Feb. 10, 1953 E. W. SWAN 2,627,999

COMBINED HOLDER AND DISPENSER FOR TUBE CONTAINED MATERIALS

Filed April 22, 1949 2 SHEETS—SHEET 1

Fig. 1

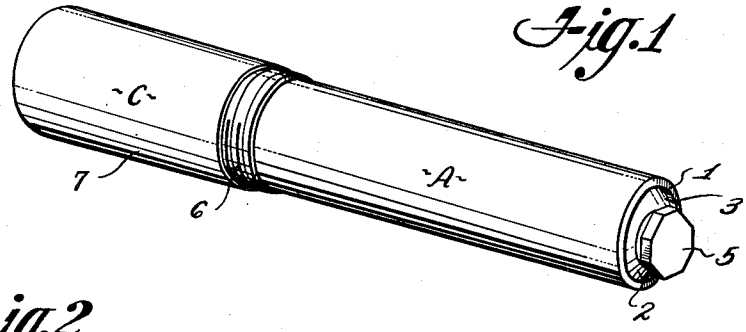


Fig. 2

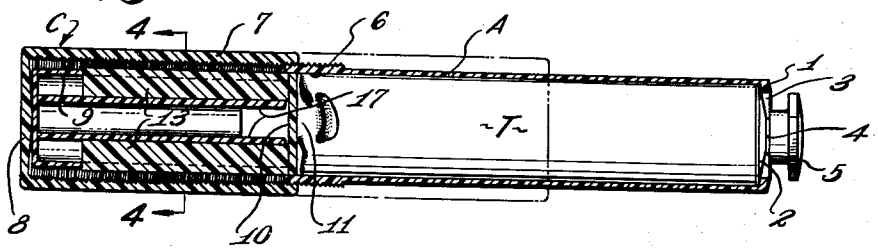


Fig. 3

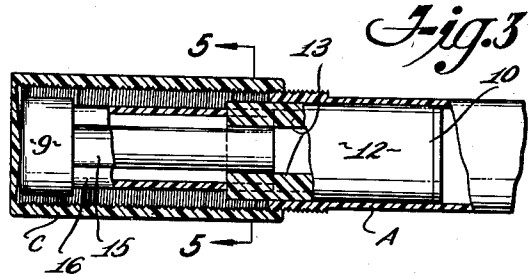


Fig. 4

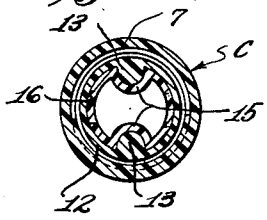
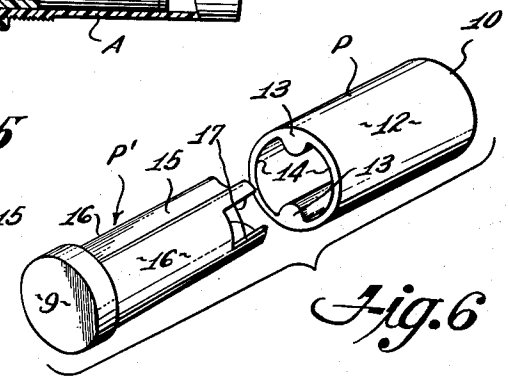


Fig. 5



Fig. 6



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2 SHEETS—SHEET 2

Fig. 7



Fig. 8

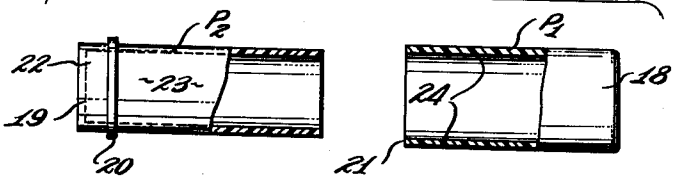
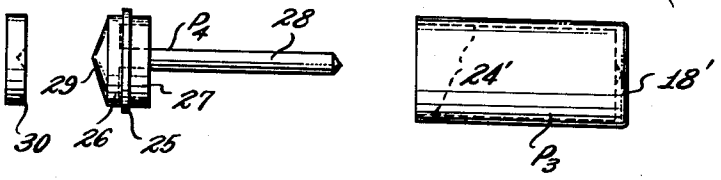


Fig. 9



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COMBINED HOLDER AND DISPENSER FOR TUBE CONTAINED MATERIALS

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10 Claims. (Cl. 222—95)

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This invention relates to and has for an object the provision of a dispenser for toothpaste, shaving cream and various other pastes and creams which are usually dispensed by users by progressively collapsing the flexible metal tubes in which such elements are contained for distribution to users. Due to the thinness of the usual metal tubes containing pastes and creams, the tubes are frequently punctured by carelessness of users and also by the uneven application of pressure to the tubes as they are slightly collapsed at local points in order to discharge requisite quantities of the paste or cream for use at different times.

