(No Model.)

2 Sheets—Sheet 1.

W. E. EBY.

STEAM PUMP.

No. 330,571. Patented Nov. 17, 1885.

Fig. 1.

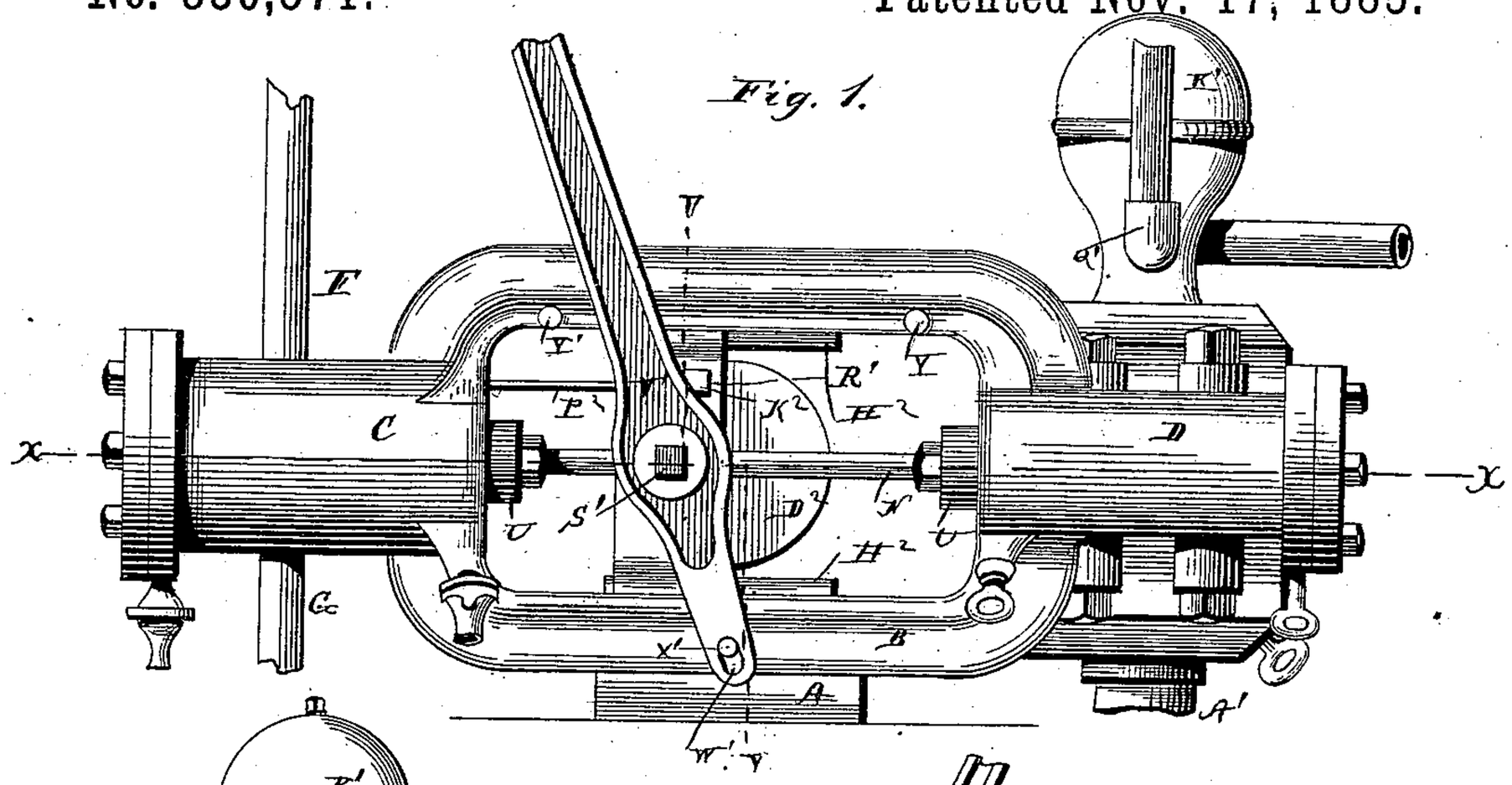


Fig. 2.

