

F. L. SMITH & T. B. WILLIAMS.

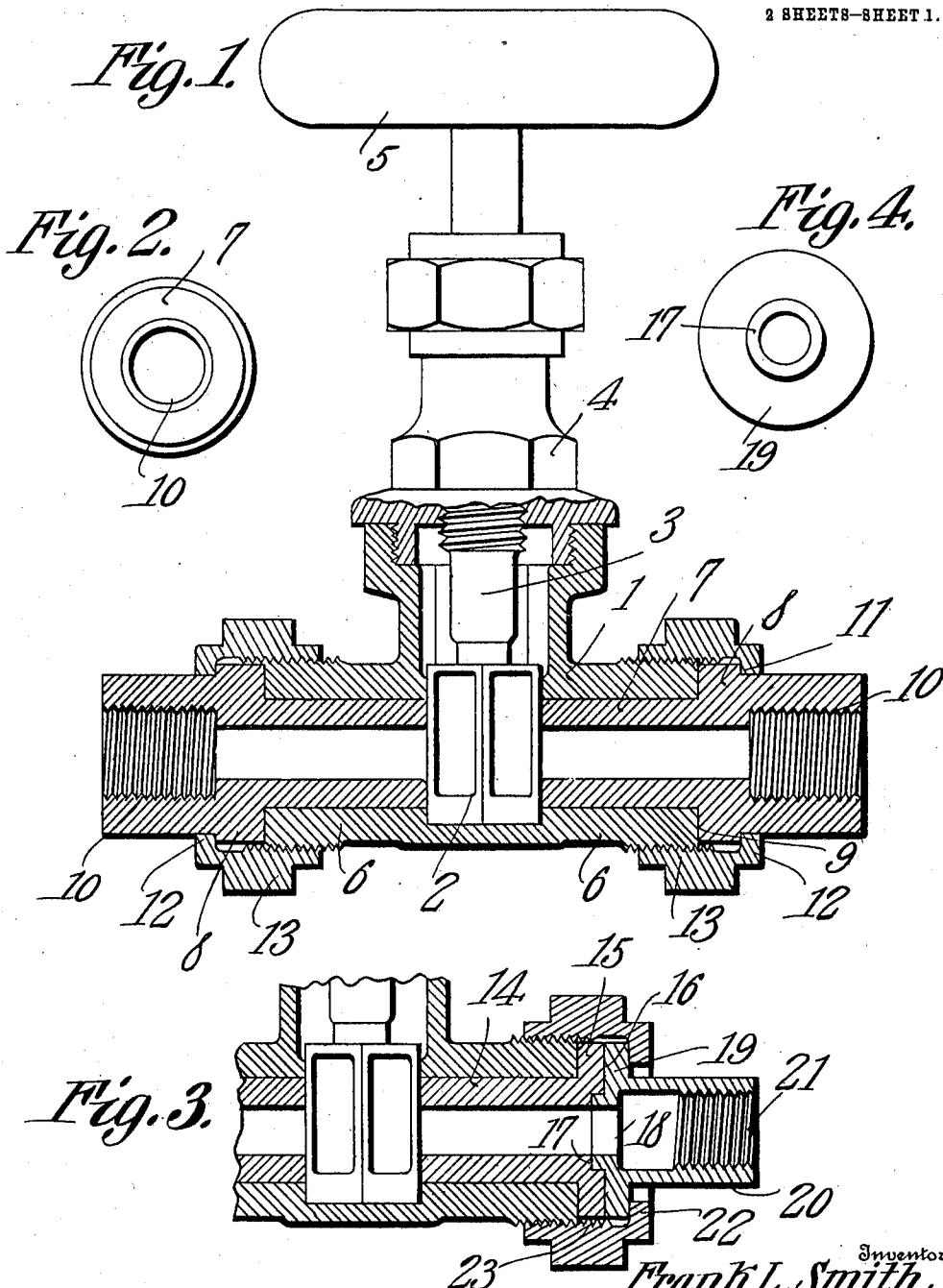
PLUG AND GATE VALVE.

APPLICATION FILED SEPT. 13, 1909.

982,446.

Patented Jan. 24, 1911.

