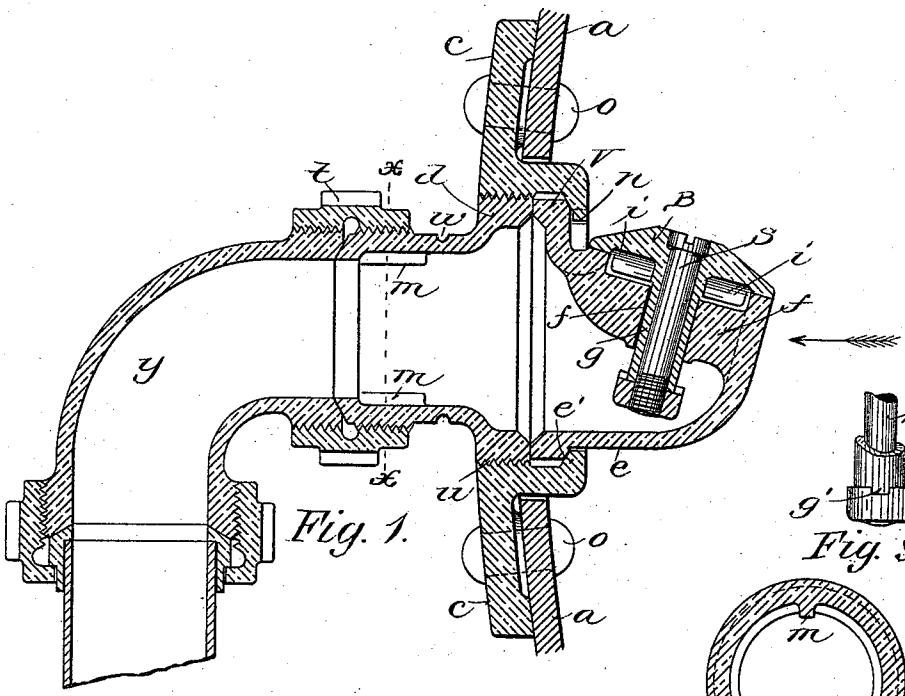
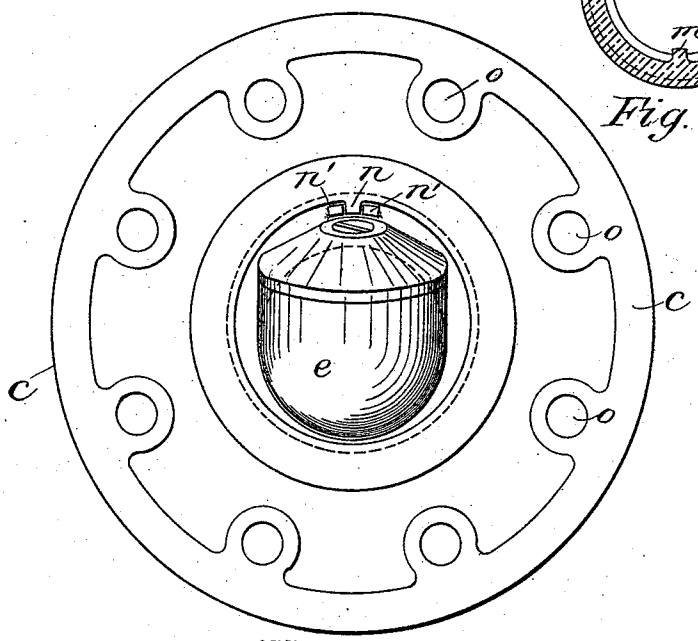
(No Model.) 2 Sheets—Sheet 1.

J. M. FOSTER.

SAFETY CHECK VALVE.

No. 525,196. Patented Aug. 28, 1894.





WITNESSES:

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Joseph Doyle.

INVENTOR

John M. Foster.

BY Wm. E. Doyle

ATTORNEY

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

(No Model.) 2 Sheets—Sheet 2.

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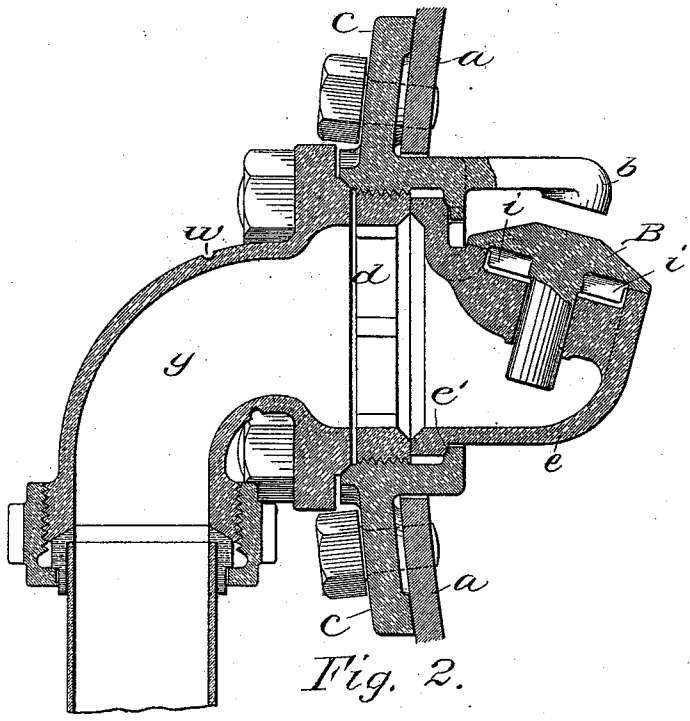


