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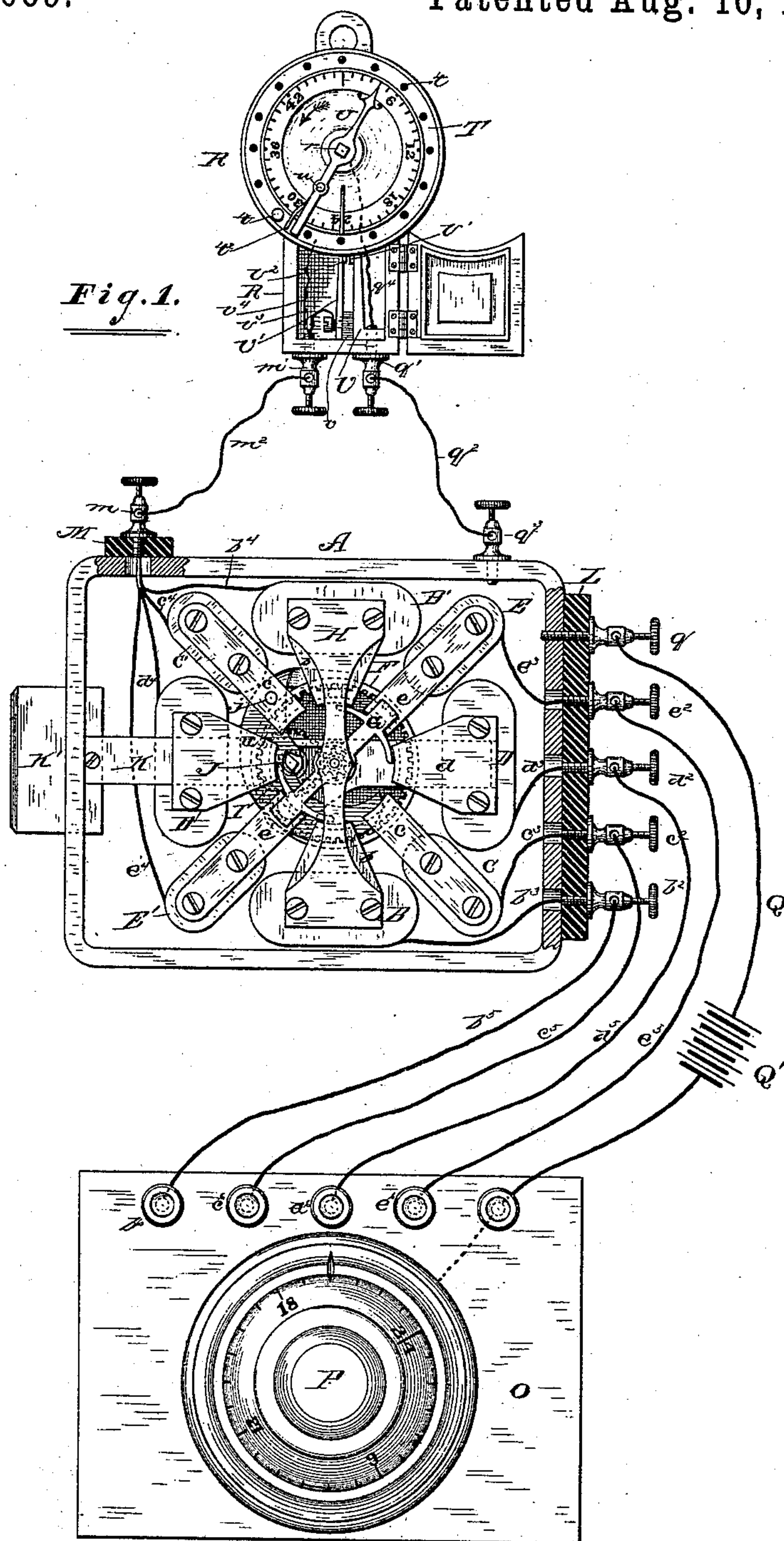
3 Sheets—Sheet 1.

F. SEDGWICK.

ELECTRO MAGNETIC TIME LOCK.

No. 347,069.

Patented Aug. 10, 1886.



