

J. S. FOSTER.
STEAM-ENGINE.

No. 171,275.

Patented Dec. 21, 1875.

Fig 1.

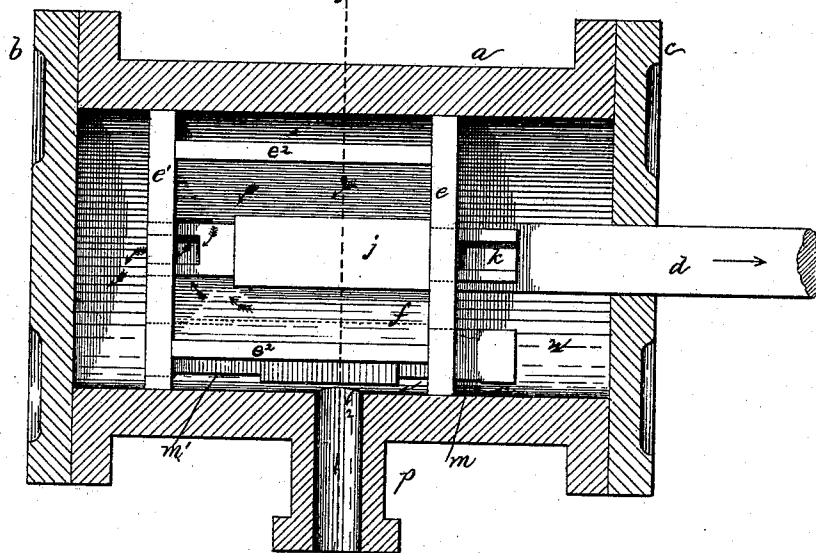
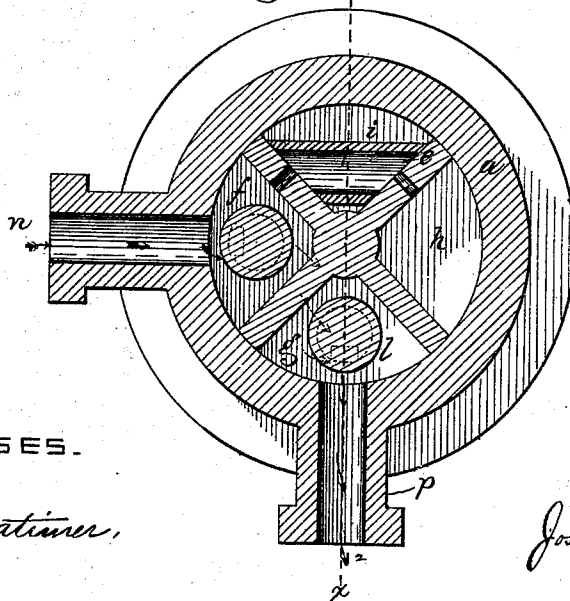


Fig 2.



WITNESSES.

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JOSEPH S. FOSTER, OF SALEM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHESTER L. JOHNSON, OF UTICA, NEW YORK.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 171,275, dated December 21, 1875; application filed May 18, 1875.

To all whom it may concern:

Be it known that I, JOSEPH S. FOSTER, of Salem, county of Essex, State of Massachusetts, have invented Improvements in Engines, of which the following is a specification:

This invention relates to an improvement in connection with the cylinder-piston and valve mechanism of steam, air, or gas engines, or for steam-pumps; and consists in the combination, with the piston and cylinder, of steam and exhaust ports carried by the piston and operated as hereinafter described; also, in the combination, with the piston, of a steam-passage leading from that side of the piston where the steam is admitted to the steam-port to the opposite side, to equalize the bearing of the piston within the cylinder.

Figure 1 represents a longitudinal section of the cylinder, on the line *x x*, Fig. 2, and with the piston and steam and exhaust ports or valves in elevation. Fig. 2 represents a cross-section of the cylinder and piston on lines *y y*, Fig. 1.

In the drawing, *a* is the cylinder, having heads *b c*, the latter being provided with an opening suitably packed or bushed for the passage of the piston-rod *d*, connected with the piston *e*, which is composed of two disks or heads, *e e'*, on the rod *d*, connected by means of radial wings *e''*, forming spaces *f g h i*. In the passage *f* is placed a steam-port, *j*, consisting of a rod enlarged at its center, and with reduced ends provided with ways *k k'* for the passage of steam, the reduced ends being fitted to, and so as to slide within, openings in the heads *e e'*. In the space *g* is placed an exhaust-port, consisting of a rod, *l*, enlarged at its center, with its reduced ends fitted to the heads to slide therein, and provided with openings *m m'* for the passage of exhaust steam. Leading from space *f*, opposite inlet *n*, where the steam is first admitted, is a pipe, *o*, it terminating in space *h*, and steam, passing through pipe *o* and filling space *h*, tends to keep the piston opposite the inlet *n* from being crowded against the opposite side of the cylinder, and the pressure of the steam does not bind the piston and cylinder.

The distance between the heads *e e'* is always sufficient, so that the inner faces of the heads in the extreme movements of the piston do not pass beyond the inlet *n*.

Assuming the piston in the position shown in Fig. 1, steam passing into the space *f* through the inlet *n* will pass into the passage *k'* of the steam-port *j*, and through the head *e'*, between it and the end *b* of the cylinder, as indicated by the arrows, Fig. 1, and the piston will be forced and move the piston-rod *d* in the direction of the arrow on it, and during this movement the exhaust steam between the head *e* and the cylinder-head *c* will pass out through the opening *m* in the exhaust-port *l*, as indicated by arrows 2, and out through the exhaust-pipe *p*. Arriving at the end of its movement at the right, (see Fig. 1,) the ends of the steam and exhaust ports *j l* strike the head *c* of the cylinder, forcing their opposite ends through and beyond the ends of head *e'*, and then the steam will be free to pass through the passage *k* in the steam-port, while the dead steam between heads *e'* and *b* will be free to pass out through the passage *m'* of the exhaust-port *l*. At each stroke of the piston the steam and exhaust ports carried thereby are automatically operated.

This device may be used with any fluid or air motor, and for any desired purpose.

Having described my invention, I claim—

1. In combination, the cylinder, the inlet and exhaust passages formed in the cylinder, and the piston and its sliding steam and exhaust ports *j l*, constructed and adapted to operate substantially as described.

2. The combination of the cylinder and piston, provided with steam ports and spaces *f h*, with the pipe *o*, for equalizing the pressure of the steam on the piston, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH S. FOSTER.

Witnesses:

JOHN M. FOSTER,
NATHAN FARNUM.