No. 765,525. PATENTED JULY 19, 1904.

J. R. TYSON.

GAGE COCK VALVE.

APPLICATION FILED DEC. 3, 1903.

NO MODEL.

Fig. 1

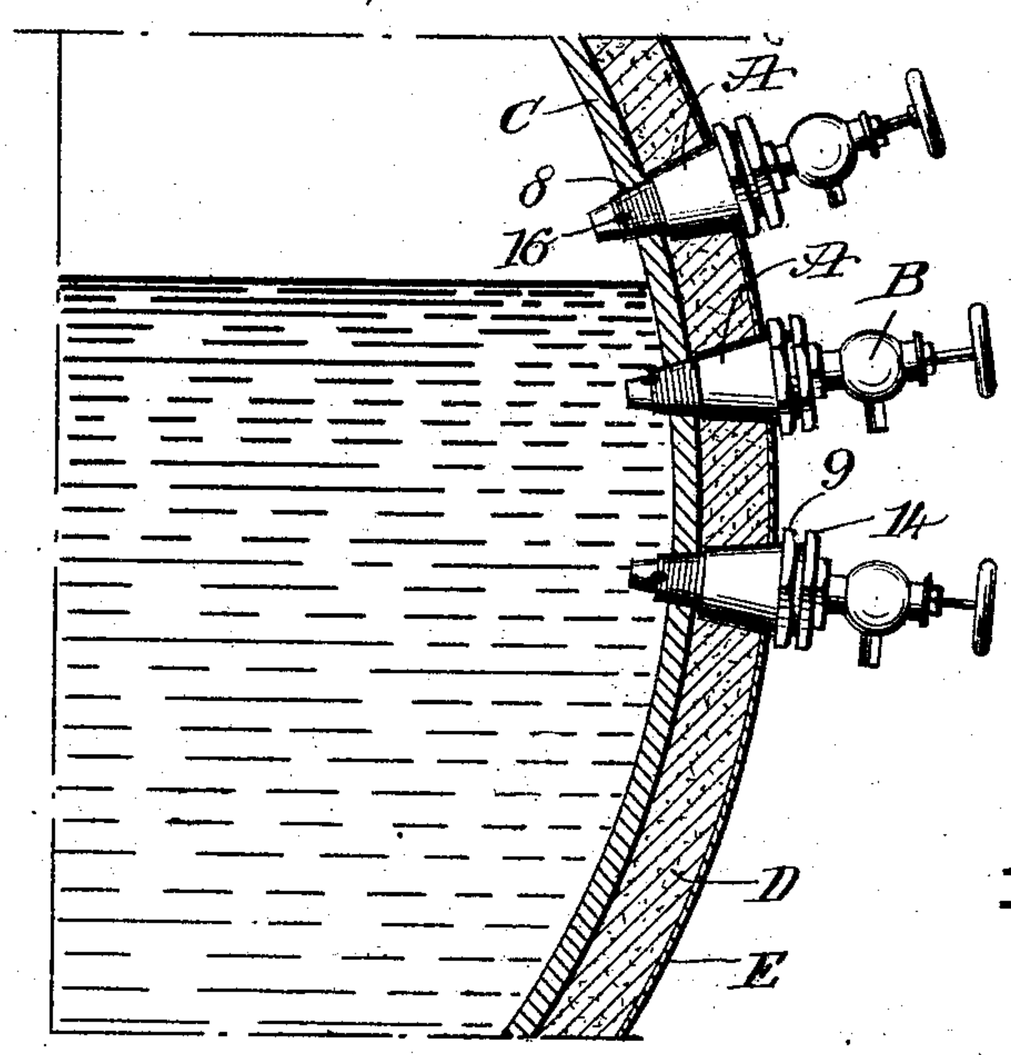


Fig. 4

