Jan. 26, 1926. 1,570,900

R. H. LIEBERTHAL

COLLAPSIBLE TUBE

Filed Oct. 10, 1922

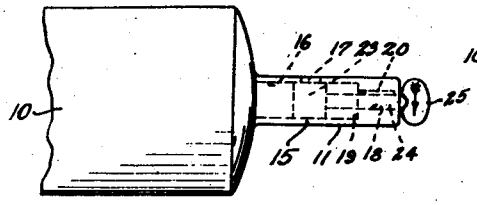


Fig. 1.

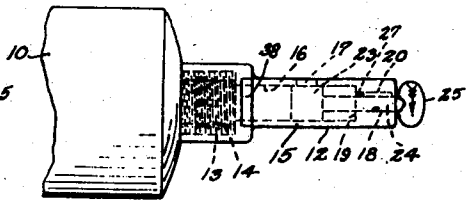


Fig. 2.

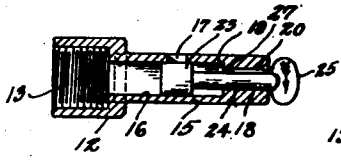


Fig. 3.

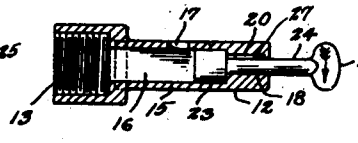


Fig. 4.

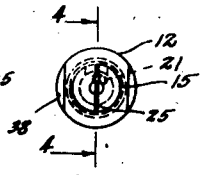


Fig. 5.

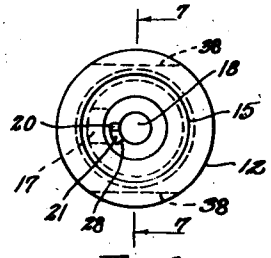


Fig. 6.

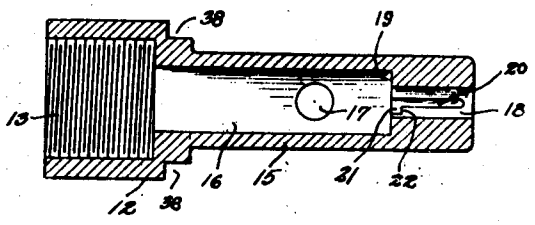


Fig. 7.

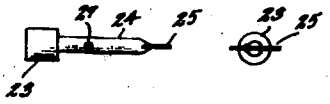


Fig. 8.



Fig. 9.

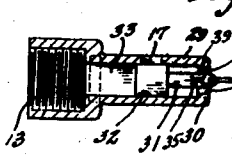


Fig. 10.

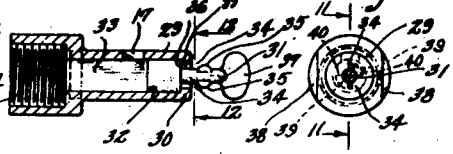


Fig. 11.

Fig. 12.

INVENTOR

Robert H. Lieberthal

BY

Wooster & Davis

ATTORNEYS.

Patented Jan. 26, 1926.

1,570,900

UNITED STATES PATENT OFFICE.

ROBERT H. LIEBERTHAL, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE ALL-IN-ONE MANUFACTURING COMPANY, INCORPORATED, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

COLLAPSIBLE TUBE.

Application filed October 10, 1922. Serial No. 593,612.

To all whom it may concern:

Be it known that I, ROBERT H. LIEBERTHAL, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Collapsible Tubes, of which the following is a specification.

This invention relates to collapsible tubes of the type used for holding paste or liquids such as tooth paste, shaving cream, paints, and so forth, and particularly to the discharge nozzle for these tubes and the means for sealing the same.

It has for an object to provide a discharge nozzle and means for closing the same which will eliminate the removable cap ordinarily employed with such devices, which will be simple in construction and compact, will be sanitary and may be quickly and easily locked to seal the tube or unlocked to allow discharge of the contents from the tube.

With these and other objects in view I have devised the construction illustrated in the accompanying drawing, in which—

Fig. 1 is a side elevation of the discharge end of the collapsible tube showing my improved discharge nozzle, as formed integral with the tube.

Fig. 2 is a similar view but showing the nozzle as a separate attachment which may be applied to the threaded nipple of the common form of collapsible tubes.

Fig. 3 is a longitudinal section of the nozzle shown in Fig. 2 with the piston or plunger in position to close the discharge opening from the nozzle.

Fig. 4 is a similar view showing the piston or plunger removed from the discharge opening, the section being substantially on line 4—4 of Fig. 5.

Fig. 5 is an end view looking from the right of Fig. 4.

