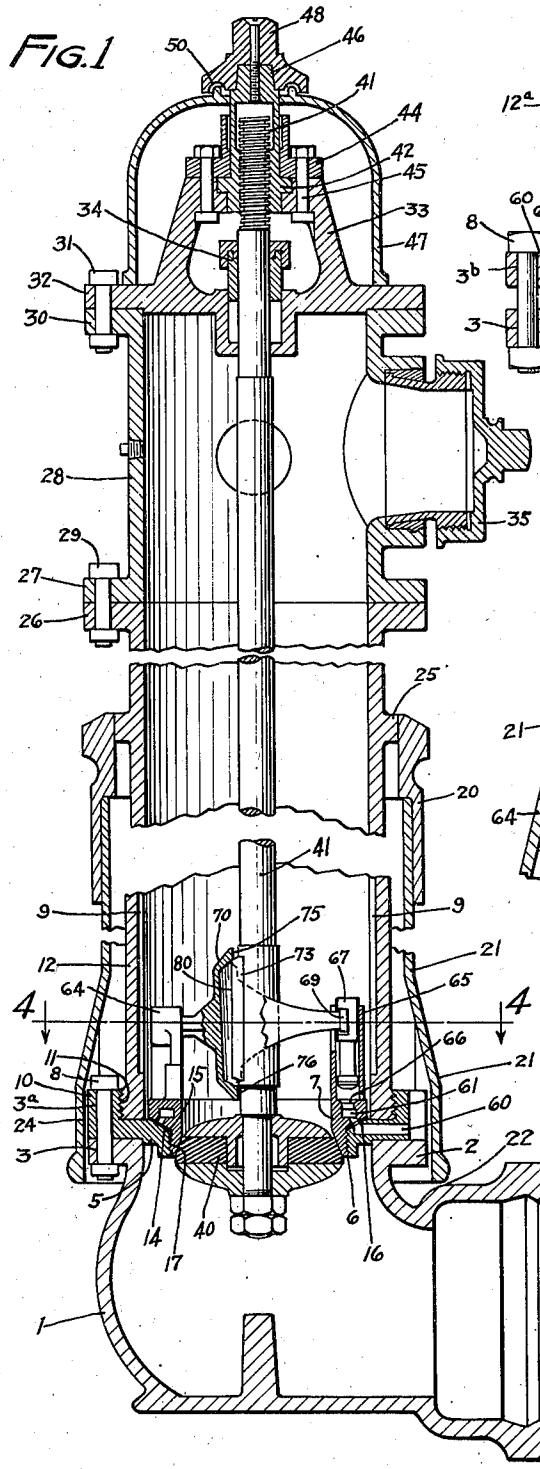
April 27, 1937. L. P. STOREY 2,078,782

HYDRANT

Filed May 11, 1933 2 Sheets-Sheet 1

FIG. 1



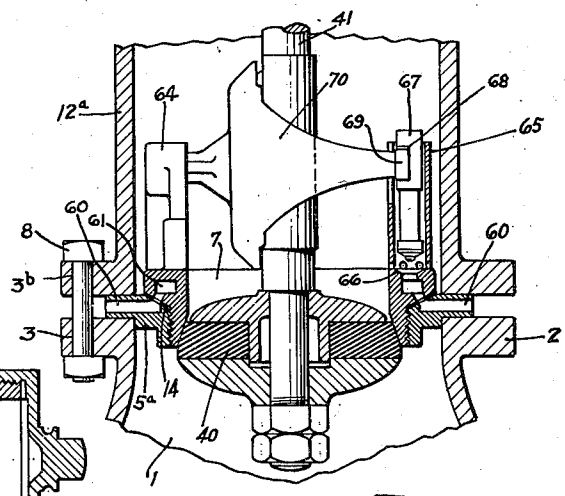
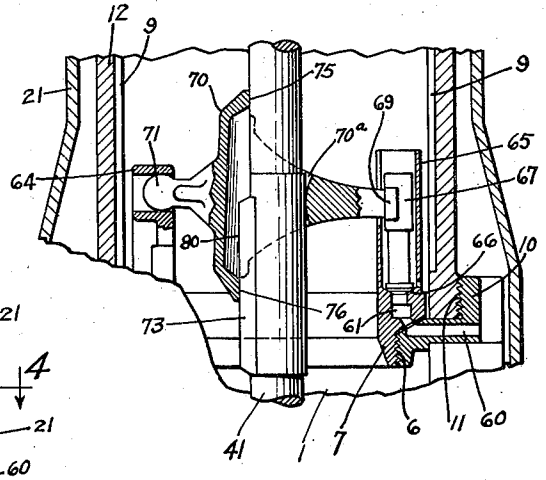


