

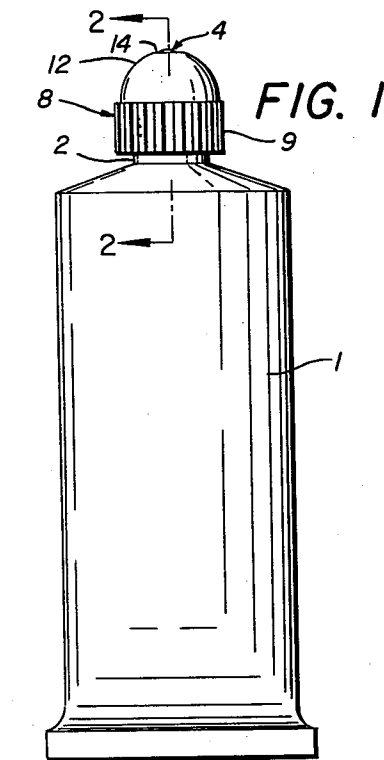
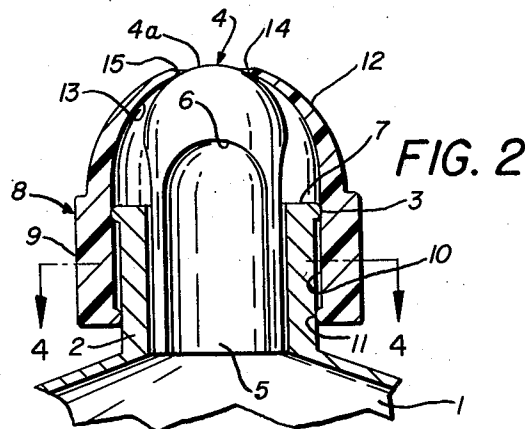
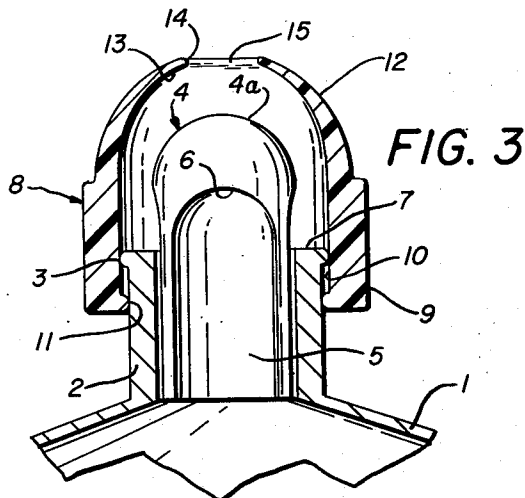
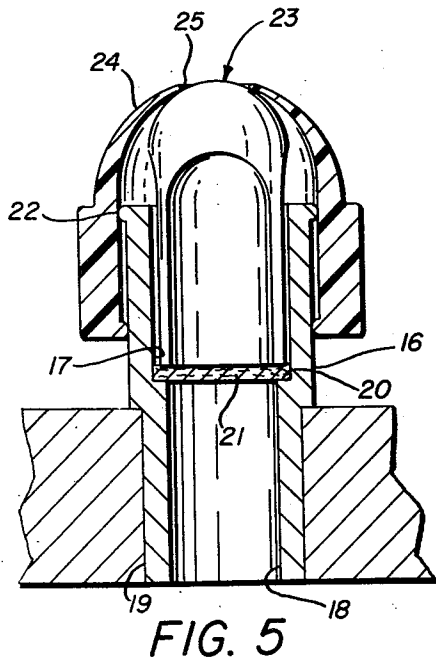
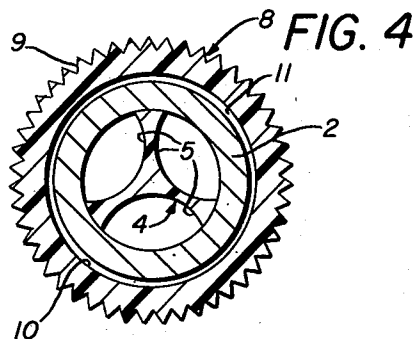
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CLOSURE FOR COLLAPSIBLE TUBES AND THE LIKE

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CLOSURE FOR COLLAPSIBLE TUBES AND THE LIKE

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5 Claims. (Cl. 222—525)

This invention relates generally to closures for collapsible tubes and the like, but has reference more particularly to a closure which may also be utilized as part of an oil cup.

