G. W. JOHNSTON.

HYDRANT.

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928,663.

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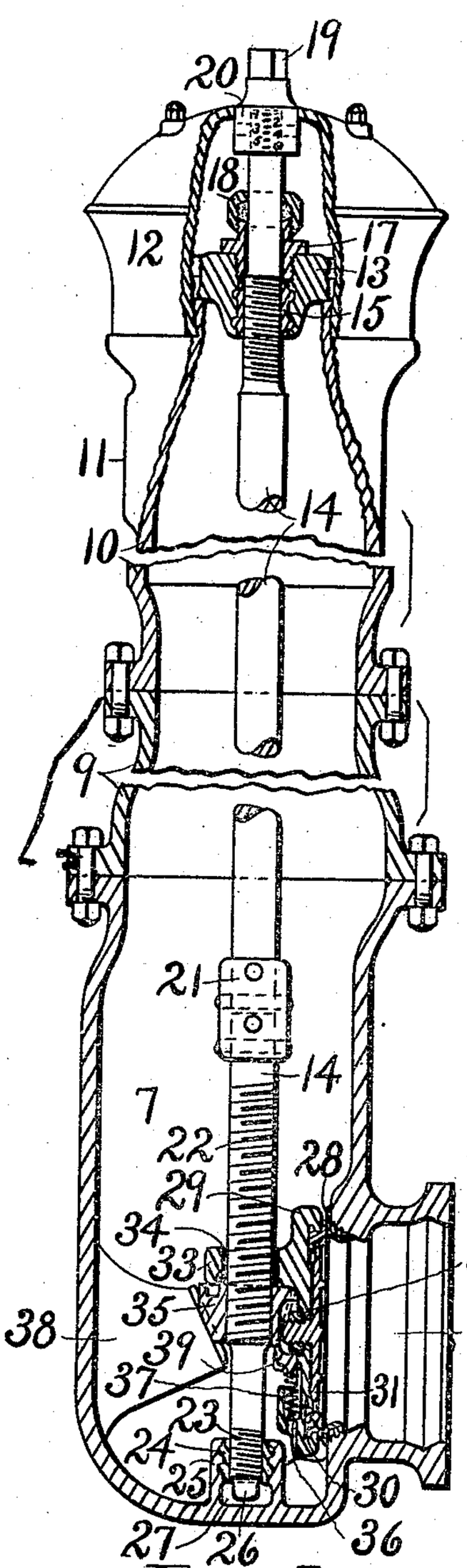

FIG. 1.

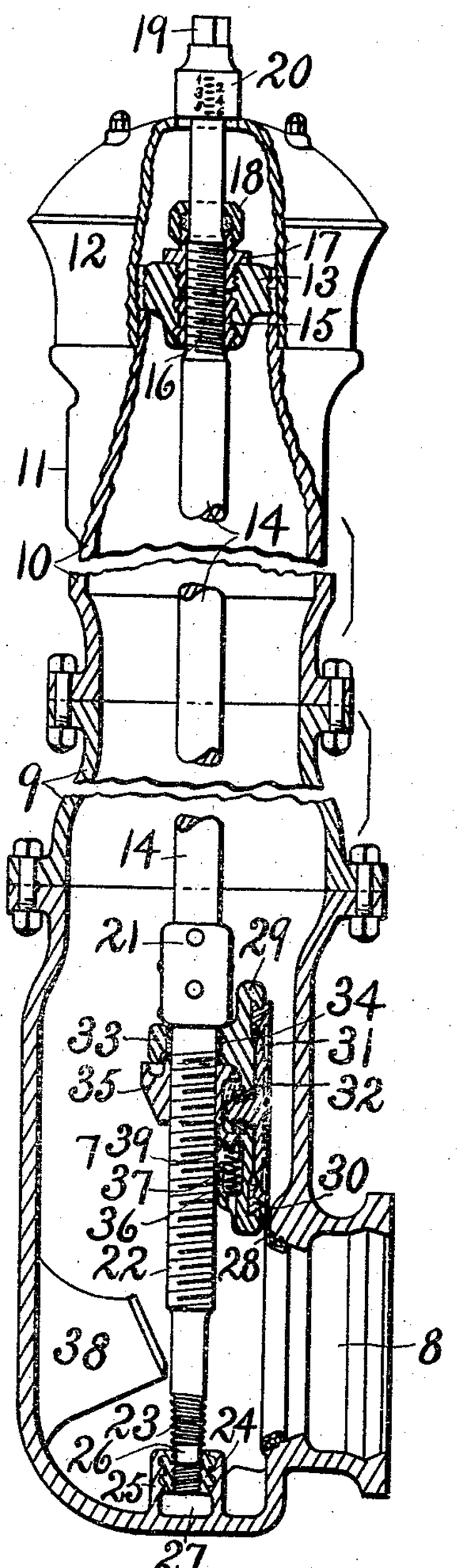

FIG. 2.

WITNESSES:

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HYDRANT.

