Nov. 17, 1953 C. H. REINHARDT, JR 2,659,517

PASTE TYPE PRODUCTS CONTAINER AND DISPENSER THEREFOR HAVING A CUTTER-VALVE FOR OPENING THE CONTAINER

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Fig. 2

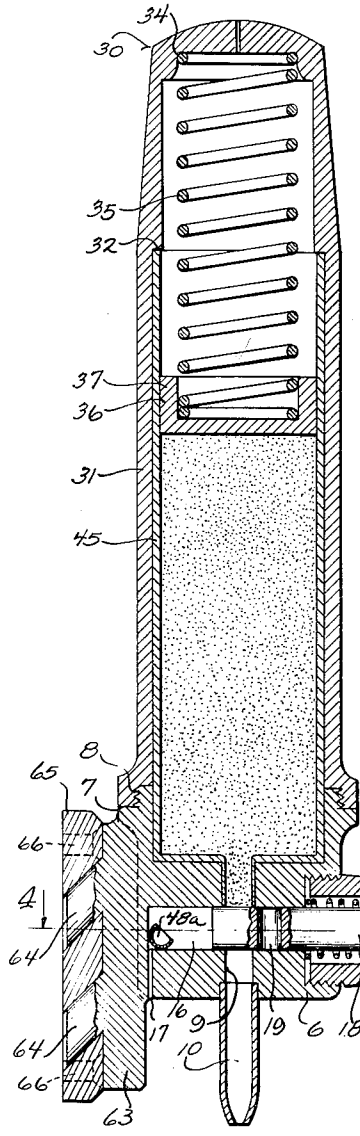


Fig. 3

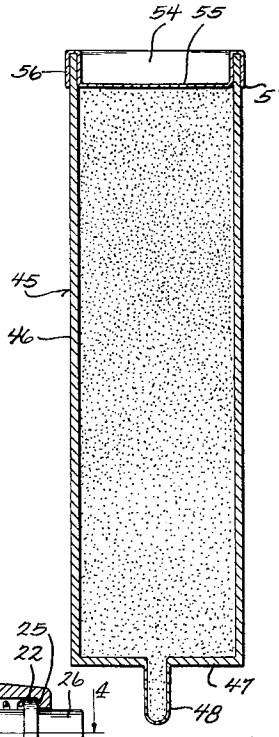
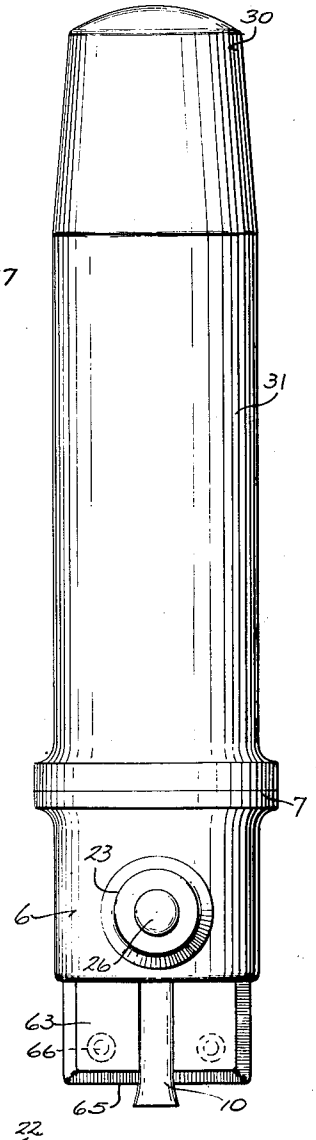


Fig. 1



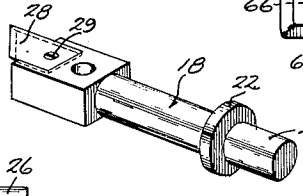


Fig. 5

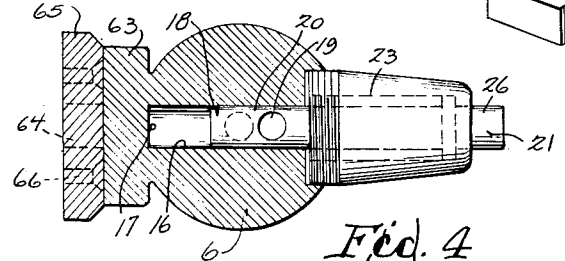


Fig. 4

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PASTE TYPE PRODUCTS CONTAINER AND DISPENSER THEREFOR HAVING A CUTTER-VALVE FOR OPENING THE CONTAINER

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7 Claims. (Cl. 222—82)

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This invention relates to improvements in containers and dispensers for fluent products such as soaps, lotions, toothpastes and the like which are in the form of heavy or viscous liquids or creams or pastes.

