June 9, 1936. H. R. HUGHES 2,043,248

SQUEEZER FOR COLLAPSIBLE TUBES

Filed Oct. 15, 1934

FIG. 1

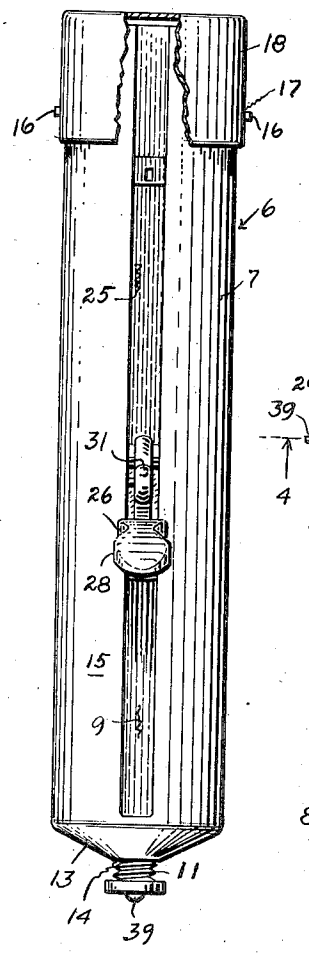


FIG. 2

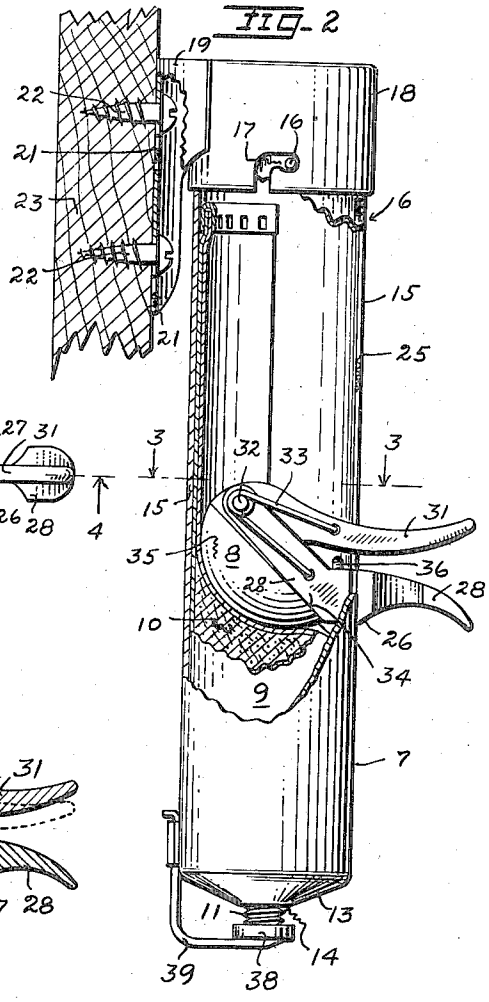


FIG. 3

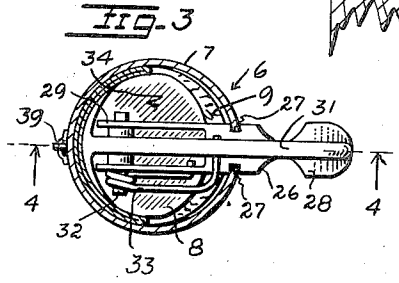


FIG. 4

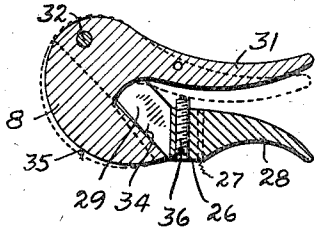
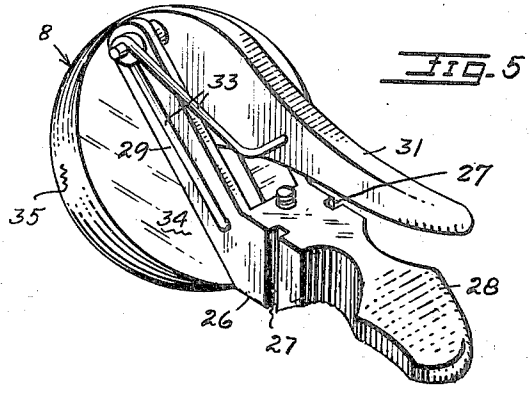


FIG. 5



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SQUEEZER FOR COLLAPSIBLE TUBES

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8 Claims. (Cl. 221—60)

The invention relates to a device for squeezing collapsible tubes containing plastic materials such as tooth-pastes, cosmetic creams, pharmaceutical preparations, oil paints, adhesives, etc., for expressing charges of the tube contents through the discharge nozzle of the tube.

