UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

SENKO ADVANCED COMPONENTS
Petitioner

v.

US CONEC LTD.
Patent Owner

_____

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

DECLARATION OF EDWARD LURIE

TABLE OF CONTENTS

I. INTRODUCTION 1

II. BACKGROUND OF THE '794 PATENT 7

III. BACKGROUND OF THE PRIOR ART 11

A. U.S. Publication No. 2019/0243072 ("Takano") 13

1. First Embodiment of Takano 13

2. Second Embodiment of Takano 19

3. Third Embodiment of Takano 21

B. U.S. Publication No. 2012/0057826 ("Katoh") 24

C. U.S. Publication No. 2019/0204513 ("Davidson") 26

D. U.S. Patent No. 7,677,812 ("Castagna") 28

E. U.S. Patent 5,390,272 ("Repta") 29

F. U.S. Publication No. 2004/0247252 ("Ehrenreich") 30

IV. CLAIM CONSTRUCTION 31

V. LACK OF WRITTEN DECRIPTION (GROUND 1) 31

A. Claim 8 Lacks Written Description Support 32

B. Claim 16 (and Corresponding Dependent Claims 17-19) Lack Written Description Support 35

C. Claim 20 Lacks Written Description Support 41

VI. ANTICIPATION: TAKANO (FIRST EMBODIMENT) (GROUND 2) 43

A. Independent Claim 1 45

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising: 45

1.a.1 "a front end opening in the housing," 48

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,". 48

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"..... 50

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;" 53

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and" 55

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 58

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"..... 61

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and"..... 65

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."... 68

B. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to the at least two optical fibers." 70

C. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."..... 72

D. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing." 73

E. Claim 5 74

5.a "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and" 74

5.b "wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 87

F. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch." 91

G. Claim 8 "The fiber optic connector according to claim 1, wherein the center portion of the boot engages the rear portion of the housing."..... 92

H. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector." 96

I. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector." 101

J. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot." 103

K. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing." 105

L. Claim 14 "The fiber optic connector according to claim 1, wherein the center portion has sides with cutouts."..... 108

M. Independent Claim 16..... 109

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:" 109

16.a.1 "a front end opening in the housing for the two fiber optic ferrules," 110

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"111

16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 111

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;" 111

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and" 126

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 127

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot," 128

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"128

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot.". 128

N. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers." 128

O. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 129

P. Independent Claim 20.....129

20.P "A fiber optic connector comprising:"..... 129

20.a "a boot;" 129

20.b "a crimp body engaged to the boot forward of the boot; and" ... 129

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein,"..... 132

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules,"..... 132

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom," 132

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 132

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides," 132

20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers," 133

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers," 133

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and" 137

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and" 140

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are

rotatable relative to each other to change a polarity of the fiber optic connector." 142

VII. ANTICIPATION: TAKANO (SECOND EMBODIMENT) (GROUND 3).142

A. Independent Claim 1.....145

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising: 145

1.a.1 "a front end opening in the housing," 145

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"146

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"..... 146

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;" .. 146

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and" 146

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 146

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"..... 147

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and"..... 150

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot.". 150

B. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface

along a length of the back portion to provide strain relief to the at least two optical fibers." 150

C. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."..... 150

D. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing." 150

E. Claim 5 "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."..... 151

F. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch." 152

G. Claim 7 "The fiber optic connector according to claim 6, wherein the front extension portion has two latches separated from each other on the front extension." 154

H. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector." 155

I. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector." 158

J. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot." 159

K. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing." 159

L. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion." 159

M. Independent Claim 16.....161

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:" 161

16.a.1 "a front end opening in the housing for the two fiber optic ferrules," 161

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"161

16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 161

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;" 162

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and" 162

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 162

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot," 162

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"162

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot.". 163

N. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers." 163

O. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 163

P. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."..... 163

VIII. OBVIOUS: TAKANO (THIRD EMBODIMENT) (GROUND 4)..... 165

A. Modification of Takano's Micro Connector of Figs 1-4 Based on Takano's Micro Connector of Figs. 16-36 166

B. Independent Claim 1..... 180

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising:..... 180

1.a.1 "a front end opening in the housing," 185

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"186

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"..... 188

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;" .. 192

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and" 194

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 198

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"..... 201

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and" 204

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot.". 210

C. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to the at least two optical fibers." 210

D. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."..... 210

E. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing." 212

F. Claim 5 214

5.a "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and" 214

5.b "wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 217

G. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch." 218

H. Claim 7 "The fiber optic connector according to claim 6, wherein the front extension portion has two latches separated from each other on the front extension." 218

I. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector." 218

J. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector." 221

K. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot." 222

L. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing." 222

M. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion." 225

N. Independent Claim 16.....226

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:" 226

16.a.1 "a front end opening in the housing for the two fiber optic ferrules," 226

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"227

16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 227

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;" 228

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and" 232

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension," 233

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot," 233

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"234

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot.". 234

O. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers." 234

P. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 234

Q. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."....235

IX. OBVIOUS: TAKANO & KATOH (GROUND 5) 235

A. Modification of Takano Based on Katoh 235

B. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot." 241

X. OBVIOUS: TAKANO & REPTA (GROUND 6) 242

A. Modification of Takano Based on Repta.....242

B. Claim 15 "The fiber optic connector according to claim 1, wherein a material of the boot has a Young's modulus greater than 500 MPa." ...244

XI. OBVIOUS: TAKANO & DAVIDSON (GROUND 7).....244

A. Modification of Takano Based on Davidson.....245

B. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion." 251

C. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."....252

XII. OBVIOUS: TAKANO, DAVIDSON, & CASTAGNA (GROUND 8) 252

A. Modification of the Takano/Davidson Combination Based on Castagna253

B. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion." 256

C. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."....257

XIII. OBVIOUS: TAKANO & CASTAGNA (GROUND 9).....257

XIV. OBVIOUS: TAKANO & EHRENREICH (GROUND 10) 260

A. Modification of Takano Based on Ehrenreich 262

B. Independent Claim 20.....267

20.P "A fiber optic connector comprising:"..... 267

20.a "a boot;" 267

20.b "a crimp body engaged to the boot forward of the boot; and" ... 268

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein,"..... 268

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules,"..... 268

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom," 268

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 268

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides," 269

20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers," 269

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers," 269

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and" 273

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and" 274

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 275

XV. OBVIOUS: TAKANO & EHRENREICH (GROUND 11) 275

A. Modification of Takano's Micro Connector of Figs 1-4 Based on Takano's Micro Connector of Figs. 16-36 277

B. Modification of Takano Based on Ehrenreich 277

C. Independent Claim 20.....277

20.P "A fiber optic connector comprising:" 277

20.a "a boot;" 277

20.b "a crimp body engaged to the boot forward of the boot; and" ... 277

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein," 278

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules," 278

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom," 278

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides," .. 279

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides," 279

20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers," 279

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers," 279

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and" 280

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and" 281

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector." 281

XVI. OBVIOUS: TAKANO, DAVIDSON, CASTAGNA, AND/OR EHRENREICH (GROUND 12) 281

XVII. SECONDARY CONSIDERATIONS 284

XVIII. TAKANO AND DAVIDSON ARE SUPPORTED BY THEIR RESPECTIVE PROVISIONAL APPLICATIONS 284

A. Takano is Prior Art to the '794 Patent 285

B. Davidson is Prior Art to the '794 Patent 288

DECLARATION OF EDWARD LURIE

I, Edward Lurie, hereby declare as follows:

I. INTRODUCTION

1. Although I continue to provide consulting, I retired from full time work in Sept. 2019, after a 36-year career in new product design & development in the field of optical fiber connectivity. I worked for 34 years for 3M in the Telecom, Interconnect Solutions (ISD), and Communication Markets (CMD) Divisions. I worked the last two years of my career for Corning in the Optical Connector Systems (OCS) Division, after 3M sold its CMD Division to Corning.

2. I currently have a number of issued US Patents in fiber optics, in both discrete and multi-fiber interconnects. I also developed dozens of proprietary processes that are held confidentially as trade secrets.

3. I received a BS Degree from Franklin & Marshall College in 1980, and did post graduate study at the Institute of Optics in Rochester, NY. My qualifications are enumerated in detail in my curriculum vitae, along with a list of issued patents, which is attached as Appendix A to this declaration.

4. I have been a member of the Optical Society of America (OSA), and have contributed to Telcordia, IEC, and TIA/EIA Standards Bodies for Intermatability Standards for Discrete and Multi-Fiber Connectors. My research interests have included F.O. Connectors, Adapters, Field Installation Kits,

Precision Cleaving Tools, and Cable Assembly. I have published papers on various topics related to all of the above.

5. Through many years of working and research, I have gained extensive knowledge, experience and expertise in the field of fiber optic connector design. Having worked on fiber optic connector design for most of my career, I have an extensive background and understanding of the principles and processes involved with the field of technology of U.S. Patent No. 11,906,794 ("the '794 Patent").

6. I have gained general experience with patents as an inventor. I am a lead named inventor on a number of patents in fiber optic interconnects. I assisted in the prosecution of the aforementioned patents including writing the records of invention, assisting counsel in preparing the patent applications, and assisting counsel in responding to communications received from the U.S. Patent and Trademark Office.

7. I am being compensated at $450/hour. My compensation is in no way dependent on the outcome of this proceeding, and my compensation in no way affects the substance of my statements and opinions in this Declaration.

8. In providing the testimony set out in this declaration, I have reviewed the figures, specification, and claims of the '794 Patent and the file history of the '794 Patent. I have also reviewed the following documents:

Exhibit No.	Description
1001	U.S. Patent No. 11,906,794
1003	U.S. Publication No. 2019/0243072 (“Takano”)
1004	U.S. Provisional Application No. 62/649,539 (“the ‘539 Provisional”)
1005	U.S. Publication No. 2012/0057826 (“Katoh”)
1006	U.S. Publication No. 2019/0204513 (“Davidson”)
1007	U.S. Patent No. 7,677,812 (“Castagna”)
1008	U.S. Patent No. 5,390,272 (“Repta”)
1009	U.S. Publication No. 2004/0247252 (“Ehrenreich”)
1010	Prosecution History of U.S. Patent No. 11,906,794
1011	Prosecution History of U.S. Publication No. 2019/0243072
1012	Prosecution History of U.S. Publication No. 2019/0204513
1013	U.S. Provisional Application No. 62/640,914 (“the ‘914 Provisional”)
1014	The Importance Of Proper Cleaving for Fiber Optic Connectors
1015	Guide to Connectorization and Polishing Optical Fibers
1016	U.S. Patent No. 7,001,081
1017	U.S. Publication No. 2013/0094816
1018	U.S. Patent No. 5,673,346
1019	PCT Publication No. WO2019/126337
1020	Designerdata: Polypropylene

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

9. In forming my opinions, I have relied upon various legal principles explained to me by Senko's counsel. My understanding of these principles is summarized below.

10. I understand that in patent law, a patent's claims define the scope of protection for the claimed invention.

11. I understand that the validity of a patent's claims is determined on a claim-by-claim basis.

12. I understand that in this proceeding, Senko has the burden of proving that the challenged claims would have been unpatentable over the prior art by a preponderance of the evidence.

13. Ground 1 asserts that claims 8 and 16-19 of the '794 Patent should be invalidated for lacking written description support.

14. I understand that a claim is unpatentable for lacking written description support if the specification of the challenged patent does not reasonably convey to a person of ordinary skill in the art ("POSA") that the inventor or inventors had possession of the claimed subject matter as of the filing date of the challenged patent.

15. Grounds 2-12 assert that the claims of the '794 Patent should be invalidated as anticipated by one or more prior art references, or as obvious over one or more combinations of prior art references.

16. I understand that a claim is unpatentable as anticipated if the prior art reference teaches the claimed subject matter.

17. I understand that a claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to a hypothetical person having ordinary skill in the art at the time of the invention and who is presumed to have known the relevant prior art.

18. I understand that the question of obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness.

19. I further understand that for each of the obviousness grounds, Senko must demonstrate a person of ordinary skill would have: (1) a motivation to combine the teachings of the relevant references and (2) a reasonable expectation of success of developing the claimed invention.

20. I understand that a motivation to combine the teachings of the relevant references may come from, but is not limited to: teachings, suggestions, or motivations found in the prior art; the nature of the problem; or the knowledge of a person having ordinary skill in the art.

21. I understand that the United States Patent and Trademark Office ("USPTO") will interpret the claims of the '794 Patent as they would have been understood by those of ordinary skill in the art as of the filing date of the '794 Patent in view of the claim language itself, the specification and figures of the '794 Patent, the prosecution history of the '794 Patent, and other relevant evidence showing how one of ordinary skill would have understood the language.

22. In forming my opinions, I have applied the understanding of one of ordinary skill in the art working at the time of the invention claimed in the '794 Patent, i.e., shortly prior to April 6th, 2018.

23. It is my opinion that a person having ordinary skill in the art ("POSA") at that time would have: (1) at least a bachelor's degree in mechanical engineering, electrical engineering, physics, or a related field, and three years of experience in fiber optics and fiber optic connectors; (2) a master's degree in mechanical engineering, electrical engineering, physics, or a related field and at least one year of experience in fiber optics and fiber optic connectors; or (3) industry experience (at least three years) designing fiber optic connectors in lieu of a formal degree.

24. In my opinion, the level of ordinary skill is not determinative because those of less or more skill would also find the claims to be unpatentable.

II. BACKGROUND OF THE '794 PATENT

25. The '794 Patent is directed to fiber optic connectors with "a boot that can be used with a fiber optic connector to insert into and remove from a receptacle [and that] can also be detached from a portion of the fiber optic connector and reinstalled in a different configuration to identify a polarity of the fiber optic connector." EX1001: 1:50-55. Such features were already present in the art. EX1003: Figs. 16-36.

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

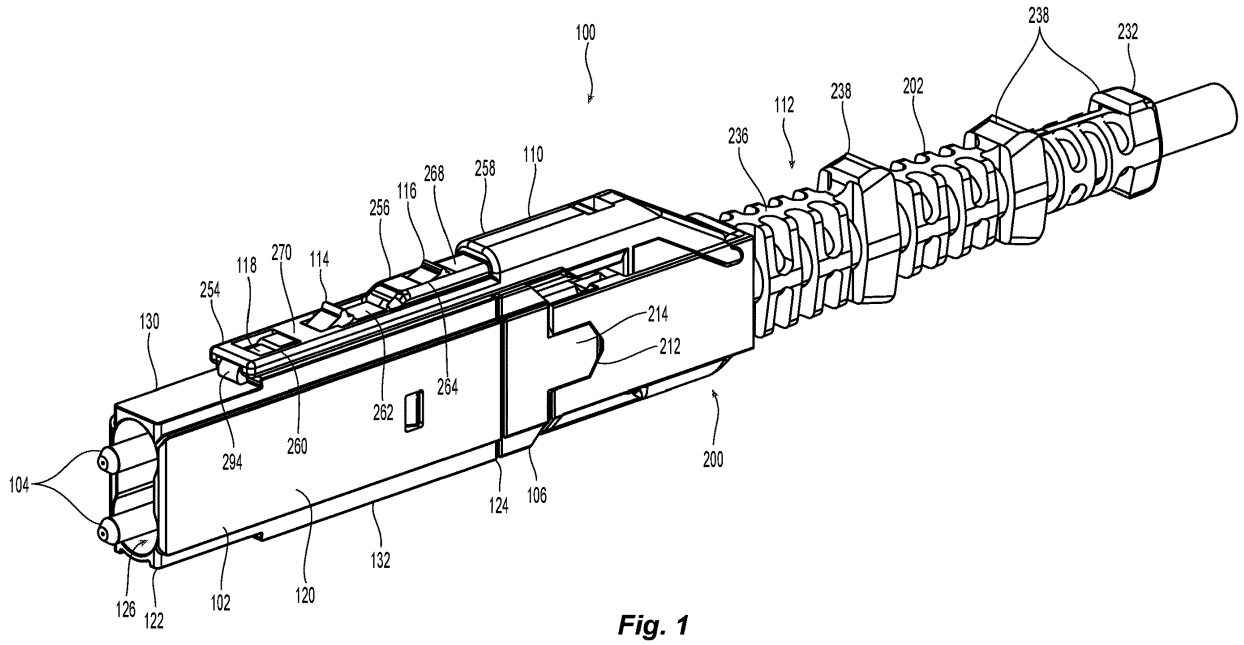


Fig. 1

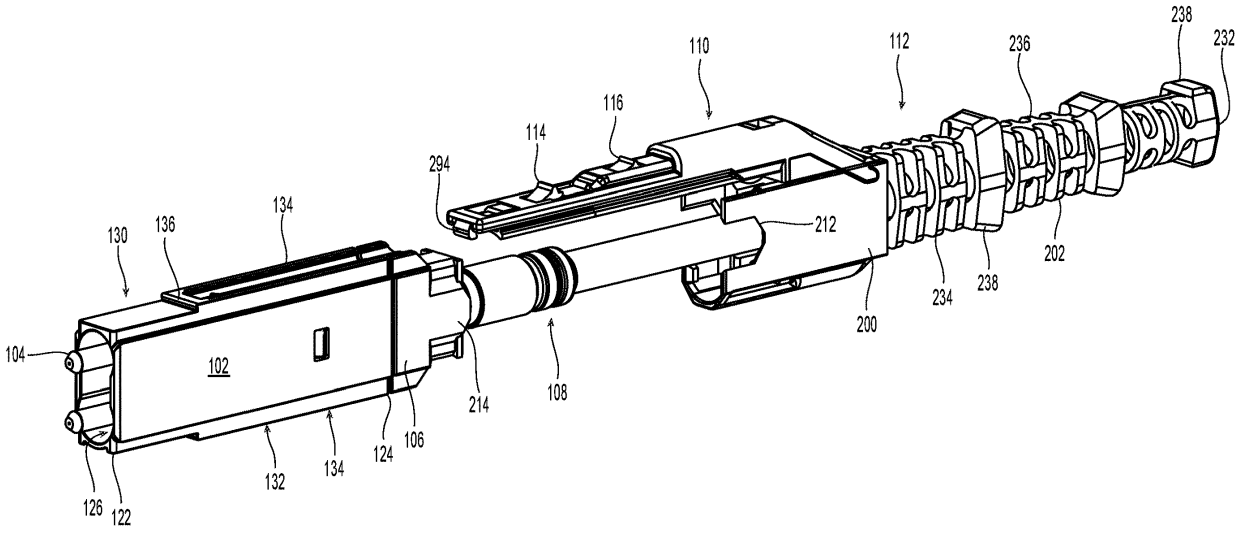


Fig. 6

EX1001: Figs. 1 and 6.

27. The front extension (110) of the boot (112) serves several functions. EX1001: 4:4-20. The front extension (110) includes latches (114, 116) to connect the fiber optic connector (100) to a corresponding adapter. EX1001: 4:4-9. To disconnect the fiber optic connector (100) from the adapter, the boot (112) is pulled rearward to depress the latches (114, 116). EX1001: 8:40-67. The front extension (110) includes a main body (250) which moves the main body (250) rearward along the latch body (118) of the front extension (110), of which the latches (114, 116) are a part of, when the boot (112) is pulled rearward to depress the latches. EX1001: 8:40-67.

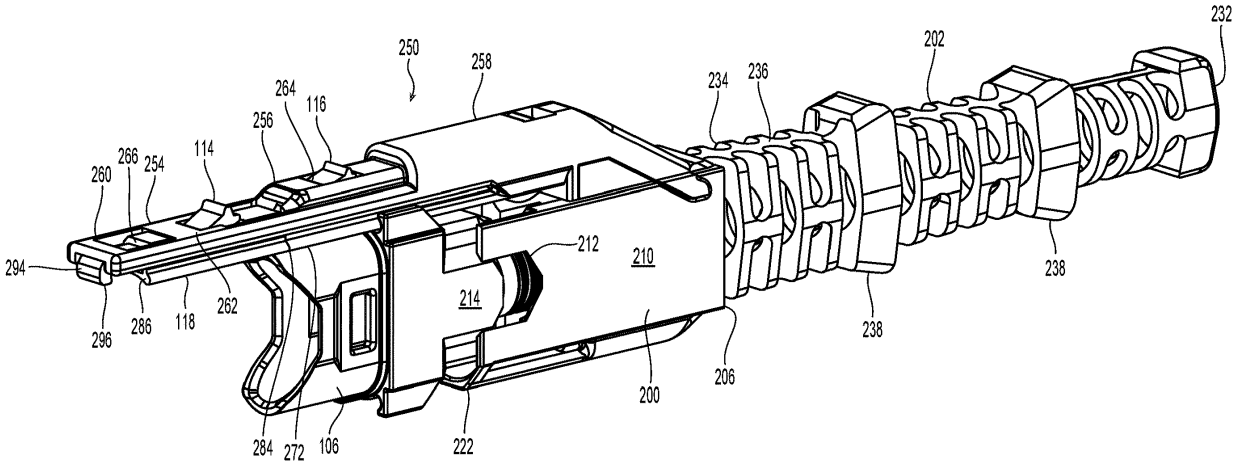


Fig. 14

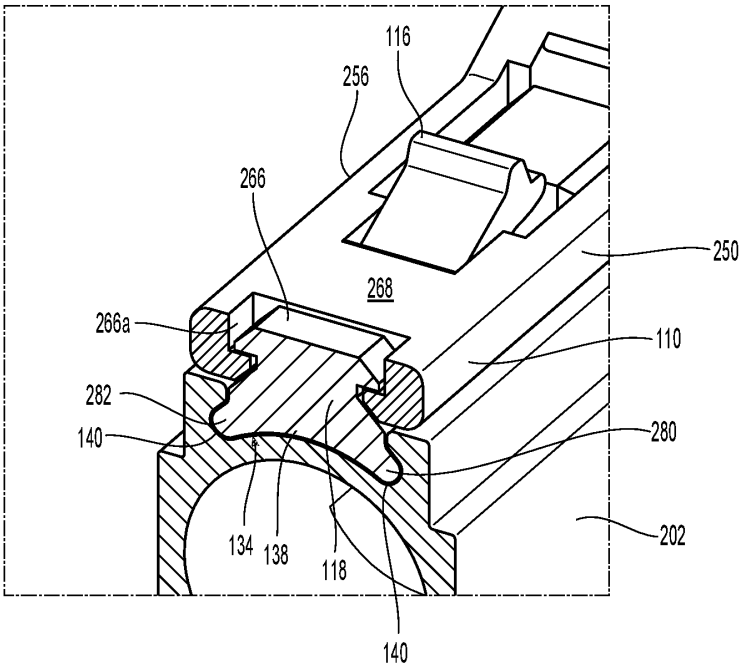


Fig. 7

EX1001: Figs. 7 and 14.

28. The front extension (110) also serves as a polarity key by limiting the fiber optic connector (100) to be inserted in only one orientation relative to the adapter—i.e., in the single orientation where the front extension aligns with a corresponding keyway of the adapter. EX1001: 4:9-20. The front extension (110) can be attached to the top of the housing (102) to place the fiber optic connector (100) in a first polarity configuration, or attached to the bottom of the housing (102) to place the fiber optic connector in a second (or reversed) polarity configuration. EX1001: 1:52-55, 2:8-10, 9:7-13.

29. The polarity of the connector (100) can be changed by releasing the boot (112) from the crimp body (106) and housing (102). This is accomplished by pressing on a bridge portion (222) to release a latched connection (e.g., latches 220) of the boot (112) with the crimp body (106) and lifting the connector latch (294). EX1001: 6:1-7, 7:54-62.

III. BACKGROUND OF THE PRIOR ART

30. While there have been evolving industry standards for fiber optic connectors and increasing demand for higher pitch densities, fiber optic connection systems have been well known in the art for decades.

31. Fiber optic connectors now come in several common varieties and ferrule types, including FC, SC, ST, LC, MU (primarily in Japan), E-2000 (primarily in parts of Europe), MPO/MTP, and MTRJ/MT:



FC/UPC



ST Multi-mode



SC/APC



LC/UPC



LC/UPC Duplex



LC/APC



MT-RJ



MPO

32. The ceramic ferrule types listed are available in single fiber (simplex) and dual fiber (duplex) configurations. The MT ferrule types have been developed for higher density ribbon fiber (& cable) - from 2-fiber in the case of MT-RJ, to 8-fiber, 12-fiber, 24-fiber, 48-fiber, and up to 72-fiber ribbon in a single, rectangular MT ferrule that was first commercialized in the MPO/MTP connector footprint. The MT ferrules and MPO/MTP connectors are utilized in the highest data/bandwidth applications, such as singlemode telephony, cell towers for mobile communications, and data centers that power the internet and the ever expanding broadband needs for on-demand 'video streaming' and 'big data.' Today's data center customers are pressing for even higher density, more compact connector designs.

33. The claims of the '794 Patent are not specific to a fiber optic connector or ferrule type, and in theory would be compatible with a number of the common fiber optic connector and ferrule types. However, the specification of the '794 Patent shows and describes a Very (or ultra) Small Form Factor ("VSSF") duplex optical connector. EX1001: Fig. 1.

34. The references outlined below, and other references elsewhere herein, disclose features of fiber optic connection systems, and those of ordinary skill in the art would consider them all to be in the same field of endeavor with each other

and with the '794 Patent. EX1001: 1:15-55; EX1003: ¶[0002]; EX1005: ¶[0002]; EX1006: ¶[0002]; EX1007: 1:6-8; EX1008: 1:7-9; EX1009: ¶[0002].

A. U.S. Publication No. 2019/0243072 ("Takano")

35. Takano "relates generally to ultra-small form factor optical connectors, termed 'micro optical connectors,' and related connections within adapters and optical transceivers." EX1003: ¶[0002].

36. Takano teaches multiple different embodiments of optical connectors. EX1003: Figs. 1 and 16. I will refer to these different embodiments of optical connectors in this declaration as the "first embodiment," the "second embodiment," and the "third embodiment."

1. First Embodiment of Takano

37. Figs. 16-36 of Takano illustrate one embodiment of a micro optical connector (9100). I will hereby refer to this embodiment as the "first embodiment" of Takano. The micro fiber optic connector (9100) has an outer housing (9101, 9201, 9301, 9401), two ferrules (9203), a boot or boot assembly (9109.1, 9209.1, 9309.1, 9409.1), and a back body (9106, 9206). EX1003: ¶¶[0058], [0061], Figs. 16 and 18. Although different reference numerals are used in Figs. 16-36, one skilled in the art understands that the these figures show the same connector, just in different configurations. EX1003: ¶¶[0016]-[0036].

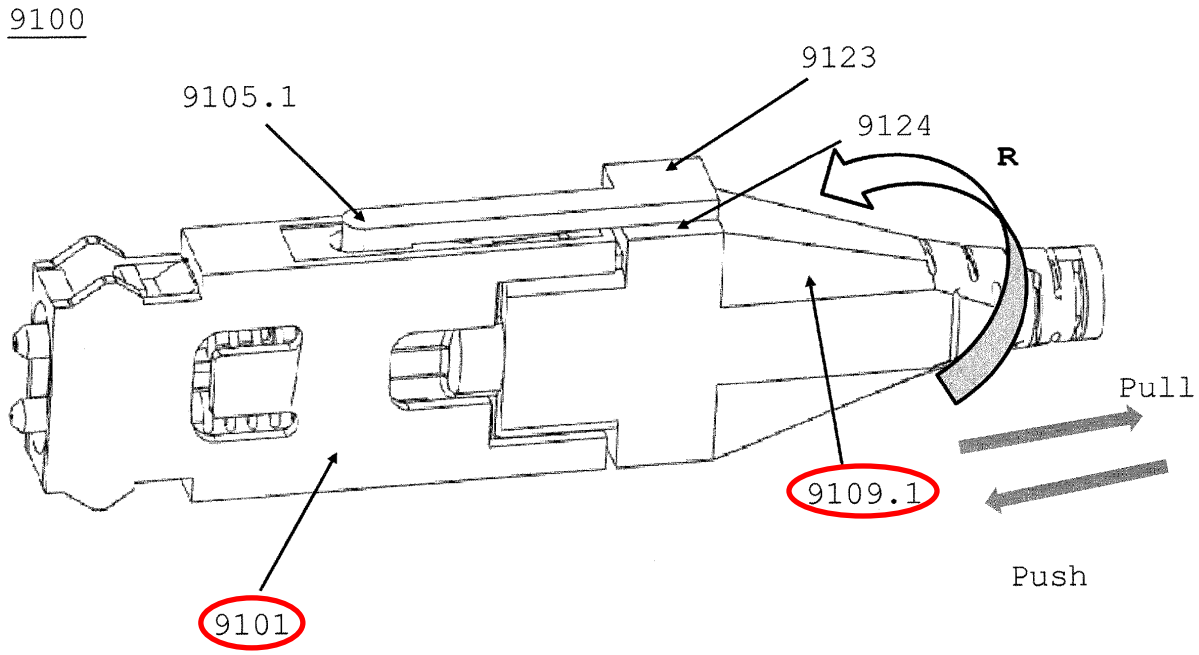


FIG. 16

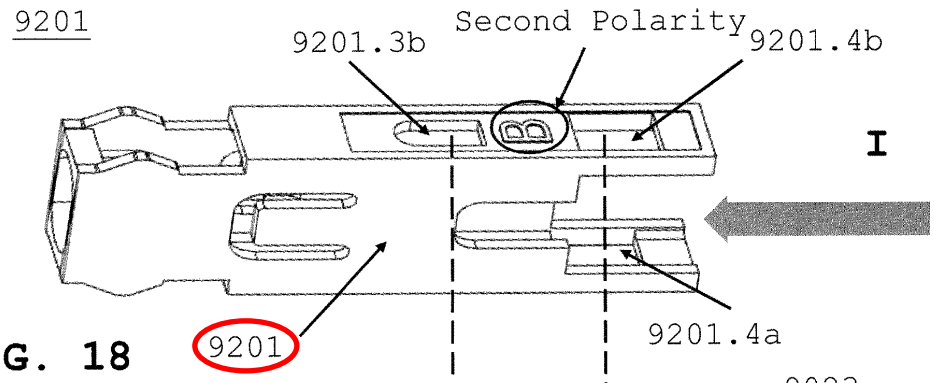


FIG. 18

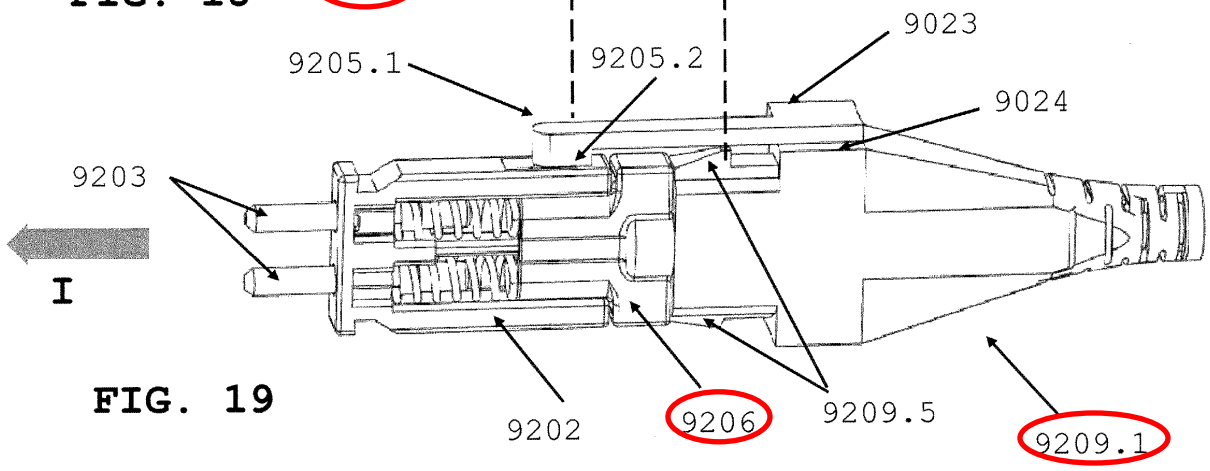


FIG. 19

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

38. The boot (9109.1, 9209.1, 9309.1, 9409.1) includes an alignment and offset key (9105.1, 9205.1, 9305.1, 9405.1) for setting the polarity of the micro connector (9100). EX1003: Figs. 16, 25, and 33 ¶[0059].

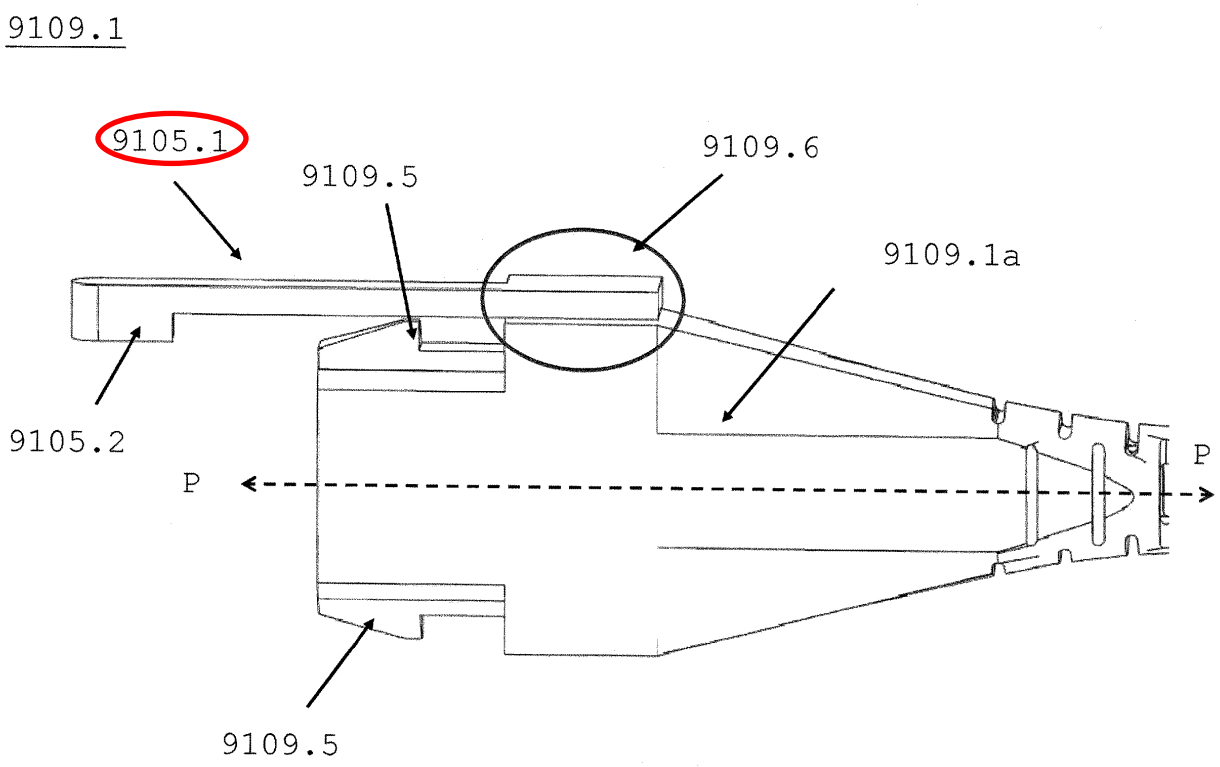


FIG. 17

EX1003: Fig. 17 (annotated).

39. The boot (9109.1, 9209.1, 9309.1, 9409.1) includes boot hooks or latches (9109.5, 9209.5) that releasably connect the boot to the outer housing (9101, 9201, 9301, 9401). EX1003: ¶[0058].

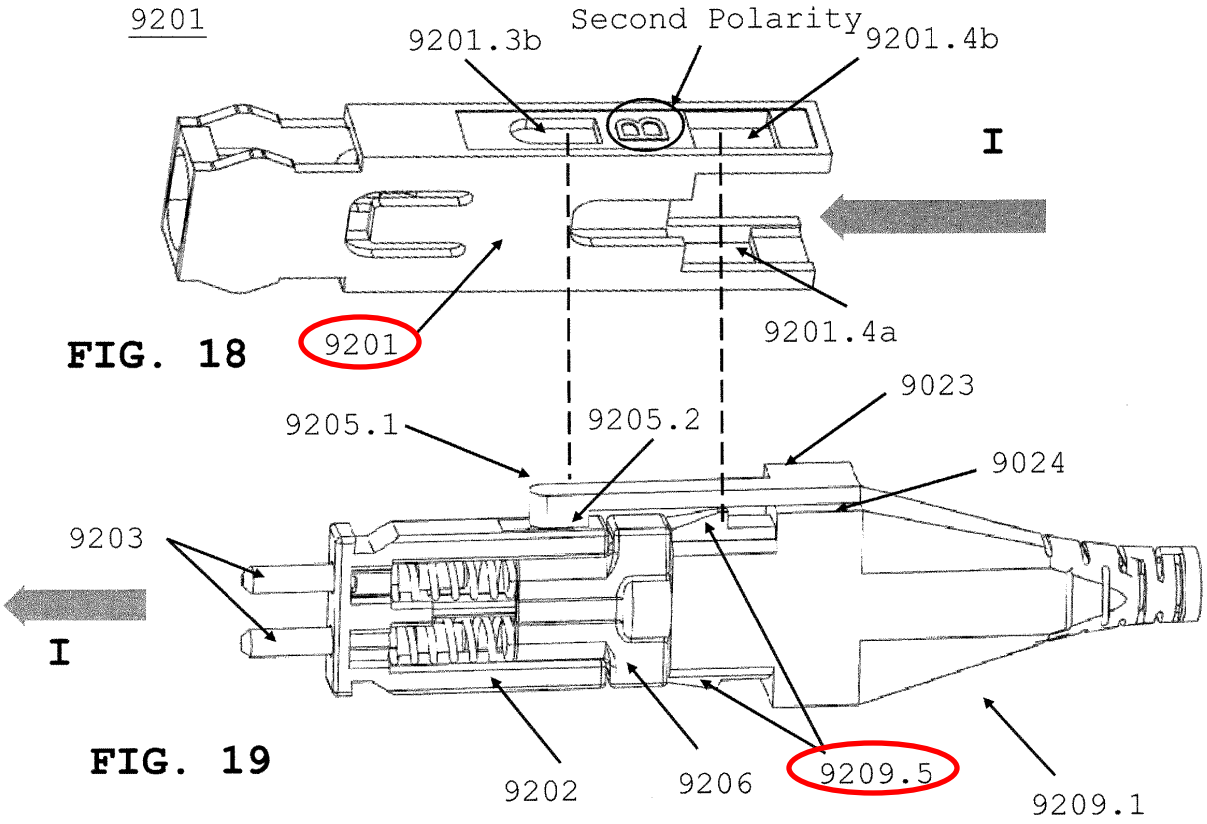


FIG. 18

FIG. 19

EX1003: Figs. 18 and 19 (annotated).

40. The boot hooks (9109.5, 9209.5) allow the boot (9109.1, 9209.1, 9309.1, 9409.1) to be rotated relative to the outer housing (9101, 9201, 9301, 9401) to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top to the bottom of the outer housing (and *vise versa*) to change the polarity of the micro connector (9100) from a first polarity configuration to a second polarity configuration, as shown in Figs. 20-23 and again in Figs. 25, 28-33. EX1003: ¶¶[0063]-[0065], [0067]-[0071].

FIG. 20

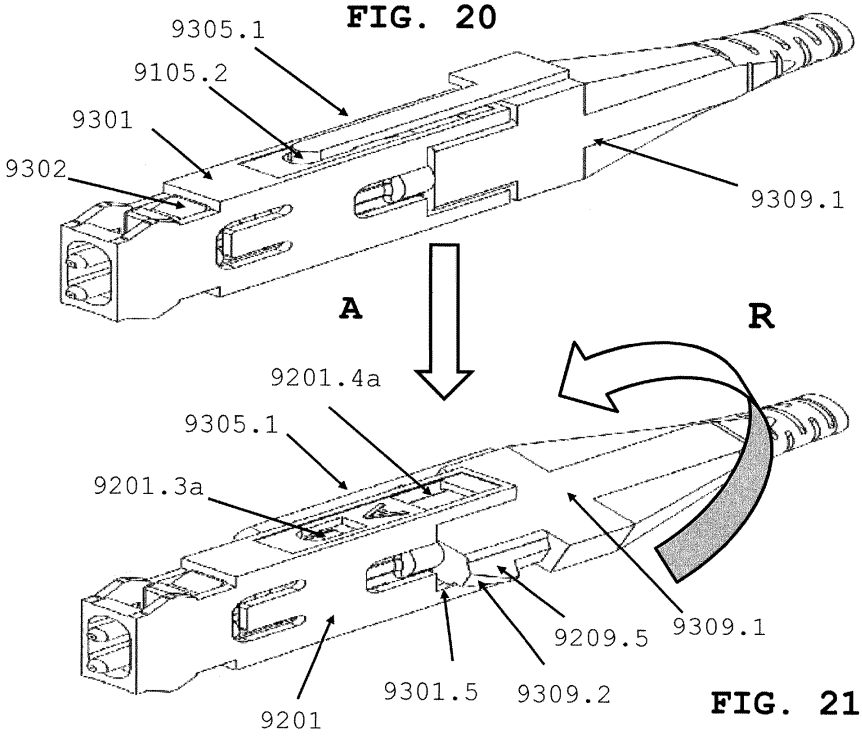


FIG. 21

FIG. 22

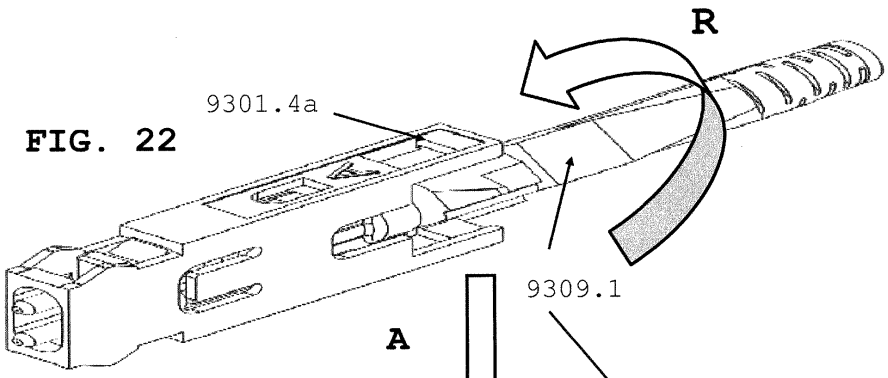
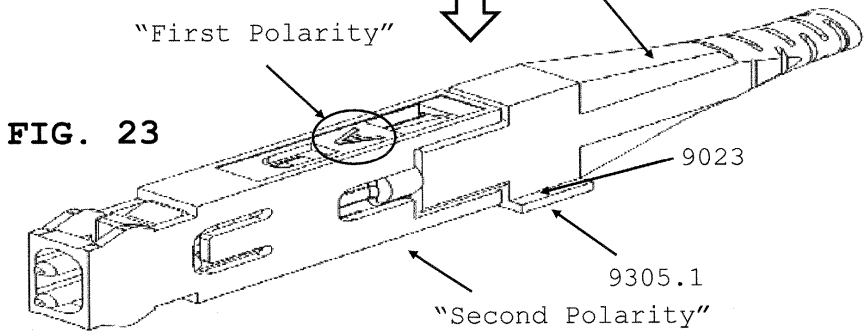


FIG. 23



EX1003: Figs. 20-23.

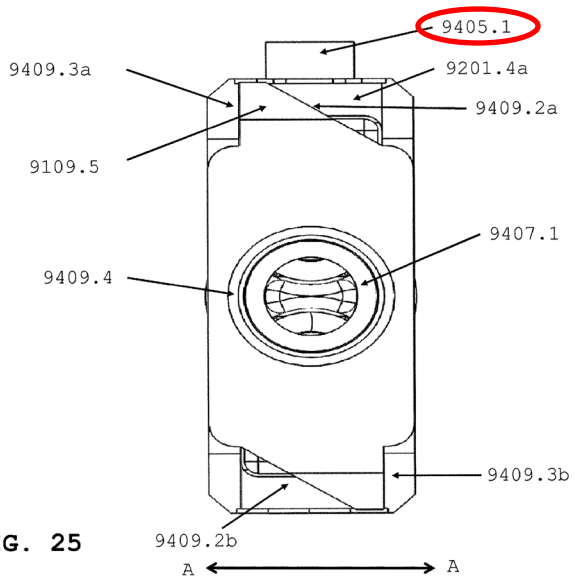


FIG. 25

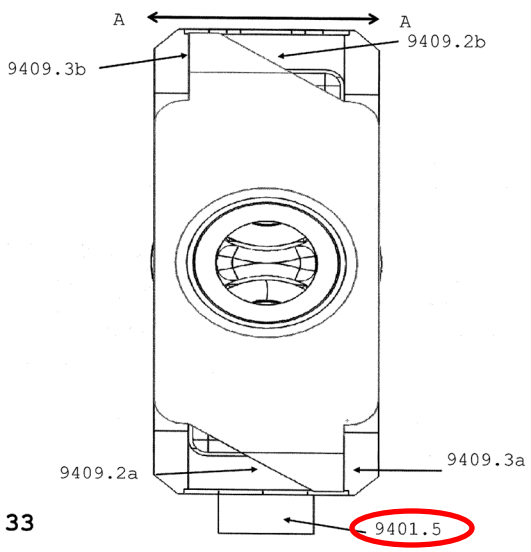


FIG. 33

First Polarity

Second Polarity

EX1003: Figs. 25 and 33 (annotated).

41. To detach the micro connector (9100) from the adapter (2400), the boot (9109.1, 9209.1, 9309.1, 9409.1) is pulled rearward (relative to the front and back bodies) to move the outer housing (9101, 9201, 9301, 9401) rearward to lift the adapter hooks or latches (2425) of the adapter out of recesses (9211), thereby allowing the entire micro connector to be removed. EX1003: ¶¶[0073]-[0074]. The front end of the outer housing (9101, 9201, 9301, 9401) includes ramps on the top and bottom that lift the latches (2425) out of recesses (9211) when the outer housing is pulled rearward within the adapter (2400). EX1003: Figs. 16 and 35-36.

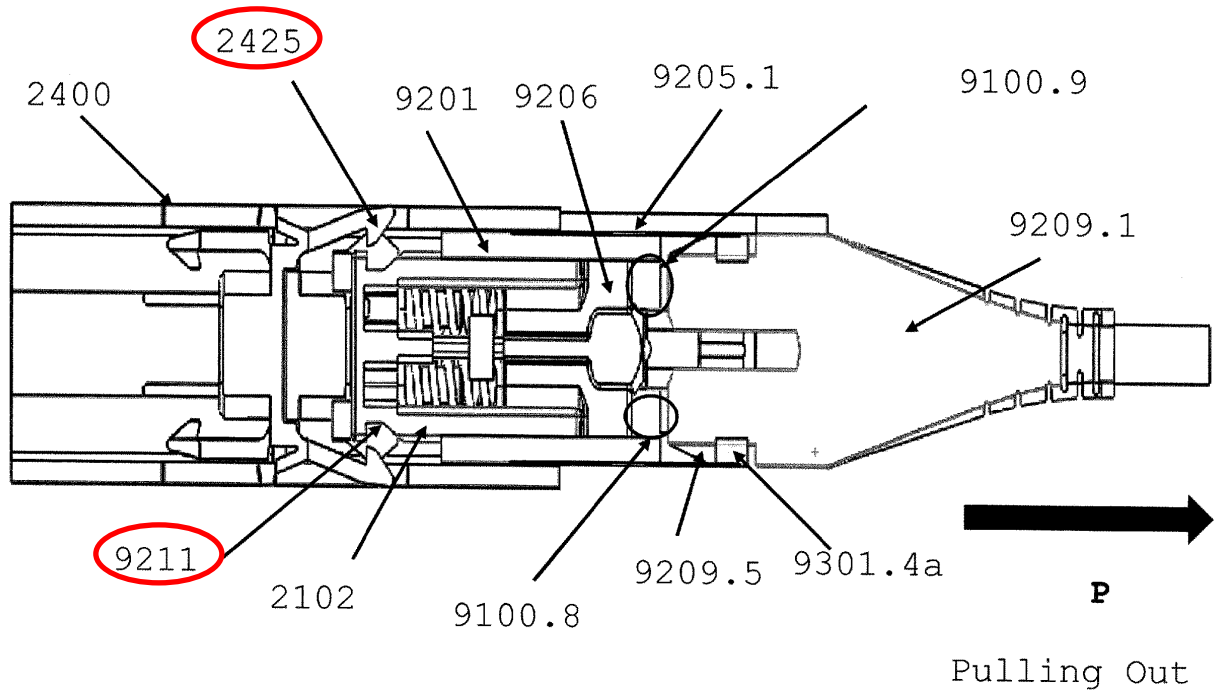


FIG. 35

EX1003: Fig. 35 (annotated).

2. Second Embodiment of Takano

42. Takano discloses a variation of the micro connector (9100) of Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector *does not include* the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059]. Instead, the key (9105.1, 9205.1, 9305.1, 9405.1) is part of the outer housing (9101, 9201, 9301, 9401). EX1003: ¶[0059] ("Alignment and offset key 2105 may be fixed on connector outer housing, as shown in FIG. 1 or at alignment key 5305 disclosed in FIG. 37."). I will hereby refer to this embodiment as the "second embodiment" of Takano.

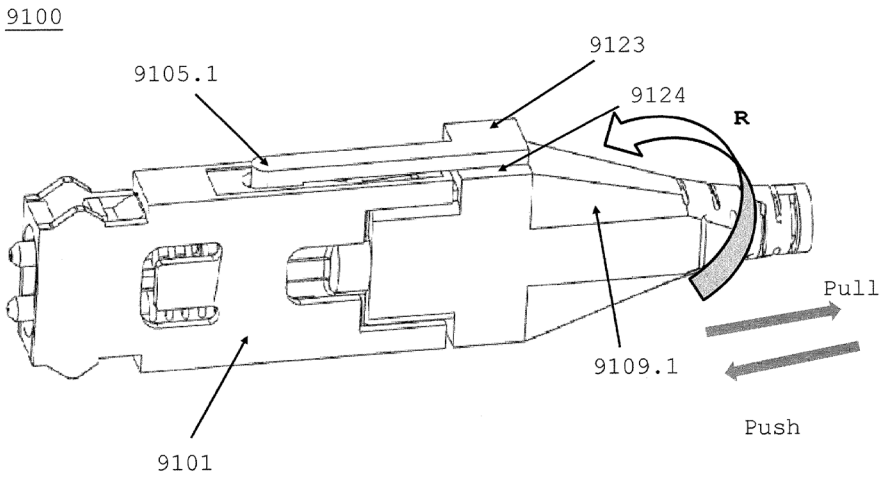


FIG. 16

EX1003: Fig. 16.

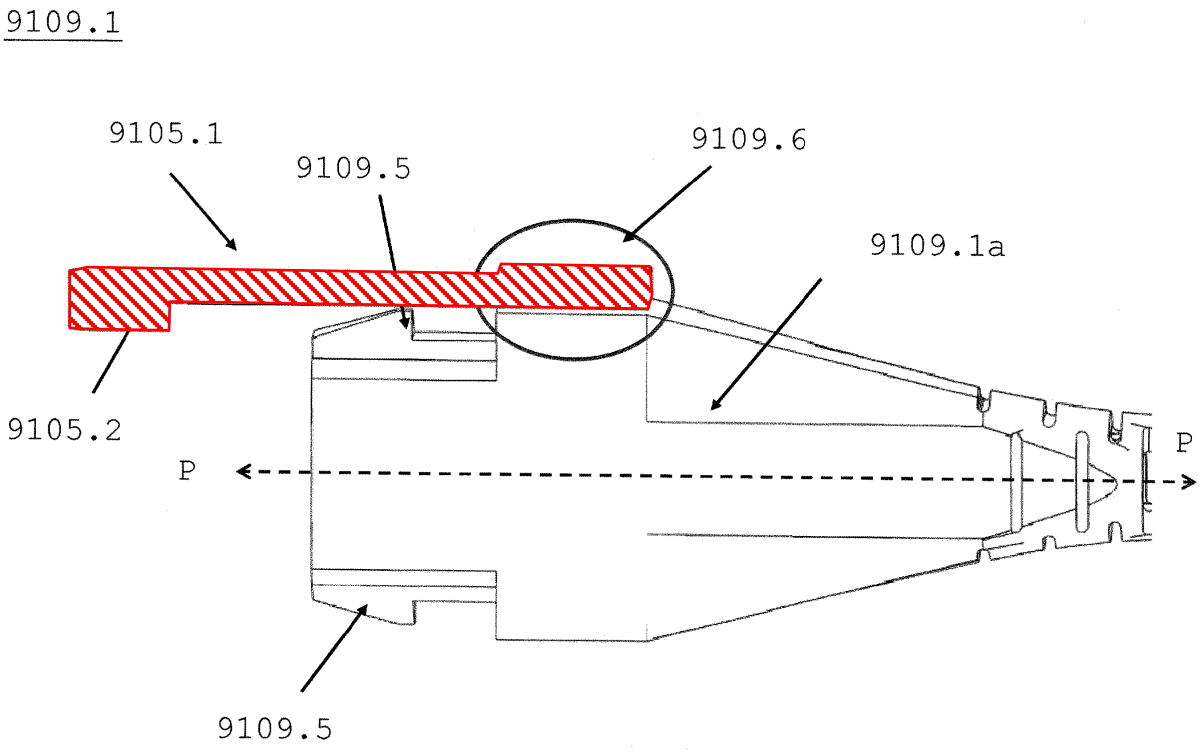


FIG. 17

EX1003: Fig. 17 (annotated).

3. Third Embodiment of Takano

43. Figs. 1-4 illustrate another embodiment (i.e., third embodiment) of a micro optical connector (2100, 3700). I will hereby refer to this embodiment as the "third embodiment" of Takano.

44. The micro connector (2100, 3700) includes an outer housing (2101, 3701), two ferrules (2103), a front body (2102), a boot (2109), a back body (2106), and a back post (2107). EX1003: ¶¶[0050], [0061], Figs. 1-4. Although different reference numerals are used in Figs. 1-4, one skilled in the art understands that Figures 2-4 show the polarity change steps of the connector of Fig. 1. EX1003: ¶¶[0008]-[0009].

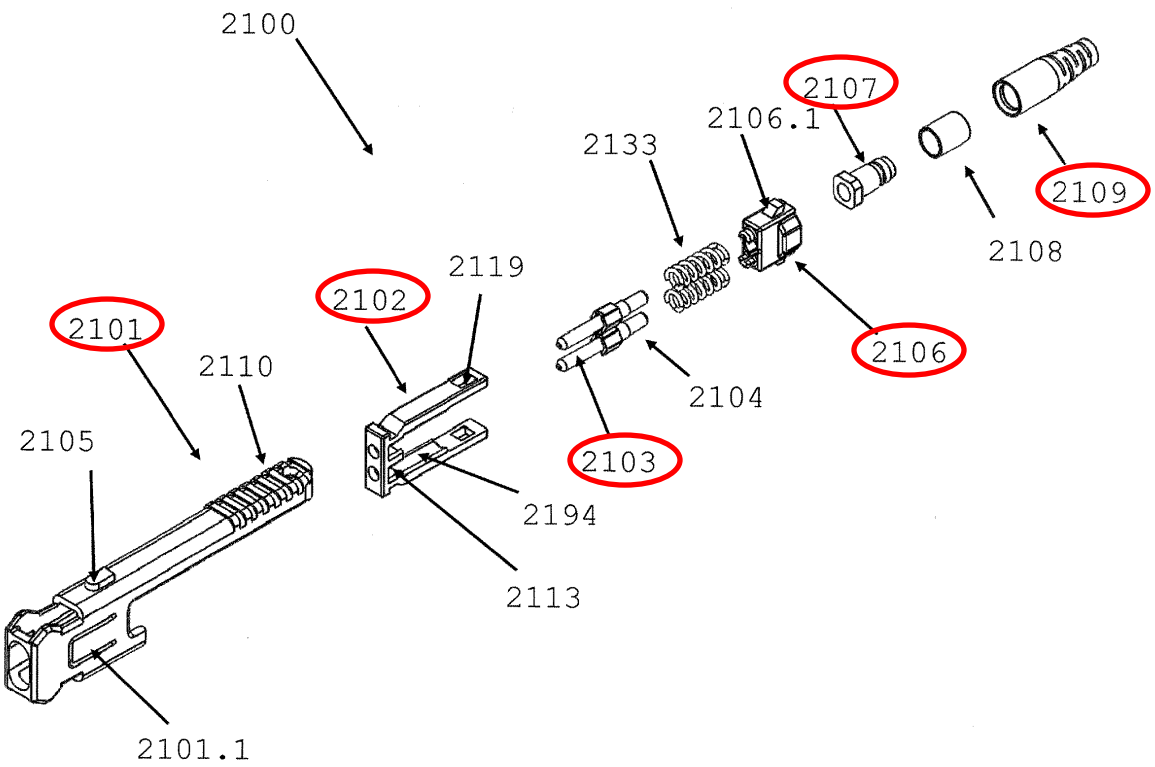


FIG. 1.

EX1003: Fig. 1 (annotated).

45. The outer housing (2101, 3701) includes a key (2105) to set the polarity of the micro connector (2100, 3700). EX1003: ¶[0050]. To change the polarity of micro connector (2100, 3700), the outer housing (2101, 3701) is detached from the inside assembly (i.e., ferrules (2103), boot (2109), back body (2106), back post (2107), front body (2102), etc.), the inside assembly is flipped over, and is then reattached to the outer housing. EX1003: ¶[0051].

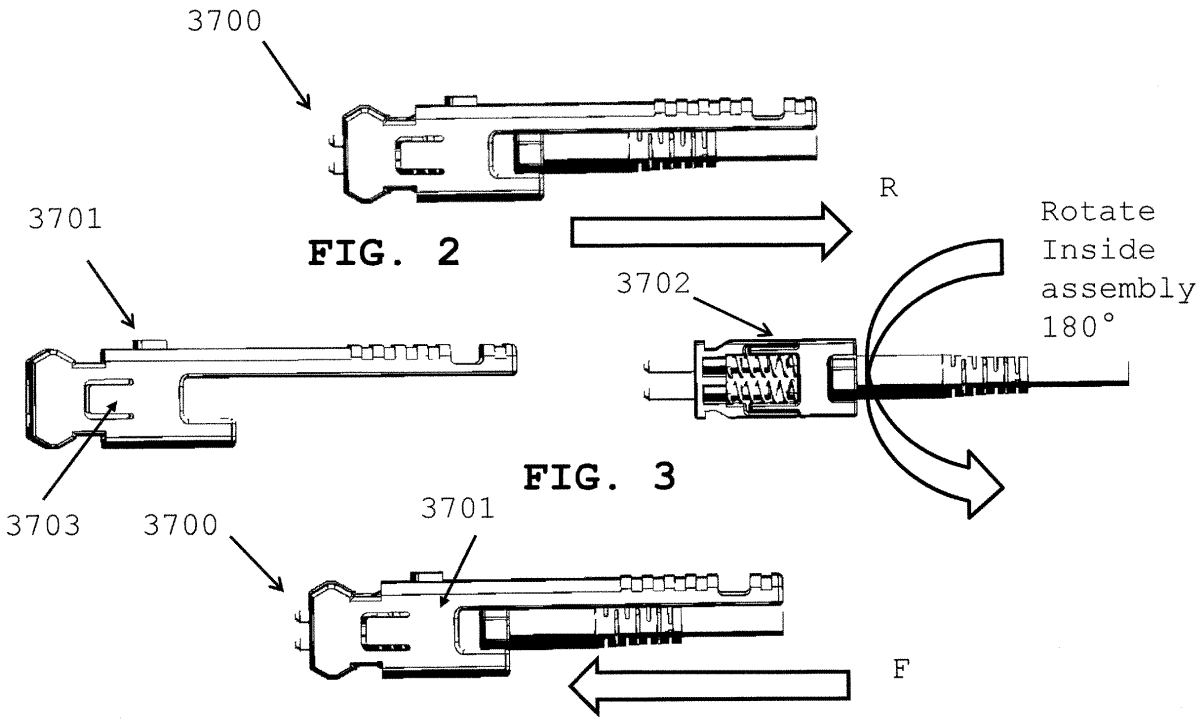


FIG. 2

FIG. 3

FIG. 4

EX1003: Figs. 2-4.

46. To detach the micro connector (2100, 3700) from the adapter (2400), the outer housing (2101, 3701) is pulled rearward—via pull key (2110)—to lift the adapter hooks or latches (2425) of the adapter out of recesses in the front body (2102), thereby allowing the entire micro connector to be removed. EX1003: ¶[0050]; EX1004: Figs. 32B, 34-35C, ¶¶[236]-[237]; EX1030: ¶[0106]. The front end of the outer housing (2101, 3701) includes ramps on the top and bottom that lift the latches (2425) out of recesses when the outer housing is pulled rearward within the adapter (2400). EX1003: Figs. 1-4.

B. U.S. Publication No. 2012/0057826 ("Katoh")

47. Katoh—published in 2012—"relates to an optical connector, and a method of inserting and removing the optical connector into/from a connector housing (optical connector adapter or the like)." EX1005: ¶[0002].

48. Katoh discloses an optical connector (10) with a boot (4) that is pushed and pulled to insert and remove the optical connector from an optical connector adapter (7). EX1005: ¶¶[0078], [0083] ("the boot 4 is pressed forward"), [0091], [0092] ("the boot 4 is pulled rearward"), claim 1.

FIG. 1

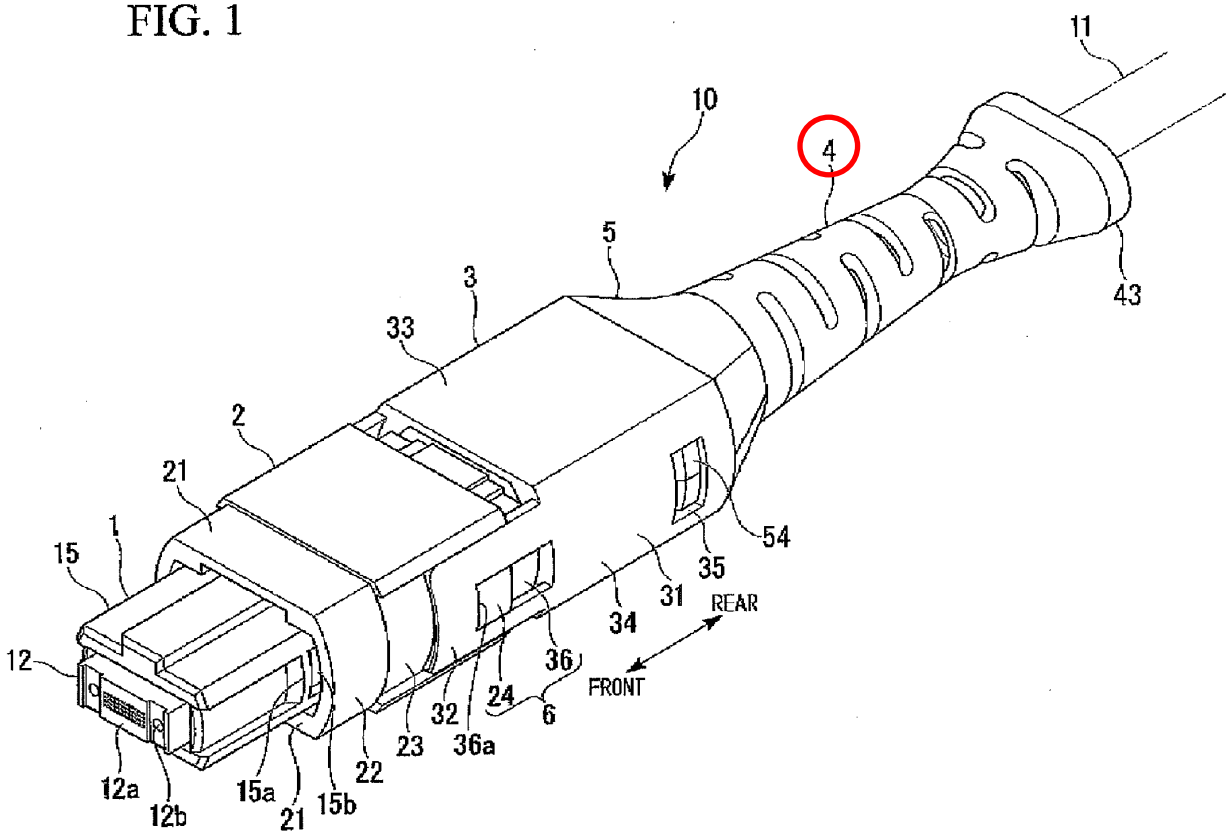


FIG. 4

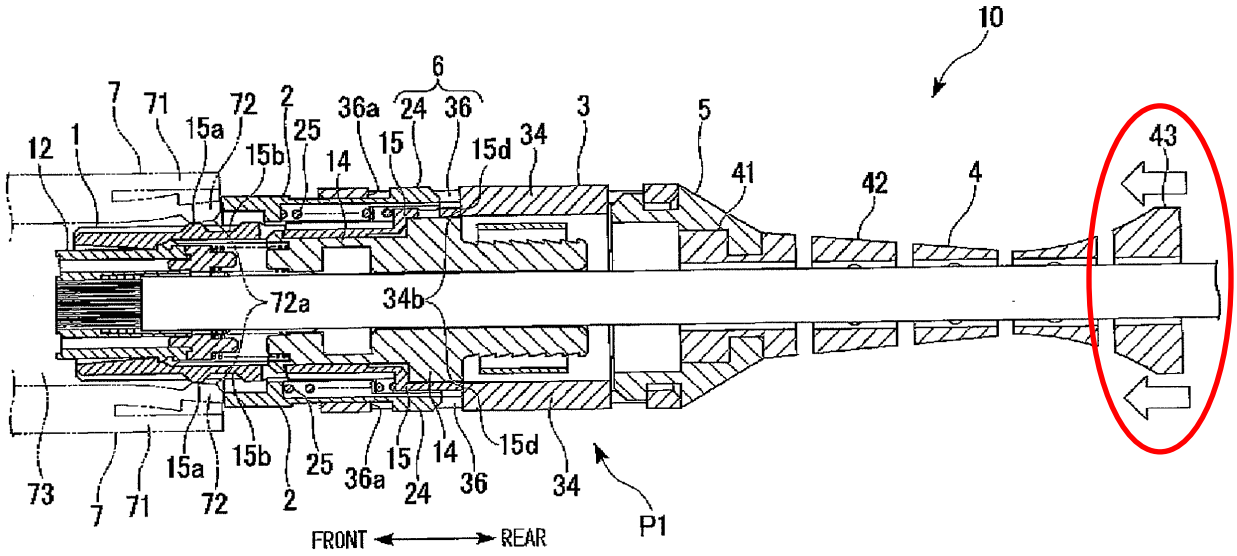
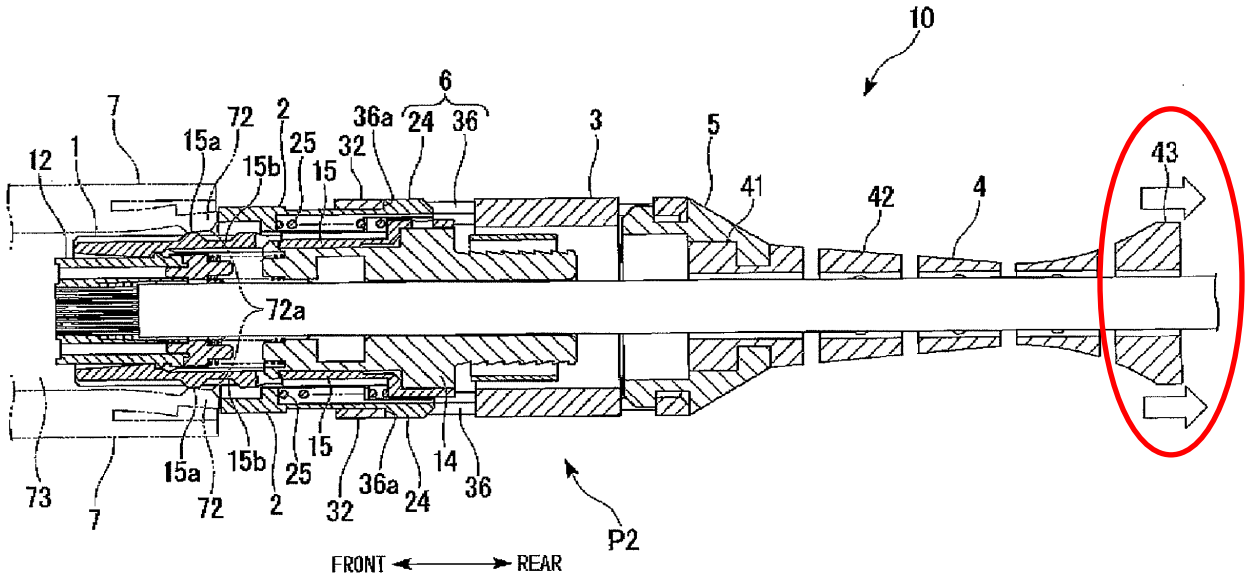


FIG. 6



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

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

C. U.S. Publication No. 2019/0204513 ("Davidson")

50. Davidson "relates generally to connectors for fiber optic cables." EX1006: ¶[0002].

51. Davidson discloses a push-pull boot connector (100) with a strain relief boot (300) that is pushed and pulled to insert and remove the connector from an adapter (400). EX1006: ¶¶[0038]-[0039].

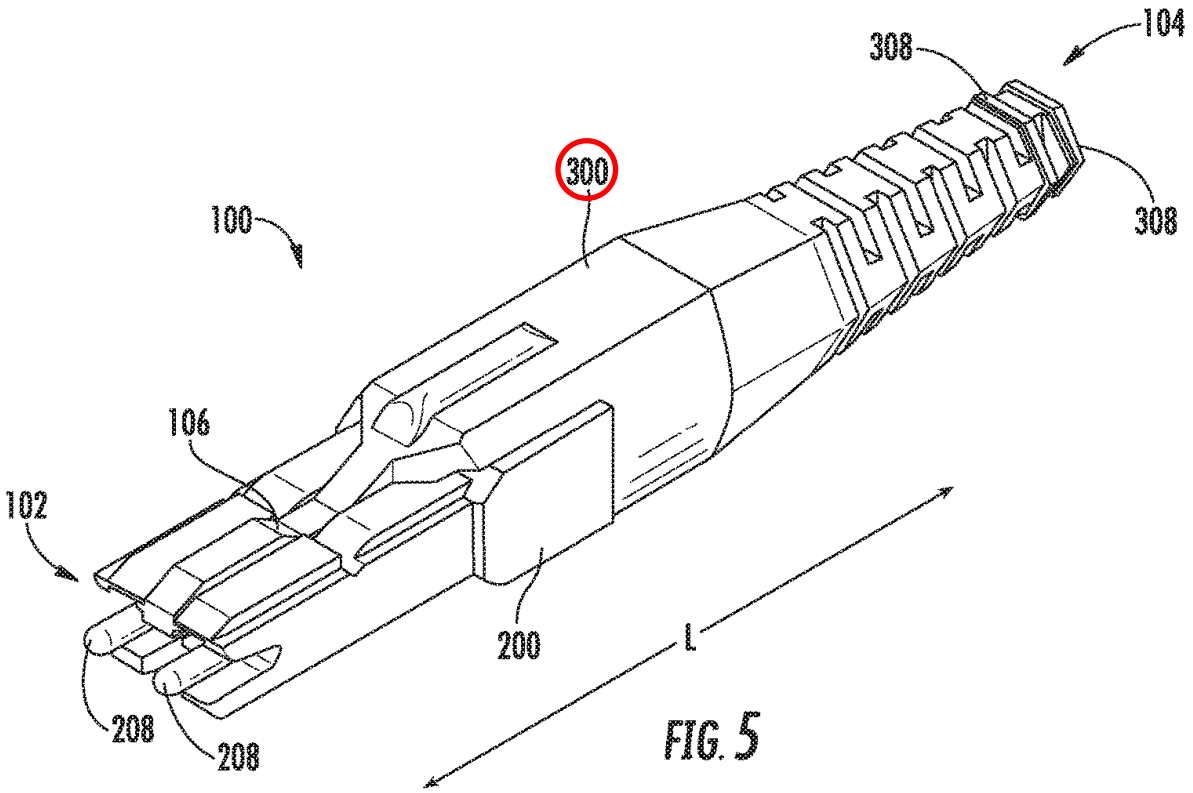


FIG. 5

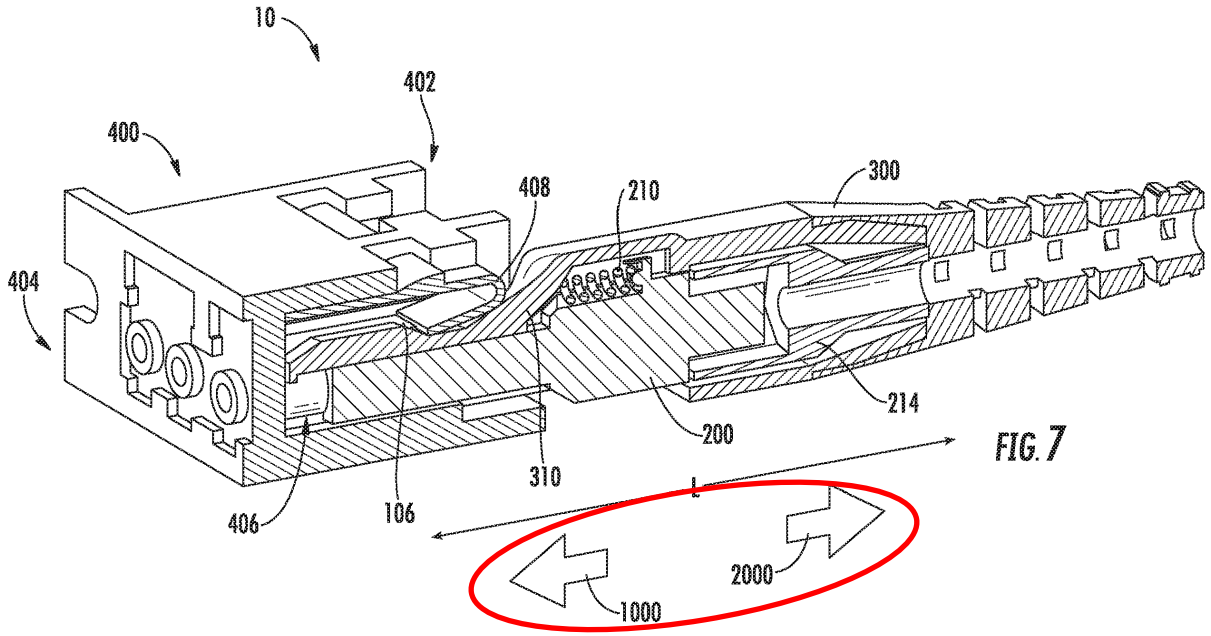
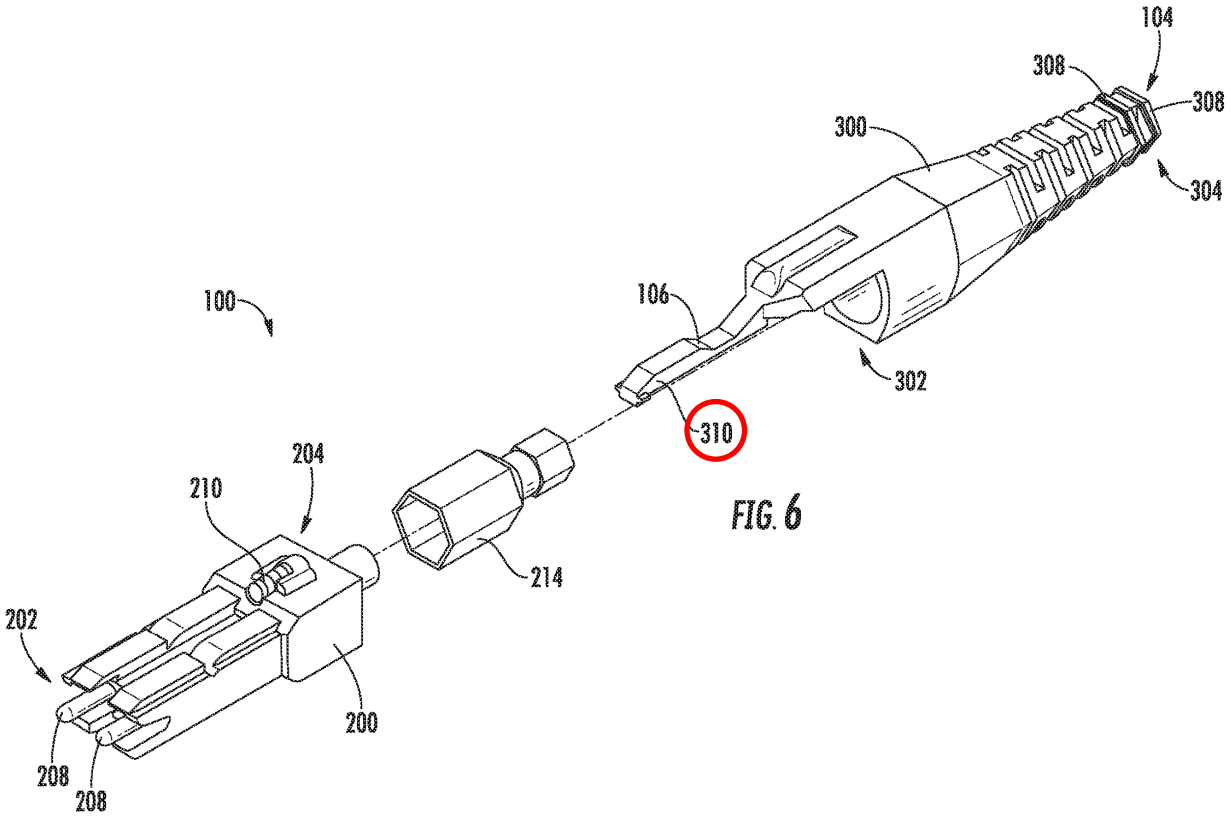


FIG. 7

EX1006: Figs. 5 and 7 (annotated).

52. Davidson's strain relief boot (300) includes an integral connector release arm (310) for raising the latch (408) to disconnect the connector (100) from the adapter (400). EX1006: ¶¶[0038]-[0039].



EX1006: Fig. 6 (annotated).

D. U.S. Patent No. 7,677,812 ("Castagna")

53. Castagna—issued in 2010—"relates generally to strain relief for cables, and more particularly to a strain relief boot for a fiber optic or other cable and/or connector." EX1007: 1:6-8.

54. Castagna discloses a fiber optic cable assembly (10) with a strain relief boot (30) "constructed of conventional materials, such as polypropylene,

using conventional manufacturing methods, such as a conventional injection molding process." EX1007: 3:58-61.

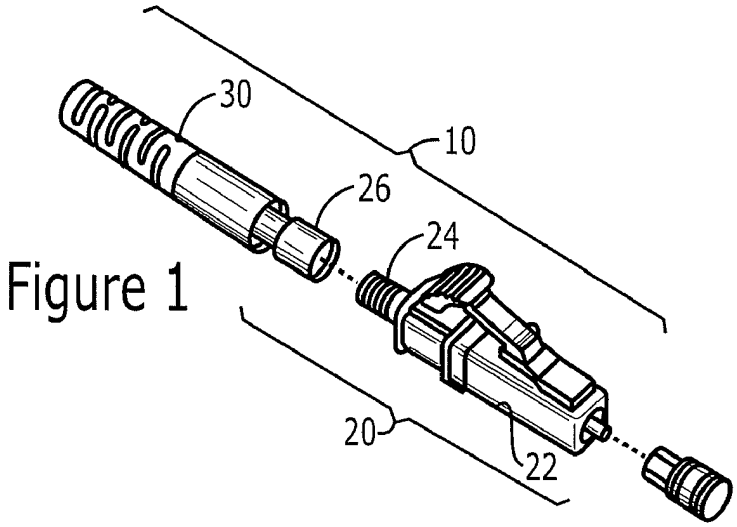


Figure 1

EX1007: Fig. 1.

E. U.S. Patent 5,390,272 ("Repta")

55. Repta—issued in 1995—"relates to a cable strain relief system, and in particular to a strain relief system for an optical fiber connector." EX1008: 1:7-9.

56. Repta discloses an optical fiber connector with a boot (10) made out of polypropylene for its "tensile flexibility to allow bending under loading and compressive rigidity to maintain form once the minimum bend radius is achieved." EX1008: 3:21-23, 4:10-15.

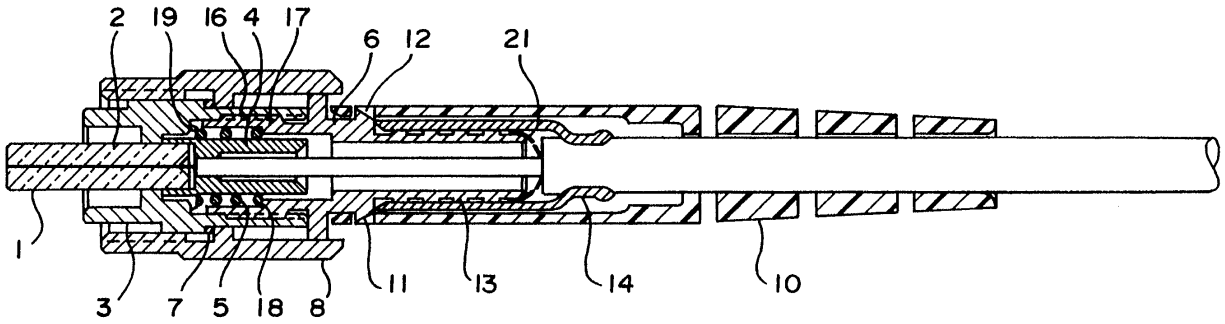


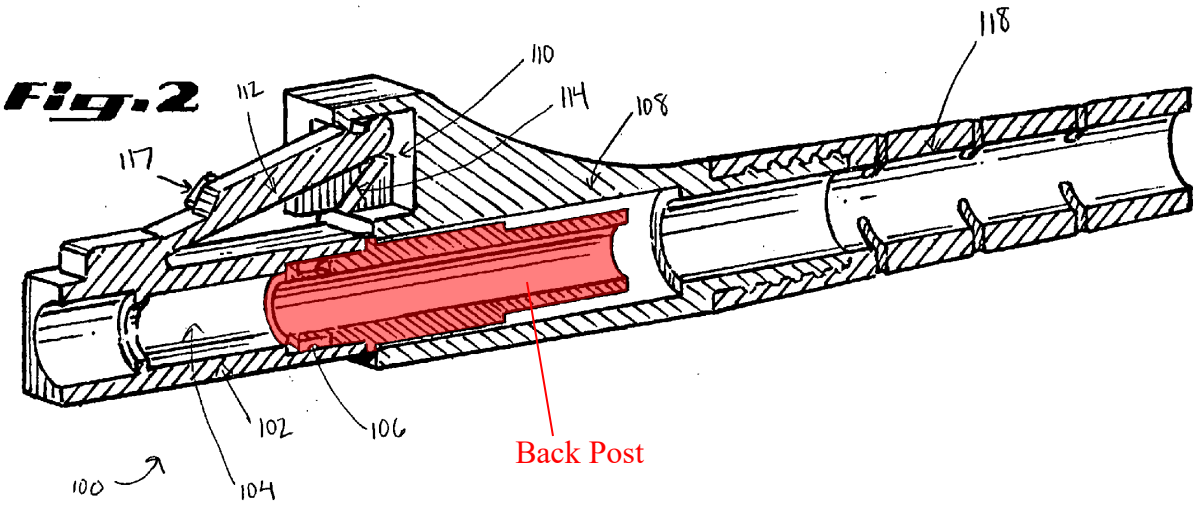
FIG. 1

EX1008: Fig. 1.

F. U.S. Publication No. 2004/0247252 ("Ehrenreich")

57. Ehrenreich—published in 2004—"relates to a fiber optic connector used for data communication and telecommunication applications, and particularly to a fiber optic connector that is easier to install and remove from a receptacle in high-density installations." EX1009: ¶[0002].

58. Ehrenreich teaches an optical connector (100) with a push/pull boot (118) and an extended back post for attaching to a fiber optic cable. EX1009: Fig. 2, ¶[0026].



EX1009: Fig. 2 (annotated).

IV. CLAIM CONSTRUCTION

59. As I stated in Paragraph 21 above, it has been explained to me that the Board will interpret the claims of the '794 Patent as they would have been understood by those of ordinary skill in the art as of the filing date of the '794 Patent in view of the claim language itself, the specification and figures of the '794 Patent, the prosecution history of the '794 Patent, and other relevant evidence showing how one of ordinary skill would have understood the language.

60. In my opinions discussed below, I have applied the plain and ordinary meaning of the claim terms within the grounds below.

V. LACK OF WRITTEN DECRIPTION (GROUND 1)

61. As I stated in Paragraph 14 above, it has been explained to me that a claim is invalid for lacking written description support if the specification of the '794 Patent does not reasonably convey to a person of ordinary skill in the art that

the inventors had possession of the claimed subject matter as of the filing date of the '794 Patent.

62. In my opinion, claims 8 and 16-20 have a lack of written description support.

A. Claim 8 Lacks Written Description Support

63. Claim 8 recites:

> The fiber optic connector according to claim 1, wherein the center portion of the boot ***engages*** the rear portion of the housing.

64. I have been informed that to the extent that the language of the claim is clear on its face, the language of the claim is to be read literally and precisely. In my opinion, the language of claim 8 is clear on its face in requiring the center portion of the boot to engage the rear portion of the housing.

65. In my opinion, the specification of the '794 Patent contains no reference or indication that US Conec was in possession of a center portion of a boot ***engaging*** a rear portion of a housing.

66. The fiber optic connector (100) of the '794 Patent includes a housing (102), a crimp body (106), and a boot (112) (among other components). EX1001: 3:63-4:2. As described by the '794 Patent, the boot (112) has different portions including a front extension (110), a center portion (200), and a back portion (202). EX1001: 5:21-24, claim 1. While the front extension (110) is shown and described

as engaging the housing (102), the center portion (200) of the boot (112) never is.

EX1001: Figs. 1-6, 7:22-25.

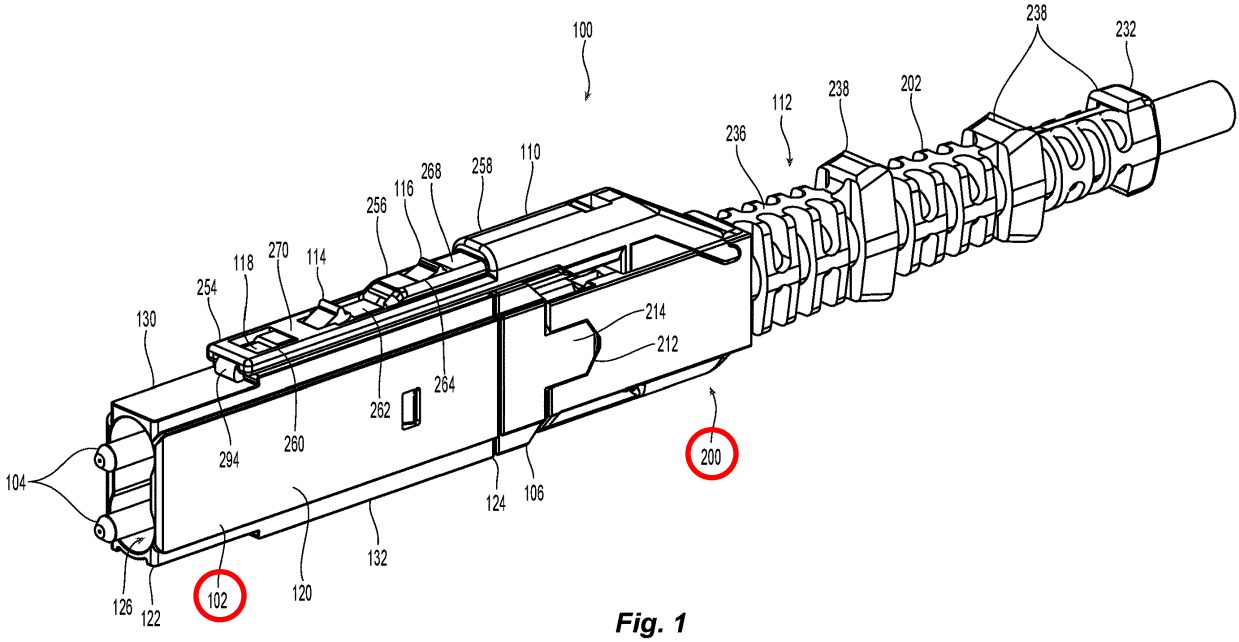


Fig. 1

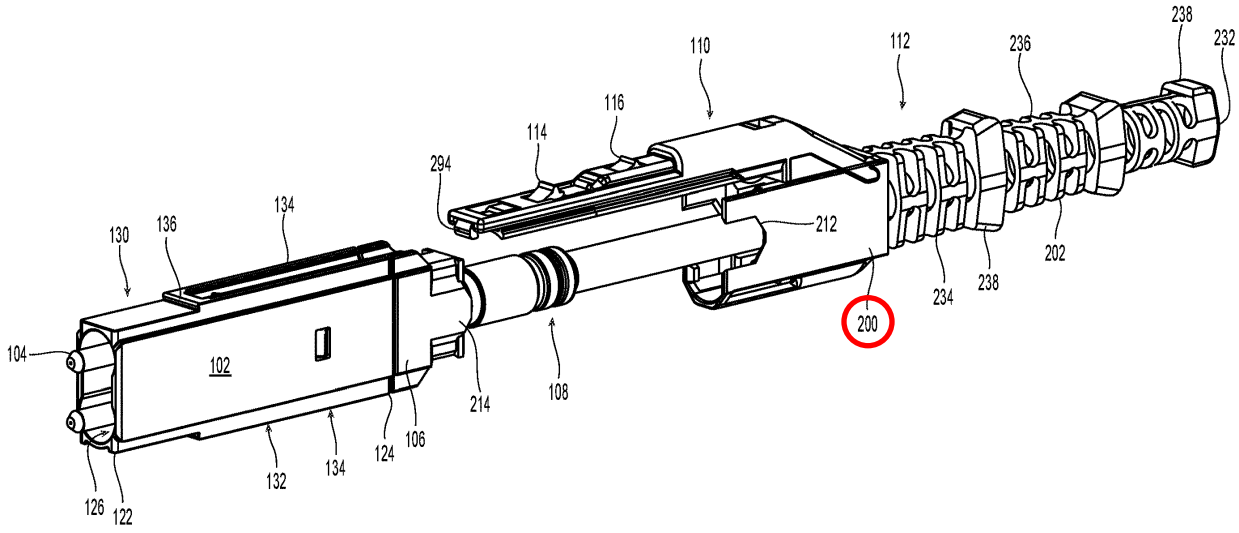


Fig. 6

EX1001: Figs. 1 and 6 (annotated).

67. No figure of '794 Patent shows the center portion (200) of the boot (112) engaging the housing (102), let alone a rear portion thereof. Instead, the center portion (200) of the boot (112) is shown as engaging the crimp body (106). EX1001: Figs. 1-6, 8, 9, and 15. In fact, the crimp body (106) separates the center portion (200) of the boot (112) from the housing (102). EX1001: Figs. 1-6, 8, 9, and 15.

68. Further, the detailed description describes the center portion (200) of the boot (112) as engaging only the crimp body (106), not any portion of the housing (102):

- "the front end 204 of the center portion 200 should be touching the first portion 154 of the central portion 152 of the crimp body 106." EX1001: 5:56-58.
- "With the front end 204 of the center portion 200 disposed against the crimp body 106, the cut-outs 212 receive the portion 214 of the crimp body 106." EX1001: 8:29-31.
- "the way of engagement between the center portion [504] [of the boot] and the crimp body 520 has changed." EX1001: 9:39-40.[1]

[1] This passage of '794 Patent mistakenly uses reference numeral "500" instead of "504." Reference numeral "500" refers to the boot of the second embodiment shown in Figs. 15-18, whereas reference numeral "504" refers to the center portion of the boot (500). EX1001: 9:14-17.

69. Therefore, in my opinion, US Conec was not in possession of the subject matter recited by claim 8.

B. Claim 16 (and Corresponding Dependent Claims 17-19) Lack Written Description Support

70. The pertinent part of claim 16 recites:

> "the front extension extending towards the front end of the housing and attached to the housing ***via at least one latch*** forward of a center portion of the boot"

71. The plain and ordinary meaning of "at least one" means one or more than one—e.g., one, two, three, etc. Thus, "at least one latch" means the front extension is attached to the housing via one latch, two latches, three latches, etc. that are forward of the center portion of the boot.

72. I have been informed that in order for a claim to have written description support, the specification of the '794 Patent must show that the inventors were in possession of the ***full scope*** of the claim limitation.

73. In my opinion, the specification of the '794 Patent demonstrates that US Conec was ***not*** in possession of the ***full scope*** of this claim limitation—i.e., a front extension attached to the housing via one latch, two latches, three latches, etc. The same is true of the patent documents—U.S. Patent No. 11,719,893, Provisional Application No. 62/793,198, and Provisional Application No. 62/653,706—the '794 Patent claims priority to. EX1027; EX1028; EX1029.

74. The specification of the '794 Patent shows and describes the front extension (110) of the boot (112) being attached to the housing (102) by a ***single*** latch (294) (i.e., connector latch), not two, nor three, nor four or more latches. EX1001: Figs. 1, 6, and 14, 7:53-62 ("The latch body 118 has a connector latch 294 as well. The connector latch 294 extends forward … to engage the stop surface 136. The connector latch 294 has a downward curling portion 296 that provides a surface to engage the stop surface 136 to prevent the latch body 118 from moving rearwardly relative to the housing 102 as the boot 112 is pulled").

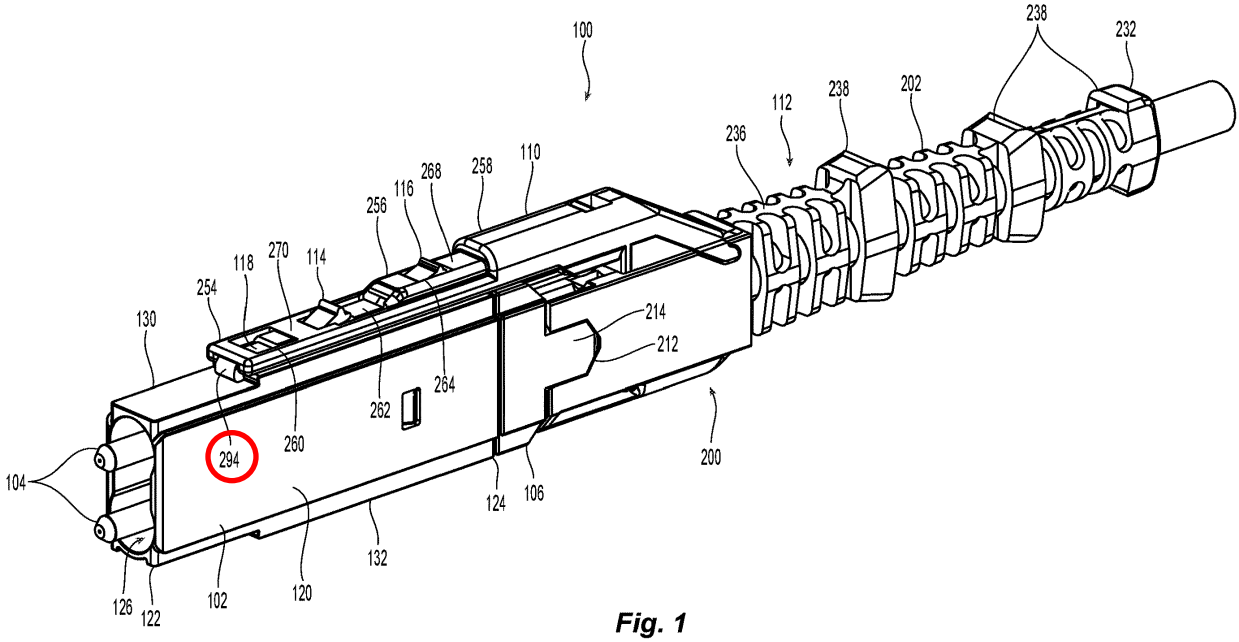


Fig. 1

EX1001: Fig. 1 (annotated).

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

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

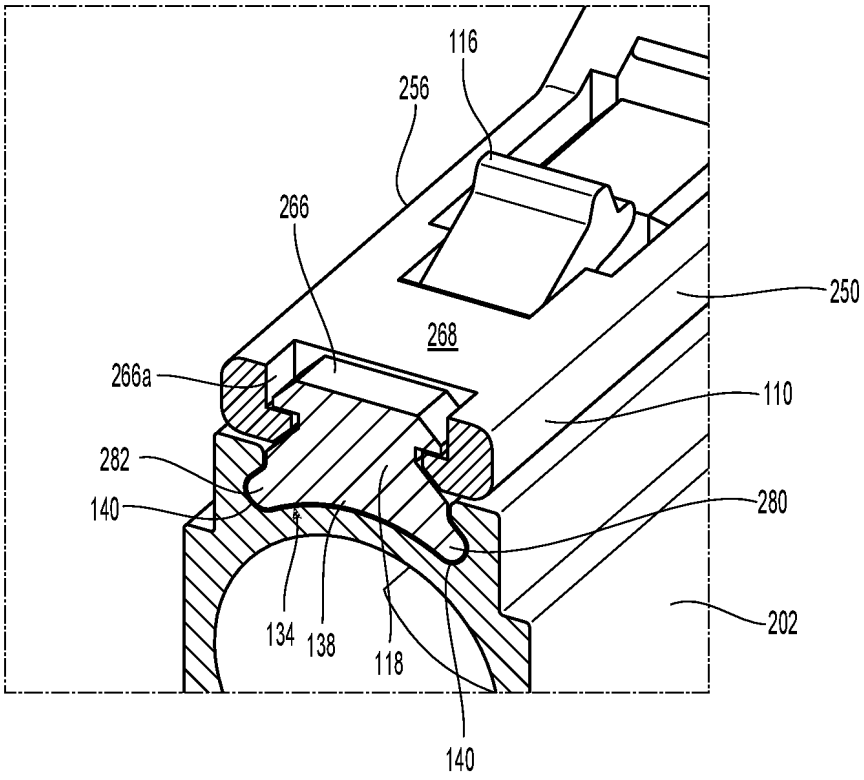


Fig. 7

EX1001: Fig. 7.

