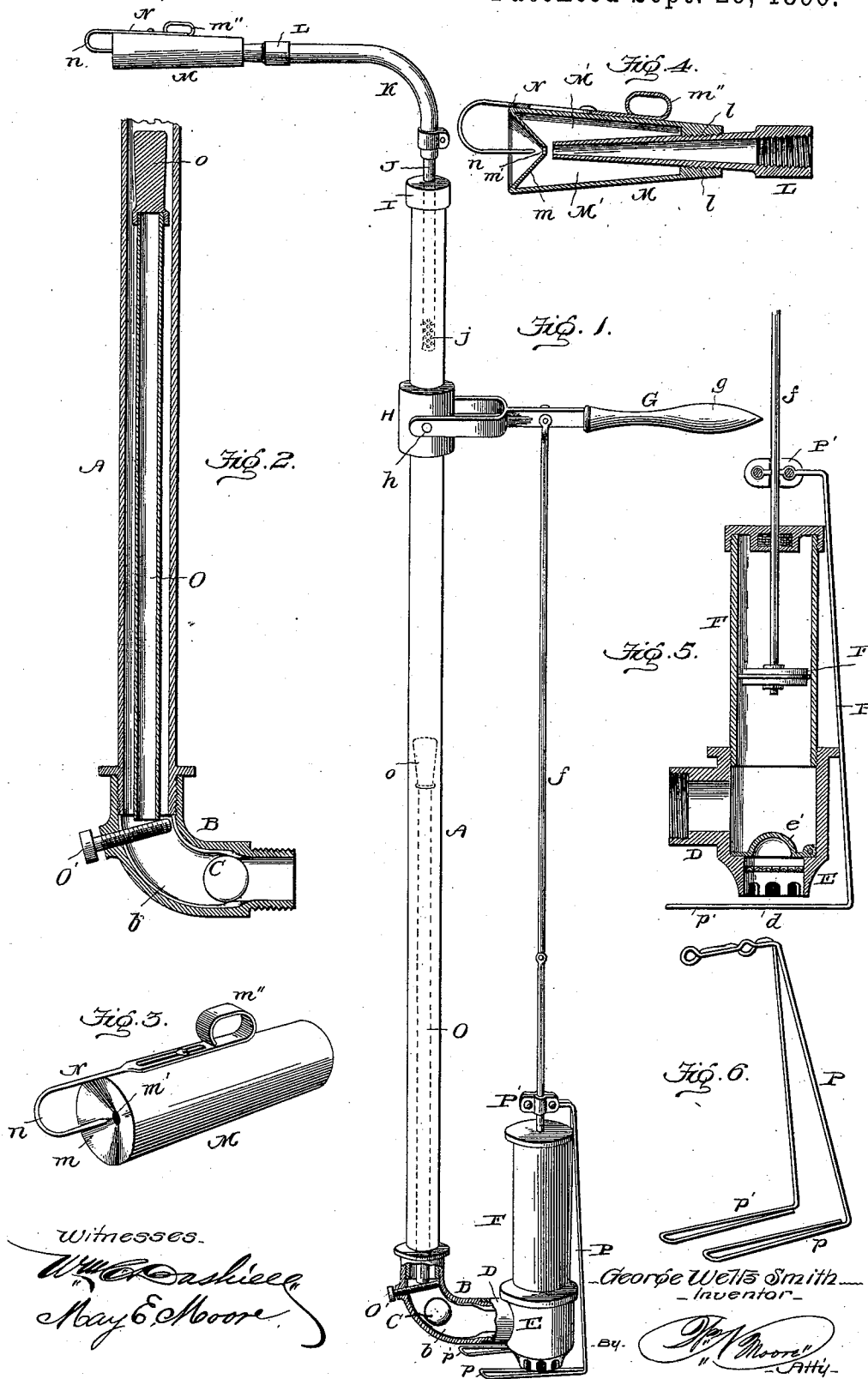


(No Model.)

G. W. SMITH.
FORCE AND SPRAY PUMP.

No. 568,462.

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UNITED STATES PATENT OFFICE.

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FORCE AND SPRAY PUMP.

SPECIFICATION forming part of Letters Patent No. 568,462, dated September 29, 1896.

Application filed September 12, 1895. Serial No. 562,321. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WELLS SMITH, a citizen of the United States, residing at Union City, in the county of Randolph and State of Indiana, have invented certain new and useful Improvements in Force and Spray Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in force and spray pumps; and the objects in view are to provide an improved pump in which the stream will issue from the nozzle very steadily and uniformly, which can be readily adjusted to convert the stream into either a spray or a solid stream, and which may be used for distributing paris-green upon plants or trees.

