

[54] ELECTRICAL RESISTANCE FUSIBLE LINK FOR A SPRINKLER HEAD

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[51] Int. Cl. A62c 37/18

[58] Field of Search 169/56, 59, 60, 61, 37, 169/40, 42; 137/72, 73

[56]

References Cited

UNITED STATES PATENTS

3,726,344 4/1973 Rothman et al. 169/37

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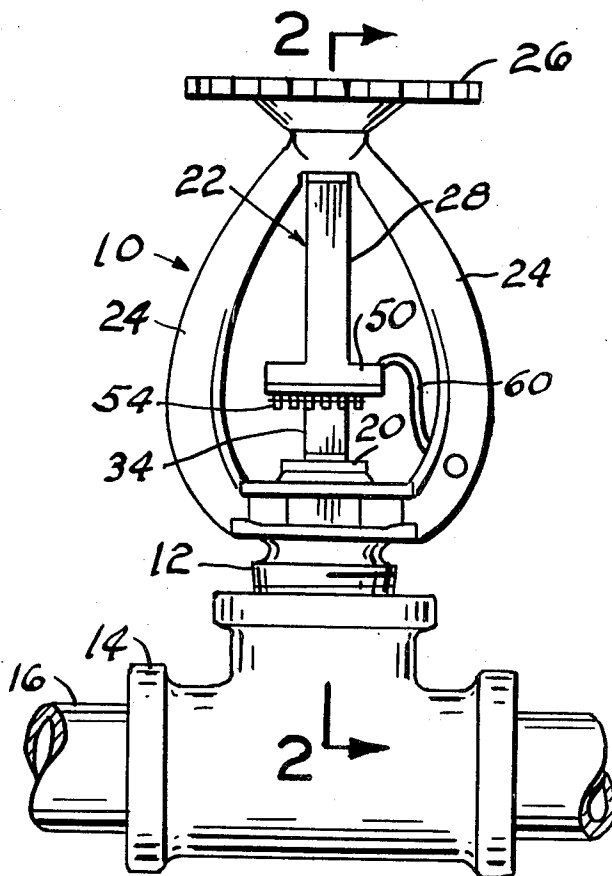
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[57]

ABSTRACT

The high temperature fusible connecting link maintaining a sprinkler head in closed position is replaced by a link formed by one or more strands of wire fusible by electrical resistance.

