

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
U.S. Patent No. 11,061,190

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,061,190**

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Patent Trial and Appeal Board
U.S. Patent & Trademark Office
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PETITIONER'S EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 11,061,190 to Takano et al. (“’190 Patent”)
1002	<i>Curriculum Vitae</i> of James Brennan III, Ph.D.
1003	File History for U.S. Patent Application Serial No. 15/884,327 which issued as U.S. Patent No. 11,061,190
1004	U.S. Patent No. 9,684,130 to Veatch et al. (“Veatch”)
1005	U.S. Patent No. 6,575,640 to Connelly et al. (“Connelly”)
1006	U.S. Patent No. 8,662,760 to Cline et al. (“Cline”)
1007	U.S. Publication No. 2011/0299814 to Nakagawa (“Nakagawa”)
1008	U.S. Patent No. 9,557,495 to Raven et al. (“Raven”)
1009	U.S. Patent No. 8,764,308 to Irwin et al. (“Irwin”)
1010	U.S. Patent No. 8,406,597 to Case (“Case”)
1011	<i>Intentionally Left Blank</i>
1012	PCT Publication No. WO 2017/127208 to Lee (“Lee”)
1013	Kant, K., “Data Center Evolution: A Tutorial on State of the Art, Issues, and Challenges,” <i>Computer Networks</i> , 53:2939-65 (2009)
1014	Wenke, I.G., “Report on Fiber Optic Cables,” accessed at https://www.researchgate.net/publication/308332946 (2015)
1015	Curran, M. & Shirk, B., “Basics of Fiber Optics”, accessed at https://www.fibersystems.com/pdf/whitepapers/Basics-of-Fiber-Optics.pdf (May 2016)
1016	Declaration of James F. Brennan III, Ph.D.
1017	“19-Inch Rack,” <i>Lite-On</i> , accessed at https://liteon-cips.com/products/racks/19-inch-rack/
1018	“Fiber Optic Rack Mount Enclosure, 3-Panel 1 RMS,” <i>Computer Cable Store</i> , accessed at https://www.computercablestore.com/fiber-optic-rack-mount-enclosure-3-panel-1-rms

Exhibit No.	Description
1019	“Fiber Optic Connector Tutorial,” <i>Fibermart</i> , accessed at https://www.fiber-mart.com/news/fiber-optic-connector-tutorial-a-848.html

I. INTRODUCTION

Petitioner US Conec Ltd. (“Petitioner”) requests *inter partes* review (“IPR”) and cancellation of claims 1-3, 6-16, and 19-20 of U.S. Patent No. 11,061,190 (“the ’190 patent”) to Takano et al., which is assigned to Senko Advanced Components (“Patent Owner”). The claims recite an optical fiber connector having a rotatable boot assembly with an elongate arm, which sets a polarity of the optical connector.

These claims do not, however, recite a patentable invention. The claimed structure includes basic, well-known features like a front body, back body, and rotatable boot. Indeed, the allegedly allowable feature of the optical fiber connector is explicitly disclosed by Nakagawa and Veatch, which should not be barred from use under § 325(d).

Accordingly, there is at least a reasonable likelihood that at least one claim of the ’190 patent is unpatentable. Petitioner respectfully requests that the Board institute trial on the grounds herein and determine that claims 1-3, 6-16, and 19-20 are unpatentable.

II. SECTION 325(D) SHOULD NOT BAR USE OF NAKAGAWA AND VEATCH

Section 325(d) discretionary denial is not applicable for at least three reasons. First, Patent Owner’s changed claim scope of the original claims between Office action and Allowance demonstrates the Examiner never properly evaluated

Nakagawa and Veatch against the patented claims. Second, the Examiner erroneously evaluated the claims against this prior art. Finally, the prior art is being used in new combinations, and thus a new light.

A. *Advanced Bionics* favors institution.

This Petition respectively recites Nakagawa and Veatch as grounds for unpatentability. As explained, the Office Action also used Nakagawa and Veatch in its rejections. However, the Board should not deny this petition under § 325(d).

The Board has established a two-part test for applying its discretion under § 325(d): “(1) whether the same or substantially the same art previously was presented to the Office”; and if so “(2) ... whether the petitioner has demonstrated that the Office 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). In particular, the Board explains that “the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection” and “the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments” relate to part (2) of the test. *Id.* at 9-10.

Here, only factor (2) is relevant as the Examiner erred in allowing the claims over this prior art.

B. The fact that the challenged claims do not recite the elements recited in reasons for allowance warrants reconsideration of the prior art.

The Examiner erred by allowing the claims over Veatch. In the only Office Action, the Examiner indicated that claim 3 was allowable due to the claimed “boot” and “projections and keys.” EX1003, 0090. The Examiner pointed out that “[t]he prior art does not disclose a rotatable boot configured to change the polarity of the connector using **the claimed projections and keys.**” *Id.* (emphasis added). Indeed, the remainder of claim 3— “rotatable boot configured to change the polarity”— had been already recited in the original claim 1, on which the original claim 3 depended. EX1003, 0065. Yet in its Reply, Patent Owner’s amended claims did not include this allowable subject matter and, appearing to miss this fact, the Examiner allowed the claims merely referring to his previous allowable subject matter statements. EX1003, 0141-145, 185. But neither the “boot wing” nor “projections and keys” were in the allowed and now patented claims. Therefore, the Examiner made an inadvertent error referring to his past allowable subject matter as the reasons for allowance and not properly re-analyzing the final prosecution claims against Veatch.

In light of the above facts, Petitioner respectfully requests reconsideration of the challenged claims, as the challenged claims do not recite the elements recited in reasons for allowance.

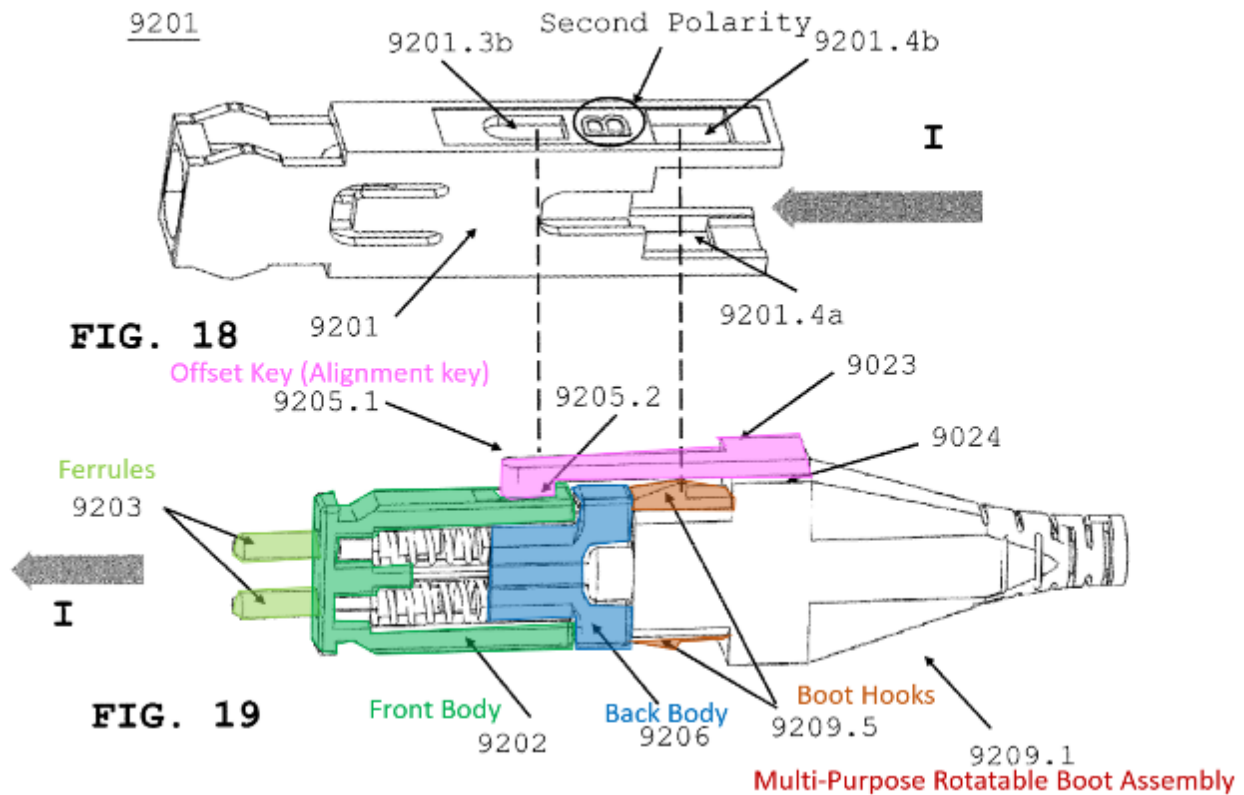
C. Veatch and Nakagawa are being asserted in a new light

The use of Veatch and Nakagawa during prosecution differs from its use in this Petition. For example, Nakagawa was not evaluated as or used as a primary reference during prosecution. In the only Office Action, the Examiner stated Veatch in view of Nakagawa rendered obvious prosecution claims 1-2 and 4-6. EX1003, 0088-89. In contrast, this Petition asserts obviousness of the '190 patent using each as an independent primary reference, rather than the combination of Nakagawa and Veatch. Each of Veatch and Nakagawa is combined with new secondary references. Thus, each of these positions uses this prior art in a new light as compared to how the Examiner used them in prosecution.

III. OVERVIEW OF THE '190 PATENT

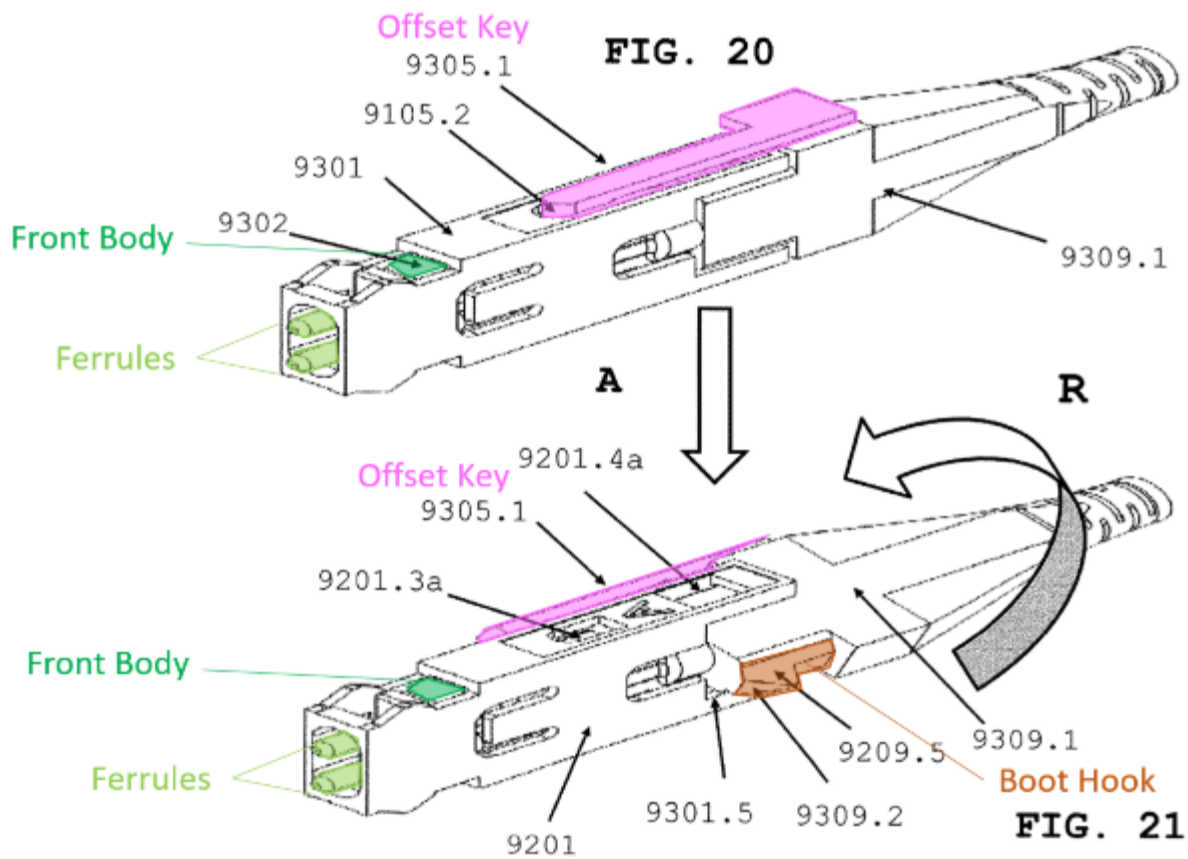
A. Overview

The '190 patent generally discloses optical connectors having a multi-purpose rotatable boot assembly for polarity change. EX1001, '190 patent, Abstract; EX1016, Brennan Declaration, ¶¶57-59. The '190 patent discloses an optical connector that includes the following components: “multi-purpose rotatable boot assembly 9209.1 comprises [an] alignment and offset key 9205.1”, “boot hook 9209.5”, “back body 9206”, “front body 9202”, “plural of ferrules 9203”, and an “offset key 9023.” EX1001, 6:50-67, FIGs. 18, 19; EX1016, ¶59.

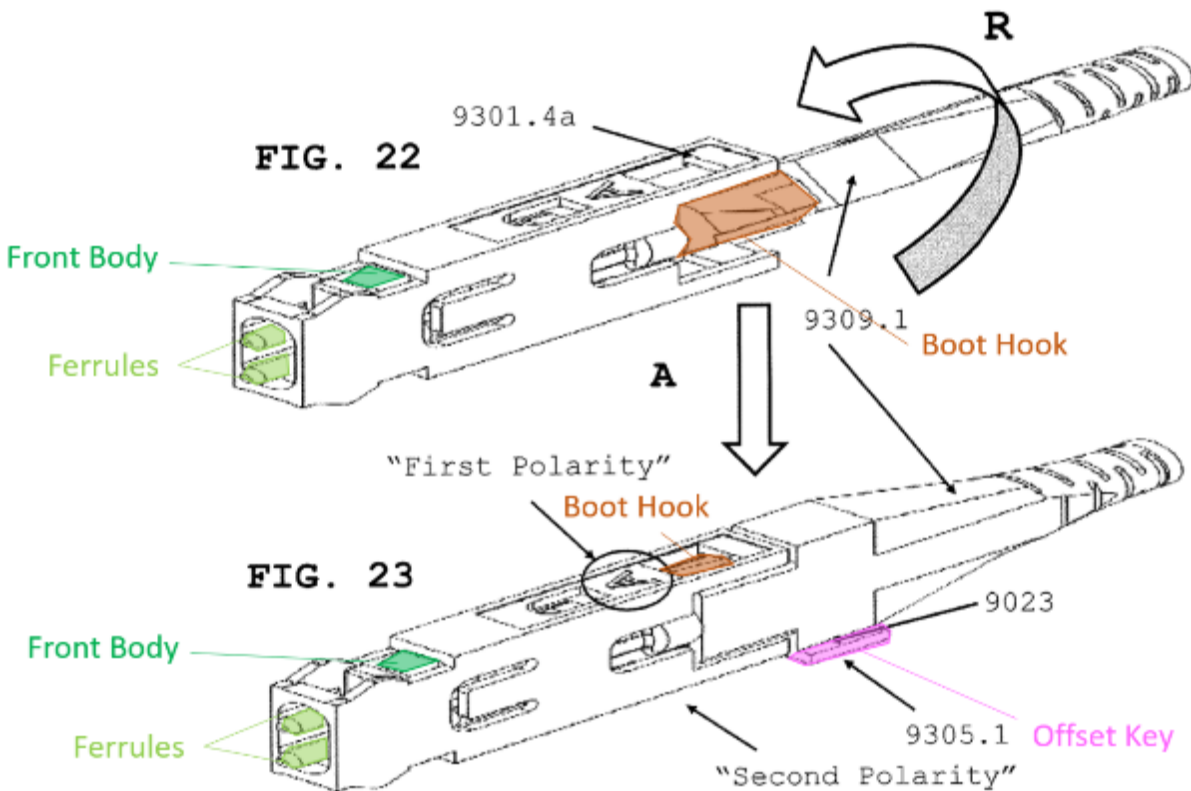


EX1001, FIGs. 18 and 19 (annotated).

The '190 patent discloses that the offset key can determine a polarity of the optical connector upon rotation of the boot assembly. For example, as shown in Figures 20-23, “multi-purpose rotatable boot assembly 9309.1 is rotated in direction ‘R’ to convert from a first polarity ‘A’ (refer to FIG. 20) to [a] Second Polarity ‘B’ (refer to FIG. 23), with alignment and offset key 9305.1 180 degrees or opposite the first polarity position as depicted in Figure 20, to Second Polarity position ‘B.’” EX1001, 7:4-9; EX1016, ¶¶60-61.



EX1001, FIGs. 20, 21 (annotated).



EX1001, FIGs. 22, 23 (annotated).

The '190 Patent further explains how to disconnect the multi-purpose boot assembly from an adapter. The '190 Patent discloses, “[r]eferring to FIG. 35, boot assembly 9209.1 is being pulled rearward in the direction of ‘P’. Boot assembly 9209.1 is pulled a release distance ‘d’ to interface 9100.8, 9100.9 to unlatch connector from adapter interface.” EX1001, 8:66-9:2; EX1016, ¶¶62-66.

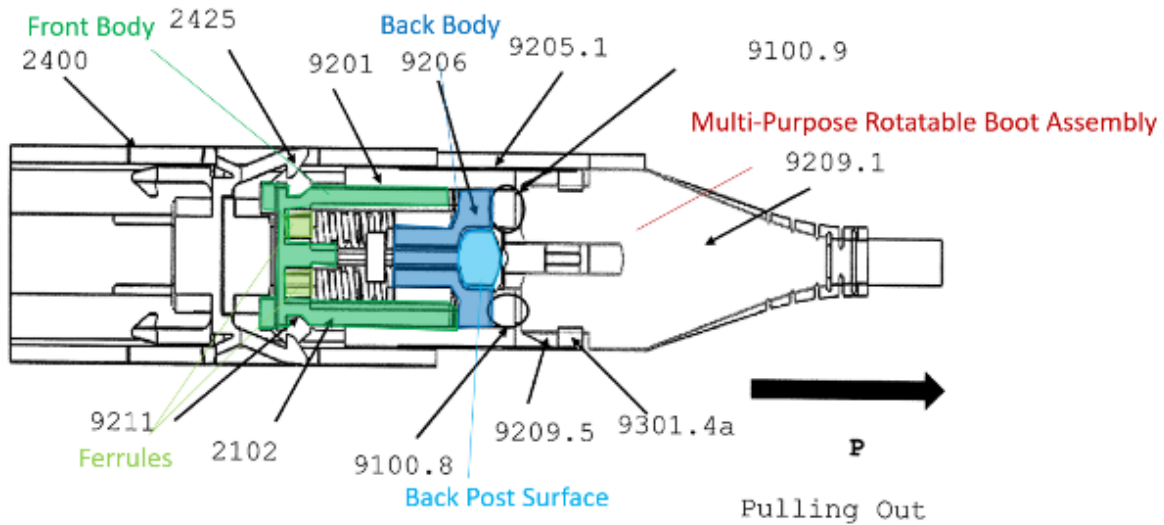


FIG. 35

EX1001, FIG. 35 (annotated).

IV. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art, at the time the '190 patent was filed, would have been a person having: (1) at least a bachelor's degree in mechanical engineering, electrical engineering, physics, or a related field and three years of experience in fiber optics and fiber optic connectors; (2) a master's degree in mechanical engineering, electrical engineering, physics, or a related field and at least one year of experience in fiber optics and fiber optic connectors; or (3) industry experience (at least five years) designing fiber optic connectors in lieu of a formal degree. EX1016, ¶¶34-40.

V. CLAIM CONSTRUCTION

Petitioner does not believe any claim terms require specific construction and thus should receive their plain and ordinary meaning.¹

¹ Petitioner reserves the right to challenge the claims under 35 U.S.C. §112 in other forums.

VI. GROUNDS FOR THE UNPATENTABILITY OF THE '190 PATENT

Petitioner requests *inter partes* review of claims 1-3, 6-16, and 19-20 of the '190 patent and a determination that those claims are unpatentable based on the following grounds:

Ground	Prior Art	Basis	Claims Challenged
1	§ 103	Nakagawa (EX1007) and Raven (EX1008)	1-3, 6-16, and 19
2	§ 103	Nakagawa (EX1007), Raven (EX1008), and Cline (EX1006)	20
3	§ 103	Veatch (EX1004) and Connelly (EX1005)	1-3, 6-11, 13-16, and 19
4	§ 103	Veatch (EX1004), Connelly (EX1005), and Cline (EX1006)	20

The earliest priority date of the '190 patent, on its face, is July 14, 2017.

EX1001, (60). The prior art references cited for each ground above qualify as prior art to the '190 patent for the following reasons:

- Veatch (EX1004) is prior art under at least AIA 35 U.S.C. § 102(a)(2) because its effective filing date is May 4, 2011, and it was issued on June 20, 2017.
- Connelly (EX1005) is prior art under at least AIA 35 U.S.C. § 102(a)(2) because its effective filing date is February 4, 2000, and it was issued on June 10, 2003.

- Cline (EX1006) is prior art under at least AIA 35 U.S.C. § 102(a)(2) because its effective filing date is October 29, 2010, and it was issued on March 4, 2014.
- Nakagawa (EX1007) is prior art under at least AIA 35 U.S.C. § 102(a)(1) and 102(a)(2) because it was published on December 8, 2011.
- Raven (EX1008) is prior art under at least AIA 35 U.S.C. § 102(a)(2) because its effective filing date is October 10, 2012, and it was issued on January 31, 2017.

VII. APPLIED REFERENCES OVERVIEW

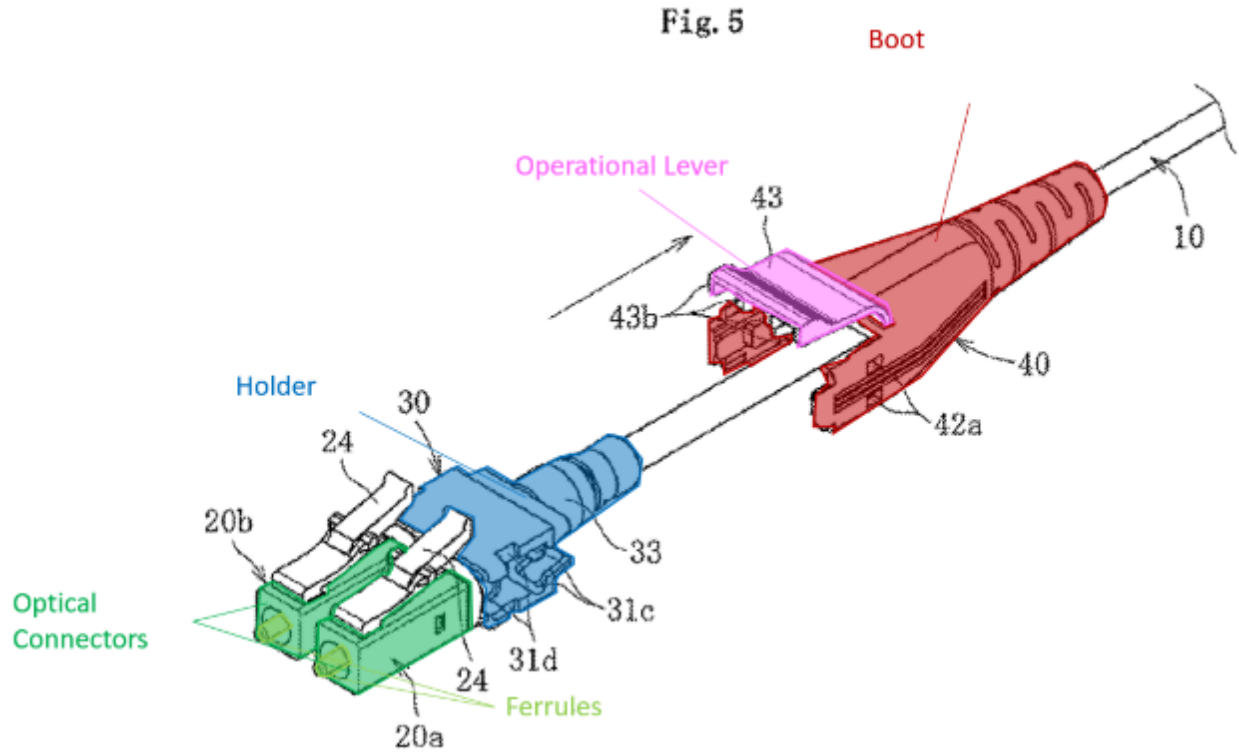
A. Nakagawa

Similar to the '190 patent, Nakagawa “relates to an optical connector, and more particularly, to a duplex optical connector unit for bidirectional communication including a pair of optical connectors” and focuses on providing “an optical connector unit which includes the locking levers and the operation lever and enables the pair of optical connectors to be easily exchanged in position.” EX1007, ¶¶1, 14; EX1016, ¶¶80-82.

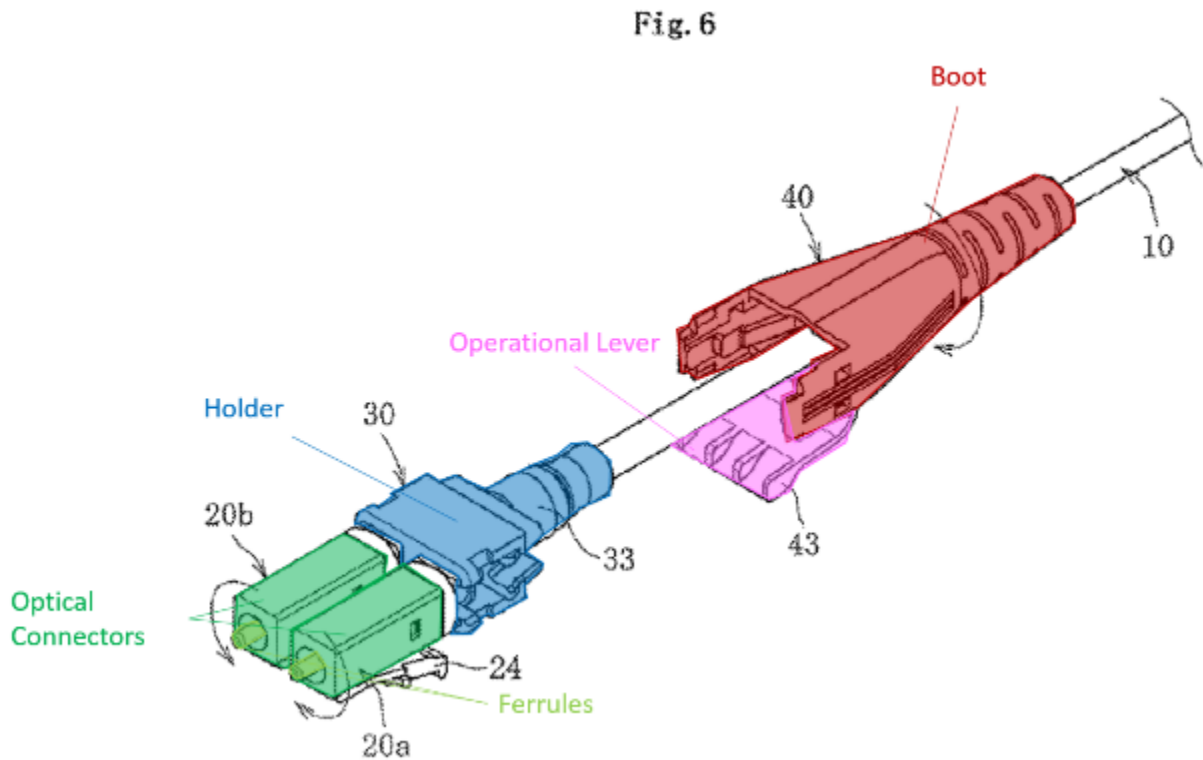
Specifically, Nakagawa discloses an optical connector unit including “input optical connector 20a, an output optical connector 20b, a holder 30, and a boot 40.” EX1007, ¶46. If Nakagawa’s optical connectors 20a and 20b are “reversely assembled relative to the correct positions,” the connectors can be exchanged (*i.e.*,

reverse polarity) by rotating boot 40 relative to holder 30. EX1007, ¶¶60-62.

Figures 5-6 illustrate the steps required to rotate boot 40 to effectuate a polarity change. EX1016, ¶83.



EX1007, FIG. 5 (annotated).

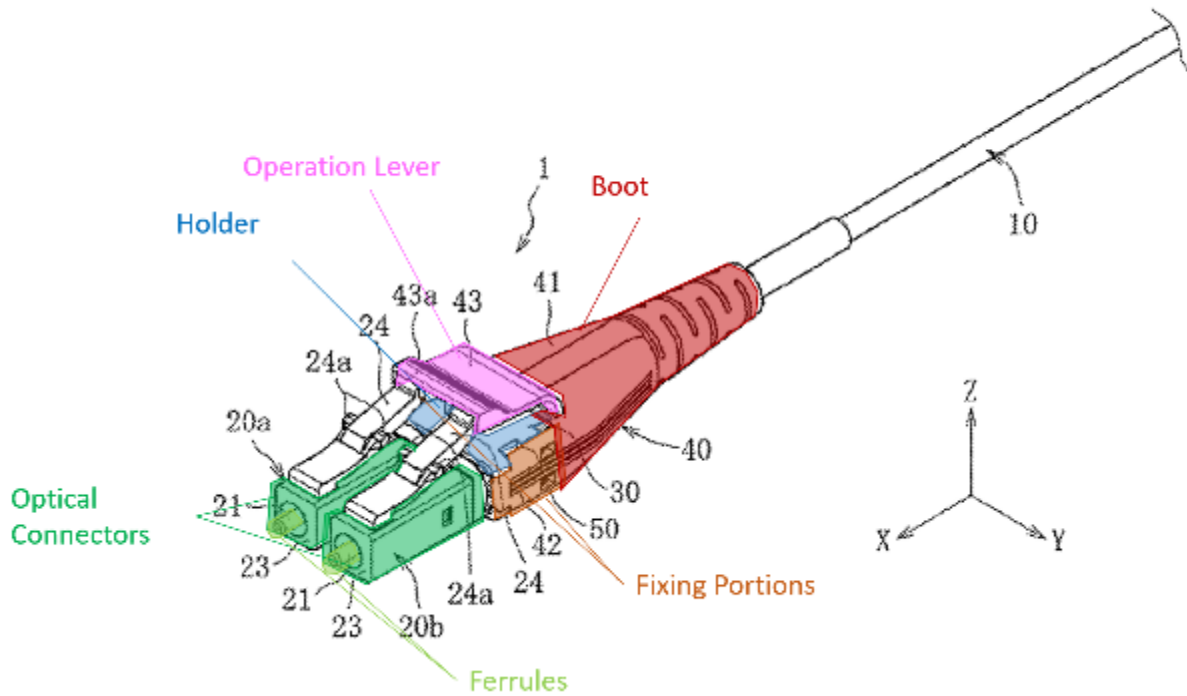


EX1007, FIG. 6 (annotated).

Nakagawa also teaches that “the boot 40 integrally includes ... an operation lever 43 which is provided in a top surface of the main body portion 41.” EX1007, ¶56; EX1016, ¶84. Nakagawa indicates that the position of the operation lever is flipped up and down when the optical connector is rearranged to change its polarity. EX1016, ¶85.

Nakagawa further discloses that “the boot 40 integrally includes ... a pair of fixing portions 42 which extend from both ends in the width direction of a leading end portion of the main body portion 41.” EX1007, ¶56; EX1016, ¶86. Figures 5 and

Fig. 1



EX1007, FIG. 1 (annotated).

B. Raven

Raven teaches that a front body of an optical connector configured to hold two ferrules was well known. EX1016, ¶¶87-92. Like Nakagawa and the '190 patent, Raven relates to a connector device for a fiber optic cable, in particular “a duplex fibre optic cable; a fibre optic cable assembly; and a method for changing the polarity of first and second optical fibres in a fibre optic cable assembly.” EX1008, 1:5-9; EX1016, ¶89.

Raven discloses a “leading end unit 3” included in “a duplex fibre optic cable 9.” EX1008, 9:51-53. Figures 1 and 4 show leading end unit 3 comprises a

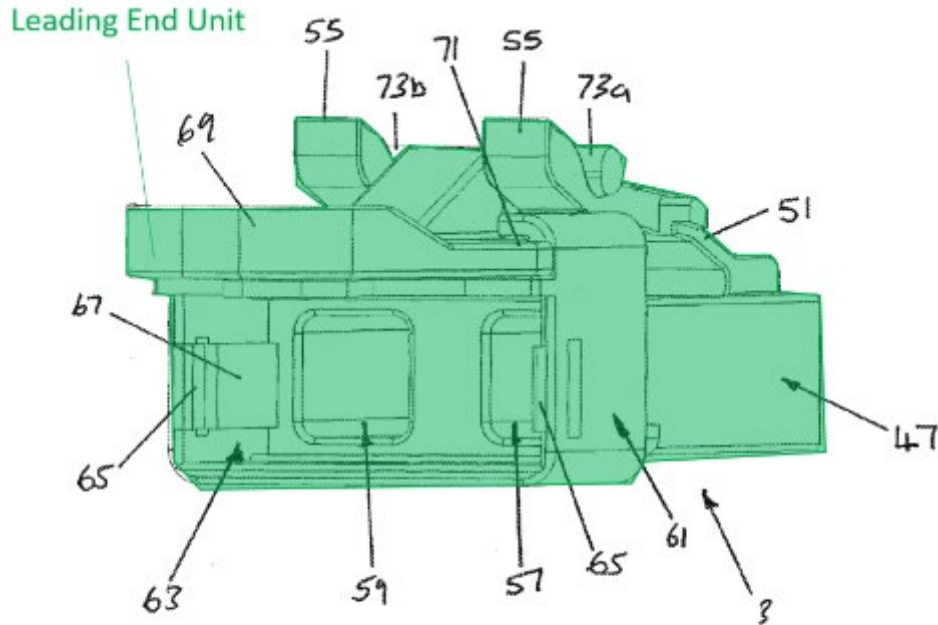


Fig. 4

EX1008, FIG. 4 (annotated).

Raven teaches that the polarity can be changed by removing the leading unit 3 from the cable and rotating it. EX1016, ¶¶91-92. Raven discloses that “[t]he leading end unit 3 is separated from the housing 5 by actuating latches 41” and then “[t]he leading end unit is rotated through 180° about a longitudinal axis Z-Z.” EX1008, 12:35-37, FIGs. 2 and 6.

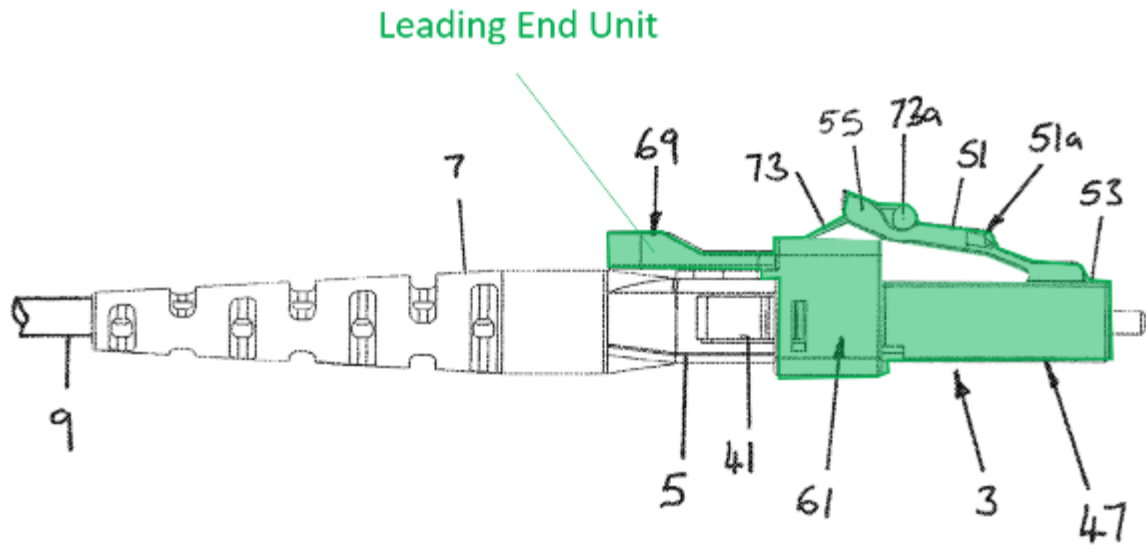
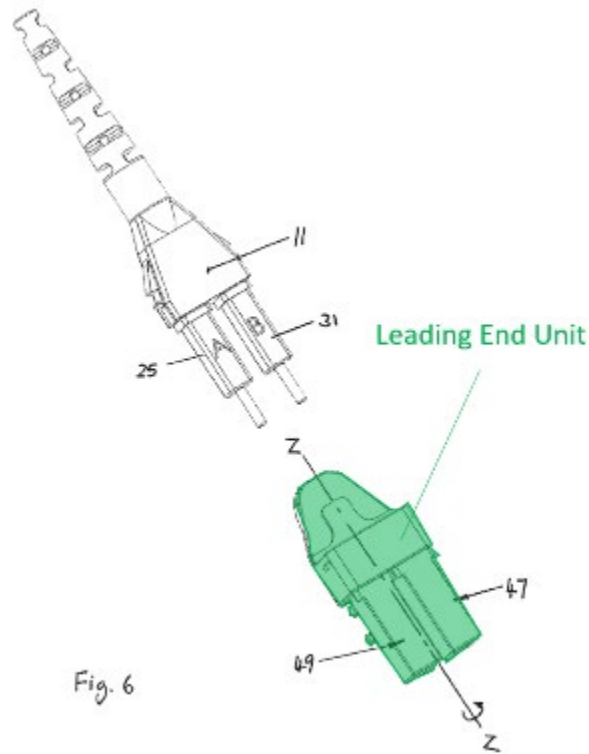


Fig. 2

EX1008, FIG. 2 (annotated).

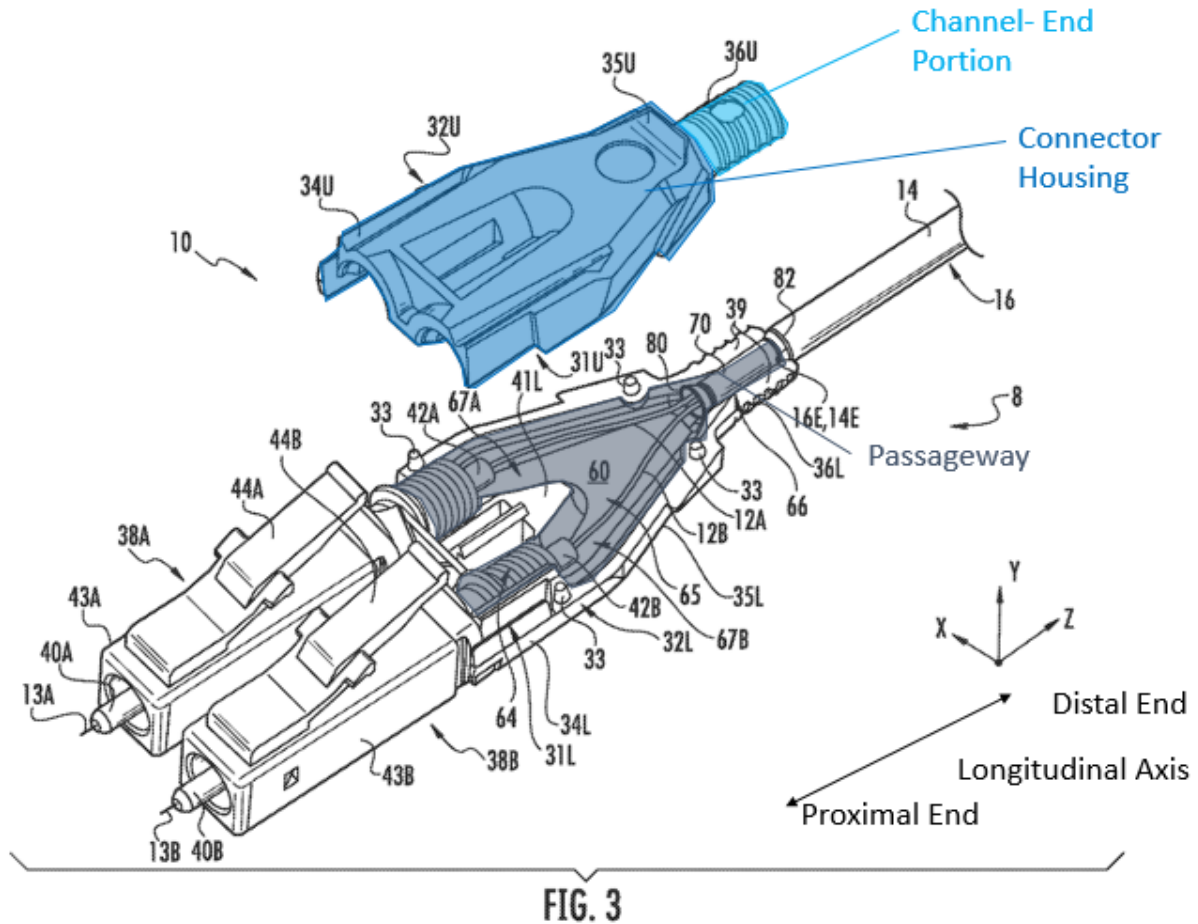


EX1008, FIG. 6 (annotated).

C. Cline

Cline teaches that it was well known that a passageway of a back body of an optical connector is tapered. Cline discloses connector housing 30, which has a tapered shape that tapers from the proximal end to the distal end. EX1016, ¶¶100-105. For example, Cline discloses that connector housing 30 has “a housing connector-end portion 34 and a housing channel-end portion 36, with a housing middle portion 35” and “housing middle portion 35 is tapered and gives connector housing 30 a generally tapered geometry that is narrower toward housing channel-

end portion 36 and wider toward housing connector-end portion 34.” EX1006,
3:60-4:4; EX1016, ¶¶102-105.