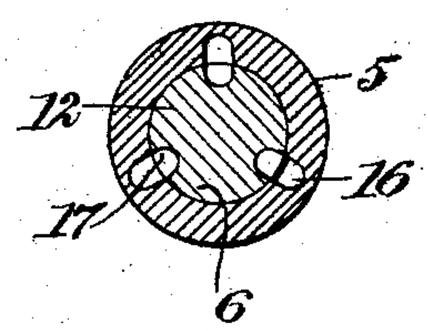


Fig. 5

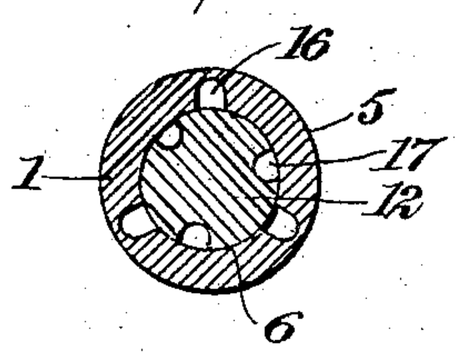


Fig. 2

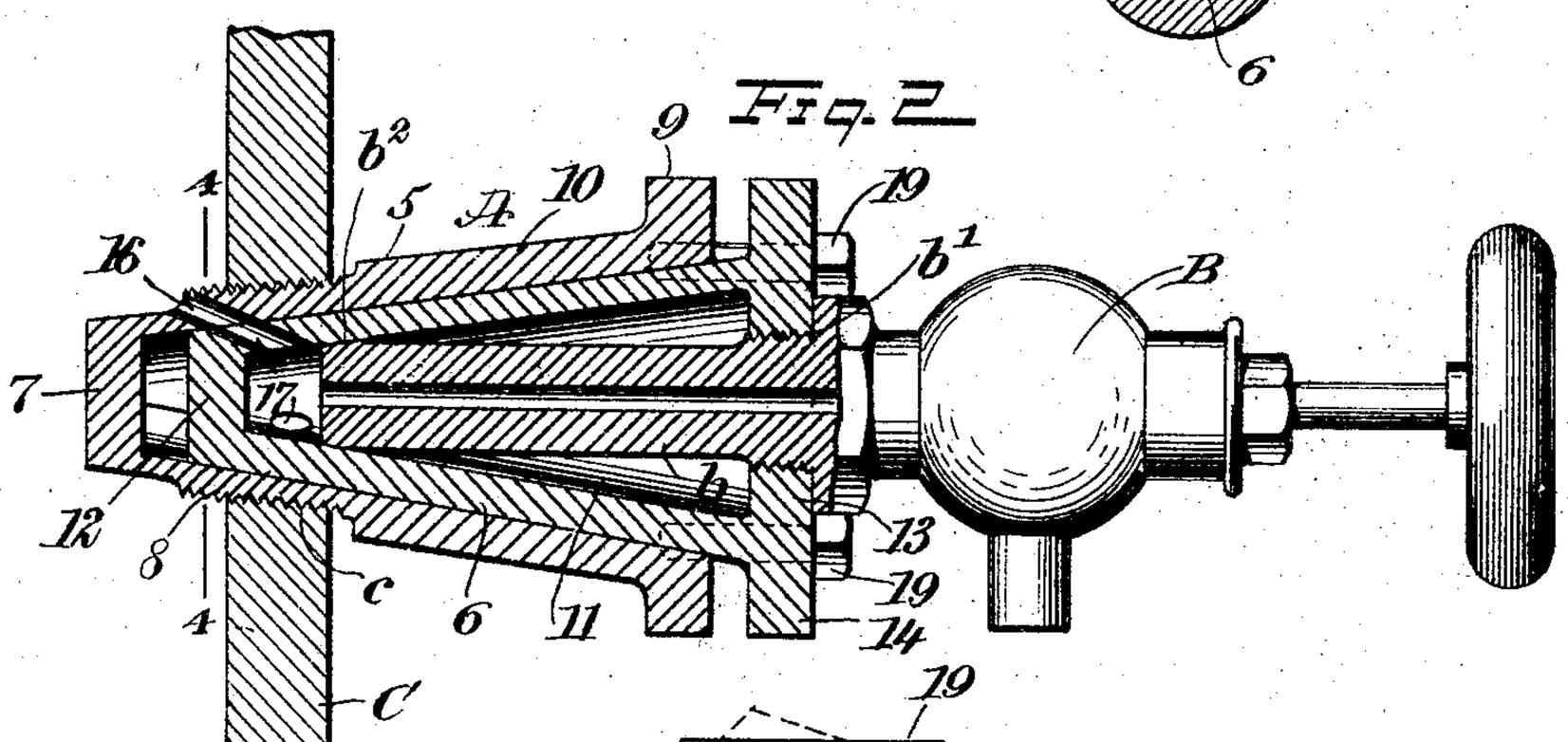
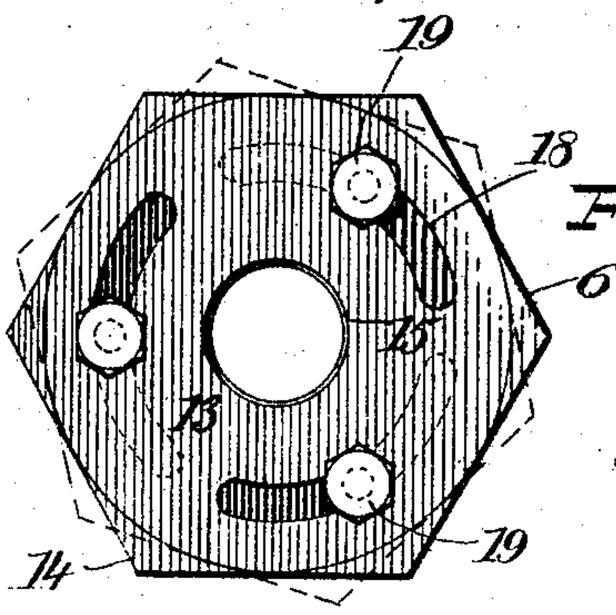


