B. KOHLEN.

BURGLAR AND FIRE ALARM.

APPLICATION FILED OCT. 7, 1907.

950,853.

Patented Mar. 1, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

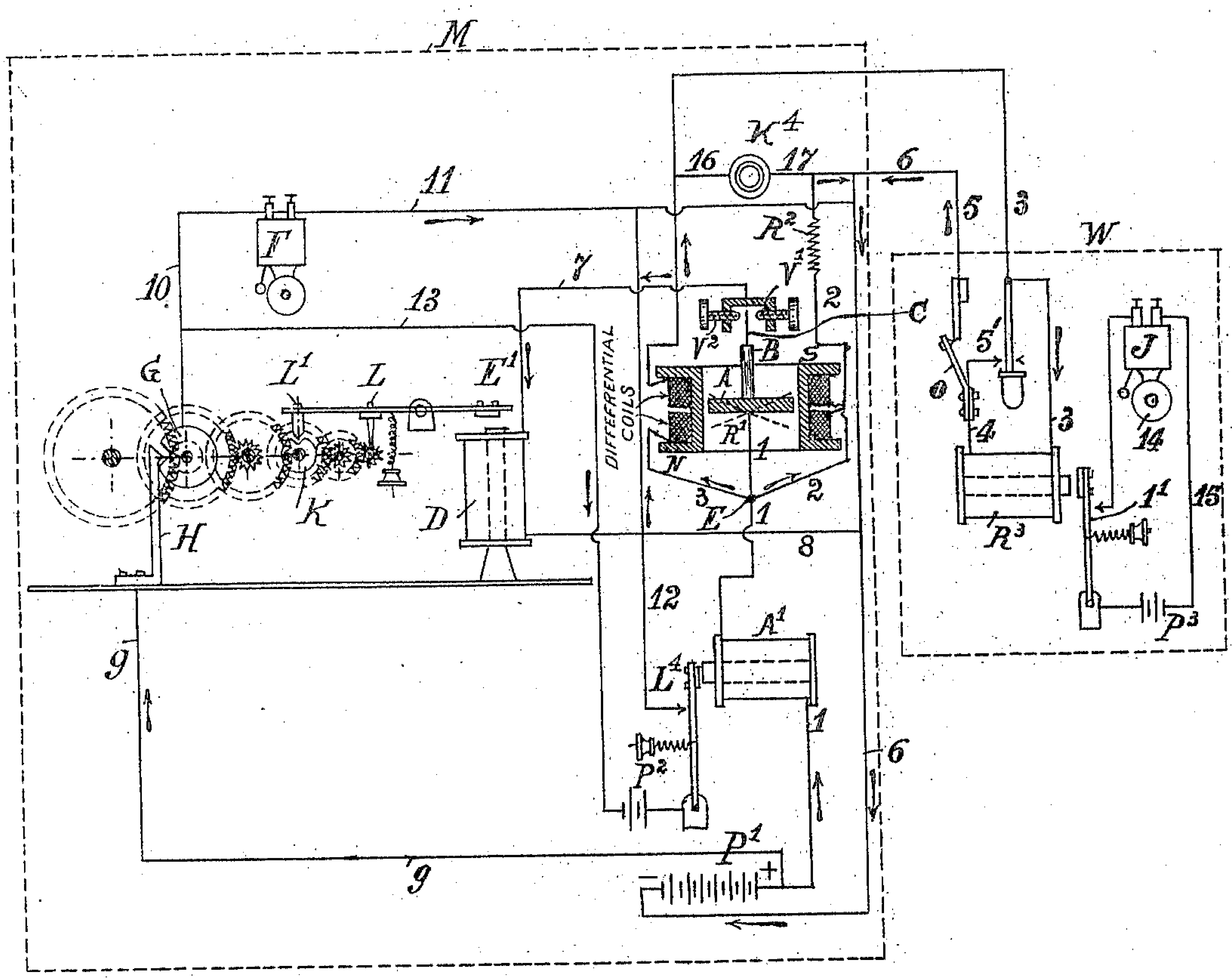
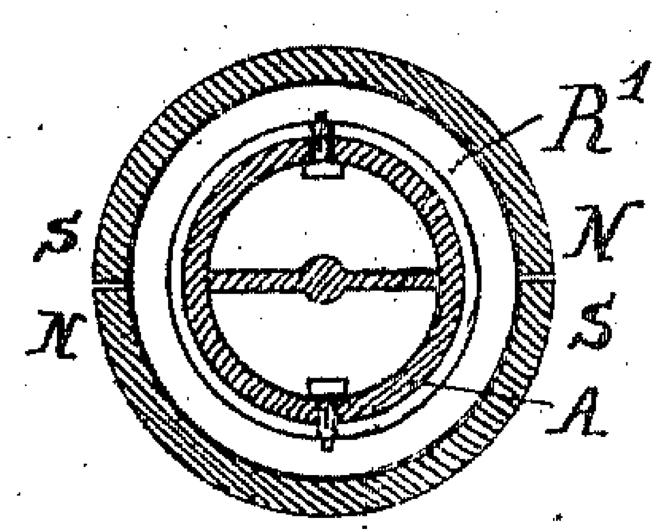


