Oct. 22, 1935. H. M. LOFTON 2,018,454

FIRE HYDRANT

Filed Jan. 17, 1934

FIG. 1

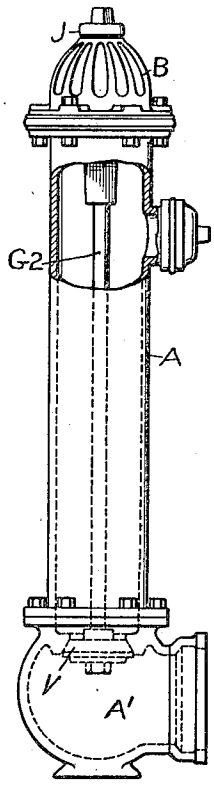
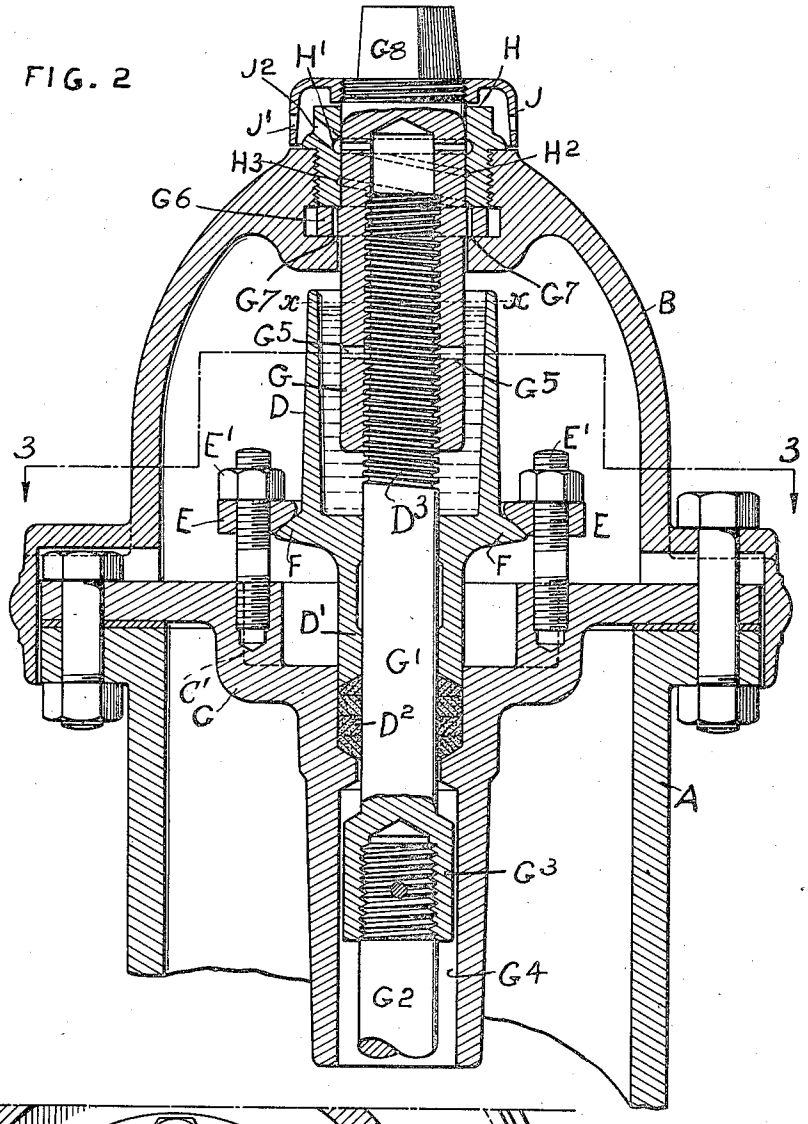


FIG. 2



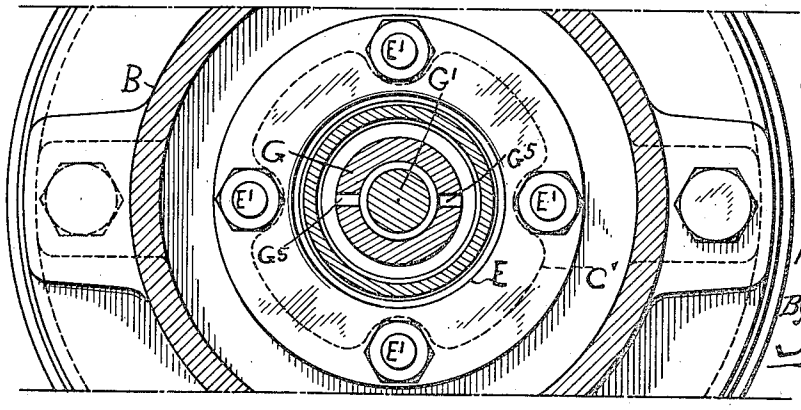


FIG. 3

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FIRE HYDRANT

Herbert M. Lofton, Chattanooga, Tenn.

