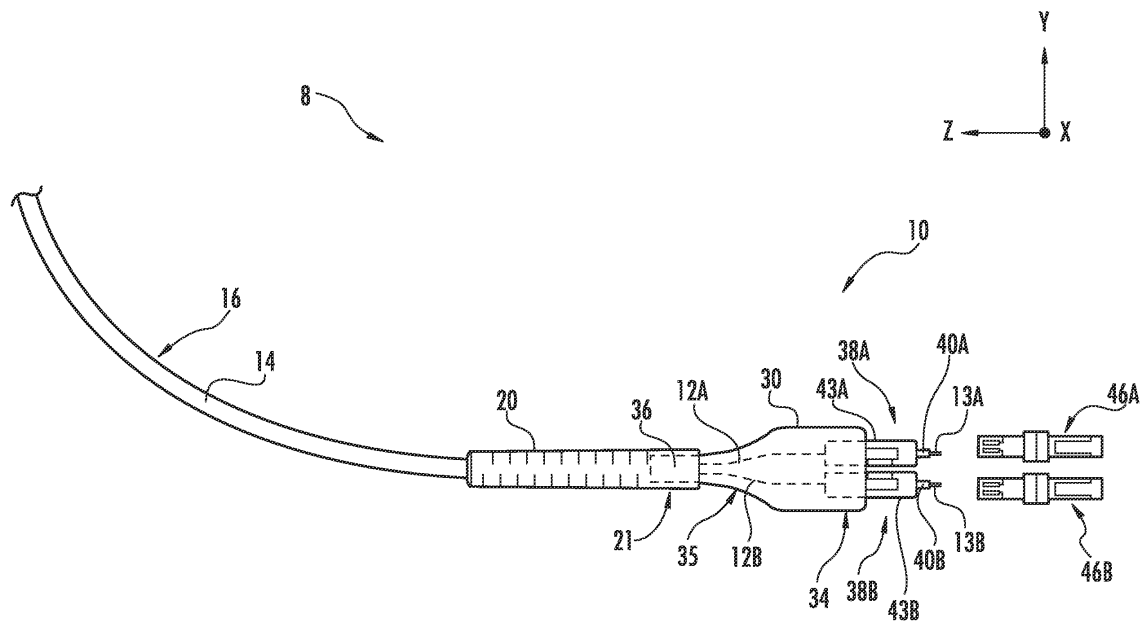


FIG. 1

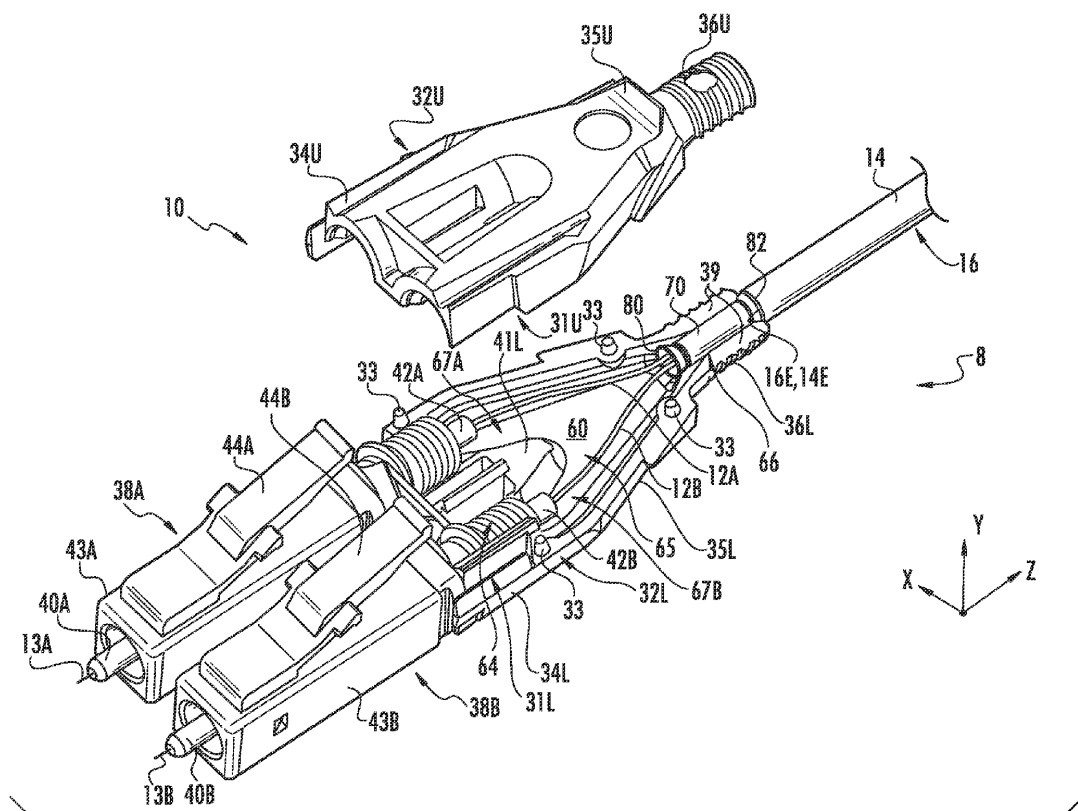


FIG. 3

EX1006: Figs. 1 and 3.

V. CLAIM CONSTRUCTION

In an IPR, the Board gives claim terms their plain meaning as understood by a PHOSITA. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005); 37 C.F.R. § 42.200(b). In construing terms, “the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313.

A. The PHOSITA

Senko does not challenge US Conec’s stated level of ordinary skill in the art at this time but reserves the right to do so later.

VI. US Conec Has Failed to Present a *Prima Facie* Case That Claims 1-3, 6-16, 19, and 20 of the ‘190 Patent Are Invalid

US Conec has failed to show its asserted prior art combinations disclose or suggest each and every element in independent claim 1. EX2007: ¶¶90, 182.

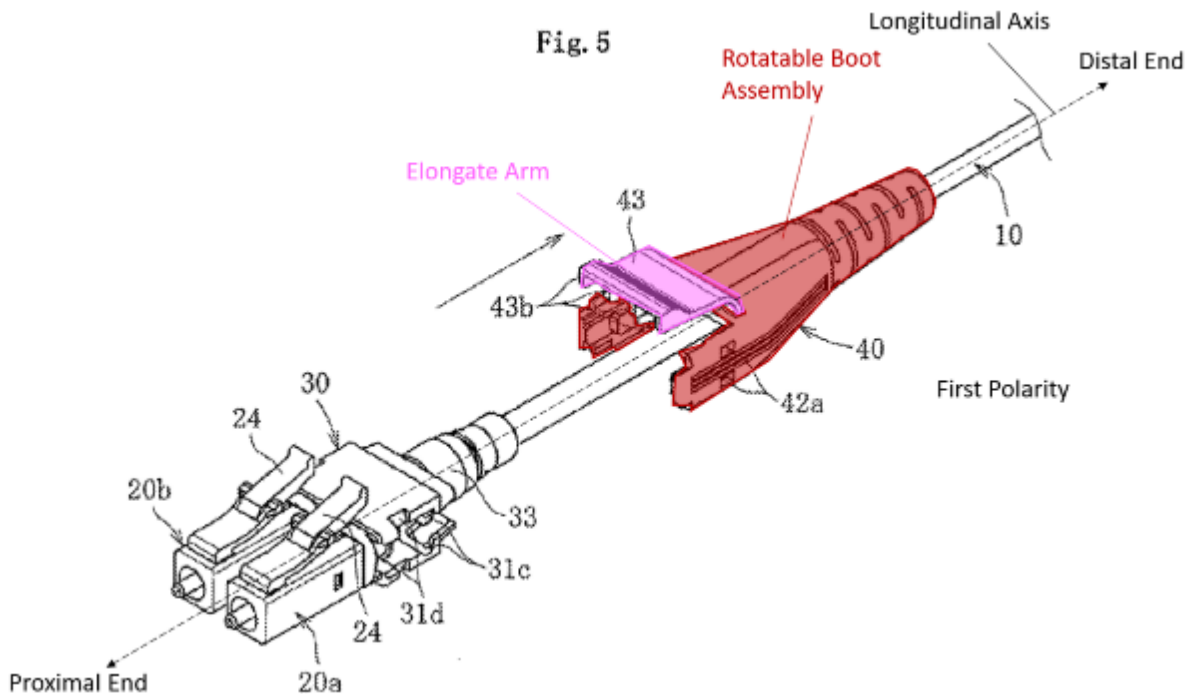
A. Ground 1: US Conec Has Failed to Carry Its Burden to Prove Independent Claim 1 of the ‘190 Patent is Obvious over Nakagawa and Raven

Ground 1 of US Conec’s Petition asserts that independent claim 1 (and dependent claims 2, 3, 6-16, and 19) are obvious over Nakagawa modified in view of Raven. But US Conec fails to give proper consideration to the specific structural detail recited in independent claim 1. EX2007: ¶¶92.

1. The Nakagawa/Raven Combination Does Not Teach “the Rotatable Boot Assembly Further Comprising an Elongate Arm Extending Longitudinally From the Main Body in a Proximal Direction Along the Longitudinal Axis” (1st Clause of Limitation 1.3.9)

Independent claim 1 recites “a rotatable boot assembly ... comprising an *elongate* arm extending longitudinally from the main body in a proximal direction along the longitudinal axis.” EX1001: 11:44-47.

US Conec asserts that Nakagawa teaches a rotatable boot assembly with an elongate arm. Petition: 52-55. EX2007: ¶94. Specifically, US Conec asserts that Nakagawa’s operation lever 43 teaches the claimed “elongate arm,” as shown below:



Petition: 53 (EX1007: Fig. 5 (annotated by US Conec)); EX2007: ¶94.

However, Nakagawa's operation lever 43 is not elongate. EX2007: ¶95. The plain and ordinary meaning⁸ of "elongate" is "having a shape that is much longer than it is wide." EX2009; EX2007: ¶¶95, 97. This meaning is how US Conec has used the term "elongate" in its own patents and patent applications:

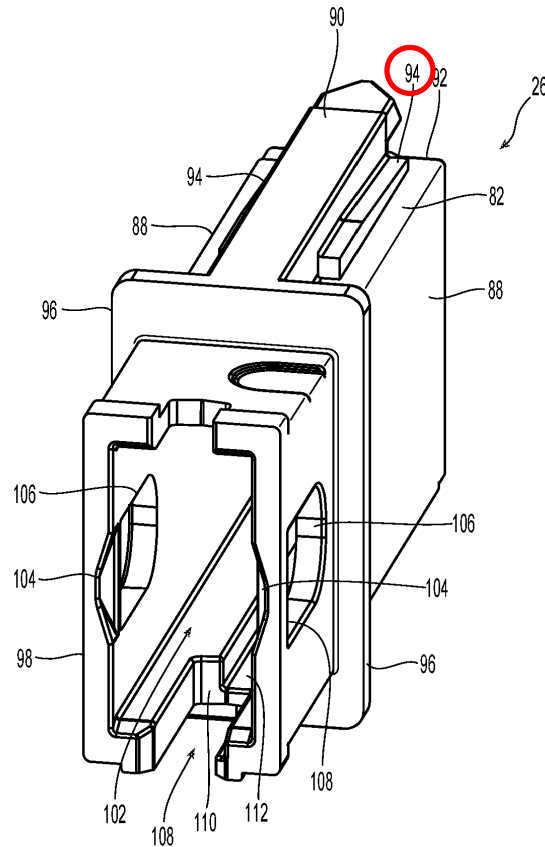
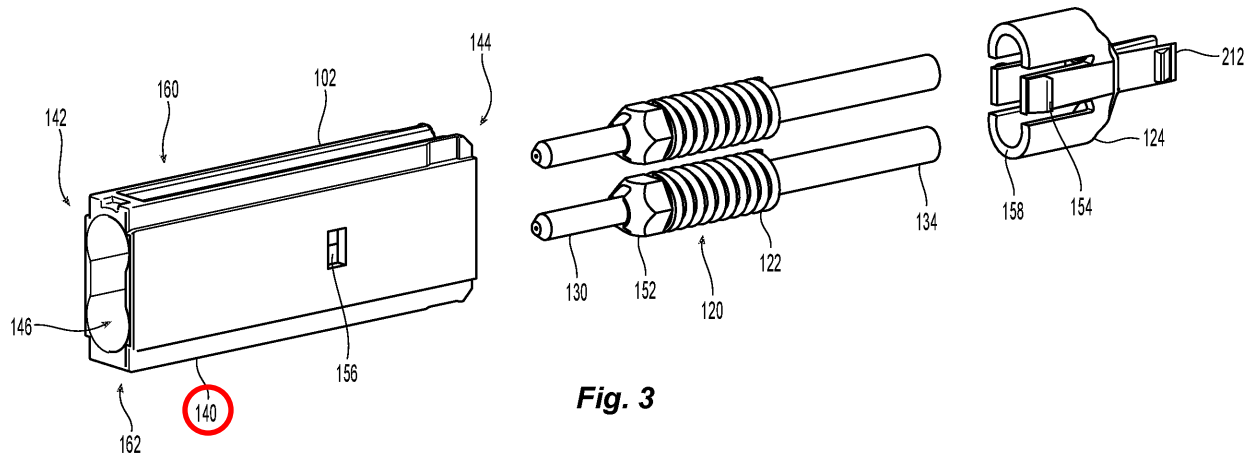


Fig. 9

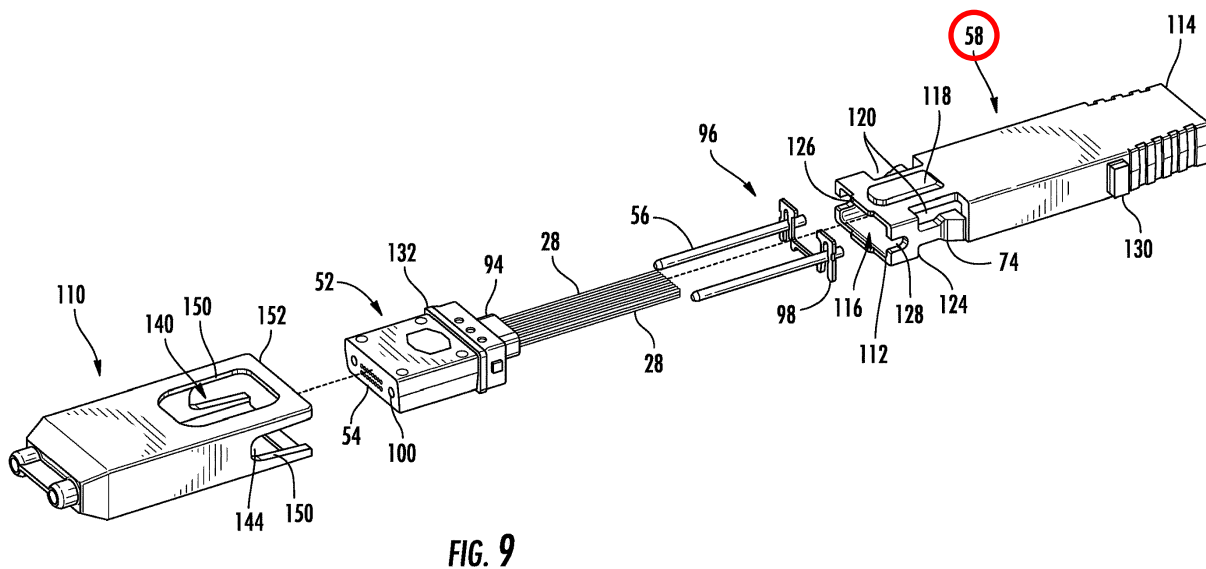
⁸ US Conec has stated all terms are to be given their plain and ordinary meaning.

