(No Model.) 2 Sheets—Sheet 1.

D. F. LEPLEY.

STEAM PUMP.

No. 471,870. Patented Mar. 29, 1892.

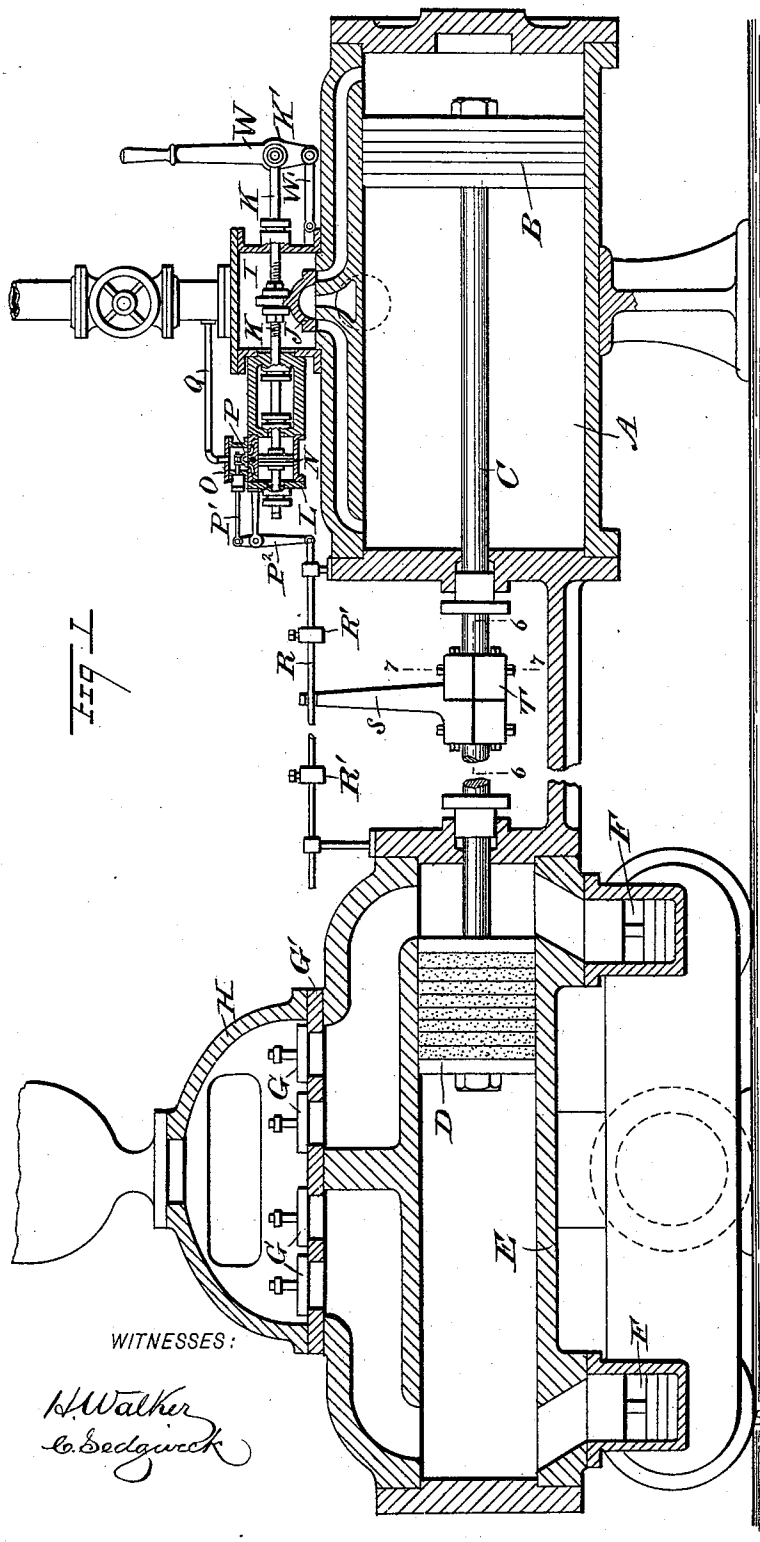

Fig. 1.

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C. Sedgwick

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(No Model.) 2 Sheets—Sheet 2.

