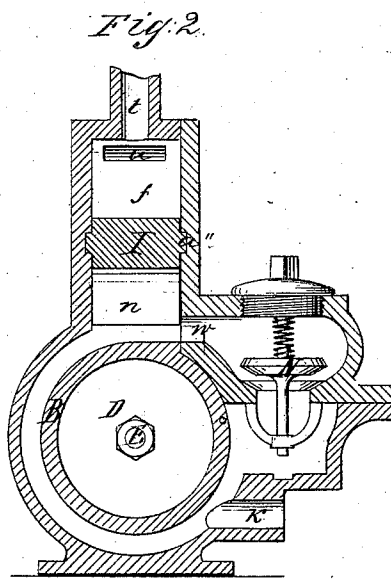
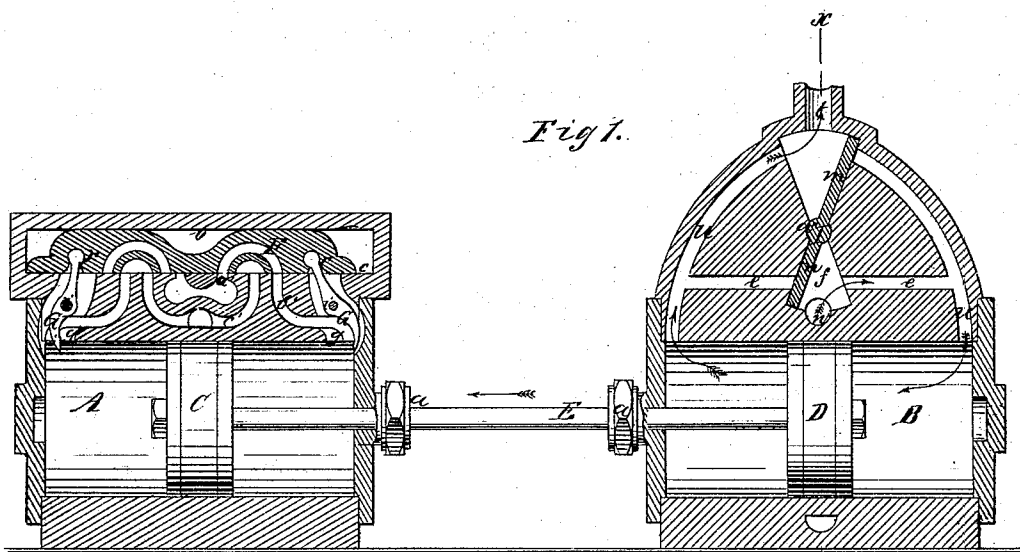


J. McCORMACK & S. R. KELLY.

STEAM-PUMP.

No. 170,008.

Patented Nov. 16, 1875.



Witnesses:

Ernst Bilhuber.

H. Wells Jr.

Inventor:

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UNITED STATES PATENT OFFICE.

JAMES McCORMACK, OF GREENFIELD, OHIO, AND SYLVESTER R. KELLY, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. **170,008**, dated November 16, 1875; application filed September 18, 1875.

To all whom it may concern:

Be it known that we, JAMES McCORMACK, of Greenfield, in the county of Highland and State of Ohio, and SYLVESTER R. KELLY, of the city of Baltimore, in the county of Baltimore and State of Maryland, have invented certain Improvements in Steam-Pumps, of which the following is a specification:

The object of this invention is to provide a steam-pump of simple and cheap construction, and one in which all liability of choking or clogging will be avoided.

The invention consists in a novel combination of a balanced-pendulum outlet-valve with the suitably-arranged ports and passages of the pump-barrel, whereby the said valve is actuated to insure the outflow of water from opposite sides of the pump-piston by means of the pressure of the water itself, independent of any positive actuating mechanism.

The invention further comprises a novel combination of a check-valve with the aforesaid pendulum-valve and the ports and passages connected therewith, whereby the interposition of any obstacle to the free movement of the pendulum-valve is prevented from causing any return flow or regurgitation of the water through the inlet-port of the pump-barrel.

Figure 1 is a central vertical longitudinal sectional view of a pump made according to our invention. Fig. 2 is a transverse vertical section of the same, taken in the line *x* of Fig. 1.