Petition: 9.

EX2010: Fig. 9, 5:61-62 (“alignment steps 94 are illustrated in FIGS. 9 and 12 as having an *elongate* form”) (annotated); EX2007: ¶98.



EX2011: Fig. 3, claim 17 (“the main body [140] has an *elongate* structure”) (annotated); EX2007: ¶99.



EX2012: Fig. 9, ¶[0064] (“ferrule push 58 is a generally *elongate* structure”) (annotated); EX2007: ¶100.

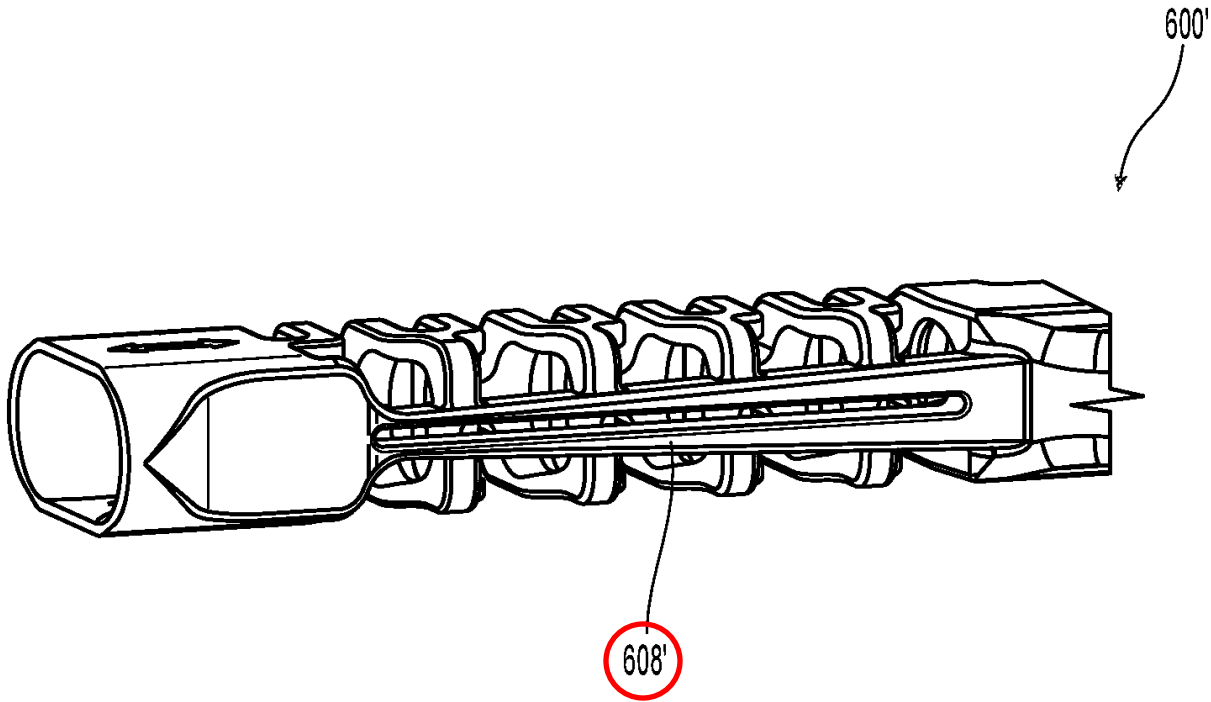


Fig. 33

EX2013: Fig. 33, ¶[0077] (“the spine member 608’ of boot 600’ may have two *elongated* members”) (annotated); EX2007: ¶101.

“Prior art references [are] ‘indicative of what all those skilled in the art generally believe a certain term means . . . [and] can often help to demonstrate how a disputed term is used by those skilled in the art.’” *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996)).

Further, the specification of the ‘190 Patent supports this plain and ordinary meaning as well. EX2007: ¶96. The figures of the ‘190 Patent show that the key 9105.1, 9205.1, 9305.1, 9405.1 is an “elongate” arm in that the key has “a shape that is much longer than it is wide.” EX2009; EX1001: Figs. 16, 17, 19, 20, and 24; EX2007: ¶96.

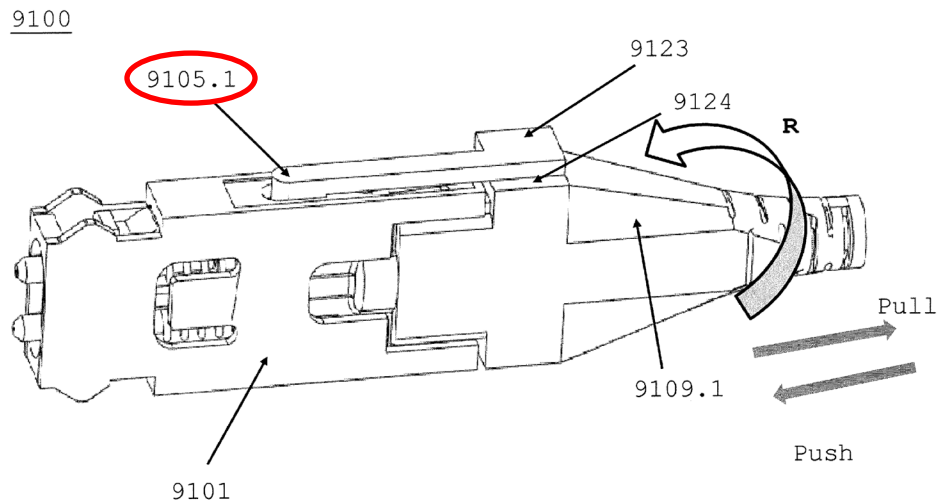


FIG. 16

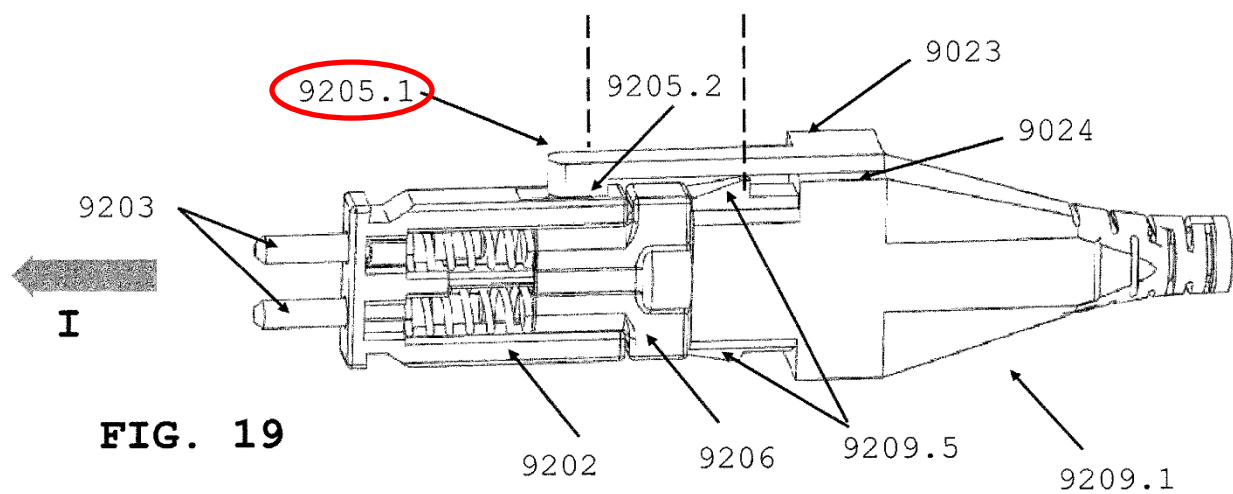


FIG. 19

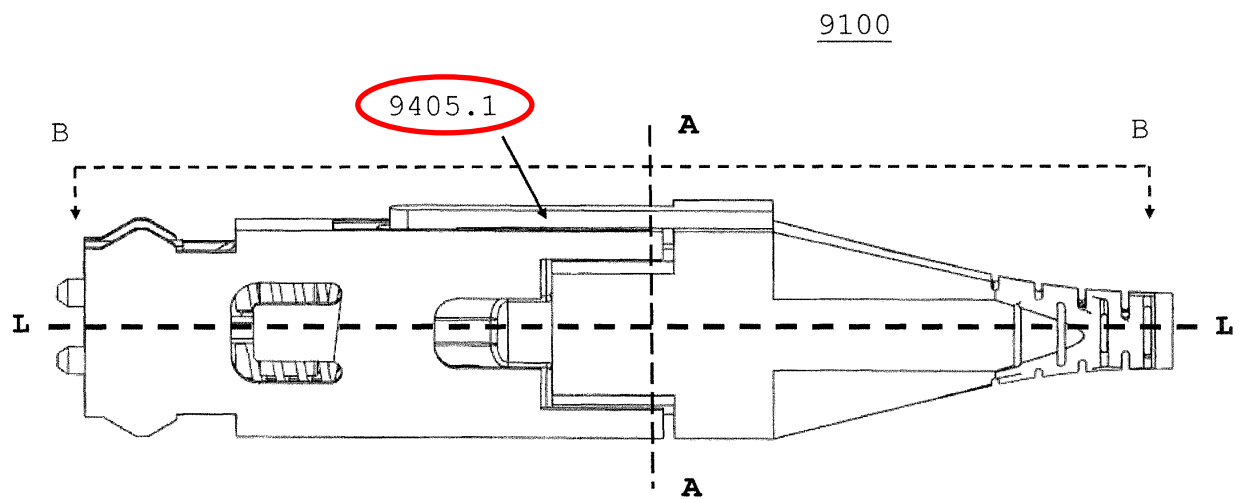
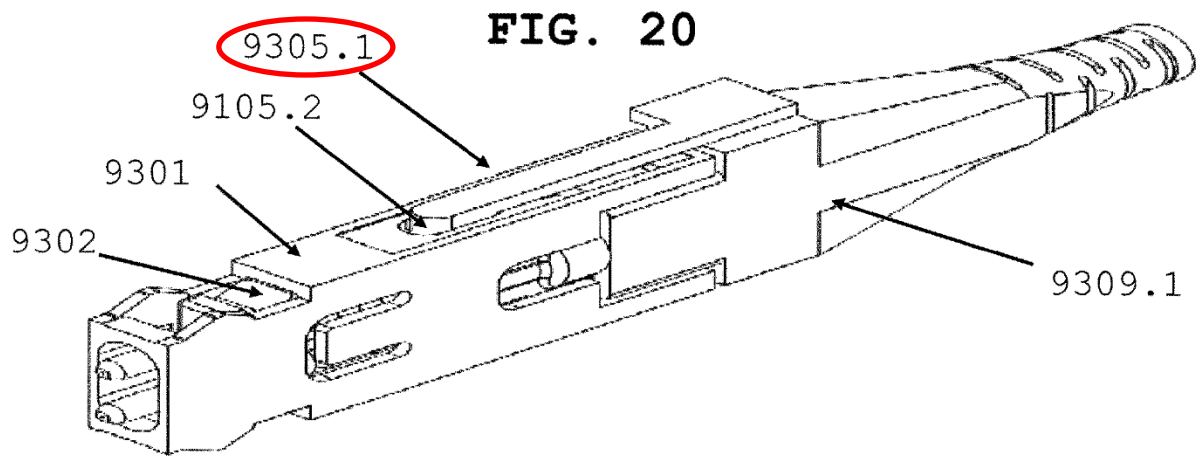
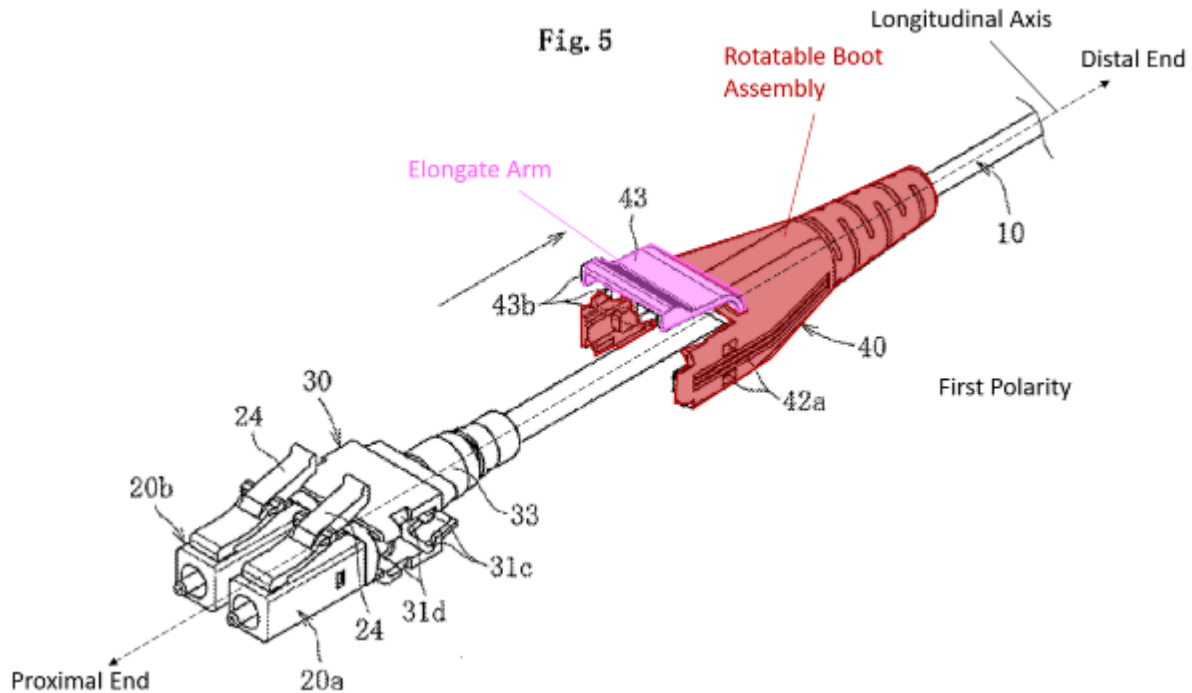


FIG. 24

EX1001: Fig. 16, 19, 20, and 24 (annotated).