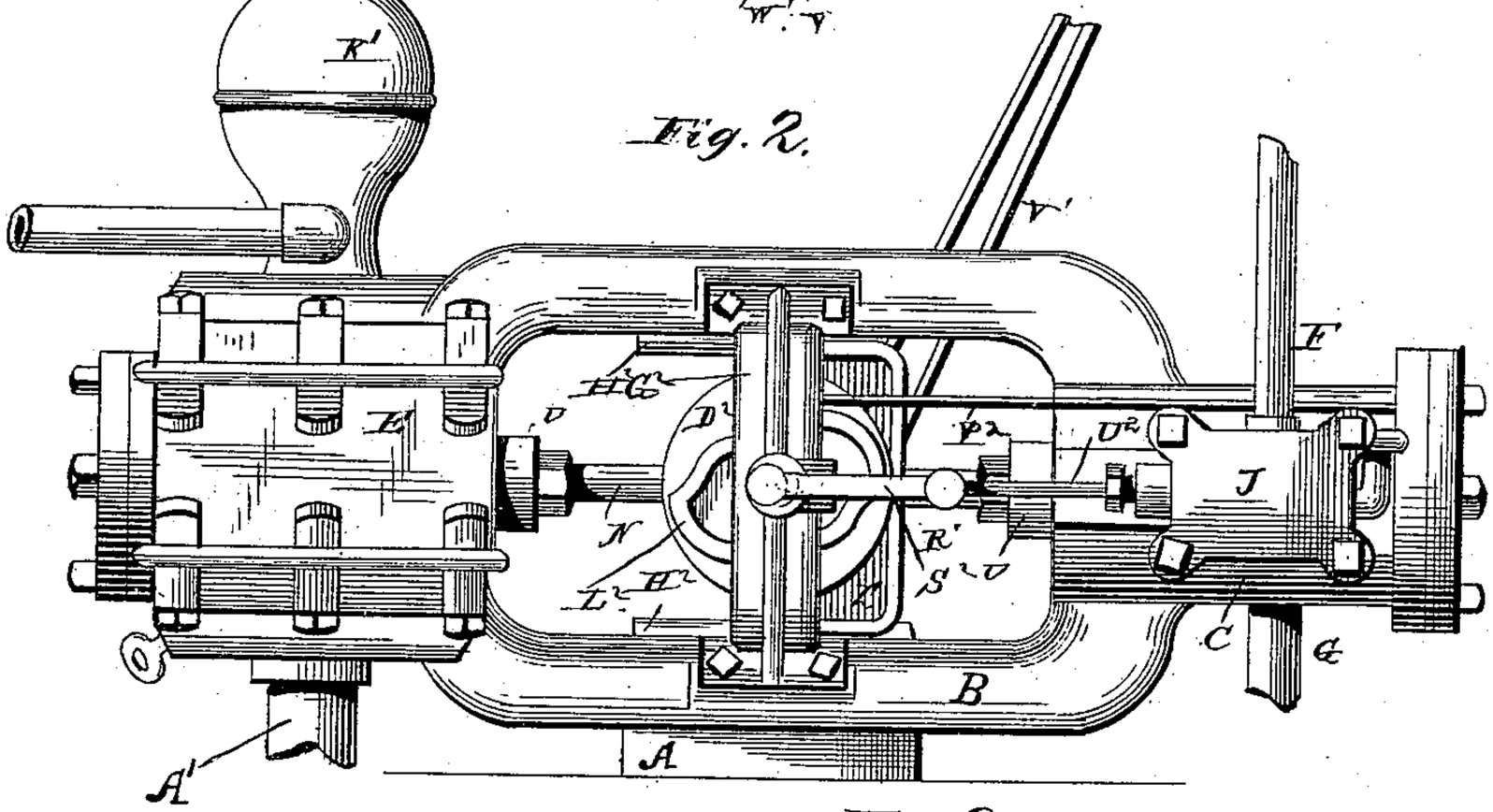


Fig. 3.

