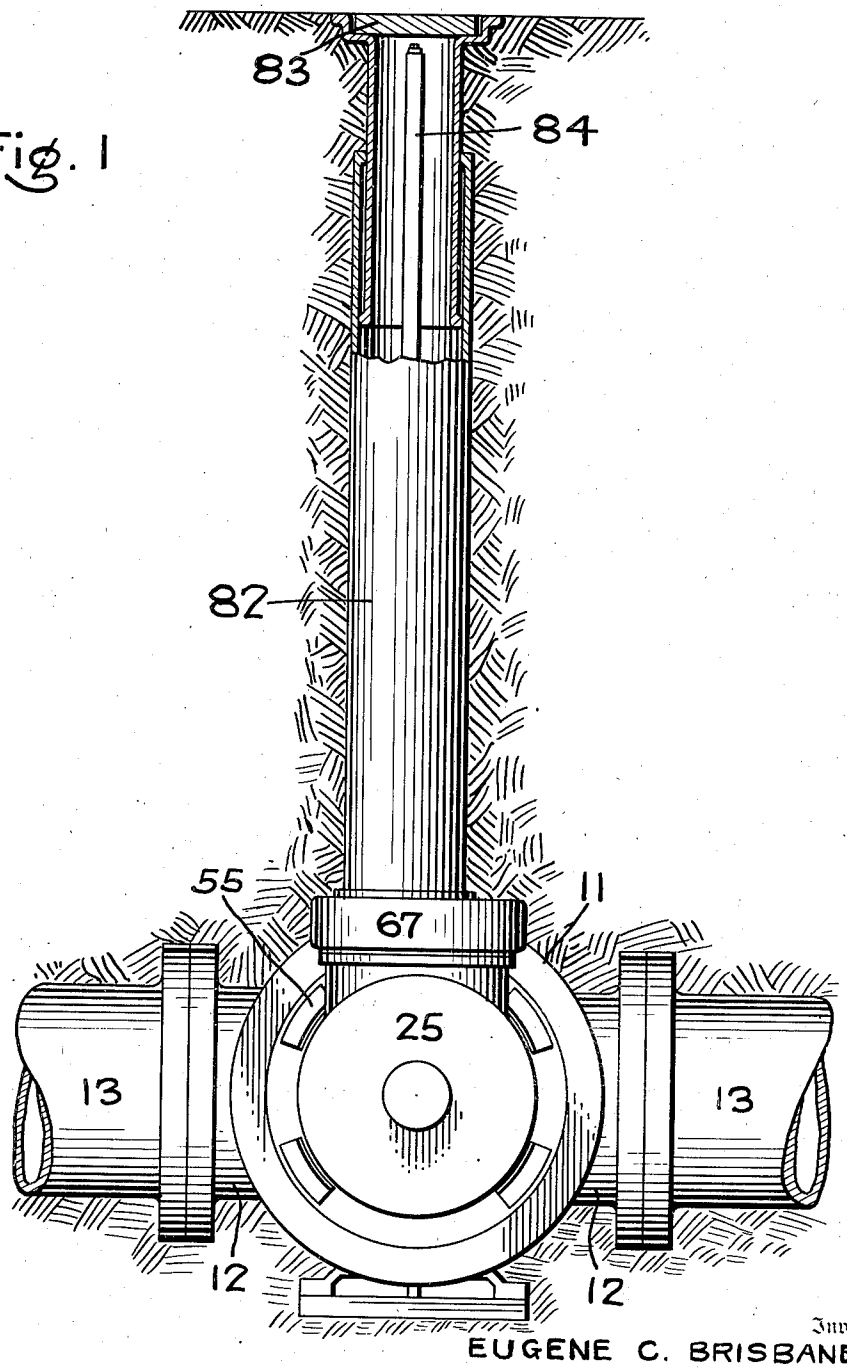
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FLUID CONTROL MEANS

