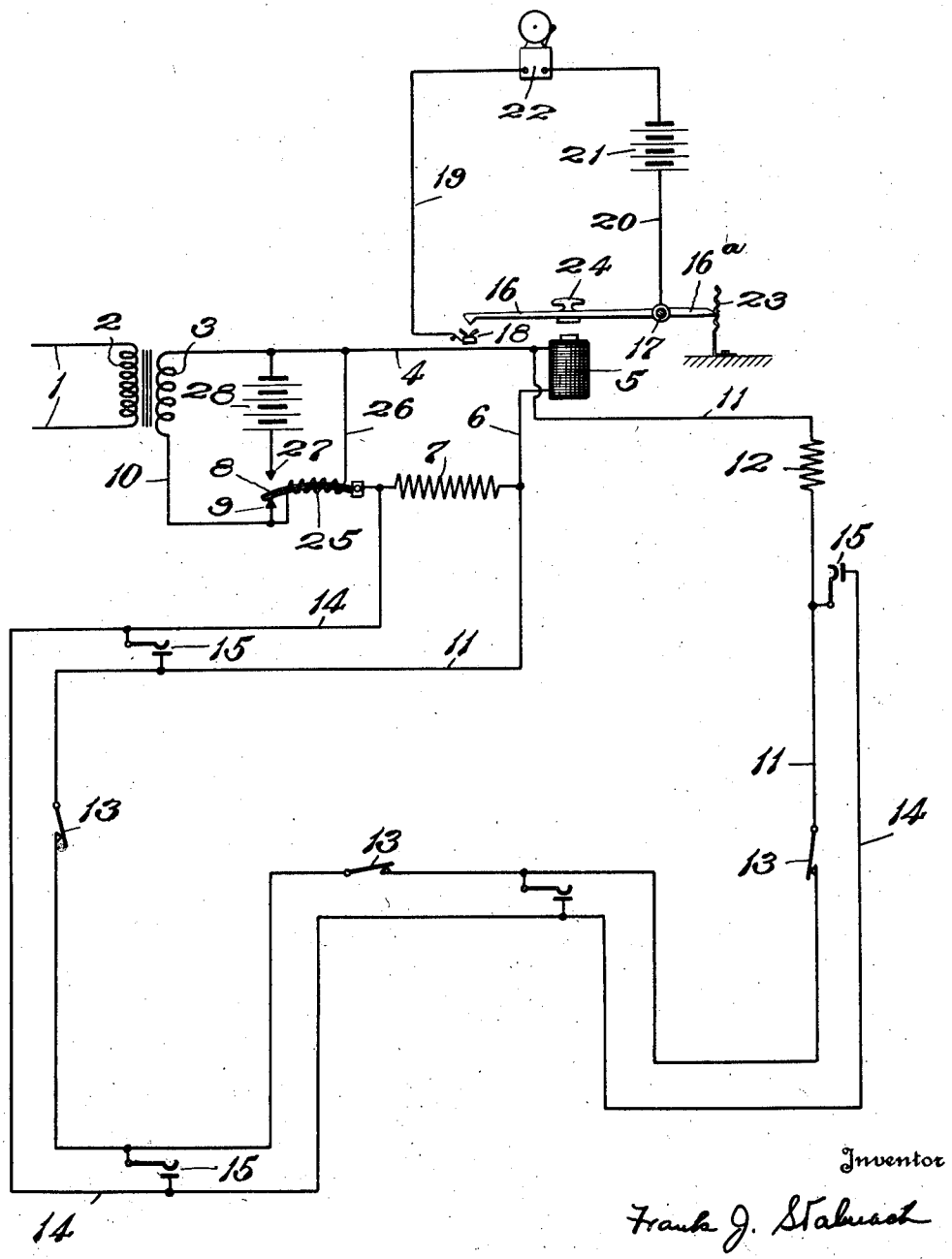
Sept. 24, 1929. F. J. STALMACH 1,729,137

ELECTRIC ALARM SYSTEM

Filed March 19, 1928



Inventor

Frank J. Stalmach

By J. Vincent Martin

Attorney

Patented Sept. 24, 1929 1,729,137

UNITED STATES PATENT OFFICE

FRANK J. STALMACH, OF HOUSTON, TEXAS, ASSIGNOR OF ONE-HALF TO M. EIDELBACH, OF HOUSTON, TEXAS

ELECTRIC ALARM SYSTEM

Application filed March 19, 1928. Serial No. 262,667.

This invention relates to electric alarm systems, and more particularly to combined fire and burglar alarms.