With these and such other ends in view as pertain to my invention the first part of the invention consists in the combination, with a stand-pipe which carries the nozzle and a plunger operating in a forcing-cylinder, of a floatable air-tube loosely arranged within the stand-pipe and adapted to be charged with air to render it buoyant, said floatable tube being provided with a weighted closed upper end, and said floatable tube being of less diameter than the stand-pipe within which it is disposed, so as to permit of the free flow of water through the stand-pipe.

The invention further consists in the combination, with an ordinary tapered nozzle, of a spray-nozzle attachment consisting of a conical body having its smaller end threaded to screw upon the ordinary nozzle, and said conical body having at its larger end a centrally-perforated head, combined with an adjustable regulator slidably fitted on the conical body and having an arm adapted to be adjusted toward and into the central opening in the head of said body, whereby the conical attachment is adapted to cause the liquid to issue in a spray which can be regulated by adjusting the slidable regulator.

The invention further consists in the combinations of devices and in the novel construction and arrangement of parts which will be hereinafter fully described and claimed.

To enable others to understand my inven-

tion, I have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is an elevation, partly in section, of a force-pump embodying my invention. Fig. 2 is a detail sectional view of the lower part of the pump, showing the floatable air-tube therein. Fig. 3 is a detailed view of the attachable spray-nozzle, and Fig. 4 is a view of the spray-nozzle applied to the ordinary nozzle. Fig. 5 is a detail view of part of the forcing-cylinder, the piston, and the agitator attached to the piston; and Fig. 6 is a detail view of the agitator detached from the piston.

Referring to the drawings, in which like letters of reference denote corresponding parts in all the figures, A designates the stand-pipe, which may be made of an ordinary piece of tubing in one or more lengths suitably attached together. To the lower end of this stand-pipe A is screwed an elbow B, which is lined interiorly with a soft-metal lining *b*, preferably of copper, to form a seat for the ball check-valve C, the latter being arranged to play loosely in the elbow. This soft-metal lining *b* serves to contract the internal diameter of the end of the elbow where it is coupled to the piston-cylinder, and the valve C is of such diameter that it works loosely in the elbow and will fit to the reduced seat formed by the soft-metal lining, thus closing the connection between the piston-cylinder and the stand-pipe. When the valve is forced away from its seat by the inflow of liquid, it leaves sufficient space between its surface and the elbow for the liquid to pass freely by and around it. To the other end of this elbow is screwed a nipple D, which connects to the casting E, the latter having a strainer *d* at its lower end and provided with a hinged check-valve *e'*. To the upper end of this foot-casting E is screwed the pump-barrel F, in which operates the packed piston F', the latter having a piston-rod *f* suitably secured to the same. This piston-rod *f* extends a suitable distance upwardly alongside of the stand-pipe, and the upper end of this rod *f* is pivoted to a hand-lever G, which is provided with a handle *g* for its convenient manipulation. This lever G has a forked end which straddles or embraces a collar H, that is fitted on the stand-

pipe, and this collar is adjustably clamped to the stand-pipe by means of the set-screws *h*, two of which screws pass through the forked end of the lever and through threaded openings in the collar to bind against the stand-pipe, whereby the two screws serve the two-fold purpose of forming the fulcrum for the hand-lever and of assisting in clamping the collar adjustably to the stand-pipe.

The upper end of the stand-pipe *A* is closed by means of the head or cap *I*, in an opening in which is fitted the reducer-pipe *J*. The inner end of this reducer-pipe is extended a suitable distance into the stand-pipe, and the inner end of said pipe *J* is closed in a suitable way and provided with the openings *j*, through which the liquid may pass from the stand-pipe into the reducer-pipe. To the upper end of said reducer-pipe is coupled a section or short length of hose or tubing *K*, and to the other end of the hose or tubing *K* is coupled the ordinary nozzle *L*. This nozzle is adapted to throw or project a solid stream of liquid when the piston is operated in the barrel; but by attaching my spray-nozzle *M* to the ordinary nozzle *L* the stream may be changed into a spray and this spray may be of regulated fineness.

