July 14, 1936. W. VAN E. THOMPSON 2,047,716

IRRIGATION SPRINKLER

Filed May 14, 1935

Fig. 1.

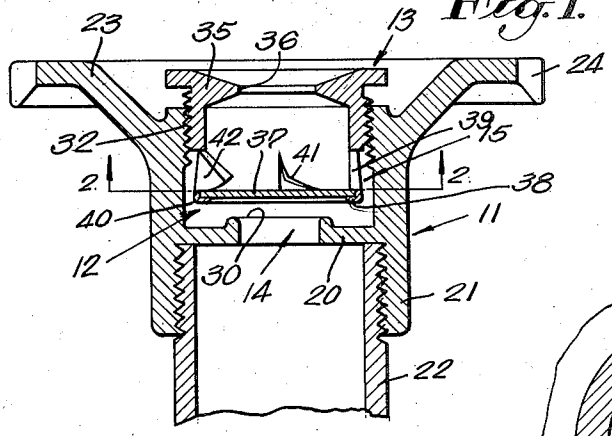


Fig. 2.

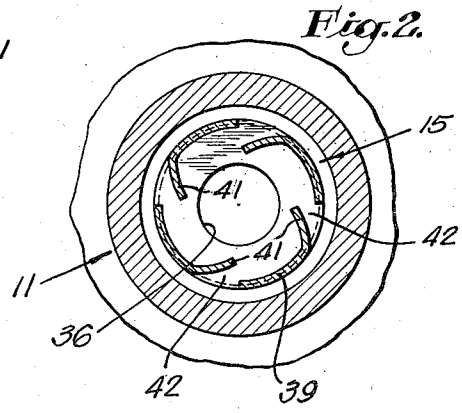


Fig. 3.

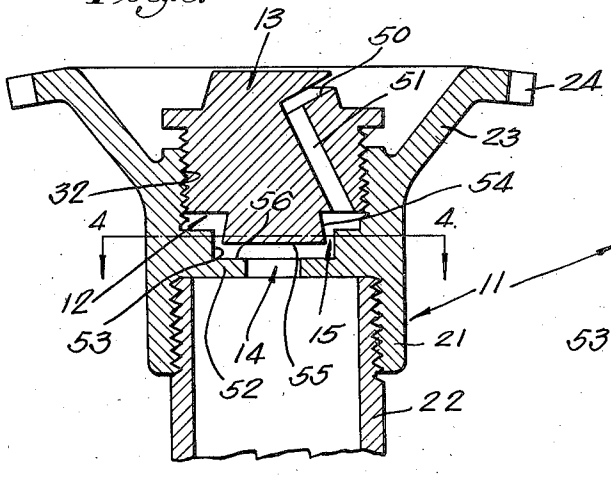
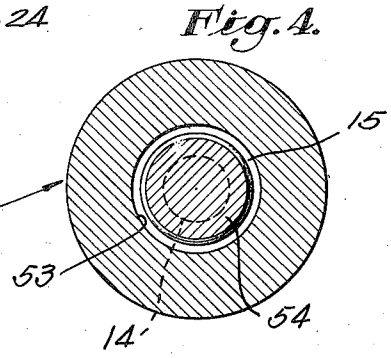


Fig. 4.



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IRRIGATION SPRINKLER

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12 Claims. (Cl. 299—60)

My invention relates to spray devices, such for instance as sprinkler heads, and is particularly adapted for use in connection with automatic sprinkler systems.

In such systems, a number of sprinkler heads are connected to underground piping and arranged so that each sprinkler covers a certain predetermined area. In order that the spray from each sprinkler head may be controlled to cover the desired area, it is necessary to provide a valve means therein to adjustably control the volume of water being sprayed therefrom.

It has been found in practice that sprinkler heads frequently become clogged by snail shells, moss, or other solid matter which may flow upward into the head with the incoming water from the supply pipes, and accordingly it is a primary object of my invention to provide a sprinkler having a control valve and including a strainer means for preventing any solid matter, which might be large enough to become caught in any of the communicating passages or the outlet orifice, from passing into these orifices after it has passed through the inlet valve opening.

