

(No Model.)

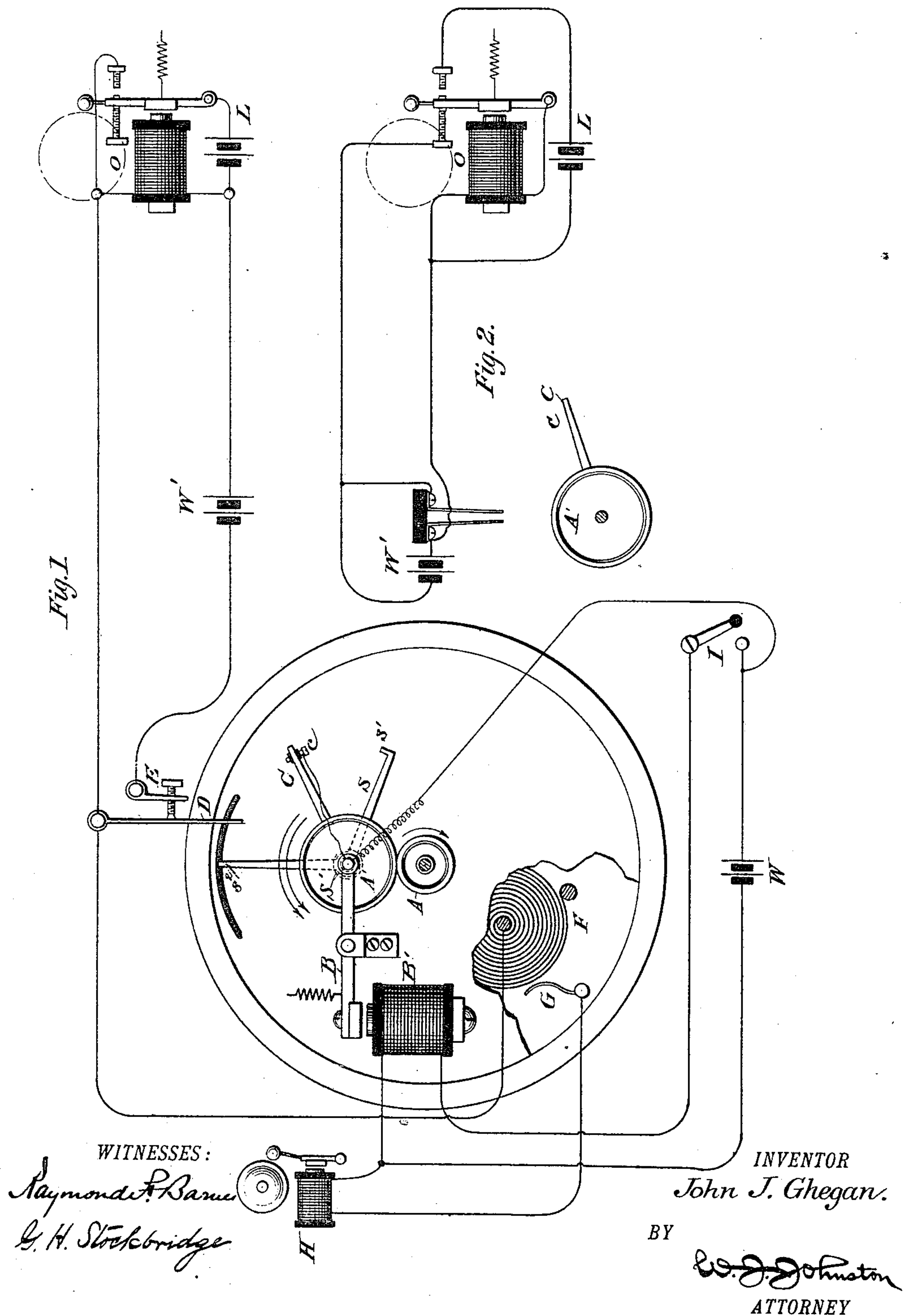
2 Sheets—Sheet 1.

