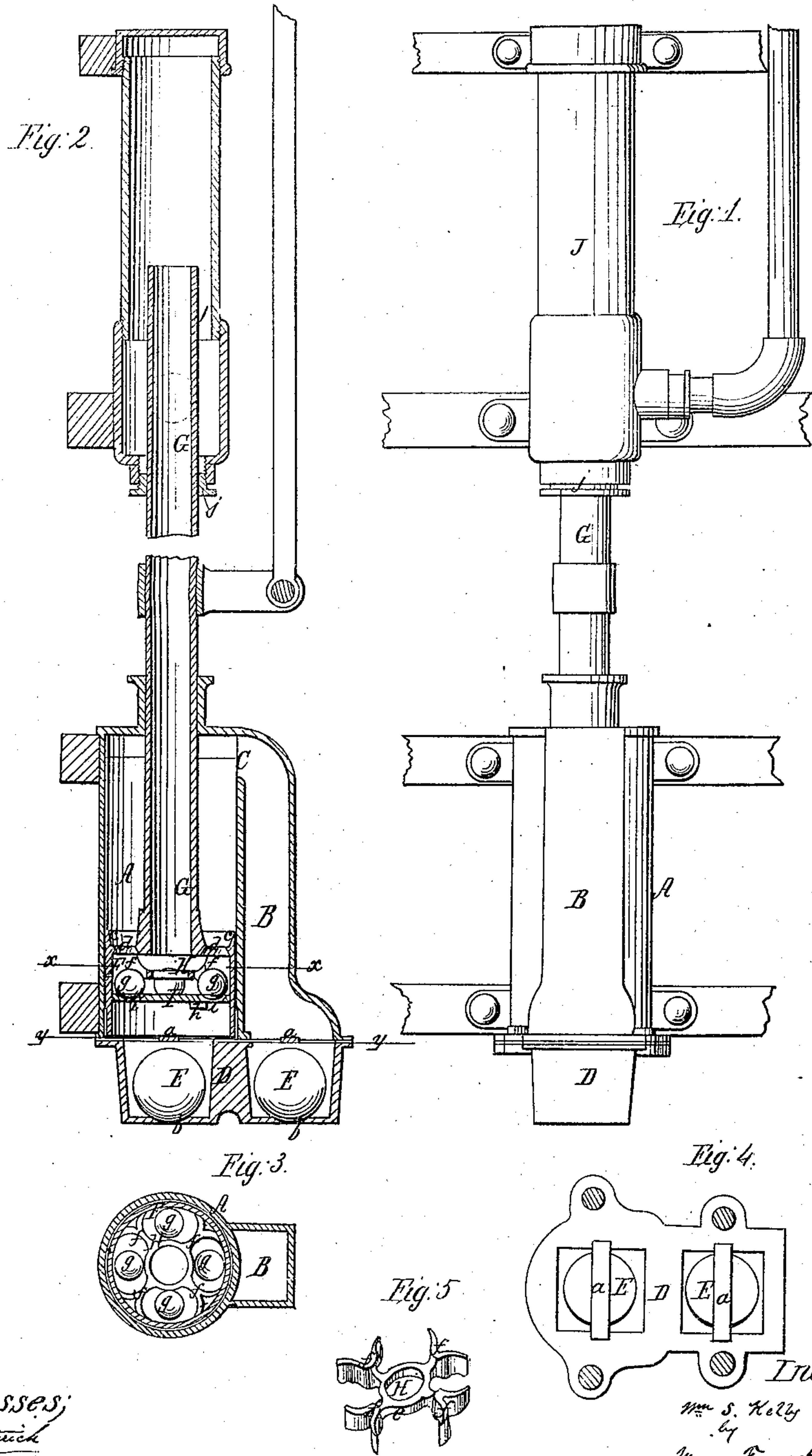


The specification in this regard
is hereby certified.

W. S. Kelly,
Pump Lift,

No. 34,505

Patented Feb. 25, 1862.



Witnesses;
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UNITED STATES PATENT OFFICE.

WILLIAM S. KELLY, OF SCHENECTADY, NEW YORK.

PUMP.

Specification of Letters Patent No. 34,505, dated February 25, 1862.

To all whom it may concern:

Be it known that I, WILLIAM S. KELLY, of the city and county of Schenectady and State of New York, have invented a new and useful Improvement in Pumps and other Similar Hydraulic Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of the pump as improved by me. Fig. 2 is a vertical transverse section of the same. Fig. 3 is a horizontal section in the line $x-x$ of Fig. 2. Fig. 4 is also a horizontal section but in line $y-y$. Fig. 5 is a perspective view of the "spider" which confines the ball valves from lateral motion.

