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(54) **Closure for a container**

(57) A closure (10) for a drinks container has a hinged cap (31) and a latch (26) to maintain the cap in a closed condition. An elastic member (43) operable between the

body (11) of the closure and the cap (31) exerts an opening torque when the cap is latched, and this gives effective one handed opening. The parts of the closure are preferably co-moulded of MDPE and TPE.

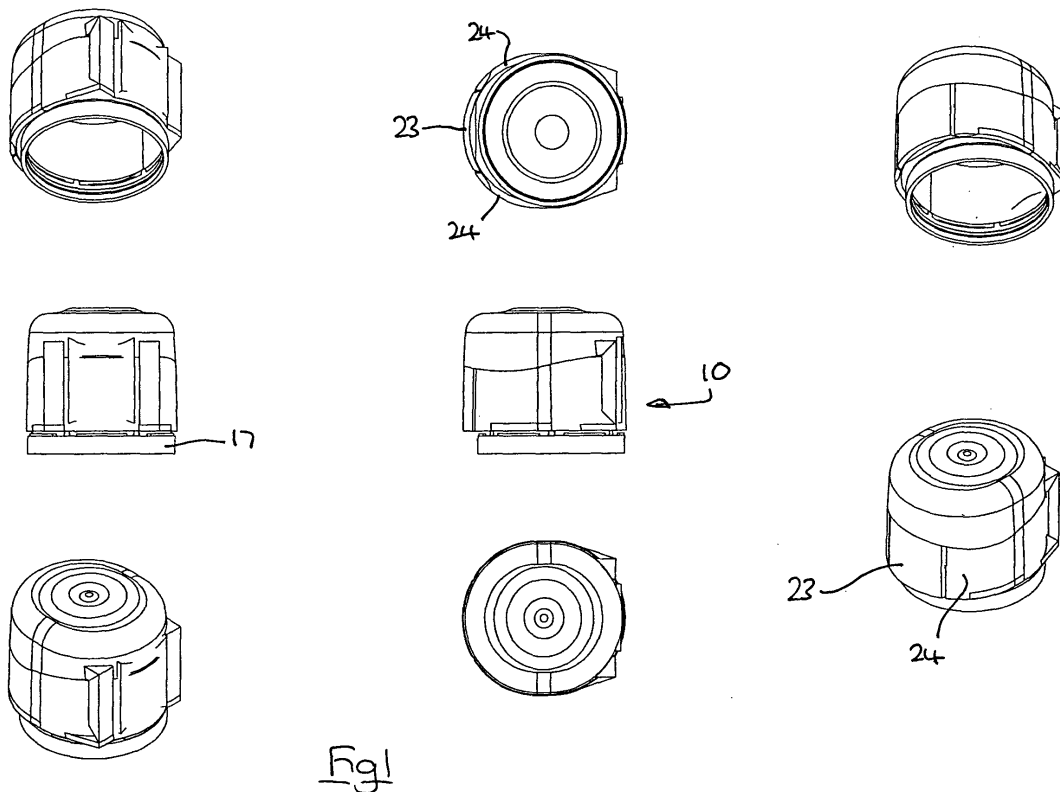


Fig 1

Description

[0001] This invention relates to a closure for a container, particularly though not exclusively to a closure for bottled drinks.

[0002] Closures for bottled drinks may comprise a conventional screw cap of moulded plastics material. The screw cap is a loose part, and thus opening the container is a two-handed operation. More recently closures for drinks in the range 250-500 ml have been provided with a moulded flip cap or pull top, both of which are adapted for a one-handed operation. Pull tops are considered less hygienic because they are opened by pulling with the teeth, and a separate overcap is accordingly provided. Flip caps can be released using a thumb, but then require to be moved to the fully open condition, which again can be unhygienic.

[0003] What is required is a closure which is adapted for one-handed release which is hygienic, which does not require additional manipulation to fully expose the opening; and which does not have loose parts.

[0004] According to a first aspect of the invention, there is provided a moulded closure for a container, and comprising an annular body adapted to be fitted to the neck of a container, a cap having a pivotal connection to the body and movable to close the opening in said body, and a latch to hold said cap in the closed condition, wherein said pivotal connection comprises an elastic member which is stretched in the closed condition to exert an opening torque on the cap.

