April 14, 1925. 1,533,088

E. BECKER

PROTECTIVE CAGE FOR BLOW-OFF COCKS

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Fig. 1

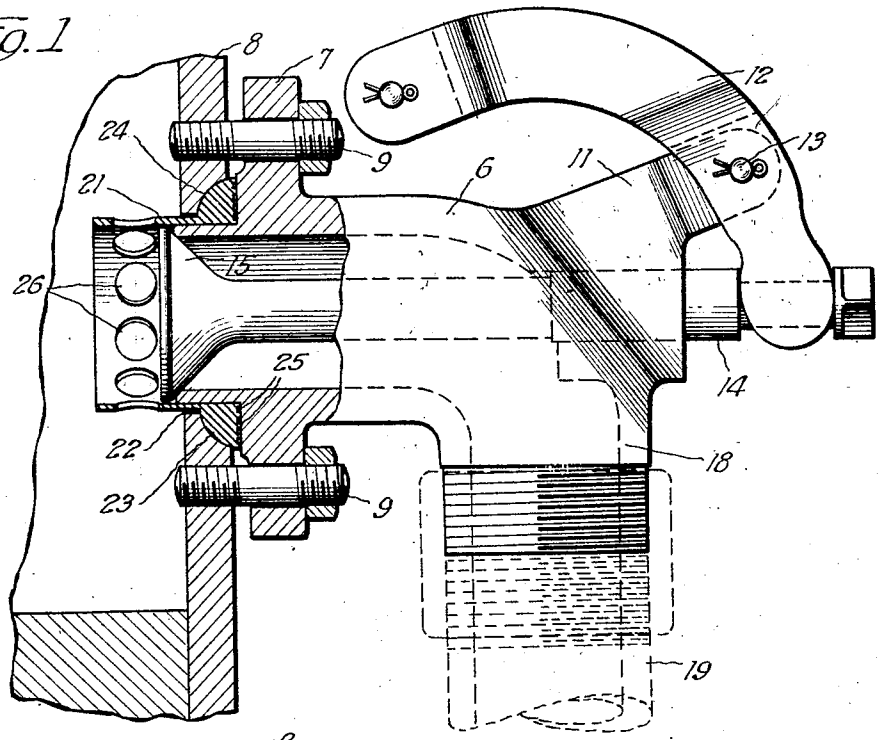


Fig. 2

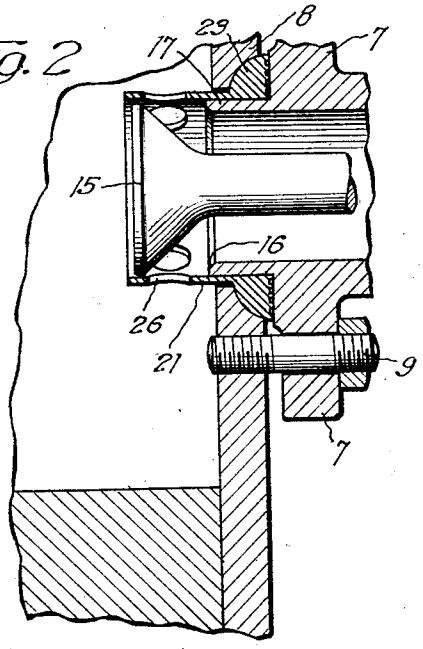
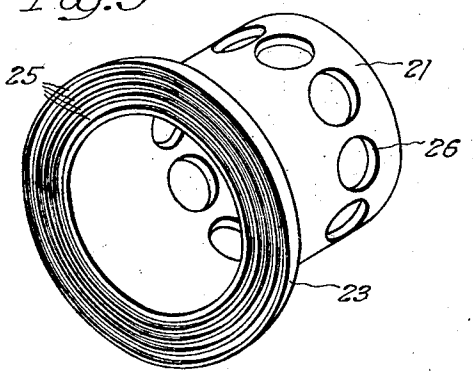


