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(54) Closure device for containers.

(57) A first tamper evident closure device 100 for a container with cylindrical opening has an outer closure member and an inner closure member, with parallel top (in use) surfaces 104 and 105, the surface 104 having an aperture 110 across which extends a tab 100 hinged permanently to the surface 104 by a hinge 111 which is biassed to the open position and a detent 112 engages under a nib 113 projecting into the aperture 110 before first use. On relative axial movement of the inner and outer closure members when the device is mounted on a container, a boss 109 on the inner member springs the detent 112 passed the nib 113 to indicate opening of the container.

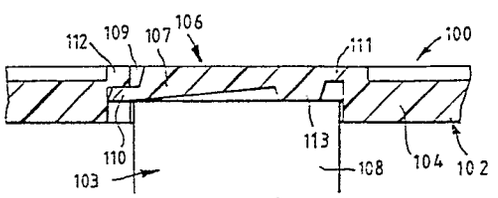

FIG. 1

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Description

CLOSURE DEVICE FOR CONTAINERS

The invention relates to a closure device for containers, particularly a container such as a pill or other medicine bottle having a cylindrical opening.

Generally, closure devices such as screw-threaded caps of containers with a screw-threaded opening such as a neck can be removed relatively easily by unscrewing. This can be dangerous when the container houses drugs, dangerous chemicals and the like and a child for example unscrews the closure device and gains access to the contents then takes the contents with possibly harmful or even fatal results. Closure devices which seek to provide for safer or authorised opening of the container have been proposed, but they are generally complex and expensive.

According to one aspect of the invention there is provided a closure device for a container with a cylindrical opening, comprising a first and a second cylindrical closure member each with an end member and a depending skirt member, and means adapted to indicate a first relative axial movement between the closure members and having a hinge and a detent remote therefrom, the arrangement being such that the detent retains the indicator means only until first relative axial movement.

The first cylindrical closure member may have an aperture in its end member with which a boss of the end member of the second cylindrical closure member is aligned, the indicating means comprising a tab connected to the first cylindrical closure member by the hinge and extending over the boss.

The hinge may have a bias to the opened condition.

The detent may comprise a projection on an adjacent part of the first cylindrical closure member projecting into the aperture.

There may be a protrusion on the side of the tab facing the boss of the second cylindrical closure member, the arrangement being that the projection and boss engage on relative axial movement for urging the nib passed the detent.

A surface of the boss facing the protrusion may have a depression facing the protrusion, which depression may be annular, and the depression and protrusion may have complementary camming surfaces which engage on axial movement.

The camming surfaces may be inclined, for example the protrusion may be of substantially V-shape in axial cross-section through the device.

The protrusion may be adjacent the hinge.

According to a second aspect, the invention provides a device as hereinbefore defined mounted thereon.

According to a third aspect of the invention there is provided a method of making a closure device for a container with a cylindrical opening, comprising providing a first and a second cylindrical closure member each with an end member and a cylindrical skirt member, providing an indicating means permanently connected with the end member of the first cylindrical closure member, moving the indicating means in a direction counter to that in which it moves to indicate, in use, whether the device has been operated, and assembling the first and second cylindrical closure members together so that the second one lies within the first with their end members spaced apart but adjacent whereby the indicating means can be actuated on operation of the assembled device.

Closure devices embodying the invention and hereinafter described, by way of example, with reference to the accompanying drawings.

Fig. 1 is a transverse view of part of an assembled closure device according to the invention;

Fig. 2 is a transverse sectional view of part of the first or outer cylindrical closure member of the device of Figure 1;

Fig. 3 is a plan view of the part of Fig. 2 in the moulding position;

Fig. 4 is a plan view of the part of Fig.2 in the assembled position;

Figs. 5 and 6 show transverse sectional views respectively in the rest and opened positions of part of an assembled closure device; and

Figs. 7 and 8 show transverse sectional views respectively of the rest and opened positions of part of yet another assembled closure member.