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

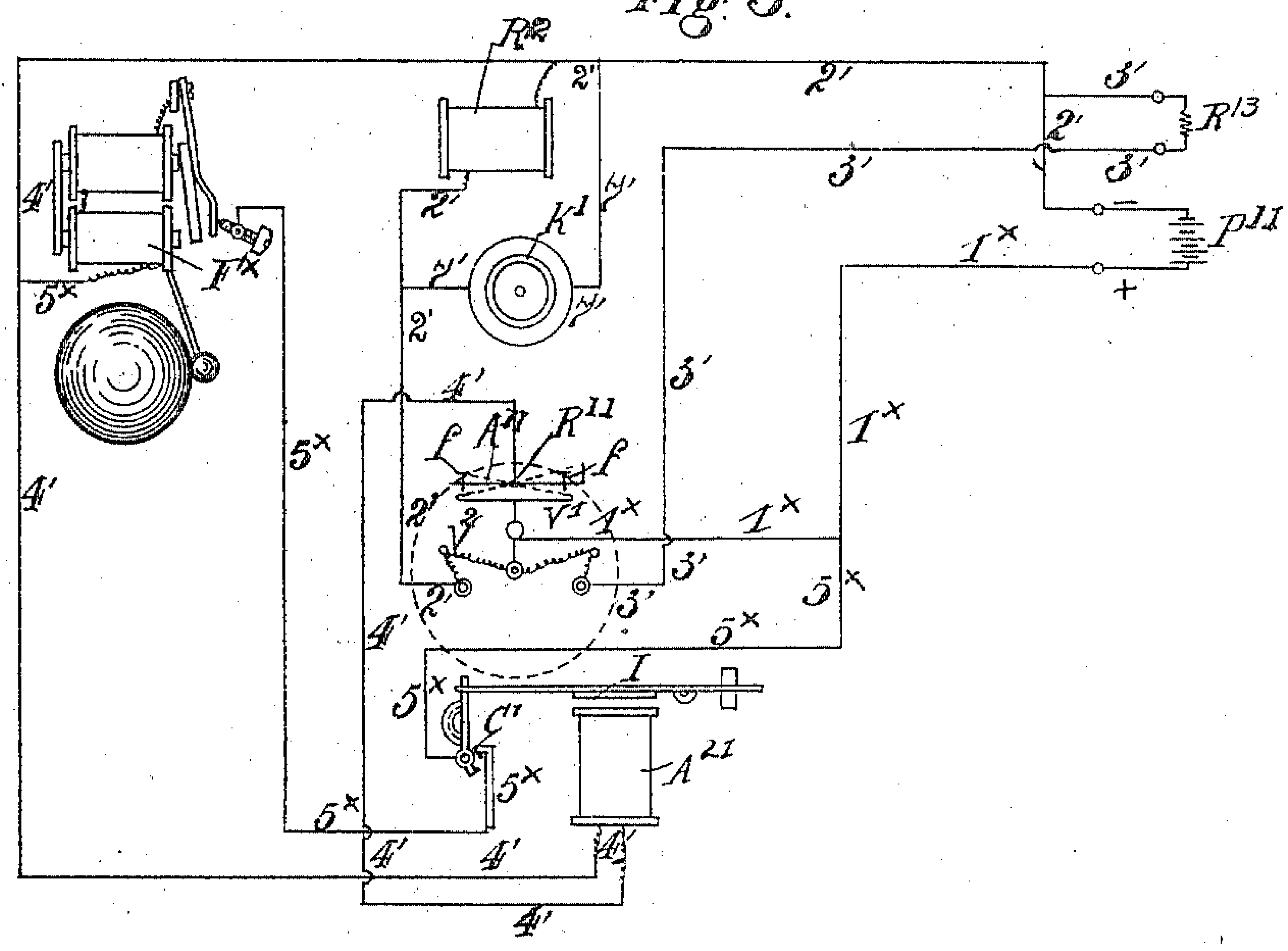


Fig. 4.

