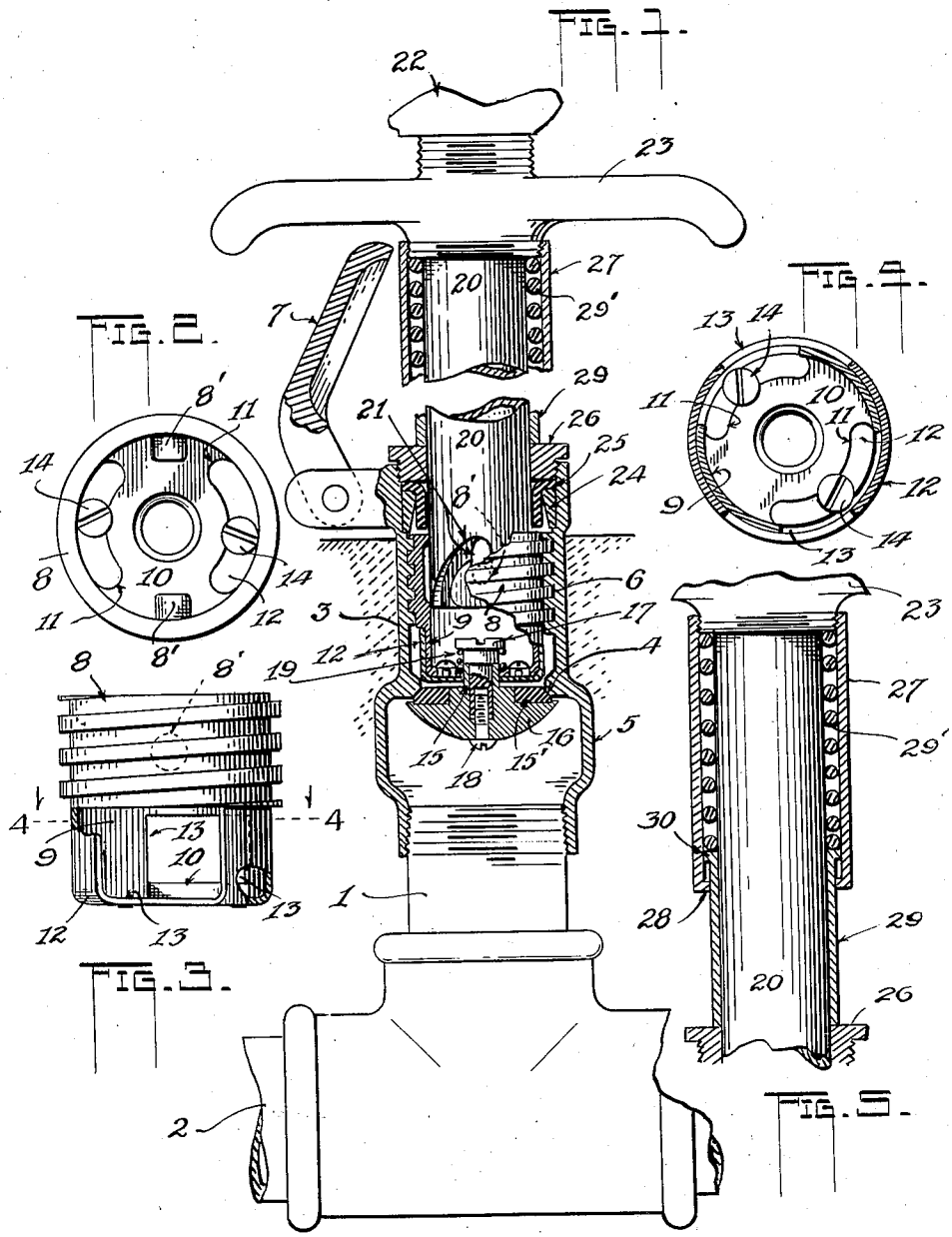
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VALVE

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VALVE

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This invention relates to improvements in valves. More particularly the invention pertains to a valve of a type that while adapted for various uses is especially well adapted for employment at outlets of pipes or conduits forming parts of lawn or golf course sprinkling systems.

