

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

US Conec Ltd.
Petitioner

v.

Senko Advanced Components, Inc.
Patent Owner

Patent 11,061,190
IPR2024-00122

**DECLARATION OF JAMES F. BRENNAN III, PH.D. IN SUPPORT OF
PETITION FOR INTER PARTES REVIEW OF
U.S. PATENT NO. 11,061,190**

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TABLE OF MATERIALS CONSIDERED

I, James F. Brennan III, Ph.D., hereby confirm that, to the best of my knowledge, the accompanying exhibits are true and accurate copies of what they purport to be and that an expert in the field would reasonably rely on them to formulate opinions such as those set forth in this Declaration.

Exhibit Number	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)

Exhibit Number	Description
1017	“19-Inch Rack,” <i>Lite-On</i> , accessed at https://litedon-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
1019	“Fiber Optic Connector Tutorial,” <i>Fibermart</i> , accessed at https://www.fiber-mart.com/news/fiber-optic-connector-tutorial-a-848.html

I, James F. Brennan III, Ph.D., hereby declare:

I. INTRODUCTION

A. Scope of Engagement

1. I have been retained as an expert witness by counsel for Petitioner US Conec Ltd. (“Petitioner”) in connection with the above-captioned *inter partes* review (“IPR”) proceeding.

2. I submit this Declaration in the above-captioned proceeding to provide my expert opinion in support of Petitioner’s Petition for *Inter Partes* Review of U.S. Patent No. 11,061,190 (the “’190 Patent”, EX1001).

3. The opinions to which I will testify, if asked, are set forth in this Declaration. My opinions in this Declaration are based upon the information that I have received to date. They may be supplemented or modified if additional information is received. They may also be supplemented to rely on additional information or opinions provided by the parties (or witnesses retained by the parties) and issues that may arise.

B. Compensation

4. Exponent charges a rate of \$650 per hour for my time spent working on this IPR in 2023 and \$750 per hour for my time spent working on this IPR in 2024. My compensation is not in any way dependent on the statements I set forth herein or the outcome of this proceeding.

C. Professional Qualifications, Education and Experience

5. I am a Principal in Exponent's Electrical Engineering and Computer Science practice where I have consulted on numerous projects, many relating to opto-mechanical device development, implementation, and function. I have worked for Exponent since January 2012. Throughout my career, I have built and utilized hundreds of electrical, electromechanical, laser, optical, and LED systems for myriad applications.

6. I hold an S.B. in electrical engineering and an S.M. in electrical engineering and computer science from the Massachusetts Institute of Technology, granted in 1987 and 1989, respectively. I also hold an Electrical Engineer degree from the Massachusetts Institute of Technology, which was granted in 1991. Throughout my graduate studies, I taught courses concerning electromagnetic field and wave theory and applications, including optical systems.

7. In 1995, I was granted a Ph.D. in physics and electrical engineering from the Massachusetts Institute of Technology. During research for my Ph.D., I designed and built electro-optical instrumentation to diagnose and treat human pathologies, including various cancers and arterial diseases. During this work, I built several investigational medical devices that utilized optical catheters, the majority of which involved the use of optical fibers to deliver light to and collect light from locations within the body. I designed and manufactured custom optical

fiber connectors, which often held several optical fibers, to interface these optical catheters with various diagnostic and therapeutic equipment. These systems were used at several locations such as the Cleveland Clinic Foundation, Leonard Morse Hospital, Massachusetts General Hospital, Leiden Hospital in Leiden, The Netherlands, and Erasmus University Medical Center in Rotterdam, The Netherlands.

8. I was a Senior Research Specialist at 3M Company's Telecommunications Systems Division where I developed passive optical components that addressed the telecommunications and sensor industries, which became the cornerstone of the 3M Optical Components business unit. I invented a direct-write laser machining technology for producing fiber gratings of arbitrary reflectivity profiles and lengths and utilized the method to make chromatic dispersion compensators for use in long-haul optical communications systems. I led teams that developed and sold products throughout the world, such as specialty optical fibers, pump stabilizers, dispersion compensators, optical connectors, junction boxes, and Bragg gratings. Many of these components were tested extensively on our optical communications testbed, which I built and maintained. I was on the team that transferred the manufacturing of many of these devices to Singapore facilities.

9. I was Vice President of Research and Development at Raydiance,

Inc., where I staffed and led the entire development team and designed and built high-power fiber laser systems capable of producing ultrashort pulses at ablation-level energies for use in laser machining and surgery. This work resulted in several recognitions and awards for the product and the corporation, including the Red Herring 100 North America Award and recognition as a finalist in the “Most Innovative Company” category in the 2008 American Business Awards. These laser systems utilized highly specialized optical fibers and optical fiber amplifiers that required innovative optical connections between the various optical fiber components.

10. I previously served as the Chief Science Officer at Prescient Medical, Inc., where I led the development of an optical catheter system for the diagnosis of coronary artery disease by utilizing Raman spectroscopy, which incorporated laser light sources. Commercial multi-fiber connectors (MTP/MPO) were adapted to interface these optical catheters with custom spectroscopic equipment.

11. I have been an active researcher with more than 75 journal and conference papers and 5 book chapters published. I have been granted 34 United States patents, with others pending. At various times in my career, I have been a member of the Optical Society of America (“OSA”), the International Society for Optics and Photonics, and the Institute for Electrical and Electronics Engineers (“IEEE”). I was a committee member for OSA’s 2007 conference on optical fiber

communications and also a committee member for OSA's Bragg Gratings, Photosensitivity, and Poling topical conference for 1999, 2001, and 2003. I have been a regular reviewer for IEEE Photonics Technology Letters, as well as several other journals.

12. I am on the American National Standards Institute's ("ANSI") subcommittee for ANSI Z136.3 "Safe Use of Lasers in Health Care," ANSI Z136.9, "Safe Use of Lasers in Manufacturing Environments," and ANSI Technical Subcommittee 1 (TSC1), "Biological Effects and Medical Surveillance of the Accredited Standards Committee (ASC Z136) on Laser Safety."

13. My *curriculum vitae* is filed herewith as EX1002.

D. Publications and Patents

14. A comprehensive list of publications and patents is included in my *curriculum vitae* filed herewith as EX1002.

E. Materials Considered

15. For purposes of this Declaration, I have reviewed and, where applicable, relied upon the information and/or teachings of the documents identified in the Table of Materials Considered following the Table of Contents above.

16. I also base my opinions on my education and professional experience in the field of electrical engineering and electro-optics.

17. I confirm that to the best of my knowledge the accompanying exhibits are true and accurate copies of what they purport to be, and that an expert in the field would reasonably rely on them to formulate opinions such as those set forth in this Declaration.

II. LEGAL STANDARDS FOR INVALIDITY

18. I understand that in *inter partes* review proceedings, a patent claim is construed using the same standard that would be used in a civil action, and that a claim should be construed in accordance with the ordinary and customary meaning of the claim as it would be understood by a person of ordinary skill in the art (“POSITA”).

19. While I am neither a patent lawyer nor an expert in patent law, I have been informed of the applicable legal standards for invalidity. I have relied upon these legal principles, as explained to me by counsel, in forming my opinions set forth in this Declaration.

20. I understand that a petitioner in an IPR proceeding must prove unpatentability by a preponderance of the evidence. I understand that the preponderance of the evidence standard means that the petitioner must show that it is more likely than not that a patent claim is not patentable. The statements below are my understanding regarding the law as explained to me by the lawyers for Petitioner. I have used my understanding of these legal principles, as set forth in

this section, to analyze the '190 Patent.

21. I understand that a patent may be deemed invalid based on anticipation or obviousness over the prior art.

22. I understand that in undertaking an invalidity analysis, the claims are to be interpreted from the perspective of a POSITA.

A. Obviousness

23. I have been informed that a patent claim is invalid as being obvious in view of the prior art if the differences between the patented subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art. *See* 35 U.S.C. § 103. In making a determination of obviousness, I understand that the following factors are analyzed: (i) the scope and content of the prior art; (ii) the differences, if any, between the prior art and the claims at issue; (iii) the level of ordinary skill in the pertinent art; and (iv) objective evidence of non-obviousness, if any exists.

24. I have been informed that any of the following rationales are some of the acceptable bases for the conclusion that a claim is obvious: (i) the claimed invention is simply a combination of prior art elements according to known methods to yield predictable results; (ii) the claimed invention is a simple substitution of one known element for another to obtain predictable results; (iii) the claimed invention uses known techniques to improve similar devices (methods, or

products) in the same way; (iv) the claimed invention was “obvious to try” because it was a choice from a finite number of identified, predictable solutions, with a reasonable expectation of success; (v) there is known work in one field of endeavor that may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces, if the variations would have been predictable to a POSITA; or (vi) there is some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art references or to combine prior art reference teachings to arrive at the claimed invention.

25. I have been informed that, in order for a patent claim to be considered obvious, at the time the invention was made, each and every limitation of the claim must be present within the prior art, or within the prior art in combination with the general knowledge held by a POSITA, and that such a person would have a reasonable expectation of success in combining these teachings to achieve the claimed invention. I also understand that the reason to select and combine features, the predictability of the results of doing so, and a reasonable expectation of success of doing so may be found in the teachings of the prior art themselves, in the nature of any need or problem in the field that was addressed by the patent, in the knowledge of a POSITA in the field at the time, as well as in common sense or the level of creativity exhibited by a POSITA. There need not be an express or explicit

suggestion to combine references.

26. I understand that substituting one known element for another known element would have been obvious when it leads to reasonably predictable results.

27. I understand that a combination of elements would have been obvious when a POSITA has a good reason to pursue the combination, which is among a finite number of known options within his or her technical grasp, and leads to reasonably expected results.

28. A prior art reference can be said to teach away when a POSITA would be discouraged from following the path set out in the reference or would be led in a direction divergent from the path that was taken in the claimed invention. The mere disclosure of more than one alternative does not constitute a teaching away from alternatives that are not disclosed when the prior art does not criticize, discredit, or otherwise discourage the solution claimed in the alleged invention. Similarly, a prior art reference that merely expresses a general preference for an alternative invention does not teach away.

29. I understand that objective evidence of non-obviousness include (i) commercial success, (ii) long-felt but unresolved need, (iii) failure of others, (iv) skepticism by experts, and (v) unexpected results.

30. I have relied upon this understanding of the applicable legal standards in reaching my opinion set forth in this Declaration.

B. Miscellaneous

31. I understand that Petitioner has the burden of proving unpatentability by a preponderance of evidence, which means that the claims are more likely than not to be unpatentable.

32. I also understand that the claims are to be construed according to the same claim construction standard that district courts use wherein claim terms are given their ordinary and customary meaning from the perspective of a POSITA at the time of the invention.

33. The analysis in this Declaration is in accordance with the above-stated legal principles.

III. LEVEL OF ORDINARY SKILL IN THE ART

34. I understand that the level of ordinary skill may be reflected by the prior art of record and that a POSITA to which the claimed subject matter pertains would have the capability of understanding the scientific and engineering principles applicable to the pertinent art.

35. I understand that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

36. I am very familiar with the knowledge and capabilities that a POSITA would have possessed in the subject area in fiber optics. Specifically, my education and experience in the industry and with engineers practicing in the industry during the relevant time period allowed me to become personally familiar with the knowledge and capabilities of a person of ordinary skill in the area of fiber optics. Unless otherwise stated, my testimony below refers to the knowledge of a POSITA in the field of fiber optics at the time of the priority date of the '190 Patent, which I understand is July 14, 2017.

37. In my opinion, a POSITA of the '190 Patent at the time of its earliest claimed priority date 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.

38. I believe such a POSITA would have been capable of understanding the '190 Patent and the prior art references discussed herein. This level of skill in the art would apply at the earliest priority date of the '190 Patent, which I understand is July 14, 2017.

39. Based upon my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a POSITA at the time of the claimed invention. Additionally, although my qualifications exceed those of the hypothetical POSITA defined above, my analysis and opinions regarding the '190 Patent have been rendered from the perspective of a POSITA at the time of the invention.

40. My analysis is intended to reflect how a POSITA would have understood the '190 Patent claims as of the priority date, even if I use the present tense.

IV. BACKGROUND OF THE TECHNOLOGY

41. My discussion of the background of the technology is intended to provide some context for my later analysis of the '190 Patent and prior art. This discussion provides a high-level overview of the components, but it is not intended to reflect the meaning of any particular claim term in a patent, which must be assessed in view of the specification and the context of the claim language. Rather, this is a general overview of fiber optic cables, connectors, adapters, and other components. The technology at issue generally relates to fiber optic connectors of the type commonly used in data centers. Optical fiber has been used for a variety of applications, including but not limited to, broadband voice, video, and data transmission.

A. Data Centers

42. Public and private fiber optic networks used for, *e.g.*, voice, video, and data transmissions often include fiber optic equipment located in data distribution centers or central offices. The '190 Patent generally relates to details of the optical fiber connectors, which are used to connect optical fibers to equipment or other optical fibers, thus creating an optical fiber interconnection.

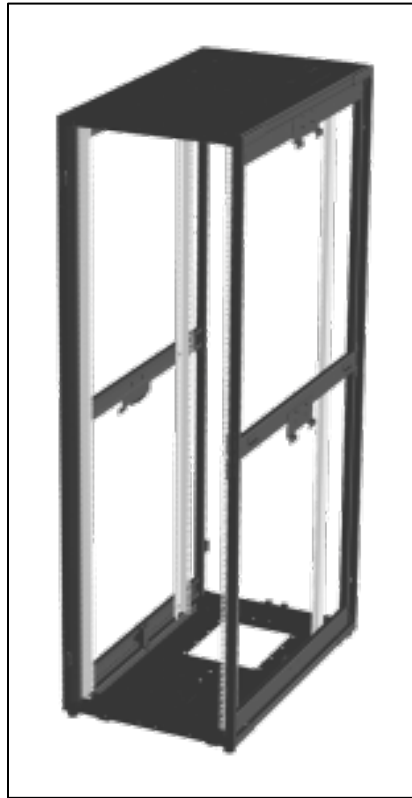
43. A data center is a facility that houses data storage and/or communication equipment used to provide a variety of services, including, for example, digitally housing Internet sites. *See* EX1013, 2939.



Organization of an example data center. *See* EX1013, 2940.

44. Data centers use “racks” to mount electrical and optical fiber interconnection equipment, a row of which is shown above. *See* EX1013, 2940. A rack is an open structure for mounting electrical or electronic equipment, including

servers, switches and storage “bricks.” Equipment is typically fastened to racks via mounting holes on the sides of the rack. The figure below shows a typical rack that may be found in a data center.



Example of a generic 19” rack that may be used in a data center. EX1017.

45. A rack unit or a “U” is a measurement of vertical space within a rack. See EX1013, 2940. For example, a base rack unit (*i.e.*, the height measurement) is 44.45 millimeters (1.75”), and a standard rack can take 42 1U modules.

46. Enclosures, chassis, or frames that are mounted to a rack in a data center can aid in further compartmentalization of racks and can be configured to house equipment for connecting fiber optic cables. An example of an enclosure used to house equipment for connecting fiber optic cables is shown below.



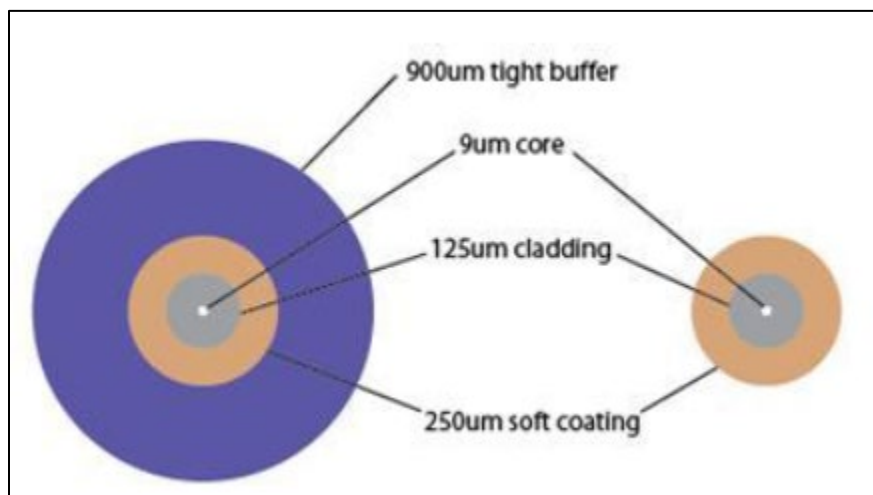
Example of an enclosure to house equipment for connecting fiber optic cables.
EX1018.

47. Maximizing use of physical space is important for optimizing costs of operating and maintaining data centers, and the fiber optic equipment typically included in housings that are mounted in equipment racks generally seek to provide a greater density of interconnections within a certain space to optimize use of space. When additional bandwidth is needed or desired, additional fiber optic equipment may be utilized in the data center to increase optical fiber port count, requiring more equipment rack space in a data center. Therefore, there is generally a desire to decrease the size (cross-sectional area) of the components that facilitate fiber optic connections. Certain types of optical connectors can aid in facilitating signal transmission while reducing physical space consumption.

B. Optical Fiber Connector Technology

48. In general terms, a fiber optic cable and assembly contain one or more

optical fibers that are used to guide light signals through a silica glass fiber that is typically coupled to a transmitter on one end that converts electrical information into optical signals and a receiver on the other end that converts optical information into electrical information. The fiber itself is composed of a core that transmits light, a cladding, the next adjacent layer that confines the light within the core, and additional non-optical layers. The figure below shows an example of a common fiber core and cladding ratio, with and without a protective buffer used in optical communications.



Example of common fiber core and cladding diameters coated or uncoated. *See* EX1014, 5.

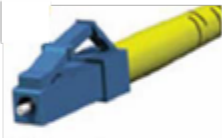
49. Optical fibers and connectors themselves are generally small and compact. Additionally, fiber optic cables can include a varying number of optical fibers. Fiber optic connectors and adapters can be used to facilitate the connection of two optical fibers. While there are several methods of connecting fiber optic cables, physical contact connectors are most relevant to the '190 Patent. Physical

contact connectors employ a ferrule surrounding an embedded optical fiber. By physically pressing the ends of two ferrules together, an optical connection between two optical fibers can be created. A component, oftentimes a spring, is utilized to provide axial compliance when ferrules are pressed together and to ensure contact is maintained during use. *See* EX1015, 8. Fiber optic connectors and adapters can be a fast, efficient, and low-cost way to connect fiber optic cables, allowing for demountable connections. There are numerous options for fiber connectors, with variability in orientation, size, and mechanical components that engage the connection. *See* EX1015, 9.

50. In the context of this matter, fiber optic adapters (sockets) receive and mate those fiber optic connectors to support one or more fiber optic connections. Fiber optic adapters may come in different shapes, but they are all typically designed to achieve the same function—to join and align the connectors of two fiber optic cables. The two fiber optic cables may have one or more fiber ferrule(s) to house all the fibers in each cable, and thus connecting the two fiber optic cables is accomplished by mating the respective ferrules. A fiber optic adapter allows fiber optic cables to be attached to each other through different interfaces, allowing many devices to communicate at once.

51. Fiber optic connectors and adapters come in different standard forms and can be used to support connections of different numbers of optical fibers. For

example, LC connectors terminate one or more optical fibers each in individual ferrules whereas MPO (Multi-Fiber Push-On/Pull-Off) connectors can terminate a greater number of fibers in a single ferrule. *See* EX1015, 9. Both LC and MPO connectors are described in various recognized industry standards (*e.g.*, IEC 61754-20 Fibre Optic Connector Interfaces – Part 20: Type LC Connector Family and IEC-61754-7, Fiber Optic Connector Interfaces – Part 7: Type MPO connector family). MTP® is a type of MPO connector developed by US Conec (Petitioner). Fiber optic adapters can also be designed to connect a plurality of discrete fiber optic adapters, or one or more multi-fiber connectors. The figure below shows some common connector types.

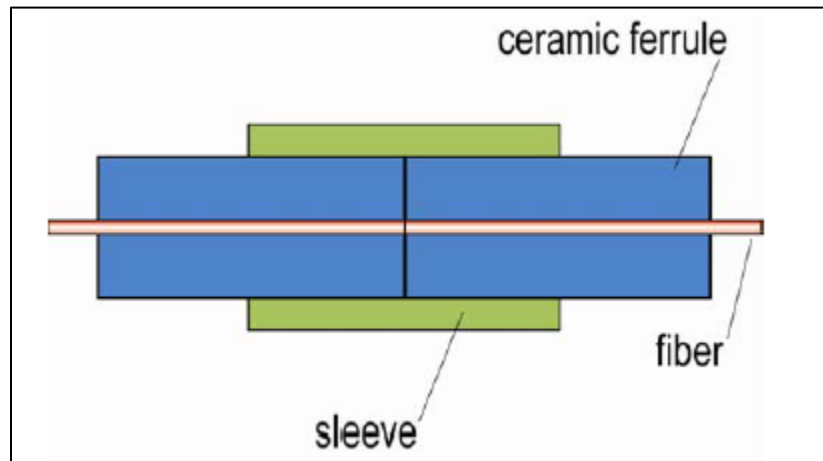
Common Connector Type	Diagram	Ferrule Size
FC - Ferrule Connector		2.5 mm
LC - Lucent Connector		1.25 mm
SC - Subscriber Connector		2.5 mm
ST – Straight Tip Connector		2.5 mm
MPO – Multi-Position Optical (also called MTP)		-

Common fiber optic connectors. *See* EX1015, 9; *see also* EX1019.

52. The key aspect to a fiber connection is the precise alignment of each fiber core for proper light coupling. The fiber core itself is extremely small in diameter, often as small as or smaller than 10 μm . A fiber connector needs to provide precise alignment of the fiber cores to ensure proper signal coupling.

53. Alignment is often achieved using a “butt-joint alignment” mechanism in which the ferrule both secures and aligns the fiber. Inside each fiber optic adapter is typically an alignment sleeve that serves to bring together the mating single-fiber ferrules of the two connectors, as shown in the figure below.

Additionally, as mentioned previously, oftentimes springs are utilized to provide axial compliance when ferrules are pressed together and to apply a compressive force for ensuring contact is maintained during use.



Physical connection between two joined fibers. *See* EX1015, 8.

C. Fiber Optic Polarity

54. When connecting two multi-fiber optic cables, such as in a bidirectional communication system, it is crucial that the connection system provides a means for maintaining the correct signal polarity (*i.e.*, signal transmission or receiving) that corresponds to the desired direction in which data travels through a fiber optic system. In other words, to ensure proper functionality of the fiber optic system, the transmitter on one end of a fiber optic channel must be connected to the receiver on the other end of a fiber optic channel.

55. Therefore, duplex optic fiber connectors may contain a key (or keys) to ensure that the polarity of each connector's ferrule properly matches the polarity

of its corresponding receptacle (*e.g.*, port in an adapter or patch panel). For some connectors, such as LC duplex connectors, the orientation of the connector's two ferrules with respect to the connector's latch is used to indicate the polarity of the connector. For example, the connector's latch being disposed above the two ferrules—right ferrule having “A” polarity and left ferrule having “B” polarity—indicates a first polarity, whereas the connector's latch being disposed below the two ferrules—right ferrule having “A” polarity and left ferrule having “B” polarity—indicates a second polarity opposite to the first polarity. *See, e.g.*, EX1004, 3:7–32.

56. Oftentimes, the polarity of two connectors may need to be reversed when upgrading components or making other changes to a fiber optic system. The ability to reverse the polarity of a fiber optic connector without having to alter the corresponding receptacle to which the connector is connected (*e.g.*, a port in an adapter or on a fiber optic patch panel) allows for a reduction in overall part count by negating the need for a separate fiber optic connector or adapter. Therefore, there is generally a desire to provide fiber optic connectors with keys (and/or latches) that can be removably coupled to the connectors' housing to provide “cross-polarity adjustment.” *See, e.g.*, EX1004, 3:7–32.

V. U.S. PATENT NO. 11,061,190

A. Overview and Background

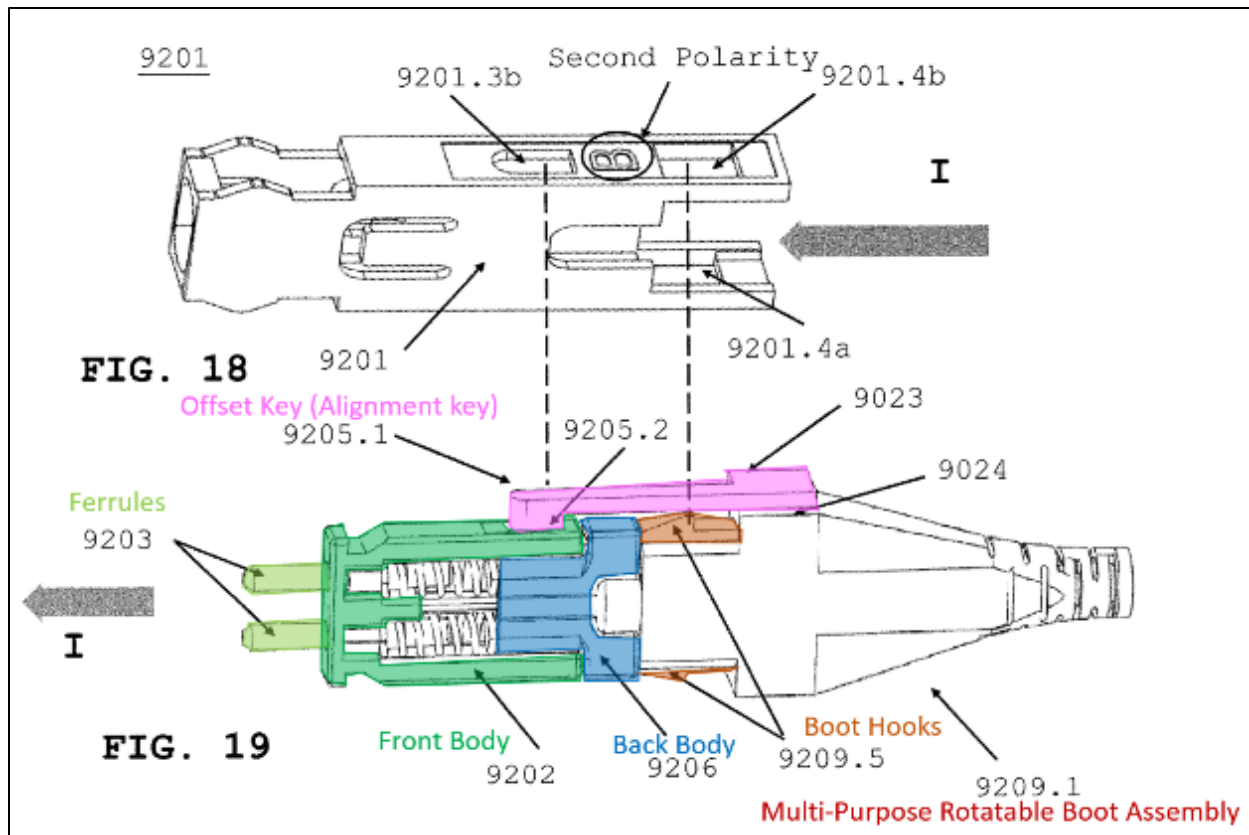
57. U.S. Patent No. 11,061,190 (EX1001) (the “’190 Patent”), entitled “Small Form Factor Fiber Optic Connector with Multi-Purpose Boot Assembly,” issued on July 13, 2021, was filed as U.S. Patent Application Serial No. 16/782,196 (the “’196 Application”) on February 5, 2020. The ’196 Application is a division of application No. 16/368,828, filed on Mar. 28, 2019, (now Pat. No. 10,705,300), and a continuation of application No. 16/103,555, filed on Aug. 14, 2018, (now Pat. No. 10,718,911), which is a continuation-in-part of application No. 16/035,691, filed on Jul. 15, 2018, (now Pat. No. 10,281,668), which claims priority to U.S. Provisional Application No. 62/588,276 filed on November 17, 2017, U.S. Provisional Application No. 62/549,655 filed on August 24, 2017, and U.S. Provisional Application No. 62/532,710 filed on July 14, 2017. Based on the above, the earliest possible priority date for the ’190 Patent is July 14, 2017.

58. The ’190 Patent generally discloses “ultra-small form factor optical connectors” and “related connections within adapters and optical transceivers.” EX1001, 1:28-31. The ’190 Patent explains that “[t]he prevalence of the Internet has led to unprecedented growth in communication networks”, leading network providers to “continuously find ways to improve quality of service while reducing cost.” EX1001, 1:35-39. The ’190 Patent introduces high-density interconnect

panels as one solution for reducing costs by “increasing [the] volume of interconnections necessary to support the fast-growing networks into a compacted form factor.” EX1001, 1:40-46. Additionally, the ’190 Patent states “more optical connectors may need to be accommodated in the same footprint previously used for a smaller number of connectors in order to provide backward compatibility with existing data center equipment.” EX1001, 1:51-55. The ’190 Patent discloses that “[i]n a high-density panel configuration, adjacent connectors and cable assemblies may obstruct access to the individual release mechanisms”, and “[s]uch physical obstructions may impede the ability of an operator to minimize the stresses applied to the cables and the connectors.” EX1001, 2:11-15.

B. Discussion of Certain Embodiments

59. The ’190 Patent generally discloses optical connectors having a multi-purpose rotatable boot assembly for polarity change. EX1001, Abstract. In some embodiments, the “multi-purpose rotatable 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 and 19 (see annotated figures below).



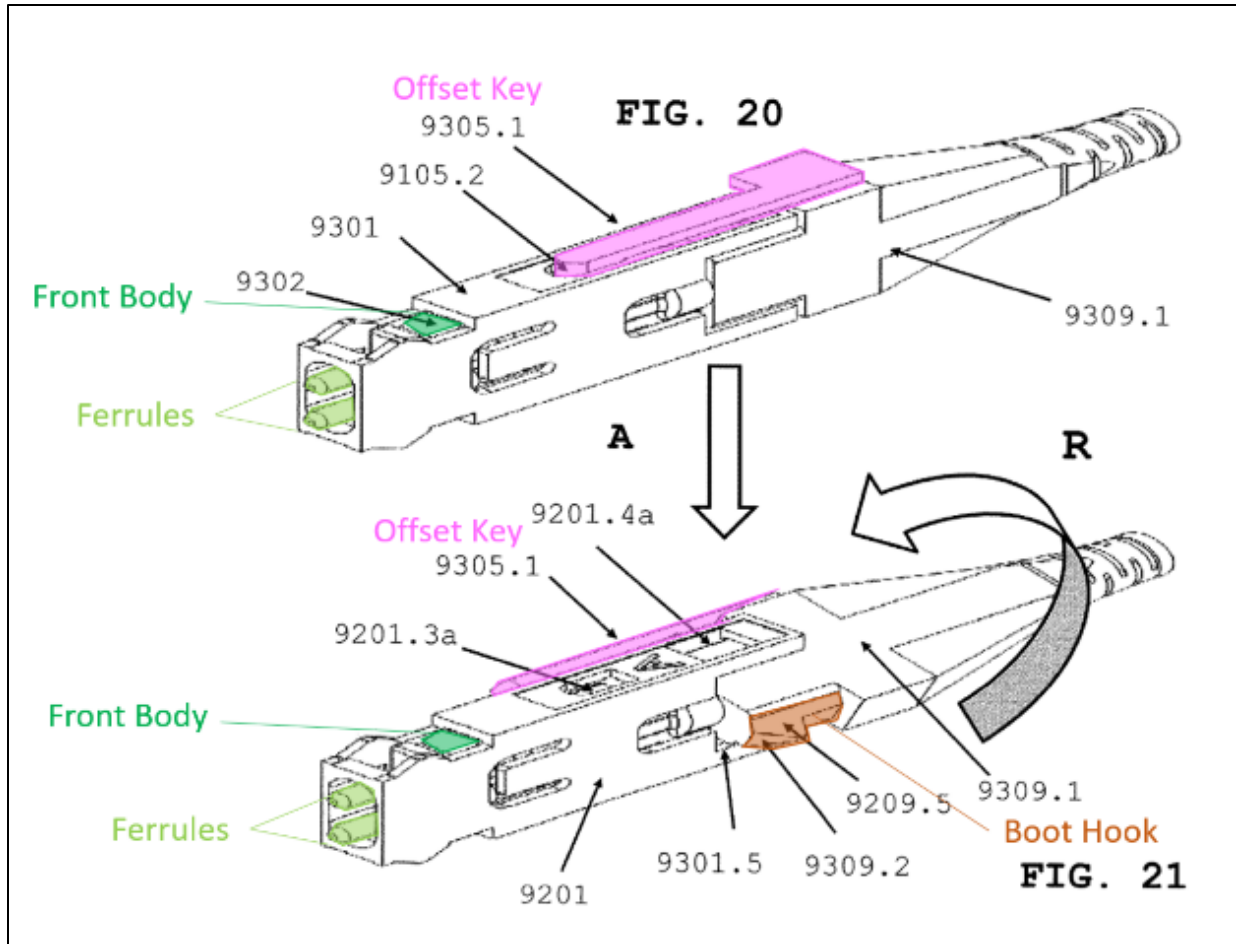
EX1001, FIGs. 18 and 19 (annotated¹).

60. The polarity “is determined by the ferrules 9203 [...], where a first ferrule is for Tx or transmit and a second ferrule is for Rx or receive.” EX1001, 4:53-55. The '190 Patent suggests that the first ferrule and the second ferrule are held by the front body 9202. EX1001, FIG. 19.

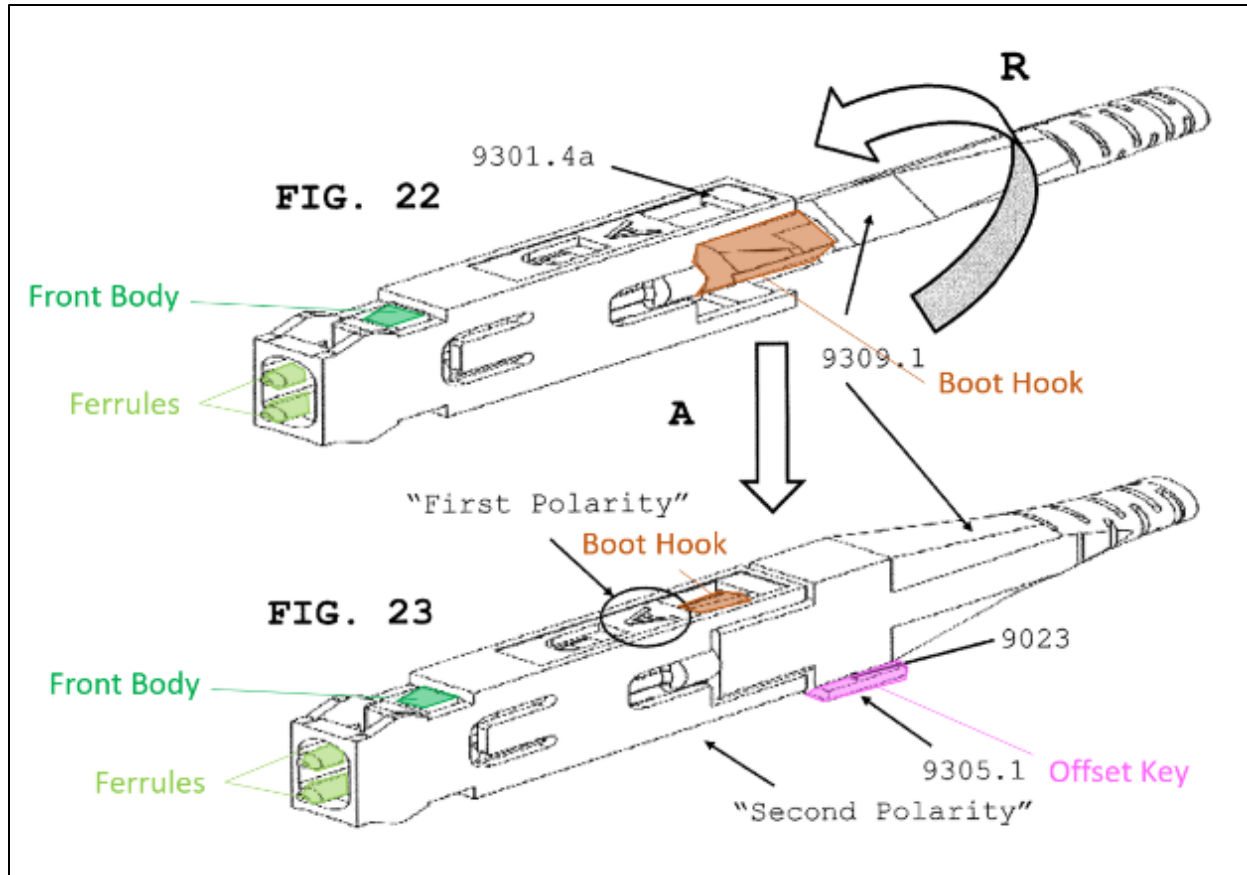
61. The polarity of the connector can be reversed by rotating the multi-purpose rotatable boot assembly. In some embodiments, as shown in Figures 20-

¹ All color annotations to figures in this declaration are added unless otherwise noted.

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 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 FIG. 20, to Second Polarity position ‘B’.” EX1001, 7:4-9. As shown in Figure 20, “front body 9302 and boot assembly 9309.1 are assembled in micro connector housing 9301 with alignment and offset key 9305.1 in a first polarity position.” EX1001, 7:1-3. In contrast, as shown in Figure 23, the alignment key 9305.1 “is in Second Polarity position or ‘B’ polarity.” EX1001, 7:31-33. As such, the alignment and offset key 9305.1 is configured for “selectively setting the optical fiber connector to each of a first polarity and a second polarity.” EX1001, Claim 1.



EX1001, FIGs. 20 and 21 (annotated).

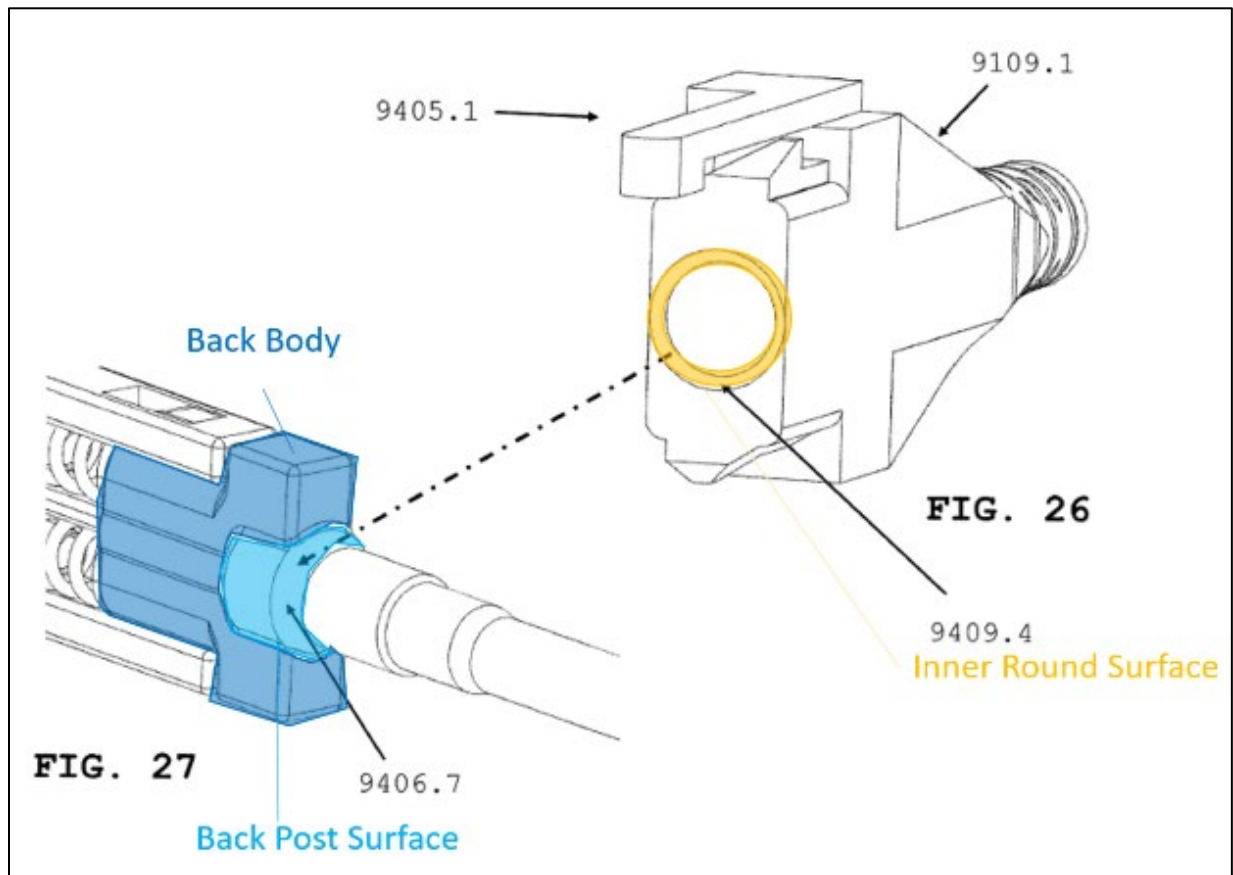


EX1001, FIGs. 22 and 23 (annotated).

62. Also as shown in Figures 20-23, the boot hook has a “[c]hamfer 9309.2 [that] engages [the] wall 9301.5 of connector outer housing” before the rotation, and the “chamfer 9309.2 lifts boot hook 9209.5 out of a distal end of connector housing 9301 and is freed from” a slot of the connector outer housing, “thereby allowing the boot assembly to rotate.” EX1001, 7:11-17. As such, the boot hooks are “configured for releasably securing the multi-purpose rotatable boot assembly against rotation relative to the back body.” EX1001, Claim 1.

63. The '190 Patent further describes a mechanism that allows rotation of a multi-purpose boot assembly. The '190 Patent explains that “[r]eferring to FIG.

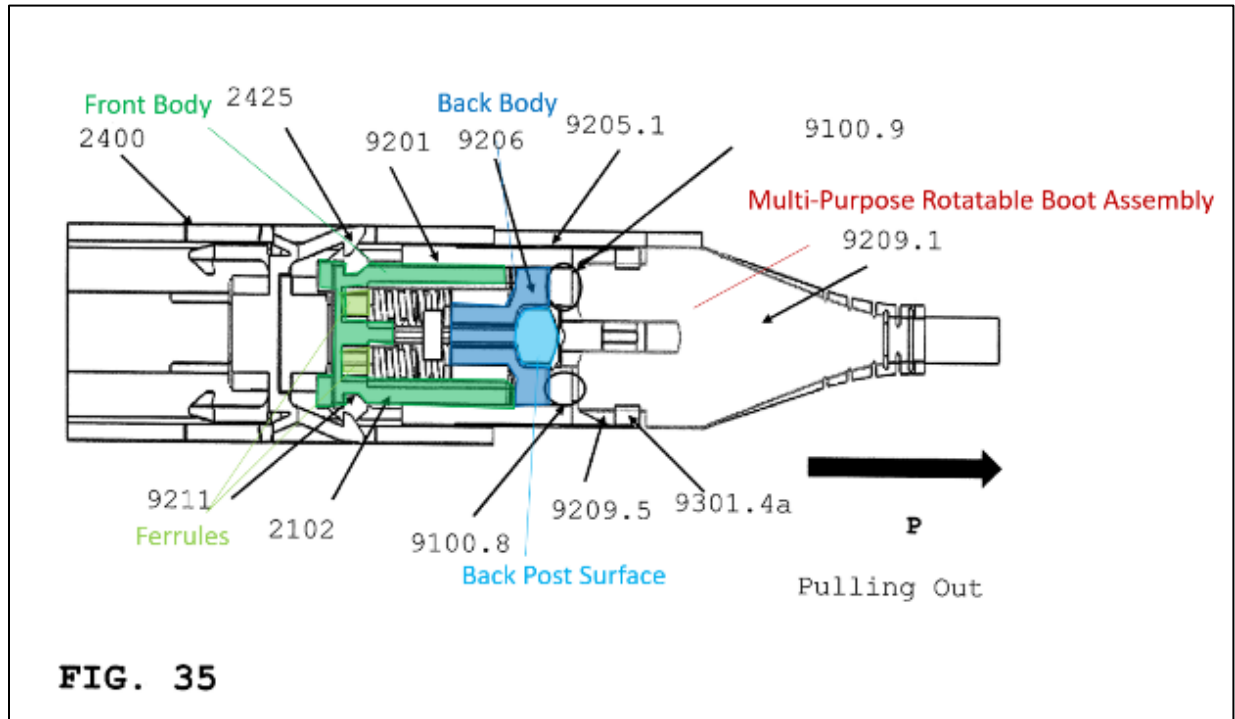
26, inner round 9409.4 engages a back post surface 9406.7 formed as an outer round shown at FIG. 27, as the assembly 9209.1 is rotated. Inner round and outer round form mating surfaces that can freely rotate thereby allowing multi-purpose boot assembly to be rotated about fiber optic connector housing.” EX1001, 7:59-65.



EX1001, FIGs. 26 and 27 (annotated).

64. The '190 Patent further explains how to disconnect the multi-purpose boot assembly from an adapter. The '190 Patent discloses that “[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

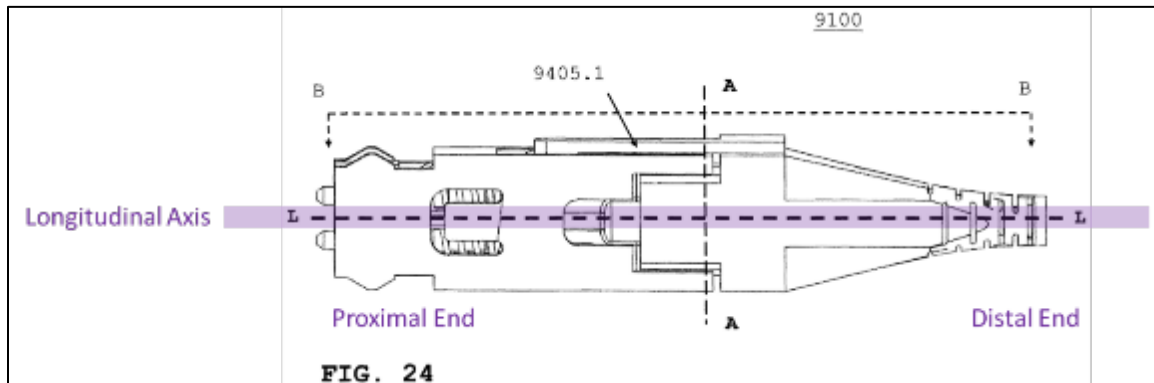
unlatch connector from adapter interface.” EX1001, 8:66-9:2. As such, “boot hooks slide upon pulling connector from adapter using rotatable boot assembly.” EX1001, 9:11-14.



EX1001, FIG. 35 (annotated).

65. With respect to claim language interpretation, the '190 Patent defines a longitudinal axis of the fiber optic connectors as the “L-L” axis of Figure 24, reproduced and annotated below, extending from a proximal end (*i.e.*, the end closer to the ferrules) to a distal end (*i.e.*, the end closer to the cable). EX1001, 6:11, 6:58-59, 7:48-54, Claim 5. However, it is worth noting that the definition of the proximal and distal ends of the connector is not consistent between the '190 Patent and the prior arts discussed. Throughout my analysis herein, when I refer to the proximal and distal ends, it is the above-described interpretation, which is also

illustrated below, to which I refer.



EX1001, FIG. 24 (annotated).

66. Additionally, with respect to claim language interpretation, I note that the '190 Patent explicitly states:

It will be understood by those within the art that, in general, terms used herein, and especially in the appended claims (for example, bodies of the appended claims) are generally intended as “open” terms (for example, the term “including” should be interpreted as “including but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes but is not limited to,” et cetera). For example, as an aid to understanding, the following appended claims may contain usage of the introductory phrases “at least one” and “one or more” to introduce claim recitations. However, the use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles “a” or “an” limits any particular claim containing such introduced claim recitation to embodiments containing only one such recitation, even when the same claim includes the introductory phrases “one or more” or “at least one” and indefinite articles such as “a” or “an” (for example, **“a” and/or “an” should be interpreted to mean “at least one”**

or “one or more”).

EX1001, 10:51-11:3 (emphasis added).

C. Summary of Relevant Prosecution History

67. In an office action notified on September 25, 2020, the ’190 Patent was rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 9,684,130 to Veatch in view of U.S. Publication No. 2011/0299814 to Nakagawa. EX1003, 0085-91.

68. According to the rejection, the Examiner asserted that Veatch in view of Nakagawa disclosed all features recited in Claims 1-2 and 4-6 of the original claims.

69. The Examiner rejected original Claim 1 by stating that the “boot wing” recited in the original Claim 1 is not disclosed in Veatch by alleging that “Veatch fails to explicitly disclose at least one ‘boot wing’ for securing the boot.” EX1003, 0089. However, the Examiner carefully emphasized that the “boot wing” recited in the original Claim 1 was recited as an “intended use.” EX1003, 0089. The Examiner asserted that “the intended use of the wing is not a positive limitation.” EX1003, 0089. In other words, the Examiner emphasized that Veatch disclosed all the features of Claim 1.

70. “For purposes of examination and advancing prosecution,” the Examiner interpreted the “boot wing” “as a boot wing configured to secure a boot.” and the Examiner alleged that “Veatch fails to explicitly disclose at least

one ‘boot wing.’” EX1003, 0089. However, the Examiner stated that Nakagawa disclosed “such securing wings” after interpreting the boot wing. EX1003, 0089.

71. On the other hand, the Examiner found that the original Claim 3 recited an allowable subject matter. The Examiner stated that “Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.” 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.**” EX1003, 0090 (emphasis added). The Examiner also admitted that “Claim 7 is allowed for the same reasons.” EX1003, 0090.

72. On February 25, 2021, Patent Owner filed amendments and remarks in response to the office action. The amendment to Claim 1 deleted most of the features of the original Claim 1 and added new features instead. Patent Owner also added new Claims 8 through 22.

73. The Examiner allowed the amended claims. The Notice of Allowance was issued on March 26, 2021.

D. Claims of the ’190 Patent

74. The ’190 Patent was issued with 20 claims, of which Claims 1 and 5 are independent claims. Independent Claim 1 recites an optical fiber connector

with a rotatable boot assembly and Claim 5 recites an alignment and offset key with a protrusion. The “Challenged Claims” of the ’190 Patent include Claims 1-3, 6-16, and 19-20. I reproduce independent Claim 1 below for reference.

1. Independent Claim 1 of the ’190 Patent

75. **Claim 1** recites:

[1pre] 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.

EX1001, 11:5-49.

VI. CLAIM INTERPRETATION

76. I understand that in interpreting claims, I should consider the literal language of the claim at issue, as well as the language of other claims, the specification, and the prosecution history of the underlying claims.

77. I also understand that the words of a claim should be given their plain and ordinary meaning as understood by those of skill in the art, unless it is clear from the specification or prosecution history (or both) that a different meaning was intended.

78. I understand that Petitioner does not propose any claim constructions. I agree that no constructions are necessary to determine whether the prior art discussed below establishes the elements recited in the claims.

79. To the extent Patent Owner or the Board proposes any claim interpretation or construction not covered in this Declaration, I reserve my right to review and potentially modify any opinions below in view of such constructions. However, the prior art shows the claims to be unpatentable under any construction.

VII. PRIOR ART

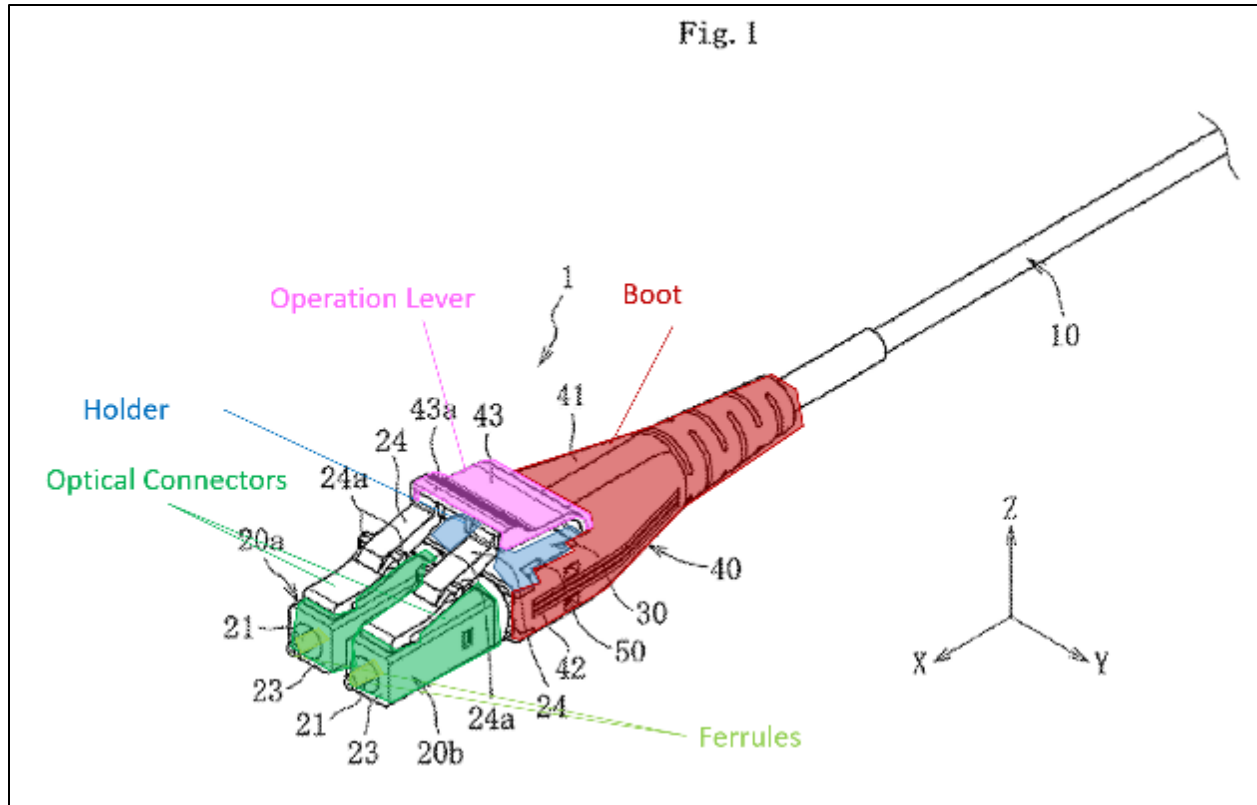
A. Overview of Nakagawa

80. U.S. Patent Publication No. 2011/0299814 is titled “Duplex Optical Connector Unit” (hereinafter “Nakagawa”). EX1007, cover. The inventor is Masaya Nakagawa. EX1007, cover. Nakagawa was published on December 8, 2011. EX1007, cover. The application was filed on May 26, 2011. Nakagawa

claims priority of a patent application filed in Japan as Japan Patent Application No. 2010-128967, which was filed on June 4, 2010. EX1007, cover.

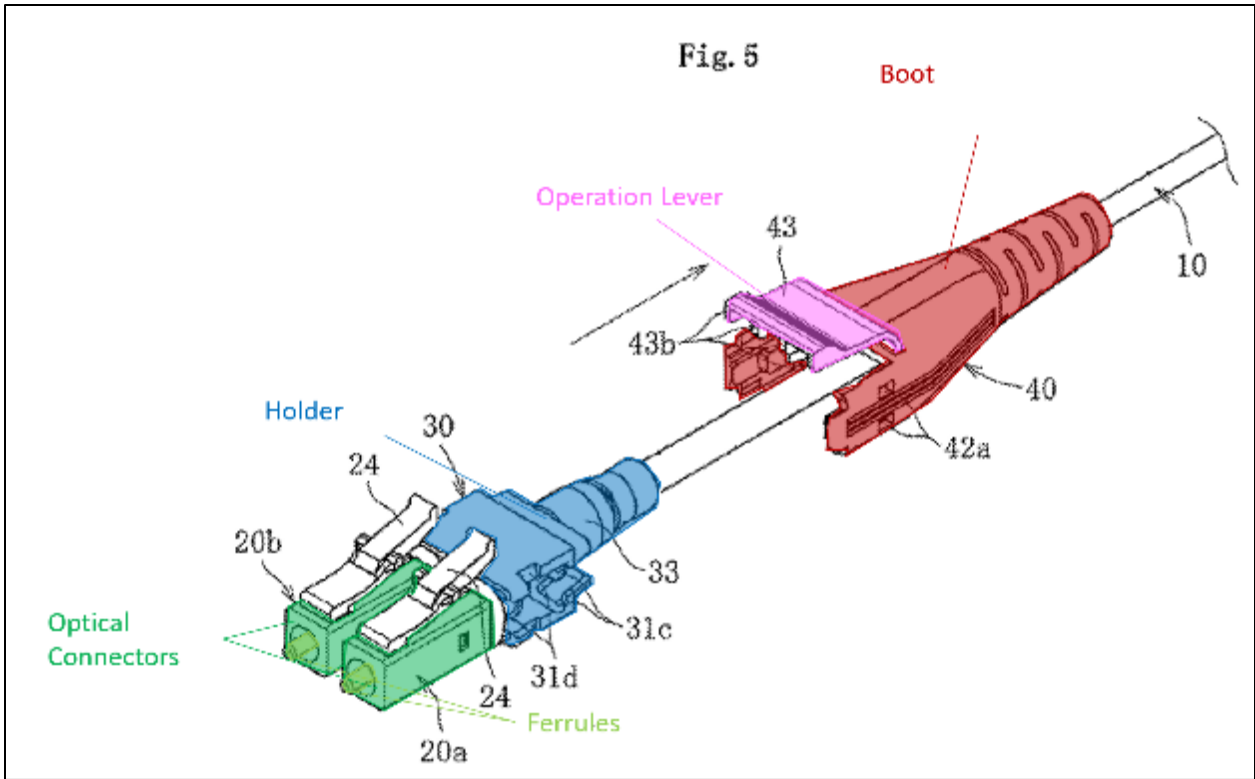
81. I understand that Nakagawa is prior art to the '190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Nakagawa has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and thus Nakagawa qualifies as prior art at least for this reason. I further understand that Nakagawa's publication date was well before the earliest possible priority date of the '190 Patent and so Nakagawa is also prior art for this reason.

82. Nakagawa discloses an optical connector unit including input and output optical connectors 20a and 20b that are LC type connectors that hold ferrules 11 and 12, a holder 30, a boot 40, and operation lever 43. More specifically, Nakagawa teaches "[t]he optical connectors 20a, 20b are both an LC type connector", and "each include a ferrule 21 fixed to the leading end of the bare fiber 11 or 12." EX1007, ¶47. Figure 1 of Nakagawa, reproduced and annotated below, illustrates the described optical connector unit.

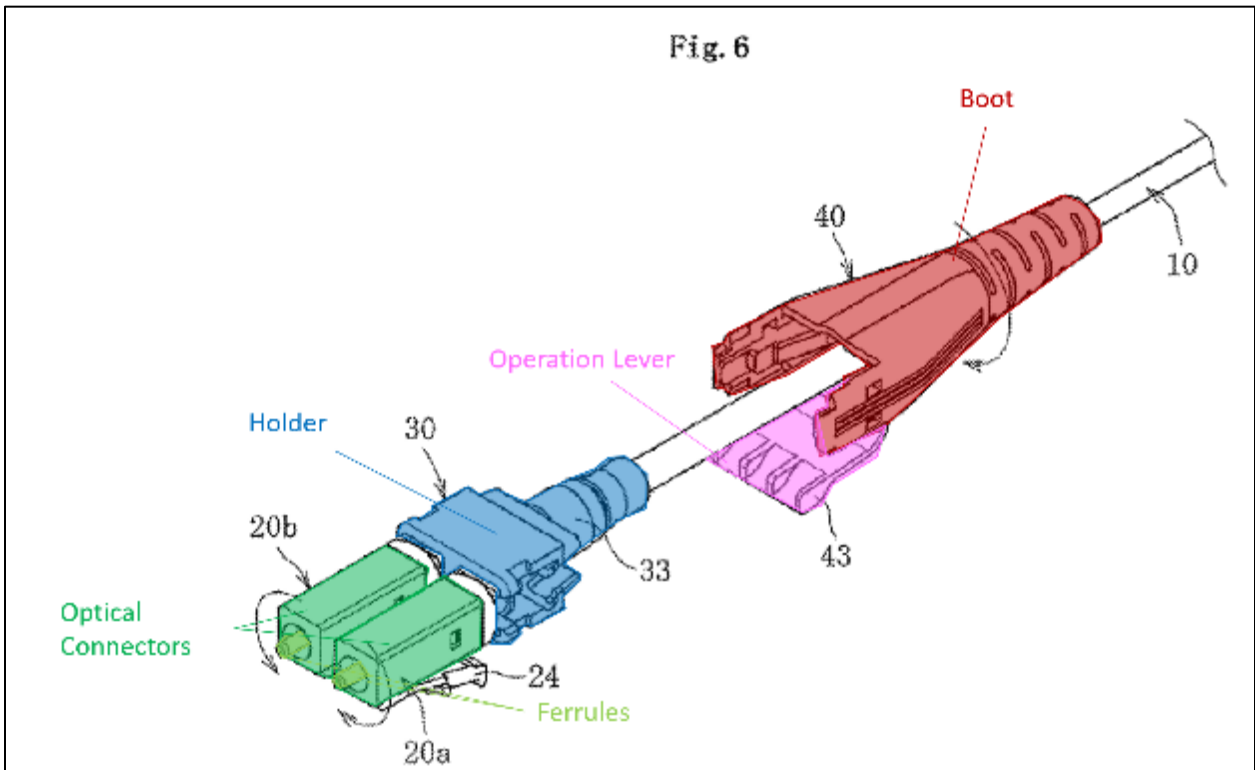


EX1007, FIG. 1 (annotated).

83. In more detail, 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 the boot 40 relative to the holder 30. EX1007, ¶61, *see also* EX1007, ¶¶60, 62. Figures 5-6, reproduced and annotated below, illustrate the steps required to rotate the boot 40 to effectuate a polarity change.



EX1007, FIG. 5 (annotated).



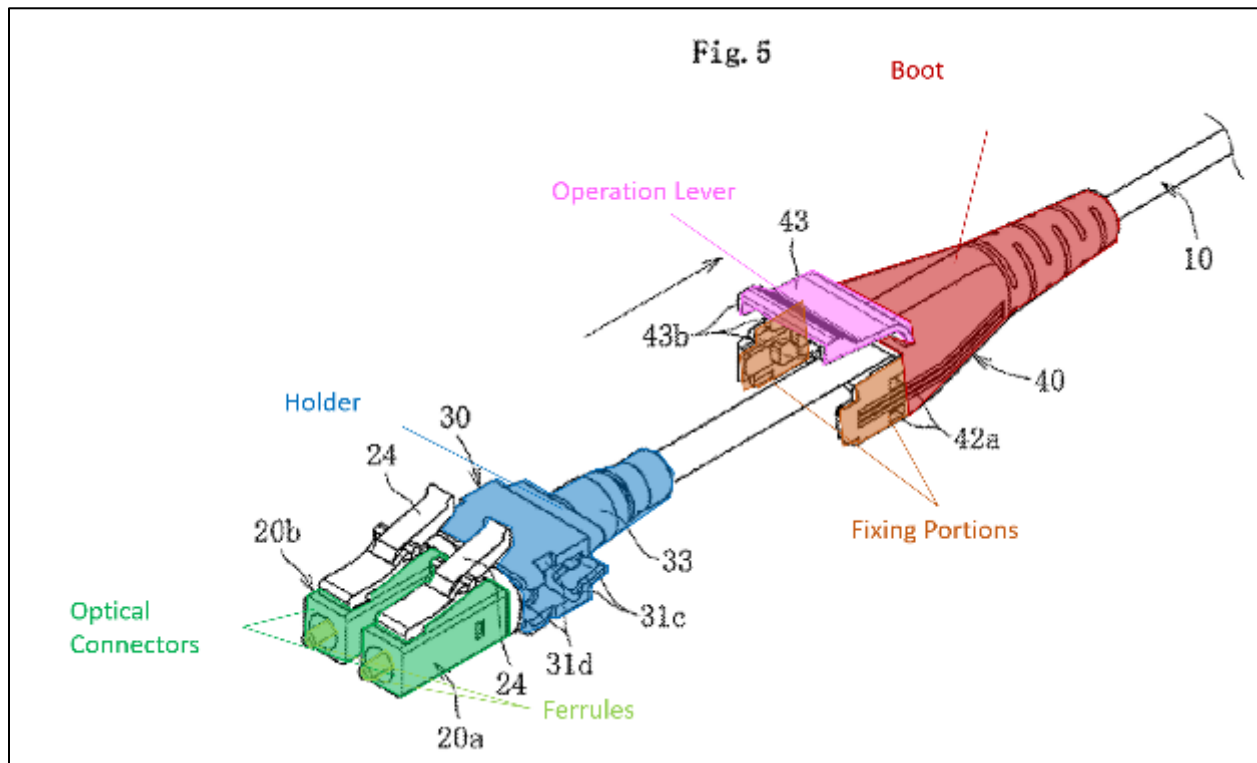
EX1007, FIG. 6 (annotated).

84. 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. “The operation lever 43 includes a leading end portion” and “[t]he leading end portion functions as a pressing part 43a for downwardly pressing the pair of locking levers 24, 24.” EX1007, ¶58. Nakagawa further explains that “[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.” EX1007, ¶58.

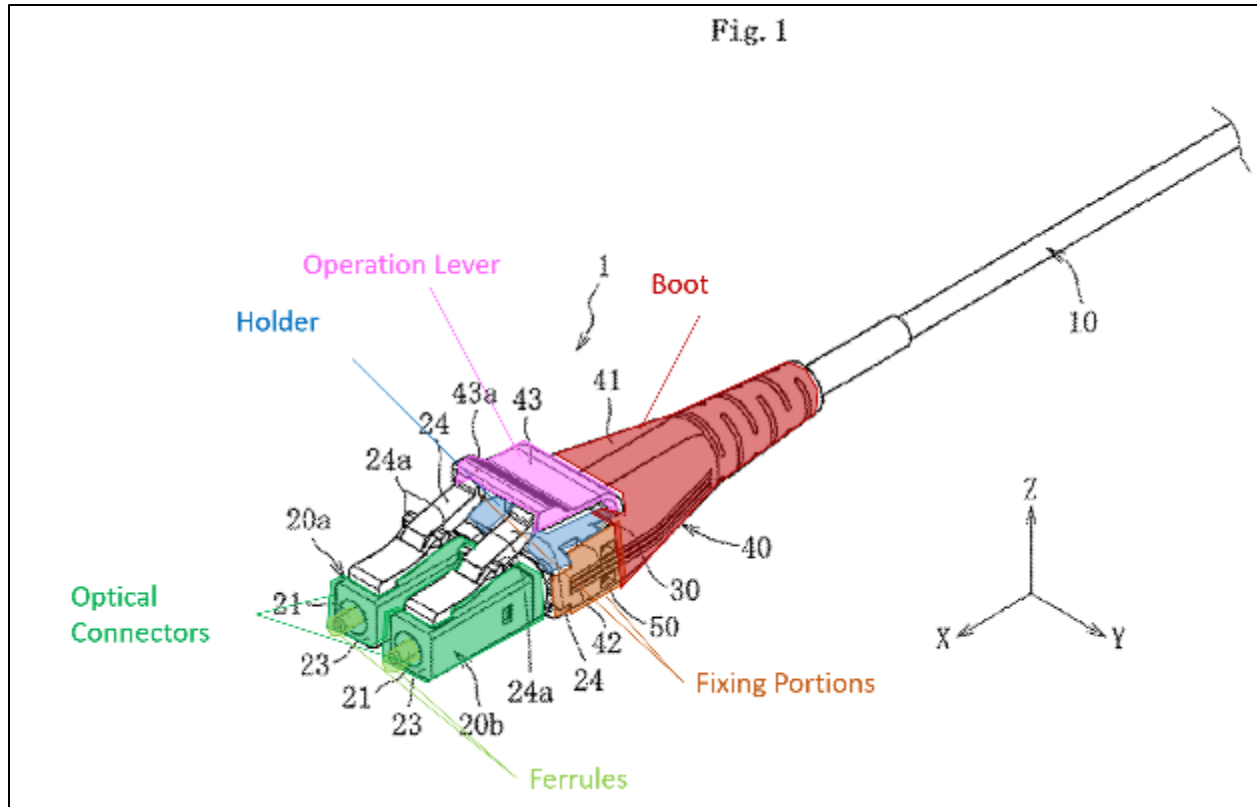
85. Nakagawa indicates that the position of the operation lever is flipped up and down when the optical connector is rearranged to change its polarity. Nakagawa’s optical connectors 20a and 20b are configured to be changed (*i.e.*, reverse polarity) by rotating the boot 40 relative to the holder 30. EX1007, ¶¶60, 62. Thus, the operation lever 43 integrated with the boot 40 also rotates to change the polarity.

