

W. P. KENNEDY

ADJUSTABLE PATTERN SPRINKLER

3 Sheets-Sheet 1

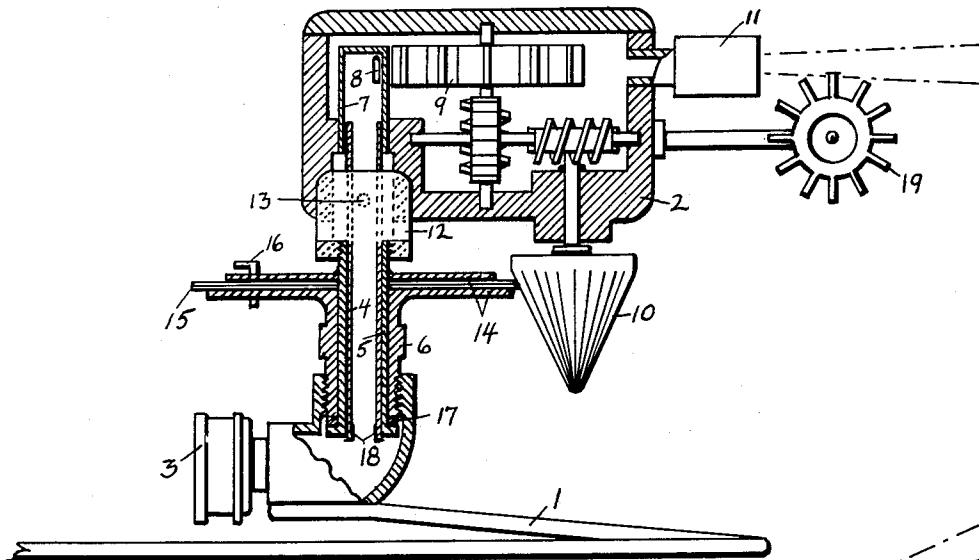


FIG. 1

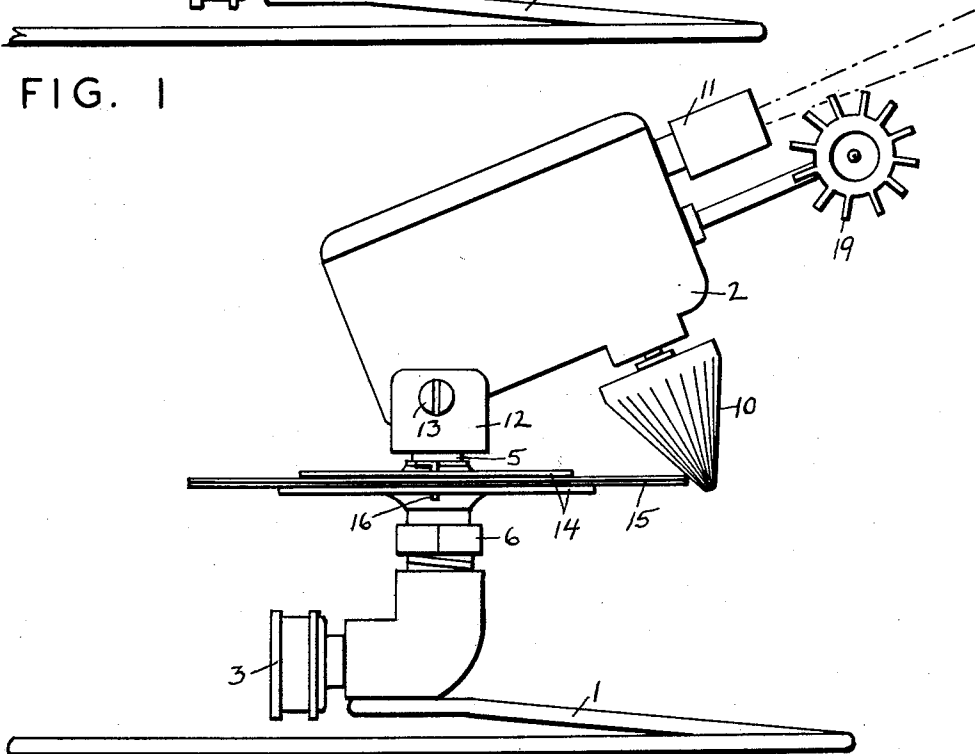


FIG. 2

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ADJUSTABLE PATTERN SPRINKLER

