

No. 772,644.

PATENTED OCT. 18, 1904.

W. L. DENIO.
FIRE ALARM SYSTEM.
APPLICATION FILED MAY 9, 1904.

NO MODEL.

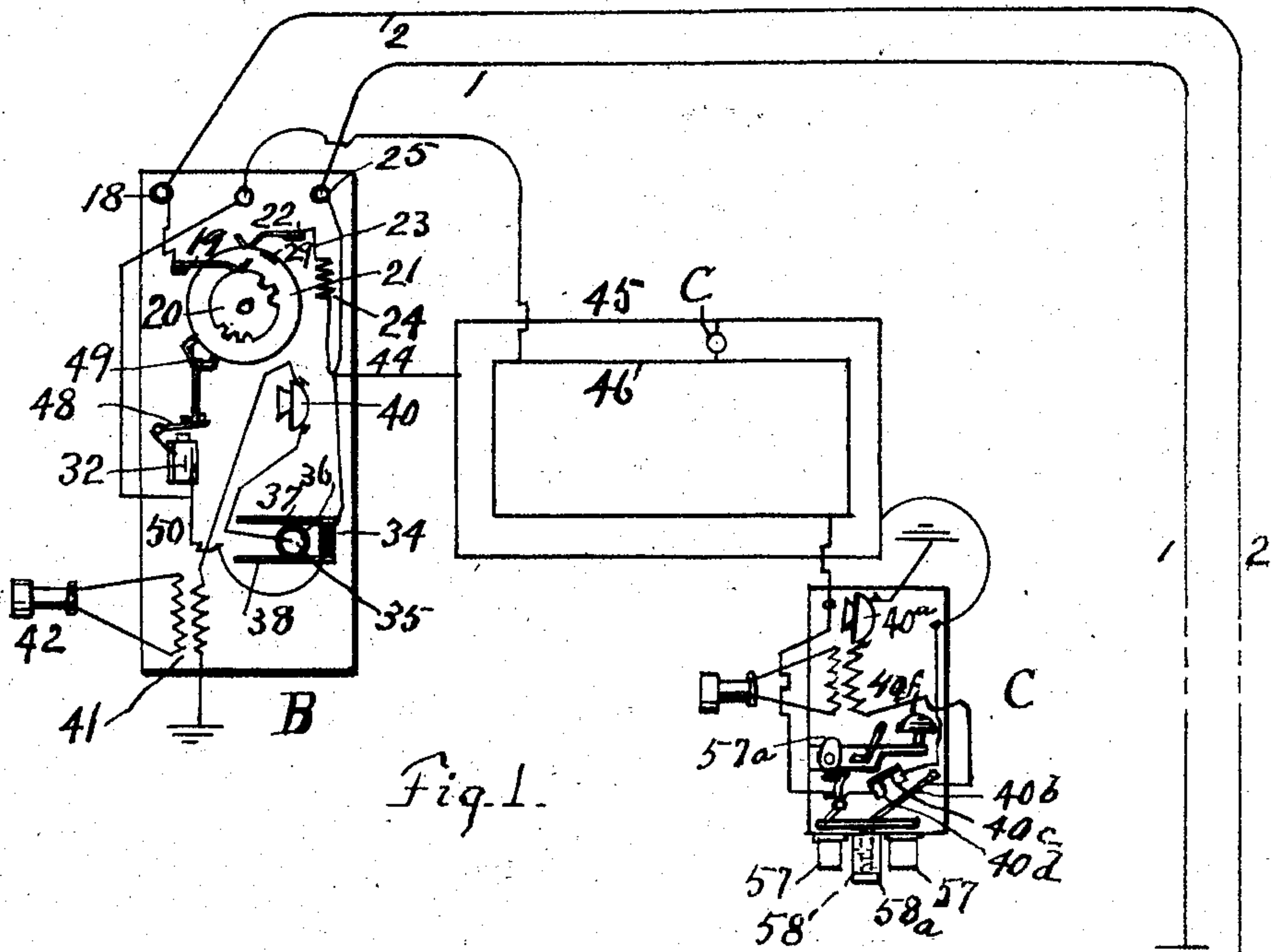


Fig. 1.

