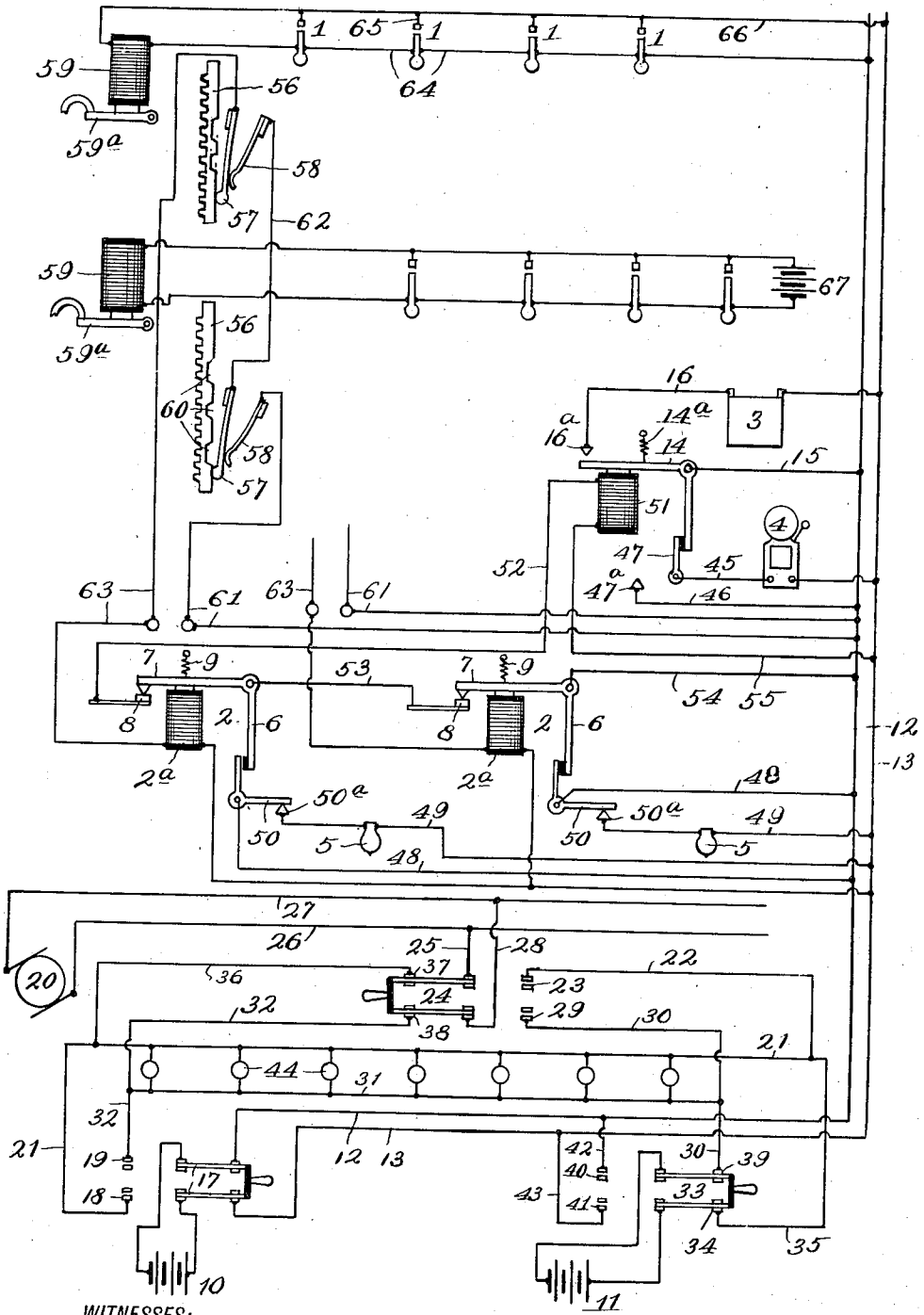
J. M. JOHNSON.

AUTOMATIC FIRE ALARM SYSTEM.

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1,174,503. Patented Mar. 7, 1916.



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AUTOMATIC FIRE-ALARM SYSTEM.

1,174,503. Specification of Letters Patent. Patented Mar. 7, 1916.

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To all whom it may concern:

Be it known that I, JOHN M. JOHNSON, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Automatic Fire-Alarm Systems, of which the following is a specification.

My invention relates to automatic fire alarm systems, and one of my objects is to produce a new system of this character whereby fire occurring in a building within a certain block will transmit signals to a central station, giving the location of the block, the number of the building, and the floor on which the fire occurs before the fire can gain much headway.

Other objects of the invention will hereinafter appear, and in order that said invention may be fully understood, reference will now be made to the accompanying diagram, which shows a central station equipment for two blocks of buildings, two house equipments, and the circuits connecting the equipments.

Each house equipment, shown at the upper portion of the diagram, embodies several thermostatic circuit closers 1, and a signal mechanism or box, with their connections.

The central station equipment, shown below, embodies two receiving relays 2, one tape recorder 3, one bell 4, and two flash lamps 5.

