

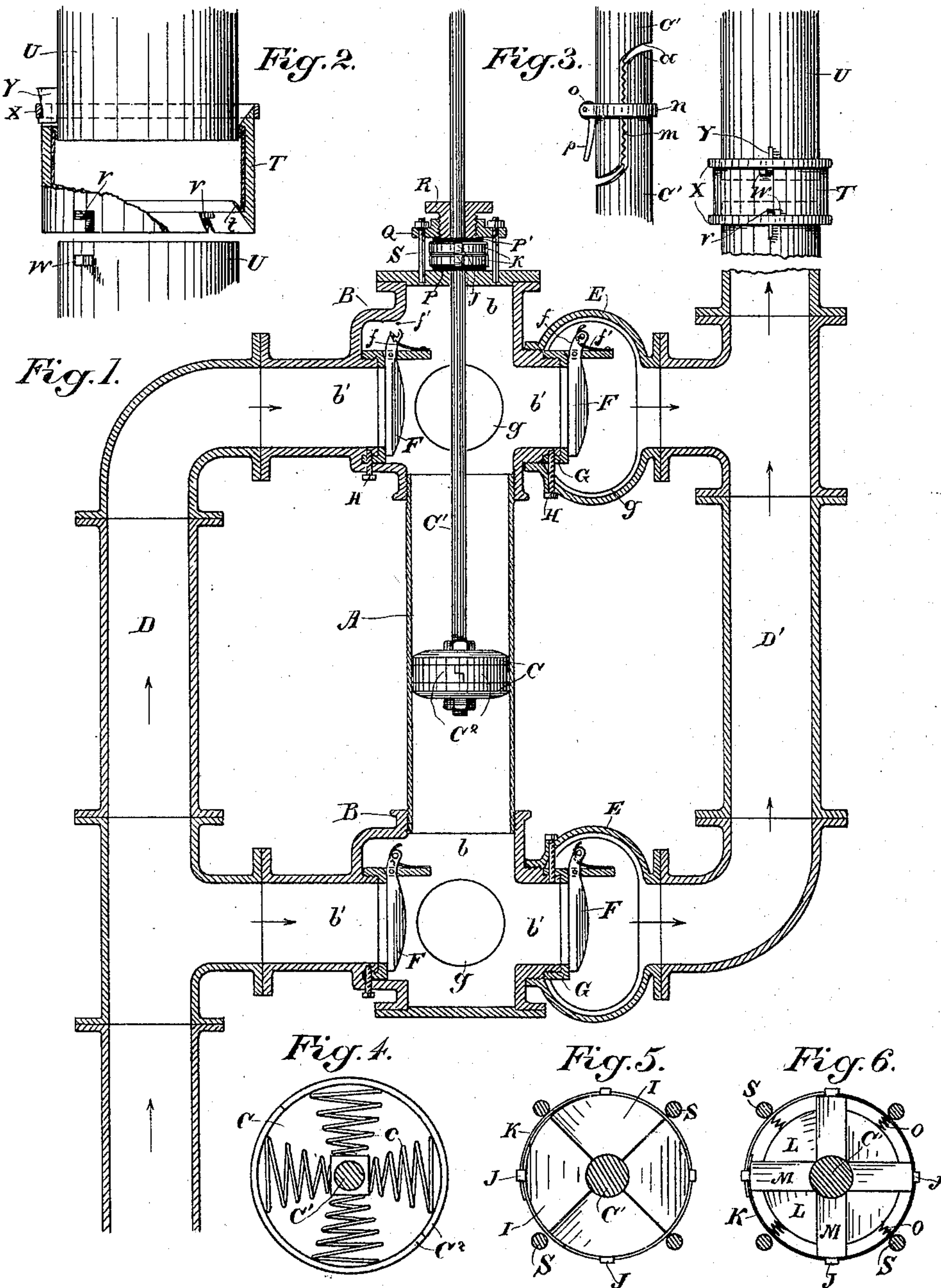
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T. J. SPARKS.  
PUMP.

(Application filed Feb. 14, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## PUMP.

SPECIFICATION forming part of Letters Patent No. 638,890, dated December 12, 1899.

Application filed February 14, 1899. Serial No. 705,480. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. SPARKS, a citizen of the United States, residing at Magalia, county of Butte, State of California, have invented an Improvement in Pumps; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in double-acting pumps.