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14 Claims. (Cl. 137—13)

My invention embodies improvements in self-oiling means suitable for fire hydrants, and more particularly in which the mere opening of the hydrant to a substantially wide open position and without removing any of the hydrant nozzles, all working parts including valve opening portions will be completely oiled at one time and without any material waste or loss of the oil. In actual use, the operation to provide satisfactory lubrication need not occur more than a few times each year, as when opening and closing the valve. In this manner, the hydrant is maintained in a thoroughly oiled condition and making it easy of operation and adapted to continue in a lubricated condition for a long period of time.

A secondary but important feature of my improvement for oiling resides in providing means associated with the oil reservoir for keeping the stuffing box and annular gland about the valve operating shaft fully oiled at all times.

My improvements further comprise a gland fitting about the valve operating shaft or stem and carrying an oil reservoir into which the operating stem nut extends, said combined oil reservoir and gland cooperating with a stuffing box formed in a transverse plate interposed between the bonnet and upper end of the hydrant stock; and furthermore, the combined reservoir and gland is provided with an annular flange receiving downward pressure by a suitably shaped follower for imparting a ball joint effect which comes into play to prevent binding of the operating valve stem.

The annular operating nut, for reciprocating the valve stem or shaft is held against vertical movement by a suitable collar and retaining groove and nut, and is provided with a helical oil groove by which oil is also supplied to the oil reservoir and on its way thereto it provides lubrication to the associated parts which permit the nut to be rotated under adequate lubrication.

This application is an improvement on the fire hydrant shown and described in my co-pending application Serial No. 24,937, filed June 4, 1935, and which said application is a division of my co-pending application Serial No. 659,293, filed March 2, 1933, and renewed June 4, 1935.

Referring to the drawing: Fig. 1 is a side elevation of a fire hydrant of the character to which my improvements more particularly relate; Fig. 2 is a vertical section of the upper portion of Fig. 3, taken on line 2—2 thereof; and Fig. 3 is a sectional plan view of my improved hydrant taken on line 3—3 of Fig. 2.

A is the stock or barrel of the hydrant and may be made of any suitable construction, as may also be the shoe A′ and valve devices A^2 therein. At the upper end of the stock A and directly bolted to it as shown, is a diaphragm plate C having a downwardly extending stuffing box D^2 through which the stub shaft G′ extends, the upper portion of said shaft being screw threaded at D^3 and engaging the operating nut G by which it is reciprocated.

The lower portion of the diaphragm plate C is downwardly extended to form one part of the stuffing box D^2, in which the annular gland D′ is received to form an oil tight joint through which the stub shaft may slide, while the upper portion of the diaphragm plate C is shaped as more particularly indicated by the dotted line C′ in Fig. 3, for providing a space in which the gland D′ may be moved downward. The upper part of the gland is open and made cup-shaped to receive oil and constitutes a reservoir D therefor. This reservoir D largely surrounds the threaded portion D^3 of the stub shaft G′. The lower part of the oil reservoir receptacle D and upper part of the gland D′ are provided with annular flange F having a convex upper surface with which the annular gland follower E, also preferably having a concave surface, makes contact, the result of which is that the gland follower working as a ball joint effect or coupling, will prevent binding of the valve operating stem. The object of this gland follower E working as a ball joint effect is that should one of the bolts E′ be screwed down further than the other, the ball joint "couple" will come into play and prevent binding of the operating valve stem.

G^2 is the valve stem proper, being attached at its lower end to the valve V and having its upper end connected with the stub shaft G′.

The stub shaft G′ is preferably polygonal shaped at G^3 and slides vertically in a socket G^4 extending down from the diaphragm plate C so as not to rotate during the act of opening and closing the valve.

