C. F. TERNEY.

TAP VALVE.

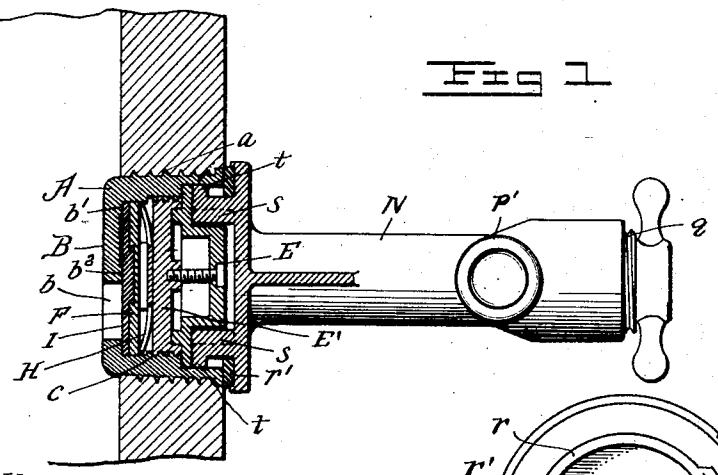
APPLICATION FILED JULY 6, 1912.

1,183,048.

Patented May 16, 1916.

2 SHEETS—SHEET 1.

Fig 1



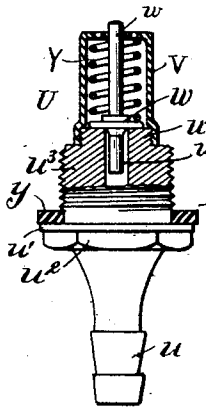


Fig. 12.

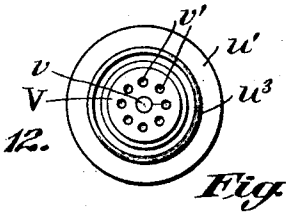


Fig. 13.

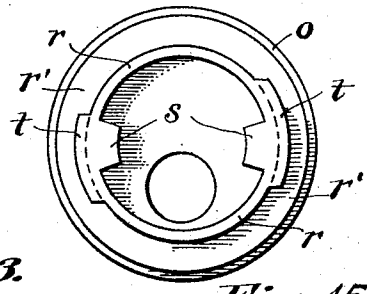


Fig. 15.

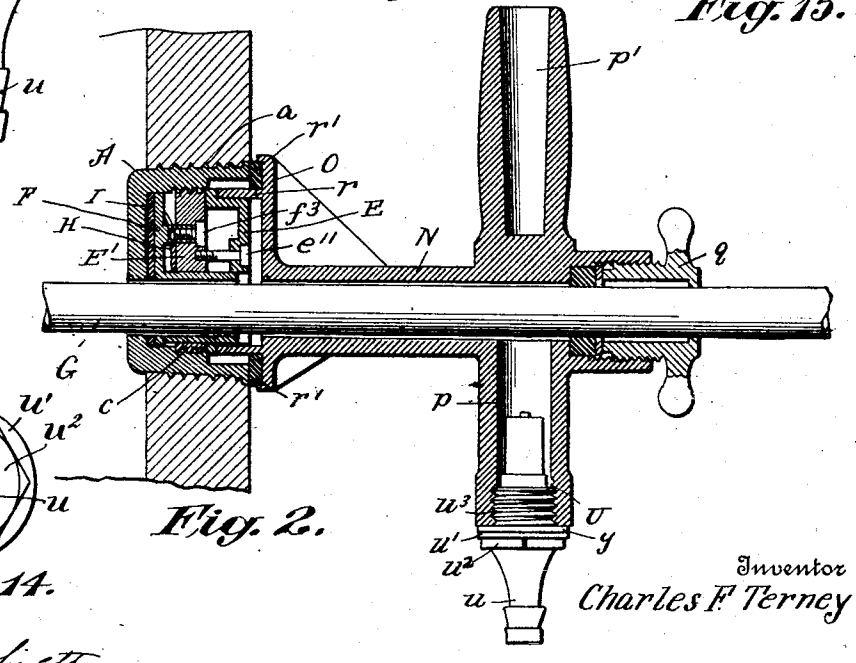


Fig. 2.

