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2,413,125

FIRE DETECTOR CABLE

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Fig. 1.

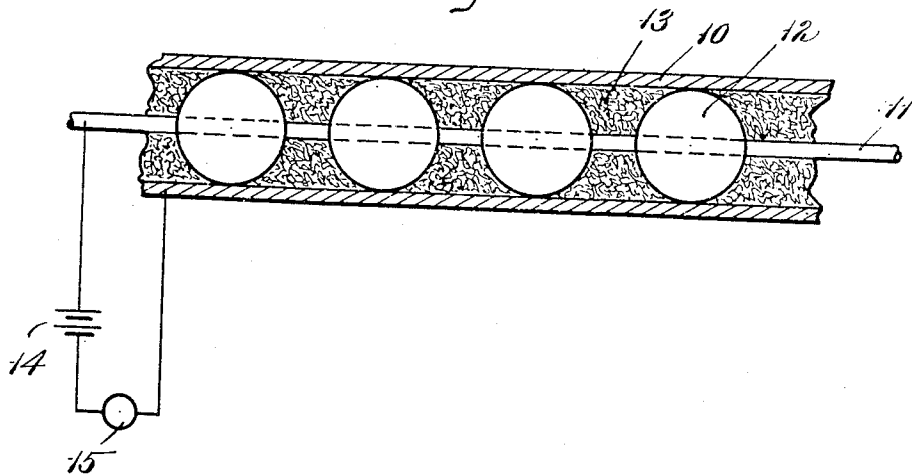
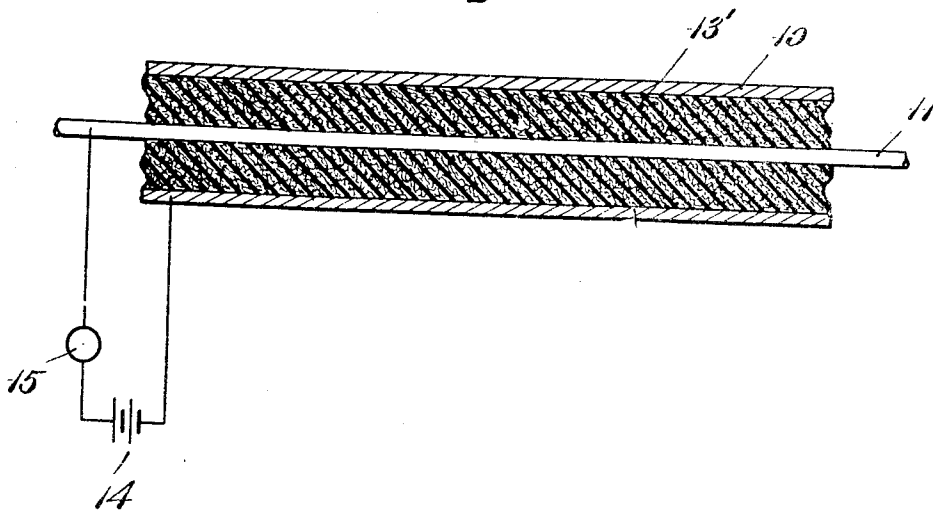


Fig. 2.



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FIRE DETECTOR CABLE

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4 Claims. (Cl. 201-63)

1

This invention relates to fire detector cables of the type wherein an undue rise in temperature at any point in the protected area will close a normally opened circuit.

When fire detector cables having a conductor enclosed within a tube and insulated therefrom by closely spaced insulation bodies are placed around the walls of a restricted space, such as the cockpit of an airplane, it has been found that the sharp bends to which the tubes are subjected will cause the insulation bodies to crack and otherwise impair the operation of the cable.

The object, therefore, of the present invention is to provide a fire detector cable which has sufficient flexibility to enable it to be bent on a small radius of curvature without injury. I have discovered that certain salts in dry form are electrically non-conductive at normal temperatures and electrically conductive at abnormal temperatures, and that such salts may be employed to insulate an electrical conductor from a conductive tube surrounding the same so that an alarm circuit having its terminals connected to the tube and conductor will remain open at normal temperatures and will be closed at abnormal or fire temperatures, the salt melting or partially melting to afford a conductive path between the tube and its enclosed conductor.

The enclosed conductor may be insulated mechanically from the enclosed tube by spaced insulators and the spaces between the latter filled with the proper salt in dry form, or the enclosed conductor may be insulated with asbestos or other suitable insulating material impregnated with a solution of such salt. I have ascertained that potassium nitrate and sodium nitrate in dry or powdered form are non-conducting at ordinary temperatures and that they melt or partially melt and thereby become conducting at higher temperatures. These salts are typical and characteristic of those that can be used in the present invention as they are stable and have relatively low melting points.

