May 22, 1951 A. C. ROWLEY 2,553,726

AUTOMATIC SPRAY SPRINKLER

Filed Nov. 19, 1947

FIG. 1.

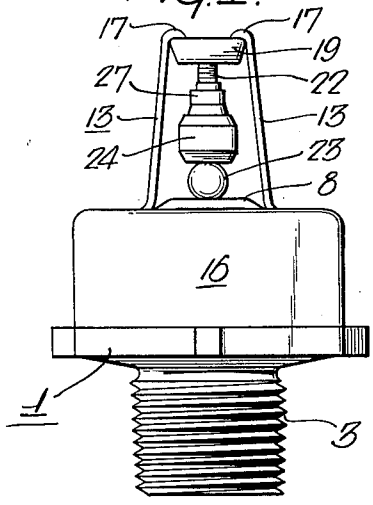


FIG. 2.

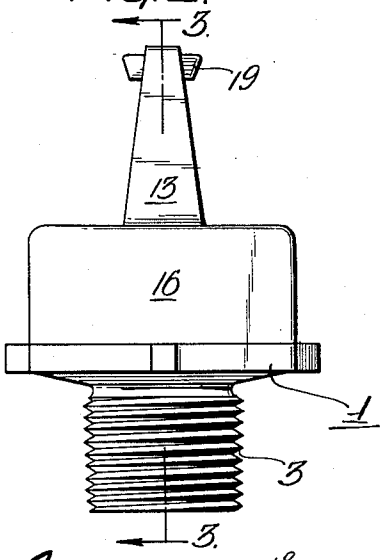


FIG. 3.

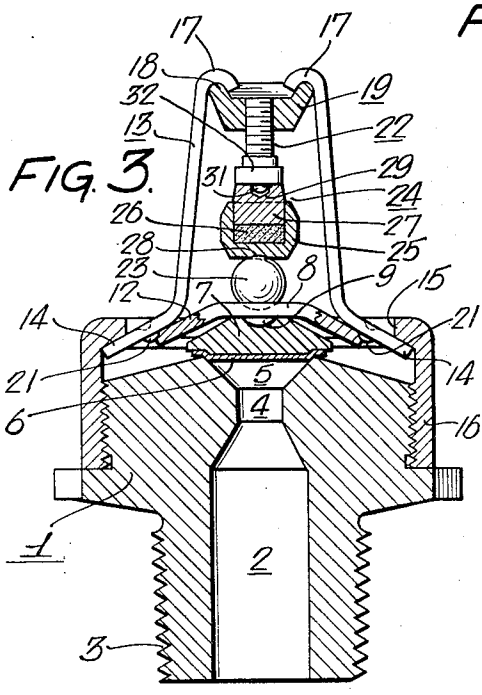
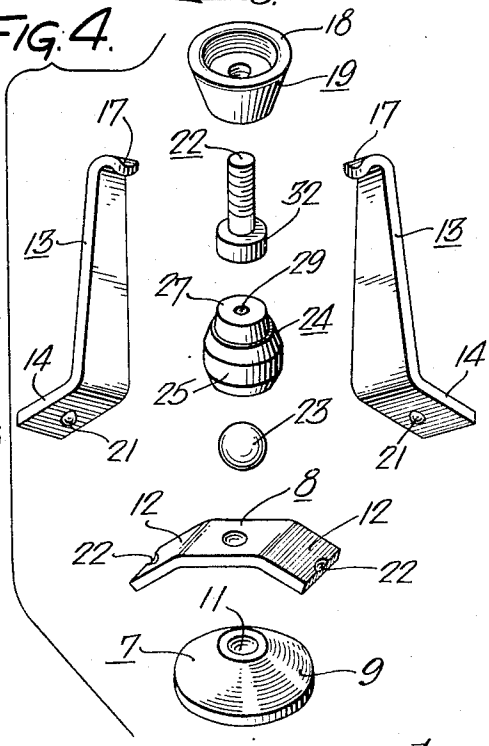


FIG. 4.



