M. F. JURUICK.

BURGLAR ALARM SYSTEM.

APPLICATION FILED AUG. 16, 1907.

1,038,594.

Patented Sept. 17, 1912.

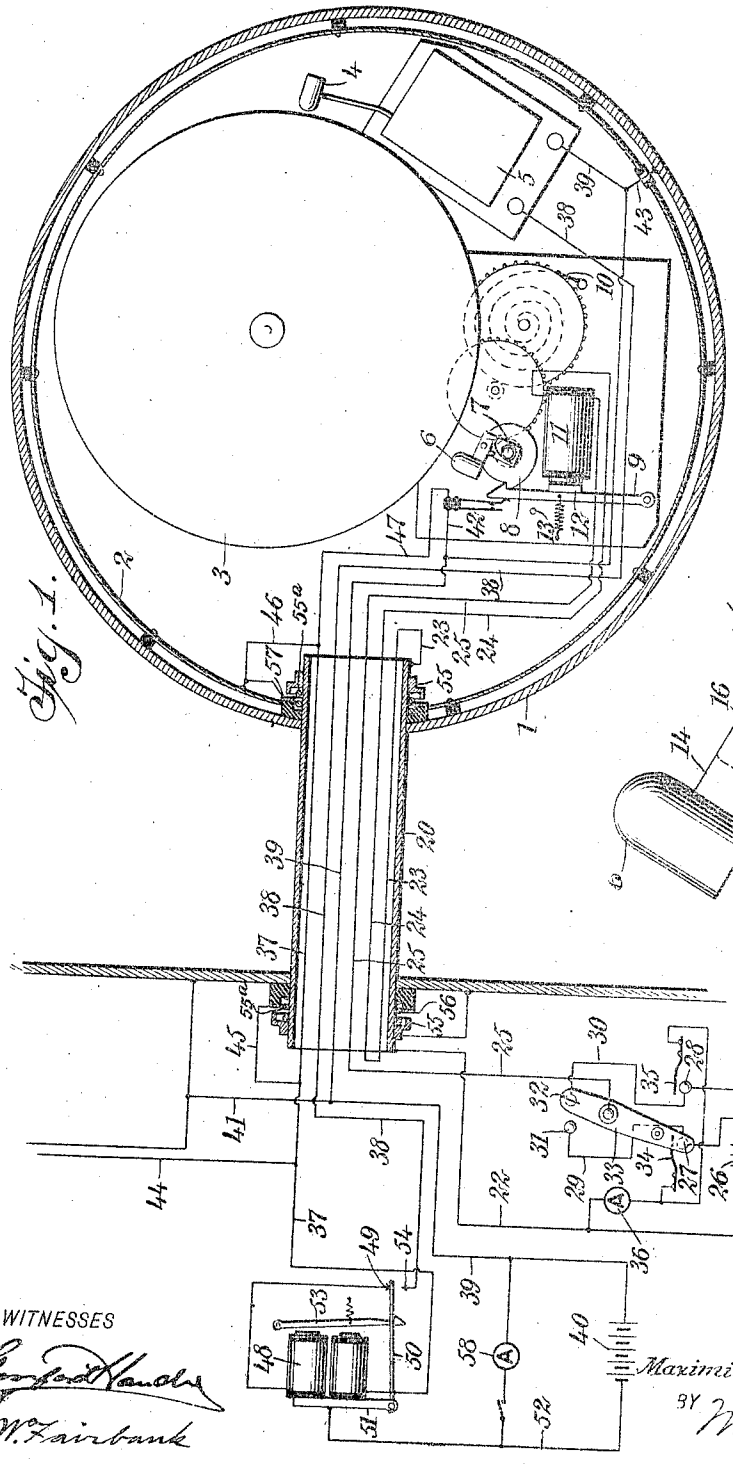

Fig. 1.

