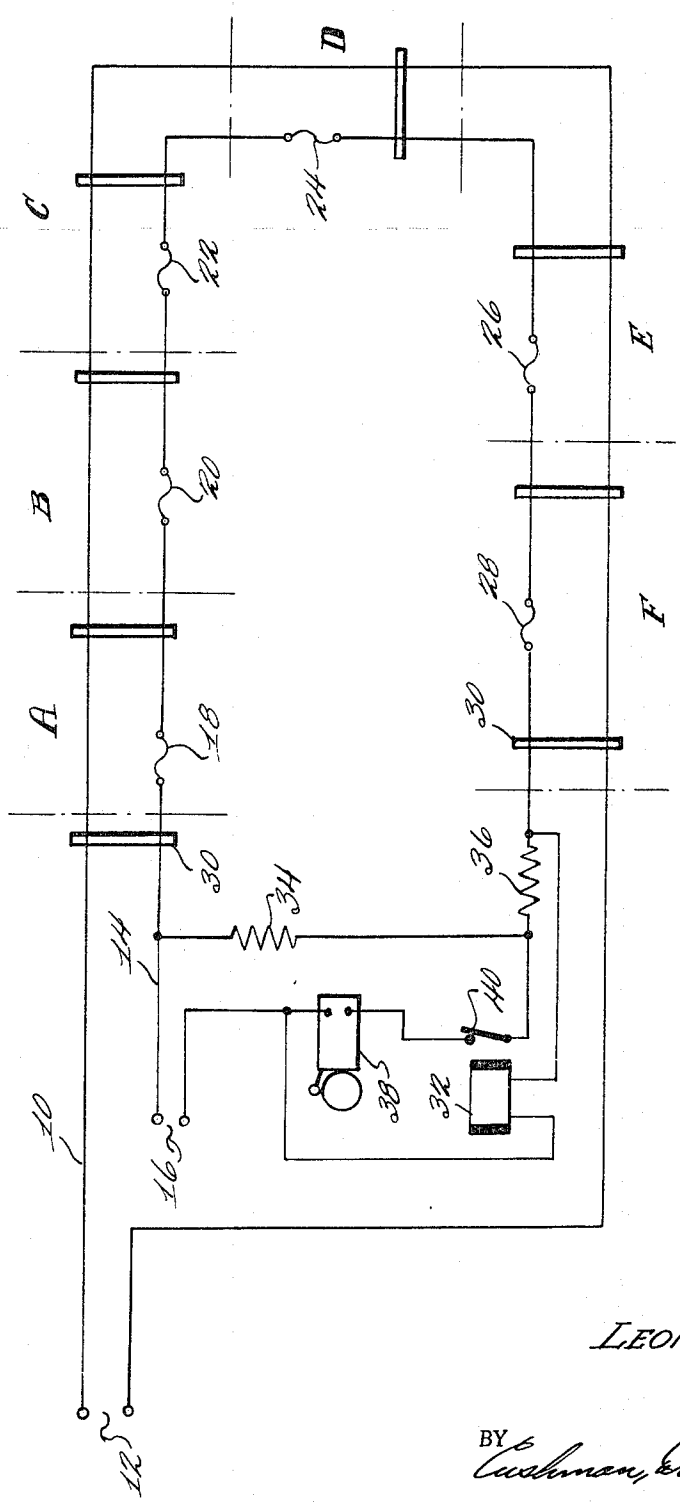
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AUTOMATIC SIGNALING SYSTEM

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AUTOMATIC SIGNALING SYSTEM

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The present invention relates to an automatic signaling system and, more particularly, to an improved arrangement for providing complete fire protection warning.

