E. O'MALLEY.

VALVE.

APPLICATION FILED APR. 10, 1909.

978,927.

Patented Dec. 20, 1910.

3 SHEETS—SHEET 1.

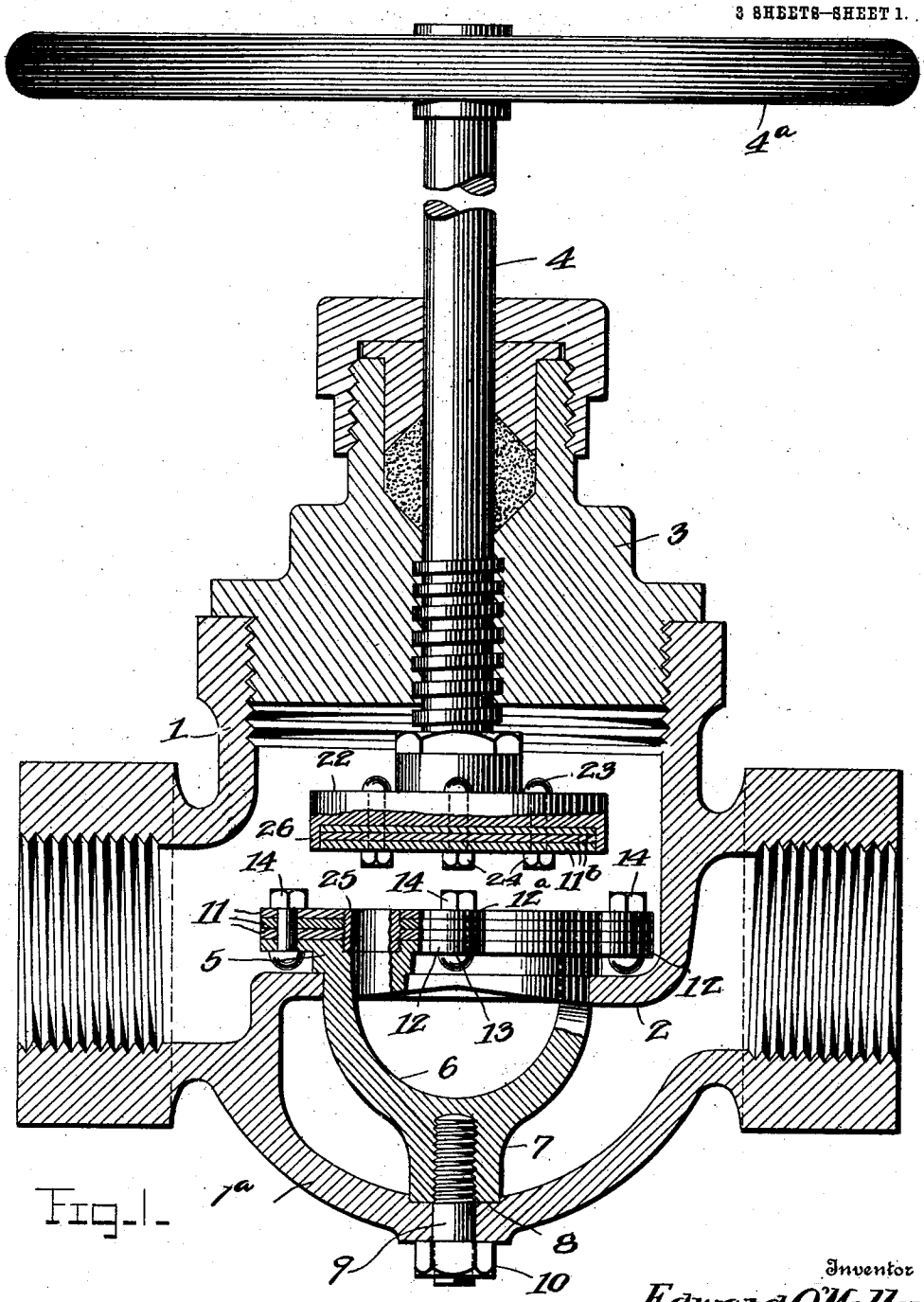


Fig. 1.