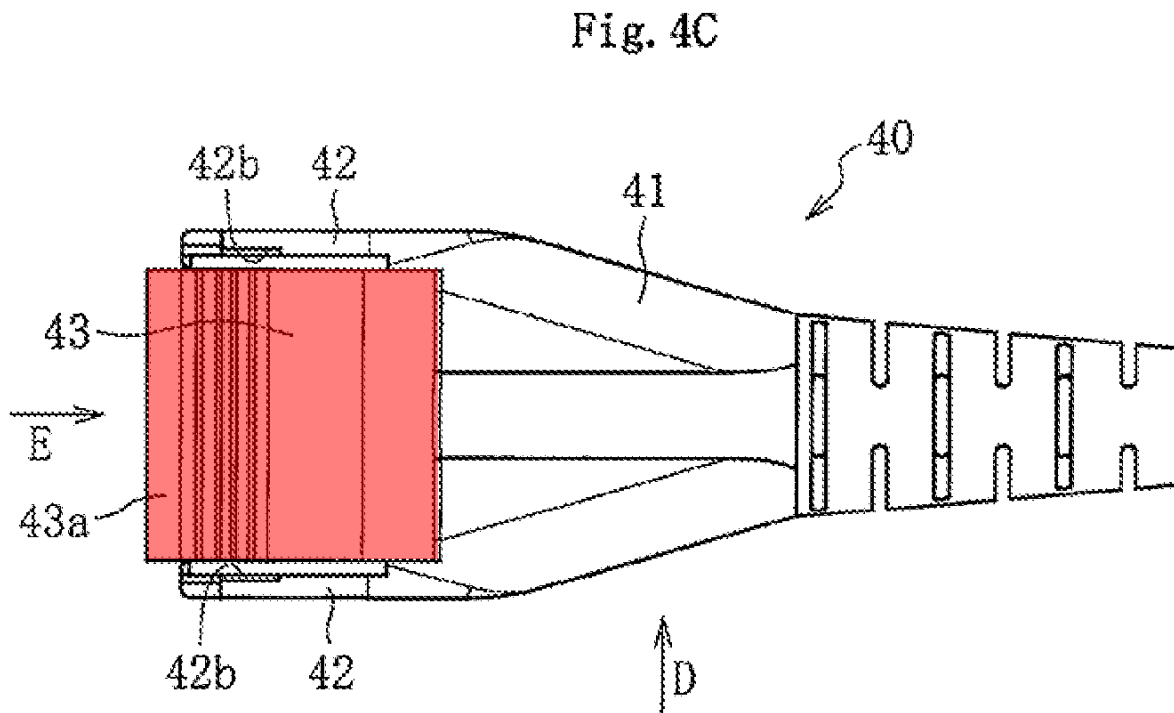
As shown below in US Conec's annotated Fig. 5 of Nakagawa, the operation lever 43 is not longer along the longitudinal axis than it is wide.⁹ EX2007: ¶102.



Petition: 53 (EX1007: Fig. 5 (annotated by US Conec)).

⁹ Independent claim 1 sets the elongate orientation as being along the longitudinal axis by reciting that the “elongate arm extending longitudinally from the main body in a proximal direction *along the longitudinal axis*.” EX1001: 11:45-47; EX2007: ¶102.

This is clearly shown in Fig. 4C of Nakagawa (reproduced below), which provides a top down view of the operation lever 43:



EX1007: Fig. 4C (annotated); EX2007: ¶103.

As shown in Fig. 4C above, the footprint of Nakagawa's operation lever 43 is a perfect square.¹⁰ EX2007: ¶103.

In its application of Nakagawa, US Conec improperly reads claim 1 as if lacked the requirement for an “elongate” arm. No evidence or reasoning is provided to show how Nakagawa's wide operation lever 43 is considered to be

¹⁰ The red box annotation added to Fig. 4C was generated using a “rectangle” shape tool in Word and has dimensions of 1.51 x 1.51 inches. EX2007: ¶103.

elongate. *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950–51 (Fed. Cir. 2006) (“[C]laims are interpreted with an eye toward giving effect to all terms in the claim” and “In sum, the effect of adopting Diro’s proposed claim construction would be to read limitations [a], [b], [e], and [h] out of the claim. Not only would that be contrary to the principle that claim language should not be treated as meaningless, but it would be contrary to the specification”); *Warner-Jenkinson Co., Inc. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997) (“Each element contained in a patent claim is deemed material to defining the scope of the patented invention”).

Instead, US Conec provides only a single conclusory statement that “a POSITA would have understood that operation lever 43 corresponds to the claimed elongate arm.” Petition: 52. Likewise, US Conec’s Expert Declaration (EX1016) also provides no evidence or reasoning. US Conec’s Expert Declaration simply repeats the same conclusory statement as the Petition: “a POSITA would have understood that the operation lever 43 corresponds to the claimed elongate arm.” EX1016: ¶182. US Conec’s failure to address the term “elongate” is a reason to deny institution. *Toyota Motor Corp. v. GE Hybrid Tech., LLC*, IPR2019-00009, paper 7 at 7–8, 18–22 (PTAB May 3, 2019) (denying institution based on claim constructions undertaken by the patent owner but not the petitioner); *Polygroup Ltd. v. Willis Electric Co., Ltd.*, IPR2014-01264, Paper 12 at 5–10 (PTAB Jan. 30,

2015) (denying institution based on a claim construction advanced by the patent owner even though the petitioner did “not offer a construction of the term”).

As explained above, the elongate shape of the arm 9105.1, 9205.1, 9305.1, 9405.1 in the ‘190 Patent is what enables the arm to function as the polarity key structure that only permits insertion of the connector 9100 in the correct mating orientation because the elongate arm cooperates with the corresponding structure, i.e., keyway, in the adapter. Section III; EX2007: ¶104. Because Nakagawa’s operation lever 43 is not elongate, it does not extend forward along the top of the optical connector unit 1 a sufficient distance to function as a polarity key. EX2007: ¶104. Instead, Nakagawa’s operation lever 43 only extends the minimal distance needed to effectively press the ends of the locking levers 24. *Id.* No portion of Nakagawa’s operation lever 43 is ever received in an adapter when the optical connector unit 1 is plugged in. EX2007: ¶105.



See EX2002 (showing an operation lever of a LC duplex connector like Nakagawa is not received by an adapter); EX2005; EX2007: ¶105.

Accordingly, US Conec has failed to meet its burden of showing the Nakagawa/Raven combination discloses the “elongate arm” of claim 1. EX2007: ¶93, 106.

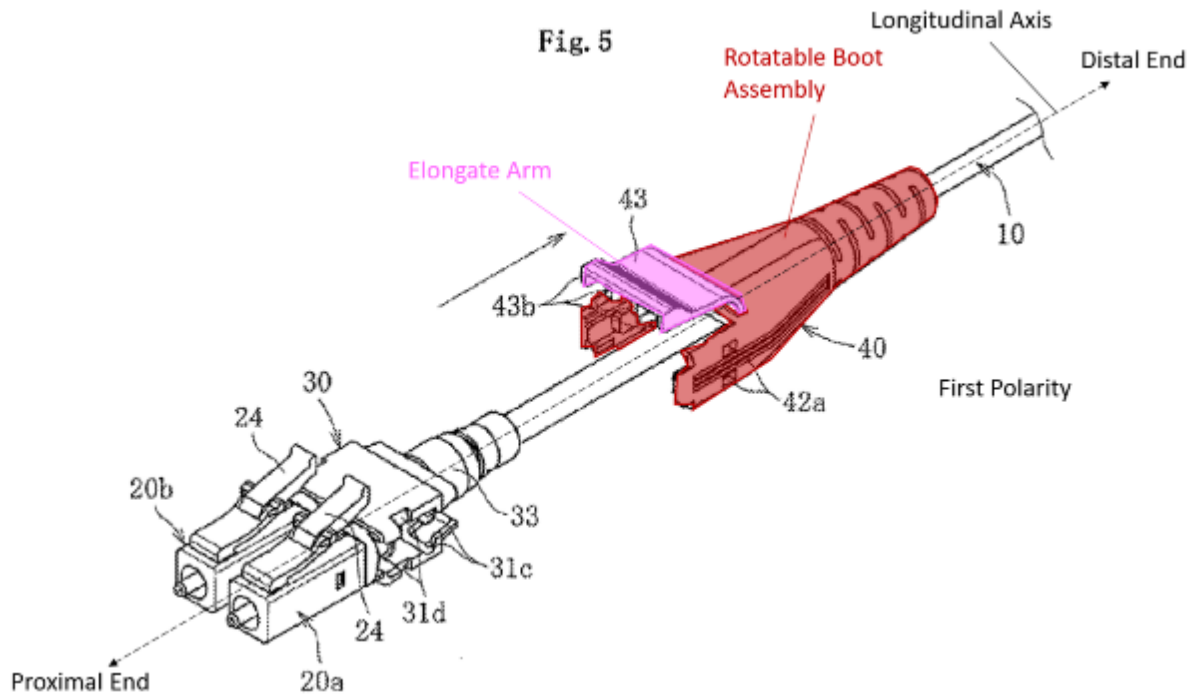
2. The Nakagawa/Raven Combination Does Not Teach “the Elongate Arm Being Configured for Selectively Setting the Optical Fiber Connector to Each of a First Polarity and a Second Polarity” (2nd Clause of Limitation 1.3.9)

Independent claim 1 recites “the *elongate arm* being configured for *selectively setting* the optical fiber connector to each of *a first polarity and a second polarity*.” EX1001: 11:47-49. US Conec asserts that Nakagawa’s operation lever 43 meets this limitation. Petition: 53-54.

Nakagawa’s operation lever 43 does not set the polarity. EX2007: ¶108.

As explained above in Section II(A)&(B), in an LC duplex connector like Nakagawa, the latch levers on top of the plug frames set the polarity of the connector because they are the key structures that fit inside an adapter and they only fit in an adapter when the connector is in the proper mating orientation (the orientation when the latch levers of the LC duplex connector are aligned with the latch receivers of the LC duplex adapter). EX2007: ¶109. Accordingly, it is Nakagawa’s locking levers 24 that set the polarity of the optical connector unit 1—not the operation lever 43. EX1007: ¶[0050]; EX2007: ¶109. Nakagawa teaches rotating each connector 20a, 20b 180° (when the boot 40 is removed) to change polarity. EX1007: ¶[0062]; EX2007: ¶109. Rotating the connectors 20a, 20b 180°

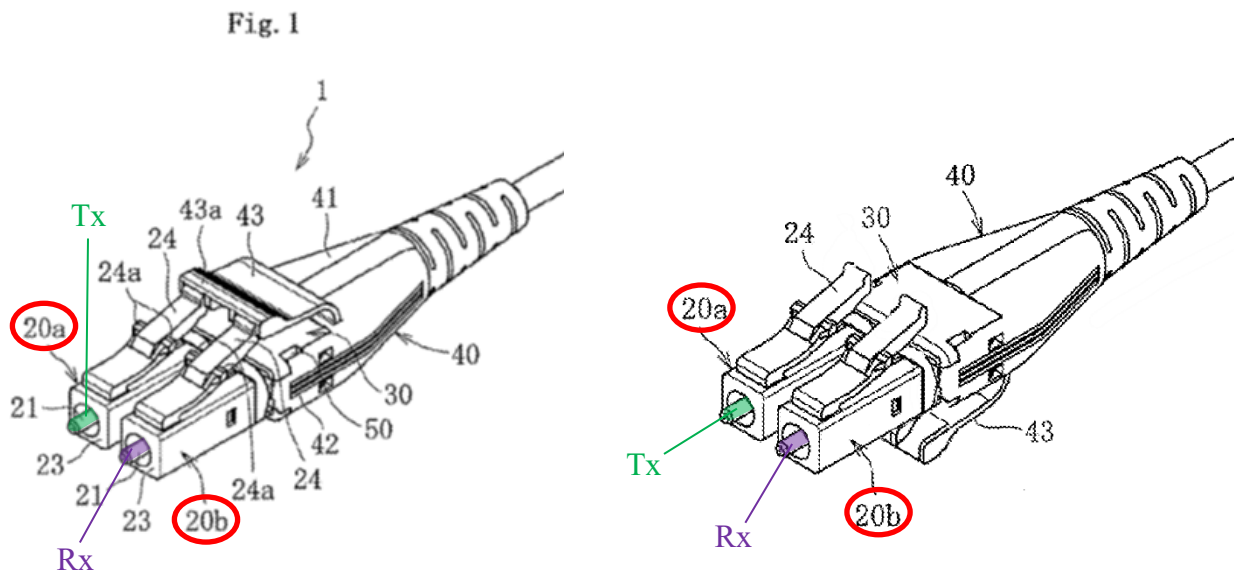
moves the locking levers 24 from top to bottom so that the arrangement of the two ferrules in relation to the locking levers 24 changes. EX1007: ¶¶[0062]-[0063]; EX2007: ¶109. Thus, the rotational positions of the connectors 20a, 20b sets the polarity independent of the operation lever 43. EX2007: ¶109.



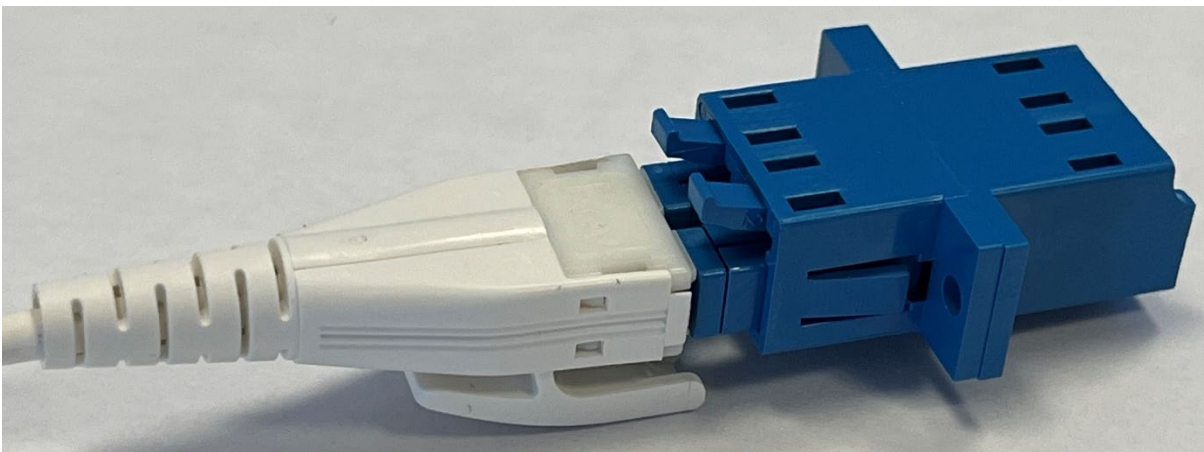
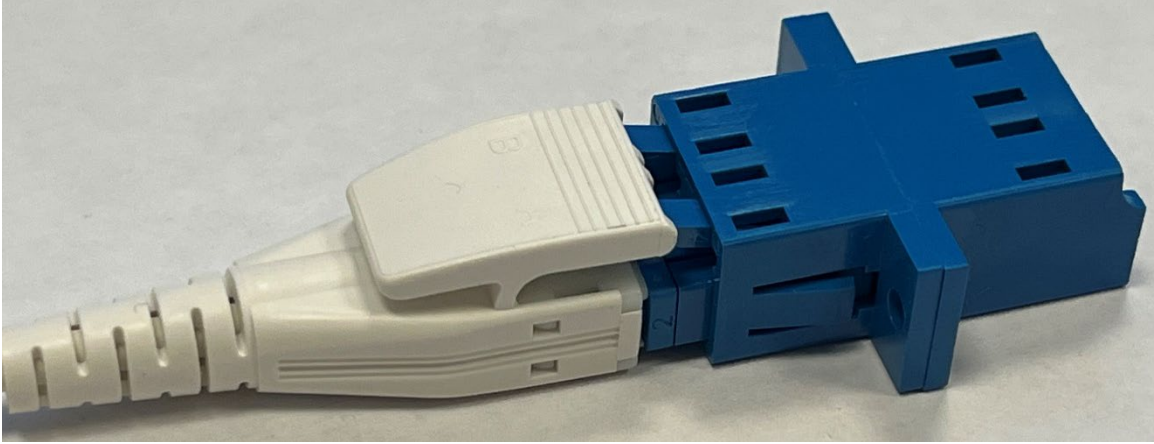
Petition: 53 (EX1007: Fig. 5 (annotated by US Conec)).

