D. F. O'BRIEN.

MEANS FOR INSERTING VALVES IN PIPES.

APPLICATION FILED MAR. 12, 1915.

1,174,342.

Patented Mar. 7, 1916.

2 SHEETS—SHEET 1.

Fig. 2.

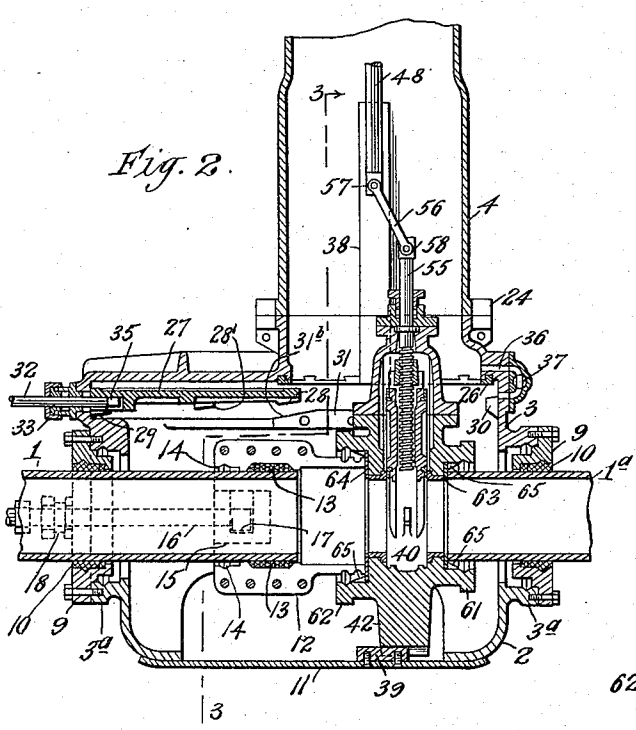


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

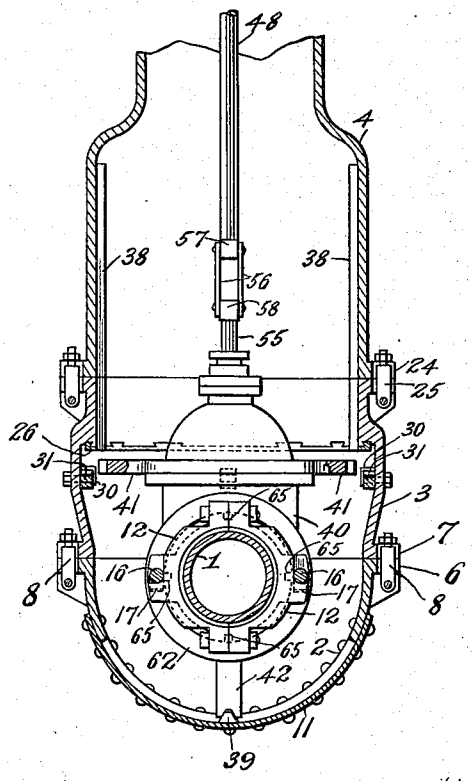


Fig. 4.

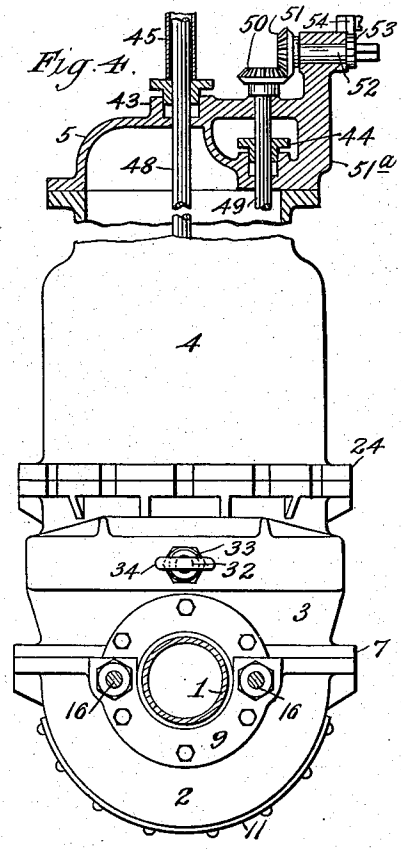


Fig. 6.

