(No Model.)

E. L. REESE.

OPERATING VALVES OF STEAM CYLINDERS.

No. 294,807. Patented Mar. 11, 1884.

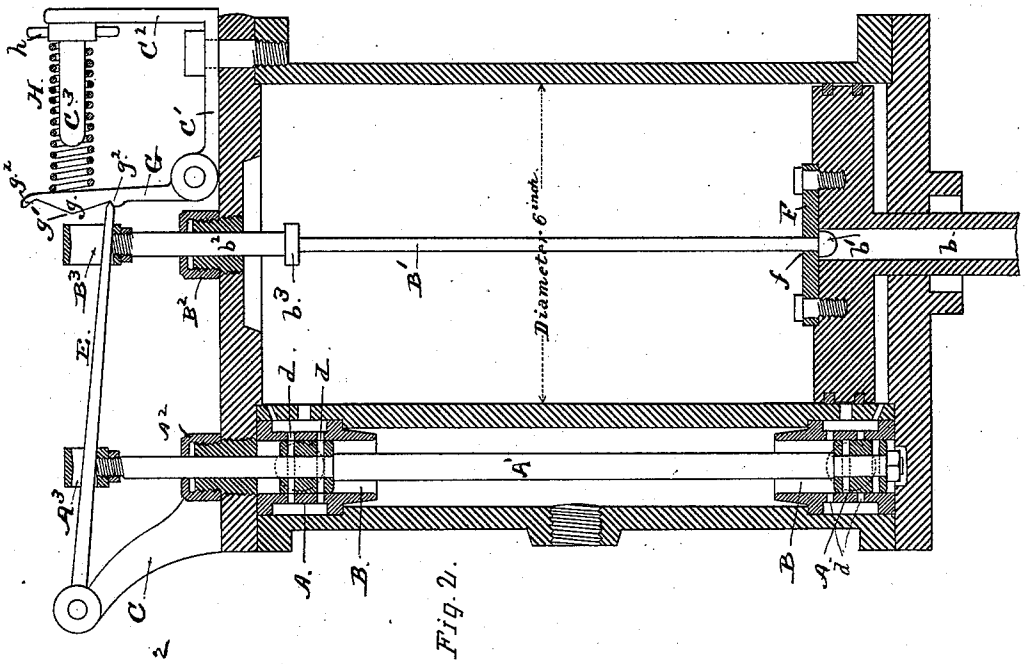


Fig. 2.

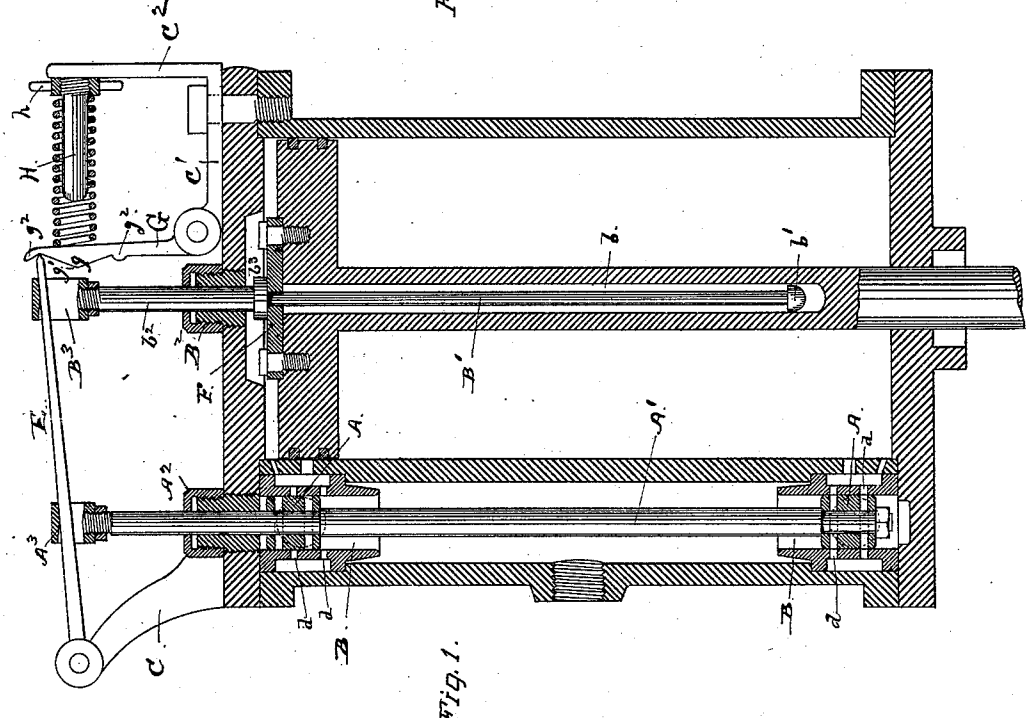


Fig. 1.

Witnesses:
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Inventor:
Evan L. Reese
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UNITED STATES PATENT OFFICE.

EVAN L. REESE, OF NEWARK, CALIFORNIA.

OPERATING VALVES OF STEAM-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 294,807, dated March 11, 1884.

Application filed September 16, 1882. Renewed December 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, EVAN L. REESE, a citizen of the United States, residing in Newark, county of Alameda, and State of California, have made and invented certain new and useful Improvements in Operating Valves of Steam-Cylinders; 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 by figures and letters.

My invention relates to novel mechanism for operating valves of steam-cylinders from the movements of the piston. It is particularly applicable to the valves of steam-pumps.

The following description fully explains the nature of my said invention and the manner in which I proceed to construct, apply, use, and operate it.

In the accompanying drawings, Figure 1 is a longitudinal section through a steam-cylinder to which my valve mechanism is applied. Fig. 2 is a similar view, showing the valve and piston at the opposite positions from those given in Fig. 1.

My improvement consists in connecting the operating-rod of a piston-valve with a vibrating lever, and then operating this lever from the movements of the piston-rod of the principal or working cylinder by certain novel mechanism which accommodates itself to the difference in the length of movements of the two rods and causes the valves to open and close with a quick movement. Steam is admitted into the valve-chamber at a point midway between the two valves, to produce equal pressure upon both pistons and balance the valve. I construct and apply this operating mechanism substantially as follows: The valves A A have seats in the bushings B, that are fitted into the ends of the valve-cylinder, as shown. In these bushings are the steam-passages *d d*. The valve-rod A′ is carried on through a packing-gland, A^2, in the cylinder-head, and has a loop, A^3, fixed to the end outside of the head. In a similar gland, B^2, in the head, over and in line with the steam piston-rod, I insert a stem, B′, which is connected with the piston or its rod in such manner that it is alternately drawn in and forced out a given length by the reciprocations of the piston. The outer end of this stem B′ is provided with a loop, B^3, and by means of a lever, E, carried through these two loops A^3 B^3, the valve-rod A′ and stem B′ are connected together. A fixed bracket, C, on the cylinder-head forms a point of attachment and the fulcrum for this lever. This fulcrum-point is placed outside of the valve-rod A′, because the movements of the actuating-stem B^3 and the rod A^3 actuated must take place in the same direction. The distance of this fulcrum-point from the rod A′ also determines the length of stroke of the valve-rod. The connection of the reversing-stem B′ with the piston provides for a short movement of the stem at the end of each stroke, with proper interval of rest after each movement, while the steam-piston is traversing the cylinder. For this purpose the lower end of the stem is carried through the piston into a socket, *b*, in the piston-rod, and a head, *b′*, of larger diameter than the aperture *f* of the plate F, is formed on the end of the stem. The enlarged upper portion, b^2, of the stem B′, outside of the piston-head, is also provided with a shoulder, b^3, and between these two stops *b′* b^3 the plate F is carried by the reciprocations of the piston, and caused to strike them alternately. The distance between these two stops is determined by the length of stroke of the steam-piston. To produce a quick throw of the valve, I bring the end of the reversing-lever E in line with a yielding arm, G, having a cam-surface, *g*, formed of a double incline, so that the end of the lever, when moved past the point *g′*, will, by the pressure of this inclined surface against it, be thrown with a quick motion until arrested by the stops g^2 at the end of the incline, or by the end of loop B^3 on the stem, sufficient room or play for the lever E being provided in the loops to permit this movement. To attach this arm G, I fix on the cylinder-head a bracket, C′, having a hinge-connection for the lower end of the arm G, and a short upright post, C^2, with a stud, c^3, to receive and support a coil-spring, H, behind and in such position with the arm G that it is pressed constantly forward and held against the end of the lever. To regulate the force of the spring, I provide a movable tension-nut, *h*, on the back part of the stud, which can be set up as required.

The parts being thus applied, the operation

is as follows: The valves being in the position shown in Fig. 1, steam enters the lower inlet and through the ports behind the piston, which then, in moving toward the opposite end of the cylinder, slides along the reversing-stem until the plate F strikes the head on the end of the stem. This takes place at the time in the stroke when it is required to cut off the steam, and for the remainder of the stroke the plate F draws upon the stem B′ and moves the point of the lever past the center of the cam-surface. The valves are then reversed and the return-stroke is made. At this time the parts will take the position shown in Fig. 2.

This valve mechanism is simple, effective, and not liable to become deranged. It is very durable, and when broken is readily repaired by any mechanic of ordinary skill.

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

1. The combination, with the valves A and rod A′, of the lever E, reversing-stem B′, and yielding arm G, having cam-surfaces *g*, substantially as described.

2. The combination, with the valve-operating lever E, of the reversing-stem B′, having the stops *b′ b²*, and the yielding cam-plated arm G, as set forth.

3. The combination, with the reversing-lever E, of the yielding arm G, having the inclines, substantially as set forth.

4. In a valve mechanism actuated from the movements of the piston-rod of the working-cylinder, the reversing-stem B′, working in a slot or bore, *b*, in the piston-rod, and having the stops *b′ b²*, in combination with the striking-plate F on the piston-head, reversing-lever E, and spring pressure-arm G, provided with the inclines, substantially as herein specified.

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Witnesses:
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