77. In addition, the ‘794 Patent explains the front extension (110) has other latches (114, 116), but these latches do not attach to the housing as recited by claim 16. EX1001: Fig. 1. Instead, these additional latches (114, 116) are for

engaging the adapter or active device receptacle the connector (100) is inserted into. EX1001: 4:4-9. Lastly, the connectors (100, 500) of the '794 Patent have other the latches (220, 528, 530) but these latches attach the crimp body (106, 520) and the boot (112, 500) to one another. EX1001: Figs. 9, 13 and 18, 5:47-53, 9:41-47. These other latches (220, 528, 530) fail to meet the claim language because (1) these latches do not attach the front extension to the housing and (2) these latches are not "forward of a center portion of the boot" as recited by claim 16. EX1001: Figs. 9, 13 and 18, 5:47-53, 9:41-47.

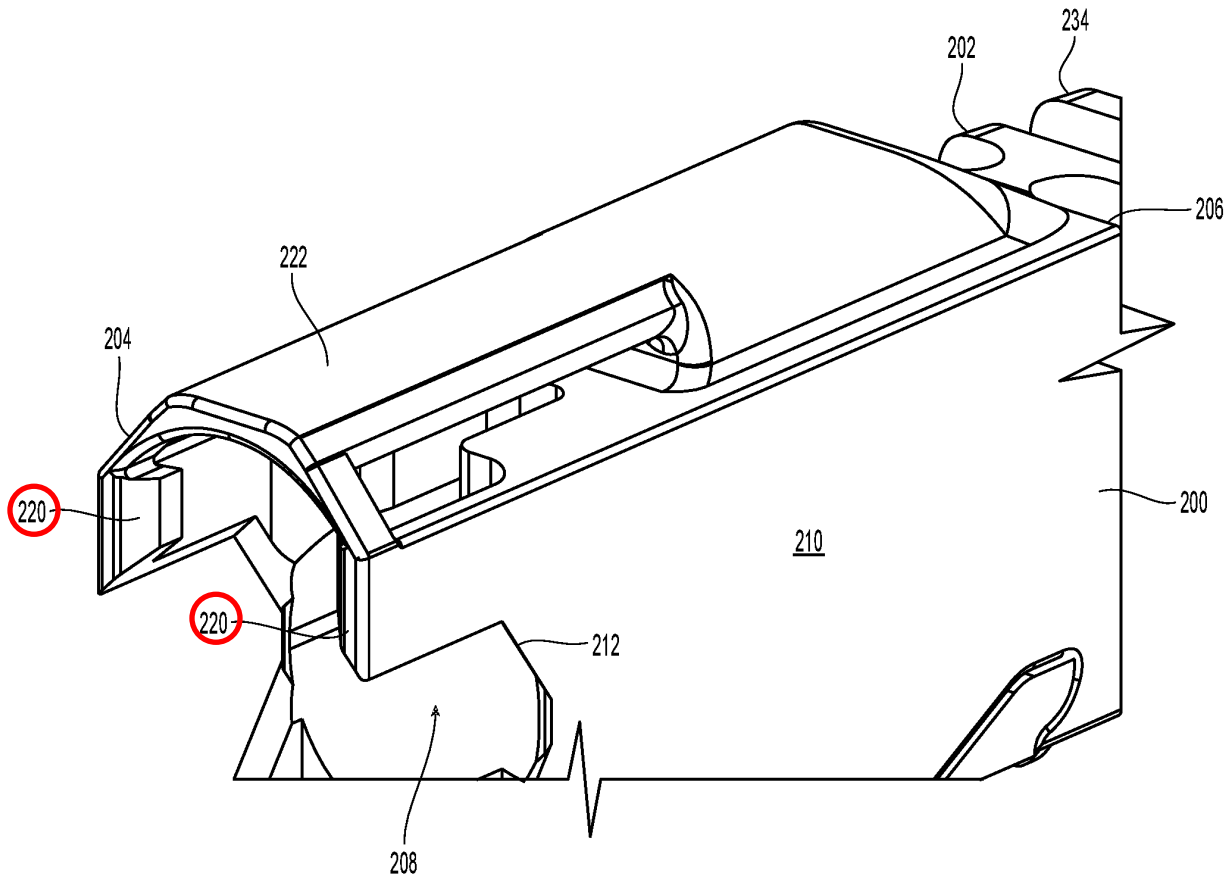


Fig. 13

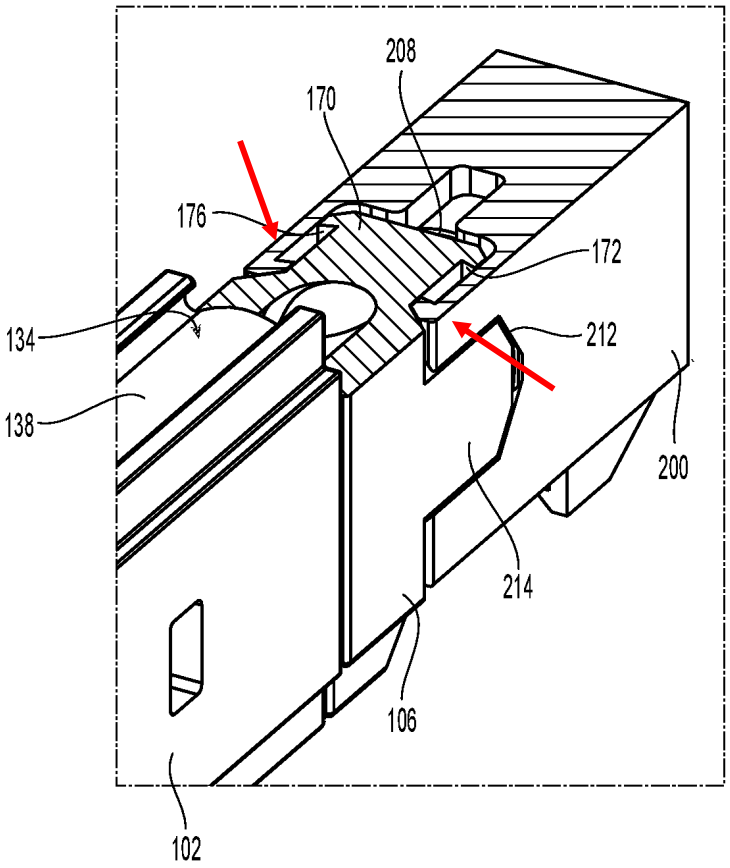


Fig. 9

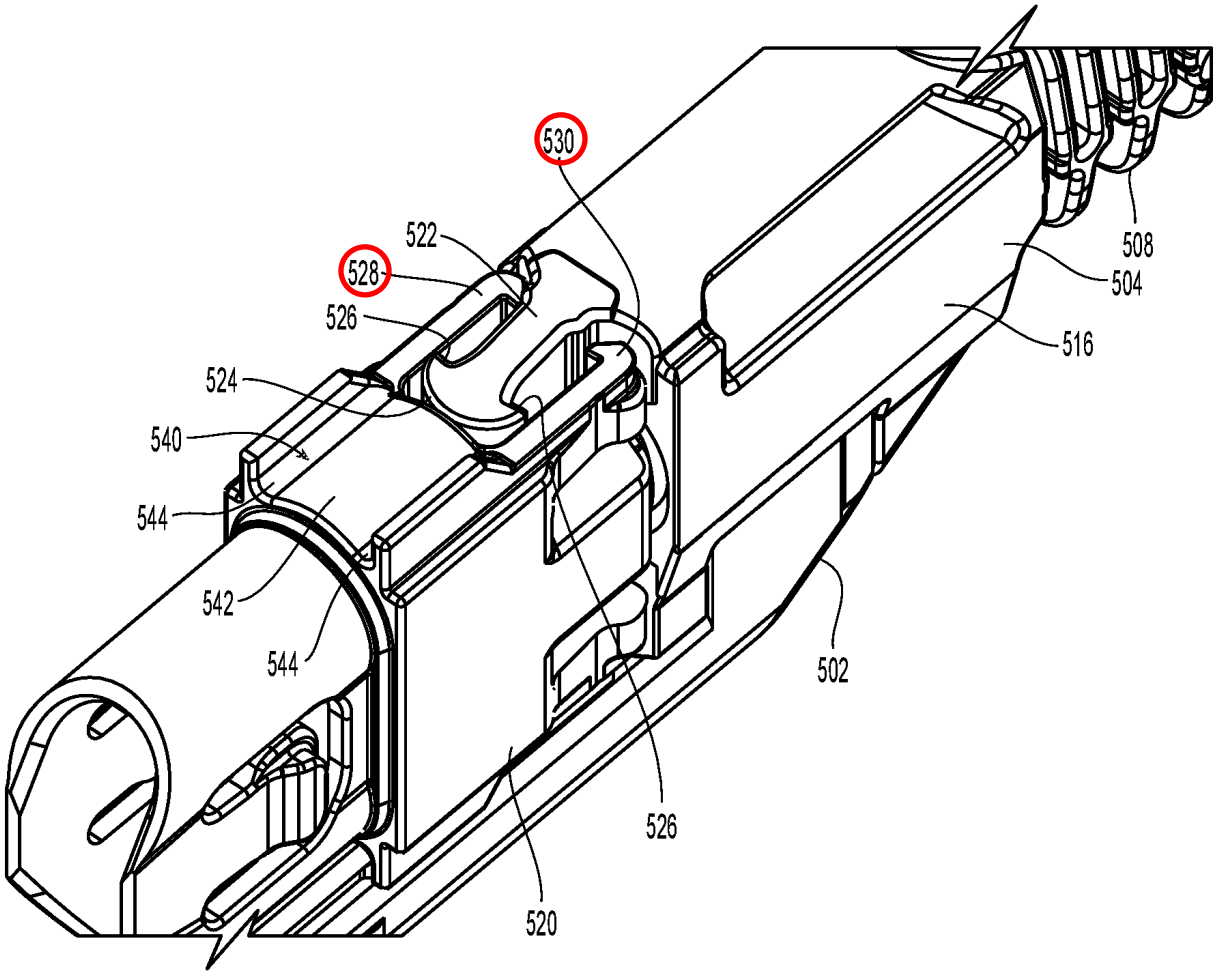


Fig. 18

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

78. Therefore, in my opinion, US Conec was not in possession of the full scope of "the front extension [is] attached to the housing ***via at least one latch*** forward of a center portion of the boot" when the specification of the '794 Patent shows and describes only a single latch (294)—not two or more latches—attaching

the front extension (110) to the housing (102). Therefore, in my opinion, claim 16 does not have written description support.

79. I have been informed that dependent claims also are invalid for lack of written description support, if the independent claim the dependent claims depend from lacks written description support. Dependent claims 17-19 depend from independent claim 16. Therefore, in my opinion, dependent claims 17-19 are invalid for lack of written description because they depend from claim 16.

C. Claim 20 Lacks Written Description Support

80. The pertinent part of claim 16 recites:

> A fiber optic connector comprising:
> a boot;
> a crimp body engaged to the boot ***forward of the boot***; and
> a housing ….

81. In my opinion, the specification of the '794 Patent contains no reference or indication that US Conec was in possession of "a crimp body engaged to the boot ***forward of the boot***."

82. The fiber optic connector (100) of the '794 Patent includes a housing (102), a crimp body (106), and a boot (112) (among other components). EX1001: 3:63-4:2. As described by the '794 Patent, the boot (112) has different portions including a front extension (110), a center portion (200), and a back portion (202). EX1001: 5:21-24, claim 1. Thus, the boot (112) includes the front extension (110). EX1001: 5:21-24, claim 1.

83. As shown below, the front extension (110) forms the front of the boot (112). EX1001: Fig. 6. However, the crimp body (106) is not engaged with the front of the boot (112) formed by the front extension (110). EX1001: Fig. 1. Instead, the crimp body (106) is located at an intermediate position along the length of the boot (112), rearward of the front of the boot, when the boot is attached to the crimp body. EX1001: Fig. 1. As shown below, the front extension (110) of the boot (112) extends forward of the crimp body (106). EX1001: Fig. 1. Accordingly, the crimp body (106) of the '794 Patent is not engaged to the boot (112) forward of the boot as recited by claim 20.

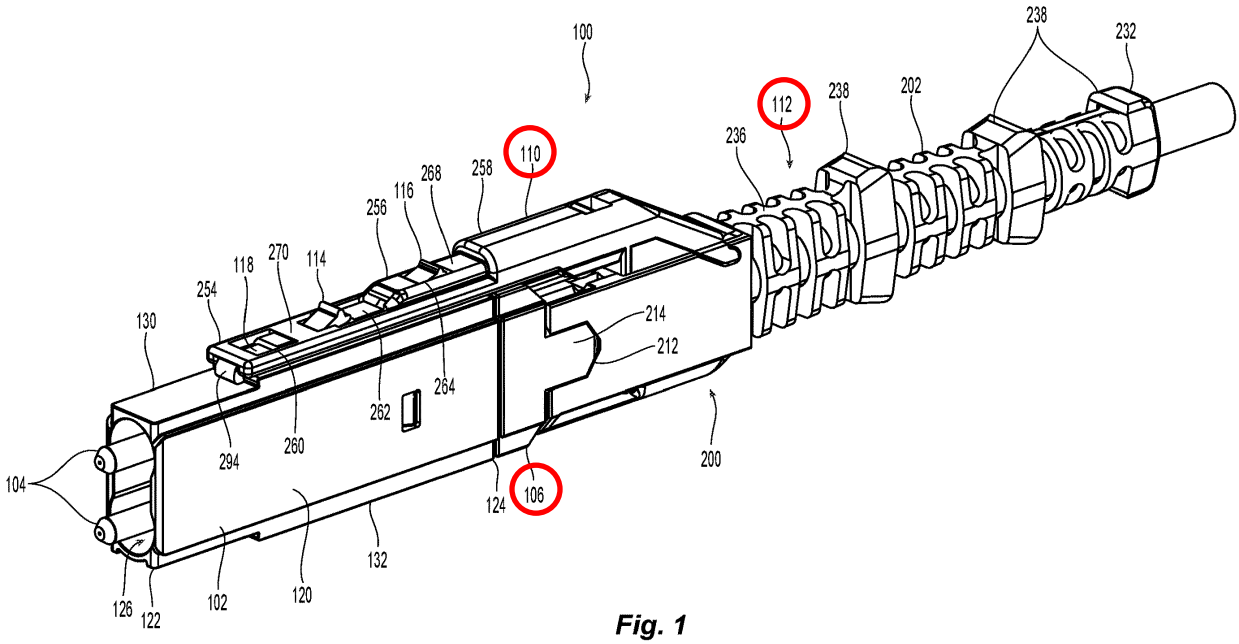


Fig. 1

EX1001: Fig. 1 (annotated).

84. Therefore, in my opinion, the limitation of "a crimp body engaged to the boot forward of the boot" in claim 20 does not have written description support in the '794 Patent.

VI. ANTICIPATION: TAKANO (FIRST EMBODIMENT) (GROUND 2)

85. As I explained in Section III(B)(1), Takano discloses multiple different embodiments of optical connectors. EX1003: Figs. 1 and 16. In this ground, I rely on the first embodiment of Takano—the optical connector shown in Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the optical connector *includes* the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059] ("multi-purpose rotatable boot 9109.1 comprises releasably attached alignment and offset key 9105.1, releasable at release point 9109.6").

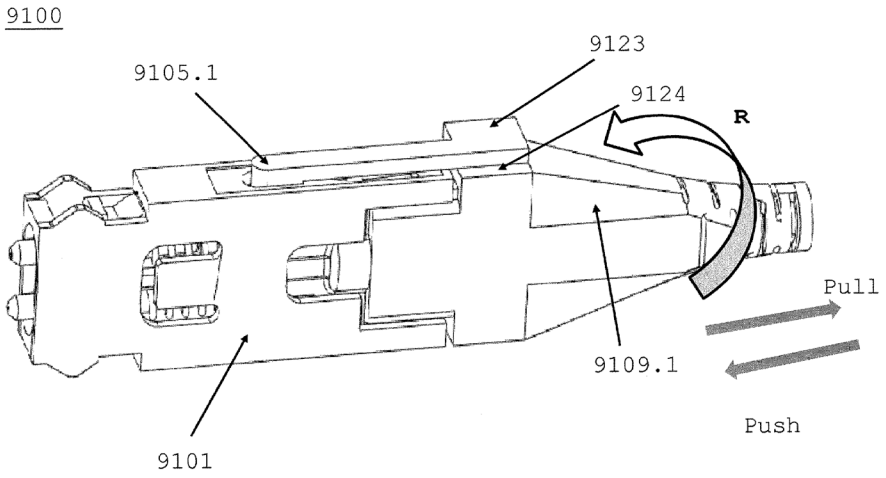


FIG. 16

EX1003: Fig. 16.

86. In my opinion, claims 1-6, 8-12, 14, 16-18, and 20 are anticipated by this first embodiment of Takano.

87. The similarities between Takano's optical connector shown in Fig. 16 and the '794 Patent's optical connector (100) shown in Fig. 1 are apparent as both include front extensions that overlap the housing to set the polarity (among other features).

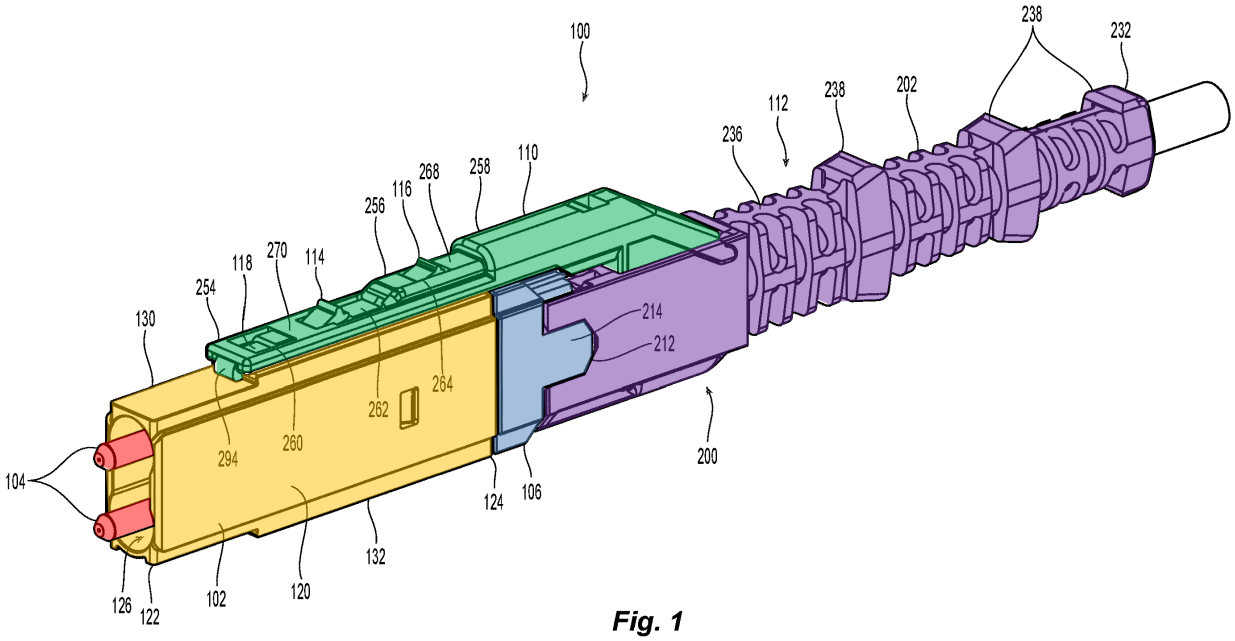


Fig. 1

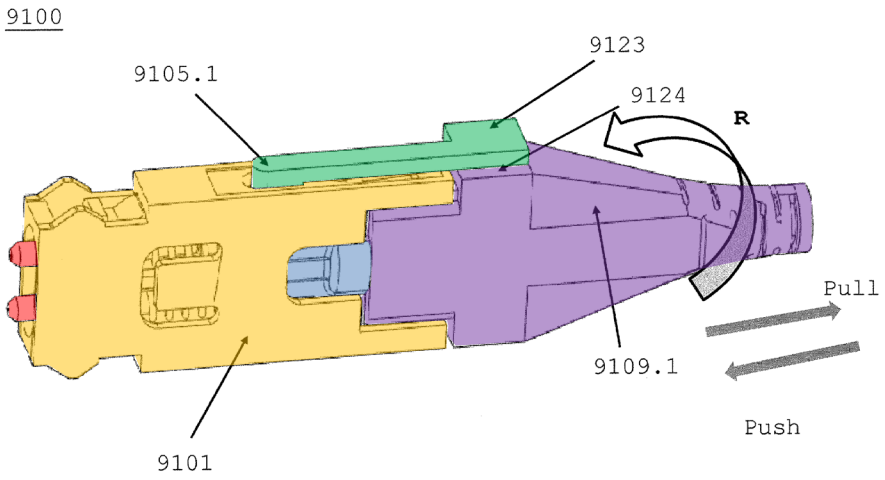


FIG. 16

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

A. Independent Claim 1

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising:

88. Takano teaches a micro fiber optic connector (9100) having an outer housing (9101, 9201, 9301, 9401), a boot or boot assembly (9109.1, 9209.1, 9309.1, 9409.1), and a back body (9106, 9206). EX1003: ¶¶[0058], [0061], Figs. 16 and 18. The POSA understands the back body (9106, 9206) is equivalent to the claimed "crimp body" because a crimp ring (9207) is crimped onto the back body. EX1003: ¶¶[0067], [0072], Figs. 27 and 34.

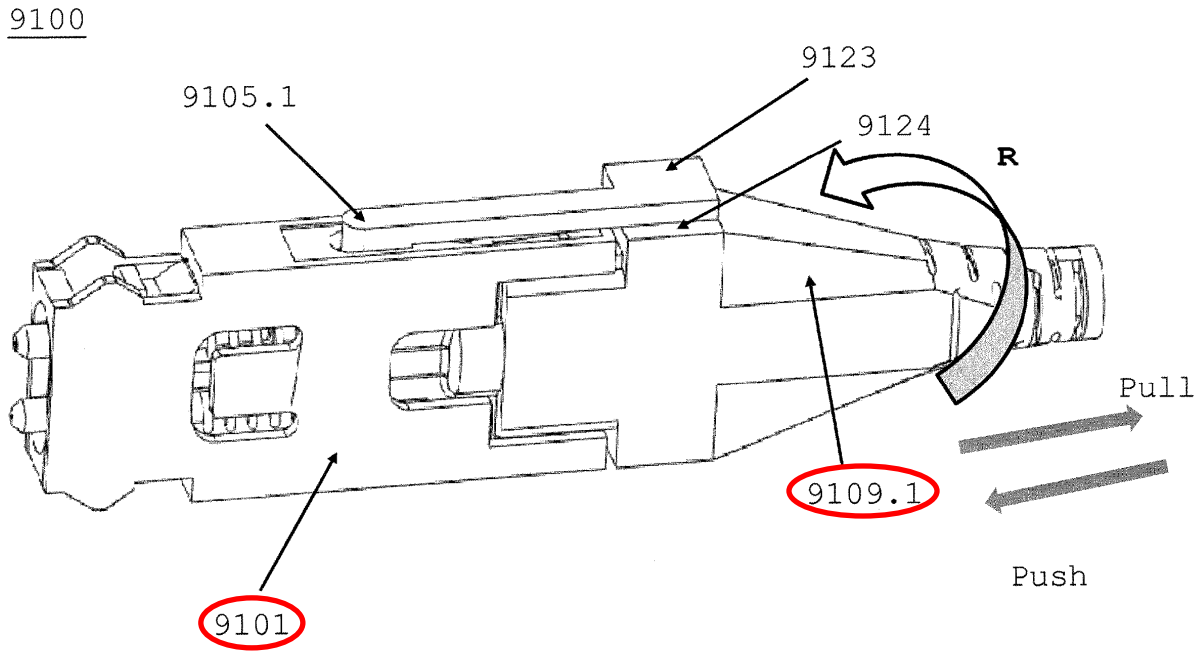


FIG. 16

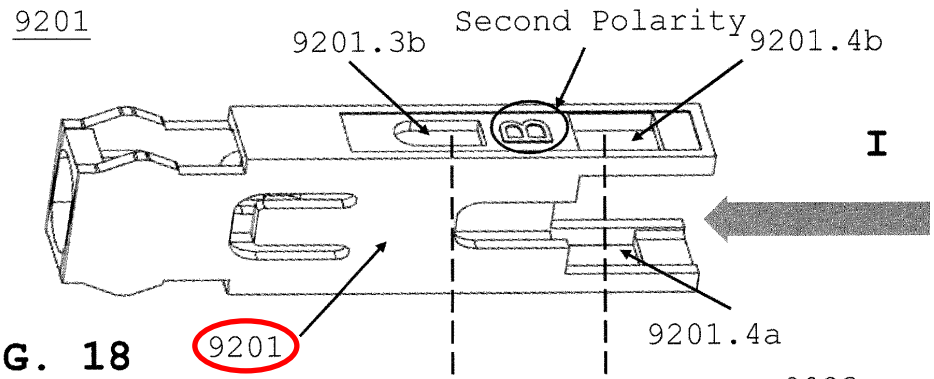


FIG. 18

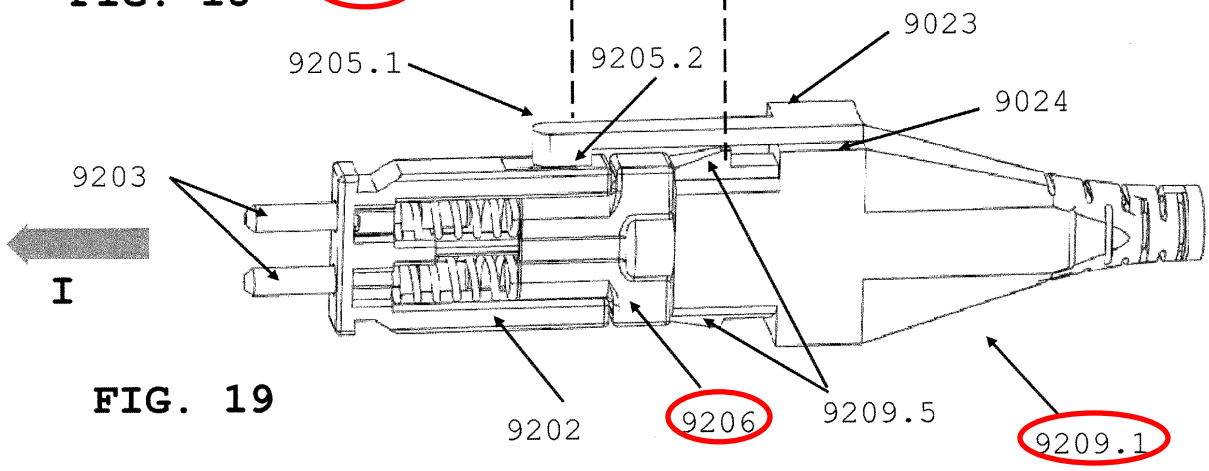


FIG. 19

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

89. The micro fiber optic connector (9100) includes two ferrules (9203) partially within the outer housing (9101, 9201, 9301, 9401). EX1003: Fig. 16 and 19, ¶[0061]. Each ferrule (9203) terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector (9100) is attached to. EX1003: ¶¶[0048], [0059], [0065]. While Takano does not illustrate the optical fibers, as understood by a POSA, Fig. 36 below has been annotated to include the optical fibers (red).

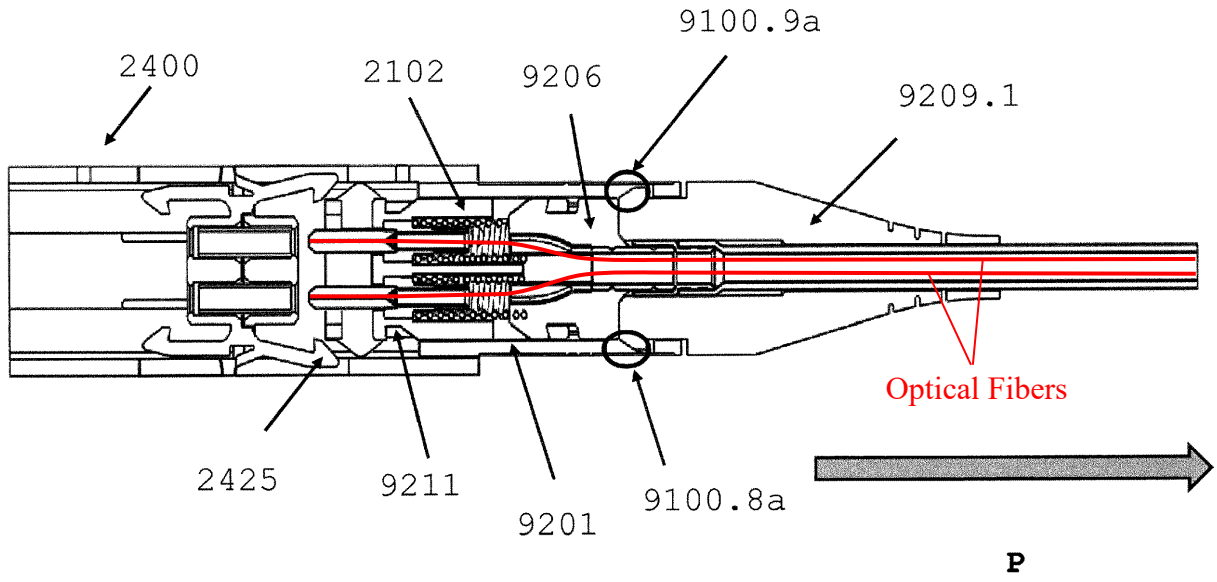


FIG. 36

EX1003: Fig. 36 (annotated).

90. Therefore, in my opinion, Takano meets this limitation.

1.a.1 "a front end opening in the housing,"

91. Takano's outer housing (9101, 9201, 9301, 9401) has a front end opening. EX1003: Figs. 16 and 30.

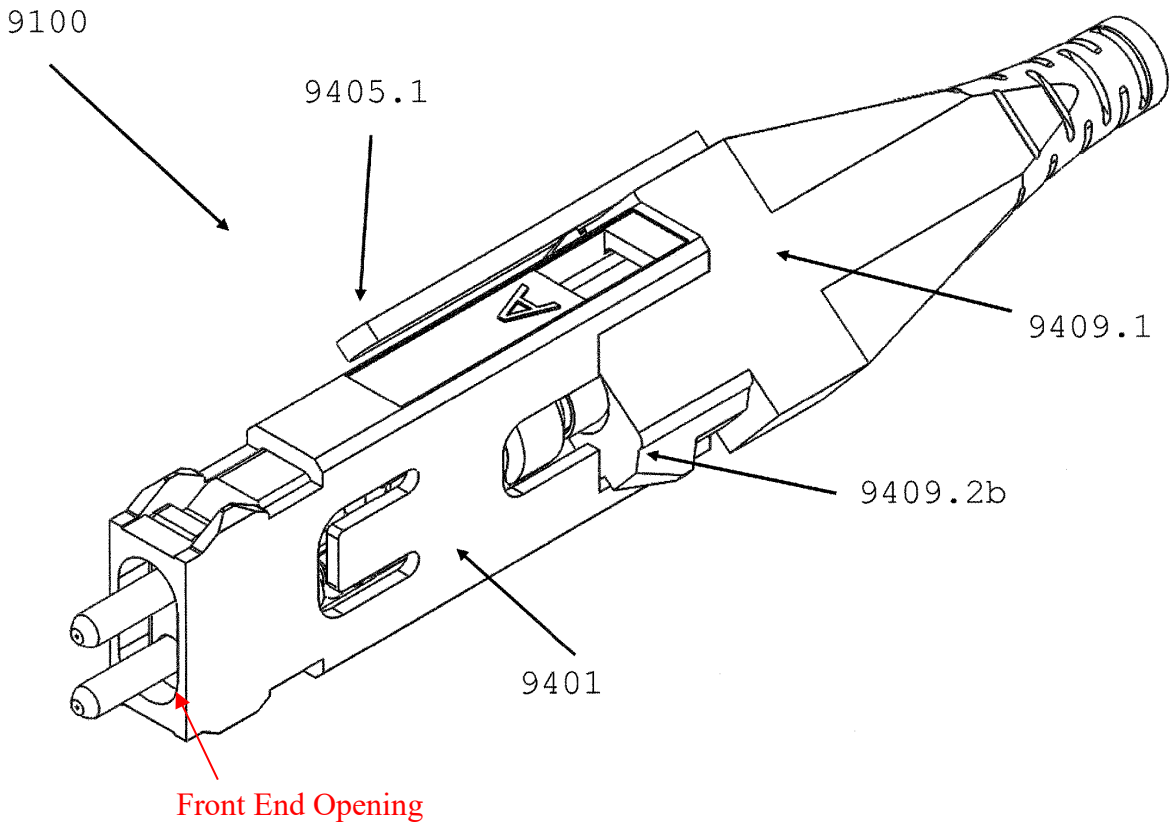


FIG. 30

EX1003: Fig. 30 (annotated).

92. Therefore, in my opinion, Takano meets this limitation.

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

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

housing (9101, 9201, 9301, 9401) also has two long sides joining the top and bottom. EX1003: Figs. 16, 29, and 30.

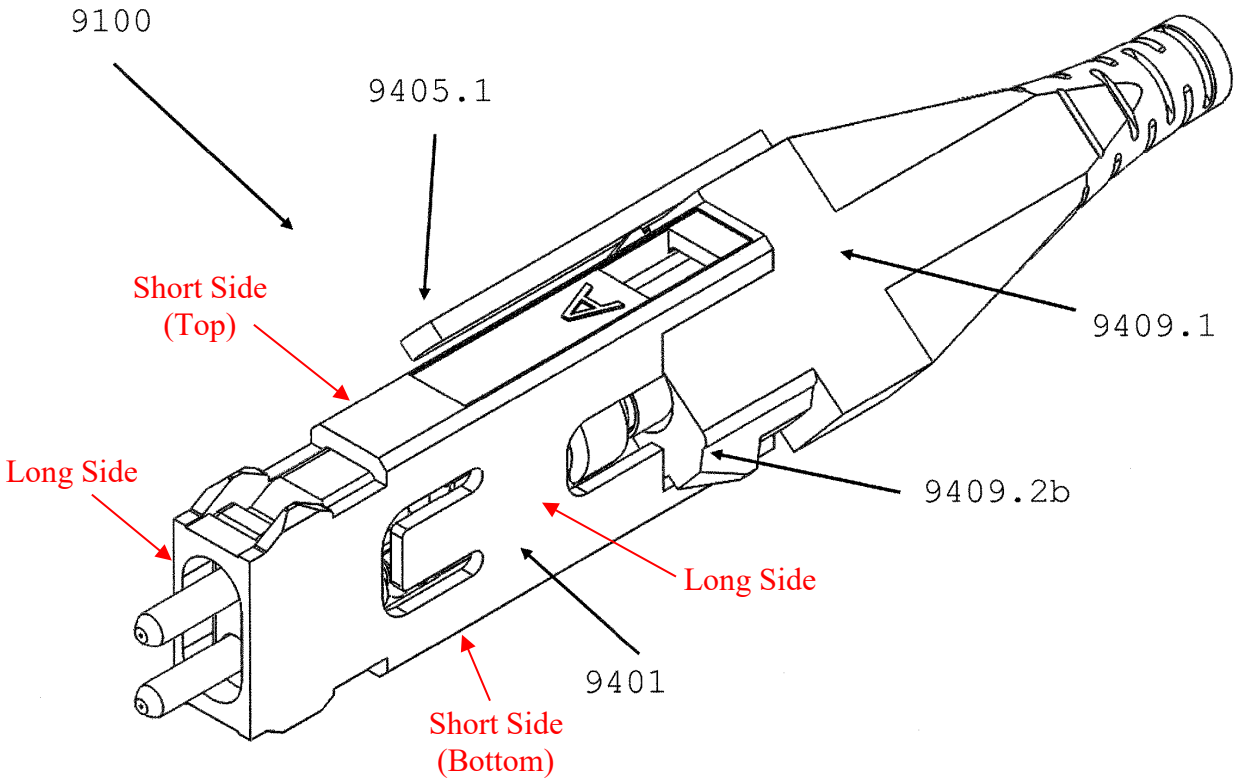


FIG. 30

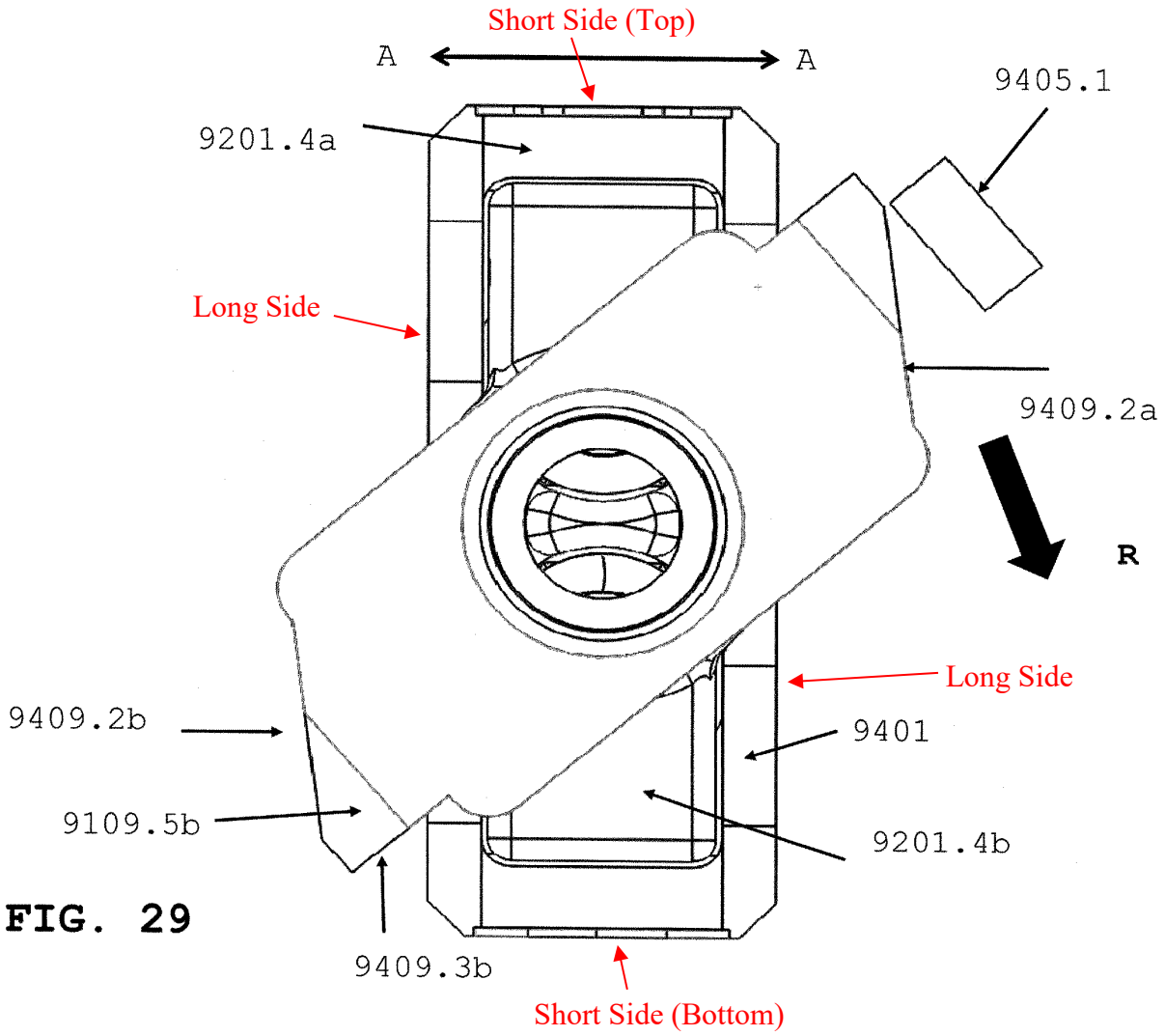


FIG. 29

EX1003: Figs. 29 and 30 (annotated).

94. Therefore, in my opinion, Takano meets this limitation.

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"

95. The micro fiber optic connector (9100) includes two ferrules (9203) that are spaced apart between the top and bottom of the outer housing (9101, 9201, 9301, 9401). EX1003: Fig. 16, 19, and 30, ¶[0061].

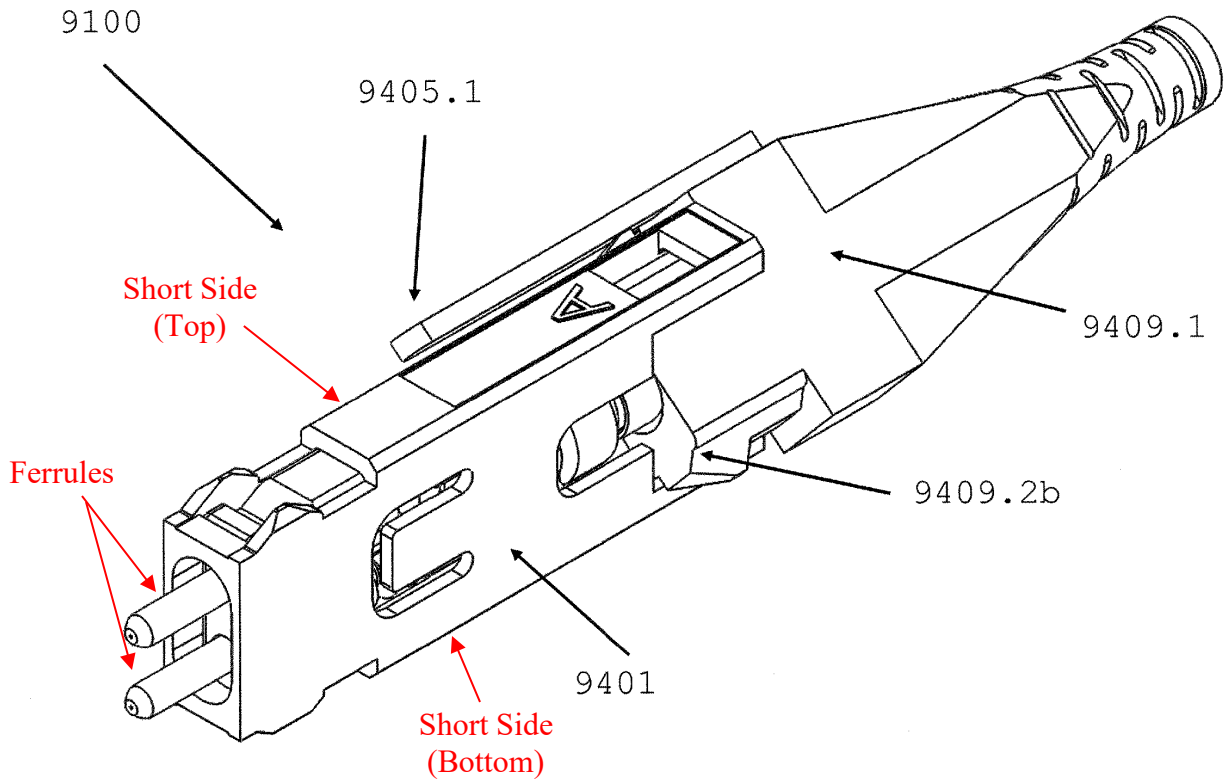


FIG. 30

EX1003: Fig. 30 (annotated).

96. Each ferrule (9203) terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector (9100) is attached to. EX1003: ¶¶[0048], [0059], [0065]. While Takano does not illustrate the optical fibers, Fig. 36 below has been annotated to include the optical fibers (red).

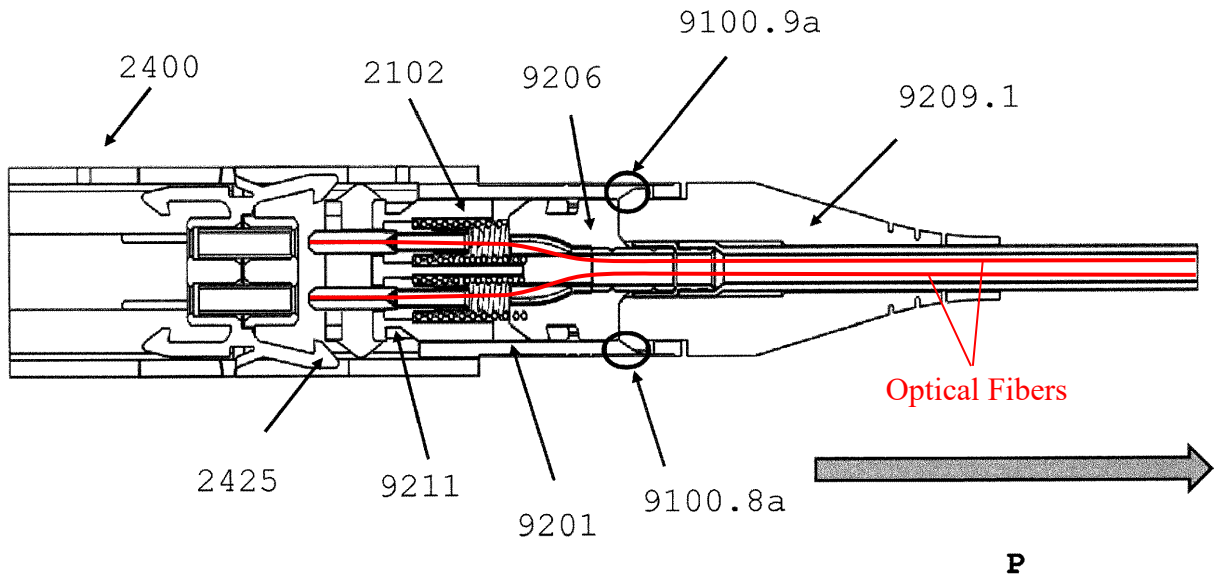
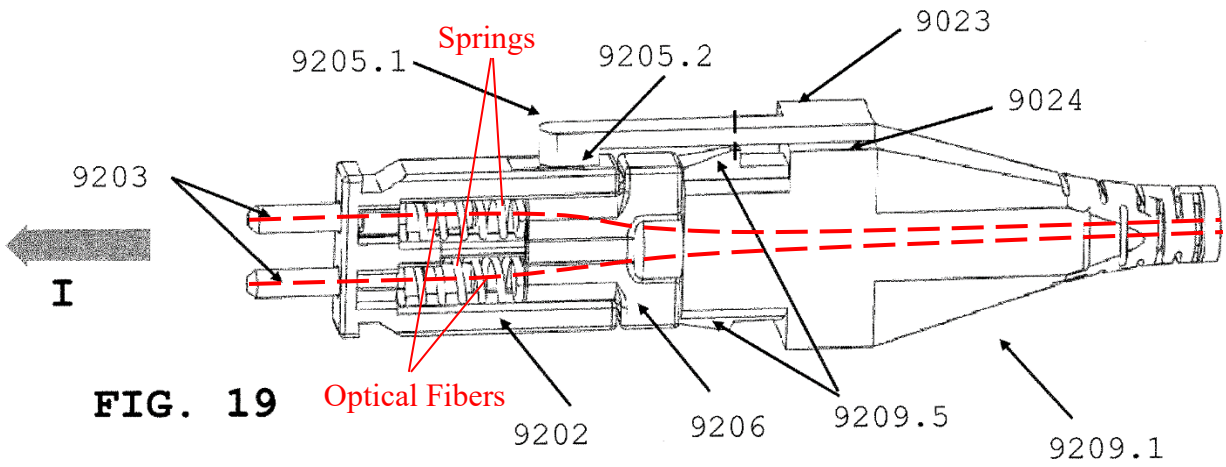


FIG. 36

EX1003: Fig. 36 (annotated).

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



EX1003: Fig. 19 (annotated).

98. Therefore, in my opinion, Takano meets this limitation.

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;"

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

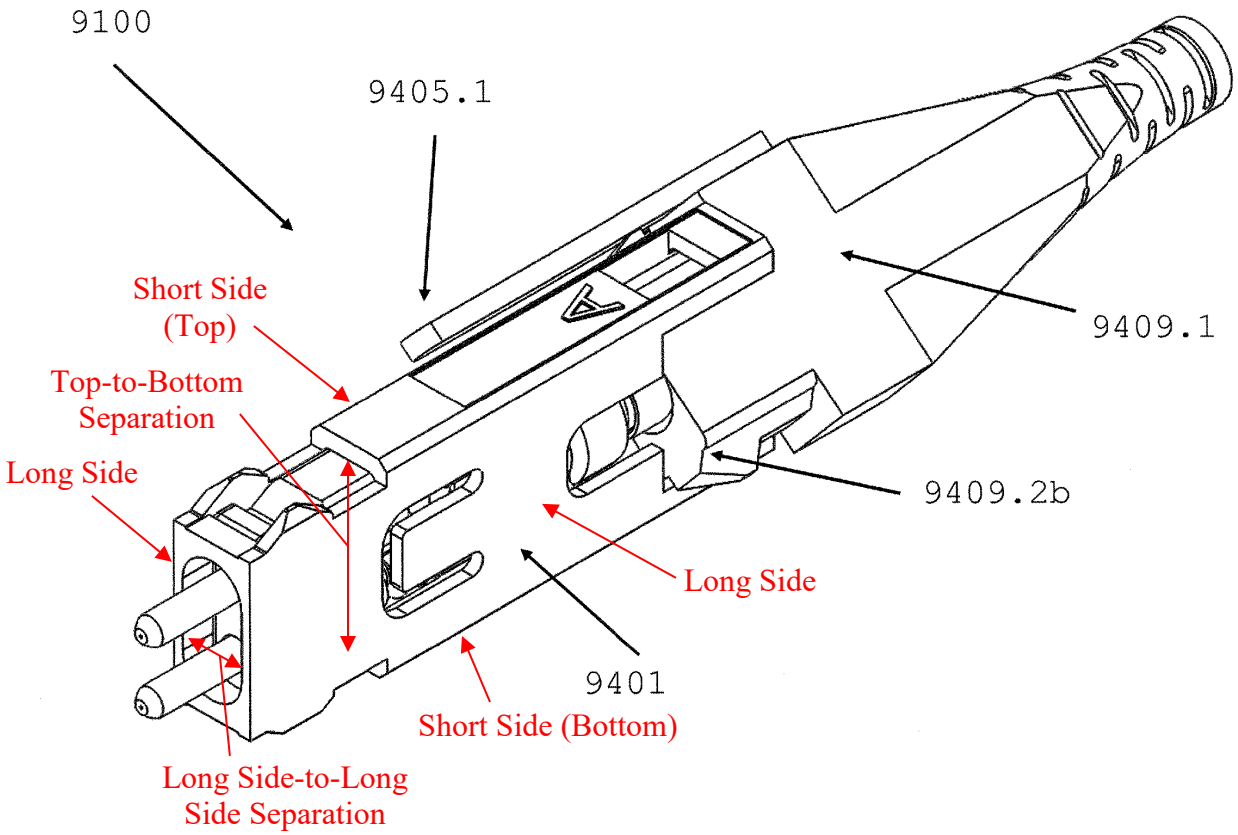

9100
9405.1
Short Side
(Top)
Top-to-Bottom
Separation
Long Side
9409.1
9409.2b
Long Side
9401
Short Side (Bottom)
Long Side-to-Long
Side Separation

FIG. 30

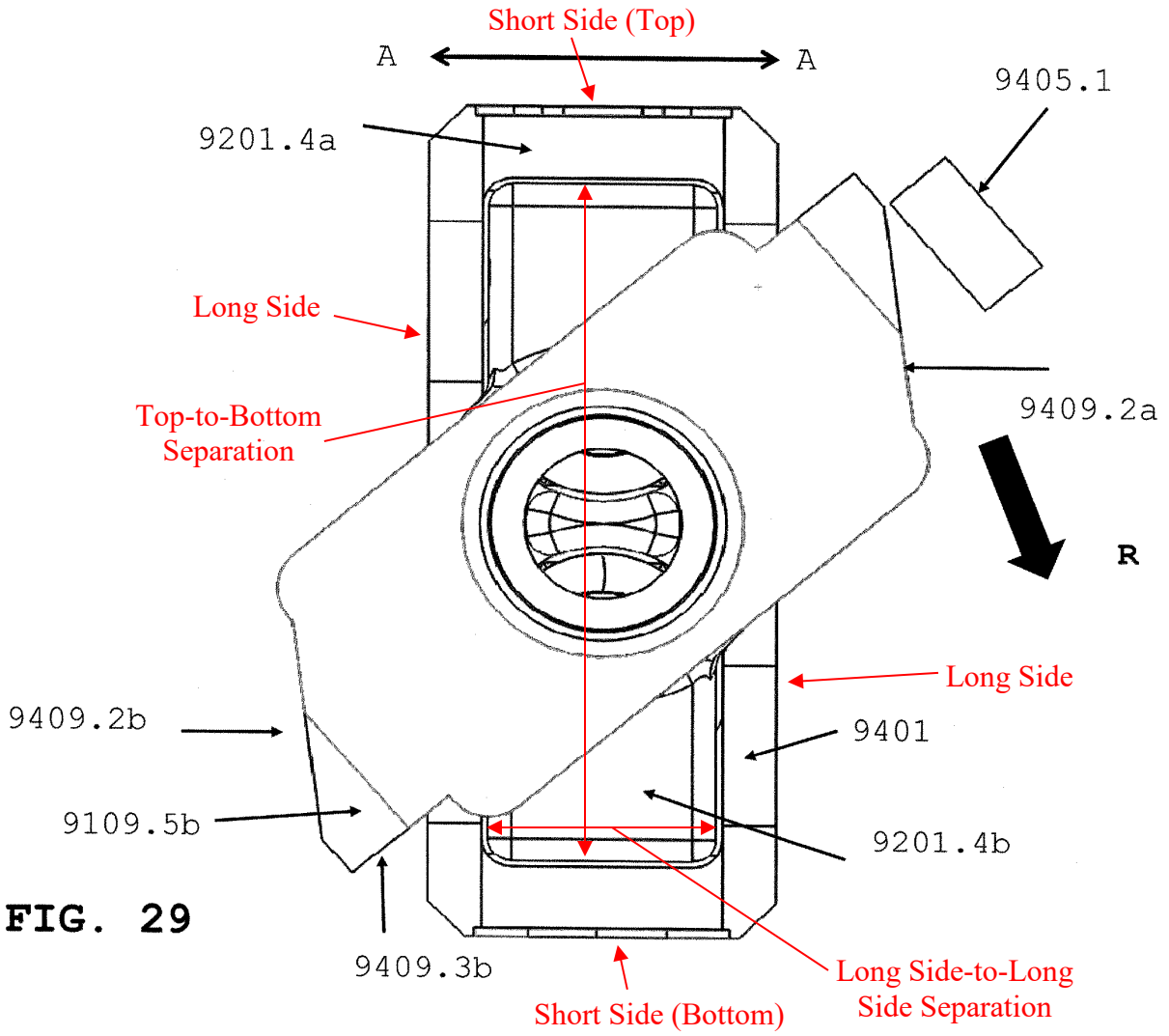


FIG. 29

EX1003: Figs. 29 and 30 (annotated).

100. Therefore, in my opinion, Takano meets this limitation.

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and"

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

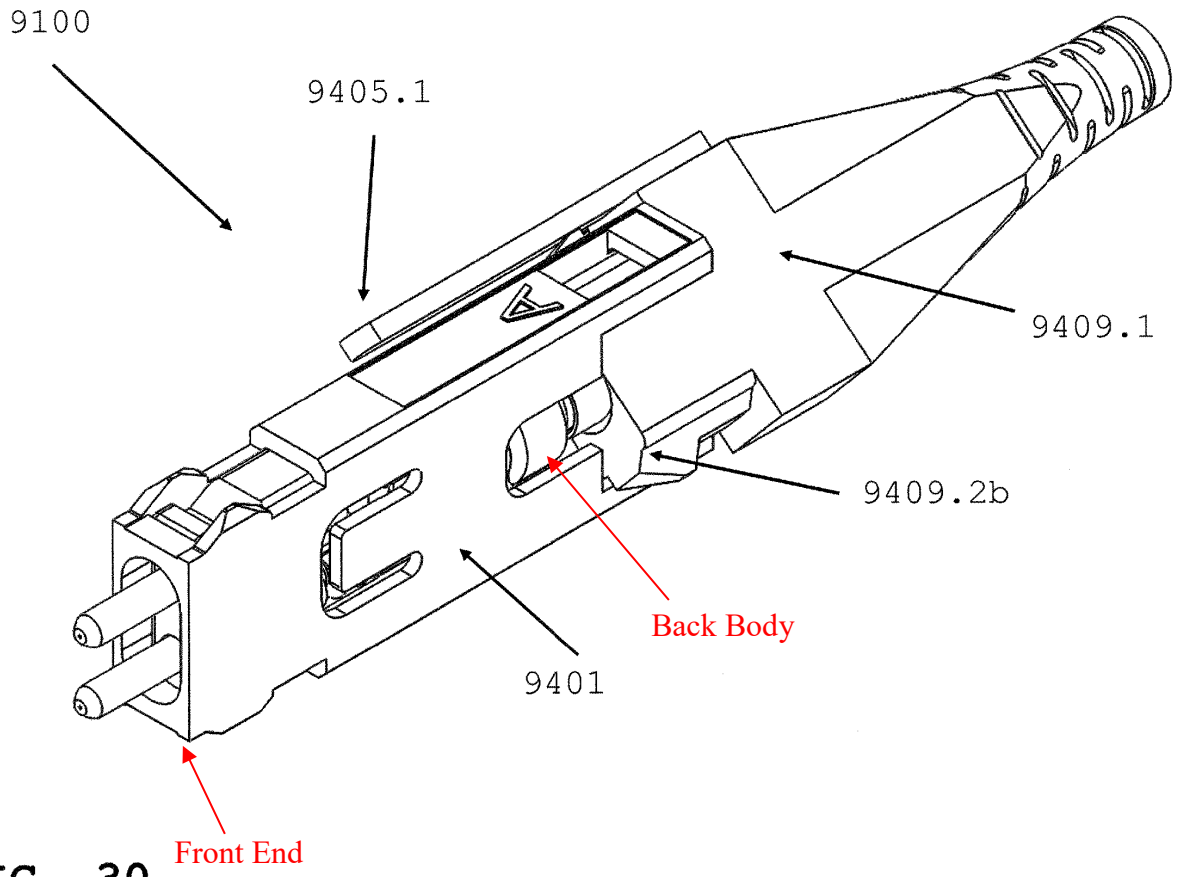

9100
9405.1
9409.1
9409.2b
Back Body
9401
Front End

FIG. 30

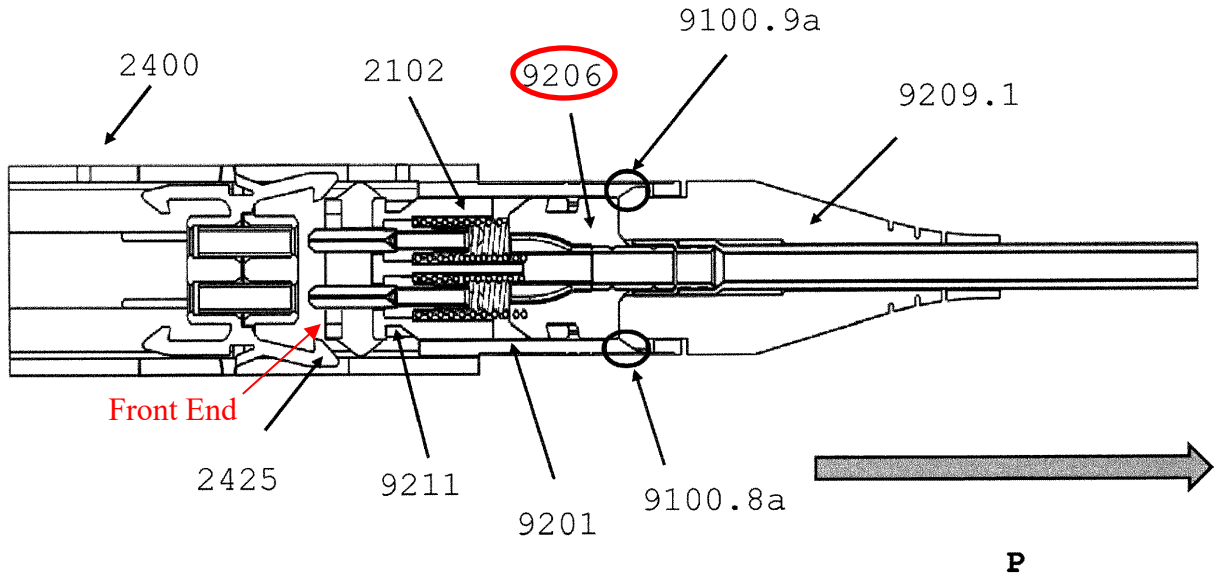

2400
2102
9206
9100.9a
9209.1
Front End
2425
9211
9201
9100.8a
P

FIG. 36

EX1003: Figs. 30 and 36 (annotated).

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

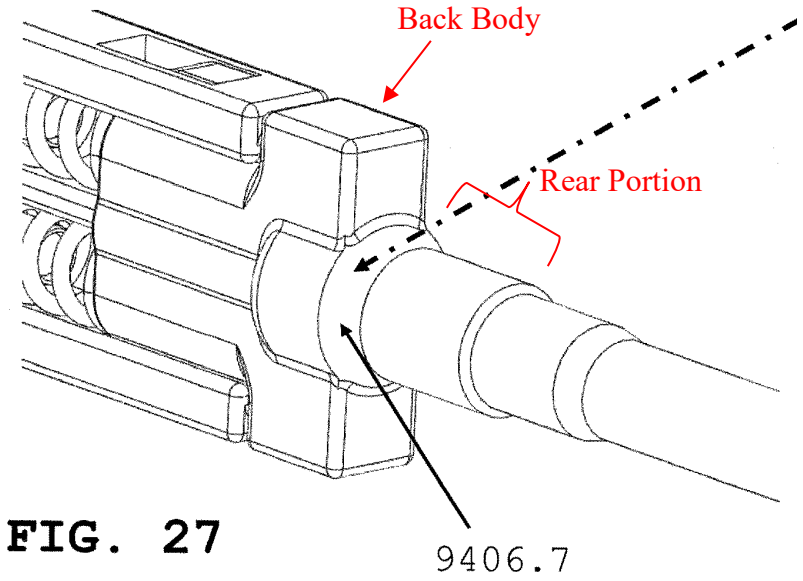


FIG. 27

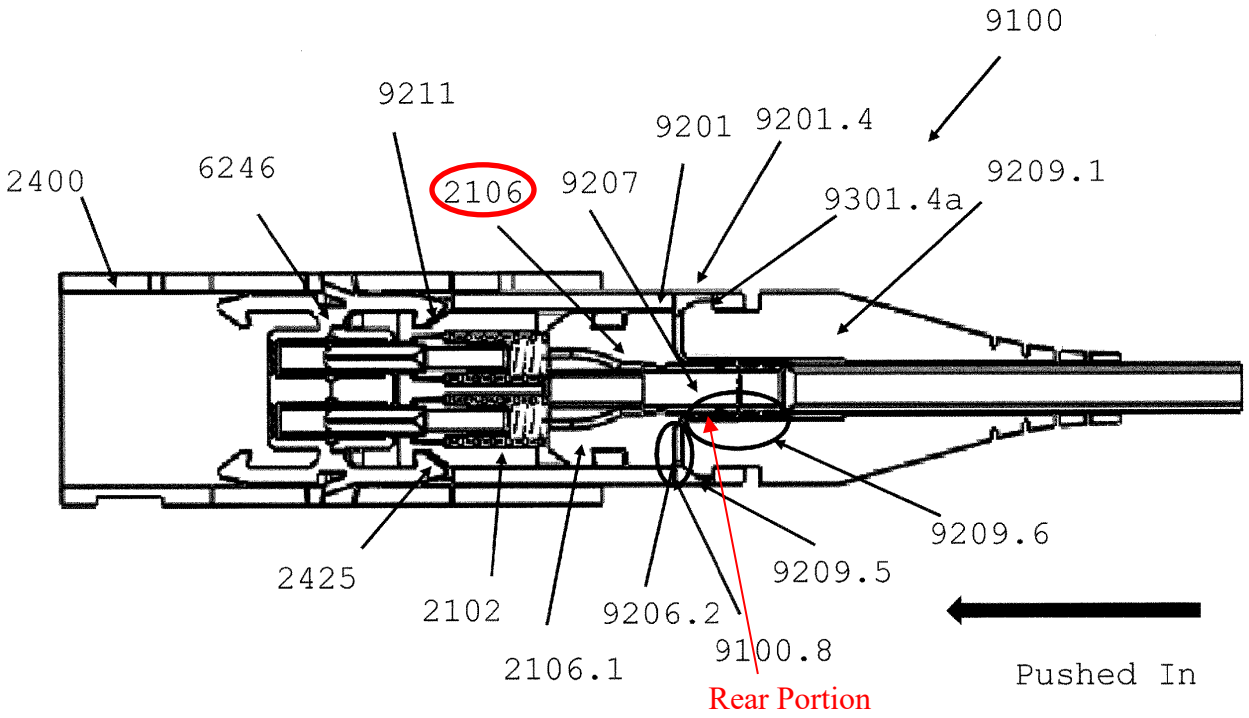


FIG. 34

EX1003: Figs. 27 and 34 (annotated).

103. Therefore, in my opinion, Takano meets this limitation.

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

104. The boot (9109.1, 9209.1, 9309.1, 9409.1) includes an inner round (9409.4) (e.g., inside diameter) that forms a cavity that receives the back post (i.e., rear portion) of the back body (9106, 9206) and the crimp ring (9207) crimped thereon. EX1003: Figs. 26, 27, 30, and 34, ¶[0067].

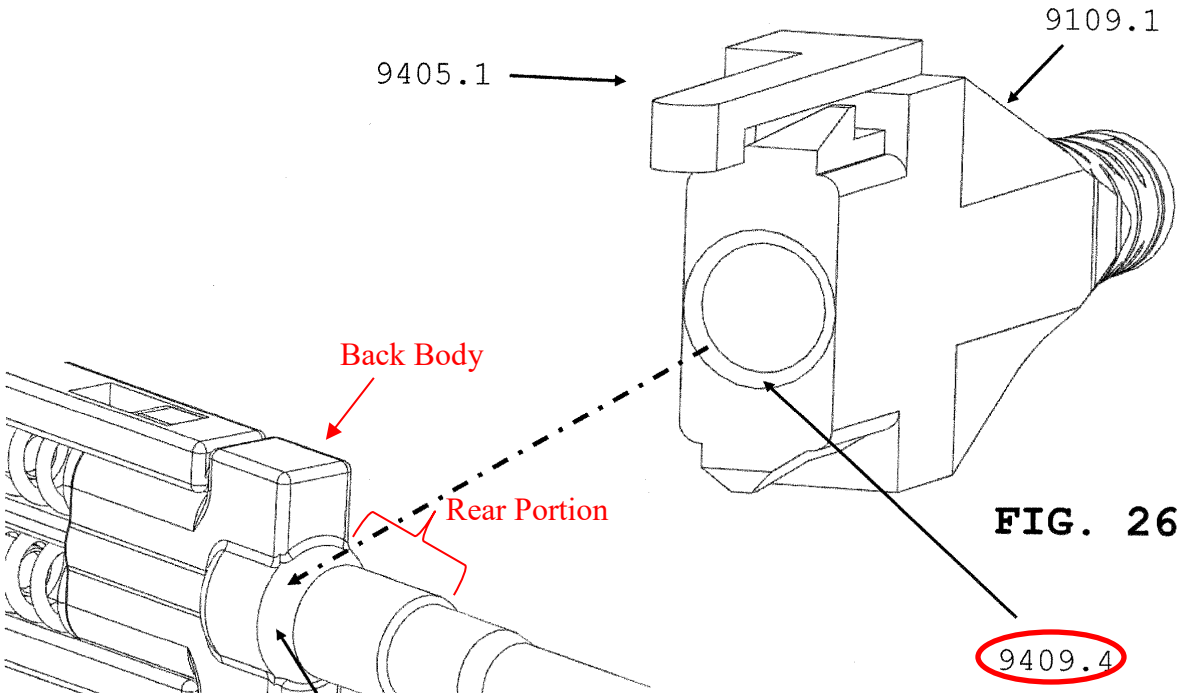


FIG. 26

FIG. 27

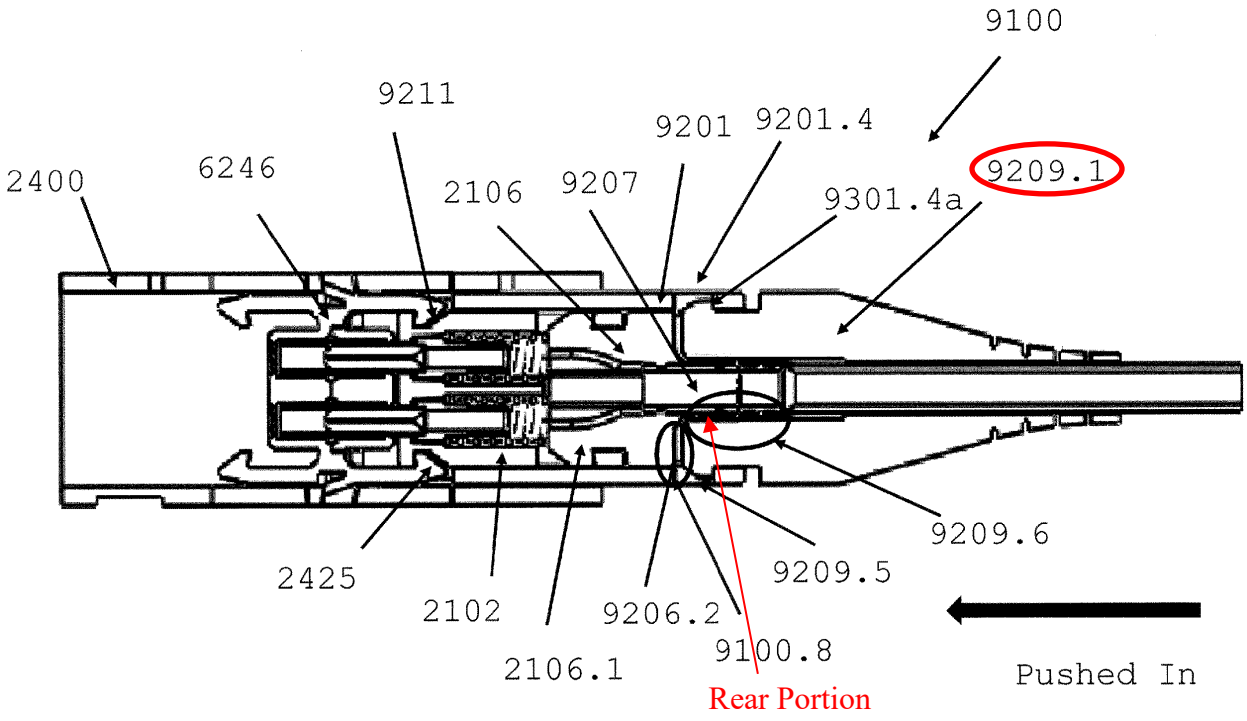


FIG. 34

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

105. The boot (9109.1, 9209.1, 9309.1, 9409.1) includes an alignment and offset key (9105.1, 9205.1, 9305.1, 9405.1) which is a front extension. EX1003: Fig. 16, ¶[0059]. The key (9105.1, 9205.1, 9305.1, 9405.1) attaches to the rest of the boot (9109.1, 9209.1, 9309.1, 9409.1) at point (9109.6). EX1003: Fig. 17, ¶[0059].

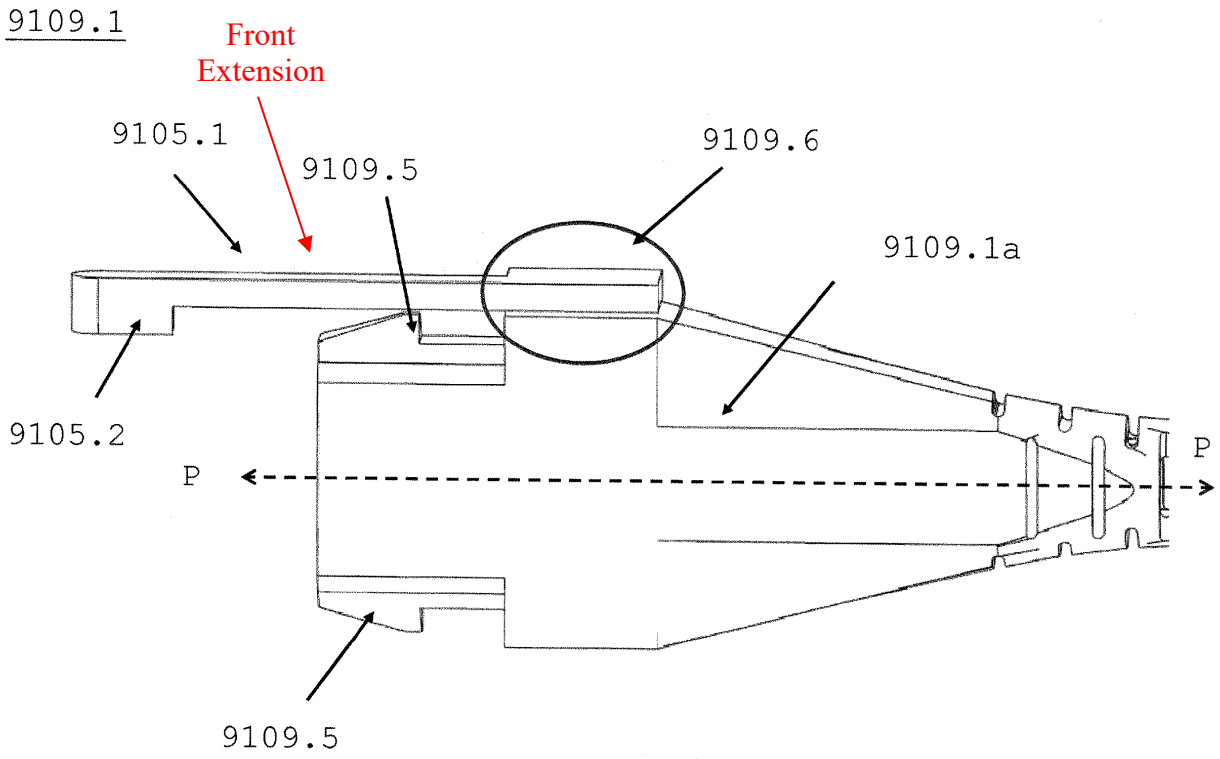


FIG. 17

EX1003: Fig. 17 (annotated).

106. Therefore, in my opinion, Takano meets this limitation.

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"

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

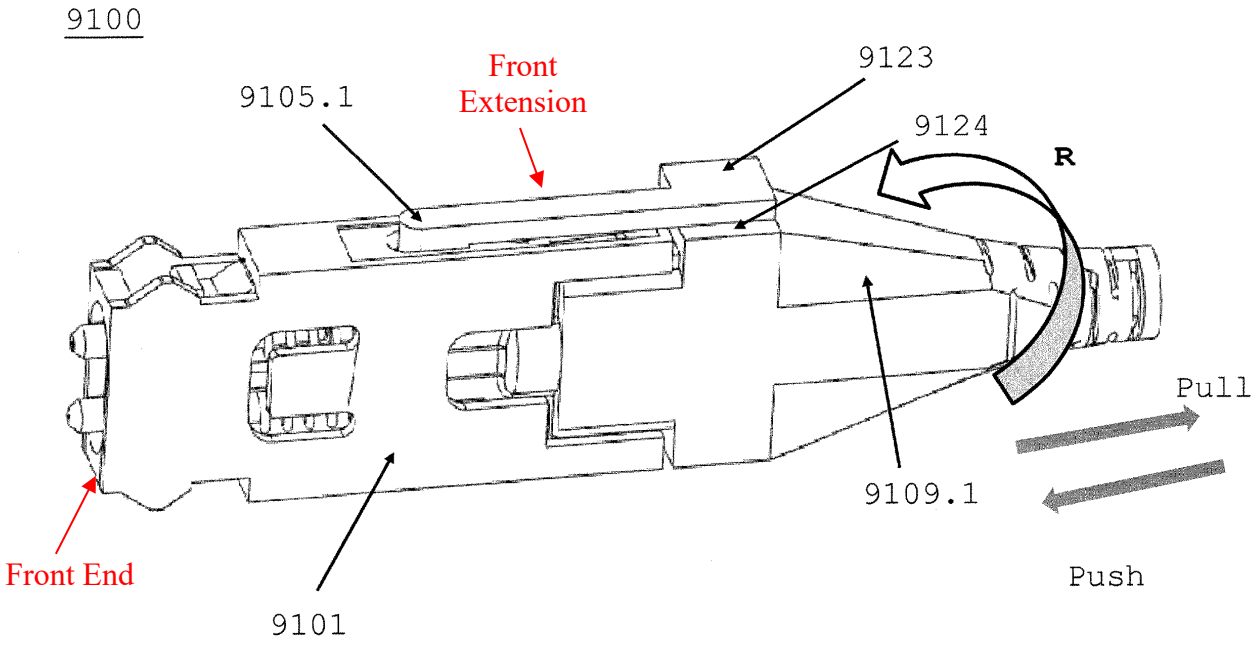


FIG. 16

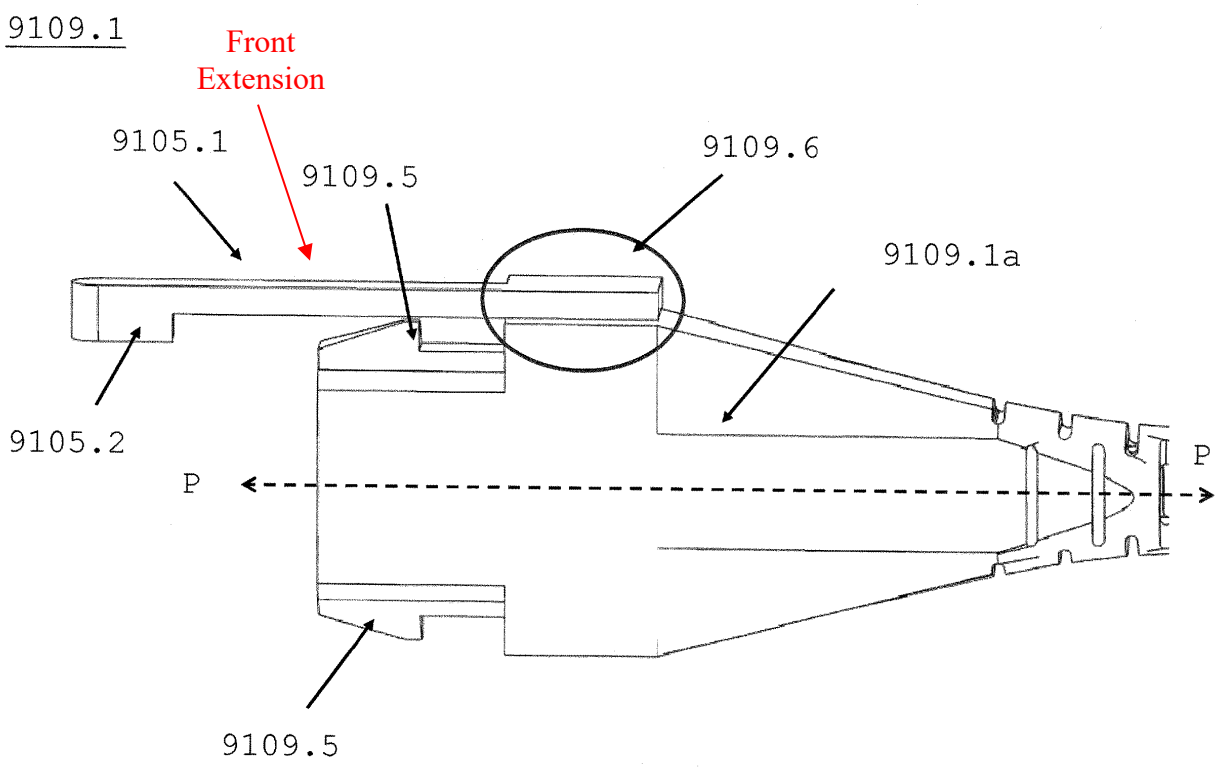


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

108. The outer housing (9101, 9201, 9301, 9401) includes a first slot (9201.3a) on the top and a second slot (9201.3b) on the bottom for receiving a securing protrusion (9105.2, 9205.2, 9405.2) of the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: Figs. 17-19, ¶¶[0059]-[0060], [0067]. The "[s]ecuring protrusion 9405.1 resides in first slot 9201.3a for "A" polarity, and then resides in first slot 9201.3b for "B" polarity." EX1003: ¶[0067].

109.

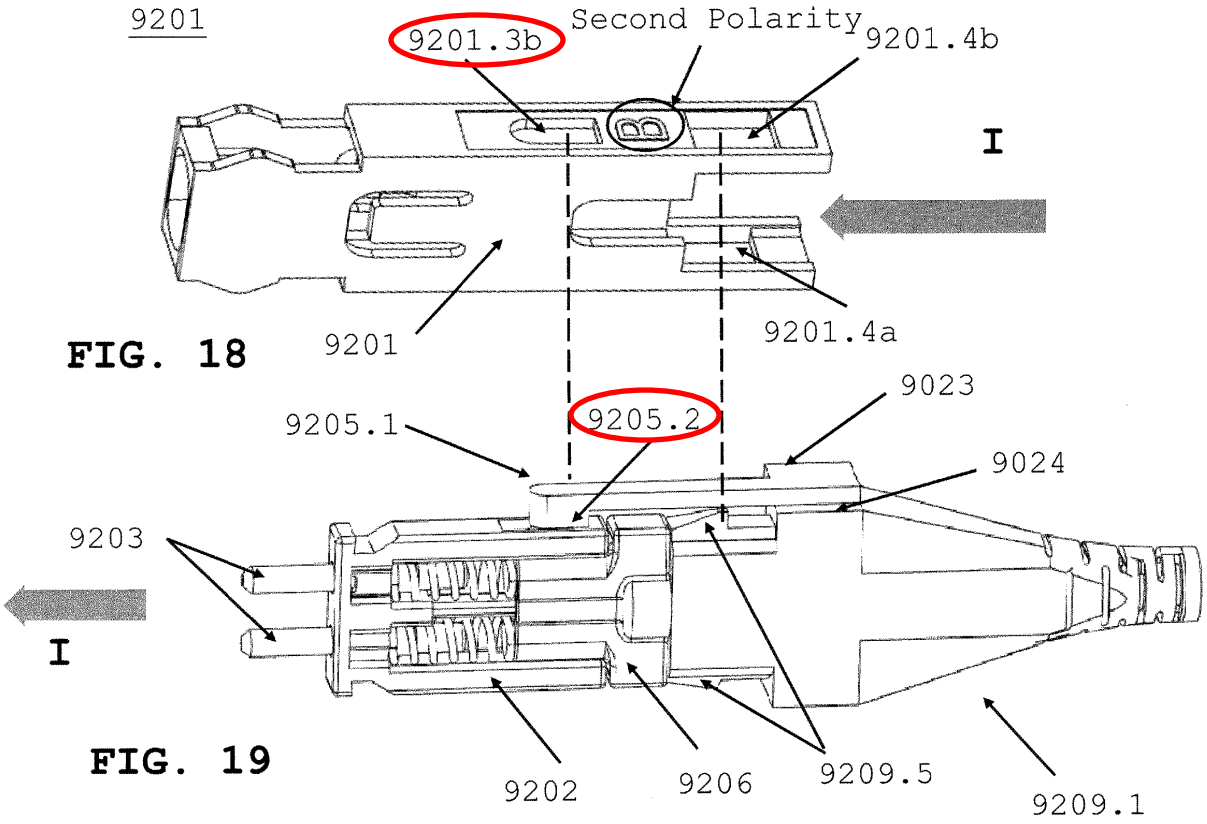


FIG. 18

FIG. 19

EX1003: Figs. 18 and 19 (annotated).

110. Reception of the securing protrusion (9105.2, 9205.2, 9405.2) of the key (9105.1, 9205.1, 9305.1, 9405.1) in one of the slots (9201.3a, 9201.3b) attaches the key to the outer housing (9101, 9201, 9301, 9401). EX1003: ¶¶[0059] ("key 9105.1 has a securing protrusion 9105.2 at a proximal end that engages first slot 9201.3b in connector housing 9201 [] to further secure multi-purpose rotatable boot assembly 9109.1 to front body 9202 or outer housing 9201"), [0061], [0067]. As shown below, the location of this attachment is forward of a center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1).

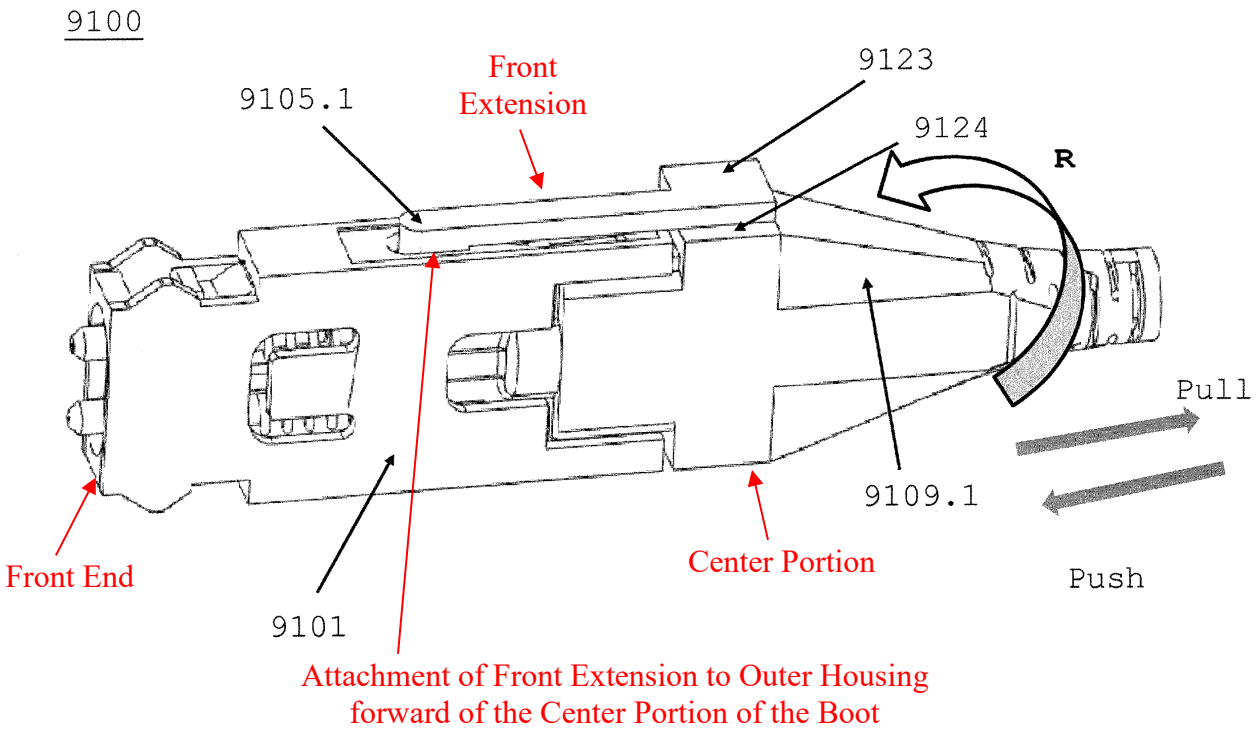

9100
9105.1
Front
Extension
9123
9124
R
Pull
Push
9109.1
Front End
9101
Center Portion
Attachment of Front Extension to Outer Housing
forward of the Center Portion of the Boot

FIG. 16

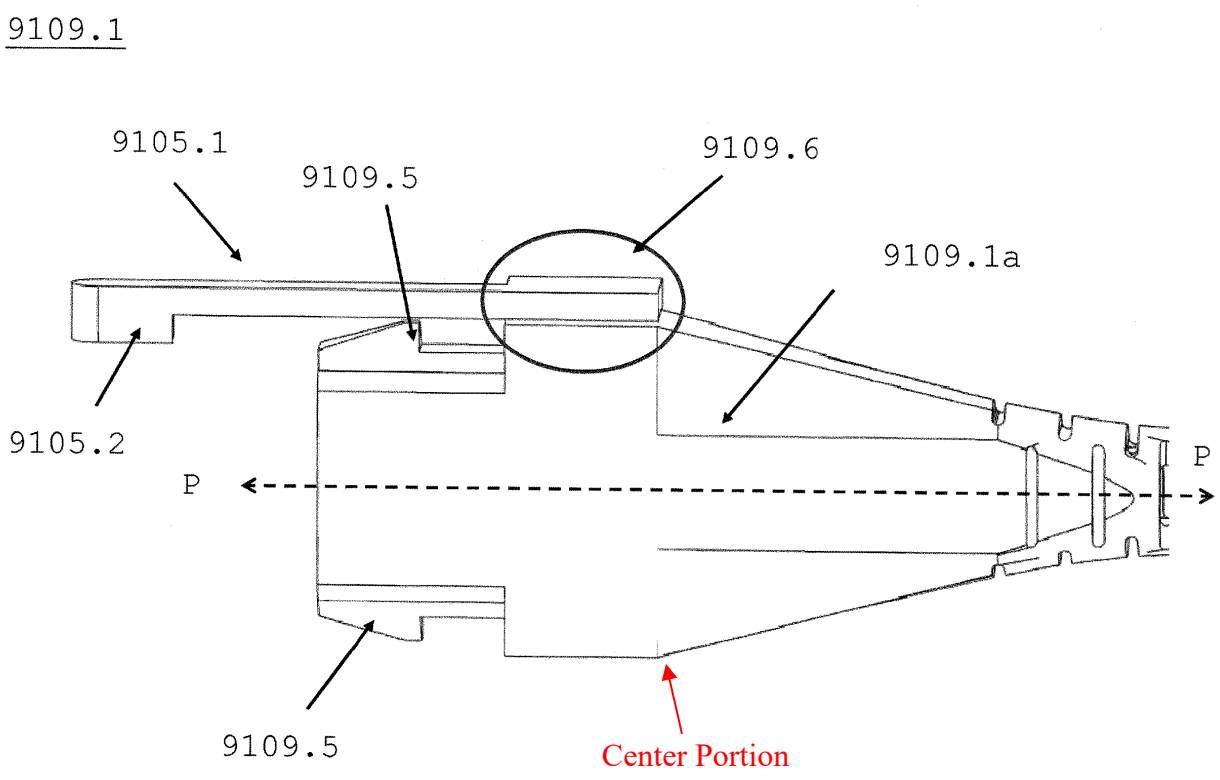

9109.1
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
9109.5
Center Portion

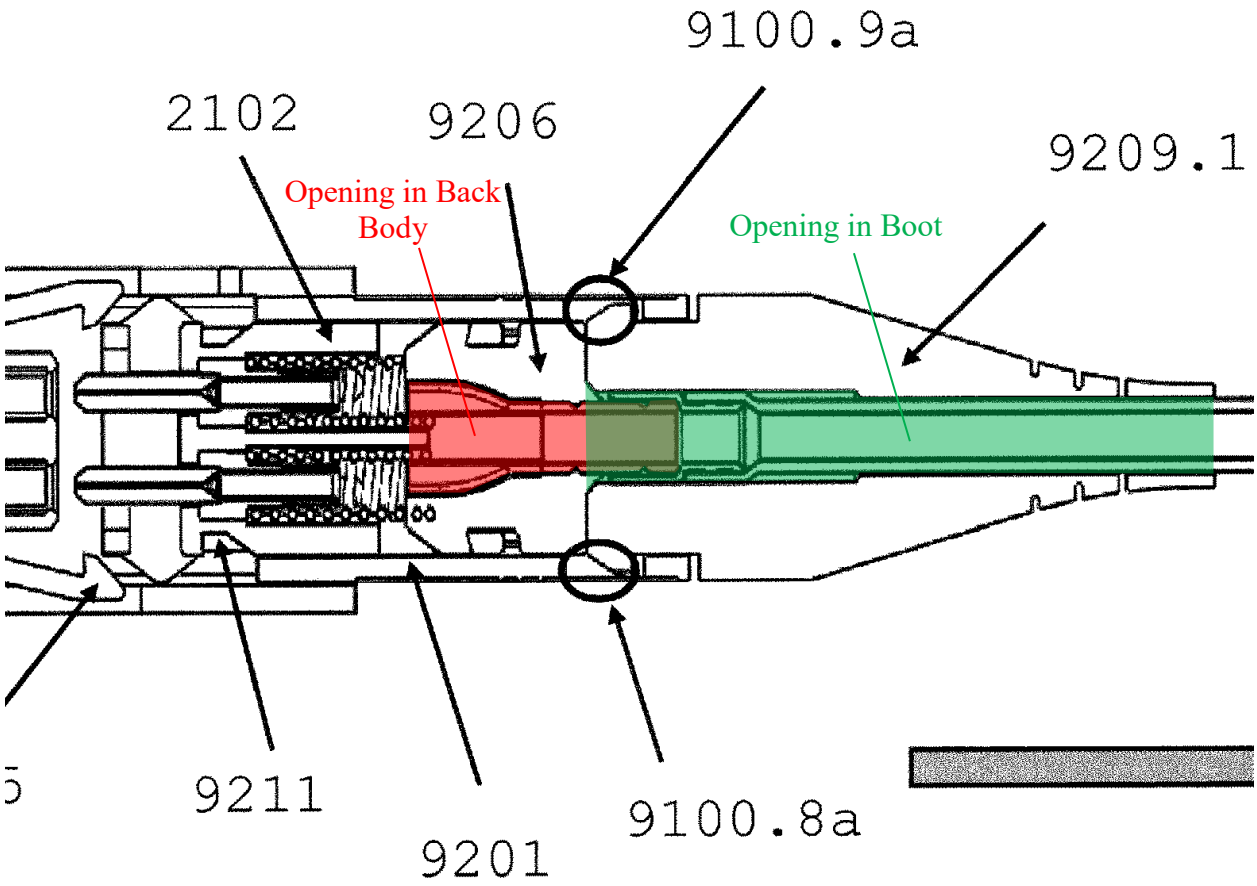
FIG. 17

EX1003: Figs. 16 and 17 (annotated).

111. Therefore, in my opinion, Takano meets this limitation.

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and"

112. The back body (9106, 9206) and the boot (9109.1, 9209.1, 9309.1, 9409.1) each have a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059] ("Multi-purpose rotatable boot assembly 9109.1 comprises a body 9109.1a with a passageway along line P-P for passing a fiber optic cable (refer to FIG. 26 and FIG. 27) to the ferrules"). The openings are axially aligned and even overlap where the back post of the back body (9106, 9206) is received in the boot (9109.1, 9209.1, 9309.1, 9409.1). EX1003: Fig. 36.



EX1003: Fig. 36 (annotated).

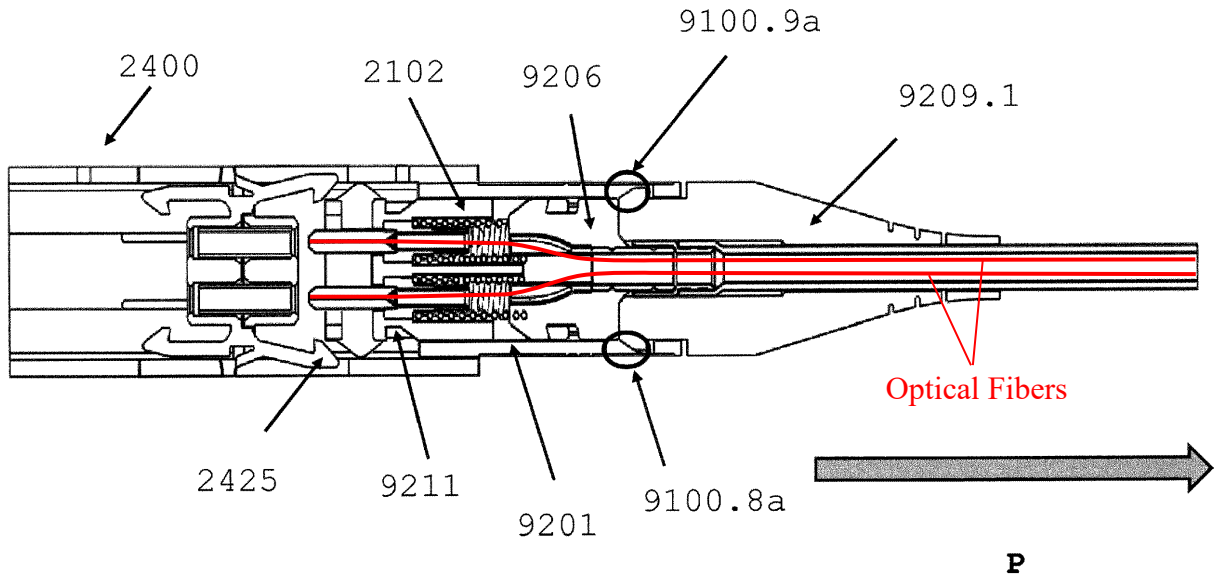


FIG. 36

EX1003: Fig. 36 (annotated).

113. As understood by a POSA, the forward ends of the optical fibers terminated by each ferrule (9203) are flush with the forward end of the respective ferrule. EX1014: 1 ("it is imperative that fibers are cleaved and polished flush with the ceramic ferrule end-face to ensure proper physical contact"); EX1015: 17-24 (explaining the steps to polish the end of the ferrule after an optical fiber has been inserted therein). Because the ferrules (9203) extend forward through the front end opening of the outer housing (9101, 9201, 9301, 9401), the front ends of the optical fibers also terminate forward of the front end opening of the housing. EX1003: Figs. 30 and 36.