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Fig 2

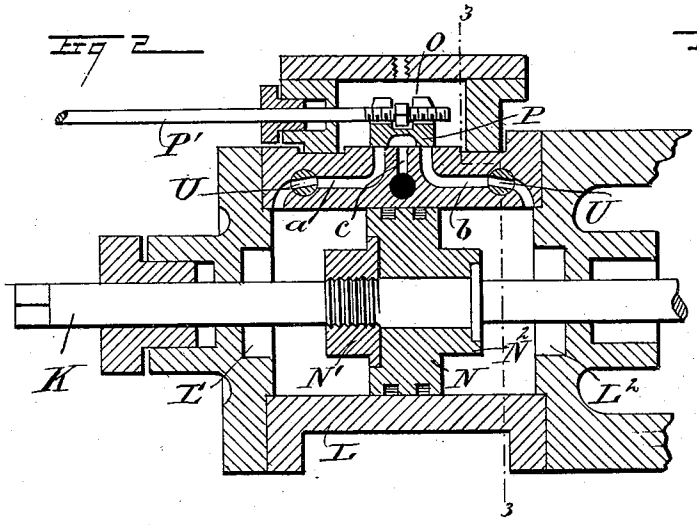


Fig 3

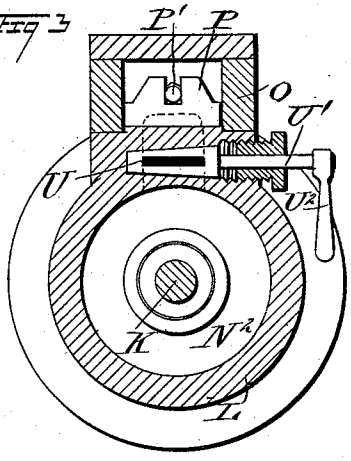


Fig 4

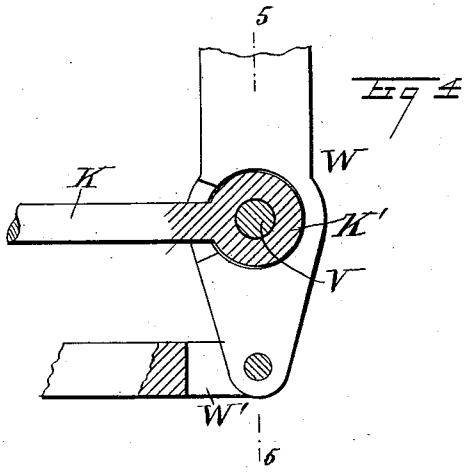


Fig 5

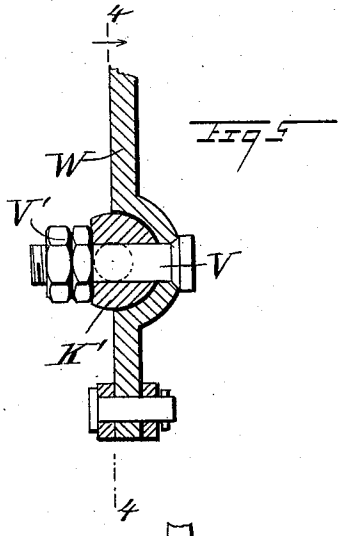


Fig 6

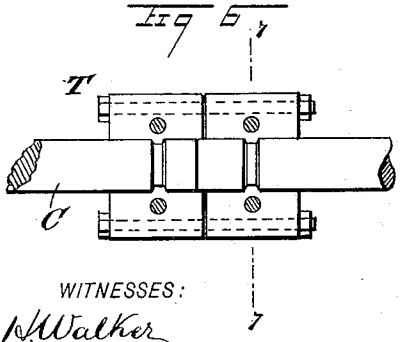


Fig 7

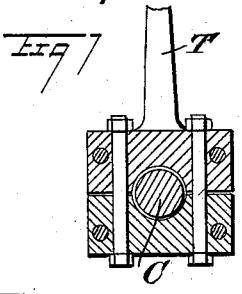
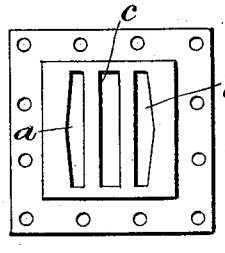


Fig 8



WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

DANIEL F. LEPLEY, OF CONNELLSVILLE, PENNSYLVANIA.

STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 471,870, dated March 29, 1892.

Application filed May 14, 1891. Serial No. 392,712. (No model.)

To all whom it may concern:

Be it known that I, DANIEL F. LEPLEY, of Connellsville, in the county of Fayette and State of Pennsylvania, have invented a new and Improved Steam-Pump, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved steam-pump which is simple and durable in construction, very effective in operation, not liable to get out of order or clogged up, and arranged to prevent undue jarring when the pistons reverse.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is an enlarged sectional side elevation of the auxiliary engine. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2. Fig. 4 is an enlarged sectional side elevation of the device for regulating the motion of the main slide-valve, taken on the line 4 4 in Fig. 5. Fig. 5 is a transverse section of the same on the line 5 5 of Fig. 4. Fig. 6 is an enlarged sectional plan view of the clamp for the piston-arm, taken on the line 6 6 of Fig. 1. Fig. 7 is a transverse section of the same on the line 7 7 of Figs. 1 and 6, and Fig. 8 is an enlarged plan view of the steam-chest for the main cylinder.

The main steam-cylinder A is provided with the usual piston B, connected by the main piston-rod C with the pump-piston D, fitted to slide in the pump-cylinder E, provided with the usual suction-valves F and the discharge-valves G, which latter are held on a valve-plate G′, secured to the top of the cylinder E and cased in on top by the discharge-cap H.

