May 26, 1964 H. G. SEYBOLD 3,134,517

CAP CONSTRUCTION

Filed March 23, 1961

FIG. 2

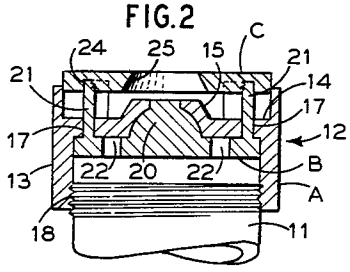


FIG. 3

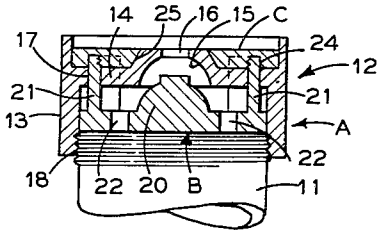


FIG. 4

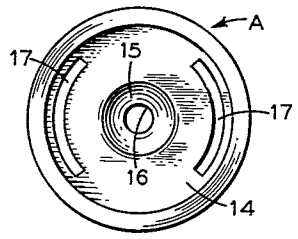


FIG. 6

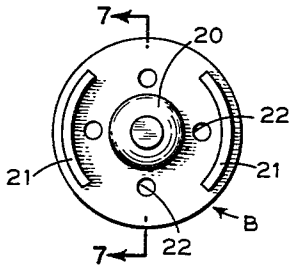


FIG. 5

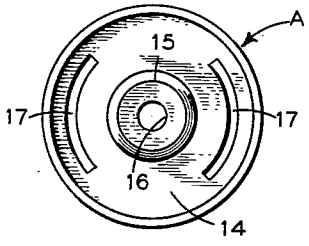


FIG. 8

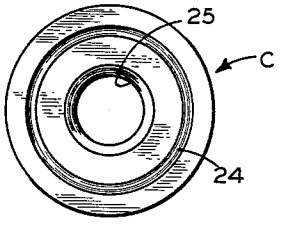


FIG. 7

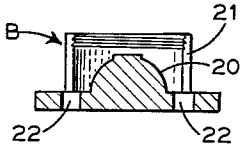
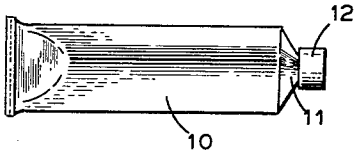


FIG. 1



INVENTOR.

Hermann G. Seybold

BY

Irving Reidman

ATTORNEY

United States Patent Office 3,134,517 Patented May 26, 1964

3,134,517

CAP CONSTRUCTION

Hermann G. Seybold, 210 E. State St., Westport, Conn.

Filed Mar. 23, 1961, Ser. No. 97,901
4 Claims. (Cl. 222—319)

This invention relates in general to a cap construction, and more particularly to an improved cap construction that is especially applicable for use on a collapsible tube.

An object of this invention is to provide an improved cap construction for a collapsible tube which is capable of permitting the contents of the tube to be dispensed without affecting the removal of the cap from the tube.

Another object is to provide a cap construction that is rendered self closing in operation.

A feature resides in the provision that the cap made in accordance with this invention is readily applicable for use on standard collapsible tubes.

Another feature of this invention is that the improved cap construction is relatively simple in construction, positive in operation and inexpensive to manufacture.

Other features and advantages will be readily apparent when considered in view of the following description and drawings in which:

FIG. 1 illustrates the improved cap of this invention as applied to a collapsible tube.

FIG. 2 is a vertical section view of the improved cap construction illustrated in the closed position.

FIG. 3 is a sectional view of the improved cap illustrated in the open or dispensing position.

FIG. 4 is a detail bottom view of the main element of the cap construction.

FIG. 5 is a detail top plan view of the main element of the cap construction.

FIG. 6 is a top plan view of the valving member of the instant invention.

FIG. 7 is a section view taken along line 7—7 of FIG. 6.

FIG. 8 is a bottom plan view of the actuating member.

Referring to the drawings, FIG. 1 illustrates a collapsible tube **10** in which tooth paste, ointments of various kinds and other paste-like commodities are commonly sold and distributed. Generally such tubes have an externally threaded neck portion **11** which is generally sealed by a conventional cap threaded thereto. Thus in order to dispense the tube contents, it was heretofore necessary to first unthread and remove the cap and then squeeze the tube. Consequently it frequently happened that in use the cap was easily lost or otherwise separated from the tube in which case the contents of the tube remained exposed to the atmosphere.

