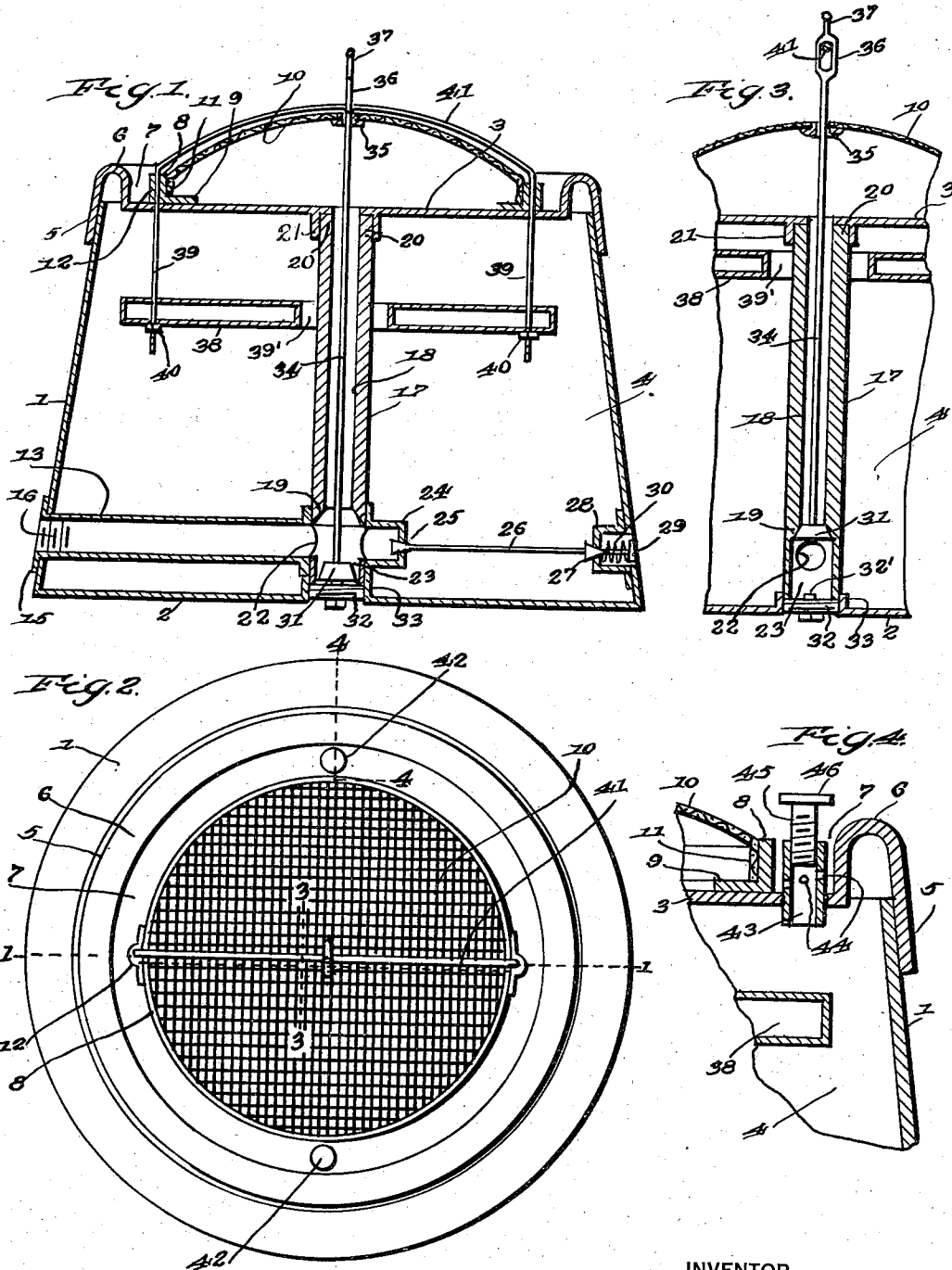


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TIMED SPRINKLER

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TIMED SPRINKLER

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This invention relates to improvements in sprinklers.

It is an object of this invention to provide a sprinkler which will automatically shut off the water after the sprinkler has been in operation for a period of time. Often, a householder desires to have a sprinkler operating when he is away from home for some hours, or for an entire evening, but does not want the sprinkler operating for the entire period of his absence, and in accordance with this invention, the sprinkler can be adjusted to operate, roughly, for a period of time and then it will shut off so that water will not be wasted by an excess of sprinkling over and above the amount necessary for the lawn.

