

(No Model.)

G. M. CONWAY.  
STEAM PUMPING ENGINE.

No. 265,657.

Patented Oct. 10, 1882.

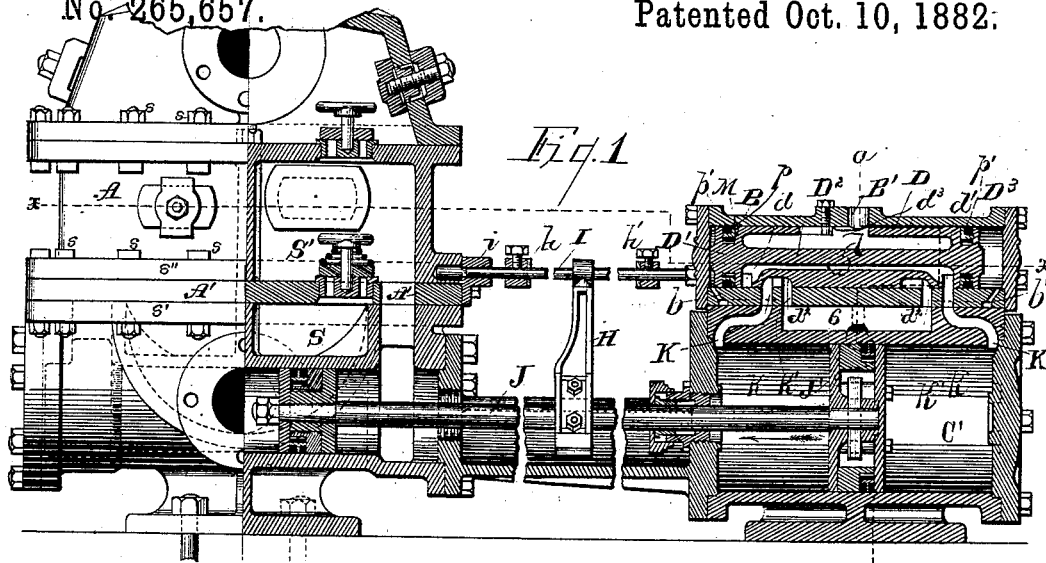


Fig. 2.

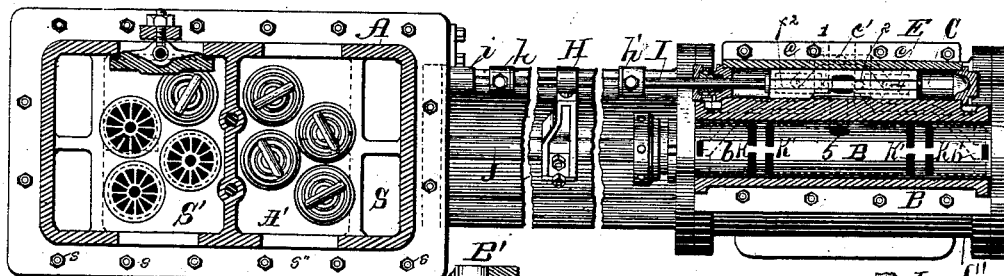


Fig. 5.

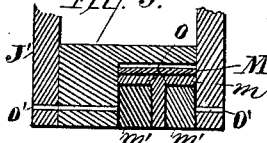


Fig. 6.

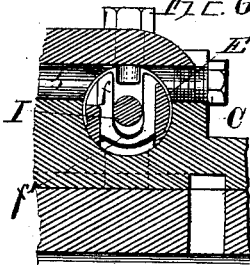


Fig. 3.

