G. H. CLEMENS.

STEAM SAFETY VALVE.

No. 112,222. Patented Feb. 28, 1871.

Fig 1.

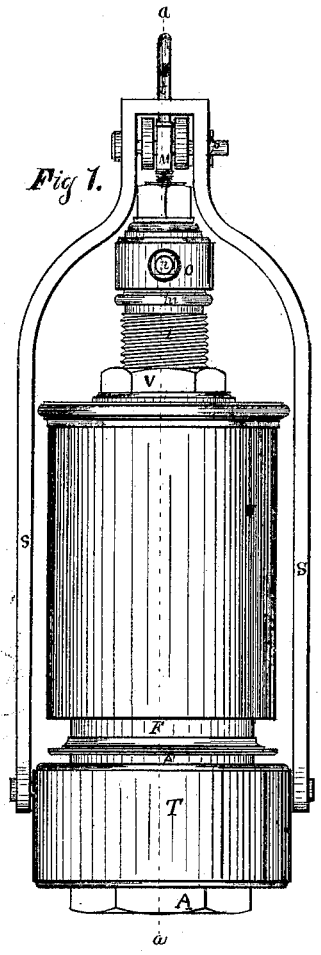


Fig 2.

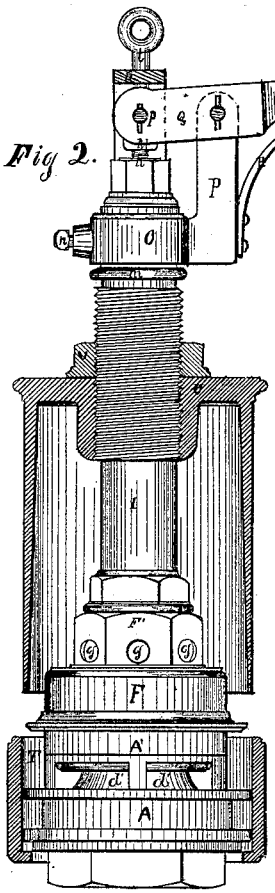


Fig 3.

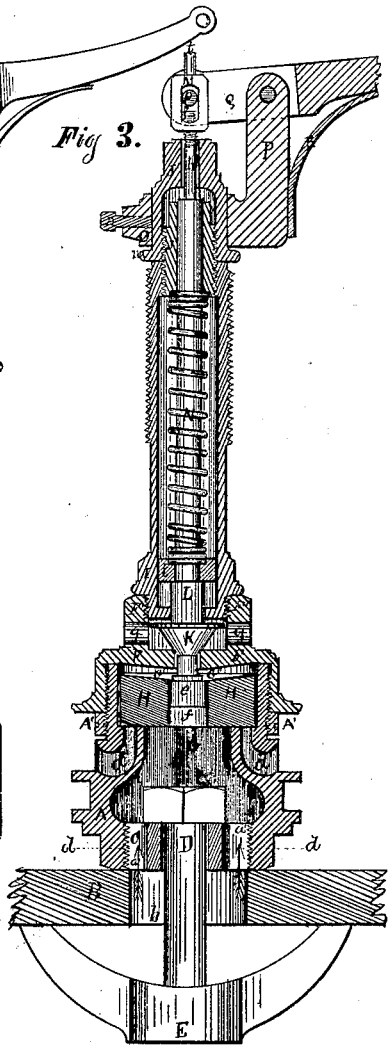
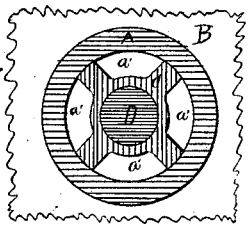


Fig 4.



Witnesses

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GILBERT H. CLEMENS, OF CHICAGO, ILLINOIS.

Letters Patent No. 112,222, dated February 28, 1871.

IMPROVEMENT IN STEAM SAFETY-VALVES.

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

To all whom it may concern:

Be it known that I, GILBERT H. CLEMENS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Combined Steam Safety-Valves and Whistles; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a front elevation of my invention;

Figure 2 is a vertical section of the same cutting the whistle through the center, showing the external parts of the valve-case;

Figure 3 is a vertical central section of the valve-case taken on a line, *a a*, with whistle removed; and

Figure 4 is a cross-section or plan taken on line *d d*.

Similar letters of reference indicate corresponding parts in the several figures of the drawing.

