April 10, 1962 G. E. DEY, SR 3,029,030

SPRINKLER HEAD FOR EMITTING SQUARE PATTERN SPRAY

Filed March 30, 1960

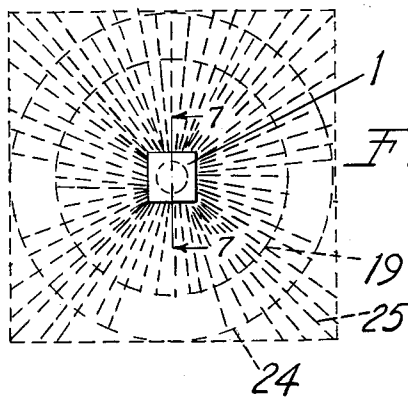


Fig 1

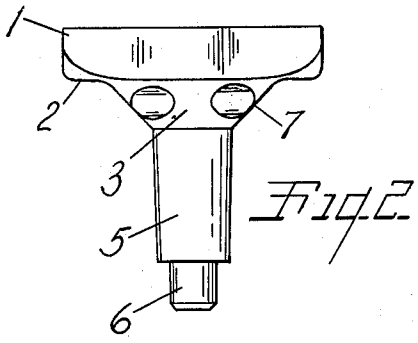


Fig 2

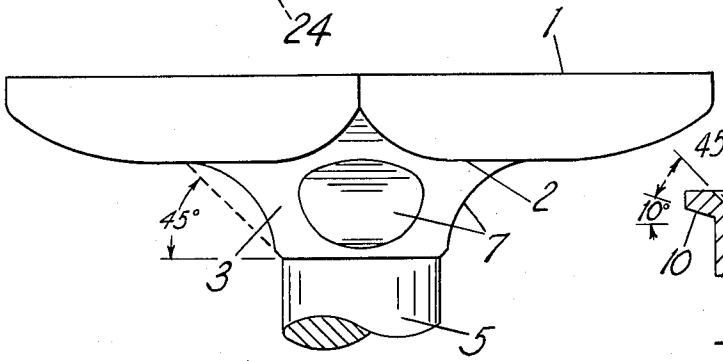


Fig 6

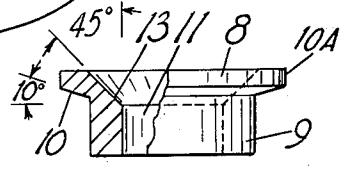


Fig 3

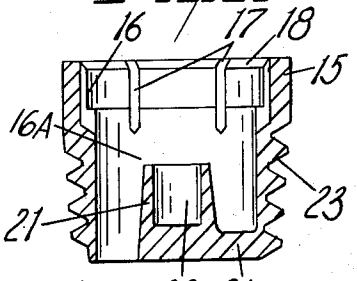


Fig 4

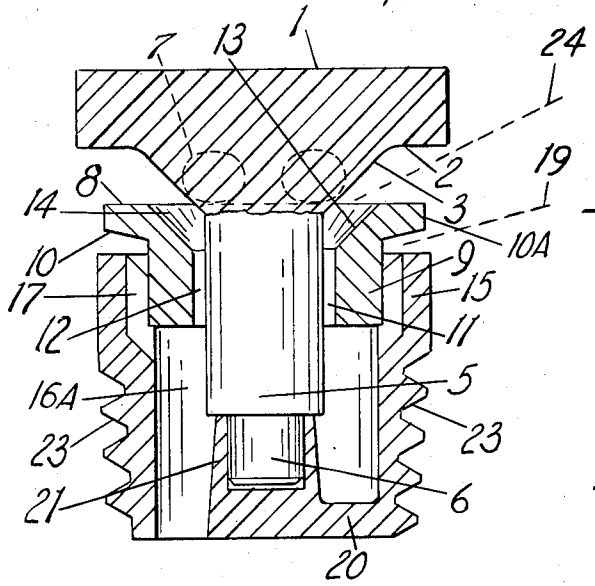


Fig 7

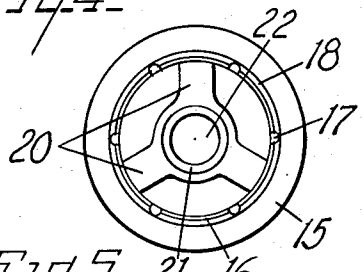


Fig 5

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SPRINKLER HEAD FOR EMITTING SQUARE PATTERN SPRAY

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This invention relates to improvements in sprinkler head for emitting square pattern spray. The principal objects of this invention are:

First, to provide a sprinkler head attachable to either a fixed or movable water distribution pipe for emitting a square pattern spray so that the sprinkler can effectively sprinkle lawns in rectangular areas defined by walks and drives without wetting the walks and drives and so that a series of the sprinkler heads can uniformly cover all of a lawn area.

Second, to provide a square pattern sprinkler head which is relatively simple and inexpensive to manufacture and which is easily attached to a water supply pipe.

Third, to provide a square pattern sprinkler head which creates and emits two concentric spray patterns with one pattern covering a circular area and another pattern covering radially extending triangular areas at rectangularly spaced positions around the circular area to complete a rectangular pattern for the spray head as a whole.

Fourth, to provide a novel form of rectangular baffle or splash plate with a compound concavo-convex undersurface which will intersect and deflect a cylindrical stream of water into a rectangular spray pattern.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there is one sheet, illustrate a highly practical form of the sprinkler head.

FIG. 1 is a small plan view of the sprinkler head illustrating conventionally the square pattern of the spray emitted thereby.

FIG. 2 is a side elevational view of the central baffle plate and its supporting stem.

FIG. 3 is a side elevational view partially broken away in cross section of the bushing and intermediate deflector which receives and cooperates with the baffle plate shown in FIG. 2.

FIG. 4 is a cross sectional view through the supporting ferrule or body which receives and supports the bushing and the baffle plate of FIGS. 2 and 3 and by means of which the sprinkler head as a whole is attached to a supply pipe.

FIG. 5 is a plan view of the body shown in FIG. 4.

FIG. 6 is a fragmentary enlarged elevational view of the baffle plate shown in FIG. 2 as viewed from one corner of the rectangular baffle plate.

FIG. 7 is a fragmentary enlarged cross sectional view through the assembled spray head taken along the plane of the line 7—7 in FIG. 1.

The rectangular baffle plate **1** of the spray head as shown in FIGS. 1, 2 and 6 has four merging downwardly concave surfaces **2** which meet at the corners of the baffle plate. The central area of the underside of the baffle plate merges with a downwardly projecting and converging conical base **3** inclined at 45° from the axis of the base and merging at its lower end with a tapering stem **5**. The lower end of the stem **5** carries a short cylindrical pin **6** which supports the stem, base and baffle plate as will be described presently.

The side surfaces of the conical base **3** are cut away along semi-cylindrical concave surfaces arranged perpendicularly to the diagonals of the square baffle plate **1**. The intersection of these semi-cylindrical surfaces

with the conical surface of the base **3** appear as ellipses at **7** in FIG. 2 and as arcs at the sides of the FIG. 6.

The bushing **8** appearing in FIGS. 3 and 7 has a circular outline with a depending cylindrical neck **9** and an upwardly and outwardly inclined undersurface **10** on the flange **10***a* projecting radially outwardly from the neck **9**. The surface **10** is inclined to the order of 10° from the horizontal. Interiorly the bushing **8** defines a central bore **11** which is sized somewhat larger than the stem **5** of the baffle plate to freely receive the stem and define an annular flow passage **12** therearound as is shown in FIG. 7. An outwardly inclined and upwardly divergent conical surface **13** at the upper end of the central bore **11** is opposed to the inclined surface of the base **3** of the baffle plate to provide a narrow throat **14** with parallel sides inclined at 45° from the horizontal.

The bushing **8** is received in the ferrule or body **15** which is provided with a central cylindrical bore **16** sized to receive the cylindrical neck **9** of the ferrule as a permanent press fit. Axially inwardly, or downwardly, from the bore **16** as viewed in FIGS. 4 and 7 the bore **15** defines a central passage **16A**. The bore **16** constitutes an upwardly opening passage extending above the lower central passage **16A**. A plurality of equal angular spaced vertical grooves **17** formed in the surface of the bore **16** afford uniform flow of water from within the body **15** around the neck **9** of the ferrule to the inclined surface **10**. The upper end of the body **15** is cut away or beveled along the inner edge of the bore **16** as at **18** to permit water emerging through the slots **17** to spread substantially uniformly around the inclined surface **10** and be ejected therealong in a generally circular pattern as indicated by the dotted lines at **19** in FIGS. 1 and 7.

