

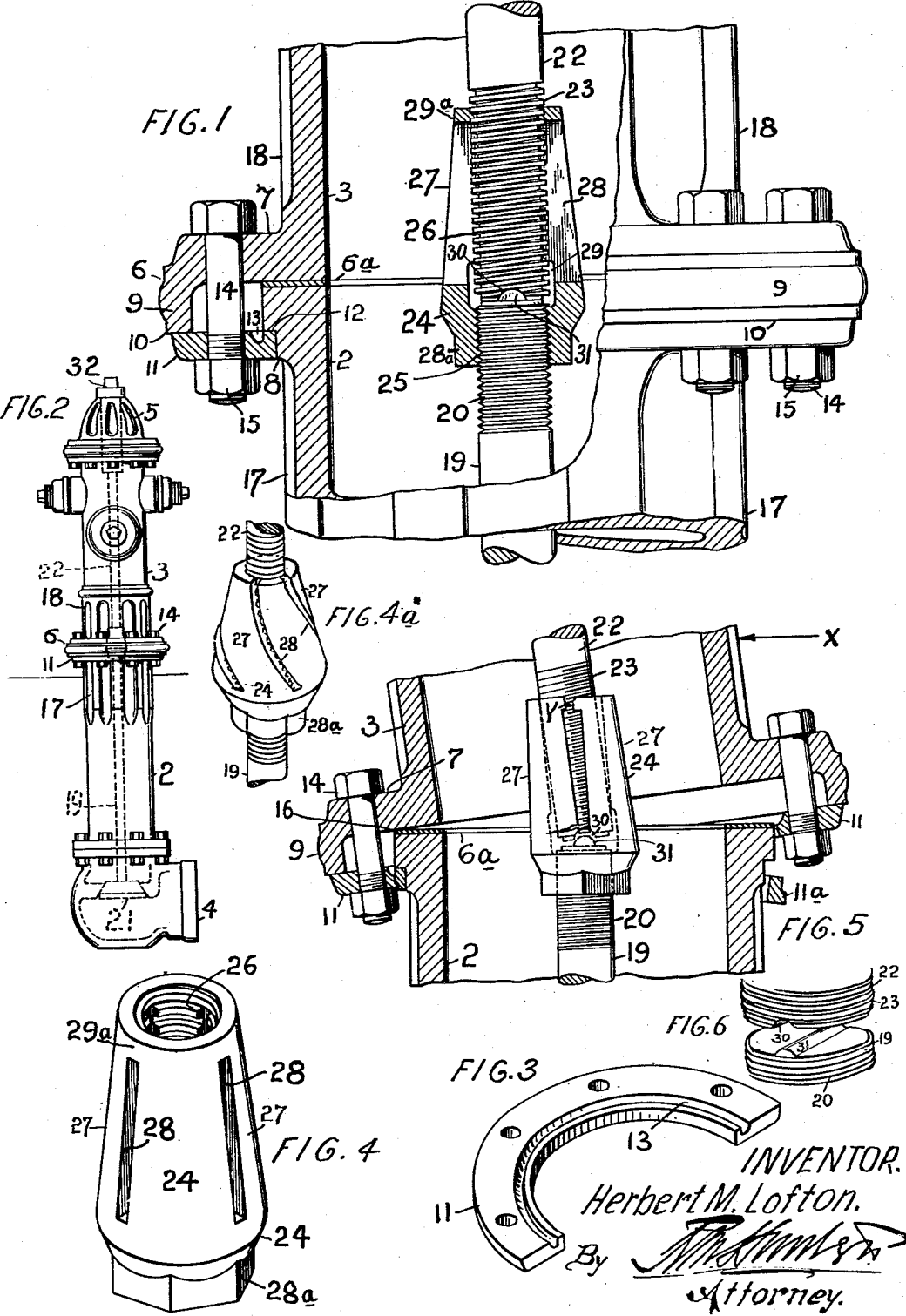
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H. M. LOFTON

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FIRE HYDRANT VALVE ROD COUPLING

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INVENTOR.
Herbert M. Lofton.
By *[Signature]*
Attorney.

