March 19, 1963 O. R. SIMMONS 3,081,949

WATER DISPERSAL APPARATUS

Filed Feb. 13, 1962 2 Sheets-Sheet 1

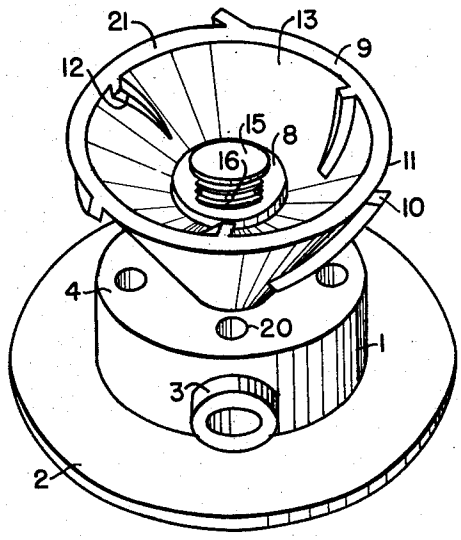


FIG. 1

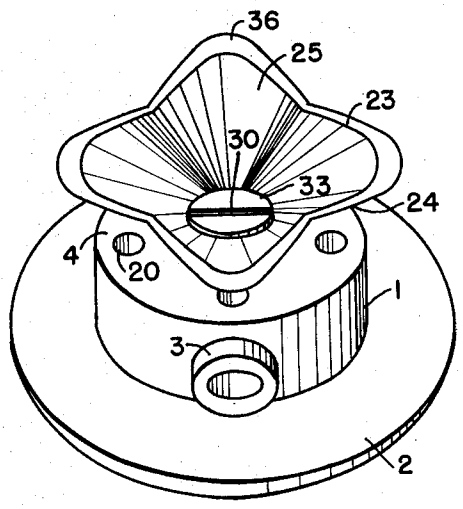


FIG. 3

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WATER DISPERSAL APPARATUS

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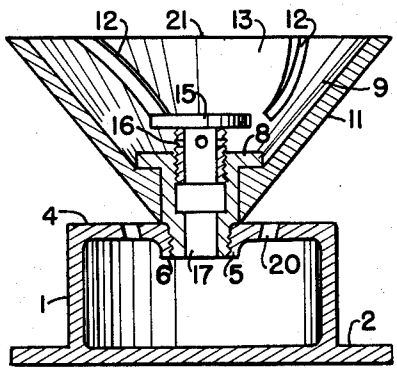


FIG. 2

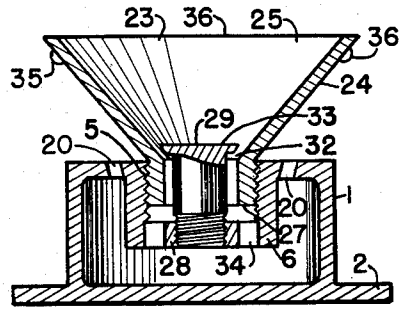


FIG. 4

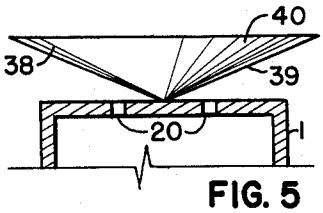


FIG. 5

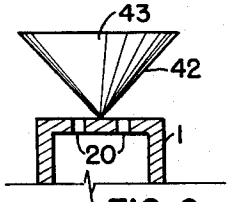


FIG. 6

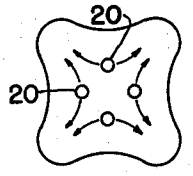


FIG. 7

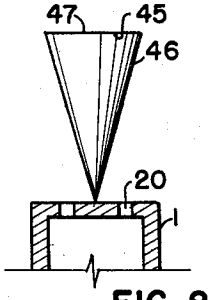


FIG. 8

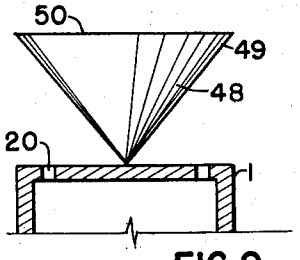


FIG. 9

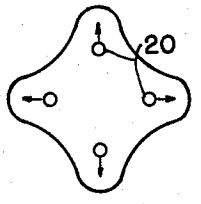


FIG. 10

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3,081,949

WATER DISPERSAL APPARATUS

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6 Claims. (Cl. 239—383)

