Nov. 30, 1937. H. M. LOFTON 2,100,862

FIRE HYDRANT

Original Filed March 2, 1933

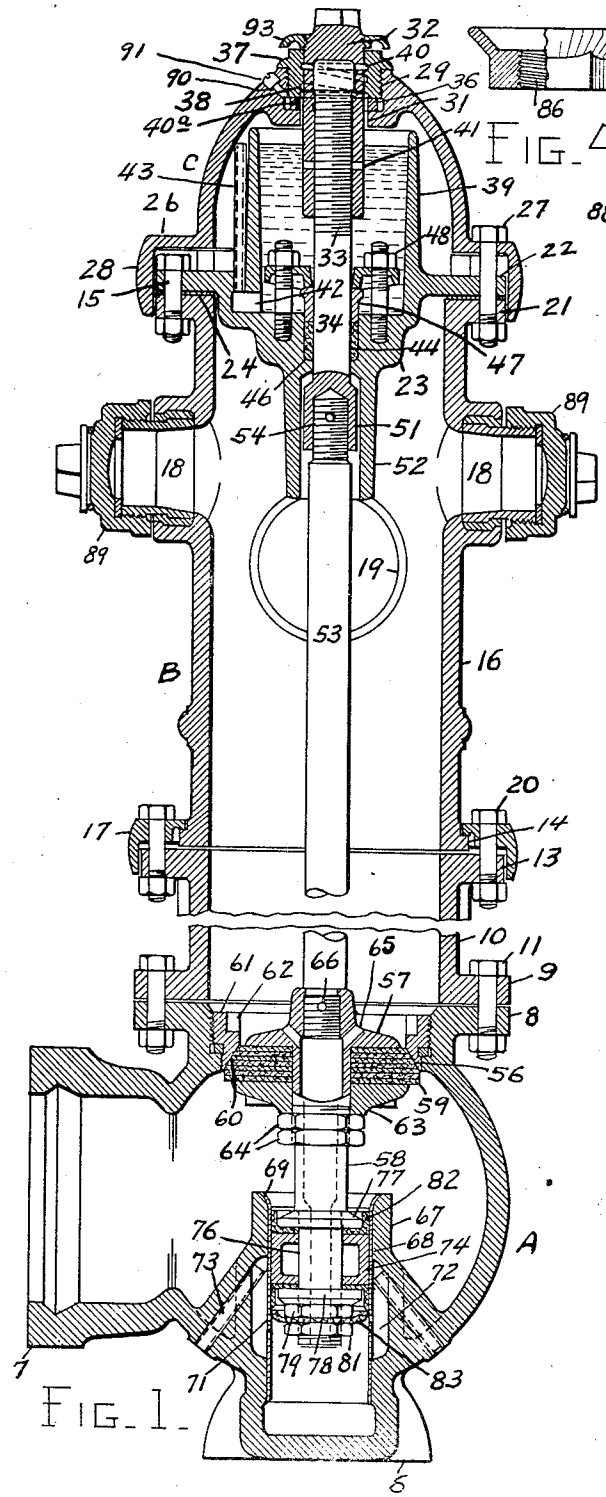

FIG. 1.

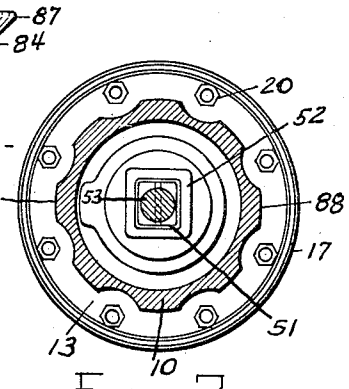

FIG. 4.

FIG. 3.

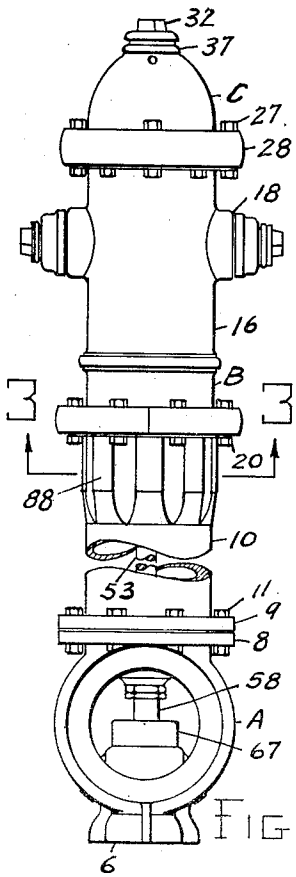

FIG. 2.

