

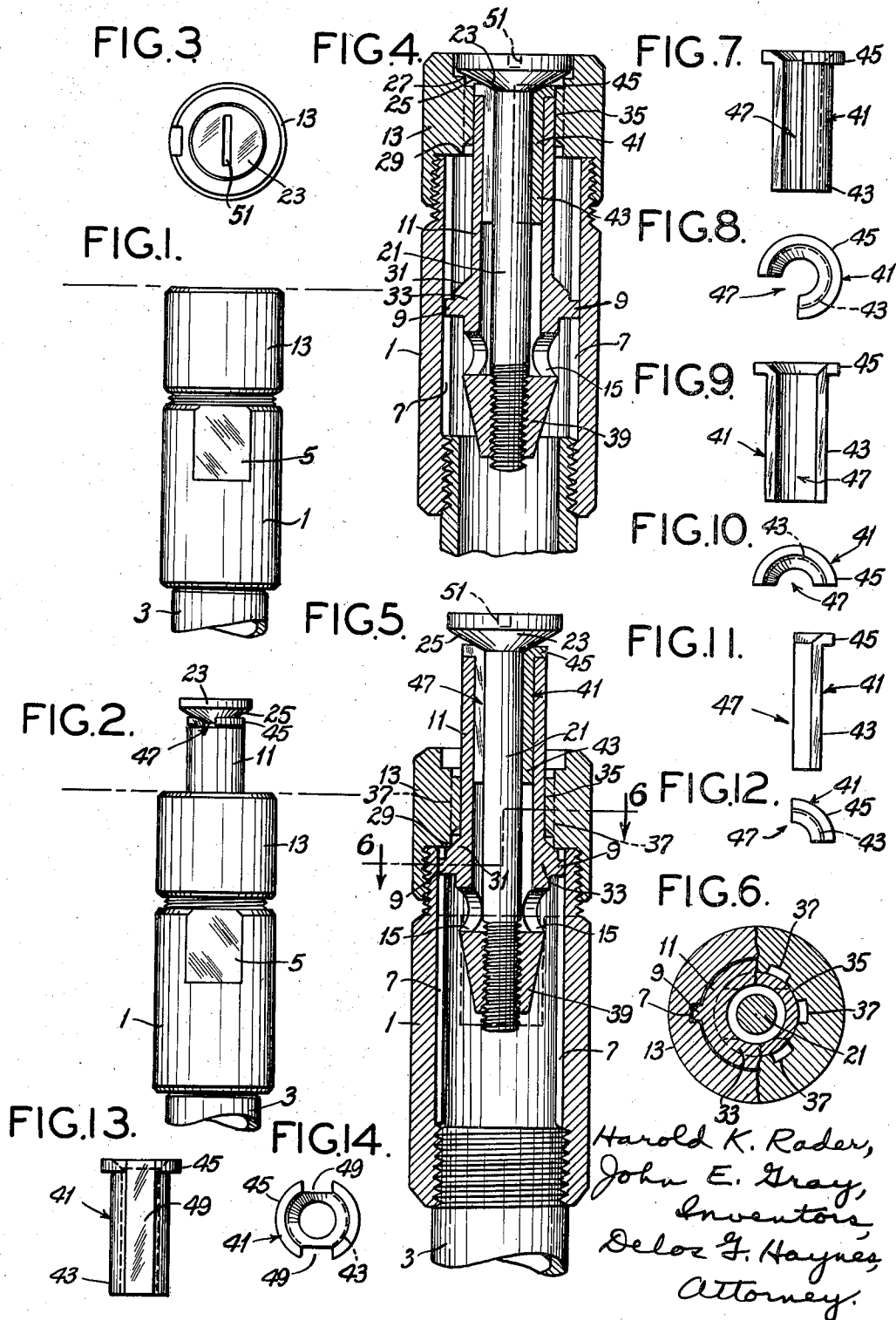
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SPRINKLER HEAD

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SPRINKLER HEAD

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1 Claim. (Cl. 299—61)

This invention relates to sprinkler heads, and, with regard to certain more specific features, to disappearing lawn sprinkler heads.

