US006331079B1

(12) **United States Patent**
Grois et al.

(10) **Patent No.: US 6,331,079 B1**
(45) **Date of Patent: Dec. 18, 2001**

(54) **MOUNTING SYSTEM FOR A CONNECTOR ASSEMBLY TO A SUBSTRATE**

(75) Inventors: **Igor Grois**, Northbrook; **Wenzong Chen**, Naperville, both of IL (US); **Jeffrey A. Matasek**, Cedarburg, WI (US)

(73) Assignee: **Molex Incorporated**, Lisle, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/456,198**

(22) Filed: **Dec. 7, 1999**

(51) **Int. Cl.**[7] **G02B 6/36**; G03B 6/38

(52) **U.S. Cl.** **385/53**; 385/62; 385/60; 385/55; 385/92; 439/567

(58) **Field of Search** 385/92, 53, 56, 385/62, 64, 66, 60, 93, 88; 439/567, 4.7; 361/4.5

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,550,362	*	10/1985	Reimer	361/415
4,767,179	*	8/1988	Sampson et al.	385/93
5,121,454		6/1992	Iwano et al.	385/60
5,257,947	*	11/1993	Scheer et al.	439/567
5,542,015		7/1996	Hultermans	385/60
5,764,834		6/1998	Hultermans	385/60
6,050,845	*	4/2000	Smalley et al.	439/417

OTHER PUBLICATIONS

Diamond Fiber Optic Components product bulletin, undated.

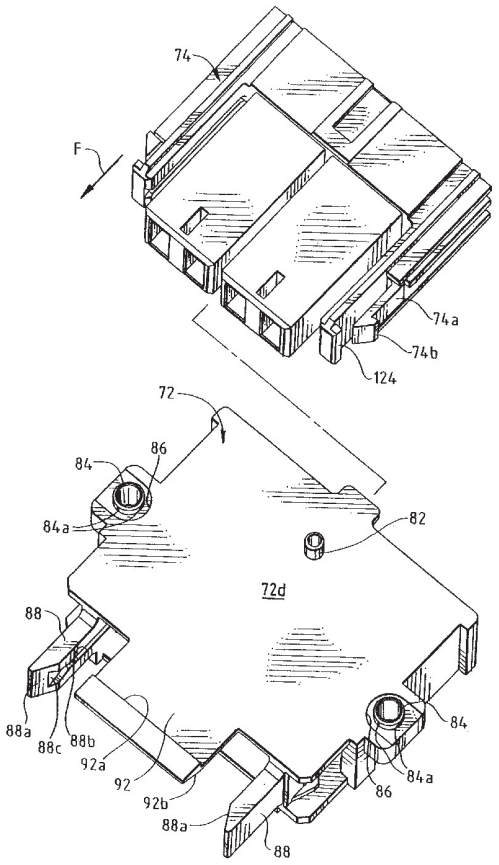
* cited by examiner

Primary Examiner—Audrey Chang
(74) *Attorney, Agent, or Firm*—A. A. Tirva

(57) **ABSTRACT**

A system is provided for mounting a connector assembly to a substrate. The substrate includes at least one pre-placement hole and at least one positioning hole. A connector housing has a pre-placement peg sized for insertion into the pre-placement hole in the substrate with substantially zero insertion forces to generally place the housing on the substrate. The housing has a positioning peg sized for insertion into the positioning hole in the substrate by a press-fit to precisely fix the housing on the substrate.

