Jan. 26, 1937. W. H. JACKSON ET AL 2,069,009

CLOSURE FOR COLLAPSIBLE TUBES

Filed Jan. 3, 1936

Fig. 1.

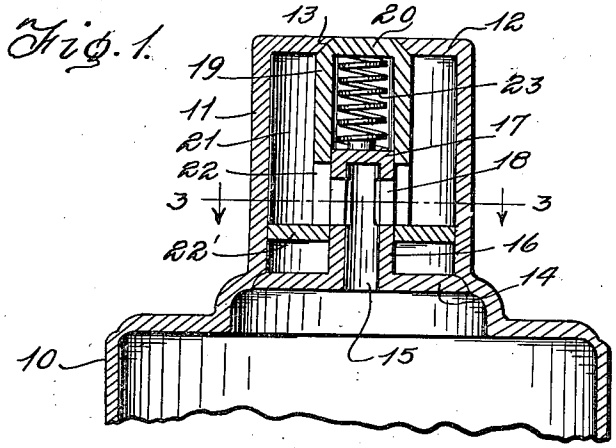


Fig. 2.

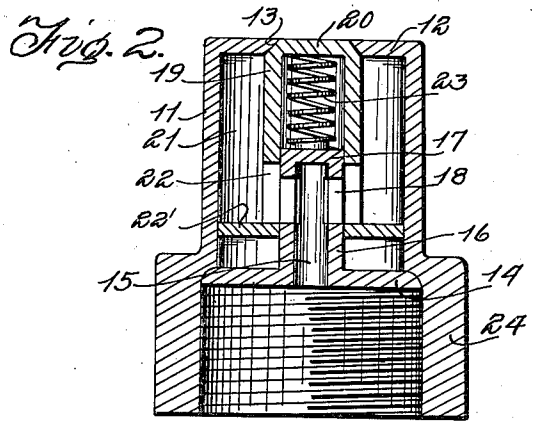
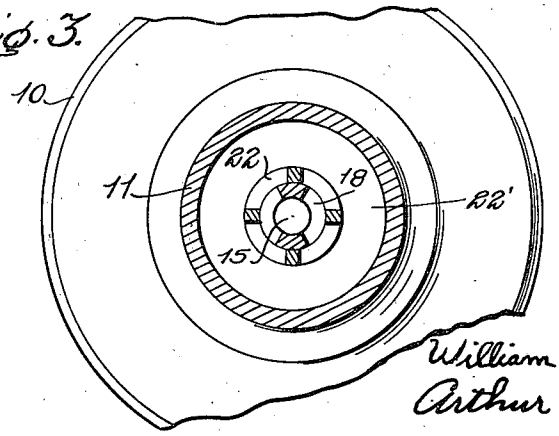


Fig. 3.



INVENTORS

William H. Jackson

Arthur W. Edmond

Patented Jan. 26, 1937 2,069,009

UNITED STATES PATENT OFFICE

2,069,009

CLOSURE FOR COLLAPSIBLE TUBES

William H. Jackson, Canton, Ohio, and Arthur W. Edmond, Hyattsville, Md.

Application January 3, 1936, Serial No. 57,436

4 Claims. (Cl. 221—60)

This invention relates to closures for collapsible tubes and has special reference to a self closing closure for such tubes.

Collapsible tubes are commonly used for dispensing semi-fluid material such as tooth-pastes, shaving cream, unguents and the like and practically all such materials harden or in other ways deteriorate upon exposure to the air. Tubes for this purpose are most frequently closed by a screw cap which may or may not have some means adapted to permanently attach it to the body of the tube. Whether or not the cap is thus permanently attached, it frequently happens that the person using the tube omits to close its outlet by applying the cap. The result, in case of such omission, is that the material at the outlet is exposed to the air and perhaps forms a hard plug or is otherwise rendered unfit for use.

Tubes for such purposes are generally made of an alloy of lead, tin or the like which is readily flexible but is, nevertheless, very tough. Such alloys lend themselves to manufacturing processes such as die casting but are generally too soft to permit much machine tool work being done upon them. Attempts have been made to produce closures which will act automatically upon release of pressure on such tubes but many such devices involve the use of materials which are not only expensive in themselves but which also require much machining to produce the desired device.

One important object of the present invention is to provide a novel and highly efficient closure for this purpose whereby great simplicity of construction is attained while, at the same time, the closure is highly effective in operation.

A second important object of the invention is to provide a novel device for this purpose which is adapted to be attached permanently to the body of a collapsible tube or to be screwed on the threaded nozzle of such a tube in place of the ordinary cap.

A third important object of the invention is to provide a novel device of this kind having but a single moving part.

With the above and other objects in view, as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts presently fully described, illustrated in the accompanying drawing and specifically claimed.

In the accompanying drawing like characters of reference indicate like parts in the several views, and:

Figure 1 is a greatly enlarged diametrical section through a closure constructed in accordance with this invention as applied integrally to a collapsible tube.

Figure 2 is a similar section of the invention as arranged to be screwed on the usual upper end of a collapsible tube as constructed in the usual manner.

Figure 3 is a section on the line 3—3 of Figure 1.

In the embodiments of the invention as here shown there has been illustrated the upper part of a collapsible tube 10 provided with a closure having an outer cylindrical shell or body 11 having a cap 12 at its upper end. In each form this upper end is provided with a central opening 13 preferably bevelled downwardly to provide a valve seat.

