

Aug. 22, 1939.

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2,170,588

SELF-CLOSING CAP FOR COLLAPSIBLE TUBES

Filed April 13, 1938

Fig. 1.

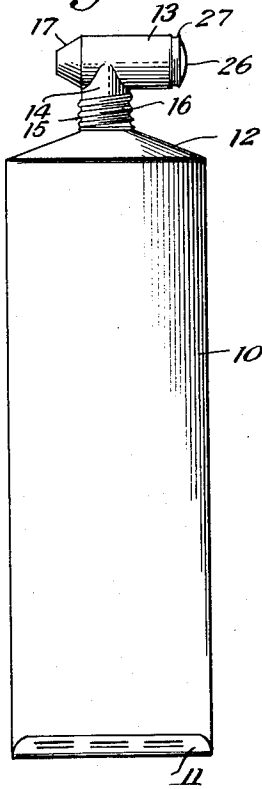


Fig. 2.

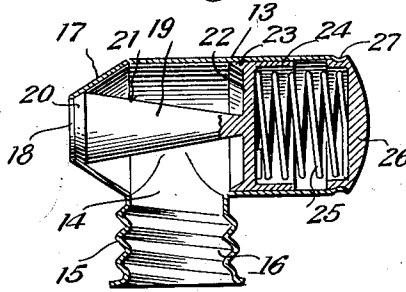


Fig. 3.

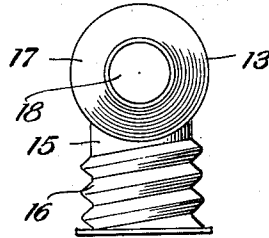


Fig. 4.

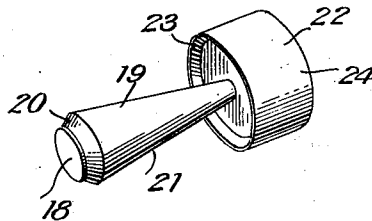
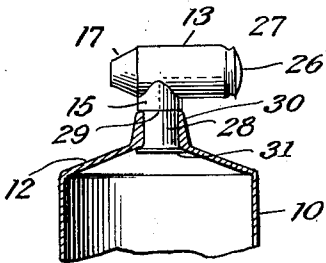


Fig. 5.



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WITNESS

UNITED STATES PATENT OFFICE

2,170,588

SELF-CLOSING CAP FOR COLLAPSIBLE TUBES

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Application April 13, 1938, Serial No. 201,840

3 Claims. (Cl. 221-60)

This invention relates to collapsible tubular containers and more particularly to a self-closing cap which may be applied either as a detachable element or a fixed part of the tube.

5 The invention has for its principal object to produce a simple and inexpensive self-closing device which is positive in its action and will effectively reseal the container after each use of the tube so as to prevent undue evaporation or
10 deterioration of the contents.

Another object is to produce a closure device which may be applied to the ordinary tubular container without material alteration in either the container or closure device.

15 With these and other objects to be attained, the invention consists in the novel construction and application of the device as hereinafter described and set forth in the appended claims, reference being had to the accompanying drawing illustrating a practical adaptation of the invention, and in which

Figure 1 is a side elevation of a collapsible tubular container with a detachable cap of the present invention applied thereto;

25 Figure 2 is a sectional view on an enlarged scale, of the cap detached from the container tube;

Figure 3 is an end view of the cap;

Figure 4 is a perspective view of the valve element removed from the cap; and

Figure 5 is a fragmentary view illustrating a modification of the means for securing the cap to the container tube.

Referring now to the drawing, the numeral 10
35 designates an ordinary collapsible tubular container which is sealed by folding at one end, as at 11, in the usual manner, after being filled, the opposite end portion being tapered, as at 12, and provided with the usual outlet nipple through which the contents are discharged by squeezing and compressing the body portion 10. This nipple portion is usually screw threaded externally for the reception of a removable cap for which the device of the present invention is substituted.

45 As shown, the device comprises a cylindrical barrel portion 13 which is provided with a lateral opening 14 surrounded by a collar or nipple extension 15 which is formed with screw threads 16 whereby it may be applied to the ordinary screw threaded nipple portion provided on the regular collapsible tubular container as just above described. One end portion of the barrel 13 is tapered, as at 17, said tapered portion being truncated to provide
55 a restricted outlet opening. Receivable with a

relatively close fit in said outlet opening is the circular shouldered end portion 18 of a valve member 19, the portion 20 of which, adjacent said annular shouldered portion 18, is beveled at an angle corresponding to the taper of the portion 17 of the barrel 13, and from this outer beveled portion 20 said valve member 19 tapers, as at 21, to a piston 22 to which it is attached axially. Preferably, the valve member 19 and said piston 22 are formed integrally in any ap-
10 proved manner. As shown, at the side of the piston from which the valve member 19 projects a sharp-edged collar or annular flange 23 is provided, while at the opposite side of the piston is an annular cylindrical collar or flange 24 pro-
15 viding a seat for a spring element 25, which latter bears at its outer end against a head 26 secured in the end portion of the barrel 13. This head 26 may be attached to the barrel 13 in any desirable manner, but as shown, it is provided
20 with an annular groove into which the adjacent end portion of the barrel 13 is crimped, as at 27.