19 Claims, 20 Drawing Sheets



US Conec EX1008
IPR2024-00117
U.S. Patent No. 11,333,836

FIG. 1

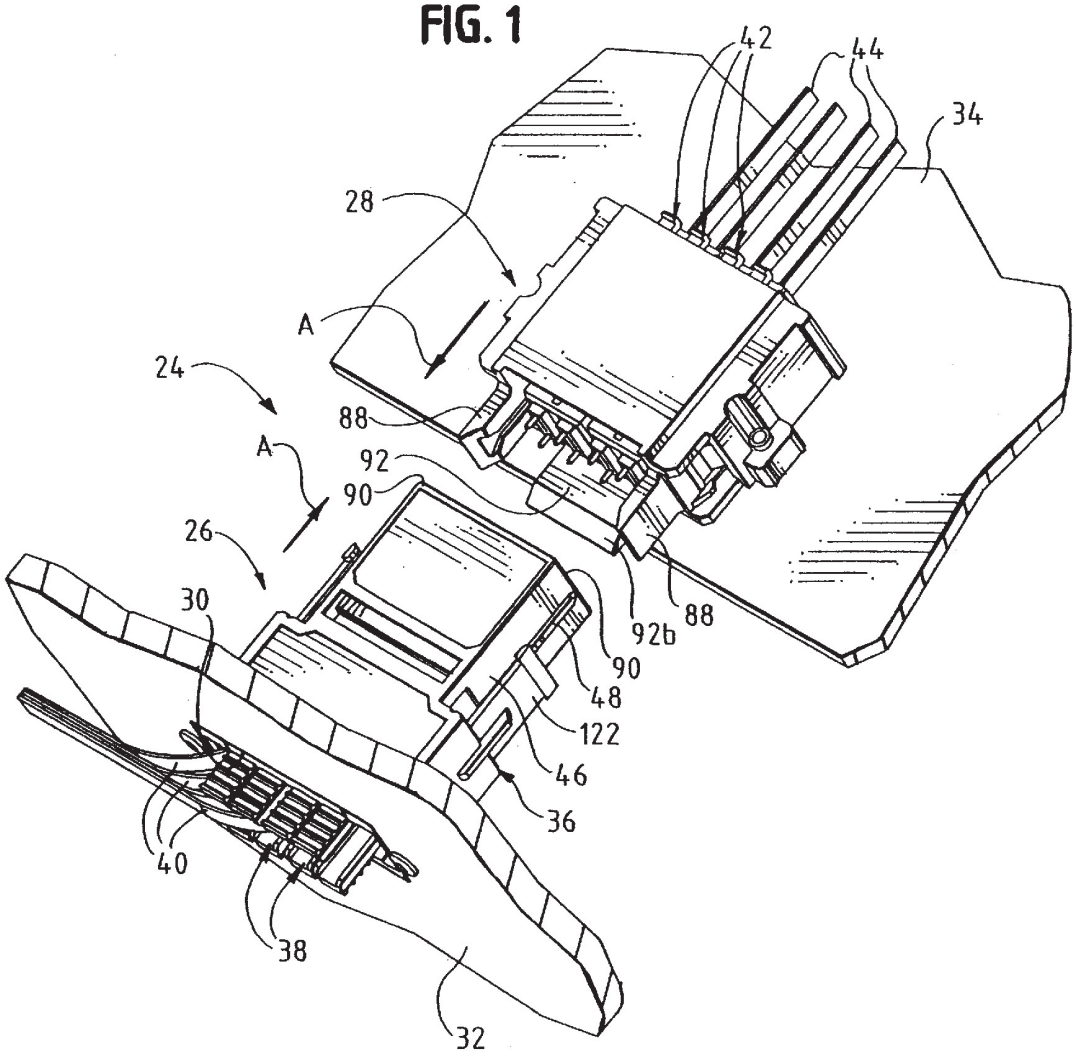


FIG. 2

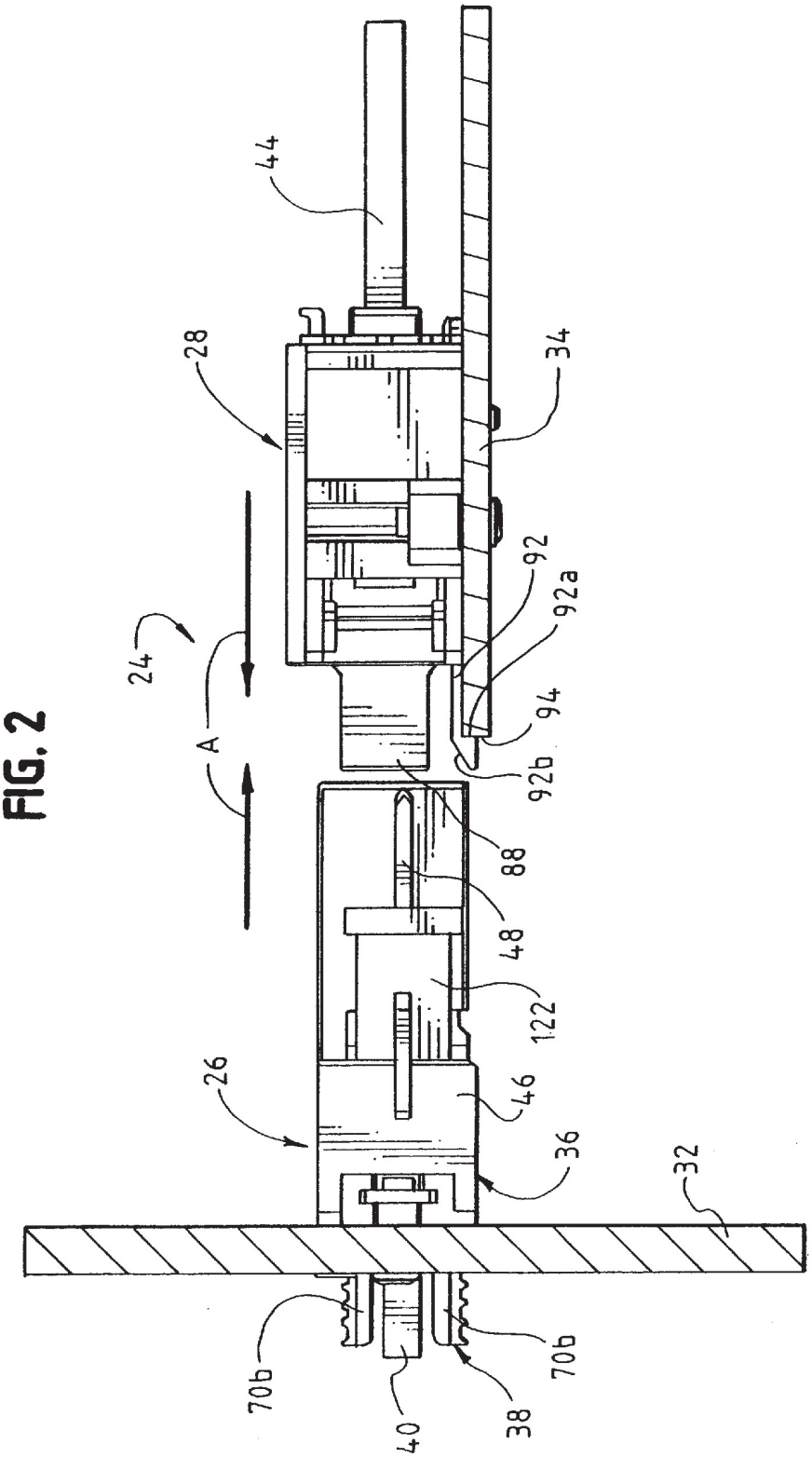


FIG. 3

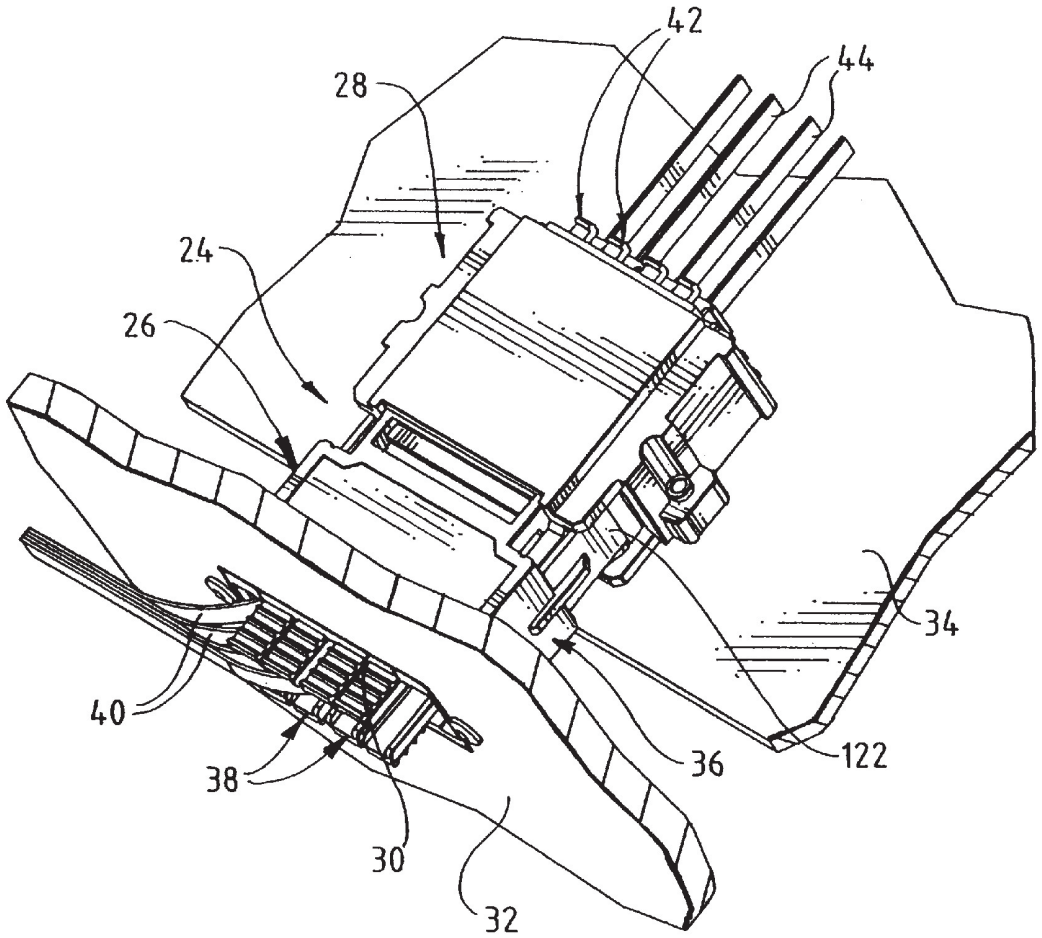


FIG. 4

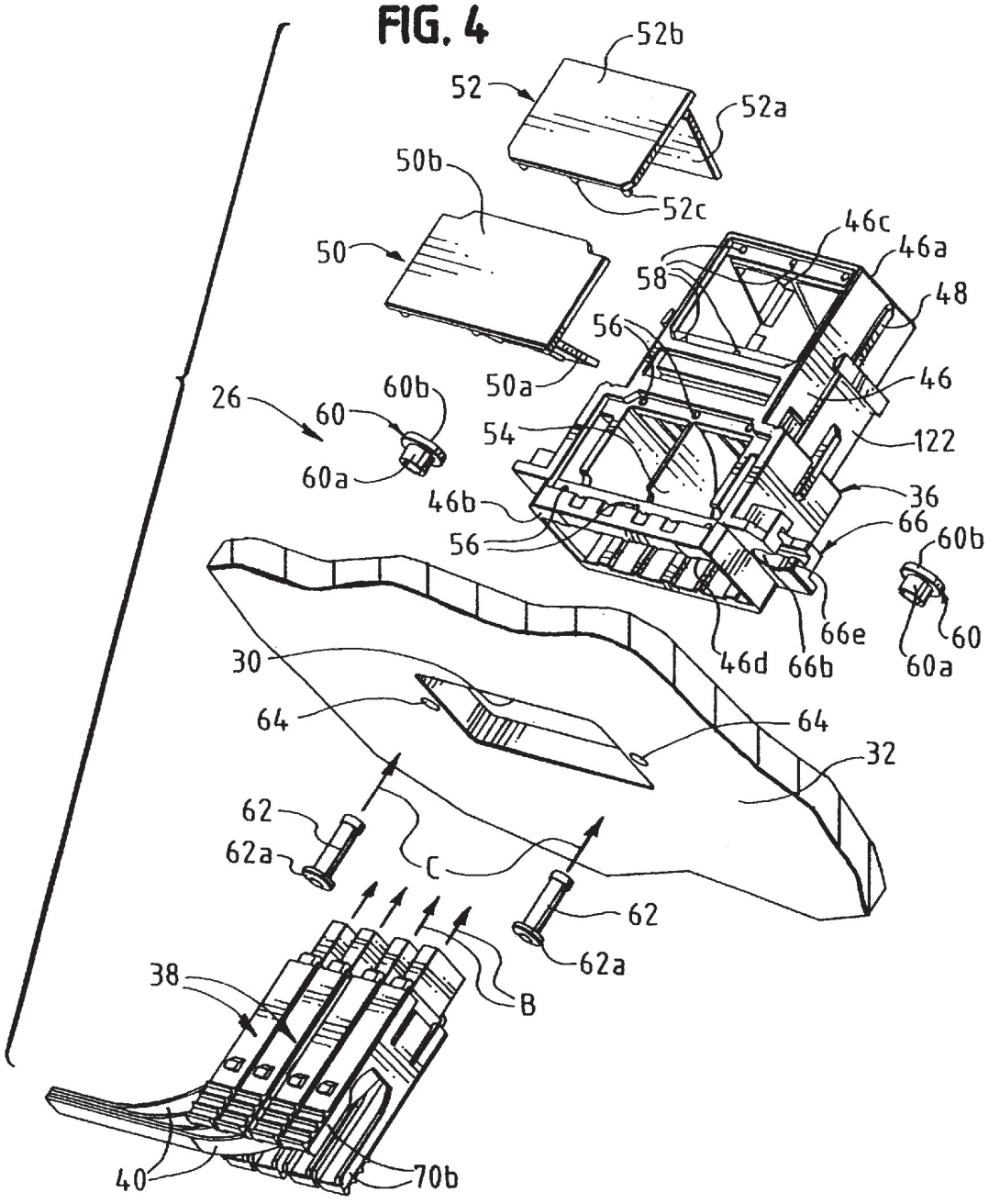