It consists, essentially, in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the pump. Fig. 2 is a detail of the pipe connections. Fig. 3 shows the manner of connecting the pump-rod sections. Fig. 4 is a top view of the plunger, the upper disk being removed. Figs. 5 and 6 are details of the pump-rod packing.

The object of my invention is to provide improvements in that class of pumps having a plunger reciprocating in the pump-cylinder and two sets of suction and discharge pipes and valves connecting, respectively, with the opposite ends of the cylinder, discharging into a common conductor, thus making a double-acting pump.

The body of my pump consists of a steel cylinder A, within which the plunger reciprocates. This cylinder is detachably connected at opposite ends with the cast heads B. These heads are in the form of a cross, having two extensions *b* in line with the cylinder A, the lower one of which is closed. The upper one receives the upper cylinder-head, with its stuffing-box, through which the plunger-rod passes. At right angles with these extensions are the extensions *b'*. The upper and lower extensions *b'* on one side connect with the suction and inlet pipe D, while the two upon the opposite side connect with the discharge conveying-pipe D'. The extensions *b* and *b'* on the cast heads B are screw-threaded upon the outside. These extensions are adapted to receive the inner ends of the globular valve-casings E, which have cylindrical screw-threaded extensions fitting upon the extensions *b'*, so that they are easily attached and removed. The valves F are hinged to a seat having annular flanges G, the interior of which are screw-threaded, and these also fit

upon the screw-threaded portion of *b'*, so that they may be screwed on or removed. When screwed down and seated, they are locked in place by screw-bolts H, which pass through the flanges G and into the part *b'*.

The valves F have curved extensions *f* to the rear of their pivot or hinge points, with antifriction-rollers, and these are engaged by springs *f'*, as shown. These springs exert a tension when the valve is opened, so that as soon as the water ceases flowing through the valve it will be quickly closed and the backward movement of water reduced to a minimum. Hand-holes *g* are made in the valve-chambers E, so that by removing an exterior cap access may be had to the valve for any small repair.

The pipes D and D' are flanged and are bolted to corresponding flanges upon the outer ends of the valve-chambers, so that if it is desired to obtain access to the interior of the valve-chambers it is only necessary to remove the sections D D', to then remove the bolts H, and finally to unscrew the valve-seats from the extensions *b'*, and, if necessary, the valve-chambers E can be removed in the same manner. This provides for easy access to all the parts, and if for any reason the pump-cylinder A needs repair or renewing it can be removed from the heads B, and repairs can thus be made with a minimum of labor and material. The interior of the heads B can also be reached from the outside by means of hand-holes opening thereinto and covered with suitable hand-hole plates. The plunger consists of two circular heads or disks C and a hub or central portion of rectangular form, and the plunger-rod C' is secured thereto. Between these heads are the metallic rings C<sup>2</sup>, made in halves, with angular joints, as shown, and these are held in place concentrically by reason of their fitting within the pump-cylinder. They are forced outwardly to preserve a close working fit in the cylinder by means of springs *c*, the inner ends of which abut against the inner faces of the rim-sections C<sup>2</sup> and the inner ends against the rectangular hub or portion, which lies between the heads C C. The angular joints in the piston-ring sections allow them to be separated by the pressure of the spring *c*, and thus



compensate for any wear of the rings and to maintain a tight joint.

In order to pack the piston-rod where it passes through the cylinder-head, I have shown 5 packing-sections of two kinds fitting around the rod. One of these sections is made in quarters or other subdivisions, as shown at I, and these have loops J fixed around their peripheries, and through this an inclosing circular spring K is passed. The ends of this 10 spring overlap, and it is so adjusted that it has a constant tendency to compress the sections I against the rod. The other packing-ring is made with similar quadrant-sections 15 L, and intermediate between these are radial straight sections M, the inner ends of which fit against the rod, as shown. Upon the outer ends of these sections M are loops J similar to those previously described, and through these 20 loops a spiral spring K, also similar to the one formerly described, is passed. The action of this spring, as before stated, is to force the radial sections M against the plunger-rod. The exterior diameter of the sections L is less 25 than the diameter across the sections M, so that a space is left between the periphery of the sections L and the interior of the spring K. Within this space the spiral springs O are fixed, and the outer ends of these springs 30 press against the surrounding spring K, while the inner ends press against the sections L, and thus force them into the angles between the previously-described sections M. The lowermost of these two sections fitting around 35 the rod C' rests upon a rubber or other flexible gasket P, which lies upon the cylinder-head. Above the upper packing-rings is another gasket P', and upon this rests a flanged disk Q. Into this disk screws the gland R, 40 through which the plunger-rod C' passes. The disk Q is secured to the cylinder-head by bolts S, which are screwed into the cylinder-head, and suitable nuts screwing down upon their outer ends compress the gaskets P P' 45 and the packing-rings I, M, and L, so that no leakage will take place around the plunger-rod. The bolts S are the only supports for the packing, and there is no exterior chamber or casing into which these parts are fitted, as 50 in the usual construction of packing.

