W. L. HARRISON.

PUMP.

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1,067,811.

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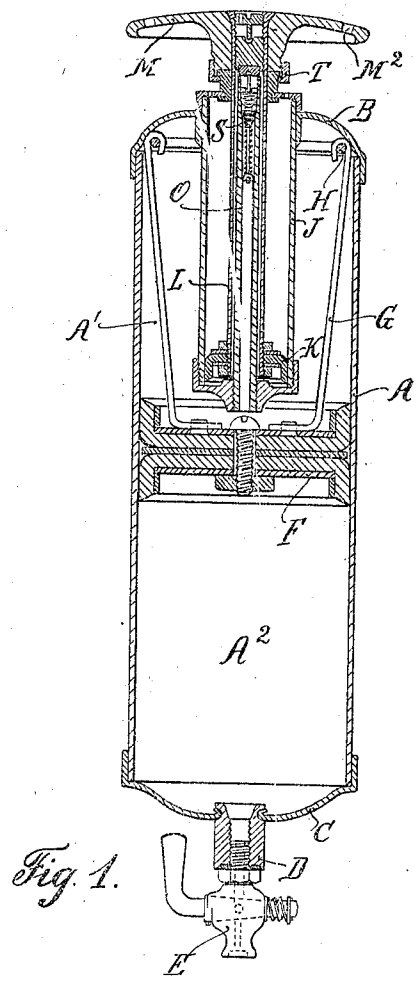


Fig. 1.

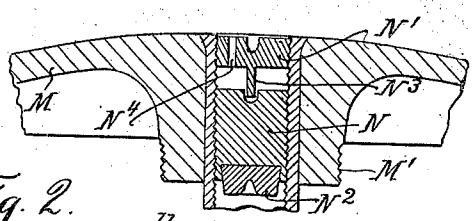
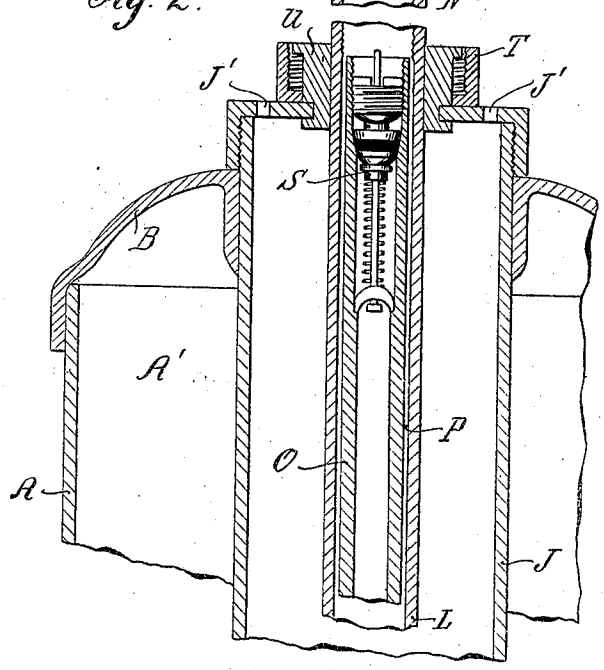


Fig. 2.



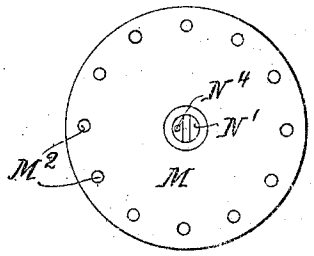
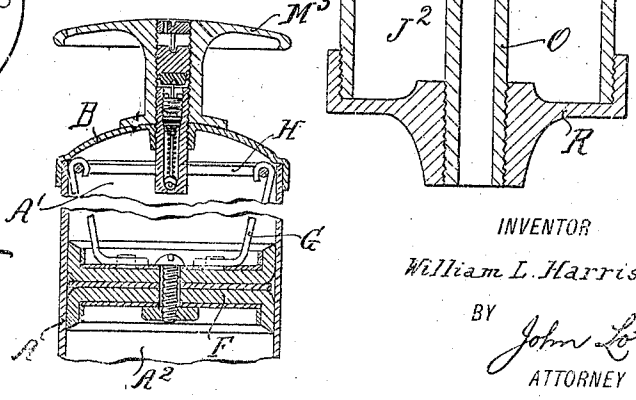


Fig. 3.

