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3,272,436

SPRINKLER HEAD

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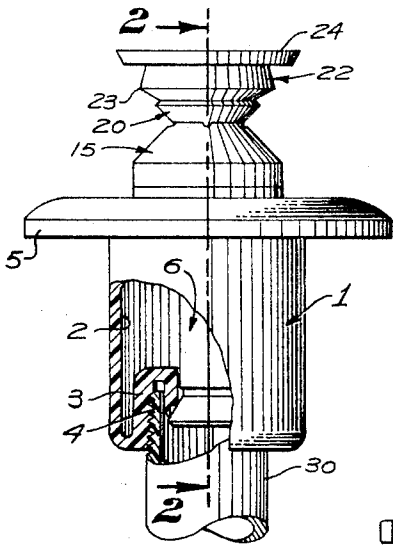


FIG. 1

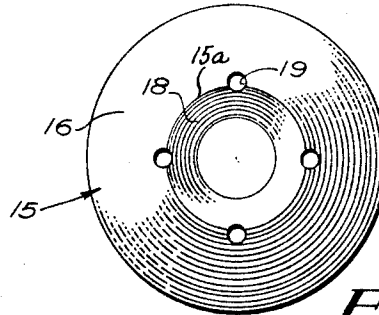


FIG. 3

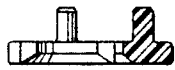


FIG. 5

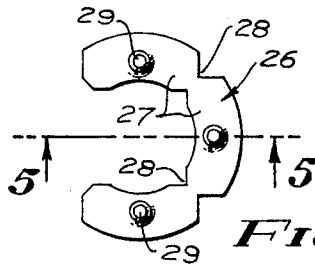


FIG. 4

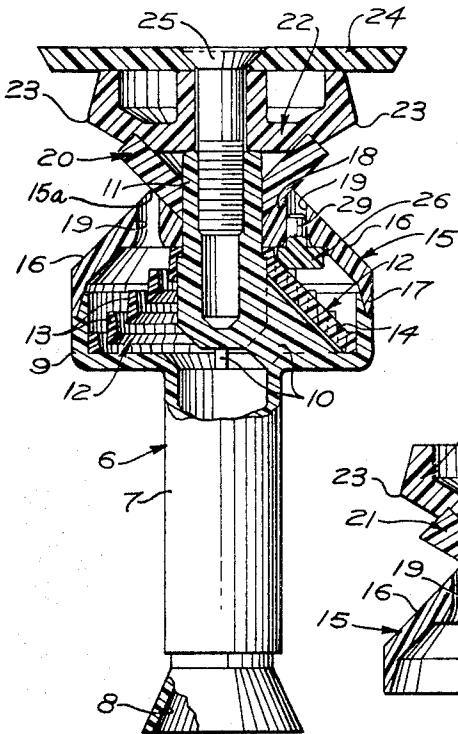


FIG. 2

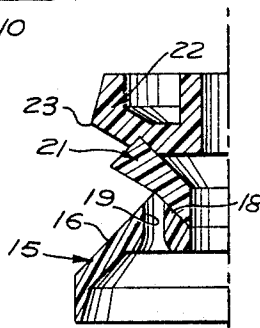


FIG. 8

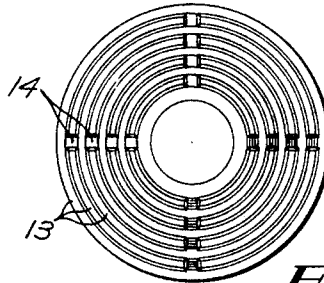


FIG. 6

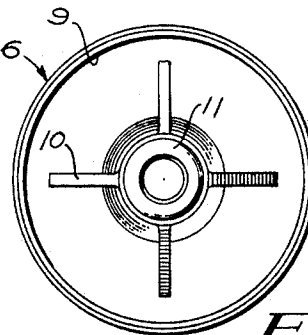


FIG. 7

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**SPRINKLER HEAD**

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This invention relates to sprinkler heads, more particularly to sprinkler heads of the pop-up, non-rotating type. Included in the objects of this invention are:

First, to provide a sprinkler head of this type which is normally a full circle sprinkler, but which may be readily converted to a quarter circle, half circle, or three-quarter circle sprinkler as installation requirement dictate.

