July 30, 1946. G. L. LATEUR 2,404,879

CONICAL CAP FOR COLLAPSIBLE TUBES

Filed Feb. 20, 1943

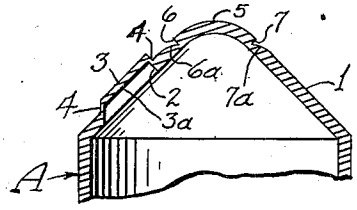


Fig. 1.

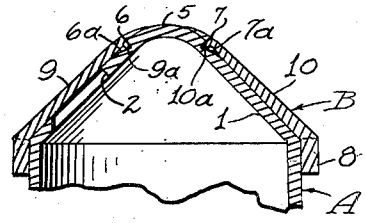


Fig. 2.

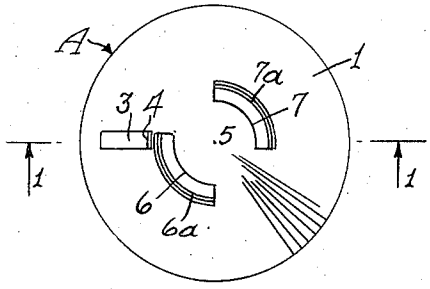


Fig. 3

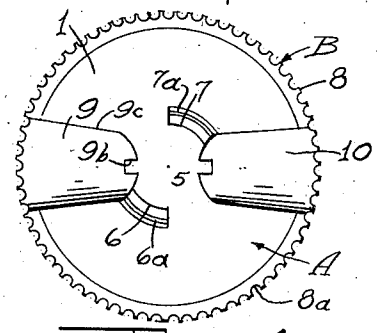


Fig. 4.

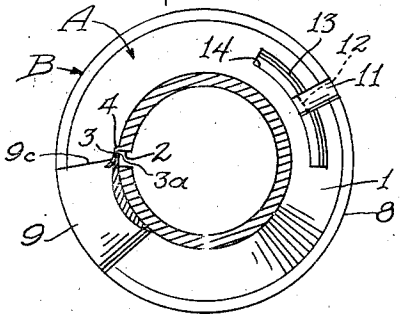


Fig. 5

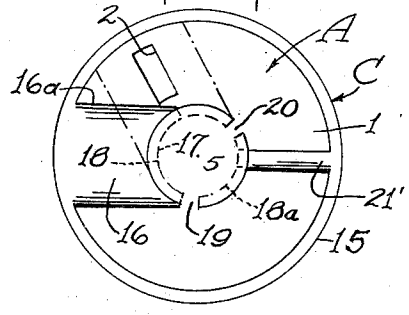


Fig. 6.

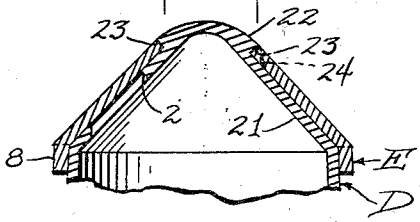


Fig. 7.

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CONICAL CAP FOR COLLAPSIBLE TUBES

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Application February 20, 1943, Serial No. 476,600

1 Claim. (Cl. 222—81)

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The present invention relates to improvements in a conical cap for collapsible tubes, and it consists of the combinations, constructions and arrangements hereinafter described and claimed.

This application is a continuation-in-part of my copending application on a Conical cap for collapsible tube, Serial No. 257,908, filed February 23, 1939, Patent Number 2,317,998, issued May 4, 1943. In the parent case I show a cap closing an opening in the conical end of a tube. The cap is in the shape of a ring that encircles the tube body and the ring carries two radially extending arms that have their free ends bearing against an annular groove for holding the cap in place. A rotation of the ring on the tube will bring either arm into a position to cover or uncover the opening.

In the present invention I illustrate the same type of cover, but the arm performs the additional function of severing a removable portion that temporarily closes the tube opening. The arm is provided with a cutting edge for this purpose. After the removable portion has been severed, the arm can be swung for closing the opening when the tube is not used.

The device is extremely simple in construction. The cover snaps into position over the tube end and this obviates any necessity of riveting the cover to the tube or otherwise securing the cover in place.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claim.

My invention is illustrated in the accompanying drawing forming a part of this application, in which:

Figure 1 is a vertical section through the upper portion of the tube and is taken along the line 1—1 of Figure 3;

Figure 2 is a section through the tube similar to Figure 1 and shows the cover in place and the removable portion severed from the tube opening;

Figure 3 is a top plan view of the tube with the cover removed;

Figure 4 is a top plan view of Figure 2;

Figure 5 is a horizontal sectional view of the tube and cover, the cover being shown in a slightly modified form;

Figure 6 is a top plan view of another modified form of cover as applied to a tube; and

Figure 7 illustrates a third modification which is similar to that shown in my copending application.

While I have shown only the preferred form of

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my invention, it should be understood that various changes or modifications may be made within the scope of the appended claim without departing from the spirit of the invention.

In carrying out my invention I provide a collapsible tube A, as shown in Figure 1, the lower end of the tube being closed in the usual manner and the top of the tube having a cone-shaped portion 1. An opening 2 is provided in the cone and is temporarily closed by a flexible closure member 3 that has weakened side walls 4. The closure 3 lies above the plane of the cone 1 and its under surface 3a lies substantially in the plane of the outer cone surface.

The apex of the cone 1 is rounded as at 5 and two shoulders 6 and 7 are formed near the apex. Figure 3 shows the plan view of the cone 1 and illustrates the closure 3 positioned above the cone surface and being connected with the cone wall by means of the weakened walls 4. The shoulders 6 and 7 are arcuate in shape and extend through substantially 90° arc for a purpose hereinafter described.

