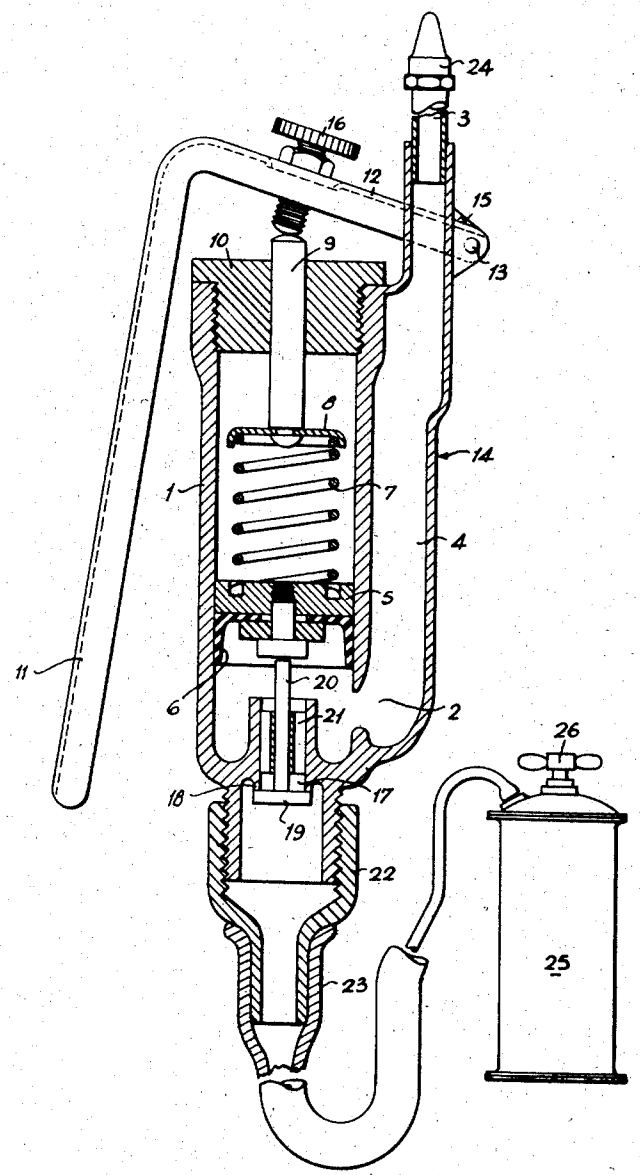
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SPRAYERS AND VALVES THEREFOR

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SPRAYERS AND VALVES THEREFOR

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1 Claim. (Cl. 137—495)

This invention has for an object to provide an improved valve device, more particularly for use in liquid sprayers in which the spraying liquid is discharged from a container by the pressure of a gas, for example air, by which the container is pressurised.

In the specification of British Patent No. 686,480 there is described a sprayer of this kind in which the pressure with which the spraying liquid is delivered to the spray nozzle or nozzles is automatically kept substantially constant, irrespective of the decrease of pressure in the container, by the discharge of liquid therefrom, by providing an automatic pressure-reducing valve in the liquid-delivery passage. In the embodiment described in the said specification a separate "on" and "off" valve is provided. With a knapsack sprayer provided with a hand lance, this "on"–"off" valve may be provided in the lance and comprise a stop-cock type of control or a trigger-operated control valve, the latter being in some cases equipped with a locking device by which the valve may be held in the open position while relieving the operator of the effort of continuously pressing the trigger.

The present invention provides an improved valve device in which a single valve element performs the functions of an automatic pressure-reducing valve and of a stop valve. According to the invention a spring-loaded pressure-reducing valve is combined with a handle-operated mechanism so constructed that when the handle is in one position, the spring load is removed from the valve so that the pressure of the liquid will close the valve, while by moving the handle to a second position the spring loading is restored to a predetermined set value. Preferably the spring means serving to load the valve is supported against a movable member which is operable from outside the valve housing by a handle, such as a trigger lever or a press button from a position in which the loading is nil to a preset-loading position in which further movement of the handle member is prevented by stop means. Preferably means are provided for altering the loading of the spring obtained when the handle member has been moved to the second position or up to the stop; for this purpose a set screw may be interposed between the handle member and the movable member, or alternatively the stop limiting the movement of the handle member may be made adjustable.

One embodiment of a hand lance incorporating an improved valve device according to the present invention is illustrated in the accompanying drawing, which is an axial section of the lance.