This application is a continuation-in-part of my application Serial No. 177,273, filed August 2, 1950, for "Paste Type Products Dispenser" is now abandoned.

Many viscous liquid, cream and paste products used for cosmetic and other purposes, are packed either in heavy-walled, rigid containers, such as glass bottles or jars or in collapsible tubes, such as the usual toothpaste-containing tube. Both the above types of containers are subject to a number of disadvantages particularly insofar as concerns the safe storage of the containers and the dispensing therefrom of only part of their contents at any given time. Glass containers are becoming increasingly expensive and the metals used in the alloys for collapsible tubes are becoming more and more restricted in supply and the costs of such metals are increasing.

Adequate supplies of some metals are available for the use indicated above if a non-collapsible container of thin wall can be used in combination with a dispenser for ejecting the materials in the quantities desired and completely. Such metals can be easily coated to meet chemical and sanitary requirements. There are also many compositions in the class generally known as "plastics" which are made from cheap and wholly domestically available materials, which may be produced by mass production methods at low cost and which may be compounded to give any desired physical and chemical qualities including various colors, different degrees of transparency and the like. However, unless containers made of the relatively inflexible metals or of plastics are specially designed for use in coaction with a specially designed dispenser, the containers can be filled only with difficulty, removal of the contents from the containers is subject to all of the difficulties in use of present rigid containers, and a considerable portion of the contents of the containers cannot be removed at all without loss of time and effort, so that even the many advantages of cheap metals or plastics cannot overbalance the disadvantages.

It is therefore one object of the present invention to provide a container of any one of a number of well known metals or plastic compositions or combinations thereof and in which the container is so shaped as to minimize the difficulty and time required in forming and to expedite

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filling of the containers while retaining the advantages of complete and easy removal of the contents of such containers.

Another object of the invention is to provide a dispenser for coaction with a special container for the complete and easy dispensing from the container of portions or all of its contents, and in an economical and sanitary manner.

A further object of the invention is to provide a special container for heavy liquid, cream or paste type products and in which one container end is completely free for filling of the container and the end closure is readily removable for exerting uniform pressure on the container contents by a dispensing device which completely encloses the container.

Another object of the invention is to provide a dispensing device for coaction with a special container and in which the device has a minimum number of parts which can be easily and quickly made from moldable metals, plastics or other materials, in which the special containers are quickly and easily placed and removed when empty and in which the dispenser is readily disassembled for cleaning and reassembled without the use of tools.

Another object of the invention is to provide both a special container and a dispenser coacting therewith in a special manner which avoids all of the present disadvantages in handling slow-flowing products or which are fluent only under pressure, while retaining the advantages of economic dispensing, complete removal of the contents, partial automatic action of the dispenser, and ease in maintaining the product and the dispenser in a completely sanitary condition.

Objects and advantages other than those above set forth will be apparent from the following description when read in connection with the accompanying drawing in which:

Fig. 1 is a front elevation of the present dispenser in a form for mounting on a bracket for attachment to either a horizontal or vertical stationary surface.

Fig. 2 is a cross-sectional view on a central longitudinal plane through a special container and dispenser for viscous or pressure-fluent products.

Fig. 3 is a cross-sectional view on a plane through the center line of a special container for use with the present dispenser.

Fig. 4 is a transverse cross-sectional view on the plane of line 4—4 of Fig. 2; and

Fig. 5 is a perspective view of one element of

the present dispenser with a cutting member mounted thereon.

Referring generally to the present embodiment of the invention, it will be seen that the container is tube-like with one completely open end and with a protuberance or nipple from the other end and formed integral with but of thinner wall than the tube-like barrel which forms the larger portion of the container, or otherwise so formed as to be readily sheared off. The barrel and nipple portions of the container are readily molded in simple molds or otherwise formed with no particular attention during the molding or other forming operation. One end of the container is left completely open so that materials of high viscosities may be easily and quickly placed in the container without the forming of air bubbles or voids. After filling of the container, a removable bottom or closure piece is applied to the container and fixed thereon in readily removable manner, a portion of the closure piece extending into the container barrel for a purpose which will be apparent hereinafter.

