

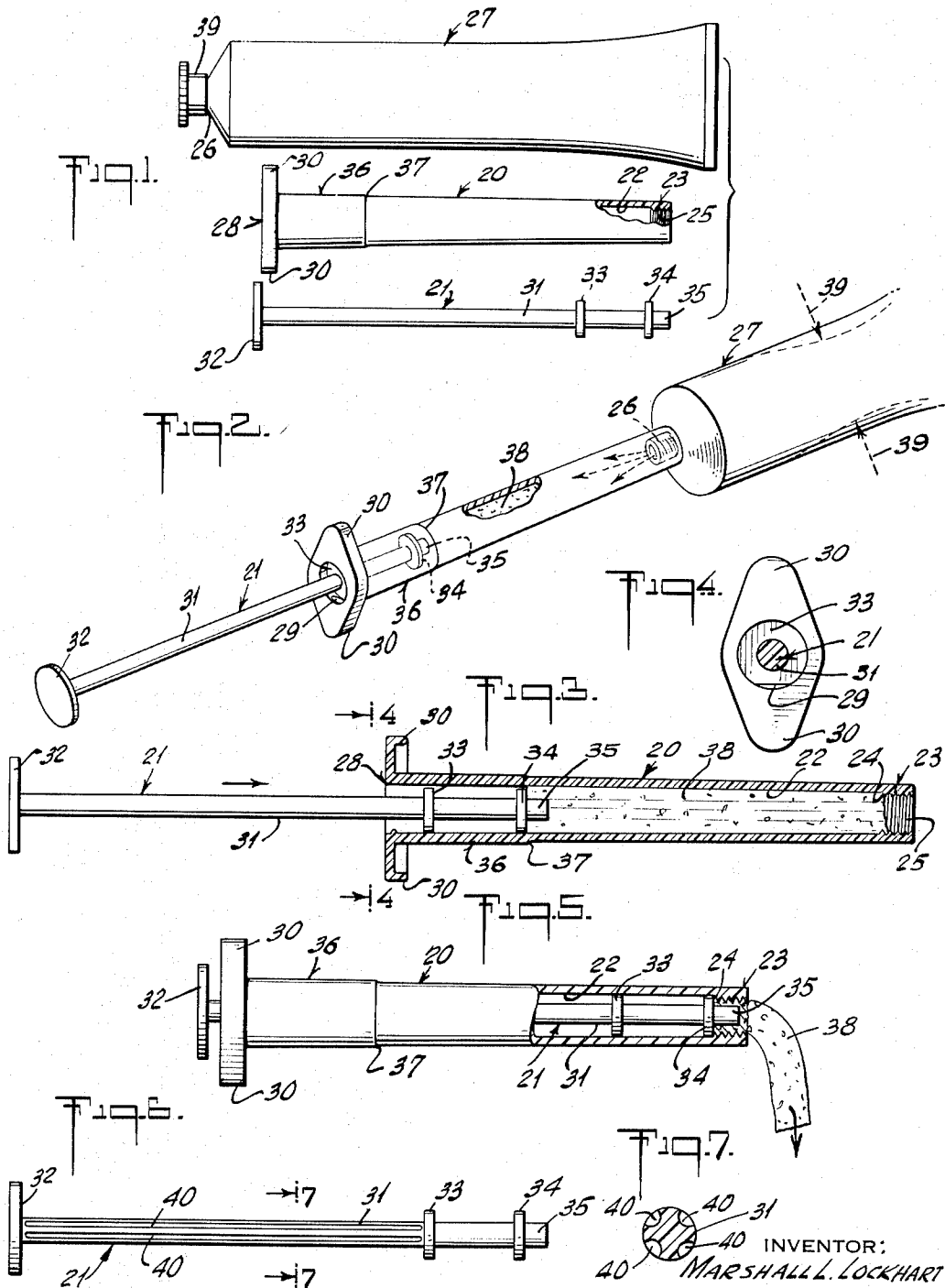
Nov. 22, 1955

M. L. LOCKHART
OINTMENT DEPOSITORS

2,724,385

Filed Jan. 19, 1953

2 Sheets-Sheet 1



INVENTOR:
MARSHALL L. LOCKHART

BY
Watson Johnson Leavenworth Blair
ATTORNEYS;

