

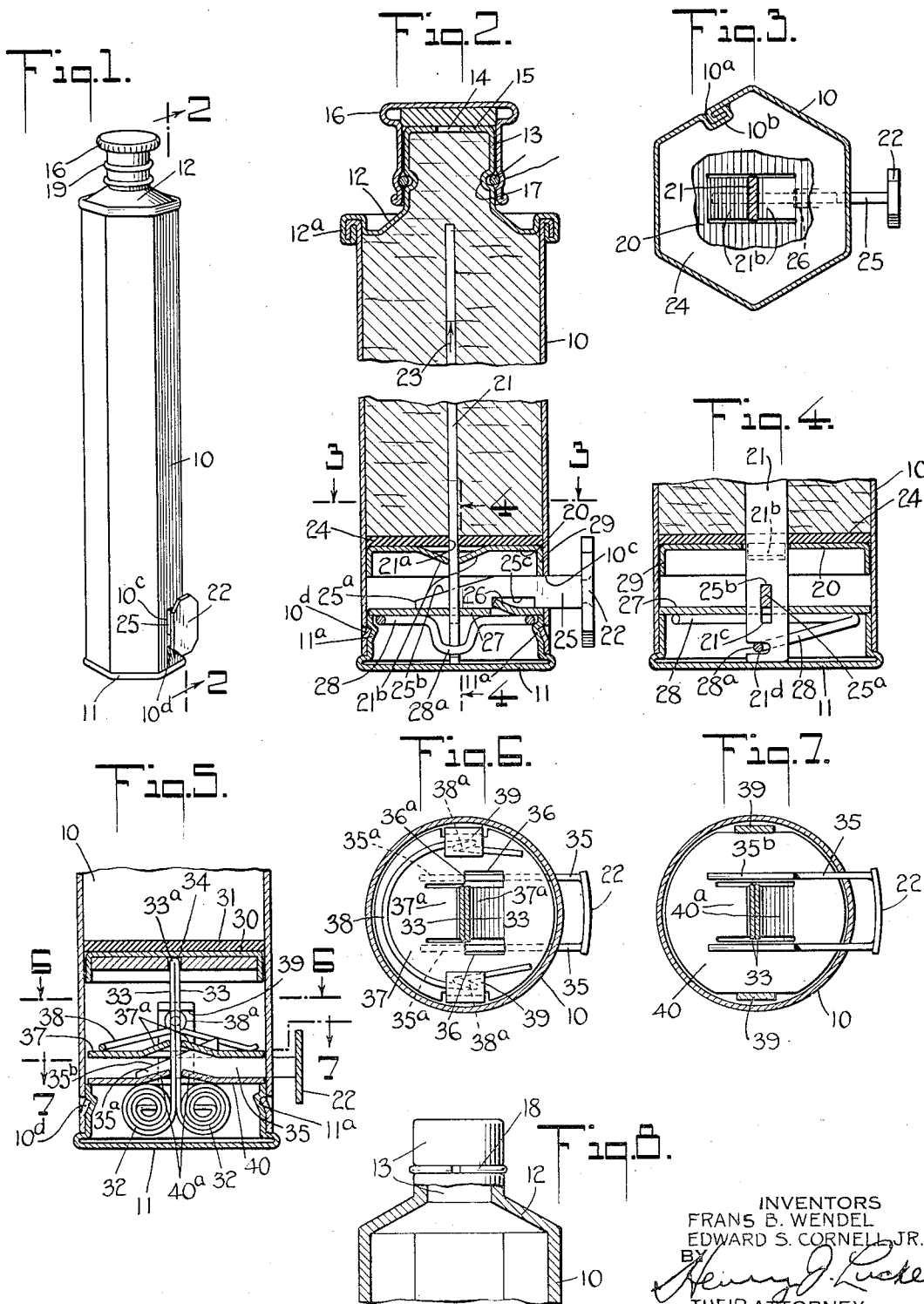
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DISPENSING TUBE

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DISPENSING TUBE

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Our invention relates to dispensing tubes.

