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[54] **FLUSH-TYPE SPRINKLER**
7 Claims, 9 Drawing Figs.

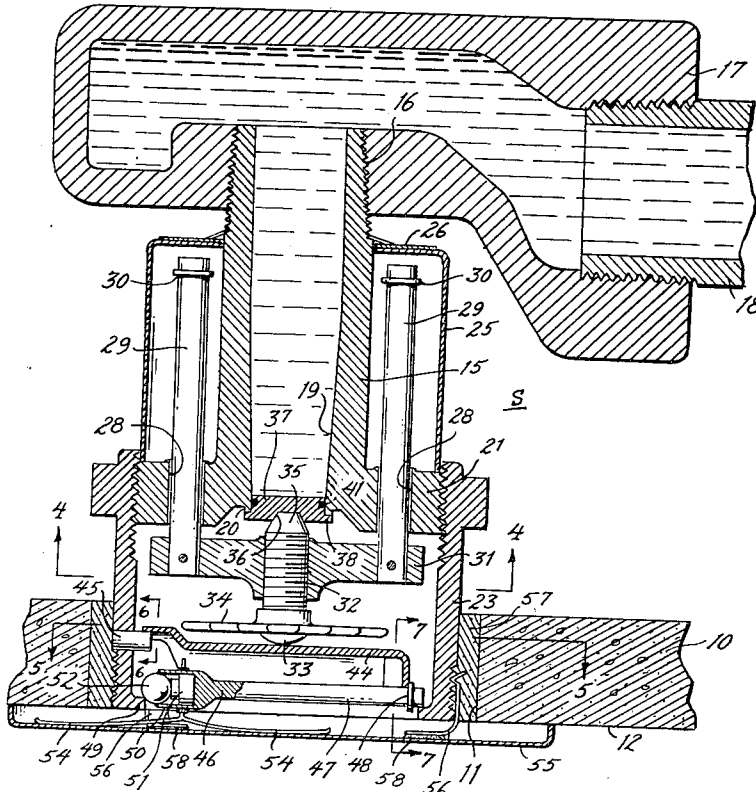
[52] U.S. Cl..... 169/40
[51] Int. Cl..... A62c 37/08
[50] Field of Search..... 169/37, 38,
39, 40, 41

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ABSTRACT: A sprinkler is provided mounted flush in a ceiling and has an outer escutcheon plate releasably held in place by heat-responsive elements having a selected release temperature. The escutcheon plate is normally in covering relation to a sprinkler which has a strut containing a heat-responsive element having a different selected release temperature. Heat-sensing fins movable downwardly below the ceiling line upon release of the escutcheon plate contribute to sensitivity.