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Fig. 1



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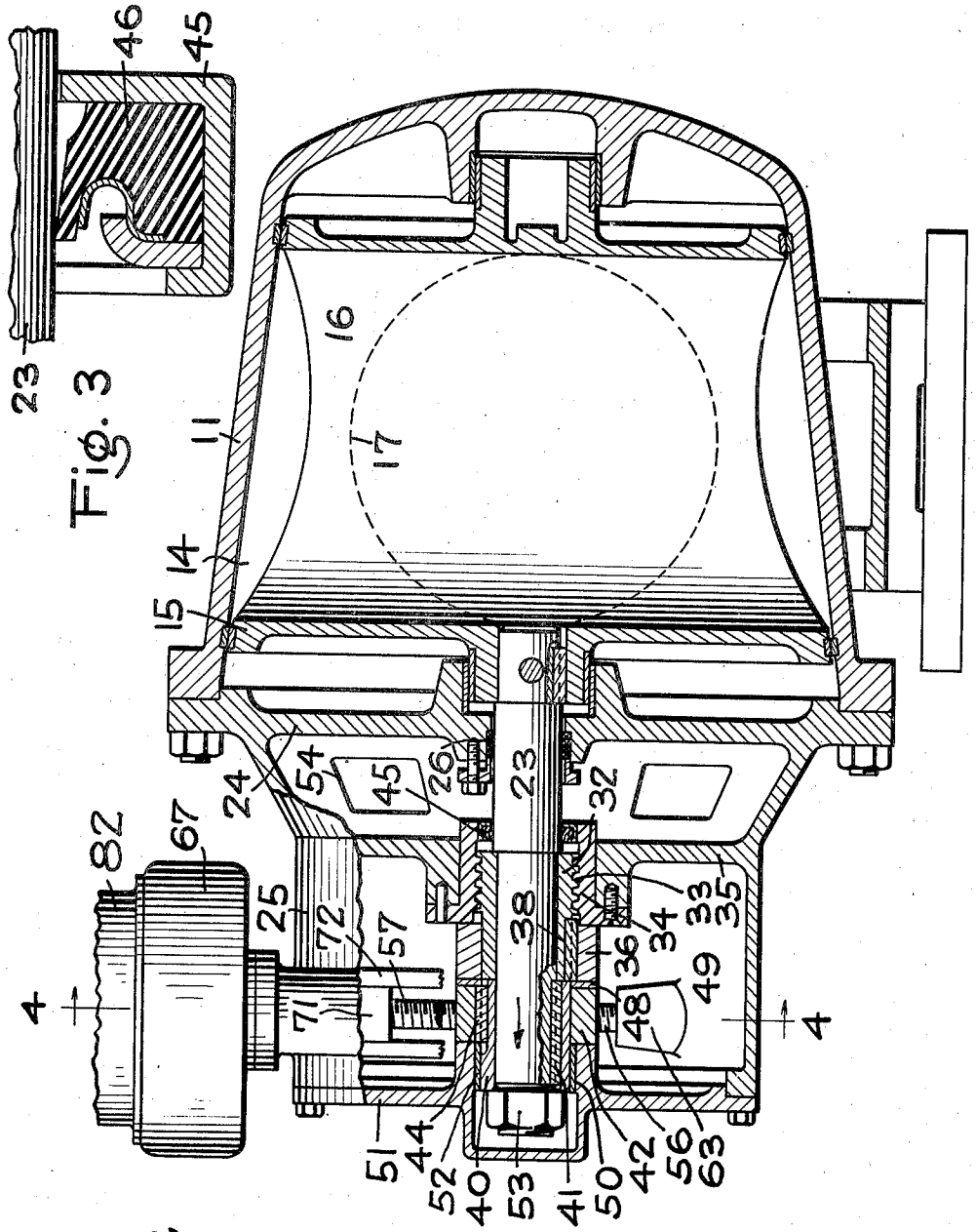