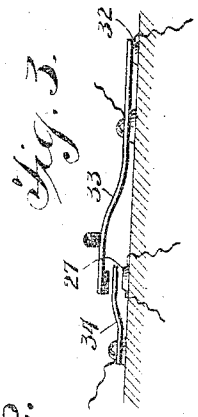

Fig. 3.

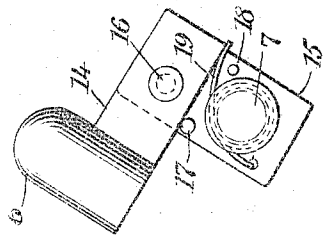

Fig. 2.

WITNESSES

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BURGLAR-ALARM SYSTEM.

1,038,594. Specification of Letters Patent. Patented Sept. 17, 1912.

Application filed August 16, 1907. Serial No. 388,788.

To all whom it may concern:

Be it known that I, MAXIMILIAN F. JURUICK, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Burglar-Alarm System, of which the following is a full, clear, and exact description.

This invention relates to burglar alarm systems and particularly those alarm systems which are started in operation by the closing of an electric circuit.

The object of the invention is to provide means whereby either the breaking of a circuit or the closing of a circuit will operate the alarm bell, and the bell when once started cannot be stopped save by one familiar with the operating mechanism.

A further object of the invention is to provide an alarm bell having both an electrically-operated means and a mechanically-operated means for ringing it, the mechanically-operated means being normally held locked by a closed circuit and adapted to close the circuit of the electrically-operated means upon the starting of the mechanically-operated means.

A further object of the invention is to provide an alarm bell having a mechanically-operating mechanism for ringing it, said mechanism being held in a locked position by a closed circuit, and having means whereby the batteries of the closed circuit may be tested without unlocking the mechanical movement and ringing the bell.

A further object of the invention is to provide means whereby it is impossible to interfere in any way with the bell or its operating parts without either closing one circuit or breaking another, either of which would start the bell in operation.

A further object of the invention is to provide an improved hammer for ringing the alarm bell, said hammer having an improved mounting whereby it is adapted to rotate and automatically withdraw from the bell after striking it on each revolution.

Further objects and advantages for the improved construction will be hereinafter described and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which—

Figure 1 is a diagrammatic illustration of my improved burglar alarm system; and Fig. 2 is a detail showing the specific form of rotating hammer which I preferably employ. Fig. 3 is a detail view illustrating more particularly the construction and arrangement of the main switch key and the relation thereto of the testing-circuit spring terminals.

The alarm portion of my improved system preferably comprises a metal casing 1, having an inner metal casing 2 spaced and insulated therefrom, and within this inner casing is located the bell 3 and the operating mechanism therefor. This operating mechanism comprises, first, an electrically-operated hammer 4, the details of the operating mechanism of which are inclosed within a casing 5 and are not illustrated in detail as the construction and operation of such mechanism is well known. In addition to the electrically-operated hammer 4, I provide a second hammer 6 adapted to be operated by suitable clockwork or other mechanical movement. As illustrated, the hammer is pivoted on a shaft 7, carrying a wheel 8 having a notch or projection on the outer surface thereof and adapted to engage with the end of a pivoted lever 9. The shaft 7 is connected by any suitable chain of gear wheels to a coil spring 10, whereby the shaft 7 may be rotated and the hammer revolved about it as an axis.

