

H. W. Hervey,
Steam Safety Valve.
N^o 81,167. Patented Aug. 18, 1868.

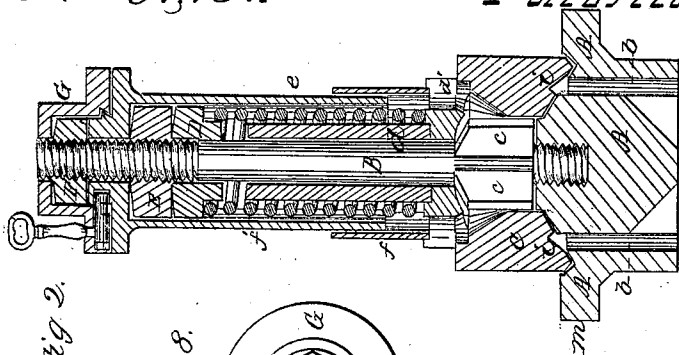


Fig. 2.

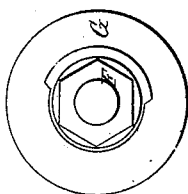


Fig. 8.

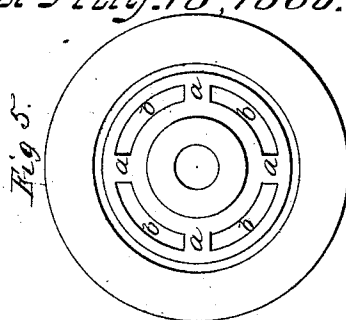


Fig. 5.

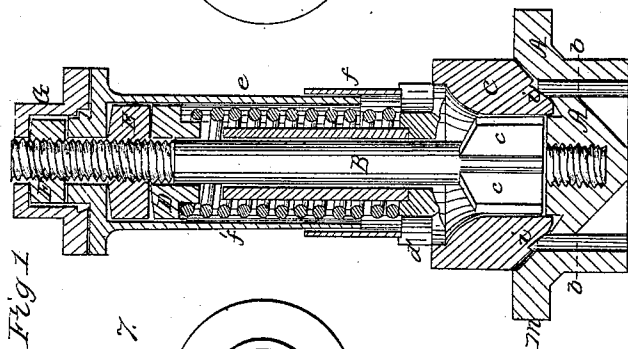


Fig. 1.

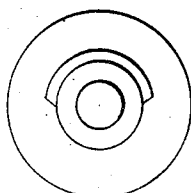


Fig. 7.

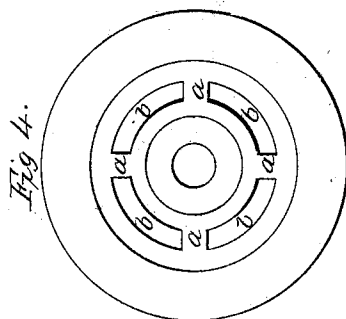


Fig. 4.

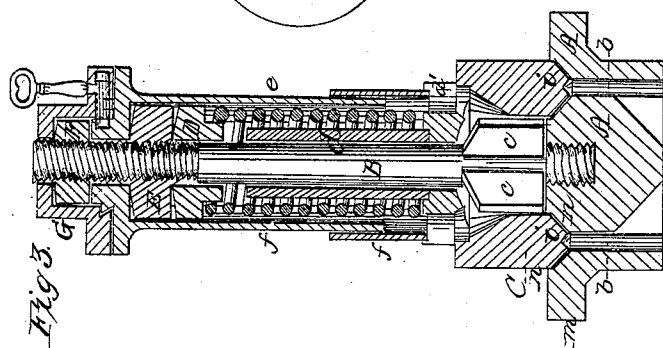


Fig. 3.

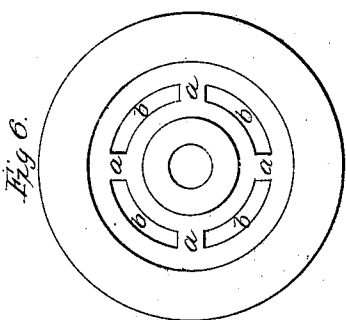


Fig. 6.

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HENRY W. HEWET, OF NEW YORK, N. Y.

Letters Patent No. 81,167, dated August 18, 1868.

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, HENRY W. HEWET, of the city, county, and State of New York, have invented certain new and useful Improvements in "Lock-Up Safety-Valves for Steam-Boilers;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, through letters of reference marked thereon, forming part of this specification, and in which—

Figure 1 represents a central vertical section of a single-seat conical valve, constructed according to my improvements.

Figure 2, a similar section of a hollow cone, single-seat valve, of like construction.

Figure 3, a similar section of a double-seat valve, operating on the same principle.

Figure 4 is a plan view of the valve-seat, corresponding with fig. 1.

Figure 5 is a like view of the seat, represented in fig. 2

Figure 6 a like view of the same part, as seen in fig. 3.

Figure 7 is a top view of the lock-up case, its cap being removed; and

Figure 8 is an inverted view of the cap or cover of said lock-up case.

Similar letters appearing on the several figures indicate like parts.

