

(No Model.)

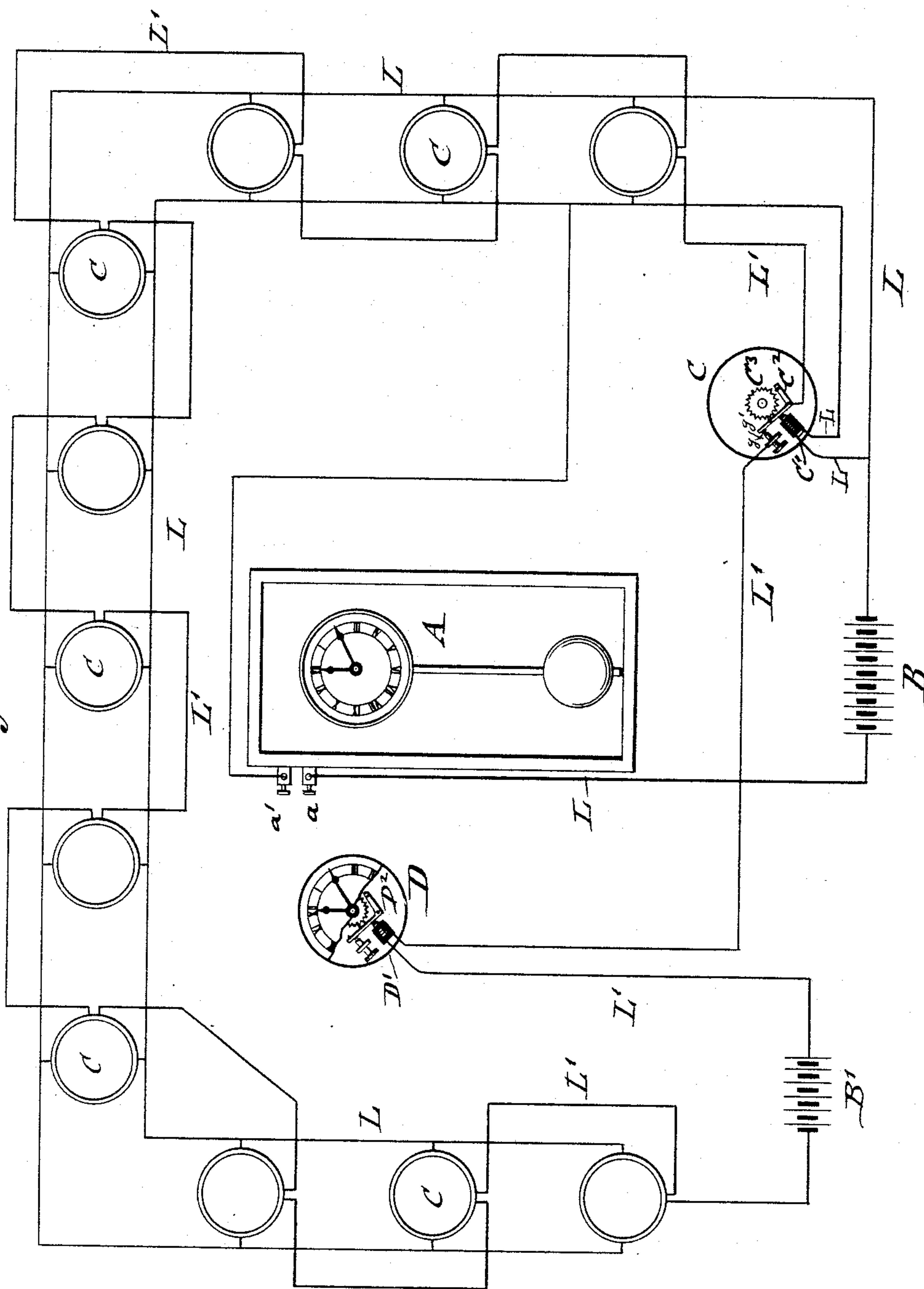
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C. H. CARTER.
ELECTRIC CLOCK SYSTEM.

No. 411,138.

Patented Sept. 17, 1889.

Fig. 1.



