June 26, 1934. C. M. BREHM 1,964,311

DISPENSING DEVICE FOR COLLAPSIBLE TUBES

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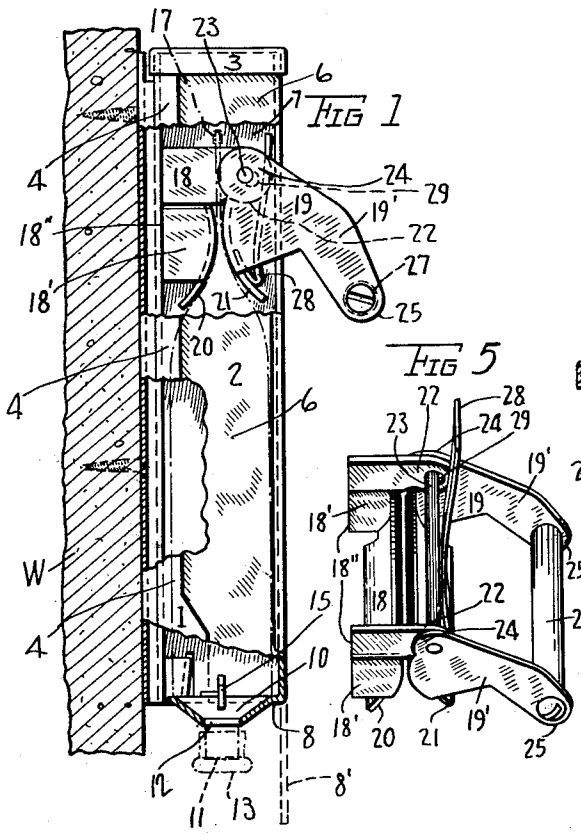


FIG 1

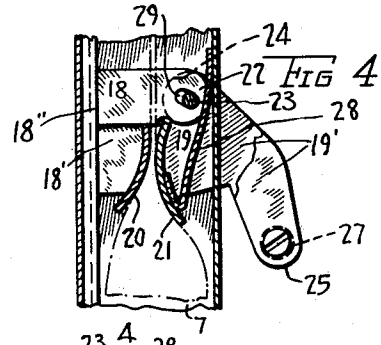


FIG 4

FIG 5

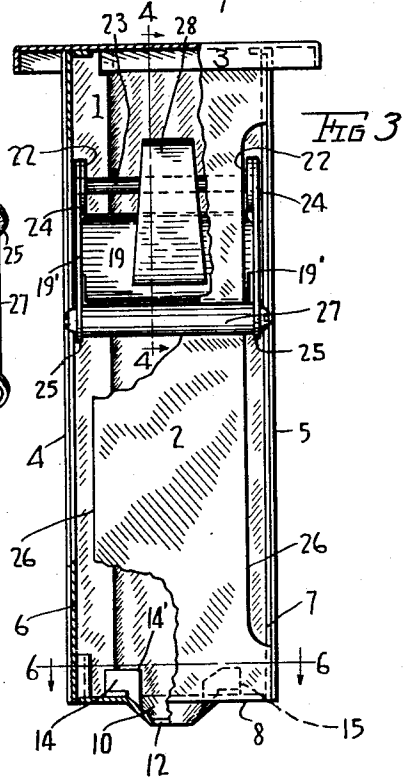


FIG 3

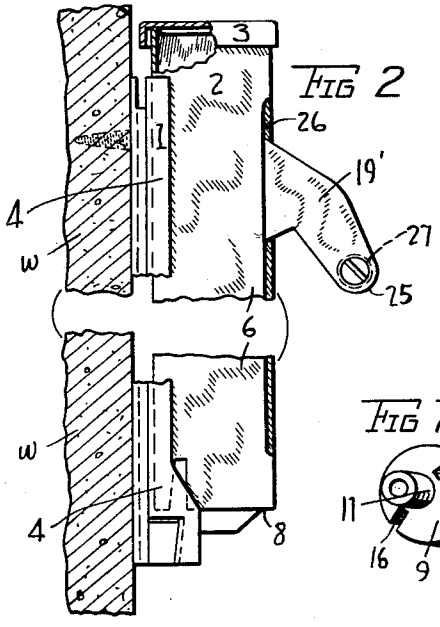


FIG 2

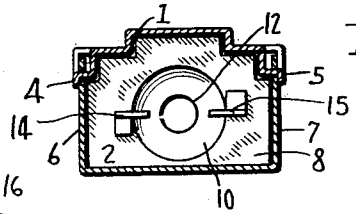


FIG 6

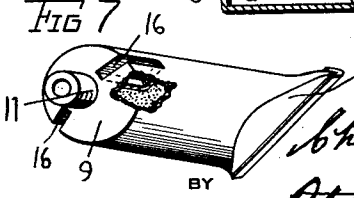


FIG 7

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DISPENSING DEVICE FOR COLLAPSIBLE TUBES