Referring now to the drawing, the lance body comprises a cylindrical sleeve 1 extending longitudinally of the lance, one end of which is open to the atmosphere while its other end opens into a pressure chamber 2 which communicates with a tube 3 leading to the sprayer nozzle 24 through a passage 4 extending along the outer side of the sleeve, the walls of said tube, sleeve, and pressure chamber being so shaped as to form a suitable hand grip portion 14 for holding the lance. A control piston

5 equipped with a cup washer 6 is slidably guided in the sleeve 1 so as to separate the pressure chamber 2 of the valve from the open end of the sleeve. A loading spring 7 is arranged in the sleeve 1, one end of this spring being centered at the back of the piston, while its other end bears against a thrust plate 8 riveted to a thrust pin 9 slidably extending through an axial bore of a screw-threaded plug 10 secured in the outer end of the sleeve 1. One end of an L-shaped handle member or operating lever 11, 12 is pivoted at 13 to a lug 15 on the lance housing so that the shorter limb 12 of the lever extends across the outer end of the sleeve 1 while its other limb 11 extends along the hand grip portion 14 so that it forms a trigger lever which can be grasped and pulled against the hand grip portion by the fingers of the hand holding the lance, this movement being limited by the lever striking the body of the lance. A set screw 16 extends through the limb 12 of the lever 11, 12 substantially co-axially with the thrust pin 9. When the limb 11 of the lever is pulled against the hand grip portion 14, the thrust pin 9 will be forced inwardly by the set screw 16 to compress the spring 7 to a predetermined loading, which may be adjusted by means of the set screw.

Arranged in the wall of the pressure chamber 2, opposite to the sleeve 1 and coaxially therewith, is a valve port 17 of smaller diameter than the bore of the sleeve 1, and having a valve seat 18. A poppet-type valve 19 cooperating with this seat bears against the piston 5 by a valve stem 20, the latter being equipped with fins 21 by which it is guided in the bore forming the valve port 17. The valve 19 may be made captive in the bore 17 in any convenient manner, for example by connecting its stem 20 to the piston 5. A screw-threaded hose-coupling collar 22 surrounds the valve seat 18 so that when a pressure hose 23 is attached to the collar 22 to connect it with a liquid container 25 (shown on a reduced scale) which is pressurised by a pump 26, the pressure of the liquid will act upon the valve 19 to close the latter so long as the spring 7 is not loaded. Accordingly the valve 19 will remain closed so long as the operating lever 11 is released. When the operator pulls the lever 11 against the lance body, a loading is applied to the spring 7 which will overcome the pressure of the liquid and open the valve 19, thus causing pressure to be built up in the pressure chamber 2 and liquid to be delivered through tube 3 to the spray nozzle. As soon as, due to the resistance of the nozzle, the pressure in the pressure chamber 2 reaches the value for which the device has been set, the action of the liquid in the pressure chamber upon the piston 5 will balance the spring loading and the valve 19 will move towards its closing position, thus throttling the flow of liquid from the container to the pressure chamber 2 to such an extent as to prevent further rise of the pressure in the chamber 2, whereafter the pressure in this chamber will be maintained substantially at the preset value irrespective of the fact that the pressure in the pressurised containers may gradually decrease as liquid is consumed.

It will be readily appreciated that the invention is not limited to the particular embodiment described. Thus for example, the coupling between the lever arm 12 and the thrust pin 9 or its equivalent may be non-adjustable while a set screw suitably arranged on the other arm of the lever 11, 12, or other adjustable stop means, may be provided for determining the end position to which the lever 11 may be pulled. Releasable locking means for the lever 11 or similar trigger member may be provided. The piston member 5 may be replaced by a diaphragm, and in general the construction of the valve may be modified in many ways known to those skilled in the

art without affecting the principle of operation of the invention.

I claim:

A hand spray lance, comprising an elongated lance housing formed with a hand grip portion, a pressure control chamber, an inlet connection adjacent one end of the housing, an outlet adjacent the opposite end of the housing, a valve port connecting said connection and control chamber and having a valve seat facing said connection, a valve element cooperating with said seat for normally closing said port when pressure is applied to said inlet connection, means for guiding said valve element for movement axially of said port, a cylinder formed in the housing and extending longitudinally thereof in substantial alignment with the valve port, one end of said cylinder communicating with said control chamber and its other end being open to the atmosphere, a piston member movable in said cylinder towards and away from the valve port, a compression spring arranged in said cylinder behind said piston, a substantially L-shaped trigger lever pivoted at one end to the housing so that one leg of the L extends transversely across the open end of the cylinder and the other leg extends alongside the grip portion whereby pivotal movement of the trigger lever will be produced when said other leg is moved, means for operatively coupling said lever and

said spring so that when the lever is released, the spring is unloaded, and when said other leg of the lever is moved towards the grip, the spring is loaded, said coupling means including adjustable means for regulating the amount of compression of said spring in response to movement of the lever and stop means for limiting the movement of the lever to load the spring.

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