The object of my invention is to provide a self-closing safety-valve combined with a whistle for steam-boilers, each being so arranged as to perform their separate and necessary function; and

The improvement consists in providing the lower portion or base of the valve-case with a receptacle-chamber communicating with the boiler. Within said chamber is secured the main valve, which is so arranged, together with the arrangement of the case, as to form a lateral enlarged supplemetal-chamber between the lower side of the bulk-head or cap of the base and upper surface of the valve, into which the steam is admitted from the receptacle-chamber, by which the valve is firmly secured in a closed position by the pressure of steam against the upper surface of the same.

Also, in providing said base with a hollow tube, within which is secured a primary valve having its seat upon the upper surface of the bulk-head, and communicating with the receptacle-chamber through the main valve, by which means the steam is confined in said supplemental-chamber, or allowed to escape therefrom by the opening or raising of the same.

Also, in the manner of securing the base of the valve-case to the boiler or dome-plate of the same.

Also, in the combination of a steam-whistle with the safety-valve, a description of which in detail will be hereinafter fully given.

In the drawing—

A represents the base of the valve-case, the lower end of which is ground to a steam-tight joint, and fitted upon the upper surface of the dome-plate B of the boiler.

C is a screw-threaded disk, which is firmly affixed within said case, and is provided with a series of openings, *a'*, communicating with the boiler through an opening, *b*, in the dome-plate.

The central portion of said disk is provided with an aperture, through which is passed a bolt, D, the said bolt extending downward through the dome-plate, and is screw-threaded on its lower end, upon which is fitted yoke E, the ends of which come in contact with and against the lower surface of the dome-plate, by which means the valve-case is firmly secured to the same.

The upper end of said case is screw-threaded externally, upon which is fitted the bulk-head or cap F.

The lower portion of said base is provided with a receptacle steam-chamber, G, which communicates with the boiler through the openings *a'* of the disk.

The inner side of said base at the upper end of the receptacle-chamber is so arranged as to form a valve-seat, upon which is fitted the main valve H, by which the steam is secured in the case.

Within the sides of said case is a series of openings, *d' d'*, which extends inward and upward from the outer side of the case to the main valve, through which the steam escapes from the receptacle-chamber when said valve is raised.

The upper surface of said valve H is slightly concave toward its center, and is so arranged as to form a supplemental steam-chamber, G', between its upper side and the lower surface of the bulk-head or cap of the base, the horizontal area of which is near twice the area of the upper portion of the receptacle G.

Affixed to the upper portion of said bulk-head or cap is a hollow tube, I, the lower end of which is screw-threaded externally, by which the same is attached to the upward-projecting portion F' of the bulk-head.

Within the upper end of said tube is a screw-threaded coupling, J, upon the outer side of which is attached the cap J' of the tube.

K is a primary valve, which is fitted within the upward-projecting portion F' of the bulk-head, below the end of tube I, and is so arranged as to admit of a slight vertical movement, the seat of said valve being formed in the upper surface of the inner portion of the same.

Attached to the center and lower portion of said valve is stem *e*, the lower end of which is slightly enlarged, and is loosely fitted within an aperture, *f*,

in the center of the main valve H, the diameter of said aperture being such as to allow the steam from the receptacle-chamber G to pass through the same around the sides of the enlarged portion of stem *e* into the supplemental-chamber G′.

The upward-projecting portion F′ of the bulk-head is provided with a series of openings *g g* through which the steam escapes from said supplemental-chamber when the primary valve K is raised.

Affixed to the upper surface of said primary valve is a stem, L, which extends upward through tube I, and is provided at its upper end with a bolt or rod, *h*, to which is attached a stirrup, M.

The lower end of said valve-stem, near the valve, is slightly enlarged, forming a shoulder, upon which is supported a collar, *i*, which is loosely fitted around the same.

Upon and around the said valve-stem, between the upper surface of said collar and lower end of coupling J′, is a coiled spring, N, which is so arranged as to hold the valve firmly against and within its seat.

Attached to and around cap J′ of tube I′ is a collar, O, which rests upon a shoulder, *m*, formed on the lower portion of said cap.

The said collar is secured in proper adjustment by a set-screw, *n*, which passes through its side and against the side of the cap.

Affixed to the side of said collar is a vertical arm, P, to which is pivoted lever Q.

Firmly bolted to the outer side of said arm is a curved spring, R, which extends outward and upward against the lower side of lever Q, by which the same is secured in proper position, the said spring being so arranged as to allow the outer end of the lever to be moved downward when desired, and to force the same back to its normal position as power is removed from the lever.

Pivoted to the forward end of said lever is a stirrup, S, to the lower end of which is attached the whistle-ring T, the same being so arranged as to admit of a vertical movement.