Fig. 6 is an end view of the nozzle removed looking from the left of Fig. 7, but drawn to a larger scale.

Fig. 7 is a longitudinal section through the nozzle substantially on line 7—7 of Fig. 6.

Fig. 8 shows a side and end view of the form of plunger shown in Figs. 1 to 5.

Fig. 9 shows a side end view of a similar plunger showing a slightly different form of operating head therefor.

Fig. 10 is a view similar to Fig. 3, but showing a slightly different construction.

Fig. 11 is a view of the construction of Fig. 10 showing the valve open, and

Fig. 12 is an end view of the nozzle taken substantially on line 12—12 of Fig. 11.

The body of the collapsible tube is represented by the numeral 10, a portion only of this body being shown in the drawing, and has at one end thereof a discharge nozzle either formed integral with the body of the tube, as shown at 11 in Fig. 1, or removably attached thereto, as shown at 12 in Figs. 2 to 7. This detachable discharge nozzle may be secured to the body of the tube by any means found desirable, but preferably by internally threading one end thereof, as shown at 13, to fit the ordinary threaded nozzle 14 of the tube.

In the forms shown in the drawing the nozzle comprises a tubular portion 15 having a longitudinal passage 16 therein with a discharge opening 17 leading from the passage 16 to the outside of the tube through one side thereof. This tube may, of course, be made of various shapes as desired, as round, square, oval, and so forth. The passage 16 is reduced adjacent the outer end of the tube, as shown at 18, to provide a guide for a portion of the sealing means as will presently be described, and also to provide a stop shoulder 19. The inner wall of the reduced portion 18 is provided with a longitudinally extending groove 20, preferably terminating short of the outer end of the tube, as shown in Fig. 7, and provided at its inner end adjacent the shoulder 19 with a lateral portion 21 to provide a shoulder 22 to coact with the locking means for the sealing element. The lateral discharge opening 17 is spaced a suitable distance from the shoulder 19 to allow for the sealing element.

This sealing element comprises a piston or plunger 23 fitting the longitudinal passage 16, but slidable longitudinally therein and of sufficient length to properly seal the lateral discharge opening 17. This plunger

or piston is reduced at its outer portion to provide a guiding stem 24 guided in the reduced part 18 of the passageway and has at its free outer end a suitable operating head 25 outside the tube. This head may be formed of various shapes, either flat, oval shaped, as shown in Figs. 1 to 5 and 8; octagonal, as shown at 26 in Fig. 9; or any other shape desired, as round, hexagonal, and so forth. The reduced portion or stem 24 of the plunger is provided with a laterally projecting pin or lug 27 extending into the groove 20 and is so located that when the piston or plunger is pushed inwardly, by pressing on the head 25, to a position over the discharge opening 17, as shown in Fig. 3, it will be in alignment with the lateral portion 21 of groove. It will be apparent that by then turning the head the lug will pass into this lateral portion and by engaging the shoulder 22 will prevent movement of the plunger outwardly away from the discharge opening, and will effectively seal the same, so that any pressure on the body of the tube will not force the contents thereof through the discharge opening. The inner end 28 will form a stop to limit the turning movement of the piston or plunger. If desired instead of providing a lateral portion to the groove the surface of the shoulder 19 may be used to coact with the pin 27 to lock the plunger in closing position. The use of the lateral portion 21, however, provides limiting shoulders at both ends thereof, so that the tube is sealed by turning the head 25 in one direction as far as it will go, or the plunger may be unlocked by turning it in the opposite direction as far as it will go to bring the pin 27 into alignment with the groove 20. After this latter movement it will be apparent that pressure on the body of the collapsible tube will, through the paste in the nozzle, push the plunger upwardly to a position shown in Fig. 4, uncovering the discharge opening 17 and allowing the paste to issue therefrom for use. The outward movement of the piston or plunger will be limited by the shoulder 19. After the desired amount of paste has been removed all that is necessary to seal the tube is to push the plunger inwardly and then rotate the same a partial revolution to bring the pin 27 into the lateral portion 21 of the groove 20. Several means may be employed to limit the movement of the plunger inwardly, such as stop means on the stem or the head may engage the outer end of the nozzle.

If desired suitable indicating means may be employed coacting with the head to indicate whether the plunger is locked or unlocked. If a flat head is used, as shown in Figs. 1 to 5 and 8, a mark of some kind may be placed on the body of the nozzle to indicate either or both of the positions as desired. When an octagonal or other shaped head, as shown in Fig. 9, is used, this mark may coact with another mark on the head or a certain designated edge of the head.