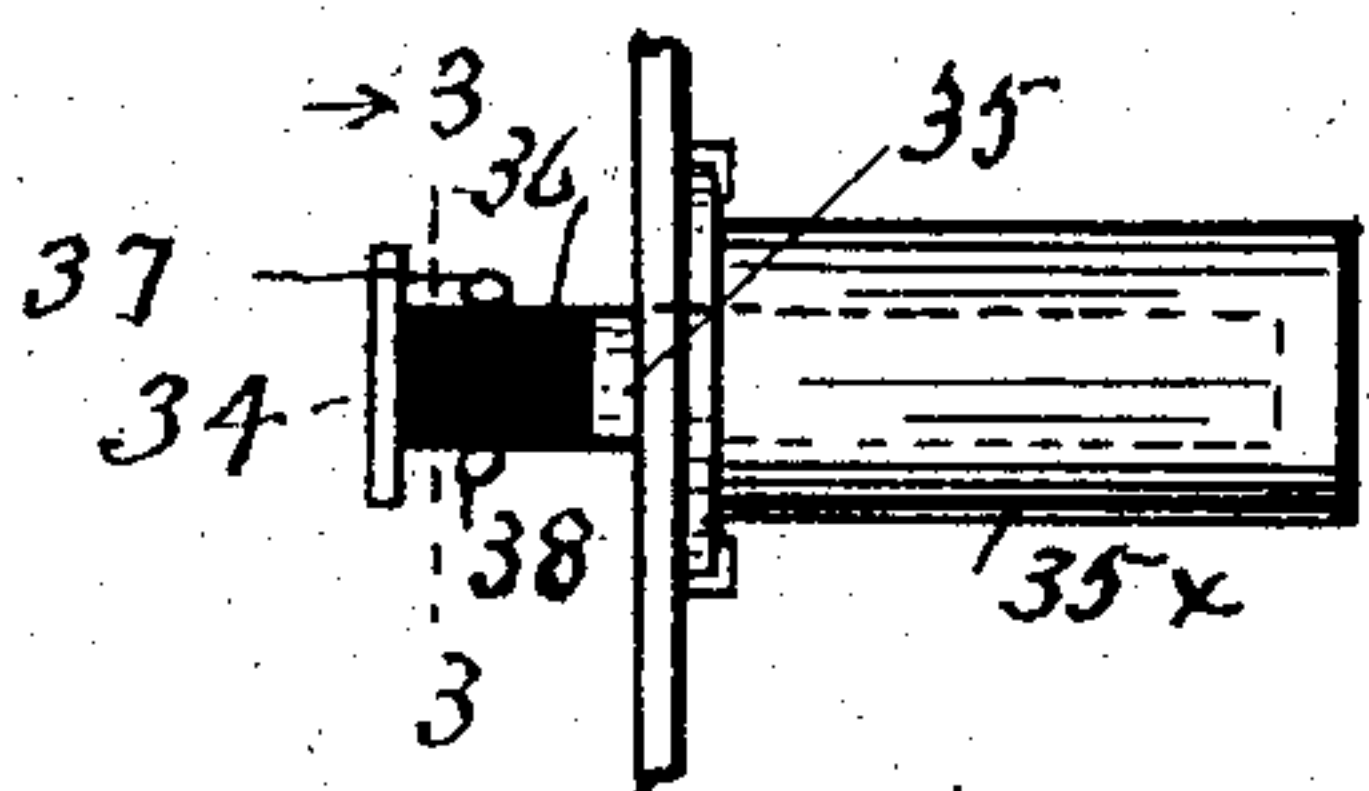


Fig. 2.

