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(54) Closure assembly

(57) A method of assembling a closure (30) to the mouth (16) of a container (11) in which the closure (30) is provided with splines (26) on a surface thereof, and the method including the step of pushing the closure (30) axially onto the container (11) so that the splines (26) cut into co-operating surfaces (17) on the container, thus locating the closure thereon.

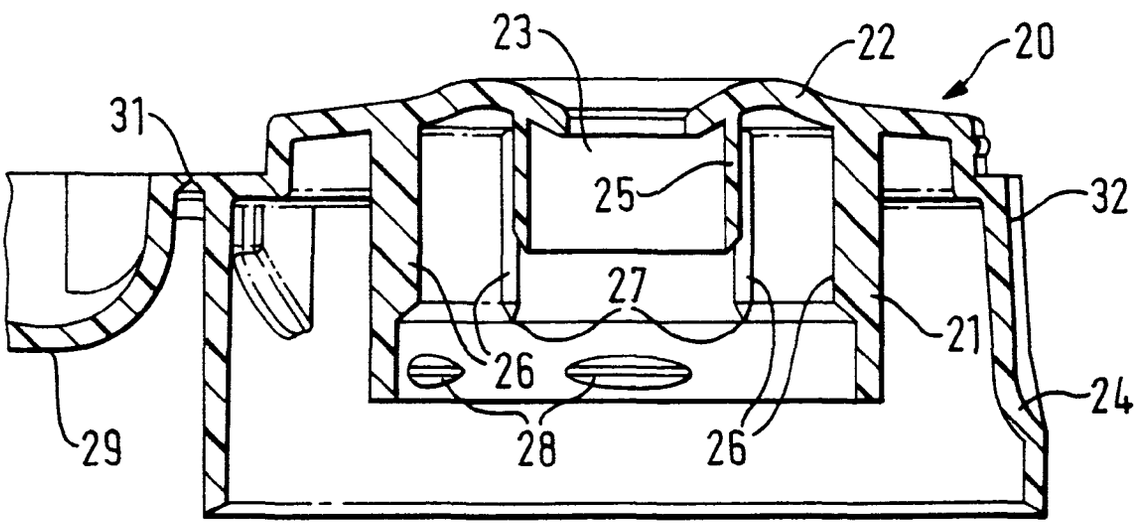

FIG.1

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Description

[0001] This invention relates to closure assemblies for containers. In particular (but not necessarily exclusively), it relates to closure assemblies in which the closure may be accurately and securely attached to the container in a specified orientation.

[0002] A problem with containers having closure assemblies comprising hinged closures, is the proper alignment of the hinge relative to the container body, so that, for example, an indentation for facilitating opening of the lid aligns with a label on the front of the container, and is secured in position once aligned.

[0003] One method of overcoming the above problem is disclosed in WO 87/00512, which discloses a snap-on closure having an axial rib which engages an axial rib or pair of axial ribs on the container. With such a container, any labelling printed on the container needs to be oriented with respect to the alignment rib on the container; the rib on the closure serves to orientate the closure with respect to the container.

[0004] Orientation devices have also been developed for use with screw-on closures. One such device is disclosed in GB 2,163,732-A.

[0005] Capping machines, which are used for capping containers, in particular flexible containers which are filled at the opposite end of the container after capping, operate at very fast speeds, and typically utilise optical sensors. It is convenient in some operations if the sensors can be triggered by a mark which is printed onto the container with any labelling and/or instructions.

[0006] The present invention provides a way of allowing for the alignment of a closure relative to a container body, but which does not require that the labelling be indexed relative to the container.

[0007] Accordingly, the invention provides, in one aspect, a method of assembling a closure to the mouth of a container, the closure being provided with splines on a surface thereof, the method including the step of pushing the closure axially onto the container so that the splines cut into co-operating surfaces on the container, thus locating the closure thereon.

[0008] Because the closure can be swaged into the container in any orientation relative to the container, it is only necessary to orientate the closure with respect to any labelling or printing on the container. This can be accomplished using machinery with optical sensors so that the labelling on the container is always aligned in a particular manner relative to a capping station, the caps or closures being fed to the capping station by mechanical means which ensures that the closures are also fed to the capping stations in a particular orientation.

[0009] Preferably, the closure is provided with resilient detent means to permit a snap-fit engagement with the container.

