

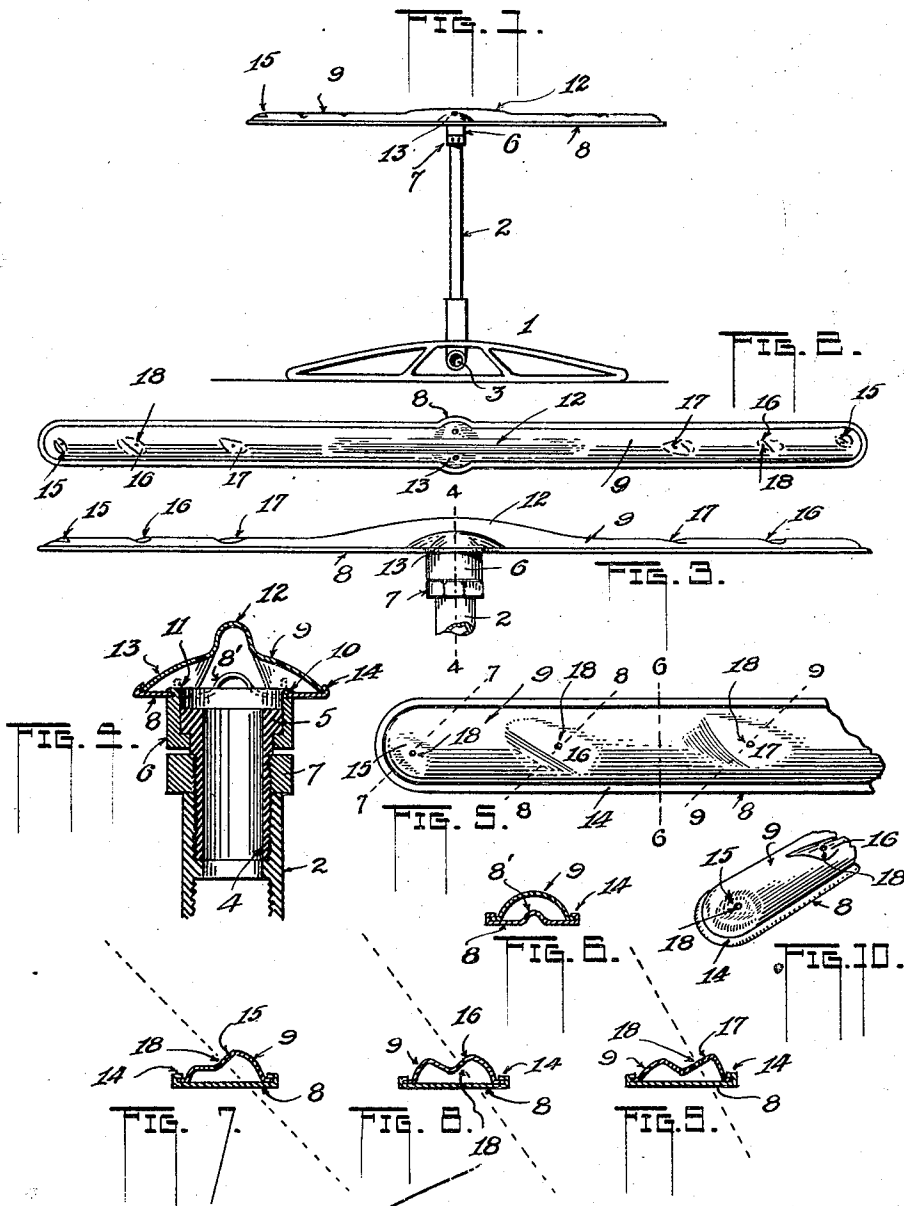
July 17, 1928.

L. R. NELSON

1,677,485

SPRINKLER

Filed June 9, 1924.



Inventor

L. R. Nelson,

L. M. Hudson

By

Attorney

UNITED STATES PATENT OFFICE.

LEWEN R. NELSON, OF PEORIA, ILLINOIS.

SPRINKLER.

Application filed June 9, 1924. Serial No. 718,721.

This invention has reference to lawn sprinklers of the rotating type. More particularly, it pertains to a sprinkler involving a rotatable perforate sprinkler-head mounted upon a standard from which it is supplied with water under pressure.

