My invention relates to collapsible tube closure means. An object of my invention is to provide collapsible tube closure means in the form of a two piece cap which is applicable to an ordinary collapsible tube and makes it possible to dispense tooth paste, shaving cream and like soft material from the tube without removing the closure means from the tube, thereby obviating the danger of dropping or misplacing and losing the closure means and in so doing making it possible to keep the contents of the tube in a more sanitary, cleaner and better condition.

Another object is to provide collapsible tube closure means of simple and inexpensive construction by which the discharge of paste or like soft material from a collapsible tube is controlled by movement on a cap member of a sleeve or collar which is captive on the cap member when the cap member is on a tube.

Another object is to provide collapsible tube closure means which is simple and easy to operate and does not require much skill or dexterity or mental effort on the part of the user in obtaining material from the tube.

A further object is to provide collapsible tube closure means which is applicable to collapsible tubes now in common use and which can be applied to these tubes in line of production by automatic machines of the type now used in capping these tubes without danger of leaving the closure means in an open or partly open condition, this being accomplished by mounting a longitudinally movable sleeve on a cap member by means of threads which spiral in the opposite direction from the conventional threads used in mounting the cap member on the collapsible tube.

Other objects of my invention will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings:

FIGURE 1 is a longitudinal sectional view, on an enlarged scale, of my collapsible tube closure device, showing the same as it may appear when on a collapsible tube and a closed position.

FIG. 2 is a view similar to FIG. 1 showing the closure device in an open position and showing parts of the tube and parts of the closure device in elevation.

FIG. 3 is a longitudinal sectional view of collapsible tube closure means of modified form showing the same on a collapsible tube and in a closed position.

FIG. 4 is a view partly in section and partly in elevation of the closure means shown in FIG. 3, showing the same in an open position.

Like reference numerals refer to like parts throughout the several views.

The closure means shown in FIGS. 1 and 2 comprises a cup shaped tubular cap member 10 having a closed outer end 11 and an open inner end which is provided with an internal thread 12. The thread 12 is adapted to interfit with and screw onto and off of an external thread 13 of a collapsible tube 15. The outer end portion of the cap 10 is provided with an overhanging annular flange 16, the inner face of which forms a stop shoulder 17. The external wall of the cap 10 adjacent to the flange 16 is smooth and cylindrical and forms a sealing surface 18. An external thread 20 is provided on the cap 10 and extends from the inner end of the sealing surface 18 to a location about half way between said inner end of said sealing surface 18 and the innermost end 23 of the cap 10. The external wall 21 of the cap 10 inwardly from the thread 20 is smooth and cylindrical and of a diameter not larger than the root diameter of the thread 20. The diameter of the cylindrical sealing surface 18 is at least equal to the maximum diameter of the external threads 20. A lateral discharge opening or port 22 is provided in the cap 10 near the outer end thereof and inwardly from the sealing surface 18. Preferably the innermost flat end 23 of the cap 10 is roughened or scored to increase frictional resistance between said cap 10 and the collapsible tube 13 and lessen the danger of the cap 10 loosening on the tube 13. A captive sleeve 25 has an internal thread 26 which interfits the external thread 20 on the cap 10 and mounts the sleeve 25 for longitudinal movement on the cap 10. The internal thread 26 of the sleeve 25 terminates short of both ends of said sleeve. This makes it possible to provide, within the outer end portion of the sleeve 25, a cylindrical sealing surface 27 of slightly larger diameter than the sealing surface 18 for sealing cooperation with said sealing surface 18 when the sleeve 25 is in a closed position, and to provide, in the inner end portion of the sleeve 25, a cylindrical guide surface 28 which is just enough larger in diameter than the external cylindrical surface 21 on the cap 10 so that it operates smoothly over and is guided by said external cylindrical surface 21. The top end 29 of the sleeve 25 is smooth and abuts against the shoulder 17 of flange 16 when the sleeve 25 is in the closed position shown in FIG. 1. Preferably scoring, indicated by marks 16' and 25' respectively in FIG. 2, is provided on the periphery of the flange 16 and sleeve 25 to facilitate grasping and applying torque to these parts. The surfaces 21 and 28 are always in sealing relation to each other at the inner end of the sleeve 25 and the surfaces 18 and 27 and 17 and 29 provide a double seal at the outer end of the sleeve 25 when said sleeve is in a fully closed position. My closure device is adaptable to use by automatic machines of the type employed to install caps on collapsible tubes when they are being filled. Usually internal threads are provided on the necks of these tubes and for this reason I preferably use left hand threads 20 and 26 respectively on the exterior of the cap 10 and within the sleeve 25 so that any torque applied to the sleeve in a direction which tends to thread the closure device onto a tube will tend to more tightly close the sleeve 25 by jamming its end 29 more firmly against the shoulder 17. Obviously the direction of the threads and the external design or configuration of the cap member 10 and sleeve 25 can be varied to suit the requirements of different cap applying machines.

This closure device is quickly and easily opened and closed without removing any parts thereof from the tube and for this reason is not liable to be dropped in places where it will pick up dirt and become unsanitary or to be misplaced or lost and cause a tube to be left open and its contents unprotected. The sleeve 25 seals efficiently and stays sealed thus protecting the contents of the tube from evaporation. The closure device is fairly short and does not add greatly to the over-all length of the packaged product.

