H. H. ENGELBERG & C. WAGNER.

ELECTRIC CLOCK.

APPLICATION FILED JUNE 21, 1905.

912,235.

Patented Feb. 9, 1909.

4 SHEETS—SHEET 1.

Fig. 1.

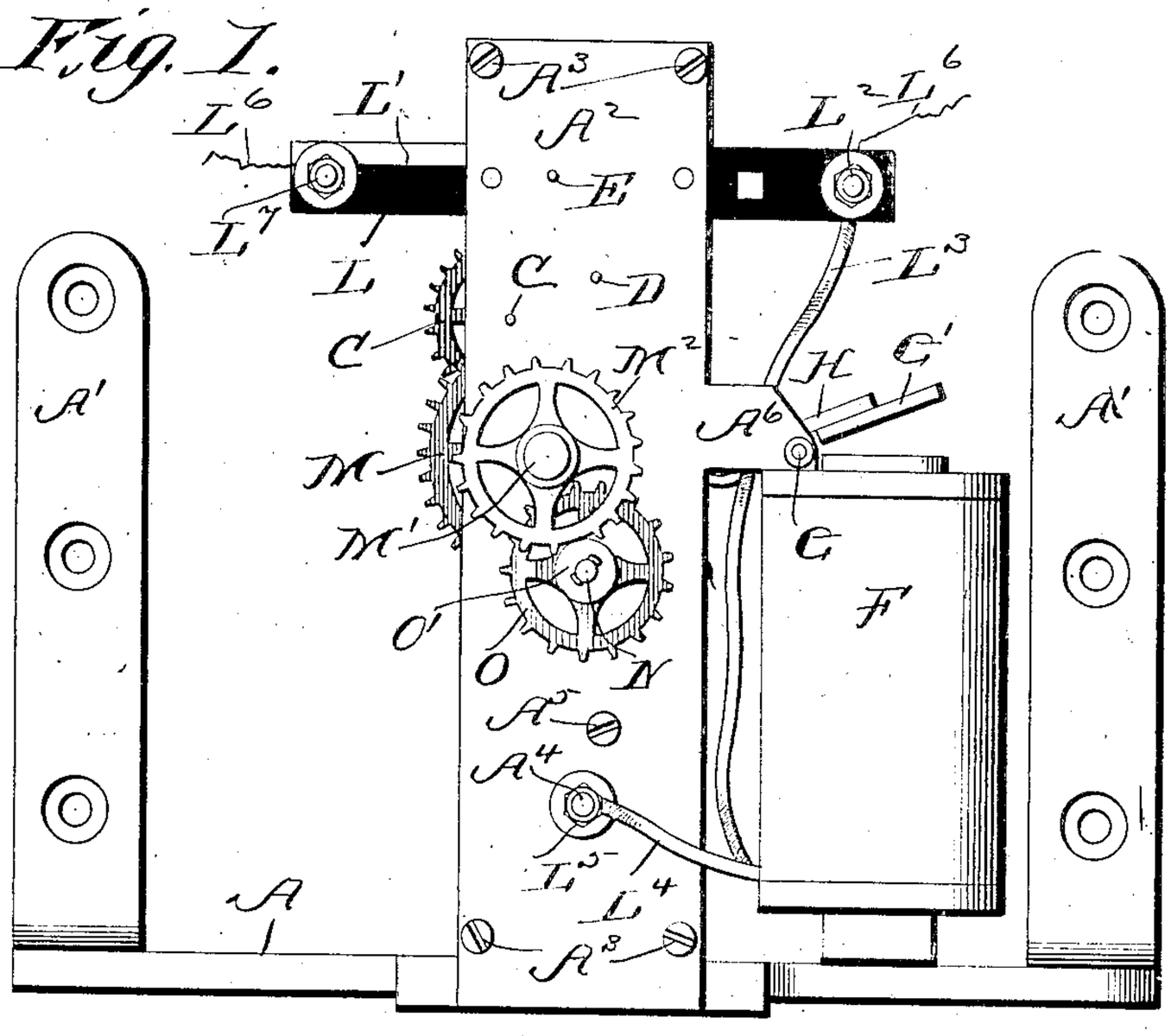
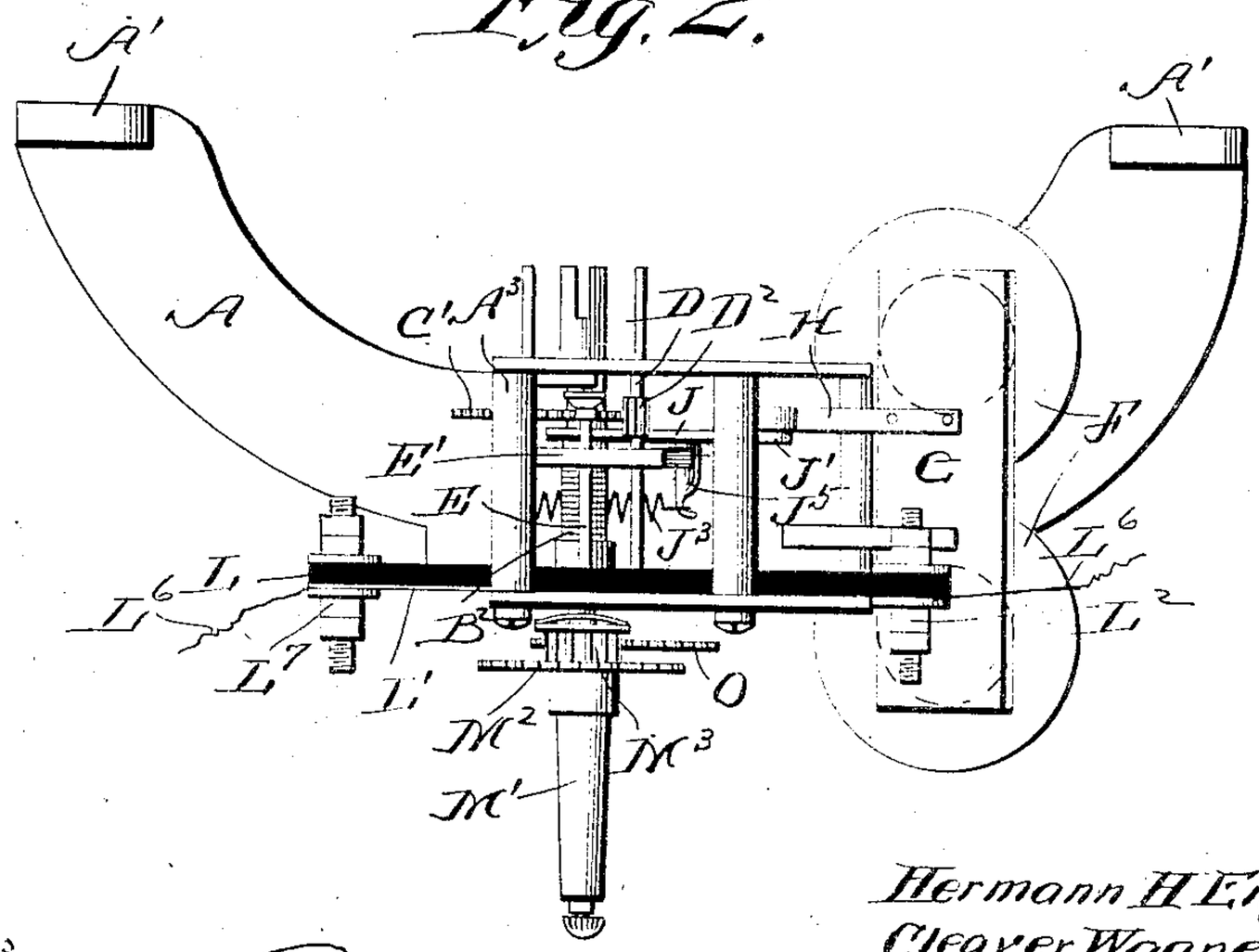


Fig. 2.