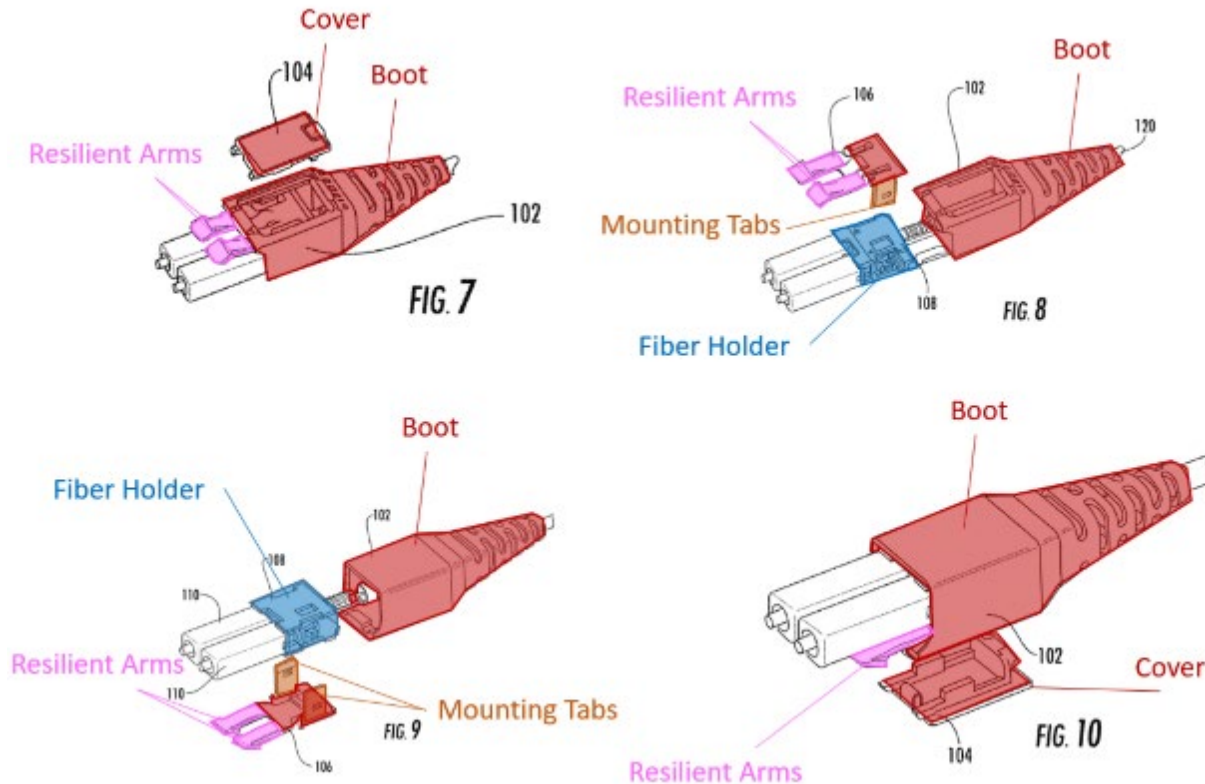
EX1006, FIG. 3 (annotated).

D. Veatch

Veatch discloses a fiber optic connector that includes a boot, a connector body, and a latch coupled to the connector body. EX1004, Abstract, FIG. 2; EX1016, ¶¶106-113. Veatch’s fiber optic connector is configured to reverse

polarity by rotating boot 180 degrees. EX1004, 3:8-20; EX1016, ¶108. Veatch's

Figures 7-10 illustrate the steps to rotate boot 102 to effectuate a polarity change:

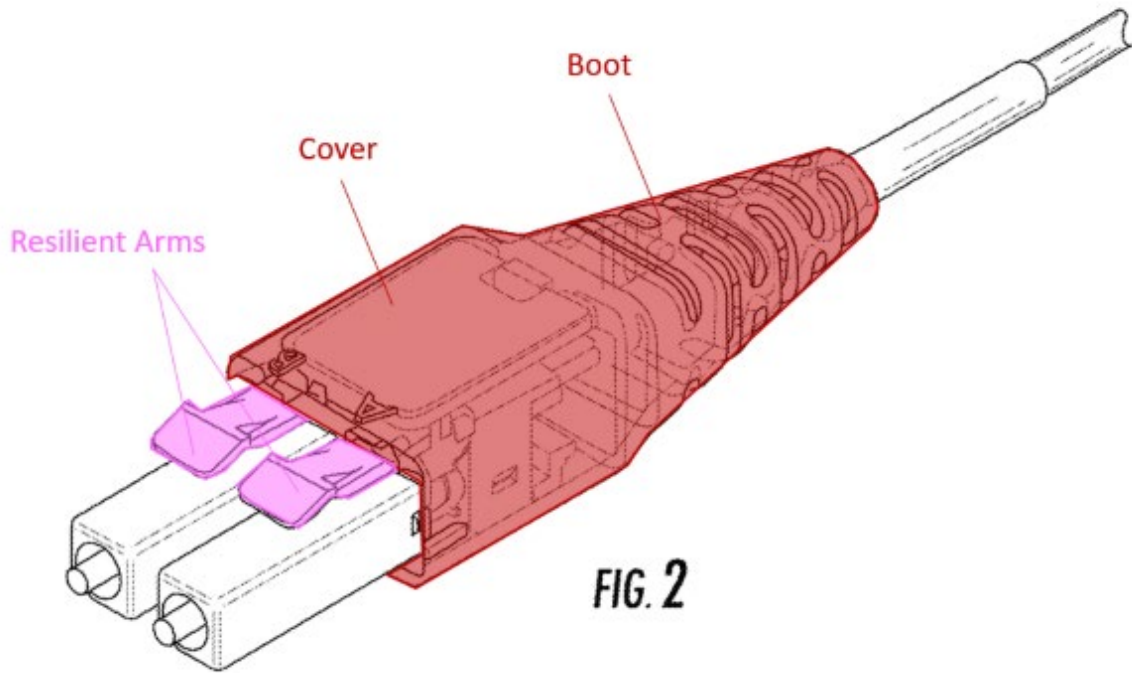


EX1004, FIGs. 7-10 (annotated).

The polarity of Veatch's connector 100 is reversed by: (1) removing cover 104 from boot 102 (FIG. 7); (2) pulling boot 102 back along cable 120 (FIG. 8); (3) relocating latch 106 "from a first side of the fiber holder 108 to a second side of the fiber holder 108" and rotating boot 102 (FIG. 9); and (4) repositioning fiber holder 108 in boot 102 and snapping 104 back on boot 102 (FIG. 10). EX1004, 3:8-36; EX1016, ¶¶108, 112.

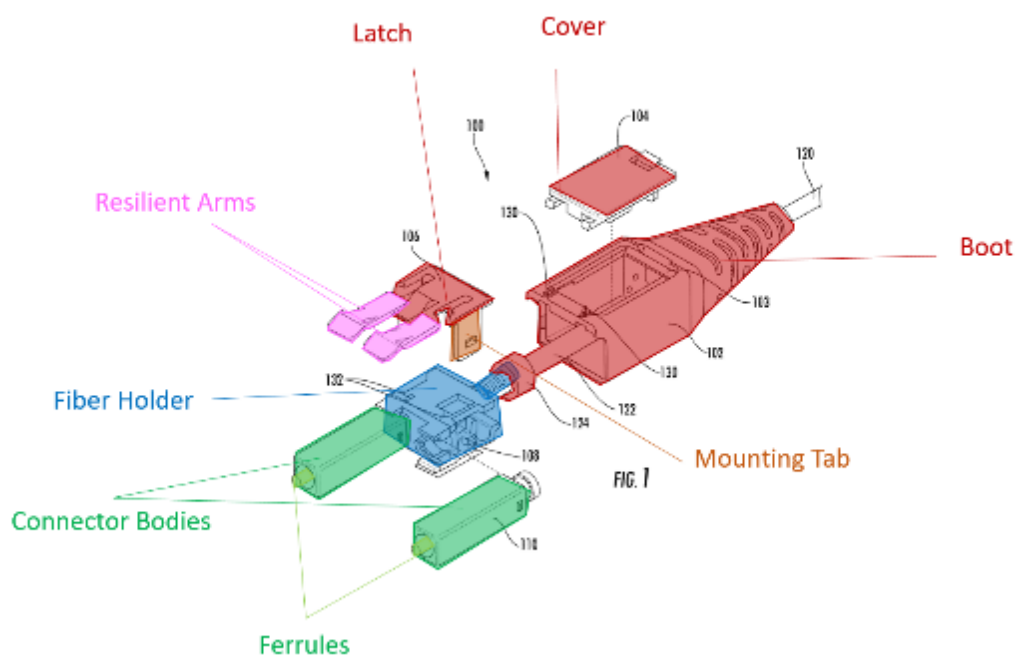
Veatch further teaches that the boot is assembled together with the cover and

the latch. Figure 2 of Veatch illustrates that the boot, cover, and latch are assembled to form the boot assembly. EX1016, ¶109.

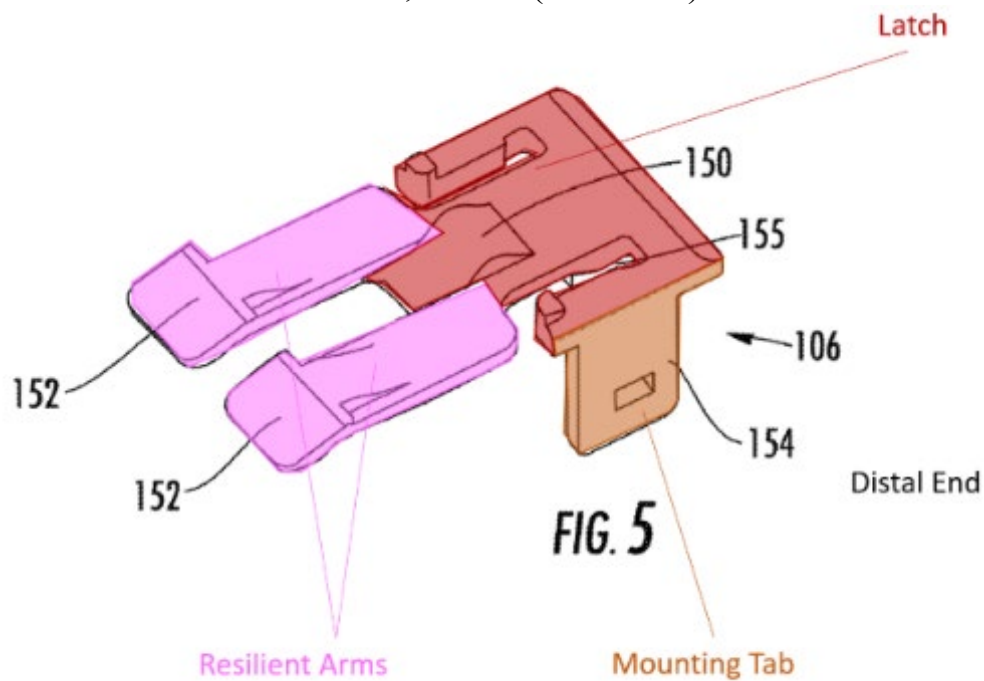


EX1004, FIG. 2 (annotated).

Veatch discloses that the latch 106 may “include[] mounting tabs 154 that secure the latch 106 to fiber holder 108.” EX1004, 2:61-63. Figures 1 and 5 of Veatch illustrates that each side of a fiber holder 108 is secured by the latch 106. EX1016, ¶110.



EX1004, FIG. 1 (annotated).

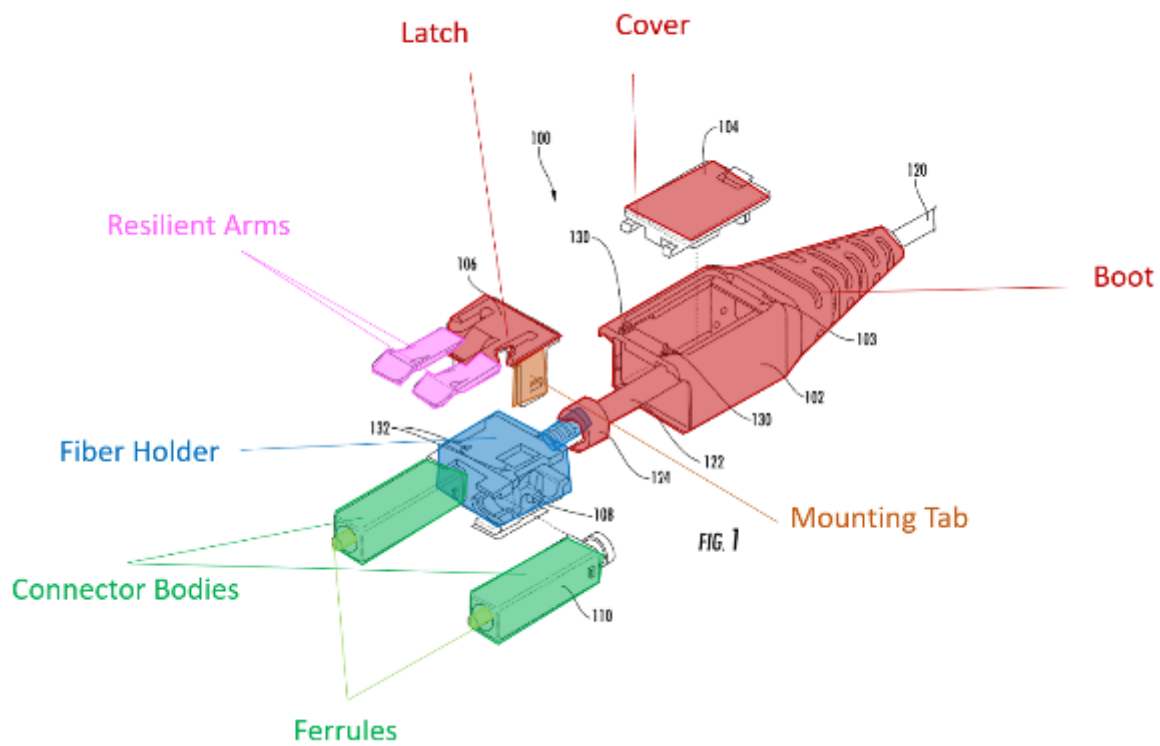


EX1004, FIG. 5 (annotated).

Figure 5 of Veatch further illustrates that the resilient arms 152 elongate from the latch. The resilient arms 152 can “engage [the] mounting structure on an LC adapter” when the connector mates the adapter. EX1004, 2:64-3:7; EX1016, ¶111.

Veatch also teaches how the connector is released from the adapter. To release the connector, “boot 102 slides relative to fiber holder 108 to provide the push-pull activation of latch 106.” EX1004, 2:64-66, 3:2-5; EX1016, ¶113.

Veatch discloses that the “[c]onnector bodies 110 terminate the two optical fibers in cable 120.” EX1004, 2:22-25. Figure 1 of Veatch illustrates that the “connector body ha[s] a ferrule configured to receive the optical fiber.” EX1004, Claim 22; EX1016, ¶114.



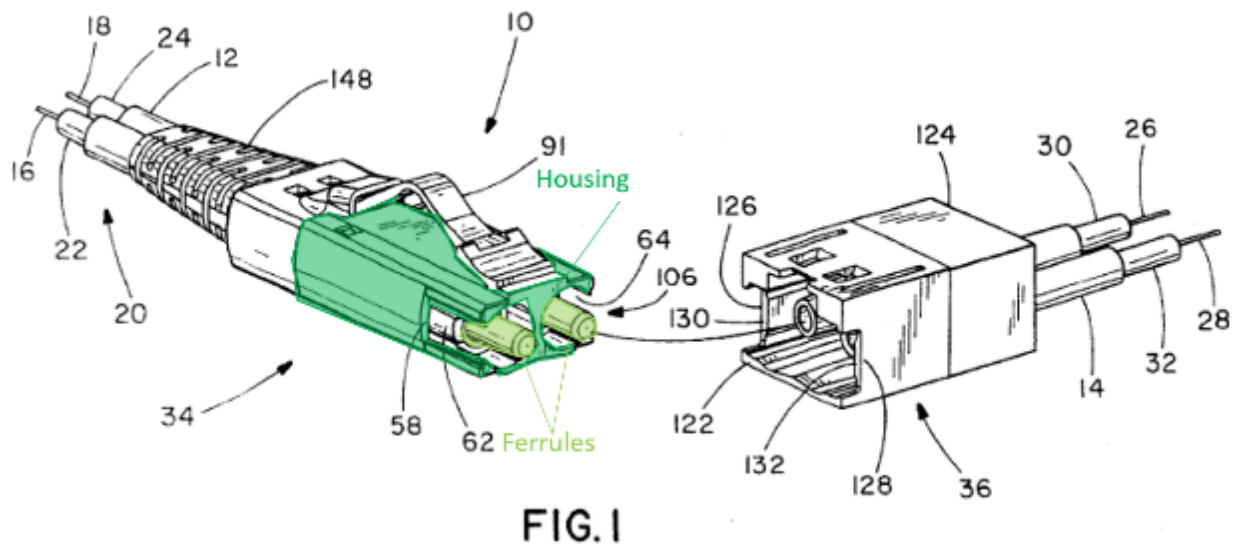
EX1004, FIG. 1 (annotated).

E. Connelly

Connelly teaches that a front body of an optical connector configured to hold two ferrules was well known. EX1016, ¶¶115-119. Like Veatch and the '190 patent, Connelly “relates generally to a fiber optic connection system and, more particularly, to a fiber optic plug wherein a housing and mating insert cooperate to secure the fiber optic cable and plug pre-assemblies with respect to the plug.”

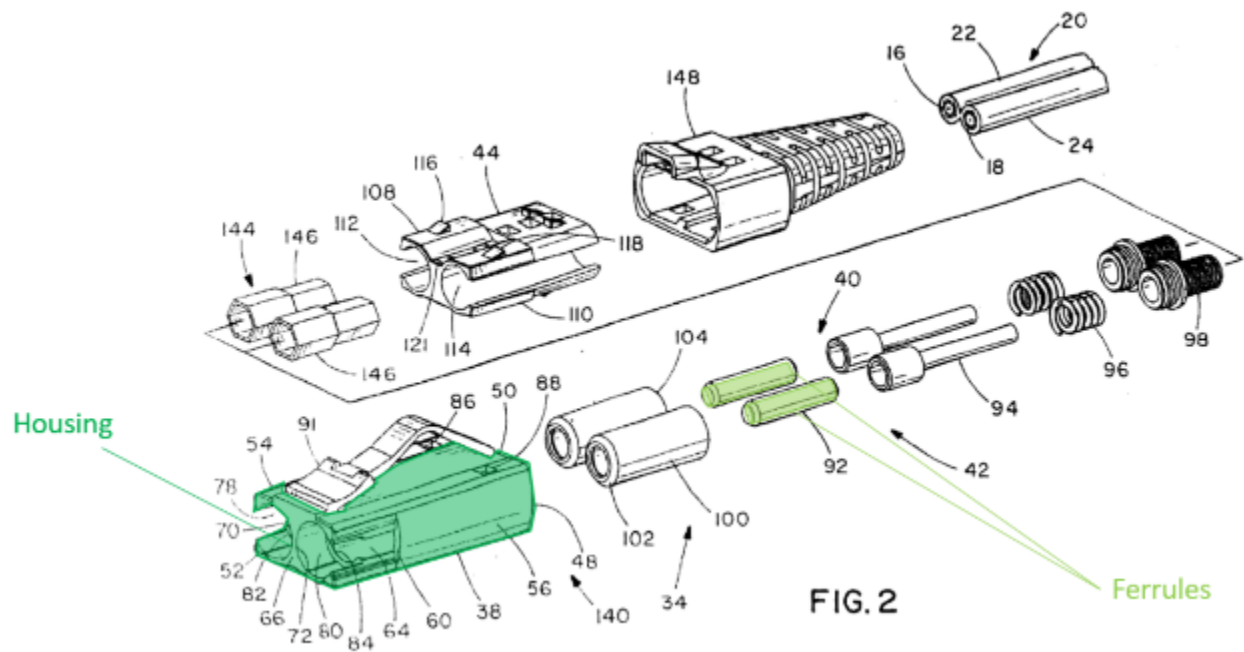
EX1005, 1:7-11.

Connelly discloses fiber optic plug 34 configured to connect to a fiber optic jack 36 in an interlocked state “as is well known in the art.” EX1005, 2:20-27, FIG. 1; EX1016, ¶118.



EX1005, FIG. 1 (annotated).

Specifically, Connelly discloses that its fiber optic plug 34 housing 38 has top, bottom, and side walls. EX1005, 2:35-37, FIGs. 1, 2. Housing 38 is configured to hold and surround two ferrules 92. EX1005, 2:66-3:2. Housing 38 also includes latch 91 on its top wall, as illustrated in annotated Figure 1. EX1005, 2:62-65; EX1016, ¶119.



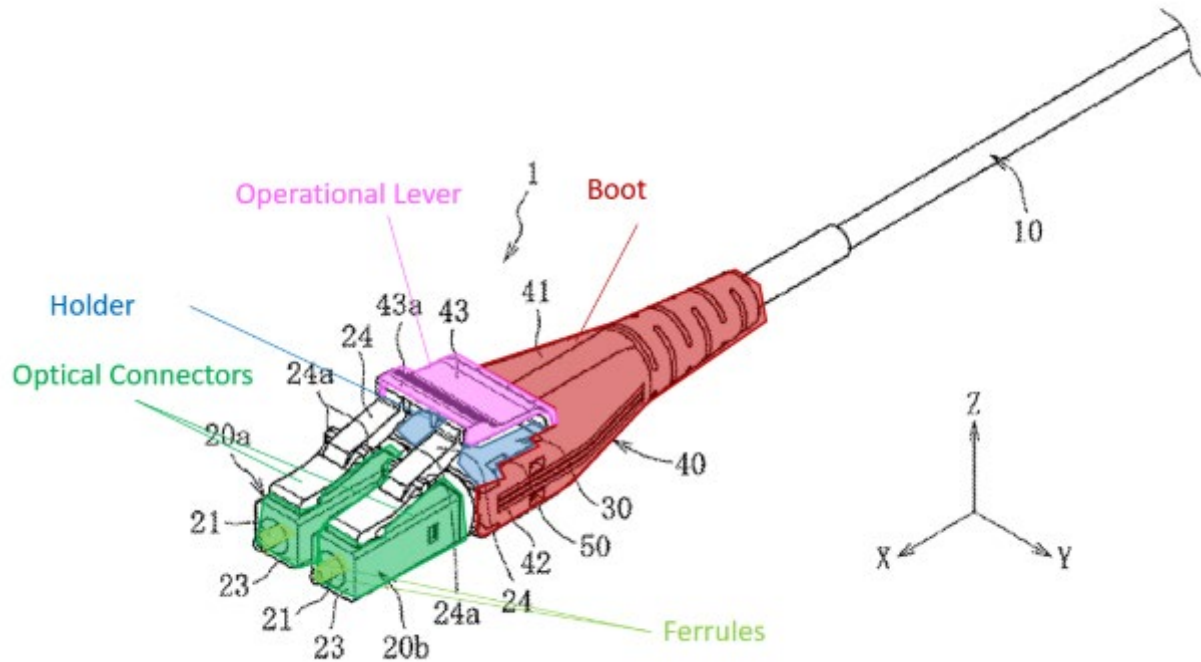
EX1005, FIG. 2 (annotated).

VIII. GROUND 1: CLAIMS 1-3, 6-16 AND 19 OF THE '190 PATENT ARE OBVIOUS OVER NAKAGAWA IN VIEW OF RAVEN

A. Motivation to Combine

A POSITA would have found it obvious to modify Nakagawa's housing that includes two optical connectors 20a and 20b, to instead include unitary leading end unit 3, as disclosed in Raven. EX1016, ¶¶133-147.

Fig. 1



EX1007, FIG. 1 (annotated).

Since Nakagawa's operating lever 43 actuates locking lever 24, and Raven's manually operable control actuates latching levers 51, a POSITA would have modified Nakagawa's front body using leading unit 3, and excluded manually operable control 69 of the leading units, as annotated below, to avoid duplication of functions. EX1007, ¶58; EX1008, 11:63-67; EX1016, ¶¶134-139.

connector. EX1008, 1:36-46. According to Raven, Nakagawa's optical connectors 20a and 20b require "relatively precise and robust engineering to ensure that the fibre optic connectors retain their axial alignment within the housing, and are only rotated when required to do so." *Id.* To address this problem, Raven discloses a connector with leading end unit 3, which accommodates the connectors similar to Nakagawa's optical connectors 20a, 20b to allow a user "to easily change the polarity." EX1008, 12:47-52. Thus, a POSITA would have been motivated to combine Nakagawa and Raven. EX1016, ¶¶141-142.

B. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success in combining the teachings of Raven's unitary leading end unit with Nakagawa's connector. EX1016, ¶143.

First, this modification is the simple substitution of one known element for another to obtain predictable results. Modifying Nakagawa's housing structure to include Raven's leading end unit would have been well within the level of ordinary skill in the art. EX1016, ¶144.

Second, this modification would have been obvious for a POSITA to try because it involves choosing from a finite number of identified predictable solutions with a reasonable expectation of success. EX1016, ¶145.

As Dr. Brennan explains, a POSITA in this field would have known, there are a finite number of ways to form housing structures of fiber optic connectors. EX1016, ¶¶145-147.

C. Claim 1

1. Preamble²

Nakagawa is “relate[d] to an optical connector, and more particularly, to a duplex optical connector unit for bidirectional communication including a pair of optical connectors.” EX1007, ¶1; EX1016, ¶148.

Not needed for this element, but to add context to later arguments, Raven also explains that its disclosure is “relate[d] to a connector device for a fibre optic cable.” EX1008, 1:5-9; EX1016, ¶¶148-149.

2. [1.1]

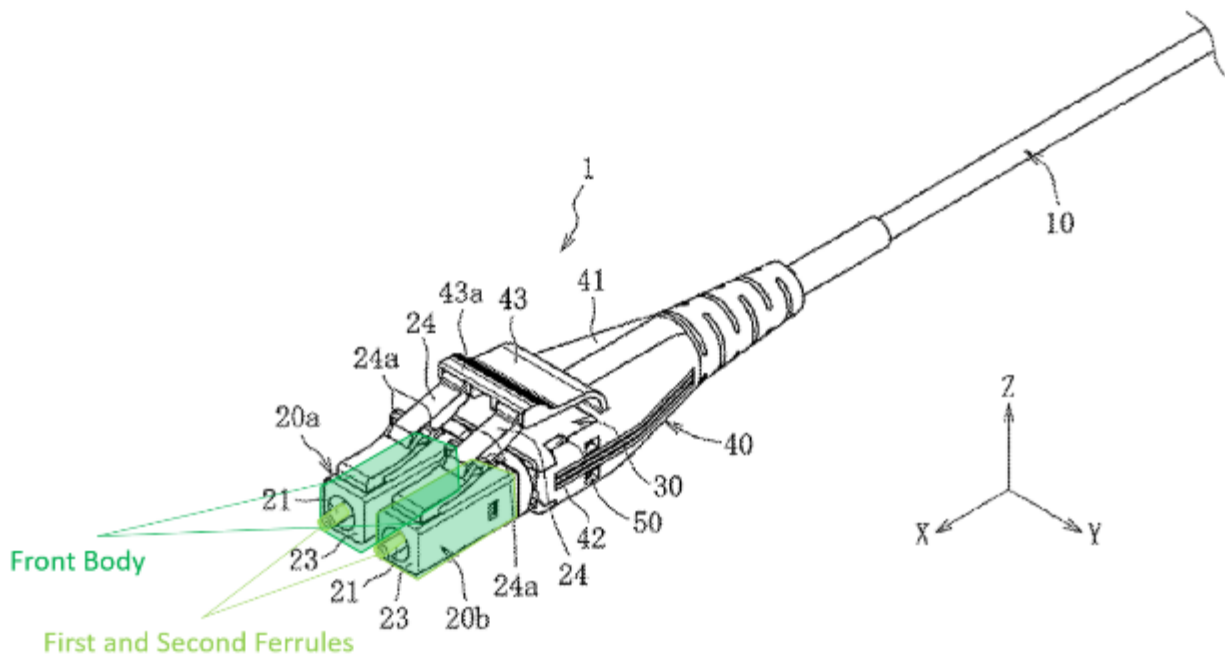
Nakagawa in view of Raven teaches [1.1].

(a) Nakagawa

Nakagawa’s “optical connector unit 1 mainly includes an input optical connector 20a, [and] an output optical connector 20b” and each of the optical connector “include[s] a ferrule 21.” EX1007, ¶¶46-47. Thus, optical connectors 20a and 20b correspond to the recited front body. EX1016, ¶¶150-152.

² Petitioner does not concede that any preambles in the ’190 patent are limiting.

Fig. 1



EX1007, FIG. 1 (annotated).

Patent Owner may allege Nakagawa does not expressly disclose [1.1], but optical connectors with a single front body holding two ferrules were well known in the prior art, for example, as explicitly taught in Raven. EX1016, ¶152.

(b) Raven

Raven discloses a “leading end unit 3” included in “a duplex fibre optic cable 9.” EX1008, 9:51-53. Raven’s Figures 3 and 4 illustrate a portion of leading end unit 3 comprises a single body and includes two respective cavities 59, 57 from which ferrules 27, 33 protrude. EX1008, 11:32-36; EX1016, ¶¶90, 153.



EX1008, FIG. 3 (annotated).

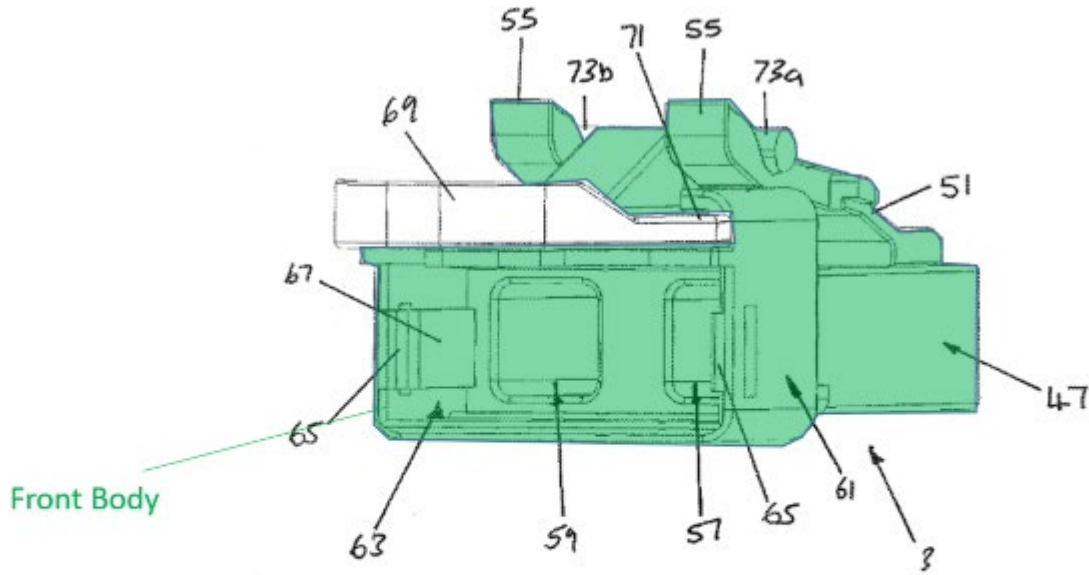


Fig. 4

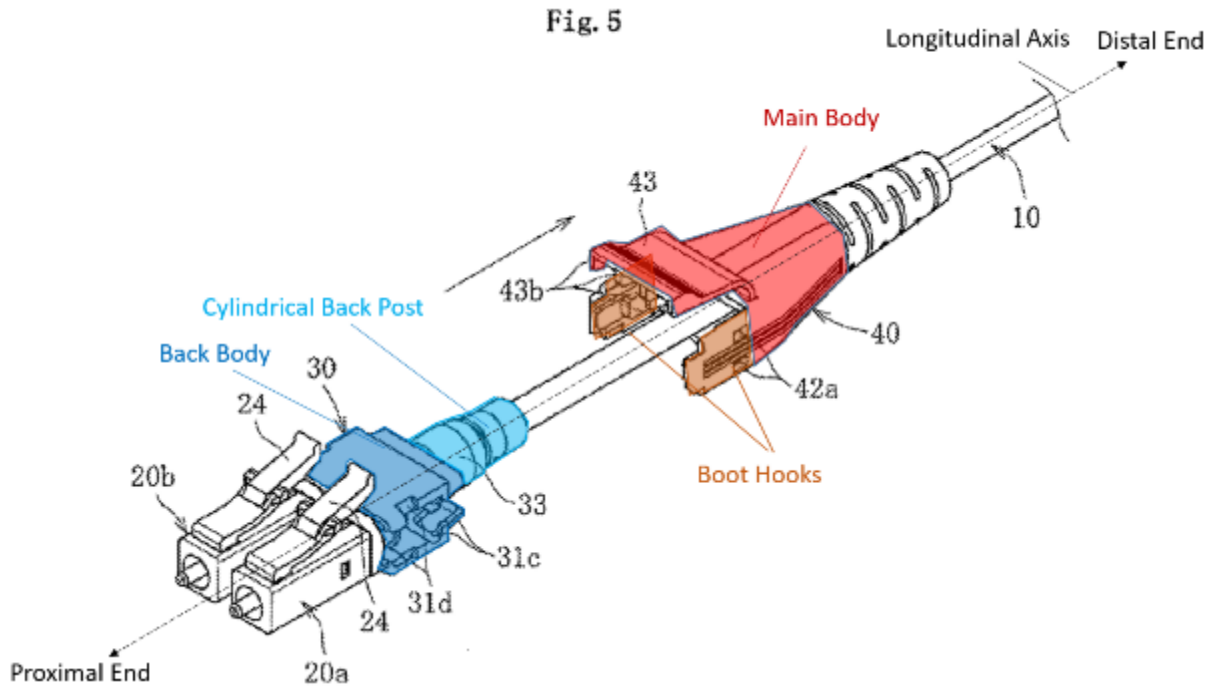
EX1008, FIG. 4 (annotated).

(c) Motivation to Combine

A POSITA would have understood that while Nakagawa presents an optical connector that comprises front bodies to each hold a ferrule, it is clear that other front bodies may be readily substituted for different connector-adapter configurations, such as disclosed by Raven. A POSITA would have been motivated to substitute leading front end 3 of Raven into the optical connector of Nakagawa, and the combination of Nakagawa and Raven, as described in Section VII.A-B, would render obvious claim [1.1]. EX1016, ¶¶134-147, 154.

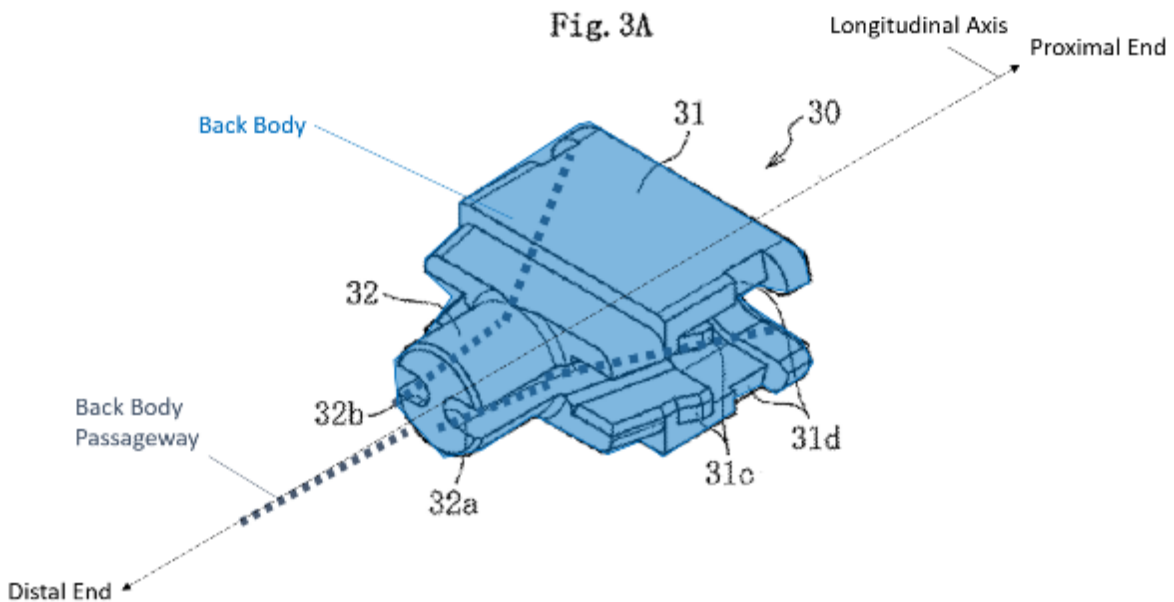
Nakagawa further teaches “[a] caulking member 33 is placed over the outer periphery of the cable fixing portion 32.” EX1007, ¶55. Figure 5 shows caulking member 33 is located at the distal end portion of holder 30. Caulking member 33 is a cylindrical back post having an outer round surface extending along the longitudinal axis. EX1016, ¶156.

Thus, a POSITA would have understood that the caulking member of Nakagawa corresponds to the recited cylindrical back post. *Id.*



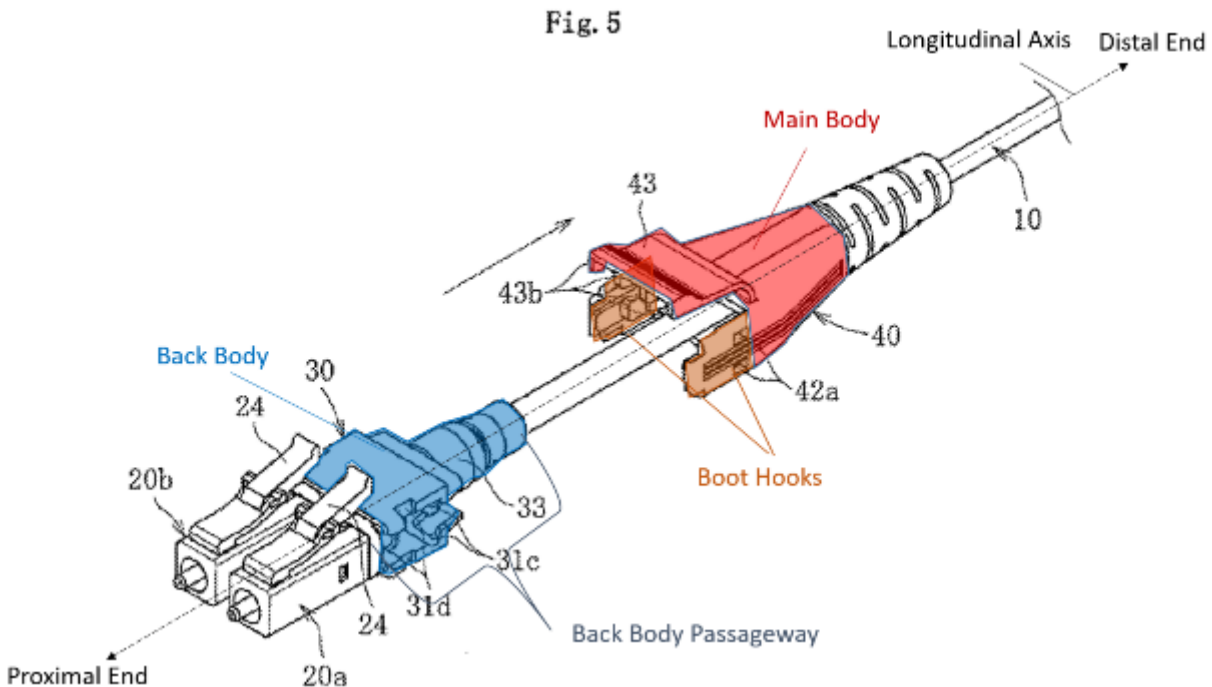
EX1007, FIG. 5 (annotated)

Nakagawa's Figure 3A shows holder 30 includes "a main body portion 31 and a cable fixing portion 32." EX1007, ¶51; EX1016, ¶157.



EX1007, FIG. 3A (annotated).

Nakagawa teaches that caulking member 33 “fix[es] the duplex cable 10 to the holder 30.” EX1007, ¶55; EX1016, ¶158. Thus, a POSITA would have understood that duplex cable 10 runs through holder 30 and caulking member 33 as shown in Nakagawa’s Figure 5. Therefore, the cable fixing portion 32 defines a passageway extending from the distal end portion through the proximal end portion. EX1007, ¶55; EX1016, ¶158.



EX1007, FIG. 5 (annotated).

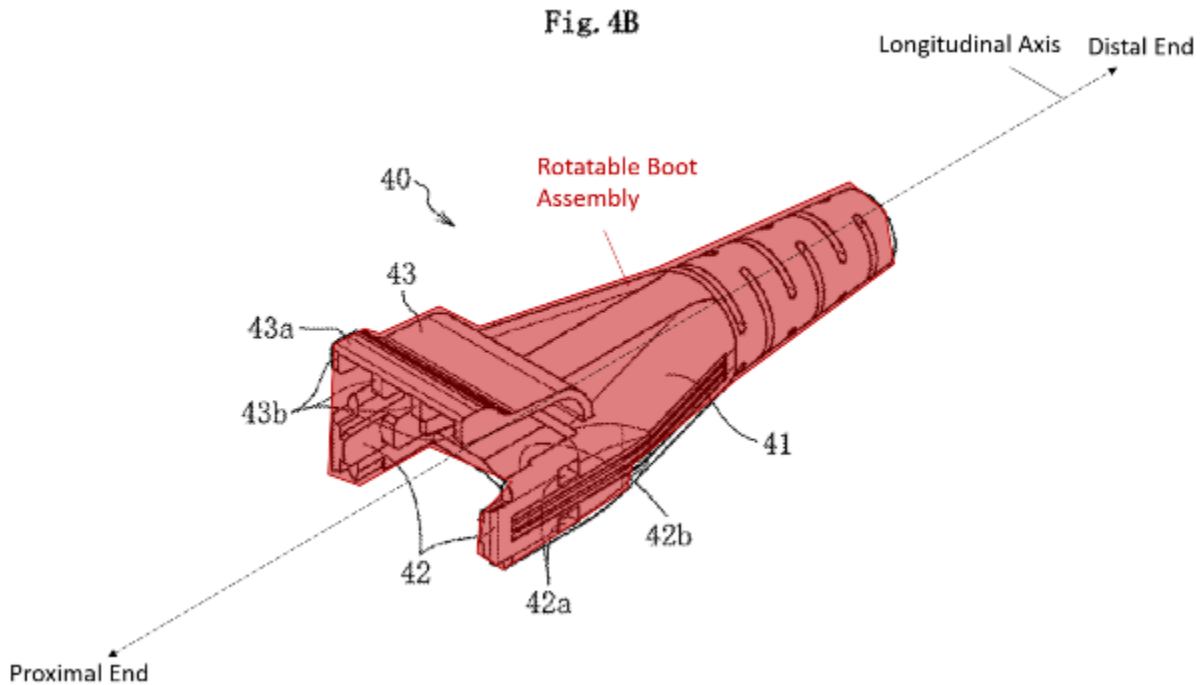
Accordingly, Nakagawa discloses [1.2]. EX1016, ¶159.

