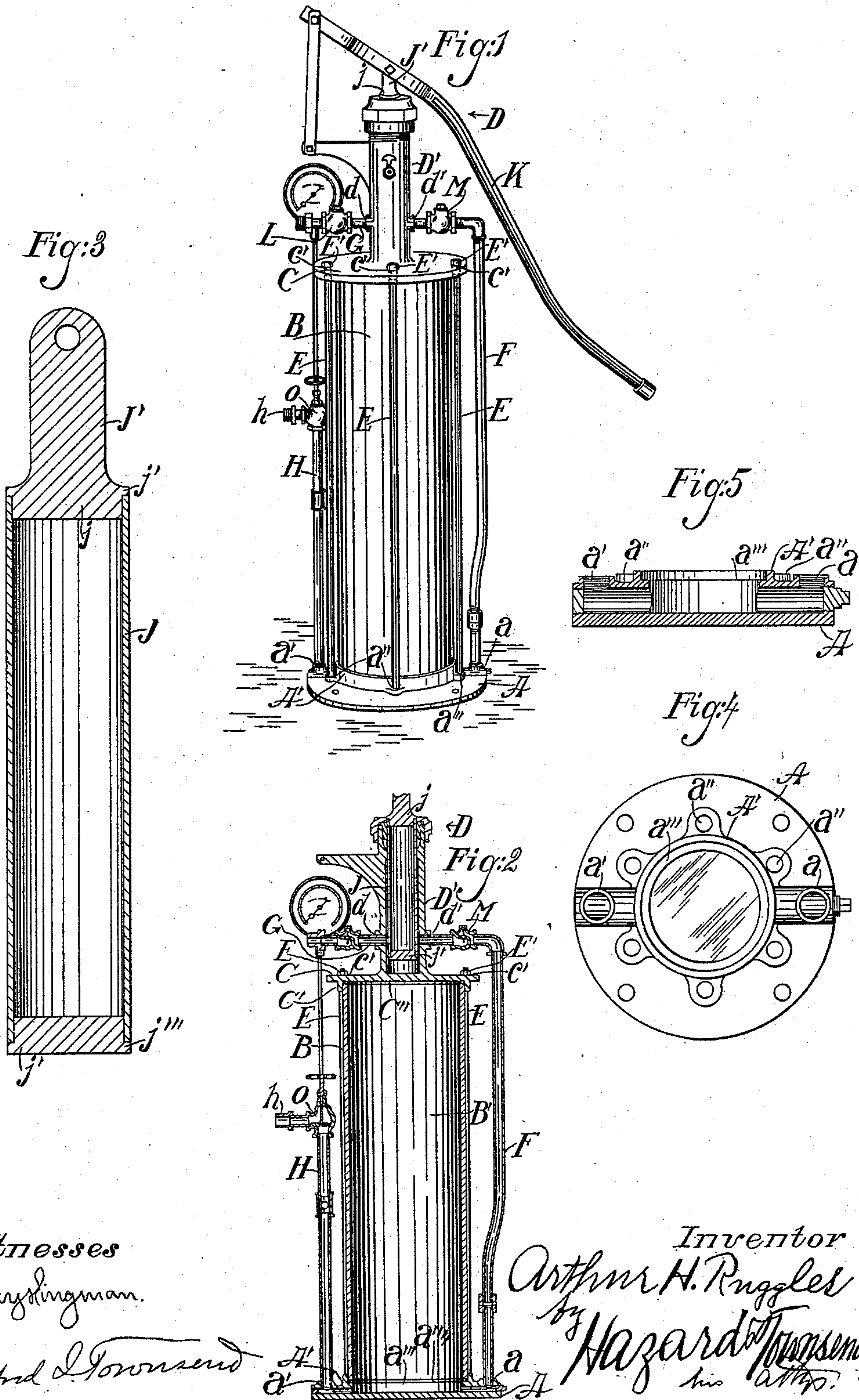


(No Model.)

A. H. RUGGLES.  
SPRAYING MACHINE AND PLUNGER THEREFOR.

No. 578,902.

Patented Mar. 16, 1897.





# UNITED STATES PATENT OFFICE.

ARTHUR H. RUGGLES, OF LOS ANGELES, CALIFORNIA.

## SPRAYING-MACHINE AND PLUNGER THEREFOR.

SPECIFICATION forming part of Letters Patent No. 578,902, dated March 16, 1897.

Application filed February 4, 1896. Serial No. 578,017. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR H. RUGGLES, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Spraying-Machines and Plungers Therefor, of which the following is a specification.