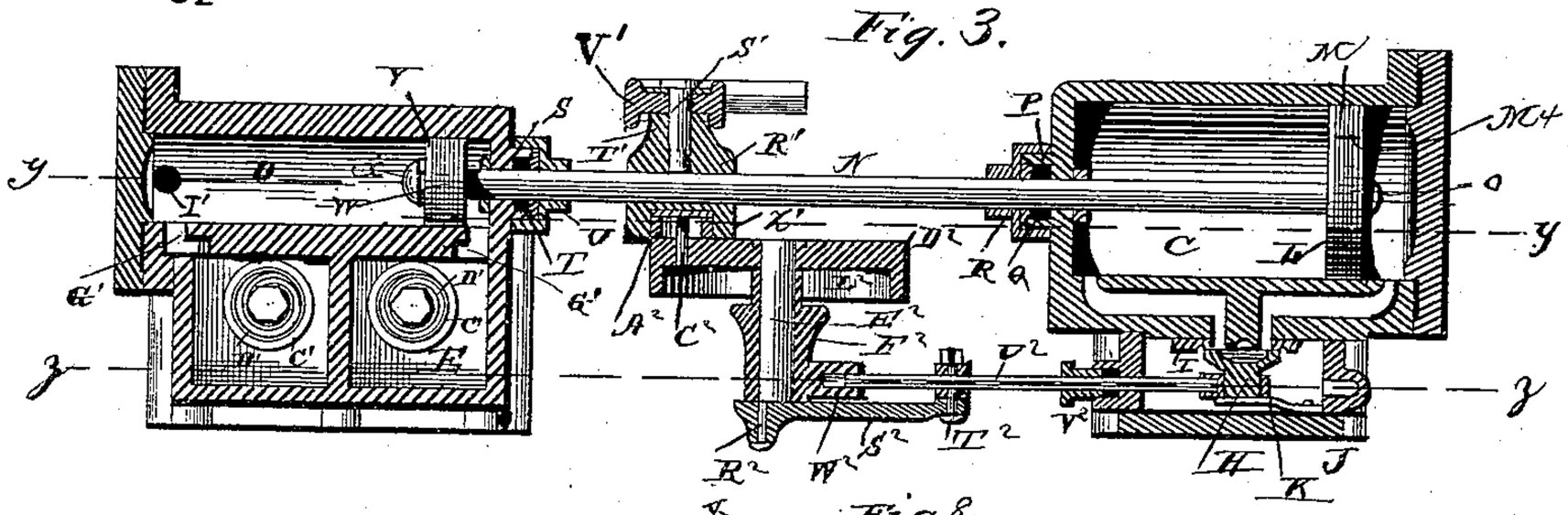
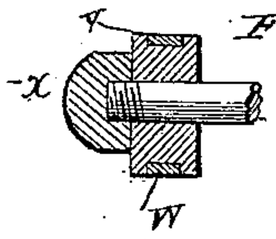


Fig. 8.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

W. E. EBY.

STEAM PUMP.

No. 330,571. Patented Nov. 17, 1885.

Fig. 4.