An object of the invention is to provide a generally improved and particularly simple tube squeezing unit which is operative to completely empty a tube through and progressively toward the tube nozzle.

Another object is to provide a tube squeezing means which is arranged to deliver adjustably metered charges at the tube nozzle at successive actuations thereof.

A further object is to provide a tube squeezing device which is operative independently of any mounting of the device.

Yet another object is to provide for a convenient support and disposition of the device and a tube therein.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment of the device and in the accompanying drawing in which,

Figure 1 is a front elevation of the tube squeezer unit embodying the present features of invention and carrying a collapsible tube therein, said unit being shown as mounted on a supporting bracket therefor and a bracket portion being broken away.

Figure 2 is a side elevation of the unit and its mounting, portions of the structures being broken away to show details of the device.

Figure 3 is a plan section at 3—3 in Figure 2.

Figure 4 is a section taken at 4—4 in Figure 3 through operative elements of the device which are unitarily associated.

Figure 5 is an enlarged perspective view of the associated operating elements.

The features of the present invention are particularly shown as being incorporated in part in a tube squeezing unit 6 wherein a tubular casing 7 carries a pressure element 8 for a progressive tube-squeezing operation against a collapsible tube 9 disposed in the casing and containing a plastic material 10 for extrusion from the tube by and upon a squeezing thereof. The collapsible tube 9 is assumed to be of a usual pliable-walled structure having one end sealed and the other end provided with a discharge nozzle 11, said nozzle being shown as being externally threaded to mount the usual closure cap for the tube.

An end wall 13 of the casing 7 tapers to an axial opening 14 which is arranged for the extension therethrough and therefrom of the nozzle 11 of a tube 9 disposed in the casing and engaged against the inner face of the wall 13. The bore of the tubular side wall 15 of the casing is of constant size for its entire length, and the casing is fully open at the end thereof opposite the end wall 13 whereby it may reecive an initially cylindric tube 9 from said end and with the disposal of the tube nozzle 11 through the opening 14.

Adjacent its open end, the casing wall 15 mounts radial pins 16 for engagement in correspondingly located bayonet slots 17 provided in the side wall of a cap member 18 which is operative to close the casing end thereat. As shown, the cap 18 is fixed on a bracket 19 which provides key-hole slots 21 for receiving the heads of screws 22 which extend from any supporting wall 23. In this manner, the unit 6 may be removably suspended from the cap 18 to dispose the tube nozzle downwardly, as is illustrated.

It will now be noted that the casing wall 15 is provided at its front portion with a longitudinal slot 25 which extends from the open tube end to the casing end wall 13, said slot being of uniform width and the casing side wall portions adjacent the slot 25 being of uniform thickness. An elongated member 26 is slidably mounted at the slot 25, said member being provided intermediately thereof with mutually parallel grooves 27 at its opposite sides for slidably receiving the front wall portions adjacent the slot whereby the member 26 is limited to a rectilinear movement along the slot while maintaining a generally fixed angular relation to the casing.

The member 26 provides an arm portion 28 extending radially of and from the casing in transverse relation to the casing axis, said arm 28 being formed and arranged for the engagement of a person's finger at the side thereof toward the casing end 13. The inner portion of the member 26 comprises an arm 29 which pivotally mounts the pressure element 8 at its inner end. As particularly shown, the arm 29 is forked to span an arm 31 which extends rigidly from the element 8 and through and from the slot 25 opposite the arm 28 of the member 26 in normally spaced relation from the latter arm.