4. [1.3.1]

Nakagawa’s Figure 4B illustrates a “boot 40 [] formed of a flexible material.” EX1007, ¶56. Nakagawa discloses, “boot 40 is rotated relative to the

holder 30 so as to be reversed upside down.” EX1007, ¶62; EX1016, ¶160.

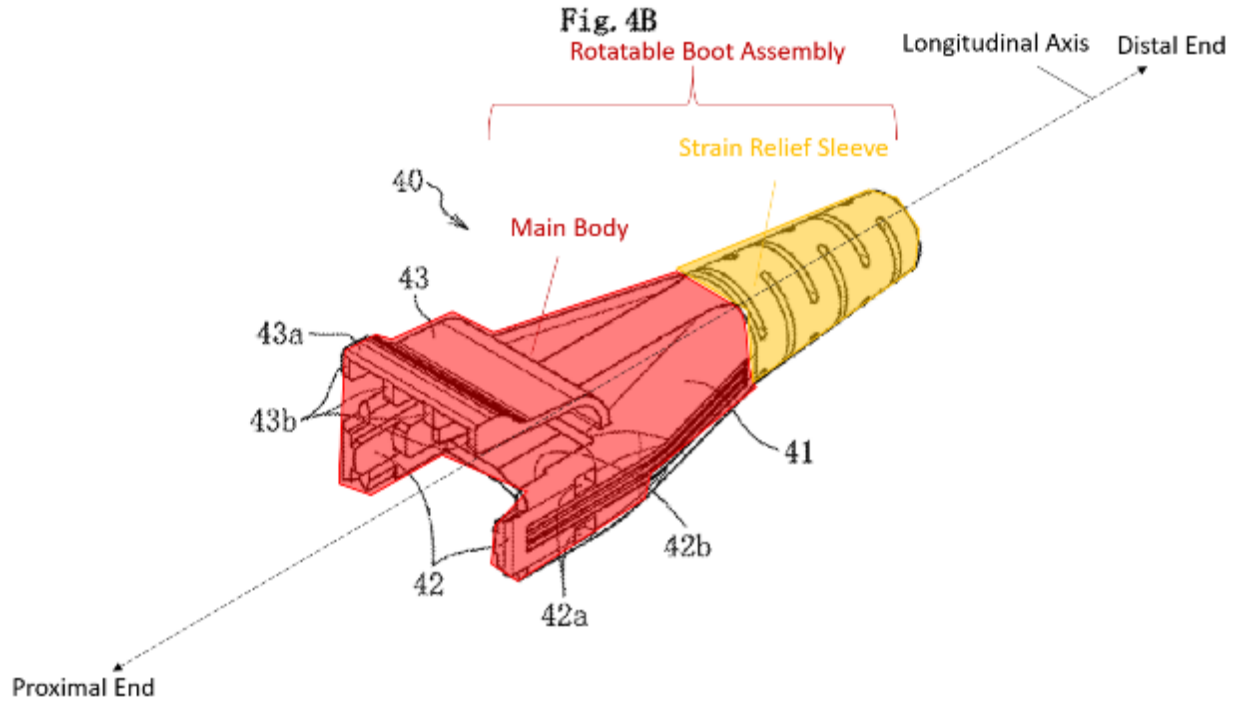
Accordingly, Nakagawa discloses [1.3.1]. EX1007, ¶161.



EX1007, FIG. 4B (annotated).

5. [1.3.2]

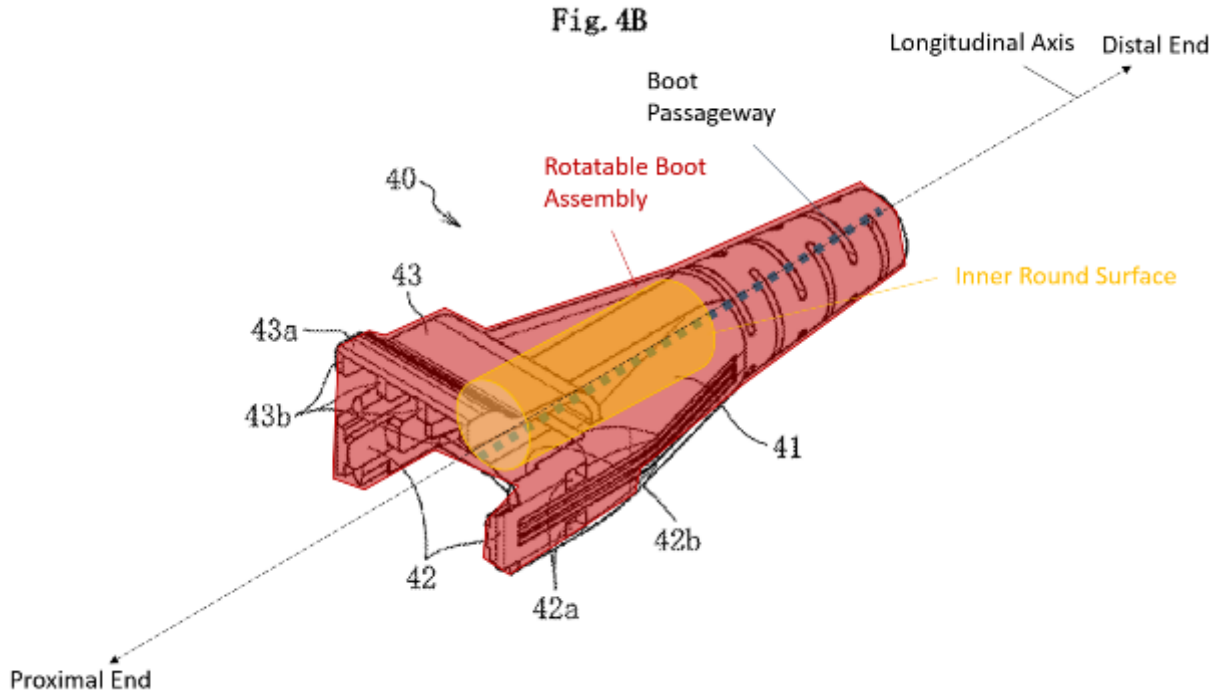
Nakagawa’s Figure 4B illustrates its boot has a sleeve with slits. Nakagawa explains that “boot 40 [] formed of a flexible material.” EX1007, ¶56. Thus, the sleeve corresponds to the recited strain relief sleeve. Further, boot 40 excluding the strain relief sleeve corresponds to the recited main body because the claim language defines the rotatable boot assembly comprising a main body and a strain relief sleeve. EX1016, ¶162. Accordingly, Nakagawa discloses [1.3.2]. EX1016, ¶163.



EX1007, FIG. 4B (annotated).

6. [1.3.3]

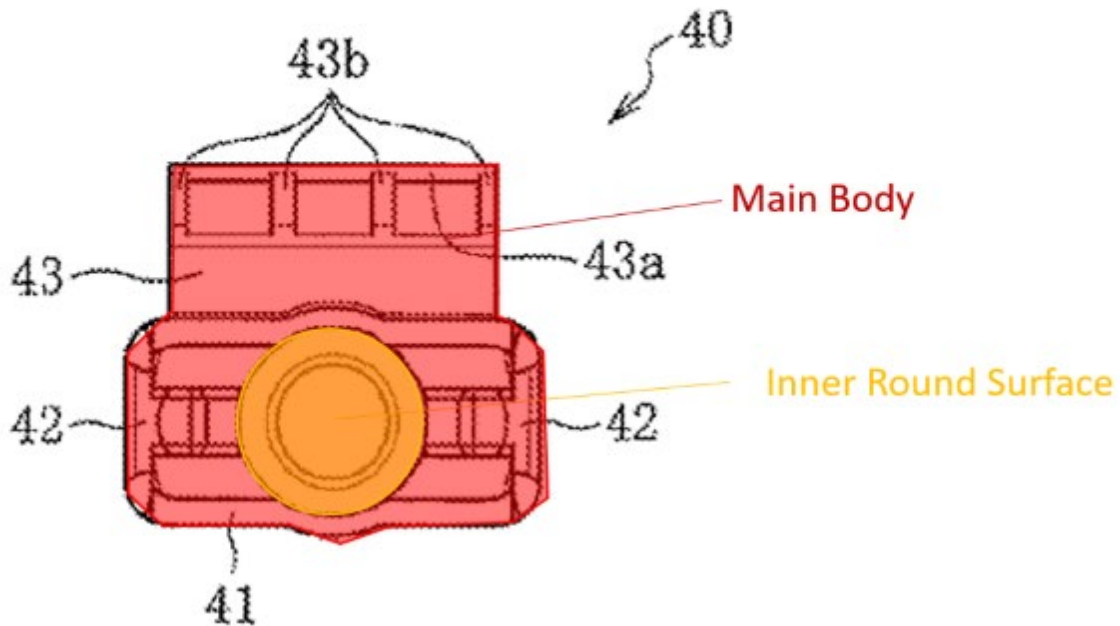
Nakagawa teaches, “boot 40 integrally includes, a tubular main body portion 41.” EX1007, ¶56. Thus, the tubular main body portion corresponds to the recited boot passageway in Nakagawa’s Figure 4B because the boot should have a passageway to accommodate an optical fiber. EX1016, ¶164.



EX1007, FIG. 4B (annotated).

Figure 4E illustrates a boot 40 having an inner round surface. A POSITA would have understood that this inner round surface is the surface of the tubular main body portion viewed from the front. EX1016, ¶165. Further, a POSITA would also have understood this inner round surface to extend along the longitudinal axis as represented in Figure 4B above. *Id.*

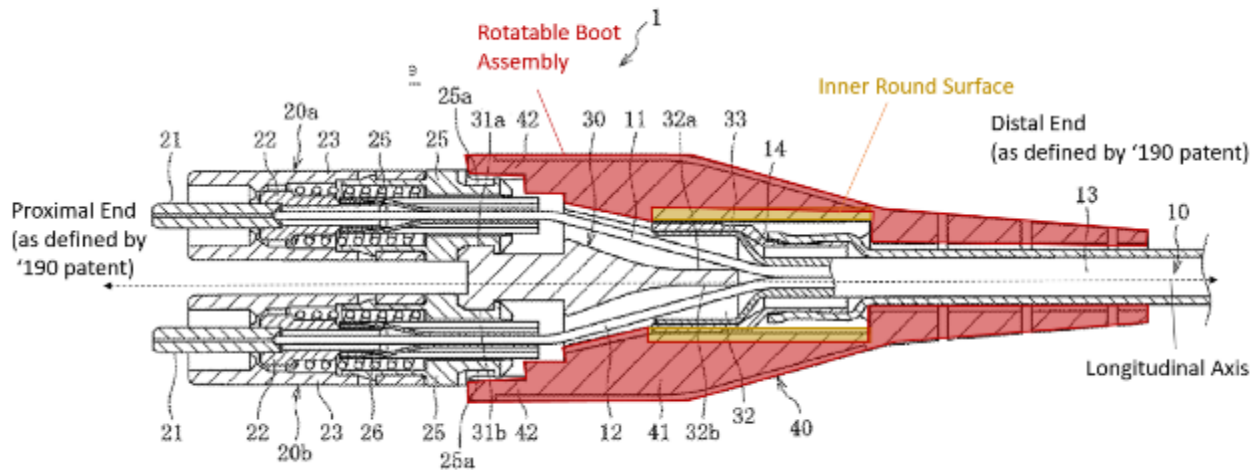
Fig. 4E



EX1007, FIG. 4E (annotated).

Nakagawa's Figure 2 shows a POSITA would have understood that Nakagawa's inner round surface defines the proximal end at the center of the rotatable boot assembly. EX1016, ¶166.

Fig. 2



EX1007, FIG. 2 (excerpt, annotated).

Accordingly, Nakagawa discloses [1.3.3]. EX1016, ¶167.

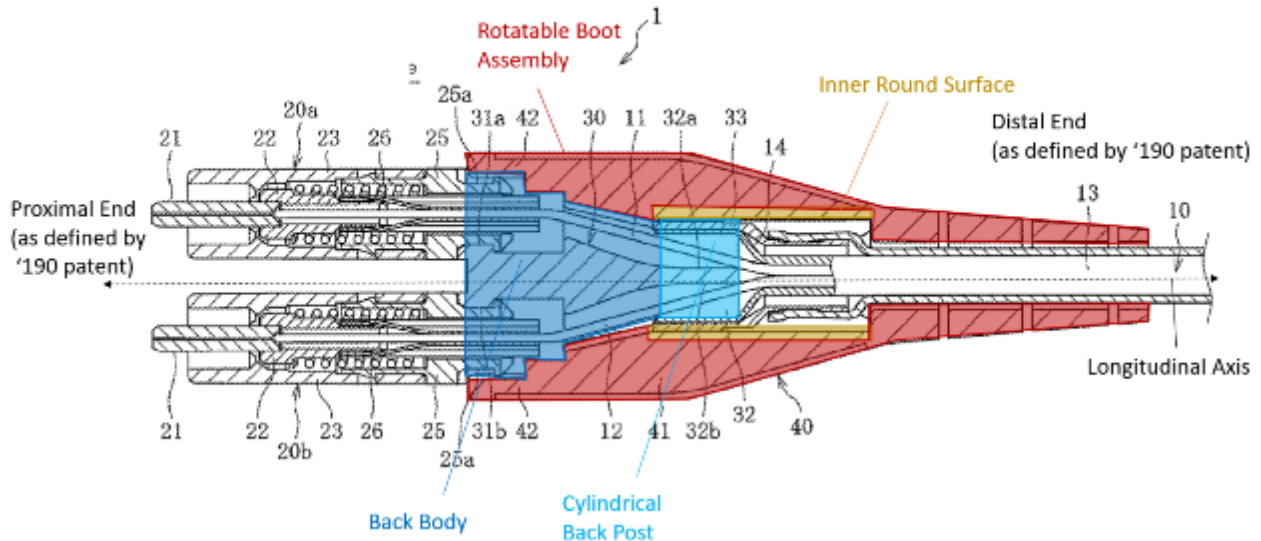
7. [1.3.4]

The recited “back post” is not mentioned in the claim before claim [1.3.4], but a POSITA would understand “the back post” to be “the cylindrical back post” recited in claim [1.2]. EX1016, ¶168.

Nakagawa’s Figure 2B illustrates that boot 40, corresponding to the recited rotatable boot assembly, is disposed on holder 30, which would correspond to the recited back body. EX1016, ¶168. Further, Nakagawa teaches that “[a]s illustrated in FIG. 2, the main body portion 41 covers the outer periphery of the duplex cable 10 extending from the cable fixing portion 32” and “caulking member 33,” which corresponds to the recited outer surface of the back post “is placed over the outer periphery of the cable fixing portion 32.” EX1007, ¶¶ 55, 56. Here, caulking

member 33 is inserted entirely into boot 40 in Figure 2B. Thus, the cylindrical back post of Nakagawa is matingly received in the inner surface. EX1016, ¶168.

Fig. 2



EX1007, FIG. 2 (excerpt, annotated).

Accordingly, Nakagawa discloses [1.3.4]. EX1016, ¶169.

8. [1.3.5]

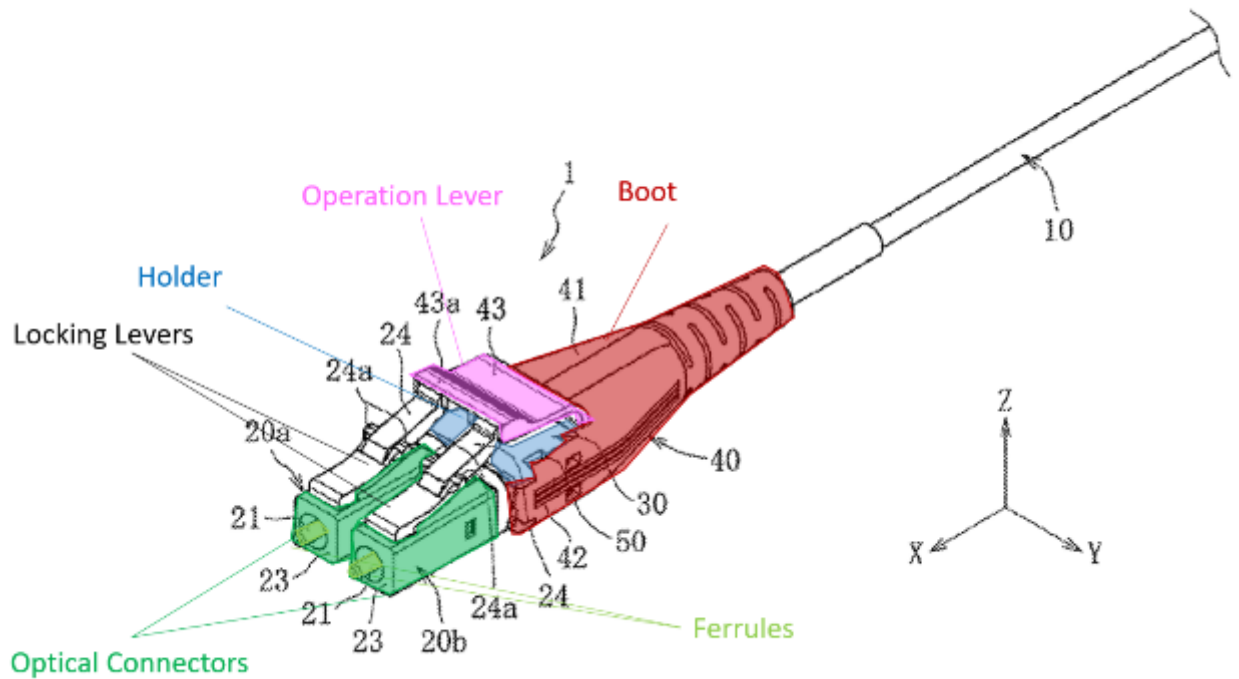
Nakagawa in view of Raven teaches [1.3.5].

The term “cable boot member” is not recited in the claim prior to claim [1.3.5]. A POSITA would understand the “cable boot member” to be at least any portion of the “rotatable boot assembly” as recited by claim element 1.3.1, at least because both terms contain “boot.” EX1016, ¶170.

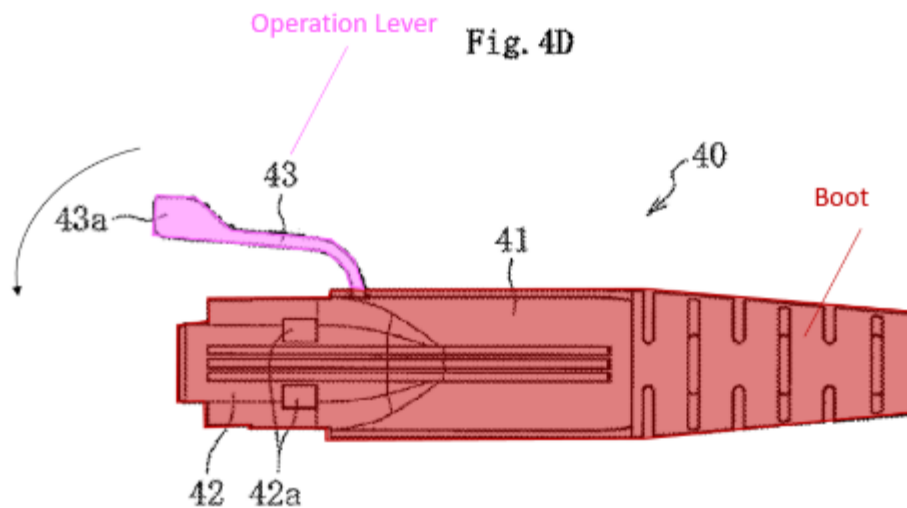
Nakagawa teaches how to disengage its optical connector from an optic adapter. EX1016, ¶171. Nakagawa discloses that “[t]he operation lever 43 includes

a leading end portion” which “functions as a pressing part 43a for downwardly pressing the pair of locking levers 24, 24.” EX1007, ¶58. Nakagawa further explains, “[w]hen the operation lever 43 is downwardly pressed to be elastically deformed, the pressing part 43a of the operation lever 43 downwardly presses the proximal end portions of the pair of locking levers 24, 24 altogether, to thereby elastically deform the locking levers 24, 24. This causes the interlocking portions 24a, 24a of the locking levers 24, 24 to be disengaged from the locking groove of the optical adapter (not shown), with the result that the optical connector unit 1 can be detached from the optical adapter.” *Id.* This configuration is shown in annotated versions of Nakagawa’s Figures 1 and 4D. EX1016, ¶171.

Fig. 1



EX1007, FIG. 1 (annotated).



When “the operation lever 43” is “downwardly pressed to be elastically deformed,” the optical fiber connector is “disengaged from the locking groove of the optical adapter” EX1007, ¶158

EX1007, FIG. 4D (annotated).

To the extent Patent Owner argues that Nakagawa's cable boot member is not slidable along a longitudinal axis relative to the back body for releasing the optical fiber connector from an adapter, Petitioner submits that a POSITA would have understood that Nakagawa renders [1.3.5] obvious in light of a general knowledge and common sense. EX1016, ¶172.

The Board can invoke ““common sense ... to supply a limitation that was ... missing from the prior art”” “when ‘the [missing] limitation in question [is] unusually simple and the technology particularly straightforward.’” *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1338 (Fed. Cir. 2020) (citing *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361–62 (Fed. Cir. 2016)). The Board can rely “on expert evidence, which was corroborated by [the expert], in concluding that [the limitation] was not only in the prior art, but also within the general knowledge of a skilled artisan.” *Id.*

As Dr. Brennan explains, the structure [1.3.5] specifies is simply that the boot member is slidable along the longitudinal axis. EX1016, ¶172. And if, the boot member of Nakagawa is configured elastically to slide along the longitudinal axis to press down locking levers 24 for releasing the connector from the adapter, the recited feature is disclosed. Thus, the recited structure is unusually simple and the technology particularly straightforward. And Dr. Brennan found the recited

structure to be well known in the prior art. EX1016, ¶¶93-97, 172 (using Irwin as corroborating evidence).

The recited structure is also within the general knowledge of a POSITA. The difference between a structure disclosed in Nakagawa-Raven and the recited structure is simply whether the part of the boot member is deformable up and down or slidable along the longitudinal axis to push down locking levers 24. It would be obvious to a POSITA that the simple way to push down locking levers 24 by interaction with operating lever 43 was to either push down on operating lever 43 or to push down on operating lever 43 by the resultant force produced by sliding operating lever 43. *Id.*

Accordingly, a POSITA would have understood that Nakagawa discloses [1.3.5], at least in light of a general knowledge. EX1016, ¶173.

9. [1.3.6]

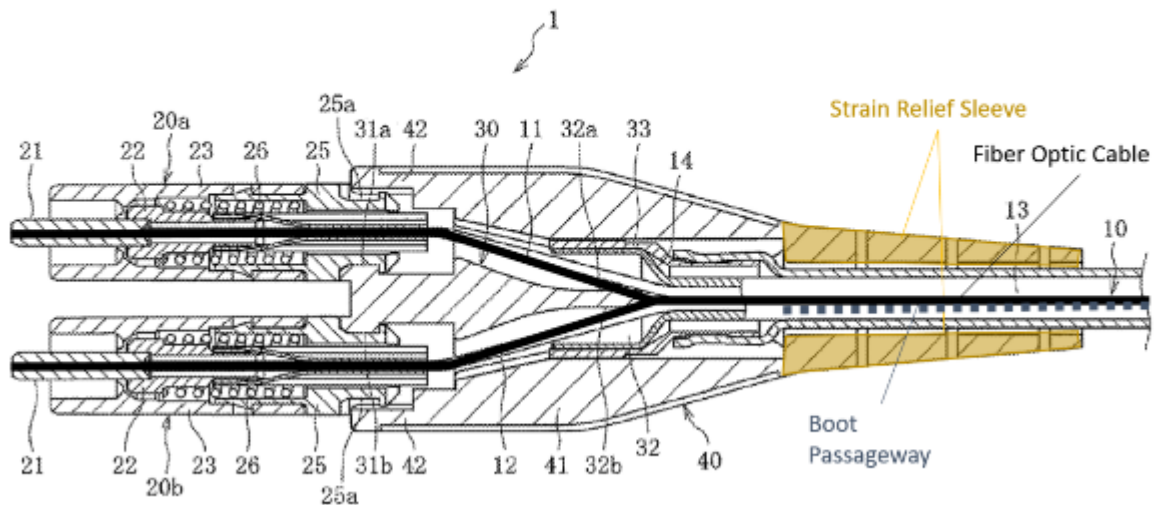
Nakagawa discloses the optical fiber connector being configured to terminate a fiber optic cable such that a jacket of the cable is received in the strain relief sleeve in the boot passageway. EX1016, ¶174. Nakagawa teaches, “the duplex cable 10 includes a pair of bare fibers 11, 12 incorporating the optical fibers, a covering tube 13 which covers outer peripheries of the pair of bare fibers 11, 12.” EX1007, ¶45; EX1016, ¶174. A POSITA would have understood that the covering tube 13 corresponds to the recited jacket, and covering tube 13 is received

in the strain relief sleeve in the boot passageway, as shown in Figure 2. EX1016,

¶174. Further, a POSITA would have understood that “a jacket of the cable [being] received in the strain relief sleeve in the boot passageway” is a necessary and common means of protection of the optical fiber against mechanical trauma.

EX1016, ¶175.

Fig. 2



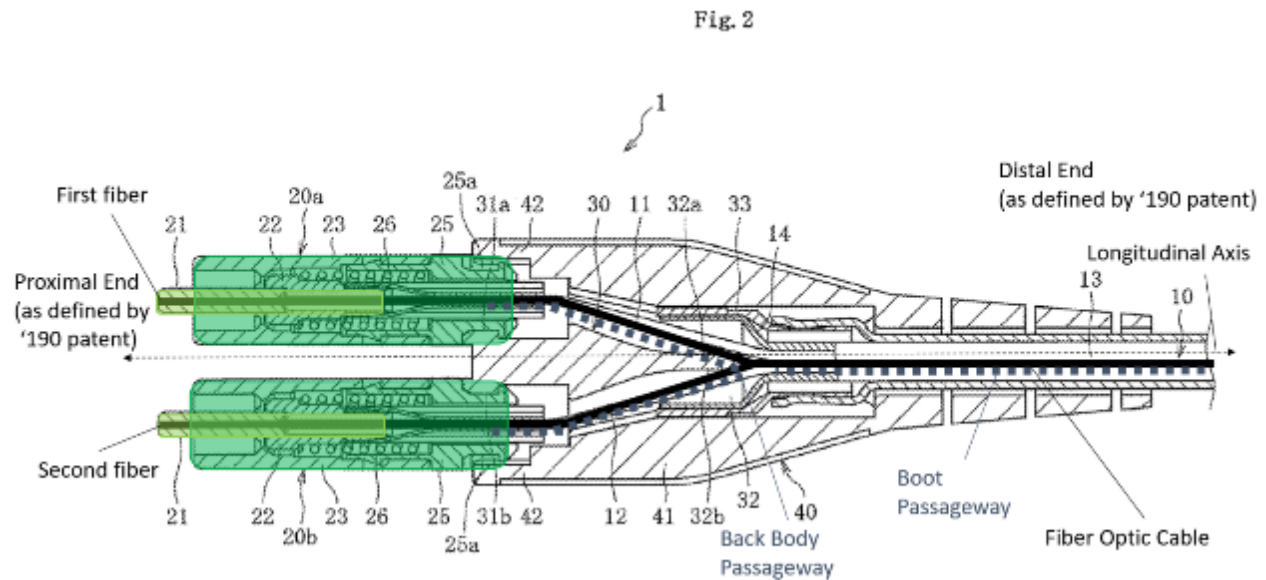
EX1007, FIG. 2 (excerpt, annotated).

Accordingly, Nakagawa discloses [1.3.6]. EX1016, ¶176.

10. [1.3.7]

Nakagawa teaches that main body portion 41, including the recited boot passageway, “covers the outer periphery of the duplex cable 10.” EX1007, ¶56. Nakagawa further teaches that “bare fibers 11, 12”, corresponding to the recited first and second fibers from the fiber optic cable, “are respectively contained in the

guide grooves 32a, 32b formed in the cable fixing portion 32 of the holder 30,”
which includes the recited back body passageway. EX1007, ¶55. Nakagawa’s
Figure 2 illustrates the boot passageway and back body passageway accommodate
the fiber optic cable. EX1016, ¶177.



EX1007, FIG. 2 (excerpt, annotated).

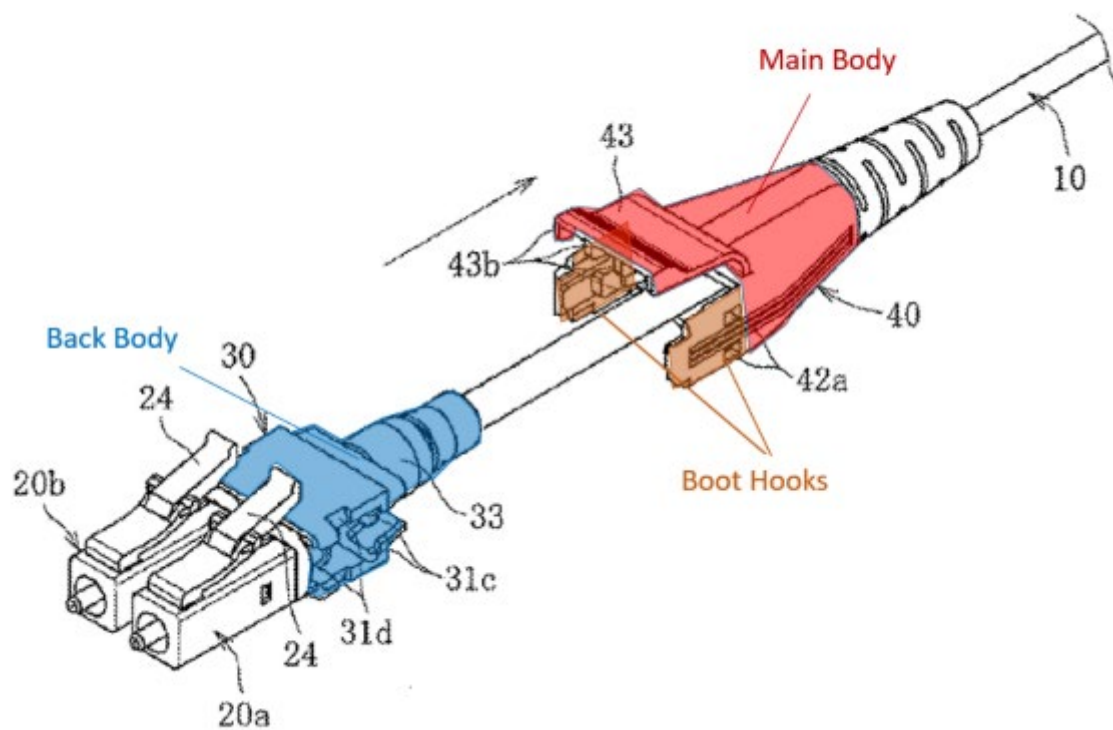
Accordingly, Nakagawa discloses [1.3.7]. EX1016, ¶178.

11. [1.3.8]

The term “the multi-purpose rotatable boot assembly” is not recited in the claim prior to this instance. Petitioner believes “the multi-purpose rotatable boot assembly” to be at least any part of “the rotatable boot assembly” as that of claim [1.3.1], at least because both terms contain the “rotatable boot assembly.” EX1016, ¶179.

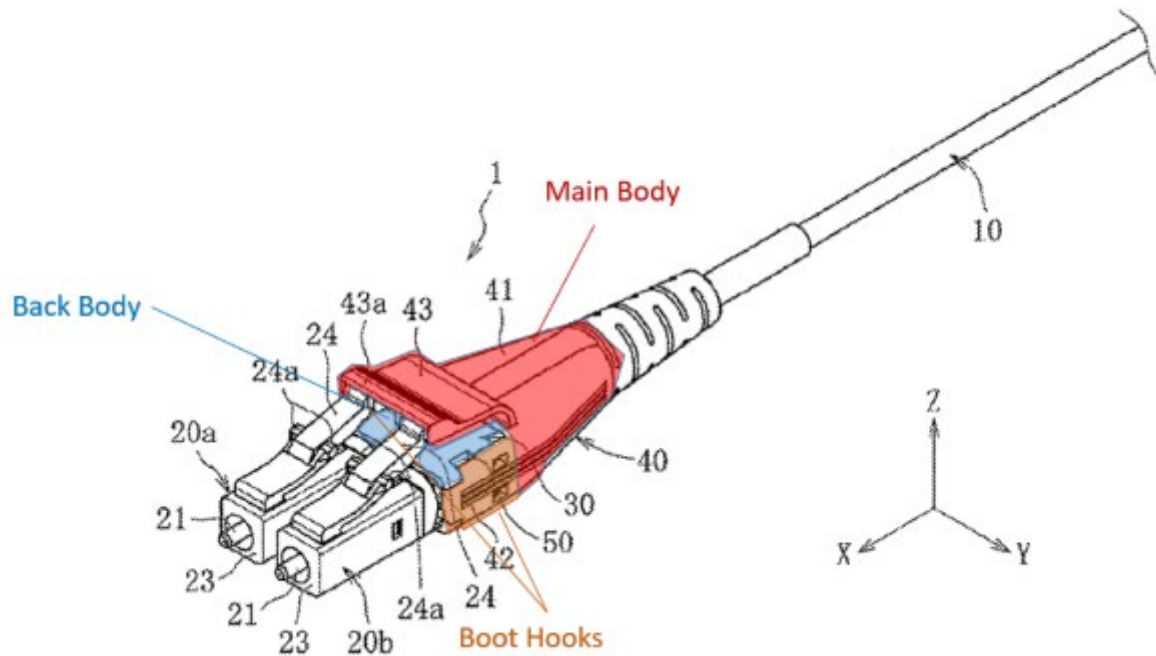
Nakagawa teaches that boot 40, corresponding to the recited main body, “integrally includes... a pair of fixing portions 42 which extend from both ends in the width direction of a leading end portion of the main body portion 41.” EX1007, ¶56. Nakagawa further teaches, “[w]hen the boot 40 is placed over the holder 30, the protrusions 31c of the holder 30 are fitted into the fitting holes 42a of the boot 40, and the protrusions 31 and the fitting holes 42a engage with each other in the optical axis direction. Therefore, the holder 30 is prevented from coming off the boot 40.” EX1007, ¶57. Figure 1 shows the boot hooks engage the back body and restrict the rotation of the back body. A POSITA would have understood that fixing portions 42 correspond to the annotated boot hook(s) for releasably securing the multi-purpose rotatable boot assembly to the back body, as depicted in Nakagawa’s Figures 5 and 1. EX1016, ¶¶179-180.

Fig. 5



EX1007, FIG. 5 (annotated).

Fig. 1

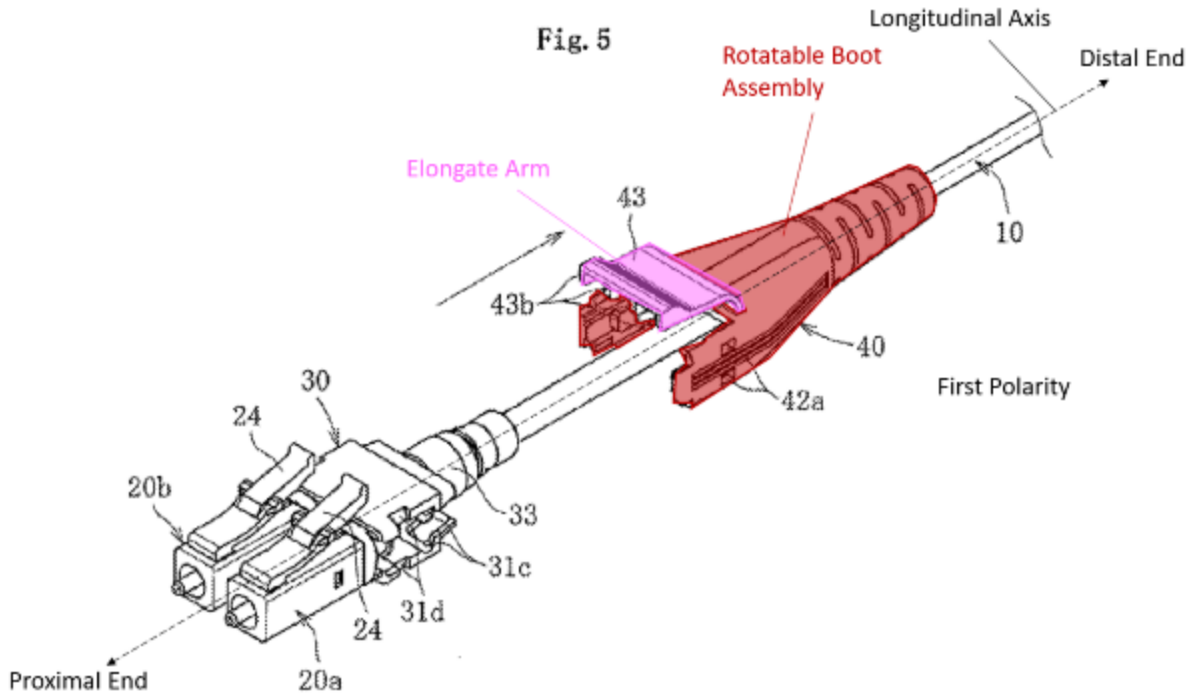


EX1007, FIG. 1 (annotated).

Accordingly, Nakagawa discloses [1.3.8]. EX1016, ¶181.

12. [1.3.9]

Nakagawa's Figure 5 shows operation lever 43 extends from the main body in a proximal direction along the longitudinal axis. Thus, a POSITA would have understood that operation lever 43 corresponds to the claimed elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis. EX1016, ¶182.

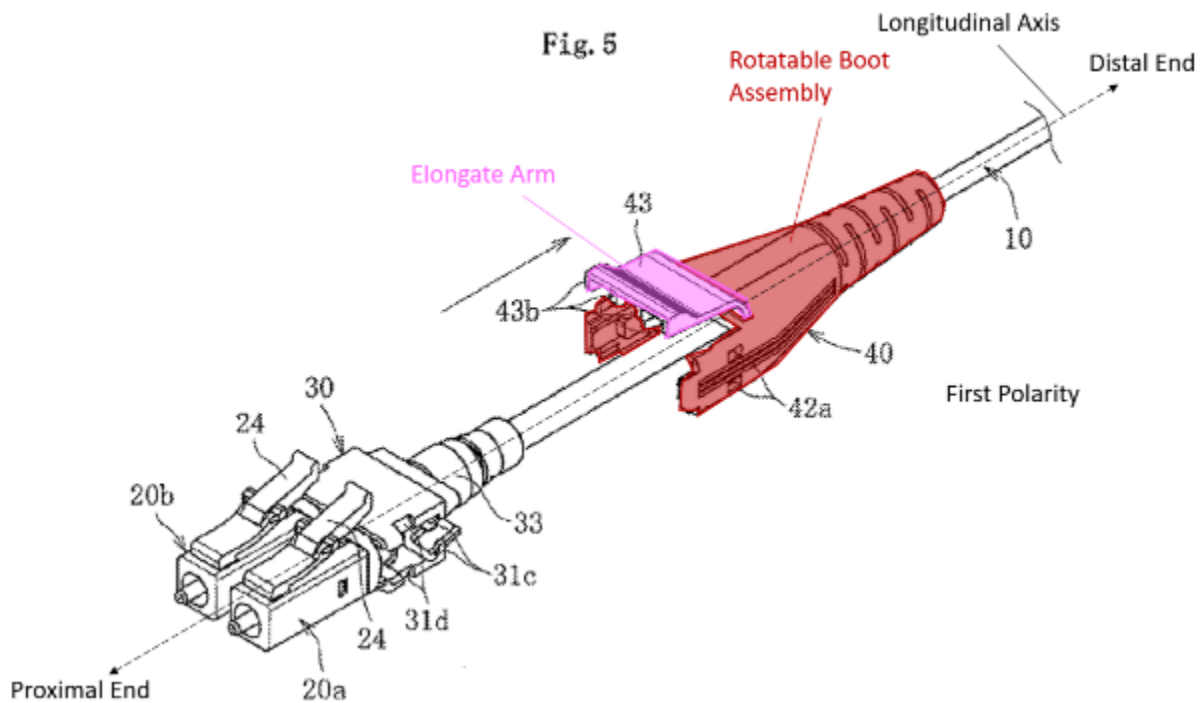


EX1007, FIG. 5 (annotated).