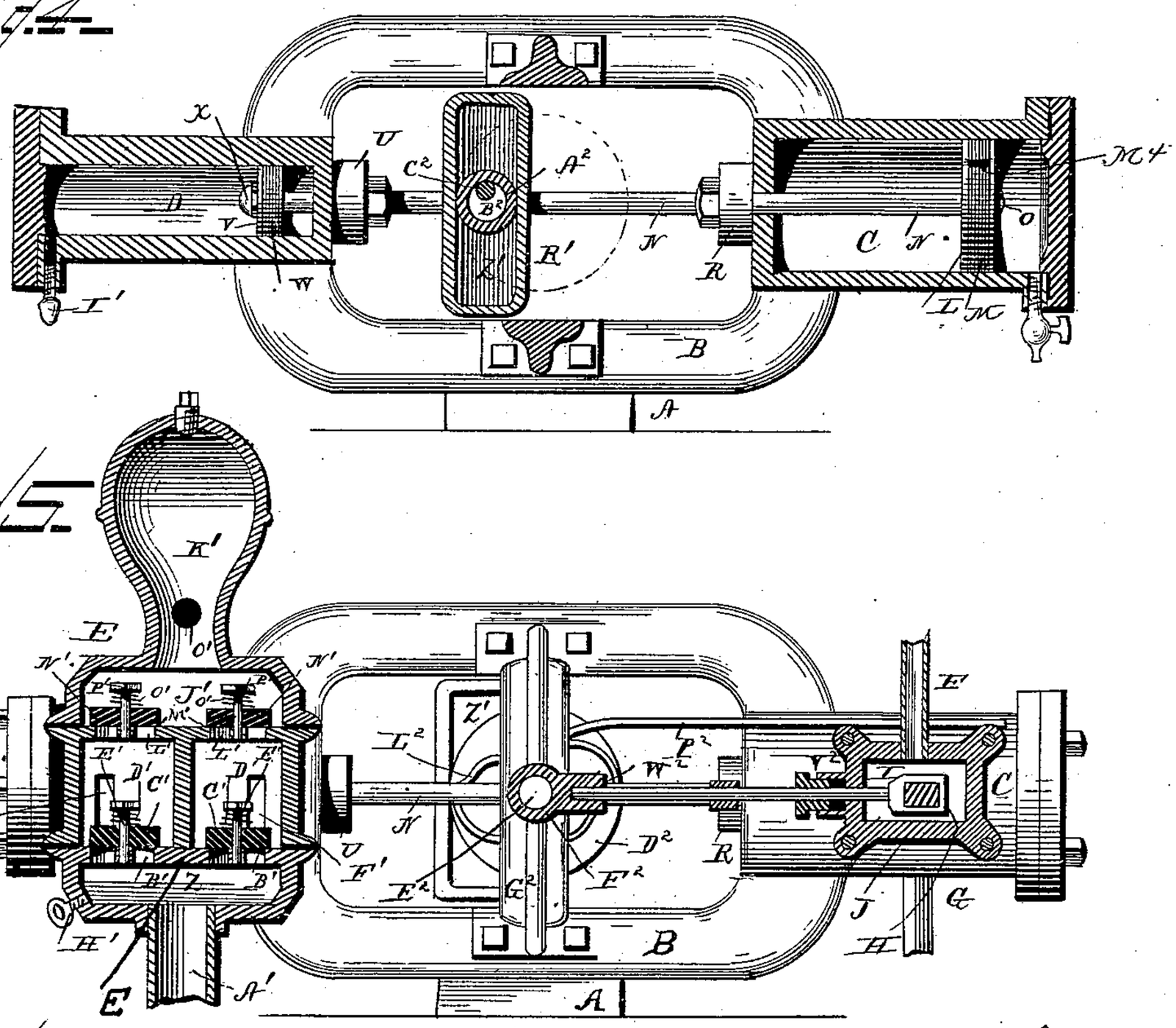


Fig. 5.

Fig. 6.