Witnesses:
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Hubert Bruce.

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3 Sheets—Sheet 2.

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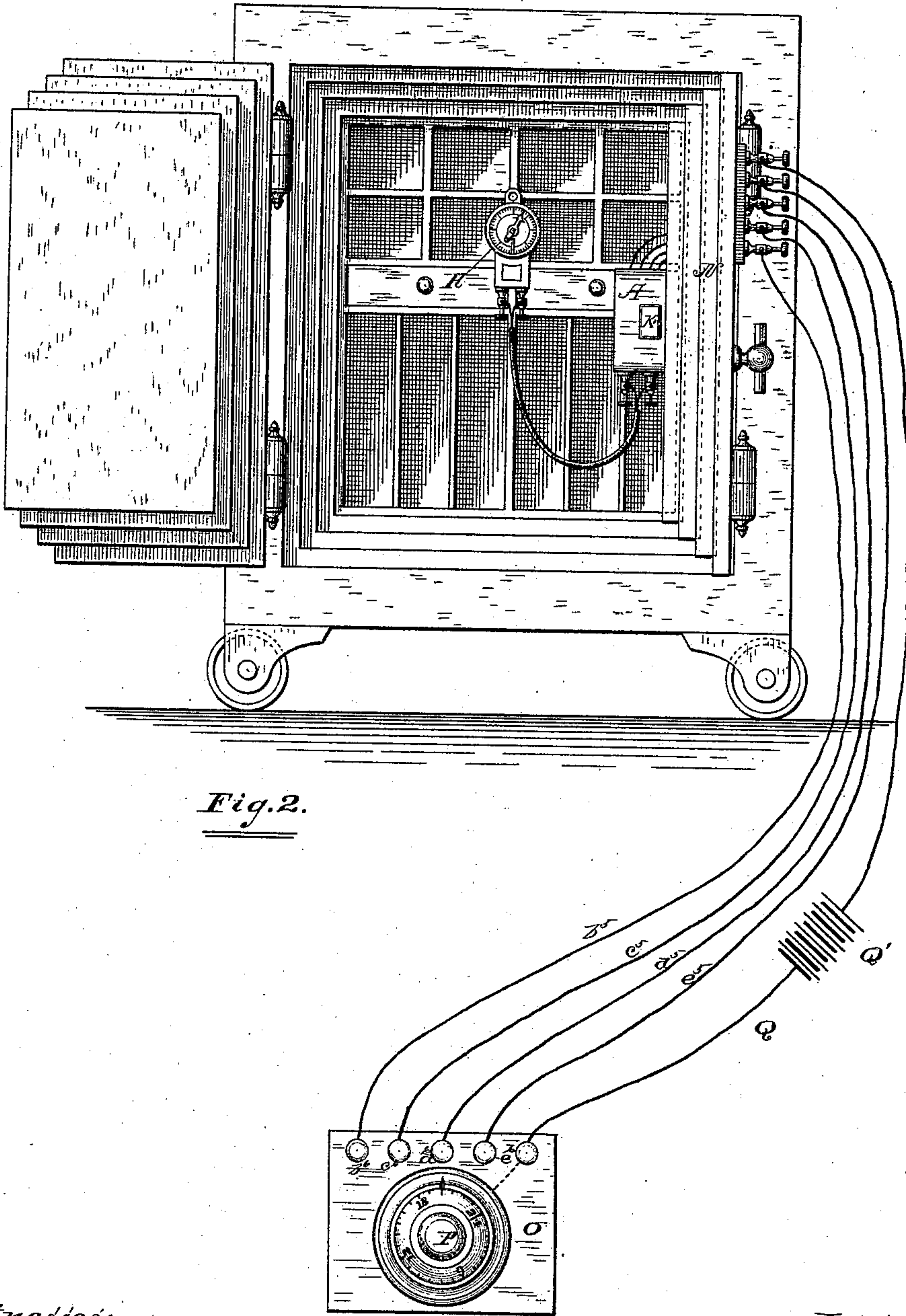


Fig. 2.