At its inner end, the arm 31 is pivoted to the arm 29 by means of a pivot pin 32 for a swinging of the arm 31 in the common plane of the arms whereby the arms may be engaged and urged toward each other by and between a person's fingers appropriately applied to the arms. A spring 33

is coactive between the arms 29 and 31 of the elements 26 and 8 respectively whereby said arms are urged apart for maintaining the normal relation of the pressure element 8 and the member 26 in the normal relation thereof which is disclosed in Figures 2, 4, and 5. As shown, the mutual separation of the arms 29 and 31 is limited by the engagement of the back face 34 of the element 8 with the under side of the arm 29 of the member 26.

It will now be noted that the element 8 is formed generally as a segment of an ellipsoid, generally partitions the casing cavity, and has its flat back face 34 oblique to the casing axis; as shown, the face 34 normally makes an angle of about forty-five degrees with said axis. When the convex working face 35 is presented against an underlying portion of the tube 9, the permitted rocking of the element 8 about its pivotal axis at the pin 32 is arranged to press the tube portion engaged by it obliquely toward the back wall portion of the casing and so squeeze the tube for expressing a charge of its contents from the tube nozzle 11.

A stop pin 36 is mounted in the member 26 for adjusted extension toward the arm 31 for limiting the movement of the latter arm toward the arm 28; as shown, the pin 36 threadedly engages in the member 26 for its required adjustment. It will be understood that the amount of material 10 delivered from the tube 9 through the nozzle 11 at each actuation of the present squeezer is directly determined by the degree of swinging of the arm 31 whereby the setting of the pin 36 determines the maximum amount of material which may be delivered from the tube at each actuation of said arm to press the element 8 against the tube.

Instead of applying the usual cap for the tube 9 on the tube nozzle 11, I prefer to cover the nozzle end with an unthreaded and shallow cap 38 which is carried on an L-shaped spring arm 39 extending downwardly and inwardly from the bottom of the back wall of the casing 7. The spring arm portion 39 which extends longitudinally of the casing 7 is swivelled to the casing whereby the lower arm portion may be swung to dispose the cap 38 beneath or away from the nozzle end.

It will now be noted that when the casing 7 is disengaged from the cap 18, and the unitary assembly of the element 8 and the member 26 is removed from the casing, a full tube 9 may be placed in the casing to have its nozzle 11 disposed through the opening 14 in the end wall 13. The element 8 and member 26 are then remounted in and on the casing and are disposed with the element 8 operably engaging the tube adjacent its closed end, and the casing may be remounted in suspended disposition from the cap 18.

With the nozzle 11 open, a manual pressing of the arms 28 and 31 toward each other is arranged to rock the element 8 against the tube for expressing a charge therefrom, it being noted that the first result of moving the arms 28 and 31 toward each other is to fix the member 26 to the casing front by reason of the engagement of the wall portions at the sides of the slot 25 in the grooves 27 of the member whereby the pivotal axis provided at the pivot pin 32 remains fixed for the balance of a working stroke of the element 8. Furthermore, the element 8 is so shaped and disposed that the tube 9 is completely and progressively flattened against the back half of the casing bore as the material 10 is expressed from the tube, this condition being brought out in Figures 2 and 3.

It will be understood that when a working stroke of the element 8 is completed and the arms 28 and 31 are released for their mutual separation by reason of the action of the spring 33, the element 8 tends to remain in the concavity which is made by it in the opposed tube portion, and the member 26 is lowered as the arms separate. In this manner, repeated actuations of the element 8 automatically advance its zone of operation downwardly along the tube as the material is discharged from the tube, and a complete flattening out of the emptied tube portion is effected above the element 8.

While the previously described operation of the present tube squeezing unit takes advantage of gravity to maintain the pressure element 8 in operative relation to a tube in the casing 7, it will be understood that the tube squeezing operation is performed independently of the mounting or disposition of the casing by reason of the fact that the reaction to the operative pressure of the element 8 through the tube and against the back wall portion of the casing is transmitted to the front wall portion through the member 26 to which the member 8 is pivoted. The present tube squeezing unit 6 is therefore understood to be readily operable as described while the same is dismounted from the supporting cap 18 and is otherwise free. If the tube 9 is in other than the inverted position shown therefor, it may be necessary to manually move the element 8 against the unflattened tube portion before the element is rocked in the described manner to express material from the tube in the described manner, it being noted that the member 26 will in any event become locked in position as an operative rocking of the element is begun.

