

A. C. ANCONA.
SAFETY VALVE.

No 109,483.

Patented Nov. 22, 1870.

FIG. 1

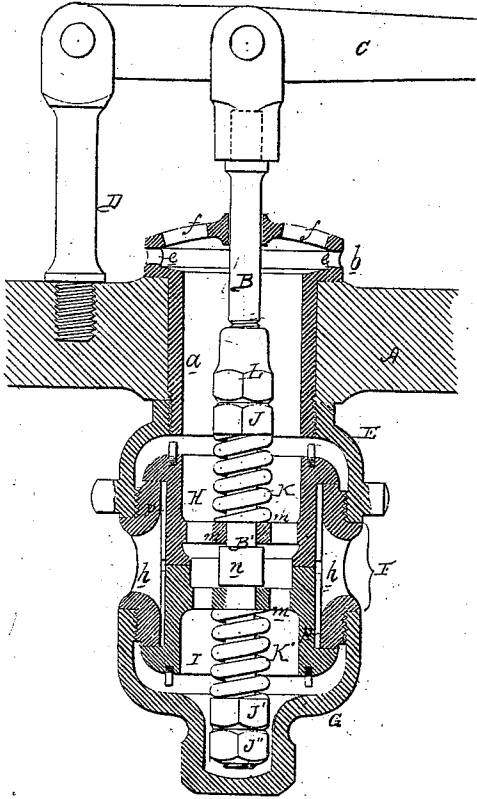


FIG. 2

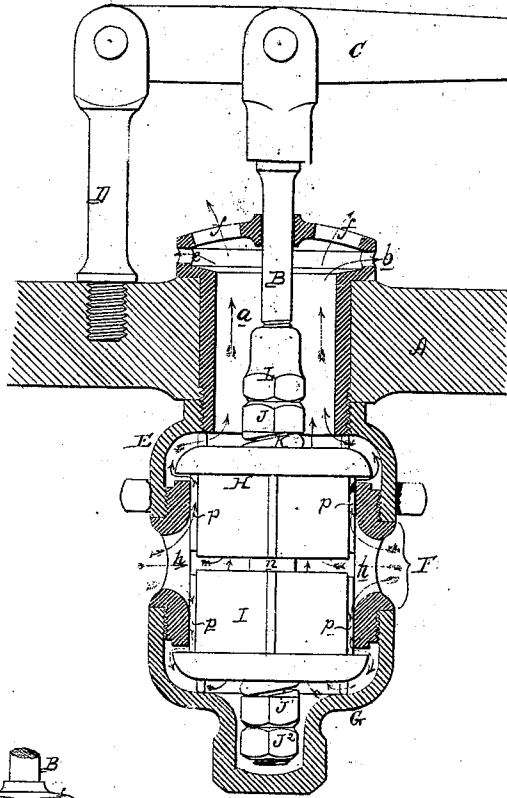


FIG. 4.

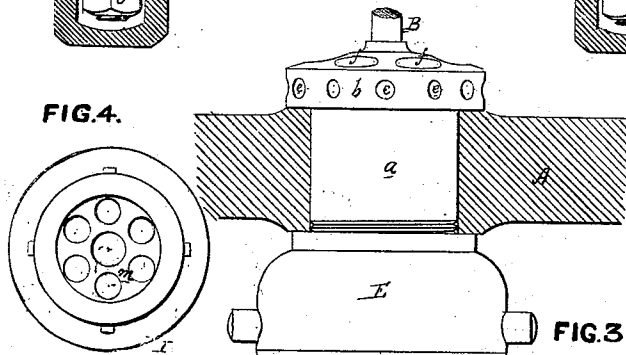
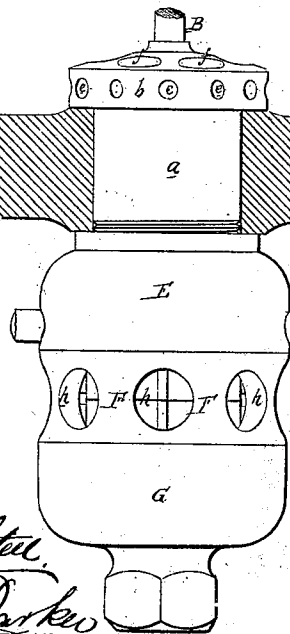


FIG. 3



WITNESSES

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ASTLEY COOPER ANCONA, OF EVANSVILLE, INDIANA.

Letters Patent No. 109,483, dated November 22, 1870.

IMPROVEMENT IN SAFETY-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

I, ASTLEY COOPER ANCONA, of Evansville, county of Vanderburg, State of Indiana, have invented an improved Safety-Valve, of which the following is a specification

Nature and Object of the Invention.

My improved safety-valve consists of a steam-chest having two seats, and containing two loaded valves which, when in contact with their respective seats, are in steam-tight contact with each other, but which, when yielding to the pressure of the steam, will be separated from each other simultaneously with their movement from their seats, all of which will be fully explained hereafter.

My invention also consists in certain peculiarities, fully described hereafter, in the construction of the valve.

The object of my invention has been to produce a safety-valve which the steam can act upon and open when it exceeds the proper pressure, but which it will be impossible for any one to gain access to and overload, or otherwise tamper with, without first entering the boiler.

Description of the Accompanying Drawing.

Figure 1 is a vertical section of my improved safety-valve as it appears when closed;

Figure 2, the same as it appears when open;

Figure 3, an exterior view of the valve-chest; and

Figure 4, a plan view of one of the valves.