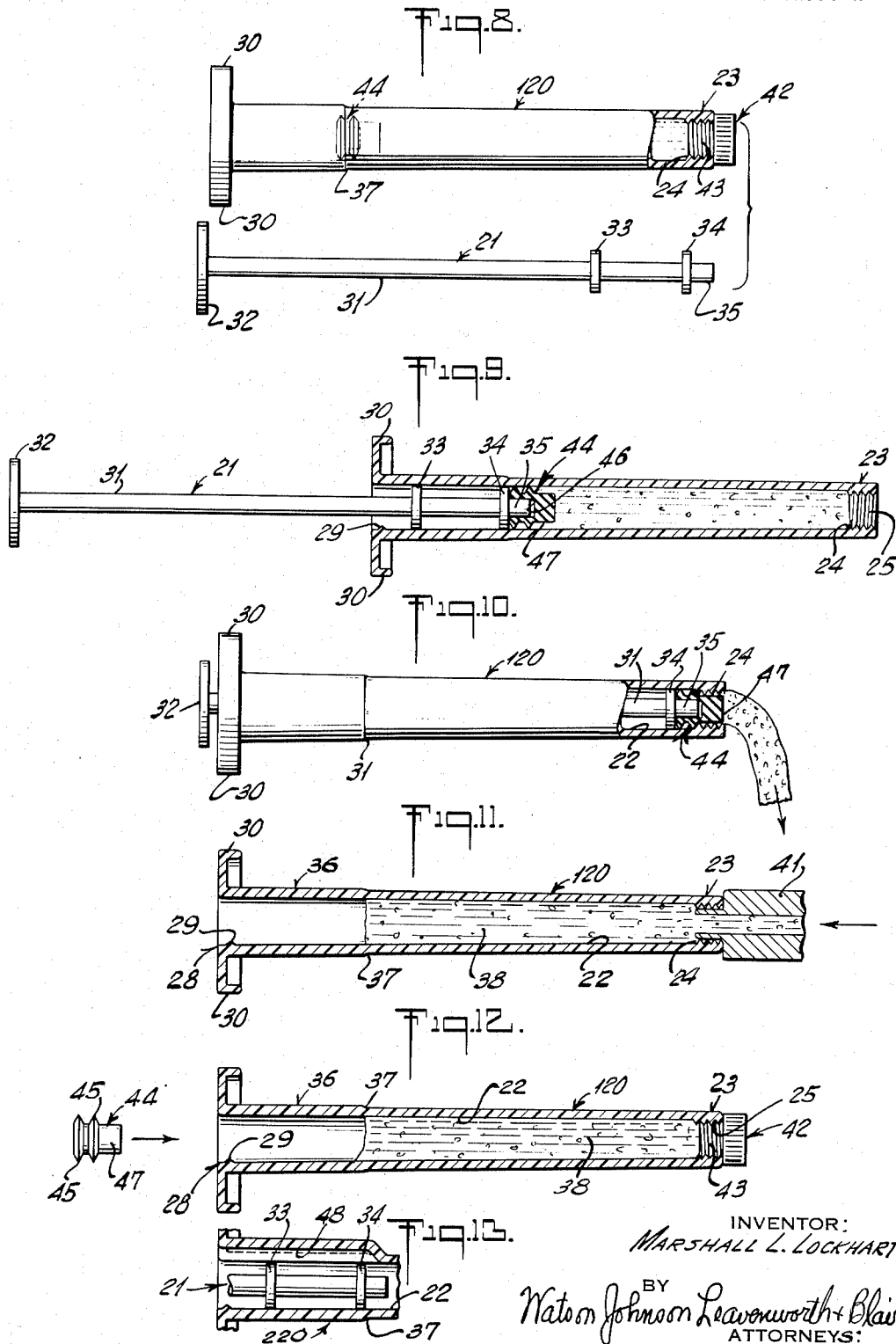
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OINTMENT DEPOSITORS

Marshall L. Lockhart, Rutherford, N. J., assignor to The Compule Corporation, Rutherford, N. J., a corporation of New Jersey

Application January 19, 1953, Serial No. 331,940

10 Claims. (Cl. 128—261)

The present invention relates to ointment depositors of the type disclosed in Jones No. 2,616,422 and, more particularly, to such devices adapted as containers to house quantities of medicated jelly or cream and viscous ointments and as applicators to eject the contents internally.

