(No Model.)

J. D. GOULD.

HEAT DETECTOR FOR ELECTRIC FIRE ALARM SYSTEMS.

No. 601,730. Patented Apr. 5, 1898.

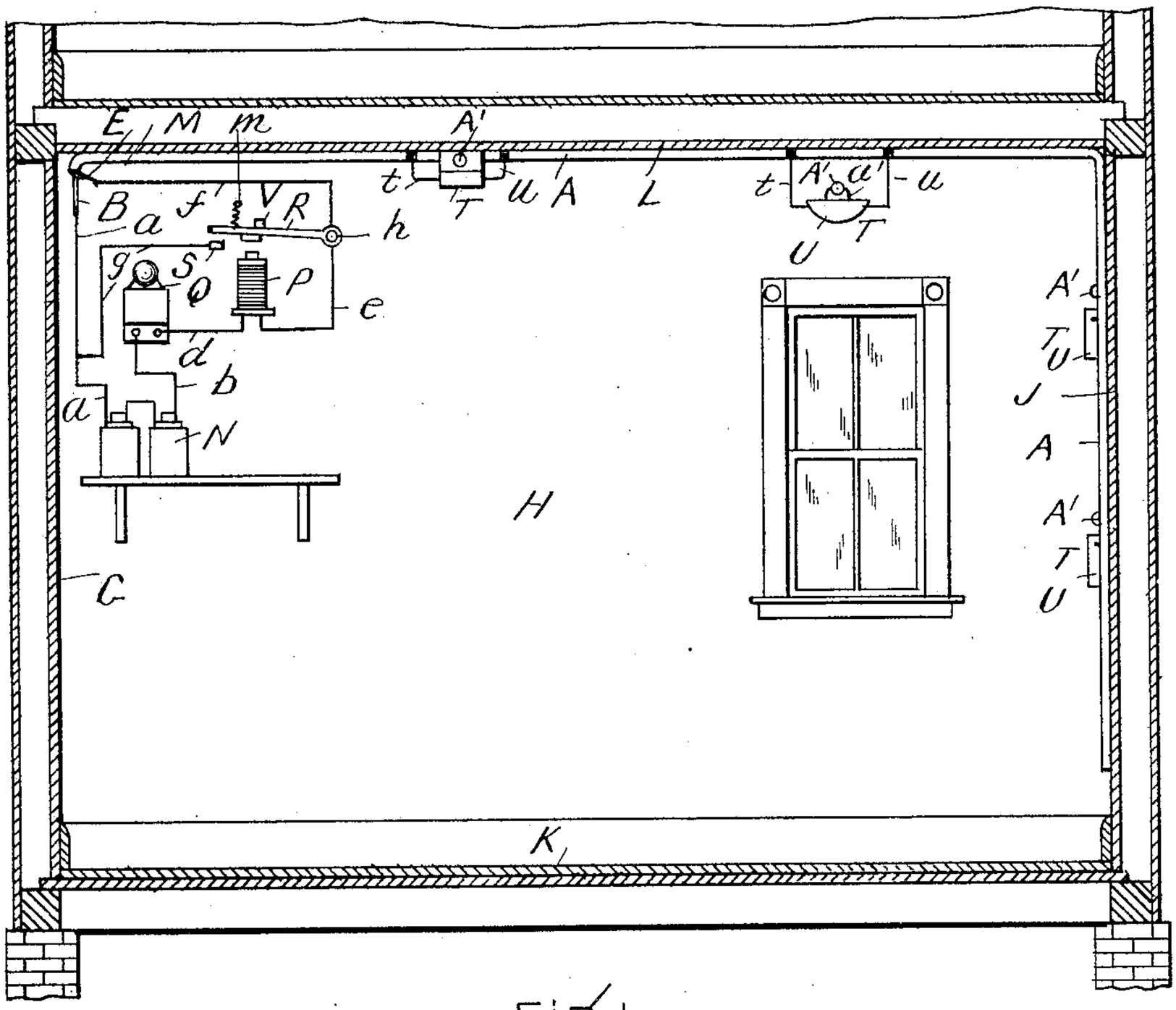

Fig. 1.

