United States Patent

[11] 3,610,472

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[31] 6938452

[54] **VALVE FOR SIMULTANEOUSLY DISPENSING A PLURALITY OF FLUIDS**
6 Claims, 2 Drawing Figs.

[52] U.S. Cl. 222/145, 222/402.16, 222/402.22, 222/402.1, 222/136, 137/625.4, 137/353
[51] Int. Cl. B67d 5/60
[50] Field of Search 222/136, 132, 129, 145, 402.16, 402.18, 193, 402.22, 136, 384, 402.1, 139; 251/321, 322; 137/625.4, 353

[56] References Cited
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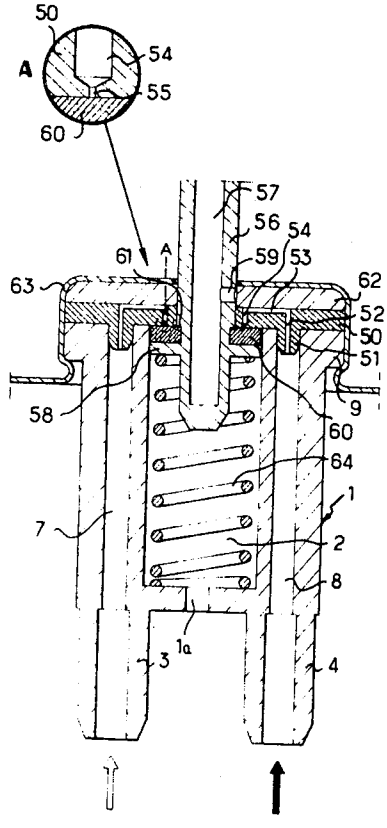
ABSTRACT: Valve for simultaneously dispensing a plurality of fluids stored under pressure comprises a cup having vertical passageways in its walls which are open at the top and lead to containers for the individual products. The cup is surmounted by a disc having radial passageways leading from the vertical passageways to points inside the cup. A spout passes through the disc and carries on a peripheral shoulder a sealing member normally engaging the inner ends of the radial channels. The spout has a radial orifice and when it is depressed, the sealing member is moved away from the radial passageways, and the orifice brought into communication with them.