Modern collapsible tubes for containing dispensable paste, cream, paints and other similarly dispensable materials are formed with a conical head in which there is a central aperture through which the materials are dispensed, a detachable cap threaded onto a nipple of the head for closing said aperture, a tubular body of substantially circular cross section when filled, and a flat tail extended diametrically across the bottom of the tube.

It is customary to progressively collapse the tube by rolling the relatively stiff tail on the body of the tube in the direction of the outlet, thereby forcing the material outwardly of the outlet when the cap is removed and correspondingly displacing the retained material gradually toward the outlet. Thus, as the quantity of material in the tube is gradually reduced by use, the tail forms a roll of gradually increasing size and gradually increasing number of convolutions while the tube between the head and tail becomes gradually shorter but of theoretically normal diameter and configuration.

In practice, however, due to carelessness and abuse, the tubes are unevenly rolled as the volume of paste or cream decreases from use, the tubes become fractured or punctured, occasioning leakage of the materials from the bodies of the tubes, and rarely, if ever, is it possible to expel all of the tube contents.

It is, therefore, an important object of this invention to provide a protective holder and dispenser for a tube of paste, cream or the like which will constantly maintain a wholly or partly filled tube in position for use and will protect the tube against damage until it is completely evacuated of its contents.

A further object is to provide a dispenser which includes a cylindrical body adapted to receive and support a filled tube of material against accidental displacement therefrom and with its outlet extended for dispensing the contents, together with a novel and efficient dispensing means longitudinally adjustable on the body for uniformly and progressively collapsing the rearmost portion of the tube as the contents thereof are expelled from the outlet in the head.

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A still further object is to provide a dispensing means embodying a composite plunger initially arranged with its members nested for partially collapsing the tube and capable of rearrangement in tandem fashion so as to elongate the plunger for completing collapse of the tube when the plunger is interposed between an operating member and the tail of the tube whereby the container tube may be completely collapsed and evacuated of its contents through a minimum adjustment range of the operating member.

Other objects include: provision of a dispenser capable of use on successive tubes of material, formed preferably of a transparent plastic material so that the tubes of paste and the like held therein may be identified visibly through the dispenser bodies, of light weight, durable but simple structure, economical, efficient and sanitary.

I have shown a preferred embodiment of my invention together with certain modifications thereof in the accompanying drawing, subject, however, to further modification, within the scope of the appended claims, without departing from the spirit of the invention. In said drawing:

Fig. 1 is a perspective view of the combined holder and dispenser with a completely filled tube of dispensable material borne thereby in readiness for use;

Fig. 2 is a longitudinal sectional view of the same showing one form of dispenser in initial contracted position;

Fig. 3 is a sectional view of the dispenser in the plane of Fig. 2 but with the dispenser in extended position as when the tube of material has been partly evacuated of its contents;

Figs. 4 and 5 are, respectively, cross sectional views of the dispenser on lines 4—4 of Fig. 2 and 5—5 of Fig. 3;

Fig. 6 is an exploded view of a form of extensible dispenser plunger shown in Figs. 2 and 3;

Fig. 7 is a perspective view of a totally collapsed and evacuated tube;

Figs. 8 and 9 are, respectively, exploded views of different other forms of extensible plungers capable of use in the dispenser.

Broadly, a combined holder and dispenser embodying my improvements includes a tubular body A of circular cross section and adapted to

removably support a tube T of paste, cream or the like, a substantially elongated cap C adjustably held on body A and constituting an operating member, and an extensible plunger including members P and P' (Figs. 2, 3, 4, 5 and 6), P_1 and P_2 (Fig. 8), and P_3 and P_4 (Fig. 9).