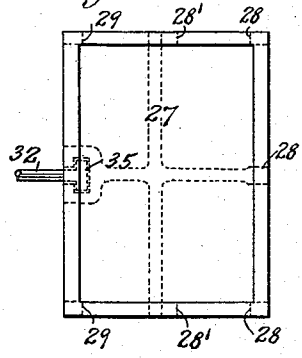


Fig. 5.

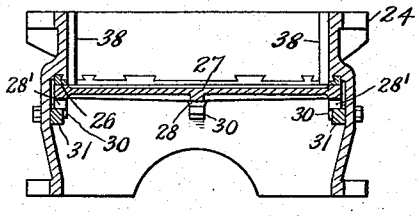
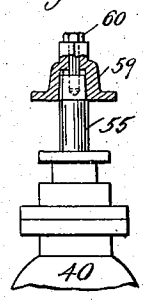


Fig. 7.



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MEANS FOR INSERTING VALVES IN PIPES.

1,174,342. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed March 12, 1915. Serial No. 14,016.

To all whom it may concern:

Be it known that I, DENIS F. O'BRIEN, a citizen of the United States, residing at East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Means for Inserting Valves in Pipes, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in means for inserting valves in pipes or mains.

The object of the invention is to provide means which will make it possible to insert a valve in a pipe or main while the latter is under pressure, that is, without stopping the flow of water or other fluid through it.

With this general object in view, the invention consists in the features, details of construction and combinations of parts hereinafter fully described in connection with the drawings, and then more particularly pointed out.

In the drawings—Figure 1 is a longitudinal sectional view of an apparatus embodying the invention, the valve being ready for insertion in the main or pipe; Fig. 2 a detail longitudinal section showing the valve inserted; Fig. 3 a transverse section on the line 3—3, Fig. 2; Fig. 4 a detail end view; Fig. 5 is a detail, transverse sectional view with the gate closed; Fig. 6 a detail view showing the connection between the gate and its operating rod, and Fig. 7 a detail view of the head at the top of the valve spindle.

Referring to the drawings, the main or pipe, which is shown in its condition after a piece has been cut therefrom, is indicated at 1 and 1^a, it being understood that at the commencement of operations this is one continuous pipe.

A suitable casing is provided whereby the pipe or main at the point where the valve is to be inserted may be inclosed water tight. In order that this casing may be put in place it is made in sections arranged to be bolted together around the pipe. In the present embodiment of the invention, the casing comprises a bottom portion made in two parts, 2 and 3, and a top portion or dome, 4, provided with a cap 5, all suitably secured together.

The parts 2 and 3 of the bottom portion are joined in any suitable manner along a plane substantially parallel to the axis of the main or pipe, but above the said axis. This joint may be made, for example, by providing the parts with flanges, as indicated at 6 and 7. These flanges are provided with registering slots, and to one part, as, for example, the part 2, are pivotally attached a plurality of shackle bolts 8, each of which is arranged to swing up into the corresponding registering slots of the flanges. The bolts are provided with the usual nuts, which when screwed down will hold the parts 2 and 3 together.

The bottom portion, comprising the two parts 2 and 3, as above described, has a circular opening at each end considerably larger than the main or pipe to be cut, and around such opening is an outwardly extending thimble as indicated at 3^a. To each thimble is detachably secured a stuffing box 9, which is made of two parts bolted together around the pipe, as will be clear from Fig. 3. Each stuffing box has a grooved rabbet to receive suitable packing, as indicated at 10, Fig. 1.

For the purpose of lightness and strength the bottom section may have a portion indicated at 11 made of sheet metal such as boiler-plate riveted in place as shown.

A sliding sleeve 12 is provided, this sleeve being made in two parts arranged to be bolted together around the pipe, as by providing each part with flanges, the corresponding flanges of the two parts being bolted together, as will be clear from Figs. 1 and 2 of the drawings. The sleeve 12 has an internal annular recess arranged to receive a suitable elastic packing material, as indicated at 13, Fig. 2, where a water tight connection may be maintained between the sleeve and pipe while at the same time longitudinal movement of the sleeve along the pipe will be permitted. The outer end of the sleeve 12 is provided with a recess at 14, Fig. 2, whose outer wall is grooved, this recess being intended to receive a final packing or calking of any usual kind, when the valve has been inserted in the main and the casing removed. The sleeve 12 is also provided with radially extending lugs, as indicated at 15, arranged to form a connection for suitable sleeve moving devices. In the present example the means for moving the sleeve longitudinally comprises a plurality of rods, two being shown, as indicated at 16, Figs. 1 and 3, each rod having a head 17 arranged to enter

