Aug. 16, 1960 S. SLONIM 2,949,241

LAWN AND CROP SPRINKLER

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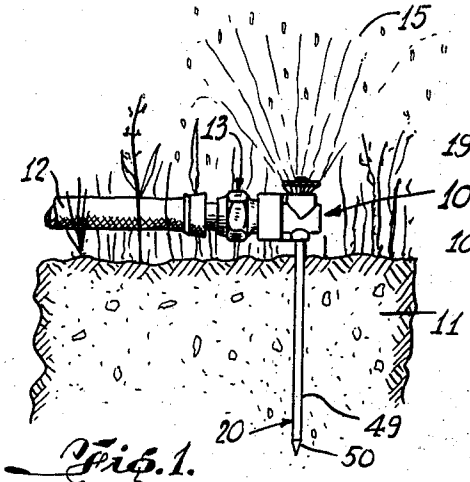

Fig. 1.

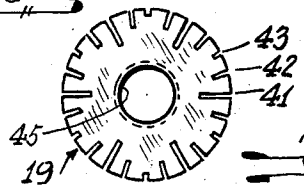

Fig. 3.

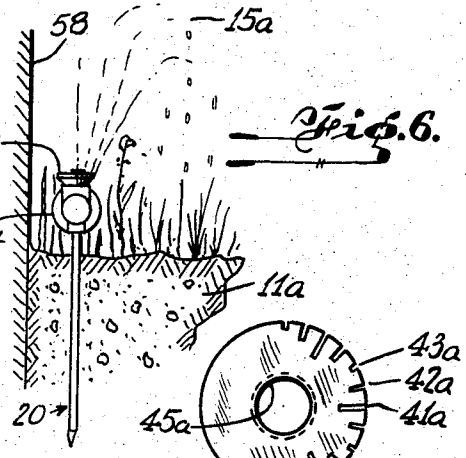

Fig. 6.

Fig. 7.

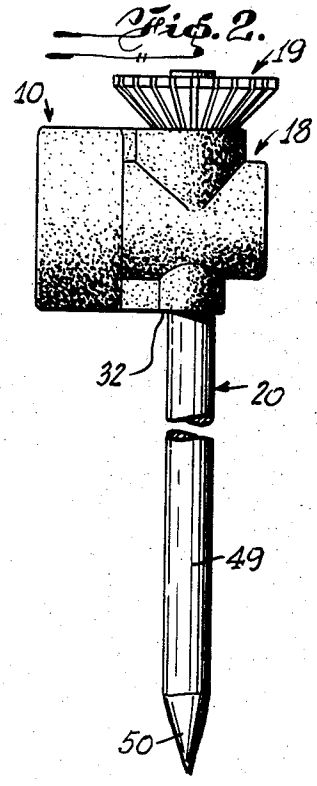

Fig. 2.

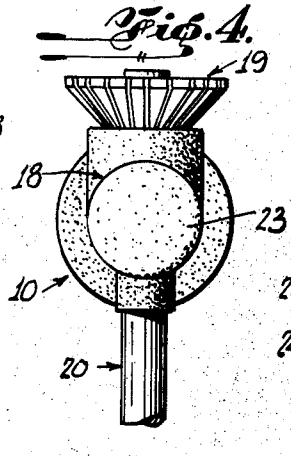

Fig. 4.

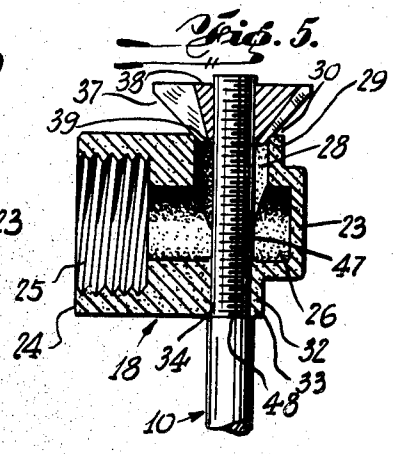

Fig. 5.