[0010] The interference between the splines on the closure and the co-operating surfaces on the container (conveniently an annular rib), is preferably at least 0.15 mm and more preferably in the range 0.2-0.4 mm.

[0011] The closure may be moulded from polypropylene and the container may be moulded from a relatively softer material for example a low density polyethylene compound, which may contain a small percentage, (for example up to 25% by weight), of high density polyethylene.

[0012] In an alternative aspect, the invention provides a closure for the mouth of a container, the closure having a plurality of circumferentially spaced axially extending splines, adapted to cut into a co-operating surface on a container. Preferably, the free ends of the splines are pointed, to facilitate cutting into the cooperating surface.

[0013] The closure is preferably substantially cylindrical, having an end wall with a cylindrical side wall which engages a nozzle on the container. The splines are preferably disposed on the surface of the side wall adjacent the nozzle.

[0014] Preferably, the closure has a cylindrical resilient skirt radially spaced from the side wall, which is resiliently biased against the container in use.

[0015] The invention also provides a closure and container assembly having a closure as defined above.

[0016] The invention further provides a closure and container assembly in which the closure is swaged onto the container, preferably onto an outlet nozzle on the container.

[0017] The invention will hereinafter be described by way of example only, and with reference to the accompanying drawings in which:-

Fig 1 is a cross-section through a closure according to the present invention;

Fig 2 is a cross-section through a top portion of a container for use in co-operation with the closure of Fig 1;

Fig 3 is an isometric view of the top portion as shown in Fig 2; and

Fig 4 is a cross-section through the closure of Fig 1 when assembled to the container of Fig 2 to form a closure/container assembly according to the present invention.

[0018] With reference to Figs 2 and 3, there is shown a container 11 having a flexible cylindrical body 12 having at one end thereof a frusto-conical shoulder 13 with an outlet nozzle 14. The opposite end of the cylindrical body 12 (not shown) is open, and after filling with the contents to be stored therein the open end is closed, typically by a welded seam.

[0019] The nozzle 14 is coaxial with the cylindrical body 12 and has at its mouth 16 a radially inwardly projecting flange 15. The external cylindrical surface of the nozzle has a pair of axially spaced annular ribs 17 and 18 thereon. The rib 17 projects radially outwardly a less-

er distance than the rib 18, the latter being nearer to the shoulder 13.

[0020] The container may be formed from low density polyethylene (LDPE) or a compound containing mostly LDPE together with another polyolefin such as high density polyethylene in amounts of up to 25% by weight.

[0021] A closure 20 for the container 11 is shown in Fig 1. The closure comprises a cylindrical sidewall 21, which engages the outer surface of the nozzle 14, and has an end wall 22 with an aperture 23 therein for expulsion of the contents of the container.

[0022] The end wall 22 extends radially outwardly of the side wall 21 and has an axially downwardly projecting cylindrical outer skirt 24 extending therefrom.

[0023] A cylindrical inner wall 25 also extends axially downwardly of the end wall 22, and surrounds the aperture 23. The inner cylindrical wall 25 can be a tight sliding fit or an interference fit in the mouth 16 of the container. The side wall 21, on its side which in use is adjacent nozzle 14, has a plurality of axially extending splines 26 thereon. There are preferably six equiangularly spaced splines 26, each with a pointed free end 27.

[0024] The splines 26 are arranged so that there is a radial interference between the splines 26 and the annular rib 17 adjacent to the mouth 16 of the container nozzle 14. The radial interference should be at least 0.15mm and preferably in the range 0.2-0.4mm.

[0025] Snap fit detent means 28 is arranged on the inner surface of the side wall. The detent means 28 comprises four circumferentially spaced chordal bosses each of which can pass over the second annular rib 18 on the nozzle 14 and then resiliently snap back to lock the closure on the container.

[0026] The closure 20 is a moulded one piece closure which is formed from polypropylene and has a cover 29 hinged to the end wall 22 by an integral hinge 31. The closure may have a recessed thumb pad 32 diametrically opposite the hinge 31 to assist in opening cover 29. Ideally, the closure 20 is assembled to the container 11 so that the thumb pad 32 is aligned with a label 33 on the container.

[0027] With reference to Fig 4, the closure 20 is shown assembled with the container 11. The outer skirt 24 is radially aligned with the outer surface of the cylindrical body 12.

