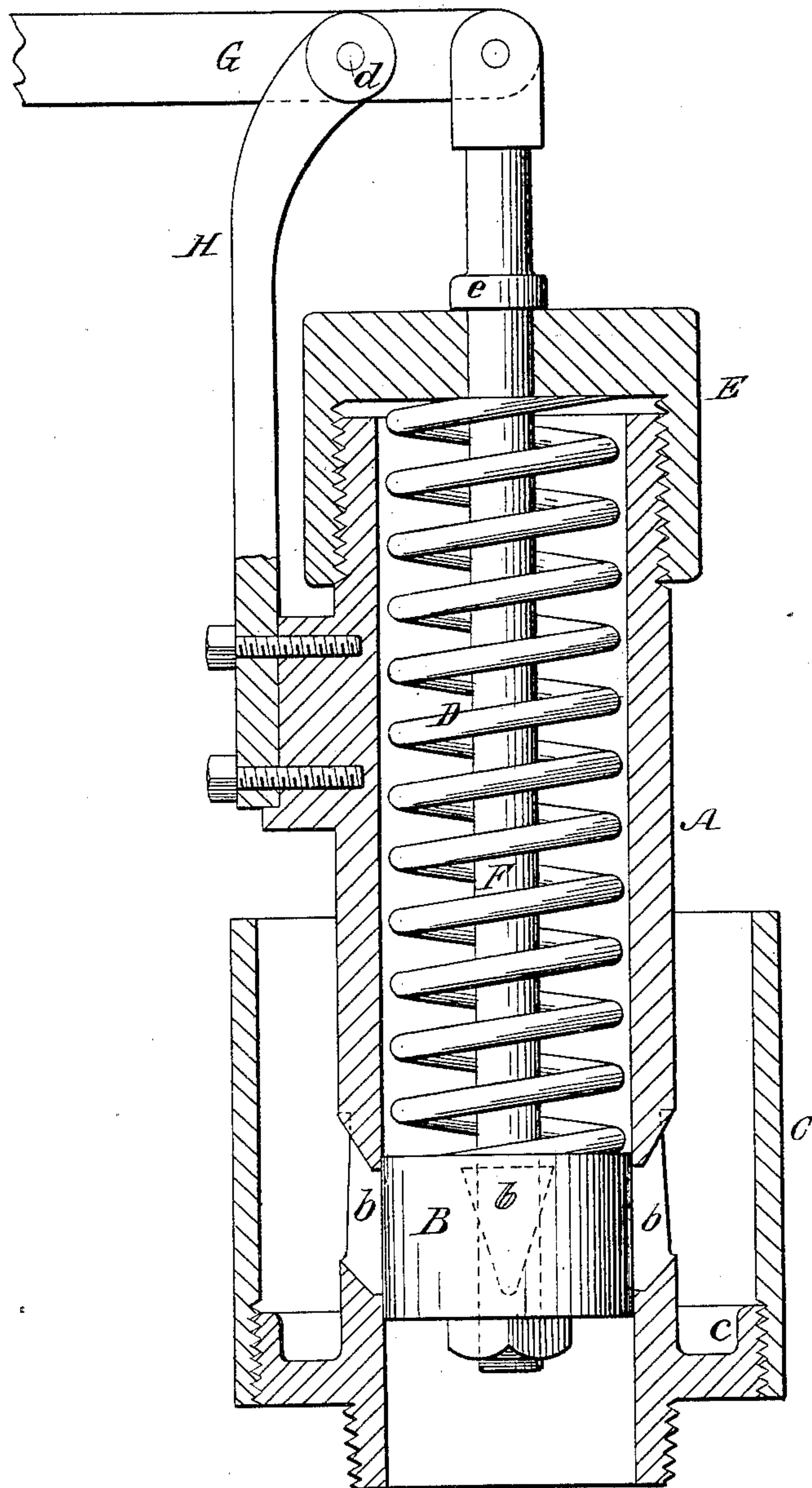


(No Model.)

T. KAYS.
SAFETY VALVE.

No. 318,748.

Patented May 26, 1885.



WITNESSES:

John H. Deemer
C. Sedgwick

INVENTOR:

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UNITED STATES PATENT OFFICE.

THOMAS KAYS, OF NEWTON, NEW JERSEY, ASSIGNOR TO THE LAWSON
NON EXPLOSIVE BOILER COMPANY, OF NEW YORK, N. Y.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 318,743, dated May 26, 1885.

Application filed May 27, 1884. Renewed April 17, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS KAYS, of Newton, in the county of Sussex and State of New Jersey, have invented certain new and useful
5 Improvements in Safety-Valves, of which the following is a full, clear, and exact description.

