Dec. 24, 1957 M. LEVY 2,817,734

FIRE ALARMS

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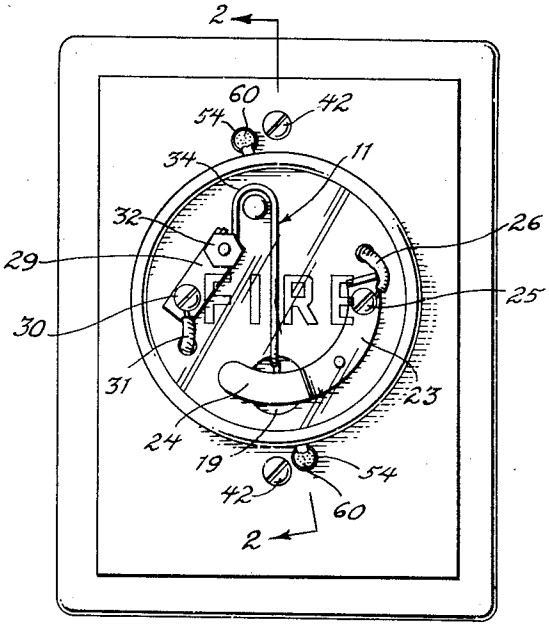


Fig. 1.

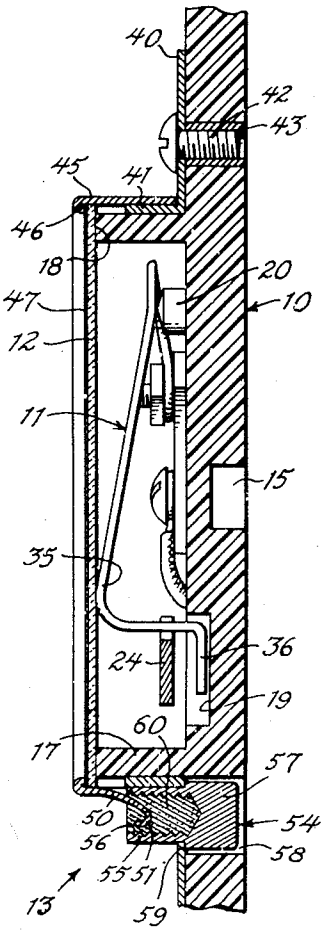


Fig. 2.

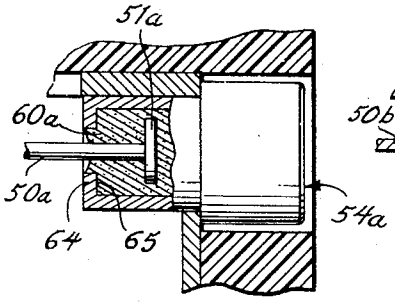


Fig. 3.

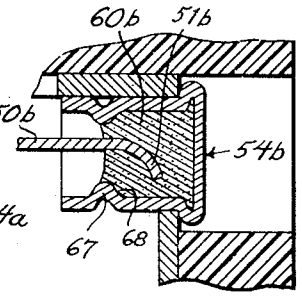


Fig. 4.

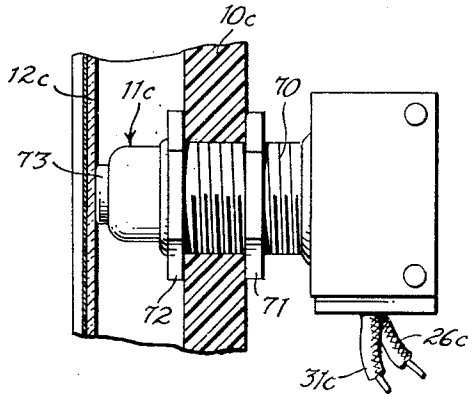


Fig. 5.

INVENTOR.
MORRIS LEVY
BY Robert K. Gaulie
ATTORNEY.

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FIRE ALARMS

Morris Levy, Philadelphia, Pa.

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6 Claims. (Cl. 200—142)

This invention relates generally to fire alarms, and is particularly directed to improvements in fire alarm stations of the type disclosed in my United States Patent No. 2,570,823.

In the constructions disclosed in the above mentioned patent, a switch is resiliently biased toward its closed position and retained in open condition by fusible means under tension, which means melts at elevated temperatures to release the switch to its closed position. As is well known to those versed in the art, relatively low melting point fusible materials, such as solder and the like, are relatively brittle and of low strength in their solid state, while such fusible material of progressively higher melting points are possessed of greater solid state strength. In particular, it has been found extremely difficult or impossible to employ solder or other fusible material having a melting point below 165° F. in fire alarm stations, as the fusible material cannot safely withstand normal vibration and other necessary conditions of use. Hence, although it is highly desirable to provide fire alarm stations which are actuable in response to ambient temperatures of less than 165° F., this has not heretofore been practicable for the reasons noted above.