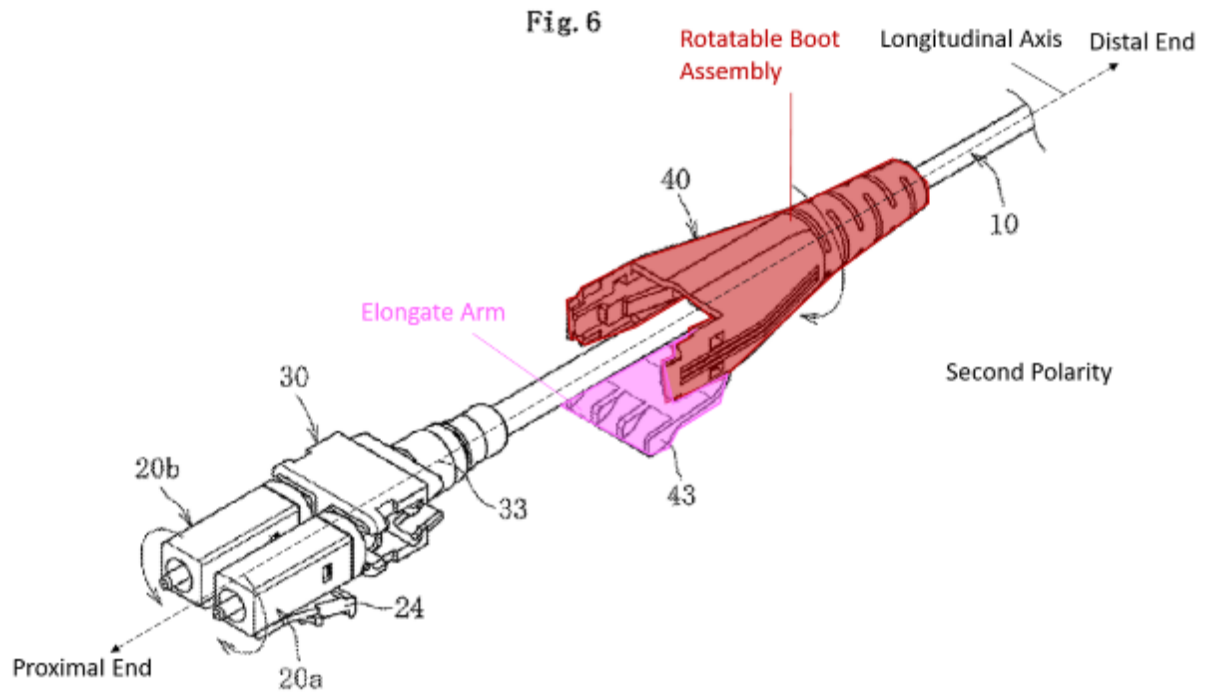
Regarding the “polarity” recited in this claim element, the ’190 patent explains that “[p]olarity is determined by the ferrules [], where a first ferrule is for Tx or transmit and a second ferrule is for Rx or receive. As known in the art, a mismatch of ferrules [] with opposing ferrules secured in an opposing adapter port, the signal would be lost.” EX1001, 4:53-58. Thus, a POSITA would have understood that if the placement of the ferrules relative to the elongate arm is reversed (*e.g.*, reverse left and right) then the polarity of the connector would be understood to be reversed. EX1016, ¶183.

Nakagawa’s Figures 5 and 6 disclose reversing the polarity by reversing the placement of the ferrules relative to the elongate arm. EX1016, ¶184. Nakagawa

teaches that if “pair of optical connectors 20a, 20b are reversely assembled relative to the correct positions [], as illustrated in FIG. 5, the boot 40 is detached from the holder 30” “and hence the optical connectors 20a, 20b become rotatable relative to the holder 30.” EX1007, ¶61. Nakagawa further teaches, “as illustrated in FIG. 6, the optical connectors 20a , 20b each are rotated relative to the holder 30 so as to be reversed upside down. Along with this, the boot 40,” including the recited elongate arm “is rotated relative to holder 30 so as to be reversed upside down.” EX1007, ¶62; EX1016, ¶184.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

Accordingly, Nakagawa discloses [1.3.9]. EX1016, ¶¶185-186.

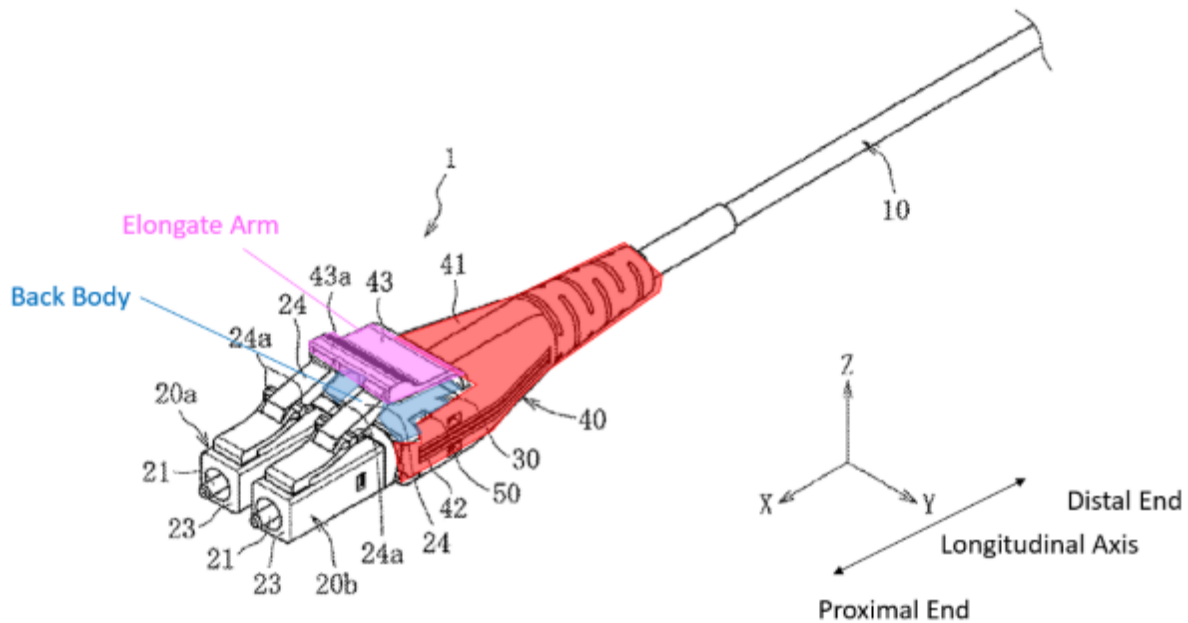
D. Claim 2

The '190 patent defines the “[a]lignment key” by describing, “[a]lignment key, and alignment and offset key is defined as a protrusion adjacent to a side of the connector housing.” EX1001, 5:64-65. Therefore, Petitioner understands “alignment key” to mean “any protrusion adjacent to a side of the connector housing” based on the definition in the '190 patent.

Nakagawa’s Figure 1 illustrates Nakagawa’s elongate arms are protrusions adjacent to an upper side of the back body. Therefore, in light of the '190 patent's

definition, a POSITA would have understood that the elongate arms of Nakagawa correspond to the recited alignment keys. EX1016, ¶¶187-189.

Fig. 1



EX1007, FIG. 1 (annotated).

Accordingly, Nakagawa discloses claim 2. EX1016, ¶190.

E. Claim 3

Nakagawa discloses operation lever 43, corresponding to the recited alignment key “is provided with interlocking portions 43b which engage with the locking levers 24” and to allow “the interlocking portions 42b (*sic*) function as the rotation restricting portion.” EX1007, ¶59; EX1016, ¶¶191-192. Nakagawa further teaches that it “prevent the optical connector 20a or 20b from coming off the optical adapter.” EX1007, ¶50; EX1016, ¶¶191-192. Nakagawa discloses that its

optical connectors are “LC type connector,” but does not expressly show the shape of the LC type optical connector, which accommodates the LC type connector. However, the claimed shape of the LC type optical connector is well known. EX1007, ¶47; EX1016, ¶¶120-123, 192-193 (using Case as corroborating evidence).

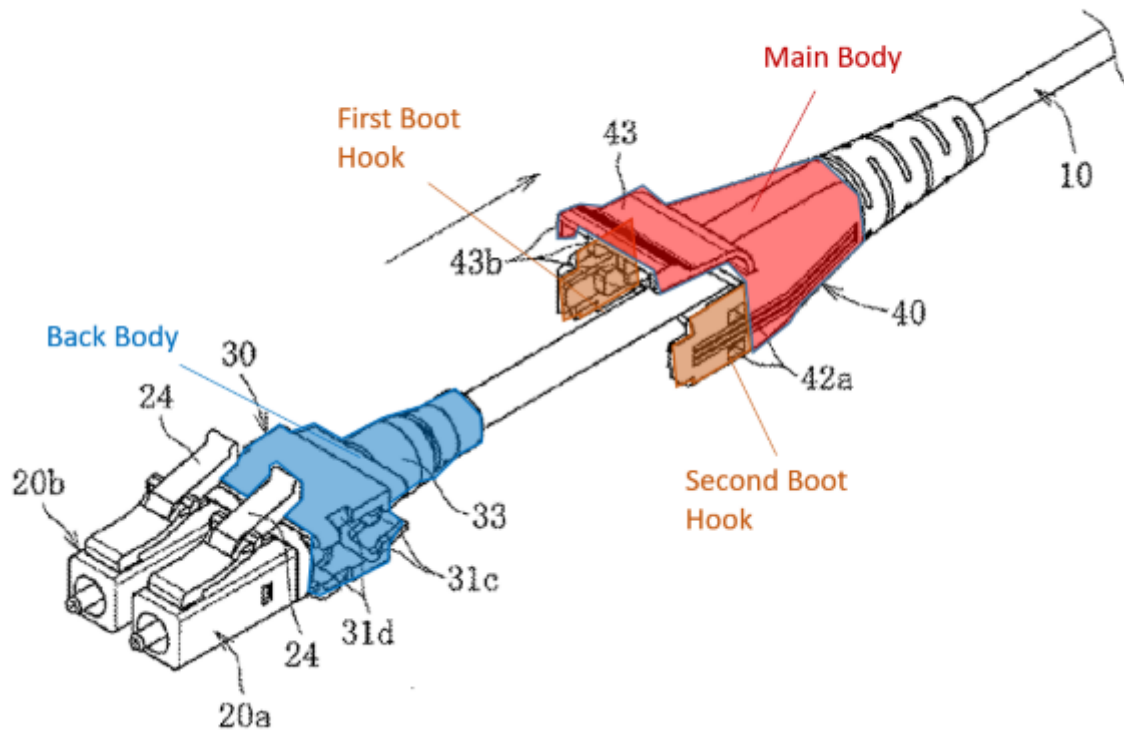
A POSITA would have understood that Nakagawa's alignment key prohibits the rotation of locking lever 24 that is inserted into an adapter, allowing the connector to be inserted into the connector, resulting in the proximal end of the connector being aligned to the adapter. EX1016, ¶193.

Accordingly, Nakagawa discloses Claim 3. EX1016, ¶194.

F. Claim 6

A POSITA would have understood that Nakagawa discloses the boot hook comprising first and second boot hooks as illustrated in annotated Figure 5. EX1016, ¶¶195-196.

Fig. 5



EX1007, FIG. 5 (annotated).

Accordingly, Nakagawa discloses Claim 6. EX1016, ¶197.

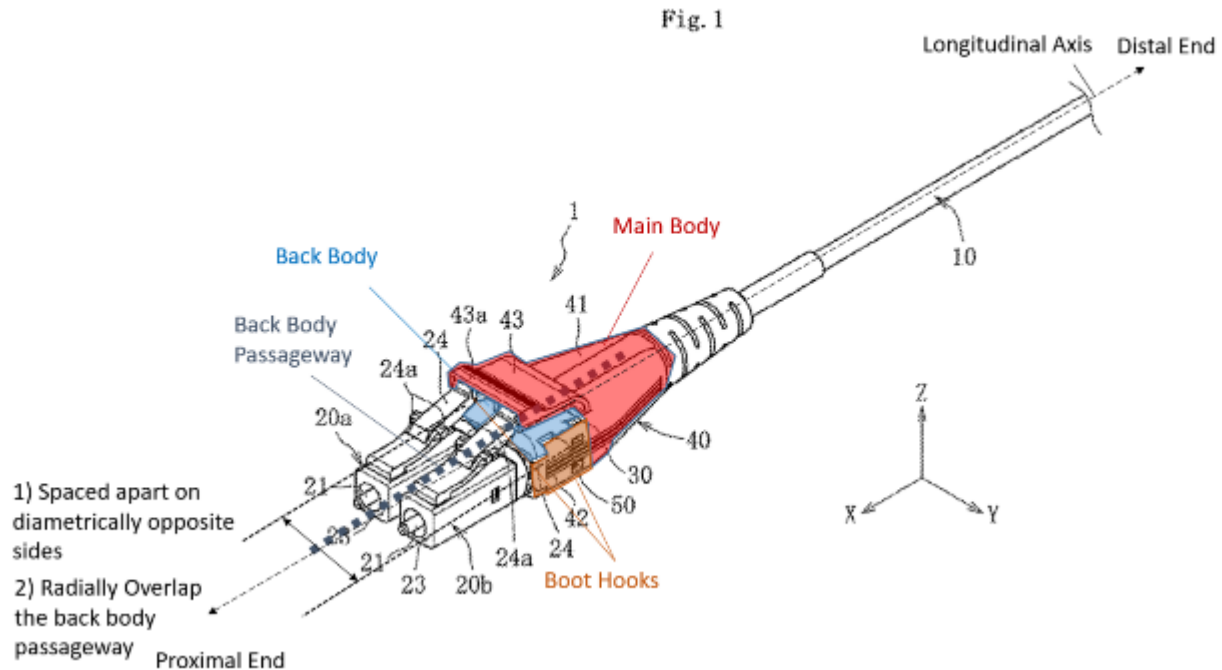
G. Claim 7

Nakagawa discloses the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis illustrated in annotated Figure 5. EX1016, ¶¶198-199. Accordingly, Nakagawa discloses Claim 7. EX1016, ¶199.

H. Claim 8

Nakagawa's Figure 1 illustrates that the connector when the rotatable boot assembly is disposed on the back body. Figure 1 illustrates the first boot hook and the second boot hook are spaced apart on diametrically opposite sides of the back

body passageway. Figure 1 also shows the first boot hook and the second boot hook the first and second boot hooks radially overlap the back body passageway relative to the longitudinal axis. EX1016, ¶¶200-203.

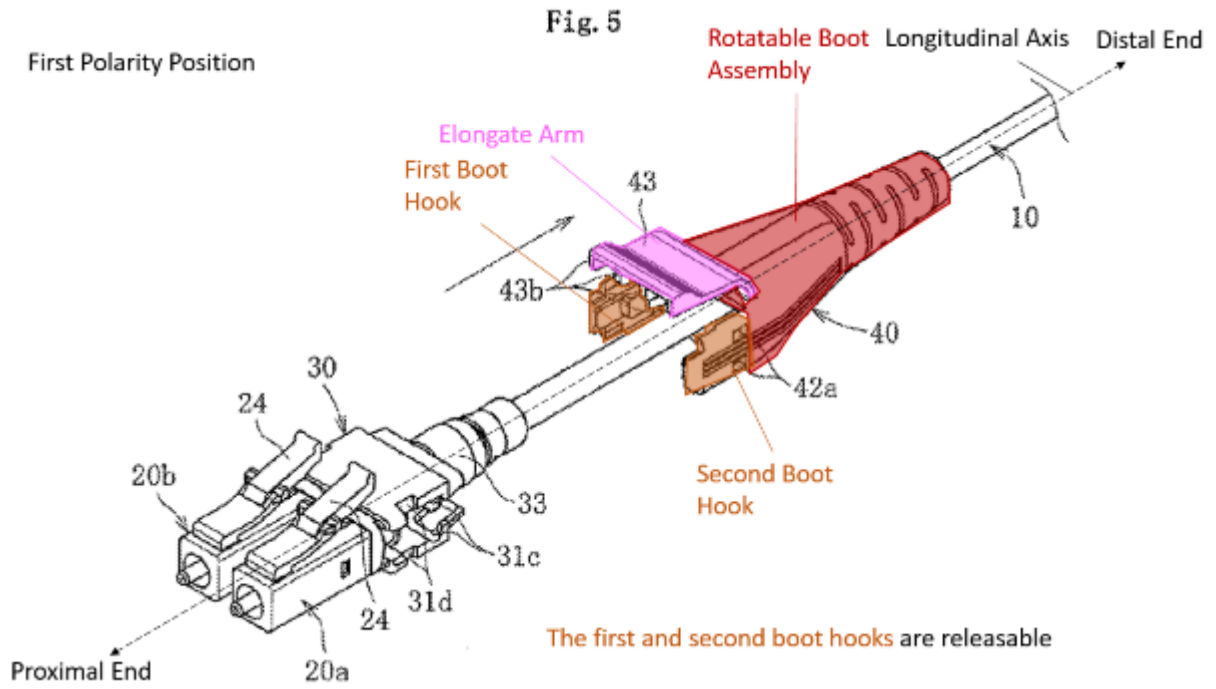


EX1007, FIG. 1 (annotated).

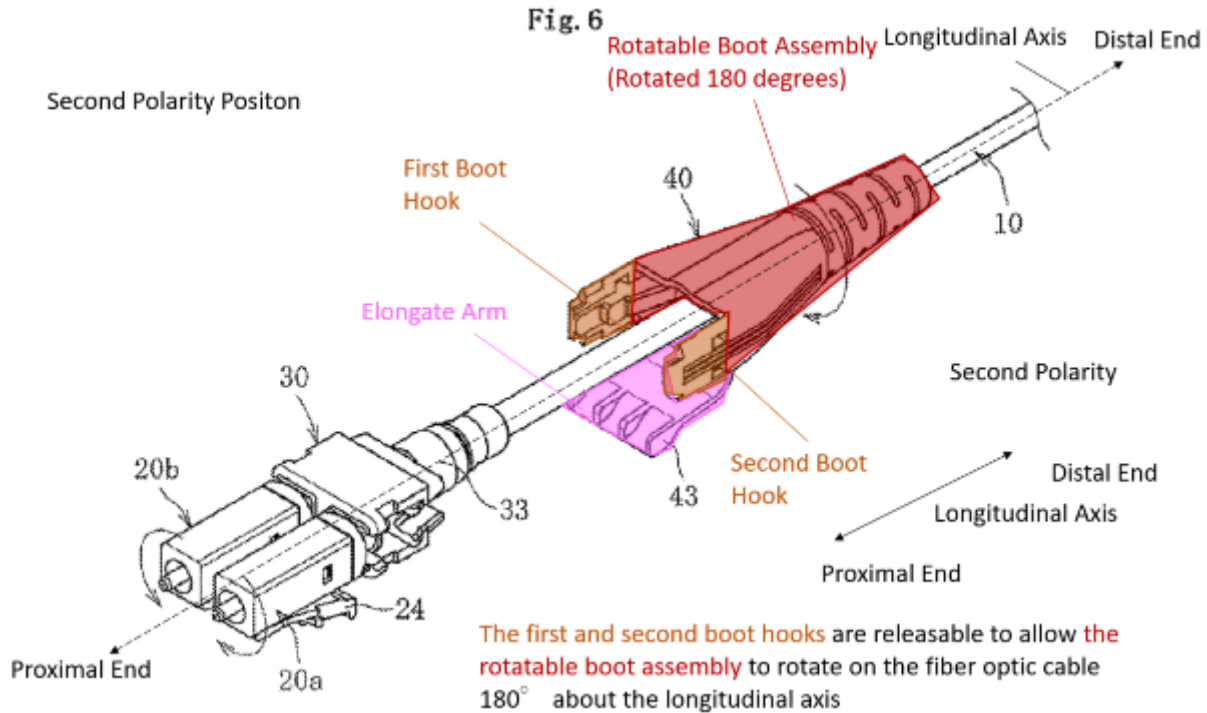
Accordingly, Nakagawa discloses claim 8. EX1016, ¶204.

I. Claim 9

Nakagawa discloses that the elongate arm being configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity. Section VIII.C.12. Nakagawa's Figures 5 and 6 demonstrate how the elongate arms move from the first position to the second position during a polarity change. EX1016, ¶¶205-207.



EX1007, FIG. 5 (annotated).



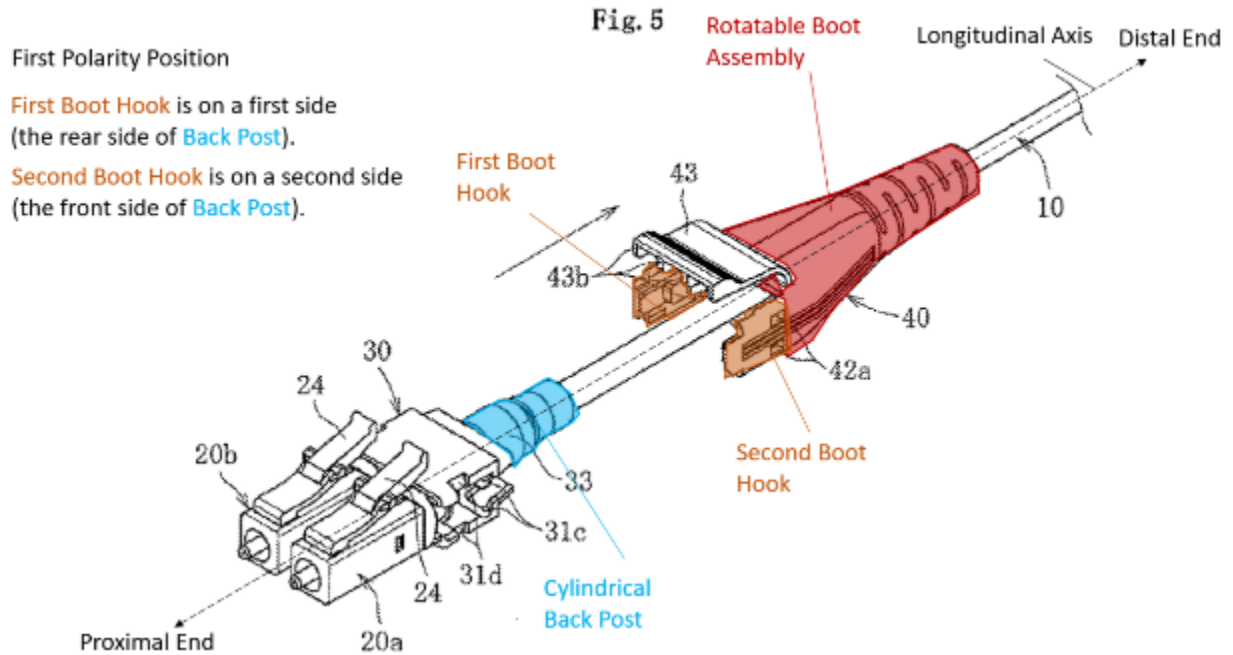
EX1007, FIG. 6 (annotated).

Accordingly, Nakagawa discloses claim 9. EX1016, ¶208.

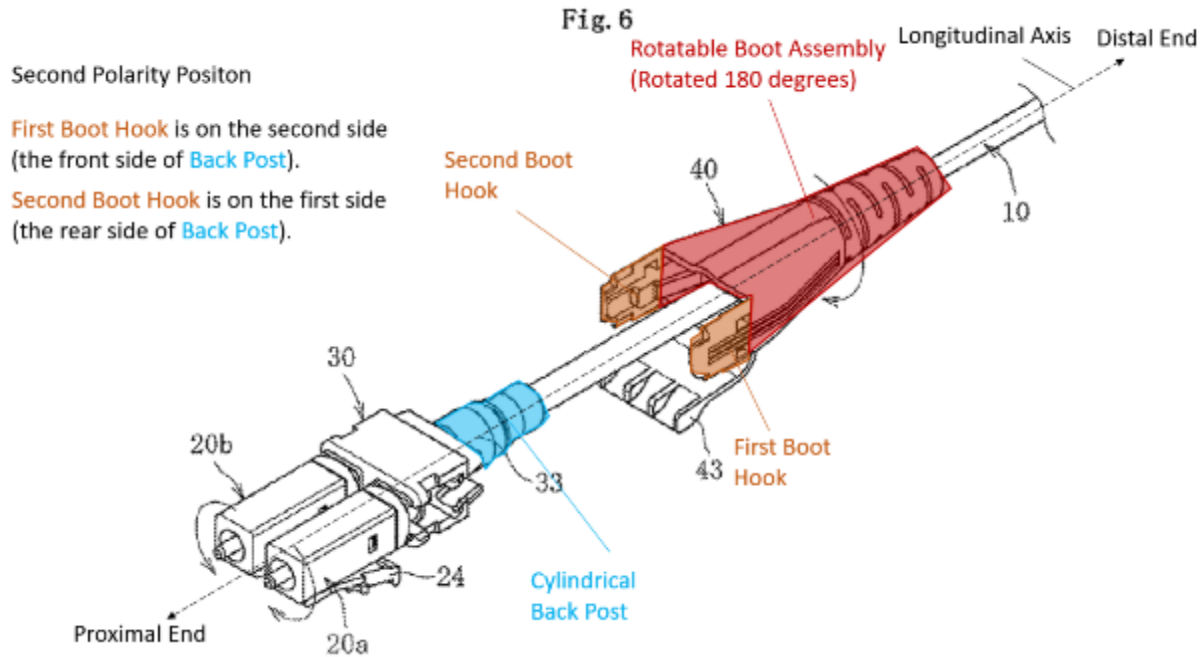
J. Claim 10

Nakagawa's Figure 5 shows the first boot hook is on the rear side of the back post and the second boot hook is on the front side of the back post when the rotatable boot assembly is in the first polarity position. Nakagawa's Figure 6 shows the first boot hook is on the front side of the back post and the second boot hook is on the front rear of the back post when the rotatable boot assembly is in the second polarity position. Further, Nakagawa teaches that boot 40, having the recited first and second boot hooks, "is rotated relative to the holder 30," having the recited back post "so as to be reversed upside down." EX1007, ¶62. Therefore, the surface

that the back post faces on each boot hook is changed before and after the polarity change. EX1016, ¶¶209-210.



EX1007, FIG. 5 (annotated).

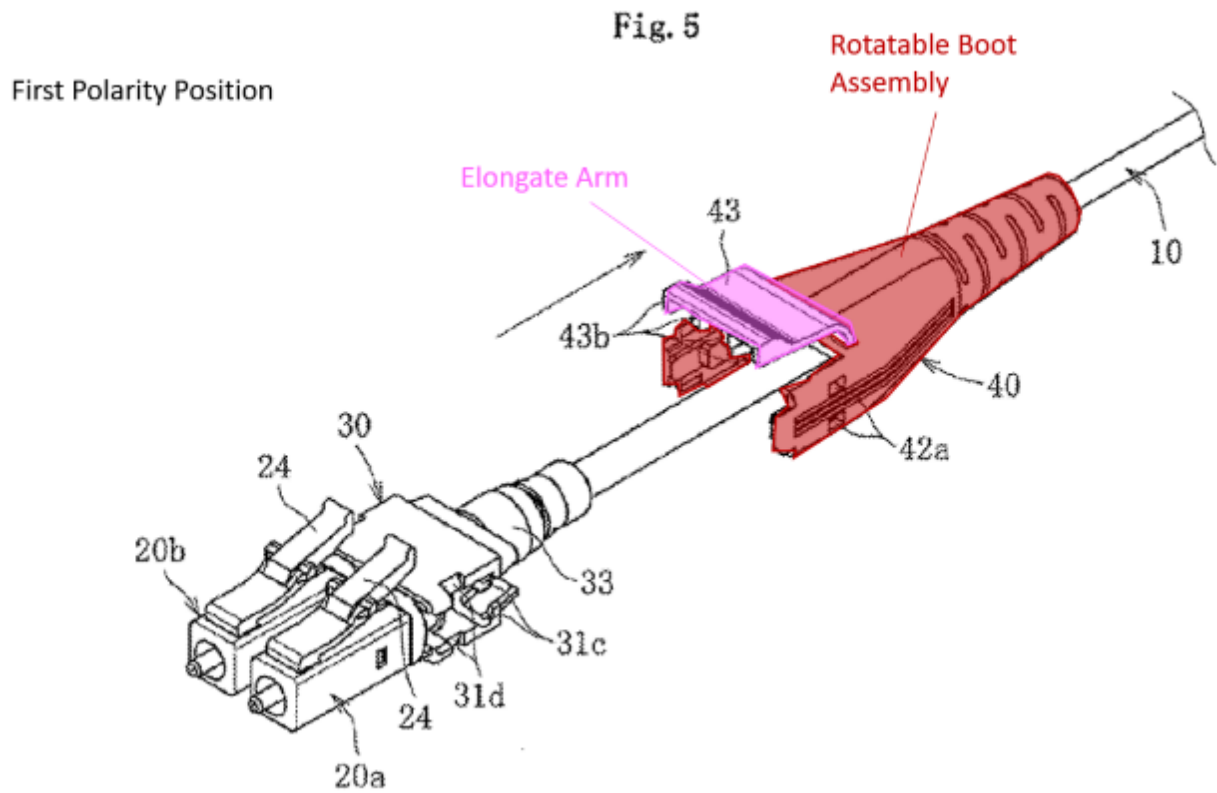


EX1007, FIG. 6 (annotated).

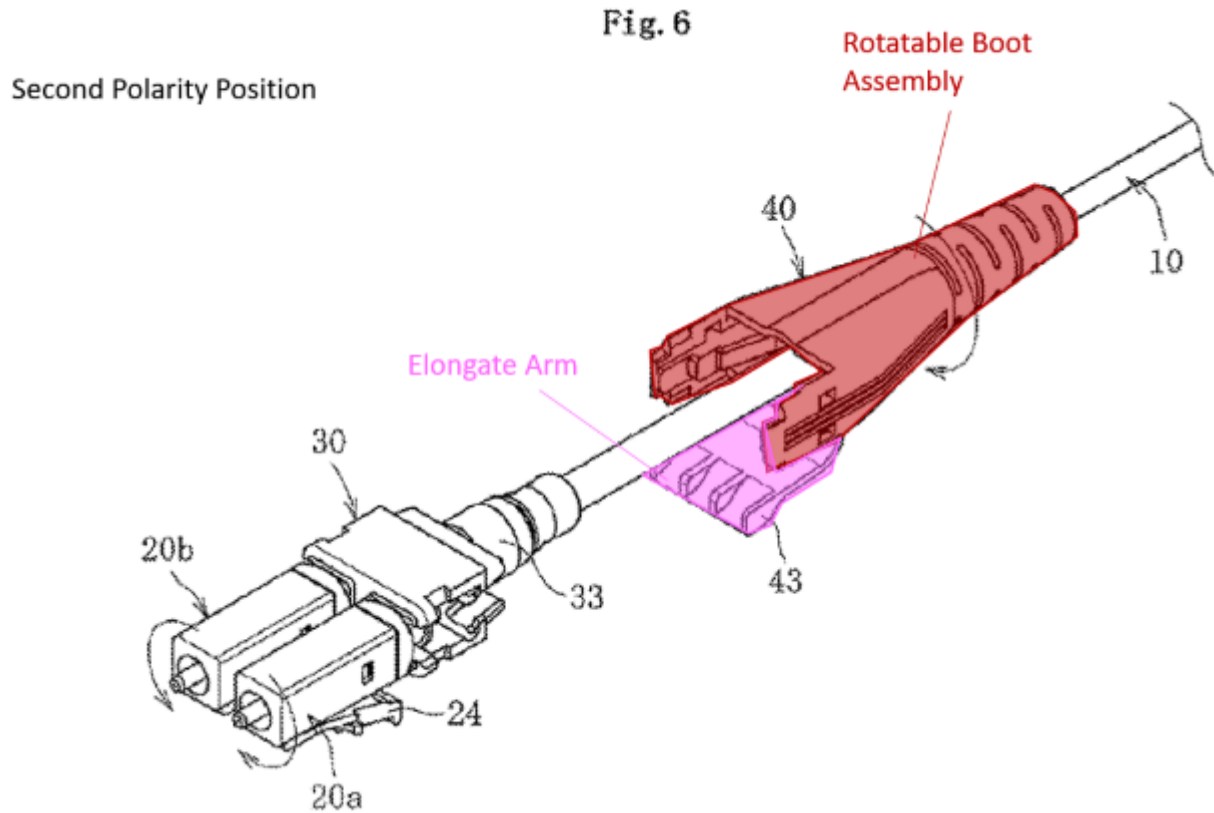
Accordingly, a POSITA would have understood that Nakagawa discloses claim 10. EX1016, ¶211.

K. Claim 11

Nakagawa teaches that its elongate arms are connected to the main body. Nakagawa further teaches that the elongate arms rotate with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position. Nakagawa's Figures 5 and 6 show the elongate arm rotates 180 degrees with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position. EX1016, ¶¶212-213.



EX1007, FIG. 5 (annotated).

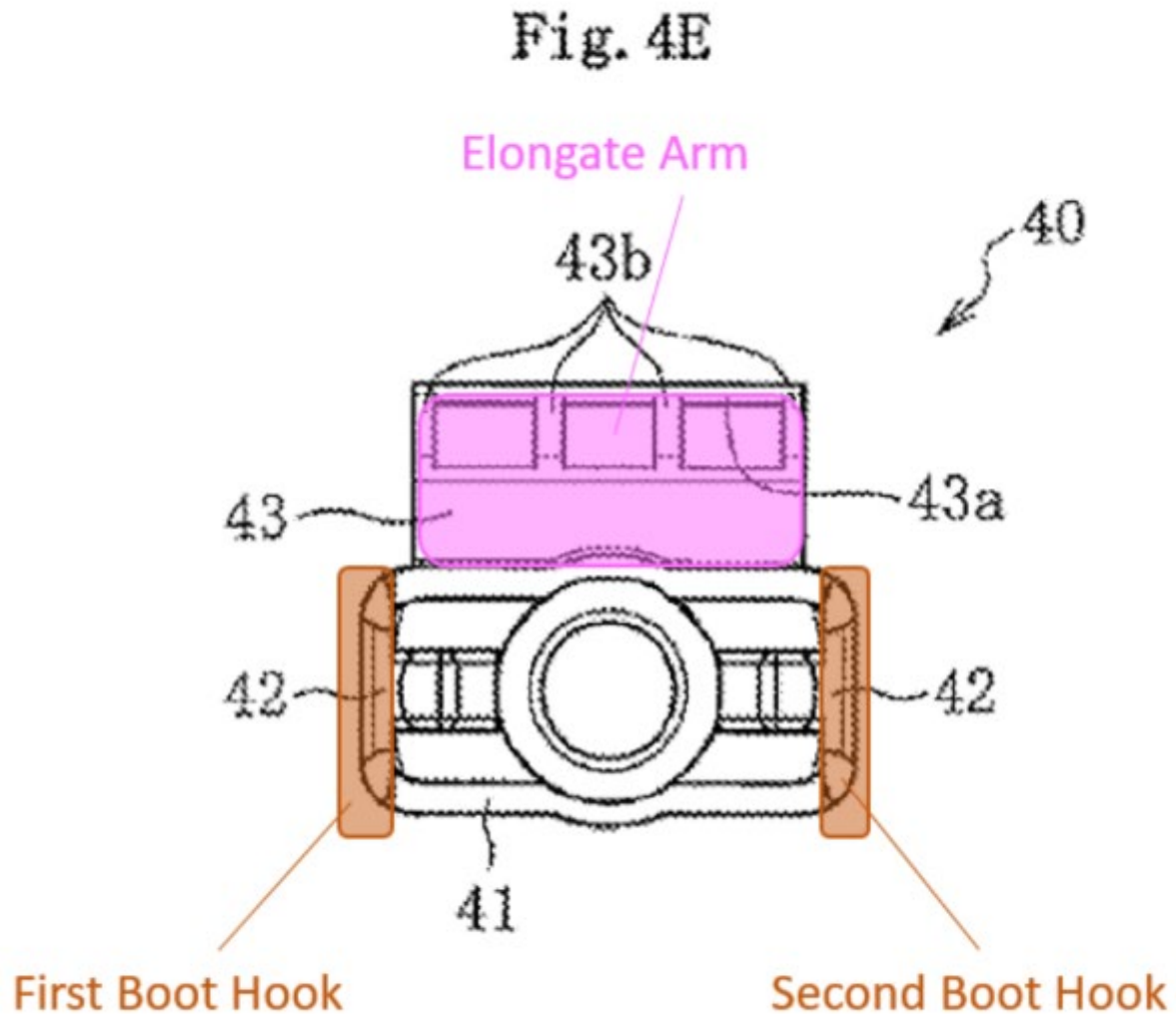


EX1007, FIG. 6 (annotated).

Accordingly, a POSITA would have understood that Nakagawa discloses claim 11. EX1016, ¶214.

L. Claim 12

Nakagawa's Figure 4E discloses that the first boot hook, the elongate arm, and the second boot hook are spaced apart each other.



EX1007, FIG. 4E (annotated).

To the extent that the Patent Owner argues that Nakagawa's boot hooks and elongate arm are not positioned as specified in claim 12, Petitioner submits that a POSITA would have understood that Nakagawa renders claim 12 obvious in light of a general knowledge and common sense. EX1016, ¶¶215-217.

The Board can invoke common sense to a limitation that was missing from the prior art. Section VIII.C.8.

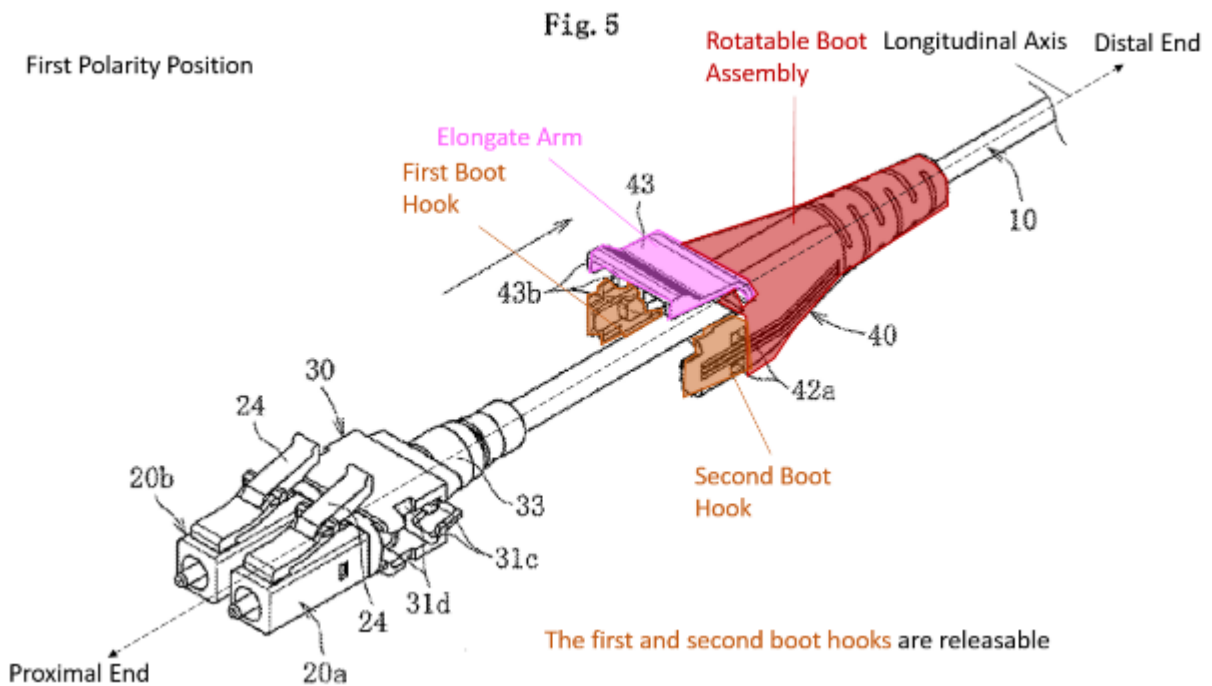
As Dr. Brennan explains, the structure claim 12 specifies is simply that the elongate arm and the first boot hook are located opposite the second boot hook across the longitudinal axis. And, if the boot hooks disclosed in Nakagawa-Raven are placed on the top and bottom of the boot, the recited feature is disclosed. EX1016, ¶216. Thus, the recited structure is unusually simple and the technology particularly straightforward. And Dr. Brennan found the recited structure to be well known in the prior art. EX1016, ¶¶98-99, 217 (using Irwin as corroborating evidence).

Finally, the recited structure is also within the general knowledge of a POSITA. The difference between a structure disclosed in Nakagawa-Raven and the recited structure is simply whether the boot hooks are placed left to right or up and down. It would be obvious to a POSITA that the only options for boot hooks placement when the boot is hooked to other parts of the connector would be to place the boot hooks on the left or right, or up or down, or all around. Therefore, it is general knowledge for POSITA that boot hooks can be placed on the top and bottom of the connector. EX1016, ¶218.

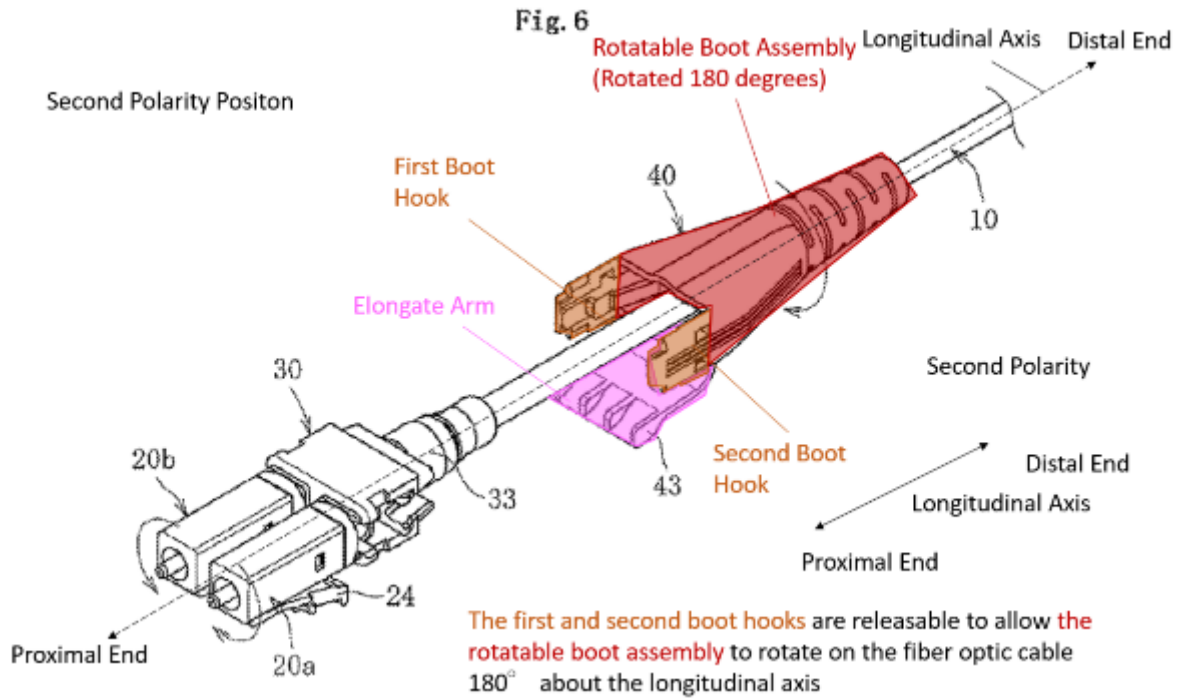
Thus, a POSITA would have understood that Nakagawa renders claim 12 obvious in light of a general knowledge and common sense. EX1016, ¶219.