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LAWN AND CROP SPRINKLER

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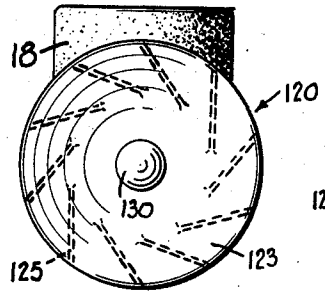


Fig. 9.

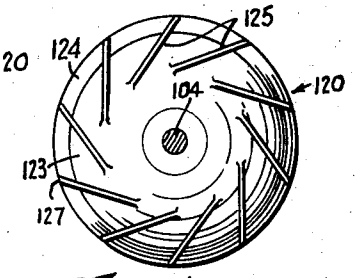
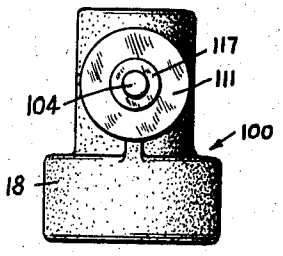


Fig. 10.

Fig. 13.



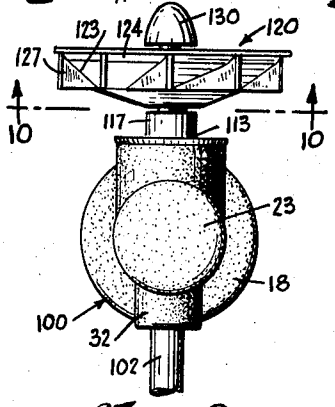


Fig. 8.

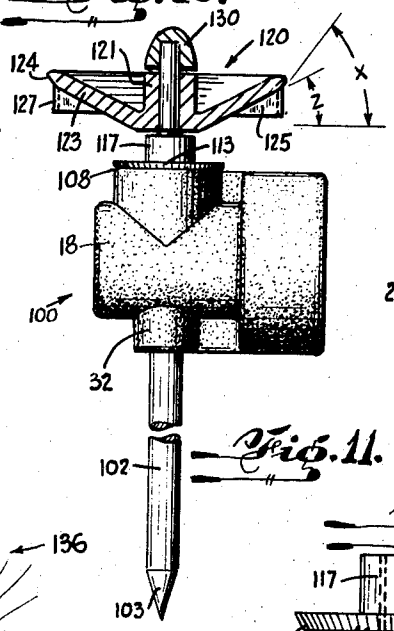


Fig. 11.

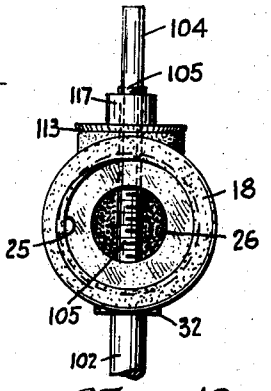


Fig. 12.

Fig. 15.

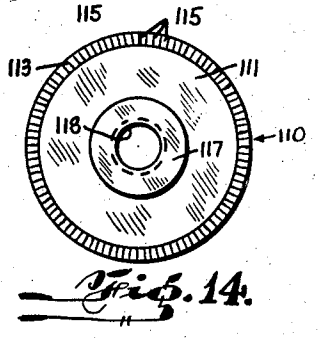


Fig. 14.

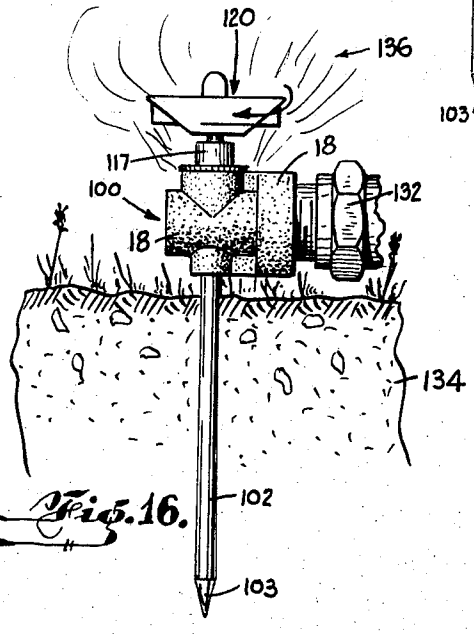


Fig. 16.

