

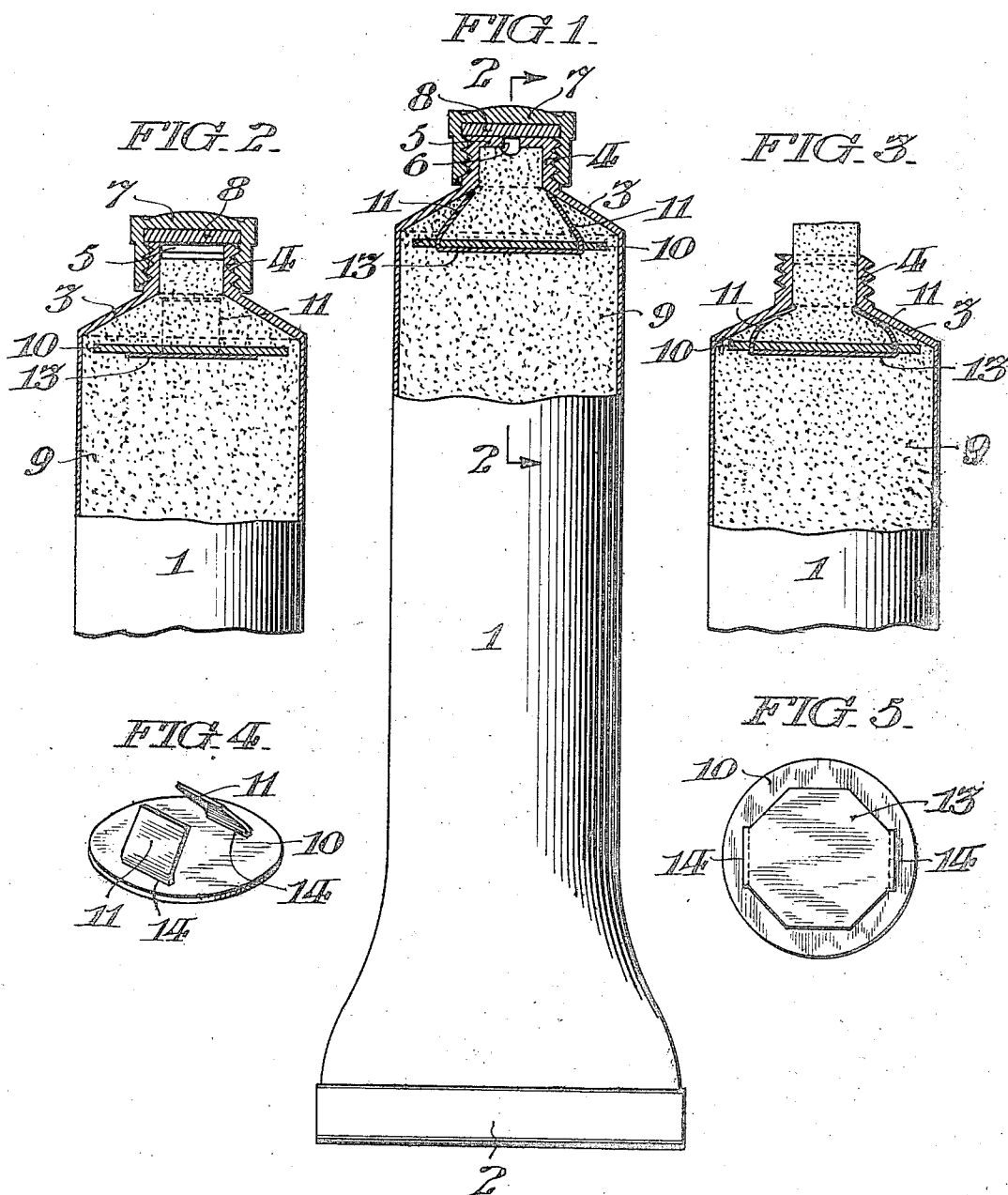
J. B. DAVIS.

MEANS FOR CONTROLLING DISCHARGE OF MATERIAL FROM COLLAPSIBLE TUBES.

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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN B. DAVIS, a citizen of the United States, residing in Lansdowne, county of Delaware, State of Pennsylvania, have invented certain new and useful Means for Controlling Discharge of Material from Collapsible Tubes, of which the following is a specification.

Broadly considered my invention relates to collapsible tubes of the character now in general commercial use which are employed for holding and dispensing liquids, viscous substances and plastic substances; for example, paints, tooth paste, soap paste, etc.