An object of the invention is to provide a sprinkler-head from which the water-streams will be projected in such manner as to obtain an even covering of the area to be treated.

Another object is to provide a metal stamping for a sprinkler-head in which accuracy of form can be maintained and wherein angles of throw of water-streams will be identical in all devices produced.

Still another object is that in producing a stamped form of sprinkler-head it can be so made that it will withstand rough treatment and cannot therefore be so altered in shape that the axes of its water-stream orifices will be changed relatively.

A further object is that of making a sprinkler-head of a sheet metal stamping by which it can be produced cheaply and marketed at a comparatively low cost to the consumer.

To the end that my invention may be clearly understood, I have provided the accompanying drawing wherein

Figure 1 is a side elevation of a standard of any approved form showing the sprinkler-head of my invention mounted thereon.

Figure 2 is a plan of the sprinkler-head, according to my invention, much enlarged from that shown in Figure 1.

Figure 3 is a side elevation of the same.

Figure 4 is a vertical section on line 4—4, Figure 3, of my sprinkler-head, but much enlarged, and a swivel connection by which it is attached to the standard illustrated in Figure 1.

Figure 5 is a plan of part of the sprinkler-head as shown in Figure 2 produced on a larger scale.

Figure 6 is a transverse section of the same on line 6—6, Figure 5.

Figures 7, 8 and 9 are sections of the sprinkler-head taken respectively on lines 7—7, 8—8 and 9—9 of Figure 5, and

Figure 10 shows in perspective a portion of one end of the sprinkler-head.

The character 1 illustrates, in general, any usual type of standard or base for supporting the sprinkler-head, and includes a stand pipe 2 having an opening in a fitting 3 with

which a hose, not shown, may be connected.

Into the upper end of the pipe 2 is screwed a tubular part 4, for example, provided with a terminal flange 5 at its upper extremity with the lower side or surface of which a collar 6 engages in any usual way by which, while the latter may rotate on the said part 4, it can lift under water pressure to form a practically leak-tight joint between it and the said flange 5. A lock-nut 7 engages the said part 4 and serves to secure it relatively to the pipe 2.

The sprinkler-head constituting the invention herein comprises a single bottom portion or plate 8, and a separate top transversely arched portion 9. Said plate 8 has a hole 10 therein at the middle of its length and receives the upper end of the described collar 6, the latter terminating in a reduced neck-portion 11 shown in dotted lines, Figure 4, which when the plate has been placed in position, receiving said neck-portion, is swedged outwardly and downwardly upon said plate, as shown in continuous lines, completing a firm structure.

The said plate 8 is long and narrow but is enlarged at that portion in which the hole is formed as shown in Figure 2 for strengthening purposes and to receive a domed part of the top or body-portion to be described. Said top or body-portion is stamped from light metal and is arched transversely, as described previously, there being a longitudinally extending rib 12 at its middle length raised above the general level of the arch as clearly shown in the first four figures, this being provided for strengthening and bracing the body as well as to admit of free flow of water entering said body to pass to either end thereof.

Also, this member has a flaring domed portion 13 at its middle length where it overlies the enlarged middle of the bottom 8 and the collar 6 permitting free entrance of water from the latter.

Said bottom 8 is slightly larger than the body-portion 9 so that its edges project beyond those of the latter, being turned up upon the lower marginal edges of said portion as clearly shown at 14. The bottom may be arched, also, as 8' as indicated in Figures 4 and 6, the latter figure being a cross section of that member on line 6—6, Figure 5, the Figures 7, 8 and 9 showing a flat plate only.

At each side of the center of rotation the

body-portion 9 is provided with spaced angled faces 15, 16 and 17 in its top and each has a jet orifice 18. These faces may lie at an angle of about 45° to the longitudinal line of the head, depending on the desired angle with respect to the longitudinal line of the head, namely the radius of rotation. The outermost one 15 lies at an angle of about 40° to the plane of rotation. The next adjacent face 16 lies at an angle of about 55° to said plane, and the innermost face 17 lies at an angle of about 59° to said plane. The name angles are merely approximate, it being desired, only, that they have different angles relatively so that the water-streams projected will describe different angles, the relation of differences in direction of stream-throw being denoted by the dotted lines in Figure 7, 8 and 9.

