E. J. SMITH & B. MASON, Jr.

STEAM ENGINES.

No. 180,664. Patented Aug. 1, 1876.

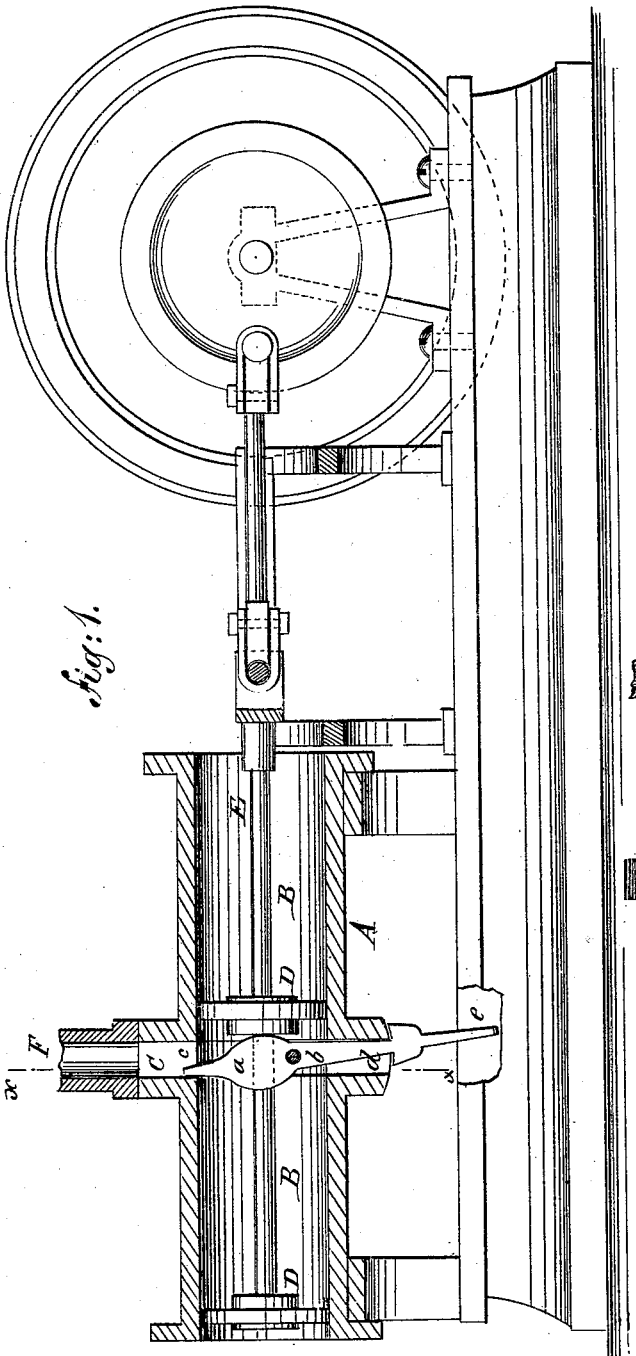

Fig: 1.

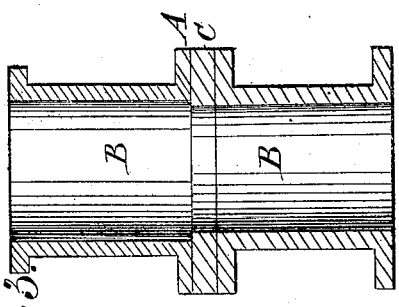

Fig: 3.

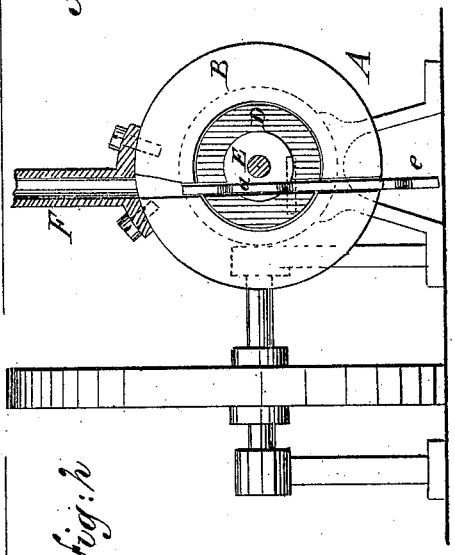

Fig: 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

ELI JAMES SMITH AND BENAJAH MASON, JR., OF NORTH ENGLISH, IOWA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **180,664**, dated August 1, 1876; application filed June 20, 1876.

To all whom it may concern:

Be it known that we, ELI JAMES SMITH and BENAJAH MASON, Jr., of North English, in the county of Iowa and State of Iowa, have invented a new and Improved Steam-Engine, of which the following is a specification:

Figure 1 is a longitudinal section. Fig. 2 is a vertical section on the line *x x* in Fig. 1. Fig. 3 is a vertical section of a pair of engines arranged for a vertical engine.

Similar letters of reference indicate corresponding parts.

Our invention consists in an arrangement of a steam-cylinder with a head or partition in the center of its length, in which is placed a valve of peculiar construction, which is operated by contact with the piston-heads. The piston is double, consisting of two piston-heads placed upon a single rod, one on each side of the central head or partition.

A is a cylinder, which consists of two flanged sections, B B, which are bolted to a central head or partition, C. A valve, *a*, is placed in a slot cut in the head C, and is pivoted at *b*. D D are pistons, which are placed upon a piston-rod, E, the distance between them being a little more than the length of the stroke and the thickness of the central head combined. The valve *a* is enlarged above the pivot *b*, so as to engage with the bosses on the pistons D D at the end of every stroke, being moved by each piston in alternation, opening the supply-passage *c* and the exhaust-passage *d*. The lower end of the valve is continued outside of the cylinder, and formed into a handle at *e*. The cylinder A is mounted on suitable supports, and the piston-rod E is connected with a crank and fly-wheel in the ordinary way, or it may be connected directly with a pump, which may consist of a cylinder, valve, and pistons like that above described for steam.

The operation of our invention may be described as follows: Steam is taken through a pipe, F, and through the open port, forcing the piston away from the central head, the piston remote from the head following, of course, until it strikes the enlarged portion of the valve, throwing the valve over, and allowing the steam to enter on the other side of the central head, forcing the other piston toward the end of its stroke. At the same time the lower part of the valve opens the exhaust-port, allowing the steam to escape through the passage *d*.

If it is desired to reverse the engine, it is only necessary to move the valve, by means of the handle *e*, at the proper instant, when steam will be admitted on what was before the exhaust side of the central head.

When the engine is made vertical the upper section of the cylinder is made a little larger than the lower one, as shown in Fig. 3, to compensate for the weight of the pistons.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

The combination of cylinder A, having median partition C, the pivoted valve *a*, and the two pistons D D, on the same rod E, as and for the purpose specified.

ELI JAMES SMITH.
BENAJAH MASON, JR.

Witnesses:
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