

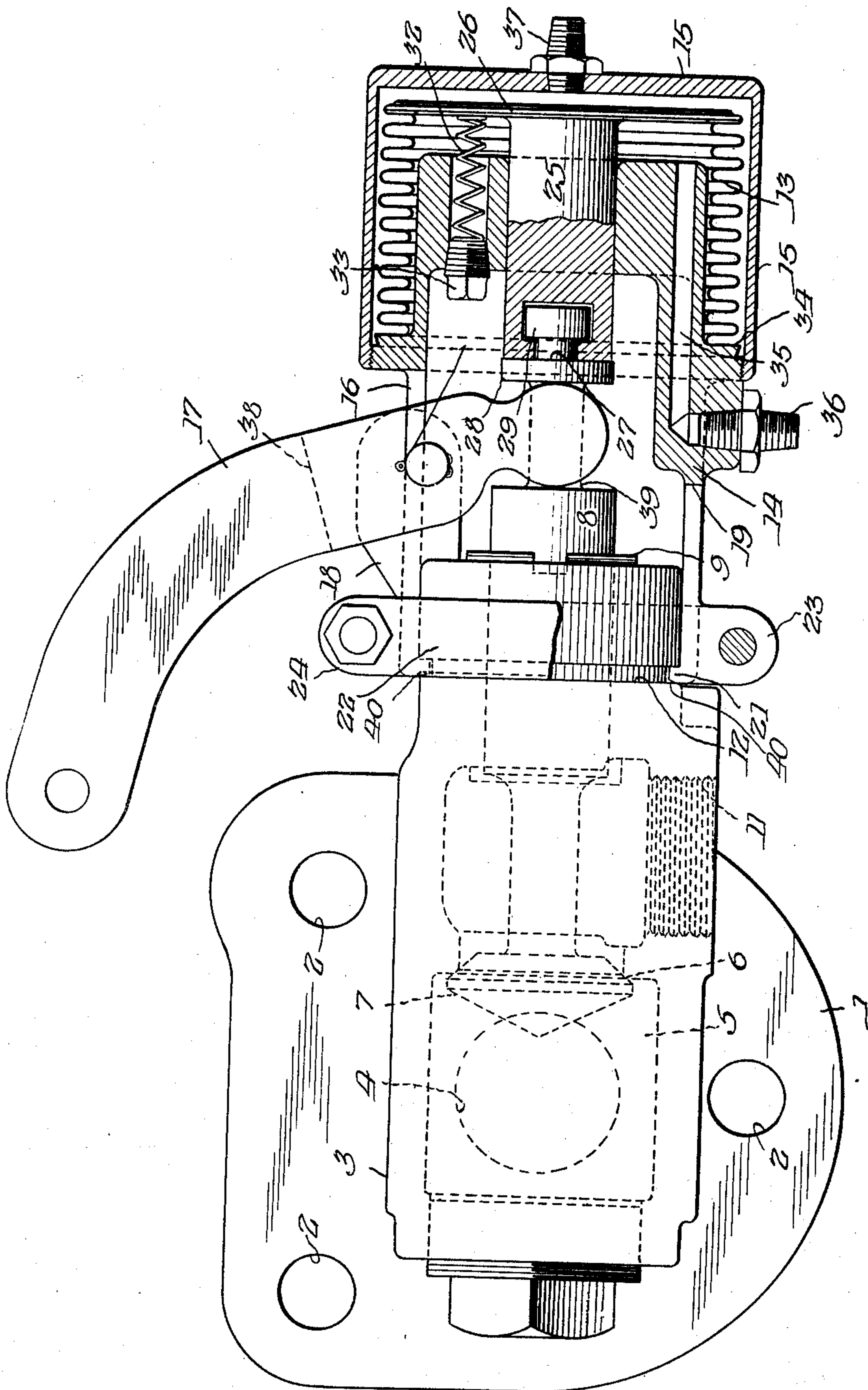
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V E. McCOY

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BLOW-OFF COCK

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Witness:

R B Davison.

Inventor:
V E. McCoy

By: Wilson, Dowell, McCanna & Lorch
Attys.

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BLOW-OFF COCK

Verl E. McCoy, Chicago, Ill., assignor to Wilson
Engineering Corporation, Chicago, Ill., a cor-
poration of Delaware

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This invention pertains to pneumatically operated valves and particularly to locomotive blow-off valves of that character.

