(No Model.)

F. SCHREIDT.

SAFETY VALVE.

No. 591,014. Patented Oct. 5, 1897.

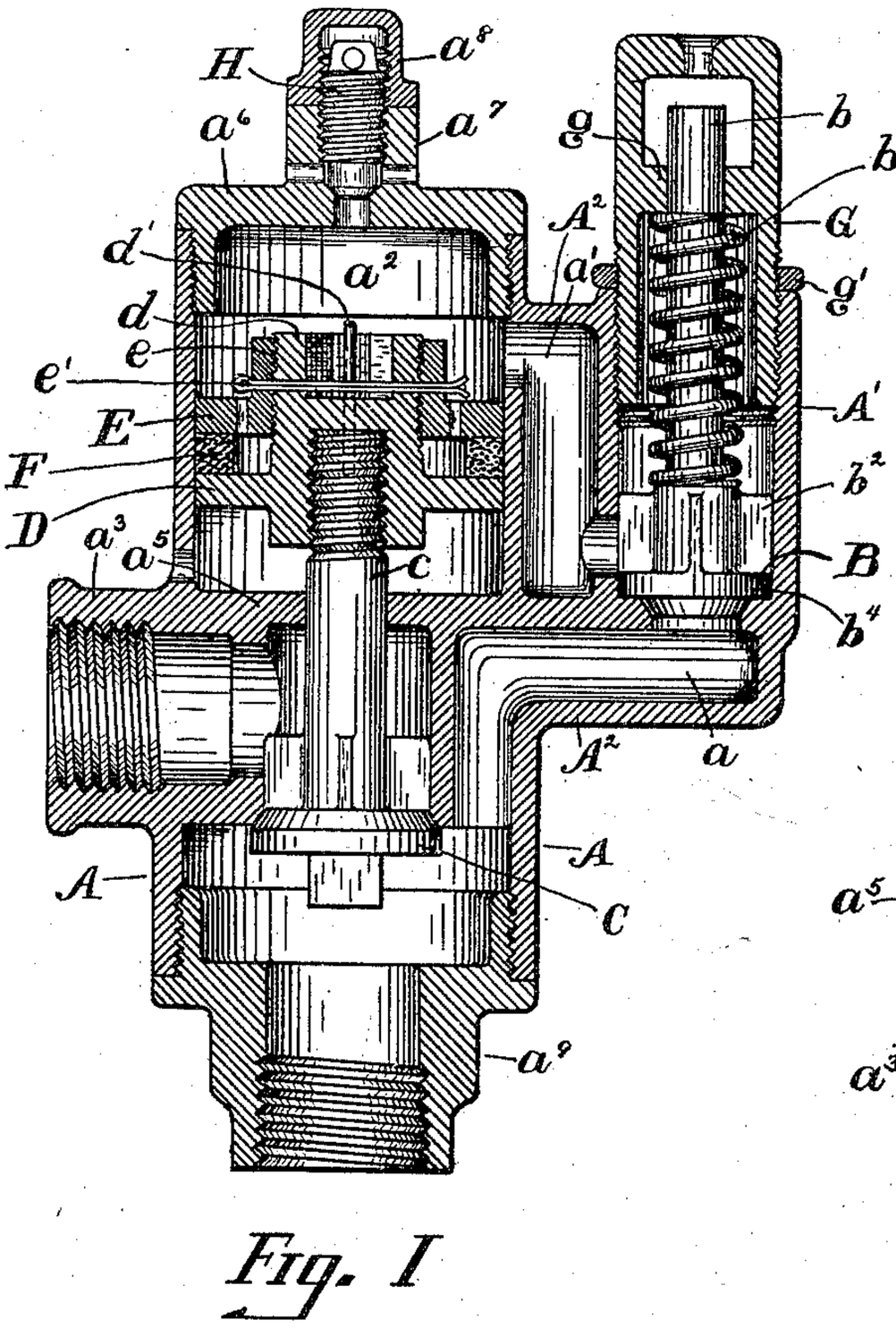

Fig. 1

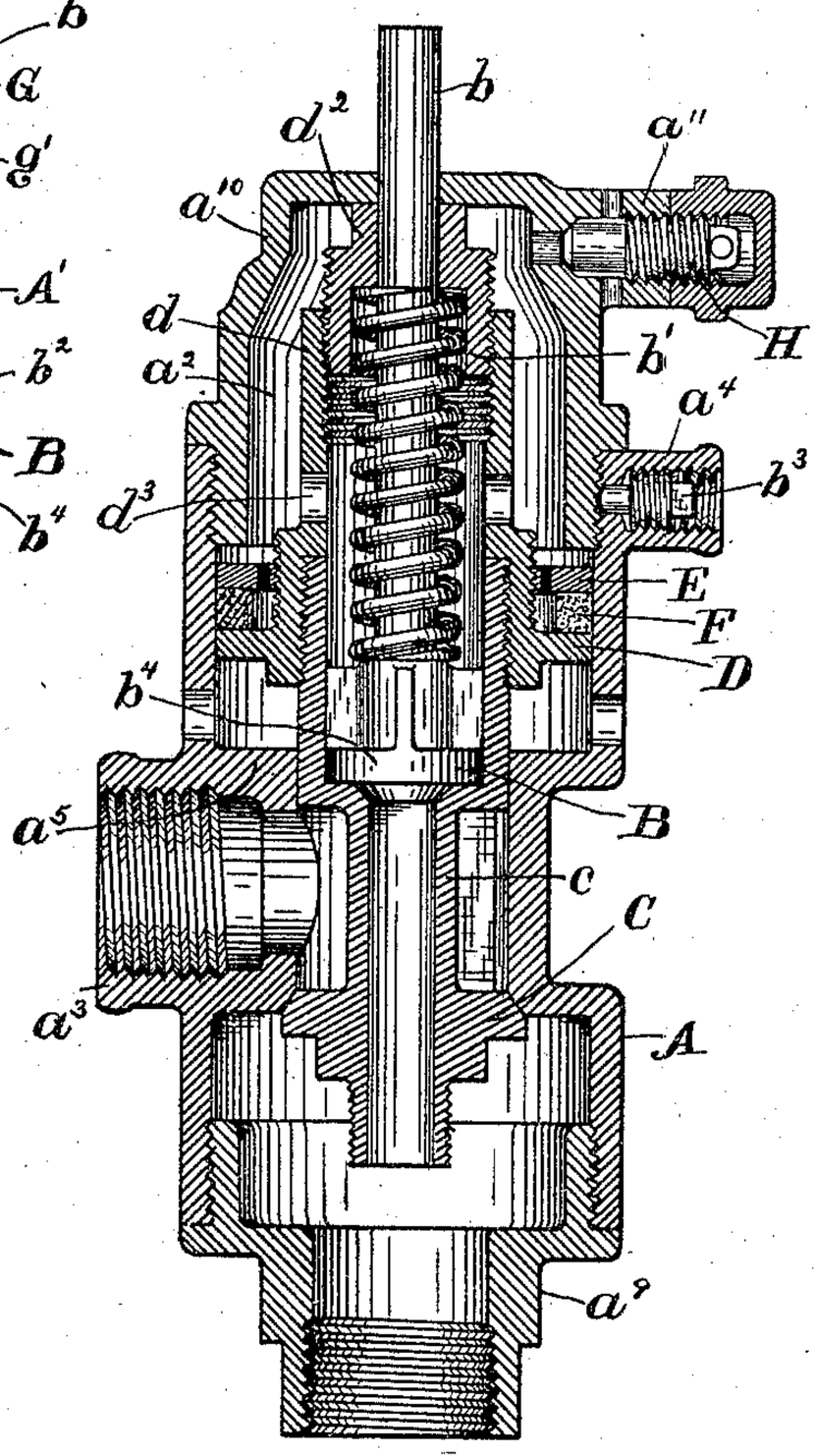

Fig. 3

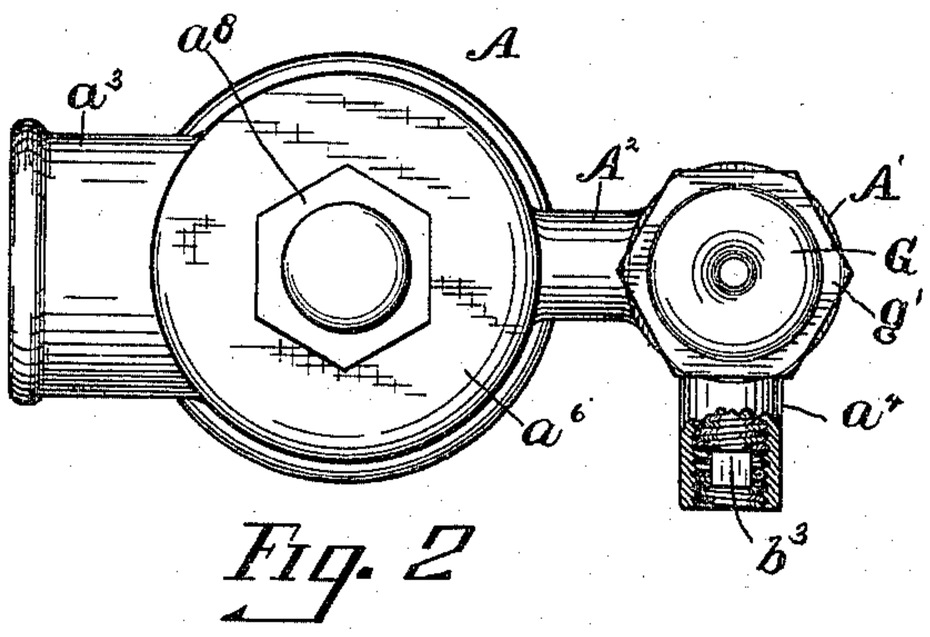

Fig. 2

WITNESSES

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FRANK SCHREIDT, OF MANSFIELD, OHIO.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 591,014, dated October 5, 1897.

Application filed July 13, 1896. Serial No. 598,933. (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-Valves, of which the following is a specification.

The object of my invention is a quick-acting pop safety-valve in which the steam or fluid under pressure is utilized to hold the main valve to its seat and also to open it when the pressure exceeds a fixed limit, a supplemental valve held against the pressure of the fluid to control the opening