Inventor:
Arthur C. Rowley
by his Attorneys
Howson & Howson

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AUTOMATIC SPRAY SPRINKLER

Arthur C. Rowley, Drexel Hill, Pa., assignor to Globe Automatic Sprinkler Company, Philadelphia, Pa., a corporation of Pennsylvania

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4 Claims. (Cl. 169—38)

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This invention relates to automatic sprinkler systems and more particularly to an improved type of automatic spray nozzle for use in such systems.

A principal object of the invention is to provide a novel and improved heat-responsive closure device for nozzles of the stated type.

The invention resides in the assembly of elements hereinafter described and illustrated in the attached drawings, wherein:

Fig. 1 is a front elevational view of an automatic spray nozzle made in accordance with the invention;

Fig. 2 is a side elevational view of the nozzle;

Fig. 3 is a sectional view on the line 3—3, Fig. 2; and

Fig. 4 is an exploded view showing in perspective the several elements of the heat-responsive closure device which forms the principal subject matter of the present invention.

With reference to the drawings, the nozzle comprises essentially a body member 1 having a bore 2 extending therethrough from one end to the other and having at one end an externally threaded portion 3 by means of which the said member may be secured in the supply pipe of the sprinkler system. The bore 2 has toward its outer end a restriction 4 which terminates in a conical discharge port 5. The port 5 is normally sealed by a closure which consists in the present instance of a washer 6 which seats in the outer end of the discharge port 5 and a cap 7 which seats upon the washer, as illustrated in Fig. 3, and the cap 7 and washer 6 are normally held seated against the fluid pressure in the system by means of a heat-responsive linkage consisting of the several elements illustrated in Fig. 4.

In immediate engagement with the cap 7 is a transverse lever member 8 having at its under side a projection 9 which seats in a recess 11 in the top center of the cap 7. The opposite inclined end portions 12—12 of the member 8 are forcibly engaged, respectively, by a pair of levers 13—13, one end 14 of each of said levers hooking under an inturned flange 15 of a sleeve 16 threaded on the body member 1, as best shown in Fig. 3 and being in effect fulcrumed on said flange. The upper ends 17 of the levers 13 are turned inwardly and are hooked over the flanged edge 18 of a retaining element 19, this element functioning to hold the said upper hooked ends of the levers in a position wherein the intermediate portions thereof which seat against the end portions 12 of the member 8 will exert pressure upon said end portions tending to hold the member 8 down forcibly against the cap 7. If it be considered that one end of the member 8 is anchored in the assembly by the proximate lever 13, then the member 8 itself acts under tension as a lever actuated by pressure of the other of the levers 13 to exert holding pressure on the cap 7. It will be noted that each of the levers 13 is provided at its under side with a projecting boss 21 which engages a notch 22 in the associated end of the transverse member 8 thereby to interlock this member with the levers against accidental displacement.

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The retaining member 19 is supported in operative position with respect to the hooked ends of the levers 13 by means of a strut consisting of a screw 22, which is threaded into the member 19, a spherical element 23 which seats in a recess in the upper side of the member 8 immediately above the projection 9, and a heat-responsive element 24 which is confined between the lower end of the screw 22 and the sphere 3. The heat-responsive element 24 consists of a cup-like member 25, which contains a heat-fusible solder 26, and a plunger element 27 which fits into the outer end of the cup 25 so as to confine the body of solder 26, said plunger seating upon the solder mass and being held in place within the cup by the action of the solder. The under side of the cup 25 has a recess 28 in which the sphere 23 seats; and the upper end of the plunger 27 is provided with a recess 29 which receives a boss 31 on the under side of the head 32 of the screw 22. It will be apparent that by adjusting the screw 22 in the member 19 the effective length of the strut, consisting of the sphere 23, the heat-responsive element 24, and the screw 22, may be adjusted to an extent such that the strut functions under compression to support the retaining element 19 in operative relation to the levers 13 as illustrated in Fig. 3. In this assembly the levers, when thus retained by the element 19, are under tension, bearing forcibly against the ends of the member 8 and thereby placing that member under tension and forcibly engaged with the cap 7.