Fig. 3



WITNESSES:

John A. Bergstrom

W. C. Bernhard

INVENTOR

James R. Tyson

BY Munn & Co

ATTORNEYS

No. 765,525. Patented July 19, 1904.

UNITED STATES PATENT OFFICE.

JAMES R. TYSON, OF READING, PENNSYLVANIA.

GAGE-COCK VALVE.

SPECIFICATION forming part of Letters Patent No. 765,525, dated July 19, 1904.

Application filed December 3, 1903. Serial No. 183,673. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. TYSON, a citizen of the United States, and a resident of Reading, in the county of Berks and State of Pennsylvania, have invented a new and Improved Gage-Cock Valve, of which the following is a full, clear, and exact description.

My invention relates to improvements in gage-cock valves for steam-boilers.

In the service of boilers on locomotive and other engines it is found that the gage-cocks do not work properly at times, owing to clogging or stopping of the passages therein by foreign matter. Difficulty is experienced in cleaning or repairing the cocks, because they cannot be withdrawn and replaced while the boiler is in service, owing to the pressure of steam therein, and the common practice is to "draw" the furnace-fires and temporarily throw the engine and boiler out of service, thus entailing delay and expense. I seek to overcome these objections by the provision of means which allows the gage-cock to be dismounted, cleaned, or repaired and replaced without reducing the boiler-pressure and with perfect safety to the engineer, the boiler remaining under pressure and in service during such operations on the gage-cock.

The new device of my invention is peculiarly constructed to prevent the leakage of steam under pressure in the boiler when said device is adjusted to a closed position, wherein the gage-cock may be detached or attached. It is necessary in a device of this class to wholly overcome the escape of steam, and great difficulty was experienced in devising a practicable means to accomplish this end. The improved construction to be hereinafter described is the result of prolonged experimentation.

In my new device the gage-cock is adapted to be coupled thereto in a way which reduces the internal pressure on the bushing and causes the steam to pass directly into the stem of the cock. Provision is made for insuring the closure of the device should the engineer act hastily or negligently by and during the operation of dismounting the gage-cock.

The improved device is constructed for its parts to grind one into the other on the repeated adjustment thereof in detaching or attaching the cock, thus further preventing leakage and compensating for wear. The device is mounted on or attached to the boiler so as to make a tight joint therewith and allow the joint to be tightened in case leakage does occur.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the actual scope thereof will be defined by the annexed claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation through a part of an ordinary boiler, showing a plurality of gage-cocks and their mounting devices, the latter being constructed in accordance with my invention. Fig. 2 is an enlarged longitudinal sectional elevation through my improved mounting device and a gage-cock, which is fitted thereto. Fig. 3 is an end elevation of the improved mounting device, the gage-cock being omitted and one part of the mounting device being shown by dotted lines as adjusted to a closed position. Fig. 4 is a vertical cross-section in the plane of the dotted line 4 4 of Fig. 2, showing the parts of the mounting device adjusted to permit the passage of steam into the gage-cock; and Fig. 5 is a sectional view somewhat similar to Fig. 4, but showing the members of the mounting device adjusted to positions with relation one to the other for cutting off the flow or leakage of steam through the improved device.

