

No. 643,239.

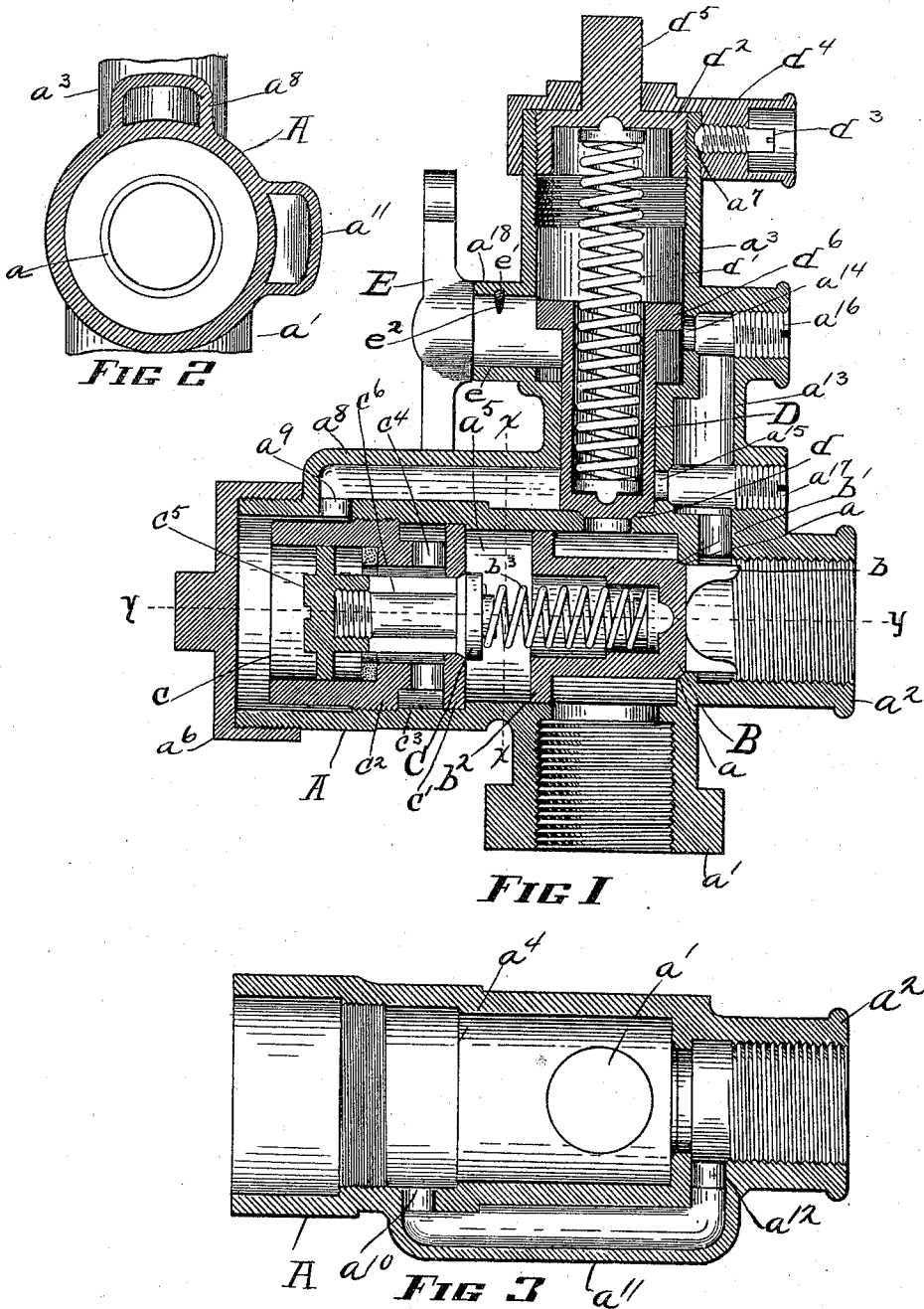
Patented Feb. 13, 1900.

F. SCHREIDT.
SAFETY VALVE.

(Application filed July 10, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

Halter Murray
Emma Lyford

INVENTOR

Frank Schreidt
By H. S. Murray

No. 643,239.

