

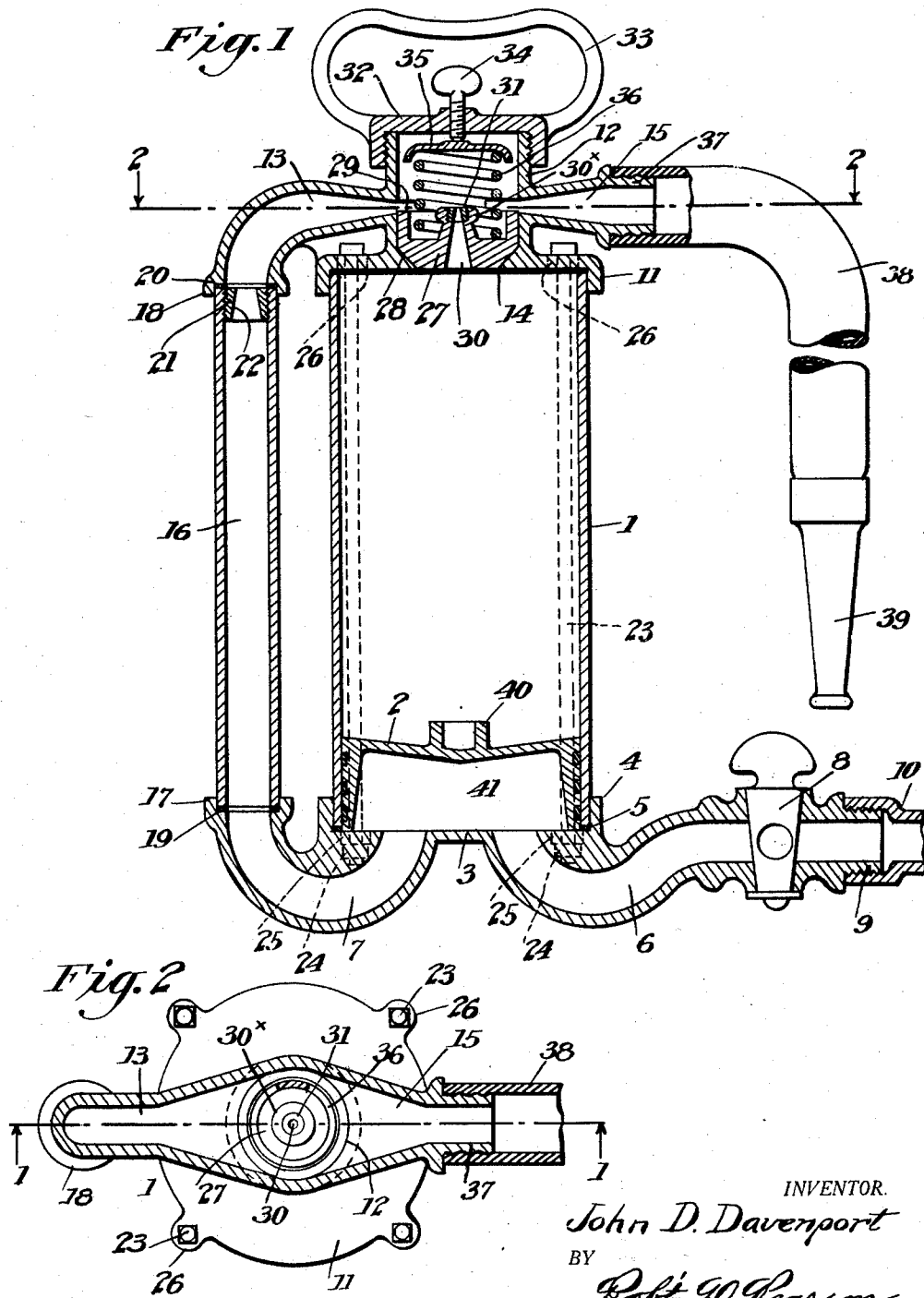
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HYDRAULIC SPRAYER

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HYDRAULIC SPRAYER

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This invention relates to mixers and sprays, and more particularly to a hydraulic mixer and spray for mixing liquids, such as germicides, disinfectants and the like, and spraying the same on trees, plants, live stock, poultry or any objects needing such treatment.

The general object of the invention is to provide a simple, efficient, light and portable mixer and spray of the character stated.

A more particular object is to provide a mixer and spray which requires no pump.