Fig. 3

Fig. 2

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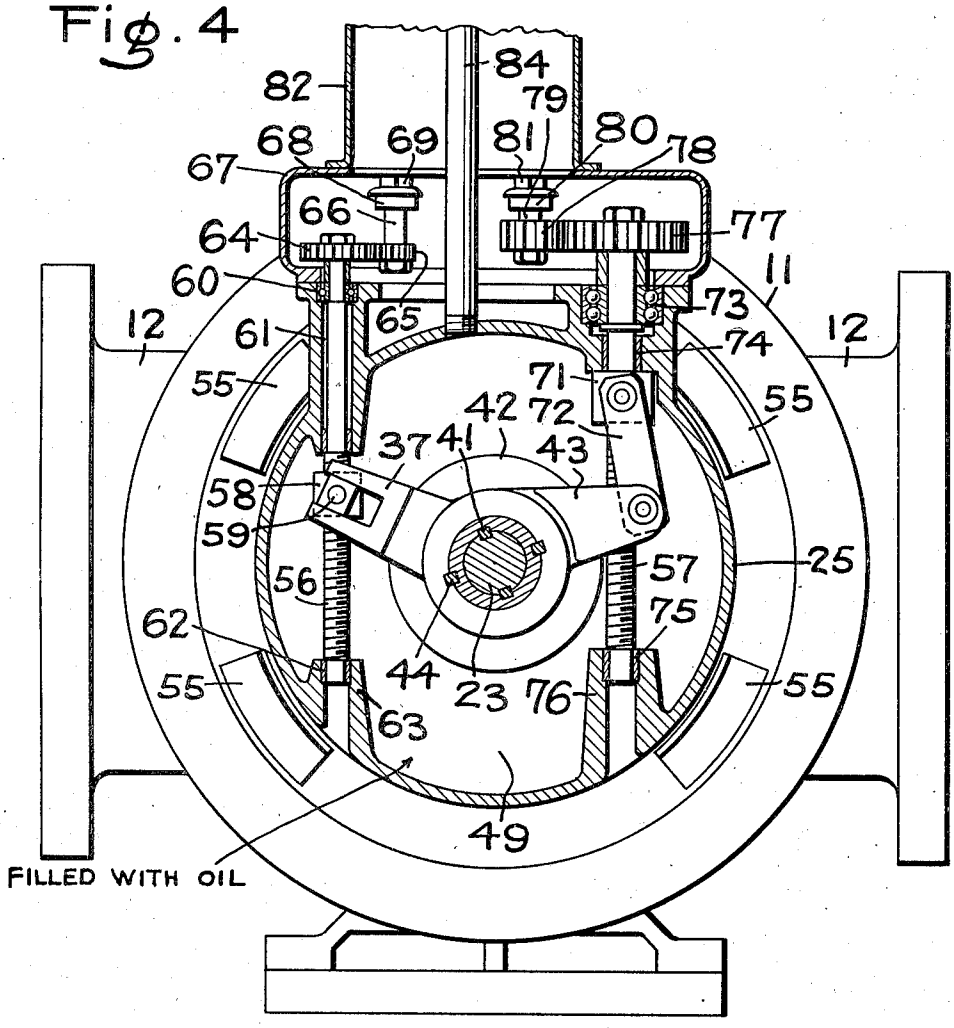
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FLUID CONTROL MEANS

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Fig. 4



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Patented Aug. 5, 1941 2,251,320

UNITED STATES PATENT OFFICE

2,251,320

FLUID CONTROL MEANS

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Application March 2, 1939, Serial No. 259,319

3 Claims. (Cl. 137—139)

This invention relates to valves of the type adapted to be installed in municipal water distribution systems and the like.

Valves of such type may be manually operable and the gates or the valve plugs may remain open for long periods of time.

The valves are usually buried at a depth several feet below the top of the ground. After the valves are connected to the pipe line, the earth is back filled and tamped around the body of the valves.

The construction of the valves heretofore employed for the above purpose was usually such that no provision was made for protecting the valve operating mechanism. Accordingly, after one of the valves remained buried in the ground for several years, the valve and its mechanism would be inoperative, due to corrosion, rust, and other causes, with the result that when it was desired to operate the valve to control communication in the pipe line, the mechanism refused to function.