86. 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. Nakagawa further discloses that “[t]he fixing portions 42 each include fitting holes 42a formed therein, for fitting the protrusions 31c of the main body portion 31 of the holder 30” EX1007, ¶57. Figures 5 and 1, reproduced and annotated below, illustrate how the fixing portions 42 fix the holder 30.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 1 (annotated).

B. Overview of Raven

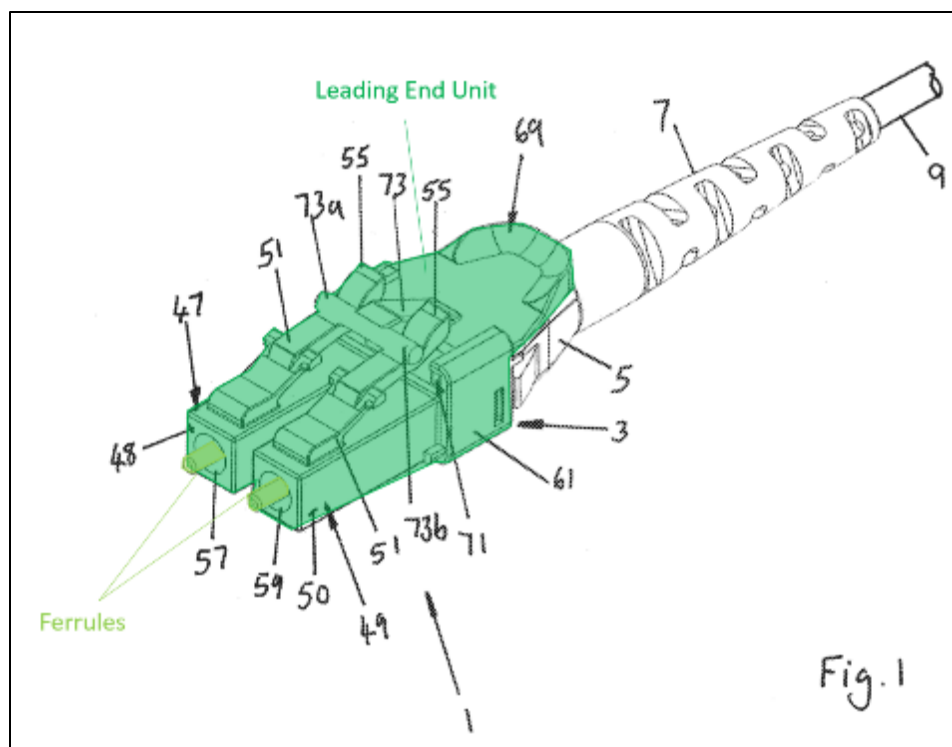
87. U.S. Patent No. 9,557,495 is titled “Fibre Optic Connector Device” (hereinafter “Raven”). EX1008, cover. The inventors are Asher Raven, Nicholas Blockley, and Alan Keizer. EX1008, cover. The application from which Raven issued was published on October 1, 2015 as U.S. Publication No. 2015/0277059 A1. EX1008, cover. The application was filed on October 9, 2013 and claims priority of Great Britain Patent Application No. GB1218194.7 filed on October 10, 2012. EX1008, cover.

88. I understand that Raven is prior art to the ’190 Patent based on my understanding of the legal standards as discussed above and discussions with

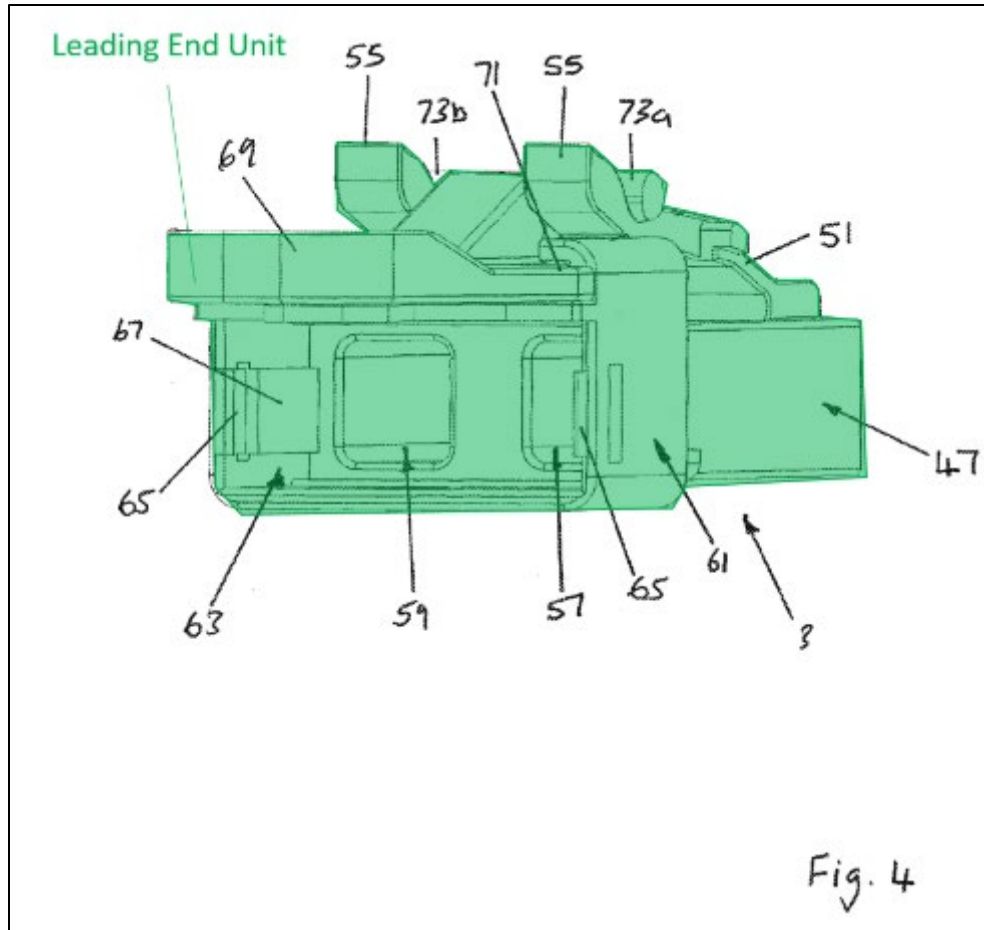
counsel. In particular, I understand that Raven has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and so Raven qualifies as prior art at least for this reason. I further understand that Raven's publication date was well before the earliest possible priority date of the '190 Patent and so Raven is also prior art for this reason.

89. Raven "relates to a connector device for a fibre 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. Raven states one problem in the field of optical connectors at the time of the invention was that "it is not uncommon for the installers to get confused between the transmitting and receiving cables and a cross over can occur" and "it is necessary for the installer to replace the existing cable or remove the connecting head from the fibres and effectively remanufacture the cable on site, which is very cumbersome and time consuming." EX1008, 1:23-35.

90. To address this issue, Raven discloses a "leading end unit 3" included in a "duplex fibre optic cable assembly 1." EX1008, 9:51-52. As shown in Figures 1 and 4, reproduced and annotated below, the leading end unit 3 comprises a single body and includes their respective cavities 59, 57 where the ferrules 27, 33 protrude from. EX1008, 11:32-36.

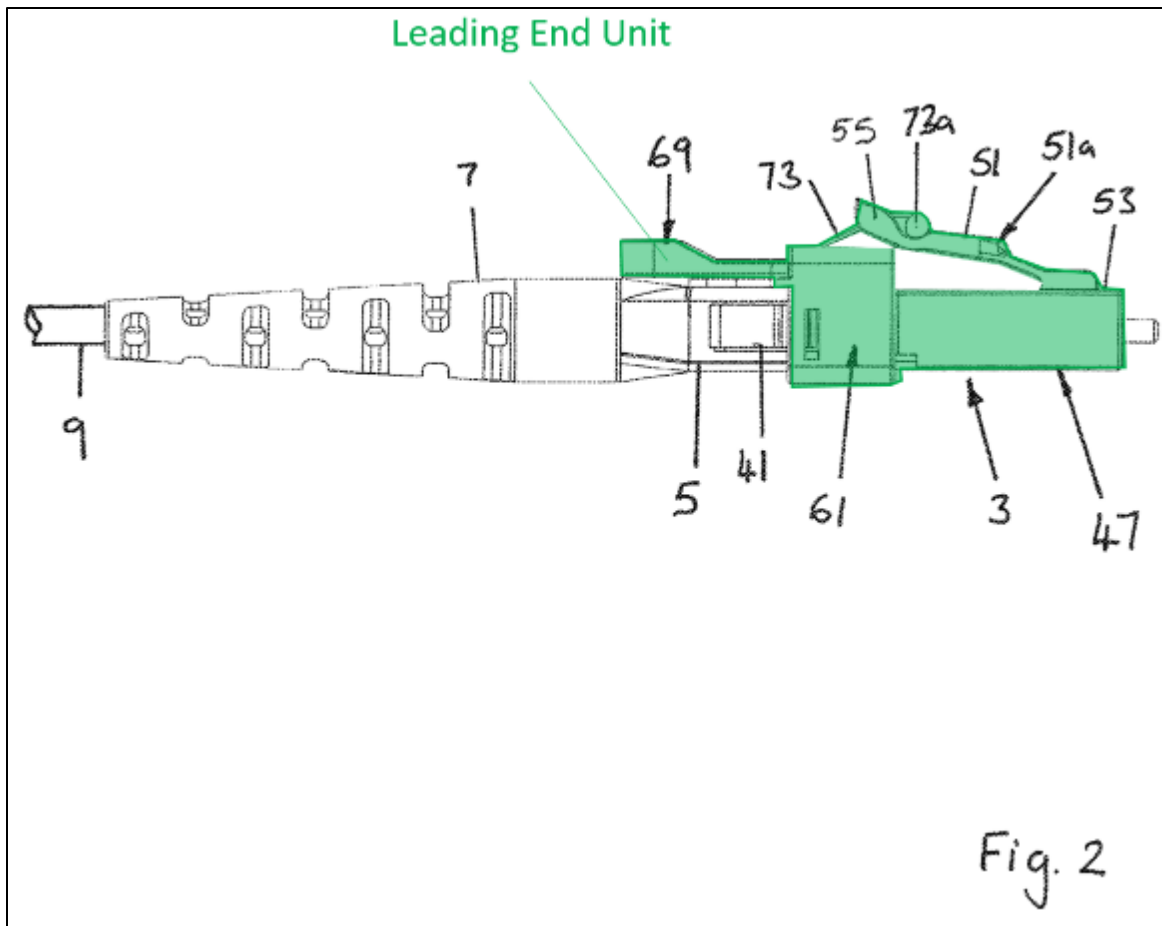


EX1008, FIG. 1 (annotated).

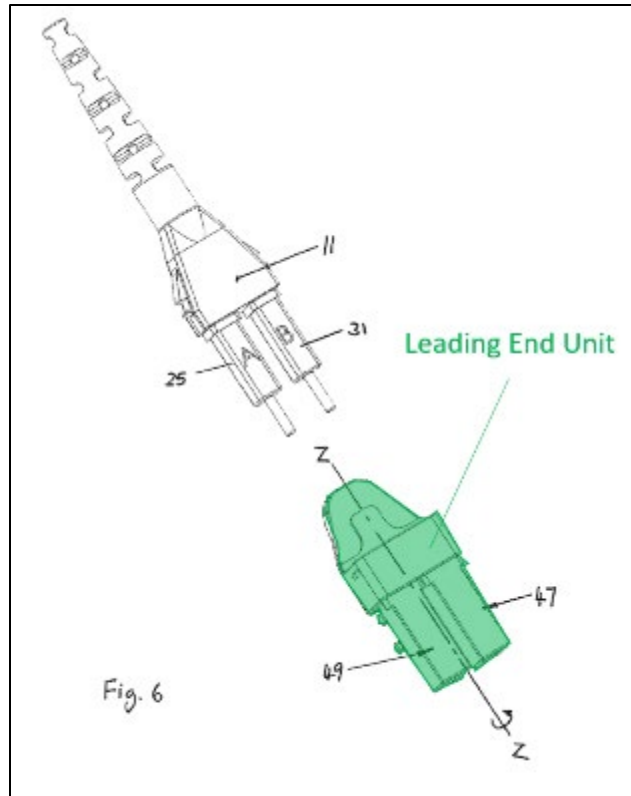


EX1008, FIG. 4 (annotated).

91. Raven teaches that the polarity can be changed by removing the leading unit 3 from the cable and rotating it. 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. The removed leading unit 3 is “reattached to the housing 5 in a second orientation that is inverted with respect to the initial orientation” so that “the polarity of the first and second optical fibres is reversed.” EX1008, 12:38-42.



EX1008, FIG. 2 (annotated).



EX1008, FIG. 6 (annotated).

92. As such, “a user is able to easily change the polarity of the duplex fibre optic cable assembly by simply removing the leading end unit 3 and changing its orientation with respect to the housing assembly, thereby changing the polarity of the transmitting and receiving fibre optic cables with respect to the complementary connector.” EX1008, 12:47-52. Raven explains that “[t]his is a more convenient and quicker way of attaching a plurality of fibre optic connectors to the housing assembly than having to change the orientation of each fibre optic connector individually.” EX1008, 3:2-6.

C. Overview of Irwin

93. U.S. Patent No. 8,764,308 is titled “Duplex Clip Assembly for Fiber

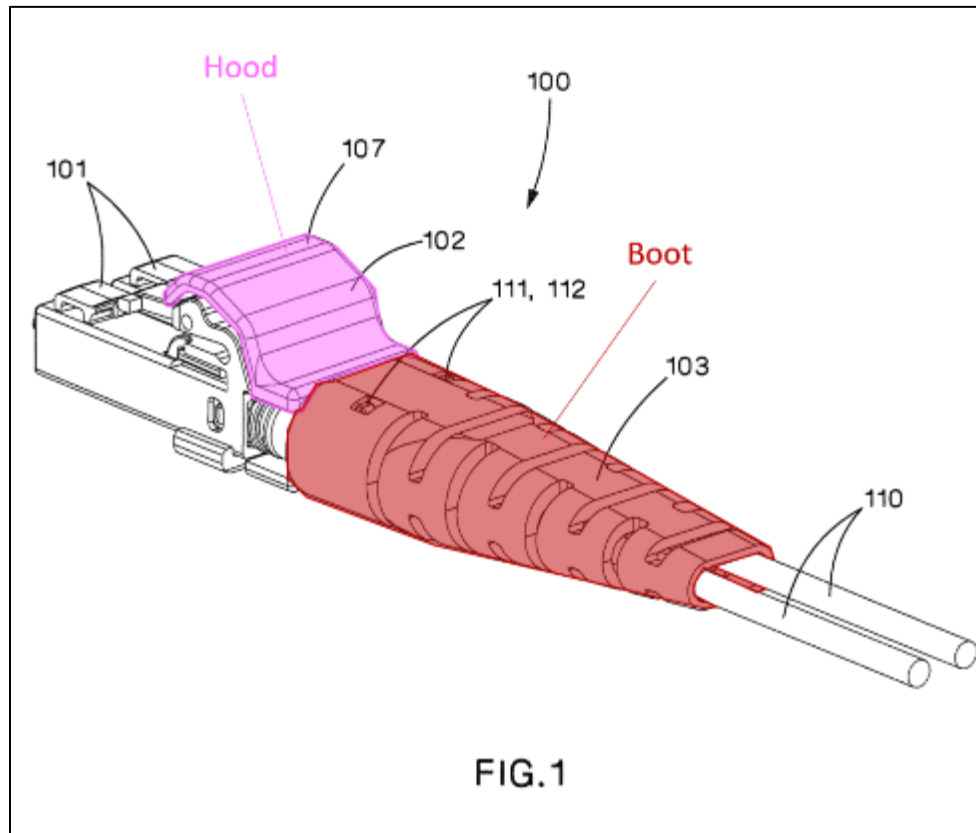
Optic Connectors” (hereinafter “Irwin”). EX1009, cover. The inventors are Philip J. Irwin and John G. Dalton. EX1009, cover. The application from which Irwin issued was published on December 6, 2012 as U.S. Publication No. 2012/0308183 A1. EX1009, cover. The application was filed on June 6, 2011 and published on July 1, 2014.

94. I understand that Irwin is prior art to the '190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Irwin has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and so Irwin qualifies as prior art at least for this reason. I further understand that Irwin's publication date was well before the earliest possible priority date of the '190 Patent and so Irwin is also prior art for this reason.

95. Irwin “relates generally to fiber optic connectors and more specifically to duplex clip assemblies for LC type connectors.” EX1009, 1:6-8. Irwin expresses concern about the “high density of the equipment” and states that it is “desirable to be able to remove connectors without having to reach the connector housings in order to depress the connector latches.” EX1009, 1:15-19.

96. Irwin discloses an LC duplex clip assembly 100 including “a pair of LC connectors 101, a clip body 102, and a boot 103.” EX1009, 2:49-51. The clip body 102 has a hood 107 “protrud[ing] from the top of the clip body 102.”

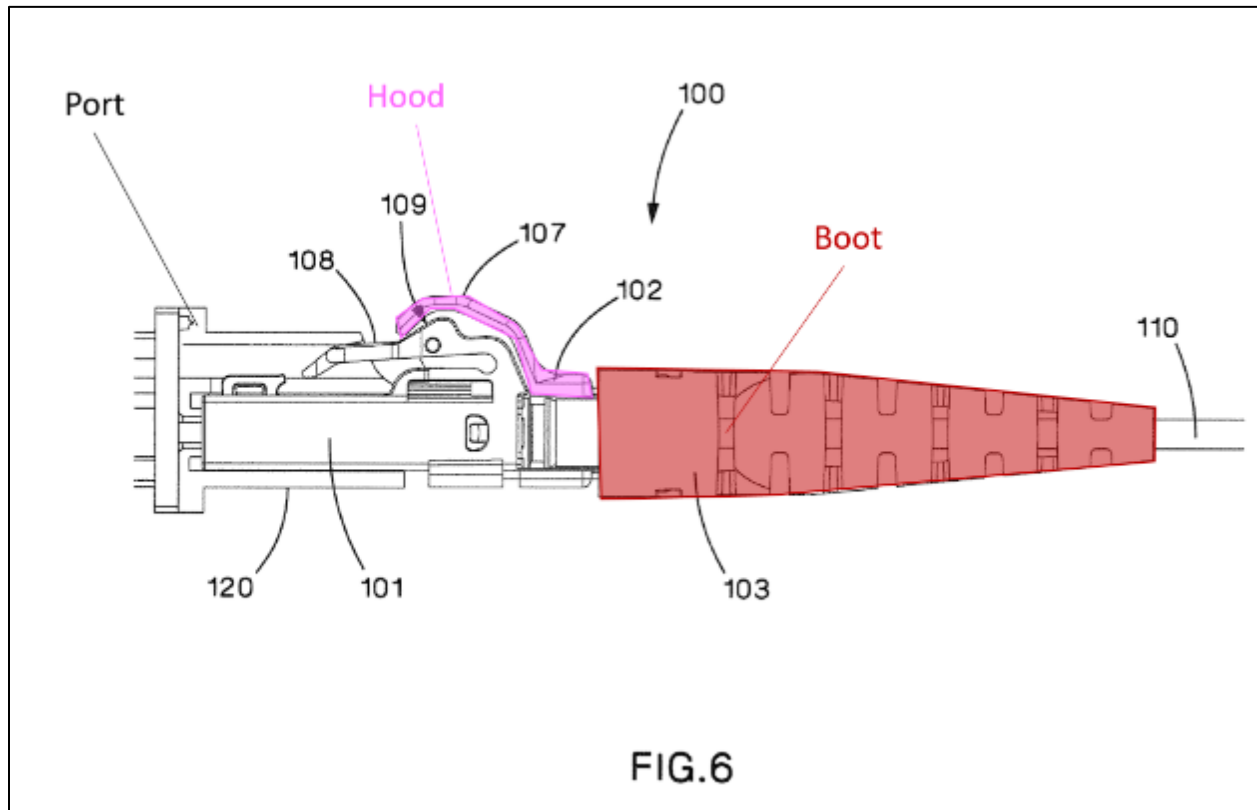
EX1009, 2:59-61, FIG. 1 (see annotated below).



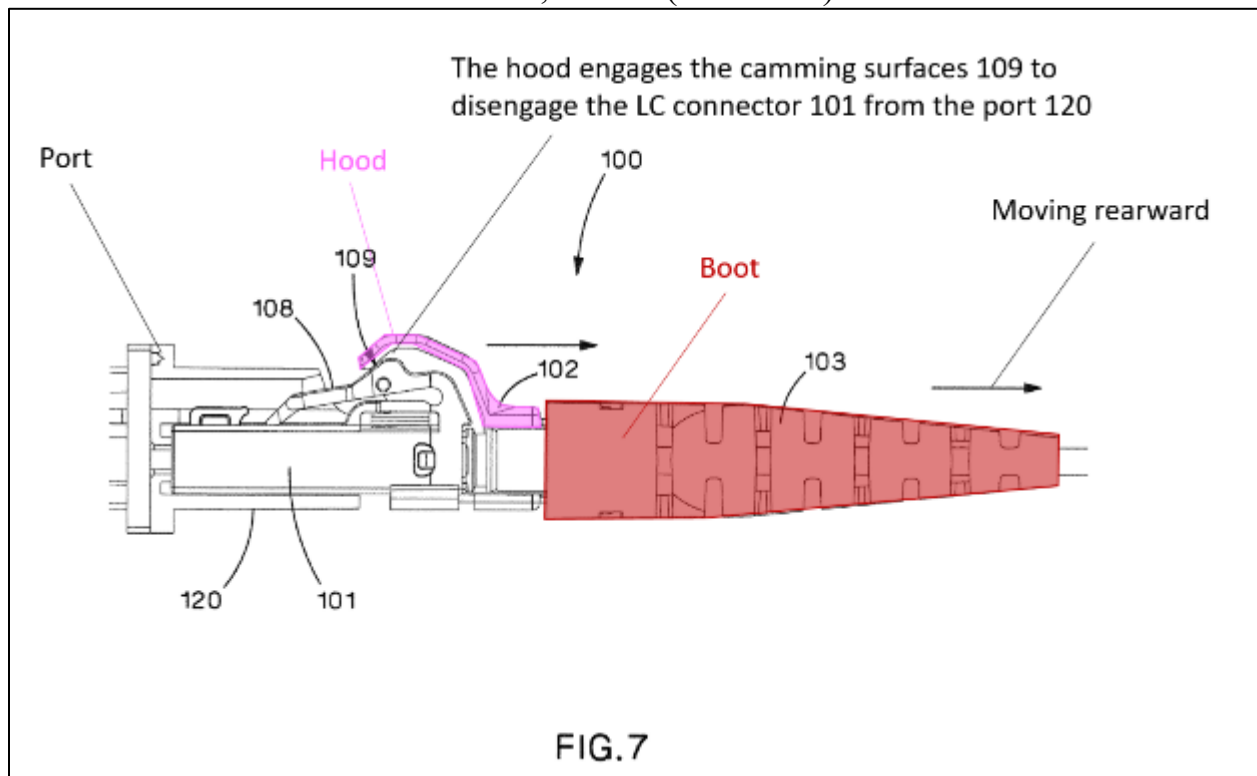
EX1009, FIG. 1 (annotated).

97. Pertinent to my discussion in this Declaration is how to disengage the LC connector 101 from the port 120. Irwin explains that “[t]he hood 107 is configured to engage a camming surface 109 on the LC connector latches 108 when the boot 103 and clip body 102 are moved in an axially rearward direction relative to the LC connectors 101.” EX1009, 2:61-64. Irwin explains the LC connector is disengaged from the port 120 by “moving the boot 103 and clip body 102 axially rearward relative to the LC connectors” that “causes the hood 107 to engage the camming surfaces 109 of the LC connector latches 108.” EX1009, 3:7-

11, FIGs. 6-7 (see annotated below).



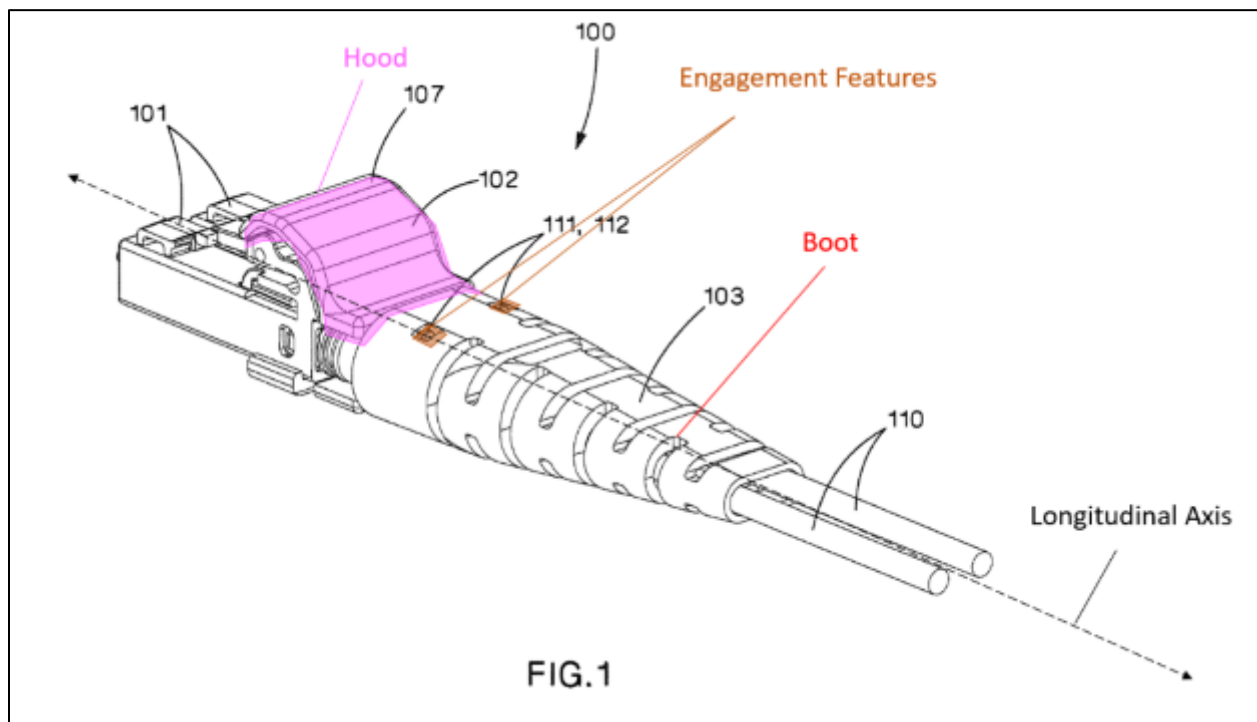
EX1009, FIG. 6 (annotated).



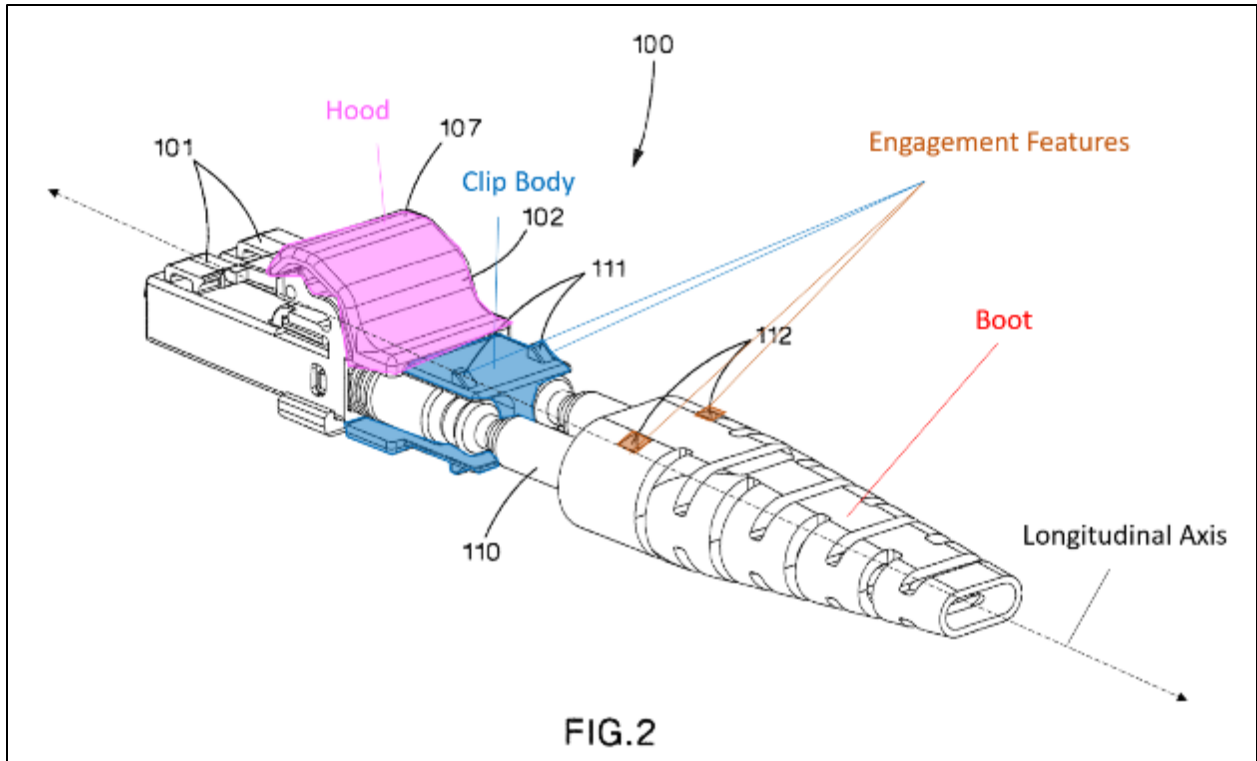
EX1009, FIG. 7 (annotated).

98. The method of securing the boot 103 to the clip body 102 is also relevant to my discussion in this Declaration. As shown in Figures 1-4 reproduced and annotated below, Irwin teaches that “the boot 103 connects to the clip body 102 via engagement features 111, 112 on the clip body 102 and boot 103.”

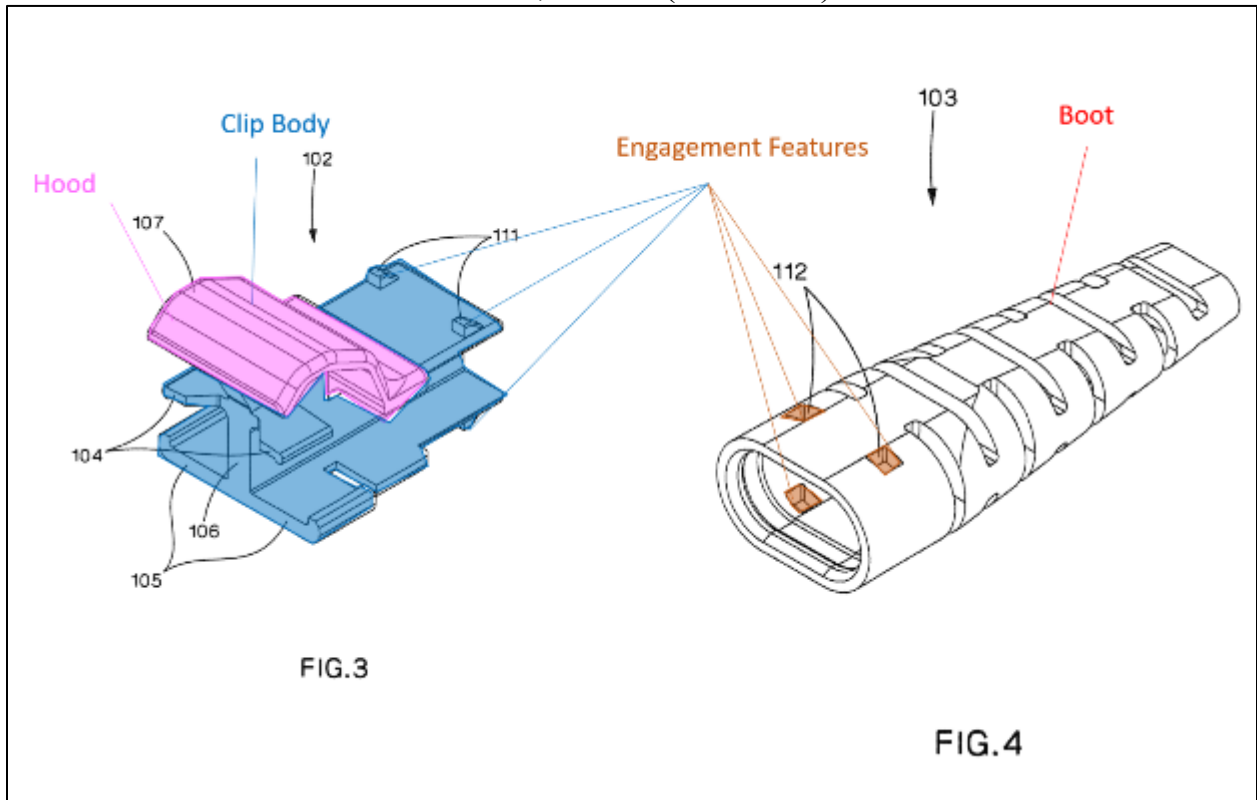
EX1009, 3:1-3.



EX1009, FIG. 1 (annotated).



EX1009, FIG. 2 (annotated).



EX1009, FIGs. 3-4 (annotated).

99. As depicted in Figures 3 and 4, the engagement features 112 of the

boot 103 and the corresponding engagement features 111 of the clip body 102 are located on the top and bottom surfaces of the boot 103 and clip body 102.

D. Overview of Cline

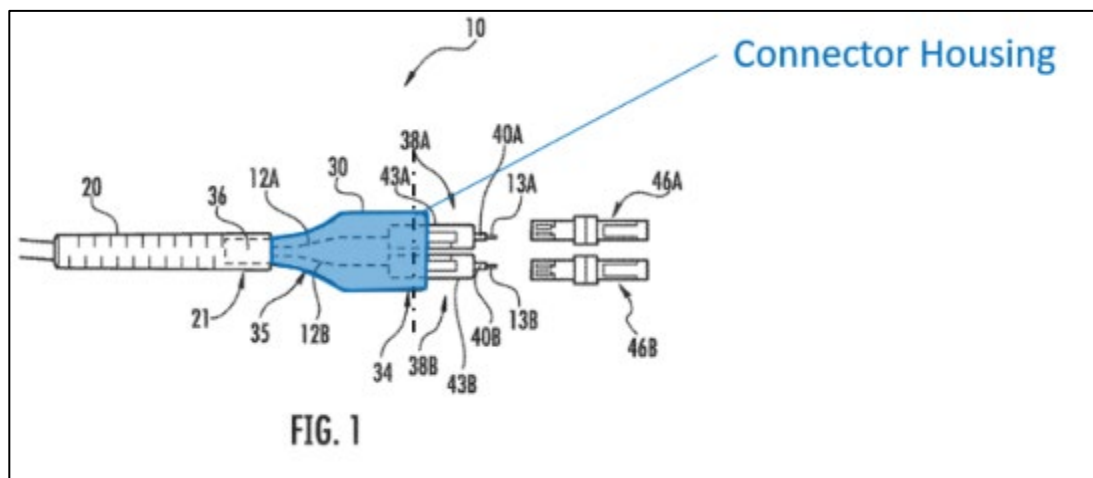
100. U.S. Patent No. 8,662,760 is titled “Fiber Optic Connector Employing Optical Fiber Guide Member” (hereinafter “Cline”). EX1006, cover. The inventors are Timothy S. Cline, Terry L. Cooke, David L. Dean, Jr., and Tory A. Klavuhn. EX1006, cover. The application from which Cline issued was published on May 3, 2012 as U.S. Publication No. 2012/0106897 A1. EX1006, cover. The application was filed on October 29, 2010 and published on March 4, 2014.

101. I understand that Cline is prior art to the '190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Cline has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and thus Cline qualifies as prior art at least for this reason. I further understand that Cline's publication date was well before the earliest possible priority date of the '190 Patent and therefore Cline is also prior art for this reason.

102. Cline “relates generally to fiber optic connectors, and in particular relates to fiber optic connectors that employ an optical fiber guide member configured to protect at least one optical fiber during connector assembly.” EX1006, 1:6-9. For example, Cline discloses a cable assembly 8 including “a

duplex LC fiber optic connector (‘connector’) 10 and a duplex fiber optic cable (‘cable’) 16.” EX1006, 3:21-24. Cline’s “[c]able assembly 8 also includes a flexible boot 20 and connector 10.” EX1006, 3:41-42.

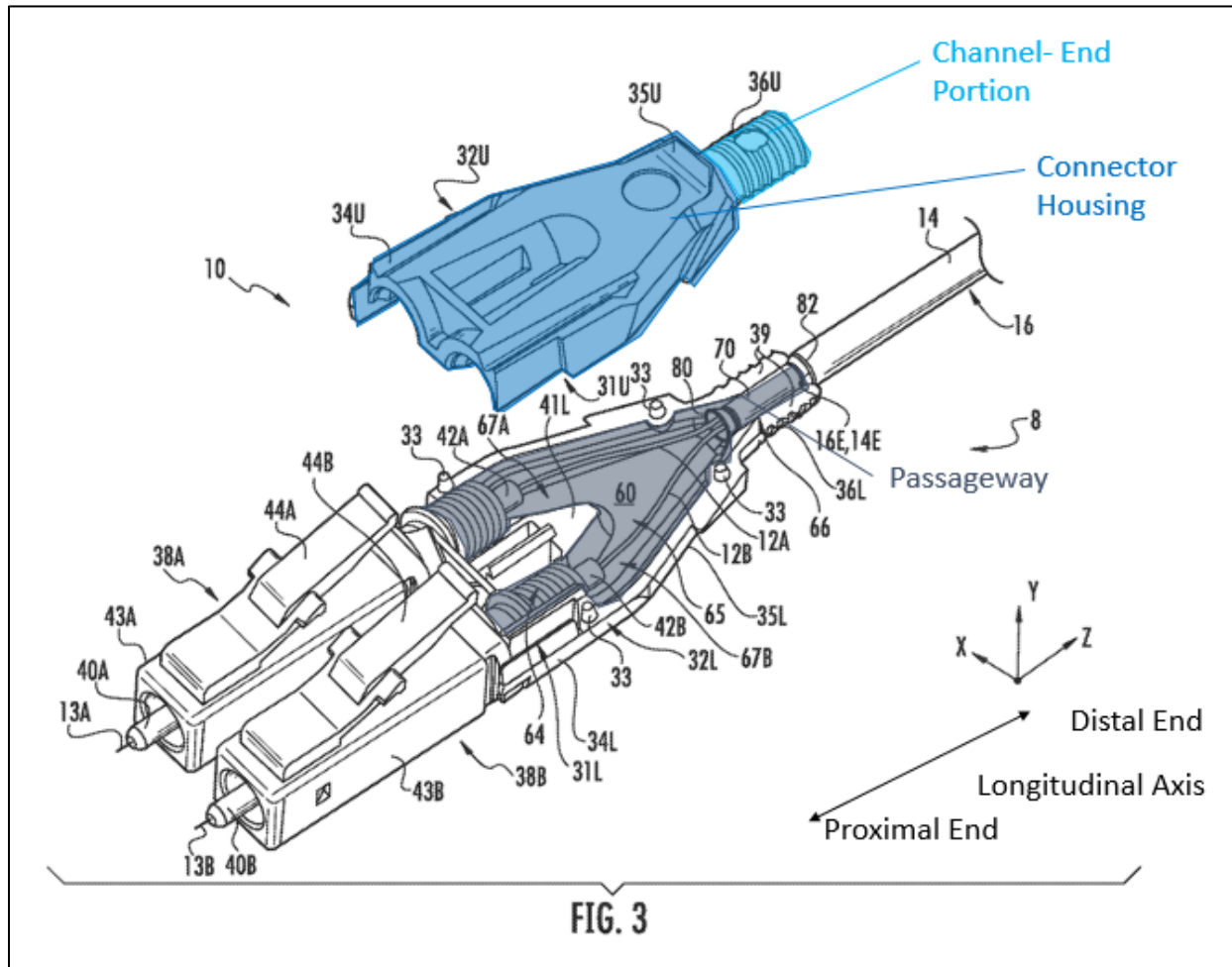
103. Cline describes a connector 10 that “includes a connector housing 30.” EX1006, 3:41-42. As shown in Figure 1, reproduced and annotated below, the boot 20 “engages a channel-end portion 36 of connector housing 30.” EX1006, 3:42-45. The connector housing also supports “two fiber optic connector sub-assemblies (‘connector sub-assemblies’) 38A, 38B.” EX1006, 4:29-30.



EX1006, FIG. 1 (annotated).

104. As shown in Figure 3 of Cline, reproduced and annotated below, a distal end of the connector housing 30 has a 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, 3:55-56, 3:62. Additionally, as illustrated in Figure 3 below, the channel end portion 36 has

a cylindrical shape and forms a passageway for accommodating a cable 16. Indeed, the end portion 36 has an “optical fiber guide member 70 arranged in channel-end passage 66” and Cline explains that “optical fiber guide member 70 is in the form of a cylindrical tube with a round or oval cross-section.” EX1006, 4:45-52.



EX1006, FIG. 3 (annotated).

105. Cline also teaches that the connector housing 30 has a tapered shape that tapers from the proximal end to the distal end. For example, Cline discloses that the 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. As a result of the tapering, Cline also teaches that its proximal end segment, the connector-end portion 34, has an elongated cross-sectional shape.

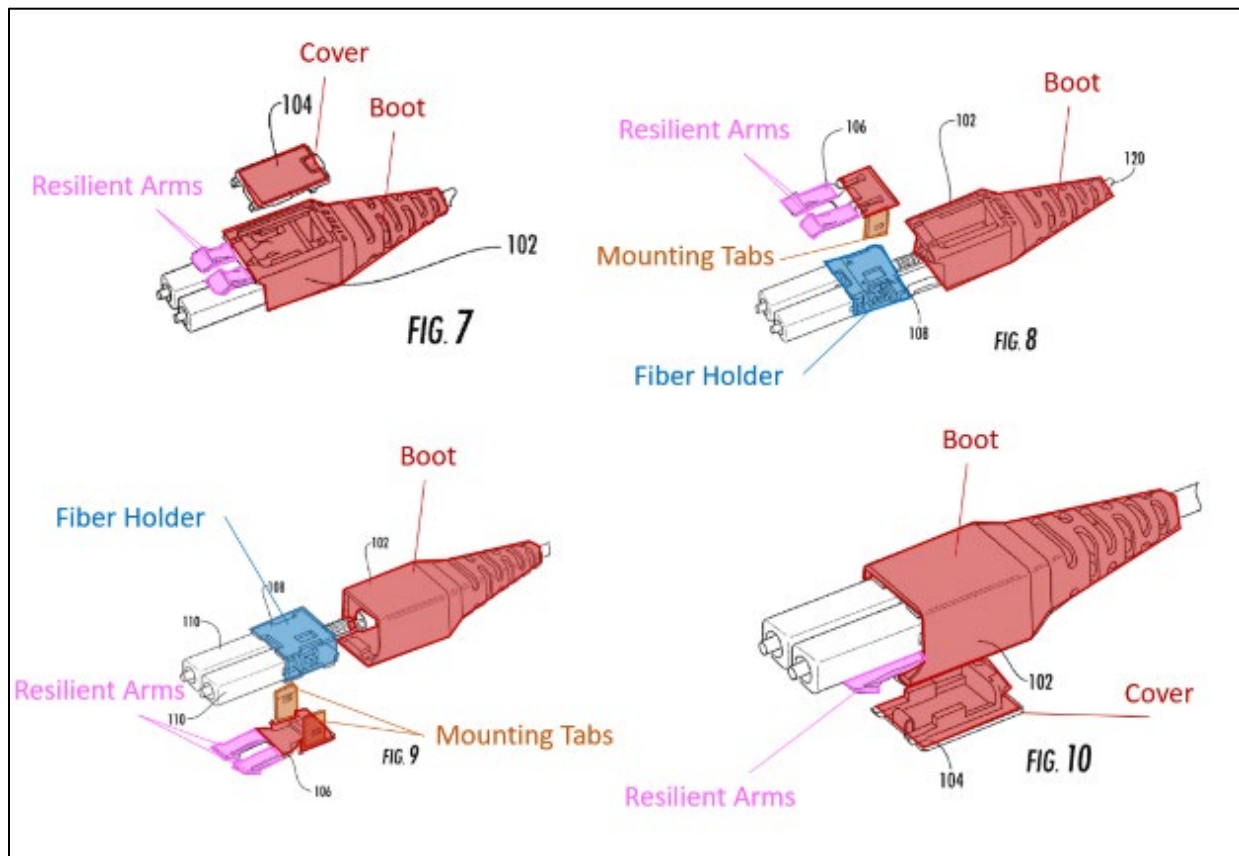
E. Overview of Veatch

106. U.S. Patent No. 9,684,130 is titled “Fiber Optic Connector with Polarity Change” (hereinafter “Veatch”). EX1004, cover. The inventors are Anthony Veatch, John A. Siemon, Johnny Zheng, Alex Yao, and Scott Nagel. EX1004, cover. Veatch was published on June 20, 2017. The application from which Veatch issued was published on June 19, 2014 as U.S. Publication No. 2014/0169727 A1. EX1004, cover. Veatch is based on International Patent Application No. PCT/US2012/035934, which was filed on May 1, 2012. EX1004, cover. Veatch claims priority to two U.S. provisional patent applications – U.S. Provisional Application No. 61/482,265 filed on May 4, 2011 and U.S. Provisional Application No. 61/567,726 filed on December 7, 2011.

107. I understand that Veatch is prior art to the ’190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Veatch has a filing date prior to the earliest possible priority date of the ’190 Patent (July 14, 2017), and so Veatch qualifies as

prior art at least for this reason. I further understand that Veatch's publication date was before the earliest possible priority date of the '190 Patent and so Veatch is also prior art for this reason.

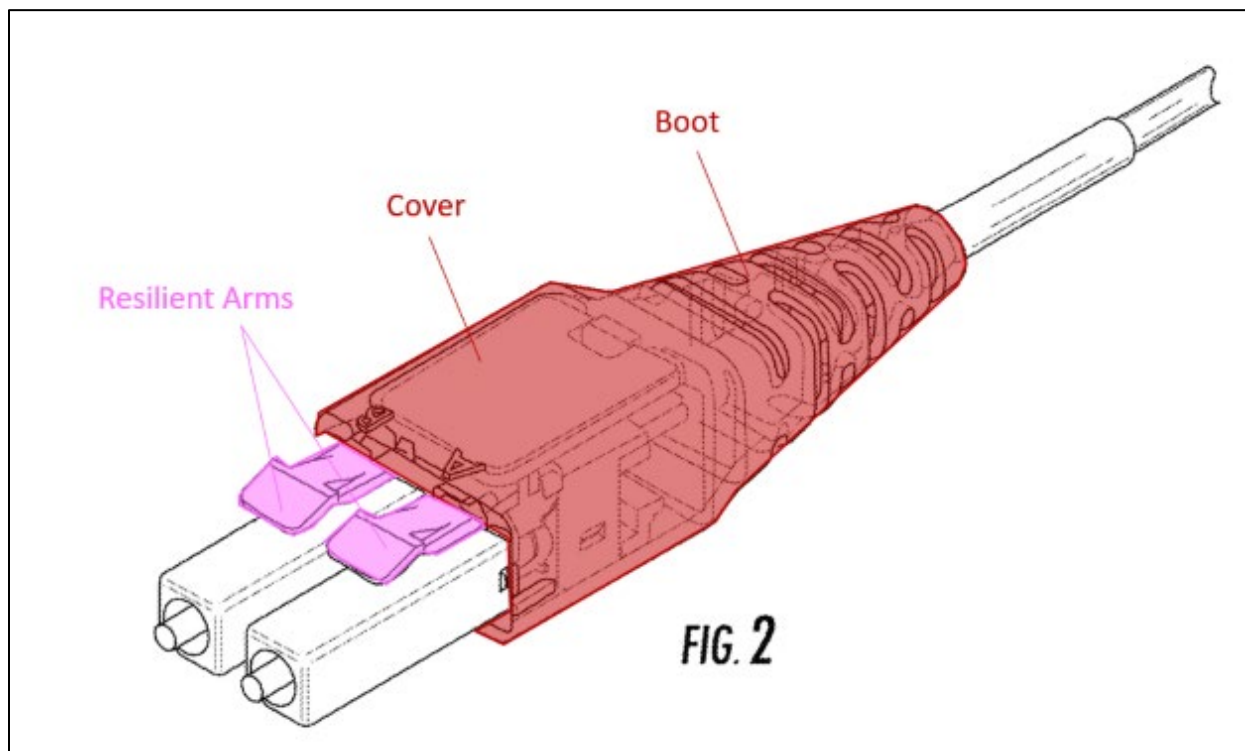
108. Veatch discloses a fiber optic connector that includes a boot, a connector body, and a latch coupled to the connector body. EX1004, Abstract, FIG. 2. Veatch's fiber optic connector is configured to reverse polarity by rotating the boot 180 degrees. EX1004, 3:8-20. Figures 7-10 of Veatch, reproduced below, illustrate the steps to rotate the boot 102 to effectuate a polarity change:



EX1004, FIGs. 7-10 (annotated).

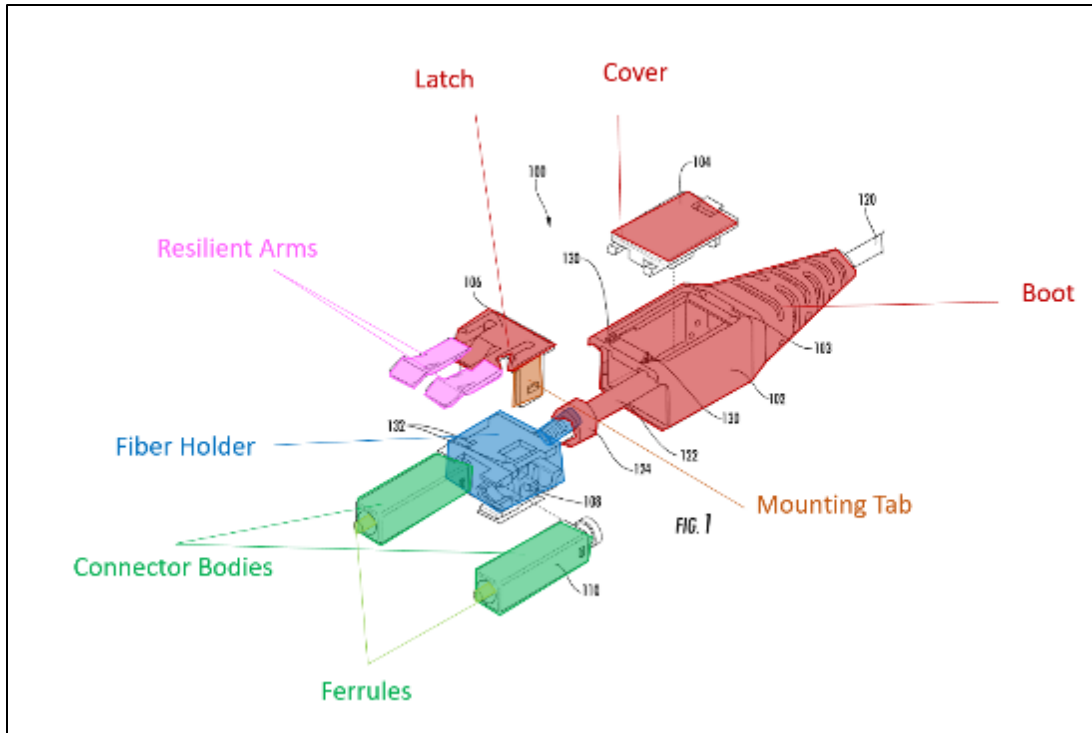
109. Veatch further teaches that the boot is assembled together with the

cover and the latch. Veatch discloses that the “cover 104 is received in a cutout 103 in boot 102.” EX1004, 2:45-46. Veatch also discloses that the “[l]atch 106 is secured to fiber holder 108 and boot 102 slides relative to fiber holder 108 to provide the push-pull activation of latch 106.” EX1004, 2:64-66. As shown in Figure 2 of Veatch, reproduced below, the boot, cover, and latch are assembled to form the boot assembly.

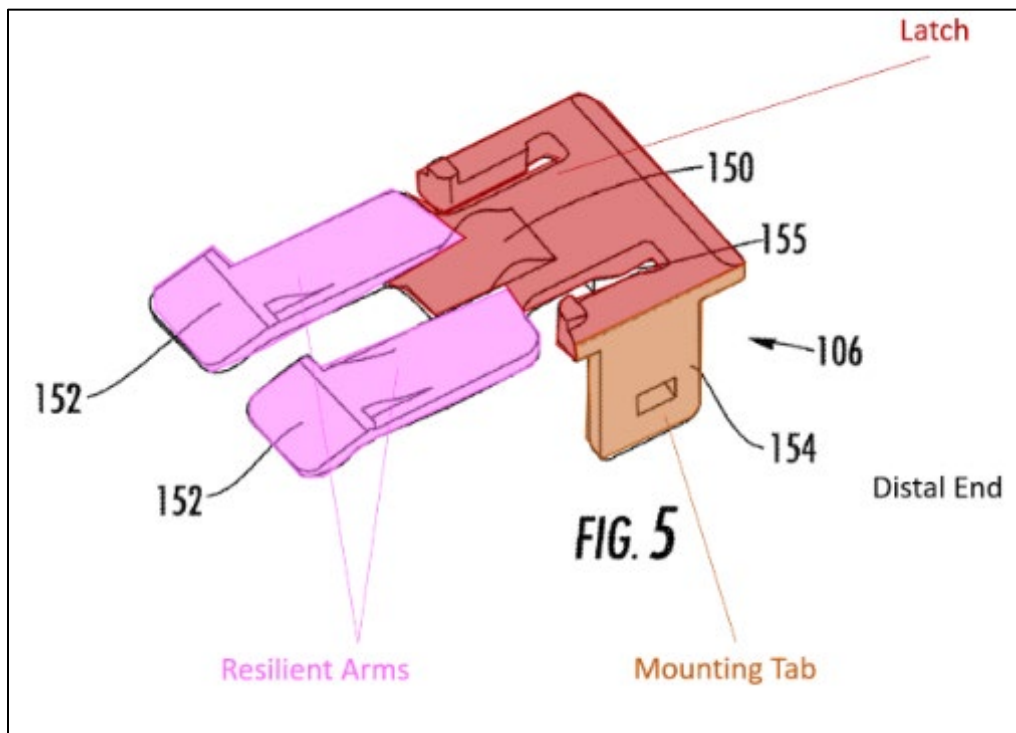


EX1004, FIG. 2 (annotated).

110. Veatch discloses that the latch 106 may “include[] mounting tabs 154 that secure the latch 106 to fiber holder 108.” EX1004, 2:61-63. Veatch discloses that each side of a fiber holder 108 is secured by the latch 106, as can be illustrated in annotated Figures 1 and 5 of Veatch, reproduced below.



EX1004, FIG. 1 (annotated).

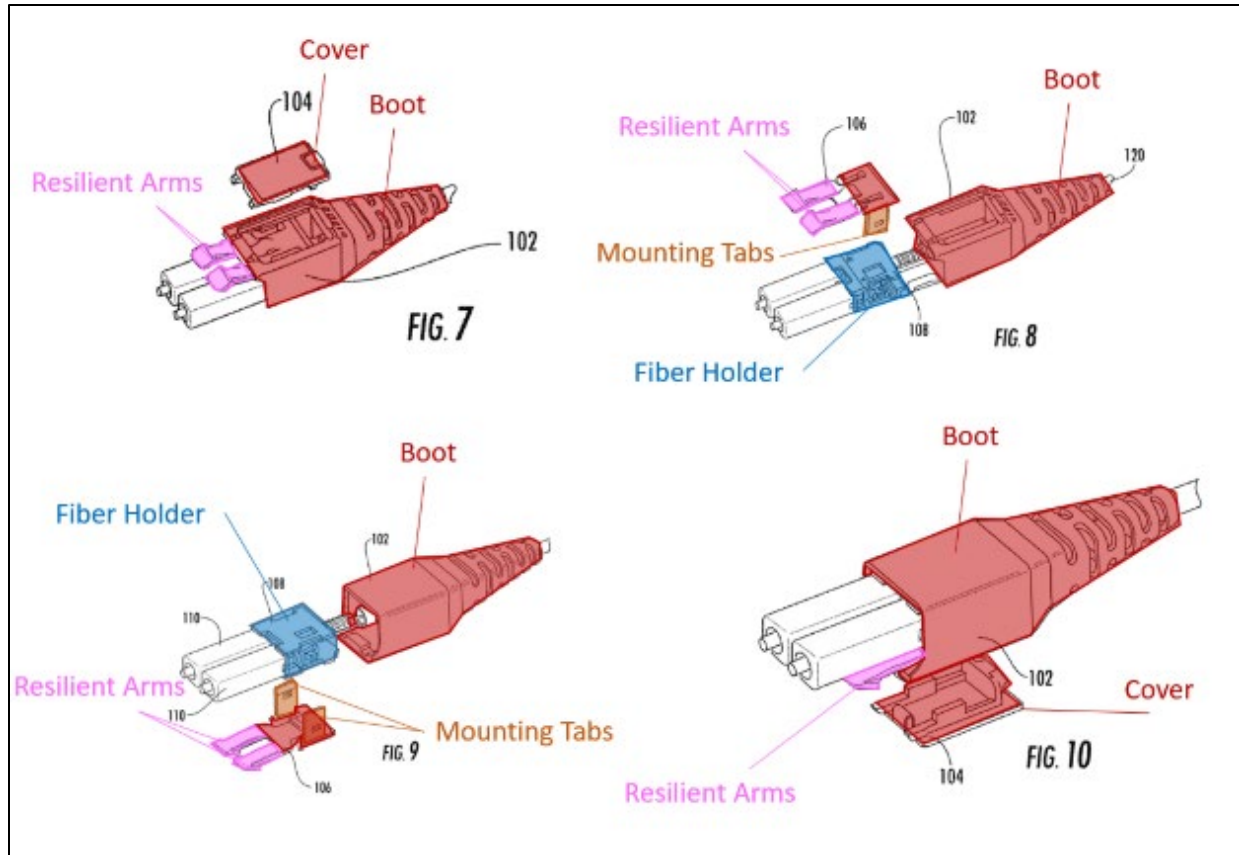


EX1004, FIG. 5 (annotated).

111. Veatch also teaches that the latch may “include[] resilient arms 152

that engage [the] 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. The resilient arms 152 can “engage [the] mounting structure on an LC adapter” when the connector mates the adapter. EX1004, 2:64-3:7. As shown in Figure 5 of Veatch, reproduced above, the resilient arms 152 elongate from the latch.

112. Veatch illustrates how to reverse the polarity of the connector in Figures 7, 8, 9, and 10, reproduced and annotated below. Veatch describes that the cover 104 is removed from the boot 102, and the boot 102 is pulled away from the ferrules until the latch 106 and the fiber holder 108 are outside of the boot 102. EX1004, 3:12-16, FIGs. 7-8. Once the latch 106 is detached from the fiber holder 108, the latch 106 can be attached to the opposite side of the fiber holder 108. EX1004, FIGs. 8 and 9. Then, the boot 102 is rotated 180 degrees and pushed towards the ferrules to surround the fiber holder 108 and a portion of the latch 106. EX1004, 3:18-20, 3:34-37, FIGs. 8-9. Finally, the cover 104 is snapped back into position. EX1004, 3:34-37, FIG. 10.

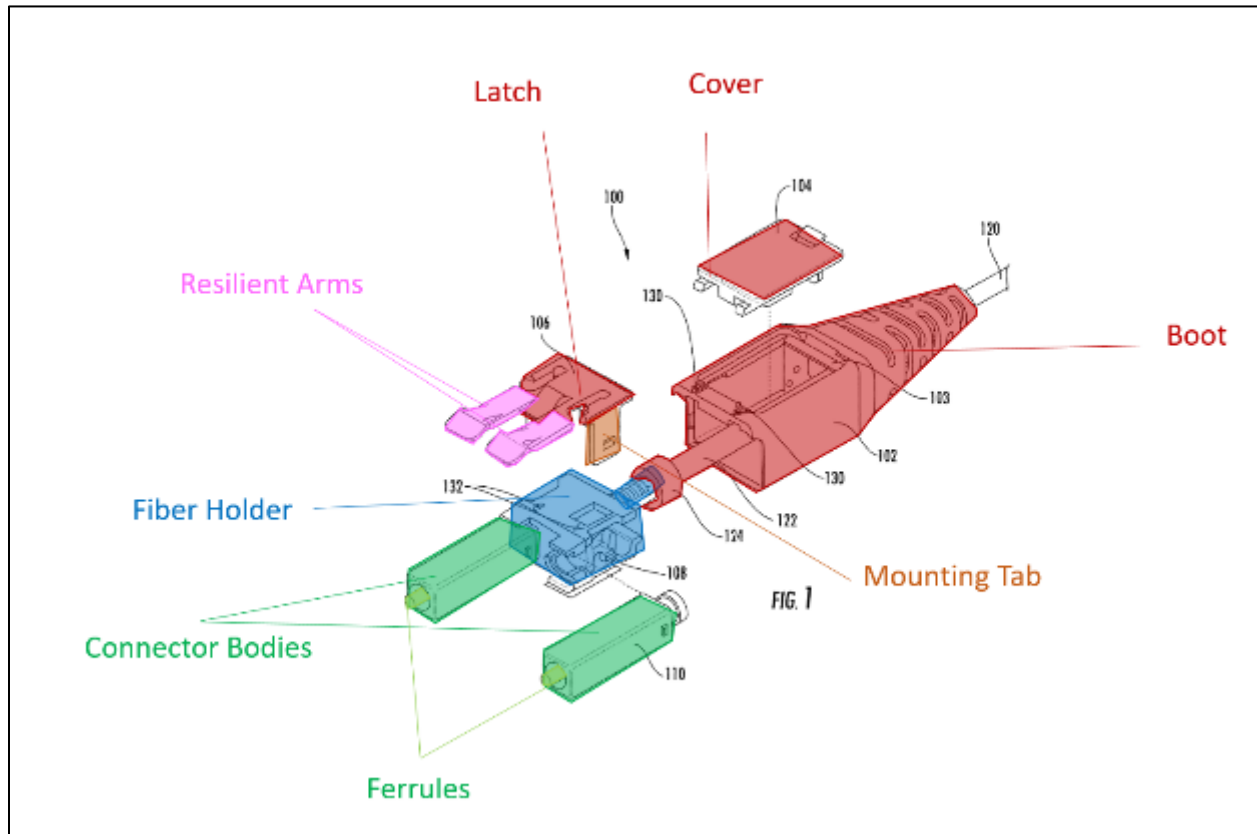


EX1004, FIGs. 7-10 (annotated).

113. 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. As the boot 102 is pulled away from the ferrules, the nub 146 on the cover 104 “ride[s] on [the] ridge 150” of the latch 106, which causes the latch arms 152 to deflect downwards, resulting in the latch 106 detaching from an adapter (*e.g.*, an LC adapter). EX1004, 3:2-6. In this manner, Veatch’s fiber optic connector 100 allows for an easy release operation by pulling the boot 102 proximally (*i.e.*, away from the adapter).

114. Veatch discloses that the “[c]onnector bodies 110 terminate the two

optical fibers in cable 120.” EX1004, 2:22-25. Veatch further discloses that the “connector body ha[s] a ferrule configured to receive the optical fiber.” EX1004, Claim 22. As shown in Figure 1 of Veatch, reproduced below, each connector body 110 accommodates a ferrule.



EX1004, FIG. 1 (annotated).

F. Overview of Connelly

115. U.S. Patent No. 6,575,640 is titled “Fiber Optic Connection System” (hereinafter “Connelly”). EX1005, cover. The inventors are John M. Connelly, Samuel M. Marrs, and Jeffrey J. Radek. EX1005, cover. Connelly was published on June 10, 2003. The application from which Connelly issued was published on

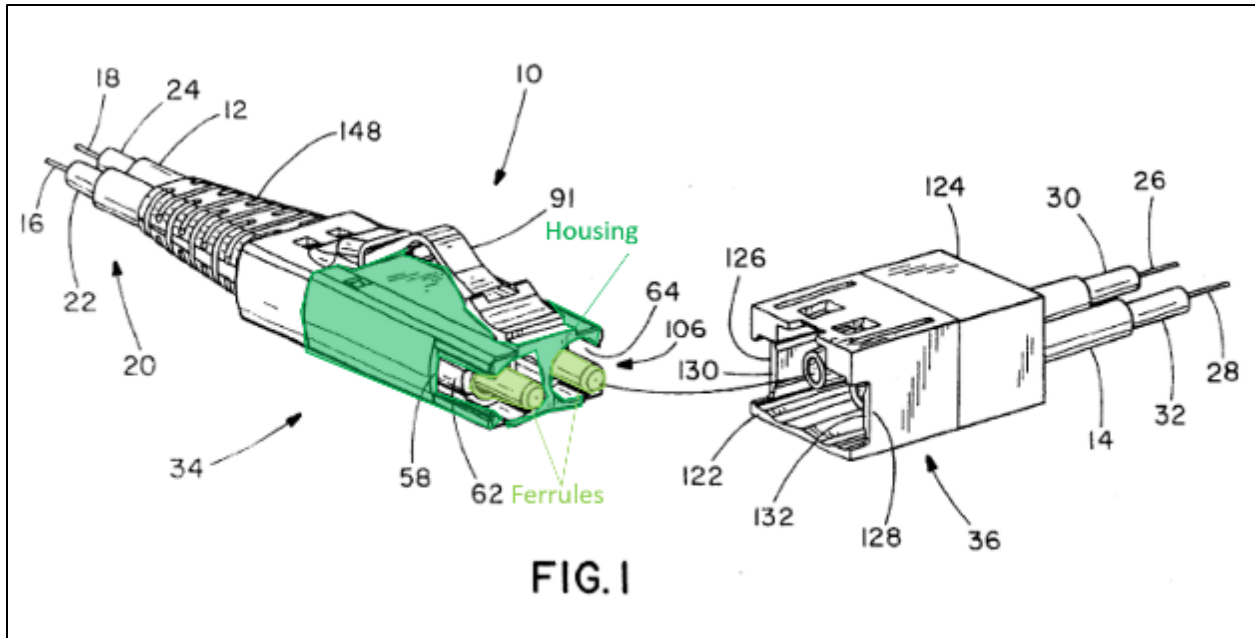
March 27, 2003 as U.S. Publication No. 2003/0059168 A1. EX1005, cover. This patent is a continuation of U.S. Patent Application No. 09/499,170 that was filed on February 4, 2000, now U.S. Patent No. 6,511,230. EX1005, cover.

116. I understand that Connelly is prior art to the '190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Connelly has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and so Connelly qualifies as prior art at least for this reason. I further understand that Connelly's publication date was well before the earliest possible priority date of the '190 Patent and so Connelly is also prior art for this reason.

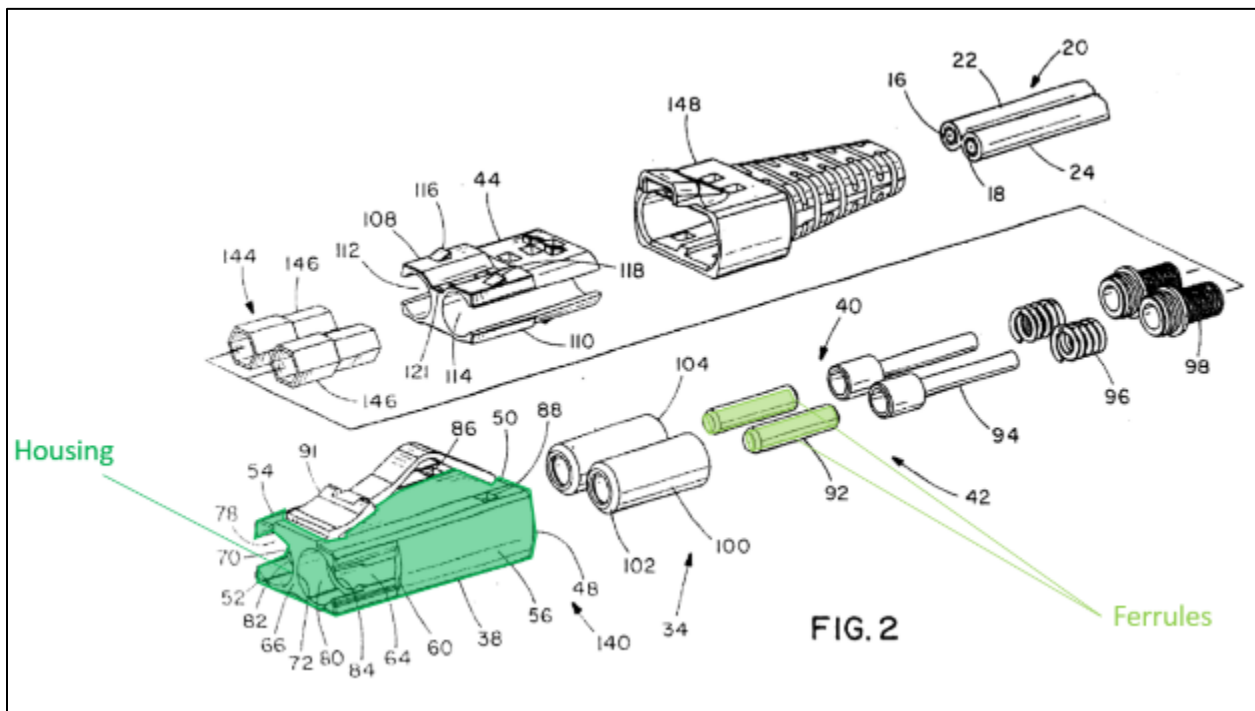
117. Connelly explains that “[f]iber optic transmission of information is now virtually commonplace,” and that “[i]ts continued growth demands the development of inexpensive, readily manufactured and quickly replac[e]able connection systems.” EX1005, 1:13-16. It describes the following as objects of the invention: “to provide a new and improved fiber optic connection system”; to provide “an inexpensive, readily produced connection system for fiber optic cable”; to provide “a fiber optic connection wherein the plug and connector are interlocked to provide connection stability and to substantially avoid connection ‘play’”; and to provide a “fiber optic plug including a housing and insert snap-locked thereto to substantially facilitate assembly and repair.” EX1005, 1:40-49.

