(No Model.)

H. E. JACOBS.

AUTOMATIC FIRE ALARM.

No. 431,979. Patented July 8, 1890.

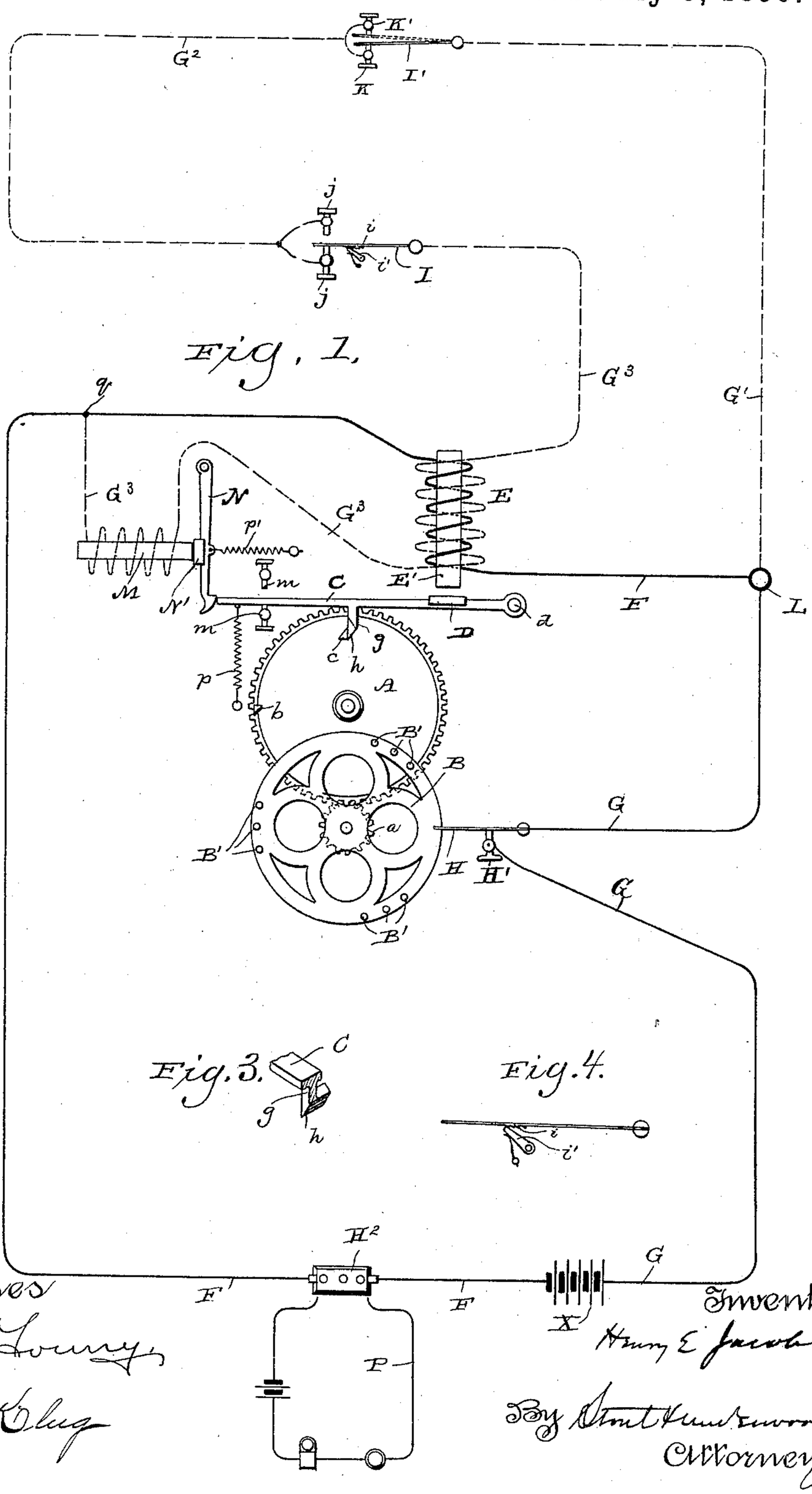

Fig. 1.

Fig. 2.

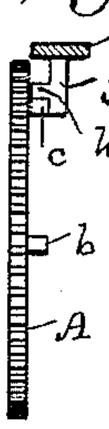

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

HENRY E. JACOBS, OF MILWAUKEE, WISCONSIN.

AUTOMATIC FIRE-ALARM.

SPECIFICATION forming part of Letters Patent No. 431,979, dated July 8, 1890.

Application filed August 2, 1889. Renewed June 17, 1890. Serial No. 355,700. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. JACOBS, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Automatic Fire-Alarms; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to electric fire-alarms, and will be fully described hereinafter.

In the drawings, Figure 1 is a view of my invention in diagram. Figs. 2, 3, and 4 are details.

A is a pinion, that is driven by any suitable motor, and B is a break-wheel, which has cog-teeth *a* on its hub, that mesh with like teeth on pinion A, and break-pins B′ B′, arranged in series on its outer face, and on its face adjacent to break-wheel B the pinion A is provided with two triangular projections *b* and *c*, one of which *b* is nearer the periphery of the pinion than the other *c*.