A primary object of the invention is to provide a closure of the character described, which need not be removed from the tube or oil cup during use of the tube or cup.

Another object of the invention is to provide a closure of the character described, which utilizes as a portion thereof a plug having a spherical upper end or head.

Another object of the invention is to provide a closure of the character described, which utilizes as a portion thereof a cap having a spherical portion having a degree of flexibility enabling it to seal down in a desired manner on the head of the plug.

A further object of the invention is to provide a closure of the character described, which employs a means of attachment which obviates the use of threads on the tube or cap.

A still further object of the invention is to provide a closure of the character described, which embodies the use of ribs which provide a seal which prevents the contents of the tube from escaping through the joint between the tube and cap.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is a view of a collapsible tube having a closure embodying the invention secured thereto;

Fig. 2 is a fragmentary cross-sectional view, on an enlarged scale, taken on the line 2—2 of Fig. 1, and showing the closure in closed condition;

Fig. 3 is a view similar to Fig. 2, but showing the closure in open position;

Fig. 4 is a cross-sectional view, taken on the line 4—4 of Fig. 2, and

Fig. 5 is a view similar to Fig. 2, but showing a modification of the invention.

Referring more particularly to Figs. 1 to 4 inclusive of the drawings, reference numeral 1 designates the upper portion of a collapsible tube, such as a tooth paste tube, which is provided with a neck 2, which, instead of being externally threaded, as in conventional tubes of this type, is provided at its upper end with a radially-outwardly extending annular rib 3, of substantially semi-circular cross-section.

Frictionally and tightly secured within the neck 2 of the tube is a plug 4, which may be made of a hard plastic or as a metal die-casting. The plug 4, for the major portion of its length, is of cylindrical form, and is provided in its external surface with three longitudinally-extending flutes, channels or grooves 5, which are spaced uniformly circumferentially of said external surface. Each of the channels or grooves 5 extends circumferentially through an arc of about 100 degrees, and the wall thereof is of

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arcuate cross-section. Each of the channels or grooves 5 is open at its lower end, but terminates at its upper end in a curved wall 6 which extends to the exterior cylindrical surface of the plug. The channels or grooves 5 extend upwardly to a point spaced a substantial distance from the upper end 7 of the neck 2 of the tube.

The plug 4 is also provided, at its upper end, with a spherical smooth-surfaced head 4a.

The closure further includes a cap 8, preferably made of a resilient plastic, such as polyethylene, although, for some purposes, the cap may be made of metal.

The lower portion of the cap 8 is of generally cylindrical form having an outer surface which may be provided with circumferentially-spaced ribs 9, as shown, or which may be knurled for the purpose of facilitating rotation of the cap, and having an inner surface 10 of a diameter substantially equivalent to the external diameter of the rib 3 of the neck 2. The cap is also provided at its lower end with a radially-inwardly extending rib or bead 11, of substantially semi-circular cross-section.

The upper portion of the cap 8 is defined by a spherical outer surface 12 and a spherical inner surface 13, these surfaces extending upwardly respectively from the outer and inner surfaces of the lower portion of the plug, and inwardly to a point 14 to provide a circular opening 15. The spherical surfaces 12 and 13 are of different radii, so that the thickness of the upper portion of the cap becomes progressively thinner in an upward direction, being thinnest adjacent the opening 15. In this manner, a certain flexibility is imparted to the upper end of the plug which enables such upper end to bear flexibly on the spherical head 4a of the plug, thus insuring a tight seal between the cap and the plug at the opening 15.

The cap is shown in Figs. 1 and 2 in closed position. Where the cap is made of a resilient plastic, such as polyethylene, it may be attached to the neck of the tube by merely snapping it over the rib 3.