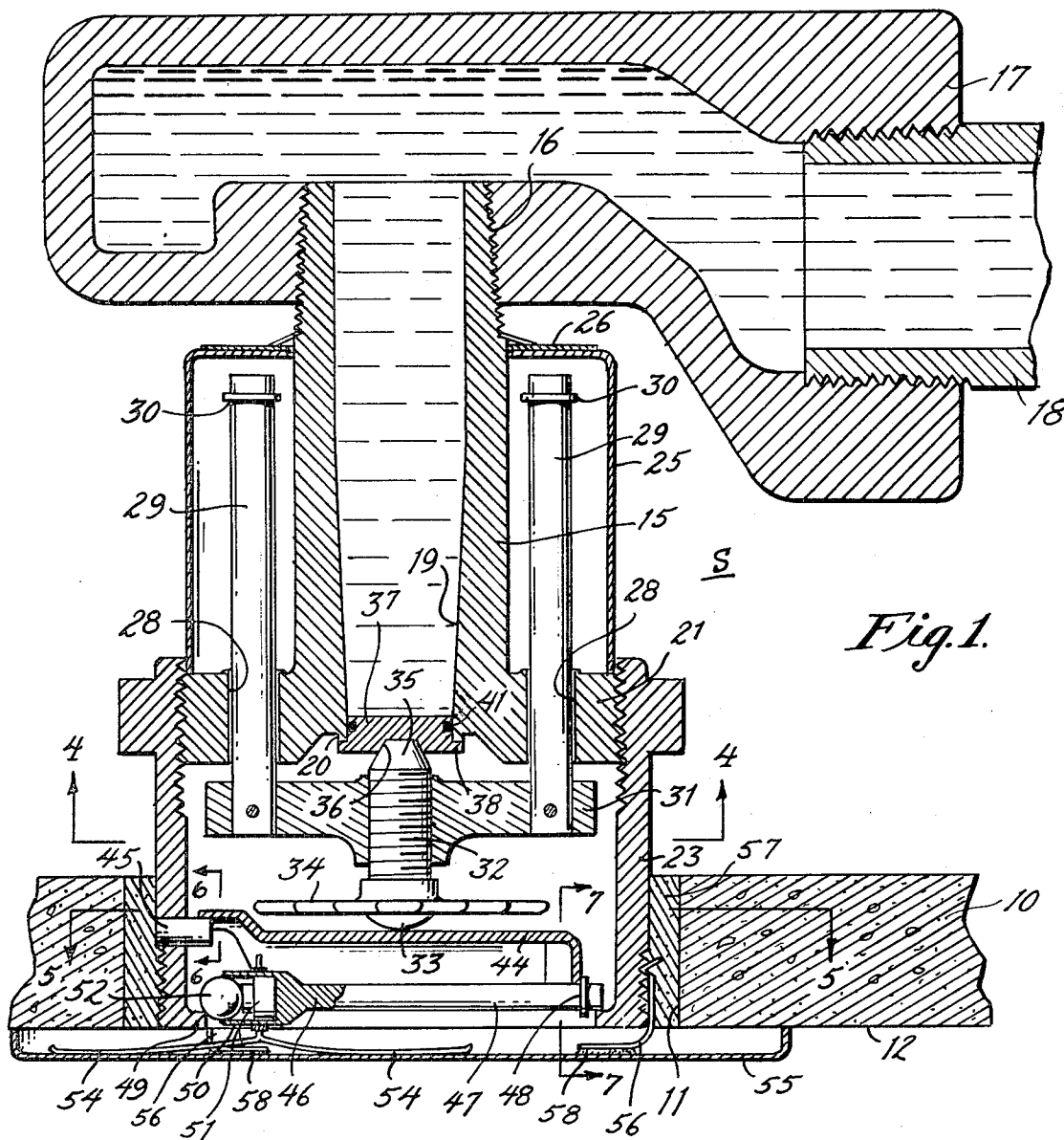


Fig. 1.

