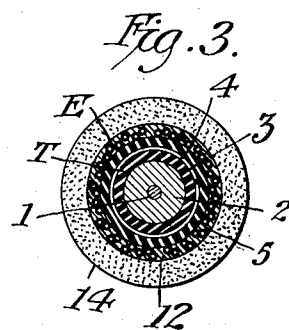
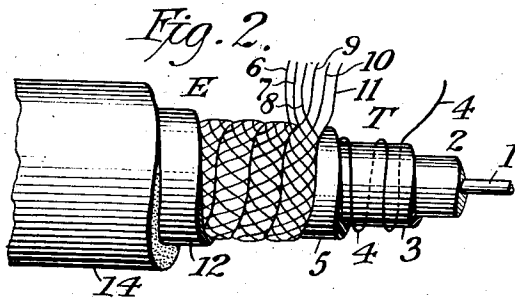
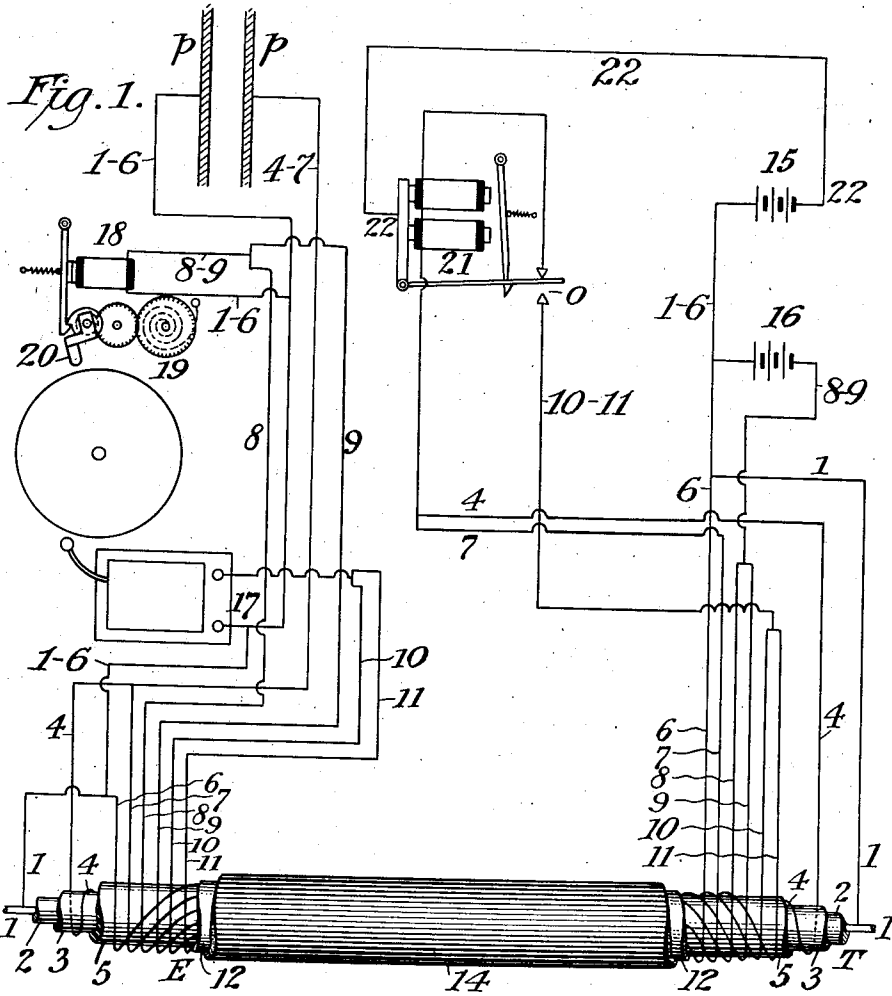


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ELECTRIC CABLE FOR BURGLAR ALARM SYSTEMS.
APPLICATION FILED MAR. 18, 1909.