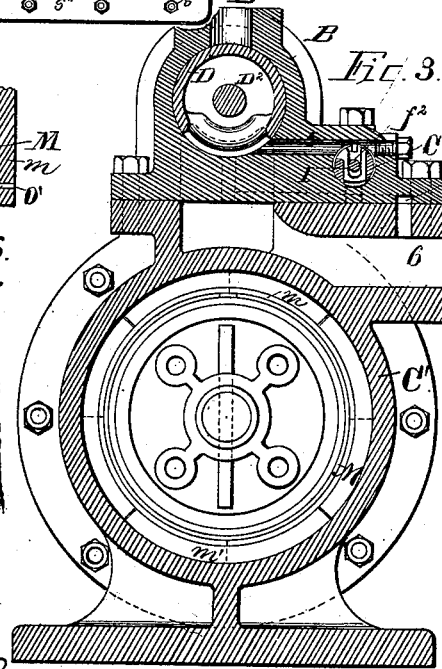
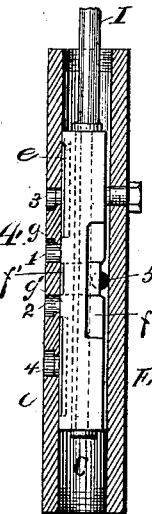


Fig. 4.



Witnesses:

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# UNITED STATES PATENT OFFICE.

GEORGE M. CONWAY, OF MILWAUKEE, WISCONSIN.

## STEAM PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 265,657, dated October 10, 1882.

Application filed December 27, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. CONWAY, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to steam pumping-engines, and will be fully described hereinafter.

In the drawings, Figure 1 is a representation of my invention, partly in side view and partly in section. Fig. 2 is a longitudinal section on line *x x*, Fig. 1. Fig. 3 is a transverse section on line *a a*, Fig. 1. Fig. 4 is a vertical longitudinal section of my supplementary valve-chamber, showing the valve in elevation; and Figs. 5 and 6 are details.

A is the water portion of my improved pumping-engine. B is the chamber of the main steam-valve. C is the auxiliary or supplementary valve-chamber, and C' is the steam-cylinder.

The main-valve chamber B and auxiliary-valve chamber C may be either cast in one piece or separately. In either case they are connected by channels *b b'*, that open into ports 1 and 2 of the auxiliary valve-chamber C from the bottom of cylinder B, and a port, 5, that leads from the center of chamber B into the side of chamber C. Other ports, *c c*, connect the ports 3 and 4 of chamber E with an exhaust-port, *c'*.

The auxiliary valve E, that works in chamber C, has a slot, *f*, in its center, that has a branch, *f'*, which leads down entirely through it, as shown in Figs. 3 and 6, and on its under side the valve E has depressions *e e*. The depressions *e e* serve, when the valve is in the proper position, to conduct the exhaust-steam to the exhaust-outlets *c'* and 6. Partitions *g g'*, that separate depressions *e e* and slot *f'* from each other, also serve to close the ports 1 and 2 when the valve is at half-travel. A rod, I, extends through a longitudinal slot, *f''*, in the valve E and through a bushing in the end of cylinder C, and slides in a bearing, *i*, in the wall of the water-chamber A, and on this rod I adjust tappets *h h'* on each side of an arm, H, that slides on rod I and is secured to the piston-rod J.

In Figs. 2 and 4 the valve E is shown at half-travel, and with it in this position imagine that the piston-rod J is moving in the direction of the arrow, Fig. 1. It will carry arm H against tappet *h* and cause it to draw the rod I and valve E to the limit of their travel, and this will first carry partition *g* partly beyond the edge of port 1, when steam will pass from it into channel *b* and behind the front head, D', of valve D, and then as the partition *g* clears port 1 the partition *g'* will begin to clear port 2 and allow the exhaust-steam to pass through it into the chamber C, from whence it escapes through one of the depressions *e* to an exhaust-channel, *c*. On the return of valve E the port 1 will admit the exhaust-steam to cylinder C, from whence it will pass out through depression *e* to channel *c'* and out to the main exhaust-channel 6.

D is the main valve. It is cylindrical and has two solid heads, D' and D'', connected by a core, D<sup>2</sup>, as well as by its cylindrical walls, between which and the core is a steam-chamber. A slot, *d''*, in the top of valve D admits steam to it from the port B', and this slot is sufficiently long to be always open to port B', no matter what position valve D may be in. Slots *d d'*, one at each end, open through ports *k k'* in cylinder B into ports K K' of steam-cylinder C'. Grooves *d''* in the bottom of valve D open to exhaust-ports *k' k'* of cylinder B, that lead into the exhaust-chamber 6, and an opening, *l*, (shown in dotted lines, Fig. 1,) admits steam from the port 5 of valve D to the auxiliary-valve chamber C, so that the steam that operates valve D must pass from its interior out into chamber C, and then through ports 1 and 2, alternately, to channels *b* and *b'*, which enter B behind the heads of valve D.

