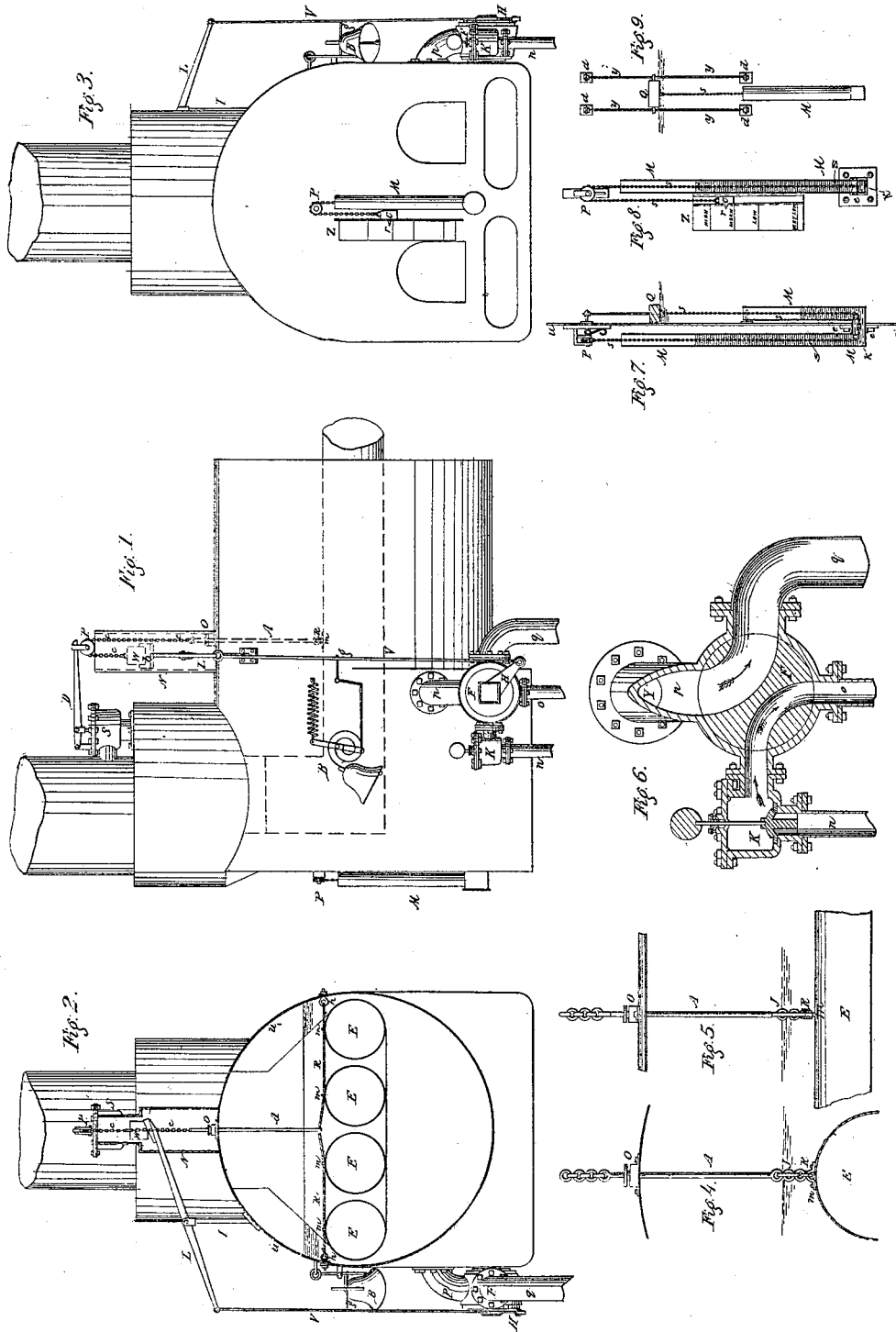


J. C. TENNENT & J. WORKMAN.
SAFETY APPARATUS FOR STEAM BOILERS.

No 7,570.

Patented Aug. 13, 1850.



UNITED STATES PATENT OFFICE.

J. C. TENNENT AND JNO. WORKMAN, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY APPARATUS FOR STEAM-BOILERS.

Specification of Letters Patent No. 7,570, dated August 13, 1850.

