May 15, 1956 V. P. MULLALLY 2,745,926

FIRE ALARM APPARATUS

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Fig. 1.

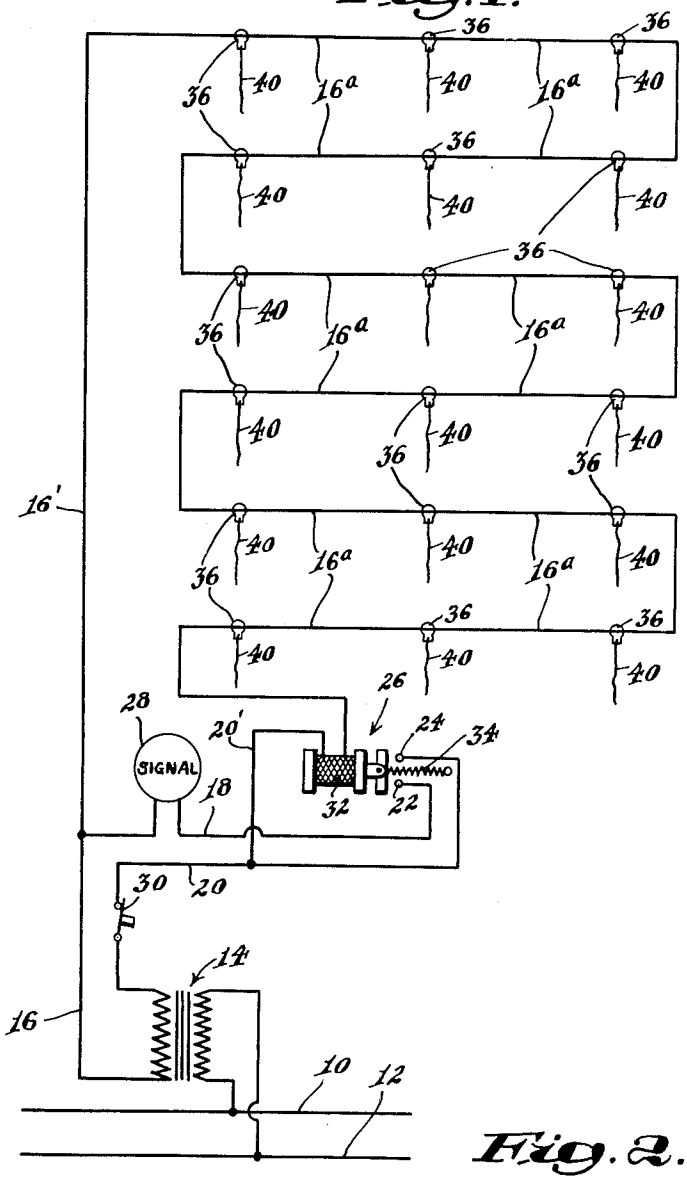


Fig. 3.

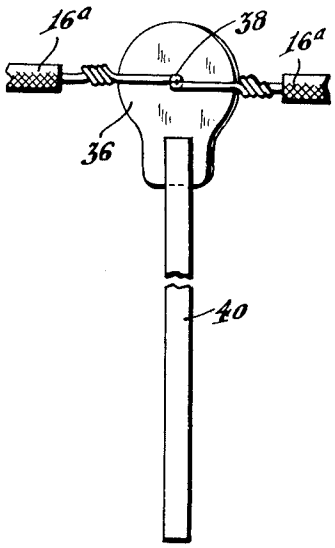
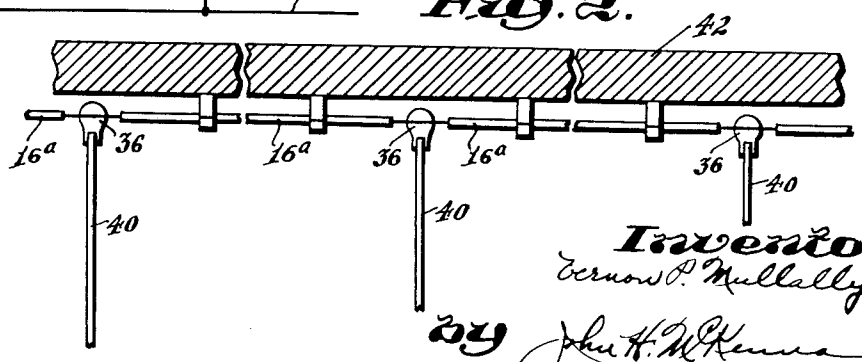


Fig. 2.



