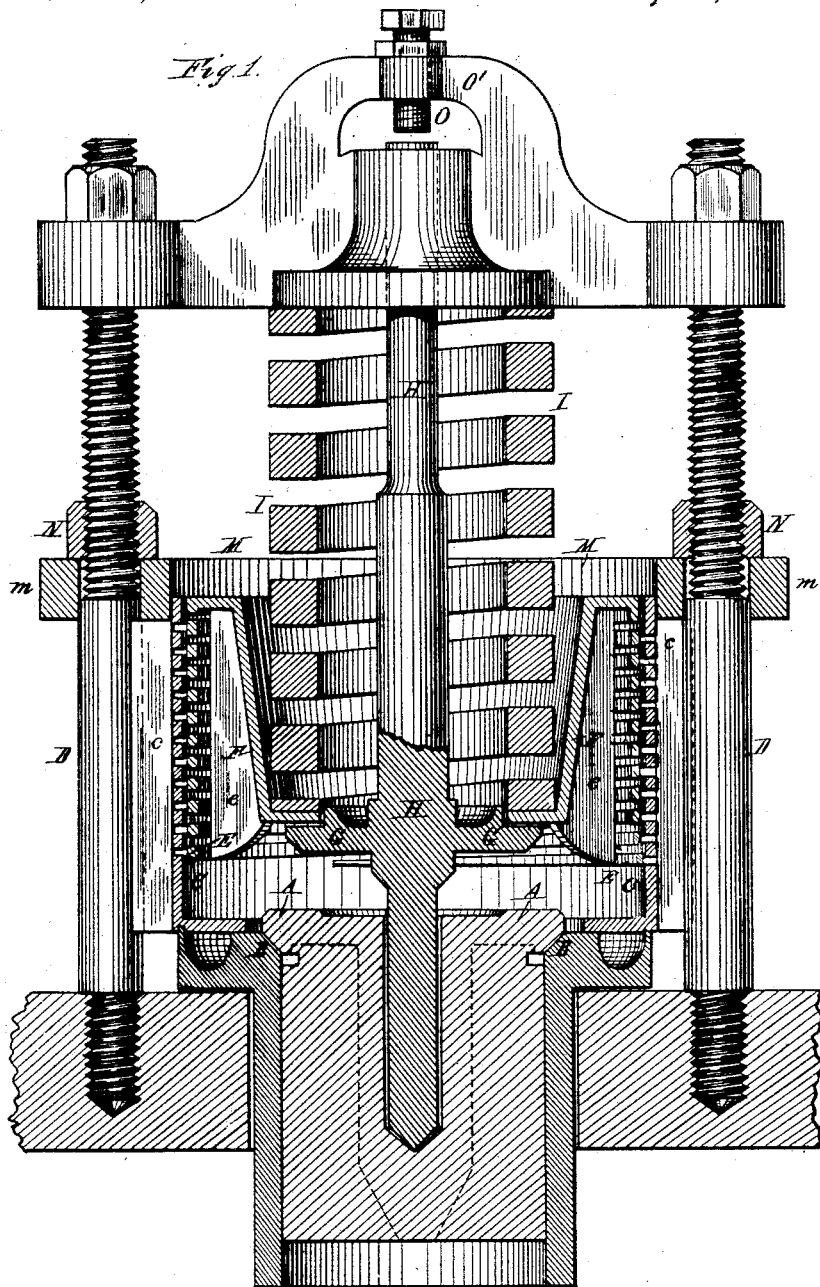


F. W. RICHARDSON.  
Safety-Valves.

No. 215,242.

Patented May 13, 1879.



*Attest:*  
*Chas. H. Searle*  
*Ward M. Lewis*  
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*By Worth Cogood*  
*Attorney.*

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Fig 2.