52b
52
52a
50b
52c
50
46c
46a
58
48
56
46
50a
26
60b
60
54
122
60a
46b
36
56
66
60b
66e
60
46d
66b
60a
30
64
64
32
62
62a
C
62
62a
38
B
40
70b

FIG. 5

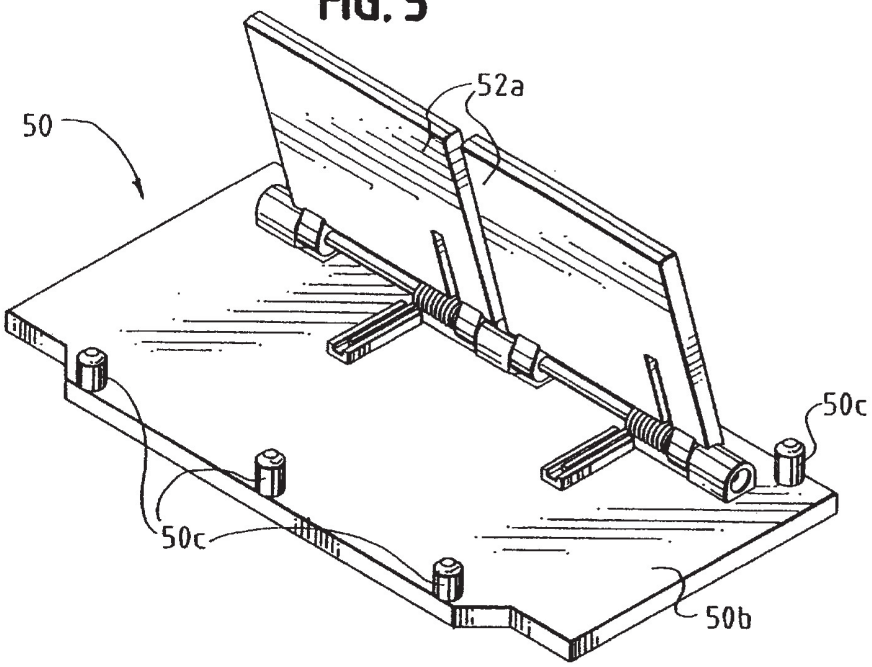


FIG. 6

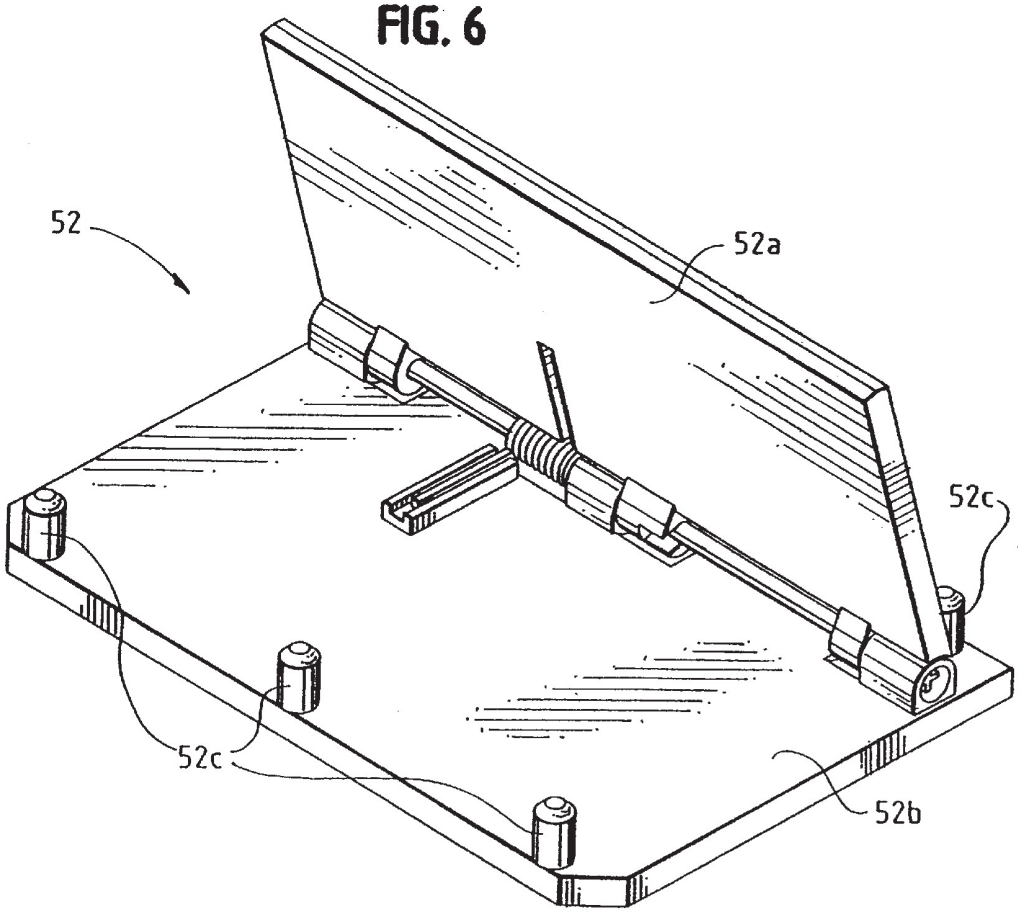
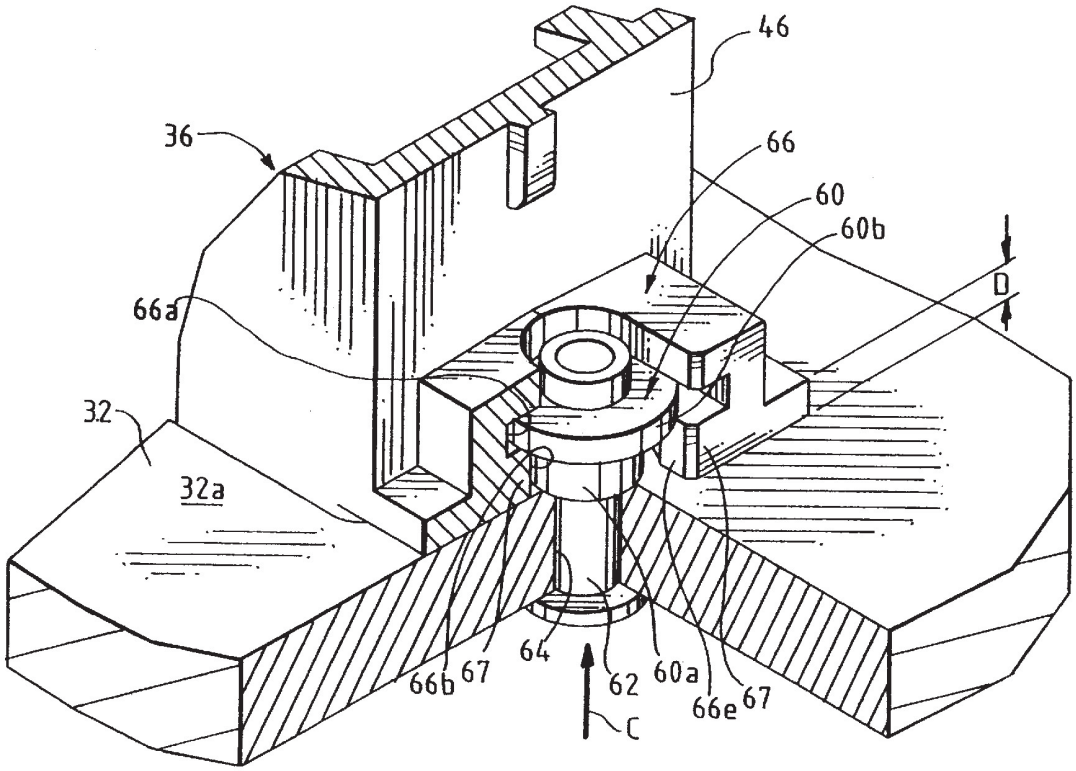