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(No Model.)

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Fig. 2.

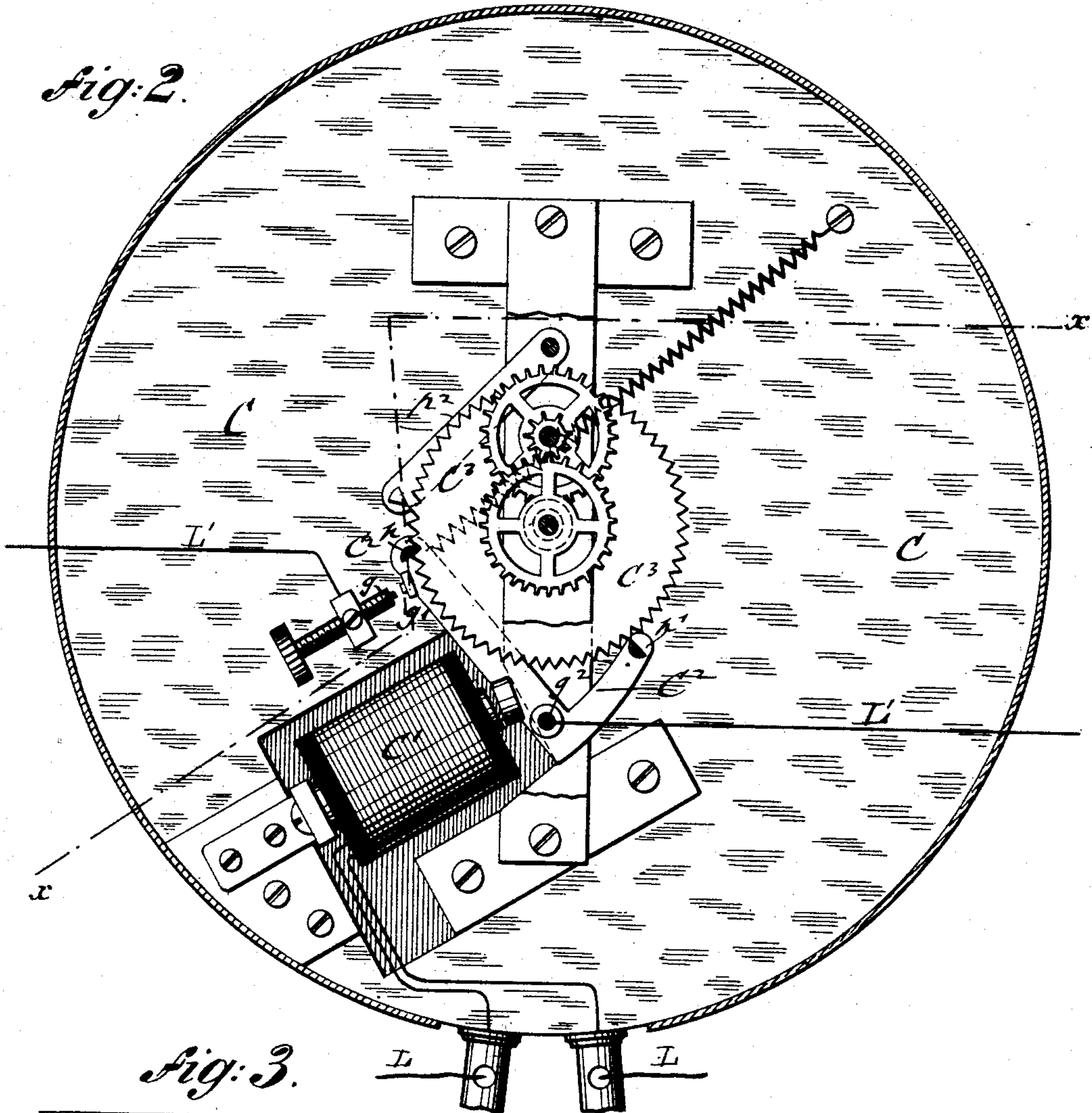
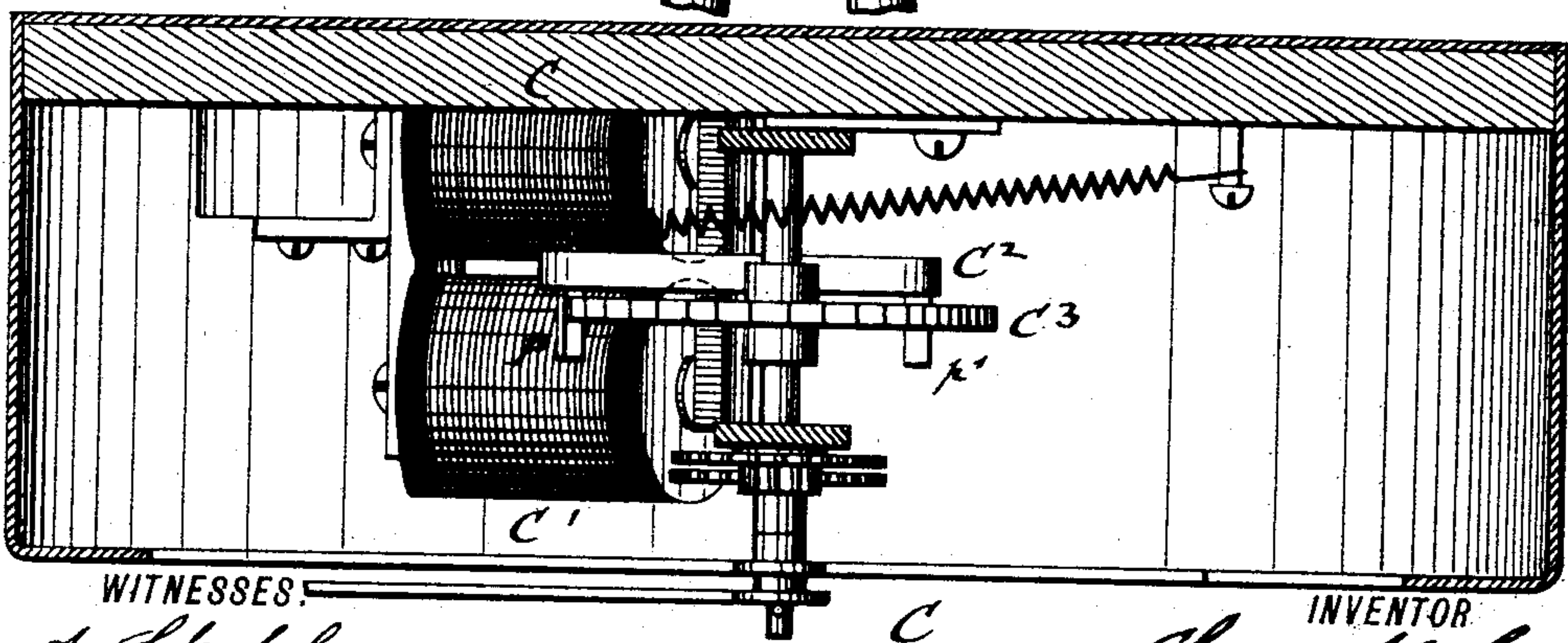