The general object of the invention is to provide a system of this character which shall be exceptionally simple in construction, containing a minimum number of parts, and easy to install and maintain.

More specifically, the invention contemplates the provision of a pair of co-extensive, protecting or house wires, one of which alone constitutes a normally closed circuit, while the two together constitute a normally open circuit, the arrangement being such that the alarm is set off either by a break in the former or a closing of the latter.

In order that the invention may be readily understood, reference is had to the accompanying drawing forming part of this specification in which is shown a conventional diagram illustrating my improved system.

Referring to the drawing in detail, the numeral 1 designates the usual wires supplying current to the building to be protected. For the purpose of illustration I have assumed that alternating current is used, and I have therefore shown the wires 1 as connected with the primary 2 of a transformer. The secondary 3 of this transformer is employed as the source of current from which my improved system is operated.

One terminal of the secondary 3 of the transformer is connected by a wire 4 with the electro-magnet 5 of a signal controlling relay. The other terminal of this magnet is connected by a wire 6 through a series resistance 7, thermal switch 8, contact 9 and wire 10, with the other terminal of the secondary 3 of the transformer. Thus current constantly flows through the circuit just traced. Connected across the terminals of the magnet 5 is a conductor 11 constituting a normally closed loop circuit. This conductor extends around the premises to be protected and contains a resistance 12 which is of the same general order of magnitude, but preferably considerably less than that of the magnet 5. The resistance 7, on the other hand, is preferably considerably higher than the resistance 12, and it will be noted that one end of the resistance 7 is connected to the conductor 11, constituting the loop circuit. Normally closed circuit interrupters 13 of any suitable type may be included in the conductor 11 and located in such a manner as to be operated by doors, windows, or other movable elements.

A second conductor 14 is connected with the other end of the resistance 7 and is disposed adjacent to and co-extensive with the conductor 11. In fact, two conductors may be combined in the form of a twisted pair, if desired. Interposed at intervals between the conductors 14 and 11 are normally open circuit closers 15. These also may be mounted adjacent doors, windows or other movable elements in such a manner as to be operated thereby.

The relay of which the magnet 5 forms a part comprises also a movable armature 16 pivoted at 17 to a fixed support, and arranged, when drawn toward the magnet, to engage a contact 18 and thus close an alarm circuit consisting of the conductors 19 and 20, a suitable battery 21, and a bell or other alarm device 22. The armature 16 is constructed to be frictionally held in any position to which it may be moved. To this end it is shown as provided with a tail piece 16^a arranged to engage a fixed, roughened or corrugated resilient clip or detent 23.

As a means for insuring continuous operation of the system, even though the line current should fail, or the wires be cut, I provide an emergency battery 28 connected at one end with the wire 4 and at the other end with a contact 27 arranged to be engaged by the thermal switch 8. This thermal switch may be of any suitable type, but is shown as comprising a bi-metallic strip fixed at one end and surrounded by a heating coil 25 connected at one end with the wire 10 and at the other end by a wire 26 with the conductor 4, the coil 25 thus being shunted directly across the transformer secondary. The heat of the coil 25 normally causes the strip to bend downwardly into engagement with the contact 9, as shown in the drawing, thus maintaining the circuit closed between the transformer and the alarm system. If, however, the current should fail, the strip being no longer

heated, would tend to straighten or bend in the other direction, thus coming into engagement with the contact 27 and switching the emergency battery 28 into the circuit.

The drawing shows the system in its normal condition. In this condition current is constantly supplied over the wires 4 and 10 and through the series resistance 7 to the magnet 5 and the loop circuit 11 in parallel. The current divides between these two parallel circuits in inverse ratio to the value of the resistances 7 and 12, and the value of the series resistance 7 is so chosen that it serves to so limit the current that that portion flowing through the magnet 5 is insufficient to operatively energize the same. That is to say, normally the pull of this magnet is not strong enough to overcome the friction of the holding device 23, and the armature 16 therefore remains in the position shown in the drawing, with the alarm circuit open at the contact 18.

Suppose, however, that the loop circuit 11 should be interrupted as by opening one of the switches 13. This interruption would immediately remove the shunt from around the magnet 5, thus substantially increasing the flow of current through such magnet and enabling it to draw the armature 16 down into engagement with the contact 18, thus closing the alarm circuit and sounding the alarm. It will be noted that the alarm will continue to sound, notwithstanding anything that may subsequently happen to the house wires 14 and 11. This is true, not only because the magnet 5 will continue to receive current through its local circuit, as described, but also because of the action of the frictional holding device 23, which serves to maintain the armature in the position to which it has been moved. The alarm circuit will remain closed and the alarm continue to sound until the armature 16 is manually restored. To facilitate this, such armature may be provided with a handle 24, or the like, which can be readily grasped.