M. Claim 13

Nakagawa's Figures 5 and 6 illustrate that the boot hooks are releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which the elongate arm sets the optical fiber connector to the second polarity. EX1016, ¶¶220-221.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

Accordingly, Nakagawa discloses claim 13. EX1016, ¶¶222.

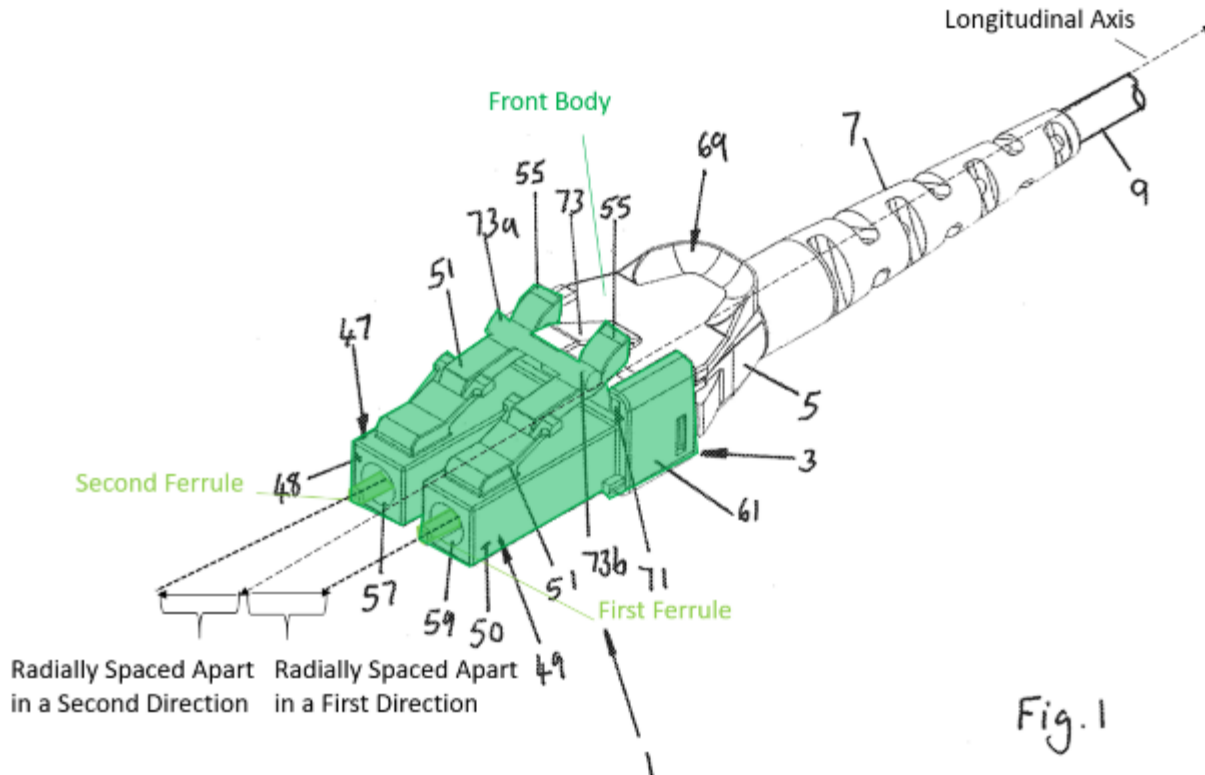
N. Claim 14

Claim 14 sets forth substantially the same matter as claim 11, except that the dependent claim has been changed from claim 9 to claim 13. This claim term is obvious for the same reasons discussed above in claim 11. EX1016, ¶¶223-224.

O. Claim 15

To the extent that the Patent Owner argues that Nakagawa does not disclose the claimed front body, a POSITA would have understood Raven discloses the claimed single front body that holds two ferrules. Section VIII.C.2; EX1016,

¶¶225-226. Further, Raven's Figure 1 illustrates that each of two ferrules is radially spaced apart from the longitudinal axis in opposite directions. EX1016, ¶227.

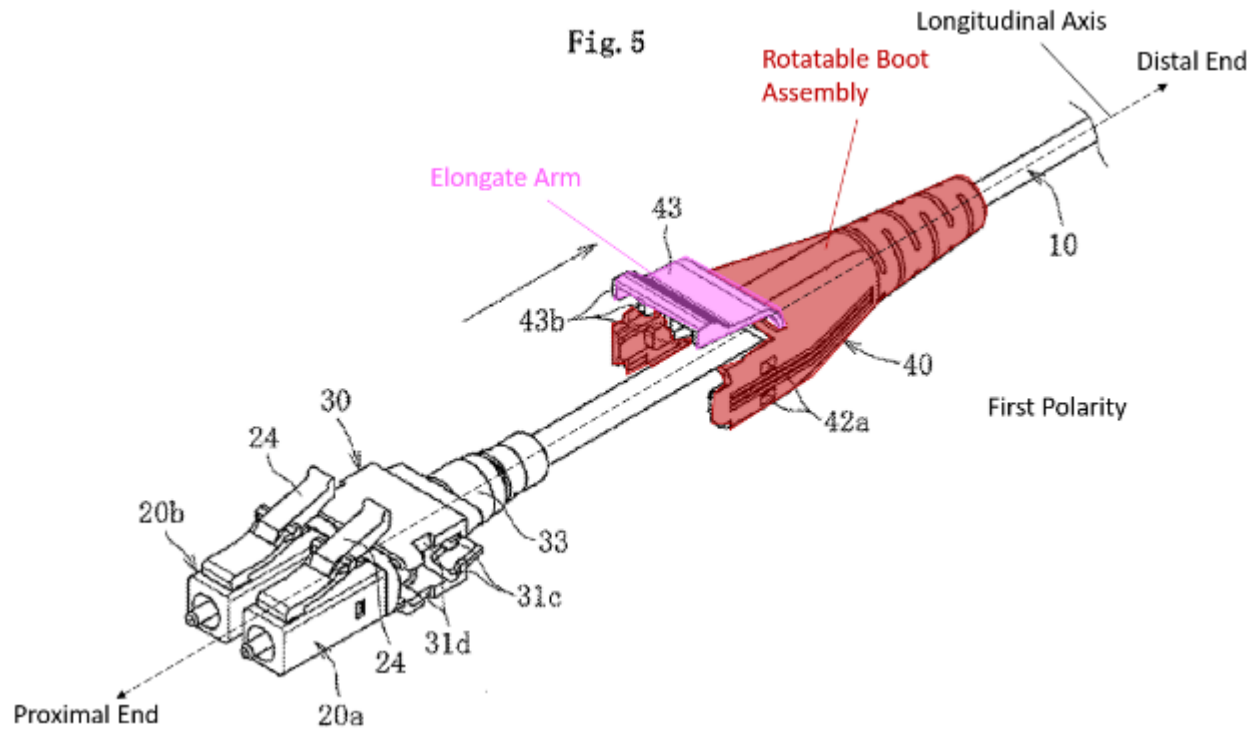


EX1008, FIG. 1 (annotated).

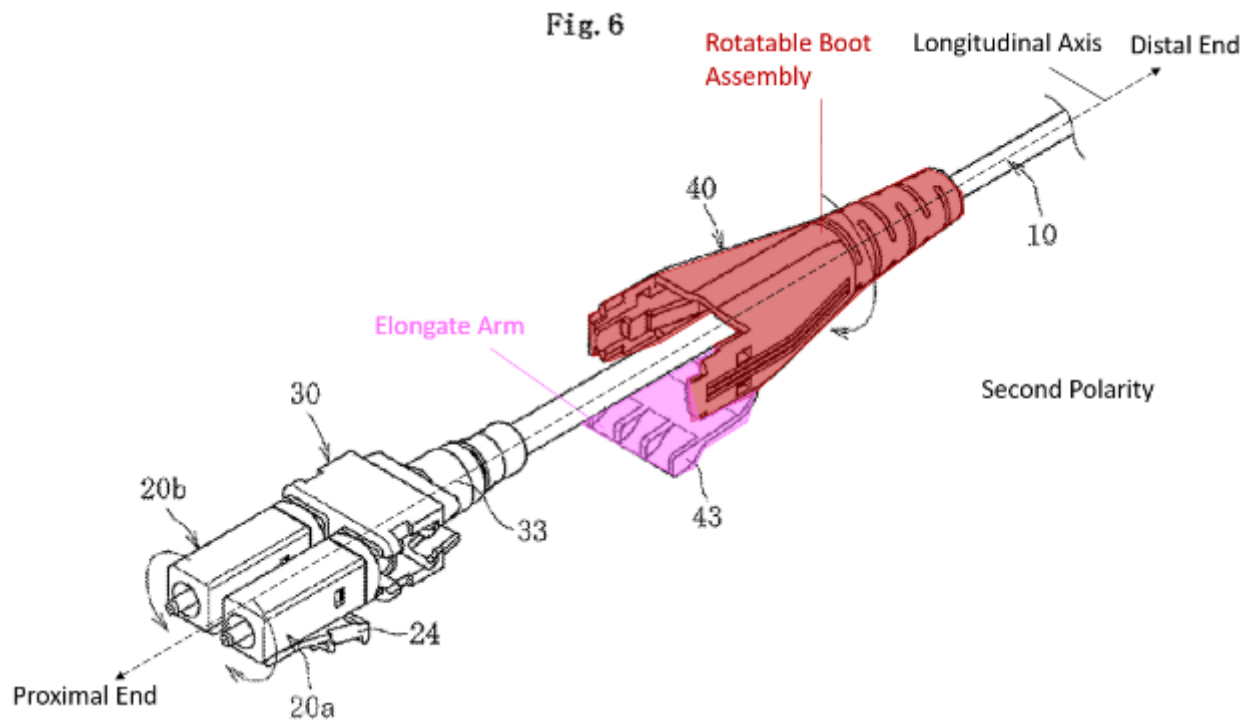
Accordingly, Nakagawa discloses claim 15. EX1016, ¶228.

P. Claim 16

Nakagawa's Figures 5 and 6 illustrate that upon rotation of the rotatable boot assembly from a first polarity position (FIG. 5) in which the elongate arm is radially spaced apart from the longitudinal axis in an upward direction, to a second polarity position (FIG. 6) in which the elongate arm is rotated to be radially spaced apart from the longitudinal axis in a downward direction.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

To the extent that the Patent Owner argues that Nakagawa's elongate arm is not positioned as specified in claim 16, Petitioner submits that a POSITA would have understood that Nakagawa renders claim 16 obvious in light of a general knowledge and common sense. EX1016, ¶¶229-234.

The Board can invoke common sense to a limitation that was missing from the prior art. Section VIII.C.8.

As Dr. Brennan explains, claim 16 specifies a very simple structure. Considering that claim 16 is dependent from claims 13 and 14, the structure specifies is simply that the elongate arm and the first and second ferrules are aligned. Thus, if the ferrules disclosed in Nakagawa-Raven are aligned vertically instead of horizontally, the recited structure is disclosed. Thus, the structure specified by claim [16.1] is unusually simple and straightforward. EX1016, ¶¶124-131, 230-231 (using Lee as corroborating evidence).

Finally, such a structure is also within the general knowledge of a POSITA. The difference between the connector structure shown in the Nakagawa-Raven and the one shown in the well-known technology is merely due to the difference in standards employed by the connectors. EX1016, ¶232. Thus, a POSITA who was exposed to one connector standard would inevitably have routinely recalled applying that connector structure to another connector standard. In other words, it is general knowledge to a POSITA familiar with other standards that the

horizontally aligned ferrule disclosed in Nakagawa and Raven could be modified to be vertically aligned. EX1016, ¶233.

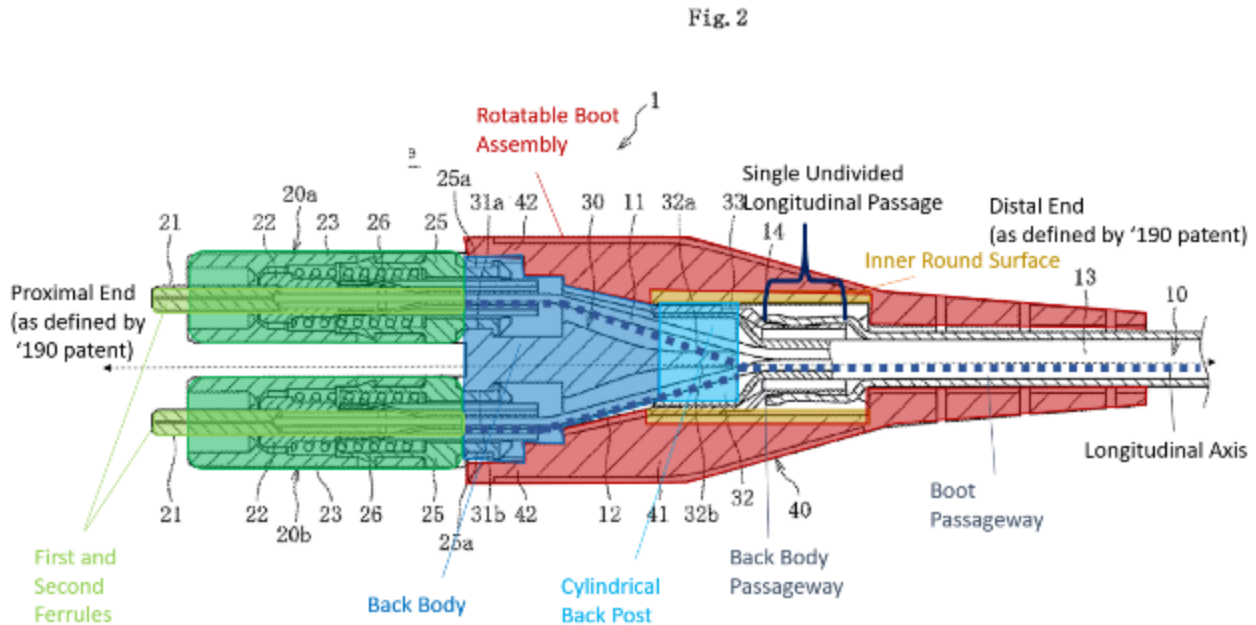
Thus, a POSITA would have understood that Nakagawa renders claim 16 obvious in light of a general knowledge and common sense. EX1016, ¶234.

Q. Claim 19

Nakagawa discloses that its back body passageway and boot passageway form a single, undivided longitudinal passage. Holder 30, corresponding to the recited back body, has caulking member 33, corresponding to the recited cylindrical back post, to form the back body passageway. EX1016, ¶¶235-236.

Nakagawa's Figure 2 shows caulking member 33 is inserted into boot 40 having the recited boot passageway. Thus, Figure 2 illustrates that the back body passageway and the boot passageway are integrated inside boot 40 to form a single, undivided longitudinal passage as annotated below. EX1016, ¶236. A POSITA would have further understood that Nakagawa's Figure 2 illustrates that the back body passageway and the boot passageway form a single, undivided longitudinal passage. For example, at the passage where back body passageway and the boot passageway overlap, at least a portion of the area enclosed by caulking member 33 forms a single, undivided longitudinal passage. EX1016, ¶237. A POSITA would have further understood that Nakagawa's Figure 2

illustrates that first and second fibers are passable from the cable to the first and second ferrules through the passage. EX1016, ¶238.



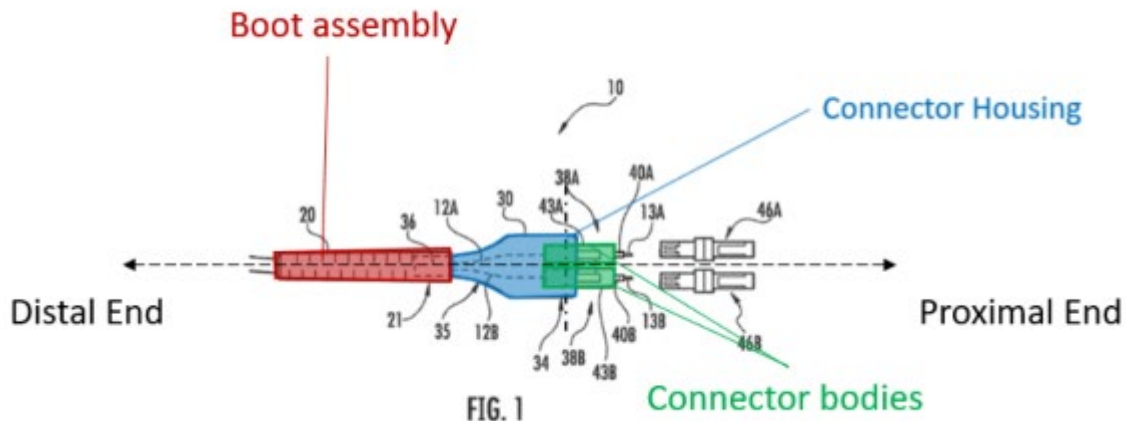
EX1007, FIG. 2 (excerpt, annotated).

Accordingly, Nakagawa discloses claim 19. EX1016, ¶239.

IX. GROUND 2: CLAIM 20 OF THE '190 PATENT IS OBVIOUS OVER NAKAGAWA IN VIEW OF RAVEN AND IN FURTHER VIEW OF CLINE.

A. Motivation to Combine

Cline teaches that connector housing 30 has a geometry tapering from the proximal end to the distal end. For example, Cline's Figure 1 illustrates that "housing middle portion 35 is tapered and gives connector housing 30 a generally tapered geometry." EX1006, 3:67-4:4; EX1016, ¶¶244-245.



EX1006, FIG. 1 (excerpt, annotated).

A POSITA would have been motivated to create a back body passageway structure with a tapering geometry as disclosed by Cline into the Nakagawa-Raven's back body to provide an improved wiring workability. EX1016, ¶¶240-243.

First, as well as Nakagawa and Raven, Cline is also in the same field of fiber optic connectors and is further directed to duplex fiber optic connectors with a back body connected with a front body and a boot. Therefore, these prior art references are all analogous prior art to the '190 patent. EX1016, ¶¶246-247.

Second, Nakagawa points out that one of drawbacks of a prior art is "poor wiring workability," and Cline discloses a configuration for improving the workability. EX1007, ¶5; EX1016, ¶248. A POSITA would have understood that replacing the rectangular shape of Nakagawa-Raven's back body and back body passageway with the tapered geometry and the cylindrical back body passageway

of connector housing 30 as disclosed by Cline would have been a standard design choice that may have enabled a higher density configuration with improved wiring workability. EX1007, ¶5; EX1016, ¶248.

B. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success in combining the teachings of Cline's taper-shaped connector housing with the Nakagawa-Raven's back body. EX1016, ¶249.

First, this modification involves the simple substitution of one known element (*i.e.*, the geometry of the back body of Nakagawa-Raven) for another (*i.e.*, the tapered geometry of connector housing 30 of Cline) to obtain predictable results. Therefore, a POSITA would have had a reasonable expectation of success. EX1016, ¶250.

Second, a POSITA would have known there are a finite number of ways to form back body structures of fiber optic connectors—*e.g.*, a back body can take on a rectangular shape as in the Nakagawa-Raven combination or a back body can take on a tapered shape as described in Cline. It would have been well known to a POSITA to swap one element of a housing structure for another with no detrimental impact on performance. EX1016, ¶¶251-253.

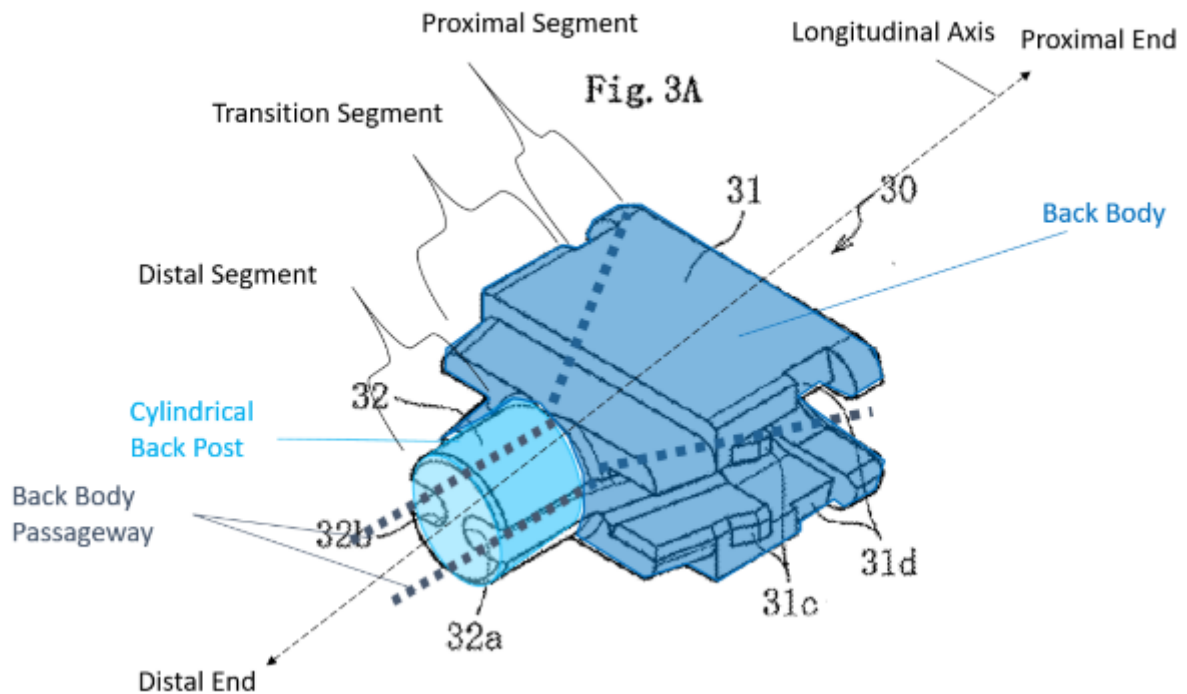
C. Claim 20

1. [20.1]

Nakagawa in view of Raven and in further view of Cline teaches [20.1].

(a) Nakagawa

Nakagawa's Figure 3A illustrates that holder 30, which encompasses a back body passageway and extends along the longitudinal axis, is comprised of three parts: a distal segment, a proximal segment, and a transition segment, as recited in claim 20. Accordingly, a POSITA would have understood that Nakagawa discloses [20.1]. EX1016, ¶¶254-256.

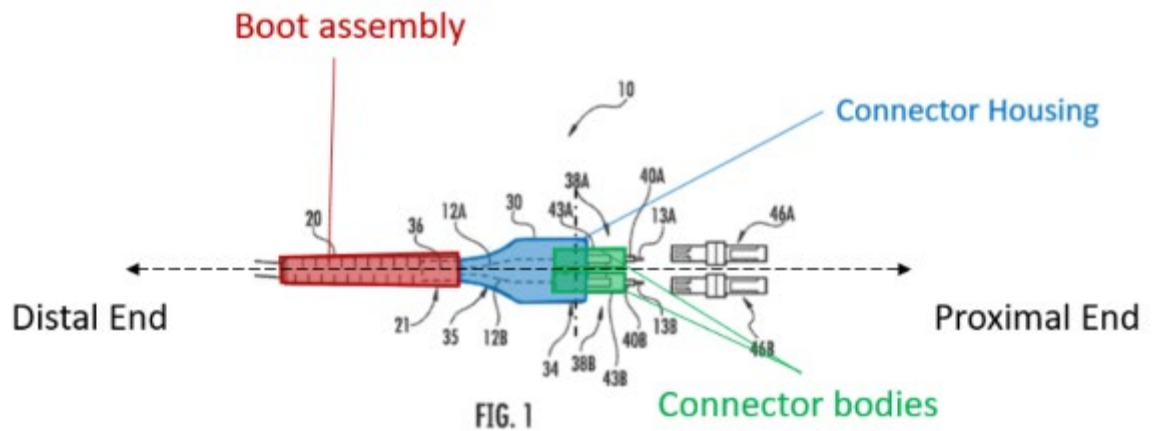


EX1007, FIG. 3A (annotated).

(b) Cline

To the extent that the Patent Owner argues that Nakagawa-Raven does not expressly disclose [20.1], a POSITA would have understood that Cline discloses this feature. EX1016, ¶257.

Cline discloses connector housing 30, encompasses a back body passageway and extends along the longitudinal axis, is comprised of “a housing connector-end portion 34 and a housing channel-end portion 36, with a housing middle portion 35 in between the connector-end and channel-end portions.” EX1006, 3:60-64. A POSITA would have understood that housing connector-end portion 34 corresponds to the recited proximal segment, housing channel-end portion 36 corresponds to the recited distal segment, and housing middle portion 35 corresponds to the recited transition segment. Accordingly, a POSITA would have understood that Cline discloses [20.1]. EX1016, ¶258.



EX1006, FIG. 1 (excerpt, annotated).

(c) Motivation To Combine

A POSITA would have understood that while Nakagawa back body and back body passageway with the rectangle geometry, it is clear that other back bodies with back body passageways may be readily substituted for different connector configurations, such as that of Cline. A POSITA would have been motivated to substitute the back body and back body passageway with tapered geometry of Cline into the optical connector of Nakagawa-Raven. The combination of Nakagawa-Raven and Cline, as described in Section IX.A-B, would render obvious claim [20.1]. EX1016, ¶259. Accordingly, Nakagawa-Raven-Cline discloses [20.1]. *Id.*

2. [20.2]

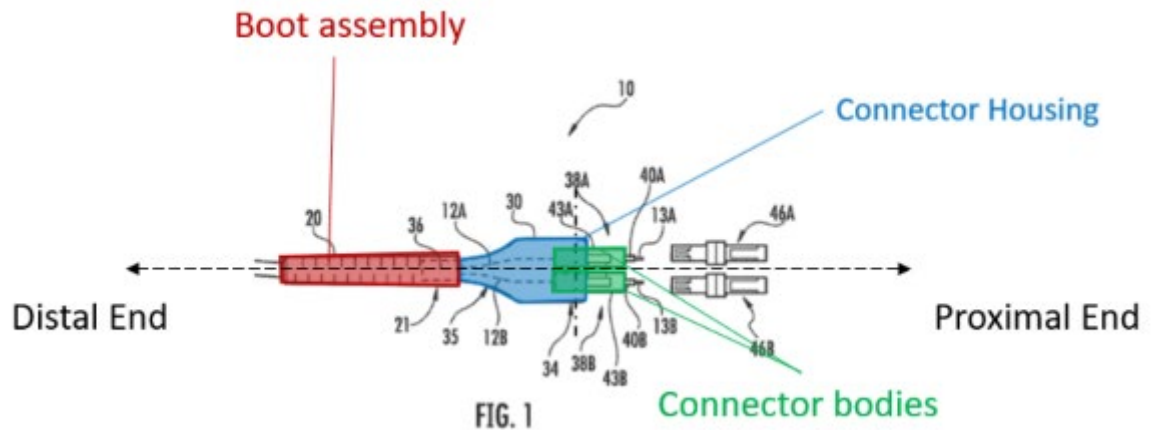
Nakagawa in view of Raven and in further view of Cline teaches [20.2]. EX1016, ¶260.

(a) Cline

To the extent that the Patent Owner argues that the Nakagawa-Raven does not expressly disclose [20.2], a POSITA would have understood that Cline discloses this feature. EX1016, ¶261.

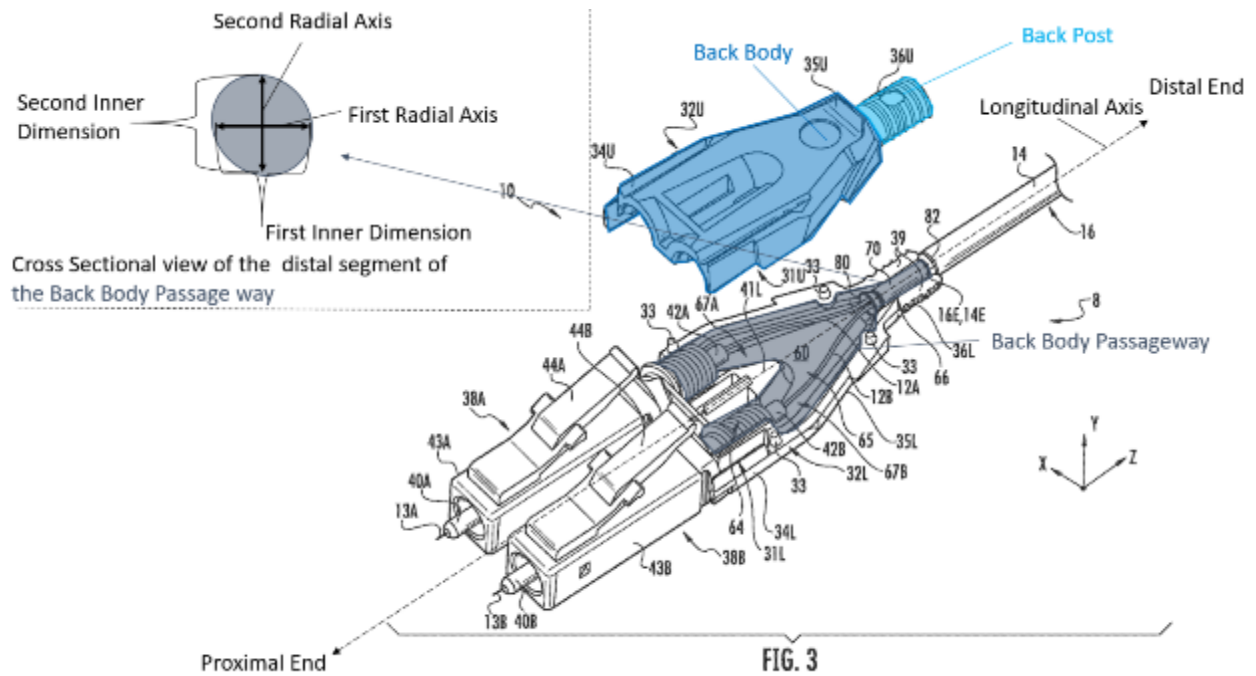
Cline teaches the “connector 10 includes a connector housing 30.” EX1006, 3:40-42. Cline’s Figure 1 illustrates that boot 20 “engages a channel-end portion 36 of connector housing 30.” EX1006, 3:42-45. The connector housing also supports

“two fiber optic connector sub-assemblies (‘connector sub-assemblies’) 38A, 38B.” EX1006, 4:29-32; EX1016, ¶262.

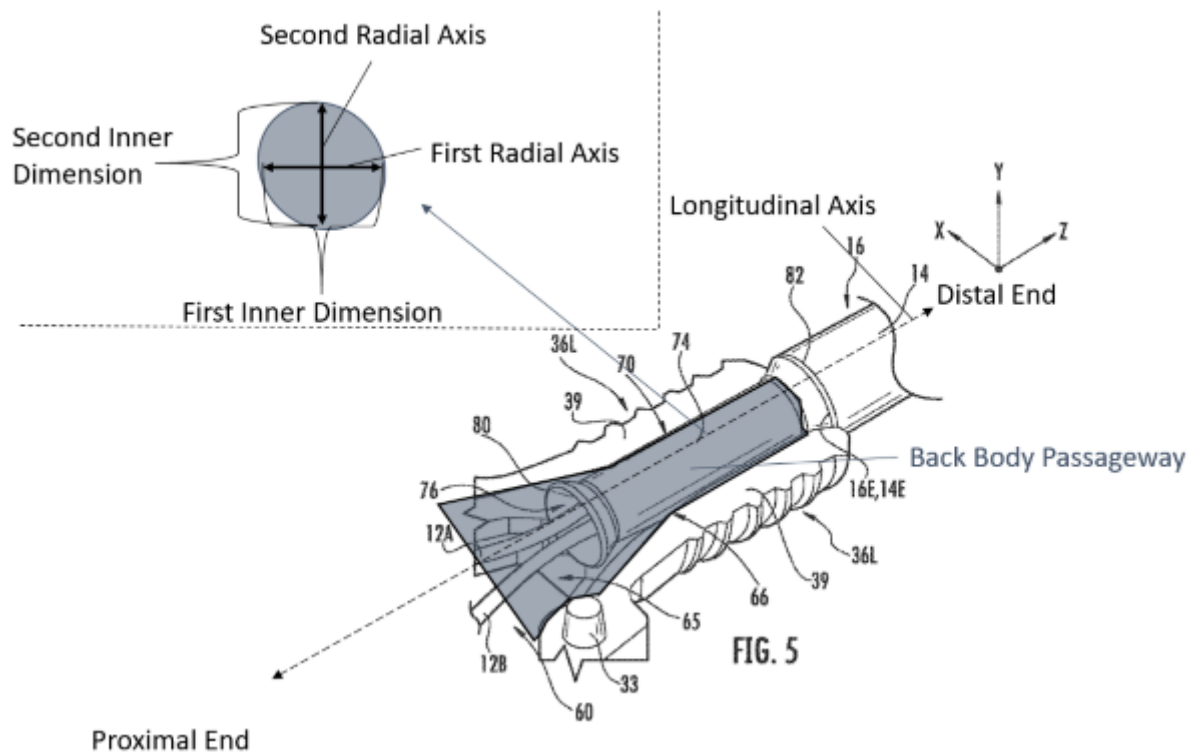


EX1006, FIG 1 (excerpt, annotated).

Cline’s Figures 3 and 5 illustrates that a distal end of connector housing 30 in Figure 3 (also shown as a channel-end portion 36 in FIG. 5) has a substantially cylindrical back body passageway to accommodate a cable. Cline explains that “respective channel-end portions 36U, 36L” are configured to mate and form “channel-end portion 36.” EX1006, 3:48-64. Cline’s Figure 3 illustrates that channel end portion 36 has a cylindrical shape and forms a passageway for accommodating cable 16. EX1006, 4:45-52; EX1016, ¶262.



EX1006, FIG. 3 (annotated).



EX1006, FIG. 5 (annotated).

A POSITA would have understood that the distal end of the back body passageway of Cline had a cross-sectional view as annotated in the upper left corner of Figure 3 above. As depicted in the cross-sectional view, the back body passageway has a first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis. EX1016, ¶263.

(b) Motivation To Combine

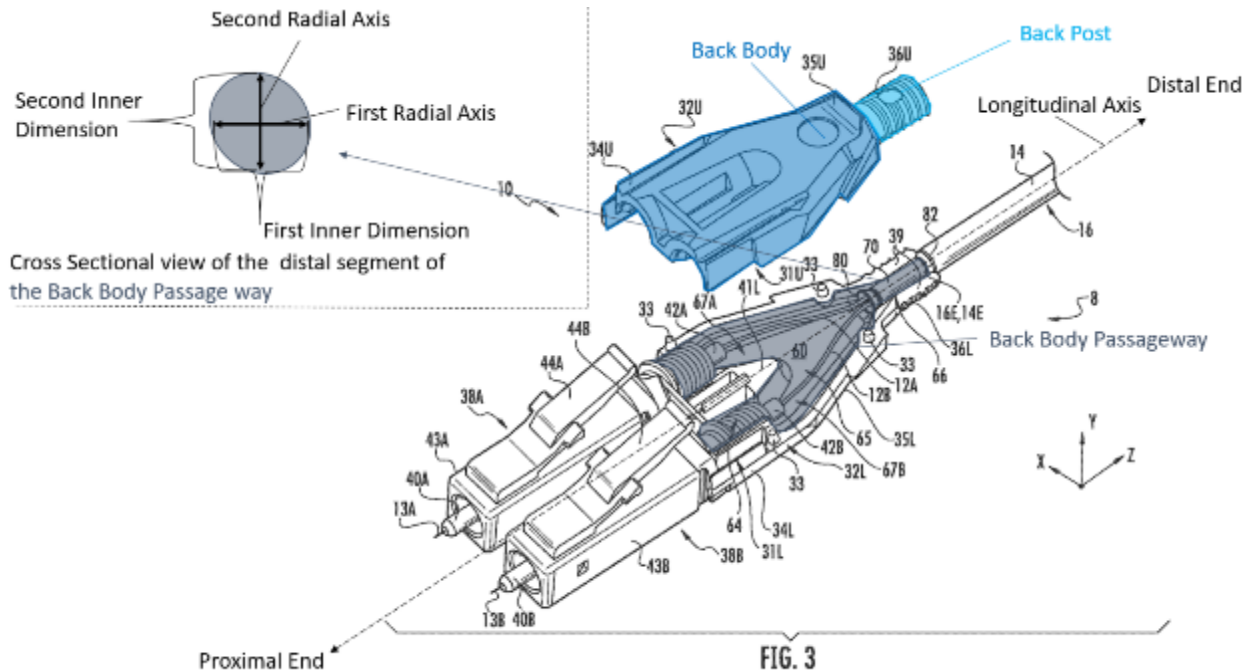
A POSITA would have been motivated to combine Nakagawa-Raven and Cline. Section IX.A-B; EX1016, ¶264. Accordingly, Nakagawa-Raven-Cline disclose [20.2]. EX1016, ¶264.

3. [20.3]

Nakagawa in view of Raven and in further view of Cline teaches [20.3].

(a) Cline

Cline's Figure 3 illustrates a back body passageway that is substantially circular along the distal segment such that the first inner dimension is about the same as the second inner dimension. EX1016, ¶265.



EX1006, FIG. 3 (annotated).

(b) Motivation to Combine

A POSITA would have been motivated to substitute the back body and back body passageway with tapered geometry of Cline into the optical connector of Nakagawa-Raven. Section IX.A-B; EX1016, ¶¶266-267. Accordingly, Nakagawa-Raven-Cline disclose [20.3].

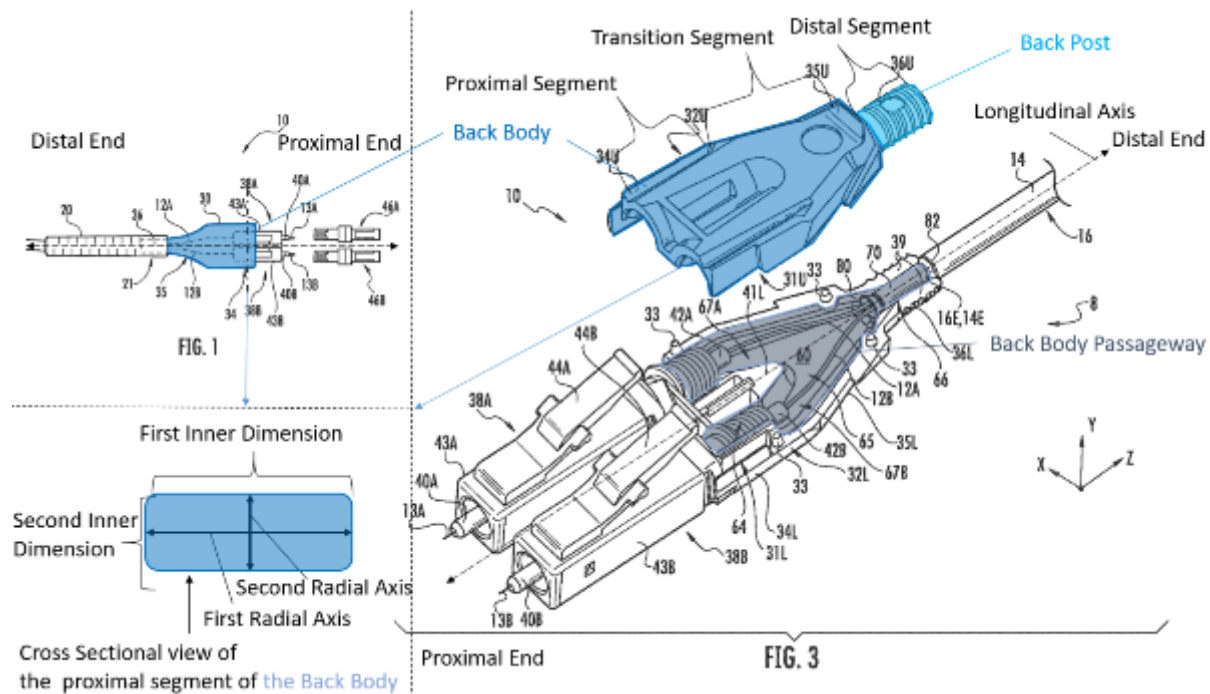
4. [20.4]

Nakagawa in view of Raven and in further view of Cline teaches [20.4].

(a) Cline

To the extent that the Patent Owner argues that Nakagawa-Raven does not expressly disclose [20.4]. Cline discloses this feature. EX1016, ¶¶268-269.

Cline discloses that connector housing 30 has “a housing connector-end portion 34 and a housing channel-end portion 36, with a housing middle portion 35” and “housing middle portion 35 is tapered and gives connector housing 30 a generally tapered geometry that is narrower toward housing channel-end portion 36 and wider toward housing connector-end portion 34.” EX1006, 3:60-4:4; EX1016, ¶270. Here, a POSITA would have understood that housing connector-end portion 34 corresponds to the recited proximal segment as illustrated in Cline’s Figure 3. As a result of this tapering, and as illustrated in Figure 3, Cline teaches that its proximal segment, connector-end portion 34, has an elongated cross-sectional shape. EX1006, 3:60-4:4; EX1016, ¶270.



EX1006, FIG. 3 (annotated).

A POSITA would have understood that the proximal end of the back body of the Cline had a cross-sectional view as annotated in the lower left corner of Figure 3 above. According to the cross-sectional view, the back body has a cross-sectional shape that is elongate along the first radial axis such that the first inner dimension is greater than the second inner dimension. EX1016, ¶271.

(b) Motivation To Combine

A POSITA would have been motivated to combine Nakagawa-Raven and Cline. Section IX.A-B; EX1016, ¶272. Accordingly, Nakagawa-Raven-Cline disclose [20.4].

