Aug. 29, 1961 J. F. BOEHM 2,998,167

RECIPROCATING PLUNGER TYPE CREAM DISPENSER

Filed Oct. 13, 1958

FIG. 1.

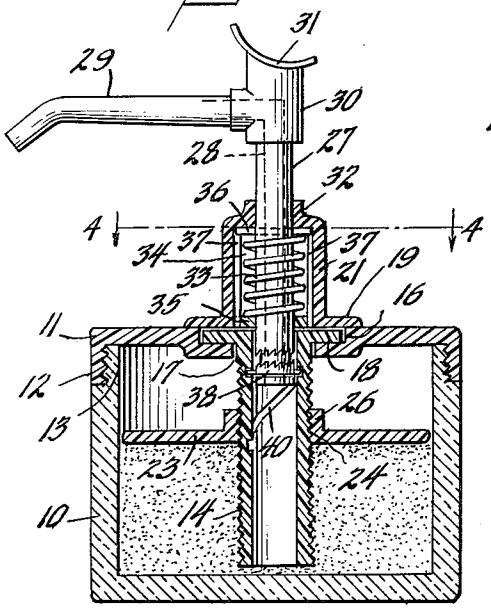


FIG. 2.

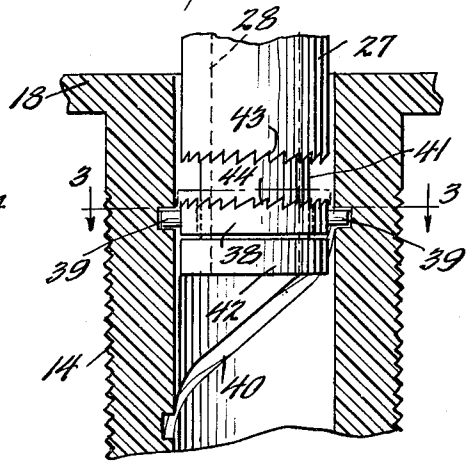


FIG. 3.

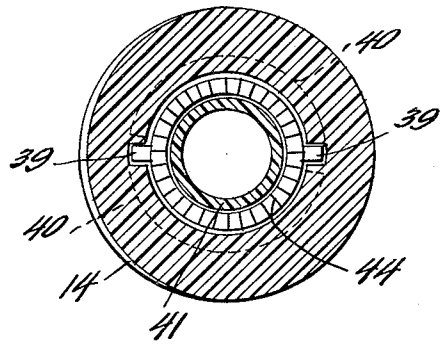
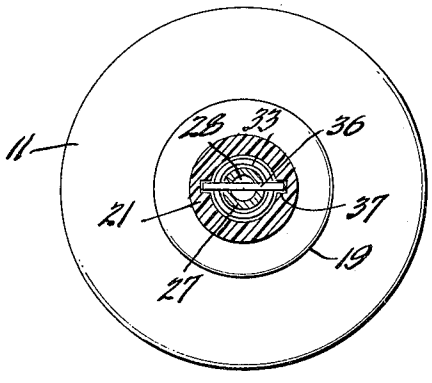


FIG. 4.



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United States Patent Office 2,998,167 Patented Aug. 29, 1961

2,998,167

RECIPROCATING PLUNGER TYPE CREAM DISPENSER

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Filed Oct. 13, 1958, Ser. No. 766,953
12 Claims. (Cl. 222—320)

This invention relates to a dispensing unit for use in dispensing cosmetic creams and similar substances from their containers. It has been customary in the past to dispense the contents of a jar or container through an externally threaded hollow tube rotatably disposed through an opening in the jar closure and having a piston threaded on the tube within the jar, whereby movement of the tube will urge the piston downwardly and thus force a portion of the jar contents into the lower end of the tube and upwardly through the tube for discharge.