[0005] In such a closure, the elastic member comprises a source of stored energy which is sufficient to urge the cap to a fully open condition on release of the latch; accordingly a second manipulation of the cap is not required. Thus one handed opening of a flip cap is provided. The pivotal connection can be moulded as a unit with the body and cap, thus avoiding loose parts. In a preferred embodiment the body and cap are moulded from medium density polyethylene (MDPE) and the pivotal connection is co-moulded from a thermo-plastic elastomer (TPE). Other thermoplastic polymers are also suitable for the cap, including high density polyethylene (HDPE) and polypropylene.

[0006] Advantageously the closure may include resilient seals to permit use on a container for carbonated drinks. In a preferred embodiment of the invention, said seals are also co-moulded from TPE.

[0007] In a preferred embodiment the body is internally threaded for co-operation with an external screw thread of a container mouth. However, snap-on closures are also possible. Typically the body comprises a cylindrical wall having a substantially planar portion at one end, and having a spout defined therein. A first resilient annular seal is provided on the inside of the planar portion for cooperation with the mouth of the container. A second annular seal is provided for the spout, typically on the underside of the cap.

[0008] The pivotal connection preferably comprises an

elastic limb connecting the cap to a relatively distant part of the body. The limb is preferably planar, and in a preferred embodiment lies against a sidewall of the body in the closed condition.

[0009] In the preferred embodiment the elastic limb is shorter than the distance between the anchoring parts thereof when the cap is in the closed condition. These anchoring parts are preferably defined by substantially radial projections of the cap and body.

[0010] In a preferred embodiment the cap and body are connected by an integral strut connected to the cap and body at the strut ends by respective living hinges. Preferably the strut is moulded integrally and is of the same material as both cap and body. Two such struts may be provided, one on each side of the elastic limb.

[0011] Preferably the strut or struts extend from the base of the closure and are substantially the full height of the body.

[0012] The precise form of the latch is not important save that it is operable to allow the elastic member to open the cap without external manipulation. Preferably the latch includes one or more frangible webs to indicate first opening, and to guard against inadvertent cap release. The latch member is preferably connected to the body via a living hinge, and is adapted to resiliently return to a relatching condition after first use.

[0013] Other features of the invention will be apparent from the following description of a preferred embodiment shown by way of example only in the accompanying drawings in which:

Fig.1 shows several views of a closure according to the invention in the closed condition;

Fig.2 shows several views of a closure according to the invention in an intermediate condition;

Fig.3 shows several views of a closure according to the invention in the fully open condition.

[0014] With reference to the drawings a closure 10 for the neck of a bottle comprises a cylindrical body 11 closed at one end by a disc like wall 12 having a central aperture 14 which defines an upstanding spout 15. The inside face of the wall 12 has an annular seal 16 for co-operation with the mouth of the bottle neck. The seal 16 may be an insert, but preferably is a co-moulded feature as will be further described below.

[0015] A conventional tamper evident band 17 is attached to the open end of the body 11, and includes internal projections 18 which engage over a neck ring of the bottle. In the event that removal of the closure is attempted, the tamper evident band 17 will break away from the body 12 and remain on the neck of the bottle as evidence of tampering. Such tamper evident bands are well known and need not be further described herein.

[0016] The body is internally screw-threaded to engage a corresponding external thread of a bottle neck (the screw-threading is not shown in the interests of clarity).

[0017] At a front side of the closure, a symmetrical shield 21 comprises a part circular wall which curves around the outer side of the body 11 with a radial clearance. The mid part of the shield comprises a generally rectangular push button 23 which is connected at a lower edge to side portions 24 by living hinges, and at an upper level by frangible links 25. Such links are moulded integrally with the closure, and are designed to break should the push button 23 be pressed radially inwardly with respect to the body 11.

[0018] At the upper edge the push button terminates in a radially outwardly facing hook 26, the purpose of which will be explained below.

