

No 47,869,



Witnesses:

Inventor:

UNITED STATES PATENT OFFICE.

JOHN Y. SMITH, OF ALEXANDRIA, VIRGINIA.

IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **47,869**, dated May 23, 1865.

To all whom it may concern:

Be it known that I, JOHN Y. SMITH, of Alexandria, in the county of Alexandria and State of Virginia, have invented certain new and useful Improvements in Safety-Valves for Steam-Generators; and I hereby declare that the following, taken in connection with the accompanying drawings, is such full, clear, and exact description as will enable others skilled in the art to make and use the same.

On locomotive-boilers and other steam-generators the safety-valve mostly used consists of a cap fitting an opening in the top of the boiler, which cap is held down by means of a lever weighted or spring-balanced to the proper degree of pressure. The dangers attending the use of this safety-valve arise, first, from the fact, well known to engineers, that the cap becomes fast or, as it were, cemented into its seat as soon as the vibration attending the operation of the engine ceases; second, from the fact that the safety-valve is under the control of engineers, who very frequently recklessly tamper with the valve so as to prevent it from blowing off steam when its pressure exceeds the calculated resistance of the boiler.

To obviate these evils is the object of my invention, and I have accomplished the same by constructing a safety-valve in the following manner:

The principle which underlies my invention consists in the employment, in lieu of the cap, of a disk made of sheet metal or composition struck off or punched out by suitable dies or machinery. This disk is of a resistance to pressure upon its surface equal to that which is calculated to be the limit of pressure to which the boiler may be with safety exposed. The disk is inserted in the boiler, so as to be inaccessible to the engineer, by means of a skeleton valve, of which the disk forms a part, and which, together with the disk, operates like an ordinary safety-valve. When the pressure in the boiler exceeds the limit of safety, then the disk will burst, allowing steam to escape through the skeleton-valve.

The valve-case may be provided with a stop-cock to shut off the steam after the bursting of the disk; but in order to prevent tampering on the part of the engineer I propose to combine with the disk a pendent rod which traverses the way in the cock, preventing it from

being shut so long as the disk and rod are not blown out.

For further security, and to allow the safety-valve to play when the engine is at rest without bursting the disk, I combine with it an expansion-rod, which may be arranged inside or outside the valve-case, the rod abutting against the skeleton-valve or the outside lever to lift the valve when the temperature increases and exceeds that corresponding to the pressure of safety.

In the accompanying drawings, A is the valve-case, which may be screwed in or bolted over the opening of the boiler or steam-dome. It is here shown provided with a stop-cock, B, for the purpose before mentioned. The upper end of the valve-case is formed into a conical seat, against which is fitted the valve composed of three parts, viz., first, a skeleton valve C, which consists of a valve-ring whose outer and lower face is made to fit the valve-seat, with downward-projecting wings *w*, whereby the valve in its up-and-down play is securely guided, and an internal annular shoulder, *a*. Upon this shoulder rests secondly, a metal disk, D. This is composed of brass, iron, or other suitable material, such as will break or tear under a pressure exceeding that of calculated resistance. This metal disk is held in place by, thirdly, a skeleton cap, E—*i. e.*, a ring directly opposite the shoulder *a*, from which ring spring ribs terminating into the seat F of the pintle or fulcrum pin of the weighted or spring-balanced lever.

The operation of this contrivance, it will be understood, is precisely like that of any other safety-valve, so long as there is no cause that interferes with its proper functions; but if the lever be held or tied down, as this is frequently done, and the pressure exceed that for which the boiler is calculated to resist, then the disk will break or burst and allow steam to escape as if the valve were open.

If the valve-case is provided with a cock, as shown in the drawings, I deem it prudent to combine with the disk the rod R, which, traversing the aperture in the cock, prevents it from being shut off, which would defeat the object of my safety contrivance.

In Figure 2 I have shown the expansion device before referred to. It consists of a steel cage having in its center a brass rod, *s*,

traversing a disk, L, which is properly screwed into the boiler or valve-case. This rod abuts against the valve or the lever, and operates as hereinbefore stated.

Having thus described my invention and the manner in which the same is or may be carried into effect, I claim—

1. Combining with a safety-valve constructed in the usual manner, as described, a metal disk of a resistance calculated to explode under a pressure exceeding that of safety.

2. The construction of the valve of three parts, substantially as herein described, and for the purposes set forth.

3. In combination with a safety-valve constructed and operating as described, the stop-cock, for the purpose set forth.

4. In combination with a valve and valve-case provided with a stop-cock, as described, the pendent rod fast to the disk, substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

J. Y. SMITH.

Witnesses:

A. POLLAK,
JOS. L. COOMBS.