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14 Claims. (Cl. 221—60)

This invention relates to improvements in devices by which a material such as tooth paste is dispensed from collapsible tubes in quantities sufficient for the purpose, the invention relating to the squeezing mechanism and to the support for the tube whereby twisting of the tube at any time is prevented.

One of the objects of the invention is to provide a paste dispenser which by simple pressure on a conveniently arranged lever will eject a desired quantity of material from the tube, the dispensing mechanism being of such form and nature as to leave a minimum quantity of paste within the walls of the collapsed tube during the entire operation and also when the tube is no longer compressible.

Another object is the provision of means which support the tube in a manner whereby the tube is prevented from distortion when the tube cap is screwed on or unscrewed from the tube.

In the accompanying drawing:

Fig. 1 is a view partly in side elevation and partly in vertical section of a paste dispenser embodying the principles of the invention, the tube squeezing mechanism being shown in one position of its operation.

Fig. 2 is a view in side elevation with a small portion broken away to show in vertical section a detail of the casing construction, the purpose of the view being to show one step in the operation of separating the casing whereby an empty tube is removed and a filled tube is placed in position.

Fig. 3 is a view partly in front elevation and partly in vertical transverse section of the improved dispenser.

Fig. 4 is a fragmentary vertical section taken on the line 4—4 of Fig. 3 showing the tube squeezing mechanism in another working position as compared to Fig. 1.

Fig. 5 is a perspective view of the tube squeezing mechanism.

Fig. 6 is a horizontal section on the line 6—6 of Fig. 3.

Fig. 7 is a perspective view of a collapsible tube especially adapted for use in the improved dispenser.

Referring to the drawing, the casing of the dispenser comprises the pressed sheet metal members, the wall-plate, tube-holder and top, indicated in general at 1, 2 and 3, respectively. The wall-plate 1 is of channel-section and is adapted to be secured to a point such as the surface of a wall W. Slidably fitted within the comparatively short legs 4 and 5 of the wall-plate is the tube-holder 2 also of channel-section. The tube-holder constitutes the greater portion of the casing, since the integrally attached legs 6 and 7 are much greater in depth than the above-mentioned legs 4 and 5 of the wall-plate and form the side walls of the casing. The bottom plate 8 on which the tube is supported in an inverted position is also an integral part of the tube-holder, the bottom plate being initially a tab shown in broken lines at 8′ (Fig. 1), this tab being formed for a purpose which will appear later and turned inwardly as shown in Fig. 1. In the present case the top 3 is a small rectangular member with downturned edges permanently secured in any suitable manner to the upper ends of the side walls 6 and 7.

The tube holder 2 is further formed so as to have a simple sliding and hooking engagement with the wall-plate 1, and since the particular form of such engaging portions does not have any bearing on the present invention, a detailed description thereof is not made other than to point out that to remove the tube-holder 2 from its engaged position with the wall-plate (Fig. 1) showing the tube-holder in such position, it is only necessary to slide the tube-holder vertically a short distance as shown in Fig. 2, after which the tube-holder may be removed bodily.

With the casing members in interlocked engagement with each other, a hollow box results large enough to receive a collapsible tube of ordinary size, and within the interior the squeezing mechanism to be described is slidably fitted. As before stated, the tube is inverted when in dispensing position, its threaded end or neck portion being downwardly disposed as shown by the dot-dash lines in Figs. 1 and 3. The bottom plate 8 supports the inverted tube, and as these tubes are usually manufactured with a sloping shoulder 9 (Fig. 7) a conical depression 10 is formed in the bottom plate 8, and to receive the threaded neck 11 of the tube there is provided at the lower portion of the conical depression, a circular opening 12, through which the neck projects a distance sufficient to permit of replacing the tube-cap 13 whereby the contents of the tube are kept in a sanitary condition.