Body A has an inwardly turned annular flange 1 at its upper or forward end adapted to be engaged by the conical end 2 of tube T and a central aperture 3 through which the outlet nipple 4 and closure cap 5 of the tube T extend, the rear end of the body being open so that tube T may be inserted in or removed from the body therethrough. The rear end portion of body A is formed with a comparatively short externally threaded section 6 adapted to receive the internally threaded barrel 7 of operating cap C in order that the cap may be adjusted longitudinally and telescopically over the body to the extent of the full length of the barrel or until the end 8 of the cap engages the rear end of the body, at which point tube T will be about one-half collapsed, as indicated by broken lines in Fig. 2.

The plunger formed of mating members P and P' is adapted to be initially held in cap C with the head 9 of member P' engaging end 8 of the cap and the member P telescoping member P' and its closed end 10 engaged with the tail end 11 of tube T. Members P and P' are of generally circular cross section, member P having a circular wall 12 with a pair of diametrically spaced longitudinal ribs 13, 13 extending throughout the length of wall 12 and corresponding arcuate recesses 14, 14 between said ribs. Member P' has longitudinal flutes 15, 15 and arcuate segments 16, 16 between said flutes so that as shown in Fig. 2 the members P and P' may telescopically be held in cap C with ribs 13, 13 seated in flutes 15, 15, and segments 16, 16 seated in recesses 14, 14 and thereby interlocking the plunger members against relative rotation but permitting relative longitudinal movement thereof. At the beginning of a dispensing operation from a filled tube T, as in Fig. 2, the head 9 of member P' engages end 8 of cap C and the rear end of member P engages head 9 of member P'.

As cap C is screwed onto body section 6, pressure is applied by end 10 of member P to the tail 11 of tube T, the ends of the normally flat tail having bent inwardly over the rear of the tube so as to clear the wall of body A and render the ensuing collapse of the tube more easy and progressively uniform and compact.

It may be noted that the diameters of the cylinder 12 of plunger member P and that of head 9 of plunger member P' are sufficiently less than the internal diameter of body A to permit free movement of the plunger in the body. When tube T has been collapsed to approximately one half of its possible extent the end 8 of cap C will abut the rear end of body A and in order to effect further collapse of said tube, it becomes necessary to remove the cap and plunger members from the body and lengthen the plunger by detaching members P and P', relatively rotating said members one quarter of a revolution and inserting member P' in the open end of member P but with the ribs 13, 13 longitudinally aligned with segments 16, 16. Said segments have notches 17, 17 at their inner ends for receiving the end portions of said ribs and the bottoms of the notches engage the ends of the ribs and thus support member P' in extended position on member P. When thus positioned, the plunger members are reinserted in cap C with

head 9 against end 8 of the cap, the cap is again screwed onto section 6 of body A until end 10 of member P engages the partly collapsed tube T, and subsequent dispensing operations may be effected at will until the tube T is completely evacuated of its contents and is compactly formed as shown in Fig. 7.

The form of plunger shown in Fig. 8 includes members P_1 and P_2 of cylindrical cross section arranged for telescopic connection, member P_1 having a closed end 18 and the inner member having a closed end 19. Member P_2 has an external annular flange 20 of the same diameter as and adapted to engage the open end 21 of member P_1, the cylindrical portion 22 between the flange 20 and end 19 being much shorter than the portion 23 on the opposite side of said flange.

This type of plunger operates in the same manner and serves the same purpose as the plunger composed of members P and P'. Initially, portion 23 is inserted in the bore 24 of member P_1 with the near side of flange 20 engaging end 21 of member P_1, after which the two members are inserted in cap C with end 19 engaging end 8 of the cap. The cap is then screwed onto body A until end 18 of member P_2 engages the tail 11 of tube T and successive dispensing operations may be effected until further movement of the cap is prevented by engagement of its end 8 with the adjacent end of body A.

At such point the cap is removed and member P_2 is reversed on member P_1 with the portion 22 seating in bore 24 of member P_1 and the flange 20 is engaged with end 21 of member P_1. The reversed plunger is then replaced in the cap, the cap is replaced on the body, and further dispensing operations may be continued until the cap again engages the end of body A or until such time as the tube T has been completely collapsed and exhausted of its contents.

