Nov. 2, 1965 H. HEISLER ETAL 3,215,320

CONTAINER AND DISPENSER FOR DISPENSING PREDETERMINED, SET, MEASURED AMOUNTS OF MATERIAL

Filed Nov. 18, 1963 2 Sheets-Sheet 1

Fig. 1

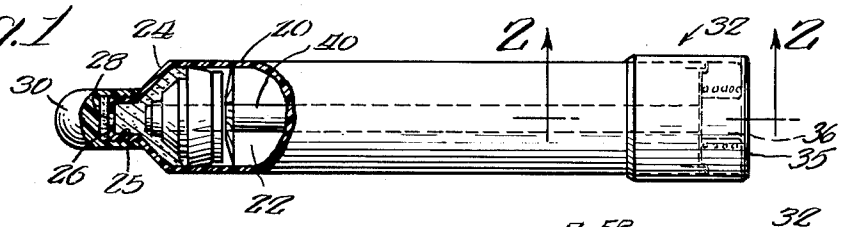
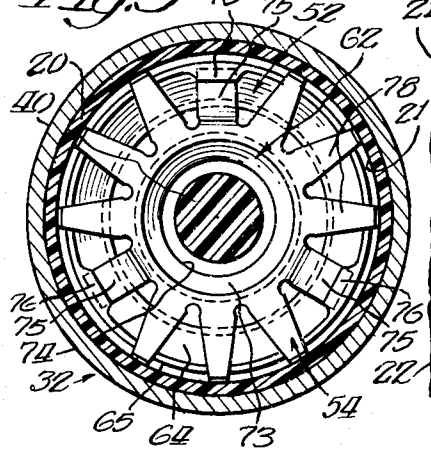


