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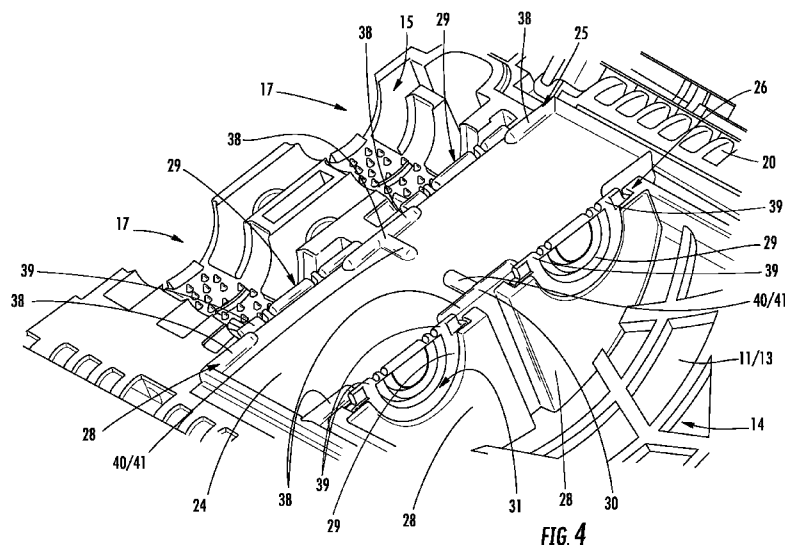
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(54) Title: CABLE CLOSURE



(57) Abstract: A cable closure, having a housing, which delimits a interior of the cable closure and seals off the cable closure, said housing comprising a covering body comprising shells and provides on opposite sides of the same cable insertion regions for inserting cables into said interior and/or for passing cables out of said interior of the cable closure, wherein compressible and/or deformable sealing elements are positioned at said opposite sides of said covering body in the region of said cable insertion regions, wherein each of said sealing elements is positioned between barrier walls of the respective shell, whereby each barrier wall of said shells comprises a first segment being fixedly attached to the respective shell and at least one second segment being detachable from the first segment of the respective barrier wall.

Cable closure

5 This application claims the benefit of priority under 35 U.S.C. § 119 of European Patent Application Serial No. 11164928.1 filed May 5, 2011 the content of which is relied upon and incorporated herein by reference in its entirety.

10 The present patent application relates to a cable closure in accordance with the preamble of claim 1.

Cable closures are used in telecommunications cable networks for protecting spliced joints at connection points between two telecommunications cables and for protecting branch points or splitting points of telecommunications cables. In
15 this case, the cable closures need to ensure the continuity of the telecommunications cables as though the telecommunications cables had not been interrupted.

The product catalog "Accessories for Fiber Optic Networks", Edition 1, page 75,
20 Corning Cable Systems, 2001 discloses cable closures firstly in the form of inline cable closures and secondly in the form of dome cable closures, which all have a housing which defines an interior of the cable closure and seals off the interior thereof from the outside. Conventionally, assemblies for connecting, namely for splicing, telecommunications conductors guided in telecommunica-
25 tions cables are arranged in the interior defined by the housing of the cable closure.

In the case of cable closures in the form of dome cable closures, the housing is formed by a dome-like covering body and a sealing body, the sealing body de-
30 fining cable insertion regions, which are sealed off on one side of the dome-like covering body and via which all of the cables can be inserted into the interior of the cable closure.

In the case of cable closures in the form of inline cable closures, cable insertion regions which are sealed off on two opposite sides of the covering body are formed for inserting cables into the interior of the cable closure, with the result
5 that inline cable closures can be installed in one line with the cables.

DE 20 2010 006 582 U1 discloses an inline cable closure, having a housing, which delimits an interior of the cable closure and seals off the cable closure toward the outside, said housing comprising a covering body, said covering
10 body comprises shells and provides on mutually opposite sides of the same cable insertion regions for inserting cables into said interior of the cable closure and/or for passing cables out of said interior of the cable closure. According to DE 20 2010 006 582 U1 compressible and/or deformable sealing elements are positioned at said mutually opposite sides of said covering body in the region of
15 said cable insertion regions of said shells, wherein each of said sealing elements is positioned between barrier walls of the respective shell, namely between a barrier wall facing the interior of the cable closure and a barrier wall remote from the interior of the cable closure.

20 Against this background, the present patent application provides a novel cable closure having improved sealing properties.

This is accomplished by the feature that each barrier wall of said shells comprises a first segment being fixedly attached to the respective shell and at least
25 one second segment being detachable from the first segment of the respective barrier wall.

The or each second segment of each barrier wall allows an easy and reliable adaption of the cable closure to different cable diameters of cables to be in-
30 serted into said interior of the cable closure and/or the be passed out of said interior of the cable closure thereby improving the sealing properties of the same.

Preferably, in the region of each of said mutually opposite sides of a first one of said shells of said covering body the distance between the respective barrier wall facing the interior of the cable closure and the respective barrier wall remote from the interior of the cable closure is smaller than the respective distance between said barrier walls in the region of each of said mutually opposite sides of a second one of said shells of said covering body, namely in such a way that edges of the barrier walls of said first shell contact, namely compress and/or deform, the respective compressible and/or deformable sealing element positioned between of said barrier walls of the second shell when the said covering body of said housing is closed. This provides a further improvement of the sealing properties.

