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DEVICE FOR EXPELLING THE CONTENTS OF A TUBE FOR LIQUID, SEMI-LIQUID OR PLASTIC SUBSTANCES

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BY A. P. C.

Fig. 1.

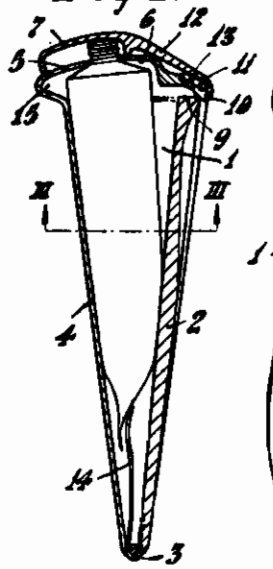


Fig. 2.

Fig. 4.

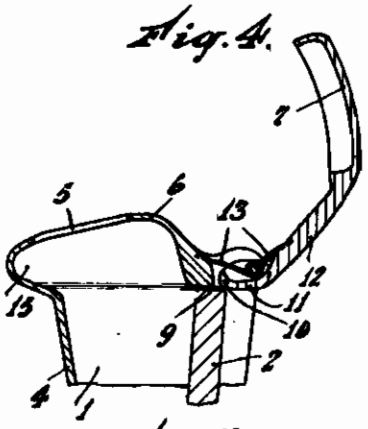


Fig. 3.

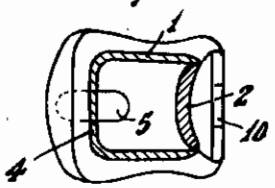


Fig. 5.

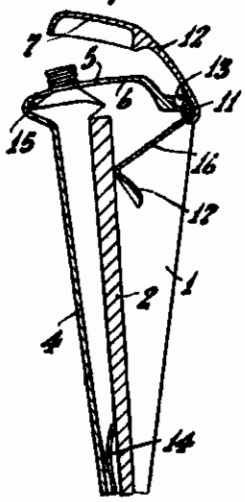


Fig. 6.

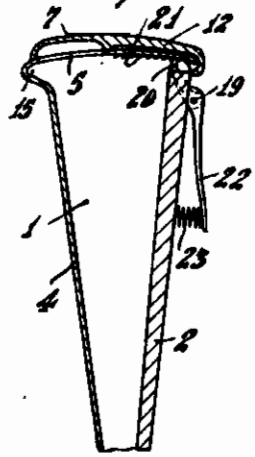
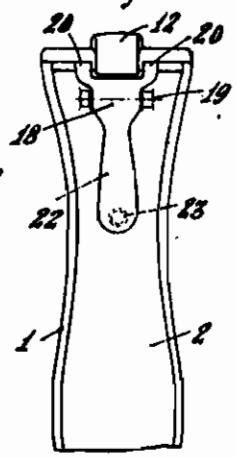


Fig. 7.



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DEVICE FOR EXPELLING THE CONTENTS OF A TUBE FOR LIQUID, SEMI-LIQUID OR PLASTIC SUBSTANCES

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The invention relates to a device for expelling the contents of a tube for liquid, semi-liquid or plastic substances, a generally usual. These tubes are made of a metal adapted to be easily deformed. They are mainly of cylindrical shape, tapering towards a flat end where the metal is bent over, and are provided at the other end with a thick and harder metal front plate which cannot be easily distorted and centrally of which the expelling nipple is located.

The invention has for its object a device for expelling the contents of tubes of this type which permits of gradually expelling the entire contents as desired.

The expelling device according to the invention consists substantially of a holder mainly having a triangular longitudinal section and a rectangular cross section, said holder having in its front side an opening through which the nipple of the tube to be compressed may extend, further having a longitudinal wall adapted to hinge about the top line of the holder and to be pressed inwardly into the holder, and having a wall opposite the hinged wall provided with a depression or recess located adjacent the front side of the holder and having such dimensions that during the expelling of the contents of the tube the hard end plate of the tube may be received therein.

In this way the tube may remain within the holder until the last portion of the contents of the tube has been expelled. The depressed portion of the base of the holder, or the recess provided therein, during the gradual expelling of the contents allows the hard end plate of the tube to be left undeformed, while nevertheless the soft tube metal therebelow is entirely compressed. The base of the holder and the hinged longitudinal wall facing it might occupy a symmetrical position with respect to the longitudinal axis of the tube during the whole expelling movement.

According to the invention this effect will still be increased if the depression or recess has such a length that the free front edge of the hinged longitudinal wall when pressed inwardly lies substantially flush with the edge of the depression or recess.