Witnesses

W. A. Rockwell

Caroline Morgan

Inventor

Edward O'Malley

By Langdon Moore.

Attorney

E. O'MALLEY.

VALVE.

APPLICATION FILED APR. 10, 1909.

978,927. Patented Dec. 20, 1910.

3 SHEETS—SHEET 2.

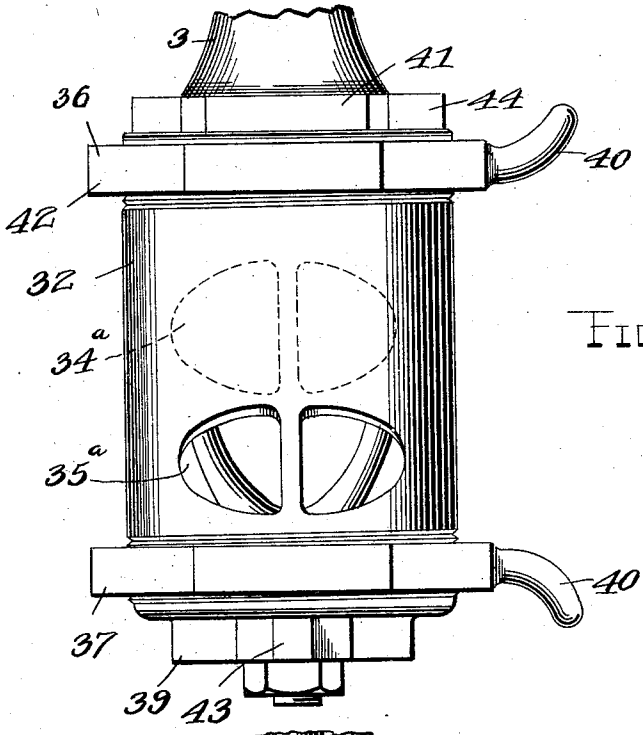
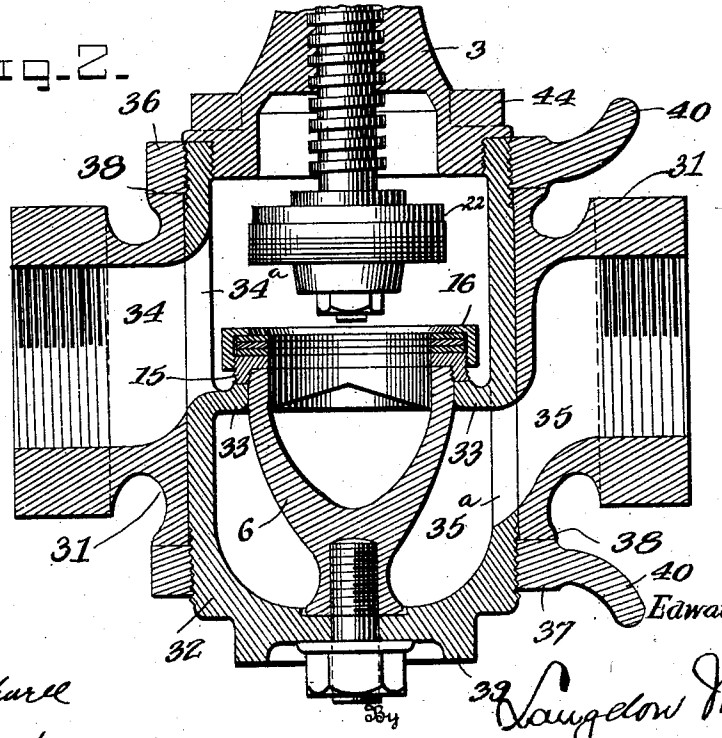


Fig. 3.

Fig. 2.



