

T. THOMPSON.
PUMP AND VALVE.
APPLICATION FILED AUG. 31, 1905.

1,002,788.

Patented Sept. 5, 1911.

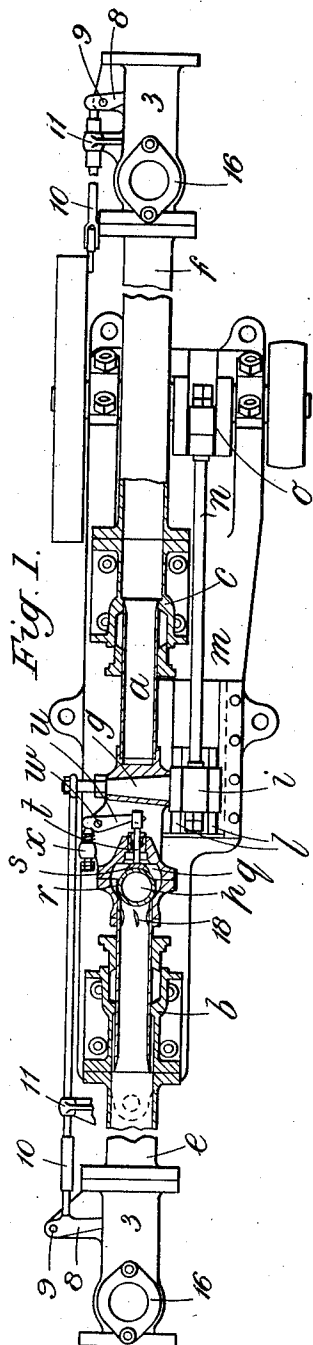


Fig. 1.

Witnesses.
Samuel Lercival
Frank J. A. Gibson

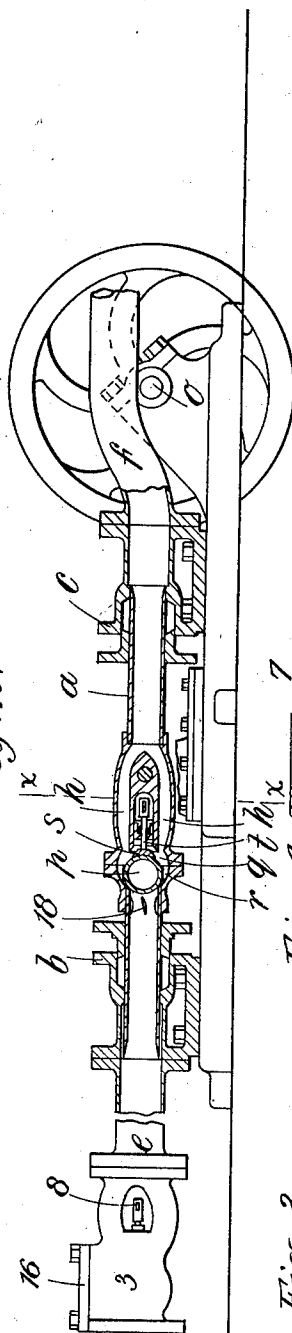


Fig. 2.

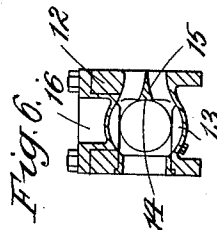


Fig. 3.

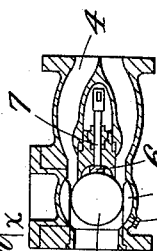


Fig. 4.

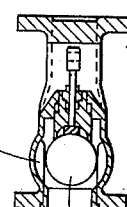


Fig. 5.

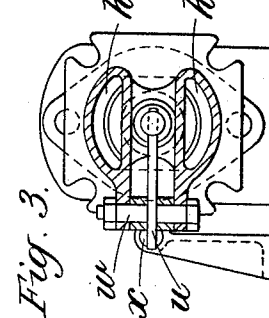


Fig. 6.

Inventor.
Thomas Thompson
By his Attorneys
Wheat & MacKuske

UNITED STATES PATENT OFFICE.

THOMAS THOMPSON, OF LONDON, ENGLAND.

PUMP AND VALVE.

1,002,788.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed August 31, 1905. Serial No. 276,534.

To all whom it may concern:

Be it known that I, THOMAS THOMPSON, a subject of the King of Great Britain and Ireland, residing at 35 New Broad street, in the city and county of London, England, have invented certain new and useful Improvements in Pumps and Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention for improvements in pumps and valves relates to pumps of that class in which a tubular barrel containing a valve is reciprocated in the suction and delivery pipes so that the water way has at all points the same sectional area, and has for its object to facilitate the operation of the reciprocating barrel, and to construct the ball valves and their boxes in such manner that the sectional area of the water way is practically the same at all points, and to provide means for operating such valves mechanically; and consists in so forming or curving the reciprocating barrel that the axis of the crosshead pin by which the reciprocating barrel is driven is in the axis of reciprocation, in constructing the valve chambers and valves so that the area of flow is uniform and free and practically in a straight line, in providing the valve chambers with webs to guide the ball, onto its seat and with a cup to limit the action of the ball and a door to enable the ball to be taken out, and in operating the valves mechanically by a cup guided axially in a hollow web extending from side to side of the chamber so as to form a bifurcated passage for the water in the valve box. It will be seen that practically the bifurcation of the water passage not only allows of the axial thrust of the connecting rod but also allows the valve to be actuated axially.

In one way of carrying out this invention the barrel is bifurcated to form two passages and the crosshead pin by which the barrel is driven is fitted in the bifurcation and is driven from the end by a single connecting rod and guided crosshead or by two connecting rods one on either end.