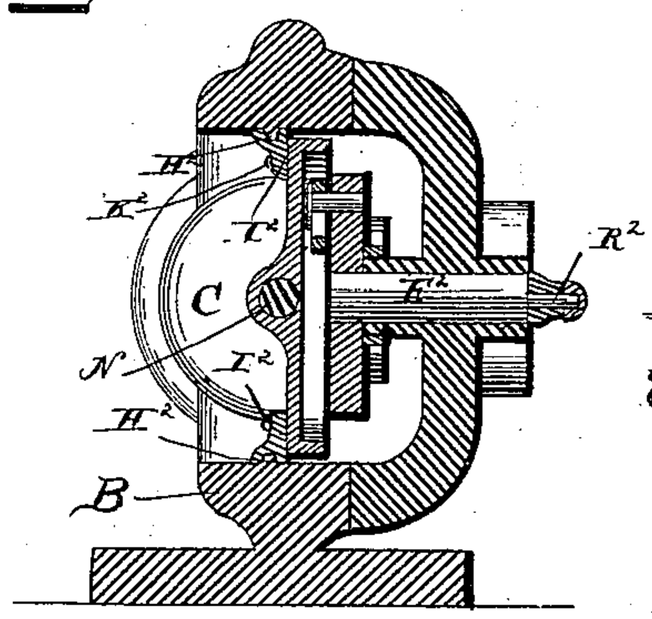
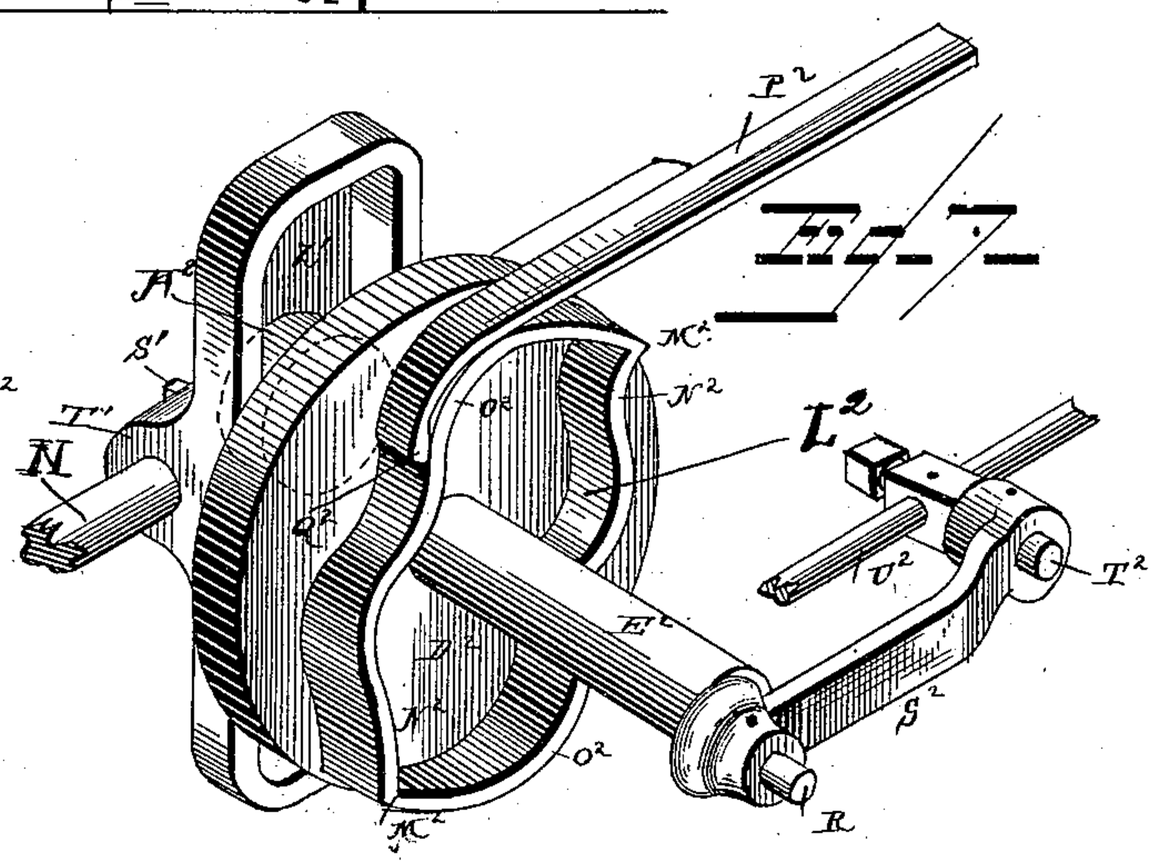


Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALTON E. EBY, OF FRANKLIN, OHIO.

STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 330,571, dated November 17, 1885.

Application filed July 6, 1885. Serial No. 170,764. (No model.)

To all whom it may concern:

Be it known that I, WALTON E. EBY, a citizen of the United States, and a resident of Franklin, in the county of Warren and State of Ohio, have invented certain new and useful Improvements in Steam-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side view of my improved steam-pump. Fig. 2 is a similar view from the opposite side. Fig. 3 is a horizontal sectional view on line *x x*, Fig. 1. Figs. 4 and 5 are longitudinal vertical sections on lines *y y* and *z z*, Fig. 3. Fig. 6 is a vertical cross-section on line *v v*, Fig. 1. Fig. 7 is a detail view of the cam-disk, its spring, the eccentric and valve rod, and the cross-head, crank-pin, and disk or washer, showing the latter parts in dotted lines; and Fig. 8 is a transverse sectional view of the piston, showing the manner of securing the same to the end of the piston-rod.

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

My invention has relation to direct-acting steam-pumps; and it consists in the improved construction and combination of parts of the same, as hereinafter more fully described and claimed.

In the accompanying drawings, the letter A indicates the base of the machine, which is cast in one piece with the oblong frame B, which forms the guides for the cross-head of the piston-rod, and this frame has cast integral with it the steam-cylinder C and the pump-cylinder D, with its laterally-extending valve-seat portion E. The steam-cylinder is provided upon its side with the valve-chest having the usual live steam and exhaust pipes, F and G, and a common slide-valve, H, slides upon a seat, I, within the said valve-chest J, and is kept bearing against its seat by means of a curved spring, K, secured to the top of the valve-chest and bearing with its free slightly curved end against the top of the valve. The piston L in the steam-cylinder is provided with a steel packing-ring, M, open at one side, M^4, and sprung upon the piston, and the piston-rod N is secured to the piston by means of a cap-nut, O, screwed upon the threaded end of the piston-rod, which projects through the piston. The piston-rod passes out at the inner end of the steam-cylinder through a stuffing-box, P, integral with the inner head of the cylinder, which head is integral with the cylinder, while its outer head is removable, and the said stuffing-box is formed by means of a gland, Q, and a screw-cap, R. The inner head of the pump-cylinder D is also integral with this cylinder, while its outer head is removable, and the said inner head is provided with a stuffing-box, S, having a gland, T, and a screw-cap, U, similar to the steam-cylinder stuffing-box.