Witnesses

W. H. Rockwell

Caroline Morgan.

Inventor

Edward O'Malley

By Langdon Moore.

Attorney

E. O'MALLEY.

VALVE.

APPLICATION FILED APR. 10, 1909.

978,927. Patented Dec. 20, 1910.

3 SHEETS—SHEET 3.

Fig. 4.

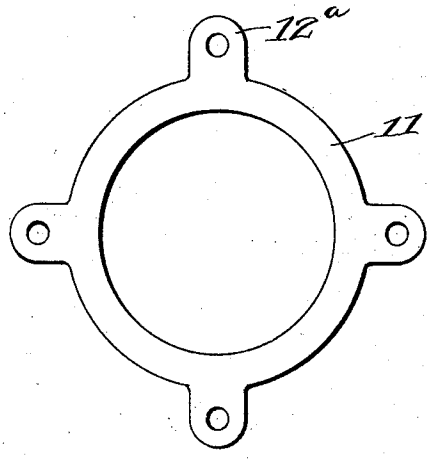


Fig. 5.

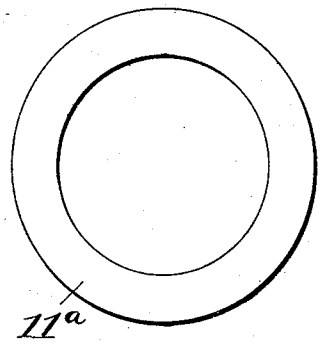


Fig. 6.

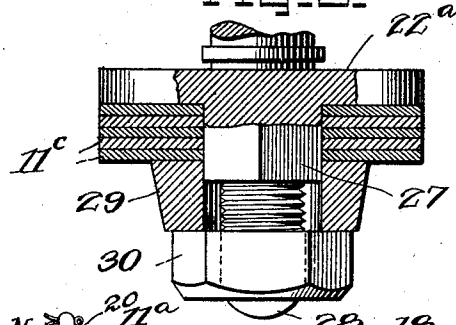


Fig. 7.

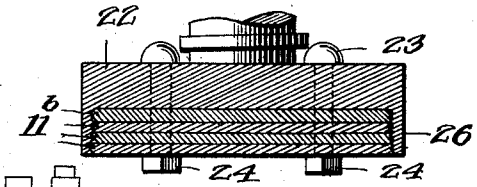
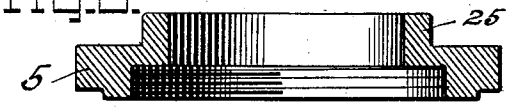


Fig. 8.



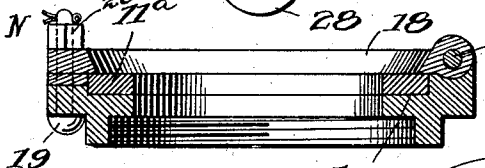


Fig. 9.

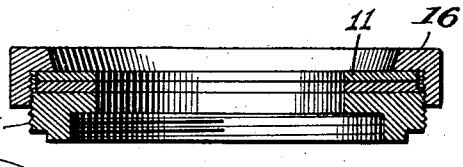
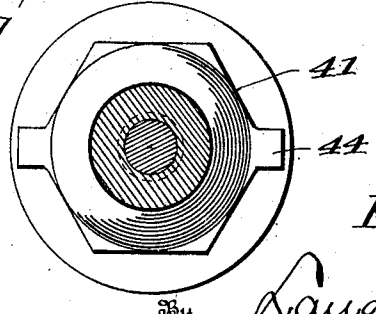


Fig. 10.

Fig. 11.



Witnesses

W. H. Rodwell

Caroline Morgan.

Inventor

Edward O'Malley

By Langdon Moore.

Attorney

UNITED STATES PATENT OFFICE.

EDWARD O'MALLEY, OF JACKSON, TENNESSEE, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO O'MALLEY-BEARE VALVE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

VALVE.