The main steam-cylinder A is provided with the usual steam-chest I, in which is fitted to slide the main slide-valve J, operating over the usual ports in the cylinder A. The main slide-valve J is connected with the valve-stem K, passing through suitable stuffing-boxes in the steam-chest I, and also forming the piston-rod for a piston N of an auxiliary engine adapted to actuate the main slide-valve J. The piston N of the auxiliary engine is fitted to slide in a cylinder L, supported from the steam-chest I and provided with the inlet-ports *a* and *b* and the exhaust-ports *c*, opening into the steam-chest O, held on the cylinder L.

In the steam-chest O, over the ports *a*, *b*, and *c*, is fitted to slide the slide-valve P, connected by a valve-stem P′ with a lever P^2, pivotally connected with a rod R, fitted to slide longitudinally in suitable bearings on the cylinders A and E. (See Fig. 1.) On the rod R are held adjustably the usual blocks R′, adapted to be alternately engaged by an arm S, secured by bolts on a cross-head T, clamped on the main piston-rod C between the cylinders A and E. The steam-chest O derives its motive agent through a pipe Q, connected with either the inlet-pipe of the main steam-chest I or with the latter itself. The exhaust of the auxiliary engine is connected with the exhaust-pipe of the cylinder A.

In the inlet-ports *a* and *b* of the auxiliary engine are arranged stop-cocks U, each of which has its valve-stem U′ extending to the outside of the cylinder, the outer end carrying a handle U^2 for conveniently adjusting each stop-cock, so as to permit more or less live steam to pass from the steam-chest O to the cylinder L of the auxiliary engine. By this means the speed of the auxiliary engine can be regulated to any desired degree, so that the slide-valve J is actuated with greater or less velocity, thus regulating the speed of the entire pump.

The piston N of the auxiliary engine is held in place at one end by a nut N′, which forms an offset adapted to fit into a corresponding recess L′ in one end of the cylinder L. The piston N is provided on the opposite side with a similar offset N^2, adapted to fit into a recess L^2 in the other cylinder-head. The offsets N′ and N^2 of the piston N strike the cylinder-heads before the piston N covers the respective ports *a* and *b*, so that the motive agent has full access to the cylinder as soon as the valve P uncovers the respective ports. It is understood that the steam in the recesses L′ and L^2 forms a cushion for the offsets, so

that no jarring motion takes place at the time the piston N is at the end of its stroke. The valve-stem K of the main slide-valve J is also extended in an opposite direction, as shown in Fig. 1, this outer end of the valve-stem being formed with a ball K′, fitting partly into a correspondingly-shaped socket in a lever W, the said ball and lever being connected with each other by a bolt V, having its nuts V′ screwing on a flattened portion of the ball K′. (See Figs. 4 and 5.)

The lever W is pivotally connected with a link W′, pivoted on the steam-chest I. The ball K′ and its socket are preferably made of steel and tempered so as to be very durable. By adjusting the nuts V′ on the bolt V any desired friction may be given to the ball and its socket, so that the speed of the slide-valve J is increased or diminished, as desired, it being understood that the ball K′ turns in the socket on the forward and backward motion of the main slide-valve J.

It is further understood that to make the pump reverse easily the main slide-valve J must not travel faster over the ports than the piston moves in the cylinder, so as to admit steam very gradually into the cylinder while the suction-valve of the pump is closing and the discharge-valves are opening. By this arrangement the jarring consequent upon throwing the full pressure of the steam against the column of water suddenly is entirely overcome, as the friction between the ball K′ and the socket in the hand-lever W prevents a rapid motion of the valve J.

As shown in Fig. 8, the outside edges of the inlet-ports for the main cylinder A are beveled, while the ends of the slide-valve are square, so that the motive agent is admitted gradually into the cylinder at the time the pump is reversing, thus reducing the jarring motion.

It will be seen that the valve-stem K is so arranged relative to the valve J that they can be readily taken apart and the said valve removed when necessary without disturbing any other parts of the pump, except removing the steam-chest cover. It will further be seen that the auxiliary steam-cylinder is separated by a special center casting from the main steam-chest, the said center casting carrying the stuffing-boxes for the stem K to prevent leakage of steam from the cylinder to the chest, and vice versa.

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

1. In a steam-pump, the combination, with the main slide-valve, of a valve-stem connected with the said main slide-valve and formed at one outer end with a ball, a lever having a socket engaged by the said ball, and a bolt for fastening the said ball into the said socket, substantially as shown and described.

2. The combination, with the cylinder L, having end recesses L′ L^2, of the piston N, having an integral offset N^2 at one end cushioning in the recess L^2 and at its opposite end provided with a separate offset N′, cushioning in recess L′ and having a central threaded aperture, and the rod K, passing through the piston and its offsets and provided with a collar bearing on the offset N^2 and screw-threaded to engage said threaded aperture, substantially as described.

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