Now, since the outermost said face 15 lies at the greatest angle to the plane of rotation and at an angle to the longitudinal line of the head the stream projected therefrom will be discharged to the farthest limit, and since the orifice 18 in the face 16 discharges at a higher angle the water therefrom though ascending higher will fall inward from the point on the ground where the streams from the orifice in the face 15 fall, and by the same rule, the orifice in the innermost face 17 discharges at a still higher angle causing the stream therefrom to fall inward from that of the stream projected from the said face 16.

Due to this arrangement, therefore, the several orifices in effect deliver streams which fall in concentric circles, or one within another. But due to the natural breaking of the drops of water in passing through the air a fine mist-like delivery over the included territory results. And it is clear that if all of the streams were discharged at the same angle the included area sprinkled would not be evenly treated. In fact, a narrow zone only would be covered and well soaked whereas the area inward therefrom would be but indifferently moistened.

I have found in practice that the angle of lateral throw of the streams is important as governing the speed of rotation for a proper water distribution. It is clear that the more nearly the direction of stream-travel approaches a line lying at right angles to the longitudinal line of the head the faster the latter will rotate. Now, if rotation is too rapid the spray will be finely divided and cannot be thrown to the desired distance whereas if there is a slower movement a farther throw of heavier drops is possible with a better covering power in consequence. Therefore the positions of the faces 15, 16 and 17 are so determined that the orifices will have just the proper angle of throw to the end that the speed of rotation will be

held within desired limits or that best suited for the work, so that while the dotted lines in Figure 5 indicating the direction of stream travel are shown substantially parallel, the angles of the faces 15, 16, 17 may be altered at will without substantially changing the other angles shown in Figures 7, 8 and 9.

The body-portion is preferably made a stamping as the most approved method of production and by reason thereof the angles of the streams can be maintained in their proper relation in all sprinkler-heads produced and the device can be manufactured at a low cost and yet due to the braced form will be sturdy and resistant to blows or strains naturally imposed in its use and handling.

However, it is to be understood that it is not my intention to be confined to the exact form shown since minor changes may be made while maintaining the relation of face-angles. And while other ways of producing the head may be possible the relation of the orifices would be difficult to produce. Therefore, the method used herein is to be preferred. Further, it is not my intention to adhere strictly to the single straight form of the sprinkler-head shown since the number of arms radiating from the center of rotation may be increased as desired.

I claim as new:

1. A hollow relatively long and narrow sprinkler-head rotatably mounted at the middle of its length, and being relatively low in height outward from its center of rotation, its longitudinal top line outward from said center being substantially parallel with its base, its upper portion at opposite sides of the center having a series of orifices whose axes are disposed at different angles with respect to one another and at different angles with respect to the plane of rotation, and also disposed at different angles with respect to a plane lying perpendicular both to such plane of rotation and to the longest axis of said head, said orifices being in substantial alignment.

2. A hollow relatively long and narrow sprinkler-head of stamped metal rotatably mounted at the middle of its length, there being a series of discharge orifices in said head at each side of its center of rotation, each said series lying in a line substantially paralleling the longest axis of the head, the axes of the orifices of each of said series being disposed at different angles with respect to one another, and the axis of each orifice of the series disposed at a different angle with respect to the plane of rotation and at a different angle with respect to a plane erected perpendicularly both to such plane of rotation and to the longest axis of said head, the angle of inclination of said axes of the ori-

fices progressively increasing with respect to the plane of rotation as the center of rotation of the body is approached.

3. A hollow rotatable sprinkler-head formed from drawn metal having at opposite sides of the center of its rotation a series of facets inclined at relatively different angles to one another and inclined at relatively different angles to the plane of rotation, and also lying at relatively different angles to a plane erected perpendicularly to the said plane of rotation, and a jet orifice perforating each of the facets.

4. A hollow relatively long and narrow rotary sprinkler-head having at opposite sides of its center of rotation a series of facets, those of one series being opposed in position to those of the other, and all of said facets being inclined at relatively different angles to the plane of rotation and to a plane lying perpendicular to said plane of rotation and at right angles to the longest measurement of said head, and an orifice in each of said facets, said facets from said center of rotation outward progressively approaching more nearly a position parallel to the second named plane whereby streams projected from said orifices are discharged at progressively lower angles in receding from said center of rotation.

