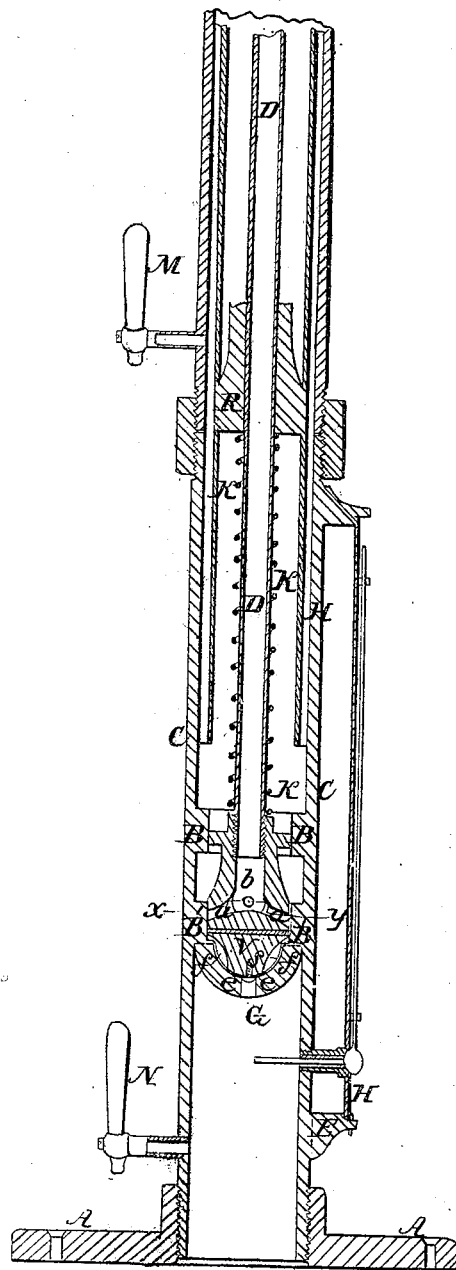


*S. Nowlan.*  
*Safety Valve.*

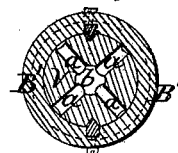
*N<sup>o</sup> 51610.*

*Patented Dec. 19. 1865.*

*Fig: 1.*



*Fig: 2.*



*Witnesses;*  
*D. L. Coombs*  
*L. D. Dwyer*

*Inventor;*  
*Samuel Nowlan*  
*by J. P. Potts*  
*his atty.*

# UNITED STATES PATENT OFFICE.

SAMUEL NOWLAN, OF NEW YORK, N. Y.

## IMPROVEMENT IN SAFETY-VALVES FOR STEAM-GENERATORS.

Specification forming part of Letters Patent No. 51,610, dated December 19, 1865.

*To all whom it may concern:*

Be it known that I, SAMUEL NOWLAN, of New York, in the county and State of New York, have invented certain new and useful Improvements in Safety-Valves for Steam-Generators; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of an apparatus constructed in accordance with this my invention, and Fig. 2 a horizontal section on line *xy* in Fig. 1.

It is unnecessary here to refer to the shortcomings or defects attending the ordinary safety-valves on steam-boilers or other steam-generators. The numerous accidents which almost daily occur in consequence of the unreliable character or sluggishness of action of safety-valves as heretofore constructed fully illustrates and demonstrates their defects. Moreover, the weighted lever-valve can only be used with advantage on stationary engines, unless combined with guiding devices, while the spring-valves partake of the same difficulties and imperfections of the ordinary weighted valves. The fact is, both are defective in this, that the pressure of steam must overcome the inertia or adhesion of the valve, in order to lift it off its seat and to allow steam to escape from the boiler. This is the cause of most explosions.

The object, therefore, of this invention is to render the apparatus more sensitive to the variations of pressure of steam and to facilitate its action, and thus attain greater safety.

To enable others to make and use my invention, I shall now proceed to describe the manner in which the same is or may be carried into effect.

Referring to the drawings, A is the socket by which the apparatus is secured to the boiler. The apparatus consists of a column, C, of a length and diameter proportionate to the capacity of the generator upon which it is used. Within this column a concavo-convex or otherwise shaped partition, G, is formed, which is centrally perforated for the admission of steam through it and out of the column. This partition forms the seat of a valve-piston, V, which is truly guided by the annular flanges B B', against which the piston has a steam-tight fitting.

The piston is provided with four radiating channels, *a*, terminating into a central opening, *b*, which forms a continuation of the hollow piston-rod D, so that any steam which may surround the piston at the circumferential openings of the side channels, *a*, will necessarily escape through the center of the piston and the piston-rod at the upper part of the column.

The lower part of the piston is provided with an india-rubber disk, *e*, which is secured onto the piston by a central screw, *s*. By this means a perfect tight fit is made to the piston in its valve-seat G. There are also in the lower part of the piston four recesses or channels, *f*, which allow steam to escape into the space between the annular flanges B B' whenever the piston is raised sufficiently high to establish communication through the channels *f* between the steam-generator and the said space.

A ring, R, is secured in the upper part of the column, through which the piston-rod is capable of an up-and-down play. Against this ring abuts the upper end of a spiral spring, K, which, winding around the piston-rod, causes the piston to bear down with a pressure which is the calculated pressure of safety less the amount of friction which the piston has against the annular flanges B B'.

From the foregoing the operation of my improved safety-valve will be understood to be as follows: Steam acting on the under side of the piston and the spring acting on the opposite side will cause it to play up and down, according to variations of pressure in the boiler. The piston, therefore, is never necessarily at rest; consequently there is no inertia or adhesion to be overcome by the sudden formation of a large amount of steam or by the sudden increase of pressure. When the pressure is such as to lift the piston to a point where the channels *f* clear the annular flange B', then the steam will rush out into the recess formed by the flanges B and B', and from the reissue through the ways *a* into the central opening, *b*, and out through the hollow piston D. When the internal pressure in the boiler is thus relieved, so as to allow the spring K to equilibrate the pressure the piston will descend again in its place, and thus cut off the steam. With this safety-valve may be combined a thermometer, indicating the temperature of

the steam. For this purpose a bracket, E, is formed on the front side of the column which supports the scale H, to which is fixed a thermometer, I. Cocks M and N may be applied, the former to remove water of condensation, the latter to blow off steam, if desired.

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

1. A safety-valve for steam-generators constructed and arranged for operation substantially as herein shown and described.

2. The combination, with the movable valve-piston provided with steam-channels, as described, of the hollow piston-rod and helical spring, when arranged for operation as herein set forth.

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

SAMUEL NOWLAN.

Witnesses:

JOHN S. HOLLINGSHEAD,  
JNO. C. DOUNS.