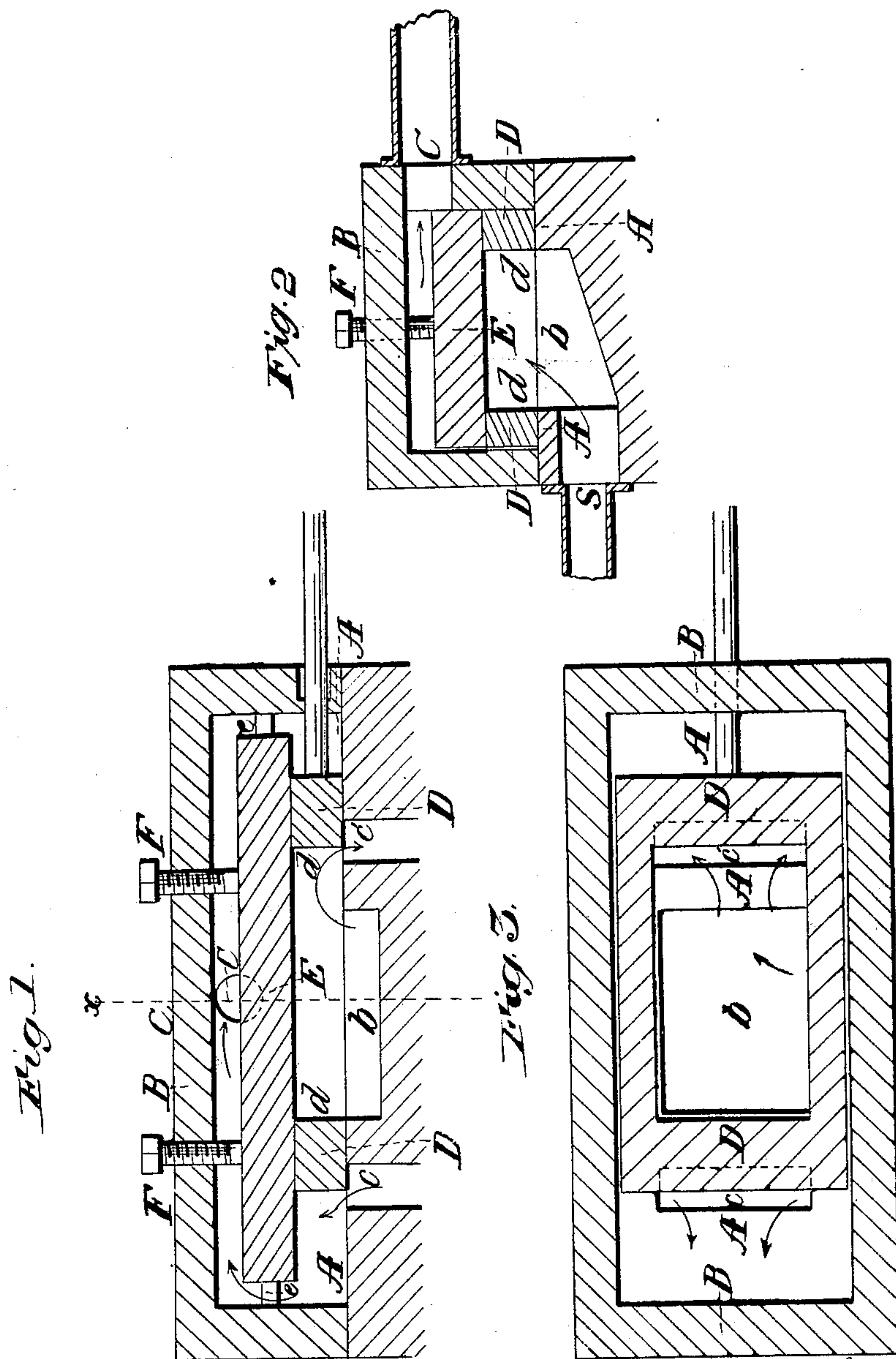


J. Randall,
Steam Balanced Valve.
No 30,184. Patented Sep. 25, 1860.



Witnesses:
J. W. Coombs,
R. S. Spencer

Inventor:
J. Randall
Per Murray
Attorney

UNITED STATES PATENT OFFICE.