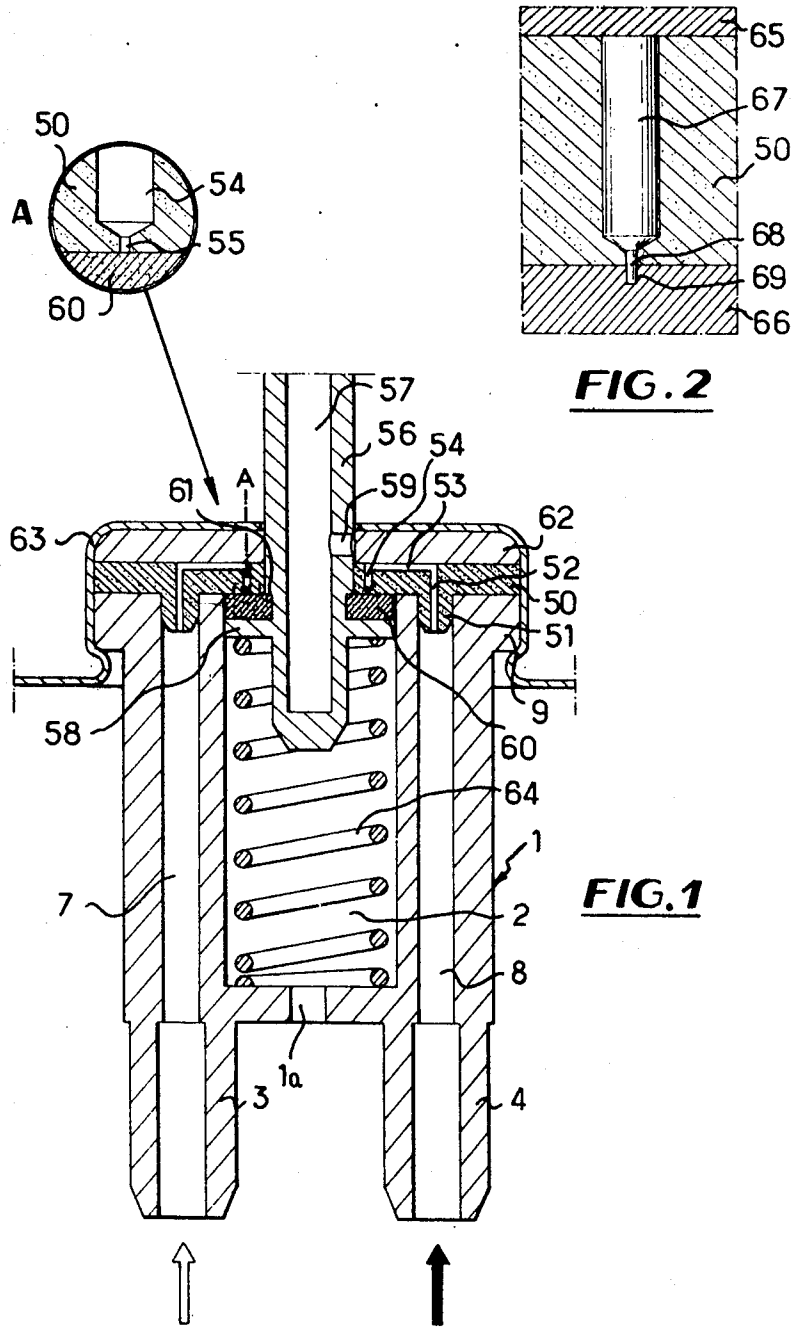

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FIG. 2

FIG. 1

VALVE FOR SIMULTANEOUSLY DISPENSING A PLURALITY OF FLUIDS

SUMMARY OF THE INVENTION

This application relates to an improvement on a dispensing device described in my prior application Ser. No. 839,842 filed July 8, 1969.

Said prior application describes a valve for simultaneously dispensing a plurality of products packaged under pressure, which valve is essentially characterized by the fact that it comprises a cylindrical cup provided at its upper end with as many radial openings as there are products to be dispensed. These openings are connected by passageways to two spigots at the lower end of the cup which are adapted to be fastened to containers, each of which holds one of the products to be dispensed. The cup is also provided with a central coaxial opening in its lower end. The valve comprises a sliding sealing member which is axially movable in the top of a central chamber in the cup and which bears on the upper end of a spring placed inside said cup. This sealing member may have the general shape of a cylindrical crown and comprise at its upper end a circular seat. The device further comprises a cylindrical spout which is open at the top and closed at the bottom. The central part of this spout is provided with a circular shoulder adapted to cooperate with the seat in the upper part of the sliding sealing member. This spout is radially perforated by at least one hole in its lower part and by at least one other hole immediately above the circular shoulder. An annular sealing member encircles the above-mentioned spout and rests on the upper surface of the cup, the sliding sealing member, and the circular shoulder on the spout.

It is the object of the present invention to provide another embodiment of the above valve, the construction of which makes it possible to inexpensively insure the simultaneous dispensing of different products at a low cost and in a well defined ratio.

The present invention accordingly provides a new article of manufacture, which consists of an improved valve for dispensing at least one product packaged under pressure, which valve is of the general type described in said application Ser. No. 839,842, which comprises in the first place a cylindrical cup, the wall of which is provided with as many passageways as there are products to be dispensed, each passage way communicating with a spigot positioned at the lower end of the cup and opening into the upper end of the cup. Suitable containers, each holding at least one of the products to be may be attached to these spigots. The cup is also provided with a central opening in its bottom. The valve also comprises a sliding annular sealing member which is slidable inside the central chamber in the cup along the axis thereof and is biased upwardly by a spring positioned in the bottom of this central chamber. Finally, the valve comprises a cylindrical spout which is open at its upper end and closed at its lower end. This spout carries a central circular shoulder and is radially perforated at a level immediately above the shoulder by at least one hole. A sealing ring is positioned around the said spout above the upper surface of the cup. The valve is essentially characterized by the fact that between this sealing ring and the upper surface of the valve cup is a disc provided, on the face toward the sealing ring with as many radial grooves as there are passageways in the wall of the valve cup, each radial groove communicating at one end with a passageway in the cup and at its other end with an orifice in the surface of the disc which comes into contact with the sliding sealing member. The sliding sealing member is annular and generally flat in shape, and carried by the circular shoulder on the cylindrical spout of the valve.

In a preferred embodiment of the invention, the surface which rests on the upper edge of the outer cup of the valve carries projections adapted to be inserted into the passageways in the cup, each projection encircling an axial duct connected to a radial passageway which opens against the face of the disc engaging the sealing ring. The radial passageways in the surface of the disc which is in contact with the sealing ring are grooves. At the end of each groove in the disc which is nearest the axis of this disc is a passageway extending through the thickness of the disc. This passageway opens into the surface of the disc which is in contact with the sealing ring through a calibrated orifice.

The valve cup and the cylindrical spout may advantageously be made of metal, or preferably of a molded plastic material. The sealing ring and the sliding sealing member are made of any suitable material, whether natural or synthetic.