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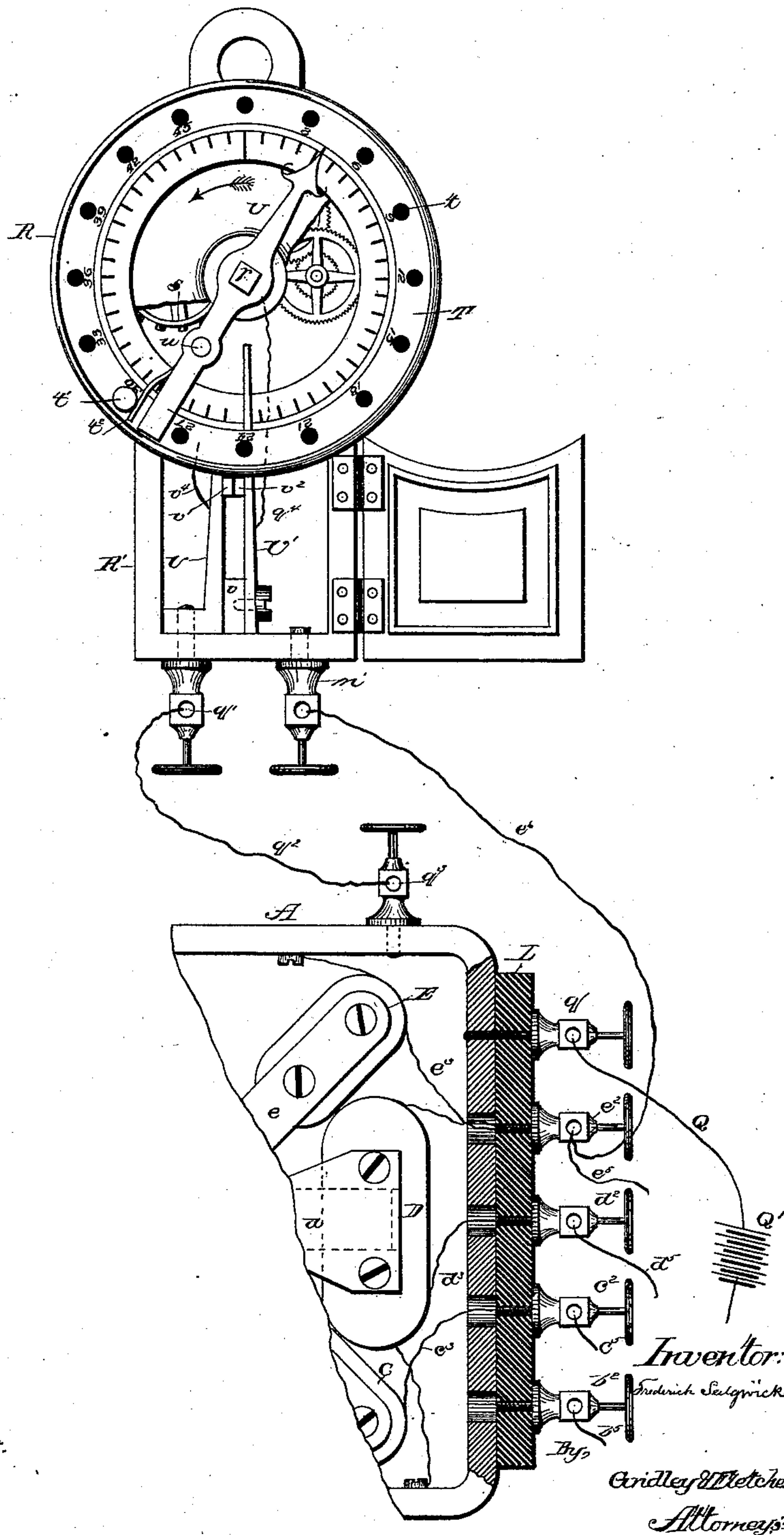
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Fig. 3.



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UNITED STATES PATENT OFFICE.

FREDERICK SEDGWICK, OF CHICAGO, ILLINOIS.

ELECTRO-MAGNETIC TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 347,069, dated August 10, 1886.