A cover B is placed over the cone-shaped portion 1, see Figure 2, and has a rim 8 that encircles the circular body portion of the tube A. Figure 4 illustrates the rim 8 as being knurled at 8a so that the closure can be manually gripped and rotated with respect to the tube. Figure 4 illustrates the closure as having two radially and inwardly extending arms 9 and 10. The arm 9 has a projection 9a bent downwardly and slidably receivable in the groove 6a formed by the shoulder 6. The downwardly bent portion 9a of the arm leaves a recess 9b in the end of the arm, see Figure 4. In like manner the arm 10 has a downwardly projecting lip 10a that slidably enters a groove 7a formed by the shoulder 7. The arms have sufficient spring qualities to permit the cover or cap to be moved over the cone-shaped end 1 and then the projections 9a and 10a will snap into place when these projections clear the shoulders 6 and 7. The projections engaging with the shoulders prevent the accidental removal of the closure from the tube.

The arm 9 or the arm 10 can act as a covering for the opening 2 after the temporary closure 3 is removed. In Figure 5 I illustrate how the arm 9 severs the weakened wall 4 when the cap is rotated and thus removes the closure 3 from the opening 2. The arm 9 has a sharp edge 9c that cuts the weakened wall 4 when the closure B is rotated with respect to the cone 1. This cutting action removes the closure from the opening. Figure 2 illustrates the arm 9 closing the opening.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

When the cover B is applied to the tube A, care is taken that the arms 9 and 10 are spaced clear of the temporary closure 3. The tube remains in this condition until it is sold and then the purchaser can remove the temporary closure 3 by rotating the cover B and causing the arm 9 to sever the weakened wall 4. The opening 2 is rectangular in shape and when material is squeezed from the tube it will form a ribbon due to the shape of the opening. After a sufficient quantity of material has been ejected from the tube, a simple rocking of the tube about its longitudinal axis will bring one edge of the opening 2 against the ribbon to sever it from the material in the tube. The cover or cap B may now be rotated for bringing the arm 9 over the opening 2 and thus protect the tube contents.

The shoulders 6 and 7 not only hold the cover in place but they limit the rotative movement of the cover with respect to the tube. When the projections 9*a* and 10*a* are at one of the extremities of the grooves 6*a* and 7*a*, the opening 2 will be closed, and when the cover is rotated for moving the projections to the other ends of the grooves, the opening 2 will be uncovered.

In Figure 5 I show a slightly modified form of the invention. Similar parts in this form to those shown in Figures 1 to 4 inclusive will be given like reference numerals. The rim 8 will be corrugated or knurled in the manner shown in Figure 4 although this is not illustrated in Figure 5. In place of the arm 10 a short arm 11 takes its place and has its inner end bent downwardly to form a projection 12 that slidably enters a groove 13 and bears against a shoulder 14. The groove 13 takes the place of the groove 7*a*. In all other respects this form of the device is similar to the form already described. In the first form either the arm 9 or the arm 10 may be used for severing the temporary closure 3 from the tube, while in the form shown in Figure 5 only the arm 9 is used for severing purposes.

In Figure 6 another modified form of the invention is shown. The ring 15 of the cover C has a side arm 16 extending inwardly and having an arcuate portion 17 for entering an annular groove 18 formed in the tube top 1. Projections 19 and 20 limit the swinging movement of the cover with respect to the tube. A narrow arm 21' also extends inwardly from the rim 15 or enters the other portion of the groove 18*a* that extends between the projections 19 and 20. Only the arm 16 is used for severing the temporary closure 3 and for covering the opening 2. The arm 21' does not perform these two functions but merely acts as a stop.

It will be noted from Figure 6 that the cutting edge 16*a* of the arm engages with the weakened wall 4 of the closure 3 at an angle of approximately 45° to the length of the wall. The edge will sever the closure when the cover is rotated with respect to the tube. The projections 19 and 20 limit the rotation of the cover from open to closed position.

In Figure 7 the form of the invention disclosed in my copending application is illustrated. Here the tube D has a cone-shaped end 21 with a projection 22 at its top forming a shoulder 23 that extends at right angles to the plane of the cone. A cover E is similar to the cover B and the arms 9 and 10 have their ends abutting the shoulder 23 rather than carry projections that enter the grooves. The arms 9 and 10 are resilient enough to permit them to snap into position when the cover is placed on the tube. The opening 2 is shown with the temporary closure 3 removed. The closure 3 is removed by the cutting action of the arm 9 in the same manner as in the other forms of the invention. Stops 24 are used for limiting the rotative movement of the cap on the conical end.

The groove receiving the arm 9 in Figure 5 can be formed by an overhanging portion integral with the apex of the conical end, this portion constituting a shoulder and having its ends merging into the outer surface of the cone, thus doing away with stops. The ends of the groove 13 provide stops for the arm 11 which in turn limits the movement of the arm 9.

I claim:

In combination, a cylindrical container having a conical end with an outlet opening therein, the opening being temporarily covered by a closure connected to the conical end by a weakened wall, the weakened wall supporting the closure above the outer surface of the conical end, and a cap having a rim rotatably mounted on the container and inwardly inclined arms adapted to contact with the conical end, means for slidably holding the inner arm ends for preventing the accidental removal of the cap, the initial rotation of the cap causing an arm to sever the weakened wall to free the closure from the opening, either of said arms constituting a cover for the opening when the cap is rotated into a predetermined position, said means including arcuate shoulders on the conical end and projections on the inner arm ends for slidably contacting with the shoulders, said arms having sufficient resiliency to snap into contact with the shoulders when the cap is mounted on the conical end, said shoulders defining grooves for limiting the rotative movement of the cap.

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