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(54) Capping of bottles

(57) A bottle (11) is capped with a metallic crown closure (12) having a centre panel (13), a peripheral skirt (14) and a curl portion (15) at the edge thereof. A capping tool (2) moves the curl (15) under a capping bead (18) on the bottle, to attach the closure thereto. The curl (15) is typically an outwardly facing curl which is partially unrolled by the capping tool (2) as it moves the curl under the capping bead (18). Thus the curl may be provided with more than 360° of material when viewed in cross section, so that there is at least 270° of material after the curl has been moved under the capping bead (18).

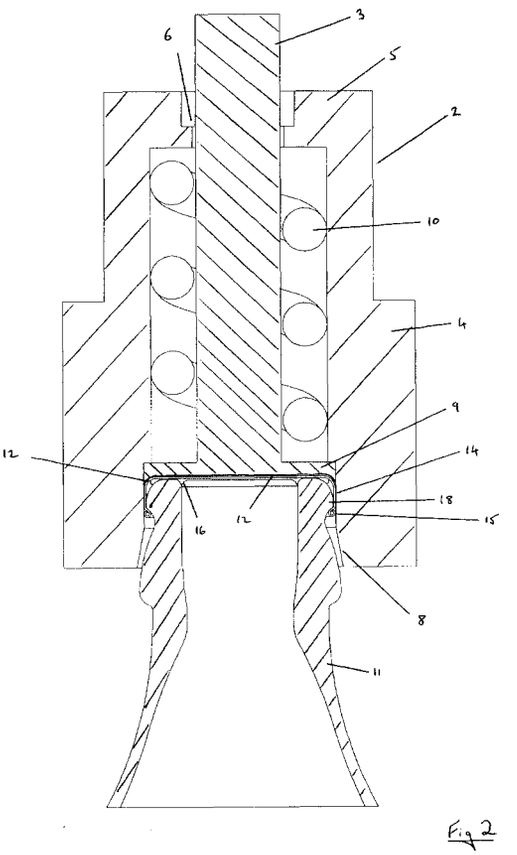

Fig 2

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Description

[0001] The present invention relates to the capping of bottles, and in particular to the use of crown closures. Such closures are long established for the capping of glass and, more recently, plastics bottles. They traditionally consist of a top panel lined with a sealing compound, and a peripheral skirt which is crimped onto the bottle to close it. The closure is removed with a traditional bottle opener, or in some cases can be twisted off of a threaded finish on the bottle.

[0002] The present invention seeks to provide an improved method for the capping of bottles, and an improved closure for use therein.

[0003] Accordingly there is provided a method of capping a bottle comprising the steps of:

i) providing a metallic crown closure including a centre panel, and a peripheral skirt portion depending downwardly therefrom, the distal end of the skirt portion being curled to form a curl portion;
ii) locating the crown closure over the neck of a bottle, the neck of the bottle including an outwardly extending capping bead; and
iii) reforming of the crown closure to move at least a part of the curl portion under the capping bead, thereby securing the crown closure onto the neck of the bottle.

[0004] The above method results in a bottle closed with a crown closure which creates a distinctive appearance. Furthermore, the curl portion serves to maintain the cut edge of the metallic closure away from the surface of the bottle. Thus, even if rust starts to form on the edge of the closure, e.g in hot and humid climates such as the Far East, this rust is not deposited on to the bottle surface when the closure is removed.

[0005] The crown closure is preferably provided with an outwardly facing curl portion, and preferably also comprising more than 360° of material when viewed in cross section. Typically the reforming step acts to roll the curl portion downwardly with respect to the centre panel. The curl portion is partially unrolled during the reforming operation as it is moved under the capping bead. Preferably the reforming step acts to roll the curl portion such that there is still more than 270°, and preferably 360° of material when viewed in cross section, after the curl portion has been moved under the capping bead. Optionally the reforming step also acts to tighten the curl portion as it is moved.

[0006] According to one arrangement, the reforming step moves the entire curl portion under the capping bead. The method preferably includes a reforming step comprising contacting the curl portion with an annular tool having a tapered infeed portion, and moving the annular tool downwardly to move the curl portion under the capping bead on the bottle. Conceivably, the tool has a generally conical shape, at least in respect of its curl contacting surface.

[0007] Alternatively the reforming step comprises contacting the curl portion with a tool having a plurality of projections thereon, and moving the projections with respect to the curl portion so as to form a fluted arrangement in which a plurality of sections of the curl portion are moved under the capping bead of the bottle. This arrangement is particularly suited for the capping of crown closures having significantly more than 360° of material in their curl portion.

[0008] The invention further resides in a metallic crown closure including a centre panel, and a peripheral skirt portion depending downwardly therefrom, the distal end of the skirt portion being curled outwardly to form a curl portion, the curl portion comprising more than 360° of material when viewed in cross section. The metallic crown closure is conveniently formed of aluminium, steel, or of metal coated with a polymer material.

[0009] The invention provides a crown closure with a distinctive appearance, and significant functional advantages. For example, the curled skirt has several advantages over the conventional corrugated skirt, not least in that it provides less of a safety hazard if discarded inappropriately. Furthermore, the uncurled corrugated crown closures are prone to a problem known as 'dusting', in which closures contact each other during transit and the sharp edges of the crown closures chip off small particles of coating materials, producing dust particles which can cause contamination. The curled periphery of the crown closures of the present invention help to avoid this problem.