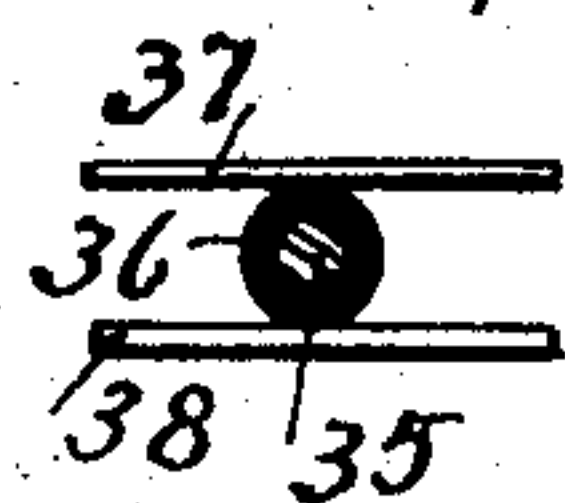


Fig. 3.

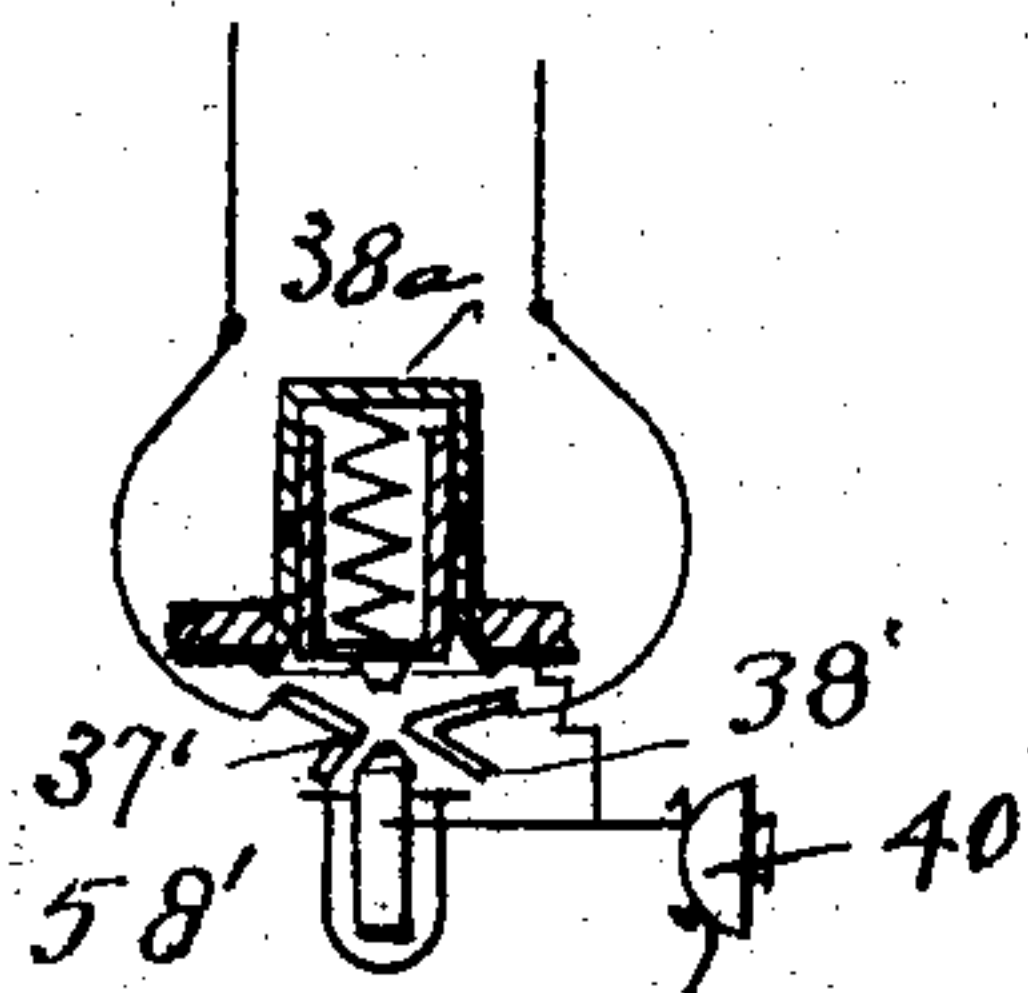


Fig. 4.