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2,949,241

LAWN AND CROP SPRINKLER

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Filed Sept. 23, 1957, Ser. No. 685,755

6 Claims. (Cl. 239—383)

This invention relates to sprinkler devices for spraying water and other fluids upon lawns and crops, and is a continuation-in-part of my co-pending application, Serial No. 535,003, filed September 19, 1955, now abandoned.

It has been found that a much larger area can be effectively sprayed with a more uniform distribution when the pressurized fluid is properly dispersed into fine particles and deflected in a horizontal direction. Accordingly, it is a general object of the present invention to provide a sprinkler device of the type described that is extremely simple and rugged in construction, utilizes a minimum number of parts, is capable of long continued and efficient use without repairs, and which can be economically manufactured in large quantities and maintained at a minimum cost.

Another object of the present invention is to provide a sprinkler device having the advantageous characteristics mentioned in the foregoing paragraphs that effects considerably finer fluid dispersion and greater fluid throw than prior similar devices, and is capable of evenly and thoroughly spraying a relatively large area.

Another object of the present invention is to provide a sprinkler device that employs a unique baffle or dispersion element capable of quick and easy adjustment to obtain any desired fineness of spray, and which is readily removed for cleaning and replacement, as when a spray of different directional characteristics is desired.

A further object of the present invention is to provide a sprinkler device that provides a deflector in association with a baffle or dispersion element for deflecting the baffle dispersed fluid stream in a substantially horizontal direction.

Still another object of the present invention is to provide a sprinkler of the above type utilizing a rotatable deflector plate in association with a baffle or dispersion element which is operative to more uniformly distribute the dispersed fluid stream over a large area in addition to directing the stream in a horizontal direction.

All of the foregoing and still further objects and advantages of this invention will become apparent from a study of the following specification, taken in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevational view showing the sprinkler device made in accordance with the present invention, in operative association with a fluid supply conduit and supported in an operative position.

Fig. 2 is an enlarged side elevational view of the sprinkler device shown in Fig. 1.

Fig. 3 is a top plan view of one of the operating elements of the sprinkler shown in Fig. 2.

Fig. 4 is an end elevational view of the device shown in Fig. 2.

Fig. 5 is a longitudinal cross-sectional view of the sprinkler shown in Fig. 2.

Fig. 6 is an end elevational view illustrating a modified arrangement of a sprinkler shown in Fig. 2.

Fig. 7 is a view similar to Fig. 3, showing a modified element used in the construction of the device shown in Fig. 6 for sprinkling in a limited direction.

Fig. 8 is a view similar to Fig. 4, showing a modified form of sprinkling device made in accordance with the present invention.

Fig. 9 is a top plan view of the device shown in Fig. 8.

Fig. 10 is a cross-sectional view taken along line 10—10 of Fig. 8.

Fig. 11 is a side elevational view, partly in section, of the device shown in Fig. 8.

Fig. 12 is an end elevational view of the device shown in Fig. 11, with certain parts removed.

Fig. 13 is a top plan view of the apparatus shown in Fig. 12.

Fig. 14 is an enlarged top plan view of a baffle plate forming a part of the device shown in Figs. 8 to 13.

Fig. 15 is a front elevational view of the baffle plate shown in Fig. 14.

Fig. 16 is a diagrammatic side elevational view showing the device of Figs. 8 to 14 in operative use.

Referring now more particularly to the drawings, and more specifically to Figs. 1 to 7 thereof, a sprinkling device **10** made in accordance with one form of the present invention is shown in operative use implanted within the ground **11** and projecting slightly above the level thereof. A pressurized fluid supply conduit or hose **12** is connected to the device **10** by means of a conventional coupling **13**. As will appear more fully hereinafter, the spray **15** emanating from the device is dispersed upwardly from the unit at a variety of different angles with respect to the sprinkler device and the ground surface **11** so as to fall to the ground surface at different distances from the sprinkler device and thus completely spray the surrounding area.

In Figs. 3, 4, and 5, the spray device **10** is seen in greater detail as comprising a hollow body or fitting **18**, a baffle or dispersion member **19** supported upon the fitting, and an elongated tie rod or securing member **20** that extends through the fitting and the baffle.

