Nov. 12, 1935. H. M. LOFTON 2,020,365

FIRE HYDRANT

Original Filed March 2, 1933

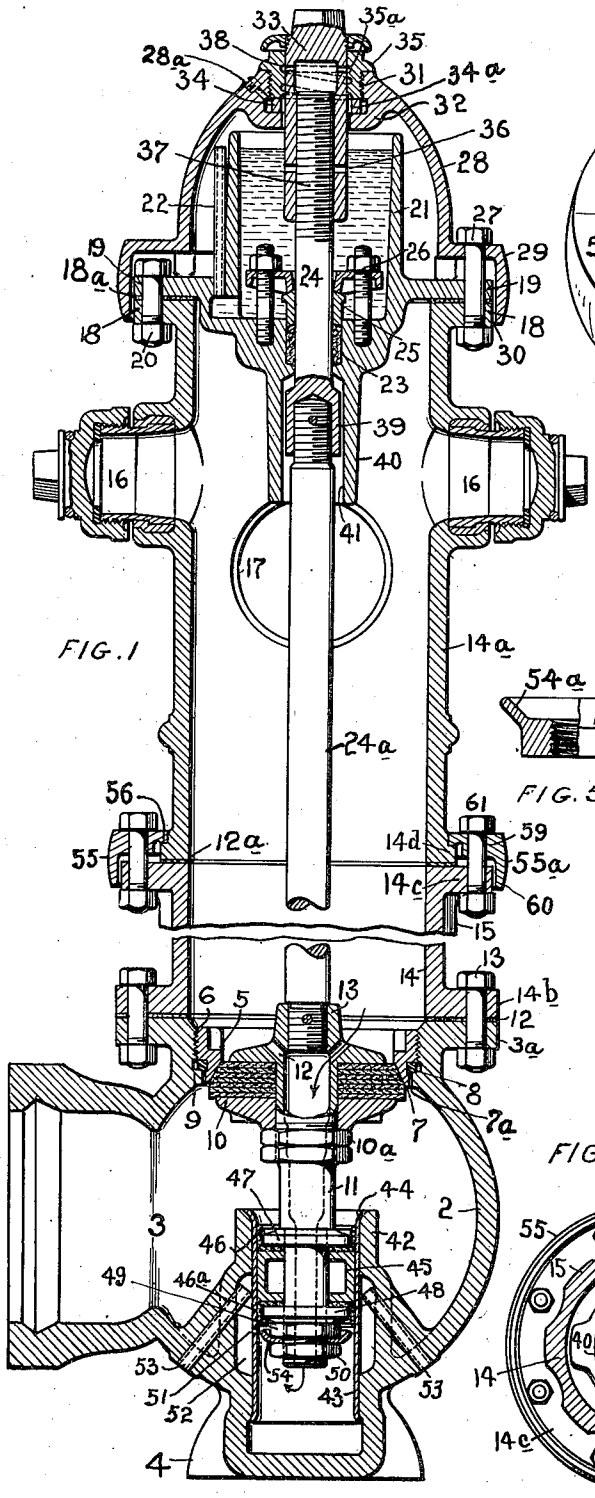

FIG. 1

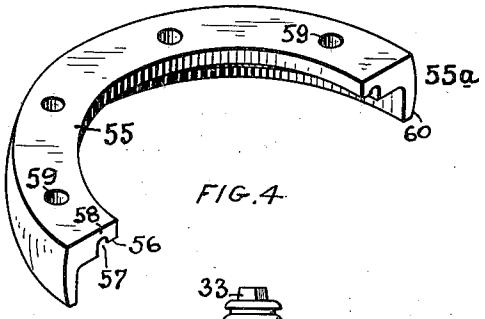

FIG. 4

FIG. 5

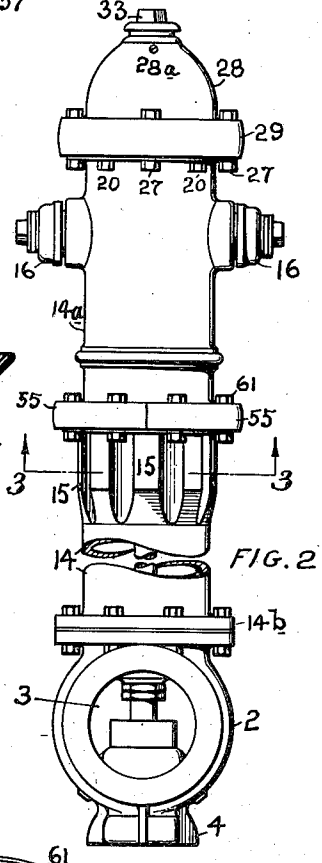

FIG. 2

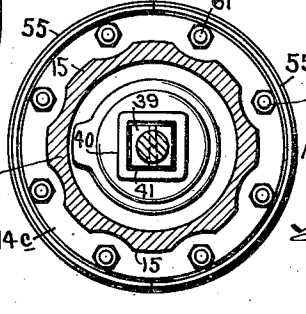

FIG. 3

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2,020,365

FIRE HYDRANT

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Application March 2, 1933, Serial No. 659,293
Renewed June 4, 1935