In order to prevent distortion of the tube when the tube cap is being replaced on the neck of the tube or being unscrewed therefrom, which distortion would possibly interfere with the proper operation of the squeezing mechanism in that all of the material might not be expelled from the tube, a pair of vertically disposed lugs 14 and 15 are provided. These lugs are secured prefer-

ably by spot-welding to the upper surface of the bottom plate 8 in diametrically opposed positions, and at such distance from the central portion of the depression 10 as to provide that they will project upwardly into the sides and shoulder of the tube; and, to receive the lugs, the tube is a special tube provided with recesses 16 formed by depressing the wall of the tube adjacent the neck into the interior thereof. Any leakage therefrom is prevented at these points. These recesses are disposed in the same plane as the clipped end 17 of the tube for the reason that the tube can not be placed in the tube holder in any position other than the correct position for dispensing because of the fact that the jaws of the dispensing or squeezing mechanism engage and flatten the tube in the same plane as the clipped end.

A further advantage obtainable by the use of the special tubes recessed in some manner similar to that already described is that a manufacturer of tooth paste or other material dispensable from tubes may offer to the public dispensers without charge in return for the privilege of replenishing the dispensers with fresh paste, and his investment in the dispensers is protected and a loss in his business of supplying fresh paste is prevented by providing that his paste only is furnished in tubes which are operable in dispensers that conform to the formation of the particular tube by preventing the substitution of other paste furnished in ordinary tubes by another manufacturer. An ordinary tube without recesses or a formation complementary to the formation of the supporting bottom plate of the dispenser can not be successfully used, as for example, the height of the lug 14 may be the same as the lug 15, but the lug 15 is trimmed off at its inner upper corner as shown in Fig. 3, while the lug 14 is provided with the square corner 14', whereby the contact of the sloping shoulder of an ordinary tube with the corner 14' of the lug 14 causes a misalignment of the ordinary tube, and the neck thereof does not project through the opening 12 of the bottom plate 8. Further, even if one of the lugs were not beveled as described, the height would be such as to prevent insertion of the neck of the ordinary tube and if such tube were forced down over such lugs, puncturing the tube, the pressure of the squeezing mechanism on the material would be sufficient to cause leakage at the punctures.

The dispensing or squeezing mechanism is a manually operated device shown separately as a unit in Fig. 5, and is for the most part of such general outline as to be adapted to slidably fit in the interior of the connected casing members 1 and 2. The elements of the squeezing mechanism consist of a pair of oppositely formed pressed sheet metal members indicated in general at 18 and 19, each of which is provided with a complementary curved portion 20 and 21 which may be likened to corresponding portions of the surfaces of a pair of horizontally disposed wringing rollers placed closely adjacent each other in parallel relation. The disposition of the curved surfaces is such that their closest approach to each other is near their upper edges, from which point each flares downwardly and outwardly from each other, whereby when in place in the dispenser the curved surfaces conform to and rest on the slopes of the tube at the clipped end 17 thereof. The member 18 will be termed the stationary member, while the member 19 will be referred to as the movable member, it being explained later, however, that the unit composed of these two members is capable of a downward sliding movement by the effect of gravity following an operation of the squeezing unit.

The members 18 and 19 are pivotally connected with each other, the connection, however, being of such nature that for an initial portion of the squeezing operation, a desired simple pivotal movement of the movable member 19 takes place, followed by a rolling action of the same member with respect to the stationary member 18, whereby a more thorough squeezing operation is obtained as will be explained, and to provide for such movements, the pivotal connection of the movable member with the stationary member is made at a point at one side of and above the point of closest approach of the curved surfaces 20 and 21.

In horizontal cross section the member 18 is U-shaped, having legs 18' integrally attached at each end of the curved portion 20 and at the upper ends of each of these legs 18' an integrally attached ear 22 is provided which projects beyond and above the upper edge of the curved portion 20 oppositely from the leg portion 18'. The length of the leg portions 18' is such that when the unit is assembled in the connected casing, the forward portion of the curved surface 20 is substantially in vertical alignment over the center of the neck opening 12 in the tube supporting plate 8, while the rearward edges 18'' (Fig. 5) of the legs 18' bear lightly against the inner surface of the wall-plate 1.

In order to compress the tube thoroughly the mating curved surface 21 of the movable member 19 is retained closely adjacent the curved surface 20 of the member 18, there being provided a pivot pin 23 which passes through the central portion of the ears 22 of the member 18 and also through ears 24 with which the movable member 19 is provided, and as before stated, in order to obtain the particular pivotal and rolling action which is desired, the ears 22 are extended to one side of the point where the mating curved surfaces most closely approach one another; therefore, the ears 24 with which the movable member 19 is provided for the pivotal connection are located on that side of the center line of the meeting of the curved surfaces.