The same letters of reference in the several figures indicate corresponding parts.

The nature of my invention consists—1st In arranging valves between upper and lower sets of passages so that they serve alternately for closing said upper and lower sets of passages. 2nd In so boxing the valves that the one set maintain their proper relative positions for alternately closing the upper and lower sets of passages. 3rd In so constructing the annular "spider" that the water which enters the pump chambers has a free passage above and below it to the hollow piston rod. 4th In the combination of the base valve box having a narrow stop bar over the center of each valve chamber; with the double chambered pump hollow piston and hollow piston rod. 5th In the combination of the hollow piston and piston rod, with a stationary air chamber, by a loose ground joint or stuffing box, at the lower end of the chamber, so that the compressed air in the air chamber shall be more effectively employed for aiding in discharging the water through the nozzle, than it is when the air chamber and piston rod are connected by a tight joint and move up and down together.

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

A, is a pump cylinder with a side or front chamber B communicating with it by a top port C. The cylinder A with its side chamber B, rests upon a base valve box D, which is open at the top, and divided into two chambers by a partition, across the center

of the top of each of which a narrow stop bar a , is placed. In each chamber a ball valve E, is arranged loosely, being kept in place by the stop a . The ball valves cover circular ports b , b , in the bottom of the valve box.

F, is a hollow cylindrical piston with a cup flange c , around its upper edge. From the center of the top of the piston a hollow piston rod G, of about one third the diameter of the piston, extends upward and passes out of the top of the pump cylinder as shown. Outside the circle of the piston rod a series of passages d , d , are cut through the top of the piston.

H, is an annular spider consisting of a ring e , and pronged arms f , f , f , f . The ring being of less depth than the arms, and forming a connection with them at the center of their depth in such manner that when the spider is clamped between two surfaces a space exists, both above and below, between said surfaces and the ring. The arms of the spider are of curve shape and form stops for ball valves g , and for clamping screws h .

I, is a screw clamping plate let loosely into the piston after the spider and the ball valves are introduced into the piston. This plate has passages i , i , i , i , cut through it, and is confined in place by means of the same screws h which prevent the spider from turning. All of the passages are made flaring so as to present seats for the ball valves.

J, is an air chamber with water discharging nozzle tapped in its side. This air chamber encircles the upper end of the hollow piston rod and the piston rod works air and water tight up and down in said chamber, a loose ground joint or stuffing box j , being employed to effect the connection between the piston rod and air chamber. The air chamber is suspended in a stationary condition over the pump cylinder as represented, and the piston is worked by means of a connecting rod which attaches to a bracket extending out from the piston rod at a point between the air chamber and pump cylinder.

The operation of the pump is as follows. The water first flows into the cylinder A and chamber B through the passages b , b , that is as the piston rises water enters the passages b directly under the cylinder A, and fills said cylinder. As the piston de-

scends the valve E of the cylinder closes and the valve E of the chamber B opens and allows water to fill the chamber and the space of the cylinder outside of the piston rod. Simultaneously with the inflowing of the water into chamber B, the water which was first received into the cylinder escapes through the passages *i, i*, and under the ring of the spider into the hollow piston—its escape through the passages *d, d*, being prevented by the ball valves *g, g*, closing said passages. As the piston again rises the water which is in the chamber B, and the space outside the hollow piston is allowed to escape down through the passages *d, d*, and under and above the spider into the hollow piston—its escape through the passages *i, i*, at this stage being prevented by the ball valves *g, g*, closing the said passages—thus the operation continues until the motion of the pump ceases. As the discharging water rises through the hollow piston into the air chamber the air, by reason of the piston rising in the chamber and compressing it acts most effectively for increasing the force of the discharge through the nozzle.

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

1. The combination with the chambers A,

B, of a double acting pump, of a hollow piston rod G, and piston F, the valves *g* of the piston F being arranged between upper and lower passages *d, i*, and the same set of valves *g* serving alternately for closing said upper and lower passages—substantially as and for the purposes described.

2. The combination of an annular spider H, and screw plate I, with the hollow piston F, and ball valves *g*, substantially as and for the purposes set forth.

3. Constructing the annular spider H, with its arms *f* of greater depth than the depth of its ring or hollow hub *e*, substantially as and for the purposes set forth.

4. The combination of the base valve box D, having a narrow stop bar *a*, over the center of each of its valve chambers, with the double chambered pump A, B, hollow piston F, and piston rod G, substantially in the manner and for the purpose described.

5. The combination of the hollow piston F, and hollow piston rod G, with a stationary air chamber J, by a stuffing box *j* at the lower end of the chamber J, substantially as and for the purposes set forth.

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