According to the present invention I employ a two-part bushing (indicated in its entirety by the reference character A) as a means for mounting a gage-cock B on a boiler C. The bushing A consists of an outer member 5 and an inner member 6, said members being necessarily tapered, as shown by Fig. 2, and the member 6 being ground into the member 5. In the construction of a practical device for mounting gage-cocks on steam-boilers considerable difficulty has been encountered in devising a construction which effectually

prevents the leakage of steam under pressure in the boiler through the bushing, particularly when the gage-cock is dismounted or removed. After considerable experimentation I find that the best results are secured by the employment of a bushing, the members of which are tapered, each member having a taper of eight degrees to the longitudinal axis of the bushing. It will therefore be understood that the inner conical surface of the outer member 5 tapers at an angle of eight degrees to the axis of the bushing and that the outer surface of the inner member 6 is inclined at a similar angle to said longitudinal axis of the bushing, the members 5 6 being fitted by a ground joint.

The member 5 is closed at its inner reduced end by a solid head 7, and said member is provided with a tapering male thread 8, the latter being adapted for application to the boiler-shell C by the provision of a threaded hole *c* therein. The male thread 8 on the outer bushing member 5 is considerably longer than the thickness of the boiler-shell in order that the bushing member 5 may be screwed up tight into the boiler-shell and overcome leakage of steam through the threaded hole *c*. This bushing member 5 is also provided at its outer end with a flange 9, the latter being preferably hexagonal, as indicated by Fig. 3 of the drawings, and between this flange 9 and the conical male thread 8 said outer member 5 is provided with a smooth surface 10, which is adapted to engage with the lagging or asbestos covering D of the boiler, the latter being in turn confined in place by an enveloping jacket E. (See Fig. 1.)

It is to be understood that the bushing member 5 passes through the jacket E and the covering D, so that its male threaded part 8 can be screwed into the shell C for the inner end portion of the bushing member 5 to project into the boiler-space, whereas the flange 9 of said bushing member 5 is applied externally to the jacket E, whereby the outer end portion of the bushing member 5 is readily accessible, thus allowing an engineer to apply a wrench to the flange 9 for the purpose of screwing the bushing member 5 tightly into the boiler-shell.

The inner bushing member 6 is hollow to produce a chamber 11. Said bushing member has at its inner end a solid head 12, while the outer end of said bushing member 6 is provided with an integral head 13, which is considerably wider than the enlarged end of the tapering bushing member and produces thereon an external flange 14. The head 13 is formed with a female threaded opening 15, the diameter of which is less than that of the chamber 11 in said member, said opening 15 being adapted for the reception of the male threaded portion *b'* of the stem *b* of the gage-cock. The inner bushing member 6 is fitted within the outer member 5 in a way to bring its head 12 in spaced relation to the head 7 of such bushing member 5, (see Fig. 2,) and the flange 14 of the member 6 likewise occupies a spaced relation to the flange 9 of the member 5, whereby the members may be fitted snugly together in a way for the member 6 to grind its way into the member 5 and compensate for friction and wear between the cooperating parts of the bushing, thus overcoming the possibility of leakage of steam between the conical surfaces of the two parts comprising the bushing.

Steam is admitted to the chamber 11 of the bushing at the inner part thereof by the employment of peculiar passages. Experience has demonstrated that radial passages between the coöperating members of the bushing will not secure a perfectly steam-tight joint, particularly if the parts become slightly worn, and to overcome this defect I employ inclined passages in each member of the bushing. The inner portion of the member 5 is provided with one or more passages 16, which are inclined to the longitudinal axis of the bushing, said passages 16 inclining in an opposite direction to the taper of the bushing members 5 or 6. The hollow inner member 6 of said bushing is likewise provided at its inner portion with a plurality of passages 17, which are inclined to the longitudinal axis of the bushing and in an opposite direction to the taper of said member 6. The passages 17 of the bushing member 6 are placed or arranged to register with the passages 16 of the member 5 when the member 6 is turned to one position, as shown by Figs. 2 and 4; but when the member 6 is turned to the position indicated by dotted lines in Fig. 3 the passages 17 are turned out of registration with the passages 16 and occupy the disalined or staggered relation thereto indicated by Fig. 5 of the drawings. The inclination of the passages in the two members is an important feature of my invention, because the inclined passages 17 in the member 6 produce a plurality of ports at their inner ends which are so peculiarly related to the passages of the outer member as to effectually cut off the passage or leakage of steam between or through said members at the inner end of the bushing, owing to the fact that there is a considerable thickness of metal between the ports formed by the passages 17 and the inner termini of the passages 16 and to the further fact that the member 6 is fitted by a ground joint in the member 5. This peculiar construction and relationship of the parts comprising the bushing presents an extremely simple and efficient structure which wholly overcomes the leakage or passage of steam through the bushing, either in the applied or removed position of the gage-cock B, and the efficiency of the bushing is due largely to the inclination

of the passages 16 17 in the members thereof, to the inclination of the members at the peculiar angle of eight degrees heretofore mentioned, and to the grinding of the member 6 within the member 5.