The present unit includes a novel mechanism in which the said threaded tube is formed telescopically in sections, one of which projects above the jar cap, and is provided with a suitable discharge spout. This last-mentioned section is associated with the closure in such manner as to be held against rotation while being axially reciprocable in the manner of a plunger. It is operatively connected to the other tube section within the jar by a mechanism for converting reciprocal movement of the first tube section into intermittent unidirectional rotary movement. Such rotary movement of the other threaded tube section results in axial movement of the piston to expel the cream from the jar through the interconnected tube sections.

By spring biasing the plunger tube in an upward direction is is possible to provide a dispensing mechanism which may be actuated by finger pressure to repeatedly depress the upper tube section or plunger tube to eject any desired amount of the cream or other contents of a container.

The foregoing features and advantages of the invention as well as other incidental features and advantages will be readily apparent from the following detailed description together with the accompanying drawings in which:

FIGURE 1 represents a vertical axial section through a generally cylindrical cream jar having the preferred embodiment of the invention applied thereto.

FIGURE 2 is an enlarged sectional view taken in the same plane as FIGURE 1 and showing the interconnected telescopically associated sections of the tube.

FIGURE 3 is a sectional view on the line 3—3 of FIGURE 2.

FIGURE 4 is a sectional view on the line 4—4 of FIGURE 1.

Referring now in detail to the accompanying drawings, the numeral 10 designates any usual type of cream jar of cylindrical shape and defining a cylindrical chamber in its interior. The upper end of this jar or container is closed by the usual removable closure element or cap 11 which, in the form shown is provided with an internally threaded skirt 12 which is threaded onto the upper jar end or portion 13.

Rotatably supported within the jar is the lower tube section or discharge tube 14. This section 14 is threaded externally as shown and suitably supported by means of the cap 11 in spaced relationship above the bottom of the jar. Suitable supporting means for the tube 14 may comprise a depressed central socket 16 in the jar closure 11 communicating with a central opening 17. The tube section 14 rotatably depends through this opening 17 and is supported for rotation above the bottom of the jar by

means of an annular flange 18 which rests on the bottom of socket 16.

Upward displacing of the tube section 14 is prevented in the present embodiment by the base 19 of a guide housing 21 which is secured over the socket 16, the base preferably being cemented or otherwise secured to the closure 11 around the edges of the socket 16. It will be seen thus that the bottom or lowermost flange of the socket 17 and the base 19 cooperate with the flange 18 of the tube section 14, to provide a suitable thrust-bearing structure. Such thrust-bearing structure will allow free rotation of the tube section 14 about its axis which is preferably coincident with the cylindrical axis of the jar 10.

Threaded on the tube section 14 is a piston or follower 23, the threaded opening 24 of which preferably is surrounded by a marginal threaded collar 26 affording an increased area of threaded engagement with the tube 14.

The piston 23 will be of a shape corresponding to the interior cross-section of the jar 10, with its periphery in snug sliding engagement with the sidewalls of the jar. Thus, it will be seen that the threaded tube section 14 may be rotated in a direction to urge the piston 23 toward the bottom of the jar. It will be understood that the piston 23 will be held against rotation by frictional engagement with the jar contents and by frictional engagement of its periphery with the sidewalls of the jar, or in any other desired manner.

Telescopically disposed and reciprocable in the upper end of the tube section 14 is an upper tube section or plunger 27 having a discharge passage 28 therethrough, establishing communication between the interior of the tube section 14 and the discharge spout 29 which preferably extends at substantially right angles from the tube section 27 adjacent to its upper end. In the preferred embodiment spout 29 is connected to the upper end of the tube section 27 by an elbow 30 which carries an upwardly directed finger piece 31 to facilitate depression of the tube 27 in an axial direction. Plunger tube 27 has its lower end guided by tube section 14 and the medial portion of the tube section 27 is reciprocably disposed and guided through the housing 21, which preferably has a guide collar 32 at its upper end.