In order to open the closure, the cap 8 is pulled upwardly away from the plug to the position shown in Fig. 3, this movement being facilitated by imparting a rotary motion or half-turn twist to the cap. Displacement of the cap from the tube is limited by the engagement of the rib 11 from the cap with the rib 3 of the neck of the tube. When the closure is thus opened, the contents of the tube may be expelled through the channels 5 and the opening 15. In order to close the closure, the cap 8 is returned to its initial position by a reversal of the aforesaid movement, and when in closed position, the upper end of the cap, as previously stated, bears flexibly on the head 4a of the plug, thereby insuring a tight seal between the cap and the plug, at the opening 15.

The closure, as thus described, has a number of features and advantages over similar closures described in earlier patents. These include the following:

(a) The cap is not removed from the tube during use of the tube.

(b) The provision of a plug having a spherical upper end or head.

(c) The provision of a cap having a spherical upper portion, which has some flexibility, so that it seals down better on the head of the plug.

(d) The manner of attachment of the cap to the tube, which does not require threads on the tube or cap.

(e) The provision of the ribs on the cap and tube, which ribs provide a seal which prevents the contents of the tube from escaping through the joint between the tube and cap.

In Fig. 5, I have illustrated a modification of the invention, which utilizes an adapter, which enables the cap to be used as an oil cup.

In this modification, an adapter is provided, having an upper cylindrical portion 16 similar to the neck 2 of the

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tube of the previously described form of the invention. The upper portion 16 of the adapter is provided with an internal bore 17, which communicates with a bore 18, of a diameter somewhat smaller than that of the bore 17, the bore 18 extending through the lower cylindrical portion 19 of the adapter, which lower portion is of somewhat smaller external diameter than the external diameter of the upper portion 16 of the adapter.

The junction of the bores 17 and 18 forms an annular shoulder, ledge or seat 20, upon which a felt washer 21 may be mounted, or a filter which is adapted to retain oil.

The portion 19 of the adapter may be externally threaded for securement to an oil fitting or the like, or it may be left unthreaded, so that it may be secured to such fitting by a press fit.

The upper portion 16 of the adapter is provided at its upper end with a radially outwardly extending annular rib 22 of substantially semi-circular cross-section, and similar to the rib 3 of the previously described form of the invention.

The plug 23 and cap 24 utilized with the adapter are substantially similar in construction to the plug and cap of the previously described form of the invention, and need not, therefore, be further described.

In using the adapter as an oil cup, the plug 23 is inserted into the bore 17 so that its lower end bears against the felt washer 21. The cup may then be filled by elevating the cap 24 and pouring oil into the cap through the opening 25 in the cap, after which the cap is moved to the closed position shown, in which position it excludes dust and dirt from contaminating the oil. The oil then finds its way through the felt washer or filter.

It is to be understood that the forms of my invention, herewith shown and described, are to be taken as preferred examples of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention, or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a device of the character described, a body having

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a bore therein terminating in a shoulder, a felt washer seated on said shoulder, a plug frictionally secured in said bore and bearing on said washer, said plug having a spherical upper portion, and a closure secured to said body and having a portion adapted to bear flexibly on said spherical upper portion, said closure portion having an inlet opening therein.

2. A device, as defined in claim 1, in which said portion of said closure has inner and outer walls of different radii, whereby said portion becomes progressively thinner in one direction.

3. A device, as defined in claim 2, in which said body and closure are provided with ribs adapted to coact with each other to limit movement of the closure from said body.

4. A device, as defined in claim 3, in which said plug is provided with circumferentially-spaced passageways in its exterior surface.

5. In a device of the character described, a body having a bore therein terminating in a shoulder and a second bore of smaller diameter than the first bore below said shoulder, a plug frictionally secured in said first bore and having a diameter greater than the diameter of said second bore, said plug having a spherical upper portion, and provided with circumferentially-spaced passageways in its exterior surface, and a closure secured to said body and having a portion adapted to bear flexibly on said spherical upper portion, said closure having an inlet opening therein.

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