Accordingly, it is a general object of the present invention to provide a fire alarm station of the type described which overcomes the above mentioned difficulties, and is capable of safe and positive actuation in response to ambient temperatures as low as approximately 136° F., without the possibility of inadvertent actuation even under extreme conditions of shock and vibration.

It is a more particular object of the present invention to provide a thermally releasable holding means for a fire alarm wherein a tension member is more firmly secured in position within a socket by a very low melting point fusible material.

It is a further object of the present invention to provide an improved fire alarm device having the advantageous characteristics mentioned in the foregoing paragraphs, which is simple and durable in construction, neat and attractive in appearance, entirely safe and reliable in operation, and which can be manufactured and sold at a reasonable cost.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

Figure 1 is a front elevational view showing a fire alarm station constructed in accordance with the present invention;

Figure 2 is a sectional view taken substantially along the line 2—2 of Figure 1, somewhat enlarged for clarity of understanding;

Figure 3 is a fragmentary, sectional elevational view showing a slightly modified construction of the present invention;

Figure 4 is a fragmentary, sectional elevational view showing a further modification of the present invention; and

Figure 5 is a fragmentary, sectional elevational view showing still another embodiment of the instant invention.

Referring now more particularly to the drawings, and specifically to Figures 1 and 2 thereof, the embodiment of the invention illustrated therein comprises a plate-like body or base, generally designated **10**, on the front of which is mounted a switch, generally designated **11**, resiliently biased forwards to a closed position. A frangible member or panel **12** is arranged in front of and in rearward bearing engagement with the switch **11**, and held in position by securing means, generally designated **13**, which is responsive to temperature increase to release the panel from its bearing engagement with the switch.

More specifically, the plate-like base or body **10** has its rear surface (to the right in Figure 2) generally flat and provided with a channel **15** for receiving wires connected to the switch **11**. On the forward or front surface of the body **10** is formed an annular outstanding wall or cylinder **17** having its forward edge **18** substantially parallel with the body **10** and defining an annular forwardly facing seat, for purposes appearing presently. Formed in the forward face of the base plate **10**, within the lower region of the cylinder **17**, is a forwardly opening recess **19**; and, a forwardly projecting boss **20** is formed on the front face of the base plate within and in the upper region of the cylinder **17**.

A generally arcuate conductor strip or bar **23** is secured to the forward face of the base **10** interiorly of the cylindrical wall **17**, and is arranged with one end portion **24** bridging the base plate recess **19**. A terminal post or fastener **25** is provided adjacent to the other end of the conductor **23**, to which is connected one end of an electric wire **26** extending from the rear channel **15** forwards through the base plate. Spaced from the conductor strip **23** is a conductor strip or bar **29**, which is fixed to the front face of the base plate **10** interiorly of the cylindrical wall **17** and provided at one end with a terminal post **30** for electrical connection to one end of a wire **31** entering from the channel **15** forwards through the base plate. On the other end of the conductor strip or bar **29** is a clamping nut **32** which secures the resilient switch **11** mechanically and electrically to the conductor bar.

The switch **11** may comprise an elongate, relatively stiff and resilient conductive wire having one end portion secured between the nut **32** and bar **29**, and bent, as at **34**, to extend upwards from the locking nut **32** and downwards around the boss **20**, having an intermediate portion **35** bent or humped forwards, and having a free end terminal portion bent to extend beneath or rearwards of the bridging contact bar portion **24**. As the switch or wire **11** is relatively stiff and resilient, and has its terminal portion **36** strongly urged forwards into engagement with the contact bar portion **24**, it will be apparent that the wire defines a switch normally resiliently biased forwards toward a position closing an electric circuit between the wires **26** and **31**. However, in the position illustrated in Figure 2, the switch is deflected rearwards, with the terminal switch portion **36** received in the base plate recess **19**, out of contact with the bar portion **24** to open the circuit between wires **26** and **31**.

Secured in facing engagement with the front surface of the base plate or body **10**, exteriorly of the cylindrical wall **17**, is a generally flat mounting plate **40**. More particularly, the mounting plate **40** is provided with a central through opening bounded by an outstanding cylin-

drical flange 41 of a size to conformably and slidably receive the cylindrical wall 17; and, suitable fastening means, preferably threaded members or screws 42 are inserted through the mounting plate and in threaded engagement with inserts 43 fixed in the base plate 10, to detachably secure the mounting plate in facing engagement with the base plate with its flange 41 extending about the base plate wall 17.