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FIRE HYDRANT VALVE ROD COUPLING

Herbert M. Lofton, Chattanooga, Tenn.

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10 Claims. (Cl. 287-117)

My invention has for its main object certain features of construction in a fire hydrant which, in case of injury to the hydrant due to heavy impact of a freight truck or other substantial vehicle, will confine the rupture or injury to certain definite parts which may be easily and quickly replaced and the hydrant again put into a commercial and practical condition at a minimum expense and with all the operativeness that it originally possessed; that it to say, the purpose of my improvements is to permit the injured hydrant to be salvaged and repaired for operative use with the same efficiency which it had before such injury.

A further object of my invention is to form the stock or barrel of the fire hydrant in such manner that adjacent sections may be stacked in vertical relation and united by a frangible coupling means or safety flange which is adapted to be broken due to heavy impact or a rupturing blow, as aforesaid, the structure of the frangible coupling being such that it is provided with relatively weakened portions to insure breakage in a definite manner and place and so as to cause any ruptured and detached portions to fall by gravity outside of the stock or barrel sections, thereby avoiding injury to the valve mechanism by broken particles falling into the shoe of the hydrant.

My object is further to so construct the valve stem or rod extending through the stock or barrel that it is formed in a plurality of parts in abutting relation and normally with rotary movement in opening and closing the valve of the hydrant; but which, in the case of the breaking down of the stock or barrel due to external impact, as aforesaid, will become separated into a plurality of parts such as to prevent the bending of the valve rod sections or injury thereto, this being accomplished by coupling the plurality of valve rod sections with a bendable coupling member or safety thimble for normally holding the valve rod sections in longitudinal alinement and which under the pressure of the impact becomes bent and liberates the valve rod sections before they are bent or injured.

With the above and other objects in view, the nature of which will be more fully understood from the following specification, the invention consists in the novel features of construction hereinafter more fully described and defined in the claims.

Referring to the drawing: Fig. 1 is a portion of the stock or barrel of the fire hydrant, with part in section showing the construction of the frangible coupling means, safety thimble, and valve rod sections; Fig. 2 is an elevation of the complete fire hydrant embodying my improvements; Fig. 3 is a portion of the frangible coupling or safety flange; Figs. 4 and 4a are per-

spective views of the preferred form of safety thimble for normally sustaining the valve rod sections in longitudinal alinement; Fig. 5 is a vertical section corresponding generally to Fig. 1, but showing the parts in the positions assumed when subjected to a rupturing blow; and Fig. 6 is a perspective view of the abutting ends of the valve rod sections.

By reference to Fig. 2, it will be seen that the character of hydrant contemplated under the present improvements comprises a stock or barrel made up of the two parts 2 and 3 rigidly secured together by a frangible coupling member or safety flange 11 (to be later described); a shoe or bottom portion 4 having a side inlet for connecting with the street main; and a top or bonnet section 5 provided with the operating nut 32 by which the valve stem, comprised of the sections 19 and 22, is operated in opening and closing the valve 21 arranged in the shoe.