Patented Feb. 13, 1900.

F. SCHREIDT.
SAFETY VALVE.

(Application filed July 10, 1899.)

(No Model.)

2 Sheets—Sheet 2.

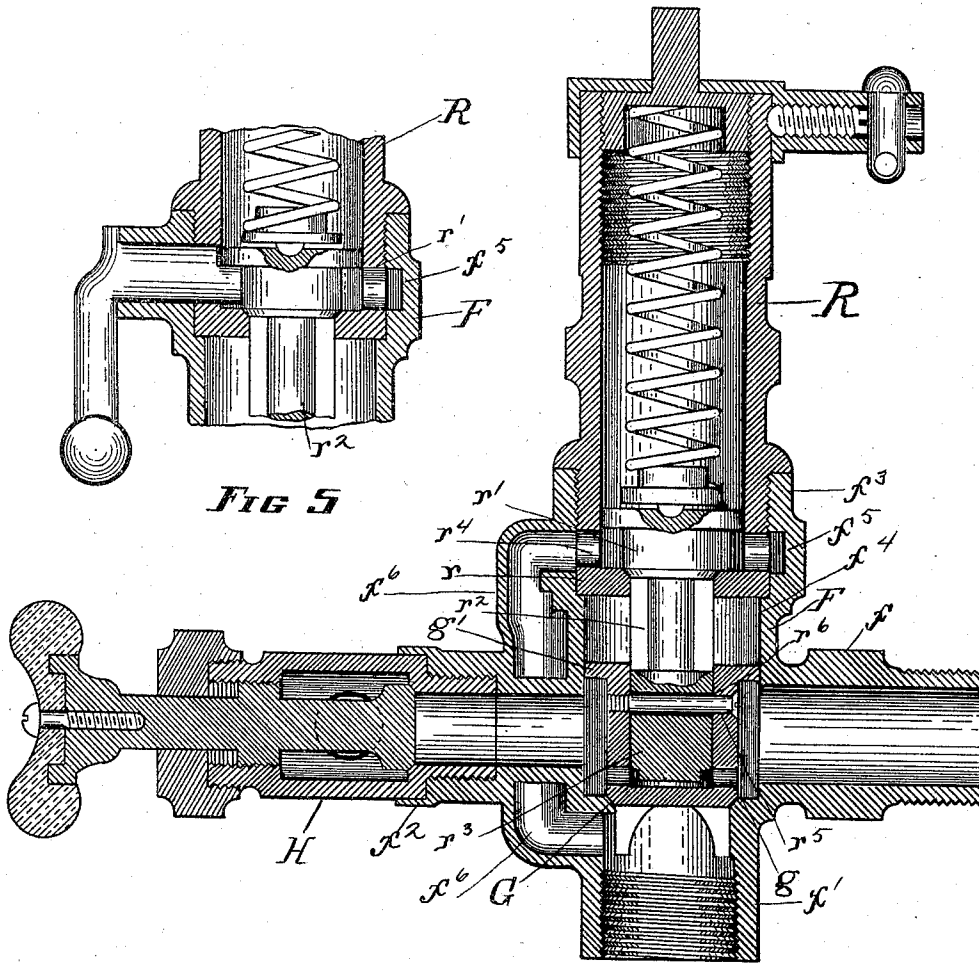


FIG 5

FIG 4

WITNESSES

Halter J. Murray
Emma Lyford

INVENTOR

Frank Schreidt
By H. S. Murray

UNITED STATES PATENT OFFICE.

FRANK SCHREIDT, OF MANSFIELD, OHIO.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 643,239, dated February 13, 1900.

Application filed July 10, 1899. Serial No. 723,271. (No model.)

To all whom it may concern:

Be it known that I, FRANK SCHREIDT, a citizen of the United States, and a resident of Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Safety and Relief Valves, of which the following is a specification.