978,927. Specification of Letters Patent. **Patented Dec. 20, 1910.**

Application filed April 10, 1909. Serial No. 489,202.

To all whom it may concern:

Be it known that I, EDWARD O'MALLEY, a citizen of the United States, residing at Jackson, in the county of Madison and State of Tennessee, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to improvements in valves and more particularly to that type known as a globe valve.

It is the object of this invention to provide a valve of this type with a series of removable trued plates carried either by the head or seat, which are constructed in such a manner that when a plate becomes worn it may be removed without the necessity of special tools for that purpose, and a new plate inserted or the ones next in line substituted without altering the operation of the valve in any manner.

It is also the object of this invention to provide a removable seat frame supported on the base of the casing which facilitates greatly the removal of the trued seat plate carried by that part when it becomes mutilated or worn.

This invention also provides means carried by the valve and forming part thereof to cut off the valve body from the main when it becomes necessary to replenish the plates.

The advantages of such a construction are obvious. The removable valve seat engaging the web or bridge through the central section of the valve body and supported on the base of the casing adds greatly to the strength of the entire structure. The series of removable trued head and seat plates constructed in accordance with this invention are held in place in such a manner that the worn plate may be removed with little or no difficulty, as the operation only requires the use of such tools as are ordinarily found in a work shop. The construction by which the main body of the valve may be cut off from the main in both directions during this operation does away with the necessity of stop-cocks, and only affects but a part of a piping system for a very short period.

The preferred form is illustrated in the accompanying drawings, yet it is to be understood that minor changes may be made in the construction without departing from the scope of the invention.

Figure 1 is a longitudinal sectional view of the ordinary form of globe valve to which this invention has been applied. Fig. 2 is a longitudinal sectional view of a modified form. Fig. 3 is a side elevation of a detail of Fig. 2. Fig. 4 is a plan view of one form of removable plate. Fig. 5 is a plan view of a modified form of removable plate. Fig. 6 is a side elevation partly in section of one form of valve head or button. Fig. 7 is a sectional view of another form of valve head or button. Fig. 8 is a longitudinal sectional view taken through one form of valve seat. Fig. 9 is a longitudinal sectional view taken through another form of valve seat. Fig. 10 is a longitudinal sectional view of a third form of valve seat. Fig. 11 is a top plan view of cap for valve casing.

In Fig. 1 the numeral 1 indicates the casing of the ordinary type of globe valve. 2 is the customary web or bridge formed integrally within the casing and in this type of valve forms the valve seat. 3 is the cap employed in valves of this type to close the top of the casing and to support the valve stem 4 which is provided with the usual hand wheel 4ª. So much of the construction is the same as employed in valves of this general type. The improvement over the common construction relates first to the manner of forming the valve seat. As shown in Fig. 1 the seat is a separate and distinct element arranged to be removably secured to the casing. The web or bridge 2 is provided with a centrally located opening. The valve seat proper comprises a shouldered seat frame 5 engaging the sides of the opening and the top surface of the web or bridge is provided with a faced seat at the point of contact to form a ground joint therewith. Depending from the underside of the seat frame 5 is a Y-shaped chair or support 6, the base 7 of which is adapted to fit in a recess 8 on the inner side of the bottom 1ª of the valve casing 1. This recess is also provided with a faced seat to form a ground joint with the base of the support or chair. The base of the support or chair is recessed and screw threaded, and a corresponding aperture is provided in the wall of the casing. A stud 9 screw threaded to correspond with the threads in the recess is inserted in the base, passing through the casing and the nut 10 placed on the exterior end of the stud will draw the seat frame and base tightly down upon the faced seats pro-

vided therefor firmly joining the parts together and forming an additional support for the seat frame by bracing it from the bottom wall of the casing. The seat frame 5 is preferably constructed integral with the depending support or chair, however, this is not essential and the frame may be removably attached as shown in the modified forms in Figs. 2, 8, 9 and 10.

