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MAGNETICALLY OPERATED SWITCH

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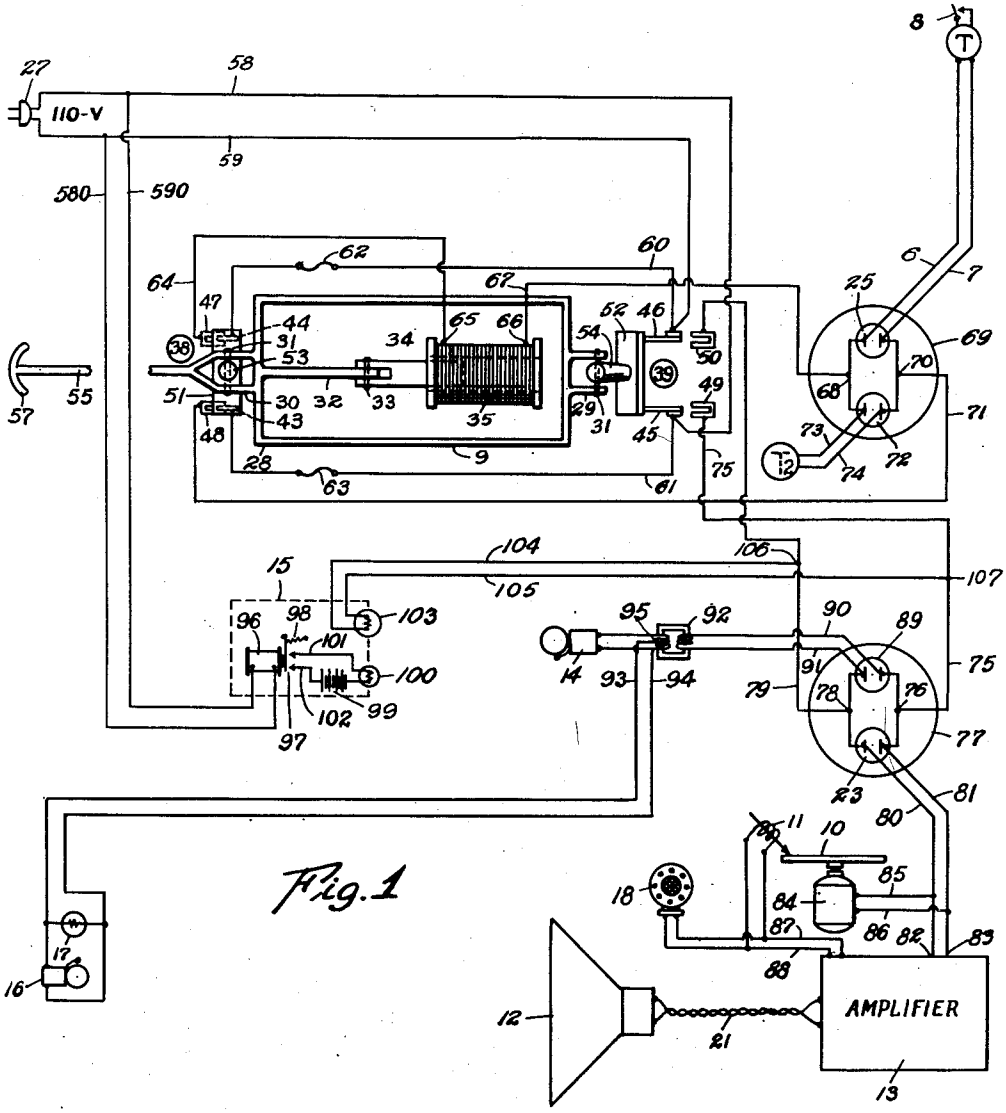


Fig. 1

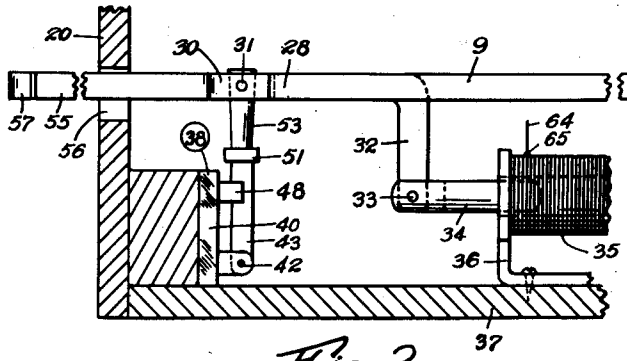


Fig. 2.

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MAGNETICALLY OPERATED SWITCH

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2 Claims. (Cl. 200—111)

1

This invention relates to a fire alarm system, such as may be installed in any type of building or enclosure, for the purpose of promptly giving an alarm of fire automatically.