More specifically, however, it relates to means for preventing the continued discharge of material from a tube after the removal therefrom of pressure, and it has for its object to provide an efficient means internally of the tube for such purpose.

My invention comprehends a construction including a disk situated interiorly of the tube adjacent to the discharge opening therein and which is provided with means whereby as a result of the pressure and release of pressure upon the tube containing material of more or less mobility the said disk is caused to move toward and recede from the discharge end or region of the tube. The receding movement takes place upon the release of pressure and the result of such movement is that the discharge of the material from the tube ceases immediately upon the ceasing or discontinuance of the pressure upon the tube.

My invention comprehends the construction and arrangement of parts as herein-after described in the specification, specifically pointed out in the claims, and as illustrated in the accompanying drawings, it being understood, however, that changes in the details of construction may be made within the scope of the claims without departing from my invention.

In the drawings:—Figure 1 is a view of a collapsible tube provided with my invention, the discharge end portion thereof being shown in longitudinal section and the remaining portion thereof in elevation; Fig. 2 is a view at right angles to that of Fig. 1, showing the tube partly broken away and being also shown partly in longitudinal sec-

tion; Fig. 3 is a view similar to that shown in Fig. 2 with the cap or closure removed and with the disk in the position occupied thereby when the tube is subjected to pressure to cause a discharge of the material therefrom; Fig. 4 is a perspective view of a disk with its means for controlling the action of the disk; and Fig. 5 is a bottom plan view of the said disk.

Referring to the drawings,—1 designates a tube having a flattened portion 2 at one end and having the inclined wall portion 3 terminating in the neck 4 at its opposite end.

The neck 4 is provided with an integral transverse closing plate 5 provided with a discharge opening 6. The said opening is closed by means of a cap or closure 7 the side walls of which are provided with internal screw threads adapted to engage with external screw threads upon the neck 4. In order to make the said cap or closure water tight I have provided a washer 8 which is adapted to be pressed down tightly upon the plate 5 and thereby close the opening 6.

As thus far described, the construction is that of tubes now known and which are in commercial use. It has been found, however, in using these tubes, that after the pressure to cause the discharge of the material 9, such, for example, as tooth paste, has been discontinued and the tube put aside, such material continues to escape and thereby not only causes waste but also causes the tube to present an unclean appearance and in some instances, after the material has dried, prevents the ready replacing of the closing cap 7 thereon.

In order to avoid these objections and inconveniences, I have provided a disk 10 situated interiorly and extending transversely of the tube and which is located within the region adjacent to the discharge end thereof.

For the purpose of controlling the operation of the said disk, I have provided means for permitting the said disk to move toward the discharge opening when pressure is applied to squeeze the substance from the tube, but which causes the said disk to recede to its normal position when such pressure is released. In the construction illustrated the said means consists of fingers 11 separated or spaced from each other and secured to

said disk and which contact with the inner surface of the inclined wall portion 3 of the tube. These spring fingers or their equivalent may be secured in any desirable manner to the disk 10 but I prefer to form them by bending the opposite ends of the spring or resilient strip 13 and inserting the same through slots 14 formed in the said disk.

The area of the disk is slightly less than the transverse area of the interior of the tube and normally the said disk occupies a position with its edge space a greater or less distance from the inner surface of the inclined portion 3 of the tube, as shown in Figs. 1 and 2. However, upon the application of a squeezing pressure to the collapsible tube and to the more or less mobile material contained therein, the said disk is moved forwardly to a position corresponding substantially to that shown in Fig. 3 in which position the material 9 is permitted to pass between the edges of the said disk and the adjacent portion of the tube and thence to the discharge opening. As a result of this movement of the disk the spring fingers 11 are placed under tension. Immediately upon the release of pressure upon the tube and the material 9 therein these spring fingers return to and assume their normal position thereby causing movement of the disk in a direction away from the discharge opening. This movement tends to create a vacuum in the portion of the tube adjacent to the discharge opening thereby causing the material to recede from said opening and thus preventing the further discharge of material from the said tube after the release of squeezing pressure therefrom.

I claim:—

1. A collapsible tube of the character and for the purpose described having a discharge opening therein, a disk situated interiorly of the said tube and within the region thereof adjacent to the said discharge opening, and the said disk having spaced resilient means connected thereto for permitting movement of the said disk toward the said discharge opening upon the application of a squeezing pressure to the said tube and the substance contained therein and which means causes a movement of the said disk away from the said discharge opening upon the cessation of such pressure.