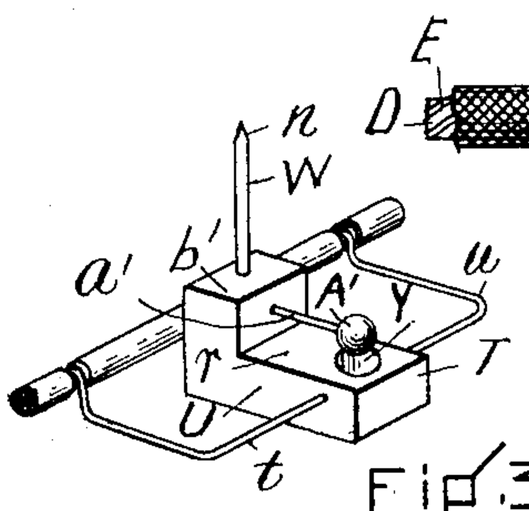

Fig. 3.

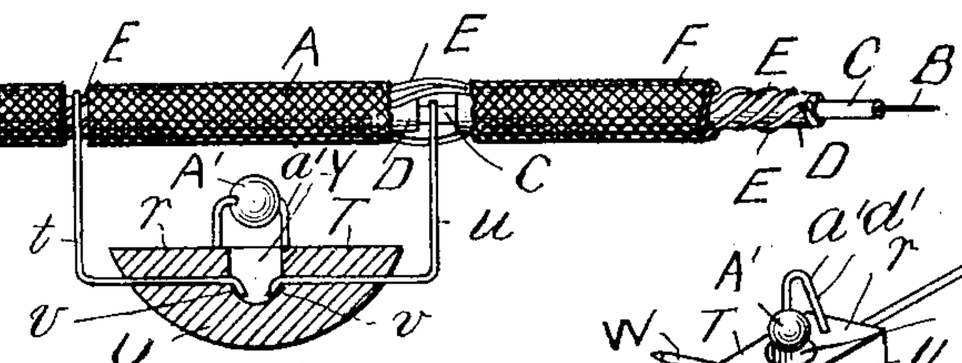

Fig. 2.

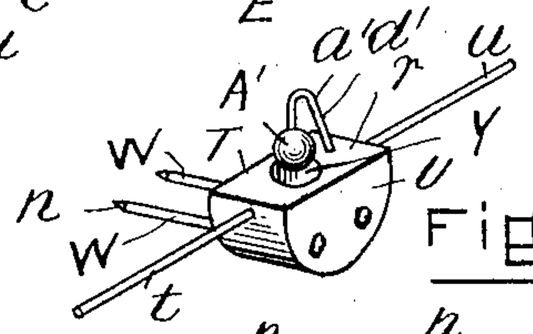

Fig. 4.

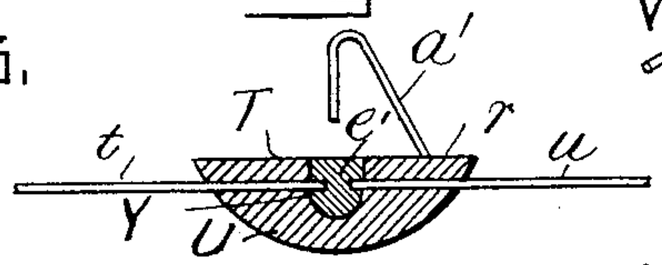

Fig. 5.

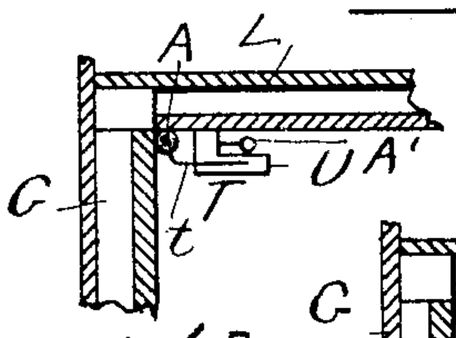

Fig. 8.

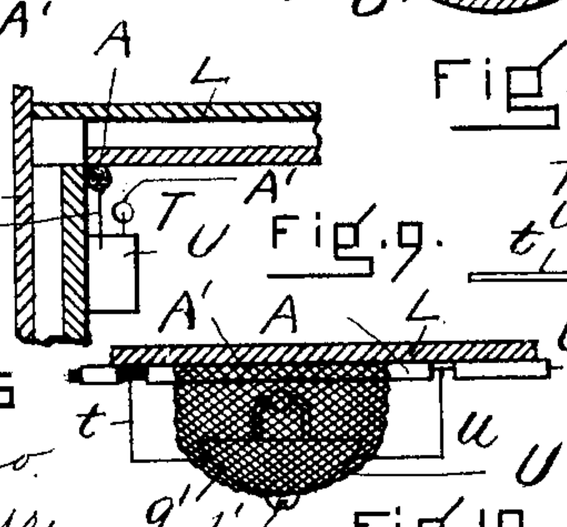

Fig. 9.