Again, the Petition applies Nakagawa's operation lever 43 to the claimed elongate arm, but the operation lever does not set polarity. EX2007: ¶110. The operation lever 43 is neither constructed to set polarity, nor arranged with respect to the other parts of Nakagawa's optical connector to set polarity. EX2007: ¶¶110, 112. The position of the operation lever 43 is, in fact, irrelevant to the polarity of the optical connector. EX2007: ¶111. Movement of the operation lever 43 is

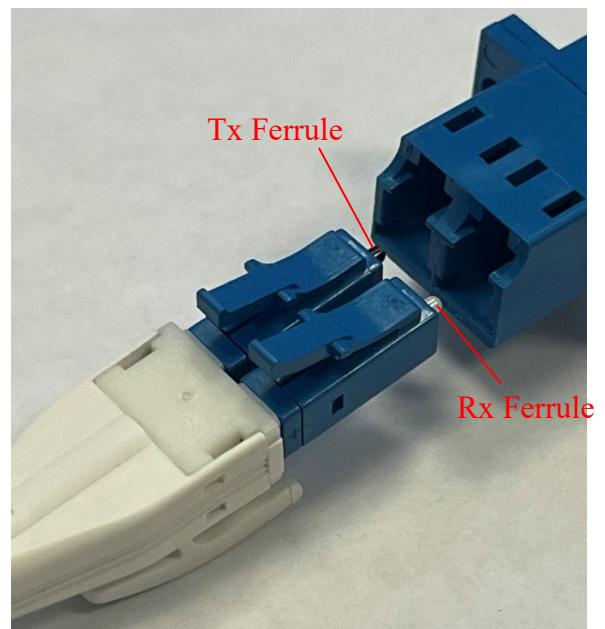
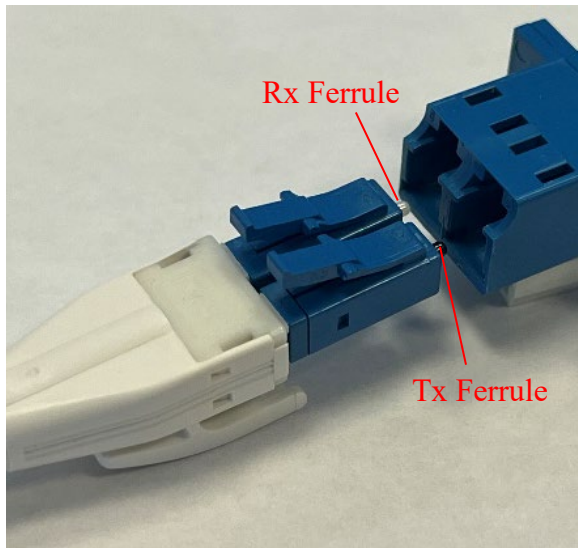
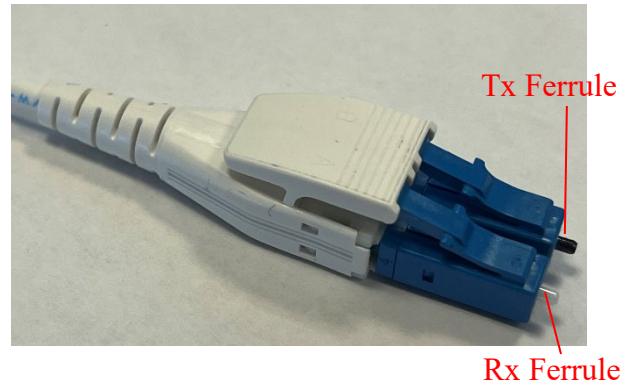
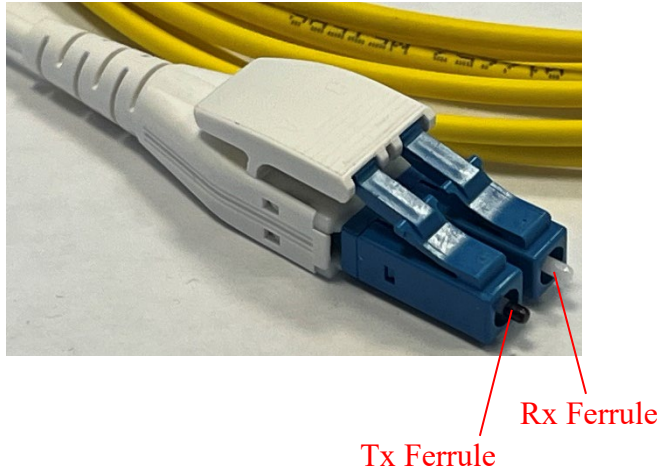
irrelevant to the positions of the ferrules in relation to the locking levers 24 (i.e., the key feature). *Id.* As shown below, changing the position of the locking lever 43 from the top to the bottom does not change the polarity of the optical connector. *Id.* Nakagawa's optical connector can have the same polarity when the boot 40 is oriented with the operation lever 43 on top (left) or bottom (right). *Id.*



EX1007: Fig. 1 (left-annotated only, right-annotated and reconstructed to show no change in polarity if only the boot 40 is rotated); EX2007: ¶111.



EX2002 (showing the LC duplex connector is connected to the adapter in the same mating orientation regardless of the position of the boot); EX2005; EX2007: ¶113.



First Polarity

Second Polarity

EX2002 (showing the polarity does not change because the boot was rotated);¹¹ EX2005; EX2007: ¶114.

Further, it is clear Nakagawa's operation lever 43 does not set the polarity of the optical connector because Raven and Veatch both disclose the same type of LC

¹¹ See Footnote 3.

duplex optical connector, and both references teach polarity change mechanisms that selectively set first and second polarities without an operation lever like the one used in Nakagawa. Sections II(B) and IV(B)&(C); EX1004: Fig. 2, 6:65-7:1; EX1008: Fig. 1; EX2007: ¶115. Accordingly, the PHOSITA clearly understands that it is the locking levers 24 of Nakagawa's LC duplex connector and their arrangement relative to the ferrules that sets the polarity of the connector—not an external operation lever that never enters into an adapter. EX2007: ¶115. Thus, in Nakagawa, it is the step of rotating the connectors 20a, 20b to reposition the locking levers 24 from the top to the bottom that causes the positions of the positions of the two ferrules to switch (relative to the locking levers) and sets the polarity of the optical connector unit 1. EX1007: ¶[0017]; EX2007: ¶115. The operation lever 43 does not set polarity, and therefore it does not meet the requirement for an elongate arm that sets polarity as claimed. EX2007: ¶115.

Accordingly, US Conec has failed to meet its burden of showing the Nakagawa/Raven combination discloses an “elongate arm being configured for *selectively setting* the optical fiber connector to each of *a first polarity and a second polarity*.” EX2007: ¶¶107, 116.

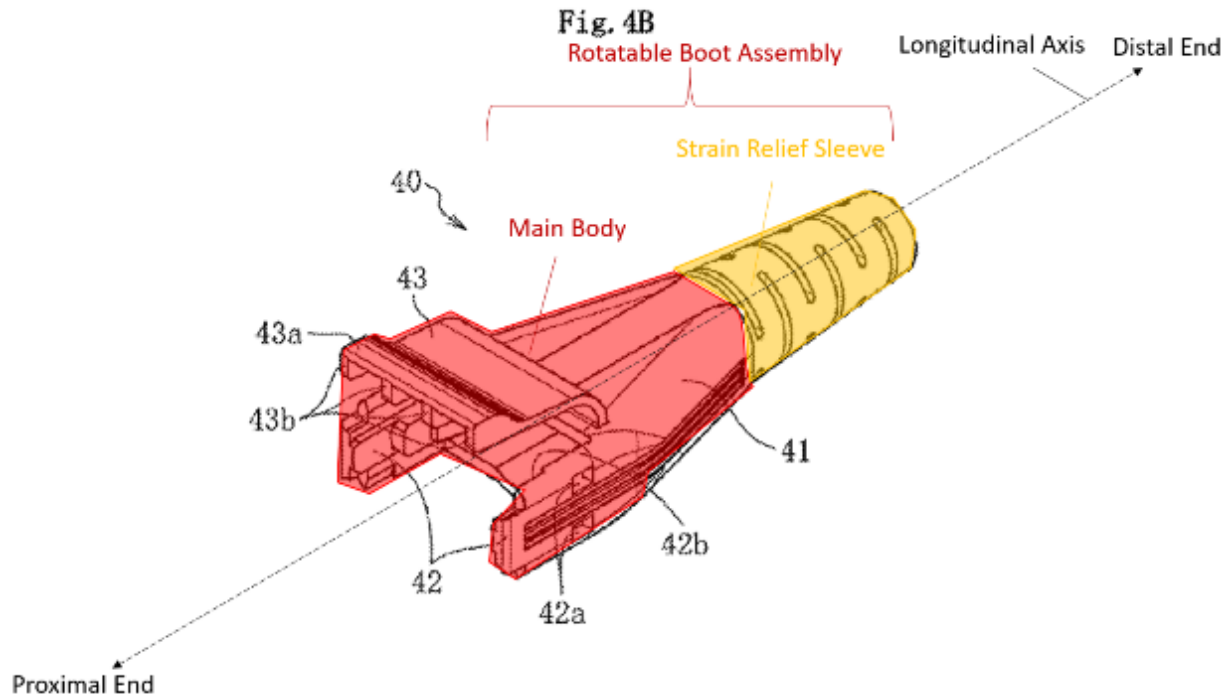
3. The Nakagawa/Raven Combination Does Not Teach “the Inner Round Surface [of the Main Body of the Rotatable Boot Assembly] Defining a Proximal End Portion of the Boot Passageway” (Limitation 1.3.3)

Independent claim 1 recites that “the rotatable boot assembly compris[es] a boot passageway extending from the distal end portion through the main body, the main body comprising an inner round surface extending along the longitudinal axis, *the inner round surface defining a proximal end portion of the boot passageway.*” EX1001: 11:21-27.

As an initial matter, the Examiner applied Nakagawa during prosecution of the ‘190 Patent and this limitation—limitation 1.3.3—was added during prosecution to distinguish Nakagawa. EX1003: 88-89, 141, 146; EX2007: ¶123. Senko specifically argued that limitation 1.3.3 was not in Nakagawa. EX1003: 146; EX2007: ¶123. The Examiner agreed and issued the notice of allowance. EX1003: 216-220; EX2007: ¶123.

Now, US Conec tries to assert Nakagawa does in fact teach this limitation. Petition: 39-42. But as explained below, US Conec is wrong. EX2007: ¶117.

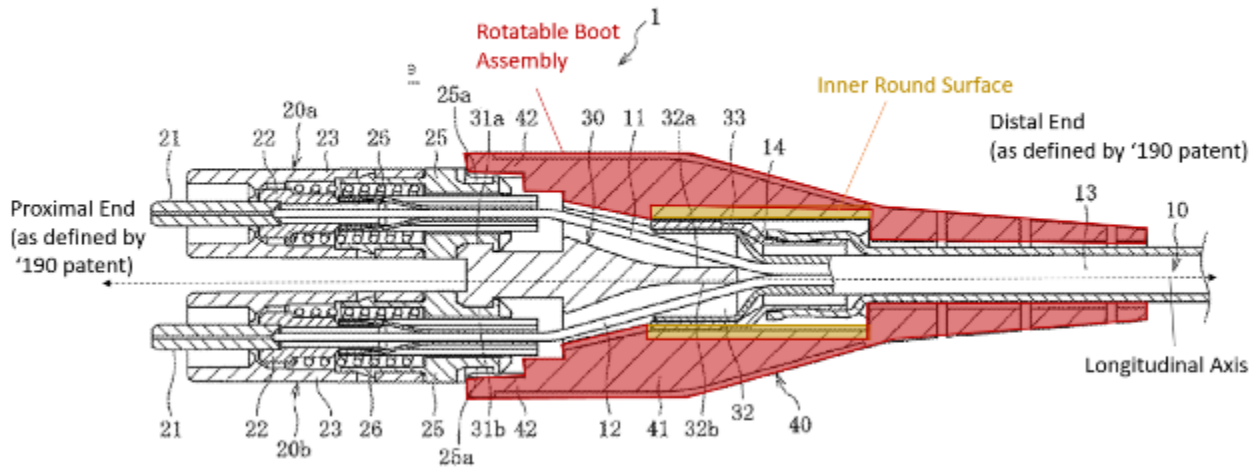
US Conec equates the indicated portion of Nakagawa’s boot 40 below to the claimed “main body” of the “rotatable boot assembly.” EX2007: ¶118.



Petition: 39 (EX1007: Fig. 4B (annotated by US Conec)).

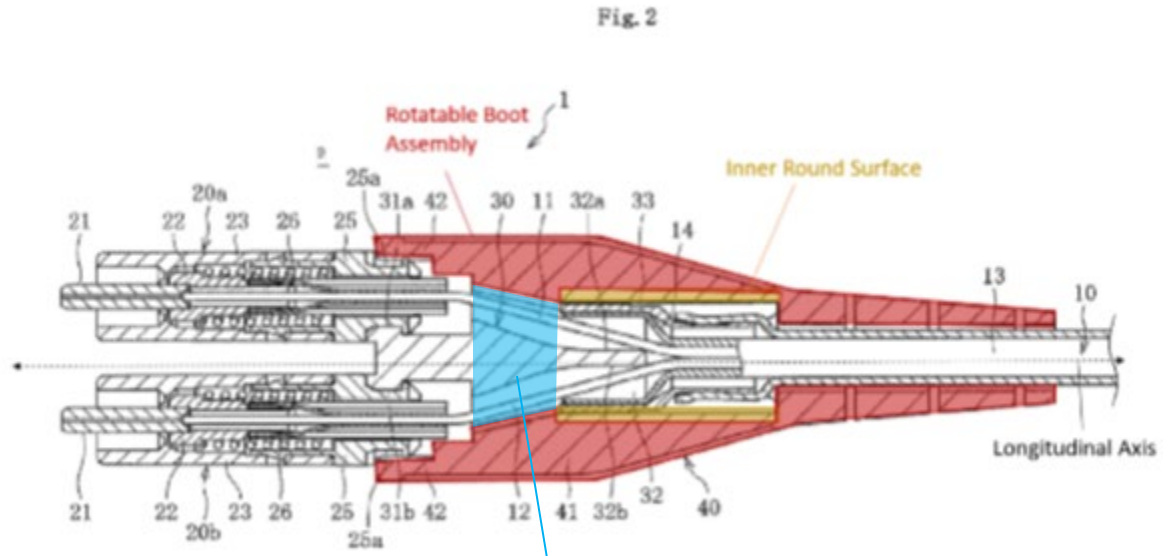
US Conec asserts that the indicated “main body” portion of Nakagawa’s boot 40 includes an “inner round surface [that] defin[es] a proximal end portion of the boot passageway” as recited by claim 1. Petition: 41-42. In support, US Conec annotates Nakagawa’s Fig. 2 (reproduced below) to identify the claimed “inner round surface.” EX2007: ¶119.

Fig. 2



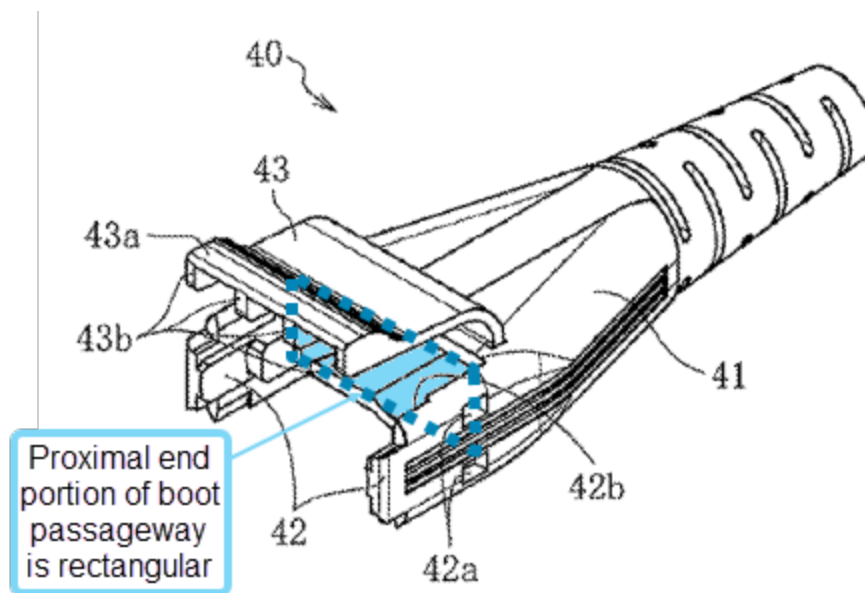
Petition: 42 (EX1007: Fig. 2 (annotated by US Conec)).

