June 20, 1950 A. C. ROWLEY 2,511,945

SPRAY NOZZLE

Filed Nov. 19, 1947

FIG. 1

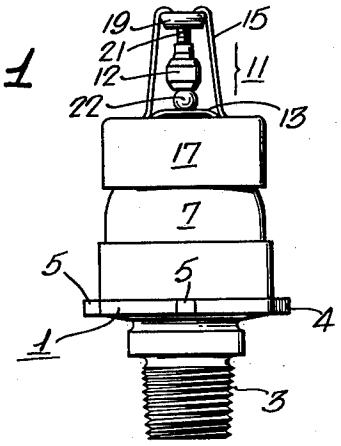


FIG. 2.

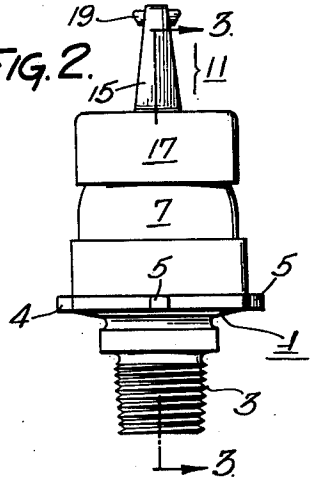


FIG. 3.

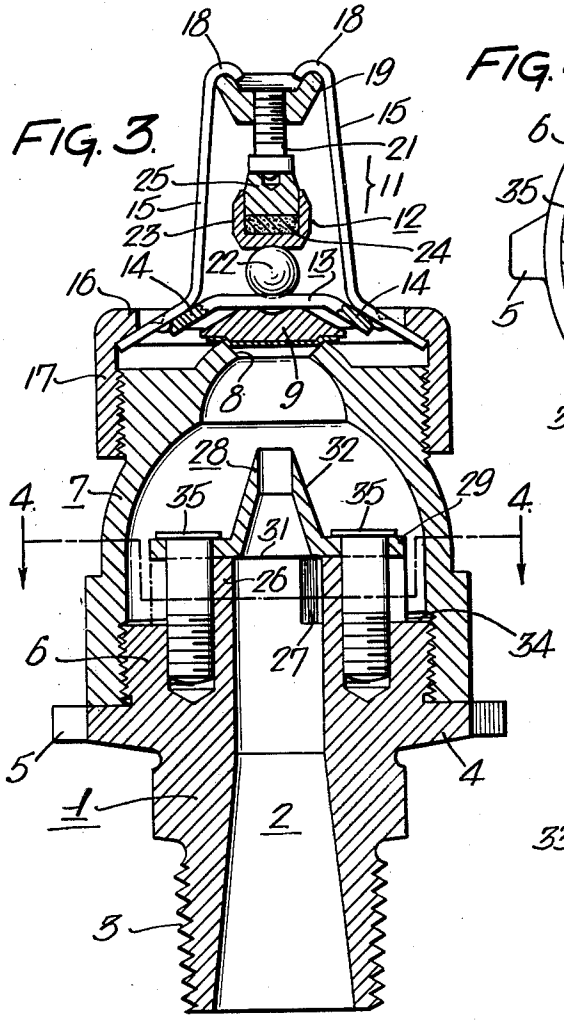


FIG. 4.

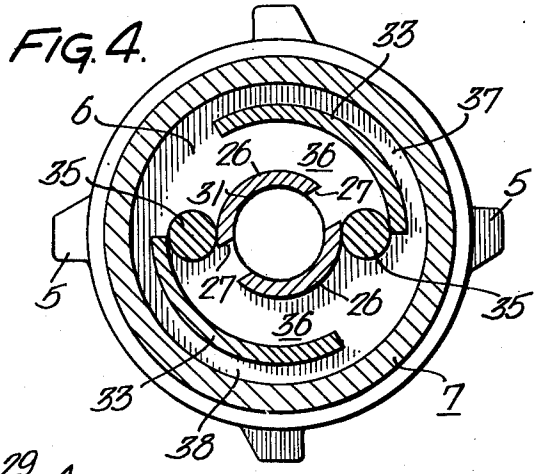
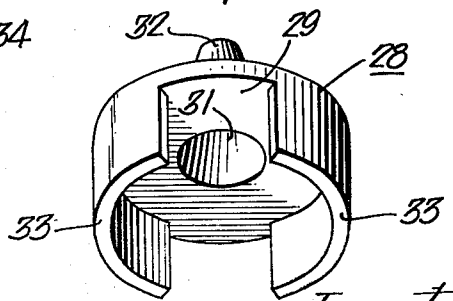


FIG. 5.



