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FUSIBLE LINK CONSTRUCTION FOR SPRINKLER HEADS

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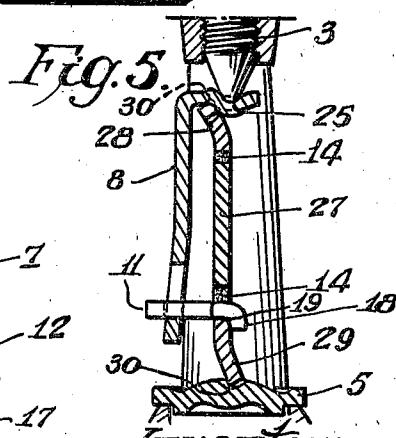
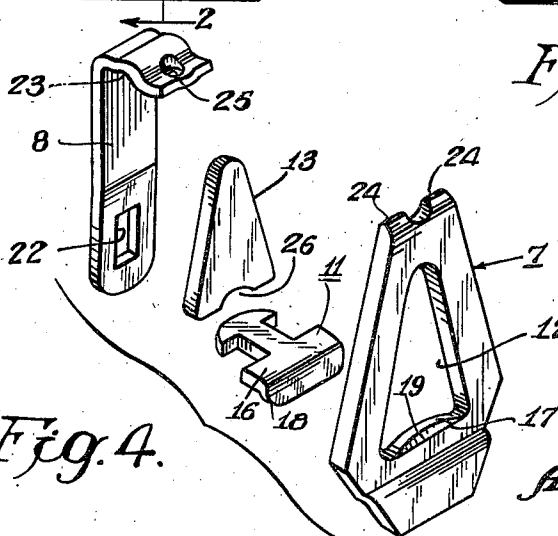
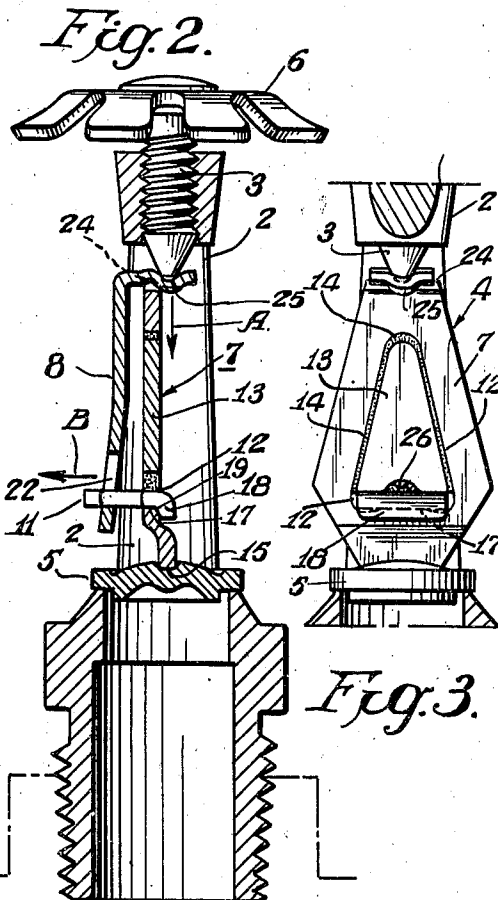
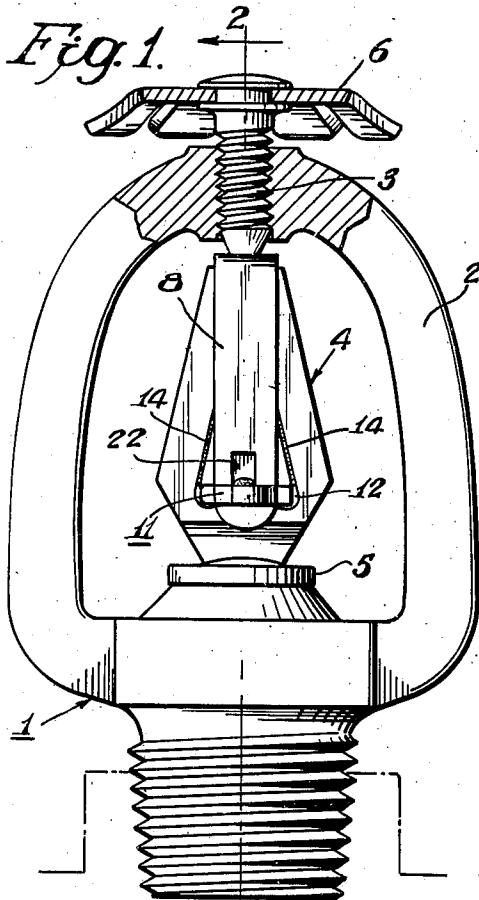


Fig. 4.