The container is adapted to fit into and be held in a dispenser generally comprising a discharge piece also serving as a valve housing, and a removable cap piece in which is mounted a spring bearing a plunger closely approximating the internal diameter of the barrel of the container. A nipple cutter and a valve sub-assembly comprises an integral valve and stem under spring pressure and extending through a housing removably attached to the discharge piece of the dispenser for enclosing the spring acting on the valve member, the cutter valve member serving for both shearing off a portion of the nipple and for controlling dispensing of the container contents.

Referring specifically to the drawing by reference numerals in which like parts are designated by like numerals, the numeral **6** generally designates a discharge part or piece of a dispenser which is preferably molded from one of the well known moldable metal or plastic compositions which may be coated or are inert to and otherwise suitable for the material to be dispensed. The discharge piece is preferably in the general form of a relatively short cylinder having a shoulder **7** adjacent one end thereof and threaded as indicated at **8** from the shoulder to the end of the piece. A bore **9** is formed axially through the piece **6** and a nozzle **10** may be set into the piece to form an extension of the discharge bore. The discharge piece **6** has a cylindrical recess in one end thereof on the center line of the discharge bore **9** and of greater diameter than the bore.

The discharge piece **6** also has a passage **16** which may be made either square in cross-section or circular as desired, the square form being first described herein. The passage **16** is preferably on a diameter of the discharge piece **6** and intersects the bore **9** thereof, the passage **16** being provided with a vent **17** adjacent one end thereof for airflow therethrough. Passage **16** is adapted to receive a cutter-valve member **18** with a transverse bore **19** in a portion **20** which may be of square cross-section, the remainder **21** of the cutter-valve member then preferably being cylindrical and being provided with a flange **22** adjacent one end thereof. A casing **23** is adapted to be threaded into and to seat in the discharge piece coaxially with the passage **16** to enclose a helical compression spring **24** acting between a surface of the discharge piece and the flange **22** on the stem **21** of the cutter-valve member. The outer end of the casing **23** is internally flanged as shown at **25** to permit free movement of the valve stem **21** in one direction while serving as an abutment or stop for the stem flange **22** on movement of the stem in the other direction. It will be noted that the portion of stem **26** extending outside of casing **23** is of such length only as to bring bores **9** and **19** into alignment when the end of the stem is substantially flush with the casing end.

If it is desired to make the passage **16** entirely circular in form, the cutter-valve member and its stem may be made wholly as a cylinder. It is then necessary to provide a groove or keyway indicated at **26** to receive a key-like projection **27** from the flange **25** of the valve stem-spring housing **23** to keep the discharge piece bore **9** and nozzle **10** and the bore **19** in the valve member in alignment.

Cutter valve member **18** may be provided with a knife-edge member **28** set into a recess in one side of the valve member as shown in Fig. 5. The cutter **28** has a sharp edge at an angle to the axis of the valve member **18** and is held in position by the sides of the recess which resist longitudinal and lateral thrust upon movement of the valve **18** and the cutter **28**, to shear off the end of the nipple as indicated at **48***a* in Fig. 2. A screw **29** holds the cutter in place upon valve closing movement by the spring **24**. A cutter member may also be used with a cylindrical valve member, although not as easily as with a square valve member which also has other advantages.

A cap member which is generally designated **30**, is hollow and substantially cylindrical for a portion **31** of its length, such length being defined by an internal shoulder **32** coacting with a surface of the bore-recess in the discharge piece **6** to define a cylindrical chamber in which a container may be securely held when internal threads of the cap are engaged with the external threads of the discharge piece **6**. From the internal shoulder **32**, the cap may be smaller in diameter than in the portion **31** thereof and is not necessarily cylindrical. The end of the cap provides a seat **34** formed internally therein to receive and hold one end of a helical compression spring **35**. The other end of the spring is attached to a plunger **36** of a diameter less than that of the cap chamber **31** by a small amount, the one side of the plunger being recessed to seat and hold one end of the spring **35** and the plunger side wall **37** being of sufficient length to preclude tilting of the plunger under use conditions which will be apparent from the following description.

