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SPRAYER

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Fig. 1.

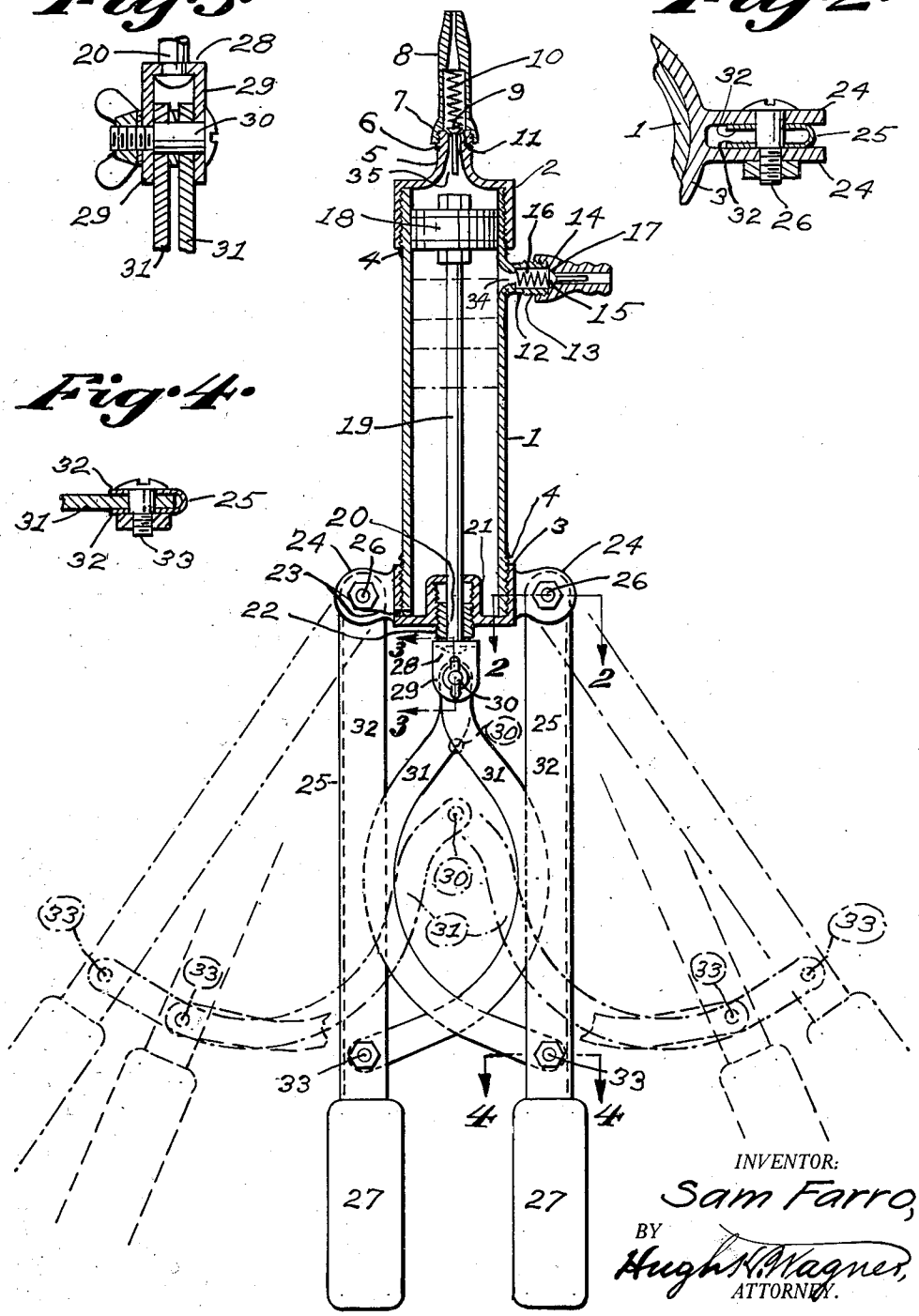


Fig. 2.

Fig. 3.

Fig. 4.

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SPRAYER

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1 Claim. (Cl. 299—94)

This invention relates to sprayers, and more particularly to improvements in that type of hand-operated sprayer in which a cylinder having a discharge nozzle at one end and an intake port in its side has handle-means borne by its other end for operating the piston, such as a pair of handles that can be pushed toward each other or pulled away from each other. It requires extra force to operate the piston of this type of sprayer on its outstroke prior to the time that the piston passes and uncovers the inlet port in the side of the cylinder, for the reason that there is a tendency to form a vacuum behind the inner side of the piston until the inlet port is uncovered, whereby the air pressure on the outer side of the piston preponderates and thus opposes the outstroke.

Accordingly, the principal purpose of the present invention is to provide operating mechanism for the piston by means of which a substantially constant force applied to the handles of the mechanism throughout the stroke of the piston will result in a force on the piston that is greater on the inner portion of its stroke than on the outer portion thereof.

