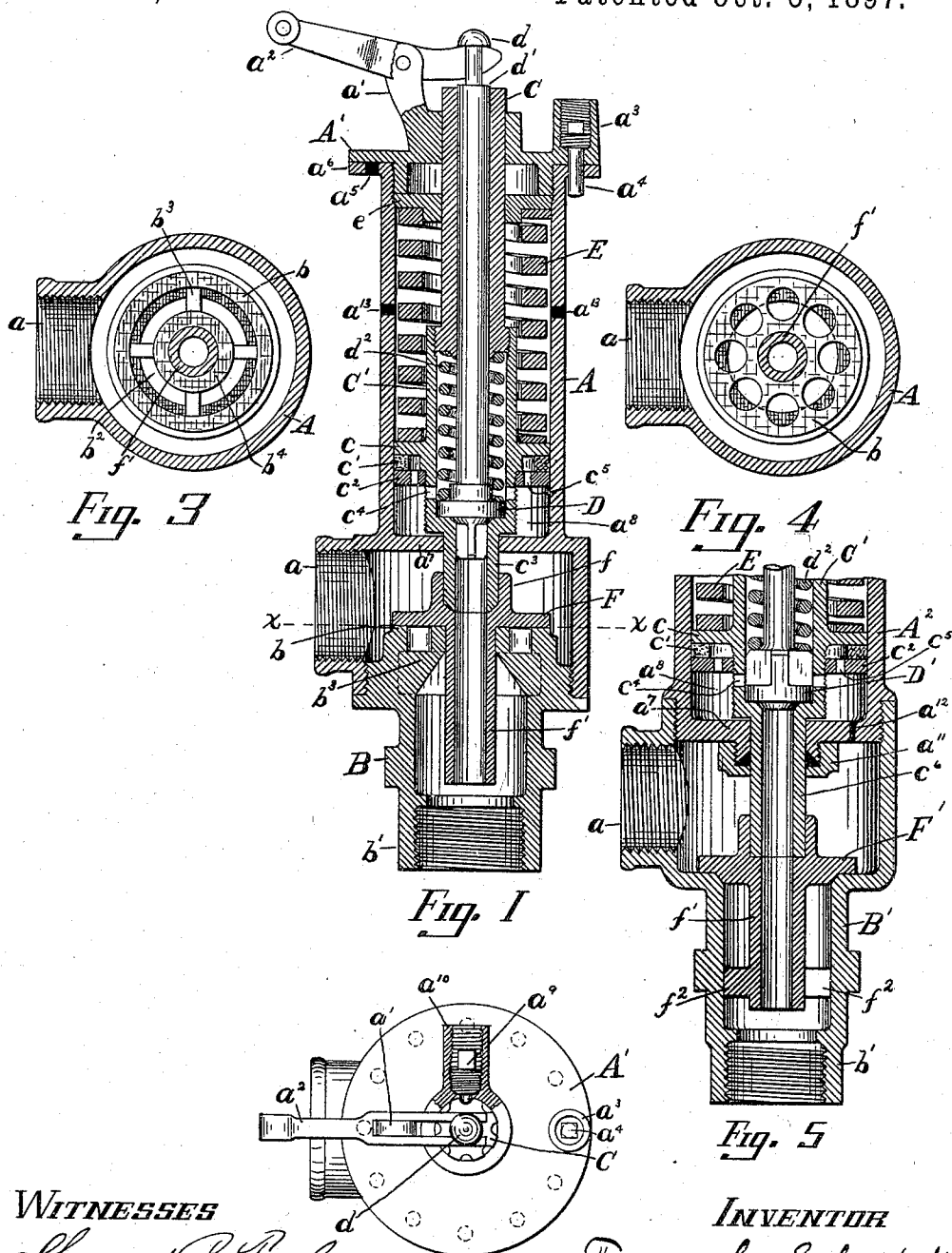


(No Model.)

F. SCHREIDT.
SAFETY VALVE.

No. 591,013.