Referring to the drawings, in which like parts are indicated by like reference numerals, the closure device 100 shown is injection moulded from plastics and is for mounting on an externally threaded cylindrical opening of a container (not shown) such as a pill or medicine bottle.

The closure devices 100 each comprise a first or outer cylindrical closure member 102 and a second or inner cylindrical closure member 103, each of which has respective end members 104 and 105 and a depending skirt member (not shown). The first and second cylindrical closure members 102 and 103 are each separately injection moulded from plastics material. They are assembled together to form the closure devices 100. There is first drive means (not shown) between the respective skirt members for driving the first and second cylindrical closure members 102 and 103 in unison in one sense only to mount the closure device 100 on the opening. There is second drive means (not shown) between the end members 104 and 105 operable when the first cylindrical closure member 102 is moved axially against the action of means (not shown) acting to urge the members 102 and 103 apart, towards the end of the second cylindrical closure member so that the members 102 and 103 can be turned in unison in the opposite sense to remove the closure device 100 from the container opening.

There is means 106 permanently connected with one member, the end member 104 of the first or outer cylindrical closure member 102, which is operable by movement, the axial movement, of the first cylindrical closure member 102 relative to the second cylindrical closure member 103 to indicate whether the device 100 has been operated.

The indicating means 106 is formed in the end member 104 of the outer closure member 102 and is in the form of a tab 107 which extends over a boss 108 on the end member of the second or inner cylindrical closure member, across an aperture 109 in the end member 104 of the first cylindrical closure member 102. The aperture 109 is circular and the boss 108 is a right cylinder of a diameter just less than that of the aperture 109 to be a close sliding fit therein. The tab 107 has a nib 110 which is free, and remote from a hinge 111 whereby the tab 107 is permanently connected to the end member 104.

The free nib 110 lies underneath (in use) a detent or projection 112, on the end member opposite the hinge 111, which is integrally moulded with the end member 104 and tab 107 and has inherent bias towards the "open" position, Figs 6 and 8 for example. The hinge 111 and detent 112 are carried by the end member 104 and lie on the same plane.

During assembly of the first and second cylindrical closure members 102 and 103 to make the closure device 100, the tab 107 is urged to lie under the detent 112 (as considered in use). The hinge 111 permanently connects the tab 107 to the end member 104. The nib 110 is effectively latched under detent 112 but the visual effect is one of integration therewith. If now the device 100 is mounted on an aperture of a pill bottle which is then opened as decribed by moving the outer cylindrical closure member 102 axially over the inner one 103, towards the bottle in effect, the boss 108 forces the nib past the detent so that stored energy in the hinge cause the tab 107 to fly up at an angle to the positions shown in Figs. 6 and 108. A user thinks that the tab has been broken, so indicating use, but moreover the lifting of the tab 107 about the hinge 111 exposes the boss 108 in any event, which is often a different colour from the colour of the end member 104 of the outer cylindrical closure member 102. It is thus readily apparent that the closure device 100 has been operated. If it has been operated without authority, for example by a child, this operation is thus readily apparent and provides a first tamper evident feature.

Adjacent the hinge 111, on the underside (in use) of the tab 107 there is a profile or protrusion 113 which is engaged by the boss 108 on relative axial movement between the inner and outer closure members. During such axial motion the boss 108 has a camming action on the protrusion 113 to urge the tab 107 to the Fig. 6 or 8 position. In the embodiment of Figs. 5 and 6 the boss has a depression 114 which is annular and of complementary shape to that of the protrusion 113.

In Figs. 7 and 8, the boss 108 has a depression 115 with an inclined boundary wall 116 to act as a camming agent.

Once in the Fig. 6 or 8 position, the tab 107 can be hinged up and down but it cannot be latched back under the detent 112 because the boss 108 extends into the aperture 109 so there is no room to latch the nib 110 under the detent 112. This is true of every embodiment.

Claims

1. A closure device for a container with a cylindrical opening, comprising a first and a second cylindrical closure member each with an end member and a depending skirt member, characterised by means (106) adapted to indicate a first relative axial movement between the closure members (102, 103) and in that there is a hinge (111) and a detent (112) remote therefrom, the arrangement being such that the detent (112) retains the indicator means (106) only until first relative axial movement.

