Oct. 5, 1943. R. W. WILSON 2,330,939

SELF-CLOSING CONTAINER CLOSURE

Filed April 3, 1940

Fig. 1

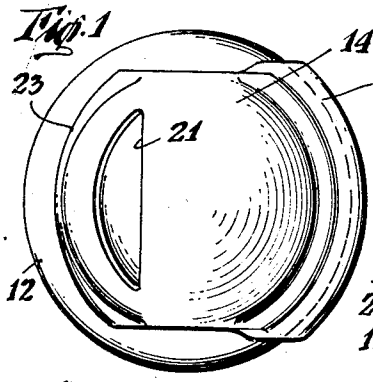


Fig. 5

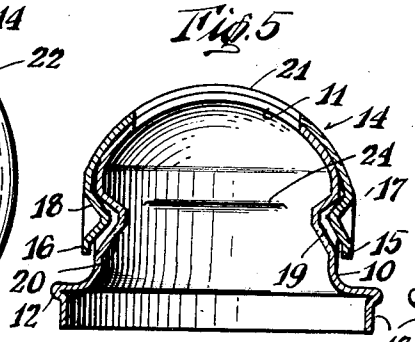


Fig. 4

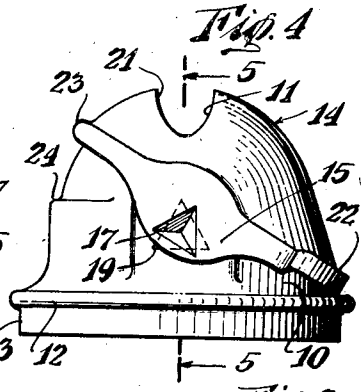


Fig. 2

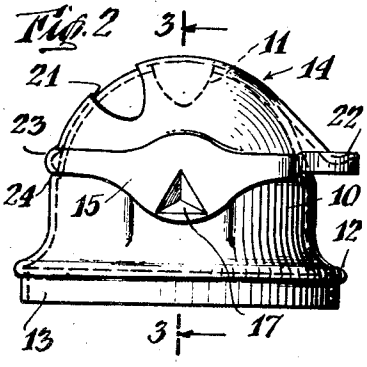


Fig. 3

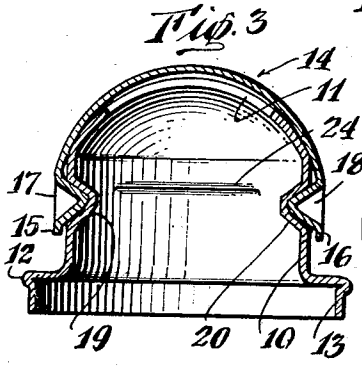


Fig. 6

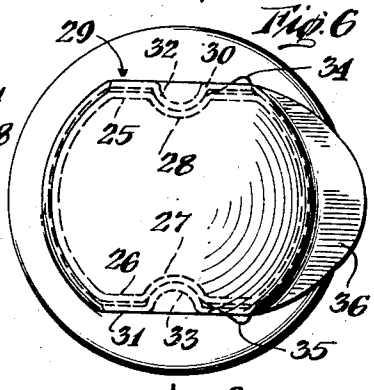


Fig. 8

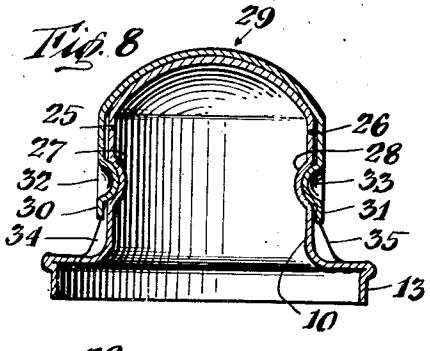


Fig. 7

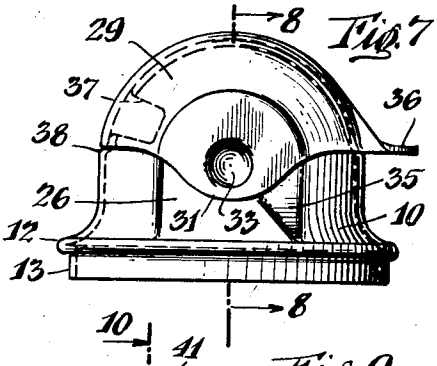


Fig. 10

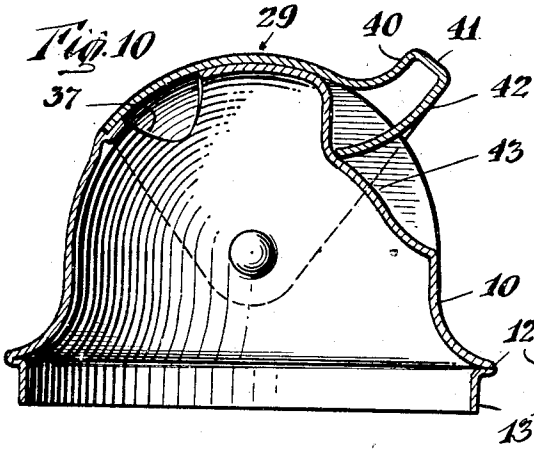
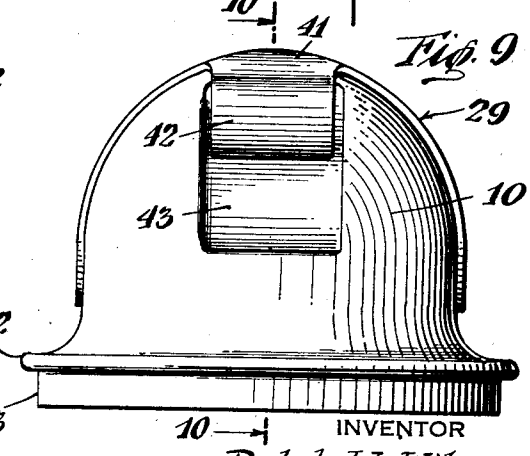


Fig. 9



INVENTOR

Ralph W. Wilson

BY

Hoguet, Neary & Campbell

his ATTORNEYS

Patented Oct. 5, 1943

2,330,939

UNITED STATES PATENT OFFICE

2,330,939

SELF-CLOSING CONTAINER CLOSURE

Ralph W. Wilson, New York, N. Y., assignor of one-half to William G. Thompson, Clinton, Mass.

Application April 3, 1940, Serial No. 327,565

4 Claims. (Cl. 221—62)

This invention relates to closures of the type used for dispensing liquids or powdered materials such as cosmetic or pharmaceutical preparations, for example. More particularly, it relates to closures for containers having a neck shell provided with a curved portion in which a dispensing aperture is formed, the neck shell being nested in a cap of similar form which is rockably secured thereto, whereby the dispensing aperture formed in the neck shell may be rendered effective or ineffective to dispense the contents of the container as required.

More specifically, the invention pertains to a new and improved container closure of this character which is self-closing in operation whereby the cap need be manually actuated only to render the dispensing aperture in the neck shell effective for dispensing the contents of the container.

In my prior Patents Nos. 2,025,188 and 2,185,284 there are disclosed a plurality of different forms of container closures of this general type. In all of the embodiments there disclosed, however, the cap is adapted to be manipulated to render the dispensing aperture in the neck shell both effective and ineffective for dispensing the contents of the container so that the dispensing aperture may sometimes inadvertently be left open by a careless user of the container. Ordinarily, an occurrence of this sort results in no damage unless the container is knocked over, in which case some of the contents thereof may be spilled.

With certain classes of materials, however, it is highly desirable to insure that the dispensing opening cannot inadvertently be left open. For example, certain materials are adversely affected by exposure to the atmosphere and might spoil if the dispensing aperture were carelessly left open. Other materials like powdered zinc stearate, for example, are highly injurious when inhaled and it is essential that the container thereof always be kept closed when not in use to prevent the contents from being spilled about accidentally. This is especially true of zinc stearate which is used around small children who may have ready access to the container.

It is an object of the invention, accordingly, to provide a new and improved closure for containers of the above character which is self-closing in action whereby the dispensing aperture in the container cannot inadvertently be left open.