In the accompanying drawing,

Figure 1 is a central longitudinal section of a fire detector cable embodying my invention and Fig. 2 is a similar section of another embodiment thereof.

In the drawing selected to more fully disclose the principle underlying my invention, 10 is a tube of suitable metal, such as copper, and 11 is an uninsulated conductor disposed within said tube and passing through apertures in spaced insulating elements 12, herein shown as spherical, although they may have any other suitable shape, 55

2

the said elements closely fitting the tube. Interposed between the wire 11 and the tube is a quantity of sodium nitrate or potassium nitrate, or other suitable material, in dry form, preferably powder, as indicated at 13.

In the embodiment of my invention shown in Fig. 2, the wire 11 is surrounded by a mass of suitable non-combustible porous material which, in the present instance, is shown as a cylinder 13 of asbestos, or the like, which is impregnated with a solution of potassium nitrate, sodium nitrate, or any other suitable salt which is non-conducting at low temperature and conducting at abnormal temperatures.

An alarm circuit is indicated diagrammatically and includes the battery 14, or other source of voltage, and an alarm or indicating device 15, the terminals of said circuit being conducted to the tube 10 and conductor 11.

In both Figs. 1 and 2, the jagged lines at the ends of the tube and the conductor indicate that the cables are of indefinite lengths. Each cable, throughout its entire length, has sufficient flexibility to permit of bending on a small radius of curvature without injury either to the tubing member or the elements enclosed therein, whereby liability to short circuit is effectively eliminated.

At normal temperatures the circuit of the indicator will be open and at abnormal temperatures, it will be closed through the conducting path afforded by the material interposed between the tube and the conductor enclosed therein.

The term "normal temperature" is used in the specification and claims as defining a temperature lower than that which is generally known in this art as "flame temperature," and the term "abnormal temperature," as defining "flame temperature" or a temperature higher than the same.

Having thus described illustrative embodiments of my invention without, however, limiting the same thereto, what I claim and desire to secure by Letters Patent is:

1. A readily bendable conductor cable of indefinite continuous length for detection of abnormal temperature conditions at any location adjacently along it, comprising an electrically conductive tubing element adapted for bending on a relatively small radius of curvature, an uninsulated electrical conductor extending continuously through and spaced from said tubing element, discontinuous non-conductive means interengaging said conductor and tubing element and maintaining the spacing thereof subject to bending of the cable, and in the spaces between said conductor, said tubing element and said non-

3

conductive means, a substantially filling quantity of non-gaseous material which is electrically non-conductive at normal temperatures and electrically conductive at abnormal temperatures.

2. A readily bendable conductor cable of indefinite continuous length for detection of abnormal temperature conditions at any location adjacently along it, comprising an electrically conductive tubing element adapted for bending on a relatively small radius of curvature, an un- 5 insulated electrical conductor extending continuously through and spaced from said tubing element, discontinuous non-conductive means interengaging said conductor and tubing element and maintaining the spacing thereof subject to bending of the cable, and in the spaces between said conductor, said tubing element and said non- 10 conductive means, a substantially filling quantity of potassium nitrate in dry form.

3. A readily bendable conductor cable of indefinite continuous length for detection of abnormal temperature conditions at any location adjacently along it, comprising an electrically conductive tubing element adapted for bending on a relatively small radius of curvature, an un- 15 insulated electrical conductor extending continuously through and spaced from said tubing element, means interengaging said conductor and tubing element and maintaining the spacing thereof subject to bending of the cable, said means 20 comprising a non-combustible porous non-gaseous material impregnated with a substance which is electrically non-conductive at normal temperatures and electrically conductive at abnormal temperatures.

4

ously through and spaced from said tubing element, discontinuous non-conductive means interengaging said conductor and tubing element and maintaining the spacing thereof subject to bending of the cable, and in the spaces between said conductor, said tubing element and said non-conductive means, a substantially filling quantity of sodium nitrate in dry form.

4. A readily bendable conductor cable of indefinite continuous length for detection of abnormal temperature conditions at any location adjacently along it, comprising an electrically conductive tubing element adapted for bending on a relatively small radius of curvature, an un- 10 insulated electrical conductor extending continuously through and spaced from said tubing element, means interengaging said conductor and tubing element and maintaining the spacing thereof subject to bending of the cable, said means 15 comprising a non-combustible porous non-gaseous material impregnated with a substance which is electrically non-conductive at normal temperatures and electrically conductive at abnormal temperatures.

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