Sept. 21, 1965 D. L. W. SHORT 3,207,390

CONTAINERS

Filed Jan. 29, 1963

3 Sheets-Sheet 1

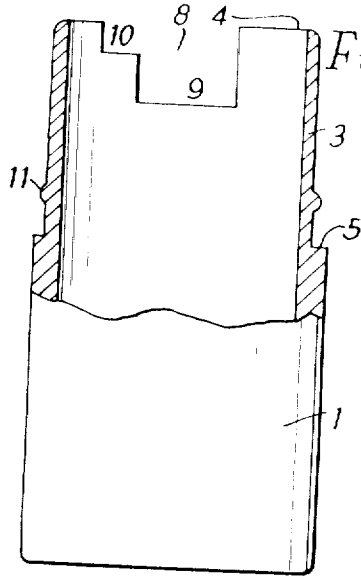


Fig. 1.

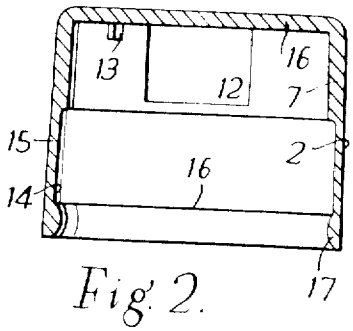


Fig. 2.

Fig. 3.

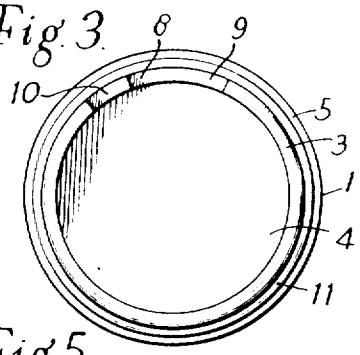


Fig. 4.

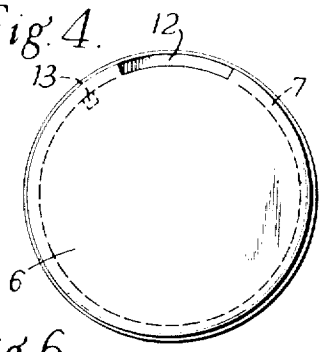


Fig. 5.

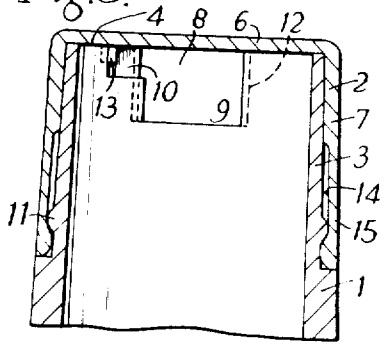
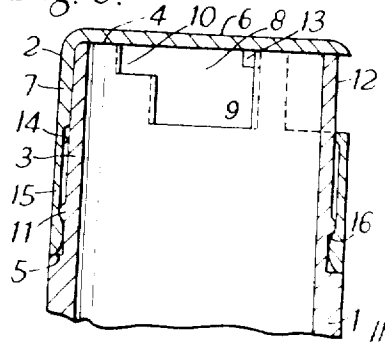


Fig. 6.



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CONTAINERS

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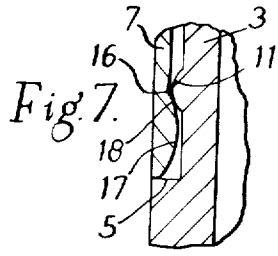

Fig. 7.

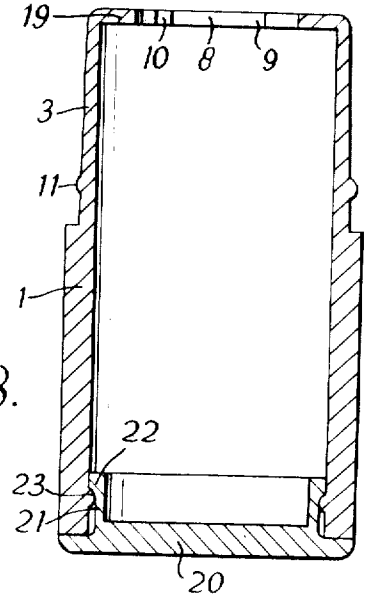

Fig. 8.

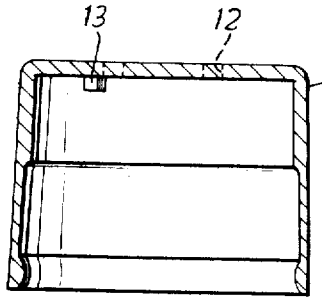

Fig. 9.