Exemplary embodiments of the invention will be explained in more detail, without any restriction being imposed, with reference to the drawing, in which:

Figure 1 shows a perspective view of a preferred exemplary embodiment of a cable closure in form of an inline cable closure in a closed status of the same;

Figure 2 shows a perspective view of the inline cable closure shown in figure 1 in an opened status of the same;

Figure 3 shows a detail of a first, lower shell of the inline cable closure;

Figure 4 shows another detail of the first, lower shell of the inline cable closure;

Figure 5 shows the detail of figure 4 in a second status;

Figure 6 shows a first perspective view of a detachable segment of a barrier wall; and

Figure 7 shows a second perspective view of the detachable segment of figure 6.

The present invention relates to a cable closure 10, which in the preferred exemplary embodiment shown is an inline cable closure comprises a housing which is formed by a covering body 13 composed of two shells 11 and 12.

- 5 In the exemplary embodiment shown, the shells 11 and 12 are half-shells and the half-shell 11 is a so-called lower shell and the half-shell 12 is a so-called upper shell of the covering body 13, which together define an interior 14 of the inline cable closure 10.
- 10 Cable insertion regions 17 are formed on mutually opposite sides 15 and 16 of the inline cable closure 10 or the covering body 13, with it being possible for cables to be inserted into the interior 14 of the inline cable closure 10 or passed out of said interior. In the exemplary embodiment shown, in each case two cable insertion regions 17 for inserting in each case one cable into the interior 14
- 15 of the inline cable closure 10 are formed on both mutually opposite sides 15 and 16 of the covering body 13.

- In the shown embodiment, the two half-shells 11 and 12 are hinged together at first longitudinal sides 18, 19 of the same. The half-shells 11 and 12 can be pivoted with respect to each other around a hinge 20 by which said two half-shells
- 20 11 and 12 are fixed to each other at said first longitudinal sides 18, 19 of the same. When the inline cable closure 10 is closed, the other second longitudinal sides 21, 22 of the two half-shells 11 and 12 can be secured to each other by a closing mechanism 23, which is in the shown embodiment assigned to the lower
- 25 half-shell 11.

- In order to ensure that the cables to be inserted into the interior 14 of the inline cable closure 10 via the cable insertion regions 17 are sealed off, compressible and/or deformable sealing elements 24, which are each arranged between barrier walls 25 and 26, are positioned in the region of both mutually opposite sides
- 30 15 and 16 of the covering body 13 of the inline cable closure 10 on which the cable insertion regions 17 are formed, both in the region of the lower half-shell

11 and in the region of the upper half-shell 12. A first barrier wall 25 is in each case, namely on both mutually opposite sides 15 and 16 in the region of the lower half-shell 11 and in the region of the upper half-shell 12, remote from the interior 14 of the inline cable closure 10 while a second barrier walls 26 is in
5 each case facing the interior 14 of the cable closure 10.

As shown in Figure 2, the compressible and/or deformable sealing elements 24 of the upper half-shell 12, which are associated with the cable insertion regions 17, are coupled via compressible and/or deformable sealing elements 27, which run parallel to longitudinal sides 18, 22 of the upper half-shell 12. As a result, an
10 annular, closed sealing region is formed by the sealing elements 24 and 27 in the region of the upper half-shell 12. Possibly, an analogous sealing region can also be formed in the region of the lower half-shell 11.

The compressible and/or deformable sealing elements 24 and possibly 27 are
15 preferably gel-like sealing elements, for example polyurethane gels or silicone gels. Such gel-like sealing elements are deformable and can be compressible.

It is also possible to use sealing elements 24 which are partially composed of different materials, for example from a deformable, gel-like sealing material and
20 from a foam-like compressible sealing material.

Each of said barrier walls 25 and 26, namely both the barrier walls 25 remote from the interior 14 and the barrier walls 26 facing the interior 14, extends transversely with respect to an insertion direction of the cable insertion regions
25 17.

Each of said barrier walls 25 and 26 of said half-shells 11 and 12 comprises a first segment 28 being fixedly attached to the respective half-shell 11, 12 and at least one second segment 29 being detachable from the first segment 28 of the
30 respective barrier wall 25, 26. In the shown embodiment, each of said barrier walls 25 and 26 comprises two second segments 29 being detachable from the first segment 28 of the respective barrier wall 25, 26.

As shown in Figure 5, the first segment 28 of each barrier walls 25, 26 provides pocket-like openings 31 for receiving the respective second segments 29. The second segments 29 can easily be positioned within said pocket-like openings 31 and can easily be removed from the same.

The first segment 28 of each barrier wall 25, 26 of each of said half-shells 11, 12 extends transversely with respect to the insertion direction of the cable insertion regions 17. The second segments 29 being detachable from said first segment 28 of the respective barrier wall 25, 26 are positioned side by side separated by a middle section 30 of said first segment 28 of the respective barrier wall 25, 26. The second segments 29 of the barrier walls 25, 26 allows an easy and reliable adaption of the inline cable closure 10 to different cable diameters of cables to be handled by the inline cable closure 10 thereby improving the sealing properties of the same.

