

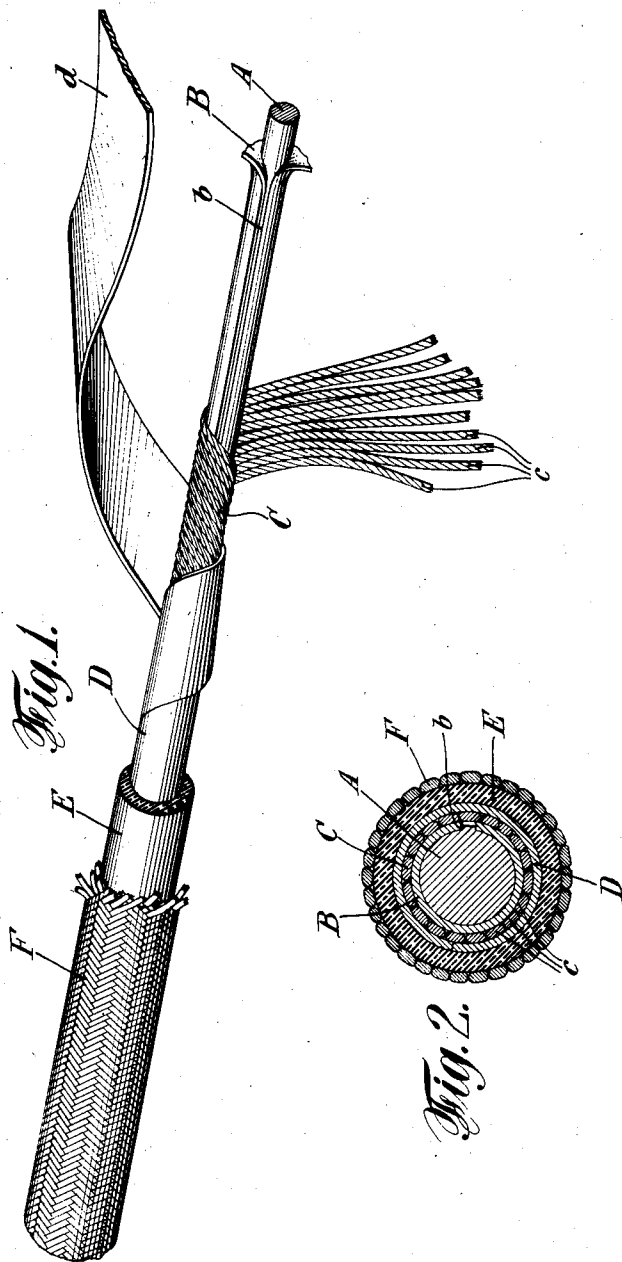
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CABLE AND METHOD OF PRODUCING SAME

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CABLE AND METHOD OF PRODUCING
SAME

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5 Claims. (Cl. 200—143)

My invention relates to a cable utilizable for sounding an alarm, operating an indicating device, or for performing any other or a plurality of control or indicating functions upon occurrence of combustion or attainment of temperature of a predetermined magnitude.

My invention relates to a cable which is satisfactorily operative, efficient and durable.

My invention relates particularly to a cable comprising interior members forming sides of an electrical circuit and an outer member functioning to prevent access of moisture to said interior cable members.

Further objects and advantages of my invention will more fully appear from the following description taken in connection with the accompanying drawing.

My invention resides in the cable, apparatus, novel features of construction and combination of parts which are hereinafter shown and described by way of example in one of their preferred forms.

This application is a continuation in part of my pending application Serial No. 198,056, filed June 11, 1927.

In the drawing:

Figure 1 is a perspective view, partly broken away, of a cable constructed in accordance with my invention; and

Fig. 2 is a transverse, vertical sectional view of the cable shown in Fig. 1.

My invention relates particularly to a cable comprising a core adapted to become molten when exposed or subjected to predetermined magnitude of temperature, said core having suitable insulating material disposed therearound and around or on which a sheath is disposed. The core and an enclosing tube therefor forms one side or branch of an electrical circuit of which the sheath forms another side or branch and, upon or shortly after occurrence of said predetermined magnitude of temperature, the core becomes molten and a part thereof passes through said insulating material and into contact with said sheath. As a result, a short circuit occurs to thereby change the characteristics of said electrical circuit.

