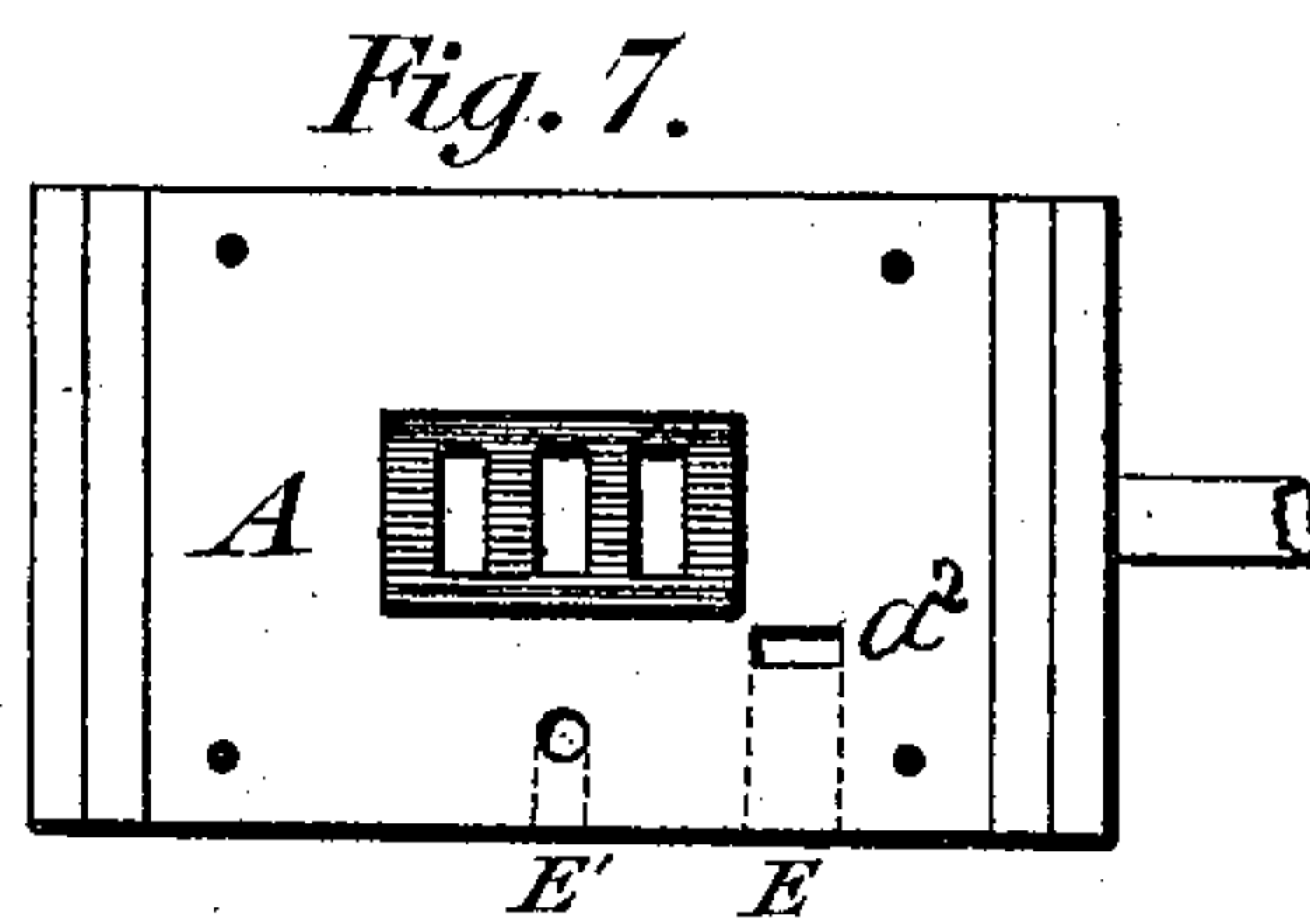
