April 7, 1953 G. O. DOUBLE 2,634,163

SPRINKLER HEAD ASSEMBLY

Filed Feb. 20, 1948 2 SHEETS—SHEET 1

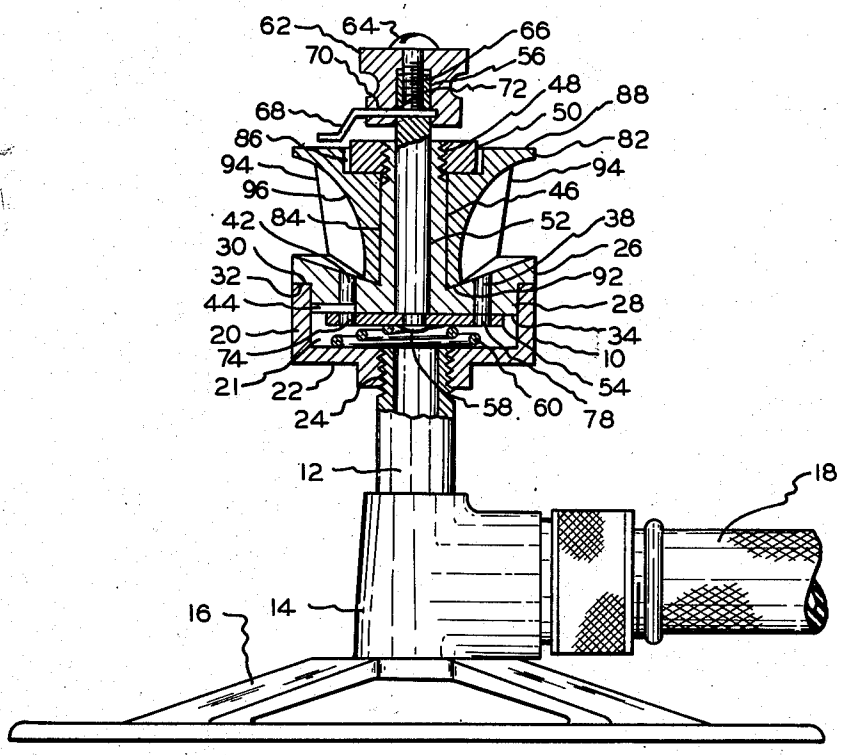

FIG. I.

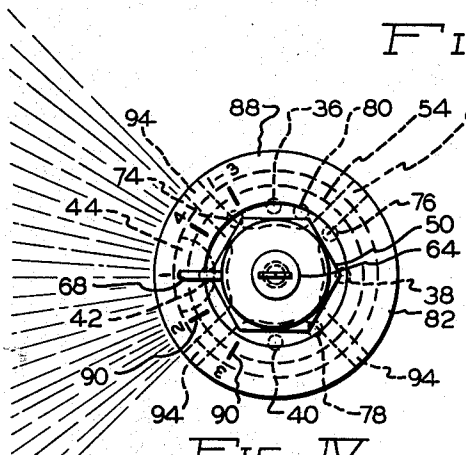

FIG. IV.

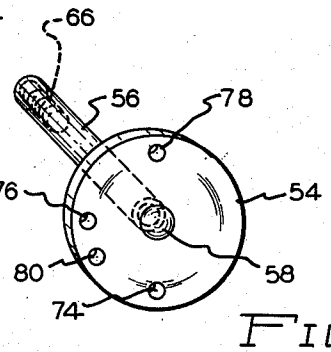

FIG. II.

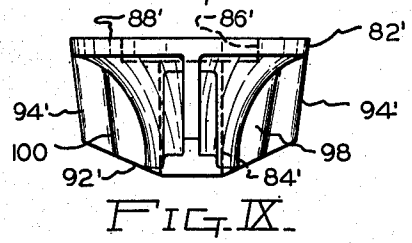

FIG. IX.

