

W.C. Selden,

Slide Valve.

No. 105986.

Patented Aug. 2, 1870.

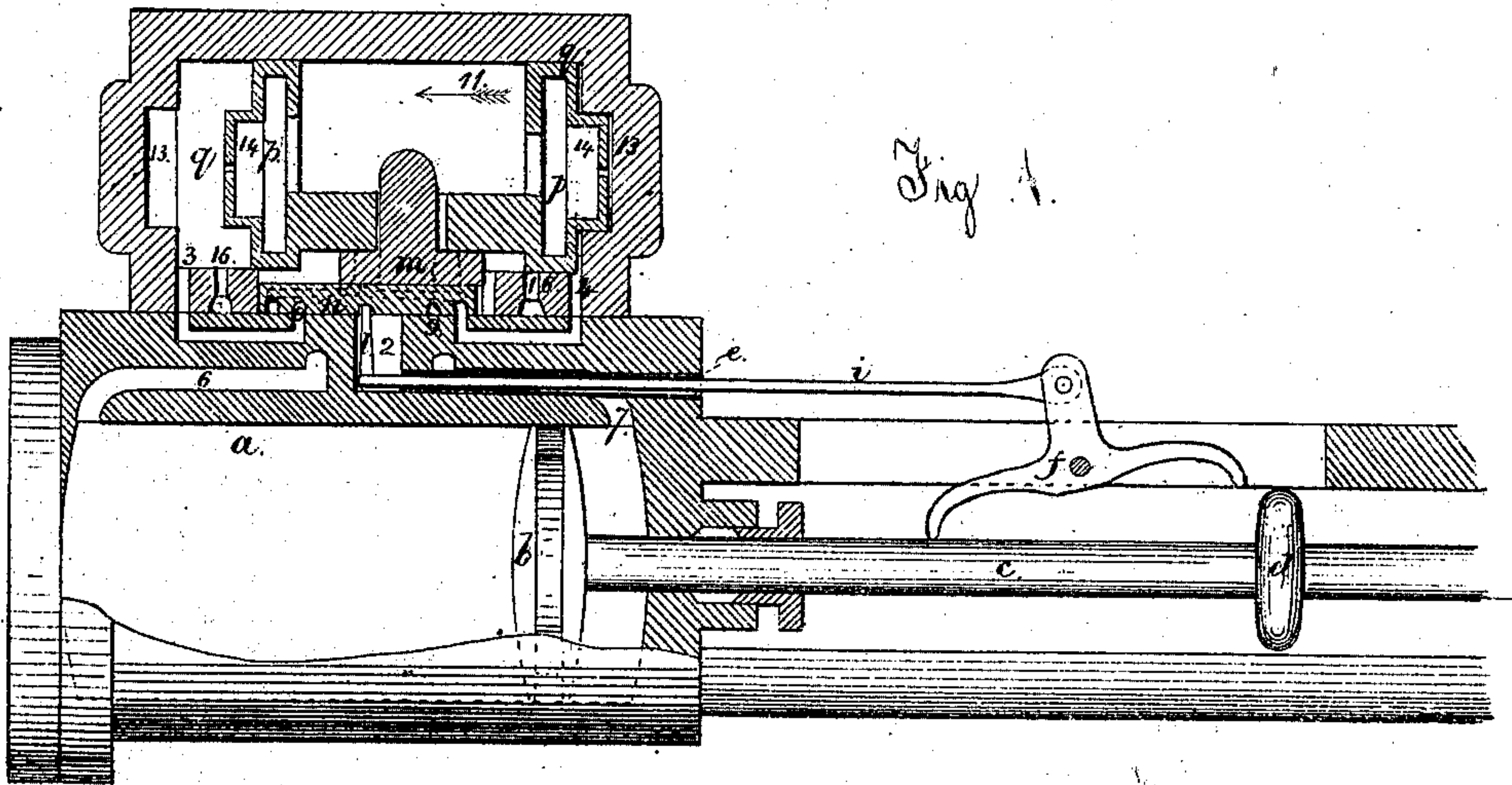


Fig. 1.

