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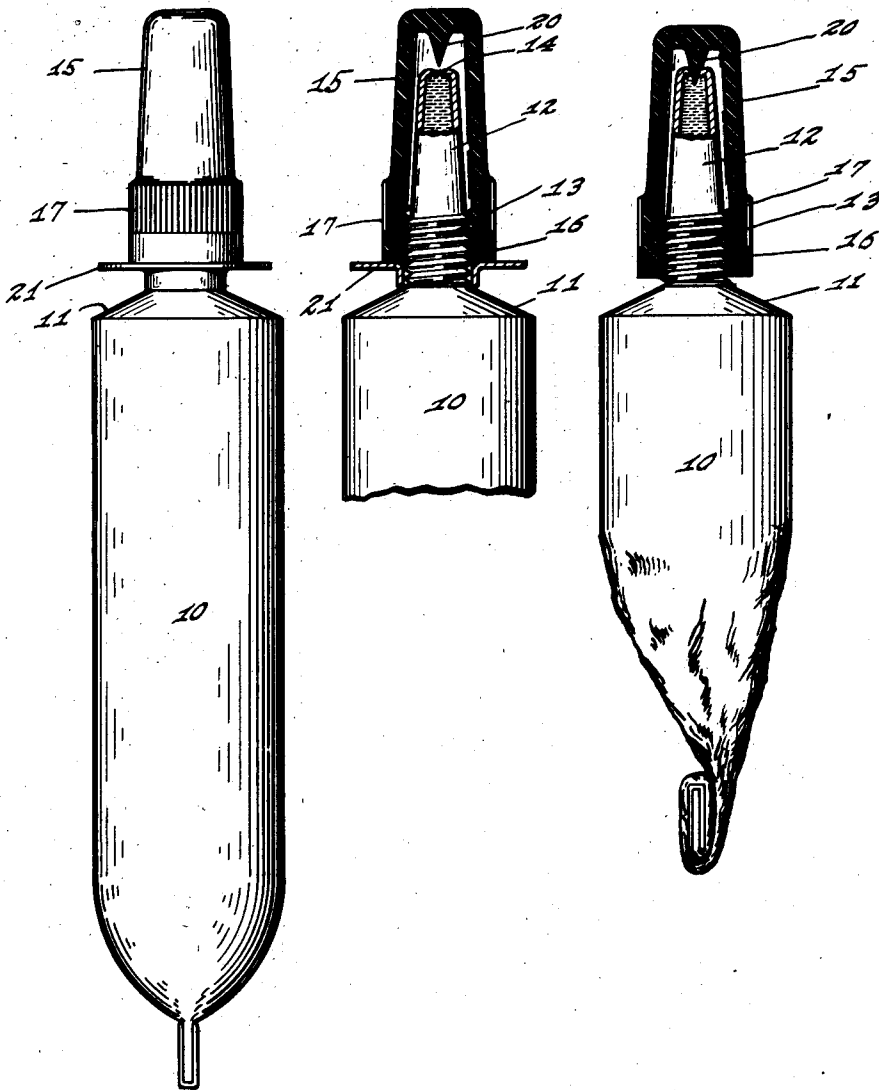
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CLOSURE FOR COLLAPSIBLE TUBES

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Fig. 1. Fig. 2. Fig. 3.



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CLOSURE FOR COLLAPSIBLE TUBES

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It is the object of my invention to provide for a collapsible tube having a projecting nozzle which is screw-threaded at its base and has its end initially closed by a puncturable seal a cap which will serve both as a puncturing device for such seal and a removable closing device for the puncture as well as a cover for the nozzle.

The accompanying drawing illustrates my invention: In such drawing, Fig. 1 is an elevation of a tube and cap embodying my invention; Fig. 2 is a fragmental view corresponding to the upper part of Fig. 1, but showing the cap, washer, and part of the nozzle in section, prior to puncturing the seal; and Fig. 3 is a view generally similar to Fig. 2, but showing the relation of the parts after the washer has been discarded and with the cap screwed down to puncture the seal and re-close the puncture.