A lever C is pivoted at *d* to a suitable support on the box, (not shown,) and carries the armature D of a differentially-wound electro-magnet E, and is also provided with a lug *g*, that, projecting downward, has a beveled finger *h* projecting from it at right angles, and the face of this finger *h* is designed for engagement with lug *c* when core E′ of magnet E is de-energized and lever C is in the position shown in Fig. 1 or to engage with lug *b* when the core is energized and the lever C is lifted.

Wires F and G form what I call the "main circuit" of my apparatus, wire F starting from battery X and passing through relay H^2 to a core E′ of a magnet E, about which it forms a helix, and then to binding-post L, and wire G starting from battery X and joining wire F at binding-post L. A make-and-break spring H and binding-post H′ are interposed between two sections of wire G, and the free end of this spring lies in the path of the break-pins B, so that when the wheel B revolves these pins will make and break the circuit successively and cause the bell in local circuit P to sound a corresponding number of strokes.

The line F is tapped at *q* by a wire G^3, and this wire, after being wound about a core M, is carried on to core E′ and wound over the helix formed by wire F in an opposite direction thereto, and thence passes to a thermostat I, one end of which projects between posts *j* *j*′, which are connected by a wire G^2 with another set of posts K K′, between which projects the free end of the thermostat I′, which is connected by a wire G′ with the binding-post L, and may include other thermostatic connections.

A swinging lever N carries the armature N′ of core M, and the lower end of this lever is hooked or offset, as shown, that it may, when core E′ is energized and lever C is lifted, engage the end of said lever C and support it in position to be out of the path of lug *c*.

m *m* are limiting-pins for the lever C. *p* is a spring for retracting lever C, and *p*′ a like spring for retracting lever N.

The operation of my device is as follows: When the parts are in the position shown in Fig. 1, as there are two currents passing around core E′, which neutralize each other, the core is practically demagnetized, and the armature D and lever C are drawn away from it by spring *p*, and the lug *g* lies in front of lug *c* on the pinion A to prevent the latter from revolving. Now if by a slight rise of temperature above normal the thermostat I (or I′) be warped away from its lower contact-post, or a break from any cause occurs in loop G′ G^2 G^3, the wire G^3 will be cut out, destroying the neutrality in the helices of core E′, which, becoming energized, will lift armature D and lever C, and as core M is also demagnetized by the cutting out of wire G^3 the lever N will be released, and as it is drawn away from core M its lower hooked end will engage lever C in its raised position, so that the finger *h* of lug *g* will be out of the path of lug *c* and in the path of lug *b* of pinion A. Just as soon as lug *c* is released the pinion A will start and make a quarter-revolution, when lug *b*, coming in contact with finger *h* of lug *g*, will stop the pinion; but during this quarter-revolution of pinion A it will, through the teeth *a* on the hub of the wheel B, revolve the latter once, causing the pins B′ to make (in this instance) nine successive breaks in the loop F G by depressing and releasing spring H. Now if there is not a sufficient

rise in temperature to cause the thermostat effected to make connection with the other post, this signal, which merely means danger or a broken line, will be all that is sent in; but if upper contact is made then the cutting in of loop G′ G^2 G^3 will energize core M, which by attracting armature N will cause it to release lever C, which as core E′ is de-energized will drop and permit the lug *b* to pass over finger *h* of lug *g*, thus releasing pinion A and permitting it to complete its revolution and in so doing revolve the wheel B three times. This gives the alarm 3 3 3 three times and indicates fire.

To prevent the re-establishment of contact between the thermostat I (or I′) with its lower post after it has once been broken and before the apparatus is readjusted, I may provide any convenient means. For instance, as shown in Fig. 4, I may provide the under side of the thermostat bar I (or I′) with rack-teeth *i*, which as the bar rises will be engaged by a spring-pawl *i′*, which pawl will support the bar in any position it may rise to until it is disengaged by hand.

It is obvious that simple switches may be used instead of thermostats without departing from the spirit of my invention.

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

1. The combination, with a signal-motor, of a main circuit and a branch circuit, a magnet wound differentially by the wires of the two circuits and another magnet in the branch circuit, a lever controlled by the differential magnet, and a detent for said lever, controlled by the magnet in the branch circuit, and connections between the lever aforesaid and the motor and thermostats, as set forth.

2. The combination of normally-closed main and branch circuits, a magnet wound differentially by the wires of said two circuits, another magnet in the branch circuit, armatures for said magnets, a signal-motor controlled by the magnets and switches in the branch circuits, and connections, substantially as described, whereby the first-named magnet is energized and the other magnet de-energized by a break in the branch circuit, substantially as set forth.

3. The combination of normally-closed main and branch circuits, a magnet wound differentially by the wires of the said two circuits, another magnet in the branch circuit, a signal-motor, a lever carrying an armature actuated by the differential magnet to start said motor when said magnet is energized by a break in the branch circuit and the other magnet thereby de-energized, and a lever provided with a detent for said first-named lever and carrying an armature actuated by the magnet in the branch circuit when said magnet is re-energized by the reclosing of said branch circuit, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

HENRY E. JACOBS.

Witnesses:
S. S. STOUT,
H. G. UNDERWOOD.