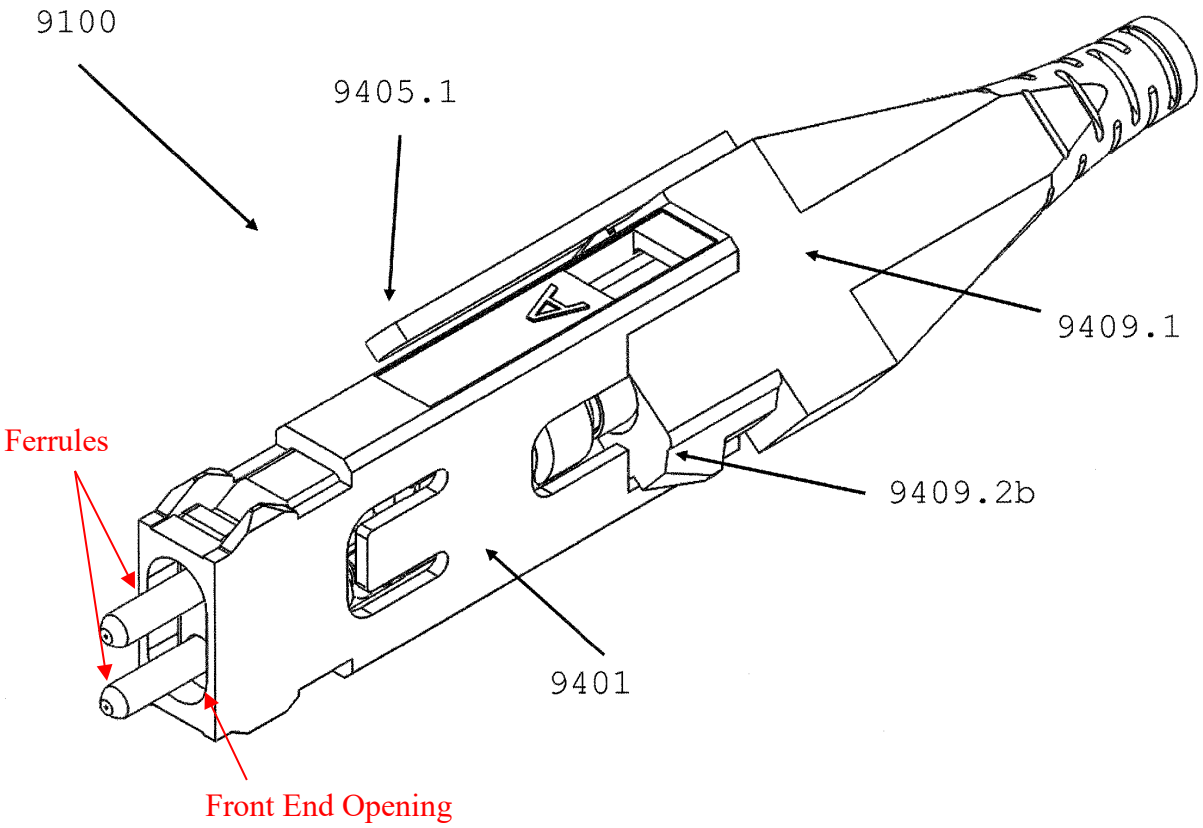


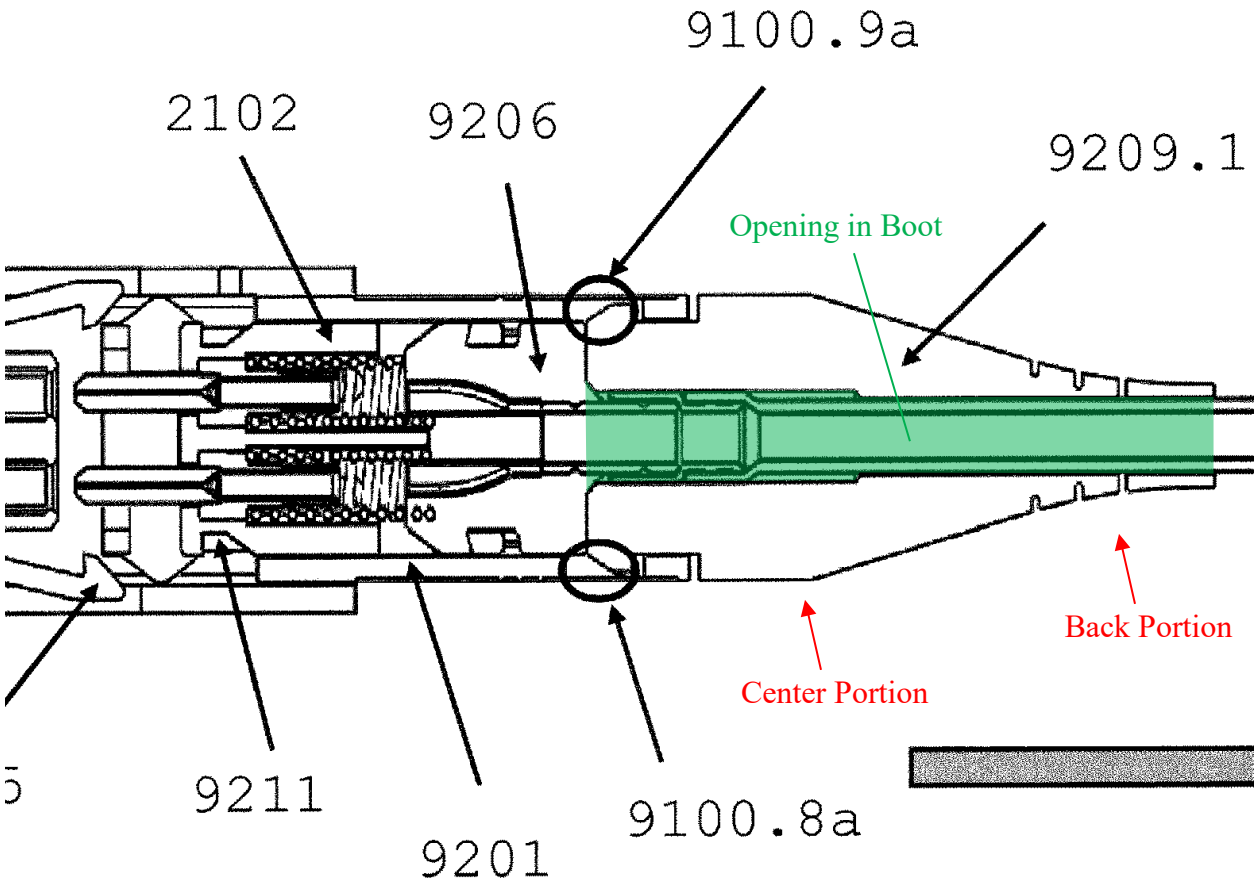
FIG. 30

EX1003: Fig. 30 (annotated).

114. Therefore, in my opinion, Takano meets this limitation.

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

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


9100.9a
2102
9206
9209.1
Opening in Boot
Back Portion
Center Portion
9211
9201
9100.8a

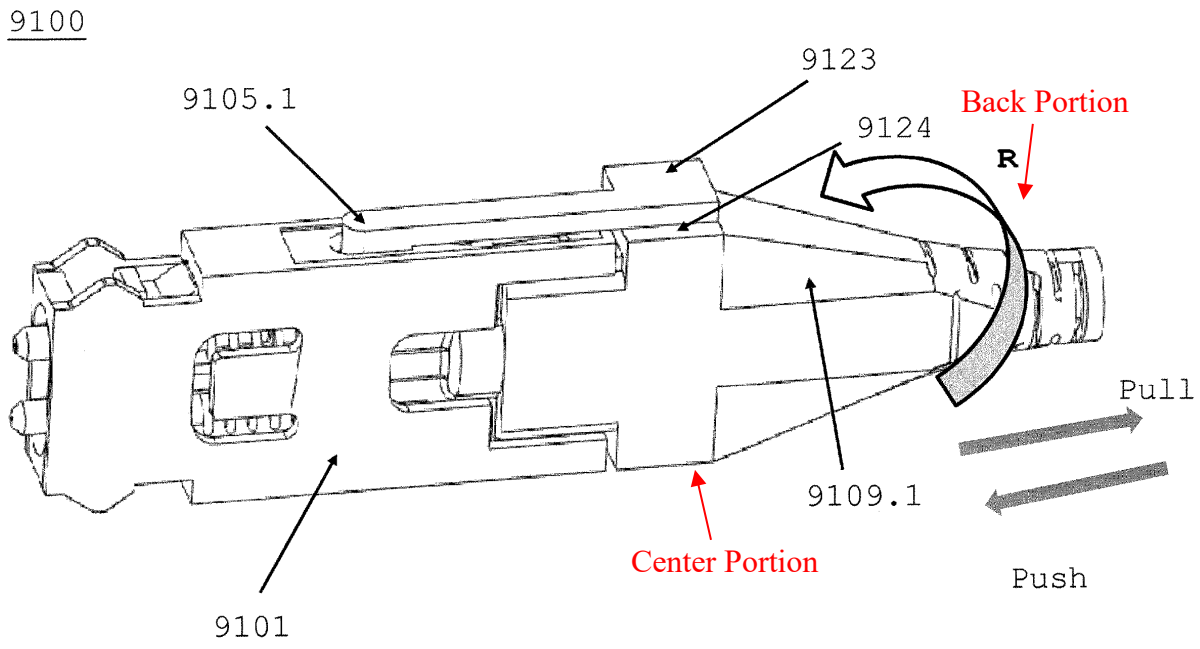


FIG. 16

EX1003: Figs. 16 and 36 (annotated).

116. Therefore, in my opinion, Takano meets this limitation.

B. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to the at least two optical fibers."

117. As illustrated, the back portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) has a ribbed structure with openings on the outside surface along the

length of the back portion. EX1003: Fig. 30.

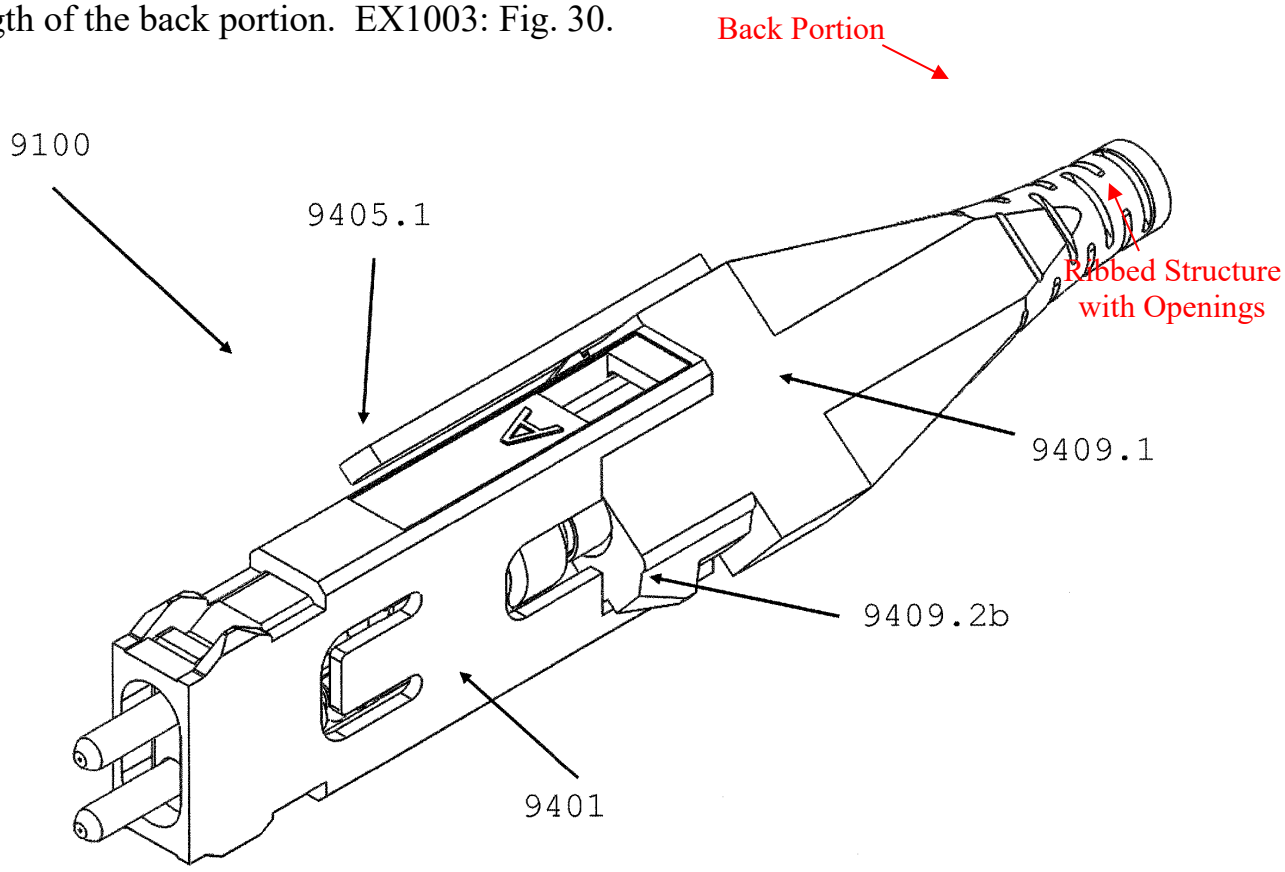


FIG. 30

EX1003: Fig. 30 (annotated).

118. As understood by a POSA, this configuration provides strain relief for the fiber optic cable and the optical fibers therein by allowing the back portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) to bend. EX1016: Fig. 1, 4:4-12 ("A plurality of slits or gaps is disposed on the core portion of the strain relief boot. The slits in the core portion and on the ribs lie generally perpendicular to the longitudinal axis L. While the slits aid in the bending and the flexing of the strain relief boot, they also act as bend limiting features. When one bends the strain

relief boot in an arc, i.e., away from its original position, the slits on one side of the core portion tend to expand, while the slits on the opposite side of the core portion tend to close."); EX1017: Fig. 4, ¶[0022] ("the flexibly bended boot 400 of the present invention is for an optical fiber connector.").

119. Therefore, in my opinion, Takano meets this claim.

C. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."

120. As explained in Sections VI(A)(1.P), (1.a.3), and (1.c.3), the two ferrules (9203) of the micro connector (9100) each terminate an optical fiber. Each ferrule (9203) is a single-fiber ferrule, as each ferrule has a single opening (see Fig. 30) at the front end thereof.

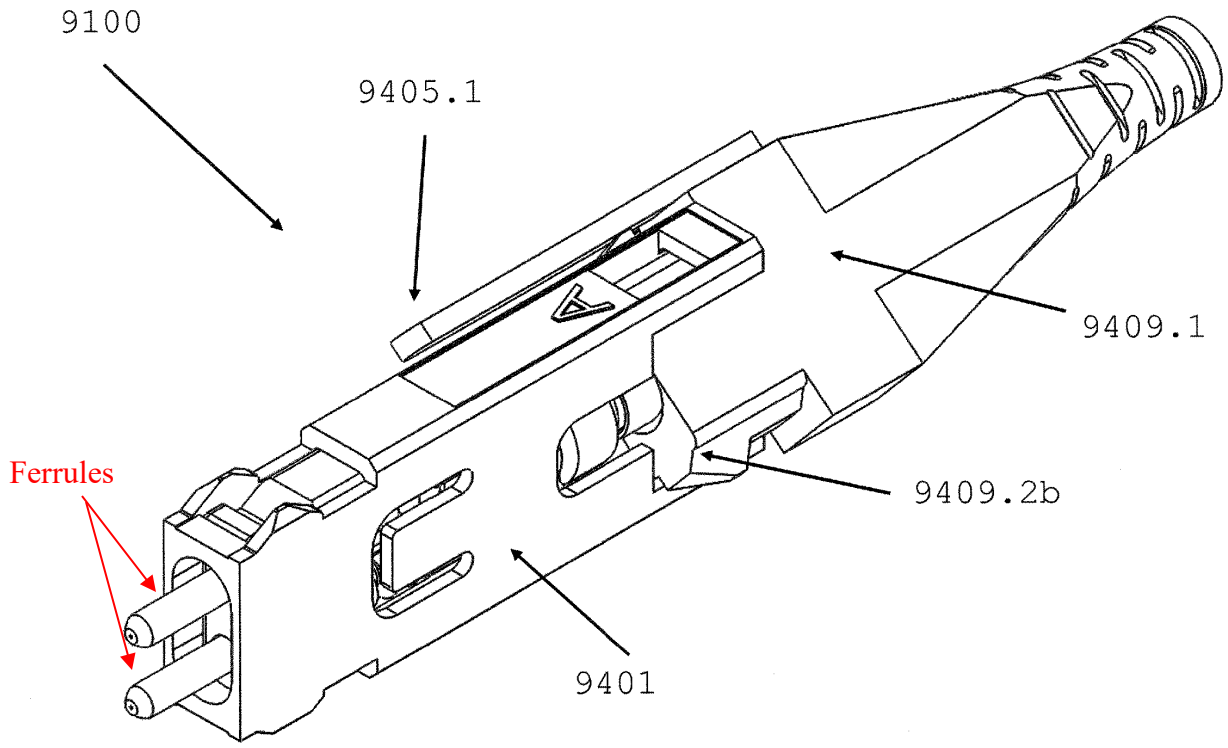


FIG. 30

EX1003: Fig. 30 (annotated).

121. Therefore, in my opinion, Takano meets this claim.

D. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing."

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

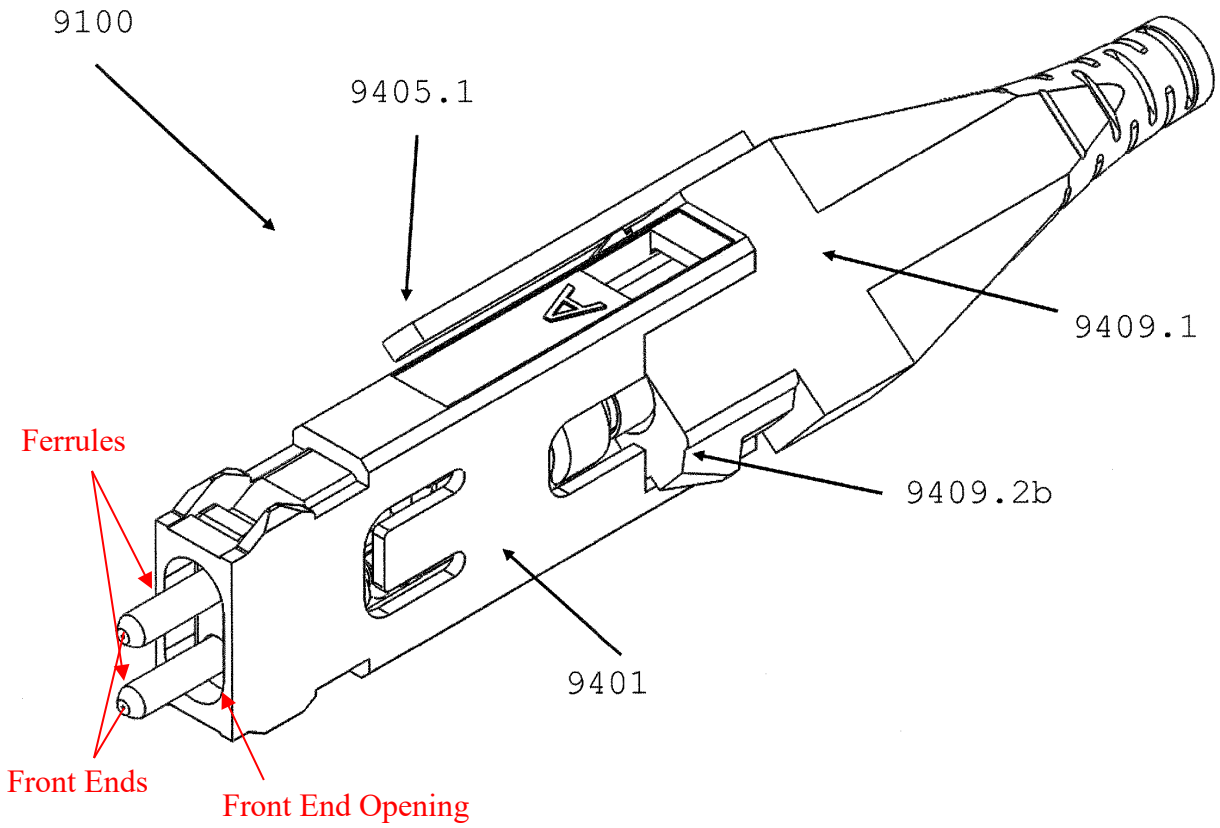


FIG. 30

EX1003: Fig. 30 (annotated).

123. Therefore, in my opinion, Takano meets this claim.

E. Claim 5

5.a "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and"

124. I have been informed that there are two types of claims: apparatus claims and method claims. I have also been informed that apparatus claims cover what a device is. I have been informed that when an apparatus claim recites an

intended use of the device, a prior art reference meets the intended use if it is capable of performing the intended use.

125. All the claims of the ‘794 Patent are apparatus claims. This limitation of claim 5—”wherein the boot is movable longitudinally relative to the housing upon application of a pull force”—recites an intended use of the claimed invention.

126. Takano’s micro connector (9100) has structure capable of meeting this intended use recited in limitation 5.a. I note that claim 5, and specifically limitation 5a, does not require the boot to be “mov[ed] longitudinally relative to the housing upon application of a pull force” as the very first step in changing the polarity of the connector. In fact, the ‘794 Patent requires that a connection of the boot (112) to the housing (102) first be released before the entire boot can be moved longitudinally to change polarity. For example, before the boot (112) can be moved longitudinally to disconnect the boot from the rest of the connector to change polarity, both the bridge (222) must be depress to release the latches (220) and also the connector latch (294) must be released. EX1001: 6:1-7, 7:54-62. In other words, the ‘794 Patent explains some actions on the boot (112) must occur before the boot can be moved longitudinally to disconnect the boot and change polarity. This is no different than Takano.

127. As shown in Figs. 20-23 and again in Figs. 25, 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable about the back body (9106, 9206) and

fiber optic cable and relative to the outer housing (9101, 9201, 9301, 9401) to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top to the bottom of the outer housing (and *vise versa*) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071].

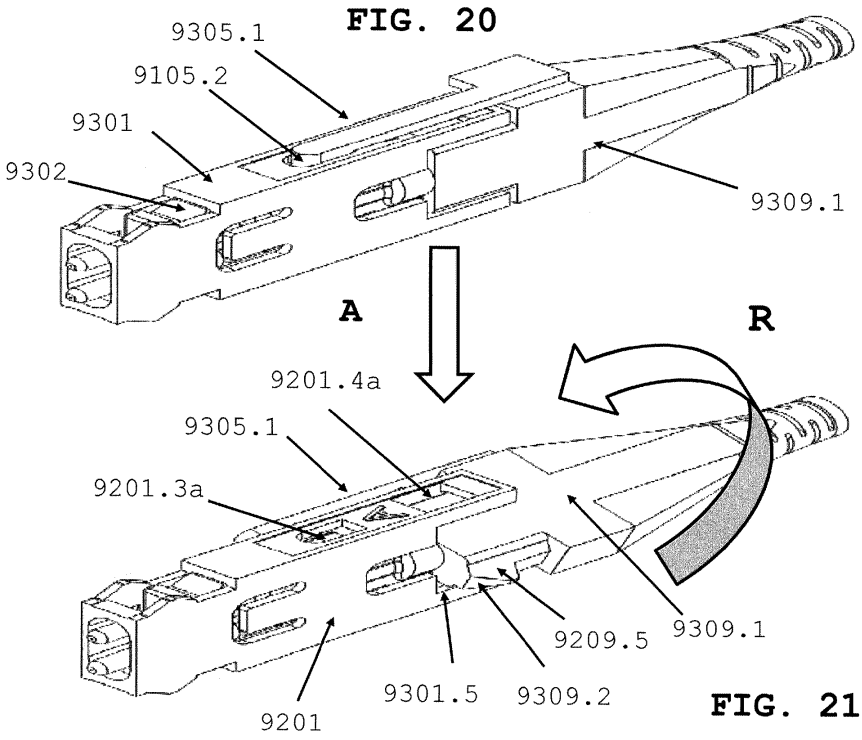


FIG. 20

FIG. 21

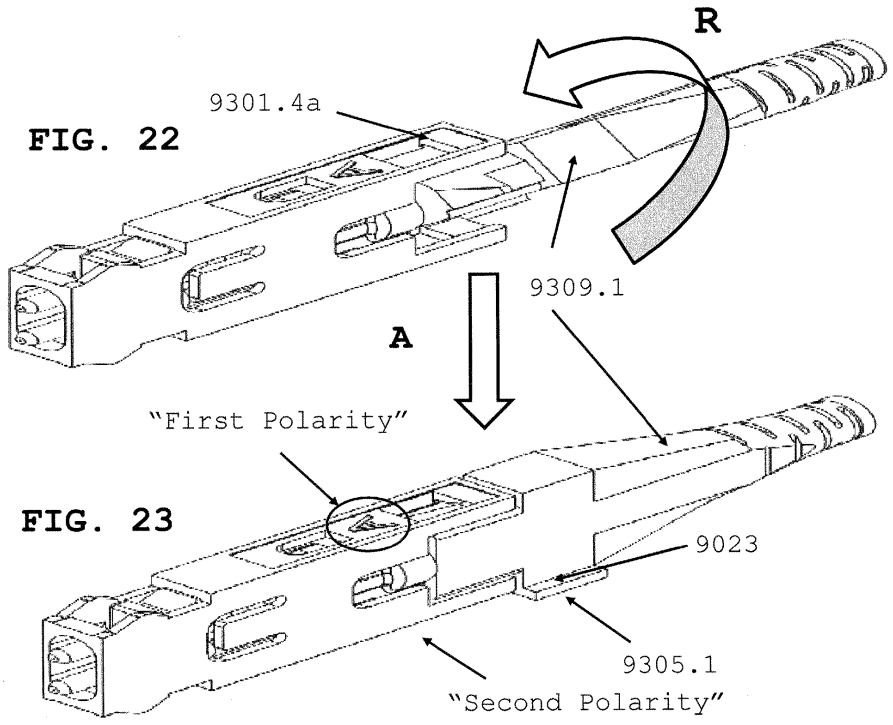


FIG. 22

FIG. 23

EX1003: Figs. 20-23.

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

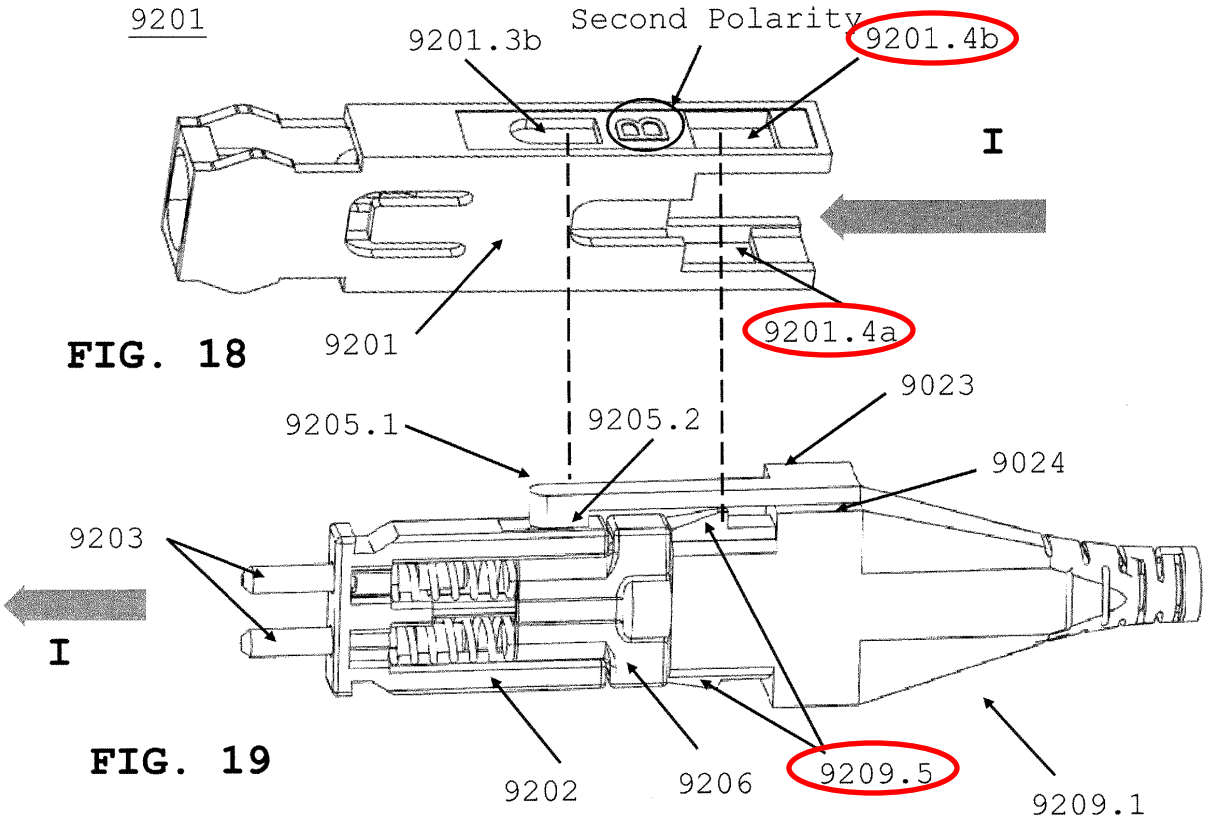


FIG. 18

FIG. 19

EX1003: Figs. 18 and 19 (annotated).

129. The boot hooks (9109.5, 9209.5) include a chamfer (9309.2, 9409.2a, 9409.2b) that allow the boot hooks to leave their respective slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) when the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotated to change polarity. EX1003: Figs. 28-33, ¶¶[0063], [0067]-[0068], [0070]-[0071].

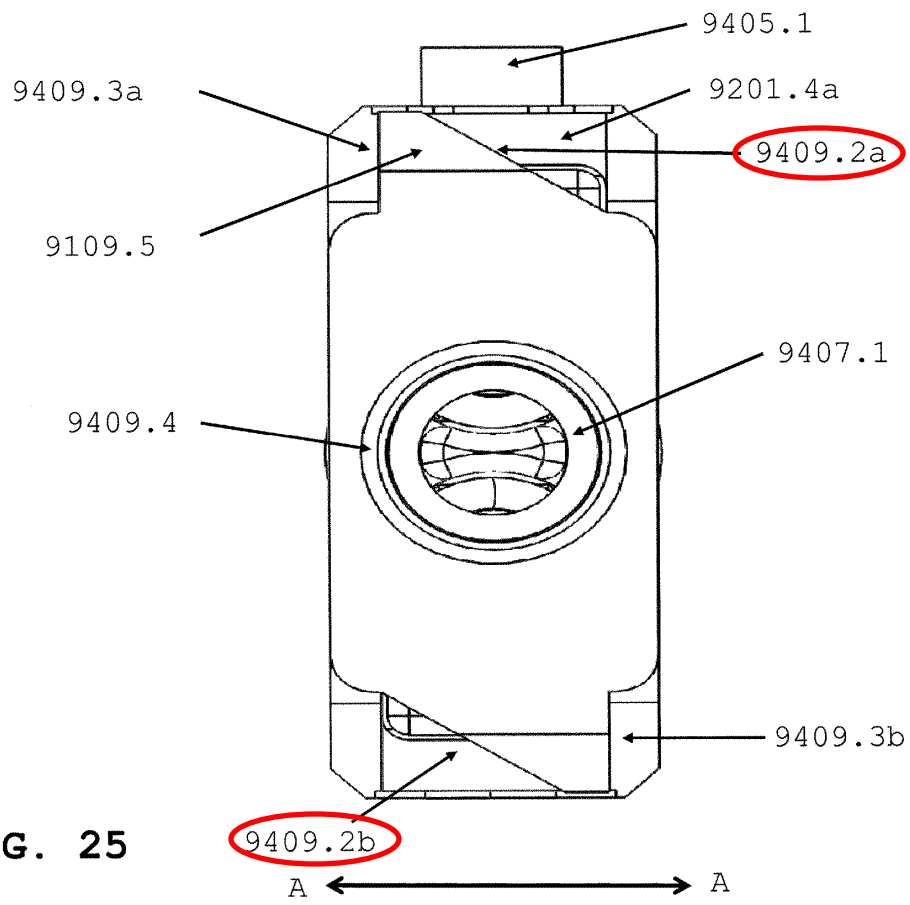


FIG. 25

EX1003: Fig. 25 (annotated).

130. The boot (9109.1, 9209.1, 9309.1, 9409.1) is released from the outer housing (9101, 9201, 9301, 9401) prior to reaching its new polarity position. When the boot (9109.1, 9209.1, 9309.1, 9409.1) is being rotated between the two polarity positions, the boot is rotated to an intermediate or release position where the boot hooks (9109.5, 9209.5) no longer engage the outer housing (9101, 9201, 9301, 9401). EX1003: Figs. 21, 22, 29-32. In addition, in this release position, the boot hooks (9109.5, 9209.5) are positioned relative to the outer housing (9101, 9201, 9301, 9401) such that the boot hooks would not engage the outer housing

and prevent the boot from moving rearward relative to the outer housing. EX1003: Figs. 21, 22, 29-32. Thus, in the release position, the boot (9109.1, 9209.1, 9309.1, 9409.1) is disconnected and moveable relative to the outer housing (9101, 9201, 9301, 9401).

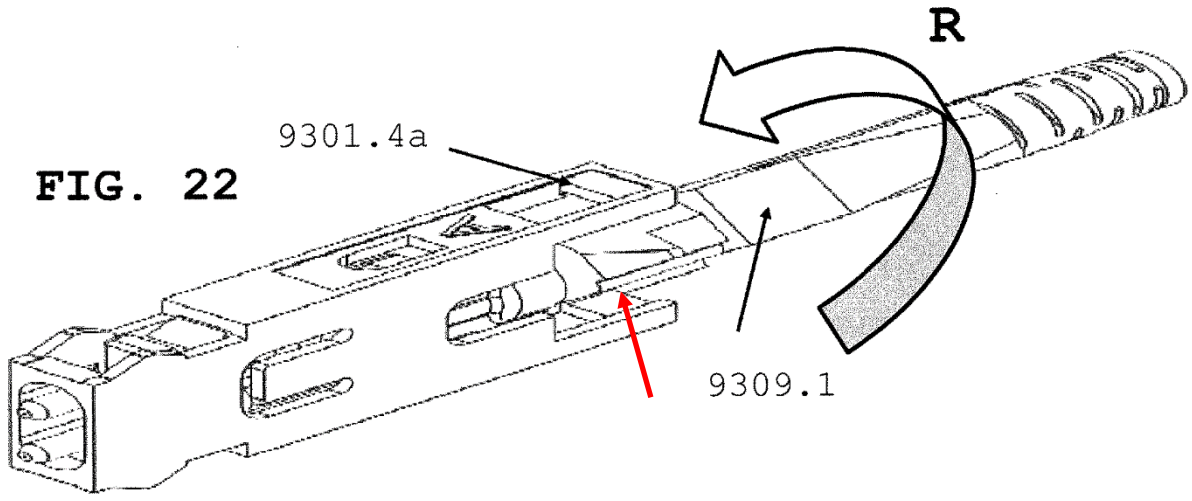


FIG. 22

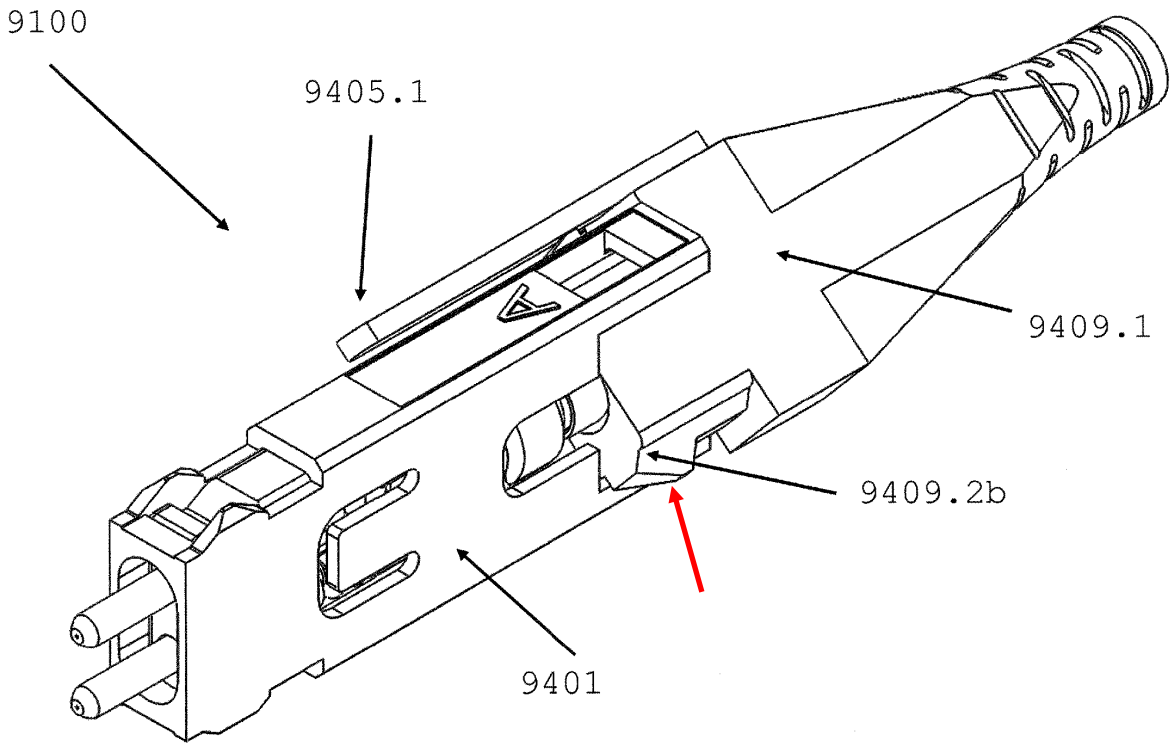
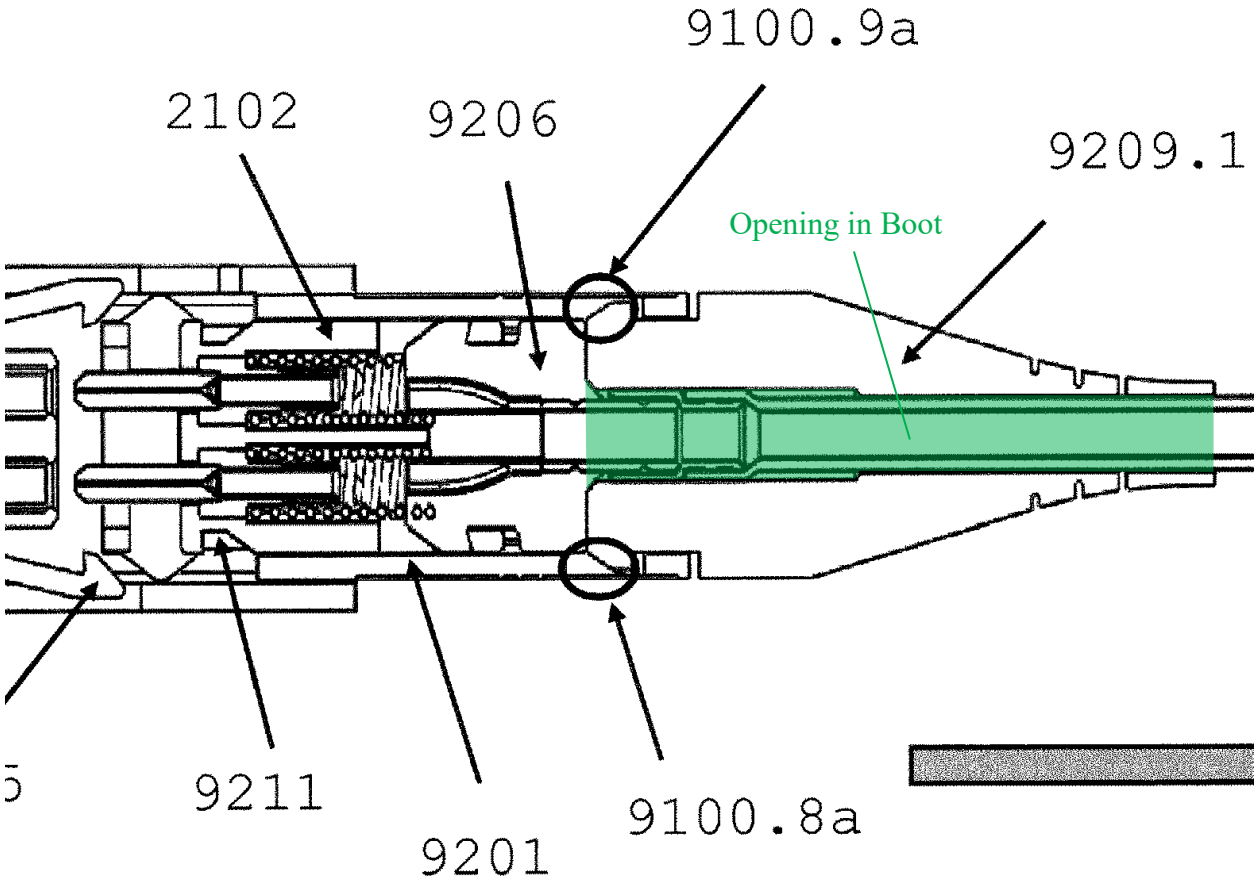


FIG. 30

EX1003: Figs. 22 and 30 (annotated).

131. Once in this release position, the boot (9109.1, 9209.1, 9309.1, 9409.1) is moveable rearward relative to the outer housing (9101, 9201, 9301, 9401). EX1001: Figs. 22 and 30. This is evident based on how the micro connector (9100) operates when the boot (9109.1, 9209.1, 9309.1, 9409.1) is connected. For example, Takano explains the boot (9109.1, 9209.1, 9309.1, 9409.1) is slideable rearward along the fiber optic cable. EX1003: Figs. 34-36, ¶[0076]. The boot (9109.1, 9209.1, 9309.1, 9409.1) slides rearward along the fiber optic cable in order to pull the outer housing (9101, 9201, 9301, 9401) rearward to

detach the micro connector (9100) from the adapter (2400). EX1003: Figs. 35 and 36, ¶[0073]. As illustrated below, the opening in the boot (9109.1, 9209.1, 9309.1, 9409.1) is shaped such that the opening allows the boot to slide along the fiber optic cable, whether or not the boot is attached to the outer housing (9101, 9201, 9301, 9401). EX1003: Fig. 36.



EX1003: Fig. 36 (annotated).

132. As show in Figs. 34 and 35 below, when the boot (9109.1, 9209.1, 9309.1, 9409.1) is coupled to the outer housing (9101, 9201, 9301, 9401), pulling

the boot rearward moves the boot rearward along the cable. EX1003: ¶¶[0072]-[0073].

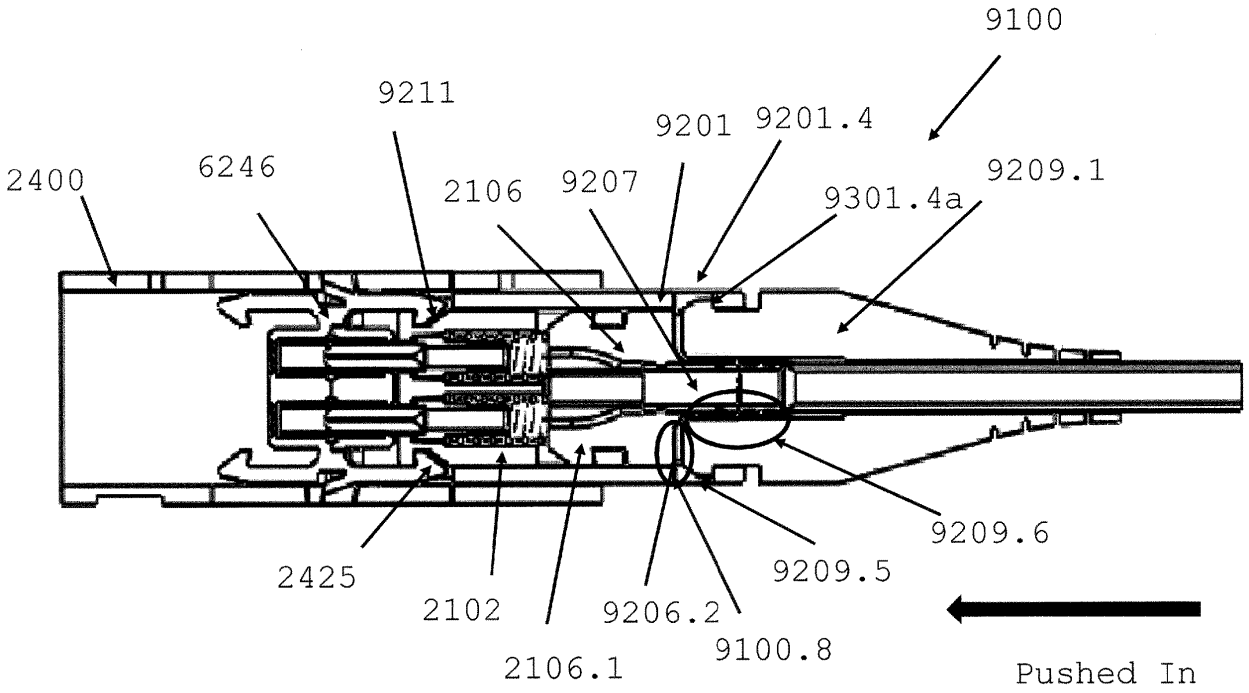


FIG. 34

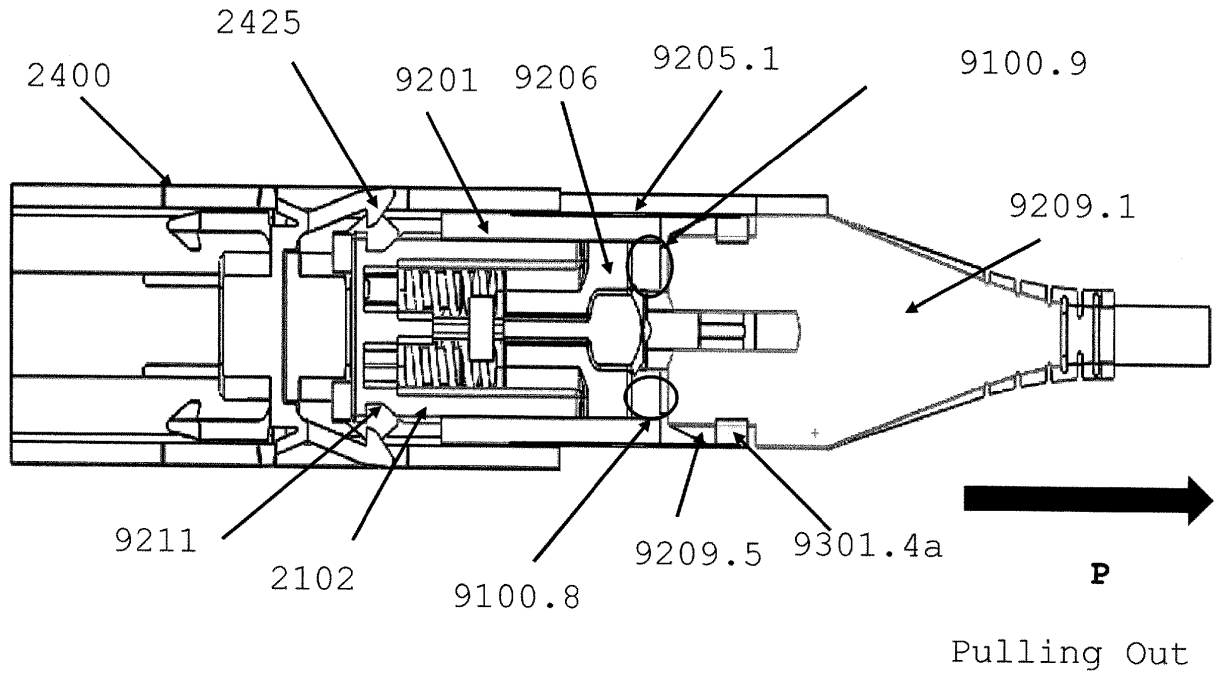


FIG. 35

EX1003: Figs. 34 and 35.

133. Thus, ***when*** the boot (9109.1, 9209.1, 9309.1, 9409.1) is in the release position (*see* Figs. 22 and 30), a rearward pull force on the boot will also move the boot longitudinally rearward along the cable. But since the boot (9109.1, 9209.1, 9309.1, 9409.1) is decoupled from the outer housing (9101, 9201, 9301, 9401), the boot will also move rearward relative to the outer housing. Accordingly, the boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector (9100) has structure capable of meeting the intended use of limitation 5.a.

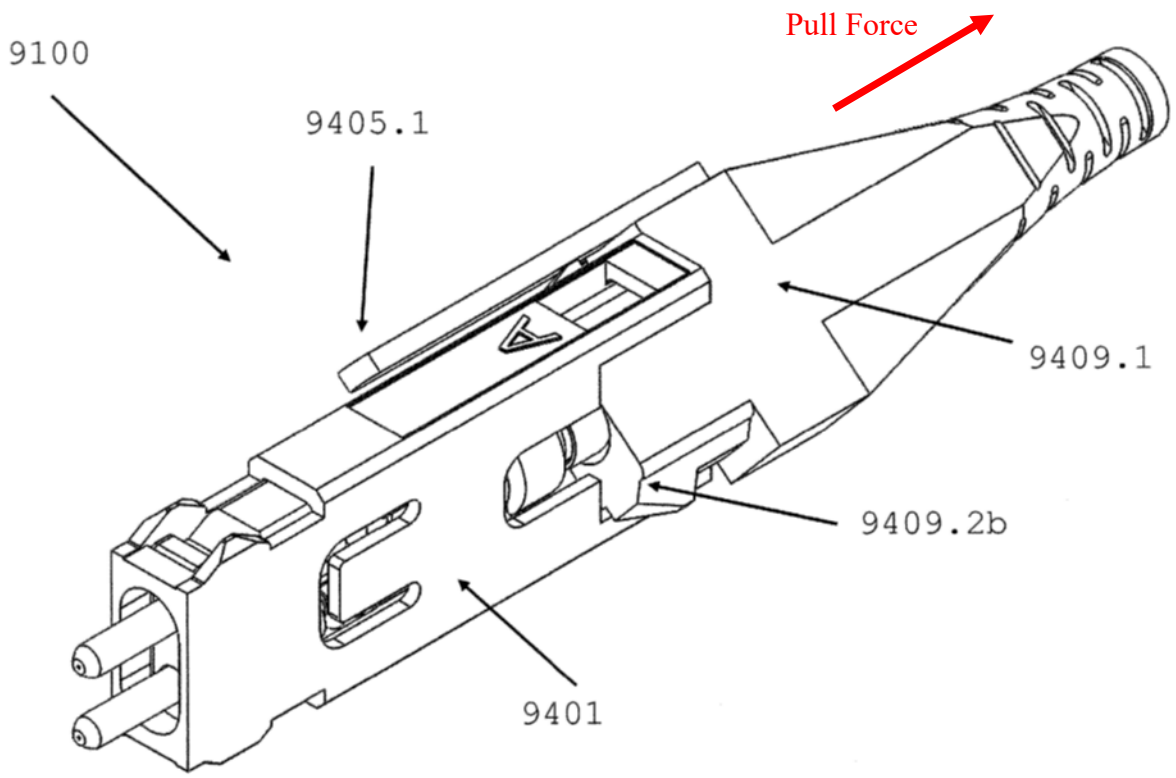


FIG. 30

EX1003: Fig. 30 (annotated).

134. Alternatively or in addition, the Takano shows a gap (annotated below) between the front of the boot hooks (9109.5, 9209.5) and the back body (9106, 9206). EX1003: Figs. 34 and 35. This gap allows the boot (9109.1, 9209.1, 9309.1, 9409.1) to move longitudinally forward and backward relative to outer housing (9101, 9201, 9301, 9401) upon application of push and pull forces, respectively. In other words, a user can wiggle the boot (9109.1, 9209.1, 9309.1, 9409.1) longitudinally relative to outer housing (9101, 9201, 9301, 9401) by a millimeter or two by successively pushing and pulling on the boot. This

movement also meets the intended use of 5.a. I note Figs. 34 and 35 also shows enough clearance behind the boot hooks (9109.5, 9209.5) for the rear end of the outer housing to accommodate this movement. EX1003: Figs. 34 and 35.

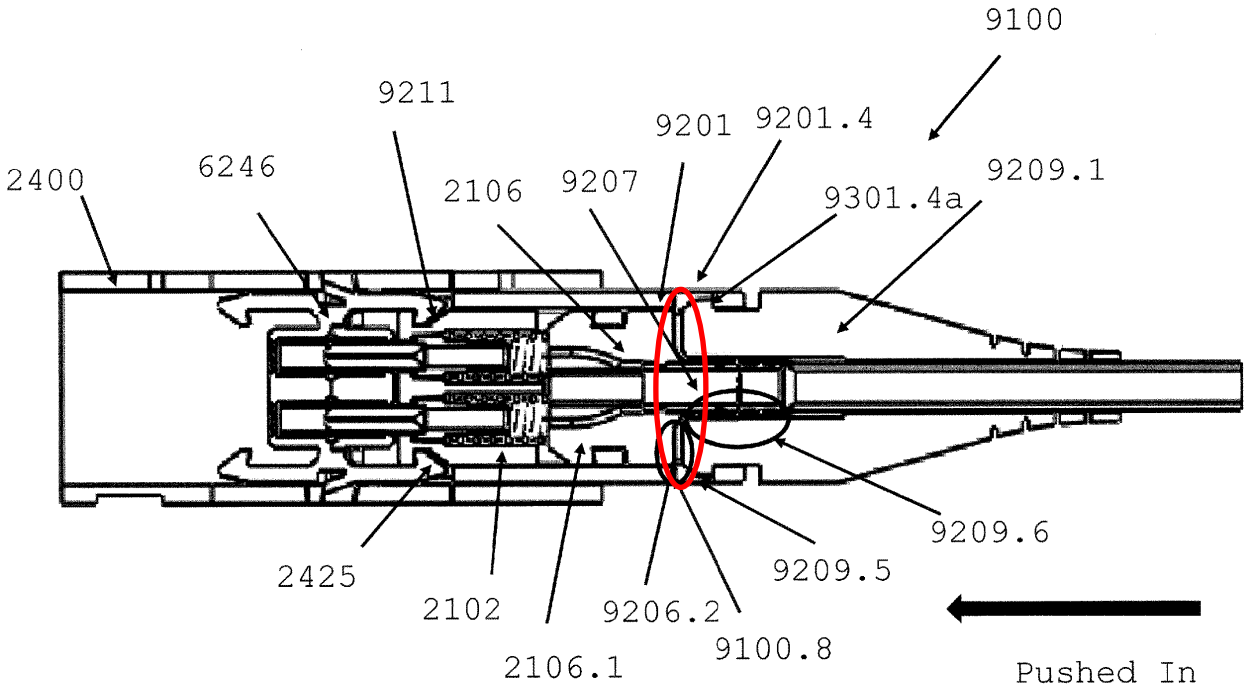


FIG. 34

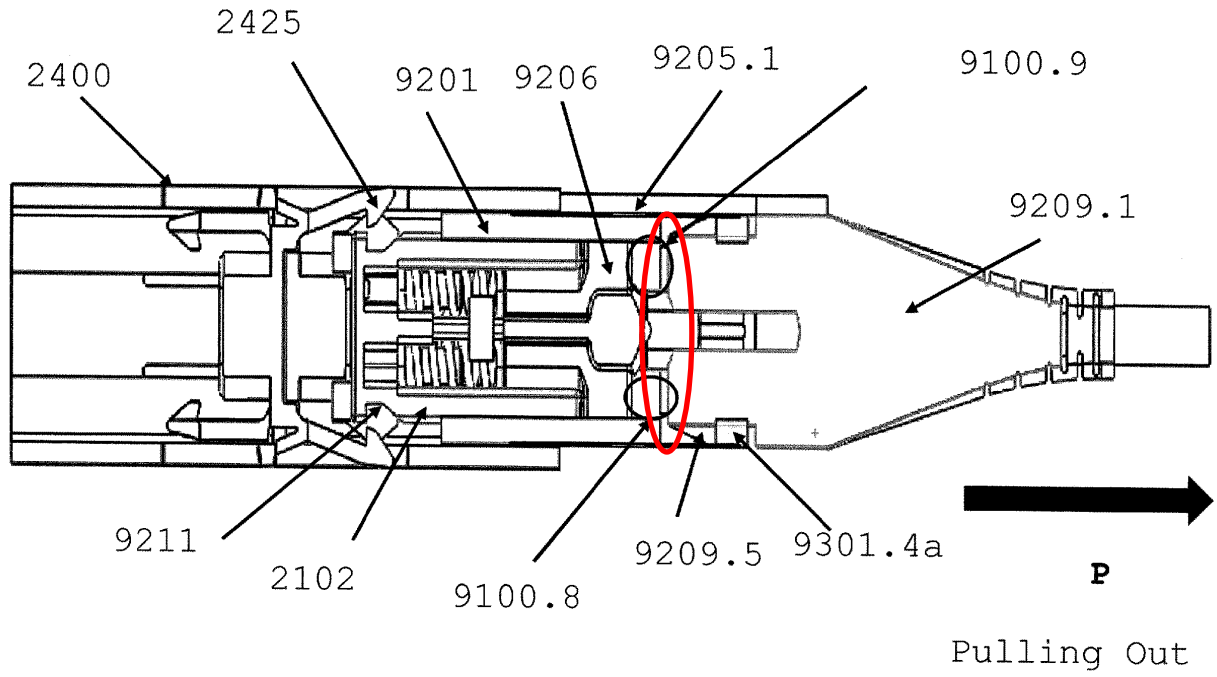


FIG. 35

EX1003: Figs. 34 and 35 (annotated).

135. Therefore, in my opinion, Takano meets this limitation.

5.b "wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

136. This limitation of claim 5—"wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector"—recites another intended use of the claimed invention.

137. As shown in Figs. 20-23 and again in Figs. 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable about the back body (9106, 9206) and fiber

optic cable and relative to the outer housing (9101, 9201, 9301, 9401) to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top to the bottom of the outer housing (and *vise versa*) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071].

FIG. 20

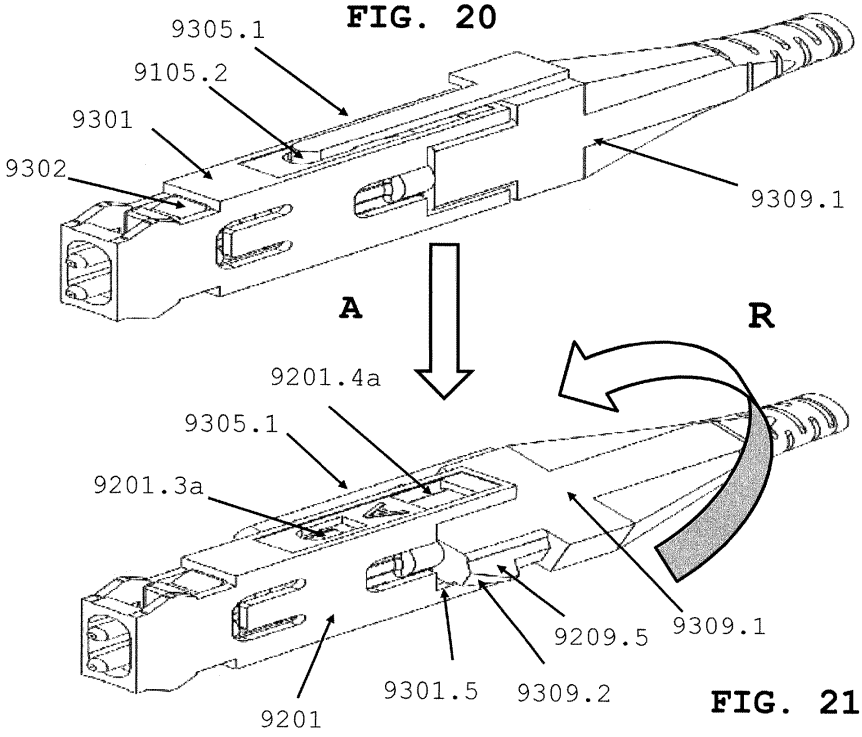


FIG. 21

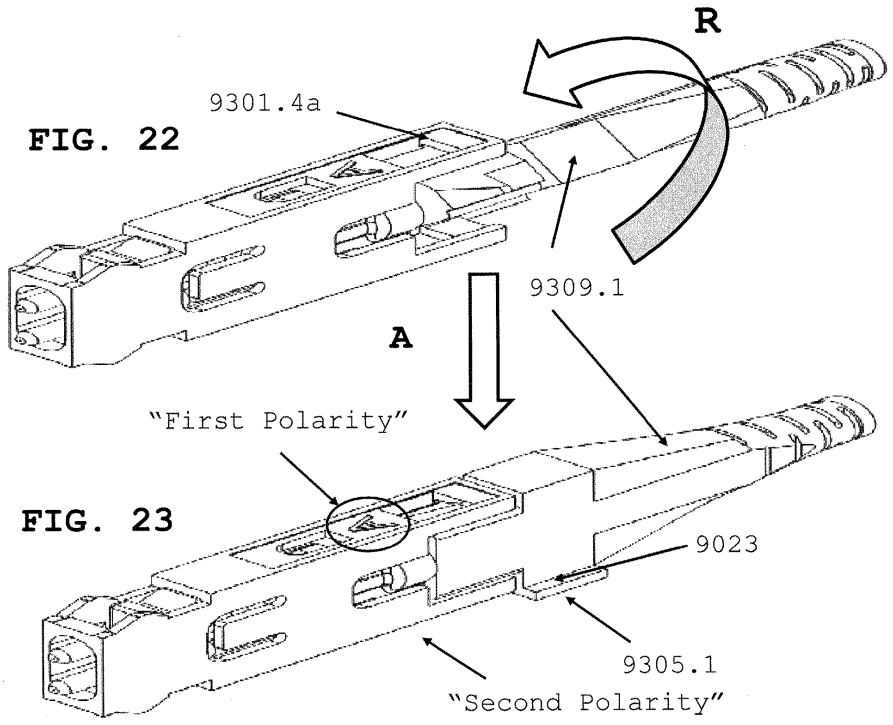
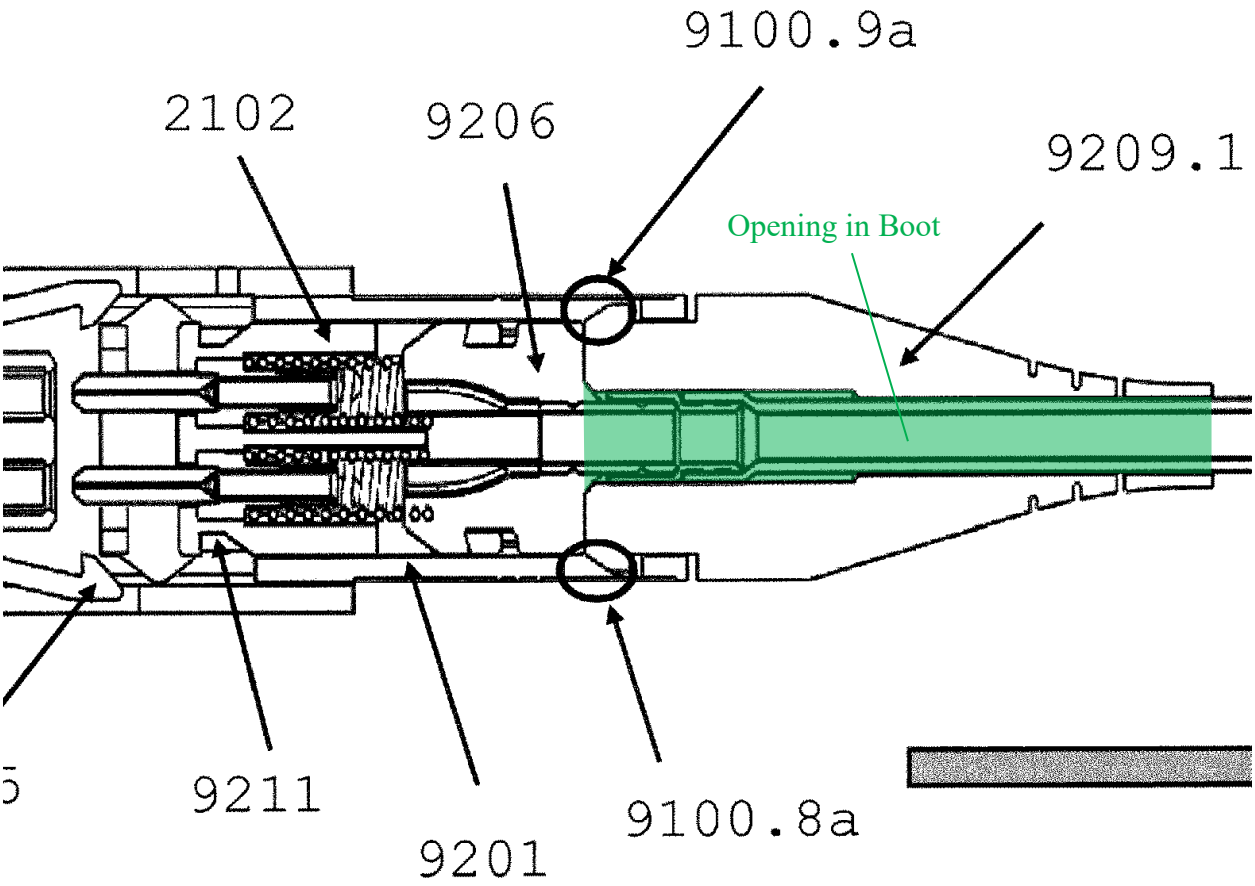


FIG. 22

FIG. 23

EX1003: Figs. 20-23.

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



EX1003: Fig. 36 (annotated).

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

140. Thus, after the boot (9109.1, 9209.1, 9309.1, 9409.1) has been moved rearward along the fiber optic cable—as explained in Section VI(E)(5.a)—the boot can be rotated relative to the outer housing (9101, 9201, 9301, 9401) to change the polarity of the micro connector (9100). Accordingly, the boot (9109.1, 9209.1,

9309.1, 9409.1) of the micro connector (9100) has structure capable of meeting the intended use of limitation 5.b.

141. Therefore, in my opinion, Takano meets this limitation.

F. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch."

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

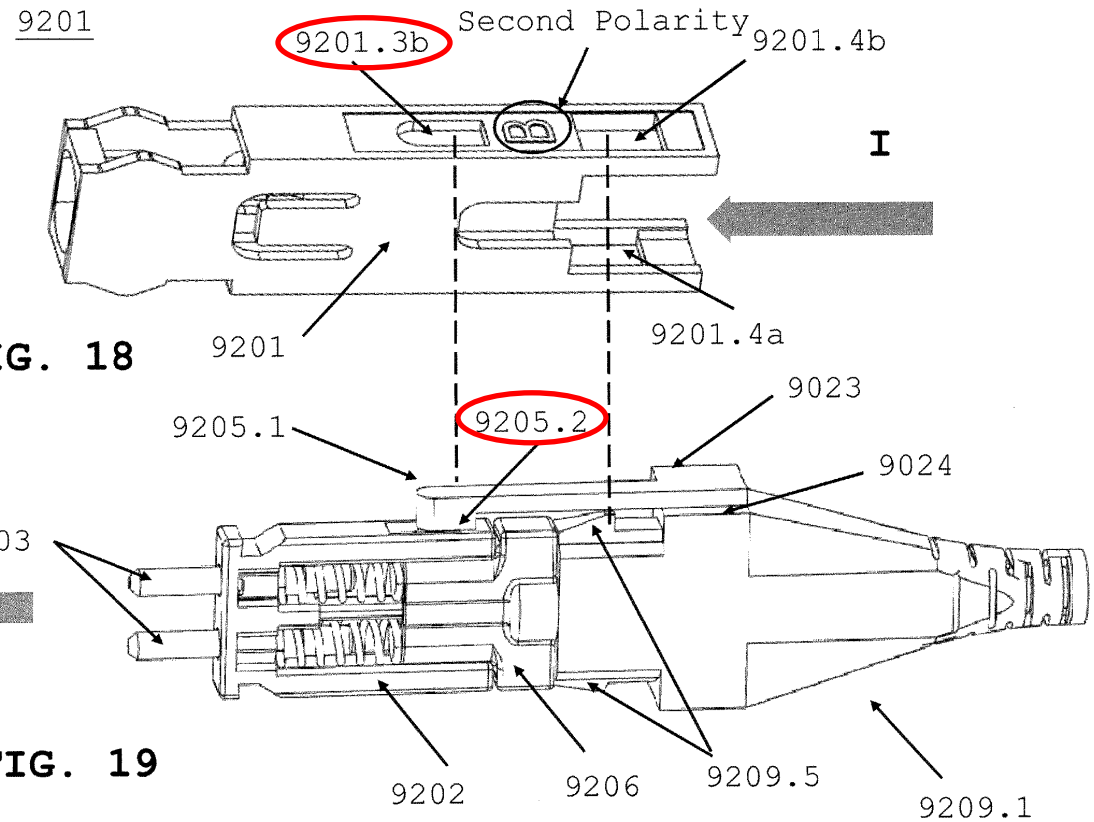


FIG. 18

FIG. 19

EX1003: Figs. 18 and 19 (annotated).

143. Within the context of the '794 Patent, the securing protrusion (9105.2, 9205.2, 9405.2) is a latch. EX1001: Fig. 14, 7:53-62 ("connector latch 294").

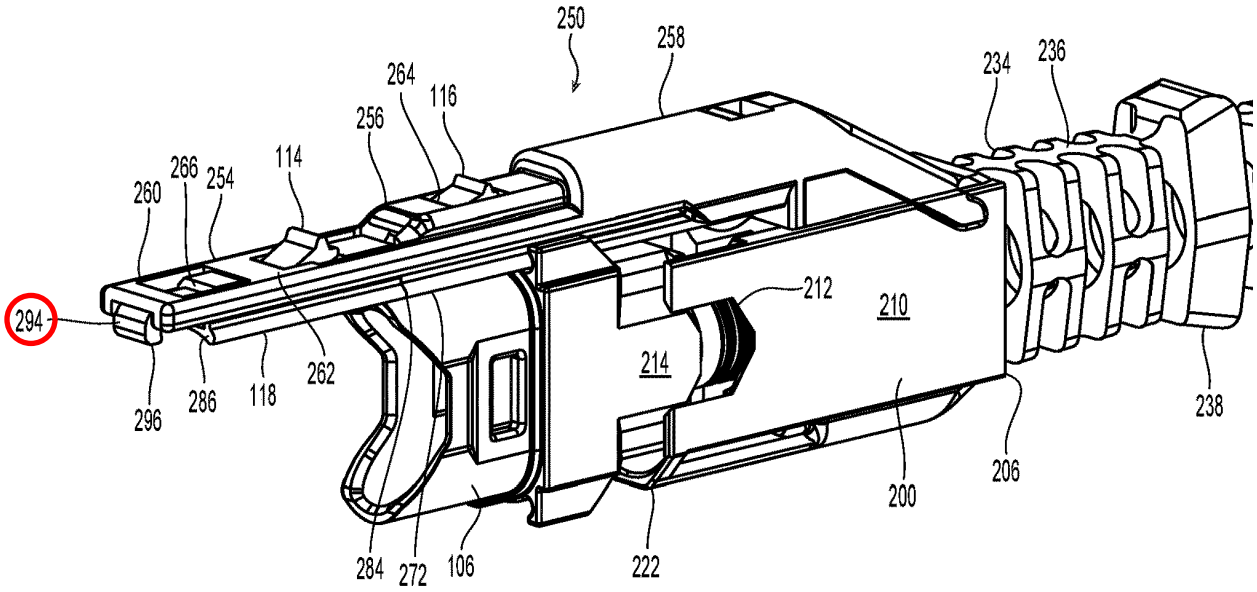


Fig. 14

EX1001: Fig. 14 (annotated).

144. Therefore, in my opinion, Takano meets this claim.

G. Claim 8 "The fiber optic connector according to claim 1, wherein the center portion of the boot engages the rear portion of the housing."

145. The center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1) includes the boot hooks (9109.5, 9209.5), in this embodiment of Takano. EX1003: Fig. 17, ¶[0058].

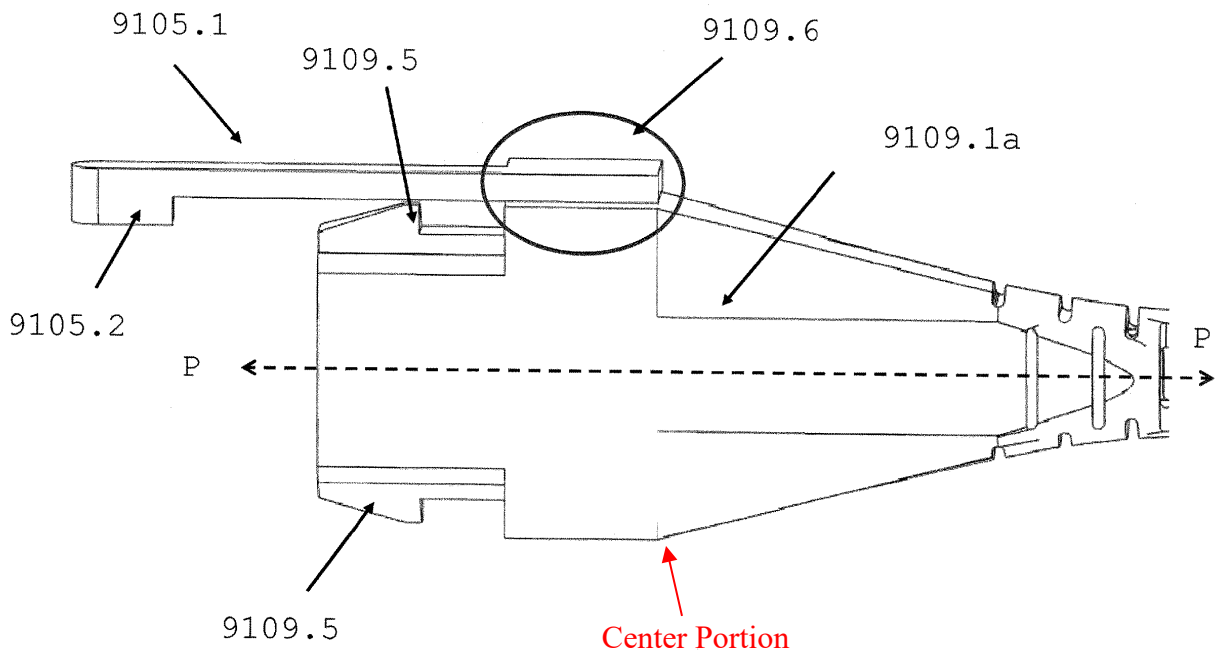


FIG. 17

EX1003: Fig. 17 (annotated).

146. The boot hooks (9109.5, 9209.5) engage the rear portion of the outer housing (9101, 9201, 9301, 9401) when exiting the slots (9201.4a, 9201.4b) of the outer housing as the boot is rotated. EX1003: Figs. 28 and 31, ¶¶[0063], [0068].

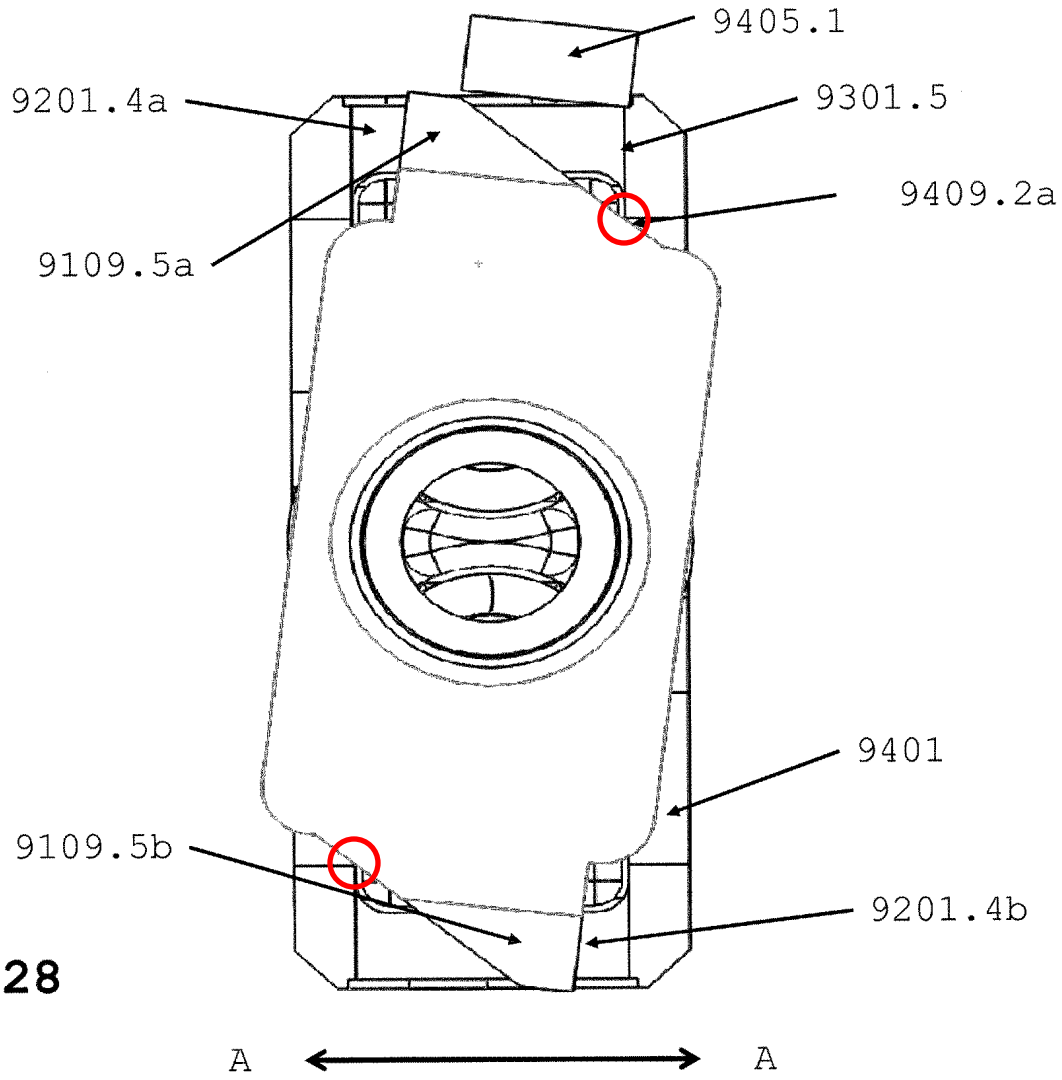


FIG. 28

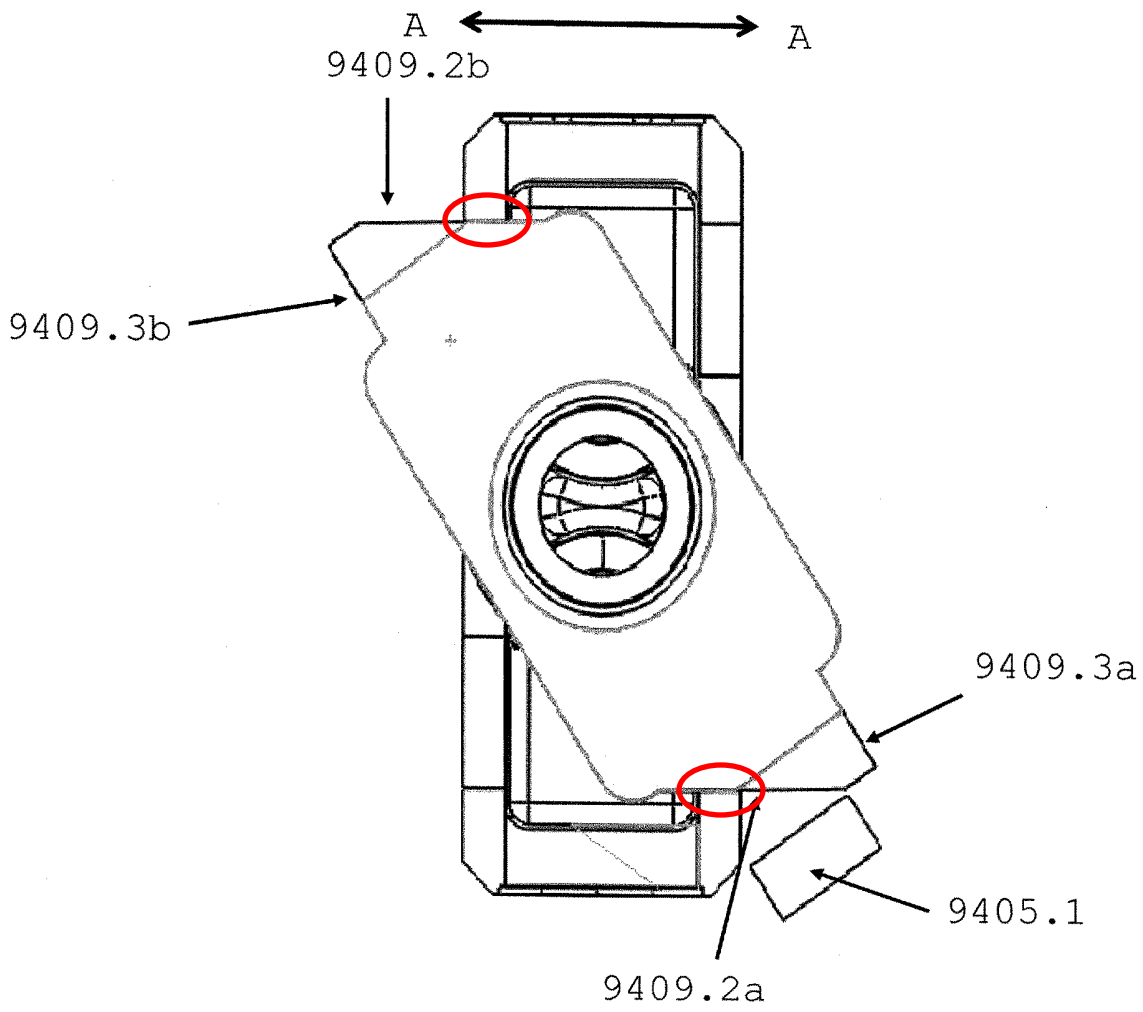


FIG. 31

EX1003: Figs 28 and 31 (annotated).

147. Alternatively or in addition, the boot hooks (9109.5, 9209.5) also engage the rear portion of the outer housing (9101, 9201, 9301, 9401) when the boot is pulled rearward to detach the micro connector (9100) from the adapter (2400). EX1003: Figs. 35 and 36, ¶[0073]. As explained by Takano, the "boot

wing 9209.5 ***engages*** outer housing face 9301.4a, and pulls outer housing 9201 rearward." EX1003: ¶[0073].

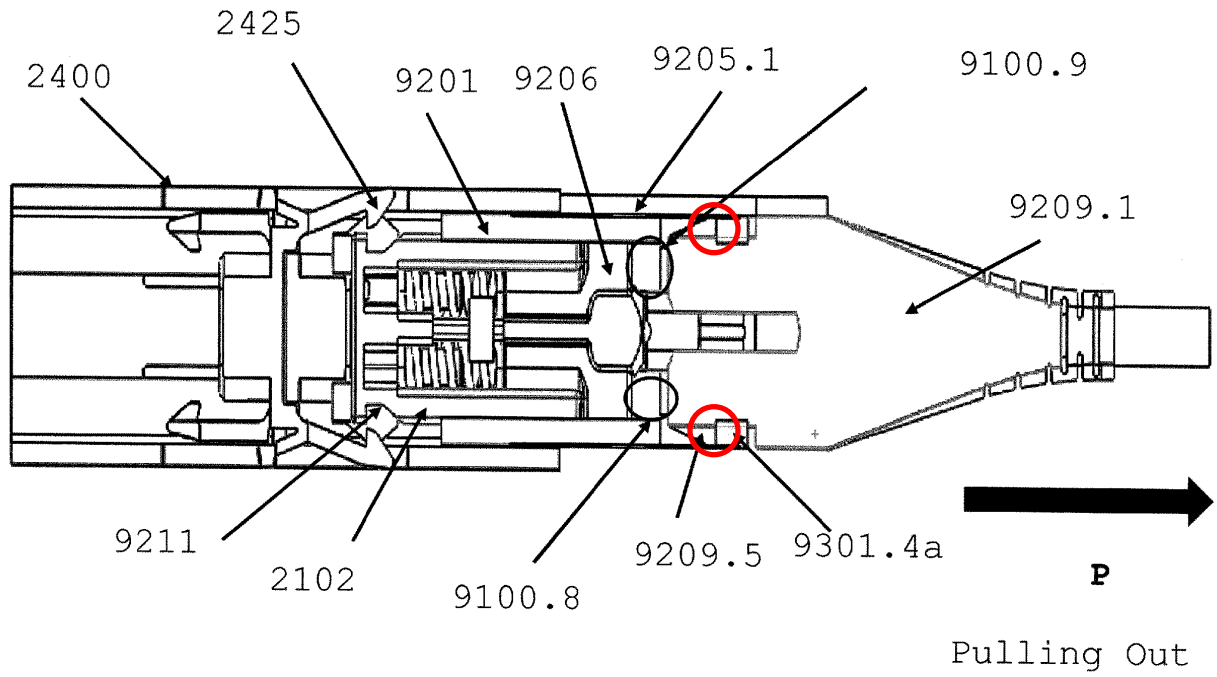


FIG. 35

EX1003: Fig. 35 (annotated).

148. Therefore, in my opinion, Takano meets this claim.

H. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector."

149. As shown in Figs. 20-23 and again in Figs. 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotatable relative to the outer housing (9101, 9201, 9301, 9401) to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top to the

bottom of the outer housing (and *vise versa*) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063]-[0065], [0067]-[0071].

FIG. 20

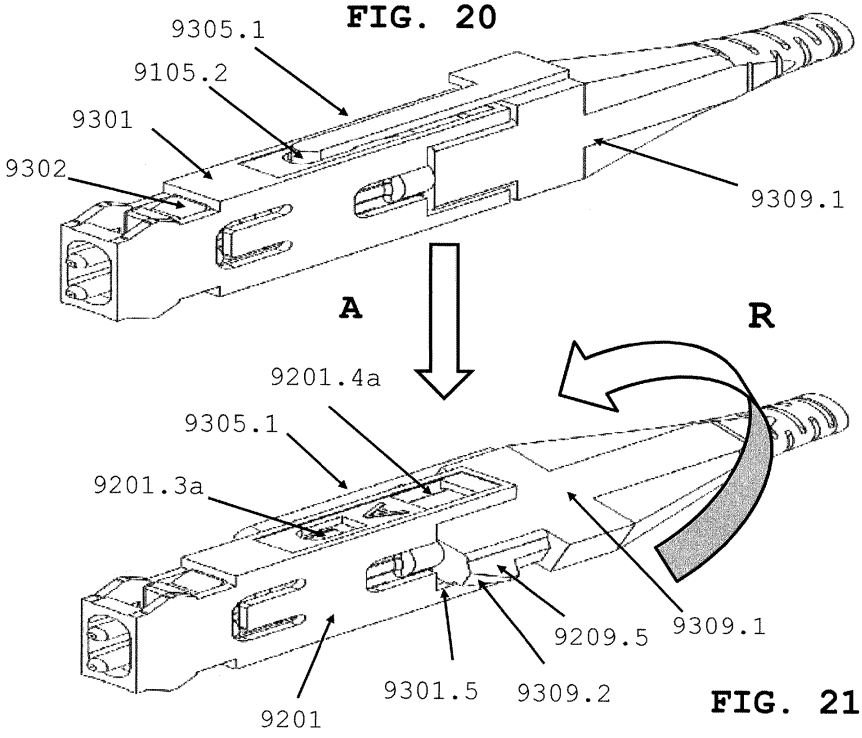


FIG. 21

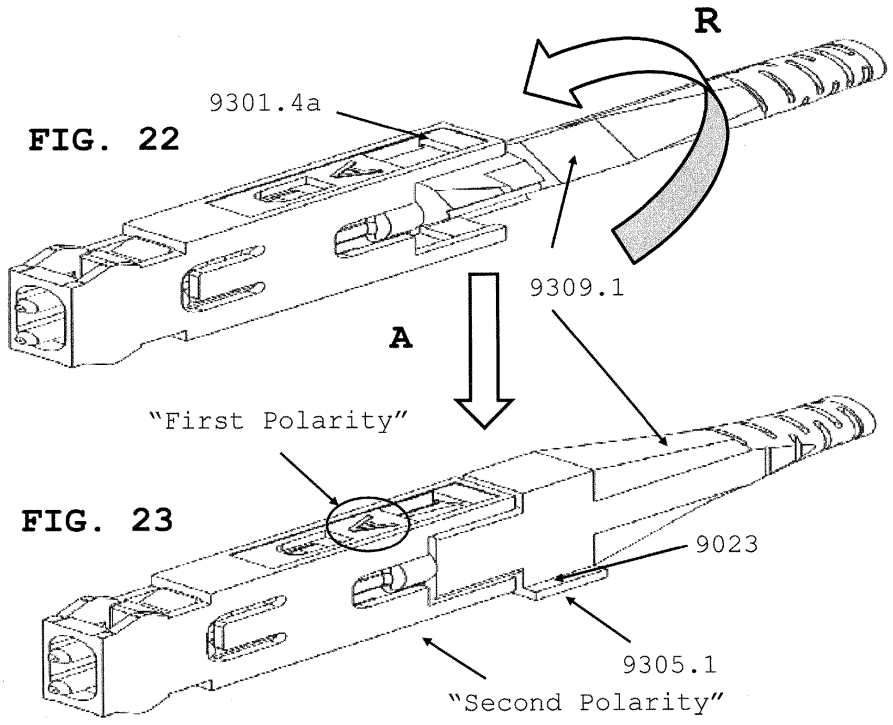


FIG. 22

FIG. 23

EX1003: Figs. 20-23.

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

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

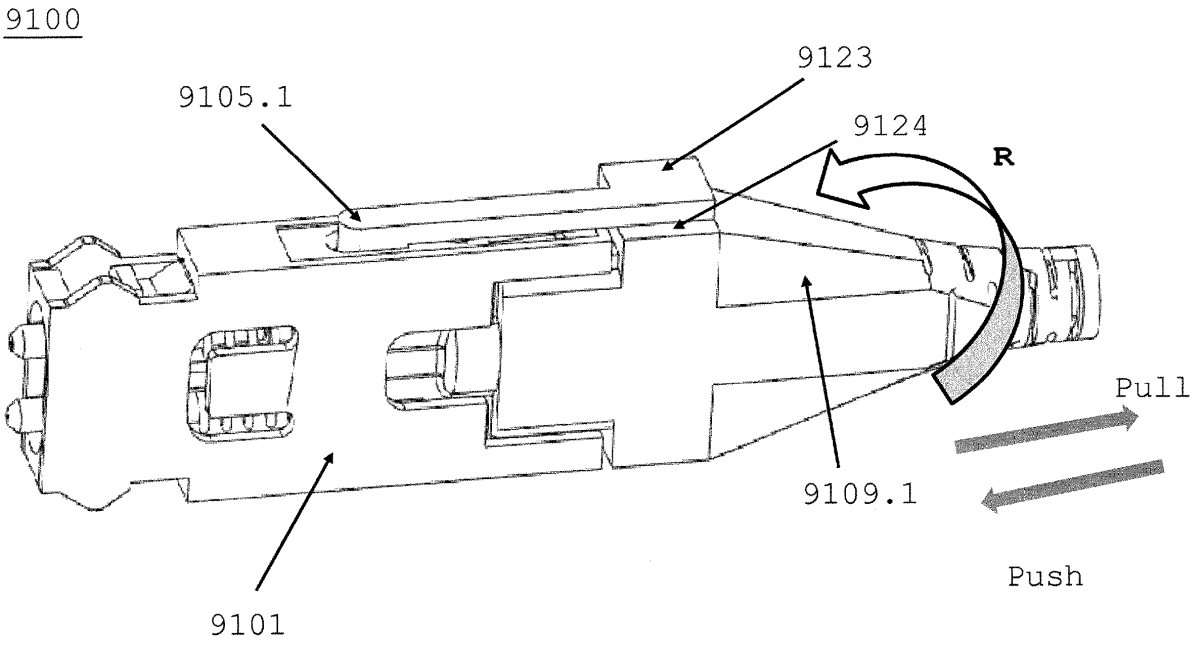

9100
9123
9105.1
9124
R
Pull
9109.1
Push
9101

FIG. 16

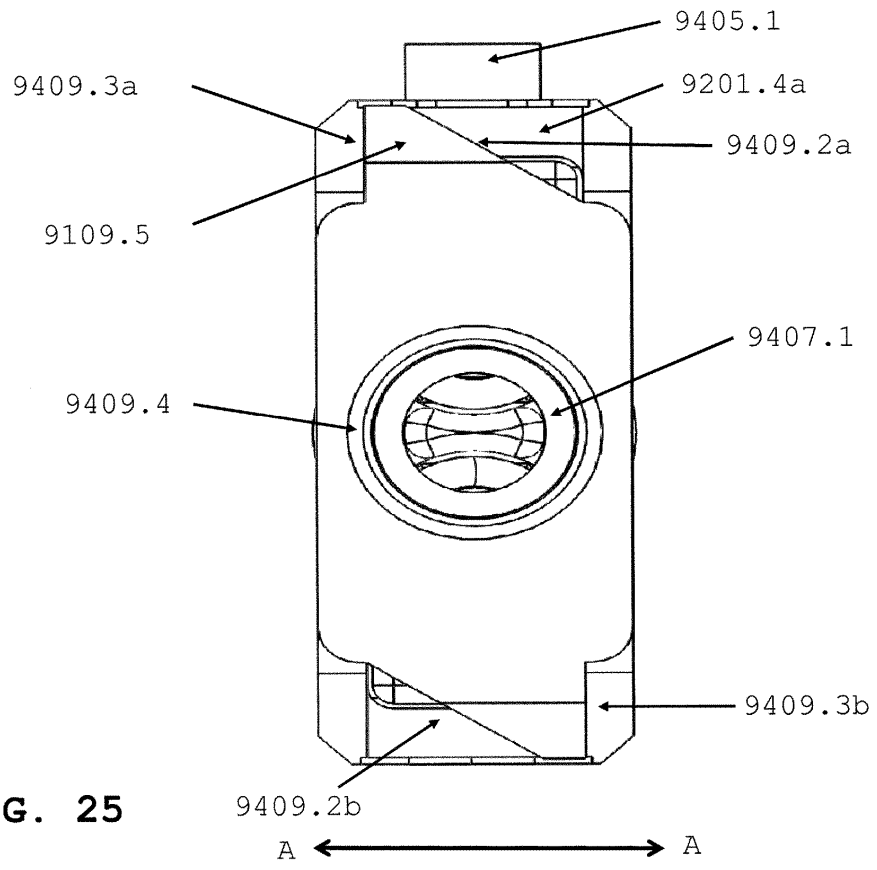

9405.1
9409.3a
9201.4a
9409.2a
9109.5
9407.1
9409.4
9409.3b
9409.2b
A
A

FIG. 25

EX1003: Figs. 16 and 25.

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

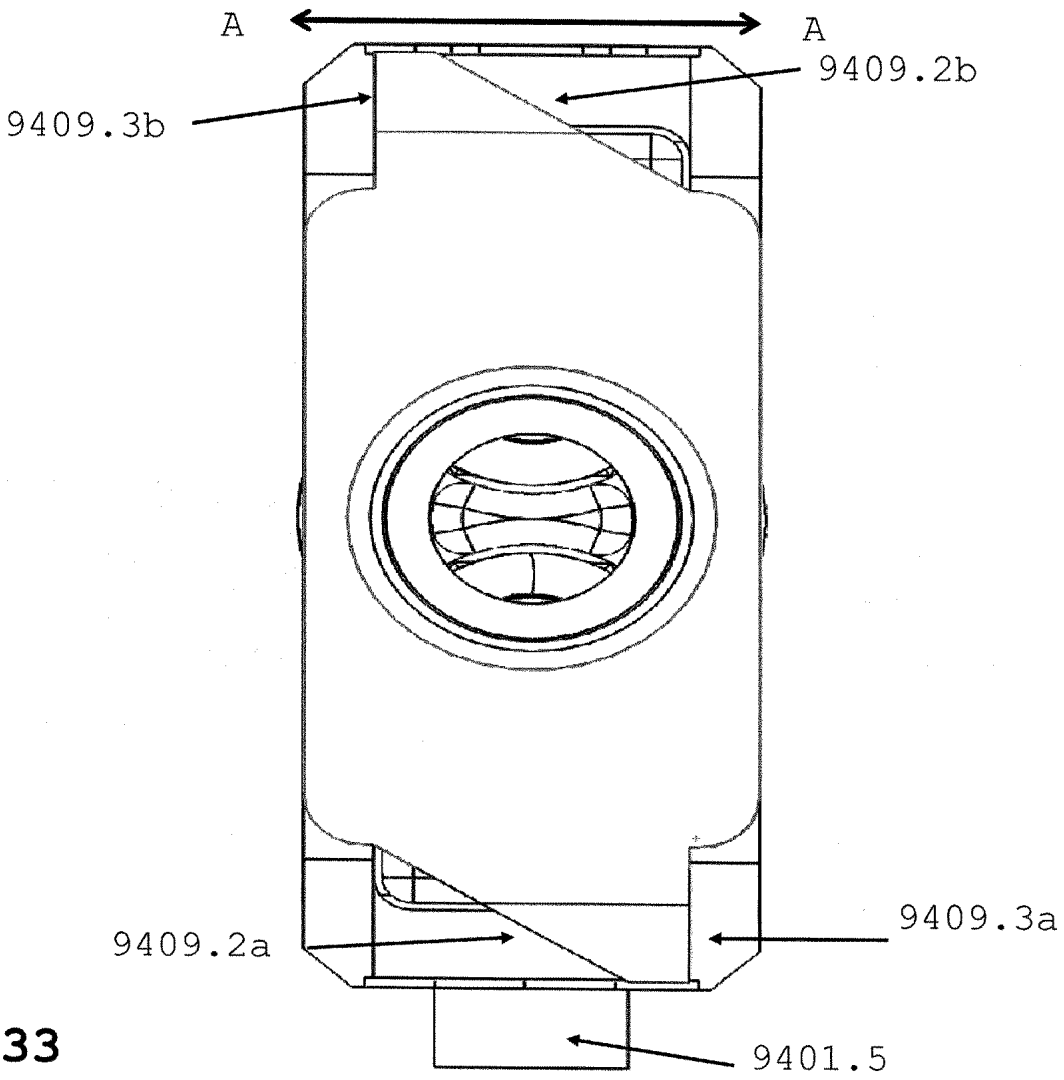


FIG. 33

EX1003: Fig. 33.

153. Therefore, in my opinion, Takano meets this claim.

I. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector."

154. As shown in Figs. 20-23 and again in Figs. 28-33, the boot (9109.1, 9209.1, 9309.1, 9409.1) is rotated 180-degrees about a longitudinal axis (L-L) (*see* Fig. 24) to change the polarity of the micro connector (9100). EX1003: ¶¶[0063] ("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'"), [0066], [0069] ("upon ***180 degree*** rotation, securing protrusion 9105.2 (refer to FIG. 20) is accepted into first slot 9201.4 b at a bottom surface of the outer housing 9401").

