

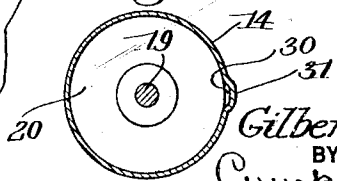
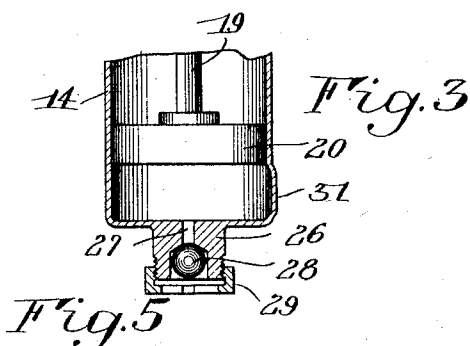
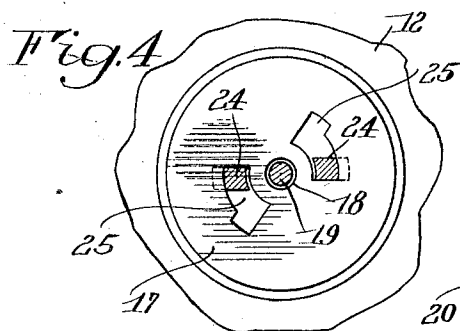
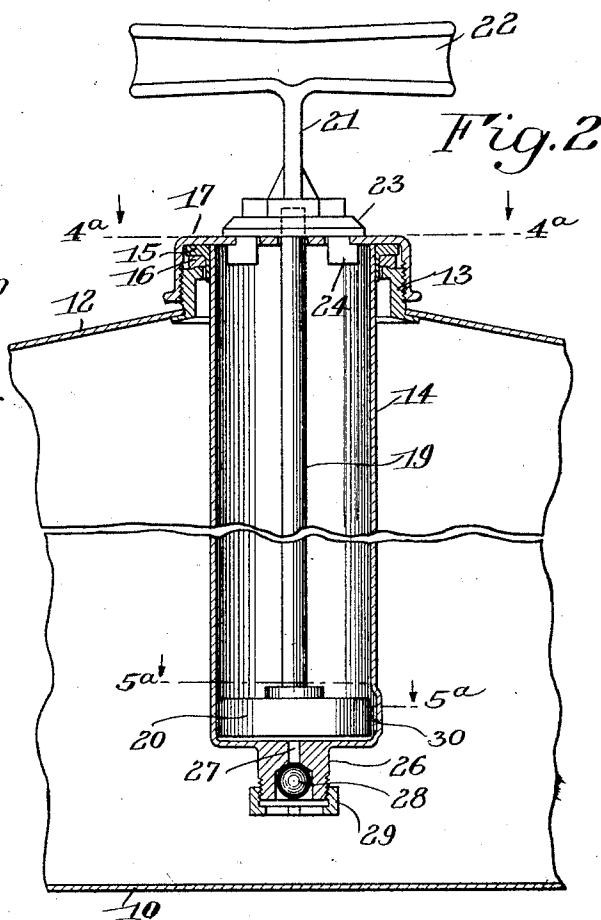
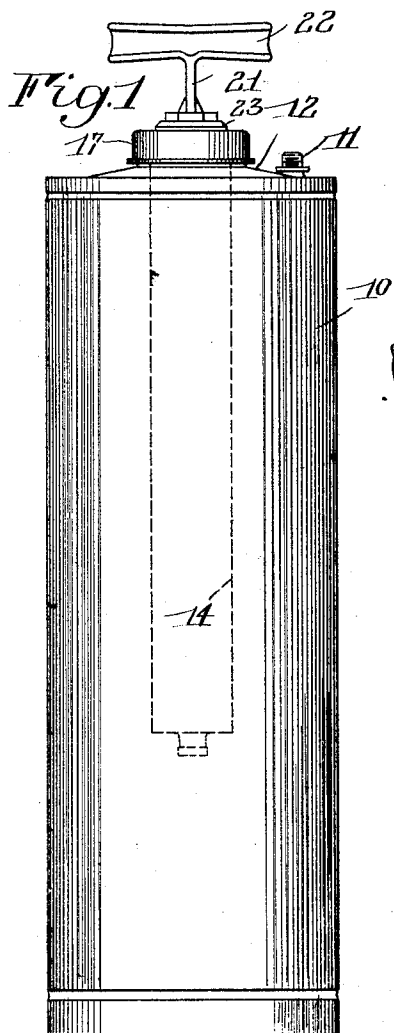
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G. C. WATERS, JR

SPRAYING APPARATUS

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INVENTOR
Gilbert C. Waters Jr.
 BY *Campbell & Siffert*
 his ATTORNEYS

UNITED STATES PATENT OFFICE.