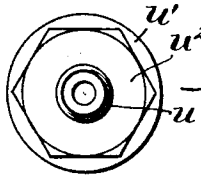


Fig. 14.

Witnesses

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2 SHEETS—SHEET 2.

Fig 3

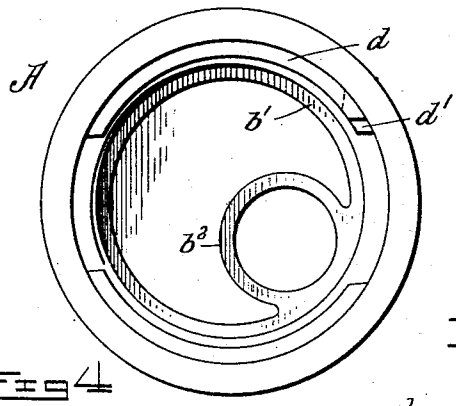


Fig 4

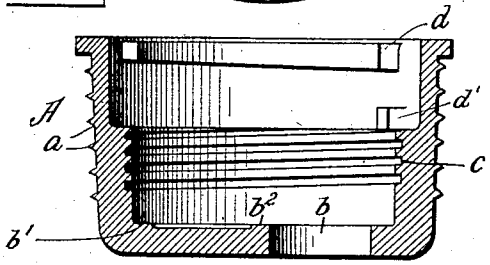


Fig 5

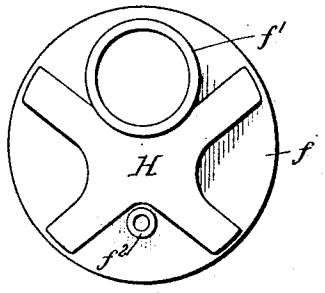


Fig 6

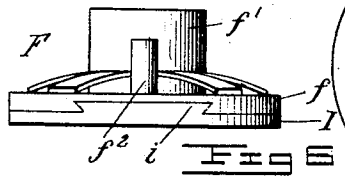


Fig 7

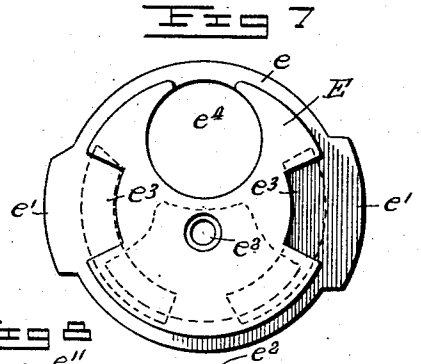


Fig 8

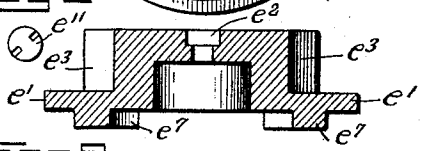


Fig 9

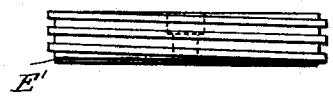
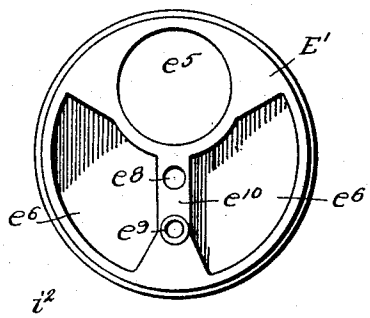


Fig 10



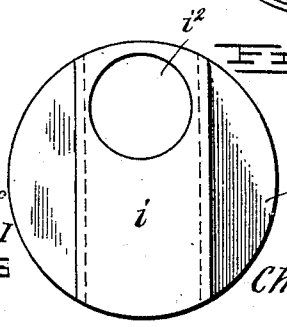


Fig. 11.

Witnesses

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UNITED STATES PATENT OFFICE.

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TAP-VALVE.

1,183,048. Specification of Letters Patent. Patented May 16, 1916.

Application filed July 6, 1912. Serial No. 708,016.

To all whom it may concern:

Be it known that I, CHARLES F. TERNEY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Tap-Valves, of which the following is a specification.

My invention relates to improvements in tap valves or closures for tapping beer or other liquids from barrels and the like by the use of fluid pressure.

The object of this invention is to provide a device of the character described which will insure a reliable gas tight closure of durable construction and easy operation.