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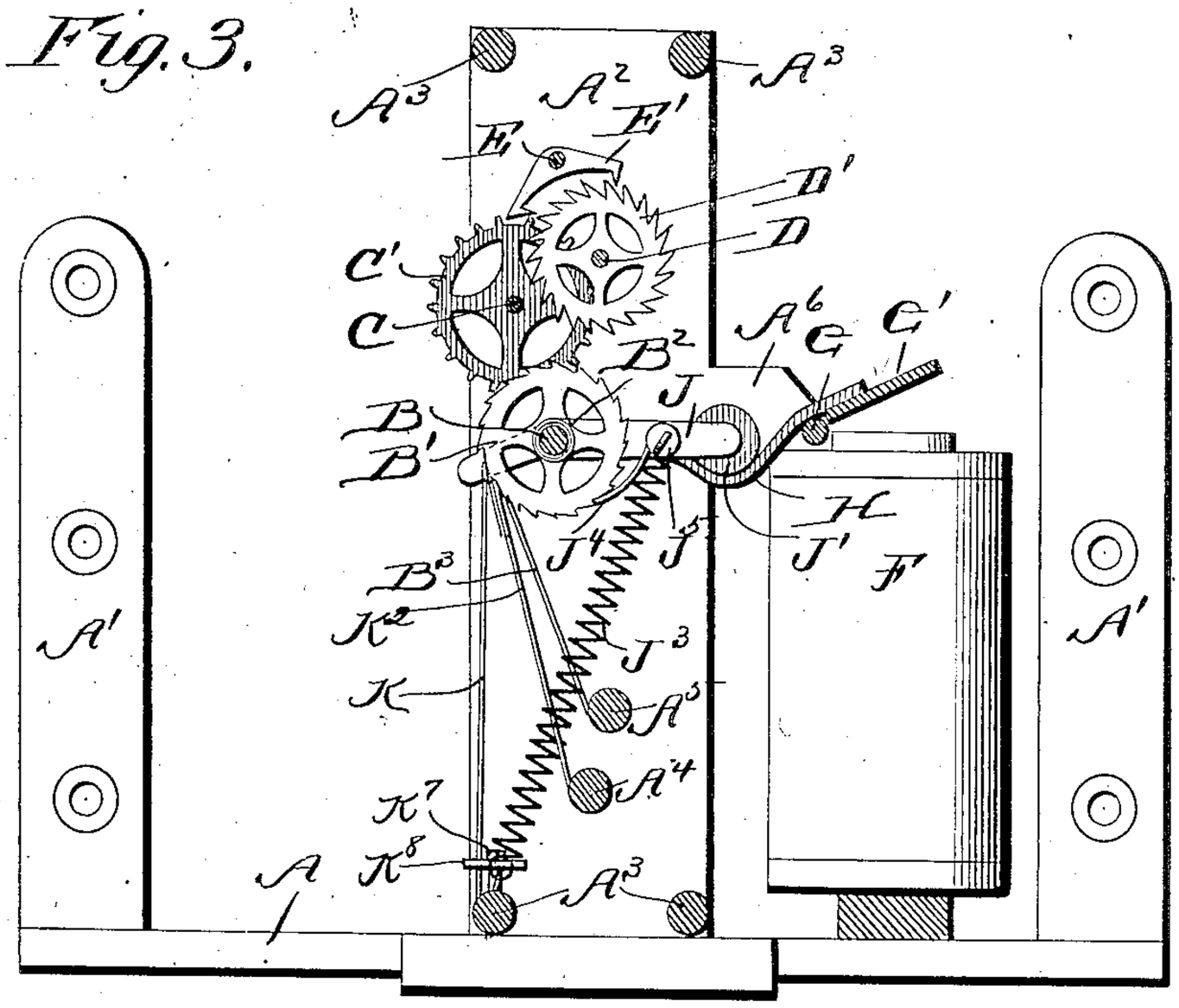
4 SHEETS—SHEET 2.