The form of plunger shown in Fig. 9 differs from that shown in Fig. 8 principally in the form of the reversible extension member P_4 which has an external flange 25 and narrow cylindrical portions 26 and 27 on opposite sides of flange 25 and adapted to selectively seat in bore 24' of member P_3. Also a stem 28 adapted to be enclosed by member P_3 when portion 27 is seated in bore 24' and a conical portion 29 engages the tail 11 of tube T or if desirable, a disc 30 interposed between portion 29 and the tail of the tube so that the apices of the cone 29 and stem 28 will frictionlessly engage one side of the disc while the opposite flat side of the disc will bear against the tail of the tube T. When reversed in position, portion 26 of member P_4 seats in bore 24' of member P_3 and stem 28 applies pressure through disc 30 to the tail of tube T.

The inner surface of end 8 of cap C is of shallow conical form so that the apex of the cone will engage head 9 of member P' and thereby minimize the friction between the cap and the plunger.

Other than with respect to minor and specific details, the plungers are similar in a broad sense and also in function.

Essentially, I have provided and have herein disclosed a holder and dispenser which in all cases, by the extensibility and elongation of the plunger after collapse of the tubes T to approximately one half of the maximum extent, I am enabled to completely collapse the tube, and by means of the forms of plunger shown in Figs. 8 and 9, the same result is accomplished by re-

versing the plunger members following the partial collapse of the tubes with an initial or normal arrangement of the plunger members.

Moreover, my dispenser provides means for initially collapsing and exhausting the contents of a tube of material to a partial extent by one arrangement of the plunger members and for completely collapsing and exhausting the contents thereof by a rearrangement of and for elongating the plunger members without changing the operative range of the operating cap.

I claim:

1. A dispenser for paste-like materials from original collapsible tubes comprising: a cylindrical body arranged to receive a tube of material at an end thereof and to prevent removal of the tube from the other end thereof while permitting discharge of the contained material, a plunger mounted on and for movement longitudinally in said body against the inner end of the tube, and a cap adjustable longitudinally on the body engaging and for applying pressure to said plunger and through the plunger to and for collapsing said tube and discharging the contents thereof for use as the cap is moved on the body, said plunger having separable portions slidable in the bore of said body and normally nested one within the other to partly collapse the tube and when expanded the two parts of the plunger are arranged end-to-end, tandem fashion, and are effective for completely collapsing said tube and exhausting the contents thereof.

2. A dispenser for paste-like materials from original collapsible tubes comprising: a cylindrical body arranged to receive a tube of material at an end thereof and to prevent removal of the tube from the other end thereof while permitting discharge of the contained material, a plunger mounted on and for movement longitudinally in said body against the inner end of the tube, and a cap adjustable longitudinally on the body engaging and for applying pressure to said plunger and through the plunger to and for collapsing said tube and discharging the contents thereof for use as the cap is moved on the body, said plunger including a pair of members normally disposed relatively for an initial range of effectiveness to partly collapse said tube and dispense its contents and when said plunger members are arranged in end-to-end tandem positions and thereby expanded, to completely collapse said tube and exhaust its contents with the same operative range of the cap on the body.

3. A dispenser for paste-like materials from original collapsible tubes comprising: a cylindrical body arranged to receive a tube of material at an end thereof and to prevent removal of the tube from the other end thereof while permitting discharge of the contained material, a plunger mounted on and for movement longitudinally in said body against the inner end of the tube, and a cap adjustable longitudinally on the body engaging and for applying pressure to said plunger and through the plunger to and for collapsing said tube and discharging the contents thereof for use as the cap is moved on the body, said plunger including a pair of longitudinal members together confined between a portion of the cap and the inner end of the tube of material whereby the thrust of the cap and plunger in successive dispensing operations progressively collapses and compacts the inner end of the tube as the contained material is displaced therefrom and compresses the exhausted portion of the tube progressively as the plunger is advanced in the body, said plunger members when rearranged in tandem fashion after partial collapse of said tube being effective to completely collapse said tube.