Among the several objects of the invention may be noted the provision of an improved sprinkler head of the class described which is completely and readily adaptable for the projection of a spray of any desired shape or angle of arc, with a minimum of complications for the selection; the provision of a sprinkler head of the class described which is adapted to provide sprays of any desired shape or angle of arc merely by the interchange of a single simple element in a basic structure, said head being thereby adapted, without major change in parts, to meet any of the requirements for various types of sprays as encountered in practice; and the provision of a sprinkler head of the class described which is relatively simple and economical to construct. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawing, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a front elevation of the device in retracted position;

Fig. 2 is a front elevation of the device of Fig. 1, but in an extended position;

Fig. 3 is a top plan view of the device of Fig. 1;

Fig. 4 is a vertical, axial section of the device in its Fig. 1 position;

Fig. 5 is a vertical, axial section of the device in its Fig. 2 position;

Fig. 6 is a cross section taken substantially along line 6—6 of Fig. 5;

Figures 7, 9, 11 and 13 are side elevations of various forms of sleeve elements; and,

Figures 8, 10, 12 and 14 are top plan views of the sleeve elements of Figures 7, 9, 11 and 13, respectively.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

The present invention is in the nature of an improvement on the sprinkler head shown in Irving et al. Patent 1,726,490, Rader Patent 1,821,579, and Lindquist et al. Patent 1,962,824.

Referring now more particularly to Fig. 1, there is illustrated at numeral 1 an outside body por-

tion threaded at the bottom to be attached to a stand pipe such as 2 which pipe connects with a sprinkling system or the like. The body 1 is provided with flats 5 to which a wrench may be applied for attaching purposes.

Interiorly the body 1 is provided with vertical grooves 7 for slidably accommodating a pair of ears 9 on a slidable outlet nozzle 11. The outlet or water ejecting nozzle 11 slidably cooperates at its upper end with a collar 13 threaded to the body 1 so that it is adapted to be moved telescopically within the body 1. The slidable outlet 11 has inlet portions 15 at the lower end thereof for receiving water from the pipe 2. A stem 21 passes upwardly through the hollow center of the nozzle 11 and is formed at its top as a head or spreader 23. The stem 21 is threaded into the bottom of the slider 11. The head 23 is formed as an inverted cone 25.

The collar 13 is provided with an upper, interior seat 27, cooperating with the conical portion 25 on the head 23. In its lower portion the collar 13 has an inner conical seat 29, which is adapted to engage the reverse-conical surface 31 of an annular shoulder 33 on the nozzle 11. It will be noted that the heretofore mentioned ears 9 extend from this shoulder 33.

A central bore 35 of the collar 13 receives the nozzle 11 with sufficient clearance only to permit extending and retracting of said nozzle as described hereinafter, thus serving to hold said nozzle 11 in vertical position. A number of grooves 37 (six in the present embodiment, see Fig. 6) are broached or otherwise formed in the inner surface of bore 35. These grooves function as follows:

When the nozzle is in its extended, Fig. 1, position, and spraying water, there is manifestly a tendency for some water to wash back from the surrounding soil, carrying with it sand, dirt particles, and the like. With old forms of sprinklers, such sand and dirt particles wedged into the mechanism and frequently, when the water was turned off, caused the sprinkler to remain in extended position. This led to frequent breakage of both lawn mowers and sprinklers. However, the grooves 37, in combination with the other features of the invention, effectively reduce or completely eliminate this tendency of the sprinklers to remain in extended position. This is because (1) the area of contact between the nozzle and collar is greatly reduced, (2) channels are provided into which the drainage water, with its content, quickly flows, and (3) channels are provided for a non-harmful leakage or seepage of water from the

body 1, thus establishing a countercurrent to the incoming drainage water and thereby effectively stopping the influx of sand, dirt, etc.

The nozzle or projectible member 11 comprises a tube having a closed end 39 threaded to receive the stem 21. Above the end 39, but below the annular flange 32, are the water inlets 15.

An important feature of the present invention is the provision of a sleeve element 41 between the nozzle element 11 and the stem 21. As will hereinafter be pointed out, the shapes of the various sleeve elements 41 that can be used are many, depending upon the type of spray wanted. In all cases, however, the sleeve element 41 has a relatively long portion 43, which is in the form of an angular section of a cylinder adapted to fit relatively tightly between the stem 21 and inner wall of nozzle 11. The upper end of the portion 43 is flared outwardly, as indicated at numeral 45, providing a shoulder which seats on the upper edge of the nozzle 11. Interiorly, the flange 45 is countersunk or otherwise formed closely to embrace the conical surface 25 of the head 23. When the stem 21 is drawn down tightly in the nozzle 11, it will be seen that the sleeve element 41 is tightly clamped into position between the nozzle 11 and the head 23.

The length of the sleeve 41, particularly the portion 43, is a principal feature of the present invention. In the embodiment shown, this length is approximately twice the maximum diameter of the portion 43. The considerable length of the element 41, we have found, is one of the principal reasons that we are able, in the present invention, to achieve the desired control of the flow of water. It is likewise necessary that the sleeve element 41 fit relatively tightly between the stem 21 and the nozzle 11, in order to prevent leakage of water where it is not wanted.