Ordinarily, the operating nut G causes the vertical reciprocation of the valve shaft G^2 simultaneously with the movements of the stub shaft G′. This nut G is provided with transverse holes G^5 through which the oil may pass from the reservoir D into contact with the screw threaded portion of the stub shaft G′. The operating nut G is provided with an annular collar or flange G^6 which, in turn, is provided with two oil grooves G^7. At the upper end of the hydrant bonnet B is a hold-down nut H, which carries the annular groove H′. The operating nut G is provided with

the weather cap J and the manually operating nut portion G^8. The hold-down nut H is provided with the internal helical oil grooves H^2 and H^3.

In operation, the operating nut G is revolved by means of the wrench actuated nut G^8. This in turn causes the stub shaft G' to move downward by means of the threaded portion of same being in engagement with nut G until the upper end of the stub shaft passes below the oil holes G^5 in the operating nut G. After this is done, the oil in the reservoir D flows through the oil holes G^5 and rises in the interior of the operating nut G. This operation acts to feed oil downward between the stub shaft and the stuffing box gland. Assuming now that the valve is to be closed, the nut G is rotated in the opposite direction and the stub shaft G' is moved upward and carries with it the oil contained within the operating nut. When the stub shaft is fully raised, it will have delivered oil to the helical grooves H^2 and H^3 and also into the annular groove H'. The oil thus delivered will flow backward and downward by means of the helical grooves H^2 and H^3. At the same time that oil is fed into the annular groove H' and helical grooves H^2 and H^3, it will find its way between the hold-down nut H and the operating nut G having the annular collar G^6 so as to lubricate these parts. The oil thus provided will also flow downward through the holes G^7 for further lubricating the operating nut within the bonnet structure. The excess of oil will gradually flow downward and again enter the reservoir D. Thus it will be seen that by merely opening wide the hydrant without removing any of the hydrant nozzles, all parts of the working mechanisms will be completely lubricated at one time and without any oil being lost or wasted.

Oil may be supplied to the hydrant from time to time by means of an oil can whose nozzle may be projected through the hole J' in the weather cap J and through a hole J^2 into the annular oil groove H', from which it flows downward by gravity through the medium of the helical grooves H^2 and H^3. The normal depth of oil in the reservoir D is best when it approximately fills said reservoir as indicated by the dotted line x—x.

Of course the fire hydrant illustrated herein may be modified and changed in various ways without departing from the invention herein set forth and hereafter claimed.

The invention is hereby claimed as follows:

1. A fire hydrant, comprising a stock and bonnet closure therefor, valve and operating valve stem, combined with a diaphragm plate interposed between the stock and bonnet closure of the hydrant, a stuffing box through which the valve stem extends, a gland for the stuffing box having an upstanding flange forming an oil reservoir secured to its upper end, an operating nut at the upper end of the hydrant providing a screw threaded engagement with the valve stem, and means on the diaphragm plate for securing the stuffing box, gland and oil reservoir in relative operative relation.

2. A fire hydrant, comprising a stock, valve and operating valve stem, combined with a closure for the upper end of the stock, a stuffing box through which the valve stem extends, a gland for the stuffing box having an upstanding flange forming an oil reservoir secured to its upper end, and an operating nut at the upper end of the hydrant providing a screw threaded engagement with the valve stem, and further, the operating nut extends downwardly into the oil reservoir and is provided with transverse apertures below the level of the oil communicating both with the oil space in the reservoir and with the screw threaded engaging means between the operating nut and valve operating stem.

3. A fire hydrant, comprising a stock, valve and operating valve stem, combined with a closure for the upper end of the stock, a stuffing box through which the valve stem extends, a gland for the stuffing box having an upstanding flange forming an oil reservoir secured to its upper end, and an operating nut at the upper end of the hydrant providing a screw threaded engagement with the valve stem, and wherein further, the operating nut extends downwardly into the oil reservoir and is provided with transverse apertures below the level of the oil communicating both with the oil space in the reservoir and with the screw threaded engaging means between the operating nut and valve operating stem, and wherein also the operating nut is provided at its upper part with a radial aperture and an annular groove whereby oil carried upwardly within the operating nut is discharged into said annular groove by means of the radial aperture, and helical grooves are also formed in the upper part of the operating nut for returning the oil to the reservoir.