FIG. 2

FIG. 3



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HYDRANT

Filed May 11, 1933 2 Sheets-Sheet 2

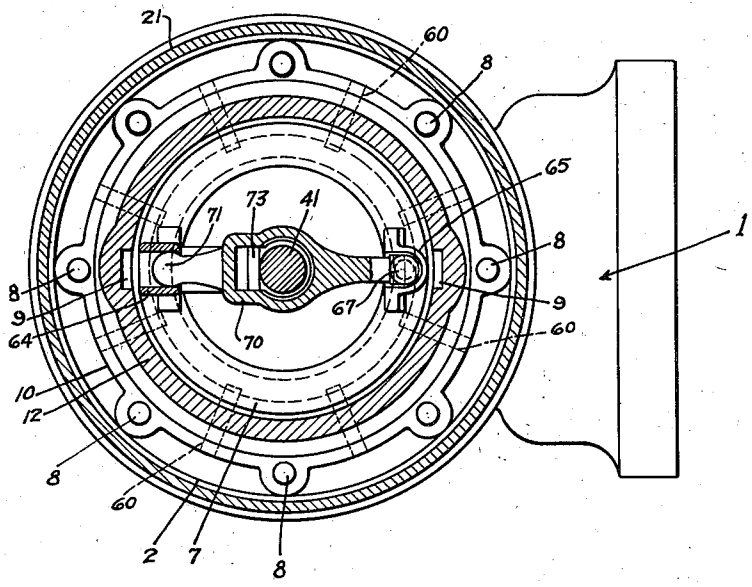
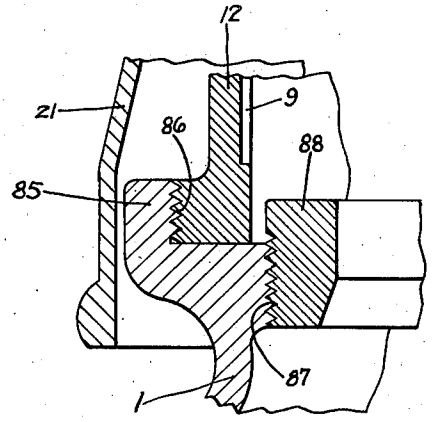
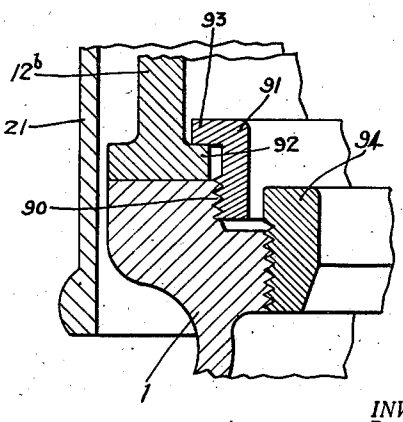


FIG. 4

FIG. 6

FIG. 5





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UNITED STATES PATENT OFFICE

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HYDRANT

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Application May 11, 1933, Serial No. 670,477

12 Claims. (Cl. 137—13)

This invention relates to improvements in fire hydrants, and has as an important object to provide a frost jacket type of hydrant in which the stand pipe can be removed independently of the valve mechanism while the valve is closed, and in which the valve mechanism can be removed independently of the stand pipe. There are two general classes of fire hydrants, those with frost jackets or casings, and those without frost jackets or casings, that is the jacketed and non-jacketed types of hydrant. Insofar as is known to me, all jacket type hydrants have the stand pipe so connected that it cannot be removed without removing the valve mechanism. It frequently happens that the stand pipe becomes broken, generally as the result of collision of a vehicle, and when this happens to an old type jacket hydrant the water has to be shut off to the mains in order to make the repair. With the present invention, the valve mechanism can remain intact and the valve can remain closed because of a construction which allows removal and replacement of the stand pipe independently of the valve mechanism.