However, as shown below in US Conec's annotated Fig. 2 of Nakagawa, the indicated "inner round surface" does **not** "defin[e] a proximal end portion of the boot passageway" as recited by claim 1. EX2007: ¶120. Instead, the indicated "inner round surface" defines an *intermediate* portion of a boot passageway, that is distal of the proximal end portion of the boot passageway. EX2007: ¶120.



Petition: 42 (EX1007: Fig. 2 (annotated by US Conec, further annotated by Senko (blue))).

The non-round shape of the proximal end portion of Nakagawa's boot passageway is apparent in Fig. 4B below. EX2007: ¶121.



EX1007: Fig. 4B (annotated).

Accordingly, the inner round surface identified by US Conec does not define the proximal end portion of the boot passageway because there is another (non-round) portion of the boot passageway more proximal than the identified inner round surface. EX2007: ¶122.

Further, the Examiner applied Nakagawa during prosecution of the ‘190 Patent and this limitation—limitation 1.3.3—was added during prosecution to distinguish Nakagawa. EX1003: 88-89, 146. Senko specifically argued that limitation 1.3.3 was not in Nakagawa. EX1003: 146. The Examiner agreed and issued the notice of allowance. EX1003: 216-220.

Accordingly, US Conec has failed to meet its burden of showing the Nakagawa/Raven combination discloses “the inner round surface *defining a proximal end portion* of the boot passageway.” EX2007: ¶¶117, 124.

4. The Nakagawa/Raven Combination Does Not Teach “a Front Body Configured to Hold First and Second Ferrules” (Limitation 1.1)

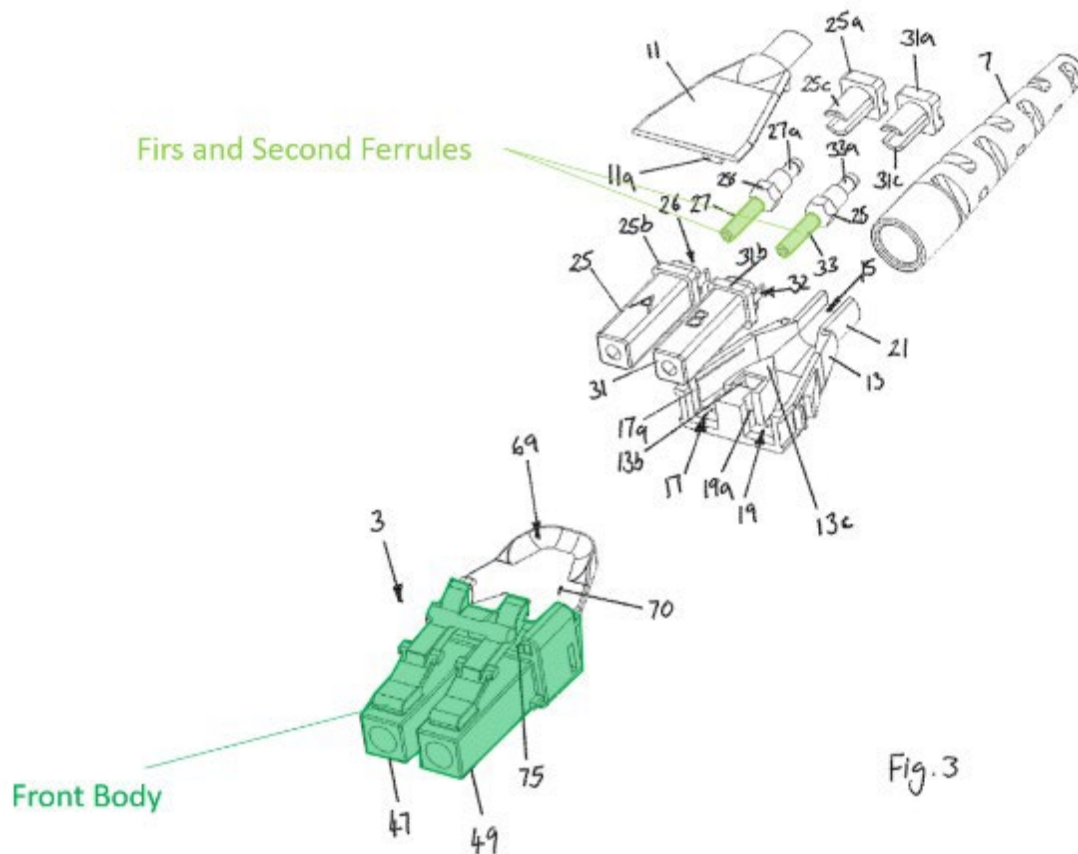
Independent claim 1 recites that the optical fiber connector comprises “a front body configured to hold first and second ferrules.” EX1001: 11:6.

As an initial matter, Senko agrees with US Conec that Nakagawa does not disclose this claim limitation as each ferrule 21 of Nakagawa is individually held by one of the simplex connectors 20a, 20b of the optical connector unit 1. Petition:

31; EX1007: Figs. 1 and 2, ¶[0047] (“connectors 20a, 20b each include a ferrule 21”); EX2007: ¶126.

Because of Nakagawa’s deficiency, US Conec proposes to modify Nakagawa’s optical connector unit 1 to include Raven’s leading end unit 3. Petition: 26-28, 31-34. Raven’s end unit 3 is a one-piece molding that covers the two LC plug frames and mounts two latch levers of an LC duplex connector. EX2007: ¶127. US Conec equates Raven’s leading end unit 3 to the claimed front body. Petition: 31-33; EX2007: ¶128.¹²

¹² US Conec points to Raven’s leading end unit 3 as the claimed front body for limitation 1.1. Petition: 31-33. However, for limitation 1.2, US Conec points to Nakagawa’s connectors 20a, 20b as the front body. Petition: 34; EX2007: ¶129.



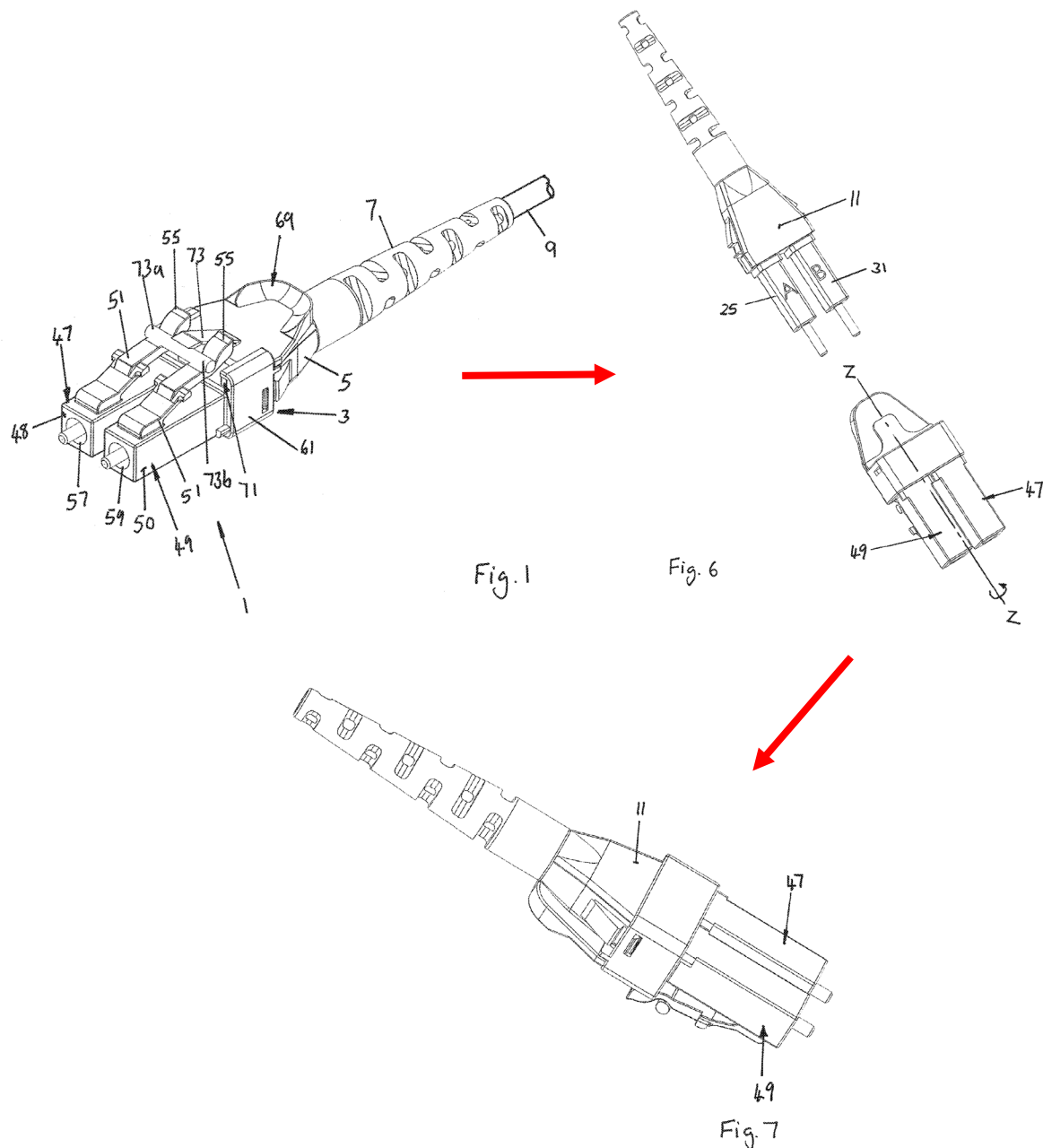
Petition: 32 (EX1008: Fig. 3 (annotated by US Conec)).

However, Raven's leading end unit 3 does not hold the ferrules 27, 33.

EX2007: ¶130. Instead, the ferrules 27, 33 are held by the first and second inner bodies 25, 31. EX1008: Figs. 3 and 5, 10:23-30, 10:42-44; EX2007: ¶130. It is readily apparent Raven's leading end unit 3 does not hold the ferrules 27, 33, as Raven's leading end unit separates from the ferrules in order to change polarity, as shown below. Raven's ferrules 27, 33 would move with the leading end unit 3 if Raven's leading end unit held the ferrules. EX2007: ¶130. But because the ferrules 27, 33 are held by the inner bodies 25, 31—not the leading end unit 3—the ferrules

do not move with the leading end unit during the polarity change operation.

EX1008: 10:23-41; EX2007: ¶130.



EX1008: Figs. 1, 6, and 7, 12:28-39.

In perhaps an implicit recognition that Raven's leading end unit 3 does not hold ferrules, US Conec *never* states that Raven's leading end unit 3—alone or

when combined with Nakagawa’s optical connector unit 1—holds any ferrules.

Petition: 31-33. Instead, US Conec only says Raven’s “ferrules 27, 33 protrude” from Raven’s leading end unit 3. Petition: 31.

Accordingly, the front body 3 of Raven does not meet “a front body configured to hold first and second ferrules,” and US Conec has failed to meet its burden of making a *prima facie* case for that limitation. EX2007: ¶¶125, 131.

- i. The Nakagawa/Raven Combination Does Not Teach “the Proximal End Portion of the Back Body Configured to Couple to the Front Body” (2nd Clause of Limitation 1.2)*

Should the Board determine that US Conec’s Nakagawa/Raven combination meets limitation 1.1 pertaining to the front body, US Conec’s Nakagawa/Raven combination still does not teach all of limitation 1.2, which recites “the proximal end portion of the back body [is] configured to ***couple to*** the front body.”

EX1001: 11:8-10; EX2007: ¶132.

For limitation 1.1, US Conec points to Raven’s leading end unit 3 as the claimed front body, as shown below:

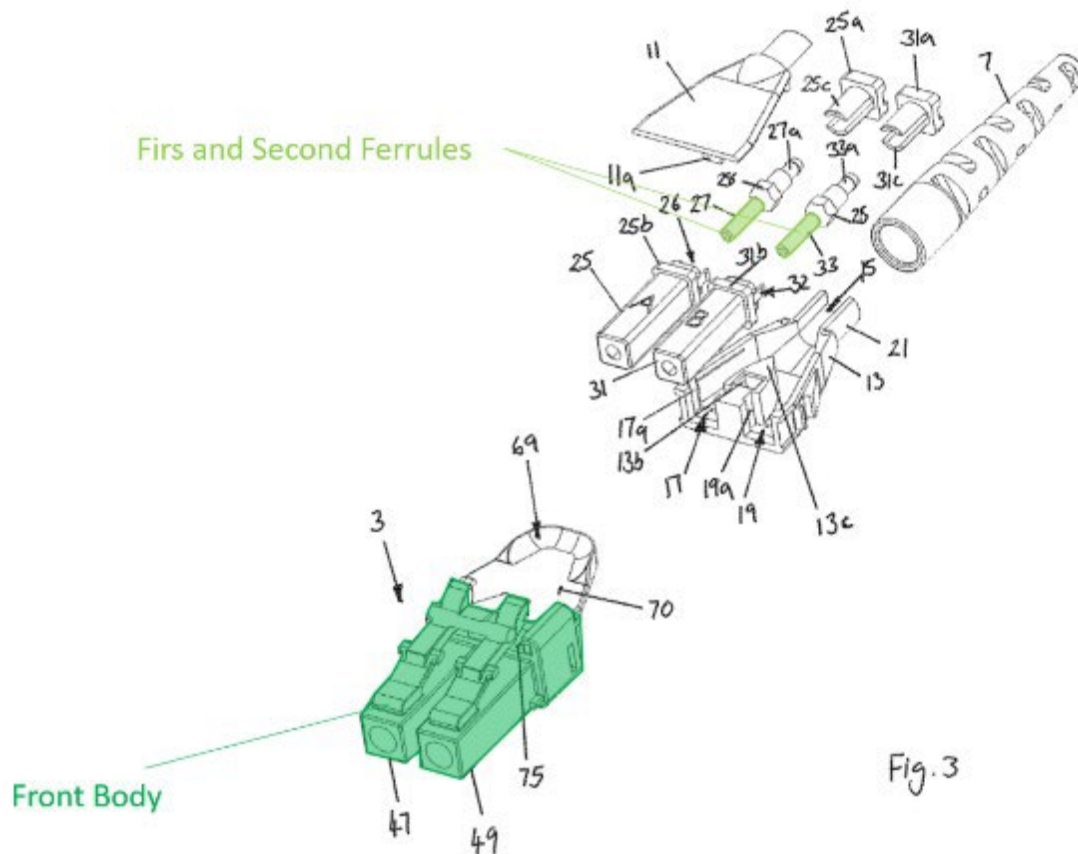
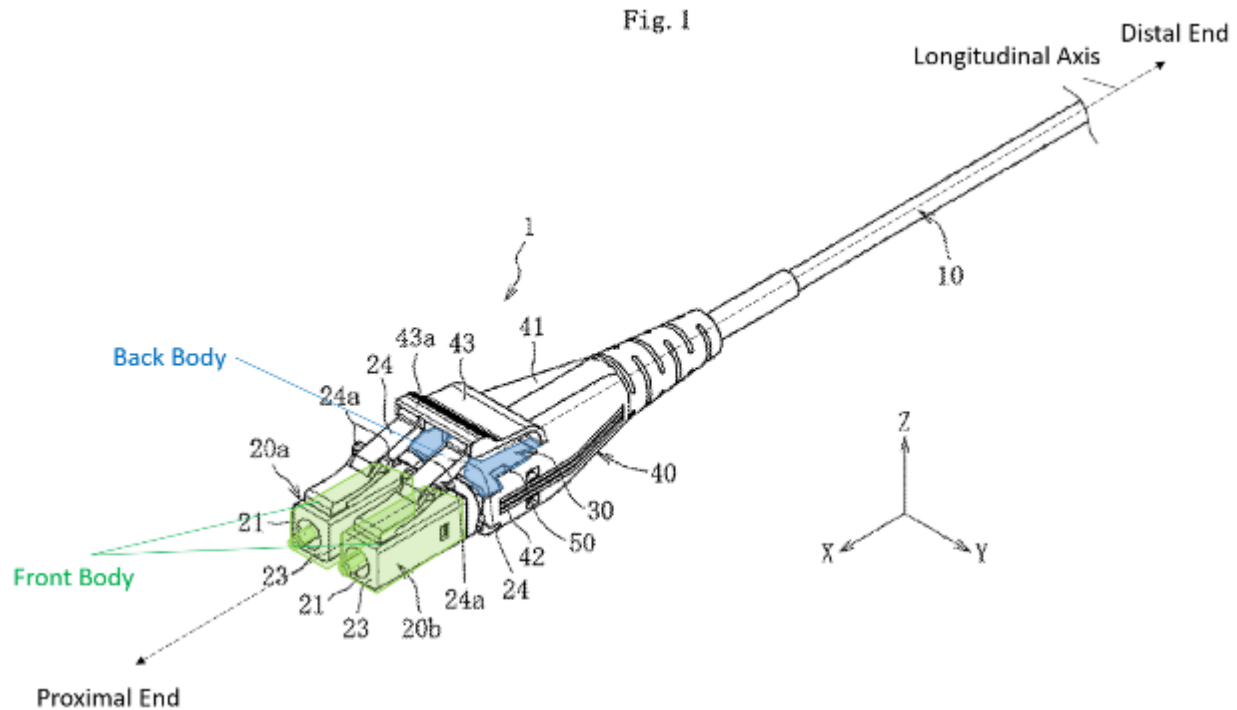


