Jan. 10, 1950 F. J. LEE 2,493,982

SPRAY HEAD FOR FIRE SPRINKLER SYSTEMS

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Fig. 1

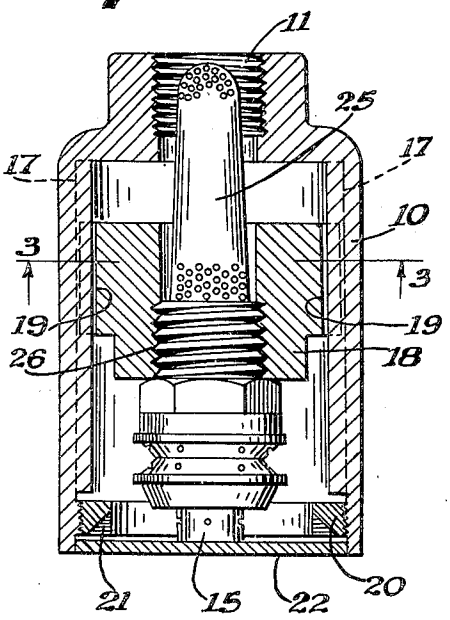


Fig. 2

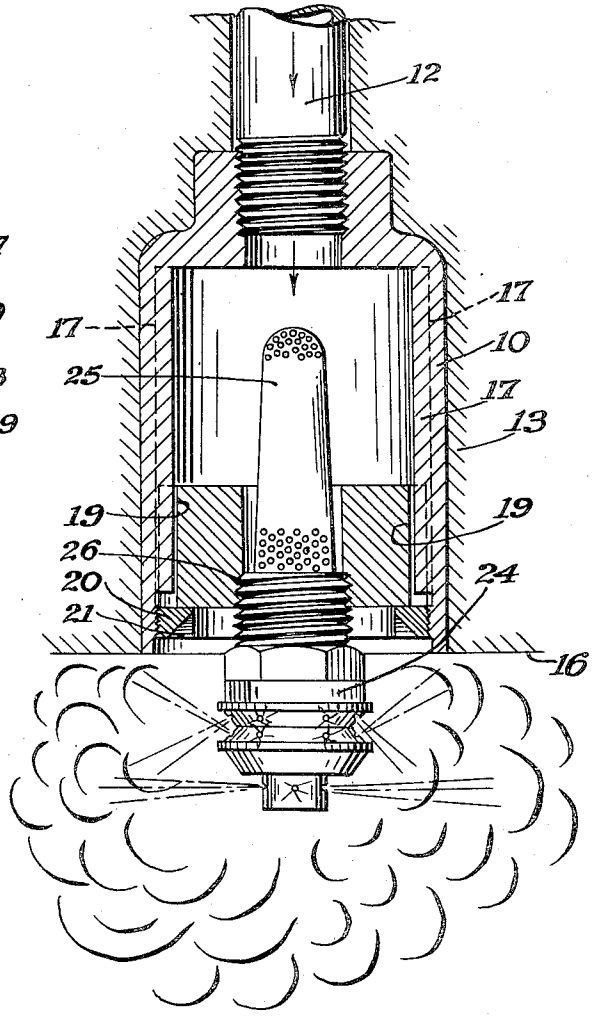
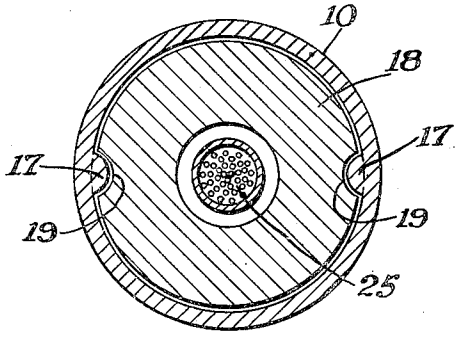


Fig. 3



INVENTOR.
FLOYD J. LEE.

BY Richey & Watts.

ATTORNEYS.