2 SHEETS—SHEET 1.



Witnesses

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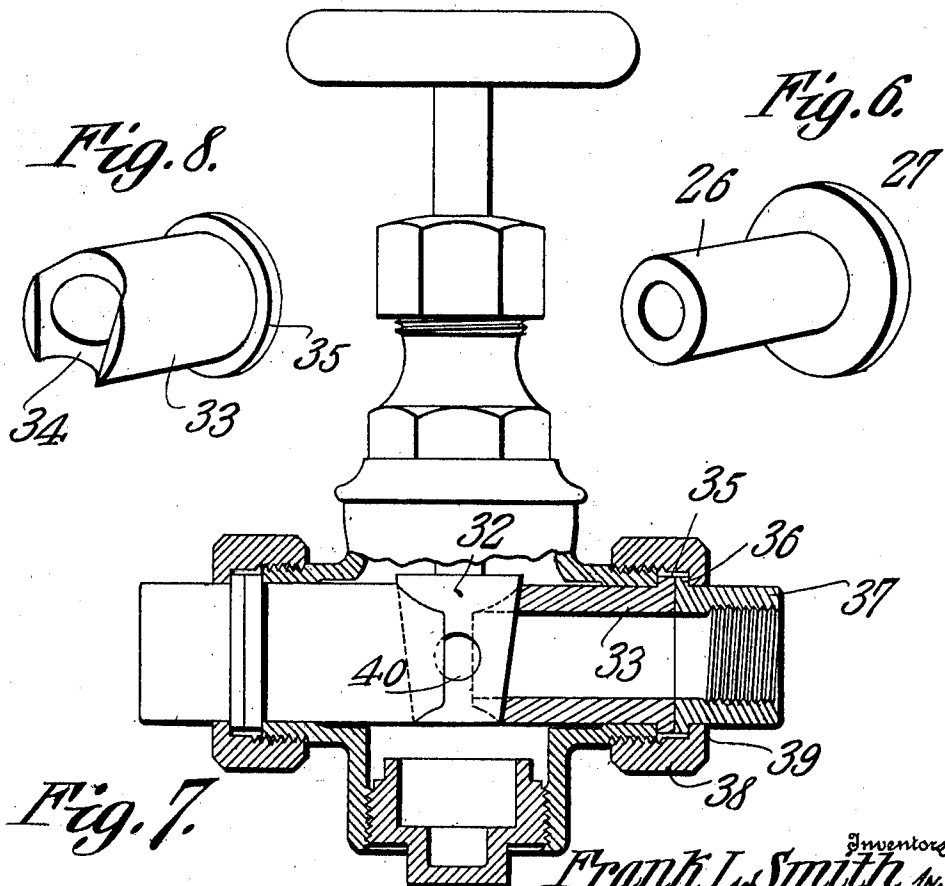
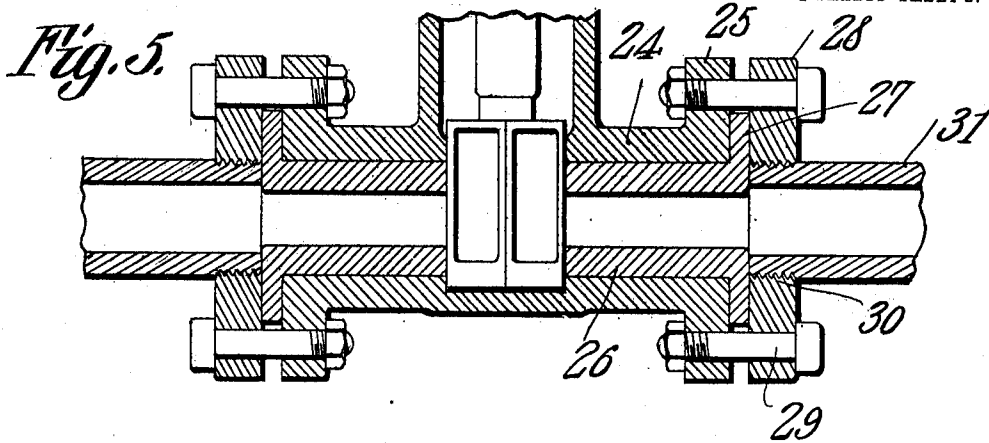
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Witnesses
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UNITED STATES PATENT OFFICE.

FRANK L. SMITH, OF CHICAGO, ILLINOIS, AND THOMAS B. WILLIAMS, OF ORANGE, MASSACHUSETTS.