[0019] At the opposite side to the push button 23, a cap 31 is attached to the body 11 by a web 41. The cap 31 comprises a shallow dish (Fig.3) intended to be up-ended over the end wall 12 so as to be generally circumferentially flush therewith, and to seal the spout 15 via an internal seal 32. Again this seal 32 may be an insert, but is preferably co-moulded with the closure.

[0020] The cap 31 includes a radially inwardly directed lip (not shown) which is intended in use to snap over the hook 26 so as to retain the cap in the closed condition.

[0021] The web 41 comprises a composite hinge for the cap, and consists of two struts 42 which are moulded of the same material as the body 11 and cap 31, and connected to the body and cap by respective living hinges. Such struts and living hinges may be moulded integrally in a known fashion.

[0022] Between the struts is provided an elastic limb 43 in the form of a generally rectangular web. The limb 43 is co-moulded with the body 11 and cap 31 but the effective length thereof is somewhat shorter in the closed condition than the effective length of the struts 42.

[0023] Thus in the cap open condition (Fig.3), the limb 43 is substantially free of tension, but in the closed condition (Fig. 1), the limb 43 is tensioned so as to generate an opening torque on the cap 31. However, as explained above, this opening torque is resisted by engagement of the hook 26 with an internal abutment of the cap 31. When in the closed condition, the struts 42 are placed in compression.

[0024] Typically the closure is moulded from a suitable grade of polyethylene, such as medium or high density polyethylene, and the seals 16,32 and elastic limb 43 are co-moulded from a compatible stretchy plastics material such as TPE. It is advantageous to restrict the moulding to two materials in order to reduce the complication of the mould tool.

[0025] In use the closure 10 is co-moulded in the open condition, and closed by snapfitting the cap to the body, thus tensioning the elastic limb 43. Suitable ramp faces (not shown) are provided for ensuring one-way engagement of the cap with the hook 26, without breaking the frangible links 25. The cap seal 32 sealingly engages the spout 15.

[0026] The closure is then screwed onto the mouth of a bottle, and the tamper evident band 17 ensures retention thereof.

The seal 16 sealingly engages the mouth of the bottle neck. In this condition the bottle is closed tightly.

[0027] To open the bottle, a user merely presses the push button 23 to break the frangible links 25, thereby moving the hook 26 radially inwardly to release the cap 31.

[0028] The elastic limb 43 then flips the cap open, through the intermediate condition illustrated in Fig.2, to allow instant access to the bottle contents for drinking. In the open condition, the elastic limb is preferably substantially free of tension.

[0029] The push button 23 remains connected to the side portions 24 and returns resiliently to the original position where it can re-engage the cap 31 should the user wish to reclose the spout. Thus the frangible links 25 provide tamper evidence that the cap has been opened.

[0030] The invention is particularly useful for carbonated drinks because the positive latch of the push button ensures that internal pressure in the container, for example of 1.5 bar, cannot push the cap open inadvertently. Additionally, this latch permits the cap to be re-sealed so that the user need not drink all of the contents of the container at once.

Claims

1. A moulded closure for a container, and comprising an annular body adapted to be fitted to the neck of a container, a cap having a pivotal connection to the body and movable to close an end opening in said body, and a latch to hold said cap in the closed condition, wherein said pivotal connection comprises an elastic member which is stretched in the closed condition to exert an opening torque on the cap.
2. A closure according to claim 1 and comprising a unitary moulding.
3. A closure according to claim 2 wherein said body and cap are moulded from medium density polyethylene and the pivotal connection is co-moulded from a thermo-plastic elastomer.
4. A closure according to any preceding claim and further including one or more resilient seals to permit use on a container for carbonated drinks.
5. A closure according to claim 4 wherein said one or more seals are co-moulded from a thermo-plastic elastomer.
6. A closure according to any preceding claim wherein said body is internally threaded for co-operation with an external screw thread of a container mouth.
7. A closure according to any of claims 1 to 5 and being for fitting to a container mouth.