This invention relates to an improved water sprinkler of the type which is useful for gardening or spray irrigation.

Water sprinklers of many types have been proposed, but most water sprinklers water circular areas, and when a large area is to be watered there are frequently spaces between the watered areas, and other spaces which receive a double watering. The main object of this invention is to provide a means whereby this may be avoided, by arranging the sprinkler to water substantially square areas. The invention can be extended to water other than straight sided shapes such as triangulars or pentagons if this is desired.

In its simplest form the invention comprises an angled deflector positioned above a plurality of equally spaced apertures from a body adapted to be connected to a hose line.

The invention is described hereunder with reference to two embodiments which however are not intended to limit the scope of the invention, these embodiments being illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of a sprinkler according to a first embodiment,

FIG. 2 is a section through FIG. 1,

FIG. 3 is a perspective view of a sprinkler according to a second embodiment,

FIG. 4 is a section through FIG. 3,

FIG. 5 illustrates schematically an arrangement with a flat cone and apertures being positioned to direct water part-way up the conical surface,

FIG. 6 illustrates a 45 degree cone with the apertures positioned near the lower end of the surface,

FIG. 7 illustrates the pattern obtained from either arrangement illustrated in FIG. 5 or 6,

FIG. 8 illustrates a sharp cone with the water adapted to be directed part-way up the surface of the cone,

FIG. 9 illustrates a 45 degree cone with the water directed to strike the conical surface near its upper end, and

FIG. 10 illustrates the pattern which can be obtained by an arrangement as shown in either FIG. 8 or FIG. 9.

Referring first to the embodiment of FIGS. 1 and 2, a hollow body **1** is formed of molded plastic and is molded to a base **2**, the body **1** being formed with a threaded inlet ferrule **3**. The upper surface **4** of the body **1** is centrally apertrued with a screw threaded aperture **5** disposed within an inwardly positioned boss **6**, and this screw threaded aperture **5** receives a bearing member **8** on which a conical deflector **9** is freely rotatable. The conical deflector **9** is formed of molded plastic and is provided with three outwardly extending vanes **10** which spiral around the outer conical surface **11** of the conical deflector **9**, and three similarly shaped inner vanes **12** which spiral within the inner conical surface **13**.

The bearing member **8** is screw threaded centrally and receives an adjusting member **15** which can be adjusted in relation to the bearing member **8** by relative rotation, the adjusting member **15** being apertured with four equally spaced radial apertures **16** so that water which passes up through the hollow center **17** of the bearing member **8** passes outwardly radially through the radial apertures **16** to impinge against the inner conical surface **13** of the conical deflector **9** and to urge rotation of the conical deflector **9** by passing upwardly and reacting against the inner vanes **12**.

The upper surface **4** of the hollow body **1** is apertured with four equally spaced jet holes **20**, these jet holes **20**

being angled outwardly slightly as shown in FIG. 2 so that water issuing therefrom will strike the outer surface **11** of the conical deflector **9** some distance below its upper edge **21**, and will have an initial radial component of force in order to attain a maximum degree of outward throw by the deflector. The action of the water issuing from the jet holes **20** and striking the outer vanes **10** is also to assist in the rotation of the conical deflector **9**. The outer vanes **10** and the inner vanes **12** further assist in the throwing of the water outwardly, and the included conical angle of both the inner surface **13** and the outer surface **11** is arranged to be approximately 45 degrees to insure a maximum throw.