of the main valve, and an escape-valve to regulate the pressure of the fluid which passes the supplemental valve to throw the main valve open, all of which will be fully understood from the following description of the accompanying drawings, taken in connection with the claim, which point out and define my invention.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is a central sectional view taken in a plane through the axes of the valves, but with the valves and their stems shown in elevation. Fig. 2 is a top plan view of the same, with the set-screw for locking the adjustment of the supplemental valve-spring shown in broken section. Fig. 3 is a longitudinal sectional view of my invention in which the supplemental valve is seated in the hollow stem of the main valve. The main valve in this view is shown in diametrical section and the supplemental valve and its connections in longitudinal elevation.

Referring first to Figs. 1 and 2, A represents a cylindrical case for the main valve and its connections, A′ a cylindrical case for the supplemental valve and its connections, and A^2 a chambered web connecting the casings of the main and supplemental valves, the chamber of said web being for the purpose of establishing a direct communication between the boiler or other fluid-receptacle and the upper chamber in case A. The pressure from the source of supply is controlled by the spring-loaded supplemental valve B, seated in the case A′, the passage or chamber a being between the supplemental valve and the boiler, and the chamber a' being between the back of said valve and the chamber a^2 in the upper part of the case A. The parts A, A′, and A^2 and the branches a^3 and a^4 are preferably cast integral.

