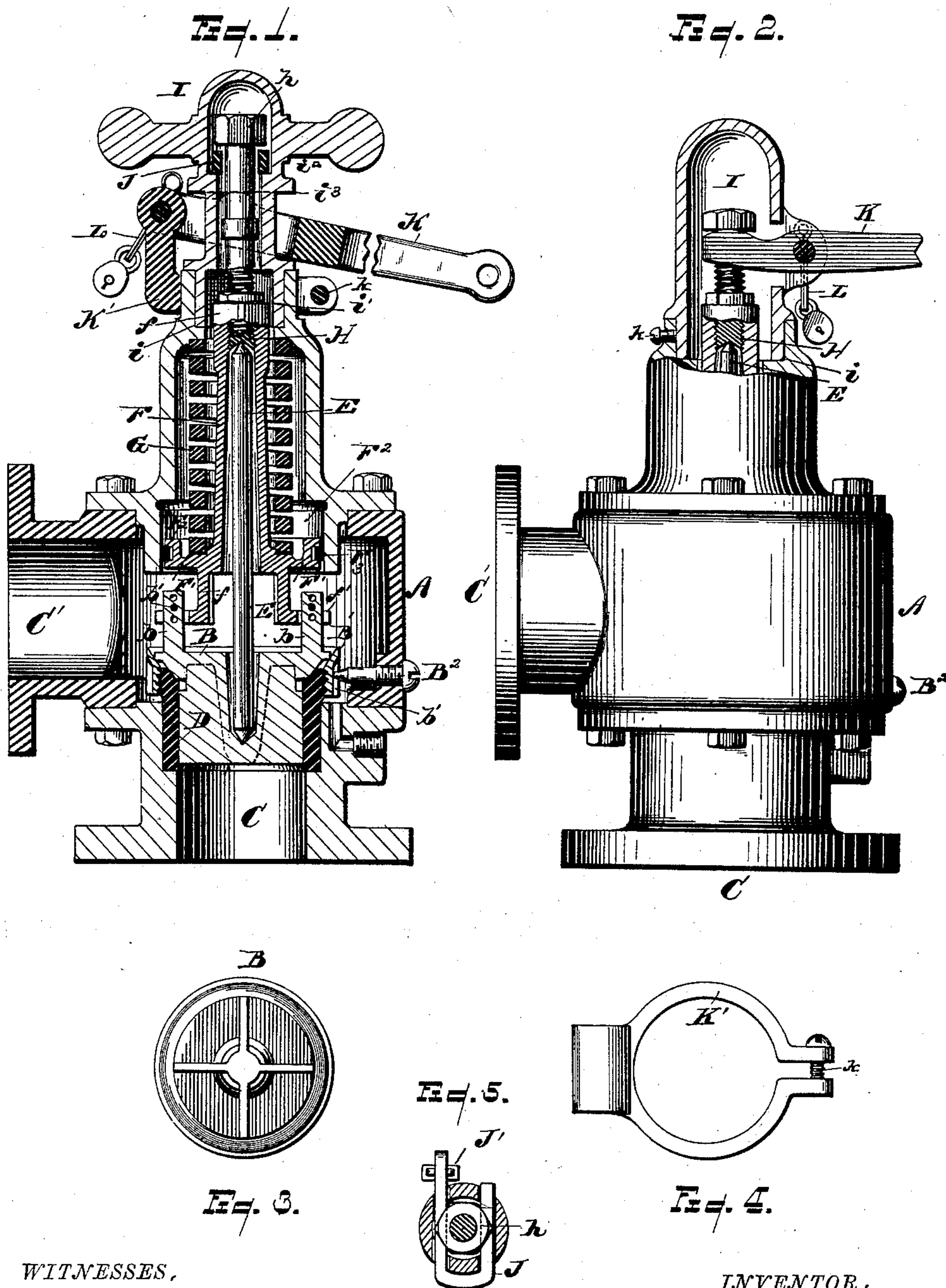


(No Model.)

A. ORME.
SAFETY VALVE.

No. 391,814.

Patented Oct. 30, 1888.



WITNESSES,

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SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 391,814, dated October 30, 1888.

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To all whom it may concern:

Be it known that I, ALEXANDER ORME, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Safety - Valves; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention consists of the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical section of a safety-valve embodying my invention. Fig. 2 is a view illustrating a variation of the same. Fig. 3 is a view of the valve located upward against its under side. Fig. 4 is a separate view illustrating the locking mechanism employed in the device shown in Fig. 1. Fig. 5 is a section through the cap, showing the locking device.

It is the purpose of my invention to produce a safety-valve certain and efficient in its operation, which cannot be tampered with, and capable of use in any location, and I will proceed to describe my said improved construction.

In carrying out my invention, A is the case of the safety-valve.

B is the valve. C that port of the case communicating with the steam-pressure, and C' the port through which escaping steam finds its exit.

D is the valve-seat. It is preferably made of brass or other suitable valve metal extending well down into the valve-case, being seated snugly within the adjacent wall of the valve-case. I countersink this valve-seat well into the said wall of the case, as shown in Fig. 1, so that its lower edge may not receive the impact of the escaping steam as it rushes through the valve. The valve-seat is thus relieved in a great measure from liability of being displaced or raised from its normal position.