Fig. 3



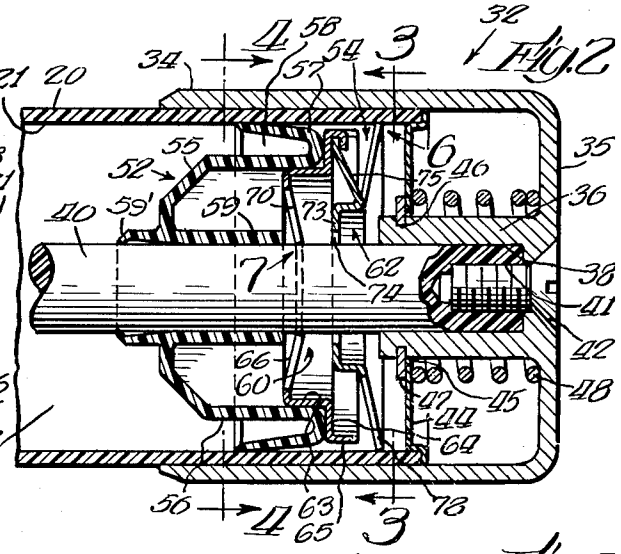


Fig. 2

Fig. 4

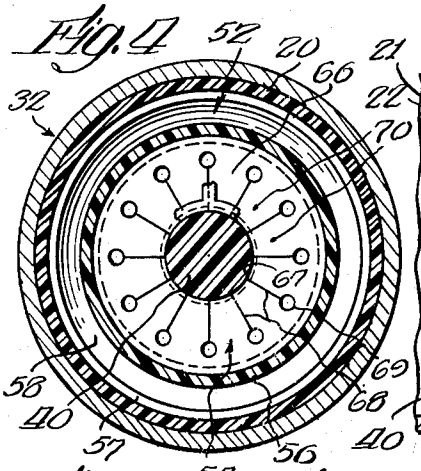


Fig. 5

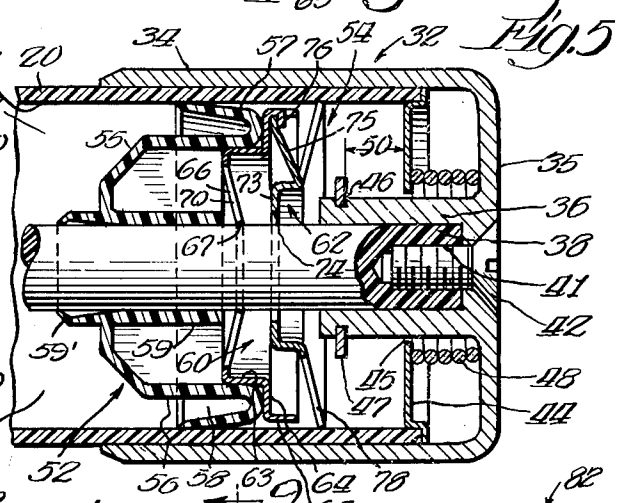


Fig. 6

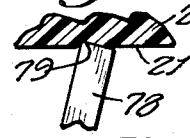


Fig. 7

Fig. 8

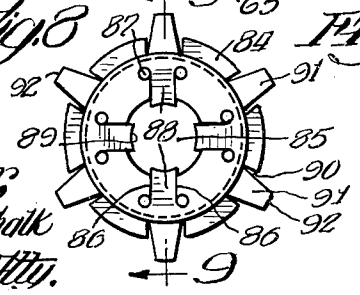
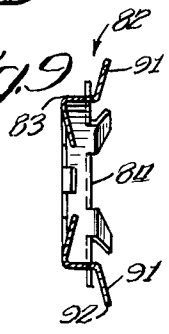


Fig. 9



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CONTAINER AND DISPENSER FOR DISPENSING PREDETERMINED, SET, MEASURED AMOUNTS OF MATERIAL