FIG. 7



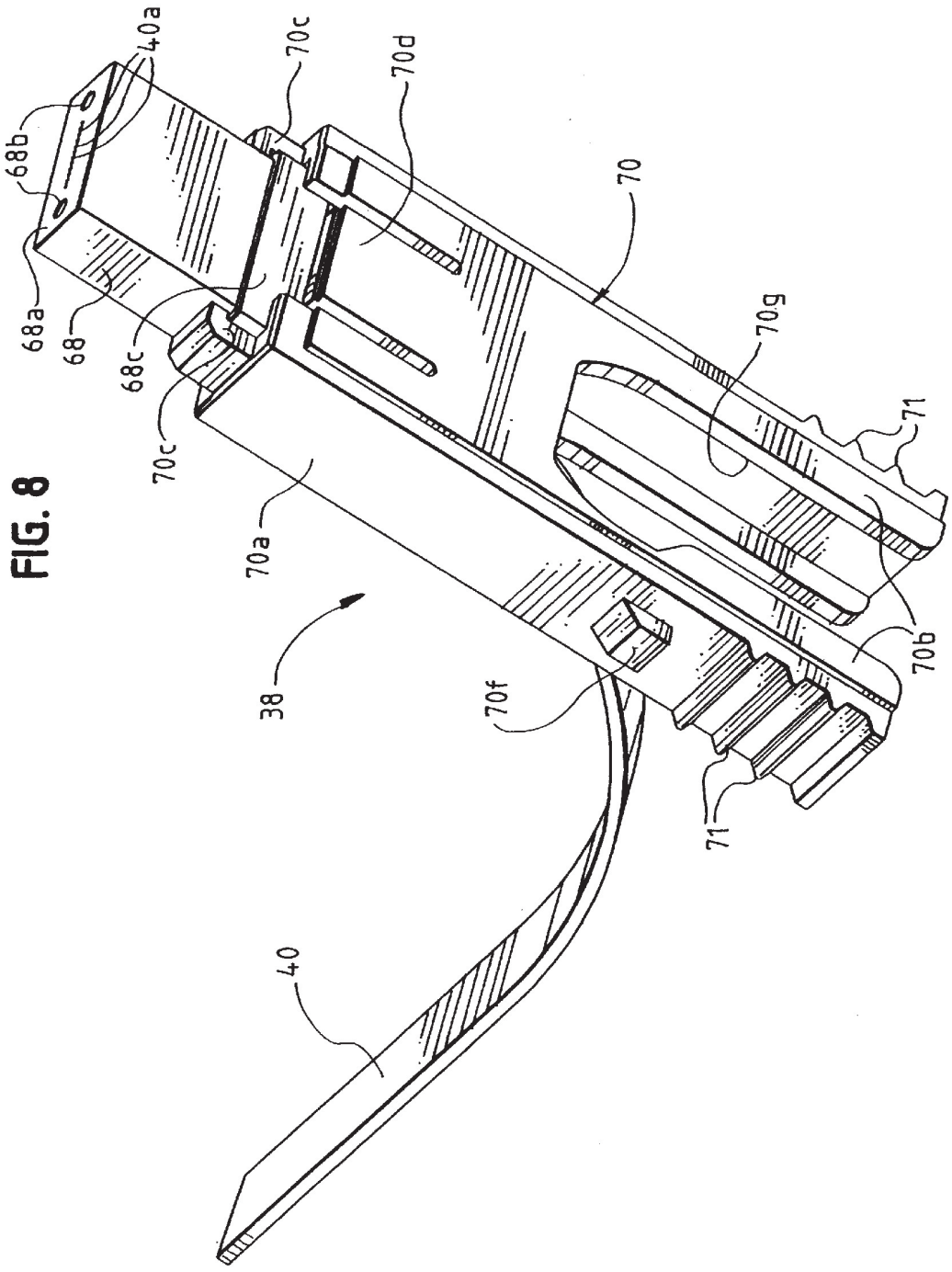


FIG. 8

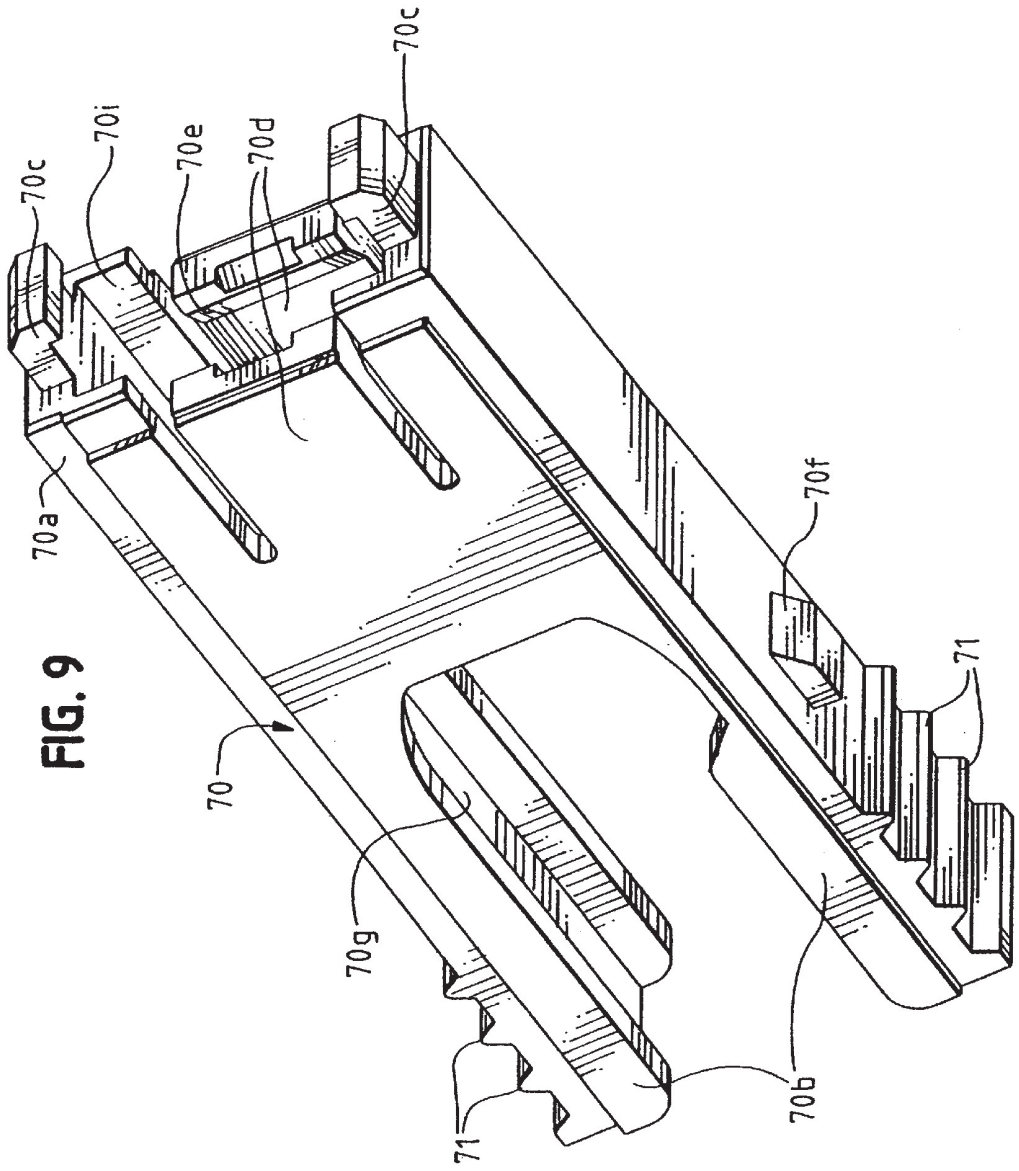


FIG. 9

FIG. 10

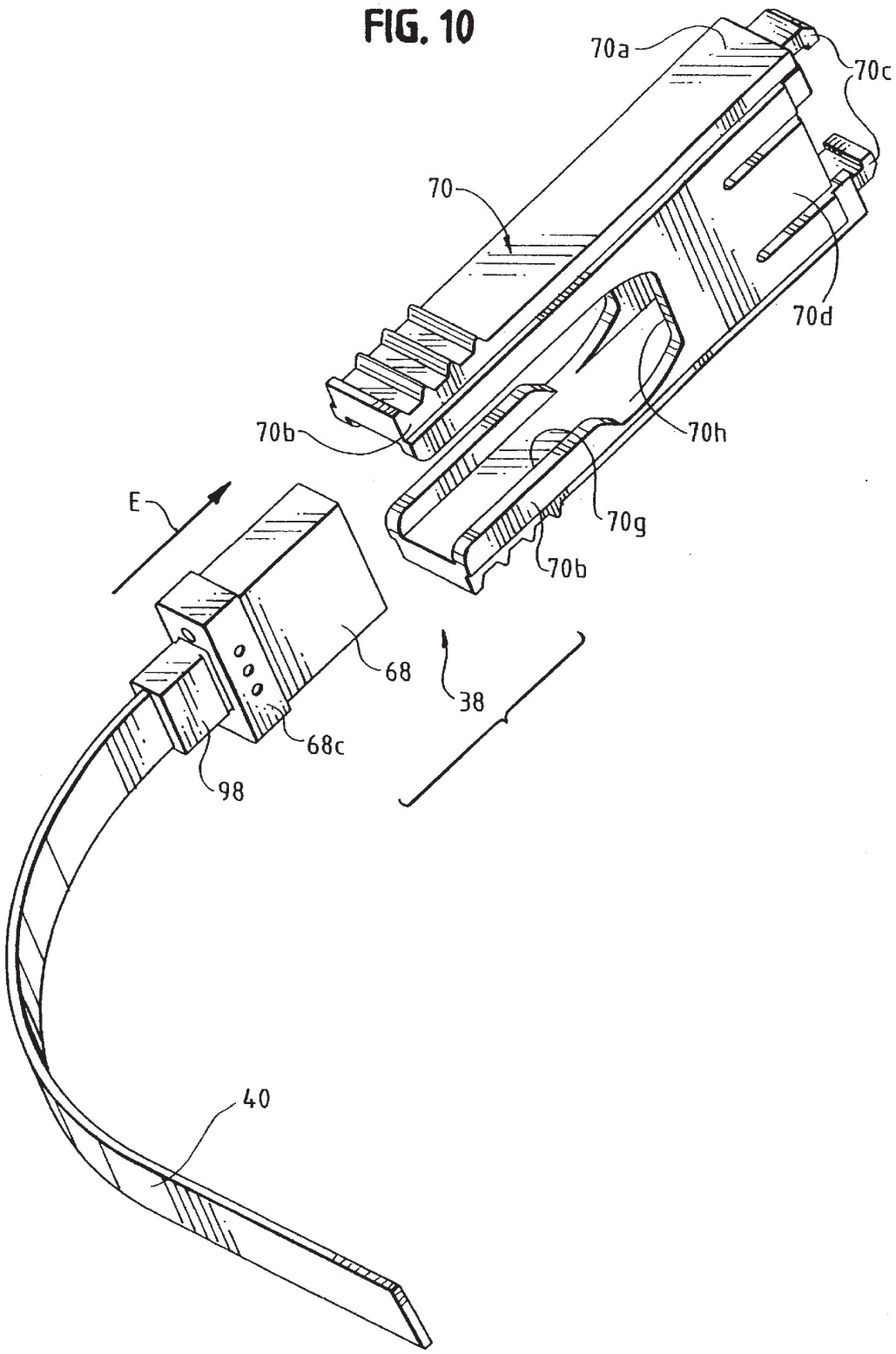


FIG. 11

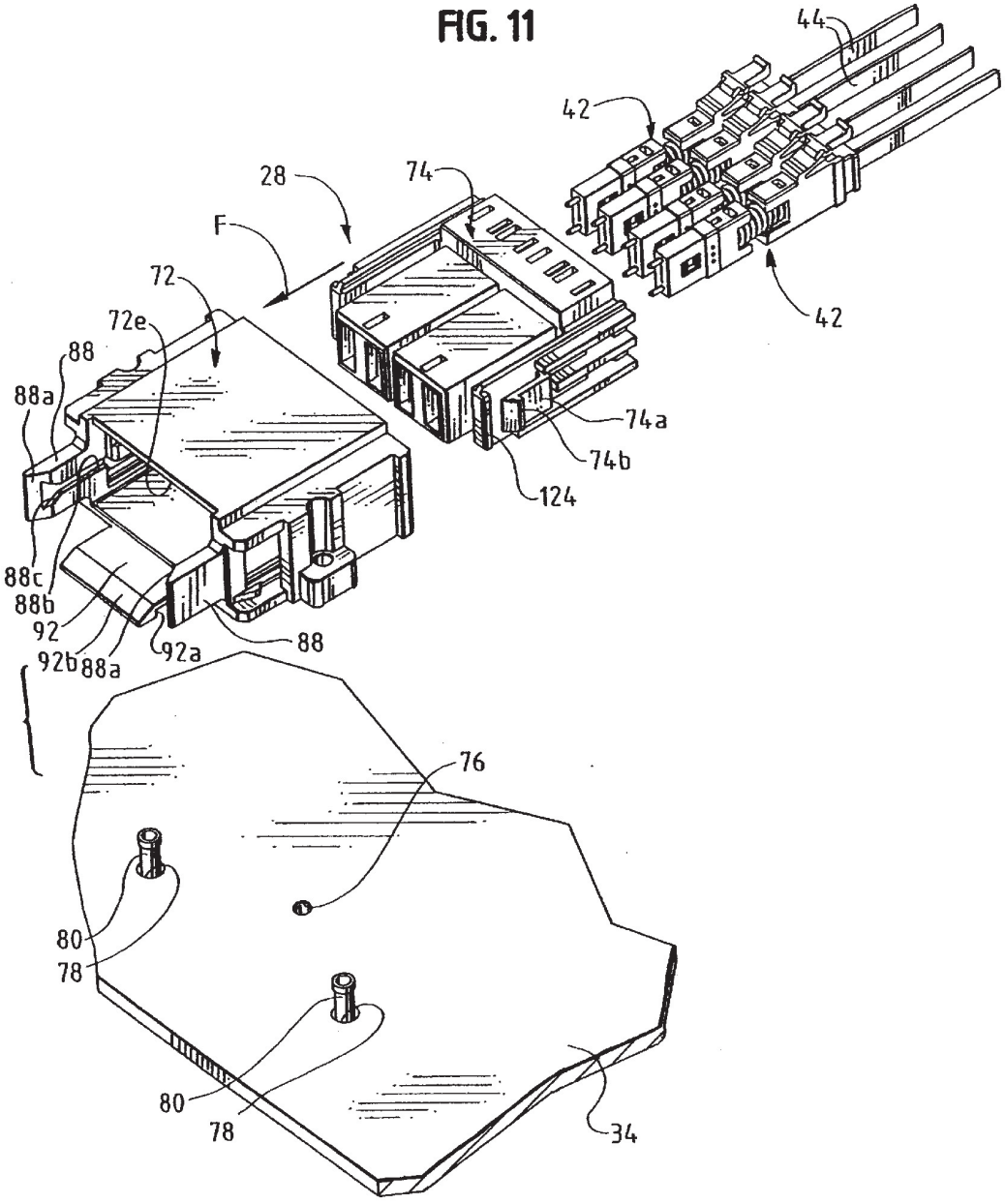

44
42
28
74
F
72
72e
88
88a
74a
74b
124
42
88c
88b
92
92b
88a
92a
88
76
80
78
80
78
34