It is an object of my invention to provide a sprinkler head having a valve controlled from the exterior of the head, the valve opening being positioned so that water enters the head through the valve opening directly from the supply pipe.

It is a further object to provide, in such a sprinkler head, a strainer means through which the water passes after it flows through the inlet valve opening.

It is still another object of the invention to provide, in a sprinkler head of the type suggested in the above paragraph, passage means through which water flows after it passes through the strainer means, the passage means being operable to cause the water to be swirled, or to rotate, as it is forced through an outlet opening.

A further object resides in the provision of a sprinkler head comprising only one stationary part and one movable part and including a valve, a strainer means through which water passes after it flows through the valve, and a means for rotating the water as it is forced through a delivery orifice.

It is another object of my invention to provide a sprinkler head having means for crushing or breaking up snail shells, which may enter the sprinkler head through the inlet valve opening, into small pieces so that these pieces may be carried on through the head and thrown out of the outlet orifice, the crushing means being operable from the exterior of the sprinkler head without removing any of the parts thereof.

It is another object of the invention to provide a sprinkler head including a stationary body providing a cavity in which a closure member is axially movable to close a valve opening communicating with the cavity, the closure member having a portion relatively spaced from the wall of the cavity to form a strainer space through which water passes after it flows through the valve opening, the area of the strainer space being unaffected by movement of the closure member.

It is a special object of my invention to provide an extremely simple and cheaply constructed sprinkler head having a minimum of parts yet embodying all of the desirable objects and features discussed above.

These and other objects of the invention will be apparent from a perusal of the following part of the specification and the appended claims, in connection with the accompanying illustrative drawing.

In the drawing,

Fig. 1 is a vertical section taken on a median plane of a sprinkler head embodying the features of my invention.

Fig. 2 is a horizontal section taken as indicated by the line 2—2 of Fig. 1, showing the water passages operable to rotate water in the sprinkler head and the strainer means of the invention.

Fig. 3 is a vertical section taken on a median plane through an alternative type of sprinkler head which likewise embodies the novel features of my invention.

Fig. 4 is a horizontal section taken as indicated by the line 4—4 of Fig. 3, showing the strainer means of the invention.

Referring primarily to both forms of the device disclosed, the invention comprises generally a body 11 having a cavity 12 therein opening upwardly, a closure member 13 axially movable in the cavity to close a valve opening 14, the member 13 having formed therein an outlet orifice and passages communicating with the cavity, and a strainer space 15 through which water passes after it flows through the inlet valve opening 14.

In describing the details of construction, I will refer first to Figs. 1 and 2. The body 11 is preferably cylindrical and is provided with a dividing wall 20, which cooperates with the cylindrical wall of the body to form the upwardly open, cup-shaped cavity 12, and a depending skirt 21. The skirt 21 is internally threaded to receive a supply pipe 22 as shown.

The body 11 is preferably provided with a flange 23 having tool-engaging notches 24 to facilitate the threading of the body on the pipe 22.

The valve opening 14, referred to above, is formed centrally through the dividing wall 20 and is provided with an upwardly extending peripheral rim 30 serving as a valve seating surface.

The upper portion of the cavity 12 is internally

threaded, as at 32, to threadedly receive the closure member 13.

The closure member, in this form of the invention, comprises a hollow shell 35 having a cylindrical outlet orifice 36 formed in the upper wall thereof, substantially in the manner shown. The shell 35 is closed at the bottom by a horizontal wall 37 which is adapted to seat on the rim 30 of the valve opening to close the opening when the closure member is threaded so as to move axially downward in the cavity 12. It will thus be clear that axial movement of the closure member in the cavity, as by rotating the member 13 to thread it upwardly or downwardly, serves to either entirely close the valve opening 14 or to control the volume of water flowing from the valve opening when the closure member is spaced therefrom any desired distance, as shown in Fig. 1. For purposes of construction, I prefer to form the bottom 37 of the shell 35 by providing a plate which abuts an internal peripheral shoulder on the shell 35 as shown, the lower end of the shell being swaged over under the plate, as at 38, to permanently secure the plate 37 to the shell.