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FIRE HYDRANT

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Original application March 2, 1933, Serial No. 659,293. Divided and this application June 4, 1935, Serial No. 24,937

13 Claims. (Cl. 137—13)

This invention relates to fire hydrants. It is a division of my application filed March 2, 1933, Serial No. 659,293, forfeited April 18, 1935, and renewed June 4, 1935, now Patent No. 2,020,365, granted November 12, 1935.

The invention of this application relates particularly to the mechanism within the bonnet, and the arrangement thereof whereby the operating parts are lubricated.

An object of the invention is to provide a fire hydrant in which the bearings of the operating parts are lubricated by the reciprocating movements of the valve stem.

Another object is to provide for the return of the unused oil to the reservoir.

Still another object is to provide means for disposing of any water which seeps into the hydrant bonnet when the valve is open.

According to the invention the hydrant structure comprises, a shoe, a stock and bonnet parts, a valve for controlling the flow of water through the stock to the outlets, a reciprocating valve rod for operating the valve and having its upper end within the bonnet, means arranged in the upper part of the hydrant and secured to the stock for guiding the valve rod and preventing it from rotating; an oil reservoir within the bonnet and having a stuffing box at its lower part through which the valve rod extends into the oil reservoir, a rotatable nut journalled in the upper part of the bonnet and forming a screw threaded socket for reciprocating the valve rod by rotating said nut, said nut provided with an oil passage through its side wall below the level of oil in said reservoir and above the upper end of said valve rod when the valve is fully opened, whereby a space within the nut above the valve rod will receive oil from the reservoir, so that when said rod is raised oil will be entrapped and raised therewith, and means at the upper end of the travel of said rod for circulating said entrapped oil to lubricate the working parts above the reservoir.

The drawing illustrates an embodiment of the invention and the views therein are as follows:

Fig. 1 is a vertical sectional view of a fire hydrant embodying the improvements, and with a portion of the stock or barrel and valve rod broken out to shorten the height of the hydrant.

Fig. 2 is a front elevation of the same.

Fig. 3 is a transverse section on the line 3—3 of Fig. 2 looking in the direction of the arrows.

Fig. 4 is a side elevation, partly in section, of the guide member which may be used for guiding the lower end of the valve stem into the cylindrical bushing in the shoe.

The shoe is indicated at A, the barrel or stock at B and the bonnet at C.

The shoe is preferably flat at the bottom 6 and is provided with a lateral tubular flange portion 7 for connection with the street supply main. The upper part of the shoe is provided with an annular flange 8 for connecting same to the annular flange 9 on the lower end of the bottom stock section 10 by means of the bolts 11.

The upper end of the lower stock, section 10, is also provided with an annular flange 13 which is connected to the annular flange 14 on the bottom of the upper stock section 16 by a segmental frangible ring coupling 17 secured by bolts 20. This coupling now forms the subject matter of the application above referred to.

The upper stock section 16 is provided with the operating mechanism including hose nozzles 18, steamer nozzles 19, and the various mechanism for operating the valve and which require lubrication.

The upper end of the upper stock section 16 is flanged, as at 21, and the annular flange 22 of the oil cup casting 23 rests on a gasket 24 on said flange 21 and said parts are drawn together by bolts 15 to insure a watertight connection.

The casting 23 is completely enclosed by the bonnet C which has an outwardly extending flange 26, while bolts 27 pass through the said flange and through the flange 22 of the casting and the annular flange 21 of the upper stock section to secure said bonnet to the stock. The flange 26 on the bonnet is also provided with an annular skirt 28 for enclosing the flange connection.

The upper end of the bonnet C is recessed at 29 to provide an inwardly directed flange 31. This recess is threaded. A cylindrical nut 32 extends through the upper end of the bonnet and same is screw threaded to fit upon the threaded portion 33 of a stub shaft 34.

The nut 32 is also provided with an annular flange 36 which rests upon the inwardly directed flange 31 of the bonnet C, and is held in place by means of the bushing 37 which is screwed into the threaded recess 29 of said bonnet.