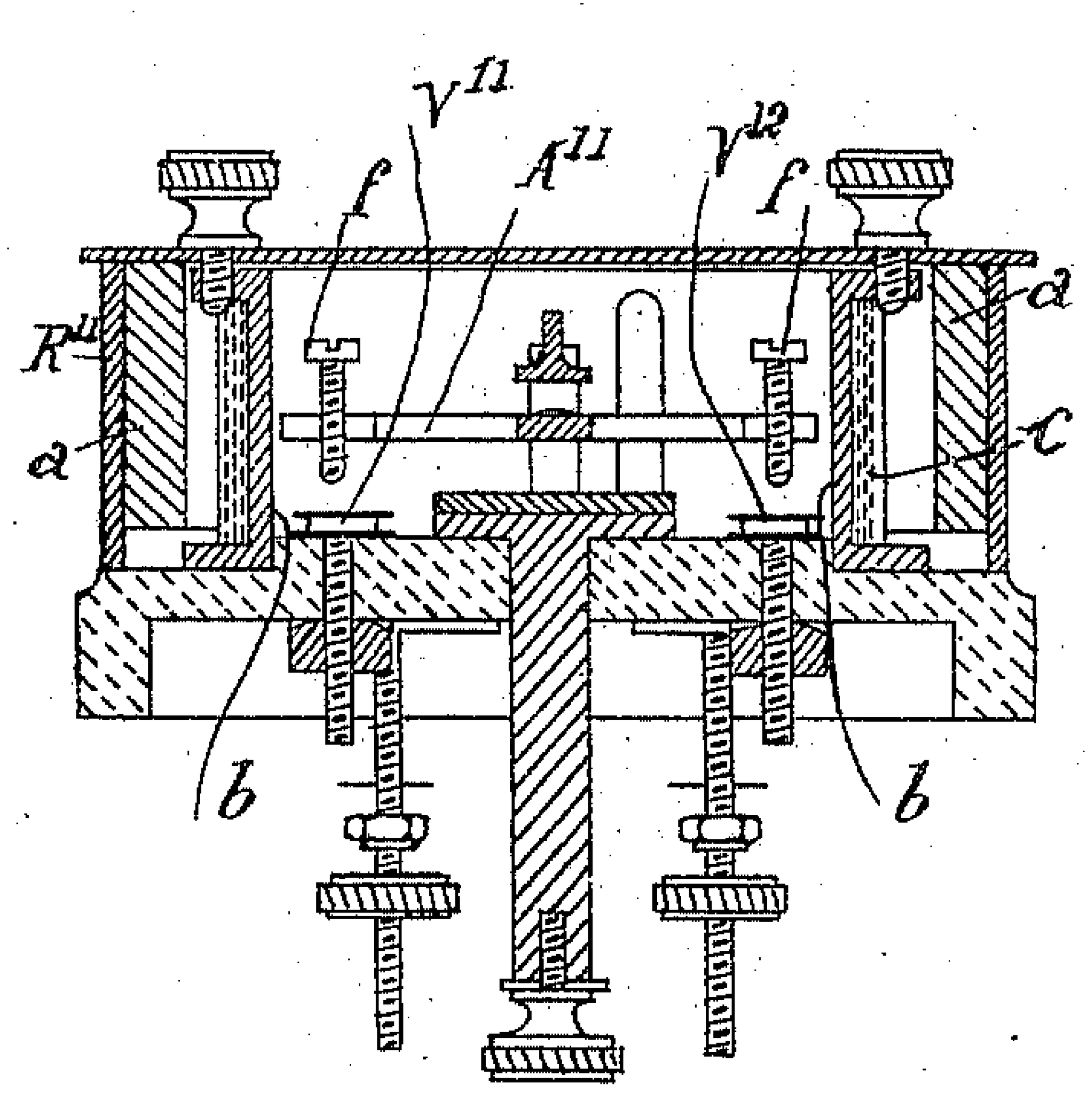