Fig. 3



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Fig. 4

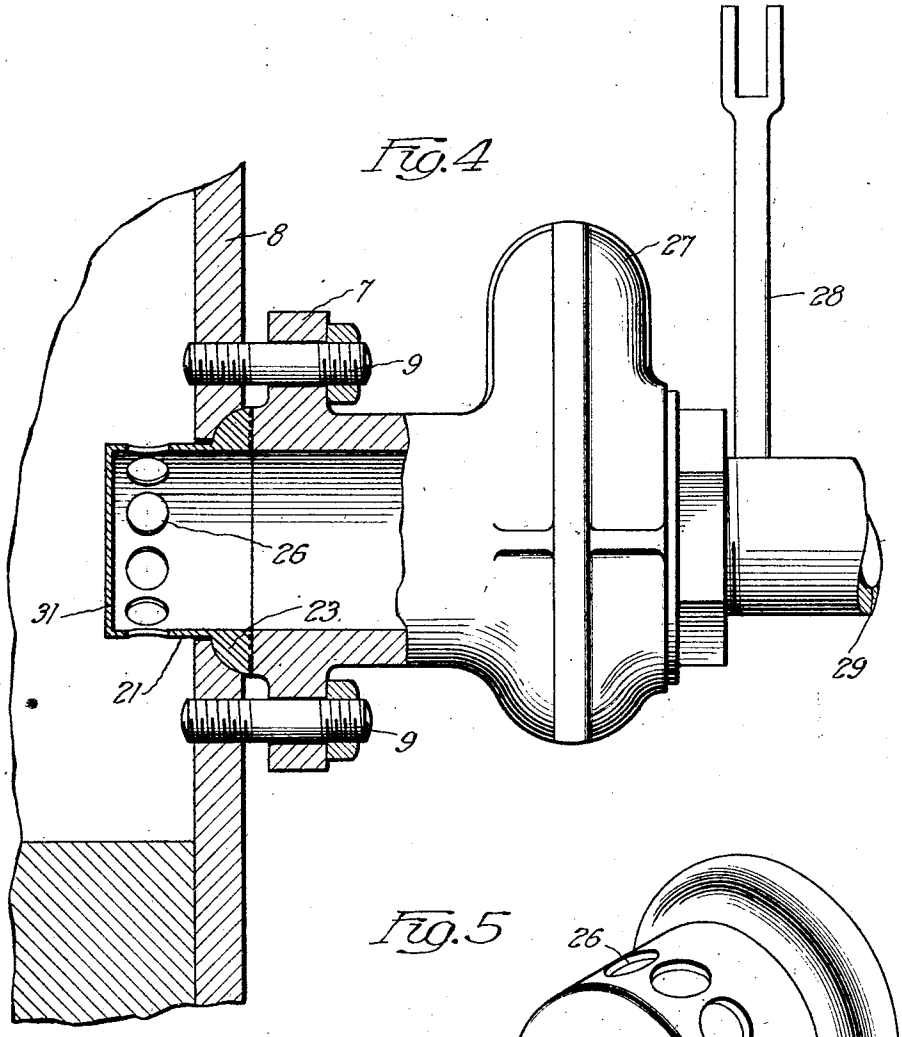
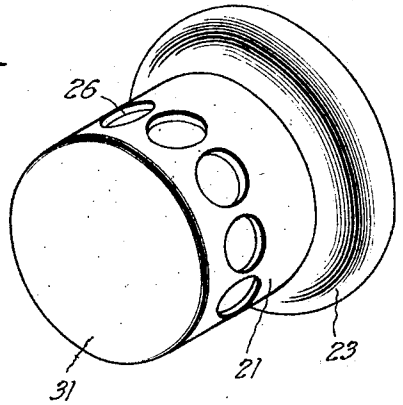


Fig. 5



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Patented Apr. 14, 1925. 1,533,088

UNITED STATES PATENT OFFICE.

ERNEST BECKER, OF GREEN BAY, WISCONSIN, ASSIGNOR OF ONE-HALF TO LYNDON F. WILSON, OF CHICAGO, ILLINOIS.

PROTECTIVE CAGE FOR BLOW-OFF COCKS.

Application filed July 9, 1923. Serial No. 650,241.

To all whom it may concern:

Be it known that I, ERNEST BECKER, a citizen of the United States, residing at Green Bay, in the county of Brown and State of Wisconsin, have invented certain new and useful Improvements in Protective Cages for Blow-Off Cocks, of which the following is a specification.

This invention pertains to blow-off cocks for steam boilers generally, and is particularly useful in connection with locomotive boilers.