[0010] It is conceivable that the use of a curled portion which on application is moved under the capping bead, may allow the use of thinner material. The curl adds strength to the closure, giving an opportunity for lightweighting. Another possible advantage is that, by providing a relatively plain skirt portion as opposed to the corrugated skirts used previously, the skirt portion may be used for printing decorative or promotional material.

[0011] The invention will now be further described by way of example only, with reference to the accompanying drawings, in which:-

Fig.1 is a schematic sectional view of capping apparatus for carrying out the method of the present invention, shown in a first position;
Fig.2 is a schematic sectional view of the apparatus of Fig.1, shown in a second position;
Fig.3 is an enlarged view of a part of Fig.1;
Fig.4 is an enlarged view of a part of Fig.2;
Fig.5 is a schematic sectional view of apparatus for carrying out an alternative embodiment of the invention;
Fig.6 is a perspective view of a capping tool for use in the apparatus of Fig.5;
Fig.7 is a schematic sectional view of the apparatus of Fig.5, shown in a second position;
Fig.8 is a perspective view of a crown closure af-

fixed to a bottle using the apparatus of Figs.5 - 7;
Fig.9 is a schematic sectional view of an alternative embodiment of the crown closure for use in accordance with the apparatus of Figs. 1 to 4; and
Fig.10 is a schematic sectional view of the closure of Fig.9, shown after it has been sealed on to a bottle.

[0012] Referring to Fig.1, capping apparatus shown generally at 1 comprises a capping tool 2 reciprocal on a central shaft 3. The capping tool is generally cup shaped and comprises a cylindrical sidewall 4 depending from an upper end 5. A central hole 6 allows the shaft 3 to pass therethrough. The lower end of the tool is open, the opening 7 being provided with a tapered infeed section 8. The shaft 3 has a piston plate 9 at the lower end thereof and a spring 10 is constrained between the piston plate and the upper end 5 of the tool.

[0013] A bottle shown generally at 11 is presented to the apparatus 1, with a crown closure 12 placed thereon. The crown closure comprises a centre panel 13 and a peripheral skirt 14 depending therefrom. The skirt 14 terminates in an outer curl 15 which, as shown in Fig.3, comprises a complete curl including at least 360° of material. A gasket of sealing compound 16, typically a plastisol material, is attached to the underside of the centre panel between the panel and an annular top surface 17 of the bottle. The bottle also includes an annular capping bead 18, and the outer curl 15 lies adjacent the capping bead 18.

[0014] To attach the crown closure 12 to the bottle 11, the piston plate 9 holds the closure in position, and the capping tool 2 is lowered on the central shaft from the position shown in Figs.1 and 3 to that shown in Figs. 2 and 4. As the capping tool 2 is lowered, the tapered infeed section 8 progressively contacts the outer curl 15, moving it downwardly and inwardly to the position shown in Fig.4, in which it lies under the capping bead 18. During this movement the outer curl 15 is partially uncurled, but remains curled to the extent that at least 270° of material is contained within the curl. In this way the crown closure 12 is attached to the bottle 11 having a distinctive slimline appearance. Furthermore, the cut edge 19 of the closure is hidden so as not to pose a danger to users, and yet it is also maintained in a position away from the surface of the bottle so that if rust starts to form on the cut edge 19, it is not in contact with the bottle 11.

[0015] Figs.5 to 7 show an alternative embodiment of apparatus in which features similar to those in Figs. 1 to 4 are designated with like reference numerals. The apparatus is suitable for capping crown closures 12 in which the outer curl 15 is provided with substantially more than one turn of material, in this case approximately 1½ turns of metal. The capping tool 2 differs from that described previously in that the tapered infeed section 8 is castellated, and has inwardly extending segments 20 separated by land portions 21. This tool is shown in Fig.6.

[0016] The operation of the apparatus is similar to that previously described, with the capping tool 2 being lowered on the central shaft 3 as shown in Fig.7. The segments 20 contact the outer curl 15 so as to urge it under the capping bead 18 at those positions around its circumference in which contact is made. The result is the petaloid structure of Fig.8, in which reformed areas 22 alternate with plain areas 23 around the circumference of the skirt 14.

[0017] In both of the above embodiments, the crown closure 12 may be removed from the bottle 11 using a conventional bottle opener. In the arrangement of Fig. 8, the plain areas 23 provide particularly good sites on which the bottle opener can be employed.

[0018] Figs. 9 & 10 show an alternative crown closure having a centre panel 13, peripheral skirt 14 and sealing compound 16 etc. as previously described. In the closure of Figs. 9 & 10, however, the skirt 14 is flared outwardly and the curl at the end thereof is an inwardly facing curl 24. The closure 12 is placed on a bottle 11 as before, and presented to apparatus as previously described with reference to Figs. 1 to 4. The capping tool moves downwardly reforming the skirt 14 into the position shown in Fig.10, in which the inner curl 24 is rolled under the capping bead 18 on the bottle 11, securing the crown closure on to the bottle as previously described.

Claims

1. A method of capping a bottle comprising the steps of:

   i) providing a metallic crown closure including a centre panel, and a peripheral skirt portion depending downwardly therefrom, the distal end of the skirt portion being curled to form a curl portion;
   ii) locating the crown closure over the neck of a bottle, the neck of the bottle including an outwardly extending capping bead; and
   iii) reforming of the crown closure to move at least a part of the curl portion under the capping bead, thereby securing the crown closure onto the neck of the bottle.

2. A method according to claim 1, **characterised in that** the crown closure is provided with an outwardly facing curl portion.

3. A method according to claim 1 or claim 2, **characterised in that** the crown closure is provided with a curl portion comprising more than 360° of material when viewed in cross section.