For normally urging the plunger 27 upwardly, there is provided a coil spring 33 enclosed within the housing 21, the spring being coaxially disposed around the tube 27 with its lower end abutting against an annular closure 35 cemented or otherwise fixed in the end of the housing. The upper end of the spring abuts against a cross-pin 36 extending diametrically through tube section 27. Abutment of this cross-pin 36 against the upper end of the housing 21 may be utilized to limit the upward movement of the plunger section 27. For restraining the plunger 27 against rotation the ends of the same pin 36 may be received and guided in diametrically opposed vertical slots 37 in the inner wall of the housing 21.

Spring 33 will return the tube section 27 to its raised position after each manual depression thereof so that the tube section or plunger 27 may be readily reciprocated simply by repeatedly depressing the finger piece 31.

For causing intermittent downward movement of piston 23 responsive to reciprocation of the plunger tube 27, there is provided a mechanism for converting the reciprocal movement of the plunger tube into intermittent unidirectional rotary movement of the threaded tube 14. Various such mechanisms are known and the invention broadly encompasses the use of any of them in combination above described, although for purposes of exemplification there is shown such a movement converting mechanism which is believed to be novel in and of itself.

Such a mechanism, as is best seen by reference to FIGURE 2, is disposed around and outside of the tube 27 in the annular space between the tube section 27 and section 14. Such disposition results in an extremely compact mechanism and avoids any obstruction to the passage of discharged material through the sections. The mechanism comprises an annular driver 38 carried by plunger 27 for axial movement therewith and having an internal threaded connection with threaded tube section 14. Such threaded connection is provided by radial studs 39 or projections 39 of the driver, which are slidably received in spiral grooves 40 formed in an inner wall of tube 14. The grooves 40 are of relatively high pitch and are substantially coextensive axially with the range of axial movement of the driver 38 to cause rotary movement of the tube 14 when the driver is moved in an axial direction and restrained against rotation.

For restraining the driver against rotation on the down stroke of the plunger, while permitting it to freely rotate on the up stroke thereof, the driver 38 is in the form of an annular collar which is normally rotatable and has limited axial movement on a reduced cylindrical portion 41 of the tube 27 between a stop shoulder 42 at the lower end of the tube and a toothed ratchet or clutch element 43, formed integrally with the plunger at the upper end of the portion 41. The stop shoulder or abutment 42 may be applied to the plunger by cementing it or otherwise fixing it thereon after application of the driver 38. The toothed or serrated clutch element 43 is adapted to engage the correspondingly toothed clutch surface 44 of the driver on the down stroke of the plunger tube 27, it being obvious that the driver will be retarded in its downward movement by frictional engagement with the tube section 14 as well as by engagement with the dispensed material in such tube section. The engagement of these clutch elements or surfaces 43 and 44 will occur at the beginning of each down stroke of the plunger tube or section 27. During the balance of each down stroke, therefore, the clutch surfaces or elements 43 and 44 will remain engaged to restrain the tube section 27 against rotation. The threaded connection exemplified by grooves 40 and studs 39 will then cause the tube section 14 to rotate for the remainder of the down stroke.

The rotation of the tube section 14 will be in a direction such as will cause downward movement of the piston or follower 23, it being understood that the latter will be restrained against rotation by engagement with the jar contents or in any other suitable manner. Such downward movement will force the contents of the jar upwardly into the connected tube sections 14 and 27 and through the discharge spout 29.

On each return stroke of the plunger the action of gravity and the frictional retarding action of its engagement with tube 14 will cause driver 38 to disengage its clutch portion 44 from the cooperating portion 43 of tube section 27. The driver will then be free to rotate in the grooves 40 throughout the return stroke of the plunger tube without causing reverse rotary movement of the threaded tube 14 or backing up of the piston 23.

It will thus be apparent that the invention includes a novel, simplified and highly useful actuating mechanism for a piston-type dispensing unit wherein the piston is driven through a threaded engagement with a rotary discharge spout.

In this application there is shown and described only the preferred embodiment of the invention, merely in order to set forth the preferred mode of carrying out the invention. However, it is to be understood that the mechanism here shown and described and its several details may be modified in various ways, all without departing from the invention.

