

May 5, 1936.

J. H. DONNELLY

2,039,952

CLOSURE

Filed Sept. 11, 1933

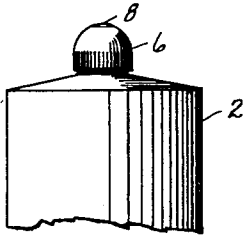


FIG. 1.

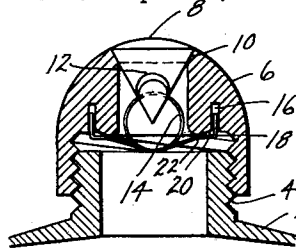


FIG. 2.

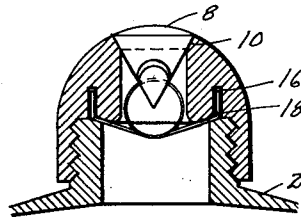


FIG. 3.

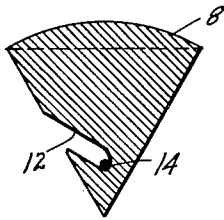


FIG. 4.

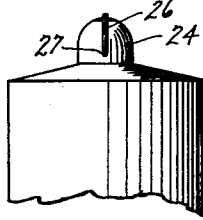


FIG. 5.

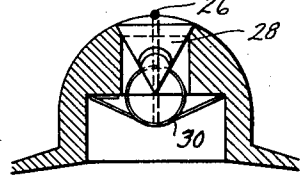


FIG. 6.

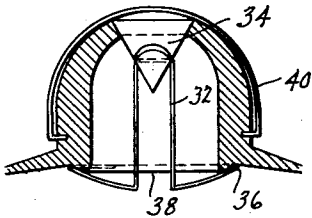


FIG. 7.

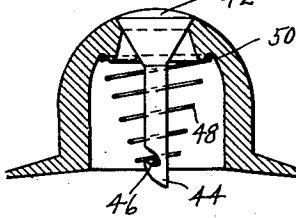


FIG. 8.

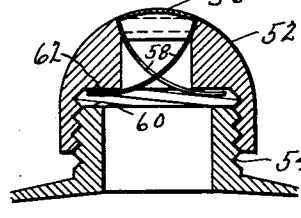


FIG. 9.

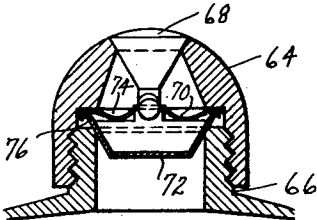


FIG. 10.

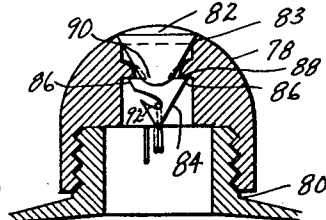


FIG. 11.

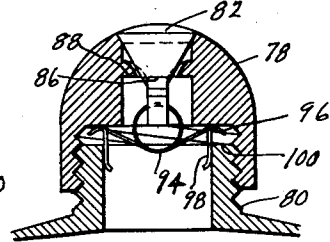


FIG. 12.

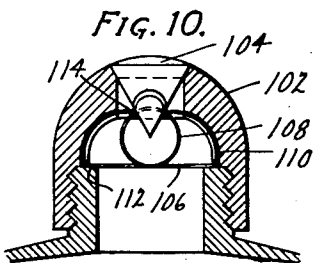


FIG. 13.

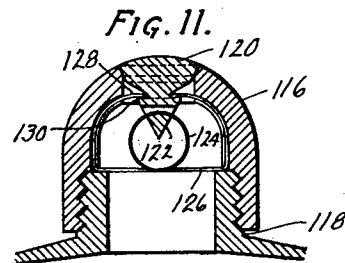


FIG. 14.

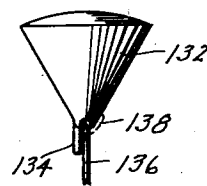


FIG. 15.