A feature of the invention is the provision of a dispensing tube of non-refillable character.

A further feature of the invention is the provision in a dispensing tube of discharge means which in its discharging operation defeats refilling of the tube.

Another feature of the invention is the assembly of a dispensing tube having a casing possessing a high artistic appearance, involving low costs of material and of operations of assembly, thereby permitting the tube when emptied to be thrown away.

A special advantage of our invention is that the discharging means is intermittent in character and may be arranged to dispense uniform quantities upon repeated operation of the discharging means.

An important feature of the invention, for certain uses, is that the tube may be formed of sheet tinued steel and other sheet metallic material which may be imprinted with any number of colors, whereas block tin, tin alloys or the like employed in regulation collapsible tubes are not capable of enduring more than two printed impressions.

The discharging means of our invention is also applicable to collapsible tubes for dispensing suitable materials.

In general, the tube is provided with a nipple, which may be threaded or non-threaded. Suitable means may be provided for closing the nipple opening, as at the stages of charging the tube, or storing the tube in travelling bags, or in dressing cabinets, kits, etc. If desired, the nipple opening may be closed by dipping into or otherwise providing suitable materials to form a coating at the nipple opening of nitro-cellulose, gelatine or like material, or a cap may be provided.

A further feature of the invention is that the casing may have any desired contour, inclusive of hexagonal and cylindrical configurations, thus affording full election to the manufacturer of any preferred contour, from the view point of artistic or ensemble appearance, and for advantage of low cost of imprinting the outer face of the casing on the projected wall face in sheet form (later formed into the final wall configuration). The casing may also be formed of suitable moldable or cast material, such as synthetic resins, condensation products, plastic materials, white metal, aluminum and aluminum alloys (molded between steel dies), pressed paper pulp, the advertising and other "printed" material being molded in the molding of the housing.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawing, in which

Fig. 1 is a side perspective view of a preferred form of the invention;

Fig. 2 is a sectional elevation on line 2—2 of Fig. 1, taken on an enlarged scale;

Fig. 3 is a horizontal sectional elevation on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary vertical sectional elevation on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary sectional elevation, corresponding to the lower half of Fig. 2, but showing a modification;

Fig. 6 is a horizontal sectional elevation on line 6—6 of Fig. 5;

Fig. 7 is a horizontal sectional elevation on line 7—7 of Fig. 5; and

Fig. 8 is a detail view of an upper portion of the tube, showing the casing and a portion of the casing neck in central vertical section and the remainder of the neck in side elevation, the cap being removed. This view also illustrates the use of moldable material for the casing.

The general dimensions and contour of the embodiments of the invention referred to more particularly herein, and inclusive of the embodiments illustrated in the drawing, are adaptable to products such as facial creams and like cosmetics, lubricating and other greases, oils, shaving creams, tooth powder, etc.; however, it is understood that the structural and operation features of the invention are applicable to other dimensions and other characteristics, dependent upon the particular properties of the article to be dispensed, the particular design effect to be attained and other controlling factors.

Referring to the embodiment illustrated in Figs. 1 to 5, the lateral sides 10 of the dispensing tube is illustrated of hexagonal cross-sectional contour, its bottom member 11 flat to permit the tube to be placed and stably supported in upright position; its upper and dispensing end 12 is of general tapering or dome shape, the neck 13 of which may be substantially cylindrical. The discharge opening is indicated at 14, and as shown is a perforation extending through a portion of the upper end 15 of the neck 13.

The cap 16 is illustrated of the friction held type, the latter function being provided by a groove 17 rolled or otherwise formed in the neck 13, to receive and retain therein a circular ring 18, the aforesaid coordinating with the com-

plemental groove 19 rolled or otherwise formed in the depending skirt of the cap 16. The ring 18, see Fig. 8, may be formed of a circularly bent wire, its ends being non-connected to provide the desired spring effect.