Mounted adjacent the chain of gear wheels is an electro-magnet 11 having an armature 12 secured to the pivoted lever 9 and provided with a spring normally tending to draw the armature away from the electro-magnet. The electro-magnet is connected directly to the battery and constitutes a part of the closed circuit, whereby the armature is held against the core of the magnet and the upper end of the pivoted lever 9 is held in engagement with the notch or projection on the wheel 8; thus the clockwork is locked in position and prevented from operating until the current of electricity is shut off from the electro-magnet 11 by the breaking of the circuit or in any other manner, whereupon the armature is released from the magnet and the coil spring draws the pivoted lever back against

a stop 13. The free end of the lever 9 is thus brought out of engagement with the wheel 8 and the hammer 6 is free to rotate and repeatedly strike the bell 3. Were the connecting arm between the shaft 7 and the rotating hammer 6 of a constant length, it is evident that the hammer would be stopped by its contact with the bell or merely graze it as it rotated and not strike it with sufficient force to properly ring it. I preferably construct this arm of two parts 14 and 15, one of which is rigidly secured to the shaft 7, while the other is rigidly secured to the hammer 6. The two members are secured together by a pivot pin 16 and two stops 17 and 18 are provided on the member 15 to limit the motion of one member in respect to the other. A coil spring 19 is provided on the shaft 7 and has one end secured to the member 15, and the other end contacting with the side of the member 14. The action of the spring tends to keep the two members of the arm at right angles to each other and thus shorten the length of the arm, so that the hammer may freely pass the bell without touching it. As the hammer begins rotating around the shaft 7, centrifugal force tends to straighten the arm against the action of the spring 19, and the stop 18 permits of a sufficient amount of straightening, so that the hammer 6 may strike the bell 3. As soon as it strikes the bell, the speed of rotation of the hammer is decreased to such an extent that the spring 19 again shortens the arm and brings the hammer out of contact with the bell, whereupon it may rotate through a second revolution and again be straightened by centrifugal force to an extent which permits of its again contacting with the bell.

The casing 1, containing the bell and operating mechanism, is preferably placed upon the outside of the building to be protected and is connected through to the batteries located within the vault or in any other suitable place, by a cable 20, preferably of metal and containing a plurality of wires by which the mechanism within the casing 1 is brought into action. Two separate and independent batteries or sets of batteries are provided, one of which controls the open circuit and the other the closed circuit. The latter 21 has one side thereof connected by a wire 22 to the metal cable 20, and the opposite end of the cable, namely, that within the casing 1, is connected to a wire 23 which extends back through the cable to the inner end and connects to a second wire 24 passing through the cable to the outer end, which latter wire, as well as the wire 25, direct from the battery 21, is connected to the electro-magnet 11, which holds the mechanical movement in its locked position. The battery 21 is in operation at all times, and as heretofore stated, a current flows first through the wire 22, then the cable 20, wires 23 and 24 to the electro-magnet 11, and then back to the battery through the wire 25. Should any one attempt to disconnect the alarm bell from the batteries by cutting the cable 20, this would break the circuit to the electro-magnet 11 and start the mechanical movement and the hammer 6 in operation. Should a person attempt to cut the wires within the cable without entirely severing the latter, the cutting of the wire 23 or the wire 24, would start the mechanical movement in operation in the same manner as would the cutting of the cable.

It is essential that the battery 21 should be maintained at full strength at all times, for should the battery become exhausted, the mechanical movement would be started and the alarm bell rung. I therefore provide a second or reserve battery 26, and provide means whereby either battery may be connected to the electro-magnet 11 and the other battery tested and whereby neither battery can be disconnected without the previous connecting of the other battery. To accomplish this, I connect one side of each of the batteries to the wire 22 leading to the electro-magnet 11 and connect the opposite side of each battery to two contacts 27 and 28. From these two contacts wires 29 and 30 lead to the two terminals 31 and 32. A key 33 is connected to the end of the wire 25 leading to the electro-magnet 11, and the opposite end of the key is of sufficient width to span both of the terminals 31 and 32. When the key is in the position shown in the drawings, the current may flow from the battery 21, through the contact 28, the wire 30, the terminal 32 and the key 33 to the wire 25, while if the key is shifted to the opposite position, the current could then flow from the battery 26, through the contact 27, wire 29, terminal 31 and key 33 to the wire 25; but as the key is of a greater width than the distance between the two terminals 31 and 32, it is evident that upon shifting the key one battery is not disconnected until after contact has been made with the other terminal and the other battery thrown into circuit.