Fig. 3.



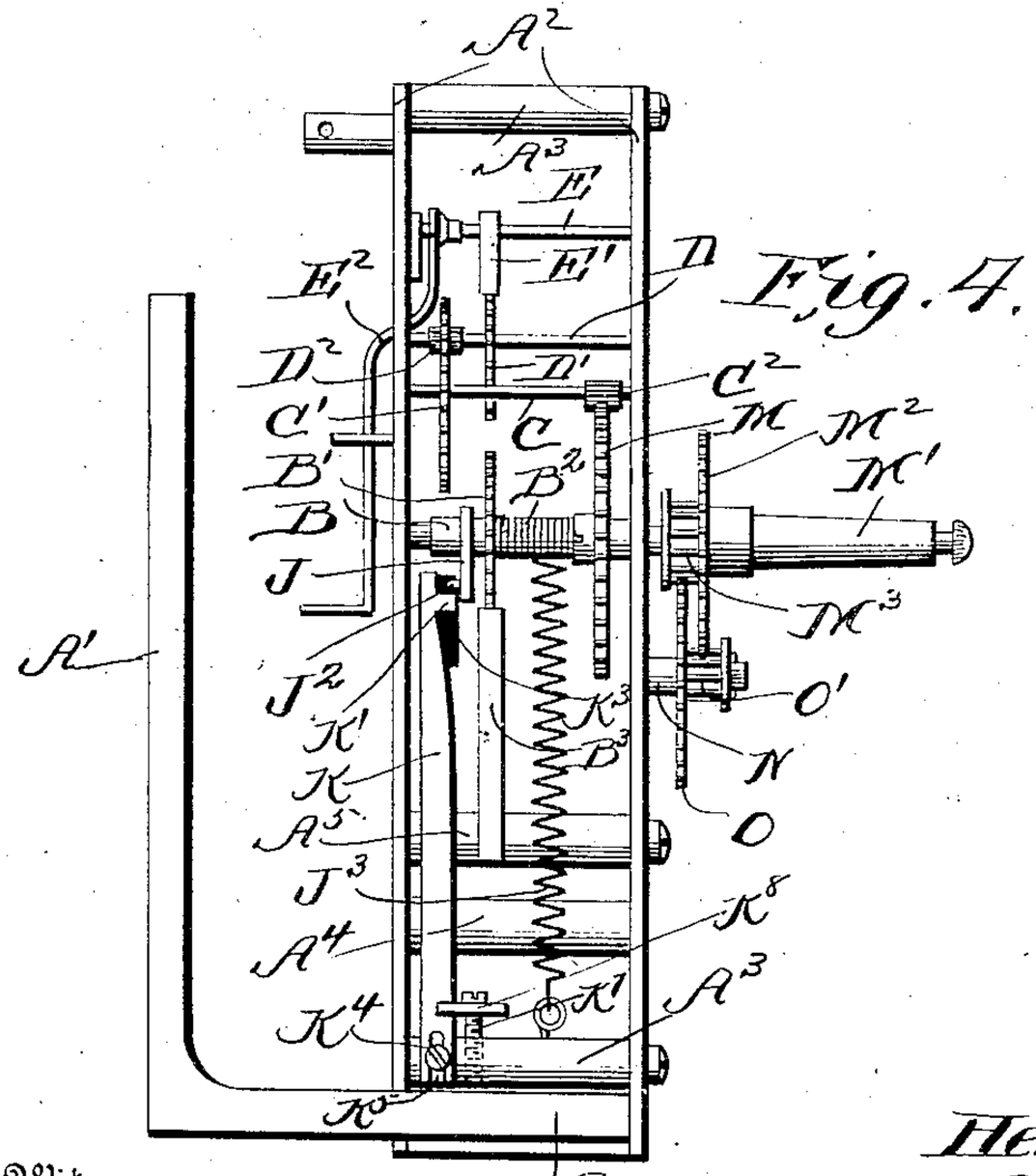


Fig. 4.