GILBERT C. WATERS, JR., OF ROCHESTER, NEW YORK, ASSIGNOR TO THE E. C. BROWN COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

SPRAYING APPARATUS.

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The present invention relates to spraying apparatus in which a pump is projected into a liquid holding reservoir or container for use in building up pressure therein for ejecting the liquid therefrom in the form of a spray and has for one object to provide an improved apparatus of this class which will be comparatively inexpensive to manufacture, convenient to operate and efficient in service.

A further object of the invention is to provide an improved spraying device embodying a liquid holding reservoir and pump therein so constructed as to avoid unseating of the check valve between the pump and reservoir after completion of the pumping operations, a condition heretofore arising due to the counter pressure of the air between the piston and valve upon extending the piston beyond its normal pumping stroke.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a side view of a spraying apparatus embodying one form of the invention;

Figure 2 is an enlarged fragmentary section showing the container and pump cylinder therein;

Figure 3 is a fragmentary section through the lower end of the pump showing the piston at the inner end of its pumping stroke;

Figure 4 is an enlarged horizontal section taken on line 4^a—4^a of Figure 2; and

Figure 5 is a section taken on line 5^a—5^a of Figure 2.

Similar reference numerals throughout the several views indicate the same parts.

The present invention contemplates improved means for overcoming certain objectionable features heretofore experienced with apparatus of the present type wherein it has been found that liquid from the container will leak into the pump cylinder and spread to the outside of the container when the apparatus is set aside or not in use, due to unseating of the check valve between the container and pump by the counter pressure of air trapped in the lower end of the cylinder when the piston is moved to its lowest or extended position.

Referring to the drawings, the reservoir or container for the liquid to be sprayed is

indicated at 10 and is provided with a nipple or threaded portion 11 with which is to be connected the outlet pipe or conduit and nozzle not shown which may be of any well known type. The top or end wall 12 of the container is provided with an upstanding threaded collar 13 secured to the container in any desired manner. The pump cylinder 14 is projected within the container through said collar and is provided with an annular shoulder 15 which is supported by the collar through the medium of a gasket 16. Fitting over and closing the outer end of the pump cylinder is a cap or closure 17 which is threaded upon the collar and screwed down to clamp the cylinder in position thereon. The cap is provided with an aperture 18 through which is adapted to reciprocate a piston rod 19 which is suitably connected with the pump piston 20 disposed within the cylinder. The rod projects through the cap and has an extended portion 21 terminating in a suitable handle 22. It will be understood that the portions 19 and 21 of the rod may be constructed as one member if preferred, although they are shown in the present instance as separate parts. The rod has connected therewith in any suitable manner a member 13 preferably in the form of a disk which is provided with a pair of undercut lugs 24 adapted to project through a pair of oppositely arranged key hole slots 25 in the cap 17. The lugs are adapted to be passed bodily through the enlarged portions of the slots and are arranged to interlock with the cap when rotated into the narrow portions of said slots by the turning of the rod, the locking position of the parts being indicated in Figures 2 and 4. Thus the rod and piston are made adjustable by rotation from the locking position shown in Figure 4 to a position in which the lugs 24 are shifted into registry with the enlarged portions of the arcuate slots 25 of the cap 17. In the last named position the rod is free to be moved longitudinally of the cylinder to permit withdrawal of the lugs from said slots, after which the rod may be rotated to any position desired in which the lugs will, upon reciprocation of the rod, cooperate with the cylinder cap to limit the inward stroke of the piston to the position shown in Figure 3 during the pumping operations. In the extended position of the piston shown in Figure 2 the lugs cooperate with the underside of the cap not only to

lock the piston in its lowermost position but, in conjunction with the extended portion of the rod and handle thereon, serve as carrying means for the entire apparatus as well as means for hanging it up when desired.

The cylinder is provided at its lower end with a reduced extension 26 having an air discharge passage 27 controlled by a check valve 28 which may be of any suitable type, preferably a ball valve as shown, which is normally held in closed position by the pressure of the liquid in the container but which may also be spring closed if desired. The valve is limited in its outward or opening movement by any suitable means such as the open-ended nut 29 threaded upon the cylinder extension 26 as shown in Figure 3.