Fig. 4.



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PUMP.

1,067,811. Specification of Letters Patent. Patented July 22, 1913.

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To all whom it may concern:

Be it known that I, WILLIAM L. HARRISON, a citizen of the United States, and resident of Branford, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to pumps and particularly to air pumps adapted for use in spraying devices employing air pressure for the purpose of operating a plunger or follower which expels the spraying compound through a suitable outlet.

The object of my present invention is to improve a pump of the above-described character in such a manner as to render its valve readily accessible and to facilitate and simplify the operation, particularly when it is desired to allow the compressed air to escape, for the purpose of allowing the plunger or follower to be moved to its initial position when the apparatus is to be refilled with the spraying compound.

Two specific embodiments of the invention are illustrated by the accompanying drawings, in which—

Figure 1 is a longitudinal section of a spraying device provided with my improvements; Fig. 2 is a detail longitudinal section showing the air pump upon an enlarged scale; Fig. 3 is a top view of the apparatus; and Fig. 4 shows a spraying device having no air pump, but embodying my improved valve arrangement.

A indicates the cylindrical body of the spraying device provided with a top or head B and with a bottom C. The latter carries a tubular outlet D screw-threaded to receive the removable cock E. A plunger or follower F of suitable construction divides the interior of the body A into an air reservoir A′ and a chamber or compartment A^2 adapted to contain the fluid or compound to be sprayed. To the follower F may be attached rods G connected with a ring H, these parts forming a guide to keep the follower from taking an oblique position, and also forming a stop to limit the movement of the follower toward the head B. So far the description will apply to both forms of my invention shown in the drawings.

According to Figs. 1 to 3, I provide, within the compartment or air reservoir A′, a pump cylinder J suitably secured to the head B. Air may enter the cylinder through openings J′. An annular piston K, arranged to reciprocate in the cylinder J, is secured to a tubular piston rod L the interior of which communicates with the pressure compartment J^2 of the cylinder. To the outer end of the rod L is secured an operating handle M, and this end is normally closed by two screw plugs N, N′. Within the hollow piston rod L extends a stationary delivery tube O, an annular space P intervening between the tubes L, O forming a passage for the air from the pressure compartment J^2 to the delivery tube O. The latter is secured to the inner head R of the cylinder J and communicates at its inner end, with the air reservoir A′, but the connection of the space P with the tube O is controlled by a check valve S provided at the outer end of the delivery tube. This valve may be of the type well-known in connection with pneumatic tires. The annular passage P is constantly open from the pressure chamber J^2 of the cylinder to the check valve of the delivery pipe O. It will be obvious that by reciprocating the piston K air sucked in at J′ during the inward stroke and flowing past the piston during the outward stroke will on the succeeding inward stroke be forced out of the pressure compartment J^2 through the annular space P, the check valve S and the delivery tube O into the air reservoir A′, thus producing pressure in said reservoir, or restoring the pressure to the proper degree, as the case may be. Upon opening the cock E, the air pressure in the reservoir A′ will drive the plunger or follower F toward the outlet, thus expelling the spraying compound from the compartment A^2, through the open cock E. The inlet for the pressure chamber J^2 is around the flexible cup-piston K and is therefore independent of the delivery pipe, since the check valve in the latter prevents any backflow therethrough.

While the air pump is not in use, its piston may be locked in any suitable manner. For instance, the handle M may be provided with a screw thread M′ to engage an internally threaded sleeve T adapted to slide on the guide or stuffing box U through

which the piston rod L passes. When the pump is being operated, the sleeve T is in the position shown in Fig. 2, its outer end being flush with that of the guide U, so that the threads M′ will not engage the threads of the sleeve as the piston is reciprocated. The threads will therefore not be injured by the reciprocation of the piston. When the pump is out of use, the sleeve T is shifted outward so as to project beyond the guide U, and the handle M turned to lock it with the sleeve, as shown in Fig. 1. This is the normal position of the parts, in which the fire extinguisher is ready for use. In this position, with the outer plug N′ removed, the inner plug N may be given a few turns by means of a screw driver or other suitable tool, to bring a packing N^2, provided on the inner surface of the plug, against the end of the tube O and of the casing of the check valve S. The plug N then performs the same function as the ordinary cap used in connection with pneumatic tire valves, that is to say, it prevents the escape of air in case the valve should leak. The outer plug N′ is then replaced, said plug having a slot to receive the end of a screw driver, and also having a central pin N^3, for a purpose to be stated presently.