a recess in the corresponding lug 15 of the sleeve. Each rod 16 extends outward through a stuffing box in the end of the bottom portion of the casing, as is indicated at 18, Fig. 1. The end of each rod is arranged to engage a suitable means for moving said rods. In the present example, the means for moving the rods comprise means for forcing said rods inward, and is shown as comprising an abutment ring 19, formed of two halves bolted to the pipe, and screw jacks 20, whose loose ends are cupped to rest on projections 21 extending from the abutment ring 19. The jack screws have heads 22 cupped to receive the ends of the respective rods 16, these heads being loosely mounted on the jack screws so that the latter may be rotated while the heads are stationary. The ends of the rods 16 are formed as removable heads 23, screw-threaded to the rods and provided with a polygonal portion for engagement by a suitable wrench, whereby the heads may be unscrewed, to permit the removal of the rods from their respective stuffing boxes.

The top portion or dome 4 of the casing is removably secured to the bottom portion in any suitable way, as, for example, by means of slotted flanges 24 and shackle bolts 25, such as hereinbefore described as constituting the means for securing together the parts 2 and 3 of the bottom portion of the casing. Between the top and bottom portions of the casing, a gate or cut-off is provided whereby the interior of the top portion may be shut off from the interior of the bottom portion.

The gate constitutes an important feature of the present invention. It is constructed to be opened and closed from the outside of the casing, and is capable of movement in two directions, that is to say, longitudinally and also transversely, as more fully explained hereinafter. In the present invention, a seat 26 is carried by the interior wall of the casing, against which the gate 27 closes tightly. The gate is mounted to slide longitudinally in grooves in the casing, and is provided with inclined surfaces on its bottom, both at the front end and, along each side near the center and the rear end, as indicated at 28, 28′ and 29, Fig. 1. The incline 28 is arranged to engage inclined abutment blocks 30, Figs. 1 and 5, secured to the interior of the casing at one end. Inclines 28′ and 29 of the gate are arranged to engage the respective inclined portions 31^a and 31^b of track bars 31 secured to each side of the casing, the machine portions 31^b being farther down from the gate than are the machines 31^a. The inclines 29 extend farther down from the gate than do the inclines 28′.

When the gate is drawn back to its open position, its sides rest on the bottom of the grooves while the plane of the seat-engaging surface of the gate is below the plane of the seat. When the gate is pushed longitudinally to its closing position, its inclined surfaces 28, 28′ and 29 engage the inclined abutment blocks 30 and the inclines 31^a and 31^b of the track bars 31, respectively, and thereby the gate is lifted toward and into contact with its seat.

For the purposes of moving the gate longitudinally and at the same time permitting the transverse movement toward and from its seat, a stem or spindle 32 is provided, this spindle extending outward through a stuffing box 33 in the casing. The outer end may be provided with a handle 34. The inner end of the stem or spindle 32 is so connected to the gate as to permit the required transverse movement of the latter. For this purpose the inner end of the spindle 32 has a T-shaped head 35 and the bottom of the gate at its front end is provided with a corresponding T-shaped slot, whose depth is greater than the vertical dimension of the spindle head.

A by-pass 36 is provided around the gate, this by-pass being controlled by a cock 37.

The side walls of the top portion 4 are provided with suitable guide mechanism, as, for example, the guide ribs indicated at 38, Fig. 3. The bottom of the casing has a guide member 39. The valve 40 is provided with means for engaging the guide ribs 38. In the present example, the valve has at each side a pair of outwardly-extending lugs 41 (Fig. 3) arranged to receive the corresponding rib between them. Also the bottom of the valve has a downwardly-extending guide member 42 arranged to coact with the guide member 39 at the bottom of the casing, as by grooving the upper member 42 and tapering the lower member 39 to fit it.