Like the stationary member 18, the movable member 19 is also substantially U-shaped in horizontal cross-section, there being provided the legs 19' integrally attached at each end of the curved portion 21. The ears 24 are an upward continuation of these legs 19', while the legs are further extended downwardly and forwardly whereby when assembled in the casing, these extensions indicated at 25 project through vertically disposed slots 26 in the front panel of the forward casing portion 2, and are united at their extremities by a bar 27 whereby a double-armed lever is formed for the operation of the squeezing mechanism.

The operation of the dispenser is as follows: The special tube conforming to the formation of the tube supporting plate of the particular dispenser is inverted and placed within the interior of the forward casing portion 2 which has previously been removed from the wall-plate 1. The squeezing mechanism is slid upwardly to the upper end of the casing and the curved portions are separated sufficiently to insert the clipped end 17 of the tube between the curved portions. As described before, the location of the lugs 14 and 15 in connection with the positioning of the recesses 16 in the special tube is so aligned as to provide that the clipped end of the tube is in the same plane as the axial direction of the curved sur-

faces. The squeezing device is allowed to drop as far as it will on the upper end of the tube and the casing portion 2 is interlocked with the wall plate 1 by placing the portion 2 in the position as shown in Fig. 2 and sliding the same downwardly when the hook portions (not described) coact with suitable engaging formations to securely retain the forward casing in position.

On downward pressure of the lever bar 27, a quantity of the material is expelled from the tube. Fig. 1 shows the relative position of the parts at the beginning of the downward movement, and due to the positioning of the pivotal point of the movable member with the stationary member as shown, the movable member 19 swings toward the tube but also in an upwardly direction, eventually making contact with the tube walls and pressing the same between the curved portion of the movable and stationary members. Further downward pressure on the lever bar brings into action a flat spring 28 which up to this time has had no operative function, but which now makes contact with the inner surface of the front panel portion of the forward casing whereby a change is made in the fulcrum position of the movable member 19, it being noted that the flat spring 28 is secured to the inner central portion of the movable member and extends upwardly to a point well above the center of the pivotal point as represented by the pivot pin 23.

On still further downward movement of the lever bar, an action results which effectively squeezes a quantity of paste from the tube, as the movement is now a rolling action of the movable member 19 on the stationary member 18 whereby no quantity of material may be forced upwardly in the previously flattened portion of the tube. The flat spring 28 now acts as a yielding fulcrum making contact at its upper end only. In order to permit the rolling action to take place freely, the opening in each ear 22 of the stationary member (in the present case) through which the pivot pin 23 is inserted is slightly elongated in a downward and forward direction as shown at 29, Figs. 1, 4 and 5, or in other words, the direction in which an epicycloidal movement of the pivot pin takes place, which direction also insures that the preliminary pivotal movement will take place as described.

The relative position of the parts at the end of the downward stroke is shown in Fig. 4, and although the showing is somewhat exaggerated for purposes of clearly illustrating the action, the nature of the squeezing effect on the tube walls by the device will be readily understood by comparison of the shape of the tube shown in Fig. 1.

When pressure is removed from the lever bar, the flat spring acts to return the movable member 19 to its normal position shown in Fig. 1, but only partly so, since in such return movement the spring is swinging away from its contact with the inner surface of the casing member 2 and eventually leaves the surface entirely, it being noted in Fig. 1 that a small gap is present between the upper end of the flat spring and the surface of the casing. This is for the reason that gravity can be relied upon to seat the device for the next expulsion movement, and the spring being free from contact with the casing offers no friction to prevent or hamper such gravity movement. When the device is acted upon by gravity the upper end of the tube acts as a cam to spread the movable member 19 apart and the device settles downwardly on the upper end of the tube until a further settling movement is arrested by friction of the parts on the tube.

Having thus described my invention, I claim:

1. In a dispensing device of the character described, the combination of a collapsible tube provided with a threaded neck, a support for the discharge end of said tube through which the neck extends, and initially and permanently formed means on both the support and tube to interengage the discharge end of the tube adjacent the neck with said support to prevent the tube from turning.

2. In a dispensing device of the character described, the combination of a collapsible tube provided with a threaded neck, a support for said tube through which the neck extends, said tube adjacent the neck and said support having the one an initially and permanently formed recess and the other a lug to engage the recess.