118. Connelly discloses a fiber optic plug 34 that houses two ferrules. *See, e.g.,* EX1005, FIG. 1. The fiber optic plug 34 is 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. Although Connelly calls the fiber optic connector a “plug,” I believe that a POSITA would have understood that Connelly’s plug 34 is a fiber optic connector as this term is also used in the ’190 Patent and in Veatch. Therefore, I may refer to Connelly’s fiber optic plug 34 as a fiber optic connector throughout this Declaration as I believe these terms are interchangeable based on Connelly’s description and illustration of a fiber optic connector 34. *See, e.g.,* EX1005, FIGs. 1-5, 1:8-39 (using the term “connector” in a different manner but describing the “plug” as a component that has the same function and structure as the other fiber optic “connectors” I discuss in this Declaration).

119. Pertinent to my discussion in this Declaration is the housing 38 of the fiber optic connector 34. The housing 38 has top, bottom, and side walls. EX1005, 2:35-37, FIG. 2. The housing is configured to hold and surround two ferrules 92. EX1005, 2:66-3:2, 2:62-65.



EX1005, FIG. 1 (annotated).



EX1005, FIG. 2 (annotated).

G. Overview of Case

120. U.S. Patent No. 8,406,597 is titled “Intelligent Fiber Optic Adapter

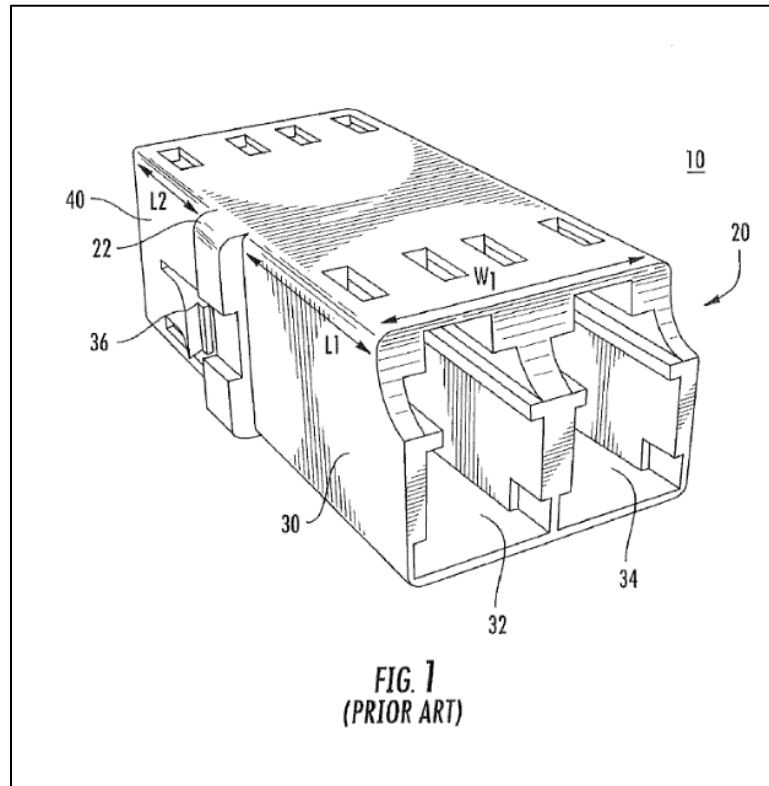
Mounting Structures That Receive and Correctly Position Multiple Types of Fiber Optic Adapters and Related Adapter Collars and Bulkheads” (hereinafter “Case”). EX1010, cover. The inventor is Richard L. Case. EX1010, cover. The application from which Case issued was published on August 18, 2011 as U.S. Publication No. 2011/02000294 A1. EX1010, cover. The application was filed on February 16, 2010 and published on March 26, 2013.

121. I understand that Case is prior art to the ’190 Patent based on my understanding of the legal standards as discussed above and discussions with counsel. In particular, I understand that Case has a filing date prior to the earliest possible priority date of the ’190 Patent (July 14, 2017), and thus Case qualifies as prior art at least for this reason. I further understand that Case’s publication date was well before the earliest possible priority date of the ’190 Patent and therefore Case is also prior art for this reason.

122. Case “relates generally to fiber optic communications systems and, more particularly, to fiber optic patching systems that have intelligent patching capabilities.” EX1010, 1:10-12.

123. Case discloses, as a prior art, “a front perspective view of a conventional duplex LC fiber optic adapter 10” in Figure 1, reproduced below. EX1010, 2:6-8. Case teaches that “[e]ach of the plug apertures 32, 34 is configured to receive an LC fiber optic cable plug termination.” EX1010, 2:16-18. As shown

in Figure 1, each of the plug apertures 32, 34 has a notch for accommodating a latch of the LC fiber optic cable plug.



EX1010, FIG. 1.

H. Overview of Lee

124. International Publication No. WO 2017/127208 is titled “Fiber Optic Connector with Small Profile, and Cable Assemblies, Systems, and Methods Including the Same.” The only named inventor is Jhih-Ping Lee, and International Publication No. WO 2017/127208 A1 (hereinafter “Lee”) published on July 27, 2017. EX1012, cover. Lee is based on International Application No. PCT/US2016/067903, which was filed on December 21, 2016. EX1012, cover. Lee claims benefit to two U.S. provisional patent applications: U.S. Provisional

Application No. 62/388,129 filed on January 20, 2016, and U.S. Provisional Application No. 62/398,673 filed on September 23, 2016. EX1012, cover.

125. I understand that Lee is prior art to the '190 Patent based on my discussion of the legal standards above and discussions with counsel. In particular, I understand that Lee has a filing date prior to the earliest possible priority date of the '190 Patent (July 14, 2017), and therefore, Lee qualifies as prior art at least for this reason.

126. Lee generally describes fiber optic connectors suitable for use in data centers. EX1012, ¶2. Lee explains the disclosure “also relates to cable assemblies, systems, and methods including such fiber optic connectors.” EX1012, ¶2.

127. Lee explains that connectors are typically provided on the ends of optical fiber cables to conveniently provide connections for data transmission. EX1012, ¶3. Lee further describes that “[t]he connectors are designed to be received in ports that align the optical fiber(s) carried by connectors with the optical fiber(s) of other connectors or with equipment (*e.g.*, transceivers) so that data can be transmitted between the components.” EX1012, ¶3.

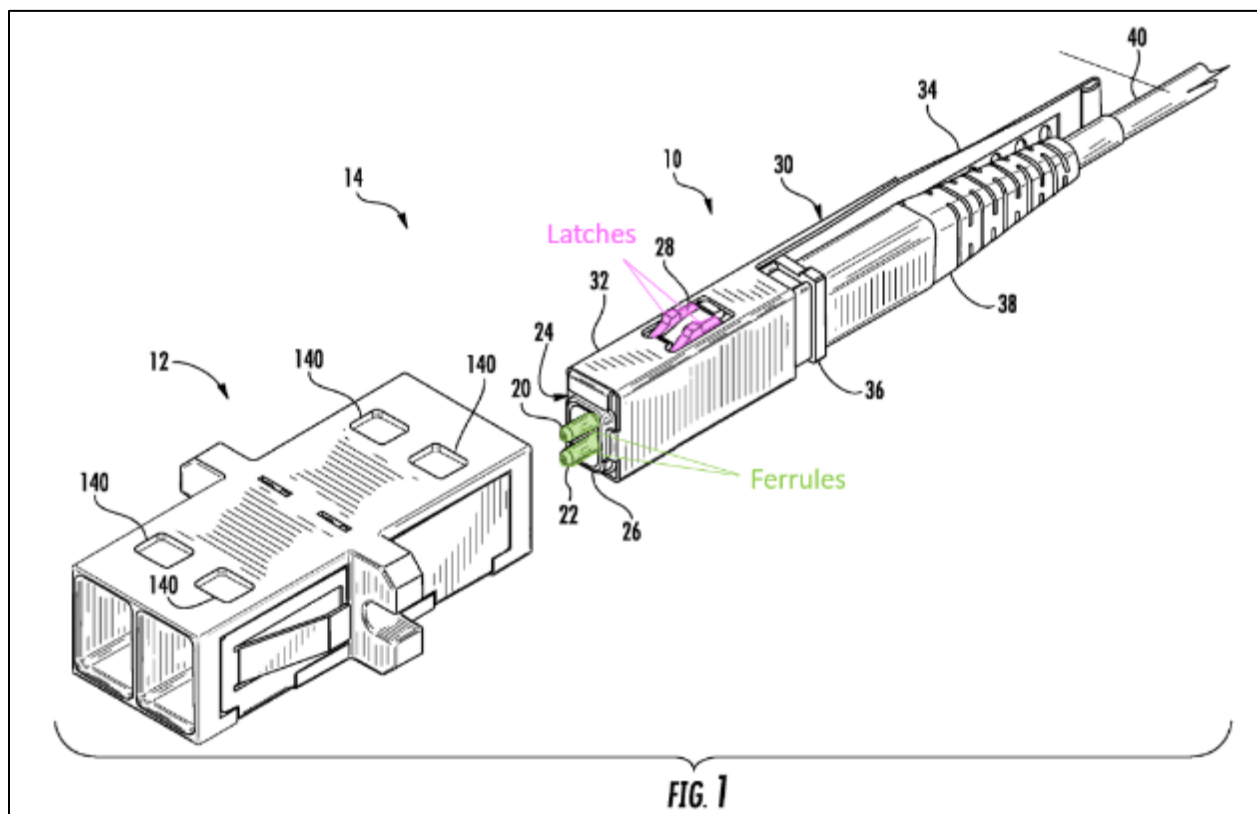
128. Lee explains that a desire for high bandwidth tends to drive a need for a high-density of interconnects. EX1012, ¶4. Lee identifies that it “can be a challenge, however, to design fiber optic connectors [capable] of providing high-density interconnects” because, *e.g.*, “[t]he fiber optic connectors often become

more difficult to handle and less robust as components are made smaller.”

EX1012, ¶4.

129. Therefore, I believe a POSITA would understand Lee to articulate a goal of designing small interconnects that provide sufficient robustness and ease of handling (*e.g.*, the ability to be easily removed and installed).

130. Pertinent to the discussion below, Lee discloses a fiber optic connector 10 and an adapter 12 and illustrates this fiber optic connector system 14 in Figure 1, which is provided below for convenience.



EX1012, FIG. 1.

131. The fiber optic connector 10 “is designed to have a small profile and thereby enable high-density interconnects.” EX1012, ¶29. As shown in Figure 1,

the fiber optic connector 10 includes a first ferrule 20 and a second ferrule 22 exposed at a front end 26 of the fiber optic connector 10 for mating with the adapter 12. EX1012, ¶30. As shown below in Lee Figure 4, the fiber optic connector 10 includes an inner connector body 24 and a latch arm 28 that extends upward from the inner connector body 24. As shown in Figure 1, the first and second ferrules, 20 and 22, are aligned vertically so that its connectors “can effectively double the density of interconnects compared to conventional LC connectors.” EX1012, ¶66.

VIII. SUMMARY OF GROUNDS

132. In my opinion, the Challenged Claims (Claims 1-3, 6-16, and 19-20) are invalid as obvious in view of the prior art. This table summarizes the grounds that I believe show invalidity:

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

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

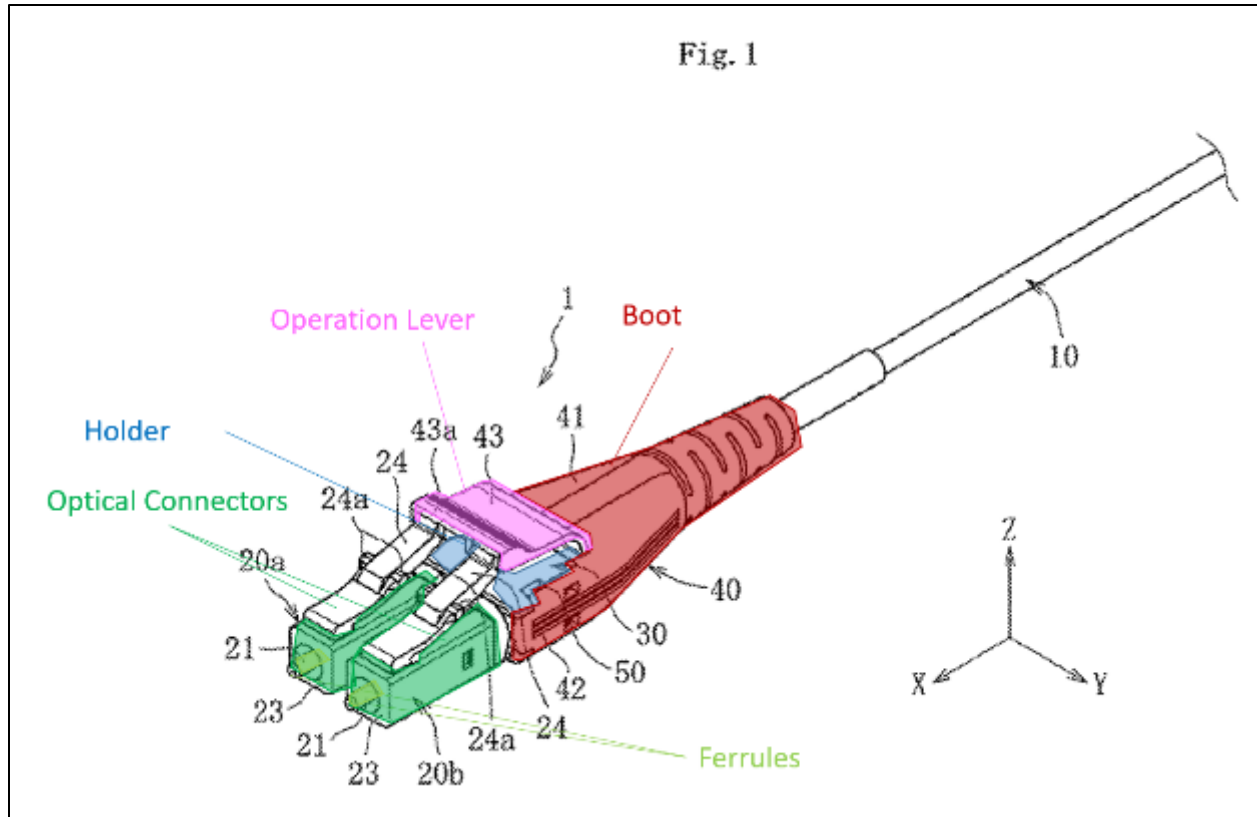
133. For at least the reasons below, it is my opinion that Nakagawa in view of Raven renders obvious independent Claim 1 of the '190 Patent. Additionally,

Nakagawa in view of Raven renders obvious dependent Claims 2–3, 6–16, and 19 of the '190 Patent.

A. Motivation to Combine

1. Nakagawa

134. As described in detail above in Section VII.A, prior art Nakagawa discloses an optical connector unit that allows for a change of polarity of the ferrules of the connector comprising “input optical connector 20a, an output optical connector 20b, a holder 30, and a boot 40.” EX1007, ¶46. Nakagawa teaches that “[t]he optical connectors 20a, 20b are both an LC type connector and fixed to the leading ends of the bare fibers 11, 12.” EX1007, ¶47. Nakagawa further teaches that “[t]he optical connectors 20a, 20b each include a ferrule 21 fixed to the leading end of the bare fiber 11 or 12.” EX1007, ¶47. This configuration is shown in Figure 1 of Nakagawa, reproduced below.



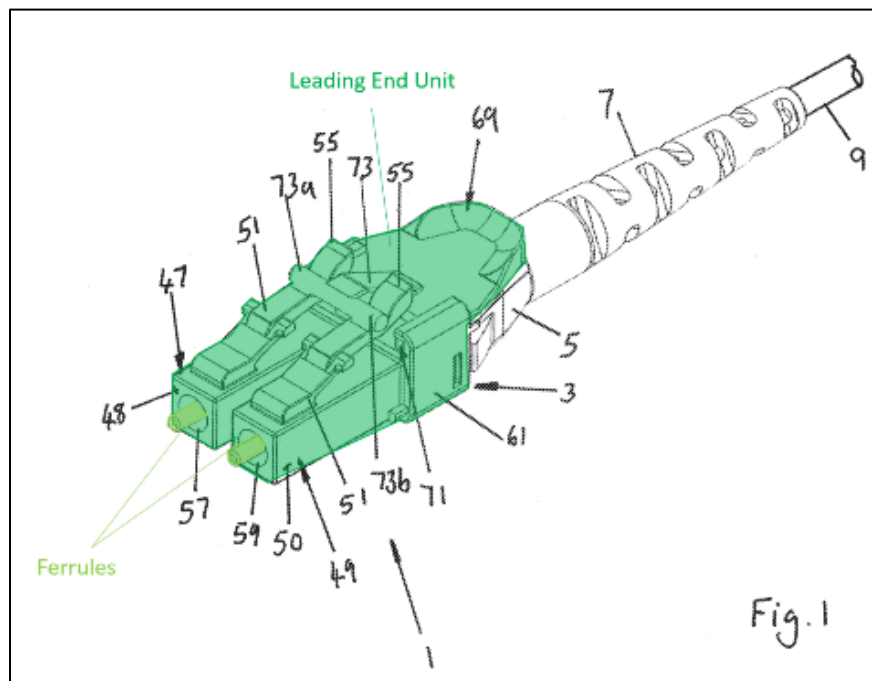
EX1007, FIG. 1 (annotated).

2. Raven

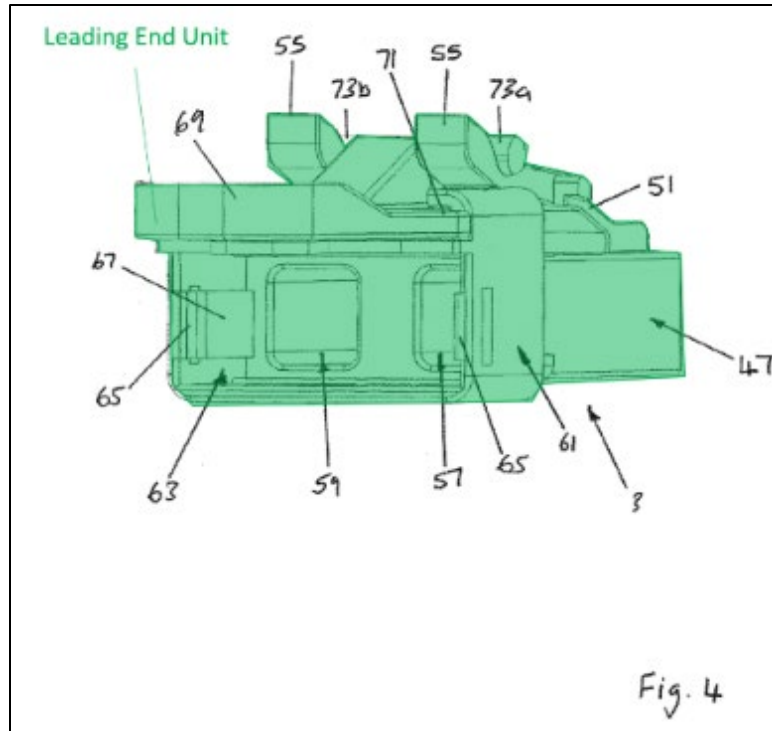
135. As described in detail above in Section VII.B, prior art Raven “relates to a connector device for a fibre optic cable, in particular” “a duplex fibre optic cable; a fibre optic cable assembly; and a method for changing the polarity of first and second optical fibres in a fibre optic cable assembly.” EX1008, 1:5-9. Raven states “it is not uncommon for the installers to get confused between the transmitting and receiving cables and a cross over can occur” and “it is necessary for the installer to replace the existing cable or remove the connecting head from the fibres and effectively remanufacture the cable on site, which is very cumbersome and time consuming.” EX1008, 1:23-35.

136. Thus, Raven proposes an improvement and describes that “[t]his problem has been addressed in US 2011/0299814,” which is Nakagawa. EX1008, 1:36. Raven states that the purpose of its disclosure is “to provide a simplified solution to the above-mentioned problem.” EX1008, 1:45-46.

137. To address this issue, Raven also discloses a duplex fiber optic cable allowing for a change of polarity of two optical fiber ferrules, but with a single leading end unit 3. *See* EX1008, 1:5-9, FIGs. 1-7. The leading unit 3 houses two ferrules 27 and 33 which protrude from “respective cavities 59,57” of the leading unit 3. EX1008, 11:32-36, FIG. 1. For example, the leading end unit can be seen in Figures 1 and 4 of Raven, reproduced below.



EX1008, FIG. 1 (annotated).



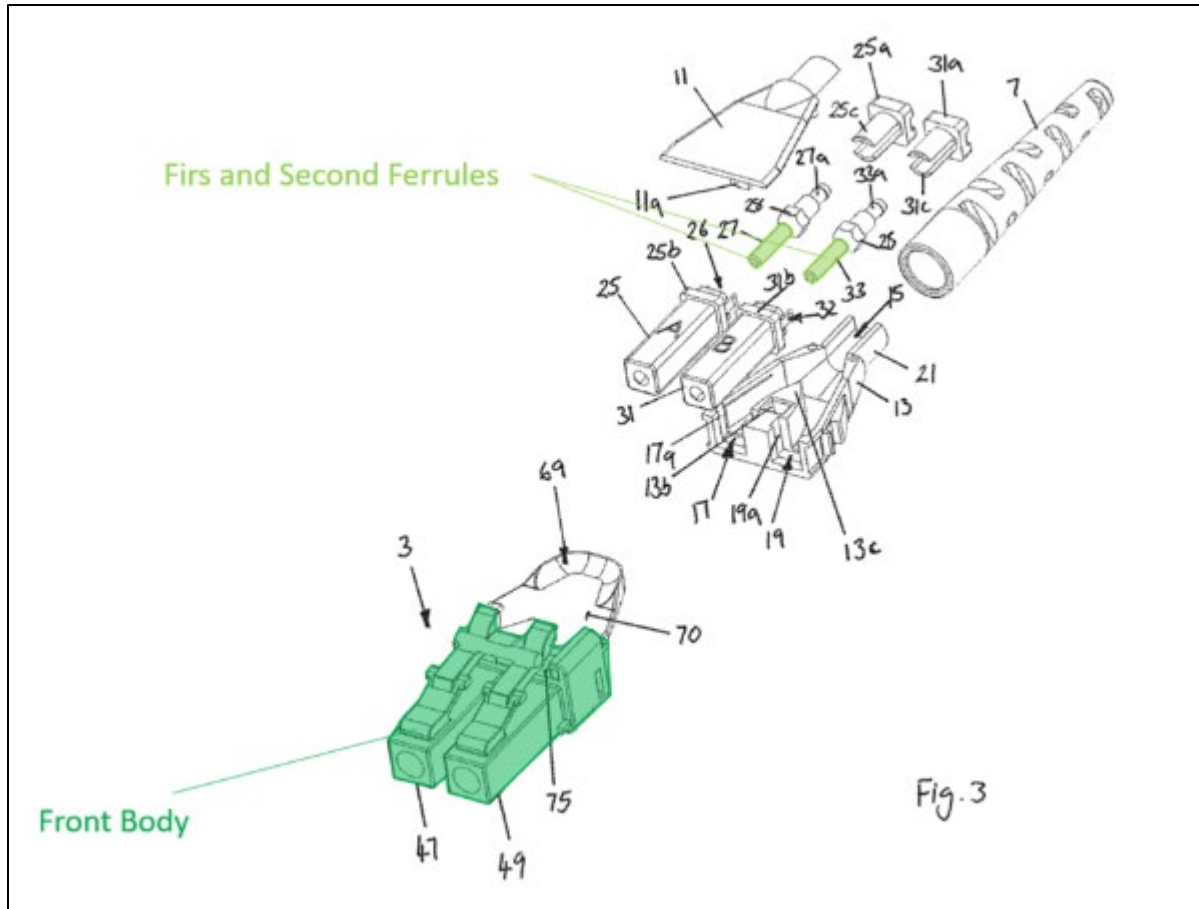
EX1008, FIG. 4 (annotated).

3. Reasons to Combine

138. First, a POSITA would recognize that Nakagawa and Raven provide interrelated teachings and are in the same field of endeavor. I believe a POSITA would have found it obvious to combine Nakagawa and Raven to arrive at the subject matter of the Challenged Claims prior to the filing date of the '190 Patent. In particular, I believe a POSITA would have found it obvious to modify Nakagawa's housing that includes two optical connectors 20a and 20b, to instead include a unitary leading end unit 3 as disclosed in Raven.

139. In my opinion, a POSITA would have found it obvious to modify Nakagawa's housing configuration comprising two optical connectors 20a and 20b to instead comprise a leading end unit 3 as disclosed by Raven. In particular, in

light of the fact that Nakagawa's operation lever 43 actuates the locking lever 24, and Raven's manually operable control actuates latching levers 51, a POSITA would have formed Nakagawa's front body using leading unit 3, excluding the manually operable control 69 of the leading units, as annotated below, to avoid duplication of functions. *See* EX1007, ¶58; EX1008, 11:63-64. In other words, a POSITA would have combined Nakagawa's housing with a part of the leading end unit 3, excluding the manually operable control 69.



EX1008, FIG. 3 (annotated).

140. First, Nakagawa and Raven are in the same field of fiber optic connectors and are both directed to duplex fiber optic connectors (*i.e.*, connectors

with two ferrules) with a latch for easy removal from a receptacle such as an adapter or port. Therefore, these prior art references are certainly analogous.

141. Second, the prior art references themselves provide a motivation to modify Nakagawa to include Raven's leading end unit 3, resulting in a unitary front body structure. In more detail, Raven explicitly explains some of the shortcomings of the connector of Nakagawa and proposes to apply its own leading end unit 3 to such a connector. EX1008, 1:36-46. Nakagawa teaches that its "optical connectors 20a, 20b are allowed to rotate relative to the holder 30" to change the polarity. EX1007, ¶52. However, 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." EX1008, 1:36-46. To address this issue, Raven teaches the 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. As such, "a user is able to easily change the polarity of the duplex fibre optic cable assembly by simply removing the leading end unit 3 and changing its orientation with respect to the housing assembly, thereby changing the polarity of the transmitting and receiving fibre optic cables with respect to the complementary connector." EX1008, 12:47-52. Raven explains that "[t]his is a more convenient and quicker way of attaching a

plurality of fibre optic connectors to the housing assembly than having to change the orientation of each fibre optic connector individually.” EX1008, 3:2-6.

142. Thus, as described above, since the motivation for combining Raven with Nakagawa is introduced in Raven, a POSITA would have been motivated to replace Nakagawa's housing structure with a leading end unit as introduced in Raven.

143. In my opinion, 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, for at least the reasons explained below.

144. First, this modification involves the simple substitution of one known element (a duplex fiber optic housing comprised of two components in Nakagawa) for another (a duplex fiber optic housing comprised of a single component in Raven) to obtain predictable results (the same housing structure of Nakagawa, with the outer features for the latch, maintained). Nakagawa and Raven are both directed to duplex fiber optic connectors. Simply modifying Nakagawa's housing structure to include Raven's leading end unit would have been well within the abilities of a POSITA, and a POSITA would have had a reasonable expectation of success because the combination merely involves the replacement of known housing structures in the field with other known housing structures in the same field.

145. 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. As any POSITA in this field would have known, there are a finite number of ways to form housing structures of fiber optic connectors—*e.g.*, 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 Nakagawa) or a connector can include a unitary housing structure that holds both optical fibers. Fiber optic connectors are mechanical components (*i.e.*, in a predictable field—mechanical) and it would have been well known to a POSITA to swap one type of housing structure for another with no detrimental impact on performance; thus, a POSITA would have had a reasonable expectation of success.

146. Although I have used a few formulations of obviousness here as I understand them, I believe that several others readily apply in the same general manner as I have explained. For example, using Raven's unitary housing 38 instead of Nakagawa's multi-component housing structure would have been obvious to a POSITA to reduce the number of components and also possibly reduce the overall footprint of the connector, thus resulting in the application of a known technique (*i.e.*, a unitary housing structure) to a known device (*i.e.*, Nakagawa's connector).

147. As a final clarification, I note that in the combination of Nakagawa and Raven that a POSITA would be motivated to make, a POSITA would have recognized that the exterior walls of the unitary housing 38 must still have all of the same contours/notches to interact with Nakagawa's boot 40. Substituting a unitary housing structure based on Raven's teachings in place of the multi-component housing structure of Nakagawa does not affect or hinder providing any of Nakagawa's latching mechanisms on the housing. Therefore, Nakagawa's fiber optic connector will continue to have the same fundamental principle of operation and the combination with Raven will not render Nakagawa unsatisfactory for its intended purpose. Throughout my analysis herein, when I refer to the combination of Nakagawa and Raven, it is the above-described particular combination to which I refer.

B. Claim 1

1. Preamble – “An optical fiber connector comprising:”

148. I have been informed by counsel that the preamble to a claim is generally not limiting. However, to the extent that the preamble is deemed limiting, it is my opinion that Nakagawa discloses an optical fiber connector as required by Claim 1. As I previously explained in Section VII.A, Nakagawa explains that its disclosure 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. Similarly, Raven discloses an optical fiber connector as required by Claim 1. As previously discussed in Section VII.B, Raven “relates to a connector device for a fibre 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.

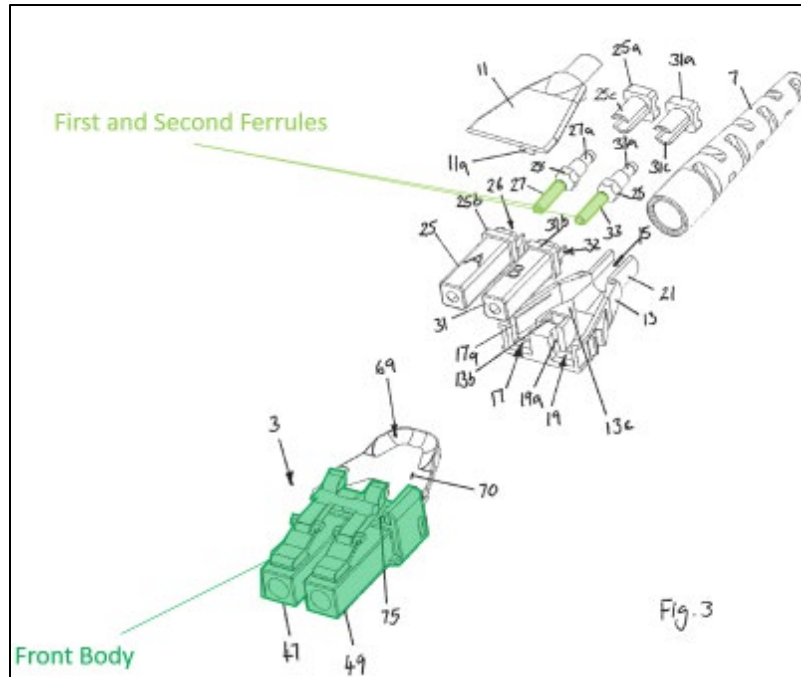
149. Accordingly, for at least these reasons, it is my opinion that a POSITA would have understood that Nakagawa and Raven each disclose the preamble of Claim 1 of the ’190 Patent.

2. Element [1.1] – “a front body configured to hold first and second ferrules;”

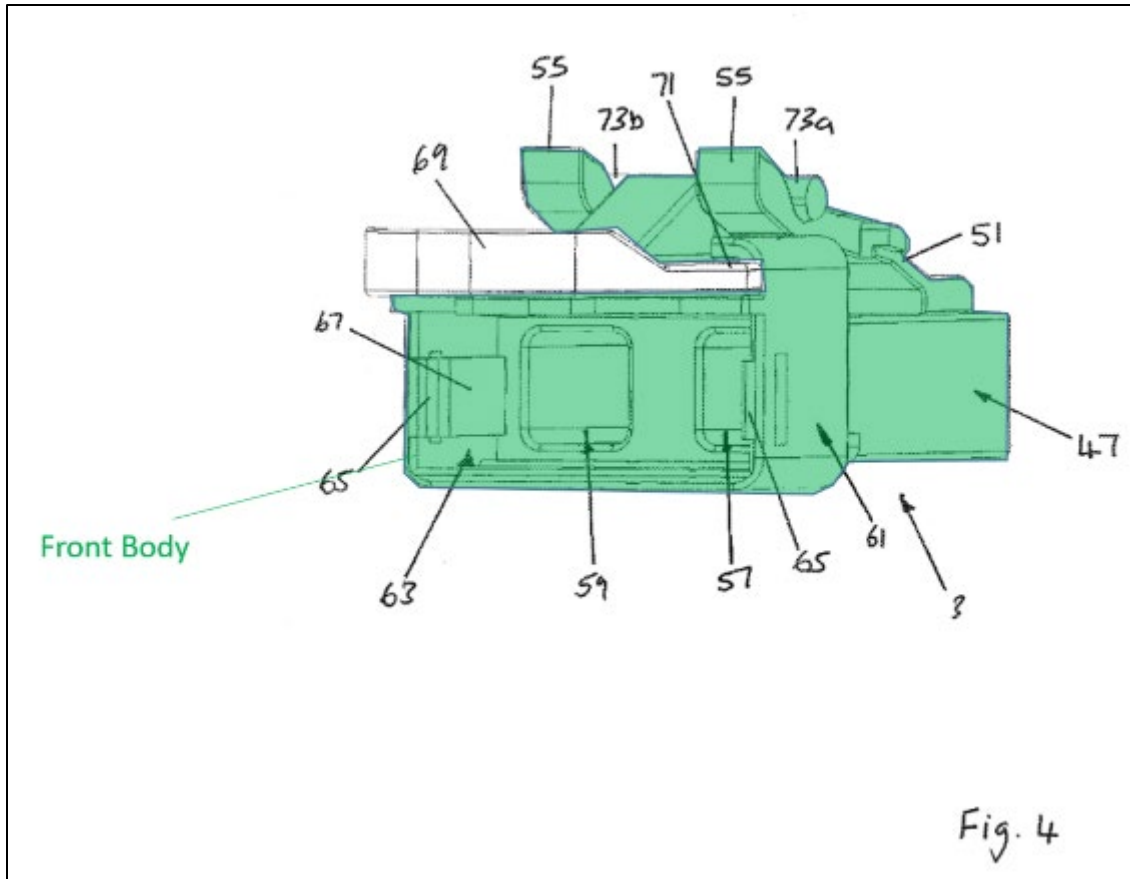
150. For at least the reasons below, it is my opinion that a POSITA would have understood that the specific combination of Nakagawa and Raven as described in Section IX.A.3 would render obvious claim element [1.1].

151. Nakagawa discloses an optical connector comprising two front bodies, each configured to hold at least one ferrule. Nakagawa teaches that its “optical connector unit 1 mainly includes an input optical connector 20a, [and] an output optical connector 20b.” EX1007, ¶46. Nakagawa further discloses that the “[t]he optical connectors 20a, 20b each include a ferrule 21.” EX1007, ¶47. Thus, a POSITA would have understood, as shown in the annotated Figure 1 of Nakagawa, reproduced below, that the optical connectors 20a and 20b correspond to the recited front body, and the connector bodies hold at least one of the recited

153. More specifically, Raven discloses a “leading end unit 3” included in a “duplex fibre optic cable assembly 1.” EX1008, 9:51-53. As shown in annotated versions of Figures 3 and 4 of Raven, reproduced below, a portion of the leading end unit 3 comprises a single body and includes two respective cavities 59, 57 from which the ferrules 27, 33 protrude. EX1008, 11:32-36. Thus, a POSITA would have understood that Raven’s leading end unit 3 is analogous to the claimed front body.



EX1008, FIG. 3 (annotated).



EX1008, FIG. 4 (annotated).

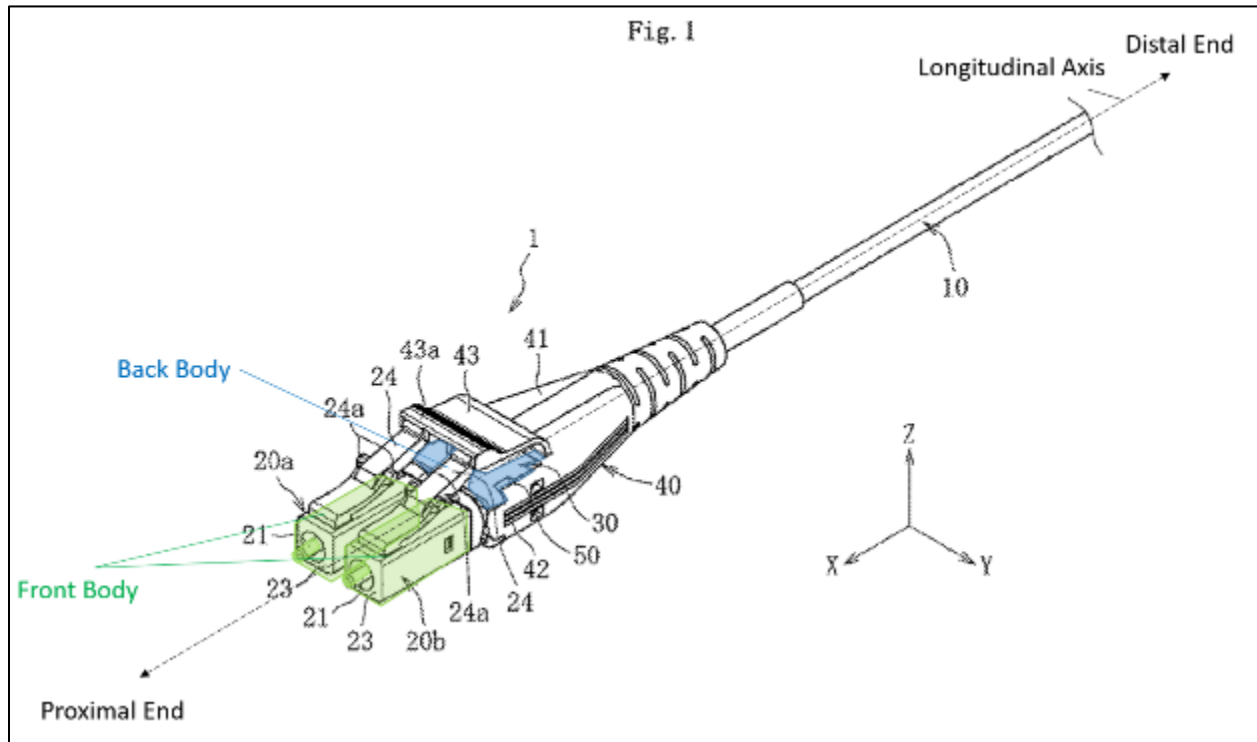
154. Accordingly, a POSITA would have understood that while Nakagawa presents an optical connector that comprises front bodies that each hold a ferrule, it is clear that other front bodies may be readily substituted for different connector-adaptor configurations, such as that of Raven. Raven explicitly discloses a single front body holding two ferrules that may be used in place of the front bodies of Nakagawa. Therefore, a POSITA would have been motivated to substitute the leading front end 3 of Raven into the optical connector of Nakagawa, which would have resulted in a connector maintaining the functionality of Nakagawa that comprises a single front body that holds two ferrules. Therefore, it is my opinion

that both Nakagawa and Raven separately disclose “a front body configured to hold first and second ferrules,” and further the combination of Nakagawa and Raven, as described in Section IX.A.3, would also render obvious claim element [1.1].

3. **Element [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”**

155. For at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious claim element [1.2]. A POSITA would have understood that Nakagawa discloses a back body having a proximal end portion and a distal end portion spaced apart along a longitudinal axis, and the proximal end portion of the back body configured to couple to the front body. For example, Nakagawa teaches that “the optical connectors 20a, 20b,” corresponding to the recited front bodies, “are fitted to the holder 30.” EX1007, ¶52. As shown in the annotated Figure 1 of Nakagawa, reproduced below, holder 30 has a proximal end portion (lower left portion of the holder 30) and a distal end portion (the upper right portion of the holder 30) spaced apart along a longitudinal axis (the axis running between the upper right part and the lower left part of Figure 1). Figure 1 further

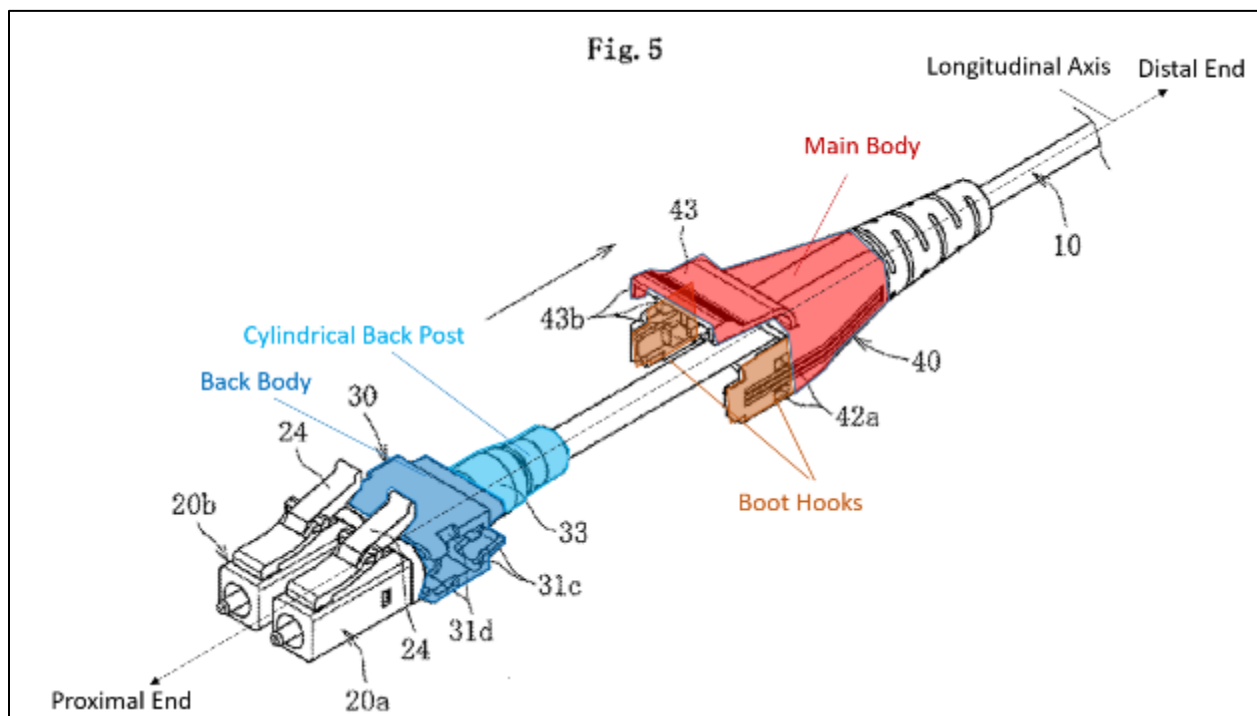
illustrates that the proximal end portion of the holder 30 couples to the optical connectors 20a, 20b. Considering the following explanations as well, a POSITA would have understood that the back body of Nakagawa is analogous to the claimed back body.



EX1007, FIG. 1 (annotated).

156. A POSITA would have understood that Nakagawa further discloses that the distal end portion of the back body comprising a cylindrical back post having an outer round surface extending along the longitudinal axis. For example, Nakagawa teaches that “the holder 30,” corresponding to the recited back body, “includes, a main body portion 31 and a cable fixing portion 32 protruding from the main body portion 31.” EX1007, ¶51. Nakagawa further teaches that “[a]

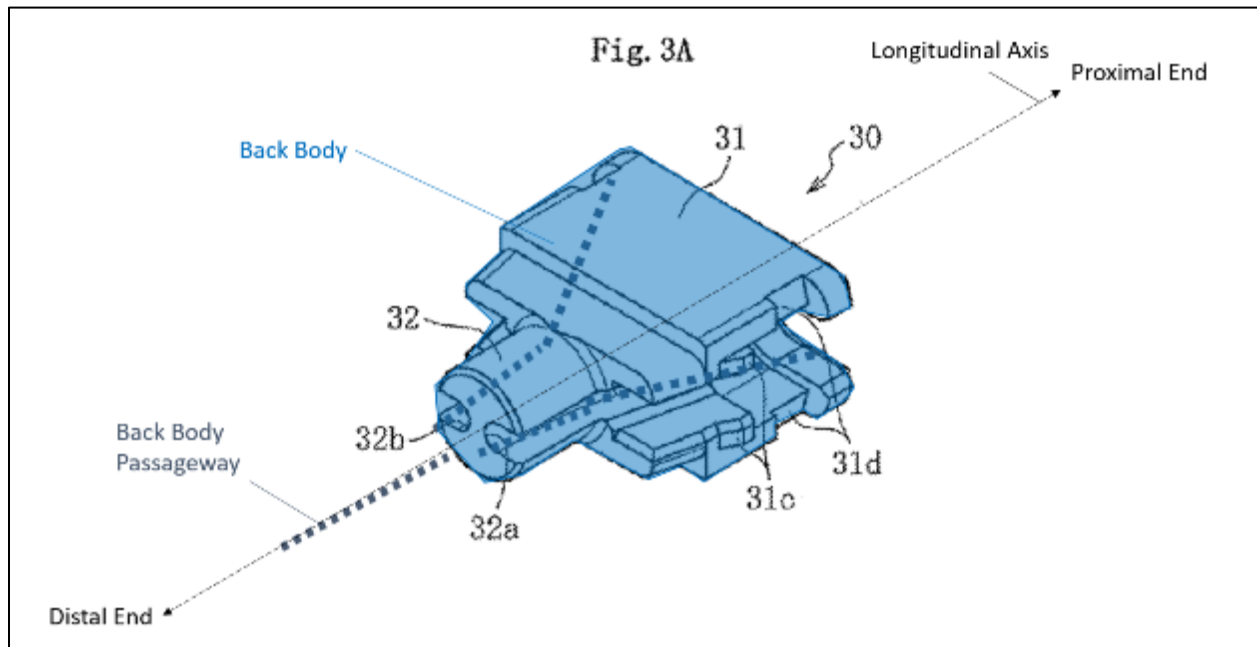
caulking member 33 is placed over the outer periphery of the cable fixing portion 32.” EX1007, ¶55. As illustrated in the annotated Figure 5 below, the caulking member 33 is located at the distal end portion of the holder 30. Figure 5 also illustrates that the caulking member 33 is a cylindrical back post having an outer round surface extending along the longitudinal axis (the axis running between the upper right part and the lower left part of Figure 5). Thus, a POSITA would have understood that the cylindrical back post shown in Figure 5 of Nakagawa, reproduced below, corresponds to the recited cylindrical back post.



EX1007, FIG. 5 (annotated).

157. A POSITA would have understood that Nakagawa also discloses that the back body defining a back body passageway extending from the distal end portion through the proximal end portion. For example, as illustrated in an

annotated version of Figure 3A of Nakagawa, reproduced below, Nakagawa teaches that “the holder 30,” corresponding to the recited back body, includes “a main body portion 31 and a cable fixing portion 32.” EX1007, ¶51.

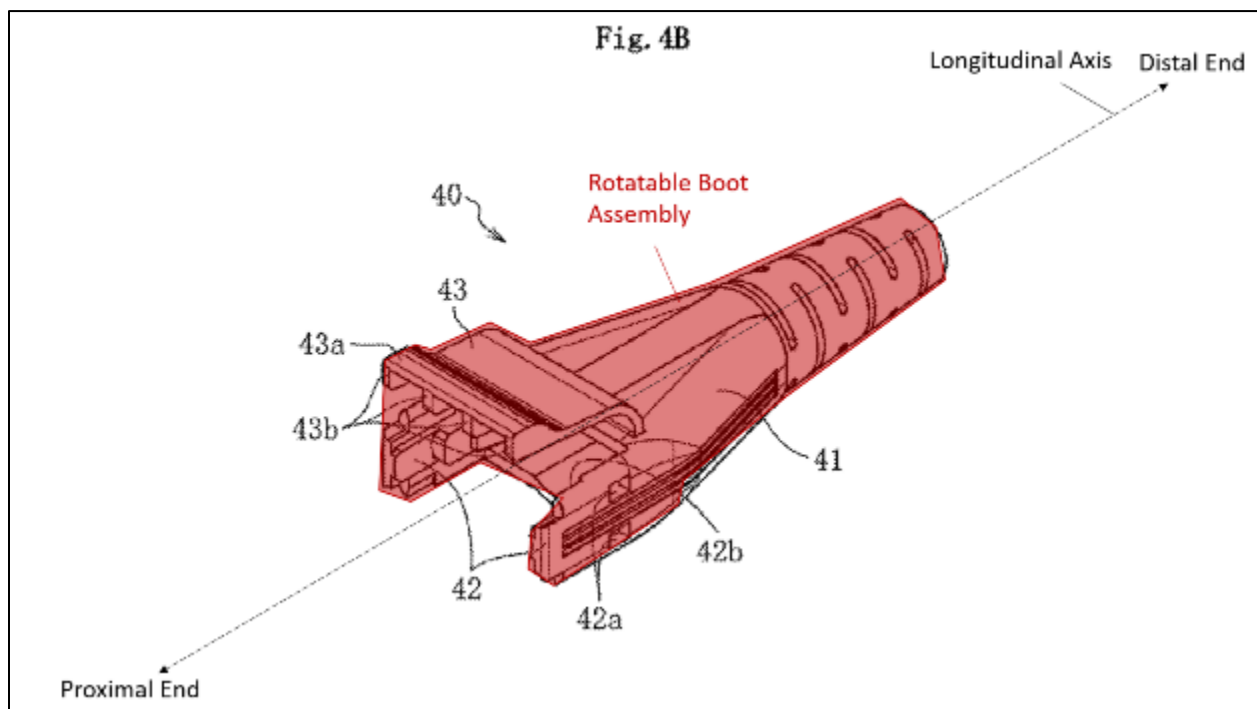


EX1007, FIG. 3A (annotated).

158. Nakagawa further teaches that the caulking member 33 “fix[es] the duplex cable 10 to the holder 30.” EX1007, ¶55. Thus, a POSITA would have understood that the duplex cable 10 runs through the holder 30 and caulking member 33 as shown in the annotated Nakagawa Figure 5 below. Therefore, the cable fixing portion 32 defines a passageway extending from the distal end portion (upper right portion of Figure 5) through the proximal end portion (lower left portion of Figure 5).

4. Element [1.3.1] – “a rotatable boot assembly having a proximal end portion and a distal end portion spaced apart along the longitudinal axis,”

160. For at least the reasons below, it is my opinion that a POSITA would have understood that Nakagawa discloses claim element [1.3.1]. For example, Figure 4B of Nakagawa, reproduced below, illustrates a “boot 40 [] formed of a flexible material.” EX1007, ¶56. Nakagawa further discloses that “the boot 40 is rotated relative to the holder 30 so as to be reversed upside down.” EX1007, ¶62.



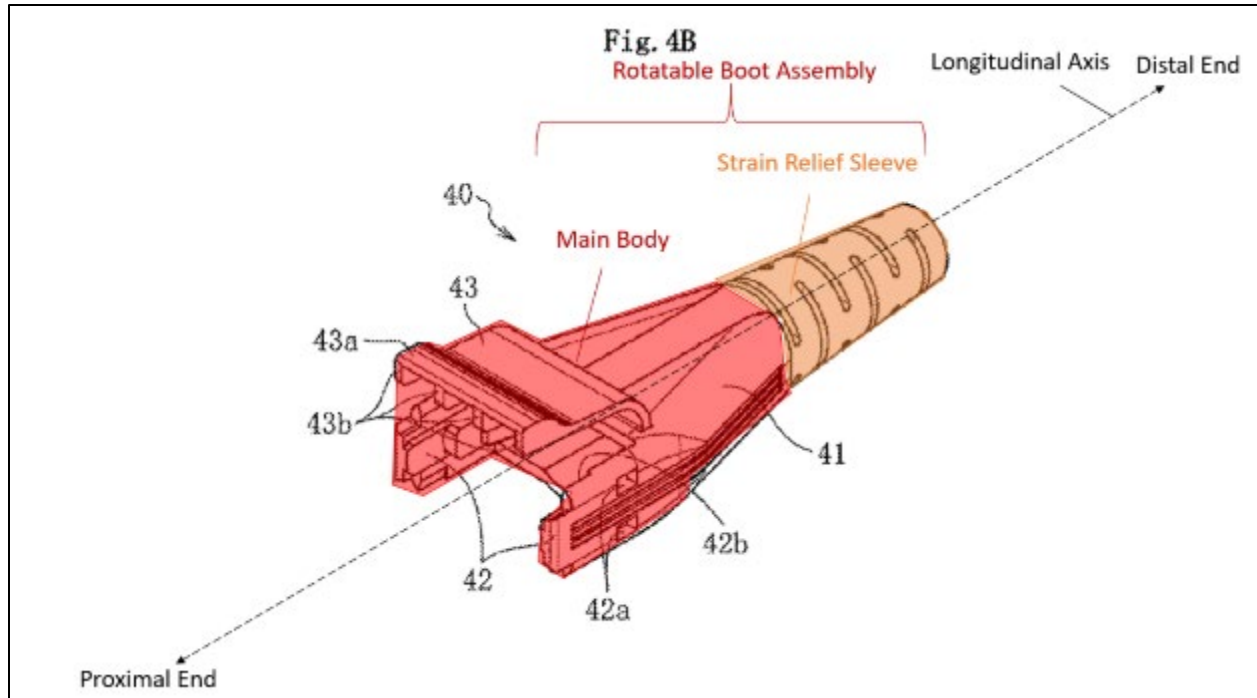
EX1007, FIG. 4B (annotated).

161. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.1]. In addition to Nakagawa disclosing claim element [1.3.1], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.1].

That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.1] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.1].

5. Element [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,”

162. For at least the reasons below, it is my opinion that a POSITA would have understood that Nakagawa discloses claim element [1.3.2]. For example, as shown in the annotated Figure 4B of Nakagawa, reproduced below, Nakagawa illustrates its boot has a sleeve with slits. Nakagawa further explains that the “boot 40 is formed of a flexible material.” EX1007, ¶56. I believe that a POSITA would have understood that the sleeve having slits, formed of flexible material, has a strain relief function. Further, Nakagawa discloses that the sleeve is extending 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 recited main body 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 Figure 4B of Nakagawa, reproduced below, corresponds to the recited strain relief sleeve.



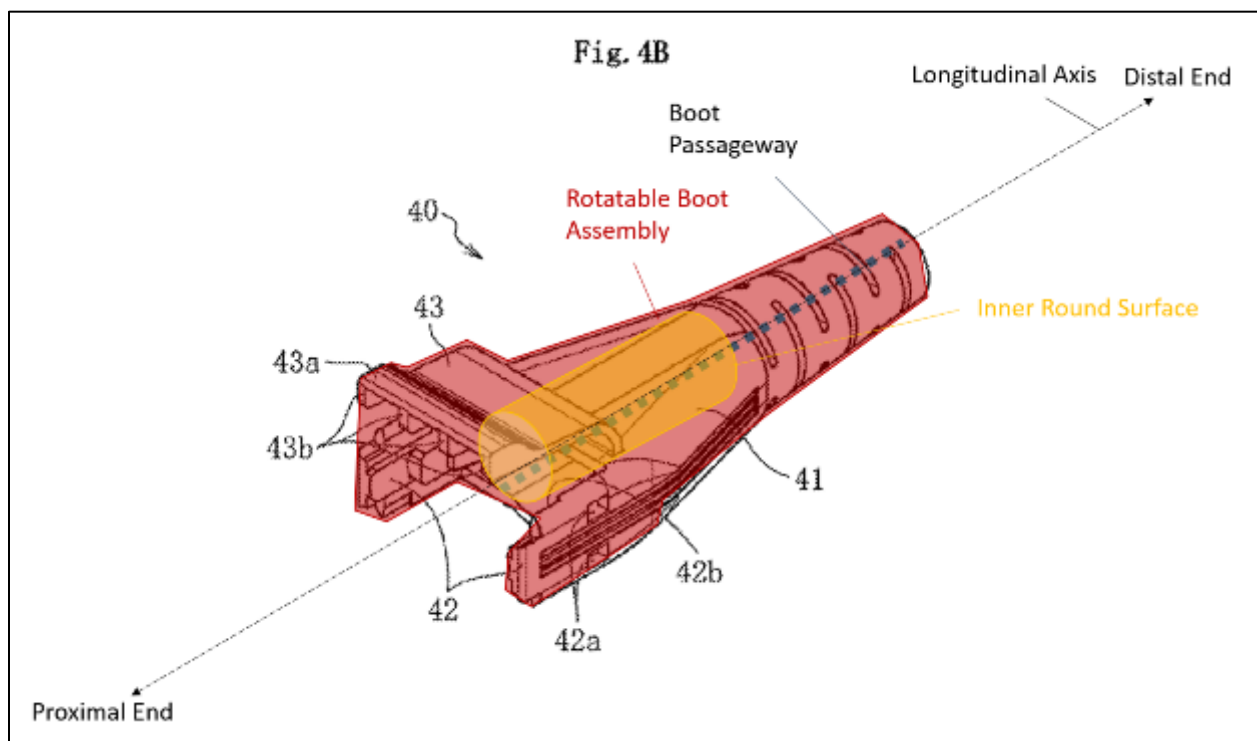
EX1007, FIG. 4B (annotated).

163. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.2]. In addition to Nakagawa disclosing claim element [1.3.2], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.2]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.2] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.2].

6. **Element [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,”

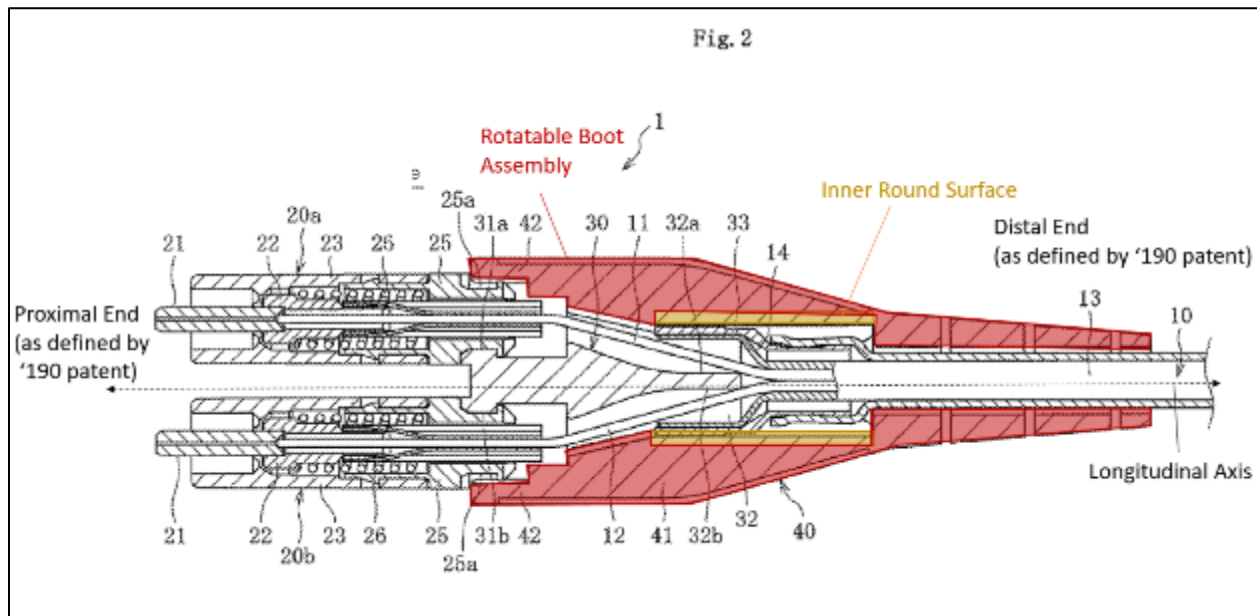
164. For at least the reasons below, it is my opinion that, a POSITA would have understood that Nakagawa discloses the rotatable boot assembly comprising a boot passageway extending from the distal end portion through the main body. For example, Nakagawa teaches that the “boot 40 integrally includes, a tubular main body portion 41.” EX1007, ¶56. I believe a POSITA would have understood that the tubular main body portion corresponds to the recited boot passageway as shown in Figure 4B of Nakagawa, reproduced below, because the boot should have a passageway to accommodate an optical fiber.



EX1007, FIG. 4B (annotated).

165. I believe a POSITA would have understood that Nakagawa also

defines a proximal end portion of the boot. As shown in Figures 4B and 2 of Nakagawa, reproduced above and below, respectively, a POSITA would have understood that Nakagawa's inner round surface defines the proximal end at the center of the rotatable boot assembly.



EX1007, FIG. 2 (excerpt², annotated).

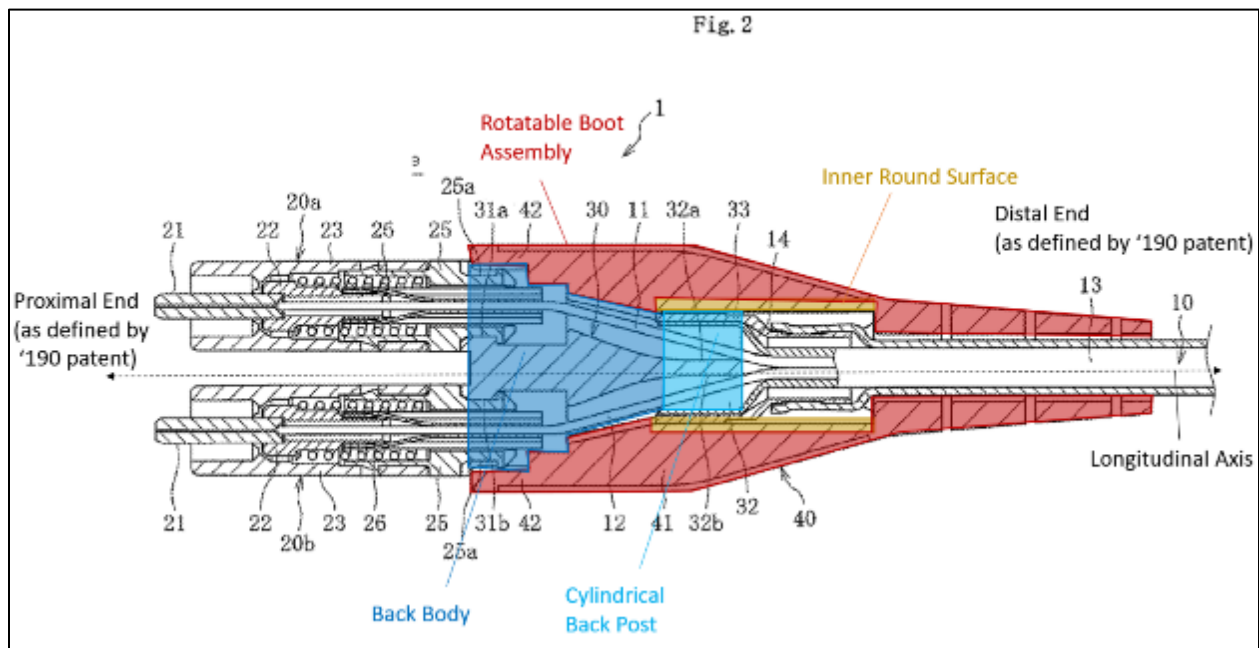
² Figure 2 of Nakagawa includes annotations of “leading end side” and “proximal side,” which conflicts with ’190 Patent’s definition of a “proximal end” and “distal end.” For ease of explanation, the definitions used in the ’190 Patent are used in this declaration. For clarity, each end is shown as “Distal End (as defined by the ’190 Patent)” and “Proximal End (as defined by the ’190 patent)” in Nakagawa's Figure 2.

167. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.3]. In addition to Nakagawa disclosing claim element [1.3.3], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.3]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.3] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.3].

7. Element [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”

168. I note that, “the back post” is not mentioned in the claim before claim element [1.3.4], but I believe a POSITA would understand “the back post” to be “the cylindrical back post” recited in claim element [1.2], since “the cylindrical back post” is introduced as a component of the back body as well as “the back post.” For at least the reasons below, it is my opinion that Nakagawa discloses a rotatable boot assembly that is configured to be disposed on the back body such that the outer round surface of the back post is matingly received in the inner round surface of the main body. For example, as shown in an annotated version of Figure 2B of Nakagawa, reproduced below, a POSITA would have understood that the

boot 40, corresponding to the recited rotatable boot assembly, is disposed on the holder 30, which would correspond to the recited back body. 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, the caulking member 33 is inserted entirely into the boot 40 as represented in Figure 2B. Thus, a POSITA would have also understood that cylindrical back post of Nakagawa is matingly received in the inner surface, as illustrated below.



EX1007, FIG. 2 (excerpt, annotated).

169. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.4]. In addition to Nakagawa disclosing claim element

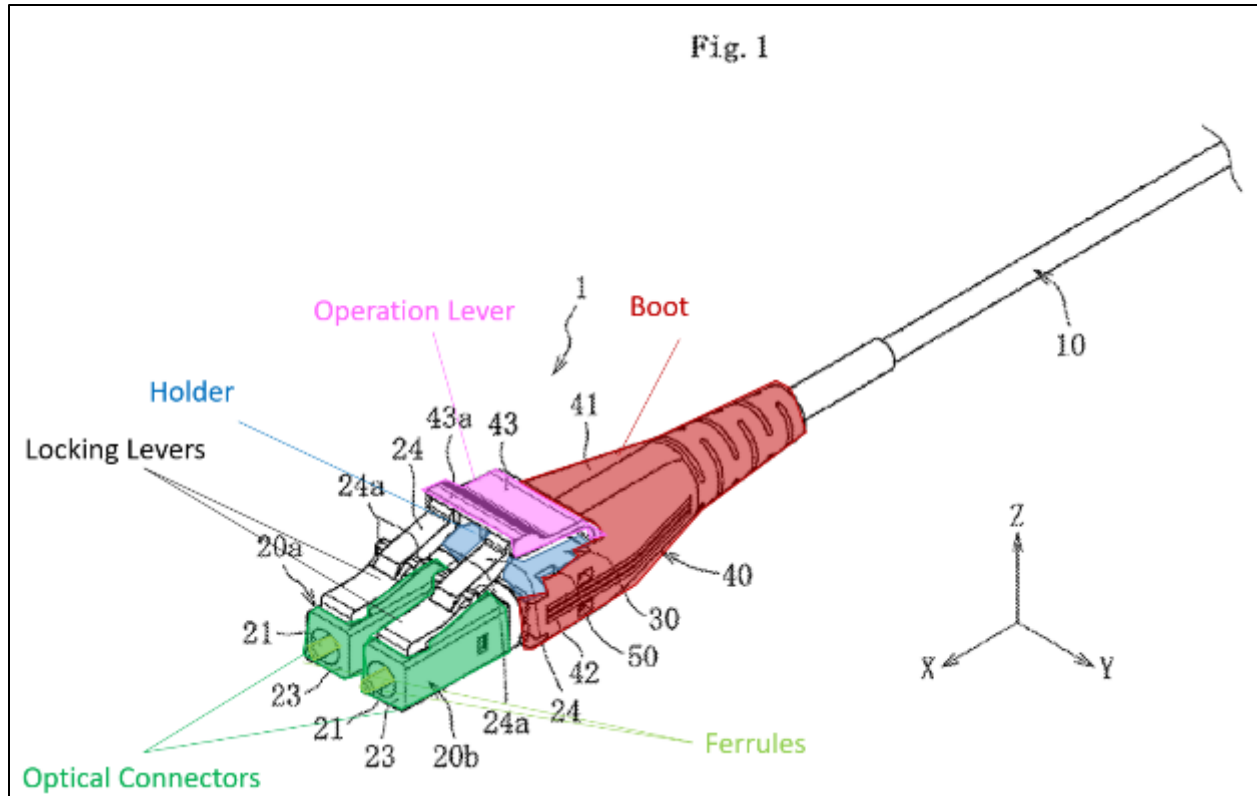
[1.3.4], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.4]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.4] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.4].