5. [20.5]

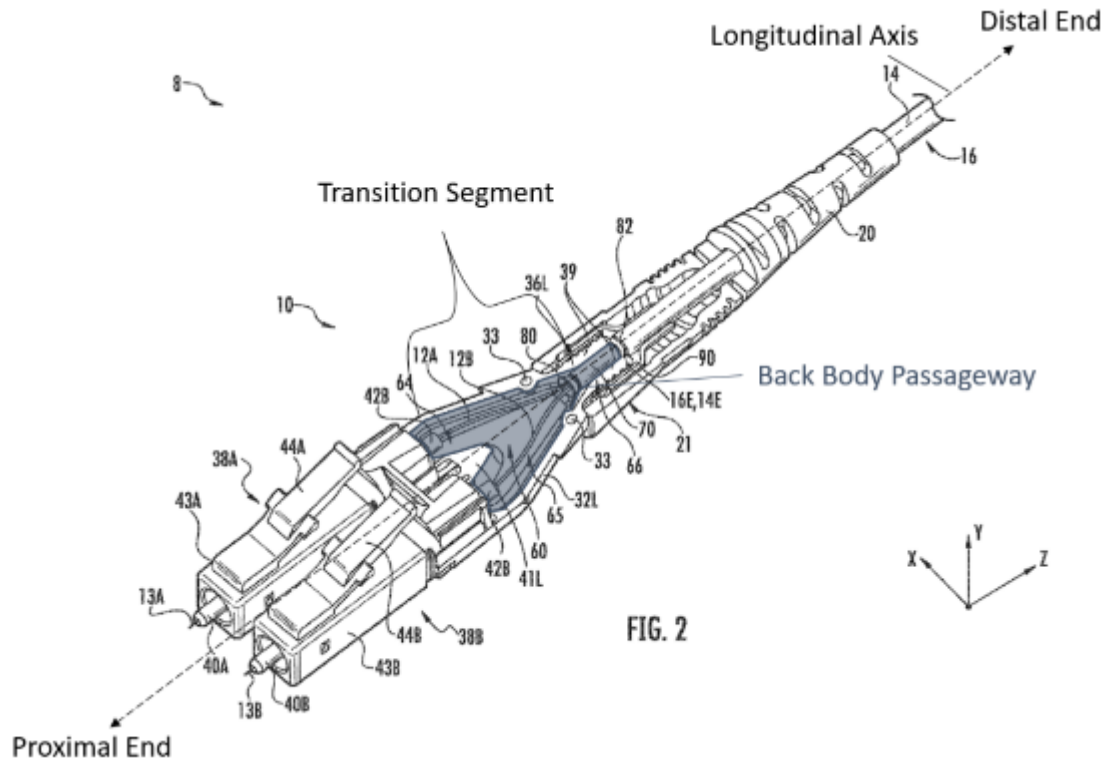
Nakagawa in view of Raven and in further view of Cline teaches [20.5].

(a) Cline

To the extent that the Patent Owner argues that Nakagawa-Raven does not expressly disclose [20.5], a POSITA would have understood that Cline discloses this feature. EX1016, ¶¶273-275.

Cline's Figure 2 illustrates that housing middle portion 35 corresponding to the recited transition segment has the back body passageway that extends in the proximal direction along the longitudinal axis, wherein the first inner dimension

increases by a greater amount than the second inner dimension. EX1016, ¶276.



EX1006, FIG. 2 (annotated).

(b) Motivation To Combine

A POSITA would have been motivated to combine Nakagawa-Raven and Cline. Section IX.A-B; EX1016, ¶277. Accordingly, Nakagawa-Raven-Cline disclose [20.5]. EX1016, ¶278.

X. GROUND 3: CLAIMS 1-3, 6-11, 13-16 AND 19 OF THE '190 PATENT ARE OBVIOUS OVER VEATCH IN VIEW OF CONNELLY.

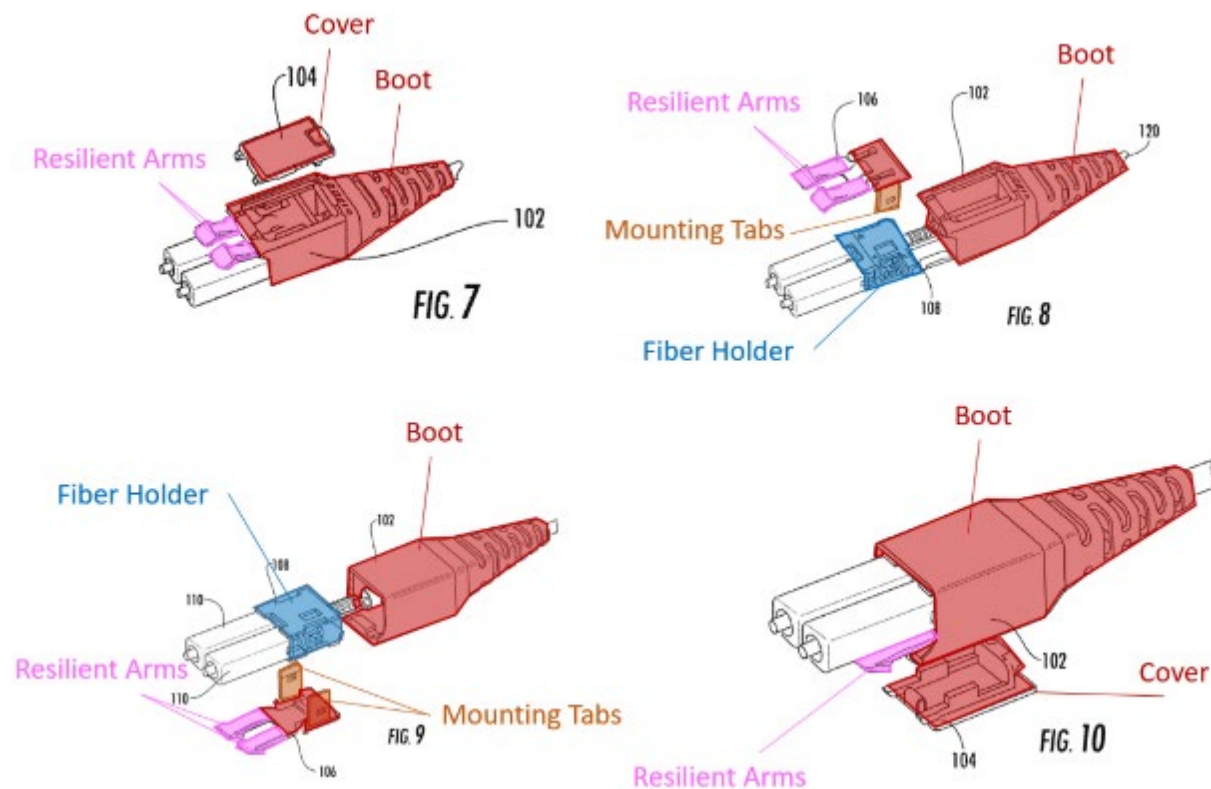
A. Motivation to Combine

A POSITA would have found it 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. EX1016, ¶279.

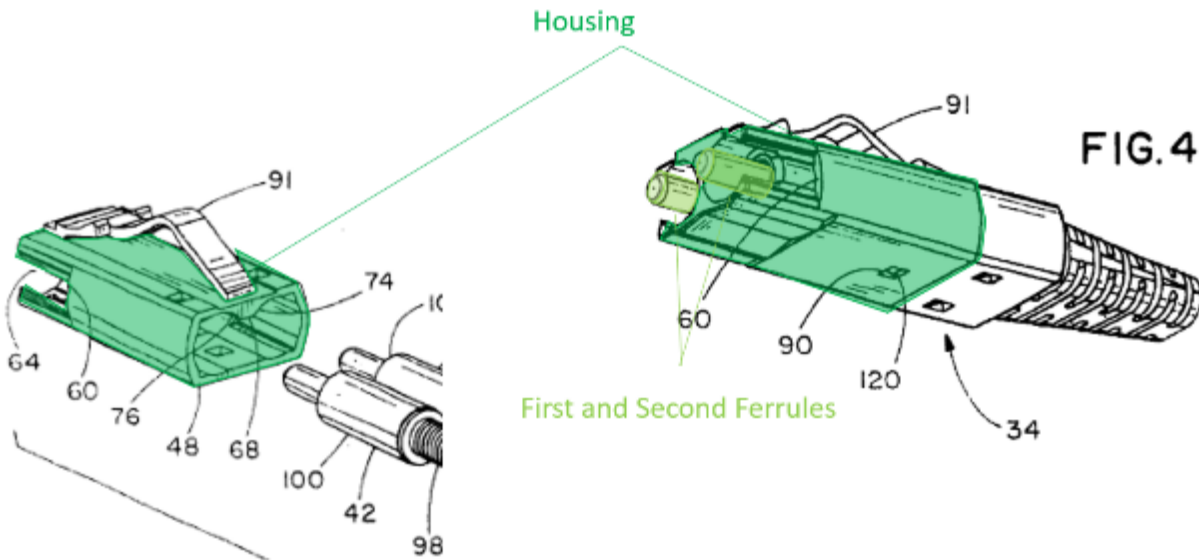
First, Veatch and Connelly are directed to duplex fiber optic connectors with a latch for easy removal from a receptacle such as an adapter or transceiver. Therefore, these prior art references are analogous prior art to the '190 patent. EX1016, ¶¶280-285.

Second, Veatch emphasizes that fiber holder 108 is not rotated or repositioned and further that connector bodies 110 are not removed from fiber holder 108 during a polarity change to avoid applying a torsional stress on the fibers undergoing a polarity change. EX1004, 1:19-28, 3:20-32; EX1016, ¶286.



EX1004, FIGs. 7-10 (annotated).

A POSITA would have understood that by substituting unitary housing 38 disclosed by Connelly for 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. EX1005, FIGs. 1-5; EX1016, ¶286.



EX1005, FIGs. 4 and 5 (annotated).

Third, the prior art references themselves provide motivation to substitute Connelly's housing 38 for Veatch's collective housing comprised of three separate components (two connector bodies 110 and fiber holder 108) that would have led a POSITA to modify Veatch to arrive at a unitary housing structure. Veatch seeks to

“enable higher density placement of mating adapters.” EX1004, 6:56-59; EX1016, ¶286. A POSITA would have understood that replacing Veatch’s housing configuration comprising two separate connector bodies 110 formed alongside—and spaced apart—one another with a single, unitary housing structure such as that taught by Connelly would have enabled a higher density configuration. EX1016, ¶286.

Further, a POSITA would have recognized that substituting Connelly’s unitary housing 38 for Veatch’s fiber holder 108 and connector bodies 110 arrangement while maintaining the latching features in the fiber optic connector of Veatch would have helped to ensure the ferrules are not rotated when changing the polarity of the fiber optic connector. EX1016, ¶287.

B. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success in combining the teachings of Connelly’s unitary housing with Veatch’s connector. EX1016, ¶288.

First, this modification is the simple substitution of one known element (fiber holder 108 and two connector bodies 110) for another (a duplex fiber optic housing comprising unitary housing 38 of Connelly) to obtain predictable results. EX1016, ¶289.

Second, this modification would have been obvious for a POSITA to try because it involves choosing from a finite number of identified predictable solutions with a reasonable expectation of success. EX1016, ¶¶290. As Dr. Brennan explains, a POSITA in this field would have known, there is a finite number of ways to form housing structures of fiber optic connectors—*i.e.*, a connector can include separate housing components for each of the optical fibers and then provide a structure to connect those separate housing components (as in Veatch) or a connector can include a unitary housing structure that holds both optical fibers. EX1016, ¶¶290-292.

C. Claim 1

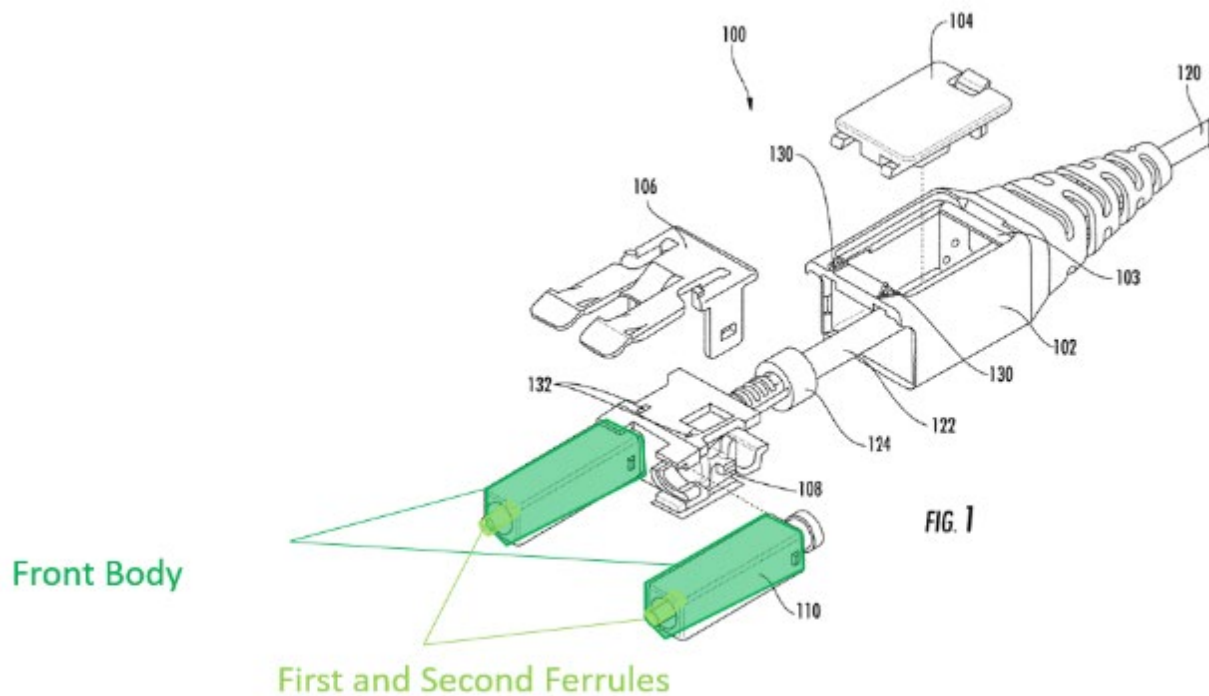
1. Preamble

Veatch discloses an optical fiber connector as required by claim 1. Veatch discloses that the “[e]mbodiments of the invention provide a push-pull LC duplex fiber connector that allows the connector to be more easily unlatched from its mating adapter when compared with a traditional LC connector.” EX1004, 2:6-9. Additionally, not needed for this feature but for future context, Connelly discloses a duplex fiber optic connector with a single connector housing 38. EX1005, 2:27-59; FIGs. 1-5; EX1016, ¶¶293-294.

2. [1.1]

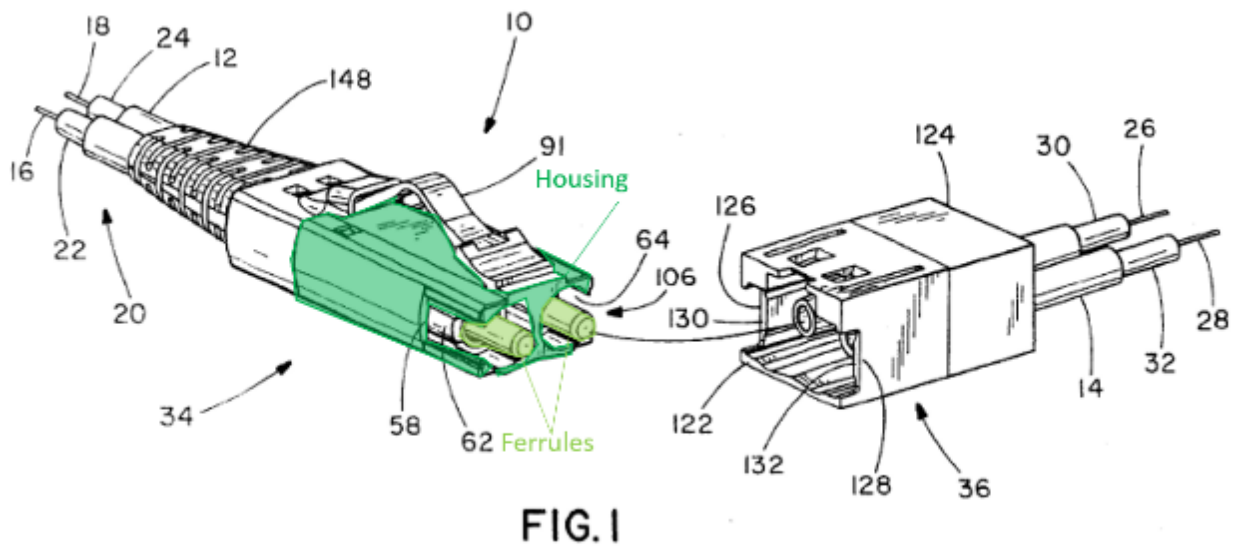
(a) Veatch

Veatch's Figure 1 illustrates that connector bodies 110 correspond to the recited front body, and the connector bodies have at least one of the recited ferrules. EX1016, ¶¶295-297.



EX1004, FIG. 1 (annotated).

To the extent that the Patent Owner argues that Veatch does not expressly disclose [1.1], Connelly discloses this feature. EX1016, ¶297.

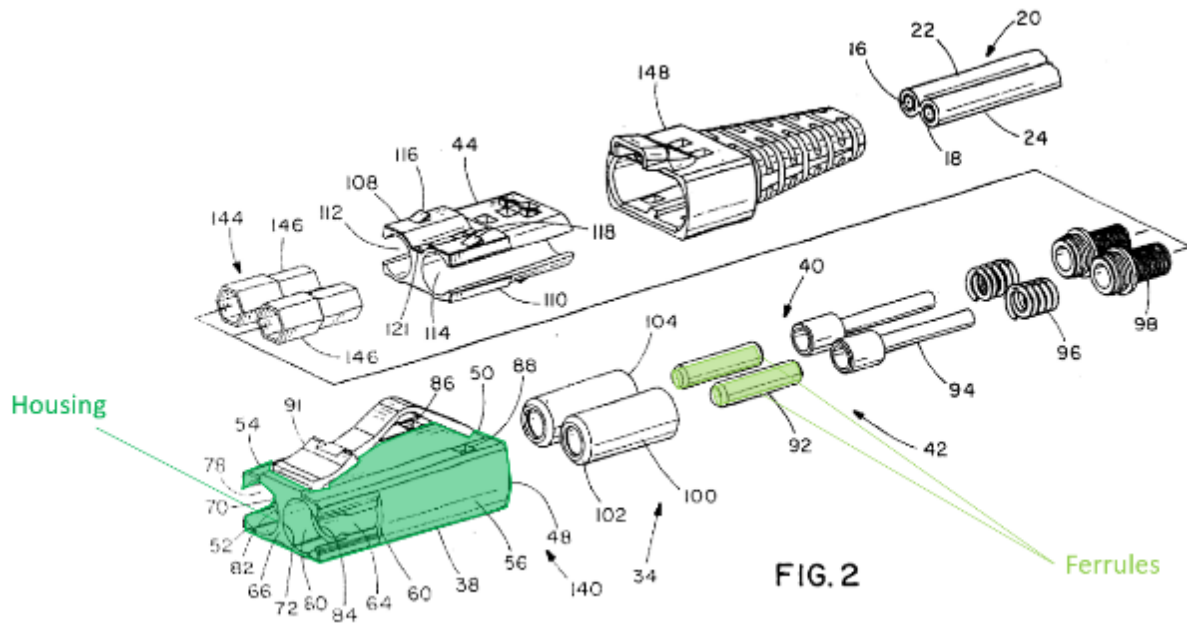


EX1005, FIG. 1 (annotated).

(b) Connelly

Connelly discloses fiber optic plug 34 with a housing that houses two ferrules. EX1005, FIG. 1; EX1016, ¶298.

Connelly teaches that its housing 38 “includes a substantially planar top wall 50, a substantially planar bottom wall 52, and substantially arcuate side walls 54, 56.” EX1005, 2:25-37. Connelly’s Figure 2 illustrates that the connector housing 38 houses two fiber optic ferrules 92. EX1005, 2:27-3:13; EX1016, ¶299.



EX1005, FIG. 2 (annotated).

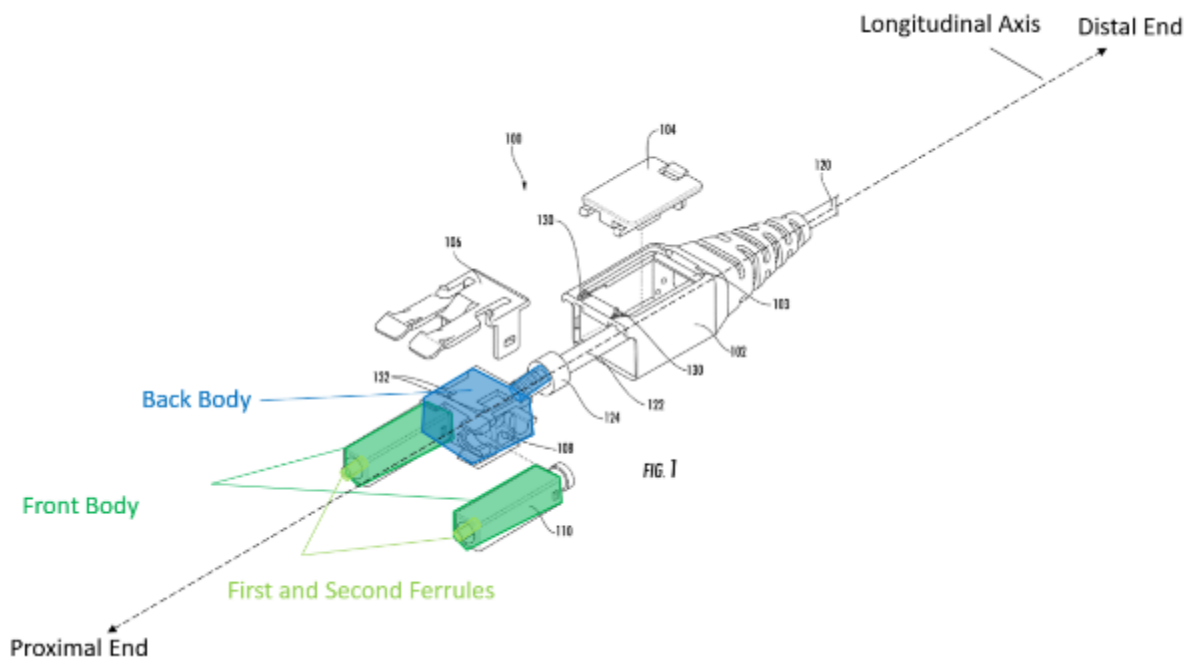
(c) Motivation To Combine

Accordingly, a POSITA would have understood that while Veatch presents an optical connector that comprises front bodies to each hold a ferrule, it is clear that other front bodies may be readily substituted for different connector-adaptor configurations, such as that of Connelly. Connelly explicitly discloses a single front body that holds two ferrules and may be used in place of the front bodies of Veatch. Therefore, a POSITA would have been motivated to substitute housing 38 of Connelly into the optical connector of Veatch, which would have resulted in a connector maintaining the functionality of Veatch that comprises a single front body that holds two ferrules. Therefore, the combination of Veatch and Connelly,

as described in Section X.A-B, would also render obvious claim [1.1]. EX1016, ¶300.

3. [1.2]

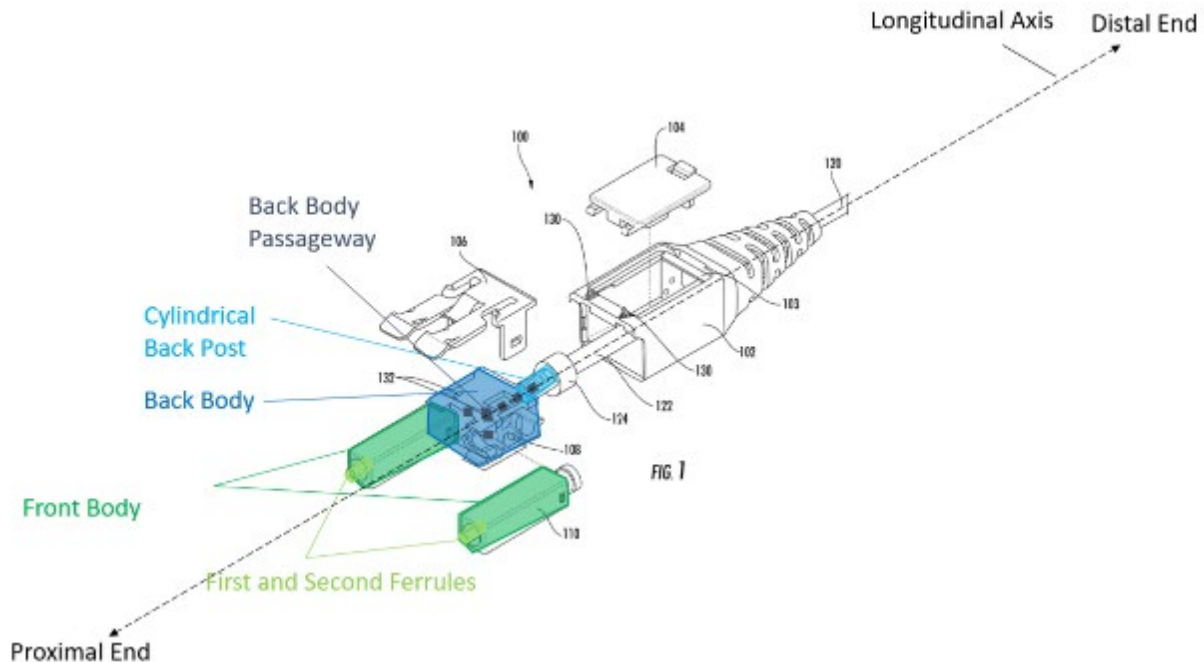
Veatch's Figure 1 illustrates a fiber holder 108 having a proximal end portion and a distal end portion. EX1004, 2:14-25. Veatch's Figure 1 also shows that the proximal end portion of fiber holder 108 couples to connector body 110. A POSITA would have understood that the holder of Veatch corresponds to the claimed back body. EX1016, ¶301.



EX1005, FIG. 1 (annotated).

Veatch's Figure 1 also illustrates that fiber holder 108 has a cylindrical back post on its distal end. A POSITA would have understood that the cylindrical back post has an outer round surface extending along the longitudinal axis. EX1005,

¶302. A POSITA further would have understood that since fiber holder 108, as the name implies, houses the optical fiber, there should naturally be a passageway for the optical fiber to pass through it. EX1005, ¶¶303-304.

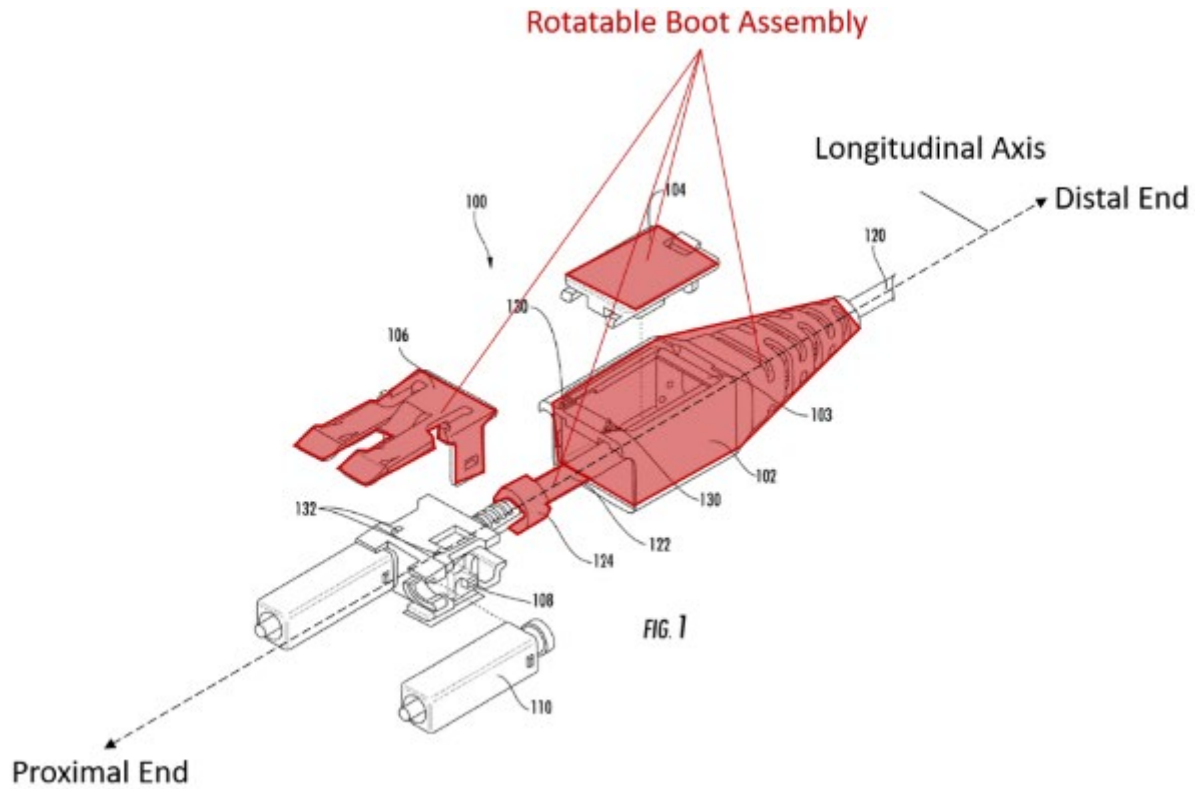


EX1005, FIG. 1 (annotated).

Accordingly, Veatch discloses [1.2]. EX1016, ¶305.

4. [1.3.1]

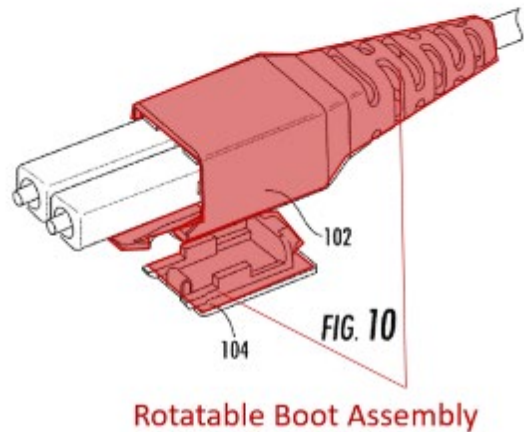
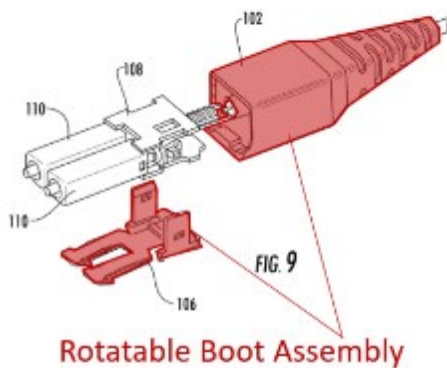
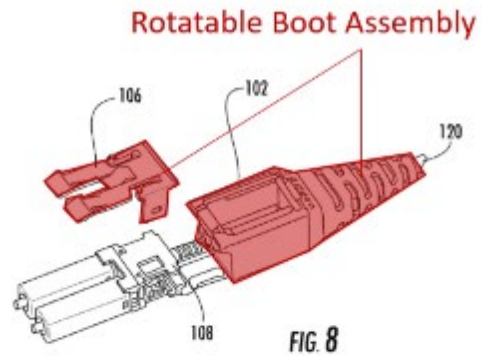
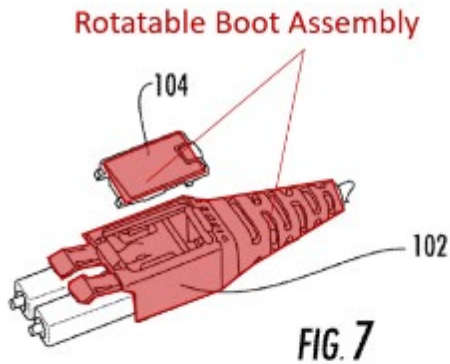
Veatch's Figure 1 discloses an assembly having "a boot 102, cover 104, latch 106," "[h]eat shrink material 122," and "crimp ring 124." EX1004, 2:14-25; EX1016, ¶306. A POSITA should have understood that the components listed above of Veatch are assembled to form the boot assembly. EX1016, ¶307. Further, Veatch's Figure 1 illustrates that the distal end and proximal end of the rotatable boot assembly are being spaced apart along the longitudinal axis.



EX1004, FIG. 1 (annotated).

Veatch teaches that its boot 102 is rotatable. Veatch's Figures 7-10 illustrate that "boot 102[,] is rotated 180 degrees" for "changing the connector polarity."

EX1004, 3:17-20. EX1016, ¶308.



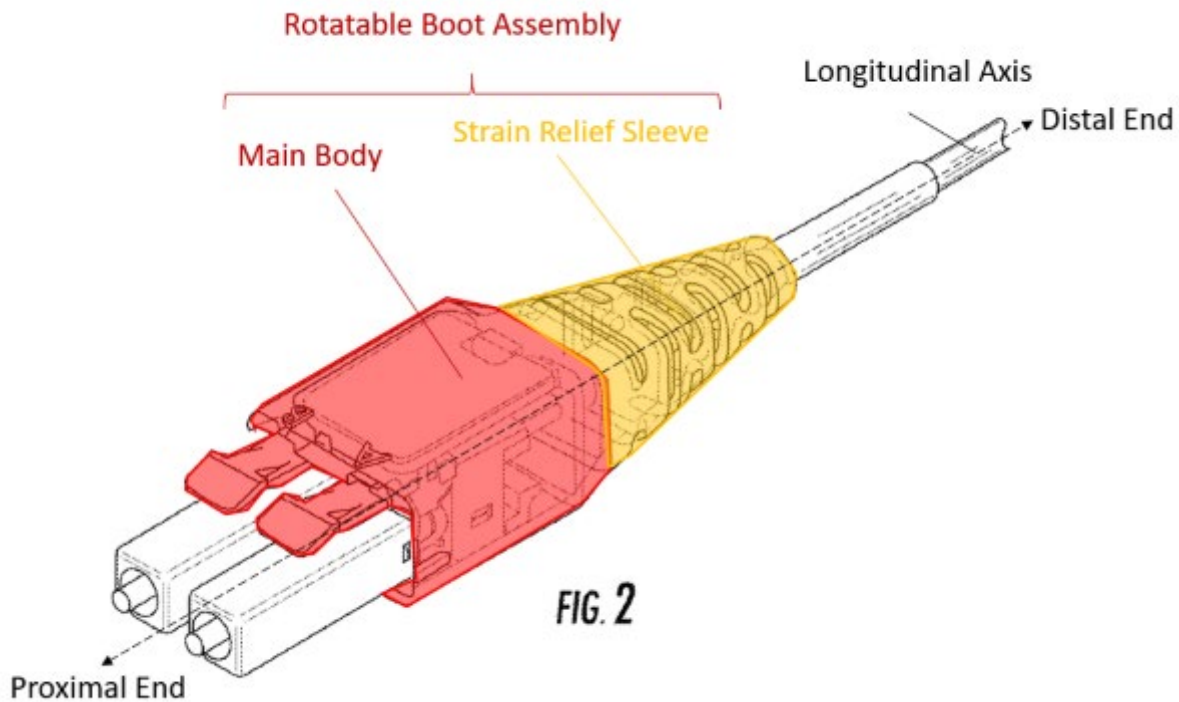
EX1004, FIGs. 7-10 (annotated).

Accordingly, Veatch discloses [1.3.1]. EX1016, ¶309.

5. [1.3.2]

Veatch's Figure 2 illustrates its boot comprises a sleeve. EX1016, ¶311. A POSITA would have understood that the sleeve has multiple slits to relieve strain. Veatch's Figure 2 illustrates that the sleeve extends longitudinally from the boot to the distal end of the boot. Here, a POSITA would also have understood that the boot, excluding the strain relief sleeve, corresponds to the claimed main body, at

least because the claim language of the '190 patent defines the rotatable boot assembly comprising a main body and a strain relief sleeve. Thus, a POSITA would have understood that the sleeve shown in Veatch's Figure 2 corresponds to the claimed strain relief sleeve. EX1016, ¶311.



EX1004, FIG. 2 (annotated).

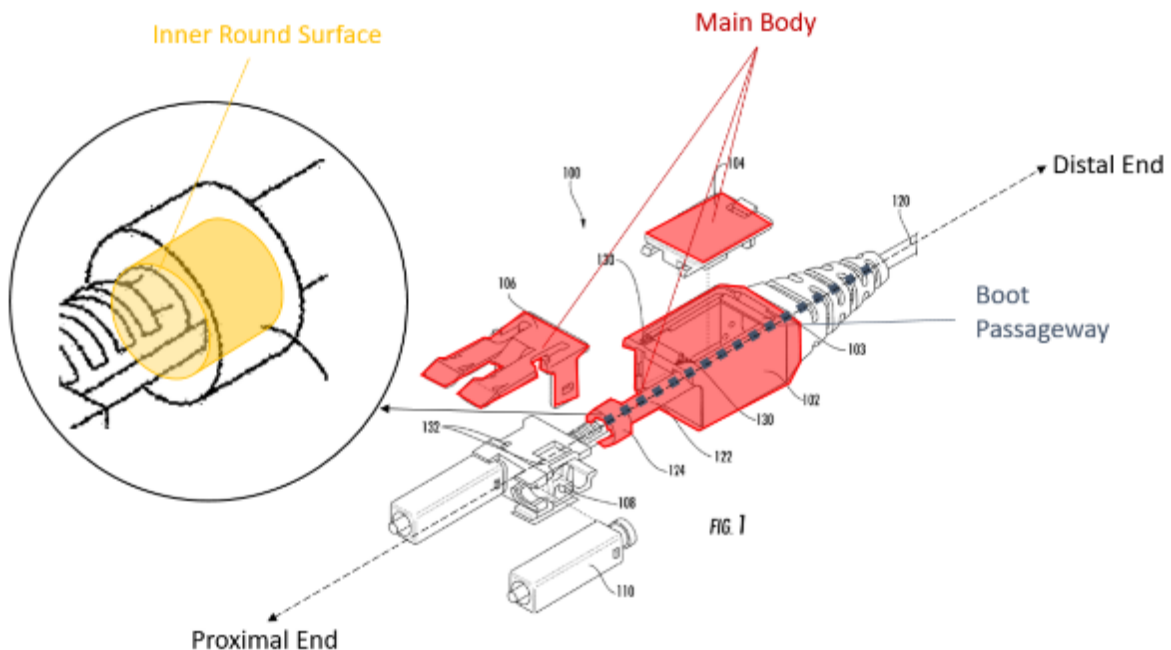
Accordingly, Veatch discloses [1.3.2]. EX1016, ¶¶310, 312.

6. [1.3.3]

Veatch teaches, “[a] cable 120 runs through boot 102 and includes two optical fibers.” EX1004, 2:9-20. A POSITA would have understood that the boot has a boot passageway to allow the cable to run through the boot as annotated in

Veatch's Figure 1. In addition, the boot passageway extends from the distal end portion through the main body. EX1016, ¶313.

Veatch also teaches that boot 102 accommodates "a crimp ring 124" inside the boot 102. EX1004, 2:20-22. A POSITA would have understood that crimp ring 124 has an inner round surface inside the crimp ring, as shown in Veatch's Figure 1. In addition, this inner round surface defines the proximal end portion of the boot passageway. Thus, a POSITA would have understood that the inner round surface of the boot shown in Veatch's Figure 1 corresponds to the recited inner round surface. EX1016, ¶314.



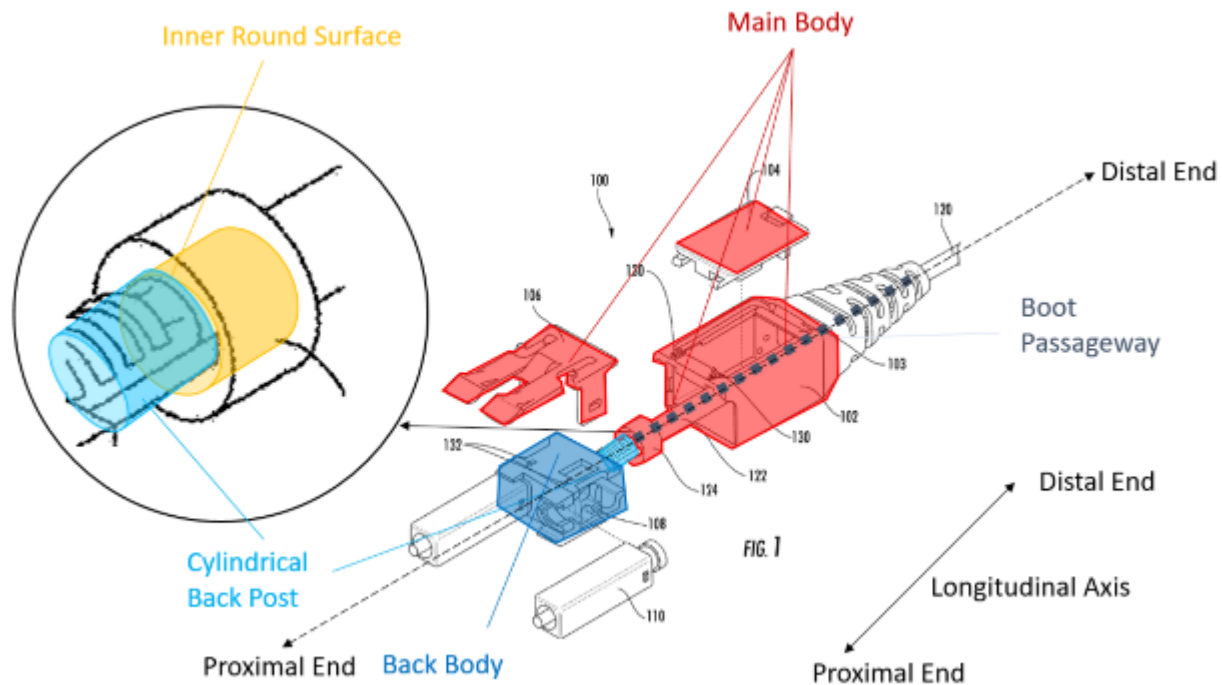
EX1004, FIG. 1 (annotated).

Accordingly, Veatch discloses [1.3.3]. EX1016, ¶315.

7. [1.3.4]

The meaning of the recited “back post” is explained in Section VII.C.7.

Veatch’s Figure 1 illustrates that the outer round surface of the back post is matingly received in the inner round surface of the main body. EX1016, ¶316.



EX1004, FIG. 1 (annotated).

Accordingly, Veatch discloses [1.3.4]. EX1016, ¶317.

8. [1.3.5]

The meaning of the recited “cable boot member” is explained in Section VII.C.8. Veatch teaches how the connector is released from the adapter. Veatch describes that to release the connector, “boot 102 slides relative to fiber holder 108 to provide the push-pull activation of latch 106.” EX1004, 2:64-66, 3:2-5. A

POSITA would have understood that a direction of the relative sliding motion is along the longitudinal axis. As boot 102 is pulled away from the ferrules, nub 146 on cover 104 “to ride on the ridge 150” of latch 106, which causes latch arms 152 to depress, which in turn causes latch 106 to detach from an adapter (*e.g.*, an LC adapter). EX1004, 3:2-6; EX1016, ¶318.