The magnetic tape recorder 3, may be of ordinary type, and the bell 4, is, preferably, of the ordinary make-and-break vibrating armature type.

For each block of buildings to be served, the central station is provided with a lamp 5 and a relay 2. Each relay comprises an electromagnet 2^a, a pivoted armature 6 having a contact arm 7, a fixed contact point 8, and a spring 9 that tends to break the normal contact between arm 7 and the point 8.

The recorder 3, is in a normally open circuit, communicating with a main circuit comprising batteries 10 and 11, a circuit wire 12, and a circuit wire 13. The recorder circuit consists of an armature 14, a wire 15 communicating with said armature 14 and circuit wire 12 and a wire 16 communicating with the circuit wire 13 and a contact point 16^a.

A double-bladed switch 17, is interposed between battery 10, and circuit wires 12 and 13, so that said battery 10, may be recharged whenever necessary by throwing the switch 17 into contact with switch-points 18 and 19, which are in circuit with a source of supply, such, for instance, as a dynamo 20, through the intermediacy of circuit wires 21 and 22, a switch-point 23, a double-bladed switch 24, circuit wires 25, 26, 27, and 28, a switch-point 29, and circuit wires 30, 31, and 32.

The battery 11, is likewise adapted to be charged from the source of supply 20. This is accomplished through a circuit comprising a double-bladed switch 33, a switch-point 34, circuit wires 35, 21, and 36, a switch-point 37, switch 24, circuit wires 25, 26, 27, and 28, a switch-point 38, circuit wires 32, 31, and 30, and a switch-point 39. In the drawing, battery 10 is shown serving the system with current, and battery 11, being recharged. The battery 11, can be placed in communication with the main circuit wires 12 and 13, by throwing the switch 33 into contact with points 40 and 41, communicating with wires 12 and 13, through branch wires 42 and 43, respectively. With the foregoing arrangement, batteries 10 and 11, can be alternately recharged, or in other words, when one battery is serving the system, the other can be recharged. Thus the system will always be ready to record a signal.

Resistance is interposed between dynamo 20 and the batteries 10 and 11, in the form of lamps 44, connected in series to circuit wires 21 and 31.

The bell 4, is in a normally-open circuit consisting of wires 45 and 46, and a drop switch 47. Wires 45 and 46, communicate with wires 13 and 12, respectively. Switch 47 is thrown to closed position against the contact point 47^a by the action of the armature 14.

The lamps 5, are in a normally-closed circuit, consisting of wires 48 and 49, a bell-crank switch 50, and its point 50^a. Wires 48 and 49 are in circuit with wires 12 and 13, respectively. Bell-crank switch 50, is actuated by the relay armature 6.

The signal relay of which armature 14 constitutes a part, embodies a normally energized electromagnet 51, located in a circuit consisting of a wire 52, the points 8, the relay armatures 6, a wire 53 connecting the armature 6 of the initial relay with the point 8 of the last relay, a wire 54 leading from the last armature 6 to the circuit wire

12, and a wire 55, leading from the circuit wire 13 to the electromagnet 51.

The house apparatus.—The house apparatus embodies a signal sending mechanism consisting of a clock-driven code-bar 56, a brush 57 contacting said code-bar, a contact member 58 normally contacting the brush 57, a trip magnet 59, and an escapement (not shown) by means of which the magnet 59, when deënergized, releases the code-bar 56. The code-bar 56, is formed with recesses 60, arranged according to the dots and dashes of the Morse (or any preferred) code, so that when said code-bar moves downward the recesses 60 pass the tip of brush 57, permitting said brush to move toward the code-bar and thereby break contact with said code-bar and also with the contact member 58, during the transit of each recess. The signal thus transmitted to the central station indicates the building and floor thereof on which the code-bar is located.

The signal sending mechanism just described, controls a signal sending circuit, consisting of a wire 61 communicating with the main circuit wire 12, a wire 62 connecting the initial brush 57 with the succeeding contact member 58, and a wire 63 connecting the last brush 57, and the main circuit wire 13.

A pair of wires 61—63, is employed for each block, and a signal sending mechanism is installed within each building of the block, the signal sending mechanism of each block being connected in series.

The mercury thermostatic circuit closers 1, are placed in any desirable number and situation in a building to be protected. Each thermostatic circuit closer consists of a glass tube having a bulb containing mercury; two wires 64 fused into the glass tube and contacting with the mercury but not with each other, and a third wire 65, fused into said tube and entering the bore above the mercury at such a point that when the temperature at the thermostatic circuit closer is raised to say 160 degrees Fahr., the mercury expands and contacts said third wire 65, thereby short circuiting a house circuit consisting of the wires 64 and 65, trip magnet 59, and a circuit wire 66. The house circuit receives its current from the main circuit wires 12 and 13. The wires 64, are provided for the purpose of giving notice at the central station of the breakage of any thermostat, and to that end one is connected to the associated trip magnet 59, and another to the circuit wire 12.