Other objects, advantages, and desirable features of the invention will appear in the course of the following description of an illustrative embodiment of the spirit thereof.

In the accompanying drawing forming part of this specification, in which like numbers of reference denote like parts wherever they occur.

Figure 1 is a longitudinal central sectional view of the sprayer, and

Figures 2, 3, and 4 are detail sections taken on the lines 2—2, 3—3, and 4—4, respectively, in Figure 1.

The sprayer comprises a cylinder 1, having its opposite ends closed by heads or caps 2 and 3, respectively that are internally screw-threaded to fit the external screw threads 4 on the ends of the cylinder 1. The anterior head 2 has an anteriorly projecting neck 5, screw-threaded exteriorly at 6 to receive the interiorly screw-threaded end 7 of a nozzle 8. The nozzle 8 contains a one-way or check valve 9, that is urged by a helical spring 10 against the valve-seat 11, formed on the end of the neck 5. A neck 12 projects from the exterior side of the cylinder 1 at a point preferably shortly behind the head 2, and has exterior screw-threads 13 for receiving the interiorly screw-threaded nipple 14. The nipple 14 contains a one-way or check valve 15, urged by a helical spring 16 into closed position against its seat 17 in the nipple 14. The cylinder contains a piston 18, on the inner end of a piston rod 19, whose outer end 20 is slidably supported in a packing or stuffing neck 21, formed in the end of the cap 3, and closed by a packing gland 22. The cap 3 and cylinder 1 may be provided with alined or co-registering vent openings 23. A pair of lugs 24 is formed on each of two diametrically opposite sides of the cap 3 to receive an interposed end of a respective lever 25, pivoted thereto by a bolt 26. The levers are preferably U-shaped in cross-section, as shown in Figure 2, and have their free ends secured in handles 27. The outer end of the rod 20 has affixed thereto a yoke 28 between the arms 29 of which are pivoted by means of a bolt 30 the interposed ends of links 31, whose opposite ends are interposed between the flanges 32 of the levers 25, respectively, and pivoted thereto by means of bolts 33.

The construction of the sprayer having been fully described, its mode of operation will be readily comprehended. The nipple 14 has attached thereto a hose or other suitable conduit that leads from any suitable source of supply of the fluid that is to be sprayed from the nozzle 8. When the handles 27 are moved outwardly or away from each other from the full line position of Figure 1, the piston 18 will be drawn outwardly or toward the posterior end of the cylinder. The outward stroke of the piston 18 tends to create a vacuum in the space between the piston and the head 2, because of the automatic closing of the valve 9, until the piston will have passed the inlet port 34 in the neck 12, whereupon the valve 15 is opened automatically by the preponderant pressure on the fluid supply side thereof, causing fluid to be drawn into the cylinder as the piston continues its outward stroke. On the inward or anterior stroke of the piston 18, the inlet valve 15 is closed and the outlet valve 9 is opened by the preponderant pressure created by such stroke in the space of the cylinder between the piston 18 and the anterior head 2, whereby the fluid passes through the outlet port 35 into the spray nozzle 8. It will be observed that when the piston occupies the position shown in broken lines, it is at the point where communication is being established between the inlet port 34 and the space anterior of the piston, the corresponding positions of the handles 27 being likewise indicated by broken lines. When the piston 18 has moved twice this distance, it and the handles 27 will occupy the positions indicated in broken-and-dotted lines. An inspection of the distances traversed by the handles between consecutive posi-

tions, as compared with those traversed by the piston, indicates that the speed of the piston for a given speed of the handles increases as the handles recede from one another. Otherwise stated, by reason of the toggle links 31 and the locations of their points of connection to the levers 25 and piston rod 19, the speed of the piston is a direct function of the distance between the piston and the discharging end of the cylinder, while the operating force on the piston is an inverse function of the distance between the piston and the discharging end of the cylinder; that is, the mechanical advantage afforded by the toggle links is a maximum when the piston is substantially at the discharge end of the cylinder, whereby the vacuum produced anteriorly of the piston at the beginning of its outward stroke can be easily overcome without extra exertion on the handles 27 at this phase of movement.

Having thus fully described this invention, I hereby reserve the benefit of all changes in form, arrangement, order, or use of parts, as it is evident that many minor changes may be made therein without departing from the spirit of this invention or the scope of the following claim.

I claim:

The combination, with a cylinder having a discharge port in one end of the cylinder and an inlet port in the side of the cylinder and spaced from its ends, of a removable cap closing the other end of the cylinder and provided with lugs on opposite sides thereof and with a central bearing, a piston in the cylinder, a rod for the piston guided by and extending through said bearing, a pair of levers pivoted to said lugs, respectively, and a pair of toggle links each having one end pivoted to the outer end of the piston rod and the opposite end to a respective lever at a point more remote from the cylinder than the point of pivoting to the rod.

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