The improved cap construction **12** of this invention obviates these difficulties. As best seen in FIGS. 2 and 3 the improved cap construction **12** of this invention comprises essentially a main member A that may be either threaded or otherwise permanently fixed to the neck **11** of a collapsible tube **10**; an associated valving member B and actuating member C connected to the valving member B.

The main member C comprises a tubular member **13** which has a transversely extending plate **14** disposed intermediate the ends thereof. Accordingly, plate **14** is provided with a centrally disposed raised portion to define a nozzle **15** terminating in an orifice **16**. Oppositely disposed on either side of the raised nozzle portion **15** the plate **14** is provided with arcuate slots **17**. The portion of the tubular member adapted to attach to the neck of the tube may be internally threaded at **18** which engages the external threads of the tube neck. In this manner the improved cap construction can be made readily adaptable to existing tube constructions.

According to this invention, the valving member B is

movably disposed within the tubular member on the tube side of the plate **14**. As shown, the valving member B is provided with a raised portion **20** centrally located and arranged to valve the orifice **16** open or closed. Disposed on either side of the raised valving portion **20** of valve member B are arcuate uprights **21** which are adapted to project upwardly through and extend beyond the arcuate slots **17** of plate **14**. Also the valving member B is provided with a plurality of openings **22** which are circumferentially spaced about the raised valving portion **20**. The arrangement of openings **22** is such that when the valving member B is disposed in the closed position, as shown in FIG. 2, the openings **22** are closed by the bottom of plate **14**.

An actuating member C for operating the valving member B is disposed on the other side of the plate **14**. Accordingly, the actuating member C is provided with an annular groove **24** on its under side for receiving the upper ends of the arcuate uprights **21**. In this manner the actuator member C is fixed relative to the valving member B, and movable therewith relative to plate **14**. If desired the connection between the actuator C and valving member B may be by cooperating threads formed in the upper end of the uprights and in groove **24**. Also the actuator member C is provided with a central aperture **25**, which in the open position of the cap construction **12**, as seen in FIG. 3, is adapted to embrace the nozzle **15**.

In the closed cap position of FIG. 2, the actuator member C is spaced above the plate **14** of the main member A, and the valving member B is positioned flush against the bottom of plate **14** so that orifice **16** and openings **22** are closed, and thereby prohibit the paste from being squeezed past the cap **12** and out of the tube **10**. To dispense the tube contents without removing the cap **12**, pressure is applied to the actuator member C to force it inwardly toward the tube. Movement of the actuator member C effects simultaneous movement of the valving member B connected thereto away from plate **14**. Movement of valving member B effects a displacement of the paste thus causing it to be squeezed out through openings **22** and thence through orifice **16** and aperture **25** of the actuator C since the walls of the tube are formed of a material which is relatively non-expandable under the pressure imposed upon the paste or contents by the displacement of the member B.

To close the cap, the pressure applied to the actuator member C is relieved, and the tube is squeezed slightly to force the paste within the tube against the bottom of the valving member B, thus forcing the valving member B to seat against the bottom of plate **14**. In this position the openings **22** and orifice **16** are again closed so that no paste is permitted to pass therethrough.

From the foregoing description it will be apparent that the improved cap construction permits dispensing of the tube contents without removal of the cap from the tube. Also it will be noted that the described construction permits a uniform measure of paste to be dispensed with each operation of the actuator. By proportioning the height of uprights **21** it will be noted that the uniform amount of paste dispensed can be varied accordingly. Further, the arcuate shape of the uprights **21** insures a positive vertical displacement of the valving member B to maintain the alignment of the valving portion **20** with respect to orifice **15**.

