

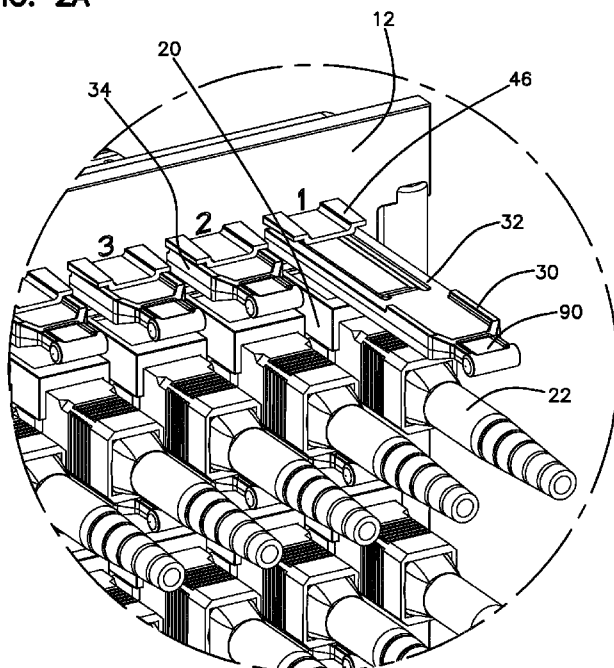


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[Continued on next page]

(54) Title: TELECOMMUNICATIONS FIBER OPTIC ADAPTER IDENTIFICATION SYSTEM AND METHOD

FIG. 2A



(57) Abstract: A fiber optic termination panel (12) includes rows and columns of adapters (20). Index flags (30) are provided for each adapter (20). The index flags (30) are moveable from retracted to extended positions. The index flag (30) assist a technician with adapter identification. RFID tags and/or visual indicators can be provided on flags (30).



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**TELECOMMUNICATIONS FIBER OPTIC ADAPTER IDENTIFICATION
SYSTEM AND METHOD**

5

Field of the Invention

The present invention relates to fiber optic boxes, closures, cabinets, and panels.

Background of the Invention

10 In the telecommunications industry, various equipment is provided with fiber optic terminations in the form of adapters and connectors. The equipment can be in the form of a fiber optic box, closure, cabinet, or panel. In some situations, increased density of the fiber optic terminations is desired. Adapters on dense patch panels may be difficult to access. While labeling of the adapters on the panel may be provided, the labeling may be difficult to view by the technician.

15

There is a need for continued development of fiber optic equipment including fiber optic terminations and systems and methods for identification of the adapters.

Summary of the Invention

20 A fiber optic termination panel is provided including one or more index flags. In one example, the index flag is movable from a retracted position to an extended position.

The index flag can provide an indication to a technician of which adapter is being accessed.

25 In one example, the index flag can carry indicia specific to the adapter. One form of indicia is an RFID tag. Other examples of indicia can include visual indicators including colors, letters, numbers, and combinations thereof.

The index flag which is retractable preferably moves between a retracted position, and an extended position wherein the flag is maintained in the desired position by a retention feature.

In one example, the index flag can be removed from the panel if desired.

In a further example, the index flag is movable between the retracted and extended positions and includes positive stops at each position.

In a further example, the movable index flag includes a spring member
5 for providing or increasing a friction fit with the panel.

In another example, a spring loaded push-push mechanism can be used to control the position of the index flag.

Brief Description of the Figures

FIG. 1 is a perspective view of one example fiber optic box including a
10 fiber optic termination panel;

FIG. 2 is an enlarged view of the termination panel of the fiber optic box of FIG. 1;

FIG. 2A is an enlarged view of a portion of the termination panel with one of the index flags shown in the extended position;

15 FIG. 3 is a perspective view of the termination panel;

FIG. 3A is an enlarged view of the termination panel of FIG. 3;

FIG. 4 is a side view of the termination panel;

FIG. 5 is a top view of the termination panel;

FIG. 6 is a front view of the termination panel;

20 FIG. 7 is a perspective view like FIG. 2, shown without the fiber optic adapters;

FIG. 8 is a front view of the termination panel without the adapters and without the index flags;

FIG. 9 is a bottom perspective view of an example index flag;

25 FIG. 10 is a bottom view of the index flag of FIG. 9;

FIG. 11 is a side view of the index flag of FIG. 9;

FIG. 12 is a top perspective view of the index flag of FIG. 9;

FIG. 13 is a perspective view of a portion of an alternative termination panel with a push-push operating mechanism for the index flags;

FIG. 14 shows a side view of one of the index flags of FIG. 13 in the retracted position;

FIG. 15 shows a side view of one of the index flags of FIG. 13 in the extended position; and

5 FIGS. 16-21 show further details of the push-push operating mechanism of FIG. 13 in various positions during use.

Detailed Description of the Preferred Embodiments

Fiber optic equipment, including boxes, closures, cabinets, and panels include termination panels with a plurality of adapters often mounted in rows, and
10 columns or in a combination of rows and columns in a dense configuration. FIG. 1 and 2 show an example equipment 10 in the form of a fiber optic box with a termination panel 12. A plurality of horizontal rows and a plurality of vertical columns of adapters 20 are provided for connecting to connectors 22 (see FIG. 3).

Because of the dense arrangement of the adapters 20, identification of a
15 specific adapter can be difficult. The rows and columns can be identified with indicia on panel 12. Individual ports themselves can also be provided with visual indicators. As shown, numbers are provided.

Because of the density of the termination panel, index flags 30 are provided for identifying individual adapters 20.

20 In one example, the index flag 30 is movable from a retracted position to an extended position. The extended position is shown as extended flag 32. The retracted position is shown as retracted flag 34 of FIGS. 2, 2A, 3, and 3A. Once the index flag 30 is placed in the extended position, index flag 30 can function as a visual indicator to the technician to see which adapter 20 the technician is actively working on,
25 and not one of the neighboring adapters. If the technician turns away, the technician can immediately return to the adapter 20 with the extended index flag 30. The index flag is moveable while the adapter 20 remains stationary.

The index flag 30 can also include indicia for differentiating index flags, or specifically identifying the index flag as a particular flag. For example, index flag 30
30 can include an RFID tag in area 90. When the index flag 30 is pulled to the extended

position, improved RFID readability and programming may be provided since the neighboring index flags 30 will be in the retracted positions and will be further away from the extended flag, helping to reduce or eliminate signal interference.

Other examples of indicia can include colors, letters, numbers and combinations thereof, or other indicators to provide information to the technician about the index flag 30. The visual indicia can be used with an RFID tag or other electronically readable tag if desired. The RFID tag can be embedded, glued, or snapped in place in area 90.

As shown in FIGS. 1-5 and 7 several index flags 30 are pulled to the extended positions. FIGS. 1-8 illustrate the dense pack of termination locations 20, 40 where access to labeling on panel 12 might be difficult.

Referring now to FIG. 7, termination panel 12 includes a plurality of openings 40 for receiving a fiber optic adapter 20. Referring also to FIG. 8, panel 12 includes a plurality of slots 42, each sized to receive an index flag 30. As shown, slot 42 is U-shaped with the legs of the U pointing vertically downwardly.

As also shown in FIGS. 7 and 8, panel 12 includes a projection 46 which facilitates alignment and sliding movement of index flag 30. As shown, projection 46 has a U-shape with the legs of the U extending upwardly and horizontally. Panel 12 includes a projection 46 on both sides of panel 12.

Referring now FIGS. 9-12, index flag 30 includes a top 60 and a bottom 62. Bottom 62 includes a first stop 66, and a second stop 68 which defines the maximum retraction and extension of flag 30. Rails 76 project outwardly and define a U-shaped profile for receipt in slot 42. A spring 74 promotes a friction fit in slot 42 during use and movement between the retracted and the extended positions. Stop 72 also engages projection 46 to limit movement of flag 30 into slot 42.

Index flag 30 includes a handle 80 for grasping by the user for moving from the retracted position to the extended position. Handle 80 can be pushed toward panel 12 to move index flag 30 from the extended position to the retracted position.

The flag 30 has a relaxed or rest position in the fully retracted position, and also in the fully extended position. The flag 30 will tend to remain in the selected position until moved by a technician. The spring 74 will require the technician to use a

small force to move flag 30 to a new position. The relaxed positions will give tactile feedback to the technician about when the flag 30 is in the desired position.

Index flag 30 includes one or more areas for locating an RFID tag or other indicia, such as areas 90, 92, as desired. Other indicia can be positioned in such areas as well. Index flag 30 can be partially colorized, or completely colorized with an identifying color for use by the technician. In one example, index flag 30 can be made from molded plastic.

To remove index flag 30 from panel 12, index flag 30 at handle 80 is rotated downwardly from the position shown in FIG. 7, thereby removing flag 30 from slot 42. Stop 66 is in the form of a curved shape, and outer end 96 of flag 30 has a curved shape to permit only downward rotation, and removal from panel 12. To mount flag 30, a reverse operation is performed wherein rounded end 96 is inserted in a rotated position of flag 30 into panel 12, flag 30 is rotated upwardly, and moved from the extended position to the retracted position.

In one example of panel 12, index flags 30 can only be removed if the adapter 20 below the selected index flag 30 is not present. If the adapter is present, the adapter prevents downward rotation, and removal thereof.

Referring now to FIGS. 13-21, termination panel 12 includes an index flag 30 which is moved by a mechanism 100 from a retracted position to an extended position. The mechanism 100 is a spring-loaded, push-push mechanism in the illustrated example. A spring 102 pushes the index flag 30 to the extended position when the index flag 30 is pushed. When the index flag 30 is pushed again against the spring 102, while the flag 30 is in the extended position, the index flag 30 relocks in the retracted position. To extend the index flag 30 again, the index flag 30 is again pushed, and spring 102 pushes the index flag 30 to the extended position. A plurality of splines 104 on index flag 30 align with notches 106, or channels 108 in stationary block 110 to allow retraction or extension of index flag 30. Teeth 112 on index flag 30 and teeth 111 on block 110 cause rotation of index flag 30 to either align splines 104 with notches 106 (for retraction) or channels 108 (for extension). Retention tabs 114 on index flags 30 retain flags 30 with panel 12. Spring 102 holds flag 30 in the desired position with the splines 104 engaged with the notches 106 or the channels 108. Spring 102 can be

positioned in area 116 on flag 30. Flags 30 can be color coded and/or shape coded. RFID tags can also be used.

The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. Since many
5 embodiments of the invention can be made without departing from the spirit and scope of the invention, the invention resides in the claims hereinafter appended.

Parts List

	10	equipment
	12	termination panel
	12	panel
5	20	adapters
	22	connectors
	24	port indicia
	30	index flag
	32	extended position flag
10	34	retracted position flag
	40	openings
	42	slot
	46	projection
	60	top
15	62	bottom
	66	first stop
	68	second stop
	72	stop
	74	spring
20	76	rails
	80	handle
	90, 92	areas
	96	outer end
	100	mechanism
25	102	spring
	104	splines
	106	notches
	108	channels
	110	block
30	112	teeth
	114	retention tabs

116 area

What is claimed is:

1. A fiber optic termination panel (12) comprising:
 - a panel body (12);
 - a plurality of termination locations (20, 40);
 - a plurality of index flags (30) associated with the termination locations (20, 40),wherein the index flags (30) are moveable relative to the panel body (12) between retracted and extended positions.
2. The panel (12) of claim 1, wherein the index flags (30) have a stop in the extended position and a stop in the retracted position.
3. The panel (12) of claims 1-3, wherein the index flags (30) each include indicia including a color, a number, a letter, and/or an RFID tag.
4. The panel (12) of claims 1-4, wherein the index flags (30) each are removable by rotating each index flag (30) relative to the panel body (12) wherein the extended position.
5. The panel (12) of claims 1-5, wherein the panel body (12) defines a first mating profile mateable with a second mating profile of each of the index flags (30).
6. The panel (12) of claims 1-6, wherein the index flags (30) have a spring (74), and two relaxed positions during use.
7. The panel (12) of claims 1-7, wherein the index flags (30) include a spring-loaded, multi-position push-push mechanism (100).
8. An index flag (30) comprising:
 - an index flag body (30);
 - a first stop (66);
 - a second stop (68, 72);

side rails (76);
a handle (80);
indicia adjacent to the handle (80).