The device of my invention is embodied in a float controlled valve means for shutting off the water, and it is a feature of the invention to provide a reservoir float chamber that is fed by the spray from the sprinkler, by a receiving well that has a restricted discharge into said reservoir. By means of a novel valve control, this restricted discharge may be regulated in such a manner as to time the shut-off operation.

The invention has many other features and objects which will be more fully described in connection with the accompanying drawing and which will be more particularly pointed out in and by the appended claims.

In the drawing:

Fig. 1 is a vertical sectional view of the sprinkler taken on line 1—1 of Fig. 2.

Fig. 2 is a plan view thereof.

Fig. 3 is a sectional view of a central portion of the sprinkler taken on line 3—3 of Fig. 2.

Fig. 4 is an enlarged sectional view taken on line 4—4 of Fig. 2.

Like characters of reference designate similar parts throughout the different figures of the drawing.

In the specific form shown in the drawing, the invention includes a hollow body of annular form having a peripheral wall 1, a bottom wall 2, adapted to form the base, and a top wall 3. The interior of said body forms a reservoir float chamber which I will designate at 4. It may be stated that the foregoing structure may be of cast metal, or of stamped material, and that the invention does not particularly relate to the material or the manner in which it is formed or fabricated. In the present illustration, I have shown the bottom and peripheral walls 2 and 1, respectively, shaped or stamped from a single piece of sheet material, and likewise, the top wall is similarly formed although this particular con-

struction is not essential as it may be varied within the scope of the appended claims.

The top wall 3 has a downwardly extending flange 5, which outwardly telescopes the upper margin of wall 1 and may be secured or removably fitted thereto in any desired manner. Said upper wall 3 has an upwardly extending portion 6 of the cross section shown in Fig. 1, and annular in form, as shown in Fig. 2, which functions to constitute the outer wall of a receiving well indicated at 7. The inner wall of said well 7 may be formed by an annular flange 8, having an angle portion 9, suitably secured to top wall 3. A stream spreading means is provided for the sprinkler which is commonly called a rose, and which may be formed by a foraminated or reticulated material of any type desired and which is herein shown in the form of a screen 10. This screen is domed across and above the upper wall 3, and its free margins 11 may be bent downwardly to fit inside the inner wall 8 of well 7, and be secured thereto in any desired manner.

Thus it will be seen that the receiving well 7 is disposed in surrounding relation to the rose 10 but because of the spread of the sprinkling stream issuing from the rose, the spray will maintain the well 7 substantially full of water while the sprinkler is in operation.

The inner wall 8 is provided with bearings 12, through which members of the float, to be presently described, are adapted to be slidably guided, and these bearings 12, which are suitably secured to the periphery of wall 8, are high enough so that leakage from well 7 cannot result through said bearings, as will later appear.

Reference will next be made to the means for supplying water to the sprinkler.

I have shown a water ingress or supply pipe at 13 which extends inwardly from the wall 1, in a substantially horizontal direction, toward the center of the reservoir 4. The outer end of said pipe may be flanged at 15 and secured to wall 1, and is provided with threads 16 for attachment to a hose. A valve pipe 17 is disposed substantially vertically and centrally of the chamber or reservoir 4 and has an upper section with a relatively reduced bore 18 which terminates at its lower end in a valve seat 19, the upper end 20 of said pipe discharging through top wall 3 against the spreading means 10 which spreads the stream into a sprinkling spray. Wall 3 may have a tubular flange 21, into which the end 20 of pipe 17 is telescoped. Below the valve seat 19 the bore of pipe 17 is enlarged and it junctures with pipe 13 and is provided with an opening 22

to receive water therefrom. The pipe 17 extends below its juncture with pipe 13 to form a dead flow valve well 23. Opposite pipe 13 I provide pipe 17 with a drain-off projection 24 in which a valve closure 25 is seated. A stem 26, connected with said closure 25, has a closure 27 seated in a chamber drain-off projection 28, secured to wall 1. Said stem 26 extends through said projection 28 and is provided with a head 29, accessible from the exterior of the sprinkler. A spring 30, interposed between said head 29 and said projection, maintains closures 25 and 27 seated but when said head 29 is shifted inwardly, both closures will be unseated. Thus, in one operation I can drain off pressure in pipe 17 and pipe 13, after the sprinkler has been shut off, and I can also drain off the chamber 4, as will later appear.

