

Aug. 18, 1931.

J. J. CAIN

1,819,672

HIGH PRESSURE GAUGE COCK

Filed Oct. 6, 1927

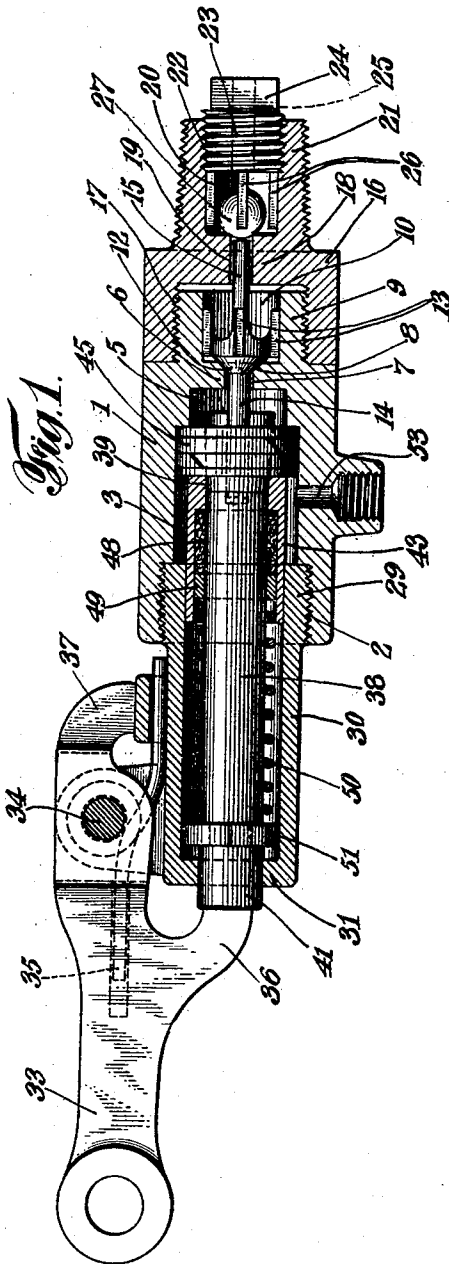
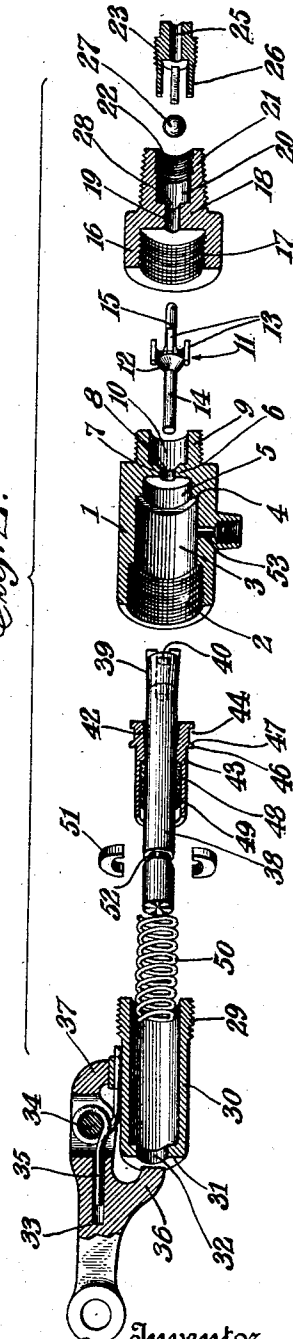


Fig. 2.



John J. Cain
 By his Attorneys
 Prindle, Wright, Neal & Bean

UNITED STATES PATENT OFFICE

JOHN J. CAIN, OF BAYONNE, NEW JERSEY

HIGH PRESSURE GAUGE COCK

Application filed October 6, 1927. Serial No. 224,331.

This invention relates to improvements in gauge cocks and that is devices adapted to be applied to steam boilers whereby the level of the water therein may be positively determined.