As best seen in Figure 2, when the frangible member or panel 12, which may comprise a circular glass plate or the like, is seated on the forwardly facing edge 18 of the annular wall 17, the panel serves to engage with the forwardly bent switch portion 35 and deflect the latter inwards against the resilience of the switch. Viewed otherwise, the switch 11 in its closed position, with the terminal switch portion 36 engaging the rearward surface of the bridging contact bar portion 24, is shaped so that the forwardly bent or humped intermediate switch portion 35 extends forwards beyond the plane of the annular seat 18, whereby seating of the flat panel 12 on the seat serves to deflect the switch rearwards to an open position.

Serving to maintain the frangible member or panel 12 flat on the seat 18, from which seated relation the panel is automatically releasible upon increase in ambient temperature, is the mounting means, generally designated 13. The mounting means 13 includes a cylindrical, annular member or ring 45 slidably circumposed about the mounting plate flange 41, and formed along its forward or outer edge with a peripherally extending internal retaining lip or flange 46, disposed forwards of the panel seat 18. The ring 45 extends closely about and exteriorly of the periphery of the frangible panel 12, and the lip 46 is engageable with the forward surface of the panel, or with a label 47 covering the front panel surface, so that retention of the ring 45 rearwards serves to maintain the panel firmly seated on the wall edge 18.

The panel mounting ring 45 is provided with one or more extensions or fingers 50, two being illustrated in the drawings, each of which has its forward end secured to the ring and extends rearwards, terminating in a rear end portion 51 free of the ring. The rearwardly extending fingers 50 may be formed of the ring material, as illustrated, or may be formed separately and secured to the ring, as desired. As seen in Figure 2, the rearward end portion 51 of the finger 50 is bent or curled forwards to define an enlargement or head.

Associated with each of the rearward extensions or fingers 50 is a forwardly opening socket or cup 54 for spacedly receiving the respective finger. As best seen in Figure 2, the cup 54 is formed in its forward portion with internal screw threads 55, which may be considered as peripherally extending internal ridges, and which define undercut surfaces 56 on the interior of the cup. The rearward cup portion 57 is preferably received in a suitable body or base plate opening, and somewhat enlarged to define a shoulder 59 for bearing engagement with the rearward surface of the mounting plate 40.

With the mounting ring 45 in its rearmost position maintaining the frangible member 12 seated on the edge 18 against the force of the resilient switch 11, and with the cup or socket 54 forwardmost with its forwardly facing shoulder 59 abutting against the rearward surface of the mounting plate 40, the extensions 50 are each received in spaced relation within their adjacent socket, and a quantity of low melting point, fusible material 60, such as solder or the like, is introduced into each socket and allowed to solidify and firmly embed the rearward end portion 51 of the respective extension in the fusible material. By this construction it has been found possible to employ a solder having a melting point approximately as low as 136° F., while using a switch 11 of considerable resilient strength. Thus, the fingers or extensions 50 are normally maintained in tension, while the fusible material 60 is in interengaging relation with the

ridged, undercut internal socket surface and the finger end portion 51, to firmly retain the finger embedded in the fusible material even under extreme conditions of shock and vibration. This construction also allows the finger to be released quickly, safely and reliably from its embedded position within the socket upon melting of the fusible material at its relatively low melting temperature.

While a pair of sockets 54 and corresponding pair of fingers 50 have been illustrated and employed in the device in Figures 1 and 2, so that the mounting ring 45 and panel 12 would be entirely released upon an increase in ambient temperature to the melting point of the fusible material, it is appreciated that a permanent securing means may be substituted for one of the releasable, socket and finger securing means, so that upon release of the remaining releasable securing means, the panel will be free to swing forwards and permit closing movement of the switch 11.

As an additional feature of the present invention, it will be noted that the mounting plate 40, ring 45, panel 12, fingers 50 and sockets 54 combine to provide a unit fixedly secured together at normal room temperatures, and resiliently biased forwards away from the body 10 by the resilience of the switch 11. Further, the resilience of the switch is resisted only by the fasteners 42 securing the mounting plate 40 directly to the body 10. Hence, if it is desired to periodically test the fire alarm station to insure proper working order, it is only necessary to partially withdraw the fasteners 42 from the body 10, which, if the device is in satisfactory condition, will permit the mounting plate 40 and panel 12 to be moved forwards as a unit by the switch 11 until the latter reaches its closed position, whereupon a signal will be actuated. The fasteners 42 may then be returned to hold the mounting plate 40 in facing engagement with the body 10, as in Figure 2.