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2,039,952

CLOSURE

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Application September 11, 1933, Serial No. 688,931

6 Claims. (Cl. 221-60)

This invention relates to closure means for a container or the like adapted to be used for dispensing fluent material therefrom, the invention being particularly adapted to the formation of a cap for a tube containing toothpaste, shaving cream, paint, or other viscous or powdered fluent material.

In accordance with the present invention, there is provided a dispenser closure which will automatically open upon increase of pressure on the material within the container and permit the ejection of the same and, after the removal of such pressure, which will automatically close.

In its preferred embodiment, the arrangement is further such as will minimize the accumulation of material upon its outside and which will therefore promote the sanitary character of the container when the container holds toothpaste, or the like.

More specifically, it is the object of the present invention to provide a closure means which may, if desired, be locked so that it will not open upon the application of pressure to material within the container with which it is associated. The provision of a locking arrangement of this type is of particular utility in connection with the shipment of containers, when it is desirable to prevent flow of the contents if the containers are accidentally subjected to pressure. The locking arrangement is also useful when containers are being carried in bags along with other articles, as in travelling.

Further objects of the invention relating particularly to details of construction will be apparent from the following description read in conjunction with the accompanying drawing, in which:

Fig. 1 is a fragmentary elevation of the upper portion of a container to which the invention is applied;

Fig. 2 is an axial section through one form of the improved closure means;

Fig. 3 is a similar section showing the parts in a different position;

Fig. 4 is a vertical section through the valve element of the modification of Figs. 2 and 3;

Fig. 5 is a fragmentary elevation of a tube with which is associated a modified type of closure;

Fig. 6 is an axial section showing the last modification in detail;

Fig. 7 is an axial section showing a further modified form of the invention;

Figs. 8, 9 and 10 are axial sections showing further modifications;

Figs. 11 and 12 are axial sections taken in

planes at right angles to each other showing the parts of still another modification in different positions;

Figs. 13 and 14 are axial sections showing further modifications; and

Fig. 15 is a detailed view showing an alternative mode of construction.

Referring first to Figs. 1 to 4, inclusive, there is illustrated at 2 the usual flexible type of tube designed to contain toothpaste, shaving cream, or the like. In accordance with the present invention, the threaded neck thereof receives a cap 6 providing a seat 10 for a conical valve member 8. The valve member is provided with a hook by means of diagonal slot 12 engageable with a loop of a spring 14 having upturned ends 18 receivable within openings 16 formed in the cap. Interiorly of the upright portions 18 the spring is provided with a bend convex upwardly as indicated at 22 adjacent an upwardly diverging face 20 on the interior of the cap. When the parts are in the position illustrated in Fig. 2, if pressure is applied to the contents of the tube the valve 8 is forced upwardly against the tension of the spring 14 and flow may freely take place. In order that the yielding of the spring may occur, there will be some slight rocking about the portions 22 thereof, while the ends 18 may move slightly downwardly from the guiding openings 16.

If it is desired to prevent the flow of material from the tube, then the cap 6 may be screwed downwardly as indicated in Fig. 3, thus bringing the ends of the spring in engagement with the upper end of the neck of the tube. As this action occurs, due to the arrangement at 20 and 22, the central portion of the spring is forced downwardly, urging the valve member 8 more strongly toward its seat. The arrangement is such that, under these conditions, the application of even quite considerable pressure to the tube will not result in the raising of the valve, the spring 14 being sufficiently stiff so that the loop engaging the hook of the valve member will not be sufficiently distorted to permit this action.

Instead of providing a conical valve member, it will be clear that the seat may take other forms. For example, a spherical seat may be provided, while the valve member seating surface may be spherical.

In Figs. 5 and 6 there is illustrated an embodiment of the invention in which the cap portion 24 is formed integrally with the body of the container. In this case a bail 26 is pivoted, as at 27, in the cap and is arranged to extend over the valve member 28, being receivable in a slot or

depression at the top thereof. The valve member 28 is normally urged toward its seat by the use of a spring 30 which engages a shoulder within the cap. If the ball 26 is swung downwardly out of engagement with the valve, then application of pressure to the contents of the tube will open the valve and flow will be permitted. The valve, however, may be locked in fixed closed position by the use of the ball 26, as illustrated in Figs. 5 and 6.