Above the two contacts 27 and 28 are located two spring terminals 34 and 35, and each of these is connected to an ammeter 36, the other wire from which is connected to the wire 22. When the key is in the position shown, the battery 21 is in circuit and the strength of the battery 26 may be tested by pressing down upon the insulated handle end of the key 33 to bring the spring contact 34 against the contact 27. The current from the battery 26 may then flow through the terminals 27 and 34 to the ammeter 36

and back to the battery. The strength of the battery may thus be indicated before this battery is thrown into circuit, so that if the battery is not strong enough to do the required work, a new battery may be substituted before the key is moved to cut out the battery 21. When the key is in the opposite position, the battery 26 would be connected to the electro-magnet 11, and upon pressing down the rear end of the key the contacts 35 and 28 would be brought together and the strength of the battery 21 could thus be tested. It will thus be noted that the strength of either battery may be tested by the pressing of the rear end of the key when the other battery is doing the required work, and as one battery cannot be disconnected until after the other has been connected, the continued supply of current to the electro-magnet 11 of the mechanical movement appears to be thoroughly insured.

Extending through the cable 20 and in addition to the wires 23, 24 and 25, are three additional wires 37, 38 and 39, through which no current normally flows. The wire 39 is connected at one end directly to the operating mechanism for controlling the hammer 4 and is connected at the opposite end directly with one side, for instance, the carbon side, of the battery 40. This wire 39 is also provided with a plurality of branch wires leading to all of the different points about the building, the doors, windows, and casing of the alarm bell at which it is desired to indicate the presence of an intruder. As shown, one branch 41 connects to the casing of the vault and to other points about the building, a second branch 42 extends to a contact adjacent the lever 9 of the mechanical movement, and another branch 43 leads through an insulated opening in the inner casing 2 and contacts with the outer casing 1. The wire 37 is provided with branches terminating closely adjacent each of the branches from the wire 39 and adapted to be placed in contact with the said branches by the intruder while attempting to gain admission or interfere with the alarm system. As shown, a branch 44 leads to various points about the building, a branch 45 communicates with a collar surrounding the cable 20 and insulated therefrom at the vault end; another branch 46 communicates with a collar surrounding the cable at the alarm end and also with the inner casing 2, and a last branch 47 terminates at a spring contact adjacent the spring contact of the branch 42 of the wire 39. The wire 37 leads to the battery 40, but on its way passes through the coils of an electro-magnet 48 and to a contact 49 adjacent a pivoted lever 50 carried by the frame 51 of the electro-magnet, which latter is connected by a wire 52 to the zinc side of the battery. The pivoted lever 50 is held in engagement with the contact 49 by the armature 53 of the electro-magnet. The wire 38 which extends throughout the length of the cable 20, communicates directly with the operating mechanism of the hammer 4 in the alarm casing and terminates at a contact 54 adjacent the pivoted lever 50 but normally out of contact therewith.

The cable 20 passes through the wall of the vault and through the outer wall of the casing around the alarm bell and is normally in contact with both. Each end of the cable is provided with a collar 55 rigidly secured thereto, and held out of engagement with the collars 56 and 57 to which the branches 45 and 46 are connected. These collars 56 and 57 are out of contact with the cable 20 and are supported upon suitable insulating blocks. Coil springs 55^a are provided to separate the insulated blocks and the collars 55.

As the circuit from the battery 40 is open at all times save when the alarm signal is operated, it is evident that the mechanism above described for testing the strength of the batteries 21 and 26, and for insuring a current, need not be resorted to. The battery 40 may be removed and replaced at will, and the strength thereof tested by an ammeter 58.