From the foregoing description taken in connection with the accompanying drawing, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains. While I have described the features and the principle of operation of a device which I now consider to be a preferred embodiment of my invention, I desire to have it understood that the showing is primarily illustrative, and that such changes may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a squeezer for a collapsible tube containing plastic material and having a terminal discharge nozzle, a tubular casing receiving the tube with its nozzle protruding therefrom, a squeezing element disposed within said casing for swinging actuations thereof against the tube in the casing to flatten the tube against a casing wall portion, and a member pivotally carrying said element and slidably mounted at the wall portion opposite said first wall portion for a solely rectilinear advancement of the pivot point toward the nozzle end of the tube as the latter is flattened.

2. In a squeezer for a collapsible tube containing plastic material, a tubular casing receiving the tube, a squeezing element disposed within said casing for swinging actuations thereof obliquely against the tube in the casing to progressively flatten the tube against a portion of the casing wall while extruding the tube contents, a member pivotally connected with said element and slidably mounted on the casing for a solely rectilinear movement of the pivotal con-

nection between the member and element, and arms extending from said element and member outwardly of the casing and in angularly spaced relation for manual engagement to effect a swinging movement of the element with respect to the member and thereby effect a tube-squeezing actuation of the said element.

3. A structure in accordance with claim 2 having means whereby the said member is automatically locked against displacement during an operative actuation of the said element.

4. A structure in accordance with claim 2 having means coactive between the member and element to limit the relative swinging of the said arms, and means constantly and yieldingly urging a mutual separation of the arms.

5. In a squeezer for a collapsible tube containing plastic material, a tubular casing receiving the tube and having a longitudinal slot in its front wall portion, a squeezing element disposed within said casing for swinging actuations thereof obliquely against the tube in the casing to progressively flatten the tube against a rear portion of the casing wall while extruding the tube contents, a member pivotally connected with said element at a point thereof adjacent the rear of the casing and slidably mounted on the front wall portion of the casing at said slot for a solely rectilinear movement of the member along the slot, an arm extending from said member and radially from the casing, and an arm extending from said element through said slot and spacedly opposite said first arm whereby the arms may be engaged between the fingers of a person's hand for rocking the second arm toward the first to effect an operative actuation of the squeezing element.

6. In a squeezer for a collapsible tube containing plastic material and having a terminal discharge opening, a casing receiving the collapsible tube, a squeezing element arranged for swinging actuations thereof against the tube in the casing for forcing the material in the tube toward and through the discharge opening of the tube, means mounting said element in the casing for progressive advancement thereof toward the nozzle end of the tube as the same is emptied, and means on the mounting means coactive with the element for adjustably limiting the permitted degree of swinging of the element at each actuation thereof.

7. In means for evacuating a collapsible tube containing plastic material and having a terminal discharge nozzle, a tubular casing receiving the tube with its nozzle extending from a casing end, a squeezing element disposed within said casing for swinging actuations thereof against the tube in the casing to progressively flatten the tube against a casing wall portion, a member pivotally carrying said element and slidably mounted in the casing for a solely rectilinear advancement of the pivot point of the element toward the nozzle end of the tube as the latter is flattened, means to actuate said element, and bracket means arranged to supportedly and releasably engage the casing at the end thereof opposite the tube nozzle for disposing the casing upright and in depending relation from the bracket means whereby the element is arranged to maintain an operative relation to the tube through the action of gravity.

8. In a squeezer for a collapsible tube containing plastic material and having a terminal discharge opening, a support member carrying and generally enclosing the tube, a squeezing element arranged for swinging actuations thereof against the tube in the support member to flatten the tube directly against a fixed portion of the support member for expressing said material from the tube, and a member pivotally carrying said element for its swinging actuation and slidably mounted on the support member at a portion thereof at the opposite side of the support member from said first portion for a solely rectilinear advancement of its pivot point toward the discharge end of the tube as the latter is flattened.

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