An object of the invention is to provide an effective fire alarm system which is simple and inexpensive, as well as reliable in operation, and which will remain serviceable over long periods of time without requiring frequent servicing or repairs.

Another object is to provide a system of the character stated, incorporating as one of its features a sound amplifier or loud-speaker, operative automatically in the event of a fire, to broadcast to the community such instructions or information as may assist in quickly locating and extinguishing the fire.

Another object of this invention is to provide a control switch adapted for controlling a fire alarm system.

Another object of this invention is to provide in a control switch a pair of double-pole single-throw switches both of which may be moved upon energization of a solenoid coil associated therewith to close one switch and open the other, one of the switches being connected in series with the coil of the solenoid so that when the solenoid moves the switches, the solenoid coil is disconnected after the other switch is engaged.

The foregoing and other objects are attained by the means described herein and illustrated in the accompanying drawings, in which:

Fig. 1 is a wiring diagram for the system, including a detailed disclosure of the master switch assembly which initiates the alarm upon detection of a fire.

Fig. 2 is a fragmental cross-sectional view taken through one end of the housing or cabinet of the device, and showing the switch assembly in side elevation.

In general, the alarm system of the invention comprises a series of sensitive thermostats or other temperature responsive devices T, located in the various rooms or compartments of a building, and adapted to close an electric circuit which initiates operation of the alarm. Any required number of thermostats may be included in the system, and some of them will occupy strategic locations in the basement, the garret, and in closets, or wherever a fire might be expected to originate. All of the thermostats are connected across two conductors 6 and 7 which constitute a normally open detector circuit. As will be understood, the thermostats include switch means to close the detector circuit as soon as abnormal

2

temperature reaches one or more of the thermostats. This circuit-closing action is the same as that resulting from closing the push-button emergency switch indicated at 8, Fig. 1.

Immediately upon closing of the detector circuit, either by the thermostats or by the emergency switch 8, the master switch assembly indicated generally at 9 (Figs. 1 and 2), will be actuated to automatically place in operation a phonograph 10 and associated mechanism including an electric pick-up 11, a speaker 12, and suitable amplifying means therefor indicated at 13 connected to speaker 12 by a duplex or two-wire conductor 21. At the same time, there will result the energizing of a bell signal 14 on the premises, an auxiliary lighting apparatus 15 also on the premises, and a remotely located signal means 16—17 at a fire station or other central office where help might be obtainable. An emergency microphone 18 will also be conditioned for use by an occupant of the building for directing his or her rescue from a sick-room, for example. The emergency microphone will preferably be connected in the circuit of speaker 12, or with a separate speaker if desired.

The master switch assembly 9 controls the operation of all associated elements of the device.

The master switch assembly may comprise a rigid frame 28 having at its ends, pairs of outwardly extending lugs 29 and 30 each carrying a pivot pin 31. The frame includes also a fixed bracket member 32 having a pivot 33 for supporting one end of a solenoid armature 34. The coil of the solenoid is indicated at 35, and may be insulatingly supported by means of a bracket 36 fixed to the bottom wall 37. The coil of the solenoid, of course, is hollow and arranged to receive the armature therein when the coil is energized by passing a current of electricity therethrough. It will be noted, therefore, that energization of the solenoid coil serves to shift the frame 28 to the right, as viewed in Figs. 1 and 2.

The remainder of the master switch assembly comprises a pair of switches, here shown as double-pole switches, indicated generally by the characters 38 and 39. The insulating bases 40 and 41 of the switches preferably are supported within the cabinet, in an upright position such that when the switches are closed, the blades or movable contacts thereof extend substantially vertically from their pivots 42. The movable contacts or blades of switch 38 are indicated at 43 and 44, whereas the movable contacts or blades of switch 39 are indicated at 45 and 46. The stationary contacts of switch 38 are at 47 and 48, and the

stationary contacts of switch 39 are marked 49 and 50. The movable contacts or blades of the switches are joined by means of insulating yokes or blocks 51 and 52. Handles for the switches are shown at 53 and 54. As is most clearly illustrated by Fig. 2, the handle 53 of switch 38 is pivoted at 31 to the frame lugs 30, whereas the handle of switch 39 is pivoted to the lugs 29 of said frame. The pivot points of the frame are spaced apart a distance which is less than the distance between the switch handles when the switches are closed. By this means, the pivotal connections of the handles with the frame are such that one switch is open while the other is closed. Referring to Fig. 2, if the frame 28 is moved to the right by the action of the solenoid, switch 39 will be closed and by the same action the switch 38 will be opened. After the solenoid has operated, the switches may be restored to the original position of Fig. 2 only by manually shifting the frame to the left, as by means of a resetting device, which as illustrated herein may consist of a rod, bar, cable, chain or the like 55 extending through an opening 56 in the side of the cabinet, and having at its outermost end a hand grasp element 57.