My invention has for its object the production of a safety-valve for steam-boilers which
10 shall not only act with greater certainty, but close, also open, more gradually than safety-valves as ordinarily constructed. The too rapid or sudden closing of the safety-valve it is believed is not an uncommon cause of steam-
15 boiler explosions, and this my invention obviates in a very simple manner. The form of valve which I use is a piston one, held down by spring-pressure; and the invention generally consists in a special construction of such
20 valve and its case, including lateral outlets for escaping steam, controlled by the piston-valve, and made of diminishing area in a downward direction, whereby the effects sought to be obtained are very perfectly secured, substantially as hereinafter described.

Reference is to be had to the accompanying drawing, forming part of this specification, in which the figure represents a vertical sectional view of a safety-valve embodying my
30 invention.

A represents an upright tube or cylinder, the lower open end of which screws into or connects with the boiler in any suitable way to provide for the passage of steam up into
35 the tube, for action on or against a piston or piston-valve, B, constructed to fit in a free but close manner the interior of the tube A, and, as it is moved up or down, to uncover or close any number of lateral escape-openings *b* for
40 the steam in the lower portion of the tube A. Said piston may either be a plain or packed one.

Screwed or otherwise fitted onto a flange, *c*, on the lower portion of the tube A is a casing, C, open at its top, and serving as a conductor for the escaping steam.

D is a coiled metal spring, of any required strength, arranged within the tube A above the piston B, and pressing at its lower end
50 thereon, while its upper end bears against an

adjustable screw-cap or follower E, arranged on the upper end of the tube, and serving, also to regulate the tensile force or pressure of the spring on the piston or valve B.

F is a central rod connected by nut and
55 screw-thread with the piston B, and passing up through the spring and through the follower E, which acts as a guide to it and assists in directing and steadying the valve. To the upper end of this rod is pivoted a hand-lever, G, having its fulcrum at *d* on a standard, H,
60 secured to one side of the tube A. This lever serves to lift the valve by hand when required.

To prevent the valve being forced by its spring lower than is necessary to fully close
65 the lateral escape-apertures *b*, the rod F is provided with a collar or stop, *e*, which, coming down on the follower or screw-cap E, arrests the downward motion of the valve B, as required.

* The lateral escape-apertures *b* in the tube A, which the piston B, as it rises or falls, opens and closes, are of a tapering shape or construction in a downward direction. This
70 secures a more gradually-varying area of exposure for them than rectangular-shaped openings would do, as the piston or valve moves over them, and makes the lower portions of them to present very contracted areas as the valve in falling is about closing them, where-
80 by the valve is made to close very slowly against the pressure of steam in the boiler the spring also by its diminishing force or resistance assisting in such gradual closing of the valve, and the pressure of the steam al-
85 most keeping the valve in a free state of balance. This doing away with the sudden closing of the valve obviates much danger. "Sticking" of the valve is also avoided, and in case of any sudden rise of pressure in the boiler
90 a largely-increasing area of escape for the steam is provided for by the tapering construction of the lateral escape-openings.

I am aware that piston safety-valves in themselves are not new, and that springs or
95 springs combined with weights have been used to close such valves. Mere escape-apertures, too, of tapering construction, and arranged to present a diminishing area as the valve closes, and an increasing area as it opens, have been
100

adopted in various forms of valves, including pressure-valves for supplying water to buildings, in which the piston-valve has been controlled by a dead-weight; also, mechanically-operated steam-engine-governor valves; but I do not know that such shaped and arranged escape-openings have ever before been used in steam safety-valves, or that the closing force to the piston-valve controlling such openings has been a spring one, which operates very differently from a dead-weight in conjunction with the tapering escape-apertures, inasmuch as the diminishing pressure of the spring in closing assists the slow closing of the valve, due to the tapering shape of the escape-apertures, as also prevents jamming of the valve, as hereinbefore set forth, and which a dead-weight would not do, but would suddenly close the valve as the reduced lower ends of the tapering openings are reached.

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

1. In piston safety-valves, the combination of a spring to close the valve with the tube or cylinder in which the piston or valve moves, provided with one or more lateral escape-apertures of tapering construction in a reverse direction to the movement of the piston thereover when opening, whereby the spring acts in concert with the tapering apertures to secure a gradual closing of the valve, essentially as described.

2. The combination of the tube A, having lateral downwardly-tapering escape-apertures b, the piston B, the spring D, the adjustable follower E, the rod F, and the hand-lever G, substantially as specified.

THOMAS KAYS.

Witnesses:

A. GREGORY,
C. SEDGWICK.