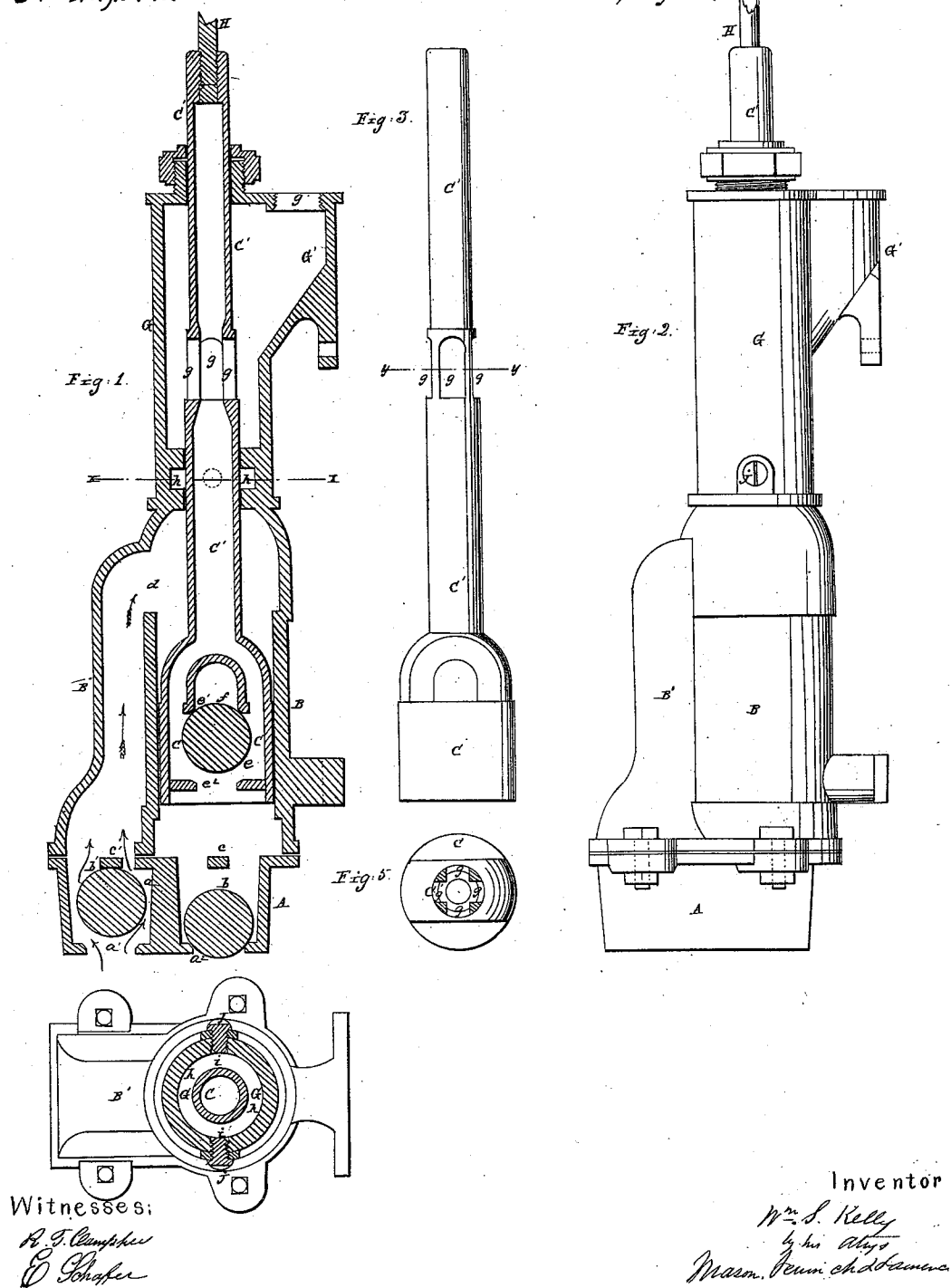


W. S. Kelly,
Double-Acting Pump.

N^o 44,272.