8. Element [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,”

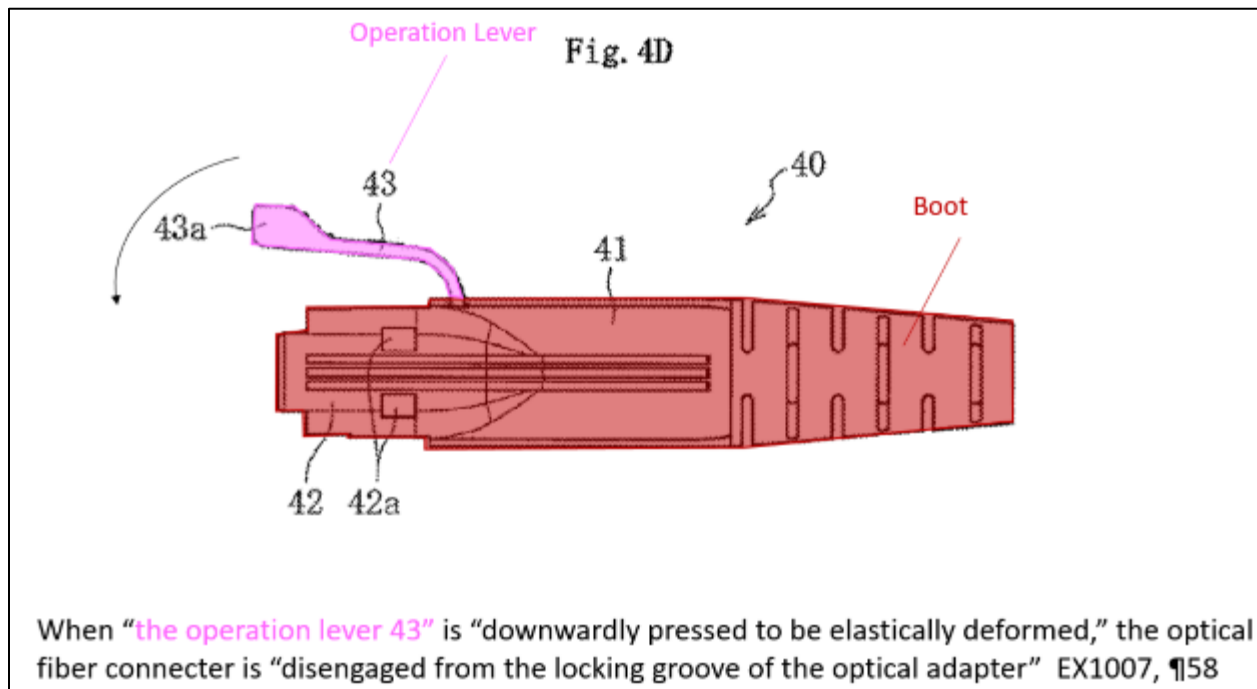
170. I note that the term “cable boot member” is not recited in the claim prior to claim element [1.3.5], however I believe a POSITA would understand the “cable boot member” to be at least any portion of the “rotatable boot assembly” as recited by claim element [1.3.1], at least because both terms contain “boot.” For at least the reasons below, it is my opinion that a POSITA would have understood that the combination of Nakagawa in view of Raven, as described in Section IX.A.3, renders obvious that the cable boot member is slidable along the longitudinal axis relative to the back body for releasing the optical fiber connector from an adapter.

171. In more detail, a POSITA would have understood that a unitary Nakagawa-Raven ferrule holder would render obvious a cable boot member for

releasing the optical fiber connector from an adapter. For example, as previously explained in Section VII.A, Nakagawa teaches how to disengage its optical connector from an optic adapter. 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. 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. “The 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 that “[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.” EX1007, ¶58. This configuration is shown in annotated versions of Figures 1 and 4D of Nakagawa, reproduced below.



EX1007, FIG. 1 (annotated).

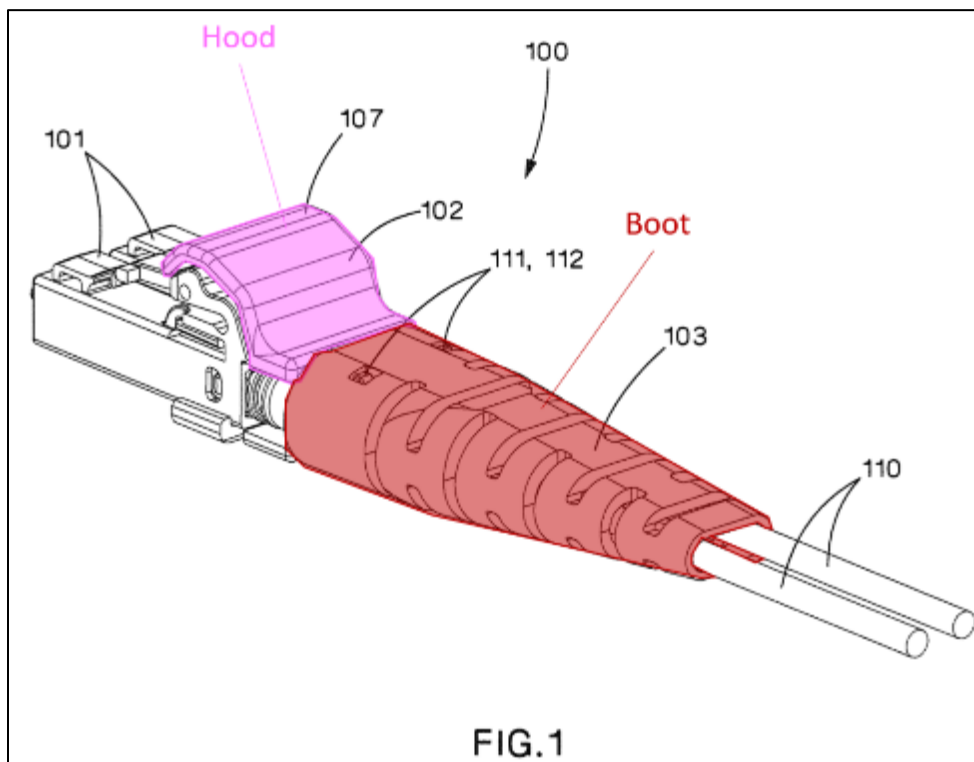


EX1007, FIG. 4D (annotated).

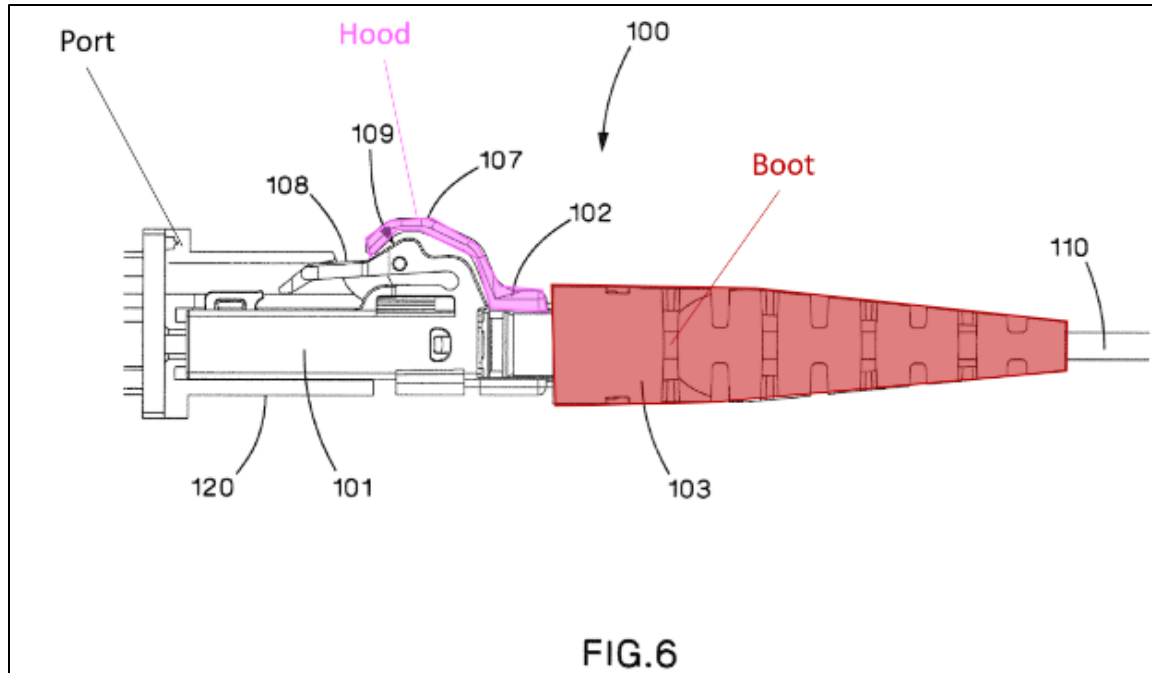
172. A POSITA would have also readily recognized that the combination

of Nakagawa and Raven renders obvious that a cable boot member may be slidable along a longitudinal axis relative to the back body for releasing the optical fiber connector from an adapter, in light of their general knowledge. Indeed, such a feature is the routine manner in which these connectors would have operated. In other words, the feature is unusually simple and particularly straightforward. For example, as described above in section VII.C, Irwin also teaches how to disengage its LC connectors from a port. Irwin discloses “an LC duplex clip assembly 100” including “a pair of LC connectors 101, a clip body 102, and a boot 103.” EX1009, 2:49-51. The clip body 102 has a “hood 107 [that] protrudes from the top of the clip body 102.” EX1009, 2:59-61, FIG. 1. Irwin further teaches that “[t]he hood 107 is configured to engage a camming surface 109 on the LC connector latches 108 when the boot 103 and clip body 102 are moved in an axially rearward direction relative to the LC connectors 101.” EX1009, 2:61-64. Irwin explains the LC connector is disengaged from the port 120 by “moving the boot 103 and clip body 102 **axially rearward** relative to the LC connectors” causing “the hood 107 to engage the camming surfaces 109 of the LC connector latches 108.” EX1009, 3:7-11 (emphasis added), FIGs. 6-7. The below annotated versions of Figures 1, 6, and 7 of Irwin, are one prior art example illustration of technology commonplace in the field of optical connectors pertaining to easily replaceable latching mechanisms. The difference between a structure disclosed in Nakagawa-Raven and

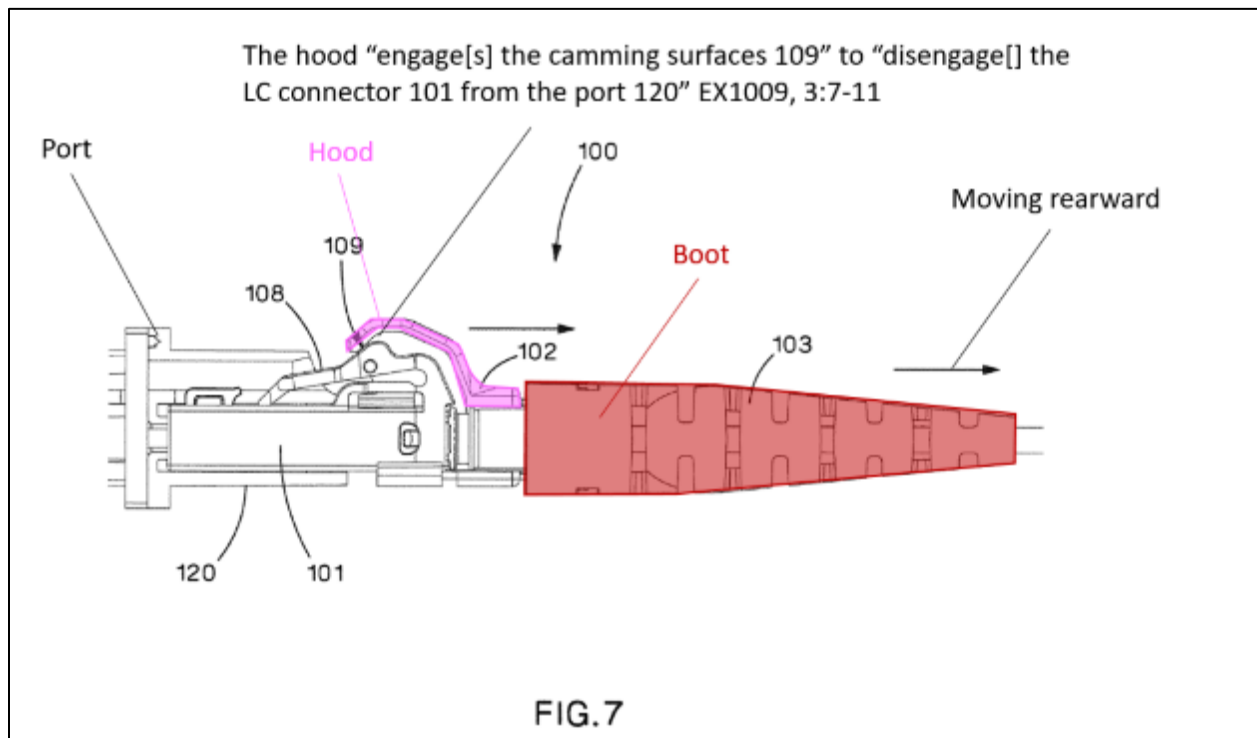
Irwin's structure is simply whether the part of the boot member is deformable up and down or slidable along the longitudinal axis to push down locking levers 24. It would be obvious to a POSITA that the simple way to push down locking levers 24 by interaction with operating lever 43 was to either push down on operating lever 43 or to push down on operating lever 43 by the resultant force produced by sliding operating lever 43.



EX1009, FIG. 1 (annotated).



EX1009, FIG. 6 (annotated).



EX1009, FIG. 7 (annotated).

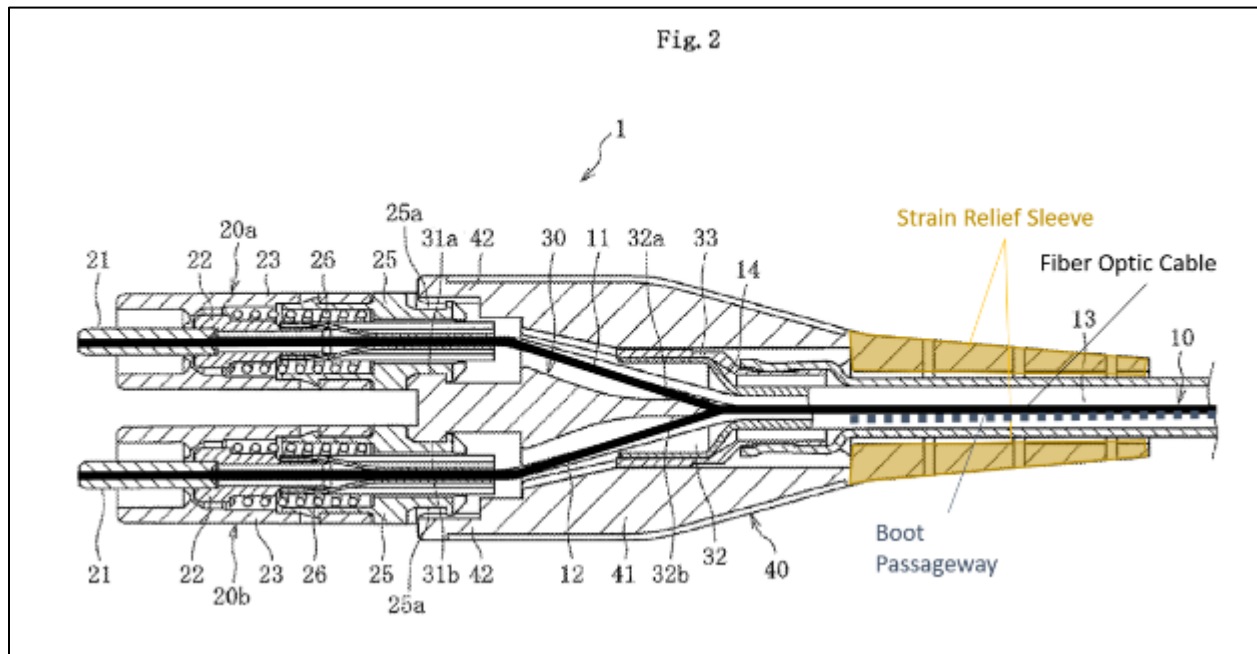
173. As the latching hood component of Irwin is a straightforward and commonplace option of a latching mechanism for optical connectors, it would be

obvious to a POSITA that such a latch would be easily supported by the optical connector of Nakagawa. As such, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.5]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.5] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.5].

9. Element [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,”

174. For at least the reasons below, it is my opinion that a POSITA would have understood that 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. Nakagawa also teaches that “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. 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 below. A POSITA

would have further understood the duplex cable 10 is terminated in a connector, because otherwise the connector of Nakagawa cannot transmit a signal through the duplex cable 10.



EX1007, FIG. 2 (excerpt, annotated).

175. Furthermore, 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.

176. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.6]. In addition to Nakagawa disclosing claim element

[1.3.6], it would be clear to a POSITA that the combination of Nakagawa and

Raven (described in Section IX.A.3) also renders obvious claim element [1.3.6].

That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.6] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.6].

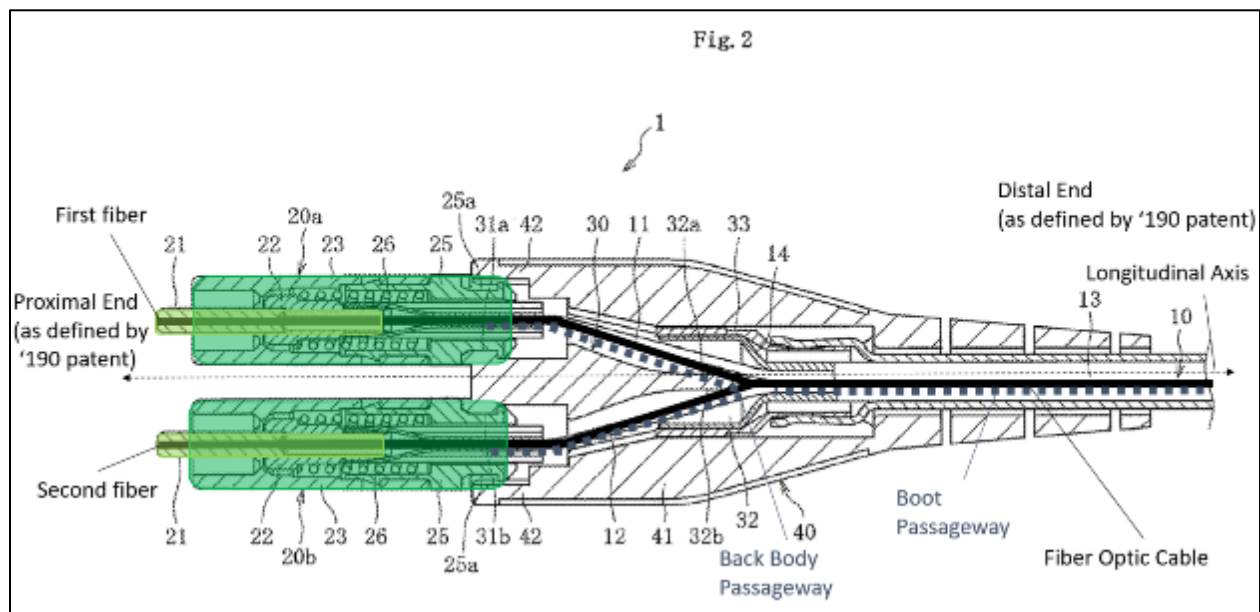
10. Element [1.3.7] – “the boot passageway and the back body passageway configured to align for passing first and second fibers from the fiber optic cable to the front body to complete a signal path to the first and second ferrules within the front body;”

177. For at least the reasons below, it is my opinion that a POSITA would have understood that Nakagawa discloses 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. As I explained in relation to claim element [1.3.3], Nakagawa teaches that its rotatable boot has a boot passageway. Further, as explained in relation to claim element [1.2], Nakagawa teaches that its back body would encompass the claimed back body passageway. A POSITA would have understood that Nakagawa further teaches that the boot passageway and the back body passageway are configured to align for passing the first and second fibers.

For example, Nakagawa teaches that “the main body portion 41”, including the recited boot passageway, “covers the outer periphery of the duplex cable 10.”

EX1007, ¶56. Nakagawa further teaches that “the 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. Indeed, as shown in Figure 2, reproduced and annotated below, Nakagawa illustrates the boot passageway and back body passageway accommodate the fiber optic cable. A POSITA would have also understood that the signal path of the fibers are completed to the first and second ferrules within the front body as illustrated in the annotated Figure 2 of Nakagawa, because otherwise the connector of Nakagawa cannot transmit a signal through the duplex cable 10.



EX1007, FIG. 2 (excerpt, annotated).

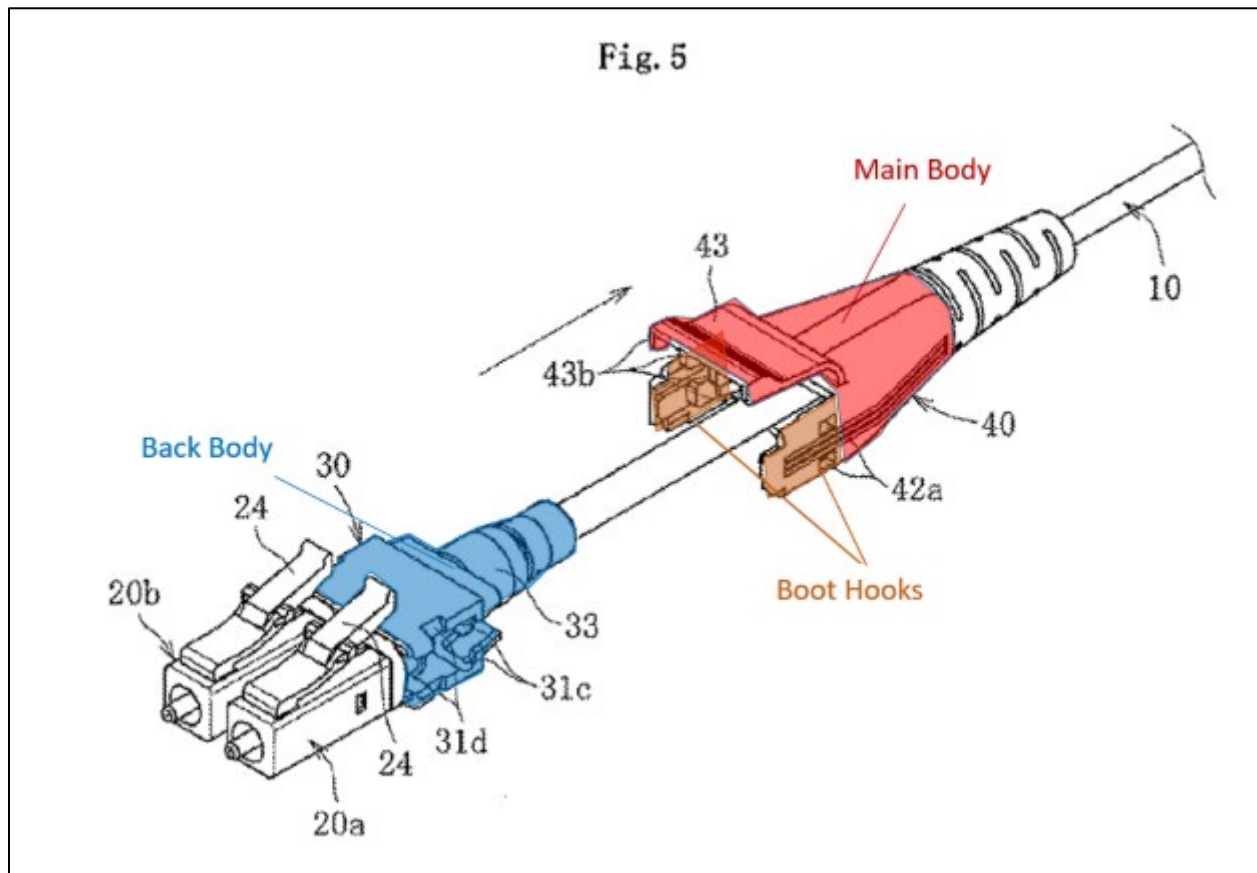
178. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.7]. In addition to Nakagawa disclosing claim element [1.3.7], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.7]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.7] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.7].

11. Element [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,”

179. For at least the reasons below, it is my opinion that a POSITA would have understood that Nakagawa discloses a main body further comprising at least one boot hook configured for releasably securing the multi-purpose rotatable boot assembly to the back body. For example, Nakagawa teaches that “the 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. Regarding the fixing portions 42, Nakagawa further teaches that “fixing portions 42 each include fitting holes 42a formed therein, for fitting the protrusions 31c of the main body portion 31 of

the holder 30,” where the holder corresponds to the claimed back body. EX1007,

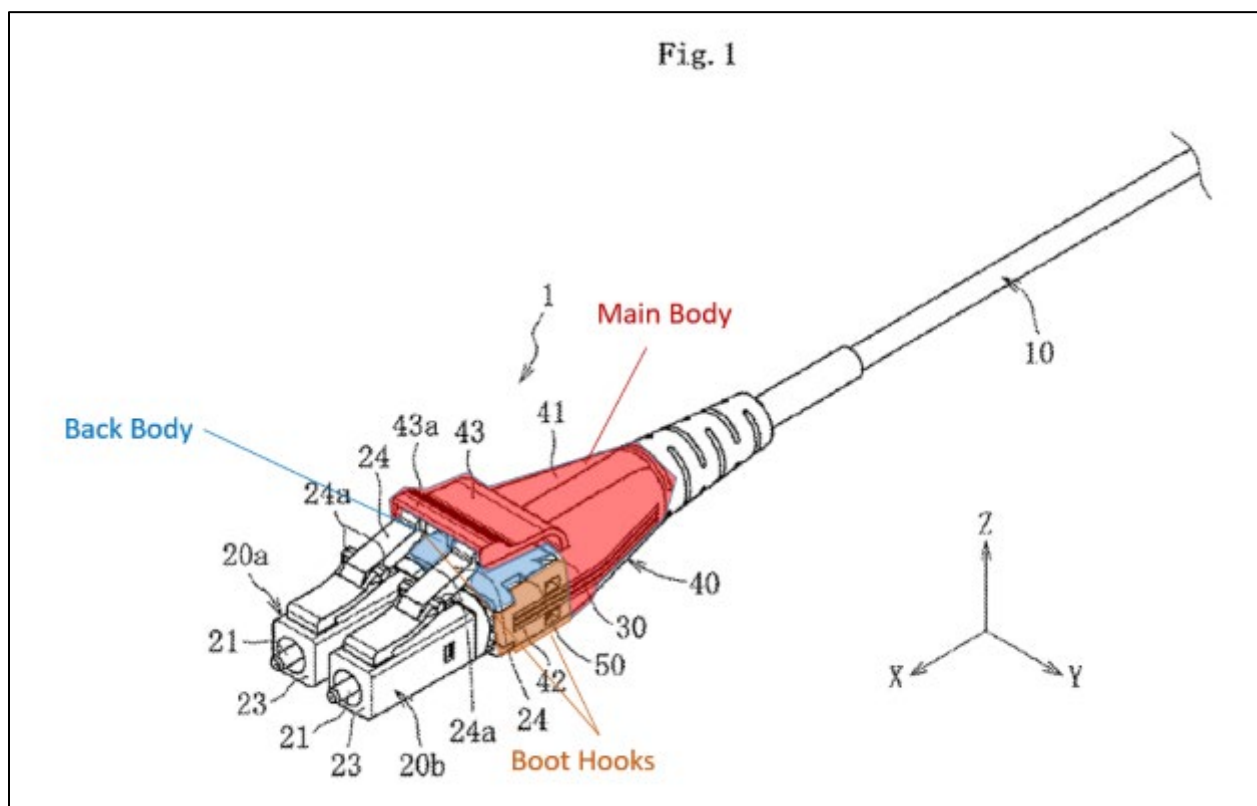
¶57. A POSITA would have understood that the fixing portions 42 correspond to the annotated boot hook(s) for releasably securing the multi-purpose rotatable boot assembly to the back body, as depicted in Figure 5 of Nakagawa, reproduced and annotated below.



EX1007, FIG. 5 (annotated).

180. A POSITA would have further understood that Nakagawa also discloses that its boot hooks may be configured for releasably securing the multi-purpose rotatable boot assembly against rotation relative to the back body. For example, Nakagawa 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. As shown in Figure 1 of Nakagawa, reproduced and annotated below, the boot hooks engage the back body and restrict the rotation of the back body.



EX1007, FIG. 1 (annotated).

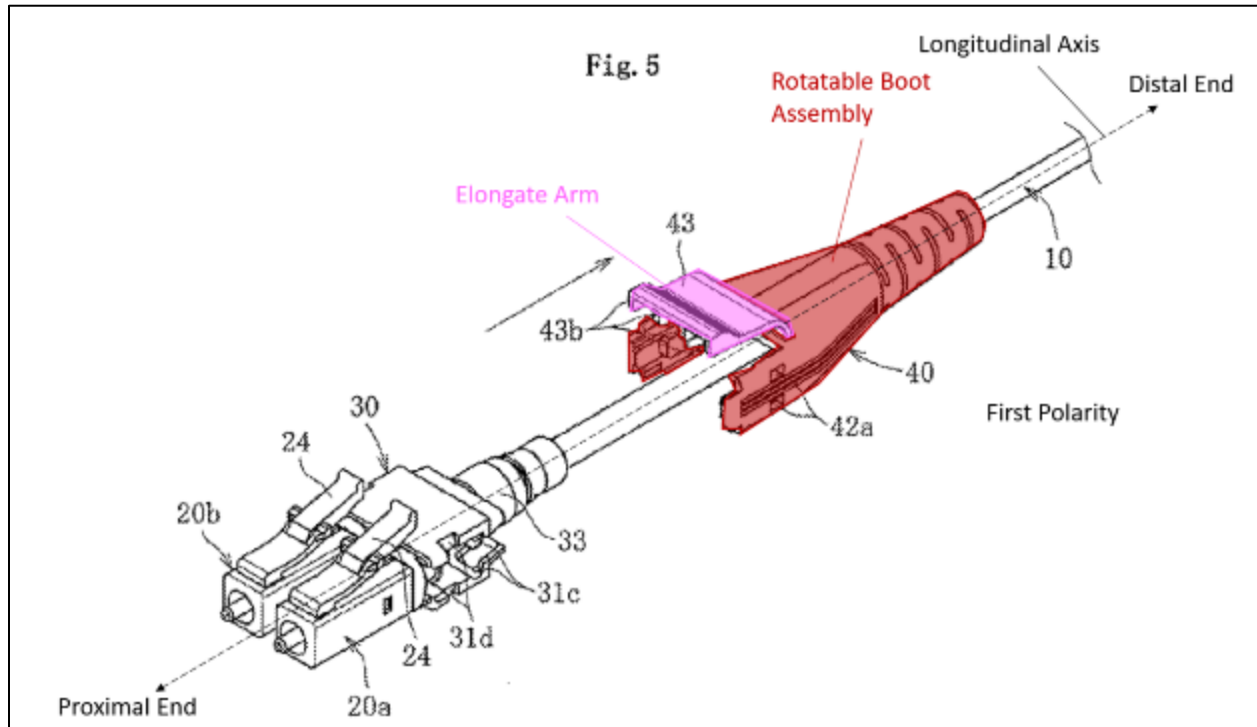
181. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.8]. In addition to Nakagawa disclosing claim element [1.3.8], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious claim element [1.3.8].

That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.8] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.8].

12. Element [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.”

182. For at least the reasons below, it is my opinion that a POSITA would have understood that Nakagawa discloses the rotatable boot assembly further comprising an elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis, and the elongate arm being configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity. For example, Nakagawa teaches that “the boot 40,” corresponding to the claimed rotatable boot assembly “integrally includes [] an operation lever 43 which is provided in a top surface of the main body portion 41.” EX1007, ¶56. As illustrated in Figure 5 of Nakagawa, reproduced and annotated below, the operation lever 43 extends from the main body in a proximal direction along the longitudinal axis. Thus, a POSITA would have understood that the operation lever 43 corresponds to the claimed elongate arm extending

longitudinally from the main body in a proximal direction along the longitudinal axis.



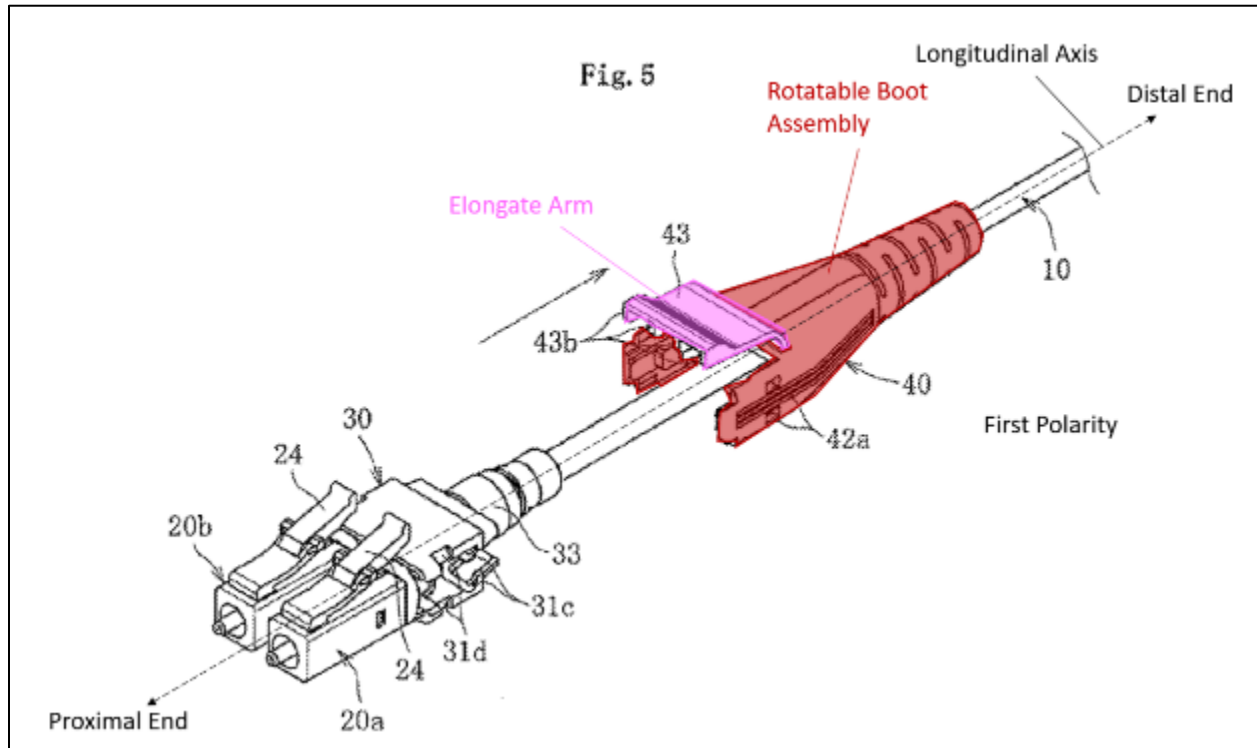
EX1007, FIG. 5 (annotated).

183. In my opinion, a POSITA would have understood that Nakagawa further discloses the elongate arm being configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity. Here, 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. In other words, the correct polarity is achieved when the position of the transmitting ferrule and the receiving ferrule coincide with

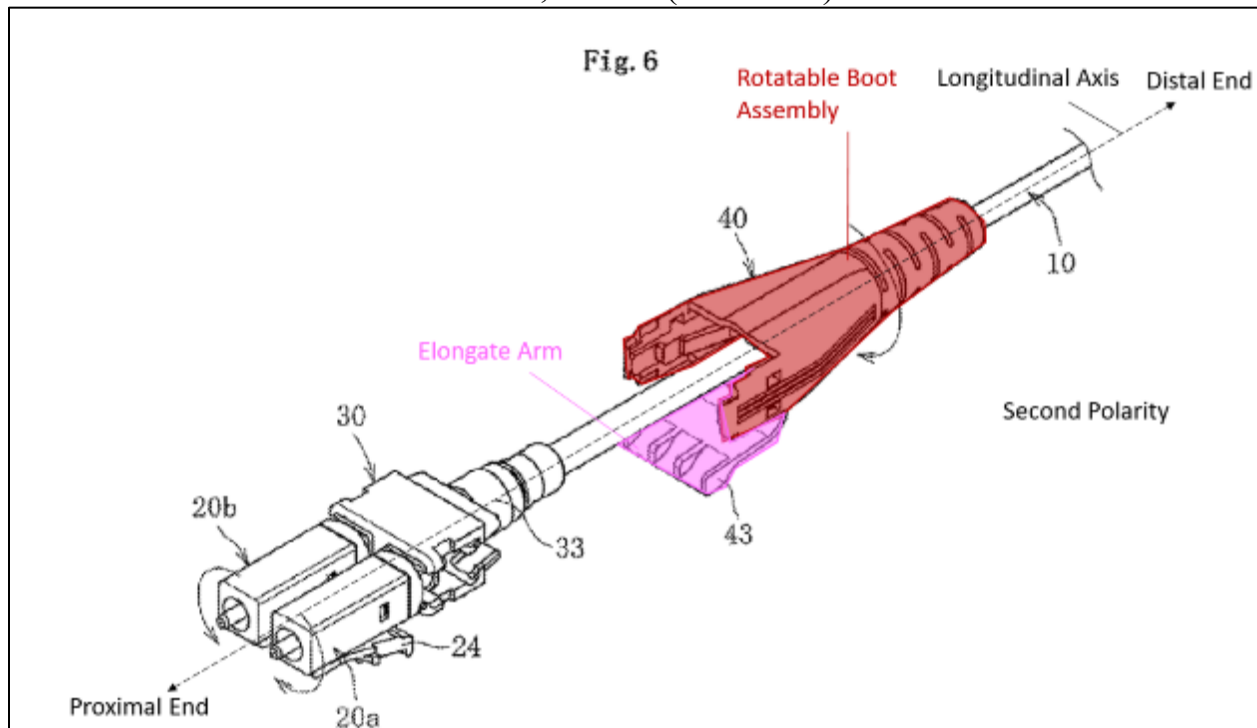
their respective mating ports. Thus, a POSITA would have understood that if the placement of the ferrules relative to the elongate arm is reversed (*e.g.*, reverse left and right) then the polarity of the connector would be understood to be reversed. As will become clear by Figures 5 and 6 of Nakagawa, reproduced and annotated below, Nakagawa discloses reversing the polarity by reversing the placement of the ferrules relative to the elongate arm.

184. For example, Nakagawa teaches that if “the 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. In other words, Nakagawa shows connectors assembled in a first polarity in Figure 5, and explains how to change the polarity to a second polarity by disassembling the connector. To change the polarity, Nakagawa teaches that “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 the holder 30 so as to be reversed upside down.” EX1007, ¶62. Thus, Nakagawa shows connectors assembled in the second polarity in Figure 6. As shown in Figures 5-6 of Nakagawa, reproduced and annotated below, Nakagawa illustrates correcting the polarity by reversing the placement of the ferrules relative to the elongate arm. A POSITA would have understood that

the elongate arm set the optical fiber connector to each of a first polarity and a second polarity in Figures 5 and 6.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

185. Accordingly, a POSITA would have understood that Nakagawa discloses element [1.3.9]. In addition to Nakagawa disclosing claim element [1.3.9], it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious claim element [1.3.9]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of claim element [1.3.9] that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious claim element [1.3.9].

186. In summary, for at least the reasons above, I believe a POSITA would have been motivated to make a combination of Nakagawa and Raven that renders obvious each of the features of Claim 1 of the '190 Patent. As such, it is my opinion that the entirety of Claim 1 of the '190 Patent is rendered obvious.

C. Claim 2

1. Preamble – “The optical fiber connector according to claim 1, wherein”

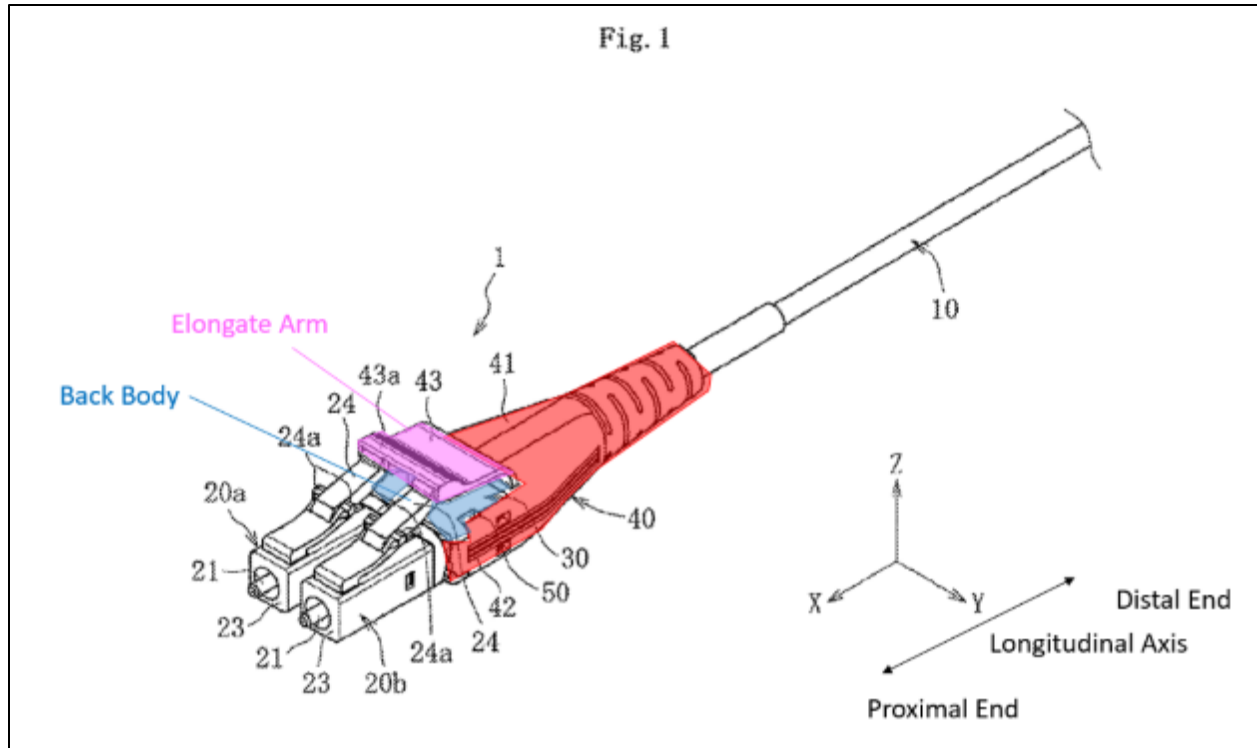
187. Claim 2 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Nakagawa and Raven renders obvious Claim 1. *See* Section IX.B. Additionally, for at least the reasons below, it is my opinion that

the combination of Nakagawa and Raven renders obvious Claim 2 of the '190 Patent.

2. Element [2.1] – “the elongate arm is an alignment key.”

188. The '190 Patent defines the “alignment 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, I interpret the meaning of “alignment key” in Claim 2 to mean “any protrusion adjacent to a side of the connector housing” based on the combined definitions in the '190 Patent.

189. In my opinion, a POSITA would have understood that Nakagawa discloses that the elongate arm is an alignment key. For example, as illustrated in Figure 1 of Nakagawa, reproduced below, the elongate arms of Nakagawa are adjacent to an upper side of the back 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 Nakagawa correspond to the recited alignment keys.



EX1007, FIG. 1 (annotated).

190. Accordingly, a POSITA would have found Claim 2 obvious based on the elongate arm of Nakagawa. In addition to Nakagawa disclosing Claim 2, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 2. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 2 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 2.

D. Claim 3

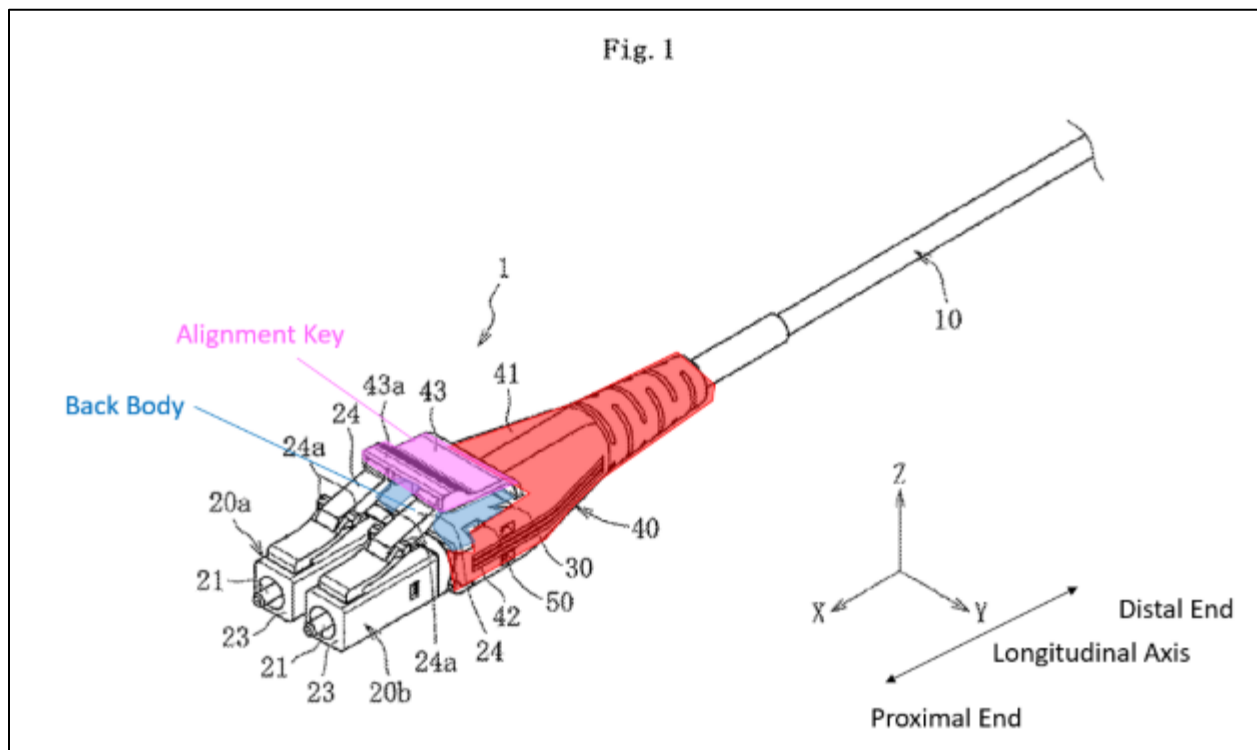
1. Preamble – “The optical fiber connector according to claim 2, wherein”

191. Claim 3 depends upon Claim 2 which depends upon Claim 1, and for at least the reasons discussed for Claim 2 and Claim 1, the combination of Nakagawa and Raven renders obvious Claim 2 and Claim 1. *See* Section IX.B; *see also* Section IX.C. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 3 of the '190 Patent.

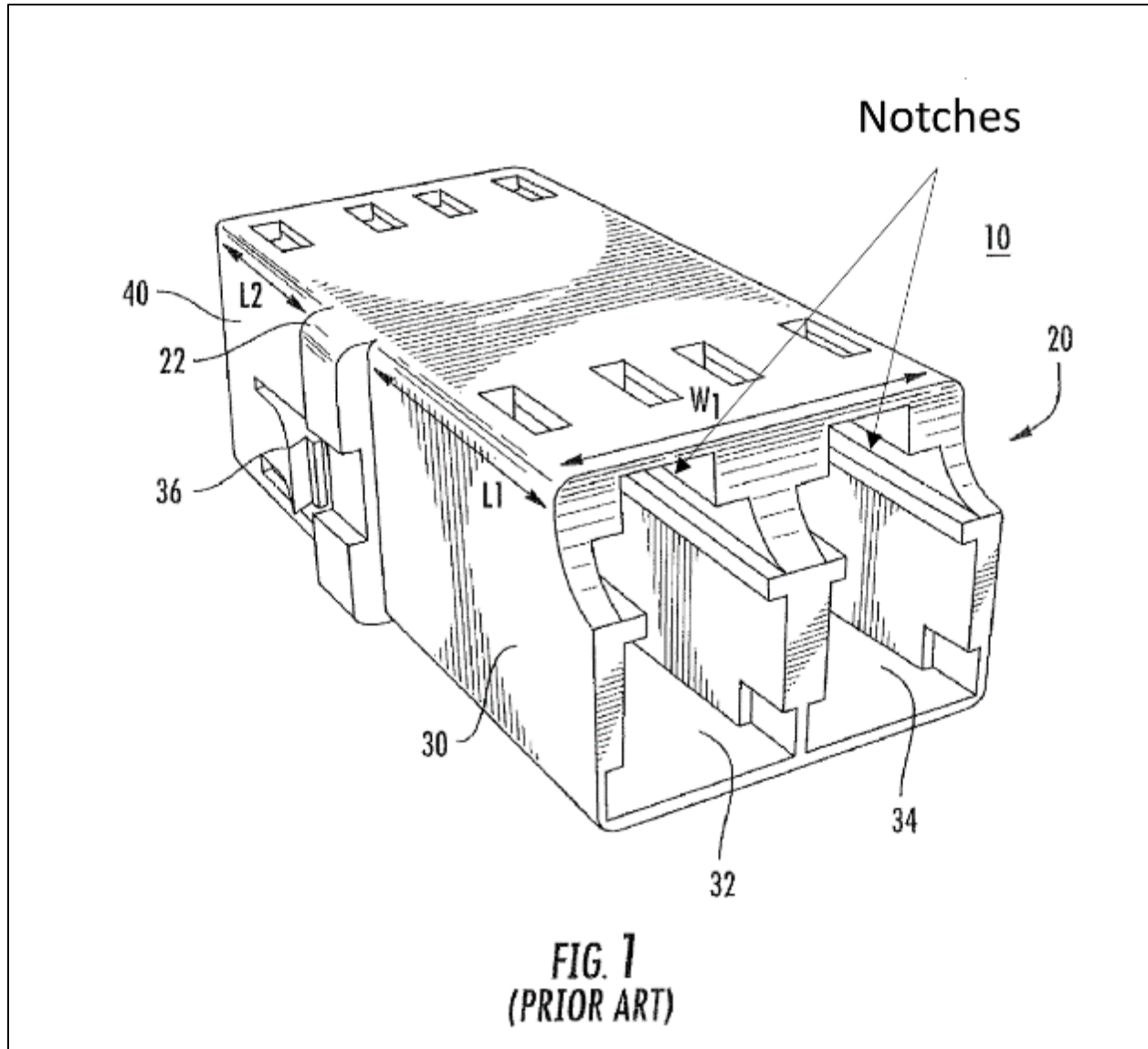
2. Element [3.1] – “the alignment key aligns the proximal end of the optical fiber connector into the adapter.”

192. In my opinion, a POSITA would have understood that Nakagawa discloses that its alignment key aligns the proximal end of the optical fiber connector into an adapter. For example, Nakagawa discloses “the 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. Nakagawa further teaches that when the locking levers 24 engage “with a locking groove [] provided in the optical adapter,” it “prevent the optical connector 20a or 20b from coming off the optical adapter.” EX1007, ¶50. Nakagawa discloses that its “optical connectors 20a, 20b are both an LC type connector”, but does not clearly disclose the shape of the receptacle (*e.g.*, adapter) which

accommodates the LC type connector. EX1007, ¶47. As described above in Section IV, an LC type optical connector is a common type of optical fiber connector with a well-known shape. For example, as shown in Figure 1 of Case reproduced below, the adapter has notches at the top for inserting locking levers, which align the connector with the adapter. Case teaches that “FIG. 1 is a front perspective view of a conventional duplex LC fiber optic adapter.” EX1010, 2:6-8. A POSITA would have understood that the locking levers 24 shown in Figure 1 of Nakagawa, reproduced below, engaged with the elongate arm, are inserted into the notches of an LC connector adapter, as exemplified in Case.



EX1007, FIG. 1 (annotated).



EX1010, FIG. 1 (annotated).

193. In other words, Nakagawa's alignment key prohibits the rotation of the 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.

194. Accordingly, a POSITA would have found Claim 3 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 3, it would be clear to a

POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 3.

That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 3 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 3.

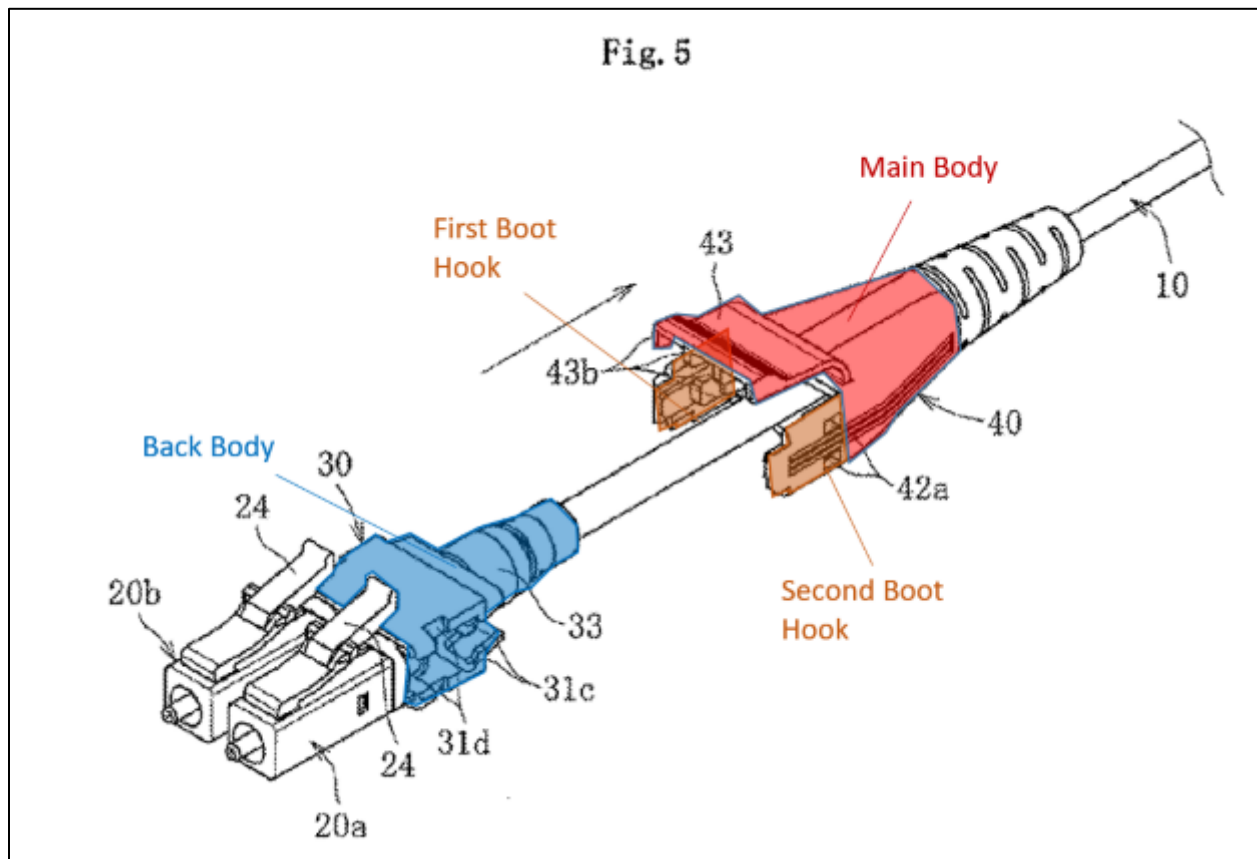
E. Claim 6

1. Preamble – “The optical fiber connector according to claim 1, wherein”

195. Claim 6 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Nakagawa and Raven renders obvious Claim 1. *See* Section IX.B. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 6 of the '190 Patent.

2. Element [6.1] – “at least one boot hook comprises first and second boot hooks.”

196. In my opinion, a POSITA would have understood that Nakagawa discloses the boot hook comprising first and second boot hooks as illustrated in Figure 5 as annotated below.



EX1007, FIG. 5 (annotated).

197. Accordingly, a POSITA would have found Claim 6 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 6, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 6. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 6 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 6.

F. Claim 7

1. Preamble – “The optical fiber connector according to claim 6, wherein”

198. Claim 7 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Nakagawa and Raven renders obvious Claim 1 and Claim 6. *See* Section IX.B; *see also* Section IX.E. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 7 of the '190 Patent.

2. Element [7.1] – “the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis.”

199. In my opinion, a POSITA would have understood that Nakagawa discloses the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis illustrated in Figure 5 as annotated above. Accordingly, a POSITA would have found Claim 7 obvious based Nakagawa. In addition to Nakagawa disclosing Claim 7, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 7. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 7 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it

is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 7.

G. Claim 8

1. Preamble – “The optical fiber connector according to claim 6, wherein”

200. Claim 8 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Nakagawa and Raven renders obvious Claim 1 and Claim 6. *See* Section IX.B; *see also* Section IX.E. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 8 of the '190 Patent.

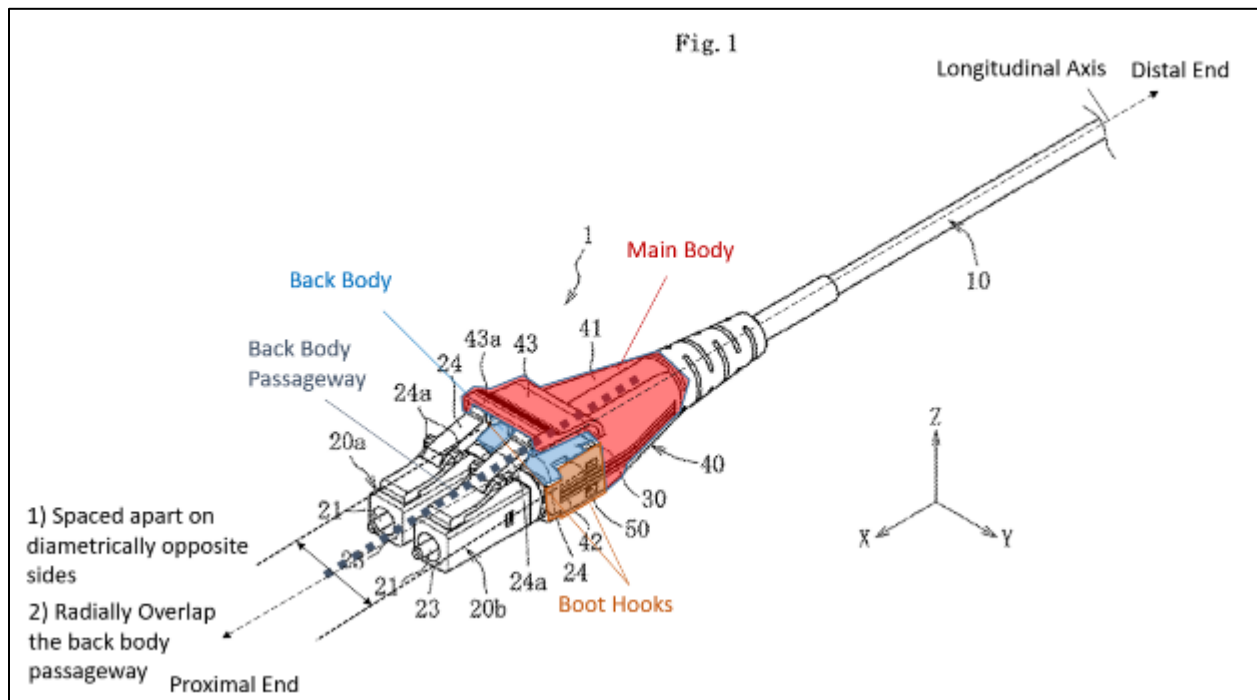
2. Element [8.1] – “when the rotatable boot assembly is disposed on the back body, the first and second boot hooks are spaced apart on diametrically opposite sides of the back body passageway and radially overlap the back body passageway relative to the longitudinal axis.”

201. Claim 8 recites: “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.” Claim 8 of the '190 Patent depends upon Claim 6 and as previously mentioned, Claim 6 depends upon Claim 1, and for at least the reasons as detailed for Claims 1 and 6, the combination of Nakagawa and Raven renders

obvious Claims 1 and 6. Claim 8 adds an additional limitation to Claim 6. For at least the reasons below, it is further my opinion that the combination of Nakagawa and Raven renders obvious Claim 8 of the '190 Patent.

202. In my opinion, Nakagawa discloses that the rotatable boot assembly may be disposed on the back body, the first and second boot hooks are spaced apart on diametrically opposite sides of the back body passageway. For example, Figure 1 of Nakagawa, reproduced below, illustrates the connector when the rotatable boot assembly is disposed on the back body. As annotated below, Figure 1 also illustrates the first boot hook and the second boot hook are spaced apart on diametrically opposite sides of the back body passageway.

203. Further, in my opinion, Nakagawa also discloses when the rotatable boot assembly is disposed on the back body, the first and second boot hooks radially overlap the back body passageway relative to the longitudinal axis. As annotated below, Figure 1 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.



EX1007, FIG. 1 (annotated).

204. Accordingly, a POSITA would have found Claim 8 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 8, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 8. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 8 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 8.

H. Claim 9

1. Preamble – “The optical fiber connector according to claim 6, wherein”

205. Claim 9 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Nakagawa and Raven renders obvious Claim 1 and Claim 6. *See* Section IX.B; *see also* Section IX.E. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 9 of the '190 Patent.

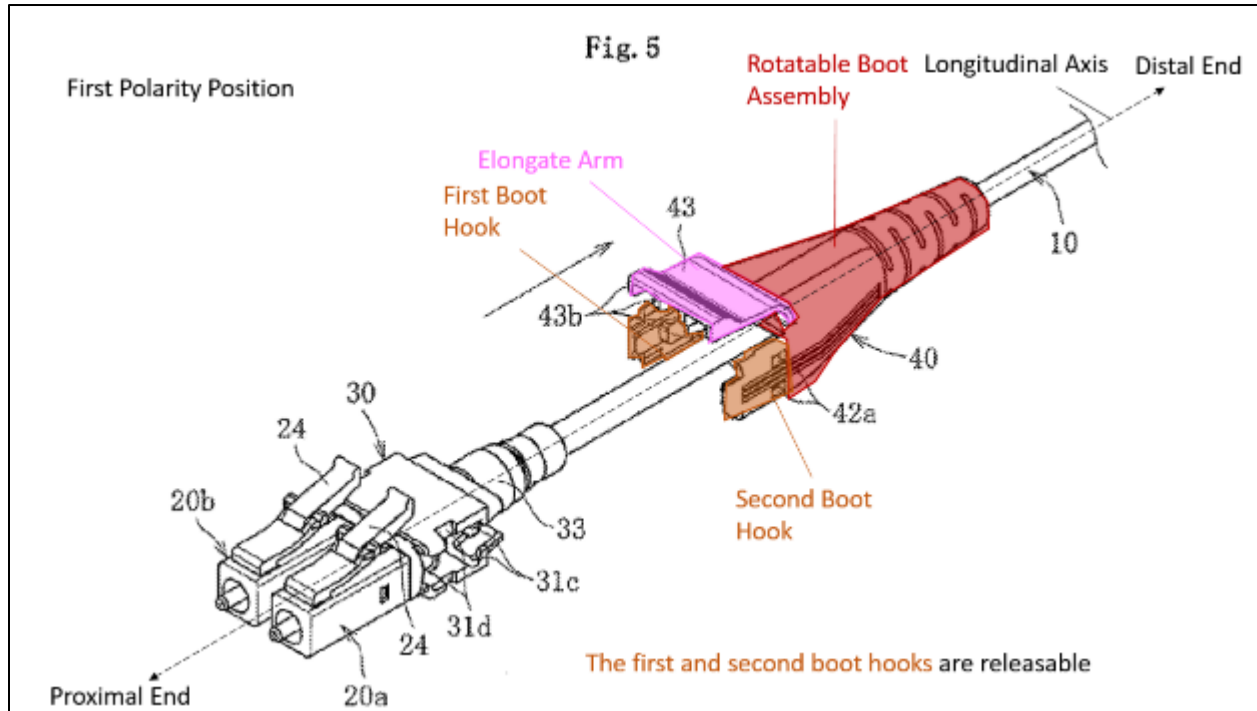
2. Element [9.1] – “the first and second boot hooks are releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which the elongate arm sets the optical fiber connector to the second polarity.”

206. In my opinion, a POSITA would have understood that Nakagawa discloses that 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. For example, Nakagawa discloses that its “boot,” corresponding to the recited rotatable boot assembly, “is detached from the holder” to exchange the position of “the pair of optical connectors.” EX1007, ¶17.

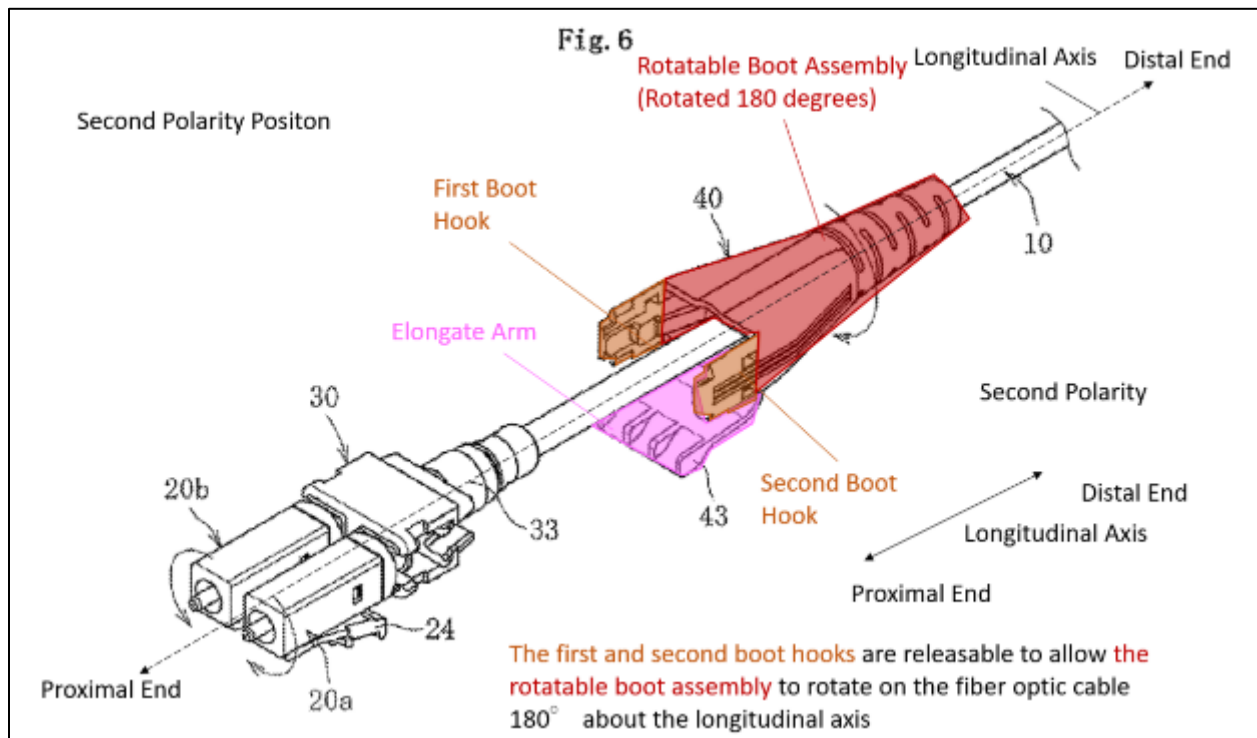
207. Further, as explained in the explanation for the claim element [1.3.9], Nakagawa discloses that the elongate arm being configured for selectively setting

the optical fiber connector to each of a first polarity and a second polarity.

Annotated versions of Figures 5 and 6 of Nakagawa, reproduced below, demonstrate 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 5 illustrates that the rotatable boot assembly of Nakagawa is located at the recited first polarity position and Figure 6 illustrates that the located at the recited second polarity position.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

208. Accordingly, a POSITA would have found Claim 9 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 9, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 9. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 9 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 9.

