

Edward Merriman: Steam Pistons.

116853

PATENTED JUL 11 1871.

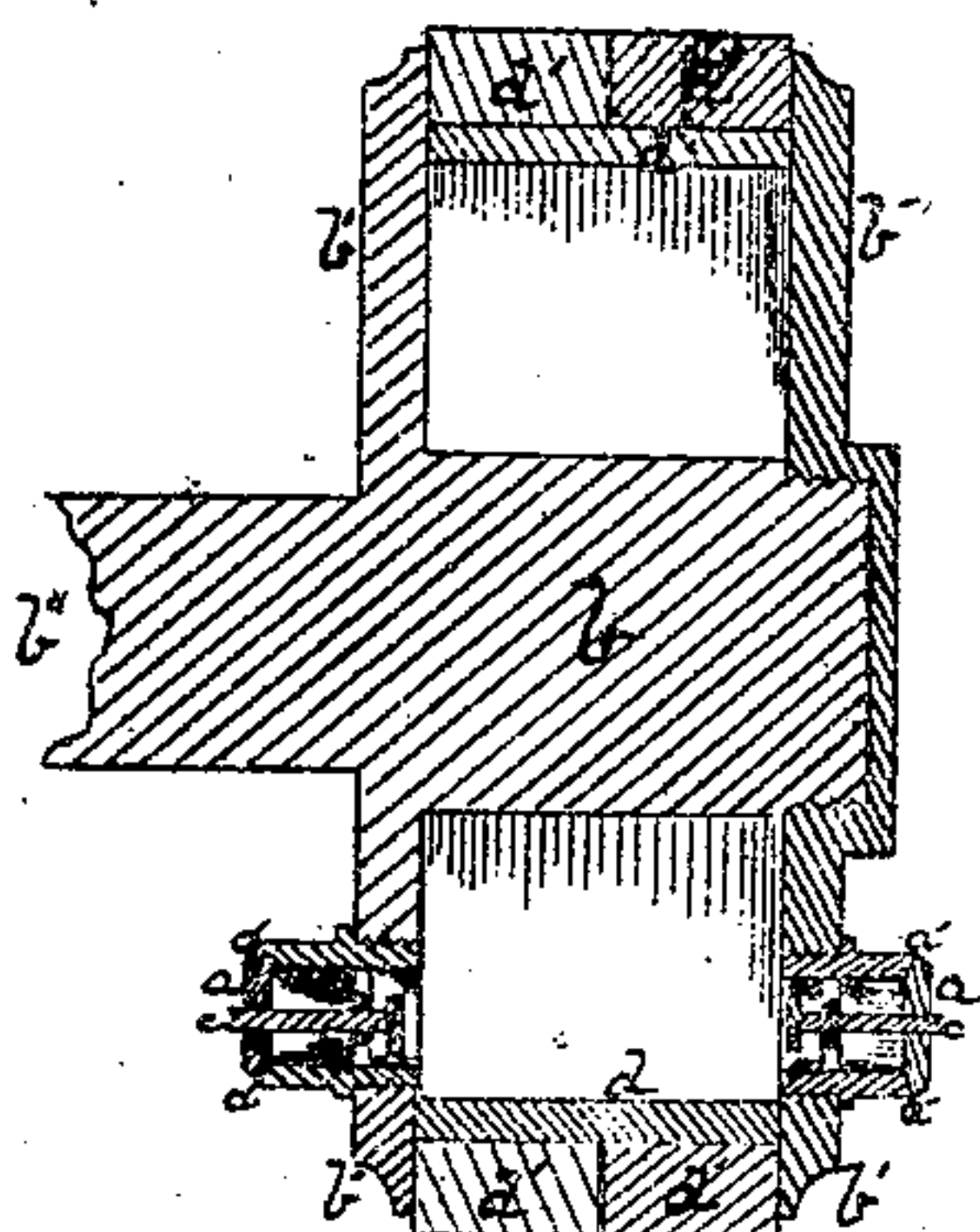


Fig. 1.

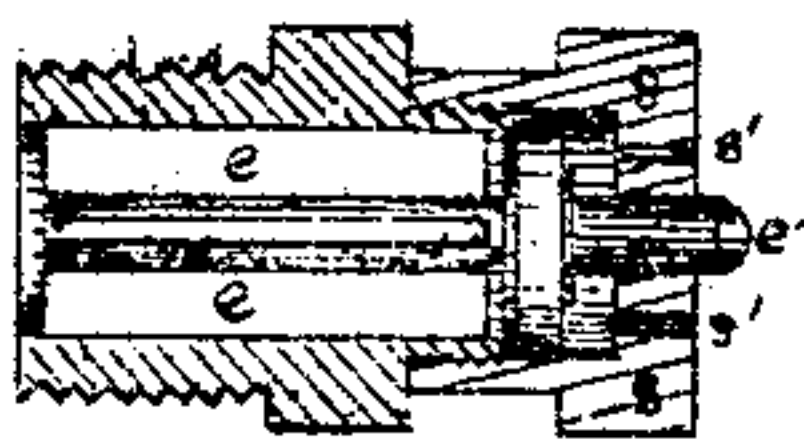


Fig. 3.