Another object of the invention is to provide a new and improved container closure of the above character having means, operative when the cap is manipulated to render the dispensing aperture in the neck shell effective for dispensing the contents of the container, for urging the cap rearwardly in the direction to render the dispensing aperture in the neck shell ineffective for this purpose.

A further object of the invention is to provide a new and improved container closure of the above character having cam type nibs which serve both to mount the cap pivotally on the neck shell and also to provide a restoring force for returning the cap to the normal closed position when the container is not in use.

A still further object of the invention is to provide a new and improved container closure of the above character in which the cap is provided with a spring element which is adapted to cooperate with a cam surface formed on the neck shell to provide a restoring force for returning the cap to the normal closed position after use.

The invention may be better comprehended from the following description of several embodiments, taken with reference to the following drawing, in which:

Figure 1 is a view in plan of a container closure constructed in accordance with the present invention, the cap being in the normal closed position;

Figure 2 is a view in elevation of the container closure shown in Figure 1;

Figure 3 is a view in section taken along line 3—3 of Figure 2, looking in the direction of the arrows;

Figure 4 is a view in elevation illustrating the container closure of Figures 1–3 in the dispensing position;

Figure 5 is a view in section taken along line 5—5 of Figure 4, showing the position assumed by the nibs on the cap when the latter is in the position shown in Figure 4;

Figure 6 is a plan view of a modified form of the invention;

Figure 7 is a view in elevation of the modification shown in Figure 6;

Figure 8 is a view in section taken along line 8—8 of Figure 7, looking in the direction of the arrows;

Figure 9 is a side view in elevation of another embodiment of the invention; and

Figure 10 is a view in section taken along line 10—10 of Figure 9, looking in the direction of the arrows.

In the preferred embodiment shown in Figures 1 and 2, the closure comprises a neck shell 10, the upper surface of which may be curved or hemispherical in form and in the top of

which is provided an opening 11 through which the contents of the container may be dispensed. The lower portion of the neck shell 10 terminates in a laterally extending flange 12 and a downwardly extended flange 13 which is adapted to be clinched into a conventional type container. Obviously the invention is not limited to the type of connection between the neck shell 10 and the container shown, but the neck shell 10 may be secured to the container in any conventional manner.

Nested on the upper curved surface of the shell 10 is a cap 14 of similar shape which is provided with downwardly extending lugs 15 and 16 in which are formed the inwardly extending nibs 17 and 18, respectively, which are adapted to be received within recesses 19 and 20, respectively, formed in the neck shell 10, for the purpose of pivotally securing the cap 14 thereto. The cap 14 is provided with an aperture 21, similar in form and area to the aperture 11 in the neck shell 10, which is located for convenience to the left of the vertical axis of the neck shell 10 when the cap 14 is in the normal closed position shown in Figures 1 and 2.

At one end of the cap 14 is formed a flange 22 which extends outwardly and downwardly from the neck shell 10 and which forms a finger piece whereby the cap 14 may be rocked about the nibs 17 and 18 to move the aperture 21 in the cap 14 into alignment with the aperture 11 in the neck shell 10.

In this embodiment, the cap 14 is made self-closing by designing the nibs 17 and 18 and their cooperating recesses 19 and 20 so as to have a cam and cam follower relationship with respect to each other. This is accomplished as shown in Figures 2–5 by forming the nibs 17 and 18 in the shape of trihedrons, the faces of which are equilateral triangles, and the recesses 19 and 20 in the neck shell 10 in the same manner.

In operation, when the finger piece 22 is moved downwardly to bring the aperture 21 in the cap 14 into alignment with the aperture 11 in the neck shell 10, the rotation of the nibs 17 and 18 with respect to the recesses 19 and 20 causes the lugs 15 and 16, respectively, to be moved outwardly in opposite directions along an axis transversely of the neck shell 10 as shown in Figure 5. The cap 14 and the lugs 15 and 16 are made of resilient material so that the lugs 15 and 16 exert a spring action which tends to restore the cap 14 to the normal closed position shown in Figures 1 and 2.