Fig. 3.



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Fig. 4.

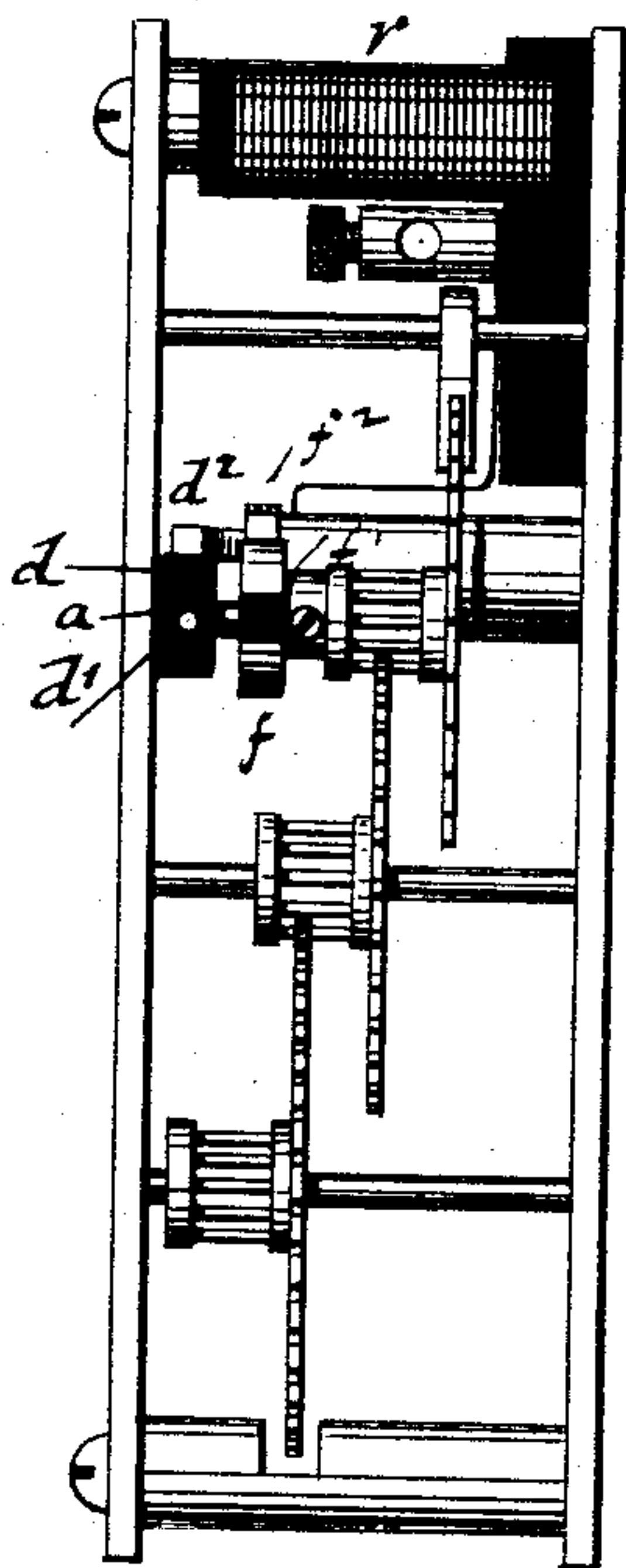


Fig. 5.

