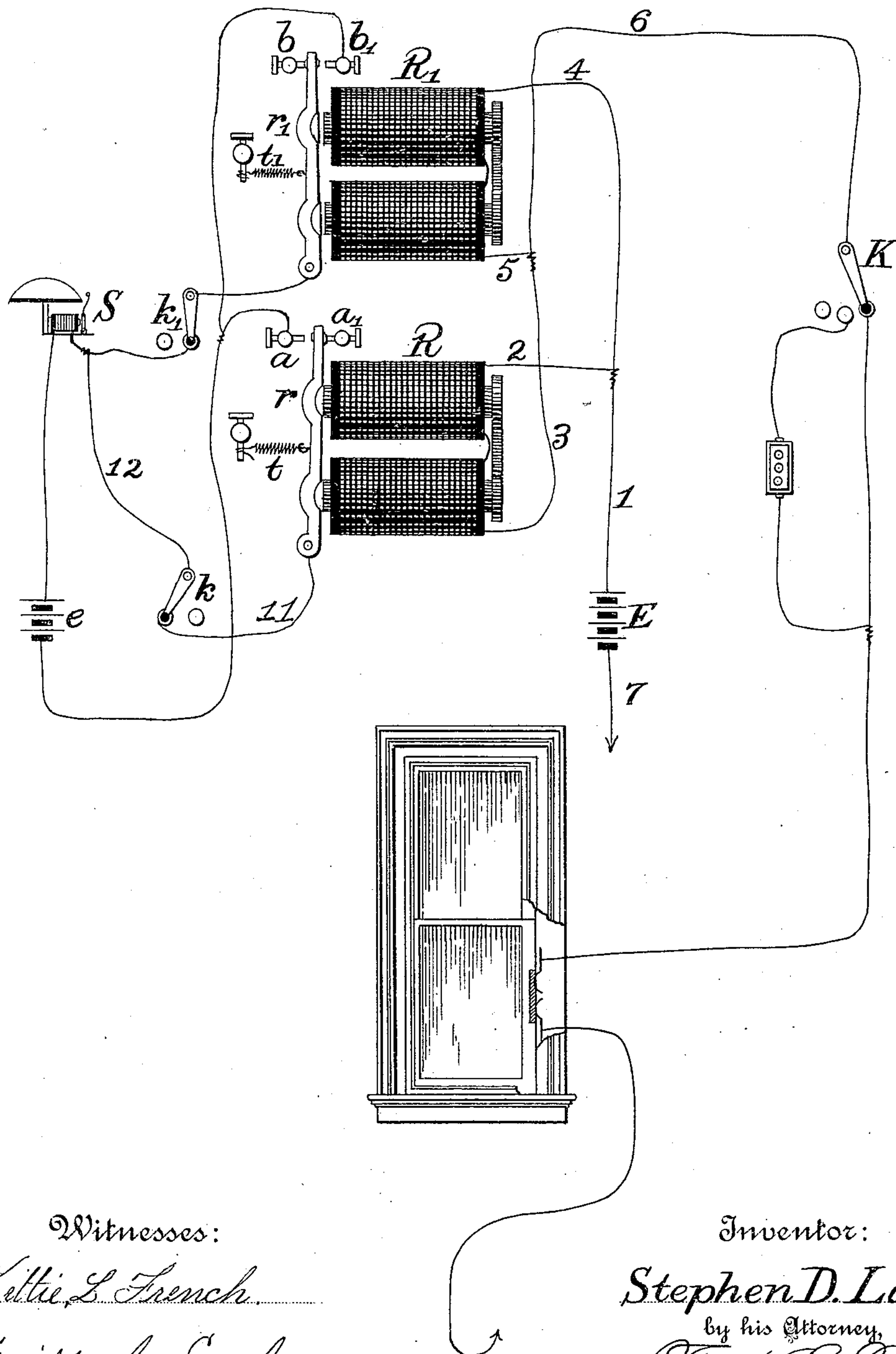


(No Model.)

S. D. LAKE.  
BURGLAR ALARM.

No. 253,070.

Patented Jan. 31, 1882.



Witnesses:

*Kittie L. French*

*Miller C. Earl*

Inventor:

*Stephen D. Lake,*

by his Attorney,

*Frank L. Pope*

# UNITED STATES PATENT OFFICE.

STEPHEN D. LAKE, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF ONE-HALF  
TO ASA W. DICKINSON, OF SAME PLACE.

## BURGLAR-ALARM.

SPECIFICATION forming part of Letters Patent No. 253,070, dated January 31, 1882.

Application filed December 10, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN D. LAKE, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Burglar-Alarms, of which the following is a specification.

My invention relates to certain improvements in the construction of apparatus employed in electric burglar-alarms, and in the arrangement of circuits therefor.

The object of the invention is to organize the apparatus and its connections in such a manner that an alarm shall be given whenever the conductor traversing the building to be protected is broken, short-circuited, or tampered with in any way, whereby its electrical resistance is materially altered.

To this end my invention comprises a main battery having two electro-magnets or relays included in multiple arc therewith, each provided with an armature and circuit-closer, so adjusted with reference to each other by retracting-springs that the magnetism induced in one of the magnets by the current traversing its coils shall be just sufficient to overcome the retractile force exerted upon its armature, while the magnetism simultaneously induced in the other shall not be sufficient to counteract the retractile force of its armature.

My invention further consists in the combination, with the above-described apparatus, of a local battery, two branch circuits, each including one of the circuit-closing levers, and a signal or alarm apparatus so arranged as to be set in action whenever a circuit is closed through either of the armatures and its contact-stop by the interruption or change in the resistance of the house-circuit.