As can be best seen in Figure 6, each second segment 29 comprises at least one break-out section 33, 34, 35 for adapting the respective second segment 29 to a cable diameter of a cable which is be inserted into the interior of the cable closure and/or passed out of said interior of the cable closure. In the shown embodiment, each second segment 29 comprises three break-out sections 33, 34 and 35. These break-out sections 33, 34 and 35 are arranged concentrically to each other. By breaking out an inner break out section 33, the respective second segment 29 can be adapted to a cable having a relative small cable diameter. By breaking out one of the outer break out sections 34 and/or 35, the respective second segment 29 can be adapted to a cable having a larger cable diameter. By providing a second segment 29 having three concentrically arranged break out sections 33, 34 and 35, the same can be adapted to three different cable diameters.

The break out section 33, 34 and 35 can be broken out from the respective second segment 29 along predetermined breaking points 32 running between

adjacent break out sections 33, 34, 35. These predetermined breaking points 32 are assigned to a front wall 36 of the respective second segment 29 and not to a back wall 37 of the same. If the respective second segment 29 is positioned inside one of said pocket-like opening 31 of the respective first segment 28 of the respective barrier wall 25 or 26, the back wall 37 of the respective second segment 29 faces into the direction of the sealing element 24 being positioned between two barrier walls 25 and 26.

As can be best seen in Figure 2, in the region of each of said mutually opposite sides 15, 16 of a first one of said half-shells 11, 12 of said covering body 13, namely in the region of the lower half-shells 11, the distance x between the respective barrier wall 26 facing the interior 14 of the cable closure and the respective barrier wall 25 remote from the interior 14 of the cable closure 10 is smaller than the respective distance y between said barrier walls 25, 26 in the region of each of said mutually opposite sides 15, 16 of a second one of said half-shells 11, 12 of said covering body 13, namely in the region of the upper half-shells 12.

When the said covering body 13 of said housing is closed by bringing the half-shells 11 and 12 in the position shown in Figure 1, edges of the barrier walls 25 and 26 of said first, lower half-shell 11 extending transversely with respect to the insertion direction of the cable insertion regions 17 contact, namely compress and/or deform, the respective compressible and/or deformable sealing element 24 positioned between of said barrier walls 25, 26 of the second, upper half-shell 12.

In the shown embodiment, edges 38 of the first segment 18 of the respective barrier wall 25, 26 and edges 39 of the or each second segment 29 of the respective barrier wall 25, 26 of said first, lower half-shell 11 contact, namely compress and/or deform, the respective compressible and/or deformable sealing element 24 being positioned between said barrier walls 25, 26 of the sec-

ond, upper half-shell 12 when the said covering body 13 of said housing is closed.

5 Thereby the compressible and/or deformable sealing element 24 becomes compressed and/or deformed so that the respective cable insertion region 17 is properly sealed even in the case that no cable is to be handled in the respective cable insertion region 17.

10 Said middle sections 30 of said first segments 28 of the barrier walls 25, 26 being positioned between second segments 29 of the respective barrier wall 25, 26 are T-shaped having protrusions 40 running in longitudinal direction with respect to the insertion direction of the cable insertion regions 17. Edges 41 of said protrusions 40 also contact, namely compress and/or deform, the respective compressible and/or deformable sealing element 24 positioned between of
15 said barrier walls 25, 26 of the second, upper half-shell 12 when the cable closure is closed. This provides a further improvement of the sealing properties.

20 In addition, edges 42 of said lower half-shell 11 running in longitudinal direction contact, namely compress and/or deform, said compressible and/or deformable sealing element 27 running along longitudinal sides 18, 22 of the upper half-shell 12 and/or said compressible and/or deformable sealing elements 24 being positioned between said barrier walls 25, 26 of the upper half-shell 12 when the said covering body 13 of said housing is closed. This provides a further improvement of the sealing properties.

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List of reference numerals

5	10	inline cable closure
	11	shell/lower half-shell
	12	shell/upper half-shell
	13	covering body
	14	interior
10	15	side
	16	side
	17	cable insertion region
	18	longitudinal side
	19	longitudinal side
15	20	hinge
	21	longitudinal side
	22	longitudinal side
	23	closing mechanism
	24	sealing element
20	25	barrier wall
	26	barrier wall
	27	sealing element
	28	first segment
	29	second segment
25	30	middle section
	31	pocket-like opening
	32	predetermined breaking points
	33	break out section
	34	break out section
30	35	break out section
	36	front wall
	37	back wall

	38	edge
	39	edge
	40	protrusions
	41	edge
5	42	edge

Claims

1. A cable closure, having a housing, which delimits an interior of the cable closure and seals off the cable closure toward the outside, said housing comprising a covering body (13), said covering body (13) comprises shells (11, 12) and provides on mutually opposite sides (15, 16) of the same cable insertion regions (17) for inserting cables into said interior of the cable closure and/or for passing cables out of said interior of the cable closure, wherein compressible and/or deformable sealing elements (24) are positioned at said mutually opposite sides (15, 16) of said covering body (13) in the region of said cable insertion regions (17) of said shells (11, 12), wherein each of said sealing elements (24) is positioned between barrier walls (25, 26) of the respective shell (11, 12), namely between a barrier wall (26) facing the interior (14) of the cable closure and a barrier wall (25) remote from the interior (14) of the cable closure, **characterized in that** each barrier wall (25, 26) of said shells (11, 12) comprises a first segment (28) being fixedly attached to the respective shell (11, 12) and at least one second segment (29) being detachable from the first segment (28) of the respective barrier wall (25, 26).
2. The cable closure as claimed in claim 1, **characterized in that** in the region of each of said mutually opposite sides (15, 16) of a first one of said shells (11) of said covering body (13) the distance (x) between the respective barrier wall (26) facing the interior (14) of the cable closure and the respective barrier wall (25) remote from the interior (14) of the cable closure is smaller than the respective distance (y) between said barrier walls (25, 26) in the region of each of said mutually opposite sides (15, 16) of a second one of said shells (12) of said covering body (13).

