Sept. 18, 1962 R. DOYLE 3,054,537

AUTOMATIC SQUEEZE-TUBE CAP

Filed Nov. 15, 1960

Fig.1

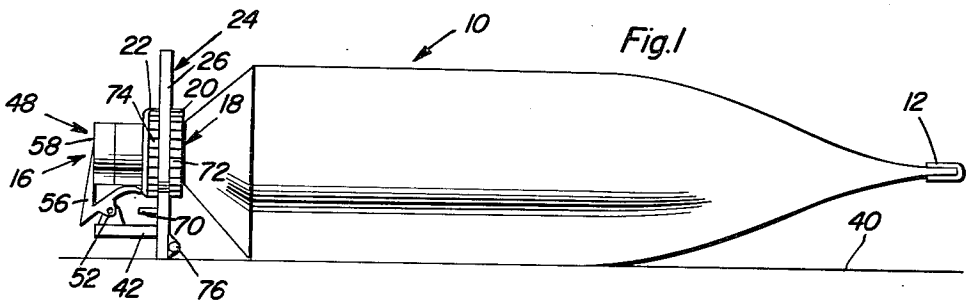


Fig.2

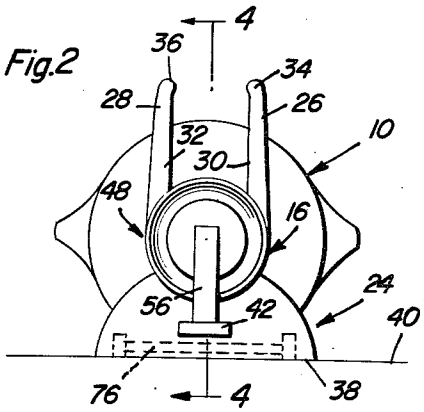


Fig.3

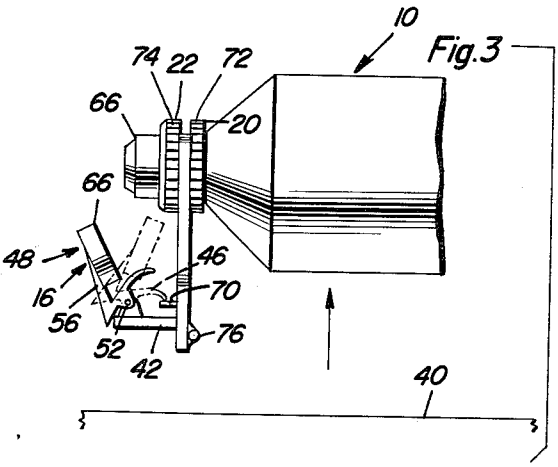
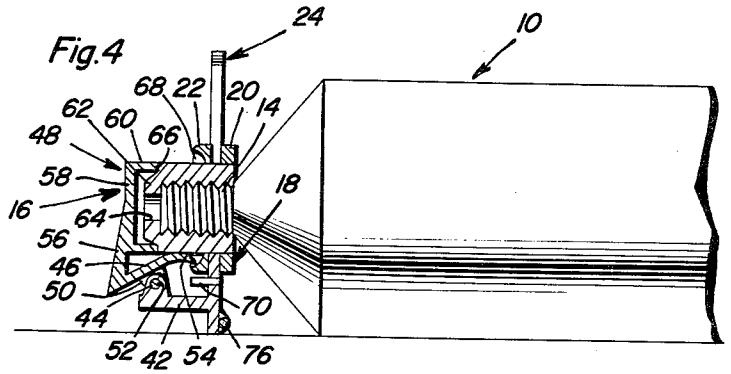


Fig.4



Robert Doyle

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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AUTOMATIC SQUEEZE-TUBE CAP

Robert Doyle, Uniondale, N.Y., assignor of one-half to Louis Tomeo, North Merrick, N.Y.

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This invention relates to a novel and useful automatic squeeze-tube cap and more particularly to a closure cap construction adapted to be mounted upon the diametrically reduced neck portion of a squeeze-tube.

The cap construction includes a slide member mounted for movement laterally of the neck portion of a squeeze-tube and a cap member pivotally mounted thereon for movement between a closed position axially alined and extending transversely of the diametrically reduced neck portion of the squeeze-tube and an open position spaced laterally therefrom and pivoted away from the neck portion of the squeeze-tube.

The main object of this invention is to provide an automatic squeeze-tube cap construction for the diametrically reduced neck portion of a squeeze-tube which will be completely automatic in operation and be provided with means for pivoting the cap member to an open position at any time that the squeeze-tube is lifted from a horizontal position on a supporting surface.

A further object of this invention, in accordance with the preceding object, is to provide a cap construction having a pivoted cap member which will be automatically pivoted to the closed position comprising a closure for the diametrically reduced end of a squeeze-tube upon return of the squeeze-tube to a horizontally disposed resting position on a supporting surface.