In the accompanying drawing, I have shown an arrangement of circuits embodying the features of my invention.

E represents a main battery, one pole of which is connected with a main-line wire, 1, which traverses the house or building to be protected, being connected with the doors, windows, safes, vaults, and other exposed points in a well-known manner, returning to the other pole of the battery through the wire 7.

R and R' represent two relays, arranged in multiple arc in the main line between the points

1 and 6. The electro-magnet R is provided with an armature mounted upon an armature-lever, *r*, playing between the two stops *a a'*. Of these the front stop, *a'*, is provided with a point of insulating material, against which the lever *r* rests when in its normal position. The electro-magnet R' is similarly provided with a lever, *r'*, playing between the two stops *b b'*, and the stop *b* is insulated from its lever in the same manner as the stop *a'*. The resistance of the circuits 2 3 and 4 5, including their respective magnets R and R', is made approximately equal, in order that the currents traversing them from the battery E may likewise be equal. A switch, K, is included in the line 6, for convenience in testing the condition of the connections and of the adjustment, and for placing the battery E upon an open circuit whenever required.

Each of the armature-levers *r r'* is provided with an adjustable retractile spring, *t t'*, for regulating the amount of mechanical resistance to be overcome by the attractive force of the electro-magnet. The circuit of the battery E is normally closed, and the tension of the spring *t* is so adjusted that the armature-lever *r* shall be permitted to be drawn toward the magnet R and to rest against the stop *a'* by the action of the current traversing the coils of this magnet. The tension of the other spring, *t'*, is such that the normal current traversing the electro-magnet R' shall be not quite sufficient to attract the armature *r'*, which therefore remains in its normal position against the rear stop, *b*. The armature-levers *r* and *r'* are included in multiple arc in the circuit of a local battery, *e*, and an alarm-bell or other suitable signaling apparatus, S, is included in the same circuit.

The circuit-connections extend from one pole of the battery through the signaling apparatus to the levers *r* and *r'*, and from the other pole of the battery to the stops *a* and *b'*.

Each of the branch circuits, which include the armature-levers *r r'* is provided with a switch, as shown at *k* and *k'*, respectively, for disconnecting the lines when desired. The battery *e* is normally upon an open circuit; but this circuit will be closed through the lever *r* and its contact-stop *a* whenever the main line becomes disconnected or its resistance is in-



creased, and through the lever  $r'$  and its contact-stop  $b'$  whenever the main-line resistance is decreased and the armature-lever  $r'$  consequently attracted toward the magnet  $R'$  and against this stop.

In case an attempt is made to insert a shunt-circuit for cutting out the main line traversing the building to be protected, thus causing a change of resistance therein, or in case the wire is severed, causing an interruption of the circuit, one or the other of the relays will be actuated, thus causing the circuit of the battery  $e$  to be closed and an alarm to be given from the signaling apparatus  $S$ . By including the relays  $R$  and  $R'$  in multiple arc the resistance offered to the battery  $E$  is reduced, and a battery of considerably less electro-motive force may be employed than would be required were the magnets connected in series.

The switch  $k$  is employed for disconnecting the line 11 12, in order that the signaling apparatus may be cut out of circuit during the day or at other times when the alarm is not required for protection. It is evident that when the line 11 12 is disconnected no alarm will be sounded by the breaking of the house-circuit and the consequent retraction of the armature  $r$  against its contact-stop  $a$ , since the circuit will still be incomplete. When it is desired to set the alarm the switch  $k$  is closed. In case the house-circuit should be through inadvertence or design left open or disconnected—as, for instance, at switch  $K$ —the lever  $r$  being still in contact through the signaling apparatus, the alarm will be actuated. A switch,  $k'$ , is similarly included in the circuit of the lever  $r'$ , to provide against an alarm being given on account of a decrease of resistance in the main circuit, or an increase in the strength of the battery at times when its protection is not required.

Suitable circuit-breakers of well-known construction are applied to the windows or doors of the buildings, safes, &c., to be protected, and are included in the main or house line 6 7. Suitable artificial resistances may also be included in the main line, when required, for the

purpose of adjusting the relays  $R$  and  $R'$ . These artificial resistances may be employed either to measure the additional resistance required in the main line to cause the armature-lever  $r$  to fall back from the stop  $a'$ , or to add a sufficient resistance to balance the main line when for any reason it is desired to cut out a portion of the same or to otherwise reduce the resistance thereof.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of a main battery, a main circuit, two relays included in said main circuit, a local battery, a local circuit having two branches connected respectively to the front contact-stop of one of said relays and the rear contact-stop of the other, and a signaling or alarm apparatus.

2. The combination, substantially as hereinbefore set forth, of a main battery, a main circuit, two relays included in said main circuit, a local battery, a local circuit having two branches connected respectively to the front contact-stop of one of said relays and the rear contact-stop of the other, a signaling or alarm apparatus, and a switch adapted to open or close said branch circuits.

3. The combination, substantially as hereinbefore set forth, of a main line, a main battery, two relays having their respective electro-magnets included in multiple arc with said battery and their circuit-breaking armature-levers respectively included in two branches of a local circuit, a local battery, means for adjusting the retractile force exerted upon said armature-levers, and contact-stops for closing the local circuit through a signaling apparatus by the movement of either of said armature-levers.

In testimony whereof I have hereunto subscribed my name this 8th day of December, A. D. 1881.

STEPHEN D. LAKE.

Witnesses:

CHARLES A. TERRY,  
MILLER C. EARL.