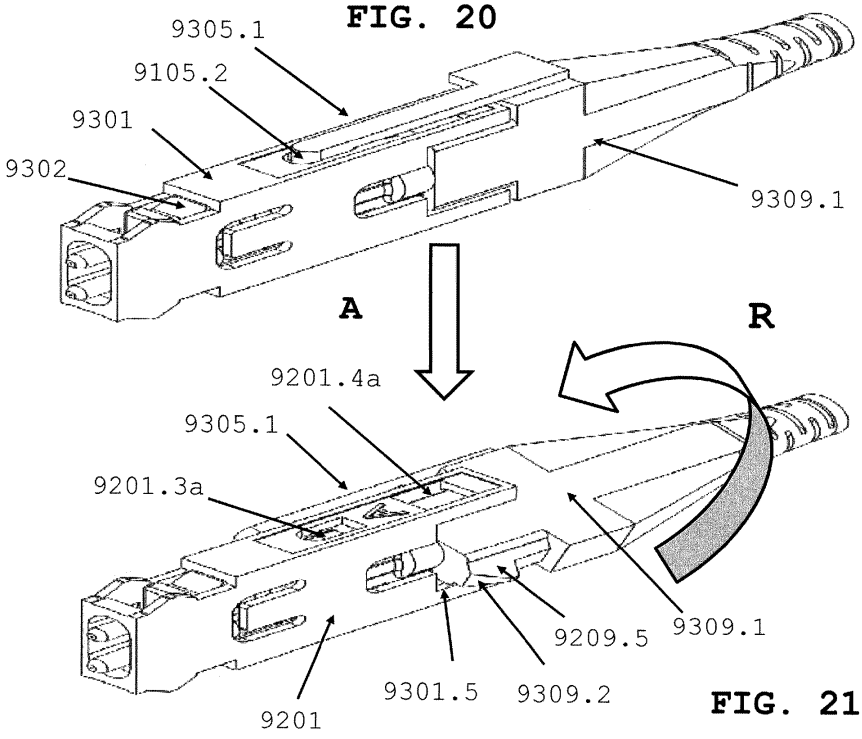


FIG. 20

FIG. 21

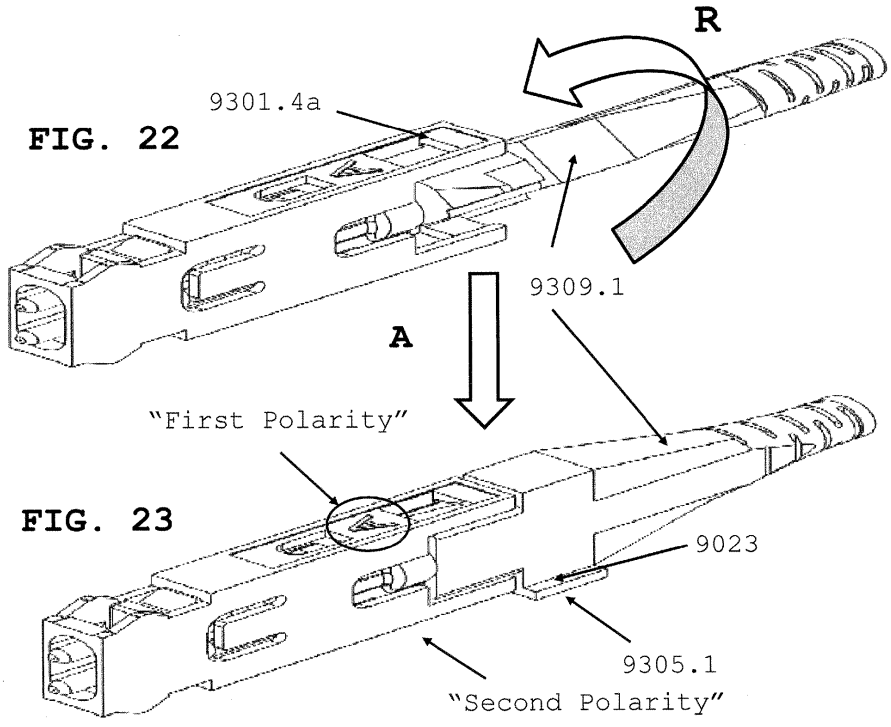


FIG. 22

FIG. 23

EX1003: Figs. 20-23.

155. Therefore, in my opinion, Takano meets this claim.

J. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot."

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

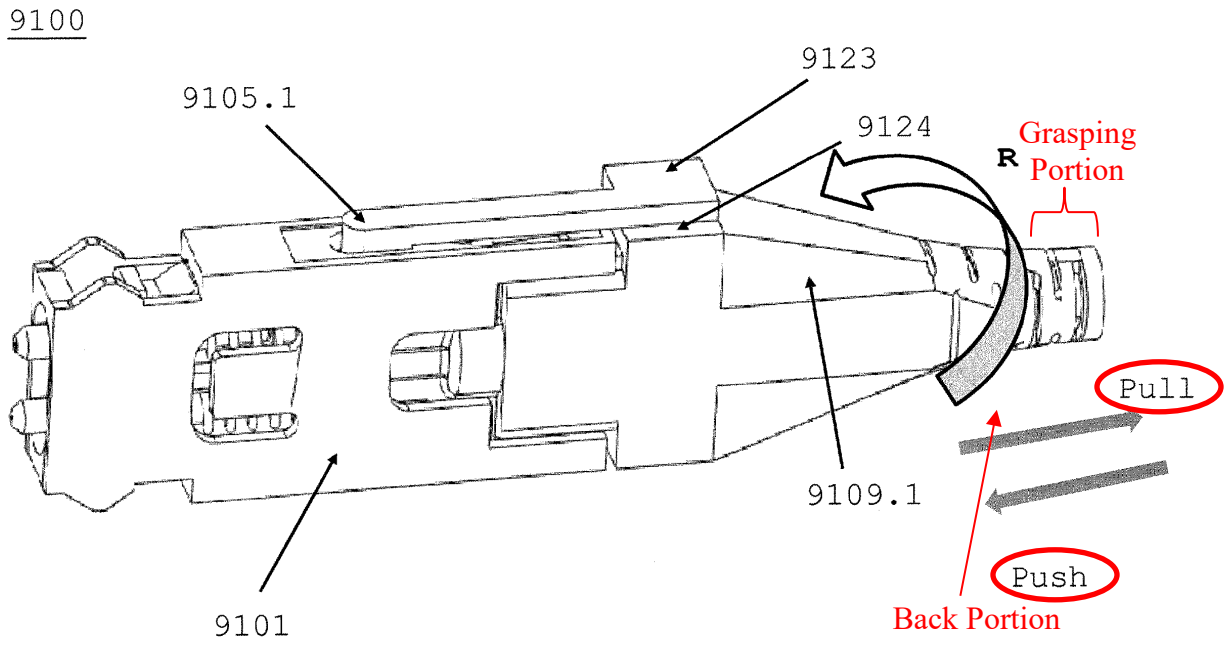


FIG. 16

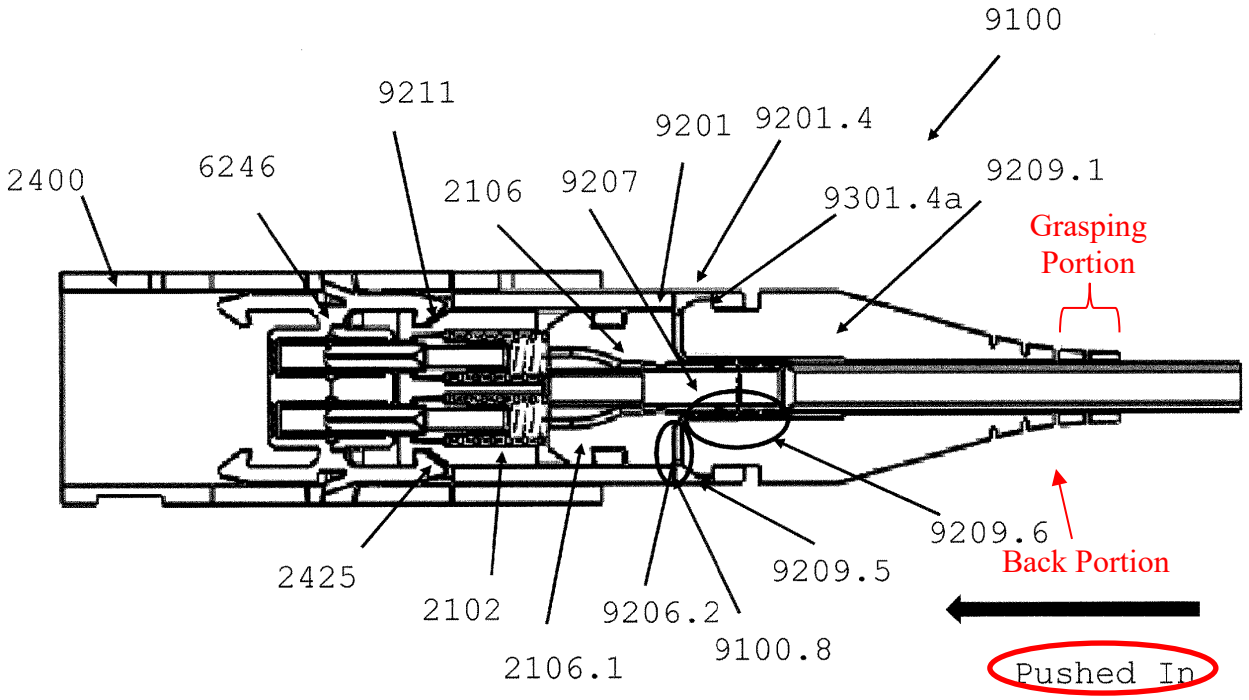

9100
9211
9201
9201.4
2400
6246
2106
9207
9301.4a
9209.1
Grasping Portion
9209.6
Back Portion
2425
2102
9206.2
9209.5
2106.1
9100.8
Pushed In

FIG. 34

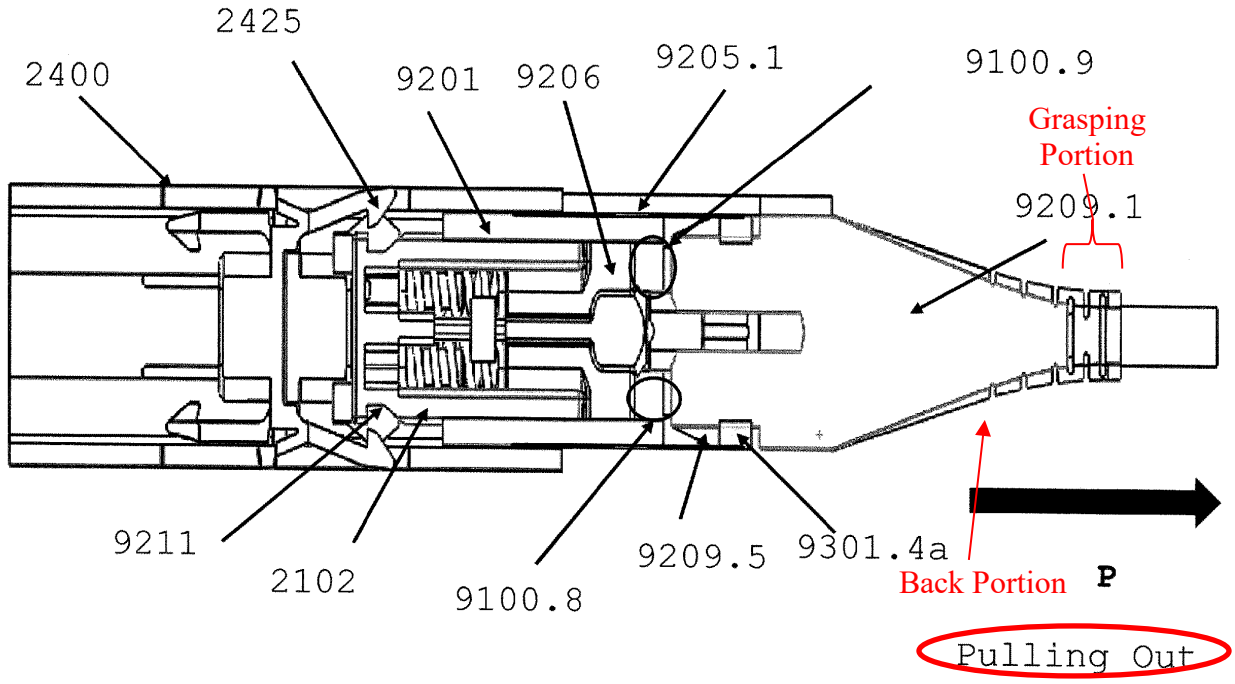

2425
2400
9201
9206
9205.1
9100.9
Grasping Portion
9209.1
9211
2102
9100.8
9209.5
9301.4a
Back Portion
P
Pulling Out

FIG. 35

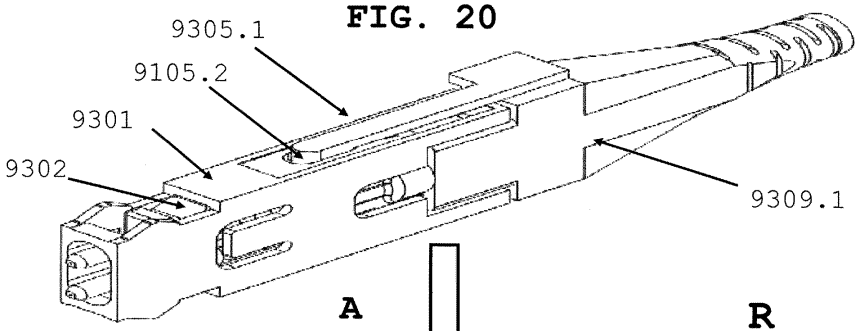
EX1003: Figs. 16, 34, and 35 (annotated).

157. Therefore, in my opinion, Takano meets this claim.

K. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing."

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

FIG. 20



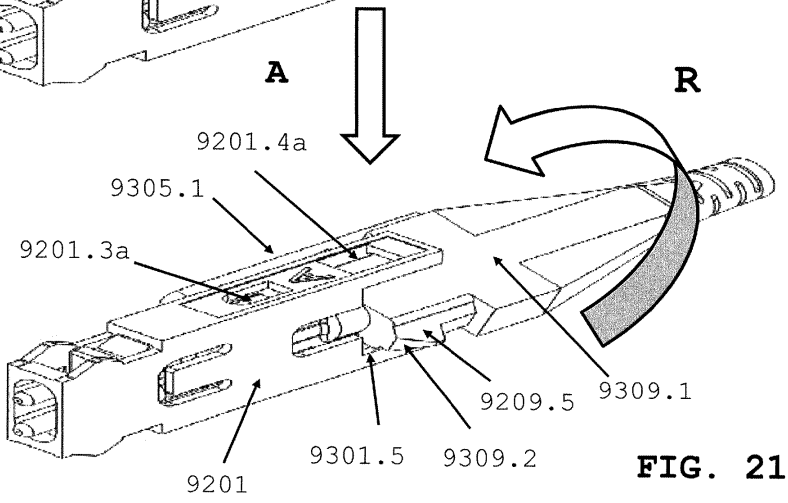


FIG. 21

FIG. 22

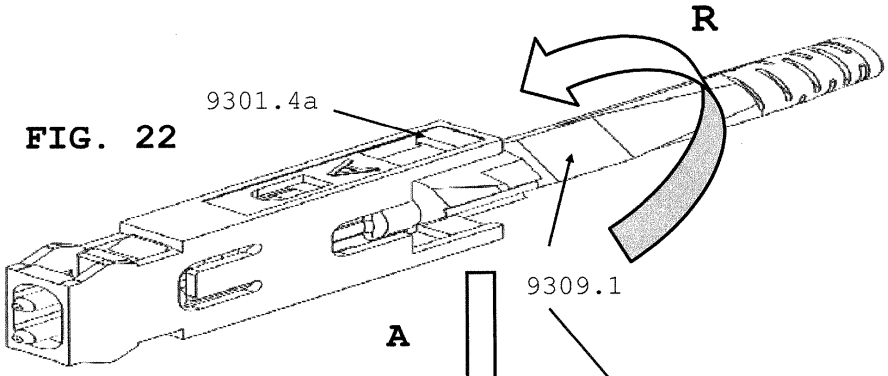
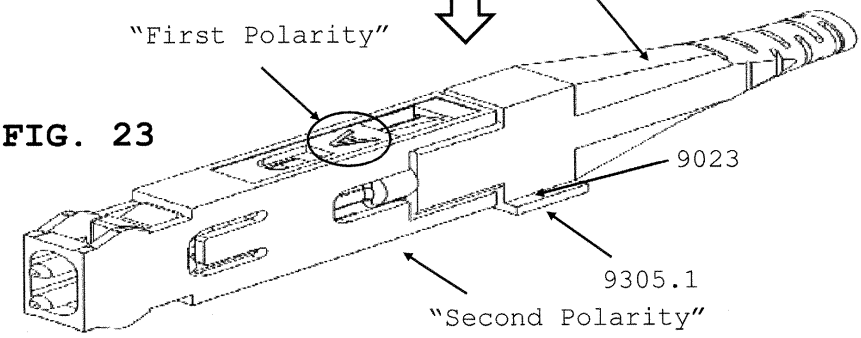


FIG. 23



EX1003: Figs. 20-23.

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

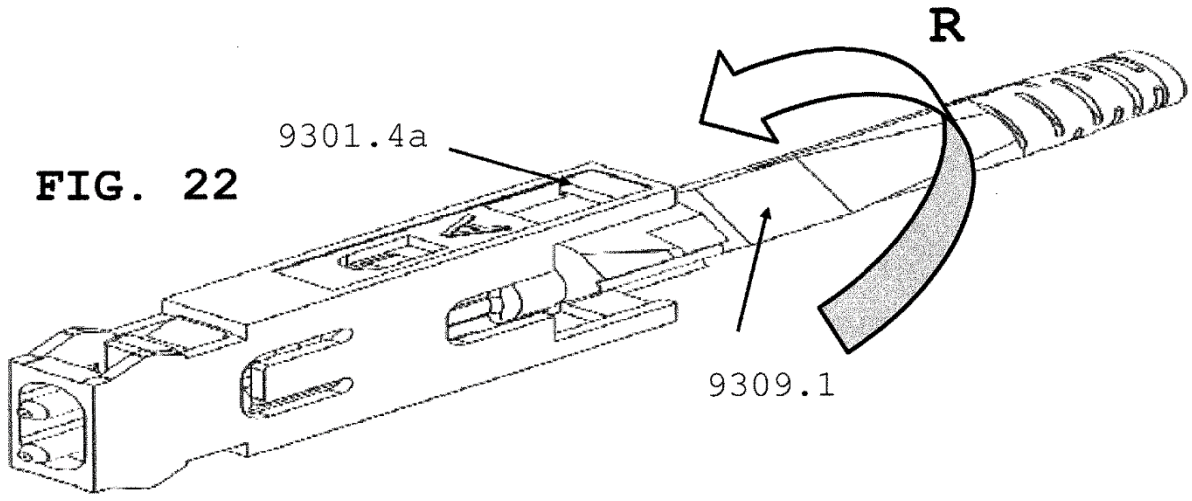


FIG. 22

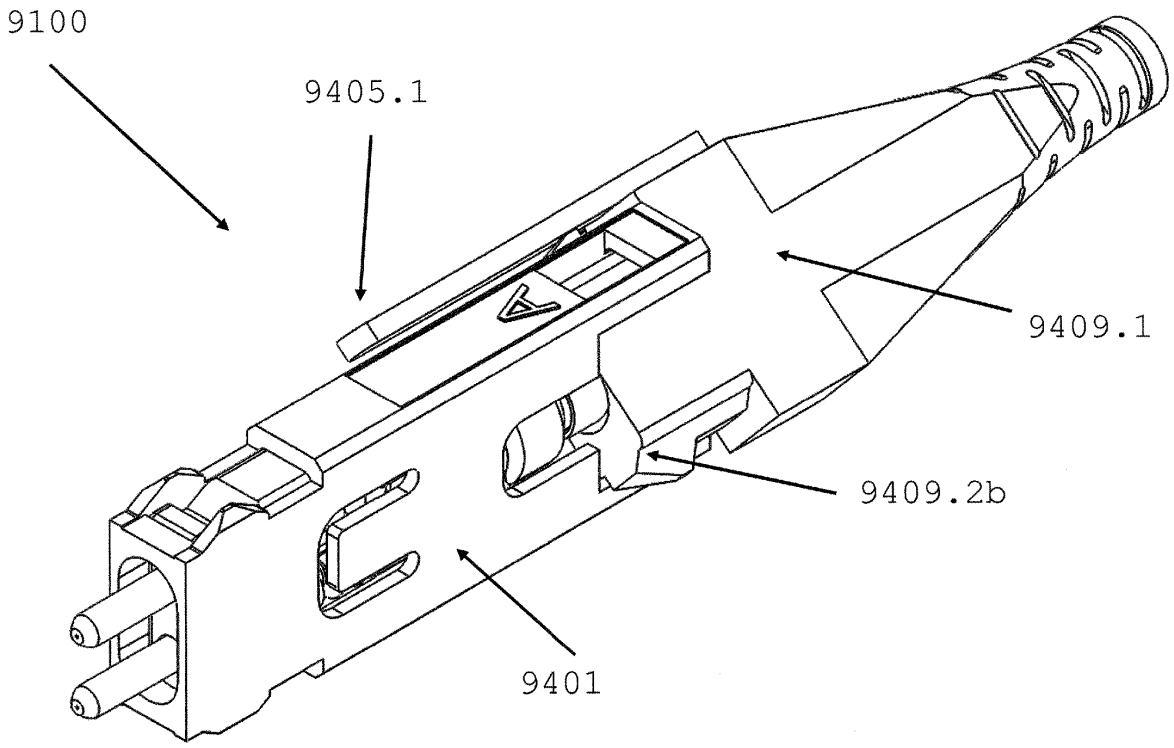


FIG. 30

EX1003: Figs. 22 and 30.

160. Therefore, in my opinion, Takano meets this claim.

L. Claim 14 "The fiber optic connector according to claim 1, wherein the center portion has sides with cutouts."

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

9109.1

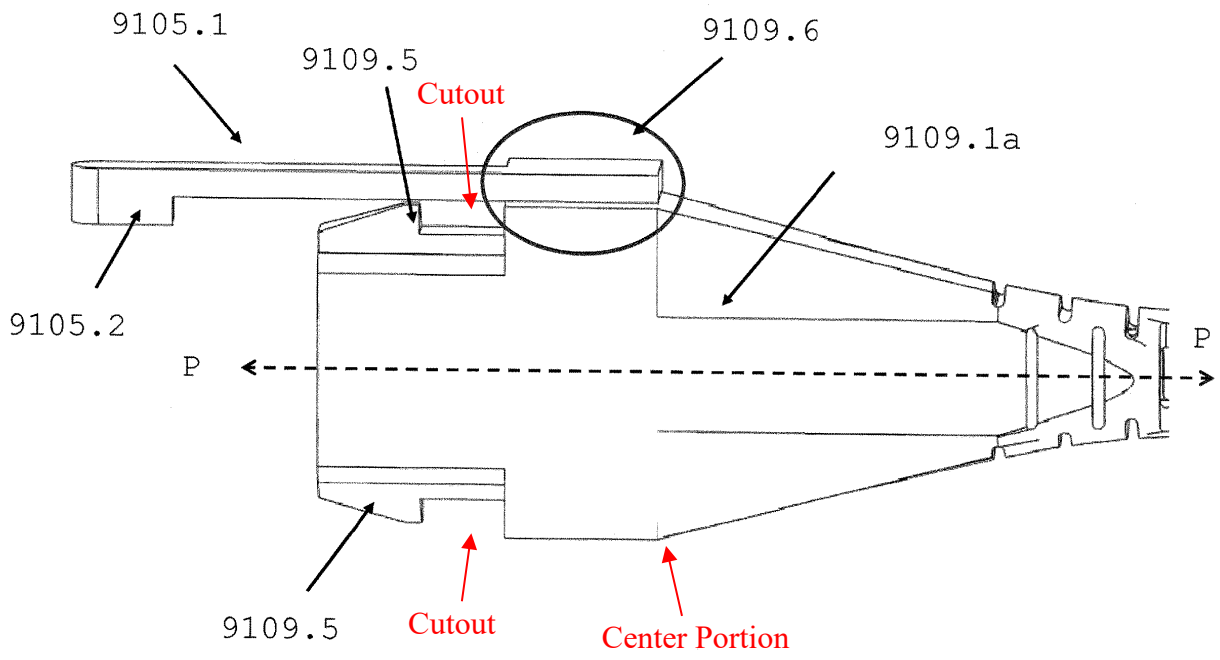


FIG. 17

EX1003: Fig. 17 (annotated).

162. Therefore, in my opinion, Takano meets this claim.

M. Independent Claim 16

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:"

163. For the reasons I discussed in Section VI(A)(1.P), in my opinion Takano meets this limitation.

16.a.1"a front end opening in the housing for the two fiber optic ferrules,"

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

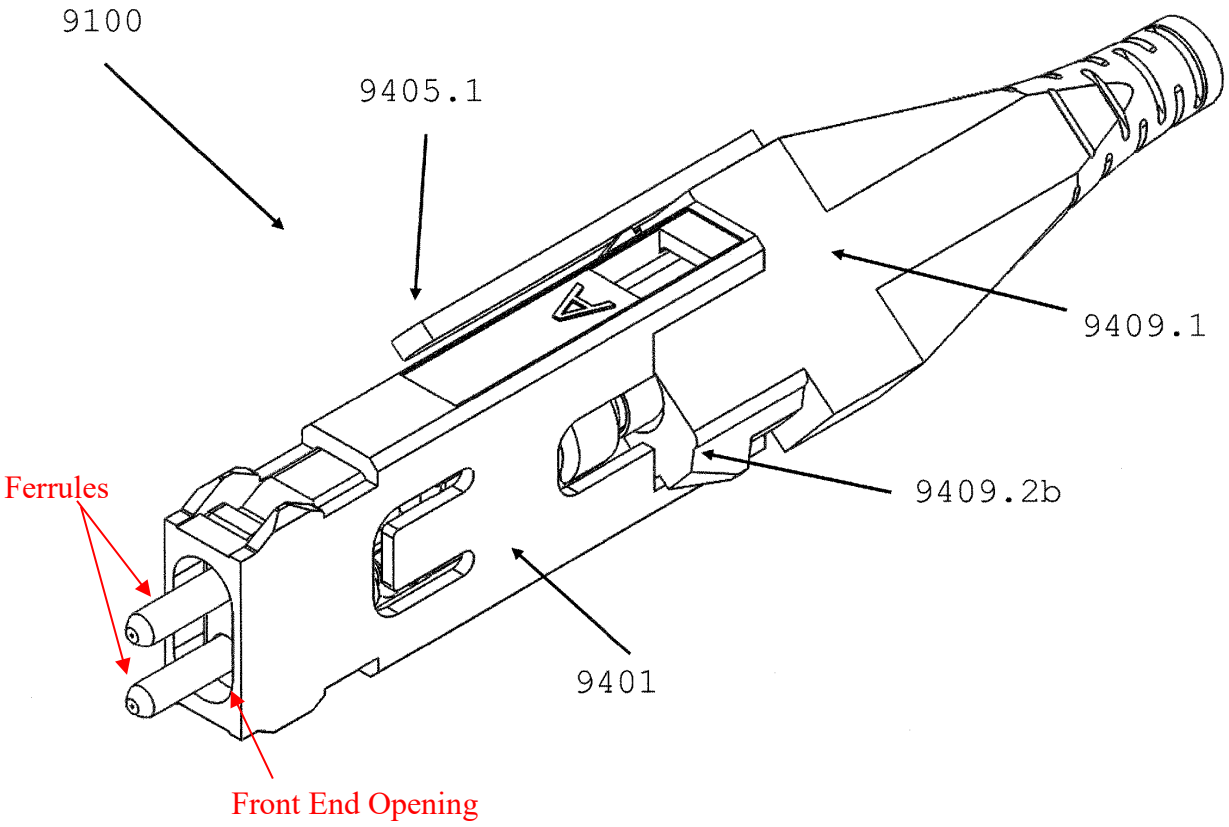


FIG. 30

EX1003: Fig. 30 (annotated).

165. Therefore, in my opinion, Takano meets this limitation.

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

166. For the reasons I discussed in Section VI(A)(1.a.2), in my opinion Takano meets this limitation.

16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

167. For the reasons I discussed in Section VI(A)(1.a.4), in my opinion Takano meets this limitation.

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;"

168. The micro fiber optic connector (9100) includes two ferrules (9203) that are spaced apart between the top and bottom of the outer housing (9101, 9201, 9301, 9401). EX1003: Fig. 16, 19, and 30, ¶[0061].

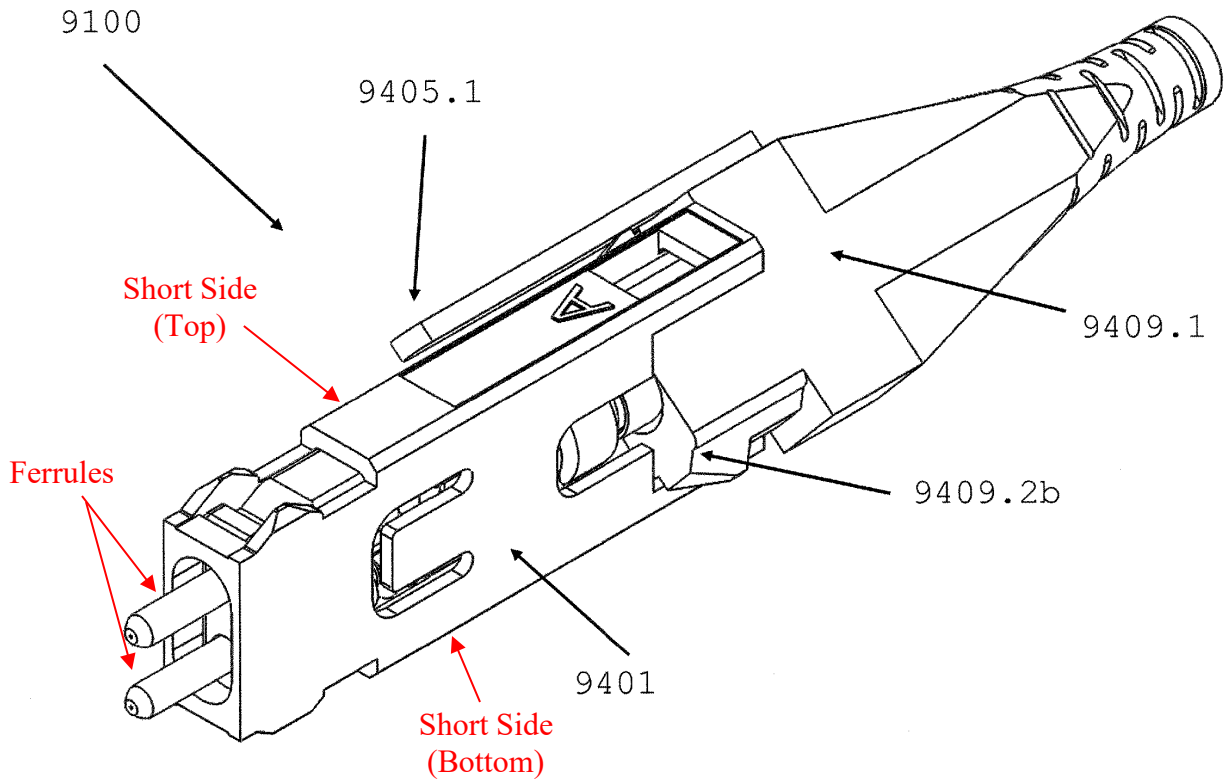


FIG. 30

EX1003: Fig. 30 (annotated).

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

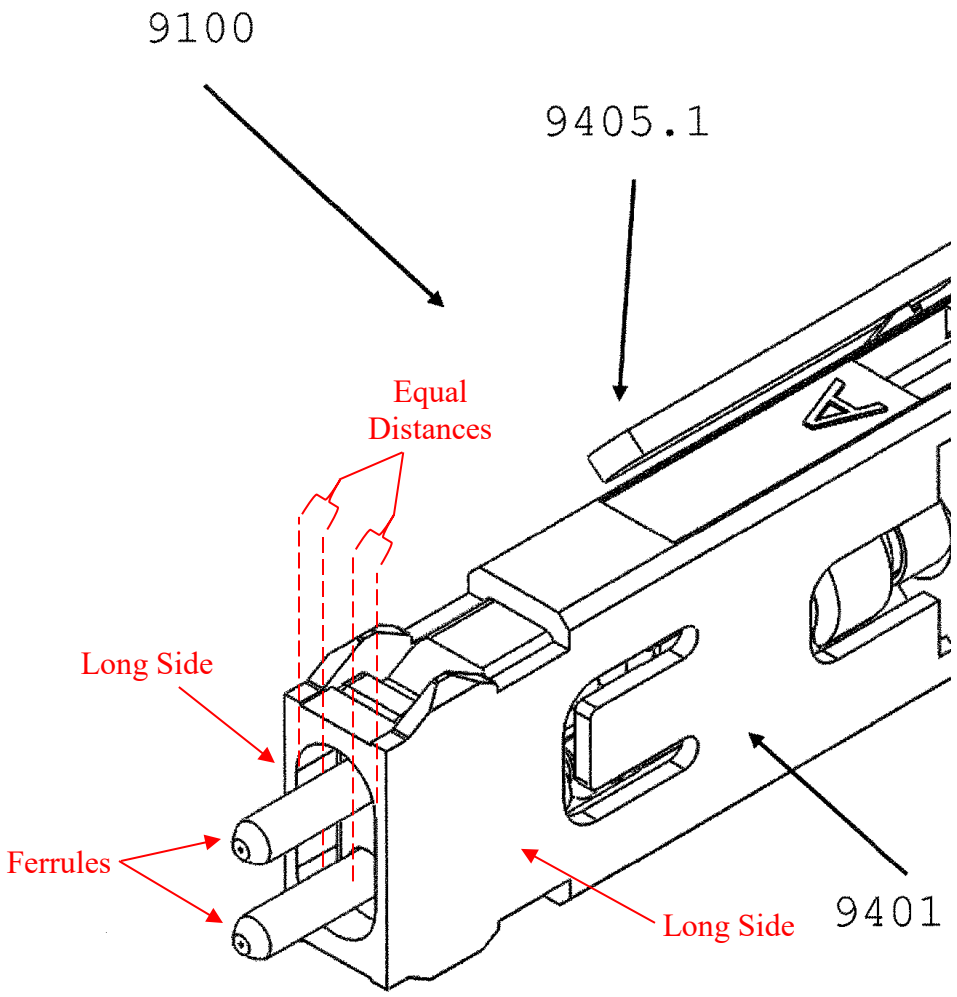


FIG. 30

EX1003: Fig. 30 (annotated).

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

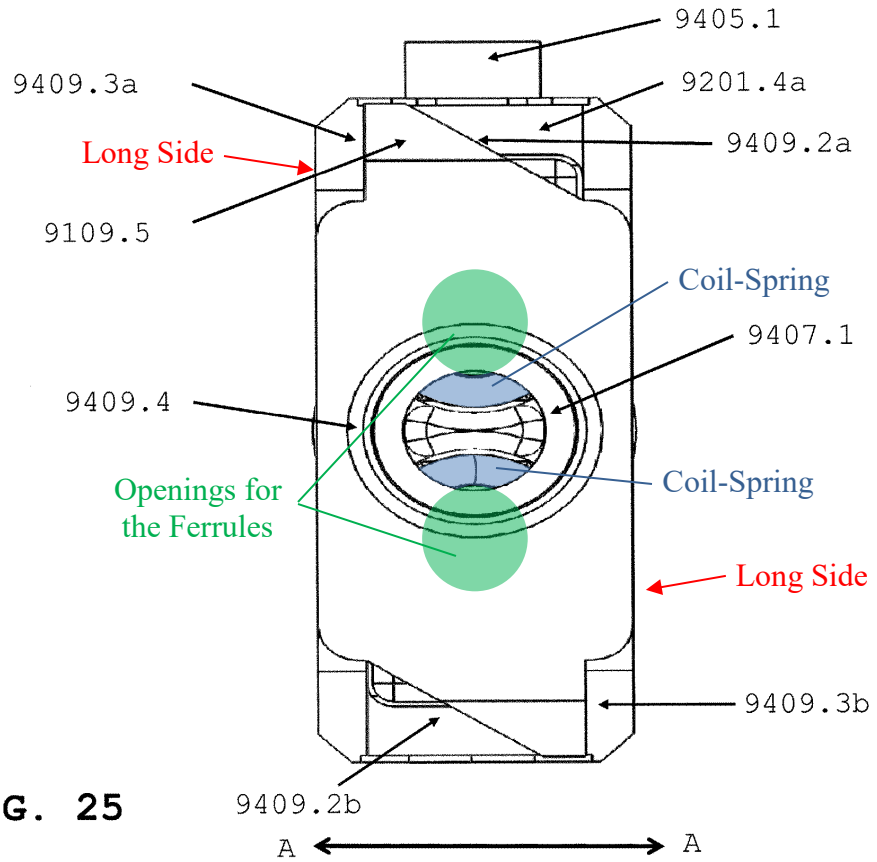


FIG. 25

EX1003: Fig. 25 (annotated).

171. In addition, the ferrules (9203) being spaced equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401) would be an inherent property of the micro connector (9100) in order for the micro connector to connect to the adapter (2400) in both the first polarity configuration and the second polarity configuration. In order to explain why the POSA understands that the ferrules (9203) are spaced equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401), we need to first talk about the concept of "polarity."

172. In general, "polarity" refers to the relative positions of the two ferrules

(9203) when the micro connector (9100) is inserted into the adapter (2400). In duplex connectors, like the micro connector (9100), one ferrule is a transmit or Tx ferrule that transmits a light signal and the other ferrule is a receive or Rx ferrule that receives a light signal. Polarity refers to the relative positions of the Tx and Rx ferrules in the connector when the connector is inserted into a corresponding adapter.

173. To talk about polarity, we first need to establish ***a frame of reference for the micro connector*** to describe the relative positions of the Tx and Rx ferrules within the connector. Because the key (9105.1, 9205.1, 9305.1, 9405.1) of the micro connector (9100) allows insertion into the adapter (2400) in ***only one orientation*** (i.e., a mating orientation), the micro connector's "polarity" is defined by the positions of the Tx and Rx ferrules in relation to the key.

174. The key (9105.1, 9205.1, 9305.1, 9405.1) of the micro connector (9100) defines ***a single proper mating orientation*** of the micro connector and restricts the micro connector to being inserted into the adapter (2400) in only this single proper mating orientation. As shown below, the adapter (2400) includes connector alignment slots (2447) for receiving the keys (9105.1, 9205.1, 9305.1, 9405.1) of the micro connectors (9100) (i.e., four micro connectors). EX1004: ¶¶[224], [228]. The connector alignment slots (2447) are only along the top side of the adapter (2400). As readily appreciated by looking at the images below, the key

(9105.1, 9205.1, 9305.1, 9405.1) of the micro connector (9100) allows the micro connector to be inserted in only one orientation—the orientation where the key and one of the connector alignment slots (2447) are aligned. The key (9105.1, 9205.1, 9305.1, 9405.1) blocks insertion of the micro connector (9100) if the micro connector is upside down in relation to the adapter (i.e., the micro connector is oriented such that the key is not on top of the micro connector).

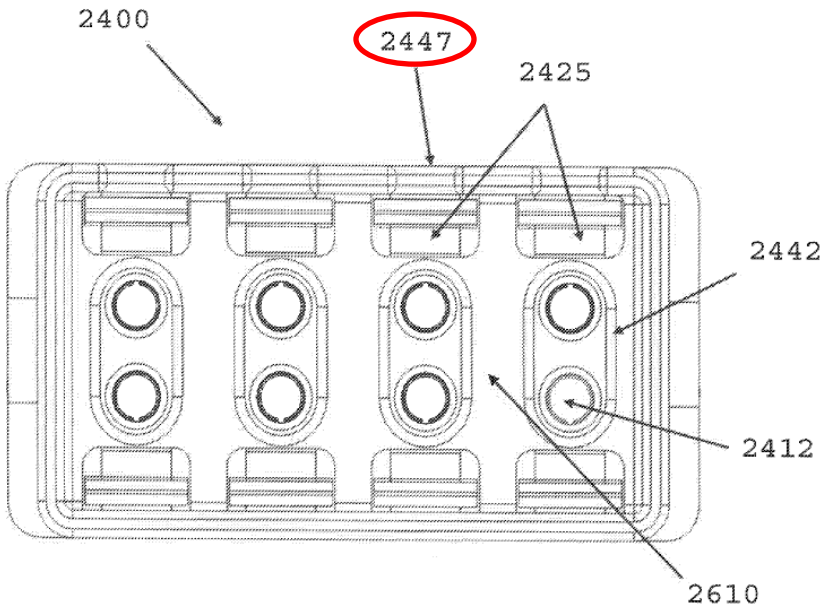


FIG. 26

EX1004: Fig. 26 (annotated).

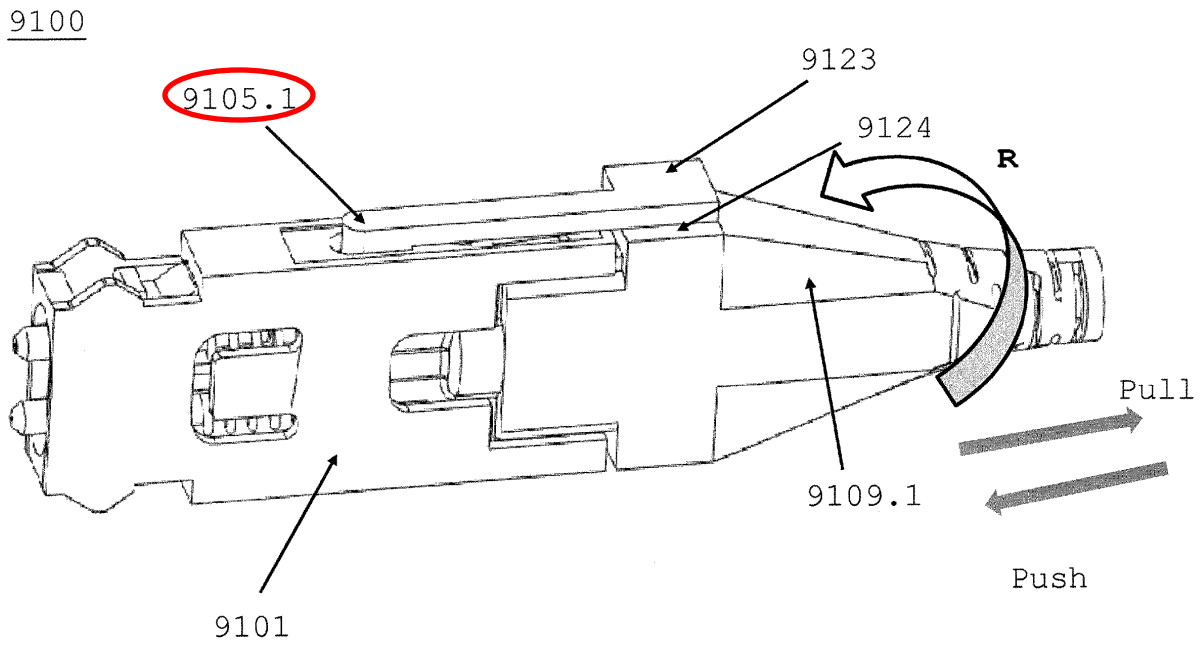


FIG. 16

EX1003: Fig. 16 (annotated).

175. For simplicity, I will discuss polarity in terms of the positions of the Tx and Rx ferrules when the key (9105.1, 9205.1, 9305.1, 9405.1) is on top of the micro connector (9100). In other words, the micro connector (9100) oriented with the key (9105.1, 9205.1, 9305.1, 9405.1) on top will be the frame of reference used to discuss the polarity of the micro connector. This is a common mating orientation for inserting a connector into an adapter.

176. In order to make proper optical connections in an optical interconnect system, it is essential that the micro connector's polarity matches the polarity of the adapter with which the connector is mated. Matching polarity results in the Tx

ferrule of the connector mating with the Tx port of the adapter and the Rx ferrule of the connector mating with the Rx port of the adapter to establish optical communication. Otherwise, the optical communication would not occur. When installed incorrectly, the connector will have the wrong polarity for the adapter in the field. For example, the position of the Tx and Rx ferrules in relation to the key would cause the Tx ferrule to mate with the Rx port and the Rx ferrule to mate with the Tx port when the connector is inserted into the adapter. To fix this, it is necessary to change the polarity of the LC duplex connector by changing the positions of the Tx and Rx ferrules in relation to the key. This way, the Tx ferrule will mate with the Tx port and the Rx ferrule will mate with the Rx port.

177. Changing polarity is not as simple as just flipping the connector over. ***It is not possible*** to change the polarity of the micro connector (9100) by flipping the entire connector over. This is because the micro connector (9100) can only be inserted into the adapter (2400) in one orientation—the mating orientation—and therefore the connector is not able to be connected to the adapter in this flipped over orientation. Because the micro connector (9100) will always have to return to the mating orientation to be inserted into the adapter (2400) in order to align the key (9105.1, 9205.1, 9305.1, 9405.1) with one of the connector alignment slots (2447), simply flipping the connector over does nothing. In other words, while the entire connector may have changed orientation in its flipped-over state, the

positions of the Tx and Rx ferrules in relation to the key (the frame of reference for polarity) have not changed.

178. This is why Takano describes a way to move the key (9105.1, 9205.1, 9305.1, 9405.1) from the top of the outer housing (9101, 9201, 9301, 9401) to the bottom of the outer housing to change polarity. EX1003: ¶[0067]-[0071]. After, the key (9105.1, 9205.1, 9305.1, 9405.1) is moved from the top of the outer housing (9101, 9201, 9301, 9401) to the bottom, the ***entire*** micro connector (9100) is then flipped over to place the micro connector in the mating orientation—i.e., to align the key with one of the connector alignment slots (2447) of the adapter (2400). Flipping the entire micro connector (9100) over changes the relative positions of the two ferrules in the micro connector.

179. Thus, the orientation of the outer housing (9101, 9201, 9301, 9401) and the two ferrules (9203) when the micro connector (9100) is inserted into the adapter (2400) in the ***first*** polarity configuration ***is inverted or flipped over*** from the orientation of the outer housing and the two ferrules when the micro connector is inserted into the adapter in the *second* polarity configuration. This point is key for the following discussion.

180. The adapter (2400) for the micro connector (9100) includes two alignment sleeves that each receive one of the ferrules (9203) when the micro connector is inserted into the adapter. EX1003: Figs. 34 and 36. As understood by

a POSA, alignment sleeves form a cylindrical bore in which ferrules (9203) inserted from opposite ends meet therein to form an optical connection therebetween. EX1003: Figs. 34 and 36; EX1004: ¶¶[224], [233]; EX1018: 30:18-21.

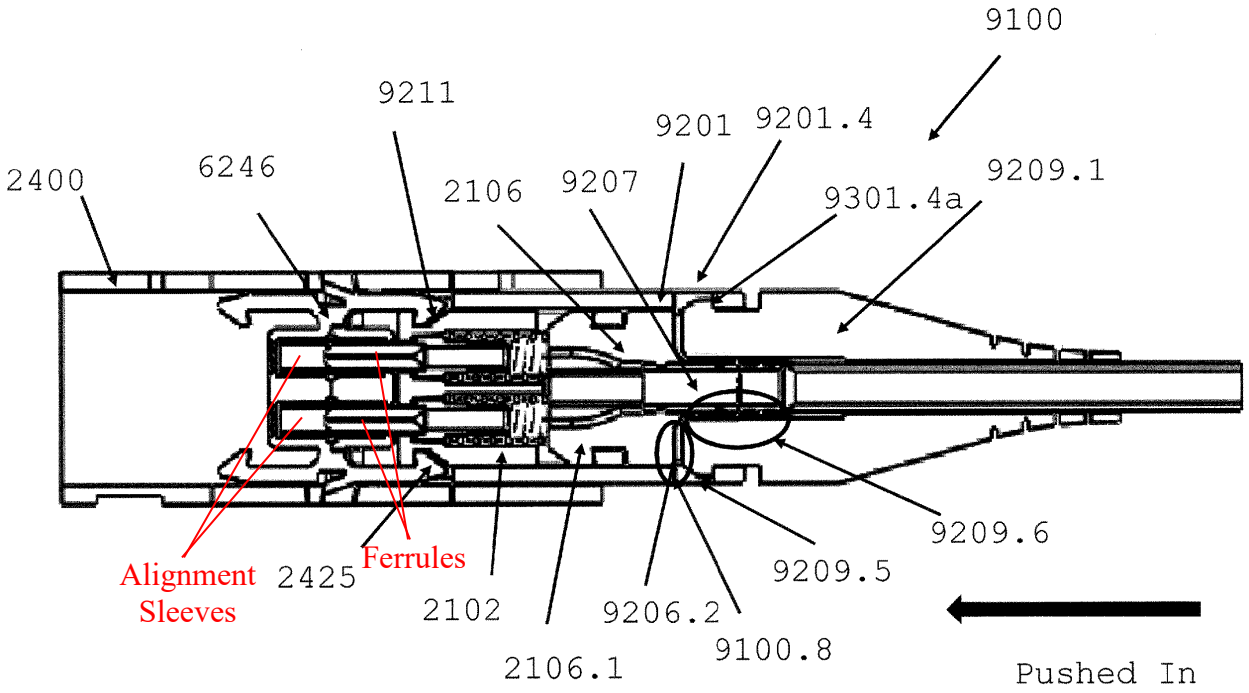


FIG. 34

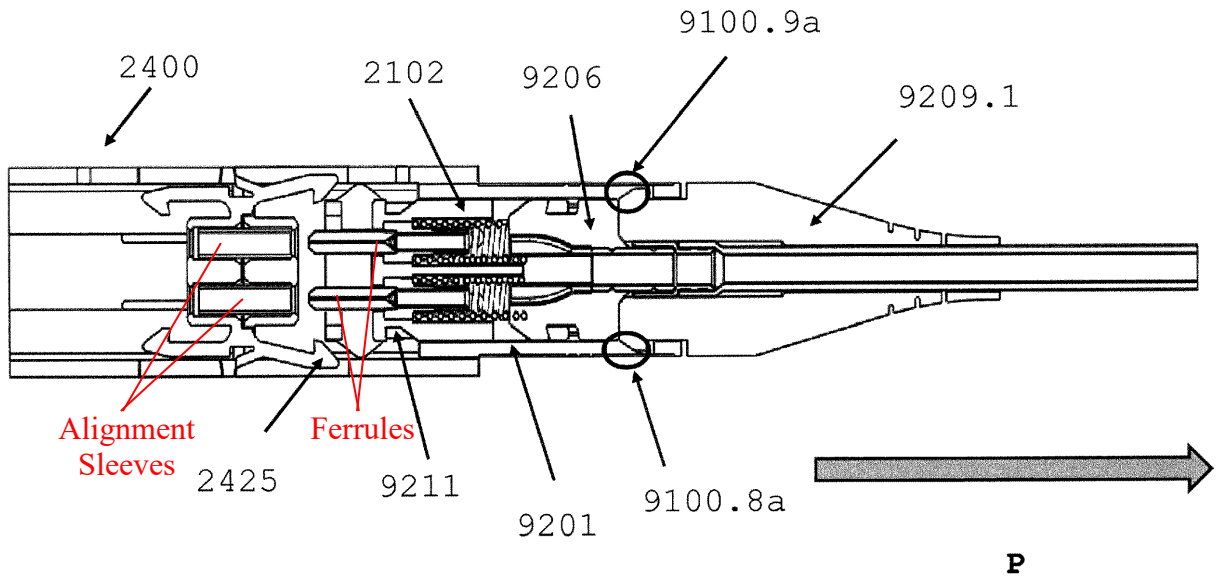


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

181. Additional description and drawings of the adapter (2400) are provided in Takano's provisional application, Provisional Application No. 62/649,539 ("the '539 Provisional), which is incorporated by reference into Takano. EX1003: ¶[0001]. As shown, the adapter (2400) includes alignment slots (2447) along the top of the adapter housing (2440) that receive the respective keys of the micro connectors (9100) inserted therein. EX1004: ¶¶[224], [288].

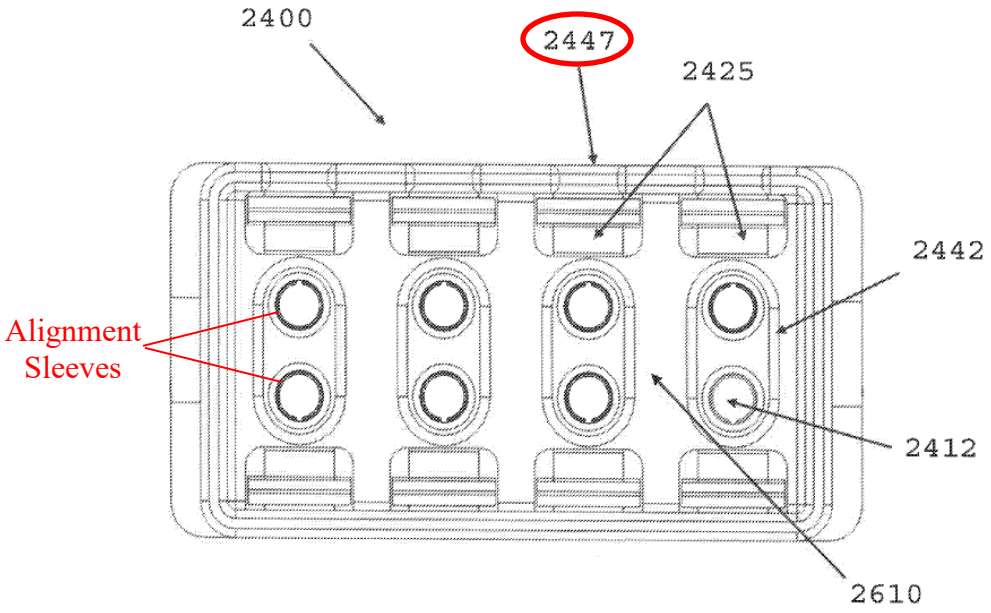


FIG. 26

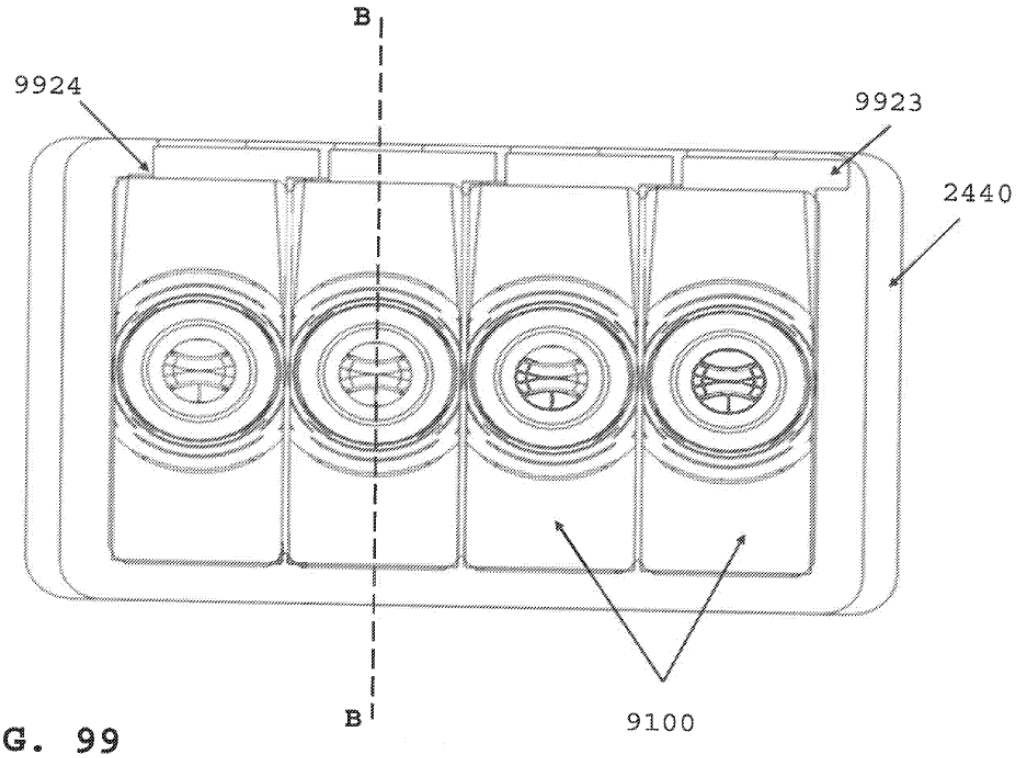


FIG. 99

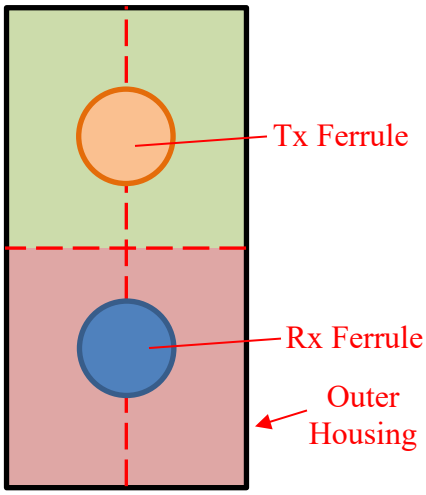
EX1004: Figs. 26 (annotated) and 99.

182. The micro connector (9100) can be inserted into the adapter (2400) when in the first polarity configuration and when in the second polarity configuration. EX1003: ¶[0065]. Regardless of which polarity configuration the micro connector (9100) is in, the ferrules (9203) are each received by one of the alignment sleeves when inserted into the adapter (2400). EX1003: Fig. 34. The alignment sleeves are fixed in position in the adapter (2400). In other words, the positions of the alignment sleeves do not change in the adapter (2400). In order for the ferrules (9203) of the micro connector (9100) to *align* with the alignment sleeves of the adapter (2400) when the micro connector is in the first polarity *and* when the micro connector is in the second polarity, the ferrules must be symmetrically arranged relative to the outer housing (9101, 9201, 9301, 9401)—both horizontally and vertically. The vertical symmetry between the ferrules (9203) and outer housing (9101, 9201, 9301, 9401) is shown in Figs. 34 and 36.

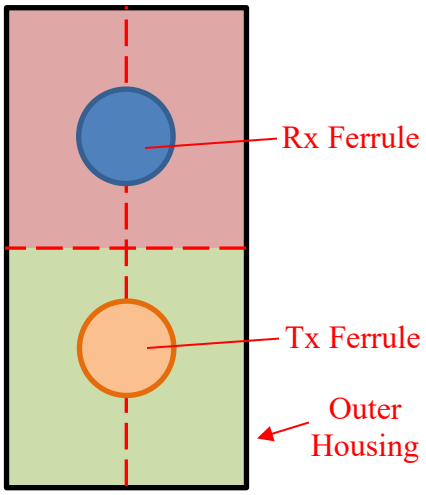
183. The '794 Patent itself recognizes polarity change connectors like those in Takano need to be symmetrical. EX1001: 4:14-20 ("housing 102 is symmetric …. the fiber optic connector 100 could be inserted into a receptacle in at least two ways [but] [t]he front extension 110 prevents the fiber optic connector 100 from being inserted in all but one way—thereby giving it a polarity function.").

184. Such horizontal and vertical symmetry is necessary because the orientation of the outer housing (9101, 9201, 9301, 9401) relative to the adapter (2400) when the micro connector (9100) is in the first polarity configuration is ***flipped over*** from the orientation of the outer housing relative to the adapter when the micro connector is in the second polarity configuration. This symmetry is necessary so that the ferrules are in the same x/y positions (although have switched top/bottom places) in the outer housing to align with the alignment sleeves of the adapter (2400) regardless of how the outer housing is oriented relative to the adapter (e.g., regardless of if the outer housing is flipped over or not).

185. For example, the schematic diagrams below show that Tx ferrule when the micro connector is in the mating orientation for the first polarity configuration is at the same x/y position as the Rx ferrule when the micro connector is in the mating orientation for the second polarity configuration (i.e., the outer housing rotated 180-degrees).



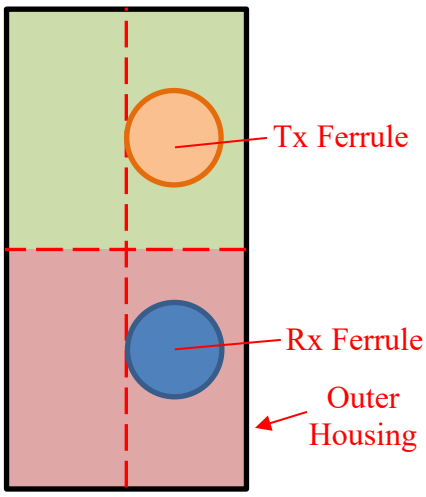
First Polarity Configuration



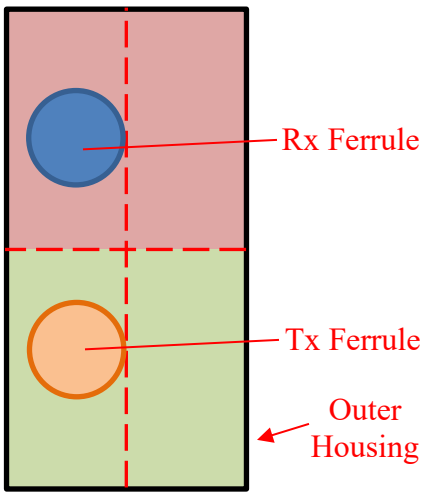
Second Polarity Configuration (outer housing flipped over from First Polarity Configuration)

186. If the ferrules (9203) are not symmetrically arranged relative to the outer housing (9101, 9201, 9301, 9401), then the ferrules will not align with the alignment sleeves of the adapter (2400) when the polarity of the micro connector (9100) is changed. If there is no symmetry, then the ferrules will not be in the same x/y positions (although have switched top/bottom places) in the outer housing and therefore will not align with the alignment sleeves of the adapter (2400) when the outer housing is flipped over. In other words, at most the ferrules will only align with the alignment sleeves when the connector is in one polarity configuration (i.e., first polarity configuration), but not the other polarity configuration (i.e., second polarity configuration). For example, if the ferrules are offset to the side of a central vertical axis of the outer housing, as shown in the schematic diagrams below, the Tx ferrule when the micro connector is in the

mating orientation for the first polarity configuration will ***not*** be in the same position (e.g., x or horizontal position relative to the outer housing) as the Rx ferrule when the micro connector is in the mating orientation for the second polarity configuration (i.e., the outer housing rotated 180-degrees).



First Polarity Configuration



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

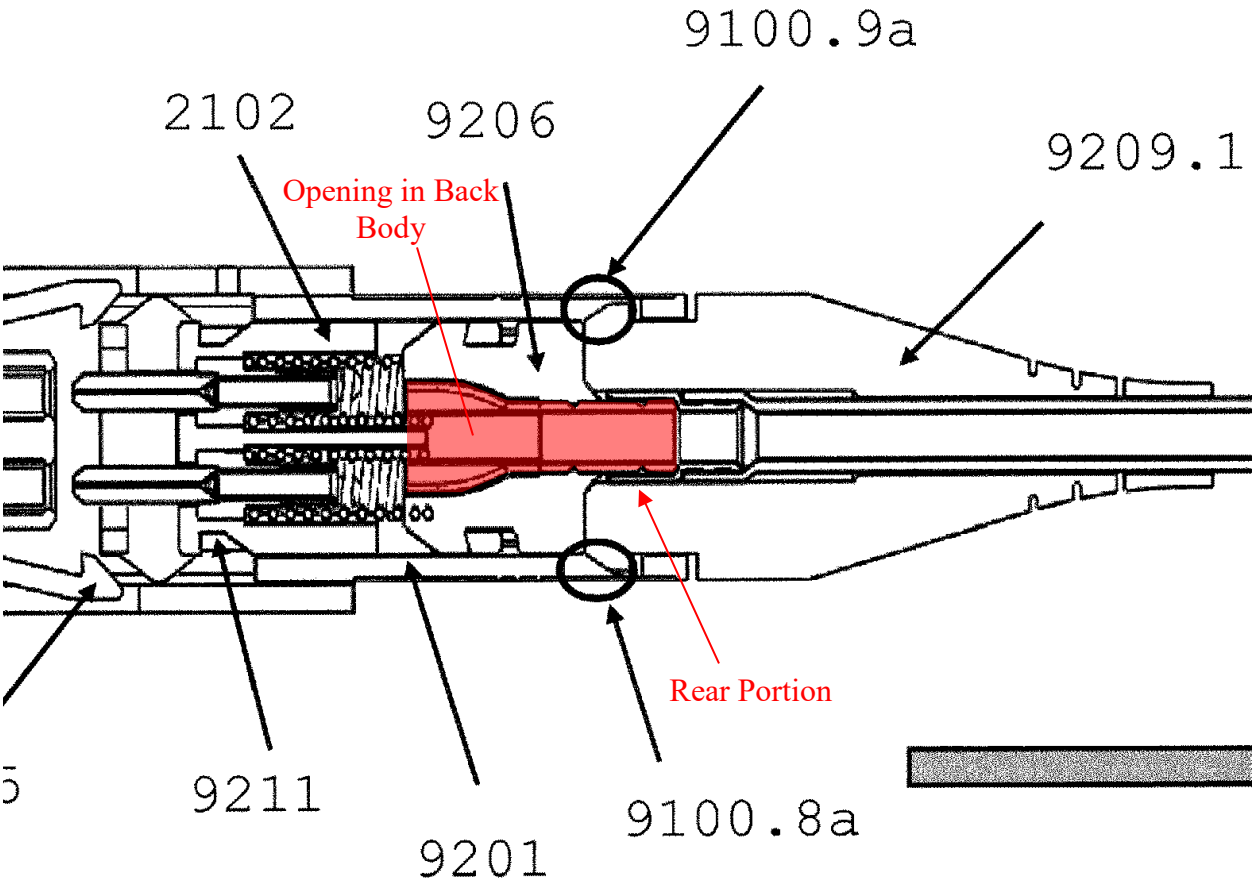
187. Because the ferrules (9203) are symmetrically arranged horizontally and vertically relative to the outer housing (9101, 9201, 9301, 9401), the ferrules are inherently spaced equidistant from the long sides of the outer housing.

188. Therefore, in my opinion, Takano meets this limitation.

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and"

189. For the reasons I discussed in Section VI(A)(1.b), in my opinion, Takano meets this limitation. Further, as explained in Section VI(A)(1.c.3), the

back body (9106, 9206)—including the back post (i.e., rear portion)—has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (9203). EX1003: Figs. 26, 33, 34, and 36, ¶[0059].



EX1003: Fig. 36 (annotated).

190. Therefore, in my opinion, Takano meets this limitation.

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

191. For the reasons I discussed in Section VI(A)(1.c.1), in my opinion Takano meets this limitation.

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot,"

192. For the reasons I discussed in Sections VI(A)(1.c.2) and VI(F), in my opinion Takano meets this limitation.

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"

193. For the reasons I discussed in Section VI(A)(1.c.3), in my opinion Takano meets this limitation.

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

194. For the reasons I discussed in Section VI(A)(1.d), in my opinion Takano meets this limitation.

N. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers."

195. For the reasons I discussed in Section VI(B), in my opinion Takano meets this claim.

O. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

196. For the reasons I discussed in Section VI(E), in my opinion Takano meets this claim.

P. Independent Claim 20

20.P "A fiber optic connector comprising:"

197. For the reasons I discussed in Section VI(A)(1.P), in my opinion Takano meets this limitation.

20.a "a boot;"

198. For the reasons I discussed in Section VI(A)(1.P), in my opinion Takano meets this limitation.

20.b "a crimp body engaged to the boot forward of the boot; and"

199. As I explained in Section VI(A)(1.P), Takano's micro connector (9100) includes a back body (9106, 9206) (i.e., crimp body). As shown in Fig. 36 and described by Takano, the back body (9106, 9206) engages the boot (9109.1, 9209.1, 9309.1, 9409.1) forward of the boot. EX1003: Figs. 26 and 27, ¶¶[0067] ("inner round 9409.4 ***engages*** a back post surface 9406.7 formed as an outer round,"), [0072] ("inner round 9409.4 ***engages*** back post face surface 9406.7,"

"boot assembly wing 9209.5 facing surface ***is in contact*** with facing surface 9206.2 of back post 2106," "boot assembly 9209.1 ***is up against*** back body 2106").

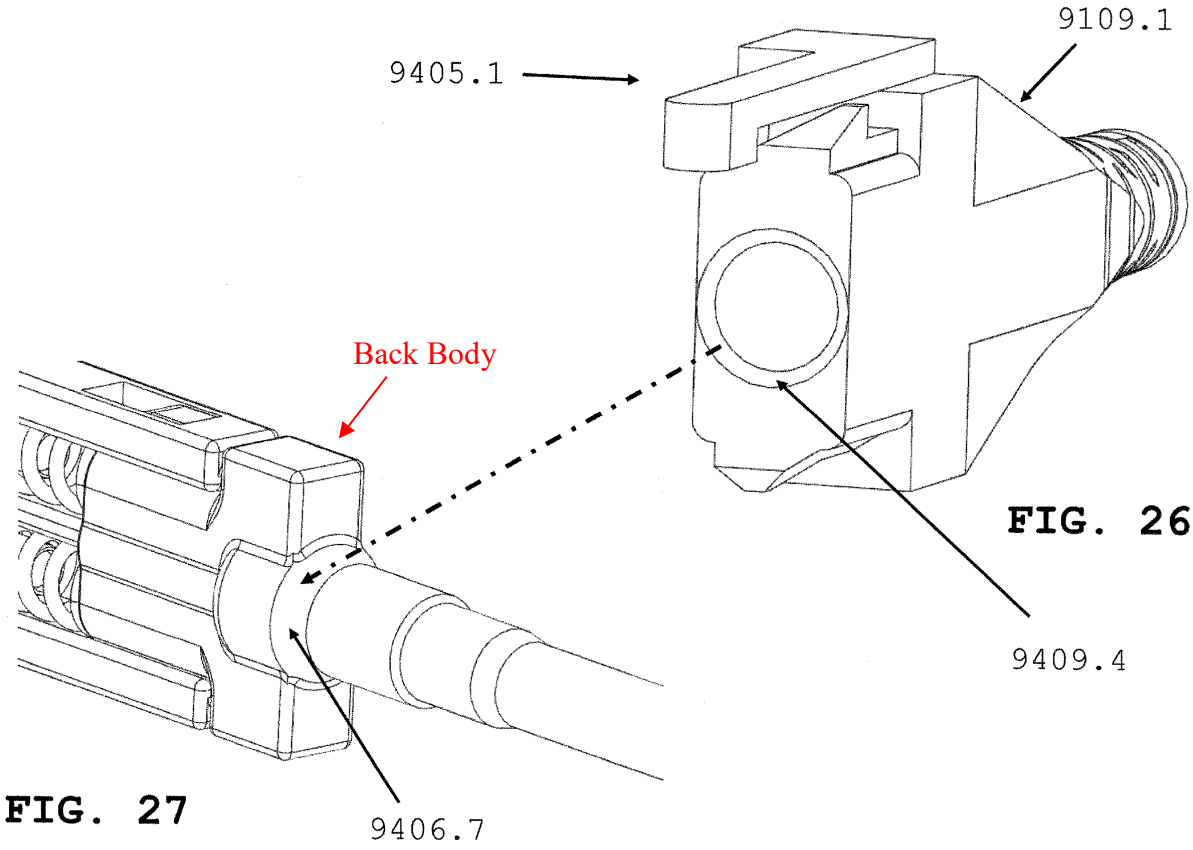


FIG. 26

FIG. 27

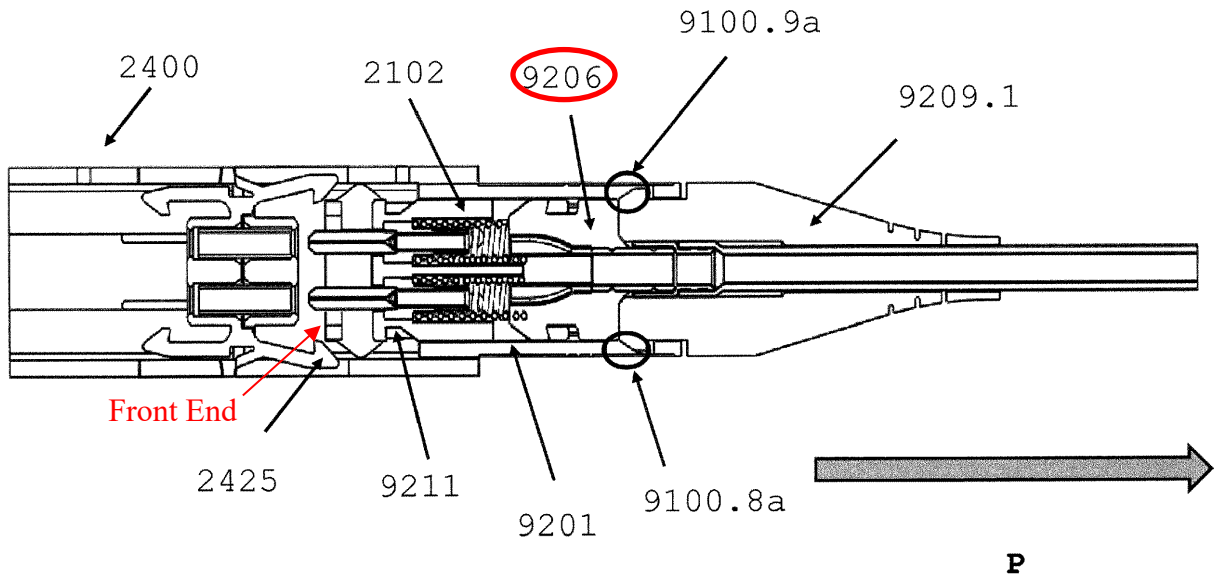


FIG. 36

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

200. Therefore, in my opinion, Takano meets this limitation.

201. I note that the arrangement of the back body (9106, 9206) and the boot (9109.1, 9209.1, 9309.1, 9409.1) (including the key (9105.1, 9205.1, 9305.1, 9405.1)) of Takano is analogous to the arrangement of the '794 Patent's crimp body (106) and boot (112) (including the front extension (110)). EX1001: Fig. 1; EX1003: Fig. 16. Because of the analogous arrangement, if this limitation is found to have written description support, which I do not agree with for the reasons I explained in Section V(C), then in my opinion I believe this limitation would be met by Takano for the reasons discussed above and for the reasons this limitation would be determined to have written description support.

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein,"

202. For the reasons I discussed in Sections VI(A)(1.P)&(1.c.3), in my opinion Takano meets this limitation.

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules,"

203. For the reasons I discussed in Sections VI(A)(1.a.1)&(M)(16.a.1), in my opinion Takano meets this limitation.

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

204. For the reasons I discussed in Section VI(A)(1.a.2), in my opinion Takano meets this limitation.

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

205. For the reasons I discussed in Section VI(A)(1.a.4), in my opinion Takano meets this limitation.

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides,"

206. For the reasons I discussed in Section VI(M)(16.a.4), in my opinion Takano meets this limitation.

20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers,"

207. For the reasons I discussed in Sections VI(A)(1.b)&(M)(16.b), in my opinion Takano meets this limitation.

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers,"

208. As I explained in Section VI(A)(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a center portion. As shown below, the center portion has a front end and a back end. EX1003: Fig. 17.

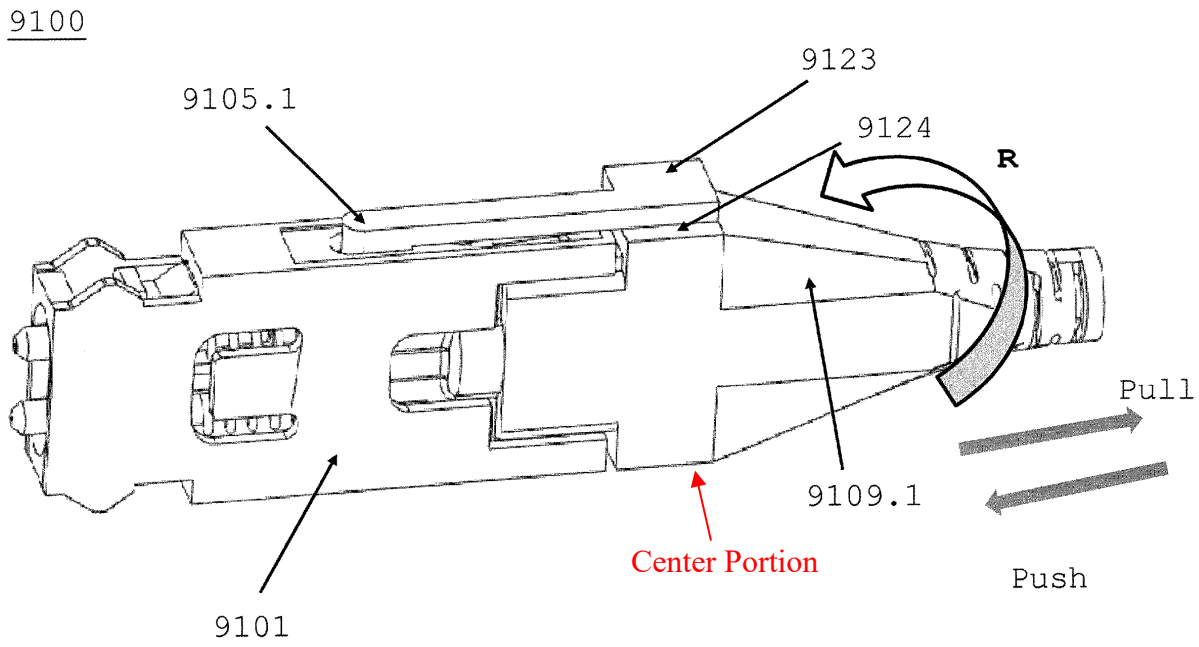


FIG. 16

9109.1

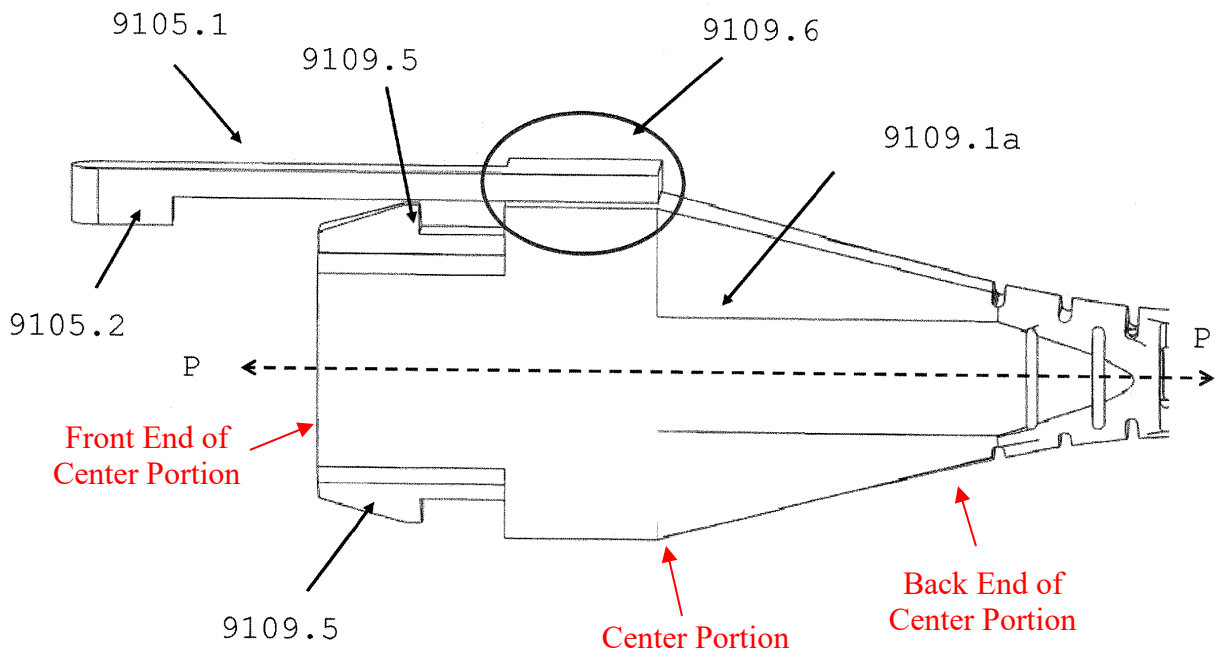
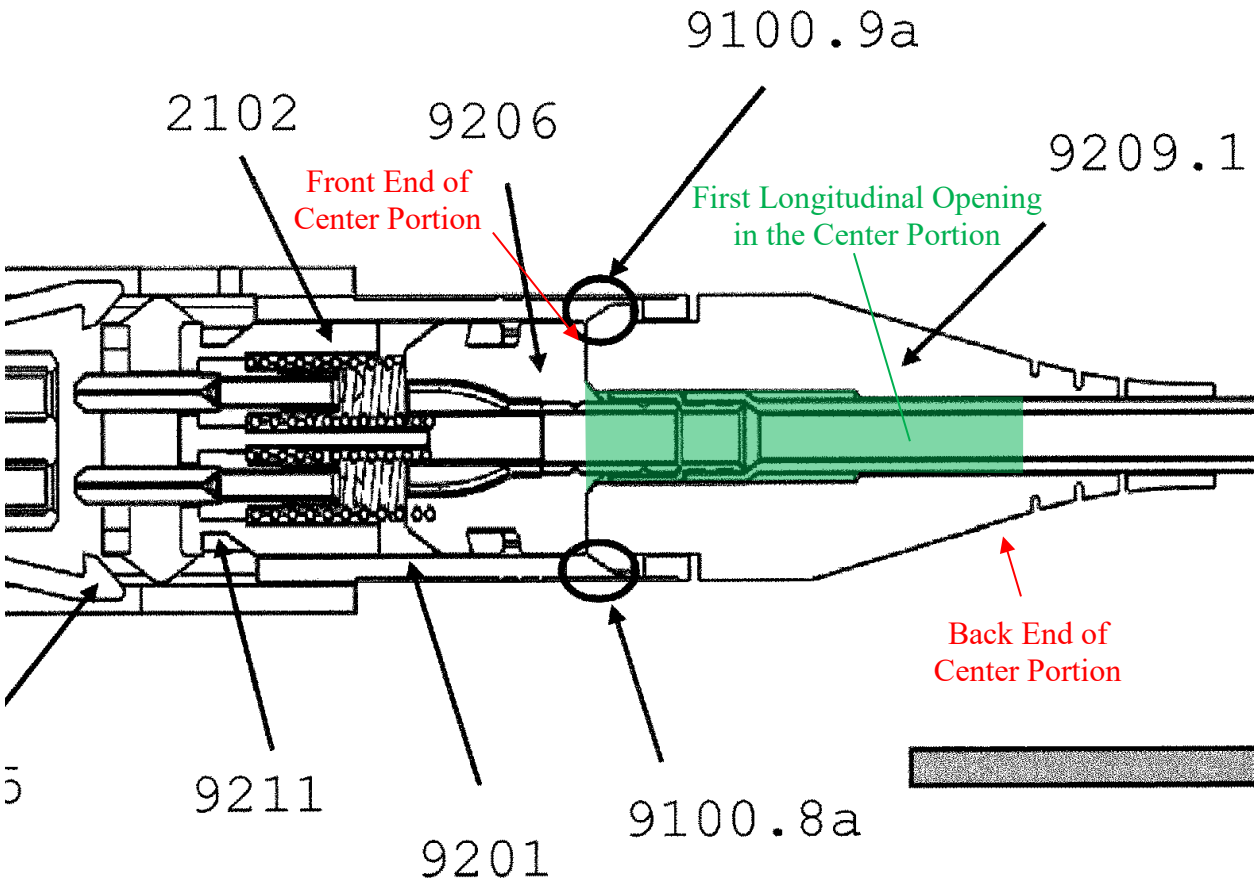


FIG. 17

EX1003: Figs. 16 and 17 (annotated).

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



EX1003: Fig. 36 (annotated).

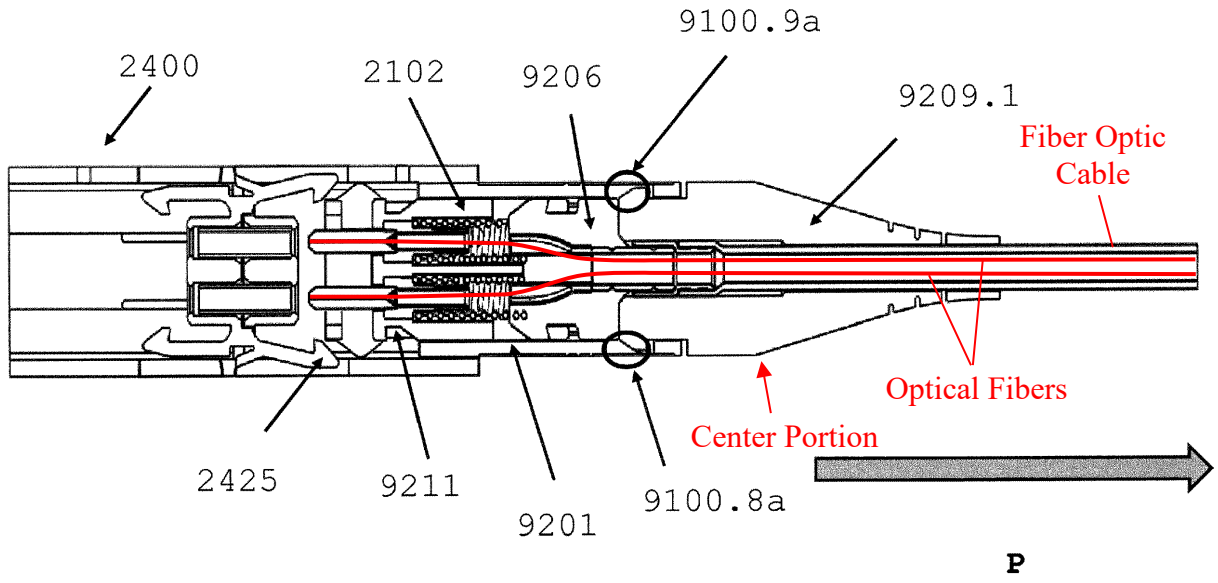


FIG. 36

EX1003: Fig. 36 (annotated).

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

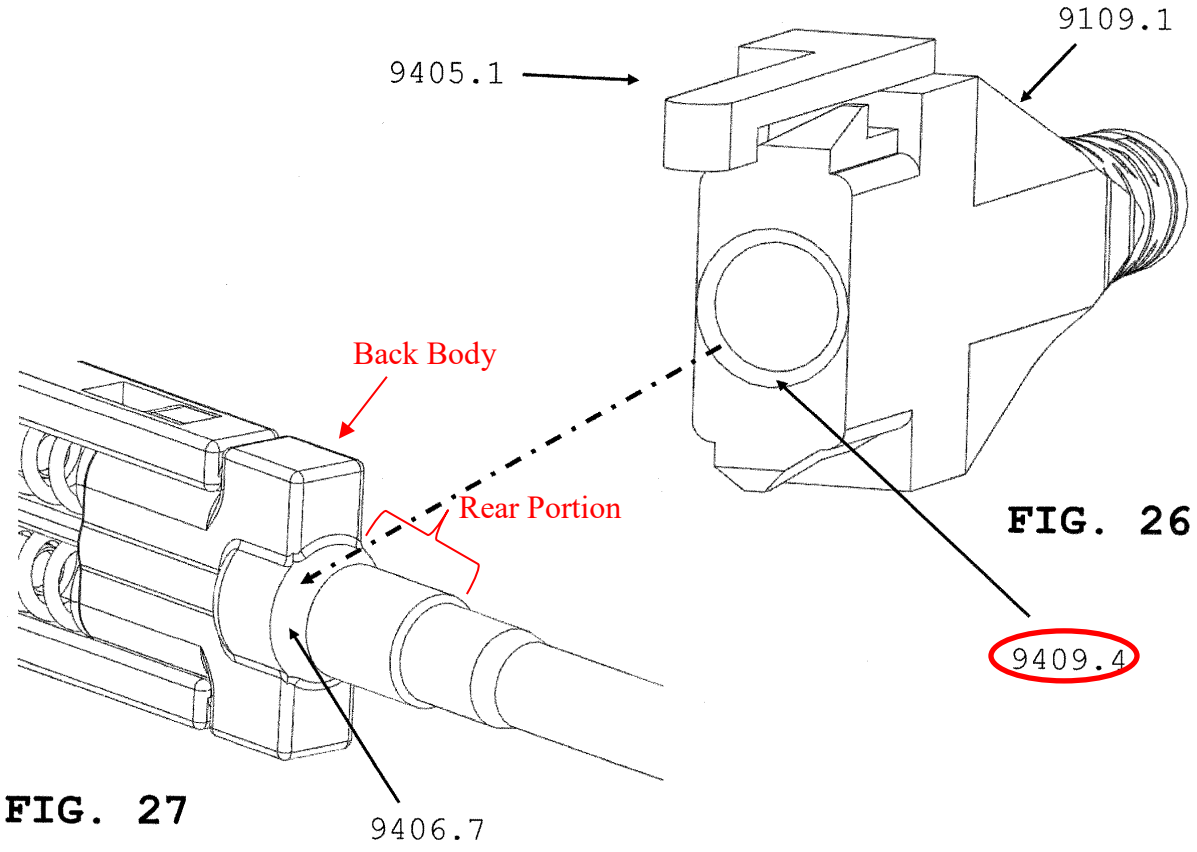


FIG. 26

FIG. 27

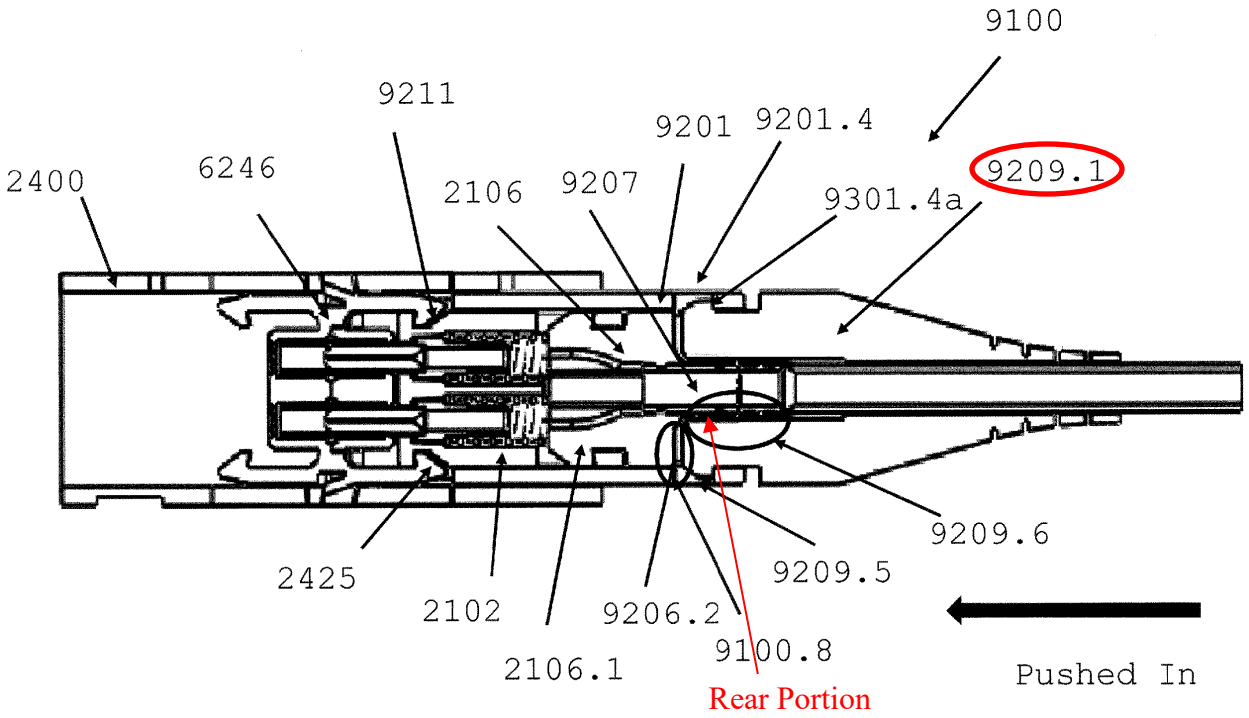


FIG. 34

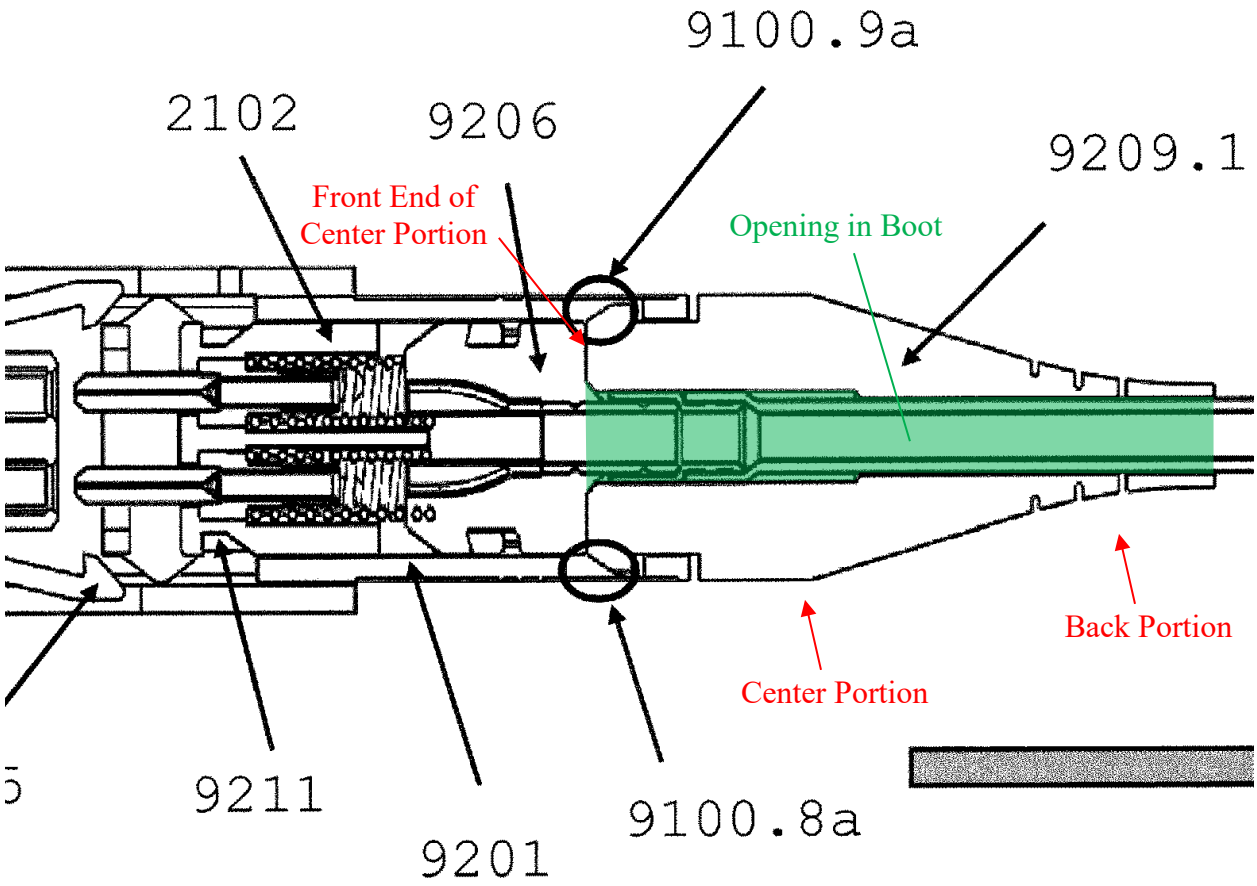
EX1003: Figs. 27, 28, and 34 (annotated).

211. Therefore, in my opinion, Takano meets this limitation.

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and"

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

EX1003: Figs. 16 and 36.