Filed Nov. 18, 1963 2 Sheets-Sheet 2

Fig. 10

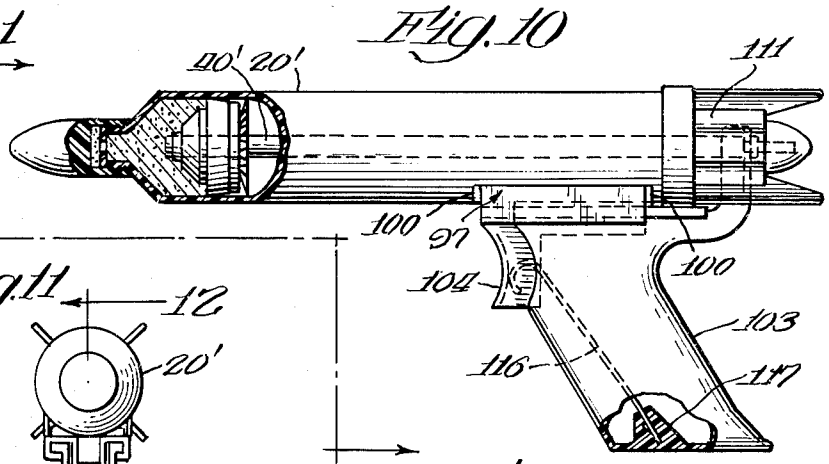


Fig. 11

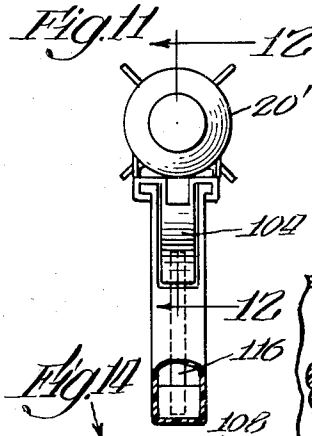


Fig. 12

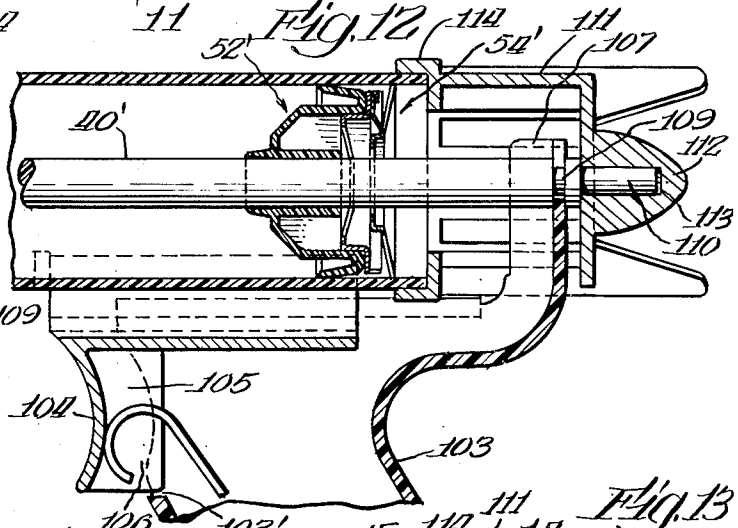


Fig. 14

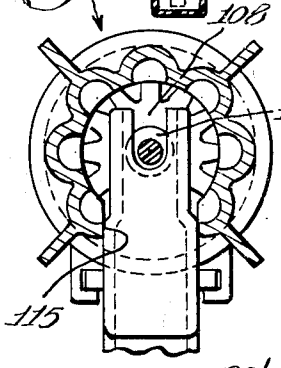


Fig. 13

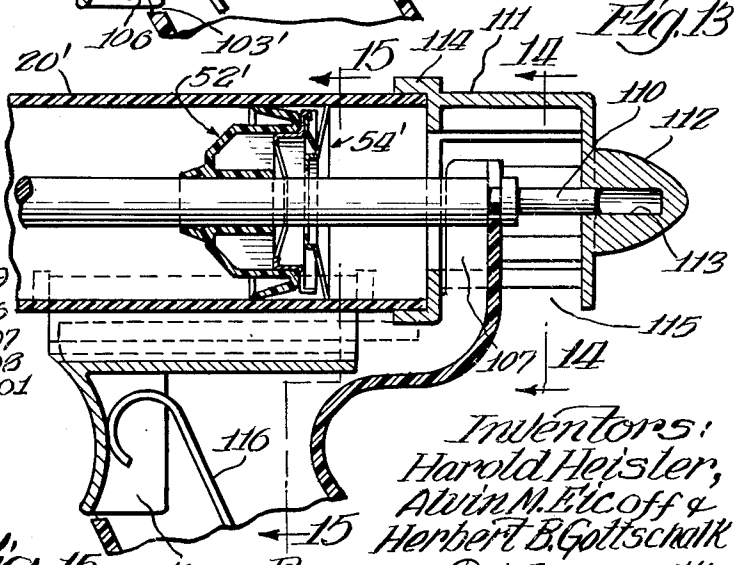
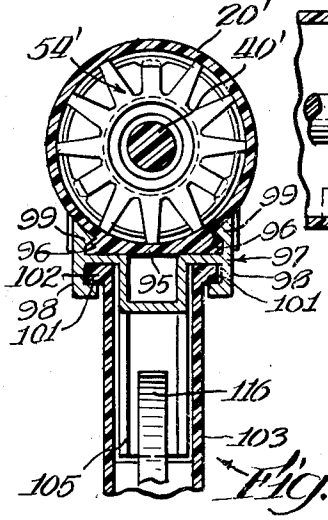


Fig. 15



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3,215,320

CONTAINER AND DISPENSER FOR DISPENSING PREDETERMINED, SET, MEASURED AMOUNTS OF MATERIAL

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3 Claims. (Cl. 222—391)

This invention relates to a container and dispenser for dispensing predetermined set measured amounts of material.

One of the objects of this invention is to provide a container and dispenser in which a material is packaged and dispensed in predetermined set measured amounts. The material may be either a semi-solid or fluent mass material, or a paste, or a viscous, or a liquid material.