By relative rotation of the adjusting member **15** and the hollow body **1** the pattern of the water discharged through the sprinkler can be varied from a somewhat square pattern to a round pattern, while if the adjusting member **15** is screwed into the bearing member **8** so as to blanket the radial apertures **16** the quantity of discharge can be reduced progressively until the only discharge is that through the jet holes **20**, so that by adjusting the member **15** it is possible to vary the flow rate and thereby vary the distance of throw and volume of water discharged through the sprinkler. This gives a wide range for fluctuations in water pressures.

Referring now to the second embodiment which is illustrated in FIGS. 3 and 4, the main difference is that the deflector is not conical in shape and is not rotational. In this embodiment the deflector **23** is star shaped, somewhat of the shape of the well known star fish or star flower, and has a maximum included angle of about 90 degrees, so that the outer surface **24** of the deflector and the inner surface **25** of the deflector are disposed at about 45 degrees, again to insure maximum throw. The deflector **23** is screwed into the screw threaded aperture **5** in the inwardly positioned boss **6**, but the inwardly positioned boss **6** extends below the lower end **27** of the deflector **23** and terminates in a thread **28** which is smaller in diameter than the threaded aperture **5**, and this thread **28** receives a screw threaded adjusting member **29** which can be screwed into or out of the aperture **28** by means of a turn screw slot **30** so as to increase or decrease the annular space **32** between the head **33** of the adjusting member **29** and the inner surface **25** of the deflector **23**, these progressively reducing or increasing the water flow upwardly through apertures **34** in the inwardly positioned boss **6**, and outwardly through the annular space **32**.

As in the first embodiment, the body **1** has four jet holes **20** which are disposed beneath the deflector **23** and which direct water on to the outer surface **24** and the deflector **23**, and the star shape of the deflector **23** assists in spreading the water evenly over the square area which is to be watered. However, a square area can still be watered even if the deflector member **23** is of simple conical form instead of being star shaped. Projections **35** are positioned near the upper edge **36** of the deflector **23** in order to retain the water in a finely divided form.

The principle underlying the constructional variations which may be made to either one of the above embodiments or to any other embodiment employing this invention is illustrated in FIGS. 5 to 10 inclusive. FIG. 5 illustrates a flat cone **38** with the water directed on to its outer surface **39** some distance below the upper edge **40**, and this will result in a pattern as illustrated in FIG. 7. FIG. 6 shows a further way to achieve the pattern shown in FIG. 7 where the water issues from the jet holes **20** on to an outer conical surface **42** of a deflector **43**, the outer conical surface **42** being inclined at 45 degrees. The water in traversing an excessive distance along the outer conical surface **42** will follow a path of impingement between the streams issuing from the jet holes **20** as illustrated by the arrows of FIG. 7.

FIG. 8 illustrates a very sharp cone **45** with water from the jet holes **20** striking the outer surface **46** partway down from its upper edge **47**, and this will achieve a pattern as illustrated in FIG. 10.

FIG. 9 illustrates a cone **48** which has its outer surface **49** disposed at 45 degrees, as in FIG. 6, but in FIG. 9 the water issuing from the jet holes **20** strikes the conical surface **49** near the upper edge **50** of the cone **48**, and there is insufficient traverse of the streams from the jet holes **20** over the conical surface **49** to achieve a high degree of impingement so that the pattern of spray is as illustrated in FIG. 10 and the main water flow is as shown in the arrows of FIG. 10.

A consideration of the above embodiments will show that with one spray impinging on the upper surface and another on the lower surface, a very fine control is obtained, and it is possible to achieve a very even distribution.

It will be seen that the number of variations and the number of embodiments within this invention can be widely varied, and yet still utilize the principle which is illustrated in FIGS. 5 to 10 inclusive.