Patented Oct. 5, 1897.



WITNESSES

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FRANK SCHREIDT, OF MANSFIELD, OHIO.

SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 591,013, dated October 5, 1897.

Application filed March 18, 1896. Serial No. 583,802. (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 improvement in safety and relief valves; and it consists in approved means by which the fluid to be controlled is utilized to overcome the external force upon the pressure controlling the valve, whereby said valve will be rapidly thrown open to insure a free discharge of the fluid under pressure and as rapidly closed when the excess of pressure is relieved.

It also consists in certain details of construction by which the main objects of the invention are economically and with certainty attained, all of which will be first fully described in connection with the accompanying drawings and then particularly referred to and pointed out in the claims.

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 longitudinal central vertical sectional view of one form of my improved safety-valve. Fig. 2 is a top or plan view of the same, a portion being broken away to more clearly indicate the means by which the spring-pressure of the supplemental or trigger valve is locked. Fig. 3 is a transverse sectional view through line $x-x$ of Fig. 1, looking down upon the main-valve seat. Fig. 4 is a similar view through the same line, showing another form of valve-seat adapted to the same form of valve. Fig. 5 is a modified form of the device shown in the preceding figures and is my preferred form of valve for general purposes.

Referring first to Figs. 1 to 4, inclusive, the valve case or housing proper is composed of the cylindrical shell A, which has a lateral discharge-branch a . The lower end of this case A is screw-threaded to receive the member B, which has formed integral with it the main-valve seat b and a downwardly-projecting branch b' , which connects to the boiler or other vessel containing the fluid under pressure. This part B is connected to the case A by screw-threaded connection, and the top

of the case A is closed by a cap A', which is centrally perforated to pass the tubular stem C and has also projecting upwardly from it an arm a' , which is perforated at its upper end to receive the pivot, which is the fulcrum of a testing-lever a^2 , the bifurcated arms of which pass upon each side of the arm or stud a' and under the head d of the valve-stem d' of the trigger-valve D. The head A' has also a tubular extension a^3 , which receives a screw-threaded set-pin a^4 , the shaft of which passes through one of a series of perforations a^5 in the outwardly-projecting flange a^6 of the cylinder A. The purpose of this arrangement is to adjust or regulate the tension of the spring E, which is compressed between an adjustable plunger e and a piston c , formed integral with the tubular stem C for the purpose of regulating the pressure by which the main valve F is held to its seat b .

The flange c , in connection with the split ring c' and a screw-threaded disk c^2 , forms a piston within the cylindrical shell A, the parts being, when screwed together, practically integral with the cylinder or tube C', which houses a spring d^2 , which is compressed between the lower end of the cylindrical stem C and the top of the valve D.

The cylinder C' has a reduced lower end c^3 , which passes through the partition a^7 of the case A and seats in the upper extended neck f of the main valve F, so that the pressure of the spring E forcibly holds the valve F to its seat. The valve F has also a tubular extension f' , which passes through the valve-seat b and extends down into the branch b' . The valve D has its seat at the lower and larger end of the cylinder C', and said cylinder has above the valve lateral perforations c^4 , which, when the valve D is thrown up by pressure within the boiler or other vessel holding the compressed fluid, allows the fluid to pass into a chamber a^8 and exert its pressure to throw up the cylinder C'. The disk c^2 has a series of vertical perforations c^5 , which admit the fluid under pressure between the flange c and disk c^2 , thus expanding the split packing-ring c' and making a steam-tight joint between the piston and the cylindrical shell A.

The cylindrical stem C is grooved or corrugated externally, as clearly seen in Fig. 2, and the lower end of the stem being screw-

threaded and tapped into the cylinder or housing C' it is evident that the tension of the spring d^2 may be regulated by screwing the tubular stem C into the end of the tube C' or turning it backward to release the spring's tension. By this means the valve D is adjusted to its seat with the desired pressure, and when properly adjusted the adjustment is held by a screw-threaded pin a^9 , tapped into a tubular extension a^{10} upon the cap A'. The point of the screw a^9 entering one of the grooves in the tube C locks the adjustment.