In the operation of this portion of my improved alarm system any attempt on the part of a burglar to enter the building or interfere with the operation of the mechanism within the casing 1 would serve to close a circuit between the wires 37 and 39, which would energize the electro-magnet 48 and cause the arm 50 to drop onto the contact 54 and place the electrically-operated mechanism for the bell in circuit and start its operation. If a person should attempt to drill through the two casings, the current could then flow from the wire 37, through the branch 46 to the inner casing, and through the drill to the outer casing and back to the battery through the branch 43 and wire 39. If he should pull on either end of the cable it would bring one of the collars 55 into engagement with the collars 56 or 57, and the circuit would be closed between the wires 37 and 39 by means of the branches 45 and 46 and the outer casing 1. If one of the wires of the closed circuit which holds the mechanical movement in its locked position, should be cut, the pivoted lever 9 in moving backward under the influence of the spring would force the two contacts adjacent thereto, into engagement with each other and the circuit would be closed between the wires 37 and 39 through the branches 42 and 47. The closing of a circuit by any of the means above referred to or by any other means, would serve to

operate the automatic drop 50 and close the circuit to the bell and start it in operation. As one of the wires through which a current would first be sent by the closing of any of the contacts, passes through the automatic drop, including the electro-magnet 48, and the connection betwee this wire and the battery is broken the instant the drop operates, it is evident that it would be impossible for a burglar to send in a strong current, for instance, from an electric lighting circuit, to ruin the batteries, for the instant that such a current was sent in through the wires 37 or 39, or any of their branches, the electro-magnet 48 would immediately shut off said current and start the alarm bell in operation. If the burglar attempted to send in a strong current through the wires 38 and 39 to ruin the batteries, such current would never reach the battery, as the wire 38 is normally dead and is only connected to the battery after the automatic drop has performed its function. If the burglar were familiar with the alarm system employed and should attempt to sever either of the wires 37, 38 or 39 to prevent the electrically-operated portion of the signal from starting when the circuit is closed, he might partially sever the cable 20, but as there are six wires within the cable and the severing of any one of three of these, namely, wires 23, 24 and 25, would not only serve to free the mechanically-operated portion of the alarm, but this would in turn close the circuit and start the electrically-operated portion. It would be practically impossible for the burglar to pick out the wires 37, 38 and 39 and sever them without severing at least one of the three wires 23, 24 and 25; but even though the burglar were successful in picking out the wires 37, 38 and 39, it is evident that either the wire 21 or the wire 25 from the closed circuit may be arranged adjacent the various doors and windows of the building and in a position to be broken upon the entering of any one through these doors or windows. Thus the breaking of the circuit would start the mechanically-operated portion of the alarm in motion. If in attempting to sever the wires 37, 38 or 39 without severing the wires 23, 24 or 25, the burglar should accidentally sever one of the latter and immediately unite the ends of the severed wire, the mechanically-operated hammer would instantly cease its operation, but the stopping of the mechanically-operated hammer by the closing of the circuit would not serve to stop the electrically-operated hammer, which would be started simultaneously, for the second the armature of the electro-magnet 11 is released it brings the two contacts of the branches 42 and 47 together and the lever 50 at the automatic drop closes the circuit between the lever 50 and the wire 49, and the electrically-operated hammer starts in motion. The stopping of the mechanically-operated hammer would have no effect upon the electrically-operated one, for as soon as the electrically-operated hammer starts in motion, the wire 37 and all the branches thereof immediately become disconnected from the battery and dead.

It is evident that various attachments may be used in connection with the system above described, as for instance, means for turning a switch to illuminate the building as the alarm bell is operated, or for automatically cutting the alarm out of circuit during the daytime, or providing means for operating the bell to indicate the hours of the day, or more particularly, the noon hour.

It is evident that various changes may be made in the construction and operation of the mechanism above described without departing from the spirit of my invention.