Accordingly, Veatch discloses [1.3.5]. EX1016, ¶319.

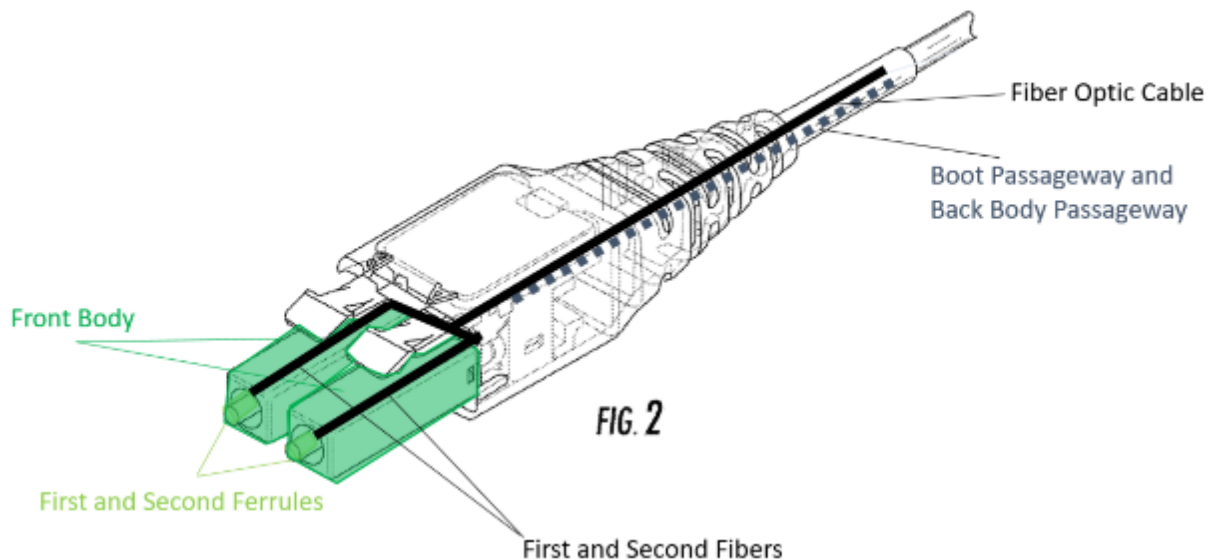
9. [1.3.6]

Veatch discloses, “[a] cable 120 runs through boot 102” and its “[c]onnector bodies 110 terminate the two optical fibers in cable 120.” EX1004, 2:14-25. A POSITA would have understood that cable 120 has a jacket and the jacket is received in the strain relief sleeve in the boot passageway, at least because the connector could not otherwise accommodate an optical fiber. EX1016, ¶320. In particular, the optical fiber connector being configured such that “a jacket of the cable is received in the strain relief sleeve in the boot passageway” would be obvious to a POSITA as the optical fiber itself is very fragile and great care is required to mechanically protect the fiber within an optical connector. A POSITA thus would have understood that “a jacket of the cable being received in the strain relief sleeve in the boot passageway” is a necessary and common means of protection of the optical fiber against mechanical trauma. EX1016, ¶321.

Accordingly, Veatch discloses [1.3.6]. EX1016, ¶322.

10. [1.3.7]

Veatch states “cable 120 runs through boot 102” and includes “[c]onnector bodies 110 [that] terminate the two optical fibers in cable 120.” EX1004, 2:19-23. Therefore, a POSITA would have also understood that the signal paths of the fibers are completed to the first and second ferrules within the front body. Veatch’s Figure 2 shows how cable 120 passes through the connector. EX1016, ¶323.



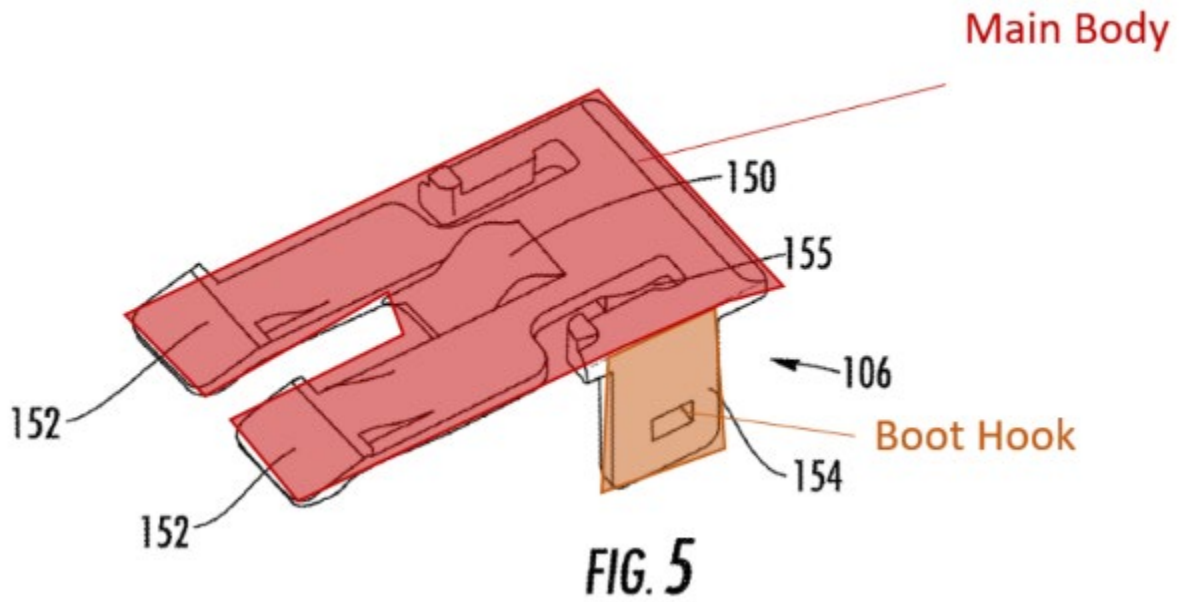
EX1004, FIG. 2 (annotated).

Accordingly, Veatch discloses [1.3.7]. EX1016, ¶324.

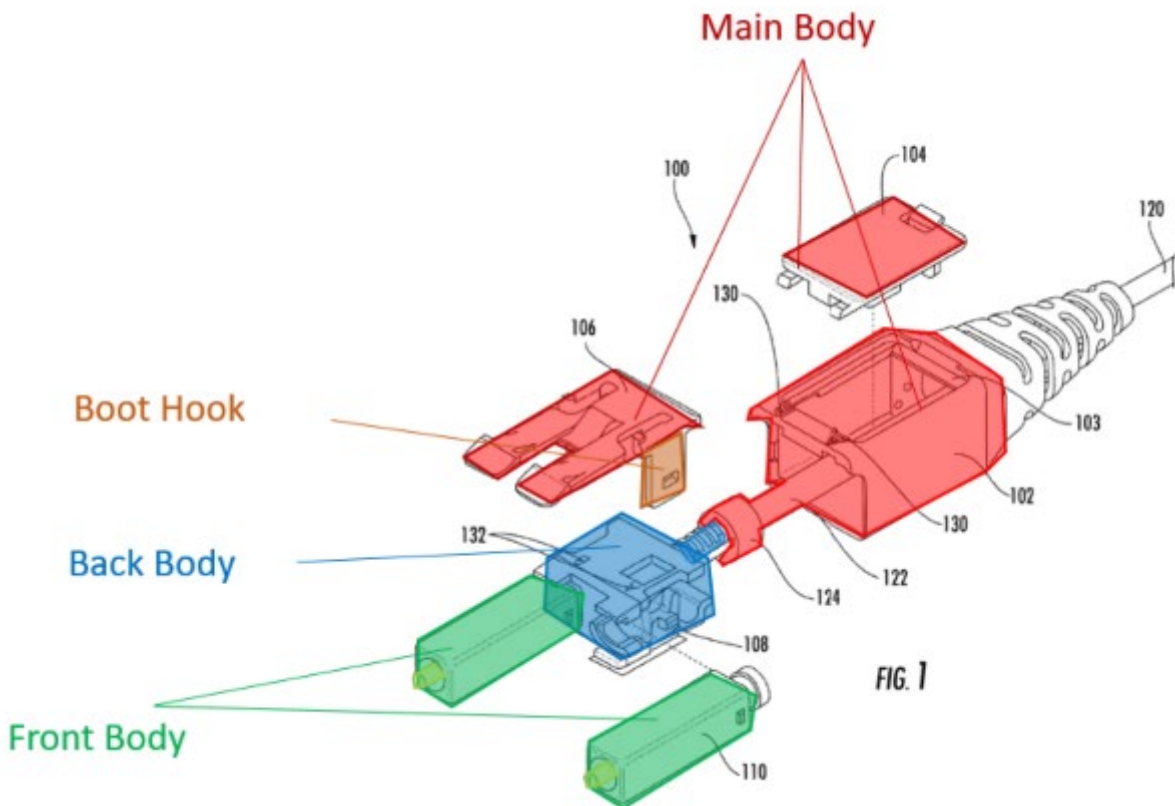
11. [1.3.8]

Regarding the meaning of the recited “the multi-purpose rotatable boot assembly,” see Section VII.C.11.

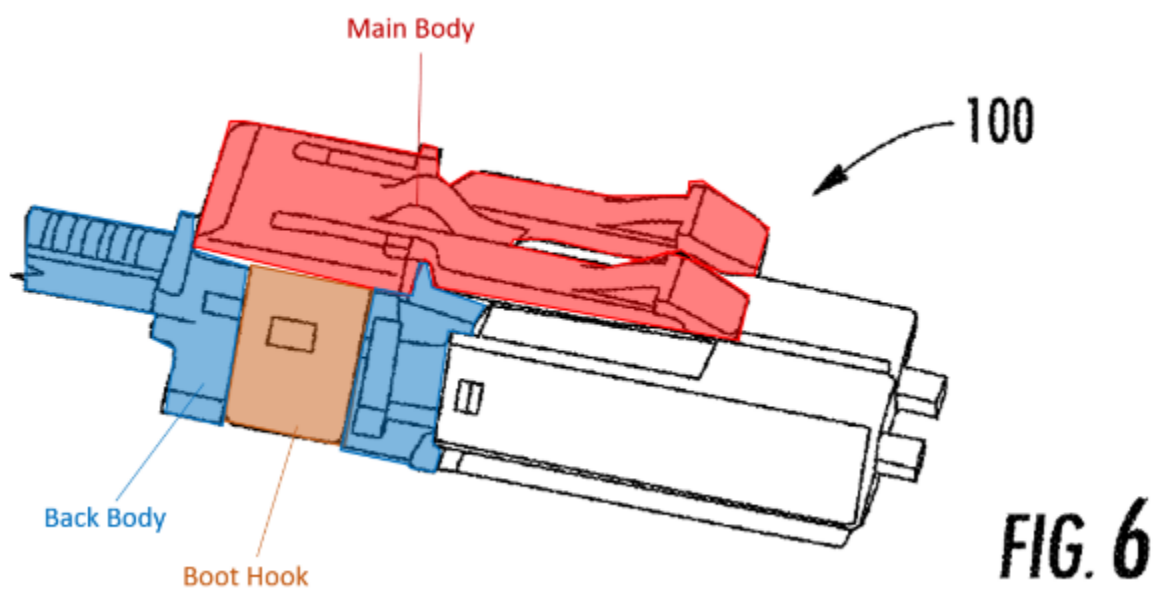
Veatch teaches, “[l]atch 106 also includes mounting tabs 154 that secure the latch 106 to fiber holder 108.” EX1004, 2:61-63. Veatch’s Figure 5 illustrates where mounting tabs 154 (corresponding to the claimed boot hook) are located. Veatch’s Figures 1 and 6 explain how mounting tabs 154 secure fiber holder 108. Veatch’s Figure 9 illustrates that latch 106 including mounting tabs 154 is releasable from fiber holder 108 when boot 102 of Veatch is rotated to “chang[e] the connector polarity.” EX1004, 3:17-18. In contrast, Veatch further teaches, “fiber holder 108 is not rotated” during the rotation of the boot, as shown in Figure 2. EX1004, 3:20-21. Thus, a POSITA would have understood that mounting tabs 154 secure rotatable boot 102 of Veatch against rotation relative to fiber holder 108. Therefore, a POSITA would have understood that mounting tabs 154 shown in Veatch’s Figure 5 correspond to the claimed boot hook(s). EX1016, ¶325.



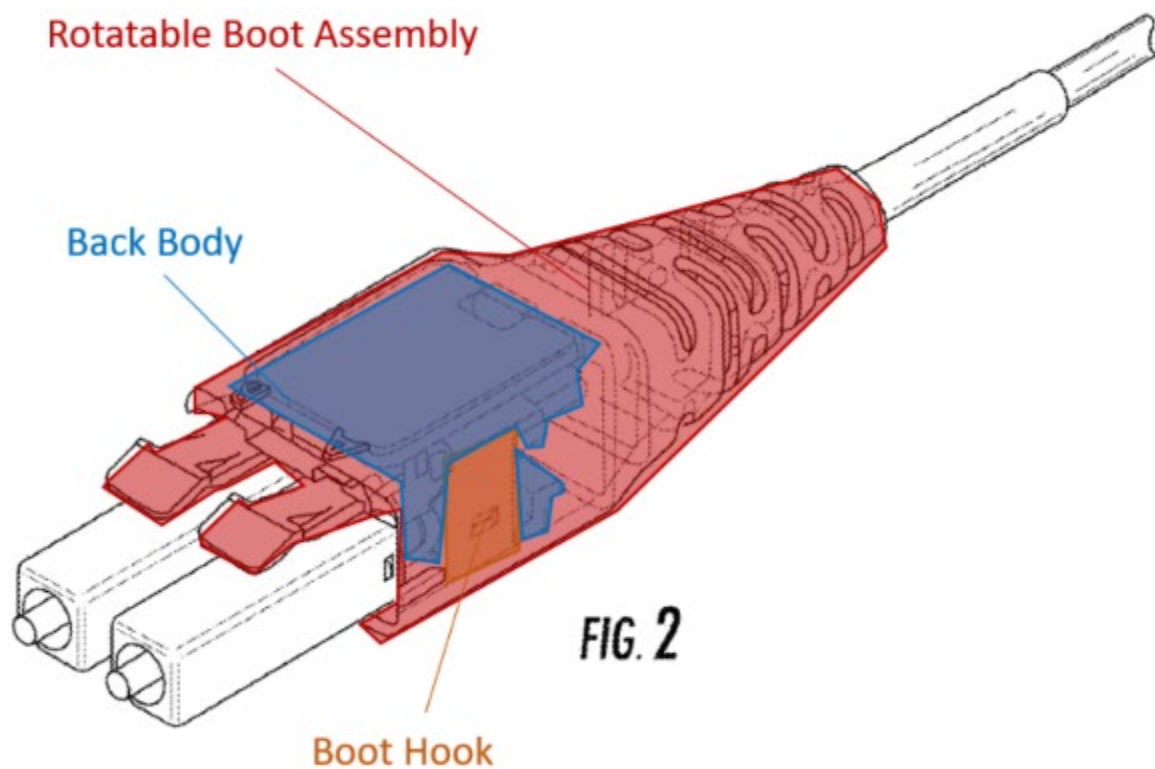
EX1004, FIG. 5 (annotated).



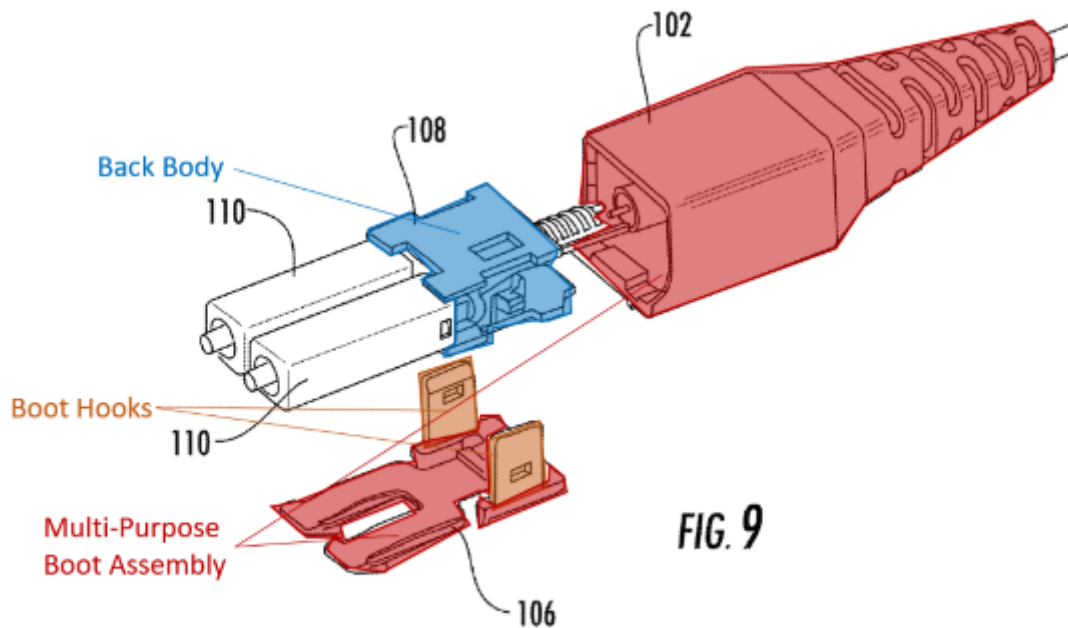
EX1004, FIG. 1 (annotated).



EX1004, FIG. 6 (annotated).



EX1004, FIG. 2 (annotated).



The multi-purpose boot assembly is releasably secured to the back body by the boot hooks.

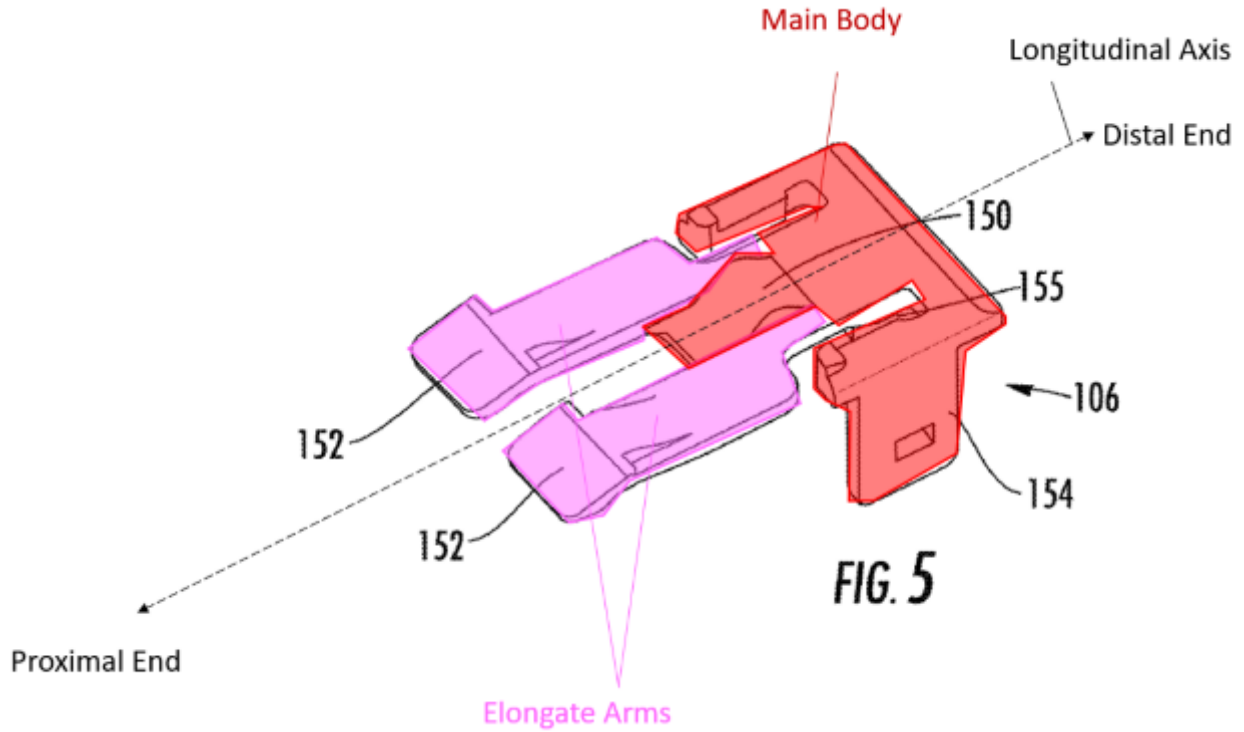
EX1004, FIG. 9 (annotated).

Accordingly, Veatch discloses [1.3.8]. EX1016, ¶326.

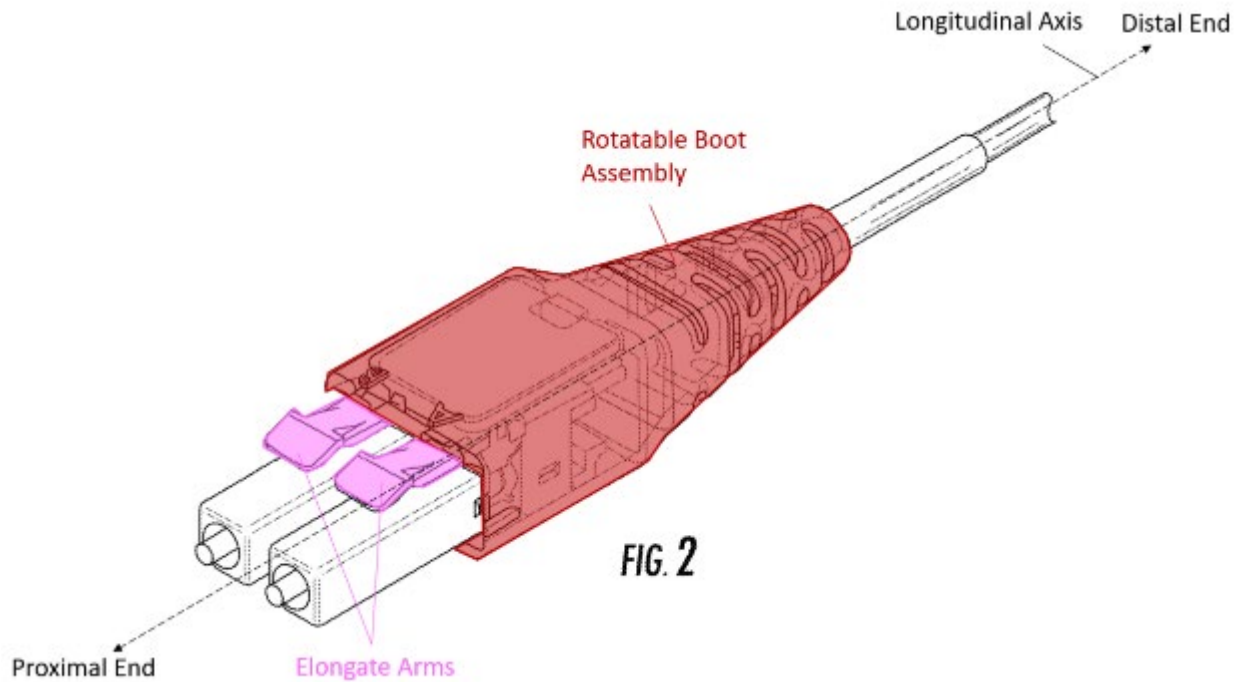
12. [1.3.9]

Veatch teaches, “[l]atch 106 includes resilient arms 152 that engage [a] mating structure on an LC adapter. Arms 152 extend forward, away from boot 102, along the axis of insertion of the connector 100 with an adapter.” EX1004, 2:54-58. Veatch’s Figure 5 and 9 illustrate that the resilient arms extend longitudinally from the main body in a proximal direction along the longitudinal axis. Thus, a POSITA would have understood that resilient arms 152 correspond to the recited

elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis. EX1016, ¶¶327-328.

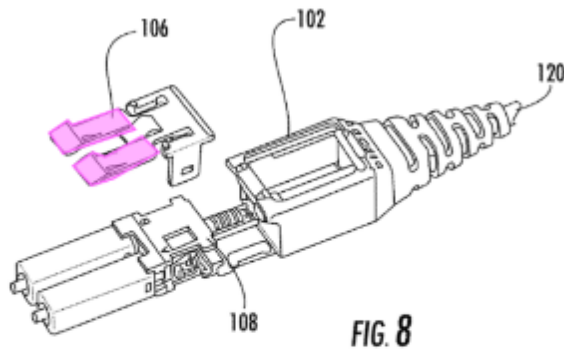


EX1004, FIG. 5 (annotated).



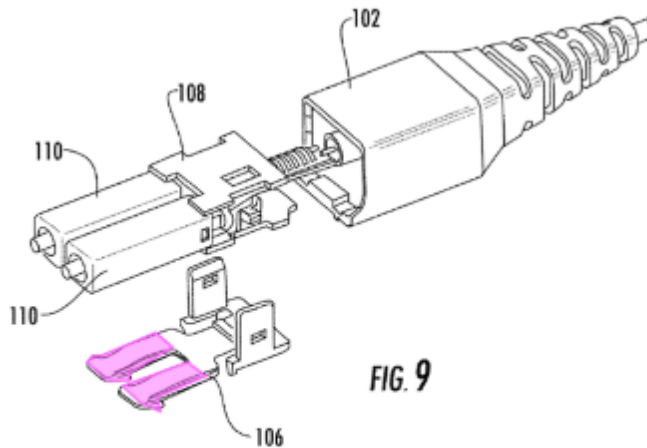
EX1004, FIG. 2 (annotated).

Veatch further teaches that the latch, which has the elongate arms, “is removed from the fiber holder 108” at a second step of “changing the connector polarity” illustrated in Veatch’s Figure 8. EX1004, 3:12-16. Veatch also teaches that the latch “is moved from a first side of the fiber holder 108 to a second side of the fiber holder 108” at a third step of “changing the connector polarity.” EX1004, 3:17-20. Indeed, resilient arms 152 are moved from the top surface of holder 108 to the bottom surface of the holder while changing the polarity. EX1004, FIGs. 8, 9. Thus, a POSITA would have understood that that the resilient arms of Veatch are configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity. EX1016, ¶329.



First Polarity

The elongate arms are located on a top surface of the optical fiber connector (first side).



Second Polarity

The elongate arms are located on a bottom surface of the optical fiber connector (second side).

The elongate arms are configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity.

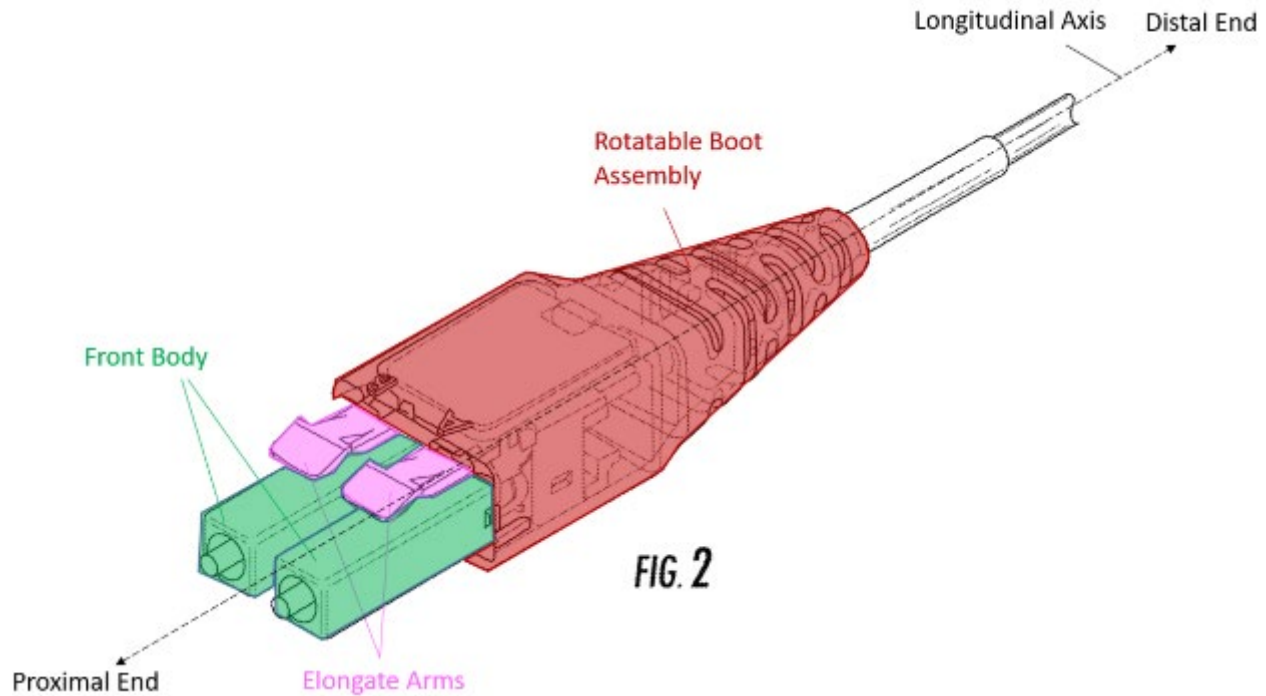
EX1004, FIGs. 8-9 (annotated).

Accordingly, Veatch discloses [1.3.9]. EX1016, ¶¶330-331.

D. Claim 2

Veatch's Figure 2 illustrates that the elongate arms of Veatch are adjacent to an upper side of the front body and are used as a structure to indicate the connector polarity orientation with respect to an adapter. Therefore, in light of the '190

patent's definition, a POSITA would have understood that the elongate arms of Veatch correspond to the recited alignment keys. EX1016, ¶¶332-334.

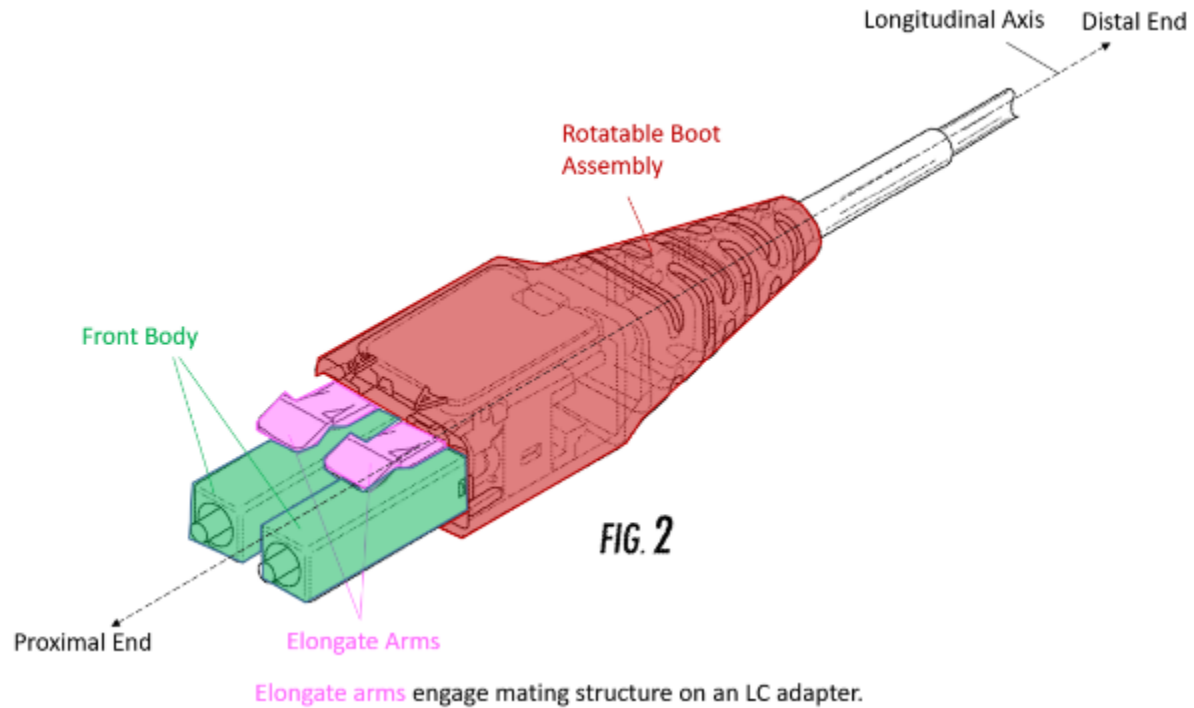


EX1005, FIG. 2 (annotated).

Accordingly, Veatch discloses claim 2. EX1016, ¶335.

E. Claim 3

Veatch teaches that resilient arms 152 “engage mating structure on an LC adapter.” EX1004, 2:54-56, FIG. 2. A POSITA would have understood that the proximal end of the connector is aligned with the adapter as arm 152 engages the mating structure. EX1016, ¶¶336-337.

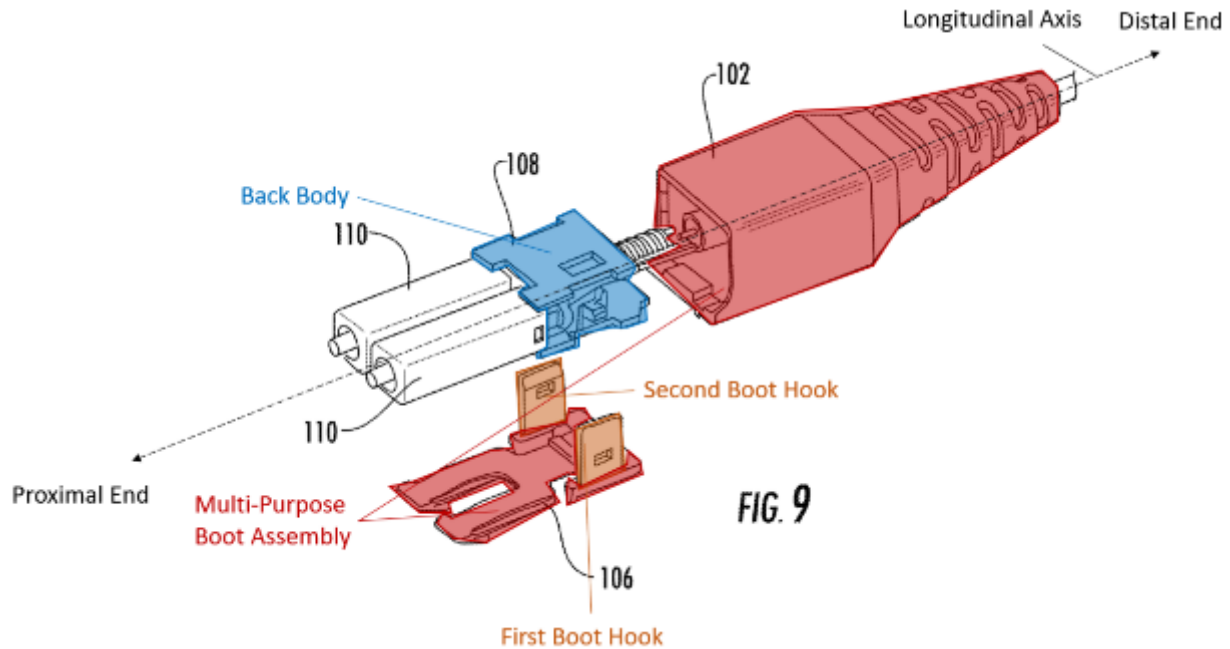


EX1004, FIG. 2 (annotated).

Accordingly, Veatch discloses claim 3. EX1016, ¶338.

F. Claim 6

Veatch discloses the boot hook comprising first and second boot hooks as illustrated in Figure 9. EX1016, ¶¶339-341.

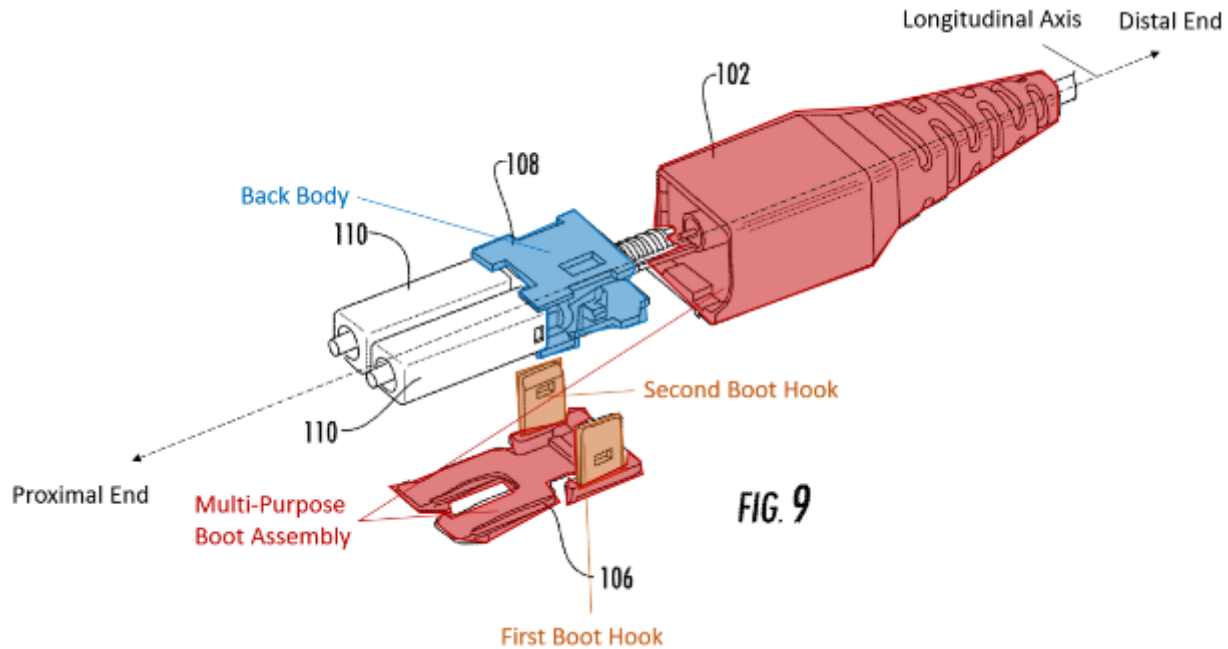


EX1004, FIG. 9 (annotated).

Accordingly, Veatch discloses claim 6. EX1016, ¶341.

G. Claim 7

A POSITA would have understood that Veatch discloses the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis illustrated in Veatch's Figure 9. EX1016, ¶¶342-343.

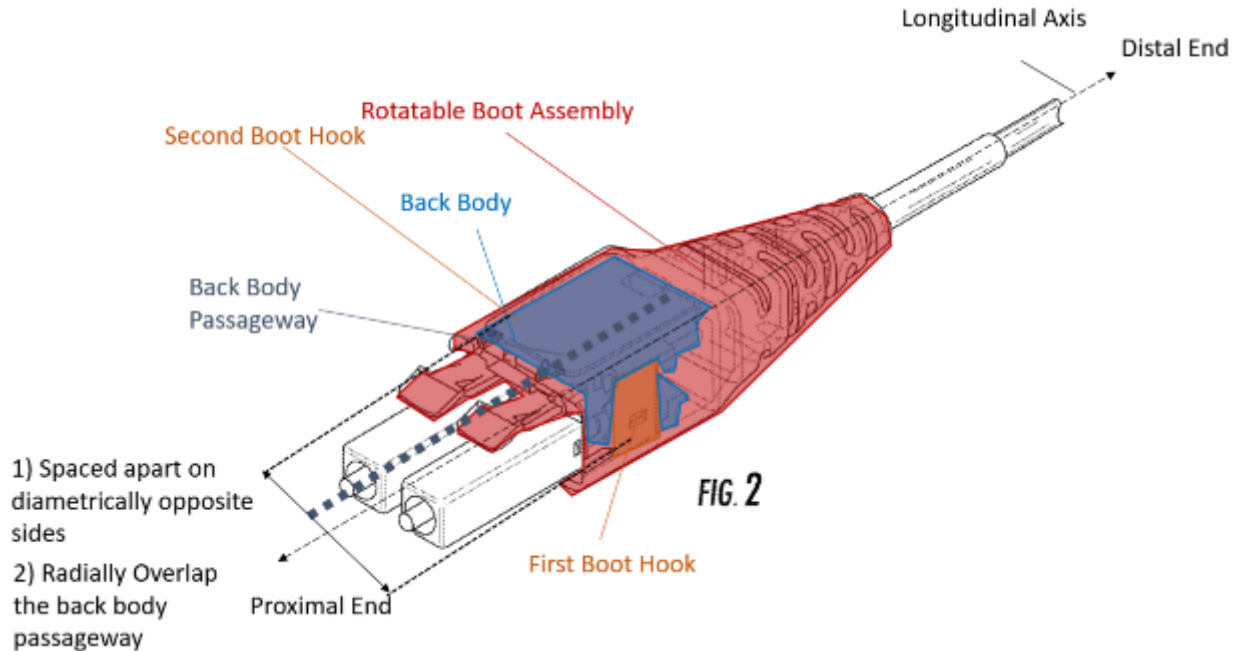


EX1004, FIG. 9 (annotated).

Accordingly, Veatch discloses claim 7. EX1016, ¶343.

H. Claim 8

Veatch's Figure 2 illustrates a connector when the rotatable boot assembly is disposed on the back body. Figure 2 also shows a first boot hook and a second boot hook that are spaced apart on diametrically opposite sides of the back body passageway. Veatch also teaches that when rotatable boot 102 is disposed on the back body, the first and second boot hooks radially overlap the back body passageway relative to the longitudinal axis. Veatch's Figure 2 illustrates the first and second boot hooks radially overlap the back body passageway relative to the longitudinal axis. EX1016, ¶¶344-346.



EX1004, FIG. 2 (annotated).

Accordingly, Veatch discloses claim 8. EX1016, ¶347.