Application filed January 31, 1885. Serial No. 154,514. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK SEDGWICK, of Chicago, in the county of Cook and State of Illinois, late of Cincinnati, Ohio, have invented certain new and useful Improvements in Electro-Magnetic Time-Locks, of which the following is a description, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of an electro-magnetic permutation-lock with the plate removed, together with a dial-plate for operating the same and a timer connected therewith for controlling or preventing the action of the electrical current upon the magnets during a predetermined time. Fig. 2 shows the application of said time-lock to an ordinary safe, and Fig. 3 is a detail view showing said timer and a portion of said lock, the same being a modification of the construction shown in the other figures.

Like letters of reference indicate like parts in the different figures.

The object of my invention is to so combine a chronometer or any suitable time-piece with an electro-magnetic permutation-lock that the electrical current may be broken or switched upon a shorter circuit during a predetermined period, so as to prevent during said period the manipulation of the tumblers from without the safe by one familiar with the combination, said invention having special reference to my improved electro-magnetic combination-lock for which application for Letters Patent was filed by me on the 20th day of August, A. D. 1884.

In the drawings, A represents the case of the lock, which may be constructed of brass or other suitable material in the usual manner.

B, C, D, and E are a series of electro-magnets, arranged and secured within said case, the opposite poles of which are represented by B', C', D', and E', said magnets being provided with pole-extensions $b\ c\ d\ e$ and $b'\ c'\ d'\ e'$, respectively, the inner ends of which are arranged concentrically to the axis of the tumblers, one of which (the driving-tumbler) is provided on its front face with an annular gear-wheel, F, Fig. 1, rigidly secured thereto, the remaining tumblers being placed back of said wheel F, and do not appear in either of said figures.

G, Fig. 1, is a revolving armature having

its axis upon the same shaft which supports said tumblers, one end of the same having its bearing in the cross-bar H, which is made of brass or insulated from the magnets to which it is attached. A small pinion (shown in dotted lines beneath the bar H) is rigidly attached to the axis of the armature, and engages an intermediate gear, I, which in turn meshes into the wheel F, the former having its bearing upon a wrist-pin secured to a crank-arm loosely attached to the axis of the armature. An extension, J, of said pin is adapted to engage with a notch in a movable angle-bar, which is pivoted at j , and a portion of which forms the usual "fence," which falls into the tumbler-notches when the latter are in line. So long as said fence is raised by the displacement or non-alignment of the tumbler-notches the pin J is retained within the notch of said angle-bar, and the wheel I, being revolved by a pinion upon the armature, causes the wheel F to rotate, thus actuating the tumblers; but simultaneously with the locking of the latter by the falling of the fence the pin J is released and the wheel F becomes a fulcrum, against which the teeth of the wheel I bear, and the latter is caused to revolve, moving the crank and pin J with it, which latter, operating in a slot in the bolt-bar K, serves to retract the bolt K'. Upon one side of the lock-case I attach a plate, L, of vulcanite or other insulating material, to which are secured binding-posts $b^2\ c^2\ d^2\ e^2$, to form connections for the helix-wires $b^3\ c^3\ d^3\ e^3$. The opposite ends or termini of said wires $b^4\ c^4\ d^4\ e^4$, respectively, instead of being connected directly with the lock-case, as described in said application above named, are preferably "bunched," as at m , Fig. 1, and connected with a binding-post, m' , secured to an insulating-plate, M, attached to said case.

Connecting with the binding-posts $b^2\ c^2\ d^2\ e^2$ are insulated wires $b^5\ c^5\ d^5\ e^5$, leading through the door N, Fig. 2, of the safe, and connecting, preferably through binding-posts $b^6\ c^6\ d^6\ e^6$, with a series of segmental blocks attached to an insulating-plate, O, separated from each other, and arranged concentrically to the axis of the dial P thereon, said dial being provided with a movable metallic hand, connected with a circuit-wire, Q, which in turn is con-

connected by means of the binding-post q , Fig. 1, to the lock-case A, thereby completing the circuit through said movable hand and any one of said magnets with which connection may be made by the contact of said hand with said segmental blocks, provided the termini b^1 c^1 d^1 e^1 of said wires are connected with the lock-case A, all of which, except the bunching of the wires b^1 c^1 d^1 e^1 , as above stated, is more fully and minutely described and shown in my application for Letters Patent hereinbefore mentioned.