The lower portion 39 of the shell 35, below the threaded portion thereof, has a reduced outer diameter which serves to space this lower portion 39 from the wall of the cavity 12 to provide the annular space 15, which is the strainer means of the invention. As clearly shown in Fig. 1, I prefer to relieve the outer surface of the portion 39 upwardly, so that the cross-sectional area of the annular strainer space is less adjacent the lower peripheral edge 40 of the shell 35. This feature is preferred because it prevents obstructing matter which might have an irregular shape from passing into the entrance of the strainer space and then becoming caught in the upper portion thereof. It will be seen that the area of the annular space 15 defined by the edge portion 40 of the shell and the wall of the cavity 12 always remains the same, being unaffected by the upward or downward axial movement of the closure member 13.

Formed through the wall of the lower portion 39 of the closure member 13 is a plurality of passages communicating between the interior of the shell 35 and the cavity 12 and disposed to rotate the water in the shell. I prefer to form these passages by cutting substantially right-angled slits in the wall of the shell and then deforming the portions 41 within the angled slits so that these portions project inwardly, as shown best in Fig. 2, so as to provide passages 42 which deliver water into the interior of the shell in a swirling or rotating motion.

It will be seen that water from the supply pipe 22 flows through the inlet valve opening 14, the volume thereof being controlled by the spacing of the closure member therefrom; after which it passes through the annular strainer space 15, the restricted space serving to prevent shells, etc., from passing on into the passages 42 where they might become lodged.

Periodically the closure member 13 may be removed and accumulated matter easily cleaned from the cavity 12.

The form of the invention shown in Figs. 3 and 4 is essentially the same as the form described above. No means for rotating the water in the head is shown, the closure member 13 threadedly engaging the cavity 12 in this form, having merely a kerfed slot 50 in the upper part thereof which communicates with the cavity 12 below the member 13 through a bore or passage 51, substantially as shown.

In this embodiment of the device I prefer to provide a dividing wall 52 in the shell, the upper surface of which is counterbored to provide a reduced diameter cavity 53 forming a continuation of the cup or cavity 12.

Provided in the wall 52 forming the bottom wall of the cavity 53 is a cylindrical opening which comprises the inlet valve opening 14.

Extending downward from the closure member 13 is a reduced portion 54 of smaller external diameter than the wall of the lower portion 53 of the cavity 12, so that the relative spacing of these walls provides the annular strainer space 15 through which water passes after it flows through the inlet valve opening 14. As shown in Fig. 3, I prefer to relieve the outer surface of the reduced portion 54 upwardly, as and for the purpose set forth in connection with the upwardly relieved outer surface of the shell 35 in the above described form.

The lower horizontal surface 55 of the projection 54 is adapted to seat on the upper surface 56 of the wall 52 to close the valve opening 14, or to control the volume of water flowing from the valve opening when it is spaced therefrom as shown.

The projection 54 and the seating surface 56 cooperate to perform an additional function which is a special object of the invention. In the event that snail shells, or the like, enter the inlet valve opening 14 with the water stream and are of such a size as to be prevented by the strainer space 15 from flowing on through the head to the outlet orifice, they will come to rest on the ledge formed by the upper surface of the wall 52 which comprises the seating surface 56. If the accumulation of these shells, etc., begins to obstruct the flow of water through the valve opening, the closure member 13 may be threaded downward, with the result that the shells are broken up, the flat surface engagement between the surface 55 and the seating surface 56 assuring that the shells will be broken into very fine pieces which will be readily carried through the strainer space, the passage 51 and the outlet orifice 50 by the water stream. It will thus be seen that an accumulation of shells, etc., may be removed from the head without removing any of the parts of the head.