4. A fire hydrant, comprising a stock, valve and operating valve stem, combined with a closure for the upper end of the stock, a stuffing box through which the valve stem extends, a gland for the stuffing box having an upstanding flange forming an oil reservoir secured to its upper end, and an operating nut at the upper end of the hydrant providing a screw threaded engagement with the valve stem, and wherein further, an annular oil groove is in communication with the outside of the operating nut and having outwardly directed apertures through which oil may be delivered to the nut, and wherein also the operating nut is provided at its upper part with a radial aperture and an annular groove whereby oil carried upwardly within the operating nut is discharged into said annular groove by means of the radial aperture, and helical grooves are also formed in the upper part of the operating nut for returning the oil to the reservoir.

5. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and an operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with an integrally formed gland extending into said stuffing box, and means for forcing said gland against the packing in said stuffing box.

6. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and an operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem an oil cup surrounding a part of the stem and nut and provided with an integrally formed gland extending into said stuffing box, and a gland follower for forcing said gland against the packing in said stuffing box.

7. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and an operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem an oil cup surrounding a part of the stem and nut and provided with an integrally formed gland extending into said stuffing box, and a gland follower provided with bolts engaging said diaphragm plate for forcing said gland against the packing in said stuffing box.

8. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and an operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with an integrally formed gland extending into said stuffing box, an annular flange on said oil cup, a ring-shaped gland follower engaging said flange, and bolts passing through said follower and engaging said diaphragm plate for forcing said gland against the packing in the stuffing box.

9. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and an operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with an integrally formed gland extending into said stuffing box, an annular flange on said oil cup, a ring-shaped gland follower engaging said flange, and bolts passing through said follower and engaging said diaphragm plate for forcing said gland against the packing in the stuffing box, the contacting surfaces between said flange and follower being shaped to provide a ball-joint effect.

10. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and a rotatable operating nut, a diphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with a gland extending into said stuffing box, an aperture in said nut within the confines of said cup whereby oil may enter said nut when the valve and stem are lowered and be trapped therein upon the raising of said stem, means at the upper end of the nut for distributing said entrapped oil and returning the excess to the cup, and means for forcing said gland and cup downward to cause the gland to hold the packing in said stuffing box firmly against the stem.

11. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and a rotatable operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with a gland extending into said stuffing box, an aperture in said nut within the confines of said cup whereby oil may enter said nut when the valve and stem are lowered and be trapped therein upon the raising of said stem, means at the upper end of the nut for distributing said entrapped oil and returning the excess to the cup, and a gland follower for forcing said gland and cup downward to cause the gland to hold the packing in said stuffing box firmly against the stem.

12. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and a rotatable operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with a gland extending into said stuffing box, an aperture in said nut within the confines of said cup whereby oil may enter said nut when the valve and stem are lowered and be trapped therein upon the raising of said stem, means at the upper end of the nut for distributing said entrapped oil and returning the excess to the cup, and a gland follower provided with bolts engaging said diaphragm plate for forcing said gland and cup downward to cause the gland to hold the packing in said stuffing box firmly against the stem.

13. In a fire hydrant having stock and bonnet parts, a main valve, a valve stem, and a rotatable operating nut, a diaphragm plate secured between the stock and bonnet and providing a stuffing box around the stem, an oil cup surrounding a part of the stem and nut and provided with a gland extending into said stuffing box, an aperture in said nut within the confines of said cup whereby oil may enter said nut when the valve and stem are lowered and be trapped therein upon the raising of said stem, means at the upper end of the nut for distributing said entrapped oil and returning the excess to the cup, an annular flange on said oil cup, a ring-shaped gland follower engaging said flange, and bolts passing through said follower and engaging said diaphragm plate for forcing said gland against the packing in the stuffing box, said aperture being so located in the nut whereby it will always be well below the top of the cup and above the top of the stem when the main valve is fully opened.

14. A fire hydrant, comprising stock and bonnet members, valve and operating valve stem in combination with a diaphragm plate interposed between the said stock and bonnet members, a stuffing box through which the valve stem extends, a gland for the stuffing box, an oil reservoir surrounding part of the valve stem positioned above the gland, an operating nut at the upper end of the hydrant providing a screw-threaded engagement with the valve stem, and means on the diaphragm plate for securing the stuffing box, gland and oil reservoir in relative operative relation.

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