[0028] During assembly, a plurality containers 11 may be mounted on a turntable (not shown) having a plurality of stations, each comprising a mandrel on which a respective container is mounted. Each mandrel is rotatable relative to the turntable. The closures 20, in a closed condition, are mechanically fed to a capping station on the turntable in which they are held in a particular orientation. When the turntable has indexed to the station the mandrel will rotate, and as it rotates a sensor may detect a mark printed on the container. The mandrel is then stopped and indexed to a position so that the mark is located at a particular orientation relative to the closure orientation.

[0029] At that point the closure 21 will be pushed axially onto the container neck. The detent means 28 will pass over the first rib 17 and contact the second rib 18 and start to ride up the top inclined face 19 of the rib 18 just prior to the pointed ends 27 of the splines 26 cutting into the first rib 17. Further axial movement cause the splines 26 to cut through the rib 17 and the detent means rides over the rib 18 and resiliently contracts on passing over the annular rib 18 to form a snap-fit connection preventing removal of the closure from the nozzle 14. Since the splines are swaged into the rib 17, the closure 20 is rotationally fixed relative to the container and can only be rotated by damaging the container or closure.

[0030] The skirt 24 is a resilient skirt which contacts the container shoulder 13 and exerts an upwards bias on the closure to hold the detent means 28 against the annular rib 18 and prevent axial movement of the closure on the nozzle.

Claims

1. A method of assembling a closure to the mouth of a container, the closure being provided with splines on a surface thereof, the method being characterised by the step of pushing the closure axially onto the container so that the splines cut into co-operating surfaces on the container, thus locating the closure thereon.

2. A method as claimed in claim 1, characterised in that the closure is provided with resilient detent means whereby the closure makes a snap fit engagement with the container.

3. A method as claimed in claim 1 or claim 2, characterised in that said co-operating surfaces are formed on a first annular rib.

4. A method as claimed in claim 3, characterised in that the detent means comprise circumferentially spaced annular bosses on the closure that engage a second annular rib on the container before the splines engage said first annular rib.

5. A method as claimed in any one of claims 2 to 4, characterised in that the closure is provided with a resilient skirt which, during the mounting of the closure onto the container, reacts against the container biasing the closure away from the container, and which, after assembly of the closure and container, reacts against the container, so that the detent means is held against the second annular rib to prevent axial movement of the closure relative to the container.

6. A closure for the mouth of a container, the closure having a plurality of circumferentially spaced axially

extending splines, characterised in that the splines are adapted to cut into a co-operating surface on a container.

7. A closure as claimed in claim 6, characterised in that the closure is provided with detent means adapted to provide snap fit engagement of the closure with the mouth of the container.

8. A closure as claimed in claim 6 or claim 7, the closure being generally cylindrical and having an end wall with a cylindrical sidewall which engages with the mouth of the container, characterised in that said splines are disposed on the surface of the sidewall adjacent the mouth of the container.

9. A closure as claimed in claim 8 when dependent from claim 7, characterised in that the detent means is located on the same surface of the sidewall as the splines, at a position axially further from said end wall than the cutting ends of the splines.

10. A closure as claimed in any of claims 6 to 9, the mouth of the container being disposed in an outlet nozzle, characterised in that the splines are located on a cylindrical wall adapted to fit over said outlet nozzle.

11. A closure as claimed in claim 8 or any claim dependent therefrom, characterised in that the closure has a cylindrical resilient skirt radially outwardly spaced from the sidewall, which skirt is adapted and arranged to be resiliently biased against the container in use.

12. A closure and container assembly, characterised in that the closure is a closure as claimed in any one of claims 6 to 11 and is splined onto the container.

13. An assembly as claimed in claim 12, characterised in that the closure is formed from a polypropylene compound, and the container is formed from a material containing at least a majority of low density polyethylene.

