

[54] **ADJUSTABLE PATTERN WATER SPRINKLER SYSTEM**
 [76] Inventor: **Thornton L. Warren, 5919 E. Indian School Rd., Phoenix, Ariz. 85018**

[22] Filed: **Oct. 17, 1972**

[21] Appl. No.: **298,402**

[52] U.S. Cl. **239/256, 239/DIG. 1, 239/261, 239/265, 239/587**

[51] Int. Cl. **B05b 3/06, B05b 15/04**

[58] Field of Search ... **239/251, 252, 253, 256, 261, 239/264, 265, 587, 97, DIG. 1**

[56] **References Cited**
UNITED STATES PATENTS

3,047,240	7/1962	Lent.....	239/265
2,406,941	9/1946	Brooks.....	239/587 X
1,716,305	6/1929	Dillman	239/265 X
1,758,115	5/1930	Kelly.....	239/587 X

1,796,942	3/1931	Pottenger.....	239/DIG. 1
2,342,757	2/1944	Roser.....	239/587 X
2,620,231	12/1952	King.....	239/265 X
3,099,393	7/1963	Lent.....	239/97
3,193,203	7/1965	Crow	239/251 X
3,441,222	4/1969	Law	239/587 X
3,667,673	6/1972	Knudsen	239/256 X

FOREIGN PATENTS OR APPLICATIONS

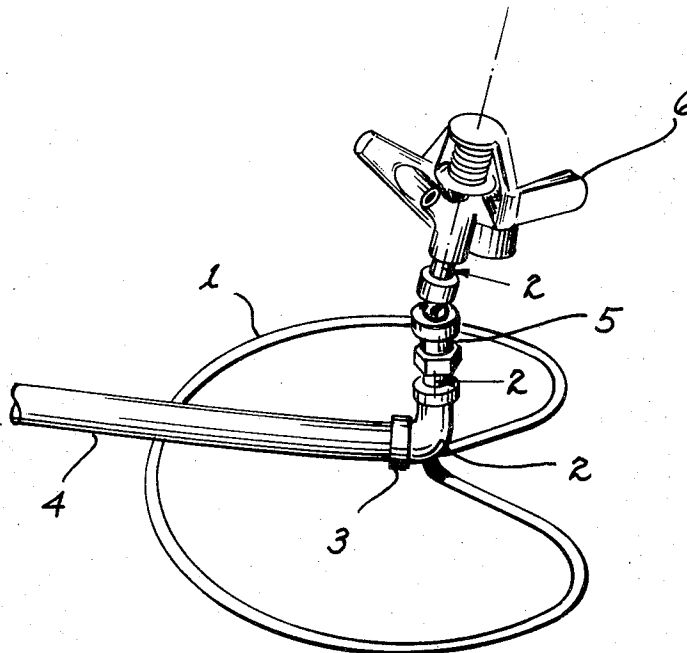
1,082,441	6/1954	France.....	239/587
-----------	--------	-------------	---------

Primary Examiner—Robert S. Ward, Jr.
Attorney, Agent, or Firm—Cahill, Sutton & Thomas

[57] **ABSTRACT**

In order to accommodate odd shaped areas to be sprinkled, an impulse sprinkler is supported by apparatus which permits tilting the impulse sprinkler from the vertical in any radial direction. As a result, the sprinkler pattern is altered from a circle (or portion of a circle) to an ellipse-like (or portion thereof) shape.