FIG. 12

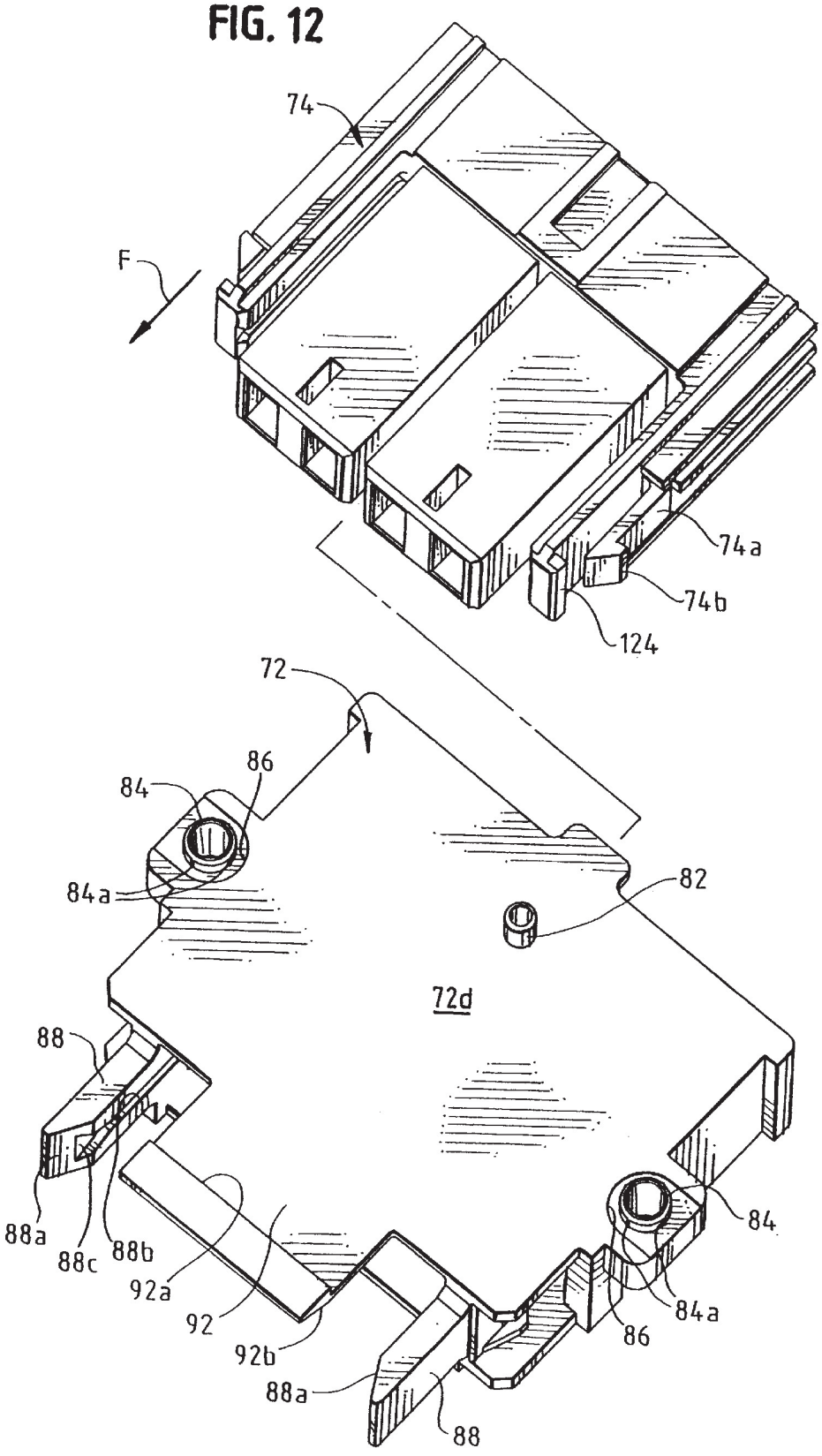

74
F
74a
74b
124
72
86
84
84a
82
72d
88
88a
88c
88b
92a
92
92b
88a
88
84
84a
86

FIG. 13

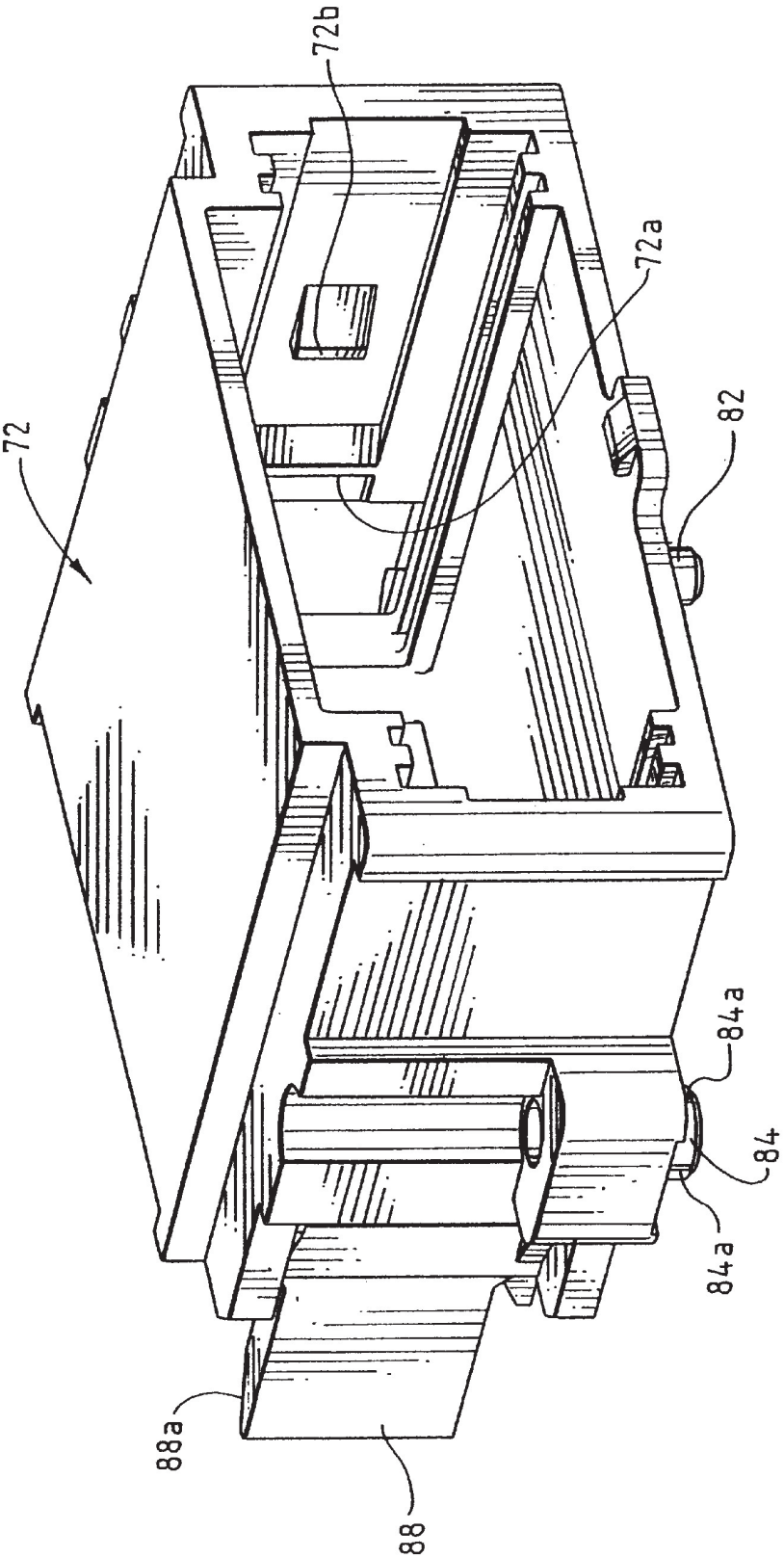


FIG. 14

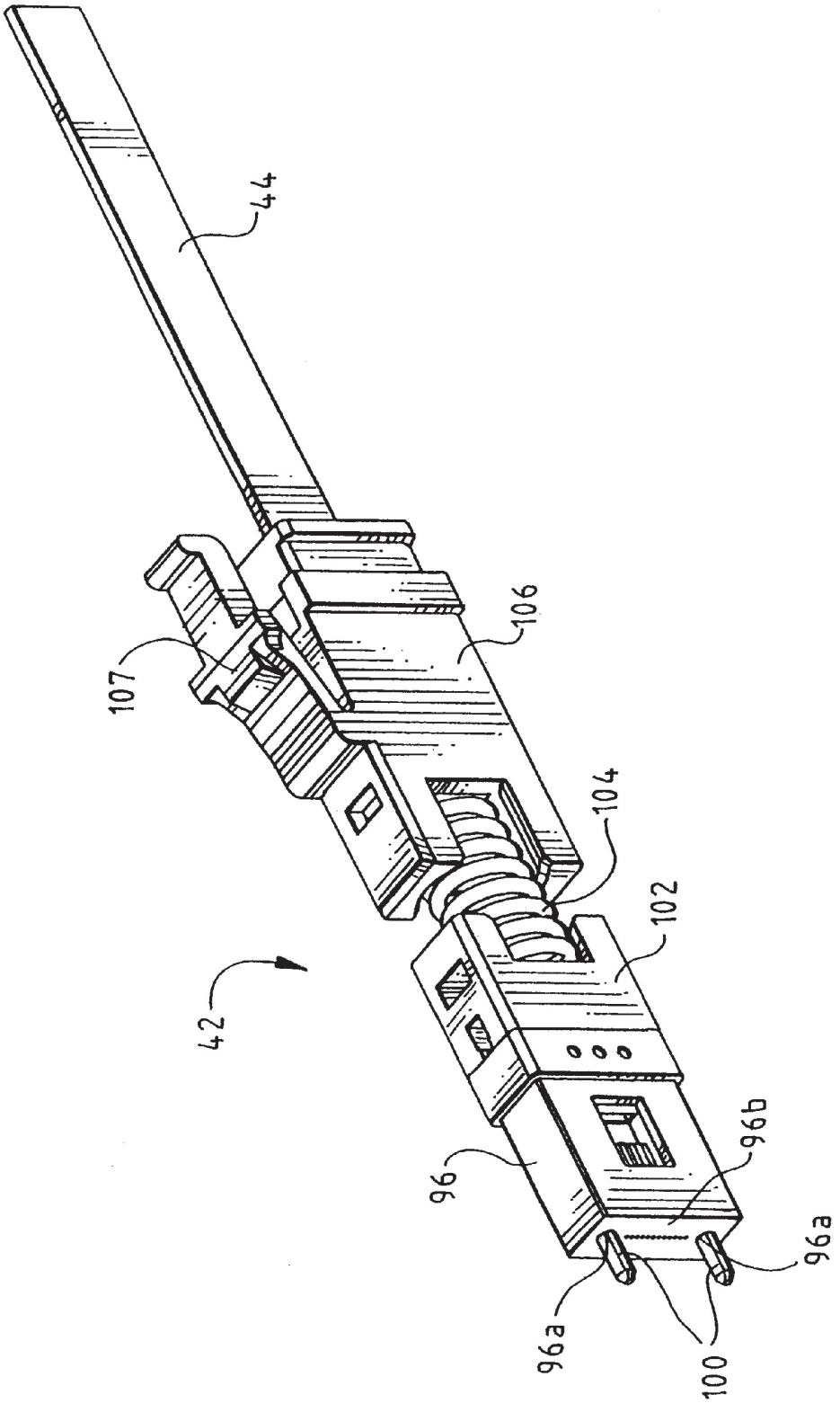


FIG. 15

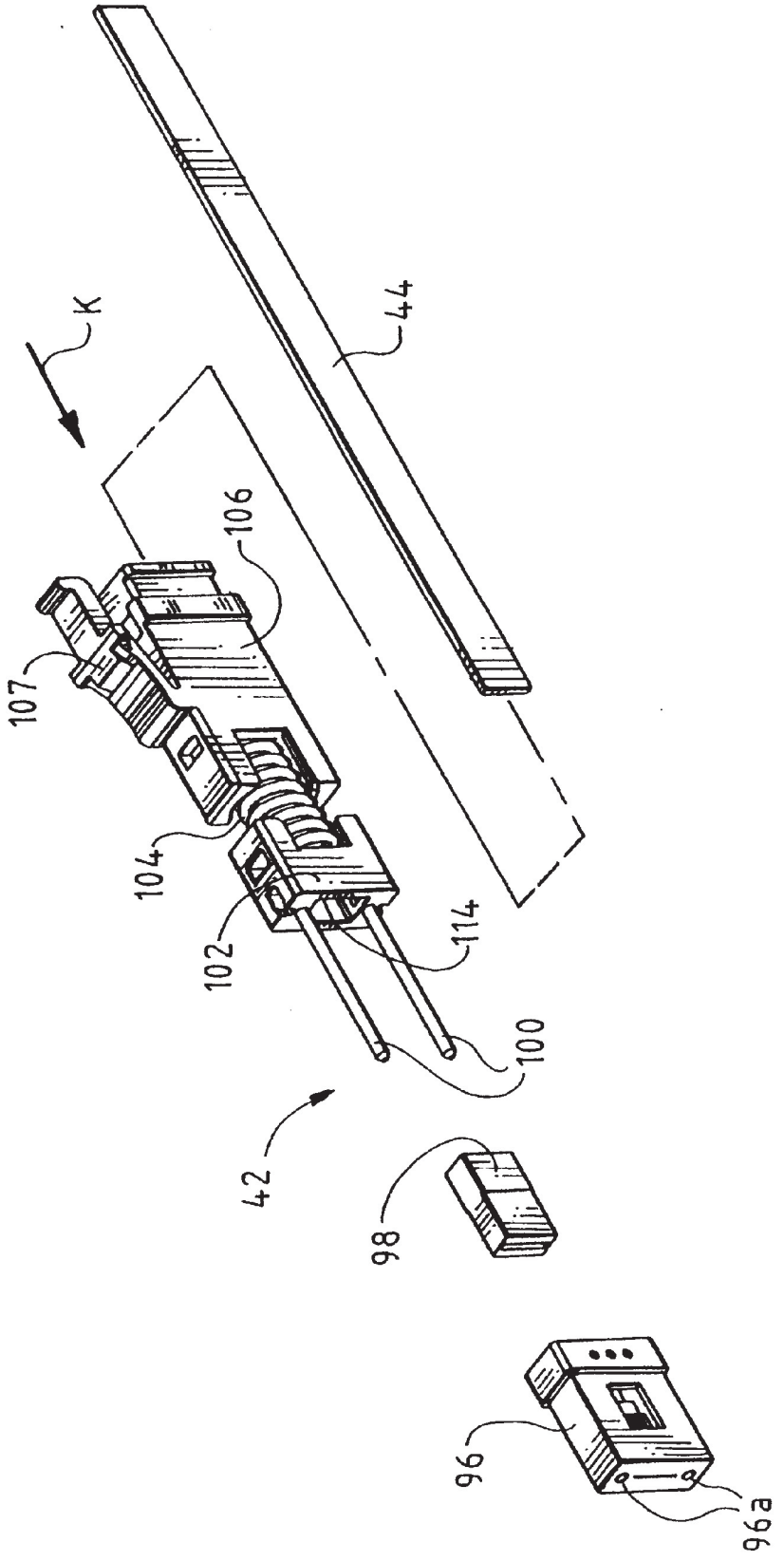


FIG. 16

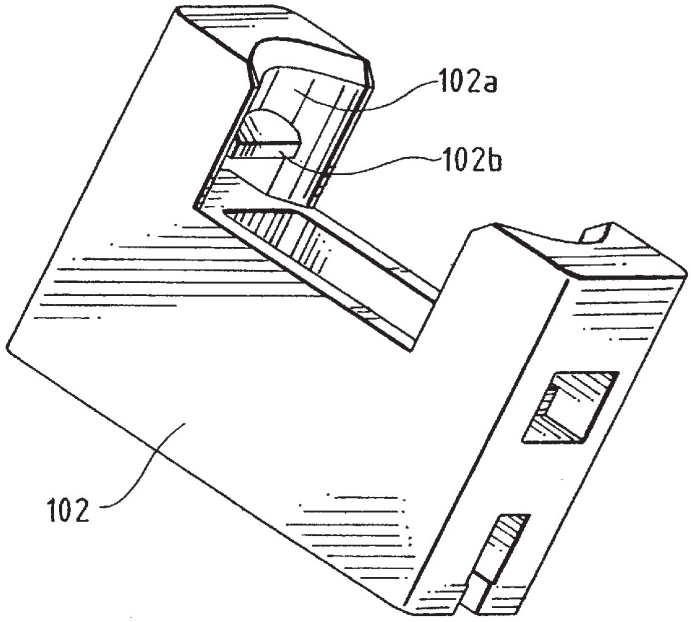
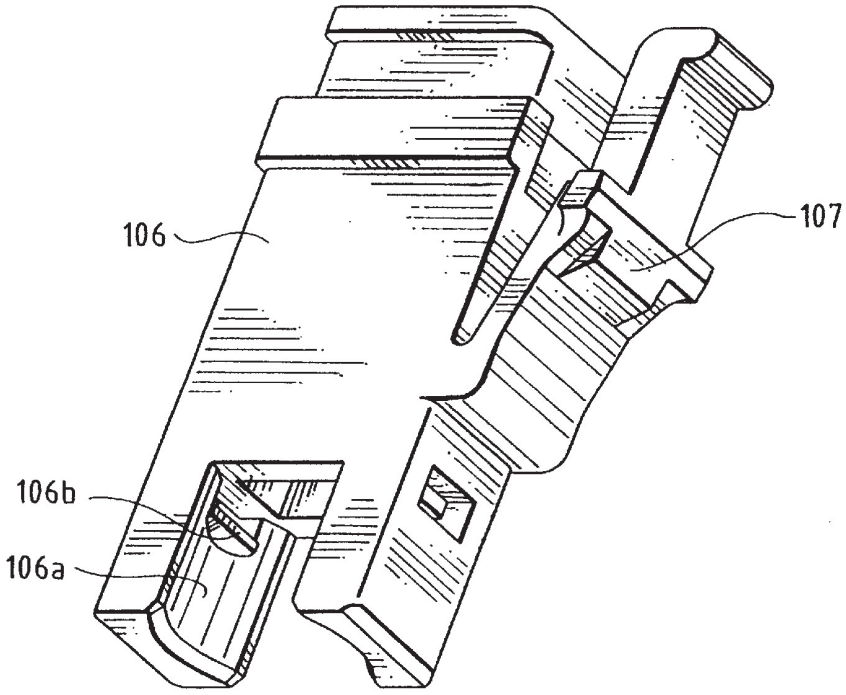