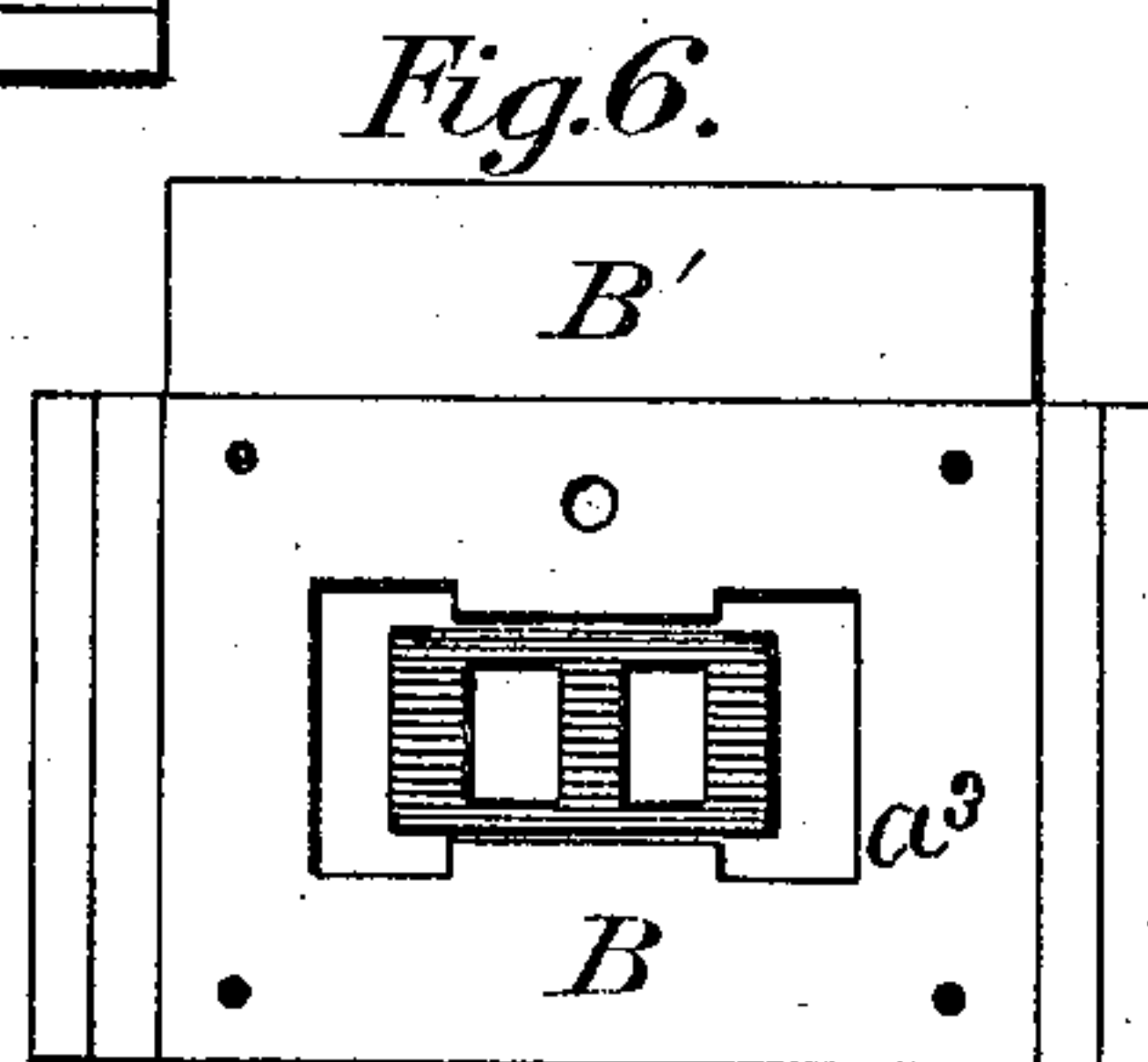