A general object of the present invention is to provide such devices in the form of plunger ejectors which may be readily and economically constructed on a mass basis; permitting effective use as single-use disposables while being of such sturdy and simple construction as to allow efficient reuse, particularly since they are easily cleaned and sterilized and permit ready personal recharging.

A more specific object of the present invention is to provide such an ejector in the form of a barrel equipped with a simple plunger which permits ready escape of air when the barrel is being loaded with viscous substance, simple but unique means being provided to prevent accidental withdrawal of the plunger from the barrel.

A further object of the invention is to provide structural embodiments of the device which may be readily constructed and allow efficient use and operation thereof.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements and arrangement of parts, which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view, with parts broken away and in section, of a three-piece assembly to be distributed as a kit, and including an embodiment of the depositor of the present invention as a two-part device consisting of a barrel and a plunger;

Fig. 2 is a perspective view, with parts broken away and in section, of the assembly of Fig. 1, showing the parts assembled together and the barrel being charged or loaded with ointment;

Fig. 3 is an axial section of the barrel illustrated in Figs 1 and 2, as loaded for depositor use by the Fig. 2 procedure, and showing in elevation the plunger mounted in the back end of the barrel ready for expulsive ejection of the barrel contents, the parts being shown substantially to the scale thereof as produced for commercial distribution;

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 3, and showing the back end of the barrel in elevation;

Fig. 5 is a plan view of the depositor shown in Fig. 3, with parts broken away and in section, and illustrating expulsion of barrel contents with ejective forward thrust of the plunger;

Fig. 6 is a plan view of a modified form of plunger;

Fig. 7 is an enlarged sectional view taken substantially on line 7—7 of Fig. 6;

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Fig. 8 is a view similar to Fig. 1 of the parts of a different type of kit in which the depositor barrel is supplied in preloaded condition, and may constitute a disposable embodiment with a plurality of the loaded barrels preferably being supplied with one reuseable plunger;

Fig. 9 is a view similar to Fig. 3 of the embodiment shown in Fig. 8;

Fig. 10 is a view similar to Fig. 5 of the structural embodiment depicted in Figs. 8 and 9;

Fig. 11 is an axial section illustrating one step of the barrel loading procedure as may be performed in a factory for the production of the preloaded barrel illustrated in Fig. 8;

Fig. 12 is an axial section, with barrel closing plugs in plan, illustrating the last step of the factory loading procedure; and

Fig. 13 is a longitudinal section, with parts broken away, of the back section of a modified form of barrel with the piston portion of the plunger shown in plan, illustrating a modified form for venting air past the retracted piston during loading.

Referring to the drawings, in which like numerals identify similar parts throughout, it will be seen from Figs. 1 to 5 incl. that an embodiment of the present invention may comprise a barrel unit 20 and a plunger unit 21. The barrel unit 20 is preferably molded from plastic material; and constitutes an elongated, substantially cylindrical tube having a bore 22 extending to an orifice section 23 at one end, preferably of reduced inside diameter and internally threaded, as shown in Figs. 1, 3 and 5. The reduced orifice section 23 provides an internal shoulder 24 to serve as a plunger thrust travel stop. The internal threads 25 of the orifice section 23 are adapted threadably to receive an externally threaded or elastic closing plug, as hereinafter described, or the external threads on a supply fixture or tube, such as the externally threaded neck 26 of a collapsible tube 27 in which a supply of jelly, ointment or cream may be housed, as will be more fully explained hereinafter in connection with Fig. 2.

The bore 22 of barrel 20 is open at the other end 28 and carries therein a laterally-projecting protuberance 29 preferably in the form of a small transverse rib, as indicated in Figs. 2 and 4, and preferably is made integral with the barrel 20 thereby being elastic and deformable when the barrel is molded from elastic plastic, such as polyethylene. The rib 29 is adapted to serve as stop means to prevent accidental dropout of the plunger 21, as hereinafter more fully explained. The back end 28 of barrel 20 carries externally thereon a pair of diametrically-opposed, laterally-extending, finger-engaging wings 30, 30, preferably molded integral with the barrel, and the structure thereof readily will be understood from Figs. 2, 3 and 4.