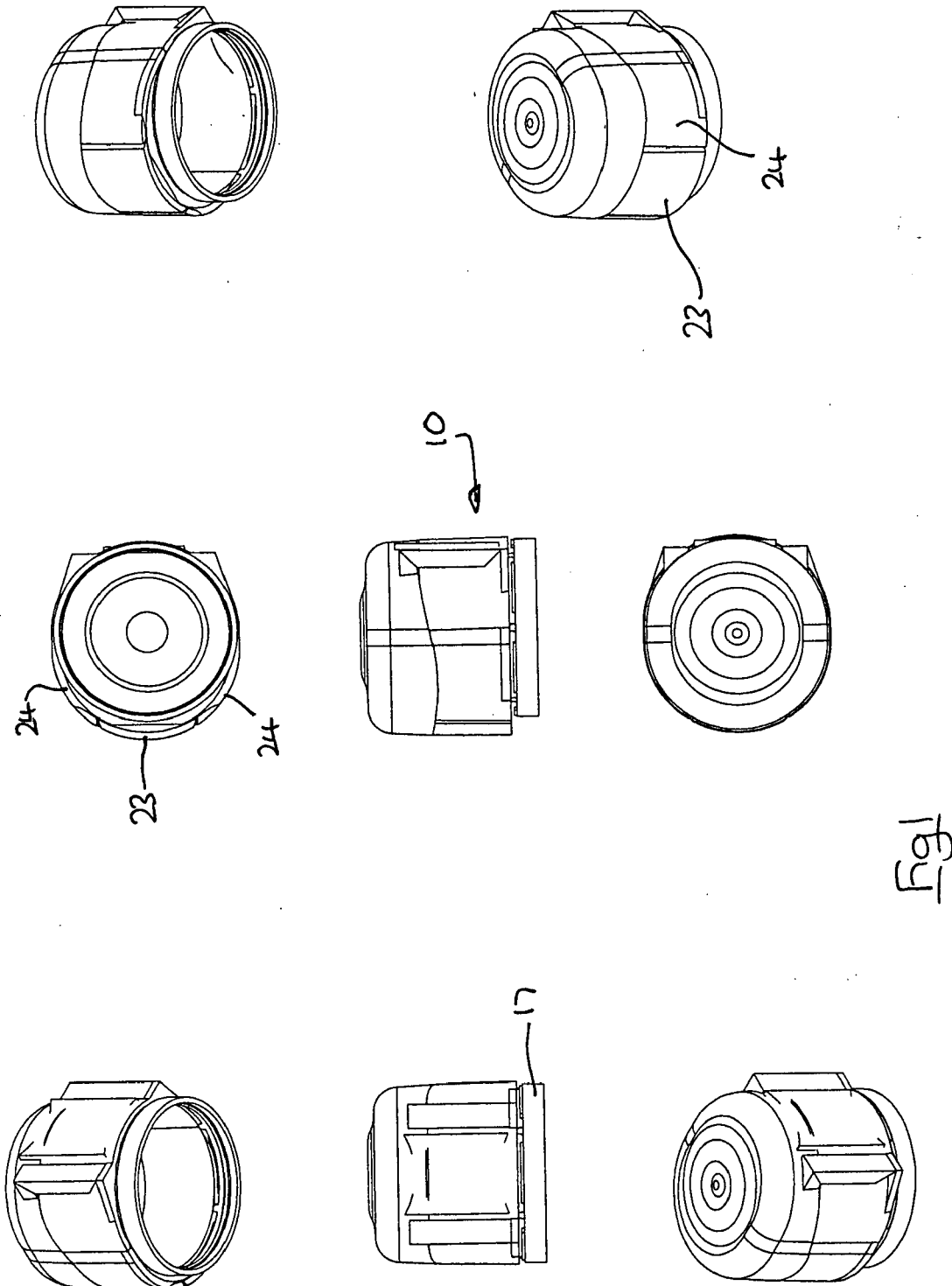
8. A closure according to any preceding claim wherein said pivotal connection comprises an elastic limb connecting said cap to a relatively distant part of said body. 5
9. A closure according to claim 8 wherein said limb is planar.
10. A closure according to claim 9 wherein said limb lies against a sidewall of the body in the closed condition of the cap. 10
11. A closure according to any preceding claim wherein the said elastic limb has anchoring parts defined by substantially radial projections of the cap and body. 15
12. A closure according to any preceding claim wherein the cap and body are connected by an integral strut having living hinges at the strut ends. 20
13. A closure according to claim 12 and having two said struts provided, one on each side of said elastic limb.
14. A closure according to claim 13 wherein said strut or struts extend from the base of the closure and are substantially the full height of the body. 25
15. A closure according to any preceding claim wherein said latch includes one or more frangible webs to indicate first opening. 30
16. A closure according to any preceding claim wherein said latch comprises a latch member connected to the body via a living hinge, and adapted to resiliently return to a relatching position after first use. 35