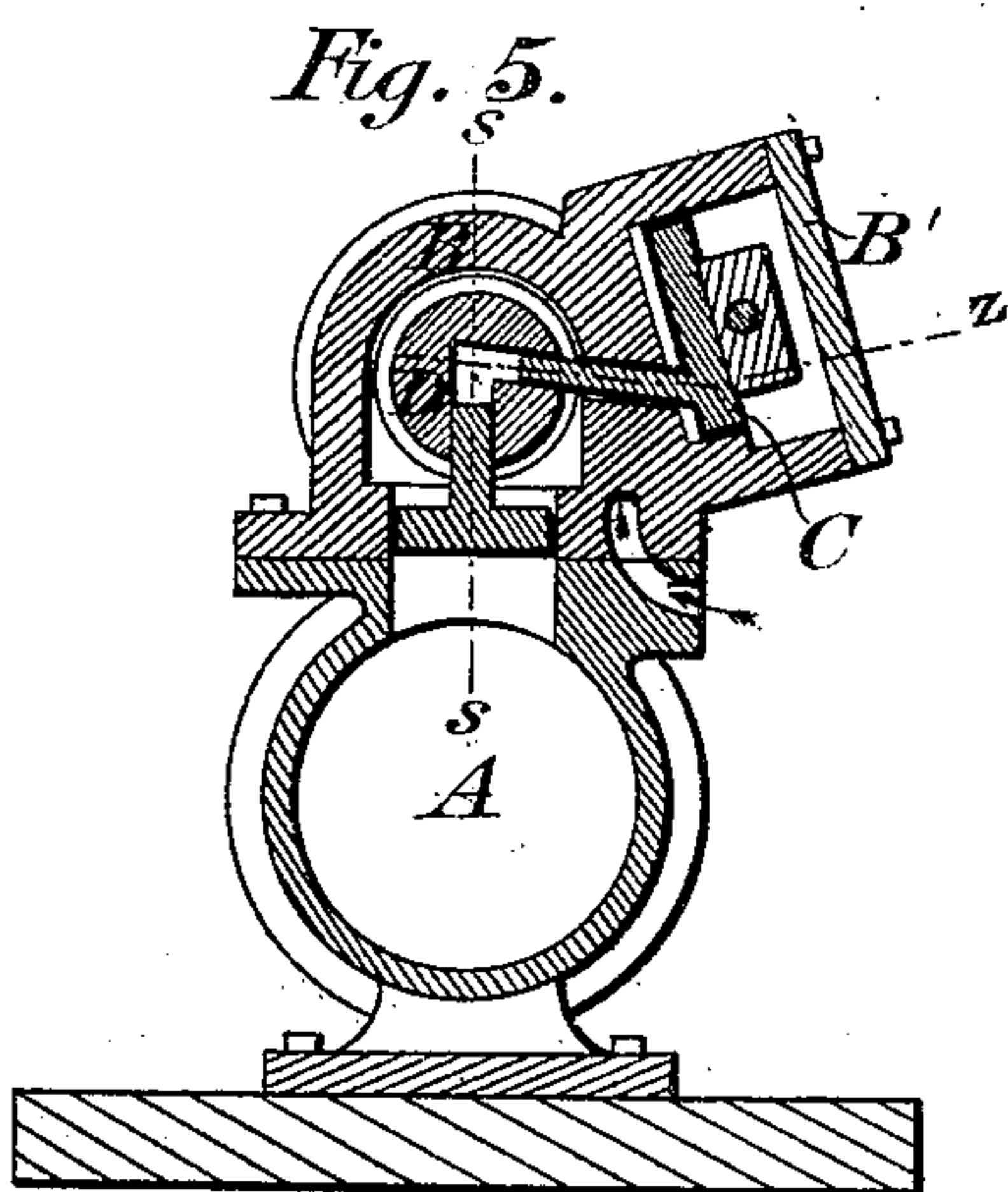
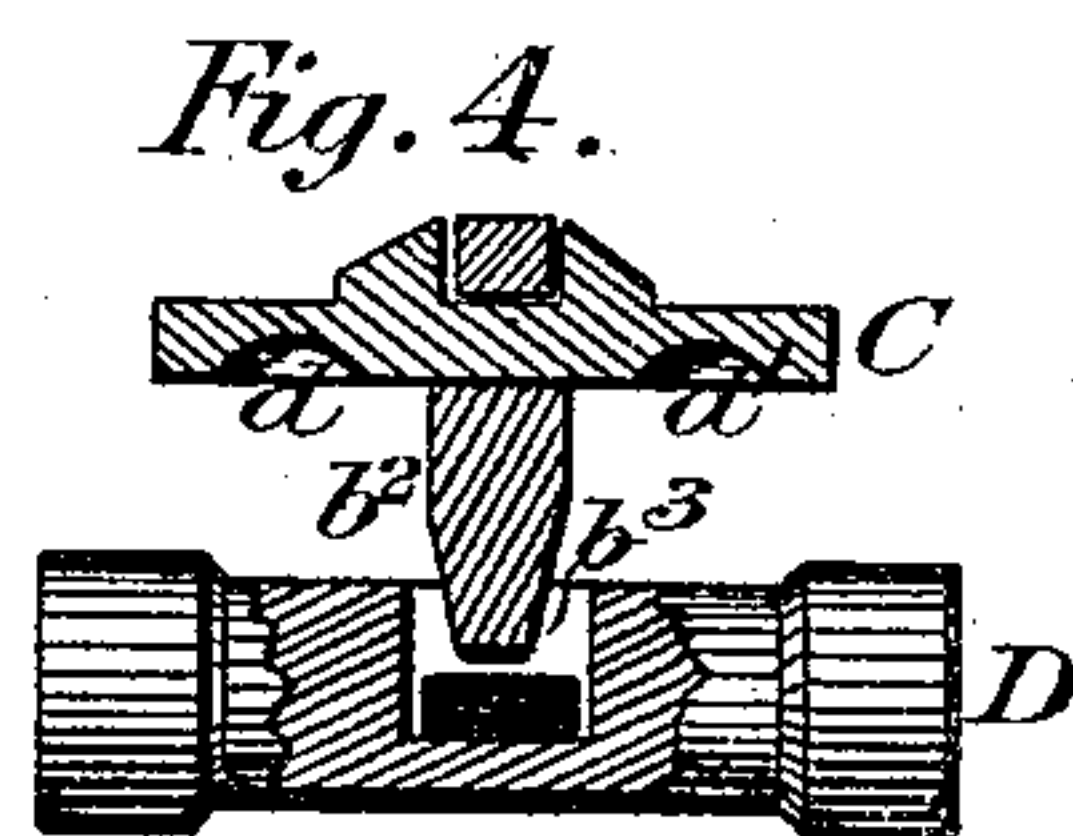
