

(No Model.)

F. SCHREIDT.
SAFETY VALVE.

No. 591,015.

Patented Oct. 5, 1897.

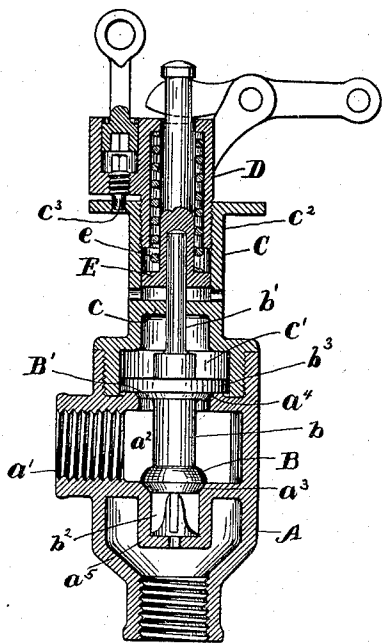


Fig. 1

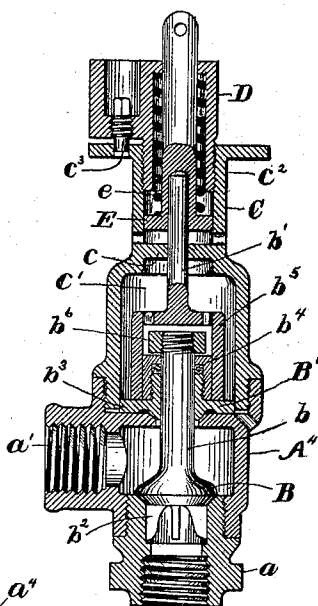


Fig. 2

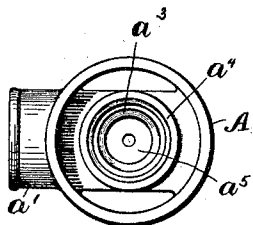


Fig. 6

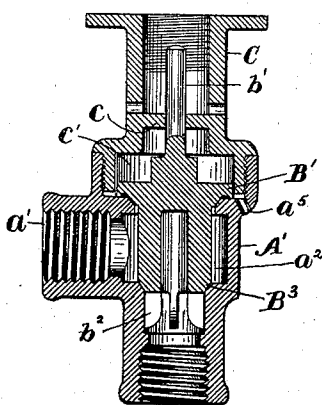


Fig. 3

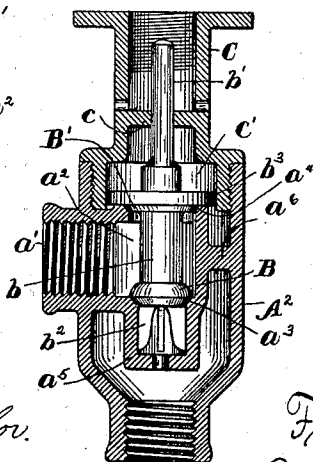


Fig. 4

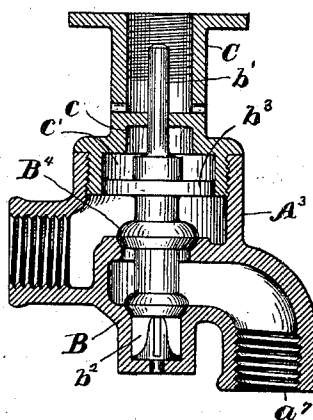


Fig. 5

WITNESSES

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FRANK SCHREIDT, OF MANSFIELD, OHIO.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 591,015, dated October 5, 1897.

Application filed November 27, 1896. Serial No. 613,684. (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.

My invention is an improved safety-valve. Its object is to provide a sensitive valve that will keep its seat until the predetermined pressure in the boiler is exceeded, when it will instantly be thrown wide open and as quickly closed without jar when the excess of pressure is reduced. This object I attain, mainly, by providing two connected valves, which control the pressure of steam in the boiler, located upon opposite sides of the entry-port. The exposed area of the upper valve is greater than the lower one and has an overlapping flange which acts as a piston in the steam-chamber above. The difference between the pressure upon the two valves is regulated by a spring, which may be adjusted to any degree desired.

There are other peculiarities of the invention, which will be clearly understood from the following description of the accompanying drawings and the claims appended thereto.

Referring to the drawings, Figure 1 is a central longitudinal sectional view of my improved valve in its preferred form. Fig. 2 is a view similar to Fig. 1, but with each valve independent of the other, but operating as a single valve. Figs. 3, 4, and 5 are similar views of modifications, but with the upper spring-case removed. Fig. 6 is a top or plan view of the preferred form of valve-case shown in Fig. 1, the spring-case and valves being removed to expose the seats and passage around the valve-chamber.

In all the views except Fig. 2 the body of the case A, A', A², and A³ is cast in a single piece, having the seats for the double valves formed in the integral casting. In Fig. 2 the case A⁴ is substantially the same, excepting that the outlet branch a is screwed into the body of the case, its upper end forming the seat for the lower valve B.

Referring particularly to Fig. 1, the body A upon one side is provided with a screw-threaded branch a' for connection to the pipe leading from the boiler and into a steam-chamber

a², provided with upper and lower seats a³ and a⁴ for the connected valves B and B'. The double valves B and B' are formed integral with the neck b and the stem b', which extends through a web c in the case C, the web dividing the case C into the steam-chamber c' and the upper flanged extension c², which receives the hollow spring-case D and follower E, which is perforated at its lower end to receive the upper end of the valve-stem b'. The seat-partition a³ has a lower extension a⁵ to receive the wings b² of the valve B and is perforated at its bottom to allow a limited escape of steam when the valve is open or in the act of closing. The seat a⁴ of the valve B' is formed on an upwardly-projecting annular ring, and the flange b³, projecting over against the walls of the steam-chamber c', forms a piston loosely fitting in the steam-chamber c'.