961,827.

Patented June 21, 1910.



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ELECTRIC CABLE FOR BURGLAR-ALARM SYSTEMS.

961,827.

Specification of Letters Patent. Patented June 21, 1910.

Application filed March 18, 1909. Serial No. 484,142.

To all whom it may concern:

Be it known that I, JOHN P. WILLIAMS, a citizen of the United States, and resident of the city of New York, borough of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Electric Cables for Burglar-Alarm Systems, of which the following is a specification.

This invention relates to electric cables for burglar-alarm systems, and it has for its object to provide a simple and improved electric cable which will be perfectly protected against cutting of the wires and against the action of heat or flame.

A further object of my invention is to provide an improved cable of the character mentioned, in which the thermostatic elements for protection against heat or fire will themselves be protected by elements for causing the operation of an alarm signal if an attempt is made by cutting to reach or destroy the thermostatic fire-alarm elements, and which will be perfectly protected against an attempt to either melt or cut out the shellac or other insulating compound with which the wires of the non-thermostatic elements of the burglar-alarm cable are coated.

My improved electric cable is adapted for use in connection with all types of burglar-alarm systems, for the purpose of insuring combined protection both as a burglar-alarm and as a fire-alarm, the thermostatic and other wires of the cable being suitably connected up with the signals, bells or other features of the burglar-alarm system, and when employed in connection with a general burglar-alarm system will serve the combined purpose of protection against the attempt to either cut or employ heat or flame in an attack upon the cable. My improved cable is also adapted for effective use in connection with fire-alarm systems, the thermostatic and other wires of the cable being connected up with suitable signals, alarms or other features of a general fire-alarm system, and when so employed serves the combined purpose of protection against either the action of heat or flame or an attempt to cut out and destroy the thermostatic elements.

My invention comprises, in its main features, an electro-thermostatic cable of the class described, having a thermostatic core embodying circuit wires or conductors, and

circuit wires or conductors exterior of the thermostatic core and arranged outside of or around the same (said exterior wires being preferably wound around the outside surface of the thermostatic core so that they inclose the same), the wires or conductors of both the thermostatic core and the part of the cable exterior thereof being preferably connected in multiple and adapted for connection to the alarm or signal circuits of the general alarm system, and it further comprises other improved features of construction and arrangement, substantially as hereinafter described and particularly indicated in the claims.

In the accompanying drawings and the following specification I have illustrated and described one form of the improved electro-thermostatic cable constructed according to my invention, and have shown and described the same in connection with one type of a general alarm system.

In the drawings—Figure 1 is a diagrammatic view showing the cable and its circuit connections with the general features of an alarm system. Fig. 2 is a detail side view of a section of the cable, parts being broken away. Fig. 3 is a detail cross-section, on an enlarged scale, of the cable.

Corresponding parts in all the figures are denoted by the same reference characters.

Referring to the drawings, T designates a thermostatic core, which in the construction herein shown consists of a central wire or conductor, 1, inclosed within a surrounding covering or shell of fusing metal, 2, which latter is surrounded by a covering, 3, of any suitable insulating material, and around the insulation 3 is a wire or conductor, 4 (which may be a wire suitably wound around the insulation 3, as herein shown, or a tubular conductor), the conductor 4 being inclosed within and surrounded by a covering, 5, of any suitable insulating material. It will be understood that the thermostatic core, in lieu of the construction and arrangement just described, may be of any other suitable or adapted construction, but I preferably employ a construction in which the core embodies fusing metal in combination with the electrical conductors.