Reference will next be made to the valve closure for shutting off the sprinkler and to the manner in which it is operated.

A tapered valve closure 31 is disposed in said well 23 when in an open position, and the same may rest upon the projection 32' of a plug 32 that is threaded into an upturned portion 33 in bottom wall 2. This plug 32 may be removed when the parts are assembled or for other purposes. However, it will be clear that because the well 23 is below the juncture of pipes 13 and 17, that it will be substantially free from velocity flow that moves upwardly from pipe 13 to pipe 17, and will therefore be out of range of the flow, or in other words, there will be such an absence of flow that it will be in a dead flow area. When said valve closure 31 is moved upwardly against seat 19 it will shut off the flow of water, and it will be noted that the area of the bottom of this closure is greater than that of the top thereof.

Said closure 31 has a stem 34 extending longitudinally in pipe 17 and through the rose 10, which may be provided with a ferrule 35 to facilitate sliding movement of stem 34 therethrough. Above rose 10 said stem is provided with one member of a lost motion connection which is shown in the form of a loop 36, and above the loop 36 the end of the stem is indicated at 37.

Reference will next be made to the float actuating means for controlling the closure 31.

A float is indicated at 38, and the same may be cylindrical and be provided with a central opening 39' to provide clearance for pipe 17. Said float may be hollow as shown, or of any buoyant material desired, but will preferably be of sufficient rigidity to be self-stable. The remaining member of the lost motion connection may take the form of a bail having limbs 39 adjustably connected with the float 38, as indicated at 40, and extending upwardly through top wall 3 and through bearings 12, in such a manner that leakage from the well 7 will be prevented around the sliding connection thereby formed.

Said bail has a bight portion 41 which extends across the top of rose 10 and through the loop 36 whereby the stem 34 will have lost motion connection with the float 38. Said bail is preferably made of a rigid rod of the shape shown in Fig. 1.

Reference will next be made to the timing valves whereby a periodic or timed and restricted delivery of water from well 7 to chamber 4 may be effected.

I have shown two timing valves generally indicated at 42, in Fig. 2, but in many cases only one is necessary, and as they are identical in function and structure, only one need be described in detail, reference being made to Fig. 4.

Said valve consists of a sleeve 43 adapted to be threaded through top wall 3 in the well portion 7, and having a series of staggered holes 44 above wall 3, and opening into said well 7. Thus, water from well 7 may readily flow by gravity into said sleeve 43 through holes 44, and down into chamber 4. A regulating screw 45, which may have a head 46, is threaded into said sleeve 43, and when it is turned downwardly it will serve to close openings 44, dependent upon the extent of adjustment of the regulating screw, and likewise, it will open more holes when adjusted upwardly.

While I do not pretend to provide a timing action to the precision of minutes, I can roughly time the action of the sprinkler by these valves, after trial, to an extent amply sufficient for the purpose. With two or more valves I can increase the restricted flow to shorten the period of operation of the sprinkler but usually one valve will be sufficient.

While the operation will be clear from the foregoing, it may be briefly recapitulated as follows:

Before the water is turned on, the parts will be in the position shown in Fig. 4, with chamber 4 empty, and closure 31 not only seated by gravity against projection 32', but also held down by the weight of float 38, as exercised through the bail 41 and stem 34. When the water is turned on it will enter pipe 13 and then pipe 17 and flow upwardly against rose 10 which will spread the stream into a sprinkling spray. Enough of the spray will descend into well 7 to fill the same and the restricted discharge through valves 42 will gradually fill the reservoir chamber 4. At this point it is desired to point out that the rush of water through pipe 13 will be upward into pipe 17, and hence the valve 31 will be below the flow area and will not be influenced thereby because it will be in a dead flow area. The oppositely disposed valve chamber formed by the projection 24 will increase this effect. As the water rushes up the bore 18, around stem 34, the skin friction will exert a lifting action on the stem 34 which will tend to raise closure 31 but this will be overcome by the weight of the float 38 acting to hold the closure 31 seated against the projection 32' with the clearance between the bottom of the closure 31 and the plug 32, as shown in Fig. 1.

