

Feb. 23, 1954

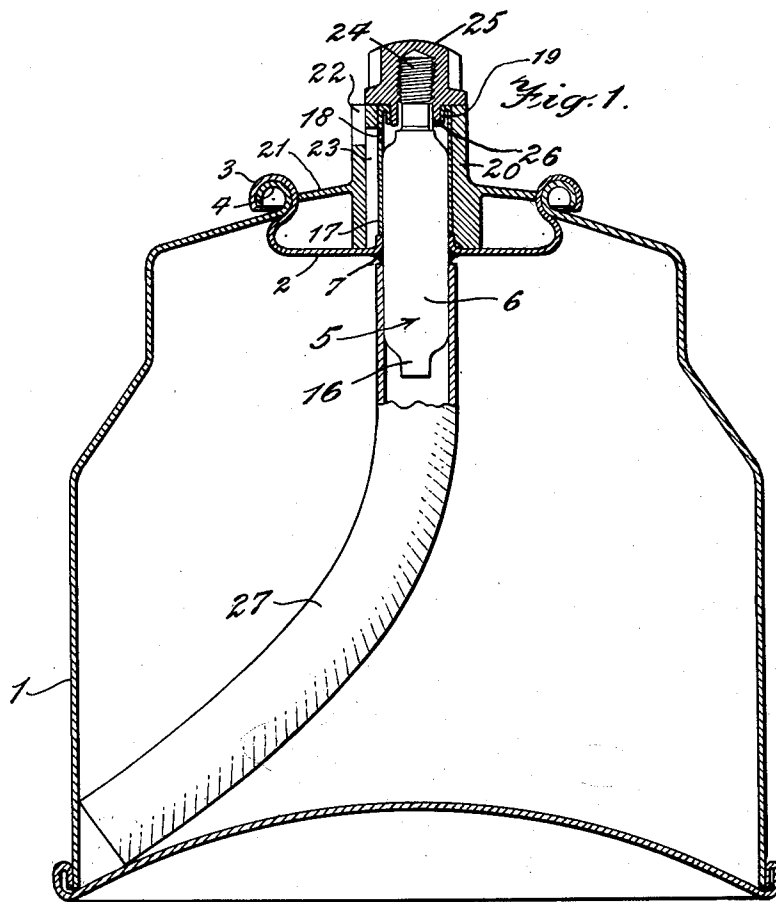
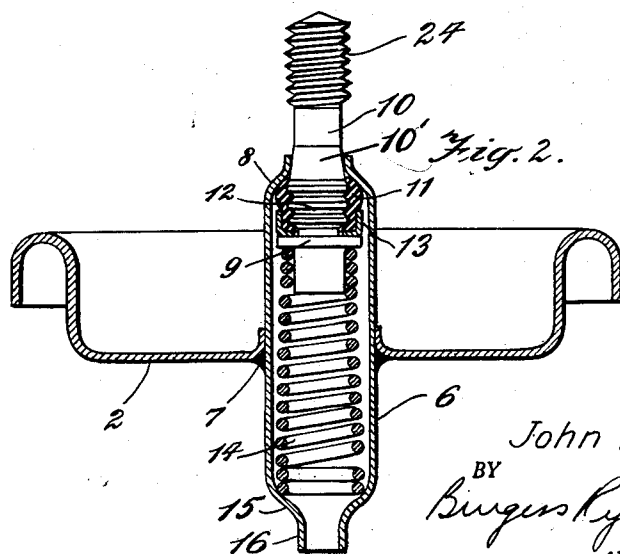
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MULTIPURPOSE PRESSURIZED CONTAINER VALVE

Filed Oct. 12, 1950

2 Sheets-Sheet 1



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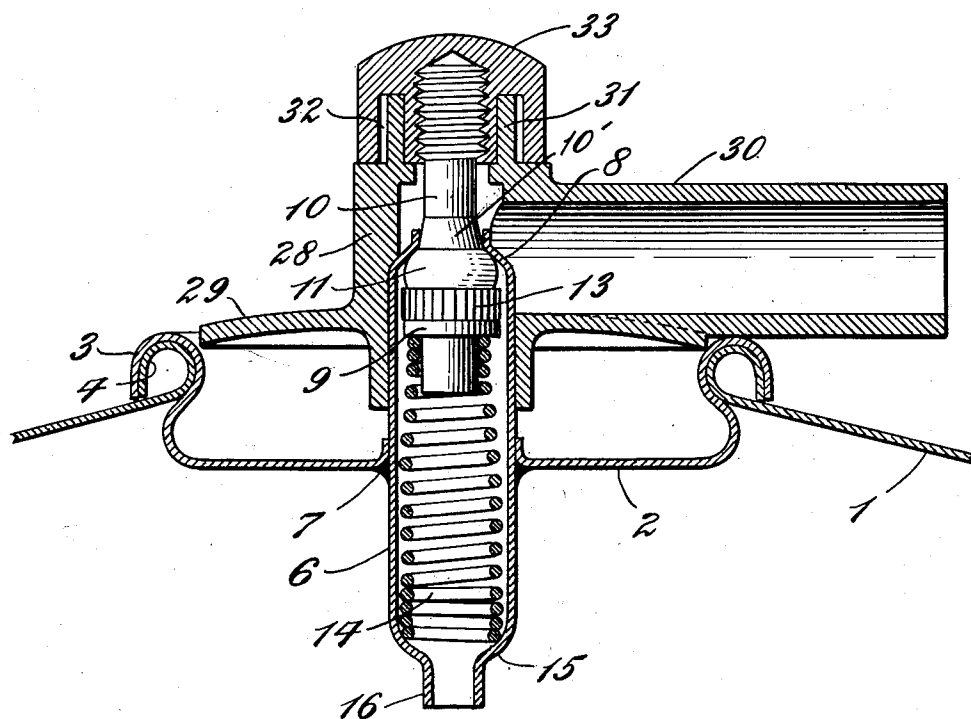


Fig. 3.

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## UNITED STATES PATENT OFFICE

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MULTIPURPOSE PRESSURIZED CONTAINER  
VALVE

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Application October 12, 1950, Serial No. 189,779

7 Claims. (Cl. 222—394)

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This invention relates to valve structures suitable for dispensing liquid and semi-liquid products from pressurized containers. Among the products now being marketed in such form may be mentioned whipped cream and brushless shaving cream.

One of the objects of the invention is an improved valve capable of convenient assembly at low cost.

Another object of the invention is a valve of that character which can be readily adapted to effect the spray discharge of free flowing products, such as insecticides and fumigants.

The invention will be readily understood from the following description of the accompanying drawings, in which:

Fig. 1 is a vertical section of a pressurized container equipped with a preferred embodiment of the invention, suitable for spray dispensing liquid products.

Fig. 2 is an enlarged vertical section of the valve of Fig. 1 and the container cap before application to the container;

Fig. 3 is an enlarged vertical section of the same valve and associated parts adapted for dispensing semi-liquid products.

Referring first to the valve construction of Figs. 1 and 2, a container 1 is shown provided with a closure cap 2. This cap is formed up as shown in Fig. 2 and then is applied to the container to seal it, as shown in Fig. 1, with the cap flange 3 crimped around the bead 4 which surrounds the mouth of the container. The dispenser valve, generally designated 5 in Fig. 1, is carried by the container cap to which it may be preassembled as a unit. The valve comprises a body 6 of tubular form which may be produced cheaply on an automatic eyelet machine, the tube being centered in an opening in the cap and protruding above and below it. The body is secured to the cap as by soldering, as indicated at 7. This general arrangement forms part of the subject matter of copending application, Serial No. 170,163, filed June 24, 1950.

One end of the valve body (in the illustrated embodiment the upper end) has an integral valve seat which can be made by simply necking in or forming the end of the body tube to provide an upwardly and inwardly extending flange 8. A valve plunger is located in the center opening of the valve seat with a head portion 9 depending below the seat and a stem 10 extending up through and protruding above the upper end of the valve body.

As disclosed in the above-mentioned applica-

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tion, the tight closure of the valve seat aperture may be effected by a sealing ring 11 of rubber or the like, encircling and gripping the lower end of the plunger adjacent its head 9; and, as also disclosed in said application, the plunger may be formed with small flanges 12 to afford the sealing ring a better grip on the plunger and insure its moving with the plunger when the latter is depressed to open the valve. The sealing ring may be further locked to the plunger by means of a cup 13 crimped against the rubber to pinch the ring into close engagement with the plunger stem.

The valve plunger is held in valve closing position by a spring 14 located within the valve body with its upper end abutting the plunger head and having its lower end supported by the valve body. For the latter purpose and for another purpose to be mentioned below, the lower end of the valve body tube is also necked in to form an inwardly and downwardly projecting flange 15, terminating in a reduced diameter section 16. The flange 15 serves to sustain the valve spring and, by so forming the lower end of the valve body tube, there is provided a convenient sub-assembly of valve body, valve plunger and valve closing spring.

Telescoping over the upwardly protruding portion of the valve body is tubular valve chamber shell 17 which extends above that portion of the valve body which it engages and is provided with a small discharge opening 18 in the upper part of its wall. This shell is preferably secured to the valve body simply by press-fitting. The upper end of the valve chamber shell is formed with a re-entrant flange 19 to form part of the means by which the top of the shell is sealed.

Telescoped over the shell 17 is a spout member 20 which may be of molded plastic and provided with a flange 21 to finish off and form a closure for the depression in the closure cap 2. The hub or tubular portion of spout member 20 is suitably apertured to provide for the lateral discharge of the product issuing through hole 18 in the valve chamber shell 17. In the form illustrated, overlapping slots or grooves 22, 23, are formed respectively in the outer and inner surfaces of the spout member wall. By this arrangement the spout member can be rotated to seal off hole 18 to prevent drying out of material in the hole.

The upper end of the valve plunger extending above the tops of the shell 17 and spout member 20 is threaded as at 24 to receive a nut member 25 which, when turned home against the upper end of the spout member, serves to lock the valve

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closed. To open the valve and discharge the contents of the container, the nut is backed off slightly and then depressed. As disclosed in the said copending application, the section 10' of the valve stem which extends through the center opening of the valve seat is slightly tapered, such arrangement having been found to afford close and effective control of the discharge through such opening.

To complete the sealing of the upper end of shell 17, the nut member 25 is provided with a depending flange 26 which is a snug fit within the shell flange 19. The pressure within shell 17, when the valve is open, serves to hold the flanges in sealing engagement. In this connection it may be mentioned that the nut member may be formed of flexible molded plastic or rubber and its depending flange of quite thin section.

As in the above-mentioned prior application, a siphon tube 27 depends from the dispenser valve to the bottom of the container, the tube preferably being flexible and attached to the valve body simply by its snug fit. Tubes of polyethylene are found to be suitable for the purpose. By reason of the necked-in form of the lower end of the valve body, a smaller siphon tube may be utilized in those cases where it is desirable. As will be recognized, a smaller tube of appropriate diameter can be fitted over or within the reduced diameter section 16.

Fig. 3 illustrates the adaptability of the construction to the dispensing of semi-liquid products such as whipped cream. In this figure the components of the valve itself are precisely the same as those already described, as also is the manner of mounting the valve body in the container cap. Accordingly, all of the identical parts are correspondingly numbered.

In this instance, the shell 17, spout member 20 and nut member 25 are omitted and in place of the shell and spout member, there is telescoped directly onto the valve body 6 a spout member of the general form disclosed in the above-mentioned application. This spout member consists of a hub portion 28 having a flange 29 similar to flange 21 and a laterally directed spout element 30 through which the product issuing through the valve aperture is discharged when the valve is open. As in the said prior application, the upper end of the spout member hub 28 is sealed by means of an upstanding flange 31, telescoped with a recess 32 in nut member 33.

Without any change whatsoever in the structure of the valve body, plunger and spring, or in the manner of assembling this unit with the container cap, there is thus provided a valve structure which is adaptable to the spray discharge of liquids or to the discharge of semi-liquids, thereby holding to a minimum the total number of different parts required for these two purposes and achieving maximum economy.

In the light of the foregoing description, the following is claimed:

1. In a dispenser valve mechanism for a pressurized container having a closure cap, the combination of a tubular valve body extending through and having portions protruding above and below the cap and secured thereto; a centrally apertured, downwardly facing valve seat at one end of the valve body; a tubular valve chamber shell telescoped over the portion of the valve body protruding above the closure cap, said shell having a wall portion extending above the valve body portion engaged by the shell and having a discharge opening in such wall portion;

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a plunger having its upper end extending through the valve seat aperture and beyond the upper end of the valve chamber shell and having its lower end located beneath the valve seat, the upper end of said plunger being threaded, sealing means carried by the lower end of the plunger, a closure spring engaging with the plunger and urging the sealing means carried thereby into engagement with the valve seat, and a member threaded on the upper end of the plunger, said member being engageable with the top of the valve chamber shell to bring the sealing means on the plunger into engagement with the valve seat independently of the closure spring.

2. In a dispenser unit for a pressurized container having a closure cap with an aperture therein, the combination of a tubular valve body of sheet metal centered in the cap aperture and sealed to the cap with portions of the valve body protruding above and below the cap, an internal valve seat carried by the valve body, said valve seat comprising a centrally apertured flange extending inwardly and upwardly from the end of the valve body protruding above the cap, a valve plunger extending through the aperture in said flange with its lower end located within the valve body, said plunger having a tapered section adjacent its lower end and an operating stem projecting beyond the valve body, said tapered section sloping outwardly toward the lower end of the plunger and engaging with the edges of the flange defining the aperture at a point intermediate its ends, said operating stem being of a smaller diameter than the diameter of the aperture in the flange, sealing means of compressible material carried by the plunger at its lower end and a valve closing spring having one end engaging with the lower end of the valve plunger and its other end engaging with the valve body, said spring urging the valve plunger in a direction to engage the sealing means on the plunger with the valve seat and the tapered section with the edges of the flange defining the aperture in the valve seat.

3. In a dispenser valve mechanism for a pressurized container having a closure cap, the combination of a valve body of sheet metal having tubular side walls and being open at its ends, said valve body having portions protruding above and below the cap, a centrally apertured, downwardly facing valve seat at one end of the valve body, a plunger extending through the valve seat aperture with its lower end projecting beneath the valve seat, said plunger having a gradually tapered section extending through the aperture in the valve seat and an operating stem projecting beyond the valve body, said tapered section sloping outwardly toward the lower end of the plunger, sealing means of compressible material carried by the plunger at the lower end thereof, a valve closing spring engaging with the plunger and urging the plunger in a direction to engage the sealing means with the valve seat, a tubular valve chamber shell having one end telescoped over the portion of the valve body protruding above the cap and having a discharge opening in its wall and manually operable plunger actuating means engaging with the operating stem of the plunger through an opening in the other end of the shell, said operating means engaging with the shell and closing the opening therein.

4. In a dispenser valve mechanism, the combination as defined in claim 3 which includes an intumed flange carried by the valve chamber

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shell, said flange engaging with the plunger operating means and forming a seal therewith.

5. In a dispenser valve mechanism for a pressurized container, the combination of a valve body of sheet metal and having tubular side walls, a valve seat formed integrally with said body at its upper end; said valve seat consisting of an inwardly and upwardly directed flange having a central aperture therein; a valve operating plunger having its lower end located within the valve body and extending through said aperture in the valve seat; said plunger including an operating stem projecting beyond the valve body and a gradually tapered section extending through the aperture in the flange, said stem being of a diameter less than the diameter of the aperture; said tapered section sloping outwardly toward the lower end of a plunger and engaging with the edges of the flange defining the aperture therein at a point intermediate its ends, a sealing ring of compressible material carried by the plunger at its lower end, a retaining cap encircling and interlocking the sealing ring to the plunger, said sealing ring engaging with the lower surface of the said flange; and a valve closing spring engaging with the headed end of the plunger, said spring being biased to urge the plunger upwardly to engage the sealing ring with the valve seat flange and the tapered portion of the plunger with the edges of the flange defining the aperture in the valve seat.

6. In a dispenser valve mechanism for a pressurized container, the combination of a valve body of sheet metal and having tubular side walls, said valve body being open at its upper and lower ends, a centrally apertured flange extending inwardly and upwardly from the upper end of the valve body, said flange defining the opening at the upper end of the valve body and having a lower surface forming a valve seat, a plunger extending through the aperture in said flange with its lower end inside of the valve body, said plunger having an operating stem projecting beyond the upper end of the valve body and a gradually tapered section fitting within the opening in the flange, said operating stem being of a smaller diameter than the aperture in the flange, said tapered section sloping outwardly toward the lower end of the plunger to a diameter larger than the opening in the flange, sealing means carried by the plunger at the lower end thereof, and a valve closing spring engaging with the lower end of the plunger, said spring urging the

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plunger in a direction to engage the sealing means with the valve seat and the tapered section with the edges of the flange defining the opening therein.

7. In a dispenser valve mechanism for a pressurized container having a closure cap, the combination of a valve body of sheet metal having imperforate tubular side walls, said valve body having necked-in portions defining openings at its ends and being secured to the closure cap intermediate its ends with its lower end protruding below and its upper end protruding above the cap, a valve seat the inner surface of the necked-in portion at the upper end of the valve body, said valve seat comprising a substantially conoidal surface extending inwardly and upwardly at the upper end of the valve body, a valve operating plunger extending through the opening in the upper end of the body, said plunger having an actuating stem projecting beyond the upper end of the valve body and a headed end projecting beneath the valve seat, said plunger also having a gradually tapered section adjacent and sloping outwardly toward the headed end thereof, said tapered section being centered within the opening in the upper end of the valve body and engaging with the edges of the necked-in portion defining said opening at a point intermediate the ends of said tapered section, sealing means secured to the lower end of the plunger and a valve-closing spring engaging with the headed end of the plunger and with the lower end of the valve body, said spring urging the plunger upwardly to engage the sealing means on the plunger with the valve seat and the tapered section of the plunger with the necked-in portion of the valve body defining the opening in the upper end thereof.

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