The main valve C is an outwardly-closing valve seated against a partition below the exhaust branch a^3. Its stem c projects through a perforation in the upper wall or partition a^5 of the case A, and its upper end is screw-threaded to connect with the hub d of the piston or follower D, which is fitted to slide in the chamber a^2 of the case A. The upper end of the hub d is screw-threaded to engage the hub e of the piston disk or follower E. The disks D and E, together with the packing F, form a piston connected to the upper end of the stem c of the main valve C, operating in the chamber a^2. The packing F, which is preferably a split ring similar to those ordinarily used in steam-cylinder pistons, is free to expand or contract between the followers D and E, and is expanded to make a practically steam-tight joint with the wall of the chamber a^2 by pressure admitted between the followers D and E through perforations in the follower E. The hub e of the follower E is locked to the hub d of the follower D by a spring-key e', and the stem c is locked to the hub d by a key or pin d', which enters key-seats cut one-half in the upper screw-threaded end of the stem c, and the threaded opening in the hub d, with which said screw engages.

The cap a^6 of the case A is provided with a nut or angular projection a^7, forming a seat for the wrench, by which the cap is screwed into place. This projection is axially perforated, the perforation extending through the cap a^6. The upper part of the perforation is tapped to receive the regulating-plug H, the lower end of which seats on the top of the cap to control the passage of steam under pressure from the chamber a^2 through transverse perforations in the nut a^7. The perforation in the top of the plug H is for the reception of a pin to adjust the plug with relation to its seat. After it is adjusted the cap-nut a^8 locks the adjustment, prevents the plug from being tampered with, and provides a neat finish. In the lower end of the case A is screwed a branch a^9 to connect with the boiler. If the chamber a^2 were made steam-

tight, the valves would not stay open long enough to relieve the boiler-pressure and the valve would wear by pounding; but by providing the regulating-valve H, I can control the boiler-pressure perfectly, avoid all pounding, and insure a quick noiseless closing of the valves when the pressure has fallen to its fixed limit.

The stem b of valve B, which is located in the case A′, projects through a partition g of the spring-adjusting follower G. Around this stem b is a coiled spring b', which bears upon the hub and wings b^2 of the supplemental valve B. By screwing the follower up or down in the case A′ the pressure of the spring upon the supplemental valve B is adjusted and the adjustment locked by a set-screw b^3, which is tapped through the branch a^4 of the case A′, the inner end of which bears upon the screw-threaded portion of the follower G. This, aided by the set-screw g', locks the follower in case A′. The valve B has an annular flange b^4, which furnishes an increased area when the valve B is started from its seat and insures its quick opening above the port through which the steam under pressure passes to the chamber a^2 to exert its pressure above the piston in said chamber to throw the valve C from its seat and hold it open until the pressure in the boiler is reduced below the tension at which the spring b' is set.

In the modification shown in Fig. 3 the case A′ and web A^2 are omitted and the stem c' of the valve C made tubular and enlarged at its upper end to incase and seat the supplemental valve B. The hub d is also enlarged and made tubular and its neck extended to receive the stem b and spring b'. The tension of the spring in this case is regulated by a plug d^2, which screws into the upper end of the neck. The plug is axially perforated to pass the stem b, which passes through it and extends through the cap a^{10}. The regulating-valve H in this case is in a branch a^{11}, extending radially from the top of the cap a^{10}. In this case also the diameter of the flange or lip b^4 should be less than the wall of its chamber to allow the steam to pass up to the chamber a^2 through the port d^3. The operation of this device is the same as that illustrated in Figs. 1 and 2. In both cases the valve B is held to its seat against the pressure of the steam by the spring b', which may be regulated to any pressure desired, and the main valve C is held to its seat by the pressure from the boiler. Whenever the pressure in the boiler exceeds the fixed limit, the valve B is thrown from its seat, and the steam-pressure is then thrown above the piston in chamber a^2 and the main valve thrown open and so held until the pressure has been reduced to or slightly below its limit, when the spring will quickly close the supplemental valve upon its seat, relieving the pressure above the piston, and the pressure from the boiler will seat the valve C.

What I claim as new is—

The combination of the case having an upper chamber therein, the outwardly-closing main valve having its stem extending into said chamber, the piston secured upon said valve, the supplemental valve for admitting steam above said piston to open the main valve, a spring to hold the supplemental valve to its seat against the pressure, and a regulating-valve for the upper chamber, substantially as shown and described.

FRANK SCHREIDT.

Witnesses:
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