The spring element 25 is placed under compression between the head 26 and the piston 22 so that it tends to constantly press the valve element
25 19 with its circular shouldered end portion 18 within the outlet opening of the barrel and the beveled end portion 20 of the valve in contact with the adjacent tapered portion 17 of the barrel, thereby providing an effective closure seal, and the peculiar end formation of the valve element in addition to affording the sealing effect in the closed portion of the valve, being such that only slight resistance has to be overcome in the closing movement of the valve under the pressure
35 of the spring 25. So, too, by tapering the end portion 17 of the barrel there is merely an annular restricted edge portion surrounding the discharge opening and with which the end portion 18 of the valve member 19 is flush in the closed
40 position of the valve, whereby there is no appreciable surface for adherence of any of the discharged contents to the container. This is of material advantage in that the cap is readily
45 wiped clean after use as well as protecting the contents of the container against evaporation and deterioration.

By the peculiar tapered form of the valve member 19 there is ample piston surface whereby
50 the valve member is retracted due to the pressure of the contents of the container under the collapsing pressure of the fingers of the user externally thereof and at the same time there is no interference with the free flow of the contents
55

around the tapered end portion 20 and outer circular shoulder portion 18 of the valve.

5 Instead of applying the device to the container as a detachable unit as shown in Figures 1 to 3 inclusive, it may be fixedly secured thereto, as shown in Figure 5, in which modification the collar or nipple extension 15 is reduced in diameter through a portion of its length, as at 28, to provide an annular shoulder 29 near its base so as to abut the outer end of the nipple extension 10 30 of the container 10, through which latter the reduced portion 28 extends and has its inner end portion expanded and flared, as at 31, to tightly engage the adjacent inner end wall portion of the container, the attachment of the cap to the container being thereby effected with a tight seal. 15 Otherwise, the construction is the same as that illustrated in Figures 2, 3 and 4.

20 Obviously, the structure may be modified in many respects other than herein shown without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

25 1. A self-closing cap for collapsible tubular containers, comprising a transverse barrel having a lateral nipple portion for communicable attachment to the outlet nipple of the container, one end portion of the barrel being tapered and truncated to provide a discharge opening, and a spring pressed elongated, longitudinally reciprocable, valve member in said barrel, said valve member having an axial stud formed with a relatively short, counterpart, beveled forward end portion to engage the inner tapered wall portion 30 of the barrel surrounding the discharge opening thereof and a circular shouldered portion at its extreme end adjacent its beveled portion, said circular shouldered end portion of the valve member being approximately of the same diameter as the discharge opening of the barrel and being

flush with the adjacent edge portion of the barrel in the closed position of the valve member, said stud traversing the opening of the container nipple, and a piston head at the inner end of said stud and having an annular forwardly extending sharpened peripheral flange slidably engaging the adjacent inner wall surface of the barrel. 5

2. A self-closing cap for collapsible tubular containers, comprising a transverse cylindrical barrel portion having a lateral nipple extension for attachment to the outlet nipple of the container, one end portion of the barrel being tapered and truncated to provide a restricted discharge opening, a valve comprising an elongated axial stud portion tapered annularly near its outer end as a counterpart of the adjacent tapered inner wall portion of the barrel and having a flat end-faced circular shouldered portion at its extreme outer end, said tapered portion engaging an adjacent inner wall portion of the barrel and said circular shouldered portion entering the discharge opening with relatively close fit and substantially flush with the surrounding outer edge portion of the barrel in the closed position of the valve, said stud portion of the valve tapering rearwardly from said tapered end portion, a piston attached axially to the inner end of said stud portion of the valve and having a sharpened forwardly extending annular flange slidably engaging the adjacent inner wall portion of the barrel, a head member at the opposite end of the barrel, and a spring element interposed between said head member and piston normally urging the valve member into closed position. 10 15 20 25 30

3. The structure set forth in claim 2 and further describing the head member as circumferentially grooved and the adjacent end portion of the barrel being annularly crimped into the grooved portion of the head. 35

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