An object of the present invention is to provide an improved valve in which the valve operating mechanism is enclosed in a fluid-tight housing.

Another object of the invention is to provide an improved valve of the above type in which the valve operating mechanism is submerged in oil.

Another object of the invention is to provide an improved valve in which the housing of the valve operating mechanism is disposed in spaced relation to the main body of the valve.

Another object of the invention is to provide an improved means for sealing the joint between the shaft of the valve plug and the housing of the valve operating mechanism.

Another object of the invention is to provide an improved valve adapted to be buried in the ground without the use of additional protective means and in which the operating mechanism of the valve is protected from damage and deterioration of a nature such as would render the valve inoperative.

The invention also comprises certain new and useful improvements in the construction, arrangement and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

In the accompanying drawings:

Figure 1 is an end elevation of a valve installation embodying the present invention;

Fig. 2 is a vertical longitudinal section of a portion of the valve structure shown in Fig. 1;

Fig. 3 is an enlarged section of the valve plug shaft packing; and

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 2.

Referring to the drawings, the valve has a main body or casing 11 formed with diametrically disposed waterway extensions 12 adapted to be connected in any suitable manner to the adjacent ends of pipe 13.

The pipe line 13 may be buried at a suitable depth in the ground and the valve 11, after being installed in the pipe line, is also adapted to be covered with earth.

Formed in the main body 11 of the valve is a cavity 14 for a tapered plug 15.

The plug 15 is formed with a waterway 16 which is adapted to be registered with the waterway 17 formed in the extensions 12 so as to establish communication through the pipe line.

As is customary in the construction of tapered plug valves, the plug 15 is adapted, when either in open or closed position, to be wedged or seated in the cavity 14, and, therefore, in order to turn the plug it is first necessary to unwedge the same. Thus, the plug 15 is supported for both axial and rotary movement in the valve body 11.

At its outer or larger end the plug 15 has secured thereto one end of a shaft or stem 23.

The plug shaft 23 extends through a web 24 of a housing 25 attached to the valve body 11, said web constituting a cover plate for the larger end of the valve body, and said housing 25 constituting a closure for the valve operating mechanism (see Fig. 2).

A packing gland 26, fastened to the outer side of the web 24, prevents leakage of fluid from the interior of the valve housing 11, around the shaft 23.

Mounted on the valve shaft 23 is a sleeve 32 having a portion of its exterior formed with screw threads 33. The sleeve is free to turn independently of the valve shaft 23.

The threaded portion 33 of the sleeve 32 is mounted in an internally threaded bushing 34 fixed to a web 35 of the housing 25.

The web 35 is spaced a suitable distance from the web 24 heretofore referred to, and constitutes the inner wall of the chamber which encloses the valve operating mechanism.

Mounted on the sleeve 32 is the hub 36 of a lever 37, said lever being connected to the sleeve 32 by means of a sliding key 38, so that when the lever 37 is operated, the sleeve 32 will also be operated. The sliding key 38 permits axial or longitudinal movement of the sleeve 32 with re-

spect to the hub of the lever 37 when the valve plug 15 is being unwedged or wedged in its seat in the valve body 11.

Beyond the sleeve 32 the valve shaft 23 has mounted thereon a collar 40 which is connected to said shaft by a key 41.

Mounted on the collar 40 is the hub 42 of a lever 43, said lever being keyed to the collar 40, as indicated at 44, Fig. 2. The purpose of lever 43 is to turn the valve plug 15 (see Figs. 2 and 4).

At a point adjacent the inner end of the sleeve 32 the shaft 23 has mounted thereon a thrust washer 47.

Also interposed between the hub 36 of the lever 37 and the hub 42 of the lever 43, is a washer 48.

A fluid-tight sealing means 45 encircles the shaft 23 at a point inwardly with respect to the sleeve 32, said sealing means being supported by the inner portion of the bushing 34, as shown in Fig. 2. The sealing means includes a ring 46 formed of suitable resilient material, such as rubber composition or the like. The ring 46 is adapted to bear against the shaft 23 so as to prevent loss of fluid from chamber 49, as will be hereinafter described.