Fig. 3

Petition: 31-33 (EX1008: Fig. 3 (annotated by US Conec)); EX2007: ¶133.

However, for limitation 1.2, US Conec points to Nakagawa's connectors 20a, 20b as the front body, as shown below:



Petition: 34 (EX1007: Fig. 1 (annotated by US Conec)); EX2007: ¶134.

This pointing by US Conec to different elements of different prior art references for the same element—e.g., a front body—depending on which limitation the element is recited in, demonstrates the prior art does not render the claim obvious. EX2007: ¶135. That is, US Conec has not established that the same prior art front body (either Raven’s leading end unit 3 or Nakagawa’s connectors 20a, 20b) meets all the “front body” limitations recited in claim 1. EX2007: ¶135.

Further still, US Conec does not assert that Raven’s leading end unit 3 (the “front body” according to limitation 1.1) would *couple to* Nakagawa’s holder 30 (which US Conec equates to the claimed back body). Petition: 34-37. Instead, US

Conec only asserts that Nakagawa's connectors 20a, 20b are coupled to Nakagawa's holder 30. Petition: 34; EX2007: ¶136.

US Conec cannot have it both ways. Either:

- 1) Raven's leading end unit 3 is the claimed front body, in which case US Conec's Nakagawa/Raven combination fails to teach limitation 1.2, because US Conec has not shown how (or even whether) Raven's leading end unit 3 would be coupled to Nakagawa's holder 30; or
- 2) Nakagawa's connectors 20a, 20b are the claimed front body, in which case US Conec's Nakagawa/Raven combination fails to teach limitation 1.1 (Section VI(A)(4) above), because Nakagawa does not teach one front body that holds two ferrules. EX2007: ¶137.

Accordingly, US Conec has failed to meet its burden of showing the Nakagawa/Raven combination discloses that "the proximal end portion of the back body [is] configured to couple to the front body." EX2007: ¶138.

B. Ground 2: Claim 20 is Not Obvious over Nakagawa, Raven, and Cline

US Conec's Ground 2 argues that dependent claim 20 would have been obvious over the combination of Nakagawa and Raven in further view of Cline. However, Cline fails to remedy the deficiencies of Nakagawa and Raven discussed in Ground 1. EX2007: ¶139. Therefore, Ground 2 fails for the same reasons discussed above in connection with Ground 1.

C. Ground 3: US Conec Has Failed to Carry Its Burden to Prove Independent Claim 1 of the ‘190 Patent Is Obvious over Veatch and Connelly

Ground 3 of US Conec’s Petition asserts that independent claim 1 (and dependent claims 2, 3, 6-11, 13-16, and 19) are obvious over Veatch modified in view of Connelly. But US Conec again ignores the specific structural detail recited in independent claim 1. EX2007: ¶140.

1. The Veatch/Connelly Combination Does Not Teach “a Back Body Having a Proximal End Portion and a Distal End Portion Spaced Apart Along a Longitudinal Axis, the Proximal End Portion of the Back Body Configured to Couple to the Front Body” (First Two Clauses of Limitation 1.2)

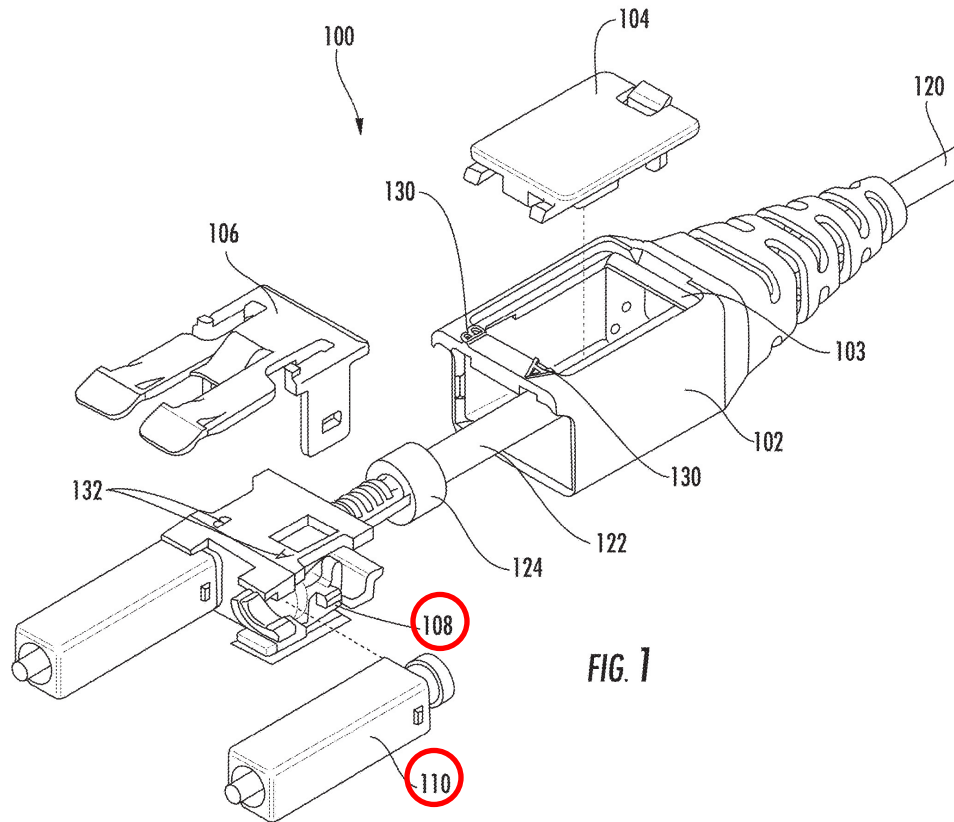
Independent claim 1 recites that the optical fiber connector comprises “a front body configured to hold first and second ferrules” (limitation 1.1.) *and* “a back body having a proximal end portion and a distal end portion spaced apart along a longitudinal axis, the proximal end portion of the back body configured to couple to the front body” (limitation 1.2). EX1001: 11:6-10. US Conec’s modification of Veatch’s connector 100 in view of Connelly’s fiber optic plug 34 does not result in an optical fiber connector that has both (1) a front body and (2) a back body as claimed. EX2007: ¶141.

To achieve “a front body configured to hold first and second ferrules,” US Conec states it would have been “obvious to modify Veatch’s housing configuration comprising *two separate connector bodies 110 and the fiber holder*

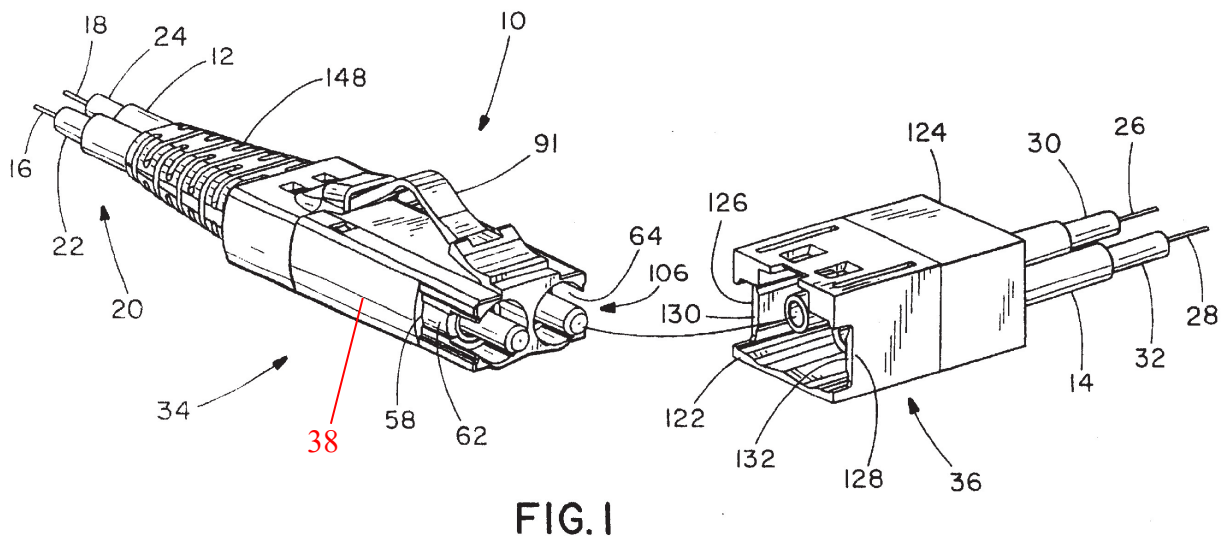
108 to instead comprise *a unitary housing 38* as disclosed by Connelly.” Petition: 86-87; EX2007: ¶¶142-143. US Conec’s Expert explain the proposed modification further:

“a straightforward *modification of the three components* (i.e., fiber holder 108 and two connector bodies 110) that remain connected together would be in the form of *creating a unitary housing* that surrounds both ferrules. As such, by *substituting the unitary housing 38 disclosed by Connelly for the fiber holder 108 and connector bodies 110* in the polarity-reversible connector of Veatch, two ferrules may continue to be surrounded and maintain a lack of rotation during a polarity change while reducing the total number of components in the optical fiber connector.” EX1016: ¶286.

Accordingly, US Conec argues that it would be obvious to make a three-to-one substitution, replacing the two simplex LC connectors 110 and fiber holder 108 of Veatch with the single unitary housing 38 of Connelly. EX2007: ¶144.



EX1004: Fig. 1 (annotated).

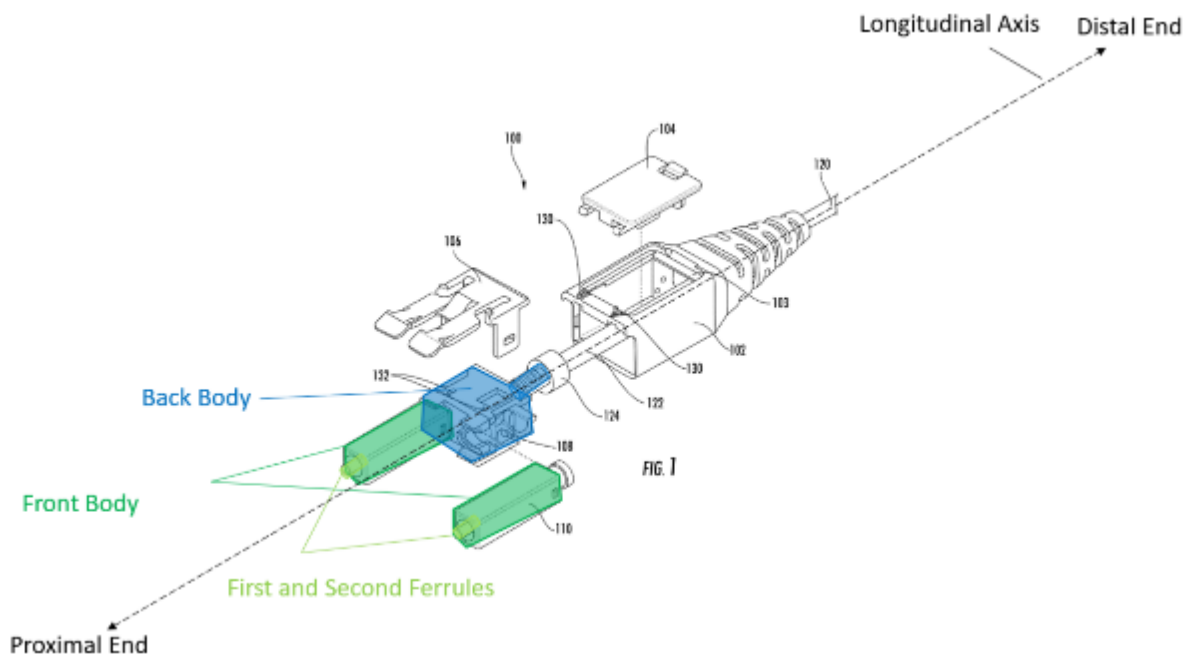


EX1005: Fig. 1 (annotated).

But once Veatch is modified by replacing the two simplex LC connectors

110 and fiber holder 108 with the single “*unitary housing*” 38 in of Connelly, the resulting Veatch/Connelly combination does not meet the limitations of claim 1 because it is completely devoid of the back body required in limitation 1.2.

EX2007: ¶145. For limitation 1.2, US Conec argues that Veatch’s fiber holder 108 meets the claimed back body. Petition: 94-95. But in the proposed modification of Veatch in view of Connelly, the fiber holder 108 was eliminated as a separate component. EX2007: ¶145. By modifying Veatch’s connector bodies 110 and fiber holder 108 to be a unitary housing, Veatch/Connelly modification no longer has both a front body and a back body. *Id.* Instead, the Veatch/Connelly modification only has one body, which US Conec has equated to the front body that holds two ferrules. Petition: 91-94; EX2007: ¶145.



Petition: 94 (EX1004: Fig. 1 (annotated by US Conec)).