Inventor

GLENN O. DOUBLE

By Raman & Patch

ATTORNEYS

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SPRINKLER HEAD ASSEMBLY

Filed Feb. 20, 1948 2 SHEETS—SHEET 2

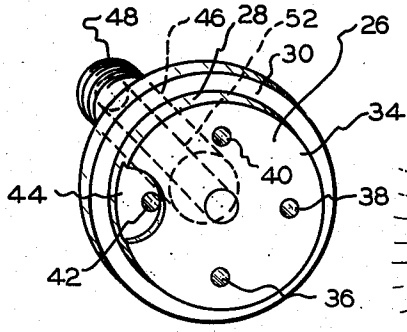

FIG. III.

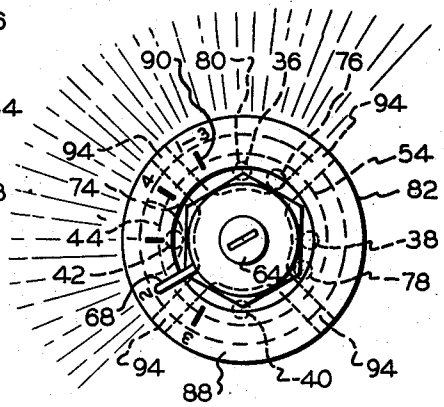

FIG. V.

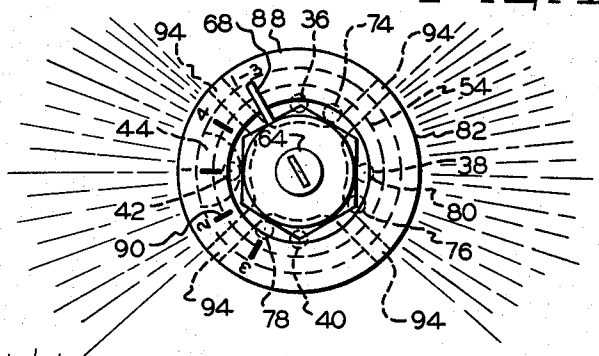

FIG. VIII.

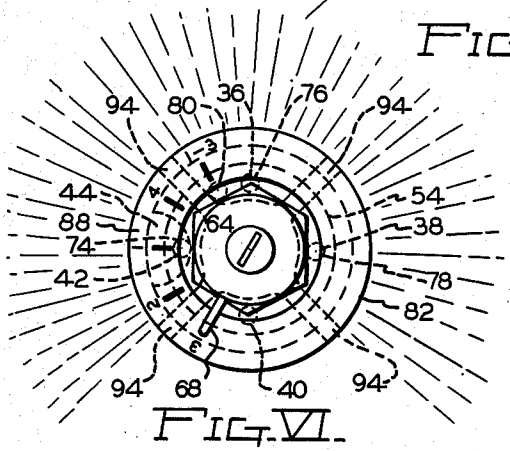

FIG. VI.

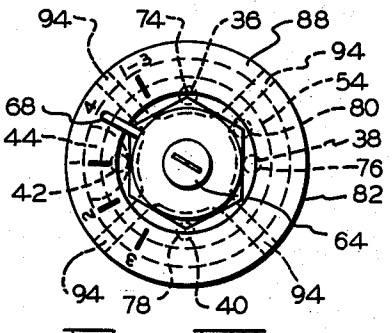

FIG. VII.

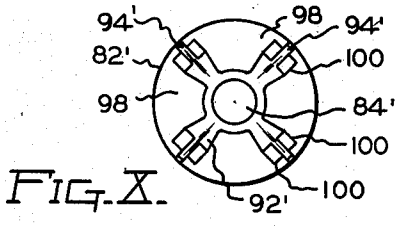

FIG. X.

Inventor

GLENN O. DOUBLE

By Cramer & Parker

ATTORNEYS

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2,634,163

SPRINKLER HEAD ASSEMBLY

Glenn O. Double, Hillsdale, Mich.

Application February 20, 1948, Serial No. 9,825

1 Claim. (Cl. 299—18)

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This invention relates to sprinkler systems, and more particularly to the provision of a sprinkler head assembly which may be adjusted selectively to spray in one quadrant of a circle, in a complete circle, or in any possible combination of quadrants in a circle.