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3 Sheets-Sheet 2

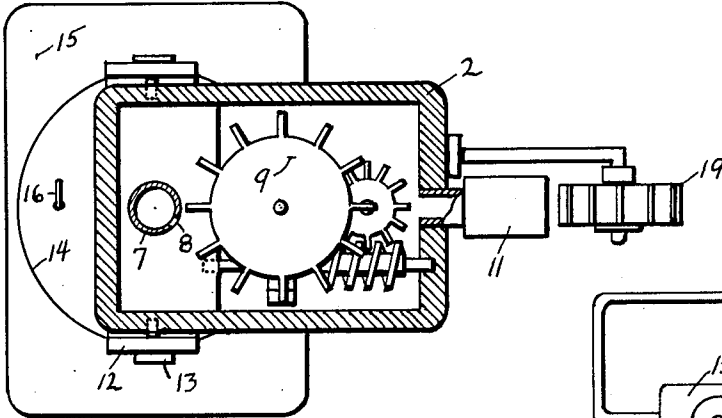


FIG. 3

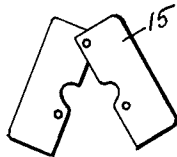


FIG. 7

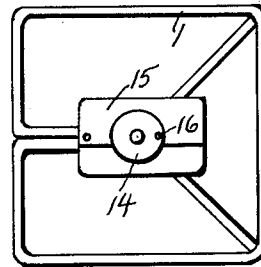


FIG. 6

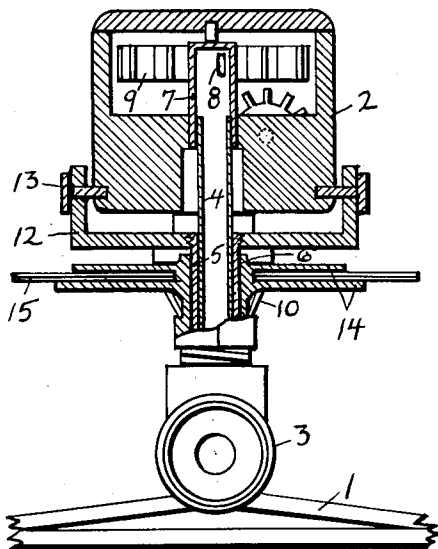


FIG. 4

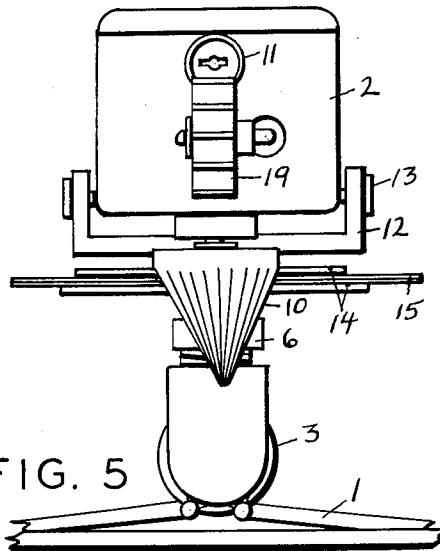


FIG. 5

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3,091,399

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3 Sheets-Sheet 3

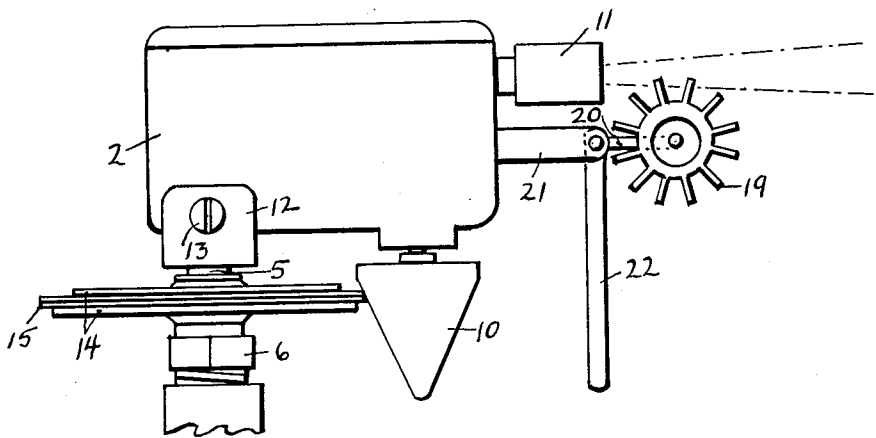


FIG. 8

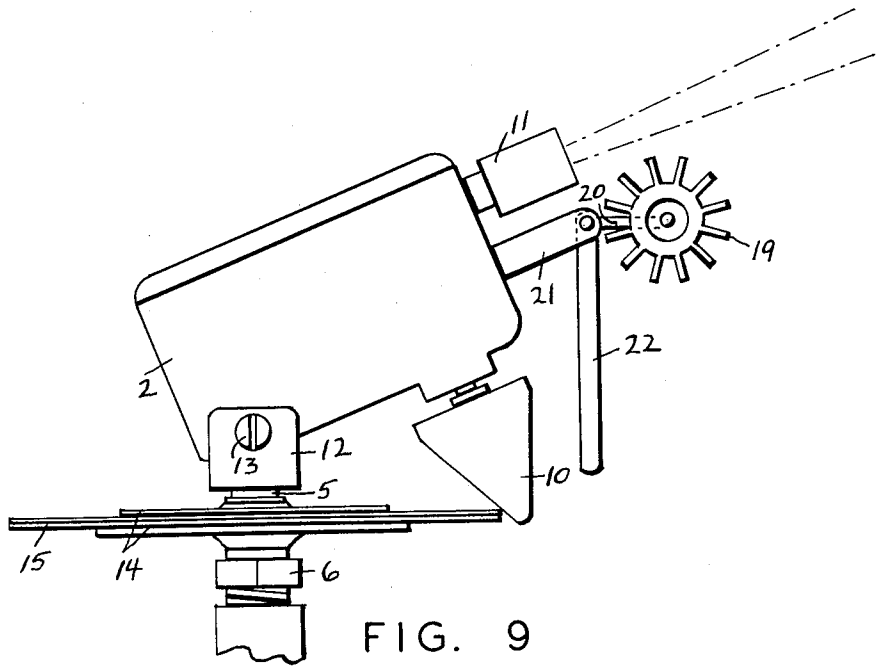


FIG. 9

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1

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ADJUSTABLE PATTERN SPRINKLER

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5 Claims. (Cl. 239-231)

This invention relates to water motor powered irrigation sprinkling devices that have rotary water distribution means and is particularly concerned with such devices that embody cam means mounted interchangeably upon the body of the device with said cam means enabling the device to sprinkle any one of a multiplicity of area spray patterns.

The sprinkler of the present invention has certain features of control and operation similar to, and represents improvements over, the sprinkler shown in my pending application, Serial No. 202,811, filed June 15, 1962, now Patent No. 3,081,039, in the United States Patent Office.

The principal object of this invention is to provide a pattern producing sprinkler of the rotary tilting type in which the speed variation during each revolution of the distribution head is more precise and dependable than that furnished by the operation of impulse motivated sprinklers of this type previously designed. The performance of a reduction geared turbine water motor is superior in power and continuity of operation under extremes of variation of supply pressures and volumes to that of an impulse motivated drive mechanism in water sprinklers.