In the preferred form, the piston plunger 21 preferably comprises an elongated stem 31 carrying a thrust knob 32 on one end thereof and on the other end a pair of transversely-extending, longitudinally-spaced piston discs 33 and 34. The head end of the piston plunger 21 which carries the longitudinally-spaced discs 33 and 34 constitutes piston head means in the form of a spool structure annularly cut back to an appreciable depth between the discs to provide between the latter a free wide groove. Preferably, the piston plunger 21 is formed as a unitary structure of rigid plastic, such as polystyrene, from which it may be molded. An end portion 35 of stem 31 of limited length extends beyond the outer or forward piston disc 34 to form an ejecting, orifice-clearing projection, as will be explained in connection with Fig. 5. The employment of a plurality of piston discs on the plunger stem 31 is advantageous, not only for guidance but also to assure efficiency in expulsion of contents of the barrel.

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However, the end or forward disc 34 functions chiefly to expel the barrel contents, and the other disc 33 functions chiefly as a guide to assure that the stem 31 may be held substantially axially of the barrel 20 during forward thrust therein; thus, to avoid any undue angularity or canting of the piston disc 34, which might permit excessive back leakage.

It will be noted from Fig. 5 that adjacent the thrust travel stop shoulder 24, the diameter of the bore 22 is substantially equal to the diameter of the forward piston disc 34. In commercial embodiments, the piston disc 34 actually is of slightly larger diameter than the bore 22 at that point to assure maximum efficiency in expulsion of barrel contents. This over-size of the piston means is permitted by virtue of the fact that the barrel walls are elastic so as to swell slightly adjacent the orifice section 23 to permit the piston disc 34 to be thrust up thereto. This, of course, would also be permitted should the plunger 21 be formed of elastic plastic and the barrel 20 be molded of relatively rigid plastic or, conversely, if both the barrel and the plunger were formed of plastic having at least some elasticity. It is preferred, however, to form the plunger of relatively rigid plastic to avoid undue flexure of the relatively slender plunger stem 31 during ejecting thrust thereof.

Means are provided to vent air from the barrel bore 22 while the piston section of the plunger 21 is in the retracted position, as illustrated in Fig. 3, and while still housed in the barrel during loading of the barrel with viscous jelly, ointment or cream. Preferably air-venting clearance between the piston means, comprising discs 33 and 34, and the bore wall in the retracted position of the piston means is provided by slight taper of the bore 22 so that the bore walls converge at least from the back section 36 of the barrel, which defines the retracted position of the plunger, toward the reduced orifice section 23. Section 36 readily may be defined in the molding of the barrel 20 by a slight thickening of the barrel wall therein to form a small circumferential shoulder 37 to serve as a loading line. Accordingly, when the plunger is in the retracted position, illustrated in Figs. 2 and 3, such clearance permits air to be vented past the piston discs 33 and 34 out of the open end 28 of the barrel 20 as a body 38 of viscous substance is injected or loaded into the bore 22 through the reduced orifice section 23. Preferably, the barrel bore 22 is tapered throughout from the open end 28 to the shoulder 24, particularly since that simplifies molding procedure and provides relief for ready withdrawal of the molding core. The diameter of the open end 28 of the barrel 20 is approximately 0.412" while the diameter of the bore at the shoulder 24 is approximately 0.407" in the structure illustrated substantially to scale in Fig. 3 wherein shoulder 24 is about 4/8" from the open end 28. Of course, other suitable means may be provided for by-passing the piston means with the air in the barrel during loading when the piston means is located in the retracted section 36, as will be more fully explained hereinafter in connection with Fig. 13.