J. J. GHEGAN.

AUTOMATIC ELECTRIC DANGER ALARM.

No. 362,739.

Patented May 10, 1887.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

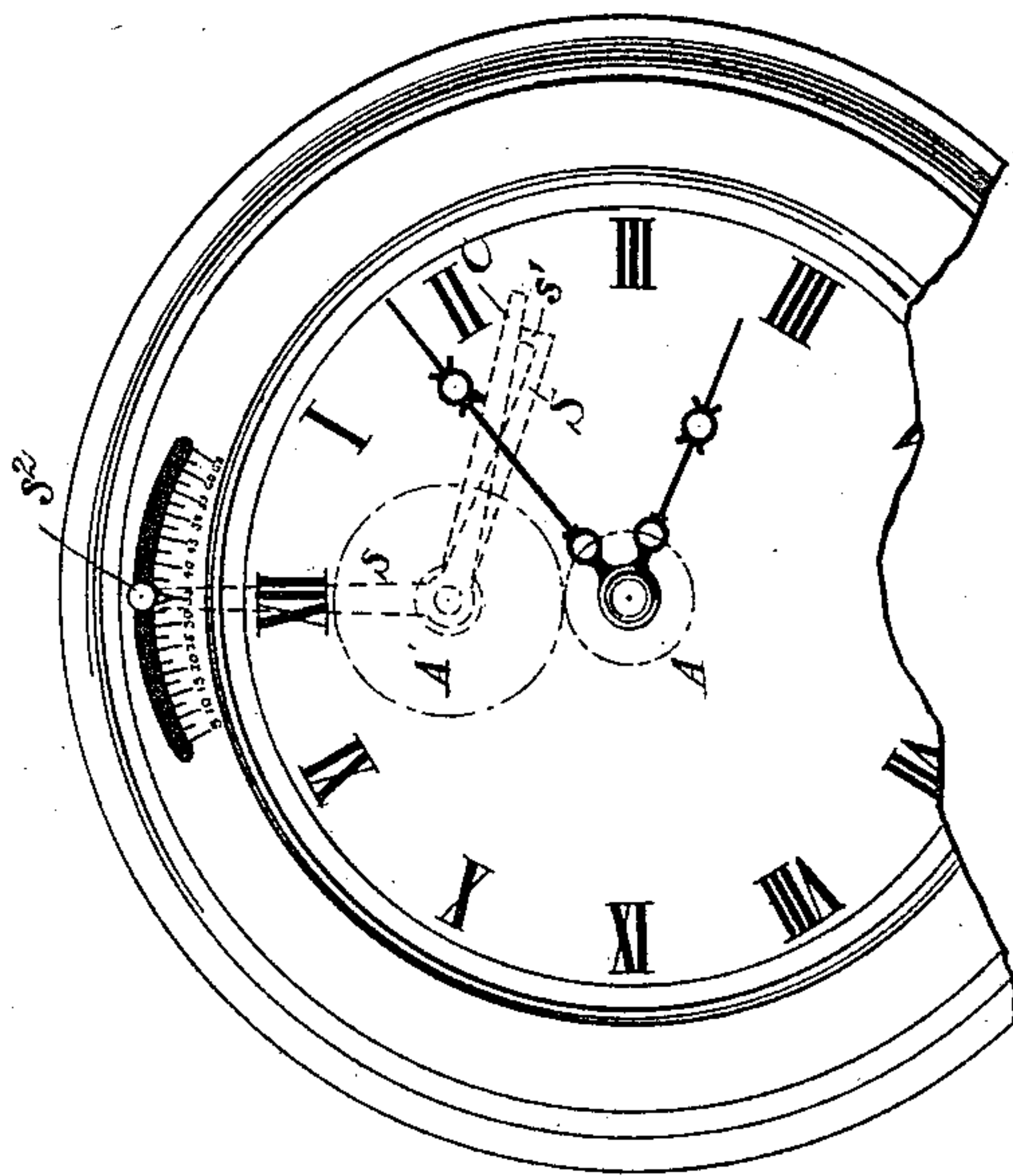
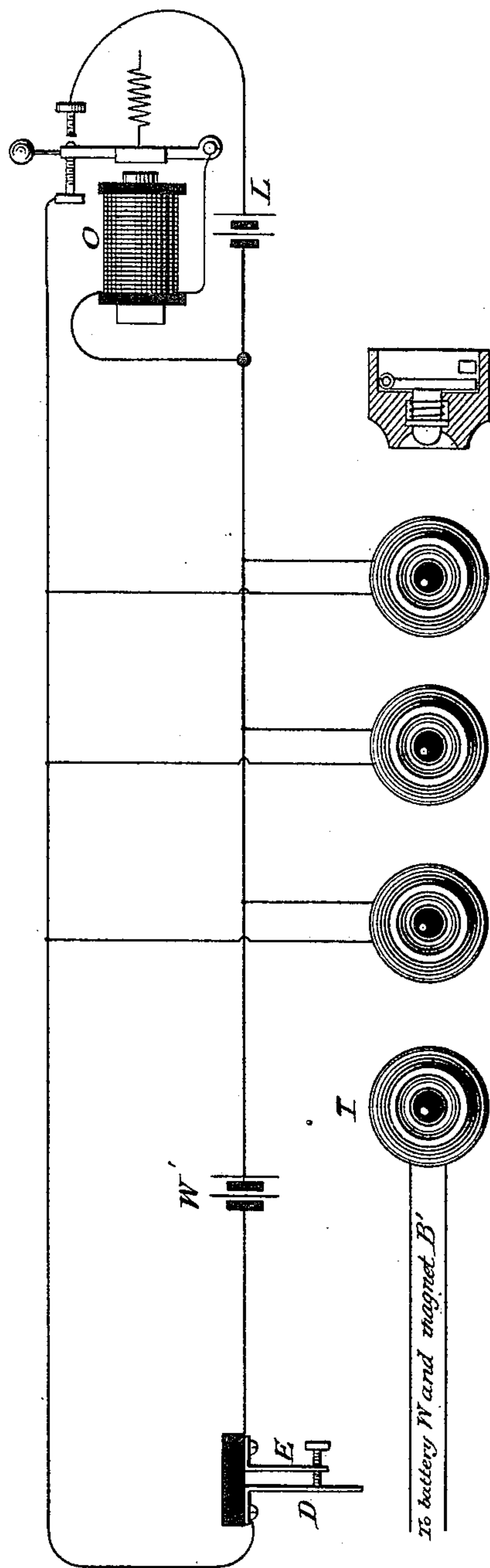