Fig. 4.

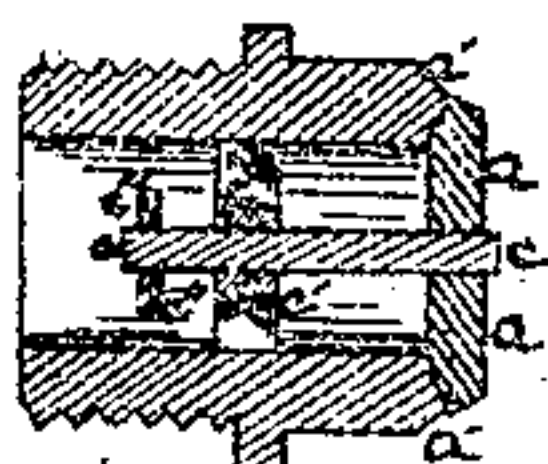


Fig. 2.

Witnesses:

R. C. Wrenshaw

James S. Kay

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UNITED STATES PATENT OFFICE.

EDWARD MERRIMAN, OF ALLEGHENY, ASSIGNOR TO HIMSELF AND HUGH COLL,
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IMPROVEMENT IN STEAM-PISTONS.

Specification forming part of Letters Patent No. 116,853, dated July 11, 1871.

To all whom it may concern:

Be it known that I, EDWARD MERRIMAN, of Allegheny city, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steam-Pistons; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a sectional view of the piston of an ordinary steam-cylinder, and illustrative of my improvement; Fig. 2 is a like view, somewhat enlarged, of one of the valves shown in Fig. 1; and Figs. 3 and 4 are sectional and end views, showing a modified valve arrangement.

Like letters of reference indicate like parts in each.

My invention relates to an improvement in steam-pistons for high-pressure engines; and consists in arranging in either or each end of the piston a check or relief-valve, by which the steam which may have leaked into the piston will be exhausted along with the exhaust steam.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation.

The piston-head *b* and end plates *b'* *b''* of the piston are made in the usual way, as also the stem *b''*, expanding rings *d*, and packing-rings *d'*. Any desired construction or arrangement of expanding devices may be used between the head *b* and expanding ring *d* to cause the packing-rings *d'* to work in proper relation to the inner face of the cylinder.

In the use of steam-pistons thus constructed on high-pressure engines great difficulty has been experienced from the fact that, especially when the devices become worn, steam will leak into the inside of the piston-head, and sometimes to such an extent as to expand or press out the packing-rings *d'* against the inner face of the cylinder with too great force. The result is a loss of power from excessive friction; and sometimes the packing-rings are thus pressed out with such force as, in operation, to injure seriously or destroy their working-faces, or the inner face of the cylinder, or both.

To prevent this internal steam-pressure I arrange in one or both ends of the piston a check or relief-valve, *a*, (Figs. 1 and 2,) opening by an outward lift from its seat *a'*, and guided by a stem, *c*, which plays through a perforated guide, *c'*, hav-

ing suitable steam-openings. The length of the lift is limited by a knob, *c''*, on the stem, but which is so arranged as not wholly to close the steam-passages through the guide *c'* or around it. Then, as soon as the pressure of steam inside the piston exceeds atmospheric pressure, the valve on the then exhausting side or end of the piston will be opened thereby and the steam within be free to escape and pass out at the exhaust-port. At the same time the valve on the opposite side or end of the piston will be closed and held to its seat by the pressure of the inflowing steam. In this way the inside of the piston is kept free from an excessive and injurious pressure of steam, notwithstanding the leakage.

In Figs. 3 and 4 I have shown the valve *a* in the form of what is known as a wing-valve. It rests on a seat, *a'*, as already described. The wings *e* guide it in its motion to and from its seat, and, for the same purpose, a stem, *e'*, projecting through the cap *s*, may be used, if so desired. The length of lift may be limited by a knob, as before, or other suitable stop, or the cap *s* may be used for that purpose, in which case steam-ports *s'* made in the cap for the exit of steam.

I am aware that relief-valves have been arranged, one in each end of the piston, but both on the same stem, so that both valves must necessarily open and close at every stroke of the piston. Such construction is objectionable on account of the excessive and destructive wear on valves and seats, which is so great that frequent renewal would be required. I am also aware of the construction shown in Thurber's patent of March 26, 1867; but in his patent no provision is made for the escape of the steam from inside the piston, which is the chief object in view in the construction I have described.

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

A relief-valve or valves, arranged in one or both ends of a steam-piston in such a way as to open only from within by steam-pressure when the pressure inside is in excess of that outside on the exhaust end, substantially as described.

In testimony whereof I, the said EDWARD MERRIMAN, have hereunto set my hand.

EDWARD MERRIMAN.

Witnesses:

A. S. NICHOLSON,
G. H. CHRISTY.