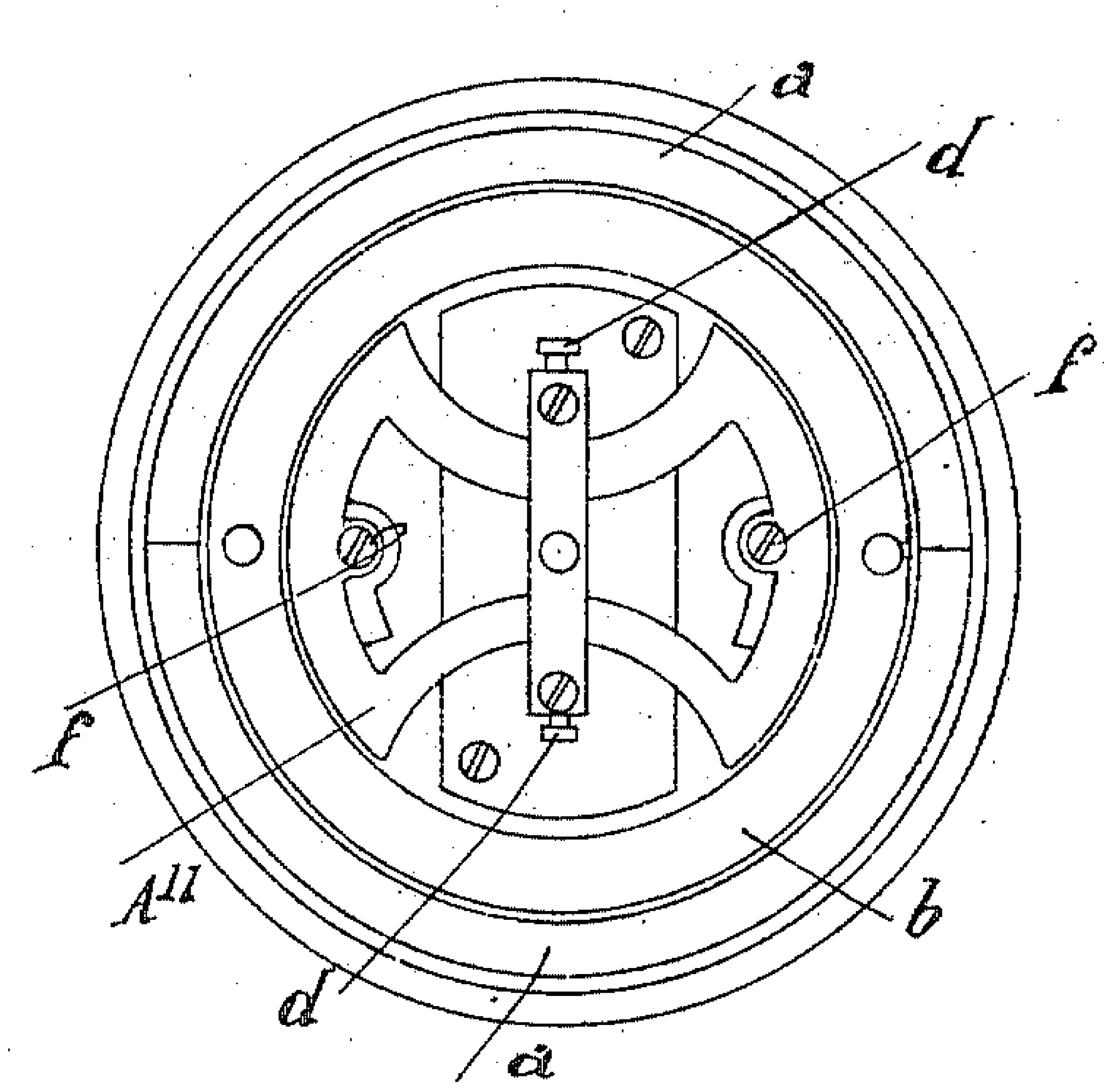