At its lower end the body or ferrule **15** is provided with integral spider arms **20** supporting a central boss **21** with a bore or recess **22** therein which receives and supports the pin **6** on the lower end of the stem of baffle plate **1**. Engagement of the stem of the baffle plate with the boss **21** in the body determines the proper axial positioning of the baffle plate **1** with respect to the surrounding bushing **8**. Water enters the body **15** through the openings between the spider arms **20** for delivery and diversion into separate streams alongside of the stem **5** of the baffle plate and through the several grooves **17** in the body to the annular inclined surface **10** on the bushing **8**. The exterior of the ferrule of body **15** is threaded as at **23** for attachment to any suitable internal thread in a water supply pipe or conduit.

As appears most clearly from FIGS. 1 and 7 the stream of water delivered through the grooves **17** is deflected into the generally circular pattern **19** and discharged at a relatively flat angle as has already been described. The annular stream of water directed through the passage **12** between the stem of the baffle plate and the inner bore **11** of the bushing is first deflected and projected outwardly through the inclined throat **14** at a substantially higher angle of 45° as indicated by the dotted lines at **24** in FIGS. 1 and 7. Part of these projecting spray elements **24** deliver to a larger circular area than the inner area **19** by striking against the downwardly convex under surfaces **2** on the baffle plate. The rest of the spray or stream developed along the conical base **3** is deflected outwardly where it travels across the semi-cylindrical surfaces **7** underneath the corners of the baffle plate **1** thereby developing four rectangularly arranged streams or sprays indicated by the dotted lines **25** which project upwardly and therefore radially outwardly somewhat further than the other radially projecting spray lines to fill in and complete the rectangular overall spray pattern of the spray head. It will thus be seen that the three piece head structure is easily assembled and attached to a supply pipe to provide

the rectangular spray pattern and the other objects set forth at the beginning of this description.

What is claimed as new is:

1. A spray head comprising a tubular body attachable at its lower end to a supply pipe and having a central passage formed therethrough with axially extending grooves spaced angularly around the upper end of the passage, a spider positioned in the lower end of the said passage and supporting a recessed boss in the center thereof, an annular bushing received in retained engagement within the upper end of said passage and terminating above the inner ends of said grooves, an outwardly projecting flange on said bushing overlying the upper ends of said grooves and inclined upwardly on its underside at a relatively small angle of approximately 10°, the upper end of said body being beveled along the upper ends of said grooves, said bushing defining a second passage opening from said first passage in said body and having an upwardly and outwardly inclined upper surface disposed at a relatively large angle of approximately 45° from the horizontal, a rectangular baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage, a pin on the lower end of said stem received in and supported by said boss, and downwardly convex surfaces formed along the underside of said baffle plate along each side of said plate and merging at the corners of said baffle plate in overhanging relation to said bushing, the sides of said conical base being cut away along downwardly concave semi-cylindrical surfaces disposed about axes perpendicular to diagonals of said rectangular baffle plate and spaced therebelow.

2. A spray head comprising a tubular body attachable at its lower end to a supply pipe and having a central passage formed therethrough with axially extending grooves spaced angularly around the upper end of the passage, a spider positioned in the lower end of the said passage and supporting a recessed boss in the center thereof, an annular bushing received in retained engagement within the upper end of said passage and terminating above the inner ends of said grooves, an outwardly projecting flange on said bushing overlying the upper ends of said grooves and inclined upwardly on its underside at a relatively small angle, the upper end of said body being beveled along the upper ends of said grooves, said bushing defining a second passage opening from said first passage in said body and having an upwardly and outwardly inclined upper surface disposed at a relatively large angle from the horizontal, a rectangular baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage, a pin on the lower end of said stem received in and supported by said boss, and downwardly convex surfaces formed along the underside of said baffle plate along each side of said plate and merging at the corners of said baffle plate in overhanging relation to said bushing, the side of said conical base being cut away along downwardly concave semi-cylindrical surfaces disposed about axes perpendicular to diagonals of said rectangular baffle plate and spaced therebelow.