An object of the invention is the provision, in a valve, of a novel manner of engaging a manually operated portion with a part of the valve mechanism that controls the closure-member of such valve for seating and unseating such member.

Another object lies in providing a structure for seating and unseating a closure-member by a control-member wherein such closure-member can be made to positively rest snugly upon the valve-seat before the control-member carrying it is quite or wholly retracted.

Again, an object is to furnish in a valve a positively manually operated member having a closure carried elastically thereby, the organization being such that when said manually operated member has been moved to a position at or about the limit of its travel in seating the closure the latter is free to have further travel independently of such member and thus is permitted to positively adjust itself to its seat.

Another object lies in providing in a valve a manually operated control member carrying a closure, the latter being free to move with respect to the former to the end that when the control member has been moved to a position where the closure is about to be seated that member may be forced upon its seat by water pressure behind it, such movement of the closure being independent of the control member.

In addition to these objects there is the further object of providing a manually operated element insertable into a valve for engaging and controlling a closure operating member and to fashion the element and the member so that they will be held in positive operating engagement and there held by water pressure in a somewhat automatic manner.

In order that the invention may be fully understood the accompanying drawing is provided wherein—

Figure 1 is a longitudinal sectional elevation of the valve of our invention. Figure 2 is a plan of a threaded closure-control member produced on a larger scale than shown in Figure 1. Figure 3 is a side elevation of the member shown in Figure 2. Figure 4 is a transverse section of the member shown in Figure 3 taken on line 4—4 of that figure, and Figure 5 is a detail in vertical section of a spring control arrangement shown but partially in Figure 1.

The valve is adapted for connection with a stub connection 1 of a conduit 2 of a sprinkling system, for example, the body of said valve being denoted at 3. It is provided with a seat 4 above a bulbous portion 5, being further provided with screw threads 6 in the wall of its bore above said seat. At the top of the body any usual lid or cap 7 may be hingedly mounted for closing the bore when the valve is not in use. Engaging the threads 6 is a correspondingly threaded member 8 whose lower portion 9 is of cupped form, in this instance, the same including a bottom 10 furnished, for example, with arcuate slots 11, one lying diametrically opposite the other. Thus constructed the portion 9 receives in a smooth turning fit an outer cupped portion 12, one adapted to rotate with respect to the other, and each has an opening 13 in its side wall in registering position as best shown in Figures 3 and 4.

One of the purposes of the invention is that the rate of flow of water through the valve may be governed even though the closure to be described may be fully open. That this may be accomplished the last named parts may be adjusted relatively to provide a resultant opening of greater or less degree whereupon they may be fixed relatively by means of screws 14, for example, which may extend through the slots 11 and threaded into the bottom of the cup 12, their heads engaging the margins of the bottom 10 at said slots, said heads being readily reached by a suitable tool (not shown) inserted through the bore of the valve from above. Such an arrangement or its equivalent thus provides for regulating water flow for a given sprinkler installation aided by any usual pressure gauge, not shown.

The bottoms of the portion 9 and cup 12 each has a central opening through which extends from below the stem 15 of a member 16, the latter carrying a closure-member 15' of a material suitable for properly closing upon the seat 4. For convenience in manufacture and for ease of assembling the parts just described the said stem 15 is bored to receive a screw 17 from above through the member 8, 9 and a screw 18 of smaller diameter extends from below through the member 16 into said screw 17. A coil spring 19 surrounds the later and is compressed between the head thereof and the bottom 10 of the portion 9, for example, by means of which the closure 15' may be elastically held upon the seat 4, said spring permitting the closure parts 15', 16 to have move-

ment with respect to the member 8,9 in a direction in line with the direction of seating.