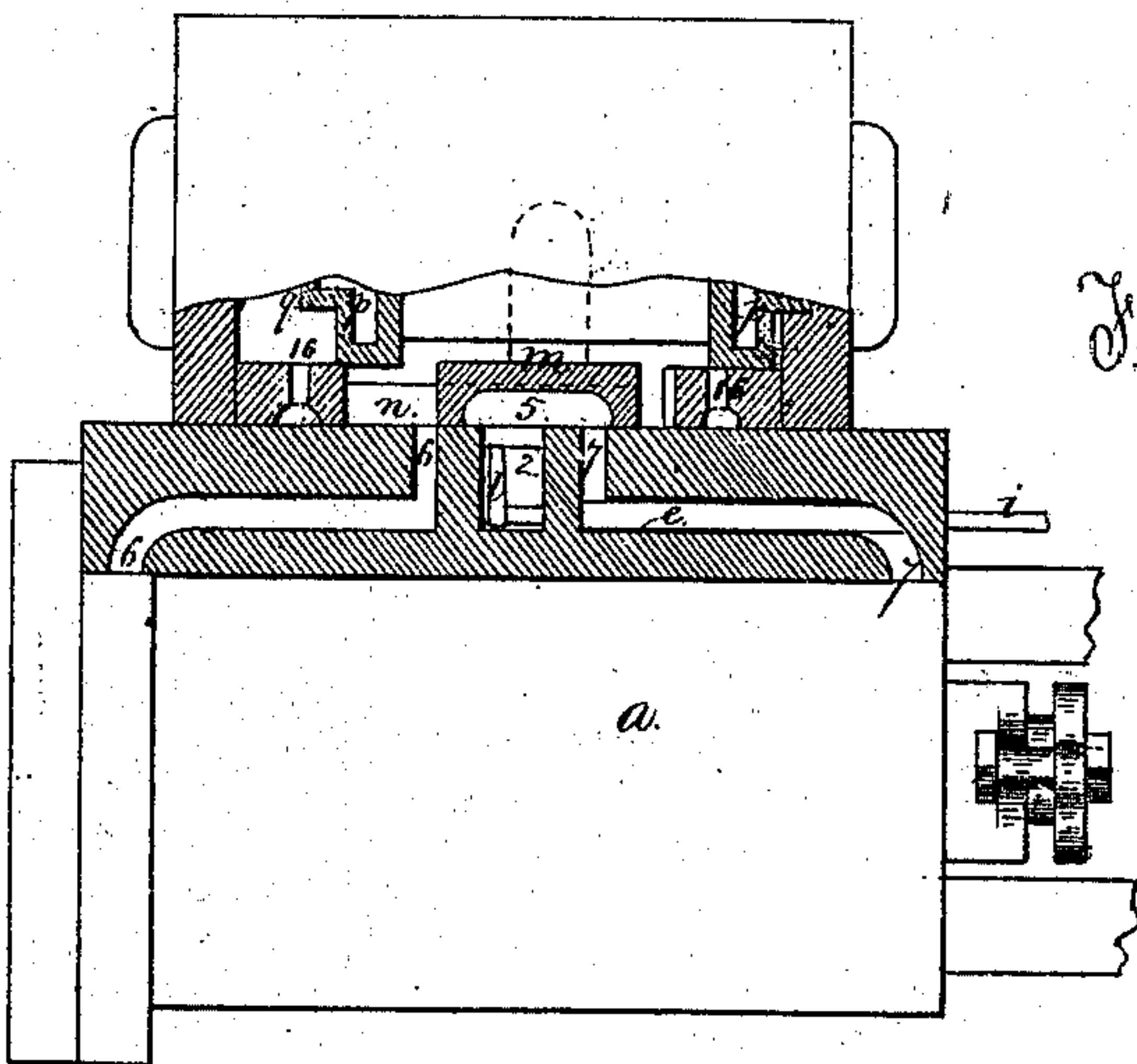


Fig. 2.