FIG. 17



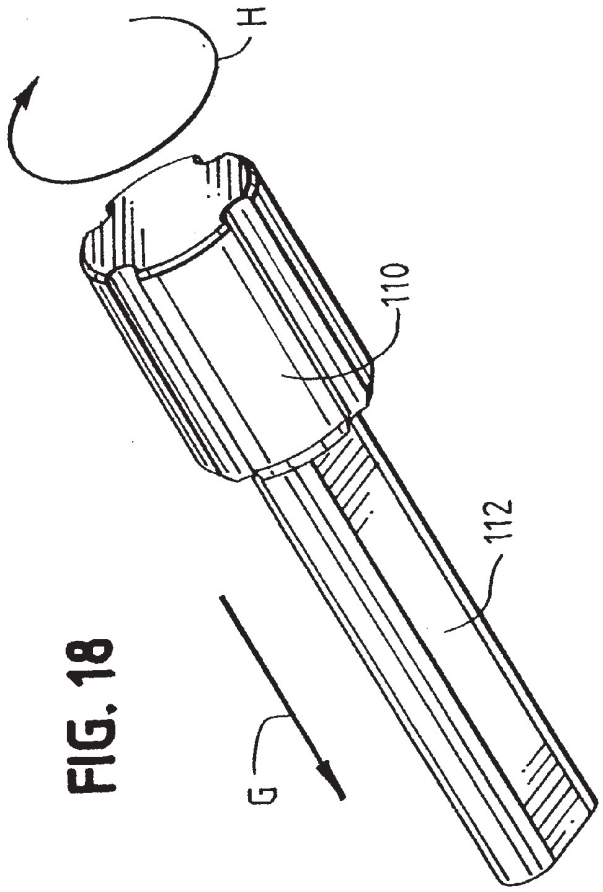


FIG. 18

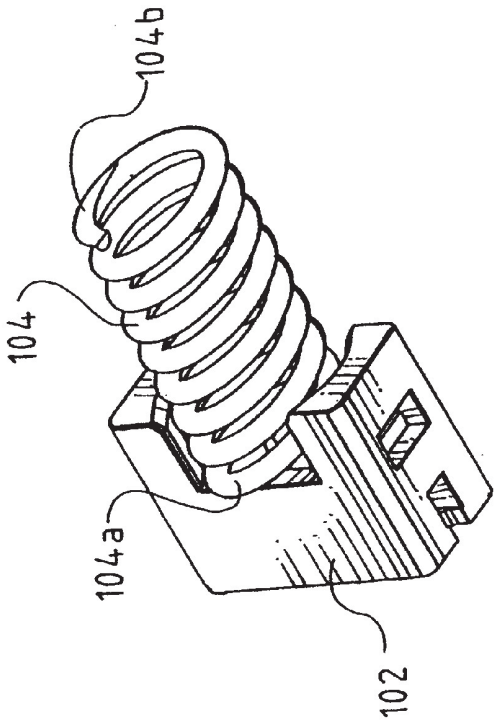
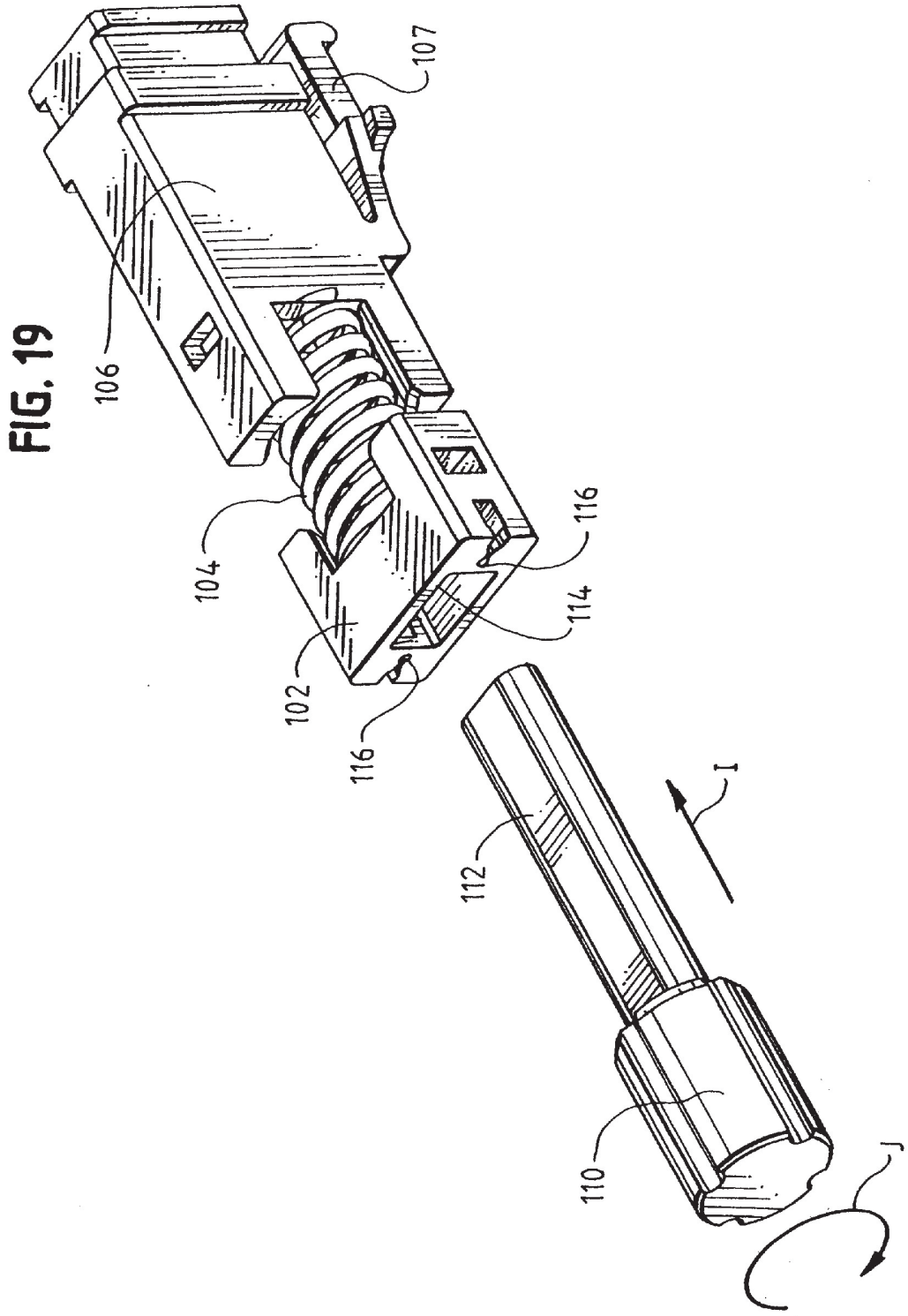


FIG. 19



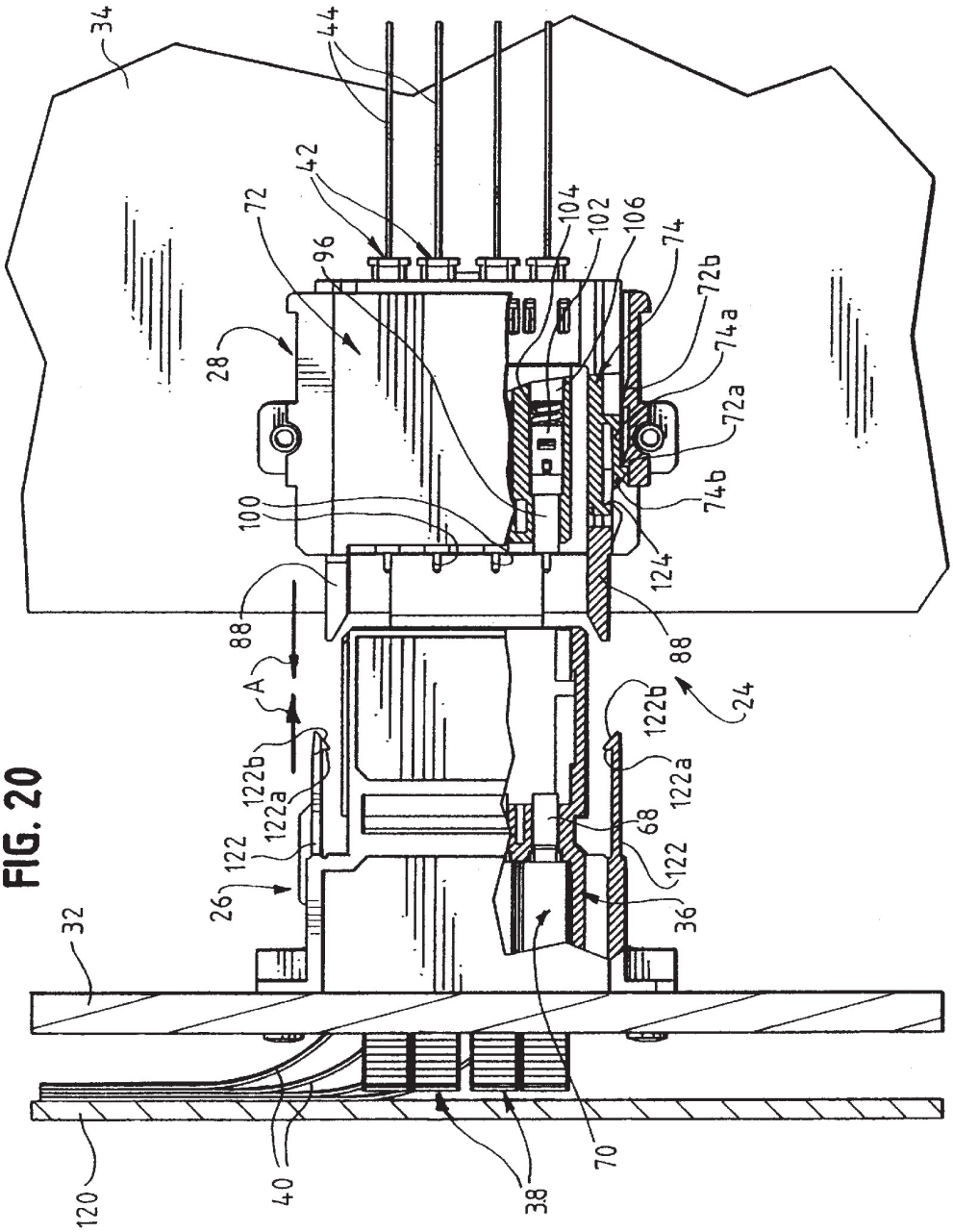

34
44
42
72
96
28
104
102
106
74
72b
74a
72a
74b
100
124
88
A
122b
122a
122
26
32
120
40
38
70
68
36
24

FIG. 20

FIG. 21

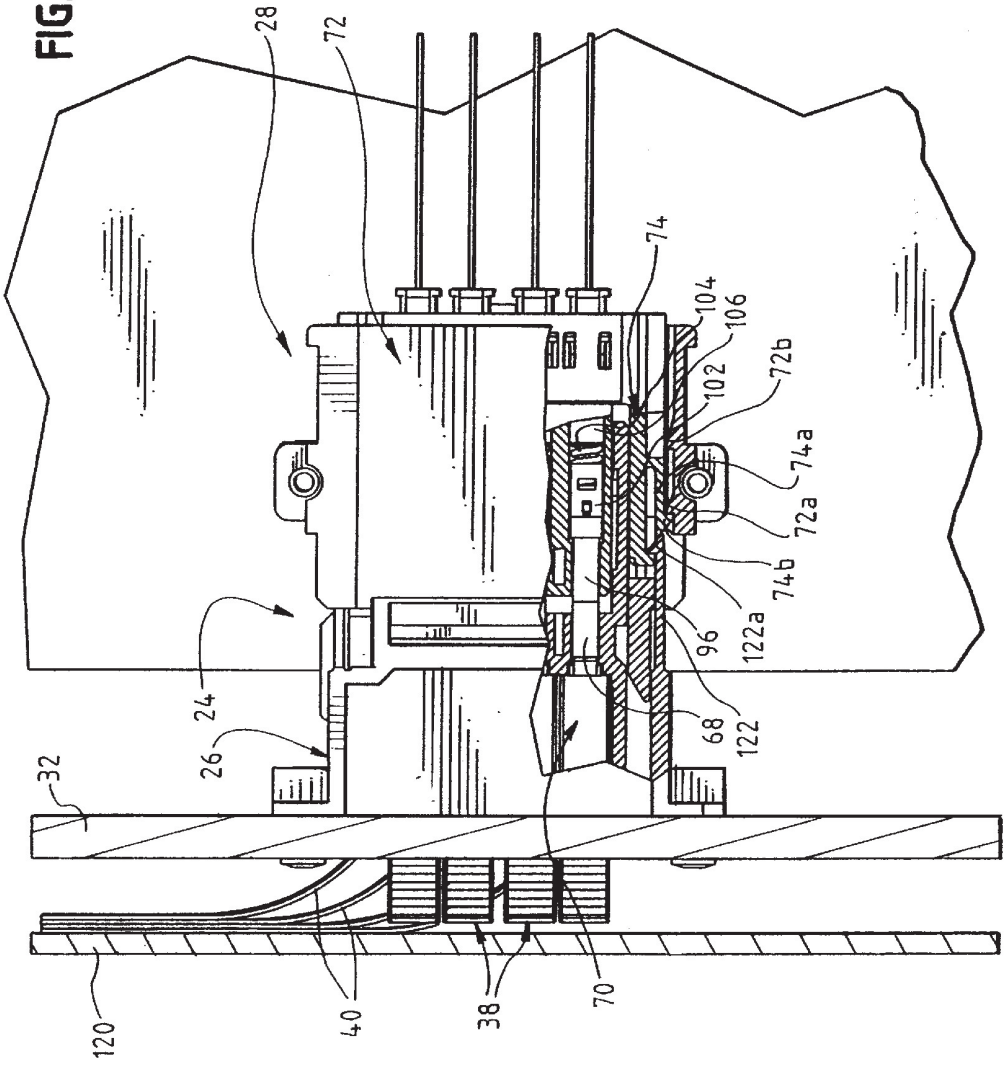
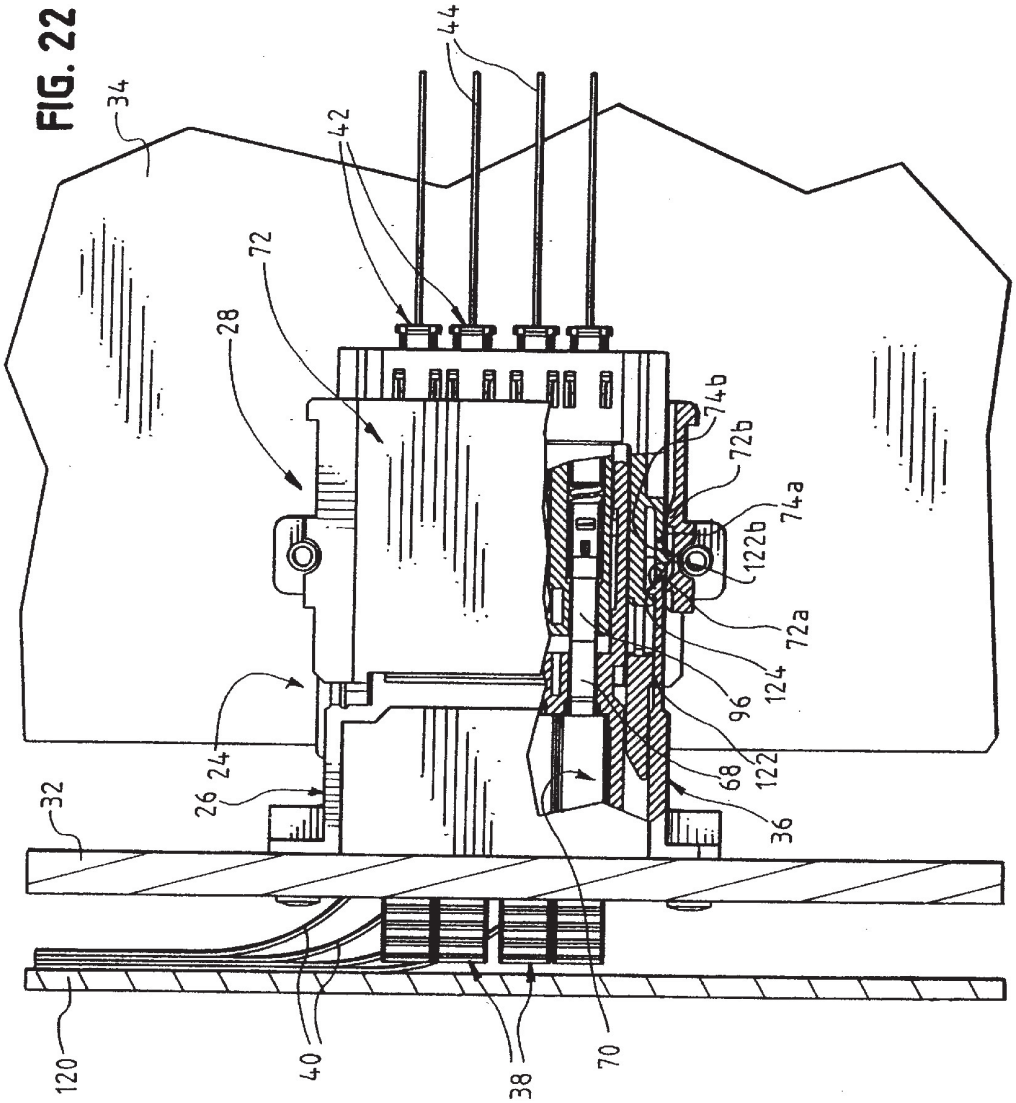