The type of spring which may be used is subject to considerable modification. In Fig. 7, for example, instead of being formed with a circular loop, as indicated in the previous modifications, the spring has an upstanding portion, indicated at 32, engageable with the hook of the valve member 34. At its lower end the spring is provided with annular portions 36 engageable outside of a suitable ridge 38 whereby it is maintained in position. A ball 40 may be provided in this case to lock the valve in closed position.

In Fig. 8 there is illustrated a further spring arrangement. In this case, the valve 42 is provided with an extension 44 having a hooked lower end, as indicated at 46, receiving a lower convolution of a spring 48 which is seated at its upper end in an annular groove surrounding the opening in the cap. This arrangement may likewise be provided with a ball if locking is desired, or by a gelatin cap, or the like.

A further modification is illustrated in Fig. 9, in which cap 52 is threaded on a neck 54 of a tube. The valve in this case is formed of sheet metal, as indicated in 56, and takes the form of a shell having a frusto-conical shape. The material extends, as indicated at 58, from the seating portion of the valve underneath the shoulders 62 formed inside the cap. The material of which the valve is made is resilient, so that the extensions 58 provide springs yieldingly urging the valve member 56 to its closed position. When the cap is tightened, the ends of the extensions 58 are clamped between 62 and the top surface 60 of the neck of the tube. The valve member is thus held fixedly in closed position.

In Fig. 10, a cap 64 is threaded upon the neck 66 of a tube. A valve 68, shown as of a conical form, is provided with a hook engaged by a spring 70 reacting between it and an interior shoulder of the cap to normally urge the valve toward closed position. In this case, instead of locking the valve downwardly, a complete closure is effected by the use of a washer 72 in the form of a dish adapted to seat upon the edge of the opening through the neck 66 of the tube. The sides of the member 72 are cut away, as indicated at 74, leaving spaced extensions 76 for engagement with the cap. The washer 72 is so formed that after an initial closure is effected, the extensions 76 bite into the cap, forming a permanent connection. Accordingly, when the cap is partially unscrewed, the washer 72 will rise from its seat, permitting a free flow of material through the openings 74 and past the valve, which will be opened due to the application of pressure on the contents. On the other hand, if the cap is screwed down tightly, the washer 72 is seated and flow completely prevented.

Another modification is illustrated in Figs. 11 and 12, in which a cap 78 is threaded on the neck 80 of a tube. A conical valve member 82 seats within the opening at the top of the cap, as indicated at 83. It is provided at its lower portion with an extension 84 forming a hook and

provided at 86 with flattened extensions adapted to engage beneath shoulders 88 provided on the cap. Between the shoulders there is an opening 90 which is of sufficient width greater than that of the shoulders 86, to permit them to move upwardly when the opening is brought in alignment with said shoulders. When, however, the shoulders 86 are turned beneath the shoulders 88, the valve member 82 cannot rise and accordingly the closure is locked. The hook opening 92 receives the loop of a spring 94, which is provided with downturned outer extensions, indicated at 96, and portions 98 receivable within the opening in the neck of the tube. The arrangement which is illustrated substantially prevents rotary motion of the valve 82 with the cap as the cap is screwed in either direction. Accordingly, by turning the cap through about 90°, the shoulders 86 may be brought into or out of alignment with the openings 90. When they are in alignment with the openings, the valve may yield upwardly against the action of the spring 94 to permit the flow of material. On the other hand, when the shoulders 86 are brought beneath the shoulders 88, then the valve cannot open and the closure is locked.