The second feature of this invention is the peculiarly constructed valve seat applied to the seat member. A plurality of trued plates 11 corresponding in shape to the seat frame 5 are attached to the upper surface thereof, the uppermost plate forming the valve seat proper. The frame 5 is provided with outwardly extending perforated ears 12. A bolt 13 is passed through the perforations of the ears 12 on the frames and ears 12^a on the trued plates, with a nut 14 engaging the upper plate to secure the parts together. When the valve seat formed by the upper plate becomes scarred or worn to such an extent as to allow the valve to leak, the nuts 14 are removed, the upper plate 11 is taken off, the nuts replaced, and second plate will then provide an entirely new and perfectly trued seat for the valve head or button. Should the bolts become rusted so that they might be twisted in two by attempting to remove the nuts, the ears 12^a on the upper plate may be filed through and the plate removed. In this case the ears remaining on the bolts 13 act as washers to retain the remaining plates in position. The valve plates may be attached to the frame in other ways without departing from the scope of the invention. Furthermore, the ears 12 and 12^a may be dispensed with and the outer surface 15 of the frame 5 screw threaded to engage a securing ring adapted to engage the outer edges of the upper plate 11 as illustrated in Fig. 10. In this case the ring 16 may be readily removed when it is desired to furnish a new valve seat. Another form of securing ring is shown in Fig. 9 in which the one removable seat plate 11^a is employed. The frame 5 is recessed at 17 to receive the seat plate 11^a. The ring 18 hinged to the frame 5 engages the outer edges of the plate 11^a and secures the same in place by being firmly attached to the frame 5 by a bolt 19 and nut 20 on the side opposite the hinge. When a new seat plate is to be inserted the bolt 19 is removed, the ring 18 swung upward on its hinge 21, the defaced seat removed, a new one inserted, the ring closed and secured. With these forms of removable valve seats the usual head or button may be used, however, I prefer to employ a different form of head or button, which is believed will operate to a greater advantage. This valve head or button forms a part of this invention and provides a plurality of removable head or button plates.

In Figs. 1 and 7 the head or button 22 is secured to the stem 4 in the usual manner, but the underside is recessed and a plurality of trued plates 11^b are secured therein by bolts 23 passing through the head or button provided with nuts 24 engaging the outer plate 11^b. A supplemental valve seat is advantageously employed with this form of head or button, and consists of a ring or flange 25 extending upwardly from the inner surface of the seat frame to the height of the upper surface of the seat plate 11. In operation the integral flange 26 formed by the recess of the head or button will engage the seat plate 11 while at the same time the supplemental seat 25 will engage the head or button plate 11^b. As the seat and head or button plates are of the same thickness the removal of one plate from both parts provides a fresh seat and head or button.

The head or button plates are not necessarily attached in the manner above set forth. The head or button may be solid and provided with outwardly extending ears and the plates adapted to be secured thereto in a manner similar to that described in connection with the seat plates in which the ears were employed. In this form of head or button a guide for the ears carried thereby should be provided to prevent the same from coming in contact with the ears upon the seat frame. Another form of head or button is illustrated in Fig. 6 in which the head or button 22^a is provided with a centrally disposed square extension 27 provided with a screw threaded stud 28. A plurality of head or button plates 11^c centrally perforated to correspond with the extension 27 are placed thereon, a thick washer 29 and a nut 30 on the stud form a firm attaching means for the head or button plates.

The supplemental seat 25 may be formed integral with the seat frame 5 as shown in Fig. 8, and will form a perfect valve seat when used in connection with all forms of the improved head or button, operating equally as well in this connection without the addition of the seat plates 11. However, this supplemental seat 25 is superfluous and not necessary to the construction employing the removable seat plates 11 when the usual valve head or button is employed, or when the removable head or button plates 11^c extend over the entire surface of the head or button 22^a.