The pipe-sections employed in this pump are jointed as follows: T is a coupling-sleeve having an interior flexible and elastic lining, which has beveled or interior flanges, as shown 55 at *t*. The inner periphery of these flanges is normally of smaller diameter than that of the pipe-section U which is to be coupled. A section of pipe being slipped into each end of the coupling T will be clasped closely by the 60 elastic section *t*, and thus form a tight joint. In order to hold the parts in place, I have shown a locking-joint of what is termed the "bayonet" pattern. Right-angled slots V are made upon opposite sides of the coupling- 65 section T, and the pipe-sections U have upon them lugs W, which are adapted to slip into the slot V to the bottom. Then by turning one

or the other of the parts the lugs W are moved into the horizontal portion of the slot, and they are then locked in place by means of a key 70 Y, which has a hook end and which engages a clamping-ring X, as shown in Figs. 1 and 2, and prevents the parts from being separated.

This pump is designed for deep mines and 75 like localities, and the plunger-rod extensions or sections, which are usually made of wood and square in cross-section, are connected at the ends of the sections as follows: An S-shaped curve is made upon the meeting ends 80 of each of the sections, as shown at *a*, and the inner surfaces of these curves are lined with metal, with teeth or corrugations *m* projecting from the faces of the curved ends along that portion which is approximately parallel 85 with the sides and which extends between the outer ends of the curves. When the sections are put together, these teeth *m* interlock. The band *n* is fitted to surround the two sections thus placed together, and by means of 90 a cam *o* and a lever *p* this band is drawn tightly and the interlocking teeth *m* are forced together, and the corresponding curves *a*, which form the continuation, fitting together the rods will stand in line with each other and 95 will be very strongly locked together.

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

1. A double-acting pump consisting of in- 100 dependent heads in the form of cross-couplings, a detachable cylinder connecting one head with the other, and a pump-plunger adapted to reciprocate within said cylinder, said heads having lateral extensions, enlarged 105 valve-chambers fitted to said extensions, removable valve-seats fitting said extensions and located interior to said chambers, valves removable with said seats and having tail extensions projecting into the chambers, and 110 springs within said chambers and acting against said tail extensions to quickly close the valves, and bolts passing through the walls of the enlarged chambers and walls of the valve-seats and detachably fixing the 115 chambers and seats to the extensions of the cross-couplings.

2. In a pump of the character described, a pump-cylinder, the heads in the form of cross-couplings, enlarged valve-chambers adapted 120 to screw upon the head extensions which are transverse to the line of travel of the piston, valve-seats within said enlarged chambers and also screwing upon said extensions, valves hinged thereto having tail extensions beyond 125 the hinges and projecting into the enlarged chambers and springs carried by the valve-seats and engaging said extensions substantially as herein described.

3. In a pump of the character described, 130 independent upper and lower heads in the form of cross-couplings, and having lateral extensions from both sides, a detachable cylinder connecting one head with the other and



a pump-plunger to operate in the cylinder and a discharge-pipe on the opposite side of said cylinder, enlarged valve-casings connecting the pipes with the lateral extensions of both heads, valve-seats threaded upon said extensions interior to the valve-casings and valves carried by said seats, and means for fixing the casings and valve-seats to the extensions after they have been screwed into position.

4. In a pump of the character described, the pump-cylinder, a plunger adapted to reciprocate in the pump-cylinder, a plunger-rod connecting therewith and packing consisting of sectional rings surrounding the plunger-rod, exterior surrounding springs by which said rings are compressed upon the rod, gaskets fitting respectively between the lower set

of packing-rings and the cylinder-head and between the upper packing-rings and the gland-carrying head through which the plunger-rod passes, one of said sets of packing-rings comprising quadrant-sections and intermediate radial straight sections and a spring for each quadrant-section and interposed between said section and the exterior surrounding spring and bolts extending through said head and into the cylinder-head whereby the parts are held together and a joint formed therewith.

In witness whereof I have hereunto set my hand.

THOMAS J. SPARKS.

Witnesses:

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