The majority of locomotive blow-off valves heretofore have been operated mechanically by means of levers. Here and there some efforts have been made to operate them by pistons propelled by steam or compressed air. But in these latter instances many operating difficulties have been encountered, such as the sticking of the pistons and the freezing of condensates in the operating mechanisms. Hence the adoption of pressure operating mechanisms for the valves has been retarded and much discouraged by such operating difficulties. Nevertheless, it is still desirable in many cases to utilize pressure operating mechanisms for these blow-off cocks and this invention is intended to provide a pressure operated blow-off cock which will be free from the above mentioned difficulties and which will possess various other advantages.

One of the objects of this invention is to provide a pressure operated blow-off cock constructed to be free of the tendency to stick or freeze even under adverse weather conditions.

Another object of this invention is to provide an attachment for a blow-off cock which may conveniently and inexpensively be attached to convert a mechanically operated blow-off cock into a pneumatically operated blow-off cock.

Another object of this invention is to provide an attachment for a blow-off cock which will convert it for pneumatic operation yet not require the mounting of the attachment on the boiler shell by means of studs or other devices.

Other objects and advantages of the invention inherent to it will become apparent upon a perusal of this specification.

The single figure of the drawing illustrates a preferred embodiment of the invention, being generally a side elevation of the blow-off cock and the pneumatic control attachment, the latter being shown partially in section.

In the drawing there is shown in elevation a blow-off cock consisting of a mounting plate 1 intended to be secured to the side of a locomotive boiler by means of studs passing through the holes 2 so that the interior of the valve casing 3 may communicate by means of the port 4 with whatever sludge collecting pipe or pipes may be used inside of the boiler. At the outlet of the valve chamber 5 is a valve seat 6 and a valve 7, the latter having a stem 8 which slidably fits in the valve casing and protrudes therefrom as shown. Suitable packing about this slidable valve

stem is provided, the specific type of arrangement thereof not being a part of the invention. A packing gland nut 9 however is shown to indicate the position and use of the packing. The discharge port for this valve is shown at 11.

A large number of blow-off cocks of the type shown and just above described are already installed on locomotives now in use in this country. It is accordingly a great advantage to be able to secure the pneumatic operating attachment to such valves without substantial alteration of the valves and their parts. This advantage accrues both as to valves now installed and others which may be manufactured in the future. The valve casing 3 may readily be removed from the boiler in order that a circular groove 12 may be cut thereon as shown, or in the factory this groove may be originally provided. The case for the bellows, the latter being generally indicated as 13, is conveniently made by providing a tubular structure 14 on to which a cap 15 may be threaded into sealing relation therewith. The tubular member 14 is provided with a yoke extension, generally indicated as 16, suitably recessed at the top to pass around the mechanical operating lever 17 and its supporting lug 18 which are ordinarily provided on valves of this character and again recessed at the bottom forwardly of the point 19 to facilitate drainage of rain, condensation and other foreign matter from the structure. This yoke is provided with an inturned flange 21 which seats snugly in the groove 12, the yoke and its flange between the top and bottom edges extending only approximately 180° about the circular extent of the groove. In order that the yoke, which is only a half of a cylinder, may be firmly secured to the valve casing, a clamping half collar 22 provided with a flange corresponding to the flange 21 is mounted as shown and bolts are passed through corresponding lugs 23 of the yoke and 24 of the collar, the lower lug of the collar not being shown in this cut-away view, while the upper lug of the yoke coincides with the lug 24. Thus it will be seen that the half collar 22 is readily removable and the entire yoke attachment may be disengaged from the groove 12.

The other end of the tubular attachment piece 14 is provided with a central bore through which extends a bellows post 25 secured to the head 26 of the bellows. A groove 27 is provided near the extremity of the valve stem 8 between flanges 28 and 29. A typical bayonet slot is provided in the end of the bellows post 25 which permits the latter to be readily slipped into engagement

with the grooved end of the valve stem. It should be understood that the bayonet slot will open toward the position from which the valve is viewed in this drawing so that the flange of the yoke and the bayonet slot may be brought into register with their associated parts in the same movement of the attachment toward the blow-off cock. Once the clamping half collar 22 is secured in place the bayonet slot cannot become disengaged from the valve stem extremity.

If desired, in order to make certain that the bellows may not contract to open the blow-off cock when there is little internal boiler pressure, a plurality of compression springs 32, one of which only is shown, may be installed at uniform intervals around the bellows post to hold the bellows distended and the blow-off valve firmly seated. Plugs 33 or other suitable means may be employed as a back stop for these compression springs.