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Fig. 4.

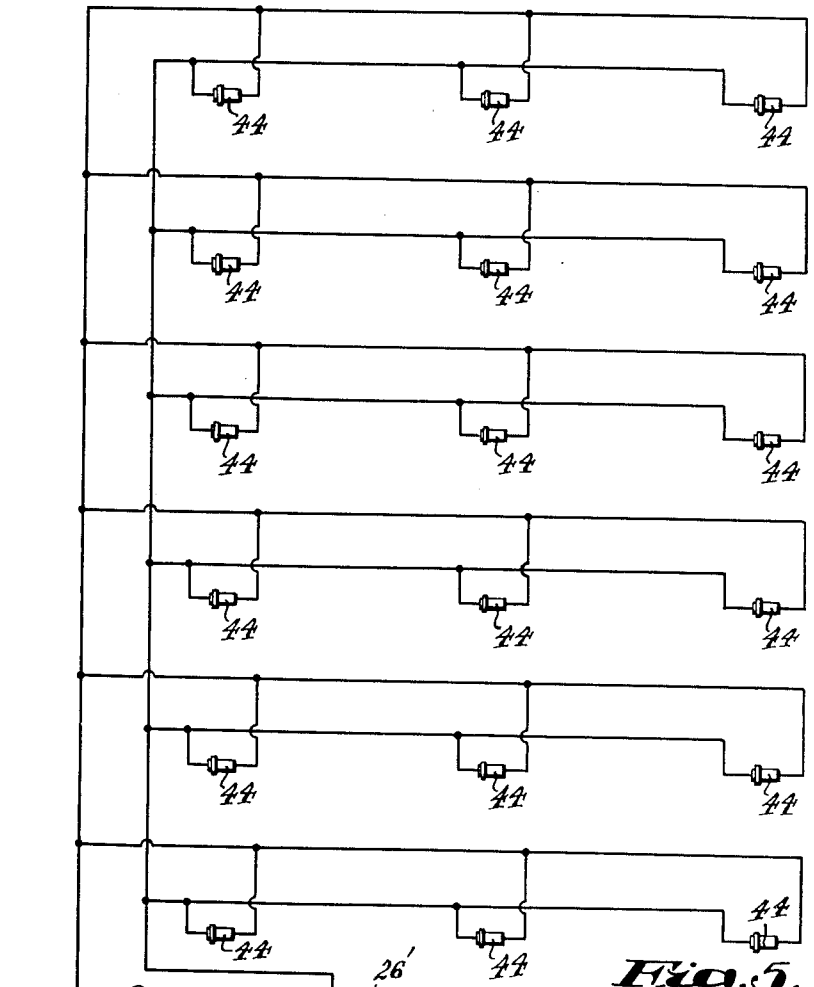
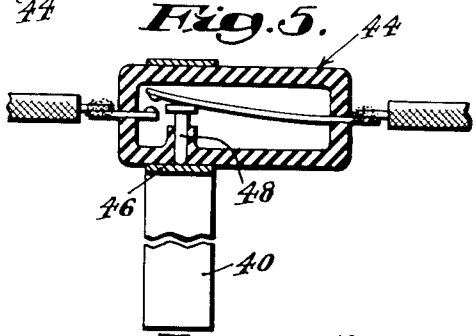


Fig. 5.



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FIRE ALARM APPARATUS

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Application July 28, 1951, Serial No. 239,037

2 Claims. (Cl. 200—142)

This invention relates to improvements in fire alarm apparatus for signalling the occurrence of a fire within a building. More particularly it provides fire signalling apparatus wherein an electrically operated signal responds to a flash-consumption of any of a suitable number of highly combustible circuit-controlling elements which have wick-like runners along which a flame or spark rapidly travels to ignite one of the highly combustible circuit-controlling elements when a fire comes in contact with one of the wick-like runners.

