

Aug. 7, 1951

L. AKER
SPRINKLER

2,563,300

Filed Sept. 8, 1948

2 Sheets-Sheet 1

Fig. 1

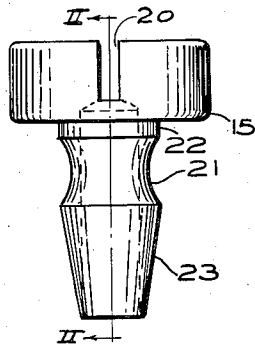


Fig. 2

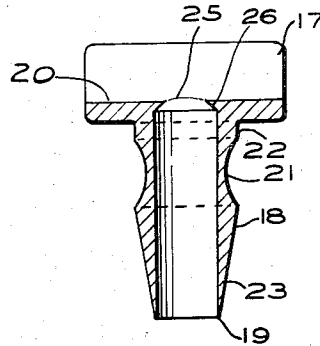


Fig. 3

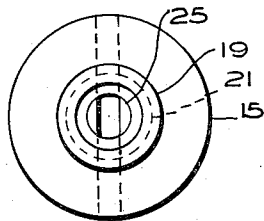


Fig. 4

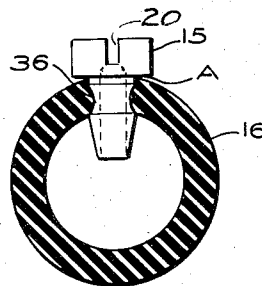


Fig. 5

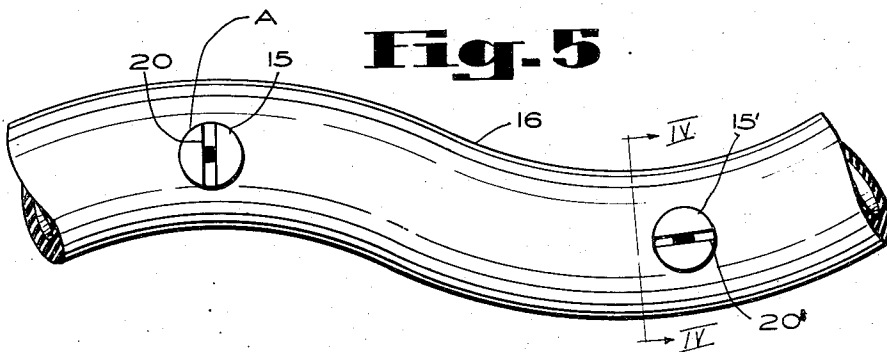
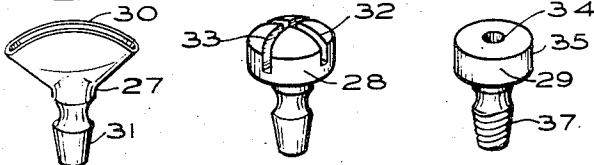