The spring **35** is of a size which may be readily compressed but which will provide adequate pressure on the material within the container (and which resists expansion of the spring when the plunger acts on the container contents), and maintain such pressure during expansion of the spring sufficiently to cause easy flow of the contents from the container at all times and finally to press the plunger firmly against the nipple end of the container. Thus incremental and complete discharge of the contents is obtained. The spring is preferably such as to produce a total pressure of approximately ten pounds per square inch so that even stiff pastes will flow readily. A spring producing an initial pressure of ten pounds per square inch is adequate to press the plunger on the container end wall to dispense all of the material except that in the nozzle.

The chamber defined by the recess in discharge piece **6** and the portion **31** of the cap **30**, is

adapted for the easy sliding fit thereinto of a special container. The container is generally designated 45 and comprises a cylindrical barrel 46 with an end portion 47 extending substantially at right angles to the center line of the container barrel, and with a hollow nipple 48 extending from the end 47 and also on the center line of the container. The other end of the container is completely open. Hence, the container may be readily formed of many materials but is particularly easily molded from one of the many plastic compositions which are now well known. It will be noted that the barrel and the container end wall have a considerable thickness but that the nipple wall is relatively thin. Hence, the side and end wall of the container can resist considerable pressures even when the container is empty. The nipple wall is of a thickness sufficient to prevent breakage thereof during filling, storage and handling of the container but shears off readily by coaction of an edge in the discharge piece formed by intersection of the bore 9 and the passage 16, with an edge of the cutter-valve member 18 or the cutter 28. The sheared-off tip 48a of the nipple may remain in passage 16 until the container is replaced.

Having one completely open end, the container 45 is readily filled without the formation of air bubbles or voids in any creamy or pasty material. After filling, the open end is closed by a cap or closure generally designated 54 and having a reentrant central portion 55 and a rim portion 56 to define a substantial annular space into which the end of the container barrel 46 may seat. For products not likely to flow under conditions encountered in storage or handling, the closure 54 may be held to the barrel 46 by pressure as by making the closure flange 56 slightly conical and of a diameter slightly less than that of the container barrel thus utilizing the resilience of the plastic for holding the closure on the barrel.

For more liquid materials, if the container and closure are made from some plastics they may be removably joined by applying a solvent about the edge of the closure rim 56 to secure a partial solution and joining of the closure rim with the container barrel, by applying a material which will fuse with the container barrel and closure or attach itself thereto as is well known or by applying a controlled amount of heat to the rim edge 57 if the composition used in either the barrel or closure or both, is thermoplastic. If the container is made of metal, the closure is removably attached by solder.

In experimental use it was found that forming both the dispenser and the container from a methyl-methacrylate type of resin produces a construction satisfactory in every respect. All of the parts of both the dispenser and the container are readily molded by the use of simple molds operable at high speeds. There are no critical dimensions or "close fit" tolerances requiring special attention in the molding operation. Even with a wall thickness of the order of .05 inch for the container barrel and one-half of that dimension or less for the nipple wall thickness, even an empty container resists any external pressure likely to be encountered during filling, storage or handling.

To prepare the container-dispenser combination for use, the casing 23 is taken off the discharge piece to permit withdrawal of the valve 18—22 and the spring 24 from the discharge piece. The cap member 30 is removed from the discharge piece and held in inverted position to bring the plunger 36 substantially centrally in the chamber. The closure 54 having been previously removed from the container 45, the container is inserted in the cap member to seat the container at the open end thereof on the cap shoulder 32. The plunger 36 will then be entered in the container and be seated on the end of the contents of the container. The assembled cap and container are now turned and the nipple 48 is inserted in the discharge piece bore 9. Pressure on the cap compresses the spring 35 until the cap threads may be engaged with the threads adjacent the shoulder 7 on the discharge piece. The cap and container are now turned until the end of the cap member seats on the discharge piece shoulder whereupon expansion of the spring 35 holds the various parts in assembled relation.

The valve member is now inserted in the passage 16 with the spring 24 in place and the casing 23 is replaced. Pressure is now applied to the valve stem to cause the forward edge of the valve member to shear off the tip of the nipple in coaction with the edges at the intersection of the discharge piece bore 9 and the passage 16. The sheared-off nipple tip is pushed into the end of the passage 16 as shown in Fig. 2 of the drawing. For sanitary reasons, the dispenser is preferably completely disassembled and cleaned after each container has been emptied. Hence, the disassembling operation described above will not be required for replacement of a full container but the re-assembly operations will follow as above described.