Mounted in a bore 50 formed in the outer wall 51 of the housing 25 is a bushing 52 which constitutes a bearing for the outer end of the valve shaft 23.

The outer end of the shaft 23 is threaded for the reception of a nut 53.

When the parts are being assembled the nut 53 is screwed inwardly an amount sufficient to retain the sleeve 32 and the collar 40 in position on the shaft 23, but the nut 53 is not screwed in far enough to bind the sleeve 32, since the sleeve should be free to turn on the shaft 23 and should also be free to float up and down the shaft a slight distance, say .005 to .015 of an inch. When the sleeve 32 has been properly assembled on the shaft 23, the nut 53 may be locked in position by any suitable means.

The levers 37 and 43 may be moved by any form of energy, such as hydraulic, electric or manual, the construction shown in the drawings being arranged to be operated by hand.

In this construction there is provided a screw spindle 56 which is operatively connected with the lever 37, and a screw spindle 57 which is operatively connected with the lever 43.

The outer or free end of the lever 37 is forked so as to straddle a cross head nut 58 mounted on the screw spindle 56.

The nut 58 carries diametrically disposed pins or trunnions 59 which are slidably mounted in the forked end of the lever 37, as shown in Fig. 4.

The upper end of the spindle 56 is supported in a bearing 60 mounted in a bore 61 formed in the housing 25. The lower end of the spindle 56 is mounted in a bushing 62 supported by a boss 63 formed in the housing 25.

The upper extremity of the spindle 56 extends upwardly through the housing 25 and has mounted thereon a gear 64.

The gear 64 is in meshing relationship with a gear 65 on a vertically disposed shaft 66 supported in a housing 67 mounted on top of the housing 25. The manner of supporting the shaft 66 is indicated at 68, Fig. 4.

The upper end of the shaft 66 is formed with a head 69 adapted to receive a tool (not shown) by which the spindle 56 can be operated to effect movement of the cross head nut 58 thereon.

Mounted on the screw spindle 57 is a cross head nut 71 which is connected to the outer end of the lever 43 by a pair of links 72.

The upper end of the spindle 57 is supported in a bearing 73 mounted in a bore 74 formed in the housing 25. The lower end of the spindle 57 is mounted in a bushing 75 supported by a boss 76 formed in the housing 25.

The upper extremity of the spindle 57 extends upwardly through the housing 25 and has mounted thereon a gear 77.

The gear 77 is in meshing relationship with a gear 78 on a vertically disposed shaft 79 supported in the housing 67, as indicated at 80, Fig. 4.

The upper end of the shaft 79 is formed with a head 81, similar to the head 69 heretofore referred to.

Supported by the housing 67 and extending upwardly therefrom is a tubular member 82, which may consist of two telescoping parts, as shown in Fig. 1. The top of the tube 82 is formed to receive a cover plate 83. The top of the tube 82 is adapted to be disposed at the surface of the ground.

The mechanism disposed within the chamber 49 is adapted to be submerged in oil, and in order that oil may be supplied to said chamber from time to time, disposed within the tube 82 is a pipe 84 having its lower end inserted in the wall of the chamber 49.

Assuming that the valve is closed and the plug 15 seated, as shown in Fig. 2, when it is desired to open the valve, the shaft 66 is turned, by means of a suitable tool, in the direction to cause the sleeve 32 to turn within the stationary bushing 34 so that a longitudinal or axial movement of the shaft 23 is effected in the direction of the arrow (Fig. 2). This results in the valve plug 15 being moved slightly so as to unwedge the same from its seat in the valve body 11.

After the plug 15 has been unwedged, the operating tool is applied to the shaft 79 and said shaft turned an amount sufficient to rotate the plug 15 through an angle of approximately 90°. The shaft 66 is then turned, but in the direction opposite to the unwedging movement initially imparted thereto, thereby reseating the plug 15 in the valve body 11.