Another feature of my invention consists in the employment of means by which the bushing is adjusted to a shut-off position by and during the operation of dismounting the gage-cock B, said means being also effective in clamping the member 6 within the member 5, so as to secure the necessary tight engagement between the conical surfaces of these members.

The head 13 of the member 6 is provided with one or more arcuate slots 18, the same being concentric with the axis of the bushing, as shown by Fig. 3, and through each slot passes a headed bolt 19, which is screwed into the flange 9 of the member 5, so as to make its heads engage with the headed end 13 of the member 6. These bolts may be tightened in the member 5 to draw the member 6 into wedging engagement therewith, and the ends of the slots are adapted to impinge the bolts when the bushing member 6 is turned, in order to limit the axial turning movement of said member with relation to the member 5. The slots 18 and the passages 17 in the member 6 are peculiarly related one to the other in such a way as to make the passages 17 register or disaline with the passages 16 of the member 5 when one end or the other of each of the arcuate slots 18 engage with one of the bolts 19—that is to say, when the bushing member 6 occupies the position indicated by full lines in Figs. 2 and 3, so as to make the right-hand end of the slots 18 engage with the bolts 19, the passages 17 register with the passages 16 of the member 5; but when the member 6 is turned toward the left and takes the dotted-line position of Fig. 3 the left-hand ends of the slots 18 engage with the bolts 19, and the passages 17 of said member 6 are moved out of registration with the passages 16 of the member 5, the slots 19 and the bolts limiting the turning movement of the member 6 in either direction. This adaptation of the slots and bolts in limiting the axial turning movement of the member 6 is furthermore advantageous, because the operation of unscrewing the gage-cock B will turn the member 6 toward the left and throw the passages 17 out of registration with the passages 16 at the commencement of the dismounting operation of said gage-cock, thus overcoming any negligence or carelessness on the part of the engineer in closing the bushing preliminary to removing the gage-cock and preventing the escape of steam.

By reference to Fig. 2 it will be seen that the stem *b* of the gage-cock passes through the chamber 11 of the bushing member 6, the inner extremity of said stem *b* having a slightly-conical portion b^2, which is seated friction-tight within the member 6 at a point adjacent to the ports formed by the inner ends of the inclined passages 17. The gage-cock thus has a threaded and friction-tight fitting within the bushing member 6, and said gage-cock is extended into the bushing, so that the steam or water from the boiler will pass through the passages 16 17 and directly into the stem of the cock, thereby reducing the boiler-pressure on the interior of the bushing and minimizing the tendency of the fluid under pressure to escape through the threaded joint which unites the gage-cock to the bushing member 6.

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

1. A means for mounting and dismounting gage-cock in boilers, comprising a bushing limited to two members each of which is provided with an opening and with a flange at the outer end, the outer member being externally threaded for application to a boiler-shell and the inner member having a thickened outer end portion, which is formed with a threaded socket for the reception of a gage-cock, the flange of the inner member being provided with arcuate slots, and screws threaded in the flange of the outer member and effective in clamping the two members endwise and in limiting the axial turning movement of the inner member.

2. The combination with a boiler-shell, of a two-part bushing each member of which is provided with a port, one of said members being fixed in the boiler-shell and the other member being capable of an axially-turning movement in the fixed member, externally-accessible clamping-screws having threaded engagement with one member and binding against the other member for clamping the two members tightly together, and a gage-cock mounted detachably in the inner member.

3. The combination with a boiler-shell, of a two-part bushing each member of which is provided with a port, one of said members being fixed in the boiler-shell and the other member having a ground joint fitting in the fixed member and capable of an axial turning movement therein, an externally-accessible clamping-screw mounted in the fixed member and binding against the inner member for moving it endwise and inwardly with respect to the fixed member, and a gage-cock mounted detachably in the inner member.