In such embodiment of the invention, the sides 10 may be formed of a flat sheet of metal or other suitable material, the "printing" of the character of material, its brand, trademark, name and address of owner, and other trade indicia being printed while the metal constituting the sides 10 is in sheet form. The printing may be in multiple colors, the specific colors and number of same being as desired. Metals, inclusive of those of low price, are applicable for attaining the desired structural and artistic effects, as well as capable of withstanding the necessary multiple operations of impressing and handling to derive the desired final trade indicia.

The lateral edges of the sheet 10 are interconnected with one another in any suitable manner, as by interbending the ends 10a, 10b, to form a self-locking and leak-proof joint, under pressure.

The upper end 12 may be contoured or formed by suitable drawing process, or in any other suitable manner, and its lower edge suitably secured to the upper edge of the sides 10, as by a self-locking interconnected joint, see 12a.

The bottom 11 is preferably assembled in correlation with the dispensing mechanism, the details of the latter being now referred to.

In general, the dispensing mechanism comprises a plunger or equivalent which is controlled and actuated to effect step by step advancement from the closed toward the dispensing end of the tube. In the embodiment illustrated in Figs. 2 to 4, the plunger 20 is advanced in cooperation with a rod 21 upon reciprocal movement of the rod 21, the reciprocation of the rod being effected upon application of pressure upon the finger piece 22. For effecting such results, the plunger 20 is provided with an effective opening 21a, see Figs. 2 and 3, preferably central, and having a contour corresponding to and closely embracing the rod 21, the opening 21a being effected by blanking and forcing down the slightly depending fingers 21b, the acuteness of the angle and resiliency of the fingers 21b serving as gripping elements in the direction of the discharging movement, see arrow 23, Fig. 2. Although not necessary, the abutting faces of the rod 21 may be roughened or otherwise unsmoothed, to facilitate such gripping action by the fingers 21b relative to the reciprocated rod 21.

The effective face of the plunger 20 is provided with the disk 24 of cardboard or other suitable material, to prevent or minimize the expressing of the charge toward the dispensing fingers 21b, 21b.

Such charging movement of the rod 21 may be had by any suitable means operated by a finger piece 22 or equivalent. For simplicity of operation and assembly as well as low cost of manufacture, I illustrate an operating arm 25 to the outer end of which is attached the finger piece 22, its inner end 25a being tapered at its upper edge 25b and rectilinear at its lower edge, the resulting tapered end portion being received within a slot 21c, see Fig. 4, of predetermined length, coordinated with the height of the operating arm 25. The arm 25 extends through the slot 10c in one of the sides 10. The arm 25 and finger piece 22 are shown in Figs. 2,

3 and 4 in normal position, preparatory for discharging movement. Assuming pressure to be applied to the finger piece 22, the tapered upper edge 25b of the end portion 25a of the operating piece 25 engages and forces upwardly the rod 21, and therewith by means of the gripping fingers 21b. The maximum extent of the displacement of the rod 21, that is to say, in the direction of the arrow 23, is regulated by the vertical height differences between the location of normal engagement of the tapered edge 25b with the upper edge of the slot 21c and the upper edge of the arm 25. Accordingly, the extent of the effective stroke of the operating rod 21 is regulated by varying the relative dimensions of the above stated parts, together with the extent of reciprocal stroke of the arm 25, as will now be explained.

The extent of reciprocal stroke of the arm 25 is regulated by the stop 26, formed by punching, or in any suitable manner, a portion of the plate 27, the plate 27 having a facial portion which is substantially rectilinear, for engagement with and cooperation with the rectilinear lower edge of the inner end portion 25a of the arm 25, the stop 26 cooperating with a slot 25c, formed by cutting away the lower edge portion, or by any other suitable stop carried by the arm 25.