I. Claim 10

1. Preamble – “The optical fiber connector according to claim 9, wherein”

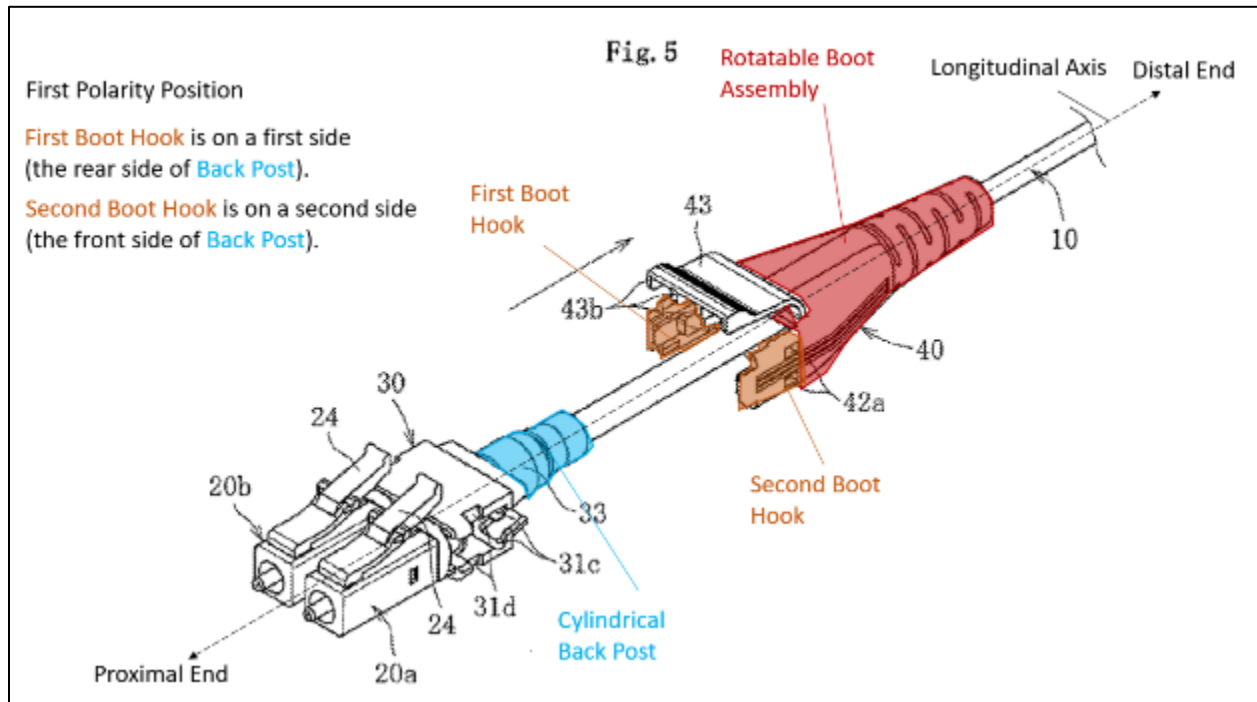
209. Claim 10 depends upon Claim 9 which depends upon Claim 6 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 6, and Claim 9, the combination of Nakagawa and Raven renders obvious Claim 1, Claim 6, and Claim 9. *See* Section IX.B; *see also* Section IX.E; *see also* Section IX.H.

Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 10 of the '190 Patent.

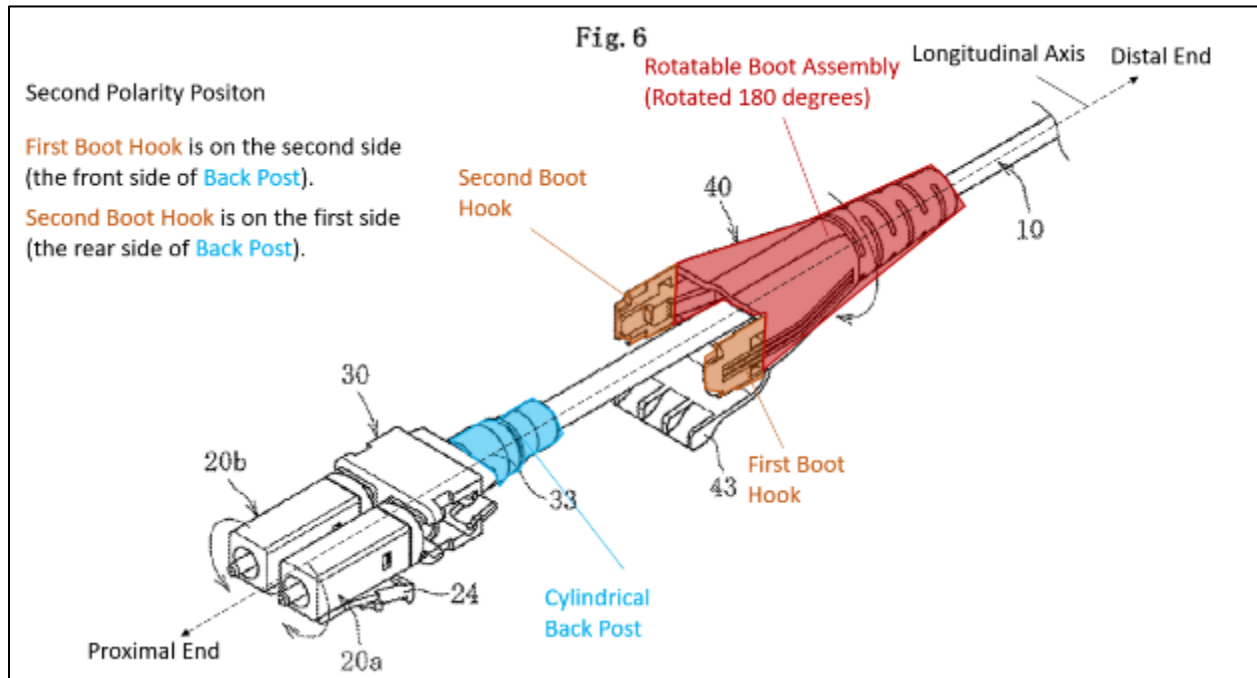
2. Element [10.1] – “when the rotatable boot assembly is in the first polarity position, the first boot hook is on a first side of the back post and the second boot hook is on a second side of the back post; and wherein when the boot assembly is in the second polarity position, the first boot hook is on the second side of the back post and the second boot hook is on the first side of the back post.”

210. As previously mentioned in relation to my analysis for Claim 9, the rotatable boot assembly of Nakagawa is 1) in the first polarity position when the rotatable boot assembly is in the first polarity and 2) in the second polarity position when the rotatable boot assembly is in the first polarity. *See* Section IX.H. In my opinion, a POSITA would have understood that Nakagawa further discloses that the positions of the first hook and the second hook are interchanged in the first and second polarity positions (*i.e.*, 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 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). For example, as shown in annotated versions of Figures 5 and 6 of Nakagawa, reproduced below, 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, Nakagawa teaches that “the 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.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

211. Accordingly, a POSITA would have found Claim 10 obvious based

on Nakagawa. In addition to Nakagawa disclosing Claim 10, it would be clear to a POSITA from the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 10. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 10 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 10.

J. Claim 11

1. Preamble – “The optical fiber connector according to claim 9, wherein”

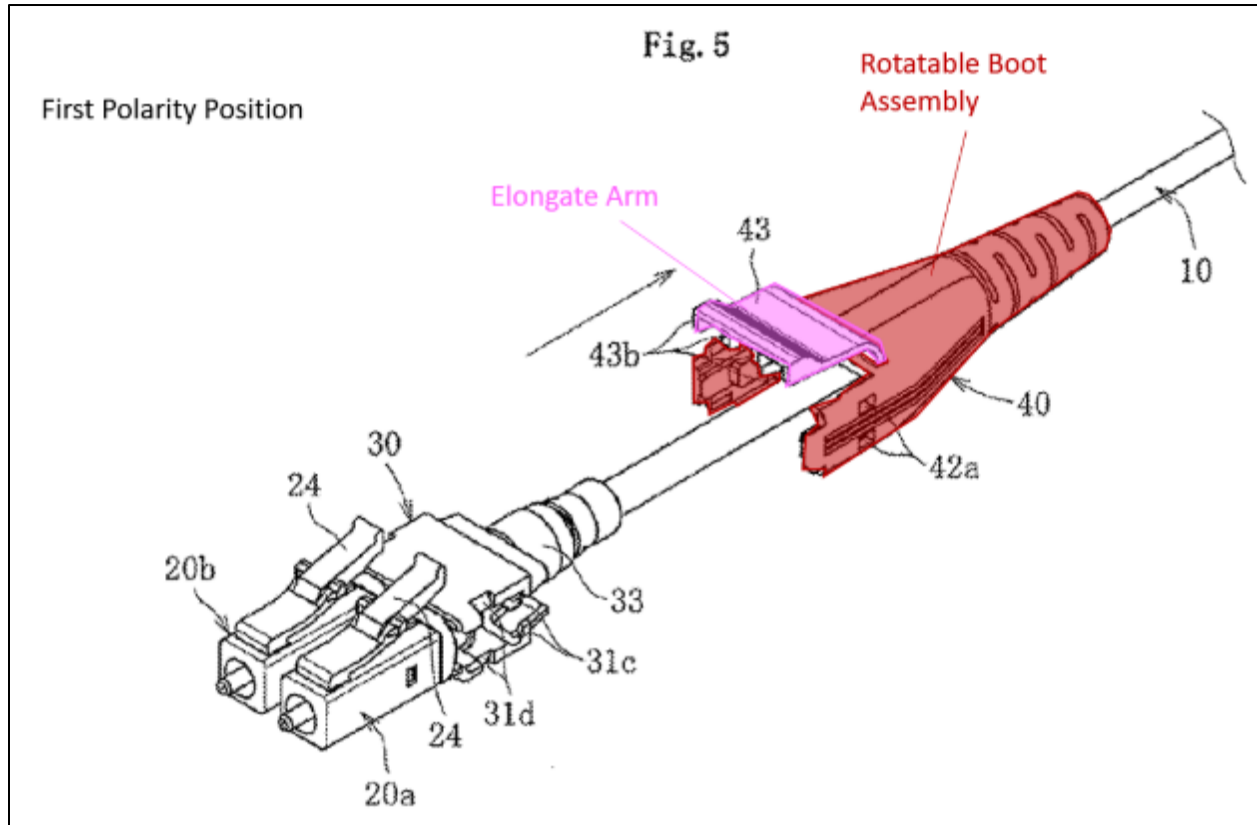
212. Claim 11 depends upon Claim 9 which depends upon Claim 6 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 6, and Claim 9, the combination of Nakagawa and Raven renders obvious Claim 1, Claim 6, and Claim 9. *See* Section IX.B; *see also* Section IX.E; *see also* Section IX.H.

Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 11 of the '190 Patent.

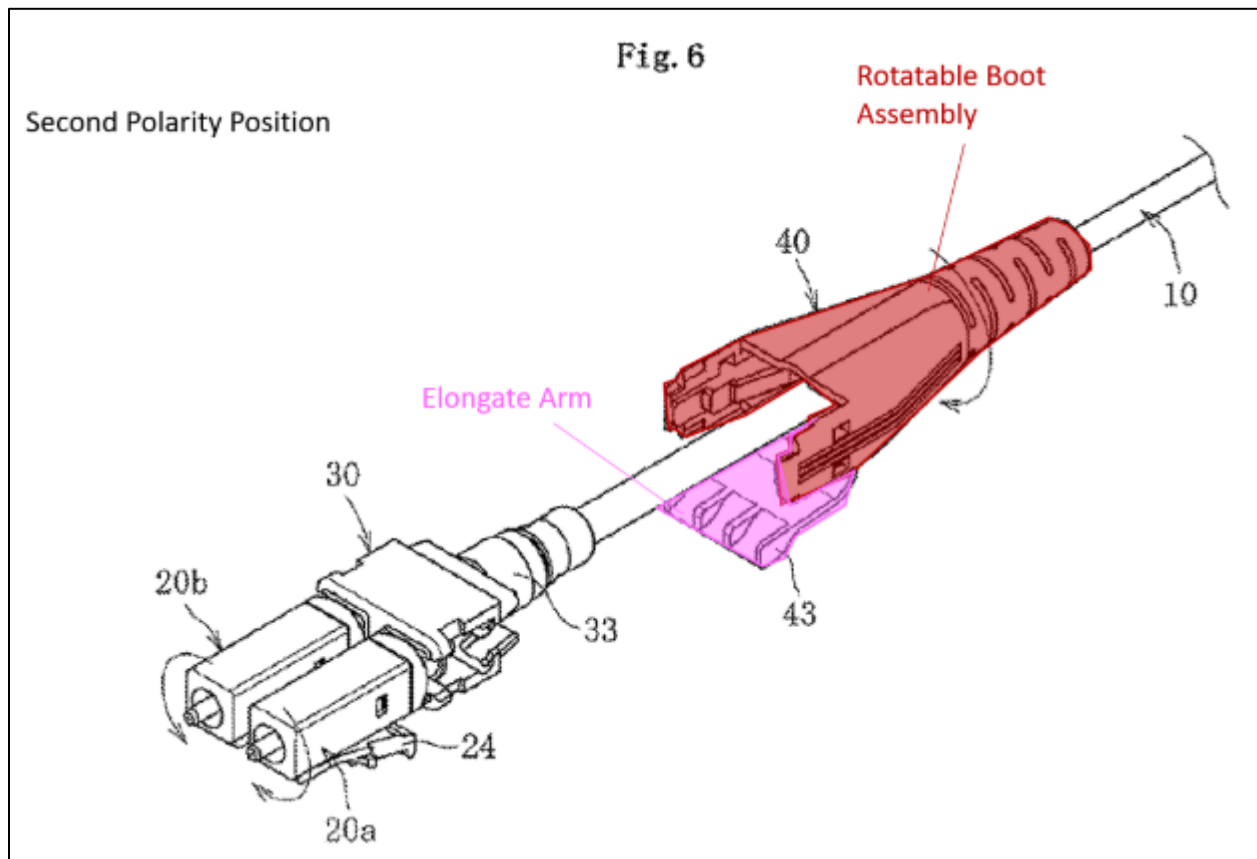
2. Element [11.1] - “the elongate arm is connected to the main body to rotate with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position.”

213. As previously mentioned, in relation to my analysis for claim element [1.3.9], Nakagawa teaches that its elongate arms are connected to the main body.

See Section IX.B.12. In my opinion, a POSITA would have understood that 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. For example, as shown in Figures 5 and 6 of Nakagawa, reproduced below, 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. See my analysis in relation to Claim 9 for additional support.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

214. Accordingly, a POSITA would have found Claim 11 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 11, it would be clear to a POSITA that the combination of Nakagawa and Raven that a POSITA would be motivated to make (described in Section IX.A.3) also renders obvious Claim 11. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 11 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 11.

K. Claim 12

1. Preamble – “The optical fiber connector according to claim 6, wherein”

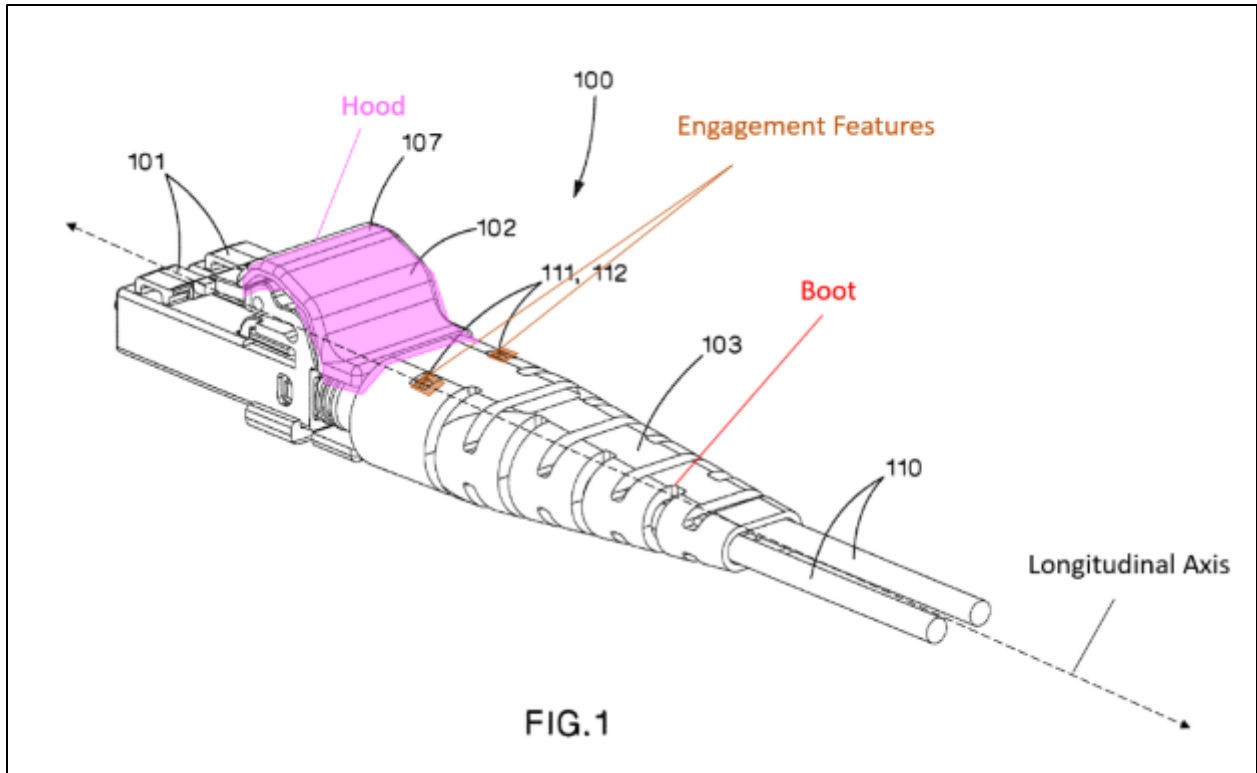
215. Claim 12 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 6 and Claim 1, the combination of Nakagawa and Raven renders obvious Claim 6 and Claim 1. *See* Section IX.B; *see also* Section IX.E. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 12 of the '190 Patent.

2. Element [12.1] – “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.”

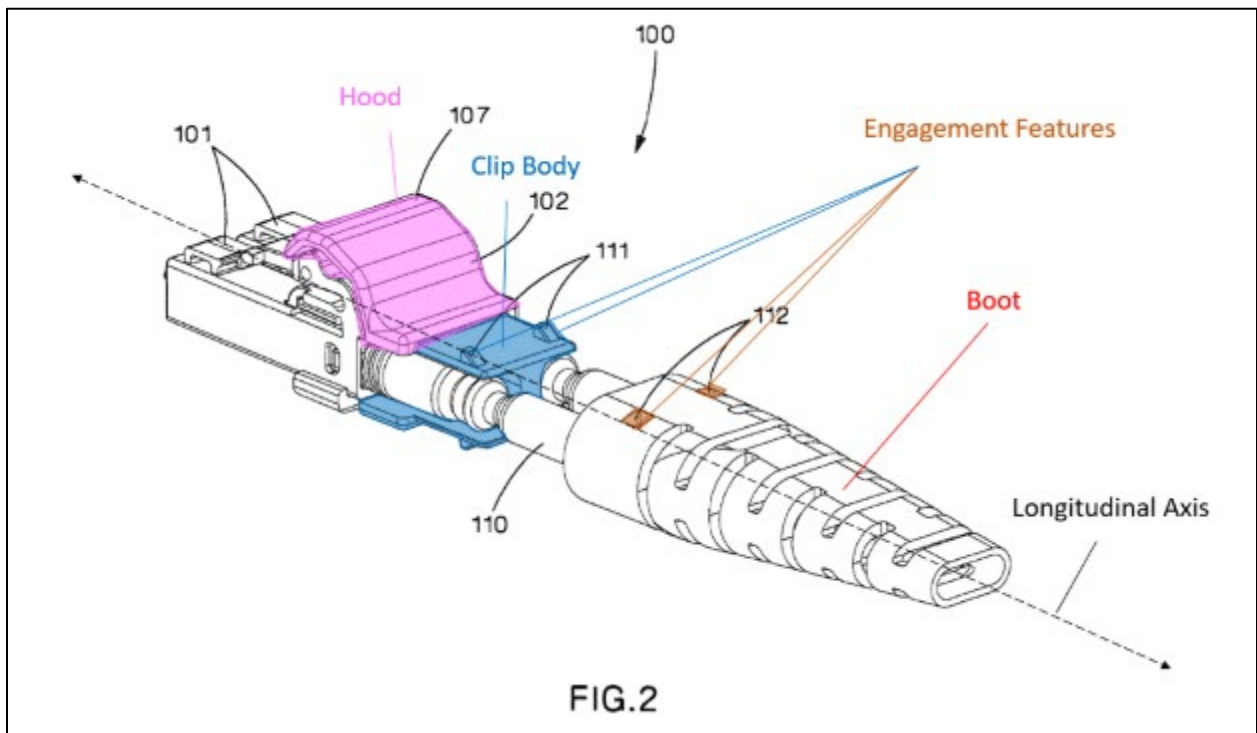
216. Claim element [12.1] specifies a common structure. The structure claim element [12.1] specifies is that the elongate arm and the first boot hook are located opposite the second boot hook across the longitudinal axis. Thus, if the boot hooks disclosed in the combination of Nakagawa and Raven are placed on the top and bottom of the boot, the feature of claim element [12.1] is disclosed.

217. To the extent Patent Owner argues that the combination of Nakagawa and Raven does not disclose an elongate arm and first boot hook located in a first direction radially spaced apart from the longitudinal axis, such a structure is well-known in the prior art. As corroborating evidence unnecessary for this obviousness

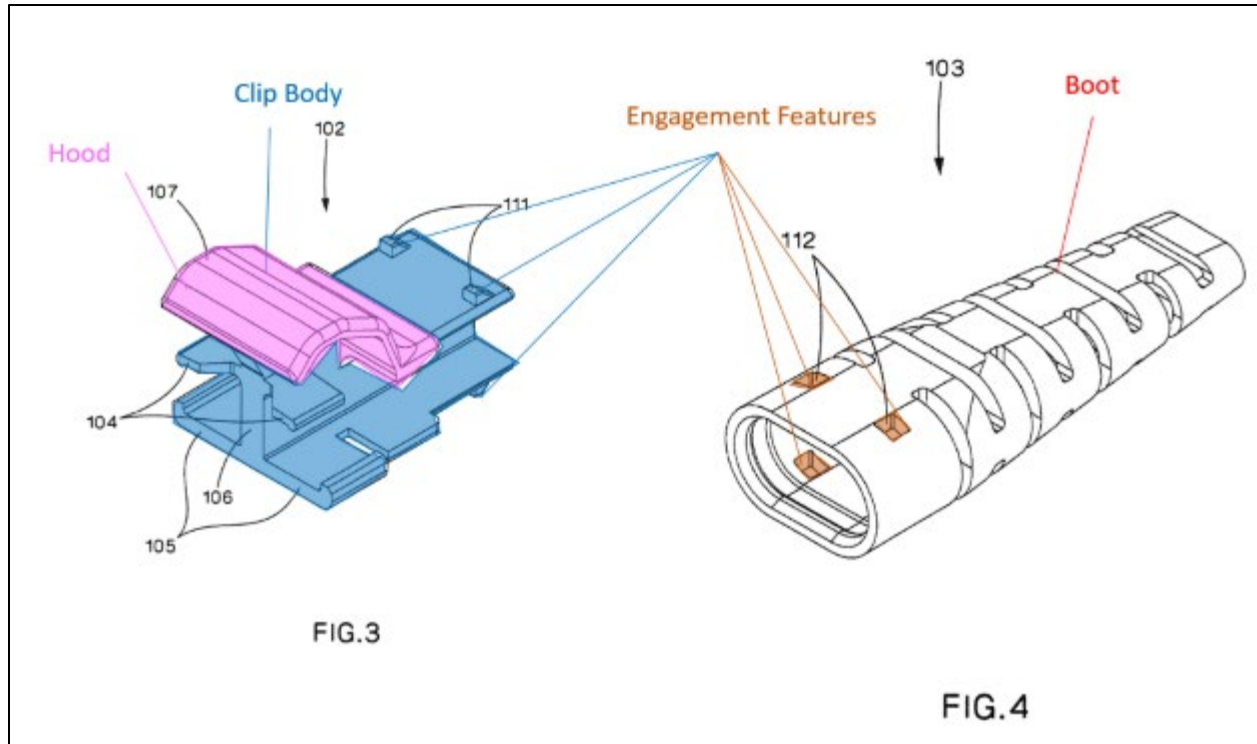
argument, a POSITA would have found this claim feature was well-known, for example I note Irwin discloses engagement features 112 placed on the top and bottom of the connector. Irwin teaches that “the boot 103 connects to the clip body 102 via engagement features 111, 112 on the clip body 102 and boot 103.” EX1009, 3:1-3. As shown in Figure 2, Irwin’s engagement feature 112 has a similar function to the ’190 Patent’s boot hook in that the edge of the hole functions as a hook to secure the boot 103 and clip body 111. As already explained in claim element [1.3.5], Irwin’s hood 107 is similar to the ’190 Patent’s elongate arm in that it is a protrusion adjacent to the side of clip 102. *See* EX1009, 2:59-61. Further, as is noticeable in Figures 3 and 4, the engagement features 112 of the boot 103 and the corresponding engagement features 111 of the clip body 102 are located on the top and bottom surfaces of the boot 103 and clip body 102. The structure of claim element [12.1] is therefore disclosed by Irwin.



EX1009, FIG. 1 (annotated).



EX1009, FIG. 2 (annotated).



EX1009, FIGs. 3-4 (annotated).

218. Further, such a structure is also within the general knowledge of a POSITA. The difference between a structure disclosed in Nakagawa-Raven and claim element [12.1] is simply whether the boot hooks are placed on the left and right surfaces or the top and bottom surfaces. It would be obvious to a POSITA that the only options for the placement of the boot hooks when the boot is hooked to other parts of the connector would be to either place the boot hooks on the left and right surfaces, top and bottom surfaces, or on all surfaces (left, right, top and bottom). Therefore, it is common knowledge for POSITA that boot hooks can be placed on the top and bottom of the connector. As a result, if there is an elongate arm located on the top surface of the connector as in Nakagawa, as well as boot

hooks on the top and bottom surfaces of the connector, the connector will necessarily have the structure specified in the claim element [12.1].

219. Thus, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious Claim 12. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 12 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 12.

L. Claim 13

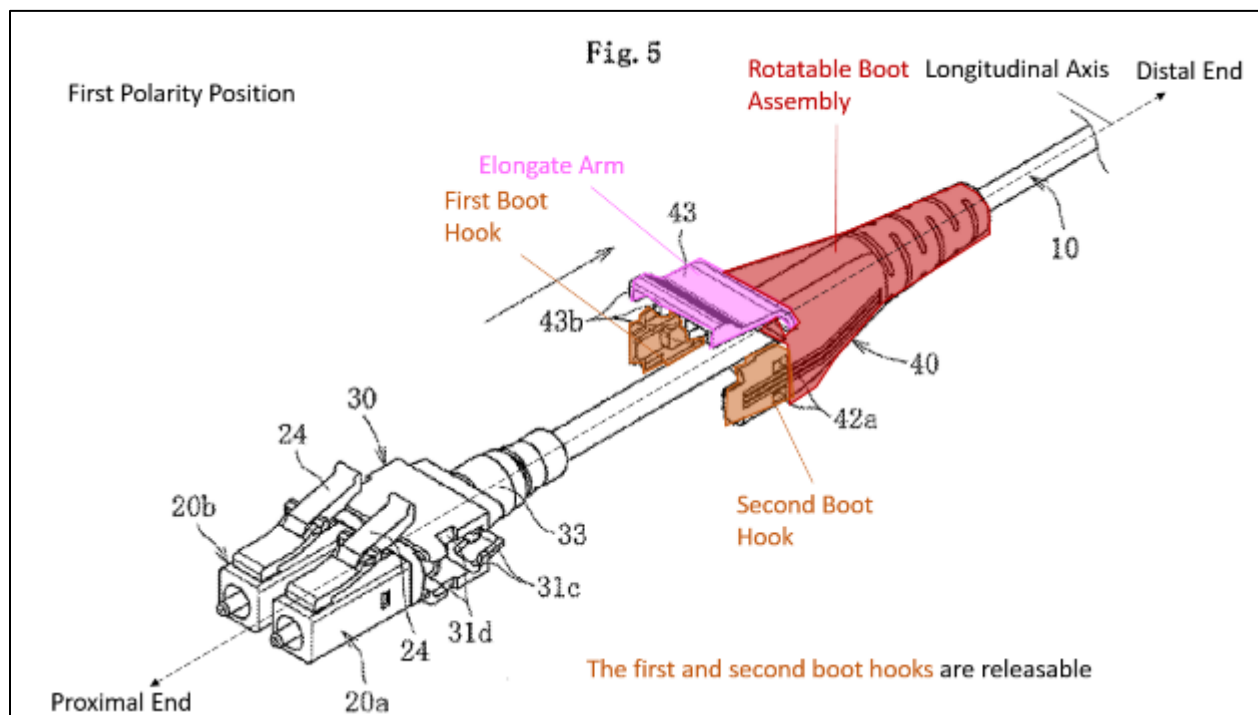
1. Preamble – “The optical fiber connector according to claim 1, wherein”

220. Claim 13 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Nakagawa and Raven renders obvious Claim 1. *See* Section IX.B. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 13 of the '190 Patent.

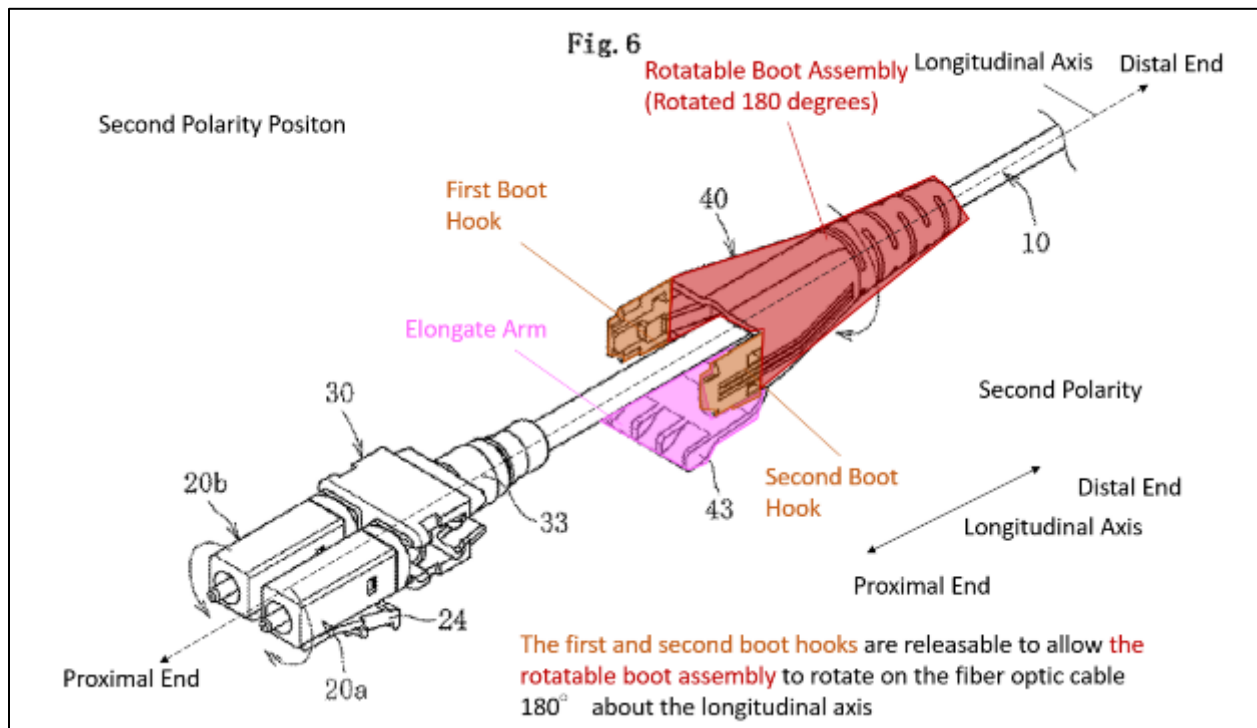
2. Element [13.1] – “the boot hook is releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position

in which the elongate arm sets the optical fiber connector to the second polarity.”

221. As previously discussed, the annotated versions of Figures 5 and 6, reproduced below, illustrate that the boot hooks of Nakagawa 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. See my analysis in relation to Claim 9 for additional support.



EX1007, FIG. 5 (annotated).



EX1007, FIG. 6 (annotated).

222. Accordingly, a POSITA would have found Claim 13 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 13, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious Claim 13. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 13 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 13.

M. Claim 14

1. Preamble – “The optical fiber connector according to claim 13, wherein”

223. Claim 14 depends upon Claim 13 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 13, the combination of Nakagawa and Raven renders obvious Claim 1 and Claim 13. *See* Section IX.B; *see also* Section IX.L. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 14 of the '190 Patent.

2. Element [14.1] – “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.”

224. I believe that 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. Further, I believe a POSITA would have found Claims 6, 9 and 11 obvious based on the combined disclosures of Nakagawa and Raven as discussed above. *See* Section IX.E; *see also* Section IX.H; *see also* Section IX.J. Thus, a POSITA would have found Claim 14 obvious based on Nakagawa. In addition to Nakagawa disclosing Claim 14, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious Claim 14. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 14 that

are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 14.

N. Claim 15

1. Preamble – “The optical fiber connector according to claim 14, wherein”

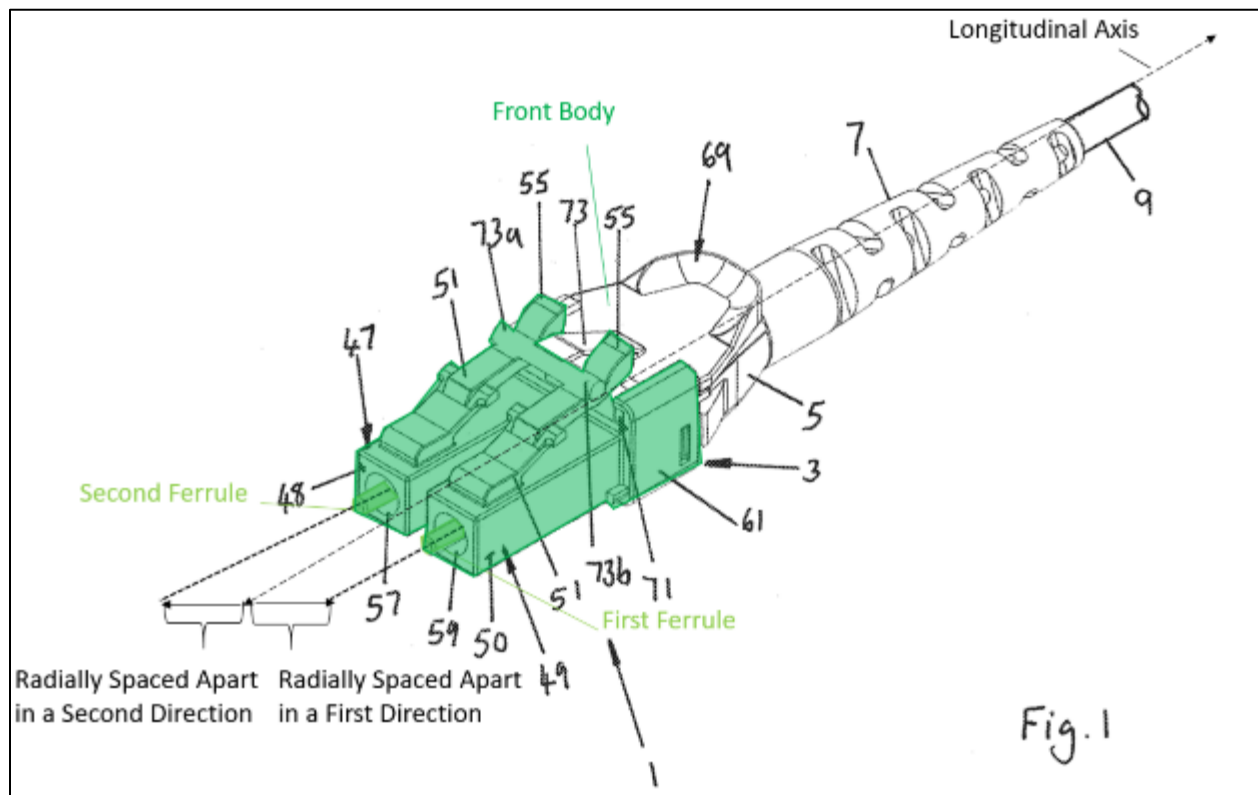
225. Claim 15 depends upon Claim 14 which depends upon Claim 13 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 13, and Claim 14, the combination of Nakagawa and Raven renders obvious Claim 1, Claim 13, and Claim 14. *See* Section IX.B; *see also* Section IX.L; *see also* Section IX.M. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 15 of the '190 Patent.

2. Element [15.1] – “the front body holds the first and second ferrules such that and the second ferrule is radially spaced apart from the longitudinal axis in a second direction opposite the first direction.”

226. As previously discussed for claim element [1.1], 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. *See* Section IX.B.2. To the extent that the Patent Owner argues that Nakagawa does not disclose that 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, a POSITA would understand Raven also discloses this feature.

227. In my opinion, a POSITA would have understood that Raven further discloses that its 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. For example, Figure 1 of Raven, reproduced below, illustrates that each of two ferrules is radially spaced apart from the longitudinal axis in opposite directions.



EX1008, FIG. 1 (annotated).

228. Accordingly, a POSITA would have understood that Raven teaches a

front body that 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. As such, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) renders obvious Claim 15. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 15 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 15.

O. Claim 16

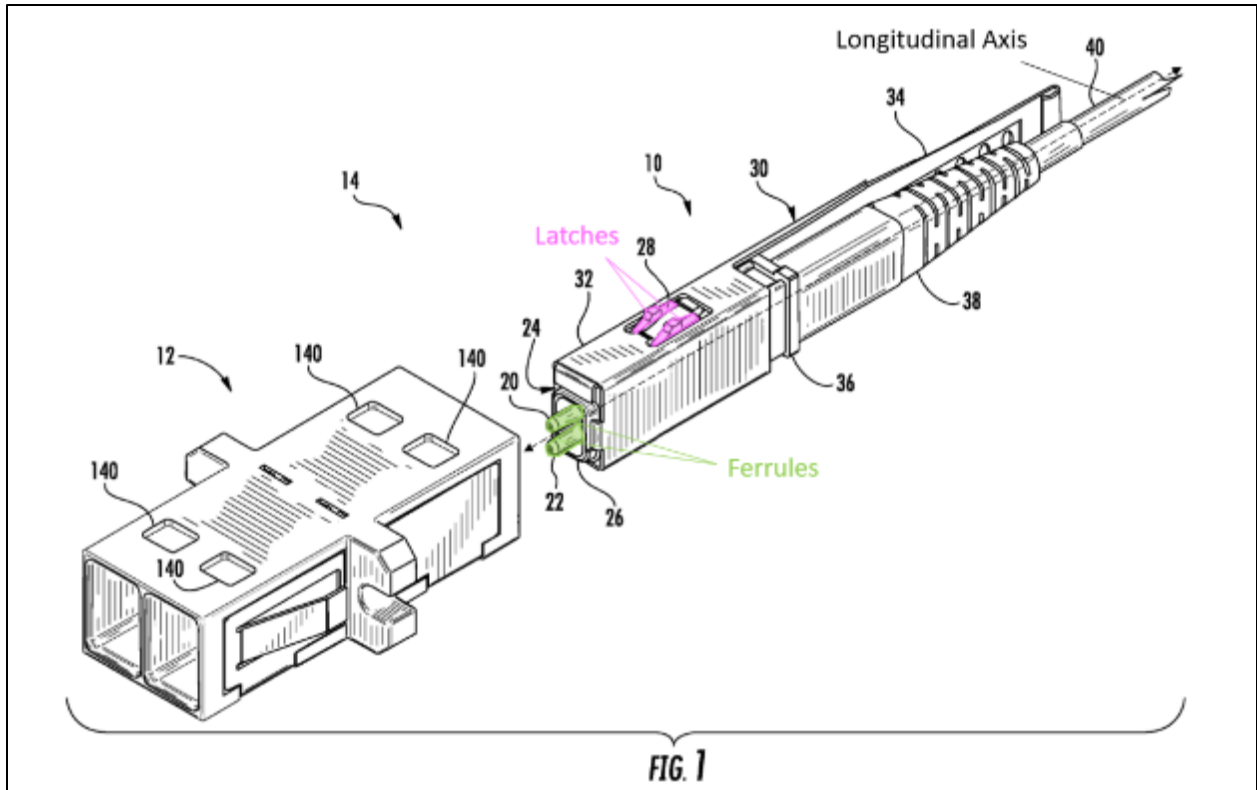
1. Preamble – “The optical fiber connector according to claim 15, wherein”

229. Claim 16 depends upon Claim 15 which depends upon Claim 14, Claim 13 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 13, Claim 14, and Claim 15 the combination of Nakagawa and Raven renders obvious Claim 1, Claim 13, Claim 14, and Claim 15. *See* Section IX.B; *see also* Section IX.L; *see also* Section IX.M; *see also* Section IX.N. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 16 of the '190 Patent.

- 2. Element [16.1] – “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.”**

230. Claim element [16.1] specifies a common structure. Considering that Claim 16 is dependent from Claims 13 and 14, which require the elongate arm to rotate 180 degrees, the structure recited in claim element [16.1] specifies 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 feature of claim element [16.1] is disclosed.

231. Indeed, such a structure is well-known in the prior art. As corroborating evidence not needed for obviousness, Lee discloses an optical connector with two ferrules and an elongate arm aligned vertically. As shown in Figure 1, reproduced below, Lee discloses the “fiber optic connector 10” which “includes first and second ferrules 20, 22” aligned vertically. EX1012, ¶¶29-30. Lee further discloses that a latch 28 is provided above the ferrules. A POSITA would have understood that a function of the latch 28 is similar to the claimed elongated arm because the latch is for “engag[ing] the latching feature 140 on the adapter body.” EX1012, ¶63, See EX1001, Claims 2-3.



EX1012, FIG. 1 (annotated).

232. Further, 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 prior art Lee is merely due to the difference in standards employed by the connectors. It is common knowledge for a POSITA that connector geometries need to be standardized in connection components such as optical connectors. *See* Section IV.B. For a POSITA, it is routine to understand the similarities and differences among several different optical connector standards. Therefore, even if there were multiple standards for optical connectors, a POSITA would have understood that the basic principle of exchanging signals by ferrule would remain unchanged. It would also have been common knowledge to POSITA

that the position of the ferrule and elongated arm could be changed depending on the situation targeted by the standard.

233. 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 common 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.

234. Thus, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious Claim 16. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 16 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 16.

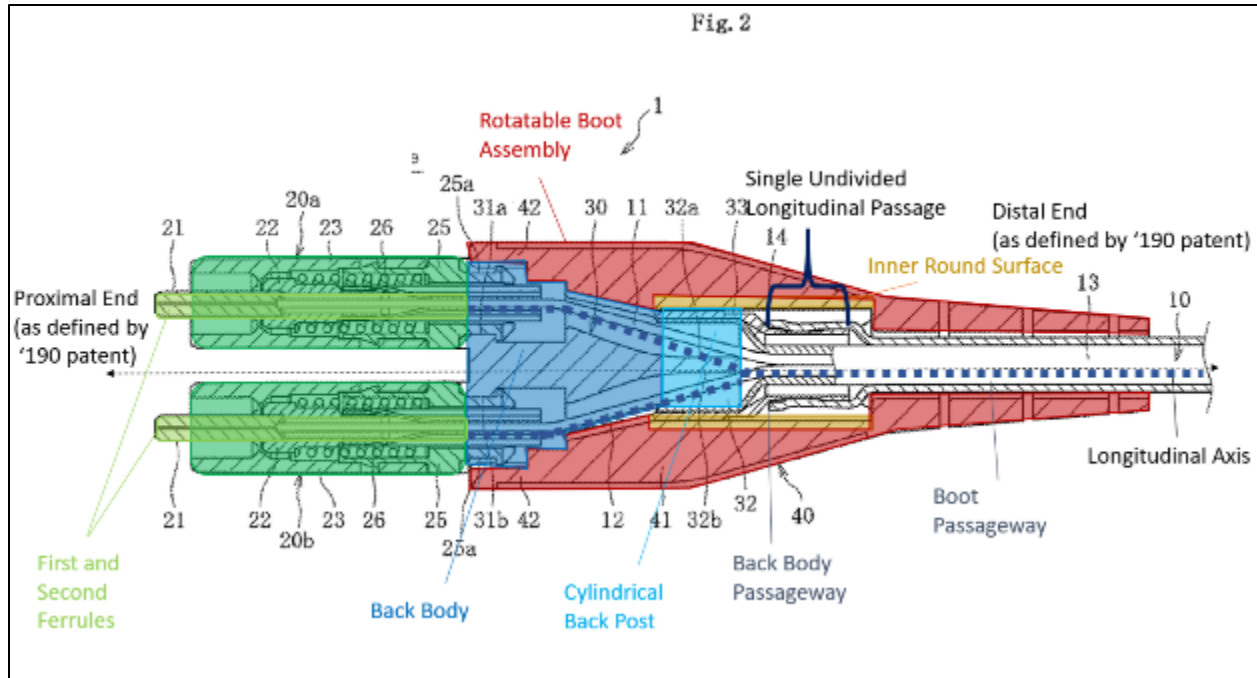
P. Claim 19

1. Preamble – “The optical fiber connector according to claim 1, wherein”

235. Claim 19 depends upon Claim 1, and for at least the reasons discussed for Claim 1 the combination of Nakagawa and Raven renders obvious Claim 1. *See* Section IX.B. Additionally, for at least the reasons below, it is my opinion that the combination of Nakagawa and Raven renders obvious Claim 19 of the '190 Patent.

- 2. Element [19.1] – “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.”**

236. In my opinion, a POSITA would have understood that Nakagawa discloses that its back body passageway and boot passageway form a single, undivided longitudinal passage. For example, as previously explained for claim element [1.3.4], the holder 30, corresponding to the recited back body, has the caulking member 33, corresponding to the recited cylindrical back post, to form the back body passageway. Further as shown in Figure 2 of Nakagawa, reproduced below, the caulking member 33 is inserted into the boot 40 having the recited boot passageway. Thus, Figure 2 illustrates that the back body passageway and the boot passageway are integrated inside the boot 40 to form a single, undivided longitudinal passage as annotated below.



EX1007, FIG. 2 (excerpt, annotated).

237. A POSITA would have further understood that Figure 2 of Nakagawa 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 the caulking member 33 forms a single, undivided longitudinal passage.

238. A POSITA would have further understood that Figure 2 illustrates that first and second fibers are passable from the cable to the first and second ferrules through the passage. As shown in Figure 2, the bare fibers 11, 12 pass to the ferrules 21, through the single undivided longitudinal passage.

239. Accordingly, a POSITA would have found Claim 19 obvious based

on Nakagawa. In addition to Nakagawa disclosing Claim 19, it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A.3) also renders obvious Claim 19. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa, the additional claimed features of Claim 19 that are disclosed by Nakagawa would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Nakagawa-Raven ferrule holder optical connector would render obvious Claim 19.

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

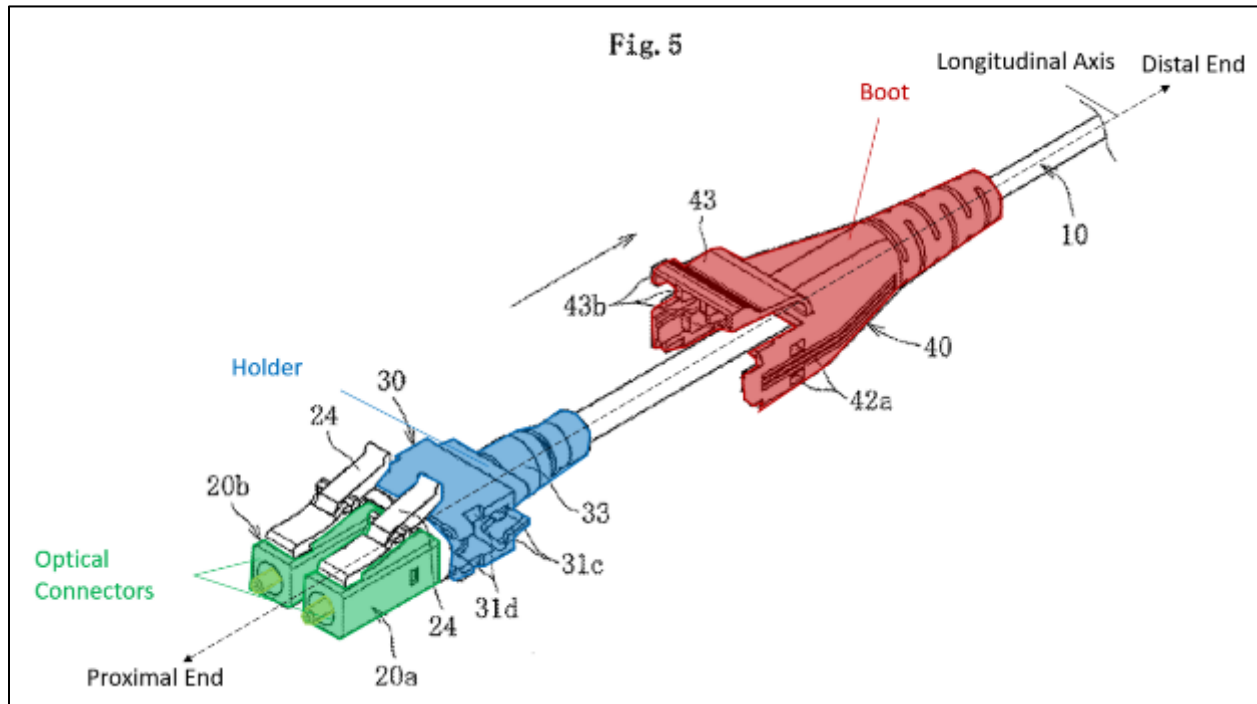
240. For at least the reasons below, it is my opinion that the combination of Nakagawa, Raven and Cline renders obvious dependent Claim 20 of the '190 Patent.

A. Motivation to Combine

1. Nakagawa in view of Raven

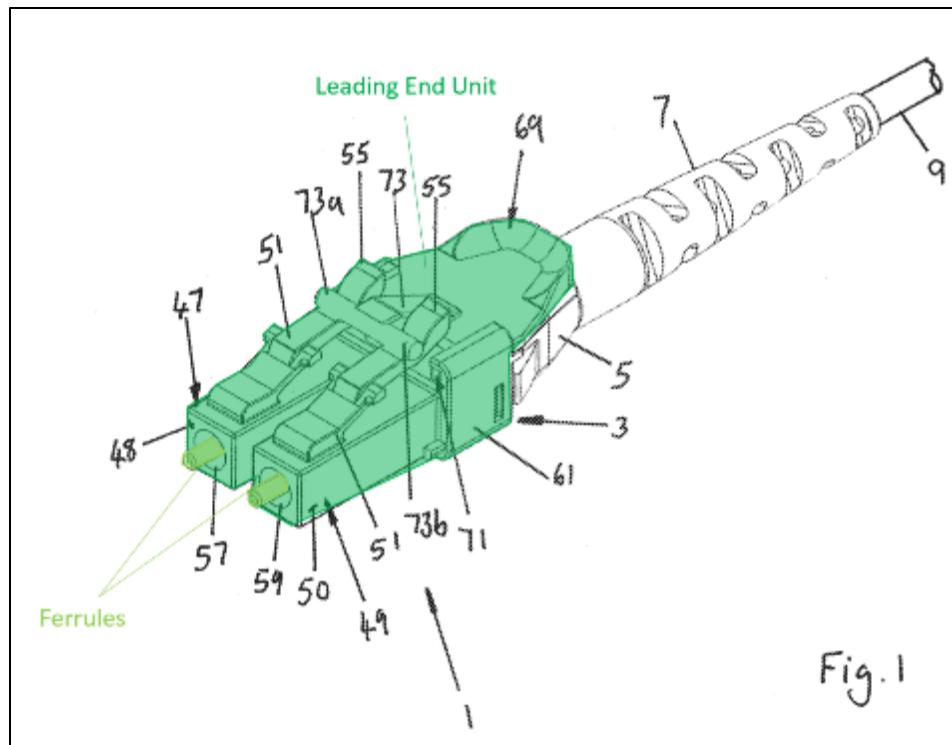
241. Nakagawa discloses a duplex fiber optic connector with a holder 30 having a proximal end portion and a distal end portion spaced apart along a longitudinal axis. Nakagawa also discloses that the proximal end portion of the holder 30 is configured to couple to the optical connectors, and the distal end portion of the holder 30 is configured to couple to a boot. For example, Figure 5 of Nakagawa, reproduced below, illustrates a fiber holder 108 having a proximal end portion (lower left portion of the holder 30) and a distal end portion (the upper right

portion of the holder 30). *See* EX1007, ¶46. Figure 5 of Nakagawa also shows that the proximal end portion of the fiber holder 108 couples to the optical connectors 20a and 20b, and that the distal end portion of the fiber holder 108 couples to the boot 40.



EX1007, FIG. 5 (annotated).

242. Raven also discloses a duplex fiber optic cable allowing for a change of polarity of two optical fiber ferrules, but with a single leading end unit 3. *See* EX1008, 1:5-9, FIGs. 1-7. The leading unit 3 houses two ferrules 27 and 33 which protrude from “respective cavities 59,[]57” of the leading unit 3. EX1008, 11:32-36; *see also* EX1008, FIG. 1. For example, the leading end unit can be seen in Figure 1 of Raven, reproduced below.



EX1008, FIG. 1 (annotated).

243. In my opinion, a POSITA would have found it obvious to modify Nakagawa's housing configuration comprising two optical connectors 20a and 20b to instead comprise a leading end unit 3 as disclosed by Raven, resulting in a unitary Nakagawa-Raven ferrule housing. In particular, in light of the fact that Nakagawa's operation lever 43 actuates the locking lever 24, and Raven's manually operable control actuating latching levers 51, a POSITA would have formed Nakagawa's front body using leading unit 3, excluding the manually operable control 69 of the leading units, to avoid duplication of functions. *See* EX1007, ¶58, EX1008, 11:63-64. In other words, a POSITA would have been motivated to combine Nakagawa's housing with a part of the leading end unit 3,

excluding the manually operable control 69.

2. Cline

244. Cline discloses a duplex fiber optic connector with a connector housing 30 having a proximal end portion and a distal end portion spaced apart along a longitudinal axis. For example, as depicted below in annotated Figure 1, Cline discloses the connector housing 30 is comprised of “a housing connector-end portion 34”, which corresponds to the recited proximal segment, “a housing channel-end portion 36”, which corresponds to the recited distal segment, and “a housing middle portion 35 in between the connector-end and channel-end portions”, which corresponds to the recited transition segment. EX1006, 3:60-63. Additionally, Figure 1 of Cline shows that housing-connector end 34, which corresponds to the recited proximal segment, couples to LC fiber optic connector sub-assemblies 38A, 38B “that have generally rectangular housings 43A, 43B.” EX1006, 4:39-42. Furthermore, Figure 1 of Cline shows that the channel-end portion 36, which corresponds to the recited distal segment, of connector housing 30 is connected to a flexible boot 20. EX1006, 3:41-47.

to duplex fiber optic connectors and the combination of both into the Nakagawa-Raven connector described would be directed to duplex fiber optic connectors with a back body connected with a front body and a boot. In addition, 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.

248. Second, the prior art references themselves provide a teaching, suggestion, and/or motivation to implement the geometry of Cline's connector housing 30 into the Nakagawa-Raven connector. In other words, it would have been straightforward for a POSITA to modify the unitary Nakagawa-Raven ferrule housing to have a tapered geometry with a cylindrical back body passageway. Nakagawa points out that one of drawbacks of a prior art is "poor wiring workability." EX1007, ¶5. Thus, Nakagawa suggests that facilitating the wiring work is necessary to improve on the prior art. EX1007, ¶7. A POSITA would have understood that replacing the rectangular shape of the unitary Nakagawa-Raven ferrule housing with the tapered geometry and the cylindrical back body passageway of the 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. That is, a tapered geometry of the back body would help to facilitate access to individual connectors even when multiple connectors are

densely arranged as well as improve wiring workability. As such, a POSITA would have further been motivated to create a ferrule housing structure with a tapering geometry as disclosed by Cline into the unitary Nakagawa-Raven ferrule holder optical connector based on the teachings of Nakagawa and Raven seeking higher density placement of fiber optic connectors and mating adapters with improved wiring workability while preserving the change of polarity functionality of both Nakagawa and Raven and also the latching mechanisms of Nakagawa.

249. In addition to being motivated to make the specific combination of prior arts as described above, it is my opinion that a POSITA would have had a reasonable expectation of success in combining the teachings of Cline's taper-shaped connector housing with the unitary Nakagawa-Raven ferrule housing, for at least the reasons below.

250. First, this modification involves the simple substitution of one known element (*i.e.*, the geometry of the unitary ferrule housing of Nakagawa-Raven) for another (*i.e.*, the tapered geometry of connector housing 30 of Cline) to obtain predictable results (*i.e.*, a slightly modified unitary ferrule housing that preserves the previous features of Nakagawa with respect to: comprising a back body connected with a front body and boot; the change of polarity functionality; and the latching features described by Nakagawa). Therefore, by simply substituting the tapered geometry of Cline's connector housing 30 into the unitary ferrule housing

of the Nakagawa-Raven connector would have been well within the abilities of a POSITA. As such, a POSITA would have had a reasonable expectation of success because this combination merely involves the replacement of known elements of housing structures in the field with other known elements of housing structures in the same field.

251. 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. In more detail, 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. The physical fiber optic connectors are mechanical components (*i.e.*, in a predictable field—mechanical) and 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; thus, a POSITA would have had a reasonable expectation of success of combining the unitary ferrule housing of Nakagawa-Raven with the tapered body shape of Cline.

252. Although I have used a few formulations of obviousness here as I understand them, I believe that several others readily apply in the same general manner as I have explained. For example, using the tapered geometry with a

cylindrical back body passageway as described for Cline's connector housing 30 with the unitary Nakagawa-Raven ferrule housing would have been obvious to a POSITA to facilitate wiring work, thus resulting in the application of a known technique to a device that would have been obvious to a POSITA.

253. As a final clarification, I note that in the combination of Nakagawa-Raven and Cline, a POSITA would have recognized that substituting the geometry of the unitary Nakagawa-Raven ferrule housing with that of Cline's taper-shaped connector housing 30 does not affect or hinder providing any of functions of the unitary Nakagawa-Raven ferrule housing. In other words, even if the unitary ferrule housing is tapered, the main features of the ability to change polarity, the latching mechanisms of Nakagawa, and the single body ferrule holder would be maintained. Therefore, the described Nakagawa-Raven fiber optic connector would continue to have the same fundamental principle of operation and the combination with Cline would not render Nakagawa-Raven unsatisfactory for its intended purpose.

B. Claim 20

1. Preamble – “The optical fiber connector according to claim 1, wherein”

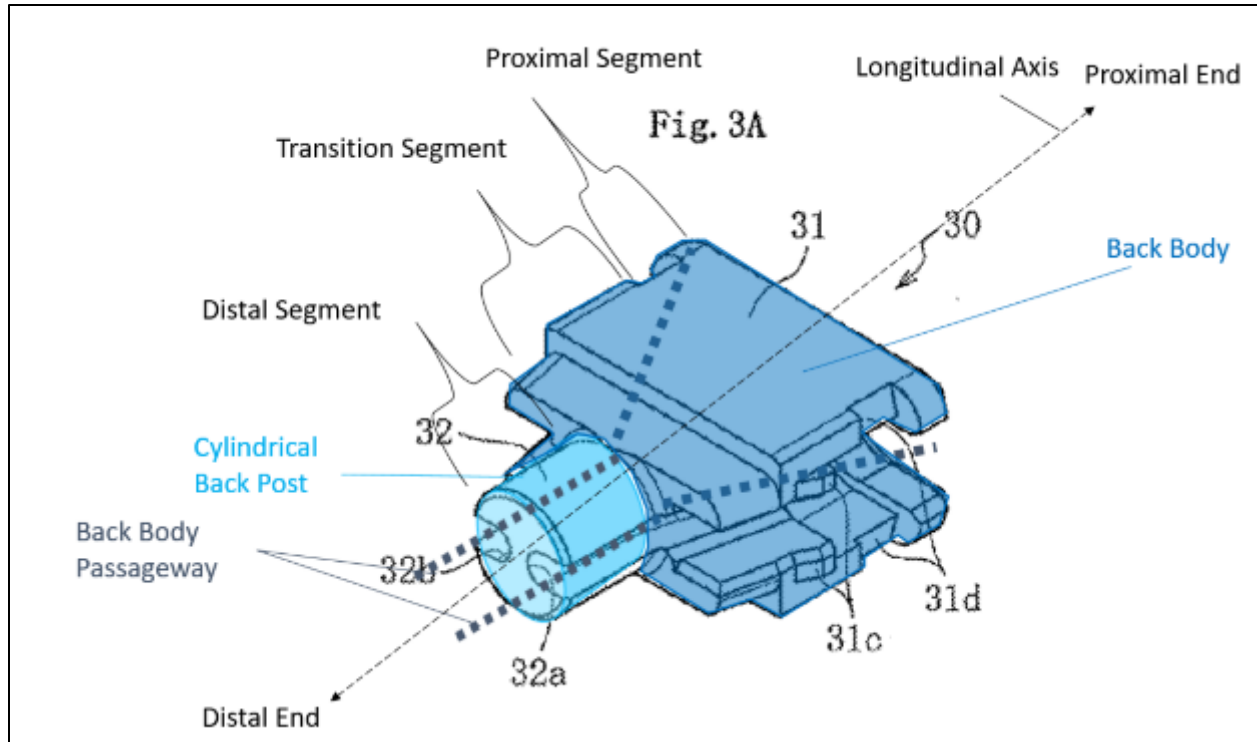
254. Claim 20 depends upon Claim 1, and for at least the reasons discussed for Claim 1 the combination of Nakagawa and Raven renders obvious Claim 1. *See* Section IX.B. Furthermore, for at least the reasons below, it is my opinion that it

would be clear to a POSITA that the combination of Nakagawa, Raven, and Cline also renders obvious Claim 20.

2. Element [20.1] “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,”

255. It is my opinion that a POSITA would have understood that Nakagawa discloses that 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.

256. As explained in Section IX.B.3, Nakagawa discloses the claimed back body, back post, and back body passageway. Nakagawa further discloses that 1) the back body passageway comprises a distal segment along the back post, 2) a proximal segment along the proximal end of the back body, and 3) a transition segment between the distal segment and the proximal segment. As illustrated in Figure 3A of Nakagawa, reproduced below, Nakagawa’s 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 element [20.1].

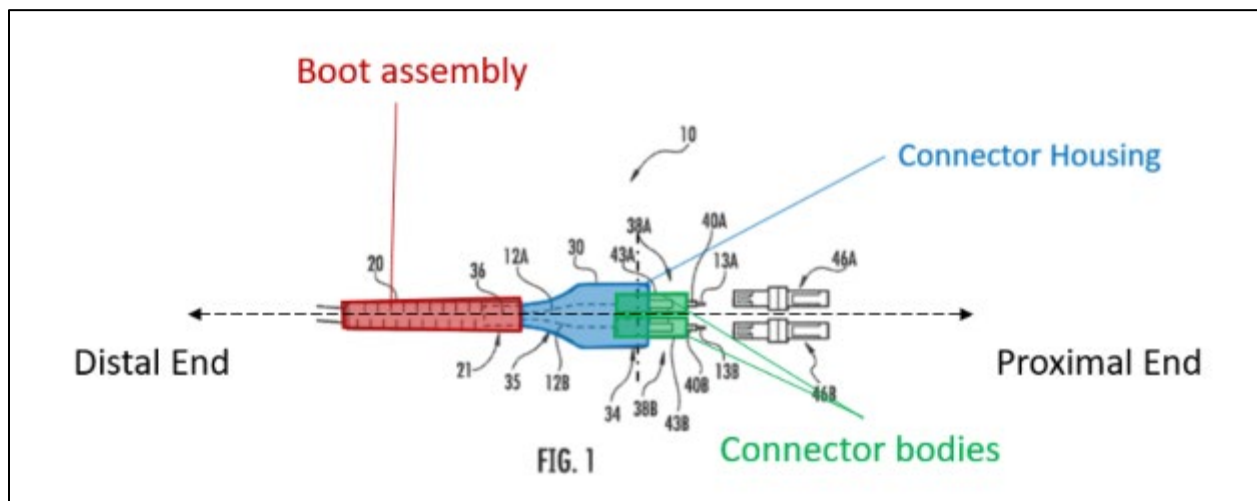


EX1007, FIG. 3A (annotated).

257. However, to the extent that the Patent Owner argues that the unitary Nakagawa-Raven ferrule holder as described in Section IX.A does not disclose that that 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, in my opinion, a POSITA would have understood that Cline discloses this feature.

258. For example, as depicted below in annotated Figure 1 of Cline, Cline discloses the 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, 3:60-63. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment, the housing channel-end portion 36 corresponds to the recited distal segment, and the housing middle portion 35 corresponds to the recited transition segment. Accordingly, a POSITA would have understood that Cline discloses element [20.1].



EX1006, FIG. 1 (excerpt, annotated).

259. In addition to Nakagawa and Cline disclosing claim element [20.1], it would be clear to a POSITA that the combination of Nakagawa, Raven, and Cline (described in Section X.A) also renders obvious claim element [20.1]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa with the tapered geometry of Cline, the additional claimed features of claim element [20.1] that are disclosed by Nakagawa and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed

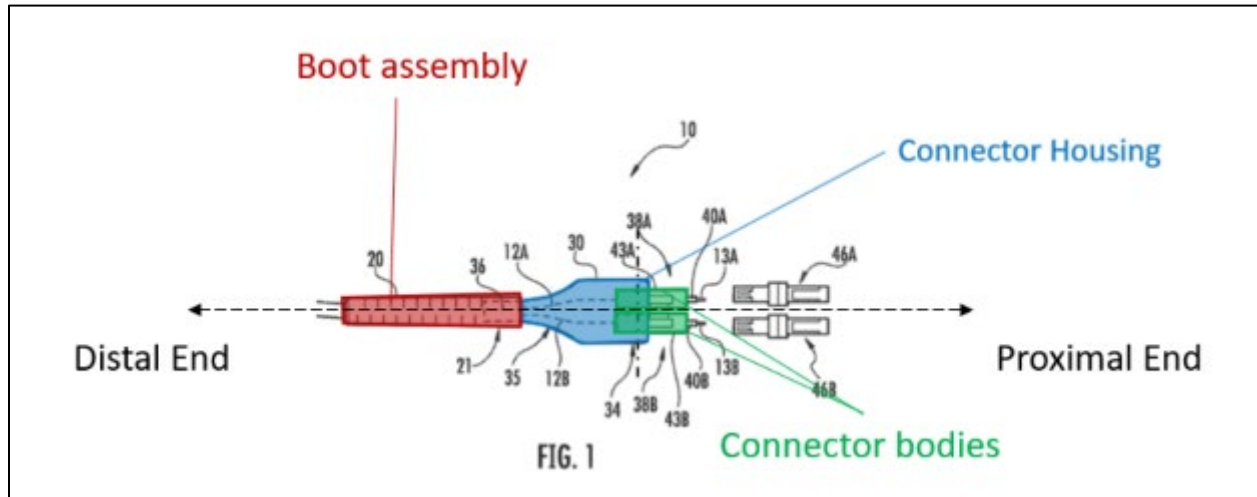
above, it is my opinion that the unitary Nakagawa-Raven ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.1].

3. Element [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,”

260. As previously discussed for claim element [20.1], it is my opinion that a POSITA would have understood that Nakagawa discloses the back body passageway. However, to the extent that the Patent Owner argues that the unitary Nakagawa-Raven ferrule holder as described in Section IX.A does not disclose that the back body passageway has a cylindrical shape which has substantially the same first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis, it is my opinion that a POSITA would have understood that Cline discloses this feature.