Another object of this invention is to provide a container for products of the foregoing character with a push button type of action, in which a slight manual pressure on the push button will dispense a preset measured amount of the product.

Another object of this invention is to provide a device of the foregoing character in which the dispensing of predetermined set measured amounts of material is accomplished by a pusher member or piston clutchingly connected to a pusher rod actuated by manual pressure, in which the piston is clutched to the rod to move with the rod on the forward stroke and is clutched to the container on the return stroke, for advancing the piston in the container an increment with each actuation of the device.

Another object of this invention is to provide a dispensing device of the foregoing character which utilizes clutching means provided with sharp gripping members for effecting the clutching operation of the piston and thereby obviating the use of friction for said purpose. This results in a device which is actuated with a minimum of manual pressure.

It has been found in the dispensing of a paste or fluent mass material such as tooth paste and numerous other like packaged products which are usually packaged in collapsible tubes, that the dispensing of same is left to the whim of each individual and that as a result thereof either insufficient or excessive amounts are dispensed each time the product is used. This results in a great waste of the product as the user cannot determine with any degree of certainty the amount which should be used with each application. With the present invention these objectionable features are all eliminated. The device is so arranged that each time it is actuated, a preset, predetermined and measured amount of material will be dispensed sufficient for an individual use or application.

In the use of present day collapsible tubes a greater manual pressure is necessary to squeeze the material out of the tube when the pressure is applied at the rear end of the tube rather than at the center or the like. Thus, young children will generally start squeezing the tube from the center, and after the material has been discharged from the front end of the tube, causing that portion of the tube to collapse, the material remaining in the lower portion of the tube cannot thereafter be conveniently dispensed. This is eliminated with the present invention.

Another object of this invention is to provide a device in which the dispensing operation consists of merely pressing a member, and irrespective of the pressure applied the device will operate to dispense the preset measured amount of material and will position itself in condition for the next use. With the final actuation of the device all of the material is dispensed, eliminating waste which is common with the use of squeeze-type tubes.

Another object of this invention is to provide a device of the foregoing character which may be inexpensively and economically constructed and which may be thrown away after the product has been completely dispensed from the container. The cost of producing this device and the packaging of the material therein is sufficiently low so as to make it comparable and competitive with the use of collapsible squeeze-type tubes now on the market. Further, the container may be filled by standard filling machines now in common use.

Other objects and advantages will become apparent as this description progresses.

In the drawings:

FIG. 1 is a view of the invention with a portion sectioned and showing the piston or pusher member advanced to a forward position.

FIG. 2 is an enlarged sectional view taken on lines **2—2** of FIG. 1, with the parts in normal position before actuation and with the piston or pusher member at its rearmost position on the pusher rod, such as when the container is fully loaded.

FIG. 3 is a view taken on lines **3—3** of FIG. 2.

FIG. 4 is a view taken on lines **4—4** of FIG. 3.

FIG. 5 is a view similar to FIG. 2, but with the manually pressable member pressed as when actuated and with the piston or pusher member advanced one increment on the pusher rod.

FIG. 6 is an enlarged fragmentary view showing the finger of the container body clutching member engaging the inside wall of the container.

FIG. 7 is an enlarged fragmentary view showing the finger of the rod clutching member engaging the pusher rod.

FIG. 8 is a front elevational view of a modified unitary clutch member.

FIG. 9 is a sectional view taken on lines **9—9** of FIG. 8.

FIG. 10 is a modified construction with a portion sectioned.

FIG. 11 is a front end view taken on lines **11—11** of FIG. 10.

FIG. 12 is an enlarged sectional view taken on lines **12—12** of FIG. 11 and corresponding to the position of parts in FIG. 2.

FIG. 13 is a view similar to FIG. 12 but with the parts in position corresponding to FIG. 5.

FIG. 14 is a view taken on lines **14—14** of FIG. 13, and

FIG. 15 is a sectional view taken on lines **15—15** of FIG. 13.