As shown in Figures 2 and 3 the member 8,9 is furnished interiorly with a pair of oppositely disposed lugs 8' by means of which that member may be turned upon its threads to seat or unseat the closure 15' as will now be understood. A tubular water conducting stem 20 snugly fits within the bore of the member 8 and at its entering end said stem is cut away at opposite sides to provide hook shaped slots or notches 21, these each having such a contour as to provide for receiving the said lugs while inserting said stem during a slight rotary movement, and at a recurved inner terminus thereof the walls or abutments of the slots enclose the lugs between them as in a socket, see Figure 1, and thereby the member 8,9 may be positively rotated in either direction, it being observed that when the lugs lie within the termini of the slots the stem cannot be withdrawn from the member 8,9 intentionally or forced out of the member by water pressure.

The outer end of the stem is surmounted by a sprinkler-head part only of which is indicated at 22, and for convenience in manipulating the stem it may have grasping portions such as 23. The stem serves as a conductor for water passing toward the sprinkler-head and in order to provide a snug water-tight fit within the bore of the body a suitable packing arrangement is provided. This may comprise, for example, a spreader ring 24 resting upon a portion of said body, a packing leather 25 within it, and a packing nut 26 threaded into the body for clamping the leather upon said ring 24.

The closure 15' is unseated for placing the valve in operation by inserting the stem 20 and engaging the lugs 8' by a turn to the right until the lugs prevent further rotation. Then by a withdrawal endwise movement of the stem the lugs are engaged between the abutments of the terminals of the slots that parallel the axis of the bore of the stem as shown in Figure 1. By rotating the stem further to the right the member 8,9 is moved on its threads in the direction of the seat 4 thus unseating the closure and, though not so shown, the portion 9 passes partially into the bulbous portion 5 exposing the openings 13 therein, water thereby freely entering said member 8, 9 to pass up through the stem to the sprinkler-head 22. In order that positive control of the said member 8,9 may be had at all times an outward pull upon the stem 20 may be maintained during adjustment periods whereby the proper engagement of the parts may be held. However, pressure of the water within the valve when the closure is open tends to force the stem outwardly and thus maintain the described relation so that the member 8 can be adjusted at any time the stem is grasped for the purpose. By such action it is clear that engaging relation is maintained automatically.

At the time the member 8 is turned on its threads for terminating the flow of water, the pressure being thus reduced as the closure approaches its seat, means may be employed to maintain the lug and slot engagement. One manner of preserving this is shown in Figures 1 and 5, but means equivalent thereto may be used. A sleeve 27 encircles a portion of the stem and is spaced therefrom being secured at one end to the latter, its other end having an inturned flange 28. Enveloping the stem, also, is a sleeve 29 having at one end an outwardly turned flange 30 lying between the stem and sleeve 27 and adapted to be prevented separating from the latter by engaging the flange 28. The other end of the sleeve 29 abuts the packing nut, in this instance, and a coil spring 29' is compressed between the flange 30 and a part of said sleeve 27. By such an arrangement it is clear that the tension of the spring will tend to hold the stem 20 outward with respect to the lugs 8', preserving operative relation.

The spring structure just described may not be used but is of advantage at the times stated so that the operator need not exert an outward pull.

It has been previously noted that the closure structure 15', 16 is permitted longitudinal movement with respect to the member 8,9 in the employment of the spring 19. In this connection it is to be understood that even after the closure is seated during rotation of said member the latter may be rotated still further or to any reasonable limit of travel as permitted by said spring and thus said closure is allowed to adapt itself to the seat in a perfect manner, the rotation of the member 8,9 being with respect to the closure parts at such times as permitted by the stem 15, said member turning about said stem. This independent movement of the closure admits of water pressure assisting in its seating in addition to the spring.

We claim:

1. The combination with a valve body, its valve seat, a closure for the latter, and a tubular portion in adjustable engagement with the body for carrying and operating said closure, of a tubular stem adapted for engagement with the said portion, one of the two last named parts having structures complementary to the other including a slot extending along its wall from an open end thereof and thence being recurved in a direction contrary to that of fluid flow toward said end substantially paralleling the bores of the parts creating a socket, the other part having a lug extending therefrom adapted to traverse part of the slot during entrance of one part into the other and to engage the bottom of the said socket in a retracting movement of such part, complete retractile movement being prevented by such engagement, the rotation of one of the portions due to said engagement of the lug and socket portion permitting and causing a positive unrestricted rotational movement of the two said parts as a unit, a rotatory movement imparted to one of them.