The exposed area of the lower face of the valve B' is greater than the back of the valve B, so that the tendency is to throw both valves open were it not for the pressure exerted by the small spring e, which is compressed between the top of the case D and the back of the follower E. The tension of this spring is regulated by screwing the case D down into the case C, and the adjustment is locked by a screw-pin c³, passing into a perforation in the extended flange c². When the pressure in the boiler exceeds the tension put upon the spring, the valve starts from its seat, and the moment it starts the steam rushes under the lower seat and under the extended flange of the upper seat and throws the valve wide open. As soon as the pressure is reduced to the predetermined limit the steam that passes the upper seat in its course to reach the outlet by passing around the periphery of the flange on the upper seat exerts its force to quickly close the valve.

The object in dividing the cylinder or case C by the web and putting perforations through it is to keep the spring away from the heat of steam carried by the improved tubular boilers, and the air constantly passing through the perforations keeps the spring and follower from getting hot.

In the modification Fig. 2 the valves are constructed independently of each other, but operate as a double valve when in action.

The purpose of making the valves separate is in order to facilitate the grinding of the seats when making large-size valves. In this case the stem b passes through the upper seat 5 and has a packing-gland b^4 . In this case the stem b' terminates in a shell b^5 , which passes over the gland and bears upon the back of the upper valve B' , and the lower valve is seated upon the upper end of the tubular extension a . There is a slight play between the 10 top of the gland-box b^4 and the nut b^6 . The pressure on top of the valve B holds it firmly to its seat until the pressure underneath the valve B' lifts the valve against the light 15 spring until the top of the gland-box strikes the nut b^6 , when the steam, rushing under the enlarged flange, throws the valve rapidly from its seat. In other respects the action is the same as Fig. 1.

20 In Fig. 3 the pressure of the spring is relied upon to hold the valve B' to its seat, the lower valve B^3 having no back to receive the pressure of the steam; but as the exposed area of the valve B' is very small but a light spring is 25 required to hold the pressure in the boiler until the valve is slightly started from its seat, when the full area of the valve is exposed to the pressure and the valve will be quickly thrown from its seat. The steam on 30 its way to the outlet, passing between the piston or flange, will quickly close it when the pressure is reduced, and the openings a^5 , of which there are a number, allows the steam underneath the valve to escape.

35 The modification shown in Fig. 4 differs from Fig. 1 mainly in having the steam-chamber a^2 connected to the case by studs a^6 instead of having the seats extending to the wall of the case.

40 In the modification shown in Fig. 5 the body A^3 is formed after the style of the globe valve-case. The entry-port a^7 of the case leads between the lower valve B and upper valve B^4 , and the flange or piston b^3 is arranged above the valve B^4 and operates substantially as in Figs. 1, 3, and 4, so far as 45 opening and closing the valves is concerned.

What I claim is—

1. The combination of the main valve-case 50 having a steam-chamber within it to communicate with the steam under pressure from the boiler, valve-seats upon opposite sides of said chamber, two connected valves seated thereon the upper one having its exposed area 55 greater than the lower one when seated, a spring-pressed follower bearing upon the valves in opposition to the steam-pressure, means such as shown to adjust and hold the tension of the spring-follower, an overlapping piston-flange to receive the pressure of 60

the steam when the valve is started from its seat, and a steam-chamber in which said piston is loosely fitted, substantially as shown and described.

2. In a safety-valve the combination of the 65 main valve-case, the steam-chamber within it having passages around it leading to the discharge provided with seats upon the opposite sides and having a perforated pocket surrounding one of said seats, two connected 70 valves to control the steam under pressure, the stem of said valves extending through an upper closed chamber, the upper one of said valves having an extended flange or piston to slide in said upper chamber and an adjust- 75 able spring-follower to bear upon the stem of said valves and hold them to their seats until the pressure in the boiler has exceeded its predetermined limit, substantially as shown and described. 80

3. The combination in a safety-valve of the main case having a steam-chamber within it and valve-seats in its upper and lower walls, the space around said chamber leading to the exhaust-port, the upper closed chamber, a 85 spring-pressed follower-case screwed into the main case, said case having a web or partition dividing the steam and spring-follower chambers, connected valves to control the pressure in the boiler having a common stem 90 passing through the web of the upper case and a piston on said stem loosely fitting the steam or inclosed chamber in said case, a spring-pressed follower bearing upon said stem and an adjustable case for the spring, 95 whereby its tension is regulated, substantially as shown and described.

4. The combination substantially as here- 100 inbefore set forth of the main valve-case having a steam-chamber within it provided with discharge-ports leading to the main case and seats surrounding said ports, the upper case screwed into the main case and divided by a partition or web into a closed chamber and an open spring-follower chamber, the connected 105 valves having a common stem extending through the web in the upper case, the upper valve having an extended flange to form a loose piston for the closed chamber, the spring-case screwed into the follower-case, the fol- 110 lower having a stem extending through the top of the spring-case and bearing on the stem of the main valves, a spring bearing upon said follower to regulate the pressure by which the valves are held to their seats.

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Witnesses:

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