When in a valve of this character the seat or head becomes defaced to such an extent as to require the refacing of the affected part, the cap 3 must be removed and the seat frame 5 as well. Where the valve is a part of a piping system the flow through that main in which the affected valve is located must be cut off during the entire operation. This invention includes a

further improvement in the construction of the valve casing by which the removable parts of an affected valve may be cut off from the main.

As shown in Fig. 2 the valve casing is constructed in two parts, the casing proper 31, which connects the valve to the main, and a rotatable cylindrical casing 32 mounted therein containing the valve seat, and to which the cap 3 bearing the stem 4 and head or button 22 is secured. The cylindrical casing 32 is provided with the integral web or bridge 33 upon which the seat frame 15 rests and is secured and supported by a Y-shaped chair 6 in the manner heretofore described. The detachable cap 3 is mounted upon the upper opening of this casing 32. The casing proper 31 is provided with the conducting passages 34 and 35 from the main, one above and one below the bridge or web. The cylindrical casing 32 is provided with openings or ports 34^a and 35^a corresponding to the passages 34 and 35 to normally complete the flow from the main through the valve. This cylindrical casing 32 is normally secured in position with these openings 34^a and 35^a or ports registering with the passages 34 and 35 in the casing proper by the two external locking rings 36 and 37 engaging bearings 38 on the casing proper provided therefor. A suitable packing is provided between the locking rings and the bearings. When it becomes necessary to renew the parts carried by the cylindrical casing 32, the locking rings 36 and 37 are loosened and the casing 32 given a partial rotation, enough to close the ports leading to the main passages, thereby completely segregating the operating parts of this valve. The bottom of the cylindrical casing 32 is provided with a hexagonal face 39 to be engaged by a wrench, and the locking rings 36 and 37 may be similarly faced or provided with outstanding lugs 40. When the parts 15 and 22 have been removed and refaced they are replaced, the cylindrical casing 32 returned to its normal position, the locking rings 36 and 37 made secure, and the valve will be in perfect working order again. While not necessary to this invention the revoluble casing 32 may be constructed with a taper in either direction.

Considerable difficulty is encountered in starting the cap 3, locking rings 36 and 37 and cylindrical casings 32, both in new and old valves. It has been found that it is hardly sufficient to use a wrench in connection with the square or hexagonal surfaces provided upon these parts for this purpose, and it usually requires several sharp blows of a hammer upon the handle of a wrench in the direction of rotation to start these parts. At times it becomes necessary to apply a square nose tool or other instrument to the engaging surface, and rap the same sharply with a hammer before the part is started. In either of these cases the use of a hammer in this connection will cause the wrench to deface the engaging surface or the tool to bite into the surface to such an extent that its function will be destroyed. To overcome this difficulty and to preserve the engaging surfaces 41, 42 and 39, integral outstanding lugs 44, 40, and 43 are provided on each of these respective parts, to which hammer, block of wood, or tool may be applied to start the part without defacing or mutilating the surfaces provided to be engaged by the wrench in the further rotation of the same part.

By the above structure a valve is provided in which all of the removable parts are readily accessible, and which requires only the use of such tools as are usually carried by a mechanic, furthermore it requires no special skill to place a valve of this description in perfect working order, and it may be entrusted to any person of ordinary intelligence.

What I claim is:—

1. In a valve, the combination of a casing, an integral bridge, a cap, valve stem and valve head, with a removable seat frame engaging the bridge including a chair supported upon and removably secured to the inner wall of the casing, and a plurality of detachable trued seat plates carried upon the seat frame.

2. In a valve, the combination of a casing, an integral bridge, a cap, valve stem and valve head, with a removable seat frame, a plurality of trued seat plates, means to removably secure the seat plates to the seat frame, and a supporting and securing means supported on the inner wall of the casing removably secured to the valve seat and casing.

3. In a valve, the combination of a casing, an integral bridge, a cap, valve stem and valve head, with a removable seat frame engaging the bridge including a chair supported upon and removably secured to the inner wall of the casing, and a trued seat plate removably attached to the seat frame, and a plurality of removable head plates detachably secured to the valve head.