The disc is inexpensive to make from a molded plastic material. The orifices in the surface of the disc which is to come in contact with the sliding sealing member may easily be calibrated exactly during molding by using a pin inserted into the mold and fixed to the part of the mold which is in contact with the surface of the disc carrying the radical grooves. The end of this pin corresponds in size to the calibrated orifice desired and fits into a seat provided in the part of the mold which does not carry the pin.

It is important to emphasize that the embodiment according to the present invention makes it possible to economically provide, by means of the disc of molded plastic material, satisfactory calibration of the orifices through which the different products to be simultaneously dispensed must flow. The practical importance of this characteristic is obvious when it is realized that for the distribution pressures conventionally utilized when two products of analogous viscosity are being simultaneously dispensed an equal proportion between the quantities of the two products dispensed can be obtained only if the diameters of the orifices through which each of the two products differ by less than 0.005 mm.

When a valve according to the invention, mounted on a container holding a pressurized fluid, is placed in use, the containers enclosing each of the products to be dispensed are connected to the spigots located at the lower end of the outer cup of the valve, and the user, in order to dispense the products, presses vertically on the valve spout. This slides the slidable sealing member down into the chamber in the cup and clears the outlets of the calibrated dispensing orifices in the disc. Each of said orifices is supplied with one of the products to be dispensed, which is held in the corresponding pressurized container. During this depression the radial opening in the spout, which is initially positioned at the level of the sealing ring, is moved below the disc, and a mixture of the products to be dispensed simultaneously may then escape through the axial passageway in the cylindrical spout. When the user releases his pressure, the spout and the sliding sealing member return to their initial position in response to the spring which presses them upwardly. The sliding sealing member is then pressed against the lower face of the disc and blocks the calibrated dispensing orifice.

It should be noted that, in its normal state, the valve has no dispensing chamber in which a mixture of the products which are to be dispensed simultaneously can accumulate. This is an essential characteristic of the invention which is quite important when the different products to be distributed are capable of reacting chemically with each other, a feature which has also been pointed out in connection with the device described in the aforesaid prior U.S. application.

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

FIG. 1 and the associated detail view show a valve according to the invention in axial section; and

FIG. 2 is a detail view schematically illustrating the molding step which makes it possible to obtain calibrated orifices for the discs of the valve.

Referring now to the drawings, it will be seen that reference numeral 1 indicates the valve cup. The cup 1 has a generally cylindrical shape and defines a central axial chamber 2. Two diametrically opposed spigots 3 and 4 are provided at its bottom. Passageways 7 and 8 are coaxially formed in the spigots 3

and 4 and extend upwardly into the wall of the cup 1. These passageways are open at the upper part of the cup 1. The top of the cup is provided with a peripheral shoulder 9. The bottom of the cup is axially pierced by a hole 1a.

The shoulder 9 of the cylindrical cup 1 carries a disc 50. This disc is pressed against the upper surface of the cup 1 and comprises two projections 51 which are seated in the ends of passageways 7 and 8. Axially of each projection 51 is a duct 52 parallel to the axis of the disc 50. The ducts 52 terminate at the surface of the disc which is not provided with the projections 51. In this surface, leading from the ducts 52, are two substantially radial grooves 53. At the end of each groove 53 remote from the duct 52 is another duct 54 parallel to the duct 52. Each duct 54 extends from the bottom of the corresponding groove 53 to a calibrated orifice 55 in the surface of the disc 50 which carries the projections 51. The disc 50 comprises a central circular passageway in which a spout 56 is positioned. The spout 56 is substantially cylindrical. It comprises an axial passageway 57 closed at its lower end and open at its upper end. It also comprises a circular shoulder 58 encircling the spout proper. The diameter of this shoulder 58 is substantially equal to the diameter of the chamber 2. In the wall of the spout 56 is a radial opening 59. The sliding sealing member 60 is positioned on the circular shoulder 58. The sealing member 60 is a ring of elastic material and is in the wall of the spout 56 between the shoulder 61 and the shoulder 60.

A sealing ring 62 is positioned above disc 50. This sealing ring encircles the spout 56. The assembly formed by the shoulder 9, the disc 50, and the sealing ring 62 is held together by a metallic cap 63 which forms the support for the valve and serves to connect it to the pressurized container to which it must be attached.

In the rest position of the valve which has just been described, the spout 56 is biased upwardly by a spring 64 positioned in the chamber 2. One end of the spring 64 bears against the bottom of the chamber 2, whereas the other end presses against the circular shoulder 58. In this rest position the sliding sealing member 60 is biased by the spring 64 against the disc 50 and blocks the calibrated orifices 55 in this disc. The radial opening 59 in the spout is at the level of the sealing ring 62. The orifices 55 are blocked by the sliding sealing member 60, and no dispensing of the products in the containers connected to the spigots 3 and 4 can take place through the passage 57.

