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(54) **Pump of simplified structure, for delivering pressurized fluids**

(57) The present invention provides a pump for delivering pressurized fluids, the pump being of very simple structure and low production cost, it comprising a very small number of components, all easy to construct and assemble.

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This invention relates to a pump of simplified structure, for delivering pressurized fluids.

Many types of manually operated pumps are known and used on a wide scale for drawing a fluid from a container on which they are fitted, and expelling the fluid to the outside under pressure.

Known pumps are of rather high cost, this sometimes considerably affecting the cost of the bottles to which they are applied.

The main object of the present invention is to provide a pump consisting of an extremely small number of component parts which can be assembled very simply, resulting in a pump of very low cost.

This and further objects are attained by a pump comprising a cup-shaped body into which there is inserted, in a manner able to undergo translational movement, one end of a hollow stem carrying a piston slidable in a sealed manner against the inner surface of the cup-shaped body, the stem being urged by a spring housed in the cup-shaped body towards the open end of said body, within which it is retained by a locking ring cap superposed on the mouth of the cup-shaped body, which is provided with a hole intercepted by a suction valve and connectable to a dip tube, on the other end of the stem there being mounted a fluid delivery head with a discharge hole communicating with the cavity within the stem via a discharge valve, characterised in that said stem has substantially the shape of a hollow tube open at that end which lies within the cup-shaped body and from which there projects said slidable piston, which is formed in one piece with the stem, said discharge valve consisting of a flexible endless lip also formed in one piece with the stem, from the other end of which it projects to close the stem cavity, there being provided within the stem at least one passage opening upstream of said flexible endless lip, which is housed within and seals against a cavity provided in said delivery head, said cavity extending downstream of the discharge piston and being in direct communication, via at least one channel provided in the head, with a turbulence chamber defined in the delivery head by a shaped insert housed in a seat provided in said head and having a discharge hole connecting said turbulence chamber to the outside.

The structure and characteristics of the pump according to the invention will be more apparent from the description of one embodiment thereof given by way of non-limiting example with reference to the accompanying drawing, in which the single figure represents a longitudinal section through the pump in its rest state.

As can be seen from the figure, the pump comprises a cup-shaped body 1 into which there extends, in a manner able to undergo translational movement, a hollow stem 2 from the lower end (relative to the figure) of which there projects a piston 3 which is slidable in a sealed manner against the inner cylindrical wall of the cup-shaped body.

The stem 2 is urged upwards by a spring 4 acting against longitudinal ribs or fins 5 (the length of which determines the pump capacity) projecting into the cavity within the stem, the lower end of which is freely open. The stem is retained by a ring cap 6 which is mounted and snap-locked on the mouth of the cup-shaped body.

In the base of the cup-shaped body 1 there is provided a feed hole intercepted by a suction valve consisting of a plug 7 with a flexible endless seal lip. In correspondence with this feed hole there is mounted and retained one end of a dip tube 8 which extends (in conventional manner) into a bottle or the like containing the fluid to be delivered after applying the pump.

On the free end of the stem 2 (that facing upwards on the drawing) there is mounted a head 9 provided with an internal cavity 10 which, via channels 11, communicates with a turbulence chamber 12 defined by a shaped insert 13 housed in a seat provided in said head, in the insert there being provided a discharge hole connecting the chamber 12 to the outside.

As can be seen from the drawing, the top of the stem 2 is shaped to form a discharge valve consisting of a flexible endless lip 15 which bears and seals (when in the rest state) against the opposing wall of the cavity 10 in the head 9.

Below the lip 15 (ie upstream of it) there are provided in the stem 2 passages 16 the purpose of which will be apparent from the following description.

It will be assumed that the pump is mounted (and retained in position by any known system, for example by a ring nut or a bush) on the mouth of a bottle containing a liquid into which the dip tube 8 dips.

It will also be assumed that the pump is already primed, ie that the chamber defined within the cup-shaped body and the hollow stem 2 are filled with liquid retained therein by the lip 15 and the plug 7.

By means of a finger (or a conventional lever system) the head 9 is now lowered (relative to the finger) against the action of the spring 4, hence pressurizing the liquid until it deforms the lip 15, which withdraws from the opposing surface of the cavity 10 so that the pressurized liquid passes through the cavity 10, the channels 11 and the turbulence chamber 12, to be expelled to the outside in finely atomized form through the discharge hole 14. The liquid present in the cup-shaped body cannot flow back into the bottle, this being pre-

vented by the plug 7.