The embodiment of my invention shown in FIGS. 3 and 4 is illustrative of a collapsible closure design and it discloses a cap 30 and sleeve 31 which are longer than the just described cap 10 and sleeve 25, thereby making it possible to provide a discharge opening or port 32 in an externally smooth and non-threaded part 37 of the cap 30. Said cap 30 has an open inner end provided with an internal thread 33 for engagement with the usual thread 13 on the neck of a collapsible tube 15.
Said cap 30 has a closed outer end 34 provided with an overhanging flange 35 forming a shoulder 36 for stop and sealing purposes. The external wall of the cap 30 is shaped to form the relatively long sealing surface 37 and a medially positioned external thread 38 and a cylindrical sealing surface positioned adjacent the inner end of said sleeve and numbered 39, which correspond respectively to the surface 18, thread 20 and surface 21 of the device shown in FIGS. 1 and 2. It is to be noted however, that the sealing surface 37 is enough longer than the sealing surface 18 of FIGS. 1 and 2 so that the mouth of the discharge opening 32 can be entirely within the area of this non-threaded sealing surface 37.

The sleeve 31 has internal threads 40 and internal cylindrical sealing and guide surfaces 41 and 42 which correspond to the previously described thread and sealing and guide surfaces within the sleeve 25, except that the sealing surface 41 is of greater length than the sealing surface 27. Preferably scoring, indicated by marks 43 and 44 respectively, is provided on the rounded upper end of the cap 30 and on the outer rounded peripheral wall of the sleeve 31 to facilitate grasping and applying torque to these parts. The flat top and cylindrical exterior shown in FIGS. 1 and 2 and the spherical top and exterior shown in FIGS. 3 and 4 are illustrative of the width range in external designs to which this cap is adapted.

The operation of the cap and captive sleeve shown in FIGS. 3 and 4 is similar to the previously described operation of the cap 10 and sleeve 25 of FIGS. 1 and 2, except that in the closure device of FIGS. 3 and 4 the discharging material is kept clear of the threads on the exterior of the cap and in the sleeve. This lessens the danger of the contents of the tube being smeared on the outside of the closure device.

The foregoing description and accompanying drawings clearly disclose preferred embodiments of my invention but it will be understood that this disclosure is merely illustrative and that changes may be made within the scope of the following claims.

1. A closure device for application to the externally threaded neck of a collapsible tube comprising a tubular cap of inverted cup shape having an internally threaded lower end adapted to be screwed onto the externally threaded neck of a collapsible tube, said cap having a closed upper end provided with an external flange and having an external thread adjacent to said flange and having a lateral discharge opening in the wall thereof inwardly from and adjacent said flange; of a captive sleeve of substantially less length than said cap and having an internal thread interfitting with the thread on said cap, said sleeve being longitudinally movable on said cap between an open position and a closed position relative to the lateral discharge opening in said cap, the spiraling direction of the threads on the exterior of the tubular cap and the interior of the sleeve being opposite from the spiraling direction of the threads in the inner end portion of the cap and on the tube to which the cap is applied, whereby torque applied to the sleeve in a direction tending to screw the cap onto the tube will tend to tighten the sleeve against the external flange on the outer end of the cap, thereby obviating loosening of the sleeve on the cap in applying the cap to the tube and adapting the closure means for use by a cap applying machine.

2. A closure device for application to the externally threaded neck of a collapsible tube comprising a cup shaped tubular cap having an open inner end and a closed outer end; internal threads in said cap adjacent to the open inner end adapted to screw onto an externally threaded neck of a collapsible tube; an overhanging external flange on the outer end portion of the cap; an external thread on the cap adjacent to said overhanging external flange, said thread terminating short of the inner end of the cap and the external wall of the inner end portion of the cap being smooth and cylindrical and of a diameter not exceeding the root diameter of said external thread; and a laterally directed discharge opening or to be retracted clear of said discharge opening, the outer end of the sleeve abutting said external annular flange at the outermost limit of its movement, the internal thread of the sleeve terminating short of the inner end of said sleeve and said sleeve having an internal cylindrical sealing surface between its inner end and its said internal thread extending around and disposed in close sealing relation to said smooth external cylindrical wall of said cap.

3. In combination a collapsible tube having an externally threaded neck; a cup shaped tubular cap having an open inner end and a closed outer end; internal threads in said cap adjacent said open inner end adapted to screw onto the externally threaded neck of the tube; an overhanging external annular flange on the outer end portion of said cap, said flange having an inner face forming a stop shoulder, and said external flange on the cap; an external annular flange on the cap; an external thread terminating short of the stop shoulder and sealing surface formed by the inner face of said flange, the external wall of said cap between said flange and said external thread being smooth and cylindrical and forming an external sealing surface of a diameter at least equal to the maximum diameter of said thread, the inner end of said external thread terminating short of the inner end of the cap, and the external wall of the cap between the inner end of the external thread and the inner end of the cap being smooth and cylindrical and of a diameter not exceeding the root diameter of said external thread; a laterally directed discharge opening in the wall of said cap adjacent to but spaced inwardly from the inner face of said overhanging flange; and a captive sleeve having an internal thread interfitting the external thread on said cap and having an upper end portion adapted to abut and seat against the stop shoulder and seal formed by the inner face of said flange and having, outwardly from said internal thread, a smooth cylindrical internal sealing surface of slightly larger diameter than the external sealing surface of said cap adjacent said flange for sealing engagement with said sealing surface adjacent the flange on said cap, said sleeve being longitudinally movable by rotation thereof on the cap to cause the upper end portion of the sleeve to move over and close said discharge opening and to be retracted clear of said discharge opening, the internal thread of the sleeve terminating short of the inner end of said sleeve and said sleeve having an internal cylindrical sealing surface between its inner end and the adjacent end of its said internal thread extending around and disposed in close sealing relation to said smooth external cylindrical wall adjacent the inner end of said cap.

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