Second, to provide a sprinkler head of this type having four sprinkler jets, one for each quadrant, and a readily inserted means to inactivate selected sprinkler jets, and whereby, in order to orient the sprinkler jets with respect to the area to be covered, does not require an adjustment of more than a quarter turn of the sprinkler head on its riser pipe.

Third, to provide a sprinkler head wherein the component parts are uniquely suited for manufacture from injection molded plastic parts capable of being readily assembled and held together by a single screw.

Fourth, to provide a sprinkler head of this type which incorporates a novel strainer disposed ahead of the sprinkler orifices.

With the above and other objects in view as may appear hereinafter, reference is directed to the accompanying drawings in which:

FIGURE 1 is a side view of the sprinkler head shown in its extended position having a portion broken away in section;

FIGURE 2 is an enlarged partial sectional partial side view of the sprinkler head assembly removed from its housing;

FIGURE 3 is a top view of the sprinkler jet cone;

FIGURE 4 is a top view of the sprinkler jet plug;

FIGURE 5 is a sectional view thereof taken through 5-5 of FIGURE 4;

FIGURE 6 is a top view of the strainer;

FIGURE 7 is a top view of the base member;

FIGURE 8 is a fragmentary view corresponding to FIGURE 2 and showing a modified form of the distributor or deflector cone.

The sprinkler head includes a housing 1 having a cylindrical portion 2 open at its upper end. The cylindrical portion is provided with a re-entrant lower end 3 which is internally screw-threaded. Extending downward and axially into the re-entrant lower end 3 is an annular sealing lip 4. The upper end of the housing is provided with a radial flange 5.

Slidably mounted in the housing 1 is a base member 6 which includes a stem 7 adapted to extend through the annular lip 4. The stem 7 is provided with a flared entrance end 8 adapted to engage the annular lip 4. The entrance end 8 is flared after insertion of the stem through the lip 4 so that the stem is permanently retained with respect to the housing 1.

The upper end of the base member is provided with the radially enlarged shallow cup 9. The cup has a flat bottom from which extends radial webs 10 which support a central post 11 disposed in coaxial relation with the stem 7. The post is spaced from the stem so that water may flow upwardly through the stem and between the webs 10 into the cup 9.

Fitted within the cup 9 is a conical strainer 12 comprising a plurality of concentric strainer rings 13 is connected with radiating webs 14.

Fitted over the cup 9 is a sprinkler jet cone or cover

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member 15 including a conical outer surface 16 terminating in an annular lip 17 which fits over the upper end of the cup 9 and forms a sealed connection therewith. The sprinkler jet cone 15 is provided with a central opening so that the cone 15 fits slidably over the central post 11. The upper portion of the bore is flared outwardly to form a conical recess 18 surrounding the central post 11. The cone 15 is provided with a set of four upwardly extending sprinkler orifices 19 which intersect the circle or annular rim 15a defined by the conical outer surface 16 and the conical recess 18.

The conical recess 18 receives a spray distributor or deflector 20 in the form of an inverted cone so as to provide upwardly diverging conical surfaces overlying the discharge ends of the sprinkler orifices 19.

In order to provide different types of spray patterns, distributors or deflectors of various shapes may be substituted for the deflector 20. For example, as shown in FIGURE 8, an alternative or modified deflector 21 is illustrated wherein the conical outer surface slopes at a different angle than the distributor 20.

Mounted on the distributor 20 or 21 is a spacer ring 22 having an annular notch in its under surface which mates with the upper extremity of the distributor. Radially outward of the distributor the under surface of the spacer ring slopes upwardly at an angle to avoid interference with the spray pattern, or, alternatively, its peripheral portion 23 may be positioned for engagement with the spray stream so as to modify its pattern.

