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W. VAN E. THOMPSON

1,776,455

SPRINKLER HEAD

Filed Dec. 8, 1926

Fig. 1.

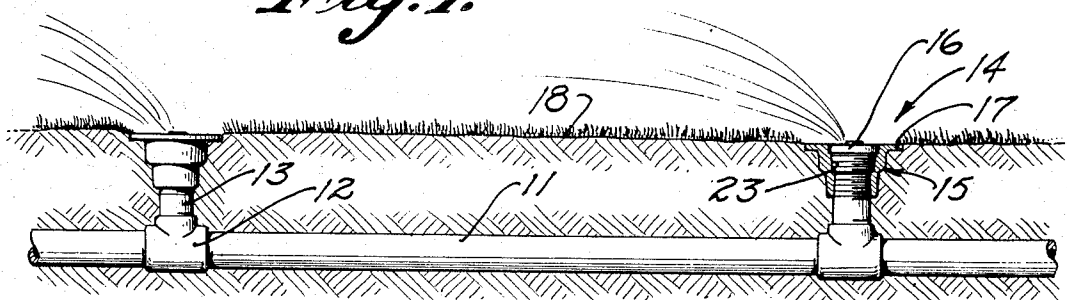


Fig. 2.

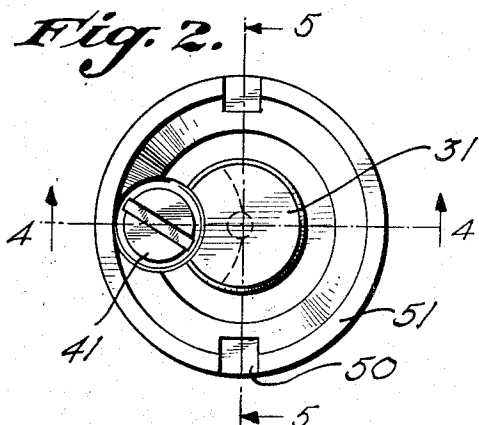


Fig. 3.

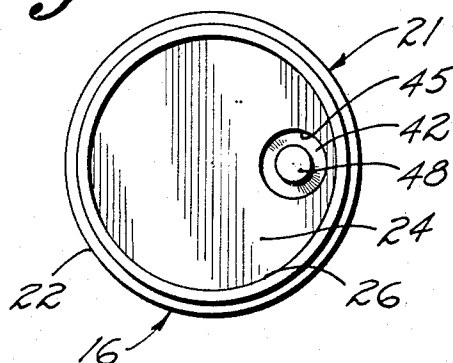


Fig. 4.

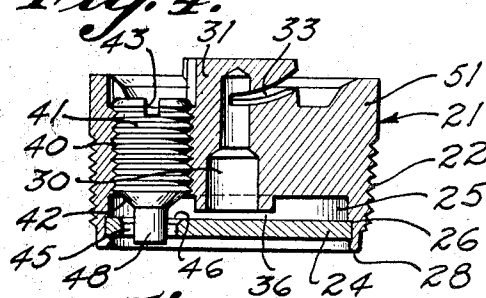


Fig. 5.

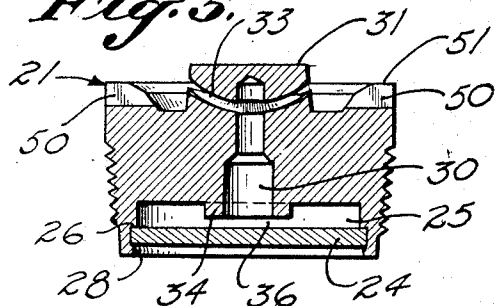
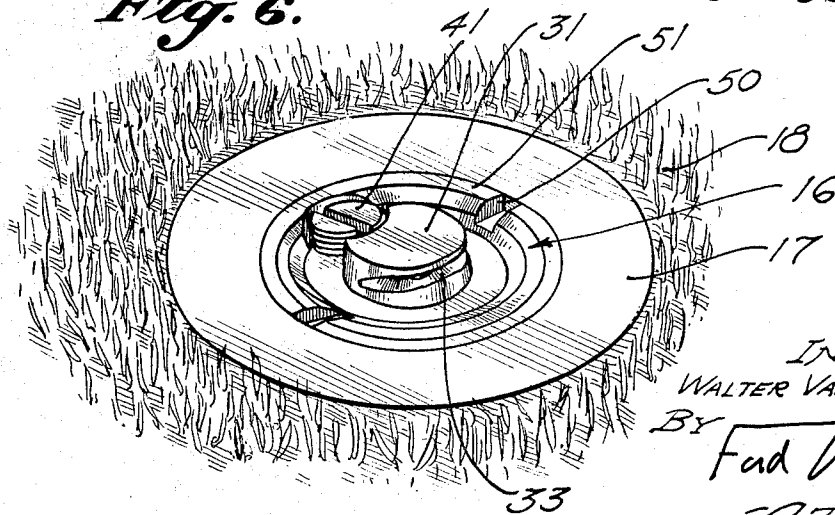