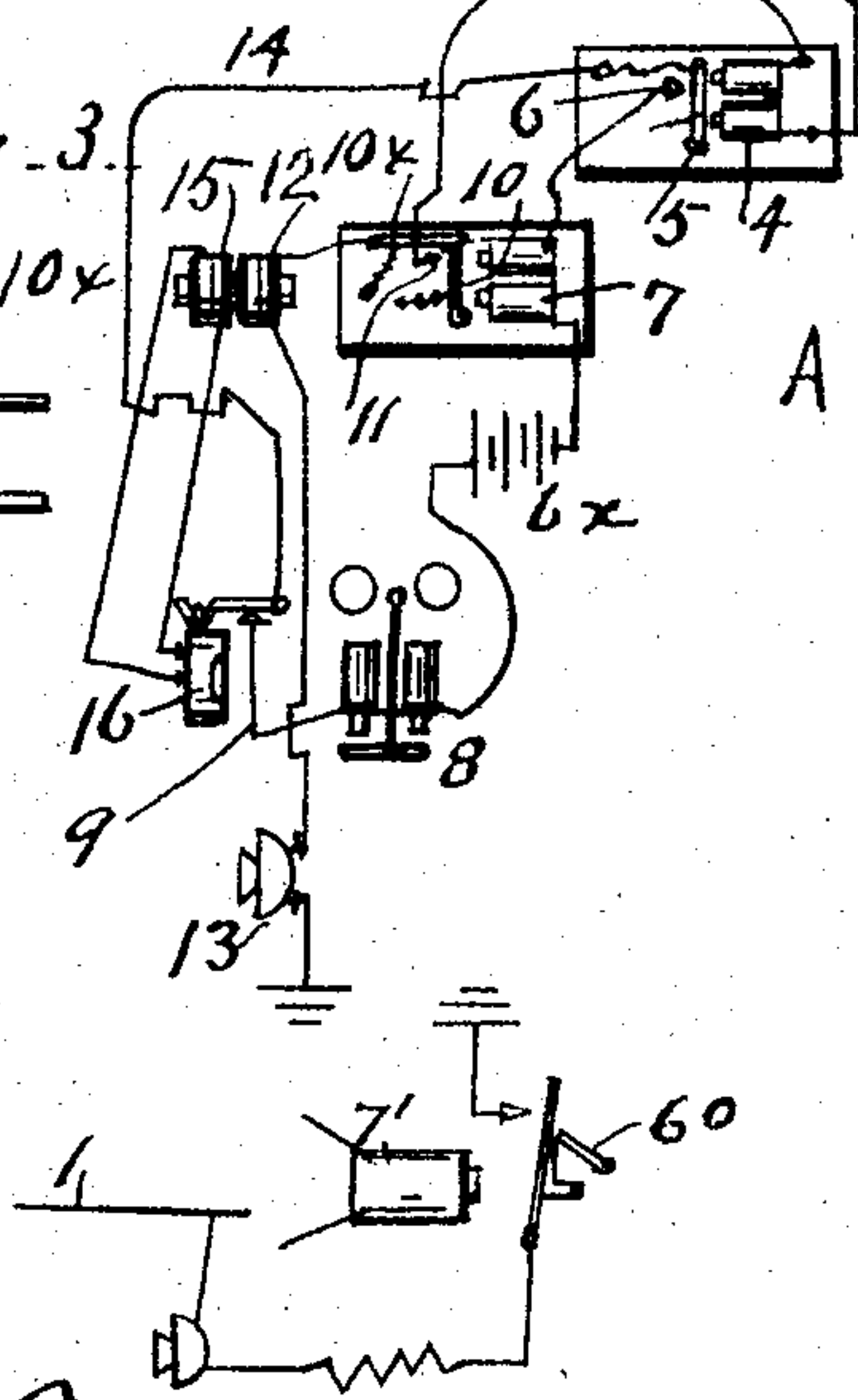


Fig. 5.