It is among the objects of the invention to provide a fire alarm apparatus whose alarm or signal may be more promptly responsive to a fire as compared with prior fire alarm systems wherein the melting of fusible means by heat developed by a fire is relied upon to set off the alarm or other warning signal. Whereas the mentioned prior fire alarm systems involve substantial delays while a fire develops sufficiently to generate enough heat to melt a circuit-controlling fusible means before the system responds to sound an alarm or to give a visual signal, the apparatus of the invention responds on the principle of conducting a fire to any of a suitable number of circuit-controlling elements which are of a combustible nature to be consumed in a flash when ignited. Wick-type runners extending from the circuit-controlling elements may extend into or close to regions where combustible materials are stored and into any other regions where a fire might originate, and each runner is adapted to rapidly conduct a flame or spark to a circuit-controlling element when any portion of its extent is contacted by a fire.

Another object of the invention is to provide a fire alarm apparatus wherein an electric signalling circuit or an auxiliary circuit has a plurality or multiplicity of circuit-controlling devices distributed along the circuit interiorly of a building, each said device including a control means adapted to be quickly consumed when ignited, thereby to effect a closing of a signalling circuit, there being at least one relatively long wick-type runner extending from each said device along which a flame or spark rapidly travels to ignite a said device when any portion of a runner is contacted by fire. In one embodiment of the invention, a plurality or multiplicity of normally closed circuit-controlling devices are connected in parallel in a signalling circuit, each held open by a readily combustible flash element from which at least one wick-type runner extends. In another embodiment a plurality or multiplicity of readily combustible flash devices are distributed in series in an auxiliary circuit which is maintained closed so long as all of said devices continue intact, thereby maintaining a signalling circuit open, said auxiliary circuit being adapted to be opened if and when any of said devices becomes consumed by flame, thereby to effect closing of the signalling circuit.

It is, moreover, my purpose and object generally to improve the structure and operative efficiency of fire alarm systems and more especially to hasten the response of such systems by conducting a fire to the responsive

means as distinguished from prior practices which rely upon heat generated by a fire to melt a fusible circuit-controlling means.

In the accompanying drawings:

Fig. 1 is a diagrammatic representation of a fire alarm system embodying features of the invention;

Fig. 2 is an elevational view showing portions of the system of Fig. 1 supported below a floor of a building, the floor being shown in cross-section;

Fig. 3 is a front elevation of one of the circuit-controlling devices of the system of Figs. 1 and 2, on a larger scale;

Fig. 4 is a diagrammatic representation of a modified form of fire alarm system embodying features of the invention; and

Fig. 5 is an elevational view, with parts in cross-section, of one of the circuit-controlling devices of the Fig. 4 system.

Referring to the drawings, and more particularly to the embodiment of the invention as illustrated in Figs. 1–3, the conductors **10**, **12** may lead from any suitable source of electric current, they conveniently being a part of the usual 110 v. house circuit, assuming that the alarm system is to be installed in a home. A suitable reducing transformer is represented at **14**, the low side of which is connected by the conductors **16**, **18** and **20** to the two contacts **22**, **24** of a solenoid switch which is indicated generally at **26**. A signal device **28**, which may be a gong or a light, or any other signalling means, is connected in conductor **18**, the circuit through the signal device **28** being open at the contacts **22**, **24** in Fig. 1. A manual switch **30** in conductor **20** permits manual opening of the signal circuit when the solenoid switch **26** is closed.

An auxiliary circuit, provided by the conductors **16'**, **20'**, leads through the coil **32** of the solenoid switch **26**, and this auxiliary circuit normally is energized holding the solenoid switch **26** in its open condition of Fig. 1 against its biasing spring **34** which tends to close it.

The normally closed auxiliary circuit, as represented in Fig. 1, has its conductor **16'** made up in part of a plurality or multiplicity of relatively short conductors **16ª** which are connected together by the circuit-controlling devices **36**.