Features of the invention include the broad idea of detachability of the stand pipe independently of the valve mechanism in a hydrant of the jacketed type; the specific means by which such detachment is accomplished; an interchangeable hydrant assembly by means of which conversion of a standard hydrant into that of the jacketed type or vice versa may be easily made; the provision in the seat ring of a conically beveled gasket seat cooperative with corresponding bevel of the seat annulus; the drain control mechanism; the formation of a reservoir by means of the jacket in a manner to permit of unobstructed waste water disposal; the use of loose threads for obtaining ease and sureness of disassembly of the seat annulus from the seat ring; and all details of construction disclosed in the drawings and specification.

Objects, features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings

Figure 1 is a vertical section through a hydrant of the jacketed type constructed in accordance with this invention;

Figure 2 shows a portion of a hydrant of the standard or non-jacketed type, with the drain valve open; Figures 1 and 2 together illustrate the feature whereby conversion of the standard hydrant into the jacketed type or vice versa may be made;

Figure 3 is a view illustrating the action of the drain valve control mechanism and showing the drain valve closed;

Figure 4 is a horizontal section on line 4—4 of Figure 1 further illustrating the drain valve control mechanism and positions of the related parts;

Figure 5 is a modification in which the stand pipe is secured directly to the base; and

Figure 6 is a modification illustrating means for clampingly but detachably securing the stand pipe directly to the base.

The base of the hydrant is generally indicated at 1 and has the usual flange 2 at the top having bolt openings 3 therein. For the claimed convertible assembly, these openings are spaced to register with the corresponding openings of the flange of a standard stand pipe. Engaged against the top surface of the flange is a seat ring generally indicated at 5. This seat ring is threaded interiorly as at 6 to cooperate with the corresponding threads of the seat annulus 7. The seat ring has an upstanding annular portion 10 interiorly threaded as at 11 to cooperate with threads at the exterior and bottom of a special stand pipe 12. The seat ring has bolt openings 3^a spaced to register with the openings 3, as well as with openings 3^b (see Figure 2) of a standard stand pipe 12^a. The bolts are indicated at 8. The stand pipe 12 has vertical grooves 9 interiorly disposed for engagement by a suitable wrench, for rotating the pipe.

The seat ring 5 is also provided on its upper side inwardly of the stand pipe with a conical downwardly inwardly convergent seating surface 14 which cooperates with a corresponding surface 15 of the under side of the seat annulus 7. This beveling in the manner shown is a feature of the invention, and prevents such collection of material, as pebbles, on the packing surface 14 as would interfere with sealing contact between gasket 16 and surfaces 14 and 15, and with proper registration of drain passages described below. The annulus has threaded engagement with the seat ring as at 17. Inasmuch as the threads 17 merely act as mechanical coupling means and not as means for obtaining a water-tight assembly, the threads have a rather free fit, thereby making disassembly sure and easy.

In this instance, the jacket of the hydrant is composed of two tubular elements telescopically engaged, as shown, the outer tube being indicated at 20, the inner at 21. The lower end of the inner tube extends below the flange 2 of the base and may rest upon the portion 22 of the base 1. The jacket is spaced from the flange and seat

ring as at 24. The inner surface of the outer or upper part of the jacket is engaged with an annular projection 25 of the stand-pipe 12.

The upper end of the stand pipe has the usual flange 26 bolted to corresponding flange 27 of the nozzle section 28, as at 29. The usual nozzle cap 35 is provided. The upper end of the nozzle section is flanged as at 30 which flange is bolted as at 31 to the base 32 of the cap structure 33.