9100.9a
2102
9206
9209.1
Front End of
Center Portion
Opening in Boot
Back Portion
Center Portion
9211
9201
9100.8a

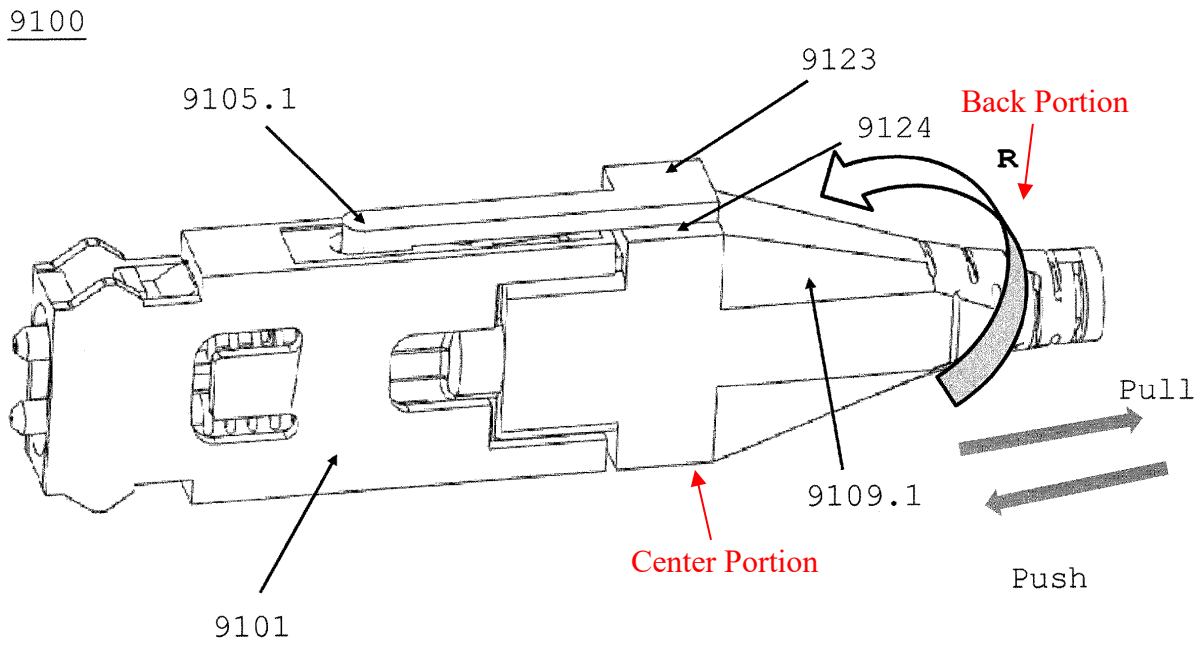
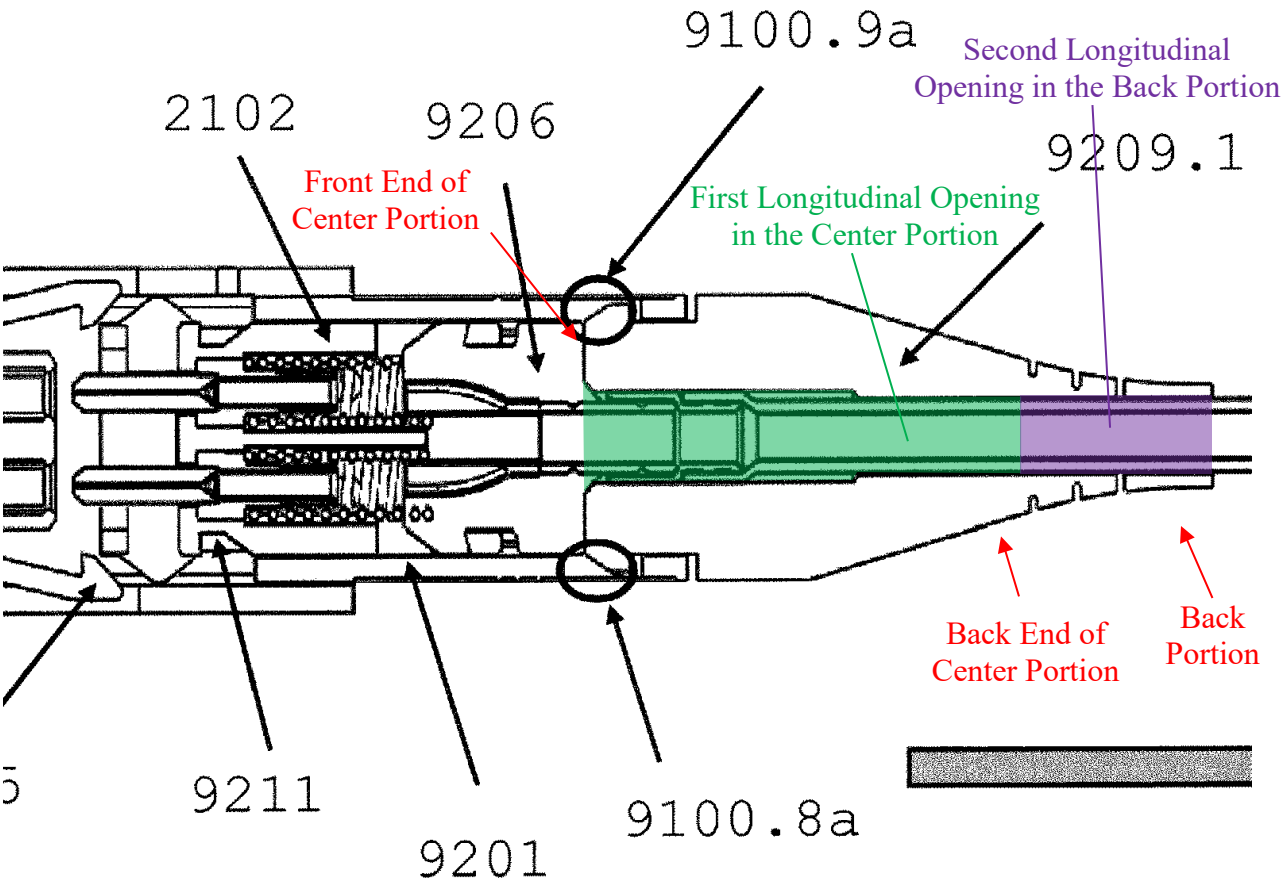


FIG. 16

EX1003: Figs. 16 and 36 (annotated).

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



EX1003: Fig. 36 (annotated).

214. Therefore, in my opinion, Takano meets this limitation.

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and"

215. As I explained in Sections VI(A)(1.c.1)&(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) includes a key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) attached to the central portion at point (9109.6). EX1003: Fig. 17, ¶[0059]. The key (9105.1, 9205.1, 9305.1, 9405.1) extends forward beyond the front end of the central portion. EX1007: Fig. 17.

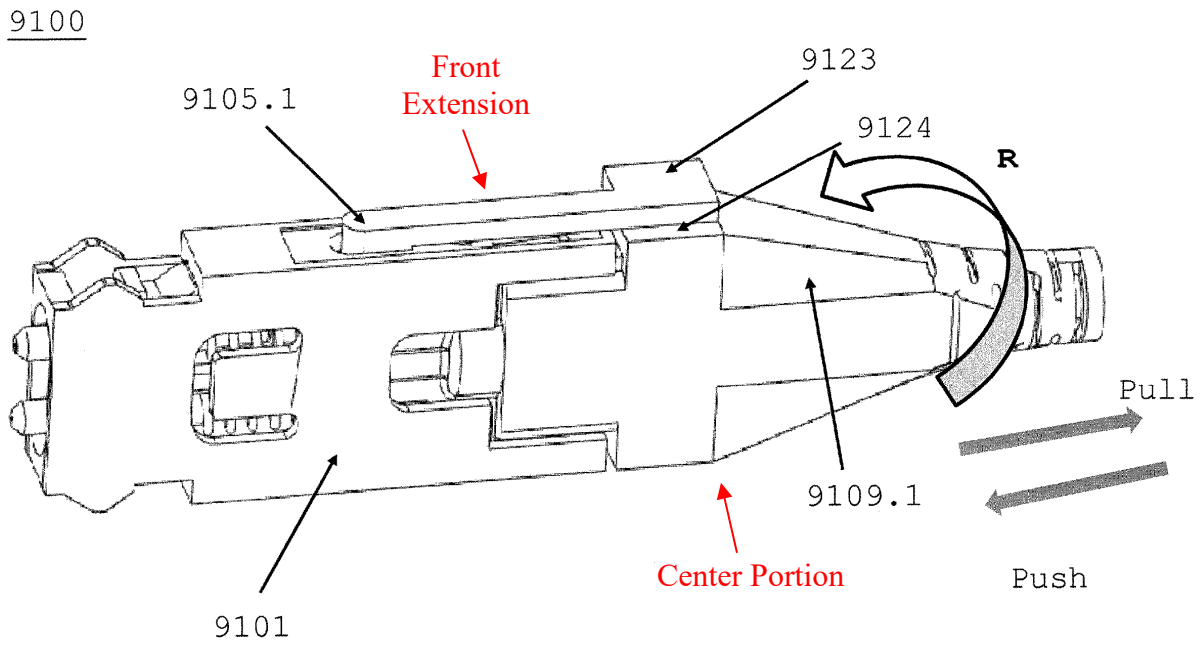

9100
9105.1
Front
Extension
9123
9124
R
Pull
9109.1
Center Portion
Push
9101

FIG. 16

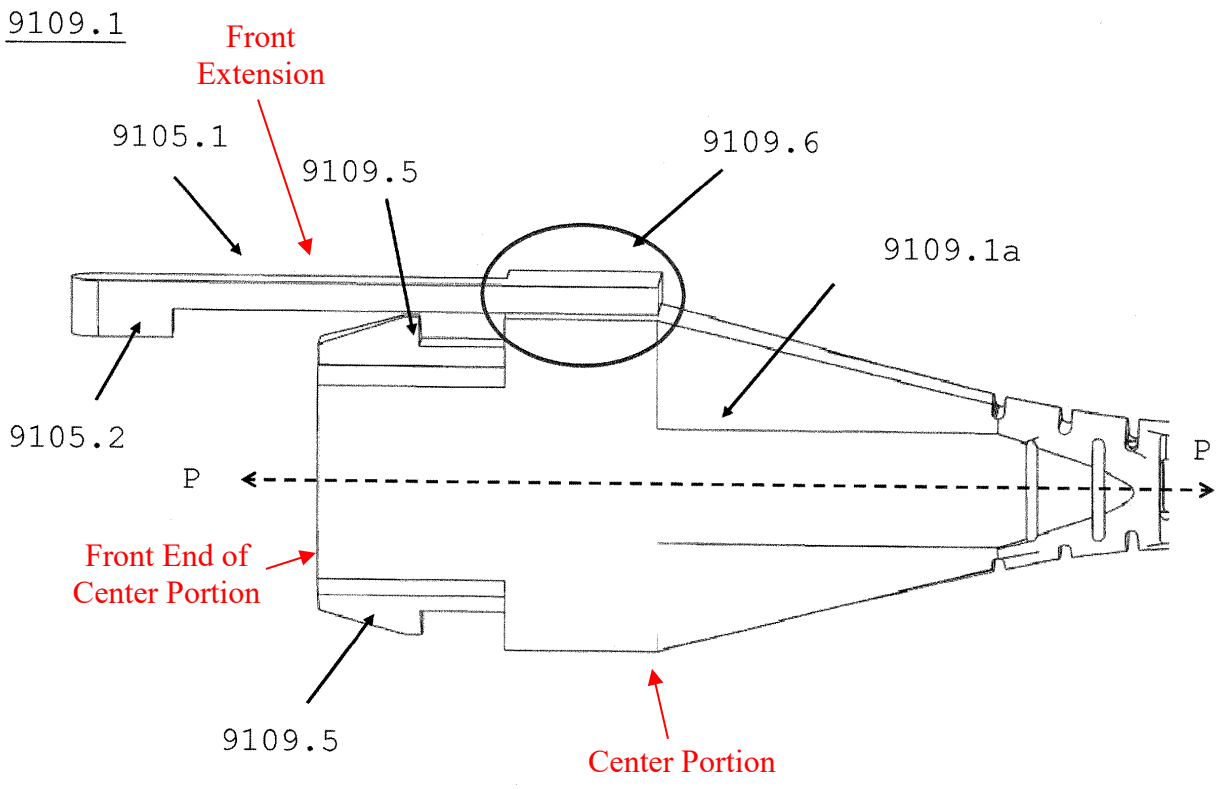

9109.1
Front
Extension
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
Front End of
Center Portion
9109.5
Center Portion

FIG. 17

EX1003: Figs. 16 and 17 (annotated).

216. Therefore, in my opinion, Takano meets this limitation.

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

217. For the reasons I discussed in Section VI(E), in my opinion Takano meets this limitation.

VII. ANTICIPATION: TAKANO (SECOND EMBODIMENT) (GROUND 3)

218. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the second embodiment of Takano—the optical connector shown in Figs. 16-36, in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the optical connector *does not include* the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059]. Instead, the key (9105.1, 9205.1, 9305.1, 9405.1) is part of the outer housing (9101, 9201, 9301, 9401). EX1003: ¶[0059].

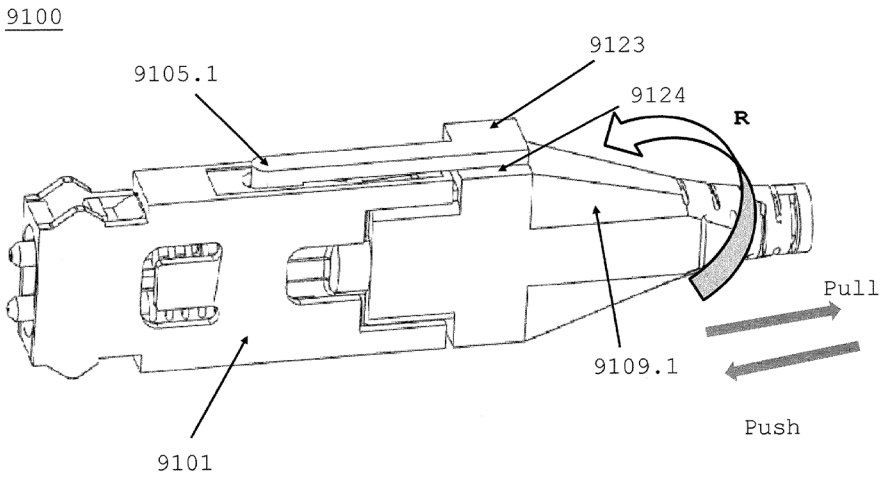


FIG. 16

EX1003: Fig. 16.

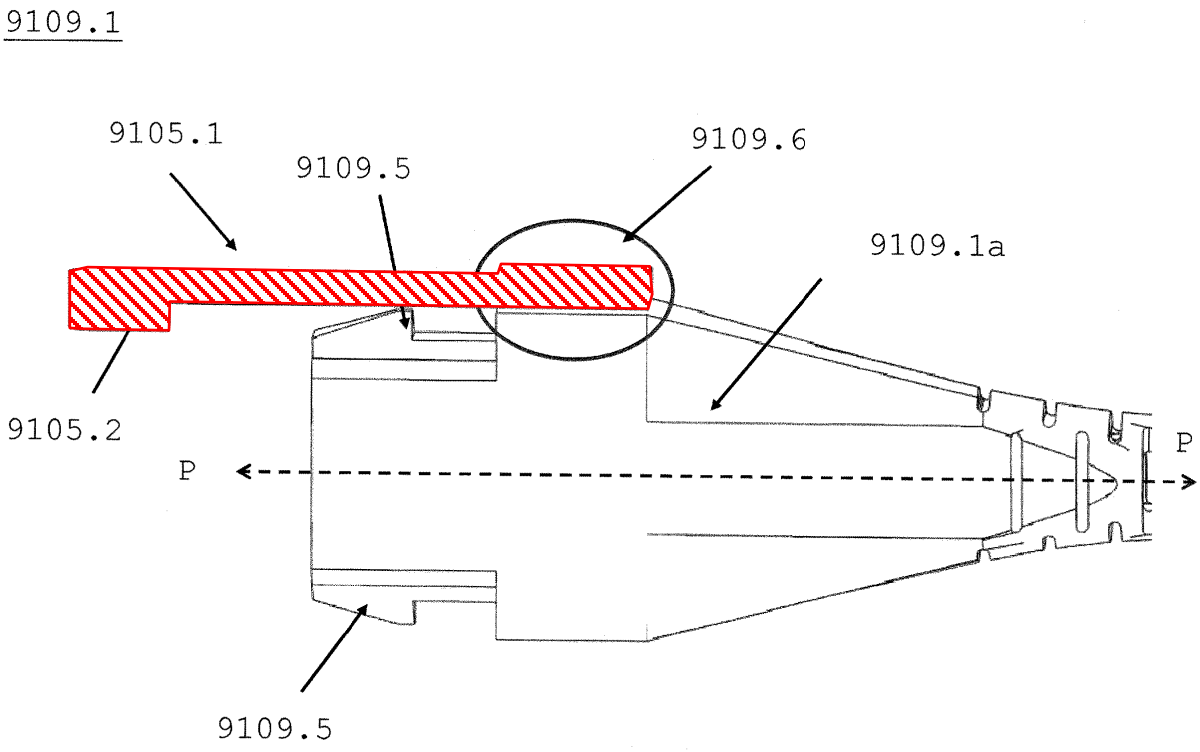


FIG. 17

EX1003: Fig. 17 (annotated).

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

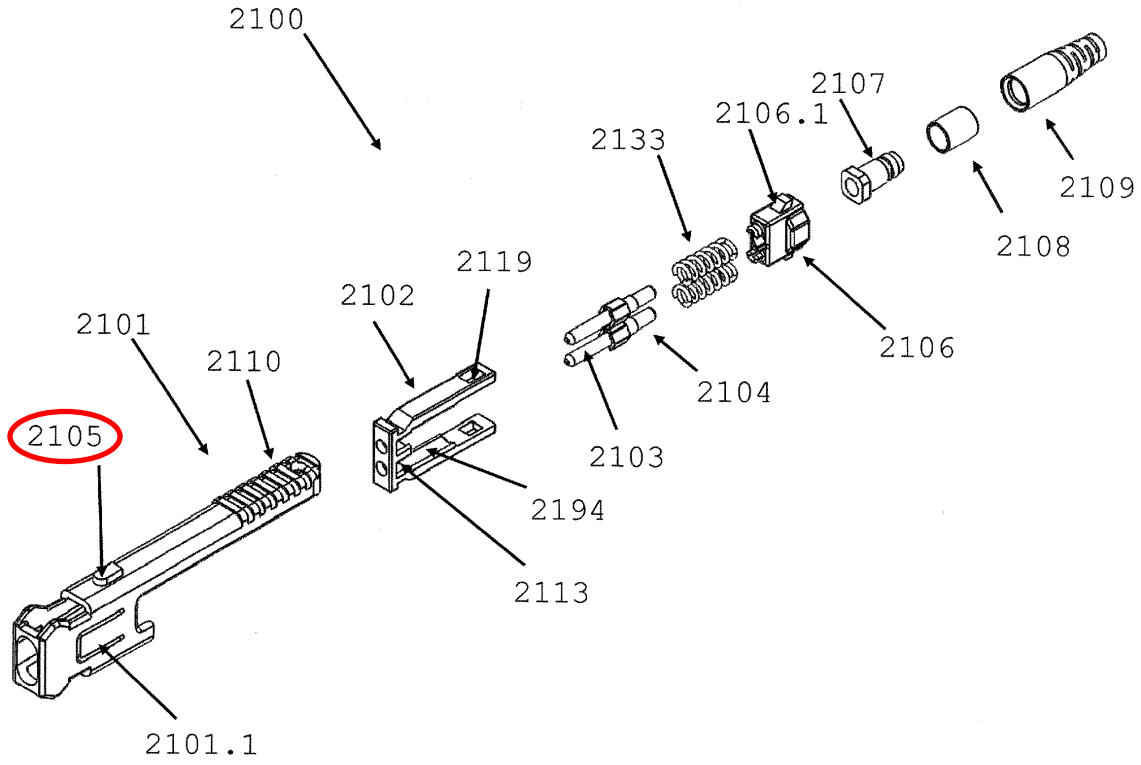


FIG. 1.

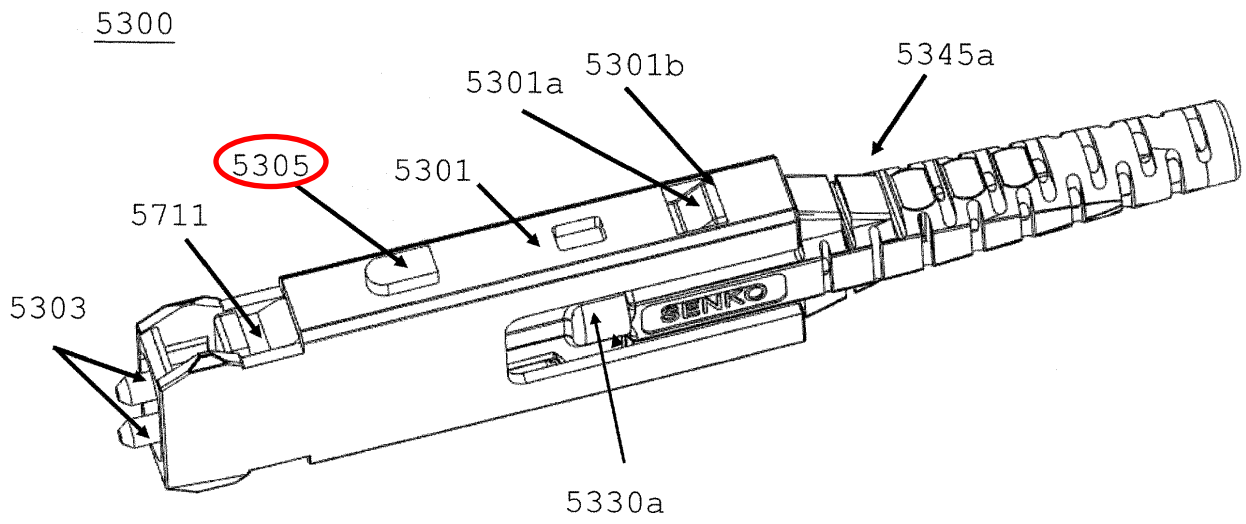


FIG. 37

EX1003: Figs. 1 and 37 (annotated).

220. In my opinion, claims 1-7, 9-13, and 16-19 are anticipated by this second embodiment of Takano.

A. Independent Claim 1

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising:

221. For the reasons I discussed in Section VI(A)(1.P), in my opinion Takano meets this limitation.

1.a.1 "a front end opening in the housing,"

222. For the reasons I discussed in Section VI(A)(1.a.1), in my opinion Takano meets this limitation.

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

223. For the reasons I discussed in Section VI(A)(1.a.2), in my opinion Takano meets this limitation.

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"

224. For the reasons I discussed in Section VI(A)(1.a.3), in my opinion Takano meets this limitation.

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;"

225. For the reasons I discussed in Section VI(A)(1.a.4), in my opinion Takano meets this limitation.

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and"

226. For the reasons I discussed in Section VI(A)(1.b), in my opinion Takano meets this limitation.

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

227. As I explained in Section VI(A)(1.c.1) ,the boot (9109.1, 9209.1, 9309.1, 9409.1) receives the back post (i.e., rear portion) of the back body (9106, 9206). EX1003: Figs. 26, 27, 30, and 34, ¶[0067].

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

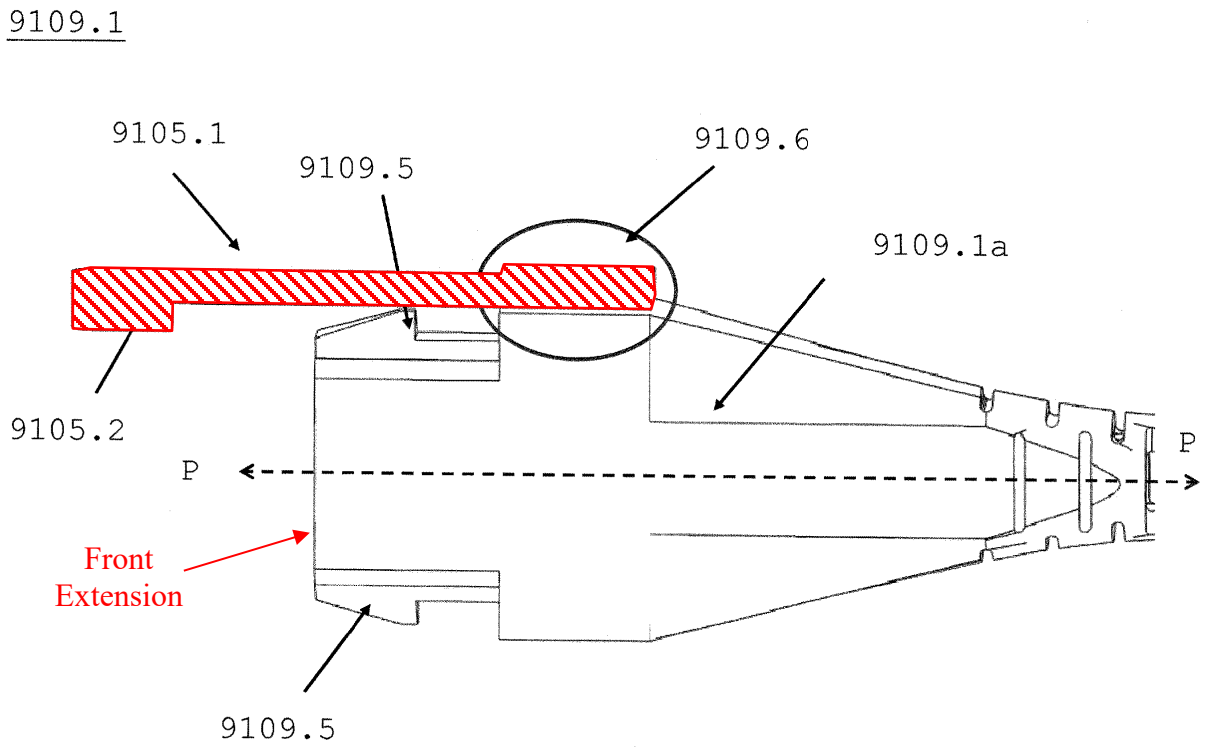


FIG. 17

EX1003: Fig. 17 (annotated).

229. Therefore, in my opinion, Takano meets this limitation.

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"

230. The front extension extends forward toward the front end of the outer housing (9101, 9201, 9301, 9401) from point (9109.6). EX1003: Figs. 16 and 17.

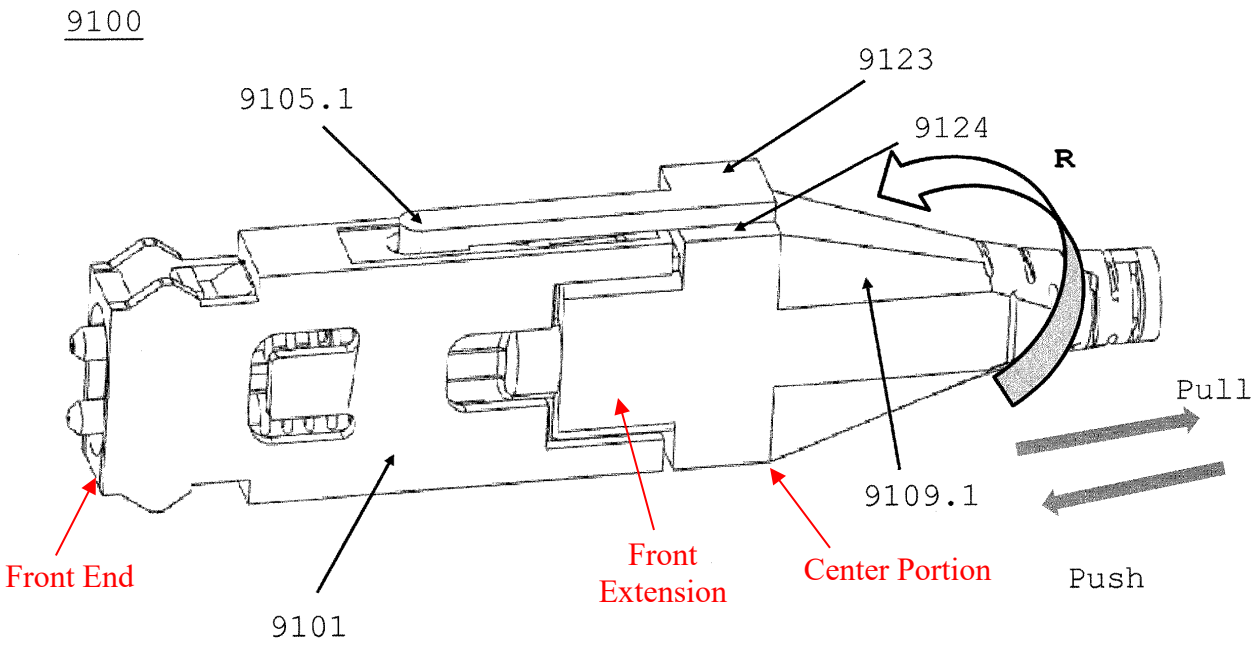

9100
9105.1
9123
9124
R
Pull
Push
9109.1
Front End
9101
Front
Extension
Center Portion

FIG. 16

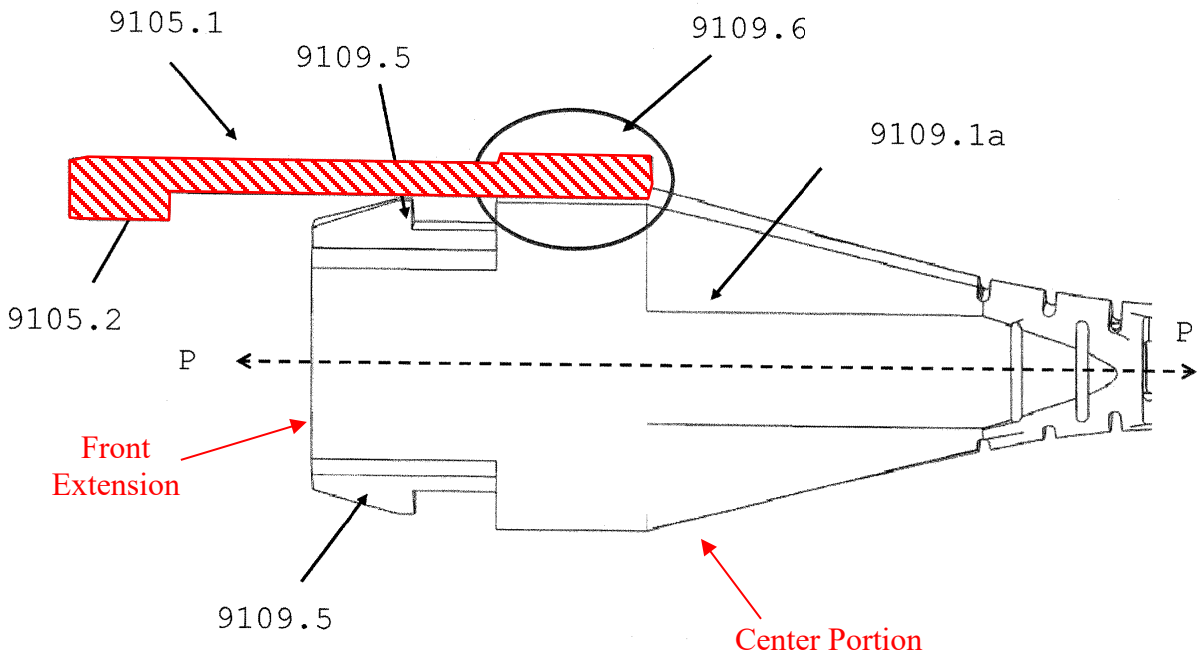
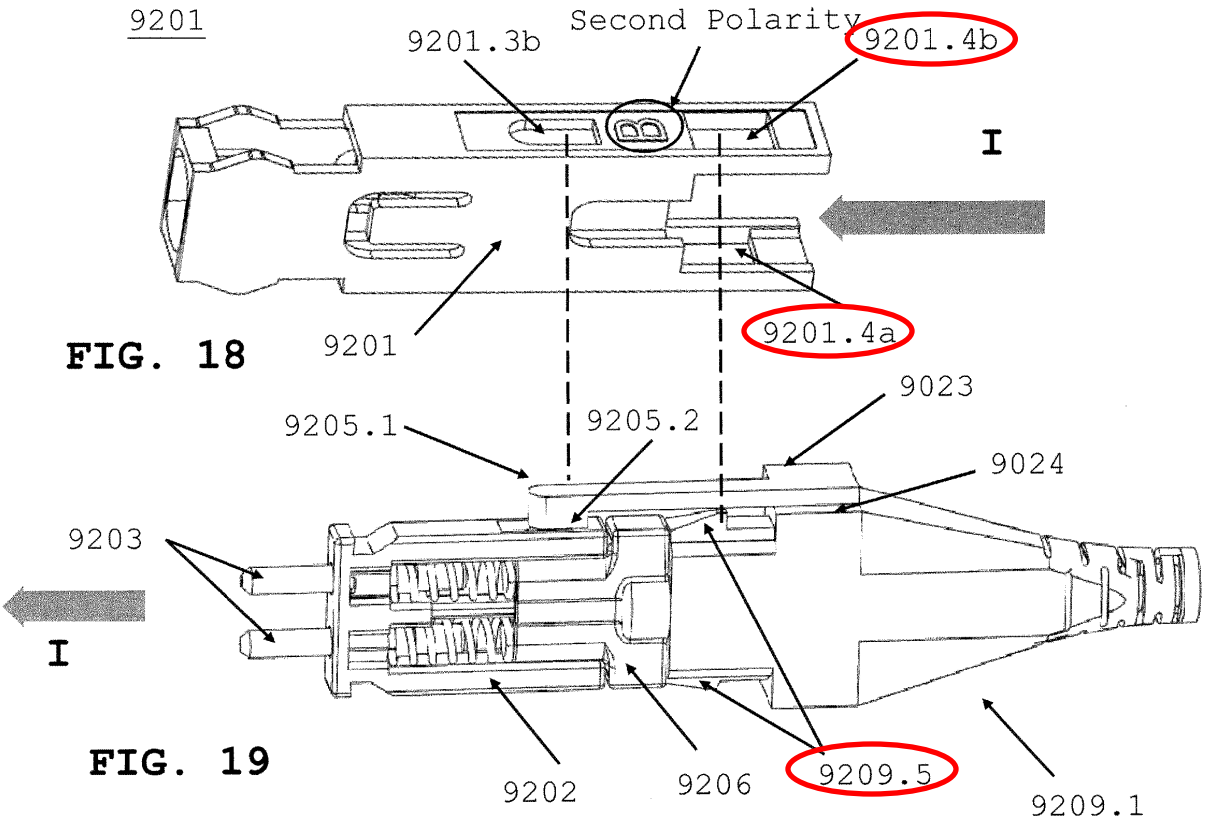

9109.1
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
Front
Extension
9109.5
Center Portion

FIG. 17

EX1003: Figs. 16 and 17 (annotated).

231. The boot hooks (9109.5, 9209.5) are received in respective slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) when the boot is in the first and second polarity positions to secure the boot to the outer housing. EX1003: ¶[0058]. As shown above, the attachment of the boot hooks (9109.5, 9209.5) to the outer housing (9101, 9201, 9301, 9401) is forward of a center portion of the boot (9109.1, 9209.1, 9309.1, 9409.1). EX1003: Figs. 16 and 34-36.



EX1003: Figs. 18 and 19 (annotated).

232. Therefore, in my opinion, Takano meets this limitation.

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and"

233. For the reasons I discussed in Section VI(A)(1.c.3), in my opinion Takano meets this limitation.

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

234. For the reasons I discussed in Section VI(A)(1.d), in my opinion Takano meets this limitation.

B. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to the at least two optical fibers."

235. For the reasons I discussed in Section VI(B), in my opinion Takano meets this claim.

C. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."

236. For the reasons I discussed in Section VI(C), in my opinion Takano meets this claim.

D. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing."

237. For the reasons I discussed in Section VI(D), in my opinion Takano meets this claim.

E. Claim 5 "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

238. For the reasons I discussed in Section VI(E), in my opinion Takano meets this claim.

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

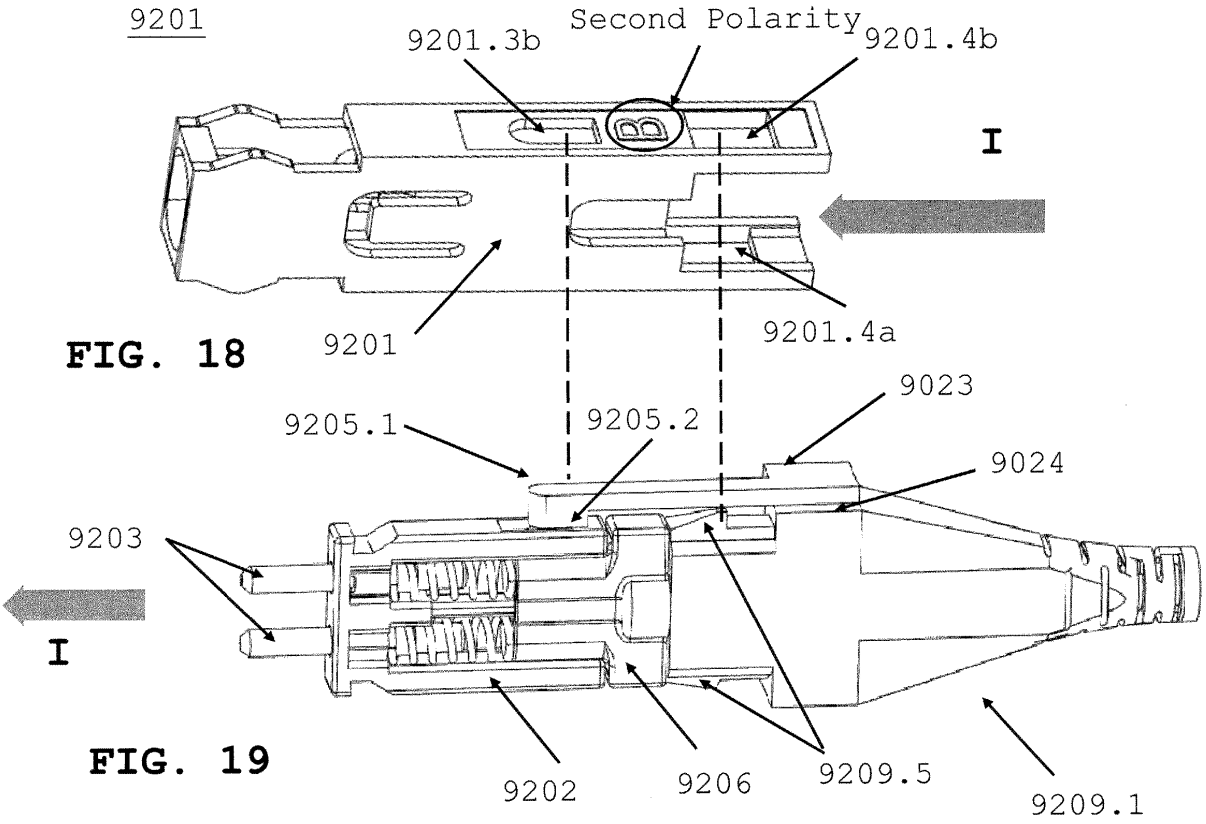


FIG. 18

FIG. 19

EX1003: Figs. 18 and 19.

240. Therefore, in my opinion, Takano meets this claim.

F. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch."

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

9109.1

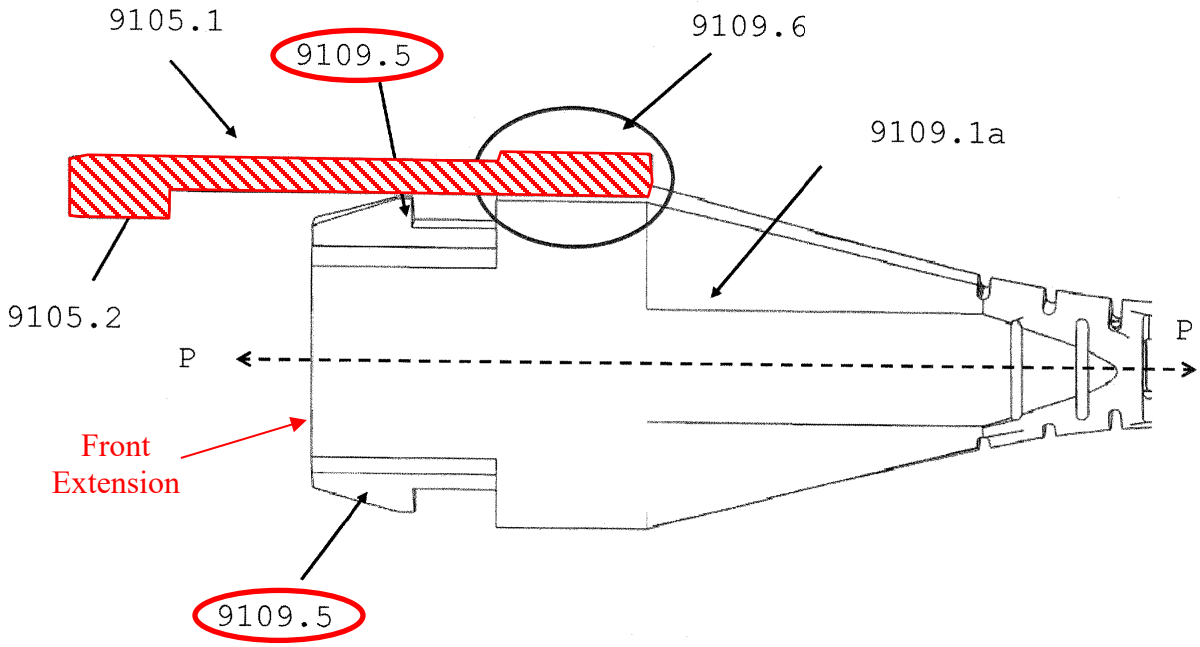


FIG. 17

EX1003: Fig. 17 (annotated).

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

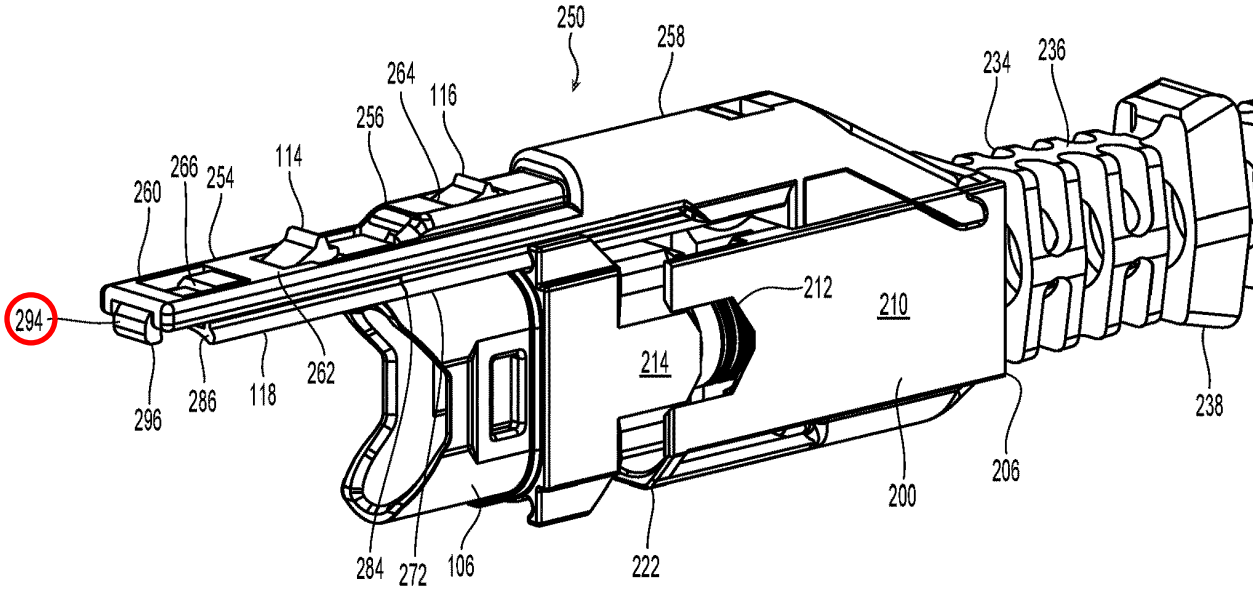


Fig. 14

EX1001: Fig. 14 (annotated).

243. Therefore, in my opinion, Takano meets this claim.

G. Claim 7 "The fiber optic connector according to claim 6, wherein the front extension portion has two latches separated from each other on the front extension."

244. As I explained in Section VII(F), the front extension includes the two boot hooks (9109.5, 9209.5) (i.e., two latches). The two boot hooks (9109.5, 9209.5) are separated from each other on the front extension. EX1003: Fig. 17.

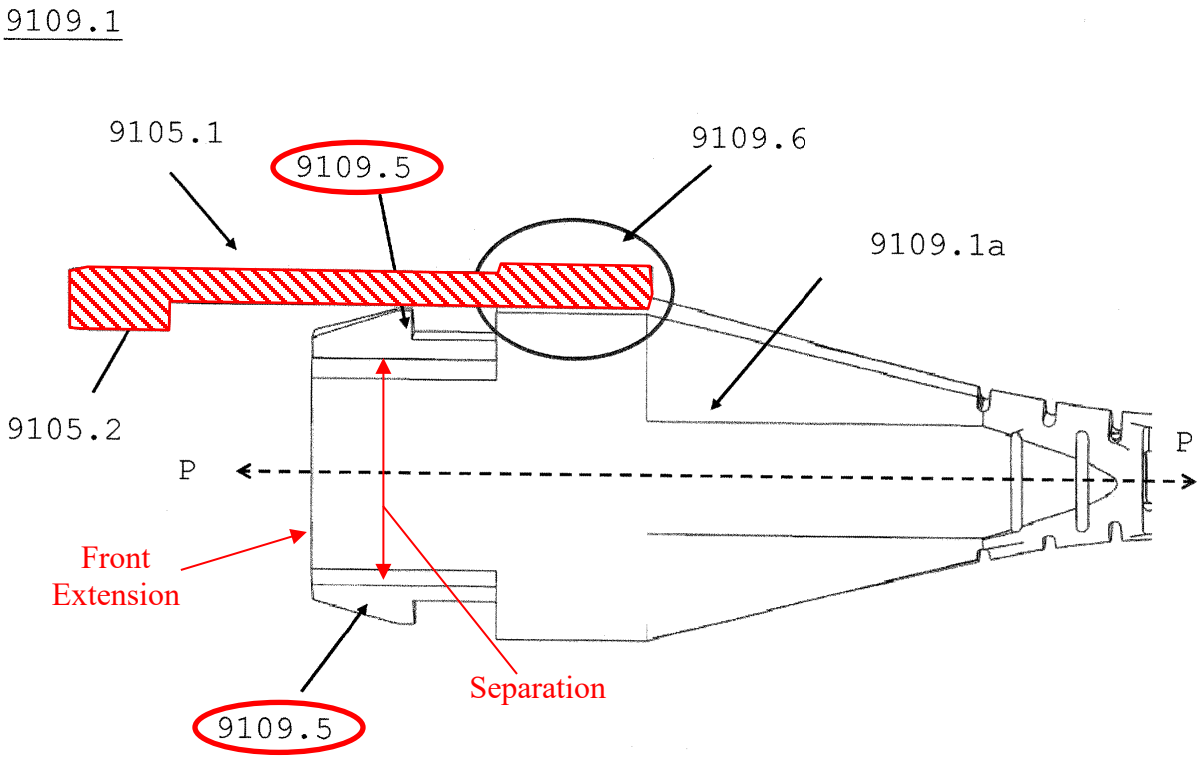


FIG. 17

EX1003: Fig. 17 (annotated).

245. Therefore, in my opinion, Takano meets this claim.

H. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector."

246. As I discussed in Section VI(H), the boot (9109.1, 9209.1, 9309.1, 9409.1) connects to the outer housing (9101, 9201, 9301, 9401), via the boot hooks (9109.5, 9209.5), in two different orientations. In this embodiment, with the key (9105.1, 9205.1, 9305.1, 9405.1) being part of the outer housing (9101, 9201,

9301, 9401), to change the polarity the boot (9109.1, 9209.1, 9309.1, 9409.1), the front body (9102, 9202) and the back body (9106, 9206) are disconnected from and then rotated relative to the outer housing (9101, 9201, 9301, 9401) to move the key relative to the ferrules (9203). EX1003: Figs. 2-8, 18, and 19, ¶¶[0051]-[0052]. After this rotation, the boot (9109.1, 9209.1, 9309.1, 9409.1), the front body (9102, 9202), and the back body (9106, 9206) are then reconnected to the outer housing (9101, 9201, 9301, 9401) (while maintaining the flipped over orientation). EX1003: Figs. 2-8, ¶¶[0051]-[0052].

247. This process of changing the polarity for this embodiment of the micro connector (9100)—with the key part of the outer housing (9101, 9201, 9301, 9401)—is no different than the steps shown in Figs. 2-4:

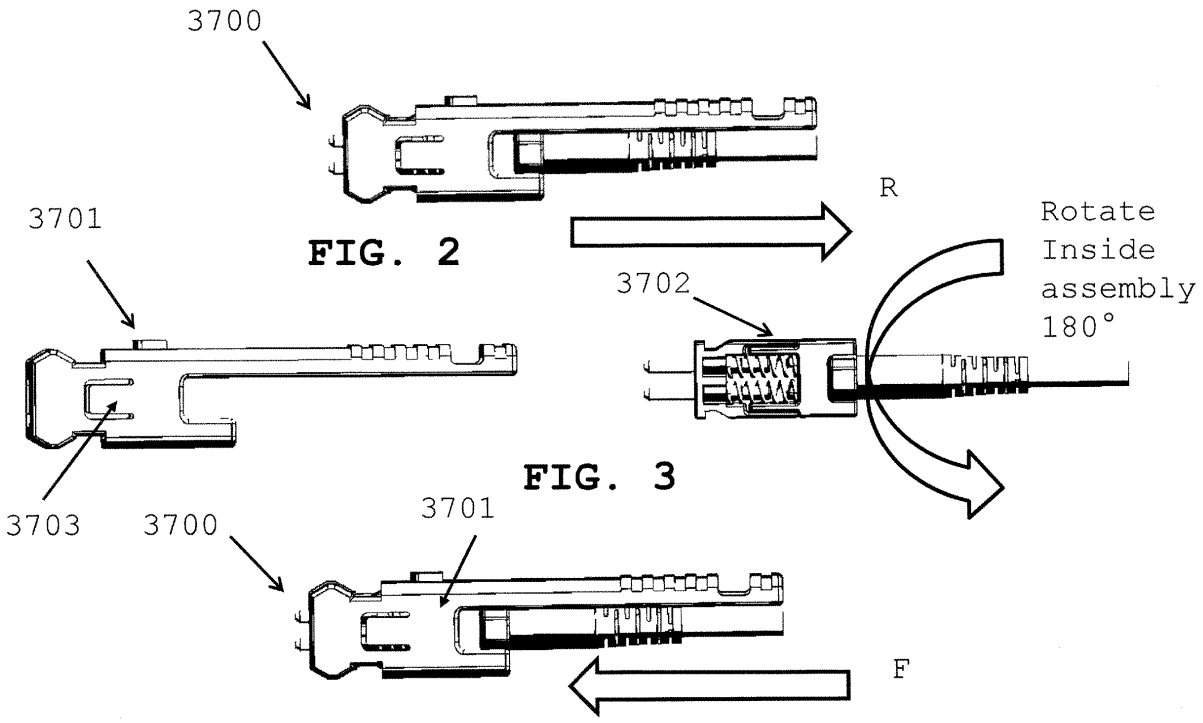


FIG. 2

FIG. 3

FIG. 4

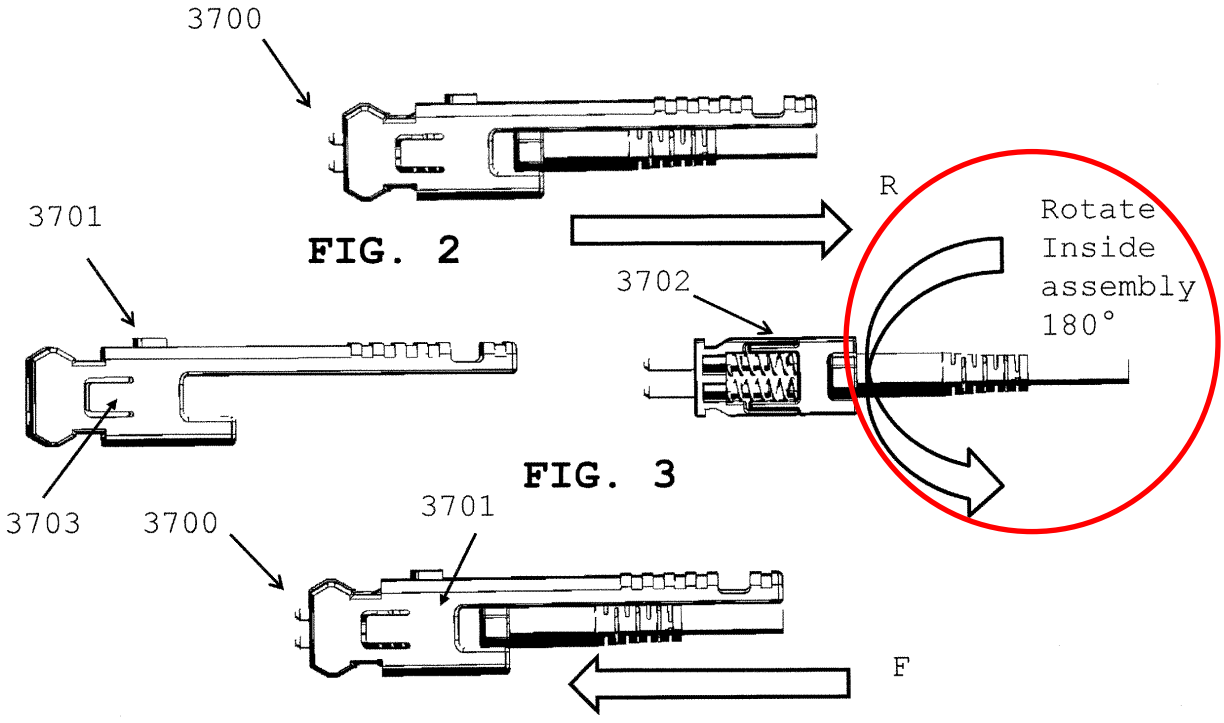
EX1003: Figs. 2-4.

248. Thus, when the boot (9109.1, 9209.1, 9309.1, 9409.1)—and the front body (9102, 9202) and the back body (9106, 9206)—is connected to the outer housing (9101, 9201, 9301, 9401) in one orientation, the micro connector (9100) is in a first polarity. EX1003: Figs. 2-8, ¶¶[0051]-[0052]. Similarly, when the boot (9109.1, 9209.1, 9309.1, 9409.1)—and the front body (9102, 9202) and the back body (9106, 9206)—is connected to the outer housing (9101, 9201, 9301, 9401) in the other (i.e., flipped over) orientation, the micro connector (9100) is in a second polarity. EX1003: Figs. 2-8, ¶¶[0051]-[0052].

249. Therefore, in my opinion, Takano meets this claim.

I. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector."

250. For the reasons I discussed in Section VII(H), in my opinion Takano meets this claim. The boot (9109.1, 9209.1, 9309.1, 9409.1)—and the front body (9102, 9202) and the back body (9106, 9206)—is flipped over 180-degrees about a longitudinal axis (L-L) (*see* Fig. 24) between the two orientations. EX1003: Figs. 2-8, ¶¶[0051] ("after rotating front body 3702 by ***180 degrees*** as shown in FIG. 3"), [0052] ("the outer housing 5301 is rotated ***180 degrees***"), [0063], [0066], [0069].



EX1003: Figs. 2-4 (annotated).

251. Therefore, in my opinion, Takano meets this claim.

J. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot."

252. For the reasons I discussed in Section VI(J), in my opinion Takano meets this claim.

K. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing."

253. For the reasons I discussed in Section VI(K), in my opinion Takano meets this claim. Further, the boot (9109.1, 9209.1, 9309.1, 9409.1) is slidable relative to the outer housing (9101, 9201, 9301, 9401) when the boot—and the front body (9102, 9202) and the back body (9106, 9206)—is being disconnected and reconnected to the outer housing when changing polarity, as I discussed in Section VII(H).

254. Therefore, in my opinion, Takano meets this claim.

L. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion."

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

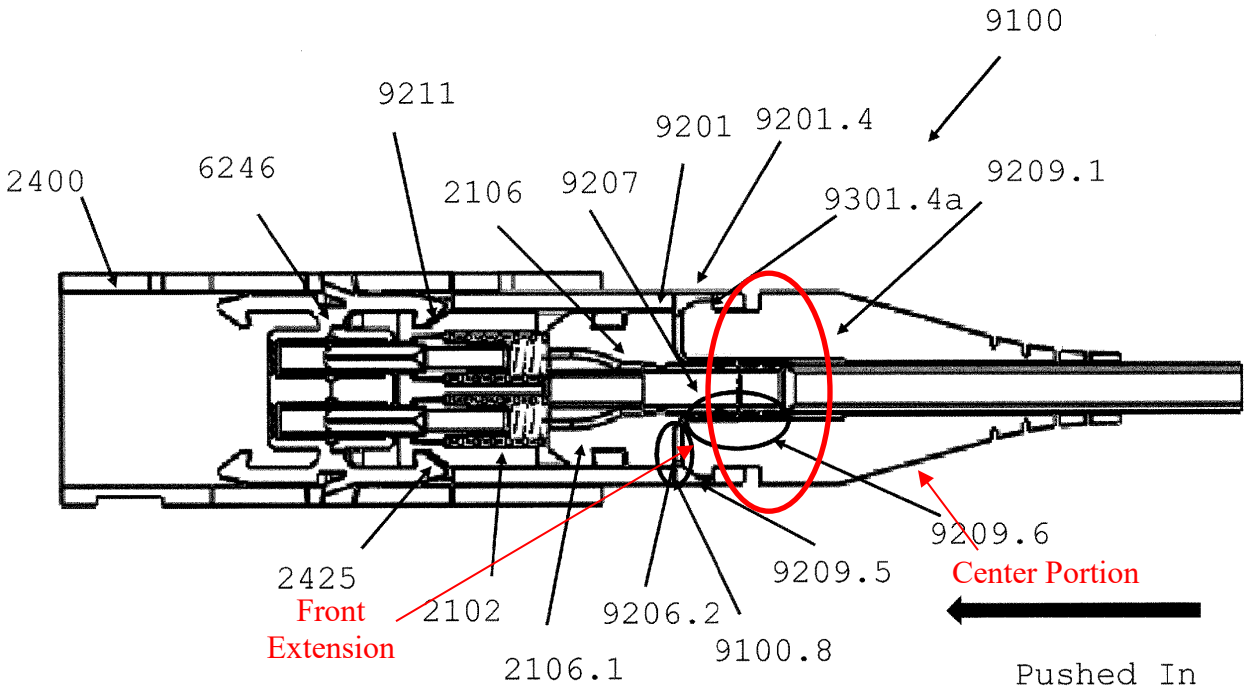


FIG. 34

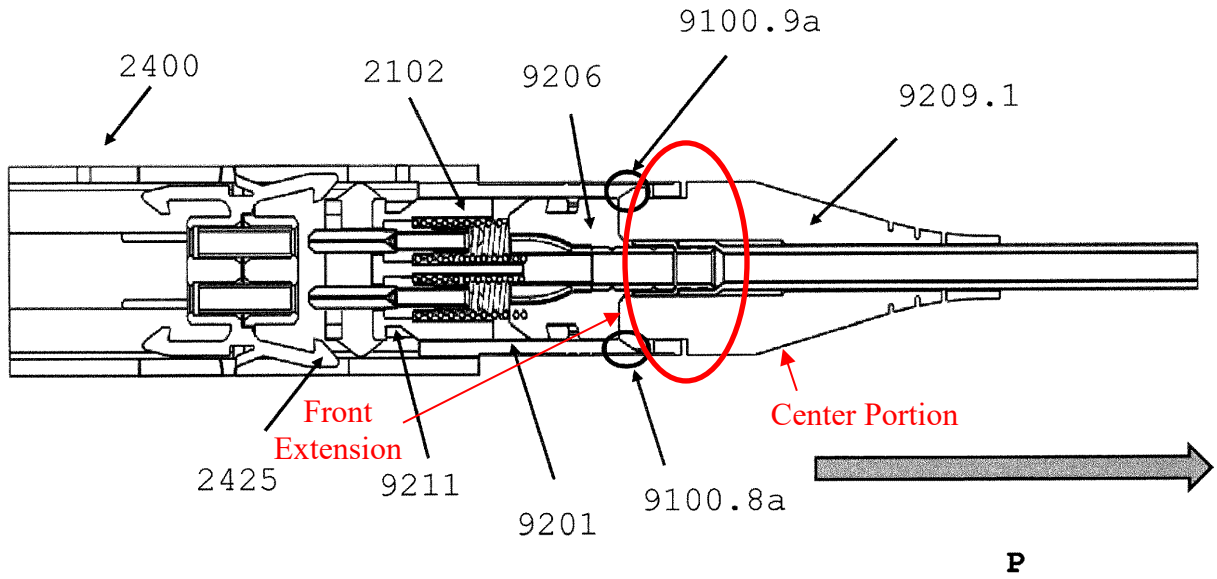


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

256. Therefore, in my opinion, Takano meets this claim.

M. Independent Claim 16

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:"

257. For the reasons I discussed in Section VI(A)(1.P), in my opinion Takano meets this limitation.

16.a.1 "a front end opening in the housing for the two fiber optic ferrules,"

258. For the reasons I discussed in Section VI(M)(16.a.1), in my opinion Takano meets this limitation.

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

259. For the reasons I discussed in Section VI(A)(1.a.2), in my opinion Takano meets this limitation.

16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

260. For the reasons I discussed in Section VI(A)(1.a.4), in my opinion Takano meets this limitation.

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;"

261. For the reasons I discussed in Section VI(M)(16.a.4), in my opinion Takano meets this limitation.

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and"

262. For the reasons I discussed in Section VI(M)(16.b), in my opinion Takano meets this limitation.

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

263. For the reasons I discussed in Section VI(A)(1.c.1), in my opinion Takano meets this limitation.

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot,"

264. For the reasons I discussed in Sections VII(A)(1.c.2) and VII(F), in my opinion Takano meets this limitation.

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"

265. For the reasons I discussed in Section VI(A)(1.c.3), in my opinion Takano meets this limitation.

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

266. For the reasons I discussed in Section VI(A)(1.d), in my opinion Takano meets this limitation.

N. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers."

267. For the reasons I discussed in Section VI(B), in my opinion Takano meets this claim.

O. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

268. For the reasons I discussed in Section VI(E), in my opinion Takano meets this claim.

P. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."

269. As I explained in Section VII(L), the front extension is integral with the center portion.

270. I have been informed that there is a category of claim limitations called product-by-process limitations. I have been informed these are claim limitations that describe the product or device (or element thereof) by reciting the

process of making the product or device. I have been further informed that product-by-process claim limitations do not hold any patentable weight.

271. In my opinion, the use of the term "molded" in claim 19 is a product-by-process limitation because "molded" is the process by which the front extension is made with the center portion of the boot. Therefore, I believe the term "molded" has no bearing on the patentability of claim 19.

272. Here, the front extension of Takano is integral with the center portion, and therefore anticipates a front extension being integral with a center portion due to the components such as by being formed by the process of molding.

273. Further, to the extent "molded" is not considered a product-by-process limitation, Takano discloses the structure of "integrally molded." The structural meaning imparted by molded (i.e., integrally molded) further emphasizes the word "integral" in the claim—i.e., is that of an integral structure—, which as I explained in Section VII(L) Takano discloses.

274. As I explained in Section VII(F), Takano's front extension has two latches. It is unclear to me if "a latch" recited by claim 19 is part of the group of "at least one latch" recited by claim 16 or a different latch. However, because Takano's front extension has two latches, Takano discloses the "front extension … ha[ving] a latch" recited by claim 19 whether or not the "a latch" recited by claim 19 is part of the group of "at least one latch" recited by claim 16 (from which claim

19 depends). In other words, regardless of whether or not claim 19 requires the front extension to have at minimum one latch or two latches, Takano's front extension has two latches.

275. Therefore, in my opinion, Takano meets this claim.

VIII. OBVIOUS: TAKANO (THIRD EMBODIMENT) (GROUND 4)

276. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the third embodiment of Takano—the optical connector (2100, 3700) shown in Figs. 1-4 modified in view of the optical connector (9100) shown in Figs. 16-36.

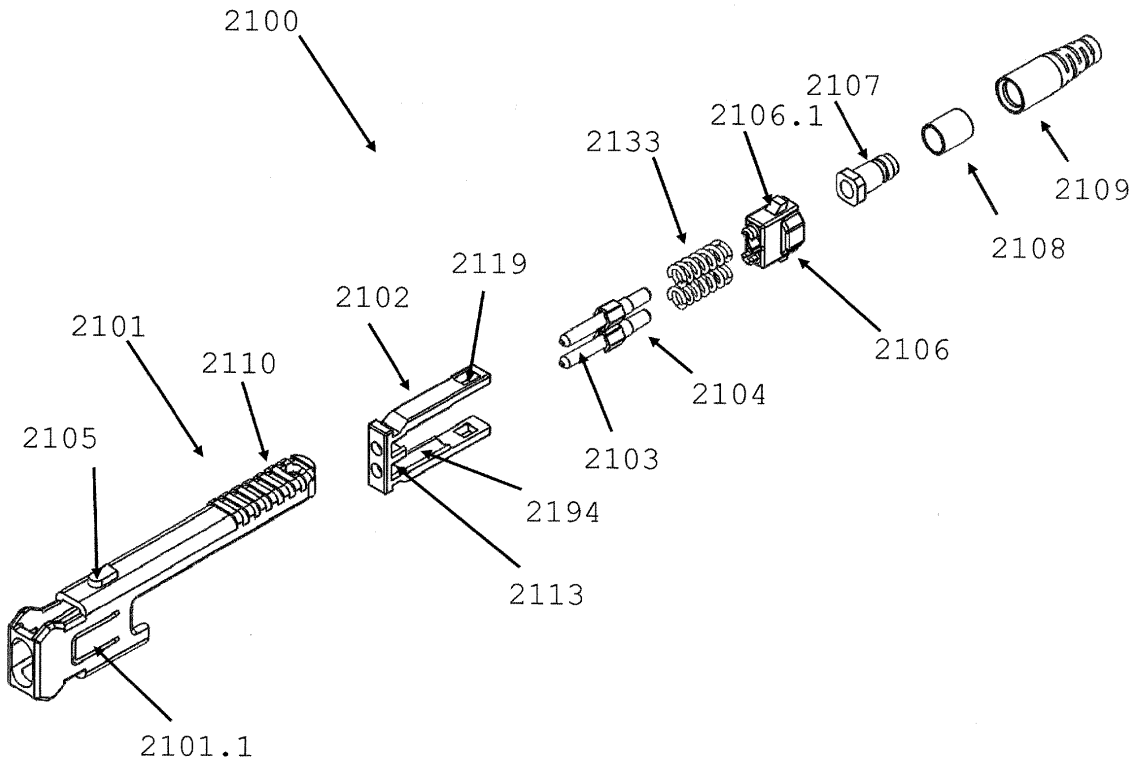


FIG. 1.

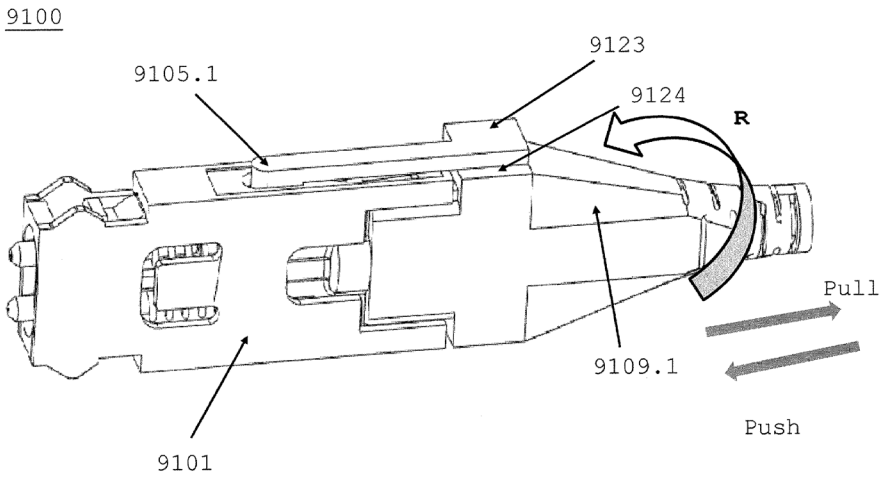


FIG. 16

EX1003: Figs. 1 and 16.

277. In my opinion, claims 1-7, 9-13, and 16-19 would have been obvious in view of Takano.

A. Modification of Takano's Micro Connector of Figs 1-4 Based on Takano's Micro Connector of Figs. 16-36

278. Takano discloses multiple different embodiments of optical connectors. EX1003: Figs. 1 and 16. These different optical connectors are very similar to one another. EX1003: Fig. 1, 18, and 19.

279. One embodiment—the third embodiment—of a micro connector (2100, 3700) is shown in Figs. 1-4. The micro connector (2100, 3700) of Figs. 1-4 has the same form factor as the micro connector (9100) of Figs. 16-36 discussed above and mates with essentially the same types of adapters. EX1003: ¶[0049];

EX1004: Figs. 24, 99, 100B, ¶¶[224], [282], [287] ("plural of connectors 9100 are inserted into an adapter similar to FIG. 24").

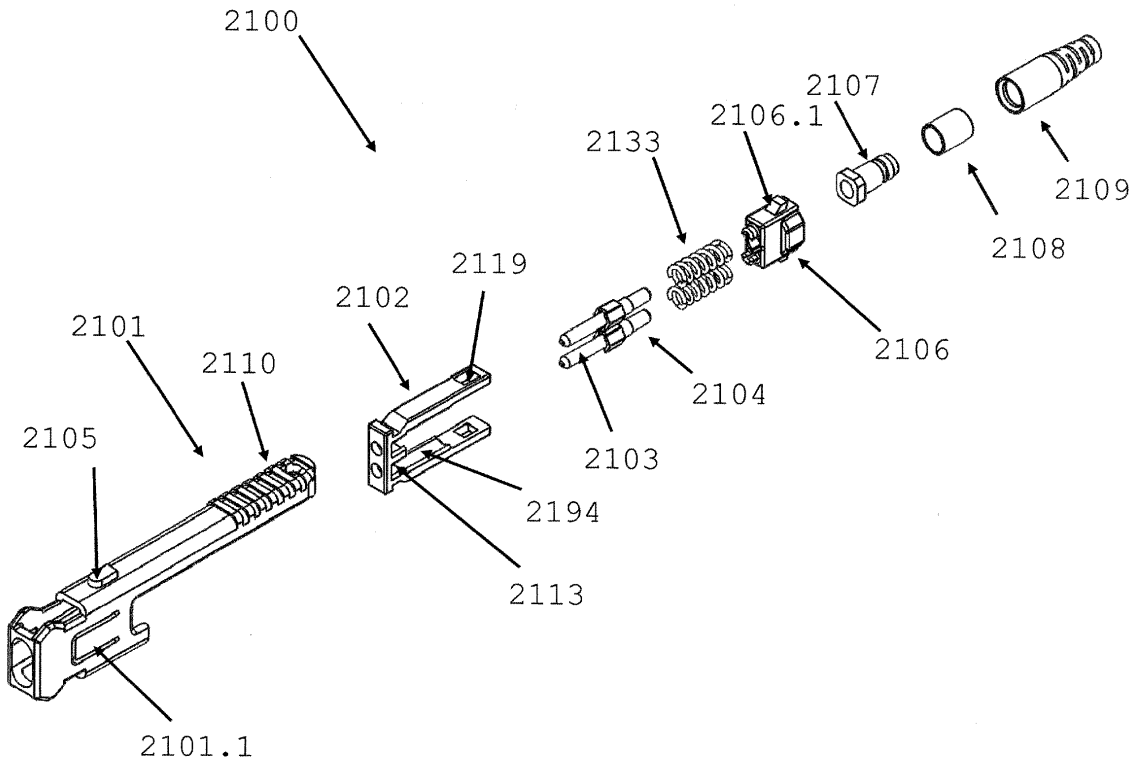


FIG. 1.

EX1003: Fig. 1.

280. This micro connector (2100, 3700) of Figs. 1-4 differs from the micro connector (9100) of Figs. 16-36 in that the outer housing (2101, 3701) has an optional pull key (2110) and is pulled relative to the boot (2109) to extract the micro connector from the mating adapter. EX1003: ¶[0050]. Pulling the outer housing (2101, 3701) rearward disengages the adapter hooks (2425) of the adapter (2400) from the micro connector (2100, 3700), thereby permitting the micro connector to be withdrawn from the adapter. EX1030: ¶[0106]. As the outer

housing (2101, 3701) moves rearward within the adapter (2400) due to the pull force, the outer housing is displaced rearward relative to the front body (2102, 3702), ferrules (2103), ferrule springs (2133), back body (2106), and boot (2109) (these components do not initially move rearward with the outer housing), thereby lifting the adapter hooks (2425) of the adapter out of the recesses (2111) in the front body (2102, 3702) to unlatch the adapter hooks (2425) of the adapter (2400) from the micro connector (2100, 3700). EX1030: ¶[0106]. With the adapter hooks (2425) lifted clear of the front body (2102, 3702), the entire micro connector (2100, 3700) moves rearward to disconnect the micro connector from the adapter (2400), due to the continued rearward pulling of the outer housing (2101, 3701). EX1030: ¶[0106]. The pull key (2110) may also be used to push the micro connector (2100, 3700) into the adapter (2400).

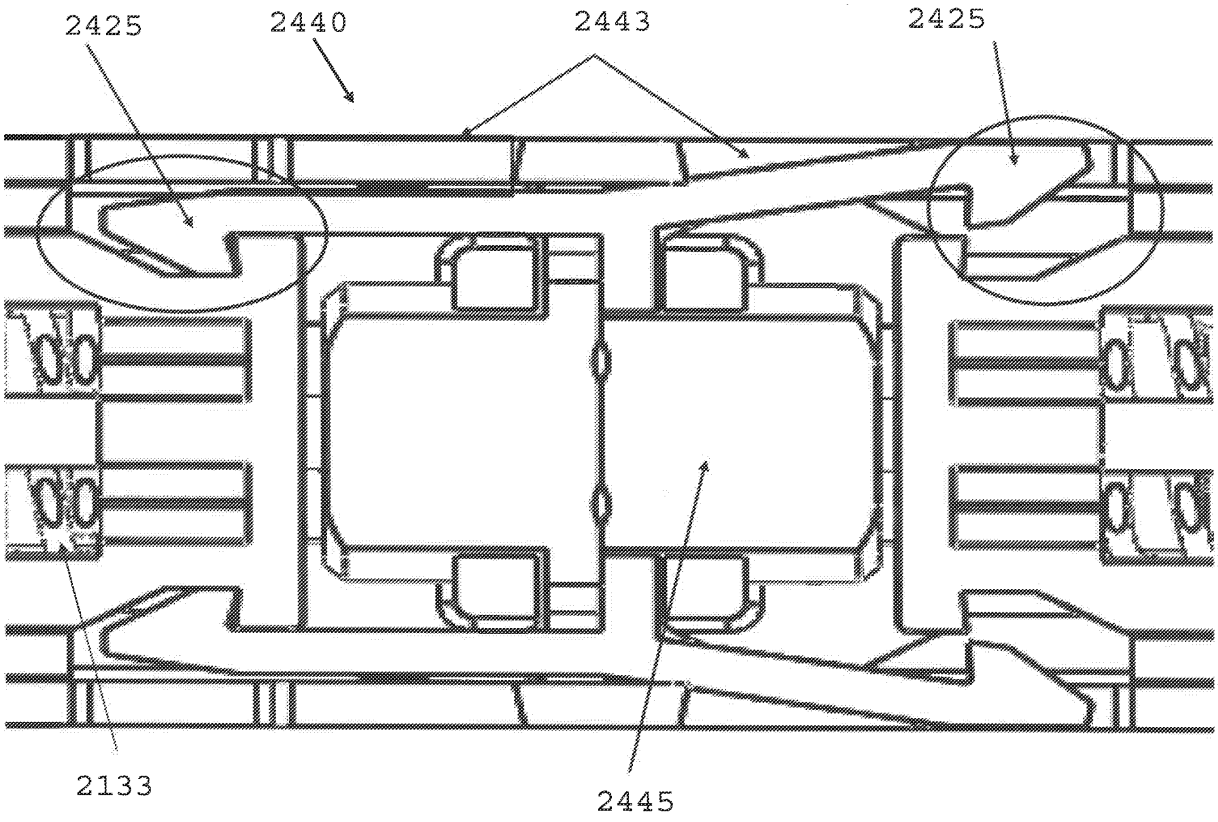


FIG. 32B

EX1004: Fig. 32B.

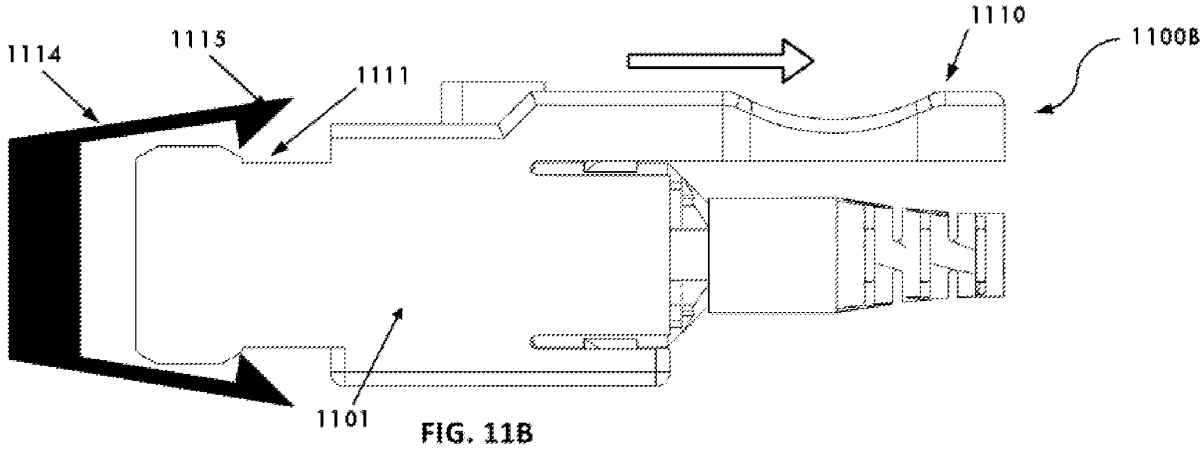


FIG. 11B

EX1030: Fig. 11B.

281. The micro connector (2100, 3700) of Figs. 1-4 also differs from the micro connector (9100) of Figs. 16-36 in how the outer housing (2101, 3701) releases from the remainder of the connector in order to facilitate polarity change. Whereas the outer housing (9101, 9201, 9301, 9401) of micro connector (9100) of Figs. 16-36 is releasable by simply twisting the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) as I explained in Section VI(E), releasing the outer housing (2101, 3701) of Figs. 1-4 requires a more complex effort.

282. To disconnect the front body/back body/boot assembly from the outer housing (2101, 3701), a user must lift at least one flap (2101.1, 3703) of the outer housing. EX1003: ¶¶[0050]-[0051]. In a variation of the micro connector (2100, 3700) of Figs. 1-4, the micro connector (5300) does not include the flaps (2101.1, 3703). EX1003: Figs. 5-8, ¶[0052]. Instead, a tool is inserted into an access slot (5329) to separate the outer housing (5301) from the front body/back body/boot assembly. EX1003: Figs. 5-8, ¶[0052]. Both the flap-lift method and tool-insertion method are more complex and less user-friendly than the simple quarter-turn method of releasing the outer housing (9101, 9201, 9301, 9401) using the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) from Figs. 16-36.

283. As shown in Figs. 2-4 and again in Figs. 5-8, once the outer housing (2101, 3701) is released from the remainder of the connector, the micro connector (2100, 3700) can change polarity by (1) separating the outer housing (2101, 3701)

from the front body (2102, 3702), the back body (2106), and the boot (2109), then (2) rotating the front body/back body/boot assembly relative to the outer housing (*see* Fig. 2), and then (3) reattaching the front body/back body/boot assembly into the outer housing (while maintaining the flipped over orientation). EX1003: ¶[0051].

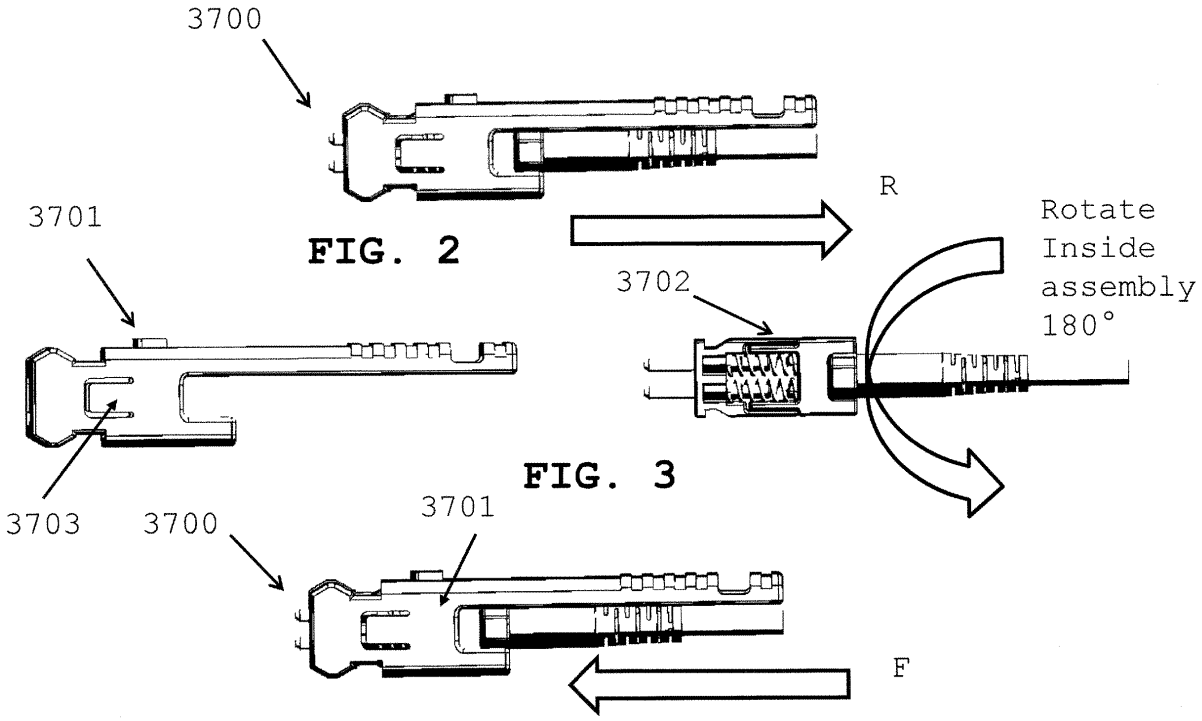
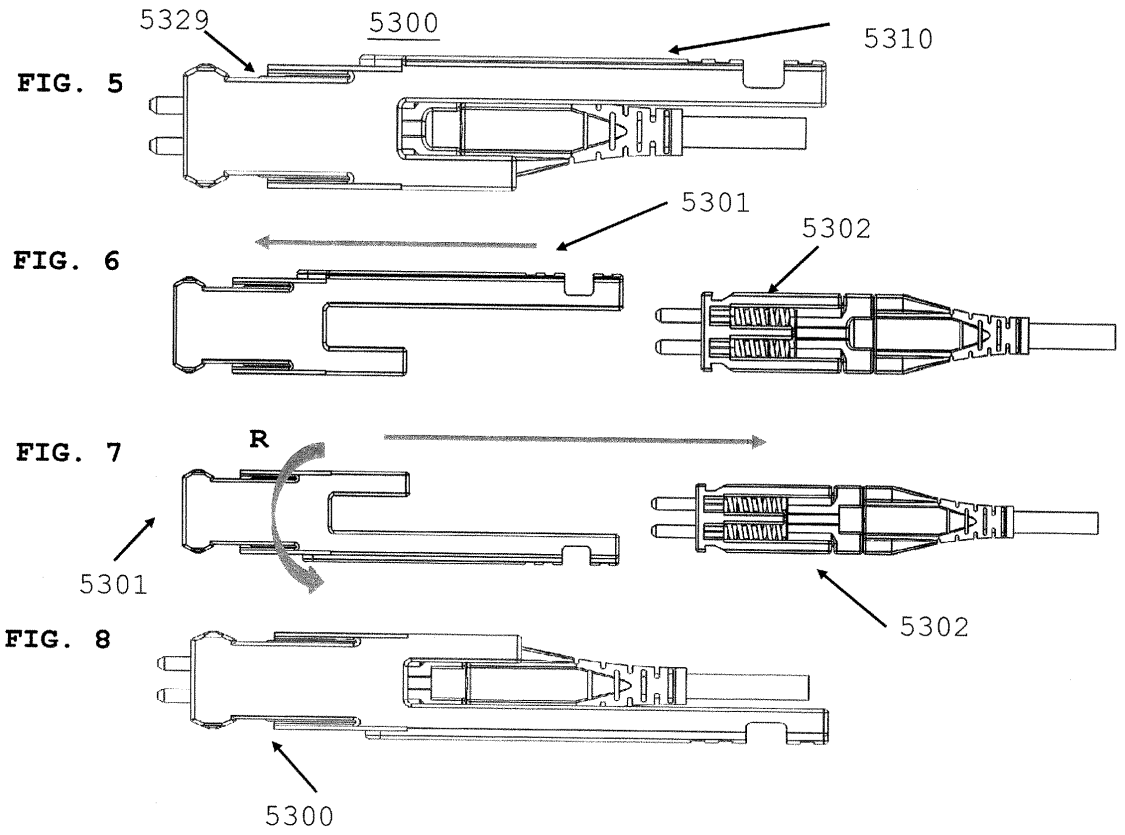


FIG. 2

FIG. 3

FIG. 4



EX1003: Figs. 2-8.

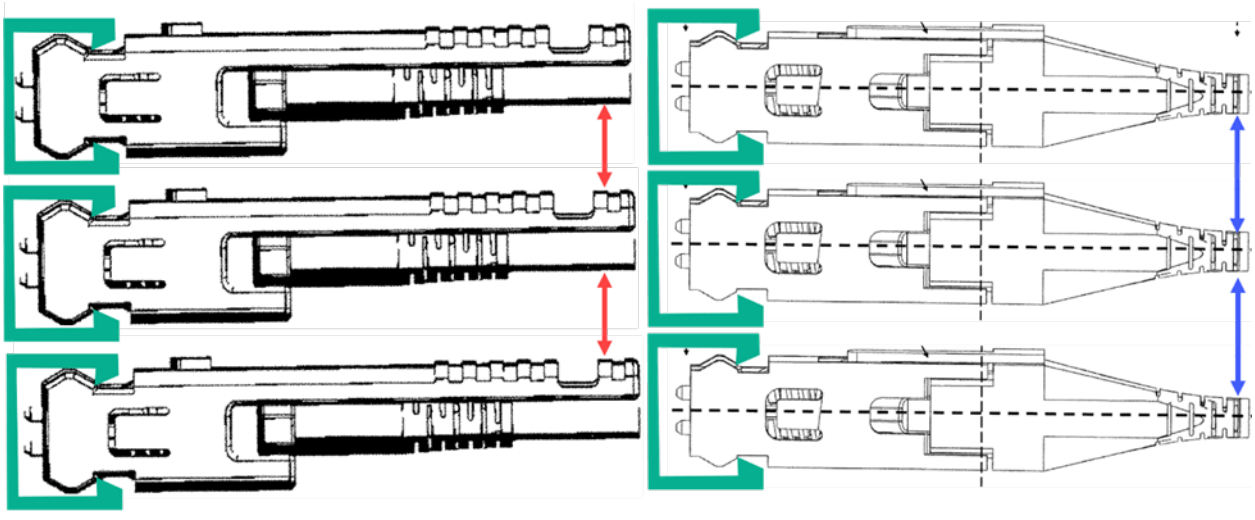
284. In my opinion, it would have been obvious to replace the boot (2109) and optional pull key (2110) of the micro connector (2100, 3700) of Figs. 1-4 with the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector (9100) of Figs. 16-36. Because the outer housing (2101, 3701) of Figs. 1-4 already has an integrated alignment key, the detachable boot-mounted alignment key (9105.1, 9205.1, 9305.1, 9405.1) would not be used in the modified version of the micro connector (2100, 3700) of Figs. 1-4. EX1003: ¶[0059].

285. The POSA would have been motivated to make this modification for several reasons. First, this modification would make it easier to insert and remove

the micro connector in high density environments. Push-pull boots like the boot (9109.1, 9209.1, 9309.1, 9409.1) in Figs. 16-36 are widely understood to improve connector access in high density connection environments. EX1003: ¶[0049] ("a remote release mechanism such that a user can remove cable assembly connectors that are closely spaced together on a high density panel without damaging surrounding connectors, accidentally disconnecting surrounding connectors, disrupting transmissions through surrounding connectors, and/or the like"). In fact, Takano's micro connectors are intended for "high-density interconnect panels." EX1003: ¶[0004]. Such panels fit as many connectors as possible onto fiber optic rack equipment by arranging adapters in horizontal rows that are spaced apart vertically by the smallest possible spacing distance.

286. For example, in the schematic illustration below, the green claw shapes schematically represent closely spaced rows of adapters on a high density panel. As shown, each micro connector is in very close proximity to the micro connector above and/or below it. Micro connectors (2100, 3700) of Figs. 1-4 are shown on the left and micro connectors (9100) of Figs. 16-36 are shown on the right. Because of the way the pull keys (2110) overlap the cables, the micro connector (2100, 3700) of Figs. 1-4 on the left have relatively small vertical space for finger access, as represented by the red arrows. By contrast, because the pull keys (2110) are eliminated in the micro connectors (9100) of Figs. 16-36 on the

right, the use of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36 provides more vertical space for finger access, as represented by the blue arrows. Eliminating the optional pull key (2110) from the micro connector (2100, 3700) of Figs. 1-4 and replacing its functionality with a push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36 provides better finger access for inserting and extracting the connector in a high density connection environment. EX1003: ¶[0049]; EX1006: ¶[0042] ("Ease of access to install or remove the push-pull boot connector 100 is increased, e.g., in that the installation or removal can be performed by pushing or pulling on the connector boot 300 instead of needing access to the connector housing 200. No remote pulling latch to hinder cable routing or finger access is included."). This advantage would have motivated the POSA to make the modification.



Micro Connectors of Figs. 1-4 Micro Connectors of Figs. 16-36

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

288. Takano explains the key (9105.1, 9205.1, 9305.1, 9405.1) is releasable (i.e., removable) from the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36. EX1003: ¶[0059]. It would have been a very apparent design choice to utilize the integrated alignment key (2105) on the outer housing (2101, 3701) instead of the boot-mounted alignment key (9105.1, 9205.1, 9305.1, 9405.1) used in some embodiments of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36 when Takano already teaches the boot-mounted key is releasable (i.e., removable) from the push-pull boot of Figs. 16-36. EX1003: ¶[0059]. The POSA would realize that, as the key (9105.1, 9205.1, 9305.1, 9405.1) is removable from the rest of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36, the push-pull boot of Figs. 16-36 can be used without the key to:

(1) push and pull the outer housing (2101, 3701) of Figs. 1-4 to connect and disconnect the micro connector (2100, 3700) of Figs. 1-4 with the adapter (2400), especially as the outer housing of Figs. 1-4 and the outer housing of Figs. 16-36 are both pushed and pulled to connect and disconnect the micro connectors with the adapter (EX1003: ¶¶[0072]-[0074], EX1030: ¶[0106]); and

(2) secure the inner components of the micro connector (2100, 3700) of Figs. 1-4 within the outer housing (2101, 3701) of Figs. 1-4.

289. The key (9105.1, 9205.1, 9305.1, 9405.1) is not needed to perform either of these functions.

290. This modification would have also been nothing more than the application of a known technique (Takano's push-pull boot of Figs. 16-36 that releasably attaches to the outer housing using quarter-turn chamfered boot hooks) to improve a similar device (Takano's micro connector (2100, 3700) of Figs. 1-4) in the same way to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change).

291. This modification would have also been nothing more than combining known prior art elements (Takano's push-pull boot of Figs. 16-36 and Takano's micro connector (2100, 3700) of Figs. 1-4) according to known methods

(connection to the outer housing as shown in Figs. 16-36) to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change via chamfered boot hooks).

292. This modification would have also been nothing more than a simple substitution of one known alternative (Takano's boot and pull key of Figs. 1-4) with another (Takano's push-pull boot of Figs. 16-36) to yield predictable results (a micro connector with a push-pull boot for improved finger access for removal and quick disconnect for polarity change).

293. In making this modification, the POSA would make minor structural changes to the micro connector (2100, 3700) of Figs. 1-4 to make the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36 compatible therewith. For example, the POSA would add the slots (9201.4a, 9201.4b) of the outer housing (9101, 9201, 9301, 9401) of Figs. 16-36 to the outer housing (2101, 3701) of Figs. 1-4. EX1003: ¶[0058], Fig. 38. To add the slot to the bottom side of the outer housing (2101, 3701), the POSA would extend the bottom side of the outer housing rearward a sufficient distance to accommodate the bottom slot, as is the case in Figs. 16-36. EX1003: Fig. 18. Such minor structural changes to plastic components are well within the capabilities of the POSA. Further, the way to modify the rear end portion of the outer housing (2101, 3701) of Figs. 1-4 is already shown in the outer housing of the micro connector of Figs. 16-36.

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

295. A POSA would have had a reasonable expectation of success in replacing the boot (2109) and optional pull key (2110) of Figs. 1-4 with the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs. 16-36. As shown below, Takano and Takano's provisional application (EX1004, the '539 Provisional) have different drawings depicting a blueprint for how to make the structural modifications required for compatibility between the outer housing (2102, 3701) of Figs. 1-4 and the push-pull boot of Figs. 16-36. Fig. 37 of Takano and Fig. 97.1 of the '539 Provisional are clear indications that (1) the minor structural modifications needed to support the basic change to the micro connector (2100, 3700) of Figs. 1-4 would have been well-within a POSA's capabilities and (2) the POSA would have had a reasonable expectation that the modification could

successfully yield a desirable micro connector. The only difference between the modified connector according to this Ground and the connectors shown in Fig. 37 of Takano and Fig. 97.1 of the '539 Provisional, is that the way the boot couples to the outer housing in the drawings does not appear to facilitate quarter-turn release (e.g., the boot hooks in these drawings are missing the circumferential chamfers (9409.2a, 9409.3b) on the boot of Figs. 16-36). However, these figures still indicate a reasonable expectation of success, even without this small detail.

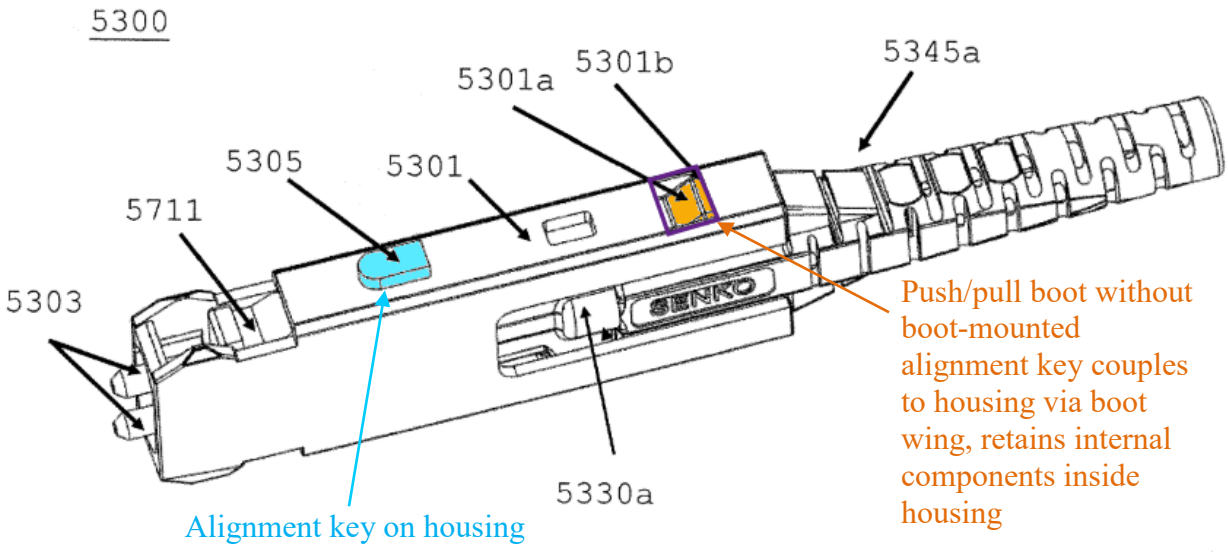


FIG. 37

EX1003: Fig. 37 (annotated).

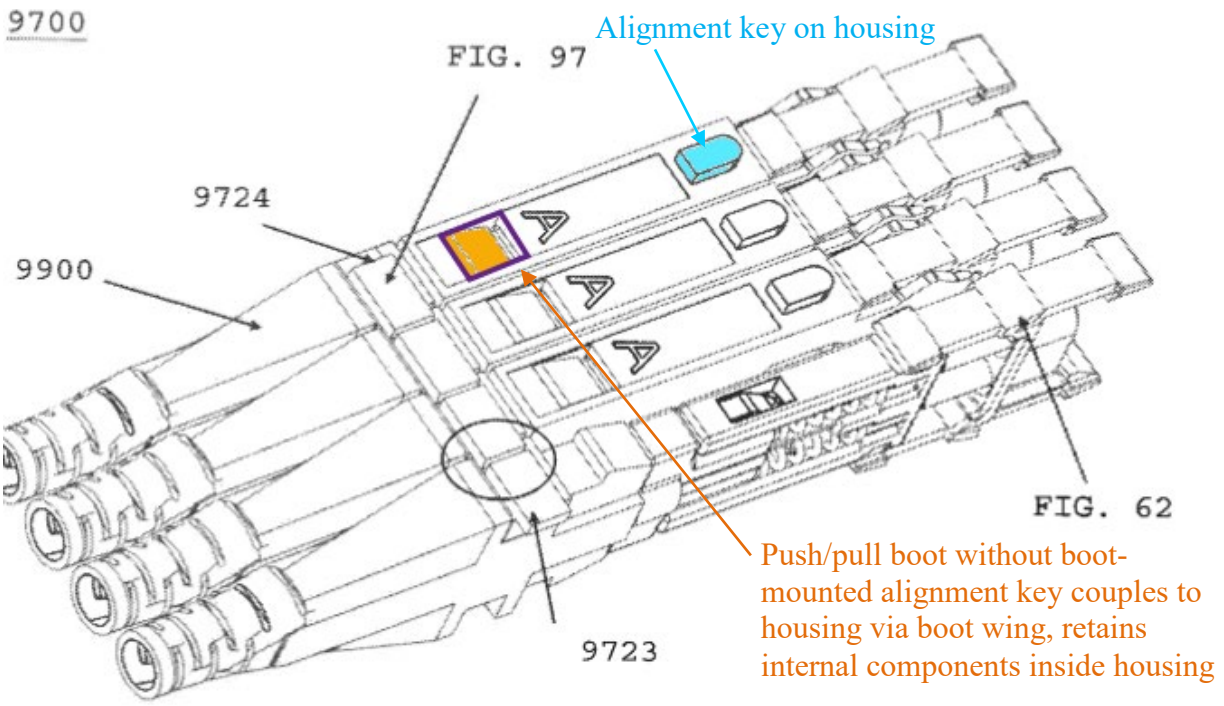


FIG. 97.1

B. Independent Claim 1

1.P A fiber optic connector having a boot, a crimp body, and a housing having at least two optical fibers therein, the fiber optic connector comprising:

296. The Takano combination results in the micro connector (2100, 3700) of Figs. 1-4 having an outer housing (2101, 3701), a push-pull boot or boot assembly (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36, a back body (2106), and a back post (2107). EX1003: ¶¶[0050], [0061], Figs. 1-4 and 17. The back post (2107) attaches to the back body (2106). EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 23B. A crimp ring (2108) is crimped onto the back post (2107). EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 23B. Together the back post (2107) and the back body

(2106) form a crimp body as PCT Application No. PCT/US2018/066523, incorporated by reference into the '794 Patent, explains the "crimp body 106" can be "a single, unitary body … [or] it could also be molded as two pieces and then later the two pieces secured to one another." EX1019: ¶[0078]; EX1001: 3:65-67, 7:16-18.