9. The index flags (30) of claim 8, including indicia in the form of a color, a number, a letter, and/or an RFID tag.

10. A method of using fiber optic termination panel (12) comprising a panel body (12), a plurality of termination locations (20, 40), and a plurality of index flags (30) associated with the termination locations (20, 40), comprising:

moving one of the index flags (30) relative to the panel body (12) between a retracted position and an extended position to differentiate an associated termination location (20, 40) from adjacent termination location (20, 40).

11. The method of claim 10, wherein each index flag (30) is only removable from the panel body (12) through rotational movement.

12. The method of claim 10, wherein each index flag (30) includes a spring (74) and two relaxed positions during use.

13. The method of claim 10, wherein each index flag (30) includes a spring-loaded, multi-position push-push mechanism (100).

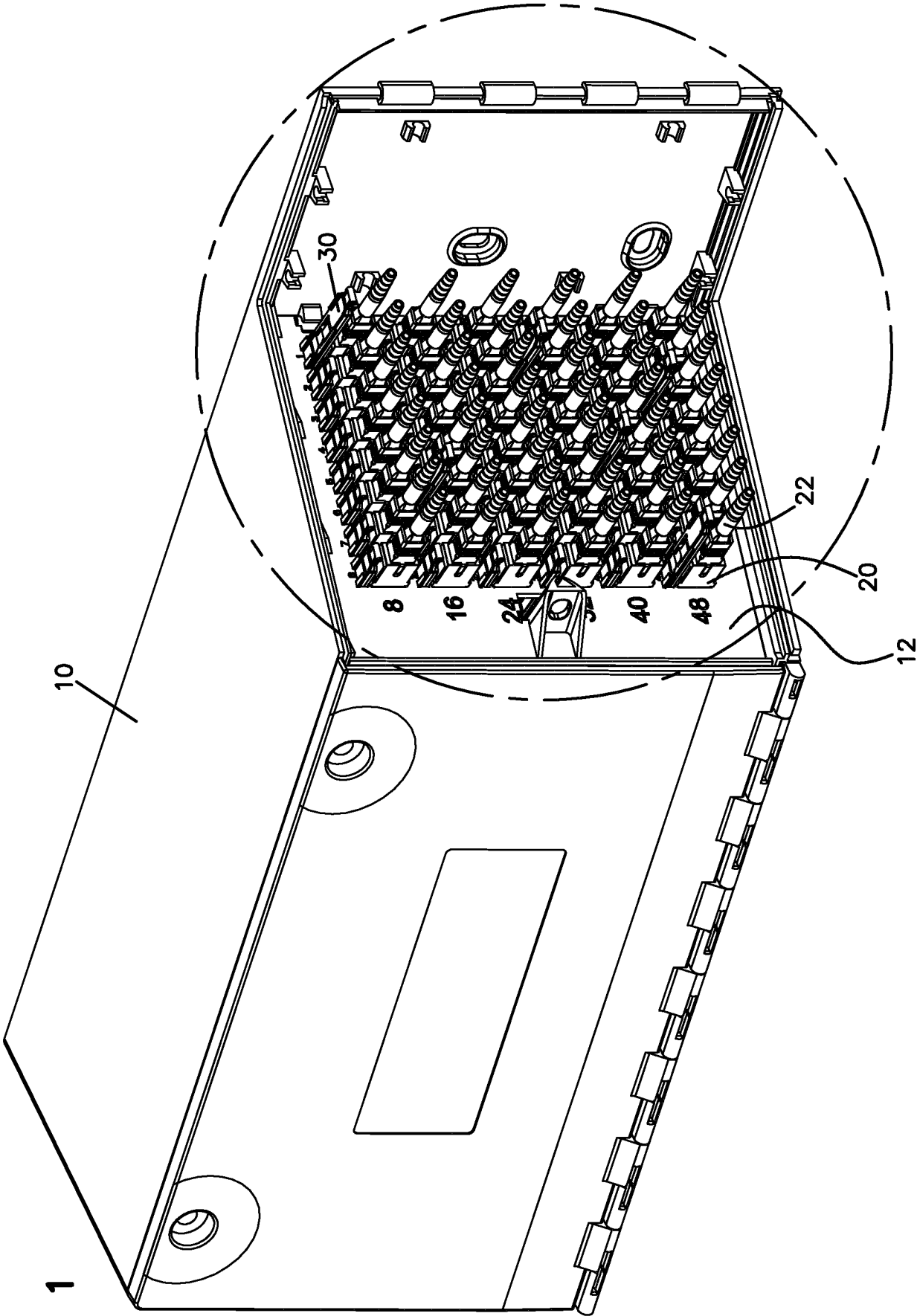


FIG. 1

FIG. 2

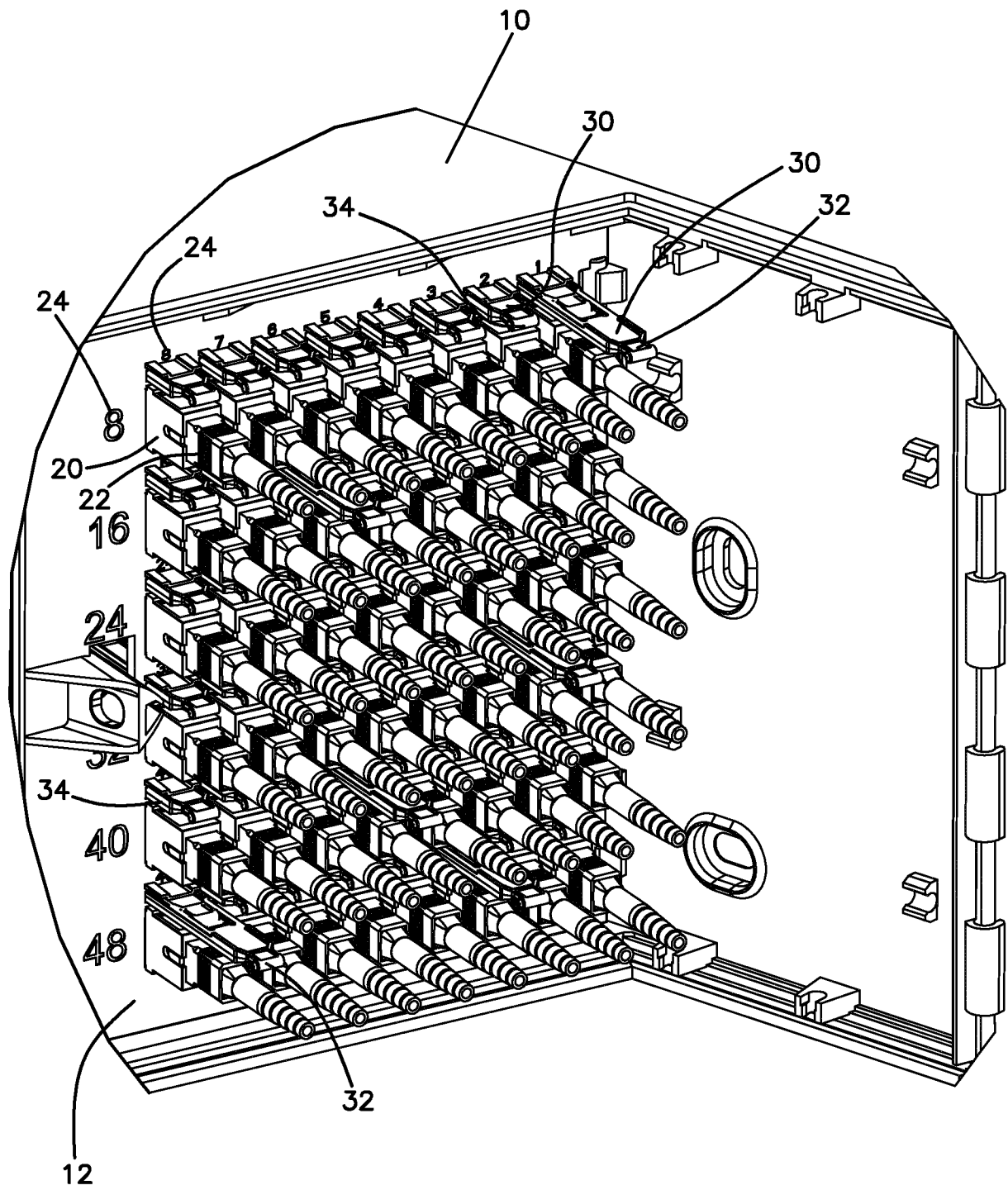


FIG. 2A

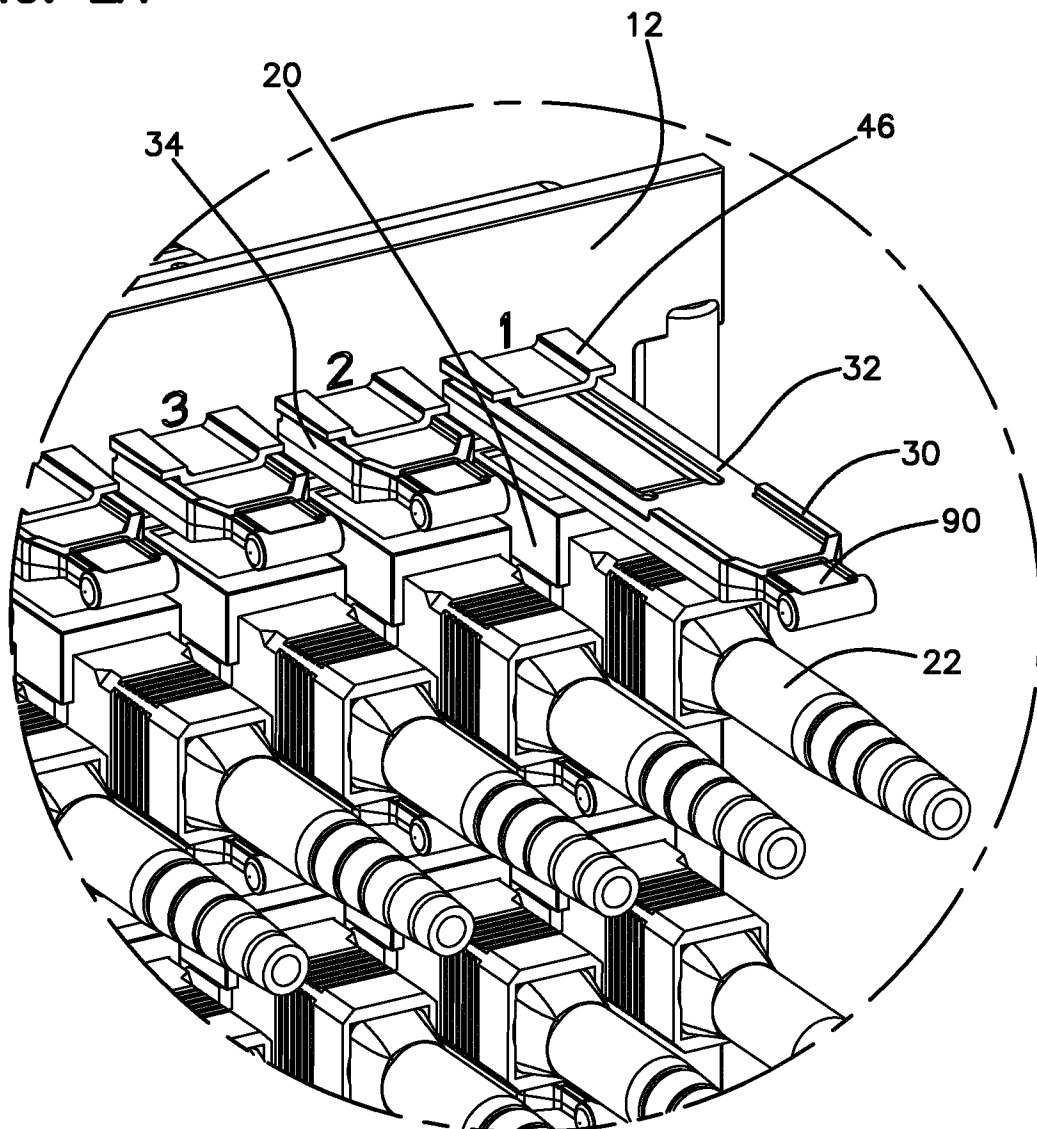


FIG. 3

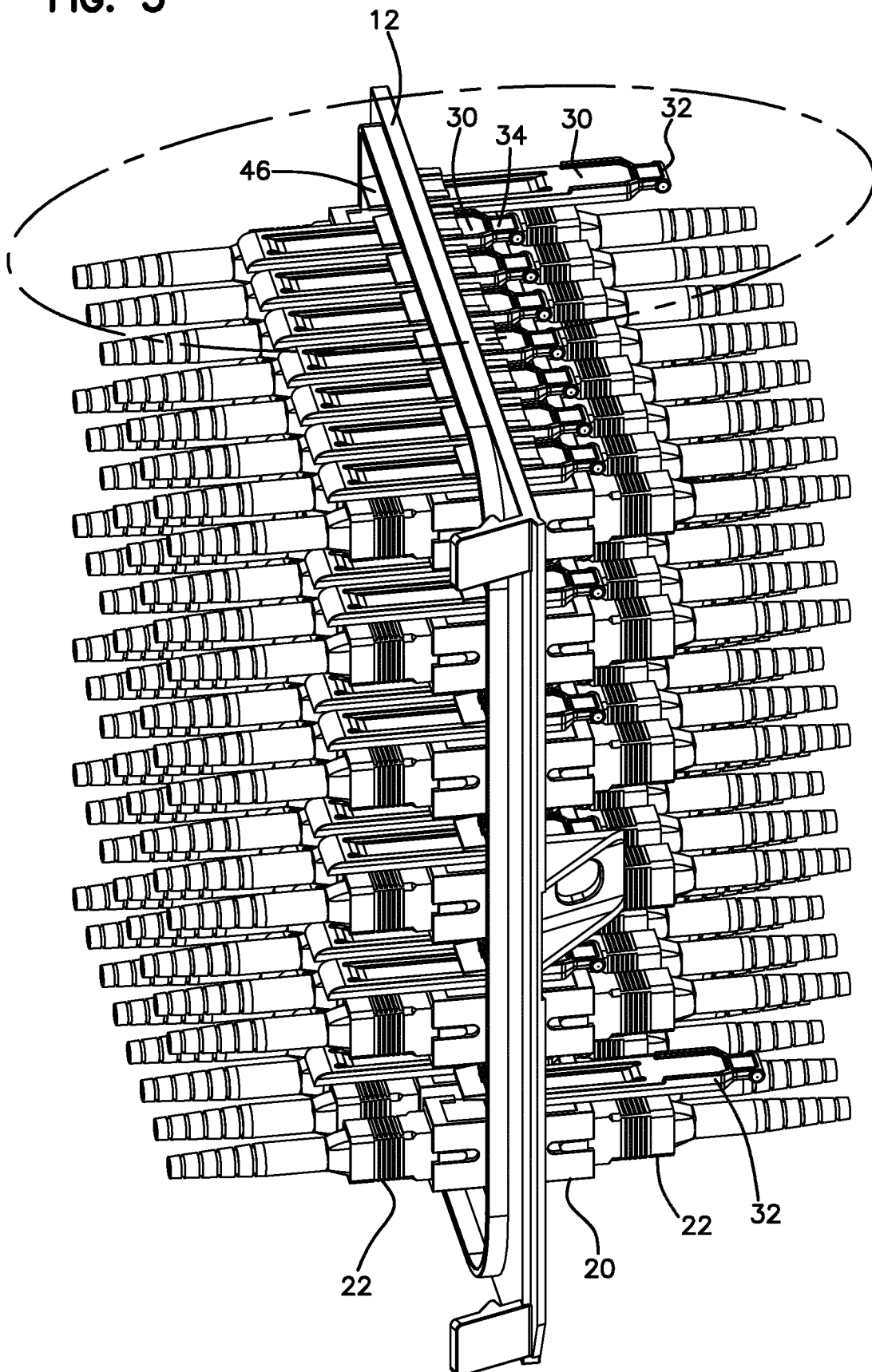


FIG. 3A

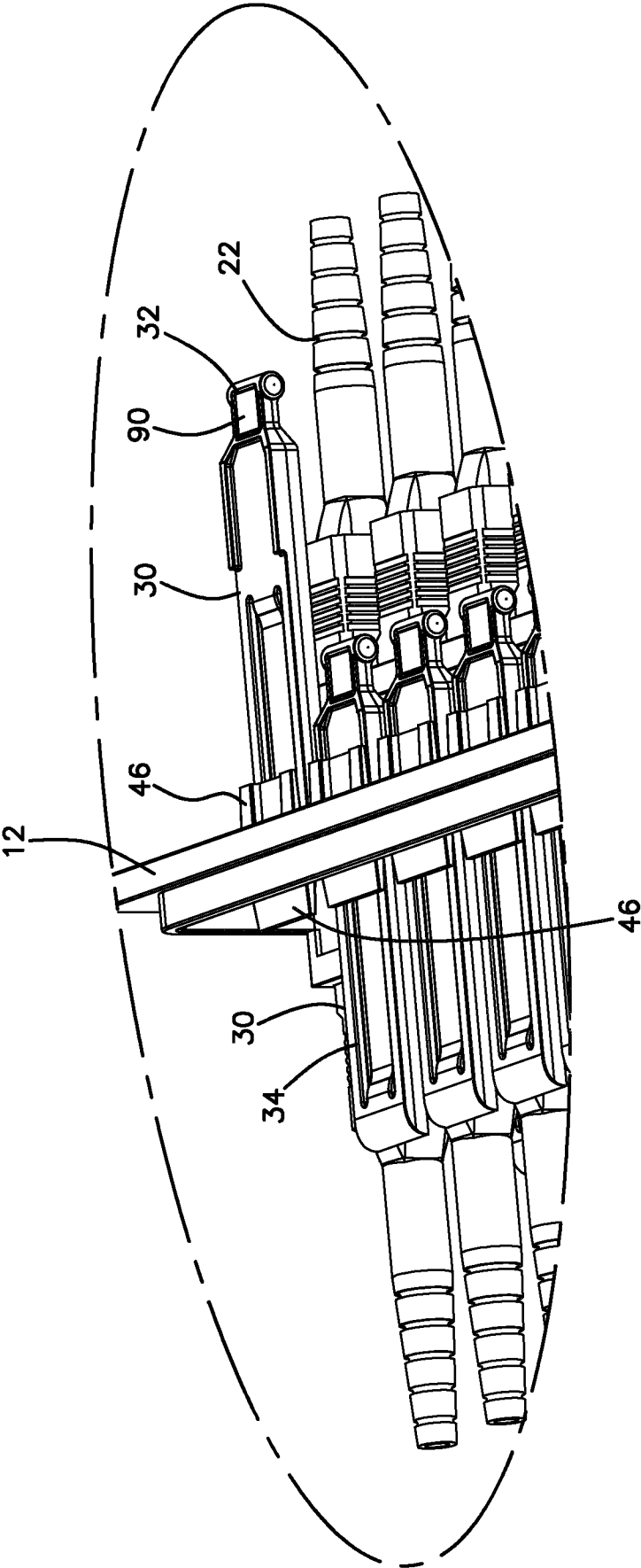
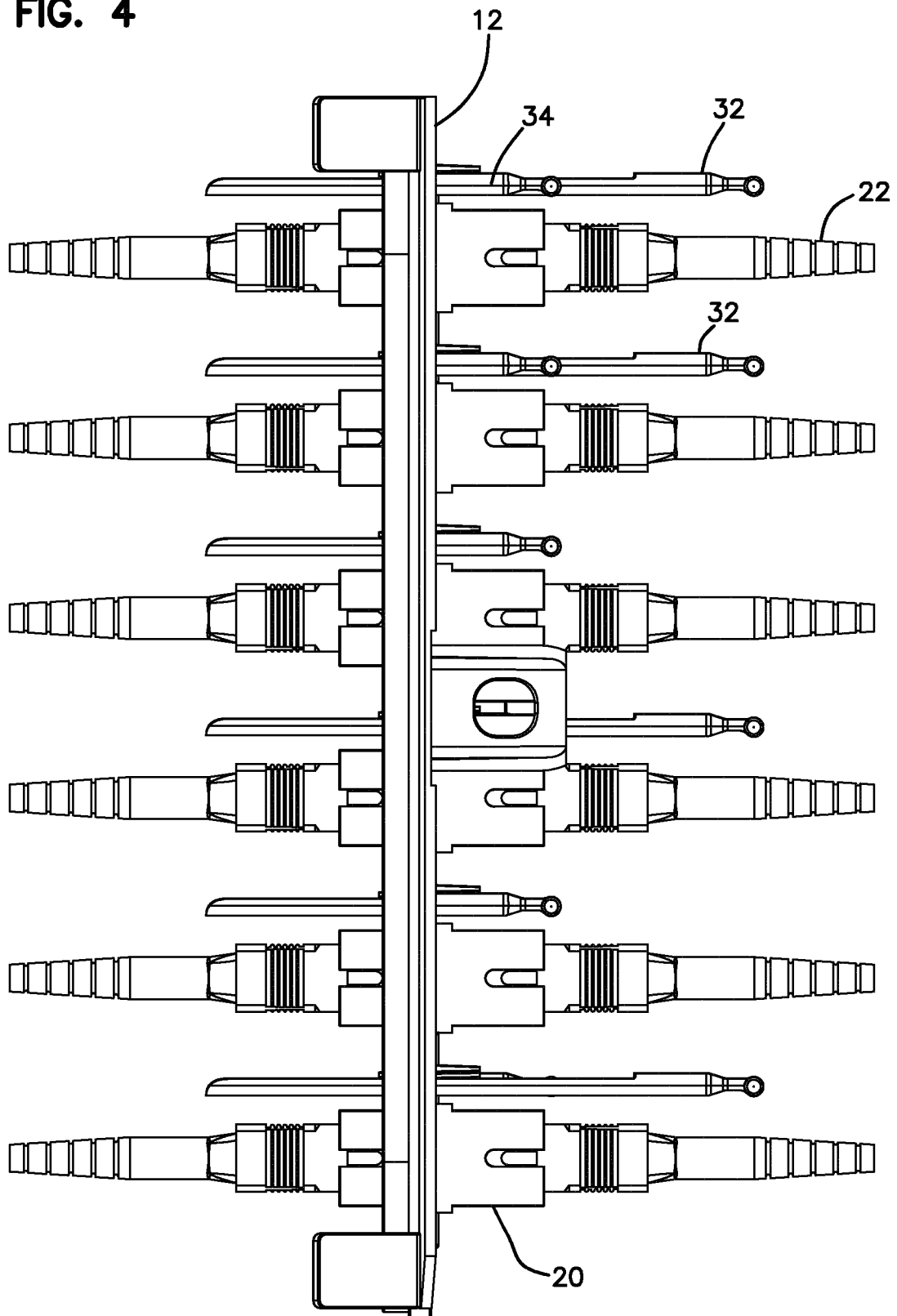