The device includes a cylindrical-shaped body **20** forming the container **22** for the material. The front of the container is funnel-shaped as at **24** and terminates with an externally threaded neck **25** which has an end wall **26** provided with an opening or openings **28**, which may be in the form of a die through which the material is expressed or discharged from the container. A closure cap **30** is threadedly secured to the neck.

The opposite or rear end of the container has no integrally formed end wall but is provided with a slidable and manually pressable member generally indicated at **32** which is axially slidable with respect to the body **20**. The slidable and pressable member includes an end cap having a skirt portion **34** and an end wall **35** provided with an inwardly extending boss **36** having a central bore **38** which receives one end of a pusher rod **40**. The end of the pusher rod is internally threaded as at **41** and is secured to a threaded bolt **42** countersunk in the end wall of the cap. The skirt portion **34** telescopes over the rear end of the cylindrical body **20** and is slidable axially with respect thereto to a degree to be described. The pusher rod **40** is thus firmly anchored to the slidable or manually pressable member **32** and moves with it.

Positioned against the open rear end of the cylindrical body **20** and press fitted thereto is an annular plate **44**

having a central opening 45 to accommodate the boss 36. The boss has an annular recess 46 in which is received a snap ring 47. A helical compression spring 48 surrounds the boss 36, with one end of the spring resting against the end wall 35 of the slidable cap and the other end against the plate 44 to normally urge and retain the slidable member 32 in its extended position, as shown in FIG. 2, in which the snap ring 47 on the slidable member 32 engages and abuts against the plate 44 to limit the outward travel of the slidable member 32.

The inward travel of the slidable member 32, as shown in FIG. 5, takes place when the slidable member 32 is manually pressed inwardly. A slight manual pressure by the hand or fingers of the user against the slidable member will cause same to slide or move inwardly from the position shown in FIG. 2 to the position shown in FIG. 5 and compress the helical spring 48. Movement of the slidable and pressable member 32 moves with it the pusher rod 40 and the pusher head or piston generally indicated at 52, presently to be described. The distance of movement or travel of the slidable member 32 on each actuation, which is indicated by the arrowed line 50 in FIG. 5, is preset and remains fixed, hence, a set predetermined and measured amount of material is dispensed from the container each time the slidable member 32 is pressed, as will be subsequently described.

It should be noted that by virtue of the positive clutching arrangement, to be subsequently described, in which the clutching members grip or bite into their respective engaging members that friction is not relied upon for clutching, thereby reducing friction in this device, and by virtue of this arrangement a minimum of manual pressure is employed to actuate the device. Hence, actuation or control is effected by a slight manual touch which is an important factor.

The pusher member or piston generally indicated at 52 is mounted on the pusher rod 40 and is provided with positive clutching means generally indicated at 54 which will cause the pusher member or piston 52 to move forwardly with the pusher rod 40 with each actuation in the direction of the discharge nozzle of the container, but will remain stationary in the forwardly moved position as the pusher rod retracts from its said actuation. Upon release of the manual pressure against the slidable member 32 the spring 48 acting against the end cap will return the slidable member from the FIG. 5 position to its extended position as shown in FIG. 2 and with it the pusher rod 40 will be retracted.

The pusher member or piston 52 has a truncated cone-shaped head 55 and a body portion 56 with a reversely bent skirt 57 to provide a pocket 58 between the body portion and skirt. The ends of the skirt engage and wipe against the inner wall 21 of the cylindrical body and provides an effective seal for the rear end of the container, with a minimum of friction between the piston and the container. The piston has a central sleeve 59 which surrounds the pusher rod 40. The sleeve extends forwardly of the head and has an increased internal diameter which merges into an inwardly flared and sharpened front edge 59′ which provides an effective seal with respect to the pusher rod 40. This arrangement also reduces the friction between the piston and the pusher rod 40 as the friction is principally at the front edge 59′.