4. In a valve, the combination of a casing, an integral bridge, a cap, valve stem and valve head, with a removable seat frame, a plurality of trued seat plates, and means to removably secure the seat plates to the seat frame, a plurality of trued head plates, and means removably attaching said plates to the valve head.

5. In a valve, the combination of a casing, an integral bridge, a cap, valve stem and valve head, with a removable seat frame engaging the bridge including a chair supported upon and removably secured to the

inner wall of the casing, and a plurality of detachable trued seat plates carried upon the seat frame, a depending flange on the valve head adapted to engage the upper seat plate, a plurality of removable head plates detachably secured to the valve head, and a supplemental valve seat member carried by the seat frame adapted to engage the lower head plate.

6. In a valve of the character described, a main casing having outlet and inlet passages, a rotatable casing detachably secured therein and having apertures normally communicating with said outlet and inlet passages adapted to close said passages upon rotation, a cap closing the top of the rotatable casing carrying a valve stem and valve head, an integral bridge within the rotatable casing and a removable valve seat engaging said bridge supported upon and removably secured to the bottom of the rotatable casing.

7. In a valve of the character described, a main casing having outlet and inlet passages, a rotatable casing detachably secured therein and having apertures normally communicating with said outlet and inlet passages, adapted to close said passages upon rotation, adjustable means carried on the exterior of both casings to aline the apertures and secure the rotatable casing, a cap, valve stem and head carried by the rotatable casing, and a removable valve seat supported upon and secured to the inner wall of the bottom of the rotatable casing.

8. In a valve of the character described a main casing and a supplemental casing rotatably mounted therein, normally in communication therewith, securing rings mounted on the exterior of the supplemental casing arranged to engage the main casing to secure the supplemental casing thereto, and a removable valve head and a removable valve seat carried by the supplemental casing.

9. In a valve of the character described, a main casing and a supplemental casing rotatably mounted therein normally in communication therewith, securing rings mounted on the exterior of the supplemental casing arranged to engage the main casing to secure the supplemental casing thereto, and a removable valve head, and a removable valve seat carried by the supplemental casing, and a plurality of detachable head plates and seat plates removably secured to the valve head and valve seat respectively.

10. In a valve of the character described, a main casing, a supplemental casing rotatably mounted therein, means to secure the supplemental casing rigid thereto, a detachable valve head and valve seat removably carried by the supplemental casing, said supplemental casing and securing means provided with tool engaging surfaces to operate same, and an additional integral operating lug.

11. In a valve of the character described, a main casing, a supplemental casing rotatably mounted thereon, and provided with ports communicating on opposite sides with the main casing, a removable cap carrying, a valve spindle, and valve head closing the upper end of the supplemental casing, a removable valve seat supported upon and secured to the inner wall of the bottom of said casing, said cap and supplemental casing provided with tool engaging surfaces, and an additional integral operating lug.

12. In a valve of the character described, a main casing, a supplemental casing rotatably mounted therein, external securing means carried upon the top or bottom of said supplemental casing arranged to engage the main casing, a removable cap carrying a valve stem and valve head, closing the upper end of the supplemental casing, a removable valve seat supported upon and secured to the inner walls of the bottom of the supplemental casing, said external securing means, cap and supplemental casing provided with external flat tool engaging surfaces, and an additional integral operating lug.

13. In a valve of the character described, a main casing, a supplemental casing rotatably mounted therein, external securing means carried upon the top or bottom of said supplemental casing arranged to engage the main casing, a removable cap carrying a valve stem and valve head, closing the upper end of the supplemental casing, a removable valve seat supported upon and secured to the inner walls of the bottom of the supplemental casing, said external securing means, cap and supplemental casing provided with external flat tool engaging surfaces, and an additional integral operating lug projecting from said engaging surfaces.

EDWARD O'MALLEY.

Witnesses:
R. L. BEARE,
S. D. WADDILL.