FIG. 4

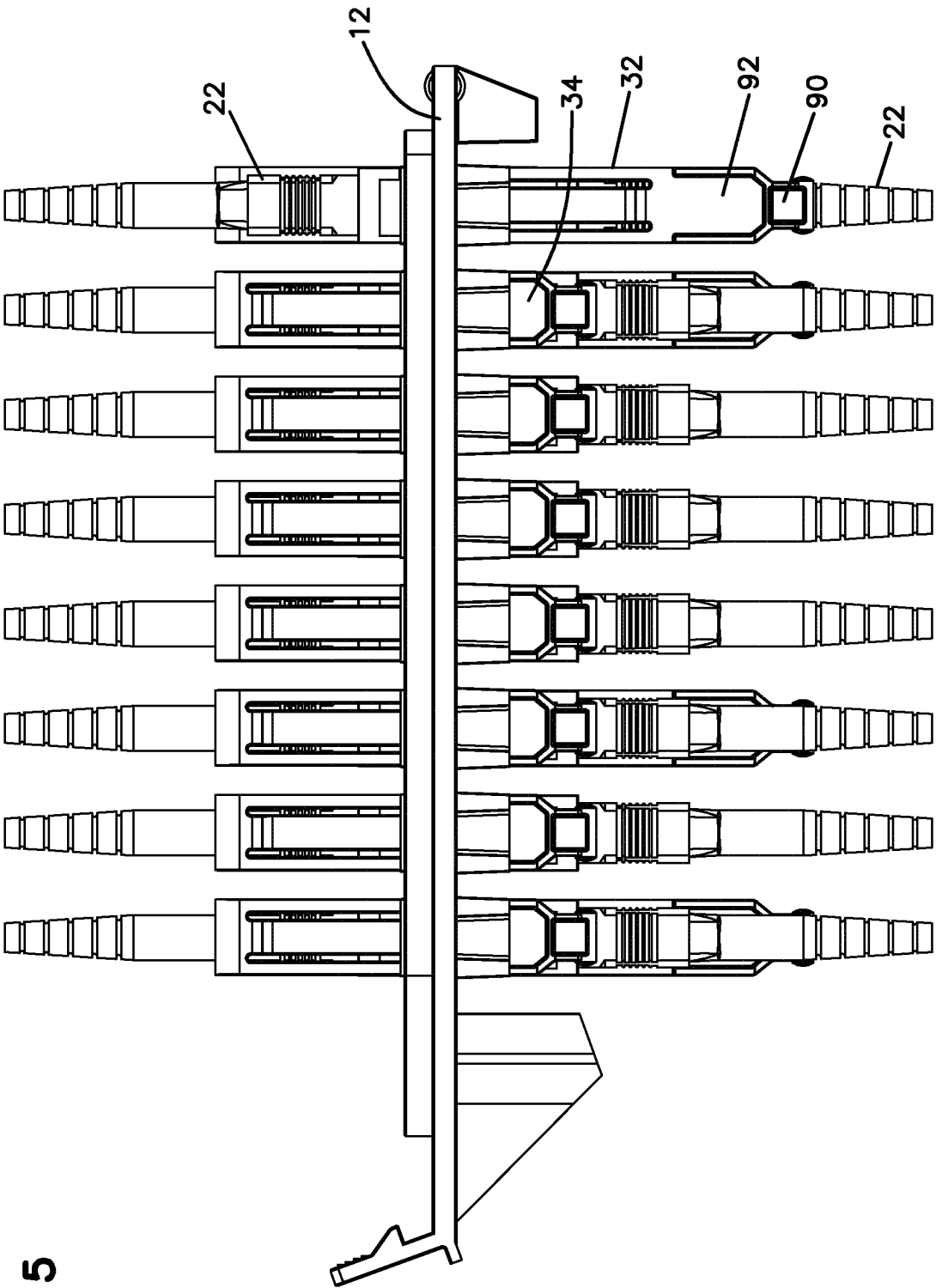
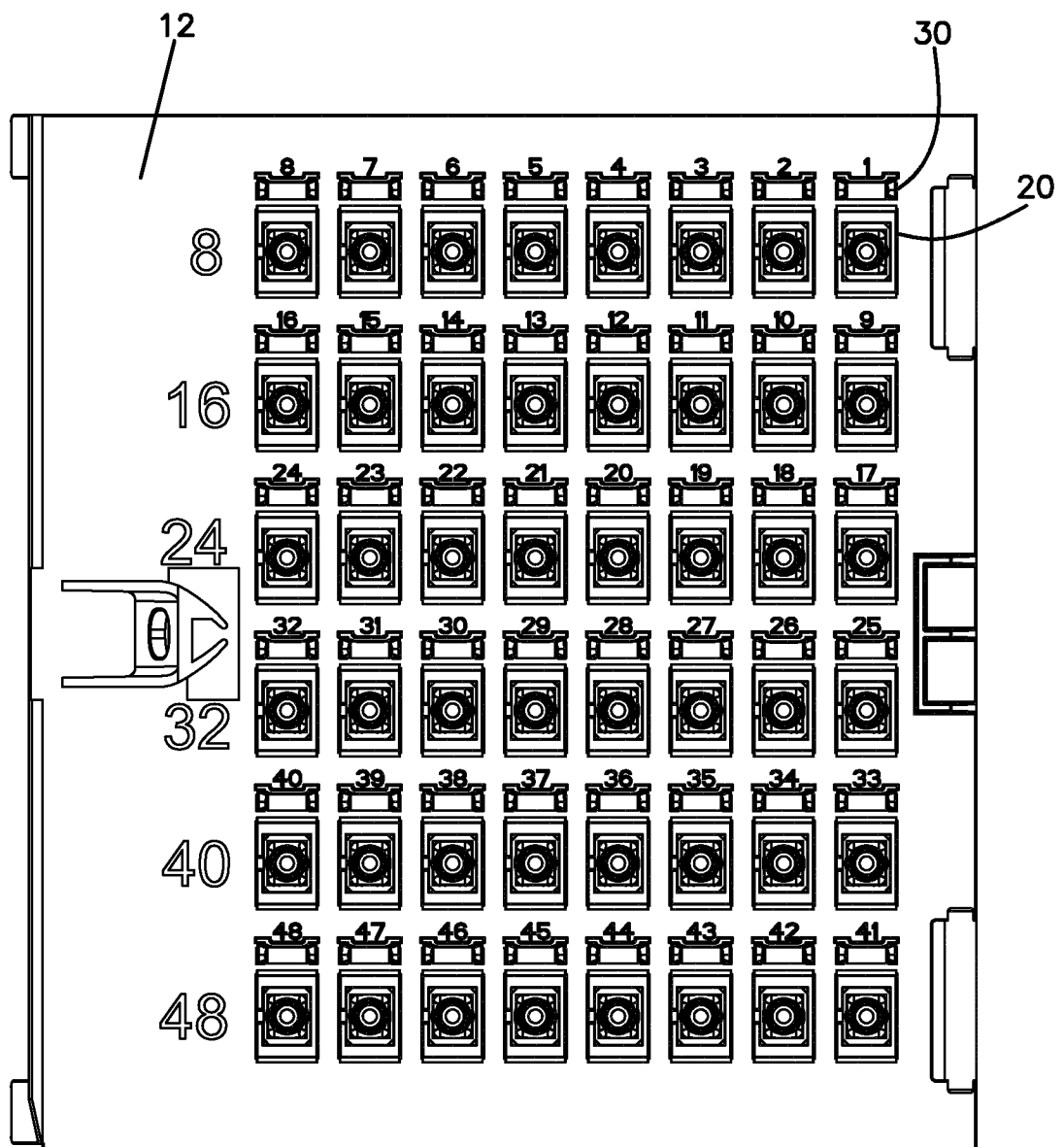