5 Claims. (Cl. 285—140)

My present invention relates to fire hydrants and is an improvement upon the construction of hydrant for which Letters Patent No. 1,717,392 was issued to me on June 18, 1929, and also upon the construction illustrated in an application Serial No. 574,284, filed by me on November 11, 1931.

My invention also has special reference to the thorough lubrication of the mechanism employed for imparting the reciprocating movements to the valve stem, whereby the same is maintained in a lubricated condition, and hence easy of operation; the features of this part of my invention being adapted during the reciprocation of the valve stem to pump the oil from its normal static location in the lubricant well to a relatively higher position oil duct, whereby it may be supplied at a relatively high elevation and permitted to flow by gravity to the bearings for the operating nut.

My object is further to provide the valve stem at its lower end with a cylinder and piston as a guiding means for the valve stem, all as in my aforesaid application Serial No. 574,284, but modified by the provision at its extreme lower end below the packing means for centralizing the valve stem of a disk-like metallic means preferably cupped so as to insure the entering of the piston into the cylinder by metallic guiding means and, at the same time, protecting the soft leather or rubber packing of the piston during the assembling operation.

My invention also embodies certain features of construction associated with that part of the stock or barrel of the hydrant which extends above the ground, the same embodying a structure of less resistance to fracture than the stock or barrel itself, so that in the event of the upper part of the fire hydrant being forcibly struck by a truck, or because of impact, whatever the cause, the said weakened portion will become broken and limit the damage to a small easily repairable part associated with the stock or barrel flanges. More particularly, it is my object in this portion of my improvement to provide a suitable clamping means for normally uniting two sections of the stock or barrel, the clamping means introducing a detachable flange structure adapted under strain to become fractured and releasing the normally united flange portions of the stock or barrel, whereby the part of the hydrant above the ground level may become detachable with respect to the stock or barrel of the hydrant below the ground level and with relatively small damage to the hydrant as a whole.

According to the invention, the hydrant has a stock comprising tubular parts disposed end to end in aligned relation, the adjacent ends thereof having peripheral flanges of different diameters, a frangible circular coupling member disposed adjacent said flanges, and means for clamping together said coupling member and one of said flanges to provide a water-tight joint between the parts. The coupling may be made up of segments and it may be provided with an inner annular lip disposed for circumferential engagement with the flange of smaller diameter and it may, if desired, be provided with a weakening groove constituting a point of least resistance to fracture when the hydrant is struck by a heavy blow.

Referring to the drawing: Fig. 1 is a vertical sectional view of a fire hydrant embodying my improvements but with a portion of the stock or barrel and valve rod removed for shortening the height of the hydrant; Fig. 2 is an elevation of the same; Fig. 3 is a transverse section of the same taken on line 3—3 of Fig. 2, looking upward as indicated by the arrows; Fig. 4 is a semi-circular part of the clamping means for normally and detachably holding the upper and lower portions of the stock or barrel together during normal use of the hydrant; and Fig. 5 is a lock nut adapted for attachment to the lower part of the valve stem as a substitute for the cup-shaped disk for guiding the lower end of the valve stem into proper relation with the cylindrical portion within the shoe.

2 is the body of the shoe which is preferably flat at the bottom, as indicated at 4, the shoe being also provided with a lateral tubular flange portion 3 adapted for connection with the supply main in the street. The upper portion of the shoe is flanged, as at 3a, and is bolted at 13 to the bottom flange 14b of the stock or barrel 14. The upper end of the stock or barrel is detachably clamped to the upper section 14a of the stock or barrel by clamping means 55, which will later be described in detail.