The main valve is generally indicated at 40 and has suitably attached thereto a stem 41 which passes upwardly through a stuffing box 34 in the base of the cap structure 33, and is threaded as at 41. These threads engage a rotatable nut 42 operatively held by the cap and by thrust plate 44, as shown. The plate 44 is suitably bolted to the cap 33 as at 45. The nut extends upwardly and through cover 47 and has a square terminal 46 with which cap nut 48 is engaged to protect said portion 46 against wrench abrasion. A cap labyrinth 50 gives protection against rain, sleet, and ice. By means of the stuffing box 34 the threads are protected against water.

An important feature of this invention in relation to jacketed hydrants is the ability to remove or attach a stand pipe without in any way disturbing the valve mechanism, and while watertight closure of the valve is maintained.

Insofar as I am aware, it has not heretofore been possible in a jacketed type of hydrant to remove the stand pipe without disturbing the valve mechanism. Such detachment is possible in the practice of the present invention, because the lower end of the stand pipe 12 is releasably attached to the seat ring by means of threads 11.

Another feature of the invention previously mentioned, relates to a hydrant assembly by which conversion of one type of hydrant into another can be made. For this purpose, certain parts are made interchangeable with standard stand pipes. Referring to Figure 2, which has a base 1 like that of Figure 1: As before stated, the openings 3 of the flange of the base 1, openings 3a of the seat ring, and openings 3b of the lower flange of the ordinary type of stand pipe 12a are so spaced as to be registrable. There are two types of seat rings provided: one type, shown at 5 in Figure 1, and the other type shown at 5a in Figure 2. In Figure 1, the bolts 8 clamp the seat ring directly to the flange 2 of the base. In Figure 2, the bolts 8 do not pass through the seat ring, but said ring is clamped between the stand pipe and the base. In both instances the seat ring lies between the stand pipe and base, and in both is provided with a drain passage 60 which delivers to the outside of the hydrant and which passes between the stand pipe and the base. In practice there are a plurality of such drain passages.

Another feature of the invention relates to the waste drainage system, and to the means for controlling the drain valve. The seat rings 5 and 5a are substantially identical in construction, with the exception that ring 5 has the threads 11 for connection with the stand pipe. Each ring has the beveled face 14 and each has radially extending waste drain passages 60, see also Figure 4, leading outwardly from said face 14. In both Figures 1 and 2, the seat annulus 7 has the same construction, and includes an annular passage 61 leading downwardly and registering with and delivering into radial passages 60. The seat annulus is provided with two upward extensions respectively indicated at 64—65 diametrically related to the stem 41. The extension 65 is tubular and has formed at its bottom a valve seat 66. Within the tube is reciprocably disposed a waste drain valve 67, cooperable with the seat 66 to control flow to passages 61, 60. This valve is laterally notched at its upper end as at 68 to receive the end 69 of control lever 70 which is pivoted as at 71 in extension 64 to oscillate in a vertical plane. Because of the character of the pivotal structure, the lever can also move slightly horizontally, but not sufficiently to disengage the opposite end 69 of the lever from the recess 68 of the drain valve. The stem passes through an opening 70a of the lever, and the sides of this opening limit the horizontal motion of the lever. The connection of lever end 69 with the slot 68 of the valve is a hinge connection permitting slight hinging action. The open and closed positions of the drain valve are respectively shown in Figures 2 and 3. The main valve stem 41 is provided with an elongated cam 73, upper and lower ends cooperable with corresponding upper and lower abutment portions 75—76 of the lever 70, to raise the lever 70 and open the drain valve when the main valve moves to closed position, see Figure 2, and to lower the arm 70 and close the drain valve when the main valve moves to open position.

In Figure 1, the upper end of the cam is holding the lever 70 in raised position. When the stem is lowered from that position, the lever follows until the drain valve is closed, see Figure 3. During this motion, vertical face 80 of the cam is engaged with corresponding face of the abutment 76. Upon upward movement of the stem 41 to close the main valve, the upper end of the cam 73 engages the abutment 75 and raises the lever and therefore the drain valve. It is noted that the valve stem passes through the lever 70 as at 70a with sufficient looseness to obtain proper operation. The lever is positively moved in both directions, and is positively held in each control position.