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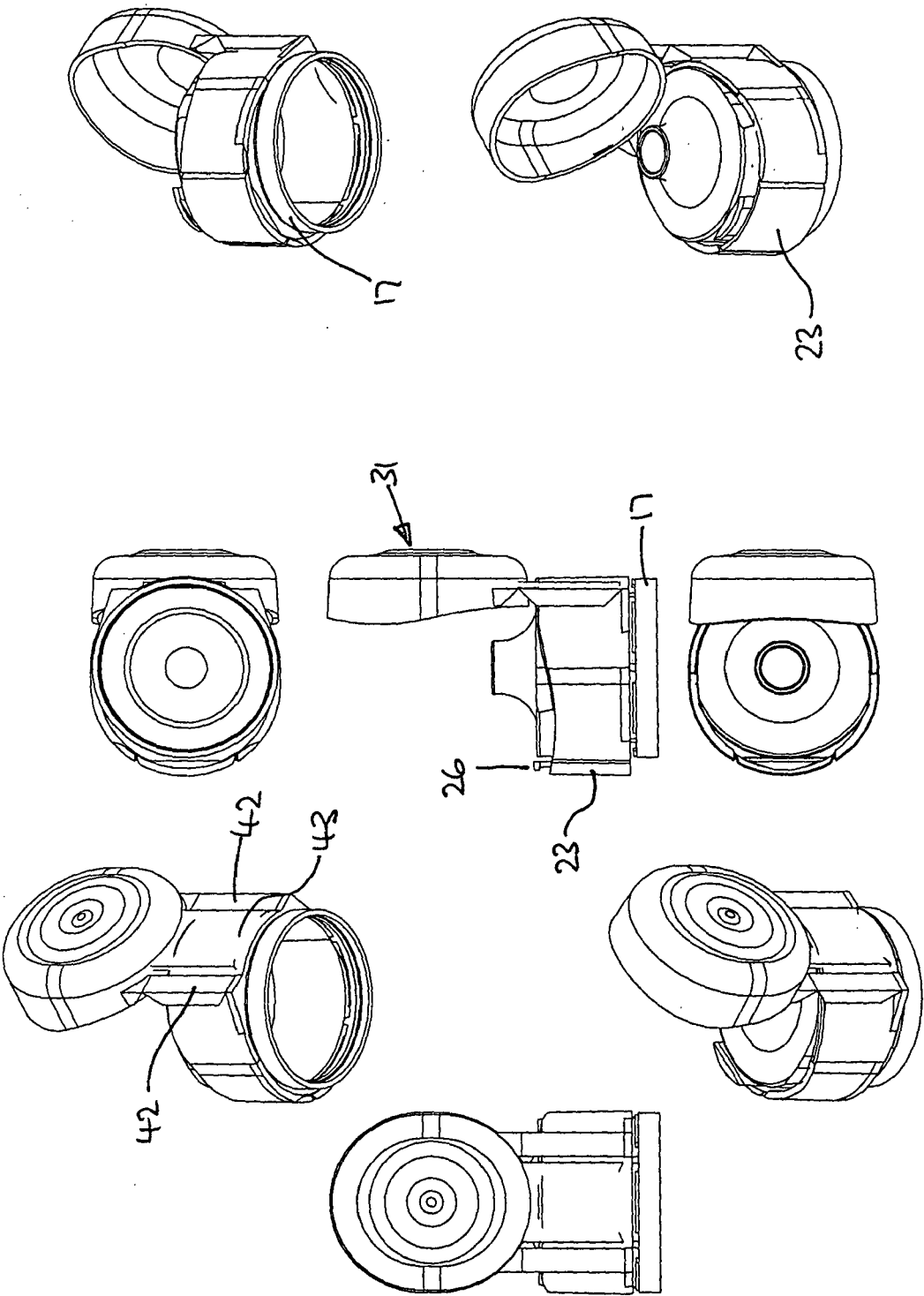