The interior bore of the bushing 37 is provided with a helical groove or channel 38, while the nut 32 at a point near the top of its threaded hollow interior is provided with a transverse hole 40 for communicating with said helical groove. The flange 36 on the nut 32 may be provided with one or more vertical holes 40a to permit surplus oil to be returned, as later explained.

The nut 32 extends down into an oil cup 39 upstanding on the casting 23, and at a point sufficiently low to permit oil from said cup to pass into same, the said nut being provided with transverse apertures 41. The wall of the oil cup 39 is provided with an outlet 42 at the bottom of same and said outlet leads to a small standpipe 43 of a little less height than the height of the oil cup wall.

The center of the casting 23 below the oil cup is provided with a stuffing box 44 through which the stub shaft 34 extends and said box is filled with packing 46, while a gland 47 presses against same through the medium of the adjusting bolts 48 located in the oil cup 39.

The stub shaft 34 has its lower end formed of polygonal cross-section, as at 51, and this part loosely fits within a vertical polygonal guide aperture 52 in the downwardly extending portion of the casting 23.

The upper end of the valve rod 53 is secured to the stub shaft 34 as shown at 54, and said rod extends down to the main valve 56.

The main valve has an upper disk shaped body 57 and a tubular shaft 58 formed integral therewith, and a series of disks 59 of leather or other tough yieldable material graduated in diameter to fit the beveled seat 60 of the seat ring 61. This ring 61 is screwed into the upper end of the shoe and is provided with means 62 for inserting a tool for such purpose. Below the disks 59 is an annular plate 63 fitting loosely on the shaft 58 while clamping nuts 64 press the same firmly against the said disks.

The valve rod 53 extending downward from the stub shaft 34 is screwed into the disk-like body 57 and a pin 66 prevents rotation of same with relation to the valve 56, while the square or polygonal section 51 of the stub shaft to which the said valve rod is secured, working as it does in the polygonal guide aperture 52, prevents the rotation of the main valve and its tubular shaft 58.

The disk-like body 13 of the main valve 56 has drainage ports 65 through which the entrapped water may flow from the stock or barrel 13 into the tubular shaft 58 for draining the hydrant stock when the main valve is closed.

The interior and bottom of the shoe A is provided with an integrally formed upstanding tubular part 67 into which a bronze bushing 68 is internally fitted to form a cylinder with an outwardly flared top 69.

The tubular bushing 68 is provided about midway its height with a lateral drainage port 71 which communicates with an annular chamber 72, while draining tubes 73 provide an outlet from said chamber but maintain a head of water therein at all times.

The tubular shaft 58 has a piston 74 secured on its reduced part 76 by washer plates 77 and 78 and lock nuts 79 and 81, while cup-shaped leather washers 82 and 83 at top and bottom respectively have their annular lips extending away from said piston. The washer plates 78 and 79 hold these leather washers so that their lips press firmly against the internal bore of the bushing 68.

If desired the nut 81 may be omitted and the guide member 84 shown in Fig. 4 substituted therefor. This member has a threaded attaching part 86 and an upwardly curved annular skirt 87 which will guide the piston 74 and its associated parts into the internal bore of the bushing 68 and prevents mutilation of the cup shaped washer 83.

This particular feature of the invention forms the subject matter of another divisional application filed on even date herewith and now ripened into Patent No. 2,088,426, dated July 27, 1937. In the parent application and in the divisional application this guide member 84 and its operation and advantages are discussed at length.

The lower stock or barrel 10 is provided at a point adjacent the annular flange 13 (and hence close to the frangible coupling 17) with vertical strengthening ribs 88, the purpose of which is to help brace the stock or barrel against breakage when the hydrant is impacted by a heavy body such as an automobile truck or the like.

Instead of removing the bushing 37 for filling the oil reservoir 39, oil may be admitted through the hole 93, which is normally closed by the plug 91.