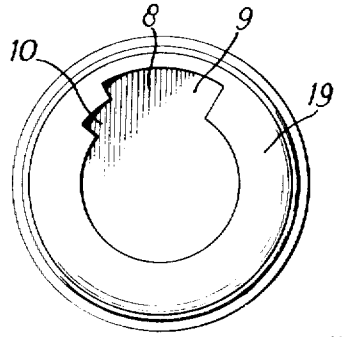

Fig. 10.

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Fig. 11.

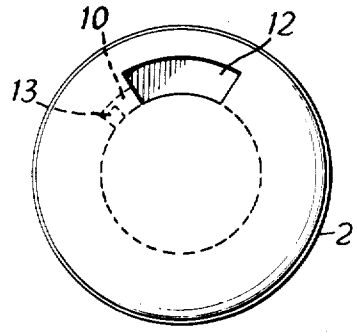


Fig. 12.

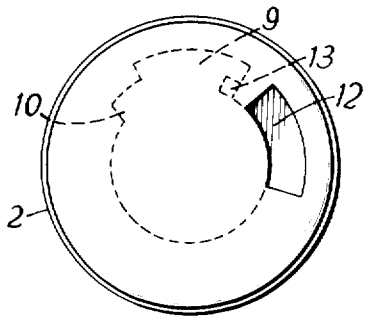
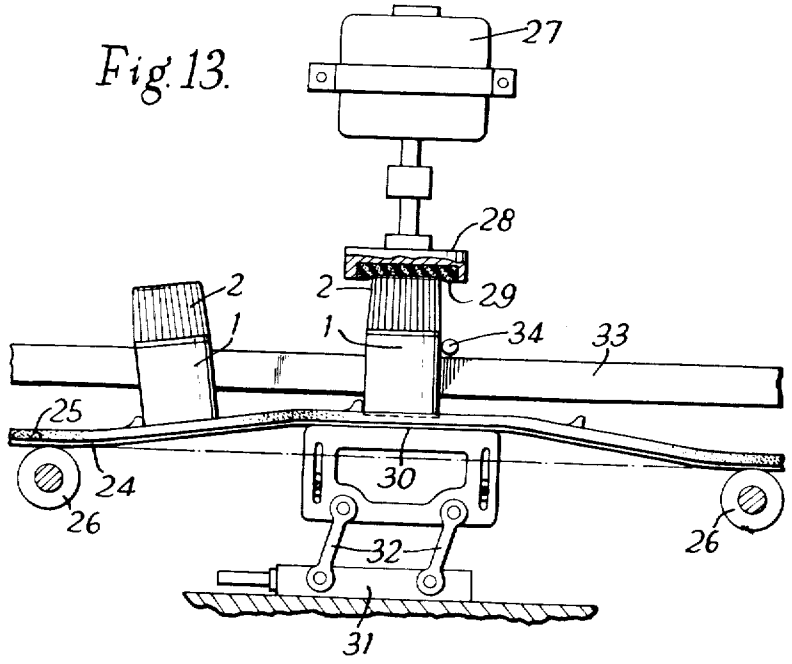


Fig. 13.



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United States Patent Office 3,207,390 Patented Sept. 21, 1965

3,207,390

CONTAINERS

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Filed Jan. 29, 1963, Ser. No. 254,627
Claims priority, application Great Britain, Jan. 30, 1962, 3,547/62
1 Claim. (Cl. 222—553)

This invention relates to containers of the kind formed of two or more parts including a body having an open end or neck and a cap fitting over and rotatable about the open end or neck so that an aperture in the wall of the cap can be moved into register with an aperture in the wall of the body to permit removal of contents of the container or out of register with the aperture in the wall of the body to prevent egress of the contents.

With a container of this kind in which the cap is capable of being freely rotated through 360° about the axis of the container, movement of the apertures in the cap and body into or out of register with one another is a matter of chance or trial and error and with containers of small size may be a matter of some difficulty.

Furthermore in the operation of applying the caps to large numbers of filled containers mechanically it is necessary that the applied caps shall have a final position relative to the body in which the apertures in the caps and bodies are out of register in order to ensure retention and protection of the contents prior to sale or distribution of the filled containers. Problems arise in this connection due to the difficulty of so orienting the cylindrical bodies and caps before assembly that the apertures will always be out of register after assembly, and inspection and picking out of, and adjusting by hand the parts of containers which are found to be open or partly open is economically prohibitive.

It is the object of the invention to provide an improved form of container of the kind indicated, with which the above described disadvantages are overcome.