In my Patent 938,288, granted Oct. 26, 1909, I have shown and described a device of the above-mentioned type in which the valve, as it is rotated to the open position to permit the insertion of the draft tube, is simultaneously moved away from the bottom of the bushing, whereby in the open position of the device a space exists between the valve and the seat. In such construction, if any particles of dirt or other foreign matter should enter this space there is always the danger that the valve cannot be closed tightly when rotated in the proper direction to accomplish that result.

It is the object of the present invention to provide a device which will have all the advantages of the barrel valve described in my said patent but which will be free from the disadvantage pointed out above.

With this object in view my invention consists in the features, details of construction, and combination of parts, which will first be described in connection with the accompanying drawings and then particularly pointed out in the claims.

In the drawings,—Figure 1 is a sectional view of a tap valve embodying my invention, in its closed position, the tap being shown partly in section and partly in elevation, in a position ready to open said valve. Fig. 2 is a sectional view of the valve and tap with part of a draft tube in elevation, the valve being in an open position. Fig. 3 is a plan view and Fig. 4 a central section view of the valve bushing. Fig. 5 is a plan view and Fig. 6 a side elevation of the valve body and its accompanying plate spring. Fig. 7 a plan view and Fig. 8 a central section of the outer member of the plug. Fig. 9 is a side elevation and Fig. 10 a top plan view of the inner member of said plug. Fig. 11 is a top plan view of the removable valve plate. Fig. 12 is a side elevation partly in section of the check valve to the pressure inlet. Fig. 13 is an end view of said check valve showing the inner end. Fig. 14 is a similar view showing the outer end of said valve; and Fig. 15 is a view of the inner end of the tap.

Referring to the drawings, A indicates the bushing of the valve, said bushing being circular in form and suitably arranged to be secured to a barrel or other receptacle. In the present instance it is provided on its periphery with a screw thread *a* whereby the bushing is secured within an opening in the head of the barrel, said bushing also having a head B at its inner end which has a port or opening *b* located eccentrically, that is to say, at one side of the center of the head B. The outer surface of the head B is provided with a complete annular track *b'*, slightly raised as shown in Figs. 3 and 4, and the port or opening *b* is surrounded by a valve seat b^2 also slightly raised above the outer surface of the bottom, the annular track *b'* and the seat b^2 having their outer surfaces in one plane.

The lower or inner part of the bore of the bushing is provided with an internal left-handed screw thread *c*. The outer part of the bore of the bushing is somewhat larger in diameter than the inner screw threaded portion and is provided on opposite sides close to the outer face of the bushing with cam projections *d* having inclined lower faces, as shown in Fig. 4. Between the corresponding ends of the cam projections, spaces are left as will be clear from Fig. 3. The interior of the bushing is provided with an inward projecting stop *d'* as shown in Figs. 3 and 4. A plug is provided for the bushing, this plug comprising an outer part E and an inner part E'. The outer part consists of a substantially cup-shaped portion having a flanged edge *e*, two opposite portions of which are extended radially as indicated at *e'*, these extended portions being of such a size as to permit them to pass between the respective opposite ends of the cam projections *d*. The part E is further provided with a countersunk opening arranged to receive the head of a machine screw as indicated at e^2 and also with a circular port e^4 having its center about 90° from the centers

of the extended portions e'. The part E is furthermore provided with oppositely located notches e^3 adjacent to the said portions e'. The inner part E′ is provided externally with left-handed screw threads so that it may be screwed into the screw-threaded portion c of the bushing. The said part E′ is also provided with a circular port indicated at e^5, Fig. 10, and arranged to register with the corresponding port e^4, Fig. 7, in the outer part E of the plug. The outer face of the part E′ is provided with two recesses e^6 arranged to receive segmental extensions e^7 on the inner face of the part E, Fig. 8. The part E′ has two holes e^8 and e^9 respectively, located on the rib e^{10} between the recesses e^6. The outer and inner parts E and E′ respectively are held together by a machine screw e^{11} threaded into the opening e^8 in the part E′, the head of the screw being received in the countersunk opening e^2 in the part E as will be clear in Fig. 2. In this position the segmental extensions e^7 enter the recesses e^6 and thereby insure the rotation of the two parts E, E′ in unison. A valve body F, Fig. 6, is provided; this valve body comprising a disk-like portion f having a substantially diametrical dovetail groove in its inner surface. A sleeve f' is formed integral with the disk f and extends outward therefrom, this sleeve or tube being of such a size externally as to fit closely, but not tight, in the ports e^4 and e^5 of the parts E, E′ while the interior of the tube f' is arranged to receive a draft tube G, Fig. 2, passing loosely therethrough. It is to be noted that the sleeve f', which fits closely the ports e^4 and e^5 of the parts E, E′, effectively prevents the entry of foreign matter into the space between E′ and the valve member F. The disk f also carries an outward extending pillar f^2 arranged to enter and play loosely in the hole e^9 in the part E′, this pillar being screw-threaded at its outer end to receive a machine screw f^3 whose head is countersunk as shown in Fig. 2. It will be seen that the valve body is movable axially with respect to the plug, that is to say, it has a certain amount of play toward and from the plug parts, but at the same time is compelled to rotate with said plug parts E and E′.