Referring now more particularly to Fig. 1, the two sections 2 and 3 of the stock or barrel are abutted end to end with an intermediate gasket or packing 6a and provide a flange-like coupling 6 the parts of which are bolted together for uniting the stock sections 2 and 3. The specific construction of this flange-like coupling comprises the following features, namely, the upper stock member 3 is provided with an annular wide flange 7 which at its outer perimeter is curved downwardly as at 9 so as to provide an annular abutment 10 surrounding the stock or barrel 3. The section 2 of the stock or barrel is provided with a flange 8 of less radial width than the upper flange 7, before referred to, and this smaller flange 8 is grooved as at 12, the same forming an under-abutting surface which lies in the same plane as the abutting surface 10 of the upper flange 7. In addition to these flange portions 7 and 8, I provide two semi-circular frangible coupling members 11, as shown in Fig. 3, which are radially shaped to fit against the abutment surfaces 10 and 12 to form a safety flange, said coupling members being clamped by the bolts 14 and nuts 15 thereof in such manner that the two flange portions 7 and 8 are strongly clamped upon the gasket 6a. The ring-shaped frangible coupling members 11 are bored to the right diameter, so as to snugly fit the annular shoulder on the flange 8 to properly position the said frangible coupling members 11. This member 11 may be weakened by means of an annular groove 13 on the portion which abuts the surface 12 of the flange 8. Immediately above the flange 7 there are provided strengthening ribs 18, and similarly, immediately below the flange 8 the stock or barrel is provided with strengthening ribs 17, said ribs respectively extending above and below the frangible coupling member or safety flange 11.

Referring now to Figs. 1 and 4, and more espe-

cially with respect to the valve operating stem, said stem is composed of two valve rod sections 19 and 22 which are respectively screwed into opposite ends of a coupling or safety thimble 24, said ends respectively provided with a transverse rib portion 31 and a transverse groove portion 30. Moreover, the screw threads 20 on the upper end of the rod section 19 engage the screw threads 25 in the lower part of the thimble or coupling 24 and the screw threads 23 on the lower end of the rod section 22 screw into the screw threads of the upper portion of the thimble or coupling 24. These threaded ends of the valve rod sections 19 and 22 form an interengagement between said ends as will make the said valve rod sections move as a unit in opening and closing the valve. It will further be seen that the pitch of the screw threads 20 upon the upper end of the valve rod section 19 is less than the pitch of the screw threads 23 on the lower end of the valve rod section 22. Furthermore, the safety thimble is provided with a strong body portion 24 inside of which is a chamber 29 for providing a clearance space into which the threaded ends of the valve rod sections 19 and 22 may extend when adjusting them into normal engagement for the usual operation of the hydrant. The upper end 27 of the safety thimble is tapered and is slotted at 28, said slots extending entirely through the sides and threaded interior 26 of the safety thimble or coupling. These tapering portions 27 of the thimble provide gradually weakening side walls from which the threaded stem portion 22 may be detached by a sufficient pull endwise of said valve rod section 19. To enable a considerable resistance to the said portions 27 before they spread or open up, the upper portions of said walls are preferably connected by the ring-shaped portion 29a which must be broken in alignment with the several slots 28 before the releasing action of the thimble takes place. The lower end 28a of the safety thimble 24 may be provided with a hexagonal shape to facilitate the use of a suitable wrench when screwing the thimble tightly in position upon the threads 20 and 23.

In order to install the safety thimble or coupling 24, it is screwed upon the threaded end 20 of the lower valve rod section 19 as far as the threads will permit. Then the lower screw threaded end 23 of the upper valve rod section 22 is screwed into the upper end of the safety thimble until it touches the transverse rib 31 on the end of the lower valve rod section 19. The upper valve rod section 22 is then adjusted rotatively until the groove 30 therein comes exactly in line with the transverse rib 31. When this is done, the thimble is screwed upwardly upon the stationary valve rod sections which, due to the differential threads thereof, will gradually pull the two ends of the valve rod sections 19 and 22 together very firmly, causing the transverse rib 31 of the rod section 19 to tightly engage the transverse recessed portion 30 of the rod section 22. As a result of this adjustment, no further rotative movement to either the upper or lower stem section is permitted and both of the valve rod sections 19 and 22 cooperate as if they were a single rod shaped valve piece or stem. When the two valve rod sections 19 and 22 are firmly coupled together by the safety thimble or coupling 24, the valve 21 in the shoe of the hydrant is reciprocated vertically by rotation of the nut 32 in the bonnet, and the construction of this nut 32 and its co-operation with the valve operating stem is fully

shown in my applications Serial No. 574,284, filed November 11, 1931; Serial No. 579,683, filed December 8, 1931; Serial No. 659,293, filed March 2, 1933; and Serial No. 706,926, filed January 17, 1934. If desired, the means for preventing normal rotation of the valve stem embodied in the aforesaid applications may be employed in the hydrant structure of the present application.