The return stroke of the operating rod 21 is effected by any suitable means, as by the provision of the return spring 28, see Figs. 3 and 4; the spring 28 is shown formed of resilient wire, the body portion of which is extended peripherally conforming generally to the respective sides 10 of the tube, a portion of the wire being bent downwardly, see 28a, to be received within the notch 21d, or other suitable retaining means, of the operating rod 21.

Preferably, the plunger 20 and its above effective stroke operating parts are assembled as a unit mechanism, in conjunction with the lower cap 11, the aforesaid parts being locked in position upon insertion of the same within the lower end of the tube. As one specific form of such unit assembly, I have shown the plunger 20 as the head of an expanded dish member, the lateral faces 29 of which conform to and closely fitting within the sides 10 of the tube.

The unit is inserted into final position upon inserting the lower cap 11, which is advantageously formed of dish shape, its sides 11a conforming to and closely fitting the sides 10 of the tube. The locking of the cap 11 and therewith of the unit is had by one or more tongues 10d, see Fig. 1, blanked and pressed inwardly of a side 10, and cooperating intumed notch or notches 11a, see Fig. 2.

The embodiment illustrated in Figs. 5, 6 and 7 conforms in general to the embodiment hereinabove described, and like parts are designated by like reference numbers. However, the plunger, in the embodiment shown in Figs. 5, 6 and 7, is advanced by operating means, including an effective arm which attains from stage to stage increasing length, the material of the length being provided from coiled portions. A pair of coils, for forming the arm length is illustrated, in that greater stability is attained by the employment of a pair, in lieu of a single coil, as will be apparent.

In the embodiment shown in Figs. 5, 6 and 7, the plunger 30 is imperforate at its upper face, to which may be applied a disk 31.

The operating mechanism comprises the pair of coiled strips 32, the uncoiled portions 33, preferably integrally connected at the end 34, which

portions 33 are disposed to extend substantially axially thereof. Said portions 33, 33, are preferably flat, whereby the flat face to face engagement with one another, augmented by the integral end connection 34, see Fig. 5, results in enhanced stiffness of the resulting effective operating arm 33, 33, in the advancement of the plunger 30, toward the discharge end of the tube. In this embodiment, the operating arm mechanism comprises dual arm portions 35, conforming generally to the aforesaid operating arm 25, the respective inner tapered portions 35a, see Fig. 6, being received within slots 36 in the plate 37, the edge 36a of the slot 36 engaging the tapered edge 35b of each operating arm 35, whereby upon pressure being applied to the manipulating member 22, the fingers 37a, 37a grip the portions 33, 33, on opposite sides thereof, to advance the same, and therewith the plunger 30 in discharge movement, and also effect uncoiling or further uncoiling of the coil portions 32, 32.

The return movement of the plate 37 is effected by any suitable means, as by the return spring 38, shown as a resilient wire, the body and end portions of which engage and exert pressure upon the plate 37, the spring 38 being pivoted at intermediate portions 38a, within retaining ears 39 formed as extensions from the plate 40, the body portion of the plate 40 being disposed below the plate 37, and also having its edges extending peripherally of and conforming to the inner face of the tube. It will be noted, that the plate 40 is substantially flat at its upper face portions whereat the lower rectilinear edge of each operating arm 35 engages, and that the plate 40 is supported by the inner flange of the end cap 11, whereby the plate 40 serves as a fulcrum for the operating arms 35.

Accordingly, upon release of pressure on the finger piece 22, the spring 38 returns the plate 37 to its normal position, shown in Fig. 5, its gripping fingers 37a idly receding along the formed strip lengths 33, 33. In this return movement, the fingers 40a formed by blanking and bending, similar to the gripping fingers 35b, grip the lower portions of the formed strip lengths 33, to thereby prevent any return movement of the formed strip lengths 33, 33 and therewith retain the plunger 30 in its advanced position. The plate 40 serves also to retain the coils 32, 32, and to facilitate the uncoiling of the same in the function of forming the strip lengths 33, 33.