2. The combination of a collapsible tube for containing and dispensing substances of the character described having a discharge opening therein, means situated in the said tube and partially closing the same, and spaced yielding means interposed between the first mentioned means and the said tube which means permits a forward movement of the said first mentioned means upon the application of pressure to the said tube to cause the discharge of a substance contained

therein and causes a receding movement thereof upon the release of such pressure to thereby prevent a further discharge of such substance from the said tube after the release of said pressure.

3. The combination of a collapsible tube of the character and for the purpose described having a discharge opening therein, a disk situated interiorly and transversely of the said tube, and means interposed between the said disk and the said tube and directly engaging the walls of the latter for permitting movement of the said disk toward the said discharge opening upon the application of a squeezing pressure to the said tube and the substance contained therein, and which means causes a movement of the said disk away from the said discharge opening upon the cessation of such pressure.

4. The combination of a collapsible tube of the character and for the purpose described having a discharge opening therein, a disk situated in the said tube within the region and adjacent to the said discharge opening, and extending transversely of the said tube and being surrounded by the substance within the tube, a plurality of spring acting means interposed between the said disk and the said tube which means permits movement of the said disk toward the discharge opening upon the application of a squeezing pressure to the said tube and the substance contained therein and causes a movement thereof away from the said opening upon the release of such pressure.

5. The combination of a collapsible tube of the character and for the purpose described, having a discharge opening, a disk situated in the said tube within the substance contained therein and within the region of the tube adjacent to the said opening and the said disk extending transversely of the said tube, spring fingers interposed between the said disk and the said tube which fingers permit movement of the said disk toward the discharge opening upon the application of a squeezing pressure upon the said tube and the substance contained therein and cause movement of the said disk away from the said opening upon the release of such pressure.

6. The combination of a collapsible tube of the character described having a discharge opening and the said tube having portions of its walls adjacent to the said opening inclined inwardly toward the said opening, a disk situated within the said tube adjacent to the lower edges of the inclined portions of said wall, spring members contacting with the interior surface of the inclined portions of the said wall and with the said disk and permitting movement of the said disk toward the said opening upon the application of a squeezing pressure to the said tube and the substance contained

therein and causing movement of the said disk away from the said opening upon the release of said pressure.

7. The combination of a collapsible tube 5 of the character described having a discharge opening therein, a disk situated within the said tube and extending transversely thereof, the said disk being situated within the region of said tube adjacent to said 10 opening and the said disk having slots therein in spaced relation with respect to each other, a resilient strip having its opposite ends projected through the said slots, the said ends being bent inwardly and constituting springs for engagement with portions 15 of the wall of said tube, the said springs permitting movement of the said disk toward the said opening upon the application of a squeezing pressure to the said tube and the substance contained therein 20 and causing movement thereof in the opposite direction upon the release of the said pressure.

8. The combination of a collapsible tube 25 of the character and for the purpose described having a discharge opening therein, a disk situated interiorly and transversely of the said tube, the area of said disk being less than the transverse area of the interior 30 of said tube to permit the passage of the substance contained in the tube between the edge of said disk and the adjacent portion of the tube, and means interposed between and in direct contact with the said disk and 35 the said tube for permitting movement of the said disk toward the said discharge

opening upon the application of a squeezing pressure to the said tube and the substance contained therein and for causing the movement of said disk away from the said discharge opening upon the release of such 40 pressure.

9. The combination of a collapsible tube having an opening in one end with a floating disk situated interiorly and transversely 45 of the said tube and operative to partially obstruct the passage of material to said opening and resilient means between said disk and said tube.

10. The combination of a collapsible tube 50 having an opening in one end with a substantially floating disk situated interiorly and substantially transversely of the said tube and operative to partially obstruct the passage of material to said opening and resilient means between and directly contact- 55 ing with said disk and a part of said tube.

11. The combination with a collapsible container having an orifice, of a resilient retractor located within the tube near the discharge 60 end thereof, said retractor comprising a follower arranged to permit passage of the contained material thereby, and resilient means for engaging the end portion 65 of the tube.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 10th day of December, A. D. 1912.

JOHN B. DAVIS.

In the presence of—

WM. J. RUSSELL,
HARRY R. BARBER.