The pump-piston V is provided with a flexible packing, W, of rubber, leather, or similar material, and is secured to the end of the piston-rod by means of a cap-nut, X, fitting upon the threaded end Y of the piston-rod passing through the pump-piston. The suction-chamber Z of the pump has the suction-pipe A′, secured into it, and is secured upon the under side of the valve-seat portion E of the pump-cylinder, and the said valve-seat portion has seats B′ for the suction-valves C′, which are kept down upon their seats by means of spiral springs D′, wrapped around stems E′, and which open into the feed-passages F′, which enter the cylinder through the ports G′ at the ends of the cylinder. The suction-chamber is provided with a drain-plug, H′, through which the water may be drained when the pump is stopped, preventing freezing of the pump in cold weather, and the pump-cylinder is likewise provided with a drain-plug, I′, for the same purpose. The delivery-chamber J′ and the air-chamber K′ are cast in one piece, and the delivery-passages L′, which deliver the water from the ends of the pump-cylinder to the delivery-chamber, are provided with valve-seats M′, upon which play outwardly-opening valves N′, having spiral springs O′, wrapped around their stems P′. The delivery-pipe Q′ opens from the lower portion of the air-chamber in the usual manner. The piston-

rod is provided with a cross-head, R′, at its middle, which cross-head is secured to the rod by means of a set-screw, S′, which passes through the end of a laterally-projecting lug, T′, upon the middle of the cross-piece, upon which lug a box, U′, in a handle or lever, V′, may fit, the lower end of the said lever being provided with a slot, W′, which rocks and slides upon a stud, X′, projecting from the bottom piece of the frame B, so that by rocking the said lever the piston-rod and the pistons may be reciprocated when the pump is to be operated by hand. The top piece of the frame B is provided with two laterally-projecting lugs, Y′, which confine the stroke of the hand-lever. The inner face of the cross-head is formed into a box, Z′, within which a roller or disk, A^2, may reciprocate vertically, and this roller has a central bore or aperture, B^2, of a diameter somewhat larger than the diameter of a wrist-pin, C^2, projecting laterally from the face of a disk or fly-wheel, D^2, which is secured upon the inner end of a short shaft, E^2, journaled in a bearing, F^2, in the middle of a yoke, G^2, secured at its ends to the top and bottom pieces of the oblong frame B. The inner sides of the top and bottom pieces of this oblong frame are provided with V-shaped ribs, H^2, upon which ribs or ways the inverted V-shaped ends of two blocks, I^2, slide, which blocks are provided with vertical slots, through which pass screw-bolts K^2 into the outer side of the cross-head, the said ways and blocks forming guides for the cross-heads, in which wear may be taken up by adjusting the blocks outward by means of the screw-blocks passing through the vertical slots. The other face of the fly-disk is provided with a cam-flange, L^2, forming two diametrically-opposite sharp points, M^2, at points at right angles to the point from which the wrist-pin projects from the disk, and the flange forms two steep portions, N^2, to the rear of the points, at the inner ends of which the flange forms two outwardly curved or bulging portions, O^2. The outer free end of a strong flat spring, P^2, is formed into a round head, Q^2, and bears against the outer side of this cam-flange, while its inner end is secured to the top of the valve-chest, and the outer end of the shaft E^2 projects through its bearing, and is formed into a small eccentric pin, R^2, upon which the head of a connecting-rod, S^2, is pivoted, the inner end of which rod is pivoted to a pin, T^2, projecting laterally from the valve-rod U^2, the said rod passing through a stuffing-box, V^2, in the end of the valve-chest, while its outer end reciprocates in a box, W^2, projecting at a right angle from the shaft-bearing F^2. It will now be seen that the points of the cam-flange will pass under the end of the spring at each end of the stroke of the piston-rod, and the end of the spring bearing against the steep portion of the flange will force the fly-disk and its shaft slightly forward in its revolution, causing the eccentric pin at the end of the shaft to shift the slide-valve and change the direction of the stroke of the piston-rod, the roller upon the wrist-pin having a bore of a larger diameter than the pin, allowing the fly-disk to be revolved by the spring over the dead-centers, the cam and spring in this manner preventing any possibility of stoppage on dead-centers.