3. The cable closure as claimed in claim 2, **characterized in that** edges (38, 39) of the barrier walls (25, 26) of said first shell (11) extending transversely with respect to the insertion direction of the cable insertion regions (17) contact, namely compress and/or deform, the respective compressible and/or deformable sealing element (24) positioned between of said barrier walls (25, 26) of the second shell (12) when the said covering body (13) of said housing is closed.
4. The cable closure as claimed in claim 3, **characterized in that** edges (38) of the first segment (18) and/or edges (39) of the or each second segment (19) of said barrier walls (25, 26) of said first shell (11) contact, namely compress and/or deform, the respective compressible and/or deformable sealing element (24) positioned between of said barrier walls (25, 26) of the second shell (12) when the said covering body (13) of said housing is closed.
5. The cable closure as claimed in claim 3, **characterized in that** the compressible and/or deformable sealing elements (24) of said second shell (12) are coupled to one another via compressible and/or deformable sealing elements (27) which run along longitudinal sides of the second shell (12) so as to form an annular sealing region.
6. The cable closure as claimed in claim 5, **characterized in that** edges (42) of said first shell (11) running in longitudinal direction contact, namely compress and/or deform, said compressible and/or deformable sealing element (27) running along longitudinal sides of the second shell (12) and/or said compressible and/or deformable sealing elements (24) being positioned between said barrier walls (25, 26) of the second shell (12) when the said covering body (13) of said housing is closed.

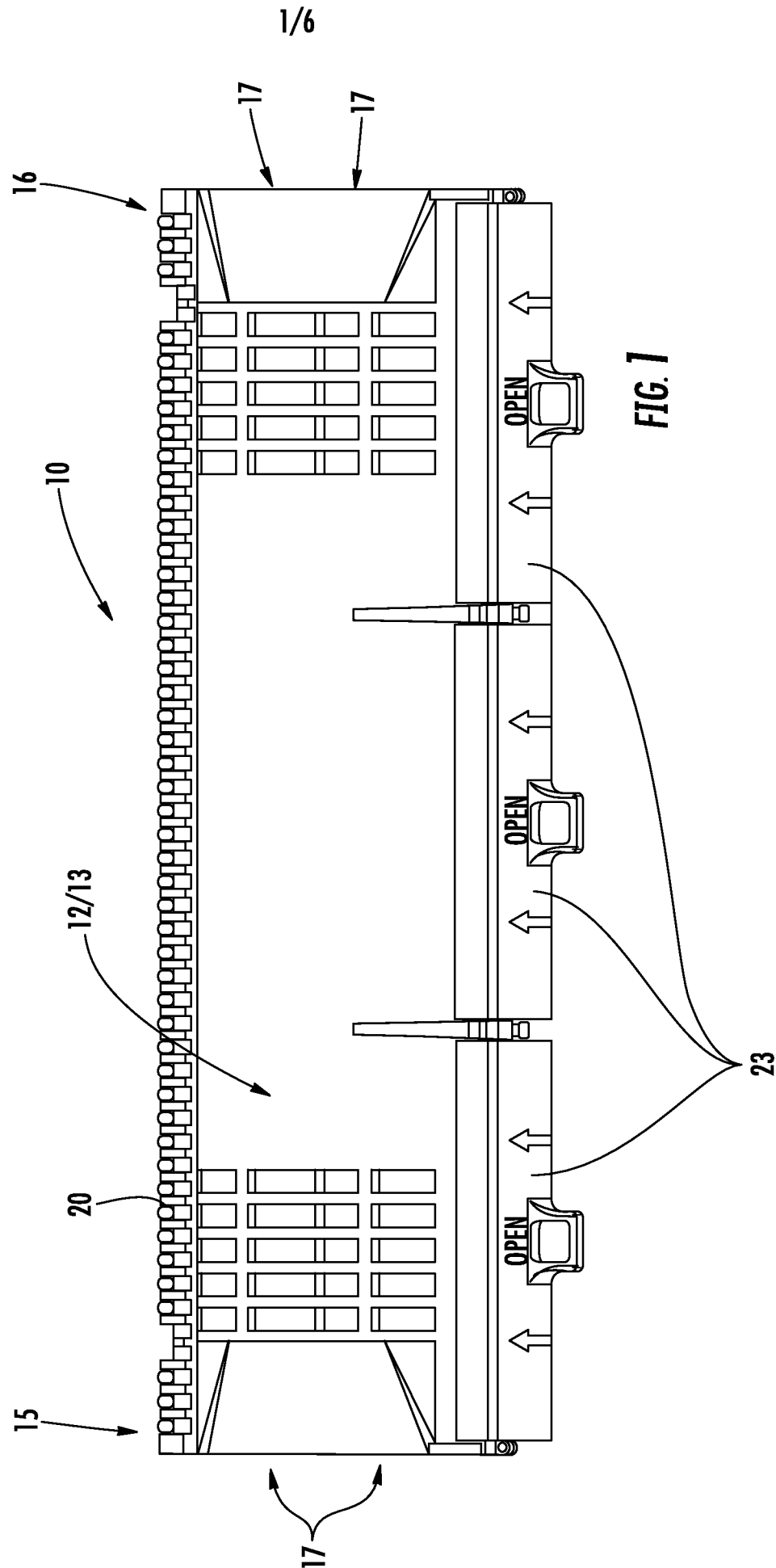
7. The cable closure as claimed in one of claims 1 to 6, **characterized in that** said first segment (28) of each barrier wall (25, 26) of each of said shells (11, 12) extends transversely with respect to the insertion direction of the cable insertion regions (17), and that at least two second segments (29) being both detachable from said first segment (28) of the respective barrier wall (25, 26) are positioned side by side separated by middle sections (30) of said first segment (28) of the respective barrier wall (25, 26).