Witnesses

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FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 772,644, dated October 18, 1904.

Application filed May 9, 1904. Serial No. 207,141. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. DENIO, a resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Fire-Alarm Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to fire-alarm apparatus; and the main object of the invention is to provide improved means for giving an "answer-back" signal, more particularly in the "auxiliary fire-alarm systems."

A further object is to provide improved means for informing the central or fire-alarm station whether an alarm-box was started by some accident or by the alarm-box being operated in the prescribed manner.

Other subsidiary objects will appear from the following description and claims.

In the accompanying drawings, Figure 1 is a diagrammatic view of a fire-alarm system embodying the invention, and Fig. 2 is a side view of the manual push-rod. Fig. 3 is a section on line 3 3 of Fig. 2. Fig. 4 shows a modified detail, and Fig. 5 is a diagrammatic view showing a modification.

The system illustrated has a central fire-alarm station A, from which extend any desired number of metallic circuits 1 2, but one being shown, in which at said station is a battery 3 and a magnet 4, called the "alarm-relay-magnet." The armature 5 is normally attracted, being held away from the alarm-circuit contact 6, which is connected through magnet 7, a local battery 6^x, to the alarm-bell 8, from which wire 9 leads to the lower contact of the telephone-switch, then by wire 10^x to said armature 5. The armature 10 of magnet 7, called the "telephone relay-magnet," when attracted releases arm 10^x, which drops onto contact 11, which is connected to the line-circuit, arm 10^x being connected to the primary coil 12 of an induction-coil, to telephone-transmitter 13, to ground. Said arm 10^x also serves to hold said contact closed after the armature has once been attracted.

Contact 11 is thus normally disconnected from the ground. 15 indicates the secondary coil of said induction-coil and to which is connected the telephone-receiver 16.

The system also has connected to circuit 1 2 one or more fire-alarm boxes B, placed at or near the building or district to be protected. Wire 2 connects with box-terminal 18, then to spring 19, toothed wheel 20, adapted to send the box-number, to wheel 21, which has an insulating-segment or other circuit-changing device, adapted to give warning of a coming alarm before the sending of the box-number by momentarily changing the circuit before the circuit-wheel operates. From wheel 21 the connection is by spring 22, wire 23, including a resistance 24, to terminal 25 of the box, to wire 1, back to battery. Resistance 24 is made about equal to that of the wiring extending through the building. One of the objects of this resistance is to divert current on closure of its circuit.

In the alarm-box is a manual push-rod 34, consisting of a conducting-body 35, with an insulating sleeve or section 36, against which springs 37 38 normally bear. Preferably the push-rod is inclosed in a glass cover, as common in fire-alarms, the cover to be broken to get at the push-rod. Spring 37 is connected to box-terminal 25, and push-rod 34 is connected to the telephone-transmitter 40, to the primary coil of induction-coil 41, thence to the ground connection. The secondary of said induction-coil includes a receiving-telephone 42.

The connection from spring 37 branches to line 1 and also through resistance 24 to spring 22, through the wheels to spring 19, resistance 24 thus being in the normal main circuit. A third branch, 44, connects with the thermostat-loop 45. Loop 46 is connected to magnet 32, armature 48, escapement 49, to wheels 20 21 in the main circuit. A branch 50 extends to spring 38, normally disconnected electrically from spring 37 by sleeve 36. Conducting part 35 of the push-rod when advanced electrically connects said springs.

The telephone at box B when push-rod 34 has been operated should be in condition to

receive an answer-back signal from central, automatically returned by the sound of alarm-bell 8, operating on the telephone-transmitter 13 in the ground connection at said central.