In the slightly different construction shown in Figs. 10, 11 and 12 the outer end of the nozzle 29 is somewhat shortened leaving merely a flange 30 in which the reduced portion 31 of the piston or plunger 32 is guided. The nozzle has a longitudinal passage 33 corresponding to the passage 16 of the other form and a lateral discharge opening 17. The outer end of the nozzle in this form has grooves 34 on opposite sides of the reduced portion 31, and this portion 31 has struck up from the opposite sides thereof lugs 35 adapted to pass through these grooves, these grooves communicating with the interior of the tube adjacent the stop shoulder 36. The flange 30 is, however, cut away adjacent shoulder 36 from the grooves 34, as shown at 39, to form stop shoulders 40. The plunger has an operating head or handle 37 outside of the nozzle. In sealing the tube the plunger is pushed inwardly, the lugs 35 passing through the grooves or notches 34, which lugs are so located as to be within the inner portion of grooves 34 when the head of the plunger is over the opening 17. A partial rotation of the plunger will remove the lugs from alignment with the grooves 34, into the cut away portion 39, thus securing the plunger in position to close the outlet opening. The stop shoulders 40 will engage the lugs and limit this turning movement. When it is desired to use the tube the plunger is rotated to bring the lugs 35 into alignment with the grooves 34, the plunger being automatically stopped in this position by engagement of the lugs 35 on the opposite side of the grooves 34. Pressure on the body of the collapsible tube will then force the plunger outwardly and the paste through the discharge opening 17. Where the nozzles are formed as separate elements as in Figs. 2 to 7 and 10 to 12 they may be provided with flats 38 for engagement of a wrench or pair of pliers to facilitate removal of the nozzle if desired.

It will be apparent from the foregoing description that the closing and sealing means is very simple and compact, that it effectively seals the tube against accidental discharge of the contents thereof, but at the same time, may be quickly and easily released to allow discharge of the contents of the tube when desired, and that after use it may be easily and quickly sealed again. The device is also sanitary and will effectively prevent drying of the paste within the tube. It further does away with the removable cap now in common use, which is

easily misplaced or lost. With this latter type of closure it is also very easy to forget to seal the tube allowing the paste to become dry and hard also contaminated with dirt.

Having thus set forth the nature of my invention, what I claim is:

1. A discharge nozzle for a collapsible tube provided with a discharge opening, a closure for said opening, and means for securing the closure over said opening said means being movable to non securing position by a rotary movement of said closure, and said closure being so arranged that it is movable from closing position by pressure from the contents of the tube when said securing means is released.

2. A collapsible tube having a discharge nozzle provided with a passage and an opening leading from said passage, a closure for said opening within the passage, means arranged to be set at will by a rotary movement of said closure to secure the closure over said opening or release said closure, and means operable by pressure from the contents of the tube to remove the closure from said opening when the securing means is released.

3. A collapsible tube having a discharge nozzle provided with a passage and a lateral opening leading from said passage, a closure for said opening within the passage comprising a piston in said passage movable to and from a position over said opening to close and open the same, and positive means operated by a rotary movement of the closure for securing the piston in position over said opening.

4. A collapsible tube having a discharge nozzle provided with a passage and a lateral opening leading from said passage, a piston movable longitudinally in said passage and adapted to cover said opening, and means for securing the piston in position over said opening operable by turning movement of said piston, and means accessible from the exterior of the nozzle for operating said piston.

5. A collapsible tube having a discharge nozzle provided with a passage and a lateral opening leading from said passage, a movable piston fitting said passage and adapted to close said opening, means operable by a rotary movement of the piston for positively securing the piston in closing position, and means accessible from the exterior of the nozzle for releasing said securing means.

6. A collapsible tube having a discharge nozzle provided with a passage and a lateral opening leading from said passage, a piston fitting said passage and movable longitudinally therein to cover and uncover said opening, one of said elements being provided with a longitudinally extending groove provided with a lateral stop shoulder and the other of said elements being provided with a lug adapted to project into said groove and to engage said shoulder to secure the piston over said opening, and means to turn said piston to bring the lug into alignment with the groove.

7. A collapsible tube having a discharge nozzle provided with a passage and a lateral opening leading from said passage, a piston fitting said passage and movable longitudinally therein to cover and uncover said opening, said piston being provided with a stem having a laterally projecting lug, said nozzle being also provided with a guide passage for said stem having a longitudinal groove in the inner wall thereof and a stop shoulder at the inner end of this groove, and means connected with the stem and operable from the exterior of the nozzle for moving the piston to place the lug either in alignment with said shoulder or said groove.

In testimony whereof I affix my signature.

ROBERT H. LIEBERTHAL.