What is claimed is:

1. Fluid dispersing apparatus comprising
a chamber having a central relatively large aperture located in the upper wall thereof and having other relatively small apertures located in said upper wall in generally regular arrangement about said central aperture,
a hollow and generally conically-shaped open-ended dispersing means arranged with its apex end inserted in said central aperture in a manner to connect with said central aperture and also adapted to outwardly divert streams of fluid issuing upwardly through said small apertures against the exterior surface of said dispersing means, and
a deflecting means adjustably inserted in said open apex end of said dispersing means and adapted to form fluid issuing upwardly through said central aperture into a similar plurality of streams and to direct said similar streams in equi-distant lateral directions against the interior surface of said dispersing means in volume functionally related to the extent of insertion of said deflecting means in said open apex end of said dispersing means.

2. Fluid dispersing apparatus comprising
a chamber having a relatively large central aperture located in the upper wall thereof and having a plurality of relatively small apertures located in said upper wall circumferentially in generally regular arrangement about said central aperture,
a hollow and generally conically-shaped and open-ended dispersing means arranged with its apex end fixedly connected to said chamber in a manner to connect with said central aperture and adapted to outwardly divert streams of fluid issuing upwardly through said small apertures against the exterior surfaces of said dispersing means, and
a deflecting means adjustably inserted in said open apex end of said dispersing means and into said central aperture and arranged and adapted to form fluid issuing upwardly through said central aperture into a similar plurality of streams directed in generally regular lateral arrangement outwardly against the interior and toward the larger end of said dispersing means in a manner such that said streams issuing from said central aperture combine substantially with said streams issuing from said small apertures in volume functionally related to the extent of insertion of said reflecting means in said disbursing means to form a lateral pattern of fluid disbursal corresponding to the number of said streams of fluid.

3. The apparatus of claim 2 wherein

said small apertures are located in said upper wall of said chamber in relatively close proximity to said central aperture such that said streams of fluid issuing upwardly therethrough are directed against said disbursing means at points relatively near the apex thereof.

4. The apparatus of claim 2 wherein
said small apertures are located in said upper wall of said chamber in a relatively displaced relationship to said central aperture such that said streams of fluid issuing upwardly therethrough are directed against said disbursing means at points relatively near the larger end of said disbursing means.

5. Fluid dispersing apparatus comprising
a chamber having a relatively large central aperture located in the upper wall thereof and having four relatively small other apertures located in said upper wall in generally equi-distant arrangement about said central aperture,
a hollow and generally conically-shaped dispersing means having a plurality of curvilinear projections arranged on its exterior and interior surfaces,
said dispersing means being rotatably disposed in an inverted manner with its apex end connecting with said central aperture in a manner such that fluid issuing upwardly through said small apertures against said projections on said exterior surfaces rotates said dispersing means on said chamber, and
a deflecting means adjustably inserted in said open apex end of said dispersing means and adapted and arranged to form fluid issuing upwardly through said central aperture into a similar plurality of streams directed against the interior surface of said dispersing means in generally coincident lateral arrangement with said streams issuing from said small apertures.

6. Fluid dispersing apparatus comprising
a chamber having a relatively large central aperture located in the upper wall thereof and having four relatively small other apertures located in said upper wall in generally equi-distant arrangement about said central aperture, and
a hollow and generally conically-shaped dispersing means having a plurality of curvilinear projections on the interior and exterior thereof, said dispersing means being rotatably arranged in an inverted manner on said chamber such that the apex end of said dispersing means connects with said central aperture, and adapted and arranged to divert fluid issuing upwardly through said small apertures into four outwardly directed streams and to form said streams into a generally rectangular lateral dispersal pattern.
said dispersing means being further arranged and adapted to direct fluid issuing upwardly through said central aperture against said interior projections,
said other apertures being further located in said upper wall of said chamber in a manner to direct upwardly issuing streams of fluid against said exterior projections in a manner to rotate said dispersing means.

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