

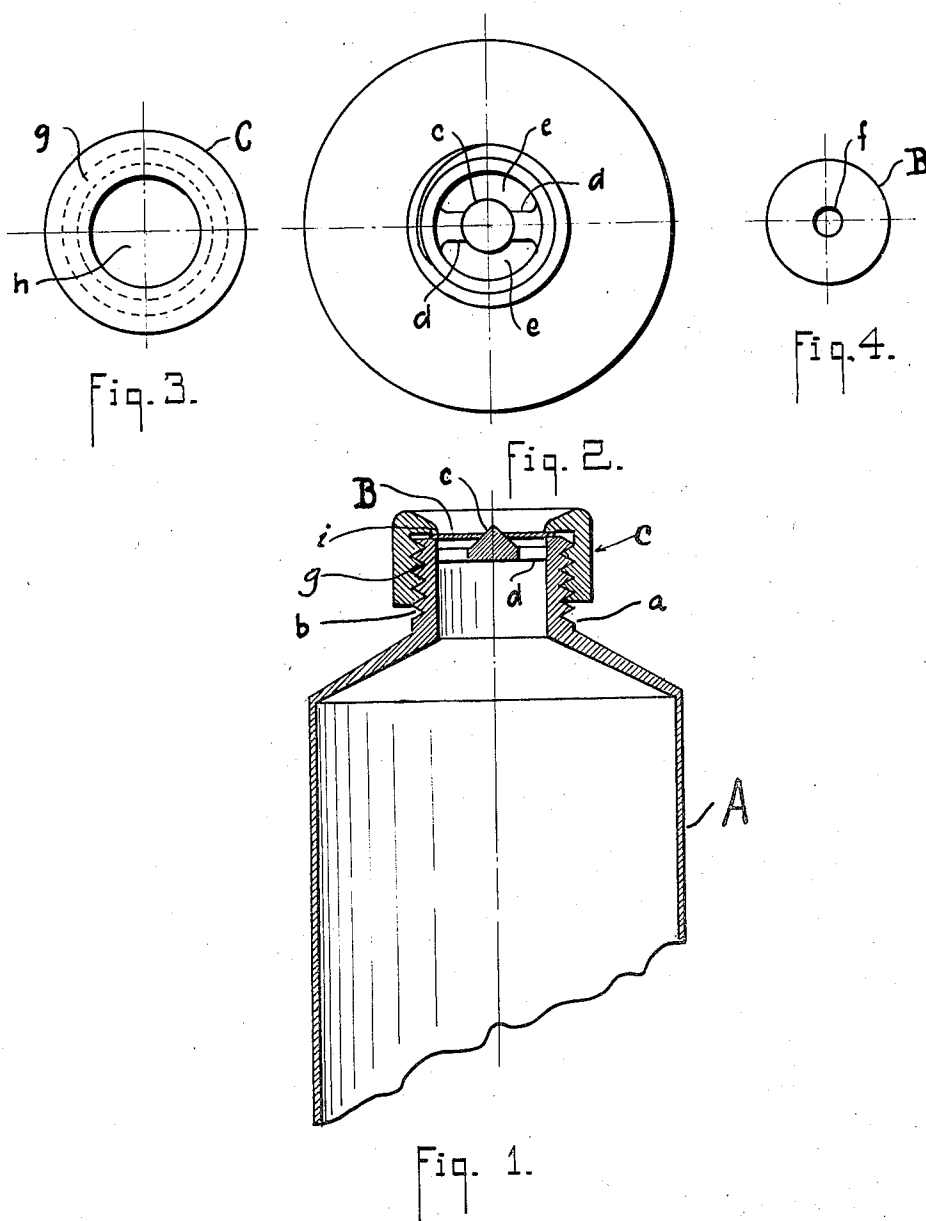
Sept. 27, 1932.

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1,880,103

CLOSURE OR CAP FOR COLLAPSIBLE TUBES

Filed Oct. 16, 1931



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UNITED STATES PATENT OFFICE

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CLOSURE OR CAP FOR COLLAPSIBLE TUBES

Application filed October 16, 1931. Serial No. 569,325.

The object of the invention is to provide an improved valve, adapted to be used as a closure for collapsible tubes, and for other devices from or through which fluid, semi-fluid and plastic substances flow intermittently.

Another and more specific object is to provide a valve closure of this type which is entirely automatic, and is especially designed for application to tubes in which tooth paste, creams, salves and similar viscous substances are contained, and which are forced from such tube past its valve closure by squeezing the opposite end portion of the tube. In such case, the desired quantity of the tube's contents readily passes through and from the closure, as the metallic valve disc flexes in alignment with its axis, but, when the extraneous squeezing pressure upon the tube ceases, the resiliency of said disc causes the same to positively return to its normal position, and thereby seat itself with respect to a fixed valve member and thus prevent the passage of more of such contents.

25 A further object, still more specifically, is to provide a resilient metal valve closure disc, which is characterized by the fact that its amplitude of vibration is within limits closely adjacent to its original plane, namely, the plane of its periphery, so that the axial movement of its central portion when functioning is sufficient for all intents and purposes, without depending upon or requiring of it any appreciable stretching in the usual sense of that term.