One of the most essential requirements of a fire hydrant is a positive sure-acting drain valve. The drain should open promptly just before closing of the main valve and conversely, it should close with or just after the main valve starts to open. The drain valves are sometimes not opened for months and therefore the valve, depending on close surface contact to be water-tight, undergoes cementation with its seat. A strain sufficient to disrupt this bond must be established when the hydrant is used, and if leather or other material is used as a valve facing, the tendency is to tear or wrinkle and promote a leaky condition.

The drain valve herein is of the compression type and water pressure tends to keep it closed or to hold it tightly on its seat. Unlike the friction slide type valve, the present valve fits loosely in the vertical tube or housing. The lower end of the valve is preferably tipped with a slightly yielding disk although metal to metal seating is practicable. The valve seats squarely and without friction on its seat.

The lever imparts a movement to the drain valve which is twice as speedy as that of the main valve movement, enabling the drain valve to close fully as the result of small movement of the main valve and to open fully at the instant that the main valve is closing. This accelerated opening and closing relative to the opening and closing of the main valve prevents saturation of the earth around the hydrant which in the sum-

mer time accelerates or attracts root growth of the surrounding trees, and in winter, freezes. The drain valve is positively controlled for all positions of the main valve and the valve is frictionless in operation.

In the modification shown in Figure 5, the base 1 has an upstanding annular flange 85 threaded interiorly as at 86 to cooperate with corresponding threads at the lower end of special stand pipe 12. In this instance, the base 1 is also interiorly threaded as at 87 to cooperate with corresponding threads of seat annulus 88. In this instance, the seat ring is not used. The seat annulus, in this instance, carries the drain valve (not shown). In this construction, of course, the stand pipe is detachably connected directly to the base but as in the first instance, is removable independently of the valve mechanism so that replacement may be made without disturbing that mechanism. Whatever the particular means used, the idea of removability of the stand pipe in a jacketed hydrant without digging is broadly claimed.

In the modification of Figure 6, the base 1 has an upstanding flange which is interiorly threaded as at 90 to cooperate with the corresponding threads of a clamping ring 91 which has a flange 93 engaging an internal annular flange 92 of stand pipe 12b to clamp the bottom surface of the stand pipe directly against the top surface of the base 1. To remove the stand pipe, the ring 91 is removed by a suitable wrench. In this instance also, no valve seat ring is used, but only valve 94 corresponding in structure to valve 88 of Figure 5.

I claim as my invention:

1. A hydrant including a base, a ring detachably secured to the base, a valve mechanism supported by the ring, including a valve seat annulus having threaded engagement with the interior of the ring, said ring having a downwardly inwardly convergent conical upper packing surface in sealing engagement with a corresponding packing surface of the annulus, said ring having a drain passage leading from its conical surface outwardly beyond the hydrant wall, and said annulus having a passage communicating with the drain passage at the conical surfaces to establish a drain connection between the inside and the outside of the hydrant.

2. A fire hydrant having a base, a ring immovably secured to the base, a main valve mechanism detachably secured to the ring and having a stem, a stand pipe and means establishing a water-tight connection between the stand pipe and the ring to permit detachment of the stand pipe by rotation, a jacket at the outer side of the stand pipe, passages establishing a drain connection through the ring and valve mechanism from the interior of the stand pipe to a point outside thereof, a drain valve for controlling said drain passage, a lever pivoted to an immovable part of the main valve mechanism and connected to operate the drain valve, and means respectively on the lever and stem cooperable to move the valve to open and closed position respectively as the stem moves to close and open the main valve.

3. A hydrant having a base, a valve mechanism secured to the base including a main valve having a stem, a drain passage establishing communication with the outside of the hydrant, a valve translatable at one side of and in a direction axially of the stem for closing said drain passage, a lever pivoted at the opposite side of the stem to an immovable part of the valve mechanism and connected to operate said drain valve, and means respectively on the lever and stem cooperative by a sliding motion to move the lever, to open and close the drain valve respectively as the stem moves to close and open the main valve.