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SPRAY NOZZLE

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Application November 19, 1947, Serial No. 786,889

5 Claims. (Cl. 299—115)

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This invention relates to spray nozzles for automatic sprinkler systems, and the principal object of the invention is to provide a nozzle of this class of simple and inexpensive construction and highly efficient operating characteristics.

A more specific object of the invention is to provide a spray nozzle wherein a novel combination of velocity and vertical action is utilized to obtain a highly efficient spray formation.

The invention will be more readily understood by reference to the attached drawings, wherein:

Fig. 1 is a front elevational view of a 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;

Fig. 4 is a sectional view on the line 4—4 Fig. 3, and

Fig. 5 is a view in perspective of one of the individual elements of the assembly.

With reference to the drawings, the embodiment of the invention therein illustrated comprises a body member 1 having a through bore 2 and provided at one end with threads, as indicated at 3, whereby the member may be installed in the feed pipe of the sprinkler system. The body member 1 is provided at its mid-section with a radial flange 4 having lugs 5 projecting from the periphery thereof which provide for application of torque through the medium of a suitable wrench to thread the body member 1 into the sprinkler system as mentioned.

Beyond the flange 4 is an externally threaded cylindrical portion 6 which is adapted to receive a correspondingly internally threaded dome 7 which embraces the discharge end of the bore 2 of the body member 1 as illustrated. The dome 7 has a discharge port 8 in alignment with the bore 2 of the body member 1 and normally this port 8 will be closed by a cap 9 which is maintained in port sealing position by means of a linkage designated generally by the reference numeral 11, said linkage including a thermo-sensitive release element 12 which when subjected to temperatures above a predetermined maximum will act to release the linkage so as to permit the fluid pressure within the system to unseat the cap.

Referring more specifically to the linkage 11 it will be noted that it comprises a transverse member 13, the opposite downwardly deflected ends 14 of which are engaged under the intermediate portions of two levers 15—15. These levers are confined at one end by an inturned flange 16 on a sleeve 17 which is threaded onto the outer or discharge end of the dome 7. The

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outer hooked ends 18—18 of the levers 15 are normally retained in the position shown in Fig. 3 by a retaining member 19 with which the said hooked ends are interlocked as shown. The member 19 is supported in the lever-retaining position by a strut consisting of a screw 21 threaded into the member 19, the thermo-sensitive or heat-responsive element 12, and a spherical element 22 which seats upon the member 13. It will be noted that the head end of the screw 21 seats against the heat-responsive element 12, that the latter in turn seats against the sphere 22, and that by adjusting the screw 21 the member 19 may be forced upwardly against the hooked ends of the levers 15, so that the strut under compression acts to tension the levers 15 in the longitudinal direction. It will be noted also that a proper location of the sleeve 17 in the axial direction will cause the levers, when their outer hooked ends are confined by the member 19 as illustrated, to bear forcibly against the ends of the member 13 so as to place the latter under tension and cause it to bear forcibly upon the cap 9. Thus the entire linkage assembly acts under tension (with the exception of the aforedescribed strut which is under compression) to hold the cap 9 tightly in the port sealing condition. When, under these circumstances, the heat-responsive element 12 is actuated by subjection to a relatively high temperature to release the linkage, the aforesaid tension acts to disintegrate the linkage assembly and to immediately release the cap 9.

It is to be noted that the heat-responsive element 12 consists in its present form of a cup-shaped container 23 in the bottom of which is placed a body 24 of a solid heat-fusible compound, such as a solder, and a plunger 25 which fits loosely into the cup 23 and seats upon the solder 24. Normally the solder functions to hold the plunger in an extended position as shown, but when the solder changes to liquid state the plunger is free to move into the cup, thereby causing collapse of the strut assembly and consequent release of the entire linkage system.

The linkage system 11 in itself forms no part of the present invention and is described and claimed specifically in my co-pending application Serial No. 786,888.

The discharge end of the bore 2 at the inner end of the body member 1 which is embraced by the dome 7 is defined by two segmental flanges 26—26 which are arranged opposite to each other as shown in Fig. 4 so as to provide between the adjoining ends thereof, radial passages 27—27.

Secured to the inner end of the body member 1 in the interior of the dome 7 is a nozzle element 28, the form of which may be more readily understood by reference to Figs. 3 and 5. This element 28 consists in effect of a flat disc 29 having a central aperture 31 from which a frustoconical nozzle extension 32 projects, as best shown in Fig. 3. In assembly the disc 29 seats upon the upper edges of the segmental flanges 26—26 with the port 31 and nozzle projection 32 in axial alignment with the bore 2. The member 28 also comprises two segmental flanges 33—33 which project from the opposite face of the disc 29 from the nozzle projection 32 and which in assembly seat upon the shoulder 34 of the body member 1. The member 28 is secured to the body member by means of screws 35—35.