When the sprinkler has been in operation the well 7 will have filled and will have discharged into chamber 4 to gradually raise the level therein in accordance with the adjustment of valves 42. When the level in chamber 4 reaches float 38 the latter will begin to raise but its buoyancy will not at this time be at the maximum, and hence it could not at this time exert the same lifting stress on stem 34 that would be possible at the time that the float had attained a maximum buoyancy. In other words, the maximum buoyancy of the float would only be effective after the water level had risen above the float. Thus, while the float was not subjected to any load it would gradually rise and take up the lost motion provided by the loop 36. After the bail portion 41 had engaged the upper end of the loop, then the float would exercise its full lifting power on the valve stem 34, and this lifting power, added to the ascending stress exercised by the water on stem 34, in bore 18, would be sufficient to lift closure 31 against seat 19, as will now be clear. Thus, water would then be shut off into pipe 17 and the sprinkler would cease to operate. Under some conditions, it is merely necessary for the float to lift or shift the valve closure 31 sufficiently into the path of

the stream to cause the latter to finish this closing movement and maintain the closure 31 seated against seat 19. This is especially true when the closure 31 has upper and lower faces of different areas, as shown.

It will also be clear that the lost motion connection enables the float to idly rise to a given range without performing any function against a load, so that after the slack has been taken up, the imposed load will slow up ascent of the float toward a final limit. However, it will be understood that the lost motion connection is not essential to all practical forms of the invention.

After the owner has returned home he will shut off the water at the usual hydrant or wall cock. This will not wholly release pressure in the sprinkler, hence the user will then press inwardly on head 29 and open valve closures 25 and 27, which will release pressure in pipe 13 into chamber 4, and will drain the latter through valve projection 28, to entirely empty the chamber 4 so that the sprinkler will be ready for the next usage.

It will be noted that the lower end of closure 31 has a greater area than the upper end, and that because of the projection 32', the lower end of said closure is never allowed to rest in flat abutting relation with plug 32. Hence, as closure 31 ascends into the flow of the stream, the latter will pass into engagement with the larger lower end of the closure, which is in clearance relation to the wall of the valve well, and this differential will assist the float, and the action of the stream on stem 34, to elevate and will be effective to hold closure 31 into engagement with seat 19. However, it will be understood that the float will be effective to seat the valve, irrespective of the differential of areas of the valve, and irrespective of the "lift" imparted to the stem 34 by the upwardly moving stream.

It is believed the invention will be fully understood from the foregoing description, and I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:

1. In a timed shut-off sprinkler, an annular hollow body forming a reservoir float chamber and having a bottom wall forming a base and a top wall having a sprinkler rose extending thereover, said top wall having an annular receiving well surrounding said rose and adapted to be fed from the spray, a timing valve in said well controlling delivery of water therefrom to said float chamber, a water ingress pipe extending from the periphery of said hollow body into the latter, a valve pipe extending substantially vertically in said body and junctioning with said ingress pipe to receive water therefrom and said valve pipe extending to and discharging through said top wall under said rose, said valve pipe having a valve seat above the juncture of said ingress pipe and extending below said juncture to form a dead flow valve well, a valve closure in said valve well adapted to coact with said valve seat and having a stem extending longitudinally in said valve pipe and through said rose and provided with a lost motion loop above said rose, and a valve actuating float in said float chamber having a bail with the limbs thereof extending slidably through said top wall and the bight portion extending above and across said rose and through said loop to permit of a limited ascent of said float before said bail actuates said valve stem to lift said valve closure.

2. In a timed shut-off sprinkler, a hollow body forming a reservoir float chamber and having a bottom wall forming a base and a top wall pro-

vided with a sprinkler rose and a receiving well adapted to be fed by the sprinkling spray, a timing valve for controlling delivery of water from said well to said float chamber, a water ingress pipe extending into said float chamber, a valve pipe disposed substantially vertically in said float chamber and having a communicating juncture with said ingress pipe and said valve pipe extending to and discharging through said top wall under said rose and being provided with a valve seat above said juncture and extending below said juncture to form a dead flow valve well, a valve closure in said valve well adapted to coact with said seat to shut off the sprinkler and having a stem extending longitudinally in said valve pipe and slidably through said rose and being provided with a lost motion loop above said rose, and a valve actuating float in said chamber having a bail extending through said top wall and through said loop to elevate said closure after said float has been fully energized.