35 With these objects in mind, the invention comprises further details of construction and operation, which are fully brought out in the following description, when read in conjunction with the accompanying drawing, in which:—

Fig. 1 is a vertical section through the collapsible tube and seal.

45 Fig. 2 is a plan view of the tube, the screw cap and seal having been removed.

Fig. 3 is a plan view of the screw cap.

Fig. 4 is a detail plan view of the sealing valve.

Referring to the drawing, and to Figs. 1 and 2 in particular, a collapsible tube "A"

has a tubular neck portion "a", provided with an external screw thread "b", in turn spanned by a diametrically extending spider, which comprises a central conical valve member "c" supported by radially extending ribs "d", between which are passageways "e", said conical portion "c" forming a valve seat.

A valve disc "B" having a central aperture "f" is provided, and as the performance of its function depends upon resiliency, as compared with elasticity or mere flexibility, it is preferably formed of relatively thin non-corrosive metal such as brass or bronze, and is sufficiently thin to permit quite an amplitude of axial movement, but is also sufficiently thick to insure its positive resumption of its normal closed relation to the valve seat "c", after having been flexed therefrom by the passage of the tube contents under the extraneous pressure exerted upon the tube. Said valve disc is so positioned as to rest upon the outer peripheral portion of the neck "a" of the tube, and is secured in such position by means of a screw cap "C", provided with an internal thread "g" in normal engagement with the thread "b" of said neck, said cap having a central aperture "h" which is preferably larger than the aperture "f" in the valve disc, and is surrounded by a radially inwardly directed shallow flange "i" which in turn operates to bind the marginal portion of said disc in firm, fluid-tight engagement with said neck. Thus, when the cap, disc and tube are assembled, the cap holds the disc fixedly with respect to the neck of the tube, with the edge of the disc surrounding the aperture "f" in uniform positive contact with the conical valve member "c", which effectively closes said aperture, and the shallowness of said cap beyond said disc offering but minimum hindrance to the wiping of extruded material from the valve.

The operation of the above described mechanism is as follows:

The collapsible tube "A" being filled with a viscous or plastic material such as tooth paste, shaving cream, vaseline, etc., and the bottom closed, any pressure applied to the exterior of the tube is transmitted through the contents against the inner side of the

disc "B", causing the disc to flex and bend away from the valve member "C" and leaving an opening between the edge of the disc and the said member "C", through which opening and through the hole "f" in the disc "B" the contents of the tube "A" can escape, as long as pressure is applied to the exterior of the tube. Immediately upon release of the external pressure the disc "B", due to its resiliency, will resume its normal position in contact with the projection "C" of the top "a", thus severing the discharged material from that still remaining within the tube re-sealing the tube "A" against contact of its contents with the surrounding atmosphere.

The opening of the tube and the discharge of the required quantity of the contents, have been accomplished by means of the external pressure placed upon the tube by the fingers manually or otherwise, while the re-sealing of the tube is accomplished automatically by the resiliency of the valve disc. There is no necessity of the removal or replacement of any cap or other part.

The mechanism herein shown and described has been selected as a simple means to accomplish the desired result, but the inventor has achieved the same object by mechanisms of different design, and it is therefore not his intention to limit his invention to this specific design and arrangement.

Having thus described my invention, I claim:

1. The combination of a receptacle having a tubular neck, a conical valve member positioned within and adjacent to the open end of said neck, a substantially planular resilient disc having an aperture through which said member normally extends, and means to secure the marginal portion of said disc to said neck.

2. The combination of a receptacle having a tubular neck, a spider spanning said neck and comprising a central conical member forming a valve seat, a substantially planular resilient disc having an aperture through which normally extends said member, and an apertured cap to secure the marginal portion of said disc to said neck.

3. The combination of a receptacle having a tubular neck, a spider spanning said neck and comprising a central conical member forming a valve seat, a substantially planular resilient disc having an aperture through which normally extends said member, and an apertured cap to secure the marginal portion of said disc to said neck, pressure applied to material at the rear of said disc tending to flex said disc axially towards one side of the plane of its marginal portion, and upon release of such pressure the resiliency of said disc tending to positively return said disc towards said seat and thereby sever the material upon the opposite sides of said disc.

4. The combination of a receptacle having a

tubular neck, a conical valve seat disposed within and supported by said neck, a substantially planular resilient disc positioned adjacent to said neck and having an aperture through which said seat normally extends, and means also carried by said neck and securing said disc in operative position, said means presenting a minimum hindrance to the wiping of extruded material from and around the surface of said disc.

5. The combination of a receptacle having a tubular neck, a conical valve seat disposed within and supported by said neck, a substantially planular resilient disc positioned adjacent to said neck and having an aperture through which said seat normally extends, and means also carried by said neck and securing said disc in operative position, pressure applied to material at the rear of said disc tending to flex said disc axially towards one side of the plane of its marginal portion, and upon release of such pressure the resiliency of said disc tending to positively return said disc towards said seat and thereby sever the material upon the opposite sides of said disc.

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