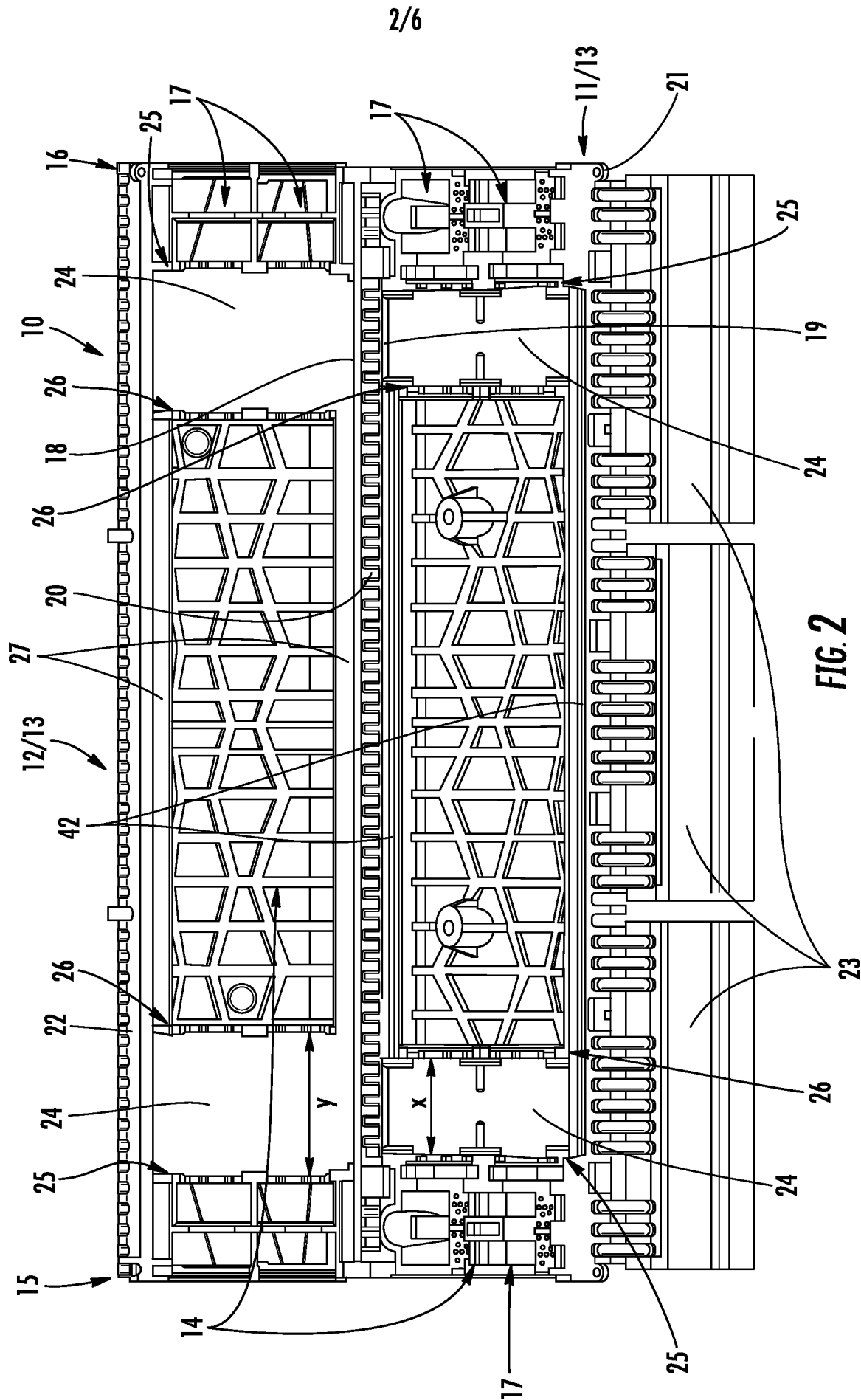
8. The cable closure as claimed in claim 7, **characterized in that** said middle section (30) of said first segment (28) being positioned between second segments (29) of the respective barrier wall is T-shaped having a protrusion (40) running in longitudinal direction with respect to the insertion direction of the cable insertion regions (17).

9. The cable closure as claimed in claim 1, **characterized in that** the second segment (29) of each barrier wall (25, 26) being detachable from the first segment (28) of the respective side barrier wall (25, 26) comprises at least one break-out section (33, 34, 35) for adapting the respective second segment (29) to a cable diameter of a cable which is to be inserted into the interior of the cable closure and/or passed out of said interior of the cable closure.