The spray obtained from the sprinkler of the present invention will extend through an angle of arc determined by the amount of the basic cylinder of element 41 that has been cut away. For example, if the projection of a spray only through an angle of approximately 90° of arc is required, the sleeve element 41 shown in Figures 7 and 8 may advantageously be employed. In this instance, it will be seen, the cylindrical section is 270° of arc, leaving a longitudinal notch or opening 47 that extends through 90° of arc. The flange 45 is of the same angle of arc, namely 270°, as the portion 43.

The sleeve element 41 of Figures 7 and 8 is shown in position in the sprinkler head assembly of Figures 4 and 5. The portions 43 of the sleeve 41, it will be seen, completely fills the annular space between the nozzle 11 and the stem 21, except for the region of the notch 47. This means that when water under pressure is admitted to the pipe 3, the nozzle, which will be raised to the Fig. 5 position by the pressure of the water, will pass water upwardly only in the region of the notch 47, and will discharge a spray of water only in the region of the notch 47 that would have been occupied by an extension of the flange 45, had it been present. This means that a spray of water over substantially 90° of arc will be directed out from the upper edge of the nozzle 1, between said upper edge and the under conical surface 25 of the head 23.

The long sleeve 41 heretofore mentioned apparently has a distinct guiding effect upon the water being sprayed. For example, if the sleeve 41 be made relatively short, it is found that the water passing through the notch 47 does not

have sufficient time to have its flow direction accurately aligned in the notch 47; hence, when it is sprayed out from under the head 23, its direction of spray is not necessarily limited to the angular extent of the notch 47. However, with a long sleeve 41, the direction of flow of the water is sufficiently corrected by the time it reaches the head 23, so that the spray is accurately maintained within the angular distance desired.

Figures 9 and 10 show an alternative sleeve element 41. In this particular case, the cylindrical section of the sleeve 41 is substantially 180° of arc, and the notch 47 is of like size. This means that the spray will be projected out from the head through 180° of arc.

Figures 11 and 12 show still another embodiment of the sleeve member 41, wherein the sleeve itself extends only through 90° of arc, providing for a spray extending through 270° of arc. While the cylindrical portion 43 of the sleeve 41 is now relatively much smaller than the notch itself, the shape and size of said sleeve still permit it accurately to be positioned in the nozzle 11, to be clamped by the head 23, and the accurate directional effect on the water is thus still produced.

Figures 13 and 14 show an embodiment of the invention wherein the sleeve 41 is essentially a complete cylinder, with a pair of milled notches 49 disposed at diametrically opposite points on its periphery. The notches 49 extend into the flange 45. With this embodiment in position in the sprinkler head assembly, water is projected in two diametrically opposite directions from the spray head, this being what is known in the trade as a "line" spray.

It will be apparent that other sleeve members 41 of other shapes (in respect of their degrees of arc) or, of other numbers and positions of notches 49 analogous to the two notches 49 of the Fig. 13 embodiment, may be provided with the scope of the invention.

A particular feature of the invention is the manner in which the base assembly, comprising all of the parts described except the sleeve 41, may be adapted, with the use of a set of different sleeves 41 as illustrated, for the spraying of substantially any type of lawn or the like. In prior sprinklers, a complete redesign of the spray head as a whole has been necessary in order to make it adapted for various shapes and types of sprays. In the case of the present invention, the cost of the sleeve elements 41 is so little that each sprinkler head can be supplied with a complete set, of the type shown, at relatively little cost, or a smaller total stock of heads and sleeve elements may be maintained. The user then needs only to select the sleeve corresponding to the particular spray that he desires, and then all he needs to do is to remove the stem 21 from the assembly, place the selected sleeve 41 in position, and replace the stem 21 in position, screwing it down tightly into the nozzle 11 in order firmly to clamp the sleeve element 41 in position. In order to facilitate this withdrawal and replacement of the stem 21, a screw-driver slot 51 is preferably provided in the top of head 23.

Once the head of the present invention is adjusted in position on the pipe 3, it will always deliver the spray at the desired location, because, by reason of the engagement of the ears 9 in the channel 7, no turning of the nozzle 11 relative to the body 1 is permitted.

In view of the above, it will be seen that the

several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

In a sprinkler head, the provision of a cylindrical nozzle, a stem mounted centrally in said nozzle, said stem having a conical head positioned over the edge of said nozzle, and a water-direct-

ing sleeve positioned between said stem and said nozzle, said sleeve having a flange clamped between the upper edge of said nozzle and the under surface of said conical head, said sleeve having a portion that is a section of a complete cylinder, 5 said portion being positioned between said stem and the inner wall of said nozzle and filling radially such space therebetween as it occupies by reason of its incomplete cylindrical shape, said portion being of the order of twice as long as its 10 maximum diameter.

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