The seat b , as seen in Figs. 1 and 3, has an annular groove b^2 from the top down to the brackets b^3 , which support the center ring b^4 , which serves as a guide for the valve-stem f' , while in Fig. 4 the valve-seat is provided with an annular series of perforations for the same purpose. The purpose of making the valve F and valve-seat larger than the unobstructed opening of the branch b' is to insure a greater area for steam-pressure through the series of perforations or through the annular groove b^2 to the under side of the valve F to allow a free discharge of the fluid under pressure with a very limited upward movement of said valve.

The form shown in Fig. 5 differs from that shown in the preceding figures in that the lower member of the case B' extends up above the discharge-branch a and is screwed onto the lower end of the case A². The main valve F' in this view seats upon the upper portion of the branch b' , in which it is guided by the wings b^5 , extending from the lower end of its stem. The lower end of the case A² has a downwardly-extended screw-threaded neck to receive the packing-nut a^{11} to form a steam-tight joint around the stem c^6 of the valve-seat, the valve D' in this case being inverted and guided by wings extending up into the cylinder C.

In the form shown in Fig. 1 the diminished end c^3 fits loose enough to allow steam or condensed water to escape from the chamber a^8 , but the stem in the form shown in Fig. 5, being packed by the nut a^{11} , will not allow the steam or condensed water to escape, and in this case a small hole a^{12} is bored through the bottom of the cylinder A², and there are also perforations a^{13} in the case A and A² to permit any steam to escape which might leak into the upper part of said case from the chamber a^8 .

In operation the valve F is held by the spring E to its seat with slightly more pressure than desired to relieve the boiler, while the trigger-valve D or D' is set to the pressure desired. When this pressure is exceeded, the trigger-valve is thrown up against the pressure of its spring d^2 . The steam under pressure then entering the chamber a^8 exerts

its pressure to throw the stem C' up against the pressure of its spring E, when the valve F will quickly open until the pressure is reduced. So soon as it is the spring d^2 will throw its valve D to its seat, cutting off the pressure in the chamber a^8 , when the force of the spring E will quickly close the valve upon its seat.

What I claim is—

1. The combination of the main-valve chamber, the main valve having a tubular stem extending into the inlet-passage and a tubular extension upon the back of said valve having a valve-seat within it, a tubular stem having a reduced lower end to pass through the partition of the main-valve chamber, a seat within the upper tubular extension of the main valve the enlarged upper portion of said stem above the partition having a valve in its lower end and a piston above the valve forming a pressure-chamber, a tubular follower screwed into said stem and forming an upper extension thereof, a spring compressed between said follower and said valve to hold it to its seat the tension of said spring being regulated by the follower, a spring to bear upon the piston of the tubular stem and hold the main valve to its seat, a follower above said spring in the upper end of the case, and the top cap of the case having a screw-threaded neck to engage the external thread in the upper end of the case and bear upon said follower, whereby the tension of the main-valve spring is regulated, substantially as shown and described.

2. The combination of the case having a main-valve chamber, a tubular extension screwed into the upper end of said valve-chamber having its lower end perforated, and a screw-threaded neck or extension surrounding said perforation, a tubular stem passing through said neck extending through the top of the case having a valve-seat within it, and a piston carried by it to fit the tubular extension, the main valve centrally perforated and having an upper tubular extension to receive the diminished neck of the tubular stem, a packing-nut to make a steam-joint between the tubular extension of the case and the tubular stem, a valve in said tubular stem having its stem extending outside of the tubular stem, a spring to hold said valve to its seat, a spring bearing upon the piston of the tubular stem to hold the main valve to its seat, and means such as shown for regulating the tension of the valve-springs, substantially as shown and described.

FRANK SCHREIDT.

Witnesses:

J. CLARKE CUSTER,
LOUIS P. BENNETT.