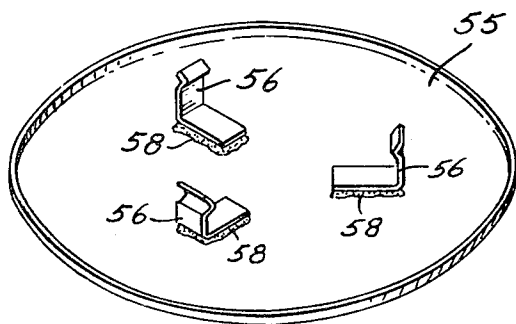
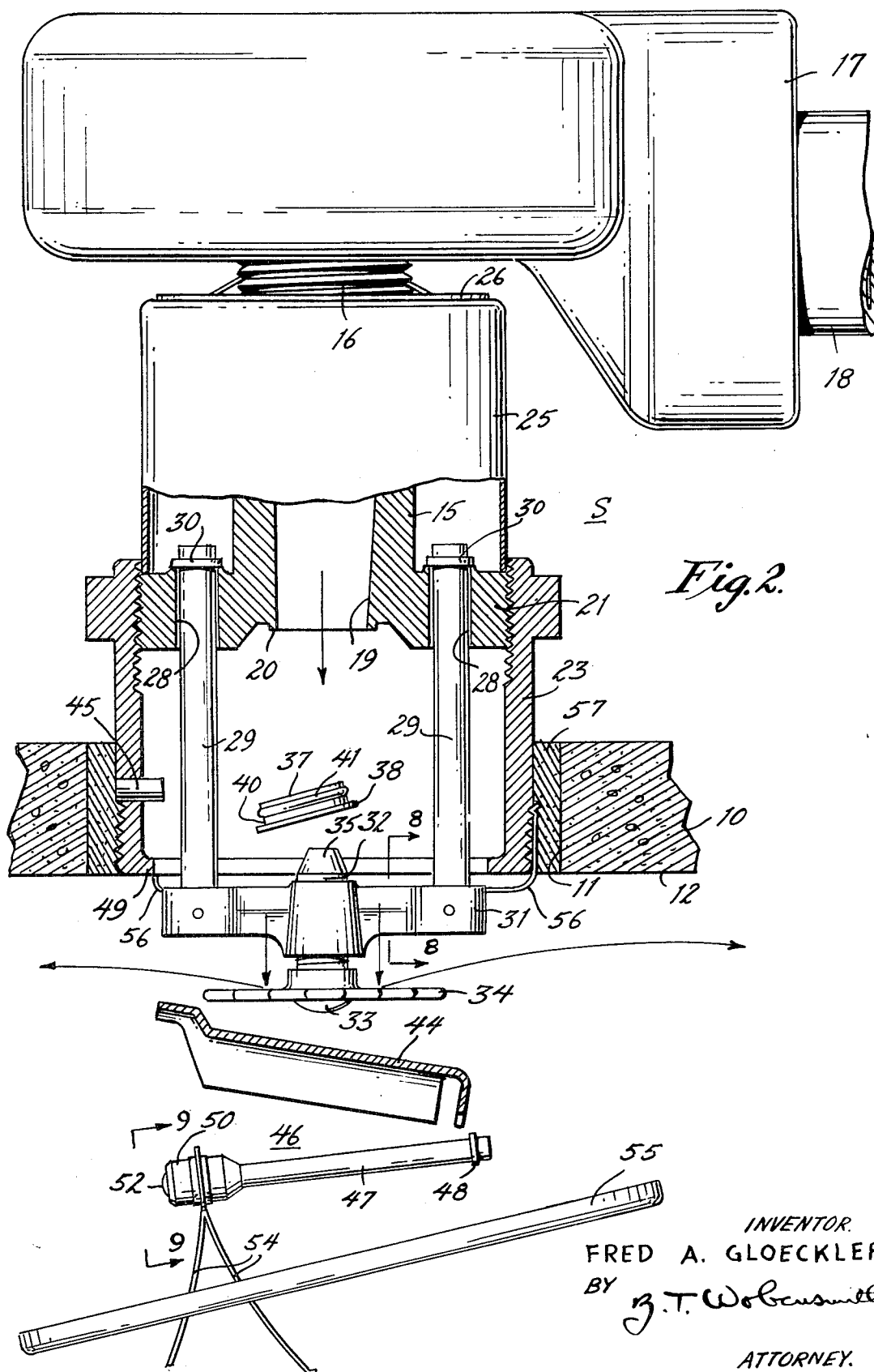


Fig. 3.

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Fig. 4.