Fig. 4.

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AUTOMATIC ELECTRIC DANGER-ALARM.

SPECIFICATION forming part of Letters Patent No. 362,739, dated May 10, 1887.

Application filed November 24, 1886. Serial No. 219,777. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. GHEGAN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Automatic Electric Danger-Alarms or Watchmen's Time-Detectors; and I do hereby declare that the following is a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is especially designed for the protection of express-agents on railway-cars, or watchmen in banks or other places of responsibility, although it may be applied to service as a watchman's time-detector, to indicate whether a watchman, whose duty it is to make a record of his movements from time to time, has faithfully performed his duties.

The general scheme of my invention is to provide automatic means for sounding an alarm or danger-signal, unless the operation of the said means is interrupted by the action of the watchman or other person to be protected by my invention.

The sounding of the alarm is designed to indicate either that the watchman is negligent of his duties or that he is in danger and unable to prevent the sounding of the signal as it is required of him to do. If, however, the watchman is free from constraint and operates the device for preventing the alarm-signal, the absence of such a signal will indicate that there is no danger and that the official concerned is faithfully performing his trust.

The apparatus in which I have embodied my invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a diagram of the circuits and a part of the apparatus in detail. Fig. 2 shows a modification of the means for operating the alarm-circuit. Fig. 3 shows in detail switch devices connected up in the alarm-circuit. Fig. 4 is a detail view.