The bellows is fixed in sealed relationship to the attachment member 14 along the shoulder 34.

A channel 35 will then be provided in the attachment member 14 communicating with the interior of the bellows and through the nipple 36 either to the atmosphere or to a source of fluid pressure supply such as high pressure steam or compressed air. Another nipple 37 provides communication to the interior of the bellows cap 15 surrounding the bellows and affords a ready means for attachment of a pipe leading to a pressure fluid supply, such as high pressure steam or compressed air.

It will be observed that since the yoke passes around the mechanical operating lever 17, there will be no interference with the normal mechanical operation of this valve. It should be understood that, in accordance with the usual practice, this lever 17 is bifurcated at the point 38 to straddle the lug 18 and to straddle the reduced portion 39 of the valve stem.

The device is operated as follows. Positive pressure will normally be supplied through a pipe connected to the nipple 37 to compress the bellows and push the blow-off valve to the left, off its seat. The area of the head 26 of the bellows is amply larger than the area of the blow-off valve itself to make it a simple matter to overcome the internal boiler pressure either with live steam pressure or with compressed air. The blow-off products may then escape through the passage 11 and be disposed of in any desired manner. When it is desired to close the valve either the pressure outside of the bellows may be released and the internal boiler pressure relied upon to bring the valve back to its seat, or pressure may be supplied through the nipple 36 to the interior of the bellows to distend it and thus assure seating of the blow-off valve.

It should be understood that either steam or air can be supplied to the interior or exterior or both interior and exterior of the bellows, also that some other fluid, such as oil or other liquids, may be utilized for transmitting the desired operating pressures to the bellows.

Because of the simple yoke attaching means and the bayonet slot provided in the bellows post, these pneumatic attachments may be readily engaged or disengaged from blow-off cocks for installation, repair or replacement. There is no need for mounting the attachment directly on the boiler shell by means of studs or other attaching devices. No harmful strain is exerted

upon the blow-off valve or its mounting plate by the attachment and use of this device. By cutting the groove 12 concentrically with the valve stem 8 and by providing a small wedging plane 40 on the toe of the flange 21, the attaching device may be securely and firmly aligned with the valve stem.

Even though there may be some desirable and necessary friction in the customary packing retained by the packing gland nut 9, this is confined to a small area relatively to the total effective area of the bellows and accordingly that friction should be readily overcome and should easily prevent sticking of the valve. The bellows post 25 need not have a tight fit where it passes through the head of the attaching member 14 as internal pressure within the bellows is only temporarily maintained and a slight leakage around the post will not be harmful. There need, therefore, be no substantial friction caused by movement of the bellows post.

It should be further understood that the drawing discloses only the preferred embodiment of the invention and that other embodiments of the invention may be made and are contemplated which may differ somewhat yet remain within the spirit and scope of the appended claims.

Having shown and described my invention, I claim:

1. In combination with a locomotive blow-off cock provided with a valve casing, a valve and valve stem therefor slidably mounted in the casing and protruding therefrom, a valve operating lever carried by the casing connected to the valve stem outside of the casing, a chamber having a bellows mounted therein, a yoke rigidly connected with said chamber and arranged to partially surround said casing, said yoke being so recessed as to straddle said lever without interference therewith, a clamping collar connectable with said yoke for clamping the same rigidly to the outside surface of said casing, the outer end of said valve stem outside of said lever having two enlarged portions of circular cross section separated by an annular recess, a post connected with said bellows having a bayonet slot for engagement with the outermost of said enlarged portions, and a flange adjacent to the slot for insertion in said recess, the yoke and bayonet slot being arranged so that movement of the post to engage its slot at the end of the valve stem brings the yoke into operative position with said casing for clamping thereon.

2. In combination with a valve having a casing and a valve stem slidably protruding therefrom, the outside surface of said valve casing adjacent said valve stem having a peripheral groove cut therein, a lever pivotally carried by said casing operatively connected with said protruding valve stem, a chamber and a bellows carried therein having a yoke rigidly connected with said chamber, said yoke being shaped to support the bellows outwardly beyond the exposed end of said valve stem, the yoke passing about said lever and engageable with a portion of said groove, a clamping collar also engageable with said groove and with said yoke for clamping the latter rigidly upon said casing, the outer end of said valve stem having an enlarged portion, and a post connected to said bellows having a bayonet slot engageable with the enlarged end of said valve stem by the same movement which will bring said yoke into registration with said groove.

VERL E. MCCOY.