Nov. 28, 1961 K. L. BROWN 3,010,611

CAPLESS TUBE NOZZLE

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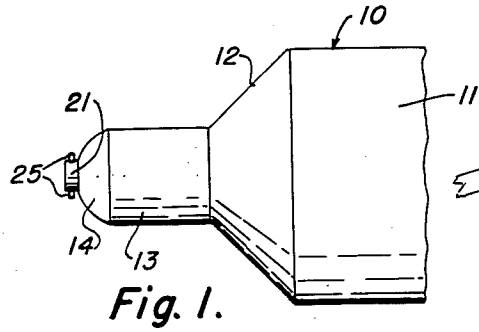


Fig. 1.

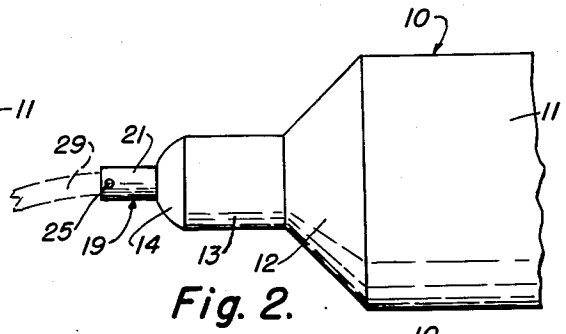


Fig. 2.

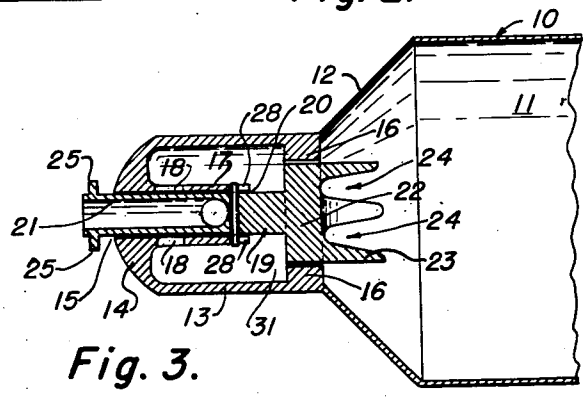


Fig. 3.

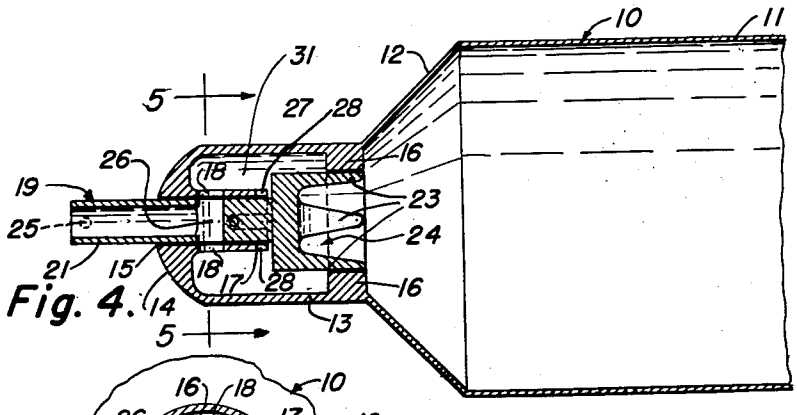


Fig. 4.

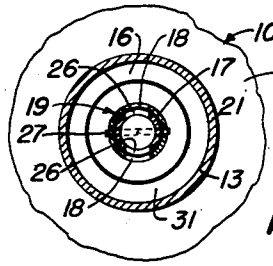


Fig. 5.

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CAPLESS TUBE NOZZLE

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The present invention relates to a discharge nozzle, and more particularly to a discharge nozzle for a compressible tube of the type which is adapted to hold a paste such as tooth paste or the like.

This invention has an object or provision of a capless tube nozzle where it is not necessary to provide a threaded cap for a tube of paste like material and wherein the present invention is constructed so that the nozzle can be selectively locked so as to prevent accidental discharge of the material from the tube or member on which it is being used.

