R. Hardie.

Steam Valve.

No. 85,583. Patented Jan. 5, 1869.

Fig. 2.

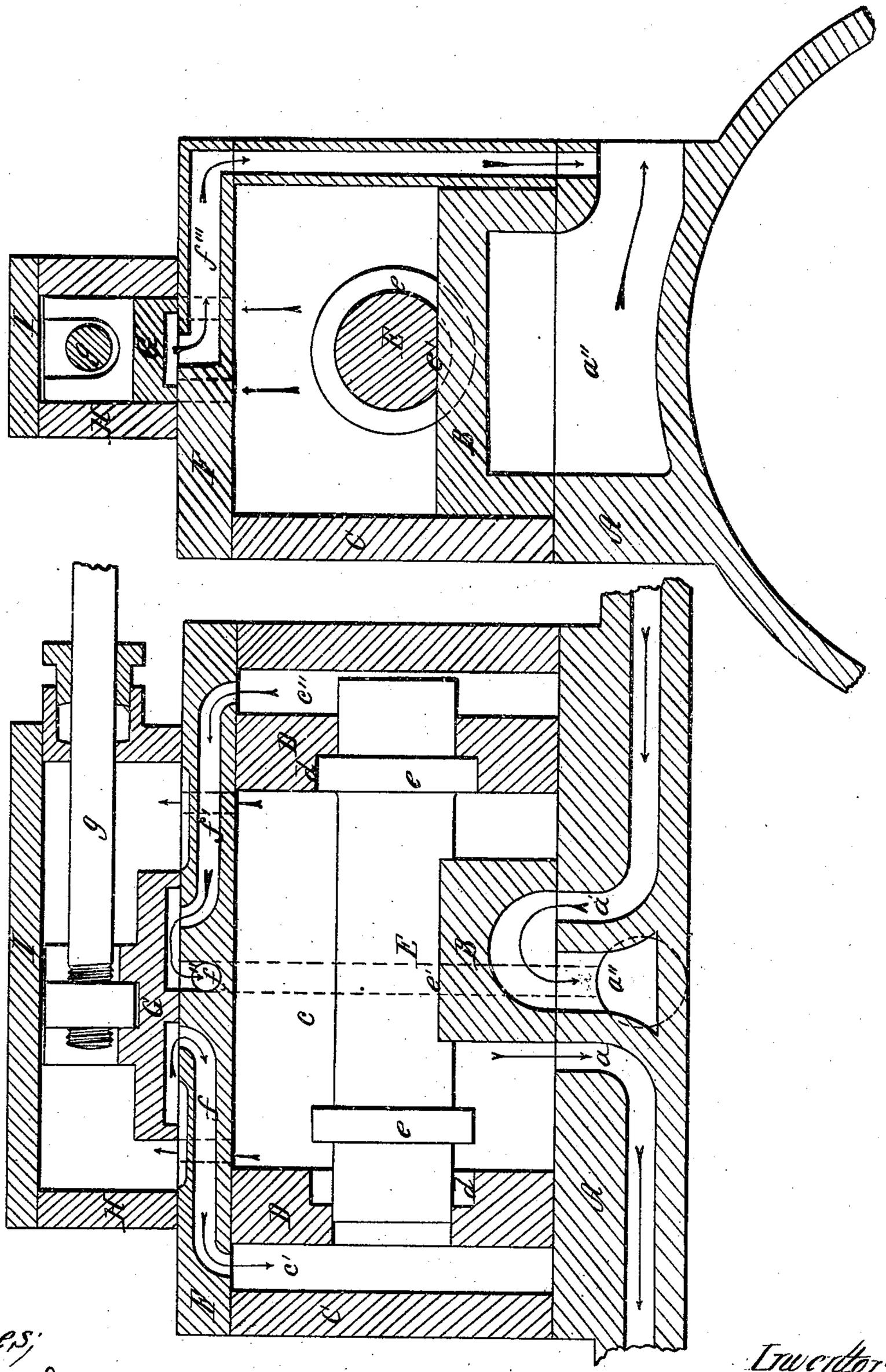

Fig. 1.

Witnesses;
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UNITED STATES PATENT OFFICE.

ROBERT HARDIE, OF ALBANY, NEW YORK.

IMPROVEMENT IN STEAM-ENGINE SLIDE-VALVES.

Specification forming part of Letters Patent No. **85,583**, dated January 5, 1869.

To all whom it may concern:

Be it known that I, ROBERT HARDIE, of the city and county of Albany, and State of New York, have invented a new and useful Improvement on Steam-Valves; and I hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal section through the valves and chests, and Fig. 2 a transverse section of the same.

The nature of my invention relates to that class of valves whose motion is governed by the movement of an auxiliary valve, worked by some part of the engine having a reciprocating motion.

The following description will enable others skilled in the art to make and use my invention.

A is the seat for the main valve, provided with the usual steam-ports *a a'* and exhaust-port *a''*. B is the main valve. C is the chest for the main valve, which is divided, by means of the partitions D D, into three chambers, *c c' c''*. *d d* are recesses in the partitions D D.

E is a movable piston passing through the partitions D D, and is provided with the collars *e e*, to fit into the recesses *d d*, a space equal to the proposed "throw" of the valve being allowed between the outside faces of the collars and the depth of the recesses.

A space, *e'*, is cut in the lower side of the piston, at or near its middle, for receiving the valve B, which has a free vertical movement, to compensate for any wear between it and its seat.

F is the cover for the chest C, and forms the seat for the auxiliary valve. It is provided with the steam-ports *f f'*, (communicating with the chambers *c' c''*,) and the exhaust-port *f''*, communicating with the exhaust-port *a''*, for the main valve.

G is the auxiliary valve, attached to its rod *g*. It may be operated by means of an arm attached to the piston-rod of the engine striking "tappets" placed on the rod *g*, or by any of the well-known devices used for a like purpose.

H is the chest for the auxiliary valve, steam being admitted into it by holes through the cover F. I is the cover for the auxiliary-valve chest.

Steam, being admitted into the chamber *c* of the main-valve chest, passes freely through the holes through the cover F into the chest H; thence under the auxiliary valve G, through one of the steam-ports *f*, into the chamber *c'* of the chest C, and its pressure, acting on the end of the piston E, forces it out of the chamber until one of the collars *e e* is carried to the end of its proper recess. This movement carries the main valve B into its proper position to open one of the steam-ports *a* for the passage of steam into one end of the cylinder of the engine.

When the piston of the engine has nearly completed its stroke, the auxiliary valve G (by means of the arm and tappets, or equivalent device) is moved, when the motions herein described are reversed, so as to admit steam for the return stroke of the piston, the exhaust-ports *a''* and *f''* being opened for the escape of the spent steam.

The collars *e e* and recesses *d d* are intended to regulate the stroke of the valve, and, by confining a part of the steam between them, to "cushion" the piston E, so that no noise or jar will be caused by its movement.

The arrows indicate the direction in which the steam passes during one stroke of the engine-piston.

Among the advantages I claim for my invention are its simplicity, its reliability, and its cheapness of construction.

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

1. The movable piston E, in combination with the chambers *c c' c''* and partitions D D, substantially as and for the purpose herein described.

2. Also, the collars *e e*, in combination with the recesses *d d* and partitions D D, as and for the purpose specified.

ROBERT HARDIE.

Witnesses:

WILLIAM H. LOW,

A. B. VOORHEES.