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BURGLAR AND FIRE ALARM.

950,853. Specification of Letters Patent. Patented Mar. 1, 1910.

Application filed October 7, 1907. Serial No. 396,219.

To all whom it may concern:

Be it known that I, Barthelemy Kohlen, subdirector of the telegraph service of Brussels, a subject of the Belgian King, and residing at Brussels, Belgium, have invented new and useful Improvements in or Relating to Burglar and Fire Alarms; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to an apparatus signaling burglary and fire, characterized by the piece of furniture, safe, wardrobe, cupboard, etc., being provided with a device comprising a normally open local circuit in which is arranged a bell or some other alarm device as well as a resistance coil the armature of which is normally attracted and which is switched into a circuit of a battery with a continuous current comprising an electromagnet with double winding, as well as another resistance coil, the armature of which is also attracted in the normal position. The battery, the electromagnet and this latter coil are inclosed in a box which is placed in any desired place and contains, moreover, an electrically controlled clockwork as well as a local circuit comprising a bell or some other alarm device for the purpose of notifying any attempt to steal or to burgle (or the beginning of a fire) by the disturbance of the equilibrium in the continuous current circuit, which disturbance renders operative one or the other of the alarm bells.

The accompanying drawing given by way of example, shows diagrammatically two methods of carrying out the present invention.

Figure 1 is a diagram of an installation with clockwork, Fig. 2 is a plan of a special galvanometer for this installation, Fig. 3 is a diagram of a simplified installation with a single battery and a single electromagnet, Fig. 4 is a section, and Fig. 5 a plan of a special galvanometer for this arrangement.

In the box M (shown dotted) of the apparatus Fig. 1, or at any desired place, is arranged a continuous current battery P^1, the positive terminal of which is connected by wire 1 to a resistance coil A^1 above which the said wire is continued up to a point E where it is divided into two branches 2 and 3 which form the windings of an electromagnet R^1. The wire 1 is also carried to the oscillating armature A of the said electromagnet on which is mounted a needle B with contact blade C arranged between two contact studs V^1 and V^2 connected by a wire 7 to an electromagnet D, the armature E^1 of which having the shape of an oscillating lever, is normally out of contact with the core of the coil D and carries two pawls L L^1 which, in the normal state, stop a clockwork K, one of the wheels G of which can establish an electric contact with the spring H when the clockwork is released.

The coil R^1 is secured between the branches of two magnets S N, and its armature A is held in equilibrium by the permanent passage of the current counteracting the influence of the lines of force of the said segments. At each disturbance of the said equilibrium the needle or hand B is deflected and brings its blade C into contact with one of the studs V^1 V^2: the circuit of the electromagnet D is then closed. The armature E^1 of the latter is then attracted and releases the clockwork which closes the circuit of the bell F by establishing contact between the parts G and H as long as the needle B remains deflected. On leaving the coil R^1, the wires 2, 3 are connected, the first to a resistance R^2 in the interior of the box M, and the second to the wire 3 of the main circuit passing through the piece of furniture W to be protected (shown dotted). In the interior of the latter is arranged a resistance coil R^3, say of 250 ohms, which maintains equilibrium with the resistance R^2, also of 250 ohms. The armature 1′ of the coil R^3 is normally attracted and connected to the local circuit comprising a battery P^3 and a bell J, and which it closes as soon as it is no longer attracted, that is to say, as soon as the equilibrium of the circuit of the battery P^1 is disturbed.