3. A spray head comprising a tubular body attachable at its lower end to a supply pipe and having an upwardly opening passage formed therein with axially extending grooves spaced angularly around the upper end of the passage, means forming a recess in the lower end of the said passage, an annular bushing received in retained engagement within the upper end of said passage and terminating above the inner ends of said grooves, an outwardly projecting flange on said bushing overlying the upper ends of said grooves and inclined upwardly on its underside at a relatively small angle, the upper end of said body being beveled along the upper ends of said grooves, said bushing defining a second passage opening from said first central passage in said body and having an upwardly and outwardly inclined upper surface disposed at a relatively large angle from the horizontal, a rectangular baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage, a pin on the lower end of said stem received in and supported by the walls of said recess, and downwardly facing convexly curved surfaces formed along the underside of said baffle plate alongside of said conical base and merging at the corners of said baffle plate in overhanging relation to said bushing, the sides of said conical base being cut away along downwardly concave semi-cylindrical surfaces disposed about axes transverse to diagonals of said rectangular baffle plate and spaced therebelow.

4. A spray head comprising a tubular body attachable at its lower end to a suply pipe and having an upwardly opening passage therein, means forming a recess formed in the lower end of the said passage, an annular bushing received in retained engagement within the upper end of said passage, said bushing and said body forming axially extending angularly spaced passages opening to said central passage, an outwardly projecting flange on said bushing overlying the upper ends of said axially extending passages and inclined upwardly on its underside at a relatively small angle, said bushing defining a second passage opening from said first passage in said body and having an upwardly and outwardly inclined upper surface disposed at a relatively large angle from the horizontal, a rectangular baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage, a pin on the lower end of said stem received in and supported by the walls of said recess, and downwardly facing surfaces formed along the underside of said baffle plate alongside of said conical base in overhanging relation to said bushing, the sides of said conical base being cut away along downwardly concave semi-cylindrical surfaces disposed about axes transverse to diagonals of said rectangular baffle plate and spaced therebelow.

5. A spray head comprising a tubular body attachable at its lower end to a supply pipe and having an upwardly opening central passage formed therein, an annular bushing received in retained engagement within the upper end of said passage, said bushing and said body forming angularly spaced passages from within said central passage to the end of said body, an outwardly projecting flange on said bushing overlying the upper ends of said angularly spaced passages and inclined upwardly on its underside at a relatively small angle, the upper end of said body being beveled along the upper ends of said spaced passages, said bushing defining a second passage opening from said first central passage in said body and having an upwardly and outwardly inclined upper surface disposed at a relatively large angle from the horizontal, a baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage and supported in said body, and downwardly facing convexly curved surfaces formed along the underside of said baffle plate alongside of said conical base and merging at a corner of said baffle plate in overhanging relation to said bushing, the side of said conical base being cut away along a downwardly concave semi-cylindrical surface disposed about an axis transverse to a diagonal of said baffle plate extended to said corner and spaced therebelow.

6. A spray head comprising a tubular body attachable at its lower end to a supply pipe and having an upwardly opening central passage formed therein, an annular bushing received in retained engagement within the upper end of said passage, said bushing and said body forming angularly spaced passages from within said central passage to the end of said body, an outwardly projecting flange on said bushing overlying the upper ends of said angularly spaced passages and inclined upwardly on its underside at a relatively small angle, said bushing defining a second

passage opening from said first central passage in said body, a baffle plate having a depending central conical base with a stem depending further therefrom and positioned in spaced relationship from the wall of said second passage and supported in said body, and downwardly facing convexly curved surfaces formed along the underside of said baffle plate alongside of said conical base and merging at a corner of said baffle plate in overhanging relation to said bushing, the side of said conical base being cut away along a downwardly concave semi-cylindrical surface disposed about an axis transverse to a diagonal of said baffle plate extended to said corner and spaced therebelow.

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