The relative arrangement of the flanges 26 and 33 and the screws 35 is best shown in Fig. 4. As therein illustrated these elements coact to form two concentric arcuate channels 36—36, one end of each of which is closed by one of the screws 35 while the other ends terminate in open space within the dome 7. The openings 27 between the flanges 26 afford access to the inner ends of these channels from the bore 2 of the body member. It is to be noted also that the segments 33 are spaced inwardly from the wall of the dome 7 so that therebetween secondary channels 37 and 38 are formed into which fluid discharging from the open ends of the channels 36 may pass and from which the said fluid may discharge also into open space within the dome 7.

It will be apparent that, assuming a flow of water from the sprinkler system through the bore 2, the ports 27 and the channels 36, a vortical movement of the water will thereby be set up in the interior of the dome 7 and that this vortex movement will be stimulated by passage of a portion of the water into and through the secondary segmental channels 37 and 38. Another part of the water so flowing through the bore 2 will discharge directly and axially through the nozzle 32 and directly toward the discharge opening 8 of the dome 7. This high velocity jet discharging from the nozzle 32 will strike the mass of water in the aforedescribed vortex which is being continuously contracted radially by the compound arch of the inner surface of the dome 7 toward the discharge opening 8 whereby the entire water mass is broken up into fine particles and passes as such from the discharge opening 8.

The device constitutes a relatively inexpensive and highly effective spray nozzle well adapted for use in sprinkler systems of known type. It will be apparent that there may be some modification in the details of construction without departure from the invention as defined in the appended claims.

I claim:

1. In a spray nozzle of the type described, a body member having a chamber with aligned discharge and admission ports at opposite sides respectively, segmental flanges projecting into the chamber at said admission port, a nozzle element seating on said flanges and having segmental flanges spaced outwardly from the flanges first named and forming with the latter arcuate channels extending around the axis of the nozzle element and communicating at one end with said chamber, said channels communicating at their other ends with the admission port by way of the spaces between the proximate ends of the first named flanges, and means for closing the latter ends of said channels.

2. A spray nozzle according to claim 1 wherein the channel-closing means consists of two screws securing the nozzle element to the said body member.

3. In a spray nozzle of the type described, a body member having a chamber with a discharge port at one side, a nozzle element projecting into the chamber from the opposite side toward said discharge port and defining the terminal end of an admission passage within said member, the open inner or discharge end of the nozzle element being directed toward but lying remote to the said discharge port, a port at the base of said nozzle element opening laterally into the chamber from said passage, means associated with the said lateral port for directing admitted fluid into a vortical path within said chamber, said liquid-directing means including a radial extension on the nozzle element having a marginal axially directed flange forming with adjoining surfaces of the body member a curved channel extending around the base of the nozzle and opening at one end to the chamber and at the other end to said port.

4. In a spray nozzle of the type described, a body member having a chamber with a discharge port at one side, a nozzle element projecting into the chamber from the opposite side towards said discharge port and defining the terminal end of an admission passage in said member, a plurality of ports at the base of said nozzle element opening laterally into the chamber from said passage, and flanges on said nozzle element forming circumferentially extending channels into which the said lateral ports open and by way of which admitted fluid is directed into a vortical path within said chamber.

5. In a spray nozzle of the type described, a body member having a chamber with a discharge port at one side, a nozzle element projecting into the chamber from the opposite side toward said discharge port and defining the terminal end of an admission passage in said chamber, and a port at the base of said nozzle element opening laterally into the chamber from said passage, the inner wall surface of said chamber converging toward the discharge port and comprising two adjoining substantially semi-circular sections of differing radius of which the section of lesser radius terminates in the discharge port.

ARTHUR C. ROWLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
579,371	Watson	Mar. 23, 1897
713,670	Ocumpaugh	Nov. 18, 1902
1,093,996	Kestner	Apr. 21, 1914
1,239,168	Eneas	Sept. 4, 1917
1,331,376	Quinn	Feb. 17, 1920
1,368,055	Reznicek	Feb. 8, 1921
1,390,048	Lange	Sept. 6, 1921
2,415,794	Keep	Feb. 11, 1947

Certificate of Correction

Patent No. 2,511,945 June 20, 1950

ARTHUR C. ROWLEY

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 1, line 8, for "velocity and vertical" read *velocity jet and vortical*;

and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of September, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.