



(51) International Patent Classification:

G02B 6/44 (2006.01) *H02G 3/08* (2006.01)
H01R 13/52 (2006.01)

(21) International Application Number:

PCT/EP2012/060682

(22) International Filing Date:

6 June 2012 (06.06.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

11169103.6 8 June 2011 (08.06.2011) EP

(71) Applicant (for all designated States except US): **TYCO ELECTRONICS RAYCHEM BVBA** [BE/BE]; Diestsesteenweg 692, B-3010 Kessel-Lo (BE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KEMPENEERS, Dirk** [BE/BE]; Betekomsesteenweg 26, B-3200 Aarschot (BE). **BRYON, Roel, Modest, Willy** [BE/BE]; Tieltsbaan 16, B-3200 Aarschot (BE). **JUNIUS, Erwin** [BE/BE]; Boswachterslaan 23, B-3120 Tremelo (BE). **VANDAMME, Wouter** [BE/BE]; Karel van Renterghem Straat 34, B-9040 Sint Amandsberg (BE). **DE VOS,**

Pieter, Arthur, Anna [BE/BE]; Frederik De Merodeplein 2, B-2600 Berchem (BE). **DOULTREMONT, Pieter** [BE/BE]; Vanaf Leliestraat 19, B-3510 Kermt-hasselt (BE). **FOULON, Wouter** [BE/BE]; Blijde-Inkomstraat 31D/9, B-3000 Leuven (BE).

(74) Agent: **HEINZ-SCHAEFER, Marion**; Tyco Electronics UK Ltd, European Patent Department, Faraday Road, Dorcan, Swindon Wiltshire SN3 5HH (GB).

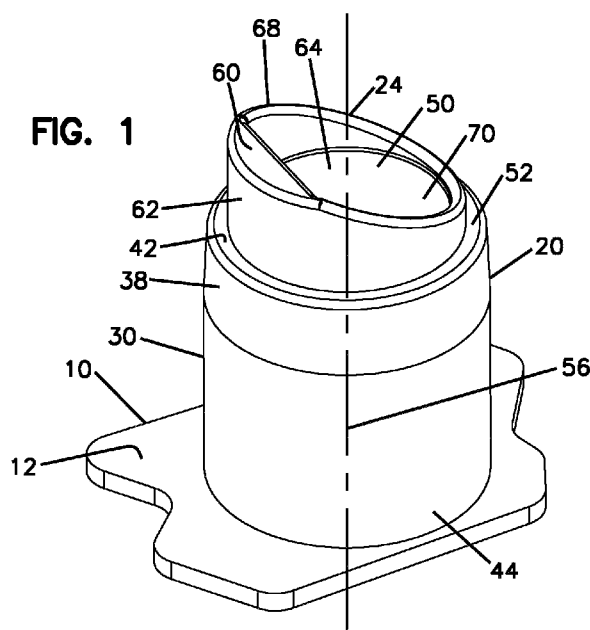
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,

[Continued on next page]

(54) Title: TEAR-OFF TAPS FOR PORTS

FIG. 1



(57) **Abstract:** A telecommunications port including a port (20, 120) includes a port body (30, 130) having a circular end (42, 142) and a tear-off tap (24, 124) positioned on the circular end (42, 142). A webbing (52, 152) seals the tap (24, 124) to the circular end (42, 142). The tap (24, 124) includes a tap body (50, 150) including a projecting handle (60, 160) and a reinforcement element (68). In one embodiment, the reinforcement element (68) includes a spherically shaped middle body portion (70). A further embodiment of a reinforcement element (68) includes a tapering circular rib (80) extending around the periphery of the tap body (50) from the handle (60) to an opposite side (82) of the tap body (50). A further embodiment of a reinforcement element (68) includes a linear rib (190) positioned on an inside surface of the tap body (150). A gap (92, 192) is provided inside port (20, 120) to promote removal of the tap (24, 124). A method of use includes accessing a port (20, 120) by providing a tear-off tap (24, 124) attached to a circular end (42, 142) of a port body (30, 130) with a webbing (52, 152), gripping a projecting handle (60, 160), and pulling the handle (60, 160) to tear the webbing (52, 152) to form a circular opening, wherein a reinforcement element (68) prevents breakage of the tap body (50, 150).



EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *of inventorship (Rule 4.17(iv))*

TEAR-OFF TAPS FOR PORTS**Field of the Invention**

5 The present invention relates to ports for telecommunications boxes, enclosures, or panels.

Background of the Invention

10 Cables enter telecommunications boxes, enclosures, or pass through panels through ports or other openings. Knockouts are known for creating a cable passage in the field at a desired time when the opening is needed. Knockouts are sometimes difficult to use and create less than a full opening initially, requiring multiple steps to create the full opening. Sometimes the knockouts do not fully remove from the
15 opening when the operator attempts to remove the knockout. For example, the knockout may break in part, with a portion remaining in the opening. This may require additional tools or cutting to fully remove. There is a need for devices and methods for creating openings in ports where the opening is easy to form and creates a desired shape in a quick and convenient manner.

20 **Summary of the Invention**

 The present invention concerns a telecommunications port including a port body having a first end and a tear-off tap positioned on the first end. A webbing seals the tap to the first end. The tap includes a tap body including a projecting handle and a
25 reinforcement element.