Having thus described my invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A dispensing unit for cream jars comprising an externally threaded discharge tube, means supporting said tube for free rotary movement about its axis and against axial movement, a piston threaded on said tube for axial movement thereon responsive to relative rotation between the tube and piston, a hollow plunger tube disposed for reciprocation in one end of said discharge tube, said tubes being in communication interiorly to jointly define a discharge passage, and means preventing rotation of said plunger tube relative to said first-mentioned means, in combination with mechanism interconnecting said tubes for converting axial reciprocating movement of said plunger tube into intermittent unidirectional rotary movement of said externally threaded discharge tube.

2. The combination of claim 1 in which said mechanism is located between and concentrically to the said tubes.

3. A dispensing unit for cream jars comprising an externally threaded discharge tube, means supporting said tube for free rotary movement about its axis and against axial movement, a hollow plunger tube disposed for reciprocation in one end of said discharge tube, said tubes being in communication interiorly to jointly define a discharge passage, and means preventing rotation of said plunger tube, in combination with mechanism interconnecting said tubes for converting axial reciprocating movement of said plunger tube into intermittent unidirectional rotary movement of said externally threaded discharge tube.

4. A dispensing unit for cream jars comprising a jar closure element having a control opening therethrough, a rotary thrust bearing on said element coaxial with said opening, an externally threaded discharge tube for the jar contents depending through said opening and rotatably supported at its upper end in said bearing against axial displacement, a piston threaded on said tube for axial movement thereon responsive to relative rotation between the tube and piston, a hollow plunger tube telescopically disposed in the said threaded discharge tube for reciprocation therein, means on said closure element slidably engaging and preventing rotation of the plunger tube, both of said tubes being in communication interiorly to jointly define a discharge passage for the jar contents, in combination with mechanism connecting said tubes for converting axial reciprocating movement of said plunger tube into intermittent unidirectional rotary movement of said externally threaded discharge tube.

5. The combination of claim 4 including a spring resiliently urging said plunger tube out of said discharge tube.

6. The combination of claim 4 in which said movement converting mechanism comprises a driver having a threaded connection with one of said tubes, and a one-way clutch means operative responsive to axial movement of the plunger tube in one direction to establish a fixed connection between said driver and the other of said tubes, whereby said threaded connection causes relatively intermittent unidirectional rotation between said tubes.

7. The combination of claim 6 wherein said movement converting mechanism is located between and concentrically to the telescoping portions of said tubes.

8. In a dispensing unit, an externally threaded discharge tube, means rotatably supporting said discharge tube, and a plunger tube telescopically connected to said discharge tube for relative axial movement, said tubes being in communication the combination comprising an annular driver disposed concentrically between said tubes and having a threaded connection with one of said tubes, said driver and the other said tube having ratchet means operative to connect them against relative rotation responsive to relative axial movement between said tubes in one direction, and to permit free rotary movement of said discharge tube responsive to relative movement thereof in the opposite axial direction.

9. The combination of claim 8 including a piston having a central threaded bore operatively receiving said threaded discharge tube.

10. In a dispensing unit, an externally threaded discharge tube, and a plunger tube telescopically received in said discharge tube for relative axial and rotary movement, said tubes jointly defining a discharge passage for the dispensed material, said plunger tube being formed with a reduced diameter portion within said discharge tube, the combination comprising an annular driver disposed on said portion for both axial and rotary movement relative to said plunger tube, means establishing a threaded connection between said driver and the discharge tube, said driver and said plunger tube having axially opposed clutch means thereon engageable responsive to relative axial movement between said tubes in one direction to interconnect said driver and said plunger tube against relative rotation, and disengageable responsive to relative axial movement between said tubes in the opposite direction.

11. The combination of claim 10 wherein said means establishing a threaded connection comprises a radial lug on said driver, said discharge tube being formed internally with a spiral groove slidably receiving said lug.

12. The combination of claim 10 in which said clutch means comprises axially directed ratchet teeth on the plunger tube and on the driver respectively.

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