It will be readily apparent, therefore, that when the finger of the user is removed from the finger piece 22 after the cap 14 has been moved to the position shown in Figure 4, the nibs 17 and 18 will cooperate with the recesses 19 and 20 in the neck shell 10 in the manner described above to restore the cap 14 to the normal closed position shown in Figures 1 and 2.

The extent of movement of the cap 14 in the direction to move its aperture 21 out of alignment with the aperture 11 in the neck piece 10 may be limited by providing an abutment 23 on the lower edge of the cap 14 which is adapted to come to rest against a shouldered portion 24 formed on the corresponding side of the neck shell 10. As disclosed in my above mentioned prior patents, the finger piece 22 on the cap 14 cooperates with the lower portion of the neck shell 10 to limit the movement of the cap 14 in the direction to bring its aperture 21 into alignment with the dispensing aperture 11 in the neck shell 10.

In the embodiment illustrated in Figures 6–8, inclusive, the neck shell 10 is provided with parallel flat sides 25 and 26 formed with diametrically opposed substantially hemispherical recesses 27 and 28, respectively. Nested on the neck shell 10 is a cap 29 having flat downwardly extending lugs 30 and 31 formed with pressed-in nibs 32 and 33, respectively, which are also substantially hemispherical in shape and which are adapted to be received within the recesses 27 and 28 in the neck shell 10.

This modification is made self-closing by forming inclined cam surfaces 34 and 35 on the flat sides 25 and 26, respectively, of the neck shell 10. As shown in the figures, the cam surfaces 34 and 35 begin at the edges of the lugs 30 and 31, respectively, which are located on the right hand side of the nibs 32 and 33 when the cap 29 is in the position shown in Figure 7 and they extend downwardly and outwardly therefrom. The cap 29 is provided with an outwardly extending flange 36 which serves as a finger piece for rocking it about the nibs 32 and 33.

A dispensing aperture 37 is formed in the neck shell 10, which is located to the left of the vertical axis thereof when in the position shown in Figure 7. The dispensing aperture 37 is normally covered by the cap 29, but it is adapted to be uncovered when the finger piece 36 is manipulated to turn the cap 29 about the nibs 32 and 33.

From an inspection of the drawing, it will be apparent that when the finger piece 36 is manipulated by the finger of the user to uncover the dispensing aperture 37 in the neck shell 10, portions of the lugs 30 and 31 will ride up on the inclined cam surfaces 34 and 35, respectively, and will be spread apart along an axis transversely of the neck shell 10.

The lugs 30 and 31 and the cap 29 are made of resilient material so that when they are spread apart in this fashion, forces are produced which tend to urge the cap 29 in the direction to cover the dispensing aperture 37 in the neck shell 10. Accordingly, when the finger piece 36 is released after the container has been used, the cap 29 will immediately be restored to the normal closed position covering the dispensing aperture 37.

As in the modification of Figures 1–5, a stop for limiting movement of the cap 29 in the direction to cover the dispensing aperture 37 may be provided by forming a shouldered portion 38 on the neck shell 10 which is adapted to abut the adjacent edge of the cap 29.

A further modification is shown in Figures 9 and 10 in which the cap 29 is provided at one end thereof with an upwardly extending portion 40, an outwardly extending portion 41 and a portion 42 which is bent downwardly and inwardly, forming a finger piece for actuating the cap 29. The downwardly extending portion 42 also constitutes a spring element which is adapted to ride upon an outwardly inclined cam surface 43 formed in the neck shell 10.

When the cap 29 of this embodiment is manually moved to the dispensing position, the spring element 42 will ride up on the inclined cam surface 43 on the neck shell 10. In so doing, it will be bent inwardly, producing a force tending to urge the cap 39 in the direction to cover the dispensing aperture 37 in the neck shell 10. Accordingly, when the finger of the user is removed from the upwardly bent portion 40 of the cap 39,

the cap 39 will return immediately to the normal closed position shown in Figure 10.