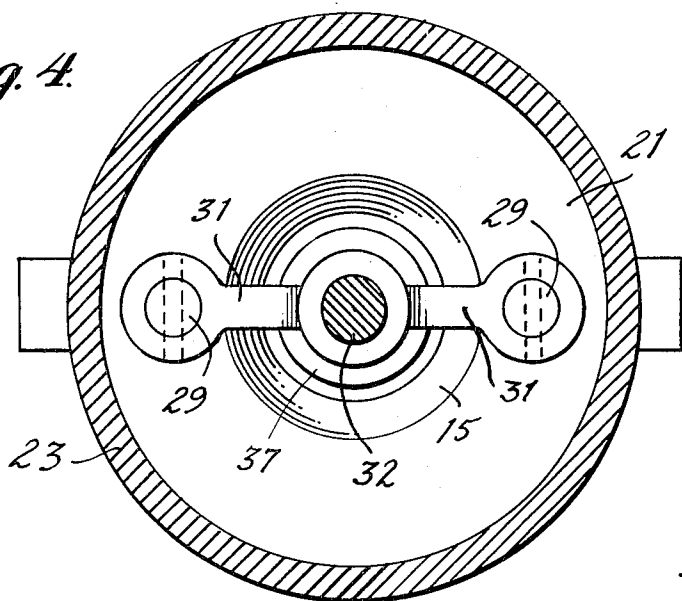
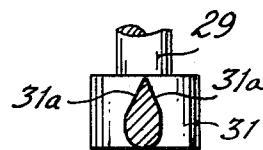


Fig. 8.

Fig. 5.

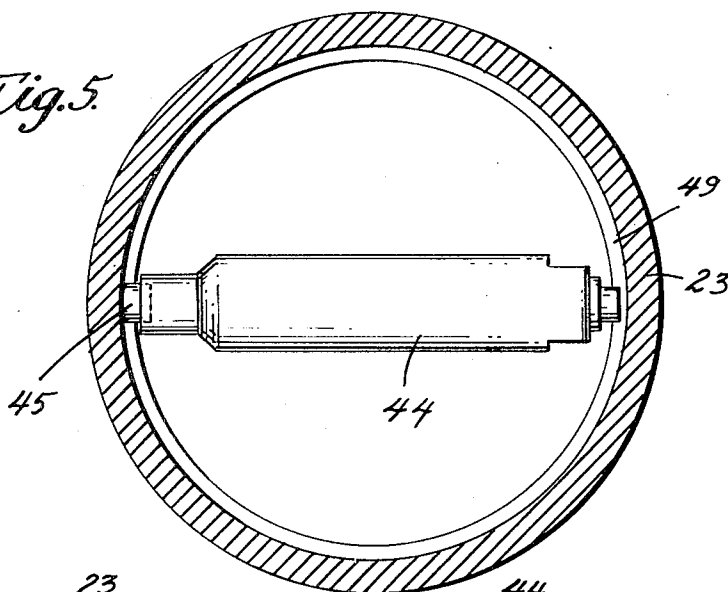
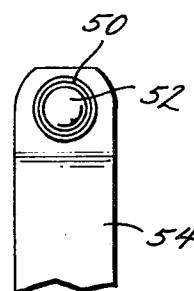


Fig. 9.

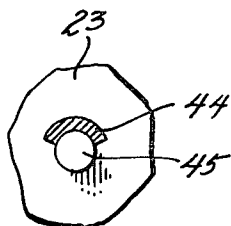


Fig. 6.

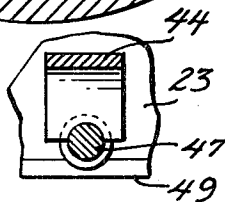


Fig. 7.

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FLUSH-TYPE SPRINKLER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to sprinklers and more particularly to sprinklers flush-mounted in a ceiling and releasable when predetermined temperatures are attained.

2. Description of the Prior Art

Various types of sprinklers flush-mounted at the ceiling have been proposed but these have not proven wholly satisfactory particularly because of lack of reliability of response, lack of sensitivity, and for other reasons.

SUMMARY OF THE INVENTION

In accordance with the invention a sprinkler is provided having a sprinkler valve disposed above the level of a ceiling, the valve being retained in closed position by a strut and lever, the strut being releasable at a predetermined temperature. The strut is provided with heat-sensing fins which are normally held in a horizontal position by an escutcheon plate which covers the valve and its release mechanism. The escutcheon plate is held by elements which release it when a predetermined temperature occurs at the plate and the falling of the escutcheon plate permits the heat-sensing fins to fall and be exposed to the conditions prevailing in the vicinity.