Fig. 6.



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UNITED STATES PATENT OFFICE

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SPRINKLER HEAD

Application filed December 8, 1926. Serial No. 153,278.

My invention relates to irrigation devices and particularly to a novel sprinkler head which is designed especially for irrigating lawns and the like. In irrigation systems for lawns it is necessary to place what is known as half-circle sprinklers at the boundaries of the lawn. The half-circle sprinklers provide a fan-shaped stream of water which is substantially a half-circle. This type of sprinkler delivers the stream of water onto the lawn but not outside the boundary thereof. If there is any turbulence of the water when it passes through the sprinkler head of the sprinkler an uneven distribution of water results; that is, the fan-shaped stream is imperfect and all parts of the lawn will not receive an equal amount of water.

It is an object of this invention to provide a sprinkler head in which the water is quieted so that there will be no turbulence in the head, and so that a perfect distribution of water may be obtained.

Water sometimes carries particles of sand or gravel, which, if they lodge in the sprinkler head, cause it to clog up and operate imperfectly. This, of course, results in some portion of the lawn not receiving the proper amount of water.

It is an object of this invention to provide a sprinkler head in which particles too large to pass entirely through it are prevented from entering it.

A row of sprinklers is usually connected in the same supply pipe. Consequently the pressure of the water flowing through the sprinkler head at the supply end of the pipe will be greater than the pressure of the water flowing through a sprinkler at the opposite end. It is desirable to have an adjustment means which controls the amount of water passing through the sprinklers so that the streams of each sprinkler regardless of its position will be the same size.

It is an object of this invention to provide a sprinkler head in which the size of the stream of water issuing therefrom may be regulated.

Other objects and advantages of the invention will be made evident hereinafter.

Referring to the drawing in which I illustrate my invention:

Fig. 1 is an elevational view in section of sprinkler heads of my invention installed in an irrigation system.

Fig. 2 is a plan view of the sprinkler head.

Fig. 3 is a bottom plan view.

Fig. 4 is a section taken on the line 4—4 of Fig. 2.

Fig. 5 is a section taken on the line 5—5 of Fig. 2.

Fig. 6 is a perspective view of a sprinkler having a sprinkler head of my invention as a part thereof.

Referring to Fig. 1, I show a supply pipe 11 which is provided with T fittings 12. Attached to the T fittings 12 and extended upward therefrom are nipples 13, at the upper end of which sprinklers 14 are attached. The sprinklers 14 each consist of a body 15 and a sprinkler head 16 embodying the features of this invention. The body 15 is threadedly secured to one of the nipples 13 and an upper flange 17 thereof rests in the same plane as the level of the ground as indicated at 18. The sprinkler head 16 of the invention is shown best in Figs. 2 to 6 inclusive.

The sprinkler head has a body 21 which is in the shape of a cylinder and is provided at its lower end with threads 22 so that it may be screwed into a threaded cavity 23 of one of the bodies 15. The lower end of the body 21 is provided with a cavity, the lower part of which is closed by a plate 24, thus forming the cavity into a quieting chamber 25. The plate 24 is held against an annular shoulder 26 by a lip 28 which is spun into the position shown in Figs. 4 and 5 after the plate 24 has been placed. Connected to the central part of the quieting chamber 25 is an exhaust passage 30, the upper end of which terminates in a substantially cylindrical boss 31 formed at the upper end of the body 21. The boss 31 is provided with a spray opening 33 which connects to the upper end of the exhaust passage 30. The spray opening is of a certain shape, as shown in the drawing, so that a fan-shaped stream of substantially a half-circle will be formed when water issues therefrom. In the preferable form of the invention shown in

the drawings the area of cross-section of the spray opening 33 where it connects to the exhaust chamber 30 is smaller than that of the exhaust chamber 30 so that the pressure of the liquid in the exhaust chamber 30 will not drop, and so that the drop in pressure occurs when the liquid passes through the spray opening 33. The particular shape of the spray opening 33 is not a part of this invention but forms the subject matter of an invention already patented.