Commercially, a kit including an embodiment of the present invention may be marketed, which comprises one barrel 20, one plunger 21 and a collapsible tube 27 of viscous substance as illustrated in Fig. 1. In the use of such a kit, one will unscrew the cap 39 from the externally threaded neck 26 of the collapsible tube 27 and threadably engage the neck into the internally threaded orifice section 23 of the barrel 20. The plunger 21 will be thrust into the open end 28 of the barrel 20 to the retracted position, illustrated in Figs. 2 and 3, with the piston discs 33 and 34 successively passing the dropout-limiting stop protuberance 29 with deformation thereof. Squeezing of the side walls of the collapsible tube 27 in the directions of the arrows 39, 39, shown in Fig. 2, will discharge viscous substance from the tube into the barrel bore 22 with simultaneous venting of the barrel-con-

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tained air past the piston means due to the air-venting clearance thereat resulting from the tapering of the bore 22. With the piston disc 34 located at the load line 37, a charge 38 of viscous substance of predetermined quantity, suitable for an application, may be loaded into the barrel bore 22, as illustrated in Figs. 2 and 3. Thereafter, the body 38 of viscous substance may be discharged from the barrel in depository operation of the device through the orifice section 23, as illustrated in Fig. 5, by forward thrust of the plunger 21, which may be accomplished by one's index finger with the thumb and middle finger located behind the finger wings 30, 30 of the barrel.

It will be noted from Fig. 5 that during this ejection of the barrel contents, the stem projection 35 moves into the orifice to expel therefrom the major portion of the contained viscous substance so as to assure delivery of practically all of the charge, thereby reducing wastage and assuring application of a predetermined quantity of viscous substance. During the time intervening the loading of the barrel, as illustrated in Fig. 2, manipulatory positioning of the device may be accompanied by orientation of the barrel 20 tending to permit the plunger 21 to drop out of the open end 28 thereof. Such undesirable dropout of the plunger 21 is prevented by the stop protuberance 29.

It has been mentioned that, due to the slenderness of the plunger stem 31, the unitary plunger structure 21 is preferably made or molded from relatively rigid plastic. As illustrated in Figs. 6 and 7, the plunger stem may be strengthened by fluting the same, as at 40—40. However, it is to be understood that no limitation is to be inferred from a preferential use of such fluting of the plunger stem 31.

The embodiment of the device illustrated in Figs. 1 to 5 incl., may be marketed in another type of kit, wherein a plurality of preloaded barrels are supplied with a single plunger unit. One such preloaded barrel 120 and the plunger unit 21 is illustrated in Fig. 8. For such a kit, the barrels are factory loaded by fitting the orifice section 23 of each thereof to a suitable loading fixture, such as that diagrammatically illustrated, by way of example, at 41 in Fig. 11. Each barrel will be loaded substantially to its load line 37, and a suitable closing piston plug will be inserted in the open end 28 of the barrel. This may be readily accomplished as illustrated in Fig. 12, by closing off the discharged orifice after removal of the fixture 41 with a suitable closing plug 42, which may be of elastic rubber composition, preferably provided with a pre-threaded shank 43 threadably to be engaged with the internal threads 25 of the orifice. However, if desired, the shank of the plug may be unthreaded and of such over-sized diameter as to be deformable into the orifice threads with forcible insertion of the plug in the threaded orifice.

Such closing of the discharge end 23 of the barrel 120 will then permit the insertion through the open end 28 of another closing plug which, if provided with elastic ribs or other highly flexible contacting means, will permit air-venting therepast with deformation. For example, an elastic piston plug 44, such as that illustrated in Figs. 8, 10 and 12 may be molded from a rubber composition having silicon content, and in the form of a cylindrical body having a pair of axially spaced, thin, circumferential ribs 45, 45, each of a diameter slightly larger than the diameter of the bore 22 in the retracted section 36 thereof, so that it may efficiently serve as a piston for ejection of the barrel contents. The flexibility of the ribs 45, 45 will permit their deformation during insertion of the piston plug 44 into the barrel bore 22 to allow the air in retracted section 36 to be vented from the barrel to produce the preloaded unit 120, illustrated in Fig. 8.

One may select one of the preloaded barrels 120 from the kit and fit the plunger unit 21 therein in the manner

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illustrated in Fig. 9, with the projecting tip 35 of the plunger stem being received in a socket 46 in the back end of piston plug 44. The barrel contents may then be ejected, as illustrated in Fig. 10, in a manner similar to the ejecting operation illustrated in Fig. 5, with the difference that the forward piston plug rib 45 engages against the stop shoulder 24, and with the forward end 47 of the piston plug serving as an ejecting, orifice-clearing projection, as illustrated in Fig. 10.