4. A hydrant including a base, a valve mechanism secured to the base, and including a removable valve seat annulus, a main valve operating against said seat and having a stem, a passage for draining water from a point above the valve through the annulus to a point outside the hydrant, a drain valve for controlling said passage, a lever and means pivoting it to the annulus to oscillate in a vertical plane and to be translated in a horizontal plane, means operatively associating the lever with the valve in a manner to move the valve, said lever having an opening loosely traversed by the stem, means carried by the stem and lever cooperable for controlling movements of the lever to open the drain valve and hold it in opposite position as the result of motion of the main stem in closing direction and to close the drain valve and hold it closed as the result of motion of the stem to move the main valve in opening direction, said stem acting with the opening of the lever to limit and control translative motions of the lever.

5. A hydrant including a base, a ring secured to the base, a valve seat annulus supported on the ring in threaded engagement therewith, said rings having conical packing surfaces, the packing surface of the ring being downwardly inwardly convergent and the surface of the annulus being complemental thereto, the ring having a drain passage leading from its conical packing surface to deliver at the outside of the hydrant wall, and said annulus having a drain passage intersecting its conical packing surface and communicating with the drain passage of the ring to establish a drain connection between the inside and the outside of the hydrant.

6. A fire hydrant having a base, a main valve mechanism operatively associated with the base, and including a seat ring and a valve, said seat ring having a tubular element in axial parallelism with the stem, a drain passage establishing communication between the tubular element and the outer side of the hydrant, a drain valve reciprocable in said tubular element for closing the drain passage, a lever pivoted at that side of the stem diametrically opposite the tubular element to an immovable part of the seat ring and operatively associated with the drain valve, and means on the lever and stem cooperative as a result of sliding motion of the stem to open and close the drain valve respectively as the stem moves to close and open the main valve.

7. In combination with a hydrant which is operably positioned in the ground, said hydrant including a base, a valve mechanism arranged adjacent the base, and a standpipe, means detachably operably connecting the valve mechanism to the base, and means detachably operably connecting said standpipe to the base, and a jacket surrounding said standpipe, respective connecting means permitting detachment of either valve mechanism or standpipe independently of the other and while the other remains operably attached, whereby the standpipe can be detached independently of the valve mechanism and drawn out through the jacket without removing the earth around the jacket and while said valve mechanism is holding back water.

8. A fire hydrant including a base having bolt

openings spaced in correspondence to the spacing of the bolt openings in the flange of the ordinary standpipe, a ring having bolt openings in register with the bolt openings of the base, bolts securing the ring to the base, a standpipe having an independently detachable threaded connection with the ring, a jacket for the standpipe, and a valve mechanism attached to the ring and including a seat ring adapted to be detached independently of the standpipe.

9. A fire hydrant including a base having bolt openings spaced in correspondence to the bolt openings of an ordinary standpipe, a ring having bolt openings in register with the bolt openings of the base, bolts securing the ring to the base, a special standpipe and means detachably securing it to the ring, a valve mechanism including a valve seat ring and means detachably securing it to the first mentioned ring, and a jacket for the standpipe through which the standpipe can be removed.

10. A hydrant including, a base, a first ring secured to the base, a seat ring carried by the first ring and main valve cooperative with the seat ring, a standpipe, a jacket for the standpipe, and means detachably securing the standpipe to the first ring to allow removal as a result of rotation of the pipe, whereby the standpipe may be removed from the jacket while the valve mechanism is holding back water.

11. A hydrant including, a base, a standpipe, a jacket and a valve mechanism, means detachably securing the valve mechanism to the base for independent removal, and means having no connection with any part of the valve mechanism and detachably securing the standpipe to the base for independent removal through the jacket.

12. A hydrant including a base, a standpipe, a jacket, and valve mechanism, screw threads detachably securing the valve mechanism to the base for independent removal, and screw threads having no connection with any part of the valve mechanism and detachably securing the standpipe to the base for independent removal through the jacket.

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