2. The combination with a valve body and its seat, a closure for the latter, and a tubular portion in adjustable engagement with the body for carrying and operating the closure, of a tubular stem associated with the said portion, the latter and said stem having structures to engage each other during a rotary and endwise movement of one of them relatively to the other, such engagement preventing endwise movement of the two relatively in the direction of fluid flow and fixing them relatively during a rotary movement applied to one of them, and means to elastically maintain engagement of the two relatively in an endwise direction.

3. The combination with a valve body, its seat, a closure for the latter, and a tubular portion in adjustable engagement with the body for carrying and operating said closure, of a tubular stem associated with the said tubular portion, one of the two last named parts having a slot in its wall extending from and opening through the end of such part, said slot terminating distant from said end in a communicating slot substantially

paralleling the bores of the said parts and extending toward and spaced from said end forming a socket, the other of the parts having a lug adapted to engage in said communicating slot by a combined inward, rotary and retractile movement of one of the parts, and means to elastically maintain the engaged relation of the lug and socket and constantly tending to impart a retractile movement to one of the parts.

4. The combination with a valve body, its seat, and a closure for the latter, and a hollow member for operating said closure and having adjustable engagement with said body, of a hollow stem for engagement with the operating member, there being a slot included in the construction of one of the last two named parts extending in a direction substantially paralleling the axes of the bores of such parts forming a closed socket, a lug on the other of the two parts to engage and seat in the socket preventing separation of the member and stem, the said two last named parts having unrestricted rotational movement as a unit with respect to the valve body during such engagement of the said socket and lug, and elastic means to maintain the socket and lug engagement.

5. In a structure for the purposes described, a valve body and its seat, a tubular member open at one end and having an opening and a wall at its other end, said member having engagement adjustably with the wall of the body, a valve having a part engageable with the named wall of the member adapted to close upon said seat and movable relatively to and toward the member in the direction of fluid flow during seating, and a hollow stem for insertion into the member, the same having a slot in its wall opening through the insertable open end thereof and extending in the direction of said fluid flow and recurving and being directed toward said open end in a direction contrary to the direction of such flow, forming a socket, said tubular member having a lug to enter said slot and made to seat in said socket during a rotary and endwise movement of the stem within said member.

6. In a structure for the purposes described, a valve body including a valve seat, a tubular member open at one end and having threaded engagement with the inner wall of said body, the same having a wall at its other end, a valve having a part engageable with the last named wall and movable independently thereof adapted to move toward the valve seat and toward and relative to the tubular member in the direction of fluid flow, and a hollow stem insertable into and positively engageable with the said tubular member for rotation of the same in either direction for adjusting said valve with respect to the seat.

7. In a valve structure for the purpose described in combination with a pipe system, a valve body including a seat open toward and into said pipe system, a tubular member open at one end and having threaded engagement with the inner wall of said body and having a free opening at its end remote from said seat, said tubular member having a wall at its other end, a valve guided in said wall of said member, a spring interposed between the end wall and a part of said valve and tending to move the valve with respect to and toward the said wall and toward said seat, there being an opening in a side wall of said tubular member between said valve and the opening of said member, and a member to overlie the opening of said tubular member adapted in an adjustment thereof to vary the effective area of said opening.

8. The invention according to claim 7 including means exposed within the cavity of the tubular member operable through the open end thereof for securing both members in fixed relation.

9. The combination with a sprinkler system including a conduit and a lateral discharge outlet therefrom for receiving a sprinkler head, of a valve body connected at one end with said outlet, its other end being open, said body including a valve seat, a tubular member having threaded engagement with the inner wall of the body at a position in the same between its seat and the open end thereof, said tubular member being open at one end toward the open end of the body and having a wall at its other end, a valve carried by and guided in said wall adapted to engage the valve seat, a spring constantly tending to seat the valve, there being an opening in the side wall of the tubular member, a member carried by the latter for controlling the effective area of the opening, and means for adjusting and fixing the last named member, said means being operable through the end openings of the body and said tubular member.

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