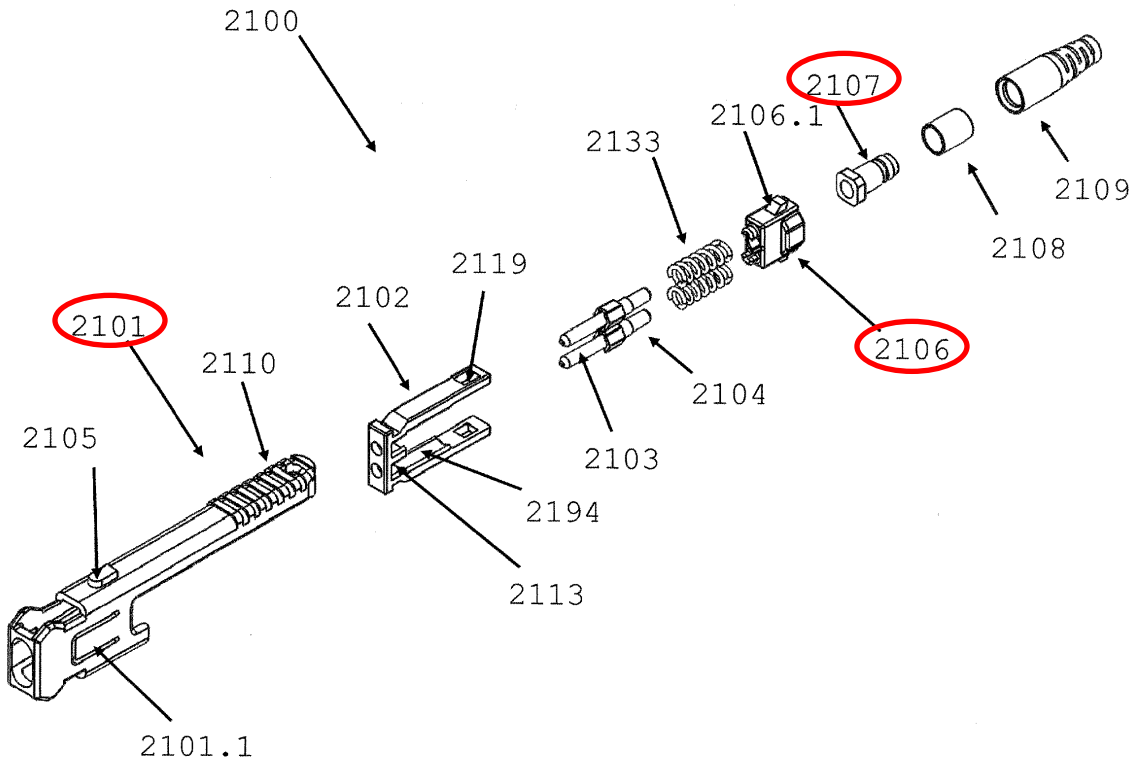


FIG. 1.

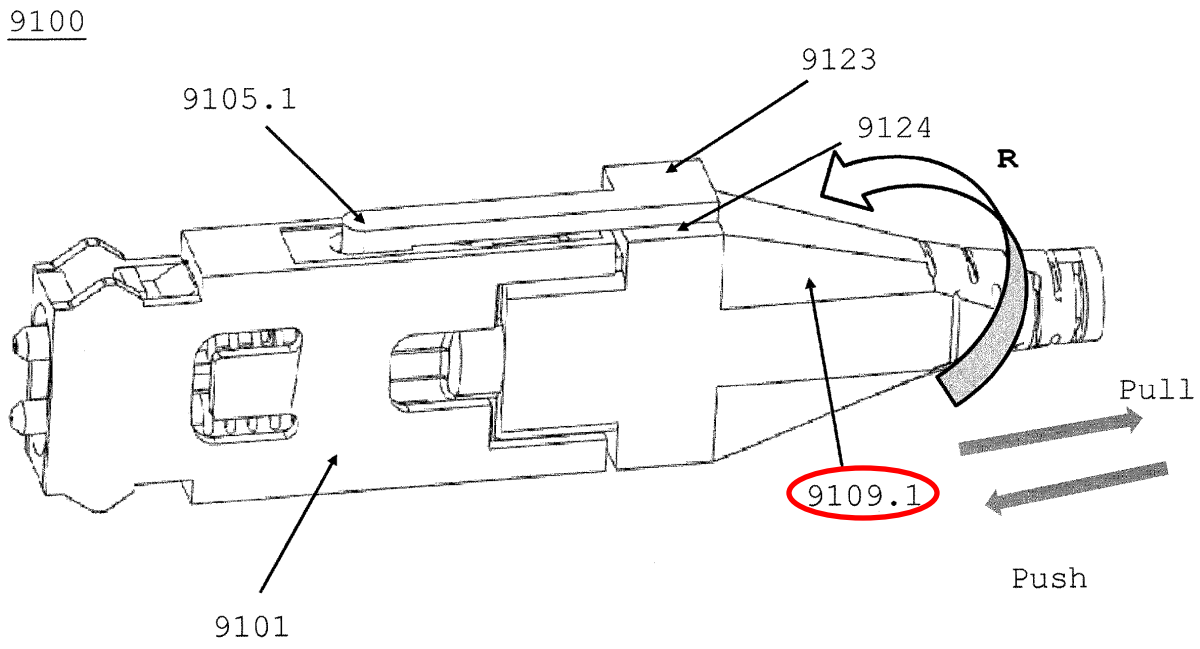

9100
9123
9105.1
9124
R
Pull
9109.1
Push
9101

FIG. 16

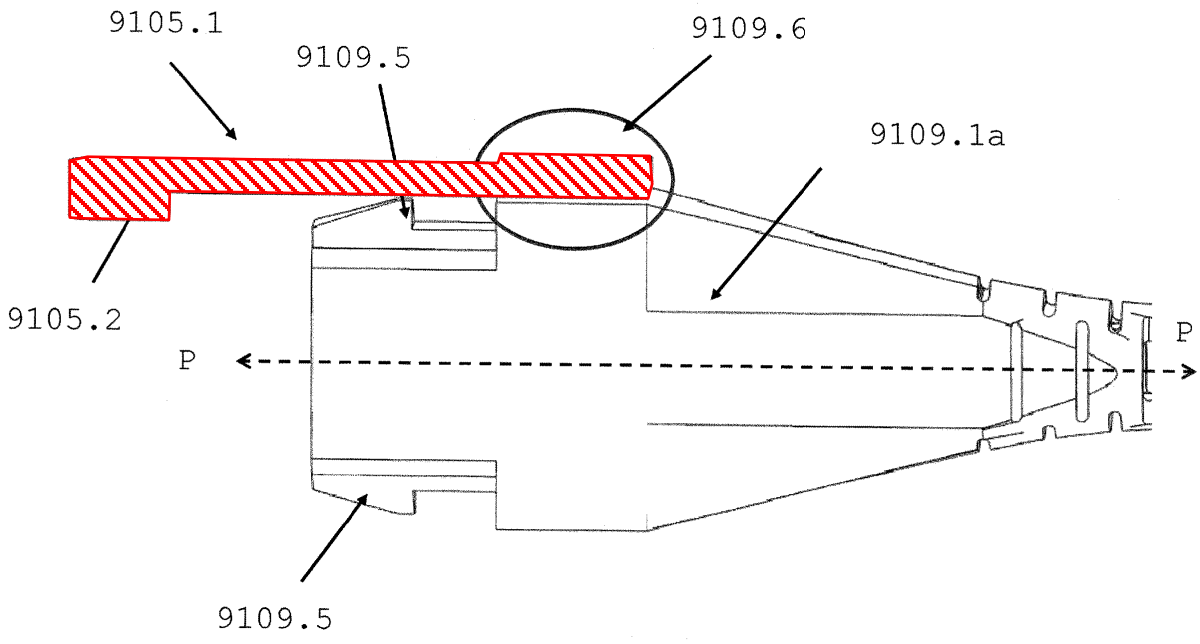

9109.1
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
9109.5

FIG. 17

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

297. The micro connector (2700, 3700) includes two ferrules (2103) partially within the outer housing (2101, 3701). EX1003: Figs. 1-4, ¶[0050]. Each ferrule (2103) terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector (2700, 3700) is attached to. EX1003: ¶¶[0048], [0050]. While Takano does not illustrate the optical fibers, Figs. 1-3 below have been annotated to include the optical fibers (red).

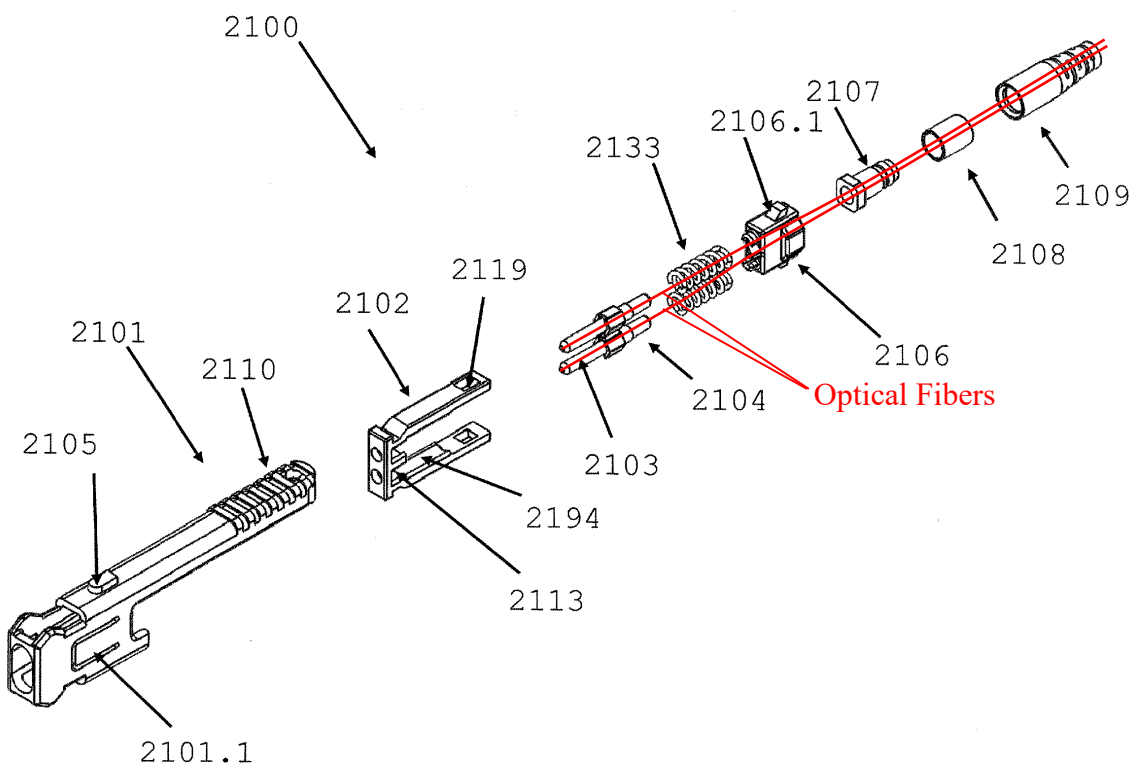
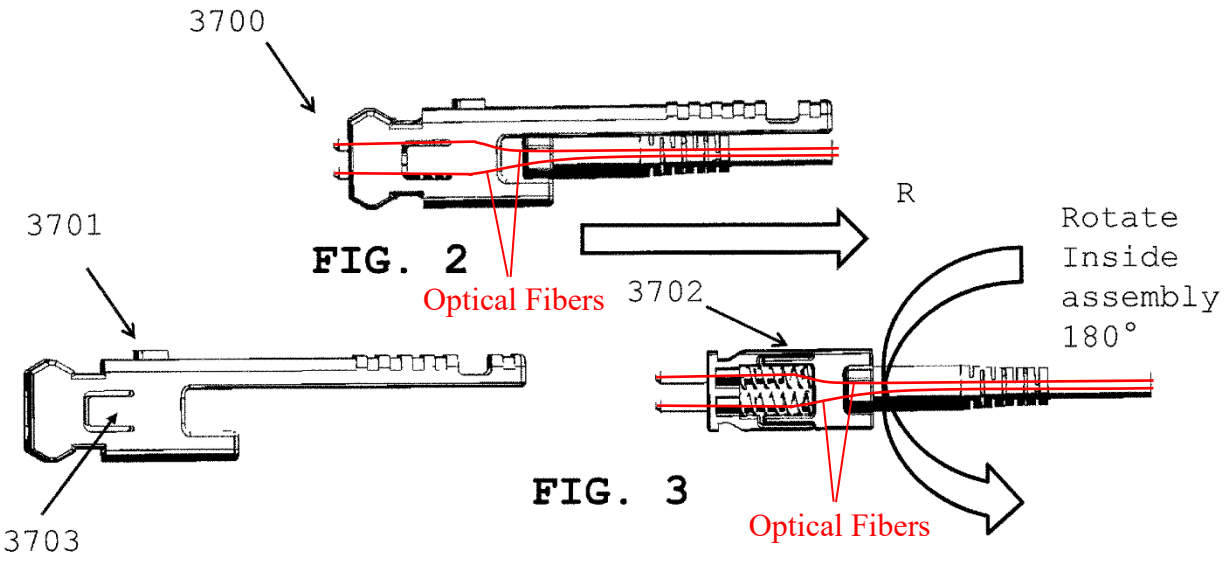


FIG. 1.



EX1003: Figs. 1-3 (annotated).

298. Additional figures of the micro connector (2100, 3700) are provided in the '539 Provisional, which is incorporated by reference into Takano. EX1003: ¶[0001].

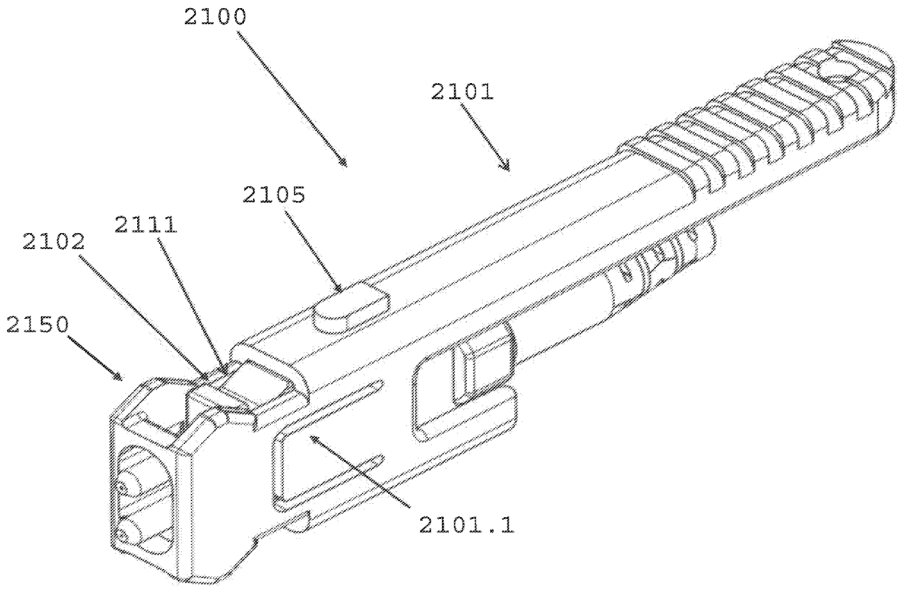


FIG. 21B

EX1004: Fig. 21B.

299. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.a.1 "a front end opening in the housing,"

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

EX1003: Fig. 1.

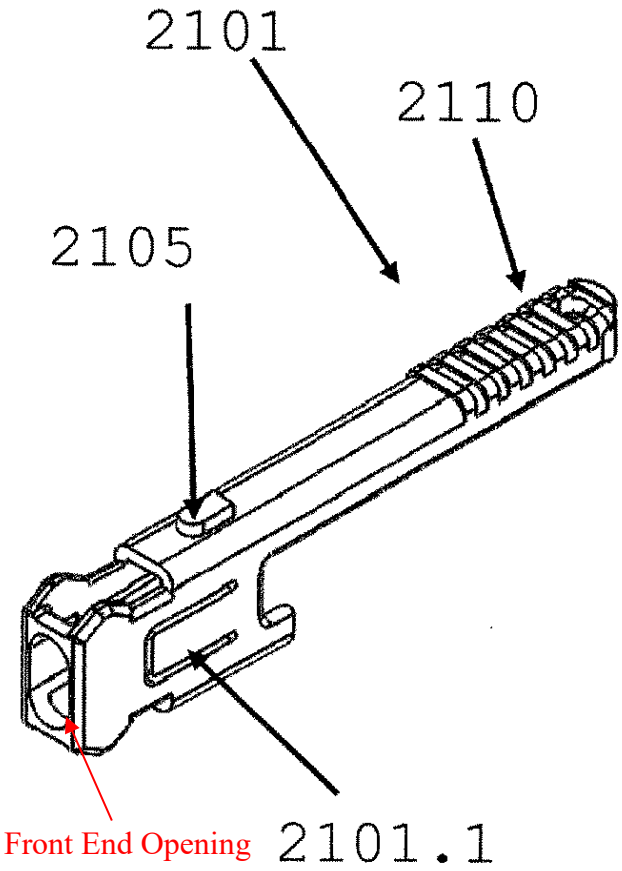


FIG. 1.

EX1003: Fig. 1 (annotated).

301. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

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

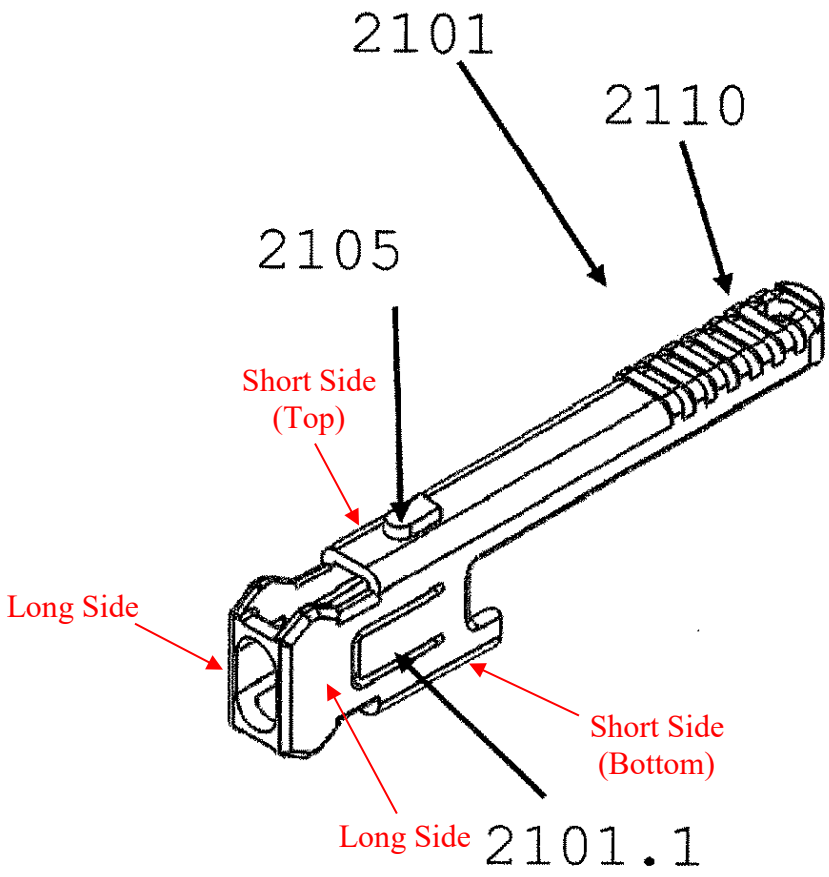


FIG. 1.

EX1003: Fig. 1 (annotated).

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

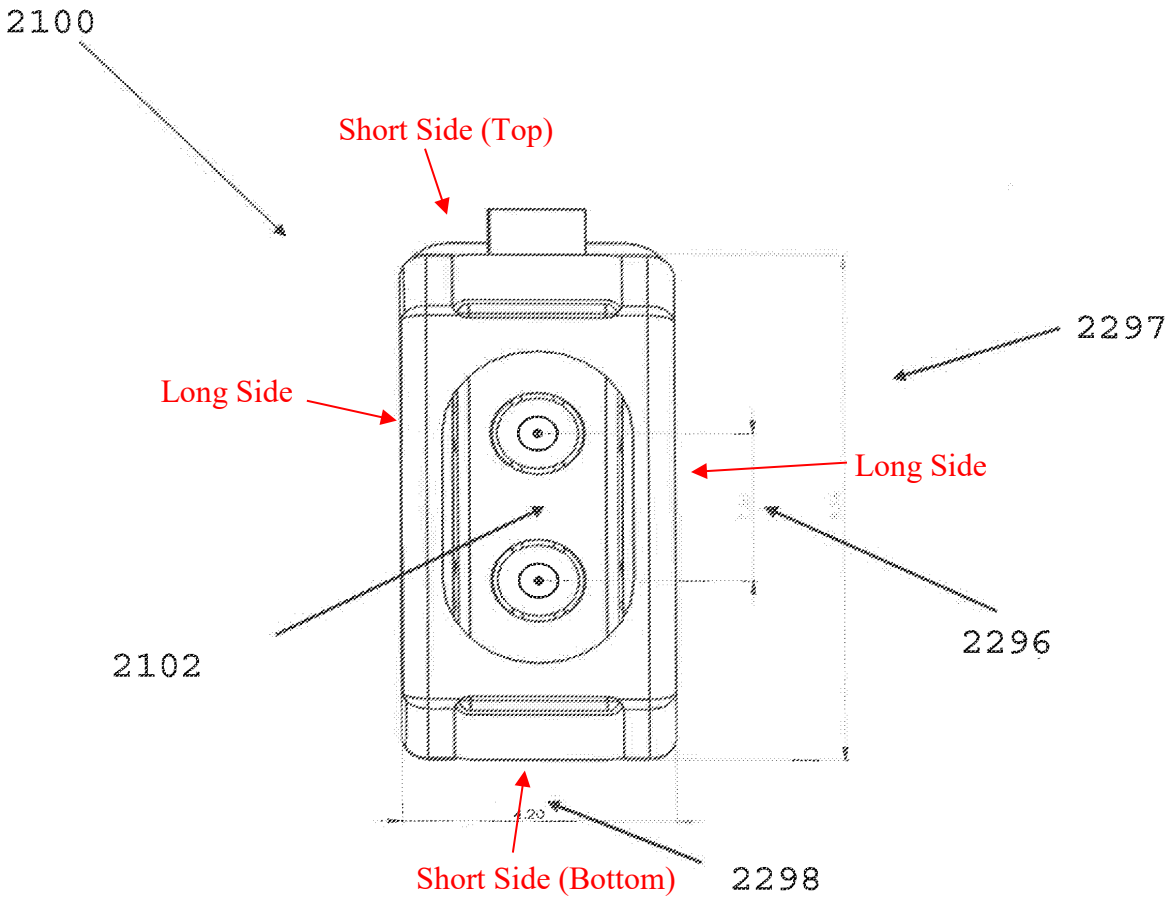


FIG. 22

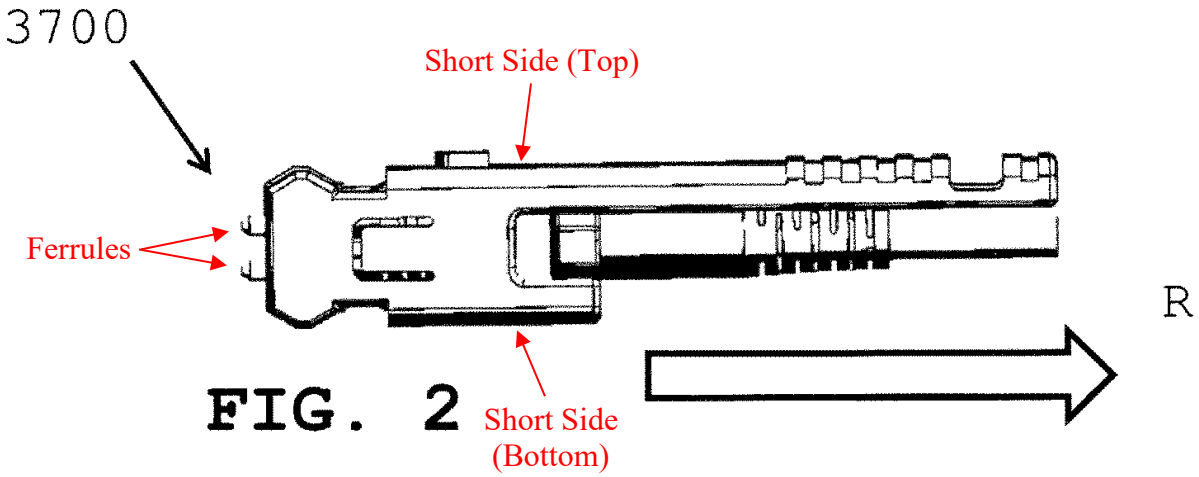
EX1004: Fig. 22 (annotated).

304. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.a.3 "the at least two optical fibers spaced apart between the top and the bottom formed by the pair of short sides,"

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

EX1003: Figs. 1-4, ¶[0050].



EX1003: Fig. 2 (annotated).

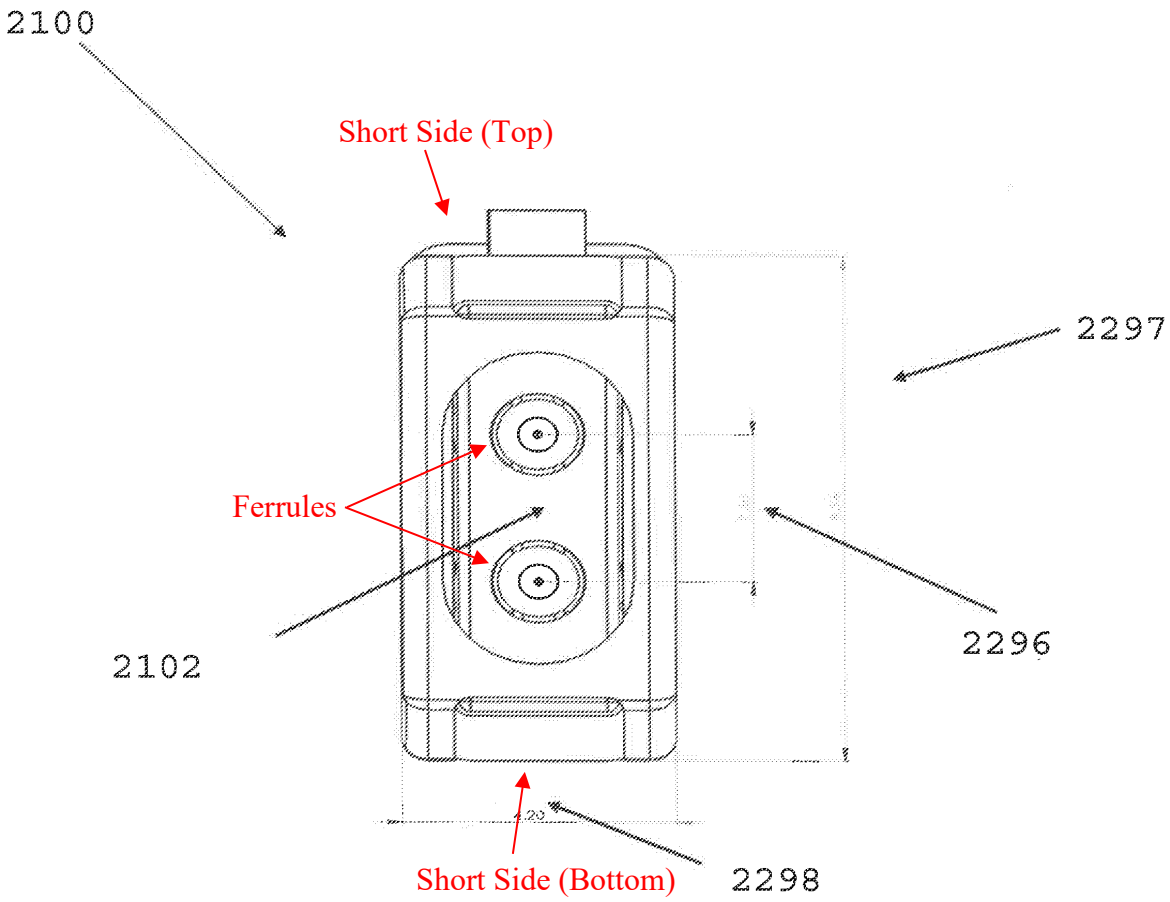

2100
Short Side (Top)
2297
Ferrules
2102
2296
Short Side (Bottom)
2298

FIG. 22

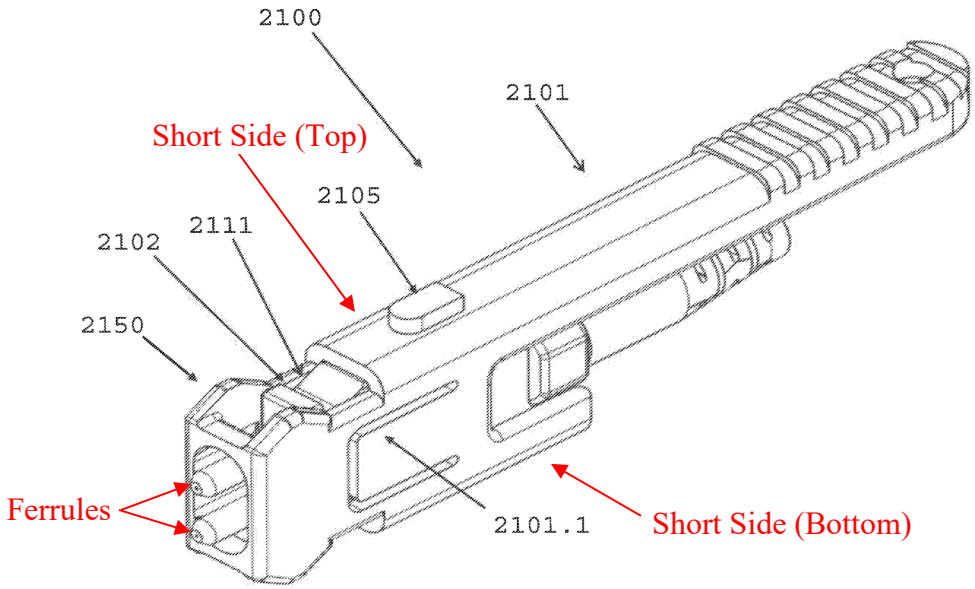


FIG. 21B

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

306. Each ferrule (2103) terminates an optical fiber (a total of two optical fibers) from the fiber optic cable the micro connector (2100, 3700) is attached to. EX1003: ¶¶[0048], [0050]. While Takano does not illustrate the optical fibers, Figs. 1-3 below have been annotated to include the optical fibers (red).

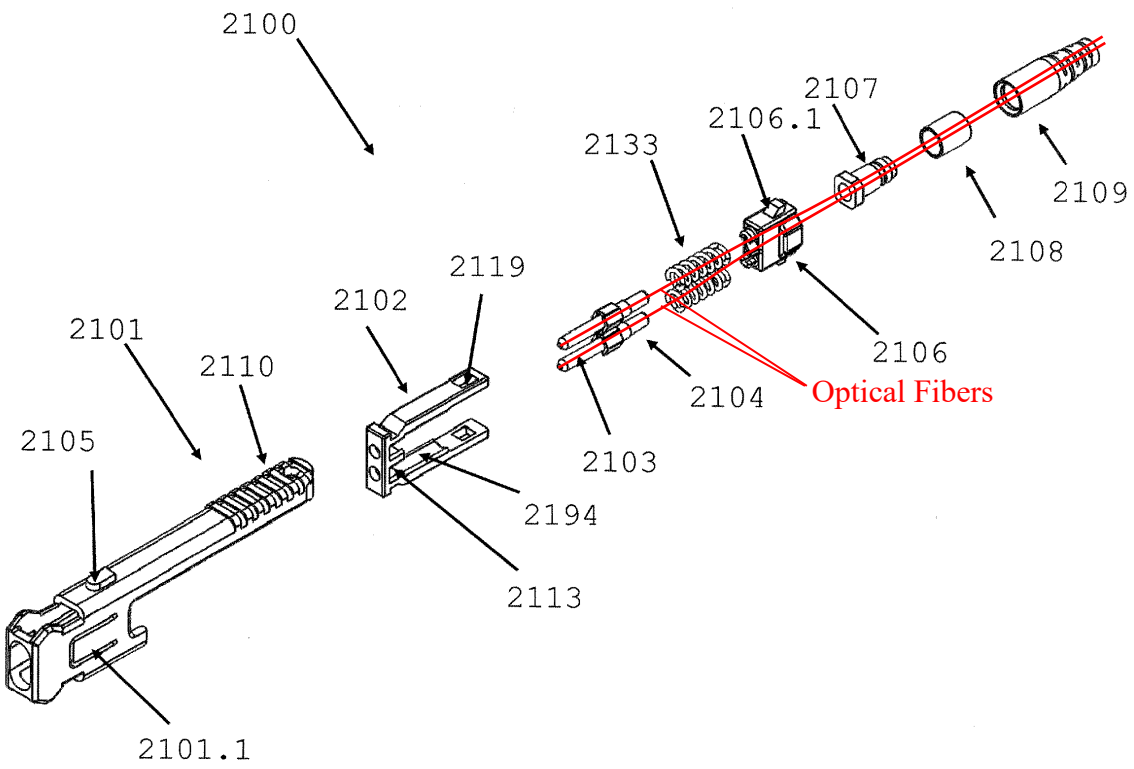


FIG. 1.

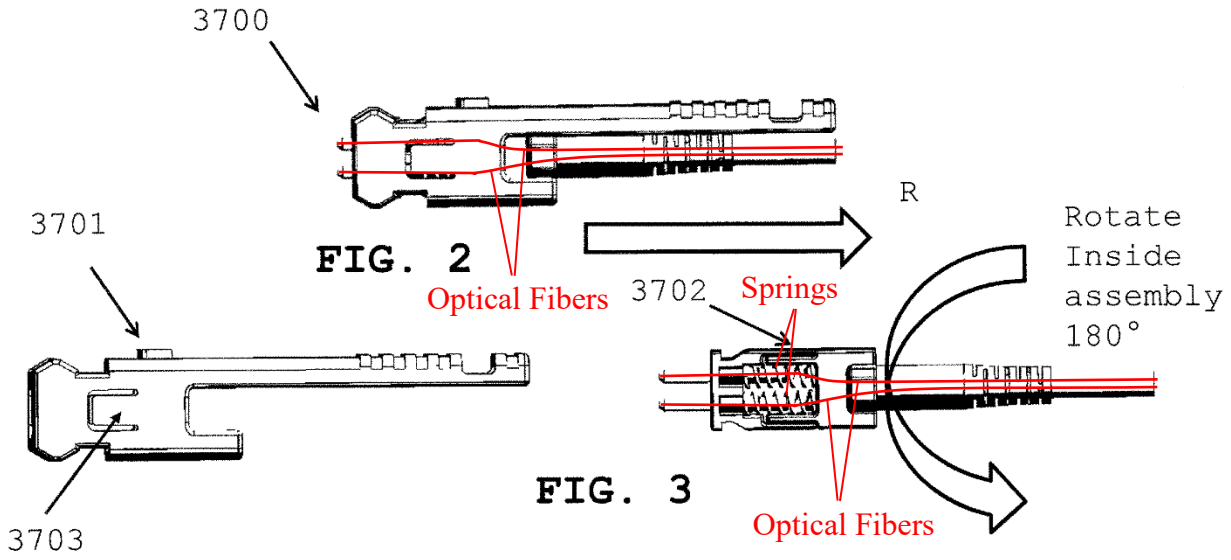


FIG. 2

FIG. 3

EX1003: Figs. 1-3 (annotated).

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

bottom of the outer housing (2101, 3701). EX1003: Figs. 1-4, ¶[0050]. Further, the optical fibers would also be spaced apart when extending to each ferrule (2103), as each optical fiber would pass through one of the springs (which are also spaced apart) biasing the ferrules, as shown above in Fig. 3.

308. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.a.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides;"

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

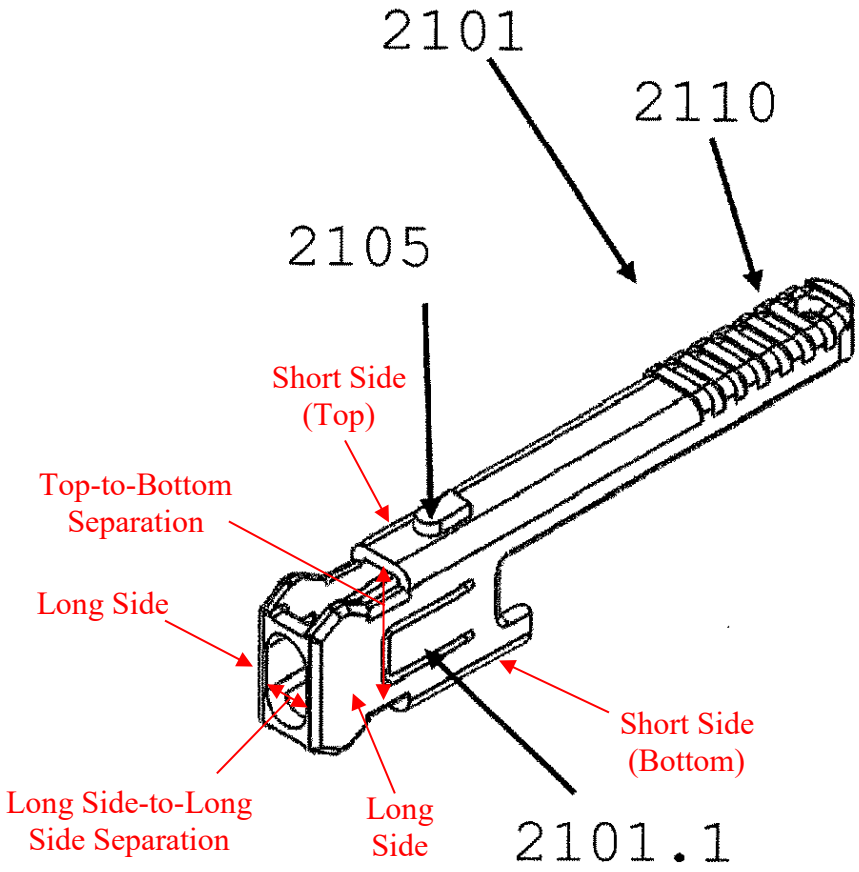


FIG. 1.

EX1003: Fig. 1 (annotated).

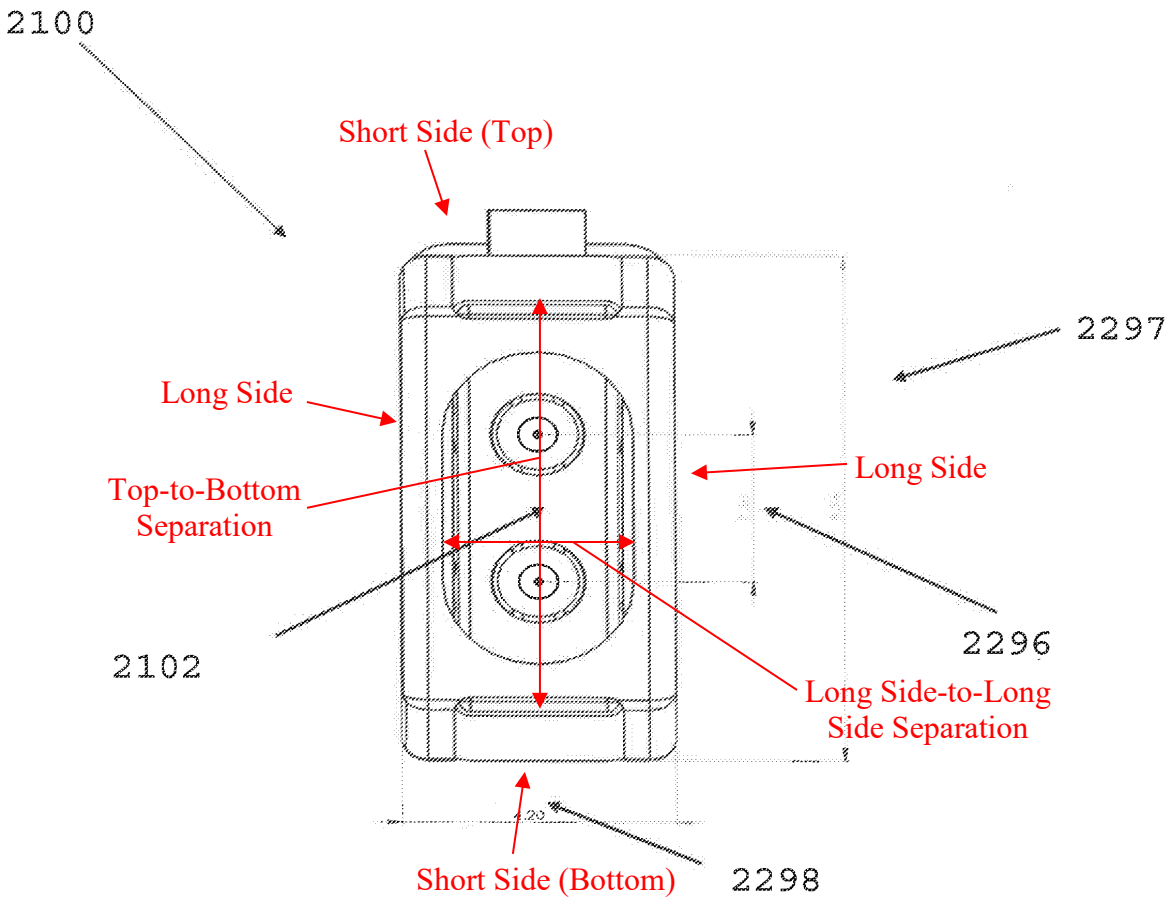


FIG. 22

EX1004: Fig. 22 (annotated).

310. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion; and"

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

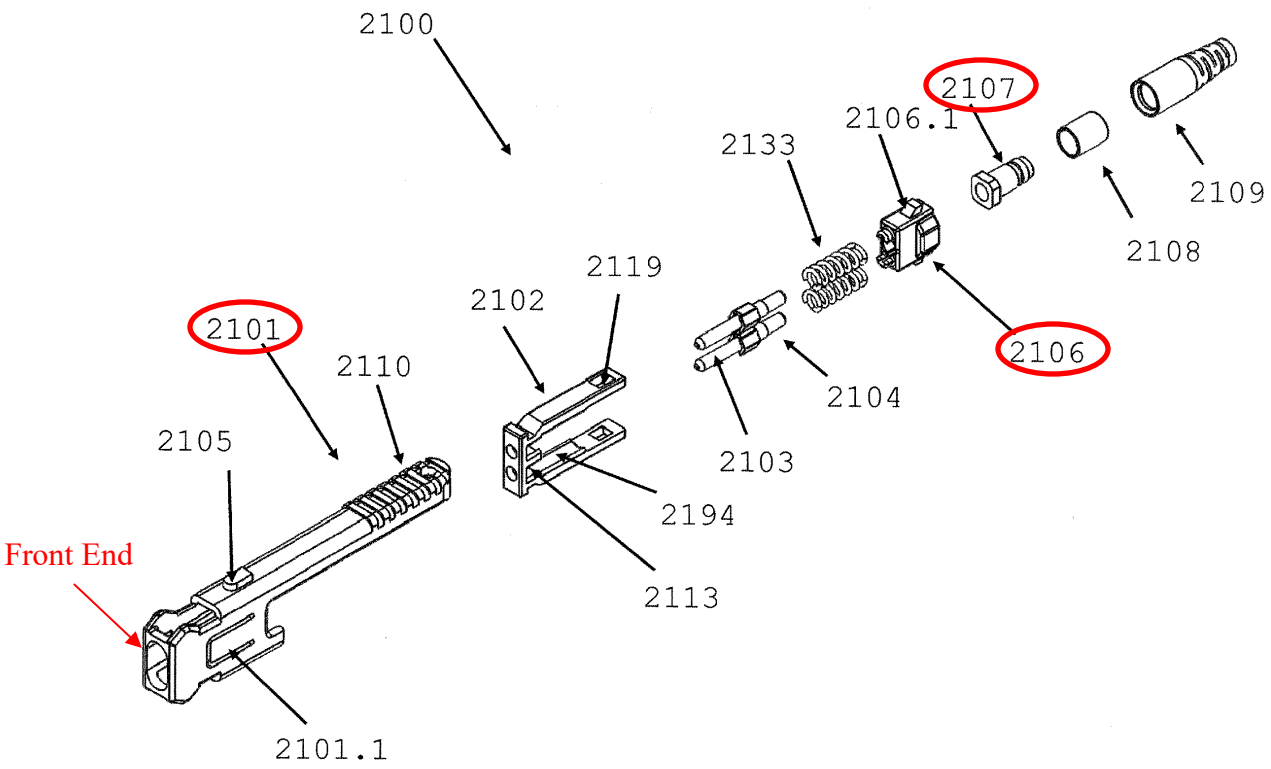


FIG. 1.

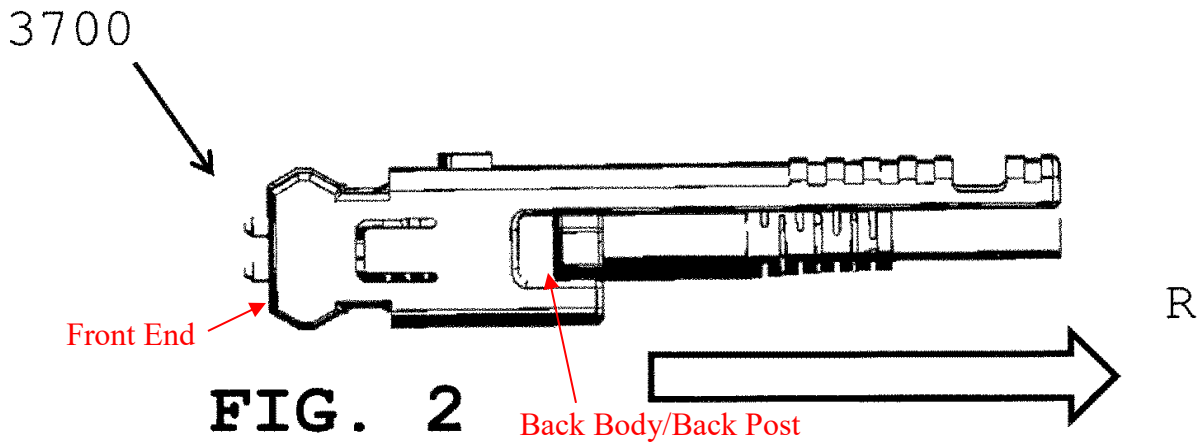


FIG. 2

EX1003: Figs: 1 and 2 (annotated).

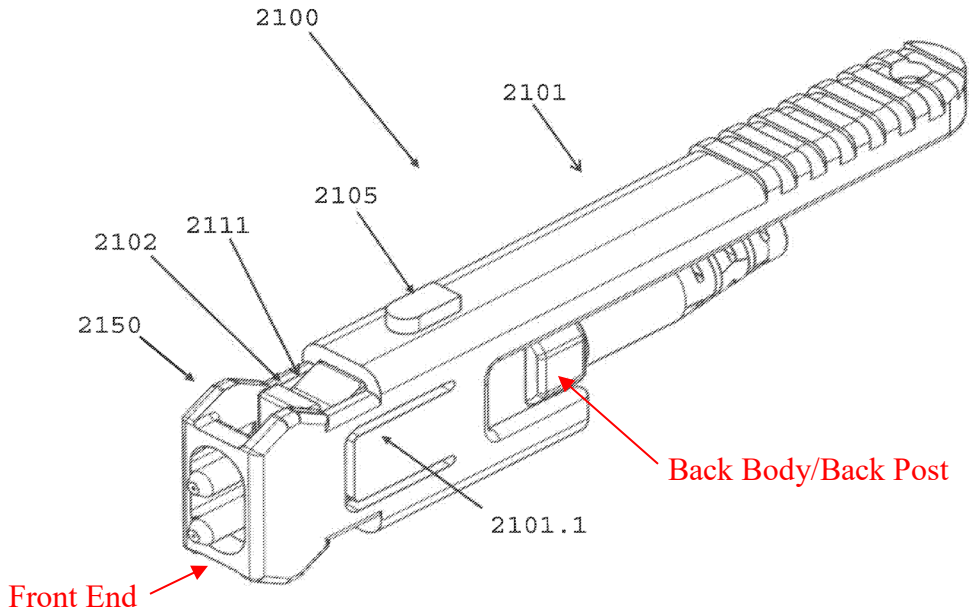


FIG. 21B

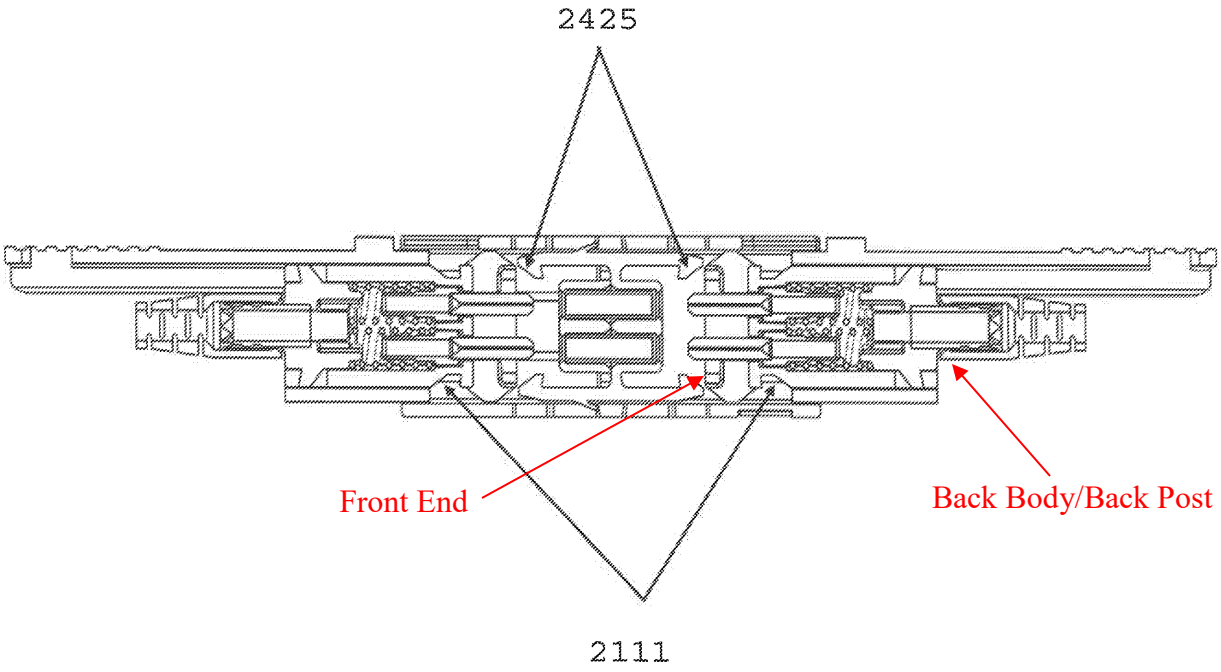


FIG. 23B

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

312. The back post (2107) forms a rear portion onto which the crimp ring (2108) is crimped onto. EX1003: ¶[0050], Fig. 1; EX1004: Fig. 23B.

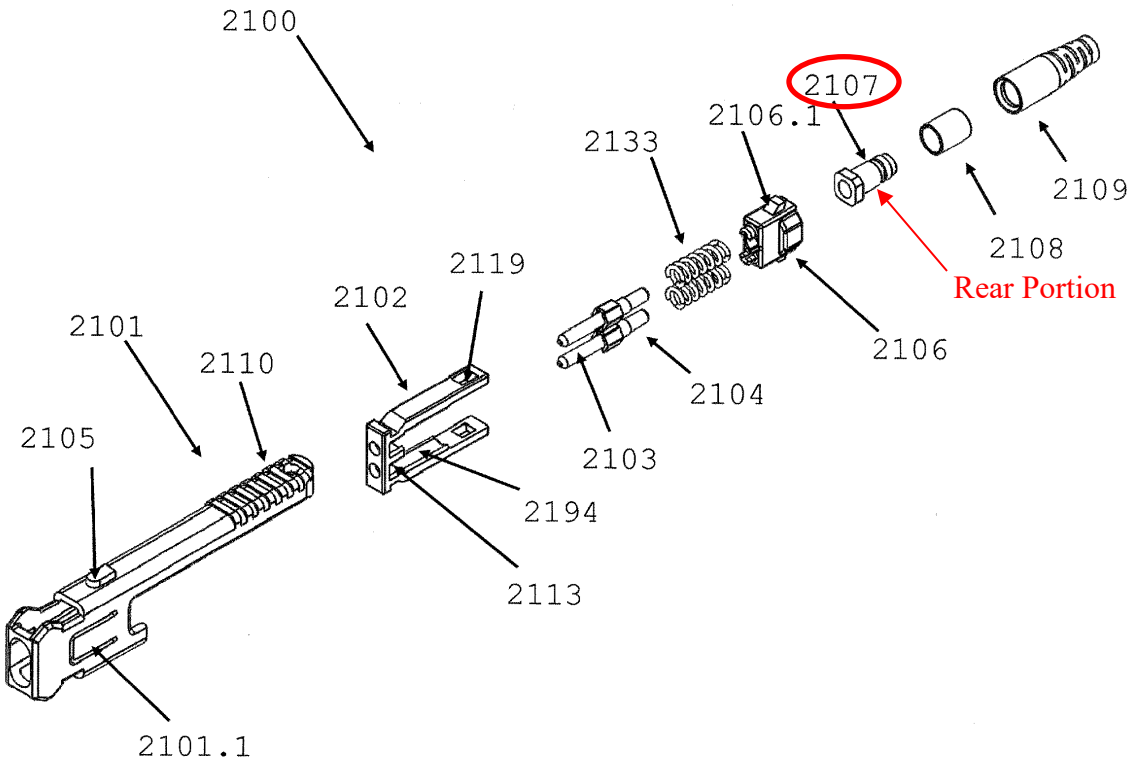


FIG. 1.

EX1003: Fig. 1 (annotated).

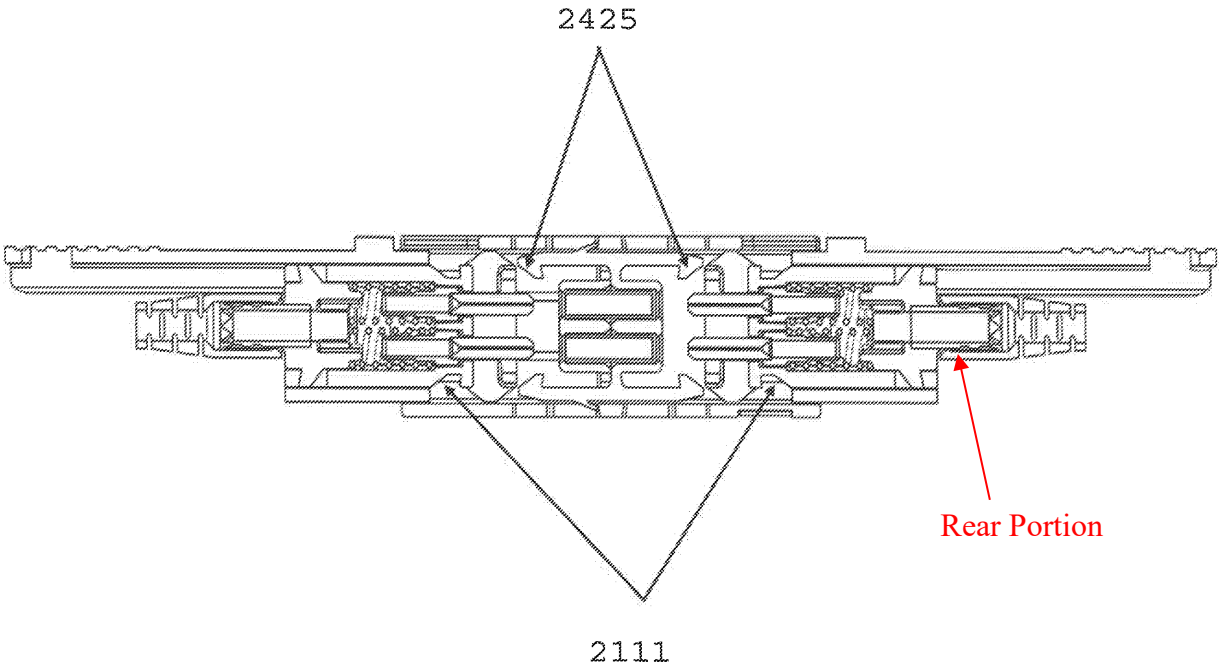


FIG. 23B

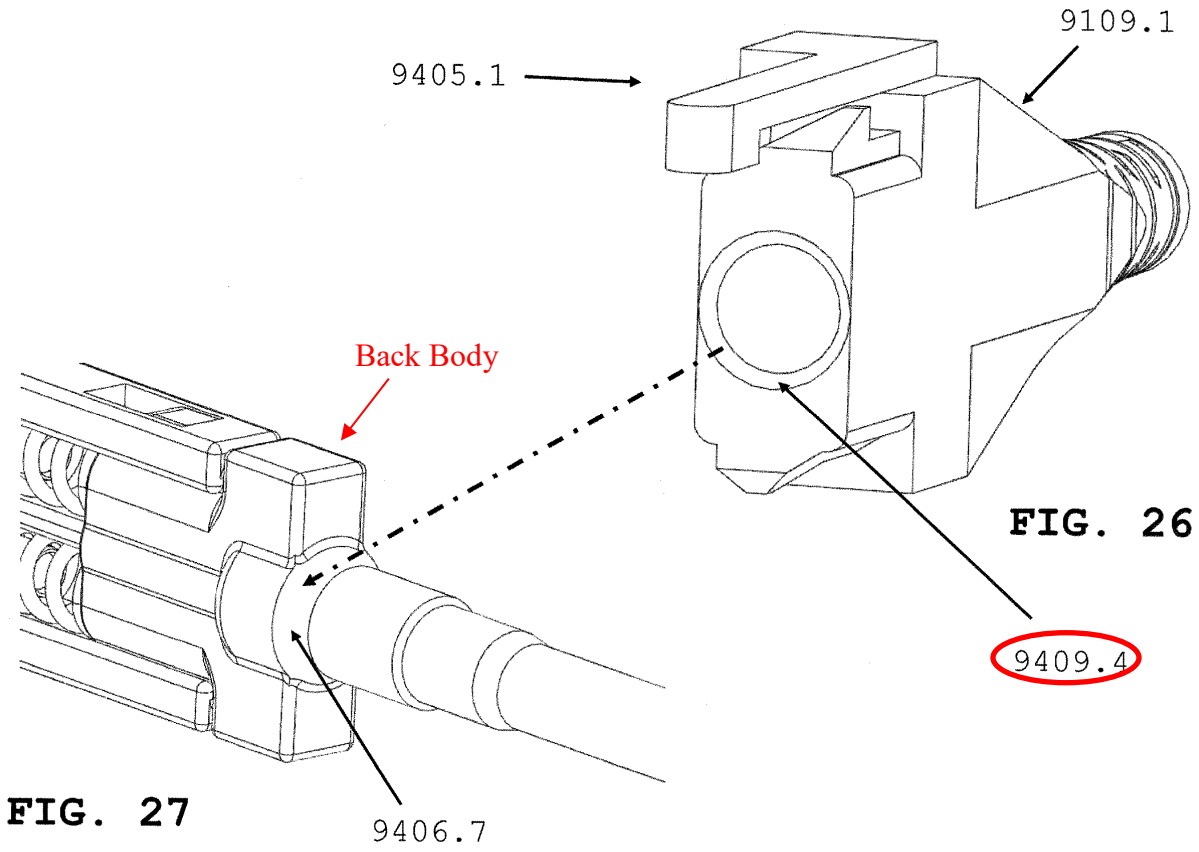
EX1003: Fig. 23B (annotated).

313. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

314. The push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) includes an inner round (9409.4) (e.g., inside diameter) that forms a cavity that receives the back post of the back body (9106, 9206). EX1003: Figs. 26, 27, 30, and 34, ¶[0067]. When implemented in the Takano combination, the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) would receive the back post (2107) (i.e., rear portion),

same as the boots in both embodiments of Takano. EX1003: Figs. 1-4; EX1004: Fig. 23B.



EX1003: Figs. 26 and 27 (annotated).

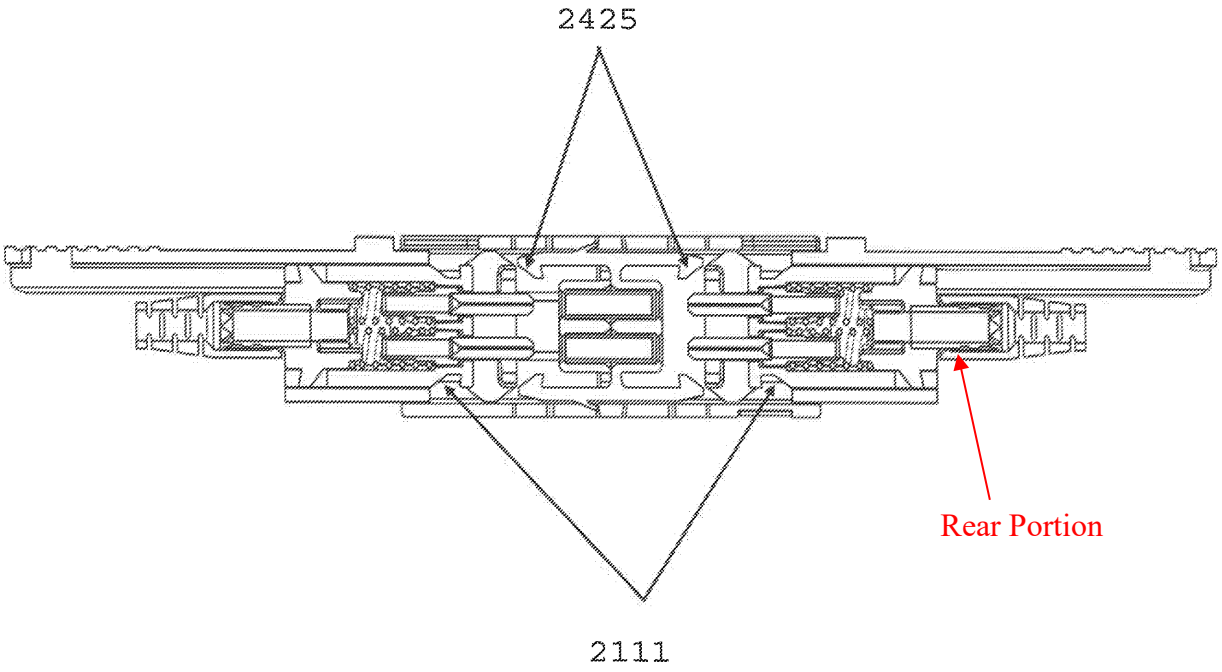


FIG. 23B

EX1003: Fig. 23B (annotated).

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

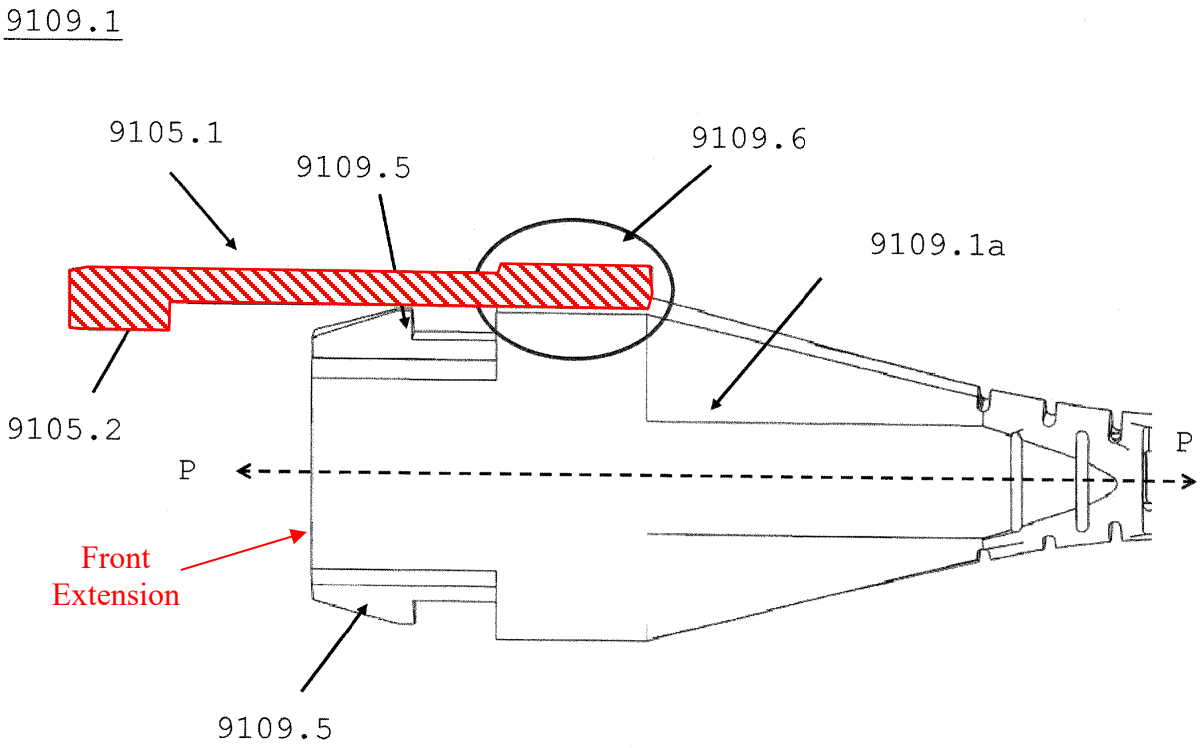


FIG. 17

EX1003: Fig. 17 (annotated).

316. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.c.2 "the front extension extending towards the front end of the housing and attached to the housing forward of a center portion of the boot,"

317. The Takano combination results in the front extension extending forward toward the front end of the outer housing (2101, 3701) from point (9109.6). EX1003: Figs. 1-4, 16 and 17.

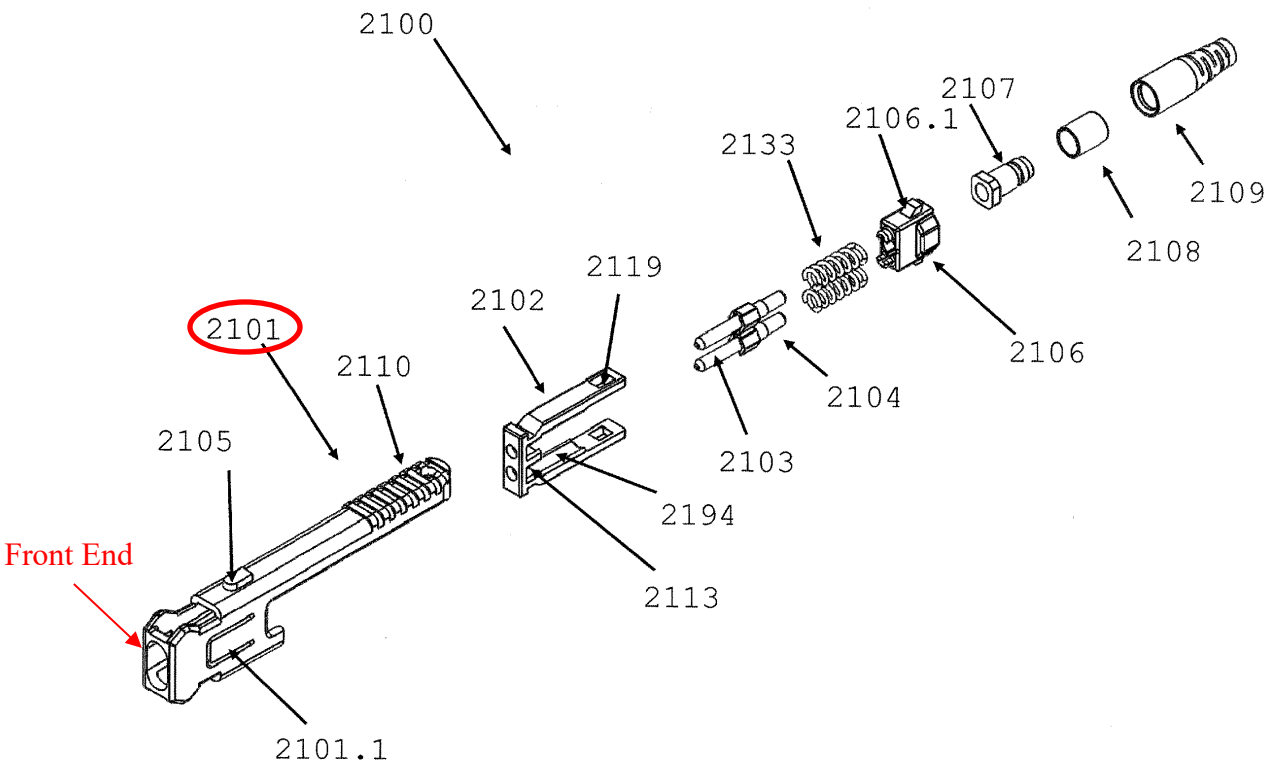

2100
2107
2106.1
2133
2109
2108
2119
2102
2101
2110
2106
2105
2104
2103
2194
Front End
2113
2101.1

FIG. 1.

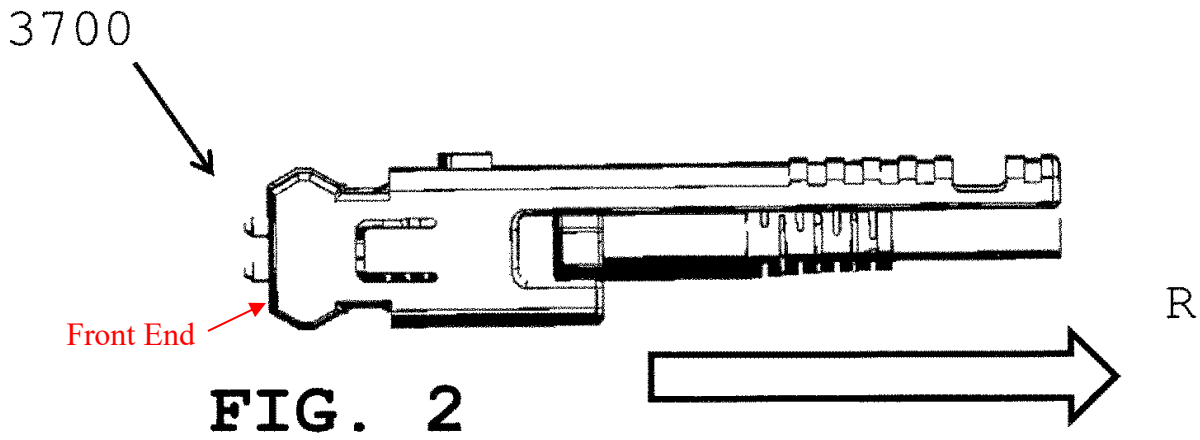

3700
Front End
R

FIG. 2

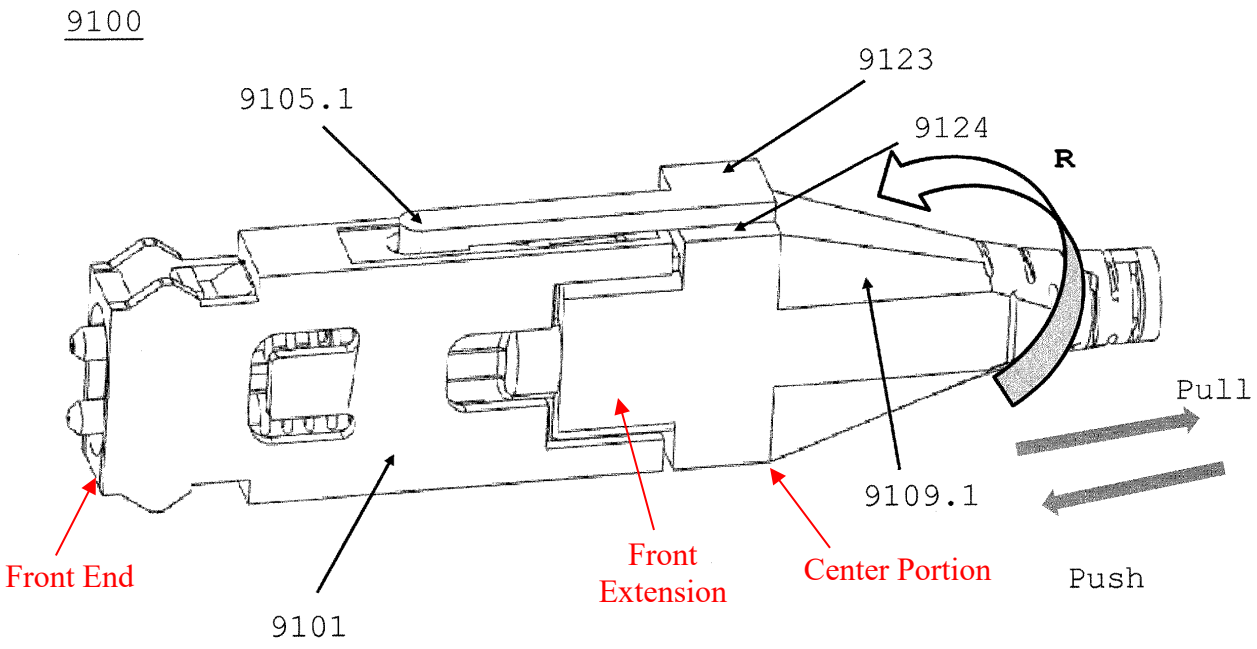

9100
9123
9105.1
9124
R
Pull
9109.1
Front End
9101
Front
Extension
Center Portion
Push

FIG. 16

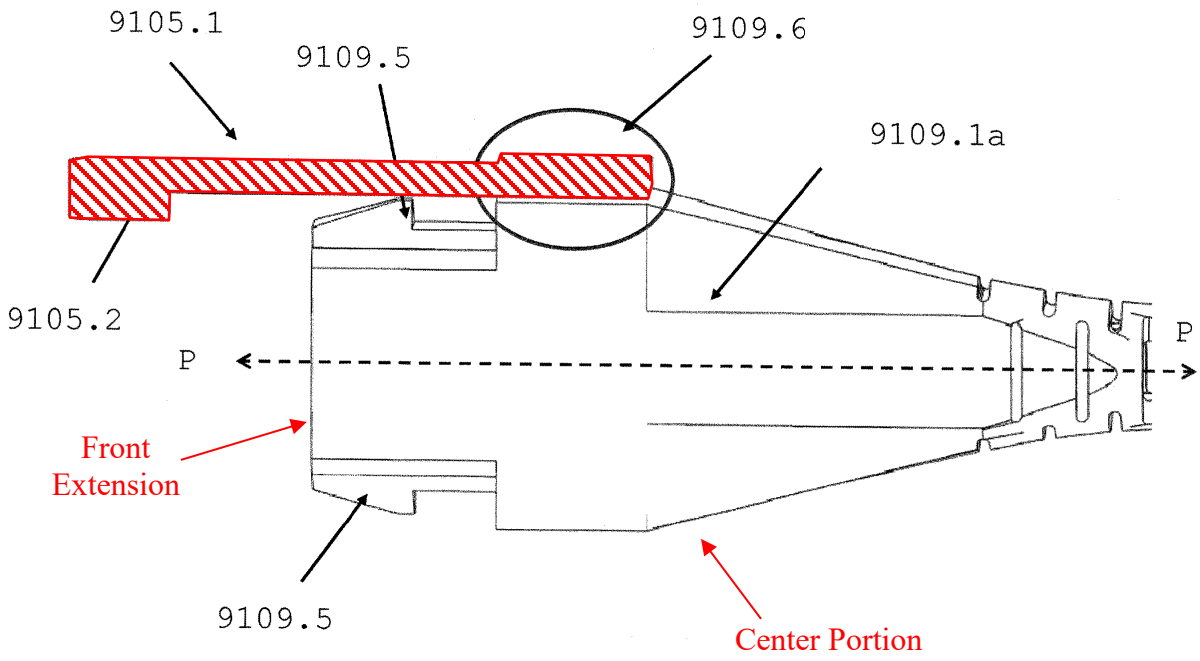

9109.1
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
Front
Extension
9109.5
Center Portion

FIG. 17

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

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

319. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.c.3 "wherein the crimp body and the boot each have a respective contiguous longitudinal opening to accommodate the at least two optical fibers having ends terminated forward of the front end opening of the housing, and"

320. Together, the back body (2106) and the back post (2107) define a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (2103). EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 23B. Fig. 1 is annotated below to shown the opening (red).

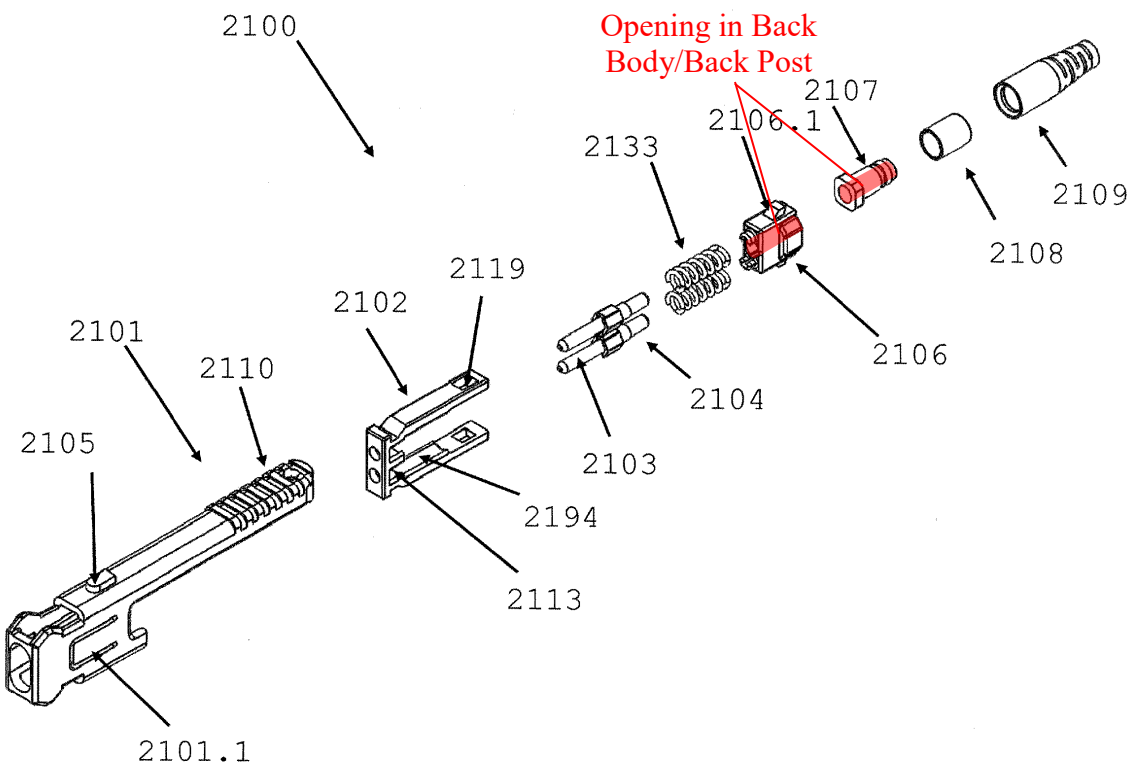


FIG. 1.

EX1003: Fig. 1 (annotated).

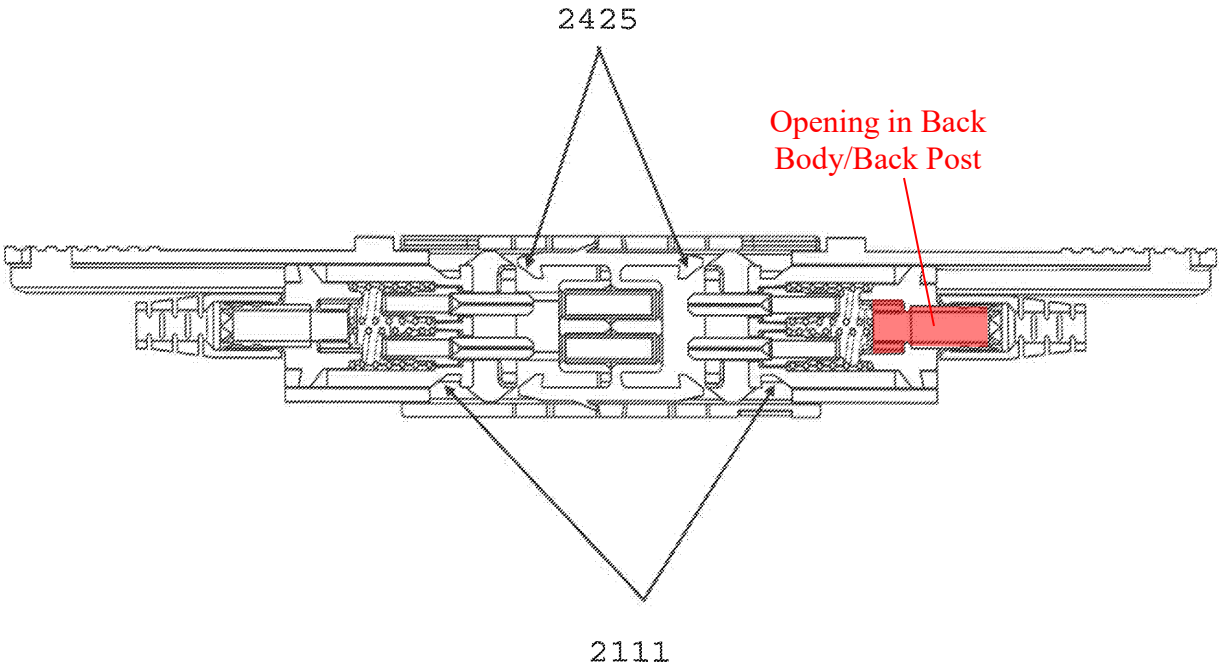
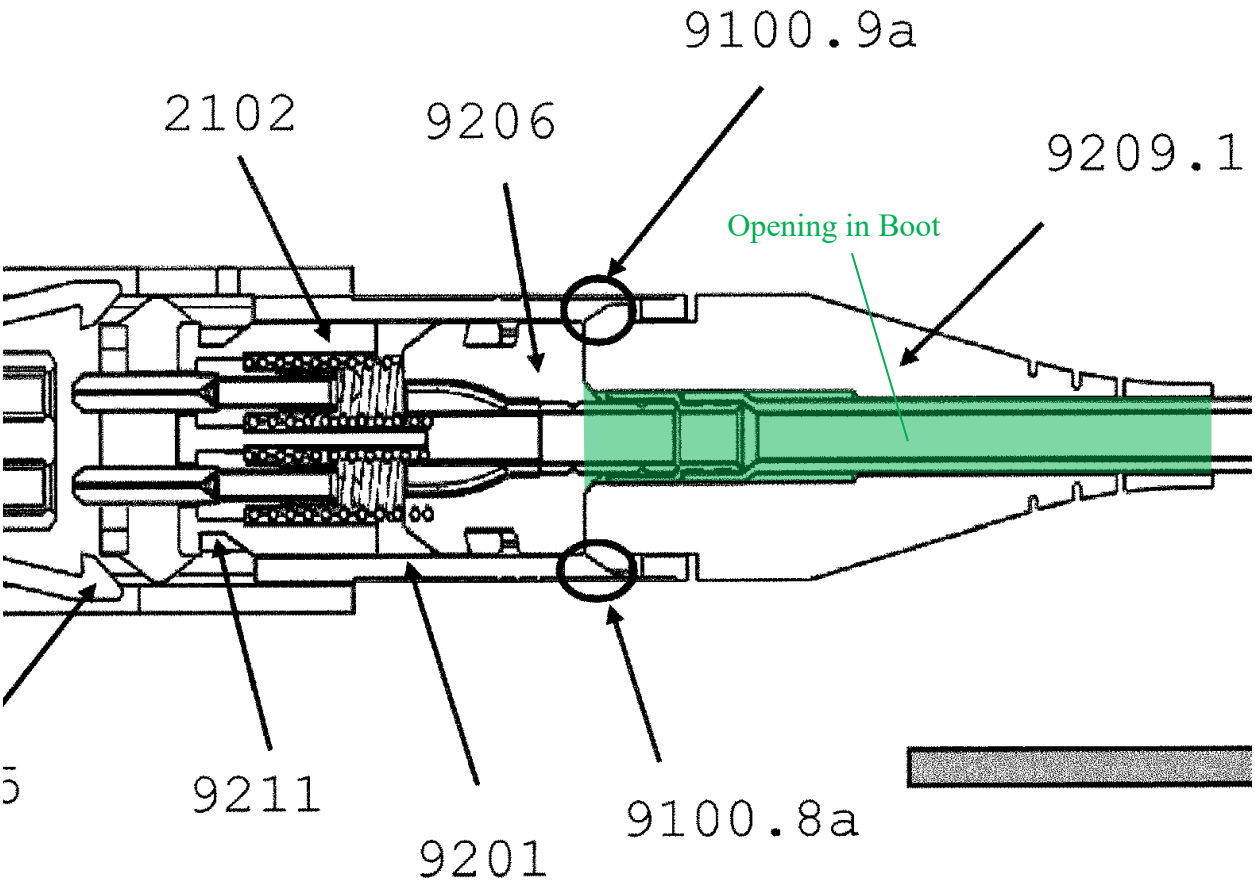


FIG. 23B

EX1003: Fig. 23B (annotated).

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



EX1003: Fig. 36 (annotated).

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

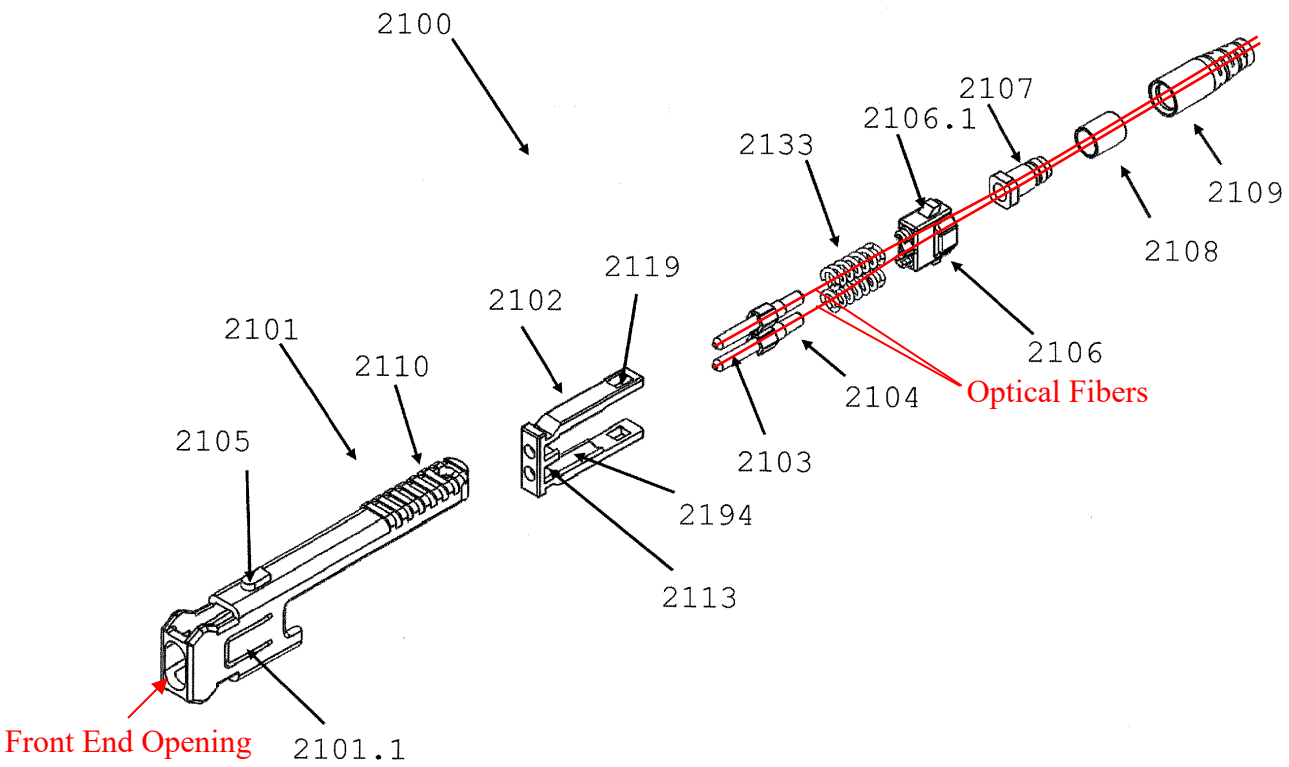


FIG. 1.

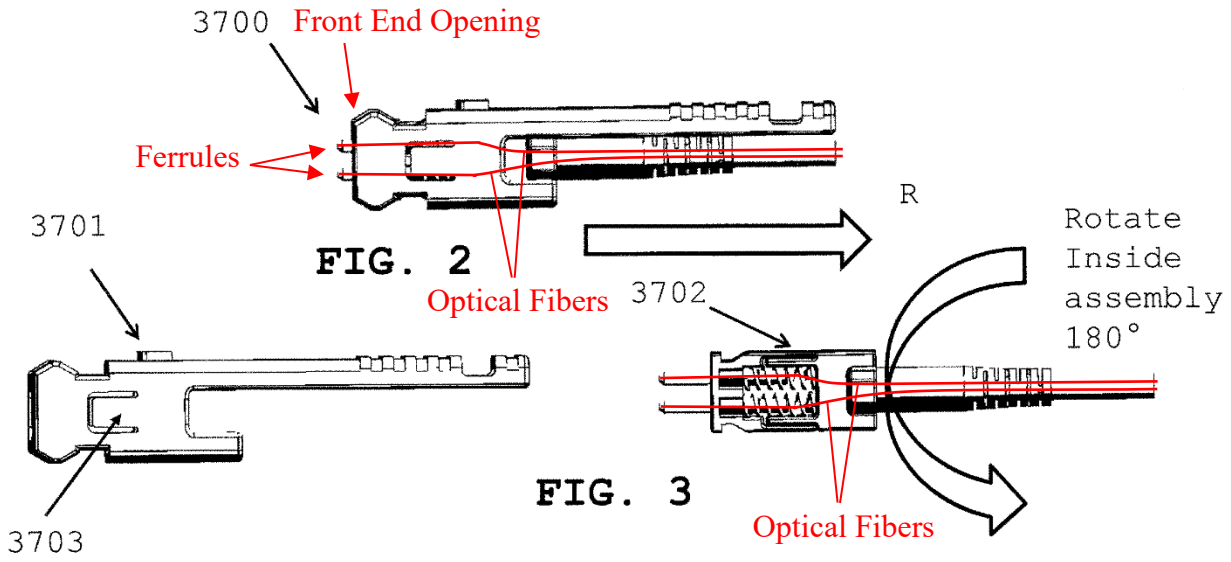


FIG. 2

FIG. 3

EX1003: Figs. 1-3 (annotated).

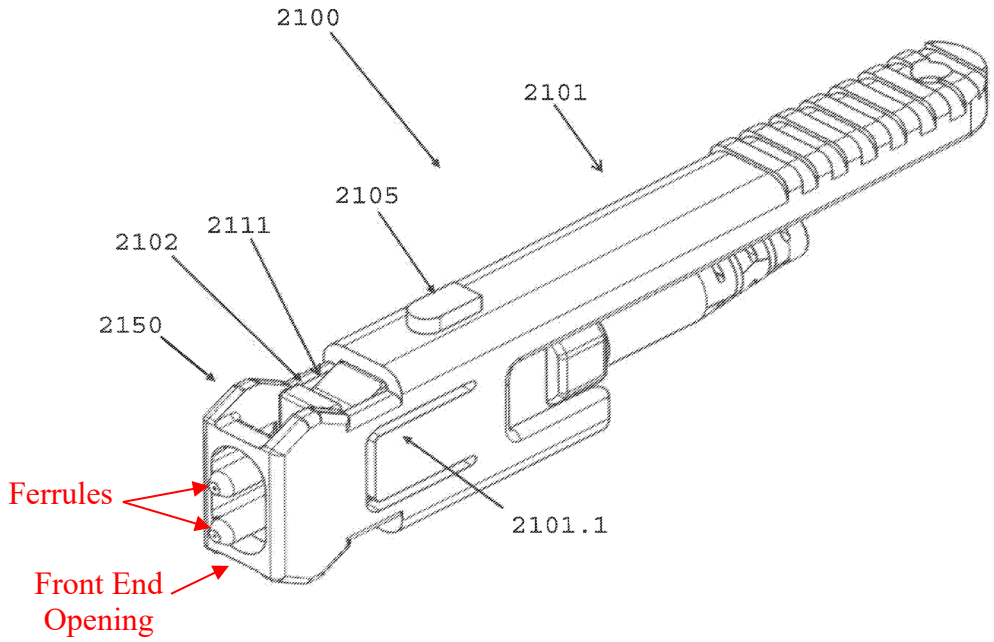


FIG. 21B

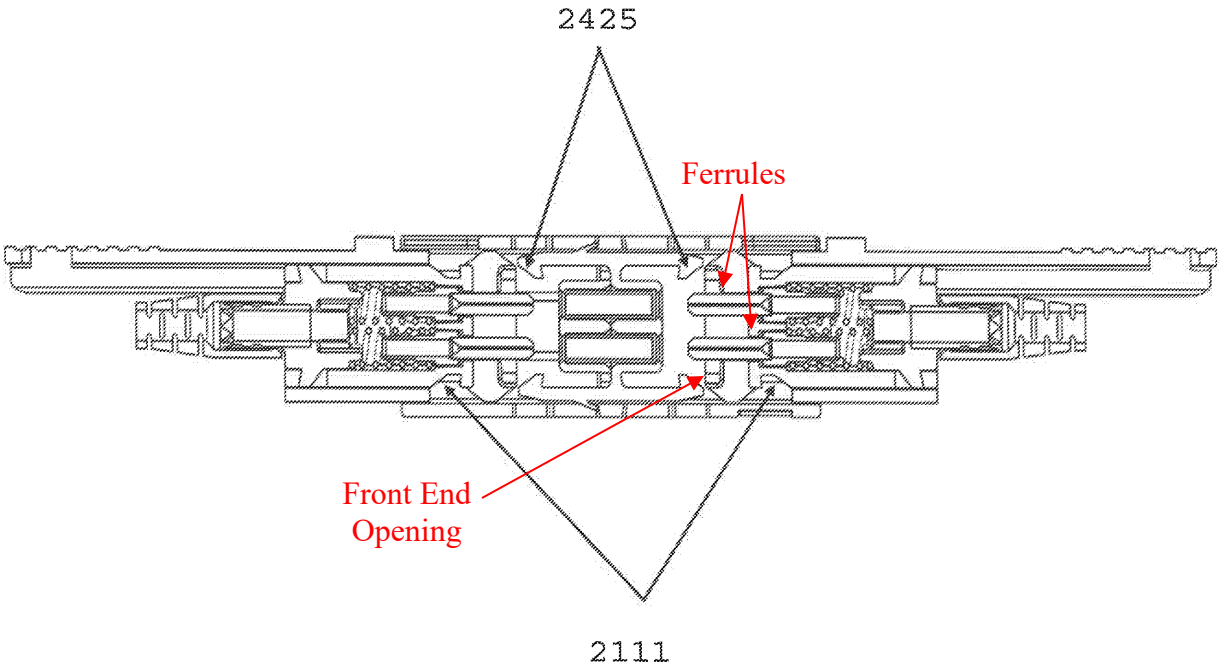


FIG. 23B

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

323. Therefore, in my opinion, the Takano combination renders this limitation obvious.

1.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

324. For the reasons I discussed in Section VI(A)(1.d), the Takano combination renders this limitation obvious.

C. Claim 2 "The fiber optic connector according to claim 1, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to the at least two optical fibers."

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

D. Claim 3 "The fiber optic connector according to claim 1, wherein the ends of the at least two fibers are terminated in respective two single fiber ferrules."

326. As I explained in Sections VIII(B)(1.P), (1.a.3), and (1.c.3), the two ferrules (2103) of the micro connector (2100, 3700) each terminate an optical fiber. And each ferrule (2103) is a single-fiber ferrule, as each ferrule has a single opening at the front end thereof. EX1003: Fig. 1; EX1004: Figs. 22 and 21B.

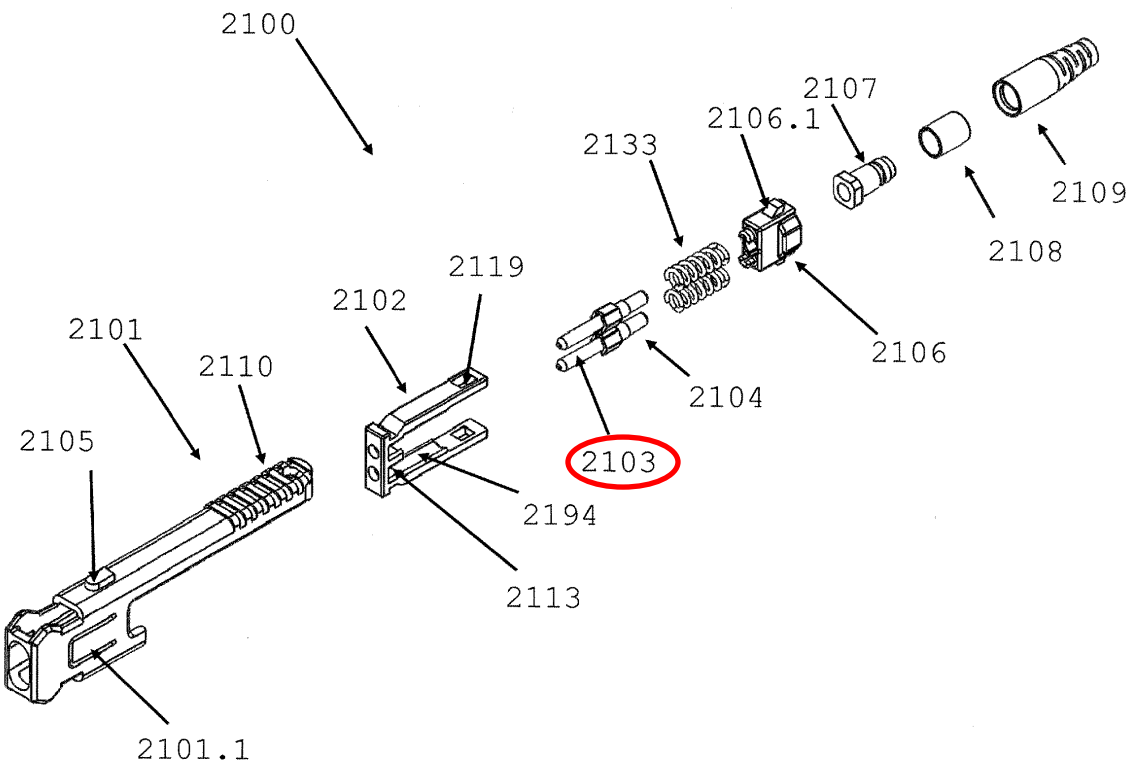


FIG. 1.