From the foregoing, it will be understood that the frame of the master switch assembly may assume either of two positions, one of which effects a closing of switch 38 and an opening of switch 39, and the other of which effects a closing of switch 39 while opening or breaking the contacts of switch 38. The solenoid acts when energized, to close the contacts of switch 39, and to open those of switch 38.

The master switch assembly may be wired as follows. The 110 volt service leads of a building are indicated at 58 and 59. A branch circuit therefrom, which always carries a similar current, is indicated at 580 and 590. Lead 59 is electrically connected to the movable contact 46 of switch 39, whereas lead 58 has electrical connection with the movable contact 45 of the same switch. From these two switch points, conductors 60 and 61 extend to and connect with the movable contacts 44 and 43, respectively, of switch 38, there preferably being in series with these conductors a pair of fuses 62 and 63.

From the stationary contact 47 of switch 38, a conductor 64 connects with one terminal 65 of the solenoid coil. The other terminal 66 of said coil is connected, by means of a conductor 67, to a strap 68 joining corresponding poles of a pair of receptacles contained within a junction box 69. One of said receptacles receives the plug 25, which carries the conductors 6 and 7 of the thermostat or detector circuit. Fig. 1 shows the circuit 6—7 with one of the thermostats T included therein, along with the emergency manual circuit closer 8, which was previously mentioned herein.

The second strap 70, which connects poles of the receptacles, has electrical connection with a conductor 71 that connects with the stationary contact 48 of switch 38. A plug 72 insertable in one of the receptacles of junction box 69, carries the conductors 73 and 74 which lead to the cabinet thermostat indicated at T2. This thermostat closes the thermostat circuit and initiates the alarm of fire, just as any of the other thermostats T would operate.

In the relationship of the switches as illustrated by Fig. 1, the electric circuit which is adapted to energize the amplifier 13 and the phonograph mechanism 10—11, is open at switch 39. Upon closing of said switch 39, however, the service leads will furnish current to the circuit mentioned, through the stationary contacts 49 and 50 of the switch. Contact 49, it will be noted, has a conductor 75 which leads to a strap 76 which electrically connects corresponding poles of a pair of receptacles within a junction box 77. The other strap 78, which connects the remaining poles of the receptacles, is connected by means of a conductor 79, to the remaining stationary contact 50 of the switch 39. The plug 23, which enters one of the receptacles of junction box 77, carries a pair of conductors 80 and 81 which enter the amplifier at the locations 82 and 83, and carry the necessary current thereto for establishing the output of speaker 12, by way of the duplex conductor 21.

Across the conductors 80 and 81 is connected the motor 84 of the phonograph or reproducing apparatus, the connection being effected by means of conductors 85 and 86. Thus, the amplifier and the phonograph motor are placed in operation simultaneously. At the same time, leads 87 and 88 from the amplifier carry the necessary energizing current to the electric pick-up 11, and to the emergency microphone 18, the purpose of which has been fully explained hereinbefore.

The second receptacle 89 of junction box 77, furnishes an outlet for conductors 90 and 91 which lead to the primary winding of a step-down transformer 92, the secondary winding of which furnishes a proper electric current to energize the bell or other audible signal device 14. If desired, a siren or other signal may be placed in this circuit ahead of the transformer, and if necessary, a rectifier for same may be furnished for operating it on direct current. This signal device, as will be recalled, is preferably located upon the premises and serves as a warning signal to the occupant, for indicating that operation of the fire alarm has been initiated, either automatically by means of heat closing a thermostat, or by the closing of emergency switch 8 in the thermostat circuit.

Transformer 92 may supply proper current also to the remote signal means 16—17, by way of the pair of conductors 93 and 94, which may lead to any central alarm station such as one which is maintained at a fire or police center. The third tap 95 of the transformer may supply approximately 30 volts to the conductors 93 and 94, for properly operating the remote signal means 16—17. As will be understood, this remote signal circuit might be energized from a separate transformer suitably connected in the system, if desired.