The tube 10 is a collapsible tube of the type which at its discharge end has a shoulder 11 from which a relatively long nozzle 12 projects axially of the tube. The nozzle 12 is long, and usually tapering, for discharging the tube-contents into some body cavity, as for instance into a nostril. At its base, near the shoulder 11, the nozzle 12 is provided with an external screw-thread 13. At its free end, remote from the shoulder 11, the nozzle 12 is provided with a metallic closing seal 14, which is usually somewhat thinner than the metal of the nozzle-wall to facilitate its puncturing but is desirably made of one piece with the nozzle. This type of tube is already known, and is referred to as the closed-end nasal-tip type.

The cap 15 which I use with that collapsible tube is in the general form of a deep cup, inverted over the nozzle. It has an internal screw-thread 16 near its open end, for co-operating with the screw-thread 13 on the base of the nozzle; but is of sufficient internal diameter so that except at such screw-threaded base it clears the sides of the nozzle 12 in all positions, especially when the nozzle tapers. Usually the cap is itself tapered, both internally and externally; and at its open end may be pro-

vided with a knurled thickened part 17 to provide a non-slip finger-grip.

With the cup of the cap 15 is an axial conical projection 20, in line with the seal 14 when the cap is in place. By screwing the cap down on to the nozzle 12, the pointed projection 20 may be made to impinge upon and puncture the seal 14, and is apparent from a comparison of Figs. 2 and 3. The conical point 20 serves not only as a puncturing device for the seal 14, but also as a removable closure for the puncture which it makes.

The space between the outside of the nozzle 12 and the interior of the cap 15 save at the screw-threads 13 and 16 and where the point 20 engages the seal 14, makes it possible to screw the cap down as far as necessary, possibly with progressive enlarging of the puncture in the seal 14, so that a tight closing of such puncture is always obtainable.

The cap 15 may be of any material, but is desirably made as one piece of molded material, such for instance as bakelite.

To prevent premature puncturing of the seal 14, I provide a removable spacing washer 21 which surrounds the base of the nozzle 12 and lies between the shoulder 11 and the open end of the cap 15. As shown, the washer 21 is formed as a sheet-metal stamping.

In first assembling the cap on the tube, the washer 21 is in place, as is shown in Fig. 2; and prevents the cap 15 from being screwed down far enough for the point 20 to puncture the seal 14. When puncturing is desired, in order to permit extrusion of the tube-contents, the cap 15 is first unscrewed, the washer 21 then removed, and the cap 15 then put back in place and screwed down to force the point 20 through the seal 14. By now removing the cap, the contents of the tube may be ejected to any extent desired through the hole now in the seal 14, in the usual manner of collapsible-tube operation. When the desired amount of the tube-contents has been expelled, the cap 15 is put back in place and screwed down, so that it covers and protects the nozzle, and so that

the point 20 closes the hole in the seal 14 and thus re-seals the tube.

I claim as my invention:—

1. In combination with a collapsible tube
5 having a long tapering nozzle threaded at its base and provided with a seal at its free end, a cap in the general shape of a deep cup having an internal thread at its open end for co-operation with the thread on the nozzle-base and an axial pointed projection
10 within the cap at the closed end thereof for puncturing and re-closing co-operation with the seal at the nozzle-end, the inside of the cap being spaced from the nozzle sides save
15 at the threads.

2. In combination with a collapsible tube having a long nozzle threaded at its base and provided with a seal at its free end, a cap in the general shape of a deep cup having an
20 internal thread at its open end for co-operation with the thread on the nozzle-base and an axial pointed projection within the cap at the closed end thereof for puncturing and re-closing co-operation with the seal at the
25 nozzle-end, the inside of the cap being spaced from the nozzle save at the nozzle-base and at the puncturing point.

3. In combination with a collapsible tube having a long nozzle threaded at its base and
30 provided with a seal at its free end, a cap in the general shape of a deep cup having an internal thread at its open end for co-operation with the thread on the nozzle-base and an axial pointed projection within the cap
35 at the closed end thereof for puncturing and re-closing co-operation with the seal at the nozzle-end, and a removable washer which surrounds the nozzle below the cap to prevent premature puncturing of the seal.

40 In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 14th day of July, A. D. one thousand nine hundred and thirty-two.

CHARLES R. MILLER.

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