Considering now the possibility of an injury to the hydrant which would necessitate repairs 10 and permit the operativeness of the hydrant to be restored. Assuming that the hydrant is struck with force in the direction of the arrow X, as indicated in Fig. 5, it will be understood that the frangible coupling member 11 will be broken 15 along the grooved portion 13 thereof for more or less of the extent of said groove 13, (Fig. 3), as more fully indicated in Fig. 5, wherein the part marked 11a is derived from the member 11 and in falling under the action of gravity 20 descends outside of the stock or barrel 2, and hence does not find its way into the hydrant barrel or shoe where it might disrupt or cause injury to the valve mechanism located in the shoe of the hydrant. Under the condition assumed, the 25 sections 3 and 5 of the hydrant barrel will be inclined in the manner indicated in Fig. 5, and which so ruptures the frangible coupling member that the sections 3 and 5 may be lifted from the lower section 2 of the hydrant barrel which 30 maintains its upright position. While this rupture of the frangible coupling member is taking place, the connection of the upper valve rod 22 is pulled upward by the lever action of said upper barrel member 3 and bonnet member 5, 35 through the connection of the latter with the operating nut 32, and this upward thrust is so strong that the screw threaded end 23 of the valve rod section 22 is pulled out of the safety thimble 24 and at the same time rupturing the 40 annular part 29a as at Y in Fig. 5, which permits the spreading of the parts 27 thereof and the release of the valve rod section 22 without bending it. When the top of the hydrant is toppled over from the impact, the action of the 45 safety thimble 24 is such that the segments or walls 27 between the slots 28 will open up slightly, allowing the upper section 22 of the valve stem to pull out from the thimble entirely, which is due partly to the bending action of the segments 50 and partly to the fact that in opening up slightly it allows the taper threads 23 on the stem 22 to pull out of the thimble without injury to the valve stem in any manner. It will be understood that if the bolts 14 are removed after the impact and breakage of the frangible coupling members 11, the entire sections 3 and 5 together 55 with the operating nut 32 and valve rod section 22 may be removed and again replaced together with new frangible coupling members, safety thimble or coupling and bolts 14, in which case the hydrant as a whole becomes operative with the original efficiency. The only parts which are permanently damaged are the frangible coupling members 11 and the safety thimble 24, which 65 may be easily and quickly replaced at a nominal cost for parts and labor.

As will be seen, the construction of the hydrant embodies valve operating means and parts co-operating with the frangible coupling members 70 in such manner that external pressure upon the bonnet or upper member 3 of the hydrant body will act to release the upper section of the valve stem as will permit access to the interior of the hydrant and the replacement of injured parts, 75

and consequently the release of the upper valve rod section is not directly accomplished by the action of the cause of the rupture or blow, but rather indirectly by the pressure applied upon said valve rod section through the lever action of the barrel or body upon the breakage of the frangible coupling member under the direct action of the blow.

Furthermore, it will be understood that while I have shown a preferred form of frangible coupling member and also a desirable construction of the safety thimble or coupling, these are shown by way of illustration only and may be modified as desired without impairing the co-action between the various parts described. For instance, the groove 13 may be omitted from the frangible members 11, as may also the annular portion 29a from the safety thimble 24, (see Fig. 4). Further, while I show the slots 28 of the safety thimble as being of a longitudinal construction, these may be arranged spirally about the body of the thimble as shown in Fig. 4a.