10. The cable closure as claimed in claim 9, **characterized in that** said second segment (29) of each barrier wall (25, 26) comprises at least two break-out sections for adapting the respective second segment (29) to a cable diameter of a cable, whereby said break out sections of the second segment (29) of each barrier wall (25, 26) are arranged to each other concentrically so that an inner break out section (33) adapts the respective second segment (29) to relative small cable diameter and that the or each outer break out section (34, 35) adapts the respective second segment to a larger cable diameter.

11. The cable closure as claimed in claim 1, **characterized in that** the compressible and/or deformable sealing elements (24) are gel-like sealing elements.





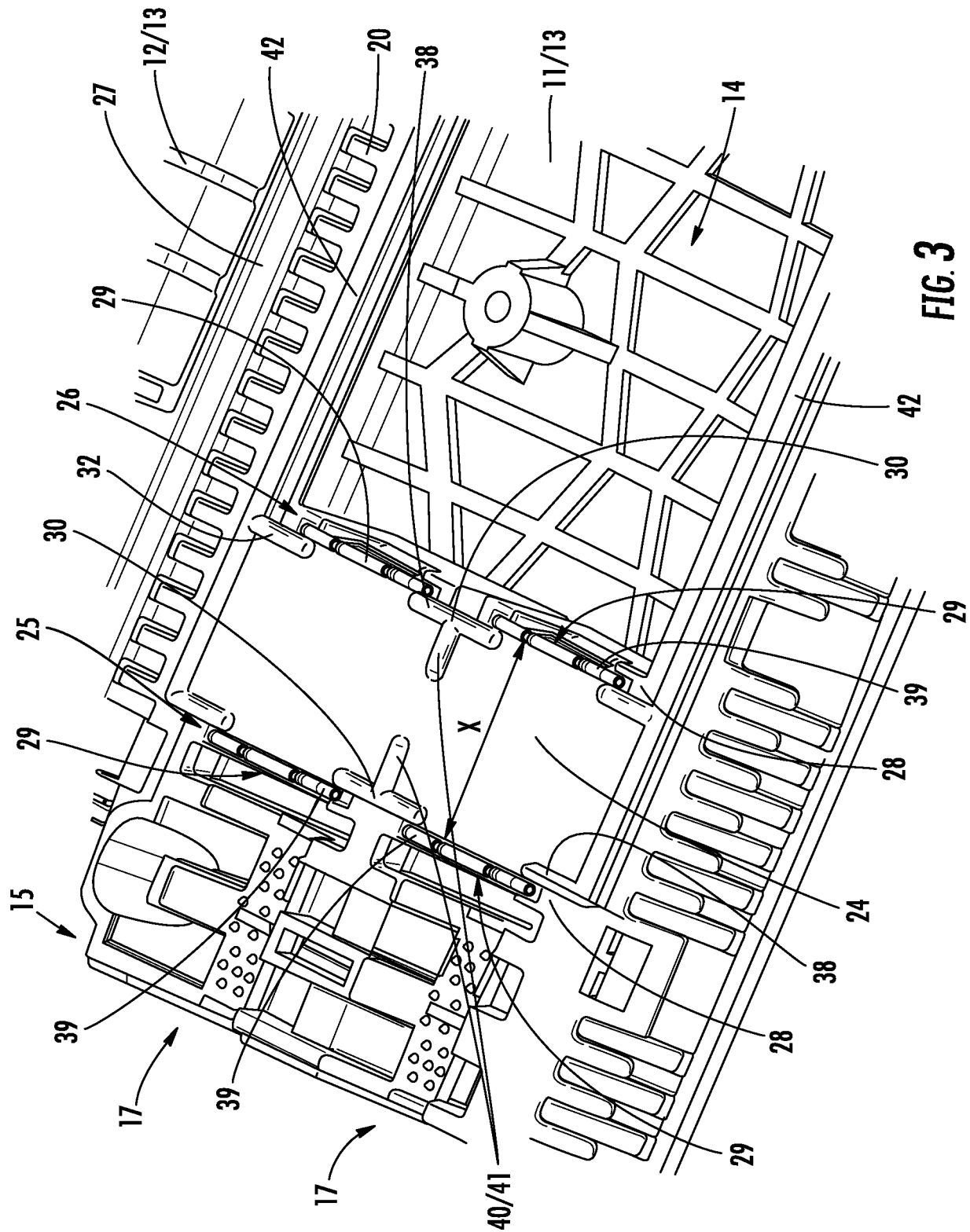


FIG. 3

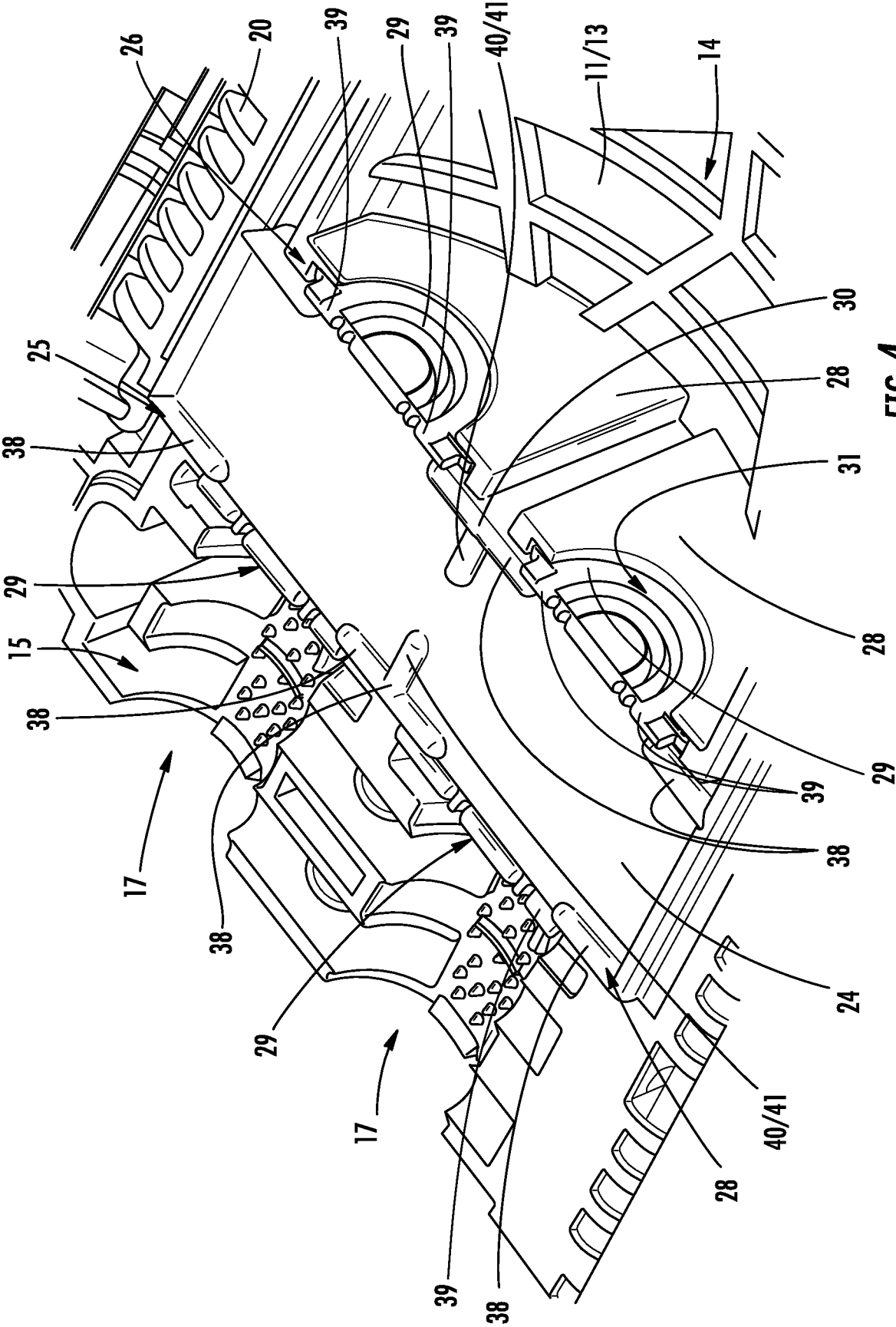
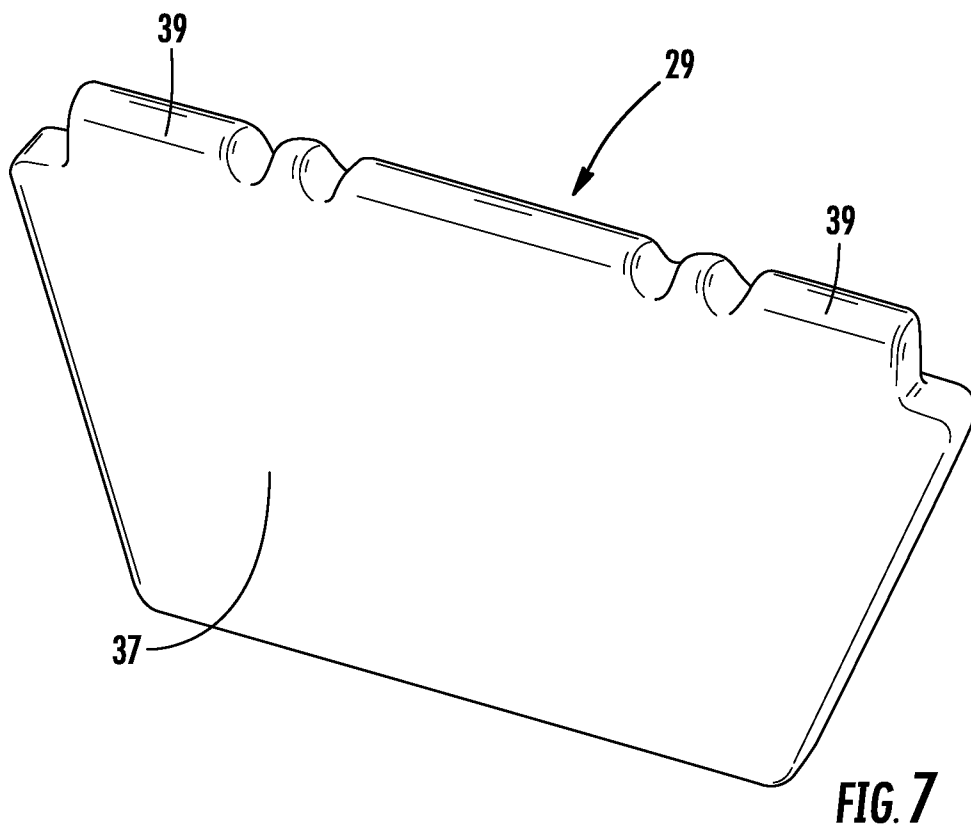
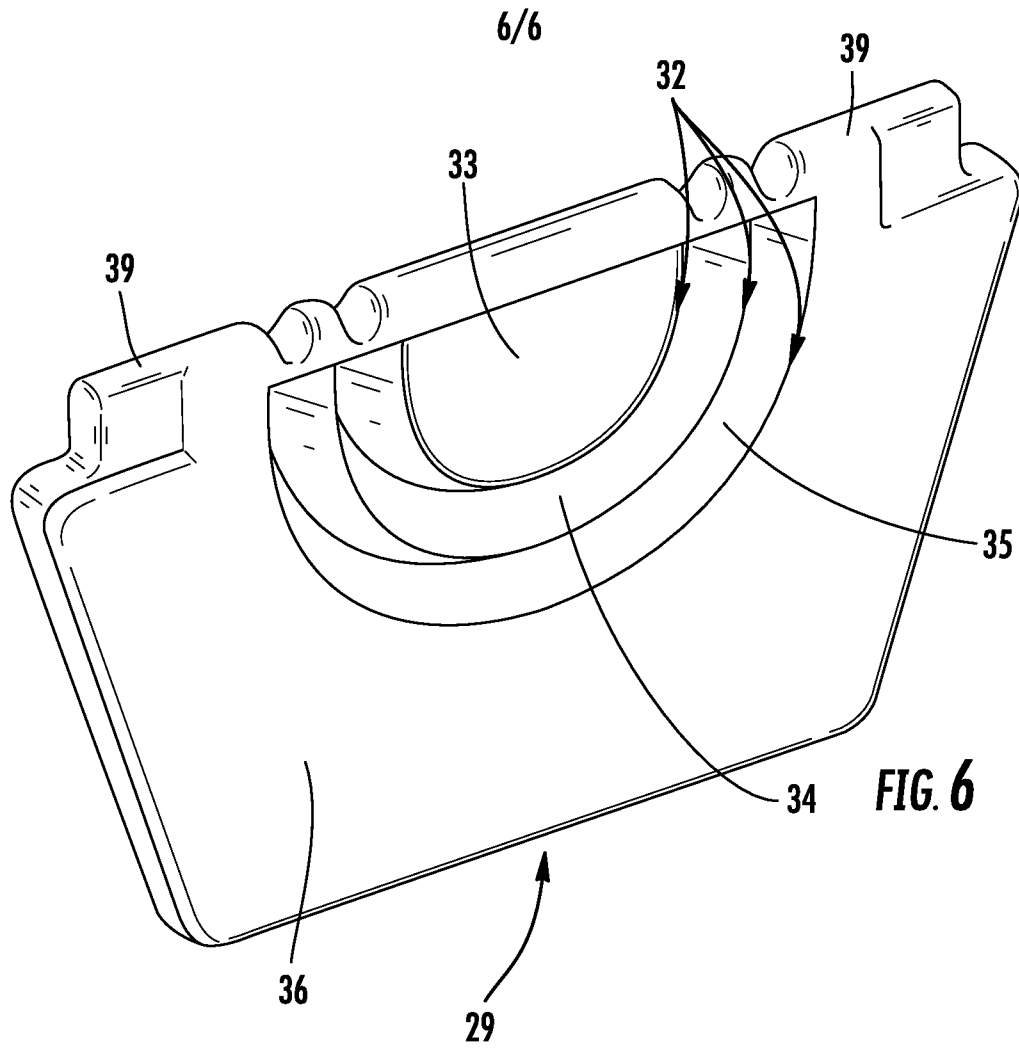