Fig. 10.

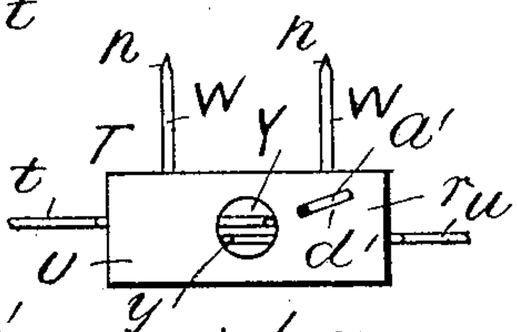

Fig. 7

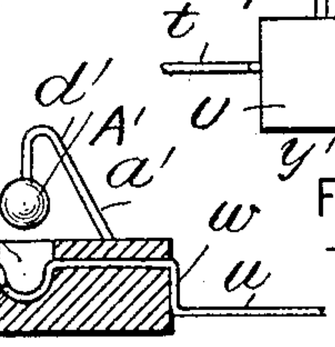

Fig. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

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HEAT-DETECTOR FOR ELECTRIC FIRE-ALARM SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 601,730, dated April 5, 1898.

Application filed January 30, 1896. Serial No. 577,420. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. GOULD, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Heat-Detectors for Electric Fire-Alarm Systems, of which the following is a full, clear, and exact description.

This invention consists, in combination with a novelly constructed electric heat-detector or heat-detectors, of wires or other electric conductors, the two wires being located and extending or running side by side or close to each other in any suitable manner around a room or building or other place, as desired, the two wires or conductors being connected to an electric battery, one to each pole of the battery, but in open electric circuit, and a sounding device, all constructed and arranged together for operation, as hereinafter fully described; and the invention also consists, in combination with a novelly constructed electric heat-detector or heat-detectors, of two wires or other electric conductors, one of which is preferably made of any suitable fusible material that will fuse at the desired degree of heat, preferably a low degree, the two wires being located and extending or running side by side or close to each other in any suitable manner around a room or building or other place, as desired, the two wires or conductors being connected to an electric battery, one to each pole of the battery, but in open circuit, and a sounding device, all constructed and arranged together for operation, as hereinafter fully described, reference being had to the accompanying sheet of drawings, in which is illustrated the present invention in connection with a room in a building.

Figure 1 represents the sides of the room, with the walls, ceiling, and flooring in vertical section, with this invention applied thereto. Fig. 2 is a sectional view of one of the heat-detectors, illustrating its connection with the electric wires in an electric cable, the electric cable being in detail side view, showing its construction. Fig. 3 is a perspective view of a heat-detector adapted to be applied to the ceiling, electrically attached to the electric wires. Fig. 4 is a perspective view of one of the heat-detectors adapted to be applied to a side wall or other upright. Fig. 5 is a vertical section of Fig. 4, but showing changes to be hereinafter referred to. Fig. 6 is a vertical section of one of the heat-detectors; Fig. 7, a plan view of Fig. 6; Figs. 8 and 9, detail sections at the corner of a wall and ceiling of a room and the manner of attachment of the heat-detectors to the same. Fig. 10 is a view of the heat-detector as shown in Fig. 2, having a wire-gauze or perforated covering over it.

Although the two wires forming electric connection with the heat-detectors can be arranged alongside of each other in any suitable manner and can be of any suitable wires or electric conductors, it is preferred to construct and arrange them in cable form, such as will be now described.

Fig. 2 illustrates sufficiently the construction of the cable A, and in such figure it is formed of a central wire B, preferably of copper, covered or coated with a metal C, such as lead, or compound of metal that will fuse at a low degree of heat. This fusible metal can be applied in any suitable manner to the central wire B. For instance, it can be run through a die in a fusible state with the copper wire, which will lay it even and smooth thereover and in a quick, satisfactory, and practical manner. Over this fusible metal is placed a coating or covering D of insulating material, preferably one that will fuse or burn in a flame at a low degree of heat, and preferably at a lower degree of heat than the fusible-metal covering will melt, and over this insulating material is wound a series of fine copper wires E, as many as desired, being wound, preferably, in long spiral form, and over these copper wires is another covering or coating F of insulating material, which can be like the inner insulating material D, or, preferably, one that is somewhat firmer and stronger, but yet that will fuse or burn at the desired low temperature.

G, H, and J represent the side walls of a room or building, two, H J, of which are in vertical section, and K and L the floor and ceiling, respectively, in cross-section, all of which is as usual in the construction of a room or building.