PLUG AND GATE VALVE.

982,446.

Specification of Letters Patent. Patented Jan. 24, 1911.

Application filed September 13, 1909. Serial No. 517,402.

To all whom it may concern:

Be it known that we, FRANK L. SMITH and THOMAS B. WILLIAMS, citizens of the United States, residing, respectively, at Chicago and Orange, in the counties of Cook and Franklin, States of Illinois and Massachusetts, have invented a new and useful Plug and Gate Valve, of which the following is a specification.

10 This invention relates to plug and gate valves and more particularly to bushings for use in connection therewith and which constitute seats for the valves, the said bushings being removable and capable of being turned
15 down to enable the valve to be accurately re-seated after the parts have become worn to an objectionable extent.

Another object is to provide improved means for fastening the bushings in the valve casing, said means being of such a character as to permit the bushings to be
20 easily withdrawn from the casing whenever desired.

With these and other objects in view, the invention consists in certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

30 In the accompanying drawings the preferred forms of the invention have been shown.

In said drawings:—Figure 1 is a view partly in section and partly in elevation of one form of valve embodying the present improvement. Fig. 2 is an elevation of the outer end of one of the bushings, shown in Fig. 1. Fig. 3 is a section through a portion of a valve having a modified form of bushing therein. Fig. 4 is an elevation of the inner end of the coupling member which engages the outer end of the bushing as shown in Fig. 3. Fig. 5 is a section through a valve casing having another form of bushing mounted therein. Fig. 6 is a perspective view of one of the bushings shown in Fig. 5. Fig. 7 is a view partly in section and partly in elevation of another modified form of valve. Fig. 8 is a perspective view of one of the bushings shown in Fig. 7.

50 Referring to the figures by characters of reference, 1 designates the casing of a gate valve, the valve 2 being carried by a stem 3 which is threaded within a bonnet 4 such

as ordinarily employed, the upper end of the stem being provided with a suitable handle 55 5 whereby it can be conveniently rotated. The opposed alining arms 6 of the casing are provided with smooth bores, in each of which is inserted a tubular bushing 7 having an annular enlargement 8 forming a shoulder 9 which is designed to abut against the end of the arm 6. The outer end of the bushing is of greater diameter than the inserted portion 7 and is counterbored and interiorly screw threaded, as indicated at 10. 65 By reason of the increased diameter of the outer portion of the bushing, an outer shoulder 11 formed by the annular enlargement 8 is smaller than the shoulder 9. This shoulder 11 is designed to be contacted by an inwardly directed flange 12 formed at one end of an interiorly screw threaded coupling ring 13 which engages threads formed upon the arms 6 and has an angular exterior whereby it can be firmly gripped and turned 75 by means of a wrench or other suitable tool.

In a structure such as herein described, the inner ends of the bushings constitute seats for the valve 2. Should the valve and the seats become worn, the bushings can be 80 removed by detaching the rings 13. Then the shoulder 9 can be turned down and the inner end of the bushing also dressed so as to properly fit against the valve.

In Fig. 3 a modified form of bushing has 85 been shown. This bushing 14 has an annular flange 15 at its outer end which is designed to bear against the end of the arm of the valve casing, there being a counter bore 16 in the outer end of the bushing for the reception of a boss 17 formed about an opening 18 in the flanged end 19 of a tubular coupling member 20. This coupling member is interiorly screw threaded as at 21 and the flange 19 thereof is designed to be engaged 95 by a flange 22 carried by a coupling ring 23. This ring is similar to the ring 13 heretofore described and is mounted in the same manner. Obviously, by turning this ring in one direction the flange 22 will bind the 100 flange 19 against the enlarged end 15 of the bushing and will in turn force said bushing the desired distance into the valve casing. In the event of wear, the parts can be dressed in the manner heretofore described so as to 105 permit the accurate readjustment thereof.

In Fig. 5 another modified structure has been described. In this form of device the arm 24 of the casing has an annular flange 25 and the bushing 26 is insertible into the arm and is provided at its outer end with a flange 27. This flange is designed to be clamped against the flange 25 by a ring 28 which is held in position by bolts 29 passing through said ring and also through the flange 25. The ring 28 is interiorly screw threaded as at 30 and is designed to be engaged by the end of a pipe 31.