JOHN RANDALL, OF ELMIRA, NEW YORK, ASSIGNOR TO HIMSELF, AND R. R. SMALLEY, OF TROY, NEW YORK.

SLIDE-VALVE.

Specification of Letters Patent No. 30,184, dated September 25, 1860.

To all whom it may concern:

Be it known that I, JOHN RANDALL, of Elmira, in the county of Chemung and State of New York, have invented a new and useful Improvement in Slide-Valves for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section of the valve seat, valve and valve box of a steam engine illustrating my improvement. Fig. 2, is a transverse section of the same in the line *z*, of Fig. 1. Fig. 3 exhibits a plan of the interior of the valve chest without the back plate which is fitted to the valve.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in certain means whereby the valve is relieved of all pressure toward its seat and is made to work with a very inconsiderable amount of friction.

A, is the valve seat having three ports *b*, *c*, *c'*, arranged as for the ordinary three-port valve but so that the center port *b*, communicates with the induction steam pipe S, instead of with the exhaust pipe. The ports *c*, *c'*, lead to the ends of the cylinder in the usual manner.

B, is the valve chest covering the valve seat in the usual manner but having the exhaust pipe C, connected with it.

D, is the valve consisting of a flat plate having its face of a form similar to that of the ordinary three port valve but having an opening *d*, right through it, such opening corresponding in form and arrangement with the exhaust cavity commonly provided in the face, the sides of the said opening being perpendicular to the face and back of the valve, both of which are perfectly parallel.

E, is a flat plate fitted steam tight to the back of the valve, covering it entirely, and made sufficiently longer to keep the valve covered, during the whole movement but short enough to allow the exhaust steam to pass its ends where it is furnished with horns or studs *e*, *e*, whose ends fit between the ends of the valve chest and thereby prevent its moving longitudinally with the valve.

F, F, are two set screws screwing through the cover or back of the valve chest and pressing upon the back of the plate to keep it in steam tight contact with the valve and the valve in steam tight contact with its seat A.

The valve D, is operated in the usual manner except that its movement relatively to the movement of the piston of the engine is precisely the reverse of that of the ordinarily constructed three-port valve; and in such operation it admits steam to the cylinder from the cavity of the port *b*, through the opening *d*, and through the cylinder ports *c*, *c'*, alternately. The steam is exhausted from the cylinder through the ports *c*, *c'*, alternately under the ends of the valve and passes through the valve chest to the pipe C.

The drawing represents the steam, whose course is indicated by arrows, as entering the cylinder by the port *c'*, and exhausting therefrom by the port *c*. In the above operation the valve is subject to no pressure of the live steam except in such portion of this face as may overhang the port *b*, or the port *c*, or *c'*, which is receiving the steam, and this small amount of pressure which is in an upward direction is met by the plate E, and the set screws F, F.

In case of the valve wearing leaky it is set tight to its seat by screwing down the set screws F, F.

A similar construction of valve and similar application of a plate at its back may be used in connection with a similar induction port in the seat when a separate valve is used in connection with each of the cylinder ports *c*, *c'*, each valve in such case being arranged in a separate valve chest or both in one valve chest, the chest or chests in such case being in constant free communication with the exhaust pipe.

I do not claim separately either the induction of the steam through the central port, the construction of the valve with a central opening right through it, or the application of a plate and set screws at the back of the valve; but

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

The employment in combination with the valve constructed with a single opening *d*, right through it, of the induction cavity *b*, in the seat, the plate E, and set screws F, F, applied to the back of the valve, and a valve chest in constant communication with the induction pipe, the whole arranged and operating substantially as herein set forth.

JOHN RANDALL.

Witnesses:

GEO. L. DAVIS,
ROBERT F. HYLEN.