The valve B may be of the ordinary type, or it may be of the type known as a "pop-valve." In the latter case it has an extended

surface, b^3 , of any of the usual forms common to pop safety-valves. In order, however, to adjust this valve so as to make it more or less sensitive in its operation, I provide a ring, B', made adjustable up or down by a screw-threaded engagement with its support, and in the instance shown this support is the valve-seat. By turning the ring in one direction it is adjusted downward, while turning it in the opposite direction adjusts its upward. The edge of the ring is provided with ribs b' , with which a set-screw, B², engages. This set-screw is of sufficient size that when removed from the case the point of a tool may be inserted and the ring B' be turned to the right or left to give it any desired adjustment, and when once adjusted the screw B² may be run into place and so fix the ring in its position. The valve B is held to its seat by a central loose stem, E, preferably pointed both at its lower and upper ends. The valve is fitted loosely about this stem, as shown in Fig. 1, so that it may find a perfect seat without in any way binding upon the stem.

F is a frame which supports a spiral spring, G. This spring bears upon the frame at its base, and at its upper end bears against the interior of the case. At the top of the frame F a screw-shaft, H, is tapped into it, and the lower end of this screw-shaft forms the bearing for the upper end of the stem E. By screwing the shaft down against the stem E the result is to lift the frame F, and so compress the spring, bringing the tension of the spring upon the valve to hold it to its seat. By this means the pressure upon the valve may be set to conform to any limit of pressure at which it is desired that the valve may lift to permit steam to escape.

I is a loose cap seated at i , either upon the outside or inside of the case A, as shown, and the lower portion of this case is squared at i' to fit over the squared upper end, f , of the frame F.

i^2 is a handle or other means for rotating the cap I. By this means it is apparent that the valve may be rotated upon its seat to grind away any scale or sediment that may have gathered upon its seat. To this end the valve is provided with arms b , which engage corresponding arms, f' , which project from the

frame F. The screw shaft H is provided at its top with a head, *h*, and a yoke, J, may be passed through the cap beneath this head and be provided with a lock, J', to prevent its removal. By this means the cap I is firmly locked over the screw-shaft H and prevents any access to the adjusting mechanism of the valve, while at the same time there is perfect freedom to the movement when it is necessary to grind the valve upon its seat.

K is a lifting-lever. It is supported by a collar, K', which is clamped to the case A by a set-screw, *k*. This lifting-lever K embraces the neck of the cap I, so that when it is left open it will impinge against the under side of the shoulder *i*³. In this way the cap may be lifted, and, through the medium of the yoke J', this lifting action is communicated to the under side of the head or button *h*, and so the valve may be at any time lifted free from its seat. The pin or cotter *b'* in the arms *b* serves to communicate the lifting action directly to the valve.

The frame F is shaped at its lower portion, F', into a piston which fits and travels within a cylinder, F², and the steam-packing ring F³ serves to make a practically steam-tight fit. It is apparent that this renders the adjustment of the valve entirely independent of the amount of back-pressure through the discharge-orifice of the valve. Thus the steam may discharge freely into the open air, or it may be discharged through a restricted conduit of greater or less length, which will afford a greater or less resistance or back-pressure against the valve. This back-pressure, however, is communicated simultaneously to this piston F' and to the upper surface of the valve. The pressure against the piston being equal and contrary in direction to that against the valve, the valve is rendered entirely independent of all such back-pressures, and will consequently open and close at the pressure for which it was set, no matter how great a back-pressure there may be, and no matter how that back-pressure may vary. By this construction an inspector or engineer might set this valve, even before it leaves the shop or before it is applied for use, so as to blow off at a certain predetermined limit of pressure without the necessity of first placing it upon the boiler or steam-conduit which it is designed to guard, and then subsequently set it to conform to the particular conditions that might subsist as to back-pressure.

The device shown in Fig. 1 combines with its other features the feature of grinding the valve upon its seat. In Fig. 2 is presented a variation similar in its essential features, except that it does not possess the feature of enabling the valve to be ground upon its seat without opening the case, and the lever K projects into and is pivoted directly to the

cap I, the whole being locked by a lock passed through the cotter L, which engages the lever to the case. A similar cotter and lock serve in like manner to prevent displacement of the lifting-lever K in Fig. 1. In both cases the lifting-lever may be turned in any direction, and when once turned this lever may be set in its position in Fig. 1 by the binding-screw *k*, which clamps the collar to the case, and in Fig. 2 by the binding-screw *k*, which binds the cap to the case. Thus both these forms combine with a safety-valve and inclosing cap whereby tampering with the mechanism is prevented, and a lever whereby the valve may be lifted from its seat at will, said lever in each case constructed to be rotated to any position about the axis of the valve without disturbing the other parts.

What I claim is—

1. The combination, with a safety-valve, of an inclosing rotatable cap, whereby tampering with the mechanism is prevented, means, substantially as described, connecting the casing with the valve, and a rotatable lever clamped around the cap for lifting the cap and actuating the valve, said cap and lever being capable of adjustment in any position around the valve independently of each other, substantially as specified.

2. The combination, with a safety-valve, of a spring for holding it to its seat, a frame for supporting the spring, a central stem, E, and a screw-shaft, H, tapped through the upper portion of said frame and constituting a bearing for said stem, the upper portion of the frame F being squared, whereby the frame may be rotated and the valve ground upon its seat, substantially as described.

3. The combination, with a safety-valve, of a spring for holding it to its seat, a frame for supporting the spring, a screw-shaft tapped through the upper end of said frame and forming a bearing for the valve-stem, and a head or button, *h*, and in connection therewith a rotatable cap and locking-yoke J, said cap squared to engage the upper end of the frame F, all substantially as and for the purposes described.

4. The combination, with the valve, valve-stem, frame F, spring, and shaft H, of the cap I, locking-yoke J, and lifting-lever K, substantially as and for the purposes described.

5. The combination, with the cap I, shaft H, and yoke J, of a lock engaging the end of said yoke, substantially as and for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

ALEXANDER ORME.

Witnesses:

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