June 24, 1941. J. C. CID 2,247,277

FIRE ALARM APPARATUS

Filed June 19, 1939

Fig. 1

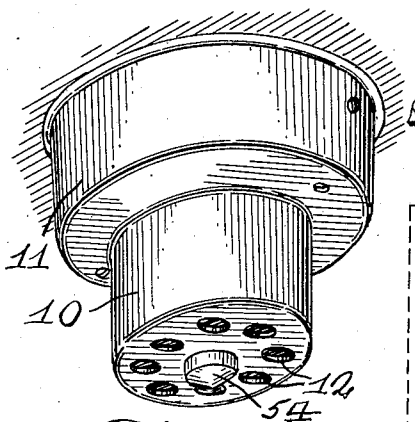



Fig. 2

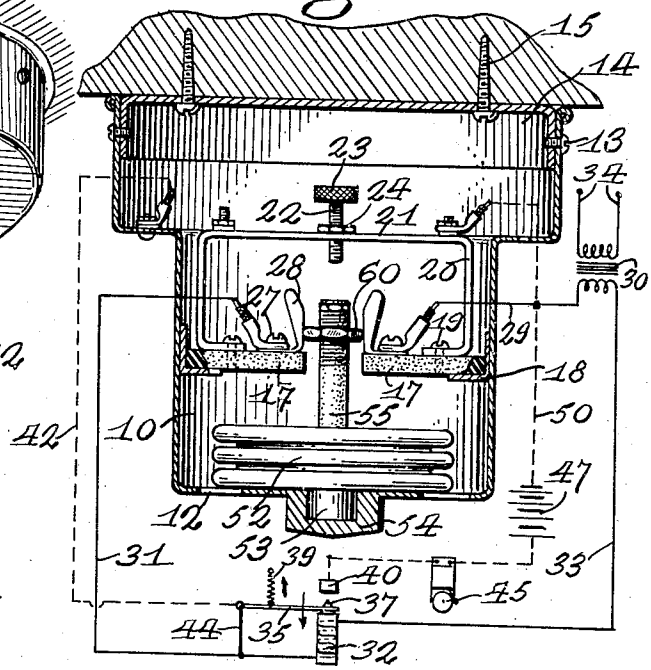



Fig. 4

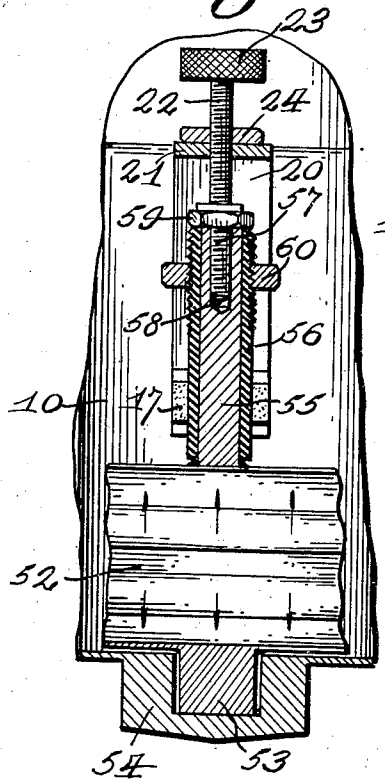
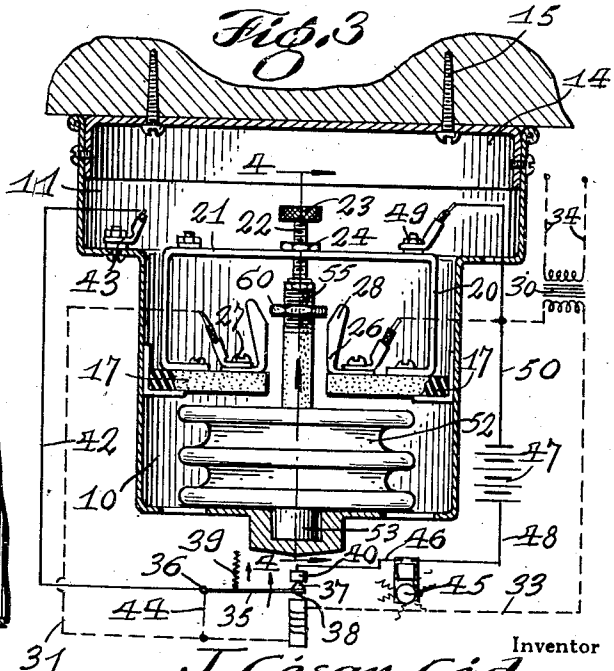



Fig. 3

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2,247,277

## FIRE ALARM APPARATUS

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2 Claims. (Cl. 200—140)

The present invention relates to improvements in fire-alarm apparatus.

An object of the invention is the provision of fire-alarm apparatus of generally improved design.

Another object of the invention is the provision of fire-alarm apparatus embodying signal means automatically operative when the apparatus is subjected to temperature above a predetermined degree.

A further object of the invention is the provision of fire-alarm apparatus wherein the signal will become operative if the primary electric circuit becomes dead or broken.

Still another object of the invention is the provision of fire-alarm apparatus of the aforesaid character which is efficient and reliable in operation.

A still further object of the invention is the provision of fire-alarm apparatus of the above character which is relatively simple in construction.

Other objects and advantages of the invention will become apparent as the description progresses.

In the accompanying drawing forming a part of this specification and in which like reference characters are employed to designate corresponding parts throughout the same:

Figure 1 is a perspective view of the apparatus installed on the ceiling of a chamber,

Figure 2 is a sectional view therethrough showing the signal circuit open,

Figure 3 is a similar view showing the signal circuit closed, and

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 3.