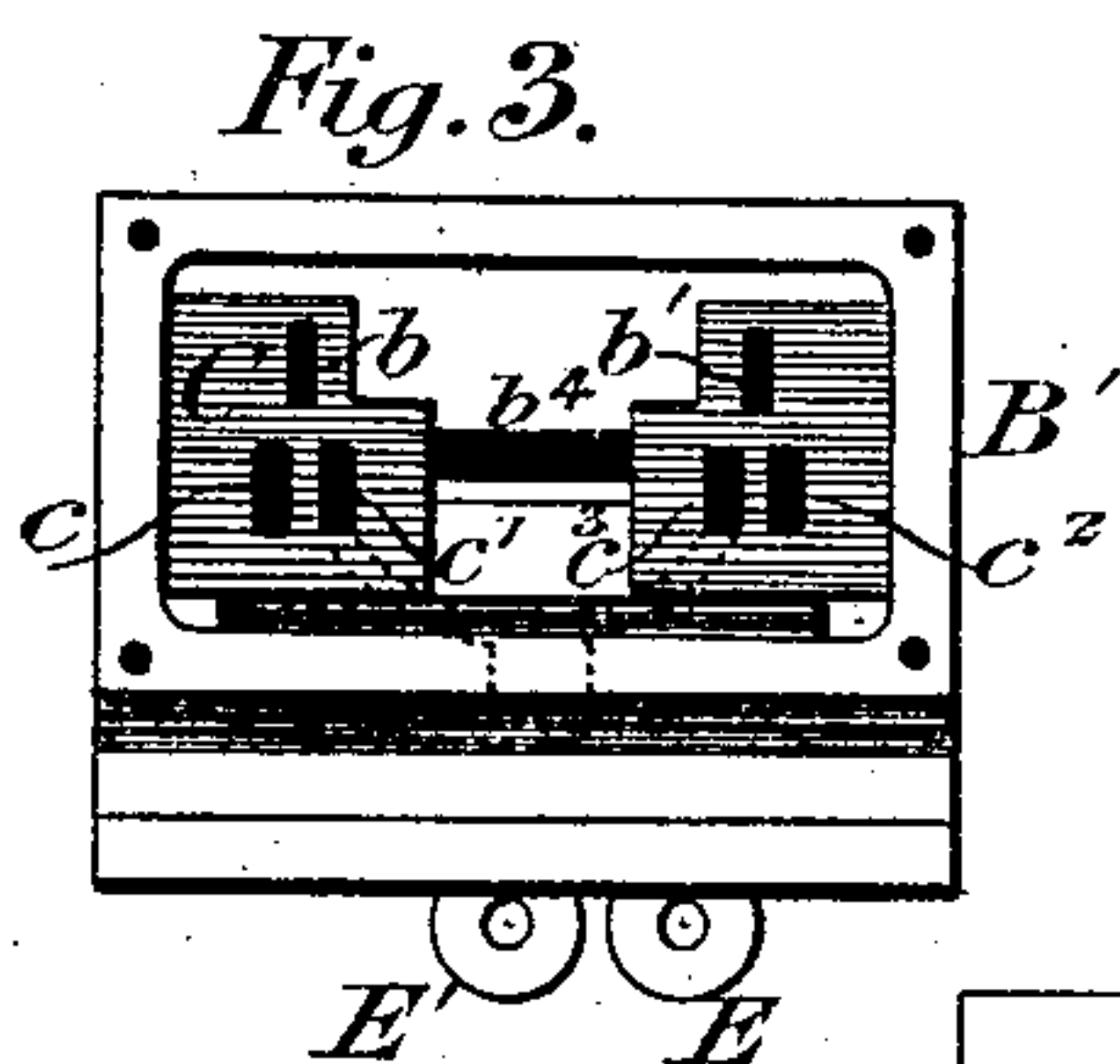