4. A method according to any of claims 1 to 3, **char-**

acterised in that the reforming step acts to roll the curl portion downwardly with respect to the centre panel.

5. A method according to claim 4, **characterised in that** the reforming step acts to tighten the curl portion as it is moved.

6. A method according to claim 4 or claim 5, **characterised in that** the reforming step acts to roll the curl portion such that there is still more than 270° of material when viewed in cross section, after the curl portion has been moved under the capping bead.

7. A method according to any preceding claim, **characterised in that** the reforming step moves the entire curl portion under the capping bead.

8. A method according to claim 7, **characterised in that** the reforming step comprises contacting the curl portion with an annular tool having a tapered infeed portion, and moving the annular tool downwardly to move the curl portion under the capping bead on the bottle.

9. A method according to any of claims 1 to 6, **characterised in that** the reforming step comprises contacting the curl portion with a tool having a plurality of projections thereon, and moving the projections with respect to the curl portion so as to form a fluted arrangement in which a plurality of sections of the curl portion are moved under the capping bead of the bottle.

10. A metallic crown closure for use in the method of any of claims 1 to 9.

11. A metallic crown closure including a centre panel, and a peripheral skirt portion depending downwardly therefrom, the distal end of the skirt portion being curled to form a curl portion, the curl portion comprising more than 360° of material when viewed in cross section.

12. A metallic crown closure according to claim 11, **characterised in that** the curl portion is an outwardly facing curl portion.

13. A metallic crown closure according to claim 11 or 12, **characterised in that** it is formed of aluminium.

14. A metallic crown closure according to claim 11 or 12, **characterised in that** it is formed of steel.

15. A metallic crown closure according to claim 13 or claim 14, **characterised in that** it is formed of metal coated with a polymer material.