When the user presses on the spout 56, he compresses the spring 64 and, by means of the shoulder 61, the sliding sealing member 60 is driven downwardly by the spout 56. Consequently the calibrated orifices 55 are unblocked, thus permitting each of the products to be dispensed to pass through the spigots 3 or 4, the passageway 7 or 8, the ducts 52, the grooves 53 and the ducts 54.

The products to be dispensed thus arrive in the space defined between the disc 50 and the sliding sealing member 60. During the descent of the spout 56, the opening 59 is brought to a level lower than that of the lower surface of the disc 50. The two products emerging through the orifices 55 are thus evacuated as a mixture through the hole 59 and the passageway 57. When the user releases the pressure on the spout 56, the various components of the valve return to their initial position under the influence of the spring 64.

It should be noted that, in the valve according to the invention, there is no mixing chamber which holds a mixture of the two products between the two dispensing operations. This is important in the case in which two products which react with each other are being dispensed. Moreover, the provision of the disc 50 make it possible to calibrate the orifices 55 in a very satisfactory manner.

FIG. 2 shows in detail the operation of the mold for the disc 50, in the course of which operation it is necessary to perfectly calibrate the orifices 55. Reference numeral 65 indicates the upper part of the mold and 66 the lower part. The part 65 of the mold for the disc 50 carries, for each orifice 55, a pin 67 on the lower end of which is a perfectly calibrated projection 68. The diameter of the projection 68 corresponds to that desired for the orifice 55 allowing for the possible contraction of the plastic material after molding. The end of the projection 68 seats in a seat 69 provided in the part 66 of the mold. This method of operation greatly increases the precision of calibration of the holes 55. When the valve shown on FIG. 1 must deliver products having a low viscosity at a low rate of flow, in a predetermined ratio, the two orifices 55 may have diameters of from 0.5 mm., the permissible difference between these diameters being about 0.005 mm. for a pressurizing fluid under about 3 kg./cm.^{2} of pressure.

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

What is claimed is:

1. In a valve for simultaneously dispensing a plurality of products stored under pressure, said valve being of the type comprising a cylindrical cup provided with as many passageways in the walls thereof as there are products to be dispensed, each passageway communicating with a spigot positioned at the lower end of the cup and an opening at the upper end of the cup, each of said spigots being adapted for the attachment of containers for holding one of the products to be dispensed, said cup defining a central chamber having an aperture in the bottom thereof, a sliding sealing member which is movable inside the central chamber in the cup along the axis thereof, a spring in said chamber biasing said sliding sealing member away from the bottom thereof, a cylindrical spout which is open at its upper end and closed at its lower end, said spout being provided with a central peripheral shoulder, said spout being radially perforated at a level immediately above that of the circular shoulder, a sealing ring encircling said spout and positioned above the cup, the improvement comprising a disc positioned between the top of said cup and said sealing ring, said disc having, on the surface thereof facing said cup, as many radial channels as there are passageways in the wall of the cup, each radial channel communicating at one end with one of the passageways in the cup and at its other end with an orifice provided in the area of the disc inside the cup, which area comes in contact with the sliding sealing member, said sliding sealing member being a flat circular ring and supported on the circular shoulder of the cylindrical spout.

2. A valve as claimed in claim 1 in which said disc comprises projections on the surface thereof which engages the top of the cup, said projections being adapted to fit into the passageways in the cup, each projection having therein a duct extending substantially axially thereof and leading to the face of the disc with which the sealing ring is in contact.

3. Valve as claimed in claim 1 in which the radial channels in the surface of the disc in contact with the sealing ring are grooves.

4. Valve as claimed in claim 3 in which the end of each groove in the disc which is closest the axis of the disc meets a passageway traversing the thickness of the disc which passageway reaches the area of the disc in contact with the sliding sealing member through a calibrated orifice.

5. Valve as claimed in claim 1 in which the cup and cylindrical spout are made of a plastic molded material and the sealing ring and sliding sealing member are made of an elastic material.

6. Valve as claimed in claim 4 in which the disc is made of a plastic molded material said molding being carried out by using for each calibrated orifice of the disc a pin inserted in the mold and fixed to one of the parts of the mold with its other end being calibrated and seated in a seat provided in the other part of the mold.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,610,472 Dated October 5, 1971

Inventor(s) BRUNO P. MORANE

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

[72] Inventor Bruno P. Morane

[73] Assignee L'Oreal
Paris, France

Signed and sealed this 3rd day of October 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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