From a point M on the ceiling the cable runs along the ceiling and then down on the opposite wall J, as shown in Fig. 1.

The wire B and its fusible-metal covering C, making practically one wire or core-wire,

and the series of wires E, making practically one wire, are connected to an electric battery N, magnet P, and electric bell Q in the following manner:

A wire *a* is connected to the end of the fusible-metal-covered wire B, which runs to and connects with one pole of the electric battery N. From the other pole of the electric battery a wire *b* extends to and connects with the electric bell Q, and from the bell a wire *d* runs to and connects with magnet P, and a wire *e* from the magnet connects with the armature R, and from the armature R runs a wire *f* to the series E of wires of the cables. A short distance below the free end of the armature is a metal block S, secured to the wall or support, which is connected by an electric wire *g* with the wire *a*, connecting the battery and the wire B. The armature R is pivoted at *h* to swing up and down and is held by its free end by a spring *m* against a block V, secured to the wall or support, but which is of insulated material or insulated in any suitable manner. The two conductors B E are not in contact with each other at any place and at their outer ends are secured in any manner so as to be separate from each other.

Connected with the cable are the several alarm-sounding devices or heat-detectors T, which are constructed and connected with the wires forming the cable for operation of this firm-alarm system. These heat-detectors T, which constitute the present invention more particularly, are shown in several forms, with the mode of securing them in place on the wall or ceiling, but practically are substantially alike in operation. These heat-detectors consist of blocks U, preferably of insulating material, although they can be made of any suitable material, but arranged to be suitably insulated for the purposes of this invention.

The block U shown in Figs. 3 and 8 is adapted to be secured to the ceiling or to the under side of any part of the building, such as a shelf in a closet, while those shown in Figs. 2, 4, 6, 7, and 9 are adapted to be secured to a side wall or upright; but the mode of attachment, as shown, is alike in all, and consists of a pin or pins W W, having pointed ends *n*, secured in the blocks and projecting from the upper side for the ceiling attachment and from the side for the wall or upright attachment, and they can be secured in position by simply pressing the pins W into the ceiling or woodwork of the walls. They can, however, be secured in any suitable manner. Each of these blocks has in its upper side *r* a recess or open chamber Y, and extending from each side of the block are respectively electric wires *t u*, the inner ends of which extend into the recess a certain distance, but not so as to be in contact with or touch each other.

In Fig. 2 the ends of the wires *t u* are bent downward a short distance in the recess, which forms a shoulder *v* to prevent the wires pulling out. In Fig. 6 the wires are bent down on the outside, as at *w*, which prevents the wires moving inward. In Fig. 5 the wires pass straight into the recess, but depend more particularly upon their close joint to prevent moving. In Figs. 6 and 7 the wires are not in the same vertical line, but are alongside of each other and project into the recess sufficiently to be bent down into the recess and up the opposite side, as at *y*, forming shoulders on each side of the recess, which prevents the wires from moving either way. In the use of this form the wires need not be bent down on the outside, as in Fig. 6. Over the recess Y in each block is suspended a globule or bulb or knob A′ of fusible metal or compound of metal which will fuse at the desired low degree of heat, and this is secured in Fig. 2 to the middle of a wire *a′*, its ends being bent down and secured in the top of the block. In Fig. 3 the bulb is secured to the end of a horizontal wire *a′*, secured in the upright portion *b′* of the block, and in Figs. 4, 5, and 6 to the end of a wire *a′*, which points downward, its other part being bent over at *d′* and secured in the block, as shown. These heat-detectors or blocks T and their connecting parts are connected to the electric cable as many as desired and at as many points along the same as desired, and in such case either one of the wires in a block is connected to the series E of wires in the cable, and the other wire of the block is connected to the fusible core-wire B, so that each block is in the electric circuit of the two wires B E of the cable.