Yet another object of this invention, in accordance with the preceding object, is to provide a cap construction for the diametrically reduced neck end of a squeeze-tube which will prevent the material disposed within the squeeze-tube from coming in contact with the outer surfaces of the neck portion of the tube which in some instances, particularly when the tube is filled with toothpaste, causes discoloration of the material disposed within the squeeze-tube upon contact with the outer surfaces of the neck portion of the tube.

Still another object of this invention, in accordance with the preceding object, is to provide an automatic closure cap construction for a squeeze-tube which will be capable of returning the cap member to a closed position over the open end of the neck portion of the tube whenever the tube is returned to a horizontally disposed resting position upon a supporting surface regardless of the positions to which the squeeze-tube is rotated about its longitudinal axis.

A final object of this invention to be specifically enumerated herein is to provide an automatic squeeze-tube cap construction which will conform to conventional forms of manufacture, be of simple construction and easy to operate so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of a conventional form of squeeze-tube with the automatic cap assembly of the instant invention shown mounted on the diametrically reduced externally threaded neck portion of the squeeze-tube;

FIGURE 2 is an end elevational view of the embodiment shown in FIGURE 1 as seen from the left side of FIGURE 1;

FIGURE 3 is a fragmentary side elevational view of the left end of the embodiment shown in FIGURE 1 but with the squeeze-tube being disposed in an elevated position above the supporting surface and the cap assembly disposed in an open position; and

FIGURE 4 is a fragmentary vertical longitudinal sectional view taken substantially upon the plane indicated by the section line 4—4 of FIGURE 2.

Referring now more specifically to the drawings, the numeral 10 generally designates a conventional form of squeeze-tube having one end sealed by means of a sealing strip 12 and the other end provided with an externally threaded diametrically reduced neck portion 14, see FIGURE 4.

The automatic cap construction comprising the present invention is generally designated by the reference numeral 16 and includes a cylindrical sleeve-like mounting member generally referred to by the reference numeral 18. The mounting member 18 includes a pair of axially spaced outwardly and radially extending shoulder portions 20 and 22. A slide generally referred to by the reference numeral 24 is provided and includes a pair of spaced arms 26 and 28 having generally parallel confronting surfaces 30 and 32 respectively. It will be noted that the arms 26 and 28 are disposed in the same plane and that they are of substantially equal and constant thickness throughout their length relative to the plane in which they are disposed. The free end portions of the arms 26 and 28 are slightly inwardly directed and are spaced from each other as at 34 and 36 to form stop members as will be hereinafter more fully set forth. The other end of the slide 24 is provided with a substantially flat end edge 38 for supporting engagement on the supporting surface 40. It is to be noted that the arms 26 and 28 are received between the confronting surfaces of the shoulder portions 20 and 22 on opposite sides of the sleeve mounting member 18. In this manner, it will be noted that the slide 24 is mounted for longitudinal movement transversely of the sleeve 18. It is to be noted that the arms 26 and 28 are resilient to some extent and that the inwardly directed end portions 34 and 36 thereof may be spread slightly apart in order that the free ends of the arms may pass between the shoulder portions 20 and 22 on opposite sides of the sleeve member 18. However, once the slide member 38 has been engaged with the sleeve 18, the inturned end portions 34 and 36 will resiliently resist disengagement of the slide member 24 from the sleeve member 18.

The end of the slide member 24 remote from the inturned end portions 34 and 36 is provided with a mounting flange 42 which may be either secured to or formed integrally with the slide 24. The mounting flange 42 is disposed at substantially right angles to the slide 24 and is provided with a bifurcated mount 44 on the free end thereof by which the lever arm 46 of the cap member generally referred to by the reference numeral 48 is pivoted to the mounting flange 42. It is of course to be understood that the furcations of the bifurcated mount

44 and the outwardly projecting lug 50 of the lever 46 are suitably apertured to receive a pivot pin 52.

The lever arm 46 terminates at one end in a curved end portion 54 and at the other end in an angulated arm portion 56 which has formed integrally therewith or secured thereto in any convenient manner a cap element 58 which includes a generally cylindrical wall 60.

The sleeve 24 is provided with an end wall 62 suitably apertured as at 64 and the inner face of the end wall 60 is adapted to abut the free end of the threaded neck portion 14. The outer face of the end wall 62 is provided with an annular seating surface 66 for engagement with the free end of the cylindrical wall 60 of the cap element 58.

The outer face of the shoulder 22 is provided with an annular recess 68 for receiving the curved end 54 of the lever arm 46 when the cap element 58 is in the closed position as illustrated in FIGURES 1 and 4.

The slide 24 also includes a stop flange 70 for engagement by the curved end 54 of the lever arm 46 as illustrated in FIGURE 3 of the drawings when the cap element 58 is in the open position and the tube is disposed in a substantially upright position. This stop flange 70 prevents the cap member 58 from falling down against the slide 24 and preventing the latter from being moved toward the sleeve 18 by becoming wedged between the mounting flange 42 and the shoulder 22. It will be noted that the outer face of the shoulder 22 is rounded slightly and that the cap member, when the curved end portion 54 is in engagement with the stop flange 70, is disposed in substantial alinement with the curved surface of the shoulder 22 to that should the slide 24 be moved toward the sleeve 18 with the cap disposed as shown in phantom lines in FIGURE 3 the free end of the cylindrical wall 60 of the cap element 58 will engage the curved surface of the shoulder 22 and cam the cap member 58 to the full open position illustrated in FIGURE 3 as the tube 10 is being lowered to a horizontally disposed resting position in engagement with the supporting surface 38.