The positive clutching means generally indicated at 54 which is carried by the pusher member or piston 52 consists of a rod clutching or gripping member generally indicated by the numeral 60, and a container body clutching or gripping member identified generally by the numeral 62. The terms "rod clutching" and "container body clutching" members identify the parts of the device which the respective clutching members engage for effecting their respective clutching operation. Both of these members are formed preferably of a mildly resilient metal.

The rod clutching member 60 is shaped to provide an annular side wall 63 which continues outwardly to form

an inner annular wall 64 and then rearwardly to form a rearwardly extending flange or lip 65. The rod clutching member 60 is positioned against the rear of the piston with the side wall 63 nesting and press-fitted within the piston body and the annular wall 64 forming a shoulder against the rear of the piston with the lip extending rearwardly thereof. Extending inwardly of the side wall 63 is an end wall 66 provided with a central opening 67 to accommodate the rod 40.

The end wall is provided with spaced slots 68 radiating from the center which bisect spaced openings 69 in the end wall and which form a plurality of spaced radiating fingers 70 which are bent to extend and face rearwardly at an oblique angle so that the sharp engaging edges 71 of the fingers engage and bite into the pusher rod 40, as best shown in FIGS. 2, 5 and 7, so that as the pusher rod 40 is moved forwardly from the FIG. 2 to the FIG. 5 position the pusher member or piston 52 will remain affixed to the rod 40 and move with it and push against the rear of the material in the container to expel it outwardly through the discharge opening 28. The rod and piston member can only move forward on each actuation the distance identified by the numeral 50 in FIG. 5, and hence, only a set, predetermined and measured amount of material is discharged from the container on each actuation.

Upon the completion of the forward stroke of the rod and upon manual release of the slidable member 32, the spring 48 will act against the slidable member and urge it outwardly or rearwardly, thereby retracting the pusher rod 40. During the retraction of the rod 40 the obliquely positioned fingers 70 will move or bend rearwardly and will not produce or effect any coaction between the pusher member 52 and the retracting pusher rod 40. However, the pusher member 52 will remain in its forwardly moved position due to the action of the container body clutching member now to be described.

The container body clutching member generally indicated at 62 and best shown in FIGS. 2, 3, 5 and 6, comprises an annular dish-shaped body 73 having an enlarged end opening 74 for passage of the rod 40. Extending outwardly and forwardly of the body 73 at an oblique angle are a plurality of spaced radiating arms 75 (three are shown), the ends of which are secured to the correspondingly spaced crimped lugs 76 formed on the flange 65 of the rod clutching member 60 to retain the two clutching members 60 and 62 to each other and to the pusher head or piston 52.

Also extending outwardly of the body 73 are a plurality of spaced radiating fingers 78 which extend rearwardly at an oblique angle. They are provided with sharp engaging ends 79 which engage and bite into the inner surface 21 of the container wall or body 20, as best shown in FIG. 6. The forward movement of the pusher member or piston 52 has no interconnecting effect between the fingers 78 and the inner wall 21 of the container, however, these fingers grip or clutch the inner wall to prevent retraction of the pusher head or piston 52 when the rod 40 is retracting. Thus, the push rod clutching member 60 engages or clutches the pusher rod on the forward movement of the rod so as to move with it, while in this movement the clutch member 62 remains ineffective or inoperative. After the pusher member or piston 52 has been moved forward and the rod retracts, the push rod clutching member 60 becomes ineffective and the container body clutching member 62 becomes effective to prevent retraction. The pusher head 52 can only advance a set, predetermined distance on each forward movement of the rod, hence, only a set, predetermined and measured amount of material can be expressed from the device each time.

The pusher member 52 advances progressively on the rod 40 in the direction of the discharge nozzle a prescribed set definite increment with each actuation until the pusher member 52 reaches the forward end of

the rod, at which time the final increment of material is dispensed from the container **22**.