The upper section 14a of the stock is provided with the operating mechanism including hose nozzles 16, steamer nozzles 17, and the various features for operating the valve and requiring lubrication. The upper end of the stock or barrel section 14a is flanged, as at 18, and to which a transverse plate 19 is bolted by bolts 20. This transverse plate 19 is provided with an oil reservoir 21 having an overflow pipe 22 opening from the bottom of the reservoir and terminating at a short distance below the level of the upper end

of the reservoir. The central portion of the plate 19 is provided with a stuffing box 23 through which the stub-shaft 24 extends, the said stuffing box comprising packing 23a, a gland 25, and adjusting bolts 26, the latter being located within the oil reservoir 21. The stub-shaft 24 is screw threaded at 37 on its upper portion which extends through the oil reservoir and to a short distance above the same. The oil reservoir and the operating mechanism employed in connection with the screw threaded stub-shaft are all housed in the bonnet structure 28, the same being flanged at 29 to fit over the plate 19 and bolted at 27 to the flange 18 of the stock or barrel section 14a, before referred to. A suitable gasket 18a may be employed between the flange 18 and plate 19 to make a water tight joint at the upper end of the stock or barrel section 14a.

The upper end of the bonnet 28 is recessed at 31 and providing an inwardly directed flange 32. A cylindrical nut 33 extends through the upper end of the bonnet and screw threaded to fit upon the threaded portion 37 of the stub-shaft 24, and is also provided with an annular flange 34 which rests upon the inwardly directed flange 32 of the bonnet, and held in place by means of the bushing 35 which is screwed into the threaded recessed portion 31 of the bonnet. When revolving the nut 33, its flange 34 prevents longitudinal movement and, consequently, such rotation will raise or lower the stub-shaft 24 according to the direction in which the nut is rotated. The nut 33 is provided with transverse apertures 36 and are positioned sufficiently low to permit the oil to pass from the reservoir 21 to the threaded portions of the stub-shaft and nut.

To lubricate the operating surfaces between the nut 33 and the inner wall of the bushing 35, I provide the interior bore of the bushing with a helical groove or channel 35a, and also provide the upper part of the nut 33 with a transverse hole 38 which forms a communication between the helical groove 35a and the interior of the nut 33. It will now be understood that when the nut is rotated to raise the stub-shaft 24 when closing the valve, the oil which is immediately within the nut and above the upper end of the stub-shaft is forced upward by the said stub-shaft acting as a piston and forcibly circulating the oil through the aperture 38 and the helical groove 35a to lubricate the said nut in its contact with the bushing 35 and flange structures 32 and 34. The flange 34 of the nut may be provided with one or more vertical holes 34a to permit the surplus oil to be returned to the reservoir. When introducing the oil into the reservoir, the bushing 35 may be removed and the oil poured directly into the space so provided and thence downward into the reservoir 21. Instead of removing the bushing for filling the reservoir, the oil may be admitted through a removable plug 28a. When the reservoir is substantially filled with oil, there will be an overflow from the pipe 22 sufficient, through leakage from above the plate 19 in the bonnet 28 and through the annular space 30 therefrom, to indicate that the reservoir is filled. It will be seen, therefore, that the stub-shaft 24 is not only thoroughly lubricated in its connection with the nut 33, but the lower part which passes through the stuffing box 23 is likewise thoroughly lubricated at all times. When the hydrant is wide open and the stub-shaft 24 is at its lowest position, the oil will flow through the orifices 36 into the space above the stub-shaft and within the nut 33, and thereupon a closing action of the hydrant and raising of the stub-shaft will provide the pumping effect and thereby, during one or two minutes, will circulate the oil through the nut and its associated parts. It is here pointed out that one of the great sources of trouble with fire hydrants as heretofore constructed and commercially used is that the lubricating of the hydrants is largely neglected; and even where small oiling holes are provided and used at intervals, the oil supplied in that manner soon drains away and leaves the hydrants without material lubrication. It is, therefore, my object to provide thorough lubrication which is positively secured by employing a large reservoir of oil and causing the opening and closing movements of the hydrant to forcibly pump the oil to the working parts of the hydrant.

One of the novel features of my invention is in providing the stock with a breakable means 55 comprising a flange 55a just above the ground level so that in case the hydrant is struck with great force by a truck or other means, the lips 56 on the inner portions of the semi-circular flange sections 60 will break off without damaging either the lower section 14 of the hydrant stock or the upper section 14a thereof carrying the more expensive machine work embodied in the operating mechanism which I have already described. This breakable means 55 consists more particularly of the wide flange 14c of the lower stock portion 14, and the small flange 14d of the upper stock portion 14a clamped together upon an intermediate gasket 12a by bolts 61. This is made possible by use of the semi-circular flange parts 60 butted together in ring shaped form and through the holes 59 in which the bolts 61 pass, as will be understood from Figs. 1, 3, 4 and 5. The cross-section of the ring flange 55a is of angle shape with the under part of the horizontal portion grooved at 57 (Fig. 4), forming thereby the narrow lip 56 about the inner diameter. When subjected to breaking strain, this flange 56 breaks away along the grooved portion 57 where its cross-section is weakest, as indicated at 58 in Fig. 4. The downwardly extending flange 60 covers the flange joint as a whole and gives protection and finish (Fig. 2).

