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ADJUSTABLE NOZZLE TIPS FOR SPRINKLERS

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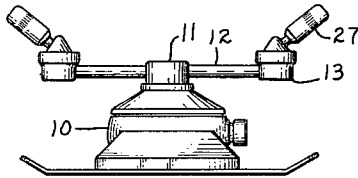


Fig. 1

Fig. 2

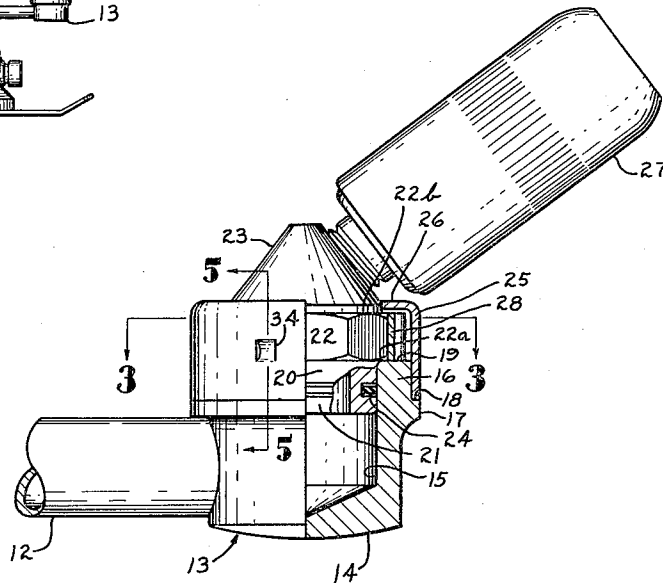


Fig. 3

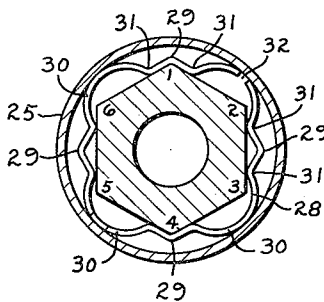


Fig. 5

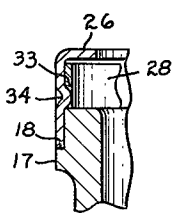


Fig. 4

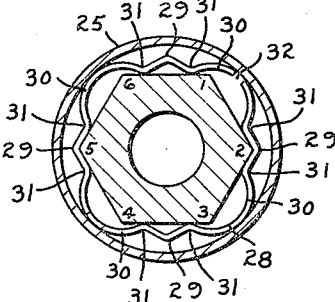
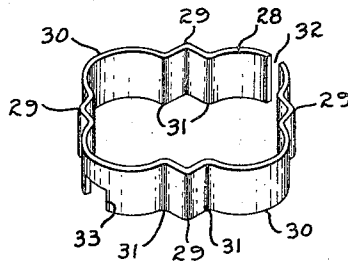


Fig. 6



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ADJUSTABLE NOZZLE TIPS FOR SPRINKLERS

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This invention relates to a nozzle unit and particularly to the type that is carried on the end of the radial arm of a reaction-type rotary sprinkler.

In this type of sprinkler, the amount of area covered is usually controlled by the angle at which the nozzle tips are adjusted relative to the end of a rotating arm on which the tips are supported. The position of adjustment of this nozzle tip is usually maintained by a friction or binding nut.

One of the faults present in the above type of sprinkler is that often when the sprinkler head is allowed to rotate very rapidly, due to a high pressure line, the nozzle tips will be thrown out of adjustment from a predetermined set position due to centrifugal force and thus lose their effectiveness in covering a predetermined area and require the operator to stop the sprinkler and reset the nozzles.

It is the principal object of this invention to provide a locking means which will permit the nozzle tips to be manually adjusted to a plurality of indexed angular positions relative to the end of their support arms without having to loosen and tighten any binding nut to make the adjustment.

A further object is to provide a locking means in the form of an index spring that will permit the nozzle tip to be manually adjusted without requiring any abnormal force on the part of the operator to adjust said nozzle tip, and also which will lock the nozzle in any one of several adjustable positions so that it will withstand the centrifugal force factor encountered when the sprinkler head may operate at extremely high speeds.