5 At one or more suitable points between wires 45 46 is or are connected auxiliary boxes C, adapted when operated to start box B by connecting contacts 40^c 40^d by arm 40^b, which may be done by breaking glass tube
10 58^a, Fig. 1, and pushing up rod 58, which movement carries up arm 40^b to connect said contacts, or the arm may be similarly moved by operation of one or more thermostatic devices 57. Operation of either the manual
15 push-rod or the thermostatic devices trips the eccentric 57^a, having any suitable driving means, which mechanically operates a bell 40^f in obvious manner. This bell operates on the auxiliary box-telephone transmitter,
20 whereby the department or central operator can hear the auxiliary box at his receiver, and thus be informed that the signal is one to be responded to. The bell also serves as an alarm tending to prevent the sending of false
25 alarms. Arm 40^b when moved also closes a branch to ground through a primary coil and a telephone-transmitter 40^a, the secondary coil containing a receiver in its circuit. At some of the less important points to be pro-
30 tected instead of the described auxiliary box I may use a combined manual push-rod and thermostatic device, as indicated in Fig. 4, where 58' is a manual push-rod generally pro-
35 tected by a glass cover and controlling a ground branch, being normally separated from contacts 37' 38', but when operated connecting them and closing said ground branch through telephone-transmitter 40. The ther-
40 mostatic part of this device 38^a consists of two cup-like reverse bodies with an intermediate spring held under tension by fusible solder connecting the cups, this of itself be-
ing old. Such device I locate so that when released it acts on contacts 37' 38' to connect
45 them and to close the ground branch in the same way as push-rod 58'. When the relay-magnet 7', Fig. 5, which corresponds to mag-
net 7 of Fig. 1 attracts its armature and closes the ground-telephone branch, the ar-
50 mature may be held against its contact by arm 60, which is arranged to fall when the armature moves forward.

From the above description it will be seen that normally the main circuit is closed as
55 follows: from battery 3 to magnet 4, wire 2, box-terminal 18, spring 19, the circuit-wheels, spring 22, resistance 24, and thence to wire 1 to battery. In this circuit, notwithstanding the inclusion of said resistance, is sufficient
60 current to energize magnet 4 to hold its armature from back contact 6, holding alarm-circuit 9 open.

Suppose there comes an accidental break in circuit 1 2, circuit 9 will be closed by ar-
65 mature 5 and the bell will ring until its cir-

cuit is opened by the attendant. The closing of the local alarm-circuit 9 causes magnet 7 to attract its armature, closing the ground connection of the telephone-transmitter 13 and the primary coil 12 at central, and this
70 will remain closed until arm 10^x is moved back to its normal position. If while said ground branch is closed the operator on listening at receiver 16 does not hear the noise of the signal-box acting on the transmitter in
75 the box, he knows at once that the alarm was not sent by the proper operation of the box.

The signal-box transmitter should be so located that the noise of the box when operat-
ing and when the ground branch is closed
80 will affect the transmitter, and thus the central receiver.

If the the signal-box is started by push-rod 35, so as to thereby connect springs 37 38, a branch circuit will be closed at the box ex-
85 tending from line-wire 1 to parts 37 38, to magnet 32, to the armature, to the number-wheels, spring 19, to wire 2, which releases the box, and by listening at receiver 42 the one sending the alarm can hear it as it is de-
90 livered at central without anything being done by the operator there. On the other hand, if listening at receiver 16 the central operator hears the noise of the box, as well as bell 8, he knows that the box was started by push-
95 rod 35, as otherwise there would be no complete telephone-circuit.

In case the fire-alarm box B was started by operation of an auxiliary box C the central operator at his telephone-receiver would hear
100 the auxiliary-box bell acting on the adjacent telephone-transmitter, and each auxiliary box, if more than one such box is employed, being given a bell 40^f of distinctive sound would locate the floor or part of the building
105 from which the alarm was sent.