A plate spring H approximately in the form of a maltese cross and arranged between the pillar f^2 and the tubular sleeve f' is located intermediate the valve body and the plug, this spring serving to hold the valve body, yieldingly away from the plug, the extent of such movement being limited by the head of the screw f^3. The inner face of the disk f is arranged to carry a valve plate I provided on its inner surface with a dovetailed rib i arranged to enter the dovetailed groove in the inner face of said disk f. Owing to this method of connection the valve plate I is detachably connected with the valve body and may be readily removed from the body when necessary. The said valve plate I is provided with an eccentrically located port i^2 registering exactly with the inner bore of the tubular sleeve f'. When the parts hereinbefore described are assembled, the screw threaded portion E′ can be rotated about half a revolution, since the stop d' is located in the path of the outward extensions e' and thereby limits the amount of rotation of the plug. Owing to the left-handed thread c the left-handed rotation of the plug moves the latter inward and also carries the tubular sleeve f' away from alinement with the port b of the bushing, the spring plate H being compressed and thereby forcing the valve plate I tightly against the annular track b' and valve seat b^2 so as to insure an absolutely gas tight closure. A right-handed rotation of the plug moves the same outward and at the limit of this outward movement the sleeve f' is brought in alinement with the port b in the bushing, while at the same time, although some of the tension is taken off the spring plate H in order to avoid undue friction, yet the spring is still sufficiently tensioned to maintain the valve plate I in close contact with the seat b^2 to prevent any entrance of liquid or dirt between the valve and valve plate.

The valve can only be disassembled by first removing the screw e^{11}. In order to prevent unauthorized removal of this screw by the use of any ordinary tools its head is not slotted in the usual way but is provided with oppositely arranged short radial notches extending from a solid center as shown at the left of Fig. 8, whereby it becomes necessary to use a special key for the removal of said screw. After the screw is removed the part E may be turned with a suitable tool, until the extensions e' are freed from the cam projections d, and then withdrawn from the bushing. The part E′ may then be unscrewed with a suitable tool and withdrawn, together with the valve body. In this way the parts can be examined and, if necessary, the valve plate I may be replaced by a new one. The removal of the screw f^3 permits the separation of the valve body F from the part E′ if inspection or replacement of the spring plate H should be required. Owing to the peculiar shape of this spring plate it is held in place laterally by means of the pillar f^2 and sleeve f' while its four prongs distribute the spring pressure in a substantially uniform manner to the disk f.

N represents the tubular body of the tap which is arranged eccentrically on the rear or outer side of a coupling head O and which is provided with a laterally projecting nozzle p, opposite which is a hollow lat-

erally projecting handle p'. The body of the tap is adapted to receive the tapping or draft tube whereby the liquid is withdrawn from the barrel. The nozzle p is adapted to receive a tube or conduit through which compressed air or gas is delivered into the barrel for forcing or expelling the liquid therein through the draft tube. The coupling head O is provided on its inner side with a tubular shank r which is adapted to enter the outer or rear end of the bushing and around this bushing the coupling head is provided on its inner side with a packing ring r' of rubber or other suitable material which is adapted to engage with the outer face of the bushing and form a tight joint between the same and the coupling head while the tapping device is in operation.