As long as people have been sprinkling lawns, there has been the problem of accomplishing the sprinkling without unduly wasting water, and without spraying water over sidewalks, walls, and buildings adjoining the area to be sprinkled. Various types of sprinkler heads have been developed to accomplish this selective sprinkling, and I recognize that it is not new to provide a sprinkler head which will sprinkle in one, two, three, and four quadrants selectively. I believe, however, that it is new to provide a sprinkler head which will sprinkle in the quadrants enumerated selectively and in diametrically opposed quadrants, the selection being accomplished not by the installation of alternate parts, but by utilizing a pair of selectively perforated discs acting as a valve in combination with a diverting head structure which is divided into four quadrants.

It is therefore an object of this invention to provide a sprinkler head which will sprinkle in one, two, three, or four quadrants of a circle as well as two diametrically opposed quadrants.

It is also an object to provide a quadrantly selective sprinkler head which may be adjusted to sprinkle selectively as desired by rotating a knurled knob atop the sprinkler head.

It is also an object to provide a selective sprinkler head bearing indicating means on top of the head to make apparent the particular setting of the internal structure.

A further object is to provide a sprinkler head, the diverting cap of which is divided into quadrants and formed to break the water up into a fine spray and to deliver it in a 90° arc.

Further objects and advantages of my invention will be apparent from a consideration of the following specification in connection with the appended claim and the accompanying drawings, in which,

Fig. I is a view partially in elevation and partially in section showing the assembled sprinkler head,

Fig. II is a view in perspective showing the divider disc and the shaft on which it is mounted,

Fig. III is a view in perspective showing the body cap and its associated shaft,

Fig. IV is a plan view showing the sprinkler head set to sprinkle in one quadrant only,

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Fig. V is the plan view showing the sprinkler head set to sprinkle in two adjacent quadrants,

Fig. VI is a plan view showing the sprinkler head set to sprinkle in three quadrants,

Fig. VII is a plan view showing the sprinkler set to sprinkle in an entire circle,

Fig. VIII is a plan view showing the sprinkler set to sprinkle in two diametrically opposite quadrants,

Fig. IX is a view in elevation of an alternative head design, and

Fig. X is a plan view of the head shown in Fig. IX, looking at its under side.

As shown in the drawings, the sprinkler head 10 is threaded on the water supply pipe 12 which may be connected as shown to a suitable L 14 mounted on a base 16 and connected to a garden hose 18, as shown, or may be made a part of a permanent underground sprinkling installation. The sprinkler head 10 comprises a body portion 20 which is cylindrical, encloses an inner chamber 21, and presents a closed lower face 22 with the threaded aperture 24 adapted to receive the water supply pipe 12. The body cap 26 presents a lower piston-like portion 28 for close engagement within the body 20, and is inserted into the body 20 until the shoulder 30 engages the upper annular edge 32 of the body 20. The lower surface 34 of the body cap 26 is finished so that it lies as nearly as possible in a plane perpendicular to the axis of the body 20 and the body cap 26. The body cap 26 is fitted with four ports 36, 38, 40 and 42, these ports being drilled parallel to the axis of the body 20 and the body cap 26, and providing communication between the inside of the body 20 and the outside of the entire structure, being positioned at 90° from each other. The surface 34 of the body cap 26 is formed with a recess 44 to expose the port 42 to communication with the chamber 21 within the body 20, the recess 44 being preferably cored out of the surface 34 for a distance which will expose the entire port 42 and for a suitable depth such as a sixteenth of an inch. The body cap 26 is completed by an upstanding cylindrical shaft 46 having a threaded upper end 48 to receive the nut 50 and having an axial hole 52, the purpose of which will appear later.