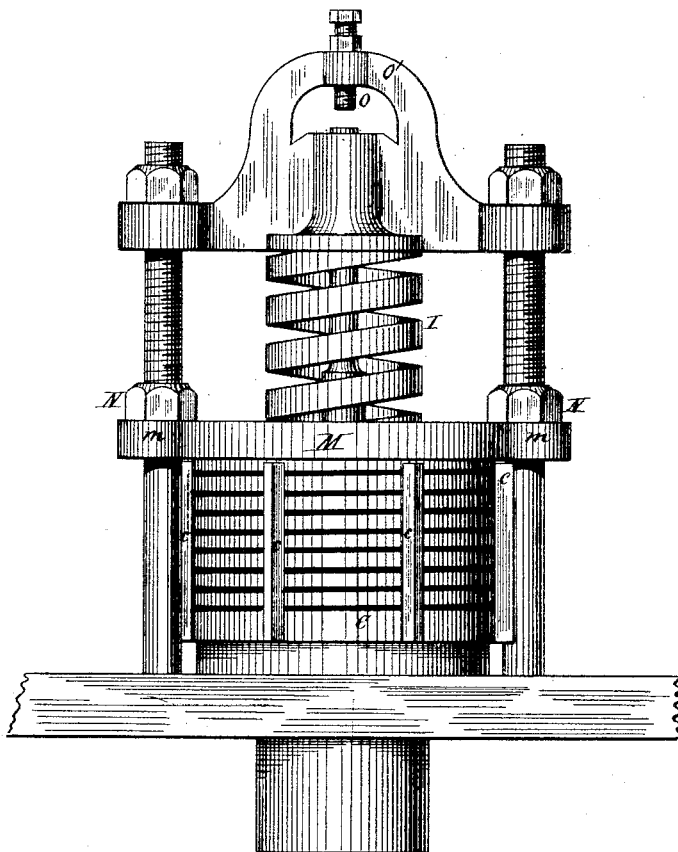
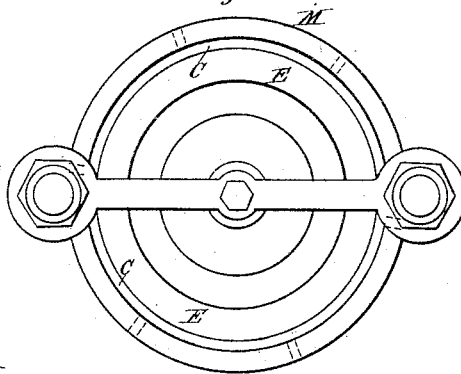


Fig 3.



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# UNITED STATES PATENT OFFICE.

FRED W. RICHARDSON, OF TROY, ASSIGNOR OF ONE-THIRD HIS RIGHT TO  
JOSEPH H. PARSONS, OF NEW YORK, N. Y.

## IMPROVEMENT IN SAFETY-VALVES.

Specification forming part of Letters Patent No. **215,242**, dated May 13, 1879; application filed  
February 25, 1879.

*To all whom it may concern:*

Be it known that I, FRED W. RICHARDSON, of Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Safety-Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a sectional elevation of my improved safety-valve. Fig. 2 is a front elevation, and Fig. 3 a top view, thereof.

Like letters in all the figures indicate corresponding parts.

My invention has special relation to that class of devices which are now ordinarily denominated "spring-loaded reactionary safety-valves," though for all purposes of the invention the principles thereof may be obviously applied to other classes of safety-valves, whether reactionary, spring-loaded, or otherwise.

The purposes and objects of my improvements are, primarily, to provide an increased area for the escape of the steam, whereby the objectionable noise attending such escape is obviated; and to this end the invention consists in certain novel and useful combinations or arrangements of parts, all of which will be hereinafter first fully described, and then pointed out in the claims.

To illustrate the principles of my invention I have chosen one form of the Richardson valve-seat, to which I have applied my improvements.