Referring to the drawings by letter, A is a friction wheel or pinion, secured to one of the shafts of the clock-work, preferably the shaft of the minute-hand. The wheel A is located behind the clock-case, and the details of the clock-work are not shown, it being thought

unnecessary to illustrate them. The view shows the parts in the position in which they would appear if seen from the front of the case. In contact with the said friction-wheel, or engaging with it, if it is made in the form of a pinion, is a wheel or pinion, A'. I have shown the wheels A and A' in contact with each other and adapted to act upon each other by friction. For that reason I shall hereinafter call them "wheels" or "friction-wheels," although I desire it to be understood that they may be engaging pinions, and may co-operate with each other after the manner of ordinary gear-wheels.

The wheel A' is pivoted to the outer end of the armature B of a magnet, B'. The said magnet is in the normally-open circuit of a battery, W, which circuit includes a switch-circuit closer, I, by means of which it may be closed by hand.

Ordinarily the armature is away from the poles of its magnet and the wheel A' is in operative connection with the wheel A. When, however, the magnet B' is energized, the wheel A' is lifted out of contact or engagement with the wheel A, for a purpose that will be explained hereinafter.

The clock-work is so connected with the shaft of wheel A as to cause it to rotate in the direction of the single arrow. As a consequence the wheel A' rotates in the direction indicated by the double arrow and carries with it an arm, C, attached thereto. On the arm C is secured an insulated metallic pin, c, which is connected by a coil of wire with a branch or derived circuit of the battery W, as shown.

In the path of movement of the arm C is located a spring terminal, D, which is normally in contact with a corresponding spring terminal, E. These springs form part of the circuit of a battery, W', which circuit includes an electro-magnetic bell, O. The circuit W' is normally closed and the armature of the bell O is normally on its front stop. In circuit with the same bell, O, and with its armature and back stop is a local battery, L. The rupture of the circuit of battery W', which I call the "alarm-circuit," releases the armature of the magnet O and allows it to fall upon its back stop, thus throwing it under the influence of the battery L and causing a vibratory move-

ment of the armature in a manner well understood.

When the pin *c* in its motion comes in contact with the spring *D* its tendency is to rupture the alarm-circuit between *D* and *E*; but this tendency is resisted for a time by the elasticity of the said spring and by the fact that the spring *E* follows the spring *D* for a little distance. If, however, the pressure is continued long enough and the wheel *A'* allowed to continue its rotation, a rupture will soon take place at the point indicated and the alarm will be sounded.

The derived circuit of battery *W*, already referred to as including the stop *c*, also includes a tap-bell, *H*, a spring, *G*, and the hair-spring *F* of the clock-work, as well as the spring *D* itself. When, therefore, contact is made between *c* and *D*, this derived circuit is completed, assuming of course that the hair-spring *F* is in contact with the spring *G*.

As a matter of fact, the hair-spring is so arranged as to make contact with the said spring at every complete pulsation or vibration. The result will be that so long as *c* and *D* are in contact there will be successive taps upon the bell caused by a closure of the circuit between *F* and *G* at every pulsation of the hair-spring.

The sounding of the tap-bell *H* is an indication to a listener that the alarm-circuit is about to be broken unless measures are taken to prevent it. If, now, an operator actuates the switch *I* and closes the circuit of the magnet *B'*, the armature *B* will be attracted, the wheel *A'* will be lifted out of contact or engagement with the wheel *A*, and under the influence of a spring (not shown) or gravity the wheel *A'* will be restored to its original position and the alarm-circuit will remain unbroken.

The switch *I* and the tap-bell are both located in the same apartment with the person to be protected. As soon as he hears a sound of the tap-bell it is his duty at once to connect the switch *I* and restore the apparatus, as above described.