28
72
74
104
106
102
72b
74a
72a
74b
122a
96
68
122
24
26
32
120
40
38
70

FIG. 22


44
34
42
72
28
74b
72b
74a
122b
72a
124
96
68
122
36
24
26
32
120
40
38
70

MOUNTING SYSTEM FOR A CONNECTOR ASSEMBLY TO A SUBSTRATE

FIELD OF THE INVENTION

This invention generally relates to the art of connector assemblies, such as electrical connectors, fiber optic connectors and the like, and particularly to a system for mounting a connector assembly to a substrate, such as a printed circuit board.

BACKGROUND OF THE INVENTION

Fiber optic connectors of a wide variety of designs have been employed to terminate optical fiber cables and to facilitate connection of the cables to other cables or other optical fiber transmission devices. A typical fiber optic connector includes a ferrule which mounts and centers an optical fiber or fibers within the connector. The ferrule may be fabricated of such material as ceramic. A ferrule holder or other housing component of the connector embraces the ferrule and may be fabricated of such material as molded plastic. A spring may be disposed within the housing or ferrule holder such that the ferrule is yieldably biased forwardly for engaging another fiber-mounting ferrule of a mating connecting device.

A pair of fiber optic connectors or a connector and another optical fiber transmission device often are mated in an adapter which centers the fibers to provide low insertion losses. The adapter couples the connectors together so that their encapsulated fibers connect end-to-end. The adapter may be an in-line component, or the adapter can be designed for mounting in an opening in a panel, backplane, circuit board or the like.

Various problems continue to be encountered in designing fiber optic connector assemblies or other connector assemblies, including applications involving backplanes, motherboards, daughterboards and the like. Such problems include properly and precisely placing a connector assembly on a substrate, such as a printed circuit board, accommodating misalignment of the connectors during mating, allowing relative floating movement between various components of the system and similar positional-type problems. Other problems simply involve efforts to simplify the design of connector assemblies. The present invention is directed to solving these problems and to providing various improvements in such connector assemblies.

SUMMARY OF THE INVENTION

An object, therefore, of the invention is to provide a new and improved system for mounting a connector assembly to a substrate, such as a panel, a printed circuit board or the like.

In the exemplary embodiment of the invention, the system includes a substrate having at least one pre-placement hole and at least one positioning hole. A connector housing includes a pre-placement peg for insertion into the pre-placement hole in the substrate with substantially zero insertion forces to generally place the housing on the substrate. The housing also includes a positioning peg for insertion into the positioning hole in the substrate by a press-fit to precisely fix the housing on the substrate.

The invention contemplates the provision of a recessed area about at least a portion of the positioning peg for receiving any material shaved off of the positioning peg as it is press-fit into the positioning hole.

As disclosed herein, the housing is fabricated of molded plastic material, with the positioning peg being molded integrally therewith. The positioning peg includes at least one crushable rib on the exterior thereof. The pre-placement peg is longer than the positioning peg and, in the preferred embodiment, is solid. The positioning peg is hollow, and there may be provided a plurality of the positioning pegs spaced from each other and from the pre-placement peg.

Other objects, features and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of this invention which are believed to be novel are set forth with particularity in the appended claims. The invention, together with its objects and the advantages thereof, may be best understood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify like elements in the figures and in which:

FIG. **1** a perspective view of a mating connector assembly embodying the concepts of the invention, with the assembly in unmated condition;

FIG. **2** is a side elevational view of the mating connector assembly as shown in FIG. **1**;

FIG. **3** is a perspective view of the mating connector assembly of FIG. **1**, in mated condition;

FIG. **4** is an exploded perspective view of the backplane connector assembly as seen to the left in FIGS. **1** and **2**;

FIG. **5** is a perspective view of one of the shutter assemblies for the adapter in the backplane connector assembly of FIG. **4**;

FIG. **6** is a perspective view of the other shutter assembly for the adapter;

FIG. **7** is an enlarged perspective view, broken away to show the floating mount between the adapter and the backplane in the backplane connector assembly of FIG. **4**;

FIG. **8** is a perspective view of one of the fiber optic connector modules of the backplane connector assembly of FIG. **4**;

FIG. **9** is a perspective view of the housing of the connector module of FIG. **8**;

FIG. **10** is a perspective view showing the assembly procedure of the module of FIG. **8**;

FIG. **11** is an exploded perspective view of the daughterboard connector assembly as seen to the right of FIGS. **1** and **2**;

FIG. **12** is an exploded bottom perspective view of the two-part housing of the daughterboard connector assembly;

FIG. **13** is a perspective view of the front housing part of the daughterboard connector assembly;

FIG. **14** is a perspective view of one of the fiber optic connector modules of the daughterboard connector assembly of FIG. **11**;

FIG. **15** is an exploded perspective view of the module of FIG. **14**;

FIG. **16** is a perspective view of the pin keeper of the module of FIG. **14**;

FIG. **17** is a perspective view of the spring pusher member of the module of FIG. **14**;

FIG. **18** is a perspective view showing the assembly of the coil spring to the pin keeper of FIG. **16**;

FIG. **19** is a perspective view showing the assembly of the spring to the pusher member of FIG. **17**; and

FIGS. **20–22** are sequential top plan views, partially broken away, showing the mating of the mating connector assembly of FIGS. **1–3**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in greater detail, and first to FIGS. **1–3**, the invention is embodied in a mating connector assembly, generally designated **24**, which includes a backplane connector assembly, generally designated **26**, mateable with a daughterboard connector assembly, generally designated **28**. The backplane connector assembly is mounted in an aperture **30** in a substrate, panel or backplane which, in the preferred embodiment, is a printed circuit board. Specifically, backplane **32** can be considered the "motherboard" herein. The daughterboard connector assembly is mounted on a top surface of a second printed circuit board **34** which is considered the "daughterboard" herein.

Backplane connector assembly **26** includes an adapter, generally designated **36**, which is mounted in aperture **30** in motherboard **32**. Four fiber optic connector modules, generally designated **38**, are inserted into adapter **36**, through aperture **30**, from the front of backplane **32**. Each fiber optic connector module is terminated to a multi-fiber cable **40**. Each cable is a flat or "ribbon" cable having a plurality of optical fibers.

After daughterboard connector assembly **28** is mounted on daughterboard **34**, four fiber optic connector modules, generally designated **42**, are inserted into the back of the connector housing, as described hereinafter. Each module **42** is terminated to a flat, multifiber cable **44** similar to fiber optic cables **40**. Backplane connector assembly **26** and daughterboard connector assembly **28** are mateable in the direction of arrows "A" (FIGS. **1** and **2**) to a mated condition shown in FIG. **3**, wherein the fibers of cables **40** and **44** are functionally connected.

Referring to FIG. **4**, adapter **36** includes a housing **46** which may be fabricated of molded plastic material. The housing defines a front mating end **46***a* and a rear terminating end **46***b*. The front mating end is open, as at **46***c*, and through which the ferrules (described hereinafter) of fiber optic connector modules **38** can project. Terminating end **46***b* is open, as at **46***d*, for receiving connector modules **38** in the direction of arrows "B". Housing **46** of adapter **36** has an outwardly projecting alignment rib **48** on each opposite side thereof and extending in the mating direction of the connector assembly, for purposes described hereinafter.

FIG. **5** shows a shutter assembly, generally designated **50**, for closing opening **46***b* of adapter **46**, and FIG. **6** shows a shutter assembly, generally designated **52**, for closing mating opening **46***c* of the adapter. Shutter assembly **50** includes a pair of spring-loaded shutters **50***a* which close opening **46***d* on opposite sides of an interior partition **54** (FIG. **4**). The shutter members are pivotally mounted on a plate **50***b* which includes a plurality of pegs **50***c* which are press-fit into holes **56** in adapter housing **46**. Similarly, shutter **52***a* of shutter assembly **52** is spring-loaded and is mounted on a plate **52***b* which has a plurality of pegs **52***c* which are press-fit into a plurality of holes **58** in adapter housing **46**. Shutters **50***a* and **52***a* provide dust covers for the interior of adapter **36**.

Referring to FIG. **7** in conjunction with FIG. **4**, means are provided for mounting adapter **36** to backplane **32** in order to provide relative floating movement therebetween. Specifically, a pair of T-nuts, generally designated **60**, are floatingly mounted to adapter **36** and receive a pair of rivets **62** insertable in the direction of arrows "C" through a pair of mounting holes **64** in the backplane. The rivets have enlarged head portions **62***a* which will engage the surface of the backplane. Mounting holes **64** are spaced on opposite sides of opening **30**.

Still further, each T-nut **60** includes a shank portion **60**a and an enlarged head **60***b*. A mounting flange, generally designed **66**, is molded integrally with each opposite side of adapter housing **46**. Each flange **66** includes an interior cavity **66***a* which receives head portion **60***b* of one of the T-nuts **60**. A passage **66***b* extends through flange **66** toward backplane **32** in communication with cavity **66***a* for receiving shank portion **60***a* of the T-nut. The following parameters should be understood: (1) the dimensions of head portion **60***b* are smaller than cavity **66***a* so that the head portion can float within the cavity, (b) the cross dimensions of shank portion **60***a* are less than the dimensions of passage **66***b* so that the shank portion can float within the passage and (c) the length of shank portion **60***a* is greater than the thickness of a wall portion **67** of flange **66** below the head portion (i.e., the thickness indicated by double-headed arrow "D" (FIG. **7**). Therefore, when rivet **62** tightens the T-nut onto surface **32***a* of backplane **32**, the adapter does not become tightened to the backplane and is allowed to float relative thereto. Lastly, passage **66***b* has a restricted mouth, as at **66***e*, so that the T-nut can be snap-fit into flange **66** to mount the nut to adapter housing **46**. It should be understood that rivet **62** equally could be a threaded fastener, such as a screw, for threadingly engaging the T-nut.

FIGS. **8–10** show one of the fiber optic connector modules **38** which are inserted into adapter **36** as described above. Specifically, each module **38** includes a ferrule **68** terminated to one of the multi-fiber cables **40** with ends **40***a* (FIG. **8**) of the fibers exposed at a mating face **68***a* of the ferrule. The ferrule includes a pair of alignment holes **68***b* opening into mating face **68***a*. The ferrule is captured by a manually manipulatable housing, generally designated **70**, which includes a front portion **70***a* which actually captures the ferrule, and a rear portion defined by a pair of laterally spaced arms **70***b* that are graspable between an operator's fingers. FIG. **10** shows that ferrule **68** has a peripheral flange **68***c*. The front portion **70***a* of housing **70** includes a pair of forward latch hooks **70***c* on two opposite sides of the housing and a pair of flexible latch arms **70***d* on the other two opposite sides of the housing. As seen best in FIG. **9**, each latch arm **70***d* includes an inside chamfered latch hook **70***e*. Latch hooks **70***c* engage the front of flange **68***c* of the ferrule, and latch hooks **70***e* on latch arms **70***d* engage the rear edges of flange **68***c* to hold the ferrule encapsulated within front portion **70***a* of housing **70**.

