Sept. 14, 1954 S. C. WILLIS 2,689,064

COLLAPSIBLE TUBE

Filed March 26, 1952

FIG. 1.

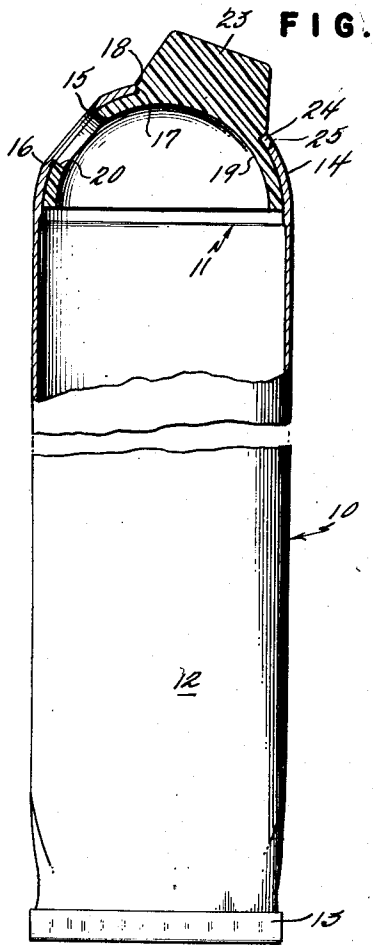


FIG. 2.

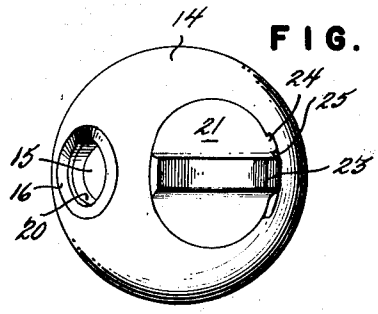
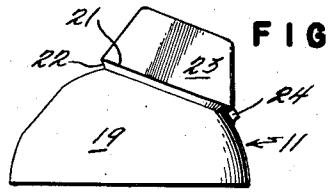


FIG. 3



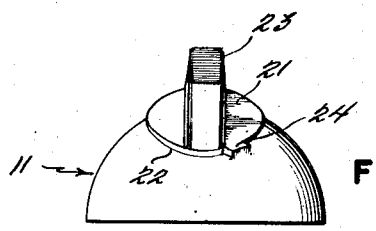


FIG. 4.

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COLLAPSIBLE TUBE

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3 Claims. (Cl. 222—92)

1

This invention relates to collapsible tubes of the type employed for containing and dispensing tooth paste, shaving creme and the like, and has more particular reference to collapsible tubes of this type having captive closure members for closing and opening the dispensing opening in the tube.

One object of the present invention is to provide a novel and improved collapsible tube having a hollow dome-shaped dispensing head provided with a captive closure member for opening and closing the dispensing opening in the tube head.

Another object of the invention is to provide a collapsible tube, as above characterized, wherein the captive closure member is a concavo convex member adapted to be tightly pressed against the internal surface of the dome whenever pressure is applied to the contents of the tube and wherein the concavo convex closure member has a dispensing opening therein and an operating knob extending through the dome of the tube for rotating the closure member to move the dispensing opening in the closure member into and out of registration with the dispensing opening in the dome of the tube.

Another object of the invention is to provide a tube, as characterized above, wherein the edge of the dispensing opening in the dome is feathered and the edge of the dispensing opening in the captive closure member is normal to the wall of the closure, whereby the discharge of the contents of the tube will be cleanly cut off and any excess material around the dispensing opening in the dome may be easily wiped off.

Another object of the invention is to provide a tube, as characterized above, wherein the operating knob carried by the closure member is angularly offset on one side of the closure from the longitudinal axis of the tube and the dispensing opening in the dome is angularly offset from the longitudinal axis of the tube on the other side of the closure.

A further object of the invention is to provide a tube, as characterized above, wherein the dome of the tube and the closure member are substantially hemi-spherically shaped to resist crushing and wherein the closure member is provided with a concavo convex retaining disc journalled in an annular seat formed in the dome and offset from the longitudinal axis of the tube.

Other objects and advantages of the invention will be apparent in the following specification when considered with the accompanying drawing, wherein:

Fig. 1 is a side elevational view with parts broken away and with parts in vertical cross section, of a collapsible tube having a dispensing head constructed in accordance with the present invention;

2

Fig. 2 is a plan view of the tube shown in Fig. 1;

Fig. 3 is a side elevational view of the captive closure member; and

Fig. 4 is an end elevational view of the captive closure member.

The present invention provides a novel and improved collapsible tube adapted to hold semi-liquid or paste material which permits the contents of the tube to be extruded therefrom without removal of the closure member.

In general, the collapsible tube is provided with a closed, non-collapsible, upper end or head having a dispensing opening, and an operating projection or handle receiving opening therein. A captive closure member is rotatably mounted within the closed upper end of the tube. The captive closure member has a contour corresponding to the internal contour of the closed upper end of the tube and is provided with a dispensing opening adapted to be rotated into alignment with the dispensing opening in the closed upper end of the tube. The closure member is also provided with an operating handle or knob which projects through the handle receiving opening in the closed upper end of the tube and provides means for rotating the closure member.

Referring now to the drawing, there is shown, in Figs. 1 to 4, inclusive, a preferred form of a collapsible tube having a captive closure member constructed in accordance with the present invention and comprising a collapsible tube **10** and a captive closure member **11** rotatably mounted therein.