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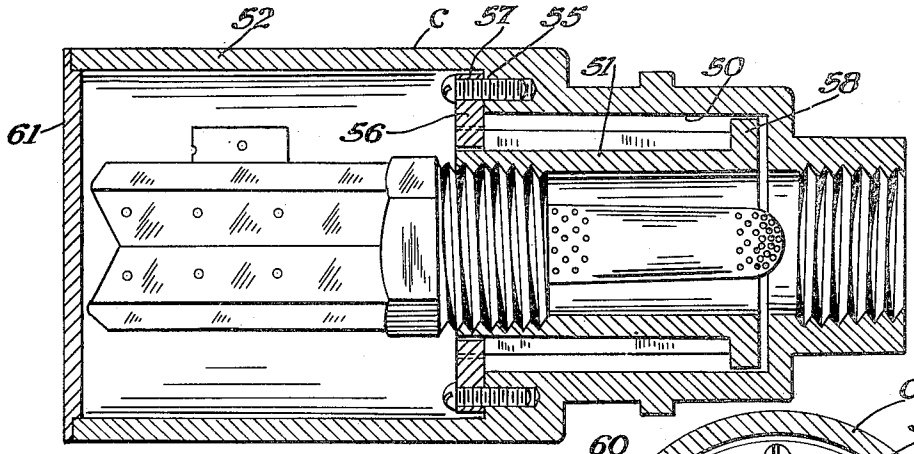


Fig. 4

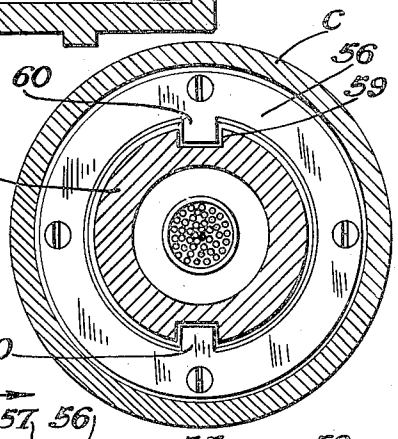


Fig. 6

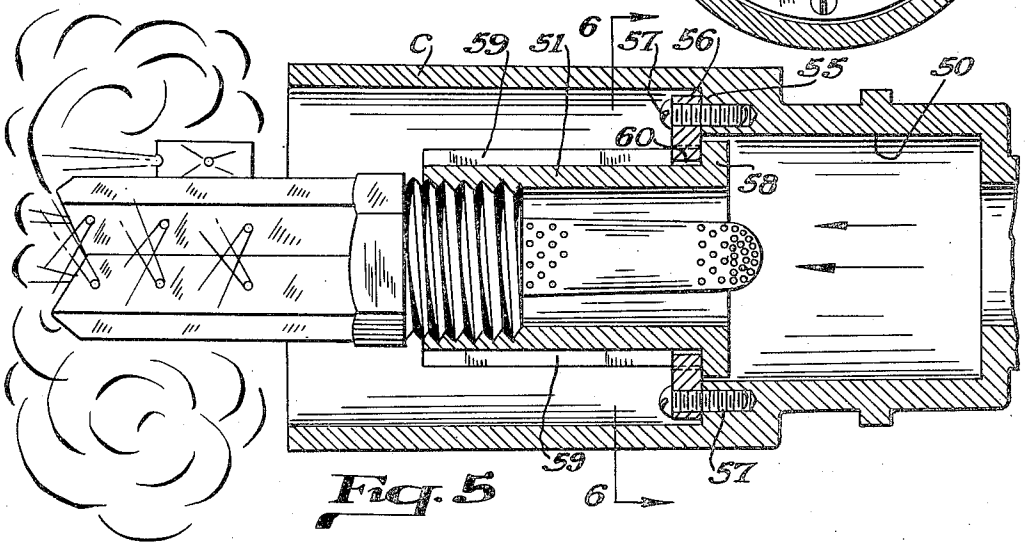


Fig. 5

INVENTOR.
FLOYD J. LEE.