The opening of the loop circuit 11 has been above referred to as occasioned by the operation of one of the switches 13. It is obvious, however, that a similar interruption of this circuit may also be caused either by the cutting of the wire 11, or by destruction of such wire by fire Thus, in either case, the alarm will be sounded.

It will be seen that the current flow through the magnet 5 will also be increased and the relay operated by the shunting or short-circuiting of the series resistance 7, since the removal of this resistance from the supply circuit will permit the full voltage of the transformer secondary to be applied to the terminals of the magnet. Such shunting or short-circuiting of the series resistance 7 may be caused by the operation of any of the normally open circuit closers 15, interposed between the two conductors 11 and 14, as will be obvious. The same effect will also be produced by the establishing of any electrical connection between these two conductors, as for example by the burning of the insulation from them, if they are arranged in the form of a twisted pair, or by the intentional connecting together of the conductors by some one seeking to render the system inoperative.

From the foregoing it will be apparent that I have provided a system comprising a pair of house wires so arranged that either the cutting of one of these wires or the connecting of the two wires together will serve to set off the alarm, and that the alarm will continue in operation until the relay is manually restored. It will also be noted that I accomplish this result by exceptionally simple means, comprising only a single magnet and a pair of resistances, and it is thought that the many advantages of my invention will be readily appreciated by those skilled in the art.

What I claim is:—

1. An electric alarm system comprising an alarm device, a relay magnet for throwing said alarm device into operation, a resistance connected in shunt across the terminals of said magnet, a source of current, a circuit constantly supplying current from said source to said magnet and shunt resistance, and a series resistance in said circuit for limiting the current to such an extent that the portion normally flowing through said magnet is insufficient to operatively energize the same, whereby, if either the resistance in series with said magnet is materially reduced or the resistance of the circuit shunted across said magnet is substantially increased, said magnet is operatively energized.

2. An electric alarm system comprising an alarm device, a relay magnet for throwing said alarm device into operation, a loop circuit connected across the terminals of said magnet, a source of current, a circuit constantly supplying current from said source to said magnet and loop circuit, a series resistance in said supply circuit for limiting the current to such an extent that the portion normally flowing through said magnet is insufficient to operatively energize the same, and means responsive to abnormal conditions in the premises to be protected for either shunting said series resistance or opening said loop circuit, and thus increasing the current through said magnet to an operative value.

3. An electric alarm system comprising an alarm device, a relay magnet for throwing said alarm device into operation, a loop circuit connected across the terminals of said magnet, a source of current, a circuit constantly supplying current from said source to said magnet and loop circuit in parallel, a series resistance in said supply circuit for limiting the current to such an extent that

the portion normally flowing through said magnet is insufficient to operatively energize the same, whereby, if either said series resistance is short-circuited, or said loop circuit opened, the current through said magnet is increased to an operative value.

4. An electric alarm system comprising an alarm device, a relay magnet for throwing said alarm device into operation, a conductor forming a loop circuit connected across the terminals of said magnet and extending about the premises to be protected, a source of current, a supply circuit through which current is constantly fed from said source to said magnet and loop circuit, a series resistance in said supply circuit and connected at one end with said loop circuit for limiting the current to such an extent that the portion normally flowing through said magnet is insufficient to operatively energize the same, and a second conductor connected with the other end of said series resistance and disposed adjacent and co-extensive with the conductor forming said loop circuit, whereby either any break in the conductor forming the loop circuit, or any electrical connection established between said two conductors serves to increase to an operative value the current flowing through said magnet.

5. An electric alarm system comprising an alarm device, a relay magnet for throwing said alarm device into operation, a conductor forming a loop circuit connected across the terminals of said magnet and extending about the premises to be protected, a source of current, a supply circuit through which current is constantly fed from said source to said magnet and loop circuit, a series resistance in said supply circuit and connected at one end with said loop circuit for limiting the current to such an extent that the portion normally flowing through said magnet is insufficient to operatively energize the same, and a second conductor connected with the other end of said series resistance and disposed adjacent and co-extensive with the conductor forming said loop circuit, a plurality of normally closed circuit interrupters in said loop circuit, and a plurality of normally open circuit closers interposed between said two conductors.

In testimony whereof, I hereunto affix my signature.

FRANK J. STALMACH.