To adapt my spray-nozzle to be used on the nozzle *L*, the latter has an external screw-thread *l* cut thereon at an intermediate point of its length, and to this threaded part of the nozzle *L* is screwed the inner threaded end of the cylindrical spray-nozzle. The ordinary nozzle *L* is made of tapering form, as shown, while the spray-nozzle is made cylindrical, or substantially so, in order that when the spray-nozzle is screwed to the ordinary nozzle an air-chamber *M'* is formed by and between the tapered ordinary nozzle *L* and the cylindrical spray-nozzle *M*. The outer or free end of the ordinary nozzle *L* terminates within the spray-nozzle and discharges through the air-chamber *M'*, and this spray-nozzle is provided with a conical head *m*, in which is produced a central outlet-orifice *m'*, the axis of which is in alinement with the axis of the ordinary nozzle, whereby the stream issuing from the nozzle *L* and passing through the centrally-perforated head in the nozzle *M* is converted into a spray. The fineness of this spray may be regulated by the adjustable rod or stem *N*, which has a straight part slidably supported on the outside of the nozzle *M*, and bent or provided with an angular or curved arm *n*, that is extended or projected inward toward the central orifice in the head of the spray-nozzle, as shown. This adjustable regulator-rod is equipped with a handle *m''*, which may be grasped for the purpose of adjusting the rod, and by drawing said rod backward so that its angular or bent end will approach the central orifice *m'* the rod is adapted to break up the spray and regulate the fineness thereof according to the position of the rod with re-

lation to the discharge-orifice *m'* in the head of the spray-nozzle.

In order to regulate the flow of the liquid through the stand-pipe so as to produce a steady uniform stream or current, I have devised the floatable air-tube *O*, which consists of a suitable length of tubing of less diameter than the stand-pipe. This floatable air-tube has its upper end closed and weighted by the cap or head *o*, while the lower end of said tube is open for the free ingress of air. This tube *O* is fitted loosely within the stand-pipe, and it is adapted to play freely therein in a vertical direction. Said floatable air-tube is adapted to be lifted by the pressure of the outgoing stream from the barrel of the pump, and its weight pressing upon the column of liquid in the stand-pipe insures uniformity and steadiness in the stream or column of liquid. The upward movement of the floatable air-tube is limited by its upper end abutting against the lower end of the fixed reducer-pipe, while the descent of the air-tube *O* is limited by means of the screw *O'*, which is supported in the elbow *B* between the air-tube and the ball-valve, so that the air-tube when it is lowered will not interfere with the free action of the ball-valve.

My pump may be used for sprinkling par-green upon the trees, growing plants, &c., and when the pump is to be used for this purpose the foot-casting *D* and the barrel *E* are to be placed in a vessel containing the solution to be sprayed. To prevent the solution from settling and forming a sediment, I have provided the agitator *P*, which is formed of steel wire bent to form the upright shanks and the angular feet, (indicated by the letters *pp'*, respectively, in Fig. 6.) The upper ends of the shanks *p* are fitted in a clamp *P'*, which is fastened to the piston-rod *f*, and the legs of the agitator straddle the pump-barrel and extend well down toward the bottom of the receptacle, so that as the piston and rod are operated to force the liquid through the pump-barrel and stand-pipe the agitator is reciprocated with the piston to stir up the contents of the receptacle.

It is thought that the operation and advantages of my invention will be readily understood from the foregoing description, taken in connection with the drawings.

I am aware that changes in the form and proportion of parts and in the details of construction herein shown and described as an embodiment of my invention may be made by a skilled mechanic without departing from the principle of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a stand-pipe, and a piston-cylinder, of the elbow *B* coupled to the cylinder and stand-pipe and having a seat, a ball-valve fitted in said elbow, a floatable air-pipe arranged loosely in the stand-pipe, a stop-screw *O'* fitted in the elbow at a

point between the air-pipe and the valve, to
limit the descent of the air-pipe and the as-
cent of the ball-valve, and a reducer-pipe J
extending into the upper end of the stand-
5 pipe and having its inner perforated end *j* in
the path of the closed end of the air-pipe, to
limit its ascent in the stand-pipe, as set forth.
2. The combination with a piston-cylinder,
and a piston-rod, of the agitator bent from a
10 single length of wire to embrace the piston-
rod and form the diverging branches having

the angular feet; the head of said agitator
being connected to the piston-rod by a clamp,
and the diverging branches and feet of the
agitator arranged to play on opposite sides of 15
the piston-cylinder, as set forth.

In testimony whereof I affix my signature
in presence of two witnesses.

GEORGE WELLS SMITH.

Witnesses:

O. C. GORDON,
P. A. TAYLOR.