In the normal state, the current starting from the positive pole of the battery P^1 passes through the wire 1, the coil A^1, divides at E into two parts, one of which passes through the wire 2, coil R^1, resistance R^2 and the wire 6 for returning to the negative pole of the battery P^1 while the other one passes through the wire 3, also passes through the coil R^1, continues through the wire 3, passes through the coil R^3, wire 4, contact O, wire 5 and returns through the wires 5, 6 to the negative pole of the battery P^1. When owing to the equilibrium having been disturbed the armature A oscillates and deflects the needle B, the blade

C comes into contact with one of the studs V^1 V^2, the current passes then through the wire 7, coil D, wire 8 branching off from the wire 6 and returns through the latter to the negative pole of the battery P^1. Owing to the passage of the current through the coil D, the armature E^1 is attracted, the pawls L L^1 are released, and the wheel G rotates and comes into contact with the spring H. A second circuit is thus closed on the battery P^1 through the wire 9, spring H, wheel G, wire 10, bell F, wire 11 branching off from the wire 6 and through the latter back to the battery P^1. If now the circuit of the main battery P^1 is broken, the armature L^4 of the coil A^1 will no longer be attracted and will fall into contact with the wire 12 and close the break between wires 12 and 13 of a local battery P^2 the current from which passes then through the wires 12 and 11, bell F, wires 10 and 13 and returns through the latter to the battery P^2. At the same time, the armature 1′ of the resistance R^3 will no longer be attracted and will come again into contact with the wire 14 and close the circuit of a second local battery P^3, the current of which passes then through the armature 1′, wire 14, bell J and returns to the battery through the wire 15. If a contact is established between the wires 3 and 5 near the piece of furniture to be protected, as by the pivotally suspended circuit closer 5′ the equilibrium will be at once disturbed, and the bell F will give alarm as hereinbefore described, and at the same time, the armature 1′ will fall down and close the local circuit of the battery P^3, since the current no longer passes through the coil R^3. At the least disturbance of the equilibrium of the circuit of the battery P^1, or at the complete breaking of the said circuit, the two bells will, therefore, immediately raise alarm.

The use of a clockwork in the signaling apparatus of the construction hereinbefore described (based on the equality of resistance), enables the door of the safe or other piece of furniture containing the apparatus, to be opened during the day without it being necessary to put the apparatus each time into the position of rest. The continuous current is, therefore, continually passing day and night through the whole circuit, and if during the day an attempt were made to render the installation inoperative, either by replacing the real resistances by artificial resistances, or by cutting the wires, the installation would immediately give alarm, on the one hand, at the point at which is arranged the box M of the apparatus, and on the other hand at the point where is arranged the safe or other piece of furniture, or at any other desired point.

In the accompanying drawing, the wires 16 and 17 are two shunt wires from the wires 2 and 3 of the main circuit which can be connected by an ordinary contact button K^4, so as to control or check at any moment the working of the installation. In fact, as soon as the said contact is established, the resistances are switched out of circuit, and the relay R^1 works in the manner described.