My invention relates to improvements in safety and relief valves. Its object is to provide safety and relief valves in which the main valve is held to its seat by pressure of steam and its opening and closing controlled by an auxiliary valve which is set to open when the pressure exceeds a certain limit, and which have no packed joints. This object is attained by the means described in the annexed specification and illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal sectional view of a safety-valve embodying my invention, the lifting-lever, springs, auxiliary valve, and regulating-screws being shown in elevation. Fig. 2 is a vertical transverse sectional view of the shell, taken through line xx of Fig. 1, the main and auxiliary valves having been removed therefrom. Fig. 3 is a central horizontal sectional view taken through the case upon line yy of Fig. 1, the parts having been removed therefrom, as in Fig. 2. Fig. 4 is a view similar to Fig. 1 of a relief-valve embodying my invention. Fig. 5 is a central transverse view of so much of the same as is necessary to show the hand-lever for lifting the auxiliary valve from its seat.

Referring to Figs. 1 to 3, the cylindrical case A for inclosing the main valve B consists of a cup having wings b upon the bottom, a lower beveled edge b' to fit the valve-seat a , and an annular rim b^2 around the upper edge to fit snugly against the interior of the case, and the auxiliary valve C has a lower interior screw-threaded extension a' for attachment to a steam-boiler or other receptacle for compressed fluid, a lateral interiorly-screw-threaded extension a^2 to be attached to an exhaust-pipe, and an upper extension a^3 for inclosing the trigger-valve D. A cup c , within which the auxiliary valve C reciprocates and against the perforated bottom c' of which the valve seats, has an exterior screw-threaded collar c^2 to fit into the case A, so that its enlarged bottom c' seats against the annular rim a^4 of the case, leaving a cham-

ber a^5 between the auxiliary valve C and the main valve B, which are held to their seats when no steam is in the boiler by a spring b^3 . The lower end of the cup c is reduced between the bottom c' and the collar c^2 to form a chamber c^3 , communication between which and the interior of the cup is made by perforations c^4 in the walls of the cup. The end of the case A is closed by a screw-cap a^6 .

The case A is perforated on the side vertically above the extension a' to form a seat d for the trigger-valve D, which is held to the seat by a spring d' , the tension of which is regulated to the point at which the pressure in the boiler is to be relieved by a cap-nut d^2 , which may be raised or lowered within the upper interiorly-screw-threaded end of the extension a^3 by loosening the set-screw d^3 and turning the key d^4 , which fits loosely upon the end of the extension and has a square perforation to fit the square end d^5 of the cap-nut. After the desired tension of the spring is obtained the key is locked by setting the screw into one of the dents or depressions a^7 upon the exterior of the extension a^3 .

Upon the top of the case is a longitudinal by-pass a^8 , which after the trigger-valve has been thrown from its seat passes the steam through the perforation a^9 in the case into the end of the case A in upon top of the piston c^5 , which terminates the end of the valve-stem of the auxiliary valve C, which is thrown from its seat by the steam-pressure, since the area of the piston c^5 is larger than that of the valve C. The steam in the chamber a^5 then passes into the chamber c^3 , then through a perforation a^{10} into a by-pass a^{11} , which is situated upon the side of the case A, and from there through a perforation a^{12} into the exhaust a^2 . As soon as the pressure in the chamber a^5 is reduced the main valve, previously held to its seat by the pressure of the steam in the chamber a^5 , is raised by the steam upon the inner edge of the rim b^2 of the main valve.

Upon one side of the extension a^3 of the case is a vertical by-pass a^{13} , which leads down into the exhaust a^2 and communicates with the upper extension a^3 of the case below the flange d^6 of the trigger-valve by perforations a^{14} and a^{15} . The outer beveled edges of these perforations seat screws a^{16} and a^{17} , by which the time of blow-off of the valve is regulated.

One side of the extension a^3 has an annular flange a^{18} to pass the arm e of the hand-lever

E, which is cut out at the inner end to fit under the flange a^b of the trigger-valve D. The arm e is held rotatably in place by a pin e' , which passes through a perforation in the flange a^{18} and a slot e^2 upon the arm e .