I. Claim 9

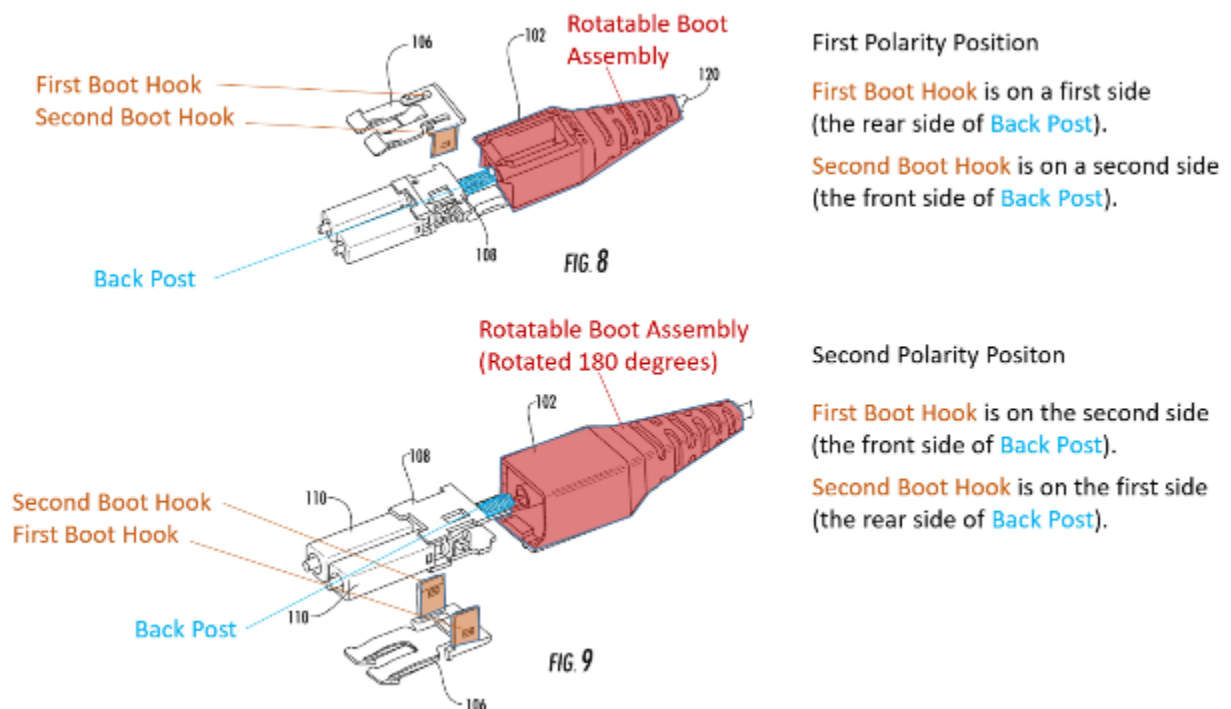
Veatch teaches that “in changing the connector polarity,” “boot 102 is rotated 180 degrees and the latch 106,” which has resilient arms corresponding to the elongate arm(s), “is moved from a first side of the fiber holder 108 to a second side of the fiber holder 108.” EX1004, 3:10-20; EX1016, ¶¶348-349.

Veatch’s Figures 8 and 9 explain how the elongate arms move from the first position to the second position during a polarity change. Thus, a POSITA would have understood that Figure 8 illustrates that the rotatable boot assembly of Veatch is located at the recited first polarity position and Figure 9 illustrates that the located at the recited second polarity position. EX1016, ¶350.

Accordingly, Veatch discloses Claim 9. EX1016, ¶¶351.

J. Claim 10

Veatch's Figures 8 and 9 illustrate that the first boot hook is on the rear side of the back post and the second boot hook is on the front side of the back post when the rotatable boot assembly is in the first polarity position. In contrast, the first boot hook is on the front side of the back post and the second boot hook is on the front rear of the back post when the rotatable boot assembly is in the second polarity position. Further, Veatch teaches that "fiber holder 108" having the back post "is not rotated or repositioned" while changing the polarity. EX1004, 3:20-21. Therefore, the surface that the back post faces on each boot hook is changed before and after the polarity change. EX1016, ¶¶352-353.

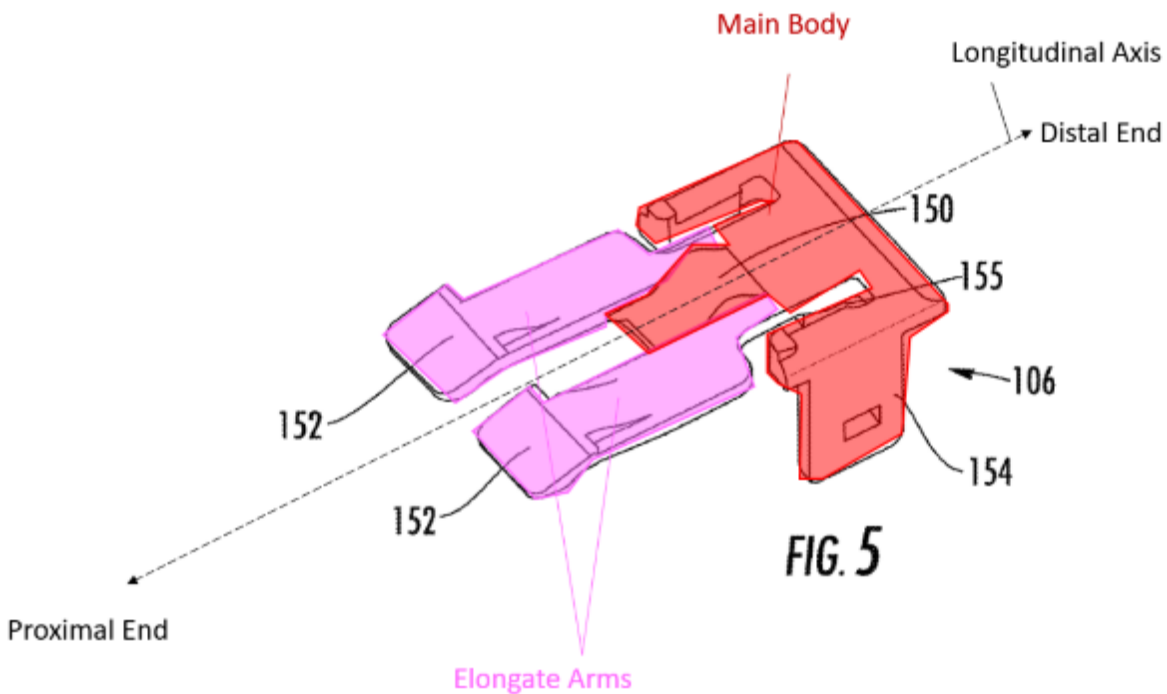


EX1004, FIGs. 8-9 (annotated).

Accordingly, Veatch discloses claim 10. EX1016, ¶354.

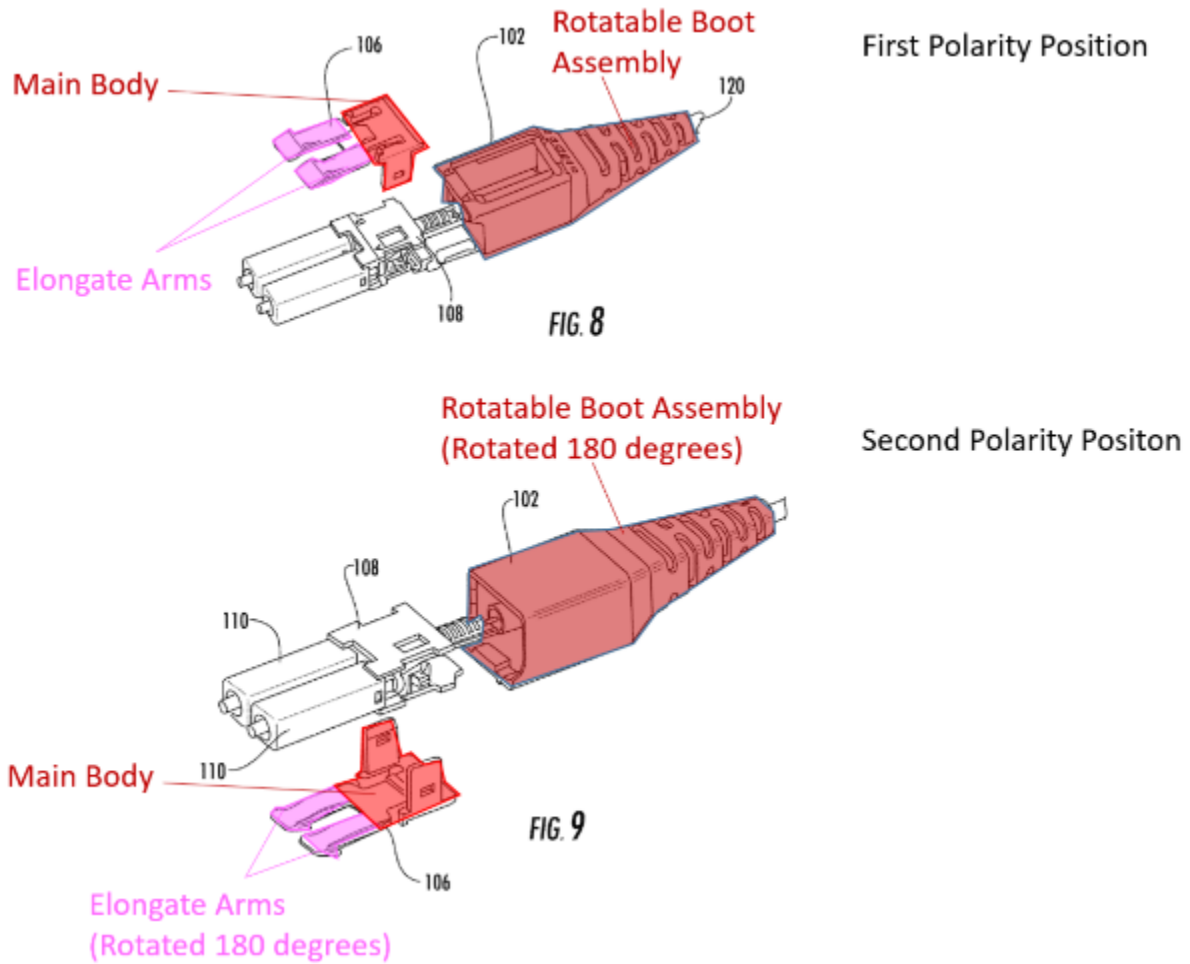
K. Claim 11

Veatch's Figure 5 teaches that its elongate arms are connected to the main body. EX1016, ¶¶355-356.



EX1004, FIG. 5 (annotated).

Veatch further teaches that the elongate arms rotate with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position as shown in Veatch's Figures 8 and 9. EX1016, ¶357.



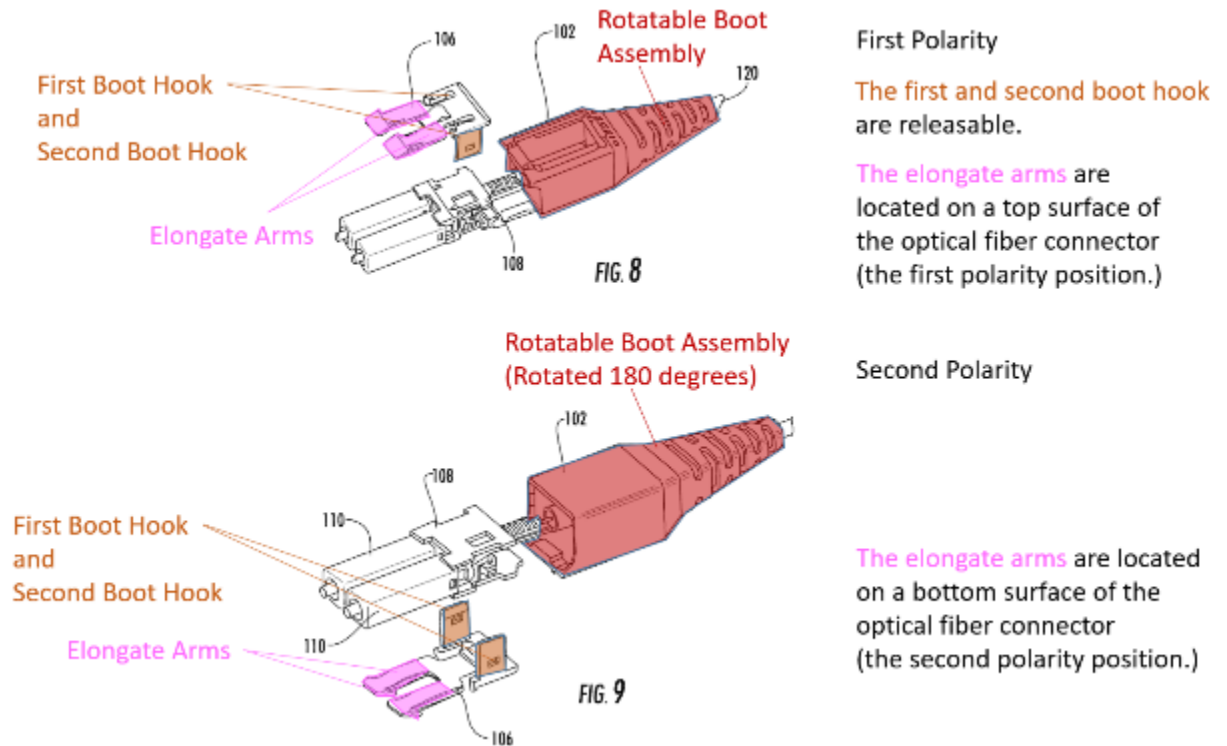
EX1004, FIGs. 8-9 (annotated).

Accordingly, Veatch discloses claim 11. EX1016, ¶358.

L. Claim 13

Veatch's Figures 8 and 9 illustrate that the boot hooks are releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which

the elongate arm sets the optical fiber connector to the second polarity. EX1016, ¶¶359-360.



EX1004, FIGs. 8-9 (annotated).

Accordingly, Veatch discloses claim 13. EX1016, ¶361.

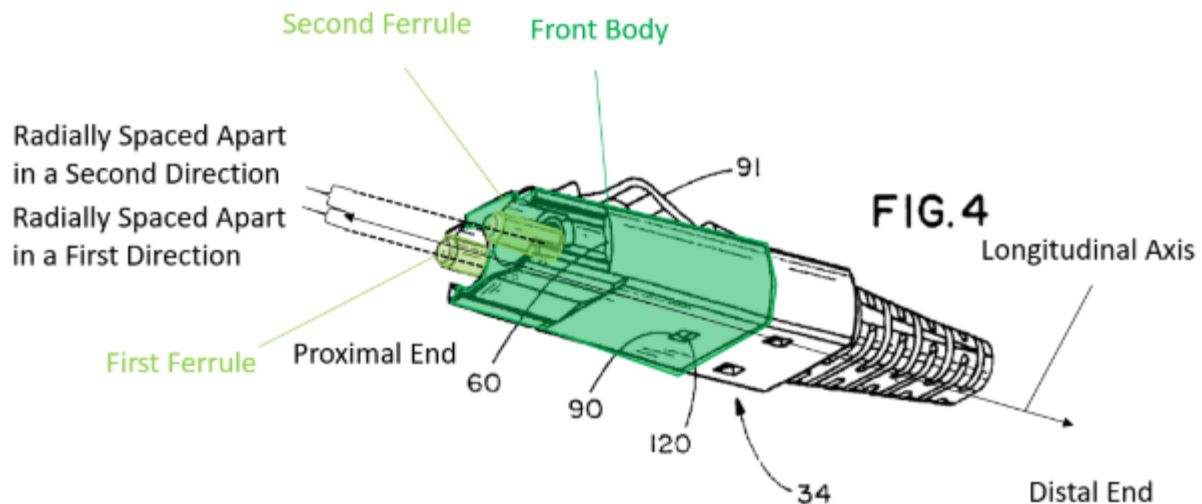
M. Claim 14

Claim 14 sets forth substantially the same matter as claim 11, except that the dependent claim has been changed from claim 9 to claim 13. This claim term is obvious for the same reasons discussed above in claim 11. EX1016, ¶¶362-363.

Accordingly, Veatch discloses claim 14. EX1016, ¶363.

N. Claim 15

As previously discussed for claim [1.1], to the extent that the Patent Owner argues that Veatch does not expressly disclose the claimed front body, a POSITA would have understood Connelly discloses the claimed single front body that holds two ferrules. EX1016, ¶¶364-365. Further, Figure 1 of Connelly illustrates that each of two ferrules is radially spaced apart from the longitudinal axis in opposite directions. EX1016, ¶366.



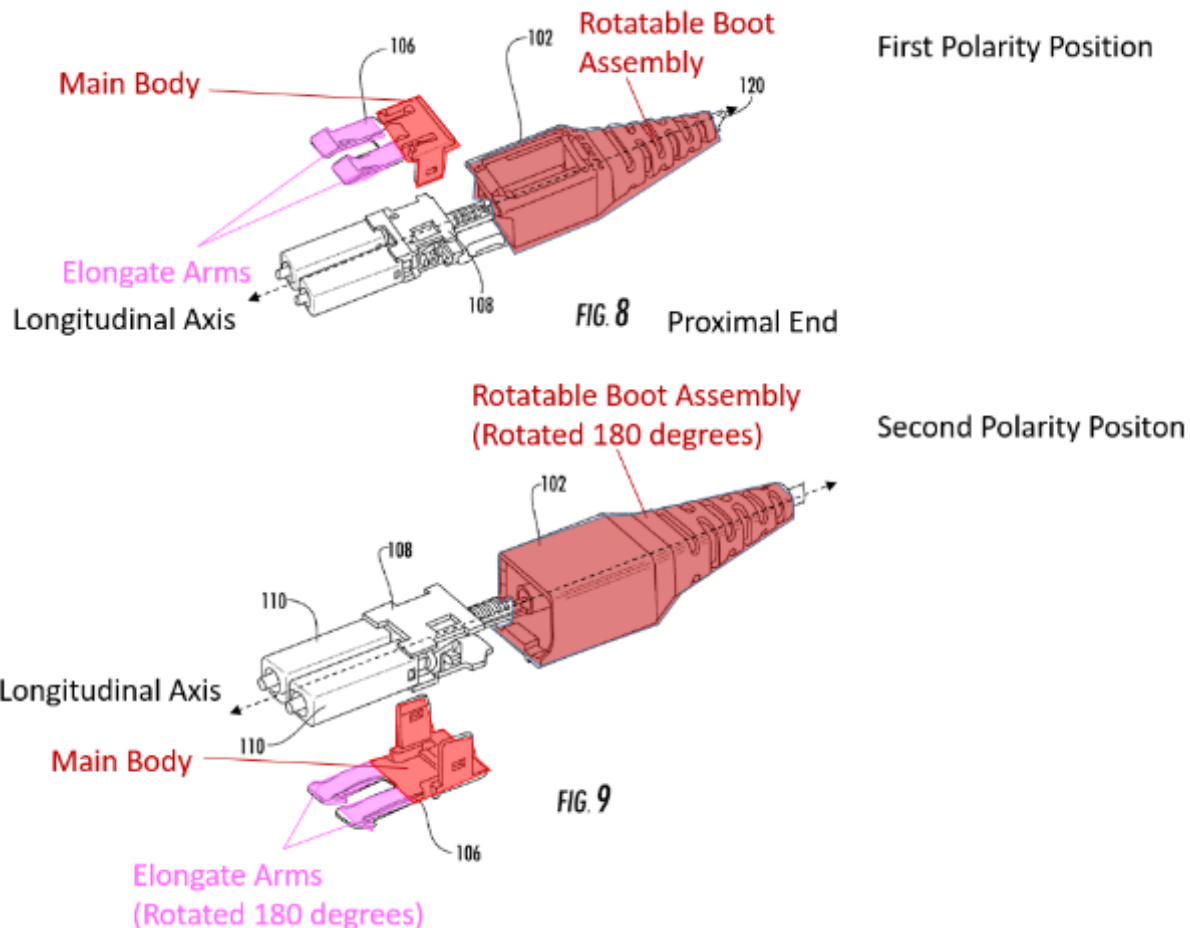
EX1005, FIG. 4 (annotated).

Accordingly, Veatch in view of Connelly discloses claim 15, and would have been obvious to combine. Section X.C.2; EX1016, ¶367.

O. Claim 16

Veatch's Figures 8 and 9 illustrates that upon rotation of the rotatable boot assembly from a first polarity position (FIG. 8) in which the elongate arm is

radially spaced apart from the longitudinal axis in an upward direction, to a second polarity position (FIG. 9) in which the elongate arm is rotated to be radially spaced apart from the longitudinal axis in a downward direction.



EX1004, FIGs. 8 and 9 (annotated).

To the extent that the Patent Owner argues that Veatch's elongate arm is not positioned as specified in claim 16, Petitioner submits that a POSITA would have understood that Veatch renders claim 16 obvious in light of a general knowledge and common sense, for the same reasons discussed in the Nakagawa-Raven Ground. Section VIII.P; EX1016, ¶¶368-372. The simplicity of the recited

structure and the reason that POSITA could have applied the structure to an existing connector are based on common sense. Section VIII.P.

Thus, Veatch renders claim 16 obvious in light of a general knowledge and common sense. EX1016, ¶372.

P. Claim 19

Veatch discloses that “cable 120 runs through boot 102”, which encompasses the boot passageway, “and includes two optical fibers”, and the “[c]onnector bodies 110” connected with the back body passageway “terminate the two optical fibers in cable 120.” EX1004, 2:19-23. Thus, POSITA would have understood that the first and second ferrules of Veatch are connected to the first and second fibers of the optical fiber to transmit signals of the fibers. EX1016, ¶¶373-374.

Accordingly, Veatch discloses claim 19. EX1016, ¶375.

XI. GROUND 4: CLAIM 20 OF THE '190 PATENT IS OBVIOUS OVER VEATCH IN VIEW OF CONNELLY, AND IN FURTHER VIEW OF CLINE.

A. Motivation To Combine

Cline teaches that connector housing 30 has a geometry tapering from the proximal end to the distal end. Section VII.C.

A POSITA would have been motivated to create a back body passageway structure with a tapering geometry as disclosed by Cline into the Veatch-

Connelly's back body to provide a higher density placement of fiber optic connectors. EX1016, ¶¶376-380.

First, as well as Veatch and Connelly, Cline is also in the same field of fiber optic connectors and is further directed to duplex fiber optic connectors with a back body connected with a front body and a boot. Therefore, these prior art references are all analogous to the '190 patent. EX1016, ¶¶381-382.

Second, Veatch seeks to “enable higher density placement of mating adapters” and Cline discloses a configuration for the higher density placement. EX1004, 6:58-59. A POSITA would have understood that modifying the unitary Veatch-Connelly ferrule housing from that of a rectangular shape to the tapered geometry of the connector housing 30 as taught by Cline would have enabled at least the same or higher density configuration. EX1016, ¶383.

B. Reasonable Expectation of Success

A POSITA would have had a reasonable expectation of success in combining the teachings of Cline's taper-shaped connector housing with the Veatch-Connelly's back body. EX1016, ¶384.

First, this modification involves the simple substitution of one known element (*i.e.*, the geometry of the back body of Veatch-Connelly that a POSITA would have been motivated to make) for another (*i.e.*, the tapered geometry of connector housing 30 of Cline) to obtain predictable. EX1016, ¶385.

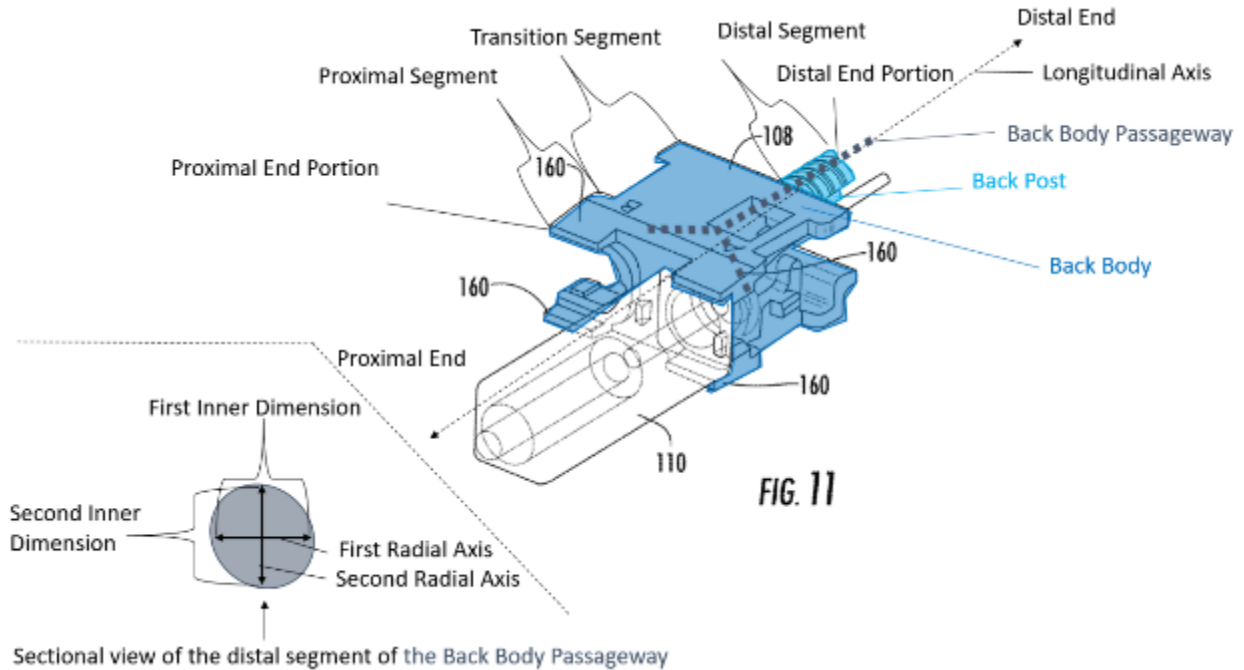
Second, a POSITA would have known there are a finite number of ways to form back body structures of fiber optic connectors—*e.g.*, a back body can take on a rectangular shape as in the Veatch-Connelly combination or a back body can take on a tapered shape as described in Cline. It would have been well known to a POSITA to swap one element of a housing structure for another with no detrimental impact on performance. EX1016, ¶¶386-388.

C. Claim 20

1. [20.1]

(a) Veatch

Veatch's Figure 11 illustrates that fiber holder 108, which encompasses a back body passageway and extends along the longitudinal axis, is comprised of three parts: a distal segment, a proximal segment, and a transition segment, as recited in Claim 20. Accordingly, Veatch discloses [20.1]. EX1016, ¶¶389-391.



EX1004, FIG. 11 (annotated).

(b) Cline

To the extent that the Patent Owner argues that Veatch-Connelly does not expressly disclose [20.1], a POSITA would have understood that Cline discloses this feature. Section IX.C.1; EX1016, ¶¶392-393.

(c) Motivation To Combine

A POSITA would have understood that while Veatch-Connelly presents back body and back body passageway with the rectangle geometry, it is clear that other back bodies with back body passageways may be readily substituted for different connector configurations, such as that of Cline. A POSITA would have been motivated to substitute the back body and back body passageway with tapered geometry of Cline into the optical connector of Veatch-Connelly. The

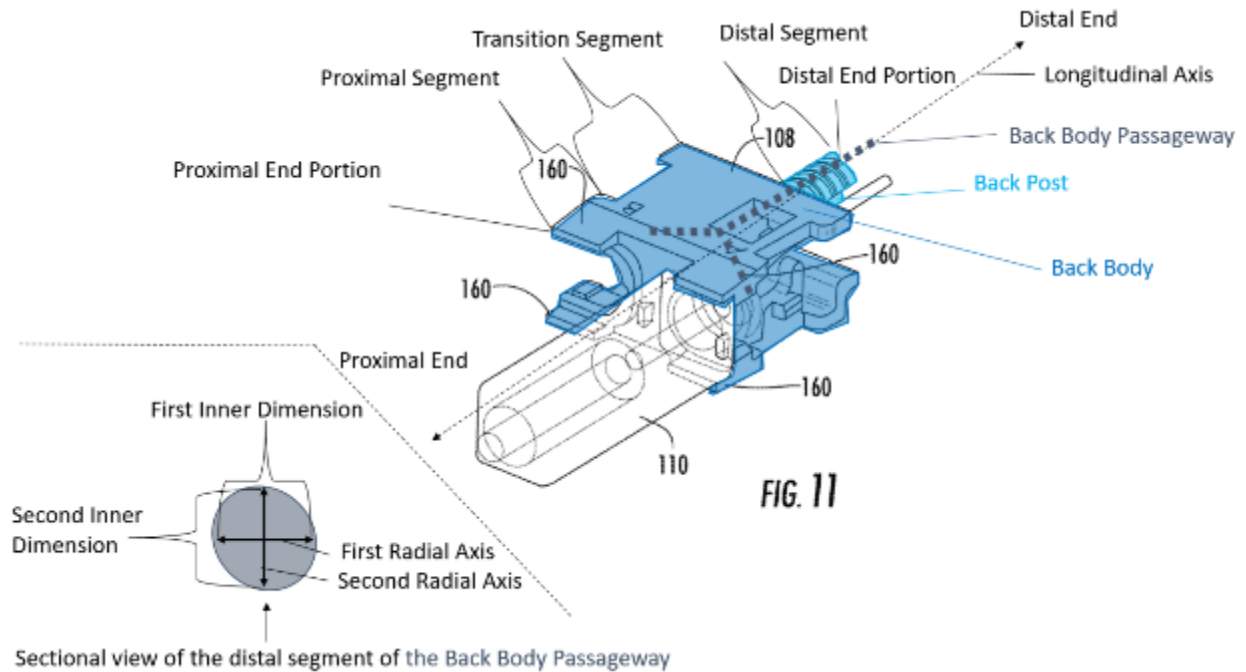
combination of Veatch-Connelly and Cline, as described in Section XI.A-B, would render obvious claim [20.1]. EX1016, ¶394.

Accordingly, Veatch-Connelly-Cline teach [20.1]. EX1016, ¶394.

2. [20.2]

(a) Veatch

Veatch FIG. 11 illustrates that the distal segment of Veatch's back body passageway has a cylindrical shape, which has substantially the same length of the first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis. EX1016, ¶¶395-396. A POSITA would have understood that the distal end of the back body passageway of Veatch has a cross-sectional view as illustrated in Figure 11. According to this cross-sectional view, the back body passageway has a first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis. EX1016, ¶397.



EX1004, FIG. 11 (annotated).

(b) Cline

To the extent that the Patent Owner argues that Veatch-Connelly does not expressly disclose [20.2], a POSITA would have understood that Cline discloses this feature. Section IX.C.2. EX1016, ¶¶398-401.

(c) Motivation To Combine

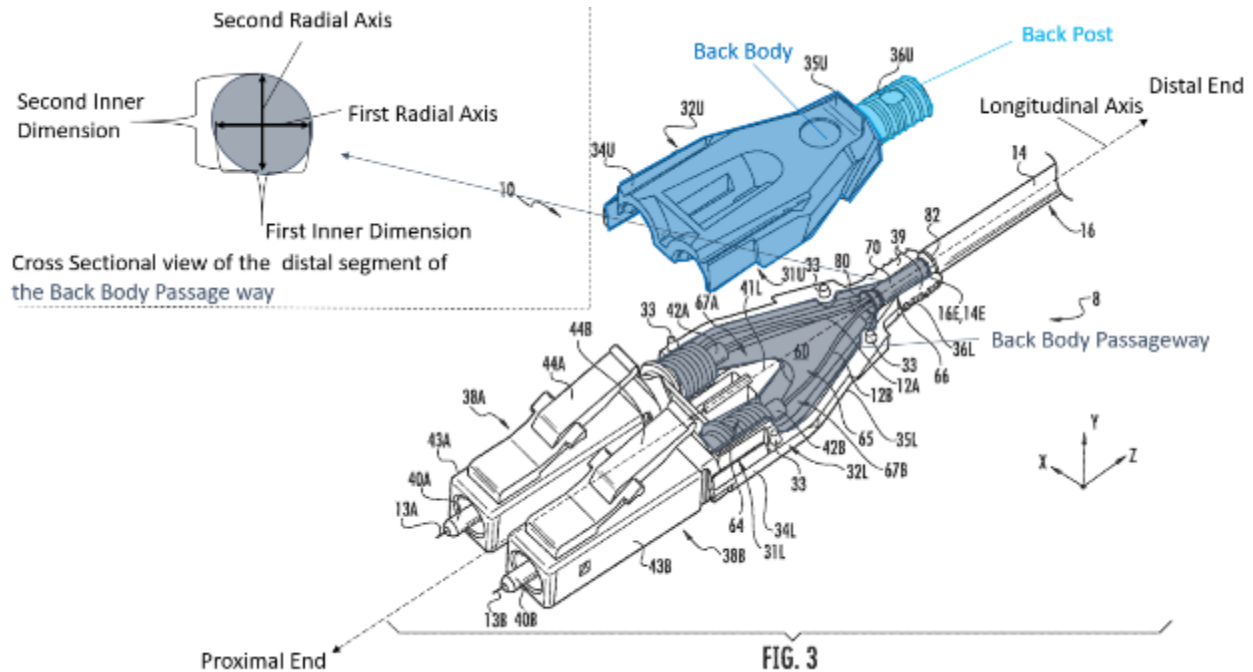
A POSITA would have been motivated to combine Veatch-Connelly and Cline. Section XI.A-B; EX1016, ¶402. Accordingly, Veatch-Connelly-Cline teach [20.2]. EX1016, ¶402.

3. [20.3]

(a) Cline

Cline's Figure 6 disclose a back body passageway that is substantially

circular along the distal segment such that the first inner dimension is about the same as the second inner dimension. Section IX.C.3; EX1016, ¶403.



EX1006, FIG. 3 (annotated).

(b) Motivation To Combine

A POSITA would have been motivated to combine Veatch-Connelly and Cline. Section XI.A-B; EX1016, ¶404. Accordingly, Veatch-Connelly-Cline teach [20.3]. EX1016, ¶404.

4. [20.4]

(a) Cline

To the extent that the Patent Owner argues that Veatch-Connelly does not expressly disclose [20.4], a POSITA would have understood that Cline discloses this feature. Section IX.C.4; EX1016, ¶¶405-408.

(b) Motivation To Combine

A POSITA would have been motivated to combine Veatch-Connelly and Cline. Section XI.A-B; EX1016, ¶409. Accordingly, Veatch-Connelly-Cline teach [20.4]. EX1016, ¶409.

5. [20.5]

(a) Cline

To the extent that the Patent Owner argues that Veatch-Connelly does not expressly disclose [20.5], a POSITA would have understood that Cline discloses this feature as discussed in Section IX.C.5. EX1016, ¶¶410-414.

(b) Motivation To Combine

A POSITA would have been motivated to combine Veatch-Connelly and Cline. Section XI.A-B; EX1016, ¶415. Accordingly, Veatch-Connelly-Cline teach [20.5]. EX1016, ¶415.

XII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY THE PETITION UNDER *FINTIV*.

The '190 patent is currently involved in a parallel district-court case that was filed on January 24, 2023. *See Senko Advanced Components Inc. v. US Conec, Ltd.*, No. 1:2023-cv-00083 (D. Del. Jan. 24, 2023), which was stayed at least through December 20, 2023. The Board should not deny this Petition under *Fintiv* for the following reasons. First, on July 6, 2023, an order was made at the district court to stay all deadlines. Second, the Petition herein sets forth a compelling

unpatentability challenge to at least one claim. Third, if instituted, Petitioner stipulates not to pursue in the district court the grounds in the Petition or any ground that reasonably could have been raised in the Petition. Accordingly, *Fintiv* does not favor denial of institution. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (P.T.A.B. Mar. 20, 2020) (precedential).

XIII. MANDATORY NOTICES (37 C.F.R. § 42.8(A)(1))

A. Real Party In Interest (37 C.F.R. § 42.8(b)(1))

The real party-in-interest is Petitioner US Conec Ltd. Petitioner US Conec Ltd. states that the following entities each own 10% or more of its stock: Corning Optical Communications, LLC; Fujikura Ltd.; and NTT Advanced Technology Corporation. This statement should not be interpreted as an admission or concession that the above-listed parties are real parties-in-interest or in privity with US Conec Ltd.

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

The '190 patent is asserted against US Conec Ltd. in *Senko Advanced Components, Inc. v. US Conec Ltd.*, 1:23-cv-00083 (D. Del.), filed on January 24, 2023, stayed through at least December 20, 2023.

C. Lead and Back-up Counsel (37 C.F.R. § 42.8(b)(3))

Pursuant to 37 C.F.R. § 42.8(b)(3) and 42.10(a), Petitioner appoints **Jason D. Eisenberg** (Reg. No. 43,447) as lead counsel. Additionally, Petitioner appoints **Lestin L. Kenton** (Reg. No. 72,314) and **Masayuki Iino** (Reg. No. 80,729) as

back-up counsel, at the address: STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.,
1101 K Street NW, 10th Floor, Washington, D.C., 20005, phone number (202) 371-
2600, and facsimile (202) 371-2540.

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

Petitioner consents to electronic service by email at:

jasone-PTAB@sternekessler.com, lkenton-PTAB@sternekessler.com, miino-PTAB@sternekessler.com, and PTAB@sternekessler.com.

XIV. STANDING (37 C.F.R. § 42.104(A))

Petitioner certifies that the '190 patent is available for *inter partes* review, and that Petitioner is not barred or estopped from requesting an *inter partes* review of the '190 patent.

The assignee of the '190 patent, Senko, served a complaint against Petitioner in the District of Delaware (Case No. 1:23-cv-00083) on January 24, 2023, alleging infringement of the '190 patent. This petition is being filed within one year of the service of that case.

XV. CONCLUSION

For the reasons provided above, Petitioner requests *inter partes* review of claims 1-3, 6-16, 19-20 of the '190 patent and a determination those claims are unpatentable as obvious under 35 U.S.C. § 103 according to the challenged grounds.

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN & FOX PLLC

/Jason D. Eisenberg/

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XVI. APPENDIX A: CHALLENGED CLAIMS

1. [1.P] An optical fiber connector comprising:

[1.1] a front body configured to hold first and second ferrules;

[1.2] 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, the distal end portion of the back body comprising a cylindrical back post having an outer round surface extending along the longitudinal axis, the back body defining a back body passageway extending from the distal end portion through the proximal end portion; and

[1.3.1] a rotatable boot assembly having a proximal end portion and a distal end portion spaced apart along the longitudinal axis,

[1.3.2] the rotatable boot assembly comprising a main body and a strain relief sleeve extending longitudinally from the main body to the distal end portion of the rotatable boot assembly,

[1.3.3] the rotatable boot assembly comprising 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,

[1.3.4] the rotatable boot assembly configured to be disposed on the back body such that (i) the outer round surface of the back post is matingly received in the inner round surface of the main body and

[1.3.5] (ii) the cable boot member is slidable along the longitudinal axis relative to the back body for releasing the optical fiber connector from an adapter,

[1.3.6] the optical fiber connector being configured to terminate a fiber optic cable such that a jacket of the cable is received in the strain relief sleeve in the boot passageway,

[1.3.7] the boot passageway and the back body passageway configured to align for passing first and second fibers from the fiber optic cable to the front body to complete a signal path to the first and second ferrules within the front body;

[1.3.8] the main body further comprising at least one boot hook configured for releasably securing the multi-purpose rotatable boot assembly against rotation relative to the back body,

[1.3.9] and the rotatable boot assembly further comprising an elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis, the elongate arm being configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity.

2. The optical fiber connector according to claim 1, wherein the elongate arm is an alignment key.

3. The optical fiber connector according to claim 2, wherein the alignment key aligns the proximal end of the optical fiber connector into the adapter.

6. The optical fiber connector according to claim 1, wherein the at least one boot hook comprises first and second boot hooks.

7. The optical fiber connector according to claim 6, wherein the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis.

8. The optical fiber connector according to claim 6, wherein when the rotatable boot assembly is disposed on the back body, the first and second boot hooks are spaced apart on diametrically opposite sides of the back body passageway and radially overlap the back body passageway relative to the longitudinal axis.

9. The optical fiber connector according to claim 6, wherein the first and second boot hooks are releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which the elongate arm sets the optical fiber connector to the second polarity.

10. The optical fiber connector according to claim 9, wherein when the rotatable boot assembly is in the first polarity position, the first boot hook is on a

first side of the back post and the second boot hook is on a second side of the back post; and wherein when the boot assembly is in the second polarity position, the first boot hook is on the second side of the back post and the second boot hook is on the first side of the back post.

11. The optical fiber connector according to claim 9, wherein the elongate arm is connected to the main body to rotate with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position.

12. The optical fiber connector according to claim 6, wherein the first boot hook and the elongate arm are radially spaced apart from the longitudinal axis in a first direction and the second boot hook is radially spaced apart from the longitudinal axis in a second direction opposite the first direction.

13. The optical fiber connector according to claim 1, wherein the boot hook is releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which the elongate arm sets the optical fiber connector to the second polarity.

14. The optical fiber connector according to claim 13, wherein the elongate arm is connected to the main body to rotate with the main body as the rotatable

boot assembly rotates between the first polarity position and the second polarity position.

15. The optical fiber connector according to claim 14, wherein the front body holds the first and second ferrules such that the first ferrule is radially spaced apart from the longitudinal axis in a first direction and the second ferrule is radially spaced apart from the longitudinal axis in a second direction opposite the first direction.

16. The optical fiber connector according to claim 15, wherein when the rotatable boot assembly is in the first polarity position, the elongate arm is radially spaced apart from the longitudinal axis in the first direction; and wherein when the boot assembly is in the second polarity position, the elongate arm is radially spaced apart from the longitudinal axis in the second direction.

19. The optical fiber connector according to claim 1, wherein the back body passageway and the boot passageway form a single, undivided longitudinal passage through which the first and second fibers are passable from the cable to the first and second ferrules.

20. **[20.1]** The optical fiber connector according to claim 1, wherein the back body passageway comprises a distal segment along the back post, a proximal segment along the proximal end portion of the back body, and a transition segment between the distal segment and the proximal segment,

[20.2] wherein the back body passageway has a first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis,

[20.3] wherein along the distal segment, the back body passageway is substantially circular such that the first inner dimension is about the same as the second inner dimension;

[20.4] wherein along the proximal segment, the back body has a cross-sectional shape that is elongate along the first radial axis such that the first inner dimension is greater than the second inner dimension; and

[20.5] wherein along the transition segment, as the back body passageway extends in the proximal direction along the longitudinal axis, the first inner dimension increases by a greater amount than the second inner dimension.

**CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION,
TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS**

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 13,307 words, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2010 in 14 point Times New Roman.

Respectfully submitted,
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CERTIFICATION OF SERVICE (37 C.F.R. §§ 42.6(e), 42.105(a))

The undersigned hereby certifies that on January 4, 2024, true and correct copies of the foregoing **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 11,061,190** and all associated exhibits were served in their entirety on the following parties via FedEx Express®:

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