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/36064

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01R 4/00 (2012.01)

USPC - 174/84C

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)

IPC(8): H01R 4/00 (2012.01)

USPC: 174/84C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
additional USPC: 174/70R, 174/74R, 174/77R, 174/84R, 174/84C

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

PubWEST(PGPB,USPT,USOC,EPAB,JPAB); Google Patents, Google

Search terms used: cable closure, housing, cover, covering, shells, cable, insertion, inserting, compress, deform, press, sealing, seal, barrier walls, detachable, segments, break out, diameter, adaptable, frangible, breakable

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,152,767 A (ROOSEN et al.) 28 November 2000 (28.11.2000) Figs 1a, 3, 7-8; col 3, ln 53-63; col 6, ln 45-63; col 7, ln 5-47; col 8, ln 15-20	1-11
Y	US 6,107,571 A (DAMM) 22 August 2000 (22.08.2000) Figs 1a, 3a-3c; col 2, ln 1-67; col 4, ln 47-63; col 5, ln 1-9, 56-64	1-11
Y	US 4,820,007 A (ROSS et al.) 11 April 1989 (11.04.1989) Fig 1; col 4, ln 61-67; col 5, ln 1-5)	8/(1-6)
A	US 7,316,518 B2 (SASAKI et al.) 8 January 2008 (08.01.2008) Figs 1-2; col 7, ln 1-33	1-11
A	US 5,245,133 A (DECARLO et al.) 14 September 1993 (14.09.1993) Figs 1-2; col 4, ln 18-67	1-11

☐ Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search

24 July 2012 (24.07.2012)

Date of mailing of the international search report

10 AUG 2012

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