Formed at the lower end of the exhaust passage 30 and extended downward from the upper wall of the quieting chamber 25 is an annular wall 34. The annular wall 34 terminates slightly above the upper face of the plate 24 and provides an annular mouth 36 through which water must flow in order to pass from the quieting chamber 25 into the exhaust passage 30. It should be noted that the mouth 36 is small as compared to the diameter of the exhaust passage 30 and as to the height of the quieting chamber 25.

At one side of the body 21 adjacent to the boss 31 is a threaded opening 40 which is extended parallel to the axis of the body. The threaded opening 40 connects to the quieting chamber 25 and to the upper end of the body 21. Adapted to be screwed into the threaded opening 40 is a valve member 41, the lower end of which is provided with a bevel seat 42, and the upper end of which is provided with a diametral slot 43 to accommodate a screw driver or other similar tool whereby the valve member may be rotated and thus adjusted in position. Aligned with the bevel seat 42 of the valve member 41 is an entrance port or opening 45 which is formed in the plate 24. The upper end of the entrance port 45 is provided with a bevel face 46 which may be engaged by the bevel seat 42. Extended downward from the lower end of the valve member 41 is a cylindrical projection 48 which extends into and through the entrance port 45. The entrance port 45, therefore, provides an annular passage through which water may pass to enter the quieting chamber 25. The width of the annular passage provided by the entrance port 45 is exactly or slightly smaller than the width of the inner part of the spray opening 33 which connects to the upper end of the exhaust passage 30.

In utilizing the head of my invention the bodies 15 are first attached to the nipples 13 and then the sprinkler heads 16 are screwed into the bodies 15. This may be done by extending a suitable tool into notches 50 formed in an upper rim 51 of the body 21. The heads are adjusted in position so that the spray openings 33 are facing the area to be irrigated, that is, pointing in a direction opposite from the boundary of the area which is to be irrigated. After all of the sprinkler heads 16 have been installed in place, water

is supplied to the supply pipe 11 for testing. If the streams of some of the sprinklers are too large, the valve members 41 of these sprinklers are screwed downward so that the seats 42 move nearer to the faces 46, thus restricting the flow of water into the quieting chambers 25. This adjustment is easily accomplished and may be done without removing the bodies 21 as is necessary in some forms of sprinklers.

The water entering the quieting chamber 25 is in a state of turbulence. The water must pass through the mouth 36 in order to reach the exhaust passage 30. I have found that by providing the annular mouth 36 there will be no turbulence of the water entering the exhaust passage 30. This is one of the important features of the invention and is responsible for the providing of an even fan-shaped stream which results in an even distribution of water.

It is quite essential to the perfect performance of the invention that the water passing upward through the exhaust chamber 30 be moving at the same rate of speed on the same diameter. In other words, the water near one side of the exhaust chamber must be traveling at the same rate of speed as the water at the opposite side. If the rate of flow on different sides of the exhaust chamber 30 is different there will be an unequal distribution of water. The chamber 25 acts as a water balance and the rate of flow of the water from all directions through the mouth 36 inward into the lower end of the exhaust chamber 30 is equal.

It will be noted from an inspection of the drawings that the spray opening 33 is connected to the upper end of the exhaust chamber 30 a small distance below the upper end thereof in order to form a pocket. This pocket is found to be essential in certain sprinklers in order to avoid the stream fluctuating and thus becoming uneven.

As previously pointed out the annular opening provided by the entrance port 45 and the projection 48 is not wider than the inner end of the spray opening 33. This is important to the invention because it prevents gravel from entering the head 21 which cannot pass from the spray opening 33. If this arrangement or an equivalent arrangement were not provided, gravel would collect in the upper part of the exhaust passage 30 and clog it, greatly interfering with the proper operation of the sprinkler head. The cylindrical projection 48 extends through the entrance port 45 even though the valve member 40 is adjusted into different positions.