The fitting or main body portion **18** is of generally hollow tubular construction having one closed end **23** and an open end **24** that is provided with internal screw threads **25** for threaded engagement with the coupling **13** for supplying pressurized fluid to the interior or space compartment **26** of the main body member.

A generally circular outlet aperture or opening **28** communicating with the interior space **26** is adapted to open outwardly in a normally vertical position. In the embodiment illustrated in Figs. 1 to 7, the outlet opening is defined by an upstanding boss **29** on the upper side of the fitting **18**, which boss terminates in a generally flat upwardly facing upper end surface **30**. Thus, the outlet opening **28** communicates between the interior and exterior of the main body portion **18** and terminates at the upwardly facing flat surface **30**.

Projecting downwardly from the underside of the fitting **18** in opposed and substantially aligned relation with the boss **29**, is another boss **32** that terminates at its lower end in a generally flat, downwardly facing surface **33**. The boss **32** defines a central threaded bore **34** which is of considerably smaller diameter than the outlet opening **28**, for threadingly receiving the securing member **20** in a manner hereinafter described.

The baffle **19** comprises an externally tapered body which has the general configuration of a conical frustum. More specifically, the baffle **19** has an external peripheral surface **37** of approximately conical tapering configuration between the larger end surface **38** and the smaller end surface **39**. The baffle end surfaces **38, 39** are substan-

tially parallel to each other and normal to the conical axis of the baffle, so as to be of generally circular configuration. Furthermore, the smaller baffle end surface **39** is of smaller diameter than that of the fitting outlet opening **28**, while the larger baffle end surface **38** is of greater diameter than that of the fitting outlet opening, thereby enabling the baffle to be inverted and arranged over the outlet opening with its smaller end inserted partially into the boss **29**, as is best shown in Fig. 5.

Formed in the peripheral baffle surface **36** are a plurality of slots or kerfs **41, 42, 43** which extend generally longitudinally of the conical baffle and open outwardly through the peripheral surface **37** and end surfaces **38, 39**. As shown in Fig. 1, the kerfs or slots **41, 42, 43** are circumferentially spaced about the entire periphery of the baffle **19** and vary in depth radially inwards from the peripheral surface **37**. The baffle **19** is also formed with an axial bore **45** that opens through the opposite baffle end surface **38, 39** and is provided with internal screw threads throughout its length. The internally threaded baffle hole or bore **45** is preferably of the same internal diameter as that of the internally threaded fitting hole **34**, and arranged in coaxial alignment with the latter when the baffle is arranged over and partially inserted into the fitting aperture **28**, as shown in Fig. 5.

The securing member **20** may be formed of an elongated thread having one end portion **47** reduced and threaded for engagement within the fitting hole **34** and baffle hole **45** to define a shoulder **48**. More specifically, the threaded rod portion **47** extends upwardly in threaded engagement with the fitting hole **34**, and in spaced relation through and beyond the fitting opening **28** where it is in threaded engagement with the baffle member **19**. The securing rod shoulder **48** is adapted to firmly abut against the boss end surface **33** while the baffle **19** is adjustable upon the threaded rod portion **47** for movement into and out of engagement with the upper end boss surface **30**, for purposes hereinafter described.

The remaining portion **49** of the rod **20** extends downwardly from the fitting nipple **32** and may have its free end tapered, as shown at **50**, to define a supporting stake or post readily insertable into the ground **11**.

In operation, pressurized fluid passes through the conduit **12**, coupling **13**, into the fitting end **24** of the main body member and into the chamber **26**. The fluid is then directed outwardly through the outlet opening **28**, around the rod **20**, and outwardly through the kerfs **41, 42, 43** in the baffle as the kerfs are of different shape and size, with the inner and bottom walls thereof inclined at different angles with respect to the horizontal, the individual sprays emerging from the respective kerfs project outwardly at different angles of inclination. This insures that the merging fluid is distributed evenly and falls to the ground at all places in the area surrounding the sprinkler **10**.