2 Claims, 4 Drawing Figures



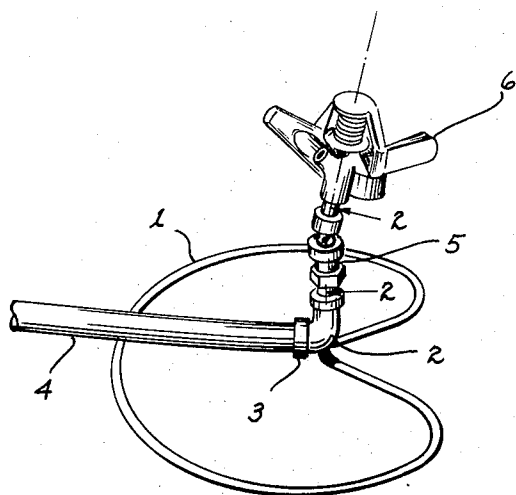


fig. 1

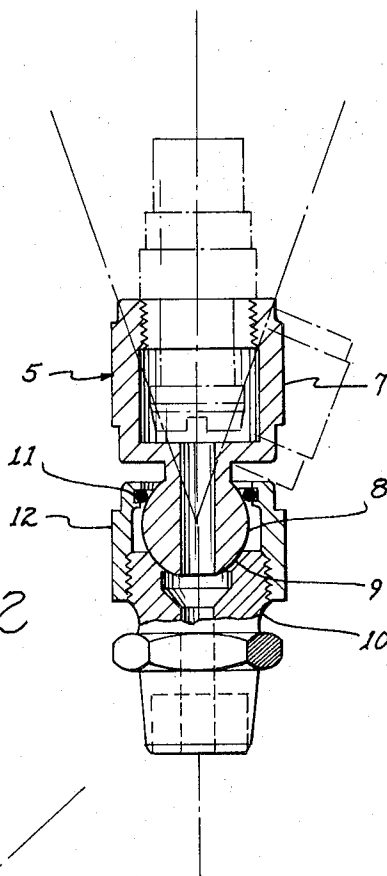


fig. 2

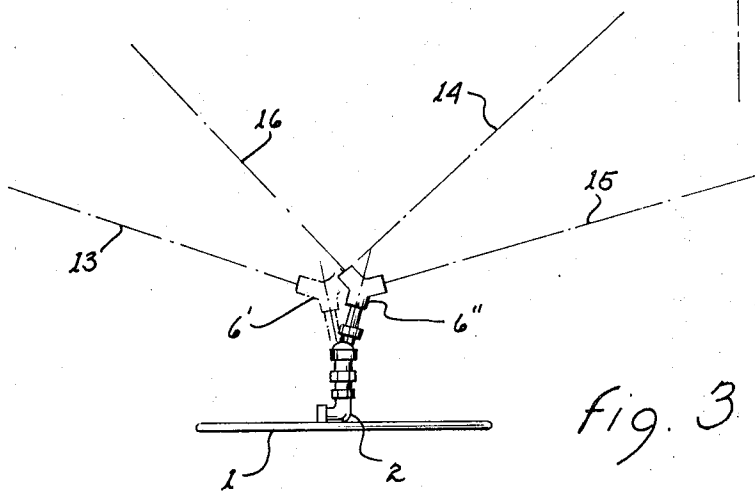


fig. 3

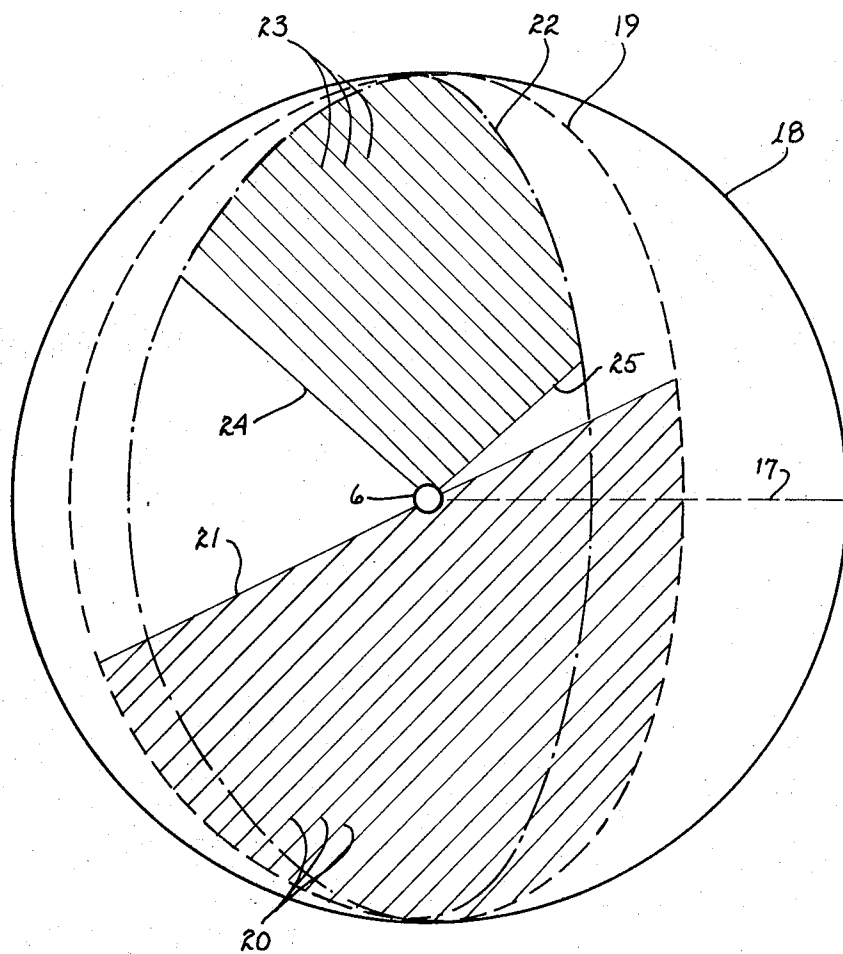


fig. 4

ADJUSTABLE PATTERN WATER SPRINKLER SYSTEM

This invention relates to sprinkler devices and, more particularly, to a sprinkler system including means for selectively controlling the water distribution pattern.

A well known and reliable type of sprinkler is generally known as an impulse sprinkler. Impulse sprinklers have an inherently circular distribution pattern, and many impulse sprinklers are fitted with limiting and reversing means whereby the pattern is altered to a section of a circle across which the water is dispensed in reciprocating sweeps.

Most lawn areas, however, are neither circular or sections of a circle in shape. As a result, a choice must be made between inadequate watering of certain areas or the distribution of excess water in areas which need not be watered in order to insure coverage of the primary areas. The natural choice is the latter which results in not only inconvenience but also significant water waste. In many arid regions, such water waste is virtually intolerable.

Many efforts have been made toward developing sprinklers which will cover only certain irregular shapes. While some of these efforts have produced useful systems, they have generally resulted in expensive and relatively unreliable apparatus.

It is therefore a broad object of my invention to provide improved sprinkling apparatus capable of being adjusted to a variety of distribution patterns.

It is another object of my invention to provide such apparatus which utilizes, as a component, a simple and reliable sprinkler head well known in the art.