Still referring to FIGS. **8–10**, manually graspable arms **70** include serrations **71** on the outsides thereof to facilitate manual grasping thereof. A latch block **70***f* projects outwardly from each arm for latching engagement within adapter **36**. Each arm **70***b* also includes an interior channel **70***g* for guiding ferrule **68** into front portion **70***a* of the housing.

FIG. **10** shows that ferrule **68** is insertable into housing **70** of connector module **38** in the direction of arrow "E". The ferrule moves within channels **70***g* of arms **70***b* and through an open rear end **70***h* of front portion **70***a* of the housing. The ferrule becomes latched in a position projecting out of an open front end **70***i* (FIG. **9**) of the housing and is locked in the position shown in FIG. **8**, with the ferrule projecting forwardly of the manually manipulatable housing.

FIGS. **11–13** show daughterboard connector assembly **28** to include a two-part housing defined by a front housing partogenerally designated **72**, and a rear housing part, generally designated **74**. The rear housing part is insertable into the front housing part in the direction of arrow "F" (FIG. **11**). Rear housing part **74** has a flexible latch arm **74***a* with a latch hook **74***b* which latches behind a front latch shoulder **72***a*

(FIG. **13**) when the two housing parts are initially assembled. FIG. **13** also shows a second latch shoulder **72***b* which is located rearwardly of latch shoulder **72***a,* for purposes described hereinafter. Each housing part **72** and **74** may be a one-piece structure unitarily molded of dielectric material such as plastic or the like.

Generally, a system is provided for mounting front housing part **72** of daughterboard connector assembly **28** on daughterboard **34** with considerable precision. Specifically, the daughterboard has a pre-placement hole **76** spaced between a pair of positioning holes **78** of as seen in FIG. **11**. A pair of rivets **80** are insertable through positioning holes **78**. As best seen in FIG. **12**, a pre-positioning peg **82** projects downwardly from a bottom surface **72***d* of front housing part **72** for insertion into pre-placement hole **76** with substantially zero insertion forces. In other words, hole **76** is larger than peg **82**. A pair of positioning pegs **84** project downwardly from surface **70***d* for insertion into positioning holes **78** in daughterboard **34** by a press-fit to precisely fix the housing on the substrate. Peg **82**. is solid, but pegs **84** are hollow for receiving rivets **80** therethrough to solidly lock the front housing part to the daughterboard. Pre-placement peg **82** is longer than positioning pegs **84** so that it is easy for an operator to locate and insert pre-placement peg **82** into pre-placement hole **76**. The housing then can be easily pivoted about peg **82** until positioning pegs **84** are aligned with positioning holes **78**.

Still referring to FIG. **12**, positioning pegs **84** are provided with crushable ribs **84***a* on the exterior thereof and which are crushed or deformed when pegs **84** are press-fit into holes **78**. Bottom surface **72***d* of front housing part **72** is recessed, as at **86**, around each positioning peg **84**. This recessed area is provided for receiving any plastic material, such as crushable ribs **84***a,* which might be shaved off of positioning pegs **84** when they are press-fit into positioning holes **78**. This ensures that bottom surface **72***d* of front housing part **72** is mounted flush on the flat top surface of daughterboard **34**.

Generally, an alignment system is provided between daughterboard connector assembly **28** and adapter **36** of backplane connector assembly **26**. More particularly, as best seen in FIGS. **11** and **12**, front housing part **72** includes a pair of alignment flanges **88** at opposite sides of an open mating end **72***e* of the front housing part. Each flange has an outwardly chamfered or flared distal end **88***a* which is engageable by the front edges **90** (FIG. **1**) of adapter **36** upon mating of the two connector assemblies. In essence, flared distal ends **88***a* allow for a degree of misalignment between the connector assemblies in an "X" direction generally perpendicular to mating direction "A" (FIG. **1**) of the connectors, the "X" direction being generally parallel to daughterboard **34**. Alignment flanges **88** have grooves or slots **88***b* on the insides thereof for receiving alignment ribs **48** (FIG. **1**) on opposite sides of adapter housing **46**. Slots **88***b* have flared mouths **88***c* which are engageable by the distal ends of alignment ribs **48** to allow for a degree of misalignment between the two connector assemblies in a "Y" direction generally perpendicular to mating direction "A" as well as generally perpendicular to the aforesaid "X" direction and daughterboard **44**. Therefore, alignment flanges **88**, with the outwardly flared distal ends **88***a* thereof in combination with flared mouths **88***c* of slots **88***b,* are unique in utilizing a singular structure to allow for misalignment in two different "X" and "Y" directions.

Referring back to FIG. **2** in conjunction with FIGS. **11** and **12**, a bottom flange **92** projects forwardly of front housing part **72** flush with bottom surface **72***d* (FIG. **12**) of the front housing part. The flange has a bottom hook portion **92***a* and a top chamfered portion **92***b*. The bottom hook portion overlaps an edge **94** of daughterboard **34**. The top chamfered portion **92***b* is engageable by the front bottom edge of adapter housing **46** to prevent the bottom edge of the housing from "stubbing" the front edge of the daughterboard during mating of the connector assemblies.

FIGS. **14–19** show in greater detail one of the fiber optic connector modules **42** inserted into rear housing part **74** of daughterboard connector assembly **28**. Specifically, each module **42** includes a ferrule **96** for terminating multi-fiber cable **44**, with a resilient boot **98** providing strain-relief for the cable. The ferrule includes a pair of through holes or passages **96***a* (FIG. **15**) for receiving a pair of alignment pins **100** fixed to a pin keeper **102** which abuts against the rear of ferrule **96** so that the distal ends of alignment pins **100** project forwardly of a front mating face **96***b* of ferrule **96**. A coil spring **104** is fixed to a rear end of pin keeper **102** as described hereinafter, and a spring pusher member **106** is fixed to the rear end of the coil spring. Both pin keeper **102** and pusher member **106** may be fabricated of molded plastic material. An integral, flexible latch arm **107** projects outwardly from the pusher member for latching the fiber optic connector module within rear housing part **74** of daughterboard connector assembly **28**. FIG. **16** shows that pin keeper **102** has a receptacle **102***a* at a rear end thereof for receiving a front end of coil spring **104**, along with a locking flange **102***b* for locking with a coil at the front end of the spring. Although not visible in FIG. **16**, one of the locking flanges **102***b* are disposed at each opposite side of receptacle **102***a* of pin keeper **102**.

Similarly, FIG. **17** shows pusher member **106** to have a front receptacle **106***a* at a front end thereof for receiving a rear end of coil spring **104**. A locking flange **106***b* is disposed at each opposite side of receptacle **106***a* for locking with a coil at the rear end of the coil spring.

FIGS. **18** and **19** show the procedure for assembling coil spring **104** between pin keeper **102** and pusher member **106** and locking the coil spring to those components. It should be noted that coil spring **104** is oval in cross-configuration. A tool **110** has a generally oval shaft **112** for insertion in the direction of arrow "G" into oval coil spring **104**. The tool then is rotated in the direction of arrow "H" to effectively rotate the coil spring and cause the front open end coil **104***a* to lock behind flanges **102***b* (FIG. **16**) of pin keeper **102**. This subassembly then is positioned as shown in FIG. **19** so that the opposite open end coil **104***b* (FIG. **18**) is aligned with locking flanges **106***b* of pusher member **106**. Shaft **112** of tool **110** then is inserted in the direction of arrow "I" (FIG. **19**) into a rectangular hole **114** in pin keeper **102** and into coil spring **104**, and the tool rotated in the direction of arrow "**3**". This effectively locks the coil spring in position between the pin keeper and the pusher member. Alignment pins **100** then are fixed within slots **116** (FIG. **19**) so that they extend from the pin keeper as seen in FIG. **15**. Boot **98** then is inserted into opening **114** of the pin keeper; ferrule **96** is positioned onto alignment pins **100**; fiber optic cable **44** is inserted into and through the entire assembly in the direction of arrow "K" (FIG. **15**); and the alignment pins and cable are epoxied within the ferrule so that an entire self-contained unit is formed as shown in FIG. **14**.

Finally, FIGS. **20–22** show the mating procedure of backplane connector assembly **26** and daughterboard connector assembly **28** in the direction of arrows "A", after the backplane assembly is mounted to backplane or motherboard **32** and after the daughterboard connector assembly is mounted to daughterboard **34**. These depictions also show that fiber optic cables **40** are engaged with yet another

substrate or board **120**. Before proceeding, FIG. **20** best shows that adapter **36** of backplane connector assembly **26** has a pair of actuator arms **122** spaced outwardly from opposite sides thereof. The distal ends of actuator arms **122** are formed with a latch hook **122***a* and a forwardly facing chamfer **122***b*.

Backplane connector assembly **26** and daughterboard connector assembly **28** are mateable in a two-step process represented by FIGS. **21** and **22**. In the first step, hooks **122***a* of actuator arms **122** snap behind a pair of preliminary latch shoulders **124** (FIGS. **1** and **20**) of rear housing part **74** of daughterboard connector assembly **28**. Latch hooks **74***b* on the ends of latch arms **74***a* at opposite sides of the rear housing part already have latched behind latch shoulders **72***a* (FIG. **14**) of front housing part **72**. This prevents any rearward movement of any part of daughterboard connector assembly **28** in response to the preliminary latching of backplane connector assembly **26** thereto. Further movement of the connectors in the mating direction causes chamfers **122***b* at the distal ends of actuator arms **122** of adapter **36** to engage the chamfered distal ends of latch arms **74***a* of rear housing part **74** and move the latch arms out of engagement with latch shoulders **72***a*. Latch hooks **74***b* of latch arms **74***a* now are free to move between latch shoulders **72***a* and latch shoulders **72***b* of the front housing part to provide a degree of floating movement between the two housing parts in the "Z" or mating direction. In other words, there is no floating movement between the housing parts in the "Z" direction until full mating occurs with the backplane connector assembly.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present examples and embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.

We claim:

1. A system for mounting a connector assembly to a substrate, comprising:

a substrate including at least one pre-placement hole and at least one positioning hole; and

a connector housing having a pre-placement peg sized for insertion into said pre-placement hole in the substrate with substantially zero insertion forces to generally place the housing on the substrate and a positioning peg sized for insertion into said positioning hole in the substrate by a press-fit to precisely fix the housing on the substrate, the pre-placement peg being longer than the positioning peg, whereby the pre-placement peg can be inserted first into the pre-placement hole

and the housing can be easily pivoted about the pre-placement peg until the positioning peg is aligned with the positioning hole.

2. The system of claim **1** wherein said housing includes a recessed area about at least a portion of the positioning peg for receiving any material shaved off of the positioning peg as it is press-fit into the positioning hole.

3. The system of claim **2** wherein said positioning peg includes at least one crushable rib on the exterior thereof.

4. The system of claim **3** wherein said positioning peg is fabricated of plastic material.

5. The system of claim **4** wherein said connector housing is molded of plastic material with the positioning peg being integral therewith.

6. The system of claim **1** wherein said pre-placement peg is solid.

7. The system of claim **1** wherein said positioning peg is hollow.

8. The system of claim **7** wherein said pre-placement peg is solid.

9. The system of claim **1**, including a plurality of said positioning pegs spaced from each other.

10. The system of claim **1** wherein said substrate comprises a circuit board.

11. A system for mounting a connector assembly to a printed circuit board, comprising:

a circuit board including at least one pre-placement hole and a plurality of positioning holes spaced from each other and from the pre-placement hole; and

a connector housing molded of plastic material and having an integral pre-placement peg sized for insertion into said pre-placement hole in the circuit board with substantially zero insertion forces to generally place the housing on the circuit board, a plurality of integral positioning pegs sized for insertion into said positioning holes in the circuit board by a press-fit to precisely fix the housing on the circuit board, and a recessed area about at least a portion of each positioning peg for receiving any plastic material shaved off of the positioning pegs as they are press-fit into the positioning holes.

12. The system of claim **11** wherein each positioning peg includes at least one crushable rib on the exterior thereof.

13. The system of claim **11** wherein said pre-placement peg is longer than the positioning pegs.

14. The system of claim **11** wherein said pre-placement peg is solid.

15. The system of claim **11** wherein said positioning pegs are hollow.

16. A system for mounting a connector assembly to a substrate having a mounting hole, comprising a connector housing having a mounting peg for insertion into the mounting hole in the substrate by a press-fit, the housing including a recessed area about at least a portion of the mounting peg for receiving any material shaved off of the mounting peg as it is press-fit into the mounting hole.

17. The system of claim **16** wherein said mounting peg includes at least one crushable rib on the exterior thereof.

18. The system of claim **16** wherein said connector housing is molded of plastic material with the mounting peg being integral therewith.

19. The system of claim **16** wherein said mounting peg is hollow.

* * * * *