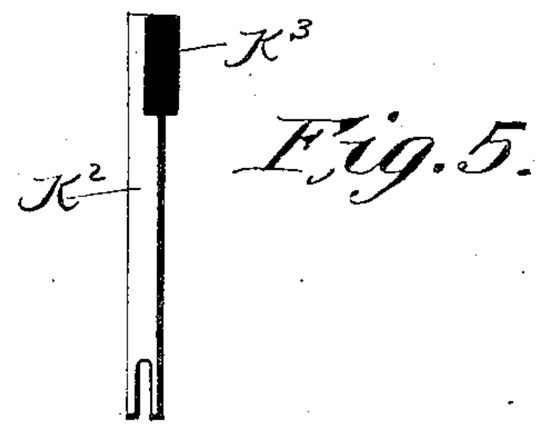


Fig. 5.

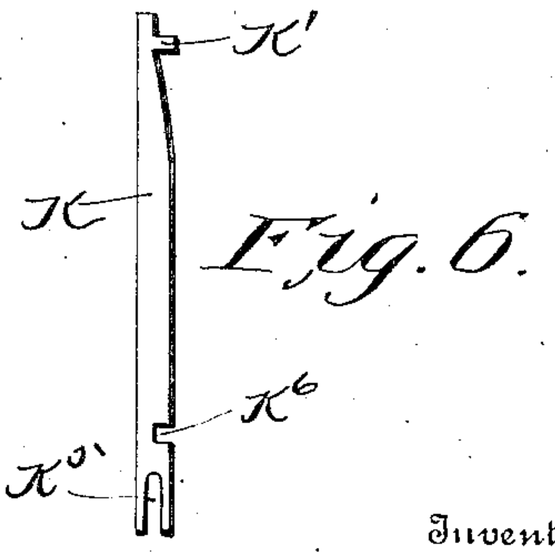


Fig. 6.

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4 SHEETS—SHEET 3.

Fig. 8.

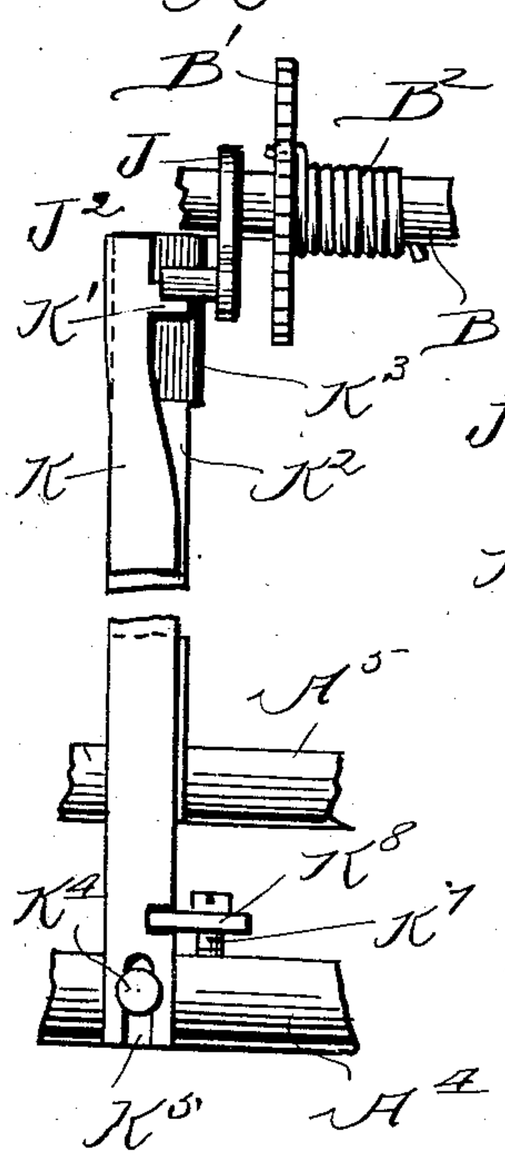


Fig. 7.