3. In a timed shut-off sprinkler, a hollow body forming a reservoir float chamber and having bottom and top walls, said top wall having a stream spraying means and a receiving well adapted to be fed by the sprinkling spray and having a restricted discharge into said chamber. A valve pipe in said chamber discharging through said top wall under said means and having a valve seat and a dead flow valve well, a water ingress pipe delivering to said valve pipe between said seat and valve well, and a valve closure in said valve well adapted to coact with said seat to shut off the sprinkler and having a stem extending longitudinally of said valve pipe and through said top wall, and a float in said chamber having means extending through said top wall and connected with said stem to elevate said valve closure.

4. In a timed shut-off sprinkler, a hollow body forming a reservoir float chamber and provided with a stream spreading means and a receiving well fed from the spray and having a restricted discharge into said chamber, a valve pipe in said body discharging against said means and having a dead flow valve well, a normally open valve in said pipe disposed in said well when open, and a float in said chamber operatively connected with said valve to close the latter when said chamber is filled to a predetermined extent.

5. In a shut-off sprinkler, a hollow body forming a reservoir float chamber and provided with a stream spreading means and a receiving well fed by the spray and having a timed discharge into said chamber, valve controlled means for discharging water against said spreading means, and float mechanism in said chamber for actuating said valve means to shut off said sprinkler.

6. In a timed shut-off sprinkler, a hollow body forming a reservoir float chamber and provided with a stream spreading means and a receiving well fed from the spray and having a restricted discharge into said chamber, a valve pipe for discharging water against said means, a valve in said pipe for shutting off the water, and a float in said chamber having lost motion connection means with said valve and said connection means having portions coacting in one extreme position for holding said valve open before said float is energized, and said connection means having portions movable to take up the play and coacting to move said valve toward a closing position upon ascent of said float.

7. In a shut-off sprinkler, a hollow body forming a reservoir float chamber and provided with

a sprinkler rose, said body having a receiving well fed from the spray and provided with a timing valve comprising a sleeve opening through said well into said chamber and having a series of
 5 holes opening to said well for passage of water therefrom through said sleeve into said chamber, a rod for selectively closing said holes to vary the extent of discharge into said chamber, valve controlled means for discharging water against said
 10 rose, and a float mechanism in said chamber for actuating said valve means to shut off the sprinkler.

8. In a shut-off sprinkler, a hollow body forming a float chamber and provided with a rose and
 15 having a receiving well, fed by the spray, a timing valve in said well opening to the latter and to said chamber, means for varying delivery of water from said well to said chamber through said valve, means for discharging water against said rose,
 20 and float mechanism for shutting off the water when said chamber is being filled.

9. In a timed shut-off sprinkler, a hollow body forming a float chamber and having a stream spreading means, a pipe discharging water
 25 against said means, a normally open valve in said pipe having a stem extending longitudinally thereof and subject to the frictional action of the water to close said valve, means for restrictively admitting the spray to said chamber to fill the
 30 same, and float mechanism in said chamber operatively connected with said stem to exert closing action on said valve in addition to the action of the water on said stem.

10. In a shut-off sprinkler, a hollow body forming a float chamber and provided with stream
 35 spreading means, a pipe discharging water against said spreading means and having a dead flow

valve well and a valve seat, a valve closure disposed in said well when unseated, float mechanism in said chamber operatively connected with said valve closure for shifting the latter from said well into engagement with said seat, and means for
 5 admitting water to said chamber to actuate said float mechanism.

11. In a shut-off sprinkler, a hollow body forming a float chamber and provided with stream spreading means, a pipe discharging water
 10 against said means and having a dead flow valve closure well communicating with but out of the range of flow of the stream passing through said pipe, and said pipe having a valve seat above
 15 said well, a valve closure disposed in said well when unseated, float mechanism in said chamber operatively connected with said valve closure for elevating the latter from said well into the path of the stream to cause the latter to seat and maintain
 20 said valve closure seated, and means for admitting water to said chamber to actuate said float mechanism.

12. In a shut-off sprinkler, a hollow body forming a float chamber and provided with stream spreading means, a pipe discharging water
 25 against said means and having a dead flow valve well and a valve seat, a valve closure for said seat, float mechanism in said chamber operatively connected with said valve closure for holding the latter in said well by gravity, and means for admitting
 30 water to said chamber to actuate said float mechanism and cause the latter to shift said valve closure sufficiently into the flow of water in said pipe to cause the water to seat and hold said valve closure seated.

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