Fig 2

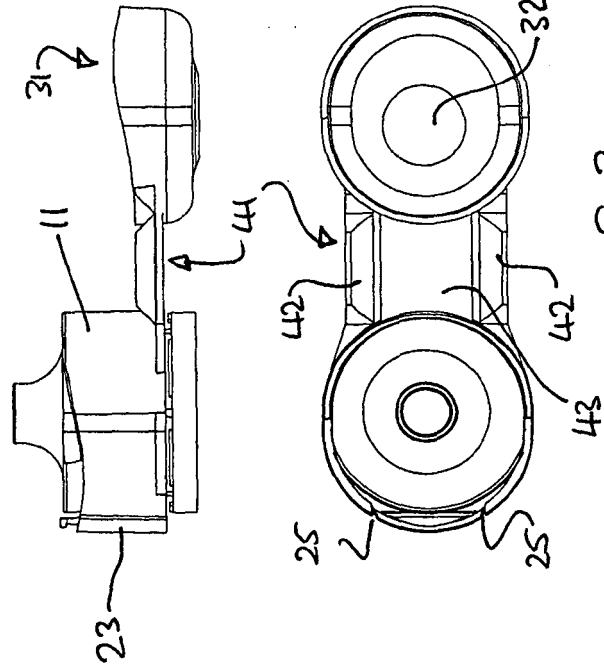
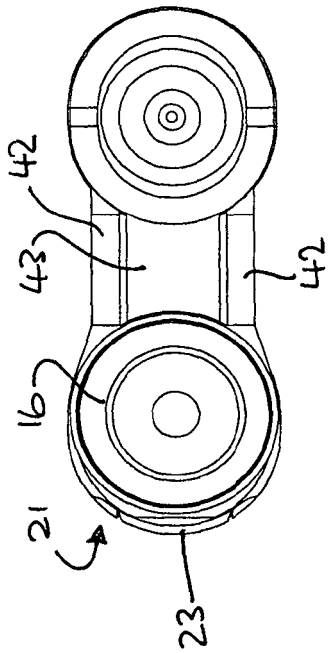
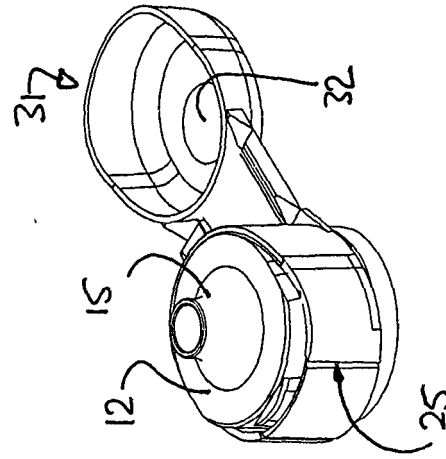
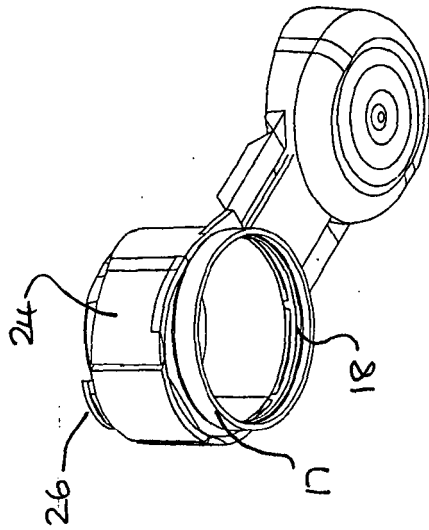


Fig. 3