Fig. 6 Fig. 7 Fig. 8



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Fig. 9

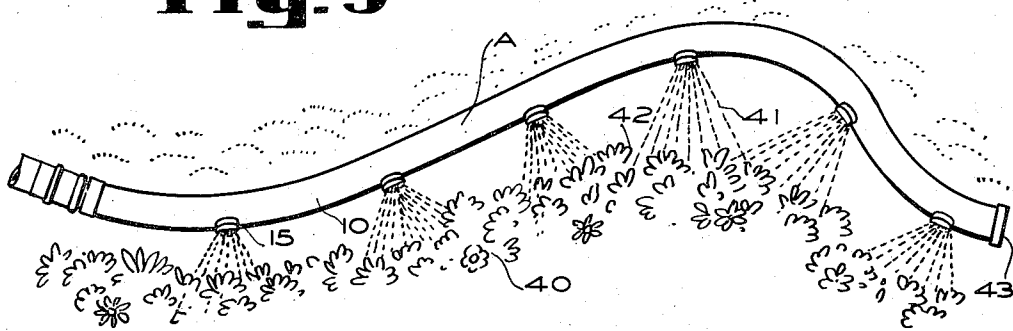


Fig. 10

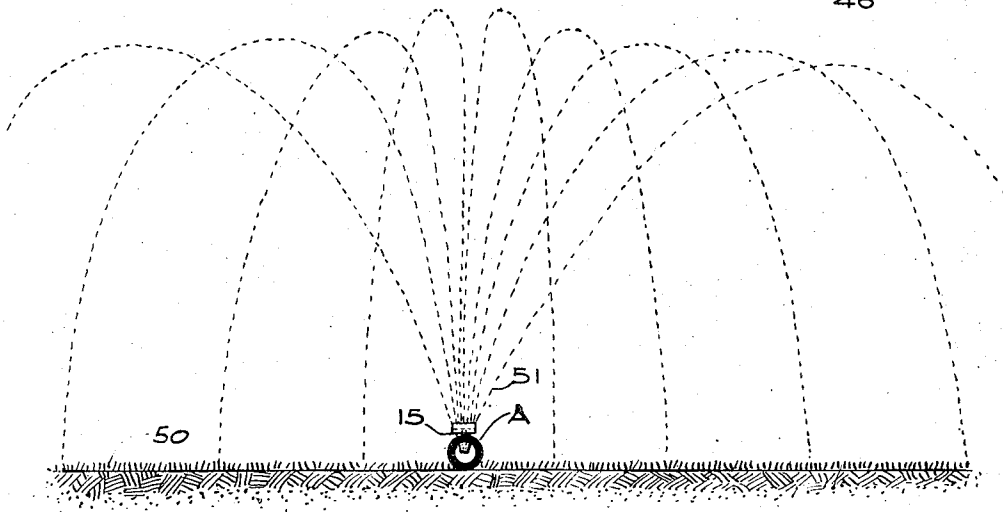
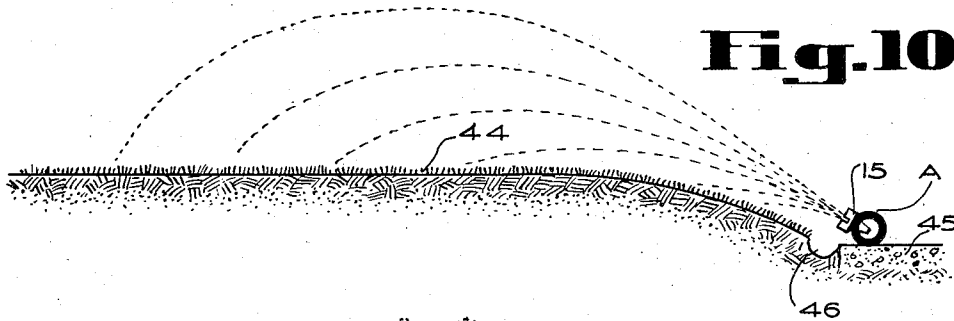


Fig. 11

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UNITED STATES PATENT OFFICE

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SPRINKLER

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6 Claims. (Cl. 299—104)

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The present invention relates to garden and lawn sprinklers, and has for an object, to provide a simplified and improved portable sprinkler of the multiple outlet type which offers a greater usefulness and flexibility of operation, all at a more economical cost.

Certain sprinklers of somewhat analogous characteristics heretofore used have a number of sprinkler outlets screwed or otherwise attached to lengths of metal pipe. Such pipes are rigid and cannot be bent around round, odd-shaped or undulating borders or flower beds, nor can they at the same time provide at any one pressure either a high or low spray.

It is therefore another object of the present invention to provide a portable multiple sprinkler that is entirely flexible and capable of being bent around any shape of border or flower bed, while also being adjusted axially, at any pressure, to provide either a high or low spray, the latter being preferred for flower beds.

Certain other sprinklers of the prior art are individual sprinkler units adapted to be interconnected by short garden hose sections, and so they are provided with the usual fittings for attachments at either end. The work and cost of preparing the individual hose sections, in addition to the comparatively high cost of the sprinkler units themselves, usually limits the number of outlets to a very few.

Still another object of the present invention is therefore to provide a multiple sprinkler at low cost, requiring a minimum of effort and skill for assembling, and having a large number of sprinkler outlet heads for effectively sprinkling a long strip of lawn, a flower-bed, or the like.

Another object of the present invention is to enable the gardener using the device to adjust the angle of the spray, as well as its direction, while the sprinkler heads are in full operation, without getting wet in making the desired spray adjustments.

Still another object of the present invention is to provide a sprinkler head that may be easily adjusted to spray either a long, narrow area, or a long, wide area with any intermediate width of spray, as desired, all without the necessity of using special tools.

A further object of the present invention is to provide a simple and inexpensive sprinkler head having its insertion edge fabricated substantially in the form of a hole punch, and thus it may be used to punch or cut its own holes in the hose comprising a part of the present invention. This feature, however, is merely incidental,

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as in most cases it may be desirable to use a separate hole cutter. As a novelty the said hole cutter may also be used as an end-plug for the hose section, which can serve in the first instance as a hole cutter.

