Jan. 11, 1938. D. HENDERSON 2,105,118

CLOSURE FOR TUBES OR CONTAINERS

Filed June 18, 1936

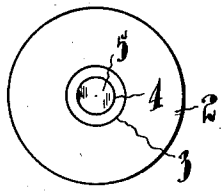


Fig. 1.

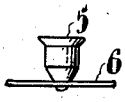


Fig. 9

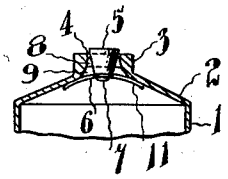


Fig. 3.

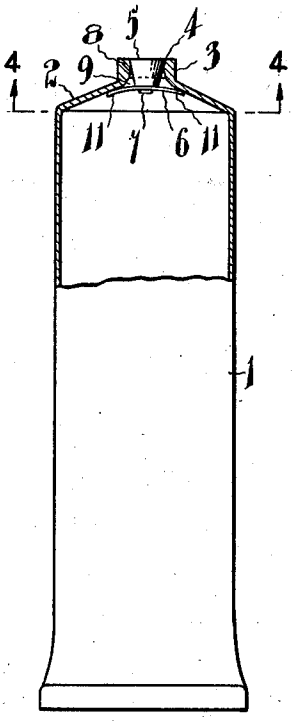


Fig. 2.



Fig. 10.

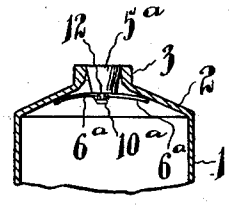


Fig. 5

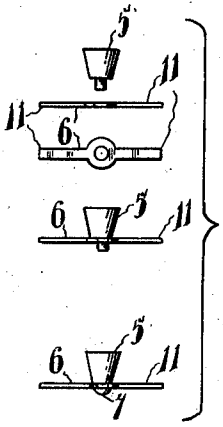


Fig. 8.

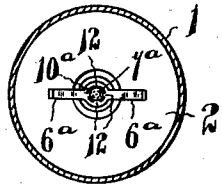


Fig. 6.

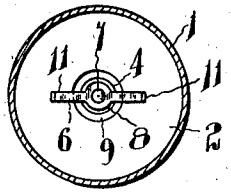


Fig. 4.

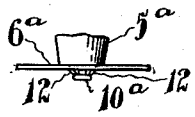


Fig. 7.

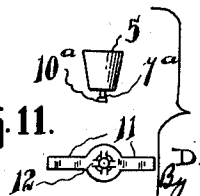


Fig. 11.

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UNITED STATES PATENT OFFICE

2,105,118

CLOSURE FOR TUBES OR CONTAINERS

Douglas Henderson, Toronto, Ontario, Canada

Application June 18, 1936, Serial No. 85,847

9 Claims. (Cl. 221—60)

This invention relates to closures for tubes or containers such as used for tooth paste, shaving cream, and similar materials, and particularly to that type of closure in which the control member or valve is actuated by the contents of the tube when squeezing pressure is applied to the tube itself, and which is provided with means to automatically seat the control member or valve when said squeezing pressure is relieved.

My object in the present invention is to devise a very simple and inexpensive closure of this type which has few parts, and which may readily be made with few operations by means of ordinary manufacturing equipment.

I attain my object by means of the constructions hereinafter described and illustrated in the accompanying drawing in which

Fig. 1 is a plan view of the closure end of the container;

Fig. 2 a side view of the container, the closure being shown in section, the valve being shown in closed position;

Fig. 3 a vertical section of the closure end of the container, the valve being shown open;

Fig. 4 a cross section of the container looking at the closure;

Fig. 5 a view similar to Fig. 3 showing a modified construction;

Fig. 6 a cross section of the container shown in Fig. 5;

Fig. 7 an enlarged detail illustrating the method of connecting the valve and spring in Fig. 5;

Fig. 8 is a detail illustrating the steps in mounting the spring on the valve;

Fig. 9 a side elevation of a modified form of valve;

Fig. 10 a side elevation of another form of valve; and

Fig. 11 a detail showing the spring and valve shown in Figs. 6 and 7 unassembled.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

1 indicates an ordinary compressible tube body having an inclined shoulder portion 2 at its upper end terminating in a comparatively short integral neck 3 through which is formed an outlet 4 for the tube contents.

This outlet is controlled by a closure member or valve 5 which is shaped as a truncated cone and extends down almost to the upper part of the inclined shoulder portion 2 of the body.

On the lower end of the valve 5 is mounted a spring member 6. This spring member consists of a single flat strip of stainless steel or other non-corrodible resilient material and has a wide central portion with a hole therein through which extends a pin 7 on the lower end of the valve which pin is preferably formed as a projection on the inner end of and integral with the valve. The end of the pin is upset or deformed to hold the spring member in place. Extending from the central portion is a pair of spring arms 11 which bear against the under side of the inclined shoulder portion 2 as shown.

In Fig. 2 the valve member is shown in normal or closed position while in Fig. 3 the valve is shown in raised or open position to permit the contents to escape.

The shape of the outlet 4 through the neck is very important. It will be noted commencing at the top, the outlet wall extends first downwardly paralleling the valve for a short distance, then substantially paralleling the axis of the valve for a short distance, and then inclined outwardly at an angle to said axis until it merges with the inside wall of the inclined shoulder.