The principal object of this invention is the provision of such a device which is positive in action, so constructed as to prevent leakage and for that purpose involving a plurality of valves and seats of different kinds, each of which valves must be moved positively from its seat.

Another object of this invention is the provision of such a device the major portion of which may be readily removed from the boiler, the remaining part including the valve acting as a check valve to prevent the escape of steam and water from the boiler or any leakage.

Farther objects of the invention include improvements in details of construction and arrangement whereby a simple and effective device of this kind is provided, having long life.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, this invention consists in the construction, combination and arrangement of parts hereinafter described and then sought to be defined in the appended claims, reference being had to the accompanying drawings forming a part hereof and which show, merely for the purpose of illustrative disclosure, a preferred embodiment of my invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from my inventive idea.

In the drawings—

Figure 1 is a longitudinal cross section of a device assembled and embodying my invention, the valves all being shown in closed position.

Figure 2 is a view on a reduced scale of the various parts entering into the construction, most of them being shown in longitudinal section, the others being shown in perspective.

Referring now to the drawings, the numeral 1 designates the body of the device.

This body is in the form of a sleeve having the internally screw-threaded portion 2 at one end leading to an enlarged chamber 3, at the end of which is provided the shoulder 4 and beyond that is provided the reduced chamber 5. A partition 6 is provided at the end of this reduced chamber 5 and this partition 6 is bored as at 7 and provided on its outside with the bevelled valve seat 8. This end of the body 1 is provided with the externally screw-threaded stud or projection 9 which is bored to provide a chamber or compartment 10.

This chamber or compartment 10 forms a valve receiving and guiding compartment for the valve member 11, which includes the valve proper 12 having a plurality of guiding and engaging members 13 around it adapted to fit and engage the inner walls of the chamber or compartment 10. This valve member is provided with the plunger or rod 14 extending through the bore 7 and through the chamber or compartment 5 into the chamber or compartment 3. At its other end the valve member is provided with the plunger or rod 15.

A nipple member 16 is internally screw-threaded as at 17 to fit the externally threaded stud or projection 9 of the body member 1. This nipple member is provided with a partition 18 bored as at 19 to receive the rod or plunger 15 of the valve member. This bore 19 communicates with the chamber or compartment 20 formed within the externally screw-threaded stud or projection 21. This externally threaded stud or projection 21 is adapted to be screwed into a boiler or other device and forms the means or method of attachment of the gauge cock in position. Part of the inner surface of the chamber or compartment 20 is screw-threaded as at 22 to receive the ball valve holding member 23, which is in the form of a plug having the squared head 24, a longitudinal bore 25 and ball holding and guiding members 26 to form a basket or cage to hold the ball valve 27 in proper position. The seat for the ball valve 27 is provided at 28 by the end of the bore 19. As stated above, the inner surface of the body member 1 is screw-threaded as at 2. This is for the purpose of receiving the screw-

threaded portion 29 of a bearing sleeve member 30, which is provided with closed end 31 having an aperture or opening 32. On this sleeve member an actuating member 33 is pivotally mounted as at 34 having a spring construction 35 adapted to normally hold the actuating finger 36 in retracted position, stop member 37 engaging part of the sleeve 30 to limit the retracting movement. The actuating finger 36 is adapted to engage the end of the operating plunger construction now to be described.