I claim as my invention:

1. In a sprinkler head, the combination of: walls forming a spray opening; a supply passage for said spray opening, said supply passage confining a stream of liquid carried thereby to prevent separation into drops; and

means forming an annular port, connecting with said supply passage, and through which liquid is adapted to be forced into said passage, said port forming means including a flat wall forming a common boundary for a side of said port and an end of said passage.

2. In a sprinkler head, the combination of: walls forming a spray opening; a supply passage for said spray opening, said supply passage confining a stream of liquid carried thereby to prevent separation into drops; and means forming an annular port, connecting with said supply passage, and through which liquid is adapted to be forced into said passage, said port opening radially inwardly into said passage, and said port forming means including a flat wall forming a common boundary for a side of said port and an end of said passage.

3. In a sprinkler head, the combination of: walls forming a spray opening; a supply passage for said spray opening, said supply passage confining a stream of liquid carried thereby to prevent separation into drops; and means forming an annular port, connecting with said supply passage, and through which liquid is adapted to be forced into said passage, said port being relatively narrow compared with the diameter of said supply passage and opening radially inwardly into said passage.

4. In a sprinkler head, the combination of: walls forming a spray opening; a supply passage for said spray opening, said supply passage confining a stream of liquid carried thereby to prevent separation into drops; means forming an annular port, connecting with said supply passage, and through which liquid is adapted to be forced into said passage; means forming a quieting chamber radially disposed outwardly from said port, there being a valve opening provided by said last mentioned means connecting with said quieting chamber; a valve controlling said valve opening from the quieting chamber side thereof; and a projection on said valve extending into said valve opening and excluding debris, larger than a given size, from said sprinkler head.

5. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops; walls forming a spray opening connected to said exhaust chamber; walls forming an annular quieting chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

6. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops, said chamber being considerably longer than its area of cross-section; walls forming a spray opening connected to said exhaust chamber; walls forming an annular quieting chamber;

and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

7. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops, said chamber being considerably longer than its area of cross-section; walls forming a spray opening connected to said exhaust chamber; and walls forming means for supplying liquid to said exhaust chamber in a non-turbulent condition.

8. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops; walls forming a spray opening connected to said exhaust chamber; walls forming an annular quieting chamber concentrically surrounding one end of said exhaust chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

9. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops, said chamber being considerably longer than its area of cross-section; walls forming a spray opening connected to said exhaust chamber; walls forming an annular quieting chamber concentrically surrounding one end of said exhaust chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

10. In a sprinkler head, the combination of: walls forming an exhaust chamber confining liquid against separation into drops; walls forming a spray opening connected to said exhaust chamber, said spray opening being of a size to maintain a liquid pressure in said exhaust chamber, the drop in pressure occurring when the liquid passes through said spray opening; walls forming an annular quieting chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

11. In a sprinkler head, the combination of walls forming an exhaust chamber; walls forming a spray opening connected to said exhaust chamber, said spray opening joining to said exhaust chamber a distance from the end thereof to provide a pocket; walls forming an annular quieting chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

12. In a sprinkler head, the combination of: walls forming an exhaust chamber; walls forming a spray opening connected to said exhaust chamber, said spray opening joining to said exhaust chamber a distance from the end thereof to provide a pocket and said spray opening being of a size to maintain a liquid pressure in said exhaust chamber, the

drop in pressure occurring when the liquid passes through said spray opening; walls forming an annular quieting chamber; and walls forming a narrow completely annular mouth connecting said annular quieting chamber to said exhaust chamber.

13. In a sprinkler head, the combination of: walls forming a quieting chamber; walls forming an entrance port for said quieting chamber; walls forming an exhaust chamber confining liquid against separation into drops, said exhaust chamber being considerably longer than its area of cross-section, and being connected to said quieting chamber; an annular wall surrounding the end of said exhaust chamber connected to said quieting chamber, said annular wall projecting into said quieting chamber; and walls forming a spray opening connected to said exhaust chamber.

14. In a sprinkler head, the combination of: walls forming a quieting chamber, said quieting chamber being comparatively large in cross-section but quite short; walls forming an entrance port; and walls forming an exhaust chamber confining liquid against separation into drops, said exhaust chamber being connected to one of the end walls of said quieting chamber.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 3rd day of December, 1926.

WALTER VAN E. THOMPSON.

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