261. In my opinion, Cline discloses a connector housing 30, as the recited back body, which has a back body passageway with 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. For example, Cline teaches the “connector 10 includes a connector housing 30.” EX1006, 3:42. As shown in Figure 1 of Cline, reproduced and annotated below, the boot 20 “engages a channel-end portion 36 of connector

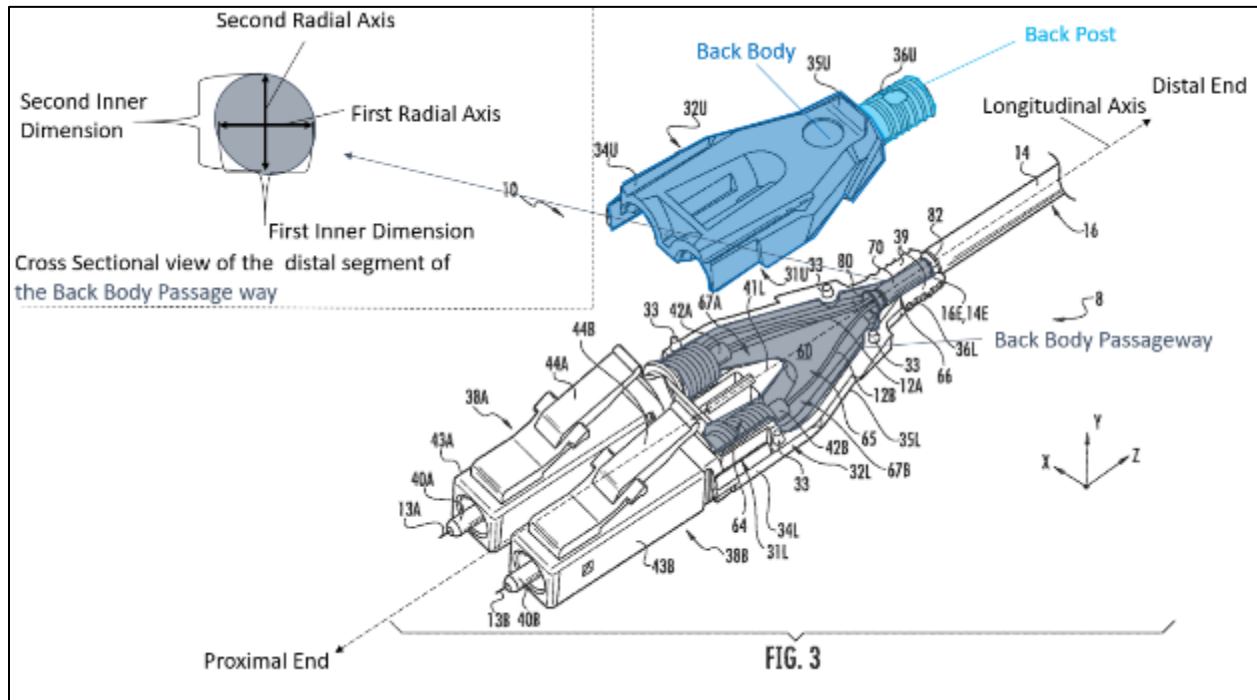
housing 30.” EX1006, 3:42-44. The connector housing also supports “two fiber optic connector sub-assemblies (‘connector sub-assemblies’) 38A, 38B.” EX1006, 4:29-30.



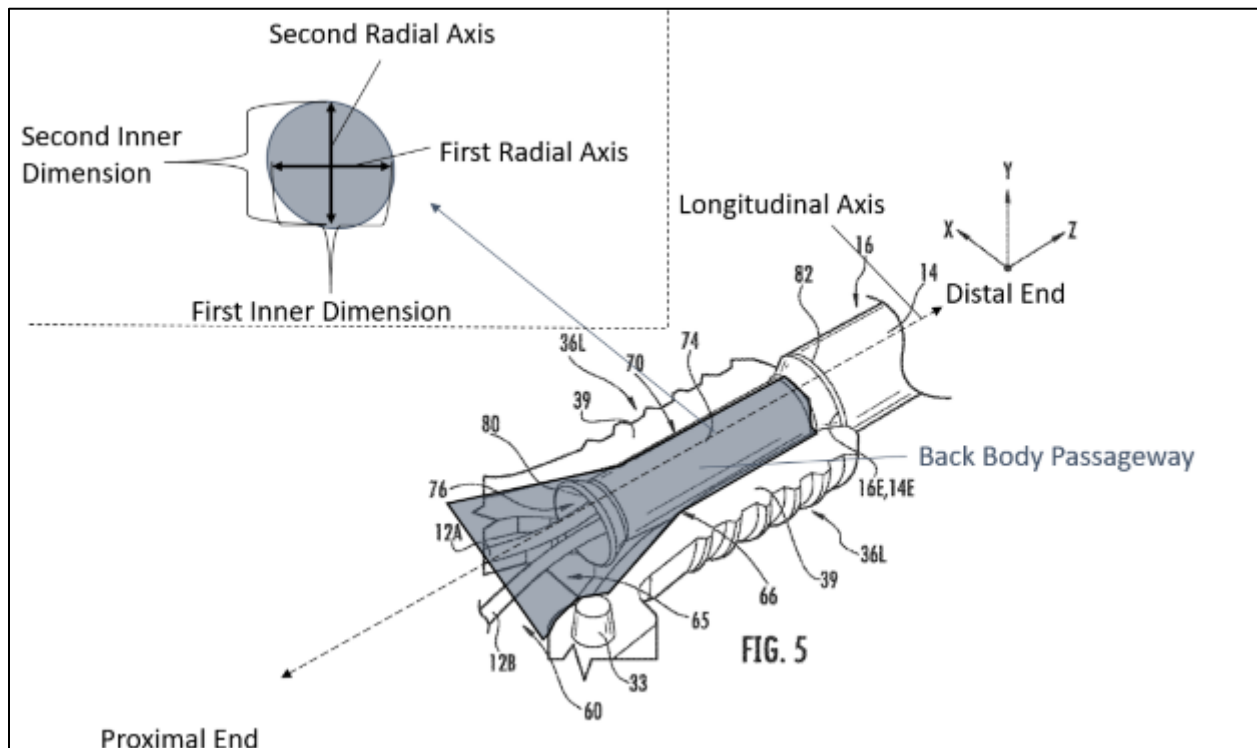
EX1006, FIG. 1 (excerpt, annotated).

262. As shown in Figures 3 and 5 of Cline, reproduced and annotated below, a distal end of the connector housing in Figure 3 (also shown as a channel-end portion in Figure 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. As illustrated in Figure 3, the channel end portion 36 has a cylindrical shape and forms a passageway for accommodating a cable 16. Indeed, the end portion 36 has an “optical fiber guide member 70 arranged in channel-end passage 66” and Cline explains that “optical fiber guide member 70 is in the form of a cylindrical tube

with a round or oval cross-section.” EX1006, 4:45-52.



EX1006, FIG. 3 (annotated).



EX1006, FIG. 5 (annotated).

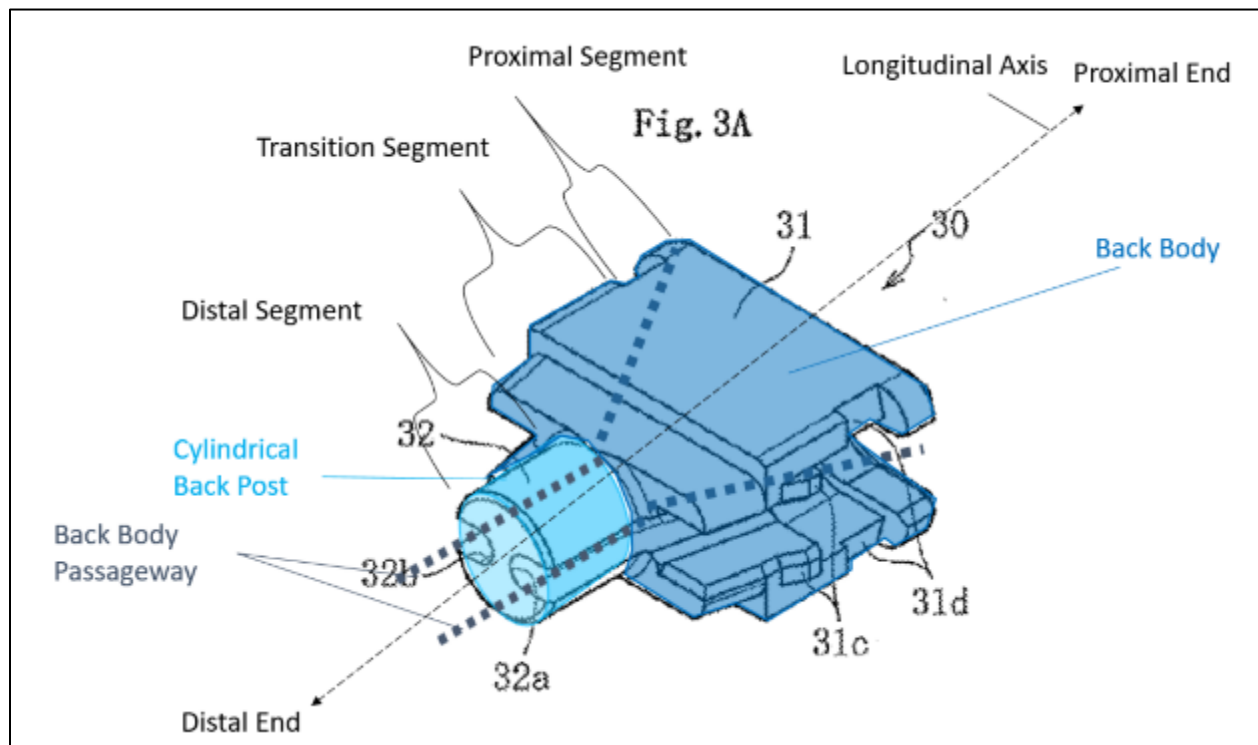
263. A POSITA would have understood that the distal end of the back body passageway of Cline had a cross-sectional view as annotated in the upper left corner of Figure 3 above. As depicted in the cross-sectional view, the back body passageway has a first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, which has a back body passageway that 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.

264. Therefore, in addition to Nakagawa disclosing claim element [20.2], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A) also renders obvious claim element [20.2]. Further, it would be clear to a POSITA that the combination of Nakagawa, Raven, and Cline (described in Section X.A) also renders obvious claim element [20.2]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa with the tapered geometry of Cline, the additional claimed features of claim element [20.2] that are disclosed by Nakagawa and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Nakagawa-Raven ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim

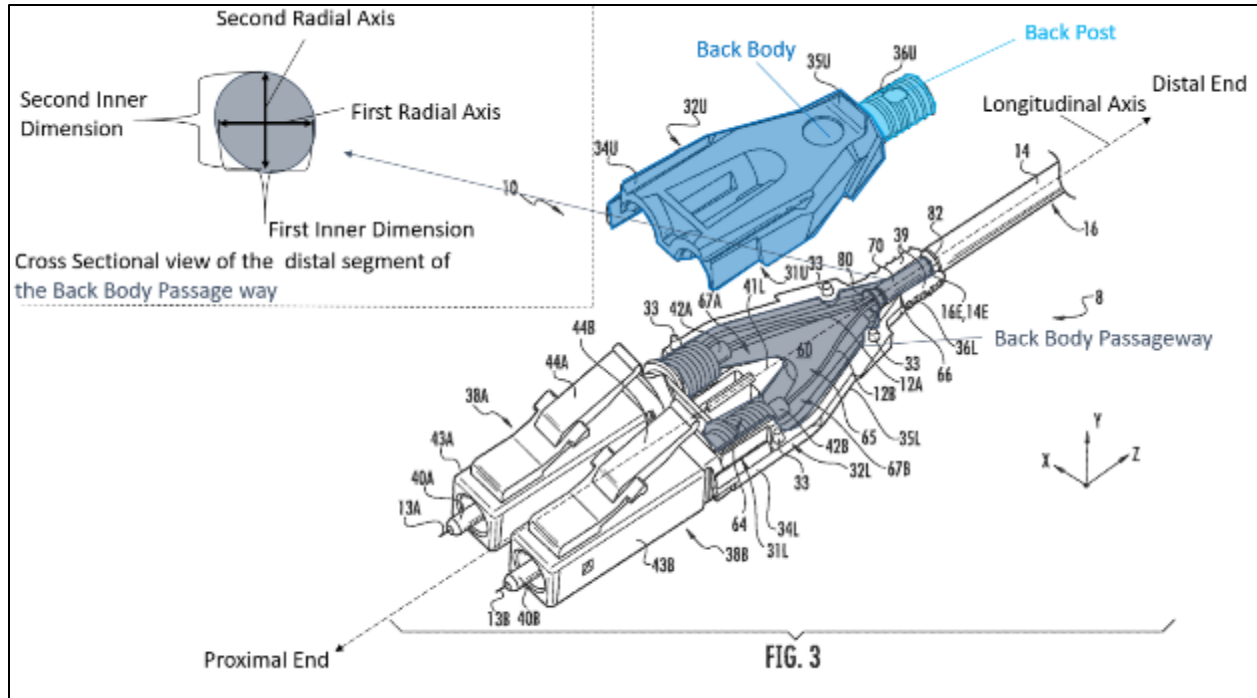
element [20.2].

4. **Element [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;”**

265. As previously discussed for claim element [20.2], and as illustrated in Figure 3A of Nakagawa and Figure 3 of Cline reproduced and annotated below, it is my opinion that a POSITA would have understood that Nakagawa and Cline 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.



EX1007, FIG. 3A (annotated).



EX1006, FIG. 3 (annotated).

266. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, which has a back body passageway that is substantially circular such that the first inner dimension is about the same as the second inner dimension, along the distal segment.

267. Therefore, in addition to Nakagawa disclosing claim element [20.3], it would be clear to a POSITA that the combination of Nakagawa and Raven (described in Section IX.A) also renders obvious claim element [20.3]. Further, it would be clear to a POSITA that the combination of Nakagawa, Raven, and Cline (described in Section X.A) also renders obvious claim element [20.3]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa with the tapered geometry of Cline, the additional claimed features of claim

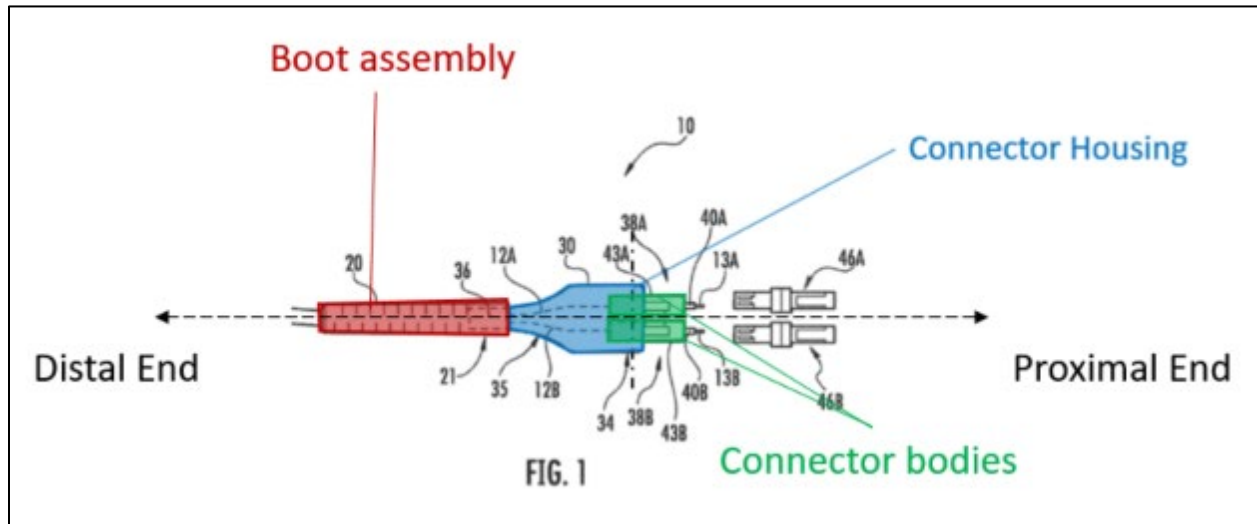
element [20.3] that are disclosed by Nakagawa and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Nakagawa-Raven ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.3].

5. Element [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”

268. As previously discussed for claim element [20.1], it is my opinion that a POSITA would have understood that Nakagawa discloses the back body including the proximal segment. However, to the extent that the Patent Owner argues that Nakagawa and further that the unitary Nakagawa-Raven ferrule housing does not render obvious that 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, it is my opinion that a POSITA would have understood that Cline discloses this feature.

269. Cline discloses a connector housing 30, corresponding to the recited back body, which 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 along the proximal segment. For example, Cline teaches its “connector 10 includes a connector housing 30.” EX1006, 3:42. As shown in Figure 1 of Cline,

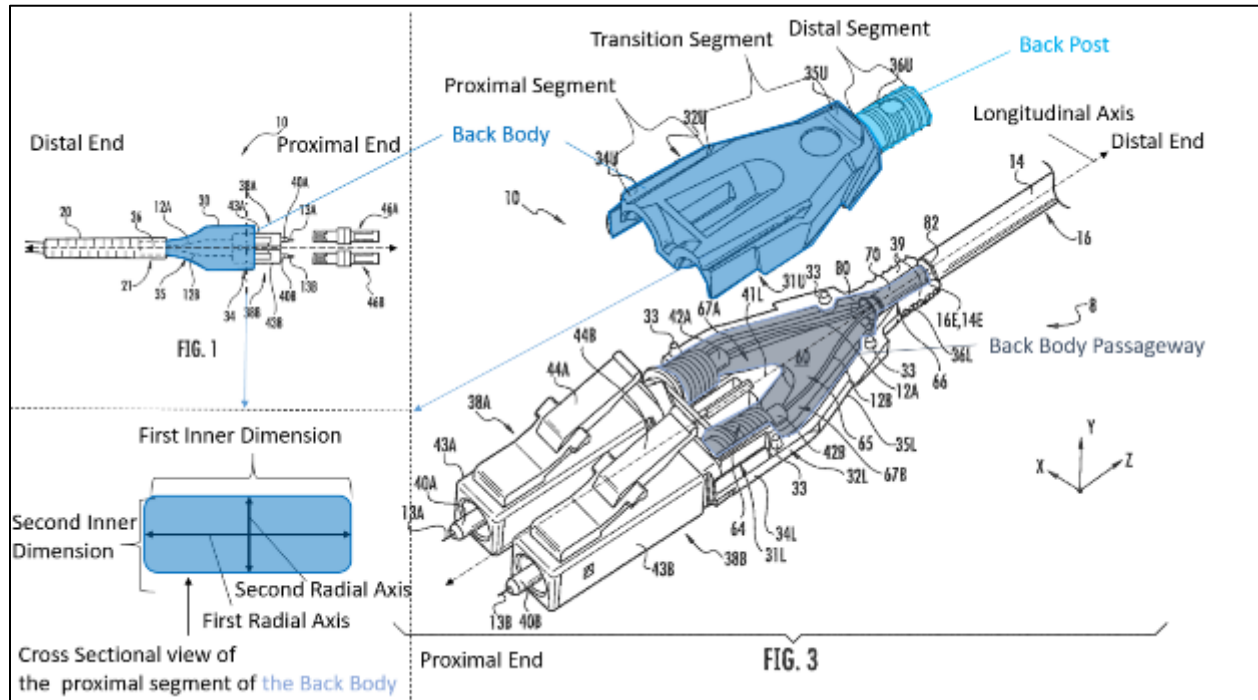
reproduced and annotated below, the boot 20 “engages a channel-end portion 36 of connector housing 30.” EX1006, 3:42-44. The connector housing also supports “two fiber optic connector sub-assemblies (“connector sub-assemblies”) 38A, 38B.” EX1006, 4:29-30.



EX1006, FIG. 1 (excerpt, annotated).

270. Cline also teaches that the connector housing 30 has a geometry that tapers from the proximal end to the distal end. For example, Cline discloses that the 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. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment as illustrated in Figure 3 of Cline, reproduced below. As a result

of this tapering, and as illustrated in Figure 3, Cline teaches that its proximal segment, the connector-end portion 34, has an elongated cross-sectional shape.



EX1006, FIG. 3 (annotated).

271. 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.

272. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, which 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, along the proximal segment. Therefore, it would be clear to a POSITA

that the combination of Nakagawa, Raven, and Cline (described in Section X.A) also renders obvious claim element [20.4]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa with the tapered geometry of Cline, the additional claimed features of claim element [20.4] that are disclosed by Nakagawa and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Nakagawa-Raven ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.4].

6. **Element [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.”**

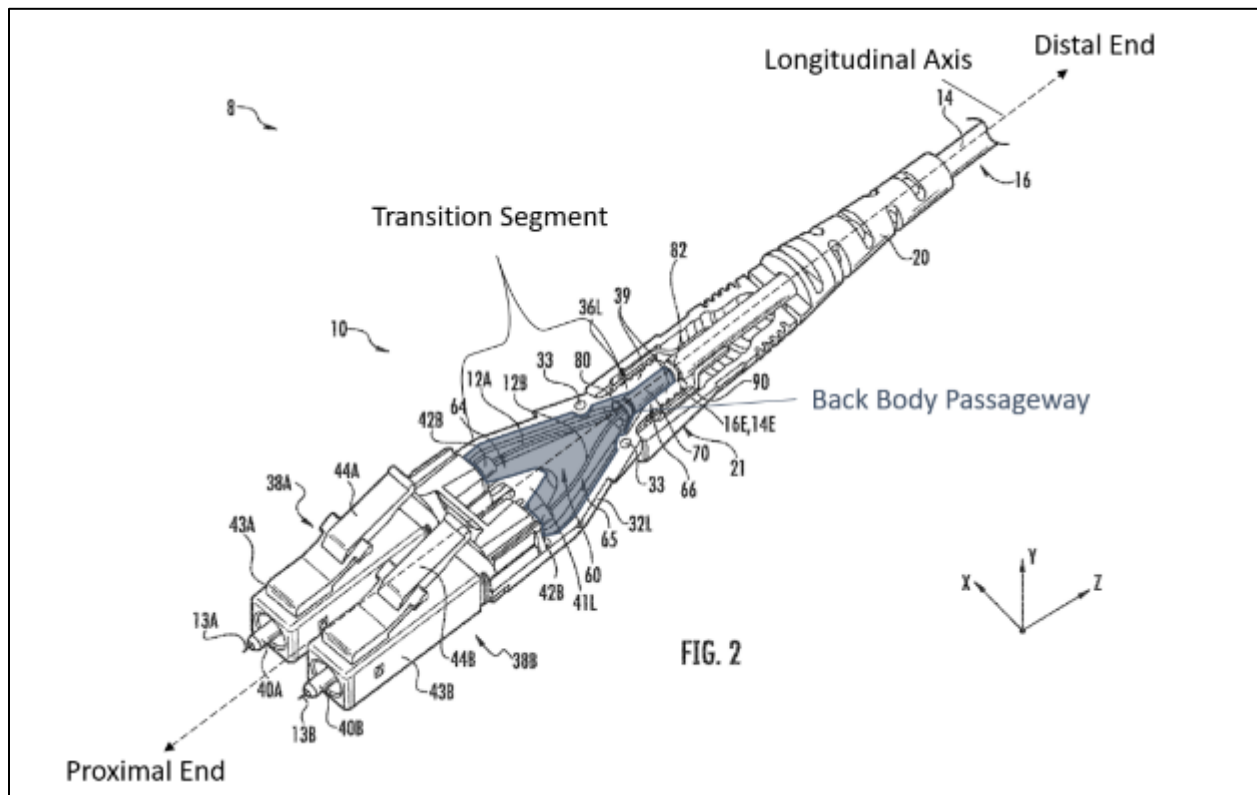
273. As previously discussed for claim element [20.1], it is my opinion that a POSITA would have understood that Nakagawa and Cline disclose the back body including the transition segment. However, to the extent that the Patent Owner argues that the unitary Nakagawa-Raven ferrule housing does not disclose that 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, in my opinion, a POSITA would have understood that Cline discloses this feature.

274. Cline discloses a connector housing 30, corresponding to the claimed

back body, has a transition segment structured with the back body passageway extending in the proximal direction along the longitudinal axis, wherein the first inner dimension increases by a greater amount than the second inner dimension.

275. As previously discussed above for claim element [20.4], Cline teaches that the connector housing 30 has a tapered geometry that tapers from the proximal end to the distal end. For example, Cline discloses that the 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. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment, the housing channel-end portion 36 corresponds to the recited distal segment, and the housing middle portion 35 corresponds to the recited transition segment.

276. As illustrated in Figure 2 of Cline, reproduced and annotated below, the 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.



EX1006, FIG. 2 (annotated).

277. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, corresponding to the recited back body, includes a transition segment with the recited structure of, 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. Therefore, it would be clear to a POSITA that the combination of Nakagawa, Raven, and Cline (described in Section X.A) also renders obvious claim element [20.5]. That is, by implementing the front end unit 3 of Raven into the optical connector of Nakagawa with the tapered geometry of Cline, the additional claimed features of claim element [20.5]

that are disclosed by Nakagawa and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Nakagawa-Raven ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.5].

278. In summary, for at least the reasons discussed above, I believe a POSITA would have been motivated to make a combination of Nakagawa, Raven, and Cline that renders obvious each of the features of Claim 20 of the '190 Patent. As such, it is my opinion that the entirety of Claim 20 of the '190 Patent is rendered obvious.

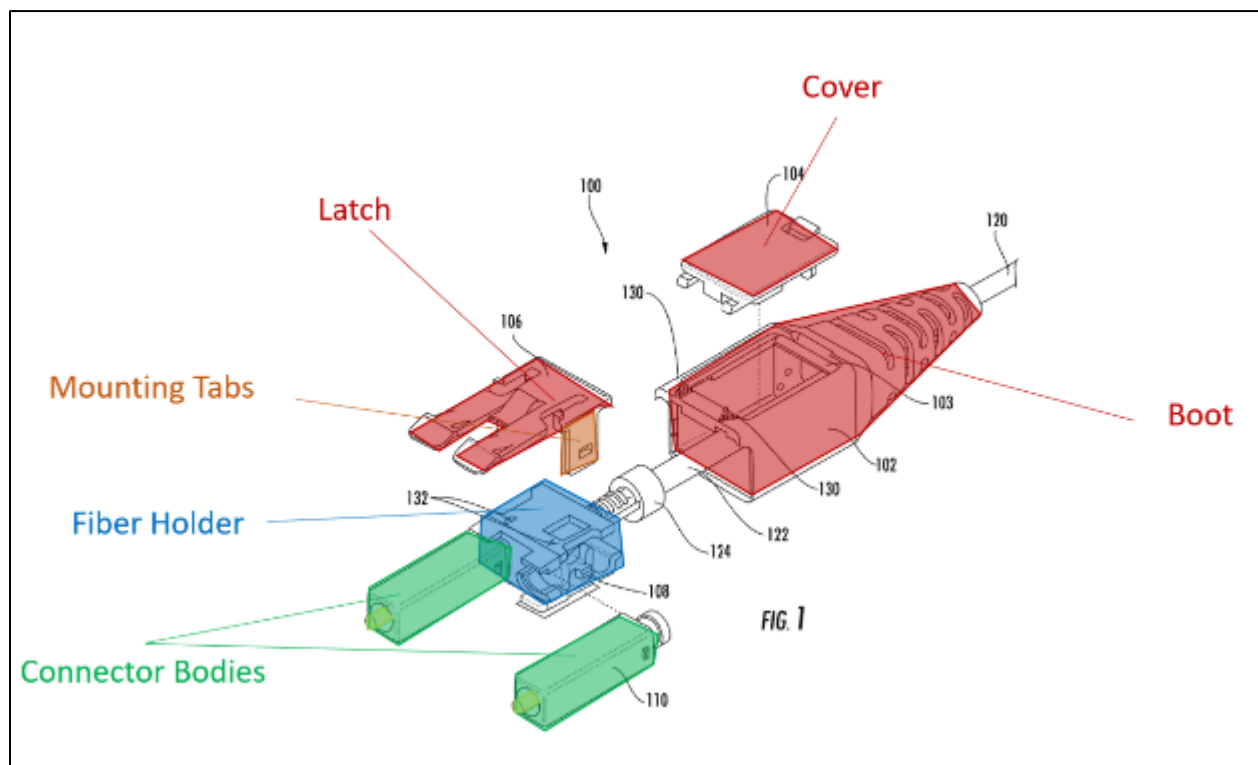
XI. GROUND 3: CLAIMS 1-3, 6-11, 13-16 AND 19 OF THE '190 PATENT ARE OBVIOUS OVER VEATCH IN VIEW OF CONNELLY.

A. Motivation to Combine

279. I believe a POSITA would have found it obvious to combine Veatch and Connelly to arrive at the subject matter of the Challenged Claims prior to the filing date of the '190 Patent. In particular, I believe a POSITA would have found it obvious to modify Veatch's configuration that includes a fiber holder 108 and two connector bodies 110 to instead incorporate the connector housing structure of Connelly (*i.e.*, housing 38 of the fiber optic connector 34). A POSITA would have found this combination obvious for several reasons, but before addressing these, I summarize the relevant disclosures of Veatch and Connelly for context.

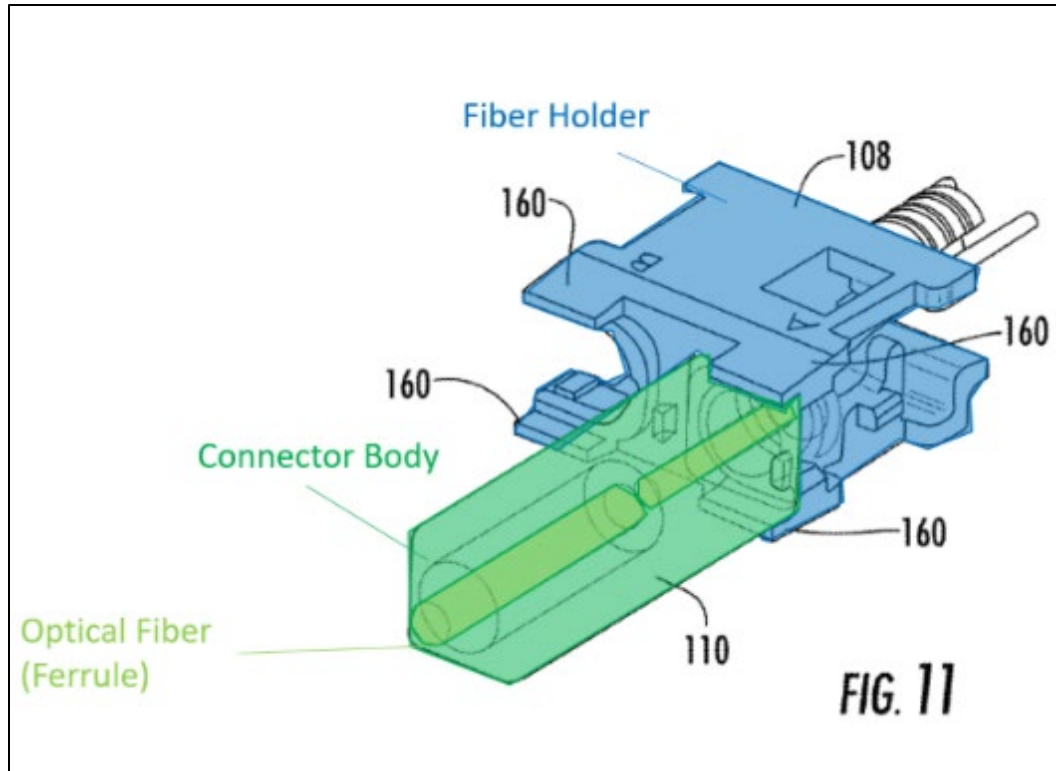
1. Veatch

280. As discussed above in section VII.E, Veatch discloses a duplex fiber optic connector with two separate connector bodies 110 provided for each fiber optic ferrule. *See* EX1004, 2:14-23, 7:2-4, FIGs. 1-3, 11. The connector bodies 110 are each held by the fiber holder 108. *See, e.g.,* EX1004, 2:14-23, 3:37-45, FIGs. 1-3, 11. This configuration is shown in Figures 1 and 11 of Veatch as annotated below:



EX1004, FIG. 1 (annotated).

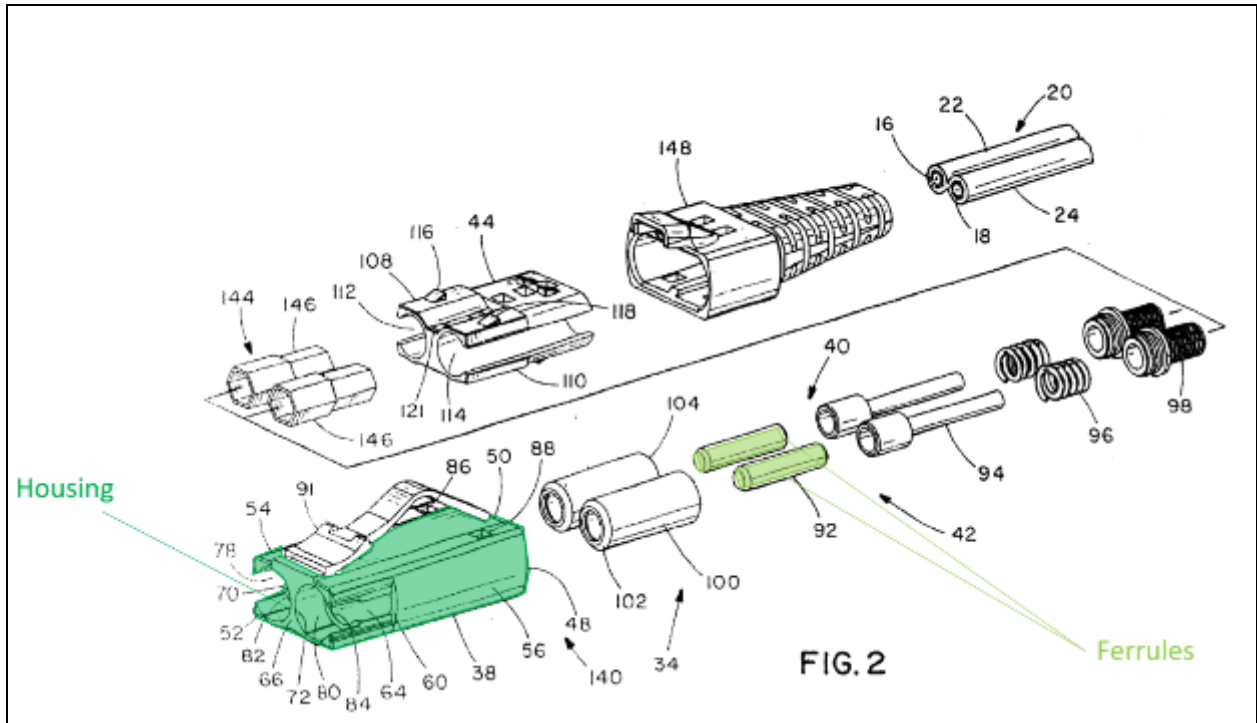
281. Figure 11 shows another view of how a connector body 110 (which holds the optic fiber terminating at the ferrule) is held by the fiber holder 108:



EX1004, FIG. 11 (annotated).

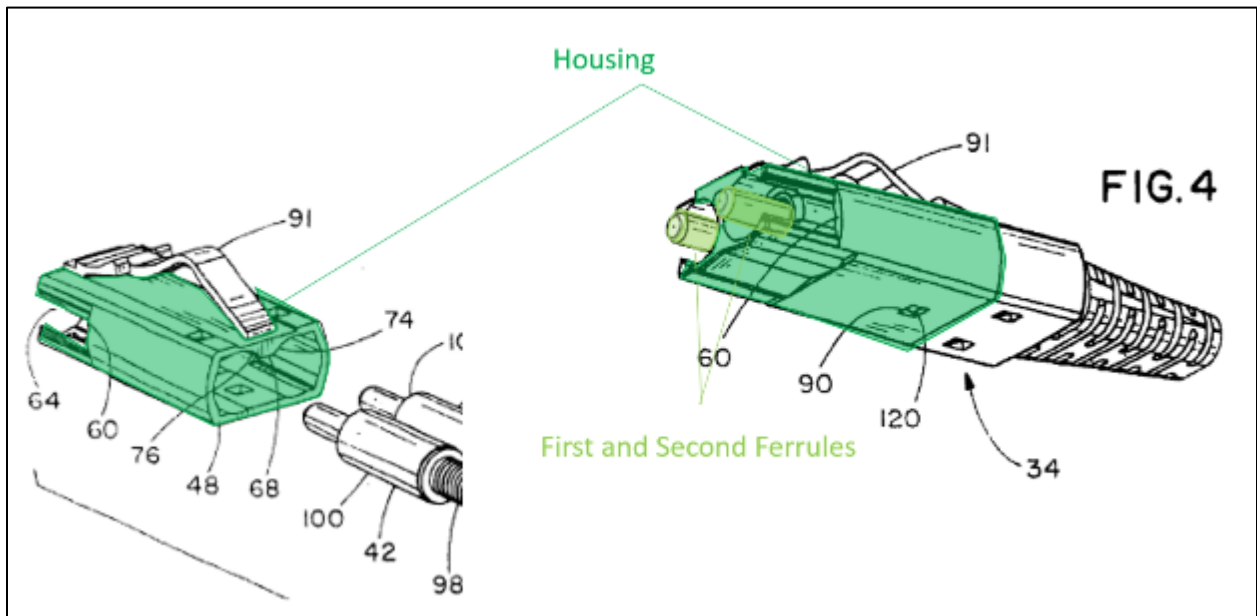
2. Connelly

282. As discussed above in section VII.F, Connelly discloses a duplex fiber optic connector with a single connector housing 38. EX1005, 2:27-59, FIGs. 1-5. The connector housing 38 holds two fiber optic ferrules 92, which extend “beyond the front housing end 46, in a conventional manner.” EX1005, 2:27-3:13; *see* EX1005, FIG. 1 (showing the housing holding the exposed ferrules 92). For example, the connector housing 38 can be seen in the exploded view of Figure 2 of Connelly, reproduced below.



EX1005, FIG. 2 (annotated).

283. Figures 4 and 5 of Connolly, reproduced below, show additional perspectives of the housing 38.



EX1005, FIGs. 4 (annotated) and 5 (excerpt, annotated).

3. Reasons to Combine

284. In my opinion, 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 for at least the following reasons.

285. First, Veatch and Connelly are both inventions in the field of fiber optic connectors and both are directed to duplex fiber optic connectors (*i.e.*, connectors with two ferrules) with a latch for easy removal from a receptacle such as an adapter or transceiver. Therefore, these prior art references are certainly analogous prior art.

286. Second, Veatch emphasizes that the fiber holder 108 is not rotated or repositioned and further that the connector bodies 110 are not removed from the fiber holder 108 during a polarity change, which avoids applying a torsional stress on the fibers undergoing a polarity change, *i.e.*, the problems of the prior art. EX1004, 1:19-28, 3:20-32. To maintain the functionality of not needing to remove the connector bodies 110 from the fiber holder 108 during a polarity change in which the latch 106 and boot 102 rotate 180 degrees with respect to the fiber holder 108, a straightforward modification of the three components (*i.e.*, fiber holder 108 and two connector bodies 110) that remain connected together would be in the form of creating a unitary housing that surrounds both ferrules. As such,

by substituting the unitary housing 38 disclosed by Connelly for the fiber holder 108 and connector bodies 110 in the polarity-reversible connector of Veatch, two ferrules may continue to be surrounded and maintain a lack of rotation during a polarity change while reducing the total number of components in the optical fiber connector. See, *e.g.*, EX1005, FIGs. 1-5. Third, the prior art references themselves provide motivation to substitute Connelly's housing 38 for Veatch's collective housing comprised of three separate components (the two connector bodies 110 and the fiber holder 108) that would have led a POSITA to modify Veatch to arrive at a unitary housing structure. That is, while Veatch discloses and illustrates LC type connector bodies 110, Veatch also explains that "[i]t is understood that embodiments may use different connector bodies." EX1004, 2:17-18. Veatch also seeks to "enable higher density placement of mating adapters." EX1004, 6:56-59. I believe 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. That is, one housing structure that can hold two ferrules may have a smaller footprint than two, spaced-apart, housing structures that can each hold one ferrule. A POSITA would have thus been motivated to create a smaller housing footprint as disclosed in

Connelly based on Veatch's disclosure explicitly seeking higher density³
placement of fiber optic connectors and mating adapters.

287. 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 further ensure the ferrules are not rotated when changing the polarity of the fiber optic connector. In other words, providing separate connector bodies 110 for each of the ferrules as in Veatch allows for the possibility of twisting of the ferrules during a change of polarity because there are additional structures (the connector bodies 110 and the fiber holder 108) that can move relative to one another. However, by instead forming Veatch's ferrule housing 108, 110 as a unitary housing structure 38 disclosed in Connelly, a POSITA would have understood that Veatch's stated design goals of preventing fiber optic rotation during a polarity change are more easily accomplished. Therefore, for at least the reasons described above, I believe that a POSITA would have been motivated to combine the unitary housing structure of Connelly into the

³ Higher density placement of fiber optic connectors is a design goal well-known to any POSITA in this field seeking to provide as many fiber optic connections as possible in a confined space such as a data center.

fiber optic connector of Veatch to allow for a connector with a smaller footprint that maintains the ability to change the polarity while not rotating each ferrule.

288. For the Veatch-Connelly fiber optic connector that a POSITA would have been motivated to make as described above, it is further my opinion that a POSITA would have had a reasonable expectation of success in combining the teachings of Connelly's unitary housing with Veatch's connector for at least the following reasons.

289. First, this modification involves the simple substitution of one known element (a duplex fiber optic housing comprised of three components in Veatch—*i.e.*, the fiber holder 108 and two connector bodies 110) for another (a duplex fiber optic housing comprising the unitary housing 38 of Connelly) to obtain predictable results (*i.e.*, the same change of polarity functionality of Veatch by using less components to surround the ferrules, with the outer features of Veatch maintained—*e.g.*, the latch 106 and boot 102). Veatch and Connelly are both directed to duplex fiber optic connectors. Simply substituting in Connelly's housing 38 would have been well within the abilities of a POSITA, and a POSITA would have had a reasonable expectation of success because the combination merely involves the replacement of known housing structures in the field with other known housing structures in the field.

290. 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. As any 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. Fiber optic connectors are mechanical components (*i.e.*, in a predictable field—mechanical) and it would have been well known to a POSITA to swap one type of housing structure for another with no detrimental impact on performance; thus, a POSITA would have had a reasonable expectation of success.

291. Although I have used a few formulations of obviousness here as I understand them, I believe that several others readily apply in the same general manner as I have explained. For example, using Connelly's unitary housing 38 instead of Veatch's multi-component housing structure would have been obvious to a POSITA to reduce the number of components and the footprint of the connector, thus resulting in the application of a known technique (a unitary housing structure) to a known device (Veatch's connector).

292. As a final clarification, I note that in the combination of Veatch and Connelly, a POSITA would have recognized that the exterior walls of the unitary

housing 38 must still have all of the same contours/notches to interact with Veatch's latch 106. Substituting a unitary housing structure based on Connelly's teaching in place of the multi-component housing structure of Veatch does not affect or hinder providing any of Veatch's latching mechanisms on the housing. Therefore, Veatch's fiber optic connector will continue to have the same fundamental principle of operation and the combination with Connelly will not render Veatch unsatisfactory for its intended purpose.

B. Claim 1

1. Preamble – “An optical fiber connector comprising:”

293. I have been informed by counsel that the preamble to a claim is generally not limiting. However, to the extent that the preamble is deemed limiting, it is my opinion that Veatch discloses an optical fiber connector as required by Claim 1. As previously explained in Section VII.E, Veatch discloses that it's “[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, as discussed above in section VII.F, Connelly discloses a duplex fiber optic connector with a single connector housing 38. EX1005, 2:27-59, FIGs. 1-5.

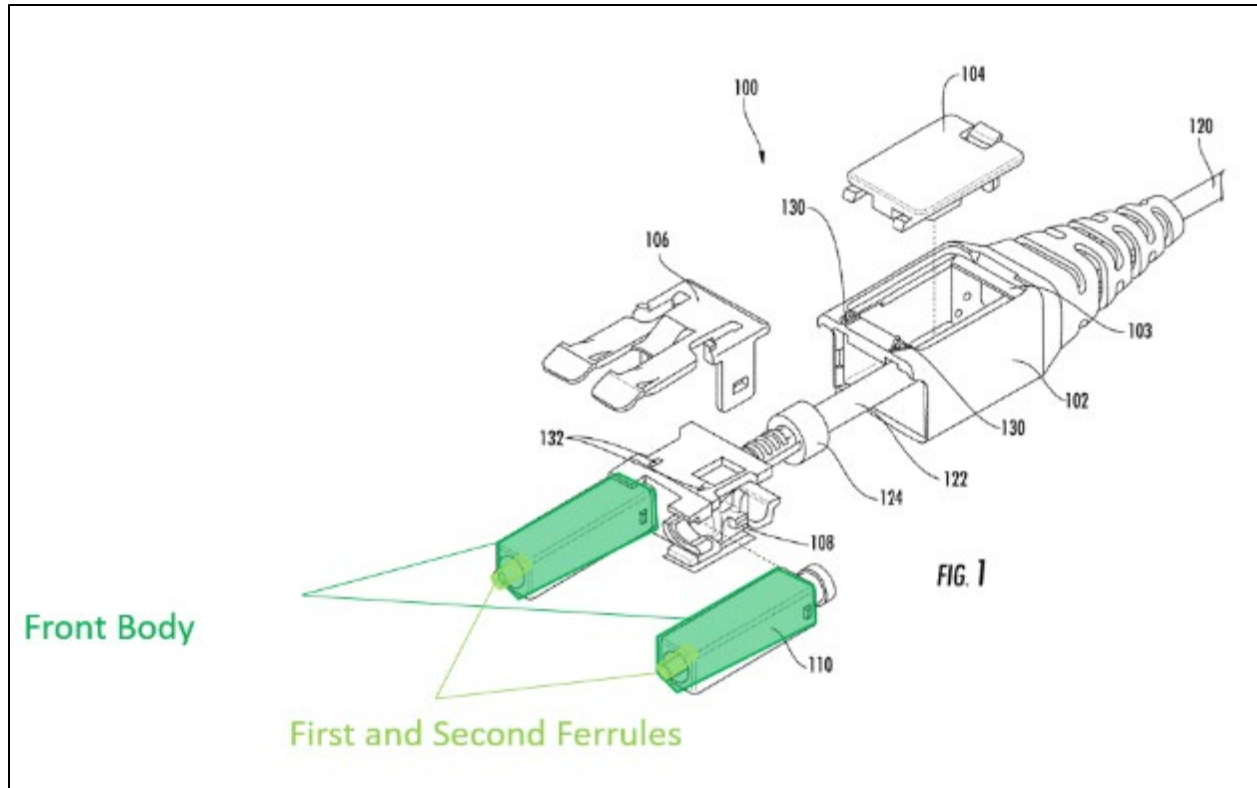
294. Accordingly, for at least these reasons, it is my opinion that a POSITA would have that Veatch and Connelly disclose the preamble of Claim 1 of the '190

Patent.

2. Element [1.1] – “a front body configured to hold first and second ferrules;”

295. For at least the reasons below, it is my opinion that a POSITA would have understood that the specific combination of Veatch and Connelly as described in Section XI.A would render obvious “a front body configured to hold first and second ferrules” for at least the following reasons.

296. Veatch discloses a front body configured to hold, at least, one ferrule. Veatch teaches that the connector has a “[c]onnector bodies 110 terminate the two optical fibers in cable 120.” EX1004, 2:14-25. Veatch further discloses that the “connector body having a ferrule configured to receive the optical fiber.” EX1004, Claim 22. Thus, a POSITA would have understood, as shown in an annotated version of Figure 1 of Veatch, reproduced below, that the connector bodies 110 correspond to the recited front body, and the connector bodies have at least one of the recited ferrules.

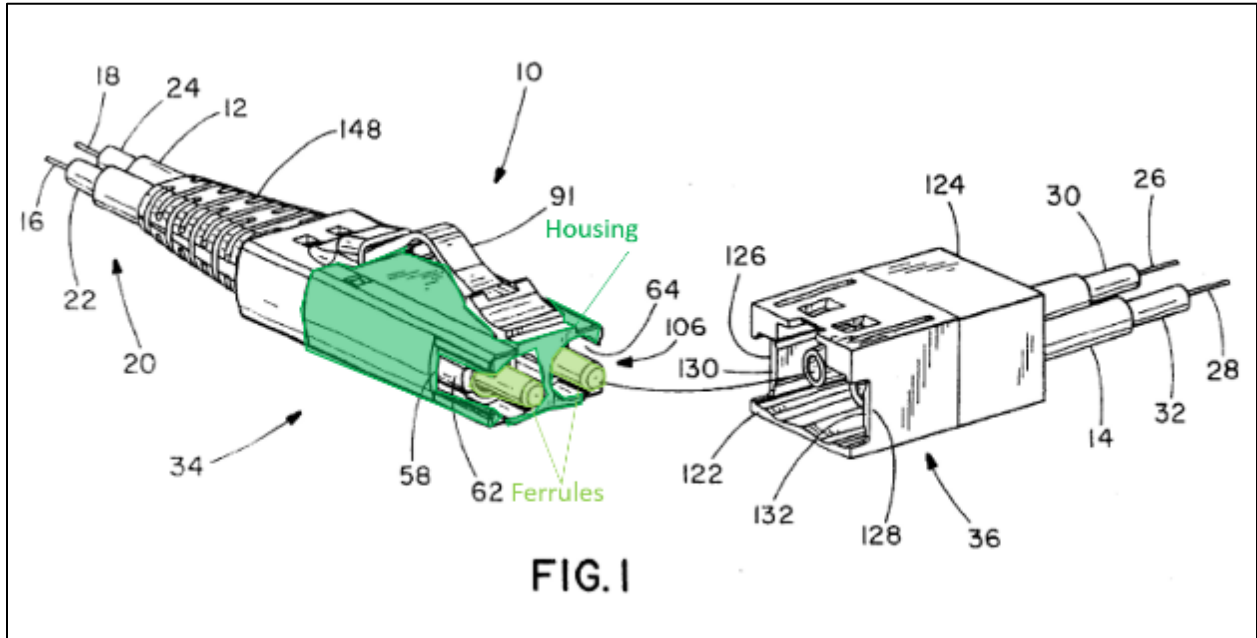


EX1004, FIG. 1 (annotated).

297. Furthermore, as mentioned above in Section V.B, the claimed term “a front body” may be interpreted to mean “one or more front bodies.” EX1001, 10:51-11:3. Thus, Veatch explicitly discloses one or more front bodies that are configured to hold first and second ferrules. However, to the extent that the Patent Owner argues that Veatch does not disclose a single front body that holds two ferrules, not only would this interpretation be counterintuitive to the ’190 Patent itself, but it is my opinion that a POSITA would have understood that Connelly, and thus the combination of Veatch and Connelly, as previously described in Section XI.A, renders this feature obvious.

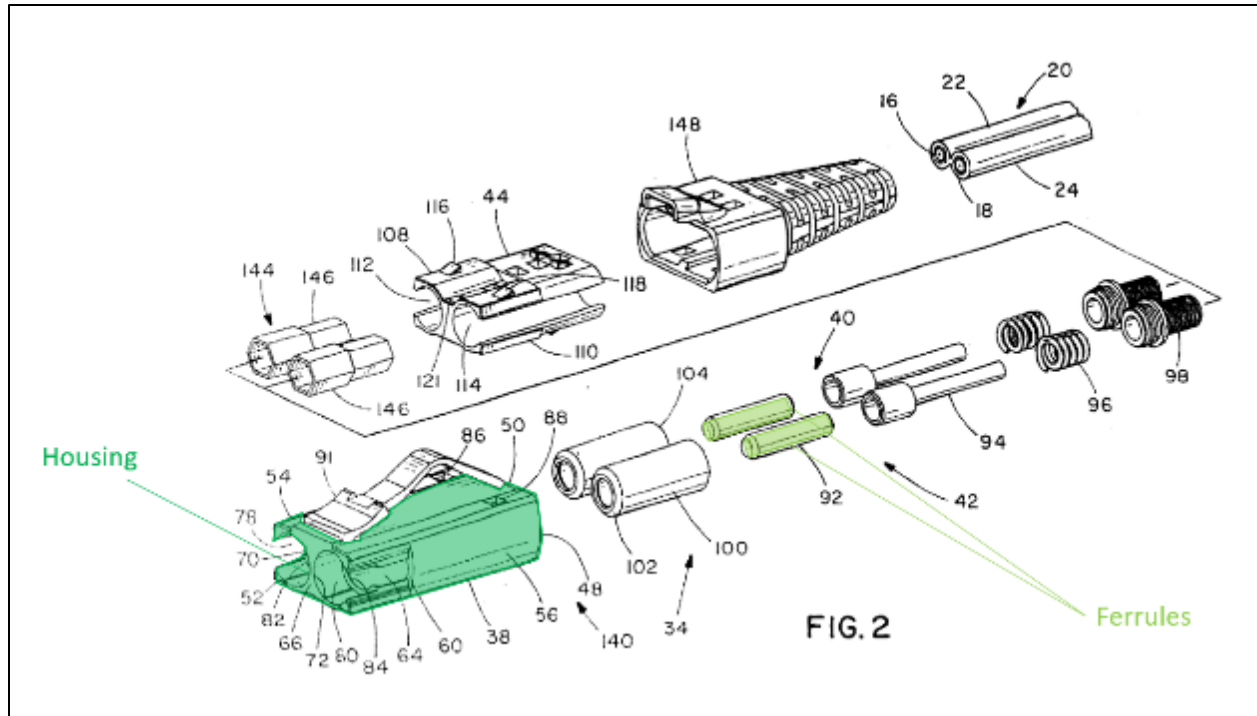
298. More specifically, a POSITA would have understood that Connelly

EX1005, FIG. 1.



EX1005, FIG. 1 (annotated).

299. Indeed, 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. The connector housing 38 houses two fiber optic ferrules 92, which extend “beyond the front housing end 46, in a conventional manner.” EX1005, 2:27-3:13. For example, the connector housing 38 and two fiber optic ferrules 92 can be seen in the exploded view of Figure 2 of Connelly, reproduced and annotated below.



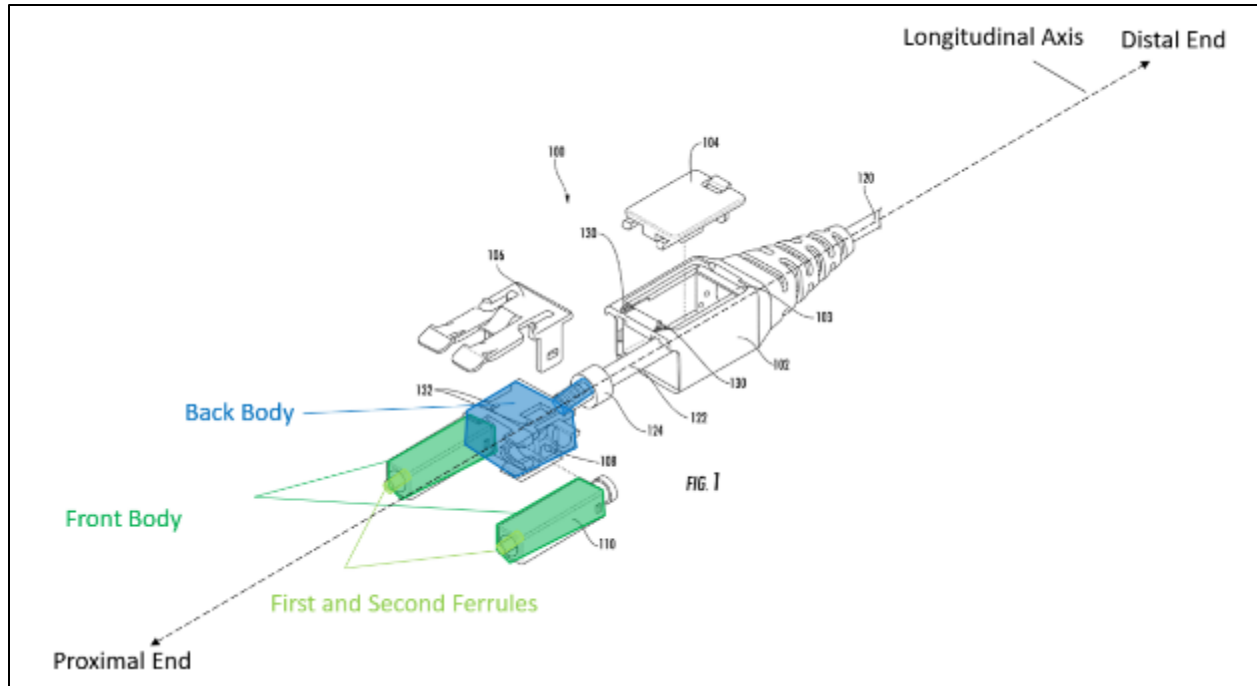
EX1005, FIG. 2 (annotated).

300. 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 the 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, it is my opinion that both Veatch and Connelly separately disclose “a front body configured to hold first and second ferrules,” and further that the combination of Veatch and Connelly, as

described in Section A, would also render obvious claim element [1.1].

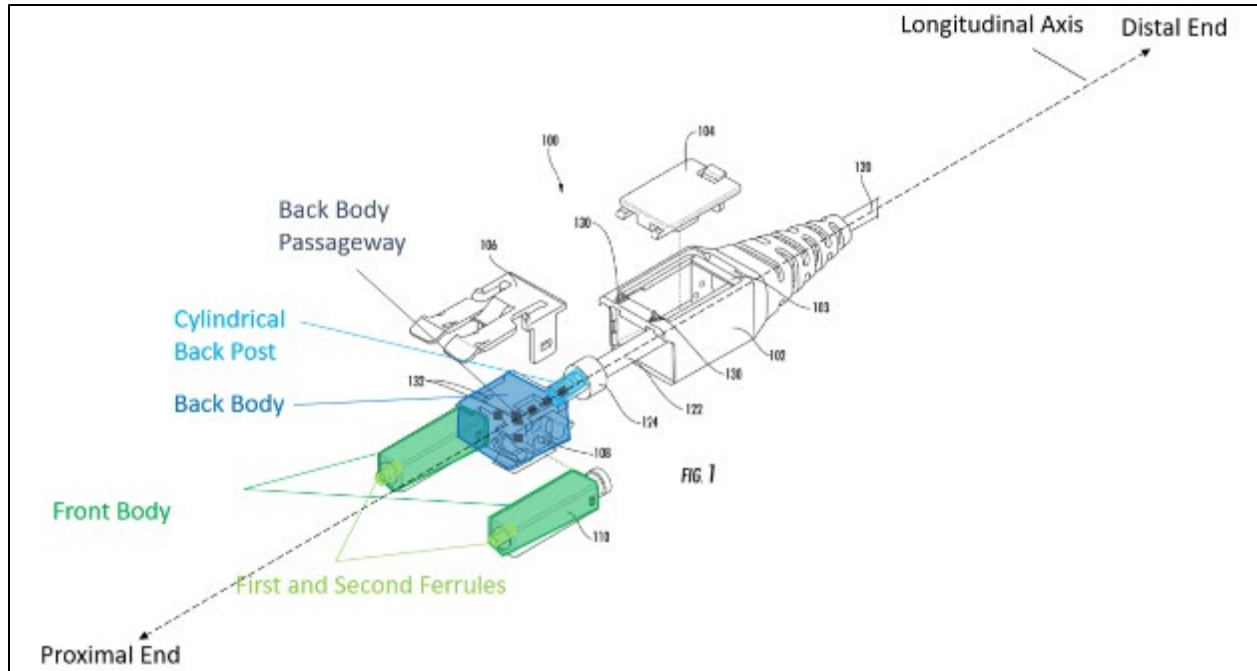
3. **Element [1.2] – “a back body having a proximal end portion and a distal end portion spaced apart along a longitudinal axis, the proximal end portion of the back body configured to couple to the front body, the distal end portion of the back body comprising a cylindrical back post having an outer 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”**

301. For at least the reasons below, it is my opinion that a POSITA would have understood that the combination of Veatch and Connelly renders obvious claim element [1.2]. Veatch discloses a back body having a proximal end portion and a distal end portion spaced apart along a longitudinal axis, and the proximal end portion of the back body configured to couple to the front body. For example, Figure 1 of Veatch, reproduced and annotated below, illustrates a fiber holder 108 having a proximal end portion (lower left portion of the holder 108) and a distal end portion (the upper right portion of the holder 108). EX1004, 2:14-25. Figure 1 of Veatch also shows that the proximal end portion of the fiber holder 108 couples to the connector body 110. It is my opinion that a POSITA would have understood that the holder of Veatch corresponds to the claimed back body.



EX1005, FIG. 1 (annotated).

302. In more detail, POSITA would have understood that Veatch discloses that the distal end portion of the back body comprises a cylindrical back post having an outer round surface extending along the longitudinal axis. For example, as illustrated in Figure 1 the fiber holder 108 has a cylindrical back post on its distal end. From Figure 1, a POSITA would have understood that the cylindrical back post has an outer round surface extending along the longitudinal axis. Thus, a POSITA would have understood that the cylindrical back post shown in Figure 1 of Veatch corresponds to the recited cylindrical back post.



EX1005, FIG. 1 (annotated).

303. A POSITA would have understood that Veatch also discloses that the back body defining a back body passageway extending from the distal end portion through the proximal end portion. For example, a POSITA would have understood that since the 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. This is illustrated in Figure 1 of Veatch, reproduced and annotated above.

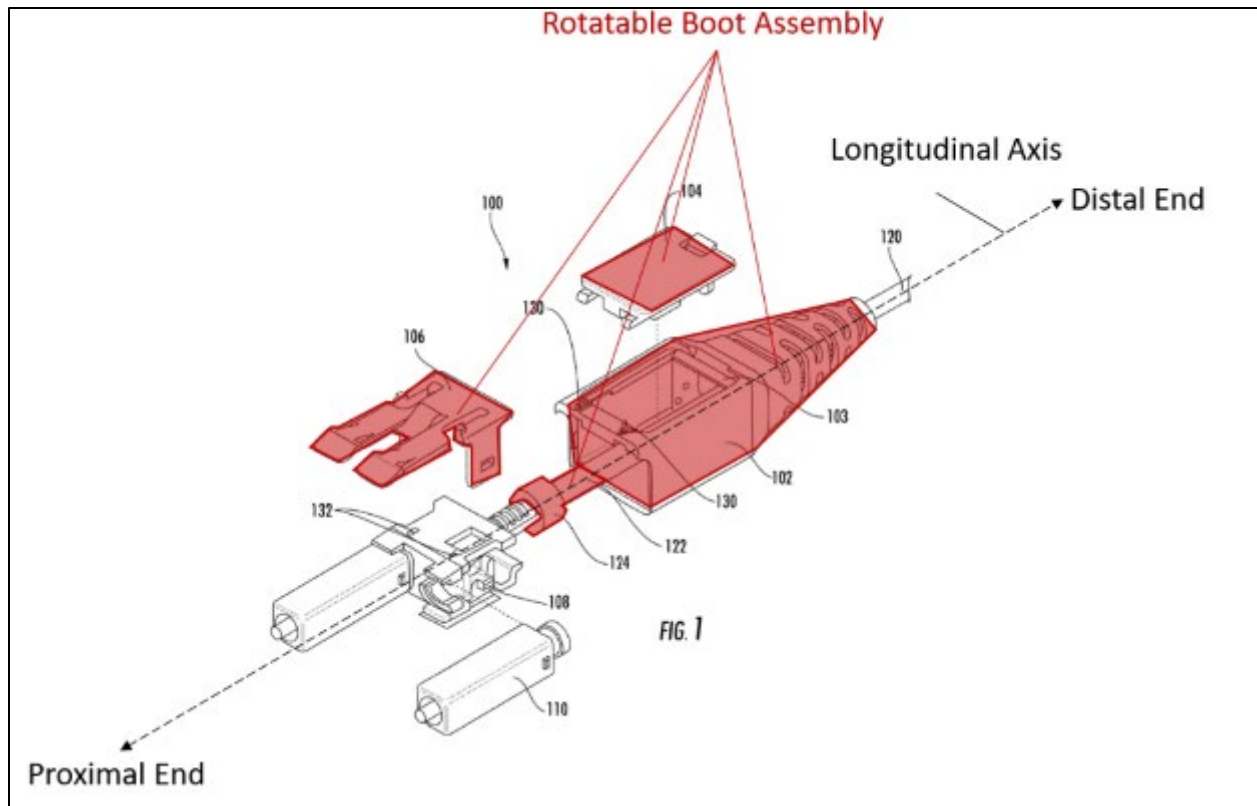
304. Thus, a POSITA would have understood that the fiber holder of Veatch has a passageway corresponding to the claimed back body passageway.

305. Accordingly, a POSITA would have understood that Veatch discloses element [1.2]. In addition to Veatch disclosing claim element [1.2], it would be clear to a POSITA that the combination of Veatch and Connelly (described in

Section XI.A) also renders obvious claim element [1.2]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.2] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.2].

4. Element [1.3.1] – “a rotatable boot assembly having a proximal end portion and a distal end portion spaced apart along the longitudinal axis,”

306. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a rotatable boot assembly having a proximal end portion and a distal end portion spaced apart along the longitudinal axis. For example, as shown in Figure 1 of Veatch, reproduced and annotated below, Veatch discloses an assembly having “a boot 102, cover 104, latch 106,” “[h]eat shrink material 122,” and “a crimp ring 124.” EX1004, 2:14-25.

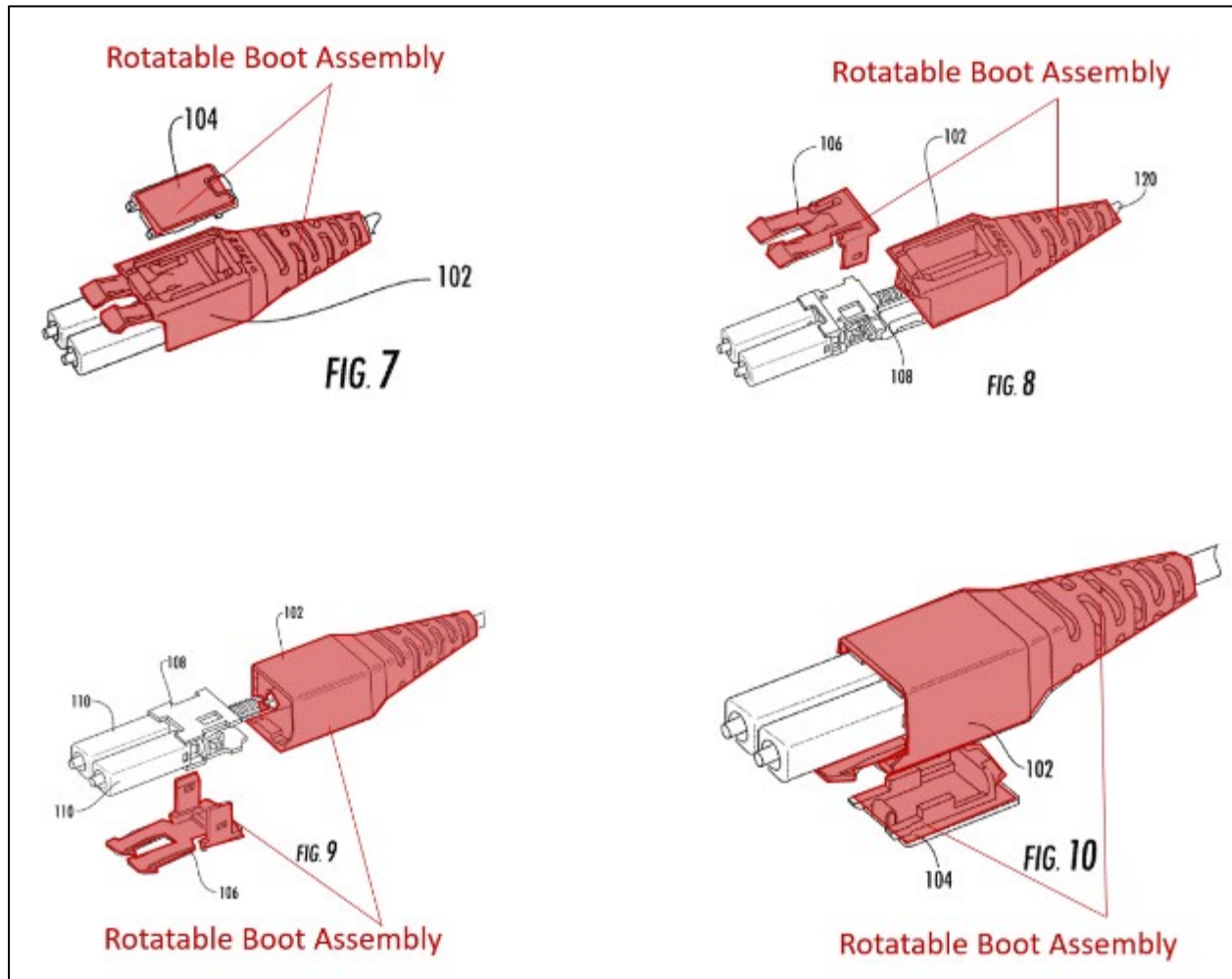


EX1004, FIG. 1 (annotated).

307. It is my opinion that the components listed above of Veatch are assembled to form the rotatable boot assembly. As shown in Figure 1, the distal end of the rotatable boot assembly corresponds to the end located at the upper right corner of Figure 1 the proximal end corresponds to the end located at the lower left in the Figure 1, and each end being spaced apart along the longitudinal axis. Thus, a POSITA would have understood that the components forming the boot assembly of Veatch (*e.g.*, at least, including a boot 102, cover 104, latch 106, heat shrink material 122, and a crimp ring 124) correspond to the claimed rotatable boot assembly.