When the spraying device has been used and it is desired to refill the compartment A^2 through the outlet D, the follower F must be brought back to its original position, that is to say, it must be pushed toward the head B. This may be done by removing the cock E and pushing a rod through the outlet D, against the follower F. In this operation the handle M is generally rested on the floor, the outlet D pointing upward, and the rod is pushed downward. Since the compressed air contained in the compartment or reservoir A′ would make it very hard, if not impossible, to move the follower toward the head B, a suitable vent is opened to allow the air to escape from the reservoir A′. For this purpose, the plugs N, N′ are unscrewed and removed from the piston rod L so as to render the valve S accessible, and the air may be allowed to escape from the reservoir A′ by opening the valve S in any suitable manner, as by screwing the plug N′ into the tube or rod L until the pin N^3 engages the customary projecting end of the air valve and holds it open. The air issuing from the valve will escape past the plug N′ through a suitable aperture or channel N^4.

The position of the valve S is such that with the plunger K and handle M in their inner position (Fig. 1), and upon removing the plugs N, N′ the valve will be readily accessible, being but a short distance from the opening in the outer surface of the handle. It will therefore be easy to remove the valve for repairs or renewal, and also to get at it for the purpose of holding the valve open to allow air to escape from the reservoir A′, or for the purpose of connecting an air hose with the outer end of the tube O when it is desired to fill the reservoir A′ with compressed air in this manner. At the same time the valve is protected against injury efficiently by the piston rod L and by the handle M. The plug N which seals the valve tightly when desired (Fig. 1) is also placed where it is readily accessible yet efficiently protected by the handle M, and the plug N′, which forms an additional protection for the plug N, is itself protected against injury by being countersunk in the handle M. The latter with the end of the tube O thus forms a protector for the valve S and for the two plugs N, N′.

In the form of my invention illustrated by Fig. 4, the air pump is omitted altogether, the delivery tube O′ being secured to the center of the head B and the handle or protector M^3 is also rigidly secured to the head B. This handle has a screw-threaded axial bore adapted to receive the plugs N, N′ which may be of exactly the same construction as described above and cooperate in the same manner with the check valve S fitted to the outer end of the tube O′. The parts A, C, D, E, F, G, H are supposed to be of the same construction as in Fig. 1. The operation is similar to that described with reference to Figs. 1, 2 and 3, except that the apparatus embodies no air pump for producing or restoring air-pressure in the reservoir A′.

In each construction the valve S, which may be used as a filling valve and also as an escape valve, is fully protected yet readily accessible. The valve protector performs a similar function with reference to the sealing cap or plug N and to the deflating or venting cap or plug N′. Thus, when the apparatus is stood upon the protector in order to drive the follower F down by means of a rod inserted through the outlet D, there will be no danger of injuring either the valve or the plugs. While I have shown the valve S at or near the head, and accessible from the end of the apparatus, such valve might be placed elsewhere on the air reservoir.

The handle M may be made of circular or mushroom shape and provided with a number of holes or sockets M^2 to receive a suitable hook for suspending the apparatus on a wall or other support. This is of especial value in a fire extinguisher, which on one side bears a label with instructions for operating the apparatus. Of course, in order to be easily read, this label should be exactly on the side farthest away from the wall. Inasmuch as the handle will not always come to a stop in the same position when it is screwed to the sleeve T, the provision of a series of holes M^2 enables me

to always hang the apparatus in such a position that the instructions will be plainly visible.

I claim:

1. A pump provided with a cylinder, a delivery tube extending within the cylinder and secured thereto, an annular piston arranged to reciprocate in the cylinder out of contact with said tube, a tubular piston rod secured to said piston and surrounding said tube at a distance to form therewith an annular chamber in permanent communication with the pressure chamber of the cylinder, a delivery valve at that end of the said tube which is nearest that end of the cylinder through which the piston rod projects, and a handle on said projecting portion of the piston rod, said handle being formed with a longitudinal channel through which access may be had to the said valve.