EX1003: Fig. 1 (annotated).

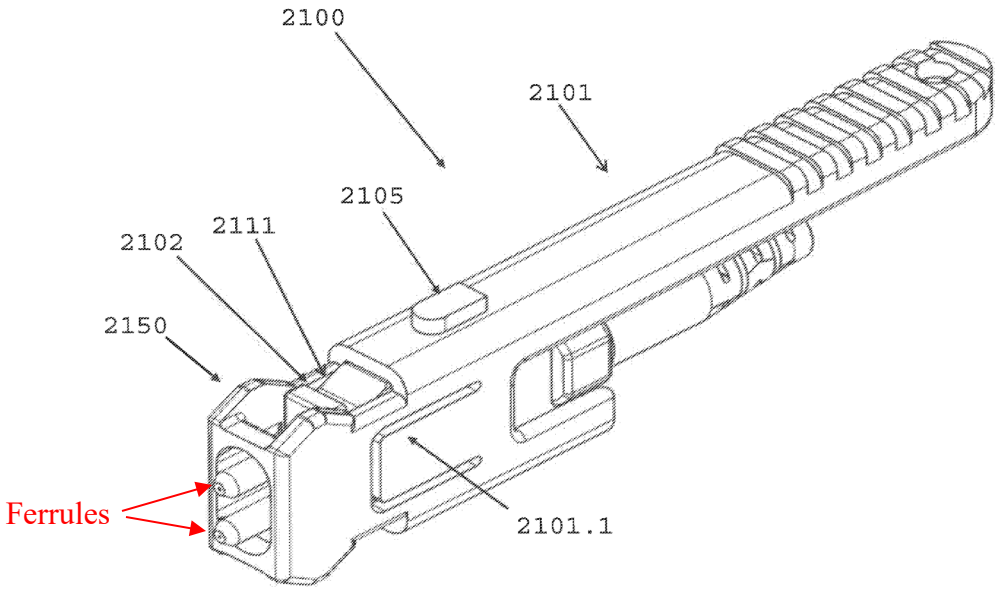


FIG. 21B

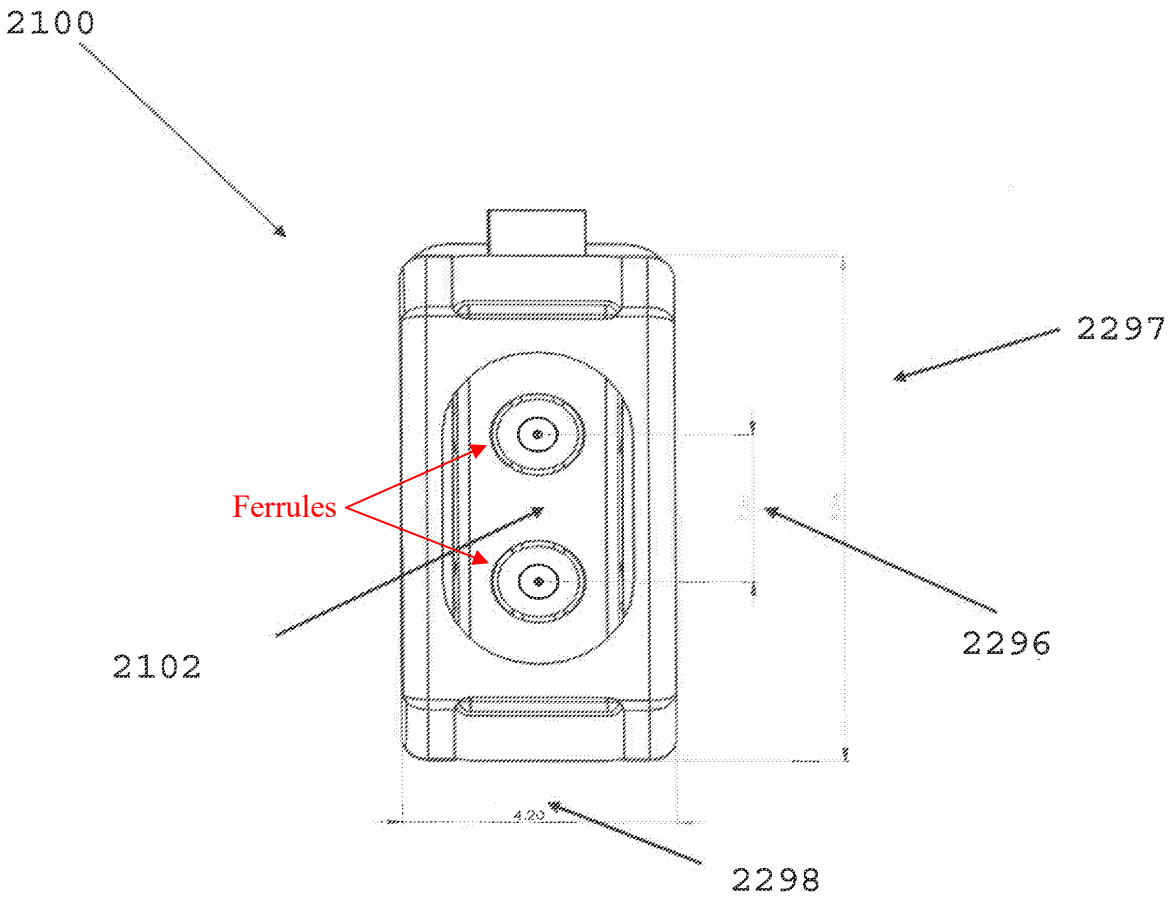


FIG. 22

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

327. Therefore, in my opinion, the Takano combination renders this claim obvious.

E. Claim 4 "The fiber optic connector according to claim 3, wherein the two single fiber ferrules have respective front ends exposed forward of the front end opening in the housing."

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

ferrules (2103) are forward of the front end opening of the outer housing (2101, 3701). EX1003: Figs. 2-4; EX1004: Figs. 21B and 23B.

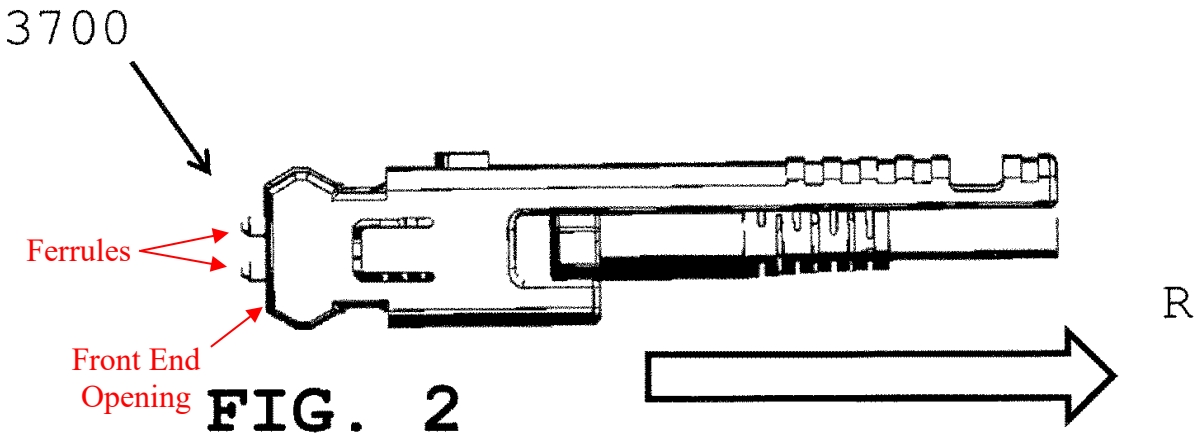


FIG. 2

EX1003: Fig. 2 (annotated).

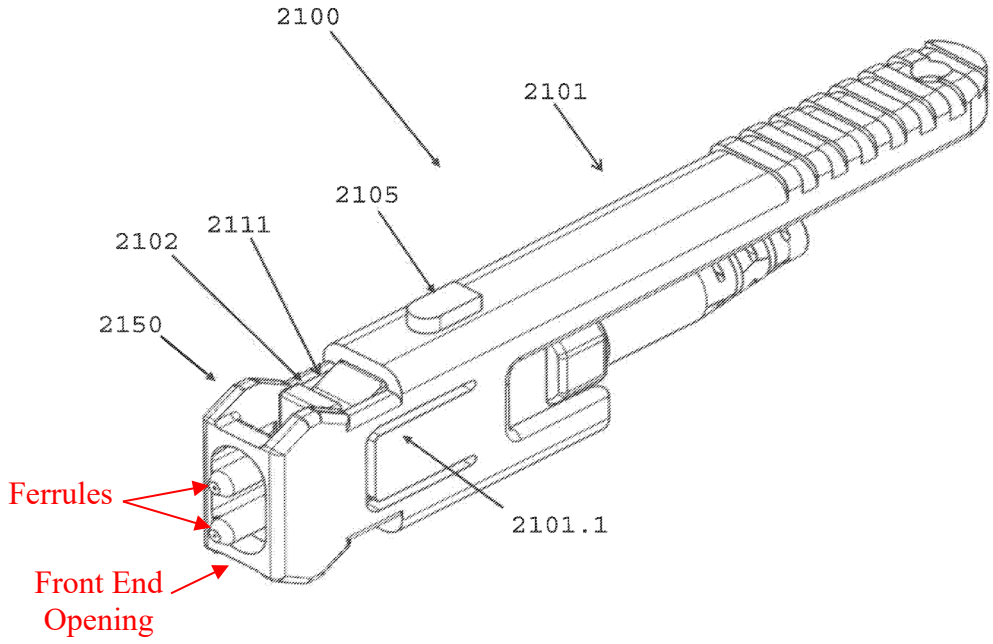


FIG. 21B

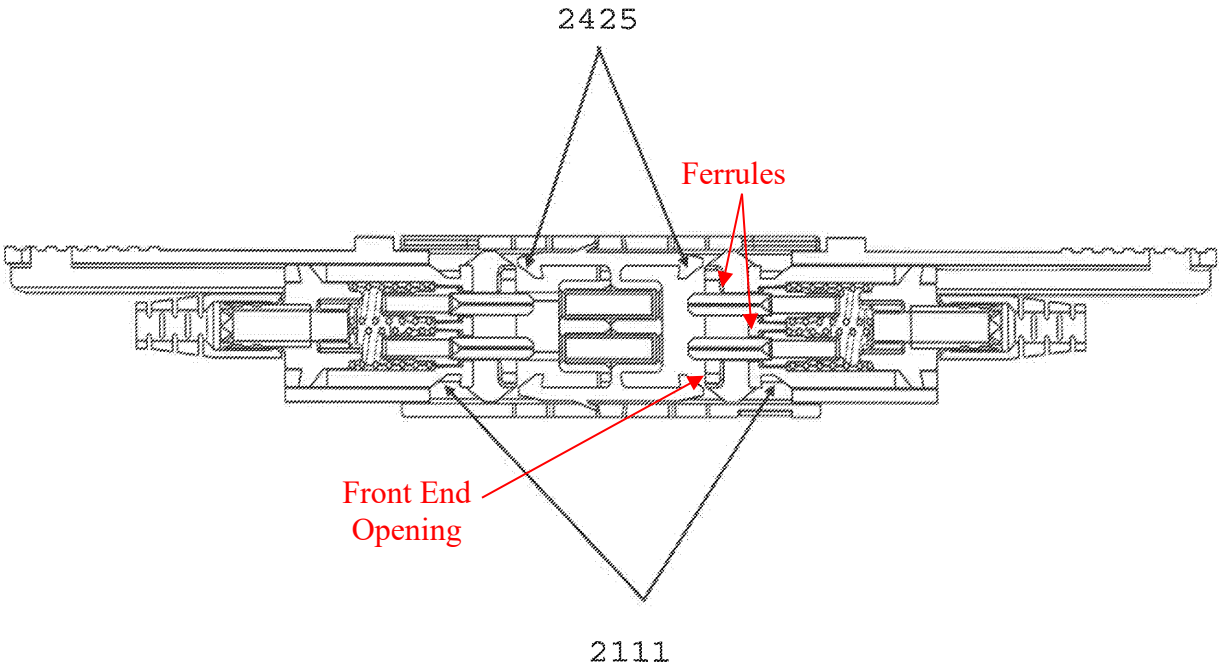


FIG. 23B

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

329. Therefore, in my opinion, the Takano combination renders this claim obvious.

F. Claim 5

5.a "The fiber optic connector according to claim 1, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and"

330. In order to change the polarity of unmodified micro connector (2100, 3700) of Figs. 1-4, the front body/back body/boot assembly is disconnected from the outer housing (2101, 3701) and moved longitudinally rearward relative to the outer housing as shown in Figs. 2 and 3 (to flip over the front body/back body/boot

assembly). EX1003: ¶[0051]. This concept remains unchanged in the Takano combination.

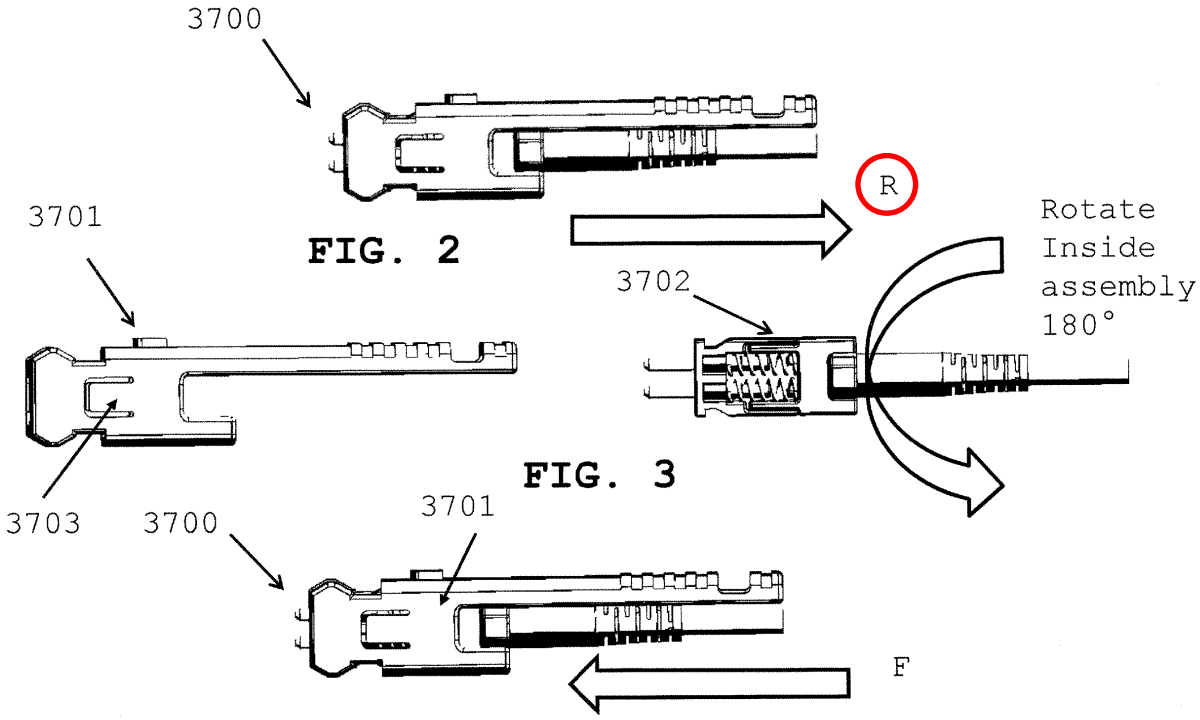


FIG. 2

FIG. 3

FIG. 4

EX1003: Figs. 2-4 (annotated).

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

9409.1) in the release position, the boot is free to move rearward relative to the outer housing (2101, 3701), for the reasons I explained in Section VI(E). Thus, with the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) in the release position, a rearward pull force (R) will move the front body/back body/boot assembly of the Takano combination longitudinally rearward relative to the outer housing (2101, 3701) as shown in Fig. 2 (above). EX1003: ¶[0051].

332. Alternatively or in addition, the Takano combination would also have the gap between the front of the boot hooks (9109.5, 9209.5) and the back body (2106) that allows the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) to move longitudinally forward and backward (e.g., wiggle a millimeter or two) relative to outer housing (2101, 3701) of Figs. 1-4 upon application of push and pull forces, respectively. As I explained in Section VI(E)(5.a), Takano shows a gap between the front of the boot hooks (9109.5, 9209.5) and the back body (9106, 9206) which allows the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) to wiggle longitudinally forward and backward relative to outer housing (9101, 9201, 9301, 9401) upon application of push and pull forces, respectively. This small gap provides clearance for the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) to freely rotate relative to the outer housing (9101, 9201, 9301, 9401) to connect and disconnect from the outer housing and would be present in the Takano combination.

333. Therefore, in my opinion, the Takano combination renders this limitation obvious.

5.b "wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

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

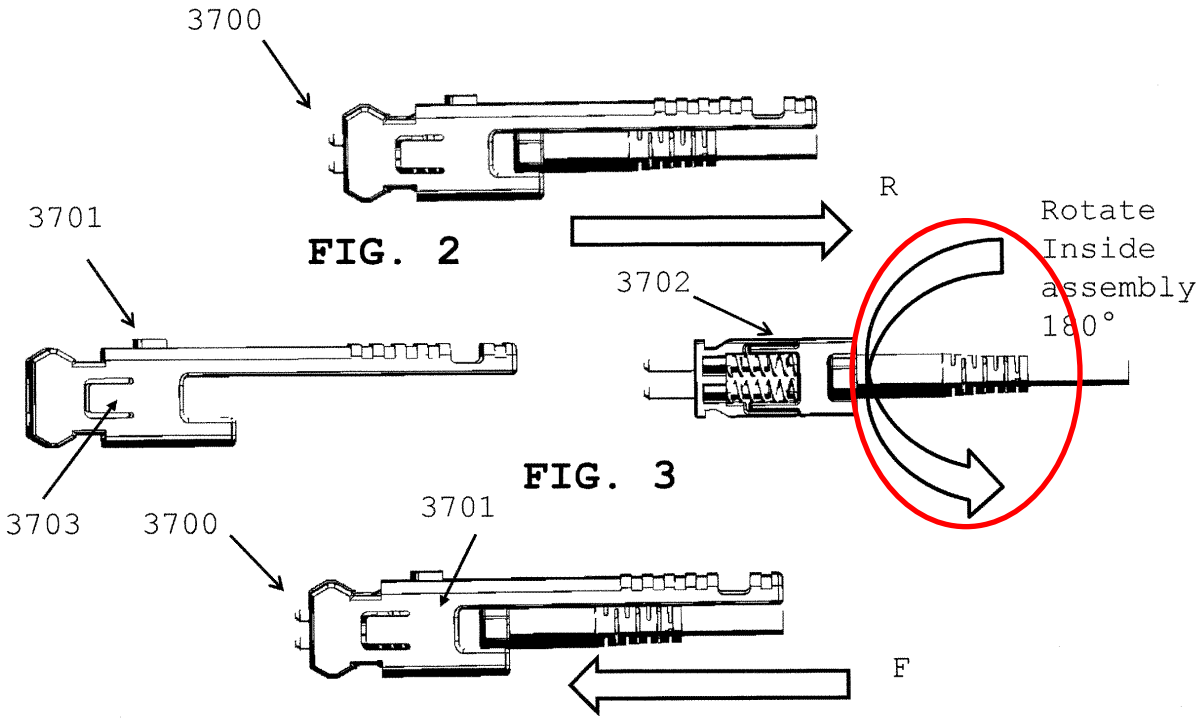


FIG. 2

FIG. 3

FIG. 4

EX1003: Figs. 2-4 (annotated).

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

336. Therefore, in my opinion, the Takano combination renders this limitation obvious.

G. Claim 6 "The fiber optic connector according to claim 1, wherein the front extension portion has at least one latch."

337. For the reasons I discussed in Section VII(F), in my opinion the Takano combination renders this claim obvious.

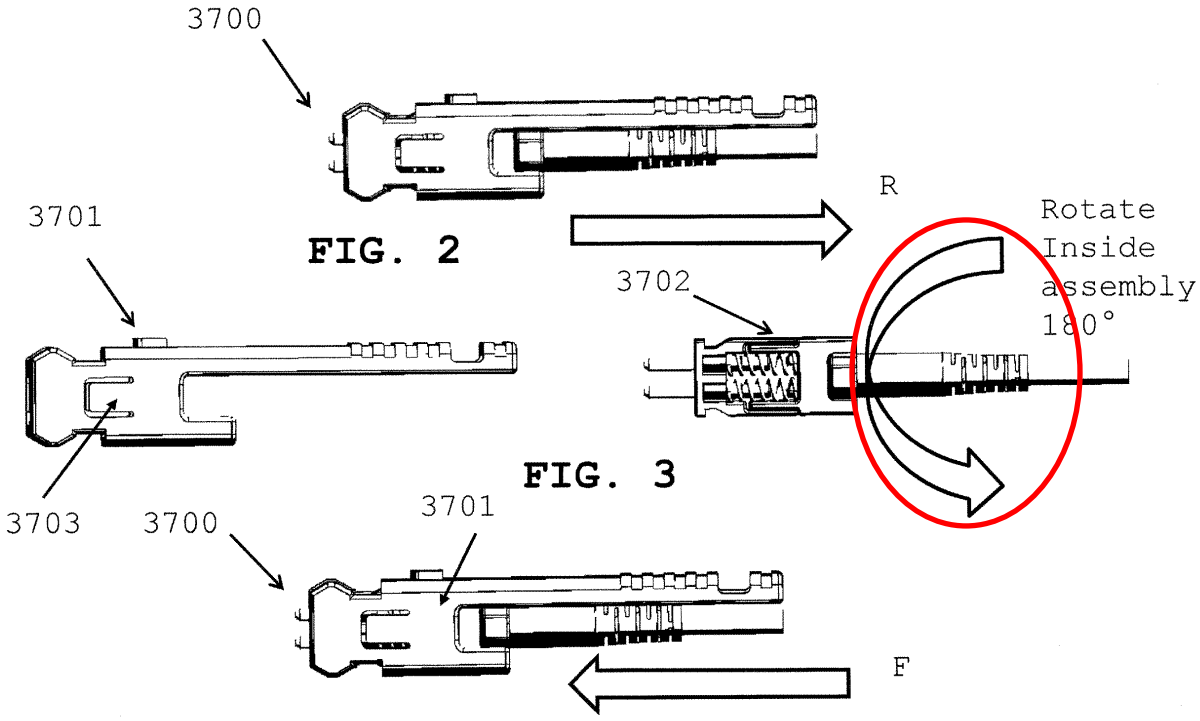
H. Claim 7 "The fiber optic connector according to claim 6, wherein the front extension portion has two latches separated from each other on the front extension."

338. For the reasons I discussed in Section VII(G), in my opinion the Takano combination renders this claim obvious.

I. Claim 9 "The fiber optic connector according to claim 1, wherein a connection of the boot to the housing in a first relative orientation determines a first polarity of the fiber optic connector

and a connection of the boot to the housing in a second relative orientation determines a second polarity of the fiber optic connector."

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



EX1003: Figs. 2-4 (annotated).

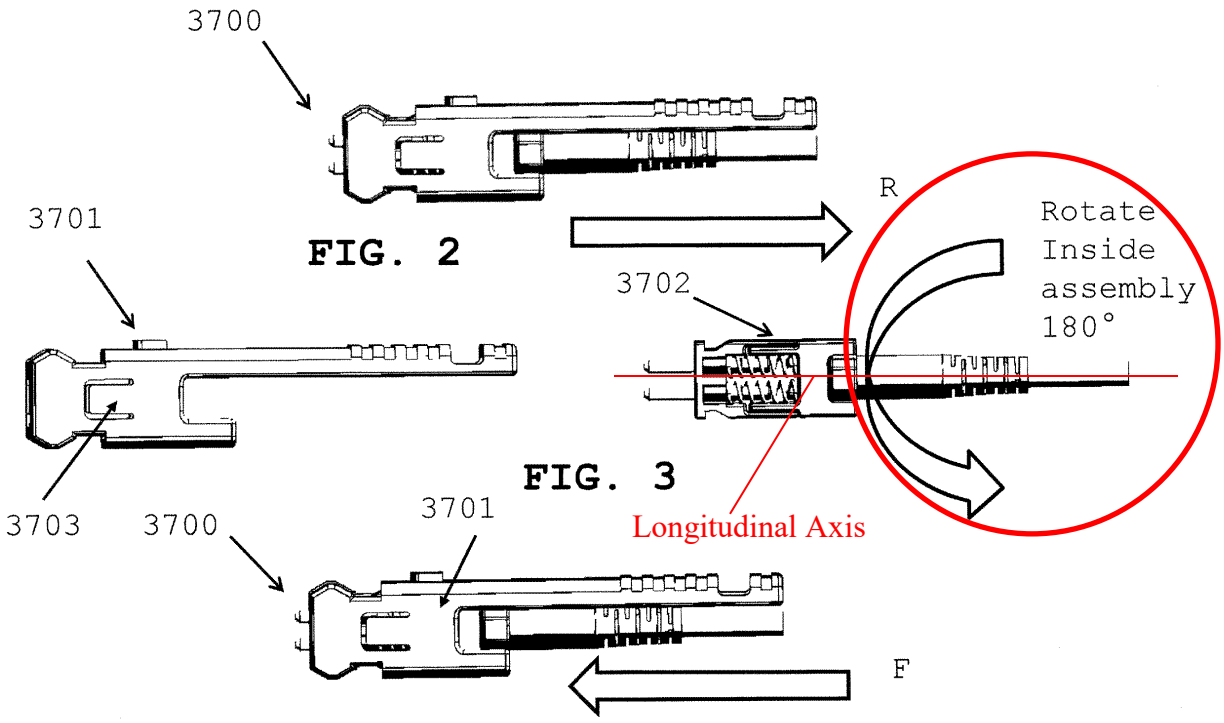
340. For the reasons I discussed in Section VI(H), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of the Takano combination connects to the outer housing (2101, 3701), via the boot hooks (9109.5, 9209.5), in the two different orientations. In the Takano combination, to change the polarity the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1), the front body (2102, 3702), the back body (2106), and the back post (2107) are disconnected from and then rotated relative to the outer housing (2101, 3701) to move the key (2105) relative to the ferrules (2103). EX1003: Figs. 1-4, ¶[0051]. After this rotation, the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1), the front body (2102, 3702), the back body (2106), and the back post (2107) are then reconnected to the outer housing (2101, 3701) (while maintaining the flipped over orientation). EX1003: Figs. 2-4, ¶[0051].

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

342. Therefore, in my opinion, the Takano combination renders this claim obvious.

J. Claim 10 "The fiber optic connector according to claim 9, wherein the first relative orientation and the second relative orientation differ by 180° about a longitudinal axis of the fiber optic connector."

343. For the reasons I discussed in Section VIII(I), the Takano combination renders this claim obvious. The relative positions of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) and the outer housing differs by 180-degrees in the first and second polarity orientations. EX1003: Figs. 2-8, ¶¶[0051], [0052], [0063], [0066], [0069]. The boot (9109.1, 9209.1, 9309.1, 9409.1)—i.e., the front body/back body/boot assembly of the Takano combination—is flipped over 180-degrees about a longitudinal axis between the two orientations. EX1003: Figs. 2-4, ¶¶[0051] ("after rotating front body 3702 by ***180 degrees*** as shown in FIG. 3"), [0052] ("the outer housing 5301 is rotated ***180 degrees***").



EX1003: Figs. 2-4 (annotated).

344. Therefore, in my opinion, the Takano combination renders this claim obvious.

K. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot."

345. For the reasons I discussed in Section VI(J), in my opinion the Takano combination renders this claim obvious.

L. Claim 12 "The fiber optic connector according to claim 1, wherein the boot is slidable relative to the housing."

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

disconnect the boot from the outer housing in order to change the polarity. EX1003: ¶¶[0063]-[0065], [0067]-[0071]. This rotation of the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) is slidable movement relative to the outer housing (2101, 3701). EX1003: ¶¶[0063]-[0065], [0067]-[0071]. For example, the chamfer (9309.2, 9409.2a, 9409.2b) of the boot hooks (9109.5, 9209.5) allows the boot hooks to slide out of the slots (9201.4a, 9201.4b) of the outer housing (2101, 3701) when the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) is being rotated. EX1003: Figs. 28-33, ¶¶[0063], [0067]-[0068], [0070]-[0071].

FIG. 20

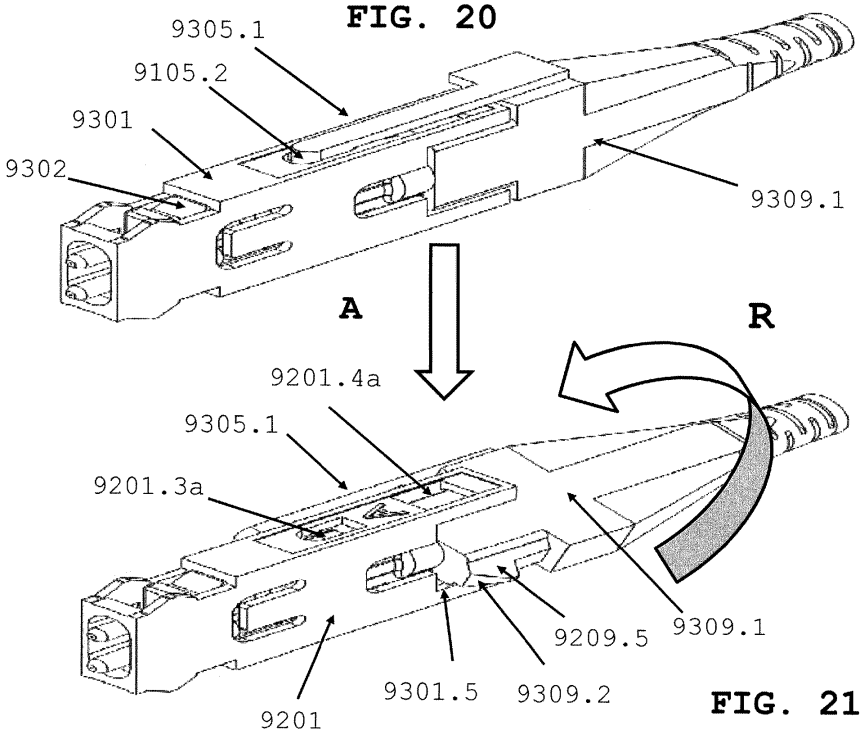


FIG. 21

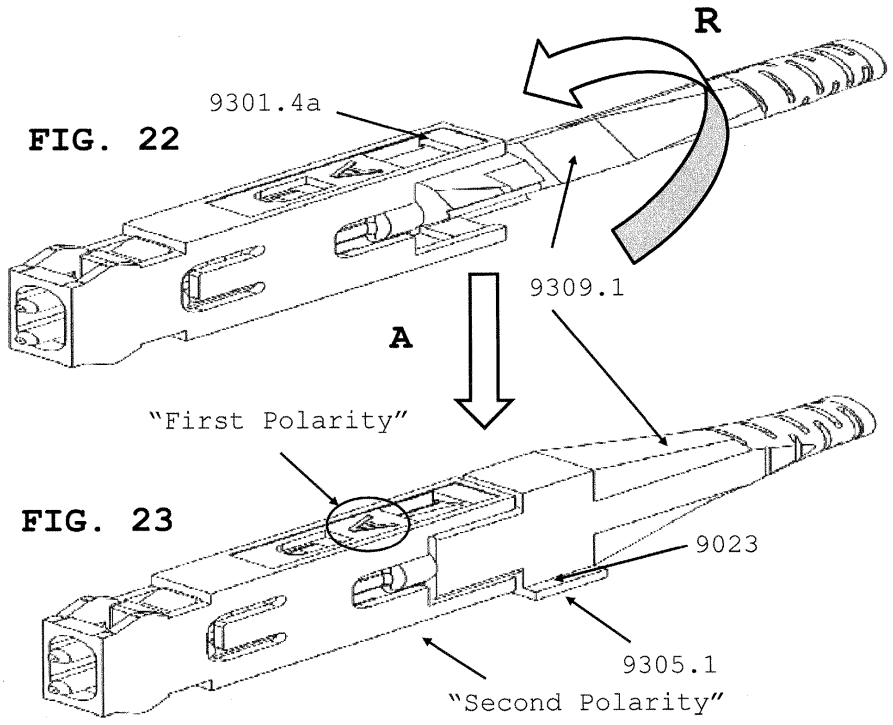


FIG. 22

FIG. 23

EX1003: Figs. 20-23.

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

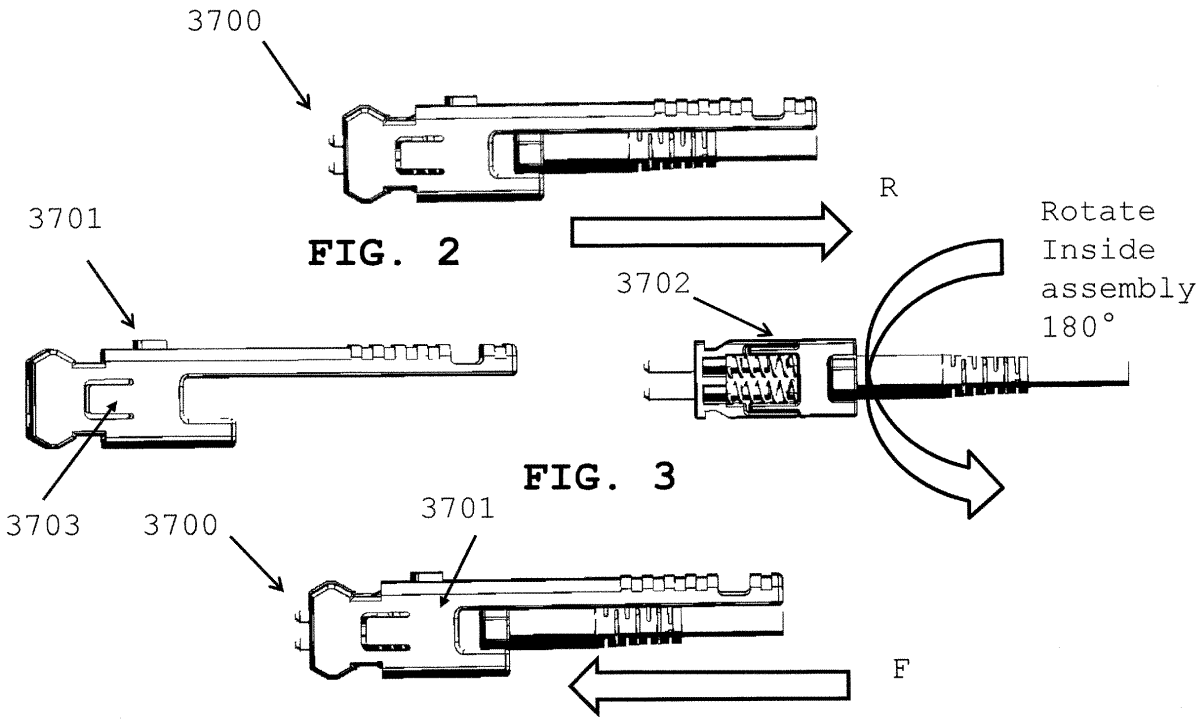


FIG. 2

FIG. 3

FIG. 4

EX1003: Figs. 2-4.

348. Therefore, in my opinion, the Takano combination renders this claim obvious.

M. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion."

349. For the reasons I discussed in Section VII(L), in my opinion the Takano combination renders this claim obvious.

N. Independent Claim 16

16.P "A fiber optic connector having a boot, a crimp body, and a housing having two optical fibers terminated respectively within two fiber optic ferrules therein, the fiber optic connector comprising:"

350. For the reasons I discussed in Section VIII(B)(1.P), in my opinion the Takano combination renders this limitation obvious.

16.a.1 "a front end opening in the housing for the two fiber optic ferrules,"

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

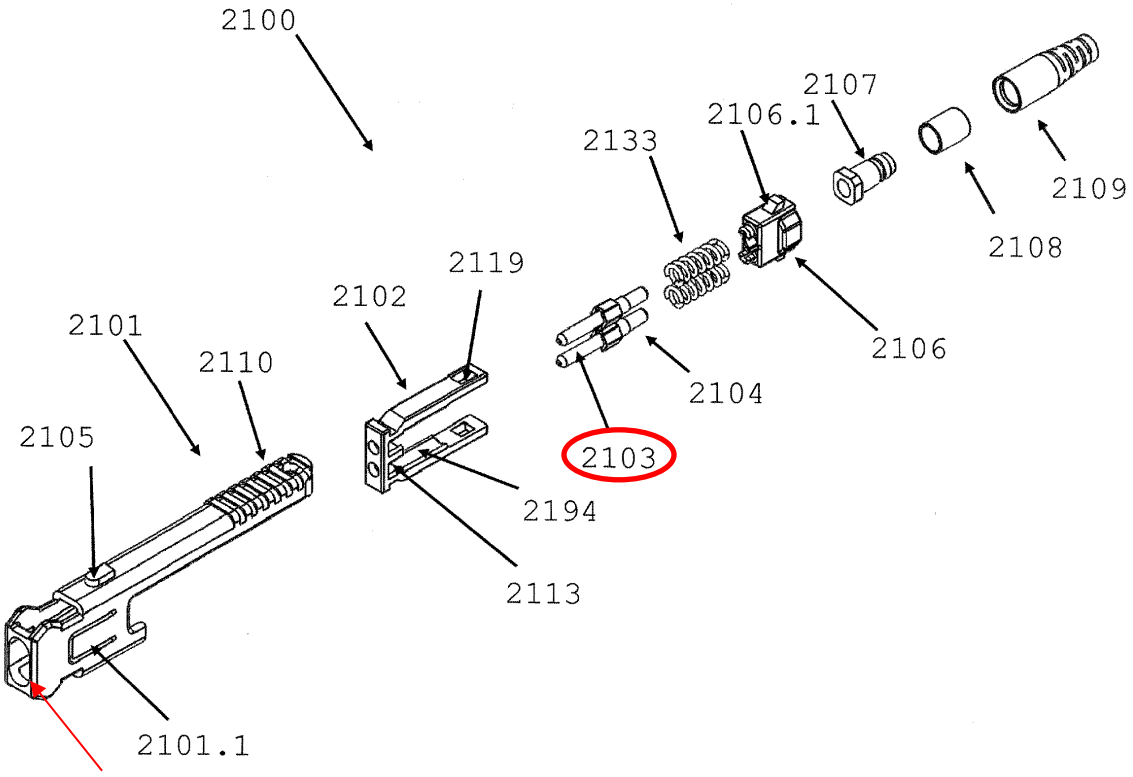


FIG. 1.

EX1001: Fig. 1.

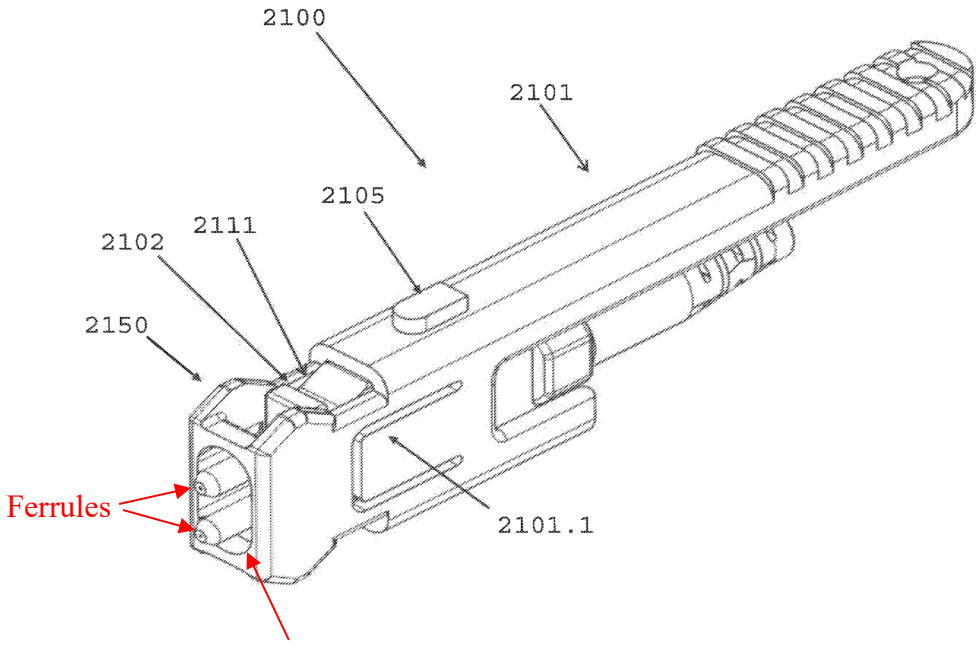


FIG. 21B

EX1004: Fig. 21B (annotated).

352. Therefore, in my opinion, the Takano combination renders this limitation obvious.

16.a.2 "the housing having a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

353. For the reasons I discussed in Section VIII(B)(1.a.2), in my opinion the Takano combination renders this limitation obvious.

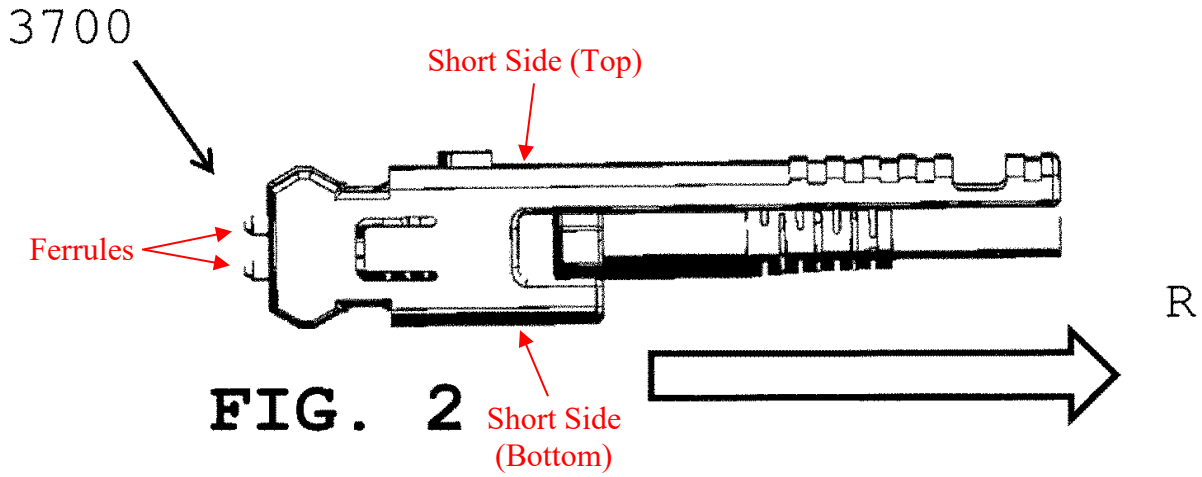
16.a.3 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

354. For the reasons I discussed in Section VIII(B)(1.a.4), in my opinion the Takano combination renders this limitation obvious.

16.a.4 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides;"

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

EX1003: Figs. 1-4, ¶[0050]; EX1004: Figs. 21B and 22.



EX1003: Fig. 2 (annotated).

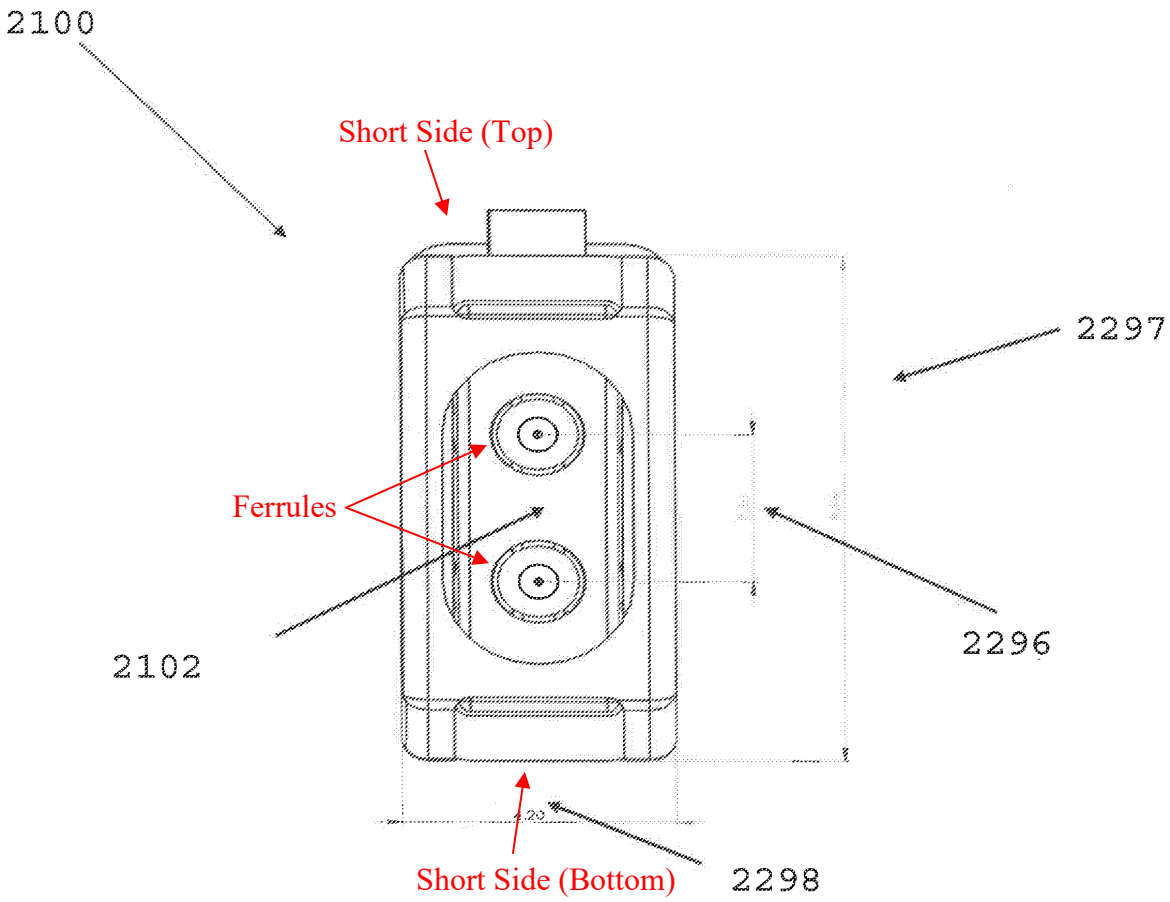

2100
Short Side (Top)
2297
Ferrules
2102
2296
Short Side (Bottom)
2298

FIG. 22

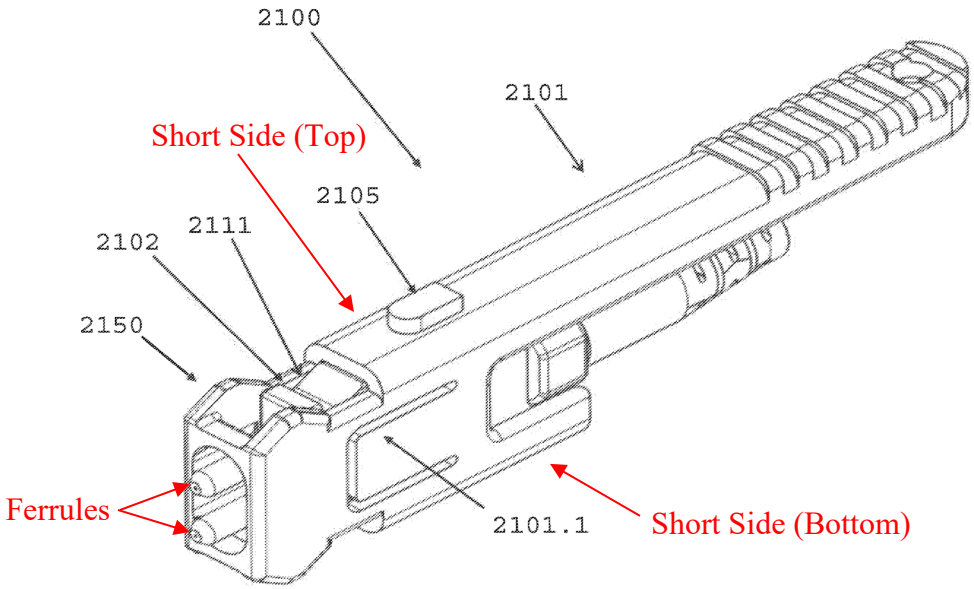


FIG. 21B

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

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

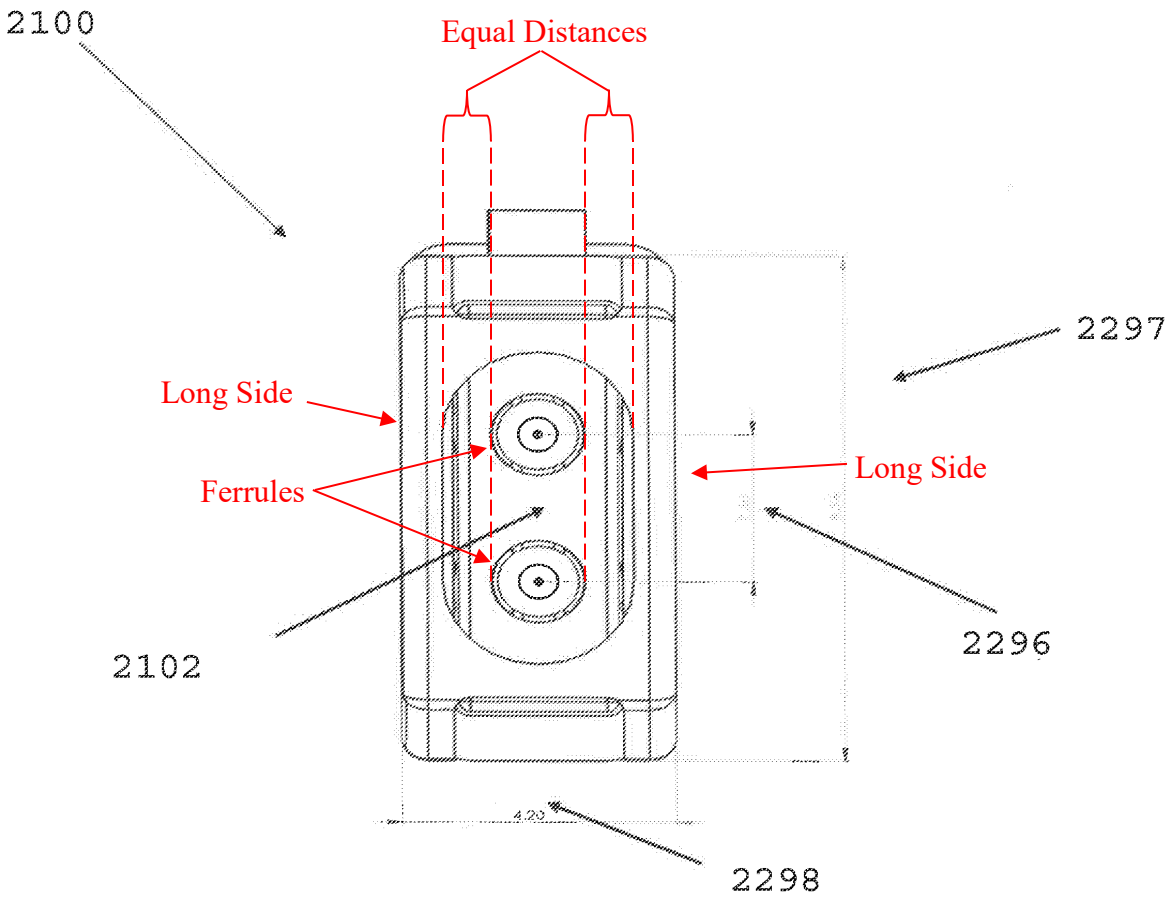


FIG. 22

EX1004: Fig. 22 (annotated).

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

358. Therefore, in my opinion, the Takano combination renders this limitation obvious.

16.b "the crimp body positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers; and"

359. For the reasons I discussed in Section VIII(B)(1.b), the Takano combination renders this limitation obvious. Further, as I explained in Section VIII(B)(1.c.3), the back body (2106) and the back post (2107) (which forms the rear portion) has a longitudinal opening for allowing the optical fibers from the fiber optic cable to reach the ferrules (2103). EX1003: Fig. 1, ¶[0050]; EX1004: Fig. 23B.

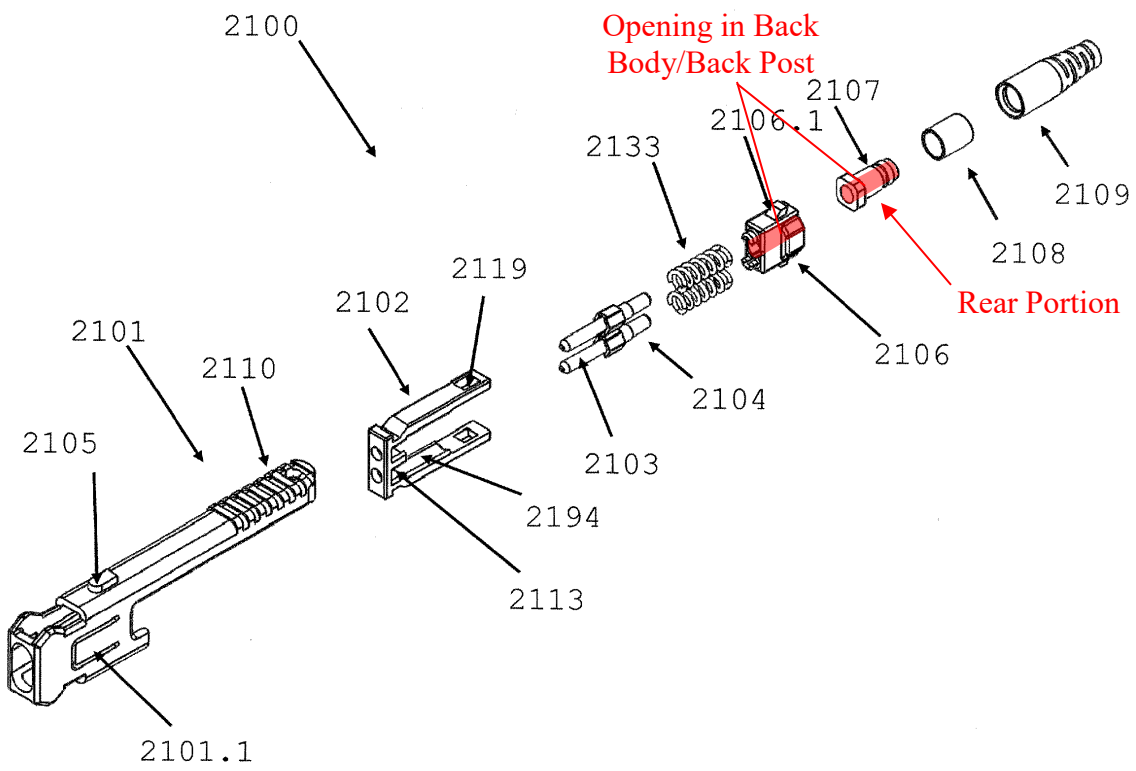


FIG. 1.

EX1003: Fig. 1 (annotated).

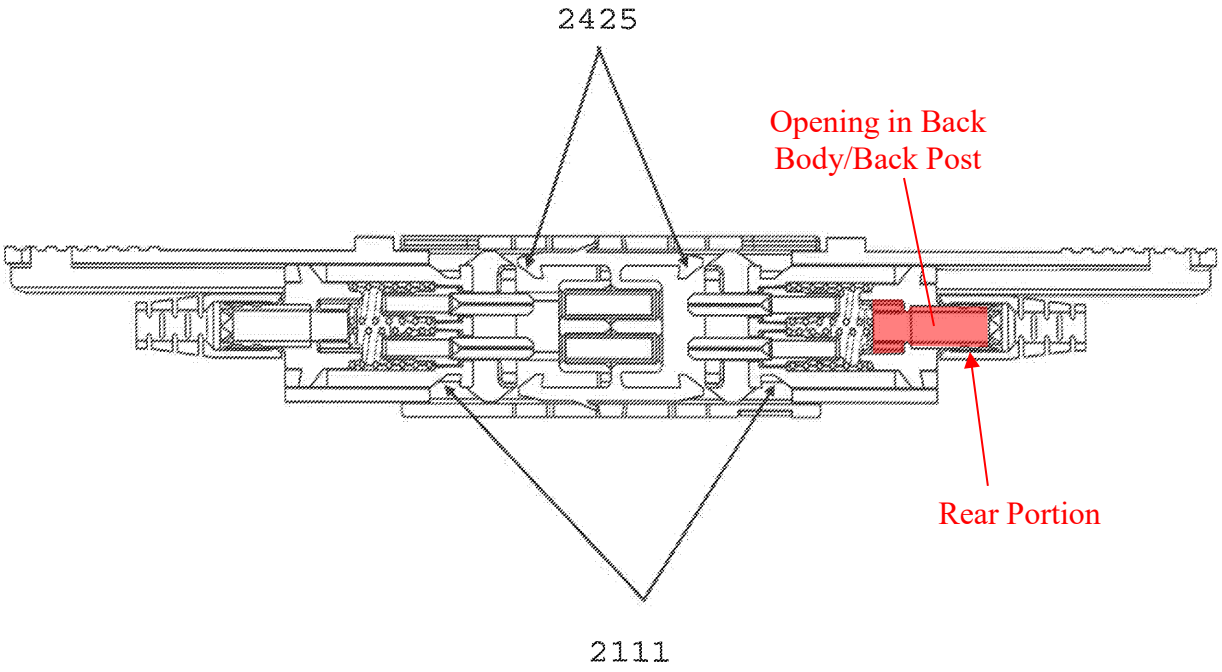


FIG. 23B

EX1003: Fig. 23B (annotated).

360. Therefore, in my opinion, the Takano combination renders this limitation obvious.

16.c.1 "the boot receiving the rear portion of the crimp body and having a front extension,"

361. For the reasons I discussed in Section VIII(B)(1.c.1), in my opinion the Takano combination renders this limitation obvious.

16.c.2 "the front extension extending towards the front end of the housing and attached to the housing via at least one latch forward of a center portion of the boot,"

362. For the reasons I discussed in Section VIII(B)(1.c.2) and VII(F), in my opinion the Takano combination renders 16.c.2 obvious.

16.c.3 "wherein the crimp body and the boot have a longitudinal opening to accommodate the two optical fibers having ends terminated forward of the front end opening of the housing, and"

363. For the reasons I discussed in Section VIII(B)(1.c.3), in my opinion the Takano combination renders this limitation obvious.

16.d "wherein the longitudinal opening extends through a back portion of the boot rearward of the center portion of the boot."

364. For the reasons I discussed in Section VI(A)(1.d), in my opinion the Takano combination renders 16.d obvious.

O. Claim 17 "The fiber optic connector according to claim 16, wherein the back portion has a ribbed structure with openings on an outside surface along a length of the back portion to provide strain relief to a fiber cable containing the two optical fibers."

365. For the reasons I discussed in Section VI(B), in my opinion the Takano combination renders this claim obvious.

P. Claim 18 "The fiber optic connector according to claim 16, wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

366. For the reasons I discussed in Section VIII(F), in my opinion the Takano combination renders this claim obvious.

Q. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."

367. For the reasons I discussed in Sections VII(P), VII(L) and VII(F), the Takano combination renders this claim obvious.

IX. OBVIOUS: TAKANO & KATOH (GROUND 5)

368. In my opinion, claim 11 would have been obvious over Takano in view of Katoh.

A. Modification of Takano Based on Katoh

369. Takano discloses a boot (9109.1, 9209.1, 9309.1, 9409.1) that is pushed and pulled to insert and remove the micro connector (9100) from the adapter (2400). EX1003: Abstract ("multi-purpose boot assembly can be pushed and pulled to insert and remove the micro connector from an adapter"), ¶¶[0072]-[0074].

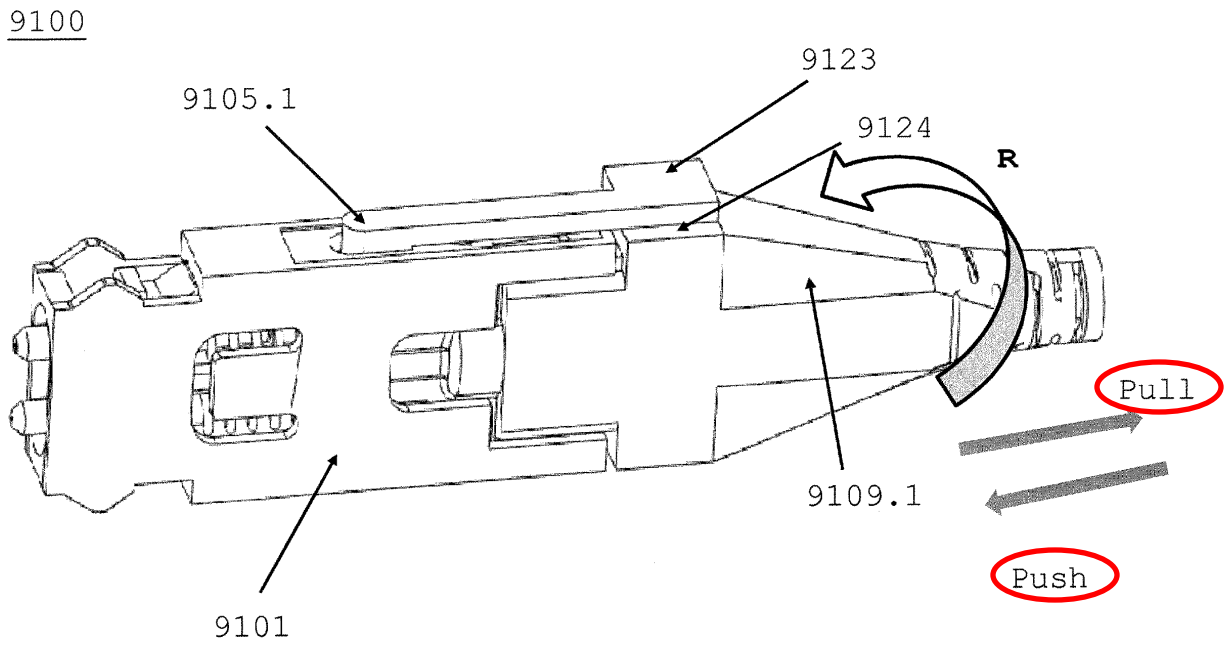

9100
9123
9105.1
9124
R
Pull
9109.1
Push
9101

FIG. 16

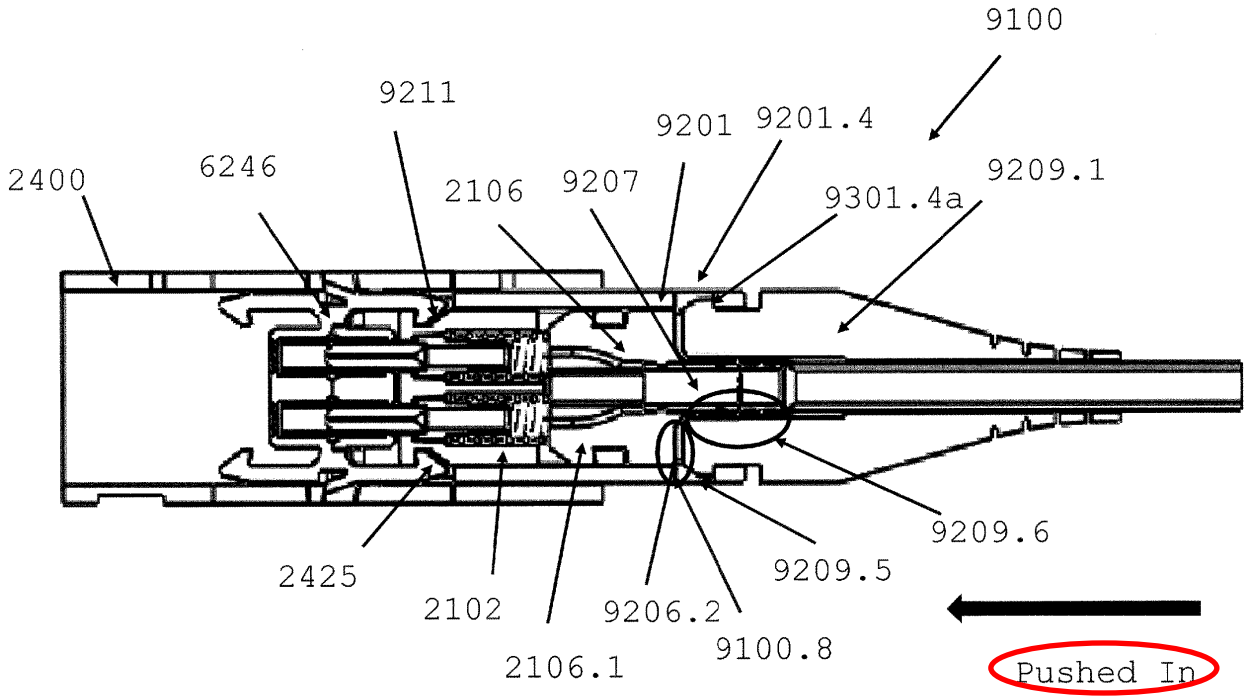

9100
9211
9201
9201.4
2400
6246
2106
9207
9301.4a
9209.1
9209.6
9209.5
2425
2102
9206.2
2106.1
9100.8
Pushed In

FIG. 34

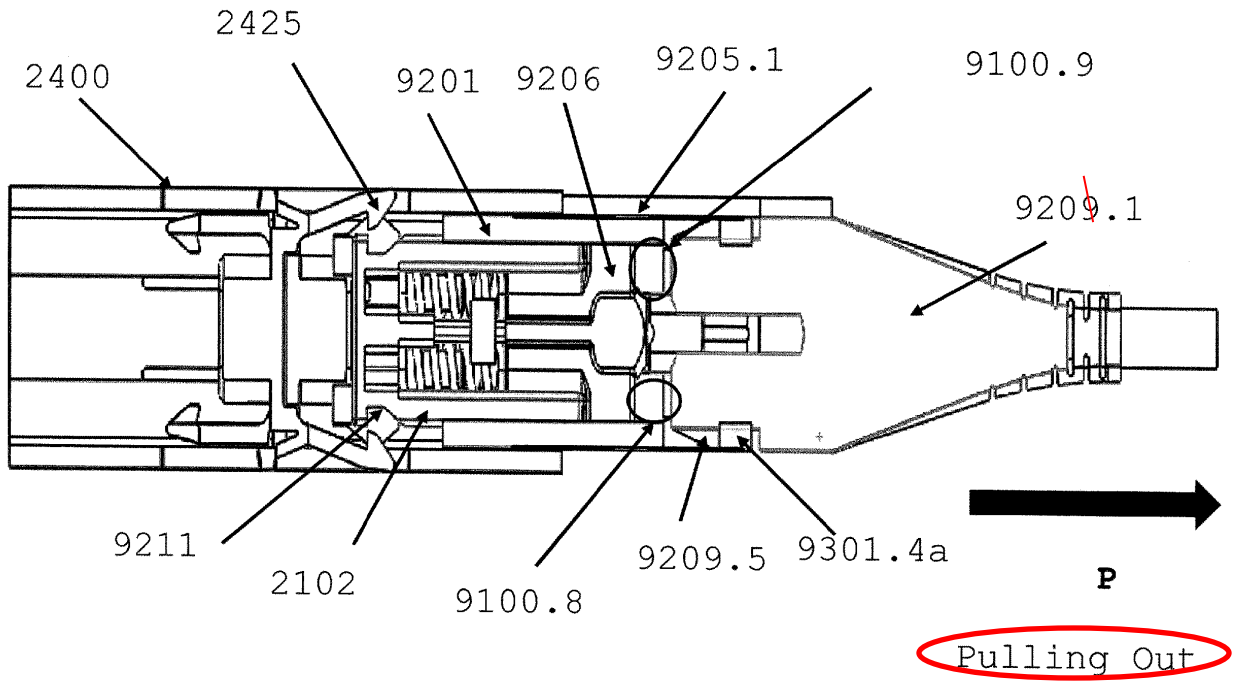


FIG. 35

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

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

FIG. 1

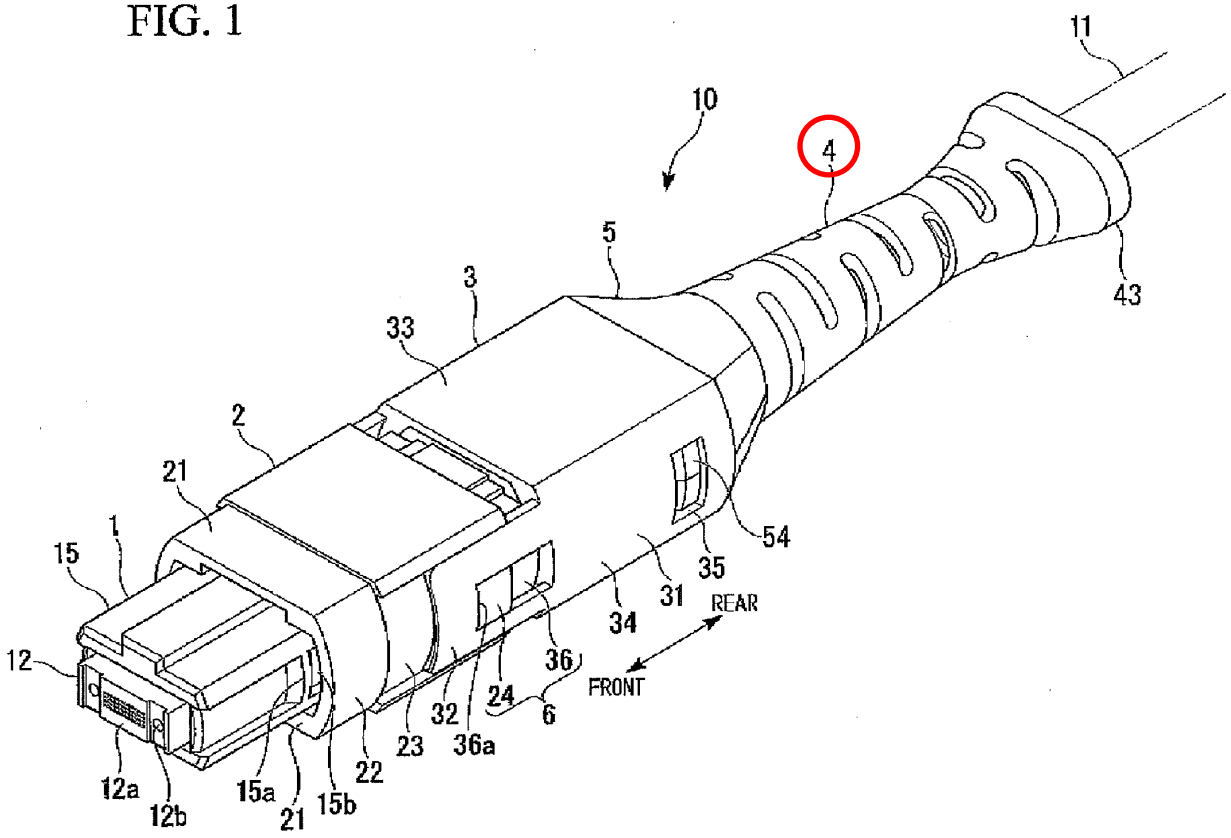

11
10
4
5
3
43
33
2
21
1
15
54
35
31
34
REAR
12
36
FRONT
24
6
32
36a
23
22
12a
12b
15a
21
15b

FIG. 4

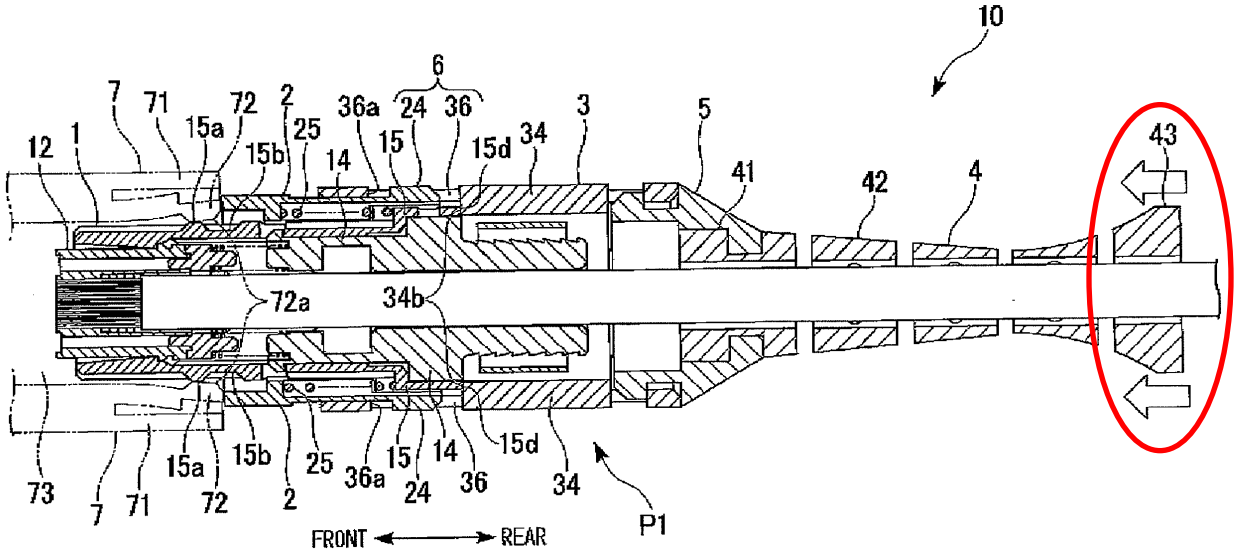
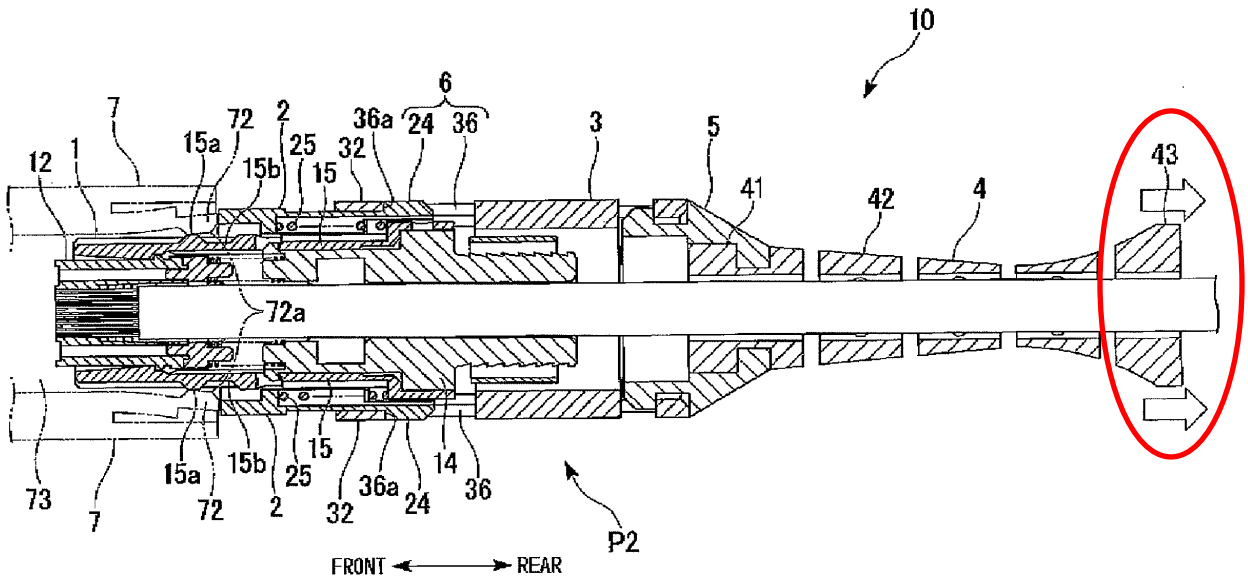

10
6
7
71
72
2
36a
24
36
3
5
43
12
1
15a
15b
25
14
15
15d
34
41
42
4
72a
34b
73
7
71
15a
72
15b
2
25
36a
15
24
14
36
15d
34
P1
FRONT
REAR

FIG. 6



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

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

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

373. Adding the operation portion (43) of Katoh's boot (4) to the boot (9109.1, 9209.1, 9309.1, 9409.1) of Takano would have been nothing more than modifying known elements (the operation portion of Katoh's boot and Takano's boot) according to known methods (the arrangement taught by Katoh) to yield predictable results (Takano's boot with Katoh's operation portion to make it easy to push/pull Takano's boot).

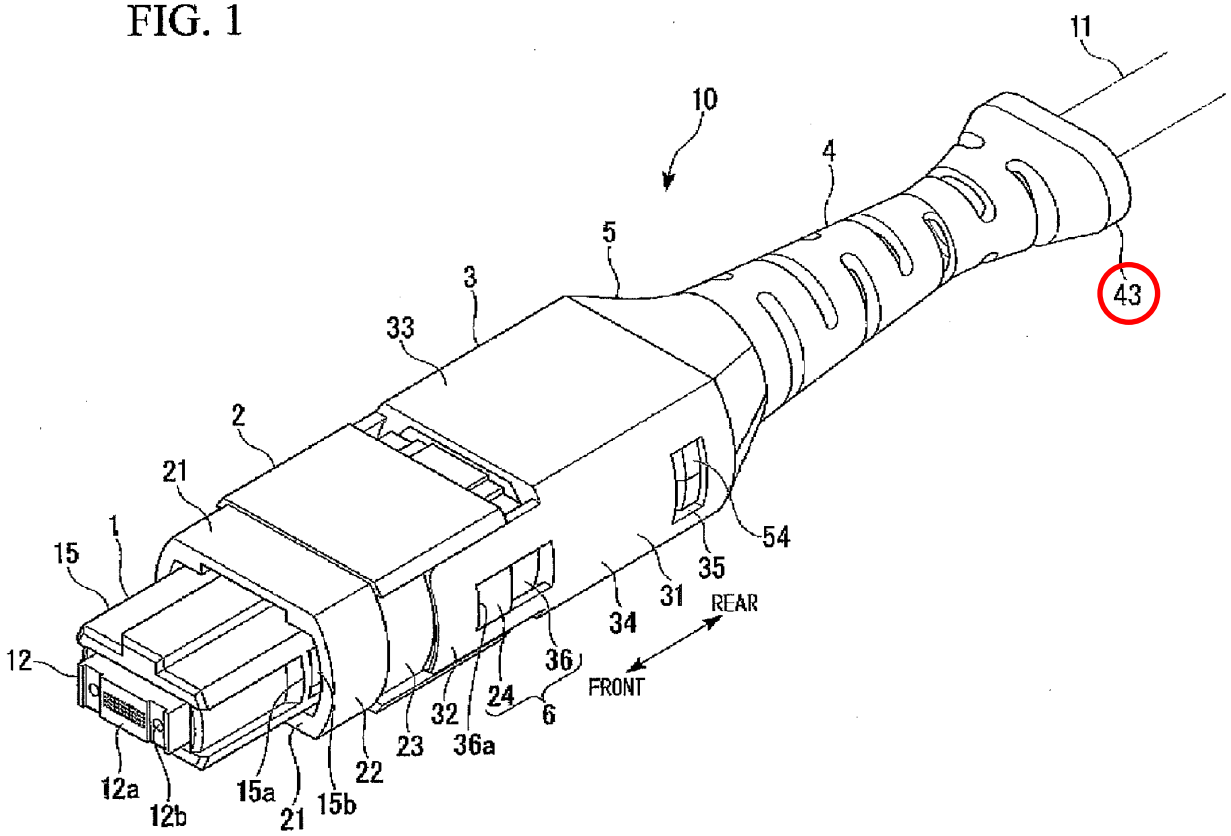
374. This modification would have also been nothing more than the application of a known technique (the operation portion of Katoh's boot) to improve a similar device (Takano's boot) in the same way to yield predictable results (Takano's boot with Katoh's operation portion to make it easy to push/pull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

375. A POSA would have had a reasonable expectation of success in adding the operation portion (43) of Katoh's boot (4) to the boot (9109.1, 9209.1, 9309.1, 9409.1) of Takano because Katoh's operation portion would retain the same functionality when incorporated into Takano's boot that it has as part of Katoh's boot (4). The operation portion (43) would be accessible to the user to grab in order to push and pull the rest of Takano's boot.

B. Claim 11 "The fiber optic connector according to claim 1, wherein the back portion has a grasping portion at a rear end of the back portion to allow a user to push and pull on the boot."

376. Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) modified in view of Katoh includes Katoh's operation portion (43), which is a grasping portion. EX1005: ¶[0070] ("operation portion 43 makes it easy to apply a pressing force to the boot 4"). The operation portion (43) would be freely accessible to an operator to grab to push and pull on the boot when inserting and removing the micro connector (9100) from the adapter (2400). EX1003: ¶¶[0072]-[0074]; EX1005: ¶¶[0070], [0083], [0092]-[0095].

FIG. 1



EX1005: Fig. 1 (annotated).

377. Therefore, in my opinion, the Takano/Katoh combination renders this claim obvious.

378. Claim 11 depends from claim 1. In my opinion, the Takano/Katoh combination renders claim 11 obvious regardless of which Takano invalidity ground—Grounds 2-4 (Sections VI-VIII)—renders claim 1 invalid, as each of these invalidity grounds relies on Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) that is being modified in view of Katoh.

X. OBVIOUS: TAKANO & REPTA (GROUND 6)

379. In my opinion, claim 15 would have been obvious over Takano in view of Repta.

A. Modification of Takano Based on Repta

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

381. In my opinion, it would have been obvious to make Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) out of polypropylene so that the boot has "tensile

flexibility to allow bending under loading and compressive rigidity to maintain form once the minimum bend radius is achieved," as taught by Repta. EX1008: 4:10-15. Moreover, it would have been obvious to try to make Takano's boot out of polypropylene, as the POSA knows polypropylene to be a suitable material for boots of optical connectors. EX1007: 3:58-61; EX1008: 4:10-15.

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

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

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

385. Moreover, selecting between known boot materials would have been a mere design choice for a POSA. Because making boots of optical connectors out

of polypropylene has been known for decades, a POSA would have had a reasonable expectation of success in making Takano's boot out of polypropylene.

B. Claim 15 "The fiber optic connector according to claim 1, wherein a material of the boot has a Young's modulus greater than 500 MPa."

386. Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) modified in view of Repta is made of polypropylene. Section X(A). Polypropylene has a Young's modulus of about 1300 MPa, greater than 500 MPa. EX1020; EX1021; EX1022; EX1023.

387. Therefore, in my opinion, the Takano/Repta combination renders this claim obvious.

388. Claim 15 depends from claim 1. In my opinion, the Takano/Repta combination renders claim 15 obvious regardless of which Takano invalidity ground—Grounds 2-4 (Sections VI-VIII)—renders claim 1 invalid, as each of these invalidity grounds relies on Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) that is being modified in view of Repta.

XI. OBVIOUS: TAKANO & DAVIDSON (GROUND 7)

389. In my opinion, claims 13 and 19 would have been obvious over Takano (first embodiment) in view of Davidson.

390. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the first

embodiment of Takano—the micro connector (9100) of Takano used in Ground 2 (Section VI) in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro connector shown in Figs. 16-36 *includes* the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., the front extension). EX1003: ¶[0059].

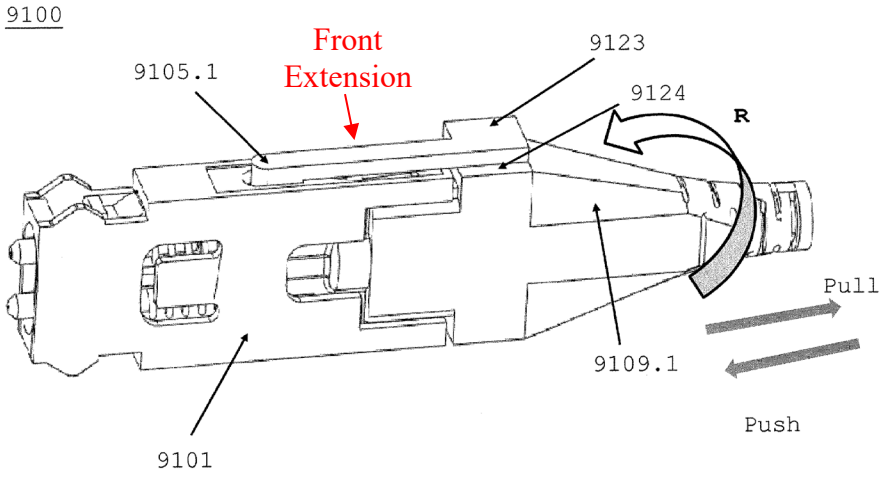


FIG. 16

EX1003: Fig. 16.

A. Modification of Takano Based on Davidson

391. Takano discloses a boot (9109.1, 9209.1, 9309.1, 9409.1) that is pushed and pulled to insert and remove the micro connector (9100) from the adapter (2400). EX1003: Abstract, ¶¶[0072]-[0074]. The boot (9109.1, 9209.1, 9309.1, 9409.1) includes the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) that is releasably attached to the rest of the boot at point (9109.6). EX1003: Fig. 17, ¶[0059].

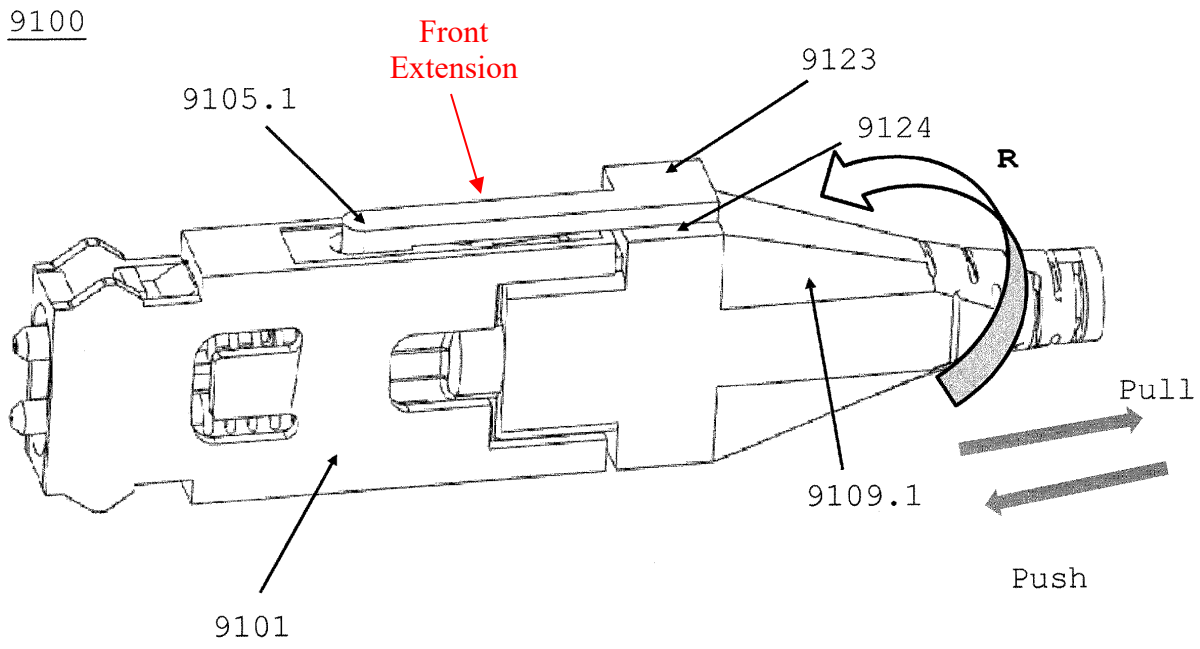

9100
Front
Extension
9105.1
9123
9124
R
Pull
9109.1
Push
9101

FIG. 16

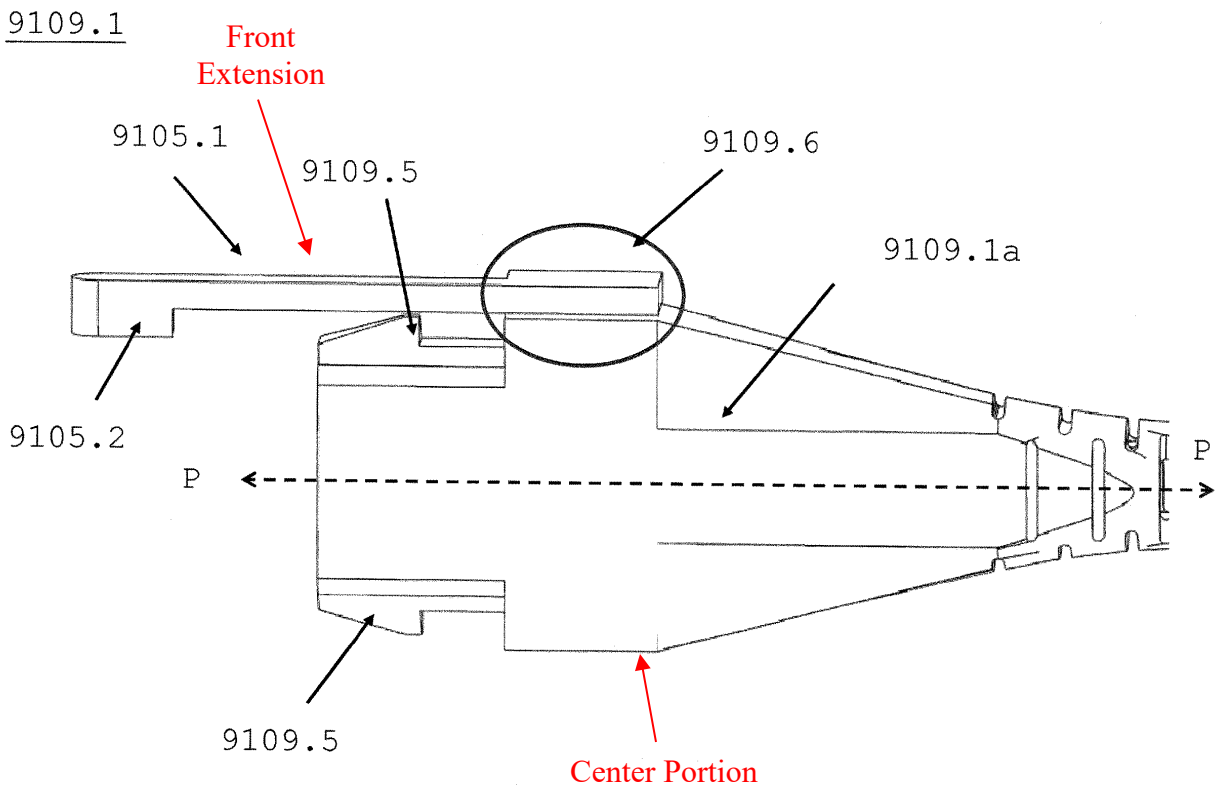

9109.1
Front
Extension
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
9109.5
Center Portion

FIG. 17

EX1003: Figs. 16 and 17 (annotated).

392. Similarly, Davidson discloses a push-pull boot connector (100) with a strain relief boot (300) that is pushed and pulled to insert and remove the connector from an adapter (400). EX1006: ¶¶[0038]-[0039].

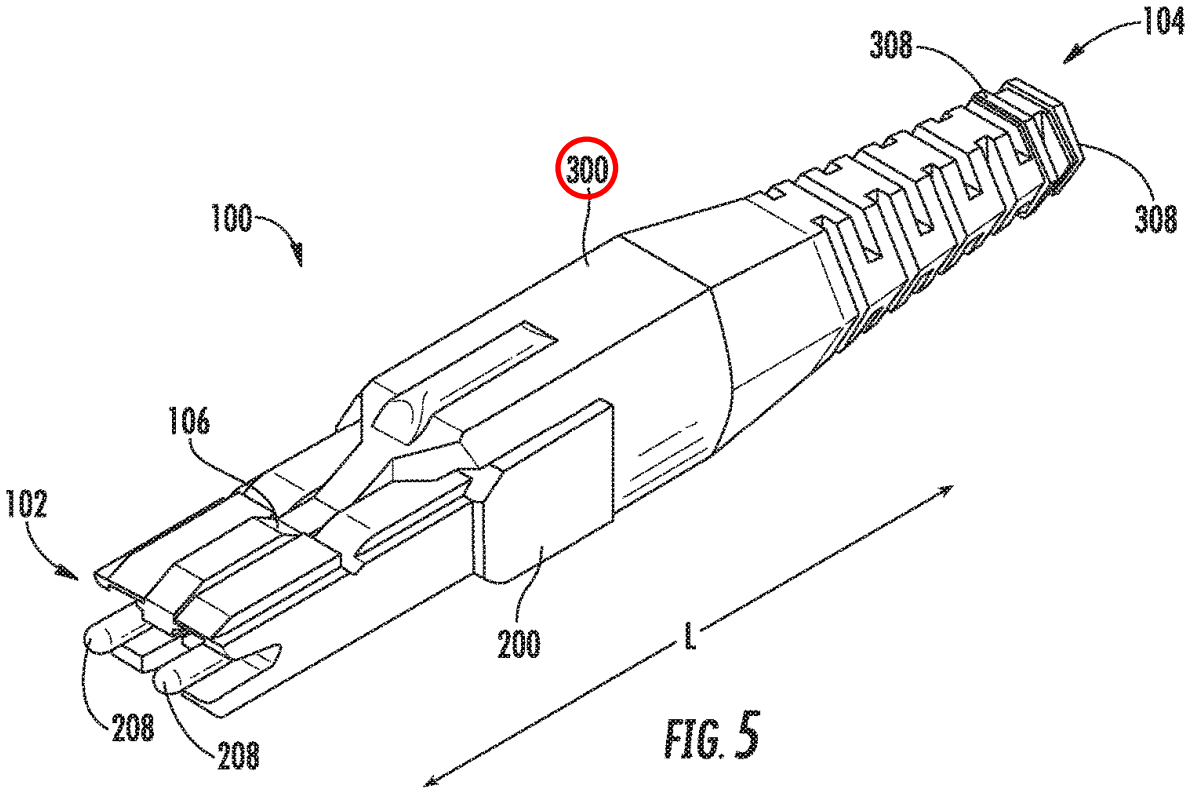
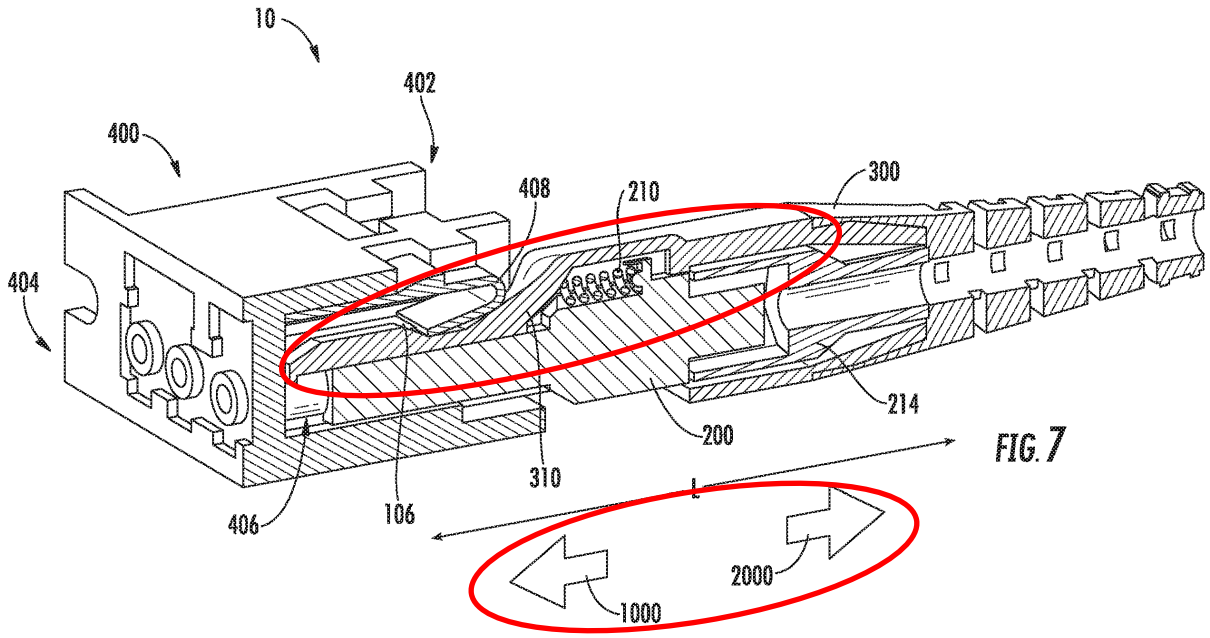


FIG. 5



EX1006: Figs. 5 and 7 (annotated).

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

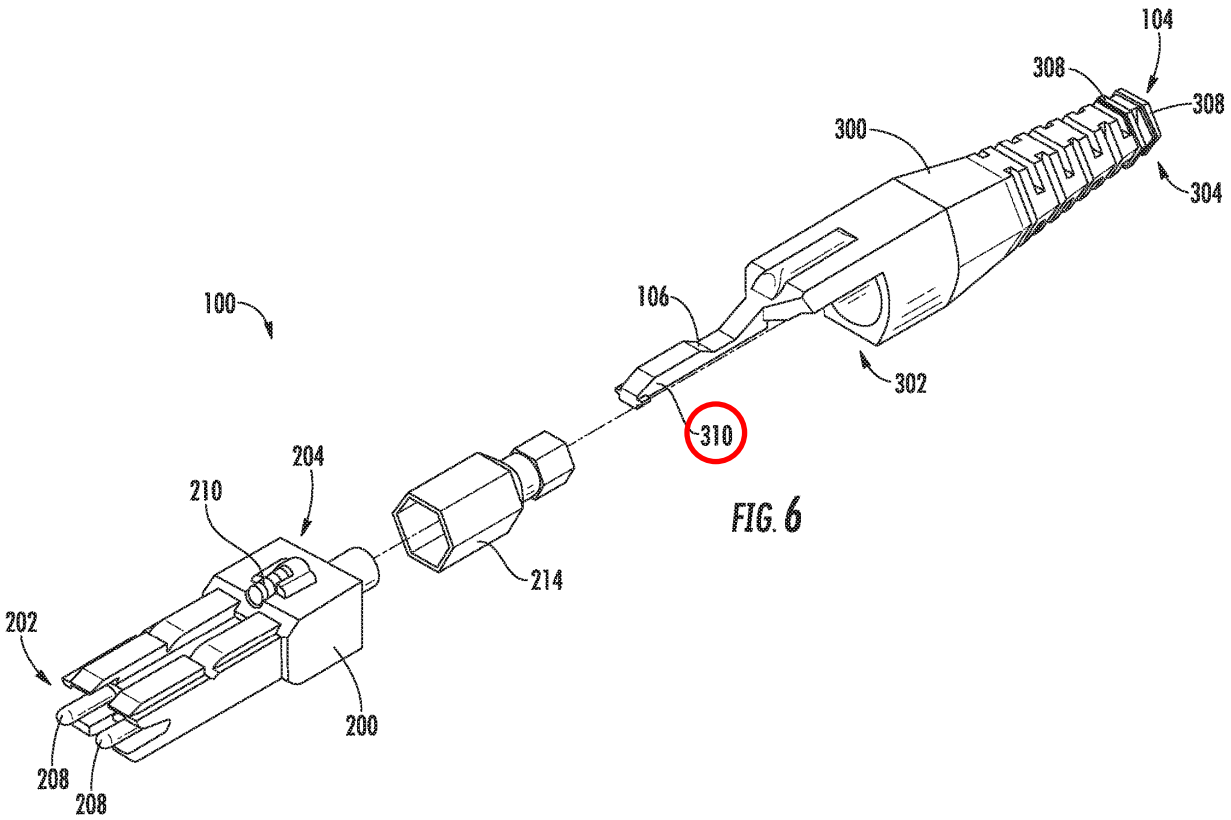


FIG. 6

EX1006: Fig. 6 (annotated).