I have provided, adjacent to the flange 14c of the lower stock or barrel (and hence close to the breakable point), a series of vertical strengthening ribs 15, the purpose of which is to help brace the stock or barrel against breakage under the violent strains above referred to.

The stub-shaft 24 has its lower end formed of polygonal cross-section, as at 39; and this part 39 loosely fits within a vertical polygonal guide aperture 41 in the downwardly extending portion of the fixed plate 19 of the oil reservoir, and by means of which the stub-shaft may be adjusted up or down but prevented from rotation. As shown, the upper end of the valve rod or stem 24a is secured to the stub-shaft and extends downward and to the main valve 10.

The main valve comprises an upper disk-like body 13 having formed integral therewith a downwardly extending tubular shaft portion 11, a series of disks of leather or other suitable material forming a conical packing adapted in shape to fit the beveled seat 7 of the seat ring 5 detachably screwed into the upper end of the shoe at 6, and a bottom annular plate 10 fitting loosely over the annular shaft 11 and clamped in position thereon by means of clamping nuts 10a. In this manner, the packing of the main valve may

be tightly clamped together between the two metal parts 10 and 13. The valve rod 24a extending downwardly from the stub-shaft 24 is screwed into the disk-like body 13 and pinned therein to prevent rotation relatively to the valve. The square or polygonal portion 39 of the stub-shaft 24 to which the valve rod 24a is firmly secured, working as it does in the polygonal guide aperture 41, prevents the rotation of the main valve and its operating rod. The disk-like portion 13 of the main valve is provided with drainage ports 12 through which the water may flow from the stock or barrel 14 into the tubular shaft 11 extending downwardly from the main valve for the purpose of draining the hydrant stock when the main valve is closed.

The interior and bottom portion of the shoe body 2 is provided with a cylindrical casting 42 which is internally fitted with a bronze bushing 43 of tubular-like form and preferably with an outwardly curved portion 44 at the top. This tubular bushing 43 is provided about half way up with a lateral drainage aperture 51, said aperture opening into an annular drainage chamber 52 formed between the casting 42 and the annular bushing, the said annular drainage space 52 extending considerably above the aperture 51 and having one or more tubular drainage portions 53 whose upper ends open into the upper portion of the annular space 52 and providing an outlet from said space at a considerable distance above the drainage aperture 51.

Surrounding the tubular shaft 11 and movable with it is a fluid tight piston 45, said piston forming an annular spacing circular body having clamped between said body and a washer plate 47 a cup-shaped leather packing 46. Similarly, at the bottom of the piston spacing circular body 45 is arranged a downwardly extending leather cup packing 46a which is clamped in position by the clamping plate 48 and nuts 49 and 50, screwed upon the lower end of the tubular shaft 11. The cylindrical bushing 43 is axially in perfect alinement with the axis of the main valve so that it acts to positively guide the main valve and its attached piston axially of the valve seat. The drainage water from the stock 14 of the hydrant flows by gravity through the orifices 12 in the upper annular body part 13 of the main valve, said water flowing downwardly through the tubular shaft 11 to a level below the piston 45 therein. The level of this drainage water rises in said cylinder 43 and passes outwardly through the lateral port 51 therein and thence through the annular space 52 and into the upper open ends of the tubular drain portions 53, said upper ends being at a somewhat higher level than the lower cup-shaped leather packing 46a of the piston 28. In this manner, the leather packing is maintained submerged in the waste water from the hydrant, and if, for any reason, the hydrant was out of use for a long period, the water in the lower part of the cylinder 43 will be retained at a level which will be above said packing 46a, and consequently keep it in a moist and pliable condition. It is also evident that if the hydrant is in connection with a source of water supply, the entire shoe would be filled with water which would have access to the upper cup-shaped packing 46 and in that manner maintain the same in a pliable and workable condition.

The piston 45 being positively connected with the main valve and spaced therefrom, said parts are each adapted to be subjected to the pressure of the water supply entering the shoe, said pressure operating upon the underside of the main valve and upon the upper side of the piston. By reason of this construction, the main valve is substantially counter-balanced by the piston 45 which greatly reduces the amount of effort required to open the main valve. The main valve is somewhat larger in diameter than the diameter of the piston 45 of the counter-balanced and waste valve. While it is desirable to have some excess pressure to normally hold the main valve closed upon its seat, it is equally desirable that the excess pressure be reduced to an amount only sufficient to insure a tight valve and, at the same time, to be limited to such an extent that the counter-balance effect operates to reduce the power necessary to open the valve to a minimum. The counter-balance feature of my improvements, while being of the same nature as shown in my Patent No. 1,717,292, dated June 18, 1929, in association with other features of improvement, is important and insures desirable results in the structure herein over and above what is illustrated in my said patent.

