J. C. HODGINS.

Safety-Valves.

No. 151,027. Patented May 19, 1874.

Fig. 1.

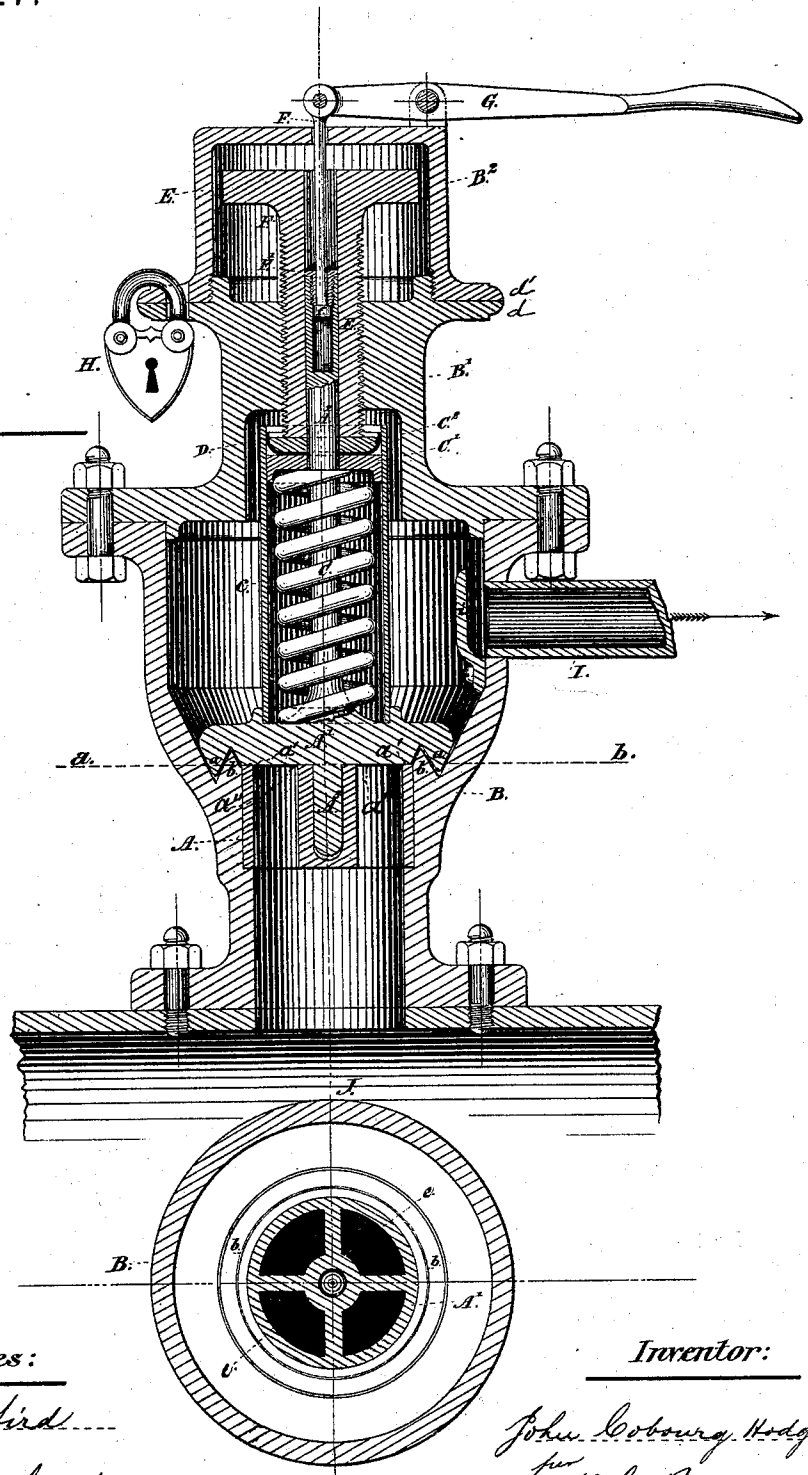

Fig. 2.

Witnesses:

Geo. Baird

Hugh Baird

Inventor:

John Coburn Hodgins
per
D. C. Ridout and Coy
Attys.

AM. PHOTO-LITHOGRAPHIC Co. N. Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

JOHN COBOURG HODGINS, OF TORONTO, CANADA.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **151,027**, dated May 19, 1874; application filed December 22, 1873.