The operation of my system is as follows: Assuming that all connections of the apparatus are in normal condition and a fire starts in the building, raising the temperature at one or more thermostatic circuit closers, to say 160 degrees Fahr., the mercury expands and makes contact with wire or wires 65. This short circuits the house circuit and diverts current from trip magnet 59, weakening the same, so that it releases its armature 59ª, tripping the escapement (not shown) and permitting the code-bar 56 to move downward. As the recesses 60 pass the brush 57, contact is intermittently broken between said brush and the code-bar 56, also between said brush and the contact member 58. When the breaks occur between the brush 57 and the contact member 58, the circuit in which the associated relay 2 is located is intermittently interrupted, allowing the armature 6 to be actuated by the spring 9, so that said armature in turn kicks the bell-crank switch 50 out of engagement with its respective contact point 50ª, and thus interrupts the lamp circuit, making the lamp 5 therein dark and thus indicating the block in which the fire is located. The building and floor thereof in which the fire is located is ascertained by the recorder 3, the circuit of which is intermittently closed when magnet 51 is successively deënergized and permits the spring 14ª to draw the armature 14 into engagement with the contact 16ª. As the armature 14 is thus actuated by the spring 14ª, it kicks the drop switch 47 into engagement with its contact point 47ª, thereby closing the circuit containing the bell 4, which is sounded and attracts attention to the dark lamp 5 and the recorder 3. The bell 4 continues to ring until the drop switch 47 is manually opened and the lamp circuit remains open until manually closed, but the signal and recorder circuits are automatically restored to normal position after the recesses 60 pass the brush 57. The code-bar is restored to normal position when the signal sending mechanism is manually reset.

Should either of the circuit wires 61, 63, be broken but no fire exist in the house, the house circuit through magnet 59 remains closed and the code-bar 56 is not released. The associated relay 2, however, closes the circuits containing the recorder 3, and the bell 4, and the circuit containing the proper light 5 is opened. The recorder runs out tape but no signals are recorded thereon.

In case a thermostatic circuit closer breaks, letting the mercury run out and break the circuit to the trip magnet 59, the same becomes deënergized, resulting in a release of the code-bar 56, so that the same will transmit impulses to the central station and cause the associated relay 2 to close the circuits embodying the recorder 3, and the bell 4, and open the lamp circuit 5.

Instead of supplying the house circuits with current from the main circuit, each house circuit may have its own battery 67.

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

1. In a system of the character described, a thermostatic circuit closer, a house circuit controlled thereby, a normally-closed main circuit communicating with said house circuit, signal transmitting mechanism controlled by the house circuit, a normally-closed circuit controlled by said signal transmitting mechanism, a relay controlled by said normally-closed circuit, a normally-open audible signal circuit, and a signal relay for controlling said audible signal circuit, said signal relay being controlled by the first-mentioned relay.

2. In a system of the character described, a thermostatic circuit closer, a house circuit controlled thereby, a normally-closed main circuit communicating with said house circuit, signal transmitting mechanism controlled by the house circuit, a normally-closed circuit controlled by said signal transmitting mechanism, a relay controlled by said normally-closed circuit, a normally-open audible signal circuit embodying a drop switch, an armature for closing said drop switch, and an electromagnet for controlling the armature, said electromagnet being normally in circuit with the relay.

3. In a system of the character described, a thermostatic circuit closer, a house circuit controlled thereby, signal transmitting mechanism controlled by said house circuit, a normally-closed circuit controlled by said signal transmitting mechanism, an electromagnet communicating with said normally-closed circuit, an armature controlled by said electromagnet, a normally-closed lamp circuit embodying a switch adapted to be opened by said armature when the electromagnet is deënergized, a normally-open audible signal circuit, and a relay for controlling said audible signal circuit, said relay being in a circuit normally-closed by the armature.

4. In a system of the character described, a thermostatic circuit closer, a house circuit controlled thereby, a signal transmitting mechanism controlled by said house circuit, a normally-closed circuit controlled by said signal transmitting mechanism, an electromagnet communicating with said normally-closed circuit, an armature controlled by said electromagnet, a normally-open signal circuit embodying an alarm, a normally-open recording circuit, a relay for controlling the audible and recording circuits, and a circuit for normally-energizing said relay, said circuit being controlled by the armature.

5. In a system of the character described, a thermostatic circuit closer, a circuit controlled thereby, a normally-closed main circuit, signal transmitting mechanism controlled by the first circuit, a normally-closed signal transmitting circuit controlled by said signal transmitting mechanism and communicating with the main circuit, a relay controlled by said signal transmitting circuit, a normally-open audible signal circuit communicating with the main circuit, a relay for controlling said audible signal circuit, and a circuit controlled by the first-mentioned relay for normally energizing the second relay, said circuit communicating with the main circuit.

6. In a system of the character described, a thermostatic circuit closer, a circuit controlled thereby, a normally-closed main circuit, signal transmitting mechanism controlled by the first circuit, a normally-closed signal transmitting circuit controlled by said signal transmitting mechanism and communicating with the main circuit, a relay controlled by said signal transmitting circuit, a normally-open recording circuit communicating with the main circuit, a relay for controlling said recording circuit, and a circuit controlled by the first relay for normally energizing the second relay, said circuit communicating with the main circuit.

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN M. JOHNSON.

Witnesses:
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