2. A closure device according to Claim 1, characterised in that the first cylindrical closure member (102) has an aperture (109) in its end member (104) with which a boss (108) of the end member (105) of the second cylindrical closure member (103) is aligned, and in that the indicating means (106) comprises a tab (107) connected to the first cylindrical closure member (102) by the hinge (111) and extending over the boss (108).

3. A closure device according to Claim 1 or Claim 2, characterised in that the hinge (111) has a bias to the opened condition.

4. A closure device according to Claim 2 or Claim 3, characterised in that the detent (112) comprises a projection on an adjacent part of the first cylindrical closure member (102) projecting into the aperture (109).

5. A closure device according to Claim 4, characterised by a part of the tab (107) adjacent the projection (112) comprising a projecting nib.

6. A closure device according to any of Claim 5, characterised by a protrusion (113) on the side of the tab (107) facing the boss (108) of the second cylindrical closure member (103), the arrangement being that the protrusion (113) and boss engage on relative axial movement for urging the tab (107) passed the detent (112).

7. A closure device according to Claim 6, characterised by a surface of the boss (108) facing the protrusion (113) having a depression (114, 115) facing the protrusion (113) which depression (114, 115) preferably being annular.

8. A closure device according to Claim 7, characterised by the depression (114, 115) and protrusion (113) having complementary camming surfaces (116) which engage on axial movement, the surfaces preferably being inclined.

9. A closure device according to Claim 8, characterised by the protrusion (113) being of substantially V-shape in axial cross-section through the device (100), the protrusion preferably being adjacent the hinge (111).

10. A container with a cylindrical opening, characterised by a closure device (100) according to any preceding claim mounted thereon.

11. A method of making a closure device for a container with a cylindrical opening, comprising providing a first and a second cylindrical closure member each with an end member and a cylindrical

skirt member, characterised by providing an indicating means (106) permanently connected with the end member of the first cylindrical closure member, by moving the indicating means (106) in a direction counter to that in which it moves to indicate, in use, whether the device (100) has been operated, and by assembling the first and second cylindrical closure members (102, 103) together so that the second one lies within the first with their end members spaced apart but adjacent whereby the indicating means can be actuated on operation of the assembled device (100).