Other advantages and features of the present invention will become apparent from a detailed description of the single embodiment thereof illustrated in the accompanying drawing in which:

FIG. 1 is a side view on a small scale of a reaction-type sprinkler to which my invention may be applied;

FIG. 2 is a partial side view and sectional view of a lawn sprinkler discharge head on a larger scale embodying my invention;

FIG. 3 is a sectional plan view taken along the line 3—3 of FIG. 2;

FIG. 4 is a similar view to FIG. 3 but showing the bushing with its polygonal portion indexed to the next position;

FIG. 5 is a fragmentary sectional view taken along line 5—5 of FIG. 2; and,

FIG. 6 is a perspective view of the locking spring, per se.

Referring now to the drawings, FIG. 1 shows a conventional type of rotary reaction lawn sprinkler having a base 10, a rotary head 11 from which extends a pair of tubular radial arms 12. The outer end of each arm 12 supports a fluid discharge head 13 which in this case is of the adjustable type. The particular construction of the discharge head is the subject of my invention and since both are identical, it is considered sufficient to describe only one of the heads.

As best shown in FIG. 2, each head consists of a support body 14 suitably attached to the end of the arm 12 and formed with a central chamber or socket 15 on a vertical axis. The body 14 is formed with an upper enlarged portion 16 and a circumferential intermediate projecting ledge 17 providing an upwardly facing shoulder 18. The

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enlarged portion 16 of the body terminates in an upper flat surface 19 normal to the body axis.

A fitting or bushing 20 is rotatably mounted in the upper end of the support body 14 and consists of a lower cylindrical section 21, an intermediate polygonal section or stem 22 and an upper conical section 23. The cylindrical section 21 is rotatably fitted within the body socket 15 and is provided with a flip ring 24 as a liquid seal between section 21 and the support body 14. The polygonal section 22 is larger than the cylindrical section 21 and provides a shoulder 22a that normally rests upon the upper flat surface 19 of said support body 14.

The fitting 20 is held in place upon the support body 14 by means of a cylindrical sleeve 25 having a drive fit around the upper enlarged portion 16 of said body 14 and resting against the shoulder 18 as a stop. The sleeve 25 is formed with an inwardly directed flange 26 at its upper end that overlies the upper shoulder 22b of the polygonal section 22.

Projecting from the conical section 23 of the bushing 20 is an adjustable spray nozzle tip 27 of the conventional type whereby the rotation of the outer casing relative to its support stem will vary the character of the spray issuing from the nozzle. It will be understood that the necessary fluid ducts will be made from the nozzle tip through the bushing 20, the body 14 and to the radial hollow arm 12.

The means for indexing and locking the nozzle tip 27 in any one of the several adjusted positions will now be explained. For this purpose, a special-shaped spring 28 is formed from flat metal stock. As shown in FIGS. 3, 4 and 6, this spring 28 is formed with four angular detent recesses 29 and four arcuate loops 30 joined to each other by angular junction points 31. One of the loops is slit and spaced apart where the ends of the spring 28 are brought together as at 32. The spring 28 is held in position in the discharge head 13 between the body flat surface 19 and the sleeve flange 26, and tensioned between the polygonal section 22 and the sleeve 25. More specifically, the apex of each loop 30 bears against the inner wall of the shell 25 and the interposed detent recesses 29 are held in spaced relationship to said wall so as to allow some lateral movement therebetween for reasons as will appear later. To hold the spring 28 against rotary movement within its confined quarters within the shell 25 when the nozzle is being adjusted, one of the spring loops 30 is provided with a cut-out recess 33 (see FIGS. 5 and 6) and a detent nib 34 is formed inwardly of the shell 25 to project into said recess.

The manner in which the locking spring 28 operates to hold the nozzle tip in one of several adjusted positions is best shown in FIGS. 3 and 4. The polygonal section 22 of the bushing 20 is preferably of hexagonal shape, thus presenting six flat sides and six angular points or axial projections that co-operate with spring recesses 29 to function as detents when angularly adjusting the nozzle tip 27. The polygonal portion, for the sake of convenience, will hereinafter be referred to as a "hex."

In FIGS. 3 and 4 to graphically show how the points of the hex section operate in conjunction with the spring 28, each point is numbered from one to six, respectively. In FIG. 3, it will be noted that points 1 and 4 of the hex are registered in the upper and lower detent recesses 29 of the locking spring 28. If the nozzle tip is to be adjusted to the next indexed position by turning it in a clock-wise direction, the points 1 and 4 will cam out of their respective detent recesses due to the resilient characteristics of the spring between adjacent loops to the position of FIG. 4 wherein points 2 and 5 of the hex are registered with the two side detent recesses 29.