It is to be noted that in the aforedescribed device the lever elements 13—13 operate under longitudinal tension to resist the fluid pressure within the bore 2, tending to displace the cap 7, this pressure being transmitted to the upper ends of the levers 13 through the medium of the strut which, as described above, includes the heat-responsive element 24. In addition, and by reason of the retention of the upper ends

of the said levers by the element 19 the said levers are made to exert a tensioned pressure upon the transverse member 8 to hold the latter under heavy pressure against the cap 7. While the tensioned force exerted upon the cap 7 to retain it normally to its seat sealing the outer end of the nozzle is thus relatively great, its retention is dependent entirely upon the integrity of the heat-responsive element 24 to the end that an increase in temperature within the area in which the device is installed sufficiently great to melt the solder 26 will immediately release the tension in the assembly and permit displacement of the sphere 23 and resultant collapse of the associated cap-retaining structure.

It will be understood that in the heat-responsive element described above the plunger 27 is sufficiently loose in the socket of the cup 25 to permit escape of the solder 26 in the fluid state. The immediate effect of the reduction of the solder mass to fluidity is to permit downward movement of the retaining element 19 with consequent release of the upper ends of the levers 13 permitting the tension in the member 8 to throw the said levers 13 outwardly about the inner edge of the flange 15 as a fulcrum, thereby releasing the cap 7 and permitting the fluid pressure within the bore 2 to dislodge the cap 7. It will be apparent further that such dislodgement of the cap 7 will in itself exert a pressure upon the transverse member 8 tending also to throw the levers 13 outwardly about the flange 15 as a fulcrum so that the release action following collapse of the thermosensitive element 24 is positive and rapid.

I claim:

1. In a heat responsive sprinkler head assembly, the combination with a nozzle having a discharge port, of a displaceable closure element for said port, and means for normally retaining said element in port-sealing position, said retaining means including a lever member extending over and seating intermediate its ends on said element so that pressure exerted on the free ends of the lever member will tend to hold the closure element in port-sealing position, second and third levers each fulcrumed at one end in the assembly, said second lever bearing intermediate its ends on one free end of the lever member first named, and the said third lever bearing intermediate its ends on the other free end of the lever member first named, and means including a heat-responsive release element and operatively engaged with the free ends of the second and third levers for normally retaining said levers in forcible engagement with the first named lever member and operative

through the latter to hold the closure in port-sealing position, said heat-releasable retaining means taking the form of a collapsible strut of which the heat-responsive element constitutes a structural part, and said strut being confined under compression between the first lever and the free ends of the second and third levers.

2. The combination of claim 1 wherein the said levers have turned ends forming hooks for interlocking engagement with the strut, and wherein further the strut comprises means for adjusting the effective length thereof so as to place the strut under compression between the said hooked ends of the levers and the closure element.

3. The combination of claim 2 wherein the strut comprises a spherical element seating on the transverse member and providing in turn a seat for the heat-responsive element, a threaded element seating against the heat-responsive element, and an element threaded on and adjustable longitudinally of said threaded element for interlocking engagement with the hooked ends of said levers.

4. In a device of the character described, the combination with a nozzle having a discharge port, of a displaceable closure element for said port, an inturned flange at each of two opposite sides of and spaced from said closure element, a member supported by and extending transversely over said element, said member being resilient and projecting freely at both ends from the closure element a pair of levers having angularly off-set ends engaged under said flanges, respectively, and having portions adjoining said ends arranged to bear upon the respective opposite sides of and to laterally tension said transverse member, and displaceable means for confining the other ends of the levers in positions causing the levers to exert pressure upon the transverse member to retain the closure element in port-sealing position, said means consisting of a collapsible strut including a heat-responsive release element and means for placing the strut under compression between the transverse member and the said other ends of the said levers.

ARTHUR C. ROWLEY.

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