If desired, either of the self-acting means for restoring the cap to the closed position shown in Figures 6–8 and 9 and 10, respectively, might be combined with that disclosed in Figures 1–4, although any one of these modifications by itself will provide a highly satisfactory and effective self-closing dispensing closure.

From the foregoing, it will be apparent that the invention provides an improved self-closing container closure which is simple to manufacture, easy to operate and which makes it impossible for the dispensing opening of the container to be inadvertently left open after use.

Obviously, many changes in form and detail may be made in the embodiments described above by one skilled in the art and the invention is not intended to be limited except as defined in the appended claims.

I claim:

1. A closure for containers comprising a neck shell having a curved upper surface provided with a dispensing aperture therein, and formed with a pair of diametrically opposed, polyhedronally shaped recesses, a cap of resilient material and of similar form having an aperture therein mounted in nested relation to the shell, a pair of diametrically opposed polyhedronally shaped nibs on the cap, adapted to be received within the recesses in the neck shell and to coincide therewith when the apertures are out of alignment, and a finger piece to facilitate movement of the cap to bring the apertures into alignment, and to turn the nibs on the cap with respect to the corresponding recesses in the neck shell, thereby spreading apart the nibs on the cap, whereby the resiliency of the material of the cap produces a force tending to move the cap to bring the aperture therein out of alignment with the aperture in the neck shell.

2. A closure for containers comprising a neck shell having a curved upper surface provided with a dispensing opening therein and formed with a pair of diametrically opposed trihedronally shaped recesses, a cap of resilient material and of similar form having an aperture therein, mounted in nested relation to the shell, a pair of diametrically opposed trihedronally shaped nibs on the cap, adapted to be received within the recesses in the neck shell and to coincide therewith when the apertures are out of alignment and in a predetermined position, means forming a shoulder on the neck shell constituting a limit stop against movement of the cap in the direction to move the apertures out of alignment, and a finger piece carried by the cap to facilitate movement of the cap for bringing the apertures into alignment and for turning the nibs on the cap with respect to the corresponding recesses in the neck shell, thereby spreading apart the nibs on the cap, whereby the resiliency of the material of the cap produces a force tending to move the cap to bring the aperture therein out of alignment with the opening in the neck shell, said finger piece being engageable with a portion of the neck shell to limit the movement of the cap.

3. A self-closing closure for containers comprising a neck shell having a curved upper surface provided with a portion through which material may be dispensed, and formed with a pair of diametrically opposed, polyhedronally shaped recesses, a cap of resilient material and of similar form mounted in nested relation to the shell for rendering said dispensing portion thereof ineffective for dispensing material therethrough, a pair of diametrically opposed, polyhedronally shaped nibs on the cap, adapted to be received within the recesses in the neck shell and to coincide therewith when the cap is in the position to render the dispensing portion of the neck shell ineffective for dispensing material therethrough, and a finger piece for facilitating movement of the cap to render said dispensing portion of the neck shell effective for dispensing material therethrough, and to turn the nibs on the cap with respect to the recesses in the neck shell, thereby spreading apart the nibs on the cap, whereby the resiliency of the material of the cap produces a force tending to restore the cap to the position for rendering the dispensing portion of the neck shell ineffective for dispensing material therethrough.

4. A self-closing closure for containers comprising a neck shell having a curved upper surface provided with a portion through which material may be dispensed, and formed with a pair of diametrically opposed, non-circularly shaped recesses, a cap of resilient material and of similar form mounted in nested relation to the shell for rendering said dispensing portion thereof ineffective for dispensing material therethrough, a pair of diametrically opposed, non-circularly shaped nibs on the cap, adapted to be received within the recesses in the neck shell and to coincide therewith when the cap is in the position to render the dispensing portion of the neck shell ineffective for dispensing material therethrough, and a finger piece for facilitating movement of the cap to render said dispensing portion of the neck shell effective for dispensing material therethrough and to turn the nibs on the cap with respect to the recesses in the neck shell, thereby spreading apart the nibs on the cap, whereby the resiliency of the material of the cap produces a force tending to restore the cap to the position for rendering the dispensing portion of the neck shell ineffective for dispensing material therethrough.

RALPH W. WILSON.