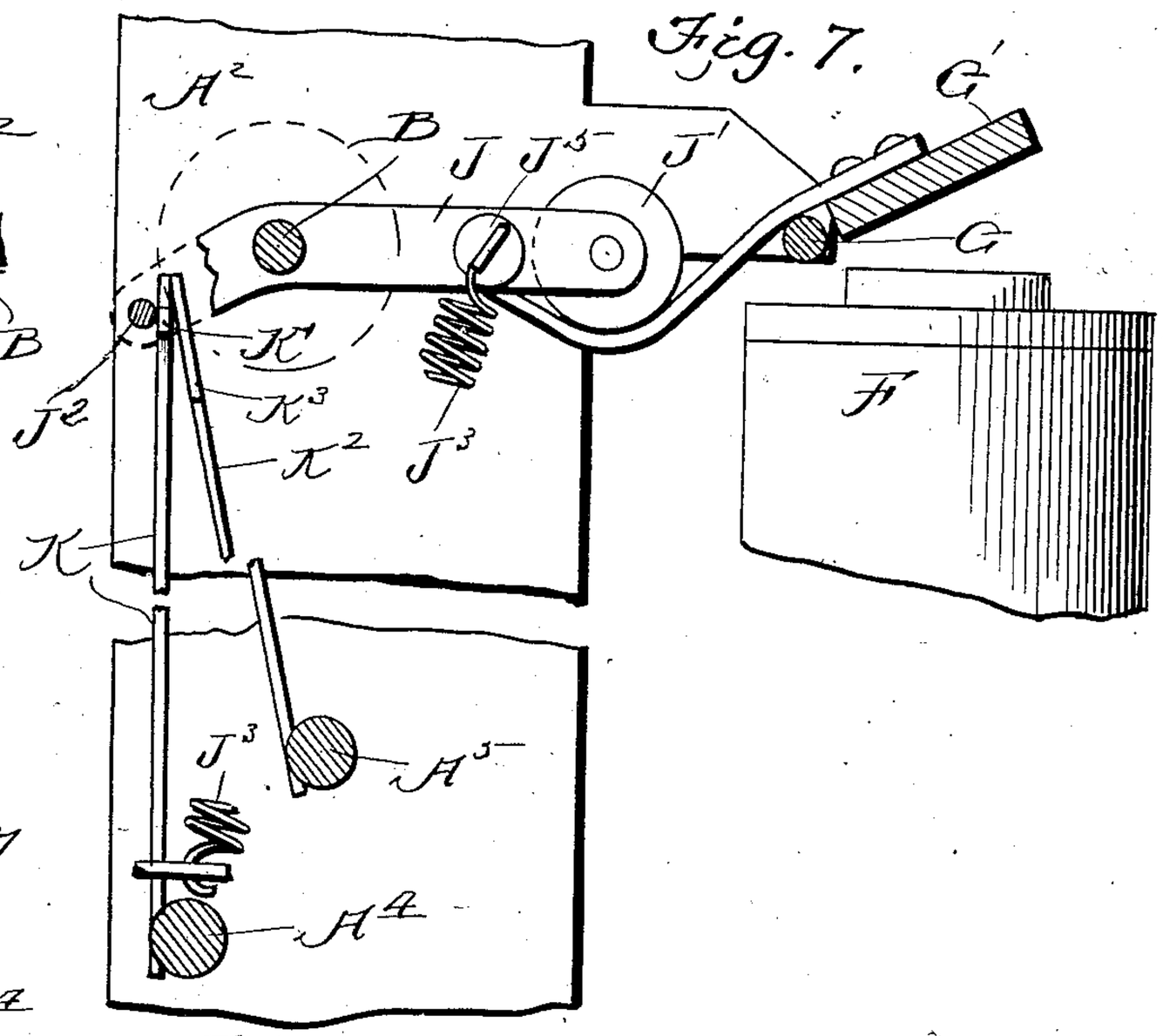


Fig. 9.

