

J. ZWICKY.
PUMP FOR PLANT SPRAYING APPARATUS.
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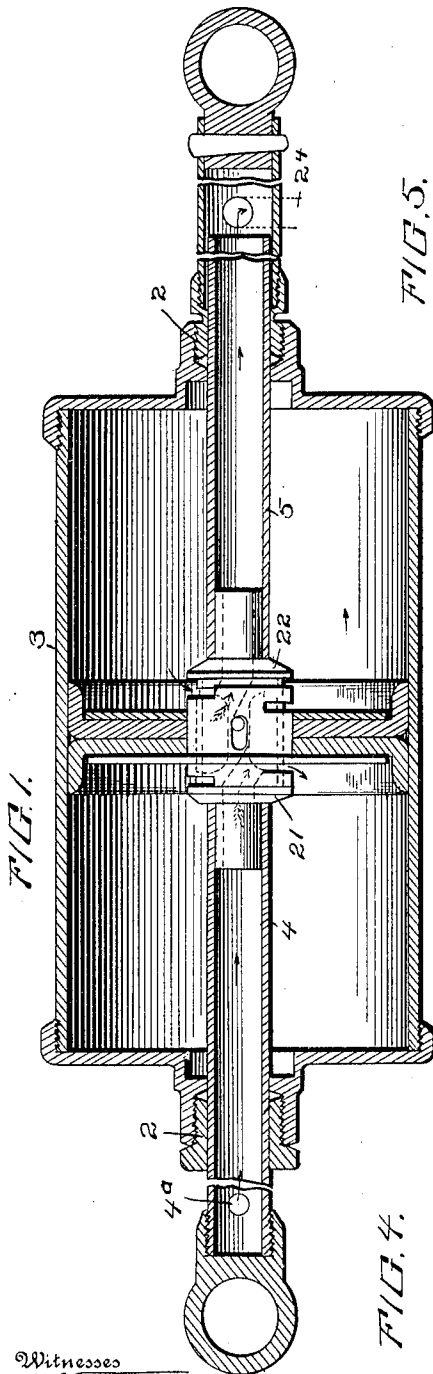


FIG. 4.

FIG. 5.

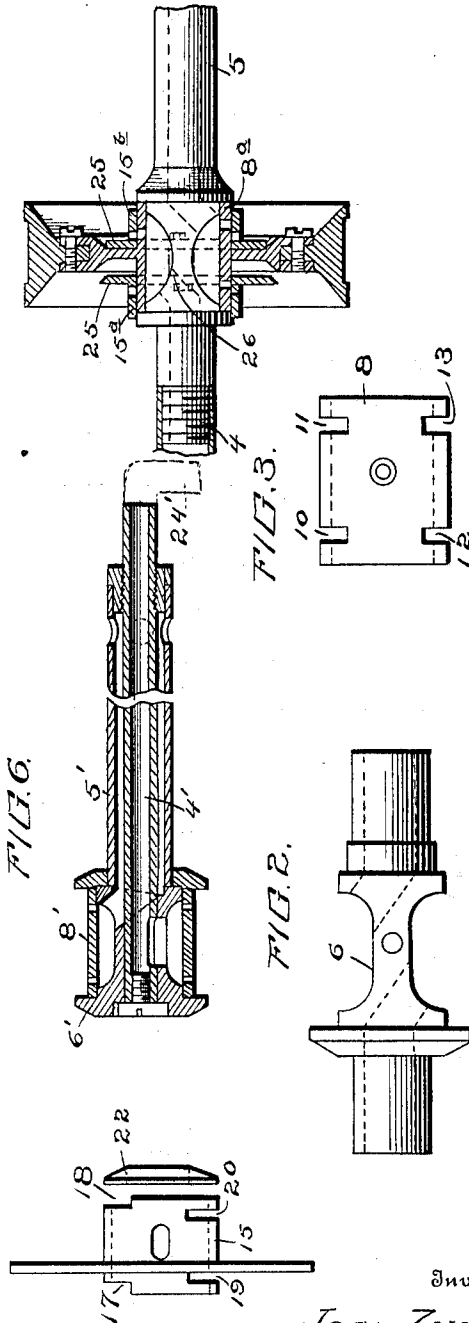


FIG. 2.

FIG. 3.

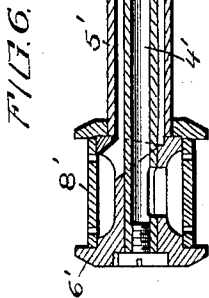
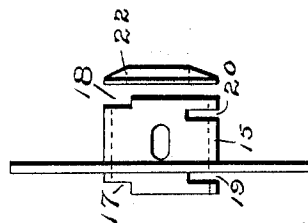


FIG. 6.



Witnesses
R. S. Trognor.
Andrew Smith.

Inventor
Jean Zwicky.

Eugene C. Brown
Attorney

UNITED STATES PATENT OFFICE.

JEAN ZWICKY, OF SOUTH TOTTENHAM, ENGLAND.

PUMP FOR PLANT-SPRAYING APPARATUS.

1,048,264.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JEAN ZWICKY, a citizen of the Republic of Switzerland, residing at 66 Chester road, South Tottenham, in the county of Middlesex, England, engineer, have invented new and useful Pumps for Plant-Spraying Apparatus, of which the following is a specification.

This invention relates to improvements in pumps and is more particularly intended for use in powder distributing apparatus, although it is also adapted for other purposes.