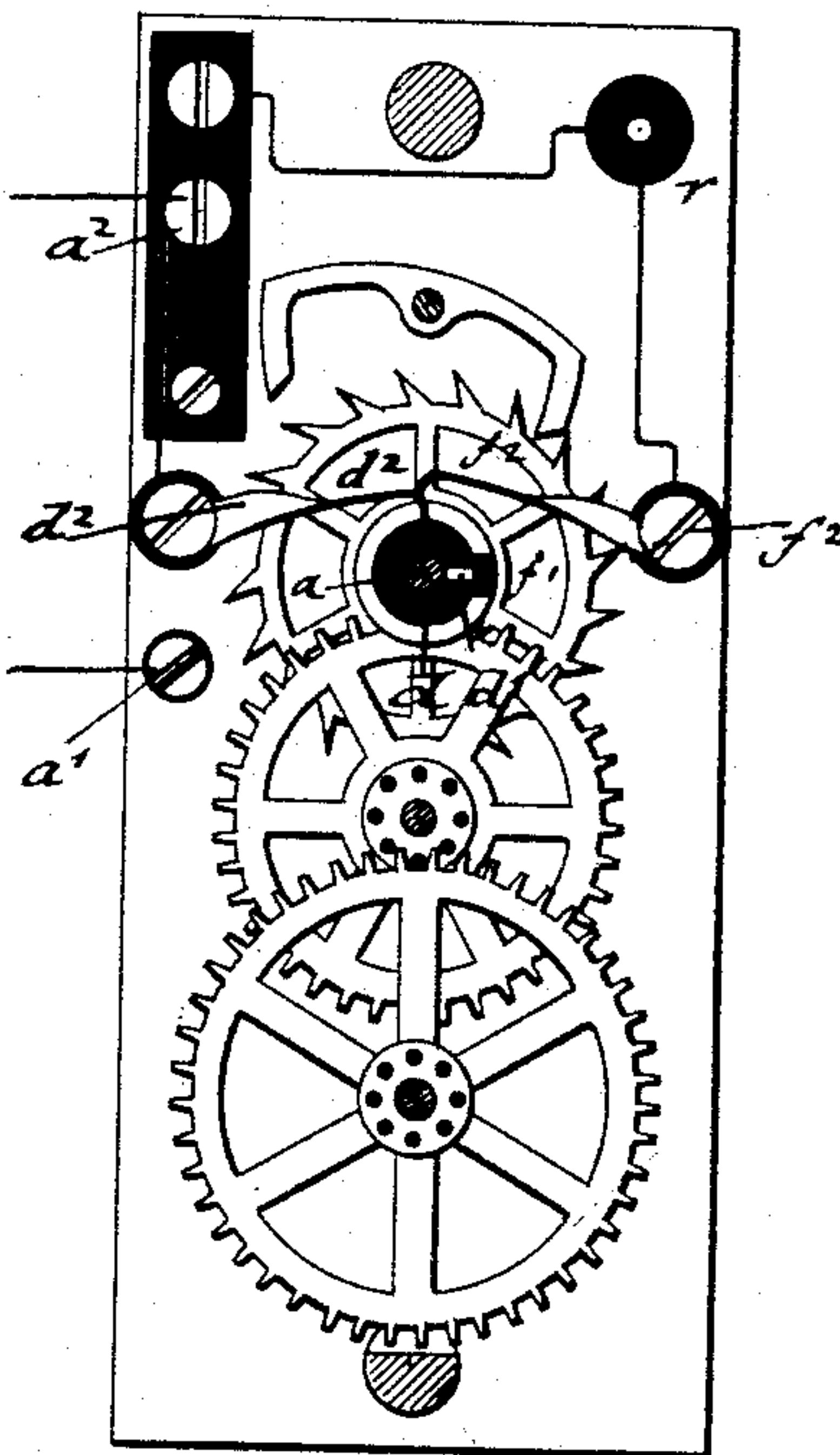
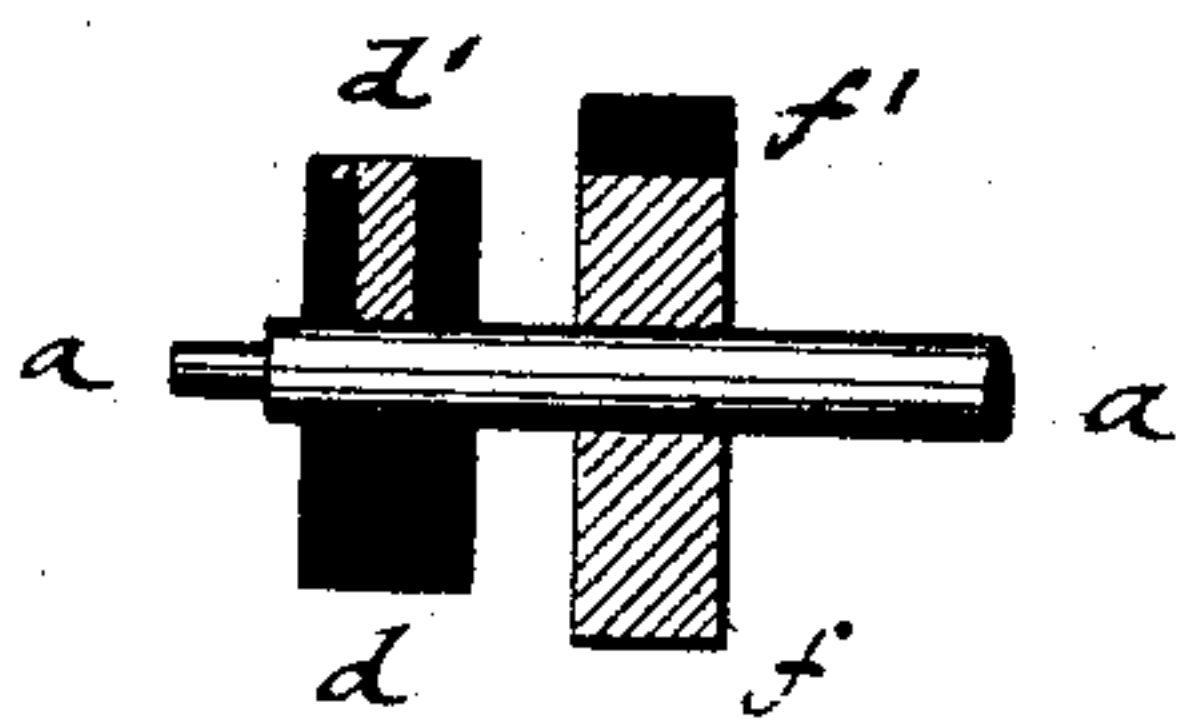