The arrangement shown in Figs. 3, 4 and 5 of the accompanying drawing, is much simpler and comprises a special galvanometer R^{11} consisting of a permanent annular magnet *a* made of two parts forming two poles of contrary sign arranged diametrically opposite. This magnet incloses or surrounds a copper coil *b* provided with a double differential winding *c* which is thus situated between the ring *a* and the body *b* of the coil. In the interior of the latter is arranged a horizontal armature A^{11} capable of oscillating on two points *d d* and provided at each end with a screw *f*. These two screws or studs are above the contact studs V^{11} V^{12}. The galvanometer R^{11} with the balance beam A^{11} is connected by wires $1^{\times}$ 2′ to the single continuous current battery P^{11} of the installation, which battery can be arranged at any desired point, it is also connected by the wire 3′ to the resistance R^{13} arranged in the piece of furniture to be protected and balancing the resistance R^{12} arranged near the galvonometer R^{11}, and finally by the wire 4′ to the electromagnet A^{21}, the armature I of which is provided with a release device C^1 connected by the wire $5^{\times}$ to the conductor $1^{\times}$, of the battery P^{11}, and by the wire $5^{\times}$ to the bell $F^{\times}$. This arrangement, which involves the employment of two coils wound reversely to each other and each of which neutralizes the induction of the other also based on the equilibrium of the circuit of the single battery P^{11}, works in the following manner: In the normal state, the current passes from the positive pole of the battery P^{11} through the wire $1^{\times}$, wire 2′ of the galvanometer, resistance R^{12} and returns through the wire 2′ to the negative pole of the battery P^{11}. Another shunt (circuit) of this current passes through the wire 3′, resistance R^{13} and returns through the wire 2′ to the negative pole P^{11}. In that case the bell $F^{\times}$ remains silent. Let it be assumed now that the resistance R^{12} becomes greater than the resistance R^{13} which would become the case if the latter resistance were done away with, the wire 3′ cut or the terminals of the said resistance R^{13} connected. In that case the equilibrium of the circuit would be disturbed, the balance beam A^{11} of the galvanometer R^{11} would oscillate and establish contact between one of the studs *f* and one of the studs V^{11} or V^{12}. The current passes then from the positive pole of the battery P^{11} through the wires $1^{\times}$, 4′, the electromagnet A^{21}, the second wire 4′ and returns through the wire 2′ to the negative pole. The electromagnet thus attracts the armature I, and the release device C^1 falls down, so that a second current can pass from the battery P^{11} through the wires 1^x, 5^x, release device C^1, the second wire 5^x, bell F^x, wire 4′ and return to the battery P^{11} through the wire 2′. In that case the bell would work and give alarm.

For verifying the state of the installation, the latter is provided with a control button K^1 like that already described for the arrangement shown in Fig. 1. By pressing the said button, the wires 7′ are connected together, and the resistance R^{12} switched out of circuit. In that case the equilibrium is again disturbed. The said balance beam A^{11} oscillates, and the current passes from the battery P^{11} through the wires 1^x, 4′, electromagnet A^{21}, second wire 4′ and returns through the wire 2′ to the negative pole of the battery P^1. The electromagnet A^{21} attracts its armature, the release device C^1 falls down and closes a second circuit going from the battery P^{11} through the wires 1^x, 5^x release device C^1, second wire 5^x, bell F^x, wires 4′ and 2′ and returns to the battery P^1. The bell works and thus notifies the good state of the installation.

The special galvanometer R^{11} shown in Figs. 3, 4 and 5, can obviously be applied to the installation shown in Fig. 1 and the clockwork of the said installation can be combined with that of Fig. 3 without departing from the spirit of this invention.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent is:—

1. The combination of an electric circuit comprising a source of energy and branches, counteracting electro-magnetic devices arranged one in each branch, an armature normally held in a state of equilibrium by said devices, a signal mechanism controlled by said armature, resistance devices, one in each branch, normally balancing each other, and means operative to cut one of said resistance devices out of circuit, substantially as described.

2. The combination of an electric circuit comprising a source of energy and branches, counteracting electro-magnetic devices arranged one in each branch, an armature normally held in a state of equilibrium by said devices, resistance devices, one in each branch, normally balancing each other said armature being adapted to indicate the failure of balance between said resistance devices, an electro-magnetic alarm device, another source of electric energy, another circuit including said alarm device and the second energy source, said second circuit having a normal break therein, a circuit closer normally adapted to close said break, and a magnet in the main or first circuit controlling said circuit-closer, substantially as described.

3. The combination of an electric circuit comprising a source of electric energy and branches, counteracting electro-magnetic devices arranged one in each branch, an armature controlled by said devices, resistance devices, one in each branch, normally balancing each other, said armature being adapted to indicate the failure of balance between said resistance devices, another circuit, a source of energy and an electric-magnetic alarm device arranged in the second circuit, said second circuit having a break therein and one of said resistance devices being a magnet, and a circuit closer normally adapted to close said break and controlled by said last-named resistance device, substantially as described.

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

BARTHELEMY KOHLEN.

Witnesses:

CHARLES HOWOLD,
GREGORY PHELAN.