The pusher rod **40** extends into the material in the container, as best seen in FIGS. 2 and 5, with the piston or pusher member **52** positioned on the rod and in the container at the rear end thereof to advance forwardly with respect to the rod on the return of the rod with each actuation. This arrangement permits a short stroke movement of the rod to perform its function and also permits the entire rod to be concealed within the container **22** and the slidable or pressable member **32**, without appreciably extending the overall length of the device beyond the container body.

To achieve a touch control, that is, actuation of the device with a minimum of manual pressure, it is important to reduce the friction between the operating parts. With the positive clutching members gripping into their respective engaging surfaces to advance the piston and to hold it in the advanced position while the rod is retracting and, in accordance with this invention, not relying on friction for this purpose, the friction in this device has been reduced to a minimum. As a result of the reduced friction it is possible to actuate the device with little manual pressure and to employ a relatively weak spring, all of which improves the ease with which the device may be operated. This is an important feature of this invention.

The amount of material to be dispensed on each actuation is set and predetermined and is uniform with each actuation. The user need not determine the amount of material necessary for each application or use as an amount preset by the manufacturer of the product will be discharged when the pressable member **32** is pressed. When released the pressable member will return to normal position and will be ready for subsequent actuation.

By varying the size of the container in relation to the degree of movement of the pressable member **32**, the manufacturer of the product may set and control the amount of material to be discharged at each actuation. Therefore, this device can be made to accommodate a variety of products.

The present device may be filled by standard present day filling machines. The filling is done through the rear end of the container **22** before the pusher rod, piston and slidable member are secured to the container.

The container parts, including the pusher rod, may be molded of polystyrene; the pusher member or piston may be formed of polyethylene, and the clutching members may be made of metal. It should be noted that the shape of the head of the piston is complementary to the shape of the discharge end of the container. This permits the piston to move forwardly to its limit to engage the inside wall of the nozzle of the container and expel all of the material in the container. The container may be formed of a transparent material if desired.

FIGS. 8 and 9 show a single or unitary clutching member generally indicated at **82** which acts upon the pushing rod and the container. The unitary clutching member performs the same functions performed by the clutching means **54**, comprised of the two members **60** and **62** previously described.

The clutching member **82** comprises an annular dish-shaped body **83** with an external annular rim **84**. The body has an enlarged opening **85** in the wall for passage of the pusher rod. The wall is provided with pairs of spaced parallel extending slits **86** which bisect spaced openings **87** in the wall to form a plurality of inwardly extending fingers **88** (four are shown), which extend rearwardly at an oblique angle and are provided with sharp engaging ends **89** which engage and bite into the pusher rod to grippingly engage the rod during its forward movement to cause the piston to move with the rod.

The external rim **84** is slitted as at **90** to provide a plurality of spaced outwardly extending fingers **91** which extend rearwardly at an oblique angle and are provided with sharp engaging ends **92** which engage and bite into the cylindrical body to prevent rearward movement of the piston as the rod is retracting.

The modified construction shown in FIGS. 10 to 15 will now be described.

The modified construction is essentially the same as that previously described, the difference being in the addition of a movable handle for the purpose of actuating the pusher rod, in lieu of the slidable or manually pressable member **32**. The operating parts heretofore described will not be redescribed in detail as the previous description is applicable to the modified structure.

The cylindrical body **20'** supports therewithin the pusher rod **40'** on which is mounted the pusher member or piston **52'** which has the same clutching means **54'**, or clutching member **82**, and performs in the identical manner as that previously described. The material is expressed through the front of the container. The bottom of the cylindrical body **20'** is provided with a flat bottom mounting base **95** which has side grooves **96**.