The lower end of the shell 11 is partially closed by a diaphragm 14 having a central opening 15 above which extends a tube 16 having a closed upper end 17. The tube 16 is provided with a plurality of lateral ports 18 and terminates short of the cap or end 12. Surrounding this inner tube 16 is an outer tube 19 which fits closely on the inner tube and is provided at its upper end with a closure 20 fitting in the opening 13. The tube 19 is spaced concentrically from the body 11 to provide an annular space 21 between the tube 19 and the cylindrical wall of the body 11. Also the tube 19 is provided with lateral ports 22 which constantly register with the ports 18 and with a flange 22′ at its lower end which fits closely within the cylindrical wall 11 of the body.

The diaphragm or flange 14 is fixed, as will be hereinafter described, to the upper end of the collapsible tube and between the ends 17 and 20 is positioned a coiled compression spring 23 which constantly urges the outer tube 19 upwardly so that its upper end 20 normally closes the opening 13 and acts as a valve therefor.

In the form shown in Figure 2 the lower end of the wall or body 11 is provided with a depending and internally threaded skirt 24 which may be screwed on the ordinary screw threaded nozzle of a tube.

In each of these forms the operation is as follows: When the collapsible tube 10 is compressed the contents are expelled through the ports 18 and 22 and after the contents of the tube pass into the space 21 they press upon the flange 22′ which moves the outer tube downwardly and thus opens the opening 13. The contents of the tube 10 then flow outward through the opening 13. When pressure on the tube 10 ceases the spring 23 forces the outer tube 19 upwardly and thus closes the opening 13.

Thus, whenever the collapsible tube is pressed the upper part of its contents is ejected but, whenever the pressure is relaxed, the opening 13 is closed and the remainder of the contents of the tube 10 is protected.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that changes may be made in the form and proportions of the invention without departing from the material principles involved. It is not therefore desired to confine the invention to the exact form herein shown and described but it is desired to include all forms which come within the scope of the appended claims.

Having thus described the invention, what is claimed as new, is:

1. In a device of the kind described, a nozzle having a cylindrical body and an upper end provided with an outlet port concentric to the body, a diaphragm fixedly extending across the lower end of said body and having a central opening, an inner tubular member extending upwardly from the opening in said diaphragm and having lateral ports, an outer tubular member slidably fitted on said inner member and having lateral ports registering continuously with the ports in the inner member, said outer member having a flange at its lower end fitting in the cylindrical body, said outer member having its upper end closed to seat against the upper end of the body to normally close the outlet port, and spring means urging the outer tubular member into position to close said outlet port, said flange being arranged for receiving pressure on its upper face from material flowing through said ports into the space between the body and outer member whereby the outer member is depressed to open said port.

2. In a device of the kind described, a nozzle having a cylindrical body and an upper end provided with an outlet port concentric to the body, a diaphragm fixedly extending across the lower end of said body and having a central opening, an inner tubular member extending upwardly from the opening in said diaphragm and having lateral ports, an outer tubular member slidably fitted on said inner member and having lateral ports registering continuously with the ports in the inner member, said outer member having a flange at its lower end fitting in the cylindrical body, said outer member having its upper end closed to seat against the upper end of the body to normally close the outlet port, and spring means urging the outer tubular member into position to close said outlet port, said inner tubular member being closed at its upper end and said spring means being fitted between the closed ends of said members to force the outer member up into port closing position, said flange being arranged for receiving pressure on its upper face from material flowing through said ports into the space between the body and outer member whereby the outer member is depressed to open said port.

3. In a device of the kind described, a nozzle having a cylindrical body and an upper end provided with an outlet port concentric to the body, a diaphragm fixedly extending across the lower end of said body and having a central opening, an inner tubular member extending upwardly from the opening in said diaphragm and having lateral ports, an outer tubular member slidably fitted on said inner member and having lateral ports registering continuously with the ports in the inner member, said outer member having a flange at its lower end fitting in the cylindrical body, said outer member having its upper end closed to seat against the upper end of the body to normally close the outlet port, spring means urging the outer tubular member into position to close said outlet port, and an internally threaded skirt depending from said body and adapted to be screwed onto the nozzle of a collapsible tube, said flange being arranged for receiving pressure on its upper face from material flowing through said ports into the space between the body and outer member whereby the outer member is depressed to open said port.

4. In a device of the kind described, a nozzle having a cylindrical body and an upper end provided with an outlet port concentric to the body, a diaphragm fixedly extending across the lower end of said body and having a central opening, an inner tubular member extending upwardly from the opening in said diaphragm and having lateral ports, an outer tubular member slidably fitted on said inner member and having lateral ports registering continuously with the ports in the inner member, said outer member having a flange at its lower end fitting in the cylindrical body, said outer member having its upper end closed to seat against the upper end of the body to normally close the outlet port, spring means urging the outer tubular member into position to close said outlet port, said inner tubular member being closed at its upper end and said spring means being fitted between the closed ends of said members to force the outer member up into port closing position, said flange being arranged for receiving pressure on its upper face from material flowing through said ports into the space between the body and outer member whereby the outer member is depressed to open said port, and an internally threaded skirt depending from said body and adapted to be screwed onto the nozzle of a collapsible tube.

WILLIAM H. JACKSON.
ARTHUR W. EDMOND.