This invention has as another object the provision of a capless tube nozzle which will eliminate the problem of caps becoming accidently lost from tubes or the like, and wherein by squeezing the tube, the contents thereof can be readily and conveniently discharged from the tube onto a tooth brush or the like.

Another object of the present invention is to provide a capless tube nozzle which is simple in construction, easy to use, well adapted for its intended purposes, and relatively inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawing forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary elevational view showing the nozzle in closed position.

FIGURE 2 is a view showing the nozzle in open or extended position.

FIGURE 3 is a sectional view illustrating the nozzle in the closed position.

FIGURE 4 is a sectional view showing the nozzle in open position.

FIGURE 5 is a sectional view taken on line 5—5 of FIGURE 4.

Referring in detail to the drawing, the numeral 10 indicates a portion of a tube or body member which includes a main portion 11 as well as a tapered portion 12, and a generally cylindrical end portion 13. The end portion 13 is provided with an end wall 14 which has a central aperture 15 therein, FIGURE 3. There is formed or provided on the inner surface of the portion 13 a circular shoulder 16 which is arranged contiguous to the junction of the portions 12 and 15, for a purpose to be later described.

Extending inwardly from the end wall 14 and secured thereto or formed integral therewith is a cylindrical hollow skirt 17 which is provided with diametrically opposed openings or apertures 18 therein

There is further provided a movable plunger as indicated generally by the numeral 19, and the plunger 19 includes a shaft 20 which includes a hollow portion 21 that is mounted for sliding movement through the aperture 15 and the end wall 14. The movable plunger 19 further includes an enlarged head 22 on its inner end, and secured to the head 22 or formed integral therewith is a plurality of spaced apart fingers 23 which have spaces 24 therebetween, the head 22 being mounted for sliding movement through the shoulder 16, as for example as shown in FIGURE 3.

Secured to the outer end of the stem 20 or formed integral therewith are lugs 25. The stem 20 is also provided with a cutout or cutaway portion 26 which is

mounted for movement into and out of registry with the openings 18 as the plunger 19 slides back and forth.

There is further provided a manually operable locking means for selectively maintaining the plunger 19 at its innermost position, and this locking means comprises a pin 27 which extends through the stem 20. The pin 27 is adapted to selectively seat in opposed notches or slots 28 which are formed in the skirt 17.

In FIGURE 2 the numeral 29 indicates the paste which may be tooth paste or the like which is being squeezed or dispensed from the device.

From the foregoing, it is apparent that there has been provided a capless tube nozzle for use with a tube or member such as the member 10. The member 10 may contain a suitable material such as tooth paste which is to be dispensed, and the portion 11 is made of a material which is manually compressible. When the paste is not to be dispensed, the plunger 19 is in the closed or inner position as shown in FIGURES 1 and 3 for example. Thus, when the parts are arranged as shown in FIGURES 1 and 3, the openings 18 will be blocked off by the stem portion 21 and the head 22 will block off the space within the shoulder 16 so that no paste can be accidently dispensed therefrom. The pin 27 is adapted to be snugly seated in the slot 28 so as to provide a locking or safety feature which prevents accidental outward sliding movement of the plunger 19, so that accidental dispensing or discharge of the paste or other material will be prevented.

When it is desired to dispense some of the material from the tube 10, the lugs 25 can be manually gripped and then the pin 27 can be released from its slot 28 and the plunger 19 can be turned slightly in the skirt 17. Then, by squeezing on the portion 11, the pressure on the paste or other material will cause the plunger 19 to move outwardly as for example to the position shown in FIGURES 2 and 4. Thus, with the plunger in the position of FIGURES 2 and 4, the paste is free to pass out through the spaces 24 into the interior of the portion 13, and the paste can then pass through the opening 18 and then through the opening 26 and then out through the hollow stem 21 whereby the paste can be deposited on a tooth brush or the like.

As shown in the drawing, the skirt 17 is also adapted to be provided with notches or cutouts 30 which may receive the pin 27 when the plunger 19 is in the extended position and this helps maintain the plunger in its proper aligned position when paste is being dispensed.