In Figs. 4 and 5 my invention is shown as applied to a relief-valve. The lateral extension f of the case F for inclosing the main valve G, which is of the same form as the main valve B, is to be attached to the end of a steam-engine cylinder, the downward extension f' to an exhaust-pipe, and the lateral extension f^2 is interiorly screw-threaded to receive a case H for an indicator. Into the upper interiorly-screw-threaded end f^3 is screwed a cylindrical case R, so as to leave a chamber f^4 between the main valve G and the end r of the case, which is perforated to seat an auxiliary valve r' , whose stem r^2 projects downward and terminates in a piston r^3 , which extends to within a short distance of the bottom of the valve G. The case R has perforations r^4 in its walls, opening into an annular chamber f^5 between the case R and the case F. A vertical by-pass f^6 upon the side of the case F forms communication between this chamber and the exhaust f' below the valve-seat. A pin r^5 passes through the walls of the valve G and through the piston r^3 by a hole r^6 , made oblong, so as to allow the piston to have a slight vertical motion independent of the valve. The valve has perforations g in its walls near the bottom, so that if there be water in the end of the cylinder it will be forced into the valve by the engine-piston beneath the piston r^3 , throw it upward, and raise the auxiliary valve from its seat. The pressure of the steam in the chamber f^4 being reduced, the valve G is thrown from its seat by the pressure on the under side of the rim g' of the valve. The case F also has a hand-lever, similar in construction to the lever E, for raising the valve r' from its seat.

What I claim is—

1. In safety and relief valves the combination of a case, a main valve seated therein so that steam from the boiler or cylinder surrounds it, an auxiliary valve to be unseated by the fluid when its pressure exceeds a certain limit, a chamber between the valves the pressure of steam within which holds the main valve to its seat until the opening of the chamber by the unseating of the auxiliary valve, substantially as shown and described.

2. In safety and relief valves the combination of a case having an extension to be secured to a boiler or an engine-cylinder and a second extension to be secured to an exhaust, a main valve within the case seating outward against the exhaust-opening consisting of a cup having a rim around its edge to fit snugly against the inside walls of the case, the cup or cylinder screwed into the case leaving a chamber between it and the main valve, the auxiliary valve seated against the end or bottom of said cup or cylinder to be

unseated by the steam when it exceeds certain pressure, and the by-pass connecting said chamber with the exhaust when the auxiliary valve is unseated by the steam, substantially as shown and described.

3. In a safety-valve the combination of a case having an inlet extension to be secured to a boiler and one to be secured to an exhaust, a main cup-valve within the case seating outwardly against the exhaust-opening and having a rim around its edge to fit against the inside walls of the case, a cup screwed into the case leaving a chamber between it and the main valve, an auxiliary valve seated against the perforated bottom of said cup and having a stem extending into the cup and terminating in a piston, a trigger-valve seated against a perforation in the case above the inlet, an adjustable spring for holding said valve to its seat, a by-pass for conveying the steam in upon top of said piston to unseat the auxiliary valve when the trigger-valve is raised, and a by-pass for conveying the steam from said chamber to the exhaust when the auxiliary valve is unseated, substantially as shown and described.

4. In a safety-valve the combination of a case having a lower inlet extension for connection to a boiler, a lateral extension for connection to an exhaust and an upper extension to contain a trigger-valve, a main valve and an auxiliary valve seated in the case having a chamber between them, a trigger-valve seated against a perforation in the case above the inlet extension, a spring for holding the trigger-valve to its seat, a by-pass for conveying the steam in upon the auxiliary valve to unseat it when the trigger-valve is raised, a by-pass for conveying the steam from said chamber when the auxiliary valve is unseated, perforations in the side of the upper extension of the case to seat screws, and said screws by which the time of blow-off of the valve is regulated, substantially as shown and described.

5. In a safety-valve the combination of a case having a lower inlet extension for connection to a boiler, a lateral extension for connection to an exhaust and an upper extension to contain a trigger-valve, a main valve and an auxiliary valve seated in the case having a chamber between them, a trigger-valve seated against a perforation in the case above the inlet extension, a spring for holding the trigger-valve to its seat, a by-pass for conveying the steam in upon the auxiliary valve to unseat it when the trigger-valve is raised, a by-pass for conveying the steam from said chamber when the auxiliary valve is unseated, and a hand-lever for unseating the trigger-valve, substantially as shown and described.

FRANK SCHREIDT.

Witnesses:

L. P. BENNETT,
CHAS. E. SCHREIDT.