In the condition illustrated in Fig. 5, the peripheral surface **37** of the baffle member **19** engages with the upper end **30** of the boss **29** so that all emerging fluid must pass through one of the kerfs **41, 42, 43**. However, for greater rate of fluid flow, the baffle **19** may be rotated with respect to the threaded rod portion **47**, slightly away from the boss end **30**. As the rod **20** is fixed upon the fitting **18**, the increased fluid flow resulting from adjustment of the baffle **19** away from the boss end **30** will be distributed evenly about the periphery of the baffle. Upon continued rotation of the baffle member **19**, it may be entirely removed from the rod for cleaning and repair purposes.

In Figs. 6 and 7, a slightly modified form of construction of a sprinkler device illustrated in Figs. 1 to 5 is shown wherein the sprinkler device **10***a* is implanted in the ground **11***a* adjacent to a building wall or other obstruction **58**. Under these conditions, it is not desired to sprinkle in all directions radially outwardly from the sprinkler, but preferably through a limited angle of approximately 180° away from the wall **58**. To accomplish this, the baffle body **19** may be replaced by a similar baffle member **19***a* of the type shown in Fig. 7 which is of similar shape having an axially threaded bore **45***a* adapted to receive the rod portion **47**. However, the baffle **19***a* is provided with a plurality of external longitudinally extending and open-ended kerfs **41***a*, **42***a*, **43***a*, on only a limited segment or portion of its periphery. In other words, the kerfs **41***a*, **42***a*, **43***a*, are peripherally spaced from each other and arranged upon a limited portion of the baffle exterior to provide a spray **15***a* directed as desired, say throughout 180° about the sprinkler device **10***a*. Of course, the baffle **19***a* may have its kerfs or slots arranged otherwise than as illustrated to achieve a spray of any desired directional characteristics.

Referring now to Figs. 8 to 16 of the drawing, a modified form of construction **100** is shown wherein the main body member **18** of the type hereinbefore described is provided with modified and additional operating parts. As discussed in connection with the form of the invention illustrated in Figs. 1 to 7, the housing **18** is provided with a closed end **23**, a central compartment **26**, and an internally threaded opening **25** for attachment to a pressurized fluid supply conduit. The ground engaging member **102** having a ground engaging point **103** at one end is provided with a smooth bearing stud projection **104** at the opposite end. The intermediate portion **105** of the ground engaging member **102** is externally threaded and extends through the boss **32** of the main body member **18** opposite from the outlet aperture **108** through which the fluid passes from the central compartment **26**.

A water spray baffle plate **110** has a boss **117** which is provided with an internally threaded bore **118** that is threadingly and adjustably carried upon the threaded intermediate portion **105** of the ground engaging member **102**. The baffle plate also includes a circular disc **111** that has a tapered peripheral surface **113** that defines an angle of approximately 45° with the central plane of the disc, and which flares outwardly in a direction away from the compartment **26** when in an operative assembled relationship with the main body member **118**. This peripheral surface **113** is also provided with a plurality of radially extending serrations of equal length which are spaced apart equal distance around the circumference of the disc **111**.

A deflector turbine wheel **120** having a bearing sleeve **121** is provided with a frusto-conical plate **123** that has a surface facing the baffle plate **110** which diverges outwardly in an opposite direction. The outermost extremity of this surface terminates in a further tapered surface **124** which has a slope substantially equal to the slope of the peripheral edge surface **113** of the baffle plate **110**, both of which are slightly greater than the slope of the facing surface of the deflector wheel **120**. Thus, the peripheral surface **113** of the baffle plate defines an angle y with a central plane of the disc **111** that is substantially equal to the angle x that is defined by the peripheral edge **124** of the turbine wheel **120** with a central plane of the wheel, both angles x and y being slightly greater than the angle z defined by the facing surface of the wheel **120** with a central plane of the wheel. It will be also noted that the cross-sectional area of the turbine wheel **120** is substantially greater than the cross-sectional area of the baffle plate **110** so that all fluid directed against the turbine wheel **120** will react therewith.

A plurality of turbine blades **125** each having an outer edge **127** coextensive with the outer edge of the turbine wheel, are carried upon the facing surface of the turbine wheel and have inner ends which are substantially tangent to a common circle having a radius slightly smaller than the radius of the base of the frusto conical plate, which inner ends flare with the surface of the plate. This turbine wheel **120** is rotatably carried upon the upper end **104** of the ground engaging member **102** and is secured

thereon by means of a cap **130** which is secured to the outermost end of the member **102**.