A further object is to provide a hydraulic mixer and spray which may be connected to a water service pipe and operated by the water service pressure line.

Other objects and advantages will appear hereinafter.

The invention is illustrated in the annexed drawing which forms a part of this specification and in which

Figure 1 is a vertical longitudinal section of my invention taken on line 1—1 of Figure 2.

Figure 2 is a horizontal section of my invention taken on line 2—2 of Figure 1.

Corresponding reference characters refer to the same parts in all the figures.

In the drawing 1 designates a cylinder which forms a receptacle for the liquid to be mixed and sprayed and 2 designates a piston mounted to move up or down in said cylinder. The lower end of the cylinder 1 is closed by a head 3 formed with an upstanding annular flange 4 which fits over the lower end of the cylinder, there being a gasket 5 between the lower end of the cylinder and said head. The head 3 is formed with an inlet 6 and an outlet 7, said inlet being controlled by a valve 8 and a threaded nipple 9 being formed on the outer end of the inlet 6 for connecting the inlet to a water service pipe 10. The upper end of the cylinder 1 is closed by a head 11 which is formed with a mixing chamber 12, a water inlet 13, an opening 14 leading into its lower end from the upper end of the cylinder, and a spray outlet 15. The inlet 13 and outlet 15 are restricted vertically and spread out horizontally at their junctures with the mixing chamber 12. A water pipe 16 connects at its ends to the out-

let 7 and the mixer inlet 13, the connecting ends of said outlet 7 and inlet 13 being flanged at 17 and 18 to fit over the lower and upper ends respectively of said water pipe, there being gaskets 19 and 20 between the ends of the water pipe 16 and the outlet 7 and inlet 13 respectively. In the upper end of the pipe 16 is screw seated an outlet ring 21, the inner diameter 22 of which is smaller than the inner diameter of the pipe 16 so as to cause a back pressure of the water in the lower end of the cylinder 1 to raise the piston 2 for the purpose hereinafter more fully described. The ring 21 may be removed from the pipe 16 and other rings of different inner diameters may be substituted to vary the back pressure in the cylinder. The heads 3 and 11 are detachably secured on the ends of the cylinder 1 and the outlet 7 and inlet 13 are detachably secured on the ends of the pipe 16 by bolts 23 and nuts 24, which bolts extend through eyes 25 and 26 on the heads 3 and 11 respectively. The inlet 13 and outlet 15 of the mixer chamber 12 are controlled by a valve 27 which seats in the lower end of said chamber on a seat 28 when the upper edge 29 of the valve rests below and uncovers and opens said inlet and outlet, (Figure 1). The valve 27 is provided with a port 30 leading centrally therethrough and converging upwardly and forming a jet 30°. In the upper end of said port is screw seated an outlet ring 31 which may be removed and other rings of different inner diameters substituted therefor to vary the jet of solution passing through the port 30 from the solution chamber 1 into the mixing chamber 12. The upper end of the mixing chamber 12 is closed by a head 32 which is screw seated thereon, there being a handle 33 formed on said head by means of which my mixer and spray may be carried about from place to place. A set screw 34 extends through and is screw seated in the head 32, the inner end of said screw bearing against a spring head 35, between which and the valve 27, is interposed a spring 36 for normally holding the valve on its seat and below the inlet 13 and outlet 15. By turning the screw the tension of spring 36 is varied to hold the valve on its seat with vary-

ing degrees of pressure. The mixer outlet 15 is formed with a nipple 37 on which is fitted one end of a hose 38 on the other end of which is fitted a spray nozzle 39. On the upper side of the piston 2 is formed a stud 40. The under side of the piston 2 is formed with a recess 41 to receive water from the inlet 6 and to permit water to pass from said inlet into the outlet 7 when the piston is in its lowermost position.

The removable jet pieces 31 are to be furnished in sets, each jet piece of the set being calibrated and of different gauge than its companions with respect to its orifice. The same is true of the outlet rings 21. Hence by using the desired size of jet piece in conjunction with the desired size of ring 21 the proportion between the chemical used and volume of water delivered may be varied in a definite dependable manner, which it would not be possible to do without a great deal of experimental adjustment, if at all, if adjustable valves were used in place of said rings and jet pieces.