The circular divider disc 54 is axially mounted on the stem 56 by some means such as a press fit or the use of a small connector 58, and is positioned within the chamber 21 and held in engagement with the surface 34 by the action of the coil spring 60 which may be of helical formation as shown. This permits the stem 56

to lie within the aperture 52 and to project above the nut 50, where, at its upper end, the knurled adjusting knob 62 is held in place by the engagement of the screw 64 within the internally threaded upper end 66, and by the indicator hand 68 which projects through a suitable aperture 70 into the knob 62 and an aperture 72 in the stem 56. The divider disc 54 is formed with four drilled apertures parallel to the axis of the shaft 56, the apertures 74, 76 and 78 being at 90° to each other, and the aperture 80 being positioned roughly 30° from the aperture 76 and 60° from the aperture 74. It is not absolutely necessary that the angular distance between the apertures 76 and 80 should be exactly 30°, although in the model that I have constructed I have used this angular distance. The apertures 74, 78 and 80 are spaced from the axis of the disc 54 at a distance exactly equal to the distance which the ports 36, 38, 40 and 42 are spaced from the axis of the cap 26 so that upon proper rotary movement of the knurled nut 62, thereby rotating the shaft 56, the divider disc 54 will be rotated, causing the apertures 74, 76, 78 and 80 to be aligned selectively with various of the ports 36, 38, 40 and 42, thereby allowing communication between the chamber 21 and the outside of the sprinkler 10, which allows water to be introduced through the water pipe 12, and selectively channeled through the open port or ports to accomplish the spraying operation.

The diffuser or divider head 82 is constructed with a cylindrical axial channel 84 so that the divider head 82 may be assembled over the shaft 46 as shown in Fig. I, and is fitted with a circular recessed portion 86 to permit the assembling of the nut 50 over the threaded portion 48 in such a way that the nut 50 does not project unduly beyond the top surface 88 of the divider head 82. The top surface 88 may be either circular as shown in the drawing or square if desired, and is provided with a number of reference or index lines 90 adjacent to which are stamped the figures 1, 2, 3, 4, and 1—3. The indexing lines 90 are positioned at a 30° angular distance from each other, which distance is controlled by the angular distance between the apertures 76 and 80 in the divider disc 54, and are used as reference marks in connection with the rotation of the knurled knob 62 and its associated indicator hand 68, so that when the indicator hand 68 covers the index mark 90 adjacent to number 1 as shown in Fig. IV, it is to be expected that the number 1 quadrant will be the only one from which water will spray upon operating the sprinkler head. The lower surface 92 of the divider head 82 is frustoconical in shape to complement the inner frustoconical upper surface of the body cap 26. The divider head 82 is also formed with four dividing wings 94 which are formed at 90° to each other, and which extend from the topmost portion of the divider head 82 down to contact with the upper surface of the body cap 26, thereby dividing the water diffusing structure into four equal quadrants. The divider head 82 is assembled over the body cap 26 and is located by means of a divider locating pin, not shown, which projects from the body cap 26 into an aperture in the divider head 82, so that each of the dividing planes 94 lie on the bisector of the 90° angles between the several pairs of ports 36, 38, 40 and 42. To furnish a proper diffusing and deflecting surface for the water emerging from the ports 94 the divider head 82, is shaped with the concave surfaces 96, as best shown in Fig. I. The upper part of the concave surface 96 is preferably of a smooth radius formation, in order that there may be no concentrating of the diffused spray of water to a given point, and the water may be diffused and scattered in a fine spray, from each of the surfaces 96 over a wide area roughly conforming to the 90° angular distance between adjacent planes 94.

In Fig. IX is shown a slightly different formation of a divider head, in which the divider head 82' is formed with a central axial aperture 84' and the cylindrical recess 86' in the top surface 88'. The radial deflecting dividing planes 94' and the lower frustoconical surface 92' are identical in construction with those shown in Fig. I. The difference in this particular diffusing head 82' lies in the central diffusing faces 98, of concave formation. On each of these diffusing faces 98 there is provided extra shoulder formations 100 adjacent the radial dividers 94', the shoulders 100 extending substantially from the engagement with the upper surface of the body cap 26 to the upper end of the divider 82', and acting upon the flow of water to give a slightly different pattern than that given by the use of the divider head 82.