As shown in Fig. 1, the tube 10 comprises a body portion **12** preferably formed of thin pliable metal of the character customarily employed in tubes intended for the retention of pastes shaving creme, or the like. The body of the tube, when distended, is of cylindrical formation and is closed at its lower end, as indicated at **13**, by crimping or otherwise sealing the metal walls together.

The upper end of the tube is closed by a hollow hemispherical cap member or head **14** formed integral with the tube but has thickened walls to make it semi-rigid. The semi-rigid hemispherical head **14** is provided with a dispensing opening **15** preferably circular and with its periphery beveled or feathered, as indicated at **16**, and a circular opening **17** through which the handle or operating knob of the captive closure member projects. The edge of the opening **17** is outwardly and upwardly beveled, as indicated at **18**, for a purpose hereinafter to be described.

The captive closure member **11** comprises a hollow hemi-spherical body member **19** having a dispensing opening **20** formed therein, preferably and as shown, of the same size and shape as the dispensing opening **15** formed in the closed

end of the tube. The closure member 11 is also provided with an integral thickened concavo convex portion to form a retaining disc 21 having its edge beveled inwardly and downwardly, as indicated at 22. A generally rectangular solid outwardly projecting knob or handle member 23 is formed integral with the retaining disc 21.

The captive closure member 11 is rotatably mounted in the hollow hemi-spherical head of the tube with the outer surface of the closure member slidably engaging the inner surface of the head and with the retaining disc 21 seated in the opening 17 in the head with the inwardly and downwardly beveled edge of the disc resting on the outwardly and upwardly beveled edge of the opening 17. In this position, the knob or handle member 23 on the disc projects outwardly of the tube to serve as a convenient means by which to rotate the closure member 11 to bring the dispensing opening 20 therein into and out of registration with the dispensing opening 15 in the cap end of the tube. It will be noted that, by this construction, the pressure on the contents of the tube, necessary for forcing the same out through the registered dispensing openings in the closure member and tube head, also serves to force the captive closure member tightly against the inner surface of the head, thereby preventing any of the contents of the tube from being forced between the closure member and the wall of the tube head. Also, when the closure member has been rotated to move its dispensing opening out of registration with the dispensing opening in the cap, any pressure on the contents of the tube will force the closure member tightly against the inner surface of the head and prevent any leakage from the tube as the contents cannot be forced between the closure member and the inner surface of the head.

Means are provided for limiting the rotation of the closure member from an open position, where the dispensing openings in the closure member and the cap are in registration, to a closed position where the dispensing openings are out of registration. In the particular embodiment of the invention illustrated, such means are shown as comprising a projection or tab 24 formed integral with the retaining disc 21 and received in an arcuate recess 25 cut into the edge of the opening 17 formed in the head. The end edges of the recess 25 form abutments limiting the travel of the tab 24 and thus the rotation of the closure member from its closed position to its open position.

The closure member 11 may be made of any suitable material and may be mounted within the head of the tube in any suitable manner. In the particular embodiment of the invention illustrated, the member is made of flexible and elastic material, such as rubber, artificial rubber, or plastic. Preferably, and as shown, the closure member is made of polyethylene, which is sufficiently flexible and elastic to permit the retaining disc 21 to be compressed sufficiently to be inserted into the opening 17 in the head. The flexibility and elasticity of the closure member permit it to be operated even though the head of the tube should be dented or otherwise slightly deformed.

In connection with the foregoing, it should be noted that the hemi-spherical shape of the tube head and closure member affords a maximum of resistance to crushing or bursting pressure and, at the same time, permits rotation of the closure member within the head. In this connection, it should be noted that the internal diameter of the hemi-spherical head is less than the internal diameter of the cylindrical tube and that the axis of rotation of the closure member coincides with the median axis of the retaining disc 21 and the circular opening 17 in the head, which last named axis passes through the coinciding centers of the hemi-spherical head and closure member.

It should be further noted that by offsetting the axis of rotation of the closure member from the longitudinal axis of the tube, the dispensing opening 15 in the head is positioned in a plane at an angle substantially 45° to the longitudinal axis of the tube, so that the portion of the head containing the dispensing opening may be unobstructed.

It also should be noted that the edge of the dispensing opening in the closure member is comparatively sharp so that it cleanly severs the discharging pasty material from the head, leaving little or nothing to be subsequently wiped from the outer face of the head, while the beveled edge of the dispensing opening in the head affords the best shape for conveniently wiping off any material which may adhere thereto.

Obviously, the invention is not restricted to the particular embodiment thereof herein shown and described.

What is claimed is:

1. A collapsible tube for dispensing tooth paste, shaving cream and the like having an integral hollow spherical segment-shaped dispensing head provided with a dispensing opening and a circular opening offset from the longitudinal axis of the tube; a concavo convex closure member slidably mounted within said head with its convex surface in closed engagement with the internal surface of said head, said closure member having a dispensing opening therein and being provided with a retaining disc projecting into and seated in said circular opening for rotation therein, the axis of rotation of said disc coinciding with the median axes of said circular opening and said disc and passing through the center of said dispensing head; a knob carried by said disc and projecting outwardly of said head for rotating said closure member; and means for limiting the rotation of said closure member from an open position in which the dispensing openings in the head and closure member are in registration to a closed position in which said openings are out of registration.

2. A collapsible tube, as set forth in claim 1, wherein the edges of the dispensing opening in the head are feathered and the edges of the dispensing opening in the closure member are normal to the outer surface thereof.

3. A collapsible tube, as set forth in claim 1, wherein the closure member is made of flexible and elastic material and the disc portion is slightly larger than the opening in the head of the tube, whereby the disc is adapted to be compressed and inserted in said opening so that the closure member will be held in place within said head.

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