The operation of the valve and strainer means of both forms of the invention disclosed is the same, the water flowing first through the valve 14 and then through the annular strainer space 15. The space 15 being smaller in cross-section than the passages communicating with the outlet orifice, effectively prevents obstructing matter of such a size as would clog the passages 42 and 51 from reaching these passages.

It will be seen that I have provided a simple, cheaply constructed, two-part sprinkler head embodying the features of volume adjustment, strainer means, and means for rotating the water to effect superior range and distribution, together with a means for crushing accumulated obstructing matter such as snail shells, so that the small pieces thereof will be flushed from the head, without dismantling the head.

Two embodiments of the invention have been disclosed in the drawing to illustrate the essential features of the combination; however, it should be understood that the true scope of the invention should be interpreted by the following claims.

I claim as my invention:

1. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means providing a relatively narrow space which is unaffected by an adjustment in position of said closure member through which water passes after it flows through said valve opening.

2. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means formed by relatively spaced walls of said closure member and said cavity defining a relatively narrow space which is unaffected by an adjustment in position of said closure member through which water passes after it flows through said valve.

3. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable axially in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and peripherally positioned strainer means through which water passes after it flows through said valve opening.

4. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof surrounded by a ledge; a closure member movable axially in said cavity to close said valve opening, said closure member having a surface adapted to engage said ledge for crushing shells; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means formed by relatively spaced walls of said closure member and said cavity through which water passes after it flows through said valve.

5. In a sprinkler head, the combination of: a body having walls forming a cup; walls forming a valve opening in the bottom of said cup; a closure member threaded in said cup for axial movement therein to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cup; and strainer means formed by relatively spaced walls of said cup and said closure member through which water passes after it flows through said valve and before it flows through said passage means.

6. In a sprinkler head, the combination of: a body having walls forming a cup; walls forming a valve opening in the bottom wall of said cup; a closure member threadedly movable in said cup to close said valve opening, said closure member having a surface adapted to pressurally engage said bottom wall; walls forming an outlet orifice and passage means in said closure member communicating with the interior of said cup; and strainer means comprising an annular space formed by relatively spaced walls of said cup and said closure member through which water passes after it flows through said valve opening and before it flows through said passage means.

7. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means comprising walls forming an annular space between said valve opening and said passage means, the area of said space being unaffected by movement of said closure member.

8. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means formed by a portion of said closure member and the wall of said cavity through which water passes after it flows through said valve opening, the area of said space being unaffected by the movement of said closure member.

9. In a sprinkler, the combination of: a body providing walls forming a cup having a valve opening in the bottom thereof; a hollow closure member movable axially in said cup to close said valve opening; walls forming an outlet orifice in said closure member; walls forming passages in said closure member disposed to deliver water from the interior of said cup to said orifice through the interior of said closure member and to rotate the water therein; and strainer means comprising walls forming an annular space through which water passes after it flows through said valve opening and before it flows through said passages, the area of said space being unaffected by movement of said closure member.

10. In a sprinkler, the combination of: a body providing walls forming a cup having a valve opening in the bottom thereof; a hollow closure member movable axially in said cup to close said valve opening; walls forming an outlet orifice in said closure member; walls forming passages in said closure member disposed to deliver water from the interior of said cup to said orifice through the interior of said closure member and to rotate the water therein; and strainer means comprising an annular space formed by a portion of said closure member and the wall of said cup through which water passes after it flows through said valve opening and before it passes through said passages.

11. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means providing a strainer space which is relatively long and relatively narrow and through which water passes after it flows through said valve opening.

12. In a sprinkler head, the combination of: a body providing walls forming a cavity having a valve opening in one wall thereof; a closure member movable in said cavity to close said valve opening; walls forming a spray orifice and passage means in said closure member communicating with said cavity; and strainer means providing a strainer space formed on a relatively large diameter and relatively narrow through which water passes after it flows through said valve opening.

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