As shown in Fig. 1 more particularly, the device is in position for operation and action, and if a fire occurs in any part of the room where these heat-detectors are placed the heat from such fire will melt the globule A′ of fusible material, which will then flow and drop from its supporting wire or wires into the recess or receptacle Y and fill the same sufficiently to surround the ends of the two wires *t w* in the recess, making contact with them, as shown in Fig. 5 at *e′*, and thus electric connection between the two wires *t u* and an electric connection or circuit between the wires B and E in the cable and the battery, which then causes the bell or alarm to sound, which will continue to sound until some one comes to stop it or the battery runs down. Immediately the circuit is made the electromagnet attracts the armature R, which moves to and makes electric contact with the metal block S, forming a short circuit through the wire *e′*, magnet, wire *d*, bell, battery, wire *a*, wire *g*, block S, to armature, insuring then the sounding of the alarm should the wires in the electric cable from any cause whatever become broken or electrically disconnected. This short circuit not only insures the continuance of the sounding of the alarm, but also does not use up the battery so fast as the long circuit of the cable-wires would. This electric

cable also serves as a means in itself of making the electric circuit and sounding the alarm if the heat-detector should not work, and such action is as follows: If a fire occurs in any part of the room or building where this electric cable or conductor is located, or from any extreme heat, both coatings or coverings of the insulating material at such place will melt or burn in flames, and the fusible metal or covering C of wires at such place quickly becomes heated at the temperature determined and melts and flows or runs down onto or connects or comes in contact with one or more or all of the electric wires E, which instantly makes the circuit with the battery, magnet, and bell through the wires and connecting-wires, sounding the bell, as before described. This doubly insures the sounding of an alarm in case of fire.

The electrical apparatus for sounding the alarm can be placed in another room or in any part of the building or can be placed outside of the building, as desired.

The electric wires forming the electric cable can be of any convenient size; also, as all the wires are arranged in a cable form, it can be laid easily and conveniently in all places about the room or building. In practical use this electric cable or conductor is run around the room at any and all places desired, at any desired height, along the mopboard, up at the sides, along the ceiling, cornices, into closets and other small places, &c.

These heat-detectors can also be placed in any and all desirable places in the room or building, each being connected, as described, electrically with the conducting-wires of the cable, and, being small, compact, and costing but a trifle, an electric fire-alarm system of this construction can be easily, conveniently, and satisfactorily placed in any building and at a very small cost and practically save the building from fire. Being cheap, a larger number of these heat-detectors can be used, so that an incipient blaze or heat at any point will immediately cause the system to operate, and thus an alarm be given at the very instant of danger.

Each detector can be covered or protected with a wire-gauze to prevent dust and dirt collecting thereon to injure it, the gauze being open enough to allow the heat to pass through to melt the bulb or knob and so arranged as not to interfere with the electric circuit. Such wire-gauze covering is shown in Fig. 10 at *g'* substantially of cup shape and surrounding the block close up against the ceiling, and it is secured by a screw *h'* to the bottom of the block. The wires *t u* of the block pass freely through it, but are insulated from it in any suitable manner. In lieu of a gauze any suitable perforated covering can be used, so long as it will not interfere with the heat reaching the fusible knob and yet prevent dirt reaching the detector to interfere with its proper working.

The wires leading into the chamber or recess of the block can be supported independent of said blocks or in any suitable manner for their ends to be in the chamber; but it is preferable to have them in or with the block, as it makes all one device and can be attached with much less trouble to its proper place.

Having thus described my invention, what I claim is—

1. In an electric fire-alarm, in combination, an insulated block, a recess or chamber in said block, a bulb or globule or knob of fusible metal or compound of metal suspended over said recess, and two wires or conductors extending into said recess independent of and insulated from each other, an electric cable or conductor composed of a central core of copper or other electric wire, a covering of fusible metal or compound of metal over said central wire, an insulating material over said fusible metal, an electric wire or wires wound upon the insulating material and an insulating material covering the whole, the central wire with its fusible-metal covering and the electric wire wound upon the insulating material being electrically connected to the two wires respectively of the insulated block and respectively to the two poles of an electric battery.

2. In an electric fire-alarm, in combination, an insulated block, a recess or chamber in said block, a bulb or globule or knob of fusible metal or compound of metal suspended over said recess, and two wires or conductors extending into said chamber independent of and insulated from each other, two other wires arranged in close proximity side by side but electrically separated from each other, one of said wires being formed of a metal fusible at a low temperature, said latter wires at one end being respectively connected to the wires of the block and respectively connected at their other ends to the poles of an electric battery.

3. In an electric fire-alarm, in combination, an insulated block, a recess or chamber in said block, a bulb or globule or knob of fusible metal or compound of metal suspended over said recess and two wires or conductors extending into said chamber independent of and insulated from each other, and two other wires, one of which is formed of a fusible metal or compound of metal and covered with an insulating material and the other of said wires being wound about and over the insulating material, said latter wires at one end being respectively connected to the wires of the insulated block and at their other ends respectively connected to the poles of an electric battery.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN D. GOULD.

Witnesses:
EDWIN W. BROWN,
LEONA C. ARNO.