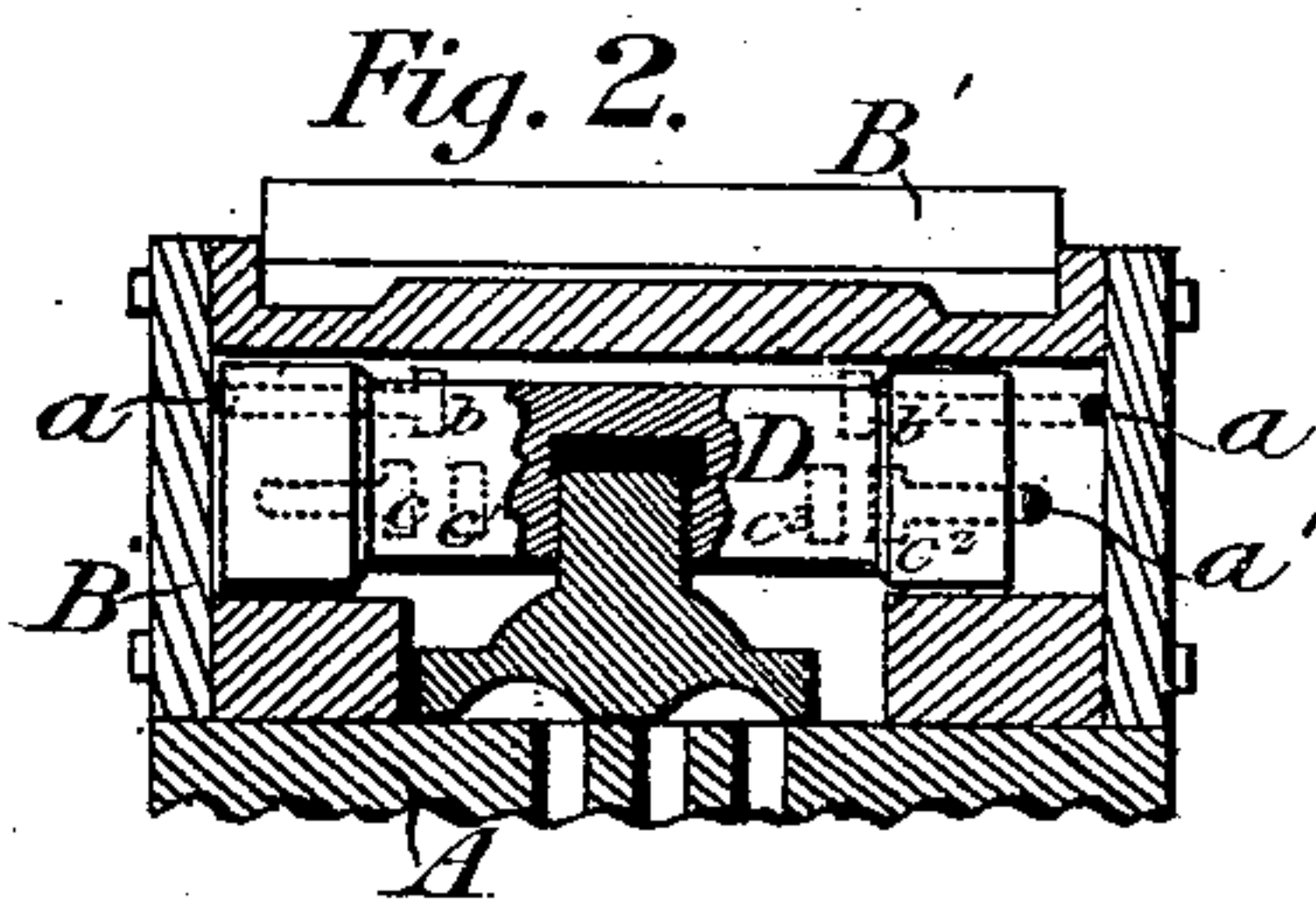