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

1. An alarm system, comprising a bell-alarm, an electrically-operated hammer for said bell-alarm, a mechanically-operated hammer for said bell-alarm, a normally-open electric circuit, a normally-closed electric circuit, the electrically-operated hammer being controlled by said normally-open circuit, whereby the closing of said open circuit operates the electrically-operated hammer, and the mechanically-operated hammer being controlled by said normally-closed circuit, and means whereby the opening of the closed circuit closes the open circuit and thereby operates the electrically-operated hammer.

2. An alarm system, comprising a bell, an electrically-operated hammer adjacent thereto, a normally-open electric circuit, the operating mechanism of said hammer forming a portion of said normally-open electric circuit, whereby the closing of said open circuit operates the electrically-operated hammer, a normally-closed electric circuit, a mechanically-operated hammer adjacent the bell and having means for normally holding it in a locked position, said means constituting a portion of said normally-closed circuit, and means whereby the opening of the closed circuit closes the open circuit and thereby operates the electrically-operated hammer.

3. In an alarm system, a hammer for sounding an alarm bell, a mechanical movement for operating said hammer, a normally-closed electric circuit, means for locking said mechanical movement in position to hold said hammer from operation, said means being controlled by said normally-closed electric circuit, a normally-open electric circuit, an electrically-operated hammer for sounding an alarm bell, said electrically-

operated hammer being controlled by said normally-open electric circuit, and means whereby the opening of the closed circuit closes the open circuit.

4. An alarm system, comprising a bell, a hammer located adjacent thereto, a mechanical movement for operating said hammer, a normally-closed electric circuit, means for locking said mechanical movement in position to hold said hammer from operation, said means being comprised in said closed circuit, a normally-open electric circuit, an electrically-operated hammer adjacent the bell and forming a portion of said normally open circuit, and means whereby the closing of the open circuit or the opening of the closed circuit starts the electrically-operated hammer in operation.

5. In an alarm system, a hammer for sounding an alarm bell, a mechanical movement for operating said hammer, a normally-closed electric circuit, means for locking said mechanical movement in position to hold said hammer from operation, said means comprising an electro-magnet in said normally-closed electric circuit, a normally-open electric circuit, an electrically-operated hammer for sounding an alarm bell, said electrically-operated hammer being controlled by said normally-open electric circuit, and means whereby the opening of the closed circuit closes the open circuit.

6. An alarm system, comprising a bell, a mechanically-operated hammer and an electrically-operated hammer adjacent thereto, an outer and an inner casing surrounding said bell and hammers, a normally-open electric circuit comprising said outer and inner casings, means whereby the electrically-operated hammer may be started in operation by the closing of said circuit, an open-circuit connection with said normally-open electric circuit, and means whereby upon the operation of the mechanically-operated hammer said open-circuit connection is closed and the electrically-operated hammer is started in operation.

7. In an alarm system, a hammer for sounding an alarm bell, a mechanical movement for operating said hammer, a normally-closed electric circuit, means for locking said mechanical movement in position to hold said hammer from operation, said means being controlled by said normally-closed electric circuit, a plurality of batteries in said normally-closed circuit, and means comprised in said normally-closed circuit whereby one of said batteries is thrown into circuit as the other battery is cut out of circuit, whereby the batteries of said closed circuit may be tested without unlocking the locking means for said mechanical movement controlled by said normally-closed circuit.

8. An alarm system, comprising a bell, a mechanically-operated hammer and an electrically-operated hammer adjacent thereto, means for holding said mechanically-operated hammer from operation, a casing surrounding said bell and hammers, a normally-closed electric circuit, means whereby the mechanically-operated hammer may be released by the opening of said closed electric circuit, a normally-open electric circuit, and means whereby the electrically-operated hammer may be started in operation by the closing of said open electric circuit or by the opening of said closed electric circuit.