When the device is provided with a plug valve such as indicated at 32 in Fig. 7, the bushings 33 are formed with tapered recesses 34 in their inner ends, as indicated in Fig. 8, the two recessed ends coöperating to form a seat for the plug valve. The bushing shown in this figure has an annular flange 35 designed to be contacted by a corresponding flange 36 formed around one end of a tubular coupling member 37, there being a coupling ring 38 which is threaded onto the arm of the valve casing and has an inwardly directed flange 39 designed to bear against the flange 36 and hold the members firmly together.

In all forms of the device which have been described, the bushings can be removed and trued so as to fit accurately against the valve, the life of the device being thus greatly prolonged. In some forms of valves of this character it is possible to grind the seats and the valves a couple of times but thereafter the distance between the bushings or the two sides of the seats becomes too great and it is then necessary to discard the entire device. With the present structure however, the bushings as well as the valves, can be trued a number of times without reducing the efficiency of the device.

Attention is directed to the fact that in all of the forms which have been illustrated the bushings have enlargements which are of less diameter than the ends of the casings. In fact it is only necessary to have these enlargements of sufficient size to lap the ends of the casings so as to limit the inward movement of the bushings.

When the device is used as a plug valve as shown in Fig. 7, an opening 40 may be extended diametrically through the plug 32 so as to enable the device to be used as a quarter turn.

It is to be understood that various changes may be made in the construction and arrangement of the parts without departing from the spirit or sacrificing the advantages of the invention.

What is claimed is:—

1. A gate valve including a casing having a smooth bore of unvarying diameter extending thereinto from one end, a bushing insertible into the casing and constituting a valve seat, said bushing having a smooth ex-

terior surface and having integral means for limiting its movement into the casing, all portions of the bushing within the casing being of uniform diameter, and means for securing the bushing to the casing.

2. A gate valve including a casing having a bore of unvarying diameter extending thereinto from one end, the surface of said bore being smooth, a bushing insertible into said bore and constituting a valve seat, said bushing having a smooth exterior surface and provided with an integral annular enlargement movable against the casing, all portions of the bushing within the casing being of uniform diameter, and means entirely outside of said enlargement for binding the enlargement against the outer surface of the casing.

3. The combination with a casing having a smooth bore of unvarying diameter extending thereinto from one end, and a valve, of a bushing insertible into the casing and constituting a valve seat, said bushing having a smooth exterior surface and an annular enlargement arranged to contact with the outer surface of the casing to limit the inward movement of the bushing, all portions of the bushing within the casing being of uniform diameter, and means entirely outside of said enlargement and adjustably connected to the casing for binding the enlargement against the casing.

4. The combination with a casing, said casing having a smooth bore extending thereinto from one end and of uniform diameter, of a bushing having a smooth outer surface and insertible longitudinally into the bore, said bushing being of uniform diameter, one end of the bushing constituting a valve seat, there being an annular enlargement upon the bushing movable against the end of the casing, said enlargement being of less diameter than said end, and a coupling ring adjustably mounted upon the casing and having integral means for clamping the enlargement against the casing.

5. The combination with a casing having a bore of uniform diameter extending thereinto from one end said bore having a smooth face, of a bushing slidable longitudinally into the bore and having a smooth exterior surface, said bushing being of uniform diameter and having an annular enlargement arranged to bear against the outer face of said end of the casing, the enlargement being of less diameter than said end, and a coupling ring adjustably mounted upon said end portion of the casing and having an inwardly directed flange engaging the enlargement to bind it against the end of the casing.

6. The combination with a casing having a bore of uniform diameter extending thereinto from one end, said bore having a smooth surface, of a bushing slidable longitudinally into the bore and having a smooth exterior

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surface, said bushing having an annular enlargement adapted to bear against the outer face of said end of the casing, the enlargement being of less diameter than said end,
5 a tubular member having an annular outstanding portion at one end contacting with the projecting end of the bushing, and means adjustably engaging the casing and engaging the outstanding annular portion
10 upon the tubular member, for clamping the annular enlargement of the bushing between

the end of the casing and the annular portion of the tubular member.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses. 15

FRANK L. SMITH.
THOMAS B. WILLIAMS.

Witnesses:

CHARLES A. PIKE,
FRANK A. HOWE.