April 23, 1935. C. CERNA 1,998,569

CLOSURE DEVICE

Original Filed Oct. 6, 1932

Fig. 1

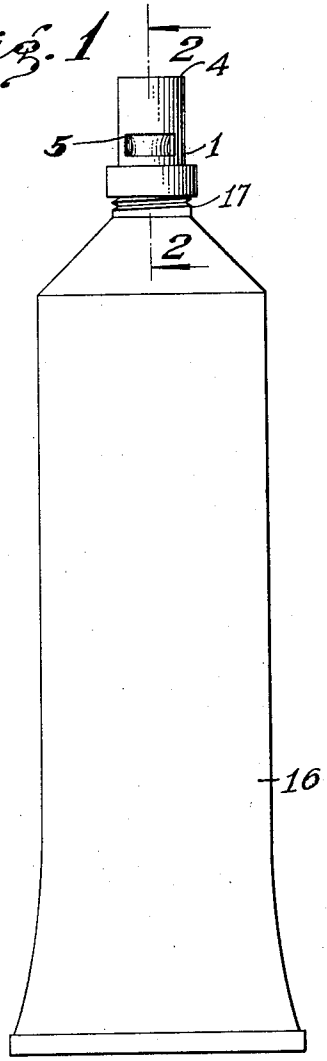


Fig. 2

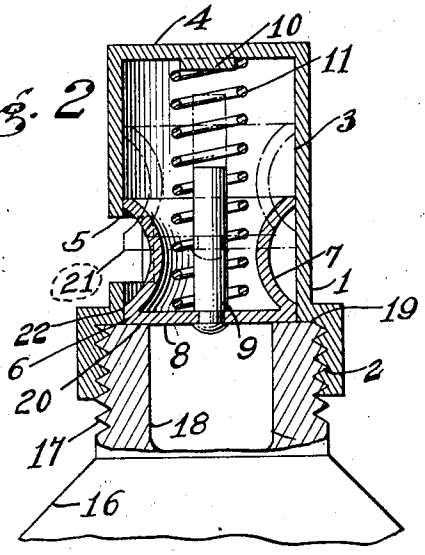
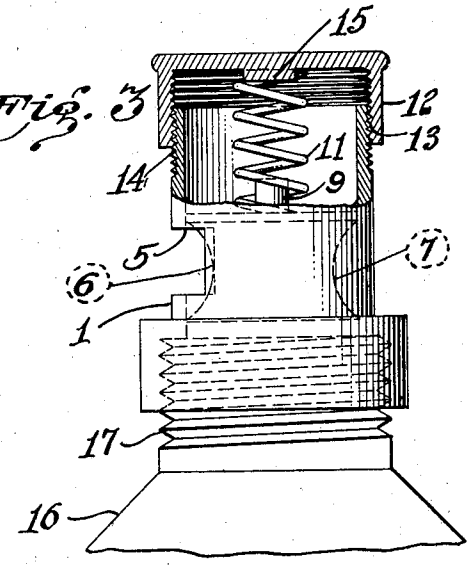


Fig. 3



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UNITED STATES PATENT OFFICE

1,998,569

CLOSURE DEVICE

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3 Claims. (Cl. 221—60)

This invention relates to tubes, and more particularly to a novel form of tube having a valved closure arranged in such a way as to obviate the necessity of providing a cap to be removed each time the contents of the tube are to be dispensed therefrom.

An object of the invention is the provision of a device adapted to be secured to a tube or form an integral portion of the tube, which is positive in operation, simple of construction, and inexpensive in cost of manufacture.

The inventor is aware that various devices have been proposed for application to a deformable type of tube for providing a valved opening for the tube, which valve is operated by pressure upon the deformable tube to force the substance within the tube outward from the tube and past said valve. So far as the inventor is aware, the majority of said devices have been impractical for various reasons, one reason being that the valve does not always open under pressure of the contents of the tube, and when opened, does not always readily reseat when pressure is relieved. Another objection is due to the fact that the material being emitted from the tube tends to harden around the orifice of the neck and prevents a proper seating of the valve. The present invention overcomes all these objectionable features and, in addition, severs or makes a clean cut of the material when pressure is no longer directed against said material and upon the valve. This is thought to be a distinct advance in the state of the art, in that it assures a sanitary device.

In one embodiment of my invention, I provide a detachable member incorporating the invention and adapted to be substituted for the ordinary cap now on tubes. Thus, my invention may be used many times without any expense other than the initial purchase price.

Other objects include convenience of use, easy operation and superiority to devices adapted to accomplish a like function.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, association and relative arrangement of parts, members and features, all as shown in certain embodiments in the accompanying drawing, described generally, and more particularly pointed out in the claims.

In the drawing:

Figure 1 is an elevation of a tube incorporating the invention,

Figure 2 is an enlarged cross sectional view on the line 2—2 of Figure 1, and,

Figure 3 is an enlarged view, partly in section of a slight modification of the device shown in Figures 1 and 2.