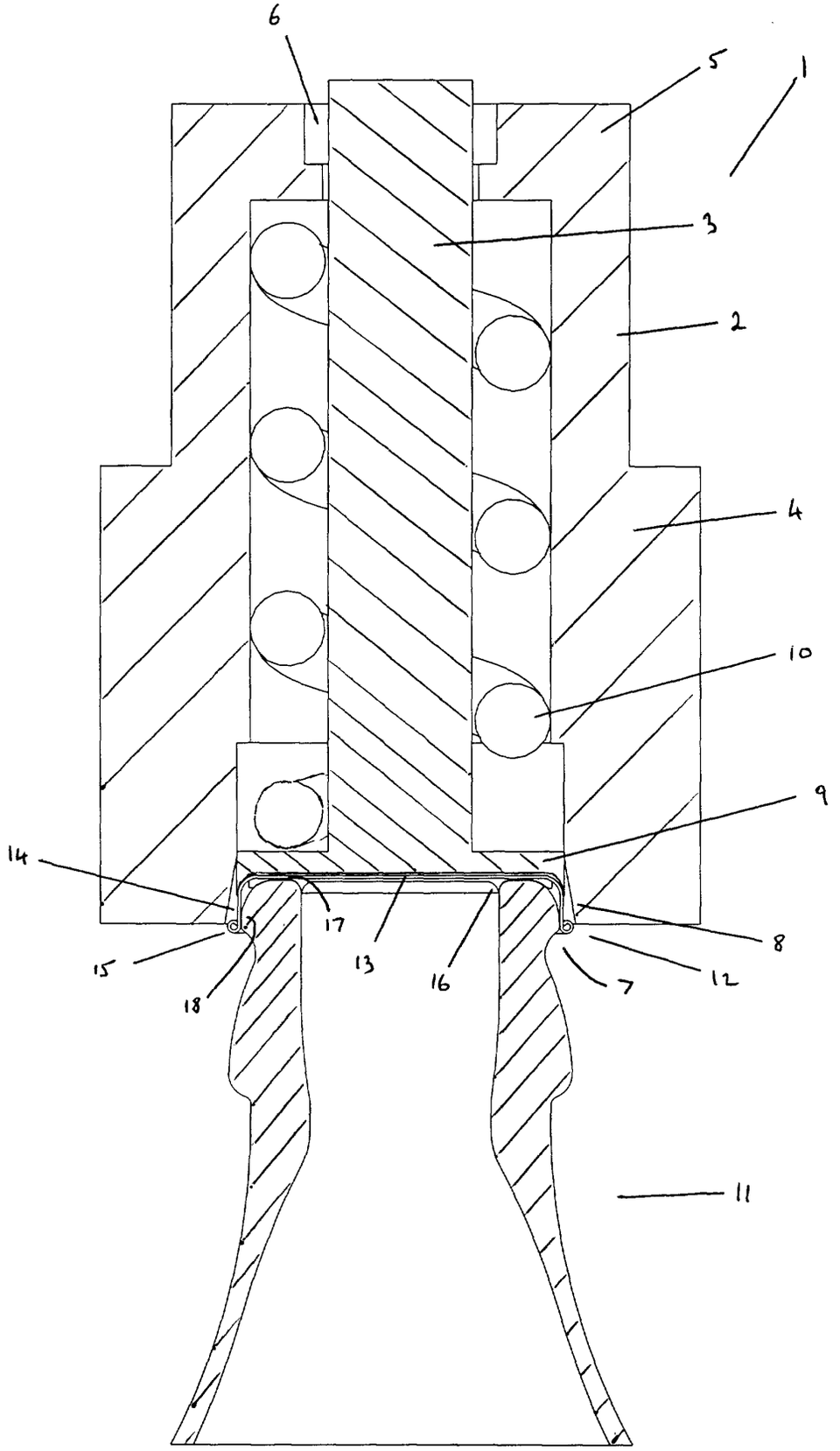


Fig 1

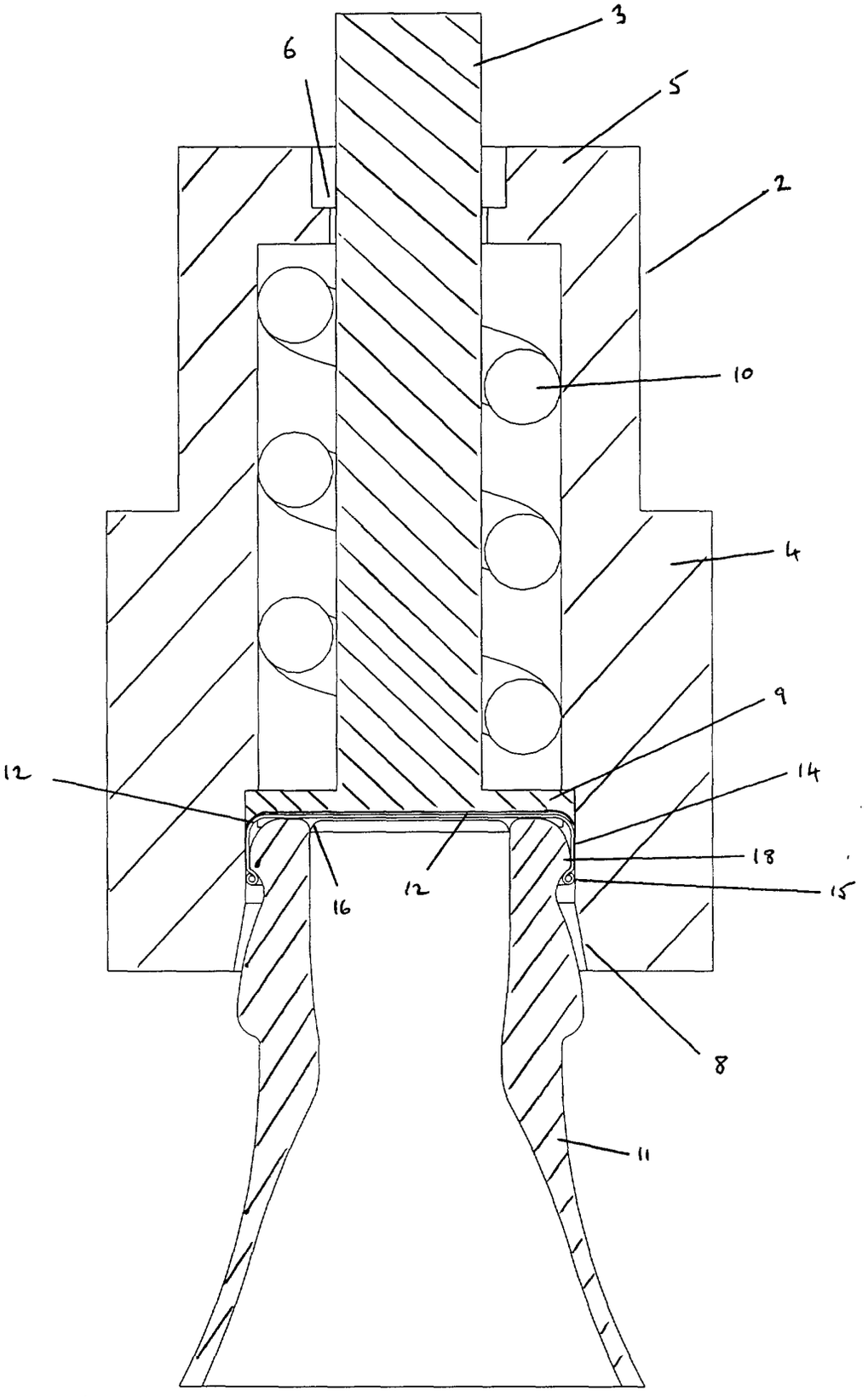


Fig 2