To all whom it may concern:

Be it known that we, JOHN C. TENNENT and JOHN WORKMAN, both of the city and county of Philadelphia and State of Pennsylvania, have invented a new and Improved Safety Apparatus for Steam-Boilers for Preventing Explosions; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification, in which—

Figures 1, 2 and 3 represent a front, back and side elevation of boiler, with safety apparatus attached; Figs. 4 and 5, front and side elevation showing the manner of making an attachment to a single flue; Fig. 6, vertical section (enlarged) through four-way cock and check valve.

R R rope of combustible material, passing transversely over upper surfaces of flues E, E, E, E, through the crow's feet *m m m m* and attached to each side of boiler, by the eye-bolts *h h* (attachment to a single flue, shown in Fig. 4, and to a number in Fig. 2). A metal rod, passing out of boiler through the stuffing-box O, terminating in an eye at the lower end, through which the rope R passes, and at the upper end connected to the chain *c c*, which passes over the pulley P on the end of safety valve lever D, and connected to weight W. L, lever, (vibrating on the fulcrum I) one end of which under weight W, is enlarged into a box *b*, and the other end extending over the side of the boiler is connected by the connecting-rod V to the handle of the four-way cock, *g*, pin, attached to connecting rod V, by which the alarm-bell B is rung. N, box, inclosing safety-valve-weight W, intended for guiding it, as also for inclosing the parts in connection. S, safety-valve; K, check-valve-box and valve; *n*, passage from feed pump; *o*, passage to waste; Y, opening into the boiler; *p*, passage from the boiler; *q*, passage to waste. J, chain adapted between lower end of rod A, and rope R (where the attachment is made to a single flue,) for the purpose of allowing rod R to be cleared from any adhesion in the stuffing-box O; when the attachment is made to a number of flues, as seen in Fig. 2, the elasticity of the rope R answers the same purpose. *u u*, shell of boiler.

The broken blue lines represent water level.

Similar letters refer to similar parts.

The manner of operation is as follows: The water in the boiler having from any cause fallen below the level of the upper surfaces of the flues or tubes E E E E, and they having become in consequence heated to an excessive degree, their condition (aided by the surcharged steam necessarily existing) causes the rope R to burn off, at all or any one of the crows-feet *m m*, which in parting causes the weight W to fall, thereby releasing the safety valve-lever from all resistance and permitting the steam to escape from the boiler; at the same instant, the weight W in being disengaged falls into the box *b*, on the extremity of the lever L, thereby causing the other end to be thrown up, which being connected to the handle H of the four-way-cock F, by the connecting rod V, places the cock in the position as seen in Fig. 6, opening a passage for the water to escape from the boiler, out of aperture Y through the passage *p*, in the direction *q* to waste; as also diverting the feed water coming through the check valve K, to waste, through the passage *n*, in the direction *o*. The same movement effecting this, rings also the bell B, by means of the pin *g*, on the connecting rod V.

The rope B may be composed of any combustible material, which will retain its tenacity in boiling water for a certain length of time, and yet, which when exposed to the action of surcharged steam and heated flues, will burn off immediately;—for the accomplishment of this purpose we use a rope made of wool, well felted and fulled, it being a property of that material, so prepared, to increase in tenacity, and retain it for a length of time, by immersion in boiling water, and also to rapidly burn and part, upon being surrounded with surcharged steam, and in contact with red hot metal.

By preventing any feed water from entering the boiler, as also reducing the level of that within it—the danger resulting from water coming in contact with the excessively heated flues (which has been the cause of numberless explosions) is avoided. For effecting the speedy exit of the water, the passage *p q*, is always to be made large in comparison to that of *n, o*, through which the feed water passes.

The use of the bell B in ringing is to give notice that the apparatus has gone into operation and the danger avoided; and by

such notice the engineer or fireman is enabled to prevent an excessive quantity of water escaping from the boiler, which otherwise would retard the early getting of the boiler into subsequent action.

What we claim as our invention and desire to secure by Letters Patent is:

The application of a rope, made of any combustible material, (using for this purpose wool as prepared in the manner before noticed, or any other material which will answer the intended effect,) to the upper surfaces of one or more tubes or flues of a boiler, which when said tubes or flues are

uncovered of water, will burn off or part in the manner as before described, from the action of the excessively heated metal and surcharged steam, which rope is connected with, and by its parting actuates the apparatus herein described or any part thereof, for the purpose either of giving alarm, or putting in action means of safety, or both, substantially as herein described.

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Witnesses:

HENRY LA REINTRIE,
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