By regulating the distance to which the wheel *A'* shall fall back at each restoration, I can predetermine the intervals at which the watchman shall be required to operate the switch. In practice I have a detent-lever, *S*, pivoted upon a suitable post, *s*, the said lever being bent at one end to form a detent, *s'*, in the path of the arm *C*. This detent-arm can be swung upon its pivot, so as to bring the detent *s'* to any desired point in the range of motion of the arm *C*. The nearer this end is adjusted to the spring *D* the shorter will be the distance traversed by the arm *C* in its return, and the shorter will be the time required to pass into contact again with the said spring. I propose to bend the other end, *s''*, of the lever *S*, and let it pass through to the front of the clock-work and there serve as an indicating-finger, to designate, in connection with a scale shown in Fig. 4, the number of minutes elapsing between any two successive contacts

between *c* and *D*. It can of course easily be arranged so that, for example, when the pointer stands at 10, that shall indicate the number of minutes forming the interval. The number of minutes at which the pointer is set will vary with different kinds of service or in accordance with personal preferences.

If the apparatus is set up in an express car and the pointer is set at 10, no more than ten minutes will ever elapse without notice being given on the alarm-bell *O*, which is located on the engine or at any other suitable part of the train, unless the express-agent himself prevents such a signal from being sounded, in the manner already described. If, therefore, he is under constraint, or is disabled in any way, in a very few minutes a danger-signal will be heard by parties interested in his safety, and measures can be taken to relieve or rescue him.

The clock-work will ordinarily be located, with the bell *H* and the switch *I*, at the point where the watchman is stationed. This, however, is not a matter of necessity. The clock-work may be located, with the bell *O*, on the locomotive, or at any other station where the alarm-signal is received.

In Fig. 2 I have illustrated a different means for operating the alarm-circuit. In this case the springs *D* and *E* are apart and are located between the battery *W'* and the bell *O*, one being connected with one pole of the battery and the other with the other. The arrangement is such that the arm *C* will press the two springs into contact after a short time, and by short-circuiting the battery will cause the alarm to be sounded as before. To avoid the short-circuiting of the battery *L*, also, I alter the battery-connections of both batteries by connecting the circuit of battery *W'* through the magnet *O* with the armature and its front stop, and connecting the circuit of battery *L* through the magnet with the armature and its back stop. As soon as the armature is released by the breaking of the alarm-circuit, the circuit of battery *L* is closed through the magnet. If the connections remained the same as those shown in Fig. 1, then when the battery *W'* was short-circuited by contact between springs *D* and *E* a short circuit would also be formed through the said springs for the battery *L*, and the bell would fail to operate. If the springs *D* and *E* are separated after being closed, the circuit of battery *W'* will be restored to operative connection with the magnet *O* by reason of the closing of the said circuit between the front stop and the armature, due to the vibration of the latter by the battery *L*. When the closure at that point takes place the current of battery *W'* will cause the armature to remain attracted and cut out the battery *L*.

I have thus far, for the sake of clearness, described the part *I* as a simple switch. In practice I prefer to have a series of push-buttons arranged, as shown in Fig. 3, in such a manner that one of them is connected, like the switch *I* of Fig. 1, with the circuit of battery *W* and magnet *B'*, while the others are all con-

5 nected on open circuit with the two poles of the battery W' between the said battery and the bell O. The push-buttons do not operate in the usual way directly upon contacts, but through the medium of switches similar to the ordinary switches, which, when once contact is made, need to be restored by some positive action into place. The button connected with the circuit of battery W operates in the usual way.

10 The object of this construction is to prevent a robber or other person harboring evil designs from operating the magnet B', and so preventing the possibility of an alarm being sounded. Such a person, endeavoring to restore the apparatus through the push-buttons, will be liable to operate one of those connected with the alarm-circuit, and not only defeat his own object, but also hasten the sounding of the alarm which he desired to obstruct. With this arrangement, also, the watchman himself, on the approach of danger, can actuate one of the buttons connected with the alarm-circuit and sound the alarm-bell without waiting for the clock to do its work.