In many types of structures there is a requirement that a fire warning system be provided which is responsive to different ambient temperatures as separate portions of the structure are normally heated to different temperatures. For example, in a school structure, the classrooms are maintained at the usual room temperature whereas a boiler room will normally be at a higher temperature due to the operation of the furnaces. In such a structure it is undesirable to maintain a fire warning system responsive to a temperature which is appreciably higher than the normal temperature of the high ambient temperature room since this makes the system relatively less sensitive to fire in the rooms which are normally at a lower ambient temperatures. Therefore, if a fire has its origin in one of these low ambient temperature rooms, its detection, and the warning of the presence of this fire, is retarded. This, of course, subjects the structure to more fire damage. On the other hand, by setting the fire responsive system closer to the ambient temperature of the lower temperature rooms, the system becomes more sensitive to variations in temperature of the high ambient temperature portions of the structure. This provides an opportunity for inadvertent actuation of the fire warning system.

In the systems of the past, separate automatic signaling systems have been provided, these systems varying in response in accordance with the environment in which they are placed in order to insure that the fire warning system is properly responsive to fire rather than to minor variations in ambient temperature.

It is an object of the invention to provide an improved single automatic signaling system which is continuous throughout the entire structure.

Ancillary to the object immediately preceding, it is a further to provide a fire protection warning system which is sensitive to a particular increase in ambient temperature of a portion of the structure independently of the normal ambient temperature of the remaining portions of the structure.

It is a further object to provide a system for audio and/or visual indications of the presence of a fire within the structure.

Another object is to provide an improved automatic signalling system which may be installed as a part of the power wiring of new structures or may be installed independently of the power wiring in existing structures.

Further objects and the entire scope of the invention will become apparent when considered in light of the following detailed description of an illustrative embodiment of the invention and from the appended claims.

The illustrative embodiment may be best understood by reference to the accompanying drawing which is a schematic diagram of one embodiment of the invention wherein the automatic signaling system is installed as a part of the normal wiring of the structure.

Briefly, the invention comprises a fuse-type failing wire system which may be installed simultaneously with the conventional power wiring of the structure or which may be installed separately thereof. The failing wire system comprises a number of lengths of fuse-type wire connected preferably in series passing through different

rooms of the structure. The lengths of fuse-type wire used in each of the separate portions of the structure are designed to fail at a degree of heat which is related to the normal ambient temperature of the portion in which is employed. For example, in a boiler room, the length of the fuse wire employed therein will fail at a relatively high temperature when compared with that length of wire used in a room having a lower ambient temperature. Associated with the interconnected lengths of fuse-type wire is a relay circuit which under normal conditions connects the fuse wire with a regulated power source but which responds to a failing of a portion of the fuse wire system to complete a circuit joining an audio and/or visual alarm to the regulated power source.

A preferred embodiment of the invention may be described with reference to the drawing which illustrates an arrangement wherein the fuse-type wire is installed simultaneously with the rough wiring found in the construction. The conventional power wiring **10** for the structure is connected to a power source **12**. For convenience of illustration, this power wiring **10** has been illustrated as a single length of wire and no power outlets have been illustrated as these are unimportant in describing the invention. Physically connected to the power line **10** is the fuse-type failing wire system **14**. This failing wire system is connected to a regulated power source **16**. While the source **16** is illustrated as a separate source of power, it will be understood that sources **12** and **16** may be related, the latter being a regulated source derived from source **12**. The failing wire system **14** comprises a plurality of lengths of fuse wire connected in series. These lengths are shown for convenience as comprising fuse areas **18**, **20**, **22**, **24**, **26** and **28** interconnected by short lengths of wire. Each of these lengths of fuse wire is positioned in a separate portion of the structure and is related in response to the ambient temperature of the portion of the structure in which it is located. For example, wire **18** is located in a portion which is diagrammatically illustrated at A, portion A being shown between a pair of dash lines. Wire **18** is designed to rupture at a given temperature above the ambient temperature of portion A. Similarly, fuse wires **20**, **22**, **24**, etc. are positioned in separate portions B, C, D, etc., each of the portions defining areas in which the ambient temperature may differ from other portions. The interconnected lengths of fuse wire are joined to the conventional power wiring **10** by means of attaching elements **30**. These attaching means may be mechanical devices, a plastic envelope joining the wire **10** and the fuse wires, etc. Also to be considered within the scope of the invention is the employment of a cable construction which includes the power wiring and the fuse wire.

