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**SPRINKLER HEAD FOR DRY POWDER FIRE
EXTINGUISHING CHEMICALS**

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Filed Feb. 15, 1960, Ser. No. 8,888

1 Claim. (Cl. 169-37)

This invention relates to sprinkler heads for dispensing dry powder fire extinguishing chemicals and more particularly it relates to sprinkler heads having heat sensitive fuses or plugs adapted to melt upon exposure to a pre-determined intensity of heat.

It is an object of this invention to provide a sprinkler head or valve for dispensing dry powder fire extinguishing chemicals upon exposure to heat of a pre-determined intensity.

It is another object to provide a sprinkler head having a metallic alloy fuse for retaining said sprinkler head in a non-operative condition.

It is a further object to provide a sprinkler head having fuse means which functions both as a sealing material to effect a gas-tight seal and also as a means of setting off the sprinkler head upon exposure to a heat of a pre-determined number of degrees of temperature.

It is another object to provide a sprinkler head which in operation disperses a relatively uniform cloud upon an adjacent fire.

These and other objects of this invention will become apparent upon reading the following descriptive disclosure taken in conjunction with the accompanying drawing of an illustrative embodiment in which:

FIG. 1 is a side elevation view of the sprinkler head disposed in a ceiling and showing the conduit connection to a storage tank containing dry powder, for example, sodium bicarbonate, under relatively high pressure of nitrogen gas,

FIG. 2 is a vertical section view of the sprinkler head in its non-operative condition,

FIG. 3 is a front view, broken-away in part, of the sprinkler head showing the flared skirt element used to disperse dry powder in a circular manner.

FIG. 4 is an enlarged vertical section view of the sprinkler head showing the piston valve in operative position and the manner of ejecting dry powder upon the sloping wall of the skirt element, and

FIG. 5 is a perspective view of the piston used to disperse dry powder in a circular manner.

Turning to the drawing, a sprinkler head 10 is secured, for example, to the wallboard 11 of a ceiling by a pair of conventional washers 12. A pressure resistant tank 13 containing suitable dry powder fire extinguishing chemicals, for example, sodium bicarbonate, is secured to the rafters 14 by means of suitable conventional supports 15. The dry powder in tank 13 is under nitrogen gas pressure of relatively high intensity, for example one hundred pounds per square inch. A conduit 16 is secured to the sprinkler head by means of a suitable partly threaded nut 17 having a polygonal surface for engagement with a wrench.

The securing of the conduit 16 both to the tank 13 as well as to the sprinkler head 10 is in a gas tight manner so that the high pressure nitrogen gas in the tank 13 is also in communication with the sprinkler head 10 at all times during operation. A valve 18 is provided in conduit 16 for turning off the communication between the sprinkler head 10 and the tank 13 in the event the head 10 needs to be disengaged as for repairs or replacement.

To effect the gas tight seal at the sprinkler head 10,

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a suitable coupling nut 19 is provided. As shown in FIG. 2 the conventional nut 17 is soldered by solder 20 to the conduit 16 and the conventional coupling nut 19 is secured by means of a pair of resilient O-rings 21 to the nut 17 and the sprinkler head 10.

The sprinkler head 10 of this invention consists of a suitable tubular element 22, a flared skirt element 23 and a piston 24.

The tubular element 22 is provided with a threaded section 25 at its rear end and with a hexagonal section 26 at its front end for convenient engagement with a wrench. Clearly a round or non-polygonal front end is operable where for example, a pipe wrench is used to screw element 22 into the nut 19.

As shown in FIG. 2 the interior of the tubular element 22 is provided with a suitable ledge 27 adapted to arrest the forward movement of a suitable collar on the piston 24.

The piston (FIG. 5) is a cylindrical cup-like element provided with a solid front wall 28. The cylinder wall 29 of the piston 24 is provided with a plurality of suitable circumferentially disposed apertures 30 suitably close to the front wall 28. The piston 24 is provided with a rear collar 31 for engagement with the ledge 27 of the tubular element 22.

The flared skirt element 23 is provided with an integral tubular portion 32 having a threaded aperture 33 therein for receiving a set-screw 34 thereby locking said skirt element to the hexagonal portion of the tubular element 22. The skirt element 32 has a flared portion 35 having an interior surface preferably of about a 45 degree slope to the horizontal plane.

In order to hold a suitable amount of predetermined low melting point alloy 36 between the tubular element front portion 25 and the top wall 28 of the piston 24, the piston is provided with an annular beveled area 37 and the borehole of the tubular front portion 25 is provided with an annular funnel area 38.

In operation, the piston 24 is placed into and then moved in the borehole of the tubular element 22 until the front wall 28 of the piston is substantially in the same plane as the front wall 25X of front portion 25 of said element 22. Low melting conventional alloy having a suitable melting point is melted and poured into the channel formed between the tubular element funnel area 38 and the annular area 37 of the piston 24. Upon cooling the piston 24 is secured immovably and in an air tight sealed relationship to the tubular element 22.

The strength of the seal effected by the alloy 36 may be tested by subjecting the sealed sprinkler head 10 (FIG. 2) to high pressure such as is used in tank 13. The tested sealed sprinkler heads 10 are then placed into the ceiling 11 and secured by means of conduits 16 to a tank 13. Upon turning the valves 18 the pistons 24 are subjected to the nitrogen gas pressure of tank 13 since they are in direct communication with this gas.

Thus the pistons 24 are under the same gas pressure as that in tank 13 when the sprinkler heads are in their fused condition.

Should a fire occur under or near a fused sprinkler head 10, the heat of the fire would heat the metal sprinkler head 10 especially the skirt portion 35 until the predetermined temperature is reached whereupon the alloy fuse 36 melts and the piston 24 is projected outwardly until piston collar 31 engages the ledge 27 of the tubular element (FIG. 4). In this position the apertures 30 of the piston extend beyond the front wall 25X of the tubular portion 25 so that the dry powder chemicals stream from these apertures with great force due to the nitrogen gas pressure. The dry powder chemicals impinge upon the interior sloped surface of

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the flared skirt portion 35 and are directed downwardly as a dense cloud upon the fire, extinguishing it rapidly.

After the fire is extinguished the sprinkler heads 10 are easily disengaged from nut 19 by loosening set screw 34 and pushing up the flared skirt element 23 up the element 22 until the hexagonal portion 25 of the element 22 is exposed for easy engagement with a wrench.

The disengaged heads are then re-fused and returned to the ceiling.

This invention has been described by means of an illustrative embodiment, but clearly it is of greater scope than this embodiment as defined in the claim herein.

We claim:

A stationary sprinkler head for permanently installed fire fighting equipment for dispensing dry powder fire extinguishing chemicals comprising a fixed cylindrical tubular element having an annular front wall and an inwardly beveled borehole and having also an internal circular ledge in said borehole and an external circular ledge adjacent said front wall; a moveable cylindrical piston slideably and captively disposed in said tubular element, said piston having a front solid portion having a front end wall having a beveled circular edge adapted to co-act with the beveled borehole and an integral rear tubular portion having a plurality of apertures circularly

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disposed adjacent said solid portion, said rear portion having a circular flange adapted to engage said inner ledge of said tubular element; a circular flared skirt element having an integral cylindrical portion having a borehole therein having an inner ledge adapted to engage the external ledge of said cylindrical tubular element; means for removeably securing said skirt element to said cylindrical element, and circular heat fusible means securing said piston to the beveled edge of said borehole of said tubular element whereby said heat fusible means are heat exposed to heat of conduction, heat of convection and heat of radiation of a fire therebelow.

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