4. A dispenser for pastes, creams and the like comprising a cylindrical body arranged to operatively support a collapsible tube of dispensable material, a cap threaded onto said body, and an elongatable plunger borne by said cap for applying pressure to said tube as the cap is screwed onto said body and the tube is correspondingly collapsed and its contents exhausted, said plunger composed of a pair of members which are of substantially equal length and concentrically interfitted and so constructed that they can be axially relatively adjusted from a position of minimum axial length, with their respective ends in juxtaposition, in which said plunger is operative to partially collapse and exhaust the contents of the tube, to a position of maximum length, with the two members arranged in tandem, end-to-end fashion, in which said plunger is effective for completely collapsing and exhausting the contents of the tube.

5. A dispenser for pastes, creams and the like comprising a cylindrical body arranged to operatively support a collapsible tube of dispensable material, a cap threaded onto said body, and an elongatable plunger borne by said cap for applying pressure to said tube as the cap is screwed onto said body and the tube is correspondingly collapsed and its contents exhausted, said plunger composed of a pair of members which are of substantially equal length and concentrically interfitted and so constructed that they can be axially relatively adjusted from a position of minimum axial length, with their respective ends in juxtaposition, in which said plunger is operative to partially collapse and exhaust the contents of the tube, to a position of maximum length, with the two members arranged in tandem, end-to-end fashion, in which said plunger is effective for completely collapsing and exhausting the contents of the tube, the cap being arranged for the same extent of movement on the body when the plunger members are initially arranged or rearranged for elongation of the plunger.

6. A dispenser for pastes, creams and the like comprising a cylindrical body arranged to operatively support a collapsible tube of dispensable material, a cap threaded onto said body, and an elongatable plunger borne by said cap for applying pressure to said tube as the cap is screwed onto said body and the tube is correspondingly collapsed and its contents exhausted, said plunger composed of relatively adjustable members which when initially arranged is operative to partially collapse and exhaust the contents of the tube and when rearranged and elongated is effective for completely collapsing and exhausting the contents of the tube, one of said plunger members having a pair of longitudinal ribs and the other plunger member having a pair of flutes adapted for engagement for an initial arrangement of said members, and means on the fluted members for endwise engagement with the ribs on the other plunger member when said plunger members are rearranged for increasing the effective length of the plunger.

7. A dispenser for pastes, creams and the like comprising a cylindrical body arranged to operatively support a collapsible tube of dispensable material, a cap threaded onto said body, and an elongatable plunger borne by said cap

for applying pressure to said tube as the cap is screwed onto said body and the tube is correspondingly collapsed and its contents exhausted, said plunger including a pair of normally nested members formed with cooperating portions whereby said members may be arranged tandem fashion for increasing the effective length of the plunger.

8. In a device of the character described, a cylinder arranged for supporting a collapsible tube of dispensable material, a plunger slidable in said cylinder and including a pair of normally nested members affording a plunger of minimum length and when arranged tandem fashion affording a plunger of maximum length, and an operating member adjustable on the cylinder for applying pressure through the plunger to and for collapsing the tube and dispensing its contents as the plunger is progressively advanced in successive operations in the cylinder, said operating member and said cylinder being arranged to limit the movement of the operating member and the plunger at a point in advance of complete collapse and evacuation of the tube and operative for complete collapse and evacuation of the tube when the plunger members are arranged in tandem fashion.

9. In a device of the character described, a cylinder arranged for supporting a collapsible tube of dispensable material, a plunger slidable in said cylinder and embodying means for contracting and expanding the plunger to a minimum and maximum effective length, and an operating member adjustable on the cylinder for applying pressure through the plunger to and for collapsing the tube and dispensing its contents as the plunger is progressively advanced in successive operations in the cylinder, said plunger including telescoping members normally contracted to nested positions for initially collapsing the tube, and means for supporting said members so that when expanded to end-to-end positions, tandem fashion, said plunger will be elongated for completing collapse of the tube and exhaust of its contents.

10. In a device of the character described, a cylinder arranged for supporting a collapsible tube of dispensable material, a two member plunger slidable in said cylinder with its members formed for contracting the plunger when the members are nested and expanding the plunger to a maximum effective length when its members are arranged end to end tandem fashion and an operating member adjustable on the cylinder for applying pressure through the plunger to and for collapsing the tube and dispensing its contents as the plunger is progressively advanced in successive operations in the cylinder.

ERNEST W. SWAN.

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