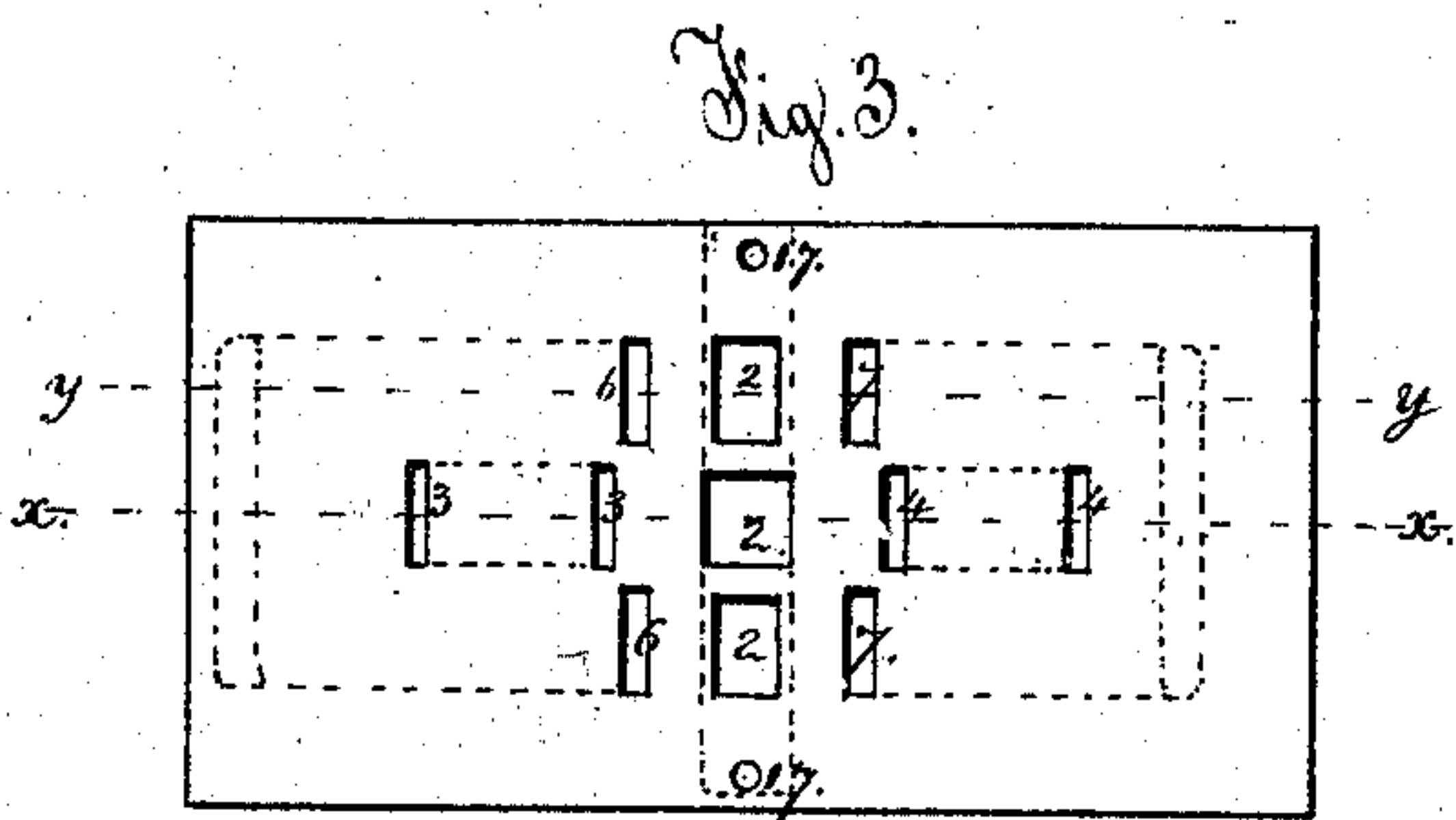


Fig. 3.