3. In a dispensing device of the character described, the combination of a collapsible tube provided with a threaded neck, a support for the discharge end of said tube through which the neck extends, said tube adjacent said neck having an initially and permanently formed recess, and a lug on the support to engage in the recess.

4. In a dispensing device of the character described, the combination of a collapsible tube having a threaded neck, a support for the discharge end of said tube through which the neck extends, the discharge end of said tube having a pair of oppositely arranged initially and permanently formed recesses adjacent the neck, and a pair of oppositely arranged lugs on said support to engage in said recesses.

5. In a dispensing device of the character described, the combination with a collapsible tube having a clipped closed end and a discharge end provided with a threaded neck, the discharge end of said tube adjacent said neck having an initially and permanently formed recess disposed in the same plane as the clipped end of the tube, a support for the discharge end of said tube through which the said neck extends, a lug on said support to engage in said recess, and squeezing devices to receive the clipped end of said tube.

6. In a dispensing device of the character described, the combination of a collapsible tube having a clipped closed end and a discharge end provided with a threaded neck, the discharge end of said tube adjacent said neck having a pair of oppositely arranged initially and permanently formed recesses disposed in the same plane as the clipped end of the tube, a support for the discharge end of said tube through which said neck extends, a pair of oppositely-arranged lugs on said support to engage in said recesses, and squeezing devices to receive the clipped end of said tube.

7. In a dispensing device of the character described, the combination of a collapsible tube, a support for the discharge end of said tube, the discharge end of said tube having a pair of oppositely arranged recesses, a pair of oppositely arranged vertically disposed lugs on said support to engage said recesses, one of said lugs having a right-angled upward inner corner and the other lug having an inclined upper inner corner.

8. In a dispensing device of the character described, a casing, a pair of curved squeezing jaws pivotally connected to each other and slidably

mounted in said casing, an operating lever rigidly attached to one of said jaws and projecting through a slot in a wall of said casing, and a flat spring attached at one end of said last mentioned jaw and having its free end arranged to engage the casing and form a yieldable fulcrum, the other jaw being adapted to bear upon the casing and be held from movement thereby during the squeezing operation.

9. In a dispensing device of the character described, a casing, a pair of curved squeezing jaws pivotally connected to each other at a point at one side of the center line between said jaws, said jaws being slidably mounted in said casing, an operating lever rigidly attached to one of said jaws and projecting through a slot in a wall of said casing, and a flat spring attached at one end of said last mentioned jaw and having its free end arranged to engage the casing after a predetermined movement of said jaw and form a yieldable fulcrum, the other jaw being adapted to bear upon the casing and be held from movement thereby during the squeezing operation.

10. In a dispensing device of the character described, a casing, a pair of curved squeezing jaws pivotally connected to each other and slidably mounted in said casing, the closest point of approach of said jaws in idle position being near the upper ends thereof with the jaws flaring from each other below said point, an operating lever rigidly attached to one of said jaws and projecting through a slot in a wall of said casing, and a flat spring attached at one end to said last mentioned jaw and having its free end arranged to engage the casing and form a yieldable fulcrum after a predetermined movement of said jaw, the other jaw being adapted to bear upon the casing and be held against movement thereby during the squeezing operation.

11. In a dispensing device of the character described, a casing, a pair of curved squeezing jaws pivotally connected to each other at a point at one side of the center line between said jaws, the pivotal connection between said jaws including a pivot pin connected with one jaw and an elongated opening in a part connected with the other jaw, an operating lever rigidly attached to one of said jaws and projecting through a slot in a wall of said casing, and a flat spring attached at one end to said last mentioned jaw and having its free end arranged to engage the casing after a predetermined movement of said jaw and form a yieldable fulcrum, the other jaw being adapted to bear upon the casing and be held from movement thereby during the squeezing operation.

12. In a dispensing device for collapsible tubes, a casing, a pair of curved squeezing jaws in said casing, said jaws being pivoted together with the pivot point at one side of the center line between said jaws and above the jaws, means to hold one of said jaws stationary during the squeezing operation, and manual means to roll the other jaw upon the stationary jaw with the tube therebetween.

13. As an article of manufacture, a collapsible tube of the character described having a discharge end provided with a threaded neck, said tube having an initially and permanently formed recess adjacent said neck.

14. As an article of manufacture, a collapsible tube of the character described having a discharge end provided with a threaded neck, said tube being provided with a pair of initially and permanently formed opposite recesses adjacent said neck.

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