Further, according to the invention, the device may be constructed so that at the front side of the holder on a hub, having a stem, a valve for closing the expelling opening of the tube is swingably mounted so that the hinged longitudinal wall of the holder, while pressing with its edge against a cam or unround portion of the hub, in its normal position keeps the valve closed, whereas on moving the wall inwardly the valve follows this movement under the influence of a spring and frees the expelling tube.

By a pressure of the thumb on the hinged wall the valve in front of the expelling opening is lifted and the contents of the tube are expelled. If the pressure is ceased then the vlave is closed again. A closure cap need not be screwed on and off since the tube when out of use is always closed.

According to the invention the device may be so constructed that in a predetermined position of the hinged wall the valve hub may be turned in such a manner that the cam will become located outside the upwardly directed path of movement of the wall edge. Thus the hinged wall may be turned into an entirely open position and a tube may be inserted into the holder.

Within the spirit of the invention various embodiments and details of the expelling device may be used. Some of these embodiments and details will be described hereinafter with reference to the accompanying drawings, in which

Fig. 1 is a longitudinal section of a tube holder.

Fig. 2 is a plan view thereof.

Fig. 3 is a cross section on the line III—III in Fig. 1.

Fig. 4 shows a detail on a larger scale.

Fig. 5 is a partial longitudinal section of a modified embodiment of the tube holder.

Fig. 6 is a partial longitudinal section of a third embodiment.

Fig. 7 is a plan view thereof.

As appears from Figures 1, 2 and 3 the holder 1 has a mainly triangular longitudinal section and a rectangular cross section. From Fig. 2 also the shape is to be seen which in practice has given the best results and which has been so chosen to afford space for the collapsed material of the tube.

The holder 1 has three stationary side walls and one movable wall 2 which is hinged to the holder along the line 3—3. The wall 2 may be pressed inwardly into the holder so that the contents of a tube placed between the base 4 and the wall 2 will be expelled. The expelling nipple of this tube extends through an oblong hole 5 in the front wall 6 of the holder. The mouth of this nipple is automatically closed by a valve 7 cooperating with the hinged wall 2. This cooperation is obtained in the following manner.

The wall 2 is connected to the holder by a spring 8 in the form of a helical spring around the hinge axis 3—3 in such a manner that the wall tends to occupy the position shown in Fig.

1. In this position the edge 9 of the wall 2 presses against an unround portion 10 of a hub 11 connected to the valve 7 by a stem 12. The hub 11 is pivotally and also resiliently (spring 13) connected to the holder.

In the position shown in Fig. 1 the tension of the spring 8 overcomes the tension of the spring 13 so that the valve 7 closes the opening 5. However, if the wall 2 is pressed inwardly then the spring 13 causes the valve 7 to be opened.

In order to permit the wall 2 to be swung entirely outwardly so that a tube may be inserted into the holder the shape of the hub 11 and the unround portion 10 thereof are such that in the inwardly pressed position of the wall 2 the valve 7 with its stem 12 and hub 11 may be turned away entirely, so that the wall 2 may pass (Fig. 4).

The helical spring 8 as shown in Fig. 2 is provided centrally with a portion 14 located within the holder in a substantially flat plane. This portion 14 serves to press the tube in the holder against the base 4 so that the tube, also when its contents have been partially expelled, cannot be shifted.

The front wall 6 of the holder merges into the base 4 via a depressed portion 15 of the base. This depression serves to receive the thicker hard metal front plate of the tube when the material of the tube itself is deformed.

The tube, which initially in entirely filled condition is located on the base 4, will, at least as regards its axis, be gradually shifted in a direction towards the base during the expelling operation. For this reason the opening 5 in the front wall 6 has been made oblong. In Fig. 1 a tube in unexpelled condition within the holder is indicated by thin lines.

The edge 9 of the wall 2 in its innermost position substantially is flush with the edge of the depression 15.

In Fig. 5 a device is shown adapted to exert a stronger force on the wall 2, in particular if this wall has approached its extreme innermost position. To this end a lever 16, having a pressure surface 17, is mounted for rotation about the same axis as that about which the valve 7 may be swung, but free therefrom. The lower side of said lever when pressed downwardly moves over the wall 2.

Another device adapted to exert a strong pressure on the wall 2 is shown in Figures 6 and 7. This device comprises a double-armed lever 18 having its fulcrum at 19 on the wall 2. The short front arm 20 of this lever is bifurcated and both ends thereof engage toothed racks 21 fixed to the front wall 6. The long rear arm 22 of the lever 18 is kept upward by a spring 23. Now, by pressing with the thumb on the arm 22 it is possible to repeatedly depress the wall 2 with increasing force over a short distance.

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