(No Model.)

A. D. KILBORN.

SAFETY RELIEF VALVE.

No. 432,140. Patented July 15, 1890.

Fig. 1.

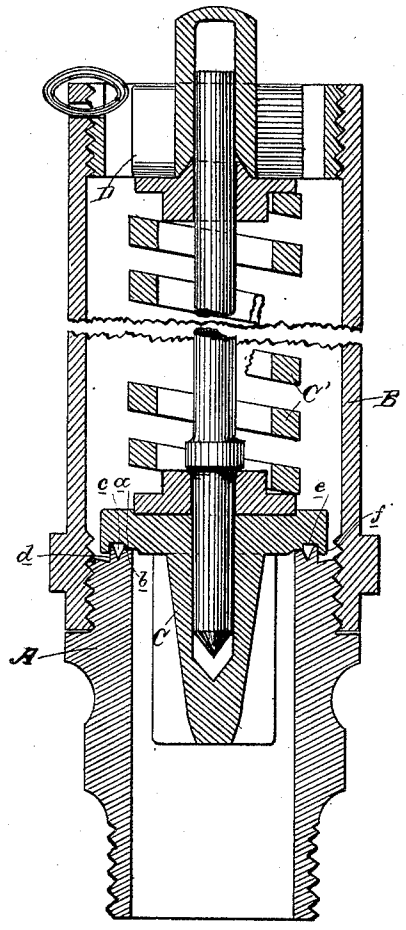


Fig. 2.

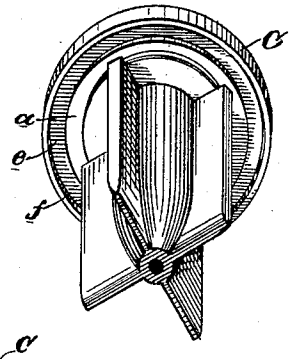


Fig. 3.

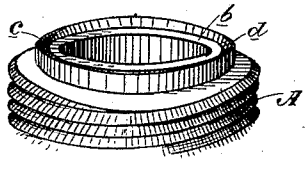
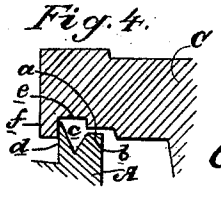


Fig. 4.



Witnesses,
Geo. H. Strong.
[illegible]

Inventor,
Alden D. Kilborn
By Dewey & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALDEN D. KILBORN, OF OAKLAND, CALIFORNIA.

SAFETY RELIEF-VALVE.

SPECIFICATION forming part of Letters Patent No. 432,140, dated July 15, 1890.

Application filed March 21, 1890. Serial No. 344,803. (No model.)

To all whom it may concern:

Be it known that I, ALDEN D. KILBORN, a citizen of the United States, residing at Oakland, Alameda county, State of California, have invented an Improvement in Safety Relief-Valves; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in safety relief-valves; and it consists in the combination, with the safety-valve casing, cup-shaped adjusting end, and tension-spring, of a valve and valve-seat having expansion chambers or grooves formed in the meeting faces thereof.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical section taken through my valve apparatus. Fig. 2 is an enlarged perspective view of the valve, showing the expansion-chamber. Fig. 3 is a similar view of the valve-seat, showing the corresponding chamber in it. Fig. 4 is an enlarged section of one end of the valve and of its seat.

A is the base, upon the upper end of which the valve-seat is formed and to which the shell or casing B is attached by screw-threads, so that it may be easily removed at any time from the base without disturbing the latter. Within this casing is contained the valve C, which is acted upon and kept closed by the spring C′, and the tension of this spring is regulated by means of the cup-shaped nut D, fitting into the upper end of the casing and adjustable therein, as shown in my former patent, dated March 27, 1883, No. 274,787.

My present invention is an improvement upon the valve shown in said patent, and it consists in forming the valve C with a flat face *a* around the inner portion, which is adapted to close upon a corresponding flat or horizontal seat *b* on the base A. Around the seat *b* is formed a V-shaped groove or channel *c*, having exterior to it an upwardly-projecting lip or flange *d*. Around the valve-face is formed a channel or groove *e*, which is wide enough to cover the groove or channel in the valve-seat, and also to inclose the upwardly-projecting lip or flange *d*, which surrounds this groove or channel. Outside this channel *e* of the valve is a downwardly-projecting lip or flange *f*, which extends downwardly around the lip or flange *d* of the valve-seat.

The upwardly-projecting flange *d* on the valve-seat is a little higher than the seat itself, while the downwardly-projecting lip or flange *f*, which surrounds the valve-face, is a little deeper or lower than the valve-face itself, so that these two form steps, as it were. The object of these grooves or channels is to form around the valve-seat and around the face of the valve which fits upon said seat an expansion-chamber, into which the steam is first admitted when the valve begins to rise on account of the pressure below overcoming the tension of the spring, and the expansion of the steam within this chamber immediately raises the valve, and as the steam escapes between the valve-face and the valve-seat the expansion within the chambers thus formed lifts the valve suddenly, by reason of the exterior flange, so as to open it to a considerable distance and allow a free escape for the steam within the casing C. This escape-opening is made much larger on account of the expansion-chambers than any opening which is formed by simply lifting the ordinary conically-seated valve, and the boiler may thus be relieved of its surplus pressure in very short time, so that the valve will close again immediately.

By forming the groove in the valve-seat V shape a practically sharp knife-edge is produced by the upwardly-projecting lip or flange *d*. The action of this lip is to cut the steam off sharply and abruptly as soon as the pressure has decreased sufficiently to allow the valve to begin to close.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The improvement in safety-valves, consisting of a flat valve-seat having the surrounding V-shaped groove or channel, and the upwardly-projecting Λ-shaped flange forming a

sharp edge around said channel, in connection with a valve having a flat face fitting upon the interior flat seat, a groove or channel formed around said face and acting in conjunction with the V-shaped groove in the valve-seat to form an expansion-chamber around said seat, and an exterior annular flange projecting downwardly from the valve and outside of the Λ-shaped flange of the valve-seat, substantially as described.

In witness whereof I have hereunto set my hand.

ALDEN D. KILBORN.

Witnesses:
GEO. H. STRONG,
S. H. NOURSE.