E designates the portion of the cable which is exterior of the thermostatic core T and which consists of wires or electrical conductors. The wires or electrical conduc-

tors constituting the exterior part E may be arranged around or about the thermostatic core T in any suitable or desired manner and in any desired number or arrangement, but they preferably consist of insulated wire conductors braided and wound around the outside of the thermostatic core T against the outside insulated surface 5 thereof, as herein shown, so that they form a network practically surrounding and approximately inclosing the thermostatic elements and constitute an outside covering therefor as well as the exterior conducting elements of the composite cable. I have herein illustrated six of such exterior conducting wires, though it will be understood that the number of such wires may be increased or decreased according to the number of circuits or multiple wires desired. These exterior conductors are respectively indicated at 6, 7, 8, 9, 10, and 11, and in the arrangement herein shown the conductor 1 of the thermostatic core and the exterior conductor 6 are in multiple, the conductor 4 of the thermostatic core and the exterior conductor 7 are in multiple, the exterior conductors 8 and 9 are in multiple, and the exterior conductors 10 and 11 are in multiple.

The exterior conductors constituting the exterior conducting part E of the cable, are inclosed within a coating of shellac or other suitable insulating material, as at 12, which provides an outside insulated covering or frangible inclosure for the cable elements E, and if desired the cable itself may be inclosed in a suitable covering or conduit surrounding the insulated surface 12, as shown at 14, which covering or conduit may be of any suitable flexible material or armor adapted to protect the cable from mechanical injury without impairing its thermostatic action.

In connecting up the improved electro-thermostatic cable with a general alarm system, as herein shown, the conductor 1 of the thermostatic core and the exterior conductor 6, which are in multiple, are both connected direct to the positive side of dry batteries and wet batteries, as shown at 15 and 16 respectively, or to other suitable sources of electrical energy, and to one side of the alarm signals or bells of the system, as shown at 17, and may also be connected to one side of a relay, as at 18, controlling the operation of a mechanical device, as at 19, to which is operatively connected a gong-hammer, as at 20, and to one of a pair of insulated plates, as at *p p*, constituting electrical conductors and forming a bell-housing or vault lining, said signals or bells or mechanically-operated hammers or plates being comprised as parts of a general alarm system and located at various points as desired. The conductor 4 of the thermostatic core and the exterior conductor 7, which are in multiple, are con-

nected to one side of another relay, as at 21, the other side of this relay being connected, as at 22, to the negative side of the dry batteries 15 or other suitable source of electrical energy. Normally, this last-mentioned relay 21 is in series with the conductors 4 and 7 on the negative side. Said conductors 4 and 7 are also connected to the plate *p*, of the before-mentioned housing or lining, which is opposite the plate to which the conductors 1 and 6 are connected.

When a short circuit is made between the conductors 1 or 6 and 4 or 7, the last-mentioned relay 21 is energized and makes a permanent connection with the signals or bells, through the positive conductors 1 or 6, and through the negative return conductors 10 or 11, said latter conductors 10 and 11 being connected to the side of said relay 21 which is normally open, as at *o*, and which is closed when a short circuit is made between the conductors 1 or 6 and 4 or 7, and the signals or bells are thus operated by the direct connection thus made to the batteries, the conductors 10 and 11 being connected to the side of the alarm signals or bells which is opposite the connection of the conductors 1 and 6. It will be noted that the conductors 1 or 6 also carry a positive current from the wet batteries or other suitable source of electrical energy; and the exterior conductors 8 or 9 carry the negative return current from the same source. Said conductors 8 and 9 are also connected to the side of the first-mentioned relay 18 which is opposite the connections of the conductors 1 and 6. Thus, with the current continuously carried by the conductors 1 or 6 and the conductors 8 or 9, the first-mentioned relay 18, which controls the operation of the mechanical gong-hammer device 19—20, retains said device out of operation, but when either of said conductors is severed said relay 18 is thrown out of circuit and the mechanical gong-hammer device is released and starts its operation; and the operation of the signals and bells controlled by the conductors 1 or 6, 10 or 11 and 4 or 7 is likewise effected when a short circuit is established through said last-mentioned conductors, as above explained.

The operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains.

It will be apparent, from the foregoing description, that an attempt upon the cable either by cutting or by the action of heat or flame will cause the signals and alarms to sound, either by the severing of the conductors and the consequent breaking of circuits or the melting of the fusing element 2 of the thermostatic core and the establishing thereby of a short circuit between the conductors.