Fig. 2.

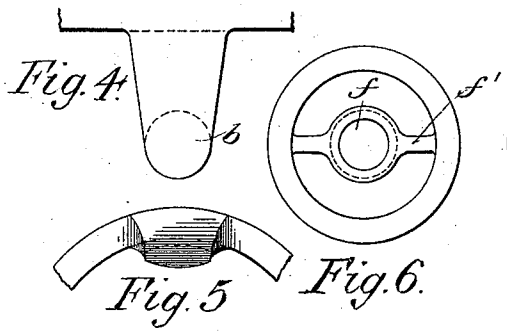


Fig. 4.

Fig. 5

Fig. 6.

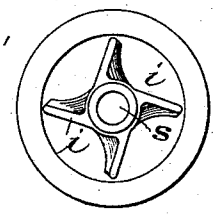


Fig. 7.

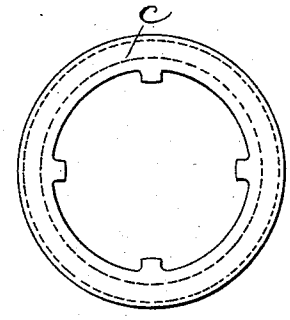


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHN M. FOSTER, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE FOSTER ENGINEERING COMPANY, OF SAME PLACE.

SAFETY CHECK-VALVE.

SPECIFICATION forming part of Letters Patent No. 525,196, dated August 28, 1894.

Application filed September 30, 1893. Serial No. 486,871. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. FOSTER, of Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Safety Check-Valves, of which the following is a specification.

This invention relates to check-valves for steam-boilers, its principal object being to provide a removable safety check-valve with the seat and valve proper located on the inner side of the boiler with an auxiliary seated flange-portion into which the valve proper is adjusted and seated by means of a retaining ring or a pipe connection which is threaded into the flange that holds the valve in place, thus facilitating the removal of the valve for regrinding or other purposes without disturbing the flange portion.

Another feature is to provide the valve proper with inwardly projecting wings which shall cause the valve to rotate under operation and thereby become self grinding, also to provide the same with a lock nutted check-bolt, as will be hereinafter explained.

In the accompanying drawings, which form a part of this specification, my invention is fully illustrated, with similar letters of reference to indicate corresponding parts throughout the same, as follows, reference being had to Sheets 1 and 2, which are provided to illustrate different methods of construction producing like results.

Figure 1, Sheet 1, represents a vertical longitudinal section, in which the pieces *a*, *a*, represent the boiler shell, and *c*, *c*, the auxiliary seated flange-portion which receives the body of the valve *e* and retains the same in position by means of the auxiliary seat *e'*, and the retaining-ring portion *d* of the connection pipe, illustrated as screwed within the flange *c*, *c*, the latter being riveted to the boiler shell by means of the rivets *o*, *o*, &c. The same figure also illustrates the lock-nutted valve bolt *s*, also shown partly in perspective in Fig. 9.

Fig. 3, Sheet 1, illustrates a face view of the body of the valve, looking in the direction of the arrow, assuming that the boiler plates *a*, *a*, are not in position, thus exposing to view the rivet holes *o*, *o*, in the flange *c*. Fig. 10 on the same sheet representing a transverse vertical view on the line *x*, *x*, Fig. 1, to show the inwardly projecting ribs *m*, *m*, by means of which the retaining ring portion *d* is screwed within the flange *c*, *c*.

Fig. 2, Sheet 2, represents a longitudinal vertical section, in which *a*, *a*, represent the boiler shell, and *c*, *c*, the auxiliary seated flange portion which receives and holds the valve body the same as illustrated in Fig. 1, the retaining ring *d* as illustrated in Fig. 2, however, being separate and independent of the pipe connection, so that should the same be broken or disconnected where it joins the flange portion *c*, *c*, the retaining ring *d* would hold the valve intact.

Figs. 4, 5, 6, 7, 8, 9, and 10 represent details of construction, which will be hereinafter referred to and explained.