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

395. This modification would have been nothing more than modifying known elements (the key and central portion of Takano's boot) according to known methods (the integral construction taught by Davidson) to yield predictable results (the key and central portion of Takano's boot being of one-piece construction).

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

397. Moreover, making the Takano's key integral with the central portion of Takano's boot would have been a mere design choice.

398. A POSA would have had a reasonable expectation of success in making the key (9105.1, 9205.1, 9305.1, 9405.1) of Takano integral with the central portion of Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) because the key would still function to set the polarity in the same manner. In other words, the ability to change polarity is not dependent on the key (9105.1, 9205.1, 9305.1, 9405.1) being releasable from the rest of the boot (9109.1, 9209.1, 9309.1, 9409.1).

B. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion."

399. As I explained in Section XI(A), the Takano/Davidson combination results in the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) being integral with the center portion.

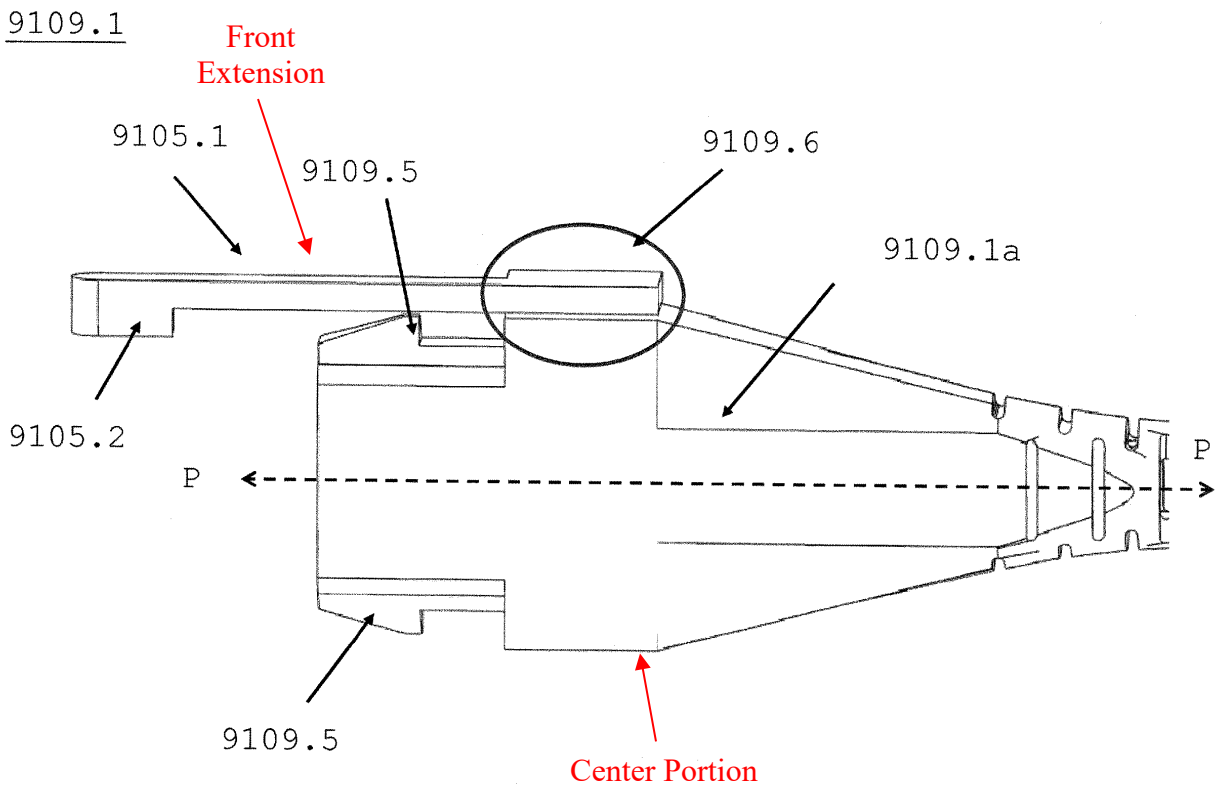


FIG. 17

EX1003: Fig. 17 (annotated).

400. Therefore, in my opinion, the Takano/Davidson combination renders this claim obvious.

C. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."

401. If the "latch" recited by claim 19 is considered to be part of the "at least one latch" recited by claim 16 such that claim 19 requires the front extension to have only one latch total, then, in my opinion, the Takano/Davidson combination renders this claim obvious.

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

403. As I explained in Section XI(A), the Takano/Davidson combination results in the key (9105.1, 9205.1, 9305.1, 9405.1) being integral with the center portion, which meets the "integrally molded" part of claim 19 for the reasons I discussed in Section VII(P).

404. Therefore, in my opinion, the Takano/Davidson combination renders this claim obvious.

XII. OBVIOUS: TAKANO, DAVIDSON, & CASTAGNA (GROUND 8)

405. In my opinion, claims 13 and 19 would have been obvious over Takano (first embodiment) in view of Davidson and Castagna.

406. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the first embodiment of Takano—the micro connector (9100) of Takano used in Ground 2 (Section VI) in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the micro

connector shown in Figs. 16-36 *includes* the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., the front extension). EX1003: ¶[0059].

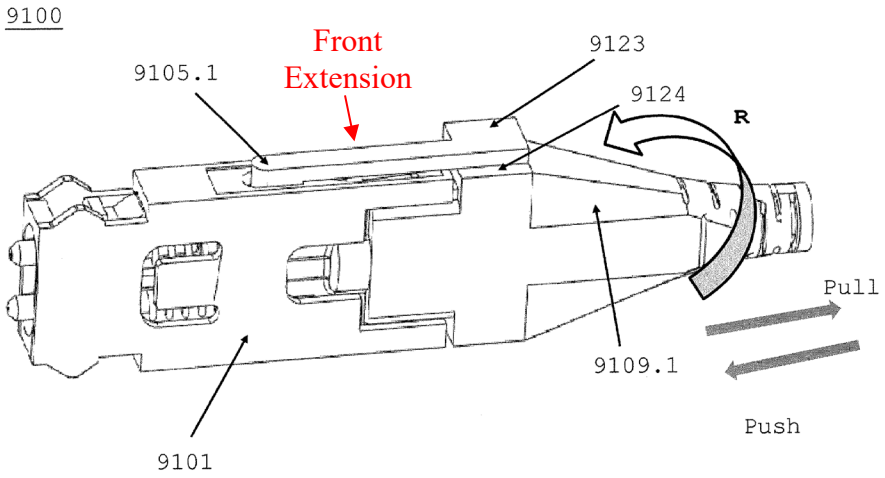


FIG. 16

EX1003: Fig. 16.

A. Modification of the Takano/Davidson Combination Based on Castagna

407. If it is determined the term "molded" of claim 19 is entitled to patentable weight, it is my opinion that such a limitation would have been obvious in further view of Castagna.

408. The Takano/Davidson combination results in Takano's key (9105.1, 9205.1, 9305.1, 9405.1) being integral with the center portion of Takano's boot. Section XI(A).

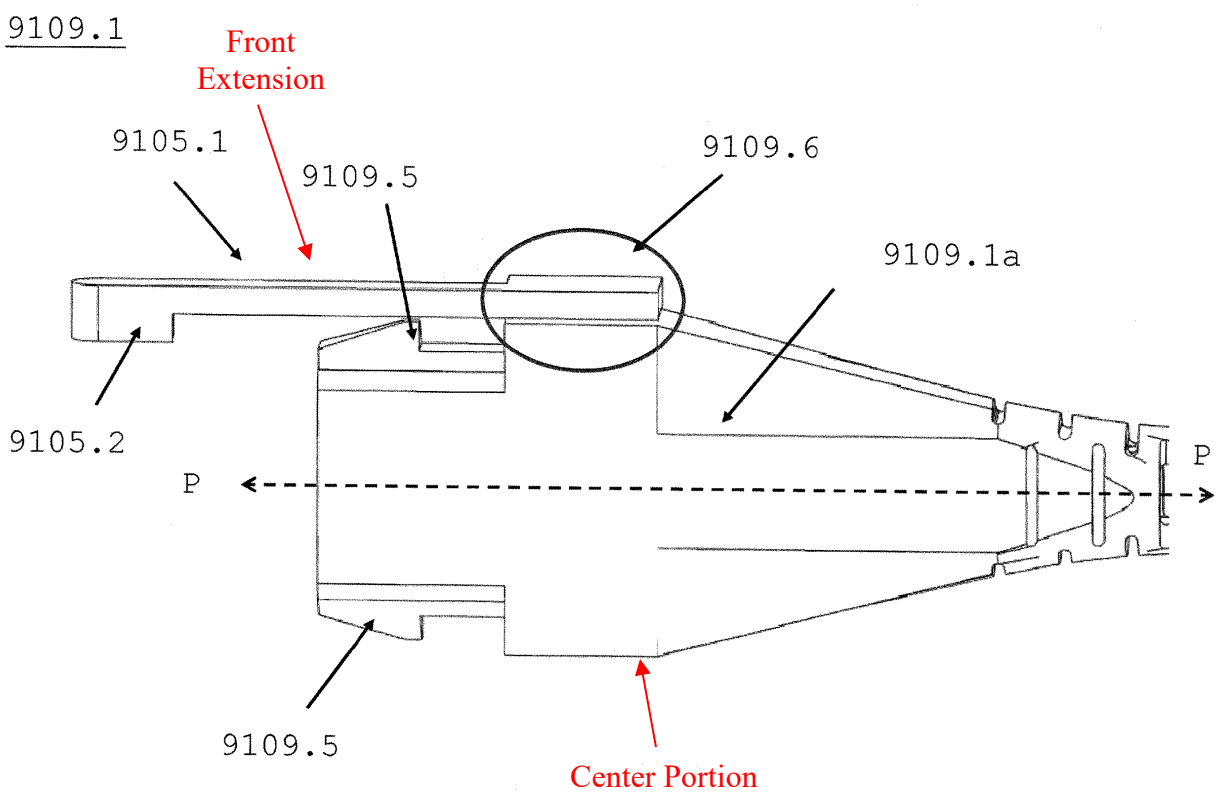


FIG. 17

EX1003: Fig. 17 (annotated).

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

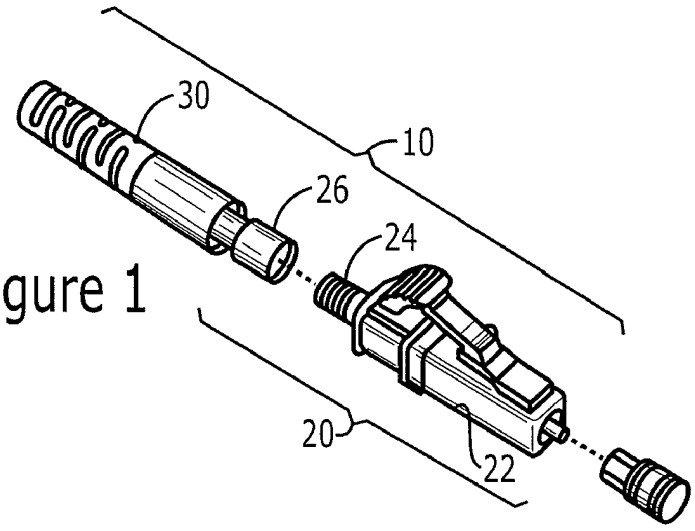


Figure 1

EX1007: Fig. 1.

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

411. This modification would have been nothing more than combining known elements (Castagna's injection molded materials and Takano's boot)

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

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

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

414. Moreover, selecting between known boot materials would have been a mere design choice for a POSA. Because making boots of optical connectors by molding is known, a POSA would have had a reasonable expectation of success in making Takano's boot by molding.

B. Claim 13 "The fiber optic connector according to claim 1, wherein the front extension is an integral part of the center portion."

415. If it is determined that the Takano/Davidson combination does not result in the key (9105.1, 9205.1, 9305.1, 9405.1) (i.e., front extension) being

integral with the center portion, in my opinion this claim would have been obvious in further view of Castagna. As I explained in Section XII(A), the Takano/Davidson/Castagna combination results in the key (9105.1, 9205.1, 9305.1, 9405.1) being integrally molded with the center portion, which results in the key being "an integral part" of the center portion.

C. Claim 19 "The fiber optic connector according to claim 16, wherein the front extension is an integrally molded with the center portion and has a latch."

416. If the "latch" recited by claim 19 is considered to be part of the "at least one latch" recited by claim 16 such that claim 19 requires the front extension to have only one latch total, then, in my opinion, the Takano/Davidson combination renders this claim obvious.

417. As I explained in Section VI(F), Takano's key has a latch.

418. As I explained in Section XII(A), the Takano/Davidson/Castagna combination results in the key (9105.1, 9205.1, 9305.1, 9405.1) being integrally molded with the center portion.

419. Therefore, in my opinion, the Takano/Davidson combination renders this claim obvious.

XIII. OBVIOUS: TAKANO & CASTAGNA (GROUND 9)

420. In my opinion, claims 13 and 19 would have been obvious over Takano (second embodiment and third embodiment) in view of Castagna.

421. As explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I build on Grounds 3 and 4 (Sections VII-VIII) which rely on the version of Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) in Figs. 16-36 that that is without the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059]. In these grounds, the front extension of the boot (9109.1, 9209.1, 9309.1, 9409.1) includes the two boot hooks (9109.5, 9209.5).

422. If it is determined that the front extension is not "integrally molded," it is my opinion claim 19 (and claim 13 if needed) would have been obvious in further view of Castagna. In Section XII(A), I explain it would have been obvious to make Takano's boot out of "integrally molded" (claim 19) material, in view of Castagna such that the front extension would have been integrally molded with the center portion. This also results in the front extension being "an integral part" (claim 13) of the center portion.

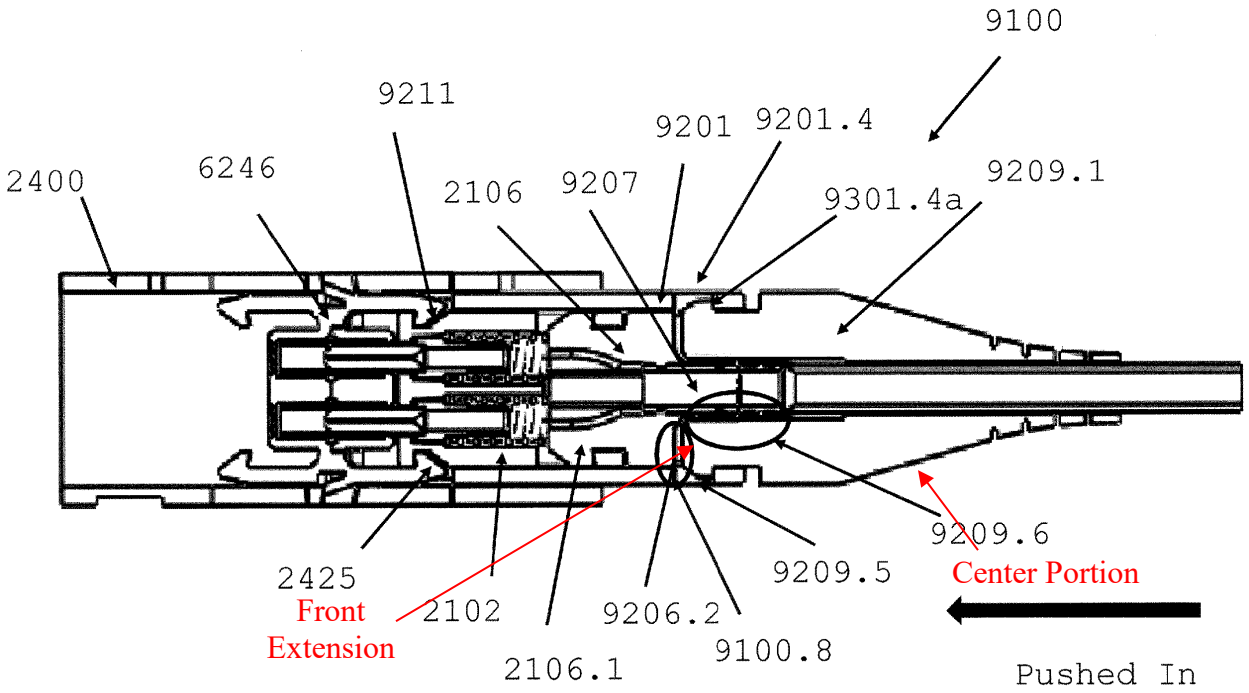


FIG. 34

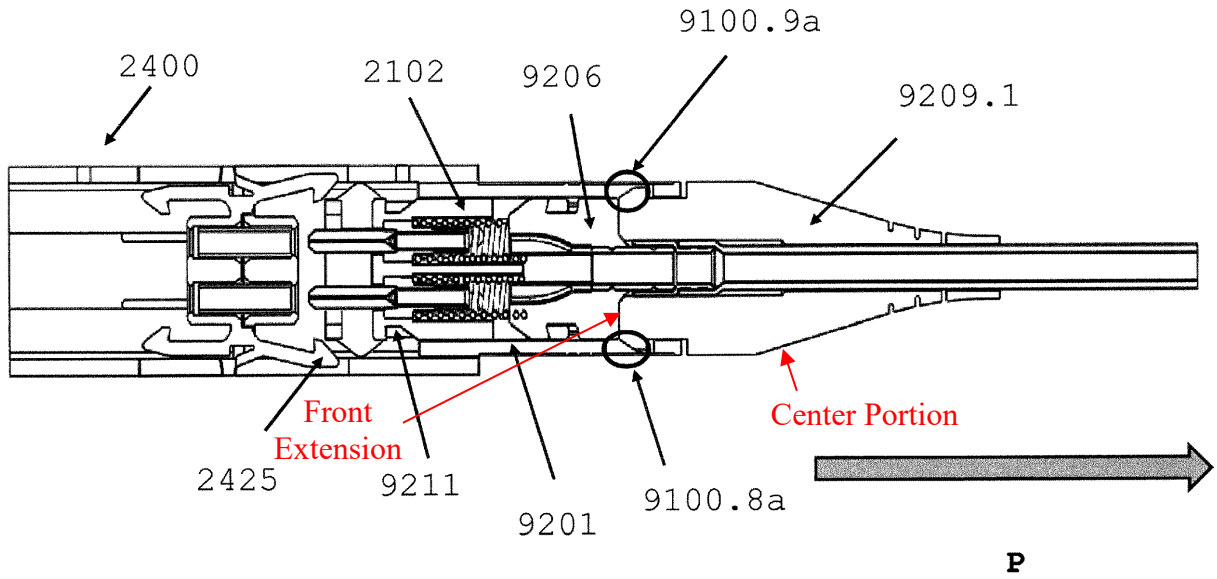


FIG. 36

EX1003: Figs. 34 and 36 (annotated).

423. The remaining limitations of the claims are met by Takano as I explain in Sections VII-VIII.

XIV. OBVIOUS: TAKANO & EHRENREICH (GROUND 10)

424. In my opinion, claim 20 would have been obvious over Takano (second embodiment) in view of Ehrenreich.

425. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the second embodiment of Takano—the optical connector shown in Figs. 16-36 in which the boot (9109.1, 9209.1, 9309.1, 9409.1) of the optical connector *does not include* the key (9105.1, 9205.1, 9305.1, 9405.1). EX1003: ¶[0059]. Instead, the key (9105.1, 9205.1, 9305.1, 9405.1) is part of the outer housing (9101, 9201, 9301, 9401). EX1003: ¶[0059] ("Alignment and offset key 2105 may be fixed on connector outer housing, as shown in FIG. 1 or at alignment key 5305 disclosed in FIG. 37.").

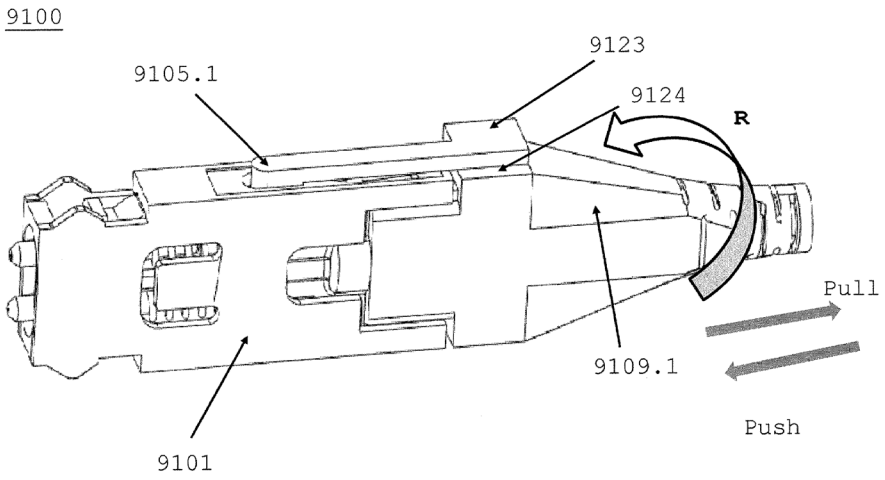


FIG. 16

EX1003: Fig. 16.

9109.1

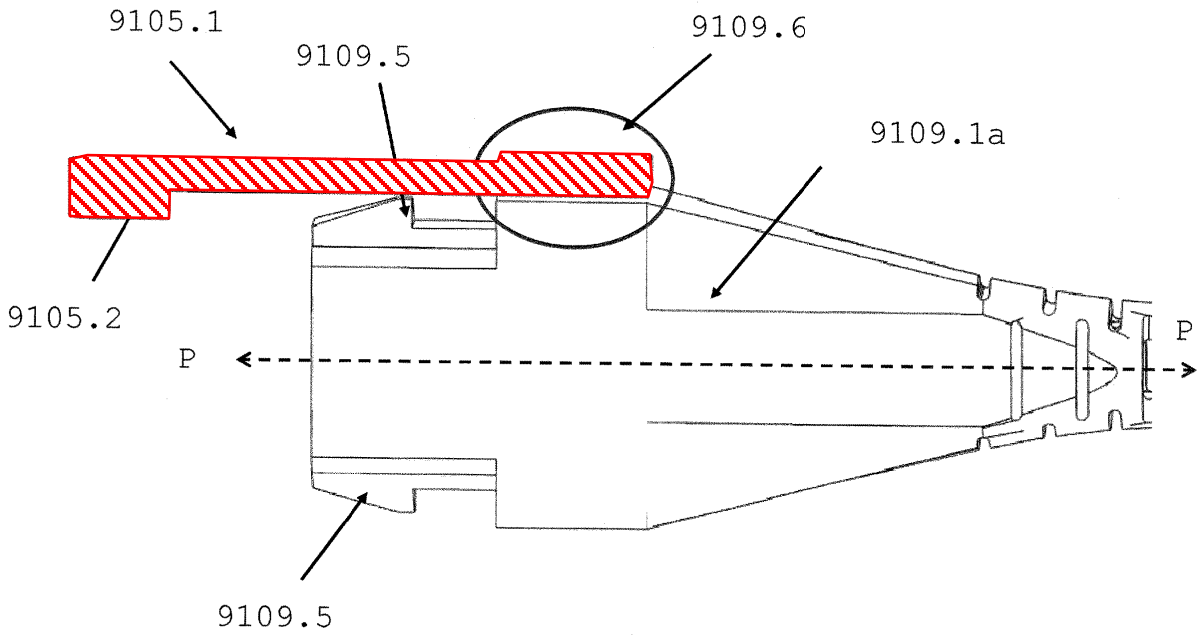
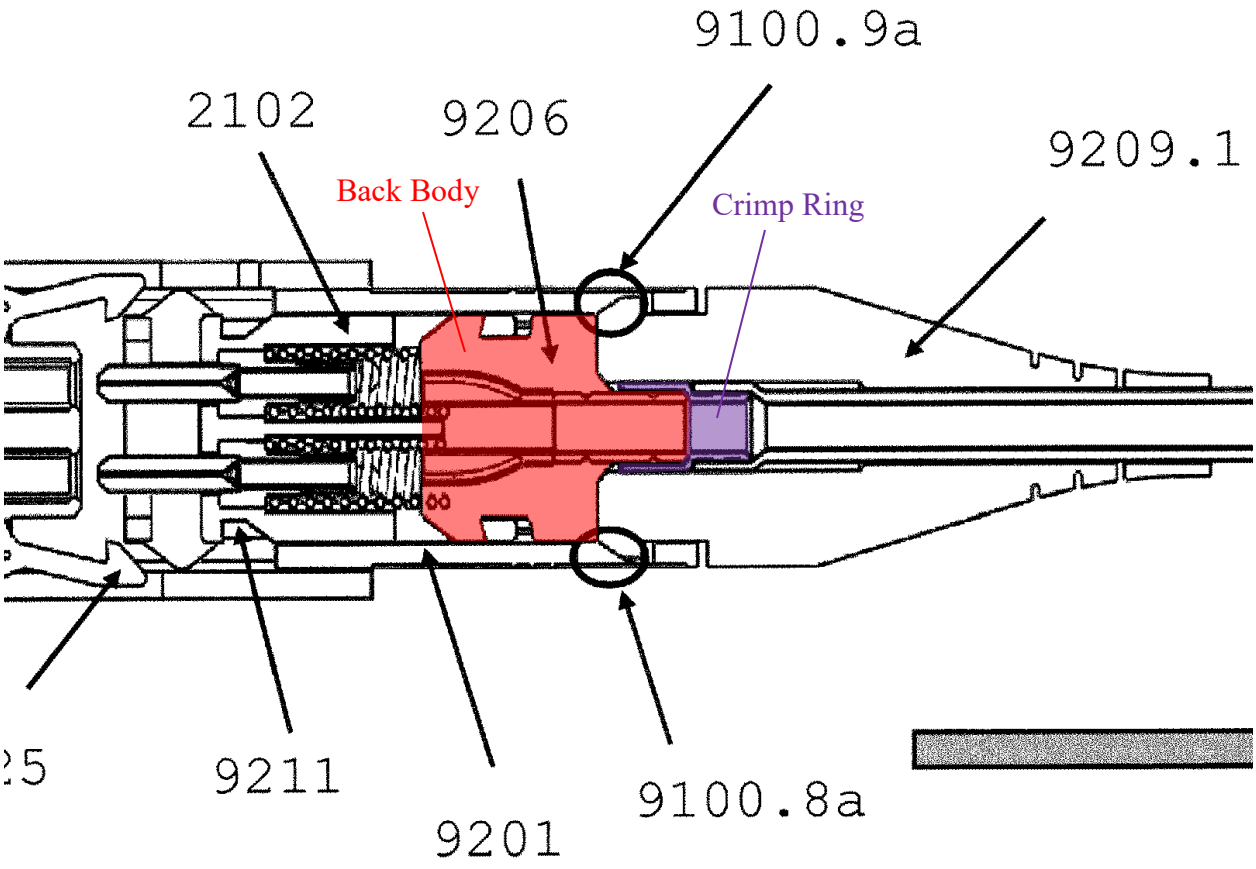


FIG. 17

EX1003: Fig. 17 (annotated).

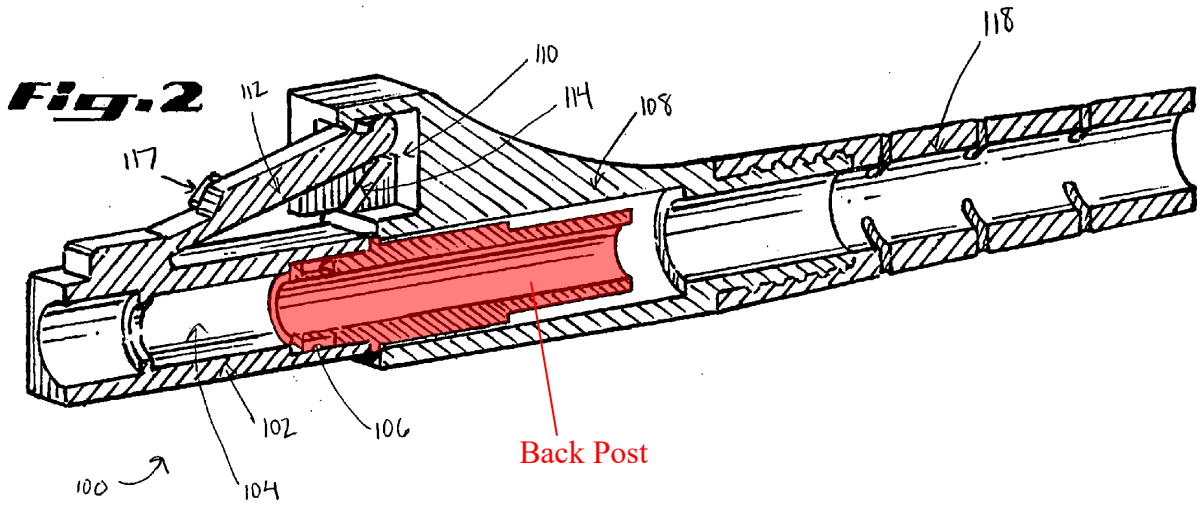
A. Modification of Takano Based on Ehrenreich

426. Takano's back body (9106, 9206) has a rear portion in the form of a back post onto which the crimp ring (9207) is crimped onto. EX1003: ¶¶[0067], [0072], Figs. 27 and 34. As shown below, the back post is relatively short, such that about half the length of the crimp ring (9207) does not overlap the back post, and therefore is not crimping against the back post. EX1003: Figs. 34 and 36. Although the fiber optic cable is shown over the crimp ring in Fig. 36, the POSA understands that the fiber optic cable would be placed between the crimp ring and the back post of the back body so that the crimping of the crimp ring clamps or squeezes the fiber optic cable against the back post.



EX1003: Fig. 36 (annotated).

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



EX1009: Fig. 2 (annotated).

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

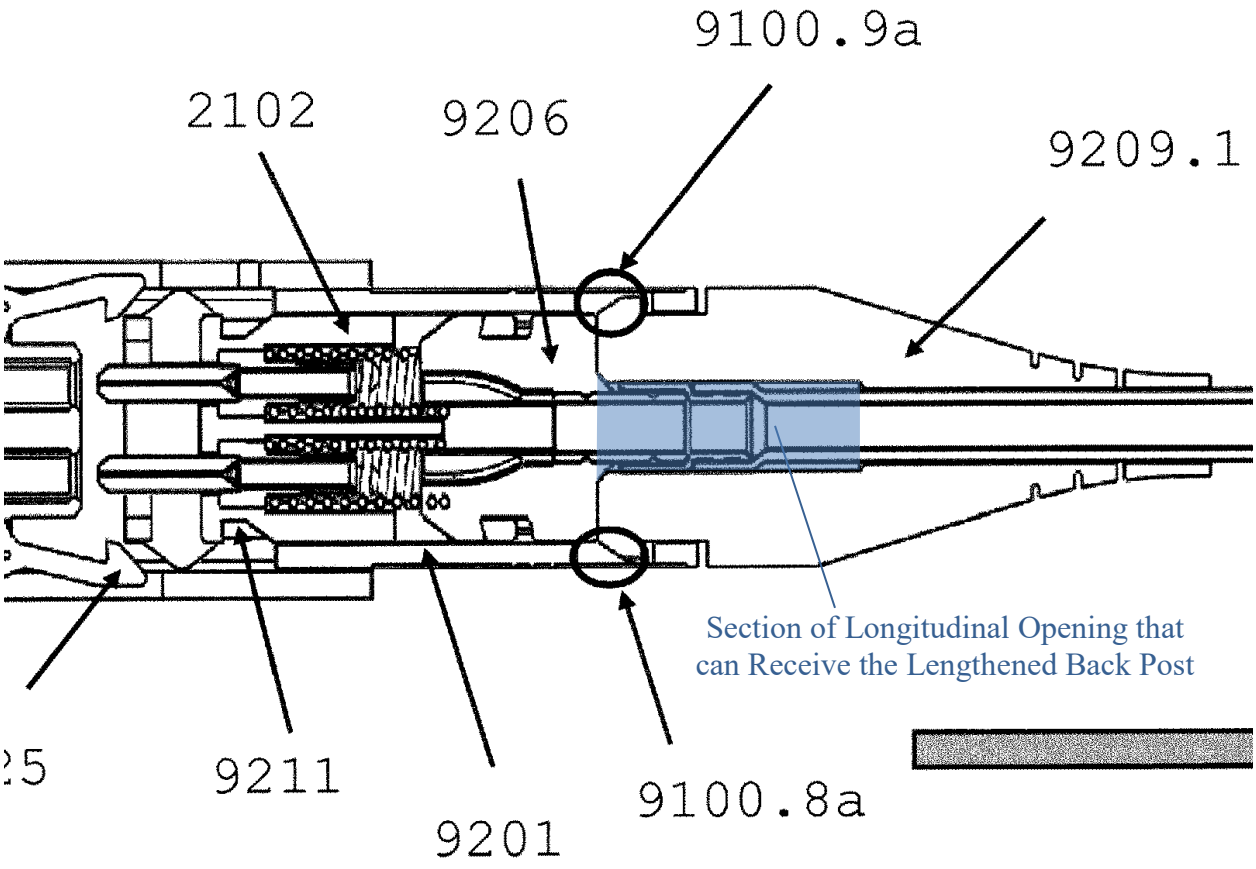
429. Lengthening the back post also strengthens the connection between the back post and the boot (9109.1, 9209.1, 9309.1, 9409.1), thereby making the micro connector stronger, such as against side pulling (tested via the side pull test). As known in the art, the side pull test is exactly what it sounds like. An optical connector is inserted into a receptacle and then the fiber optic cable extending from the optical connector is pulled sideways. The side pull test ensures the construction of the optical connector and connection of the fiber optic cable to the optical connector are of adequate strength. Lengthening the back post would

increase the lateral force the micro connector can resist, by making it harder for the boot to separate or pop-off the back post.

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

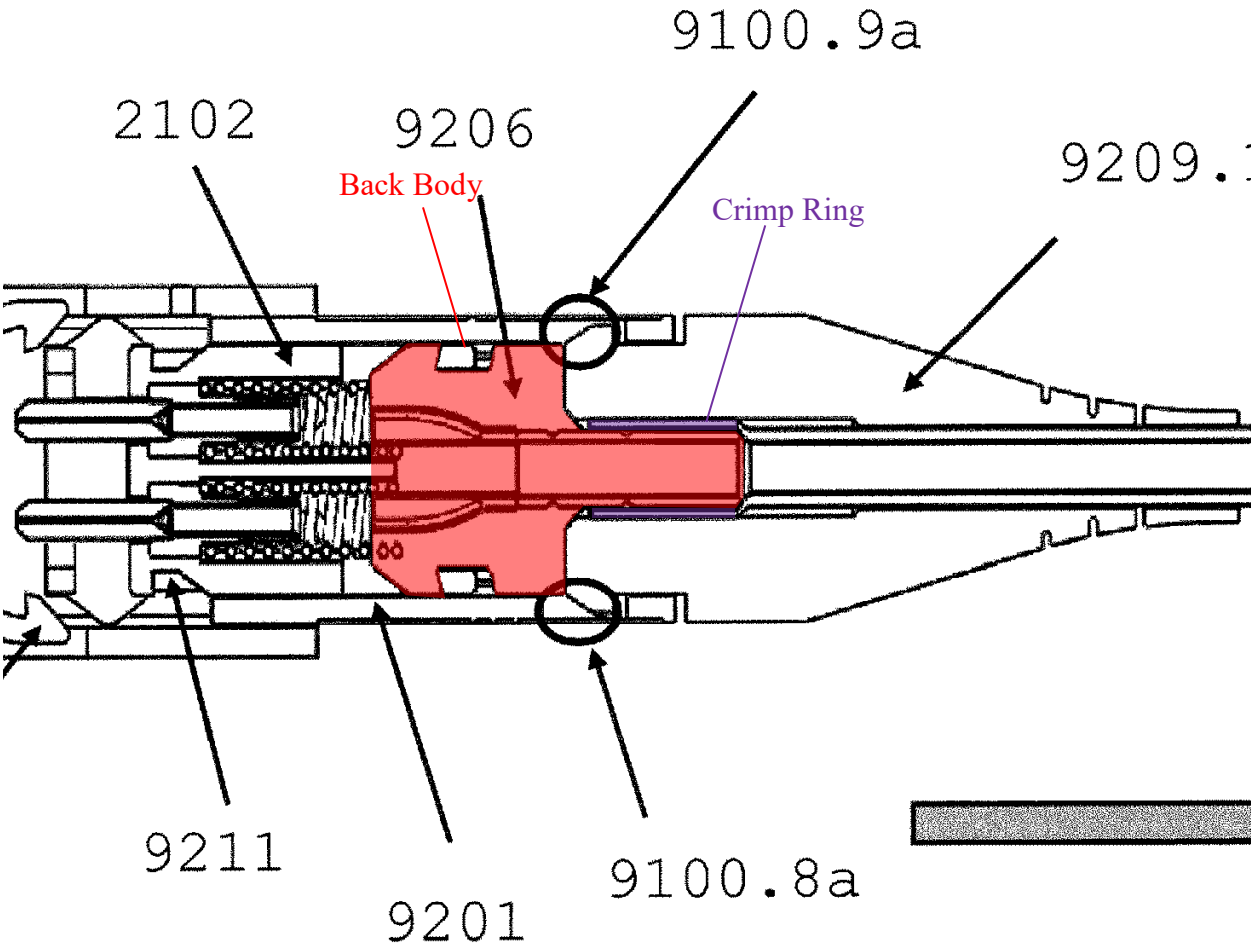
431. Further, lengthening the back post is a mere design choice to a POSA.

432. A POSA would have had a reasonable expectation of success in lengthening the back post of Takano's back body (9106, 9206) because the longer back post would still serve the same function (attaching to the fiber optic cable) and Takano's boot already includes a longitudinal opening section long enough for the extended back post. EX1003: Fig. 36.



EX1003: Fig. 36 (annotated).

433. A representational image showing the lengthened back post is provided below:



EX1003: Fig. 36 (annotated, modified).

B. Independent Claim 20

20.P "A fiber optic connector comprising:"

434. For the reasons I discussed in Section VI(A)(1.P), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.a "a boot;"

435. For the reasons I discussed in Section VI(A)(1.P), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.b "a crimp body engaged to the boot forward of the boot; and"

436. For the reasons I discussed in Sections VI(A)(1.P) and VI(P)(20.b), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein,"

437. For the reasons I discussed in Sections VI(A)(1.P)&(1.c.3), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules,"

438. For the reasons I discussed in Sections VI(A)(1.a.1)&(M)(16.a.1), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

439. For the reasons I discussed in Section VI(A)(1.a.2), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

440. For the reasons I discussed in Section VI(A)(1.a.4), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides,"

441. For the reasons I discussed in Section VI(M)(16.a.4), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers,"

442. For the reasons I discussed in Sections VI(A)(1.b)&(M)(16.b), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers,"

443. As I explained in Section VII(A)(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) has a center portion. The center portion has a front end and a back end. EX1003: Fig. 17.

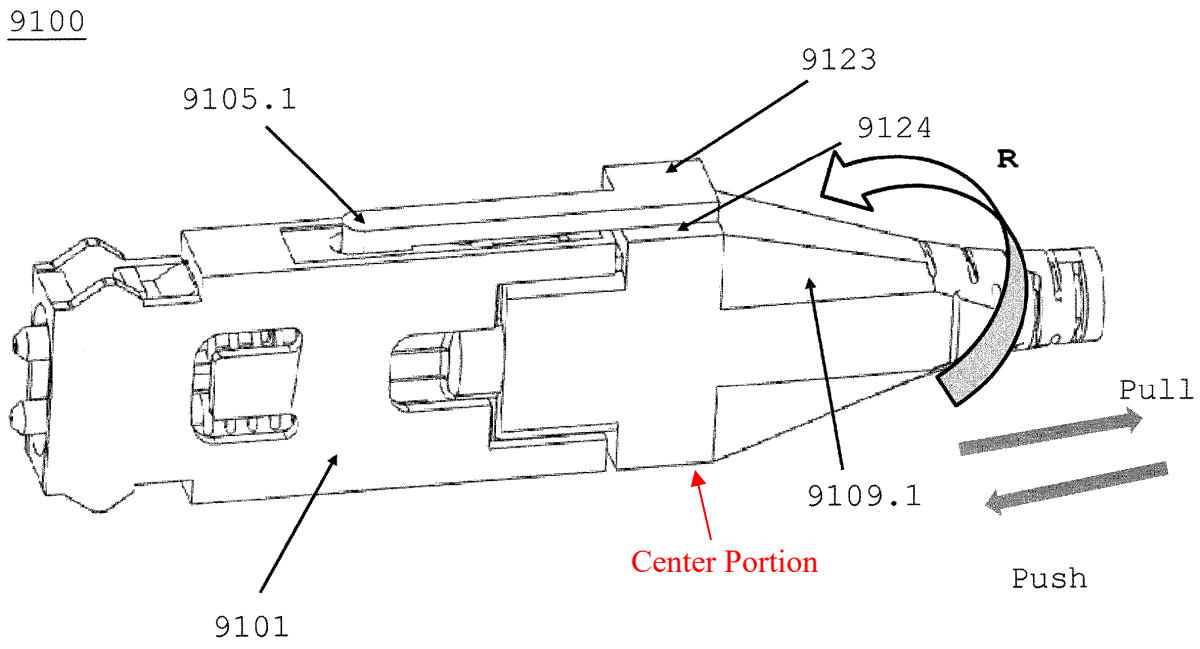

9100
9123
9105.1
9124
R
Pull
9109.1
Center Portion
Push
9101

FIG. 16

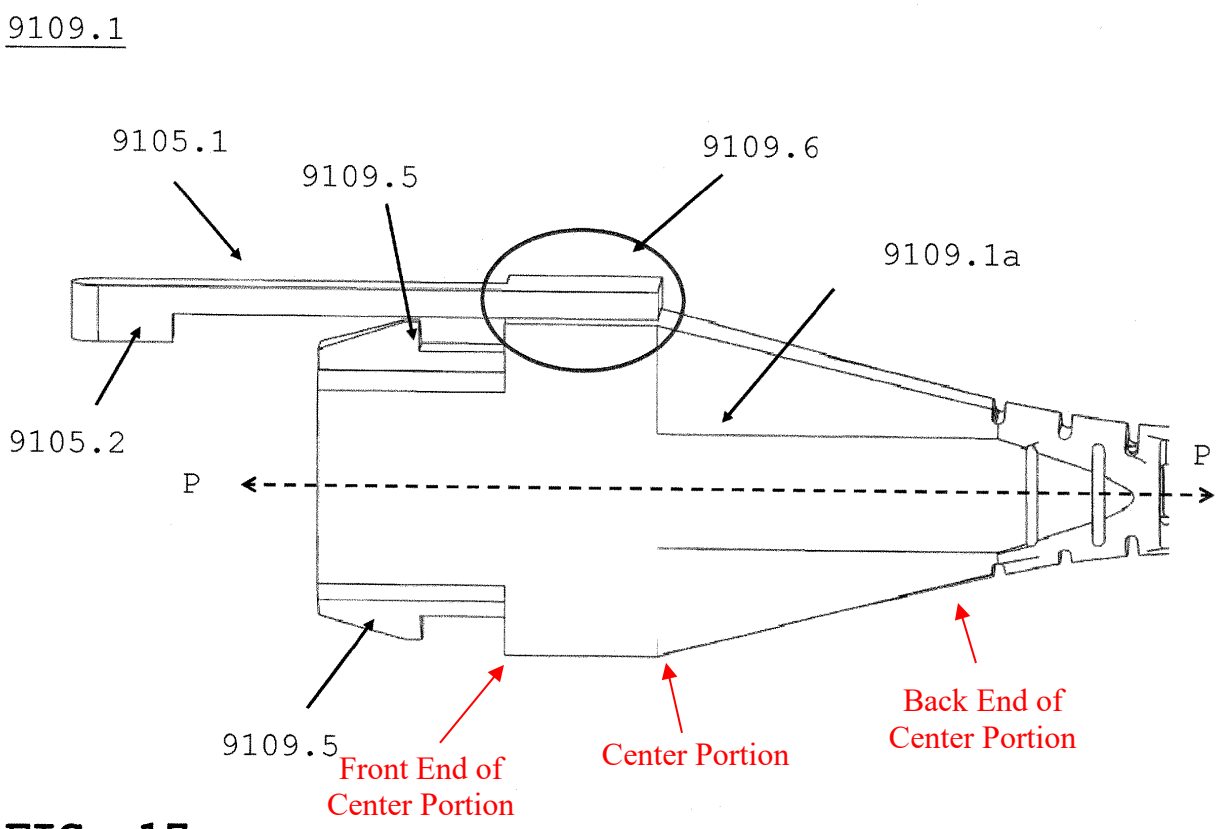
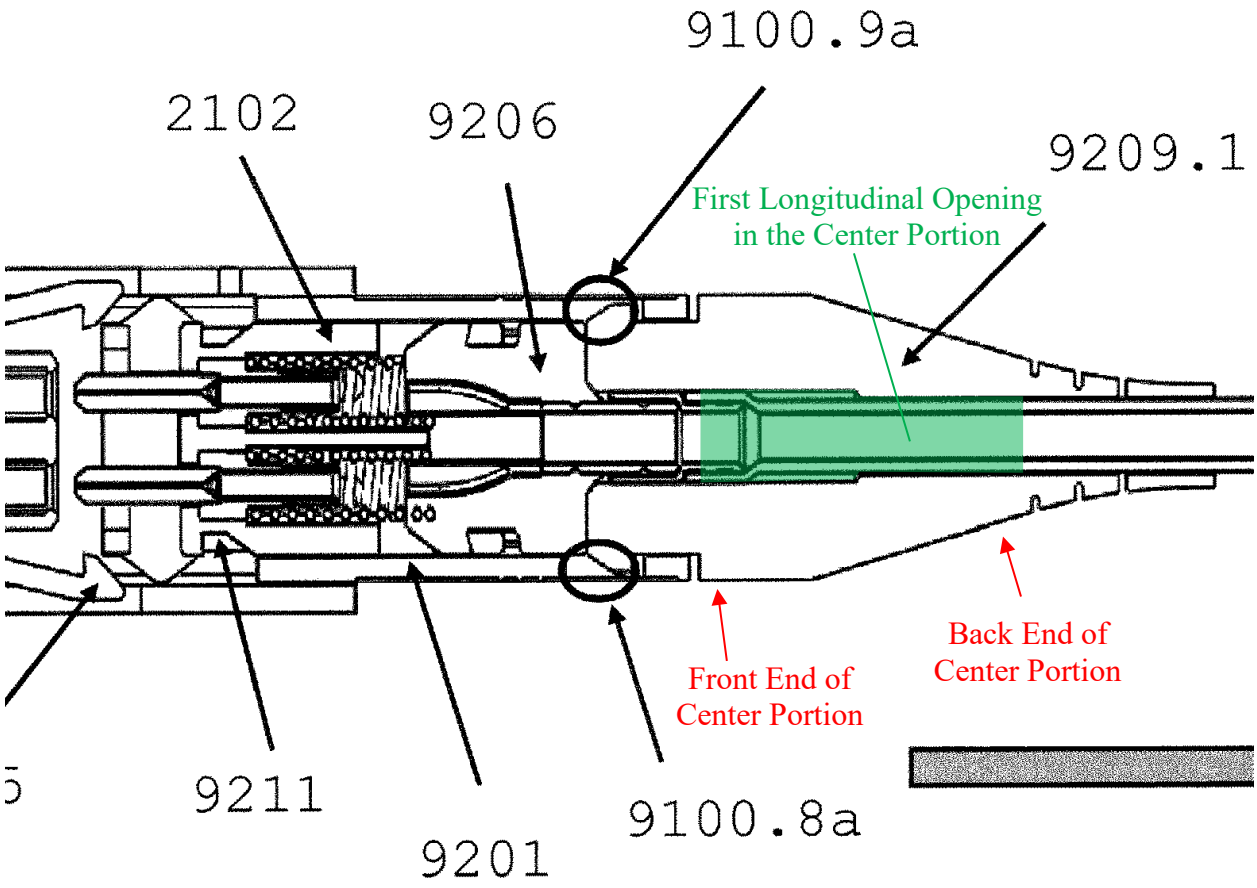

9109.1
9105.1
9109.5
9109.6
9109.1a
9105.2
P
P
9109.5
Front End of
Center Portion
Center Portion
Back End of
Center Portion

FIG. 17

EX1003: Figs. 16 and 17 (annotated).

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



EX1003: Fig. 36 (annotated).

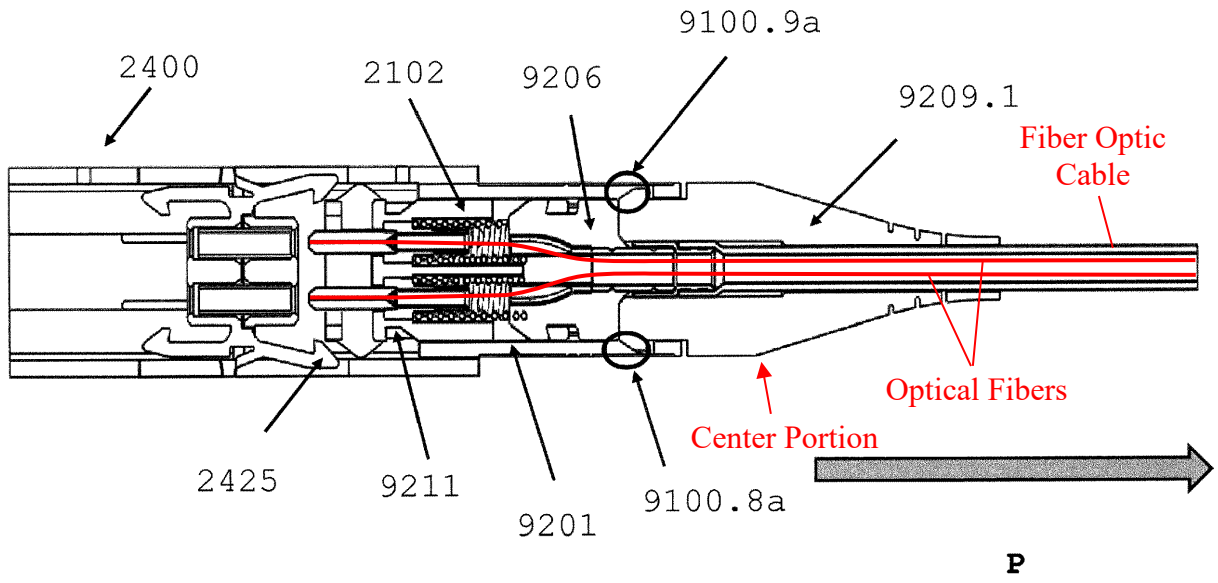
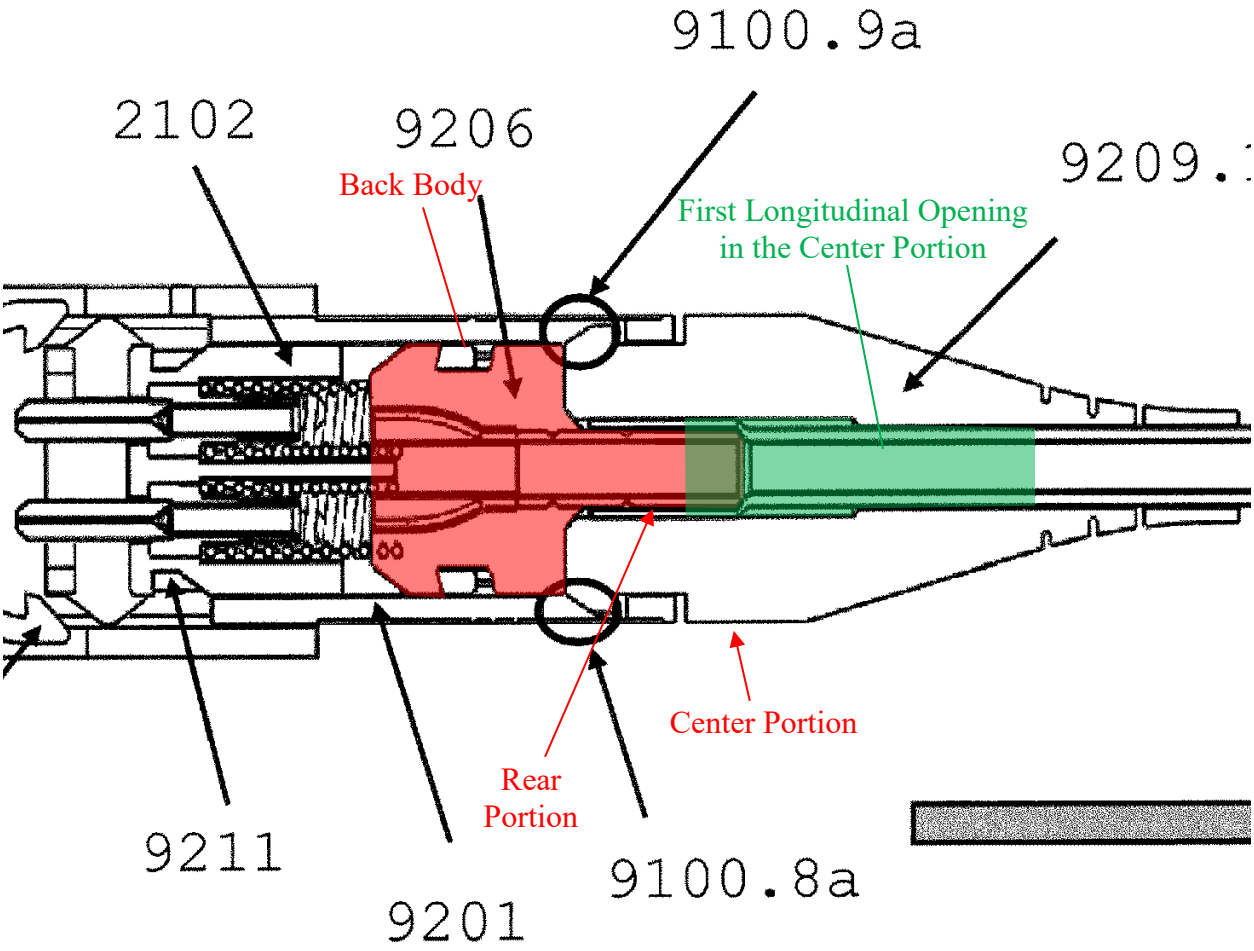


FIG. 36

EX1003: Fig. 36 (annotated).

445. As shown in Fig. 36 (above), the fiber optic cable (with its two optical fibers) is also received in this first longitudinal opening in the central portion. EX1003: Fig. 36.

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



EX1003: Fig. 36 (annotated, modified).

447. Therefore, in my opinion, the Takano/Ehrenreich combination renders this limitation obvious.

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and"

448. For the reasons I discussed in Section VI(P)(20.e.2), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and"

449. As I explained in Sections VII(A)(1.c.1)&(1.c.2), the boot (9109.1, 9209.1, 9309.1, 9409.1) includes a front extension attached to the central portion. EX1003: Fig. 17, ¶[0059]. The front extension extends forward beyond the front end of the central portion.

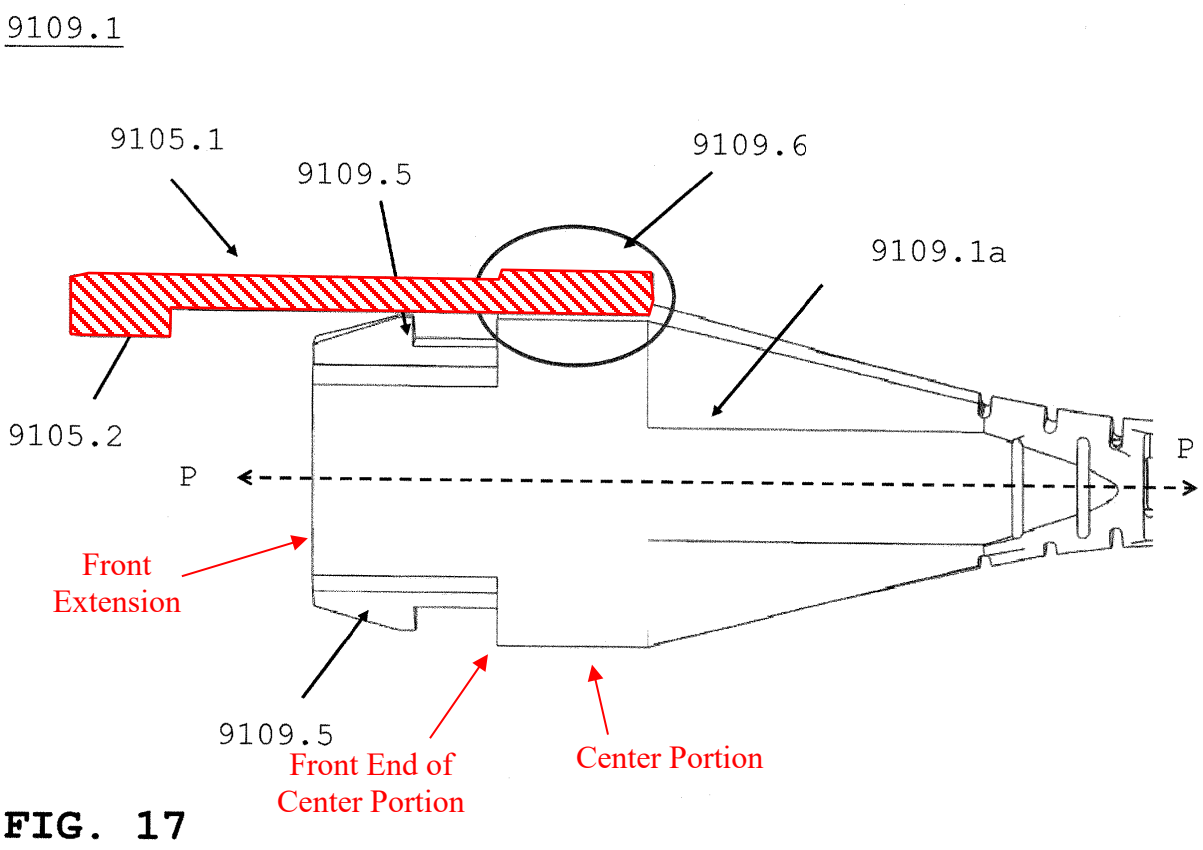


FIG. 17

EX1003: Fig. 17 (annotated).

450. Therefore, in my opinion, the Takano/Ehrenreich combination renders this limitation obvious.

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

451. For the reasons I discussed in Sections VI(E) and VII(E), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

XV. OBVIOUS: TAKANO & EHRENREICH (GROUND 11)

452. In my opinion, claim 20 would have been obvious over Takano (third embodiment) in view of Ehrenreich.

453. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I rely on the third embodiment of Takano—the optical connector (2100, 3700) shown in Figs. 1-4 modified in view of the optical connector (9100) shown in Figs. 16-36 in which the key (9105.1, 9205.1, 9305.1, 9405.1) is removed from the boot (9109.1, 9209.1, 9309.1, 9409.1). EX1003: ¶[0059].

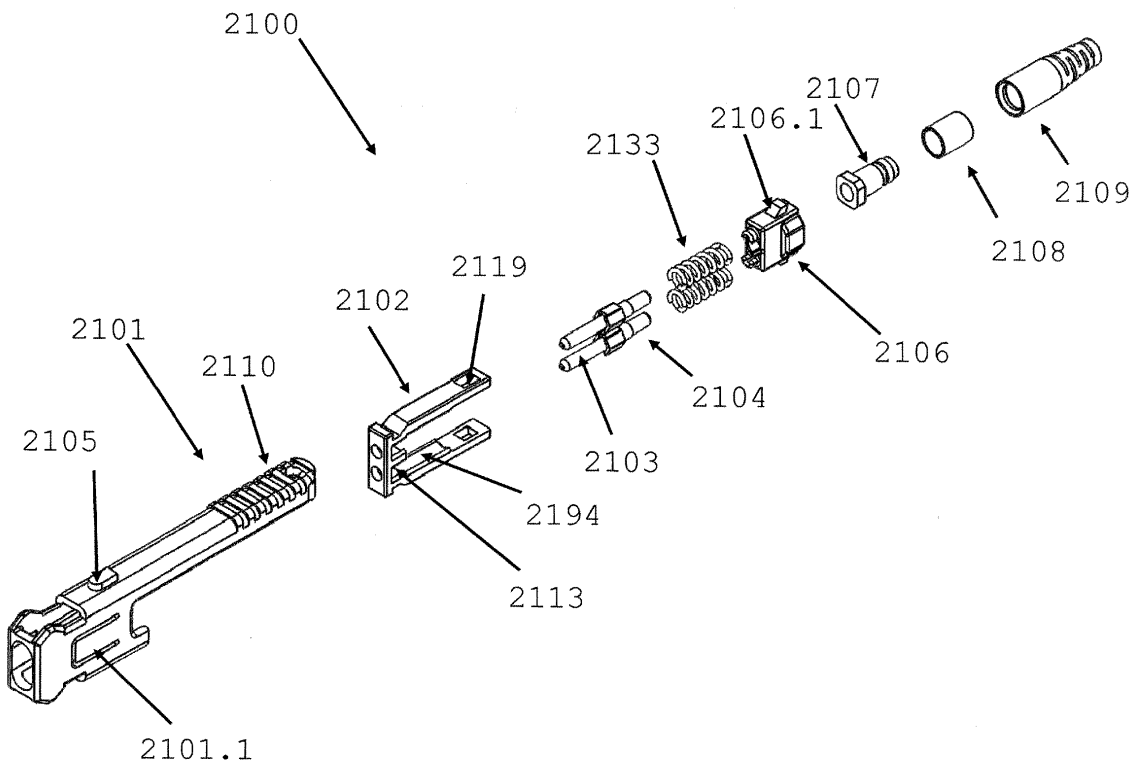


FIG. 1.

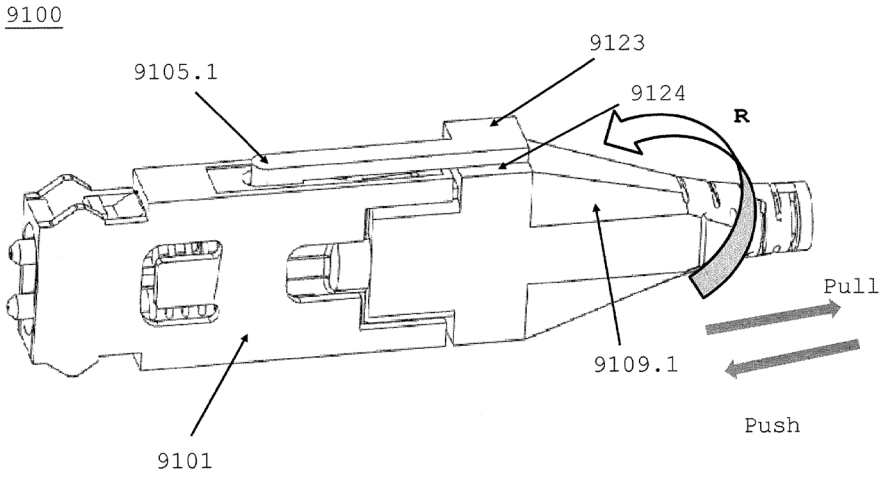


FIG. 16

EX1003: Figs. 1 and 16.

A. Modification of Takano's Micro Connector of Figs 1-4 Based on Takano's Micro Connector of Figs. 16-36

454. For the reasons I stated in Section VIII(A), in my opinion it would have been obvious to replace the boot (2109) of the micro connector (2100, 3700) of Figs. 1-4 with the embodiment of the boot (9109.1, 9209.1, 9309.1, 9409.1) without the key (9105.1, 9205.1, 9305.1, 9405.1) of the micro connector (9100) of Figs. 16-36.

B. Modification of Takano Based on Ehrenreich

455. For the reasons I stated in Section XIV(A), in my opinion it would have been obvious to lengthen Takano's back post (2107) of Figs. 1-4.

C. Independent Claim 20

20.P "A fiber optic connector comprising:"

456. For the reasons I discussed in Section VIII(B)(1.P), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.a "a boot;"

457. For the reasons I discussed in Section VIII(B)(1.P), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.b "a crimp body engaged to the boot forward of the boot; and"

458. As I explained in Sections VIII(B)(1.P) and XV(A), the Takano//Ehrenreich combination includes the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36. As I explained in Section VI(P)(20.b), the back

body (9106, 9206) in Figs. 16-36 engages the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) forward of the push-pull boot. This would also be the case when the boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36 is implemented in the micro connector (2100, 3700) of Figs. 1-4—i.e., the back body (2106) and/or back post (2107) of Figs. 1-4 would be engaged by the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36.

459. Therefore, in my opinion, the Takano/Ehrenreich combination renders this limitation obvious.

20.c.1 "a housing having two optical fibers terminated respectively within two fiber optic ferrules therein,"

460. For the reasons I discussed in Sections VIII(B)(1.P)&(1.c.3), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.2 "the housing comprising a front end opening for the two fiber optic ferrules,"

461. For the reasons I discussed in Sections VIII(B)(1.a.1)&(N)(16.a.1), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.3 "a pair of short sides forming a top and a bottom and a pair of long sides joining the top and the bottom,"

462. For the reasons I discussed in Section VIII(B)(1.a.2), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.4 "a separation between the top and the bottom is more than a separation between individual ones of the pair of long sides,"

463. For the reasons I discussed in Section VIII(B)(1.a.4), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.c.5 "the two fiber optic ferrules being spaced apart from each other between the top and the bottom but equidistant from each of the pair of long sides,"

464. For the reasons discussed in Section VIII(N)(16.a.4), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

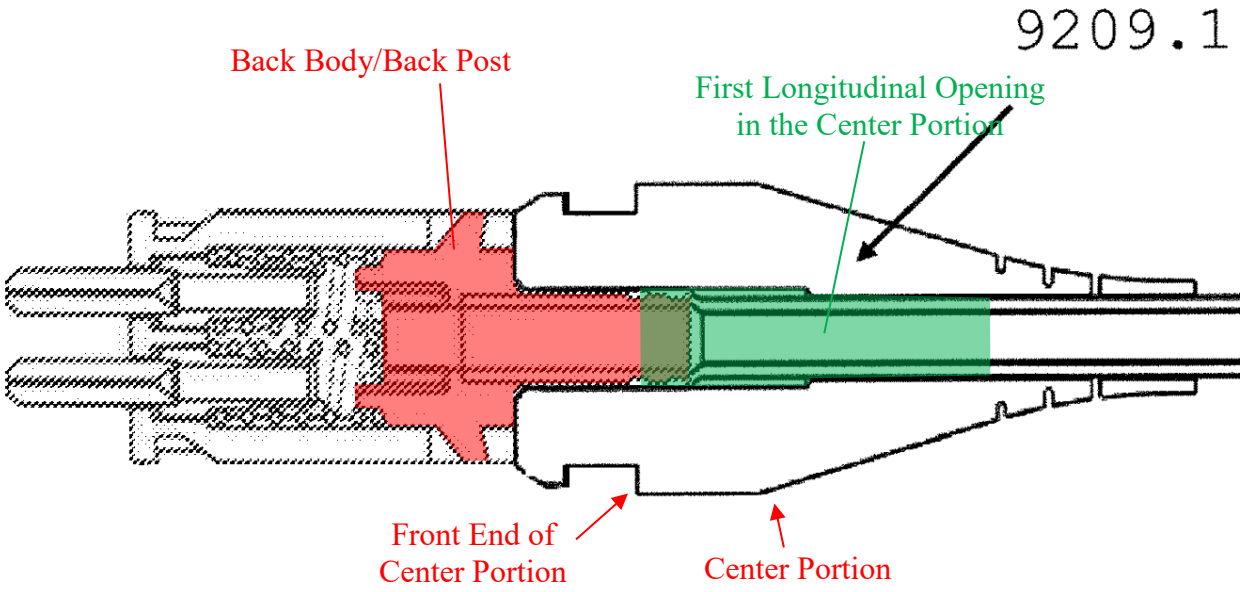
20.d "wherein the crimp body is positioned rearward of the front end of the housing, the crimp body having a rear portion to receive the two optical fibers,"

465. For the reasons I discussed in Sections VIII(B)(1.b)&(N)(16.b), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.e.1 "wherein the boot includes: a center portion having a front end and a back end, a first longitudinal opening extending between the front end and the back end to receive a portion of the crimp body and a fiber optic cable having the two optical fibers,"

466. As I explained in Section XIV(B)(20.e.2), the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) has a center portion with front and back ends and a first longitudinal opening extending between the front and back ends that receives the fiber optic cable and its two optical fibers. This would also be the case when the push-pull boot (9109.1, 9209.1, 9309.1, 9409.1) of Figs 16-36 is implemented in the micro connector (2100, 3700) of Figs. 1-4.

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



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

468. Therefore, in my opinion, the Takano/Ehrenreich combination renders this limitation obvious.

20.e.2 "wherein the boot includes: … a back portion attached to the center portion and extending away from the front end of the center portion, the back portion defining a second longitudinal opening that is in communication with the first longitudinal opening, and"

469. For the reasons I discussed in Section VI(P)(20.e.2), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.e.3 "wherein the boot includes: … a front extension portion connected to the center portion and extending forward and beyond the front end of the center portion, and"

470. For the reasons I discussed in Sections VII(B)(1.c.1)&(1.c.2), and XIV(B)(20.e.2), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

20.f "wherein the boot is movable longitudinally relative to the housing upon application of a pull force, and wherein after application of the pull force, the boot and the housing are rotatable relative to each other to change a polarity of the fiber optic connector."

471. For the reasons I discussed in Section VIII(F), in my opinion the Takano/Ehrenreich combination renders this limitation obvious.

XVI. OBVIOUS: TAKANO, DAVIDSON, CASTAGNA, AND/OR EHRENREICH (GROUND 12)

472. In my opinion, claims 16-20 would have been obvious over Takano (second embodiment and third embodiment) in view of Davidson, Castagna, and/or Ehrenreich (as needed).

473. As I explained in Section (III)(B)(1), Takano discloses multiple different embodiments of optical connectors. In this ground, I build on Grounds 2 and 3 (Sections VI-VII) which rely on the version of Takano's boot (9109.1, 9209.1, 9309.1, 9409.1) in Figs. 16-36 (that *does and does not include* the key (9105.1, 9205.1, 9305.1, 9405.1)). EX1003: ¶[0059].

474. If it is determined that Takano's micro connector (9100) of Figs. 16-36 does not disclose the ferrules (9203) being equidistance from the long sides of the outer housing (9101, 9201, 9301, 9401)—limitations 16.a.4 and 20.c.5—this arrangement would have been obvious in view of Takano's micro connector (2100, 3700) of Figs. 1-4 in my opinion. As I explained in Section VIII(N)(16.a.4), the ferrules (2103) of Takano's micro connector (2100, 3700) of Figs. 1-4 are spaced equidistant from the long sides of the outer housing (2101, 3701).

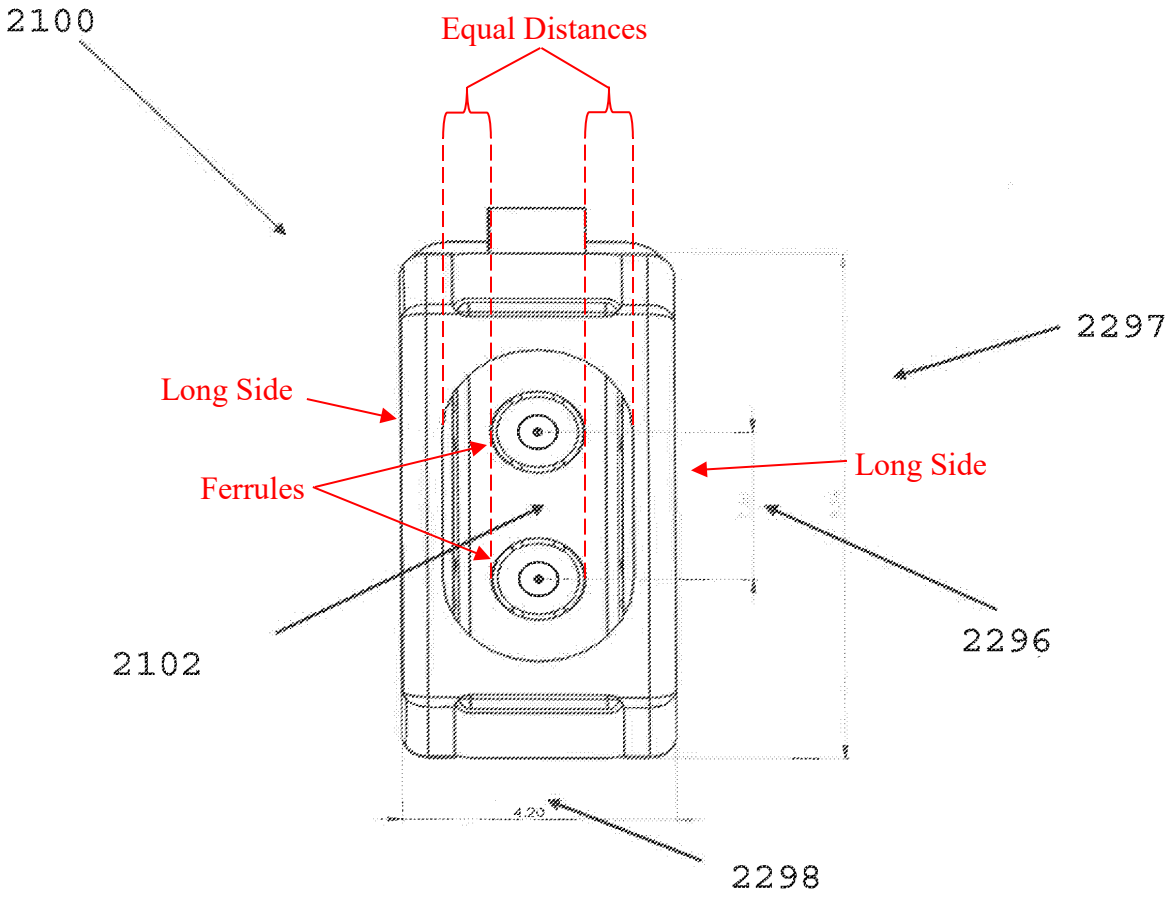


FIG. 22

EX1004: Fig. 22 (annotated).

475. In my opinion, it would have been obvious to arrange the ferrules (9203) to be equidistant from the long sides of the outer housing (9101, 9201, 9301, 9401) of micro connector (9100) of Figs. 16-36 to enable the micro connector to be receivable by the adapter (2400) when in both the first and second polarity configurations. As understood by a POSA, this arrangement results in the ferrules (9203) being symmetrically positioned between the long sides of the outer housing (9101, 9201, 9301, 9401) so that no matter the orientation of the housing relative to the ferrule or relative to the adapter (2400), the ferrules will be aligned with and inserted into the alignment sleeves of the adapter—regardless of the polarity configuration—when the micro connector is inserted into the adapter.

476. This modification would have been nothing more than the application of a known technique (equidistant ferrules) to improve a similar device (Takano's micro connector (9100) of Figs. 16-36) in the same way to yield predictable results (a micro connector receivable in an adapter in its two different polarity configurations).

477. A POSA would have had a reasonable expectation of success in making this modification as Takano's micro connector (2100, 3700) of Figs. 1-4 demonstrates such an arrangement of the ferrules (9203) is possible.

478. The remaining limitations of claims 16-20 are met by Takano alone or in view of Davidson, Castagna, and/or Ehrenreich, as needed, as explained in Sections VI, VII, and XI-XV.

XVII. SECONDARY CONSIDERATIONS

479. I understand that to date Patent Owner has not identified any secondary considerations of non-obviousness. In the event that the Patent Owner identifies any secondary considerations in the future, I may supplement my opinion to address them.

XVIII. TAKANO AND DAVIDSON ARE SUPPORTED BY THEIR RESPECTIVE PROVISIONAL APPLICATIONS

480. I understand that the non-provisional applications that published as Takano and Davidson were filed after the earliest priority date of the '794 Patent. I also understand that Takano claims priority to U.S. Provisional App. No. 62/649,539 ("the '539 Provisional"; EX1004), filed March 28, 2018, before the earliest priority date of the '794 Patent. I also understand that Davidson claims priority to U.S. Provisional App. No. 62/640,914 ("the '914 Provisional"; EX1013), filed March 9, 2018, before the earliest priority date of the '794 Patent.

481. I have been informed that in order for Takano and Davidson to qualify as prior art against the '794 Patent, Takano and Davidson must be considered as effectively filed as of the date of their respective provisional applications. I have been informed that in order for a non-provisional application (like the non-

provisional applications that published as Takano and Davidson) to be considered effectively filed as of the filing date of a provisional application, the non-provisional application must (1) claim priority to the provisional application, (2) be filed 1 year or less from the filing date of the provisional application, and (3) share a common inventor with the provisional application.

482. I have further been informed that for a non-provisional application to be considered effectively filed as of the filing date of the provisional application, the provisional application must also describe the subject matter relied upon in the non-provisional application.

A. Takano is Prior Art to the '794 Patent

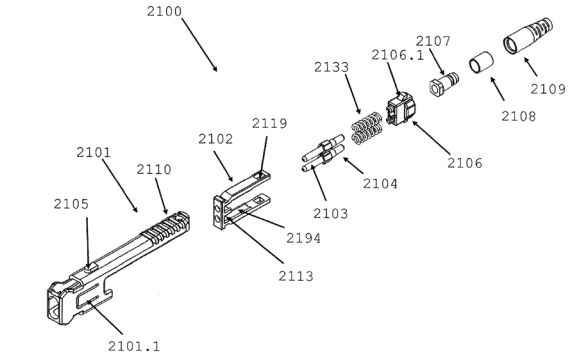
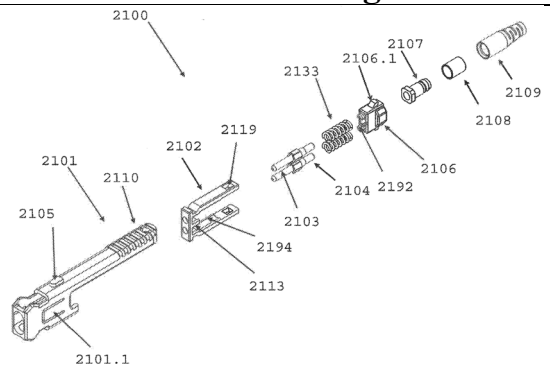
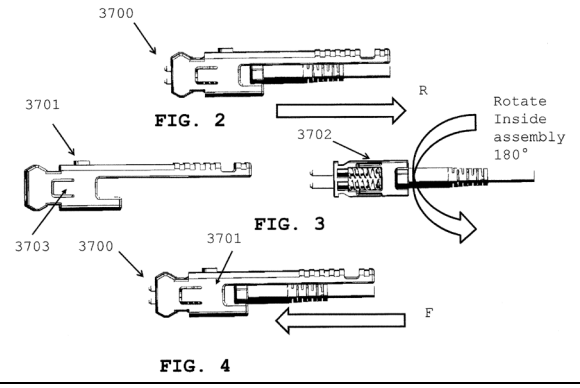
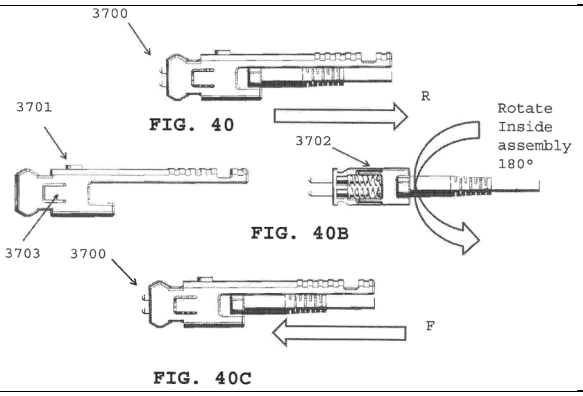
483. In my opinion, Takano qualifies as prior art against the '794 Patent.

484. In my opinion, Takano meets the first part of the test because Takano claims the benefit of the '539 Provisional (EX1003: ¶[1001]; EX1011: 296); Takano was filed 1 year from the filing date of the '539 Provisional (EX1003: (22)), and Takano shares common inventors with the '539 Provisional (EX1003: (72); EX1011: 294; EX1004: 10).

485. In my opinion, Takano meets the second part of the test because the '539 Provisional describes the subject matter in Takano forming the prior art invalidity positions described herein. For example, Figs. 21-40C and 91A-102B and paragraphs [218]-[242] and [280]-[293] of the '539 Provisional describe the

subject matter in Figs. 1-4 and 16-36 and paragraphs [0050]-[0051] and [0058]-[0074] of Takano.

486. In particular, Figs. 21, 40-40C, 91A-94E, and 100A-C of the '539 Provisional are generally identical to Figs. 1-4 and 16-36 of Takano. A select sampling of these corresponding figures is provided below, which shows the figures being identical or nearly identical:

Takano Figures	'539 Provisional Figures
 FIG. 1.	 FIG. 21
 FIG. 2 FIG. 3 FIG. 4	 FIG. 40 FIG. 40B FIG. 40C

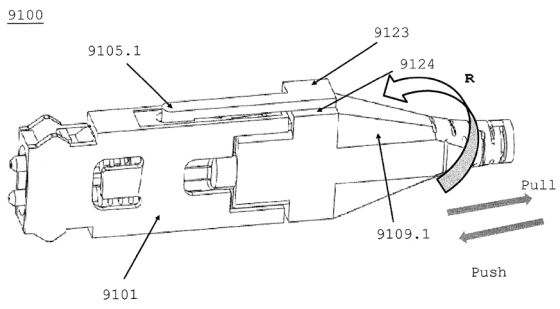


FIG. 16

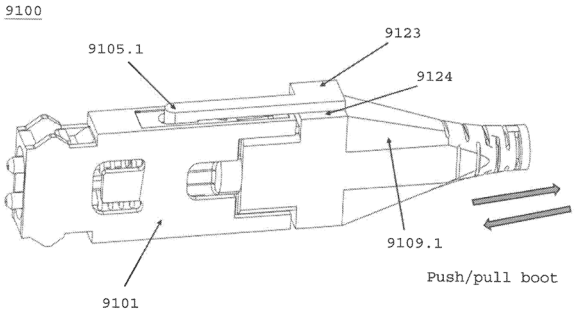


FIG. 91A

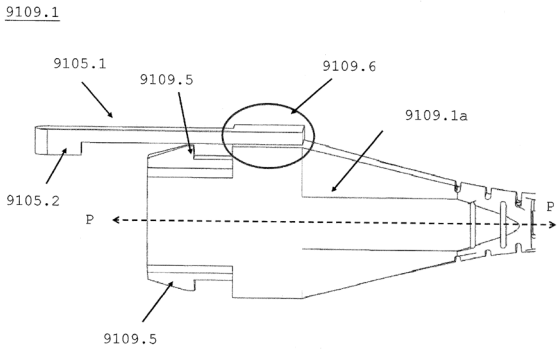


FIG. 17

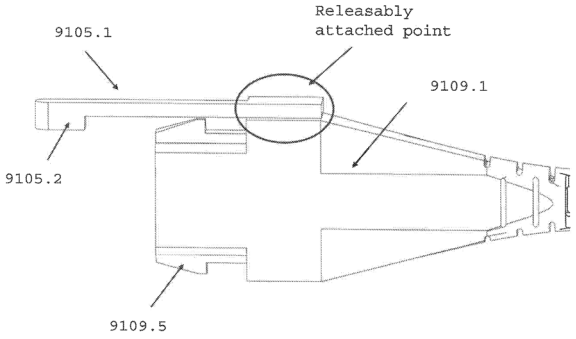


FIG. 91B

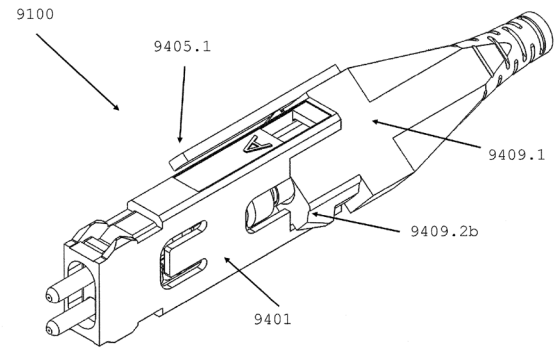


FIG. 30

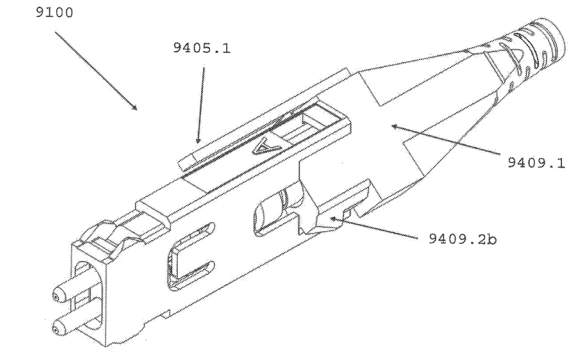


FIG. 94C.2

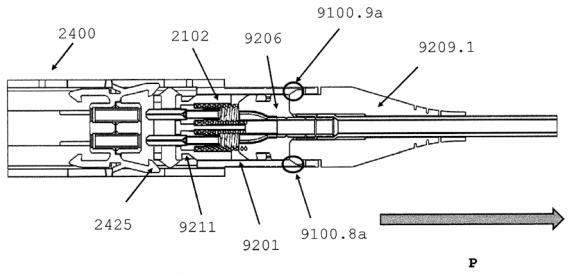


FIG. 36

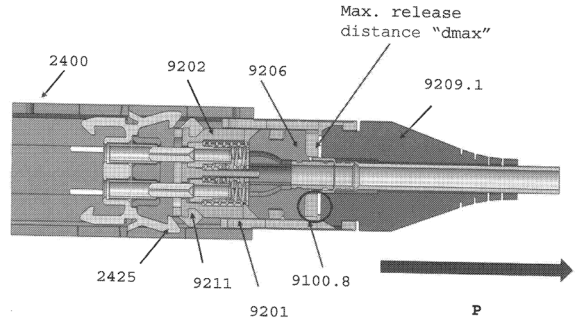


FIG. 100C

487. Further, several of the invalidity positions (see Ground 3 (Section VIII)) use figures directly from the '539 Provisional.

488. Therefore, in my opinion, the '539 Provisional describes the subject matter relied upon in Takano establishing the invalidity positions described herein.

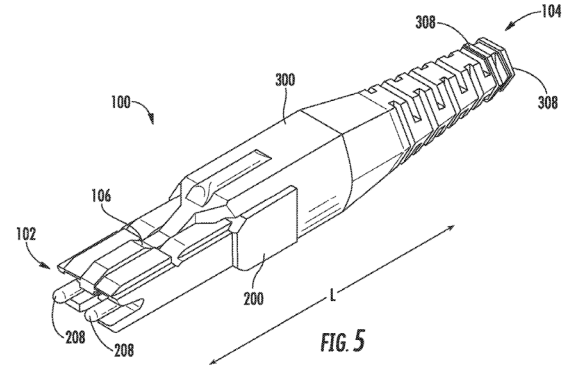
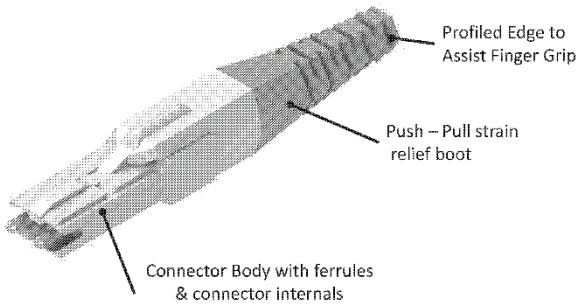
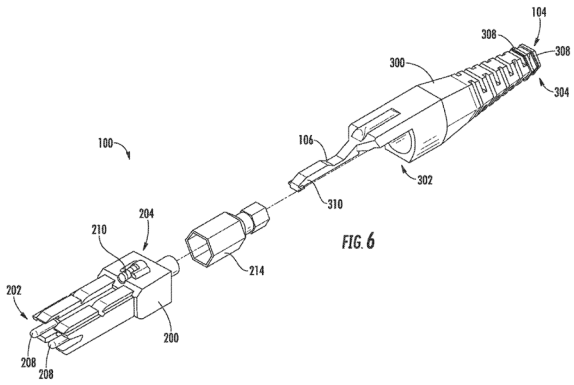
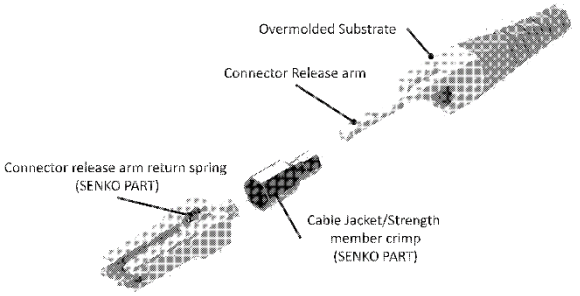
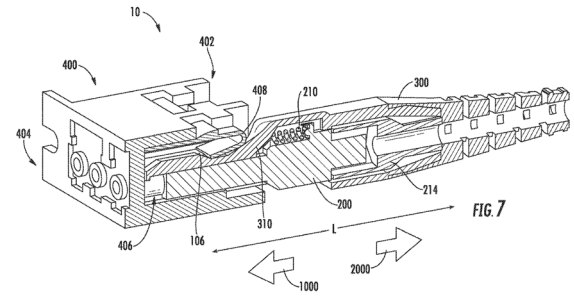
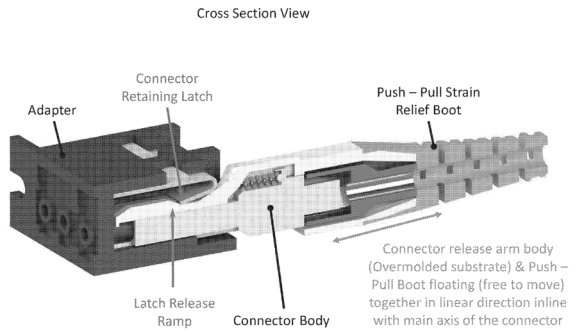
B. Davidson is Prior Art to the '794 Patent

489. In my opinion, Davidson qualifies as prior art against the '794 Patent.

490. In my opinion, Davidson meets the first part of the test because Davidson claims the benefit of the '914 Provisional (EX1006: ¶[1001]; EX1012: 255); Davidson was filed within 1 year of the filing date of the '914 Provisional (EX1006: (22)), and Davidson shares common inventors with the '914 Provisional (EX1006: (72); EX1012: 253; EX1013: 7).

491. In my opinion, Davidson meets the second part of the test because the '914 Provisional describes the subject matter in Davidson forming the prior art invalidity positions described herein. For example, drawing sheets 5-7 from the '914 Provisional describe the subject matter in Figs. 5-9 and paragraphs [0038]-[0039] of Davidson.

492. In particular, the figures identified in the chart above are generally identical between Davidson and the '914 Provisional. A select sampling of these corresponding figures is provided below, which shows the figures being identical or nearly identical:

Davidson Figures	'914 Provisional Figures
 FIG. 5	
 FIG. 6	
 FIG. 7	

493. Therefore, in my opinion, the '914 Provisional describes the subject matter relied upon in Davidson establishing the invalidity positions described herein.

494. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be

subject to cross examination in this post grant review and that cross examination will take place within the United States. If cross examination is required of me, I will be available for any such cross examination.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 14th day of June, 2024.

By Edward Lurie**:** /Edward Lurie/

Appendix A

Edward Lurie | Sr. Fiber Optic Interconnect Developer

- **Remote from Haiku, HI**
- **512-689-3664**
- **eblurie@sbcglobal.net**

Professional Profile

Proven Track record designing & developing Fiber Optic Interconnect Products: Connectors, CableAssemblies, Fanouts, Multifiber Connectors, and related Field Installation Kits & Tools. I successfully launched dozens of FO new products, leading development teams. My background in Precision Optical Mfg. has given me a unique perspective re: FO Product & Process Devel. Process development, Sub-micron machining, Injection Molding, Optical inspection, Precision Metrology, Tool Design and Fixturing are also areas of expertise. I have over 18 US Patents in FO Interconnect, listed below.

Core Skills

• FO Interconnect Design & Development
• Project Management
• Concurrent Engineering - DFM
• High yield manufacturing - 6 Sigma
• Invention submission & IP
• Problem solving
• Creativity • Process development
• Ideation • Prototype development

Career Summary

Sep 1983 - Aug 2019 3M Co and Corning, Inc, Austin, TX
Sr Product Development Specialist

Outline:

Developed Industry Standard and novel FO Interconnect Products for Telecom, Datacom, Enterprise (LANs) & Wireless markets. I was a Sr. Product Development Specialist (Chief Engineer - Technical SME) and concurrently served as Project Manager.

Key Responsibilities:

• FO Interconnect product Design & development from concept to Launch,
• Design for high yield manufacturing,
• Support to Customers & Application Engineering
• Concurrent process engineering.
• Manufacturing interface & support.

Key Achievements:

• Developed a large portfolio of FO Simplex, Duplex, and Multifiber Interconnect products over a 36yr Career (Biconic, ST Epoxy, ST, SC & LC Hotmelt, SC/UPC and SC/APC Epoxy, 8F -24F MTP/MPO,OGI, SC/No-Polish Mechanical Splice, Crimplok+, Crimplok+ Extreme, and SC/APC Shuttered Connectors).
• Developed dozens of proprietary manufacturing processes for polishing and Cable Assembly, thatare held as Trade Secret.
• Developed novel field installable FO Interconnects and Field Termination Kits for both Key Account Customers and the general Market.
• I am known widely as an industry expert in FO Connector Design and Process Development.
• Contributed to Telcordia, IEC, and TIA/EIA Industry Standards FO Interconnect over 85% of my career.
• Managed the Manufacturing Engineering group for several years in the early 1990's.

Apr 1980 - Apr 1983 Republic Lens Co, Englewood, NJ
Production Manager

Outline:

Production and Plant Manager for Precision OEM Optical Manufacturer. Oversaw precision optical manufacturing of custom lenses, mirrors, prisms, and optical assemblies, including in-house Thin-film coatings. Had P&L responsibility for the company.

Education

• **BS in Business Administration** | Franklin & Marshall College | Jul 1976 - Apr 1980 | Post Graduate Study at the Institute of Optics, University of Rochester, NY

Additional

Hobbies & Interests
Swimming, Tennis, Downhill Skiing, Hiking, Golf, Fitness , Tropical fruit & vegetable farming

Software
Microsoft Office, Excel, Word, PowerPoint, Skype, Microsoft Teams, Adobe Illustrator, Microsoft Windows, Microsoft Project

Languages
Proficient in German, mid-level Japanese

Publications
I have published several articles for OFC (Optical Fiber Conference), and other industry Magazines eg: Fiber Optic Product News, etc.

Patent Awards

I have been awarded the following US Patents, most are also filed Internationally:

US-20210405304-A1 - Fiber optic connectors with funnel-shaped boots and methods of installing the same
US-10663679-B2 - Assembly tool and optical fiber connector assembly method
US-10502919-B2 - Cable assembly with a removable installation device
US-20180299633-A1 - Cable assembly with a removable installation device

Patent Awards (continued)

US-10001619-B2 - Cable assembly with a removable installation device
US-20180081130-A1 - Assembly tool and optical fiber connector assembly method
US-20170261716-A1 - Cable assembly with a removable installation device
US-20140299645-A1 - Low cost, disposable optical fiber cleaver
US-8292699-B2 - Optical fiber polishing apparatus and method
US-20100029180-A1 - Optical fiber polishing apparatus and method
US-7255486-B2 - Field termination apparatus and method for small form factor optical connectors with thermoplastic adhesive
US-7147384-B2 - Small form factor optical connector with thermoplastic adhesive
US-7149402-B2 - Device for holding field termination load adapter for optical connectors
US-7108431-B2 - Ferrule for use in fiber optic connectors
US-20060105684-A1 - Fiber polishing apparatus and method for field terminable optical connectors
US-20060103039-A1 - Heat shrink device and method
US-20060104574-A1 - Field termination apparatus and method for small form factor optical connectors with thermoplastic adhesive
US-20060104588-A1 - Device for holding field termination load adapter for optical connectors
US-7001081-B2 - Strain relief boot with flexible extension for guiding fiber optic cable
US-6973242-B2 - Apparatus useful for guiding fiber optic ribbons into ferrules
US-20050213891-A1 - Small form factor optical connector with thermoplastic adhesive
US-6850684-B2 - Three dimensional optical circuits
US-6832032-B2 - In-line shuffle modules utilizing three dimensional optical circuits
US-20040234209-A1 - Strain relief boot with flexible extension for guiding fiber optic cable
US-20040208455-A1 - Apparatus useful for guiding fiber optic ribbons into ferrules
US-20040208456-A1 - Ferrule for use in fiber optic connectors
US-6556754-B2 - Three dimensional optical circuit
US-6549710-B2 - Method of making a three dimensional optical circuit
US-20030031436-A1 - Three dimensional optical circuit
US-20030031437-A1 - In-line shuffle modules utilizing three dimensional optical circuits
US-20030031452-A1 - Method of making a three dimensional optical circuit
US-20030031448-A1 - Optical manifold
US-5458528-A - Method for polishing fiber optic ferrules
US-5351327-A - Polished fiber optic ferrules
US-5109983-A - Package for an optical fiber jumper