The invention consists in a container formed of parts including a body part having a cylindrical end or neck and a cap fitting over and rotatable about said cylindrical end or neck, an aperture in a wall of the end or neck of the body part and an aperture in the wall of the cap part capable of being brought into or out of register with the aperture in the wall of the end or neck of the body part by relative rotation between said two parts, and a projection upon one of said two parts engaged in a slot extending in a general circumferential direction in the other of said two parts and constituting a stop for engagement with the ends of said slot, the location and dimensions of the slot being such as to determine terminal positions of the cap part relative to the body part in one of which the apertures in the two parts are in register and in the other of which both apertures are masked.

In some cases the two apertures are formed respectively, one in the side wall of the cylindrical end or neck of the body part and the other in the skirt portion of the cap part and the projection is formed in the cap part and engages in a generally circumferentially extending slot formed in the body part.

Conveniently the aperture and the circumferentially extending slot in the body part may be formed as a single recess adjacent the free edge of the end or neck of the body part with one edge of the recess open at the free edge of the end or neck.

Alternatively the body part of the container may be wholly or partly closed by a wall at the free end of the cylindrical end or neck and the apertures formed respectively one in the end wall of the cap part and the other in the wall partly or wholly closing the end or neck of the body part and the projection formed on the underside of the end wall of the cap part and the slot for engagement by the projection formed in the wall partly or wholly closing the end or neck of the body part.

The invention is illustrated by way of example in the accompanying drawings in which:

FIG. 1 is a view in sectional elevation of the body part of one form of the improved container,

FIG. 2 is a view in sectional elevation of the cap part for use with the body part of FIG. 1,

FIG. 3 is a view in plan of FIG. 1,

FIG. 4 is a view in underside plan of FIG. 2,

FIG. 5 is a view in sectional elevation of a part of the body part of the container with the cap part applied thereto, the cap part being shown in one of its terminal positions,

FIG. 6 is a view similar to FIG. 5 but with the cap part in its other terminal position,

FIG. 7 is a sectional view on an enlarged scale showing the manner in which the cap part is retained on the body part,

FIG. 8 is a view in sectional elevation of a modified form of the body part of the improved container,

FIG. 9 is a view in sectional elevation of a cap part for use with the body part of FIG. 8,

FIG. 10 is a view in plan of FIG. 8,

FIG. 11 is a view in plan of FIG. 9,

FIG. 12 is a view in plan showing the cap part of FIG. 9 applied to the body part of FIG. 8, and

FIG. 13 shows diagrammatically a form of apparatus suitable for use in the mechanical execution of the final steps in applying cap parts to body parts of the improved containers.

Referring to FIGS. 1 to 6 the container here shown comprises a hollow body part **1** and a cap part **2**. The body part **1** here shown is closed at its lower end and has a circular cylindrical and open upper end or neck **3**, the exterior of which is of slightly tapered form decreasing towards the free end edge **4**, an external shoulder **5** being presented at the junction of the parts **1** and **3**. The cap part **2** comprises a flat closed end **6** and a skirt **7** of internal tapering form corresponding to that of the exterior of the end or neck **3** of the body part **1** and such that the cap **2** is a free rotatable fit around the end or neck **3** when mounted thereon with the lower edge of the skirt **7** against or close to the shoulder **5** and the closed end **6** of the cap **2** against or close to the free end edge **4** of the end or neck **3**.

In the side wall of the end or neck **3** of the body part **1** is formed a cut-out or recess **8** to provide an aperture **9** of predetermined dimensions with one side thereof open at the free end edge **4** of the end or neck **3**. The aperture **9** is shown as being of rectangular form but other shapes may be used.

The cut-out or recess **8** is of a shape to provide a circumferential extension **10** at one side of the aperture **9** also open at the free end or edge **4** of the end or neck **3**, this extension being of predetermined circumferential length and of an axial dimension less than that of the aperture **9**.

On the outer surface of the end or neck **3** of the body part **1** and adjacent to but spaced from the shoulder **5** is formed an outwardly protruding and encircling projection **11** of arcuate section shown on an enlarged scale in FIG. 7.

In the skirt **7** of the cap **2** is formed an aperture **12** of dimensions similar to those of the aperture **9** in the end or neck **3** of the body part and with one of its sides adjacent or close to the closed top **6** of the cap, and on the underside of the closed end **6** of the cap at one side of the aperture **12** and extending radially inwards from the skirt **7** is formed a projection **13** of an axial

length not greater than the axial dimension of the extension **10** of the recess **8** in the body part **1**.