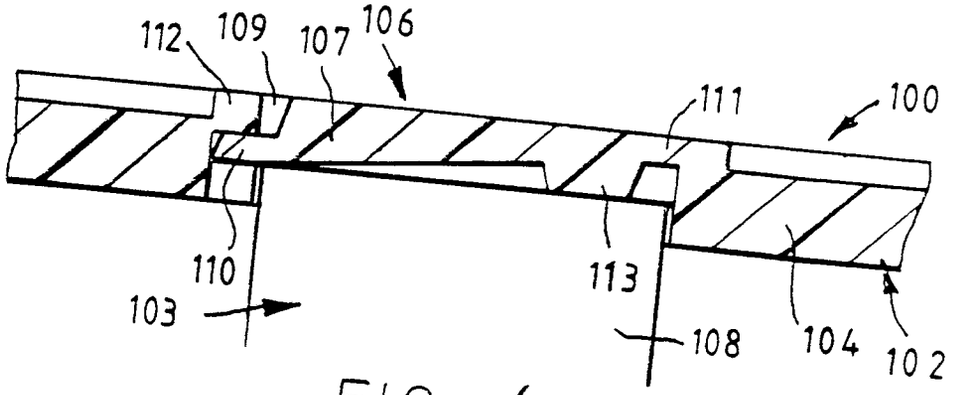

FIG. 1

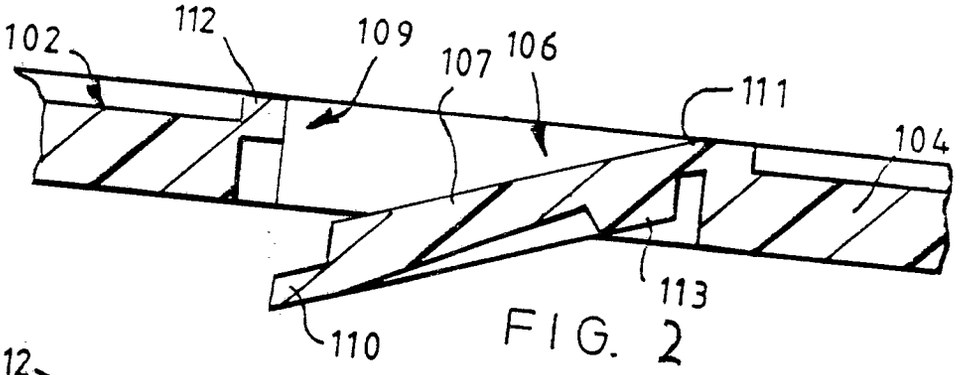

FIG. 2

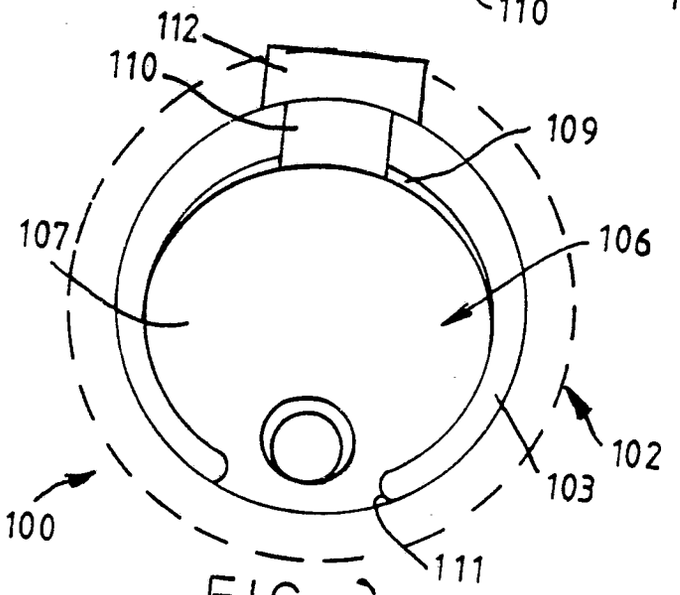

FIG. 3

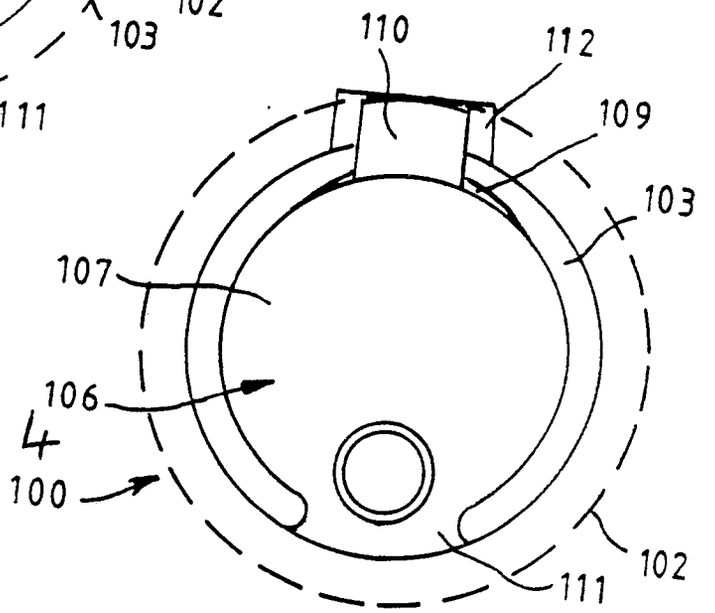

FIG. 4