In Figure 3 is shown a slightly modified form of the present invention, wherein a cup or socket 54*a*, corresponding to the socket 54, is not provided with internal screw threads in its forward portion, but rather, is formed with an internal flange, lip or ridge 64 on its forward edge defining an undercut internal socket surface 65. Further, the finger or rearward extension 50*a* is provided on its rearward end with an enlarged head 51*a* which is of a size such that it will not pass forwards through the lip 64. Of course, sufficient movement must be afforded the finger 50*a* upon melting of the fusible material 60*a* to permit closing of the electric switch.

Another slightly modified form of forwardly opening socket or cup 54*b* is shown in Figure 4, wherein the cup is provided with a crimped portion or internal rib 67, which defines an internal undercut surface 68 adjacent to the forward end of the cup. A rearward exetnsion or finger 50*b* has its rearward end portion 51*b* slightly curved for increased interengaging relation between the solid fusible material 60*b*, finger end portion and cup 54*b*, but permitting withdrawal of the finger entirely from the cup upon melting of the fusible material.

In Figure 5 is shown another type of switch 11*c*, which is adapted to be substituted for the switch 11, if desired. In particular, the switch 11*c* includes a threaded shank 70 extending through and adapted to be secured in the body 10*c* by lock nuts 71 and 72, and a button 73 electrically insulated from the circuit wires 26*c* and 31*c* and resiliently biased outward toward a closed position. A frangible panel 12*c* is arranged in front of and releasably mounted in bearing engagement with the switch button 73 to normally maintain the latter rearwards out of its closed position. It will be appreciated that the switch 11*c* performs the same function in a fire alarm station as the switch 11, but does not carry current in its forwardly biased button.

From the foregoing, it is seen that the present invention provides a fire alarm station which fully accomplishes its intended objects, and is well adapted to meet practical

conditions of manufacture, installation, maintenance, and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity and understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A fire alarm station comprising a body, an electric switch mounted on said body and resiliently biased forward toward its closed position, a frangible member arranged in front of and bearing against said switch to normally retain the latter in a rearward open position, at least one forwardly opening socket releasably fixed to said body and formed with an undercut internal surface for firmly retaining a quantity of low melting point fusible material, and an extension connected to said frangible member and extending rearward into and in spaced relation within said socket and adapted to be imbedded firmly in said fusible material for holding said frangible member in said bearing relation with said switch, said switch being released from its rearward open position to its forward closed position upon breaking of said frangible member, or release of said socket from its fixed relation to said body, or melting of said fusible material and consequent release of said extension from its imbedded relation within said socket.

2. A fire alarm station comprising a body, an electric switch mounted on said body and resiliently biased forward toward its closed position, a frangible member arranged in front of and bearing against said switch to normally retain the latter in a rearward open position, a mounting member releasably fixed to said body, at least one forwardly opening socket carried by said mounting member and formed with an undercut internal surface for firmly retaining a quantity of low melting point fusible material, and an extension connected to said frangible member and extending rearward into and in spaced relation within said socket and adapted to be firmly imbedded in said fusible material for holding said frangible member in said bearing relation with said switch, said switch being released from its rearward open position to its forward closed position upon breaking of said frangible member, or release of said mounting member from its fixed relation to said body, or melting of said fusible material and consequent release of said extension from its imbedded relation within said socket.

3. A fire alarm station according to claim 2, in combination with threaded fastener means extending through said mounting member into said body to facilitate said release of said mounting member without detachment thereof from said body.

4. A fire alarm station according to claim 2, said socket including a forwardly facing shoulder in abutting engagement with said mounting member to prevent forward withdrawal of said socket from said mounting member under the force of said resiliently biased switch.

5. A fire alarm comprising a base, an electric switch mounted on said body and resiliently biased forward toward its closed position, a frangible member arranged in front of and bearing against said switch to normally retain the latter in a rearward open position, a mounting member arranged in front of and bearing against said base, fastener means releasably retaining said mounting member firmly against said base, at least one forwardly opening socket carried by said mounting member and formed with an undercut internal surface for firmly retaining a quantity of low melting point fusible material, and an extension connected to said frangible member and extending rearward into and in spaced relation within said socket and adapted to be firmly imbedded in said fusible material for holding said frangible member in bearing relation with said switch, said switch being released from its rearward open position to its forward closed position upon breaking of said frangible member, or release of said mounting member from its firm bearing engagement with said base, or melting of said fusible material and consequent release of said extension from its imbedded relation within said socket.

6. A fire alarm according to claim 5, said mounting member being formed with an opening receiving said socket inserted forwardly through said opening, said socket including a forwardly facing shoulder in abutting engagement with said mounting member to prevent forward withdrawal of said socket under the resilient biasing force of said switch.

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