Separated from the lock A, and preferably hung in any convenient place within the safe, away from the walls thereof, as shown in Fig. 2, so as not to be affected by blows or concussions against said walls, I provide a time-piece, R, which may consist of any simple well-known train of wheel-work, but preferably having the arbor or winding-post r in the center, said post being provided with a suitable spring (not shown in the drawings) for actuating said train. A suitable escapement, S, Fig. 3, is likewise provided for regulating said movement. Upon said time-piece is a dial, which is preferably divided into forty-eight hour-spaces, as clearly shown in Figs. 1 and 3. Outside of said dial is attached an annular disk or ring, T, of brass or other metal, which is insulated from the metal of said time-piece. Said ring is perforated with a series of holes, t , of any desired number, corresponding with the hours and fractions of hours, either or both, indicated upon said dial. A detachable metallic pin, t' , adapted to fit said holes, is likewise provided, for the purposes hereinafter shown.

Rigidly attached to the winding-post r is a hand, U, which, when actuated by the spring, is caused to turn in the direction indicated by the arrow. The opposite end of said hand from that which indicates the figures upon the dial is extended over the ring T, but separated sufficiently therefrom as to be in no danger of contact therewith. A spring, t^2 , the normal position of which is indicated in Figs. 1 and 3, is permanently secured to said hand. An extension of said case, as at R', Figs. 1 and 3, is constructed of wood, vulcanite, or other non-conducting material, to which is attached, by means of a binding-post, q' , a metallic arm, V, adjacent to which and standing substantially parallel therewith is a spring, V', rigidly attached to said case or arm, but separated from the latter by an insulating-block, v . Upon the upper end of said arm V, and in a corresponding position upon the spring V', are contact-points in the form of lugs or projections v^1 v^2 , preferably made of platinum, and adapted to form an electrical contact with each other. Said spring V' is extended up between the ring R and the dial, but so adjusted as to be free to act without being brought into actual contact with either, the normal position of said spring being such that the contact-points v^1 v^2 are separated from each other. Said spring is connected by a wire, v^3 , to a

binding-post, m' , which post is likewise connected by a second wire, v^4 , to the ring R. A wire, q^1 , also connects the binding-post q' with the arbor r or hand U, as may be desired. The binding-posts m and m' are connected by a wire, m^2 , while the post q' is connected with the case A by means of a wire, q^2 , one end of which is attached to said case by a binding-post, q^3 . The hand U is provided with an insulated pin or stud, u , rigidly attached thereto and adapted to engage with the spring V'. Thus it is obvious that in order to obtain a current through any of the magnets B C D E it is essential that it be completed through said time-piece R, which may be accomplished under the following conditions, viz: Assuming the pin t' to be placed in the perforation in the ring R opposite Fig. 36, the hand U will then point to 12, while the spring t^2 will be under tension and in metallic contact with the pin t' . So long as said contact is maintained (which need be but a moment or two, for the purposes hereinafter explained) the current is made from the lock mechanism through wire v^1 , pin t' , spring t , arbor r , wires q^1 and q^2 , back to the lock-case, and thence to the circuit-wire Q, which connects with a suitable battery, Q'. As soon as the spring t^2 ceases its contact with the pin t' by reason of the movement of the hand U, said circuit is broken and cannot be again made until said time-piece shall have run down, which under the conditions assumed would require twelve hours, at the end of which time the pin u will have engaged the spring V', bending the latter sufficiently to produce a contact of the points v^1 v^2 , the tension of the arbor-spring upon the arbor serving to retain said points in contact until the timer is again wound. While the points v^1 v^2 are in contact the circuit is again closed, the same passing from the wire m^2 over v^3 , through the spring V' and arm V to the wire q^2 , and thence as stated.