Because of the fact that I have disclosed an even number of detent recesses in the spring 28 and an even

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number of points on the hex section 22, two points of the hex will always be in registry with two of the four spring detent recesses 29 to assure a firm indexed locking connection between the adjustable nozzle fitting 20 and support body 14.

It is also to be noted that the juncture points 31 between the detent recesses 29 and the spring loops 30 will be in resilient contact with two opposed flats of the hex. Also, in moving the hex from the position of FIG. 3 to the position of FIG. 4, it is necessary for the points 2 and 5 of the hex to cam past one of the juncture points of the adjacent detent recesses 29. This provides an added locking feature to assure that the nozzle tip 27 will not become disarranged due to a too rapid operation of the sprinkler head.

With four detent recesses 29 in the spring and six points on the hex section, it will be obvious that twelve different adjusting positions can be obtained for the nozzle tip. It is also to be understood that the spring could be made with a more or less number of detent recesses and likewise, the polygonal section of the bushing could have a more or less number of points depending on the degree of adjustment desired for a particular type of sprinkler.

Although a single embodiment of the present invention has been described, it will be apparent that various modifications may be made within the scope of the following claims.

What I claim is:

1. An indexing nozzle unit for attachment to the ends of the radial arms of a rotary sprinkler and comprising a body having an outlet chamber arranged on a vertical axis, a fitting having a stem rotatably mounted in said chamber, a spray nozzle tip carried by said fitting in angular relationship to the axis of said body, said fitting having a polygonal-shaped section integral with said stem, said polygonal-shaped section located above said body and presenting a series of apical projections, and a spring element of flat material carried by said body, said spring element formed with angular recesses for receiving said apical projections by a snap-locking action as the spray nozzle is rotated to selected angular positions relative to the body.

2. A nozzle construction for a water sprinkler of the reaction type having tubular arm members mounted to rotate on a support base comprising a support body secured to the outer end of each tubular member, said body having a socket arranged on a vertical axis and opening through the upper end of said body, a fitting having a stem rotatably mounted in said body and having a polygonal-shaped portion located above the open end of said body, a discharge nozzle angularly mounted on said fitting, a retainer sleeve fixed to said body for holding said fitting on said body and providing a space between said polygonal-shaped portion and said sleeve, and a spring mem-

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ber confined within said space and having angular detent means for releasably engaging the high points of said polygonal-shaped section whereby said discharge nozzle may be swung about the vertical axis of said support body to a plurality of indexed angular locked positions.

3. A nozzle construction as defined in claim 2 wherein said spring means is made from flat stock and formed to provide spaced angular sections complementary to the high points of said polygonal-shaped portion, and arcuate sections between said angular sections serving to clear the high points as the discharge nozzle is rotated from one indexed position to another.

4. An adjustable spray nozzle adapted to be carried on the end of an arm of a rotary sprinkler, said nozzle comprising a body attached to the end of said arm and having a chamber therein disposed on a vertical axis, a fitting having a stem rotatably mounted in said chamber, a spray nozzle tip angularly secured to said fitting above said body, said fitting having a polygonal-shaped portion providing a series of angular corners, a spring member having a series of angular recesses for releasably engaging the angular corners of said polygonal-shaped fitting, a shell for housing said spring and holding it upon said body, and inter-engaging means between said shell and said spring for holding said spring stationary relative to said body while said fitting is being rotated therein.

5. An indexing nozzle unit for a rotary sprinkler having radial arms, a body attached to the end of each arm, said body having an outlet chamber arranged on a vertical axis, a fitting rotatably mounted in said chamber, a spray nozzle tip carried by said fitting in angular relation to the axis of said body, said fitting having a polygonal-shaped portion located above said body and providing a series of angular corners and a series of flat sections, a spring member having a series of angular recesses separated from each other by arcuate loops, said angular recesses joined to said arcuate loops by a pair of angular juncture points, some of said angular recesses engaging some of said angular corners and the juncture points of the remaining angular recesses engaging some of said flat sections whereby said polygonal-shaped portion is held in releasable snap locking engagement with said spring member thereby permitting said nozzle tip to be rotated to a plurality of indexed positions relative to said body.

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CERTIFICATE OF CORRECTION

Patent No. 2,998,197

August 29, 1961

Henry J. Kachergis

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 6, strike out "or stem" and insert the same after "section" in line 5, same column 2.

Signed and sealed this 13th day of February 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents