

[54] SELF CLEANING VALVE

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[51] Int. Cl.....B65d 83/14

[58] Field of Search222/402.18, 402.16, 148, 145, 222/135, 136

[56] References Cited

UNITED STATES PATENTS

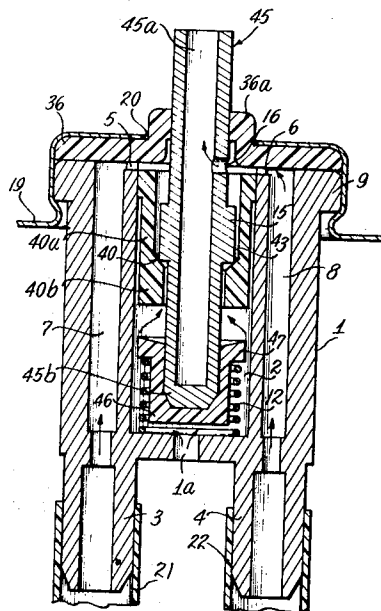
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[57] ABSTRACT

A self-cleaning valve for dispensing fluids sold under pressure comprises a sliding member positioned to open and close passages between the interiors of containers for fluid to be dispensed and the central channel in a dispensing spout. The sliding member is spring biased toward the closed position and driven to its open position by depression of the spout. As the spout is being depressed, but before it strikes the sliding member to open the passageways to the fluid containers, it reaches an intermediate position in which it opens a passage between pressurizing fluid and the central channel, so that only pressurizing fluid is exhausted, thereby cleaning the channel.

7 Claims, 5 Drawing Figures



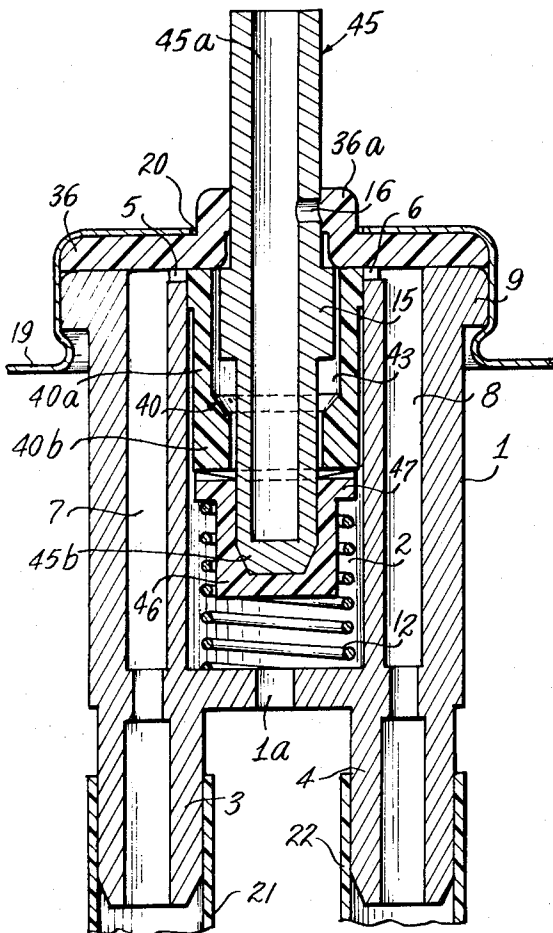


Fig. 1.

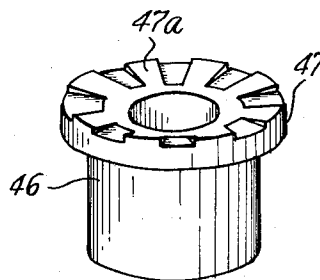


Fig. 5.

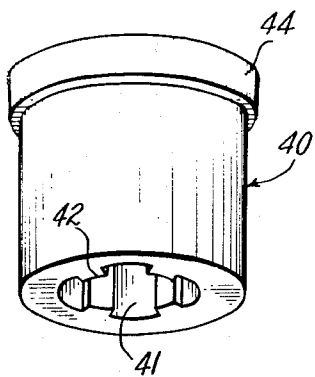


Fig. 4.

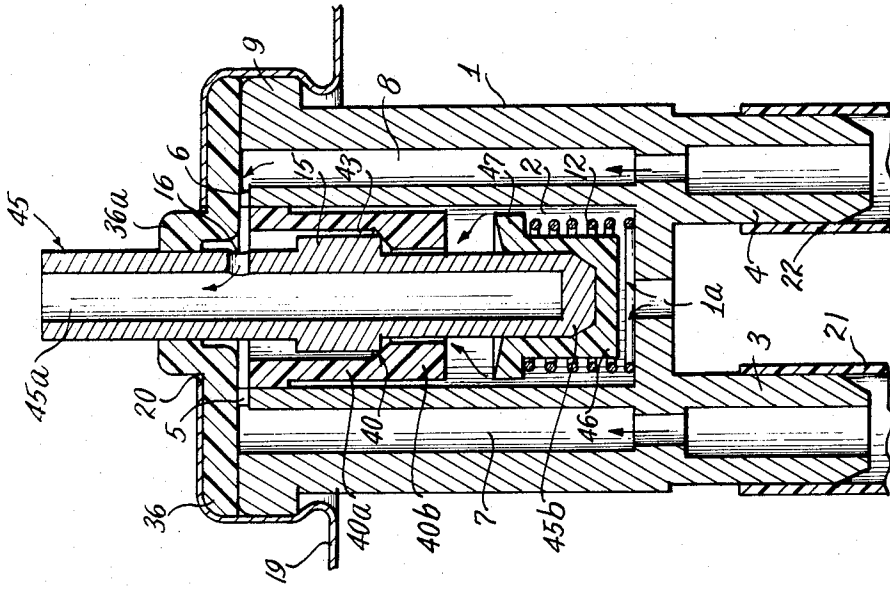


FIG. 1.

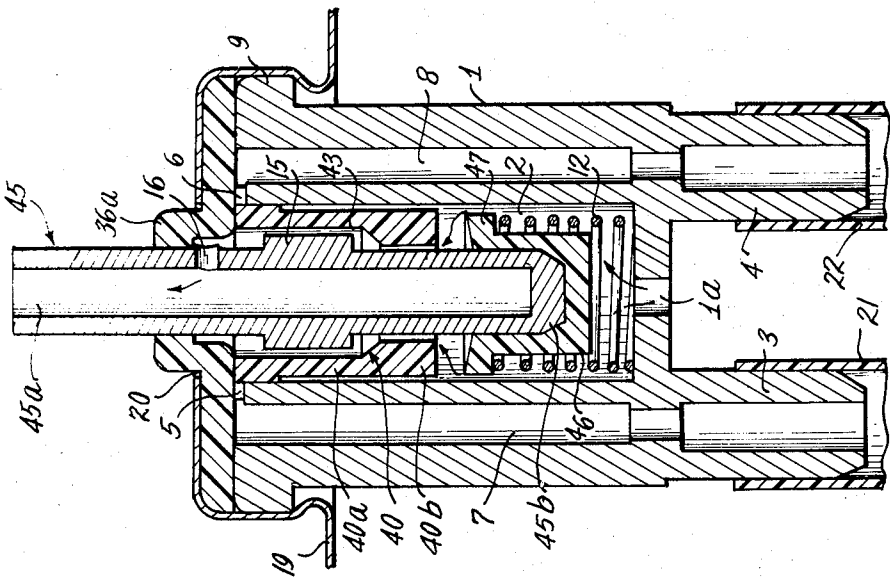


FIG. 2.

SELF CLEANING VALVE

SUMMARY OF THE INVENTION

This invention relates to a valve of the type described in my prior U.S. application Ser. No. 839,842, filed July 8, 1969, and more particularly to an improvement in that invention which is described in my subsequent application Ser. No. 844,840, which was filed July 25, 1969.

In the latter application an improved valve is described for dispensing at least one product stored under pressure, which valve is of the general type described in application Ser. No. 839,842, and comprises a cylindrical cup provided with a central chamber, which communicates through a hole in its bottom with the container on which the valve is mounted. The device also comprises a sliding sealing member which is movable within said central chamber and a cylindrical spout mounted axially of the sliding sealing member and adapted to be used in actuating it. This spout is biased upwardly by a suitable spring. An annular sealing member is positioned at the top of the valve cup. The valve according to Ser. No. 844,840, is also characterized by the fact that the spring which biases the sliding sealing member bears on a disc fixed to the lower part of the spout, which disc is adapted to butt against the slidable sealing member. This spring is seated inside the central chamber in the outer chamber of the valve. The inner passage in the cylindrical spout is open at its lower end and closed near a cylindrical shoulder fixed to said spout, which shoulder, when positioned inside the cylindrical seat in the sliding sealing member, is urged against the annular sealing member by the said spring, and is adapted to engage the sliding sealing member to move it.

One of the essential characteristics of the valve according to this application Ser. No. 844,840, is the ability to act as a self-cleaning valve because of the fact that, at each dispensing operation, a flow of propellant gas cleans the channels and dispensing orifices of the valve.

It is the object of the present invention to provide a valve having the same self-cleaning characteristics, but constructed in a slightly different manner. In the description which follows it should be noted that the part of the valve which extends into the container upon which it is mounted is considered to be the lower part of the valve.

The present invention is directed to a new article of manufacture which consists of a valve of the type described in Ser. No. 839,842, which is adapted to dispense at least one product stored under pressure and comprising an outer cylindrical cup having as many radial notches around its upper edge as there are products to be dispensed. The notches are connected by the passageways to spigots mounted in the lower part of the cup. The cup also comprises a central chamber having an opening in its bottom. A slidable sealing member is movable inside the central chamber in the cup along the axis thereof and is biased upwardly by a spring inside said central chamber. This sealing member is annular and comprises at its upper end a preferably circular cylindrical seat. The device also comprises a spout which is open at its upper end and carries a preferably circular central shoulder. The spout is radially perforated at a level just above the shoulder by at least one hole and biased by the said spring into engagement with the slidable sealing member to cause movement thereof. Finally, the device comprises an annular sealing cap encircling the upper part of the above mentioned spout and resting on the upper surface of the outer cup of the valve. This valve is essentially characterized by the fact that the spout is closed at its lower end and is biased by the above mentioned spring through a cup, the crenelated upper edge of which is adapted to abut the sliding sealing member. The sliding sealing member does not form a fluid-tight seal with the upper part of the spout, but slides instead in a fluid-tight manner inside the central chamber in the outer cup of the valve.

In a preferred embodiment of the invention, the lip of the cup at the bottom of the spout is radially crenelated from its periphery toward the central opening therein. The bore in the

slidable sealing member which receives the lower part of the spout is crenelated parallel to the axis of said sliding sealing member. The radial hole in the spout above the circular shoulder is so positioned as to lie between the upper and lower surfaces of the annular sealing member when the upper surface of the cup associated with the spout is in abutment against the lower surface of the sliding sealing member.

In order that the invention may be better understood, a preferred embodiment thereof will now be described, purely by way of illustration and example, with reference to the accompanying drawings, on which:

FIG. 1 is an axial sectional view through the valve according to the invention, showing it in closed position;

FIG. 2 is an axial sectional view through the valve of FIG. 1, showing it in self-cleaning position;

FIG. 3 is an axial sectional view through the valve of FIG. 1, showing it in its completely open position;

FIG. 4 is a perspective view showing the sliding sealing member of the valve taken from a position slightly below this member; and

FIG. 5 is a perspective view of the cup-shaped member at the lower part of the spout, as seen from a position slightly above this member.

Referring now to the drawings, it will be seen that reference numeral 1 indicates the outer cylindrical cup of the valve. The cup 1 has a generally cylindrical shape and comprises an axial central chamber 2. Two spigots 3 and 4 are positioned at the bottom of this cup. At its top, along the edge of the central chamber 2, are two radial notches 5 and 6, which are substantially rectangular in shape. The notches 5 and 6 are in alignment with the spigots 3 and 4 respectively. Axial passages 7 and 8 extend through the spigots 3 and 4 through the wall of the cup 1 so as to connect the spigots to the notches 5 and 6. At the top of the cup 1 is an external shoulder 9. The bottom of the cup is axially pierced by a hole 1a.

Inside the central chamber 2 is a slidable sealing member 40. This sealing member 40 is cylindrical in shape and comprises a cylindrical sidewall 40a and a bottom 40b. In the middle of the bottom is a bore 41 the peripheral walls of which are provided with grooves 42 parallel to the axis of the slidable sealing member 40. The slidable sealing member 40 has an internal substantially cylindrical recess 43. Near its top is an external shoulder 44 on which the sealing member 40 slides. The outer diameter of the shoulder 44 is equal to the inner diameter of the central chamber 2 in the cylindrical cup 1.

The spout 45 extends along the longitudinal axis of the sliding sealing member 40. The spout 45 is provided with a central passageway 45a closed at its lower end by a bottom 45b. An intermediate portion of this spout carries an external circular shoulder 15. The external diameter of the shoulder 15 is slightly less than the diameter of the recess 43. The diameter of the lower part of the spout between the bottom 45 and the shoulder 15 is equal to the inner diameter in the bore 41 taken between the grooves. At the base of the spout 45 is a cup 46 in which the lower part of the spout 45 is seated. The cup 46 has an upper lip 47. The surface of the lip 47, that is to say the surface facing the sliding sealing member 40, is provided with ridges 47a separated from each other by radial grooves which extend from the edge of the lip 47 to the central part of the cup 46, in which the lower end of the spout is seated. A spring 12 is positioned between the bottom of the central chamber 2 and the lip 47 of the cup 46. Above the circular shoulder 15 the spout 45 is pierced by a hole 16 which passes through the wall of the spout.

An annular sealing member 36 is positioned at the top of the valve. This sealing member has an external diameter equal to the external diameter of the shoulder 9 and an internal diameter equal to the external diameter of the upper part of the spout 45. In the closed position shown on FIG. 1, this sealing member bears on the upper surfaces of the outer cup 1 and the sliding sealing member 40. When the annular sealing member 36 is positioned on the cup 1, the notches 5 and 6 at the top of this cup are converted into holes. The annular sealing member

36 and cup 1 are held together by a metallic cap 19 which grips the circular sealing member 36 and the shoulder 9 of the cup 1. It is obvious that the cap 19 has an opening 20 in its central part which permits the free passage of the spout 45. The central part of the circular sealing member 36 forms a cup 36a which is positioned inside the hole 20 in the cap 19.

The cap 19 is adapted to be fastened to the top of an outer container which container may hold flexible inner containers in which the two products to be dispensed are stored, as well as the pressurizing fluid which places the products in these flexible containers under pressure. Suitable pressurizing fluids include the conventional freons.

The upper parts of the flexible containers holding the products to be dispensed comprise tubes 21 and 22, which tubes are adapted to be respectively mounted on the spigots 3 and 4.

When the cap 19 has been mounted on the outer container, this container holds, connected to the dispensing valve, the flexible containers filled with the products to be dispensed. The freon is then introduced into the outer container by any suitable means, and in particular through a special valve, or directly through the valve according to the invention when placed in the position shown in FIG. 2.

In the latter case the freon introduced through the axial passageway 45a in the spout 45 passes through the hole 16 which is then located between the circular sealing member 36 and the sliding sealing member 40. The freon which passes through the recess 43 along the axis of the sliding sealing member 40 enters the grooves between the ridges 42 and then the grooves between the ridges 47a. It thus enters the central chamber 2, passes through the orifice 1a, and reaches the interior of the outer container, which is to be placed under pressure. When the desired quantity of freon has been introduced into the outer container the connection between the freon container and the spout 45 is broken, and then the spout 45 is permitted to rise under the pressure exerted by the spring 12 so as to bring the valve into its closed position as shown in FIG. 1.

In the closed position shown in FIG. 1 the sliding sealing member 40 blocks the slots 5 and 6 by means of the shoulder 44 which slides in a fluid-tight manner inside the central chamber 2. As a consequence, the products within the flexible containers cannot be dispensed. The pressurizing gas inside the outer container is admitted to the inside of the recess 43 since this recess is in communication with the inside of the outer container through the orifice 1a, the grooves in the lip 47 of the cup 46, and the grooves which separate the ridges 42 in the sliding sealing member. The dimensions of the lower part of the spout 45 are such that, when the lip 47 of the cup 46 engages the sliding sealing member 40, the shoulder 15 is not pressed against the circular sealing member 36. In the closed position shown in FIG. 1, when the cup 46 bears against the sliding sealing member 40, which is itself in abutment against the annular sealing member 36, the orifice 16 is at a level such that it is between the two lower surfaces of the cup 36a. The cup 36a is in sealing contact with the upper part of the spout 35 so that the pressurizing gas inside the recess 43 cannot escape to the outside. However, if an excessive pressure arises inside the outer container, this excessive pressure acts on the inside of the cup 36a and because of the elasticity of the material which the circular sealing member 36 is made, this cup is deformed to permit an escape of gas along the upper part of the spout 45. It will thus be seen that the presence of the cup 36a in the central part of circular sealing member 36 permits the valve according to the invention to serve the purpose of a safety valve, avoiding accidental excessive pressure inside the outer container.