4 Claims, 6 Drawing Figures



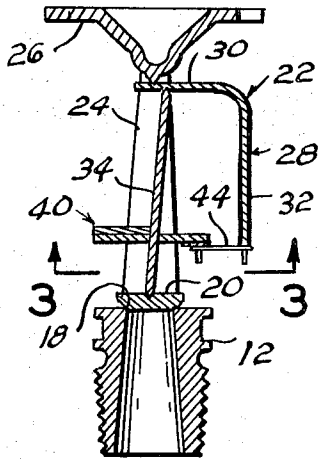


FIG. 2

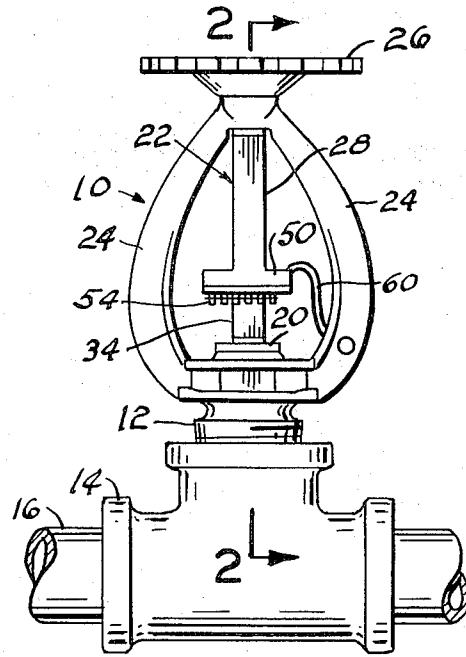


FIG. 1

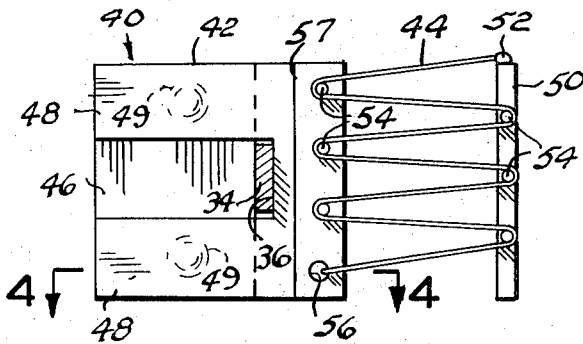


FIG. 3

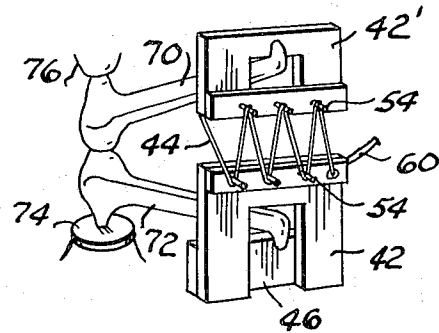


FIG. 5

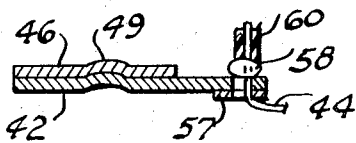


FIG. 4

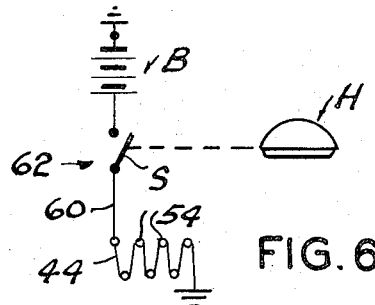


FIG. 6

ELECTRICAL RESISTANCE FUSIBLE LINK FOR A SPRINKLER HEAD

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to fire detecting systems and more particularly to an electrical resistance fusible link for sprinkler heads.

Conventional fire protection systems installed in department stores, office buildings, and the like, employ a sprinkler system including sprinkler heads arranged in selected spaced-apart relation with each sprinkler head maintained in a closed position by a fusible link. This link is normally fused by ambient heat, therefore, when a fire occurs it must burn and increase in intensity to a degree which will melt or fuse the link or links of sprinkler heads. Since these fusible links are made of low melting point metallic material, it seems obvious that the necessary heat to achieve the fusing action is a result of considerable flame having been generated. It seems obvious that if one or more sprinkler heads can be actuated or released in the area where the fire begins, assuming that the fire is not caused by a chemical explosion, then the release of a single sprinkler head would snuff out a fire in its initial stage or stages. This controlling of a fire or fires in their initial stages would not only conserve considerable merchandise but would result in less smoke and water damage being done as normally occurs when conventional sprinkler systems are activated as a result of a fire.

SUMMARY OF THE INVENTION

The conventional ambient heat fusible link of a sprinkler head is replaced by a length of electrical resistance fusible wire extending between and connected with the lever arm and strut maintaining a sprinkler head valve or cap in closed position. The electrically fusible wire is connected with a source of electrical energy through a detector head of a selected type. Electrical potential applied to the fusible wire in response to a signal from the detector head releases the sprinkler head lever arms and its cap.

The principle object of this invention is to provide an electrically fusible link for a sprinkler head which is fused to open at least one sprinkler head in response to an alarm signal thereby permitting water supply lines of smaller diameter and a reduction in water pressure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a sprinkler head connected with a fragment of a water supply line;

FIG. 2 is a vertical cross sectional view taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a bottom view of the fusible link looking in the direction of the arrows 3—3 of FIG. 2;

FIG. 4 is a horizontal cross sectional view of the fusible link taken substantially along the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary perspective view illustrating an alternative form of the fusible link connected with another type sprinkler head; and,

FIG. 6 is a wiring diagram.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral **10** indicates one type of conventional sprinkler head used in fire protection systems. The sprinkler head **10** includes a valve body **12** threadedly connected with a tee **14** interposed in selected locations within a fluid conducting line **16**. The valve body is provided with an orifice **18** normally closed by a valve or cap **20** held in place by lever arms, indicated generally at **22**. The lever arms **22** comprise brace members **24**, secured to the valve body at one end and connected with a fluid dispersing flange **26** at their other end. A release lever **28**, substantially L-shaped in side elevation (FIG. 2), has the free end portion of its foot portion **30** contacting the juncture of the arcuate arms **24** and its leg portion **32** projecting toward the valve body **12** in spaced relation with respect to the arcuate arms **24**. A strut **34** bears against the cap **20**, at one end, and against the foot portion **30** of the L-shaped lever, at the other end, in off-set relation with respect to the axis of the orifice **18** so that movement of the lever leg portion **32** away from the strut permits fluid pressure contained by the line **16** to unseat the cap **20** and discharge water against the flange **26** which in turn forms a downwardly directed spray of the fluid from line **16**. The above description is conventional with this type of sprinkler head and is set forth to show the operability of the instant invention.

The electrically fusible link is indicated generally at **40** and comprises a plate portion **42** and a fusible wire **44**. The plate **42** is substantially U-shaped in plan view (FIG. 3) and surrounds an intermediate portion of the strut **34** which is normally disposed adjacent the bight portion **36** of the plate. A retaining plate **46** spans and contiguously contacts the leg portions **48** of the U-shaped plate. The retainer plate **46** is preferably connected with the plate legs **48** by soldering, for the purposes presently explained, and both the U-shaped plate legs **48** and retainer plate **46** may be dimpled, as indicated at **49**, to insure a rigid connection.

In carrying out the invention, the L-shaped lever **28** is preferably provided with a cross bar **50** secured to the free end of its leg portion **32** to form a T-shape for this end portion of the leg of the L-shaped lever, as shown in FIG. 1. The wire **44** is preferably nichrome wire of **34** gauge and is secured at one end, as by soldering, as at **52**, to the lever cross bar **50** and strung in a weaving action around and between a plurality of prongs or pins **54** secured, in cooperating spaced relation, to the cross bar **50** and adjacent end portion of the U-shaped plate **42**. The other end portion of the nichrome wire is extended through an aperture **56** formed in the plate **42** and is secured therein by a ball or lump of solder **58** diametrically greater than the diameter of the opening **56**. The pins **54** are electrically insulated from the lever cross bar **50** and plate **42** in any well known conventional manner, such as electrical insulating pads **57** bonded to the cross bar **50** and plate **42**. Alternatively the lever **28** and strut **34** may be formed from dielectric material. The nichrome wire is in turn secured at its juncture with the solder lump or restriction **58** to one end of a wire **60** forming an electrical circuit **62**. The electrical circuit **62** comprises a

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source of electrical energy, such as a 12 volt battery B, or the like, connected in series with the wire 60 through a switch S. The switch S forms a part of or is closed by a fire detecting signal head H which may be one of any conventional type of smoke or fire detector.

Referring more particularly to FIG. 5, a fragment of another type sprinkler head is illustrated which employs a pair of arms 70 and 72 normally biased away from each other at one end by their other ends being juxtaposed in off-center frictional engagement between an orifice closing valve or cap 74 and a dispensing flange 76. In this embodiment the U-shaped plate 42 is similarly connected with the free end portion of the arm 72 and a substantially identical opposite plate 42' engages the free end of the other arm 70 with both plates 42 and 42' being provided with a plurality of the pins 54 for similarly receiving a winding of the nichrome wire 44 similarly connected with the circuit wire 60.

OPERATION

34 gauge nichrome wire has a resistance of 17.0 ohms per foot. The wire 44 comprises 2½ inches of such wire having a resistance of 3.57 ohms. Applying Ohms Law 3.36 amps. will be required at 12 volts or 40.34 watts to fuse the wire quickly. The tensile strength of the wire 44 is 8.67 pounds which is multiplied by the manner in which the wire 44 is laced or wound between the pins 54. In the event of fire or smoke detection, the detector head H closes the switch S completing a circuit to ground through the wire 44 which fuses, releasing the levers 22 of FIG. 1 or the levers 70 and 72 of FIG. 5, thus actuating the respective sprinkler head. The purpose of the sandwiched solder juncture of the plates 42 and 46 is to insure that the solder joining these plates will be melted by ambient heat in the event of a malfunction of either the detector head H or circuit connected with the wire 44.

Obviously the invention is susceptible to changes or

alterations without defeating its practicability, therefore, I do not wish to be confined to the preferred embodiment shown in the drawings and described herein.

I claim:

- 1. An electrically actuated release for an individual sprinkler head having a body including a cap normally closing an orifice axially aligned with a water deflector and having lever means interposed between the cap and water deflector with at least one portion of the lever means being separable from another portion to release the cap, the improvement comprising:
 - lever connecting means including an electrically fusible strand normally preventing separating movement between said lever means; and,
 - an electrical circuit including a normally open switch connecting a source of electrical energy to ground through said strand.
- 2. The combination according to claim 1 and further including:
 - a detector head connected with said circuit for closing said switch in response to a predetermined condition.
- 3. The combination according to claim 2 in which said lever connecting means includes:
 - plate means connected with said separable portion of said lever means; and,
 - at least one pin secured to each said plate means in dielectric relation,
 - said strand extending between said pins in wrap-around relation.
- 4. The combination according to claim 3 in which at least one of said plate means includes:
 - a U-shaped plate including leg portions surrounding an intermediate portion of said separable portion of said lever means in straddling relation; and,
 - a retainer plate extending between and soldered to said plate leg portions in superposed relation.

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