Means are provided for compelling the tap to turn with the plug for opening and closing the valve and also detachably connecting the same with the bushing. The preferred means for this purpose as shown in the drawings consist of a pair of lugs s, s, formed within the bore of the shank r and adapted to enter the notches e^3 formed in the outer part of the plug and two coupling lugs t, t, projecting laterally from diametrically opposite sides of the periphery of the shank and adapted to coöperate with the tightening ribs d of the bushing. In attaching the tap to the plug and bushing, the tap is first placed with its laterally projecting lugs t, t, in alinement with the spaces between the ribs d of the bushing and is then moved forwardly so that its shank enters the outer end of the bushing and its laterally projecting lugs t, t, pass through the spaces between the ribs, its lugs s, s, entering the notches e^3 of the plug head. After the tap has been thus applied to the bushing and plug it is turned toward the right, thereby causing the laterally projecting lugs t, t, of the shank to engage with the inclined front sides of the ribs d of the bushing, the head of the tap and the packing r' thereby drawing firmly against the outer end of the bushing, and forming a tight connection between these parts. While thus turning the tap for connecting the same with the bushing, the plug is also turned by means of the interlocking lugs and notches e^3, thereby causing the sleeve f' of the valve body to be brought in alinement with the port of the bushing head. In the coupled position of the tap and plug, the body of the tap is in line with the openings of the plug so that when the valve is opened, the port of the bushing head, the openings of the plug head, and the tubular body of the tap are all in alinement.

Before turning the tap for opening the valve, the tapping pipe or rod G is pushed part way through the stuffing box q at the outer end of the tap and after the latter has been fully turned toward the right together with the plug, the tapping rod is pushed inwardly through the openings of the plug and the port of the bushing into the barrel for withdrawing the liquid therefrom.

When disconnecting the tapping device from the barrel, the tapping rod is first withdrawn from the barrel and into the body of the tap and then the latter is turned toward the left until the tightening lugs on its shank are disengaged from the inclined inner sides of the bushing ribs and brought into alinement with the spaces between the same. Thereafter the tap may be withdrawn axially from the bushing and the plug head. While thus turning the tap toward the left for disengaging the same from the plug, the latter is also turned in the same direction for bringing its stopper over the valve seat of the bushing and closing the valve.

It will be noted that in the act of attaching the coupling to the bushing the valve will be opened and that these parts can not be again uncoupled until the valve has been closed.

At U, Fig. 2, is indicated a check-valve for the pressure inlet, this check-valve advantageously being of special construction particularly adapting it for use with a tap of the present type. This check-valve comprises a body portion having a central or axial opening, one end of the body portion being formed as a nipple, u, for the attachment of a hose or pipe. A flange u', outside of which is a nut u^2 is formed integral with the body portion at an intermediate point, and at the end inside this flange are provided screw-threaded portions u^3, u^4, the one, u^3, nearest the flange being of larger diameter than the other.

The extreme inner end of the body portion is properly surfaced off to form a seat. To the screw-threaded portion u^4 is screwed a casing V, Fig. 13, whose inner end is provided with a central guiding opening v and with a series of openings v' around the central guiding opening v and arranged to allow the passage of air or gas.

A valve W having a guiding stem w is located within the casing, said stem w passing through the central guiding opening v. The valve W also has a smaller stem w' projecting outwardly into the central bore of the valve body but of less diameter than the same. The valve W is grooved so as to make a tight closure with the valve seat on the inner end of the valve body, and is held yieldingly against said seat by a spiral spring Y surrounding the guiding stem w.

The larger screw-threaded portion u^3 of the valve body is arranged to screw into the end of the laterally projecting nozzle p of the tap, a washer y of suitable packing material being clamped against the end of

said nozzle p by the flange u', to make an air tight joint.

The check-valve thus constructed is simple, durable, easy of access and free from the disadvantages of the rubber valves heretofore used for such purposes.

What I claim is:

1. In a tap-valve, the combination, with a bushing having an internal screw-thread and a head provided with an eccentrically arranged port, of a plug having an external screw-thread arranged to engage the screw-thread of the bushing, said plug having an eccentrically arranged port arranged to be brought into alinement with the port in the bushing when the plug is rotated in one direction and to be moved out of alinement when the plug is rotated in the opposite direction, a valve body arranged to rotate with the plug and provided with an eccentric port in alinement with the plug port, said valve body being movable axially with respect to the plug, a valve plate carried by the valve body, and yielding means for maintaining said valve plate in contact with the head of the bushing.