A further object of the invention is to provide a pattern sprinkler in which the effects of trash and grit in the water supply would be of no more hazard to the operation of a pattern sprinkler than it would be to the performance of any type of sprinkler.

It is another object of the invention to provide a pattern sprinkler in which corrosion would be no sooner effected than in any other type water sprinkler and have no greater effect on performance when formed than in any other type water sprinkler.

A further object of the invention is to provide means to variably diffuse the jet stream emitting from the nozzle according to the amount of inclination of the nozzle so as to produce patterns of greater variation of minimum and maximum range and to, additionally, avoid the tangential dig of the lowest inclination jet stream into the sprinkled area at the point when nozzle inclination is practically parallel with the ground.

Numerous other objects, features, and advantages of the present structure will be apparent from the consideration of the following specification taken into conjunction with the accompanying drawings, in which:

FIG. 1 is a sectional view of the device from one side showing the jet stream inclination in shortest range position.

FIG. 2 is a side elevation of the device showing the jet stream inclination in longest range position.

FIG. 3 is a sectional view of the device from the top with the base not shown.

FIG. 4 is a sectional view of the device from the rear with the base fragmented.

FIG. 5 is a view of the device from the front with the base fragmented.

FIG. 6 is a plan view in reduced scale of the base portion of the device with the distribution head removed so as to show means for stationing cams.

FIG. 7 is a plan view in reduced scale of a cam showing its split and hinged construction.

FIG. 8 is a side view of a portion of the device in modified form, showing automatic means to cause the jet stream diffusion wheel to variably enter the stream with

2

this view showing the stream in shortest range inclination and the wheel in contact with the stream.

FIG. 9 is a view of FIG. 8 with the jet stream in longest range inclination and the wheel out of contact with the stream.

Referring to the drawing, the numeral 1 designates the base of the device upon which a water motor driven distribution head 2 is revolvably and tiltably mounted. Water enters the device through the hose coupling 3 then passes to a flexible tube 4 mounted within a revolvable spindle 5 within a spindle housing 6 mounted upon the base. The flexible tube 4 connects to a hollow standard 7 and exits the water through the port 8 to drive a water wheel 9 which imparts this action through a worm gear train to revolvably drive a sharply toothed metal cone 10. The water exits the motor-driven distribution head through a nozzle 11 which is manually adjustable from a short range, horizontally fan shaped stream to a long range jet stream. These nozzles are a standard item of merchandise and are commercially available.

Threadedly mounted to the spindle 5 at its upper end is a bracket 12 which turns with the spindle and tiltably supports the water motor by means of the pins 13. Integrally a part of the spindle housing 6 is a double flanged support 14 for a pattern cam 15 which is of light weight sheet metal and of split and hinged construction as shown in FIG. 7 so as to be readily removable from the support. Locking of the cam in the flanges is effected by insertion of the removable pin 16 through matching holes in the cam and flanges.

Leakage of water between the spindle 5 and the spindle housing 6 is precluded by means of the water seal washer 17. Sealing of the lower end of the flexible tube 4 within the spindle 5 is effected by the tapered bushing 18, the upper end of the flexible tube being sealed by the expansive force of the water upon the sides of the tube in the hollow standard 7. As shown more clearly in FIG. 4, a section of the flexible tube at its bending point is free of adjacent abutments so as to enable ease of bending. With normal household water pressures, the flexible tube will not bulge in this unconfined space but under high pressure conditions it would be desirable to encase this portion of the flexible tube in a lightly bendable flexible spring to avoid bulging of the tube.