It will be seen that the valve seats against the wall of the outlet on a comparatively narrow surface, below which there is a slowly widening space 8 between the valve and wall, and then a rapidly widening space 9 between the lower part of the valve and the outlet wall.

In actual practice, this wide space 9 is filled with the contents of the tube, and forms an annular body of said contents which, by reason of the equally applied sidewise pressure of the contents, serves to maintain the valve centrally of the opening when it is out of engagement with the seat, thus avoiding the use of centering guides which are objectionable in that they have a tendency to bind against the interior wall of the neck and thus hinder the operation of the valve. The narrow space 8 is arranged so that the material is flowing in the proper direction for discharge and further serves to facilitate seating of the valve under the action of the spring, as it provides an escape for any material which might tend to remain lodged between the valve and neck wall.

The tube with its neck and also the valve may be made of soft metal or any other suitable material.

In some cases the valve might be formed of a hard material such as stainless steel or condensation product such as "bakelite" for example. As these materials do not lend themselves to ready deformation, I provide special means, as shown in Figs. 5 and 6, for securing the spring in place. The valve 5a is provided with a thin

stem 7ª having an annular rib or flange 10ª at its lower end. The spring 6ª is formed with 2 or more spring fingers 12 which, when the spring is forced upwards into the stem, may be displaced by the flange 10ª to permit the spring 6ª to be positioned on the stem, while the spring fingers move in about the flange 10ª as shown in Figs. 5 and 6 to prevent separation of the valve and spring.

It will be seen that I have devised a very simple construction which comprises only three parts, viz, the tube with its integral neck, the valve, and the spring secured to the inner end of the valve. These parts are all simple to manufacture and are assembled with a minimum of work.

The tube and closure are assembled by inserting the valve in the outlet from the outside, positioning the spring strip from the inside of the container, and, in the case of the form shown in Figs. 2 and 3, upsetting the end of the projection to hold the spring strip in place.

While the closure is particularly adapted for tubes or containers of the collapsible or compressible type, it is also applicable to any rigid container which is provided with other means than squeezing pressure for forcing the contents therefrom.

While I find that best results are obtained if the valve member is formed as a truncated cone, it will be evident that this precise shape may be departed from and fair results obtained. In Figs. 9 and 10 are shown valves which depart from the strictly cone shape and yet give the same results, and such variations are intended to fall within the scope of my invention.

It will also be evident that the diameter of the outlet 4 and the corresponding size of the valve 5 may be varied as desired to suit the particular material in the container.

For example, should the contents be of a dense nature, the outlet would of necessity be larger than for an easily flowing material.

What I claim as my invention is:

1. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve shaped as a truncated cone, controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to the truncated end of said cone and having its ends engaging said internal shoulder; the outer part of said outlet wall forming a seat for said valve, the inner part of said outlet wall being inclined away from said valve to form an annular material receiving recess; the intermediate part of said outlet wall being inclined away from said valve at a lesser angle than the inner portion.

2. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve shaped as a truncated cone, controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to the truncated end of said cone and having its ends engaging said internal shoulder; said cone having a projection on its inner end, said spring member having a hole therein through which said projection extends, the end of said projection being upset to hold the spring member in place.

3. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve shaped as a truncated cone, controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to the truncated end of said cone and having its ends engaging said internal shoulder; said cone having a projection, said member having a hole formed therein through which said projection and shoulder extend; and spring fingers on said member adapted to permit said projection being inserted in the hole but to resist removal.

4. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve shaped as a truncated cone, controlling said outlet; and a spring member normally tending to seat the valve, said spring member being formed from a flat strip of sheet material secured intermediate its ends to the truncated end of said cone and having its ends engaging said internal shoulder; said cone having a projection on its inner end, said spring member having a hole therein through which said projection extends, the end of said projection being upset to hold the spring member in place.

5. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its end to the inner end of said valve and having its ends engaging said internal shoulder; the outer part of said outlet wall forming a seat for said valve, the inner part of said outlet wall being inclined away from said valve to form an annular material receiving recess; the intermediate part of said outlet wall being inclined away from said valve at a lesser angle than the inner portion.

6. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough, a valve controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to said valve and having its ends engaging said internal shoulder, said valve having a projection on its inner end, said spring member having a hole therein through which said projection extends, the end of said projection being upset to hold the spring member in place.

7. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to said valve and having its ends engaging said internal shoulder, said valve having a projection on its inner end, and a shoulder on the end of said projection, said member having a hole formed therein through which the projection and shoulder extend; and spring fingers on said member adapted to permit said projection being inserted in the hole but to resist removal.

8. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough; a valve controlling said outlet; and a spring member normally tending to seat the valve, said spring member being formed from a flat strip of sheet metal secured intermediate its ends to said valve and having its ends engaging said internal shoulder,

said valve having a projection on its inner end, said spring member having a hole therein through which said projection extends, the end of said projection being upset to hold the spring member in place.

9. A tube or container having a neck portion at its discharge end and an internal shoulder surrounding said neck portion, said neck portion having an outlet formed therethrough, a valve controlling said outlet; and a spring member normally tending to seat the valve secured intermediate its ends to said valve and having its ends engaging said internal shoulder, said valve having a projection on its inner end, said spring member having a hole therein through which said projection extends.

DOUGLAS HENDERSON.