In Fig. 13 is illustrated a modified form of barrel structure, which is provided with air-venting means in a section adjacent its open end defining a retracted position of piston head means. Such air-venting means is provided in the form of an enlargement of the piston-retracted bore section, preferably in the nature of an elongated, longitudinally-extending, narrow groove 48 molded into the side of the barrel section 36 and extending therebeyond past load line 37 so as to bleed air from the barrel ahead of the piston means in its retracted position when the bore 22 of barrel 220 is being loaded with viscous substance. However, due to the simplicity of and economy in manufacture, the form of the barrel illustrated in Figs. 1 to 5 incl., and 8 to 12 incl. is preferred.

Elastic and relatively rigid synthetic resins or plastic materials which may be used to advantage from which to mold or otherwise form the barrel and plunger units of the present device may be selected from those which are compatible with the intended jelly, ointment or cream contents, and not contaminable of body tissue. These are, by way of example, ethyl cellulose, cellulose acetate, polyethylene, polystyrene, vinyl chloride-vinyl acetate copolymer, vinyl chloride resin, phenolic resin composition, ureaformaldehyde composition, butyl methacrylate, rubber compositions of both the natural and synthetic types, such as natural gum, rubber hydrochloride and neoprene, and other materials having similar properties. It is preferred to employ a polyethylene as the elastic plastic and a polystyrene as the relatively rigid plastic in view of the non-contaminable, compatible and physical properties thereof, as well as from an economy point of view since embodiments of the present invention are intended to be marketed as disposables at least with respect to the barrel units thereof. Preferably, an elastic plastic is used in the construction of one of the barrel and plunger units when the other is made from relatively rigid plastic since thus the parts need not be made to close tolerances, although it is possible to form both the barrel and plunger of elastic plastic, such as polyethylene. As pointed out above, preferably the barrel is molded from polyethylene and the plunger is made from polystyrene. When closing and piston plugs are employed for plugging preloaded, disposable barrels, they may be formed of natural gum rubber or other suitable elastic material, such as a rubber-like composition containing silicon, etc., and particularly those of relatively low cost.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description are efficiently attained and, since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an ointment depositor an elongated barrel of molded plastic having a bore provided with a reduced section at one end to form an ejecting orifice of lesser diameter, said reduced orifice section being internally

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threaded; the other end of said barrel being open and externally carrying integral, laterally-projecting, finger-engaging means; the walls of the bore of said barrel being slightly tapered convergently from said open end to said orifice section whereby piston means closely fittable in the bore adjacent said orifice section will have air-venting clearance with the bore adjacent said open end.

2. The barrel structure as defined in claim 1 characterized by the provision of a laterally-projecting stop means in said bore adjacent the larger open end thereof to limit retraction of piston means therein.

3. The barrel structure as defined in claim 2 characterized by said stop means being a small integral projection on the bore walls with said barrel structure being of molded elastic plastic, the elasticity of said stop projection permitting piston means readily to be pushed therepast into the bore while avoiding dropout.

4. In an ointment depositor having an elongated barrel receivable of ejecting piston means, a piston plunger comprising an elongated stem having a thrust knob on one end and a pair of axially-spaced piston discs on the other end, said stem and said discs constituting a spool structure annularly cut back to an appreciable depth between said discs to provide between the latter a free and relatively wide annular groove, said stem having a substantially cylindrical end portion of limited length extending beyond the outer disc to form an ejecting orifice-clearing projection.

5. In the ointment depositor as defined in claim 4 the feature of said piston plunger being formed from plastic material as a unitary structure.

6. In the ointment depositor as defined in claim 5 the feature of said one-piece plastic piston plunger being formed of molded rigid plastic.