2. In a tap-valve, the combination, with a bushing having an internal screw-thread and a head provided with an eccentrically arranged port, of a plug having an external screw-thread arranged to engage the screw-thread of the bushing, said plug having an eccentrically arranged port arranged to be brought into alinement with the port in the bushing when the plug is rotated in one direction and to be moved out of alinement when the plug is rotated in the opposite direction, a valve body arranged to rotate with the plug and provided with an eccentric port in alinement with the plug port, said valve body being movable axially with respect to the plug, a valve plate carried by the valve body, and a plate spring between the valve body and the plug for maintaining said valve plate in contact with the head of the bushing.

3. In a tap-valve, the combination, with a bushing having a head provided with an eccentric port, of a plug rotatable and axially movable within said bushing and provided with an eccentric port, a valve body having a tubular sleeve arranged to enter the port in the plug and to be brought into and out of alinement with the port in the bushing, a valve plate carried by the valve body and having an opening in line with the bore of the tubular sleeve, and yielding means operating on the valve body to maintain the valve-plate in contact with the head of the bushing.

4. In a tap-valve, the combination, with a bushing having a head provided with an annular raised track and an eccentric port surrounded by a raised valve seat, of a plug rotatable within said bushing and provided with an eccentric port, a valve body located between the plug and bushing and provided with an eccentrically located opening in line with the plug port, and arranged to be moved into and out of alinement with the port in the head of the bushing, said valve body being axially movable relative to the plug, a valve plate carried by the valve body, and yielding means for keeping said valve plate in contact with the annular raised track and valve seat.

5. In a tap-valve, the combination, with a bushing having a head provided with an eccentric port, said head having a raised annular track and a raised valve seat surrounding the port, of a plug screw-threaded into the bushing, and provided with an eccentric port, a valve-body having a valve plate and provided with a tubular sleeve arranged to enter the port in the plug, said valve-body also having a pillar engaging the plug, and a plate spring provided with a body held between the pillar and sleeve, said plate spring bearing against the plug and provided with arms bearing at different points on the valve-body, whereby the valve plate is held in contact with the raised annular track and valve seat.

6. In a tap-valve, the combination with a bushing having an internal screw-thread and a head provided with an eccentrically arranged port, of a plug having an external screw-thread arranged to engage the screw-thread of the bushing, said plug having an eccentrically arranged port arranged to be brought into alinement with the port in the bushing when the plug is rotated in one direction and to be moved out of alinement when the plug is rotated in the opposite direction, a valve body arranged to rotate with the plug and provided with an eccentric port, said valve body being movable axially toward or from the plug, a valve plate carried by the valve body, yielding means for maintaining said valve plate in contact with the head of the bushing, and means for preventing access of foreign matter between said valve body and said plug.

7. In a tap-valve, the combination, with a bushing having a head provided with an eccentric port, of a plug rotatable and axially movable within said bushing and provided with an eccentric port, a valve body having a tubular sleeve arranged to enter the port in the plug with a close sliding fit and to be brought into and out of alinement with the port in the bushing, a valve plate carried by the valve body and having an opening in line with the bore of the tubular sleeve, and yielding means for maintaining the valve-plate in contact with the head of the bushing.

8. In a tap valve, the combination, with a bushing having a head provided with an eccentric port and adapted to serve as a valve

seat, of a plug rotatable within said bushing and thereby movable toward and from said head, a valve member between said head and plug arranged to seat against said head and having a port in line with the plug port, said valve member being arranged to be rotated with the plug to bring the alined plug and valve ports into line with the port in the bushing head, said plug and valve member being capable however of limited relative movement toward and from each other, and means coöperating with said plug and tending to maintain the valve member seated against said bushing head.

9. In a tap valve, the combination, with a bushing having a head provided with an eccentric port and adapted to serve as a valve seat, of a valve member rotatably seated against said head and provided with a port adapted to register with the port in said head, a plug rotatable within said bushing and thereby movable toward and from said valve member, said plug being provided with a port, means securing said valve member to said plug to compel rotation of the valve member therewith and to maintain their ports in alinement, said means being arranged to permit limited movement of the plug toward and from the valve member.

In witness whereof I have hereunto affixed my hand this 2nd day of July, 1912.

CHARLES F. TERNEY.

Witnesses:

M. C. MASSIE,

JOHN H. SIGGERS.