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FUSIBLE LINK CONSTRUCTION FOR
SPRINKLER HEADS

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8 Claims. (Cl. 169—39)

This invention relates to fusible links for automatic sprinkler heads.

One object of the invention is to provide a link well adapted for manufacture from available materials with a minimum waste in the process of manufacture.

Another object is to provide a link of the above character which shall possess in high degree the functional efficiency required in a device of this character.

The invention resides also in certain structural details and in the novel arrangement of elements hereinafter described and illustrated in the attached drawing in which:

Fig. 1 is a side view partly in section of a sprinkler head provided with a fusible link made in accordance with my invention;

Fig. 2 is a section on the line 2—2, Fig. 1;

Fig. 3 is a fragmentary side view showing the opposite side of the fusible link from that shown in Fig. 1;

Fig. 4 is an exploded view illustrating in perspective the several major elements of the link assembly, and

Fig. 5 is a fragmentary sectional view corresponding to Fig. 2 and illustrating a modification within the scope of the invention.

With reference to the drawing, 1 indicates a sprinkler head of known form, said head comprising a yoke 2 holding a screw 3 which functions normally through the fusible link 4 to retain in place in the head a valve disk 5. In accordance with the usual practice, the screw 3 carries at its outer end a spreader element 6 which, when the disk 5 is displaced and the sprinkler head thereby opened, deflects and breaks up the escaping jet of water or other fire extinguishing medium and distributes the medium over the area embraced by the sprinkler head.

As illustrated, the fusible link 4 comprises a rigid strut member 7, a lever element 8, which is fulcrumed on one end of the said strut, and a tension element 11 which is interlocked with the lever 8 at one side of the fulcrum and is detachably engaged in an aperture 12 in the strut 7, said tension element being normally retained in said engagement by heat sensitive means including a rigid element 13 which occupies a position within the aperture 12 of the strut and normally held in said position by a suitable fusible composition 14. In the sprinkler head one end of the strut member seats in a recess 15 in the valve disk 5 and the link is placed under compression between the closure element 5 and the screw 3 by turning the latter inwardly against the lever 8

as illustrated in Fig. 2. It is apparent that the pressure of the screw 3 upon the lever at one side of the fulcrum in the direction indicated by the arrow A in Fig. 2 tends to turn the lever on the fulcrum in clockwise direction as viewed in said figure and thereby tensions the element 11 in the direction indicated by arrow B tending to withdraw the element 11 from its engagement with the strut 7. This withdrawal is normally prevented by the member 13 and the solder 14, as explained above.

The forms of the various elements of the linkage is illustrated in Fig. 4. The strut 7 tapers toward each end and the triangular opening 12 may be formed by stamping out of the solid plate a triangular section which may then function as the element 13. As shown in Fig. 3, the element 13 is slightly smaller than the aperture 12 so as to provide clearance at the sides and top for the fusible composition 14 and to provide space at the bottom for reception of the tension element 11. This element, as shown in Fig. 4, has an end portion 16 which fits into the relatively large lower end of the opening 12 and seats upon the slightly crowned bottom wall 17 of this opening, this slight crown reducing the area of contact between element 11 and the strut 7. The outer extremity of the end portion 16 of the tension element is turned to form a slight hook, as illustrated at 18 in Fig. 2, this hook engaging the beveled edge 19 of the bottom wall 17 of the opening 12 so as to provide a mechanical interlock. This interlock, while ineffective to hold the element 11 in the strut against the tension previously described in the absence of the element 13 and the fusible composition 14, is sufficient to relieve the solder of a major portion of the strain particularly tensional. It is to be noted that in assembly, the element 13 seats upon the upper surface of the element 11 where it is held by the solder 14. By reason of the hooked formation 18 of the tension element and its engagement with the bottom wall 17 of the opening 12, withdrawal of the element must be accompanied by some displacement of the locking element 13 toward the apex of the triangle. This essential movement of the element 13 is normally prevented by the body of solder which lies between the sides and apex of the element and the opposed edge of the opening 12, the solder acting almost entirely in compression.

The opposite end of the element 11 is formed with lateral projections for positive interlock with the arm of the lever element 8, said arm having at its outer end an aperture 22 which per-

mits insertion of the end of the element 11 in one plane but precludes retraction of the element when the latter is turned to the position which it occupies in the assembly link.

The lever 8 is formed with a pressed out recess 23 at its under side which forms a seat for the rounded edge 24 of the strut 7. To one side of the recess 23 and in the outer surface of the lever is a recess 25 which forms a socket for reception of the tip of the screw 3, and since it is desirable that the screw shall engage the lever at a point close to the fulcrum constituted by the upper edge 24 of the strut, this upper edge 24 is recessed as indicated so as to provide clearance for the projection on the under side of the lever below the socket, as best shown in Fig. 2. It will be noted that the lower end of the strut 7, which seats in the disk 5, is offset laterally from the normal plane of the strut to an extent bringing it into alignment with the socket 25 and the axis of the screw 3.