In Southern California, and in fact all fruit-producing countries, fruit-trees are subject to depredations from scale and various insects which destroy the vitality of the tree or prey upon the fruit borne thereby. One of the most common remedies for this has been by spraying the trees with solutions and fluid compounds containing various ingredients and by means of pressure forced through fine nozzles and discharged among the branches and leaves of the trees in very fine fog-like spray. In the case of large orchards the expense of performing this operation is considerable, and heretofore, owing to the construction of the machine for spraying, the difficulty, expense, and labor have been in excess of what is necessary with my improved machine.

The objects of my invention are to produce a machine of this class which will be very simple in its construction and inexpensive to manufacture, one which will be of the utmost compactness and rigidity, so that it will not be liable to become broken or get out of order, and one which may be easily moved by one person from place to place when desired.

The accompanying drawings illustrate my invention.

Figure 1 is a perspective side elevation of a spraying-machine embodying my invention. Fig. 2 is a fragmental longitudinal vertical section of the same. Fig. 3 is a longitudinal vertical section of my improved plunger for the pump. Fig. 4 is a plan view of the base or bottom of the device, and Fig. 5 is a cross-section of the same.

In the drawings, A represents a base or bottom which is provided with an annular upwardly-projecting flange A', which is provided with a shoulder a'', which is arranged to seat the lower end of the air-chamber cylinder B. Through this flange and below the shoulder extend an inlet-port a and an outlet-port a',

which respectively open into and lead from the bottom of the chamber B' of the cylinder B. By this means I avoid the necessity of drilling outlet and inlet ports through the cylinder and the consequent difficulty of causing them to register with the ports through the flange.

C is a cap or top which is provided with a downwardly-projecting flange C', which is arranged to seat upon the upper end of the cylinder B. Rigidly fixed to this cap is the cylinder D' of the pump D, which is arranged to pump fluid (or air, as the case may be) into the chamber B'. This pump has its cylinder D' preferably cast integral with the cap C, so that thereby the expense of manufacture is greatly reduced and the absolute rigidity of the connection between the pump and the cap is insured. The base A and the cap C are connected with each other by means of connecting rods or bolts E, which have their lower ends arranged to screw into screw-threaded opening a'', provided in the base, and to pass through holes c', drilled through the cap C and nuts E', screwed upon the bolts, to clamp the base and the cap firmly against the ends of the cylinder B. By this means I am enabled to make the base very light and thin and yet secure great strength and avoid objectionable projection of the bolts beyond the face of the base.

The pump D is provided with an inlet-port d and an outlet-port d'. The outlet-port d' of the pump is connected with the inlet-port a of the chamber B' by means of a connecting-pipe F. The inlet d of the pump is provided with a short section of pipe G, to which is ordinarily secured a length of hose which is adapted to supply to the pump the liquid to be sprayed. The outlet-port a' of the chamber B' is provided with a discharge-pipe H, which is provided with a nipple h, whereto may be secured the hose ordinarily employed in spraying.

The ordinary operation of producing a pump-plunger for force-pumps is to turn such plunger to fit truly within the opening in which it is to be reciprocated. This is very expensive and greatly increases the cost of spraying-machines. I have devised means whereby I am enabled to make the plunger



out of ordinary drawn-brass tubing and to so arrange it that it will withstand all the pressure which can be brought to bear upon it. It is well known that a cylinder will stand an immense amount of pressure if the pressure is applied evenly upon all parts of the outside of the cylinder. This is the case with pump-plungers of this class, but the weak point is at the ends thereof, where the connection must be very rigid and strong in order to withstand the great force which is brought to bear there-against.

My improved plunger consists of a length of drawn tubing J, having each end closed by means of a metal plug  $j j'$ , respectively, each arranged to fit within one end of the plunger and each provided with a shoulder  $j'' j'''$ , respectively, arranged to rest against the ends of the plunger, to thereby support the thrust against the plunger-caps. The plugs are brazed or otherwise secured in the ends of the tube, as shown in Fig. 3, and the plug  $j$  is provided with an upwardly-projecting ear  $J'$ , to which is secured the pump-handle K.

Suitable valves L, M, and O are provided to control the flow of liquid through the various passages.