A is the steam-cylinder, and B the pump-barrel, placed in the same axial line, and connected by the same frame-work, in the usual or in any suitable manner, C being the piston of the steam-cylinder, and D the pump-piston, the two being united by the usual piston-rod E, passing through stuffing-boxes *a*, as in steam-pumps of ordinary construction. F is the slide-valve of the steam-cylinder, *b* being the steam-chest, and *c* the valve-seat. The ports and passages of the valve and cylinder (shown at *a' b' c'* in Fig. 1) are suitably arranged for the inlet and exhaust of the steam, and may be of the precise arrangement shown in the figure aforesaid, or of any other known to be efficient in the working of an engine slide-

valve, and therefore require no extended description here. In the side of the cylinder, between the interior of the latter and that of valve-chest, and one at each end of said cylinder and valve-chest, are slots or openings *g*, which, however, are closed at their upper ends by the flat under surface of the valve. In these slots are pivoted actuating-levers G. (The pivots shown at *i*.) The upper extremities of these levers are rounded to fit into sockets *r*, of corresponding form, in the under surface of the valve, at the two ends thereof. The lower extremities of these actuating-levers project into the interior of the cylinder, and are arranged in such relation to the ends thereof and of the piston working therein that, as the said piston nearly reaches the end of its stroke in one direction or the other, it will come in contact with the adjacent lever, and move the same to actuate the valve to change the inflow and exhaust of steam for the succeeding movement of the aforesaid piston in its return or opposite stroke.

It will be seen that by this means a simple, strong, and effective system of working the valve is secured, and that the parts being wholly inclosed by the cylinder and valve-chest, all injury thereto, either by accidental violence, or from dust, dirt, grit, &c., is effectually guarded against.

The upper part of the pump-barrel B is enlarged to provide room for the valve-chamber *f*, the form of which is shown at Fig. 1, and in which is placed the pendulum-valve I, pivoted at a point below its center in such wise that its upper arm *m* shall be longer than its lower arm *n*, the said valve being pivoted as indicated at *a''*, either by pins, pivots, projections formed upon it and fitted into fixed bearings, or by any other appropriate means. At the top of the valve-chamber is the outlet-port *t*, the said valve-chamber communicating with the ends of the pump-barrel by means of the passages *u*. The inlet-port *w* enters the bottom of the aforesaid chamber, and connects with the inlet pipe or passage K, and with the passages *u* by other passages *e*, as in Fig. 1. Between the pipe K and inlet-port *w* is a check-valve, N, the purpose of which will presently herein appear.

In the operation of the apparatus the movement of the steam-piston, hereinbefore explained, being, of course, communicated to the pump-piston, the stroke of the latter, for example, in the direction indicated by the arrow in Fig. 1, draws the water in through the inlet, adjacent passage *e*, and lower part of adjacent passage *u* into the barrel behind the piston. Simultaneous with this the stroke of the piston forces the water through the passage *u* adjacent against the upper part of the pendulum-valve I, and this being longer than the lower part of said valve, and therefore possessed of greater leverage, is swung back to the opposite side of the valve-chamber, and thereby reverses the relations of the inlet and outlet ports to the opposite sides of the pump-piston, opening the inlet-port to permit the just-explained flow of water behind said piston, and opening the outlet-port to permit the outflow therethrough of the water in front of the piston. On the reverse movement of the pump-piston the pendulum-valve is again, in the same manner, reversed to permit the filling of the cylinder behind the piston, and the expulsion of its contents in front thereof, this operation of the valve being entirely and automatically performed by the pressure of the water upon the said pendulum-valve, the pressure upon the one arm thereof, owing to the unequal length of said arms, exceeding that upon the other.

Inasmuch as the check-valve N opens up-

ward or inward to the pump-barrel, it affords no hinderance to the inflow of the water to the said barrel; but if for any reason the movement of the pendulum-valve should be interfered with, as by the interposition of some obstacle, the return of the water through the inlet-pipe will be prevented by the aforesaid check-valve, and, there being no other possible exit for the water in front of the pump-piston, the whole force of the latter is applied to press the water against the pendulum-piston until the same be moved or operated to permit and insure the normal operation of the pump.

What we claim as our invention is—

1. The pendulum-valve I, constructed with one arm longer than the other, in combination with the inlet and outlet ports *w t* and passages *u e*, the whole arranged in connection with the pump-barrel B, substantially as and for the purpose set forth.

2. The check-valve N, arranged in relation with the inlet-port W, pendulum-valve I, and passages *u e* of the pump-barrel, substantially as and for the purpose set forth.

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