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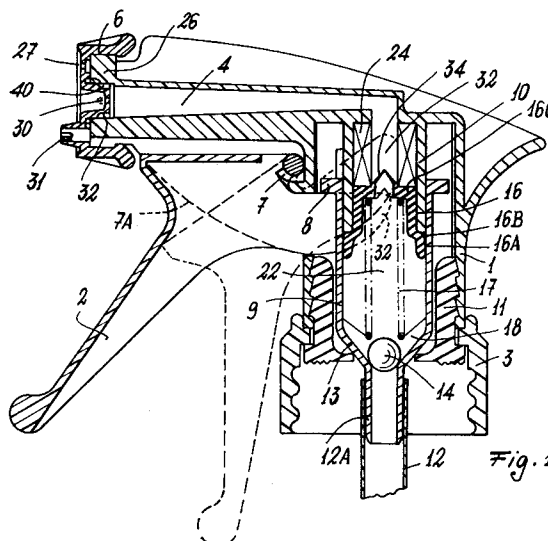
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(54) **Manually operated pump device for dispensing fluids.**

(57) A manually operated pump device for dispensing fluids from containers, comprising a mobile member (9) for pumping the fluid to be dispensed, said mobile member (9) being operationally connected to a trigger lever (2) and cooperating with a fixed guide member (10), a ball suction valve, elastic return means (17) and a delivery head (6), and a delivery valve comprising a gasket (16) sealing against said mobile member (9) and fixed member (10).

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This invention relates to a manually operated pump device for dispensing fluids from containers, particularly of the portable type for connection to said containers, for example by threaded ring nuts or capsules.

Fluid dispensing pumps are known, consisting substantially of a cylinder, a mobile piston operationally connected to a trigger lever, delivery and suction valves, elastic return means and a delivery channel.

The unidirectional delivery valves provided in known pumps consist of shutoff valves of conventional type housed in convenient seats provided within the device and operated by gravity or by return springs.

Although conventional pumps can be summarized by the foregoing simple description they are in reality of relatively complex structure requiring several seal gaskets and generally a large number of sometimes complicated pieces which are in any event difficult to assemble.

The object of the invention is to provide a manually operated pump device for dispensing fluids which is composed of a small number of relatively simple components which can be obtained by moulding plastics material, and are easily assembled.

The pump according to the invention comprises a mobile member for pumping the fluid to be dispensed, said mobile member (9) being operationally connected to a trigger lever and cooperating with a fixed guide member, a ball suction valve, elastic return means and a delivery head (6), and is characterised by comprising a delivery valve comprising a gasket sealing against said mobile member and fixed member and acting as a counteracting member for said elastic return means.

The invention will be more apparent from the detailed description given hereinafter by way of non-limited example with reference to the accompanying drawings in which:

Figure 1 is a section through a first embodiment of the pump device; and

Figure 2 is a section through a detail of a second embodiment of the pump device.

The first embodiment of the pump device shown in Figure 1 comprises a hollow cylindrical handgrip 1 connected lowerly to a rotatable screw cap 3, a trigger lever 2, a delivery channel 4 and a delivery head 6.

The lever 2 is pivoted on supports 7 provided on the inner sides of a pair of parallel spaced-apart walls 7A connected to the handgrip 1.

Said trigger lever also comprises two arms 32 which pass through suitable apertures provided in the cylindrical wall of the handgrip 1 to cooperate with a collar 8 of a mobile cylinder 9 slidingly contained within said handgrip.

Said cylinder 9 slides along the walls of a fixed piston 10 and contracts lowerly into bottle-neck shape with a frusto-conical part 13 which when the trigger lever 2 is not operated rests on the lower collar of a ring 11. The end 12A of the neck engages with a dip-tube 12 which dips into the fluid to be dispensed. Within the chamber 22 defined by the cylinder 9 and piston 10 there are provided a suction valve 14, a gasket and a loading or return spring 17.

The suction valve 14 is a conventional ball valve which when in its rest position rests on the frusto-conical part 13 of the cylinder 9, its travel being limited by the turns of the spring 17.

The gasket 16 is substantially of cap shape comprising a diverging toroidal band 16A in contact with the inner lateral walls of the cylinder 9, a central step 16B externally in contact with the end of the piston 10, an upper step 16C in contact internally with the spring 17 and externally with ribs 24 provided radially on the inner wall of the piston 10, and a terminal conical hollow lip 34 which is thinner than the other portions and is cut radially along a longitudinal part to form a series of petals which when the device is not operated but is in the suction stage adhere to each other to seal the exit passage from the chamber 22. The loading spring 17 acts upperly against the gasket step 16C and lowerly against suitable radial ribs 18 provided on the inside of the cylinder 9.