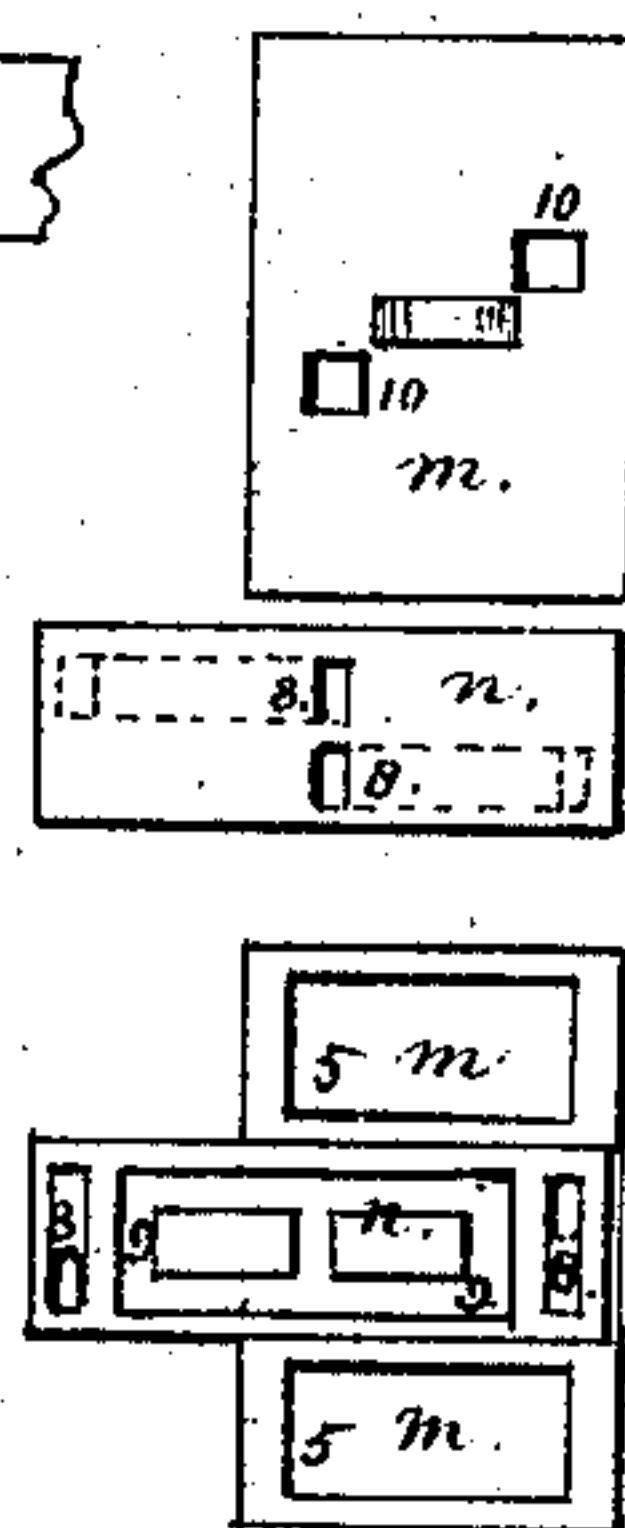


Fig. 6.

Fig. 5.

Fig. 4.

Witnesses

Geo. B. Walcott
Geo. T. Pinckney

W.C. Selden

Inventor.

UNITED STATES PATENT OFFICE.

WILLIAM C. SELDEN, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF
AND ADAM CARR, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **105,986**, dated August 2, 1870; antedated July 19, 1870.

To all whom it may concern:

Be it known that I, WILLIAM C. SELDEN, of Brooklyn, in the county of Kings and State of New York, have invented and made a new and useful Improvement in Valves for Engines; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawing, making part of this specification, wherein—

Figure 1 is a vertical section, longitudinally of the chest, at line *x x* of Fig. 3. Fig. 2 is a similar view of the valve and ports, sectionally at the line *y y*. Fig. 3 is a plan of the valve-seats. Fig. 4 shows the face of the main and secondary valves inverted. Fig. 5 is the top of the secondary valve, and Fig. 6 is a plan of the main steam-valve.

Similar marks of reference denote the same parts.

The object of this invention is to furnish a means for moving the secondary valve where the main valve is moved by steam admitted by the secondary valve, and the engine is direct-acting without an eccentric.

My invention relates to a tubular passage for the valve-rod passing through one of the steam-ports, combined with a toe inside the exhaust-port, whereby the secondary valve is moved, and the friction of a stuffing-box for the valve-rod is dispensed with. I also fit the secondary valve between the main valve and its seat, so that this secondary valve is considerably relieved from pressure, and works with less friction than heretofore.