9. An alarm system, comprising a bell, a hammer adjacent thereto, a mechanical movement for operating said hammer, means for locking said mechanical movement in position to hold said hammer from operation, an electrically-operated hammer adjacent said bell, a casing surounding said bell and hammers, a normally-closed electric circuit controlling the locking means for said mechanical movement, whereby the mechanically-operated hammer may be started in operation by the opening of said closed circuit, a normally-open electric circuit controlling the electrically-operated hammer, whereby the electrically-operated hammer may be started in operation by the closing of said open circuit, the wires of said normally-closed circuit and said normally-open circuit being extended as a cable external of said casing, and means whereby the electrically-operated hammer may be started in operation by the opening of said closed circuit.

10. An alarm system, comprising a bell-alarm, a hammer adjacent thereto, a mechanical movement for operating said hammer, means for locking said mechanical movement in position to hold said hammer from operation, an electrically-operated hammer adjacent the bell-alarm, an outer and an inner casing surrounding the bell-alarm and hammers, a normally-closed electric circuit controlling said locking means for said mechanical movement, a normally-open electric circuit controlling said electrically-operated hammer and comprising said outer and inner casings, the circuit connections between said outer and inner casings being normally open, a cable leading to the casing for said bell-alarm and said hammers and comprising the wires of said closed electric circuit and the wires of said open electric circuit, means whereby the mechanically-operated hammer may be started in operation by the opening of said closed circuit, the electrically-operated hammer being started in operation by the closing of said open circuit at any point, and means

whereby the opening of said closed circuit closes said open circuit and thereby operates the electrically-operated hammer.

11. In an alarm system, a hammer for sounding an alarm bell, a normally-closed electric circuit, a mechanical movement for operating said hammer, said mechanical movement being controlled by said normally-closed electric circuit, an electrically-operated hammer for sounding an alarm bell, a normally-open electric circuit, said electrically-operated hammer being controlled by said normally-open electric circuit, means whereby the mechanically-operated hammer may be started in operation by the opening of said normally-closed circuit, and means whereby the electrically-operated hammer may be started in operation by the closing of said normally-open circuit or by the opening of said normally-closed circuit.

12. In an alarm system, mechanically-operated means for sounding an alarm, electrically-operated means for sounding an alarm, a normally-closed electric circuit controlling said mechanically-operated means, a normally-open electric circuit controlling said electrically-operated means, means whereby the mechanically-operated alarm may be started in operation by the opening of said normally-closed circuit, and means whereby the electrically-operated alarm may be started in operation by the closing of said normally-open circuit or by the opening of said normally-closed circuit.

13. An alarm system, comprising mechanically-operated means for sounding an alarm, a normally-closed electric circuit controlling said mechanically-operated means, electrically-operated means for sounding an alarm, a normally-open electric circuit controlling said electrically-operated means, means whereby said mechanically-operated means may be started in operation by the opening of said closed circuit, means whereby said electrically-operated means may be started in operation by the closing of said open circuit or by the opening of said closed circuit, a separate battery or source of electrical energy for said normally-open circuit, a separate battery or source of electrical energy for said normally-closed circuit, and means comprised in said closed circuit for so controlling the action of the battery or source of electrical energy of said closed circuit that testing of the same is enabled without releasing the mechanically-operated means controlled by said closed circuit.

14. An alarm system, comprising mechanically-operated means for sounding an alarm, a normally-closed electric circuit controlling said mechanically-operated means, electrically-operated means for sounding an alarm, a normally-open electric circuit controlling said electrically-operated means, means whereby said mechanically-operated means may be started in operation by the opening of said closed circuit, means whereby said electrically-operated means may be started in operation by the closing of said open circuit or by the opening of said closed circuit, a separate battery for said normally-open circuit, a plurality of batteries for said normally-closed circuit, and means normally comprised in said normally-closed electric circuit whereby one of the batteries of said closed circuit is automatically thrown into circuit as the other battery of said closed circuit is cut out of circuit.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAXIMILIAN F. JURUICK.

Witnesses:
CLAIR W. FAIRBANK,
JNO. M. RITTER.