When the user desires to employ the valve according to the invention, he presses the spout 45 down along the axis thereof. The spring 12 is compressed and permits the spout 45 to be forced down into the outer cylindrical cup 1 of the valve. The first step in this depression is shown in FIG. 2. It will be seen that the hole 16 has passed to the inside of the recess 43. It fol-

lows that there is communication between the exterior and the interior of the outer container which results in a jet of pressurizing gas through the seat 43, the hole 16 and the central passageway 45a. This jet of pressurizing gas cleans the recess 43, in which particles of products to be dispensed may have remained from a previous dispensing operation. It will thus be appreciated that the valve according to the invention is of the self-cleaning type.

When the user continues to press down the spout 45, he compresses the spring 12 to a greater extent and the circular shoulder 15 comes to bear against the bottom of the recess 43, that is to say, against the upper edge of the bore 41. At this moment the pressurizing gas inside the outer container can no longer escape to the outside of that container, since the shoulder is in contact with the bottom of the recess 43. When depression of the spout 45 continues, this chimney carries with it the sliding sealing member 40, which opens the dispensing orifices 5 and 6 and permits simultaneous escape of the products to be dispensed through the hole 16 and the central passageway 45a in the upper part of the spout 45.

It will of course be appreciated that the embodiment which has just been described has been given purely by way of illustration and example, and may be modified as to detail without thereby departing from the basic principles of the invention as defined by the following claims.

What is claimed is:

1. In a valve for dispensing at least one fluid which is stored under pressure, said valve comprising:

a cup defining a central chamber having an opening in its bottom and at least one passageway leading to the exterior of said cup from a port opening into the upper part of said chamber,

a stationary sealing member closing the top of said cup, a manually movable spout projecting through said stationary sealing member into said chamber, said spout encircling and defining a dispensing passage, and at least one first radial opening leading from said dispensing passage to the exterior of said spout,

said spout being movable between a first position in which said first radial opening is blocked by said stationary sealing member and a second position in which said first radial opening lies beneath and clear of said radial sealing member,

a slidable sealing member encircling said spout within said chamber, said slidable sealing member being axially slidable within said chamber between an upper position blocking said port to a lower position clear of said port and permitting communication between the passageway in said cup and the first radial port in said spout when said spout is in its second position,

said spout having an open upper end, a closed lower end, and a transverse external first rib intermediate its ends, the improvement according to which said spout and slidable sealing member define a longitudinal clearance therebetween and said valve comprises an additional radially projecting rib member carried by said spout, at least one of said rib and slidable sealing members defining a passage connecting the lower part of said longitudinal clearance to said chamber outside said slidable sealing member,

said slidable sealing member being provided with an internal seat above said last mentioned passage and said first rib being positioned to contact said seat and thereby close said longitudinal clearance only after said spout has already left its first position sufficiently to move said first radial openings clear of said stationary sealing member, and then drive said slidable sealing member into its lower position as said spout is moved further into its second position.

2. Valve as claimed in claim 1 in which said clearance is defined between the outer surface of said spout and axial grooves in said slidable sealing member.

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3. Valve as claimed in claim 1 in which the first radial opening in said spout is positioned to be covered by said stationary sealing member when said additional rib member is in abutment with the lower end of said slidable sealing member, and said slidable sealing member is in its upper position.

4. Valve as claimed in claim 1 comprising an inner cup in which the lower end of said spout is seated, and in which said additional rib member is formed as a peripheral lip on said cup.

5. Valve as claimed in claim 1 in which the passage connecting the lower part of said longitudinal clearance and the chamber outside said slidable sealing member is formed

between the lower end of said slidable sealing member and a groove in the upper end of said rib member.

6. In combination, a valve as claimed in claim 5, a container holding a propellant gas under pressure closed by said valve and open to the opening in the bottom of said cup, and a flexible container holding a fluid to be dispensed connected to the exterior end of each passage in said cup.

7. Valve as claimed in claim 1 on which said cup has a plurality of passageways leading from the upper part of said central chamber to the exterior of said cup, and each passage terminates in a spigot projecting away from said spout.

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