From the foregoing it is apparent that the magnets within said lock cannot be excited, and hence said lock mechanism cannot be manipulated so long as said circuit remains broken, the reverse being true while the pin t' and spring t^2 or the stud u and spring V' are in contact. Thus when the safe is closed the pin t' and spring t^2 remain in contact a sufficient length of time, thereby closing said circuit, to enable the safe to be locked from without by means of the dial P, after which all control over said lock mechanism from without is prevented until said timer shall have run down, when the contact of the stud u and spring V' again enables the electrical circuit to be formed through all the magnets, whereby said lock mechanism may be again operated. The length of time during which said circuit may be broken, and the lock mechanism thus rendered inoperative, may be varied at will by moving the pin t' and placing it in different holes in the ring R.

A modification of said invention is shown in Fig. 3. Instead of bunching and insulating

from the lock-case the terminal wires b^4 c^4 d^4 e^4 , they may be connected directly with the lock-case A, and in lieu of the wire m^2 , Fig. 1, a wire, e^6 , Fig. 3, is connected with the binding-posts m' and e^2 , while the positions of the arm V and spring V' are reversed from that shown in Fig. 1, the normal position of said spring being such as to connect the contact-points v' v^2 . If desired, in said modification the ring T, spring t^2 , pin t' , and wires v^4 and q^4 may be dispensed with. By said modified construction it will be seen that the circuit is closed between the arm V and spring V' at all times, except when the stud u is in contact with the spring V', when said circuit is broken, and the electrical current, instead of passing through the magnet E, is short-circuited over the wires e^6 q^2 . While this serves to prevent any regular and systematic manipulation of the lock mechanism so as to operate the combination, the action of the remaining magnets is sufficient to revolve the armature G in one direction, in that its momentum serves to carry it past the poles of the magnet which is cut out of circuit, thus serving to throw the bolt K' when the safe is closed. When the time-piece runs down, the pressure of the stud u upon the spring V' breaks said short circuit, thus making the circuit through the magnet previously cut out, when said combination may be manipulated.

I do not confine myself to the use of the particular time-piece above described, as it is manifest that any mechanism adapted to serve the purposes of a time-piece may be readily applied to such use.

The device described in my application for Letters Patent for "electro-magnetic mechanism for time-locks," filed April 23, 1883, may, with slight modification, serve equally well to make and break or shorten said electrical circuit during a predetermined time, the latter of which methods—viz., the shortening of said circuit, one means of effecting which is shown in the modification above described—I regard as the equivalent of the former.

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

1. A time-lock consisting of a permutation-lock provided with a series of electro-magnets arranged therein, suitable electrical connections from without, and a battery-cup, whereby said magnets may be excited in regular order from without the safe, an armature for

imparting motion to the lock-tumblers, and a suitable time-piece interposed within said electrical circuit, having a hand or other equivalent device with contact-points for automatically making and breaking said circuit, substantially in the manner and for the purposes set forth.

2. An electric time-lock consisting of the combination, with a permutation or combination lock, of a series of electro-magnets arranged therein having suitable electrical connections from without, a battery-cup, and switching device, whereby said magnets may be excited from without the safe, an armature actuated thereby for imparting motion to said lock, and a time mechanism in the safe, interposed in said electrical circuit, (which is normally broken,) provided with means, as a hand and springs having contact-points, for abnormally making said circuit, substantially as and for the purposes specified.

3. A time-lock consisting of a time-piece within the safe, interposed in the electrical circuit, which is normally broken, with the electro-magnets of a permutation-lock, and provided with a rotating hand having a spring thereon adjusted to form a temporary or resilient electrical contact with the circuit-wire or its connection when the time-piece is wound, and an insulated stud adjusted to engage upon the running down of the clock with a circuit-closing spring, whereby said circuit may be first closed a sufficient length of time to lock the safe, broken during a fixed time thereafter, and again closed upon the running down of said clock, substantially as and for the purposes set forth.

4. The combination, with an electro-magnetic permutation-lock, of a time-piece interposed within the electrical circuit, said time-piece being provided with a dial, a rotating hand having a spring, t^2 , thereon, a perforated metallic ring concentric with the axis of said hand, connected with said circuit and insulated from said clock mechanism, and a removable switch-pin, t' , whereby said clock may be set to run for a longer or shorter period of time, and said circuit (normally broken) may be momentarily closed to permit the locking of said safe from without, substantially as and for the purposes specified.

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