Referring to the drawing, there is illustrated a cable constructed in accordance with my invention and herein shown as comprising a core A disposed within a tube or sleeve B longitudinally slotted as indicated at *b*. Disposed upon the tube B is a layer of insulating material C formed, preferably, by winding a plurality of fabric strands *c* upon the aforesaid tube B. Encircling

the insulating layer C is a sheath or enclosing member D formed, in the example shown, by spirally winding a metallic web or ribbon *d*, with the edges thereof preferably overlapped, upon the aforesaid insulating layer C. Surrounding the sheath D is a cover E which should be waterproof and which, ordinarily, is formed from rubber. Disposed upon the cover E and forming the outer surface of the cable is a fabric layer F.

The aforesaid core A is formed of any suitable metallic material adapted to become molten when exposed to suitable high temperature such, for example, as may be occasioned by combustion occurring in the neighborhood of the cable. In the example shown, core A comprises lead, bismuth, tin and antimony compounded or mixed in suitable proportions to produce a structure solid at ordinary or room temperatures but transformable into its molten or fluid state at a temperature of the order of 160° F., more or less.

The tube B, a good conductor of electricity, as steel or iron, forms a housing for the core A some of which, when in its molten condition, is adapted to pass first through the slot *b*, then through the insulating layer C, and then into contact with the sheath D, all as hereinafter more fully described.

The fabric strands *c* forming the insulating layer C, preferably, are ordinary cotton strings or threads of a type well known to the art of insulating or covering cables.

The web or ribbon *d* forming the sheath D, in the example shown, is a strip of sheet-like metallic material constituting a conductor of electricity, as hereinafter described. Preferably the web or ribbon *d* is arranged in spiral direction the reverse of that in which the fabric strands *c* are arranged to thereby prevent the edge of the former from slipping or passing between adjacent strands *c* toward or into engagement with the tube B.

The cover E, as stated, is formed, usually, of rubber and, as hereinafter more fully described, is applied to the sheath D under temperature conditions somewhat below the temperature at which the core A becomes molten or fluid.

As with the insulating layer C, the outer fabric layer F is former, ordinarily, from cotton strings or threads of a character well understood to the cable covering art.

The core A and tube B, primarily the latter, form one side of an electrical circuit of which the aforesaid sheath D forms the other side.

In accordance with my invention, the insulating layer C is impregnated with or comprises a

material or substance adapted to assume a liquid state corresponding with that of water at a temperature somewhat lower than the temperature at which the core A becomes molten or fluid.

5 Paraffin is well adapted for this purpose and, ordinarily, is utilized when constructing cables in accordance with my invention.

The cover E and the manner in which it is disposed upon the sheath D constitutes an important feature of my invention. Where the core A is adapted to become molten or fluid at a temperature of the order hereinbefore stated, it is not practical to form said cover E by the usual vulcanizing process. The latter, as well understood, involves treatment of rubber at rather high temperatures and, should an attempt be made to dispose the cover E in the position illustrated under such high temperature conditions the core A would become molten and some of it would pass into contact with the sheath D. As a result, the cable would be rendered inoperative for the purpose intended.

In accordance with my invention, said cover E is disposed upon the sheath D, or equivalent, in some suitable manner not requiring an operating temperature high enough to render the core A molten or fluid. Where rubber is the material forming the cover E, the "cold cure" process may be utilized, this involving the churning treatment of the rubber compound with gasoline, benzol or other solvent and the subsequent application thereof to the object whereupon it is cured or vulcanized by vapors comprising sulphur chloride. Or, rubber may be otherwise suitably treated to produce on the sheath D a cover E of the general character herein illustrated. With the cold cure process, the ribbon *d* should be formed of material suitably resistant to the deteriorating action of sulphur chloride.