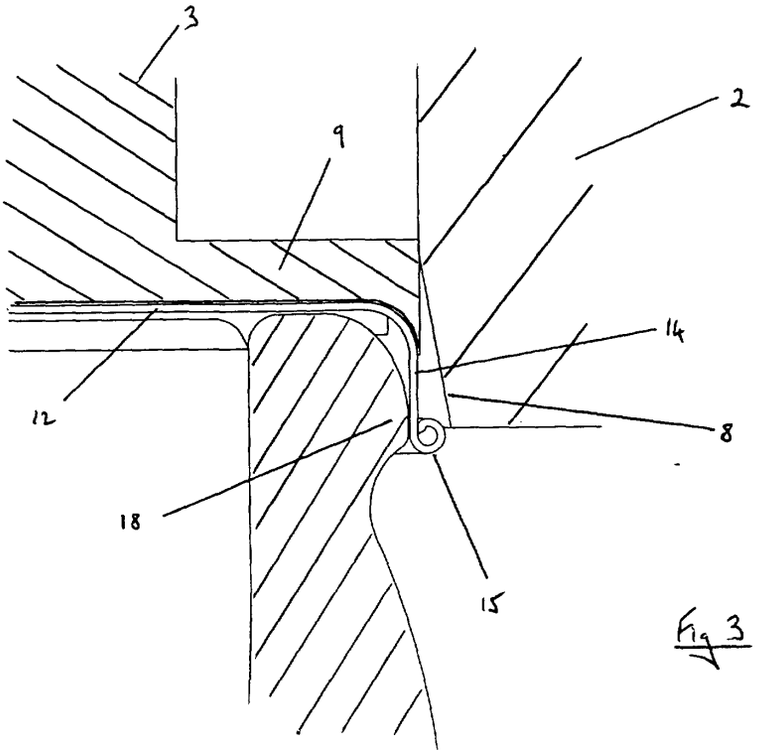


Fig 3

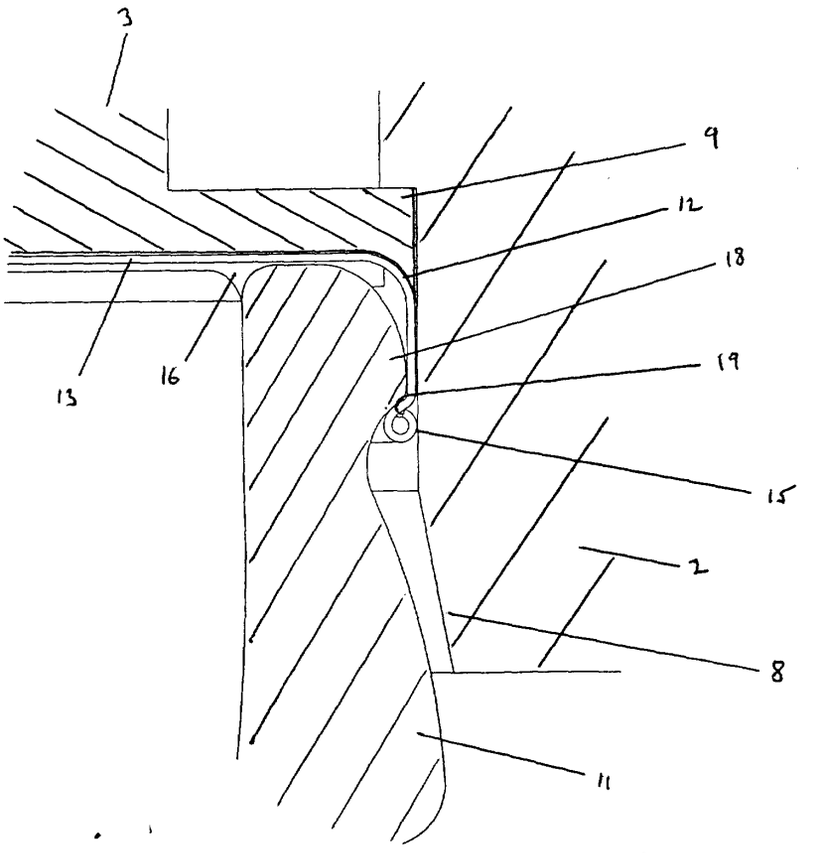


Fig 4

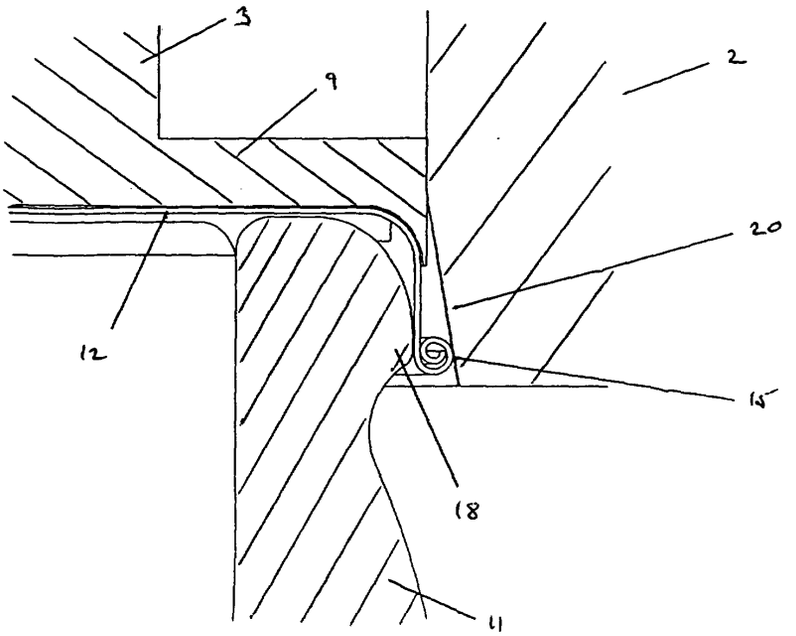