It will be seen that by casting the cylinders, the guide-frame, and the base in one piece the said parts are rigidly connected beyond any possibility of becoming displaced, while at the same time the construction and manufacture of the machine are cheapened and simplified, and the same may be said about the delivery-chamber and air-chamber being cast in one piece.

Any wear upon the blocks, upon the cross-head, or upon the guides may be taken up by adjusting the blocks upon their screw-bolts; and by the construction of the several parts of the machine and their arrangement the machine is brought to consist of few parts, which may easily be separated, and which are all protected from wear and exposure.

When it is desired to operate the pump by hand, the hand-lever may be put in place with its slot upon the lug at the bottom piece of the guide-frame and with its box upon the stud upon the cross-piece, and by rocking the lever the piston-rod may be reciprocated and the pump operated.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a steam-pump, the combination, with the guide-frame, of a yoke having a recess in one side, a slide-valve rod, one end of which works in said recess, and a shaft journaled in the yoke and having an eccentric pin at one end for operating said slide-valve rod, substantially as and for the purpose set forth.

2. In a steam-pump, the combination, with a cross-head provided with a flanged box, of a roller sliding vertically therein and having a central aperture, and a pin, of less diameter than the aperture in said roller, moving therein and operated thereby, substantially as and for the purpose set forth.

3. In a steam-pump, the combination, with a cross-head having a vertically-extending box, of an apertured roller sliding therein, a shaft journaled at right angles to said cross-head and having a fly-wheel secured thereon, and a pin, of less diameter than the aperture in said roller, projecting from one side of said fly-wheel and engaging therewith, substantially as and for the purpose set forth.

4. In a steam-pump, the combination, with the cylinders and guide-frame, of a common piston-rod having a piston on each end, a cross-head near its middle, a yoke secured upon said guide-frame, a shaft journaled in said yoke and having a fly-wheel secured upon one end and an eccentric at the other, said fly-wheel having a wrist-pin upon one side, which engages with the said cross-head, and a cam-flange upon the other, said cam-flange

having two diametrically-opposite sharp points at right angles to the wrist-pin, and having two sharp steep recesses to the rear of said points, and a spring bearing with its free end against the said cam-flange, substantially as and for the purpose set forth.

5. In a steam-pump, the combination, with the cylinders and guide-frame, of a common piston-rod having a piston on each end, a cross-head near its middle, one face of said cross-head being formed into a flanged vertically-extending box, a roller sliding vertically therein and having a central aperture, a yoke secured upon said guide-frame, a shaft journaled therein and having a fly-wheel at one end and an eccentric at the other, said fly-wheel having a wrist-pin upon one side and a cam-flange upon the other, said wrist-pin being of a smaller diameter than the aperture in said roller and engaging therewith, and a spring bearing against said cam for forcing the fly-wheel slightly forward at the ends of the stroke of the cross-head, substantially as and for the purpose set forth.

6. In a steam-pump, the combination, with the cylinders and guide-frame, of a piston provided with a cross-head working in the same, a yoke secured to said guide-frame and having a shaft journaled therein, said shaft having a fly-wheel secured to one end, said fly-wheel engaging with the piston-rod and provided with a flanged cam, as described, and a spring bearing with its free end upon said cam, the other end of said shaft having a pin turned thereon to one side of the center, a valve-rod, the outer end of which works in a recess in said yoke, and an eccentric connecting said pin and said valve-rod, substantially as and for the purpose set forth.

7. In a steam-pump, the combination, with the cylinders and guide-frame, the inner facing sides of which guide-frame are provided with V-shaped guide-ribs, of a common piston-rod provided with pistons and a cross-head, slotted blocks having V-shaped grooves in their ends, screw-bolts passing through said slots into said cross-head, and means for admitting and discharging steam to and from one cylinder and water to and from the other, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WALTON E. EBY.

Witnesses:
MARTIN W. EARHART,
JOHN SIEGFRIED.