FIG. 5

FIG. 6



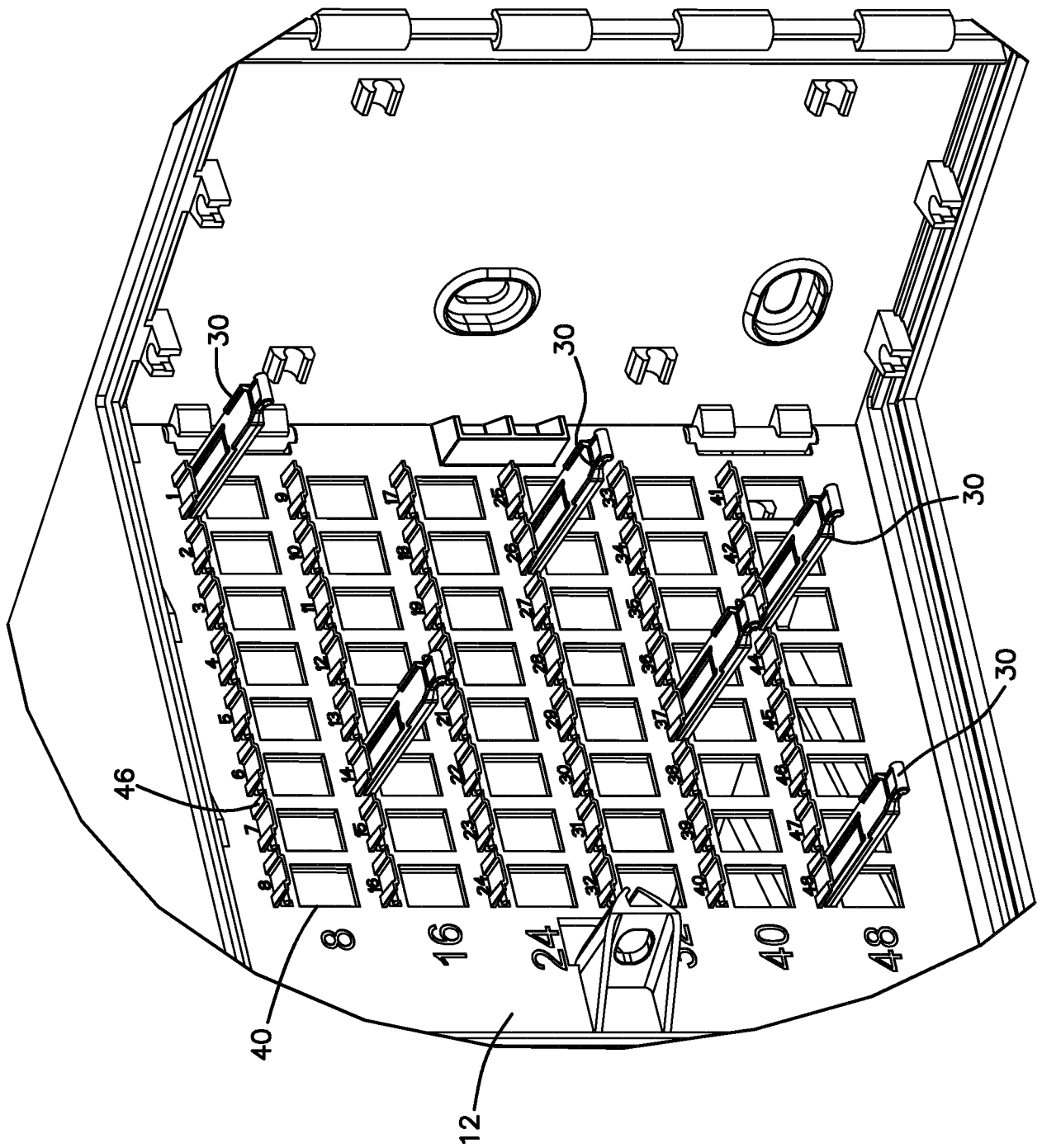
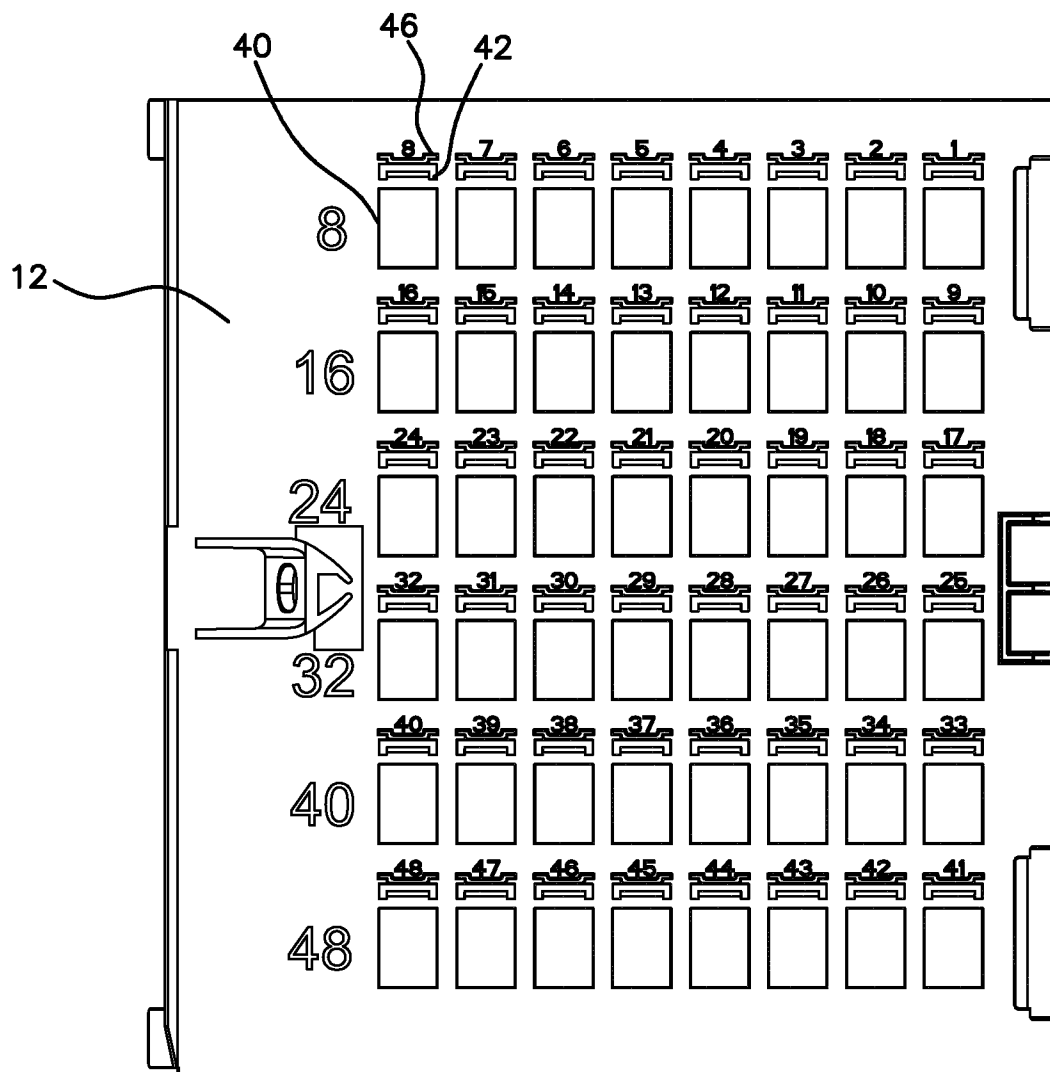


FIG. 7

FIG. 8



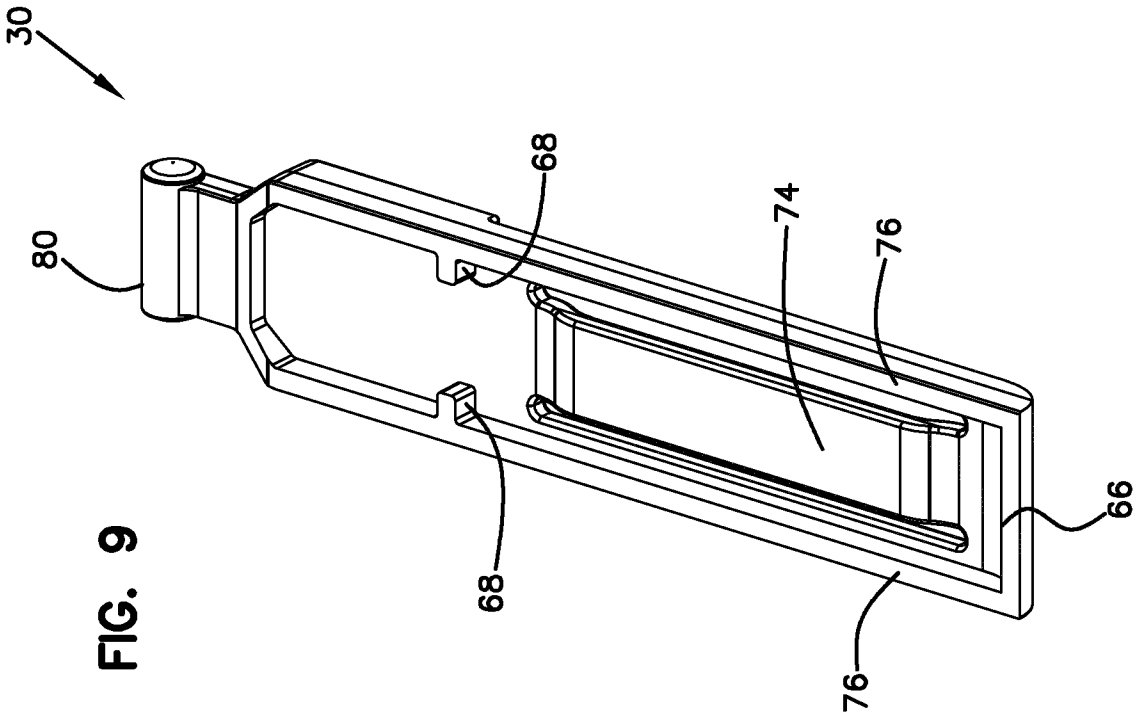
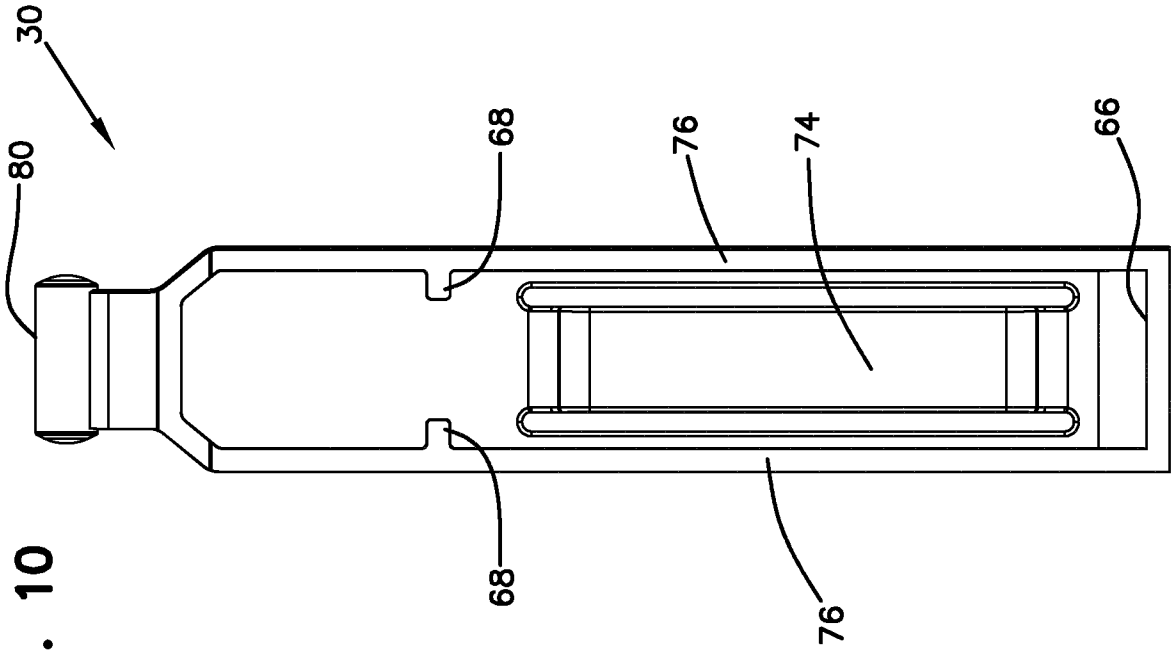