The operation of the improved fire hydrant is as follows: Let us suppose that the caps 89 of the hose nozzles 18 have been removed and hose connections made therewith. In order to supply water to the holes it is necessary to unseat the valve 57 from the seat 60. This is accomplished in the following manner. The nut 32 is rotated by means of a wrench or other tool and has its flange 36 resting on the inturned flange 31, and retained by the bushing 29, preventing longitudinal movement of said nut, the stub shaft 34 being lowered by this operation. Since the stub shaft is secured to the valve rod or stem 53 the valve 57 will be moved downward from its seat 60 so as to permit water to enter from the tubular flange 7, into the shoe A, past the valve 57 and into stock B of the hydrant from whence it may freely flow through the nozzles 18 and connecting hoses.

The nut 32 is turned until the valve 57 is completely opened, at which time the upper end of the stub shaft 34 will have cleared the transverse apertures 41 in said nut so that the oil from the cup 31 will pass through said apertures and enter into the hollow interior of said nut to a height coincident with the height of the oil in said cup.

To close the valve 57 the nut 32 is turned in the opposite direction and as the top of the stub shaft 34 passes the apertures 41 in said nut, the oil above the level of said apertures will be entrapped in the hollow interior of said nut, and as the stub shaft continues to rise by virtue of the turning of the nut 32 this entrapped oil will be carried to the upper end of the hollow interior of said nut and will pass out through the transverse holes 40 and communicate with the helical groove or channel 38, which is provided on the interior bore of the bushing 37.

Any excess oil passing through this groove will flow down through the vertical holes 40a in the flange 36 of the nut 32 and along the inwardly directed flange 31 of the bonnet and return to the oil cup 39. In this manner the operating parts in the bottom structure are kept lubricated and always ready for use.

It will thus be seen that upon the opening and closing of the valve 57, a pumping action of the oil will be obtained and this oil will be elevated to the working parts in the bonnet so that said oil will circulate through the nut and its associated parts and thus keep the same in well lubricated condition.

Since one of the greatest troubles with fire hydrants heretofore constructed and commercially used is the fact that the lubrication of

fire hydrants is largely neglected even where oiling means are provided, this improved fire hydrant offers a solution, in that the working parts of the fire hydrant are automatically lubricated every time the valve is fully open. It will therefore be readily seen that thorough lubrication is positively obtained by employing a large reservoir of oil and causing the opening and closing movements of the hydrant to forcibly pump oil to the working parts thereof.

Another important feature of this invention is that any water which seeps through the packing **46** and its gland **47** will accumulate in the bottom of the reservoir **39**, and said water will flow through the outlet **42** and up through the standpipe **43** and will be discharged from the upper end thereof where it will be dispensed over the flange **22** and between that flange and the skirt **28** of the bonnet **C**.

Of course the hydrant illustrated herein and particularly the self-lubricating mechanism employed herein may be modified and changed in many ways without departing from the invention herein set forth and hereafter claimed.

The invention is hereby claimed as follows:

1. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, and an oil reservoir surrounding a part of said valve rod, said valve rod when at its lowest position being adapted to entrap oil in said nut and when raised to distribute said entrapped oil to lubricate the valve operating mechanism.

2. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, an oil reservoir, said nut having a transverse opening below the level of oil in said reservoir, said oil reservoir surrounding a part of said valve rod, said valve rod when at its lowest position being adapted to entrap oil in said nut and when raised to distribute said entrapped oil to lubricate the valve operating mechanism.

3. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, said nut having a peripheral flange, a bushing cooperating with said flange to prevent longitudinal movement of said nut, a groove on the interior of said bushing for circulating lubricating oil, and an oil reservoir surrounding a part of the valve rod, said valve rod when at its lowest position being adapted to entrap oil in said nut and when raised to elevate said oil for circulation through said groove.

4. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, means for reciprocating the valve rod comprising a nut having a peripheral flange journalled in a recess in said bonnet and retained between an inwardly extending flange thereof and a bushing, a helical groove on the interior of said bushing co-operating with a transverse hole in said nut for circulating lubricating oil, and an oil reservoir surrounding a part of said rod and a part of said nut, said nut having a second transverse hole below the level of oil in said reservoir, said last opening permitting oil to enter said nut when the valve rod is at its lowest position, and when raised said rod will elevate said oil in said nut whereby it will be circulated through the first named hole and said groove.

5. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, means for reciprocating the valve rod comprising a nut having a peripheral flange journalled in a recess in said bonnet and retained between an inwardly extending flange thereof and a bushing, a helical groove on the interior of said bushing cooperating with a transverse hole in said nut for circulating lubricating oil, an oil reservoir surrounding a part of said rod and a part of said nut, and a second transverse hole in said nut below the level of oil in said reservoir, said last opening permitting oil to enter said nut when the valve rod is at its lowest position, and when raised said rod will elevate said oil in said nut whereby it will be circulated through the first named hole and said groove, and means for returning excess oil to the reservoir and means for collecting and draining off any water which seeps into said reservoir.

6. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, means for reciprocating the valve rod comprising a nut having a peripheral flange journalled in a recess in said bonnet and retained between an inwardly extending flange thereof and a bushing, a helical groove on the interior of said bushing cooperating with a transverse hole in said nut for circulating lubricating oil, an oil reservoir surrounding a part of said rod and a part of said nut, and a second transverse hole in said nut below the level of oil in said reservoir, said last opening permitting oil to enter said nut when the valve rod is at its lowest position, and when raised said rod will elevate said oil in said nut whereby it will be circulated through the first named hole and said groove, and an opening in the peripheral flange of the nut to permit the excess oil to return to the reservoir.

7. In a fire hydrant having a bonnet, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding a part of said valve rod, said valve rod when at its lowest position being adapted to entrap oil in said nut and when raised to distribute said entrapped oil to lubricate the valve operating mechanism, and means in said bonnet for supplying oil to the reservoir without removing the bonnet or any of the operating mechanism.

8. In a fire hydrant having shoe, stock and bonnet parts, a valve for controlling the flow of water through the stock, a reciprocating valve rod for operating the valve, means comprising a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding a part of the valve rod, a sleeve below said reservoir and surrounding said rod, packing in said sleeve to prevent water from said stock from entering said reservoir, a recess in the bottom of the reservoir wall, and means cooperating with said recess for collecting and draining off any water which seeps through said packing and into said reservoir.

9. In a fire hydrant having shoe, stock and bonnet parts, a valve for controlling the flow of water through the stock, a reciprocating valve rod for operating the valve, means comprising a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding a part of the valve rod, a sleeve below said reservoir and surrounding said rod, packing in said sleeve to prevent water from said stock from entering said reservoir, a recess in the bottom of the reservoir wall, and a pipe cooperating with said recess for collecting and draining off any water which seeps through said packing and into said reservoir.

10. In a fire hydrant having shoe, stock and bonnet parts, a main valve, a reciprocating valve

rod, a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding part of the valve rod, holes in said nut below the level of oil in said reservoir for entrapping oil in said nut when the main valve is lowered and raised, packing to prevent water from said stock entering said reservoir, a recess in the bottom of the reservoir wall, and means cooperating with said recess for collecting and draining off any water which seeps through said packing and into said reservoir.

11. In a fire hydrant having shoe, stock and bonnet parts, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding part of the valve rod, means for entrapping oil in said nut when the main valve is lowered and raised, packing to prevent water from said stock entering said reservoir, a recess in the bottom of the reservoir wall, and a vertical pipe whose lower end communicates with said recess and whose upper end is below the upper edge of the reservoir for collecting and draining off any water which seeps through said packing and into said reservoir.

12. In a fire hydrant having shoe, stock and bonnet parts, a main valve, a reciprocating valve rod, a rotatable nut for reciprocating the valve rod, an oil reservoir surrounding part of the valve rod, said nut having holes therein below the level of oil in said reservoir for entrapping oil in said nut when the valve rod is reciprocated, packing to prevent water from said stock entering said reservoir, a recess in the bottom of the reservoir wall, and a vertical pipe whose lower end communicates with said recess and whose upper end is below the upper edge of the reservoir for collecting and draining off any water which seeps through said packing and into said reservoir.

13. In a fire hydrant provided with a shoe and bonnet, a main valve in the hydrant adjacent said shoe, a reciprocative valve rod in the hydrant for opening and closing said valve, a rotatable nut in said bonnet having an interior engaging said rod for reciprocating the same to open and close said valve, said nut having an annular flange on the exterior thereof coacting with the interior of the bonnet to prevent longitudinal movement of said nut when the same is rotated, a reservoir containing lubricant in said hydrant, and means included in said nut for supplying lubricant from said reservoir to both the interior of said nut where the same engages said rod, and the coacting surfaces of said external flange of said nut and the interior of said bonnet, when said nut is rotated.

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