In operation, it will be found possible, having set up the sprinkler as shown in Fig. I and having a flow of water through the hose 18, the L fitting 14 and the supply pipe 12 into the chamber 21, and setting the indicator hand 68 by rotation of the knurled knob 62 at the indicator line 90 opposite the figure 1, to spray water out of only one of the four quadrants available. When the control is set as shown in Fig. IV, water is allowed to pass from the chamber 21 around the end of the divider disc 54, through the recess portion 44 through the port 42 and out to the surface 96 from whence it is deflected on to the lawn. It will be seen from a study of Fig. IV that none of the apertures 74, 76, 78 or 80 are aligned with any of the ports 36, 38, 40 or 42. In effect, since the water is allowed at all times to pass from the chamber 21 through the recess 44 and out through the port 42, any setting of the indicator hand 68 which does not align any of the holes in the divider disc 54 with any of the ports in the body cap 26 will still cause a spray to be sent out from the number 1 quadrant. Upon rotating the knurled knob 62 for an angular distance of 30° in a counterclockwise direction so that the indicator hand 68 overlies the indicator line 90 adjacent the figure 2, the port 80 in the divider disc 54 will be aligned with the port 36 in the body cap 26, thereby allowing water to be sprayed out through the second quadrant as well as the first quadrant. The other apertures in the divider disc 54 are not aligned with any of the ports in the body cap 26, and therefore no water will emit from the other quadrants. This can best be seen from a study of Fig. V. In Fig. VI, the sprinkler head is shown set to spray from three quadrants, with the indicator hand 68 set opposite the indicator line 90 adjacent the figure 3. In this setting, aperture 74 is aligned with port 36 and aperture 78 is aligned with port 38, thereby furnishing water from the chamber 21 out through three of the quadrants. In Fig. VII the sprinkler head is shown with the indicator hand over the index line opposite the figure 4, which indicates that water will issue from all four of the quadrants. It can be seen from a study of Fig. VII that the aperture 74 is aligned with the port

36, the aperture 76 is aligned with port 38, and the aperture 78 is aligned with the port 40, which will allow water to issue from the chamber 21 through the three side ports as well as through the port 42 by reason of the water flowing through the recess 44. A study of Fig. VIII will show that aperture 80 is aligned with the port 38, and that the other apertures in the divider disc 54 are not aligned with any of the ports in the body cap 26, thereby allowing water to issue through the ports 42 and 38 which are diametrically opposed.

I do not intend to limit myself to the divider disc shown with four apertures 74, 76, 78 and 80 in the positions in which they are arranged in the drawing, for I realize that it would be possible to shift either the aperture 74 or the aperture 78 over 90° from their present positions and diametrically opposite the aperture 76. This would necessitate a reworking of the index system marked on the surface 88 of the divider head 82, but this may be done without departing from the spirit of my invention. I likewise do not wish to limit myself to the provision of a 30° angular distance between the aperture 76 and the aperture 80, for I realize that practically any angular distance between any two adjacent apertures which are 90° from each other will allow an index system to be set up on top of the surface 88 to cause the divider disc to direct the water as desired.

Having thus described my invention, what I desire to claim and protect by Letters Patent is:

A sprinkler head assembly comprising a hollow body means adapted to connect said body to a source of water under pressure, a diffusing head mounted on top of said body, a vertical central axial aperture defined by said diffusing head, a plurality of ports defined by said body and positioned at equal radial distances from the axis of said body and extending from inside said body to the outside of said body substantially parallel to the axis of said body and below said diffusing head, a rotatable plate positioned within said body below said port defining portion of said body adjacent the top surface of said body, a shaft axially mounted on said rotatable plate and axially extending through said aperture in said diffusing head, a plurality of apertures defined in said rotatable plate at radial distances to allow their alignment with said ports, and actuating means associated with said shaft and positioned above said diffusing head for imparting rotary movement to said plate to align said apertures selectively with part or all of said ports.

GLENN O. DOUBLE.

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