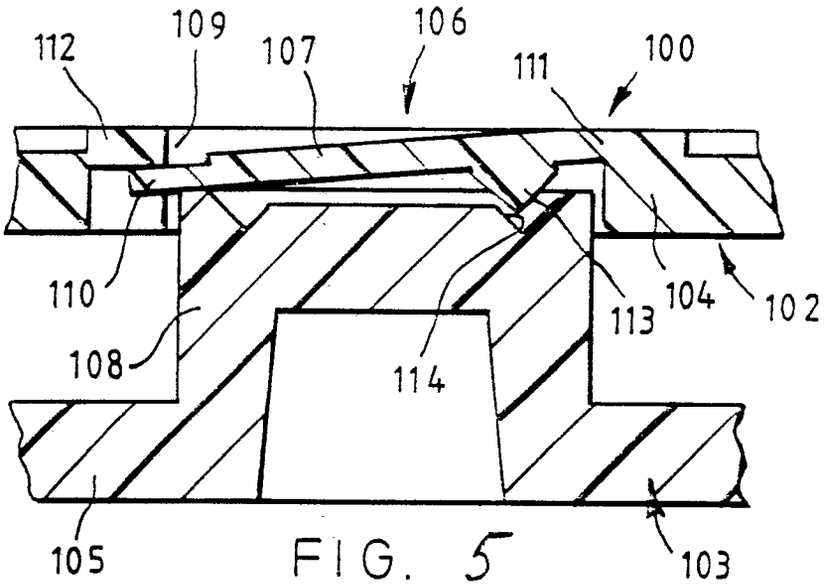
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FIG. 5

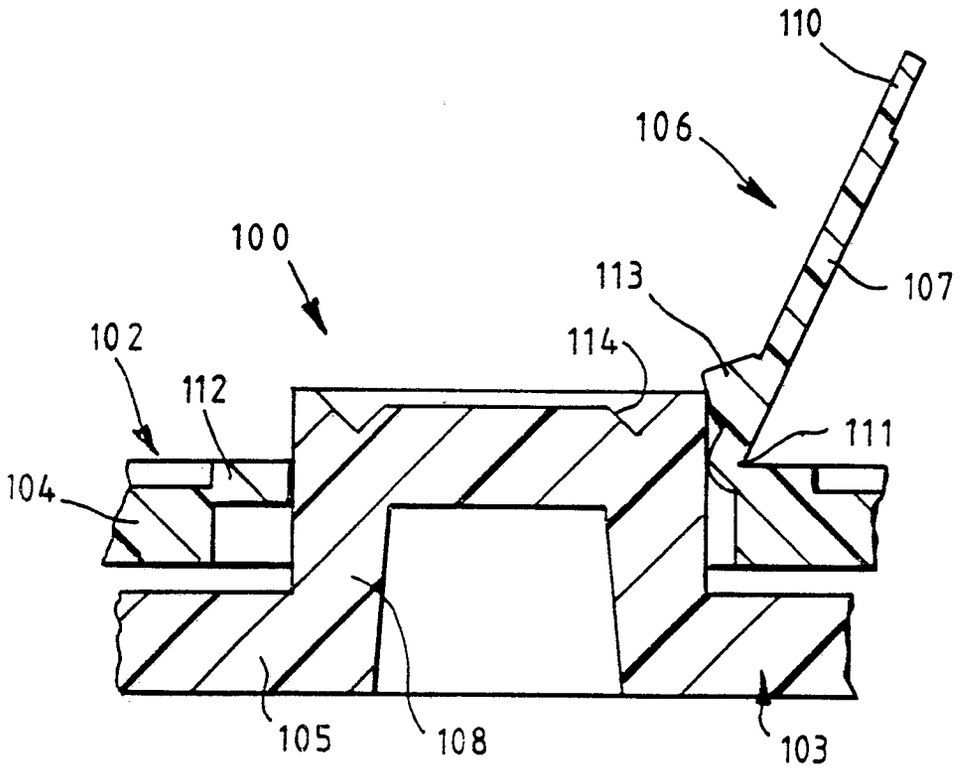
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FIG. 6