It is the principal object of the invention to provide a sprinkler flush-mounted at the ceiling and concealed by an escutcheon plate, both the escutcheon plate and the sprinkler valve being releasable responsive to predetermined temperatures.

It is a further object of the invention to provide a sprinkler of the character aforesaid in which the release of the escutcheon plate is utilized to position movable heat-sensing fins in a more effective location to control the sprinkler valve release.

It is a further object of the invention to provide a sprinkler flush-mounted at the ceiling in which an escutcheon plate effectively screens the sprinkler from view but does not prevent water release when needed.

It is a further object of the invention to provide a sprinkler of the character aforesaid which is simple in construction and reliable in its operation.

Other objects and advantageous features of the invention will be apparent from the description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part thereof, in which:

FIG. 1 is a vertical sectional view of a sprinkler in accordance with the invention ready for use when required;

FIG. 2 is a view partly in vertical section and partly in elevation showing the release of the escutcheon plate and the release of the sprinkler valve;

FIG. 3 is a view in perspective of the escutcheon plate and its mounting as seen from the interior thereof;

FIG. 4 is a transverse sectional view, enlarged, taken approximately on the line 4-4 of FIG. 1;

FIG. 5 is a transverse sectional view, enlarged, taken approximately on the line 5-5 of FIG. 1;

FIG. 6 is a fragmentary vertical sectional view, enlarged, taken approximately on the line 6-6 of FIG. 1;

FIG. 7 is a fragmentary vertical sectional view, enlarged, taken approximately on the line 7-7 of FIG. 1;

FIG. 8 is a fragmentary vertical sectional view, enlarged, taken approximately on the line 8-8 of FIG. 2; and

FIG. 9 is a fragmentary vertical sectional view, enlarged, taken approximately on the line 9-9 of FIG. 2.

It should, of course, be understood that the description and drawings herein are illustrative merely and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, a portion of a ceiling 10 is illustrated, with an opening 11 therein at which the sprinkler S to be described is mounted, and with a lower face 12.

The sprinkler S includes a body 15 in threaded engagement at its upper end 16 in a flush elbow or water-supply fitting 17, and with which a water supply pipe 18 is in threaded engagement.

The body 15 has an internal tapered bore 19 with a rim 20 at the lower end thereof.

The body 15 has a transverse flange 21 with a cylindrical frame 23 in threaded engagement therewith.

A cover 25 is provided held in place by a collar 26 carried on the threaded end 16.

The flange 21 has a pair of spaced openings 28 therein for the reception of a pair of guide rods 29 which have stop collars 30 at their upper ends to limit the downward movement thereof. The rods 29 are carried at their lower ends in a crosshead 31 which has inclined faces 31a to facilitate fluid delivery. A compression screw 32 in threaded engagement in the crosshead 31 has a head 33 thereon and carries a baffle plate 34. The screw 32 has a conical terminal end 35 which is engaged in a complimentary opening 36 in a piston or valve plug 37.

The valve plug 37 has a lower rim 38 which engages the rim 20 and a plug portion 40 which extends upwardly in the bore 19. The plug portion 40 has a peripheral packing 41 such as an O-ring for preventing fluid leakage.

The screwhead 33 has an actuator lever 44 engaged therewith. The lever 44 is supported at one end on a pin 45 carried in the frame 23 and has its opposite end in engagement with a heat-releasable strut 46.

The strut 46 has a rod portion 47 with a locating collar 48. The end of the rod portion 47 is supported on an inwardly extending rim 49 on the frame 23.