It is *prima facie* improper for US Conec to rely on the “unitary housing” of their Veatch/Connelly modification to meet both the “front body” and “back body” recited by claim 1. *Ex parte Koutsky*, Appeal No. 2008-0557, page 4 (B.P.A.I. Sept. 23, 2008) (“when a claim requires two separate elements, one element construed as having two separate functions will not suffice to meet the terms of the claim.”) (citing *Lantech, Inc. v. Keip Machine Co.*, 32 F.3d 542, 547 (Fed. Cir. 1994)); *see also In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (claims requiring three separate means cannot be rendered unpatentable by structure that contains only two means using one element twice).

Further, limitation 1.2 recites that “the proximal end portion of the back body [is] configured to ***couple to*** the front body.” US Conec completely fails to state, or even try to explain, how the “unitary housing” 38 of Connelly meets this portion of limitation 1.2 once it replaces the “two separate connector bodies 110 ***and the fiber holder 108***” of Veatch. Petition: 86-87. Moreover, an explanation is not possible because a “unitary housing” does not have separate bodies “configured to couple to” one another. EX2007: ¶146. US Conec provides only a conclusory assertion that Veatch’s connector bodies 110 are coupled to Veatch’s fiber holder 108. Petition: 94. But the coupling between the connector bodies 110 and fiber holder 108 is a red herring because these parts have been eliminated as separate components of the Veatch/Connelly combination because the underlying

premise of the combination is that the three components of Veatch are replaced by the single unitary housing 38 of Connelly.

Accordingly, US Conec has failed to meet its burden of showing the Veatch/Connelly combination discloses “a back body having a proximal end portion and a distal end portion spaced apart along a longitudinal axis, the proximal end portion of the back body configured to couple to the front body.” EX2007: ¶147.

2. The Veatch/Connelly Combination Does Not Teach a “rotatable boot assembly comprising a main body ..., the main body comprising an inner round surface extending along the longitudinal axis” (Limitation 1.3.3)

Independent claim 1 recites a “rotatable boot assembly comprising a main body ..., the main body comprising an inner round surface extending along the longitudinal axis, the inner round surface defining a proximal end portion of the boot passageway.” EX1001: 11:21-27.

As an initial matter, the Examiner applied Veatch during prosecution of the ‘190 Patent and this limitation—limitation 1.3.3—was added during prosecution to distinguish Veatch. EX1003: 88-89, 141, 146; EX2007: ¶173. Senko specifically argued that limitation 1.3.3 was not in Veatch. EX1003: 146; EX2007: ¶176. The Examiner agreed and issued the notice of allowance. EX1003: 216-220; EX2007: ¶176.

Now, US Conec tries to assert Veatch does in fact teach this limitation. Petition: 98-99. But as explained below, US Conec is wrong. EX2007: ¶148.

US Conec fails to expressly state exactly what elements of Veatch’s connector 100 form the claimed “main body.” Petition: 97-98. This alone is sufficient to deny institution. 35 U.S.C. § 312(a)(3) (a petition “may be considered only if ... the petition identifies, in writing and with particularity, each claim challenged, the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge to each claim”); *see also* 37 C.F.R. § 42.104(b)(4) (requiring the petition to “specify where each element of the claim is found in the prior art patents or printed publications relied upon”); *see also Eik Eng’g Sdn. Bhd. v. Wilco Marsh Buggies & Draglines, Inc.*, IPR2020-00344, paper 7 at 14 (P.T.A.B. June 23, 2020) (“[t]he Petition fails to identify with particularity what disclosure is relied on from each of the references”).

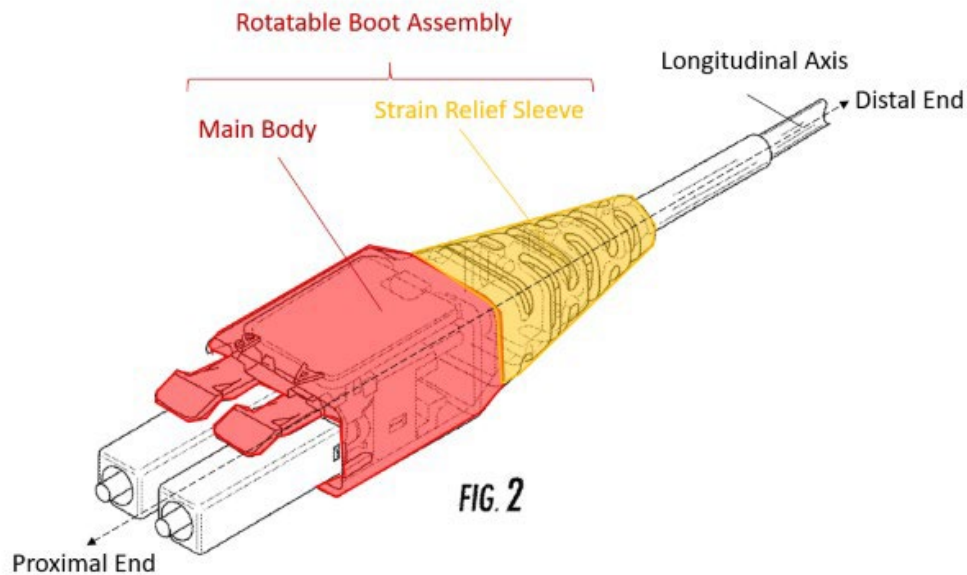
Nevertheless, searching through US Conec’s annotated images of Veatch in the Petition¹³, it appears US Conec equates some combination of the following

¹³ US Conec’s annotated images in the Petition regarding the “main body” of the rotatable boot assembly are not all consistent with one another. EX2007: ¶150.

Compare annotated images on pages 98 and 104 of the Petition with the annotated

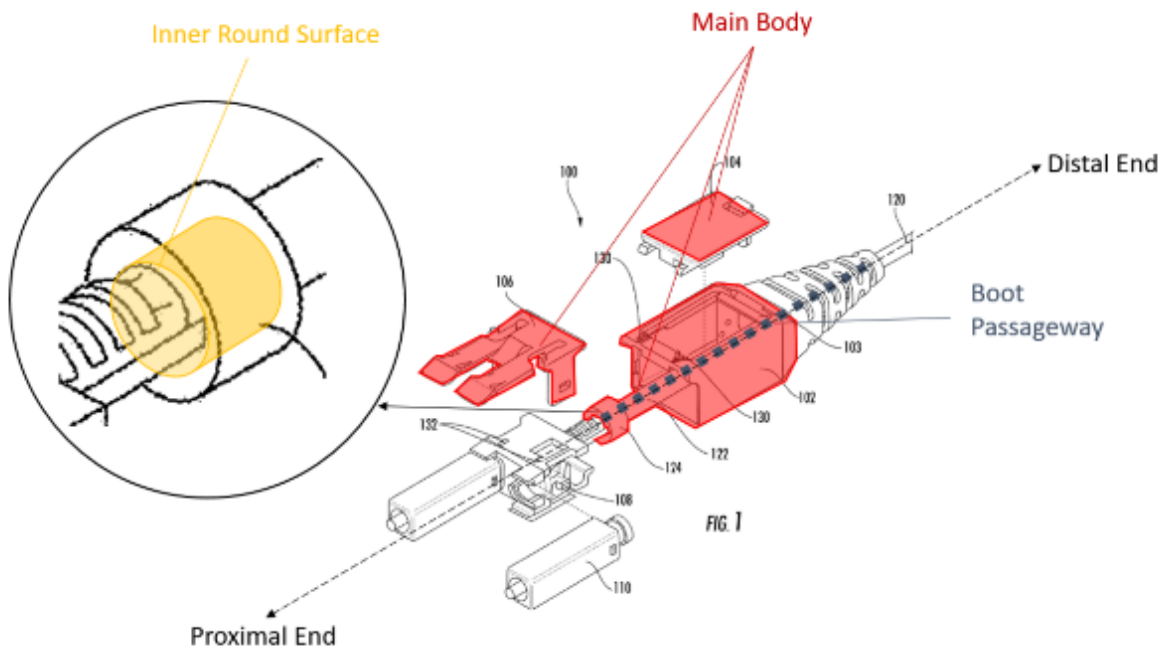
Veatch elements with the claimed “main body” of the rotatable boot assembly:

Veatch’s latch 106 (at least a portion thereof), a portion of Veatch’s boot 102 (the proximal portion thereof that forms the cutout 103), Veatch’s cover 104, Veatch’s crimp ring 124, and/or Veatch’s heat shrink material 122. EX2007: ¶149

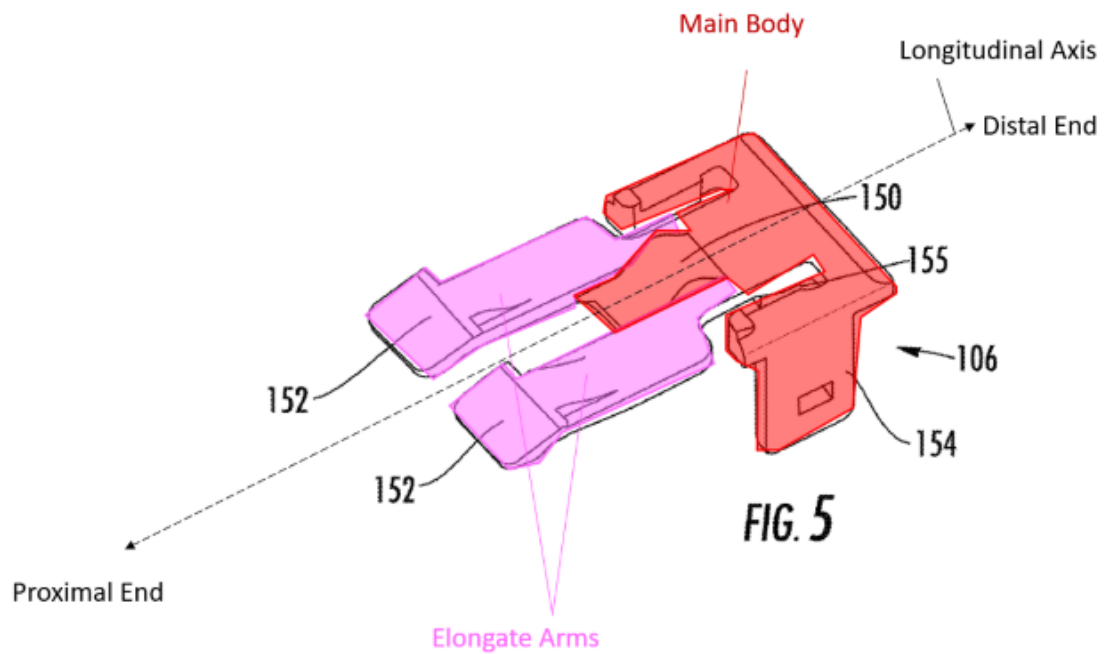


Petition: 98 (EX1004: Fig. 2 (annotated by US Conec)).

image on page 108 of the Petition, which identify different portions of Veatch’s latch 106 as being part of the claimed main body. EX2007: ¶150.

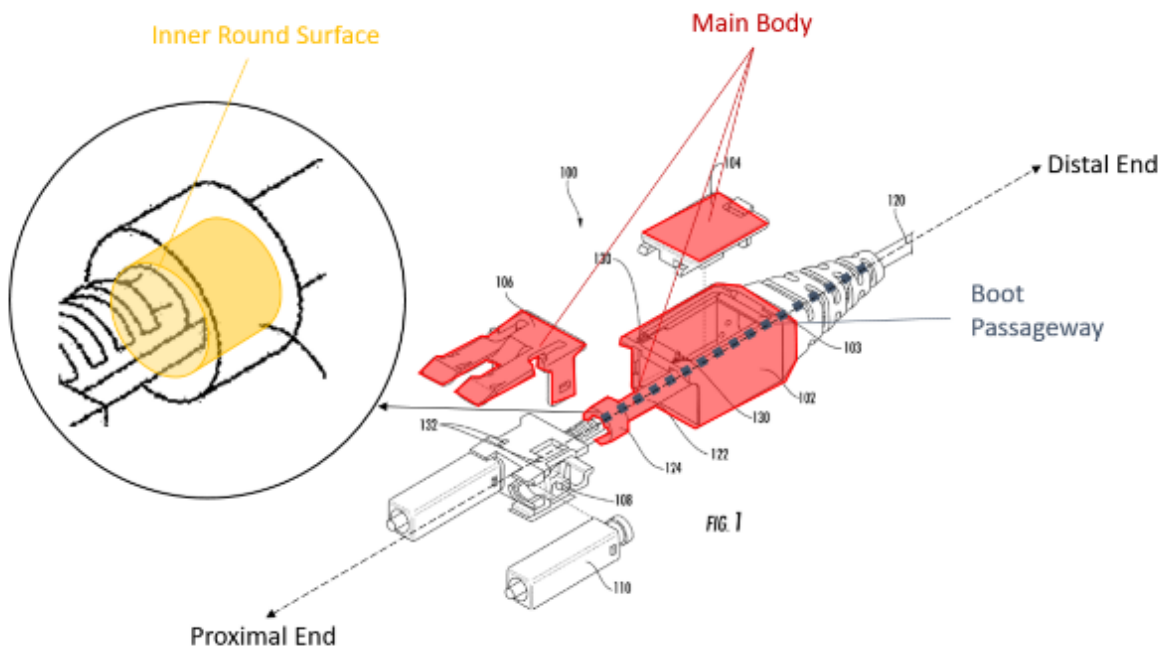


Petition: 99 (EX1004: Fig. 1 (annotated by US Conec)).



Petition: 108 (EX1004: Fig. 5 (annotated by US Conec)).

US Conec asserts that the indicated portion of Veatch's crimp ring 124 includes an "inner round surface [that] defines the proximal end portion of the boot passageway" as recited by claim 1. Petition: 99. In support, US Conec blows up and annotates Veatch's Fig. 1 (reproduced below) to identify the claimed "inner round surface." EX2007: ¶151.



Petition: 99 (EX1004: Fig. 1 (annotated by US Conec)).

US Conec strains to define Veatch's crimp ring 124 as a part of the "rotatable boot assembly" in an effort to locate some structure that can plausibly be interpreted as having an "inner round surface," as recited in limitation 1.3.3.

Petition: 98-99; EX2007: ¶152. However, Veatch's crimp ring 124 is not part of the claimed "main body" of the "rotatable boot assembly" because the crimp ring does not rotate and is in no way correlated to the rotation of Veatch's boot 102.

EX2007: ¶152. Those skilled in the art understand that crimp rings like the one disclosed in Veatch are tubes of material that are compressed (i.e., crimped) onto a back post to firmly secure reinforcement fibers of a cable to the back post.

EX2018: Fig. 4, ¶[0003]; EX2014: 2 (“a crimping tool is used to apply mechanical force to a crimp barrel (a small metal sleeve or ring), thus deforming it and forming a tight bond with the connector itself”); EX2015: 1 (“cable can be pulled without coming loose from the connector”); EX2016: 2 (“securing the cable jacket with a crimp helps prevent the jacket from detaching or twisting”); EX2007: ¶153.

Thus, Veatch’s crimp ring 124 is fixed onto the fiber holder 108 such that it cannot move relative to the fiber holder. EX1004: 2:20-22; EX2007: ¶163. US Conec never asserts that Veatch’s crimp ring 124 is rotatable like the boot 102. Petition: 95-96. Moreover, when the boot 102 rotates relative to the fiber holder 108, it necessarily rotates relative to the crimp ring 124. EX2007: ¶163. Because of how the crimp ring 124 is crimped onto the fiber holder 108, it is not even possible to rotate the crimp ring 124 separately from the boot 102 in a way that would keep the two components rotationally aligned when a polarity change is made. EX2007: ¶163. There is simply no reasonable interpretation of “rotatable boot assembly” that encompasses a combination of the rotatable boot 102 and the fixed crimp ring relative to which the boot rotates when changing polarity. EX2007: ¶163.