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To all whom it may concern:

Be it known that I, GEORGE W. JOHNSTON, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Hydrants, of which the following is a specification.

My invention relates to improvements in valves of the inside-screw variety, in which provision is made for imparting to the valve spindle a limited amount of longitudinal movement without, however, taking away as the chief factor in opening and closing the valve proper the means whereby said valve is operated by the rotary motion of said spindle after the manner of inside-screw valves, with the result that the spindle is converted into an indicator which shows the position of the valve and, what is of far greater importance, has a secure connection at the base except when the valve is wide open, the invention being particularly designed for and adapted to fire-plugs or hydrants.

It frequently happens that hydrants are broken off above the ground by heavy wagons and automobiles, when with the old construction their valves are released and immediately open, and that in consequence of such accidents large volumes of water run to waste and sometimes do much damage to adjacent property before the water can be shut off back of said valves, thus there is always the loss of the water to take into account and there may be in addition the damage just mentioned, and the primary object of my invention is to produce a hydrant in which the valve will remain closed regardless of any injury which the exposed part of such hydrant may sustain, provided the valve be closed at the time the accident occurs.

A further object of my invention is to utilize the valve spindle as an indicator of the position of the valve, the ordinary inside-screw construction not permitting this to be done.

Other objects will appear during the course of the following description, and it will be seen that the improved construction is simple, is readily adaptable to the type of valve for which it is intended, and would increase the strength, durability, practicability and efficiency of such type even in the absence of the new features of special and peculiar usefulness.

I attain the objects and secure the advantages of my invention by the means illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of a hydrant embodying my invention, showing the valve closed, and Fig. 2, a similar view showing said valve open. Parts of the casing and of the valve spindle are broken out in these views in order to economize space.

Similar figures refer to similar parts throughout the views.

The casing of the hydrant illustrated in the drawings consists of a base piece 7 in which is the inlet 8, a superimposed connection 9 which varies in length to adapt the hydrant to different localities, a superimposed body 10 in which is one or more outlets 11, and a superimposed cap 12, all bolted together in the usual and well-known manner. Suitably supported within the cap 12 is a centrally perforated, diaphragmal plate 13 which forms a bearing and guide for a valve spindle 14. The hub-like center of the plate 13 receives an internally screw-threaded bushing 15 with which a screw-threaded part 16 of the spindle 14 engages. A stuffing-box 17 for the spindle 14 is screwed into the plate 13 above the bushing 15, and a follower 18 is screwed onto the top of such stuffing-box. Rigidly attached to the top of the spindle 14 is a nut 19 which receives the wrench used to turn said spindle. The nut 19 projects through an opening in the top of the cap 12, and said nut has a body 20 which extends into said cap when the spindle is inwardly disposed. A scale, as shown in Figs. 1 and 3, is marked on the body 20, there being six graduations in the present instance, numbered from above downward from 1 to 6. A coupling 21 connects the two rods which together make up the spindle 14. Below the coupling 21 less the spindle is screw-threaded at 22, and more screw-threads appear on said spindle at 23, these last being at the lower terminal. The screw-threads 22 are much coarser than the screw-threads 16 and 23 which are alike, the ratio being in this case about four of the fine threads to one of the coarse threads. The fine threads form right-hand screws and the coarse threads for a left-hand screw, but this arrangement may be reversed. The upper screw 16 is something more than twice the length of the lower screw 23, and the inter-

mediate screw 22 is very much longer than said lower screw. The reason for these differences in threads and screws will appear presently. The upper screw 16 is a thrust screw, the next lower screw 22 is the nut-actuating screw, and the lowest screw 23 I term the safety screw.

When inwardly disposed the screw 23 engages an internally screw-threaded bushing 24 incorporated with a fixed nut 25 which rises from the bottom of the base 7. Below the screw 23 the spindle 14 is provided with a center-piece, projection or stud 26 the diameter of which is the same as the small diameter of the screw-threads in the bushing 24. A chamber 27 in the nut 25 is for the accommodation of the stud 26.

At the inner end of the inlet 8 is a valve-seat 28 for a vertically movable valve 29 which has a rubber ring 30 attached thereto by means of a retaining ring 31 and nut 32. The ring 30 makes a tight joint with the valve-seat when the valve is closed. An arm 33 projects laterally from the back of the valve 29 near the top. The spindle 14 passes through an opening 34 in the arm 33 the diameter of which opening is considerably larger than the diameter of that portion of said spindle which operates in and through said opening. Below the arm 33 and in threaded engagement with the screw 22 is an operating wedge nut 35 for the valve 29. A spring 36 seated in a pocket 37 in the lower rear part of the valve 29 and bearing at its upper end against that part of the nut 35 which is above tends to force said valve downward as far as the arm 33 and said nut will permit. The nut 35 engages the valve 29 in such a way that said nut cannot rotate. A wedge 38 springs from the side of the base 7 which is opposite the outlet 8, on the inside, and extends into the lower part of the path of travel of the nut 35. There is also a wedge 39 on the back of the valve 29 between said valve and the nut 35. In practice there are two wedges 39.