The operating plunger itself is designated by the reference character 38 and is in the form of an elongated rod substantially cylindrical in shape except for its forward end 39 which is slightly and gradually enlarged by being tapered outwardly, as clearly shown in Figure 2. At its end the plunger member is also bored as at 40 to receive the rod or plunger part 14 of the valve member 11 and the bottom of this bore is adapted to engage the end of this rod to positively move the valve member when the actuating finger 36 engages the end 41 of the plunger member 38, which protrudes through the opening 32 in the sleeve 30. The enlarged end 39 of plunger 38 forms a valve normally seated against the tapered inside surface 42 formed in one end of the sleeve 43. This end of the sleeve 43 is formed with a channel 44 adapted to receive split rings 45 in the form of piston rings, so as to form a fluid tight joint. It is to be noted that the ridge or flange 46 of the channel is formed with its inside face inclined or bevelled as at 47. The plunger member 38 passes through the sleeve 43 and packing material 48 is held in place by means of the washer or collar 49 so as to prevent leakage. A spring member 50 engages the end of the collar or washer 49 and also engages the split collar 51 mounted in the groove 52 near the end of the plunger 38, whereby the plunger is normally subjected to spring pressure holding the tapered head or end 39 within and on its tapered seat 42. When, however, the operating member is moved on its pivot and the actuating finger 36 engages the end 41 of the plunger 38 and the pressure of the spring 50 overcome, the valve part 39 of the plunger will be moved off its seat. At the same time the plunger will move the valve member 11 off its seat and the plunger 15 thereof will move the ball valve member 27 off its seat, so that the steam or water within the boiler will pass through the bore 25, bore 19 and bore 7 into the chamber or compartment 5, and there the pressure against the face of sleeve member 43 will move the same rearwardly against the pressure of the spring 50 until the split rings 45 and the channel construction 44, which actually form a piston, move across the discharge opening 53 which leads into the chamber or compartment 3, whereby either steam or water

will be discharged from the boiler so that the operator will be able to judge of the height of the water within the boiler.

When the operating pressure is released from the operating member 33 the spring 50 will return the parts to their normal position and the valves 12 and 27 will be forced to their seats by the pressure from the boiler.

In the event it is necessary to take the device down for repair or replacement, the body member is detached from the nipple member 16, leaving that in place, and any necessary repairs or replacements are made. When in that condition the ball valve 27 operates as a check valve, being positively held in place by the pressure of the boiler, whereby leakage or escape from the boiler is prevented during the time of repair.

This device is, therefore, one which is positive in operation, which has a plurality of valves and seats whereby leakage and dripping are prevented, in which the parts may be readily and quickly actuated so as to give a visible indication of the height of the water in the boiler, and in which the parts will readily return to their normal closed position when the operating member is released.

What I claim is:—

1. In a device of the character described including, in combination, a body member in the form of a sleeve and having a valve seat, a valve member mounted in said body member and having a part adapted to fit said seat, a nipple member secured to said body member and having a valve and valve seat therein, said first-mentioned valve member having a part adapted to engage said second valve member, a plunger member mounted to move within said body member and adapted to engage said first-mentioned valve member to move it off its seat, a sleeve member positioned in said body member and affording a seat for part of said plunger member and resilient means for normally holding said plunger member on its seat, and an operating member adapted to engage said plunger member to move said plunger member off its seat and to operate said other valves as aforesaid.

2. In a device of the character described including, in combination, a body member in the form of a sleeve and having a valve seat, a valve member mounted in said body member and having a part adapted to fit said seat, a nipple member secured to said body member and having a valve and valve seat therein, said first-mentioned valve member having a part adapted to engage said second valve member, a plunger member mounted to move within said body member and adapted to engage said first-mentioned valve member to move it off its seat, a sleeve member positioned in said body member and affording a seat for part of said plunger member and resilient means for normally holding

said plunger member on its seat, and an operating member adapted to engage said plunger member to move said plunger member off its seat and to operate said other valves as aforesaid, said sleeve member including a piston construction adapted to be moved by boiler pressure when said valves are off their seats so as to uncover a discharge opening from said body member.

3. A device of the character described including, in combination, a body member, a nipple member connected to the body member and adapted to attach said body member to a boiler, a valve positioned in said nipple member, said body member having a discharge orifice, a plurality of valves interposed between said first-mentioned valve and said discharge orifice, means for positively opening certain of said valves and one of said valves being movable under the pressure admitted by said other valves to afford communication with said discharge orifice, whereby a visible indication of the height of the water in the boiler may be obtained through said discharge orifice.