40 The fabric layer F is not essential but its presence is desirable. When utilized, it is desirable that it be impregnated with some material or substance resistant to cable deteriorating agents or influences; hence, said fabric layer F should be resistant to the action of acid, oil, water, fumes or the like. If desired, for thus treating or impregnating said fabric layer F, there may be utilized a suitable varnish having an acetone base.

50 A cable of the character herein described is intended to be disposed or placed in some region wherein combustion or abnormally high temperature may occur. For example, the rooms of a building may be wired with a cable of the character herein described. Then, if a fire or other high temperature should occur in a region adjacent the cable, core A, under the influence of heat transmitted thereto through the outer cable sections, becomes molten or fluid, a part thereof passing outwardly through the slot *b*, or equivalent, through the insulating layer C or through adjacent strands thereof, and into engagement with the sheath D. Usually, the core material passing through the slot *b*, or equivalent, is of small or pointed configuration. When the core A and sheath D are thus connected by some of the core material, an electrical circuit is completed or changed in character, said circuit operating or controlling mechanism of any suitable character, such, for example, as indicating mechanism, control mechanism, or the like.

When the core A becomes molten or fluid as described above, in increases in volume and, primarily for this reason, it spurts or passes into contact with the sheath D. Where the insulat-

ing layer C is impregnated with paraffin, or equivalent, as hereinbefore described, the paraffin becomes liquid in substantially the same sense that water is liquid at a temperature somewhat below the temperature at which said core A becomes molten or fluid. Accordingly, there is an increase in volume of the impregnating material and this increase in volume, together with the increase in volume of the core material, causes the satisfactory performance of the result intended, namely, the passage of some of the core material A in contact with the sheath D.

It is desirable that the insulating layer C be impregnated with insulating material as described above. However, material that has heretofore been proposed, is not entirely satisfactory in that it is viscous or not sufficiently liquid at the time when the core material becomes molten. Because viscous, said proposed impregnating material impedes rather than aids the spurting action of the core material. Paraffin, or equivalent, is not thus objectionable because it attains a liquid state similar to that of water at a temperature lower than the temperature at which the core material becomes molten or fluid. Accordingly, the spurting core material is not thereby impeded in its progress toward the sheath D; moreover, as heretofore explained, the liquid paraffin, or equivalent, cooperates in a desirable manner with the core material to produce the result intended.

As hereinbefore stated, the cover E is highly desirable. When utilized, said cover member E, not only forms a housing for the interior cable parts, but functions to prevent the passage of moisture to said interior cable parts. As a result, there is less danger of a false short circuit between the core A and sheath D.

While the invention has been described with respect to a certain particular preferred example which gives satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. A cable comprising an electricity-conducting core adapted to become molten under predetermined temperature conditions, an electricity-conducting sheath around said core, and insulating material between said sheath and core, said sheath comprising a ribbon of metallic material spirally arranged around said insulating material with adjacent edges thereof in overlapping relation said core and sheath forming sides of an electrical circuit during use of said cable.

2. A cable comprising an electricity-conducting core adapted to become molten under predetermined temperature conditions, an electricity-conducting sheath around said core, and insulating material between said sheath and core, said insulating material comprising fabric strands arranged spirally in one direction around said core, said sheath comprising a ribbon of metallic material arranged spirally in reverse direction around said insulating material.

3. A thermo-responsive cable comprising two juxtaposed electrical conductors one of which is fusible at a temperature of approximately 160° F. and insulating material normally separating

the conductors and including a fabric impregnated with an insulating substance which gasifies at a temperature below the temperature at which the conductor fuses.

- 5 4. A thermo-responsive cable comprising two juxtaposed electrical conductors one of which is fusible at a temperature of approximately 160° F. and insulating material normally separating the conductors and including a series of spirally wound threads impregnated with an insulating substance which gasifies at a temperature below the temperature at which the conductor fuses.
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5. A thermo-responsive cable comprising two juxtaposed electrical conductors one of which is fusible at a temperature of approximately 160° F. and insulating material normally separating the conductors and including a series of spirally wound threads impregnated with an insulating substance containing paraffin and which gasifies below the temperature at which the conductor fuses.

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