Referring to the drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention, 10 designates a casing, in the present example embodying a hollow cylindrical member which may be formed of sheet metal or the like having an enlarged annular part 11 at the inner open end. At the outer closed end the casing is provided with a plurality of vent apertures 12. When, as in the present illustration, the apparatus is mounted in association with a ceiling connection, the annular flange of the end enlargement 11 is attached by screws 13 to a flanged fitting 14 fastened to the ceiling support by screws 15 with the main cylindrical chamber 16 depending from the ceiling.

At the intermediate portion of the casing body 10 are provided a pair of transversely extending aligned complementary arms 17 having their outer ends attached to supporting brackets 18 and their inner ends disposed in spaced relation to form a gap therebetween. To the outer portions of the arms 17 are secured, by screws 19, the end portions of an upstanding approximately U-shaped metallic frame 20 provided with an internal threaded aperture in the centre of the cross bar 21 adapted to receive therethrough a vertically arranged adjustable contact screw 22 formed with an enlarged knurled head 23 and secured in adjusted position by a lock-nut 24.

To the inner adjacent end portions of the arms 17 are secured a pair of complementary angular contact elements 26 fastened by terminal screws 27 and forming parallel contact wings 28. One of the screws 27 is connected, through a conductor 29, with a transformer 30 while the complementary screw 27 connects, through the medium of a conductor 31, with an electro-magnet 32 which in turn connects with the transformer 30 through a conductor 33. The transformer also makes connection with conventional feed wires 34 which connect with a conventional outlet or other source of electrical current. The electro-magnet 32 is adapted to actuate a switch arm 35 which may be pivoted at one end, as indicated at 36, and which carries at its outer free end a contact 37 and an armature 38. A tension spring 39 connected to the arm 35 normally tends to swing the arm so that the contact 37 is held against a fixed switch contact 40 and is yieldable to allow the outer end of the arm to move away from the fixed contact 40 and against the electro-magnet when the latter is energized.

A conductor wire 42 connects the pivoted end 36 of the switch arm 35 with the terminal connection 43 on the casing. A branch wire 44 connects the switch arm pivot connection with the conductor 31. The fixed switch contact 40 is connected with a signal 45, in the present instance a conventional electric bell, through the medium of a conductor 46 while the opposite terminal of the bell connects with a battery 47 through a wire 48. The battery 47 connects with a terminal screw 49 on the frame 20 through the medium of a conductor wire 50 which is also joined to the conductor 29.

In the lower portion of the casing body 10 is mounted a thermostat 52, in the present example in the form of a bellows type thermostatic element expansible longitudinally of the casing. At the outer end, the thermostat 52 is formed with an axially disposed boss 53 fitted in a socket 54 at the end of the main casing chamber. At the opposite inner end an elongated stem 55 of

conducting material is secured in axial position to the thermostat and extends in a line through the gap between the arm 17 and the contact wing 26. Upon the stem 55 is secured a sleeve 56, of non-conducting material, removably held in position by a screw 57 engaging an interiorly threaded bore 58 in the outer end of the stem and having an enlarged head 59 bearing against the end of the sleeve to tightly hold the same on the stem. The end portion of the sleeve 56 is exteriorly threaded to receive a contact element 60 which may be in the form of a non-circular nut formed of conducting material.

Under normal conditions, the primary circuit through the transformer and electro-magnet is closed, inasmuch as the electro-magnet is energized to effect a circuit through the conductors 33, 31 and 29 and through the spaced switch contacts 26 by the nut 60 which bridges these contact elements.

When the thermostatic element 52 is exposed or subjected to a temperature exceeding a predetermined degree, as for example a temperature of 130° F. as would be caused by a fire in the vicinity of the apparatus, the thermostat expands from the form shown at Figure 2 to that shown at Figure 3, with the result that the stem on the inner end thereof is moved axially. In consequence of such movement, the contact nut 60 is carried to an upward position disengaging the wings 26 and the head of the screw 57 is forced against and contacts with the screw 22. This action brakes the primary circuit through the electro-magnet so that the movable switch contact 37 is swung, through the medium of the spring 39, against the fixed contact 40, while the secondary circuit is completed through the conductor 42, the casing, the thermostat, the stem 55, the screw 57, the spring 22, the frame bar 21, and the conductors 46, 48 and 50 to energize the signal 45 in the battery circuit. Thus, the audible signal sounds the fire alarm.

In the event that the feed conductors 34 are disconnected or should become dead for any reason, while the apparatus is in its normal inoperative position, the electro-magnet being de-energized will cause closure of the secondary circuit by release of the contact 37 which, at such time, engages the fixed contact 40 and causes the battery and signal circuit through the branch wire 34 and the connection of the wires 39 and 40, to signal the defective state of the apparatus.

It is to be understood that the form of my invention herein shown and described is to be taken as a preferred example of the same, and that various changes as to the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In a fire alarm apparatus switch, a vented casing, an expansible heat responsive element mounted in the casing, a stem secured to said element and adapted to follow the movements thereof, a pair of wide spaced contacts disposed symmetrically with respect to the stem, means on said stem for shorting the contacts during the first expansion stage of the element, and an auxiliary contact above the spaced contacts and adapted to engage the end of the stem after said last shorting means have moved out of engagement with the spaced contacts.

2. In a switch of the character described, a vented casing, an expansible thermostatic element in said casing, a stem on said element adapted to follow the expansion movement of the element, a pair of parallel contacts, means on the stem for shorting said contacts during the initial movement of the stem, and an auxiliary contact above the parallel contacts adapted to engage the stem after the shorting means thereof have disengaged the parallel contacts.

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