The delivery head 6 is snap-fitted to an annular portion 26 at the end of the delivery channel 4 of variable inner section, and according to its position it either connects said channel 4, via a groove 32 and a fixed channel 40 in said annular portion 26, to one of the different-shaped orifices 31, 30 and 29, or prevents the fluid from leaving.

Figure 2 shows a second embodiment of the pump device.

Those components common to the first embodiment are indicated by the same reference numerals as in Figure 1. In the device of Figure 2, the cap-shaped gasket 16 terminates with a step 16C with a central hole, on the outside of which there rests a ball 42 restricted in its travel by a step provided on the ribs 43 disposed radially on the inner wall of the piston 10. The operation of the device shown in Figure 1 is as follows. On operating the trigger lever 2 the arms 32 engage under the collar 8 of the cylinder 9 to raise it and produce fluid emission from the delivery head 6 following mutual separation of the petals of the upper part 34 of the gasket 16.

More specifically, the ball 14 rests by gravity on the conical contraction 13 of the cylinder to hermetically close the passage towards the dip-tube 12. On operating the trigger lever 2, the cylinder 9 begins to rise and as its upward travel continues it

compresses the fluid in the chamber 22 which, on reaching a certain pressure, diverges the petals of the part 34 of the gasket 16, to then flow into the delivery channel 4 and from here through the delivery head 6 to the outside.

On completion of delivery the petals of the part 34 re-close elastically to form a seal.

On releasing the trigger lever 2 the cylinder 9 moves downwards urged by the spring 17, whereas, by the effect of the vacuum created in the chamber 22 and the movement of the cylinder 9, the ball 14 separates from the conical contraction 13 on which it rests, to thus open a passageway through which the fluid present in the suction tube 12 is drawn.

The movement of the ball 14 is limited by the turns of the spring 17.