Ordinarily in a pump of this kind, after building up pressure in the container by pumping air therein, a certain amount of air is trapped between the piston and check valve when the pumping operations are completed and the piston is moved to its extended position as shown in Figure 2, in which it is locked by cooperation of the lugs 24 with the cap 17. The counter-pressure of the trapped air under these circumstances will, for a limited period of time at least, cause the valve to unseat and in some cases fluttering of the valve may take place which is of course, objectionable. The opening of the valve by the trapped air permits a certain amount of the liquid to find its way past the piston into the cylinder from whence it escapes through the cylinder head to the outside of the container where it spreads over the latter, which is of course objectionable as will be understood. To offset this objection I provide a by-pass 30 adjacent the inner end of the cylinder at a point opposite the piston when the latter is in the extended locking position shown in Figure 2. Normally, during the pumping operations the lugs 24, through engagement with the outer face of the closure 17, serve to limit the stroke of the piston so that it is not projected to a point opposite the by-pass. Therefore the air compressed by the piston is forced through the check valve into the container. However, when the piston is extended to a point opposite the by-pass, the trapped air is allowed to escape through the latter so that the valve is held seated by the pressure of the liquid within the container; or if preferred, by a light spring not shown which may be utilized in addition to the pressure of the liquid.

The by-pass is preferably provided by striking outwardly a portion of the wall of the cylinder at the desired point as indicated at 31 in Figures 3 and 5 but may be otherwise formed if preferred.

While I prefer to provide locking means for the piston and its operating rod as described above, it will be apparent that the cooperating means between the rod and cylinder

which limits the stroke of the piston may not necessarily be in the form of a locking device since, after relieving the trapped pressure in the bottom of the cylinder, the principal object in providing the locking means is to prevent the piston and rod from being accidentally displaced as might happen, for example, should the container be inverted or turned upside down.

I claim as my invention:

1. In an apparatus of the class described, the combination of a liquid holding container, a pump extending therein for pumping air thereto comprising a piston and a cylinder for the same having a valve adapted to check the flow of liquid from the container to the cylinder, operating means for the piston arranged to cooperate with the cylinder to limit inward movement of the piston to a predetermined point during the pumping operations and being adjustable to permit the piston to have an extended movement inwardly of said point and a by-pass for relieving the pressure of air trapped within the cylinder as a result of said extended movement.

2. In an apparatus of the class described, the combination of a liquid holding container, a pump extending therein for pumping air thereto, said pump comprising a piston and a cylinder therefor having a valve for checking the flow of liquid from the tank to the cylinder, an adjustable operating rod for the piston projecting through the outer end wall of the cylinder, means upon the rod adapted in one position of adjustment thereof to engage said wall whereby to limit inward movement of the piston and adapted in an extended position of the piston to project through said wall for locking engagement with the inner face thereof and a by-pass for relieving pressure in the cylinder when the piston is moved to said extended position.

3. In a spraying device, the combination of a reservoir adapted to contain a liquid, a pump cylinder extending into the reservoir, a piston and piston rod adjustable to relatively different positions within the cylinder, means upon the rod adapted for cooperation with the cylinder in one adjusted position to limit the stroke of the piston and in another to permit the piston to have an extended movement beyond the pumping stroke, a by-pass for relieving the pressure of air trapped within the cylinder as a result of said extended movement and a check valve at the discharge end of the cylinder.

4. In a spraying device, the combination of a reservoir adapted to contain a liquid, a pump cylinder extending into the reservoir and having a piston therein, a piston rod and handle thereon for operating the piston, a check valve adjacent the discharge end of the cylinder, means for limiting the pumping

stroke of the piston including locking means for the latter dependent upon an extended movement of the piston beyond the pumping stroke and a by-pass for relieving the pressure of air trapped within the cylinder as
5 a result of the extended movement of the piston therein.

5. In a spraying device, the combination of a liquid holding container, a pump extend-

ing therein for pumping air thereto comprising a piston and a cylinder for the same 10 having a valve adapted to check the flow of liquid from the container to the cylinder, operating means for the piston and a by-pass 15 adjacent the inner end of the cylinder for relieving the pressure therein when the piston is moved to a point opposite said by-pass.

GILBERT C. WATERS, JR.