The operation of my invention is as follows:

To fill the cylinder 1 with a germicide or other spray solution the head 32, spring 36 and valve 27 are removed from the mixing chamber 12 and the solution introduced into the cylinder through the chamber 12 and its opening 14 after said piston 2 has been pressed down to the head 3. The valve 27, and spring 36 are then replaced within the chamber 12 and the head 32 screw seated on the upper end of the mixing chamber. The water inlet nipple 9 is connected to a water service pipe 10. The valve 8 being opened water passes through the inlet 6, piston recess 41, outlet 7, pipe 16, mixer inlet 13 through mixing chamber 12 across the jet 30* and out through outlet 15, hose 38 and spray nozzle 39. The water passing through outlet ring opening 22 creates a back pressure which acts upon and raises the piston 2 in the cylinder 1 which forces the germicide solution up through port 30 and out of the jet 30* into the mixing chamber 12 into the path of the flattened stream of water passing from inlet 13 through the mixing chamber 12 and out through the outlet 15 and hose 38 whereby the solution is mixed in the said chamber and sprayed from the nozzle 39 onto the tree, plant, animal or other object. When the back pressure of the water has raised the piston to the top of the cylinder and forced all the solution out of the cylinder through port 30 the stud 40 on the piston engages the valve 27 and raises the same against the tension of spring 36 until the valve closes the inlet 13 outlet 15 and shuts off the spray.

Having described my invention I claim:

1. A mixer and spray comprising a solution cylinder, a piston in said cylinder above which solution is placed, the lower end of

said cylinder being formed with an inlet and an outlet, a mixing chamber on the upper end of said cylinder provided with an inlet and an outlet, a pipe connecting the cylinder outlet and the inlet of the mixing chamber, a valve in said mixing chamber provided with a port leading from the upper end of said cylinder into said mixing chamber, means for restricting the passage in said pipe to provide a back pressure in the lower end of said cylinder to raise the piston and force solution from the cylinder through said port into the mixing chamber when water under pressure is allowed to pass through said cylinder inlet, the lower end of the cylinder, cylinder outlet, said pipe, said mixing inlet, mixing chamber and mixing outlet, whereby the solution is mixed in said chamber and forced out through said mixing chamber outlet, a spring for normally holding said valve below said inlet and said outlet of said mixing chamber, and means on said piston for engaging said valve and moving it against the tension of said spring to close the inlet and outlet of said mixing chamber when all the solution in said cylinder is forced therefrom.

2. A mixer and spray comprising a solution cylinder, a piston in said chamber above which solution is placed, the lower end of said cylinder being formed with an inlet and an outlet, a mixing chamber on the upper end of said cylinder provided with an inlet and an outlet, a pipe connecting the cylinder outlet and the inlet of the mixing chamber, a valve in said mixing chamber provided with a port leading from the upper end of said cylinder into the mixing chamber, means for restricting the passage in said pipe to provide a back pressure in the lower end of said cylinder to raise the piston and force solution from the cylinder through said port into the mixer chamber when water under pressure is allowed to pass through said cylinder inlet, the lower end of the cylinder, and cylinder outlet, whereby the solution is mixed in said chamber and forced out through said mixing chamber outlet, said mixing chamber being provided with an opening leading therefrom into said cylinder, means for removably mounting said valve in said chamber for normally closing said opening, and a removable closure member for said mixing chamber.

3. A mixer and spray comprising a solution cylinder, a piston in said chamber above which solution is placed, the lower end of said cylinder being formed with an inlet and an outlet, a mixing chamber in communication with the upper end portion of said cylinder provided with an inlet and an outlet, a pipe affording fluid communication between the cylinder outlet and the inlet of the mixing chamber, a valve in said mixing chamber provided with a port leading from the upper end of said cylinder into the mixing cham-

ber, means for restricting the passage in said
pipe to provide a back pressure in the lower
end of said cylinder to raise the piston and
force solution from the cylinder through said
5 port into the mixer chamber when water
under pressure is allowed to pass through
said cylinder inlet, the lower end of the cyl-
inder, and cylinder outlet, whereby the solu-
tion is mixed in said chamber and forced out
10 through said mixing chamber outlet, said
mixing chamber being provided with an
opening leading therefrom into said cylinder,
means for removably mounting said valve in
said chamber for normally closing said open-
15 ing, and a removable closure member for said
mixing chamber.

In testimony whereof I hereunto affix my
signature.

JOHN D. DAVENPORT.