4. The combination with a boiler-shell, of a two-part bushing having flanged members fitted together by a ground joint and said members provided with ports, one of said members being fixed in the boiler-shell and the other member having arcuate slots in its flange, clamping-screws threaded in the flange of the fixed member and passing through the slots of the flanged inner member, said screws

limiting the turning movement of the inner member and also binding against said member to force it endwise within the fixed member, and a gage-cock mounted detachably in the inner member.

5. The combination with a boiler-shell, of a two-part bushing having its members fitted together by a ground joint and also provided with ports, one of said members being fixed in the boiler-shell and the other member having an axial turning movement in the fixed member, externally-located screws having threaded engagement with the fixed member and coöperative with the inner member for limiting the turning movement thereof and for clamping it endwise within the fixed member, and a gage-cock mounted detachably in the inner member.

6. A bushing of the class described, comprising a flanged outer member having an external thread and a plurality of ports, an inner member provided with a threaded socket and with an external flange, said inner member likewise having ports and the flange thereof being provided with arcuate slots, and screws having threaded engagement with the flange of the outer member and passing through the slotted flange of the inner member, said screws being effective in limiting the turning movement of the inner member, and in binding against said member to force it tightly into the outer member.

7. A gage-cock bushing consisting of companion members provided with passages and turnable one within the other, and a gage-cock having a threaded and friction-tight engagement with the turnable inner member of the bushing.

8. A gage-cock bushing consisting of companion members fitted tightly one within the other, and provided at their inner portions with fluid-passages, and a gage-cock having a threaded connection with the inner member and fitted friction-tight to said inner member at a point adjacent to the fluid-passages therein.

9. A gage-cock bushing consisting of conical inner and outer members fitted together by a ground joint, and having fluid-passages at their inner portions, the inner bushing member being turnable within the outer member, a gage-cock having threaded and friction-tight engagement with the inner member, and means coöperating with said members for limiting the turning movement of the inner member when the gage-cock is screwed to or unscrewed from the same.

10. A gage-cock bushing consisting of an outer conical member having a tapering thread, and provided with an inclined passage which opens through said member at a point beyond said thread, an inner member fitted tightly within the outer member and provided with an inclined passage adapted to register with the passage of the outer member, a gage-cock having threaded and friction-tight connection with the inner member, and means for limiting the turning movement of the inner member relatively to the outer member on the application or removal of the gage-cock to or from said inner member.

11. The combination with a boiler-shell, of an external bushing member screwed into said shell and provided at its inner portion with an inclined passage, an inner bushing member fitted tightly within said outer member, and also provided with an inclined passage, the inner member being turnable within the outer member to bring the passages into and out of registration, and a gage-cock having threaded and friction-tight engagement with the inner member.

12. The combination with a boiler-shell, of a bushing member having a tapering thread and screwed into said shell, said member being also provided with an inclined passage, an inner bushing member having wedging engagement with the outer bushing member, and also provided with an inclined passage adapted to register with the passage of the outer member, and a gage-cock screwed into the inner member and having friction-tight engagement therewith at a point adjacent to the inclined passage therein.

13. A gage-cock consisting of two conical members each made of a single piece, said members being fitted by a ground joint and provided at their inner portions with inclined passages, the inner member having arcuate slots in the outer head thereof and also provided with a threaded opening for the reception of a gage-cock, and limiting-bolts attached to the outer member and passing through the slots in the head of the inner member, whereby the bolts and slots coöperate in limiting the turning movement of the inner member with respect to the outer member.

14. The combination with a boiler-shell, of a conical outer bushing member attached thereto and provided at its inner portion with an inclined passage, a conical inner member fitted by a ground joint within the outer member, and provided at its inner portion with an inclined passage and at its outer portion with a slotted head which is furnished with a screw-threaded opening, and clamping-bolts screwed to the outer member and passing through the slots in the head of the inner member; said bolts being effective in drawing the two members tightly together and in limiting the turning movement of the inner member with respect to the outer member.

15. The combination with a boiler-shell, a covering therefor, and a jacket, of a bushing member screwed into said shell and passing through the covering in the jacket, said bushing member having at its inner end an inclined fluid-passage and an exposed flange at

its outer end, an inner bushing member fitted tightly in the outer member and provided with inclined ports, means for limiting the turning movement of the inner member with respect to the outer member, and a gage-cock mounted in the inner member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES R. TYSON.

Witnesses:
O. G. NEUDOERFFER,
GEO. H. HINE.