The lower part of the skirt **7** of the cap **2** is circumferentially recessed on the inner side as shown at **14** to provide a skirt part **15** of reduced thickness extending over approximately one half of the width of the skirt **7** and bounded at its lower edge by an inwardly directed shoulder **16**, thereby defining an internal rim **17** at the lower edge of the skirt **7** of an axial width related to that between the external shoulder **5** and the encircling projection **11** on the body part **1**.

To assemble the container the cap **2** is applied over the end or neck **3** of the body part **1** with the internal projection **13** of the cap **2** entered in the cut-out or recess **8** of the end or neck **3** and pressure exerted to cause the internal rim **17** on the lower end of the thinner part **15** of the skirt **7** of the cap to snap past the encircling projection **11** on the body part **1** so that the cap **2** becomes locked upon the body part **1**.

Thereafter the cap **2** can be rotated on the end or neck **3** in either direction to move the projection **13** in the guide slot formed by the recess **8**, in one direction until the projection **13** meets the closed end of the extension **10** of the recess **8** as shown in FIG. 5 in which position the apertures **9** and **12** in the body part **1** and cap part **2** are in register with one another to permit egress of contents of the container, and in the other direction until the projection **13** of the cap meets the edge of the aperture **9** in the end or neck **3** of the body part **1** at the end of the recess **8** remote from the extension **10** as shown in FIG. 6 in which position the apertures **9** and **12** are out of register with one another and both are fully masked so that the container is fully closed.

In FIGS. 8 to 12 there is illustrated an alternative form of the improved container.

In this case the apertures permitting the extraction of contents of the container are in an end wall of the container.

As shown, the end or neck **3** of the body part **1** is provided with an inwardly directed flange **19**, and the cut-out or recess **8** is formed in the flange **19** to provide the aperture **9** and the slot extension **10** (FIGS. 8 and 10) of the body part **1**, the recess **8** and therefore the aperture **9** and the slot extension **10** being in this case open at the inner periphery of the inwardly-directed flange **19**.

The cap **2** is of a generally similar form to that of the previously described embodiment and an aperture **12** is formed in the flat end surface **6** of a size similar to that of the aperture **9** in the flange **19**, and in a position spaced radially from the upper edge of the cap by a distance such that by rotation of the cap **2** when mounted on the end or neck **3** the apertures **9** and **12** can be brought into or out of register with one another.

At the underside of the flat end surface **6** of the cap **2** and at a predetermined distance to one side of the aperture **12** in the cap is formed the projection **13** for sliding engagement in the slot extension **10** of the cut-out or recess **8** in the flange **19** on the end or neck **3** of the body part **1**.

Mounting and locking of the cap **2** on the end or neck **3** of the body part **1** is effected in a similar manner to that previously described, and it will readily be seen that rotation of the cap **2** relative to the body part **1**, in one direction, i.e. counterclockwise in the drawings, until the projection **13** in the cap **2** engages the end of the slot extension **10** in the flange **19** will bring the two apertures **9** and **12** into register with one another as shown in FIG. 11 so that contents of the container can be removed. Rotation of the cap **2** in the reverse direction relative to body part **1** until the projection **13** meets the side of the aperture **9** furthest from the slot extension **10** will result in relative displacement of the two apertures **9** and **12** to positions as shown in FIG. 12 in which the apertures are out of register and both are masked and the container therefore closed against egress of contents.

The construction according to FIGS. 8 to 12 lends itself readily to containers intended to be filled at the end remote from the cap. Such a container may be provided with a plug such as is shown at **20** in FIG. 8 for closing the lower end. The plug may be of the hollow construction shown with thin side walls **21** presenting an outwardly projecting rim **22** adapted to make snap-lock retaining engagement with an internal circumferential projection **23** inside the lower end of the container.

The improved containers may be formed of a variety of materials, such as metal or plastics capable of being fabricated to appropriate small wall thickness and satisfactory containers can be produced by the process of injection moulding utilising polystyrene for the body parts and polythene for the caps, the latter offering elastic characteristics suited to the snap-locking of the caps on the bodies.

Utilising these and other plastic materials, the rim **17** at the lower end of the skirt **7** of the cap **2** may be shaped in cross section as shown in FIG. 7 to present an upward bulge **18** which in the assembled condition exerts elastic upward pressure on the underside of the encircling projection **11** on the body part **1** tending to hold the tapered skirt **7** of the cap **2** down in smooth rotational surface contact with the tapered external surface of the end or neck **3** of the body part **1**.

FIG. 13 shows diagrammatically a form of apparatus suitable for locking the caps **2** on the bodies **1** of the containers and delivering the containers in the closed condition that is to say with the apertures **9** and **12** in the non-registering and masked position.