FIG. 11

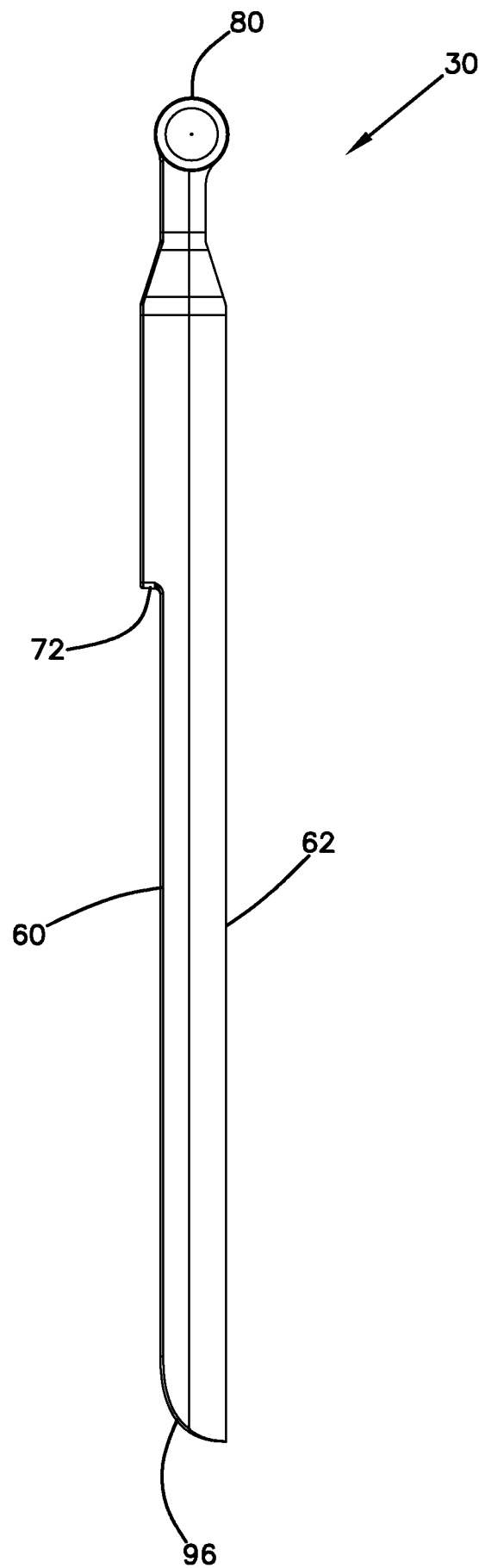


FIG. 12

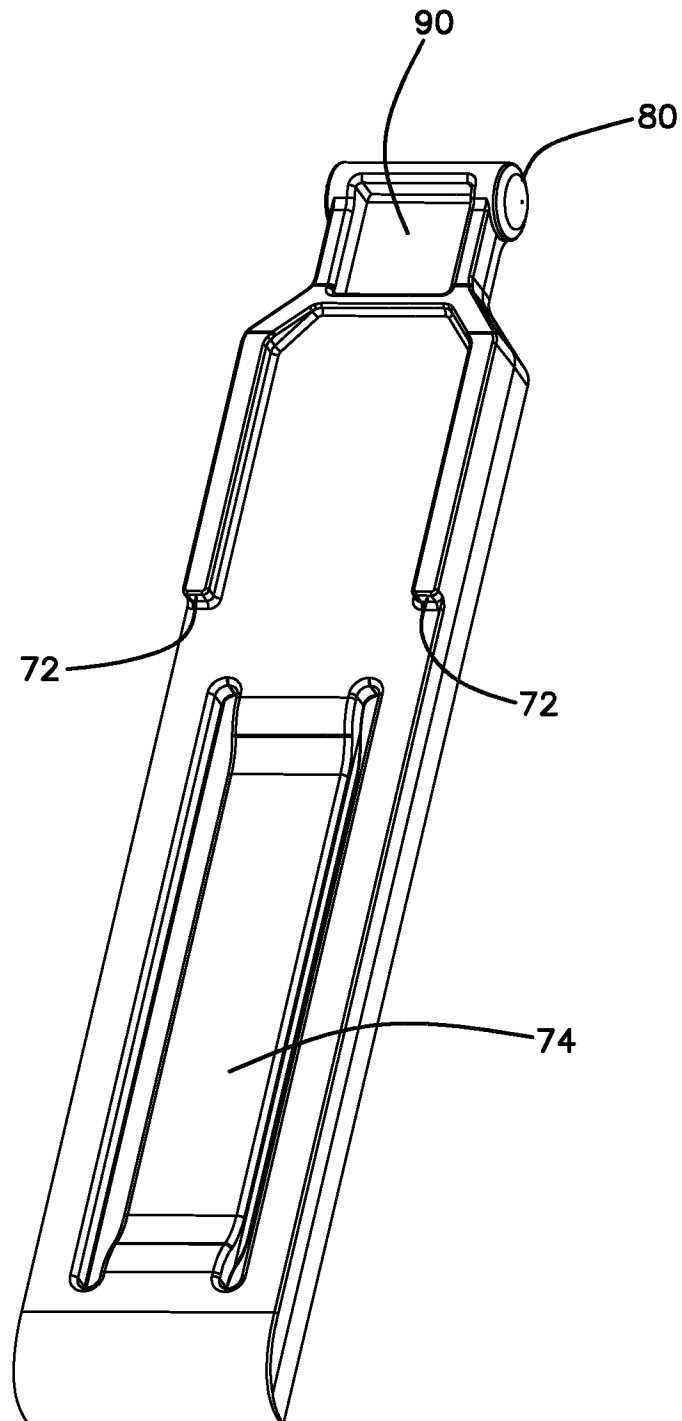


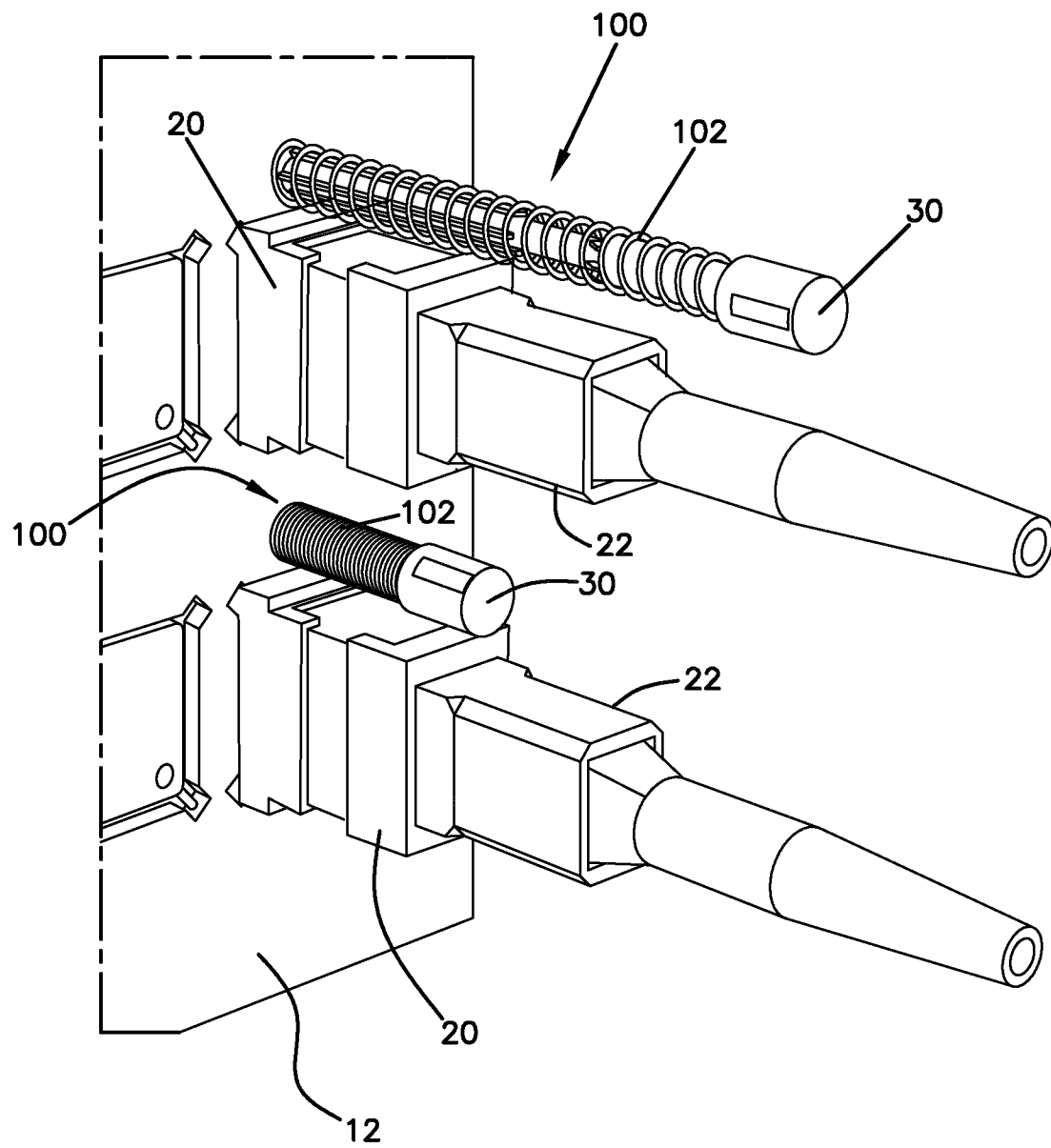
FIG. 13

FIG. 14

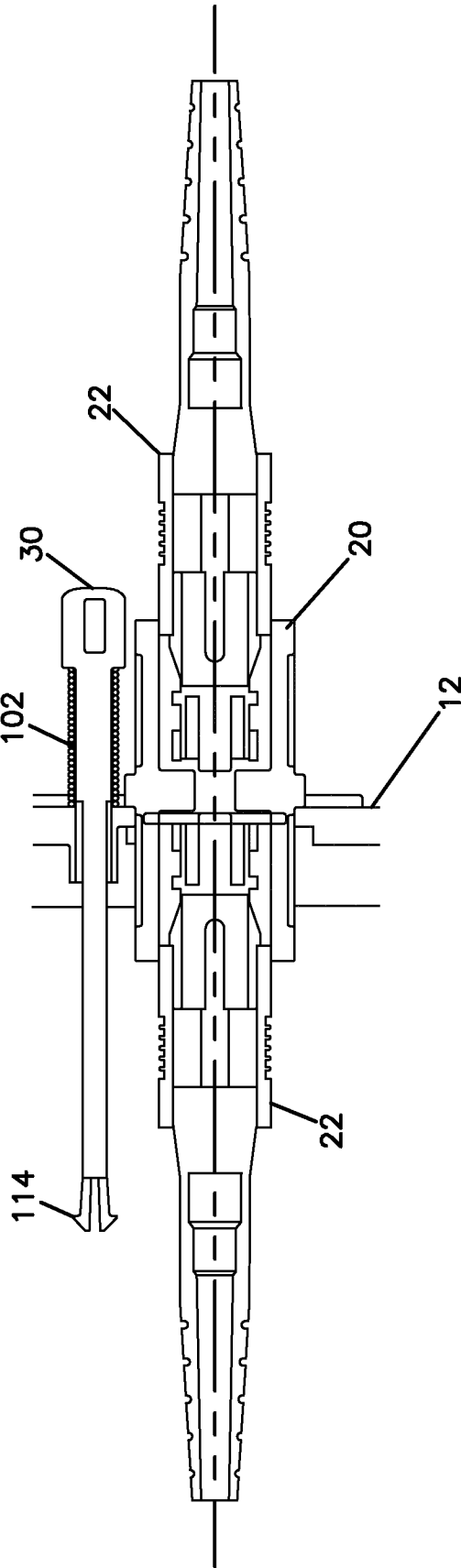


FIG. 15

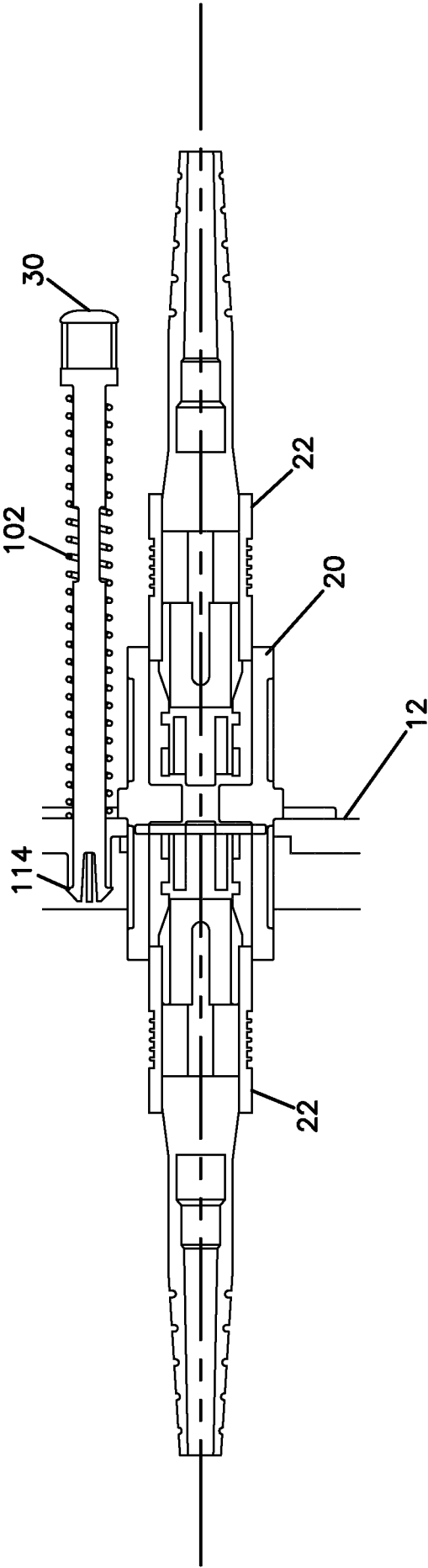


FIG. 16

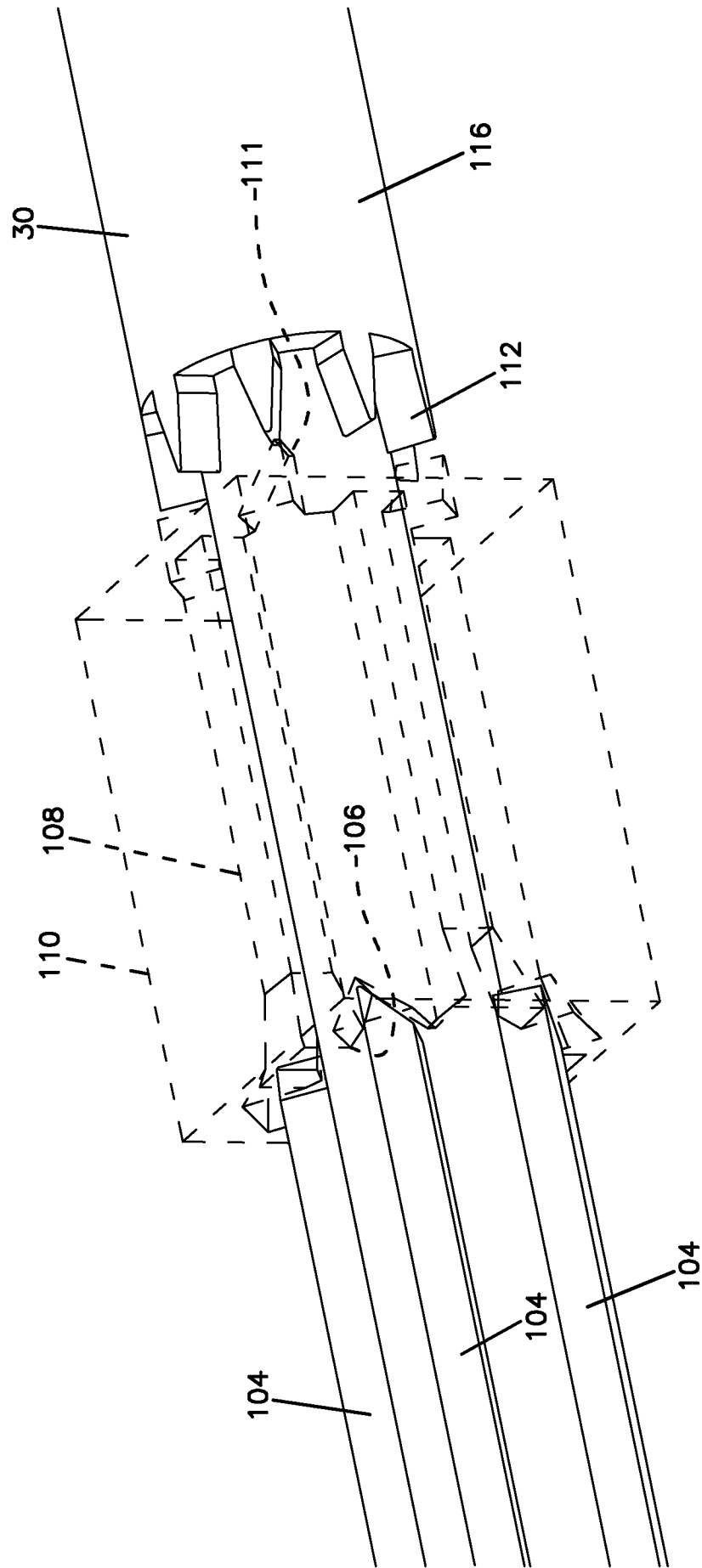


FIG. 17

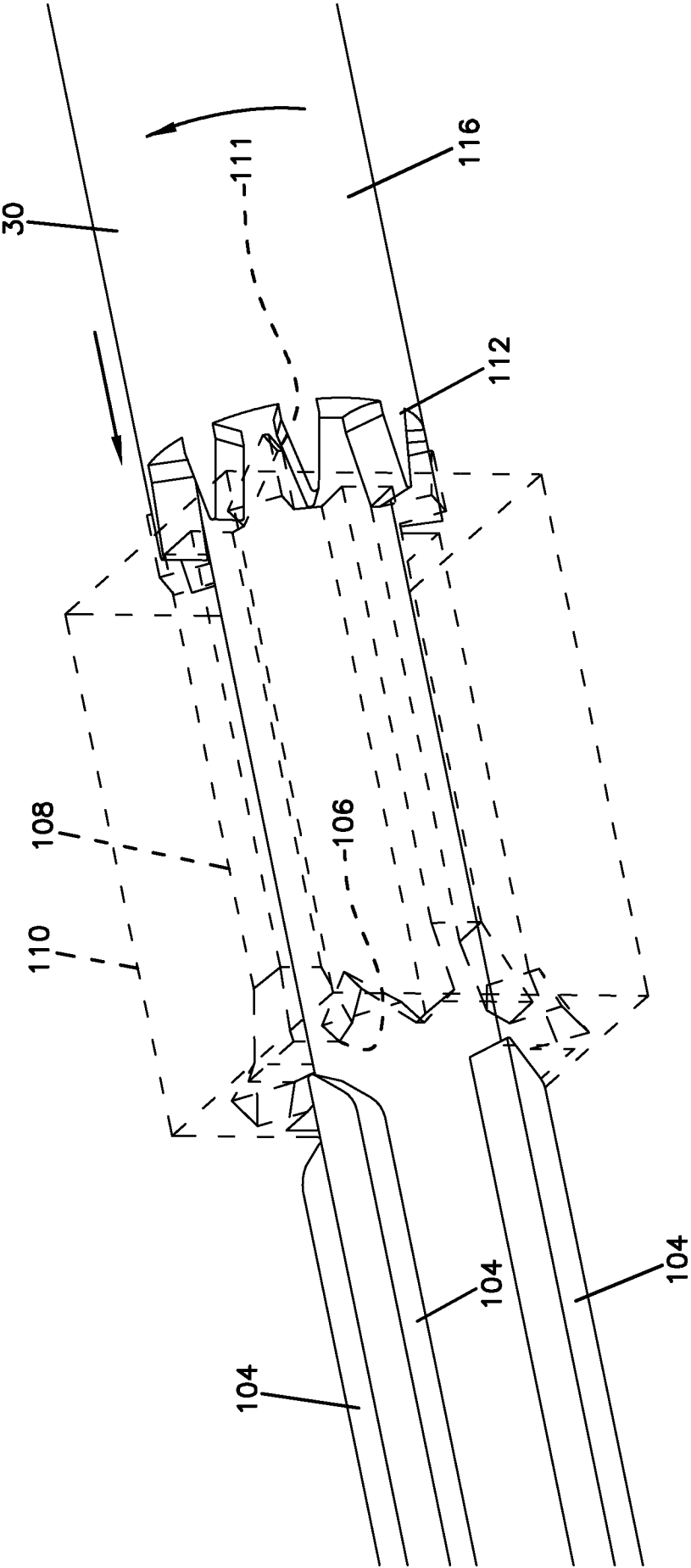


FIG. 18

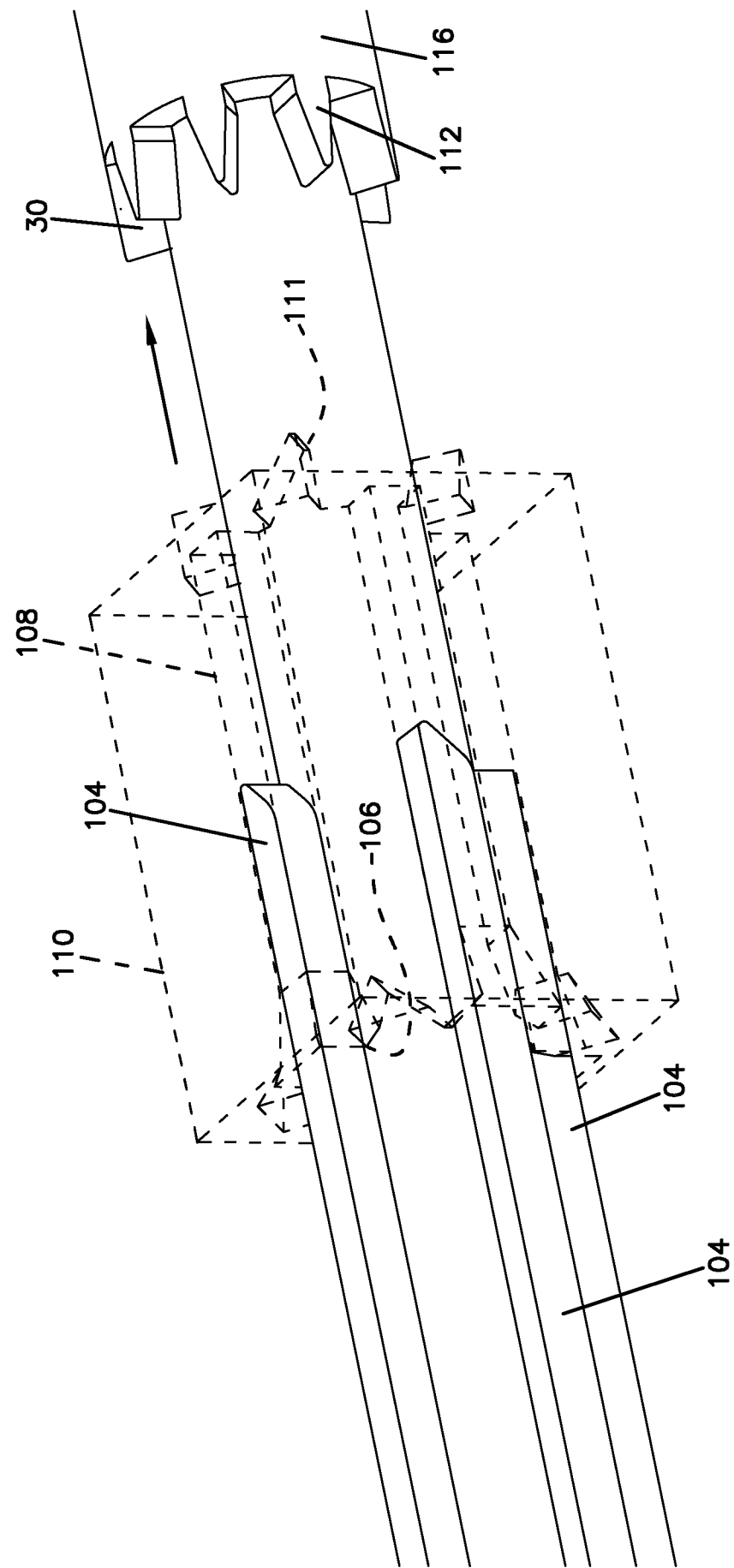