The tip of the nipple is readily sheared off without apparent damage to the shearing edges of the dispenser discharge piece and the cutter-valve so that the dispenser has a satisfactorily long life even without the use of a cutter blade. If desired, the nipple 48 may have a peripheral groove cut therein after filling of the container, the groove being located where the shearing action on the nipple will occur. The groove weakens the nipple sufficiently for the easy shearing off the closed end thereof but retains sufficient "hoop" strength to avoid accidentally knocking off of the nipple end.

When the container has a barrel of a length as much as six inches, there is no difficulty in placing springs producing ten to fifteen pound pressure, in the dispenser cap for keeping a uniform pressure on the contents of the container and of a sufficient value to eject material of the consistency of ordinary toothpaste, even when the spring is expanded to the full length of the container. The pressure is applied to the material by the spring and plunger substantially along the co-incident center lines of the container and dispenser so that only an insignificant layer of the dispensable material remains within the container when the plunger is pressed against the container end 47. Yet, even when the required ejection pressure is maintained, there is little leakage of material about the cutter-valve member over a period of as long as twelve months.

For most uses, the dispenser is preferably formed for mounting on a vertical surface and the discharge piece 6 therefore has a plate-like portion 63 with prongs 64 extending at an angle to the center line of the dispenser. A bracket plate 65 is adapted to be fixed to a stationary surface as by screws through holes 66 and is provided with holes to receive the prongs 64. Even if the dispenser is placed on a non-vertical surface only slightly off horizontal, the dispenser is firmly held in the desired position by the bracket

and prongs while readily removable and replaceable.

It will be noted especially that the construction of both the dispenser and the container are simplified as much as possible. As a result of the care in design, all parts are easily molded or otherwise formed, may be made as rugged as desirable and are easily kept entirely clean and sanitary. No tools whatever are required to disassemble and reassemble a dispenser, to remove an empty container therefrom and to place therein a full container or to shear off the container nozzle tip.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. In a device coacting with an open ended container for opening the other end of the container and for pressing on the contents of the container, a discharge piece having a recess for seating one end of the container, the discharge piece having a passage thereinto and a bore therethrough for discharging contents from the container, a cutter-valve member acting in the discharge piece passage for opening the one end of the container and for controlling the flow of contents therefrom, a cap piece attachable to and detachable from the discharge piece for coaction with the discharge piece in enclosing the container, and means in the cap for pressing on the contents of the container for causing flow of the contents through the discharge bore upon positioning the valve member for such flow.

2. In a device coacting with an open ended container for opening the other end of the container and for pressing on the contents of the container, a discharge piece having a recess for seating one end of the container, the discharge piece having a passage thereinto and a bore therethrough for discharge of the contents from the container, a cutter-valve member acting in the discharge piece passage for opening the one end of the container and for controlling the flow of contents therefrom, a cap piece attachable to and detachable from the discharge piece for coaction with the discharge piece in enclosing the container, a spring fixed at one end in the cap piece, and a plunger fitting into the container and fixed on the spring for exertion of pressure thereby on the container contents.

3. In a device coacting with a container, the container having a nipple extending from one end and having an opening at the other end thereof, a discharge piece having a recess for receiving the nipple and the end of the container about the nipple, the discharge piece having a passage thereinto and a bore therethrough for receiving the container contents from the nipple, a cutter-valve member movable in the passage for coaction of an edge thereof with an edge of the discharge piece for shearing off the nipple and having an opening therethrough for controlling the flow of contents from the container, a cap piece readily attached to and detached from the discharge piece for coacting therewith in enclosing the container, and means mounted in the cap for exerting a substantially uniform pressure on the entire end area of the contents of the container, the pressure on the container contents causing flow thereof from the container nipple upon movement of the valve to bring the opening thereof into alignment with the container nipple.