If for any reason it is necessary to withdraw the main valve and seat ring from the stock of the hydrant and thereafter re-introduce the main valve, seat ring and waste valve, it will be necessary to prevent accidental injury to the cup-shaped packing 46a when introducing the same into the cylinder 43. This is accomplished in the following manner: When the seat ring 5 has been unscrewed from the threaded portion 6, the bolts 20 and 27 may be removed to permit the main valve and drain valve to be lifted clear of the shoe and the stock portions connected thereto. When the repairs have been made, it will be necessary, in replacing the drainage piston 45 into the piston within the cylinder 43, to make sure that the cup-shaped leather packing 46a is properly introduced into curved upper end 44 of the cylinder 43, so that it will not be mutilated. To insure ready introduction of the open end of the said packing into the cylinder, a suitable guiding means is provided which, on entering the curved open end 44 of the cylinder 43, will positively centralize the packing relatively to the cylinder as the piston is being lowered into operative position. The guiding means so employed may be in the form of an annular disk 54, preferably with an upwardly curved perimeter and clamped in position between the nuts 49 and 50 on the tubular shaft 11. It will be seen that when the valve rod is being lowered, this disk 54 will be guided in the curved open end 44 of the cylinder and will, in this manner, guide the lower flanged portion of the cup-shaped packing 46a accurately into the upper open end of the cylinder and thereby shield it against injury. In place of employing a separate disk 54, the lower nut 50 may be made as indicated in Fig. 5, that is to say, the nut 50a may have an annular conical flange 54a which acts as a guide when the said nut 50a is substituted for the lower nut and the cup-shaped guide disk 54. I, therefore, do not restrict myself in respect to this guiding means.

Suitable packing 8 may be carried in the seat ring 5 and adapted to make a tight joint between the seat ring and the flange portion 9 of the shoe when the said seat ring is screwed down into position therein in re-adjusting the main valve and waste valve into operative positions.

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

I claim:

1. In a fire hydrant, a stock composed of two alined tubular parts clamped end to end and having a circular flange of large diameter on one of the tubular parts and a circular flange of small diameter on the other tubular part, in combination with a split circular frangible coupling member tightly fitting about one of the alined tubular parts and having an inner portion shaped to contact with and press upon the flange of small diameter, said coupling member having a deep circular groove providing a weakened portion and opening directly upon the flange of small diameter, and a series of clamping bolts extending through the flange of large diameter and the frangible coupling member and spaced to apply substantially equal pressure about the alined tubular parts and flanges thereof and to also tightly clamp said alined parts in axial relation.

2. In a fire hydrant, a stock composed of two aligned tubular parts clamped end to end and having a circular flange of large diameter on one of the tubular parts and a circular flange of small diameter on the other tubular part, in combination with a split circular frangible coupling member tightly fitting about one of the aligned tubular parts and having an inner portion shaped to contact with and press upon the flange of small diameter, said coupling member having a deep circular groove providing a weakened portion and opening directly upon the flange of small diameter and having a downwardly extending portion forming a closure to the space between the flanges of large and small diameter, and a series of clamping bolts extending through the flange of large diameter and the frangible coupling member and spaced to apply substantially equal pressure about the aligned tubular parts and flanges thereof and to also tightly clamp said aligned parts in axial relation.

3. In a hydrant, a stock comprising tubular parts disposed end to end in aligned relation, the adjacent ends thereof having peripheral flanges of different diameters, a split frangible circular coupling member disposed adjacent said flanges, and means for clamping together said coupling member and one of said flanges to provide a watertight joint between the parts, said coupling having sufficiently less resistance than the flanges of the stock whereby upon impact said coupling will fracture and release the stock parts.

4. A frangible ring coupling for securing together two annular flanges, comprising an annular part of small cross sectional area engaging one of the flanges, and an annular part of greater cross sectional area for attachment to the other flange, said small section having sufficiently less resistance than the flanges of the stock, whereby upon impact the smaller portion will fracture and release the stock parts.

5. In a hydrant, a stock comprising tubular parts disposed end to end in aligned relation, the adjacent ends thereof having peripheral flanges of different diameters, a frangible circular coupling member disposed adjacent said flanges, and means for clamping together said coupling member and one of said flanges to provide a watertight joint between the parts, said coupling having sufficiently less resistance than the flanges of the stock whereby upon impact said coupling will fracture and release the stock parts.

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