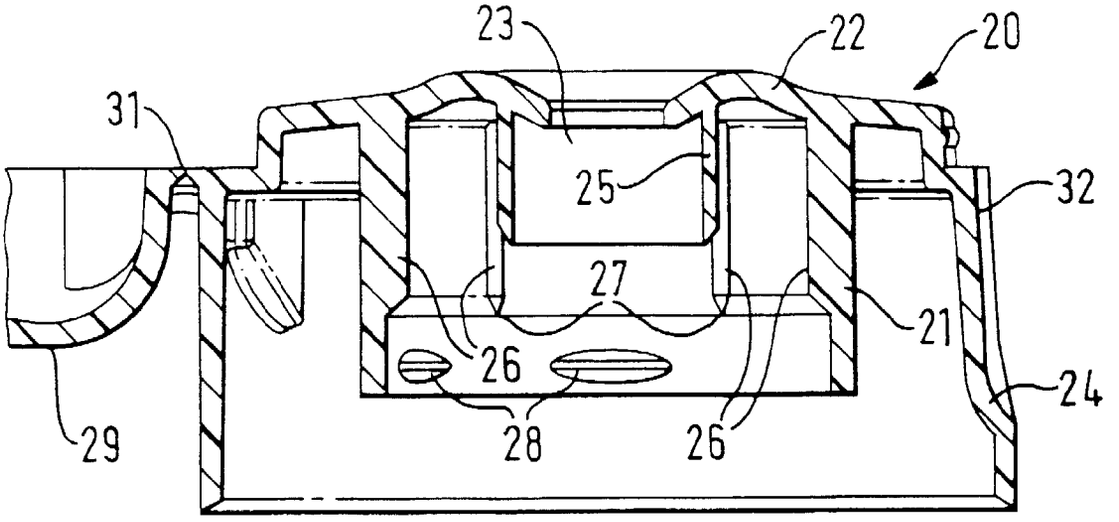

FIG.1

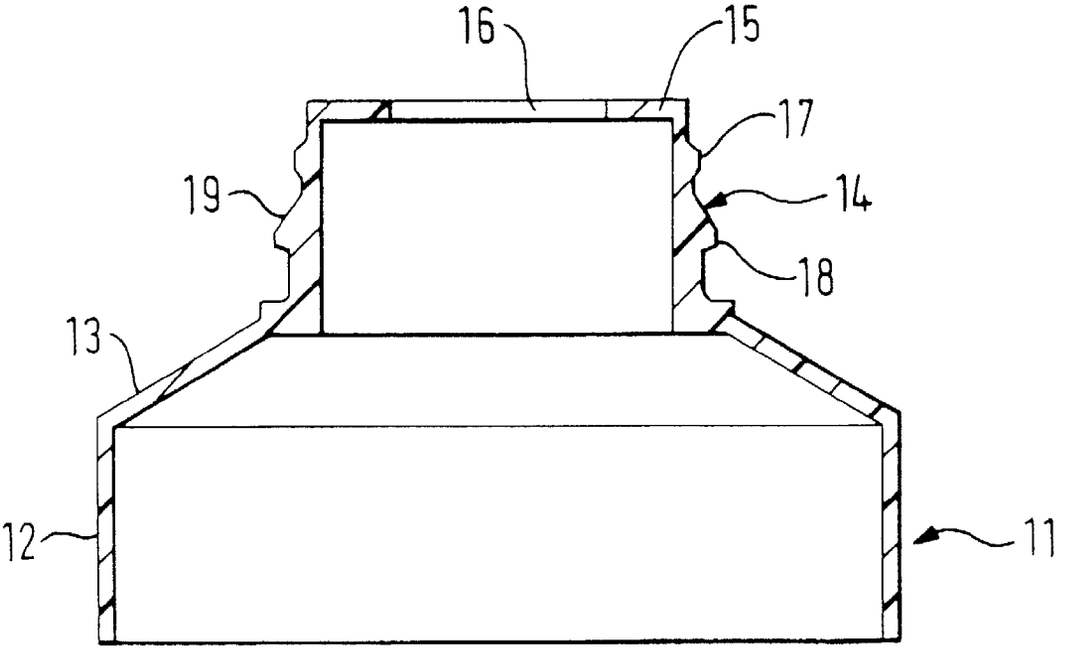

FIG. 2

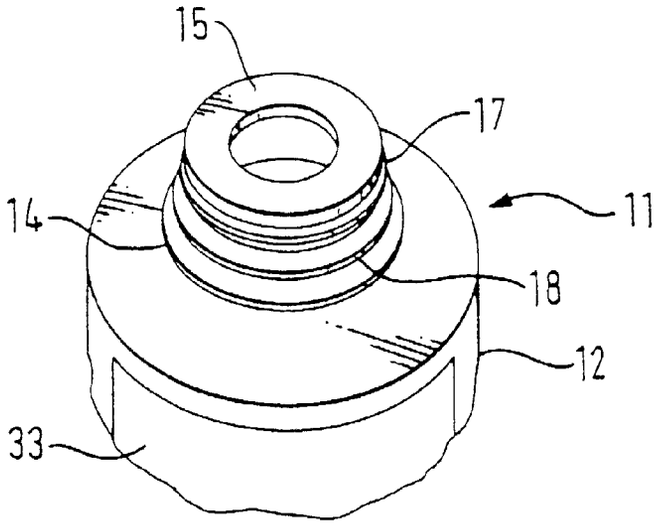

FIG. 3

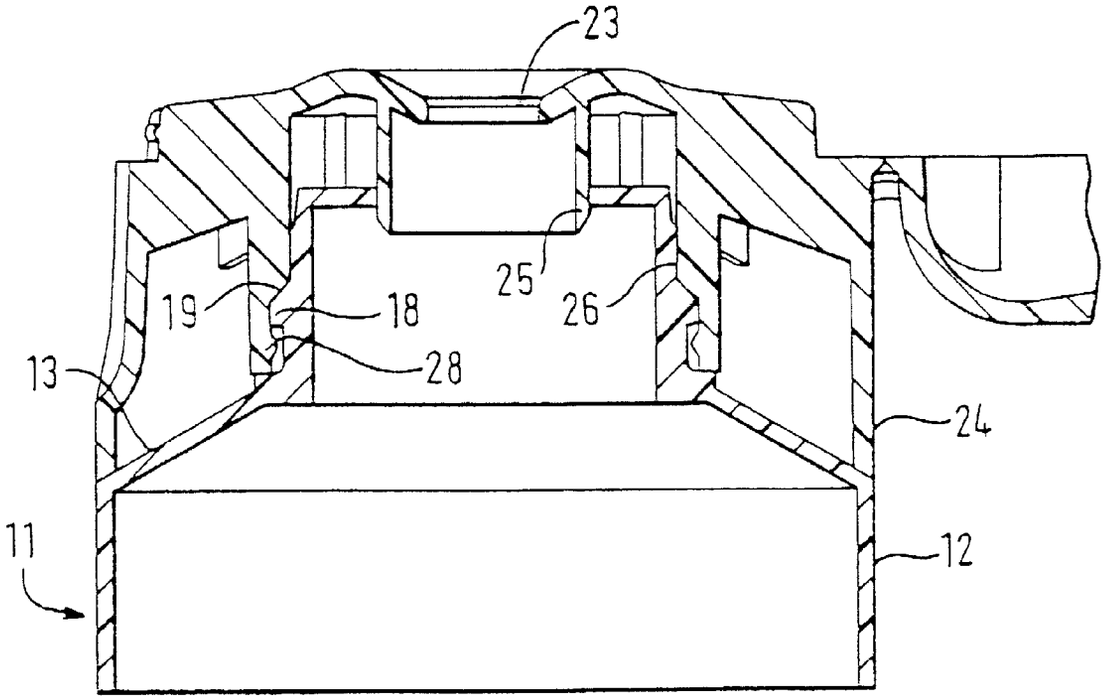

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 8499

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.6)
X Y	EP 0 251 259 A (ALCOA DEUTSCHLAND) 7 January 1988 * column 2, line 6-26 * * column 3, line 5-29; figures 1-5 *	1-4, 6-10,12, 13 5,11	B65D47/08 B65D41/16
Y	EP 0 532 471 A (CREANOVA) 17 March 1993 * column 2, line 14-28; figure 1 *	5,11	
A	EP 0 468 902 A (ASTRA PLASTIQUE) 29 January 1992 * column 2, line 44 - column 3, line 43; figure 1 *	5,11	
A	EP 0 626 320 A (TUBOPLAST HISPANIA) 30 November 1994 * column 3, line 47 - column 4, line 11; figures 1-3 *	5,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 January 1999	Lenoir, C

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 30 8499

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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25-01-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 251259 A	07-01-1988	DE 3622108 A	07-01-1988
EP 532471 A	17-03-1993	CH 683611 A	15-04-1994
		DE 59202222 D	22-06-1995
		US 5335802 A	09-08-1994
EP 468902 A	29-01-1992	FR 2665140 A	31-01-1992
		CA 2047514 A	26-01-1992
		US 5096077 A	17-03-1992
EP 626320 A	30-11-1994	ES 2068744 A	16-04-1995
		DE 69404554 D	04-09-1997
		DE 69404554 T	12-03-1998
		ES 2107779 T	01-12-1997

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