A cam 15 is of a shape conforming to the shape of the pattern to be sprinkled with the pattern being of any shape within a minimum and maximum circular diameter with the minimum diameter being such as to cause the inclination of the jet stream to be essentially parallel with the ground and the maximum diameter to cause the jet stream to be at the longest trajectory range proportionally correct for accurate distribution. This result is accomplished by means of the driving cone 10 which is in contact with the perimeter of a stationed cam. As the water passes through the motor the sharply toothed cone revolves and in turn revolves the distribution head around the cam. The use of a cone for this purpose causes not only a change in the angle of inclination of the jet stream in reference to any given position of the cone on a cam but also causes a change in speed of rotation of the head at any given position of the cone on the cam, the speed of revolution of the cone being constant under a given water volume and pressure. As shown in FIG. 1, the maximum diameter of the cone being on a minimum diameter of the cam imparts a fast speed of revolution to the head, and as shown in FIG. 2, the inclination furnished by the maximum diameter of the cam places the rotational point of the cone on its smallest diameter and imparts a much slower rotational speed to the distribution head. This change of speed is essential to the proper distribution of fluid in a constant volume pattern sprinkler,

3

the longer ranges requiring more sprinkling time than the shorter ranges for uniform distribution of fluid.

The required force of downward tilt of the head to insure contact with the cam is effected by placing by far the greater weight of the distribution head on the nozzle side of the pivot point. The effect of rearward and upward thrust of the jet nozzle stream is minimized by relatively placing the pivot points in lateral abutment with the jet thrust.

In operation the distribution head revolves around the cam, raising and lowering the jet stream inclination and thus increasing and decreasing the range of the distributed water in accordance with the shape of the cam and causing the speed of rotation to be faster on the short ranges and slower on the long to insure proper fluid distribution. The central portions of the pattern are sprinkled by means of the spinnable wheel 19 which contacts the lower portion of the jet stream and causes a fall of water all along the length of the jet stream.

In a modified version of the device shown in FIGS. 8 and 9, the spinnable wheel 19 is mounted upon a freely tiltable projecting rod 20, one end of which is pivotally mounted upon a bracket 21 extending from the distribution head 2, a dependent weight 22 keeps the plane of the rod 20 constantly parallel with the ground regardless of tilt of the distribution head. It can thus be seen that when the head is tilted parallel with the ground the spinnable wheel would be into the lower portion of the jet stream as shown in FIG. 8 and thus diffusing the stream and when the head is tilted to the highest nozzle trajectory, as shown in FIG. 9, the wheel would be entirely out of the jet stream with no diffusion of the stream by the wheel with points between these maximums being proportional. This feature would permit a radical change of maximum and minimum nozzle stream range that would be of value in producing long and narrow patterns of symmetrical shape but would not produce uniform distribution on non-symmetrical shapes and is thus shown as an auxiliary feature to the basic device.

As shown in FIGS. 8 and 9, the cone 10 is of smooth faced medium density rubber, as an alternate to the previ-

4

ously mentioned toothed metal. This material is suitable for driving the distribution head around a cam of small change in diameter size such as a square and would offer a device of lower cost than that previously described in the event such patterns were exclusively required.

It is believed that the nature and advantages of my invention will be clear from the foregoing description.

Having thus described my invention, I claim:

1. A cam-controlled pattern sprinkler, including a base, a fluid entry to a reduction geared water motor within a revoluble and tiltable distribution head in association with said base, a jet producing nozzle for fluid distribution mounted upon said head and moving therewith, a variable contour pattern cam stationed upon said base, a revolving cone mounted upon said distribution head and driven by said water motor with the sides of said cone contacting the contour of said cam and causing said distribution jet to revolve and vary the speed of revolution and the degree of tilt of said jet in accordance to the position of said cone on the contour of said cam.

2. The device as claimed in claim 1, in which a spinnable wheel is mounted to said distribution head so as to project into one side of said jet and continuously diffuse a portion of said jet.

3. The device as claimed in claim 1, in which a spinnable wheel is mounted to said distribution head so as to variably project into and out of one side of said jet with such degree of variation being a result of the angle of tilt of said distribution head.

4. The device as claimed in claim 1, in which the cone is of metal with its conical sides being sharply toothed.

5. The device as claimed in claim 1, in which the cone is of non-toothed resilient material.

References Cited in the file of this patent

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