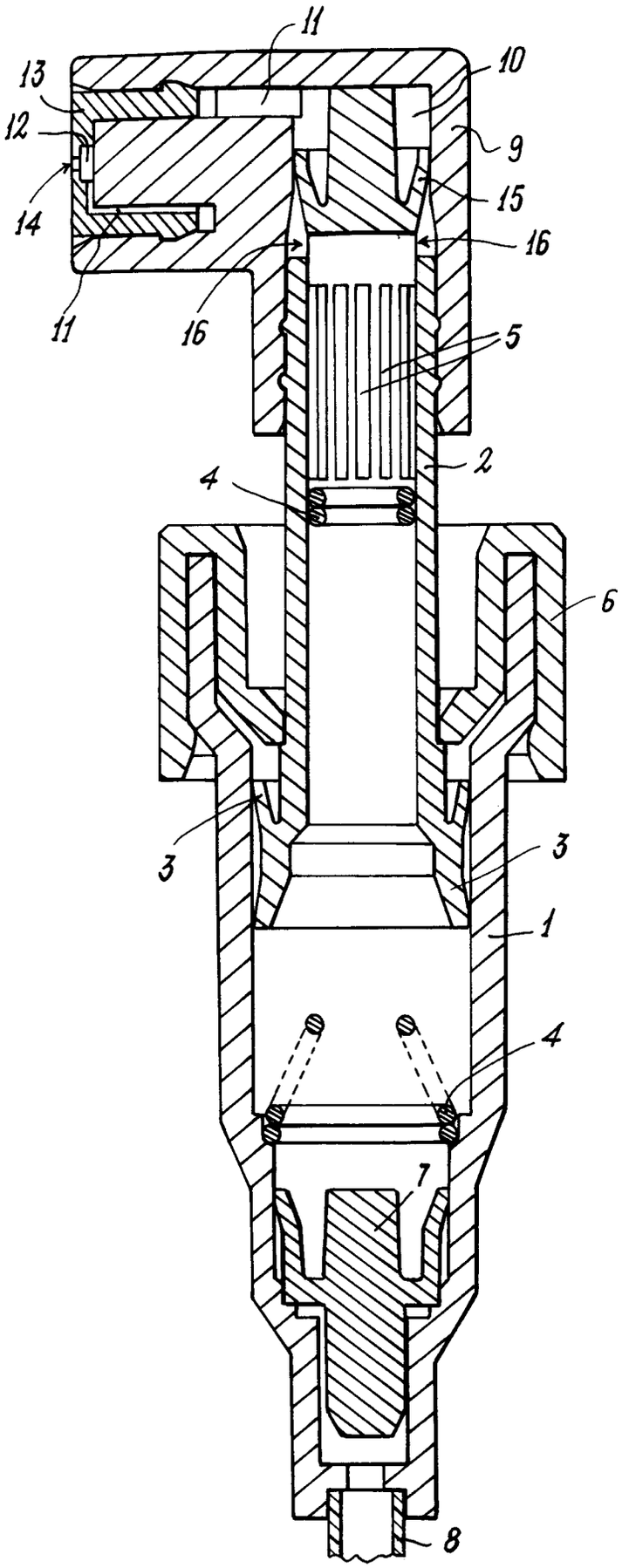
It will now be assumed that the stem is in its completely lowered position, ie with the piston 3 in its position of maximum approach to the plug 7. When the pressure exerted on the pump head 9 ceases, the spring 4 raises the stem 2 together with the head 9. As under these conditions the lip 15 seals against the opposing surface of the cavity 10, a vacuum is created within the cup-shaped body to cause the plug 7 to lift and the liquid to rise into the cup-shaped body along the dip tube 8.

From the aforegoing it is apparent that the pump structure is extremely simple, and of easy and economical construction and assembly, while providing excellent atomization of the delivered liquid.

Claims

1. A pump of simplified structure for delivering pressurized fluids, comprising a cup-shaped body (1) into which there is inserted, in a manner able to undergo translational movement, one end of a hollow stem (2) carrying a piston (3) slidable in a sealed manner against the inner surface of the cup-shaped body (1), the stem (2) being urged by a spring (4) housed in the cup-shaped body (1) towards the open end of said body, within which it is retained by a locking ring cap (6) superposed on the mouth of the cup-shaped body (1), which is provided with a hole intercepted by a suction valve (7) and connectable to a dip tube (8), on the other end of the stem (2) there being mounted a fluid delivery head (9) with a discharge hole (14) communicating with the cavity within the stem (2) via a discharge valve, characterised in that said stem (2) has substantially the shape of a hollow tube open at that end which lies within the cup-shaped body (1) and from which there projects said slidable piston (3), which is formed in one piece with the stem, said discharge valve consisting of a flexible endless lip (15) also formed in one piece with the stem (2), from the other end of which it projects to close the stem cavity, there being provided within the stem at least one passage (16) opening upstream of said flexible endless lip (15), which is housed within and seals against a cavity (10) provided in said delivery head (9), said cavity (10) extending downstream of the discharge piston and being in direct communication, via at least one channel (11) provided in the head (9), with a turbulence chamber (12) defined in the delivery head (9) by a shaped insert (13) housed in a seat provided in said head and having a discharge hole (14) connecting said turbulence chamber (12) to the outside.

2. A pump as claimed in claim 1, characterised in that into the cavity within said stem there project longitudinal ribs (5) against which the spring (4) acts.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