7. An ointment depositor comprising, in combination, an elongated barrel of molded elastic plastic having a bore provided with a major section of a certain average diameter and a reduced section at one end to form an ejecting orifice of lesser diameter, said reduced orifice section being internally threaded; the other end of said barrel being open and externally carrying integral, laterally-projecting, finger-engaging means; the walls of the bore of said barrel being slightly tapered convergently from said open end to said orifice section whereby piston means closely fittable in the bore adjacent said orifice section will have air-venting clearance with the bore in a retracted section adjacent said open end; a piston plunger comprising an elongated stem of relatively rigid plastic having an integral thrust knob on one end and a pair of axially-spaced, integral piston discs on the other end slidably mounted in said bore with at least the leading disc being of a diameter closely approaching the average diameter of the barrel bore major section for relatively close sliding fit therein; said stem having an end portion of limited length extending beyond the outer disc to form an ejecting, orifice-clearing projection receivable in said orifice section without projecting out of the latter; and a relatively small, laterally-projecting protuberance mounted on the bore wall adjacent the open end of said barrel and formed integral with the latter to have sufficient elasticity to permit said piston discs to be pushed forward into said bore past said protuberance while serving to prevent plunger dropout.

8. An ointment depositor comprising, in combination, an elongated, cylindrical barrel having a bore terminating in an ejecting orifice at one end and being open at its other end; an ejecting piston head means slidably mounted in said bore and of certain diameter to expel barrel contents when thrust forward; said barrel bore being in the vicinity of the ejecting orifice of a diameter similar to that of said piston head means, and having a section adjacent its open end defining a retracted position of said piston head means with said piston-retracted section being enlarged to provide air-venting clearance when said piston head means is retracted to this section;

and a relatively small, laterally-projecting stop means in said piston-retracted bore section to engage and temporarily to hold said piston head means in this section, at least one of said stop and piston head means being formed of elastic material to permit forced passage of said piston head means past said stop means into said bore, said stop means being located behind and serving to prevent accidental drop-out of the piston head means.

9. An ointment depositor comprising, in combination; an elongated, cylindrical barrel structure of plastic material having some elasticity, said barrel structure having a bore terminating at one end in an internally-threaded ejecting orifice and being open at the other end with a portion of the latter defining a piston-retracted section; an ejecting piston plunger of relatively rigid plastic material comprising an elongated stem having a thrust knob on one end and an elongated head end structure mounted on the other end of said stem with said head end structure slidably mounted in said piston-retracted section of said bore, said piston head end structure comprising at least a pair of appreciably axially-spaced piston discs connected together axially by a stem portion of appreciable length to provide between said discs at least one free and relatively wide and deep annular groove, said discs being of diameters as to fit slidably in said bore close enough to the walls thereof as to assure expulsion of most of the barrel structure contents; and stop means integral with and forming a part of said barrel structure located in the back end of said piston-retracted bore section behind said plunger head end structure extending laterally-inward a relatively short distance, said stop means reducing to a limited degree the size of the bore thereat and extending into the path of the plunger head end structure temporarily to hold the latter in this section to prevent accidental drop-out, the elasticity of said barrel structure permitting forced passage of said piston head end structure past said stop means to facilitate mounting and dismounting of said head end structure into and out of said piston-retracted section of said bore.

10. An ointment depositor comprising, in combination, an elongated barrel of molded elastic plastic having a

major section of a certain average diameter and a reduced section at one end to form an ejecting orifice of lesser diameter, said reduced orifice section being internally threaded; the other back end of said barrel externally carrying an integral enlargement for finger engagement; a closing plug means removably fitted in the internally threaded orifice section; an elastic piston plug slidably fitted in the back end of said barrel with a quantity of ointment housed in said bore between said plugs, said piston plug having a socket in the back end thereof and an orifice-clearing projection on the front end thereof; a piston plunger comprising an elongated stem of relatively rigid plastic having an integral thrust knob on one end with its other end engaged in the piston plug socket, said stem having disc means thereon of a diameter to be slidable in said bore and located axially back of said piston plug at an appreciable distance to serve with the latter as guiding means assuring maintenance of substantial coaxial relationship between said bore and stem; and stop means integral with said barrel located in the back end of the latter extending laterally-inward a relatively short distance, said stop means reducing to a limited degree the size of the bore thereat and extending into the path of said guiding disc means temporarily to hold said plunger in said bore with location of said disc means forward of said stop means to prevent accidental drop-out, the elasticity of said barrel permitting forced passage of said disc means past said stop means to facilitate mounting and dismounting of said plunger into and out of said bore.

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