It is a more specific object of my invention to provide means for altering the distribution pattern of such a sprinkler head from circular, or part circular, to an elliptical-like, or portion thereof, pattern, which elliptical-like pattern may be varied according to its major and minor axes.

The subject matter of the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, may best be understood with reference to the following description taken in connection with the accompanying drawing of which:

FIG. 1 illustrates the system according to my present invention showing one of many positions which the sprinkler head may assume;

FIG. 2 illustrates a component of the system of FIG. 1 which permits angular adjustment of the sprinkler head;

FIG. 3 illustrates generally the effect on the angle of water emission of the apparatus in two different angular positions; and

FIG. 4 is a polar diagram illustrating one family of curves representing the various distribution patterns which can be achieved by orienting the apparatus at successively different angular positions along one radial line and also certain irregular areas which can be accommodated by controlling the angular sweep of the sprinkler head.

Referring now to FIG. 1, it will be observed that a stand 1 is provided with a right angle fitting 2 permanently fixed to a central portion of the stand. An internally threaded coupler 3 on the horizontal part of the fitting 2 receives an externally threaded end of a hose

4 in the usual fashion. A swivel coupling 5 fits into the vertical opening of the right angle fitting 2, and the upper end of the swivel coupling 5 receives a sprinkler head 6 which may be of the well known impulse type normally having a circular distribution pattern and also adjustable to sweep only a section of the circle.