25 It might be supposed that when my device was applied to use as a watchman's time-detector, a watchman might permanently close the switch I, and so prevent all danger of the alarm-signal not being sounded, by lifting the wheel A' out of contact or engagement with A, through the medium of the electro-magnet B'. To prevent this I use for my battery W an ordinary Leclanché or other open-circuit battery, which on closed circuit will run down in a short time. It is obvious that such an attempt on the part of the watchman would be detected as soon as the battery W was exhausted. The use of this battery furnishes a safeguard against the misuse of my apparatus by the watchman himself, and the arrangement of the series of circuit-closers also renders it extremely improbable that a person not acquainted with the working of the apparatus could take advantage of it to secure his ends.

45 I prefer to have the alarm-circuit a normally-closed circuit, so that any person tampering with it, as by the cutting of the wires, will be detected. It will be understood, however, that a normally-open circuit can be employed, and that the arm C in its movement may be made to close the said circuit. So, also, the push-buttons may be made to act in a manner the reverse of that described above.

55 While in Fig. 1 I have represented the apparatus connected with the clock-work as it would appear if viewed from the front of the clock, yet I have for the sake of clearness shown the parts in full lines. Moreover, for the same reason, the post s and the lever S have been represented as located beyond the wheel A', although in fact they are located nearer to an observer from the front of the clock than the said wheel. Other minor variations from the normal appearance and rela-

tion of the parts it is thought unnecessary to mention.

In place of employing a tap-bell, H, in the derived circuit of battery W, I might use a vibrator bell and put the spring G into permanent connection with some metallic part of the clock-work; or the bell-magnet might be connected by a wire with the spring D.

Having now described my invention, what I claim is—

1. The combination, with a circuit-controlling device and a motor for operating it, of an alarm-circuit terminal located in the path of the circuit-controller and adapted to be moved by a continued pressure thereon into or out of contact with a corresponding terminal, and independent means for resetting the circuit-controller, the said means consisting of an electro-magnet in an electric circuit and a circuit-controller for the said circuit, the latter being continuous from the battery through the electro-magnet to each terminal of the last-named circuit-controller, as set forth.

2. The combination, with a circuit-controller and a motor for operating it, of co-operating circuit-changing devices adapted to be moved after a predetermined time by a continued contact with the circuit-controller, and independent means, capable of being operated at any time, for resetting the circuit-controller before the contact becomes effective.

3. The combination, with a circuit-terminal forming part of two electric circuits, of a moving circuit-controller adapted to operate one circuit by simple contact with the said terminal and the other after a predetermined time by moving the terminal so as to change its relation to a corresponding terminal, as set forth.

4. The combination, with an automatic circuit-controller adapted to change the condition of an electric circuit at the expiration of a predetermined time, of means for resetting the circuit-closer before the end of that time and an adjustable detent for limiting the return of the circuit-closer, as set forth.

5. In a system for the protection of watchmen, the combination, with an alarm-circuit and a separate circuit containing a tap-bell, of a spring forming a terminal of both circuits, a moving circuit-controller in whose path the spring is located, and means for resetting the circuit-closer, the tap-bell circuit being sounded as soon as contact is made between the spring and circuit-controller, but the alarm-circuit being operated only after a continued pressure of the circuit-controller on the spring, whereby the tap-bell is first sounded to warn the watchman and he is given an opportunity to reset the mechanism before the alarm-circuit is operated, as set forth.

6. The combination, with an alarm-circuit, a circuit-controlling device therefor, a motor for operating the said circuit-controller, and means for resetting the latter, of a series of

circuit-controllers, similar in appearance, all but one of which are operatively connected with the alarm-circuit, and the other of which is operatively connected with the resetting device, as and for the purpose set forth.

5 7. In an electric-alarm apparatus, the combination, with an electro-magnet, of two batteries, one connected through the said magnet with the armature and its front stop, and
10 the other connected through the said magnet

with the armature and its back stop, as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN J. GHEGAN.

Witnesses:

GEORGE H. STOCKBRIDGE,
CHAS. A. SAAL.