The constantly energized branch service leads 580 and 590 previously mentioned, may supply current to the coil 96 of a relay contained within the auxiliary illuminator assembly 15, for the purpose of constantly maintaining an open-circuit condition of relay switch 97. This switch may be biased by means of a spring 98, toward a closed circuit condition of an emergency power source 99 and associated emergency lamp 100, however, the force of spring 98 is overcome by the magnetic attraction of relay coil 96 so long as the branch service leads 580 and 590 are intact. Should these leads be destroyed or broken, however, as the result of fire or otherwise, the relay will be deenergized, thereby allowing spring 98 to close the contacts 101 and 102 of the emergency lighting circuit. This emergency lighting circuit has its own independent source of power,

which may be a battery 99. It will be understood that the emergency lamp 100 will not be needed as long as the service leads are intact, because in that case the auxiliary lamp 103 will be energized by way of electric conductors 104 and 105 having connections at 106 and 107 with the leads 75 and 79 which supply energizing current to the phonograph motor and to the amplifier and its associated elements 11, 12, and 18. It is intended that the auxiliary illuminator 15 will be located so as to illuminate a dark stairway or other vital escape route for the occupant of a burning building. One or more of such auxiliary illuminators may be included in the system.

The foregoing completes the description of the fire alarm system which, as will be understood, furnishes a high degree of safety and protection for the owners or the occupants of any building, whether the building be a dwelling, an office building, a warehouse, or any other form of industrial or residential property. The location of the speaker is a matter which may vary in accordance with the design of the building, wherefore, it is intended that the speaker may be placed at a most advantageous location for broadcasting the alarm and acompanying messages in the vicinity of the property in which the system is installed. The emergency switch and the microphone, indicated at 8 and 18, will preferably be located in a compartment of the building which is most frequently used, or perhaps in a sick room or other location within easy reach of persons who might be incapacitated in one way or another. There is no limit to the number of thermostat switches T to be included in the system, and this will depend largely upon the size and design of the building. Various other modifications and changes of the character mentioned may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A fire alarm system including a master control which comprises, a pair of double-pole switches each having a base, a pair of fixed contacts and a pair of movable blade contacts on its base, means for supporting the bases in upright spaced parallelism, a handle including a yoke insulatingly connecting the movable contacts of each switch, a frame, pivot means on the frame spaced apart a distance less than the distance between the handles when the switches are both closed, a pivotal connection between each pivot means and one switch handle, to maintain one switch in closed-circuit condition while the other is in open-circuit condition, a solenoid fixed relative to the switch bases and having a coil whose axis extends in opposite directions toward both switches, an armature reciprocable within the coil, means on the frame for supporting the armature substantially concentrically with the coil, whereby upon energization of the coil said armature moves the frame bodily in one direction to close one switch and open the other, manual means associated with the frame for moving same in the opposite direction, to restore the original positions of the switches, and electric conductors connecting the coil in series relationship with the fixed contacts of one of said switches.

2. A fire alarm system including a master control which comprises, a pair of double-pole single-throw knife switches each having a base, a pair of fixed contacts, and a pair of movable blade contacts on its base, a housing having a base and an apertured wall arranged substantially at right angles, means supporting the switch bases in spaced parallelism within the housing and substantially at right angles to the housing base, a handle including a yoke insulatingly connecting the movable contacts of each switch, a shiftable frame within the housing disposed in spaced substantial parallelism with the base of the housing, an extension on one end of the frame passing through the aperture of the housing wall for accessibility exteriorly thereof, pivot means on the frame within the housing, said pivot means spaced apart a distance less than the distance between the switch handles in a closed condition of the switches, a pivotal connection between each pivot means and one switch handle, to maintain one switch in closed-circuit condition while the other is in open-circuit condition, a solenoid fixed to the housing and including a coil whose axis extends in opposite directions normal to both switch bases, and armature reciprocable within the coil, means on the frame for supporting the armature substantially concentrically with the coil, whereby upon energization of the coil said armature moves the frame bodily to project the extension and to close one switch and open the other, the extension being thereby accessible exteriorly of the housing to restore the original positions of the switches, and electric conductors connecting the coil in series relationship with the fixed contacts of one of said switches.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
Re. 21,980	Seeger et al.	Dec. 16, 1941
835,025	Jackson	Nov. 6, 1906
910,682	Hill	Jan. 26, 1909
1,003,915	Knight	Sept. 19, 1911
1,121,561	Keating	Dec. 15, 1914
1,174,503	Johnson	Mar. 7, 1916
1,187,303	Graham	June 13, 1916
1,213,804	Cahill	Jan. 23, 1917
1,324,819	Hickling	Dec. 16, 1919
1,977,121	Ekman	Oct. 16, 1934
1,996,308	Skyock	Apr. 2, 1935
2,266,536	Cooper	Dec. 16, 1941
2,298,573	Little	Oct. 13, 1942

FOREIGN PATENTS

Number	Country	Date
106,912	Great Britain	June 14, 1917