I use a peculiar packing for my piston. (Shown in cross-section, Fig. 5, and also shown in the end view of piston J', Fig. 3.) M is a spring, that is first placed in the packing-groove *e* about the piston-head, its ends almost touching. I next place a segmental ring, *m*, of angle-iron or other suitable metal, about this spring M, and then I insert segmental blocks *m'* between the flange of the angle-segments and the wall of the piston-head, placing them so that they will break joints with the

segments that compose ring *m*. This packing fits loosely in the packing-groove of piston-head *J'*, and at intervals between the joints in the rings *m m'*, I make perforations *o' o'* entirely through the head *J'* of the piston, so that no matter in which direction the head will be traveling a portion of the steam that drives it will enter and impinge upon one side and beneath one series of the blocks *m'*, forcing them tight up against the flange of ring *M* and out against the cylinder, and stopping the openings on the other side, and thus preventing any egress of the steam to the other side of the head.

For the heads of my valve *D*, I use a packing that consists, first, of an expanding ring or spring, *M*. About this I place the segments that compose the ring *p*. These segments are of *S*-iron, and their vertical portion rests against the side of the groove nearest the interior of the valve, and between the vertical portion of the *S*-iron and the outer wall of the head I place segmental blocks *p'*, that compose the packing-ring of the valve-head, as blocks *m m'* compose that of the piston-head. With an ordinary packing on valve-heads *D* and *D'* the steam would force itself from the interior of the valve beyond the packing to whichever of the ports *b* or *b'* that might be exhausting; but with my packing the steam from the interior of cylinder-valve *D* will pass beneath the ring and continually force it against the outer wall of the head and the cylinder, and it would require years of continuous friction to wear the heads down far enough to cause a leakage; but I do not mean to claim this packing at present, as I design making it the subject of a separate application.

For the sake of illustrating a complete pump I have shown my improved water-chamber, and this I also propose to make the subject of a separate application. It is constructed as follows: I cast the valve-plate *A'*, that separates the inlet-chamber *S* from the outlet-chamber *S'*, by itself and interpose it between chambers *S S'*, and then secure the three together by bolts *s*, passed through it and the flange *s'* of the chamber *S* and flange *s''* of the chamber *S'*. This plate *A'* carries all the suction-valves,

and therefore when any of them need repairing it is only necessary to remove chamber *S* and the plate *A'* to gain easy access to them. This is a very important improvement, in that heretofore the plate *A'* has been cast solid with chamber *S*, and it was next to impossible to gain access to the valve-seats without injuring them, nor could the interior of chamber *S* be gotten at when repairs were necessary.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An auxiliary valve-chamber having an inlet-port leading from the inside of the main valve and outlet-ports leading to the main-valve chamber outside of the heads of the main valve, in combination with a cylindrical auxiliary valve having a port through its transverse center, as set forth.

2. The auxiliary valve having a slot through its transverse center, depressions *e e*, and partitions *g g*, in combination with the chamber *C*, having inlet 5 leading from the interior of the main valve, and ports 1 2 leading to the ends of the main-valve chamber outside of the heads of the main valve, and ports 3 and 4 leading to a common exhaust, as set forth.

3. The cylindrical auxiliary valve having a slot extending through its entire length to a point below its longitudinal center to receive its stem *I*, and having a transverse slot through it to admit steam through it to its outlet-ports, as set forth.

4. The main valve *D*, having slot *d<sup>3</sup> d d'* and grooves *d<sup>2</sup>*, in combination with its cylinder having ports *k k'*, and the main cylinder having ports *B', K*, and 6, as set forth.

5. The hollow cylindrical main valve adapted to take steam into its center, and having ports leading from its inside through the chamber in which it works to an auxiliary-valve chamber, and other ports leading to the main cylinder, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of December, 1881.

GEO. M. CONWAY.

Witnesses:

STANLEY S. STOUT,  
HAROLD G. UNDERWOOD.