It will be understood that the insulating

material intervening between the conductors is of a character that will fuse or burn at a comparatively low degree of heat and preferably at a degree lower than that which will melt the fusing metal 2.

The particular advantages derived from using conductors in multiple as herein described, are that the load carrying capacity of the cable is greatly increased, and the effective use of very fine wires, which is permissible by reason of the multiple arrangement herein described, renders the cable more sensitive to an attack, as the fine wires are more liable to breakage if a section of the coating 12 of shellac or other suitable insulating material covering them is tampered with or cut out; and of course any attempt to melt the shellac or other insulating covering of the cable will cause the short circuiting operation by action of the thermostatic core.

It will be understood that my improved electro-thermostatic cable, combining the interior thermostatic core elements and the exterior parts constituted by the outer conductors or wires surrounding the same, is adapted for effective operation in connection with alarm systems working on either open or closed circuits or on both open and closed circuits.

I do not desire to be understood as limiting myself to the detailed construction and arrangement of parts as herein shown and described, as it is manifest that variations and modifications therein may be resorted to in the adaptation of my invention to varying conditions of use, without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variations and modifications as properly fall within the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent:

1. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors, the conductors of the thermostatic core portion and the conductors of the supplementary outer portion being relatively arranged in circuits having open and closed conditions, whereby when the conductors of both the thermostatic portion and the outer portion of the cable are connected in alarm circuits the alarm will

be sounded either by the cutting of the conductors of said main outer division or the action of heat or flame upon said thermostatic division.

2. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors the conductors of the thermostatic portion and the conductors of the outer portion being arranged in multiple and in circuits operatable either by the cutting of the conductors or the action of heat or flame.

3. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors, the circuit conductors of said main outer division being wound around and outside of the thermostatic portion constituting the thermostatic division and the conductors of the thermostatic core portion and the conductors of the supplementary outer portion being relatively arranged in circuits operatable either by the cutting of the conductors or the action of heat or flame, substantially as and for the purpose set forth.

4. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and electrical conductors exterior of and supplementary to said thermostatic portion constituting the thermostatic division, said exterior supplementary conductors constituting a division of the cable embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors and being arranged to form an inclosure for said thermostatic division, and the conductors of the thermostatic core portion and the supplementary exterior conductors of the outside inclosure being relatively arranged in circuits operatable either by the cutting of the conductors

or the action of heat or flame, substantially as and for the purpose set forth.

5. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors, the circuit conductors of said main outer portion being braided and wound around and outside of the thermostatic portion constituting the thermostatic division and arranged to form an inclosure for said thermostatic division, and the conductors of the thermostatic core portion and the conductors of the supplementary outer portion being relatively arranged in circuits operatable either by the cutting of the conductors or the action of heat or flame, substantially as and for the purpose set forth.

6. An electric cable for alarm systems, comprising a thermostatic portion constituting the thermostatic division of the cable and embodying electrical conductors the fusing or contact of which will operate an alarm circuit, and a main portion constituting a division of the cable supplementary to said thermostatic portion and protecting the same and embodying electrical conductors the severing of which will operate an alarm circuit, whereby the thermostatic division of the cable is protected independent of its thermostatic action.

7. An electric cable for alarm systems, comprising two distinct divisions, one division being a main portion embodying circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors, and the other division being a thermostatic portion embodying circuit conductors operatable to cause the sounding of the alarm by the action of heat, said distinct divisions being relatively associated so that one incloses or protects the other and the conductors of the thermostatic division and the conductors of the main division being relatively associated in circuits operatable either by the cutting of the conductors of the main division or the action of heat or flame upon the conductors of the thermostatic division, whereby either division is protected by the action of the other independent of its own protective characteristics.

