J. Shaffer,

Steam Safety Valve.

No. 63,816. Patented Apr. 16, 1867

Fig: 1

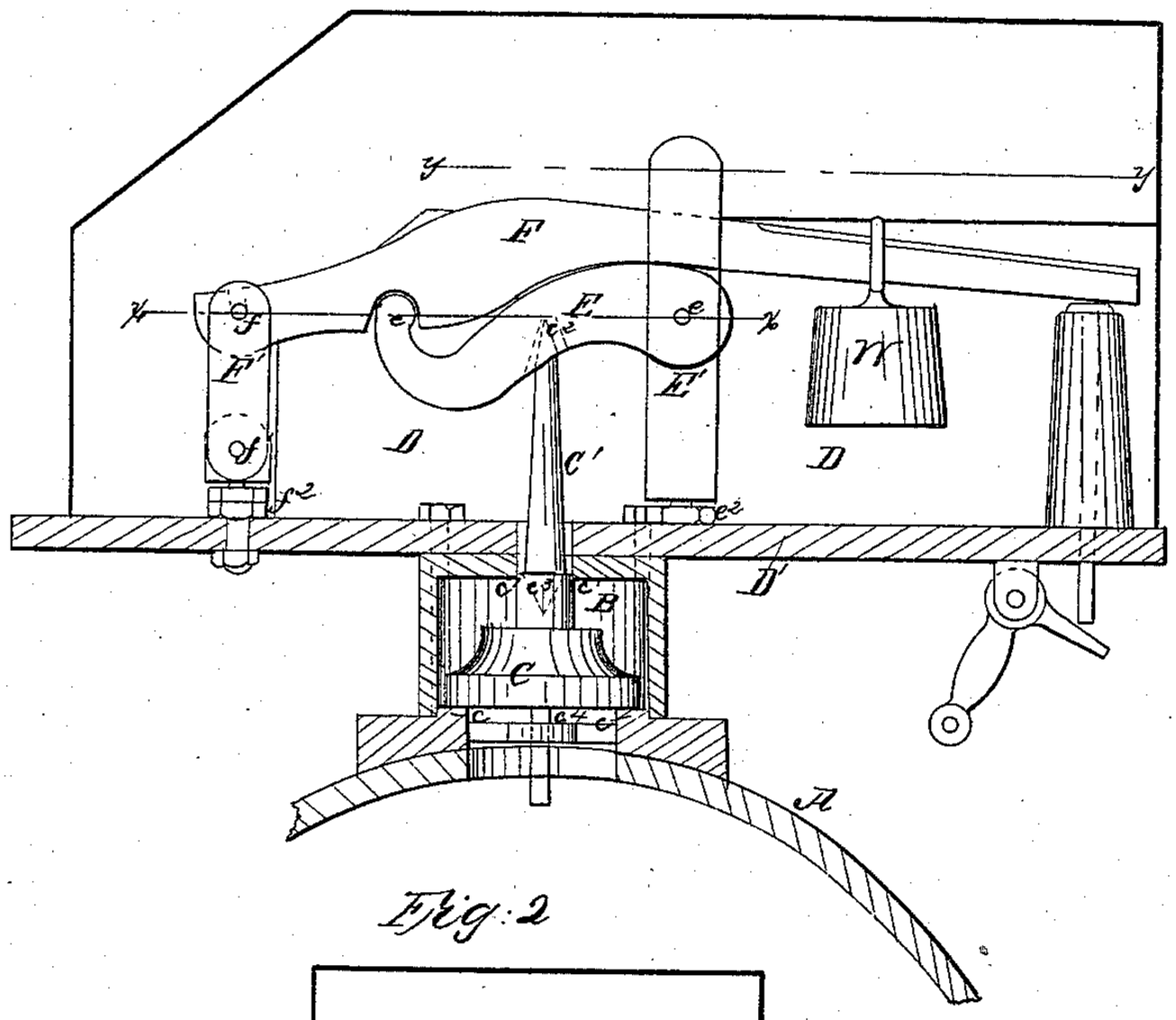
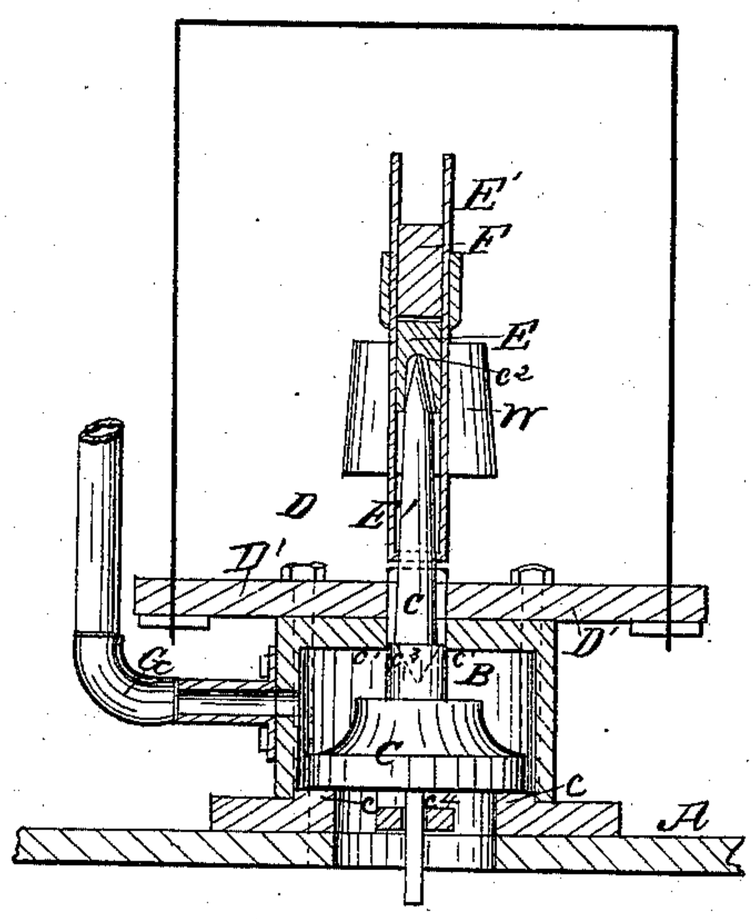