308. In my opinion, a POSITA would have understood that Veatch also

teaches that its boot 102 is rotatable. As shown in Figures 7-10, Veatch discloses that “the boot 102[,]” “is rotated 180 degrees” for “changing the connector polarity.” EX1004, 3:17-18. Additional details regarding the rotation of the boot are described below with respect to claim element [1.3.9].



EX1004, FIGs. 7-10 (annotated).

309. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.1]. In addition to Veatch disclosing claim element [1.3.1], it would be clear to a POSITA that the combination of Veatch and Connelly (described in

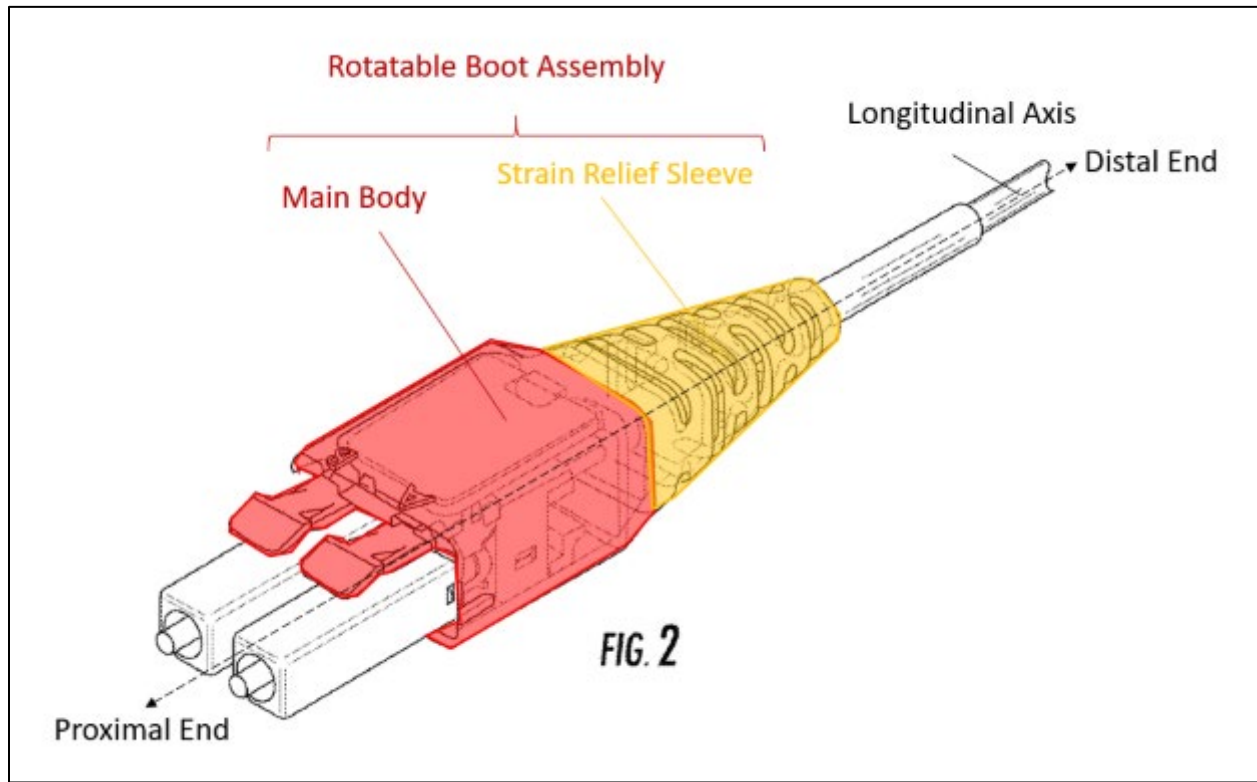
Section XI.A) also renders obvious claim element [1.3.1]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.1] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.1].

5. Element [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,”

310. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a 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. For example, as shown in Figure 2 of Veatch, reproduced below, Veatch illustrates its boot comprises a sleeve.

311. A POSITA would have understood that the sleeve has multiple slits to relieve strain. In addition, as shown in Figure 2, Veatch discloses 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 Figure 2 of Veatch corresponds to the claimed strain relief sleeve.



EX1004, FIG. 2 (annotated).

312. Accordingly, a POSITA would have understood that Veatch discloses claim element [1.3.2]. In addition to Veatch disclosing claim element [1.3.2], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.2]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.2] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim

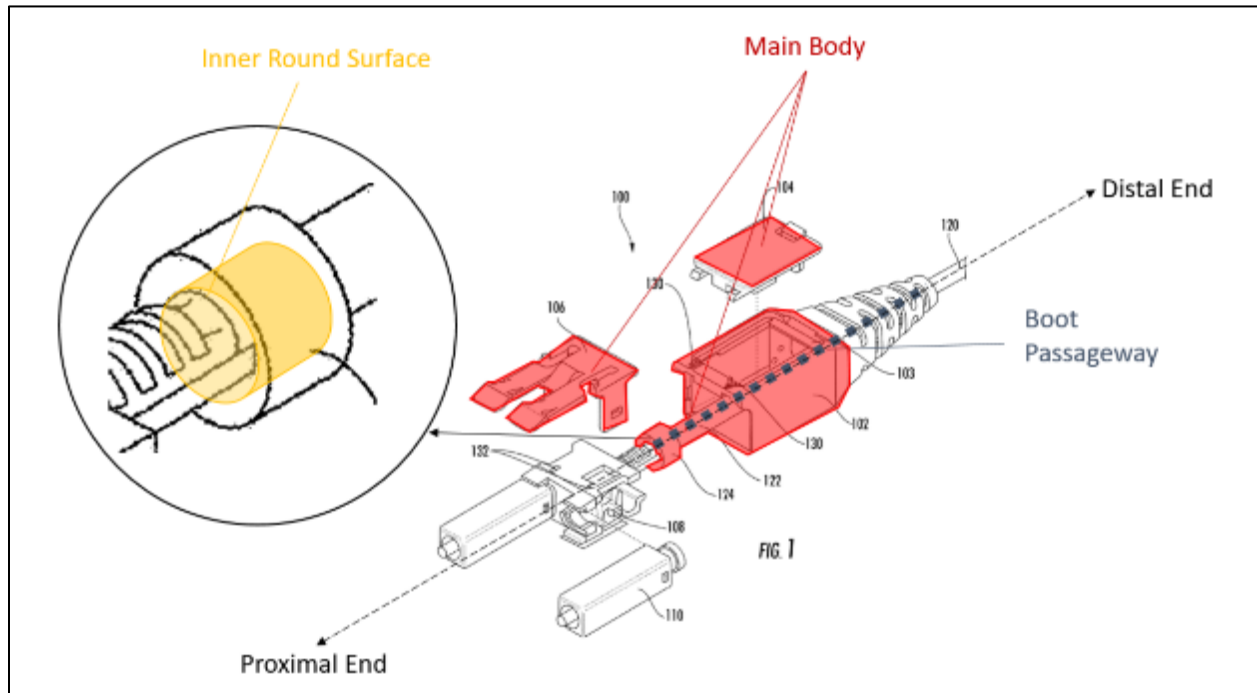
element [1.3.2].

6. **Element [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,”**

313. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a rotatable boot assembly comprising a boot passageway extending from the distal end portion through the main body. For example, Veatch teaches that “[a] cable 120 runs through boot 102 and includes two optical fibers.” EX1004, 2:10-20. A POSITA would have understood that the boot has a boot passageway to allow the cable to run through the boot as annotated in Figure 1 of Veatch, reproduced below. In addition, the boot passageway extends from the distal end portion through the main body. Thus, a POSITA would have understood that the passageway of the boot for the cable 120 shown in Figure 1 of Veatch corresponds to the claimed boot passageway.

314. I believe a POSITA would have understood that Veatch also discloses 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. Veatch teaches that the boot 102 accommodates “a crimp ring 124” inside the boot 102. EX1004, 2:22. A POSITA would have understood that the crimp ring 124 has an inner round surface inside the crimp ring, as shown in the

annotated 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 Figure 1 of Veatch corresponds to the recited inner round surface.



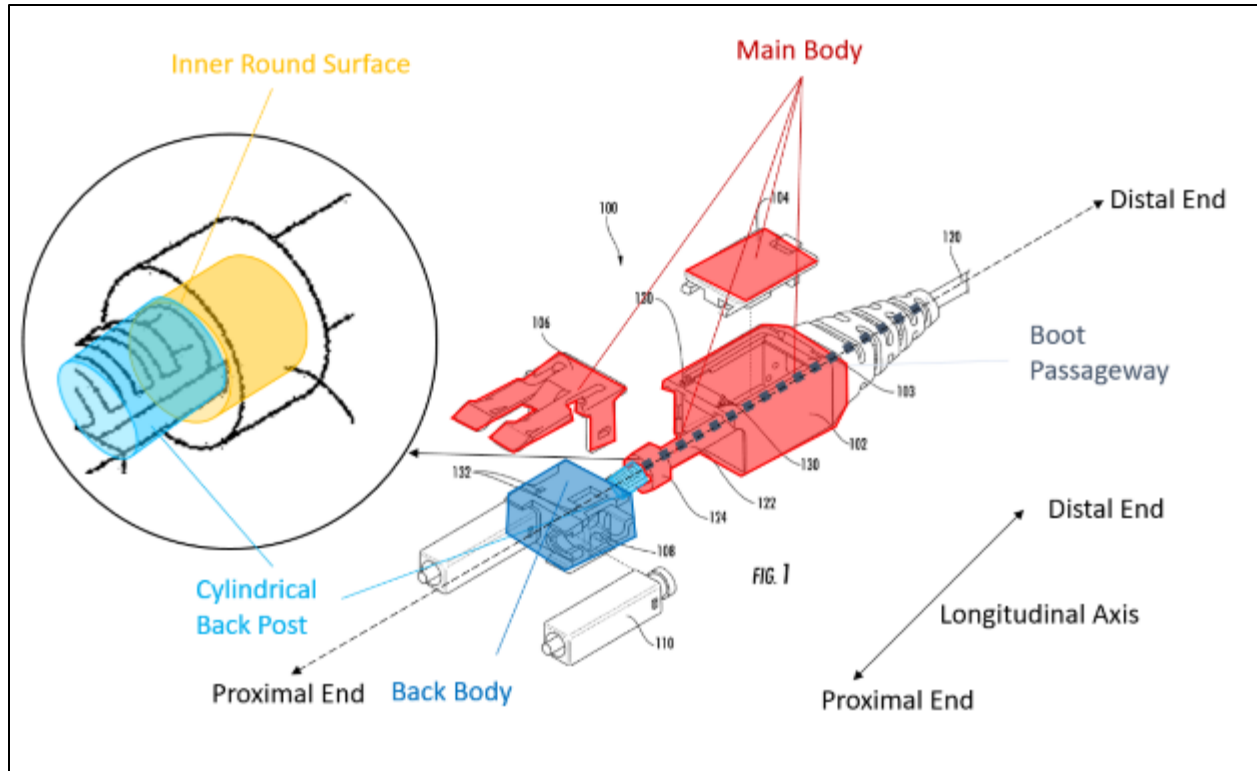
EX1004, FIG. 1 (annotated).

315. Accordingly, a POSITA would have understood that Veatch discloses claim element [1.3.3]. In addition to Veatch disclosing claim element [1.3.3], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.3]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.3] that are disclosed by Veatch would be preserved in the

specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.3].

7. Element [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”

316. I note that “the back post” is not mentioned in the claim before claim element [1.3.4], but I believe a POSITA would interpret “the back post” to mean “the cylindrical back post” recited in claim element [1.2], since “the cylindrical back post” is introduced as a component of the back body as well as “the back post.” For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses the rotatable boot assembly configured to be disposed on the back body such that the outer round surface of the back post is matingly received in the inner round surface of the main body. For example, as previously discussed in relation to claim element [1.2], the holder 108 of Veatch, which corresponding to the claimed back body, comprises a cylindrical back post. Veatch further illustrates, as shown in Figure 1, reproduced below, that the outer round surface of the back post is matingly received in the inner round surface of the main body.



EX1004, FIG. 1 (annotated).

317. Accordingly, a POSITA would have understood that Veatch discloses claim element [1.3.4]. In addition to Veatch disclosing claim element [1.3.4], it would be clear to a POSITA that the combination of Veatch and Connelly (described in Section XI.A) also renders obvious claim element [1.3.4]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.4] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.4].

8. Element [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,”

318. I note that the term “cable boot member” is not mentioned in the claim prior to claim element [1.3.5]. However, I believe a POSITA would understand “cable boot member” to be the at least any portion of the “rotatable boot assembly” as recited by claim element [1.3.1], at least because both terms contain “boot.” For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a cable boot member that is slidable along the longitudinal axis relative to the back body for releasing the optical fiber connector from an adapter. For example, 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 the boot 102 is pulled away from the ferrules, the nub 146 on the cover 104 “to ride on the ridge 150” of the latch 106, which causes the latch arms 152 to depress, which in turn causes the latch 106 to detach from an adapter (*e.g.*, an LC adapter). EX1004, 3:2-6. In this manner, Veatch’s fiber optic connector 100 is released from the adapter.

319. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.5]. In addition to Veatch disclosing claim element [1.3.5], it would be

clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.5]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.5] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.5].

9. Element [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,”

320. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses an optical fiber connector 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. For example, Veatch discloses that “[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 the 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.

321. Furthermore, the optical fiber connector being configured such that “a jacket of the cable is received in the strain relief sleeve in the boot passageway”

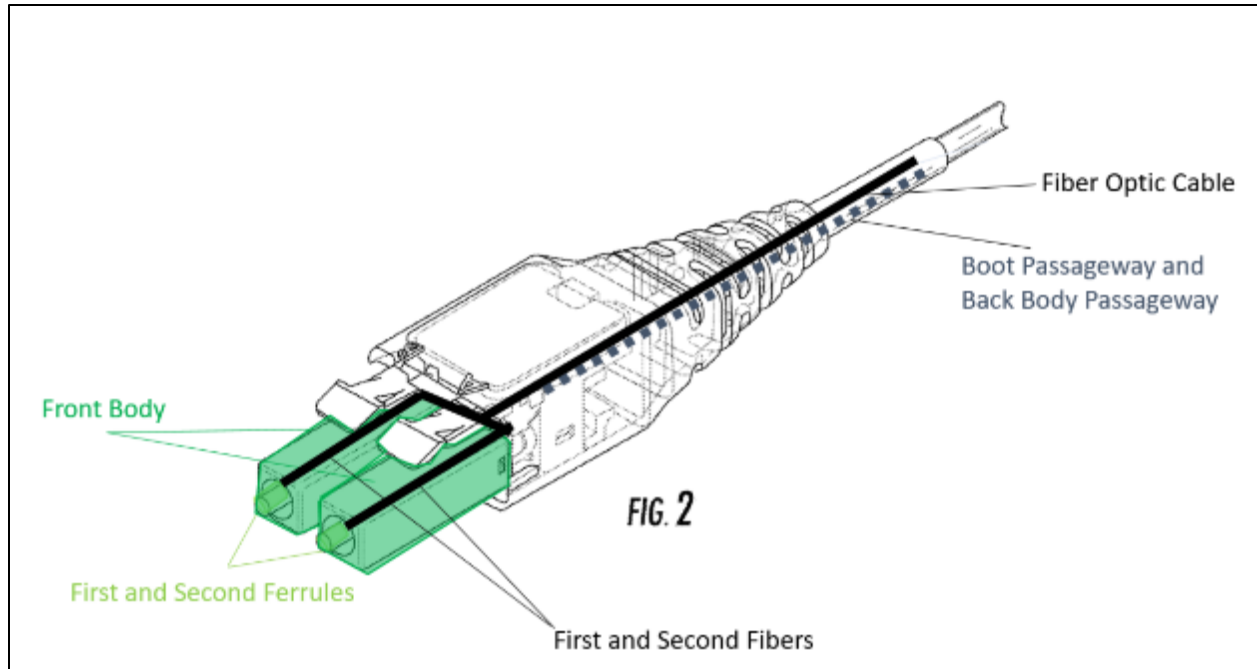
would be obvious to a POSITA as the optical fiber itself is very fragile and great care is required to mechanically protect the fiber within an optical connector. A POSITA thus would have understood that “a jacket of the cable being received in the strain relief sleeve in the boot passageway” is a necessary and common means of protection of the optical fiber against mechanical trauma.

322. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.6]. In addition to Veatch disclosing claim element [1.3.6], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.6]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.6] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.6].

10. Element [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;”

323. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a boot passageway and a 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. As previously discussed in relation to claim element [1.3.3], Veatch teaches that its rotatable boot has a boot passageway. Further, as explained in relation to claim element [1.2], Veatch teaches that the back body defines a back body passageway extending from the distal end portion through the proximal end portion. A POSITA would have understood that Veatch further teaches that the boot passageway and the back body passageway are configured to align for passing the first and second fibers through it. More explicitly, 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. Figure 2 of Veatch, reproduced and annotated below, shows how cable 120 passes through the connector.



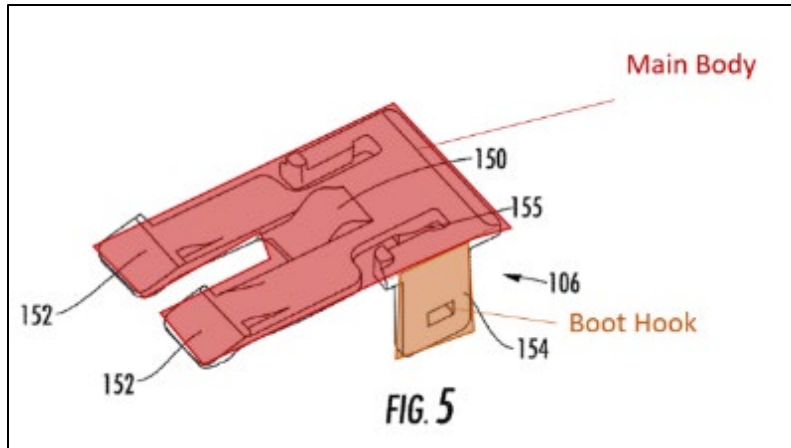
EX1004, FIG. 2 (annotated).

324. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.7]. In addition to Veatch disclosing claim element [1.3.7], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.7]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.7] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.7].

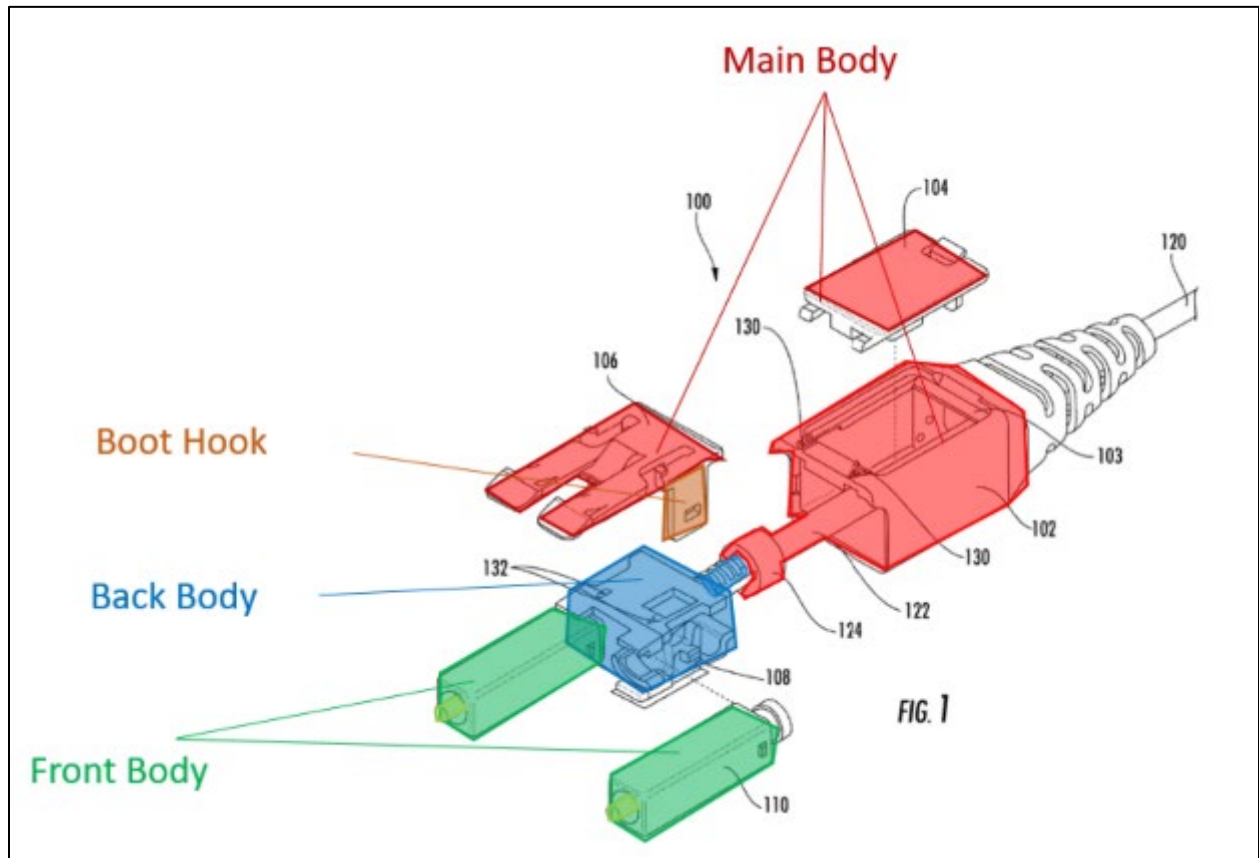
11. Element [1.3.8] – “the main body further comprising at least one boot hook configured for releasably securing the

**multi-purpose rotatable boot assembly against rotation
relative to the back body,”**

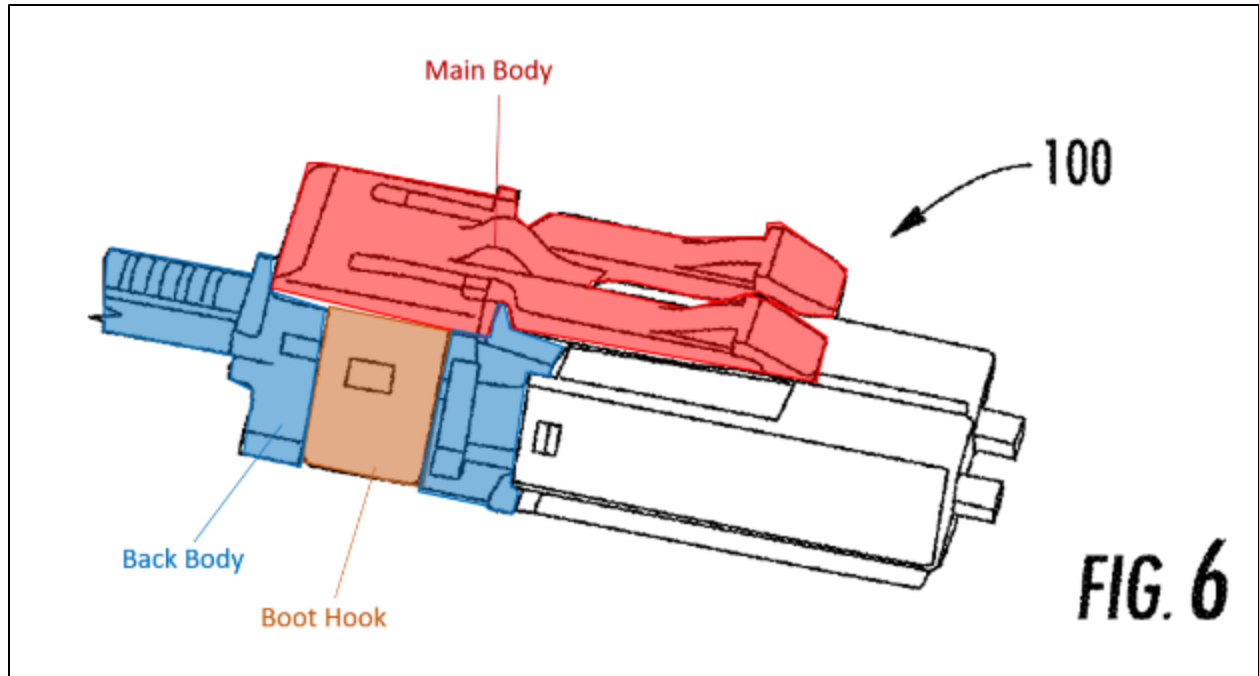
325. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a main body further comprising at least one boot hook configured for releasably securing the multi-purpose rotatable boot assembly against rotation relative to the back body. For example, Veatch teaches that the “[l]atch 106 also includes mounting tabs 154 that secure the latch 106 to fiber holder 108.” EX1004, 2:61-63. Figure 5 of Veatch reproduced and annotated below, illustrates where the mounting tabs 154 (corresponding to the claimed boot hook) are located. Figures 1 and 6 of Veatch, reproduced below, explain how the mounting tabs 154 secure the fiber holder 108. Further, as shown in Figure 9 of Veatch, also reproduced below, the latch 106 including the mounting tabs 154 is releasable from the fiber holder 108 when the boot 102 of Veatch is rotated to “chang[e] the connector polarity.” EX1004, 3:17-18. In contrast, Veatch further teaches that “[t]he fiber holder 108 is not rotated” during the rotation of the boot, as shown in Figure 2, reproduced and annotated below. EX1004, 3:20-21. Thus, a POSITA would have understood that the mounting tabs 154 secure the rotatable boot 102 of Veatch against rotation relative to the fiber holder 108. Therefore, a POSITA would have understood that the mounting tabs 154 shown in Figure 5 of Veatch correspond to the claimed boot hook(s).



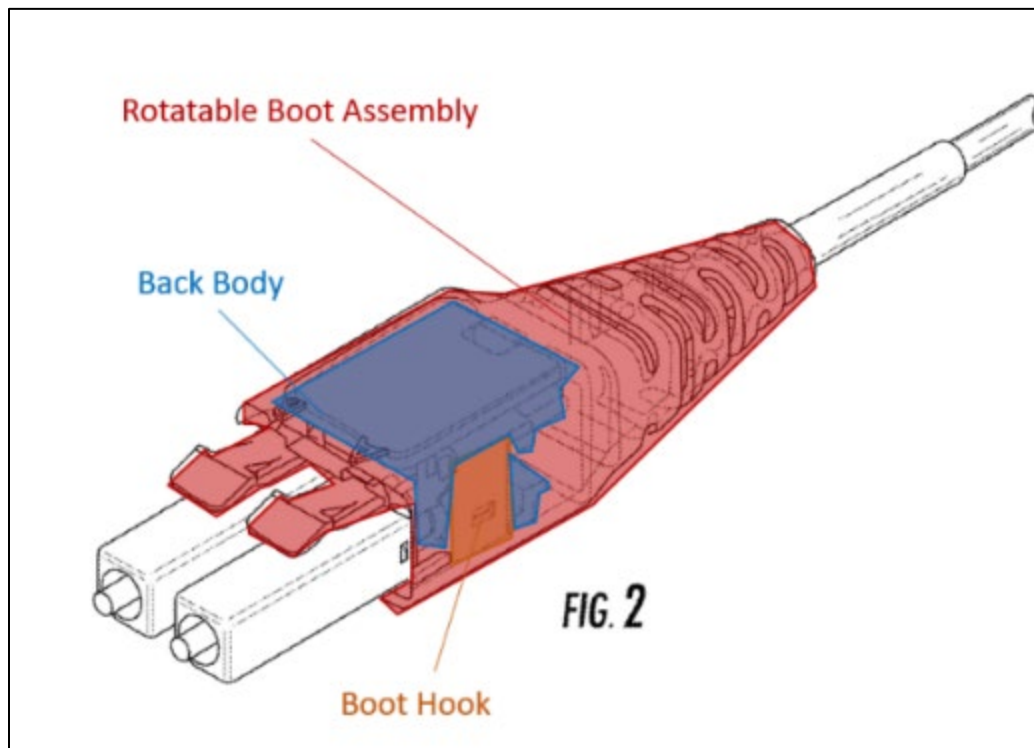
EX1004, FIG. 5 (annotated).



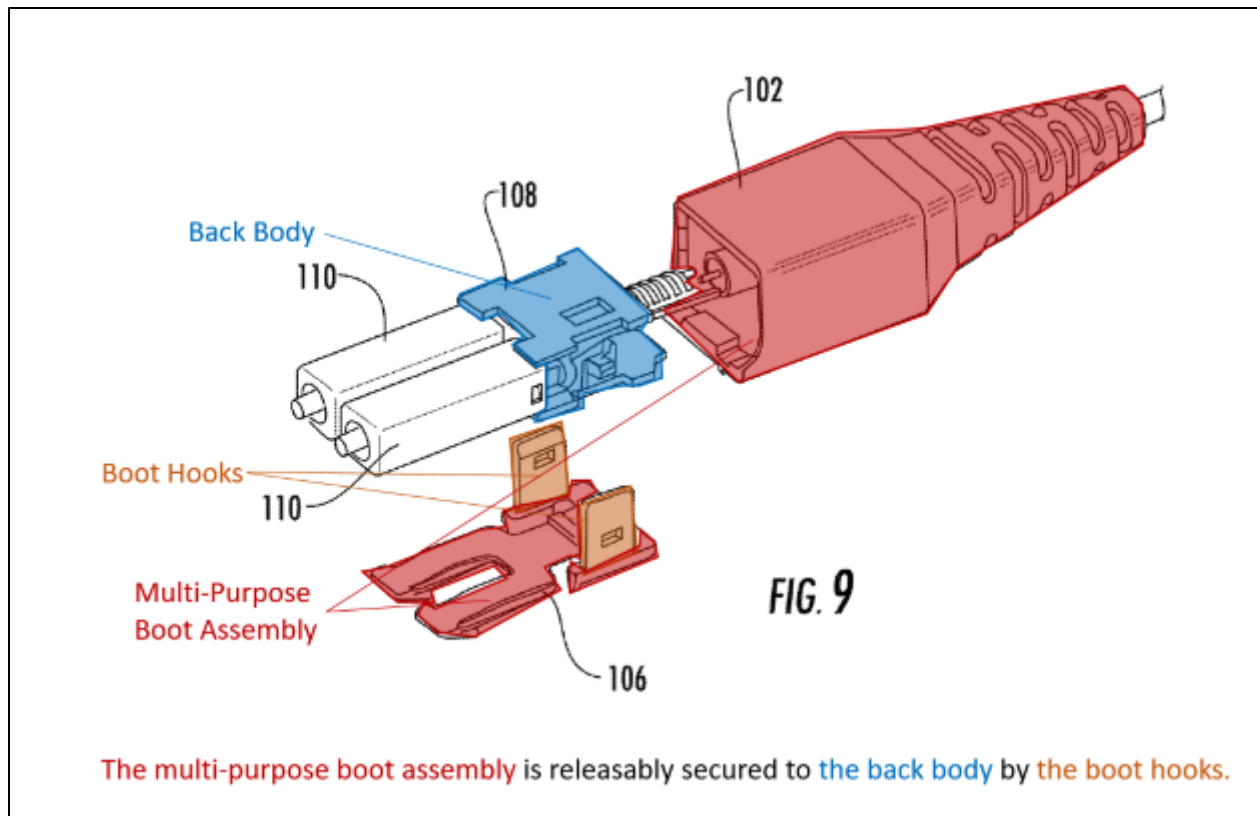
EX1004, FIG. 1 (annotated).



EX1004, FIG. 6 (annotated).



EX1004, FIG. 2 (annotated).



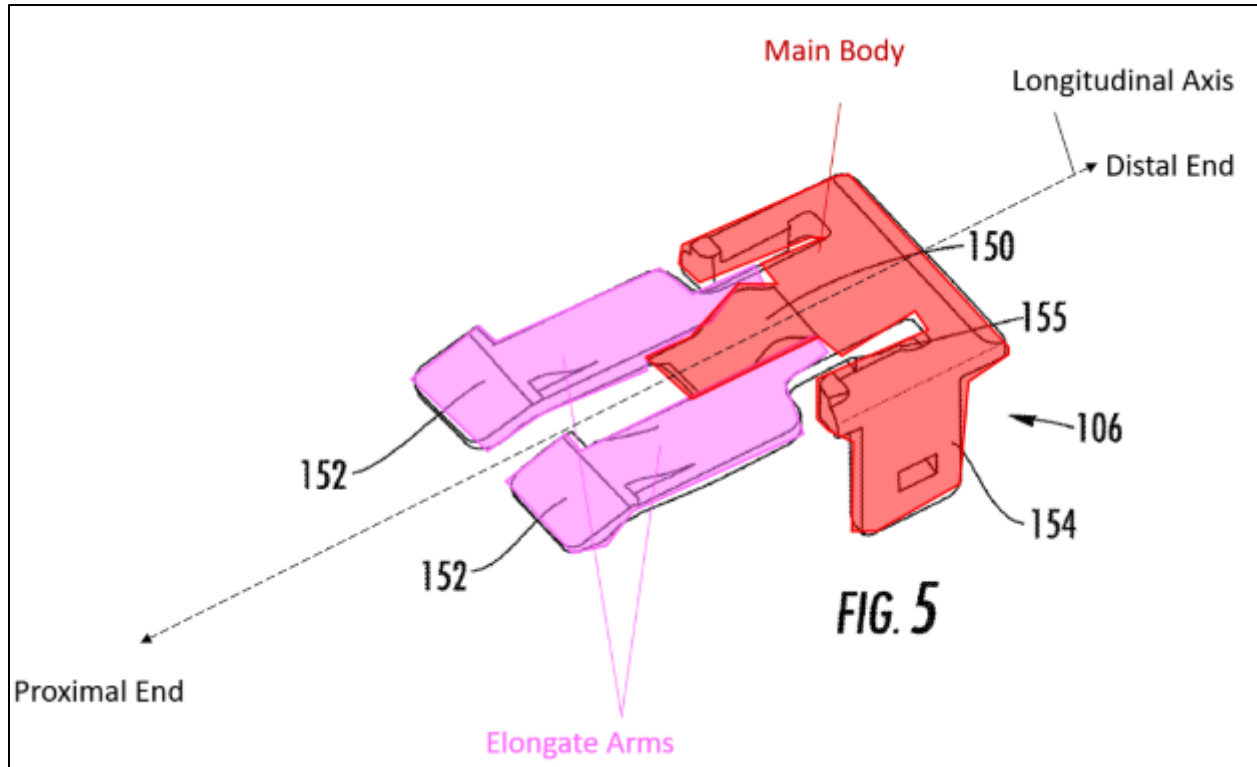
EX1004, FIG. 9 (annotated).

326. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.8]. In addition to Veatch disclosing claim element [1.3.8], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.8]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element [1.3.8] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.8].

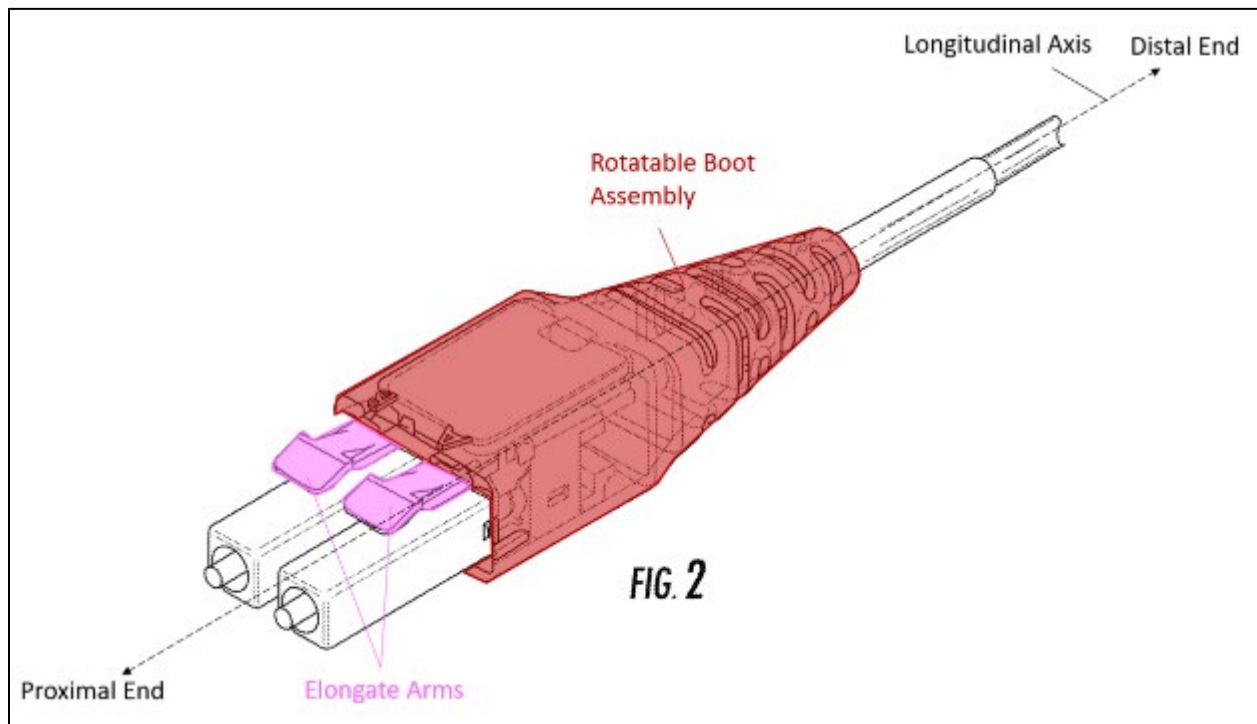
- 12. Element [1.3.9] – “[and] the rotatable boot assembly further comprising an elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis, the elongate arm being configured for selectively setting the optical fiber connector to each of a first polarity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

327. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a 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. I believe a POSITA would have understood that the resilient arms 152 shown in Figure 5 of Veatch correspond to the claimed elongate arm(s) for at least the following reasons.

328. For example, Veatch teaches that “[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. As illustrated in Figures 5 and 9 of Veatch, reproduced below, the resilient arms extend longitudinally from the main body in a proximal direction along the longitudinal axis. Thus, a POSITA would have understood that the resilient arms 152 correspond to the recited elongate arm extending longitudinally from the main body in a proximal direction along the longitudinal axis.



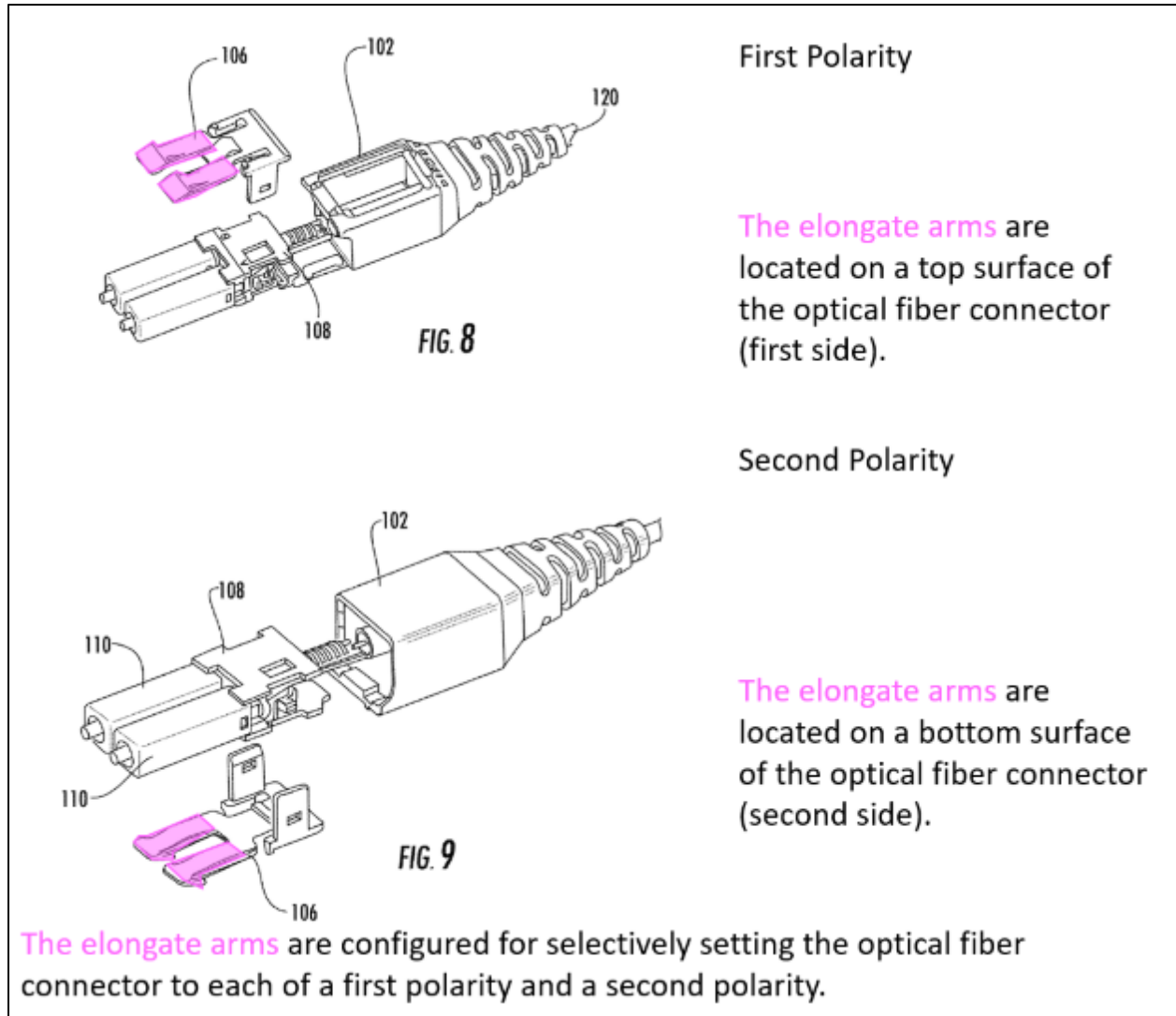
EX1004, FIG. 5 (annotated).



EX1004, FIG. 2 (annotated).

329. Veatch further teaches that the resilient arms are configured for

selectively setting the optical fiber connector to each of a first polarity and a second polarity. For example, Veatch 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 Figure 8 of Veatch, reproduced below. EX1004, 3:11-16. 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, the resilient arms 152 are moved from the top surface of the holder 108 to the bottom surface of the holder while changing the polarity. *See* EX1004, FIGs. 8 and 9. Since the resilient arms “engage [a] mounting structure on an LC adapter,” the position of the resilient arms is one of the factors that determine the polarity of the connector. EX1004, 3:1-2. 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. Therefore, a POSITA would have understood that the resilient arms 152 of Veatch correspond to the claimed elongate arm(s).



EX1004, FIGs. 8-9 (annotated).

330. Accordingly, a POSITA would have understood that Veatch discloses element [1.3.9]. In addition to Veatch disclosing claim element [1.3.9], it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious claim element [1.3.9]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of claim element

[1.3.9] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious claim element [1.3.9].

331. In summary, for at least the reasons above, I believe a POSITA would have been motivated to make a combination of Veatch and Connelly that renders obvious each of the requirements of Claim 1 of the '190 Patent. As such, it is my opinion that the entirety of Claim 1 of the '190 Patent is rendered obvious.

C. Claim 2

1. Preamble – “The optical fiber connector according to claim 1, wherein”

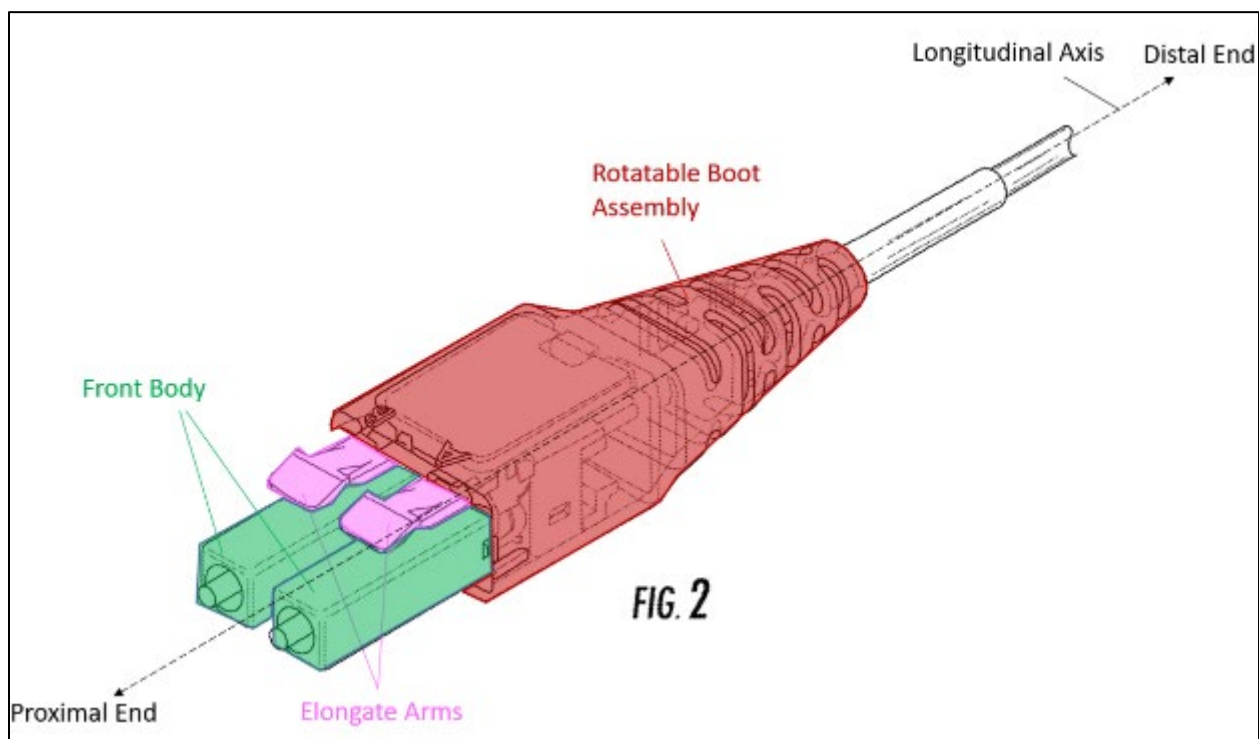
332. Claim 2 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Veatch and Connelly renders obvious Claim 1. *See* Section XI.B. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 2 of the '190 Patent.

2. Element [2.1] – “the elongate arm is an alignment key.”

333. The '190 Patent defines the “alignment 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, I interpret the meaning of “alignment key” in Claim 2 to mean “any protrusion adjacent to a side of the connector housing” based on the combined definitions in the '190 Patent.

334. In my opinion, a POSITA would have understood that Veatch

discloses that the elongate arm is an alignment key. For example, as illustrated in Figure 2 of Veatch, reproduced below, 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.



EX1005, FIG. 2 (annotated).

335. Accordingly, a POSITA would have found Claim 2 obvious based on the elongate arm of Veatch. In addition to Veatch disclosing Claim 2, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 2. That is, by implementing the housing 38 of Connelly into the optical

connector of Veatch, the additional claimed features of Claim 2 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 2.

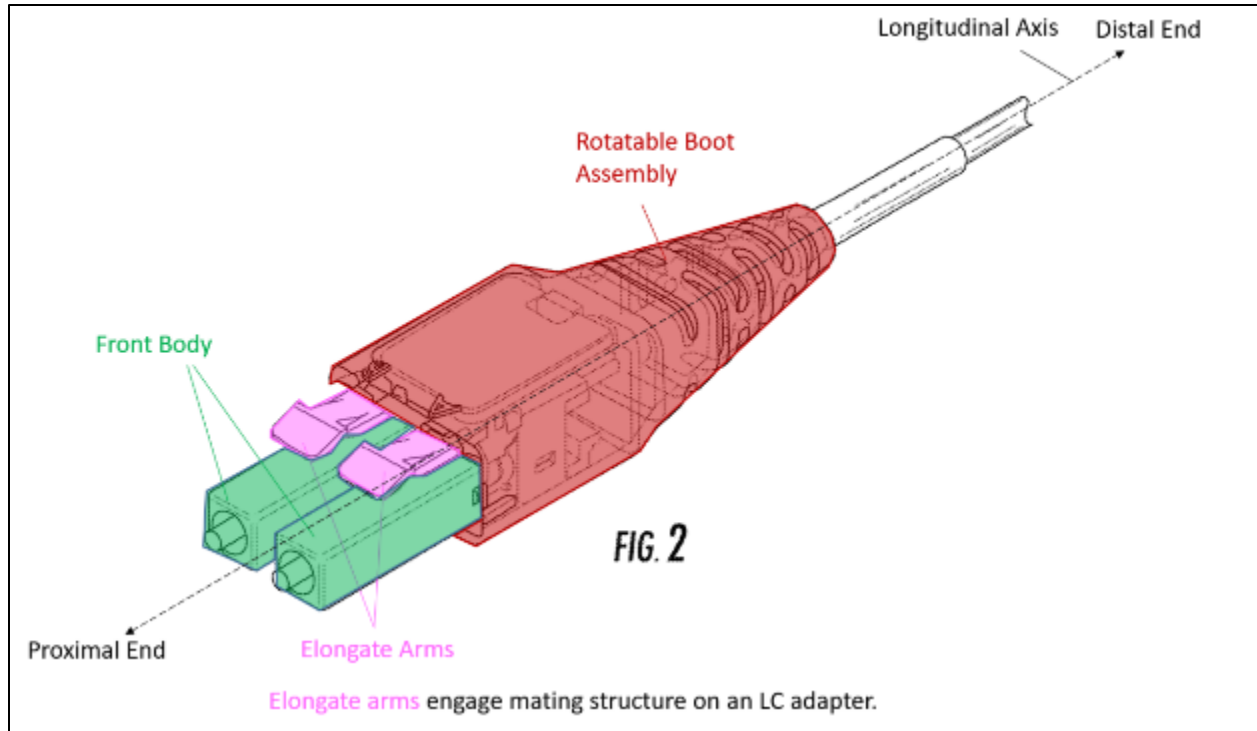
D. Claim 3

1. Preamble – “The optical fiber connector according to claim 2, wherein”

336. Claim 3 depends upon Claim 2 which depends upon Claim 1, and for at least the reasons discussed for Claim 2 and Claim 1, the combination of Veatch and Connelly renders obvious Claim 2 and Claim 1. *See* Section XI.B; *see also* Section XI.C. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 3 of the '190 Patent.

2. Element [3.1] – “the alignment key aligns the proximal end of the optical fiber connector into the adapter.”

337. In my opinion, a POSITA would have understood Veatch teaches that its alignment keys align the proximal end of the optical fiber connector into the adapter. For example, Veatch teaches that the resilient arms 152 (corresponding to the alignment key) “engage [a] mating structure on an LC adapter.” EX1004, 2:55-56. *See* EX1004 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.



EX1004, FIG. 2 (annotated).

338. Accordingly, a POSITA would have found Claim 3 obvious based on Veatch. In addition to Veatch disclosing Claim 3, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 3. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 3 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 3.

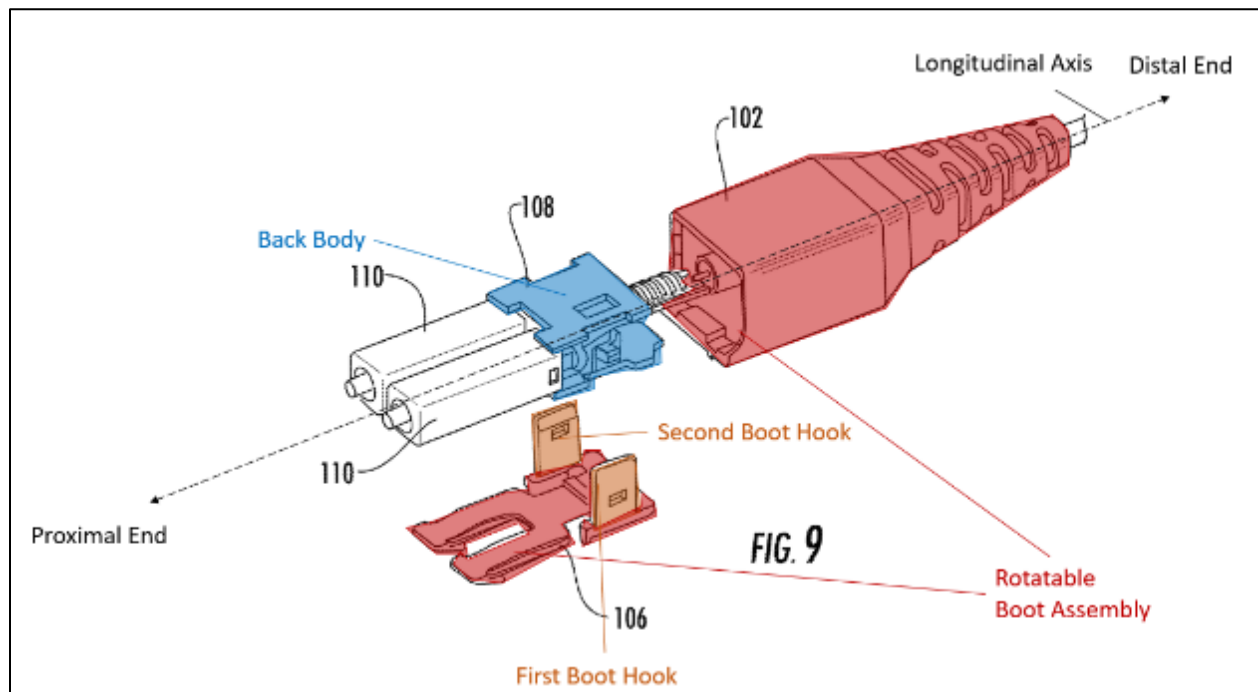
E. Claim 6

1. Preamble – “The optical fiber connector according to claim 1, wherein”

339. Claim 6 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Veatch and Connelly renders obvious Claim 1. *See* Section XI.B. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 6 of the '190 Patent.

2. Element [6.1] – “at least one boot hook comprises first and second boot hooks.”

340. In my opinion, a POSITA would have understood that Veatch discloses the boot hook comprising first and second boot hooks as illustrated in Figure 9, reproduced below, as annotated.



EX1004, FIG. 9 (annotated).

341. Accordingly, a POSITA would have found Claim 6 obvious based on Veatch. In addition to Veatch disclosing Claim 6, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 6. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 6 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 6.

F. Claim 7

1. Preamble – “The optical fiber connector according to claim 6, wherein”

342. Claim 7 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Veatch and Connelly renders obvious Claim 1 and Claim 6. *See* Section XI.B; *see also* Section XI.E. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 7 of the '190 Patent.

2. Element [7.1] – “the first and second boot hooks are spaced apart on diametrically opposite sides of the longitudinal axis.”

343. In my opinion, 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 Figure 9 as annotated above for

Claim 6. Accordingly, a POSITA would have found Claim 7 obvious based on Veatch. In addition to Veatch disclosing Claim 7, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 7. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 7 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 7.

G. Claim 8

1. Preamble – “The optical fiber connector according to claim 6, wherein”

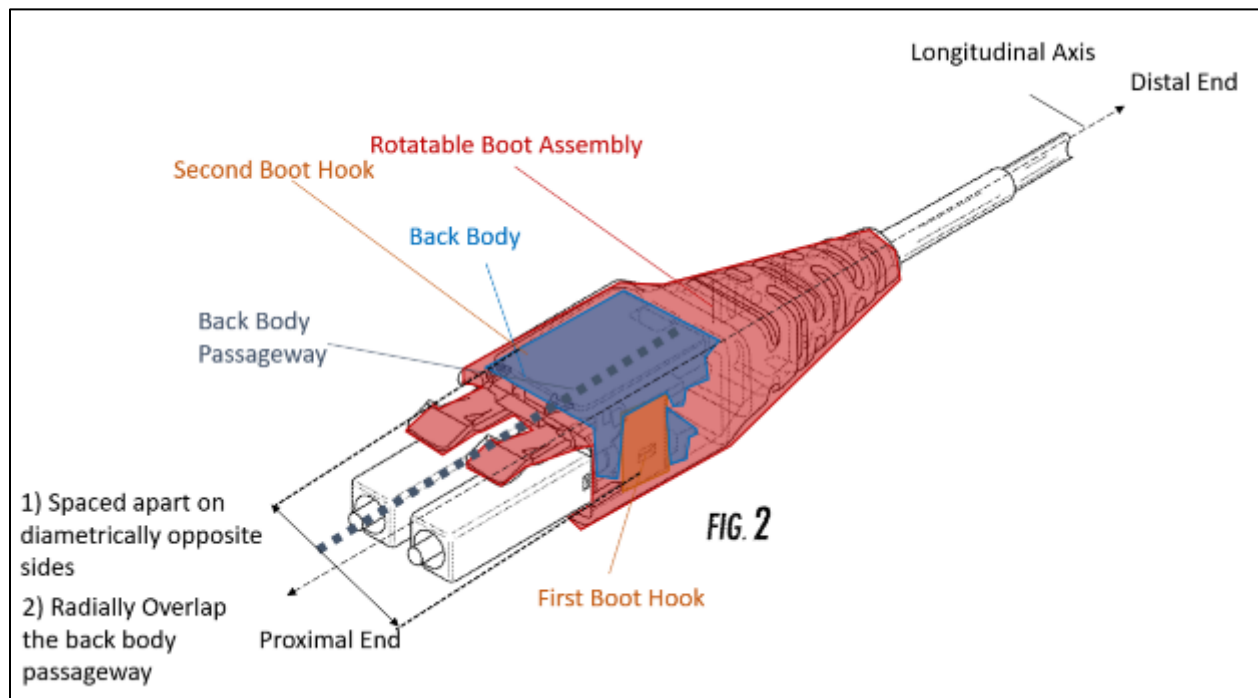
344. Claim 8 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Veatch and Connelly renders obvious Claim 1 and Claim 6. *See* Section XI.B; *see also* Section XI.E. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 8 of the '190 Patent.

2. Element [8.1] – “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.”

345. In my opinion, Veatch discloses 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. For example, Figure 2 of Veatch, reproduced below, illustrates a connector when the rotatable boot assembly is disposed on the back body. As annotated below, Figure 2 shows a first boot hook and a second boot hook that are spaced apart on diametrically opposite sides of the back body passageway.

346. Further, in my opinion, Veatch also teaches that when the 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. As annotated below, Figure 2 shows the first and second boot hooks radially overlap the back body passageway relative to the longitudinal axis.



EX1004, FIG. 2 (annotated).

347. Accordingly, a POSITA would have found Claim 8 obvious based on

Veatch. In addition to Veatch disclosing Claim 8, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 8. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 8 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 8.

H. Claim 9

1. Preamble – “The optical fiber connector according to claim 6, wherein”

348. Claim 9 depends upon Claim 6 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 6, the combination of Veatch and Connelly renders obvious Claim 1 and Claim 6. *See* Section XI.B; *see also* Section XI.E. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 9 of the '190 Patent.

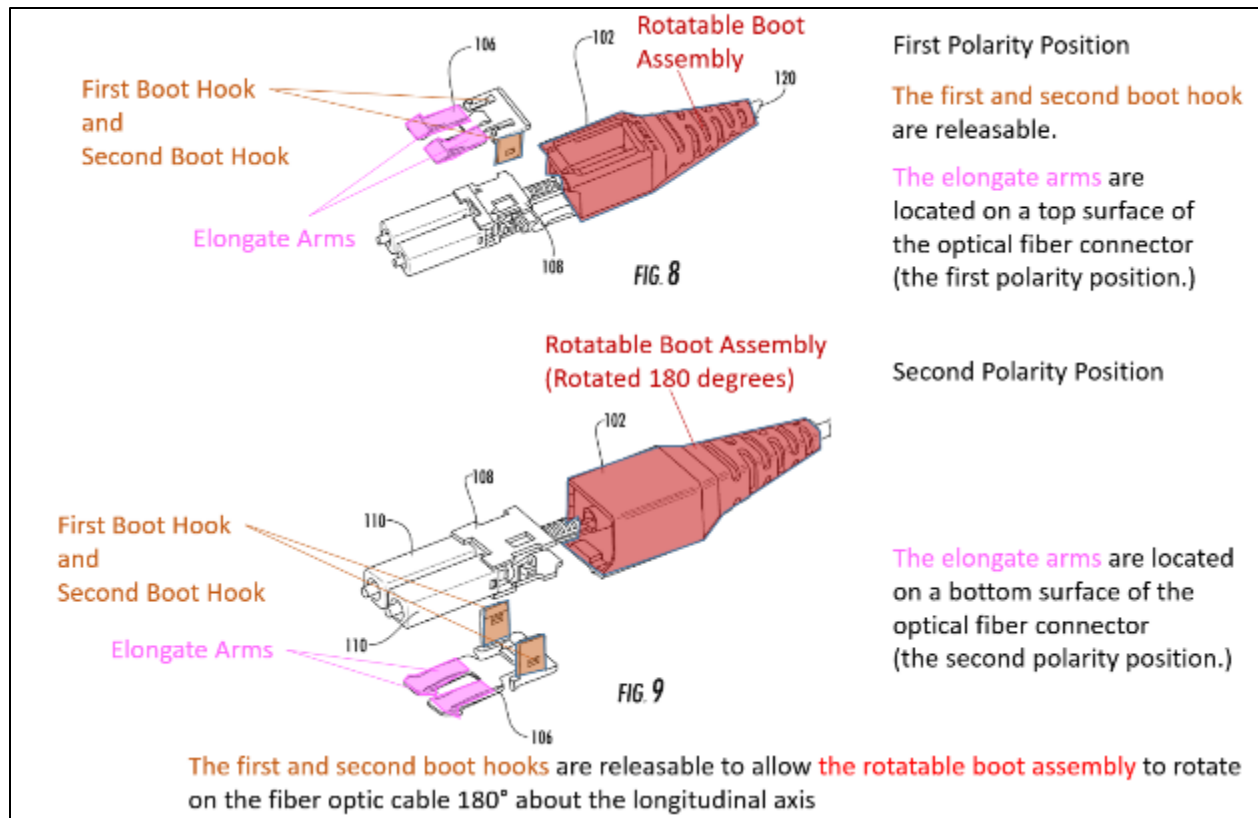
2. Element [9.1] – “the first and second boot hooks are releasable to allow the rotatable boot assembly to rotate on the fiber optic cable 180° about the longitudinal axis from a first polarity position in which the elongate arm sets the optical fiber connector to the first polarity to a second polarity position in which the elongate arm sets the optical fiber connector to the second polarity.”

349. In my opinion, a POSITA would have understood that Veatch discloses that 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.

For example, Veatch teaches that “in changing the connector polarity,” “the 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, 3:11-20.

350. Further, as explained in the explanation for the claim element [1.3.9], Veatch discloses that the elongate arm(s) are configured for selectively setting the optical fiber connector to each of a first polarity and a second polarity. Annotated versions of Figures 8 and 9 of Veatch, reproduced below, 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.



EX1004, FIGs. 8-9 (annotated).

351. Accordingly, a POSITA would have found Claim 9 obvious based on Veatch. In addition to Veatch disclosing Claim 9, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 9. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 9 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 9.

I. Claim 10

1. Preamble – “The optical fiber connector according to claim 9, wherein”

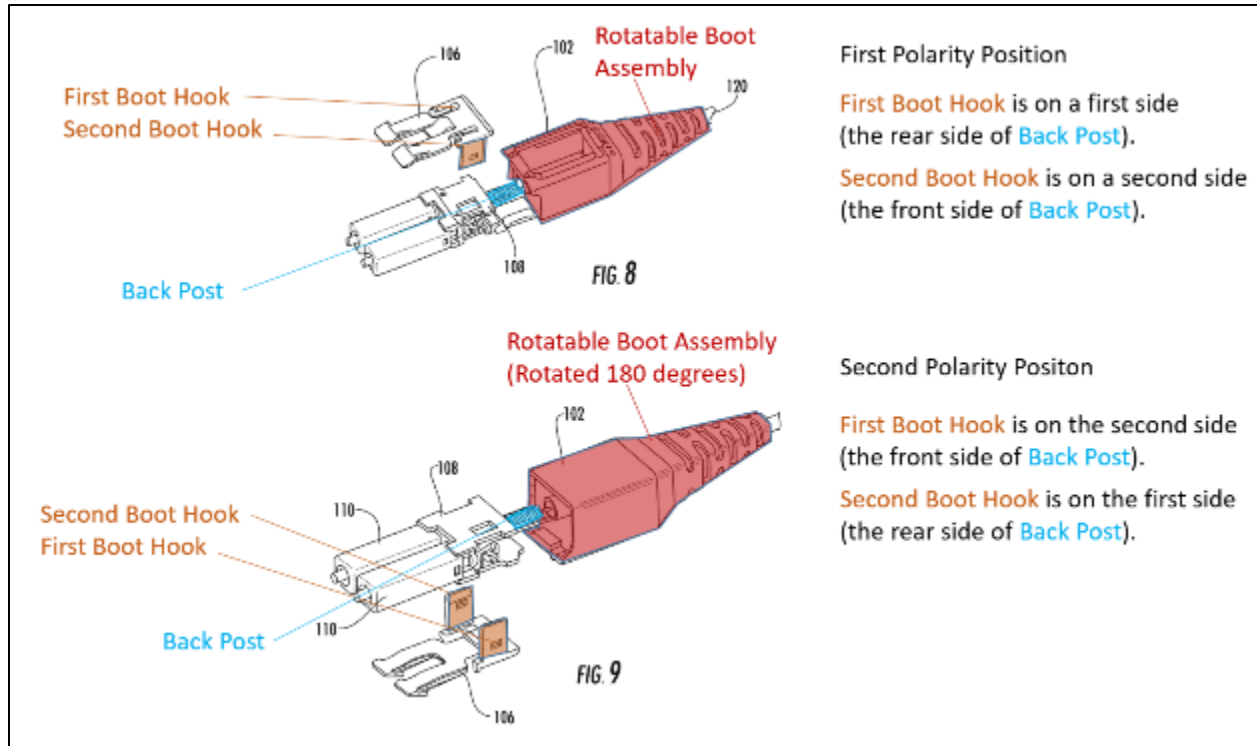
352. Claim 10 depends upon Claim 9 which depends upon Claim 6 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 6, and Claim 9, the combination of Veatch and Connelly renders obvious Claim 1, Claim 6, and Claim 9. *See* Section XI.B; *see also* Section XI.E; *see also* Section XI.H.

Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 10 of the '190 Patent.

2. Element [10.1] – “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.”

353. As previously discussed in relation to Claim 9, the rotatable boot assembly of Veatch is 1) in the first polarity position when the rotatable boot assembly is in the first polarity and 2) in the second polarity position when the rotatable boot assembly is in the first polarity. In my opinion, a POSITA would have understood that Veatch further discloses that the positions of the first hook and the second hook are interchanged in the first and second polarity positions (*i.e.*, 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 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.) For example, as shown in the annotated versions of Figures 8 and 9 of Veatch, reproduced below, 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 “[t]he 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.



EX1004, FIGs. 8-9 (annotated).

354. Accordingly, a POSITA would have found Claim 10 obvious based on Veatch. In addition to Veatch disclosing Claim 10, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 10. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 10 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 10.

J. Claim 11

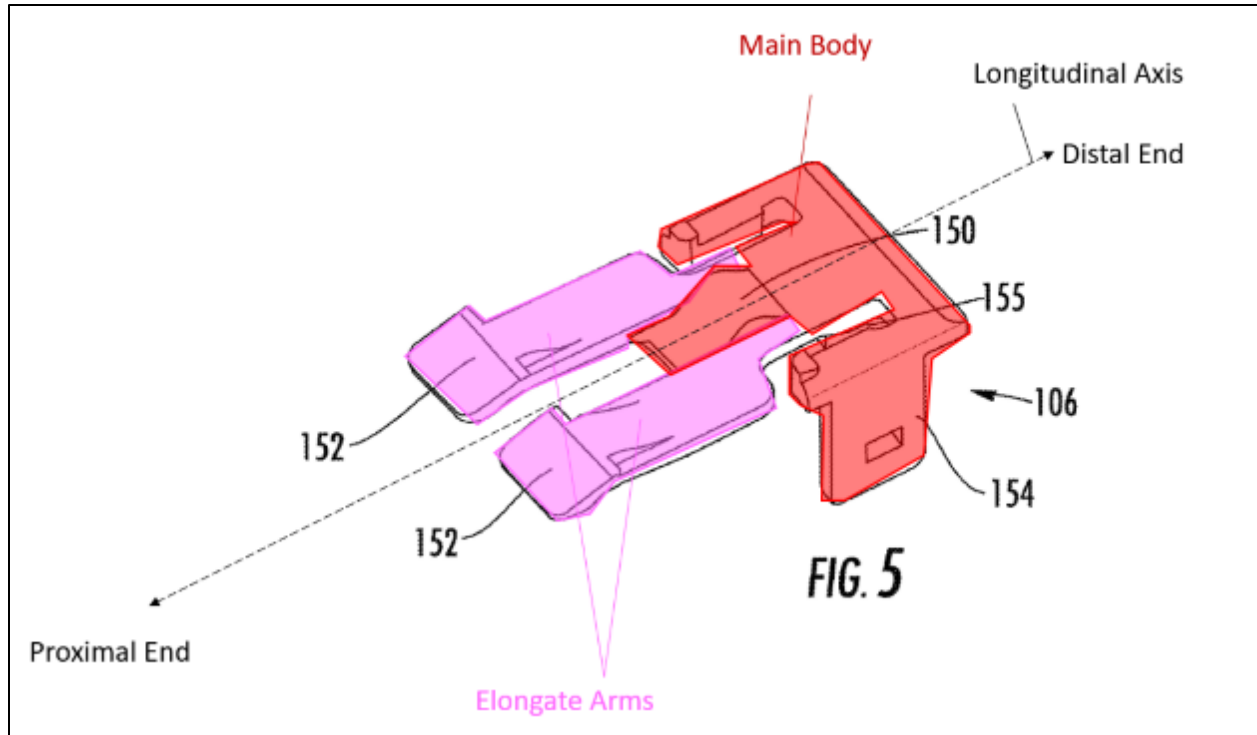
1. Preamble – “The optical fiber connector according to claim 9, wherein”

355. Claim 11 depends upon Claim 9 which depends upon Claim 6 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 6, and Claim 9, the combination of Veatch and Connelly renders obvious Claim 1, Claim 6, and Claim 9. *See* Section XI.B; *see also* Section XI.E; *see also* Section XI.H.

Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 11 of the '190 Patent.

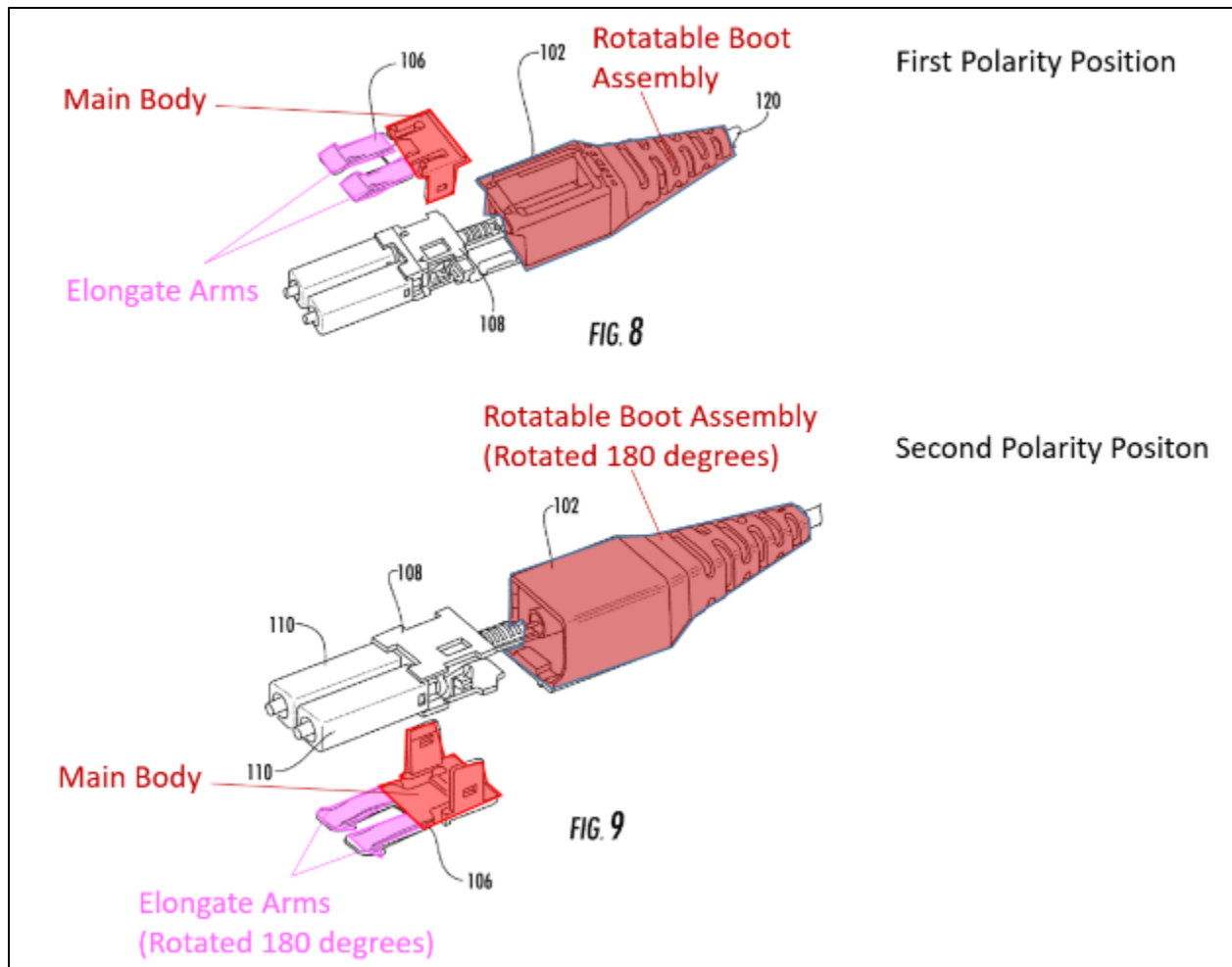
2. Element [11.1] – “the elongate arm is connected to the main body to rotate with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position.”

356. As previously annotated in a version of Figure 5 of Veatch, reproduced again below, for the discussion pertaining to claim element [1.3.9], Veatch teaches that its elongate arms are connected to the main body.



EX1004, FIG. 5 (annotated).

357. In addition to the analysis presented in relation to Claim 9 (*see* Section XI.H), it is my opinion that a POSITA would have understood that 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. For example, as shown in Figures 8 and 9 of Veatch, reproduced and annotated below, the elongate arms rotate 180 degrees with the main body as the rotatable boot assembly rotates between the first polarity position and the second polarity position.



EX1004, FIGs. 8-9 (annotated).

358. Accordingly, a POSITA would have found Claim 11 obvious based on Veatch. In addition to Veatch disclosing Claim 11, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 11. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 11 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, it is my opinion that the unitary Veatch-Connelly ferrule holder optical connector would

render obvious Claim 11.

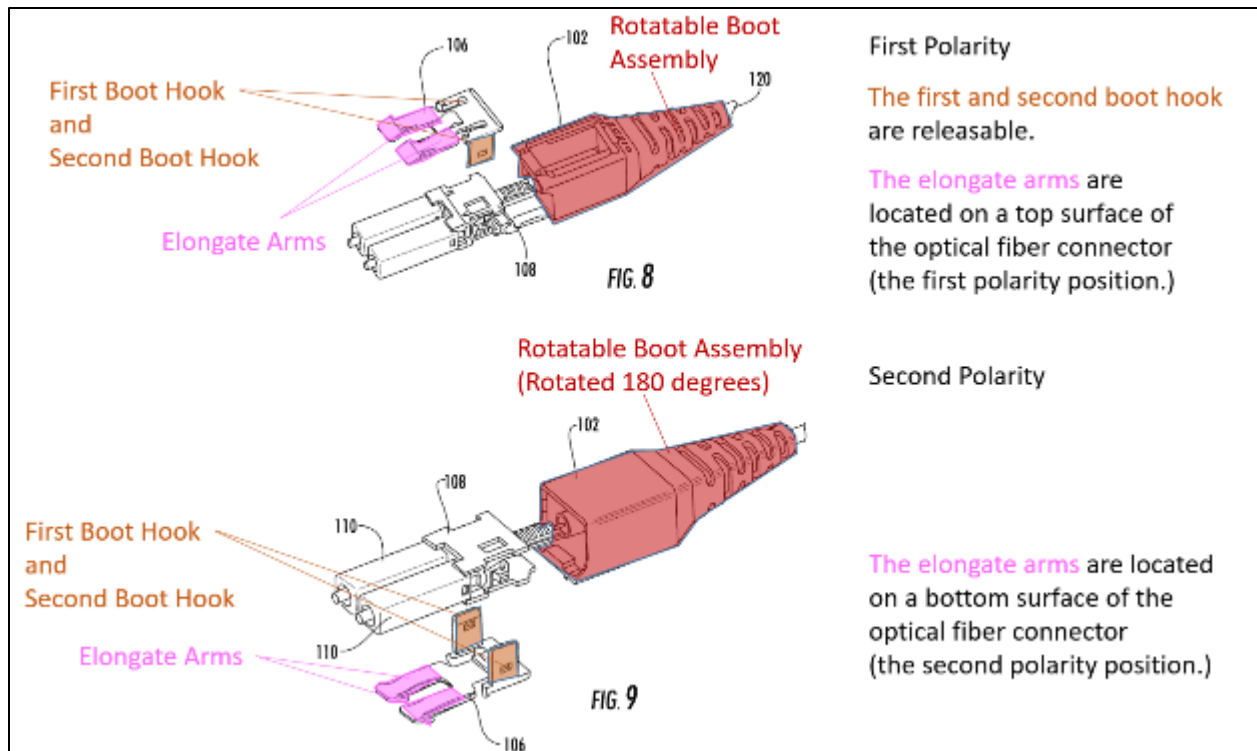
K. Claim 13

1. Preamble – “The optical fiber connector according to claim 1, wherein”

359. Claim 13 depends upon Claim 1, and for at least the reasons discussed for Claim 1, the combination of Veatch and Connelly renders obvious Claim 1. *See* Section XI.B. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 13 of the '190 Patent.

2. Element [13.1] – “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.”

360. In addition to the analysis presented in relation to Claim 9 (*see* Section XI.H), I believe the annotated versions of Figures 8 and 9 also illustrate that the boot hooks of Veatch 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.



EX1004, FIGs. 8-9 (annotated).

361. Accordingly, a POSITA would have found Claim 13 obvious based on Veatch. In addition to Veatch disclosing Claim 13, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 13. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 13 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 13.

L. Claim 14

1. Preamble – “The optical fiber connector according to claim 13, wherein”

362. Claim 14 depends upon Claim 13 which depends upon Claim 1, and for at least the reasons discussed for Claim 1 and Claim 13, the combination of Veatch and Connelly renders obvious Claim 1 and Claim 13. *See* Section XI.B.; *see also* Section XI.L. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 14 of the '190 Patent.

2. Element [14.1] – “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.”

363. I believe that 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. Further, I believe a POSITA would have found Claims 6, 9, and 11 obvious based on the combined disclosures of Veatch and Connelly as discussed above. *See* Section XI.E; *see also* Section XI.H, *see also* Section XI.J. Thus, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 14. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 14 that are disclosed by Veatch would be preserved in the specific combination of the prior

arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 14.

M. Claim 15

1. Preamble – “The optical fiber connector according to claim 14, wherein”

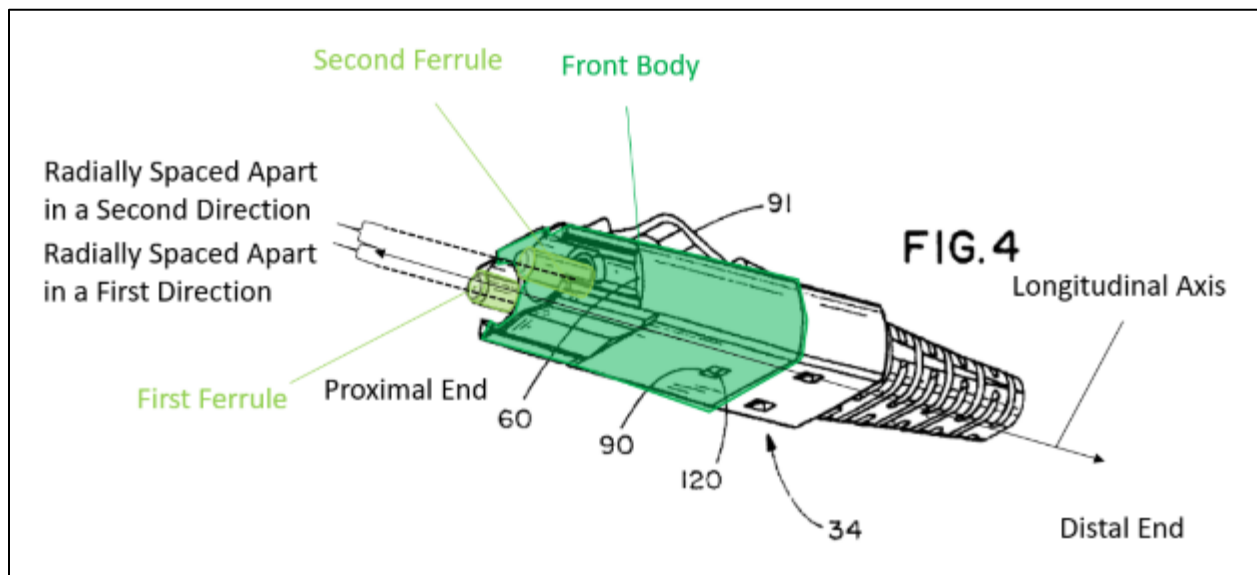
364. Claim 15 depends upon Claim 14 which depends upon Claim 13 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 13, and Claim 14, the combination of Veatch and Connelly renders obvious Claim 1 and Claim 13. *See* Section XI.B.; *see also* Section XI.L; *see also* Section XI. M. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 15 of the '190 Patent.

2. Element [15.1] – “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.”

365. As previously discussed for claim element [1.1], to the extent that the Patent Owner argues that Veatch does not disclose the claimed front body, a POSITA would understand Connelly discloses the claimed front body that holds two ferrules. To the extent that the Patent Owner argues that Veatch does not disclose that 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, a POSITA would have understood that Connelly also discloses this feature.

366. In my opinion, a POSITA would have understood that Connelly discloses that its 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. For example, Figure 4 of Connelly, reproduced below, illustrates that each of two ferrules is radially spaced apart from the longitudinal axis in opposite directions.



EX1005, FIG. 4 (annotated).

367. Accordingly, a POSITA would have understood that Connelly teaches a 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. As such, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) renders obvious Claim 15. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 15 that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 15.

N. Claim 16

1. Preamble – “The optical fiber connector according to claim 15, wherein”

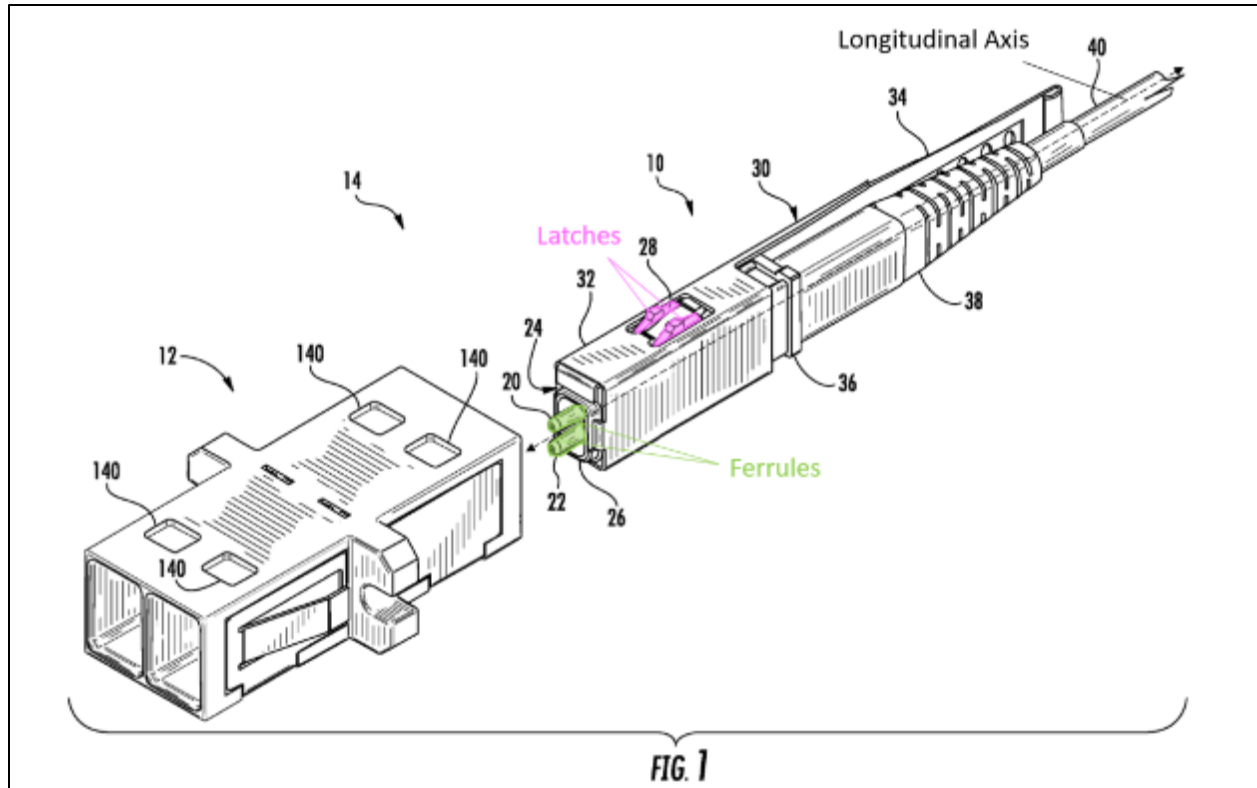
368. Claim 16 depends upon Claim 15 which depends upon Claim 14, Claim 13 and Claim 1, and for at least the reasons discussed for Claim 1, Claim 13, Claim 14, and Claim 15 the combination of Veatch and Connelly renders obvious Claim 1, Claim 13, Claim 14, and Claim 15. *See* Section XI.B; *see also* Section XI.L; *see also* Section XI.M; *see also* Section XI.N. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 16 of the '190 Patent.

2. Element [16.1] – “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.”

369. Claim element [16.1] specifies a common structure. Considering that Claim 16 is dependent from Claims 13 and 14, which require elongate arm to rotate 180 degrees, the structure claim element [16.1] specifies is that the elongate arm and the first and second ferrules are aligned. Thus, if the ferrules disclosed in Veatch-Connelly are aligned vertically instead of horizontally, the feature of claim element [16.1] is disclosed.

370. Indeed, such a structure is not only well-known in the prior art, but also within the general knowledge of a POSITA. As corroborating evidence unnecessary for this obviousness analysis, Lee discloses an optical connector with two ferrules and an elongated arm aligned vertically. As shown in Figure 1 reproduced below, Lee discloses the “fiber optic connector 10” which “includes first and second ferrules 20, 22” aligned vertically. EX1012, ¶¶29, 30. Lee further discloses that a latch 28 is provided above the ferrules. A POSITA should have understood that a function of the latch 28 is similar to the claimed elongated arm because the latch is for “engag[ing] the latching feature 140 on the adapter body.” EX1012, ¶63, See EX1001, Claims 2-3.



EX1012, FIG. 1 (annotated).

371. The difference between the connector structure shown in the Veatch-Connelly and the prior art Lee is due to the difference in standards employed by the connectors. It is common knowledge for a POSITA that connector geometries need to be standardized in connection components such as optical connectors. *See* Section IV.B. Thus, it is routine for a POSITA to understand the similarities and differences among several different optical connector standards. Even if there were multiple standards for optical connectors, a POSITA would have understood that the basic principle of exchanging ferrule signals would remain unchanged. It would also have been common knowledge to POSITA that the position of the ferrule and elongated arm could be changed depending on the situation targeted by

the standard.

372. Thus, a POSITA that was exposed to one connector standard would inevitably have routinely recalled applying that connector structure to another connector standard. In other words, it is common knowledge to a POSITA familiar with other standards, such as Lee, that the horizontally aligned ferrule disclosed in Veatch and Connelly could be modified to be vertically aligned. As such, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) renders obvious Claim 15. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 16 would be rendered obvious in view of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 16.

O. Claim 19

1. Preamble – “The optical fiber connector according to claim 1, wherein”

373. Claim 19 depends upon Claim 1, and for at least the reasons discussed for Claim 1 the combination of Veatch and Connelly renders obvious Claim 1. *See* Section XI.B. Additionally, for at least the reasons below, it is my opinion that the combination of Veatch and Connelly renders obvious Claim 19 of the '190 Patent.

2. Element [19.1] – “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.”

374. In my opinion, a POSITA would have understood that Veatch discloses that its back body passageway and 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. For example, Veatch discloses that “[a] 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. Also, as shown in Figure 2 of Veatch, a single passageway is formed to pass the cable 120 from at least the boot passageway through the back body passageway to where it meets the front body. Further a 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.

375. Accordingly, a POSITA would have found Claim 19 obvious based on Veatch. In addition to Veatch disclosing Claim 19, it would be clear to a POSITA that the combination of Veatch and Connelly that a POSITA would be motivated to make (described in Section XI.A) also renders obvious Claim 19. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch, the additional claimed features of Claim 19 that are disclosed by Veatch

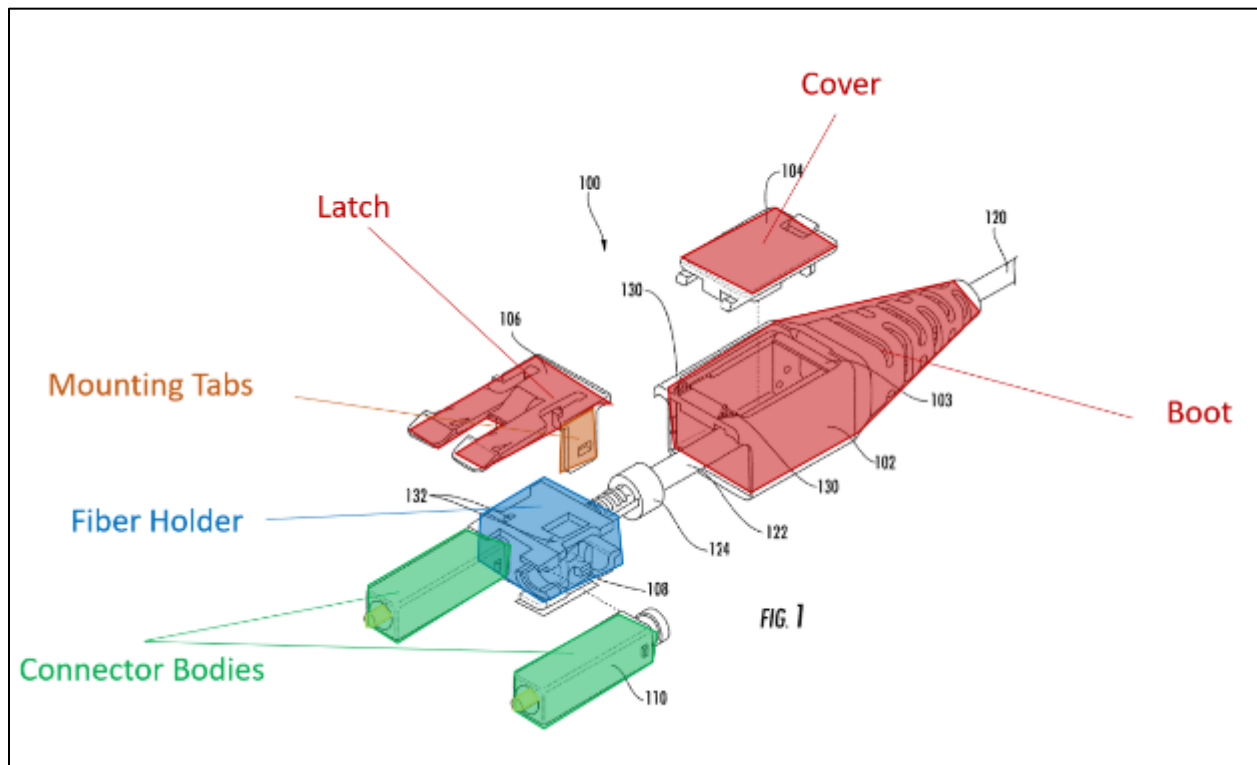
would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder optical connector would render obvious Claim 19.

XII. 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

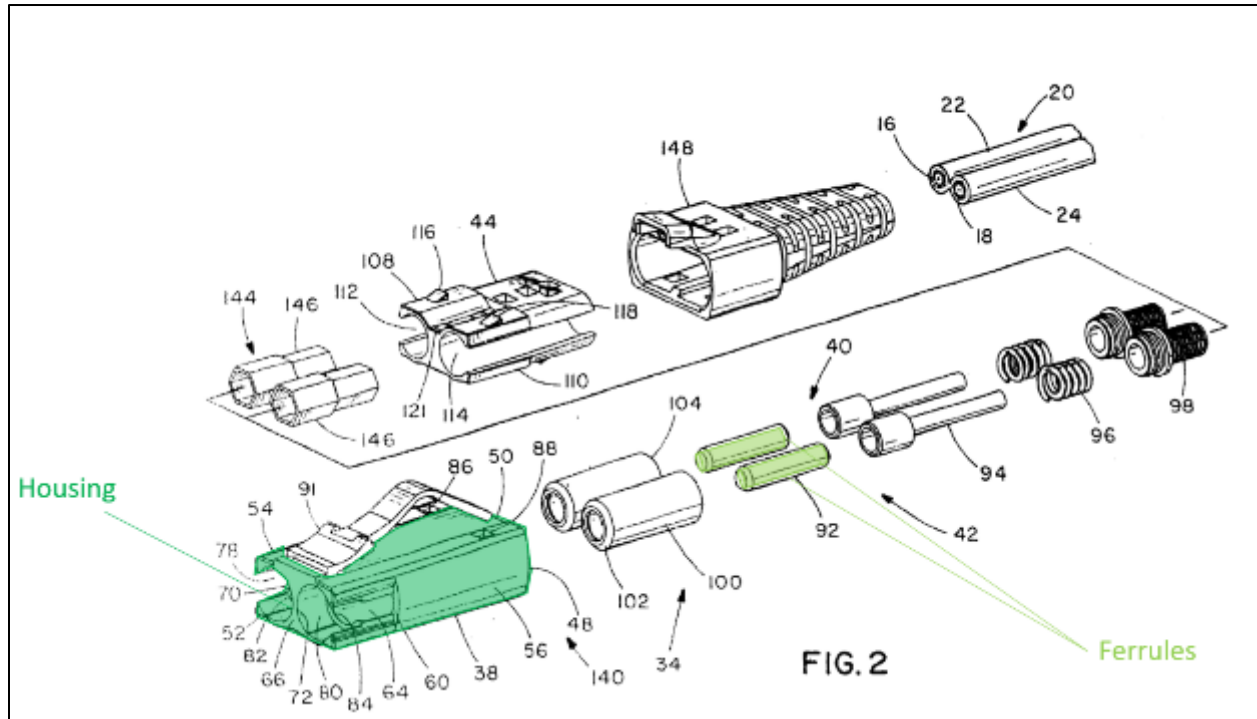
1. Veatch in view of Connelly

376. As discussed above in section VII.E, Veatch discloses a duplex fiber optic connector with two separate connector bodies 110 provided for each fiber optic ferrule. *See* EX1004, 2:14-23, 7:2-4, FIGs. 1-3, 11. The connector bodies 110 are each held by the fiber holder 108. *See, e.g.,* EX1004, 2:14-23, 3:37-45, FIGs. 1-3, 11. This configuration is shown in Figure 1 of Veatch as annotated below:



EX1004, FIG. 1 (annotated).

377. As discussed above in section VII.F, Connelly discloses a duplex fiber optic connector with a single connector housing 38. *See* EX1005, 2:27-59, FIGs. 1-5. The connector housing 38 holds two fiber optic ferrules 92, which extend “beyond the front housing end 46, in a conventional manner.” EX1005, 2:27-3:13; *see also* EX1005, FIG. 1 (showing the housing holding the exposed ferrules 92). For example, the connector housing 38 can be seen in the exploded view of Figure 2 of Connelly, reproduced below.



EX1005, FIG. 2 (annotated).

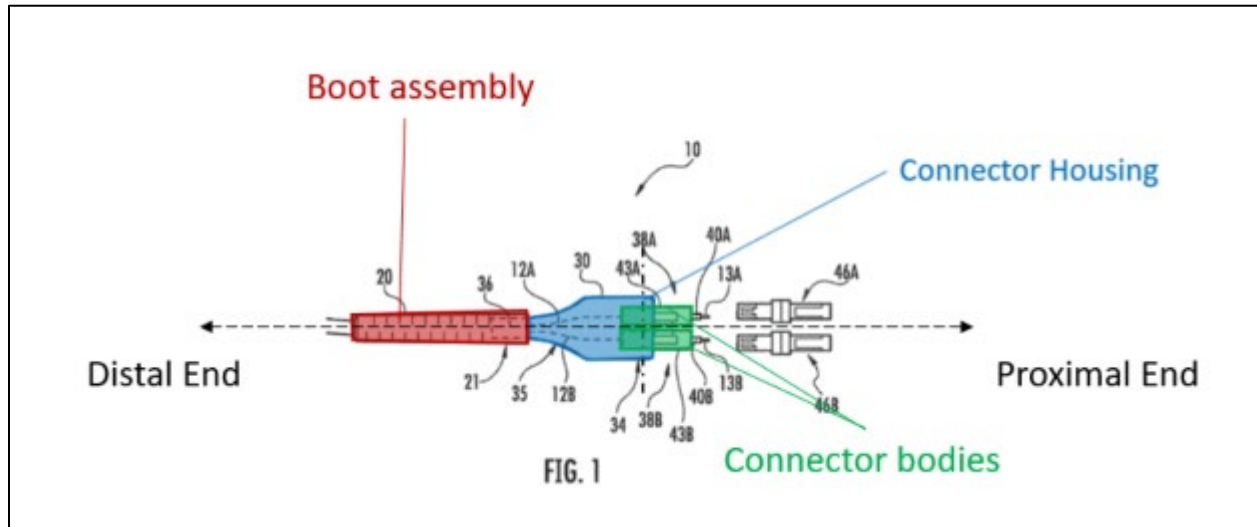
378. A POSITA would have recognized that substituting Connelly’s unitary housing 38 for Veatch’s fiber holder 108 and connector bodies 110 arrangement while maintaining the latching features in the fiber optic connector of Veatch would have helped to further ensure the ferrules are not rotated when

changing the polarity of the fiber optic connector. In other words, providing separate connector bodies 110 for each of the ferrules as in Veatch allows for the possibility of twisting of the ferrules during a change of polarity because there are additional structures (the connector bodies 110 and the fiber holder 108) that can move relative to one another. However, by instead forming Veatch's ferrule housing 108, 110 as a unitary housing structure 38 disclosed in Connelly, a POSITA would have understood that Veatch's stated design goals of preventing fiber optic rotation during a polarity change are more easily accomplished.

2. Cline

379. Cline discloses a duplex fiber optic connector with a connector housing 30 having a proximal end portion and a distal end portion spaced apart along a longitudinal axis. Cline also discloses that the proximal end portion of the connector housing 30 is configured to couple to the connector bodies and the distal end portion of the connector housing 30 is configured to couple to the boot assembly. For example, Figure 1 of Cline, reproduced below, illustrates a connector housing 30 having a distal end portion (the left portion as depicted of the connector housing 30) and a proximal end portion (the right portion as depicted of the connector housing 30). *See* EX1006, 3:41-47. Figure 1 of Cline also shows that the proximal end portion of the connector housing 30 couples to LC fiber optic connector sub-assemblies that have generally rectangular housings 43A, 43B, and

that the distal end portion of the fiber holder 108 couples to the boot assembly. *See* EX1006, 3:41-47, 4:39-42.



EX1006, FIG. 1 (excerpt, annotated).

380. Cline also teaches that the connector housing 30 has a geometry tapering from the proximal end to the distal end. For example, Cline discloses that the 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. As a result of the tapering, Cline also teaches that its proximal end segment, the connector-end portion 34, has an elongated cross-sectional shape.

3. Reasons to Combine

381. In my opinion, a POSITA would have found it obvious to modify the

unitary Veatch-Connelly ferrule housing structure that a POSITA would have been motivated to make to further include the tapered shape such as the connector housing 30 disclosed in Cline for at least the following reasons.

382. First, as previously described, Veatch and Connelly are both directed to duplex fiber optic connectors and the combination of both into the Veatch-Connelly connector described would be directed to duplex fiber optic connectors with a back body connected with a front body and a boot. In addition, 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.

383. Second, the prior art references themselves provide a teaching, suggestion, and/or motivation to implement the tapered shape of Cline's connector housing 30 for the unitary Veatch-Connelly ferrule housing that would have led a POSITA to modify Veatch-Connelly to have a back body with a tapered geometry. More specifically, while the Veatch-Connelly connector that would have been obvious to a POSITA illustrates a unitary ferrule holder, Veatch explains "[i]t is understood that embodiments may use different connector bodies." EX1004, 4:30-32. A POSITA would be further inclined to apply this teaching to other relevant prior art, such as that of Cline. Veatch also seeks to "enable higher density placement of mating adapters." 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. That is, a tapered geometry of the back body would help to facilitate access to individual connectors even when multiple connectors are densely arranged. As such, a POSITA would have further been motivated to create a unitary ferrule housing structure with a tapering feature as disclosed by Cline into the optical connector that a POSITA would have been motivated to make based on the teachings of Veatch and Connelly seeking higher density placement of fiber optic connectors and mating adapters while preserving the change of polarity and latching features of Veatch.

384. In addition to being motivated to make the specific combination of prior arts as described above, it is my opinion that a POSITA would have had a reasonable expectation of success in combining the teachings of Cline's taper-shaped connector housing with the unitary Veatch-Connelly ferrule housing, for at least the reasons below.

385. First, this modification involves the simple substitution of one known element (*i.e.*, the geometry of the unitary ferrule housing 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 results (*i.e.*, a

slightly modified unitary ferrule housing that preserves the previous features of Veatch with respect to: comprising a back body connected with a front body and boot; the change of polarity functionality; and the latching features described by Veatch). Therefore, by simply substituting the tapered geometry of Cline's connector housing 30 into the unitary ferrule housing of the Veatch-Connelly connector that a POSITA would have been motivated to make would have been well within the abilities of a POSITA. As such, a POSITA would have had a reasonable expectation of success because this combination merely involves the replacement of known elements of housing structures in the field with other known elements of housing structures in the same field.

386. 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. In more detail, 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. Fiber optic connectors are mechanical components (*i.e.*, in a predictable field—mechanical) and 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; thus, a POSITA would have had a reasonable expectation of success

of combining the unitary ferrule housing of Veatch-Connelly that a POSITA would have been motivated to make with the tapered body shape of Cline.

387. Although I have used a few formulations of obviousness here as I understand them, I believe that several others readily apply in the same general manner as I have explained. For example, using the tapered geometry as described for Cline's connector housing 30 for the unitary Veatch-Connelly ferrule housing would have been obvious to a POSITA to facilitate wiring work, thus resulting in the application of a known technique to a device that would have been obvious to a POSITA.

388. As a final clarification, I note that in the combination of Veatch-Connelly and Cline, a POSITA would have recognized that substituting the geometry of the unitary Veatch-Connelly ferrule housing with that of Cline's tapered connector housing 30 does not affect or hinder providing any of functions of the unitary Veatch-Connelly ferrule housing. In other words, even if the unitary ferrule housing is tapered, the main features of the ability to change polarity, the latching mechanisms of Veatch, and the single body ferrule holder would be maintained. Therefore, the described Veatch-Connelly fiber optic connector would continue to have the same fundamental principle of operation and the combination with Cline would not render Veatch-Connelly unsatisfactory for its intended purpose.

B. Claim 20

1. Preamble – “The optical fiber connector according to claim 1, wherein”

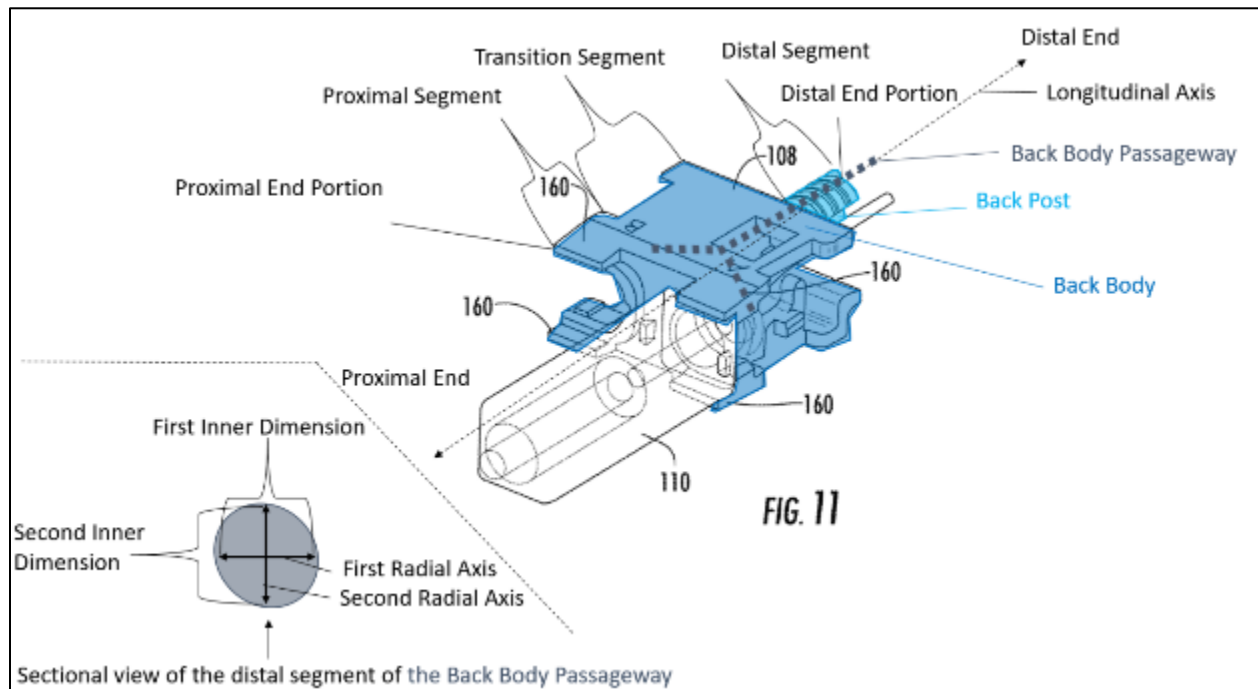
389. Claim 20 depends upon Claim 1, and for at least the reasons discussed for Claim 1 the combination of Veatch and Connelly renders obvious Claim 1. *See* Section XI.B. Furthermore, for at least the reasons below, it is my opinion that it would be clear to a POSITA that the combination of Veatch, Connelly, and Cline also renders obvious Claim 20.

2. Element [20.1] – “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.”

390. It is my opinion that a POSITA would have understood that Veatch discloses 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.

391. As previously explained for Claim 1 of the '190 Patent in Ground 3, *see* Section XI.B.3, Veatch discloses the recited back body, back post, and back body passageway. Veatch further discloses that 1) the back body passageway comprises a distal segment along the back post, 2) a proximal segment along the proximal end of the back body, and 3) a transition segment between the distal segment and the proximal segment. As illustrated in Figure 11 of Veatch,

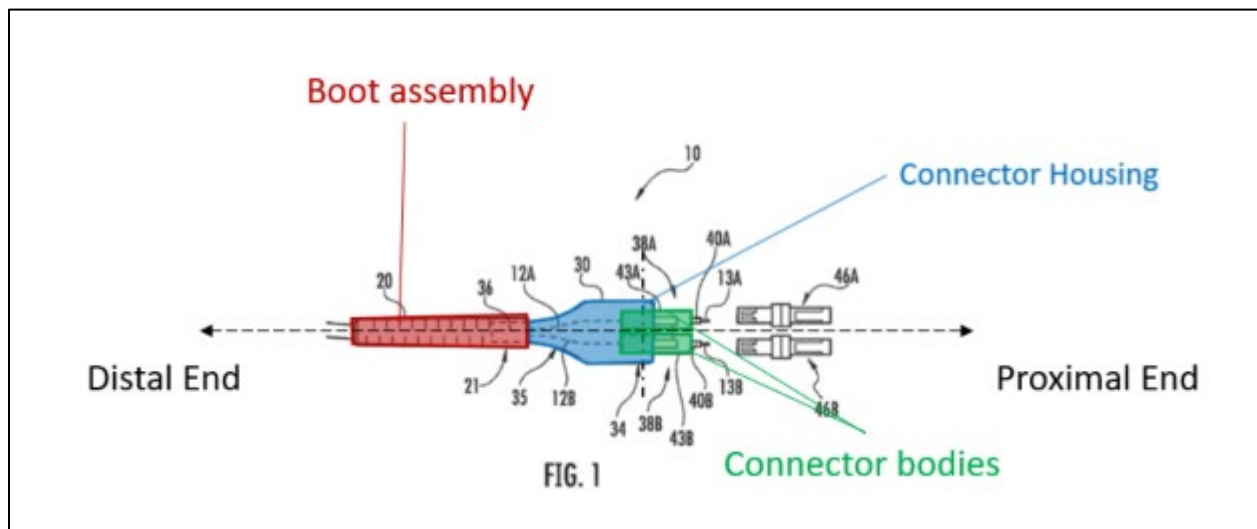
reproduced and annotated below, Veatch's fiber holder 108, which encompasses a back body passageway and extends along the longitudinal axis, is comprised of three parts: a distal segment, a proximal segment, and a transition segment, as recited in Claim 20. Accordingly, a POSITA would have understood that Veatch discloses claim element [20.1].



EX1004, FIG. 11 (annotated).

392. However, to the extent that the Patent Owner argues that the unitary Veatch-Connelly ferrule holder as described in Section XI.A does not disclose that that 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, in my opinion, a POSITA would have understood that Cline discloses this feature.

393. For example, as depicted below in annotated Figure 1 of Cline, Cline discloses the 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, 3:60-63. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment, the housing channel-end portion 36 corresponds to the recited distal segment, and the housing middle portion 35 corresponds to the recited transition segment. Accordingly, a POSITA would have understood that Cline discloses element [20.1].



EX1006, FIG. 1 (excerpt, annotated).

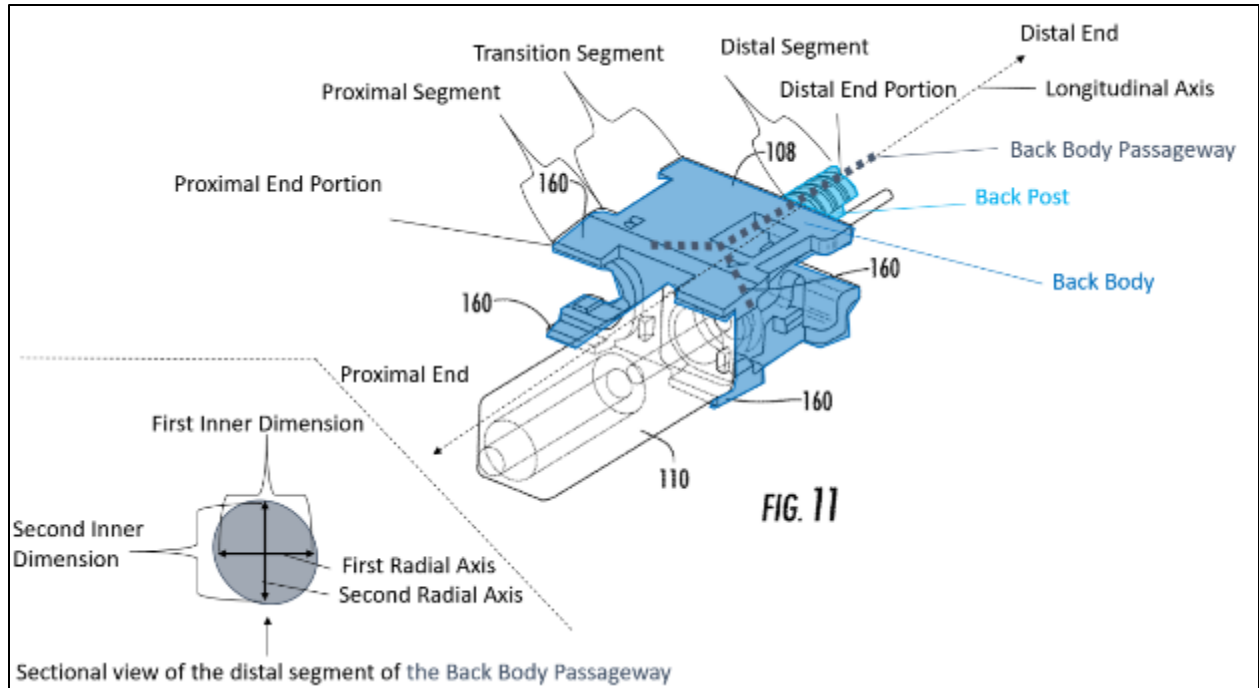
394. In addition to Veatch and Cline disclosing claim element [20.1], it would be clear to a POSITA that the combination of Veatch, Connelly, and Cline (described in Section XII.A) also renders obvious claim element [20.1]. That is, by

implementing the housing 38 of Connelly into the optical connector of Veatch with the tapered geometry of Cline, the additional claimed features of claim element [20.1] that are disclosed by Veatch and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Veatch-Connelly ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.1].

3. Element [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,”

395. For at least the reasons below, it is my opinion that a POSITA would have understood that Veatch discloses a back body passageway that 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.

396. For example, as illustrated in Figure 11 of Veatch, reproduced and annotated below, 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.



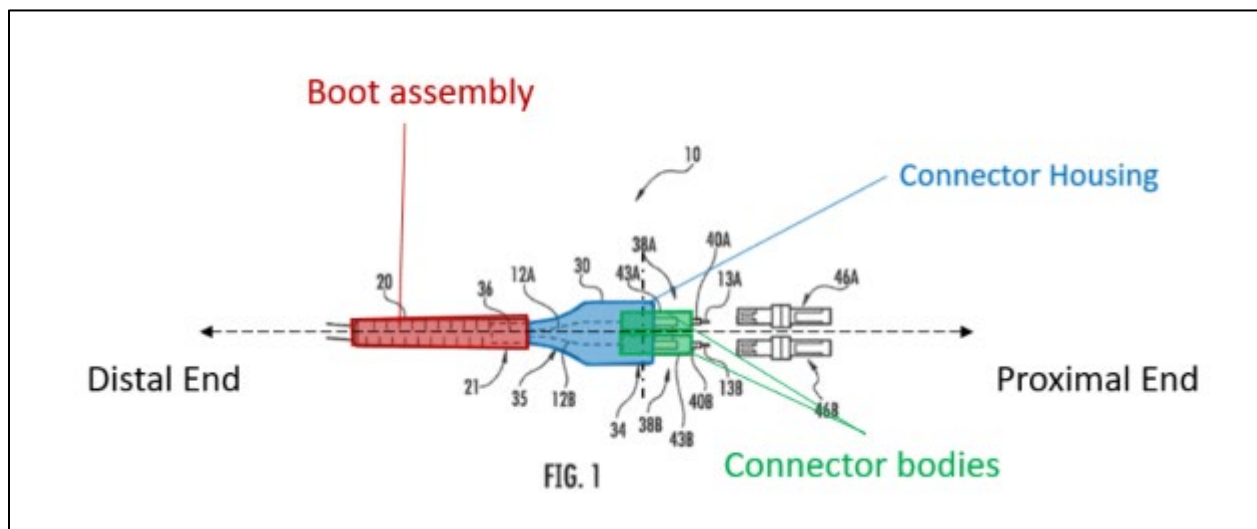
EX1004, FIG. 11 (annotated).

397. A POSITA would have understood that the distal end of the back body passageway of Veatch has a cross-sectional view as I have indicated in the lower left corner of 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. Accordingly, a POSITA would have understood that Veatch discloses element [20.2].

398. However, to the extent that the Patent Owner argues that the unitary Veatch-Connelly ferrule holder as described in Section XI.A does not disclose that 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, it is my opinion that a POSITA would have understood that Cline discloses this feature.

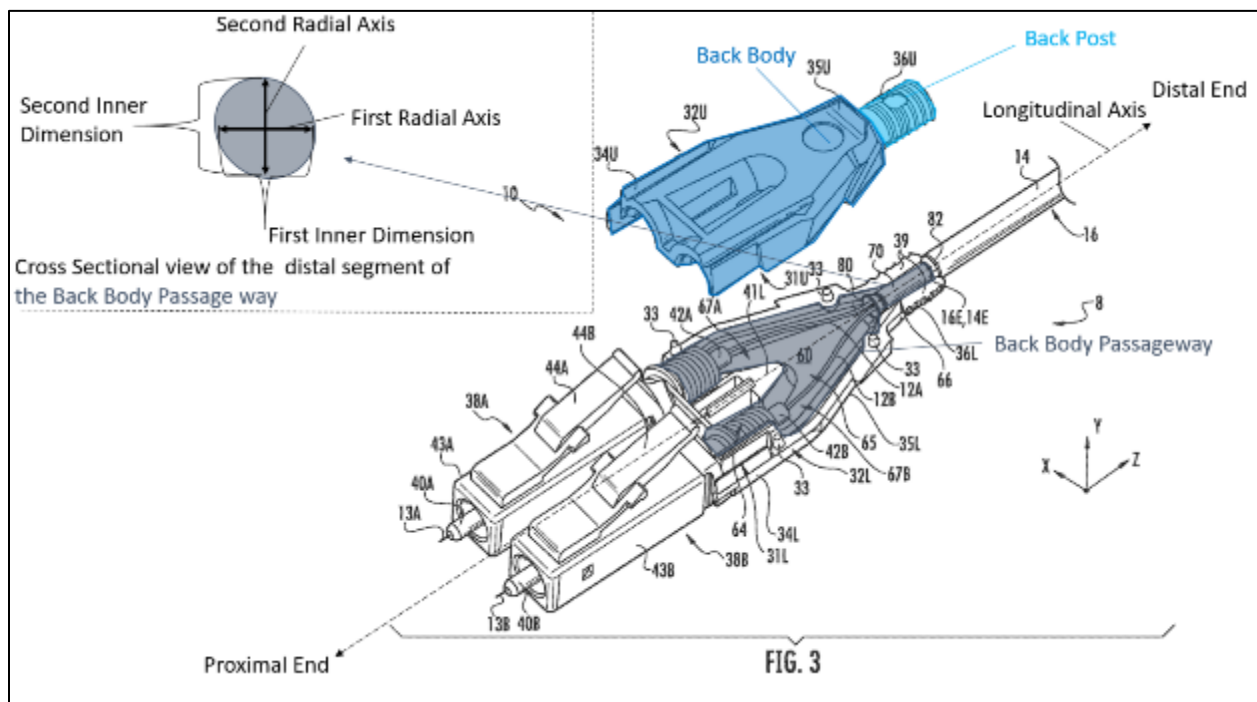
399. In my opinion, Cline discloses a connector housing 30, as the recited back body, which has a back body passageway that has a first inner dimension along a first radial axis and a second inner dimension along a second radial axis perpendicular to the first radial axis. For example, Cline teaches the “connector 10 includes a connector housing 30.” EX1006, 3:41-42. As shown in Figure 1 of Cline, reproduced and annotated below, the boot 20 “engages a channel-end portion 36 of connector housing 30.” EX1006, 3:42-44. The connector housing also supports “two fiber optic connector sub-assemblies (‘connector sub-assemblies’) 38A, 38B.” EX1006, 4:29-30.



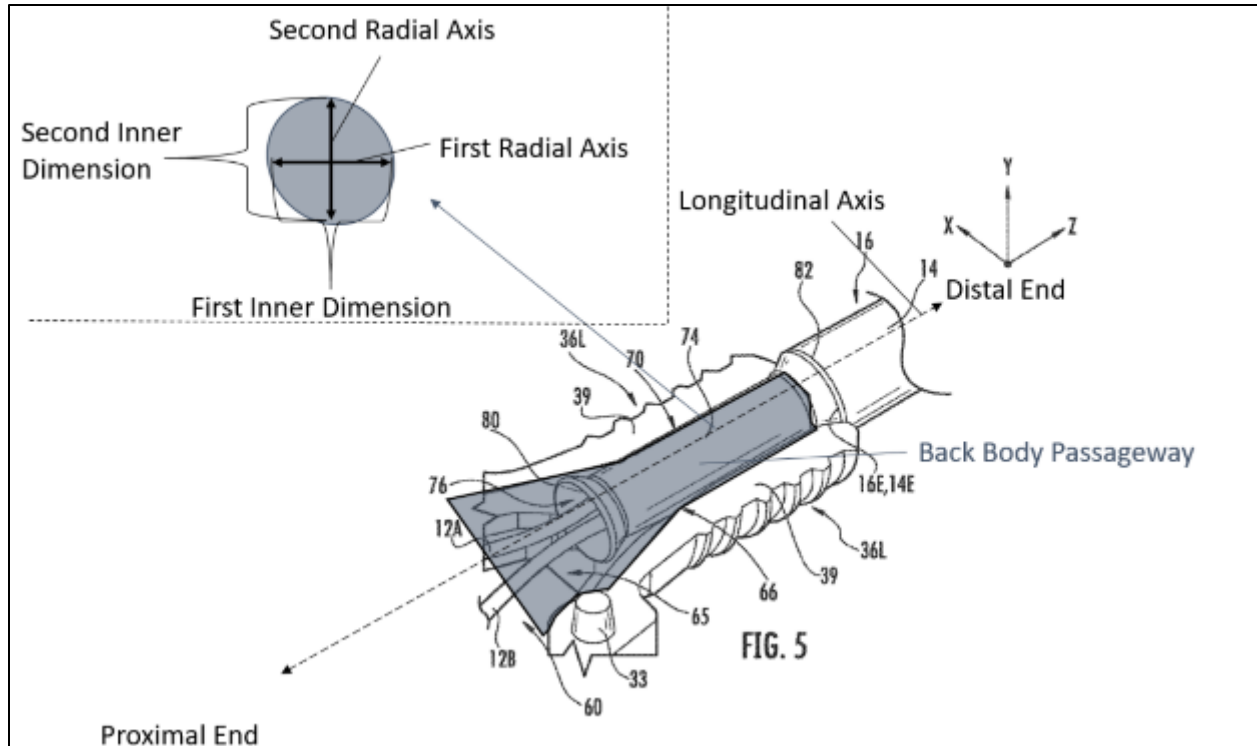
EX1006, FIG 1 (excerpt, annotated).

400. As shown in Figures 3 and 5 of Cline, reproduced and annotated below, a distal end of the connector housing in Figure 3 (also shown as the

channel-end portion in Figure 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. As illustrated in Figure 3, the channel end portion 36 has a cylindrical shape and forms a passageway for accommodating a cable 16. Indeed, the end portion 36 has an “optical fiber guide member 70 arranged in channel-end passage 66” and Cline explains that “optical fiber guide member 70 is in the form of a cylindrical tube with a round or oval cross-section.” EX1006, 4:45-52.



EX1006, FIG. 3 (annotated).



EX1006, FIG. 5 (annotated).

401. 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.

Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, which has a back body passageway that 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.

402. Therefore, in addition to Veatch disclosing claim element [20.2], it

would be clear to a POSITA that the combination of Veatch and Connelly (described in Section XI.A) also renders obvious claim element [20.2]. Further, it would be clear to a POSITA that the combination of Veatch, Connelly, and Cline (described in Section XII.A) also renders obvious claim element [20.2]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch with the tapered geometry of Cline, the additional claimed features of claim element [20.2] that are disclosed by Veatch and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Veatch-Connelly ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.2].

4. Element [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;”

403. As previously discussed for claim element [20.2], and as illustrated in Figure 11 of Veatch and Figure 6 of Cline reproduced and annotated below, Veatch and Cline 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.

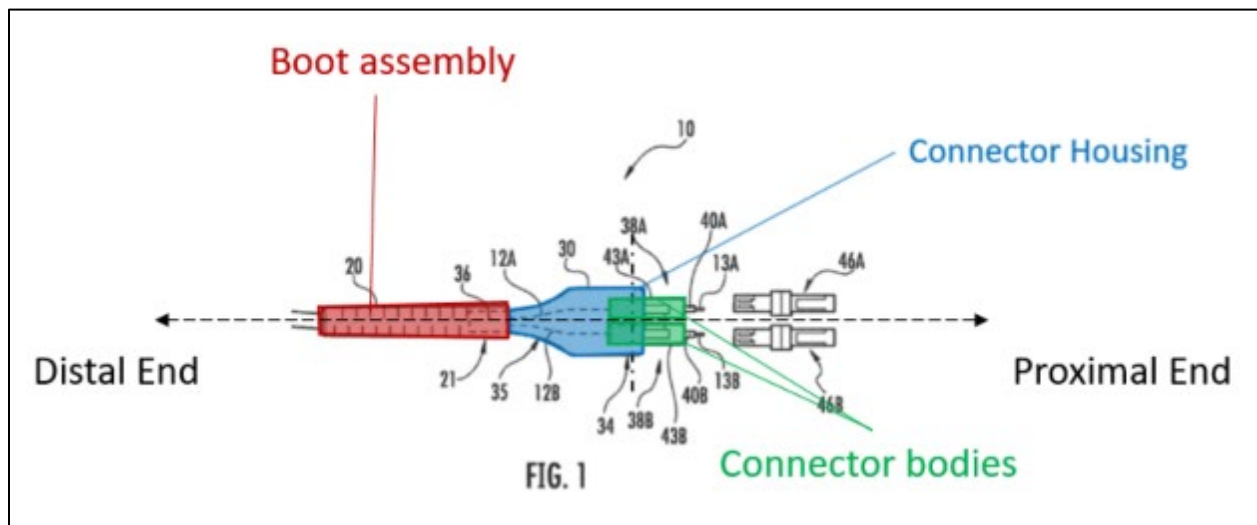
element [20.3]. In addition to Veatch disclosing claim element [20.3], it would be clear to a POSITA that the combination of Veatch and Connelly (described in Section XI.A) also renders obvious claim element [20.3]. Further, it would be clear to a POSITA that the combination of Veatch, Connelly, and Cline (described in Section XII.A) also renders obvious claim element [20.3]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch with the tapered geometry of Cline, the additional claimed features of claim element [20.3] that are disclosed by Veatch would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder with the tapered geometry of the Cline optical connector would render obvious claim element [20.3].

5. Element [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”

405. As previously discussed for claim element [20.1], a POSITA would have understood that Veatch discloses a back body comprising a proximal segment. However, to the extent that the Patent Owner argues that Veatch and further that the unitary Veatch-Connelly ferrule housing do not render obvious that 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, it is my opinion that a POSITA would have

understood that Cline discloses this feature.

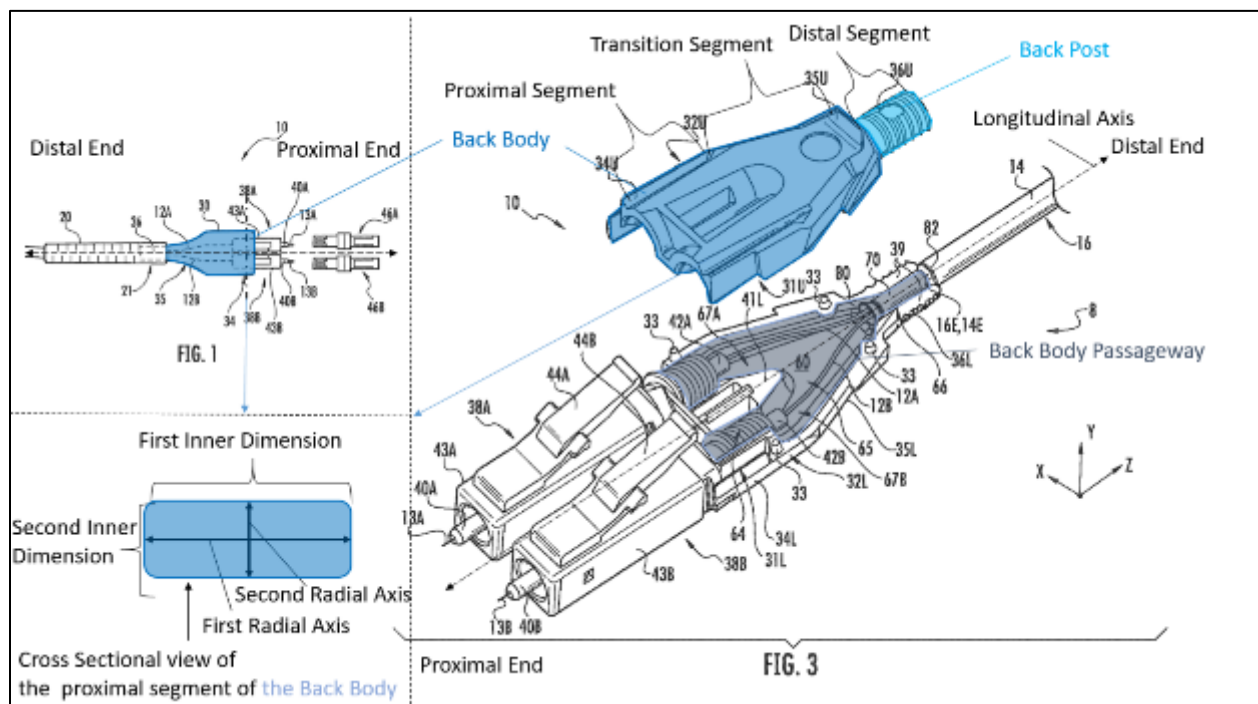
406. Cline discloses a connector housing 30, corresponding to the recited back body, which has a cross-sectional shape that is elongate along the first radial axis such that the first inner dimension is greater than the second inner dimension along the proximal segment. For example, Cline teaches its connector 10 “includes a connector housing 30.” EX1006, 3:41-42. As shown in Figure 1 of Cline, reproduced and annotated below, the boot 20 “engages a channel-end portion 36 of connector housing 30.” EX1006, 3:42-44. The connector housing also supports “two fiber optic connector sub-assemblies (‘connector sub-assemblies’) 38A, 38B.” EX1006, 4:29-30.



EX1006, FIG. 1 (excerpt, annotated).

407. Cline also teaches that the connector housing 30 has a geometry that tapers from the proximal end to the distal end. For example, Cline discloses that the 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. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment as illustrated in Figure 3 of Cline, reproduced below. As a result of the tapering, and as illustrated in Figure 3, Cline teaches that its proximal end segment, the connector-end portion 34, has an elongated cross-sectional shape.



EX1006, FIG. 3 (annotated).

408. A POSITA would have understood that the proximal end of the back body of Cline has a cross-sectional view as annotated in the lower left corner of Figure 3 above. According to this 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.

409. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, which 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, along the proximal segment. Therefore, it would be clear to a POSITA that the combination of Veatch, Connelly, and Cline (described in Section XII.A) also renders obvious claim element [20.4]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch with the tapered geometry of Cline, the additional claimed features of claim element [20.4] that are disclosed by Veatch and Cline would be preserved in the specific combination of the prior arts. Thus, the unitary Veatch-Connelly ferrule holder with the tapered geometry of Cline optical connector would render obvious claim element [20.4].

6. Element [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.”

410. As previously discussed for claim element [20.1], it is my opinion that a POSITA would have understood that Veatch and Connelly disclose the back body including the transition segment. However, to the extent that the Patent Owner argues that the unitary Veatch-Connelly ferrule housing does not disclose

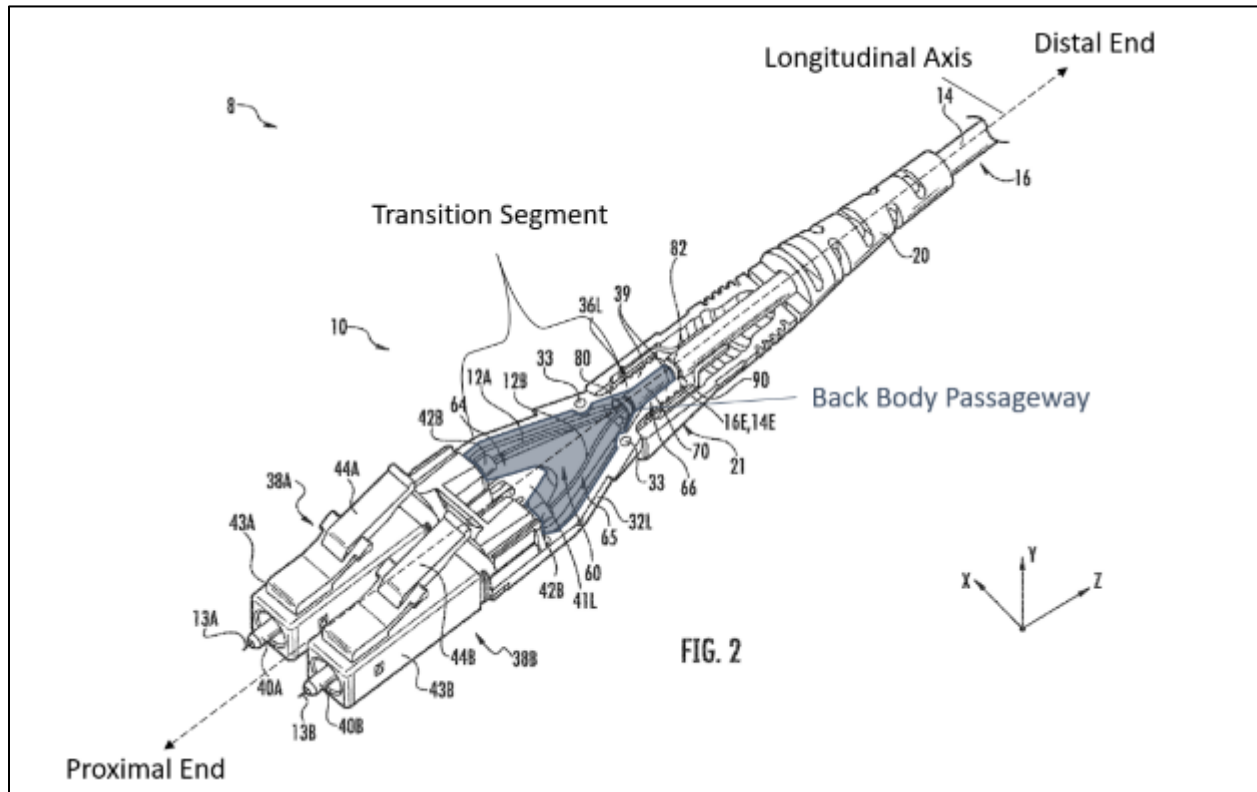
that along the transition segment, as the back body passageway extends in the proximal direction along the longitudinal axis, the first inner dimension increases by a greater amount than the second inner dimension, in my opinion, a POSITA would have understood that Cline discloses this feature.

411. Cline discloses a connector housing 30, corresponding to the claimed back body, has a transition segment structured with the back body passageway extending in the proximal direction along the longitudinal axis, wherein the first inner dimension increases by a greater amount than the second inner dimension.

412. As previously discussed above for claim element [20.4], Cline teaches that the connector housing 30 has a geometry that tapers from the proximal end to the distal end. For example, Cline discloses that the 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. Here, a POSITA would have understood that the housing connector-end portion 34 corresponds to the recited proximal segment, the housing channel-end portion 36 corresponds to the recited distal segment and the housing middle portion 35 corresponds to the recited transition segment.

413. As illustrated in Figure 2 of Cline, reproduced and annotated below,

the 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.



EX1006, FIG. 2 (annotated).

414. Accordingly, a POSITA would have understood that Cline discloses a connector housing 30, corresponding to the recited back body, that includes a transition segment with the recited structure of, 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. Therefore, it would be clear to a POSITA that the combination of Veatch,

Connelly, and Cline (described in Section XII.A) also renders obvious claim element [20.5]. That is, by implementing the housing 38 of Connelly into the optical connector of Veatch with the tapered geometry of Cline, the additional claimed features of claim element [20.5] that are disclosed by Veatch and Cline would be preserved in the specific combination of the prior arts. Thus, for at least the reasons discussed above, it is my opinion that the unitary Veatch-Connelly ferrule holder with the tapered geometry of Cline optical connector would render obvious claim element [20.5].

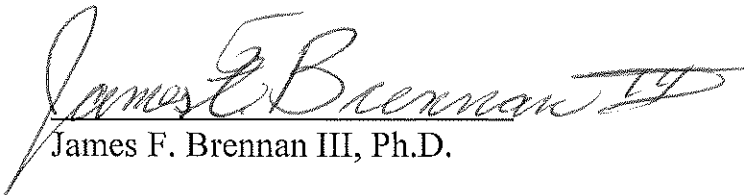
415. In summary, for at least the reasons discussed above, I believe a POSITA would have been motivated to make a combination of Veatch, Connelly, and Cline that renders obvious each of the features of Claim 20 of the '190 Patent. As such, it is my opinion that the entirety of Claim 20 of the '190 Patent is rendered obvious.

XIII. CONCLUSION

416. For at least the reasons set forth above, I am of the opinion the Challenged Claims would have been obvious to a POSITA at the time of invention of the '190 Patent based at least on the discussed prior art.

417. I understand that this Declaration is to be filed as evidence in a contested IPR proceeding before the Patent Trial and Appeal Board. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

418. I hereby declare under penalty of perjury that the foregoing is true and correct, that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and may jeopardize the validity of the application or any patent issuing thereon. If called to testify as to the truth of the matters stated herein, I could and would testify competently.

Date: January 4, 2024 
James F. Brennan III, Ph.D.