Fig 5

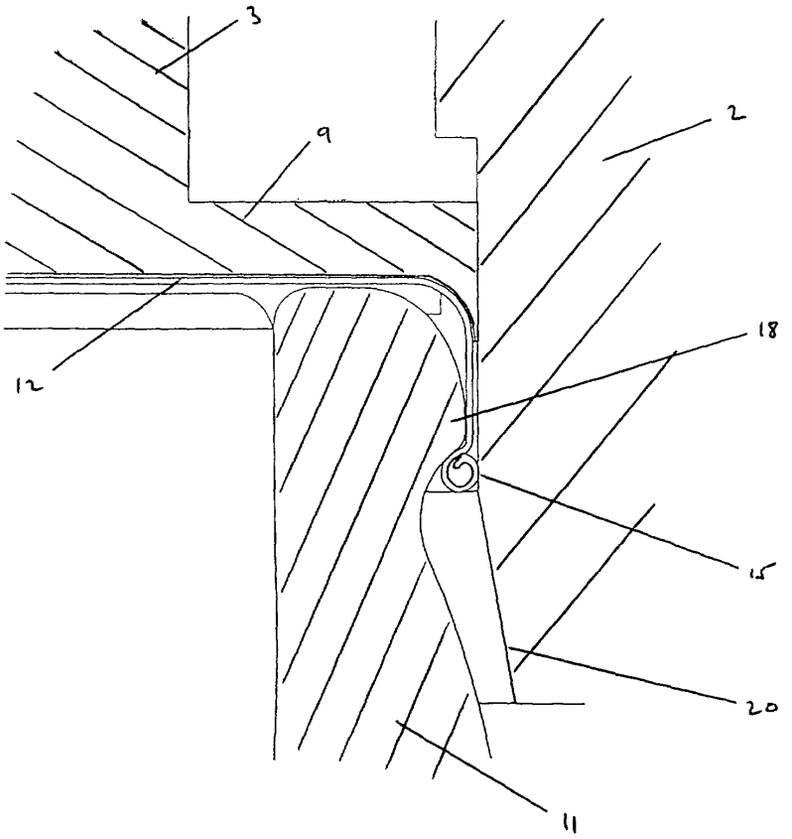
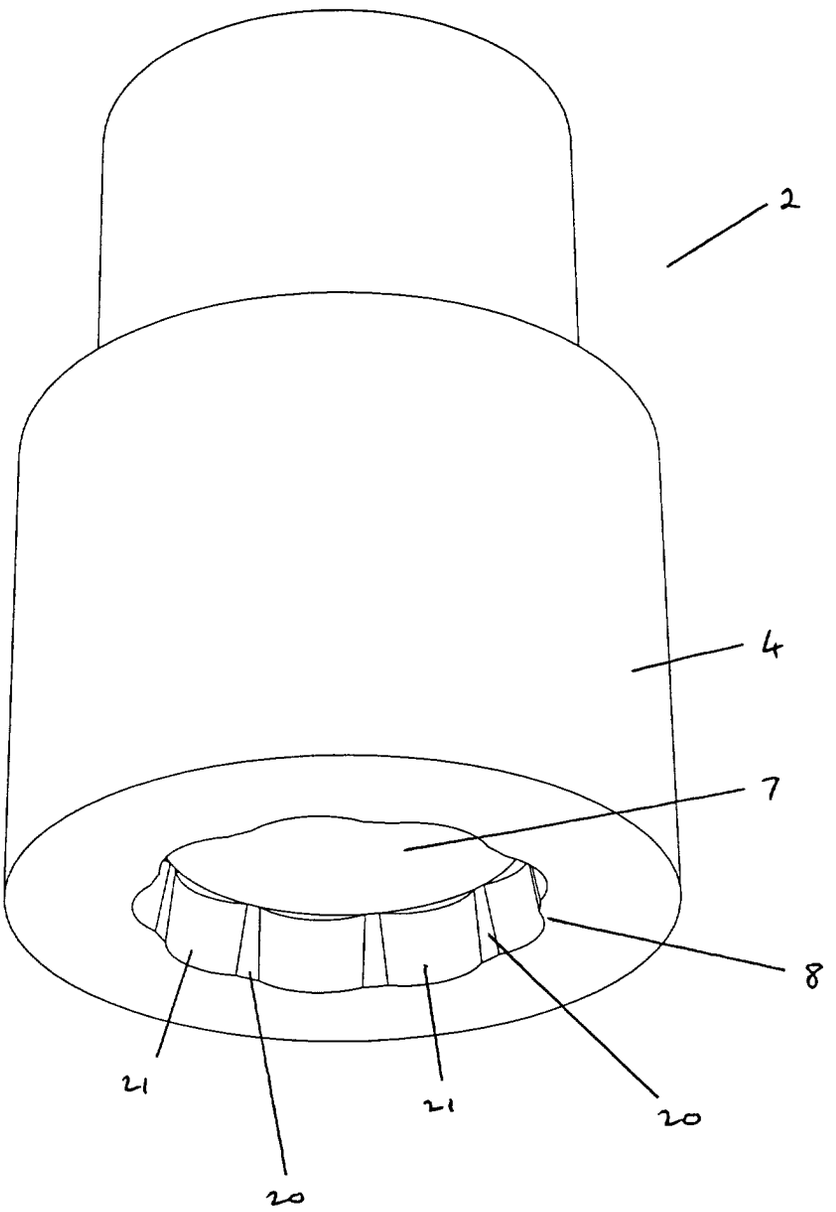