The cap 5 of the dome is detachably connected to the dome by suitable means, as, for example, by flange or bolt connections which may be of the kind hereinbefore described for the union of the dome and bottom portion of the casing. The cap is provided with two stuffing boxes, one, 43, advantageously arranged near or at the center of the cap, and the other, 44, at one side thereof. Above the central stuffing box 43 is placed a hollow post 45. On top of the post is placed a nut 47, provided with suitable means for rotating it, as, for example, the handles 46. Through this nut may be threaded a valve-operating spindle 48, which is screw-threaded a considerable distance downward from its upper end, the latter being squared, as shown in Fig. 1, in order that it may be held against rotation by means of a wrench. A second operating spindle, 49, may be passed through the stuffing box 44, as when actuating the cutting mechanism which is preferably of the type shown in Patent No. 587,091. As this sec-

ond spindle 49 must be rotated, it is provided at its upper end with a bevel gear 50 arranged to mesh with another bevel gear 51 mounted on a shaft 52 journaled at the top end of a standard 51ª carried by the cap 5. The shaft 52 has a squared outer end for the reception of a hand crank (not shown) and also is provided with a ratchet-wheel 53 engaged by a pawl 54 mounted on the standard, so that the operating shaft will not be accidentally rotated in a backward direction.

The valve-operating spindle 48 is connected by a suitable universal connection to the valve stem 55 of the valve which is to be inserted in the main or pipe. In the preferred embodiment of the invention, the universal connection comprises links 56 pivotally connected at each end to heads 57, 58, respectively, each head being provided with a threaded bolt portion arranged to be threaded into holes in the ends, respectively, of the valve-operating spindle 48, and of the valve stem 55.

The valve body is provided at each end with hubs, one of which, indicated at 61, is intended to engage the end 1ª of the cut pipe. The other hub 62 is of larger diameter and intended to engage the end of the sleeve. Each hub is provided with a suitable packing device, as the gaskets, indicated at 63, 64, respectively, and has its interior provided with wedge-shaped lugs 65, which serve to center the pipe and sleeve ends respectively, and to hold in place the gaskets 63 and 64. These centering devices are an important feature of the invention.

The operation of the mechanism is as follows: The sleeve, 12, is bolted around the pipe, at the proper place. A suitable pipe cutting device, such, for example, as that shown in said Patent No. 587,091, is mounted around the pipe or main at the place where the valve is to be inserted. The cutting mechanism is operated until the pipe is cut partly through, whereupon the bottom portion of the casing, comprising the two parts 2 and 3, is secured in place, inclosing the sleeve and the cutting mechanism. Gate 27 being opened, a supporting spindle is passed through the central stuffing box 43 of the dome and its end secured to the center of the cutting apparatus. The rotary operating spindle 49 is passed through the side stuffing box of the dome and its end attached to the operating shaft of the cutting mechanism. The dome is then slipped into place, and secured water-tight to the casing by means of the shackle bolts 25. The abutment ring 19 is put in place, and then the cutting mechanism is operated further to complete the cutting of the pipe by rotating the operating spindle through the bevel gears and shaft 52. As soon as the pipe section has been cut off, the cutting mechanism, and with it the cut section of the pipe, are elevated into the dome of the apparatus by rotating the hollow post 45, whereby the supporting spindle is drawn upward, thus lifting the cutting mechanism and pipe section into the dome. Thereupon the gate 27 is closed by pushing in the rod 32. It will be noted that this gate is free to move longitudinally until nearly opposite its seat, and thereafter, by further inward movement of the rod 32, the gate rides up the respective inclines on the track bars 31 and abutment blocks 30, so that finally the gate firmly contacts with its seat. As the seat is above the gate, any pressure of water in the bottom portion of the casing will tend to hold the gate to its seat. The by-pass cock 37 is turned to shut off the connection between the bottom and top portions of the casing, and thereafter the dome may be detached and the cutting mechanism with the cut pipe section removed. The rotary operating spindle 49 is removed from the dome and cap, and the opening through which it passes is closed by a plug. The valve is then put in place in the dome, its projecting lugs 41 engaging the guide ribs 38. The valve stem 55 is attached to the links 56 at the lower end of the operating spindle 48, and the dome replaced on the bottom portion of the casing. The by-pass 36 is then opened by turning the cock 37, thus admitting water to the dome and balancing the pressure on the gate 27. The gate may then be opened by pulling outward on the rod 32, whereupon the valve may then be lowered into position at the cut in the pipe by rotating the hollow post 45. Substantially at the time when the lugs 41 on the valve body leave the guide ribs 38, the lower guide member 42 of the valve engages the corresponding guide member 39 on the bottom of the casing. This insures the proper alinement of the valve body with the main or pipe. The jack screws 20 may then be put in place between the abutment ring 19 and the rods 16, and operated to push the rods 16 inward, whereby the sleeve 12 is forced into the large hub 62 on the valve and into contact with the packing ring 64, being suitably guided and centered by the lugs 65, inside the hub 62. Further movement inward of the rods 16 slides the valve toward the section 1ª of the pipe, the end of this section being received in the hub 61 of the valve, and centered by the corresponding lugs 65 therein. By means of the jack screws, the valve is pushed tightly against the end 1ª of the pipe, so that the packing rings 63 and 64 are both firmly compressed. In this condition, no further water can leak from the main into the casing, and the dome may then be removed while the gate is opened. Thereafter, the hubs 61 and 62 of the valve may be packed and calked in the usual way. The casing may then be re-