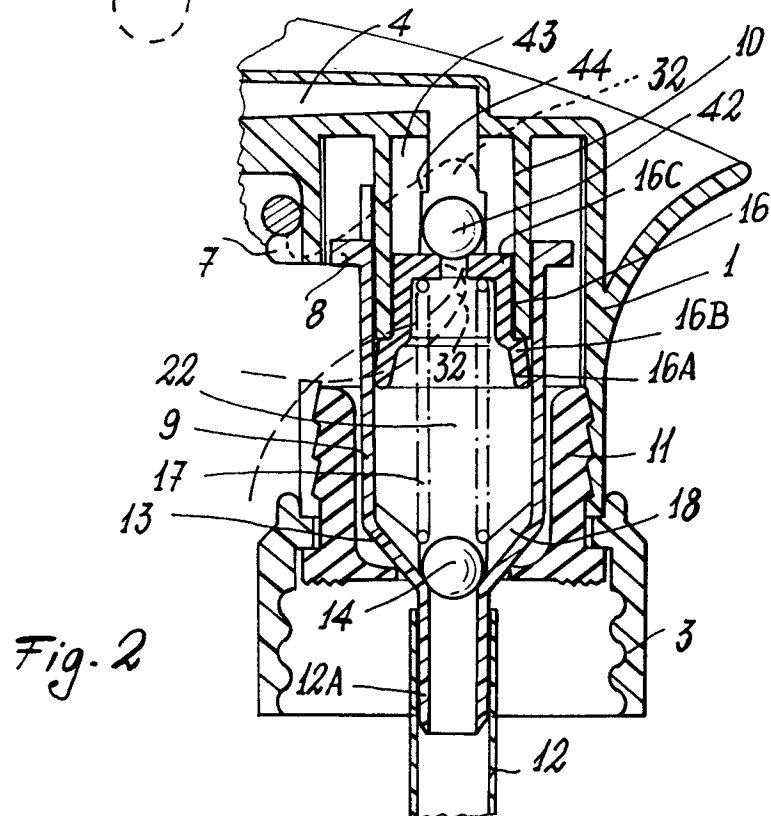
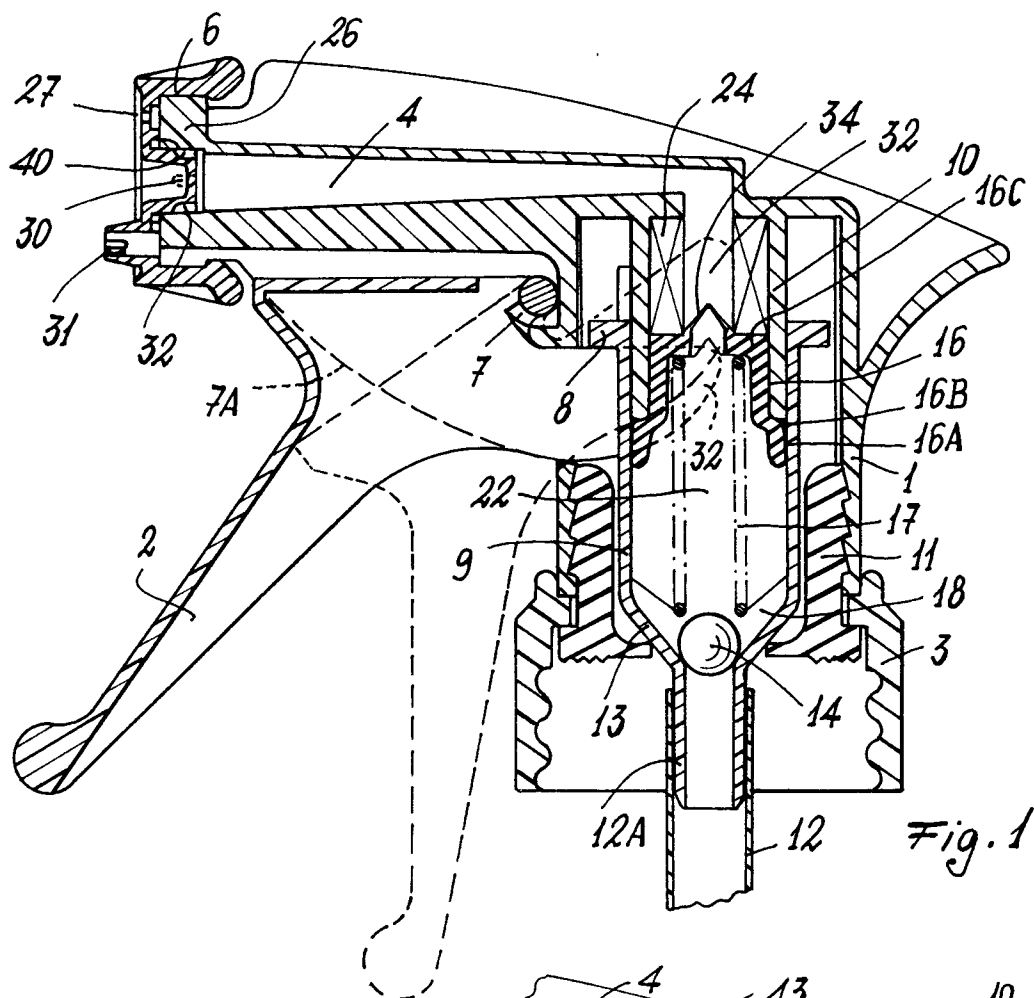
The operation of the second embodiment of the device differs from the first only in terms of the delivery stage, in that on reaching a given pressure the fluid raises the ball 42, to then flow into the delivery channel 4.

On completion of delivery the ball 42 returns to rest by gravity on the step 16C to form a seal. The travel of the ball 42 is limited upperly by the step 44 provided on the ribs 43.

4. A pump device as claimed in claim 3, characterised in that the travel of said ball (42) is limited upperly by steps (44) provided on ribs (42) situated on the inner surface of said fixed member (10).

Claims

1. A manually operated pump device for dispensing fluids from containers, particularly of the portable type for connection to said containers particularly by threaded ring nuts or capsules, comprising a mobile member (9) for pumping the fluid to be dispensed, said mobile member (9) being operationally connected to a trigger lever (2) and cooperating with a fixed guide member (10), a ball suction valve, elastic return means (17) and a delivery head (6), characterised by comprising a delivery valve comprising a gasket (16) sealing against said mobile member (9) and said fixed guide member (10) and acting as a counteracting member for the elastic return means.
2. A pump device as claimed in claim 1, characterised in that said gasket (16) itself acts as a valve, being provided with an end (34) arranged to diverge during the delivery stage and to form a seal during the suction stage.
3. A pump device as claimed in claim 1, characterised in that on said gasket (16) there acts a ball (42) which rises from a hole in the gasket during the delivery stage and seals against it during the suction stage.





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EUROPEAN SEARCH REPORT

Application Number

EP 91 10 5908

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0302994 (TADA) * column 8, line 34 - column 9, line 33; figure 1 *	1	B05B11/00
A	EP-A-0128585 (THE AFA CORPORATION) * abstract; figure 2 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B05B B65D
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 03 DECEMBER 1991	Examiner SMITH C.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			