 The shape of the first end is adapted to the shape of cables to be inserted or passed through the respective port. The shape of the first end is chosen to conform to the desired shape of the opening of the port after the removal of the tear-off tap.

 In one embodiment the first end is a circular end.

In other embodiments the opening formed by the first end after removal of the tear-off tap has an elliptical shape.

In one embodiment, the reinforcement element includes a spherically shaped middle body portion. A further embodiment of a reinforcement element includes
5 a tapering exterior rib extending around the periphery of the tap body from the handle to an opposite side of the tap body. A further embodiment of a reinforcement element includes a rib positioned on an inside surface of the tap body.

The port can be integrally molded with the tap in place.

The invention also relates to a method of using a port including providing
10 a tear-off tap attached to a first end of a port body with a webbing, gripping a projecting handle, and pulling the handle to tear the webbing to form a first opening, wherein a reinforcement element prevents breakage of the tap body. The shape of the first end conforms to the desired shape of the opening to be formed by removing the tear-off tap. The first end may have any shape conforming to the cables to be passed through the port.

15 In one embodiment the first end is a circular end. By removing the tear-off tap a circular opening is formed.

Brief Description of the Figures

20 FIG. 1 is a perspective view of a portion of a telecommunications enclosure and a port with a tear-off tap in accordance with a first embodiment of the invention;

FIG. 2 is a further perspective view of the device shown in FIG. 1;

FIG. 3 is another perspective view of the device shown in FIG. 1;

25 FIG. 4 is a side view of the device shown in FIG. 1;

FIG. 5 is a further side view of the device of FIG. 1;

FIG. 6 is a cross-sectional view of the device shown in FIG. 5, taken along
lines 6-6;

FIG. 7 is a further side view of the device shown in FIG. 1;

30 FIG. 8 is a bottom view of the device shown in FIG. 1;

FIG. 9 shows the port after removal of the tear-off tap;

FIG. 10 is a perspective view of a portion of a telecommunications enclosure and a port with a tear-off tap in accordance with second embodiment of the invention;

FIG. 11 is a side view of the device of FIG. 10;

5 FIG. 12 is a bottom view of the device of FIG. 10;

FIG. 13 is a cross-sectional side view of the device of FIG. 12, taken along lines 13-13;

FIG. 14 is a perspective cross-sectional side view of the device of FIG. 10;

10 FIG. 15 is a schematic view of a telecommunications enclosure including three ports extending outwardly from the enclosure;

FIG. 16 is an alternative telecommunications enclosure including three ports extending inwardly into the enclosure.

Detailed Description of the Preferred Embodiments

15

Referring now to FIGS. 1-9, an enclosure housing 10 includes a panel 12 and a port 20. Port 20 defines an entry and exit location for cables to enter or exit enclosure 10. Port 20 includes a tear-off tap 24 to create the cable passage through port 20.

20

Port 20 includes a port body 30 having a tubular wall 32 defining a generally cylindrically interior surface 34 and a generally cylindrical exterior surface 36. Port body 30 extends from a first end 42 to second end 44. Tear-off tap 24 is located at first end 42.

25

Tear-off tap 24 includes a tap body 50 connected to port body 24 by a webbing 52. Webbing 52 is generally thin in construction relative to port body 30 and tap body 50. Webbing 52 provides a weakened area that will tear when tap body 50 is pulled. Webbing 52 is provided fully around the periphery of tap body 50 and port body 30 at first end 42.

30

Port 20 generally includes a longitudinal axis 56 central to tubular wall 32. Tap body 50 includes a handle 60 offset from axis 56 at one side 62 of tap body 50.

Handle 60 generally projects axially away from end 42 of port body 30. Tap body 50 includes a base 64 which covers first end 42.

To open port body 30 and tear away tap body 50 requires that webbing 52 be broken. Handle 60 is pulled in a prying manner by pulling generally axially and away from side 38 of tubular wall 32. See arrow A of FIG. 4. Pliers may be used to grip handle 60; or handle 60 may be gripped by hand. Gripping surfaces 84, 86 on handle 60 are gripped during use to open port 20.

To prevent breakage of base 64 and to encourage creation of a circular opening in port body 30 formed by tearing of webbing 52, a reinforcement element 68 is included on tap body 50. One example of reinforcement structure shown in the embodiment of FIGS. 1-9 is a spherically shaped middle body portion 70, which forms a depression or indent for base 64. The spherically shaped middle body portion 70 provides reinforcement for base 64 to prevent breakage when handle 60 is pulled to break webbing 52.

The embodiment of FIGS. 1-9 also shows a second reinforcement element 68 in the form of an exterior rib 80. In the illustrated embodiment, rib 80 tapers in height from handle 60 to opposite side 82 of base 64 around the periphery of base 64. Such exterior rib 80 provides reinforcement to base 64 to prevent breakage when handle 60 is pulled to break webbing 52.

In the preferred embodiment of FIGS. 1-9, port 20 with tear-off tap 24 is integrally molded as a single part. Port body 30 can be further integrally molded with enclosure housing 10, if desired. One useful material is polypropylene.

As shown, gripping surface 84 and middle body portion 70 extend down into port body 30. Gap 92 is also provided inside port 20. Such structure promotes the prying action to break webbing 52 and separate tap 24 from port 20.

FIG. 9 shows port 20 after removal of the tear-off tap 24. Opening 96 is created in port body 30. Opening 96 creates the cable passage into and out of enclosure housing 10.