General Description.

A represents part of the dome-cap of a locomotive boiler, and into this cap is fitted and secured a tube, *a*, terminating at the top in a hollow flange or collar, *b*, which bears on the dome-cap, and which has openings, *e*, in its edge, and openings, *f f*, in the top.

The valve-spindle B passes through and is guided by the top of the tube *a*, the spindle being, in the present instance, connected to a lever, C, which has its fulcrum on a stud, D, secured in the dome.

The valve-chest is composed in the present instance of the above-mentioned tube *a*, the annular piece E, the intermediate ring F, and the cup G.

The annular piece E serves as a nut to secure the tube *a* in its place, and its lower edge is secured to the upper end, and the cap G to the lower end of the intermediate ring F, as clearly shown in the drawing, the said ring having lateral openings, *h h*.

Upper and lower valves, H and I, are fitted loosely to the lower portion B' of the valve-spindle, the seat for the upper valve being on the top of the intermediate ring F, and that for the lower valve on the under edge of the said ring.

Each valve consists of a hollow cylinder having a

perforated partition, *m m*, through which the spindle passes, a collar, *n*, on the said spindle, intervening between the valves, but not preventing them from being brought into steam-tight contact with each other.

Between the upper valve H and a nut, J, on the spindle, intervenes a spiral spring, K, and between the lower valve and a nut, J', on the spindle, intervenes a similar spring, K', there being beneath the nut J' a suitable jam-nut, J².

A jam-nut, L, also bears on the nut J, and into this nut L is screwed the upper portion B of the valve-spindle.

By means of these nuts, J and J', the springs K and K' can be adjusted to resist any pressure of steam may be decided on.

The tendency of the springs K and K' is to maintain the valves not only in steam-tight contact with each other, but also in contact with their respective seats, and they will remain in this condition so long as the steam does not exceed the pressure which the valves have been adjusted to resist, by the nuts J and J'.

It will be seen that there is a narrow annular space, *p*, between the valves and the ring F of the chest, and, consequently, that there is a correspondingly limited annular area of each valve exposed to the steam which enters the chest through the lateral openings *h h*. When the steam exceeds the proper pressure it will act on these limited areas of the valves and force them apart, and from their seats simultaneously.

Whatever may be the distance to which each valve is removed from its seat it will be exactly half the distance to which the valves are separated from each other; hence there will be a free passage for the steam in three directions from the openings *h* into the tube *a*—in one direction, between the upper valve H and its seat; in another direction, between the two valves, and thence through the openings *m m* of the upper valve; and in a third direction, between the lower valve and its seat, and thence through the openings *m m* of the two valves, the steam finally escaping through the openings *e e* and *f f* of the hollow flange *b*.

It will be impossible for any one to gain access to and overload and otherwise tamper with the valves without first entering the steam-dome, for the lever C, on the outside of the dome, has no functions to perform as regards the valves; it merely enables the attendant engineer to determine whether the valves are in proper working order. If he elevates the lever he must necessarily raise the valve H and permit the steam to escape, and if he depresses the lever he must depress the valve I with a like result, so that no manipulation of the lever can disturb the proper functions of the valves.

Even if the tube *a* of the valve-chest was open at

the top it would be difficult to contrive an instrument by which the valves could be effectually tampered with or overloaded, the weighting of the upper valve would not disturb the functions of the lower valve; but the introduction of any available instrument is rendered next to impossible by the hollow flange *b*, as will be readily understood without explanation.

The very limited area of the valves exposed to the action of the steam, enables me to use light and delicate springs, *K* and *K'* of such small dimensions that they cannot interfere with the free passage of steam through the valves.

In so-called lock-up safety-valves reliance is placed upon locks as a means of preventing access to the valves, but these locks being exposed are at all times liable to be picked or broken.

My improved safety-valve, however, being contained within the boiler, and being inaccessible from the exterior of the same, is always locked by the boiler itself.

Although I have referred to my improved safety-valve as applied to a locomotive boiler, it will be evident that it can be adapted to stationary and marine boilers, and although I have shown the steam-chest of the safety-valve as constructed in a peculiar manner of the three pieces *E*, *F*, and *G*, it will be apparent to any engineer that it is not necessary to adhere to this plan in all cases, although I prefer it on account of its simplicity.

Claims.

1. A safety-valve, consisting of a steam-chest hav-

ing two seats and containing two loaded valves, which, when in contact with their respective seats, are in steam-tight contact with each other, but which, when yielding to the pressure of the steam, will be separated from each other simultaneously with their movement from their seats, all substantially as herein set forth.

2. The combination of the two valves *H* and *I*, the springs *K* and *K'*, and spindle *B'* and its collar *n*, and adjusting nuts *J* and *J'*.

3. The combination of the said valves, spindle *B*, its collar *n*, and the toy lever *C*, or its equivalent.

4. The tube *a*, having at the top a hollow enlargement or flange *b*, with openings *e* *f* for the passage of steam and a central opening for the passage of a spindle *B*, and at the lower end threads for the reception of the piece or nut *E*, as set forth.

5. The steam-chest, composed of the pieces *E*, *F*, and *G*, substantially as described.

6. The said steam-chest in combination with the tube *a*, fitted to the dome-cap of a locomotive or shell of a boiler, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ASTLEY C. ANCONA.

Witnesses:

WM. H. H. MILLER,
JOHN TORRANCE.