In series with the interconnected lengths of fuse wire **18** through **28** is connected the winding of a relay **32**. In parallel with the lengths of fuse wire are a pair of resistors **34** and **36** connected in series. Between one terminal of the power source and the junction point between resistors **34** and **36** is connected in series a warning indicator **38** and normally closed contacts **40** operatively associated with relay **32**. The arrangement is such that resistor **36** and relay winding **32** are in parallel with indicator **38** and relay contacts **40**.

Now that the structure of a preferred embodiment of the invention has been described, the operation will be set forth. Wire **10** is provided power by source **12** to supply the outlets of the structure. Simultaneously, line **14** is supplied power from the regulated supply **16**. Under normal conditions, the path of current flow from supply **16** is through the series arrangement of fuse wires **18** through **28** and the relay winding **32**. The energization of winding **32** opens the normally closed contacts

40 preventing actuation of the alarm 38. Under these conditions, the combined resistances of 34 and 36 prevent appreciable current flow therethrough and the resistance of element 36 is sufficiently high to effectively prevent initial current flow through contacts 40 to the warning indicator 38 before contacts 40 have been opened by the actuation of relay 32. On increase of the ambient temperature in one of the sections A through F above the critical failing point of its associated length of fuse wire, the fuse wire ruptures. Due to the relatively high resistance of the series combination of elements 34 and 36, the current flow through the relay warning 32 is insufficient to maintain contacts 40 opened. Therefore, a current path is completed through element 34, contacts 40 and the warning indicator 38. While the indicator 38 is illustrated as being of the audio type, it will be apparent that a visual, or both audio and visual device, may be employed. Therefore, on failure of one of the lengths of fuse wire, the indicator is actuated to serve notice of the condition which has raised the ambient temperature of one portion of the complete structure above the critical point.

The system which has been described is suitable for all types of construction—residential, commercial, industrial, civil and military aircraft, ships, etc. The separate lengths of fuse wire which may be employed may vary from very sensitive wire designed to fail at relatively low temperatures for use in critical areas to special fuse wires with a much higher failing point for use in less critical areas or in areas with normally high ambient temperature.

While the system described is one in which the power wiring and fuse wire are joined it should be appreciated that the interconnected lengths of fuse wire may also be installed on any portion of the structure, inside or outside, independently of the normal power wiring.

The relay control circuitry described is exemplary only, and other convenient relay arrangements may be substituted therefor.

The above described embodiment is illustrative of a preferred embodiment of the invention but is not intended to limit the possibilities of insuring the features of an adequate warning system responsive to temperature conditions related to the particular normal ambient temperature of each portion of a structure. The automatic signaling system disclosed herein is an example of an arrangement in which the inventive features of the disclosure may be utilized, and it will become apparent to one skilled in the art that certain modifications may be made within the spirit of the invention as defined by the appended claims.

What is claimed is:

1. In an automatic signaling system for detection of a high temperature condition in any of a plurality of separate portions of a structure, the improvement comprising: a power supply, a plurality of heat sensitive fuse wires connected in series to said power supply, each of said fuse wires being located in separate portions of said structure and sensitive to a temperature a selected amount higher than the normal ambient temperature of the portion of the structure in which it is located to rupture when the higher temperature is reached; a control circuit for said system, said control circuit comprising a relay winding connected in series with said fuse wires, a pair of series arranged resistors connected in parallel with the fuse wires, normally closed contact means operatively associated with said relay winding and an indicator means, the contact means and said indicator means being connected in series and joined to the junction point of said pair of series arranged resistors whereby one of said pair of resistors, the contact means and the indicator means are connected in parallel with said relay winding; said control circuit being responsive to the rupture of a fuse wire to energize said indicator means to signal that a high temperature condition exists in at least one portion of the structure.

2. In an automatic signaling system as defined in claim 1, said system further comprising power wiring for said structure and means for physically attaching said fuse wires to the power wiring.

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