I have devised a pump which is characterized by the absence of the ordinary valves, these being replaced by a member having a lost motion relatively to the piston which effects the necessary opening and closing of passages between the cylinder, the outer air and the pipe through which the compressed air or other fluid is conducted.

Examples of constructions serving to illustrate the invention are illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a pump embodying my invention; Figs. 2, 3 and 4 are detail views of the valve mechanism connected to the piston; Fig. 5 is a longitudinal section of a modified form of the piston and valve mechanism; and Fig. 6 is a longitudinal section showing a modified arrangement of the conducting pipes or conduits.

In the pump structure illustrated in Figs. 1 to 4, the piston rod or stem which reciprocates through the stuffing boxes 2, at opposite ends of the cylinder 3, is formed in two parts 4, 5, each of which is hollow. These are united by a metal piece 6 shown separately in Fig. 2, which in effect divides the tube by a longitudinal partition, the two parts of the piston rod being on opposite sides of it. Secured upon this central portion of the piston rod is the tube section 8 shown separately in Fig. 3. This has four slots 10, 11, 12, 13, in its walls, arranged in opposite pairs, each slot extending through, say, a quadrant. Attached to the piston is another tube section 15, shown in detail in Fig. 4. This also may have four slots; but these are not opposite each other, and it is convenient to let two of them take the form of recesses 17, 18, cut in the ends of the tube section. It will be noted that the distance between the recesses 17, 18, is equal to the distance between the slots 10, 11, plus the

width of one of them. The distance between the slots 19 and 20, on the other hand, is less by the width of one slot than the distance between slots 12 and 13.

The piston with its attached slotted tube section can move freely between the stationary abutments 21, 22, and it is this motion which causes the necessary opening and closing of the fluid ports connecting the cylinder with the passages in the hollow piston rod. In the position shown in Fig. 1, the piston is moving toward the right and is therefore at its extreme left hand position relatively to the piston stem. It will be seen that the chamber of the cylinder to the left of the piston is connected through slots 19 and 12 with the interior of the tube 4 which opens to the atmosphere through the opening 4^a; the cylinder chamber on the right of the piston opens through recesses 18 and slot 11 into the tube 5 which is connected to the supply or delivery pipe 24. Before the piston reverses its direction of motion it moves to this right hand position on the piston rod so that slot 11 is covered and slot 13 is uncovered. The cylinder chamber on the right hand side of the piston is then connected through slots 20 and 13 with the channel of the piston rod 4 and the left hand side of the cylinder chamber through recess 17 and slot 10 with the tube 5.

It will be obvious that the slots or recesses on the tube section 15 might be equidistant and those on the tube section 8 non-symmetrical. Any disposition of slots or other openings which effects the connections above described will serve.

It is sometimes convenient to have both inlet and outlet at one end of the pump, which can be readily arranged by the use of a piston rod consisting of two concentric tubes, as illustrated in Fig. 6. In this form a metal spool 6, corresponding to the connecting member 6 in the form previously described, is secured to the inner end of the inner hollow piston-rod section of 4¹ and partitions the space within the sleeve 8¹ into two opposite chambers. One chamber is in communication with the channel in the inner piston-rod section 4¹ and the other with the outer piston-rod section 5¹. It will be understood that the piston and slotted tube-section 15, cooperate with the ported sleeve 8¹ in the same manner as previously described in connection with the form shown in Fig. 1.

Instead of permitting the piston to shift back and forth upon the connecting member, as in the forms above described, I may secure the piston rigidly to the piston-rod and
5 arrange the parts as shown in Fig. 5. The piston may be made integral with the sleeve 8^a, and the slotted tube, corresponding with the tube section 15 in Figs. 1 and 4, may be
10 formed in two separate parts 15^a, 15^b having flanges 25, connected near their periphery by bolts 26, passing through holes in the piston. These slotted tube sections are slightly separated so that they may have a
15 sliding movement upon the tube section 8^a sufficient to alternately close the ports in the tube 8^a, as the piston is reciprocated, operating in the same manner as the slotted tube 15 in Fig. 1.

I claim:—

20 1. A pump comprising a cylinder, a piston reciprocable therein, a tubular piston-stem having inlet and outlet sections and an intermediate member uniting said sections and provided with recesses upon opposite
25 sides connected respectively with the bore of said sections, a sleeve surrounding said intermediate member and provided with transverse slots upon opposite sides at each end thereof, a second sleeve concentric with the
30 first sleeve and having a limited sliding

movement thereon, said second sleeve having transverse slots at opposite ends adapted to coöperate with those of said first-named sleeve, the slots upon opposite ends and upon opposite sides of the sleeves being in aline- 35 ment simultaneously.

2. A pump comprising a cylinder, a piston reciprocable therein, a tubular piston-stem having inlet and outlet sections and an intermediate member uniting said sections 40 and provided with recesses upon opposite sides connected respectively with the bore of said sections, a sleeve surrounding said intermediate member and provided with transverse slots upon opposite sides at each 45 end thereof, a second sleeve concentric with the first sleeve and having a limited sliding movement thereon, said second sleeve having transverse slots at opposite ends adapted to coöperate with those of said first-named 50 sleeve, the slots in one sleeve being spaced unsymmetrically with respect to the slots in the other sleeve.

In testimony whereof I have signed my name to this specification in the presence of 55 two subscribing witnesses.

JEAN ZWICKY.

Witnesses:

A. E. ODELL,

LEONARD E. HAYNES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."