As best seen in Fig. 3, the adjacent end portions of the short conductors **16ª** are held in electrical contact by the circuit-controlling devices **36**, each of which latter is formed, at least in part, of a highly combustible material which is adapted to be consumed substantially instantaneously when ignited, thereby to release the held-together end portions of the conductors **16ª**. Conveniently, the devices **36** may be relatively small and thin pieces of Celluloid or the like, each provided with a small hole **38** through which the adjacent end portions of two conductors **16ª** may be inserted with the walls of the hole crowding the conductors together and maintaining them in good electrical contact. As shown in Fig. 3, the inserted end portion of each conductor **16ª** may be turned back and twisted around an adjacent portion of the same conductor to ensure that the conductor ends will not be pulled out of the hole **38**. Each device **36** has extending from it a strip or string **40** of combustible material which constitutes a wick-type runner along which a flame or spark may run for igniting the device **36**.

According to the invention, the conductors of the auxiliary circuits are to be mounted with the circuit-controlling devices **36** suitably distributed over the area of a room, a cellar or storage region, preferably under a ceiling **42**, in spaced relation thereto, as in Fig. 2, with the wick-type runners **40** extending down at any desired number of locations. The runners may be as long or as short as may seem desirable under particular conditions,

but each should be of a nature to quickly conduct a flame or spark for igniting the attached circuit-controlling device **36** if and when a flame comes in contact with any part of the runner. In storage regions and in cellars, the runners may hang down among the stored materials or objects and around oil storage tanks, and the like. In living quarters, offices, and the like, the runners may be inconspicuously attached to the walls of the rooms, and a flame or spark runs along the runners without themselves being the means of spreading a fire.

In the embodiment of Figs. 4 and 5, the auxiliary circuit is a normally open circuit which has circuit-controlling devices **44** connected in parallel therein, and the solenoid switch **26'** is a normally open switch which closes in response to energization of its coil **32'**. The devices **44** may be of any suitable variety adapted to close the auxiliary circuit in response to conductance of a flame or spark thereto. Conveniently, each device **44** may be a normally closed switch of a type illustrated in Fig. 5 which is held open by a strip **46** of highly inflammable material which may be secured in depressing relation to the switch actuator **48**, and which may have a wick-type runner **40** extending therefrom similar to the runners **40** in the Figs. 1–3 form.

Whereas the auxiliary circuit in the Figs. 1–3 embodiment is a closed circuit which opens in response to igniting of any one of the circuit-controlling devices **36**, both the signalling and the auxiliary circuits are open circuits in the Figs. 4 and 5 embodiment, the auxiliary circuit closing through the solenoid coil **32'** in response to igniting of the strip **46** of any one of the circuit-controlling switch devices **44**.

It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

I claim as my invention:

1. In a fire alarm apparatus having an electric circuit with a signalling means therein and with a pair of electrical contacts at each of a plurality of distributed locations in said circuit at each of which locations the contacts are relatively movable to open and close said circuit thereby to control the operation of said signalling means, the combination with each said pair of electrical contacts, of a body of material holding the pair of contacts in their condition wherein said signalling means is inoperative, said body of material at each said pair of electrical contacts being a relatively high melting point material which continues stable in the presence of relatively high temperatures but which is highly inflammable and becomes consumed in a flash when contacted by flame, thereby to release said pair of contacts for relative movement to condition said electrical circuit for operation of said signalling means, a said flash consumption of a said body of material leaving the conducting portions of said circuit intact for restoration of its original condition by replacing the consumed body of material by another similar body of material in said holding relation to said pair of contacts, and a flame runner of highly inflammable material connected to said body of material at at least one of said pairs of contacts for conducting flame rapidly from a remote location to said body of contact-holding material to effect a said flash consumption of said body of material.

2. In a fire alarm apparatus having an electric circuit with a signalling means therein and with a pair of electrical contacts at each of a plurality of distributed locations in said circuit at each of which locations the contacts are relatively movable to open and close said circuit thereby to control the operation of said signalling means, the combination with each said pair of electrical contacts, of a body of material holding the pair of contacts in their condition wherein said signalling means is inoperative, said body of material at each said pair of electrical contacts continuing stable in the presence of relatively high temperatures but being highly inflammable for consumption in a flash when contacted by flame, thereby to release said pair of contacts for relative movement to condition said electrical circuit for operation of said signalling means, a said flash consumption of a said body of material leaving all conducting portions of said circuit intact for restoration of its original condition by replacing the consumed body of material by another similar body of material in said holding relation to said pair of contacts.

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