The apparatus comprises a flexible and intermittently driven conveyor band **24** having a surface **25** of rubber and moving over a number of spaced supporting rollers **26** of which two are shown.

Above the conveyor band is mounted a motor **27** e.g. a pneumatically driven motor, embodying a slipping clutch or like device and driving a downwardly-facing hollow chuck **28** lined with a rubber pad **29**.

At the underside of the conveyor band **24** between an adjacent pair of the rollers **26** and below the chuck **28** is mounted a platform **30** capable of up and down guided movement under the control of a reciprocating member **31** coupled to the platform **30** by parallel links **32**, whereby a part of the conveyor band **24** between the rollers **26** may be deflected from the normal path upwards towards the chuck **28**.

The containers with the caps **2** applied over the ends or necks **3** of the body parts **1** by any convenient known form of feed mechanism are loaded on to the rubber-covered conveyor band **24**, **25** and suitably located thereon e.g. by engagement with projections on the rubber surfacing layer **25** and are taken in succession between guide fences **33** to a position beneath the chuck **28** in which they may be located e.g. by means of a movable temporary stop **34**.

The timing is such that with a container in position beneath the chuck **28** in rotation under the drive of the driving motor **27** the platform **30** rises to deflect the part of the conveyor band **28** between the pair of rollers **26** upwards so that the upper end of the cap **2** engages the rubber pad **29** in the rotating chuck **28** with pressure. The rubber cover **25** of the conveyor **24** holds the body **1** of the container by friction against rotation and the cap **2** is rotated on the body **1** by frictional engagement with the rubber pad **29** in the rotating chuck **24** and assuming that the stop **13** of the cap **2** is over the cut-out or recess **8**, the rim **17** of the cap will be pressed past the projection **11** on the body **1** and the cap rotated on the body until the stop **13** meets the end of the recess **8** remote from the slot extension **10** whereupon the rotation of the cap **2** by the chuck **28** is caused to cease by

reaction either by virtue of the slipping clutch or interruption of the pneumatic drive of the motor **27**.

Thus the cap **2** is locked upon the body **1** and the cap is in the position on the body part **1** in which the holes **9** and **12** are out of register and the container therefore fully closed.

If the container is presented to the chuck with the cap **2** in a position in which the stop **13** is not opposite the cut-out or recess **8** engagement of the cap with the rubber pad **29** in the rotating chuck rotates the cap with the stop **13** sliding upon the upper edge **4** of the container body **1** of FIG. 1 or over the surface of the end flange **19** of the container of FIG. 8 until it is capable of moving into the extension slot **10** of the recess **8**, so that the cap is permitted to move axially downwards to cause the rim **17** on its lower end to pass the projection **11** to lock the cap on the body. Thereafter the cap is rotated as previously described into the position of non-register of the holes **9** and **12** and total closure of the container.

I claim:

A container comprising a body portion having an open ended hollow delivery neck, said delivery neck being formed with a generally cylindrical wall carrying an external annular rib separate from the open end of the delivery neck, said delivery neck being provided with a neck discharge opening extending to the free edge of said cylindrical wall, and having a circumferential extension at one side of the said opening, and a cap of resilient deformable material engaged on said delivery neck, said cap having a substantially flat end wall adapted to be disposed adjacent the free edge of said delivery neck wall, a generally cylindrical skirt on said cap having an annular bead formed on its inner surface adapted for snap-locking relation with the rib on said delivery neck on assembly of the said cap onto the said delivery neck, said cap skirt being formed with a cap discharge opening adjacent the end wall of the cap, being adapted to register with said neck discharge opening, said cap having an internal projection depending from the inside of the cap top adapted to extend into said neck discharge opening and said circumferential extension thereof when the parts are assembled, the inner edge of said circumferential extension, together with the internal projection, serving to limit the rotational movement of the said cap relative to the open end of the delivery neck when the neck discharge opening and the cap discharge opening are in alignment, the spacing of the annular bead on the cap cylindrical skirt from the cap flat end wall and the neck annular rib being at least such that they engage in interlocking relation after the said projection on the cap enters the said neck discharge opening, whereby on assembly the cap need only be applied to the delivery neck and, if needed, rotated to a position where the said cap projection enters the neck discharge opening whereupon snap-locking relationship is achieved between said neck rib and cap bead, said delivery neck wall tapering slightly inwardly toward the open end and said open end having an external diameter less than the internal diameter of said cap bead, the inner wall of said cap skirt being provided with a circumferential recess between said end wall and said bead spaced from said end wall to provide an elastic zone of relatively small thickness in the said skirt portion.

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