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES H. CARTER, OF BROOKLYN, NEW YORK.

ELECTRIC-CLOCK SYSTEM.

SPECIFICATION forming part of Letters Patent No. 411,138, dated September 17, 1889.

Application filed December 27, 1888. Serial No. 294,815. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. CARTER, of Brooklyn, in the county of Kings and State of New York, a citizen of the United States, have invented certain new and useful Improvements in Electric-Clock Systems, of which the following is a specification.

This invention relates to the construction of that class of devices which are controlled by electric currents transmitted from a regulator or master clock to a number of secondary clocks located in the main circuit for the purpose of actuating them in synchronism with the master-clock, and indicating the time on any number of dials in the main circuit.

The objects of my invention are to afford simple and convenient means for disclosing errors or irregularities in the main circuit and for preventing sparking in the master-clock.

In the accompanying drawings, Figure 1 is a diagram illustrating the organization of my electric-clock system, and showing the connection of the regulator or master-clock with the secondary clocks arranged in multiple are in the main circuit, and of an auxiliary or tell-tale clock located near the master-clock in an auxiliary circuit that is operated by an independent battery after all the secondary clocks have responded to the impulse of the master-clock. Fig. 2 is a detail front elevation of one of the secondary clocks. Fig. 3 is a horizontal section of the same on line *xx*, Fig. 2; and Figs. 4, 5, and 6 are details of the contacts in the master-clock and of the shunt-circuit arranged in the same for preventing sparking at the contact-points.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the regulator or master-clock, and C C a number of secondary clocks, which are arranged in multiple are in the main circuit L. The electric impulses are furnished by a main battery B, located in the main circuit L, and by a circuit-closing device, which is applied to one of the movable parts of the master-clock, preferably to the arbor *a* of the escapement-wheel, and which is constructed of a disk *d*, of insulating material, provided with a

radial contact-pin *d'*, which establishes metallic connection with the arbor of the escapement-wheel, as shown in Fig. 6. The arbor *a* is in electrical connection with the supporting-frame of the master-clock and by a binder-post *a'* with one pole of the battery, while a contact-spring *d²*, that rides on the insulated disk *d* and is insulated from the metallic frame of the master-clock, is connected by a binding-post *a²* and conducting-wire with the other pole of the battery. At each minute or at shorter and longer periods of time, if it be desired to actuate the secondary clocks more or less frequently than once for each minute, the contact-spring *d²* establishes the main circuit by contact with the radial pin *d'* and sends an electric impulse over the main line, which actuates the electric magnets of all the secondary clocks C C and moves by suitable transmitting mechanism the clock-trains of the same.

For the purpose of preventing sparking at the contact-points of the master-clock, a shunt-circuit is arranged in connection with the arbor *a* of the escapement-wheel by arranging a metallic disk *f* on the same, which disk is provided at one point of its circumference, in line with the radial pin *d'* of the disk *d*, with an insulated segment *f'* of greater size than the head of the contact-pin *d'*. Immediately after the contact of the spring *d²* with the pin *d'* is discontinued the contact between the metallic disk *f* and a second contact-spring *f²* is established, and thereby the induced current set up in the main circuit neutralized by a resistance-coil *r* in the shunt-circuit. The shunt-circuit is established by the contact of contact-spring *f²* with the metallic circumference of the disk *f*, as shown clearly in Figs. 4 and 5, and discontinued by the segment *f'* when the impulse is sent by the contact-pin *d'* and spring *d²* into the main circuit. By the neutralizing action of the resistance-coil in the shunt-circuit the contact-points of the master-clock are protected against sparking and corrosion and no disturbing influence exerted by the induced currents on the electromagnets *c'* of the secondary clocks located in the main circuit.