It is preferred to have the tension element 11 fixed with respect to the strut 7 and to this end the bottom of the element 13 is provided with a recess 26 which receives some of the fusible composition 14 as illustrated in Figs. 2 and 3 whereby the element 11 is in effect, soldered to the element 13. When the linkage is assembled in the sprinkler head, it is placed under relatively high compression between the disk 5 and the screw 3 as previously set forth, said compression tending to separate the element 11 from the strut 7 and such separation being positively prevented by the element 7 as long as the fusible composition remains solid. Softening of the fusible composition under heat releases the element 13 and permits the tension on the element 11 to displace both of the elements from the strut thereby releasing the lever element 8 and permitting the system pressure below the disk 5 to displace the disk from the sprinkler head.

The embodiment of the invention shown in Fig. 5 corresponds with the embodiment previously described with the exception of a change in the form of the strut member. In this case the strut 27 (corresponding to the strut 7 of the other embodiment) is angularly offset at the ends as shown at 28 and 29 so that the angular edges or corners 30 of the end surfaces, rather than the surfaces themselves, define the effective extremities of the strut and seat against the opposed surfaces of the lever element 8 and valve disk 5 respectively. This avoids necessity for special shaping of the ends of the strut, for example the rounding of the edges as in 24, Fig. 4, and increases sensitivity of the device by insuring a prompt displacement of the strut from the lever and disk when the solder 14 fuses under heat.

I claim:

1. In a fusible link, a strut member having an opening, a lever element fulcrumed on one end of the strut, a tension element interlocked with the lever at one side of the fulcrum and having an end thereof detachably engaged in the strut opening, a locking element loosely inserted in said opening and coacting with the tension element to retain the latter in said opening, and a fusible composition normally retaining the said element in locking position in the opening, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

2. In a fusible link, a strut member having an opening, a lever element fulcrumed on one end of

the strut, a tension element interlocked with the lever at one side of the fulcrum and having an end thereof detachably engaged in said opening, a locking element loosely inserted in said opening for retaining the tension element in the latter, and a fusible composition securing said element in locking position and to both the strut and the tension element, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

3. In a fusible link, a strut member having an opening, a lever element fulcrumed on one end of the strut, a tension element interlocked with the lever at one side of the fulcrum and having an end portion extending into said opening, said opening having a bowed edge portion for engagement with one face of the tension element and the latter element having a turned over extremity forming an inclined hook for interlocking engagement with said edge, a locking element mounted in said opening and engaging the opposite face of the tension element, said locking element having clearance with the edges of said opening, and fusible composition in the clearance space to retain the said element in locking position, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

4. In a fusible link, a strut member having a triangular opening, a lever element fulcrumed on one end of the strut and having at one side of the fulcrum an extension substantially parallel to the plane of the strut and overlying one side of said opening, a tension element interlocked with the outer end of said extension and detachably engaged in said opening and at the base of the latter; and a triangular insert for said opening, said insert having clearance with the edges of said opening and being secured in the latter by means of a fusible composition so as to retain the tensioning element in the opening, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

5. In a fusible link, a strut member having an end thereof offset angularly from the plane of the strut so that the effective extremity of the strut at that end is defined by an angular edge of the normal end surface, a lever element fulcrumed on the other end of the strut, and heat sensitive means for releasably attaching the said lever at one side of the fulcrum to the strut, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the said angular edge at the opposite end of the strut.

6. In a fusible link, a strut member having the ends thereof offset angularly from the plane of the strut, so that the effective extremities of the strut are defined by angular edges of the respective normal end surfaces, a lever element fulcrumed on the said angular edge at one end of the strut, and heat sensitive means for releasably attaching the said lever at one side of the fulcrum to the strut, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the said angular edge at the opposite end of the strut.

7. In a fusible link, a strut member having an end thereof offset angularly from the plane of the strut so that the effective extremity of the strut

at that end is defined by an angular edge of the normal end surface, a lever element fulcrumed on said angular edge, and heat sensitive means for releasably attaching the said lever at one side of the fulcrum to the strut, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

8. In a fusible link, a strut member having an opening, a lever element fulcrumed on one end of the strut, a tension element interlocked with the lever at one side of the fulcrum and having an end thereof extending through said opening, and means for releasably retaining the said element

5 against retraction from the opening, said means including an angularly offset portion on the tension element for camming engagement against an edge of the opening, a locking element loosely inserted in the opening and normally holding the said tension element against said edge so that the offset portion may be effective to prevent retraction, and a fusible composition normally retaining the said locking element in operative position in the opening with respect to the tension element, said link being adapted to be placed under longitudinal compression by forces applied respectively to the lever at the other side of the fulcrum and to the opposite end of the strut.

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