In Fig. 13 there is illustrated a further embodiment of the invention. In this case, the cap 102, which is threaded upon the neck of the tube, is provided with a valve member similar to the members previously described and arranged to receive the loop 108 of a spring 106. This spring is formed as shown and has upwardly arched portions 110 receivable within slots in the cap. A horizontal portion engages the shoulder 112 provided by the outer end of the neck. The ends of the arched portions are looped, as indicated at 114, about the central loop 108 of the spring adjacent the valve member. When the cap 102 is turned so as to be moved away from the tube, the parts are free and the spring yields to permit the valve to open, as in previous modifications. However, when the cap is screwed down tightly, the loops 114 hold the central loop 108 and furthermore the arched portions 110 are jammed in position so that the ends thereof have no substantial freedom for upward movement. The valve is thus held in a closed, locked position.

A somewhat similar arrangement is illustrated in Fig. 14. In this case, the cap 116 is threaded on the neck 118 and provided with a valve member 120 which has an extension 122 engaged by the loop 124 of the spring 126. In this particular instance, a shoulder 130 is provided on the valve and above this shoulder there extend the ends 128 of the spring, which is somewhat similar to that illustrated in Fig. 13. Here again, when the cap is in a freed position, the valve may yield to permit the passage of the material. On the other hand, when the cap is screwed downwardly the ends 128 which engage over the shoulder 130 are prevented from yielding upwardly and accordingly the valve is held in closed position.

The valves heretofore described are, in general, provided with open hooks to receive the springs. It is found that assembly may be very readily effected in this case merely by forcing the loop of a spring toward the valve member, whereupon it will snap into the slot which is provided. There may, however, be provided a more permanent connection, as illustrated in Fig. 15, in which the valve member 132, which may function as any of those heretofore described, is provided with a downwardly directed extension 134, which may be wrapped, as indicated at 136, about 75

the uppermost portion of a spring loop 136. The valve members, which in general may be of a moderately soft material, and this type of assembly, may consequently be readily used to avoid the possibility of disengagement of the spring and valve.

While the closures heretofore described are particularly adaptable to flexible tubes of the type indicated, they may be used in connection with containers having ratchet wheels but provided with plungers or the like for exerting pressure upon the contents.

There have been described various embodiments of the invention illustrating the numerous forms which it may take. It will be obvious that still further changes may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim and desire to protect by Letters Patent is:

1. Closure means for a container for fluent material including a member provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging the valve towards the seat, and means whereby locking of the container to prevent flow of material therefrom may be provided, said last means including a washer adapted to block flow located below the valve member.
2. Closure means for a container for fluent material having an externally threaded neck portion including a cap member internally threaded to engage said neck portion and provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging the valve towards the seat, and means rendered operative by movements of said cap member relative to said neck portion to prevent escape of fluent material through said opening.
3. Closure means for a container for fluent material having an externally threaded neck portion including a cap member internally threaded to engage said neck portion and provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging

ing the valve towards the seat, and means rendered operative by movements of said cap member relative to said neck portion to prevent escape of fluent material through said opening, said last named means involving portions of said spring means cooperating with said neck portion and cap member.

4. Closure means for a container for fluent material having an externally threaded neck portion including a cap member internally threaded to engage said neck portion and provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging the valve towards the seat, and means rendered operative by movements of said cap member relative to said neck portion to prevent escape of fluent material through said opening, said last named means including a washer adapted to close said neck portion.

5. Closure means for a container for fluent material having an externally threaded neck portion including a cap member internally threaded to engage said neck portion and provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging the valve towards the seat, and means rendered operative by movements of said cap member relative to said neck portion to prevent escape of fluent material through said opening by forcibly holding said valve in closed position.

6. Closure means for a container for fluent material having an externally threaded neck portion including a cap member internally threaded to engage said neck portion and provided with an opening surrounded by a seat, a valve member arranged to engage said seat, spring means urging the valve towards the seat, and means rendered operative by movements of said cap member relative to said neck portion to prevent escape of fluent material through said opening, by forcibly holding said valve in closed position, said last named means involving portions of said spring means cooperating with said neck portion and cap member.

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