BY Richey & Watts

ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,493,982

SPRAY HEAD FOR FIRE SPRINKLER SYSTEMS

Floyd J. Lee, Fullerton, Calif., assignor to Akron Brass Mfg. Company, Inc., Wooster, Ohio, a corporation of Ohio

Application March 26, 1948, Serial No. 17,202

2 Claims. (Cl. 169—37)

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This invention relates broadly to sprinkler systems for protection against fire hazard and, more specifically, to improvements in spray heads employed therein.

Heretofore it has been customary to install the water lines in such systems in spaced relation with the ceiling or walls of the area to be protected and to mount the sprinkler heads thereon, or in free unobstructed relation with adjacent bodies. Such construction is objectionable from an aesthetic standpoint in environs in which attention has been given the artistic treatment of the room. The construction is further objectionable due to the possibility of injury to the spray heads resulting from the careless use of paint or refurbishing materials during renovating operations. The exposed pipe installations are subject to an additional hazard of injury when the room having such equipment therein is used for storage or similar purposes where foreign bodies are apt to be brought into percussive engagement therewith.

The present invention avoids the foregoing objections through the provision of a spray head which is normally concealed within a housing installed with the end thereof in flush relation with the contiguous wall or ceiling. The invention further contemplates a piston cylinder assembly which is adapted to effect distention of the spray head beyond housing upon operation of the water release valve.

A further object of the invention is to provide a cover plate for the end of the housing which is mounted to facilitate the ejection thereof upon actuation of the spray head piston assembly.

Another object of the invention is to provide a spray tip or nozzle of the type that are designed to produce an extremely fine mist or fog and to safeguard the delivery ducts therein by a screen adapted to arrest such foreign matter as may be borne by the stream without undue diminution of pressure.

Another object of the invention is to provide a structure which may be readily assembled or dismantled in place in order to accommodate inspection or renewal of parts or repairs.

Further objects of the invention reside in the provision of a sprinkler head which is durable, economic of manufacture, efficient of operation, and susceptible of installation with ease and dispatch.

Other objects and advantages more or less ancillary to the foregoing, and the manner in which all the various objects are realized, will

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appear in the following description, which, considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

In the drawings:

Fig. 1 is a vertical sectional view of the improved spray head shown in its retracted position;

Fig. 2 is a similar sectional view showing the nozzle piston assembly in its operative position;

Fig. 3 is a transverse sectional view of the sprinkler head, the section being taken on a plane indicated by the line 3—3 in Fig. 1;

Fig. 4 is an axial section of a modified form;

Fig. 5 is a similar sectional view of the sprinkler head illustrated in Fig. 4, the nozzle piston assembly being shown in its distended or operative position; and

Fig. 6 is a transverse section of the nozzle, the section being taken on a plane indicated by the line 6—6 in Fig. 5.

Referring first to Fig. 2, the improved spray head comprises a cup or housing 10 formed with a tapped opening 11 in the inner end thereof for the reception of a water delivery line 12 constituting a portion of the sprinkler system piping. The pipe 12 and associated lines or branches of the system are embedded in the wall 13 of the building structure, the cup 10 being attached thereto when the plumbing is "struck in," and set with the mouth or free end 15 thereof flush with the wall or ceiling indicated generally by the line 16. The inner wall of the cup is formed with diametrically opposed ribs 17 constituting guide rails for a plunger or piston 18 which is machined for free sliding movement within the cup and is formed with grooves 19 in the outer wall thereof for engagement with the ribs 17. The open end of the cup is bored and threaded for the reception of a ring 20 which is provided to delimit the outward movement of the piston 18. The ring may be drilled or machined with grooves 21 in the outer face thereof to accommodate the blade of a seating tool or pin wrench. The marginal edge of the cup is counterbored to receive a closure disk 22 which is retained therein under sufficient frictional pressure to support the weight of the piston and nozzle 23 when the water is turned off, but to yield and be expelled from the cup under the fluid pressure in supply lines. The nozzle 23 is preferably of the type that embodies a hollow body formed with a plurality of small ducts disposed in pairs in spaced angular relation with each other so that the stream emitted from the ducts of each pair of openings will be directed in

impinged relation with each other and form a finely divided spray or fog. Since this type of nozzle is old in the art further description therof is deemed unnecessary herein. The inner end of the nozzle is formed with a tubular shank 24 having a conical screen 25 secured therein to arrest the passage of dirt or foreign matter into the body of the nozzle. The shank 24 is threaded for engagement in a tapped opening 26 in the piston, the screen 25 being mounted to protrude beyond the inner face therof.