Referring now to FIGS. 10-14, a second preferred embodiment of an enclosure housing 100 including a panel 112 is shown. Port 120 includes a tear-off tap 124. Port 120 includes a port body 130 similarly constructed to port body 30 noted

above. A thin webbing 152 connects a tap body 150 to port body 130. Tap body 150 includes a handle 160 at one side 162 offset from axis 156. A base 164 of tap body 150 is generally planar. Base 164 includes reinforcement element 68 in the form of an interior rib 190 having a central location generally perpendicular to axis 156 and
5 extending transversely to handle 160. Rib 190 has a linear shape.

Handle 160 is pulled in a prying manner by pulling generally axially and away from side 138. See arrow A of FIG. 13. Rib 190 also tapers to a smaller height as it extends away from side 138. A gap 192 is formed between rib 190 and port body 130. Such structure promotes the prying action to break webbing 152 and form a circular first
10 end 142.

In the preferred embodiment of FIGS. 10-14, port 120 with tear-off tap 124 is integrally molded as a single part. Port body 130 can be further integrally molded with enclosure housing 110, if desired. One useful material is polypropylene.

Referring now to FIGS. 15 and 16, two enclosures 200, 300, are shown
15 with ports 20 for cables entering and exiting enclosures 200, 300. Ports 20 extend outward from an exterior of the enclosure 200 in FIG. 15. Ports 20 extend inwardly into enclosure 300 in FIG. 16. Ports 120 are also useable on the enclosures 200, 300, as desired. Enclosures 200, 300 can be used with blown fiber technology or fibers of cables extended to the enclosures such as in fiber to the home. In the case of blown fibers, a
20 duct containing the blown fiber tubes connects to ports 20, 120.

Parts List

10	Enclosure housing
12	Panel
20	Port
24	Tear-off tap
30	Port body
32	Tubular wall
34	Interior surface
36	Exterior surface
38	Side
42	First end
44	Second end
50	Tap body
52	Webbing
56	Axis
60	Handle
62	Side
64	Base
68	Reinforcement element
70	Spherically shape middle body portion
80	Exterior rib
82	Opposite side
84	Gripping Surface
86	Gripping Surface
92	Gap
96	Opening
110	Enclosure housing
112	Panel
120	Port
124	Tear-off tap

130	Port body
138	Side
142	First end
150	Tap body
152	Webbing
156	Axis
160	Handle
164	Base
166	Gripping surface
168	Gripping surface
192	Gap
190	Interior rib
200	Enclosure
300	Enclosure

CLAIMS

1. A telecommunications port (20, 120), comprising:
a port body (30, 130) having a first end (42, 142);
a tap (24, 124) positioned on the first end (42, 142);
characterized in that:
the tap (24, 124) including a tap body (50, 150) including a projecting handle (60, 160) and a reinforcement element (68);
a webbing (52, 152) sealing the tap (24, 124) to the first end (42, 142).
2. The telecommunications port (20, 120) of claim 1, wherein the reinforcement element (68) includes a spherically shaped middle body portion (70).
3. The telecommunications port (20, 120) of claims 1 and 2, wherein the reinforcement element (68) includes an exterior rib (80) extending around the periphery of the tap body (50) from the handle (60) toward an opposite side (82) of the tap body (50).
4. The telecommunications port (20, 120) of claim 3, wherein the exterior rib (80) tapers in height as it extends from the handle (60) to the opposite side of the tap body (50).
5. The telecommunications port (20, 120) of claims 1-4, wherein the reinforcement element (68) includes an interior rib (190) positioned on an inside surface of the tap body (150).
6. The telecommunications port (20, 120) of claims 1-5, wherein a portion of the tap body (50, 150) extends into the port body (30, 130) below the webbing (52, 152).
7. The telecommunications port (20, 120) of claims 1-6, wherein the first end (42, 142) has a circular shape to define a circular opening (96) or an elliptical shape to define an elliptical opening (96).

8. The telecommunications port (20, 120) of claims 3-7, wherein the exterior rib (80) is a circular rib (80) or an elliptical rib.
9. A method of using a telecommunication port comprising:
providing a tap (24, 124) including a tap body (50, 150) attached to a first end (42, 142) of a port body (30, 130);
characterized in that:
gripping a projecting handle (60) on the tap body (50, 150); and
pulling the handle (60) to tear a webbing (52, 152) which connects the tap body (50, 150) to the port body (30, 130) to form an opening (96) wherein a reinforcement element (68) prevents breakage of the tap body (50, 150).
10. The method of claim 9, wherein a portion of the tap body (50, 150) extends into the port body (30, 130).
11. The method of claims 9 and 10, wherein the reinforcement element (68) includes a spherically shaped middle body portion (70).
12. The method of claims 9-11, wherein the reinforcement element (68) includes an exterior rib (80) extending around the periphery of the tap body (50) from the handle (60) toward an opposite side (82) of the tap body (50).
13. The method of claim 12, wherein the exterior rib (80) tapers in height as it extends from the handle (60) to the opposite side of the tap body (50).
14. The method of claims 9-13, wherein the reinforcement element (68) includes an interior rib (190) positioned on an inside surface of the tap body (150).