As shown in FIG. 2, the swivel coupling 5 is preferably of the ball and seat type in which the upper portion 7 terminates at its lower end in a sphere-like ball element 8 which pivots about a seat 9 within a lower portion 10 of the coupling 5. A seal 11 is held in place by a cap member 12 which serves to hold the upper and lower portions of the assembly 5 together. With this arrangement, the sprinkler head 6 (FIG. 1) may be tilted in any radial direction from the vertical by an amount limited only by the clearance between the upper and lower portions of the coupling 5.

FIG. 3 illustrates the effect on the angle at which the water issues from the sprinkler head 6 as it is tilted slightly to the left and somewhat more to the right in a plane. In the position indicated by the numeral 6', the stream to the left 13 has an angle of less than 45° with respect to the horizontal whereas the stream to the right 14 slightly exceeds 45°. Similarly, but more pronounced in the position indicated by the numeral 6'', the stream to the right 15 has a shallower angle with respect to the horizontal than the stream 13, and the stream to the left 16 more nearly approaches the vertical than the stream 14, the more pronounced deviation from the normal pattern resulting from the position 6'' being tilted more from the vertical than the position 6'.

FIG. 4 provides a graphic demonstration of the wide variety of patterns which can be achieved by merely tilting the sprinkler head 6 along a single line 17, orienting the head 6 in specific directions, and controlling its angular distribution in the normal fashion. Thus, if the head 6 is positioned in the normal vertical position, an area encompassed by the circle 18 may be covered, or any section of the same may be covered by appropriate adjustments to the angular distribution setting of the sprinkler head 6.

By tilting the sprinkler head 6 back along the line 17, the ellipse-like area circumscribed by the line 19 is available, and, by way of example, the area indicated by the cross-hatching 20 may be covered by adjusting the sprinkler head 6 to give a 180° distribution limited along the line 21.

By tilting the sprinkler head 6 still further back, the area enclosed by the ellipse-like line 22 is available, and the odd shaped area identified by the cross-hatching 23 may be covered by appropriately orienting the sprinkler head 6 and setting it for 45° angular distribution, the angle between the limit lines 24 and 25.

Consider now that the sprinkler head 6 may be tilted to an infinite number of positions between the limits dictated by the physical configuration of the swivel coupling 5 and in any desired radial direction, and further that many sprinkler heads may be adjusted to any number of angular distributions, and it will become apparent that virtually any odd shaped area may be effectively covered with very little water being wasted upon area which need not be sprinkled. A sprinkler head which has been found particularly well adapted to the present invention by virtue of its infinitely variable angular distribution pattern is marketed under the registered trademark RAIN BIRD, model designation 25 P-J-DA.

FIG. 1 depicts a portable apparatus. Those skilled in the art will understand, of course, that permanent installations can be similarly adapted by utilizing an equivalent of the swivel coupling 5.

While the principles of the invention have now been made clear in an illustrative embodiment, there will be immediately obvious to those skilled in the art many modifications of structure, arrangement, proportions, the elements, materials, and components, used in the practice of the invention which are particularly adapted for specific environments and operating requirements without departing from those principles.

I claim:

1. In a sprinkler system including a sprinkler head for automatically distributing a discontinuous stream of water through a predetermined arc in response to the flow of water, the sprinkler head being provided with means for adjusting the angular distribution of water issuing therefrom, said sprinkler head further including support means for the sprinkler head, the improvement comprising in combination:

swivel coupling means disposed between the support means and the sprinkler head for altering the axis

of the sprinkler head, said coupling means being the sole element necessary to support and to maintain the sprinkler head in alignment with a predetermined axis; whereby, an odd shaped distribution pattern may be achieved by tilting said swivel coupling, and hence the sprinkler head, from the vertical and adjusting the angular distribution of the sprinkler head.

2. The sprinkler system set forth in claim 1 wherein said swivel coupling means comprises:

- a. a sphere-like ball element secured to the base of the sprinkler head, said ball element including a passageway extending therethrough and communicating with the internal cavity of the sprinkler head;
- b. an apertured seat disposed within the support means for receiving said ball element; and
- c. an apertured cap enclosing said ball element and securing said ball element to said apertured seat; whereby, water will flow through said ball element from the support means and into the sprinkler head.

* * * * *

25

30

35

40

45

50

55

60

65