In the drawing, *a* represents the steam-cylinder; *b*, the piston; *c*, the piston-rod, with a boss or cam, *d*, to act upon the bent lever *f* and move the same either one way or the other near the respective ends of the stroke. These parts may be of any desired character or size.

The rod *i* from the lever *f* extends loosely through a tube, *e*, that runs through from the front end of the cylinder to the exhaust-port 2, wherein is a toe, *l*, that operates upon the valve *n*, which is the secondary valve, and slides in a recess formed for it below the middle portion of the main valve *m*. The valve *m* is operated by the pistons *p p*, that slide in cylinders *q q* formed in the valve-chest of the

engine, and according to whether steam is admitted through the port 3 or the port 4, so the main valve *m* will be moved one way or the other.

The ports 5 of the main valve *m* are made nearly as usual; but, instead of being made with a continuous face, the face is made in two parts, in order that the secondary valve *n* may occupy a recess in the face of the valve *m*. In the faces of the valve *m* are the steamways 5, and 6 and 7 are the ports leading from the face of the valve-seat to the ends of the cylinder *a*. These ports are separated upon the face of the valve-seat, as seen in Fig. 3, and the exhaust-port 2 has three openings in the face of the valve-seat. The ports 3 and 4 terminate in the valve-seat, (see Figs. 1 and 3,) and they occupy the middle portion of the valve-seat, so as to act with the secondary valve *n*. The steam-port 8 and exhaust-ports 9 of this secondary valve *n* are arranged, as shown in Figs. 1, 4, and 5, so that the steam-ports 8 terminate at the upper and lower faces of the valve *n*, and the ports 9 are recesses, forming surface steamways. In the valve *m* are holes 10, that admit steam through one of the ports 8 when the valve *n* is moved so as to coincide.

It will now be understood that the valve *n* can be moved very easily by the lever *f*, rod *i*, and toe *l*, because most of its upper surface is covered by the valve *m*.

In Fig. 1 the stroke of the engine is shown complete, the valve *n* moved so that the port 4 is opened through the port 8, that coincides with a hole, 10, in the valve *m*, (see Fig. 6,) so that steam will pass thereinto and move the piston *p* and valve *m* in the direction of the arrow 11, to admit steam on the other side of the piston *b*, and at the same time open the exhaust from the cylinder *a*. The movement of the valve *n* has opened the exhaust-port 3, and as the valve *m* moves it closes the port 8 by its hole 10 no longer coinciding, and shuts off the supply of steam through the port 4. The reverse movement takes place at the other end of the stroke. If, however, these parts only were made use of, the piston *p* would strike with a blow against the head of the cylinder *q*. I prevent this by forming

a cavity, 13, at each end of the cylinder *q*, into which passes a secondary piston, 14, on the piston *p*, so that the confined steam acts as a cushion, and I make a small hole through this secondary piston, so as to allow the pressure to equalize itself, and not produce a back motion to the pistons and valve.

By this construction of secondary valve the labor performed by the lever or tappets *f* is lessened, and the parts are less likely to become injured than heretofore, the friction of the rod *i* in a stuffing-box is removed, and the leakage of steam is prevented, because the secondary valve is worked through the exhaust-port, and there is no other external connection to the steam-valve.

In order to relieve the pressure of steam that gives motion to the pistons and valve, I allow the steam to exhaust after the parts have moved sufficiently to open the steam-port to the engine. This is effected by an escape-port, 16, that is connected by a channel around the edge of the steam-chest with the

holes 17, (see Fig. 3,) and this port 16 is uncovered by the end movement of the piston *p*.

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

1. The secondary valve *n*, fitted to slide between a portion of the main valve and the seat, in combination with the ports, arranged as specified, and the pistons *p*, for actuating the valve *m*, as set forth.

2. The tube *e*, passing into the exhaust 2, in combination with the rod *i*, toe *l*, and valves *m n*, substantially as set forth.

3. The secondary pistons 14 and cavities 13, in combination with the pistons *p* and valves *m n*, substantially as set forth.

4. The exhaust-ports 16, in combination with the piston *p*, for the purposes set forth.

In witness whereof I have hereunto set my signature this 29th day of July, A. D. 1869.

WM. C. SELDEN.

Witnesses:

GEO. D. WALKER,

GEO. T. PINCKNEY.