Referring now with particularity to the drawing, the form of the invention shown in Figure 2 includes a valve housing 1 provided with an internally threaded base 2. The base has a greater diameter, in the present instance, than the interior portion or chamber 3 of said housing. This said housing is substantially cylindrical in form and provided with an end piece 4. The housing is formed with a segmental slot 5. Adapted for movement within the said housing and particularly the chamber 3, is a slide valve 6. In the present instance, the said valve includes an annular concaved side wall 7 and a bottom wall 8. A pin or stud 9 extends upwardly from the base and substantially centrally of the side wall. The top 4 is provided with an inwardly projecting central stud 10 and a coil spring 11 is interposed between the top 4 and the base 8, with the said pin or stud 9 and the stud 10 in part confined within the coils of said spring. This spring normally urges the valve toward the base portion of the housing or casing to close the segmental slot 5, as shown.

The form of the invention shown in Figure 3 does not differ from the form shown in Figure 2, save in one exception. Instead of providing the end wall 4, I provide an adjustable cap or nut 12 provided with internal screw-threads 13 in threaded engagement at 14 with the casing or housing 3. This cap is provided with an internally projecting stud 15. Thus, whereas a certain pressure will be constantly exerted by the spring 11 in the form of Figure 2, in the form of the invention shown in Figure 3, the spring compression may be adjusted by rotating the cap 12.

The operation, uses and advantages of the invention are as follows:

It is intended that the invention should be used in conjunction with a tube 16. This tube, in the present instance, is of the deformable type, such as ordinarily employed for shaving soap, face creams, tooth paste, and the like. On tubes of this character there is usually provided a screw-threaded neck 17, and ordinarily a cap is threaded to the threads 17. Therefore, to use the contents of the tube, it is necessary to remove the cap so that material may be passed through the bore 18 in the neck leading to the interior of the tube. My invention is adapted to replace the conventional cap. Thus, in Figure 2, it will be seen that there is an annular shoulder 19 be-

tween the base of the casing and housing and the portion 3. Hence, to use my invention, I attach the screw base of the housing to the threads 17 of the neck until the top of the neck engages the shoulder 19 of the housing or casing. It will be seen that the base of the valve will span the bore 18 of the neck and shoulder upon the end of the said neck, as shown at 20. The said valve has a reasonably close fit within the casing or housing. When it is desired to exude some of the material contained within the tube 16, the tube may be pressed by the usual method, to-wit, providing a key engaging the bottom end of the tube which is adapted to roll up the said tube as the key is turned, and pressure of this material against the base 8 of the valve will force the valve upwardly so that material may be passed between the base of the valve into the casing or housing and outwardly through the slot 5. Movement of the valve to permit this to occur is shown in dotted lines for said valve at 21. When pressure is relieved from the contents within the tube, the valve will again move to the position shown in Figure 2 from the dotted line position shown at 21. In so moving, the periphery 22 of the valve will cut or shear the material so that the material is substantially clear of the slot and will not interfere with action of the valve to prevent a closing movement thereof. Ordinarily, for the form of the invention shown in Figure 2, the spring will have a certain strength, best determined under actual service conditions, although the inventor has found from 5 to 10 pounds pressure per square inch ample.

In the form of the invention shown in Figure 3, adjustment of the cap 12 will, of course, adjust the spring pressure. Otherwise the invention remains the same.

While I do not wish to confine my invention to a valve, the side wall of which is concave, as other forms may be utilized, still the concaved form illustrated presents certain advantages over the cylindrical type side wall, one advantage being that when material is forced upwardly and not completely outwardly of the slot, said material may move backwardly within the concavity, to the end that said material will not interfere with the proper movement of the valve. Thus assuming the full line position of Figure 2, when the material to be exuded from the tube moves the valve upwardly to the dotted line position at 21, the material will move outwardly through the slot. However, the slot may tend to fill with said material, which would result in a part thereof being received within the concaved portion of the side wall. When the valve moves to closed position, the upper end of said concaved side wall which also engages the inner surface of the casing or housing, will tend to push this portion of the material downwardly to further move the material outwardly of the slot. Thus, a substantially clean working surface for the valve is at all times presented.

I claim:

1. In combination, a tube having a body portion and a neck provided with an orifice communicating with the interior of the body portion, a casing secured to the said neck, a slide valve within said casing and normally positioned over the end of said neck to close said orifice, said slide valve having its outer surface concaved longitudinally, the said casing being formed with a segmental slot, movement of said valve to one position permitting communication between the orifice and said segmental slot.

2. In combination, a tube having a body portion and a neck provided with an orifice, a casing secured to said neck and formed with an opening, a self-wiping slide valve within said casing and normally positioned over said orifice of the tube, said slide valve having its outer surface concaved longitudinally, said longitudinally concaved surface functioning to exude material through the opening of the housing during movement of the said valve.

3. In combination, a tube having a deformable body and a neck, a valve casing for detachable engagement with the neck, a self-wiping slide valve within said casing and normally seated against the end of said neck, said self-wiping slide valve including a tube closed at one end to form a base and its outer surface concaved longitudinally; resilient means between the base of said slide valve and the said valve casing normally urging the valve into neck engagement; said valve casing formed with a segmental slot communicating with the longitudinal concavity when the slide valve is seated against the neck and said deformable tube adapted to contain a substance to be exuded through the neck to in turn impinge against the base of the slide valve and move the same upwardly to permit said substance to pass through said segmental slot of the casing, any material not exuded being adapted to be received within the longitudinal concavity of the outer surface of the valve when the valve is returned through spring action to seating position over said neck.

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