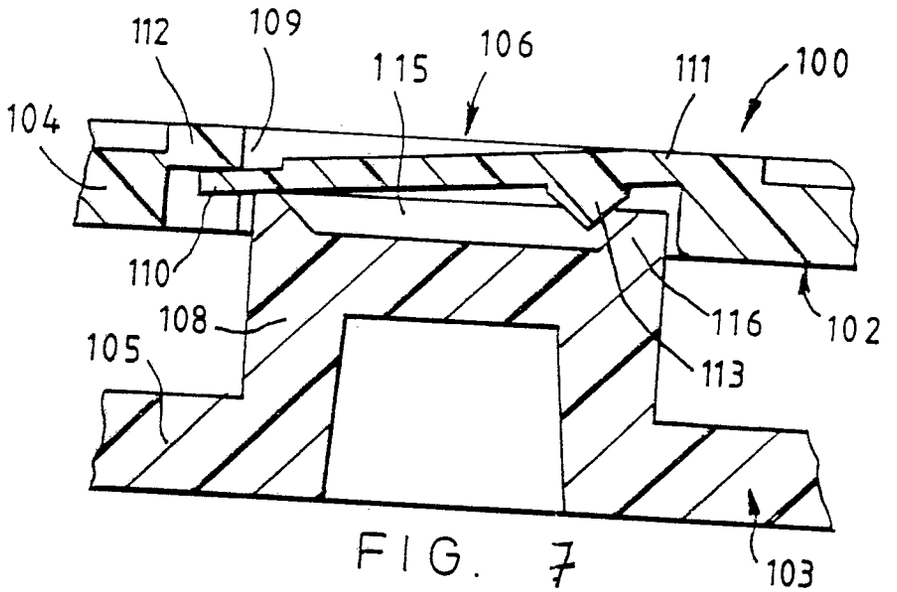
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FIG. 7

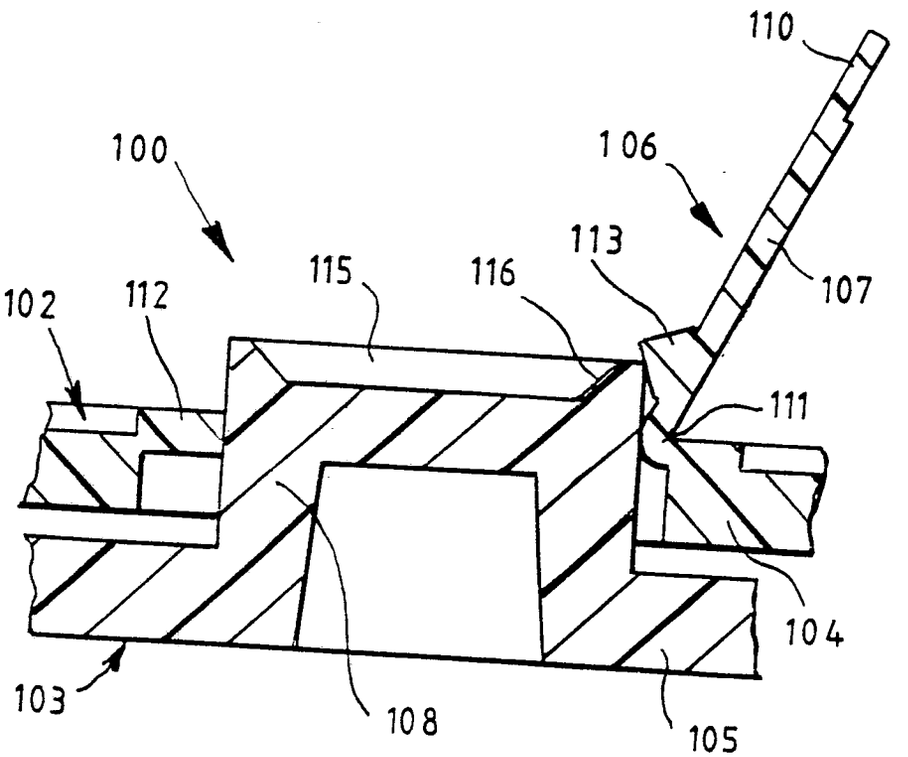
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FIG. 8