It is well known to those familiar with the care and operation of boilers that in addition to the usual sludge in the form of mud and dirt, which collects in the water legs of a boiler, more or less scale, particles of iron and stay bolts, and the like, collect in these legs, with the result that when the boiler is blown off through the blow-off cock, such particles not infrequently become lodged on the valve seat so as to preclude the complete closing of the valve. Obviously, the inability to close the blow-off cock is a matter of grave danger in high pressure boilers of any kind, and particularly in locomotive boilers.

One of the primary purposes of my present invention is to provide a protective cage which will serve to prevent access to the valve seat of scale and iron pieces of sufficient size to interfere with the closing of the valve; these fragments on the contrary being retained in the boiler, from which they are removed periodically when the boiler is taken out of service and washed out.

Another purpose of this invention is to provide a cage which is capable of use in connection with various types of blow-off cocks now in common use, and which can be installed without altering the construction of the cocks or their attaching means.

Still another object is to provide a cage of non-corrosive metal, which will not deteriorate in use, nor become the cause of leakage between the boiler shell and the blow-off cock.

Other objects and advantages of this invention should be readily appreciated as the same becomes better understood by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:

Fig. 1 is a partial elevation and partial sectional view showing a blow-off cock equipped with my invention;

Fig. 2 is a similar fragmentary view showing the blow-off valve in open position;

Fig. 3 is a perspective view of one form of my improved cage;

Fig. 4 is a view similar to Fig. 1, illustrating a modified form of my invention; and

Fig. 5 is a perspective view of the cage shown in Fig. 4.

Referring to the drawings more in detail, reference character 6 indicates generally the shell or casing of a blow-off cock which is provided adjacent its inner end with a circumferential radial flange 7, by which the cock is attached to the shell 8 of a boiler through a plurality of studs or stay bolts 9. The casing 6 is in this instance provided with an ear 11, upon which an operating lever 12 is fulcrumed at 13, one end of this lever being operatively connected with the outer end of the valve stem 14, which projects outwardly beyond the casing and is provided at its inner end with a valve 15 adapted to seat against a tapered seat 16 formed at the inner end of a tubular extension 17 projecting inwardly from the flange 7, preferably through the wall 8 of the boiler. Between its ends the casing 6 is provided with a downwardly directed discharge spout 18, which may be lengthened to any desired extent by the connection thereto of a pipe 19.

The parts thus far described are of well known construction, and in operation the valve 15 is normally seated as shown in Fig. 1, but when blowing off of the boiler is desired, the operating lever 12 is manipulated to force the valve inwardly away from its seat against the boiler pressure, so as to permit the sludge and other undesirable foreign matter to be discharged from the boiler.

For the purpose of preventing scale particles, pieces of iron, and the like, from lodging on the valve seat and preventing the closing of the valve, my invention con-

templates the provision of a protective cage, the form of which illustrated in Figs. 1 to 3, inclusive, comprises a cylindrical body 21 adapted to somewhat snugly fit the opening 22 in the boiler shell 8, and a circumferential flange 23 formed at the outer end of this body and adapted to be disposed outside the boiler shell. The face of this flange, opposed to the shell 8, is preferably convex in shape, and the outer end of the opening 22, in which the cage is disposed, is preferably counter-sunk, as indicated at 24, to insure a tight, leak proof fit between the flange and the shell. The outer face of the flange 23 is disposed perpendicular to the longitudinal axis of the cage and fits snugly against the opposed inner face of the cock flange 7. In order to insure a snug fit, irrespective of slight irregularities in the face of the flange 7, the outer face of flange 23 is preferably provided with a series of annular grooves 25, which enable this face to conform, under pressure, to the irregularities mentioned, thus insuring, without the employment of packing, a tight, leak proof joint between the cock and the cage. The flange 23 may, if preferred, be somewhat thinner than shown, and may be backed up by a convex ring slipped over the body of the cage and adapted to be clamped together with the flange, between the boiler and the cock flange.

The inner end of the cage shown in Figs. 1 to 3, inclusive, is open, and its circumferential walls are provided with a series of apertures 26, through which the water, sludge and the like, discharged from the boiler, must pass in order to be blown off. The apertures may be of any desired size, but preferably are sufficiently small to prevent scale and iron particles of any appreciable dimensions from passing therethrough; consequently they cannot become lodged between the valve and its seat so as to prevent the valve from closing. When the valve 15 is closed, the parts assume the position shown in Fig. 1, and when it is opened for blow-off purposes, it moves inwardly beyond the apertures 26, thus affording communication through the apertures between the interior of the boiler and the blow-off cock casing. Any sludge or sediment which may have collected in the cage while the valve was in closed position, is pushed inwardly through the open end of the cage back into the boiler upon opening movement of the valve; and, furthermore, by reason of this open end of the casing, the inner face of the valve is at all times exposed to boiler pressure, which facilitates the closing of the valve.