The valve is shown at A as resting upon its seat B. Around and above the seat of the valve I erect a cylinder, C, which is perforated, so as to permit the free escape of steam, and held in proper place by any suitable means—such, for instance, as a nut or sleeve upon each of the uprights D D. Within this exterior cylinder, C, is a similarly-perforated interior cylinder, E, nicely fitted, so that it may move up and down freely, and having its perforations arranged relatively to those in cylinder C, so that when the valve is seated the perforations in the walls of one cylinder will register with the imperforate portions of the other.

The cylinder E is connected with the valve by means of an interior wall, F, which rests upon a collar, G, attached to or made a part of the spindle H, the latter bearing upon the valve or a portion thereof, and movable therewith. The wall F is, of course, made imperforate.

The loading-spring I bears upon the inner flange of wall F, and its upper end abuts against the cross-bar, the latter being held immovable upon the uprights D D.

The operation of the device thus constructed and arranged is substantially as follows: When the valve is unseated by reason of an excess of pressure within the boiler, the inner wall, F, together with its attached perforated cylinder E, is elevated sufficiently to bring the perforations in cylinder E opposite those in cylinder C, and the result is a very large area for the outlet steam-ports—equal, in fact, to the combined area of all the perforations in the exterior or interior cylinders. This area being very great, the steam can freely escape into the atmosphere, in consequence of which the disadvantageous and disagreeable noise is obviated in a very great degree, depending, of course, upon the area of the before-mentioned perforations. All this actual practice has completely demonstrated.

The perforations in the two cylinders may be of any desired form; but it being desirable to afford as extended an outlet as possible, and one which is as little interrupted as possible, I prefer to cut a continuous spiral slit from top to bottom in the two cylinders. For this purpose the cylinder C is provided with a number of exterior flanges or ribs, c, serving to stiffen the uncut portions and hold them in proper place, and cylinder E is provided with similar flanges or ribs e upon its inner surface. The cuts in cylinder E are made from its exterior toward its interior surface, and those in C from its interior toward its exterior surface, so that the two cylinders will fit properly, the one within the other. The cuts are easily made by use of the ordinary lathe, as any mechanic will readily understand. By use of this form of cut, after the valve has been properly loaded, it will be a very easy matter to properly adjust the exterior cylinder by sim-

ply revolving it upon its base until its imperforate portions close the perforations in the other cylinder, after which it should be locked or fastened in proper place. As before intimated, this locking or fastening of the outer cylinder, and holding it down upon its base, may be accomplished by the use of any desirable means. The particular means illustrated in the drawings is found very simple and convenient as well as thoroughly efficient.

The ring M is provided with a pair of perforated lugs, *m*, which fit upon the uprights D D. The interior of this ring is about equal in diameter to the outer surface of the exterior cylinder; and the vertical ribs *c* are cut away at top sufficiently to afford a seat for the ring, which is clamped down upon the ends of the ribs by the nuts N N.

To prevent the valve from being forced upwardly too far, or so far as to carry the uncut portions of the interior cylinder beyond their proper location to open the escape-ports, I place a set-screw, O, in an arbor, O', above the main cross-bar, and in such location that it may be brought in line with the valve-spindle. By properly adjusting this screw, it will be readily seen that the play of the valve can be regulated at pleasure; but the method of regulating the play of the valve is no essential part of the present invention, since, as will readily appear, a great variety of means may be employed.

The inner cylinder may be made as a part of the seat; and the invention is of such a character that it may be easily applied to valves already in use, or such change in the form of its parts be made as will better adapt it for original construction with the valve and its necessary attachments.

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

1. The two perforated cylinders, one within the other, combined with and adapted to operate with the safety-valve, substantially in the manner and for the purposes set forth.

2. The two cylinders having spiral cuts, combined with the safety-valve, substantially in the manner and for the purposes set forth.

3. The combination of the two cylinders, one within the other, the outer cylinder being provided with upright exterior ribs, and the interior cylinder having similar interior ribs, the two being adapted to operate in connection with a safety-valve, substantially in the manner shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

F. W. RICHARDSON. [L. s.]

Witnesses:

WORTH OSGOOD,  
CHAS. R. SEARLE.