In use, any suitable hose fitting **132** is connected to the threaded opening **25** of the main body member **18**, and the pointed end **103** of the ground engaging member **102** is thrust into the soil **134** at any desired location. Upon supplying pressurized fluid to the device, the resulting spray **136** will be efficiently distributed over a considerably large area. The fineness of the spray emanating from the baffle plate **110** can be controlled by moving the tapered peripheral surface **113** thereof into and out of the open end **108** of the main body member. In any event, the fluid striking the blades **125** of the turbine wheel **120** are operative to effect rotation of the turbine wheel and deflect the spray from a vertical direction toward a horizontal direction, thus assuring a more uniform distribution of moisture to the surrounding ground area. Of course, with an increase in pressure of the fluid supplied to the main body member, the velocity of the wheel **120** will also increase and the resulting area covered by the spray will be enlarged.

It will be recognized that in each of the foregoing embodiments, the main housing member **18** is of substantially identical construction. It is thus possible to use any of the aforementioned baffle plates and deflector turbine wheel interchangeably with each other to effect any particular type of operation which may be required. When furnished in kit form, this device makes for an all purpose garden and crop sprinkler.

While this invention has been described with particular reference to the construction shown in the drawing, it is to be understood that such is not to be construed as imparting limitations upon the invention, which is best defined by the claims appended hereto.

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

1. A sprinkler device comprising, in combination, a hollow fitting having one open end for attachment to a fluid inlet to receive pressurized fluid therefrom, and having an outlet aperture in one side of said fitting, the central longitudinal axis of said aperture extending substantially perpendicularly to the central longitudinal axis of said open end, a baffle having a serrated peripheral edge supported partially within said aperture, a securing rod extending along said central longitudinal axis of said outlet aperture secured at one end to said fitting and at the opposite end to said baffle, said securing rod comprising a threaded portion for threaded engagement with said baffle, said baffle being threadedly adjustable upon said threaded portion relative to said outlet aperture to vary the rate of fluid flow through said outlet aperture, said baffle comprising an inverted frusto-conical body formed with a plurality of longitudinally extending open-ended radial kerfs, the smaller end of said body extending into said outlet opening, whereby fluid flowing outwardly from said outlet opening is dispersed through said kerfs.

2. A springler device comprising in combination a hollow fitting having one open inlet end at one side for connection to a pressurized fluid supply conduit, portions of said fitting defining an outlet aperture in another side of said fitting, baffle means supported adjacent to said outlet aperture for dispersing a fluid stream flowing outwardly from said hollow fitting through said outlet aperture toward said baffle, and deflector means at the opposite side of said baffle for deflecting said baffle-dispersed fluid stream, said baffle means comprising a plate of substantially the same cross-sectional configuration as said outlet aperture, said plate having a beveled peripheral edge, a rod extending axially through said aperture and threadedly secured at one end to said fitting and at the opposite end to said baffle for adjustably supporting said peripheral edge of said plate a selected distance from the outlet aperture-defining portions of said fitting, said deflector means comprising a rotor plate pivotally mounted on an extension of said rod in axially spaced relationship from said baffle plate, said rotor plate being of substantially greater cross-sectional area than said baffle plate and being supported for rotation about the longitudinal axis common to the center of said plates, and reaction means carried by said rotor plate for effecting rotation of said rotor plate in response to the reaction of a fluid stream thereagainst from said baffle plate, said reaction means comprising blades tangent to a circle concentric with said longitudinal axis.

3. A sprinkler device as set forth in claim 2, wherein said beveled peripheral edge of said baffle plate is serrated.

4. A sprinkler device as set forth in claim 2, wherein said rotor plate defines an outwardly diverging truncated conical surface facing said baffle plate.

5. A sprinkler device as set forth in claim 4, wherein the outer extremity of said rotor plate defines a beveled surface adjacent to the outer extremity of said truncated conical surface, said beveled surface of said rotor plate being of greater slope than said conical surface.

6. A sprinkler device as set forth in claim 5, wherein the slope of said conical surface is substantially identical to the slope of said beveled peripheral edge of said baffle plate.

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