I am aware that inside check valves for steam boilers have been heretofore designed and patented with the view of guarding against the escape of steam in case of accident to the pipe connections, but such valves are difficult to remove to repair or grind, and cause considerable loss of time and delay, while with my retaining ring principle of construction I create facilities for renewing the valve which makes it far more serviceable and valuable, from the fact that after the connecting elbow, *y*, is removed it is only necessary to unscrew the retaining ring, *d*, and the valve can be lifted out, while in all other valves numerous bolts have to be unscrewed, which in many cases have become so set in the foundation piece that the heads are twisted off in attempting to unscrew them, causing no end of trouble and delay. It also enables me to make a much more serviceable valve at a greatly reduced cost.

In order to describe the construction of my valve more accurately, I would state that the flange-piece, *c*, *c*, Fig. 1, is of circular form, as illustrated in Fig. 3, and provided with the holes *o*, *o*, by means of which it is secured to the boiler; its central portion projects inwardly and is provided with a beveled seat, as *e'*, it is also provided with a thread on its inner diameter, as shown at *u*. The body portion of the valve proper is made of a size which will permit it to pass through the opening in the center of the flange piece *c* suffi-

cient for its beveled flanged portion *v* to engage with the seat *e'* of the flange piece *c*, thus forming the auxiliary seat above referred to.

The retaining ring piece *d* is provided with a short extension which enables the elbow, *y*, to be joined thereto by means of the coupling ring, *t*, in the ordinary way. Projecting inwardly at the outer end of the retaining ring piece, *d*, Fig. 1, are the ribs, *m m*, with which a tool can be engaged to screw the retaining ring portion within the flange piece and thereby seat and secure the valve proper in place. On the upper side of the flange piece, projecting downwardly, as shown at *n*, Figs. 1 and 3, is a small clip, which rests between two corresponding clips, *n'*, Fig. 3, and which is intended to prevent the valve body from turning around while the retaining ring is being screwed in place.

The valve, "B," Fig. 1, is provided with a sleeve portion *g*, which passes down through the opening *f* in the guide piece *f'*, Figs. 1 and 6. The lower end of the sleeve portion *g* is formed with the small projecting nib as *g'*, which engages with a slot in the upper side of the nut *h*, and prevents the same from turning. The bolt *s* is passed downward through the sleeve *g* and is screwed within the nut *h*, which forms a stop for the rise of the valve. The head of the bolt *s* is corked or center punched between its head and upper side of the valve seat to prevent the bolt from turning within the sleeve after it is adjusted.

As shown at *i*, *i*, Figs. 1 and 7, the lower side of the valve is provided with downwardly projecting wings, which are formed at an angle to a correct radial line sufficient to cause the valve to rotate when the water or steam is being forced through to the boiler, the action of which is to cause the valve to become self grinding and to dislodge any scale or sediment which might otherwise collect on the valve seat.

The different construction shown in Fig. 2 is very similar, except that the flange piece *c*, *c*, which forms the auxiliary seat *e'* is provided with a projecting stop as *b*, and the central portion of the valve "B" is made solid, without stop or nut on its lower side, depending upon the stop *b* to regulate the movement of the valve. And also except that the retaining-ring *d* is made separate and independent of any outward projection, and the elbow *y* is provided with a flange by which it is screwed to the original flange piece *c*, *c*, thus leaving the retaining ring *d* free from strain except that which is necessary to hold the valve body in position.

As shown at *w*, Figs. 1 and 2, I provide a V shaped groove on the outside of, and which circles the projecting portion of the retaining ring *d*, and which reduces the strength of the metal at that point, thus forming a positive breaking point which leaves the valve intact in case of accident to the feed pipe.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is, to wit:

1. A removable inside boiler check valve, and in combination therewith a suitable flanged supporting piece and a retaining ring adapted to be screwed therein as described and set forth.

2. The flange piece *c*, provided with the auxiliary seat *e'*, and clip *n*, in combination with a valve the removable valve body, as *e*, provided with the flange portion, *v*, and corresponding clips *n'*, *n'*, and suitable retaining ring, as *d*, as and for the purpose specified.

3. A check valve provided with a sleeve as *g*, in combination with the bolt *s*, and slotted nut *h*, and projections *g'* for engaging the slots in the nut arranged and constructed substantially as herein specified.

4. The combination of the auxiliary seated flange piece *c*, valve body as *e*, sleeved valve piece "B," provided with the wings *i*, *i*, a valve seat in which the said valve reciprocates bolt *s*, and nut *h*, all constructed and arranged and held in position by the retaining ring piece *d*, as illustrated and described.

In testimony that I claim the foregoing improvements in safety check-valves, as above described, I have hereunto set my hand this 15th day of September, 1893.

JOHN M. FOSTER.

Witnesses:
I. S. McGIEHAN,
W. H. SPENCER.