G. W. Richardson,

Steam Safety Valve.

No. 58,294. Patented Sep. 25, 1866.

Fig. 1

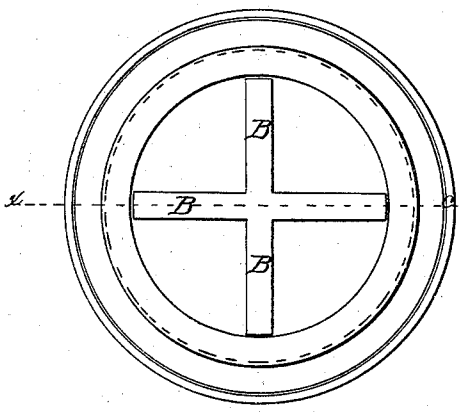


Fig. 2

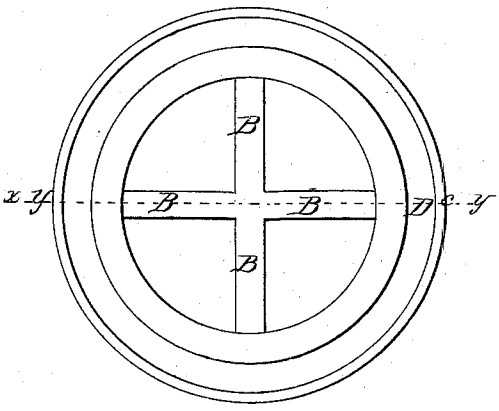


Fig. 3

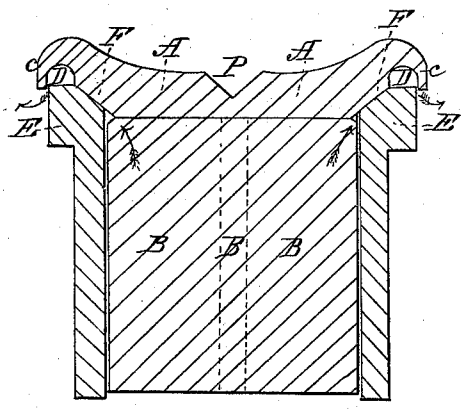
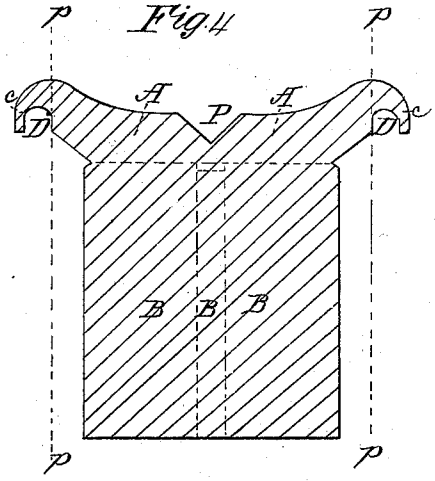


Fig. 4



Witnesses

Geo. Smith

Wm. H. Pope

Inventor.

Geo. Wm. Richardson

UNITED STATES PATENT OFFICE.

GEORGE W. RICHARDSON, OF TROY, NEW YORK.

IMPROVEMENT IN STEAM SAFETY-VALVES.

Specification forming part of Letters Patent No. **58,294**, dated September 25, 1866.

To all whom it may concern:

Be it known that I, GEORGE W. RICHARDSON, of the city of Troy, in the county of Rensselaer, in the State of New York, have invented a new and useful Improvement on a Safety-Valve for Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an end view of my improved safety-valve and its seat as seen from the bottom. Fig. 2 is an end view of the valve alone as seen from the bottom. Fig. 3 is a vertical section at *x x*, Fig. 1, of the valve and seat in position. Fig. 4 is a vertical section at *y y*, Fig. 2, of the valve alone.

Similar colors and letters of reference indicate corresponding parts in the several figures.

A A is the head of the safety-valve. B B B B are wings to guide the valve into its seat E E. *c c* is a circular or annular flange or lip extending over, slightly below, and fitting loosely around the outer edge of the valve-seat E E. D D is a circular or annular chamber, into which the steam immediately passes when the valve lifts from its seat at the ground joint F F. E E is the valve-seat. F F is the ground joint of the valve and seat. P is the countersink or center, upon which the point of the stud extending from the scale-lever rests in the usual manner.

The nature of my invention consists in increasing the area of the head of the common safety-valve outside of its ground joint, and terminating it in such a way as to form an increased resisting-surface, against which the steam escaping from the generator shall act with additional force after it has lifted the valve from its seat at the ground joint, and so, by overcoming the rapidly-increasing resistance of the spring or scales, insure the lifting of the valve still higher, thus affording so certain and free a passage for the steam to escape as effectually to prevent the bursting of the boiler or generator, even when the steam is shut off and the damper left open.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

To the head of the common safety-valve indicated by all that portion of Fig. 2 lying within the second circle from the common center I add what is indicated by all that portion lying outside of the said circle in about the proportion shown in the figure. A transverse vertical section of this added portion is indicated in Fig. 4 by those portions of the figure lying outside of the dotted lines *p p p p*, while all that portion lying within the dotted lines *p p p p* indicates a transverse vertical section of the common safety-valve alone. This increased area may be made by adding to a safety-valve already in use or by casting the whole entire. I terminate this addition to the head of the valve with a circular or annular flange or lip, *c c*, which projects beyond the valve-seat E E, Fig. 3, and extends slightly below its outer edge, fitting loosely around it and forming the circular or annular chamber D D, whose transverse section shown in the figure may be of any desirable form or size. This flange or lip *c c*, fitting loosely around the valve-seat E E, is separated from it by about one sixty-fourth of an inch for an ordinary spring or balance. For a strong spring or balance this space should be diminished, and for a weak spring or balance it should be increased to regulate the escape of the steam as required. Instead of having the flange or lip *c c* project beyond and extend below and around the outer edge of the valve-seat, as shown in Fig. 3, a similar result may be obtained by having the valve-seat itself project beyond the outer edge of the valve-head, and terminating it with a circular or annular flange or lip extending slightly above and fitting loosely around the outer edge of the flange or lip *c c* of the valve-head; but I consider the construction shown in Fig. 3 preferable.

With my improved safety-valve constructed as now described, and attached to the generator in the usual way, the steam escaping in the direction indicated by the arrows in Fig. 3 first lifts the valve from its seat at the ground joint F F, and then passing into the annular chamber D D acts against the increased surface of the valve-head, and by this means, together with its reaction produced by being thrown downward upon the valve-seat E E, it overcomes the rapidly-increasing re-

sistance of the spring or balance, lifts the valve still higher, and escapes freely into the open air until the pressure in the generator is reduced to the degree desired, when the valve will be immediately closed by the tension of the spring or balance. The escape of the steam by means of this safety-valve is so certain and free that the pressure of the steam in the generator or boiler will not increase beyond the point or degree at which the valve is set to blow off.

What I claim as my improvement, and desire to secure by Letters Patent, is—

A safety-valve with the circular or annular flange or lip *c c*, constructed in the manner, or substantially in the manner, shown, so as to operate as and for the purpose herein described.

GEORGE WM. RICHARDSON.

Witnesses:

GEO. GOULD,

WM. H. POOR.