8. An electric cable for alarm systems, comprising a thermostatic portion constituting the thermostatic division of the cable and embodying the circuit conductors which

are thermostatically operatable to cause the sounding of the alarm by the action of heat, a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying the circuit conductors which are operatable to cause the sounding of the alarm by severance of the conductors, the conductors of the thermostatic portion and the conductors of the supplementary outer portion being relatively arranged in circuits having open and closed conditions, and an insulating coating for the conductors of said exterior portion, whereby the exterior conducting elements inclose the conducting elements of the thermostatic division and are themselves inclosed and when the conductors of the thermostatic portion and outer portion of the cable are connected in alarm circuits the alarm will be sounded either by the severing of the conductors of said main outer division or the action of heat or flame upon said thermostatic division.

9. An electric cable for alarm systems, comprising a thermostatic core portion constituting the thermostatic division of the cable and embodying the circuit conductors which are thermostatically operatable to cause the sounding of the alarm by the action of heat and a main outer portion constituting a division of the cable supplementary to said thermostatic portion and exterior thereof and surrounding the same and embodying electrical conductors of relatively fine wire operatable to sound the alarm by the severance of the conductors and wound around said thermostatic portion, and a frangible coating covering the conductors of said outer portion, the conductors of the thermostatic core portion and the conductors of the supplementary outer portion being relatively arranged in circuits operatable either by the cutting of the conductors or the action of heat or flame, substantially as and for the purpose set forth.

10. An electric cable for alarm systems, comprising in combination a thermostatic portion constituting the thermostatic division of the cable and embodying the circuit conductors for short circuiting an alarm circuit by fusing, and a main portion constituting a division of the cable distinct from and supplementary to said thermostatic portion and embodying electrical conductors for operating an alarm circuit by cutting or severance of said conductors.

11. An electric cable for alarm systems, comprising in combination a thermostatic portion constituting the thermostatic division of the cable and embodying electrical conductors in connection with signal or alarm circuits operatable by fusing or contact of said conductors, and a main portion constituting a division of the cable distinct from and

supplementary to said thermostatic portion and embodying electrical conductors in connection with the same signal or alarm circuits and operatable by cutting of said conductors, substantially as and for the purpose set forth.

12. An electric cable for alarm systems, comprising in combination a main portion constituting a distinct division of the cable and embodying electrical conductors in connection with closed parts of signal or alarm circuits, whereby the cutting or severing of said conductors will open said circuits, and a thermostatic portion constituting an additional thermostatic division of the cable and embodying electrical conductors so arranged in connection with said signal or alarm circuits that fusing of the thermostatic elements will short circuit a part of said circuits and sound the signal or alarm independent of the severing of the electrical conductors of said main portion, substantially as and for the purpose set forth.

13. An electric cable for alarm systems, comprising in combination a main outer portion constituting a distinct division of the cable and embodying electrical conductors in connection with closed parts of signal or alarm circuits, whereby the cutting or severing of said conductors will open said circuits, and a thermostatic portion constituting an additional thermostatic division of the cable

surrounded by and extending centrally within said main portion and embodying electrical conductors so arranged in connection with said signal or alarm circuits that the action of heat or flame will cause the short circuiting of part of said circuits and sound the signal or alarm independent of the severing of the electrical conductors of said outer portion of the cable, substantially as and for the purpose set forth.

14. An electric cable for alarm systems, comprising a thermostatic portion, as at T, constituting the thermostatic division of the cable and embodying the electrical conductors 1 and 4 connected with signal or alarm circuits and thermostatically operatable to cause the sounding of the alarm by the action of heat, and a main portion, as at E, constituting a distinct division of the cable supplementary to said thermostatic portion and embodying electrical conductors connected with signal or alarm circuits and operatable to cause the sounding of the alarm by severance of said conductors.

In testimony whereof I have signed my name in the presence of the subscribing witnesses.

JOHN P. WILLIAMS.

Witnesses:

L. FREYTAG,

O. J. SCHUESSLER.