4. A device of the character described including, in combination, a body member, a nipple member connected to the body member and adapted to attach said body member to a boiler, a valve positioned in said nipple member, said body member having a discharge orifice, a plurality of valves interposed between said first-mentioned valve and said discharge orifice, one of said valves being provided with an operating plunger and a bearing sleeve for said plunger mounted in said body member, part of said plunger being adapted to be seated in said sleeve, and an actuating member adapted to engage one end of said plunger to move said plunger off its seat, said plunger engaging one of the other valves to move it off its seat and indirectly moving the first-mentioned valve off its seat, whereby a visible indication of the height of the water in the boiler is made through said discharge orifice.

5. In a device of the character described including, in combination, a body member, means for attaching the body member to a boiler, said means having a check valve construction therein, said body member having a valve and valve seat therein, said valve being provided with means to engage said check valve construction when moved, a plunger construction in said body member adapted to engage said valve when moved, said plunger construction including a plunger proper, a sleeve within which said plunger is slidable and against which part of said plunger fits to form another valve, said plunger being provided with a piston head tightly fitting within said body member, resilient means for normally holding said plunger and said sleeve in tight engagement, and an actuating member for moving

said plunger against the pressure of said resilient means to open all of said valves, said body member having a discharge orifice, and said piston head construction being adapted to move when subjected to boiler pressure to permit the discharge from the discharge orifice when all the valves are open.

6. A device of the character described including, in combination, a body member, a nipple member connected to said body member and forming means for attachment to a boiler, a valve movable in said nipple member, said body member having a discharge orifice and an enlarged chamber or compartment communicating with said discharge orifice, a plunger member extending into said body member, said plunger member being formed in two parts to provide a valve construction, one of said parts being in the form of a piston fitting said enlarged compartment and normally positioned forward of said discharge orifice, another valve construction positioned in said body member between the valve in the nipple member and said plunger member and operatively connected to said plunger member and piston valve in the nipple member, whereby said valves may be opened in unison, and actuating means for moving said plunger member to open all of said valves to admit boiler pressure into said enlarged compartment against said piston to force the piston rearwardly beyond said discharge orifice to permit a discharge therethrough.

7. A device of the character described including, in combination, a body member adapted to be attached to a boiler, said body member being formed with a compartment having a discharge orifice, a plunger construction positioned in said body member, said plunger construction being composed of two parts, one fitting within and seating against the other to form a valve and resilient means for normally holding said valve closed, one of said parts being in the form of a piston tightly fitting in said compartment but movable under pressure to uncover said discharge orifice, and another valve interposed between said plunger construction and the front end of said body member having operative connection with said plunger construction, whereby when said plunger construction is actuated both valves will be opened, and boiler pressure admitted to said compartment against said piston.

8. A device of the character described including, in combination, a body member adapted to be attached to a boiler, said body member being formed with a compartment having a discharge orifice, a plunger construction positioned in said body member, said plunger construction being composed of two parts, one fitting within and seating against the other to form a valve and resilient means for normally holding said valve

closed, one of said parts being in the form of a piston tightly fitting in said compartment but movable under pressure to uncover said discharge orifice, and a plurality of valves interposed between said plunger construction and said boiler, one of said valves having an extension in each direction, one of said extensions being adapted to contact with the other valve and the other of said extensions being adapted to contact with said plunger construction, whereby when said plunger construction is actuated, all of said valves will be opened and boiler pressure admitted to said compartment against said piston.

9. A device of the character described including, in combination, a body member, a nipple member connected to the front end of the body member having a check valve therein, said body member being formed with a compartment and having a valve member in its forward portion controlling communication between said compartment and said nipple member, said valve member having means adapted to contact with said check valve in the nipple, a sleeve member secured to the rear end of said body member, a plunger construction movably mounted in said sleeve member, said plunger construction being formed in two parts, one movable within and seating against the other part so as to form a third valve and also being adapted to engage and move said valve member, the other part of said plunger construction being in the form of a piston tightly fitting the inner surface of said compartment and being subjected to boiler pressure when the plunger member is moved sufficiently to open all the said valves, said compartment having a discharge orifice which is exposed when said piston has moved a certain distance.