The said lever is forked-shape, and is also attached to stirrup M of the primary-valve stem by means of bolt *p* passing through the same, said bolt also passing through stirrup S, thus properly connecting the whole.

Stirrup M is provided with a vertical mortise, *r*, through which said bolt passes, the length of said mortise being such as to allow the lever to be tilted upward sufficiently to raise ring T nearly to or against the flanges of the base as bolt *p* is brought in contact with the said stirrup; thus the whistle-ring is raised to its proper position before the steam is discharged from the respective chambers by the raising of the primary valve.

Affixed to the upper end of said stirrup M is a rod, *t*, the object of which is to raise said primary valve independent of the whistle-ring, the length of the mortise being such as to admit of the same.

The upper portion of tube I, below cap J′, is screw-threaded externally, upon which is fitted the whistle-case U, said case being so arranged as to admit of being adjusted to a proper position with the openings *g g* of the bulk-head, and is firmly secured by a screw-threaded washer, V, upon said tube, above the same.

I provide the upper portion of the base A with an adjusting-nut, A′, which is fitted upon the screw-threaded portion of the same between its shoulder and the shoulder of the bulk-head or cap F, the object of which is to secure a steam-joint, and to hold the said bulk-head firmly in position when adjusted to the required height, thereby graduating the space vertically within the supplemental-chamber.

I do not wish to confine myself strictly to a screw-threaded disk, C, as described, as I sometimes construct the base of the case and disk in one piece with the proper openings, either of which will produce the same result.

Nor do I wish to be confined exclusively to the bolt or rod *h*, by which stirrup M is connected to the primary valve-stem, as a chain may be used to connect the same and with the same result.

The manner of attaching my invention to the boiler and its operation is as follows:

The yoke E is first passed through the hole in the dome-plate B, and brought to its proper position under the same. Base A of the valve-case is then placed upon the upper side of said dome-plate, and bolt D passed downward through disk C and screwed firmly into the yoke. Thus the said case is firmly attached to the boiler, and as steam is generated in the boiler it flows into chamber G of the valve-case, through the openings *a′ b* of the disk and dome-plate, filling the said chamber. The steam then passes through the opening in the main valve H, around the enlarged portion of the primary valve-stem *e*, into the supplemental chamber G′, filling the same, by which means the main valve H is tightly closed by the overbalanced pressure of steam upon its upper surface.

The primary valve K being arranged to weigh the steam in the boiler, and as the same exceeds the limit allowed, the said valve is raised from its seat by the pressure of steam against the lower end of stem *e*, which allows the steam within the supplemental-chamber to escape through the openings in the bulk-head, thereby reducing the pressure against the upper surface of valve H sufficient to cause the pressure beneath the same to overbalance that above, by which the said valve is raised, and the steam from the boiler escapes over the valve and through the openings *d′ d′* of the case.

As soon as the steam in the boiler is sufficiently reduced to bring the pressure within the limit required, the primary valve reseats, and the supplemental-chamber instantly fills, thereby closing the main valve.

When it is desired to use the whistle, power is applied to the outer end of lever Q, moving the same downward, thereby raising the whistle-ring T simultaneously with the primary valve.

The steam escaping from the supplemental-chamber allows valve H to rise, and the steam from the boiler escapes through openings *d′ d′* in the case, to and into the whistle-chamber.

It will be noticed that the lower portion of the primary valve-stem *e* is slightly enlarged, exceeding in diameter the diameter of the base of the valve-seat, consequently giving greater surface for the steam to act thereon and a greater pressure upon the springs when the primary valve is raised from its seat, and, at the same time, reducing the pressure of the steam in supplemental-chamber G′ downward upon the upper surface of said enlargement.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The valve H in combination with the chambers G and G′, arranged as described, whereby the said valve is closed by the pressure of steam, substantially as and for the purpose described.

2. The primary valve K in combination with the main valve H, the whole arranged substantially as and for the purpose described.

3. The enlarged stem *e* of the primary valve K, in combination with opening *f* of valve H.

4. The adjusting-nut A′, in combination with base A and bulk-head or cap F, substantially as and for the purpose described.

5. The bolt D and yoke E, in combination with base A, the whole arranged substantially in the manner and for the purpose specified.

6. The combination of the stirrup M with lever Q, bolt *h* and valve-stem L with spring N, substantially as and for the purpose described.

7. In combination, the steam safety-valve, with adjusting-cup T and whistle, substantially as and for the purpose described.

GILBERT H. CLEMENS.

Witnesses:
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