FIG. 19

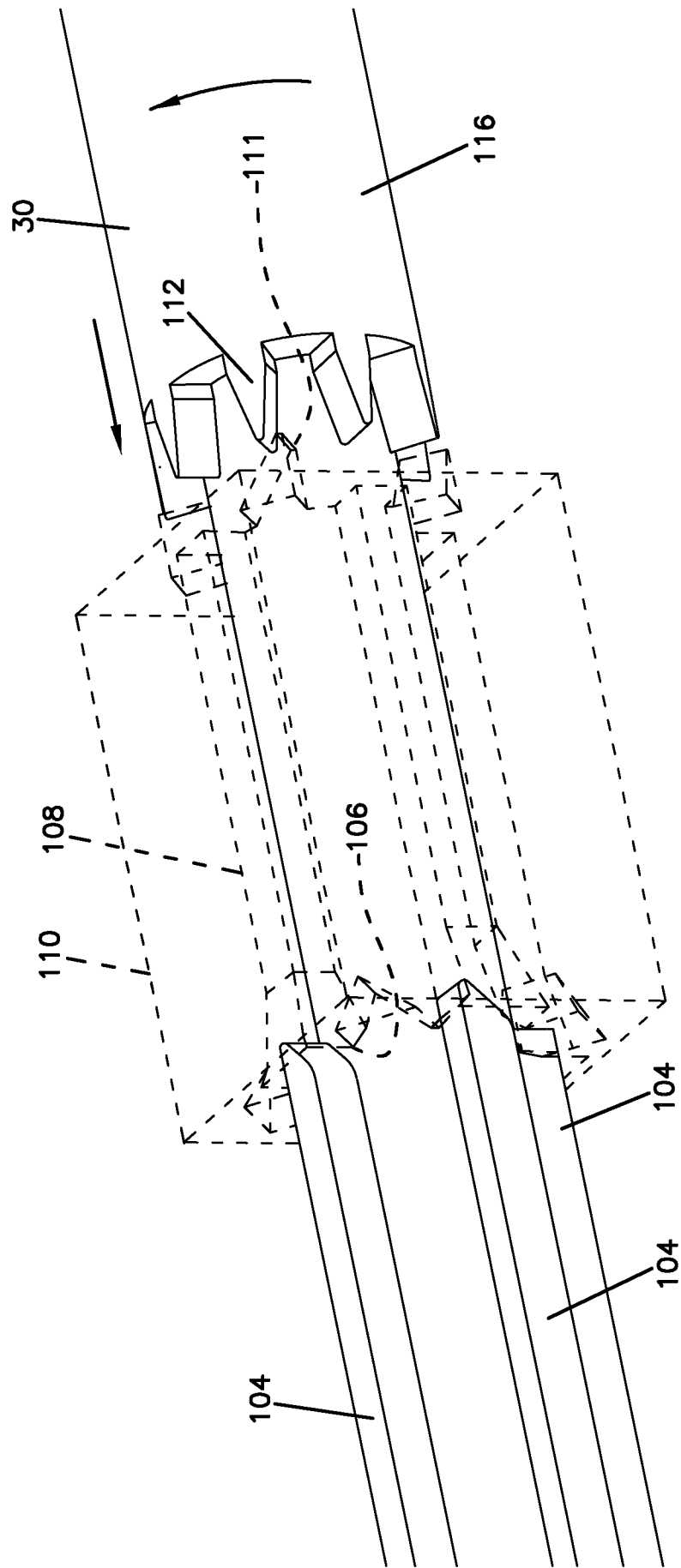


FIG. 20

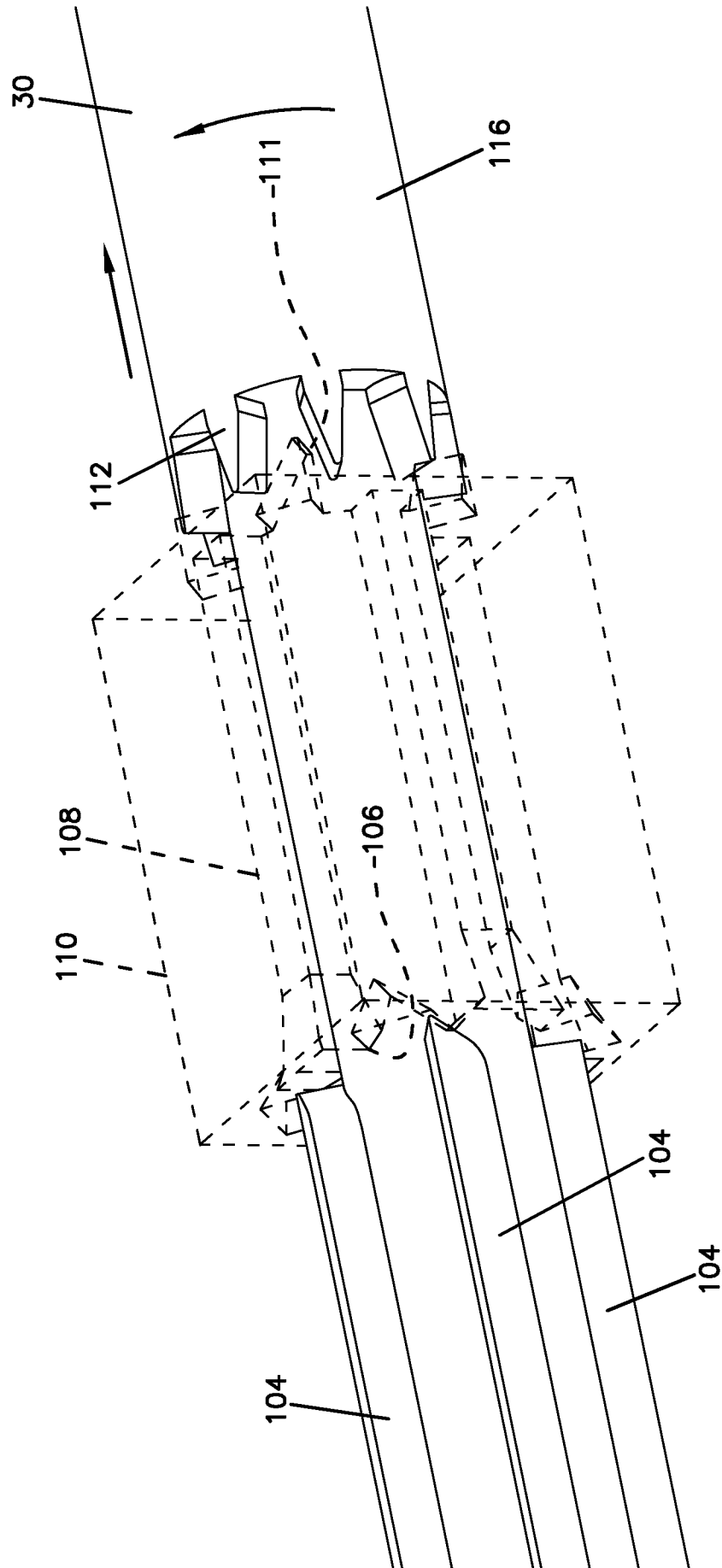
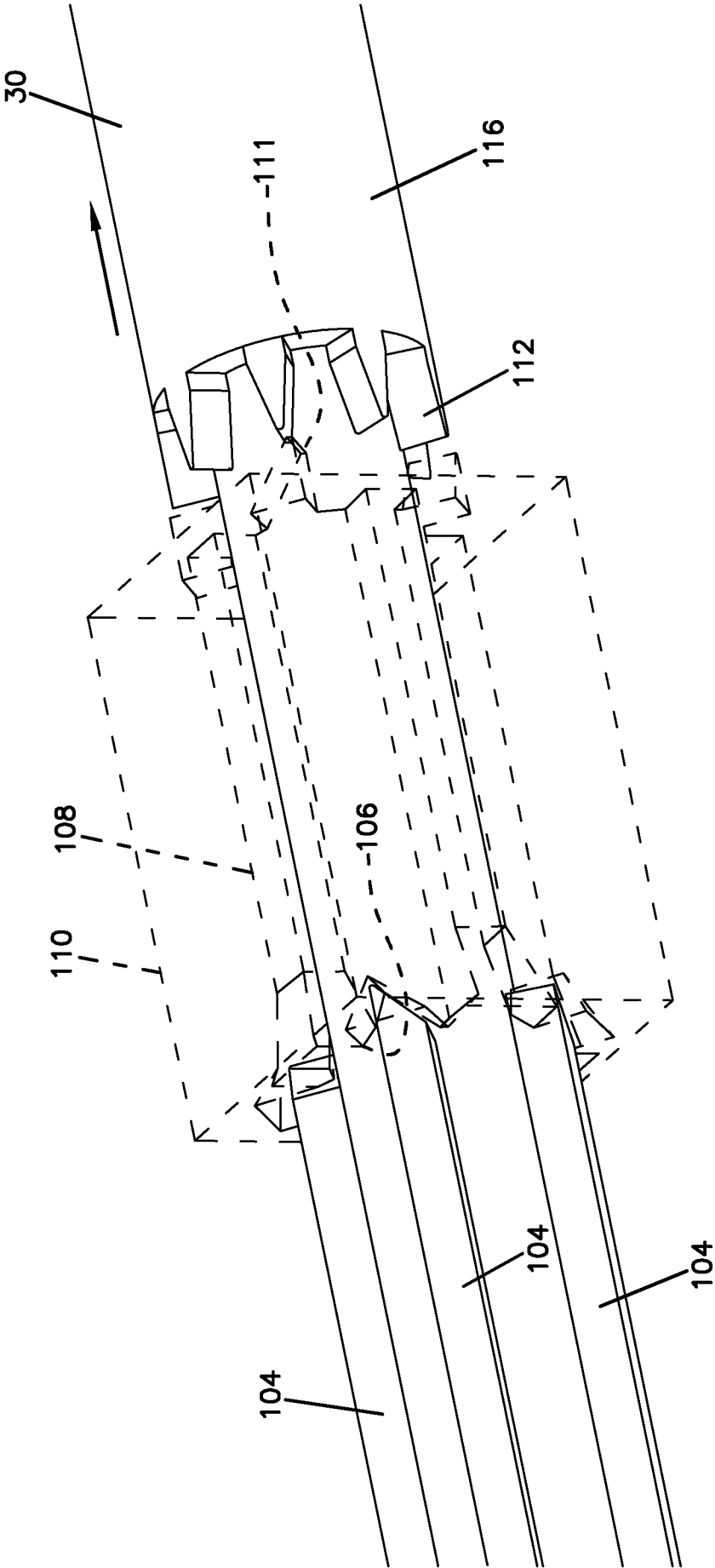


FIG. 21



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2013/071533

A. CLASSIFICATION OF SUBJECT MATTER

INV. G02B6/44

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 8 138 925 B2 (DOWNIE JOHN DAVID [US] ET AL) 20 March 2012 (2012-03-20) abstract; figures -----	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

18 December 2013

Date of mailing of the international search report

07/01/2014

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Authorized officer

Riblet, Philippe

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2013/071533

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