5. A rotatable sprinkler-head including in its construction an elongated laterally arched relatively narrow body of sheet metal having formed midway its length a raised rib extending longitudinally thereof, and also having at opposite ends a series of facets inclined at relatively different angles to one another, each series facing outwardly and laterally from the center of rotation and each having a jet orifice perforating it, and a bottom portion, the marginal edge of one of the portions engaging over those of the other.

6. In a rotatable sprinkler-head, an elongated laterally arched body portion of relatively narrow form having a dome-shaped portion at its middle length together with a raised integral rib at its top extending across the said dome portion, said rib being integral with and forming part of said dome, and also having a series of facets inclined at relatively different angles to one another facing both in a lateral direction and outwardly from said center of rotation and provided each with a jet orifice, a bottom portion whose marginal edges engage those of the body in a water-tight manner, there being an opening in the bottom beneath the said domed portion, and a water-conveying fitting extending into said opening and engaging upon the inner side of said bottom.

7. A stamped metal sprinkler-head including a body portion relatively long and narrow and arched transversely throughout its

length and provided at each side of a point in its middle length with a series of spaced facets, one series thereof facing in a direction opposite that of the other series and in a lateral direction away from said point, the angles of inclination of the facets progressively decreasing in steepness of angle with respect to the plane of the body as they approach said middle length of said body, there being an orifice in each of said facets.

8. A stamped metal sprinkler-head including a body portion relatively long and narrow and arched transversely throughout its length and provided at each side of a point in its middle length with a series of spaced facets, one series thereof facing in a direction opposite that of the other series and in a lateral direction away from said point, the angles of inclination of the facets progressively decreasing in steepness of angle with respect to the plane of the body as they approach said middle length of said body, there being an orifice in each said facet, the axes of the several orifices being perpendicular to the planes of said facets.

9. A stamped metal sprinkler-head comprising a body arched transversely and of relatively long, narrow form having terminal edges lying in a single plane, a base abutting the edges at the open side of the body, the edges of one overlapping those of the other, said base being rotatably mounted at the middle of its length, and said body having a facet formed therein near each end facing away from the center of rotation at an angle to the body's longest axis, there being a discharge orifice opening through each said facet.

10. A sprinkler head including in its construction a body of drawn metal transversely arched and relatively long and narrow, the top of the arch at each end of the body being substantially parallel to the body's base, said body adapted to be rotated about the middle of its length and perforated, the median portion thereof being domed and including a raised integral longitudinal hollow rib surmounting the dome merging into the latter and at its ends merging into the arch of the body at opposite sides of said dome.

11. A stamped metal sprinkler-head including a closed body portion relatively long and narrow and arched transversely throughout and mounted to rotate, the same having therein at each side of a point in its middle length a facet, one facing in a different direction from that of the other, there being an orifice in each facet, the axes of the orifices being inclined at an angle to the plane of rotation, at an angle to each other and at an angle to the longest axis of the body.

12. A sprinkler-head including in its construction a body of drawn metal transverse-

ly arched and relatively long and narrow, and having a facet formed therein at each side of the center of rotation, each facing outwardly from said center and each having a discharge orifice, a substantially flat base abutting the edges of the body, the edge of one of the parts being folded upon that of the other, and said base being arched in a longitudinal direction inwardly toward said body.

13. A sprinkler of the rotary type including in its construction a base, a body portion attached thereto, the two together forming a closed sprinkler-head, said base having an opening therethrough for passage of water, a collar having at one end a reduced portion received within the opening, and also having a shoulder engaging the outer face of said base, the said reduced portion within the sprinkler-head being turned over upon the base to clamp said base upon the shoulder, said collar having an integral

flange at its other end, a tubular fitting extending freely into the collar and having an external shoulder at the end within said collar to engage the flange of said collar for rotation of the latter thereon, the other end of the fitting extending outside the collar for attachment to a support.

14. A sprinkler comprising a supporting pipe and a head rotatably mounted on said pipe, said head including a tube extending laterally of said pipe and having a plurality of discharge openings along the length thereof, the axes of the bores of successive openings from the center of rotation outward intersecting the plane of rotation of the tube at progressively decreasing angles, said axes lying in different planes normal to the plane of rotation, the outlets of said openings being in substantially alignment.

In testimony whereof I affix my signature.

LEWEN R. NELSON.