Dec. 23, 1958 H. F. HICKS 2,865,541

SPRAYER

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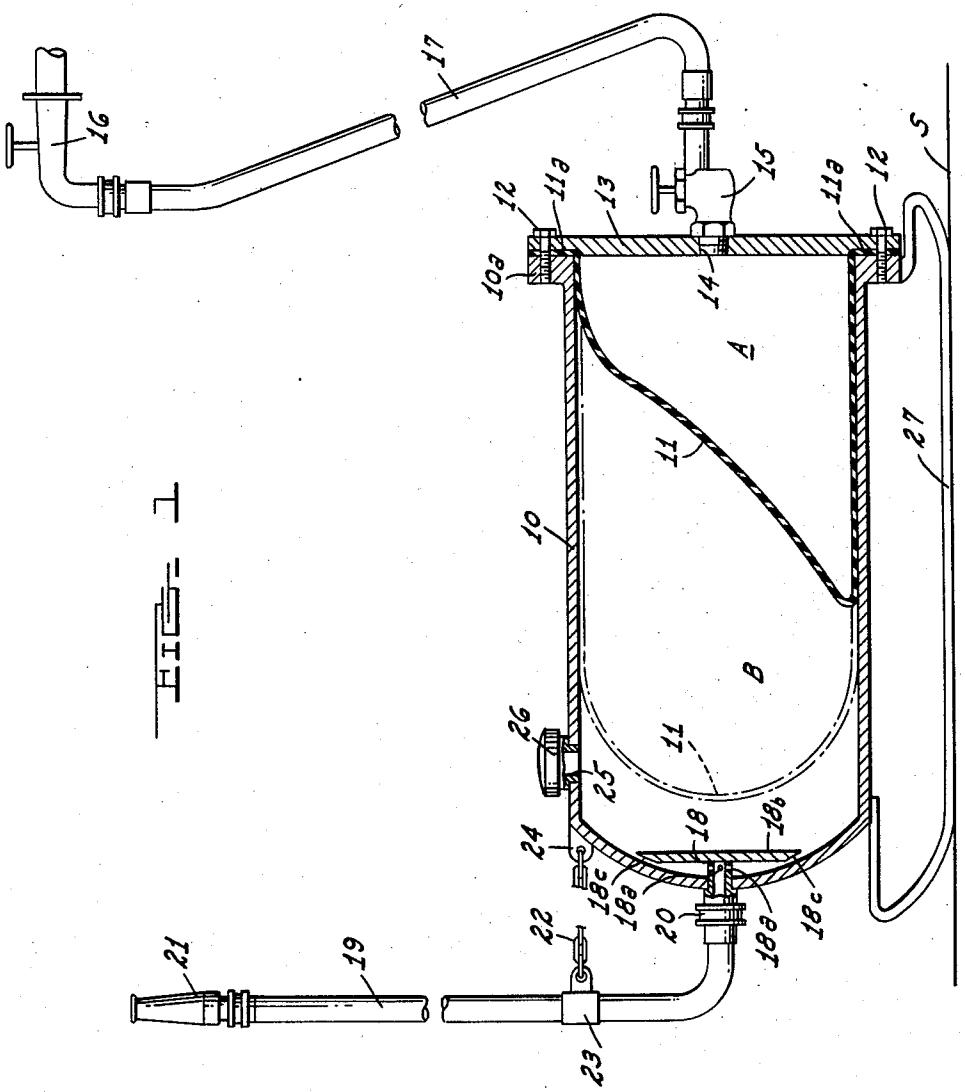

FIG. 1

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SPRAYER

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This invention relates to a sprayer for a fluid, and more particularly to an improved device for spraying aqueous solutions of poisons such as insecticides or bactericides onto various forms of plant life, such as trees, shrubbery, flowers, and the like which it is desired to protect.

Heretofore, spraying equipment designed for this purpose, particularly for home gardening, has been manually operated as by a hand pump and is bulky and rather heavy to carry about. The present sprayer utilizes a common power source to effect the spraying and therefore can be made smaller with resulting ease in transporting it. A further objection to prior sprayers where hand pumping is employed is that the pressure may vary throughout the stroke of the pump, especially at the beginning and ending of the stroke. Accordingly, the sprayed liquid often is not uniformly distributed with attendant waste. In the present sprayer, this problem also is obviated, and the spraying of the liquid is accomplished with substantially uniform pressure throughout the period of use of the sprayer.

An important object of the invention is to provide an improved form of fluid ejector which is operated by a convenient power source common to every home with a resulting saving in manual labor.

Another important object is to provide a sprayer of smaller bulk to facilitate its transportation from one work station to another, without needing to move the power source.

A further important object is to provide a sprayer which ejects or delivers a fluid under substantially uniform pressure, so that there is accurate and economical distribution of the fluid.

In carrying out the invention, an enclosure is used having an expansive diaphragm disposed within the enclosure to divide it into a pressure chamber or compartment and a discharge chamber. A fluid under pressure is admitted to the pressure chamber. Conveniently, the pressure chamber may be connected to a water system of a home at an outside valve and thereby utilize the pressure of that system. As a fluid fills the pressure chamber the expansible diaphragm extends along the enclosure increasing the volume of the pressure chamber and simultaneously decreasing the volume of the discharge chamber. In response to this action of the diaphragm, a fluid in the discharge chamber, which may be an aqueous solution of an insecticide, bactericide, or the like, is forced through an outlet in the discharge chamber and sprayed as desired as by a conventional hose and nozzle joined to the outlet.

If desired, the expansible diaphragm may be in the form of an elastic, open-ended bag which may also serve as the pressure chamber as hereinafter described. The discharge chamber may have a closable port through which the fluid to be sprayed is admitted. Runners attached to the enclosure facilitate its transportation and positioning at a work station.

Another object of the invention is the provision of means for agitating a fluid as it is discharged from the fluid storage chamber and for preventing the diaphragm from blocking the storage chamber outlet.

Various other objects, advantages, and meritorious features of the invention will become more fully apparent from the following description, appended claims, and accompanying drawing, wherein:

The figure is a side view of one embodiment of the present sprayer in which an enclosure is shown in longitudinal section.

Referring to the drawing, the embodiment disclosed includes an open-ended tank or enclosure **10** which may be composed of a light weight metal or a plastic of pleasing color. An open-ended elastic bag **11** made, for example, of rubber is inserted within the tank **10**, and the periphery **11***a* adjacent the open end of the bag overlies or abuts a flange **10***a* adjacent the open end of the tank. Bolts **12** secure a cover plate **13** to the flange **10***a* and effect a tight seal between the flange **10***a* and the periphery **11***a* of the bag.

The bag **11** effectively divides the tank **10** into two chambers or compartments. Chamber A acts as a pressure chamber; chamber B serves as an ejecting or discharge chamber, although as the description proceeds it will be apparent that the functions of the chambers might be reversed. In the embodiment illustrated, the open-ended bag **11** generally serves itself as the pressure chamber, since it is anchored at the open end of the tank **10**. But it will be appreciated that, if desired, the bag **11** could be secured at other points or stations along the tank **10**, for example at a medial part, so that the pressure chamber could include part of the tank **10** as well.

In order to effect the expansion or extension of the bag **11**, plate **13** has an outlet **14**. A valve **15** fitted to the inlet connects to another valve **16** by means of a standard rubber or plastic hose **17**. Valve **16** may be an outside spigot of a water system installed in a house, so that the present sprayer is most conveniently operated without any manual actuation whatsoever. The discharge chamber B, or tank **10** in the embodiment illustrated, has an outlet **18**, having outlet ports **18***a*, to which a standard rubber or plastic hose **19** is suitably connected by a fitting **20**. Hose **19** has a nozzle **21** for spraying the fluid ejected from chamber B, and stay means in the form of a chain **22** supports the hose **19** relatively to the tank **10** by joining a collar **23** on a section of the hose to a lug **24** fixed to the tank **10**. The discharge chamber B or tank **10** may have an opening **25**, normally closed by a cap **26**, through which a fluid to be sprayed may be admitted. Runners **27** secured to the tank **10** and extending longitudinally thereof may be readily grasped to carry the sprayer from one work station to another and also to facilitate the positioning of the sprayer at such stations as shown with respect to a support or surface, and also permit dragging the sprayer over the ground.

In a period of non-use, the bag **11** normally occupies a limp position as shown by the full lines in Fig. 1. With a fluid to be sprayed occupying the discharge chamber B valves **15** and **16** are opened to flow a fluid under pressure into the bag **11** or pressure chamber A. As the pressure in that chamber increases, the elastic bag extends along the tank **10** in a direction away from the plate **13** until a position such as that shown by the dot-dash lines is reached. Simultaneously with the increase in volume of the bag or pressure chamber A, there is a decrease in volume of the discharge chamber B due to the action of the extending bag **11**. This forces the fluid of the discharge chamber out the outlet **18** and hose **19** and through the nozzle **21** to a point of application. Since the rate

of expansion of the bag is substantially uniform, the expelling force is substantially of the same magnitude throughout the period of use of the sprayer, and the fluid is discharged at a substantially uniform force.

In order to agitate the fluid as it discharges from the chamber B, and to prevent the diaphragm 11 from blocking the outlet, I have provided a baffle plate 18*b* which is secured in any convenient fashion to the outlet fitting 18. The baffle may have a beveled marginal edge 18*c* lying closely adjacent the end wall of the enclosure, and the small annular passage between the end wall and the beveled edge sets up an agitation of the fluid as it passes therethrough. The flat face of the baffle plate extending radially outwardly to the beveled edge is abutted by the diaphragm as the latter nears its full expansion and holds the diaphragm away from the outlet ports 18*a*.

While the foregoing describes a presently preferred embodiment, it is understood that the invention may be practiced in other forms within the scope of the appended claims.

What I claim is:

1. A sprayer for a fluid including an open-ended tank, an open-ended expansible bag inserted in the tank, the peripheries adjacent the open-ended portions of the tank and bag abutting one another, a plate securing the abutting portions together and having an inlet, means to conduct a fluid under pressure through the plate inlet and into the bag to expand the bag in a direction away from the plate, said tank having an outlet, hose means joined to the outlet to conduct the fluid to be sprayed from the tank as the bag expands to force that fluid through the tank outlet under substantially uniform pressure, and

means extending across the tank outlet and spaced from the tank and having a portion disposed closely adjacent the tank to form a restricted passageway between said means and the tank communicating with the tank outlet and effecting an agitation of fluid discharged from the tank with such means preventing the bag from closing the tank outlet as the bag expands in said direction away from the plate.

2. The invention as defined in claim 1 characterized in that said means which extends across the tank outlet comprises a circular plate, a hollow boss secured to the center of the plate and received through the tank outlet, said boss provided with a plurality of radial apertures establishing communication through the wall of the boss between the interior of the tank and the interior of the boss, said apertures disposed between the inner wall of the tank and that surface of the plate opposing such wall, and the periphery of said plate disposed closely adjacent the wall of the tank to form said restricted passageway with the periphery shaped to conform to the surface of the tank.

References Cited in the file of this patent

UNITED STATES PATENTS

1,743,056	Whitacre	Jan. 7, 1930
1,768,186	Vnuk	June 24, 1930
2,097,985	Maryott	Nov. 2, 1937
2,513,455	Cornelius	July 4, 1950
2,731,297	Meyer	Jan. 17, 1956
2,735,589	Milster et al.	Feb. 21, 1956