Patented Sep. 13, 1864.



UNITED STATES PATENT OFFICE.

WILLIAM S. KELLY, OF SCHENECTADY, NEW YORK.

IMPROVEMENT IN PUMPS.

Specification forming part of Letters Patent No. 44,272, date 1 September 13, 1864.

To all whom it may concern:

Be it known that I, WILLIAM S. KELLY, of Schenectady, county of Schenectady, and State of New York, have invented a new and Improved Pump; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a diametrical section through my improved pump. Fig. 2 is a side elevation of the pump. Fig. 3 is a view of the piston-rod and valve-box removed from the pump-cylinder. Fig. 4 is a horizontal section through the stuffing-box, taken at the point indicated by red line *x x*, Fig. 1. Fig. 5 is a section through the discharge-orifices of the piston-rod, indicated by the red line *y y*, Fig. 3.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain new and useful improvements in pumps, wherein I use a center-discharge or hollow piston-rod, and conduct the water from the base of the pump up through said piston-rod into a stationary vessel, from which latter the water is finally discharged through a pipe and air-chamber.

My invention also relates to certain improvements on the pumps which have already been patented to me, in so far as the employment of a hollow piston with upper and lower passages for the water and one valve closing both passages, and also the use of a stationary receiving-vessel for receiving the water from the piston rod and discharging it into the service-pipe.

The object of my invention is to combine the receiving-vessel with the body of the pump in such manner that the latter is rendered more simple and compact and the necessity of employing a separate receiving-vessel rendered unnecessary, all as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

In the accompanying drawings, A represents a valve-box, which is suitably bolted to the base of the pump-cylinder B and side passage, B'. This valve-box is divided into two compartments by a vertical division, *a*, which compartments are adapted for receiving ball-valves *b b'*, that rest upon seats *a' a''* and pre-

vent water from escaping downward after it once enters the pump. As the spaces within which the ball-valves *b b'* are arranged are as large as the chambers B B' above them, narrow bars are secured over these balls, as shown at *c c'*, which prevent the latter from rising too high when the water is drawn into the pump.

The pump-cylinder B is provided with a side passage, B', which communicates with it through a port, *d*, for the purpose of causing the piston C to draw water into the cylinder B in its descending stroke, as indicated by the course of the arrows in Fig. 1. When the piston C is drawn upward, the valve *b'*, at the base of passage B', falls and closes this passage at the same time that the valve *b* opens and allows water to rush into the cylinder B beneath the piston C. The piston C is constructed with a valve-chamber, *e*, and an upper and lower induction-orifice, *e' e''*, and within the piston-chamber *e* a ball-valve, *f*, is applied, which closes the upper orifice, *e'*, as the piston descends, and thus allows water to enter through orifice *e''*, or as the piston ascends the ball *f* closes the lower orifice, *e''*, and causes the water to enter through orifice *e'*. The water which enters the piston-chamber *e* is all forced upward through a hollow piston rod, C', and discharged into a receiving-vessel, G, through openings *g g*, from whence it is conducted off through a discharge-pipe that is applied to the orifice *g'*.

All that portion of my pump which relates to the mode of getting water into the cylinder B and forcing it out of this cylinder may be constructed upon the principles which are clearly set forth in my present patents, dated February 25, 1862, and August 23, 1864, for double-acting hollowpiston force-pumps; but I do not confine my present invention and improvements exclusively to such pumps, as other forms may be conveniently employed for forcing the water through a hollow piston into the receiving-chamber G.