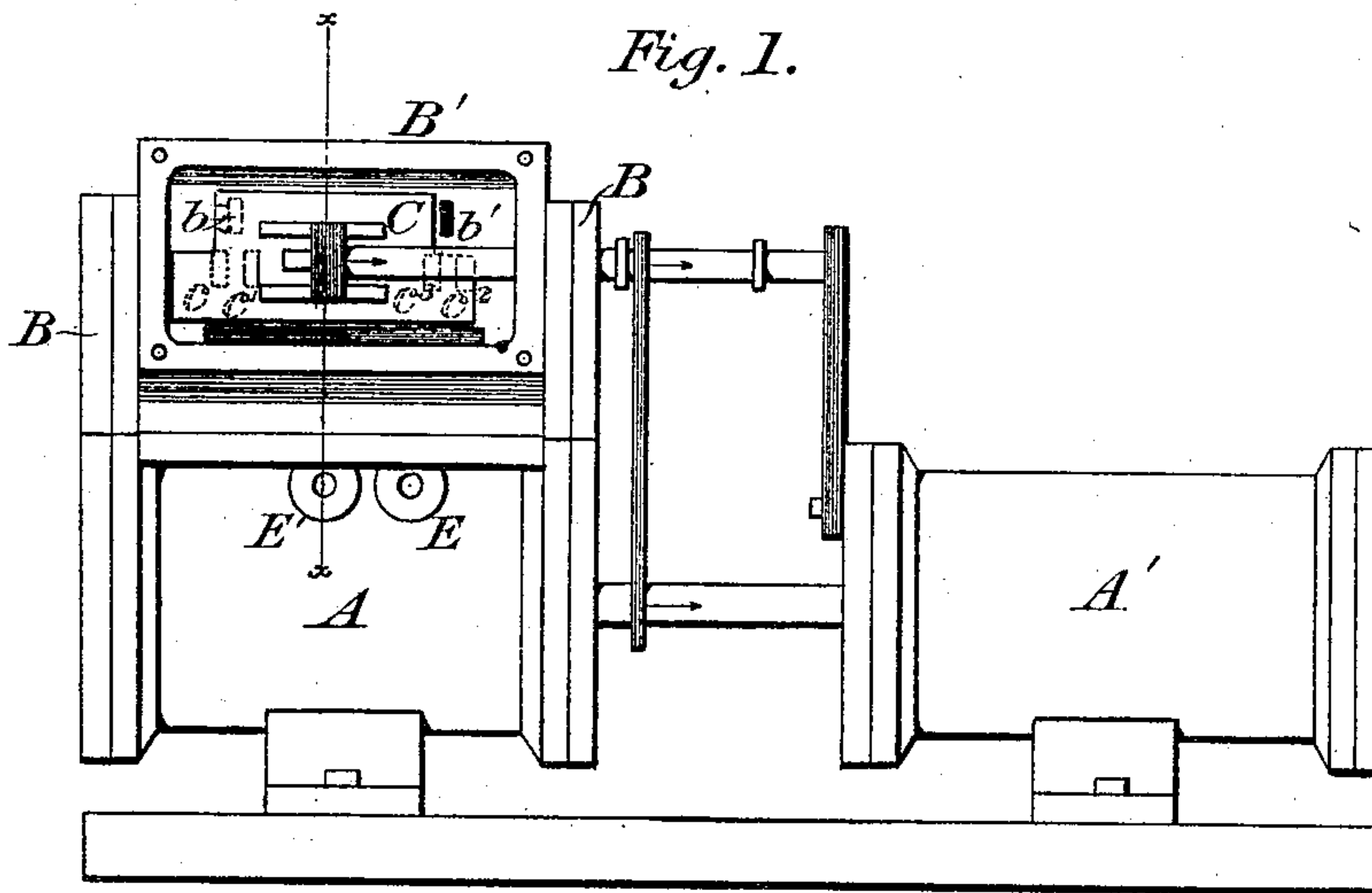