Still another object of the present application is to provide a portable sprinkling system with which a square, oblong, or even rhomboid-shaped lawn may be sprayed up to and along its edges, thereby leaving no starved corners or wasteful overlapping circle areas.

It is a further object of the present invention to provide an inexpensive and readily installed underground sprinkler system. Any plastic or rubber hose or tubing that will not deteriorate rapidly when placed in the ground rather than on top may be used, leaving only the small sprinkler heads exposed.

Further objects of the present invention are to provide a construction of maximum simplicity, economy and ease of assembly and disassembly and such further objects, advantages and capabilities as will later appear and as are inherently possessed by the device and invention described.

The invention further resides in the combination, construction and arrangement illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment and variations thereof, it is to be understood that the same is capable of modification and change and comprehends other details, constructions and uses without departing from the spirit or scope of the appended claims.

Referring now to the drawings:

Figure 1 is an enlarged elevational view of a preferred form of the sprinkler head which forms a part of the present invention.

Figure 2 is a sectional view taken along the line II—II of Figure 1, showing the central outlet for the sprinkling liquid.

Figure 3 is a bottom plan view of the device of Figure 1, showing the restricted outlet in its upper end.

Figure 4 is a transverse sectional view taken along the line IV—IV of Figure 5, showing a sprinkler head inserted in a flexible tube or hose.

Figure 5 represents a sinuously curved section of the hose into which are inserted two sprinkler heads. It will be observed that each head has a spray slot turned at different angles so as to form either a flat or a wide spray.

Figure 6 is a perspective view representing a modified form of the device shown in Figure 1 and having a flattened nozzle.

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Figure 7 is still another modification of the device in Figure 1, having a double crossed slot particularly adapted for square spraying.

Figure 8 is a perspective view of still another modification of the device in Figure 1, showing a center opening adapted to emit a conventional circular spray of cone shaped form.

Figure 9 is a plan view showing the complete assembly laid along an irregularly curved flower bed with each sprinkler head adjusted for the low spraying of the plants.

Figure 10 is a diagrammatic representation of a vertical section of a grass lawn or street parkway being sprayed by the device of Figure 9 when adjusted to a low spraying position.

Figure 11 is a diagrammatic representation of a grass lawn being sprinkled by the device of Figure 9 when placed adjacent to its center, showing one sprinkler head of a number adjusted substantially vertically so as to spray a wide area.

Referring now again to the drawings, Figures 1 to 3, inclusive, represent to an enlarged scale a preferred form of the part of the present invention hereinafter referred to as the sprinkler head 15, and Figures 4 and 5 represent the complete assembled unit wherein one or more sprinkler heads 15 coact with a convenient length of hose 16 to form the sprinkler assembly A. The hose 16 preferably is formed of a flexible and resilient material, such as a natural or synthetic rubber compound.

Referring now more particularly to Figures 1, 2 and 3, there is shown a sprinkler head 15, which may be of suitable metallic or plastic material, and may be turned from round stock, die-cast, or otherwise formed so as to have a cap portion 17, and a hollow shank or stem 18. The cap portion 17 is preferably round, but may be of a hexagonal, square, or any other cross-sectional shape that may be desired.

A slot 20 is here shown cut diagonally across the diameter of the cap portion 17 to a predetermined depth and width, so as to produce a flat fan-shaped liquid spray of the type preferred herein. The slots 20 may also be cut in the cap portions 17 at an angle acute to the longitudinal axis of the stem 18, if desired.

The hollow, elongated and recessed stem 18 of the sprinkler head 15 is formed with a comparatively wide concave flute 21 close to the cap portion 17. A collar 22 preferably, though not necessarily, is interposed between the cap portion 17 and the concave flute 21 of the stem 18, and in some applications it may be desirable to extend the length of the collar 22 considerably beyond the length illustrated in the present drawings so as to provide an extended support column or pedestal for the cap portion 17. Immediately below flute 21 and extending to the extreme end of the stem 18 is formed a frusto-conical tapered end section 23. When the sprinkler head 15 is inserted into a small hole which is preferably, but not necessarily, formed in one side of the hose 16, the tapered section 23 expands the coacting sides of the resilient hose 16 so that they again contract around the flute 21, thereby effectively sealing the said hole while still permitting the easy removal and adjustment of the sprinkler head 15. It will be noted that the effectiveness of the seal between the fluted portion 21 of the stem 18 and the coacting resilient edge 36 of the hose 16 is enhanced as the fluid pressure within the hose 16 is increased. In some instances, it will be found that

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the effectiveness of the seal will be further improved by providing a more pronounced annular cusp or lip on the portion of the flute 21 which is immediately adjacent to the ridge formed by the juncture of the flute 21 with the tapered section 23.

The hollow, cylindrical portion 25 within the stem 18 terminates at slot 20 with an inwardly converging restriction 26 adapted to form a diffusing nozzle for the emerging liquid spray.

A sharp cutting edge 19 may, if desired, be formed at the termination of the tapered stem 18, so as to act as a hole cutter when the head 15 is inserted into the hose 16. It may be more convenient, however, to use a special hole cutter, which if desired may form part of the end-plug 43 that is used to close the end of the hose section 16.

In Figure 5 there is shown a sinuously curved section of hose 16 having two spaced apart sprinkler heads 15 and 15' inserted therein. It will be observed that the slot 20 in the sprinkler head 15 is adjusted, for the sake of illustration, to extend transversely across the longitudinal axis of the hose 16, and thus is oriented so as to direct the liquid spray to either side of the hose 16, whereas the slot 20' in sprinkler head 15' is illustrated as being turned in the axial direction of hose 16 so as to direct the spray axially thereof. In actual use, however, it is probable that all heads have their slots 20 disposed at similar angular positions, which obviously may be disposed at any angle from transverse to axial.

In Figure 6 there is shown a modified form of the sprinkler head 27 in which the cap portion 17 shown in Figures 1 to 5, inclusive, has been flattened to form a fan shaped nozzle 30 having a tapered stem 31 similar to stem 18 in Figures 1 to 4, inclusive. Such a nozzle 27 may be fashioned from a section of cylindrical tubing, if desired, instead of being fabricated from round stock.

In Figure 7 there is shown another modified form of sprinkler head 28 having the double slots 32 and 33 disposed substantially at right angles to each other; and in Figure 8 there is shown still another modified form of the sprinkler head 29 having a round opening 34 in its head portion 35 and also having in the stem portion 36 thereof a threaded taper 37 adapted to be inserted within a hose 16 composed of relatively rigid non-resilient material such as plastic.

Operation

It will be understood that in operation the garden sprinkler combination hereinbefore described is particularly adapted to water flower beds, especially those beds having round or odd-shaped contours of the type illustrated in Figure 9, wherein such a flower bed 40, as viewed from directly overhead, is being watered by the device A shown in Figures 4 and 5 of the drawings. As will also be observed in Figure 9, the sprinkler heads 15 in hose 16 are directed angularly away from the perpendicular plane, while at the same time the slots 20 in the sprinkler heads 15 are turned in the axial direction of the hose 16. This orientation of the slots 20 directs a water spray 41 underneath the foliage of the plants 42 on flower-bed 40 without wetting the flowers themselves. At the closed end of the hose 16, there is shown an end-plug 43 of the type referred to earlier herein, but which is not part of the present invention. Although the individual heads 15 preferably are disposed in

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an aligned relation along the hose 16, they may be inserted therein to form several rows or a staggered pattern, if desired.

Figure 10 diagrammatically illustrates how the edge of a lawn 44 or street parkway adjacent to a sidewalk 45 may be watered without sprinkling pedestrians thereon. In this instance the sprinkler heads 15 are in the identical angular position with relation to the ground, as is best shown in Figure 9, wherein the hose 16 may be laid either in the trough 46 or straight along the edge of the lawn 44 or sidewalk 45. It has been demonstrated that lengths of the parkways up to and over fifty feet may effectively be watered by this device in one operation with the sprinkler heads 15 spaced at convenient intervals, such as two feet.

Another method of sprinkling a lawn, using the device of the present invention, is illustrated in Figure 11 wherein there is shown a diagrammatical representation of a lawn 50 upon which is stretched across its approximate middle the sprinkler combination A described herein. It should be observed that in this instance the slots 20 in the sprinkler heads 15 are turned transversely to the axis of the hose 16, so that the sprinkler heads 15 emit a wide spray 51 directed towards the outer edge of the lawn. The length of the hose section 16 may be the full length of the lawn, and as the particular sprinkler heads 15 which are positioned at each end of the hose 16 emit a flattened but wide spray, it will be understood that a rectangular area is readily wetted thereby in contrast to the circular areas covered by sprinklers of conventional design which frequently waste the water distributed in the circular areas extending beyond the borders of the rectangular lawn.