In a modification the reciprocating barrel is curved in such a manner as to allow of a direct axial drive through the center line of the pump itself. This curve may be a single branch or a double branch, the two

symmetrical branches separating at the beginning of the curve above the valve and meeting again at the delivery end at a point sufficiently high to clear the driving connecting rod and if desirable the crank.

The valve may be automatic or mechanically operated. When the valve is mechanically operated it is mechanically pressed down on to its seat at the end of the return stroke by means of a lever that acts on a guided stem against which the valve bears and that is operated by a spring contact pin on the frame, or equivalent means so that the valve is only mechanically operated just at the moment when it is about to fall on to its seat. If the valve is to be entirely mechanically operated it is connected to its actuating lever that is operated also at the end of the upstroke to raise the valve off the seat.

The suction and delivery valves each consist of a valve chamber that so surrounds the ball in its open position that the area of flow is the same throughout. The valve seating is formed by a metal bush screwed into the end of the valve box. The ball is guided on to its seat by ribs and below the seat are inclined fins to give the ball a rotary motion by causing the water under the ball to gyrate. A door is provided to withdraw the ball and a closed pin hole opposite the door to force the valve out. If these valves are to be mechanically operated they are formed with a bifurcated passage similar to the pump barrel and actuated in a similar manner to the above described pump barrel valve, viz., by a mechanically actuated cup guided axially in a hollow web extending from side to side of the chamber and which forms the bifurcated passage for the water passing through the valve box.

In the accompanying sheet of illustrative drawings Figure 1 is a horizontal section of a pump constructed according to this invention and Fig. 2 is a vertical section of the same. Fig. 3 is a cross section of the pump barrel just above the valve on the line *x x*. Figs. 4 and 5 are cross sections at right angles to one another of the mechanical valves. Fig. 6 is a section of an automatic valve.

The tubular barrel *a* has cylindrical ends that are adapted to reciprocate through the glands *b c* in the ends of the suction and delivery pipes *e f*. The barrel *a* is driven through the central crosshead pin *g* seated

in the solid metal of the barrel, the water passage curved to one side and back again to the axis to miss the crosshead pin. As shown the water passage is duplicated, the two passages *h* passing one on either side of the crosshead pin *g*. The water passages are shaped as shown so that their combined area is at all points equal to the area of the suction or delivery ends of the reciprocating tube and to present easy curves for the passage of the water.

As shown the crosshead pin *g* is mounted on a slide block *i* sliding in guides *l* on the bed plate *m* and operated by means of the connecting rod *n* from a crank on the main shaft *o*. If desired the barrel may be driven from the main shaft by two connecting rods, one on either side in which case the slide block and guides may be dispensed with.

The valve *p* as shown is a ball valve mechanically operated, but a simple automatic valve may be used. The ball *p* is contained in a valve chamber *q* and is guided on to its seat by the ribs or wings *r*. Immediately above the valve is the cup *s* that limits the lift of the valve and that is fixed to the rod *t* sliding in the solid metal between the passages *h*. A lever *u* fulcrumed on the pin *w* bears on the end of the rod *t* and at the end of the down stroke the outer end of the lever comes against the adjustable tappet pin *x* and firmly presses the ball *p* on to its seat.

The suction and delivery valves 2 are contained in the valve boxes 3 each formed with a bifurcated passage 4 shaped to give equal area of flow at all points. The ball is guided on to its seat by the wings or ribs 5 and the lift of the valve is limited by the cup 6 on the end of the slide rod 7 sliding in the solid metal between the passages 4. A lever 8 fulcrumed on the valve casing at 9 is operated by the rod 10 sliding in the guides 11 and connected to the crosshead pin *g*. The rod 10 is fitted with a sleeve in which is a spring stop to cushion the blow on the lever 8. At the end of the down stroke both suction, pump and delivery valves are pressed on to their seats. Either the suction or delivery valve or both may be replaced by an automatic valve.

An automatic valve suitable either for the barrel or the suction or delivery valve consists of the casing 12 surrounding the ball so as to give equal area of flow at all points. The valve casing is provided with the wings or ribs 13 guiding the ball on to its seat and

with the cup 14 supported by the ribs 15 to limit the lift. As shown the cast casing is adapted to be bored out the correct size from the seating end and then the seating is screwed in.

In all the valves a removable door 16 is provided for removing, unseating or inspecting the ball valve and a pencil hole stopped by the screw 17 for inserting a pencil to facilitate removal of the ball. Also the valve seating below the valve may be provided with inclined wings 18 to give the water and consequently the ball a rotary movement.

What I claim and desire to secure by Letters Patent is:—

1. A pump consisting of suction and delivery pipes, and a reciprocating pump barrel having cylindrical ends working in the ends of the suction and delivery pipes, a solid block in the axis of the cylindrical ends intermediate the ends, a curved water way connecting the said ends and avoiding the said block, a valve in the barrel and a pin secured in and projecting from the block and a driving means connected to the pin.

2. In a pump with mechanically operated valves the combination with the valve casing of a valve seat in the case, a bifurcated water way leading from the valve seat a solid block intermediate of the branches of the bifurcated water way and a rod arranged axially in the solid block and carrying a cup, a valve in position to engage said seat and to be engaged by said cup, and a means for operating the axial rod at the end of the pump stroke to force the valve on to its seat.

3. In a pump with mechanically operated valves the combination with the valve casing of a valve seat in the case, a bifurcated water way leading from the valve seat, a solid block intermediate of the branches of the bifurcated water way, a rod arranged axially in the solid block, and carrying a cup, a valve in position to engage said seat and to be engaged by said cup, a means for operating the axial rod at the end of the pump stroke to force the valve on to its seat and a removable door.

In testimony whereof I affix my signature, in presence of two witnesses.

THOMAS THOMPSON.

Witnesses:

FREDK. L. RAND,
A. NUTTING.