The clock-train of each secondary clock C is actuated by a fulcrumed and spring-actu-

ated armature-lever C^2 , which is made elbow-shaped and provided at the ends of its arms with pallets $p p'$, which mesh with the teeth of the main wheel C^3 of the secondary clock, 5 the pallet p meshing with the main wheel C^3 when the armature-lever C^2 is not attracted by the electro-magnet C' , during which time the second pallet p' rides on the apex of one of the teeth, while, when the electro-magnet 10 is vitalized and the armature-lever attracted, the second pallet p' passes into one of the recesses between the teeth and moves thereby the main wheel C^3 for the distance of one tooth. A gravity check-pawl p^2 is pivoted 15 above the main wheel C^3 and engages the teeth of the main wheel during the time when the pallet p is withdrawn by the action of the electro-magnet C' , so as to secure thereby the reliable working of the actuating-train of the 20 secondary clock. An auxiliary circuit is arranged in connection with the main circuit, said auxiliary circuit being formed of an auxiliary battery B' and conducting-wires L' , which connect a contact-stud g and contact- 25 point g' on each armature-lever C^2 with the fulcrum g^2 of the armature-lever of the next following secondary clock, the contact-point g' of the armature-lever C^2 being adjoining to the contact-stud g .

30 Near the master-clock is arranged an auxiliary or tell-tale clock, the electro-magnet D' of which is located in the auxiliary circuit L' , said electro-magnet operating an elbow-shaped armature-lever D^2 , having pallets, and 35 thereby the clock-train of the tell-tale clock D in the same manner as the secondary clocks, whenever the auxiliary circuit L' has been established by the proper working of the actuating devices of all the secondary clocks.

40 It is obvious that as long as the tell-tale clock D works in synchronism with the master-clock A all the secondary clocks have responded to the impulses sent out by the master-clock; but as soon as the main circuit 45 should for some reason or other be out of order, so that one or more of the secondary clocks in the same do not respond to the impulses of the master-clock, the tell-tale clock would not be actuated and indicate by its

being out of synchronism with the main clock 50 that the main circuit is out of order and has to be looked after.

By the auxiliary tell-tale circuit, in connection with the tell-tale clock, a full and efficient control of the main circuit is ob- 55 tained, by which any defects or irregularities in the same can be quickly discovered, so that they may be removed, and thereby a frequent cause of dissatisfaction with electric-clock systems remedied, so that they can be worked 60 with greater regularity and reliability.

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

1. The combination of a main circuit, a master-clock having circuit-closing devices 65 located in the main circuit, a number of secondary clocks provided with clock-trains and having electro-magnets disposed in said main circuit, oscillating armature-levers actuated by said electro-magnets and provided with 70 pallets for engaging said clock-trains, an auxiliary circuit composed of fixed contact-studs located adjacent to said armature-levers, and wires connecting the fulcrums of said levers with said fixed contact-studs, and a tell-tale 75 clock located in said auxiliary circuit and operated thereby, substantially as described.

2. In an electric-clock system, the combination of a master-clock, an insulating-disk on an arbor of the clock mechanism, a radial 80 contact-pin in said disk forming contact with the arbor, a contact-spring riding on the surface of said disk, a metallic disk on said arbor provided with an insulated segment in line with and of greater size than the con- 85 tact-pin of the insulating-disk, a second contact-spring riding on the metallic disk, a shunt-circuit connected with the second contact-spring, and a resistance-coil in said shunt-circuit, substantially as set forth. 90

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES H. CARTER.

Witnesses:

PAUL GOEPEL,
CARL KARP.