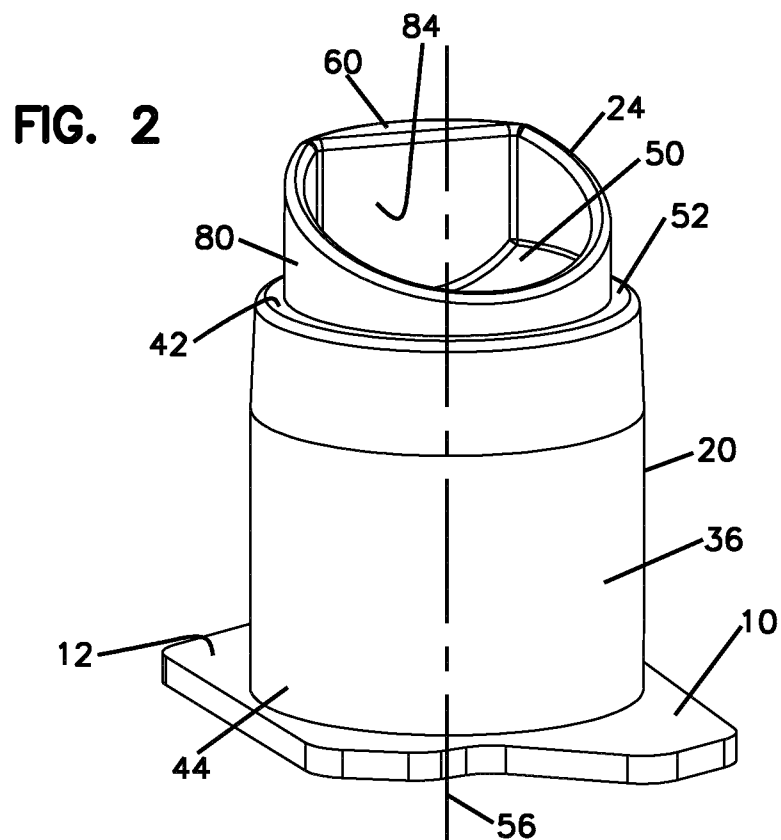
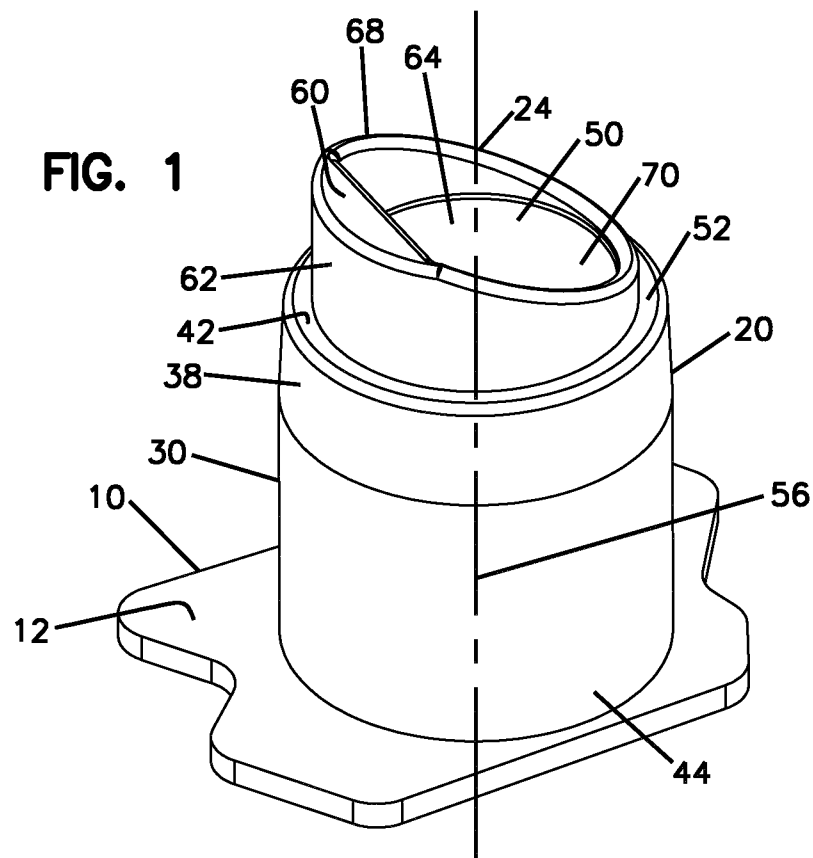


FIG. 3

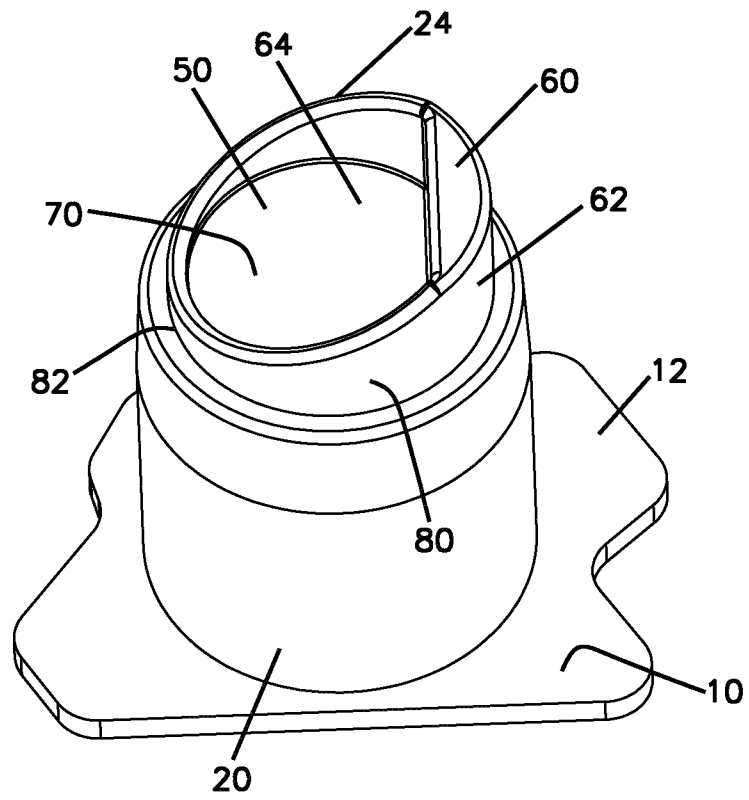


FIG. 4

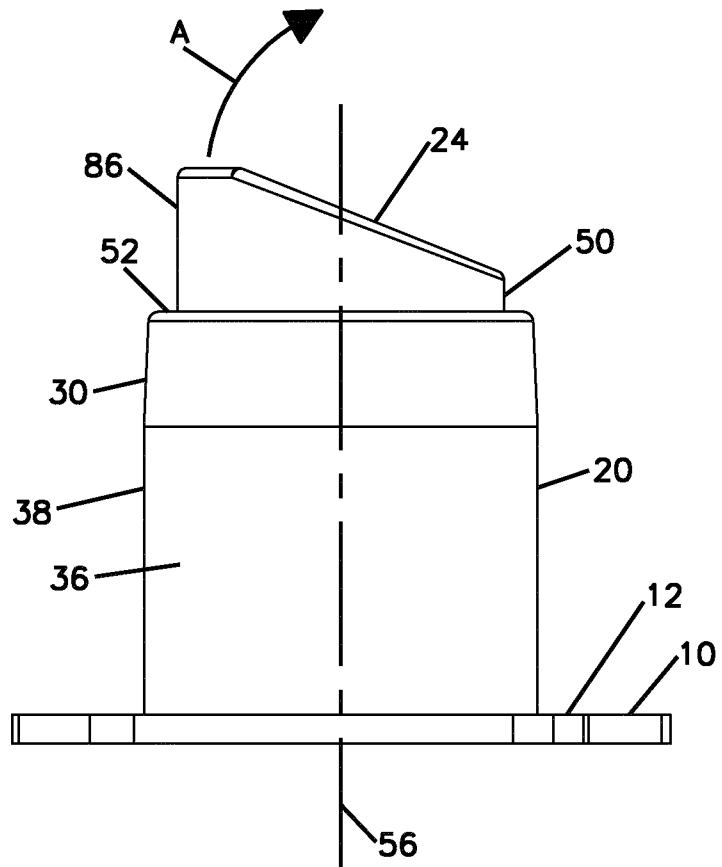


FIG. 5

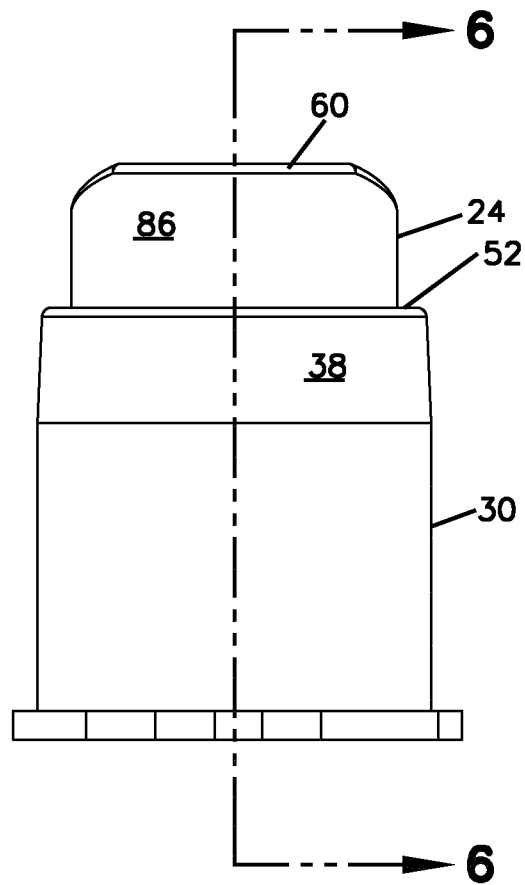


FIG. 6

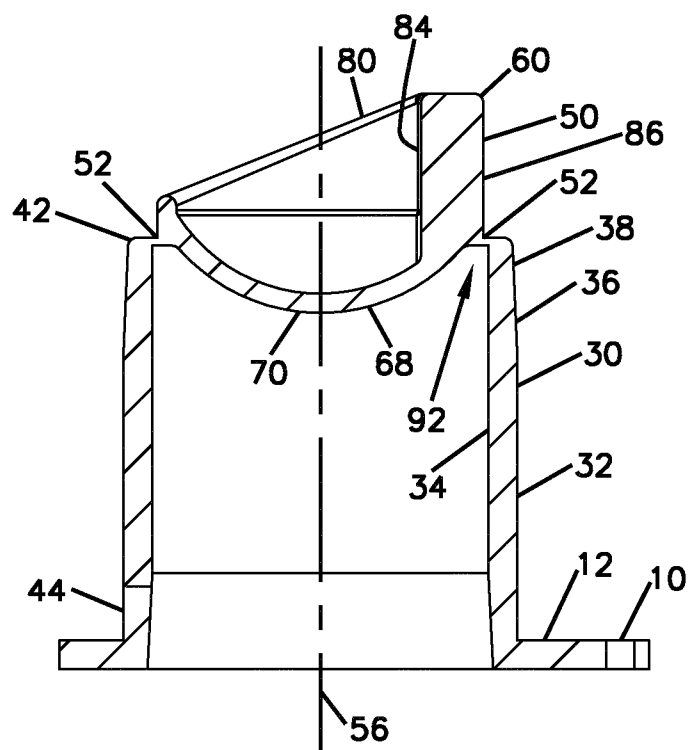


FIG. 8

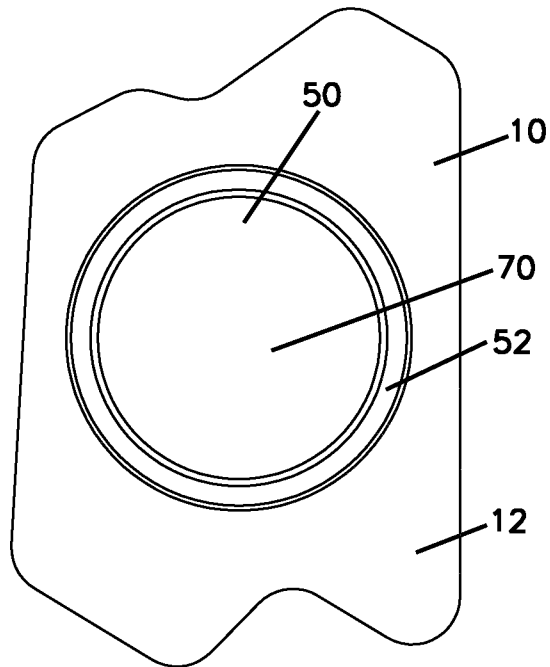


FIG. 7

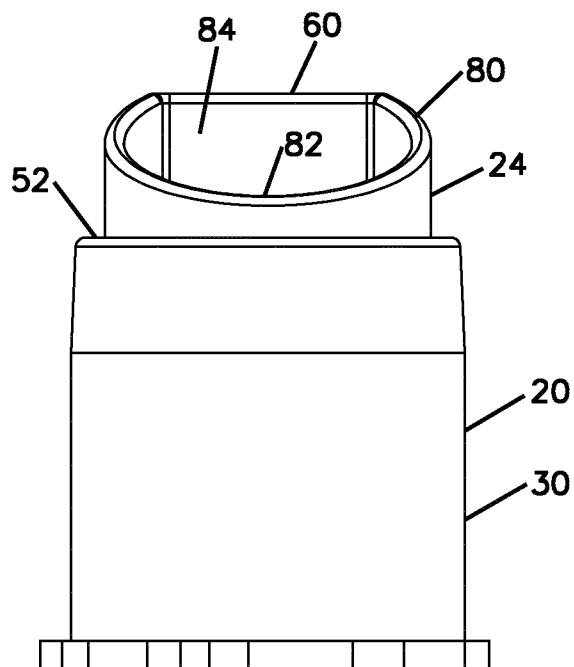


FIG. 11

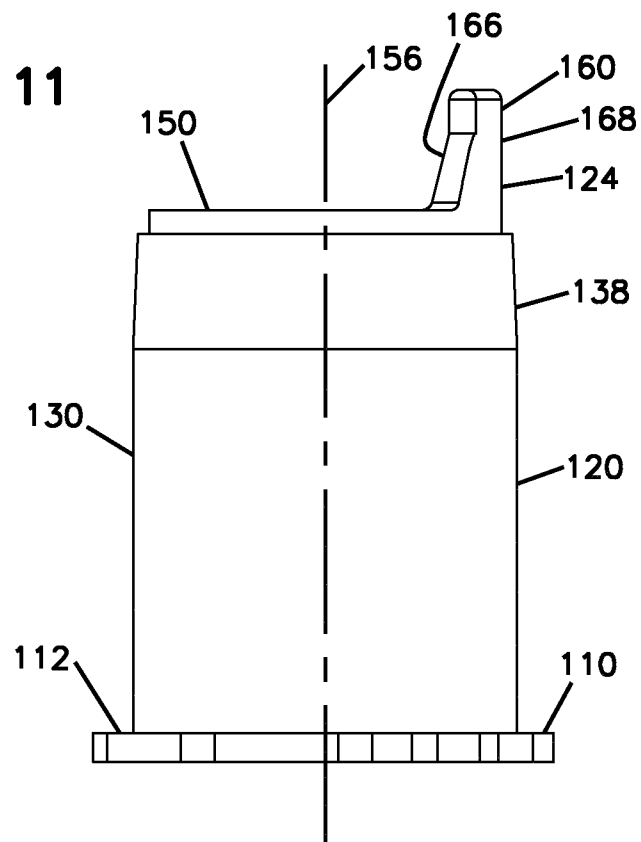


FIG. 14

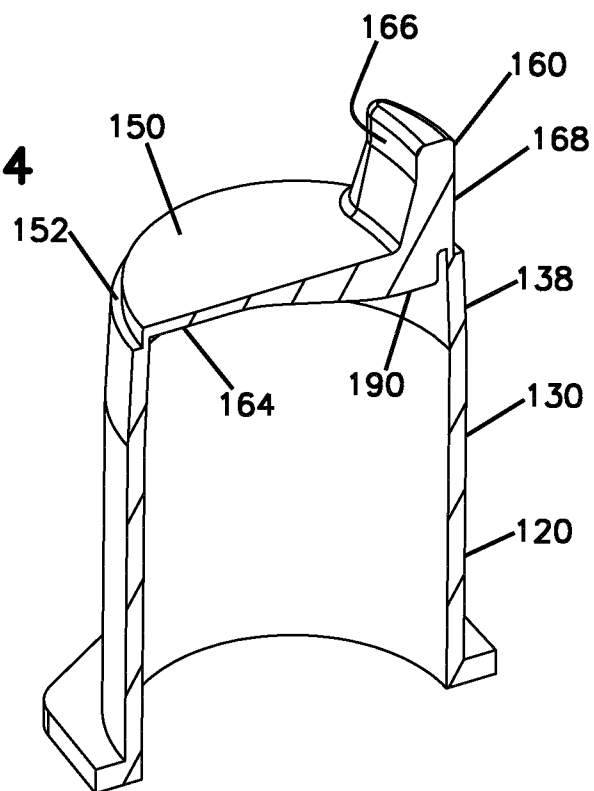


FIG. 12

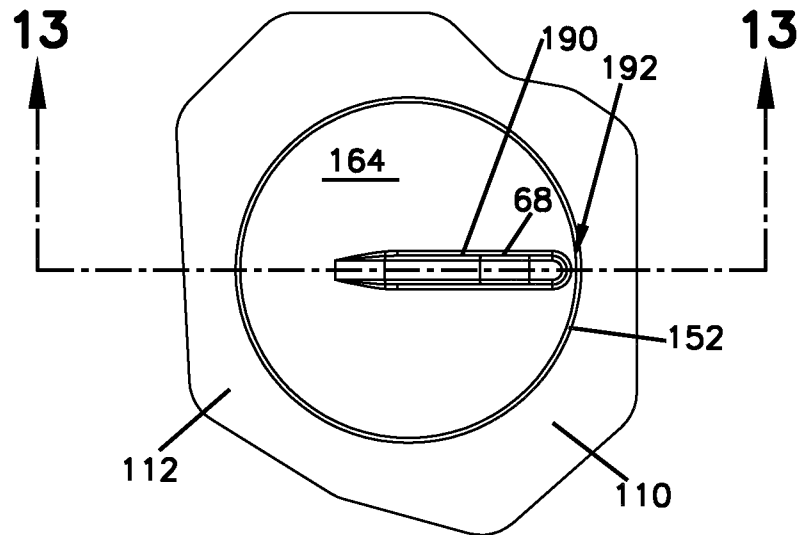


FIG. 13

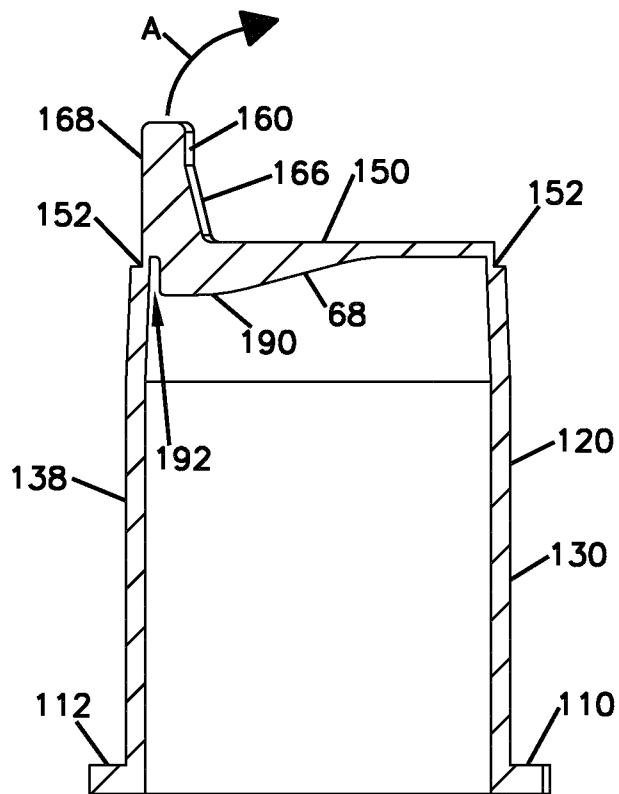


FIG. 15

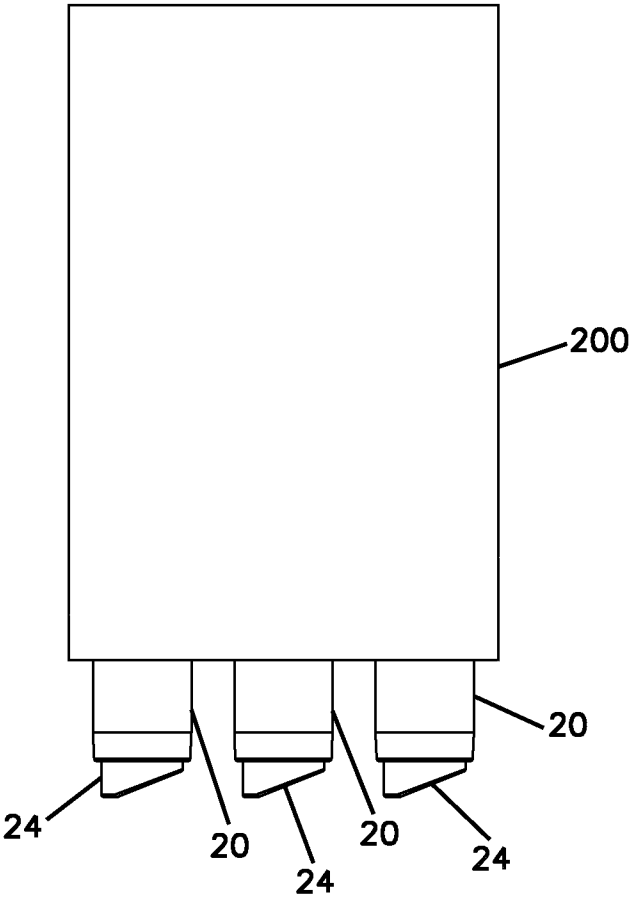
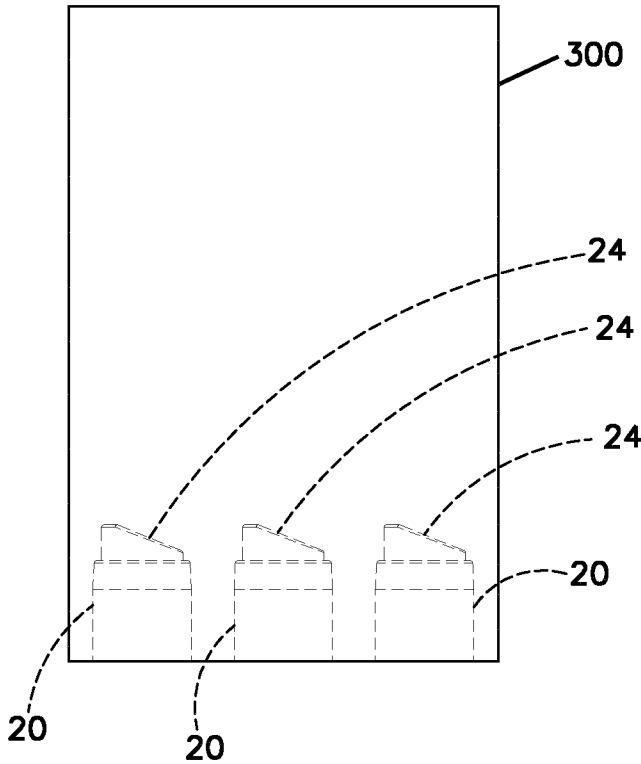


FIG. 16



INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/060682

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-4, 7-9, 11-13