The prongs or fingers 23 on the large end of the floating plunger 19 serve as a guide for the plunger which enters the cylinder.

According to the present invention it will be seen that there has been provided a capless tube nozzle for tubes containing tooth paste, shaving cream, or other jellied substances, or liquids such as grease, cream, oil, or the like. Most tube nozzles require a screw cap which is inconvenient to use and is often misplaced, and when the cap is used the paste or tube ingredients often collect around the nozzle and present an untidy appearance and if the cap is lost the substance will ooze or leak from the tube and create an unsanitary and messy sight.

In the present invention, there is provided a simple to operate, self cleaning nozzle which is always clean and which has no detachable caps or parts to manipulate. The nozzle is closed simply by pushing the discharge spout in, which not only shuts off the supply of paste or other substance, but by means of the nozzle's construction, creates a vacuum inside an inner chamber which pulls the substance from the discharging spout into the inner chamber where it can be sealed off. The spout is opened merely by applying a pressure to the tube or by pulling out on the discharge spout unless the nozzle has

been locked closed to prevent it opening from tube pressure alone.

When desired, the nozzle can be locked closed so that it will not reopen and discharge the substance when pressure is applied to the tube, and to do this, the spout is rotated a fraction of a turn after it has been pushed in place. To reopen, the spout is rotated back to its original position and either pulled out or pressure applied to the tube.

When the nozzle is in the open position, the discharging spout is extended so as to allow the openings **26** and **18** to align so that the substance can enter the interior of the portion **13** and then pass out through the openings **18** and **26** out to the stem **21**. When the nozzle is being closed, a vacuum will pull the material or substance, such as paste from the stem portion **21** into the chamber **31**, the chamber **31** being provided or defined by the interior of the portion **13**. Further movement of the spout inward creates more vacuum in the chamber **31**, and when the nozzle is closed, the substance is sealed off so that no further dispensing will take place. The nozzle can be locked in closed position by means of the pin **27** which engages the notch **28** in the inner end of the skirt **17**, and to lock the plunger, the plunger is rotated a portion of a revolution which mechanically locks the spout in place and at the same time rotates the opening **26** out of alignment with the portions **18** and seals the opening.

It is to be noted that according to the present invention there is provided a sliding plunger which is designed with a larger head on the inner end than on the stem so as to create a vacuum when the nozzle is closed which tends to clean the mouth of the spout or the like.

Minor changes in shape, size and rearrangement of details coming within the field of invention claimed, may be resorted to in actual practice, if desired.

What is claimed is:

1. In a device of the character described, a body member including a main portion, a tapered portion, and a generally cylindrical end portion, a circular shoulder on the inner surface of said end portion, said shoulder being arranged contiguous to the junction of the tapered portion and end portion, the end portion including an end wall provided with a central aperture therein, a skirt extending inwardly from said end wall and provided with diametrically opposed apertures therein, a movable plunger including a stem having a hollow portion projecting through the said skirt and aperture, there being a cutaway portion in said stem mounted for movement into and out of engagement with said apertures, lugs on the outer end of said stem, a head larger than said stem on the inner end of said plunger mounted for sliding movement through said shoulder, a plurality of spaced apart fingers extended from said head, a pin connected to said stem, there being slots in said skirt for selectively receiving said pin.

2. In a device of the character described, a body member including a main portion, a tapered portion, and an end portion, a shoulder on the inner surface of said end portion, said shoulder being arranged contiguous to the junction of the tapered portion and end portion, the end portion including an end wall provided with an aperture therein, a skirt having slots extending inwardly from said end wall and provided with apertures therein, a movable plunger including a stem having a hollow portion projecting through said skirt and aperture, there being a cutaway portion in said stem mounted for movement into and out of engagement with said apertures, lugs on the outer end of said stem, a head larger than said stem on the inner end of said plunger mounted for sliding movement through said shoulder, a plurality of fingers extending from said head, and a pin connected to said stem for slidably engaging the slots of said skirt.

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