H. EPPING.

VALVES FOR STEAM-PUMPS.

No. 178,616.

Patented June 13, 1876.



WITNESSES

James D. Philp.
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By

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UNITED STATES PATENT OFFICE.

HENRY EPPING, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO WILSON H. CARPENTER AND EDWARD J. WARING, OF SAME PLACE.

IMPROVEMENT IN VALVES FOR STEAM-PUMPS.

Specification forming part of Letters Patent No. 178,616, dated June 13, 1876; application filed April 15, 1876.

To all whom it may concern:

Be it known that I, HENRY EPPING, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Pumps; and do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation with front plate of auxiliary chest removed. Fig. 2 is a longitudinal vertical section on line *s s* of Fig. 5. Fig. 3 is a front view of auxiliary steam-chest with slide-valve removed. Fig. 4 is a section on line *Z* of Fig. 5, showing the piston-valve of the steam-chest and the slide-valve of the auxiliary steam-chest detached. Fig. 5 is a transverse section on line *X X* of Fig. 1. Fig. 6 is a plan view of the under side of the steam-chest. Fig. 7 is a plan view of the top of the main cylinder.

My invention relates to steam-pumps; and consists of the construction and adjustment of the valves and steam-ports, as hereinafter described.

A is the main cylinder, and *A'* the pump-cylinder. *B* is a cylindrical steam-chest, provided with live-steam ports *a a* and exhaust-ports *a' a'* at each end, as shown in Fig. 2 of the drawings. *B'* is an auxiliary steam-chest, provided with live-steam ports *b b'* and exhaust-ports *c c' c'' c'''*, located as shown in the drawings, and having an opening, *b⁴*, to receive the pin on the slide-valve, and to admit the live steam into the chest. *C* is the slide-valve, made with recesses at the upper corners, and provided with a pin, *b²*, and cups *d d'* on the inner side, to cover the ports *c c' c'' c'''*. *D* is a valve-piston in the cylindrical steam-chest *B*, and is provided with an opening, *b³*, to receive the end of the pin *b²* on the slide-valve, which pin passes through the opening *b⁴* in the chest into the opening *b³* in the valve *D* to start it, when by the steam it does not start quick enough.

The live-steam ports *b b'* in chest *B'* connect with ports *a a* in chest *B*; and the ex-

haust-ports *a' a'* in chest *B* connect with ports *c c'* in chest *B'*, and by cups *d d'* the exhaust steam is conducted to the ports *c' c''*, which connect with the outlet *E'*.

The valve *C*, sliding to the left end of chest *B'*, as shown in Fig. 1 of the drawings, closes port *b* and opens port *b'*, and at the same time opens the lower ports *c c'* and closes the ports *c'' c'''* in the opposite end of the chest.

The steam, entering at the inlet *E*, passes through ports *a² a³*, (shown in Figs. 6 and 7 of the drawings,) and through opening *b⁴* into chest *B'*, and through port *b'* into the right end of chest *B*, forcing valve-piston *D* to the left, the exhaust steam in that end escaping through port *a'* into port *c*, and by cup *d* into port *c'*, thence to the outlet *E'*.

The valve *C*, sliding to the right, opens port *b* and closes ports *b' c c'*. The live steam enters through port *b* into the left end of chest *B*, and forces the piston back to the other end, the dead steam escaping through port *a'* to port *c''*, and by cup *d'* into port *c'''*, thence to outlet *E'*, the valve *C* serving as a double valve, or instead of two valves, one a receiving and the other an exhaust valve.

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

1. The slide-valve *C*, having recesses at the corners and cups *d d'* on the inner side, adjusted to act as a double valve, in combination with a steam-chest having ports *b b' c c'* *c'' c'''*, substantially as described and shown.

2. The steam-chest *B*, having ports *a a a'*, and valve-piston *D*, in combination with steam-chest *B'*, having ports *b b' c c' c'' c'''*, and double slide-valve *C*, constructed and adjusted substantially as and for the purposes described.

3. The pin *b²* on the slide-valve *C*, in combination with the steam-chests having opening *b⁴*, and the valve-piston *D*, having opening *b³*, substantially as and for the purposes described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HENRY EPPING.

Witnesses:

CONRAD LIMPERT,
JAMES FRANNEY.