2. A pump provided with a cylinder, an annular piston and a tubular piston rod arranged to reciprocate in said cylinder, a delivery tube extending through the annular piston and into the piston rod but out of contact with both of them, so as to form, between the piston rod and the delivery tube, an annular chamber in permanent communication with the pressure chamber of the cylinder, an operating handle secured to the outer end of the piston rod and provided with a longitudinal channel leading toward the corresponding end of the delivery tube, a delivery valve at said end of the tube, and means for normally closing said channel.

3. A pump provided with a cylinder, an annular piston and a tubular piston rod arranged to reciprocate in said cylinder, a delivery tube extending through said piston and into said piston rod but out of contact with both of them, so as to form, between the piston rod and the delivery tube, an annular chamber in permanent communication with the pressure chamber of the cylinder, an operating handle secured to the outer end of the piston rod and provided with a screw-threaded longitudinal channel leading toward the corresponding end of the delivery tube, a delivery valve at said end of the tube, and a removable plug adapted to screw into said channel and to form a sealing cap for said valve.

4. A pump provided with a cylinder, an annular piston and a tubular piston rod arranged to reciprocate in said cylinder, a delivery tube extending through said piston and into said piston rod but out of contact with both of them, so as to form, between the piston rod and the delivery tube, an annular chamber in permanent communication with the pressure chamber of the cylinder, an operating handle secured to the outer end of the piston rod and provided with a screw-threaded longitudinal channel leading toward the corresponding end of the delivery tube, a delivery valve at the said end of the tube, a removable plug adapted to screw into said channel and to form a sealing cap for said valve, and another plug likewise adapted to screw into said channel and having means for opening the said valve.

5. A pump provided with a cylinder, a piston arranged to reciprocate in said cylinder, a tubular piston rod attached to said piston and communicating with the pressure chamber of the cylinder, a delivery tube secured to the pump cylinder, said tube extending within the hollow piston rod, a check valve at the outer end of said tube, and a handle secured to the outer end of the piston rod and provided with an opening or channel through which access may be had to said valve.

6. A pump provided with a cylinder, a piston arranged to reciprocate in said cylinder, a tubular piston rod attached to said piston and communicating with the pressure chamber of the cylinder, a delivery tube secured to the pump cylinder, said tube extending within the hollow piston rod, a check valve at the outer end of said tube, a handle secured to the outer end of the piston rod and provided with an opening or channel through which access may be had to said valve, and a sealing cap contained in said channel.

7. A pump provided with a cylinder, a piston arranged to reciprocate in said cylinder, a tubular piston rod attached to said piston and communicating with the pressure chamber of the cylinder, a delivery tube secured to the pump cylinder, said tube extending within the hollow piston rod, a check valve at the outer end of said tube, a handle secured to the outer end of the piston rod and provided with an opening or channel through which access may be had to said valve, means for locking the piston rod against reciprocation, and a cap arranged to screw within said channel and to seal said valve.

8. A pump provided with a cylinder, a piston arranged to reciprocate in said cylinder, a tubular piston rod attached to said piston and communicating with the pressure chamber of the cylinder, a delivery tube secured to the pump cylinder, said tube extending within the hollow piston rod, a check valve at the outer end of said tube, a handle secured to the outer end of the piston rod and provided with an opening or channel through which access may be had to said valve, a valve-sealing cap and a valve-venting cap contained in said channel.

9. A pump comprising a cylinder, an annular piston movable therein, a hollow piston rod connected with said piston, a delivery tube extending into the hollow piston rod, a delivery valve in said delivery

tube, and a handle on said piston rod provided with means through which access may be had to said delivery valve.

10. A pump comprising a cylinder, a hollow piston rod, an annular piston disposed between said cylinder and piston rod, a delivery tube extending into said hollow piston rod, a delivery valve on said tube, and a closing device for said hollow piston rod, said closing device being adapted to afford access to said delivery valve.

11. A pump comprising a cylinder, a hollow piston rod, an annular piston disposed between said cylinder and piston rod, a delivery tube extending into said hollow piston rod, a delivery valve on said tube, and means within said hollow piston rod for opening said delivery valve.

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

WILLIAM L. HARRISON.

Witnesses:
PERCY MACKARNESS,
E. M. LAURENCE.