The cage is made of non-corrodible metal, such, for instance, as brass, phosphor bronze, copper, or other suitable material, which will not corrode or deteriorate under the action of the boiler water, and which is sufficiently malleable to conform to the opposed faces of the cock flange and the boiler shall when the cage flange 23 is compressed and clamped between the cock flange and the shell as the bolts 9 are tightened up.

In Figs. 4 and 5 another form of the invention is illustrated, which is particularly applicable to another well known form of blow-off cock, known as the gate valve type. The details of this valve are not shown, and it is believed to be sufficient to state that within the enlarged portion 27 of the valve casing there is disposed a gate valve adapted to be opened and closed by actuation of the operating lever 28. The blown off products are discharged with this type of valve horizontally through the delivery pipe 29.

This type of valve also is equipped with the attaching flange 7, and the cage in this instance comprises the cylindrical body 21 and the flange 23 adapted to be clamped between the flange 7 and the boiler shell 8. In this instance, however, the inner end of the cage is closed by a wall 31, which may if desired be provided with a series of perforations through which the blow-off products may enter the cage from the boiler. Preferably, however, the wall is imperforate, and water and sludge being blown off must enter the cage radially through the perforations 26. The egress from the boiler is therefore in proximity to and along the line of the outer wall 8 of the boiler, and consequently produces minimum agitation in the boiler leg. Furthermore, when the boiler is refilled through the blow-off cock, the refill water is delivered radially from the cage in proximity to the outer shell, and is prevented from striking directly against the inner hot shell of the boiler leg so as to cause injury thereto. The same advantages respecting egress and ingress through the cage are also present in the form of the invention shown in Figs. 1 to 3, wherein the outer end of the shell is substantially closed by the valve disk when in open position.

It will be apparent from the foregoing that I have provided a protective cage for blow-off cocks, which prevents solid pieces and particles from passing from the boiler into or partially into the blow-off cock, where they would interfere with the closing movements of the valve, and cause the same to stick in open or partially open position. The cage, being clamped between the cock casing and the boiler shell, is capable of being readily installed, either in conjunction with new blow-off cocks, or may be applied to old cocks already in use. The cage is non-corrosive, and is sufficiently malleable to insure a tight, leak proof fit between the cock and the boiler shell, and directs the water flowing therethrough radially from and into the boiler.

The size, shape, proportion and structural details of the invention may obviously be varied within considerable limits without departing from the essence of the invention, as defined in the following claims.

I claim:

1. The combination with a boiler shell, of a blow-off cock provided adjacent its inner end with an attaching flange, a cylindrical perforated cage provided with a flange adapted to be disposed between said cock flange and said boiler shell, and means for drawing said cock flange toward said shell to clamp said cage flange in position therebetween, the cylindrical body of said cage projecting through the shell into the interior of the boiler.

2. The combination with a boiler shell, of a blow-off cock provided at its inner end with a circumferential attaching flange, means for attaching said flange to the boiler shell, and a cage comprising a portion adapted to be clamped between said cock flange and said shell and a cylindrical perforated portion projecting through said shell into the interior of the boiler.

3. The combination with a boiler shell, of a blow-off cock provided with a circumferential attaching flange, means for attaching said flange to the boiler shell, and a cage comprising a cylindrical perforated portion and a flange portion interposed between said shell and said cock, said flange portion being malleable to conform under pressure to the opposed engaging surfaces of said shell and cock.

4. The combination with a boiler provided with an opening, of a cage projecting through said opening into the boiler, said cage being provided within the boiler with radial perforations and outside the boiler with a circumferential flange, and a blow-off cock attached to the boiler shell and between which and said shell, said cage flange is clamped.

5. A protective cage for blow-off cocks, comprising a cylindrical portion perforated near one end and provided at its other end with a malleable circumferential flange, the outer face of said flange being provided with annular grooves.

6. A protective cage for blow-off cocks, comprising a cylindrical perforated body provided at one end with a circumferential flange presenting at one side a flat grooved face and at the other side a convex contour.

ERNEST BECKER.