The sprinkler head is designed for use in a system of the type in which the flow of water is controlled from a valve designed for manual operation or from one or more automatic valves of the type that are actuated through the disintegration of thermal or electric-responsive elements. Thus, when water is admitted to the line, the pressure thereof will urge the piston outwardly with sufficient force to expel the disk from the cup and effect the distention of the nozzle beyond the contiguous wall or ceiling.

The modified structure illustrated in Figs. 4, 5, and 6 is similar in form to that heretofore described, save that the cup or housing c is provided with an inner cylindrical portion 50 for the reception of the piston 51 and an outer cup section 52 to house the spray nozzle 54. The inner end of the cup section is shouldered to provide a ledge 55 for the support of a stop ring 56 which is secured thereon by cap screws 57. The piston is formed with a flange 58 on the inner end thereof which is machined for silding engagement within the cylinder 50 and designed to abut the ring 56 when the piston is moved to its distended position. The side wall of the piston is formed with diametrically opposed keyways 59 therein for the reception of ears 60 provided in the ring 56. The nozzle illustrated in Figs. 4 and 5 is of somewhat different configuration than that shown in Fig. 1, but embodies the same principle and is designed for operation in a similar manner. As in the former case, the plumbing and cup c are embedded in the building structure, the outer end of the cup being disposed in flush relation with the wall or ceiling. The outer section 52 of the cup is provided with a kockout disk 61 and the operation of the modified embodiment of the sprinkler head is the same as heretofore described.

It will be understood that the improved spray head may be used in a different manner and in other environs than those described above; for example, the housing may protrude from a wall or ceiling in a textile mill or similar plant where the nozzle is subject to lint, fumes, or other airborne materials that tend to load or corrode the discharge opening in the spray head. Moreover, if desired, the spray head may be mounted in a recess, or in the floor, in which case a knockout plate may be used which is capable of supporting the traffic loads imposed thereon.

Although the foregoing description is necessarily of a detailed character, in order that the

invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. For use in fire sprinkler systems of the type having branch conduits leading from a single water valve, a spray head arranged for open connection to a branch conduit comprising a cup having an unvalved water inlet port, a piston slidable in said cup, an opening extending axially through said piston, a spray nozzle mounted on said piston and in communication with said opening, shoulder means within said cup to engage and retain the piston in the cup, and closure means for the mouth of said cup comprising a relatively flat disc-like member, the periphery of said disc-like member engaging the mouth of said cup with a press friction fit, said friction fit being firm enough to support the weight of said piston and nozzle with the cup inverted, but free enough to be dislodged by water pressure behind the piston.

2. For use in fire sprinkler systems of the type having branch conduits leading from a single thermo-sensitive water valve, a spray head arranged for open connection to a branch conduit comprising a cup having an unvalved water inlet port, a piston slidable in said cup, an opening extending axially through said piston, a spray nozzle mounted on said piston and in communication with said opening, shoulder means within said cup to engage and retain the piston in the cup, and closure means for the mouth of said cup comprising a relatively flat disc-like member, the peripheral edge of said disc-like member engaging the radially inner wall of the mouth of said cup with a press friction fit, said friction fit being firm enough to support the weight of said piston and nozzle with the cup inverted, but free enough to be dislodged by water pressure behind the piston, said disc-like member being flush with the rim of said cup whereby said cup may be embedded in a supporting structure up to the rim thereof with said disc-like member flush with the surface of the supporting structure.

FLOYD J. LEE.

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