In practice the cylinder B is made of a single length of lap-welded metal pipe cut into suitable length, and the base A is formed of cast metal, with the ports  $a a'$  cored out therein. The cap C is also cast from metal, preferably with the pump-cylinder D integral therewith. To assemble the parts, a suitable packing  $a''''$  is placed in the base-seat formed by the flange  $A'$ , and a packing  $C''$  is placed in the seat formed by the flange  $C'$  of the cap member, and the cylinder is then arranged in position with its ends seated in the base-seat. Then the cap C is placed with its seat embracing the upper end of the cylinder, and the connecting or tie bolts E are then passed through suitable openings  $c'$ , provided in the projecting rim of the cap and are screwed into suitable screw-openings  $a''$ , provided in the base. These openings are not illustrated in detail for the reason that the construction will be clearly understood by those versed in the art.

When the various parts are assembled, by operating the pump liquid is drawn through the inlet-pipe  $d$  and discharged through the outlet-port  $d'$ , passing through the pipe F and entering the bottom of the chamber B' through the inlet-port  $a$ . It will be understood that the valve controlling the discharge-pipe leading from the chamber B' is closed until sufficient liquid has been pumped into the chamber B' to cause compression of the air therein sufficient to force the liquid through the discharge-pipe and through the spray-nozzle to produce a fine spray. In case a heavy pressure is required the pump is first operated to pump air into the chamber B', so that the pressure in the chamber is considerable before any liquid is forced thereinto. By this means sufficient pressure can be caused

within the air-chamber to force from the chamber and to finally spray all the liquid contained in the chamber.

The operation of spraying is proceeded with in the ordinary manner, the base A serving as a support for the entire device. By reason of its compactness, when it is desired to move the machine one man can easily carry it from one place to another. This is not possible with any other machine of equal capacity of which I am aware; also, owing to casting the pump-cylinder integral with the cap there is no liability of the parts working loose, and the very highest degree of rigidity is obtained at a minimum cost.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination set forth of the base provided with the annular base-seat and with the inlet-port and the outlet-port, each passing through the base and opening inside the base-seat; the air-chamber arranged with its lower end seated in the base-seat; the top or cap provided with the seat arranged to seat the top of the cylinder and seated upon such cylinder; the pump rigidly fixed to the cap and provided with the inlet and the outlet ports; a pipe arranged exterior to the cylinder and connecting the outlet-port of the pump with the inlet-port of the base; a discharge-pipe leading from the outlet-port of the base; a supply-pipe leading to the inlet-port of the pump, and suitable valves arranged to control the various passages.

2. In a spraying-machine, the combination of the cast-metal base having the upwardly-projecting annular flange provided with the shoulder arranged to seat the bottom of the air-chamber cylinder, and having the inlet-port and the outlet-port passing through the flange below the shoulder; the air-chamber cylinder having its lower end seated upon the shoulder of the base-flange; the cap provided with a downwardly-projecting flange arranged to seat the upper end of the air-chamber cylinder, and having the pump-cylinder cast integral therewith; the packing arranged in the cylinder-seats; the pump having the inlet and the outlet ports; the pipe connecting the outlet-port of the pump with the inlet-port of the base; a discharge-pipe leading from the outlet-port of the base; a supply-pipe leading to the inlet-port of the pump; valves arranged to control the various passages; and the bolt-rods arranged to connect the base and the cap and to clamp them firmly upon the ends of the air-chamber cylinder.

3. In a spraying-machine, the combination of the cast-metal base having the upwardly-projecting annular flange provided with the shoulder arranged to seat the bottom of the air-chamber cylinder, and having the inlet-port and the outlet-port passing through the flange below the shoulder, and also provided with the screw-threaded openings arranged



in the base outside of the flange; the air-chamber cylinder having its lower end seated upon the shoulder of the base-flange; the cap, provided with the downwardly-projecting flange arranged to seat the top of the air-chamber cylinder, and having the pump-cylinder cast integral therewith, and also provided with the bolt-holes arranged outside of the flange; the packing arranged in the cylinder-seats; the pump having the inlet and the outlet ports; the pipe connecting the outlet port of the pump with the inlet-port of the base; a discharge-pipe leading from the outlet-port of the base; valves arranged to control the various passages; the bolt-rods having their lower ends screwed into the screw-threaded openings in the base, and their upper ends passed through the bolt-holes in the

cap, and the nuts screwed upon the ends of the rods to clamp the base and the cap firmly against the ends of the cylinder. 20

4. In a pump, the plunger formed of drawn tubing having each end closed by means of a solid metal plug arranged to fit within the end of the plunger and provided with a shoulder arranged to fit against the end of the plunger, one plug being provided with an upwardly-projecting ear, the plug and the tube being rigidly connected with each other by brazing or other suitable means, substantially as set forth. 25 30

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Witnesses:

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