moved from the pipe and the outer end of the sleeve 12 may be packed and calked in the usual manner.

In Fig. 7 is illustrated a head 59 provided with a squared socket which receives the squared end of the valve spindle and is secured thereto by a machine screw 60. This head has a squared portion to receive a standard key used for operating the valve.

It will be noted that by the present construction the casing may be used on mains or pipes of different sizes by the use of interchangeable stuffing boxes at each end of the bottom portion of the casing of such size as to suit the pipe to be cut. Furthermore, owing to the peculiar construction of the valve body, the valves, although of different sizes, may be provided with laterally extending lugs of different lengths for the different sizes of valves to engage the guide ribs, and with downward projecting guide members of such length as always to engage the coacting guide member at the bottom of the casing when the valve is properly alined with the pipe.

Owing to the fact that the bottom portion of the casing is divided into two parts in a plane above the axis of the pipe, the rods 16 may engage the sleeve 12 on opposite sides, of a diameter of the sleeve, so that a straight push on the sleeve is possible and all canting action avoided.

What is claimed is:

1. In a valve-inserting mechanism, the combination, with a casing having a bottom portion arranged to be secured about the pipe or main, said bottom portion being provided with a downward facing seat, said bottom portion having a stuffing box, of a rod extending through said stuffing box and having its end inside said stuffing box provided with a head, a gate movable longitudinally in the casing and arranged to come opposite said seat, said gate being provided with guides engaging the head on said rod whereby a movement of the gate transverse to the rod is permitted while a longitudinal movement of the rod produces a longitudinal movement of the gate, said gate also having inclined portions, and inclined members carried by the casing and arranged to engage the inclined portions of the gate to force the latter against the seat, substantially as described.

2. In a valve-inserting mechanism, the combination, with a casing having a bottom portion arranged to be secured to the pipe or main, said bottom portion comprising two parts joined along a plane above the axis of the pipe, a sleeve arranged to be secured to the pipe wholly within the casing, and sleeve-operating rods passing through the ends of the lower part of the bottom portion and arranged to engage the sleeve.

3. In a valve-inserting mechanism, the combination, with a casing having a bottom portion and a dome, of guide mechanism inside said dome, and a valve having a casing provided with lugs arranged to engage said guide mechanism.

4. In a valve-inserting mechanism, the combination, with a casing having a bottom portion, a guide member in said bottom portion, and a valve having a casing provided with a guide member arranged to coact with the guide member of the casing.

5. In a valve-inserting mechanism, the combination with a casing comprising a bottom portion, and a dome, of guide mechanism in said dome, a guide member inside the bottom of the casing, a valve having a casing provided with means for engaging the guide mechanism in the dome and with a guide member arranged to coact with the guide member at the bottom of the casing, means for lowering the valve and its casing while guided by the guide mechanism, and means for moving the valve and its casing transversely when the said guide members are in engagement.

6. In a valve-inserting mechanism, the combination, with a casing, a sleeve arranged wholly within the casing and longitudinally movable on the pipe, stuffing boxes at one end of the casing, rods passing through said stuffing boxes and engaging the sleeve, an abutment device arranged to be secured to the pipe outside the casing, and means arranged to react against the abutment device to force the rods inward, whereby the sleeve is moved.

7. In a valve-inserting mechanism, the combination with a casing arranged to surround the pipe and inclose its cut ends, of a sleeve wholly within the casing and surrounding one end of the cut pipe, a valve casing having hubs arranged to engage the end of said sleeve and the opposite end of the pipe, said hubs having internal wedge-shaped lugs for centering the sleeve and the said opposite pipe end, and means operable from the exterior of the casing for pushing the sleeve into one valve casing hub and the other valve casing hub onto said opposite pipe end.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

DENIS F. O'BRIEN.

Witnesses:
A. WHITE,
J. F. DONOVAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."