To all whom it may concern:

Be it known that I, JOHN COBOURG HODGINS, of the city of Toronto, county of York, Province of Ontario, Canada, have invented a Lock-Up Safety-Valve, of which the following is a specification:

My invention relates to certain new and useful improvements in lock-up safety-valves for steam-boilers; and consists, first, in the peculiar formation of the valve and valve-seat, by which the valve, when closed, presents a smaller area to the action of the steam in the boiler than when it has been opened by the said action or pressure of steam, thereby requiring less power to hold the valve closed; but at the same time, when the valve is once raised and the steam escaping, (the surface being increased,) the valve is still further and more completely opened.

Reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, Figure 1 is a sectional elevation, and Fig. 2 is a sectional plan, of a lock-up safety-valve with my improvements embodied.

J is the upper plate of a boiler, to which is bolted the valve-seat casting B. A is the ported valve-seat, made of any suitable material, shaped and fitted into B, as shown. A^1 is the valve, constructed to fit on the seat A, but also having an outer annular angular projecting lip, *a*, which fits into a similarly-shaped recess cut in B. The angular faces on the valve A^1 do not come quite in contact with the angular faces of *b* cut on B, the steam-joint being made on the flat annular surfaces *a'* of A, and *a''* of A^1. In the center of the seat A a hole is drilled to within a short distance of its under surface, to receive a projecting teat, A^3, either cast or fastened to the valve A^1. To the valve A^1 is also cast or attached the spindle A^2, passing upward and within the spiral spring C, and fitting into a suitable hole bored through the compression-screw E. The spring C is contained within an outer casing, *c*, resting directly on the valve A^1, and having a cup-shaped washer, c^1, on top, fitting within the casing *c*. Between c^1 and the point of the compression-screw two washers are fitted on the spindle A^2, the lower one, D, being a diaphragm of india-rubber, or other suitable material, the upper one, c^2, having the corners of its lower edge rounded, the object being to cause the rubber, which is cut larger in diameter than the casing *c*, to press against the sides of the casing when the spring C is under compression, making a close joint, and preventing steam or air getting to the spring C. B^1 is that part of the outer shell or casing of the valve in which is cut the nut for the compression-screw E. On its upper surface is an annular projection, also with a thread cut upon it to receive the upper cap B^2. *d d'* are flanges on B^1 and B^2, through each of which a hole is drilled, the flanges being fastened together, as shown, by an ordinary padlock, H. In the upper end of the spindle A^2 a parallel hole is sunk, in which the head *f* of the rod F works freely up and down, the mouth being closed with an ordinary gland-screw, E'. G is a lever, so placed and connected that it will raise the valve A^1, but cannot put any additional pressure thereon.

On reference to the drawings it will be noticed that by the formation of the valve-seat A only a small portion of the valve A^1, when closed, is exposed to the pressure of the steam which reaches it through the ports *e;* but when once the pressure reaches the calculated resistance of the spring C, the valve A^1 lifts.

In the common valves, the opening remains nearly uniform, and if the steam-pressure is increased, the lift of the valve is not in accordance with the increase of pressure, and in no case is it proportionate to the full area of the valve. The defective lifting of the valve is found to arise from a partial vacuum produced underneath it by the radiating discharge of the steam, forming an inverted cone, the center of which is kept in a state of exhaustion by the rapidly-escaping steam.

It will be readily seen that the steam in escaping from my safety-valve is deflected by striking against the angular face of *a*, causing it to act against the angular projection *b* on the valve-seat casting B, from which it reacts on the outer angular surface of the valve A^1, thereby having sufficient power to overcome all resistance in lifting the valve A^1 to a height from the annular surface *a'* equal to the area of the ports in valve-seat A, relieving the boiler instantaneously, while so soon as the

velocity has abated, the pressure is correspondingly reduced, and the valve A closes at once. The top and bottom spindles A^2 and A^3 are made very free in their guides, as the angular faces *a* and *b* will always insure the valve reseating itself correctly, and insure the free action of the valve. All the couplings and moving parts being made free fits, and being so thoroughly protected from the action of the steam, all tendency "to stick" is obviated, and instant action of the valve, when the steam arrives at the required pressure, is insured.

By some slight alterations this valve can also be used on the lever principle, or on the combined principle of both lever and spring.

What I claim as my invention is—

The ported valve-seat A, with flat annular faces *a'*, the valve-seat casting B, formed with an annular projection, *b*, fitting into a recess cut in A^1, in combination with the valve A^1, having a flat annular face, *a''*, fitting on the valve-seat A, and also having an annular projection, *a*, fitting into the recess cut in B, arranged substantially as and for the purpose specified.

J. C. HODGINS.

Witnesses:
GEO. A. AIRD,
HUGH AIRD.