The receiving-vessel G is represented in the annexed drawings as being cast with the body of the pump—i. e., the cylinder B and side passage, B'. Heretofore this vessel has been a separate contrivance and isolated from the body of the pump; but as objections attend such an arrangement, I now cast or otherwise apply this vessel directly to the top of the pump-cylinder. In order to accomplish this

it is necessary to provide a means for packing the piston at the point where the two chambers B and G are joined. This is done by casting or otherwise forming on the inside of the vessel G, at its lower end, an annular recess, *h*, which is packed with any suitable material which will form a water-tight joint around the piston-rod C' and at the same time allow this piston to move freely through it. If the parts B and G are cast in one piece, this packing is introduced through holes *i i*, which are afterward closed by means of plugs *j j*; but if the parts B and G are cast separately and then bolted together, a packing-box may be introduced between them, or the annular recess *h* may still be used. The advantage of the openings *i i* would be felt in either case, as they admit of a renewal of the packing at pleasure.

As the packing at the junction of the two chambers B and G will prevent any of the water in the chambers B B' from escaping around the piston rod, all the water must necessarily pass up through the piston-rod, as I have above described, and enter the receiving-vessel G through the openings *g* in this piston-rod. That portion of the piston-rod C' which extends above the openings *g* is tubular merely for the purpose of giving lightness to it; but, if desirable, this extension of the rod may be made solid, with a suitable coupling on its upper end for connecting the pump-rod H to it. If made tubular, the upper end should be closed, so as to prevent the escape of water at this point. That portion of the rod C' which extends above the discharge-openings *g* passes through the upper end of the vessel G, and through a suitable stuffing-box applied at this point, so that the openings *g* can discharge all the water directly into the vessel G, and also so that the pump-rod can be applied to the piston above the vessel G, and a stroke given to the piston-rod equal to the length of said vessel. The discharge-pipe, which is not shown in the drawings, is applied to the orifice *g'* at the upper end of vessel G, as shown in Fig. 1, to which orifice the water is conducted by means of and offset, G'; but, if desirable, the chamber G may be made of sufficient diameter to admit of the application of the discharge-pipe directly to the side or end of the said vessel. The offset G' serves as an elbow for the discharge-pipe, which latter rises vertically through the well, and it also serves as a means for securing the pump to the timber used to hold it in the well.

It will be seen from the above description that the pump and also water-receiving vessel G are secured together in such a manner that a hollow piston-rod can be practically used as a means for discharging the water from the

body of the pump into said vessel, from which the water can be conducted by a stationary discharge-pipe leading to the air chamber, and thence out at the top of the well. The advantage of this arrangement over the detached receiving-vessel is, that the pump can be set up and put in working order with much greater facility than hitherto, and also that the settling or warping of the timber which sustains the pump will not in any manner change the position of the working parts or cause the piston rod to bind or work hard in its packing-boxes.

The entire pump is rendered simple and compact by my invention, and less expense attends its construction.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Casting or otherwise applying a receiving-vessel, G, directly to the body of the pump in such manner that the water shall be forced through the piston-rod into this vessel before entering the discharge-pipe, substantially as described.
2. Passing the piston-rod up through the receiving-vessel G, when the latter is secured to the body of the pump, substantially as described.
3. In a pump having a receiving-vessel, G, applied directly to it, connecting the pump-rod to a hollow piston-rod at a point directly above said vessel, substantially as described.
4. Conducting the water from a receiving-vessel, G, having a piston-rod passing through it, and otherwise operating substantially as described.
5. Introducing a water-tight packing for the piston-rod between the chamber of vessel G and the pump-cylinder through *i i*, substantially as described.
6. Constructing the receiving-vessel G and the cylinder of the pump with an annular recess within the neck of the former, adapted for receiving any suitable material for packing the piston-rod, substantially as described.
7. Providing for renewing the packing in the annular recess *h* when the vessel G and pump cylinder are cast in one piece by means of openings *i i*, substantially as described.
8. Closing the piston-rod C' above the openings *g g*, substantially as and for the purposes described.
9. Applying the receiving-vessel G, either by casting or otherwise, directly to the body of a pump having a hollow piston-rod, substantially as described.

WM. S. KELLY.

Witnesses:

R. T. CAMPBELL,
E. SCHAFER.