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2012/060682

A. CLASSIFICATION OF SUBJECT MATTER

INV. G02B6/44 H01R13/52 H02G3/08
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 H01R H02G

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 758 220 A2 (LEGRAND FRANCE [FR]; LEGRAND SNC [FR]) 28 February 2007 (2007-02-28) the whole document -----	1-4,7-9, 11-13
Y	FR 2 881 288 A1 (LEGRAND FRANCE [FR]; LEGRAND SNC [FR]) 28 July 2006 (2006-07-28) the whole document -----	1-4,7-9, 11-13
Y	US 6 765 147 B1 (WEISS BRUCE W [US] ET AL) 20 July 2004 (2004-07-20) column 3, line 66 - column 5, line 24; figures 3-7 -----	1,7-9
Y	WO 2007/079111 A2 (CORNING CABLE SYS LLC [US]; VO CHANH C [US]; TENHOLDER RODGER A [US];) 12 July 2007 (2007-07-12) paragraph [0090]; figures 6,8,9 -----	1-4,7-9, 11-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 August 2012

Date of mailing of the international search report

02/11/2012

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Frisch, Anna Maria

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2012/060682

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1758220	A2	28-02-2007	AT 408257 T 15-09-2008
		EP 1758220 A2	28-02-2007
		ES 2313587 T3	01-03-2009
		FR 2890249 A1	02-03-2007
		PT 1758220 E	02-12-2008

FR 2881288	A1	28-07-2006	CN 101107757 A 16-01-2008
		EP 1842271 A1	10-10-2007
		FR 2881288 A1	28-07-2006
		MA 29234 B1	01-02-2008
		RU 2354022 C1	27-04-2009
		WO 2006079707 A1	03-08-2006

US 6765147	B1	20-07-2004	NONE

WO 2007079111	A2	12-07-2007	CA 2635766 A1 12-07-2007
		US 2007160194 A1	12-07-2007
		WO 2007079111 A2	12-07-2007

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4, 7-9, 11-13

Subject 1 relates to a tear-off port cap with pulling handle and reinforcement, to details of spherically shaped outer reinforcement element, and to a corresponding method of opening the port.

2. claims: 5, 14

Subject 2 also relates to a tear-off port cap with pulling handle and reinforcement, to details of an interior rib reinforcement, and to a corresponding method of opening the port.

3. claims: 6, 10

Subject 3 also relates to a tear-off port cap with pulling handle and reinforcement, to details of an inner extended cap portion, and to a corresponding method of opening the port.