Fig 7

Fig 6



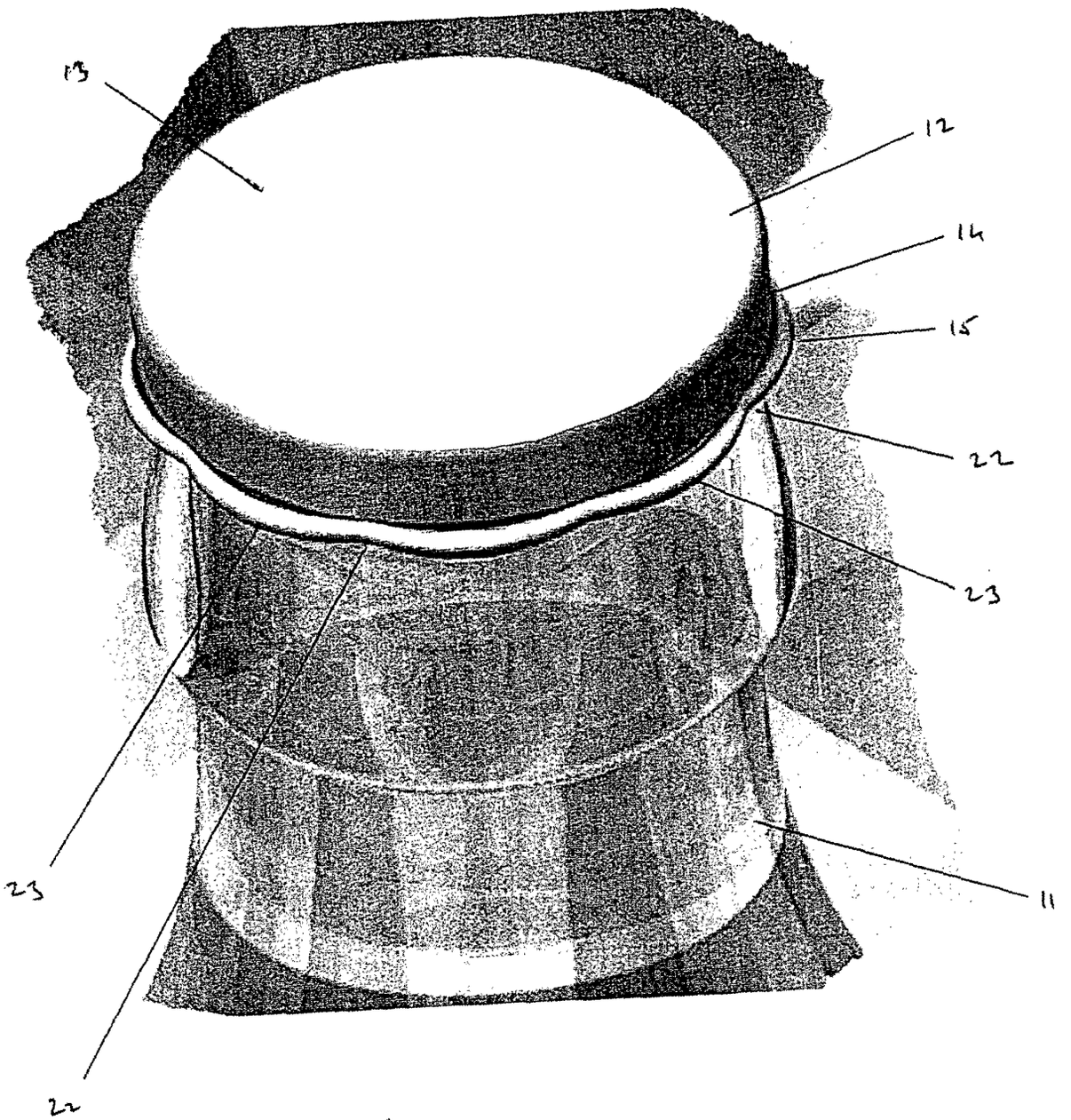


Fig 8

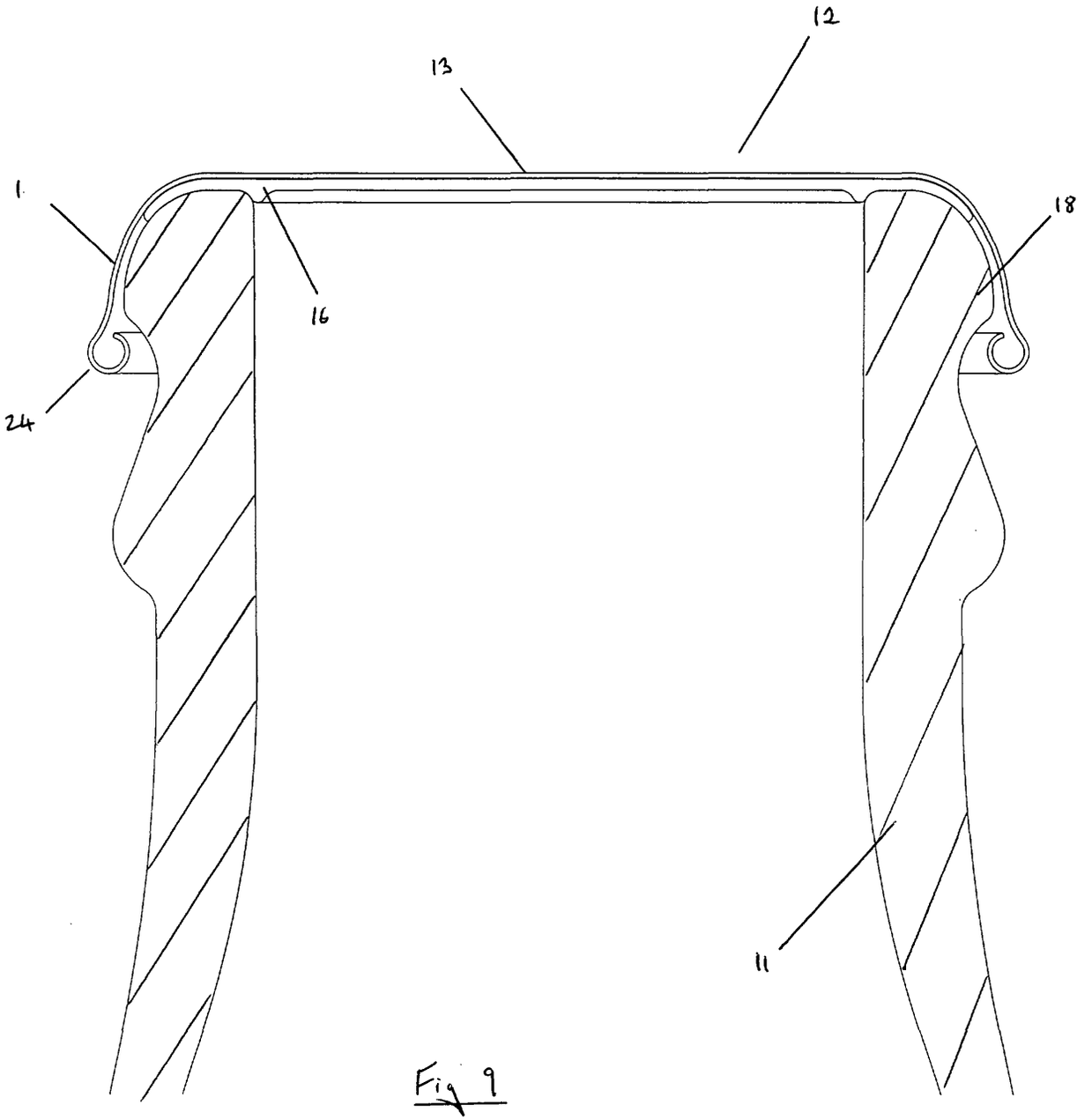


Fig 9

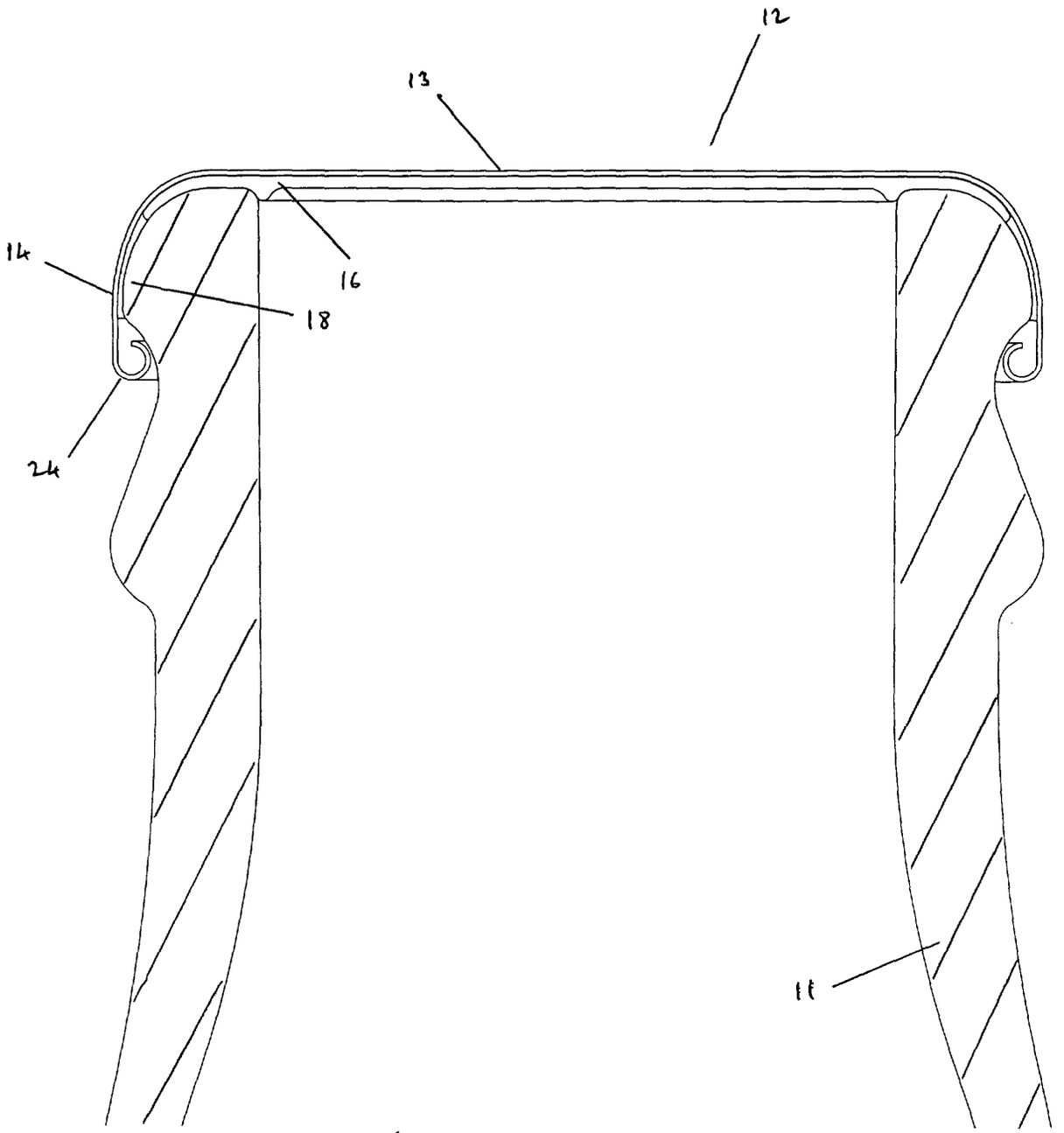


Fig 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 30 5589

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y	FR 812 508 A (LEWIN, HERMAN) 12 May 1937 (1937-05-12) * page 1, line 10 - line 14; figures 1-6 *	1-8, 10-15 9	B67B3/02 B67B3/14 B65D41/12
Y	CH 473 003 A (THOMAS HUNTER LDT.) 31 May 1969 (1969-05-31) * column 4, line 25 - line 44; figures 1-6 *	9	
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B67B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	6 December 2000	Müller, C

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 30 5589

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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