Fig: 2



Witnesses:
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JOHN SCHAFFER, OF ST. LOUIS, MISSOURI, ASSIGNOR TO SAMUEL BAXTER, OF SAME PLACE.

Letters Patent No. 63,816, *dated April* 16, 1867.

IMPROVEMENT IN STEAM SAFETY-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN SCHAFFER, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in Lock-up Safety-Valves; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates, firstly, to the arrangement of the safety-valve, which has two seats, one above and the other below it, the upper seat being used, when the valve is open, for the purpose of excluding the escaping steam from the interior of the box or case wherein the levers and weights are locked up, which are thereby rendered more free in their action and less liable to rust. The invention also relates to the arrangement of the levers and adjustable fulcra, whereby the levers are left free to yield to the vertical motion of the valve-stem without jamming or becoming disarranged during the opening of the valve, and thereby endangering the action of the safety-valves.

Figure 1 of the drawings is a sectional elevation of the improved valve.

Figure 2 is a transverse sectional elevation.

A represents the shell of the boiler to which this safety-valve is to be applied. B is the safety-valve chamber, within which is placed the valve C, which has a seat at c, where the steam escapes from the boiler when the pressure is too high, and also a seat at c^1, where the steam is shut out from the box D which contains the levers and weights which are to keep down the safety-valve. When the pressure in the boiler is not above the required standard the valve will rest upon its seat c, but as soon as there is pressure enough within the boiler to raise the valve it will, by such pressure, be forced up against the seat c^1. I employ the well-known arrangement of compound levers, E and F, as clearly shown in fig. 1. The lever E has its fulcrum at e in the adjustable standard E′, and the lever F at the point f in the adjustable standard F′. The valve-stem C′, which holds the valve down, is fitted into a socket, e^2, in the bottom of the lever E. The lever E rests under the bottom of the lever F, in a circular bearing drawn from the centre e^1. The bearing points, e, e^1, f, and e^2, are all placed in the same straight line, $x\ x$, and consequently, when the valve rises, the points e^2 and e^1 will rise in nearly a vertical direction, and without becoming cramped or jammed during the motion. This is a matter of vital importance, as the slightest disarrangement in this particular will endanger the safety of the boiler the valve is designed to protect. The standard F′ consists of two links, having pivots at f and f^1, so as to allow them a pendulous motion about the point f^1, in order to allow the lever F a longitudinal motion. This will prevent the lever E from becoming jammed at e^1 during the upward motion of the valve; for it is evident that the outer end of this lever will describe an arc of a circle drawn from the centre e. In order to compensate for the occasional grinding in of the valve C, and the consequent shortening of the stem C′, I make the standards E′ and F′ adjustable as to height by the use of the screw-nuts e^2 f^2, so that either standard may be set higher or lower, as occasion may require. This is also a very important arrangement in view of the frequent shortening or lowering the stem C′ will be subject to. The valve C is guided above and below by the slides c^3 c^4, so that its position on either seat, c or c^1, will be certain.

A common difficulty with safety-valves, as at present constructed, consists in the inability of the valve to close itself after it has once been opened and the steam is escaping through it. This difficulty arises from the fact that the dead pressure of the steam only is exerted upon the valve until it is opened; but as soon as it is open the momentum of the moving steam will have to be overcome before the valve can be closed. As this valve is of that lock-up variety which has recently been ordered to be adopted by Congress, and is entirely out of the control of the engineer, it is very important that it should be so arranged as to close itself as soon as the pressure is reduced to the proper point; and in order to accomplish this result I lower the end of the lever F, to which the weight W is applied, so that when the said lever is raised up to its greatest altitude it will not be raised higher than a horizontal line, $y\ y$, drawn across its top edge, and consequently the weight W will act with a greater force to pull down the lever when it is up than when it is down. This is evident from the fact that the weight W, in rising, travels through an arc of a circle, and, with the above conditions fulfilled, it will

be farther from the fulcrum of its lever when up than when down. The box D shuts down tightly to the bed-plate D′, where it may be locked fast. The steam pipe G conveys the escape steam out of the valve-chamber without having it pass into or through the box D.

Having thus fully described my invention, what I claim, is—

The arrangement of the double-seated safety-valve C with reference to the case D, and the levers E and F, substantially as and for the purpose set forth.

JOHN SCHAFFER.

Witnesses:

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