The spacer ring 22 supports a disc cover 24 dimensioned to close the open upper end of the housing 1 when the sprinkler is in its retracted position. The cover disc or cap 24 is provided with a central beveled aperture which receives the head of a screw 25 adapted to screw thread into a socket provided in the central post 11. The single screw 25 secures the various parts of the sprinkler head together.

The sprinkler as described functions as a full circle sprinkler. Each sprinkler orifice and the cooperating portion of the distributor 20 causes the resulting spray to cover a quadrant of the circle. It is highly desirable, however, that the sprinkler be capable of modification so as to cover a quarter circle, a half circle or three-quarters of a circle. This is accomplished by the plug member 26 shown particularly in FIGURES 2, 4 and 5. The plug member comprises a partial plate of three segments 27 joined by fracture notches 28. Each segment is provided with a plug boss 29. The segments 27 are dimensioned so as to be held between the upper portion of the strainer 12 and the under side of the sprinkler jet cone 15 below the orifices 19 and the plug bosses 29 are adapted to enter and seal selected orifices.

If the plug member as shown in FIGURE 4 is employed, then three of the four orifices are closed so that the sprinkler functions as a quarter circle sprinkler. As any three of the four orifices may be closed the direction of the quarter circle spray may be in any of the four directions. Inasmuch as the sprinkler head is screw threaded onto a riser 30 the sprinkler head need be turned a maximum of only 90°, in order to be oriented in the desired direction. If it is desired to sprinkle a half circle or three-quarter circle, then one of the segments is broken off. The two remaining segments are used to provide a half circle spray, whereas a single segment is utilized to provide a three-quarter spray.

It will be observed that the parts of the sprinkler head may be readily formed of plastic material and that, in particular, the distributor 20 or 21 and the plug member 26 are inherently inexpensive. Thus by furnishing the plug member 26 and a pair or more of the distributors, a single sprinkler head may be readily and quickly modified to meet a wide variety of conditions. This is

of substantial importance for it greatly reduces the inventory requirements.

Particular attention is called to the specific relationship of the sprinkler orifices 19 and the distributor 20 or 21. It is found that by locating the discharge end of the sprinkler orifice so that a portion actually intersects the distributor cone then flows along the surface thereof and further by causing the radially outward portion of the jet stream to impinge on the radially inner portion of the jet stream as it flows on the surface of the cone. The distribution over a quarter circle is quite uniform so that the spray from the four jet orifices complement each other and insure uniform distribution. If desired, of course, an additional number of ports may be provided.

It will also be noted that the conical strainer 12 has a relatively large straining area compared to the overall dimensions of the sprinkler head. More particularly, the spacing between the entrance ends of the concentric rings form the narrowest portions of the strainer openings, thus minimizing the wedging of sand between the strainer rings. As a consequence, even though a large number of particles too large to pass through the strainer may collect under the strainer the interstices between such large particles provide, accumulatively, ample area for flow of water. Thus the strainer while preventing clogging of the sprinkler orifices does not itself create an excessive pressure drop even under adverse conditions.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed is:

1. A sprinkler head, comprising:

- (a) a hollow member having a water inlet, and including an upper wall having externally, radially inner and radially outer conical surfaces converging upwardly and intersecting to form an annular rim, and a set of at least four upwardly directed equally spaced discharge ports intersecting said annular rim;
- (b) a deflector having a conical surface fitting said radially inner conical surface and continuing upwardly and outwardly beyond said rim to deflect in complementary arcs water issuing from said ports;
- (c) a segmental element within said hollow member including plugs inserted in selected ports thereby to restrict water discharge to selected arcs;
- (d) and a strainer within said hollow member including means for supporting said segmental element contiguous to said selected ports.

2. A sprinkler head, comprising:

- (a) a cylindrical housing open at its upper end and having a restricted inlet at its lower end;
- (b) a tubular stem slidable in said inlet, between a retracted and an extended position, and sealingly engaging said inlet when in its extended position to form a continuation of said inlet;
- (c) an enlarged hollow member joined to the upper end of said stem and guided by said housing;
- (d) said hollow member including an upper wall having externally, radially inner and radially outer conical surfaces converging upwardly and intersecting to form an annular rim, and at least one upwardly directed discharge port intersecting said annular rim;
- (e) and a deflector having a conical surface fitting said radially inner conical surface and continuing upwardly and outwardly beyond said rim to deflect in complementary arcs water issuing from said ports.