10. A device of the character described including, in combination, a body member, a nipple member connected to the front end of the body member having a check valve therein, said body member being formed with a compartment and having a valve member in its forward portion controlling communication between said compartment and said nipple member, said valve member having means adapted to contact with said check valve in the nipple member, a sleeve member secured to the rear end of said body member, a plunger construction movably mounted in said sleeve member, said plunger construction being formed in two parts, one movable within and seating against the other part so as to form a third valve and also being adapted to engage and move said valve member, the other part of said plunger construction being in the form of a piston tightly fitting the inner surface of said compartment and being subjected to boiler pressure when the plunger construction is moved sufficiently to

open all the said valves, said compartment having a discharge orifice which is exposed when said piston has moved a certain distance, and resilient means interposed between the two parts of said plunger construction to normally hold them in closed relation and also to resist the opening movement of said piston.

11. A high pressure gauge cock, including in combination, a body member, means for attaching the same to a boiler so as to afford communication therewith, said body member having a discharge orifice, a plurality of alined disconnected valves interposed between said discharge orifice and said attaching means, and means for opening certain of said valves to admit fluid pressure into said body member to cause the opening of another of said valves so as to uncover said discharge orifice, whereby said fluid is discharged therefrom to give a visible indication of the condition of the boiler contents.

12. A high pressure gauge cock, including in combination, a body member adapted to be attached to and communicate with a boiler, said body member having a discharge orifice, a plurality of alined disconnected positively operated valve controlling communication between said body member and said boiler, and a pressure operated valve located in said body member for controlling the discharge of fluid through said discharge orifice.

13. A high pressure gauge cock, including in combination, a body member adapted to be attached to and communicate with a boiler, said body member having a discharge orifice, a plurality of alined disconnected positively operated valves controlling communication between said body member and said boiler, a pressure operated valve located in said body member for controlling the discharge of fluid through said discharge orifice, and actuating means adapted to open said first-mentioned valves, and said second-mentioned valve being slidably mounted with reference to said actuating means.

14. A high pressure gauge cock, including in combination, a body member adapted to be attached to and having communication with a boiler, said body member being provided with a chamber or compartment and a discharge orifice therefrom, a valve controlling communication between said chamber or compartment and said boiler, an independent piston valve alined with and disposed spaced from the controlling valve positioned in said chamber or compartment and controlling discharge of fluid through said discharge orifice, said valves being alined and disconnected, and means for positively actuating said first-mentioned valve to admit boiler pressure to said chamber or compartment so as to move said piston valve to uncover said discharge orifice, whereby a discharge of fluid through said discharge

orifice will give a visible indication of the boiler contents.

15. A high pressure gauge cock including in combination a body member having a nipple member at one end adapted to be attached to a boiler, a check valve in the nipple member adapted to prevent steam from normally passing to the body member, a plunger in said body member having a flared end and provided with a sleeve provided with a piston and movably mounted on said plunger and means whereby the check valve may be displaced and the piston moved on the plunger so as to allow the discharge of fluid through a discharge opening in the body member to give a visible indication of the condition of the boiler contents.

16. In a high pressure gauge cock, a plunger formed with a flared end, a sleeve formed with a tapered inside surface mounted on said plunger, piston rings on said sleeve, an abutment at the other end and resilient means for normally keeping the sleeve in engagement with said flared end of the plunger.

17. A high pressure gauge cock, for use with boilers or the like, including a main casing, a secondary casing secured to said main casing and having means for connecting same to the boiler, a plurality of alined disconnected valves in the main casing, a ball valve in the secondary casing alined with the first named valves, and means for actuating said first named valves and thereby the ball valve to permit the escape of fluid from the boiler, said main casing being separable from said secondary casing for repairs thereto, and said ball valve being operable in a direction to prevent the escape of fluid when the main casing is removed.

In testimony that I claim the foregoing, I have hereunto set my hand this 4th day of October, 1927.

JOHN J. CAIN.