One of the salient features of the present invention is the manner in which the valve is constructed whereby its mechanism is enclosed in an oil-tight chamber 49, which chamber is spaced from the main valve body so as to enable access to be had through openings 54, in the portion of the housing 25 between the webs 24 and 35, for the purpose of adjusting the packing gland 26. As shown in Fig. 4, the openings 54 are normally closed by cover plates 55. A valve constructed in the above manner can be buried in the ground, as shown in Fig. 1, without damage to any of the parts of the valve, since all of the operating elements are enclosed and protected by suitable casing. Since the operating mechanism of the valve is submerged in oil the mechanism will be protected in such a manner that the valve will remain in serviceable condition for many years without the necessity of repair or adjustment. The oil used in the chamber 49 may be any type of inexpensive oil of light viscosity. If so desired, a suitable quantity of oil can also be placed in the housing 67 to cover the gears therein and to lubricate the bearings 60 and 73.

Having thus described my invention, what I claim is:

1. In underground pipe and valve equipment

of the kind comprising in combination, a buried valve, a tubular member extending upwardly from the valve, said tubular member consisting of two telescoping parts, the upper part supporting a cover plate at the ground surface and leading therefrom downwardly within the lower part, the valve comprising a body, a water gate therein, a housing secured to said body and forming a complete enclosure, said body and said housing having adjacent walls spaced from each other, a valve shaft extending from said water gate through said walls and terminating within said housing, sealing means for said shaft at its entrance to said housing, mechanism within said housing and operatively connected with said shaft for operating said water gate, said housing forming an oil-tight chamber for said mechanism, means extending outwardly from said housing and operatively connected to said mechanism for actuating said mechanism, said operating means including a pair of spaced apart operating heads, each head adapted to receive a detachable operating tool, a casing secured to said housing for enclosing and protecting said actuating means, said casing having an upper surface for supporting the lower end of the outer part of said tubular member, and an oil-filling tube for said housing extending upwardly through said casing and into said tubular member and having its top disposed for ready access when the cover plate is removed.

2. In an underground pipe and valve equipment of the kind comprising a buried valve having a body, a water gate therein, a housing secured to said body and forming a complete enclosure, a valve shaft extending from said water gate through the wall separating the housing from said body and terminating within said housing, mechanism within said housing and operatively connected with said shaft for operating the water gate, said housing forming an oil-tight chamber for said mechanism, and means extending outwardly from said housing and operatively connected to said mechanism for actuating said mechanism, said operating means including a pair of spaced apart operating heads, each head adapted to receive a removable operating tool, the combination of a casing secured to said housing for enclosing and protecting said actuating means, a tubular member secured to the casing and extending upwardly from said casing, said tubular member comprising two telescoping parts, the upper part supporting a cover plate at the ground surface and leading therefrom downwardly within the lower part, the diameter of said tubular member being of such dimensions as to permit the operating tool to be readily positioned on either of the operating heads, and an oil-filling tube for said housing extending upwardly through said casing and into said tubular member and terminating adjacent said cover plate for ready access when the cover plate is removed, said oil-filling tube being disposed in the space between said pair of operating heads in position so as not to interfere with the positioning of the operating tool thereon.

3. In an underground pipe and valve equipment of the kind comprising a buried valve having a housing secured thereto and forming a complete enclosure for the valve operating mechanism, and means extending outwardly from said housing and operatively connected to the valve operating mechanism for actuating said mechanism, said operating means including a pair of spaced apart operating heads, each head adapted to receive a removable operating tool, the combination of a casing secured to said housing for enclosing and protecting said actuating means, a tubular member secured to said casing and extending upwardly from said casing, said tubular member comprising two telescoping parts, the upper part supporting a cover plate at the ground surface and leading therefrom downwardly within the lower part, the diameter of said tubular member being of such dimensions as to permit the operating tool to be readily positioned on either of the operating heads, and an oil-filling tube for said housing extending upwardly through said casing and into said tubular member and terminating adjacent said cover plate for ready access when the cover plate is removed, said oil-filling tube being arranged in the space between said operating heads so as not to interfere with the positioning of the operating tool thereon when it is desired to operate the valve.

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