3. A sprinkler head, comprising:

- (a) a cylindrical housing open at its upper end and having a restricted inlet at its lower end;
- (b) a tubular stem slidable in said inlet, between a retracted and an extended position, and sealingly engaging said inlet when in its extended position to form a continuation of said inlet;
- (c) an enlarged hollow member joined to the upper end of said stem and guided by said housing;
- (d) said hollow member including an upper wall having externally, radially inner and radially outer conical surfaces converging upwardly and intersecting to form an annular rim, and a set of at least four upwardly directed equally spaced discharge ports intersecting said annular rim;
- (e) a deflector having a conical surface fitting said radially inner conical surface and continuing upwardly beyond said rim to deflect in complementary arcs water issuing from said ports;
- (f) and removable means within said hollow member for closing selected discharge ports, thereby to restrict water discharge to selected arcs.

4. A sprinkler head, comprising:

- (a) a cylindrical housing open at its upper end and having a restricted inlet at its lower end;
- (b) a base member including a tubular stem slidable in said inlet between a retracted and an extended position, and sealingly engaging said inlet when in its extended position to form a continuation of said inlet, an enlarged cup-shaped upper end guided in said housing, and a central upwardly directed post;
- (c) a cover member surrounding said post and closing said base member to form a hollow chamber, said cover member having externally, radially inner and radially outer conical surfaces converging upwardly and intersecting to form an annular rim, and a set of at least four upwardly directed equally spaced discharge ports intersecting said annular rim;
- (d) a deflector fitted on said post and having a conical face conforming to the radially inner conical surface of said cover member and continuing upwardly and outwardly beyond said rim to deflect in complementary arcs water issuing from said ports;
- (e) and a cap mounted on said post retaining said deflector thereon, and clearing the spray from said ports, said cap dimensioned to close said housing when said base member is retracted.

5. A sprinkler head, comprising:

- (a) a hollow member including a water inlet at its lower side and an upper wall, said wall having a ring of upwardly directed discharge ports;
- (b) a deflector joined to said upper wall contiguous to said discharge ports, said deflector having an under surface diverging upwardly to deflect water upwardly and outwardly from said discharge ports;
- (c) and an initially single piece partial plate underlying said ring of ports and closing all but one of said ports, said plate being notched to form a series of separable segments corresponding to the overlying ports whereby selected segments may be broken off from the plate when it is desired to activate selected ports.

6. A sprinkler head, comprising:

- (a) a cylindrical housing open at its upper end and having a restricted inlet at its lower end;
- (b) a tubular stem slidable in said inlet, between a retracted and an extended position, and sealingly engaging said inlet when in its extended position to form a continuation of said inlet;
- (c) an enlarged hollow member joined to the upper end of said stem and guided by said housing, said hollow member including an upper wall having a ring of upwardly directed discharge ports;
- (d) and a deflector joined to said upper wall contiguous

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ous to said ring of discharge ports, said deflector having an under surface diverging upwardly to deflect water upwardly and outwardly from said discharge ports.

7. A sprinkler head, comprising: 5
- (a) a cylindrical housing open at its upper end and having a restricted inlet at its lower end;
- (b) a tubular stem slidable in said inlet, between a retracted and an extended position, and sealingly engaging said inlet when in its extended position to form a continuation of said inlet; 10
- (c) an enlarged hollow member joined to the upper end of said stem and guided by said housing, said hollow member including an upper wall having a ring of upwardly directed discharge ports; 15
- (d) a deflector joined to said upper wall contiguous to said ring of discharge ports, said deflector having an under surface diverging upwardly to deflect water upwardly and outwardly from said discharge ports;
- (e) and a segmental element within said hollow mem- 20

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ber including plugs inserted in selected ports thereby to restrict water discharge to the remaining ports.

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