The embodiment shown in Fig. 8, in addition to illustrating the construction of the friction retaining means for the cap 16, applicable to the above described embodiments, also illustrates our dispensing tube when formed of molded material. Like parts are designated by reference numerals corresponding to the aforesaid. It will be understood, in the use of molded material, that the "printed" indicia is had by suitable impressions on the mold parts.

From the above, it appears that our discharging mechanism is applicable for dispensing tubes of the collapsible type, that is to say, formed of block tin, tin alloys, aluminum alloys and like relatively soft material, as well as of substantially non-collapsible material, such as tinned sheet steel, and other suitable metals.

In general, our discharging mechanism defeats refilling of the tube or other container, and prompts the user discarding the tube after being emptied. For such uses, the adaptation of our invention to non-collapsible tubes is of high commercial importance, in that it enables sheet ma-

terial to be employed as the wall for the tube, and to enable the wall material while in sheet form to be printed as desired. In order to effect desirable economies in cost of material and in assembly operations, the sheet wall material may be relatively thin and notwithstanding endure the necessary impressions and handling for multi-color printing or other multiple operations, as may be desired.

An advantage residing in the invention is that substantially the whole of the parts of the invention are of sheet metal, and that the metal parts are blanked and formed by comparatively simple mechanical operations.

A principal feature in the use of dispensing tubes embodying the invention is the preservation of the contour and appearance of the tube throughout the stage of dispensing.

A principal feature is the practical non-refillability, with attendant advantages of insuring genuineness of the product dispensed, and other advantages known to the trade.

The feature of intermittent operation of the discharge enables the amount discharged at any stage to be readily controlled. While the full stroke of the operating mechanism provides for substantial uniformity of discharge, any lesser amount of discharge is had by actuating the operating mechanism a partial extent of its stroke.

One form of utilization of my invention contemplates the assembly of the side wall and of the neck, which may be carried out at one location, and the filling of the tube at another location; the dispensing mechanism together with the bottom of the tube is inserted and secured in position after the tube has been charged. The dispensing mechanism per se may be manufactured irrespective of the contour of the side walls of the tube; the plunger, its face disk and the bottom cap member are shaped in correspondence to the cross-sectional contour of the side walls.

Whereas I have described the invention by specific reference to various forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

We claim:

1. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, said advancing means comprising a member advanced concurrently with the plunger, resilient means for returning said member from its advanced position to its normal position, and means for positively limiting the plunger advancing movement of the lever element.

2. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said manipulating lever element for intermittently advancing the plunger, said advancing means comprising a member advanced concurrently with the plunger, resilient means for returning said member from its advanced position to its normal position, and means for positively limiting the plunger advancing movement of the lever element.

3. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, means for positively limiting the lever element in its plunger advancing movement, said

operated means further comprising a reciprocatory rod.

4. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, and fixed stop means for positively limiting the lever element in its plunger advancing movement, said operated means including a rectilinear element advanced intermittently upon intermittent operation of the manipulating element.

5. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, means for positively limiting the lever element in its plunger advancing movement, said operated means including a rectilinear element formed of strips disposed in side by side engagement.

6. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, and fixed stop means for positively limiting the lever element in its plunger advancing movement, said operated means including a rectilinear element, the length of which effectively increases upon operation of the manipulating element.

7. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, and fixed stop means for positively limiting the lever element in its plunger advancing movement, said operated means comprising a rectilinear element, the effective length of which is furnished from a coiled portion thereof.

8. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, means for positively limiting the lever element in its plunger advancing movement, said operated means comprising a rectilinear member, the effective length of which is increased by mutually engaging strip portions supplied from coiled portions.

9. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said manipulating lever element for intermittently advancing the plunger, said reciprocatory means further comprising a reciprocatory rod, said reciprocatory rod being provided with a slot extending in the longitudinal direction of the rod, said lever element having a cam face extending in the slot of the reciprocatory rod.

10. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said manipulating lever element for intermittently advancing the plunger, said reciprocatory means including a rectilinear element advanced intermittently upon intermittent operation of the manipulating lever element, a member serving as the bottom of the tube, and means carried by the bottom member for positively limiting the manipulating lever element in its plunger advancing movement.

11. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said

manipulating lever element for intermittently advancing the plunger, and means for positively limiting said manipulating lever element in its plunger advancing movement, said reciprocatory means including a rectilinear element formed of substantially parallel strips disposed in longitudinal side by side engagement.

12. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said manipulating lever element for intermittently advancing the plunger, a member serving as the bottom of the tube, and means carried by the bottom member for positively limiting the manipulating lever element in its plunger advancing movement, said reciprocatory means including a rectilinear element, the length of which effectively increases upon operation of the manipulating lever element.

13. The combination with a tube, of dispensing means comprising a manipulating element, a plunger and reciprocatory means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, means carried by said bottom member for positively limiting the manipulating element in its plunger advancing movement, and a rectilinear element, the effective length of which is furnished from a coiled portion thereof.

14. The combination with a tube, of dispensing means comprising a manipulating element, a plunger and reciprocatory means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, means carried by said bottom member for positively limiting the manipulating element in its plunger advancing movement, and a rectilinear member cooperating with said reciprocatory means for advancing the plunger, the effective length of said rectilinear member being furnished from a plurality of coiled portions.

15. The combination with a tube, of dispensing means comprising a manipulating element, a plunger, means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, and means carried by the bottom member for positively limiting the manipulating element in its plunger advancing movement, said operated means including a member whose effective length is varied upon operation of said manipulating element.

16. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, means operated by said manipulating lever element for intermittently advancing the plunger, a member serving as the bottom of the tube, and means carried by the bottom member for positively limiting the manipulating lever element in its plunger advancing movement, said operated means including a member whose length is increased upon operation of said manipulating lever element.

17. The combination with a tube, of dispensing means comprising a manipulating lever element, a plunger, reciprocatory means operated by said manipulating lever element for intermittently advancing the plunger, a member serving as the bottom of the tube, and means carried by the bottom member for positively limiting the manipulating lever element in its plunger advancing movement, said reciprocatory means including a member whose length is intermittently increased upon operation of said manipulating lever element.

18. The combination with a tube, of dispensing means comprising a manipulating element, a plunger, reciprocatory means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, and means carried by the member for positively limiting the manipulating element in its plunger advancing movement, said reciprocatory means including a plunger advancing member comprising a substantially parallel rectilinear part and further comprising a therewith continuously connected coiled part, and means for increasing the length of said rectilinear part from its coiled part.	80
19. The combination with a tube, of dispensing means comprising a manipulating element, a plunger and reciprocatory means operated by said manipulating element for intermittently advancing the plunger, said reciprocatory means including a member formed of side by side rectilinear and coiled parts, and means for augmenting said rectilinear part from a coiled part.	85
20. The combination with a tube, of dispensing means comprising a manipulating element, a plunger and reciprocatory means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, means carried by said bottom member for positively limiting the manipulating element in its plunger advancing movement, and a rectilinear member cooperating with said reciprocatory means for advancing the plunger, the effective length of said rectilinear member being furnished from a plurality of coiled portions normally disposed below said bottom member.	90
21. The combination with a tube, of dispensing means comprising a manipulating element, a plunger and reciprocatory means operated by said manipulating element for intermittently advancing the plunger, a member serving as the bottom of the tube, means carried by said bottom member for positively limiting the manipulating element in its plunger advancing movement, and a rectilinear member cooperating with said reciprocatory means for advancing the plunger, the effective length of said rectilinear member being furnished from a plurality of coiled portions normally disposed below said bottom member.	95
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