The enabling of the auxiliary-box operator, as well as the one operating the box directly, to get a telephone-answer back is important, as also is enabling the central to hear either
110 the signal-box or the auxiliary, according to which sends the alarm.

Box B may have a thermostatic releasing device, as well as a manual one, if desired, and other modifications may be made within
115 the scope of this invention.

What I claim is—

1. In a fire-alarm system, a main circuit connecting a central station and an alarm-box, an audible box-number-receiving device, a
120 ground branch from the main circuit at said central station containing a telephone, a second ground branch located at the alarm signal-box, a telephone therein, box-number-sending mechanism, a circuit-controller and magnet
125 for releasing said sending mechanism, the circuit-controller also closing said ground branch at the box, whereby operation of said controller starts the signal-box and also renders the telephone-circuit operative.
130

2. In a fire-alarm system, a main circuit connecting a central station and an alarm-box, an audible box-number-receiving device, a ground branch from the main circuit at the central station containing a telephone apparatus including an induction-coil, a transmitter and receiver, a second ground branch at the alarm signal-box, a telephone apparatus therein including induction-coil, transmitter and receiver, box-number-sending mechanism, a circuit, magnet and controller for releasing said sending mechanism, the controller also closing said ground branch at the box.

3. In a fire-alarm system, a main circuit connecting a central station and an alarm-box, an audible box-number-receiving device, a ground branch from the main circuit at said central station containing a telephone, a local circuit including said audible alarm, a magnet in the main circuit controlling said local circuit, and a magnet in the local circuit controlling the telephone branch.

4. In a fire-alarm system, a main circuit connecting a central station and an alarm-box, an audible box-number-receiving device, a normally open ground branch from the main circuit at said central station, a telephone in said ground branch, a local circuit controlled by the main circuit and containing said box-number-receiving device, and means brought into action by closure of said local circuit for maintaining said ground branch closed until reset.

5. In a fire-alarm system, an alarm-box including number-sending means and releasing means therefor, a building-circuit connected to the box, an auxiliary box at the building to be protected means at said auxiliary box for closing the building-circuit to release the number-sending means, and telephones at the signal-box and at the auxiliary box.

6. In a fire-alarm system, a central-station receiving device, a main circuit, a telephone, a ground branch therefor, an alarm-box in the main circuit, and having number-sending parts through which the circuit is normally closed, a resistance therein, a normally open house-circuit, connected to the main circuit

but normally without current, an auxiliary box, and telephones at the alarm-box and at the auxiliary box.

7. In a fire-alarm system, a main circuit, the alarm-box, the normally open ground telephone-circuit and means which when operated release the alarm-box and close said ground telephone-circuit.

8. In a fire-alarm system, the main circuit, central receiving means, an alarm-box, a releasing-magnet therefor, an auxiliary box connected to the alarm-box so as when operated to close the circuit through said releasing-magnet, and telephones in ground branches at a central station and at said boxes.

9. In a fire-alarm system, box-number-sending means, receiving means therefor, a box-telephone in operative situation when an alarm is sent, and telephone-answer-back devices comprising an audible signal and an adjacent telephone, and means operated by receipt of an alarm to close the telephone-circuit.

10. In a fire-alarm system, an alarm-box including box-number-sending means, a telephone in a normally inoperative branch, at said box, a fire-alarm house-circuit connected to said box, an auxiliary box connected to the house-circuit, means for operating the auxiliary box to close the house-circuit, a telephone at the auxiliary box normally inoperative but made operative by said means for operating the auxiliary box.

11. In a fire-alarm system, an alarm-box, an auxiliary box connected to the alarm-box, a telephone at the auxiliary box, a main circuit from the alarm-box to a central fire-alarm station, and a telephone at said station adapted to cooperate with the telephone at said auxiliary box when the latter has been operated.

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

WILLIAM L. DENIO.

Witnesses:

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A. S. CAMPBELL.