Stationarily secured to the mounting base **95** is a stationary bracket generally indicated at **97** which serves as the coupling member between the container **20'** and the slidable handle, to be described. The stationary bracket **97** is provided with a bottom wall surface **97'** engaging the flat mounting base **95** and with spaced side walls **98** having inwardly extending ribs **99** adapted to be snapped into the grooves **96** of the mounting base. The mounting base has front and rear stop members **100** engaging the stationary bracket **97** to hold it in fixed relation to the container **20'**. In other words, after the bracket **97** is snapped to the mounting base of the container **20'** it likewise becomes a stationary member as is the container **20'**.

The spaced side walls **98** extend downwardly and inwardly to form guide channels **101** to receive the lips **102** of the slidable handle generally indicated at **103**. The stationary bracket **97** has a curved and downwardly extending finger engaging member **104** at the front thereof with spaced side walls **105** extending rearwardly thereof to provide a pocket **106** for the leaf spring secured to the handle.

The slidable handle **103** may be hollow and same is provided with a front opening **103'** to accommodate a portion of the bracket **97** which extends thereinto. The rear of the handle **103** extends upwardly to form an upper extension **107** which has a slot **108** adapted to receive the grooved end **109** of the pusher rod **40'** so that the rod **40'** is coupled to the handle **103** and moves therewith. The rod **40'** has a reduced end **110** guided in an end cap generally indicated at **111**. The end cap **111** may be ornamented with fins and is provided with an extension **112** having a bore **113** to receive the end **110** of the pusher rod **40'**. The cap **111** is fixedly secured as at **114** to the end of the cylindrical body **20'** and is provided with an enlarged opening **115** at the bottom thereof to accommodate the extension **107** of the handle.

A leaf spring **116** has the bottom end anchored as at **117** to the bottom of the handle **103**, with the upper end resting against the finger engaging member **104** within the pocket **106** to normally urge the handle **103** to its rearward position, as shown in FIG. 12.

To operate the device the movable handle **103** and stationary finger engaging member **104** are manually engaged. By applying manual pressure the handle **103** will slide forwardly with respect to the stationary finger member **104** and thereby advance the pusher **40'**, in the same manner as previously described. Thus, with each actuation of the handle a preset, measured amount of the product is discharged, in the same manner as previously described with respect to the structure shown in FIGS. 1 to 7.

While the container **20'** is disposable after use, the handle portion may be detached therefrom and coupled to another container filled with material.

It will be understood that various changes and modifi-

cations may be made from the foregoing without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A device for containing and dispensing a material, said device comprising a container, a pusher rod within said container, a piston on said pusher rod, said pusher rod adapted to be moved forwardly by manual pressure, means associated with said piston to cause said piston to move forwardly with said rod on the forward movement of said rod to expel a set, predetermined and measured amount of material from said container and to cause said piston to remain in said forwardly moved position in said container on the retraction of said pusher rod, said means associated with said piston includes fingers which extend inwardly at an oblique angle for engaging the rod, and other fingers which extend outwardly and rearwardly at an oblique angle for engaging the container.

2. A device for containing and dispensing a material, said device comprising a container, a pusher rod within said container, a piston on said pusher rod, said pusher rod adapted to be moved forwardly by manual pressure, means associated with said piston to cause said piston to move forwardly with said rod on the forward movement of said rod to expel a set, predetermined and measured amount of material from said container and to cause said piston to remain in said forwardly moved position in said container on the retraction of said pusher rod, said means comprising clutching members with gripping edges engaging the pusher rod and the container body, and in

which the clutching members are alternately operative upon the forward and return movements of the rod.

3. A device for containing and dispensing a material, said device comprising a container, a pusher rod within said container, a piston on said pusher rod, said pusher rod adapted to be moved forwardly by manual pressure, means associated with said piston to cause said piston to move forwardly with said rod on the forward movement of said rod to expel a set, predetermined and measured amount of material from said container and to cause said piston to remain in said forwardly moved position in said container on the retraction of said pusher rod, said means associated with the piston includes a plurality of fingers adapted to grippingly engage the rod on the forward stroke of the rod and a plurality of fingers to grippingly engage the container on the return stroke of the rod.

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