It will now be understood and apparent that I have devised a novel and useful construction which embodies the features of advantage enumerated as desirable, and while I have in the present instance shown and described the preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that I do not restrict myself to the details stated as these are susceptible of modification in various particulars, without departing from the spirit or scope of the invention.

I claim:

1. A coupling member for providing a yielding connection between two rod ends, said coupling having screw threaded portions of different pitches on the inside thereof and into which the ends of the rods are screwed to bring them into abutting relation, said coupling also provided with apertures along the length thereof for permitting the coupling to spread under excessive lateral pressure and release one of the rod ends.

2. A coupling member for providing a yielding connection between two rod ends, said coupling member provided at its upper and lower ends with annular shaped portions of relatively different deformability, said annular shaped portions having screw threads on the inside thereof and into which the ends of the rods are screwed to bring them into abutting relation, said coupling also provided with apertures along the length thereof for permitting the coupling to spread under excessive lateral pressure and release one of the rod ends.

3. A coupling member for providing a yielding connection between two rod ends, said coupling having screw threaded portions of different pitches on the inside thereof and into which the ends of the rods are screwed to bring them into abutting relation, and the abutting ends of said rods being provided with transverse engaging parts which interlock upon rotation of the coupling to prevent relative rotation of the rods, said coupling being provided with apertures along the length thereof for permitting the coupling to spread under excessive lateral pressure and release one of the rod ends.

4. A coupling member for providing a yielding connection between two rod ends, said coupling having the screw threaded portions of different pitches on the inside thereof and into

which the ends of the rods are screwed to bring them into abutting relation, said rod ends being also provided with screw threaded portions of different pitches so as to permit said ends to move in the same longitudinal direction and also to move toward or from each other at any time, said coupling being provided with apertures along the length thereof for permitting the coupling to spread under excessive lateral pressure and release one of the rod ends.

5. In a fire hydrant, a valve operating stem formed of two parts, combined with a connecting coupling member into the opposite ends of which said parts are respectively screwed with screw threads of similar engaging direction, and wherein also the coupling member is provided with internal screw threads of different pitches and the screw threads of the respective valve operating stem parts are provided with external screw threads of the same corresponding pitches; and wherein further, the connecting coupling member is provided with slotted portions to reduce the rigidity of one end of the same whereby it may be spread under a strong pull by the valve operating member which is screwed into the end of the coupling nearest to said slotted portions.

6. A coupling member for providing a yielding connection between two rod ends, said coupling having screw threaded portions on the inside thereof into which the ends of the rods are screwed to bring them into abutting relation, said coupling also provided with apertures along the length thereof for permitting the coupling to spread under excessive lateral pressure and release one of the rod ends.

7. A deformable coupling comprising a hollow sleeve provided with internal threads adapted to receive adjacent ends of rods or the like, said sleeve having a plurality of slots extending into the threaded portions to render it readily deformable under excessive lateral pressure to permit separation of said rods.

8. A deformable coupling comprising a hollow sleeve provided with internal threads adapted to receive adjacent ends of rods or the like, said sleeve having slots extending into the threaded portion thereof and along the length thereof to render it readily deformable under excessive lateral pressure to permit separation of said rods.

9. In a coupling for a valve operating member, a pair of juxtaposed rods disposed end to end, a sleeve embracing the ends of said rods, means for operatively connecting said rods to transmit movement therebetween to operate the valve including means for connecting said sleeve with each of said rods, and a plurality of longitudinally extending slots in said sleeve to render it readily deformable under excessive lateral pressure to provide for separation of said rods.

10. In a coupling for a valve operating member, a pair of juxtaposed rods disposed end to end, a sleeve embracing the ends of said rods, means for operatively connecting said rods to transmit movement therebetween to operate the valve including means for connecting said sleeve with each of said rods, and a plurality of longitudinally extending slots in said sleeve extending to one end thereof forming fingers in said sleeve which are deformable under excessive lateral pressure on one of said rods to provide for the release of said rod from said sleeve.

HERBERT M. LOFTON.