While the instant invention has been disclosed with reference to a particular embodiment thereof, it is to be appreciated that the invention is not to be taken as limited to all of the details thereof as modifications and variations thereof may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A valving and self closing cap for use on a collapsi-

ble tube for dispensing a paste like substance comprising a fixed plate secured to the open end of the tube, a movable plate disposed on one side of said fixed plate, said fixed plate and movable plate each having an opening therein, the openings of the respective plates being laterally disposed with respect to each other so that in the closed position thereof one of said plates valves the opening in said other plate, and a second movable plate disposed on the other side of said fixed plate, means projecting through said fixed plate for interconnecting said first and second movable plates so as to render said interconnected movable plates movable relative to said fixed plate whereby a force applied to one of said movable plates effects movement of the other to operative open position and forces the paste like substance through the opening of the first mentioned movable plate to occupy the space between the fixed plate and the first mentioned movable plate and a force applied to the other of said movable plate by squeezing the contents of said tube against the latter effects closing of the openings in said fixed and first mentioned movable plates to dispense the paste like substance previously forced through the opening of the first mentioned plate.

2. A valving and self-closing cap for use on a collapsible tube for dispensing a paste like substance comprising a tubular member fixed to the open end of the tube, said tubular member having a transversely extending fixed orifice plate therein, a movable valving plate disposed in said member on one side of said plate, said valving plate having an opening therein disposed laterally of said orifice in said fixed plate, and an actuator plate having an opening therein disposed on the other side of said fixed orifice plate, means projecting through said orifice plate for connecting said actuator plate to said valving plate so that a force applied to said actuator plate renders the opening in said valving plate in communication with said orifice in said fixed plate and forces the paste like substance through the opening in said valving plate to occupy the space between the fixed plate and the valving plate to permit dispensing of the tube contents whereby then squeezing the tube forces the paste like substance therein against the valving plate to effect closing of the opening in said fixed plate and valving plate to dispense the paste like substance previously forced through the valving plate opening and seals the tube.

3. An improved cap for closing and dispensing the paste like contents of a collapsible tube, said cap comprising a tubular member fixed to the upper end of the tub, said member having a transversely extending plate, said plate having an orifice therein and an opening disposed on either side of said orifice, a valving member positioned on one side of said plate, said valving member having a raised portion for valving said orifice, a plurality of apertures in said valving member circumferentially spaced about said raised portion, said valving member having opposed uprights adapted to be received in the openings in said

plate, and an actuating member having an aperture therein, said actuating member being disposed on the other side of said plate and connected to said uprights so that a pressure applied downwardly on the actuating member causes said valving member to be moved inwardly of said tube to force the contents of said tube out through the apertures of said valve member to occupy the space between said valving member and said transversely extending plate and whereby squeezing of the tube forces the contents therein up against the valving plate to move it toward said fixed plate to close the opening therein and to dispense the contents previously forced through the apertures of the valving member.

4. A self closing cap for use on a collapsible tube for dispensing a paste-like substance comprising a tubular member adapted to be securely attached to the upper end of a tube, said tubular member having a transversely extending plate intermediate the ends thereof, said plate having a centrally disposed raised portion defining an orifice, arcuate slots formed in said plate on either side of said orifice, a valving member movably mounted in said tubular member on the tube side of said transverse plate, said valving member having arcuate uprights adapted to project through the slots in said plate, and a raised central portion arranged on said valving member to valve said orifice closed in the closed inoperative position of said cap, said valving member having a plurality of apertures circumferentially spaced about said raised orifice closing portion, said apertures being arranged so as to be valved closed by said transverse plate in the inoperative position, and an actuator member movably mounted on the tubular member on the outer side of said plate, said actuator member being connected to the uprights projected through said plate, and said actuator haivng a central aperture arranged in alignment with the orifice in said transverse plate whereby said cap is rendered operative by application of a force on said actuator causes said valving member to be moved inwardly of said tube to force the contents of said tube out through the aperture of said valving member to occupy the space between said valving member and said transversely extending plate, and said cap being rendered inoperative by an inverse froce applied to the valving member and transmitted thereto by displacement of the content with the tube effected by a squeeze of the tube whereby said valving member is moved to effect closing of the apertures therein and dispenses the contents previously forced through the aperture of said valving plate.

References Cited in the file of this patent

UNITED STATES PATENTS

1,455,593	Lewin et al.	May 15, 1923
1,463,578	Dyer	July 31, 1923
2,695,119	Kishpaugh et al.	Nov. 23, 1954
2,759,643	Dahlin	Aug. 21, 1956
2,792,160	Jones et al.	May 14, 1957