It should also be noted that the device A referred to herein may readily be partially submerged in a shallow trench 46, such as is illustrated in Figure 10, so as to form a spray distributing system which is substantially submerged underground. The hose 16 employed in such a system preferably is of a synthetic rubber or rubberlike resilient compound which does not deteriorate rapidly upon prolonged contact with soil in the presence of moisture. The hose 16 may be substantially covered with soil if desired, provided only that the head portions 17 extend sufficiently above the surface of the soil so that they can discharge and distribute the fluid spray as desired. In such instances the orientation of the head portions 17 may be readily changed and adjusted by the operator, but if the installation is to be of a permanent or semi-permanent nature, the tubing or hose 16 preferably is retained within the shallow trench 46 by suitable retaining means such as stakes, looped lengths of wire having the free ends thereof driven into the ground, or by other similar clamping devices of conventional design.

Many other uses and combinations of adjustments are possible and are contemplated, but it suffices to here illustrate the most common uses the device may be put to. While there has been shown and described herein certain specific forms of the instant invention, it will be understood that slight modifications and changes in the form or arrangement of parts hereinbefore set forth may be made without departing from the spirit or scope of the instant invention.

What is claimed is:

1. A nozzle adapted to be inserted through an opening in the wall of a flexible hose, compris-

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ing a tubular body having a longitudinal axis and a passage extending therethrough along said axis, said body having a lower tapered end portion tapering toward the lower end of the body adapted to project beyond the inner wall of such hose, an upper head portion having a transverse slot communicating with said axial passage and an intermediate annular recessed portion adapted to seat and be rotatably retained in an opening formed in the wall of a flexible hose without cement or vulcanization.

2. A nozzle adapted to be inserted through an opening in the wall of a flexible hose, comprising a tubular body having a longitudinal axis and a passage extending therethrough along said axis, said body having a lower tapered end portion tapering toward the lower end of the body and adapted to extend beyond the inner wall of such hose, an upper, enlarged head portion having a transverse groove communicating with said passage, and an intermediate, annular recessed portion adapted to seat and be rotatably retained in an opening in the wall of a flexible hose without cement or vulcanization.

3. A nozzle adapted to be inserted through an opening in the wall of a flexible hose, comprising a tubular body having a longitudinal axis and a passage extending therethrough along said axis, said body having a lower tapered end portion tapering toward the lower end of the body and adapted to project beyond the inner wall of such hose, an upper, enlarged head portion, and an intermediate, annular recessed portion adapted to seat for rotatable non-leak retention in an opening in the wall of a flexible hose, said head portion being slotted transversely to provide a slot intersecting said passage.

4. A hose structure of the character described, comprising a flexible hose and a plurality of readily insertable and removable sprinkler heads, each said sprinkler head being seated and rotatably retained in holes in spaced longitudinal relation in said hose and comprising a tubular body defining an axial passage and having an inner end extending beyond the inner wall of the hose and an outer end outside the hose, said body being tapered at its inner end for ease of insertion, having an enlarged head at its outer end and being formed with an annular recess intermediate said ends for seating in said hole.

5. A hose structure of the character described, comprising a flexible hose and a plurality of readily insertable and removable sprinkler heads, each said sprinkler head being seated in holes spaced longitudinally in said hose and comprising a tubular body defining an axial passage and having an inner end extending beyond the inner wall of the hose and an outer end extending beyond the outer end of the hose, said body being tapered at its inner end for ease of insertion, having an enlarged head at its outer end and being formed with an annular recess intermediate said ends for seating and rotatably retaining said heads in said hole, said head portion being slotted transversely to provide a slot intersecting said passage.

6. A hose structure of the character described, comprising a flexible hose and a plurality of readily insertable and removable sprinkler heads, each said sprinkler head being seated in holes spaced longitudinally along said hose and comprising a tubular body defining an axial passage and having an inner end within the hose and an outer end outside the hose, said body being tapered at its inner end for ease of insertion and

to extend beyond the inner wall of said hose, having an enlarged head at its outer end and being formed with an annular recess intermediate said ends for seating in said hole, said head portion extending beyond the outer wall of said hose and having a diameter substantially greater than the other portions, with an external transverse slot communicating with said passage.

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