It will be noted that the end wall 62 prevents toothpaste or the like within the tube 10 from coming in contact with the outer surfaces of the threaded neck portion 14 of the tube 10 and thereby precludes any possibility of the toothpaste being dispensed from the tube 10 from being discolored by contact with the outer surfaces of the neck portion 14.

It will be noted that the shoulders 20 and 22 are provided with knurled peripheral surfaces 72 and 74, see FIGURE 3 for facilitating the threaded engagement of the sleeve 18 with the threaded neck portion 14 of the tube 10.

The end of the slide 24 remote from the arms 26 and 28 is provided with a bar magnet 76 or the like which may be secured thereto by any convenient means such as gluing. The bar magnet 76 is of course adapted to magnetically retain the end edge 38 of the slide 24 in engagement with the supporting surface 40 should it be constructed of ferrous materials so that as the tube 10 is raised from engagement with the supporting surface 40 the slide 24 will be sure to slide downwardly relative to the tube 10 in order to open the cap element 58.

In addition to slidably mounting the slide 24 on the sleeve 18 it will be noted that the arms 26 and 28 also rotatably journal the slide 24 on the sleeve 18. Thus, the tube 10 may be disposed in a horizontal position upon the supporting surface 40 in any adjusted rotated position about its longitudinal axis. Additionally, the bar magnet 76 adds a considerable amount of weight to the corresponding end of the slide 24 which in itself assists in assuring that the slide 24 will slide relative to the sleeve 18 as the tube 10 is lifted from the supporting surface 40.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An automatic squeeze-tube cap construction in combination with the diametrically reduced neck portion of a squeeze-tube, said cap construction including a mounting member secured to said neck portion, an elongated slide member including means on one end slidably mounted on said mounting member for longitudinal movement of said slide member transversely of said neck portion, a closure cap, means pivotally mounting said closure cap on the other end of said slide for movement about an axis extending transversely of said slide, and actuating means operable in response to movement of said other end of said slide toward said mounting means for pivoting said closure cap to a closed position in which said cap comprises a closure for the free end of said neck portion and extends transversely of the open end of the neck portion.

2. An automatic squeeze-tube cap construction in combination with the diametrically reduced neck portion of a squeeze tube, said cap construction including a mounting member secured to said neck portion, an elongated slide member including means on one end slidably mounted on said mounting member for longitudinal movement of said slide member transversely of said neck portion, a closure cap, means pivotally mounting said closure cap on the other end of said slide for movement about an axis extending transversely of said slide, and actuating means operable in response to movement of said other end of said slide toward said mounting means for pivoting said closure cap to a closed position in which said cap comprises a closure for the free end of said neck portion and extends transversely of the open end of the neck portion, said actuating means also including means for pivoting said closure cap from said closed position toward an open position in response to movement of said other end of said slide away from said mounting member.

3. The combination of claim 2, wherein said mounting member extends longitudinally of said neck portion, said slide extending transversely of said mounting member and including a base portion on said other end adapted to engage a supporting surface on which said tube is disposed horizontally and when said mounting member is adjacent said other end of said slide.

4. The combination of claim 3, including magnet means on said other end adapted to magnetically retain said other end in engagement with a ferric supporting surface and also to retain said slide in engagement with said surface while said tube is lifted therefrom and simultaneously open said closure cap.

5. The combination of claim 1, wherein said mounting member includes an internally threaded sleeve threadedly engaged on said neck portion, a pair of axially spaced annular outwardly projecting shoulder portions on said sleeve, said sliding mounting means compressing a pair of spaced arms on said slide lying in the same plane and having parallel confronting edges slidably received between said shoulder portions on opposite sides of said sleeve.

6. The combination of claim 5, wherein the outer ends of said confronting edges are spaced apart and directed slightly inwardly toward each other.

7. The combination of claim 6, wherein said sleeve includes an apertured outer end wall against which the inner surface of the free end of said neck portion is abutted when in said closed position.

8. The combination of claim 7, including an annular seating surface on the outer surface of said end wall, said closure cap including a cylindrical portion having one end engageable with said sleeve.

9. The combination of claim 1, wherein said mounting member includes a sleeve, said slide mounted for movement transversely of said sleeve, said actuating means including a lever arm on said cap engageable with said sleeve.

10. The combination of claim 9, including an annular outwardly and radially projecting shoulder on said sleeve, an annular recess formed in one end face of said shoulder, said lever arm including a curved free end portion

receivable in said recess when said cap is in a closed position for engagement with the outer portion.

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