When the valve 29 is closed its ring 30 is forced hard against the valve-seat 28 by the wedging action of the members 38 and 39 and the nut 35 under the downward pressure of the spindle 14 and so held, in the customary manner.

To open the valve 29, assuming that it be closed as shown in Figs. 1 and 2, apply a wrench to the nut 19 and rotate said nut and with it the spindle 14 to the right, when the latter rises in the bushings 15 and 24 and at the same time raises the nut 35 by the screw 22. The nut 35 thus carried upward by the spindle and with the spindle takes with it the valve 29 and so opens the inlet 8, such inlet being wide open by the time the arm 33 contacts with the bottom of the coupling 21, further movement in this direction then being arrested. The parts now stand as shown in Fig. 2 with the body 20 of the nut 19 above the top of the cap 12, and the screw 23 out of the fixed nut 25, only the stud 26 remaining in said nut to center the spindle at the base and to prevent dirt from fouling the screw-threads below and from getting into the chamber 27 and so obstructing the return of said spindle to its former position. The valve is again closed by rotating the spindle to the left until all of the parts resume their former places.

It will be understood that, owing to the difference already noted between the screws 16 and 23 and the screw 22, the movement of the nut 35 on the spindle is much greater at each revolution of said spindle than is the movement of the spindle itself longitudinally, therefore while the spindle is moving a short distance vertically the valve 29 moves through a considerable space relatively. The scale on the body 20 registers or indicates the position of the valve, because the total length of said scale is the same as the maximum length of vertical travel of the spindle and corresponds to the maximum length of vertical travel of the valve, and the ratio between said travel of the spindle and said travel of the valve is always the same.

From the foregoing it is clear that any given mark of the scale, when in line with the top of the cap 12, must indicate correctly the position of the valve; for example, suppose the mark 3 be in line with such top of the cap, it is known at once that the valve is three-sixths of the way or half open. This register is very convenient when it is not desired to locate the valve in either of its extreme positions. The scale may vary to meet different requirements, that is, it may be made finer or coarser and have more or less than the number of graduations shown.

The screw 16 takes the thrust of the spindle 14 in place of the nut formerly employed for this purpose, but in the event that an accident happens to the hydrant which breaks the engagement of said screw with the plate 13, while the valve 29 is closed, said spindle is prevented from rising and said valve from opening by reason of the engagement of the screw 23 with the nut 25. The great value and utility of this feature of my invention was carefully pointed out in the introductory part of this description. Excepting when the spindle is at the upper end of its travel or nearly at that point and the valve consequently wide open, the screw 23 is held by the nut 25, so there is always a strong base check or lock for said spindle which provides additional holding means for said valve whether the latter be completely closed or partly open. Since the screw 23 is not required actively while the spindle is at the upper end of its travel, it need not be as long as the screw 16 which under normal

conditions is constantly in active service, and for this reason the construction is such that said screw 23 leaves the bushing 24 when said spindle approaches the aforesaid upper end of travel.

The bushings 16 and 24 really constitute parts of the plate 13 and the nut 25, respectively, and so far as this invention is concerned it would make no difference if such bushings were omitted and the tapping were done directly in the metal of which said plate and nut consist.

I make no claim for the valve *per se* with its wedging mechanism because I am aware that the same is old in the art. I am aware, too, that various kinds of screw spindles for operating valves have been employed before, but not in the same or a similar form as herein set forth.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a device of the class described, with a valve, of a rotary reciprocating spindle therefor, means to cause said valve to travel a greater distance than said spindle longitudinally at each revolution of the latter, and a member on the spindle provided with a scale to denote the positions of both spindle and valve.

2. The combination, in a device of the class described, with a suitable casing provided above with a plate adapted to serve as a bearing and guide for a spindle, and having below a fixed nut, and a valve provided with spindle-engaging means, of a spindle tapped into said plate and also tapped into said nut and having threaded engagement with said spindle-engaging means, and an operating nut on the head of said spindle which protrudes through the top of said casing and has a scale thereon to indicate the position of the spindle and thus register the condition of the valve.

3. The combination, in a device of the class described, with a suitable casing provided above with a plate adapted to serve as a bearing and guide for a spindle, and having below a fixed nut, and a valve provided with spindle-engaging means, of a spindle tapped into said plate and also tapped into said nut and having threaded engagement with said spindle-engaging means, and provided with a bottom stud having substantially the same diameter as the small diameter of the screw-threads in the nut.

4. The combination, in a device of the class described, with a suitable casing provided above with a plate adapted to serve as a bearing and guide for a spindle, and having below a fixed nut, a valve, and a valve nut, of a spindle having formed thereon a thrust screw to engage said plate, a safety screw to engage said fixed nut, and an actuating screw for said valve nut, the threads of said nut-actuating screw being coarser than those of the other screws.

GEORGE W. JOHNSTON.

Witnesses:
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