The object of my invention is to produce a valve that will yield to the pressure of the steam in the boiler, at, or as near as may be, the point at which it is loaded, as indicated by the steam-gauge, and close again as promptly when the surplus has passed off or has ceased to be generated, and that whilst it affords ample area, when closed, to be affected by the pressure, it will also afford facility for the escape of steam at a more rapid rate than it can be generated when open; and it consists in devices for applying the pressure of the steam to a portion only of the face of the valve, through ports in its seat, in contradistinction to applying it to the centre of the valve, within the annular formation of its seat; also, in the arrangement of a double-inclined seat, said inclines being on the same plane, and on either side of the steam-ports therein; furthermore, in an annular groove or channel between the inner and outer margins of the face of the valves, said channel being of greater area or breadth in its cross-section than that of the ports in the valve-seat, so as to present a larger surface to the action of the steam, and effect a reaction on the uncovered portion of the seat; and in the arrangement of a lock-up cylinder for enclosing the spring or weight on the valve, so that whilst it may be adjusted to the required pressure from the outside of the boiler, or when the steam is up, it may also be protected against any alteration thereof, or tampering therewith, to increase the pressure when so adjusted.

To enable others to make and use my invention, I will describe its construction and operation, by referring to the drawings, in which—

A represents the seat of the valve, the lower portion of which may be of any suitable form for attachment to the boiler. This seat is closed at its centre, and provided with an annular passage vertically through it, which is intercepted only by the ribs *a*, connecting the central with its outer portion, and thus forming ports *b*, for the passage of the steam. Into the centre of this seat is screwed, or otherwise suitably attached, a stem, B, the lower end of which is formed with radial pins or wings, *c*, to serve as guides for the vertical motion of the valve encompassing them.

The valve-seat proper, on the upper surface of the part A, may be variously formed. In fig. 1 it is represented as a frustum of a cone, inclining downward towards its centre; in fig. 2 its inclination is upwards towards the centre; and in fig. 3 it is of a double-seated formation, or inclining downwardly for half of its breadth, and upwardly for the other half towards the centre, forming a V-shaped annular groove. In each of these forms the steam-ports *b* are arranged to pass vertically through the seat, at a point between the inner and outer periphery thereof, but preferably at about midway, and of about one-third of its width.

The valve-portion C is formed, on its under side, to correspond with the formation of the seat, and is ground steam-tight therein; it is of annular form, its inner periphery encircling and fitting so as to move freely over the pins *c*. of the stem B, which form its guide, and its outer periphery being of equal diameter or thereabouts

with that of its seat; it is also formed with an annular channel or groove, *i*, in its face, of slightly greater width than that of the ports *b*, in its seat, and spanning said ports, the object of which will hereinafter appear.

Surmounting this valve is a socket, *d*, formed with three or more radial arms, *d'*, at its lower end, through which it takes its bearing on the upper side of the valve, and on which rests the spring *e*, having a bearing at its upper end against a collar, *D*, which also slides over the stem *B*, and is restrained by the lock-nut *E* being screwed upon the stem, and by which the tension of the spring is to be adjusted.

Attached to or cast with the arms *d'*, of the socket *d*, is a cylindrical casing, *f*, encircling the lower portion of the spring *e*, which connects in a telescopic manner with the casing *f'*, the upper end of which is enclosed and provided with a central orifice fitting over the screw part of the stem *B*, and resting on the lock-nut *E* thereon. A nut, *F*, is then screwed on the upper end of the said stem to retain the casing in place, and which is protected against removal or change of adjustment by the cap *G*, locked to the upper part of the cylinder *f'* in any suitable manner, and by which the whole is enclosed and secured beyond possibility of being tampered with.

The adjustment and operation will then be as follows:

The valve, in either of its forms, being placed upon its seat, and the socket or collar *d*, around the stem *B*, and resting, by its arms *d'* thereon, with the spring *e* over it, the collar *D* is placed to rest upon the upper end of the spring, which is then screwed down to the necessary tension by the nut *E*. The steam may then be raised in the boiler to the maximum pressure desired, as indicated by the steam-gauge, and the tension-screw set for the steam to blow off at that point, after which the cylinder *f'* is placed over the spring, its lower end entering or passing over the fixed cylinder *f*, and secured by the lock-nut *F*; the cap *G* is then connected with the top of the cylinder *f'*, and locked thereto in any suitable manner, to prevent the nuts *E* and *F* being tampered with, whilst the cylinder prevents the introduction of wedges or the like between the coils of the spring. By this arrangement of the lock-up, it will be seen that the pressure on the valve may be accurately adjusted for the steam to blow off at any desired indication of the steam-gauge; whereas, when the adjustments are arranged within the boiler, they are inaccessible when the steam is up, and consequently must be set by guess and repeated experiments.

The steam in the boiler acts, through the ports *b*, on the grooved portion *i*, within the face of the valve, which being of slightly greater width in its cross-section than that of the ports *b*, causes a reaction on the uncovered portion of the seat to raise the valve, and the valve setting within a small collar formed around the periphery of its seat, and a corresponding elevation in its centre, projecting into the central discharge-orifice of the valve, it follows that the valve must be lifted a fraction of an inch from its seat before there is any discharge, when the entire surface of the valve is subjected to the lifting power of the steam, at a time when the tension of the spring is increased by such lifting action thereon. The valve, furthermore, being constructed with central as well as outer discharge, affords free vent for the steam, which, if desired, may be conducted by a pipe enclosing the whole, by connection with the flange *m*, of the valve-seat *A*, into the smoke-stack or elsewhere.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the steam-ports *b*, in the centre or thereabouts of the valve-seat, whether said seat be a concave or convex cone, or both combined, substantially as set forth.
2. The arrangement of the double seat *n n*, on the same plane, one on either side of the ports *b*, substantially as shown and described.
3. The arrangement of an annular cavity or groove, centrally or nearly so, in the face of the valve, and of greater width than that of the ports *b* in the seat, so as to span said ports, substantially as and for the purposes set forth.
4. The arrangement of the case *f f'*, in combination with the spring *e*, valve *C*, collar *D*, and locking-cap *G*, substantially as shown and described for the purpose set forth.

H. W. HEWET.

Witnesses:

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