The strut 46 at the other end thereof has a cup portion 50 within which an insert 51 is provided of fusible eutectic alloy material, and melting at a predetermined temperature. In a particular embodiment this temperature can be 135° F. The insert 51 normally retains a ball 52 in its outward position and bearing on the rim 49, but upon melting permits the ball 52 to move inwardly in the cup portion 50 from its support position to a release position.

The outer surface of the cup portion 50 has secured thereto metallic ribbon like heat-sensing fins 54, of which are normally held in substantially horizontal positions by an escutcheon plate 55 but the free end of which can swing downwardly when released.

The escutcheon plate 55 covers the opening 11 in the ceiling 10 and is supported by clips 56 which engage between the frame 23 and a filler ring 57.

The clips 56 are secured to the escutcheon plate 55 by an eutectic alloy 58 which in a particular embodiment melts at 117° F.

The mode of operation will now be pointed out.

The sprinkler S as shown in FIG. 1 is ready and in condition for operation when required.

If the ambient temperature at the escutcheon plate 55 rises to the set temperature, that is to an extent to melt the eutectic alloy at 58, the escutcheon plate 55 will be released from the clips 56 and fall. The free ends of the heat-sensing fins 54 will then fall and these are effective for heat transfer to the strut 46.

If and when the temperature effective on the insert 51 reaches the set value, i.e., the temperature at which the insert melts the pressure effective from above on the strut 46 and therefrom onto the ball 52 causes the ball 52 to move inwardly so that the strut 46 is also urged downwardly by force imparted thereto through the actuator lever 44 by the screw 32.

The strut 46 and lever 44 drop and the valve plug 37 is moved outwardly and downwardly by the water pressure thereon.

The crosshead 31 and guide rods 29 drop to the extent permitted by the stop collars 30.

Water discharging through the bore 19 strikes the baffle plate 34 by which it is diverted outwardly in a well-known manner.

It will thus be seen that simple but effective structure has been provided for carrying out the objects of the invention.

I claim:

1. A sprinkler for mounting in a ceiling comprising a body with a frame normally disposed above the lower face of the ceiling, said body having a fluid supply connection and a discharge bore, a valve plug normally closing said bore, a member slidably mounted with respect to said body and carrying a baffle plate for diverting water discharged from said discharge bore, and means engaged with said member for retaining said valve plug in closed position including first temperature-sensitive means responsive to a predetermined temperature carried by said frame, a cover plate disposed on the lower face of the ceiling in covering relation to said frame, second temperature-sensitive means responsive to a predetermined temperature releasably retaining said cover plate in position, and cover-plate-mounting clips in engagement with said frame, and said second temperature-sensitive means being interposed between said clips and said cover plate.
2. A sprinkler as defined in claim 1 in which said slidably mounted member has a compression screw engaged therein for retaining said valve plug in position.

3. A sprinkler as defined in claim 1, in which said second temperature-responsive means is responsive to a lower temperature than the first temperature-responsive means.

4. A sprinkler as defined in claim 1 in which said means for retaining said valve plug includes an actuator lever pivotally carried by said frame and in engagement with said first temperature-sensitive means.

5. A sprinkler for mounting in a ceiling comprising a body with a frame normally disposed above the lower face of the ceiling,

said body having a fluid supply connection and a discharge bore,

a valve plug normally closing said bore,

a member slidably mounted with respect to said body and carrying a baffle plate for diverting water discharged from said discharge bore, and

means engaged with said member for retaining said valve plug in closed position including first temperature-sensitive means responsive to a predetermined temperature carried by said frame,

a cover plate disposed on the lower face of the ceiling in covering relation to said frame, and

second temperature-sensitive means responsive to a predetermined temperature releasably retaining said cover plate in position,

heat-transmitting members being provided on said first mentioned temperature-sensitive means.

6. A sprinkler as defined in claim 5 in which

said heat-transmitting members are releasably held in predetermined positions by said cover plate.

7. A sprinkler as defined in claim 6 in which

said heat-transmitting members are metallic ribbons with pendant free ends in released position.

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