4. In a dispensing device for viscous liquids and pastes, a container having a nipple extending from one end thereof, a discharge piece having a recess for receiving the nipple end of the container and having a bore for receiving the nipple, the discharge piece bore extending therethrough for discharging the contents of the container and the discharge piece having a passage thereinto intersecting the bore, a valve member movable in the discharge piece passage and having a bore therethrough alignable with the bore in the discharge piece, a cutter mounted on the valve member for coacting with the discharge piece in shearing off the end of the nipple, a cap piece readily attached to and detached from the discharge piece and coacting therewith in enclosing the chamber, and means mounted in the cap for exerting pressure over the entire area of one end of the contents of the container, the pressure on the container contents causing flow thereof from the container upon movement of the valve to bring the bore therethrough into alignment with the container nipple and the bore through the discharge piece.

5. In a dispensing device for viscous liquids and pastes, a container having a nipple extending from one end thereof and having the other end thereof entirely open, a discharge piece having a recess for receiving and supporting the nipple end of the container and having a bore from the recess for receiving the nipple, the discharge piece having an external shoulder and screw threads adjacent the shoulder, the discharge piece bore extending therethrough for discharging the contents of the container and the discharge piece having a passage thereinto and intersecting the bore at right angles thereto, a cutter-valve member movable in the discharge piece passage and having a bore therethrough alignable with the discharge piece bore, a cap member open at one end and having internal threads adjacent the open end for attachment to the discharge piece and coaction therewith in defining a chamber, the cap member having an internal shoulder defining an end of the chamber for abutment thereon of the container wall at the open end of the container, and means mounted in the cap for exerting pressure on the contents of the container and over the entire area of the container, the pressure on the container contents causing flow thereof from the container upon alignment of the valve bore with the container nipple and the discharge piece bore, the cutter-valve member having a cutting edge coacting with an edge of the discharge piece for shearing off the end of the container nipple after enclosure of the container by the cap member.

6. In a dispensing device for viscous liquids and pastes, a container having a nipple extending from one end thereof and having the other end thereof open, a discharge piece having a recess for receiving the nipple end of the container and having a bore from the recess for receiving the nipple, the discharge piece bore extending therethrough for discharging the contents of the container and the discharge piece having a passage thereinto intersecting the bore, the discharge piece having an internally threaded recess about the end of the passage in the discharge piece, a cutter-valve member movable in the discharge piece passage and having a bore therethrough alignable with the discharge piece bore and including a flanged stem, a casing

threaded into the recess about the end of the discharge piece passage and enclosing a portion of the valve stem, and a spring compressed between the discharge piece and the valve stem flange for urging the valve member bore out of registry with the container nipple and the discharge piece bore, a cap member readily attached to and detached from the discharge piece and coacting therewith in defining a chamber for receiving the container, and means mounted in the cap member for exerting pressure over the entire area of the container contents, the pressure on the container contents causing flow thereof from the container upon alignment of the valve bore with the container nipple and the discharge piece bore.

7. In a dispensing device for viscous liquids and pastes, a container having a nipple extending from one end thereof and having the other end thereof open, a discharge piece having a recess for receiving the nipple end of the container and having a bore for receiving the nipple, the discharge piece bore extending therethrough for discharging the contents of the container and intersecting a passage into the discharge piece, a cutter-valve member movable in the discharge piece passage and having a bore therethrough alignable with the discharge piece bore, the cutter-valve member having a cutting edge coacting with an edge of the discharge piece for shearing off the end of the container nipple, the cutter-valve member comprising a stem with a flange adjacent one end thereof and having a groove therein from the flange toward the adjacent end

of the stem, a casing readily attached to and detached from the discharge piece for partially enclosing the cutter-valve stem, the casing having a flange extending inwardly toward the cutter-valve stem and having a projection therefrom engaging in the groove in the cutter-valve stem, and a spring compressed between the discharge piece and the cutter-valve stem flange for urging the valve bore out of registry with the container nipple and the discharge piece bore, a cap piece readily attached to and detached from the discharge piece and coacting therewith for defining a chamber for enclosing the container, and means mounted in the cap for exerting pressure on the contents of the container for causing flow thereof from the container upon alignment of the nipple with the cutter-valve member bore and with the discharge piece bore.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,325,930	Drake	Dec. 23, 1919
1,387,356	Cook	Aug. 9, 1921
1,522,975	Phillips	Jan. 13, 1925
1,601,467	Brownworth	Sept. 28, 1926
1,719,736	Turner	July 2, 1929
1,729,219	Kellog	Sept. 24, 1929
2,003,562	Stuart	June 4, 1935
2,244,071	Landrus	June 3, 1941