The specification of the ‘190 Patent clarifies that a crimp ring is a distinct component, separate from *any* boot assembly, that is used to secure the fiber optic cable to the back body. EX1001: Figs. 1 and 38, 4:33-39; EX2007: ¶164.

Moreover, with respect to a connector having a “rotatable boot assembly” as claimed the ‘190 Patent specifically states:

During rotation of the multi-purpose ***rotatable boot assembly*** 9209.1, boot wing 9209.5 operates as described above in FIGS. 25-33. This is accomplished by gap 9209.6 between ***boot assembly*** 9209.1 that allows “free-wheeling” about ***crimp ring*** 9207 as inner round 9409.4 engages back post face surface 9406.7 as described in FIGS. 26-27. EX1001: 8:45-51.

The ‘190 Patent explaining that the “boot assembly 9209.1” *rotates about* the “crimp ring 9207” confirms the crimp ring is not part of the rotatable boot assembly, let alone a main body thereof. EX2007: ¶164. Thus, any inner round surface of the crimp ring is different from the inner round surface of the main body. EX2007: ¶165.

As further evidence that a PHOSITA would understand that a crimp ring is not part of a boot assembly, US Conec’s own patents and patent applications consistently distinguish the crimp ring of a fiber optic connector from the boot or boot assembly. EX2007: ¶¶166-170; EX2017: Figs. 8 and 10, 5:21-26 (“a fiber optic connector 200 ... includes the connector housing 204, a ferrule 210, a spring 212, the spring push 110, and a *boot* 214. A *crimp ring* 216, disposed between the crimp portion 130 [of the spring push 100] and the *boot* 214, is also illustrated”);

EX2018: Fig. 4, ¶¶[0003], [0027] (“a *crimp band* 302 and a *strain relief boot* 304 are then applied over the back end of the two-piece spring push 100”); EX2019: Fig. 2, 4:43-47 (“[t]he fiber optic connector 100 ... include[s] a housing 102, a latch component (push-pull mechanism) 104, a crimp body 106, a *crimp ring* and heat shrink tube 108, and a *strain relief boot* 110”); EX2020: Fig. 6, 3:63-4:2 (“The fiber optic connector 100 ... include[s] a housing 102, fiber optic ferrules 104 ..., a crimp body 106, a *crimp ring* and heat shrink tube 108, a front extension 110 that is a part of *strain relief boot* 112”). As shown by its own patents, US Conec’s attempt to define a crimp ring as the component of a boot assembly would violate the plain meaning of “boot assembly” as understood by a PHOSITA. *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999) (“Prior art references [are] ‘indicative of what all those skilled in the art generally believe a certain term means . . . [and] can often help to demonstrate how a disputed term is used by those skilled in the art.’”) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1584 (Fed. Cir. 1996)).

Further, US Conec’s own actions demonstrate that a PHOSITA would not consider Veatch’s crimp ring 124 to be part of the “main body” of the “rotatable boot assembly.” EX2007: ¶171. US Conec’s changes their determination of which part of the connector the crimp ring is a part from ground-to-ground in the Petition. *Id.* In Ground 1, US Conec asserts Nakagawa’s caulking member 33—which is a

crimp ring¹⁴—is applied as part of the claimed “back body.” Petition: 34-36.

Whereas now, for Ground 3, US Conec is asserting Veatch’s crimp ring 124 is part of the “main body” of the “rotatable boot assembly.” Petition: 98-99. US Conec’s contradictory uses of the crimp rings of LC Duplex connectors as part of the rotatable boot assembly or back body demonstrate US Conec is failing to consider how one skilled in the art would interpret the prior art. EX2007: ¶172.

Thus, because Veatch’s crimp ring 124 is distinct from a “main body” of a “rotatable boot assembly,” US Conec has failed to meet its burden of showing that the Veatch/Connelly combination teaches that “the rotatable boot assembly compris[es] a main body ..., the main body *comprising an inner round surface* extending along the longitudinal axis,” as recited by claim 1. EX2007: ¶174.

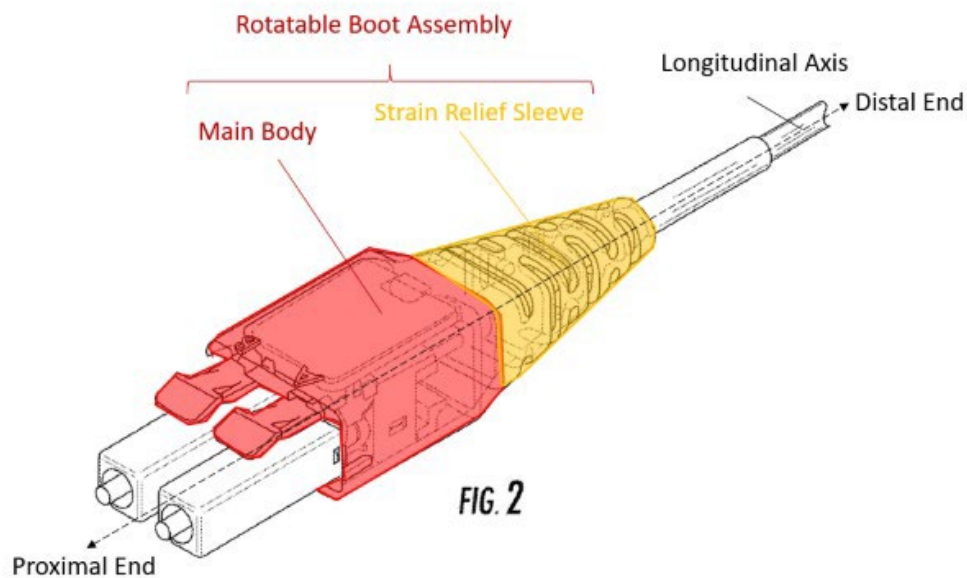
3. The Veatch/Connelly Combination Does Not Teach “the inner round surface defining a proximal end portion of the boot passageway” (Limitation 1.3.3)

Claim 1 further recites “the inner round surface defining a proximal end portion of the boot passageway.” EX1001: 11:25-27. Again, the Petition opines

¹⁴ *see* EX1001: Figs. 1 and 38, 9:37-40; EX1007: Fig. 2, ¶[0055]; *see also* EX1004: Figs. 1 and 20, 2:20-22, 4:36-37; EX1005: Figs. 2 and 5, 4:24-34; EX1006: Fig. 2, 6:21-25; EX1009: Fig. 14, 3:51-53, 3:59-63; EX1012: Fig. 2, ¶[0040].

that the interior of Veatch's crimp ring 124 meets this limitation. Petition: 99. The Petition fails to support a *prima facie* case of obviousness because the "inner round surface" of Veatch's crimp ring 124 does **not** "defin[e] a proximal end portion of the boot passageway" as recited by claim 1. EX2007: ¶175.

As explained above, the Petition never settles on a consistent definition for the "main body" in Veatch. But the one point of consistency throughout the Veatch/Connelly ground is that the "main body" is predominantly formed by the rectangular shroud of boot 102 that fits over, as shown in Fig. 2 below. EX2007: ¶176. This rectangular shroud defines the proximal end portion of the passage that extends through the boot 102. EX2007: ¶176.

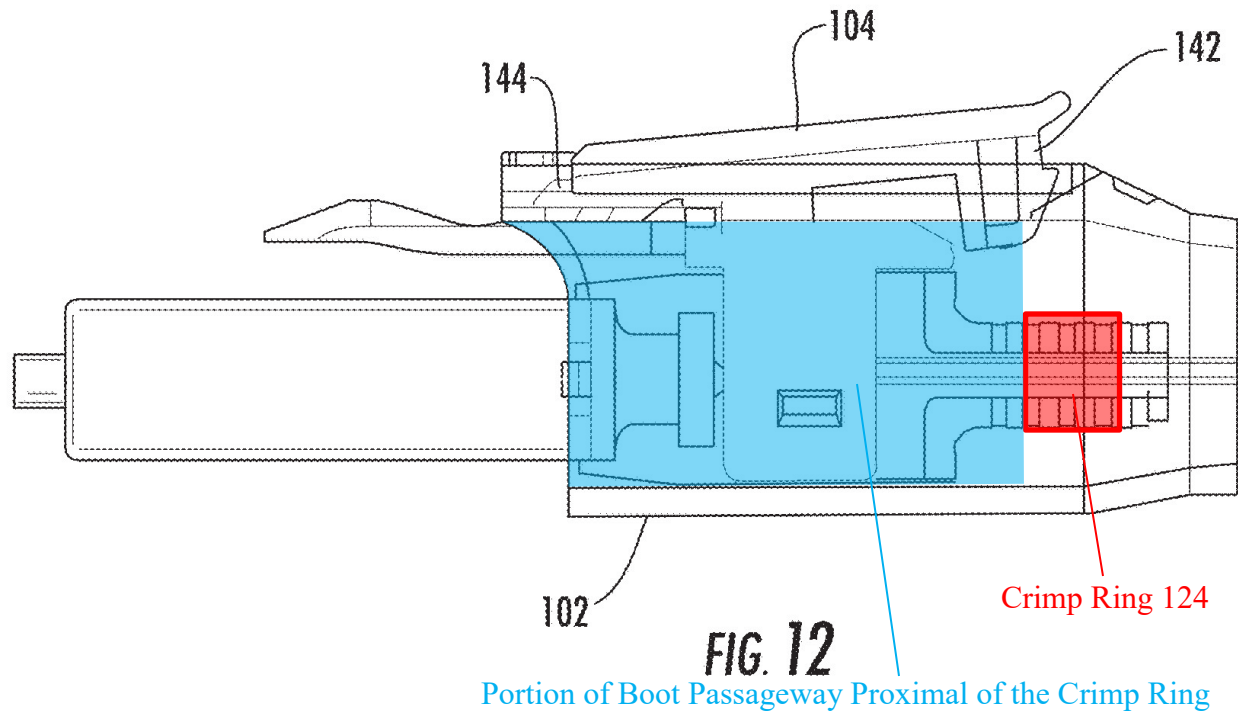


Petition: 98 (EX1004: Fig. 2 (annotated by US Conec)).

As shown in annotated Fig. 12 below (annotated to indicate the position¹⁵ of the crimp ring 124), the “inner round surface” of the crimp ring 124 is located at an *intermediate* portion of a boot passageway, that is substantially distal¹⁶ of the proximal end portion of the boot passageway. EX2007: ¶177. The proximal end portion of the boot passageway of Veatch’s boot is the rectangular section shown in blue. EX2007: ¶178. By contrast, the inner surface of the crimp ring neither defines any portion of the passageway through boot 102 nor is located at the proximal end portion of the boot passageway of Veatch. *Id.*

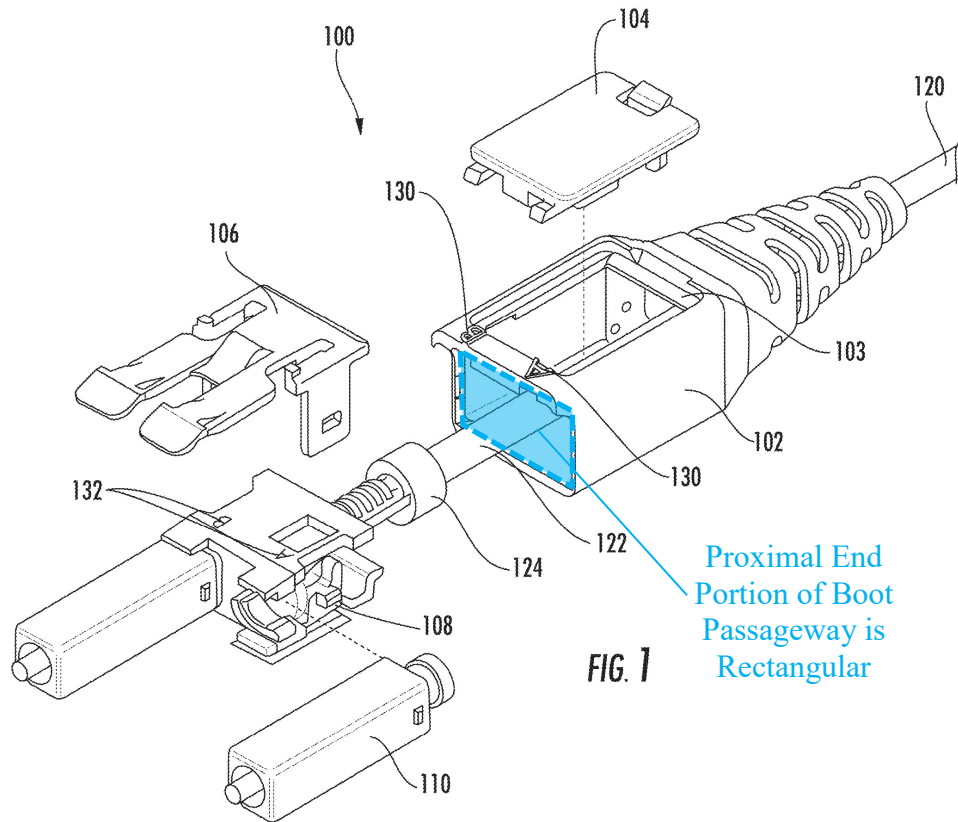
¹⁵ One skilled in the art understands the crimp ring 124 is secured to the back post of the fiber holder 108 as indicated to attach the fiber optic cable 120 to the fiber holder. EX1004: Figs. 1 and 20, 2:20-22, 4:36-37; EX1005: Figs. 2 and 5, 4:24-34; EX1006: Fig. 2, 6:21-25; EX1009: Fig. 14, 3:51-53, 3:59-63; EX1012: Fig. 2, ¶[0040]; EX2007: ¶177.

¹⁶ Again, the proximal and distal relationship with regard to the rotatable boot assembly is defined earlier in the claim 1—see limitations 1.3.1 and 1.3.2—which US Conec identifies in their annotated Fig. 1 of Veatch above. EX2007: ¶177.



EX1004: Fig. 12 (annotated).

The non-round shape of the proximal end portion of Veatch's boot passageway is apparent in Fig. 1 below. EX2007: ¶179.



EX1004: Fig. 1 (annotated).

Accordingly, US Conec has failed to meet its burden of showing the Veatch/Connelly combination discloses an “the inner round surface *defining a proximal end portion* of the boot passageway.” EX2007: ¶180.

D. Ground 4: Claim 20 is Not Obvious over Veatch, Connelly, and Cline

US Conec's Ground 4 argues that dependent claim 20 would have been obvious over the combination of Veatch and Connelly in further view of Cline. However, Cline fails to remedy the deficiencies of Veatch and Connelly discussed

in Ground 3. EX2007: ¶181. Therefore, Ground 4 fails for the same reasons discussed above in connection with Ground 3.

VII. Conclusion

US Conec's invalidity grounds fail to demonstrate that there is a reasonable likelihood that US Conec will prevail in invalidating any of the challenged claims of the '190 patent. Therefore, Senko respectfully requests the Board deny US Conec's Petition.

Dated: March 27, 2024

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CERTIFICATE OF SERVICE

Under 37 C.F.R. § 42.6(e), the undersigned certifies that on March 27, 2025, a copy of the foregoing PATENT OWNER'S PRELIMINARY RESPONSE TO THE PETITION FOR INTER PARTES REVIEW, along with the supporting exhibits, were served via email on the following:

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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 Patent Owner Preliminary Response complies with the type-volume limitation of § 42.24(b)(1) because it contains 10,155 words, excluding the parts of the Preliminary Response exempted by § 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).

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