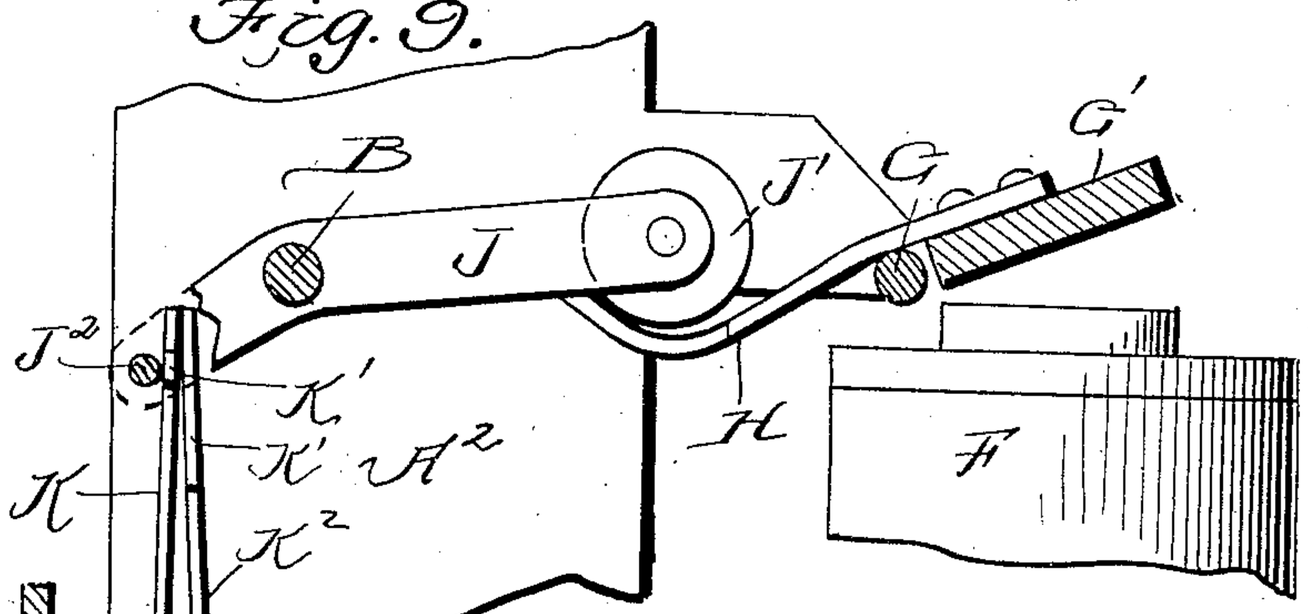


Fig. 11.

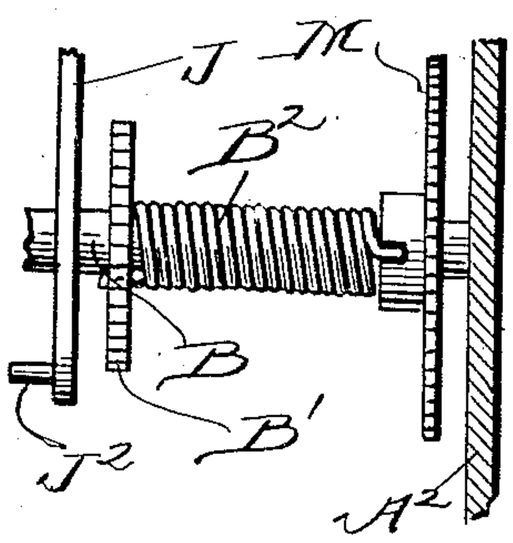
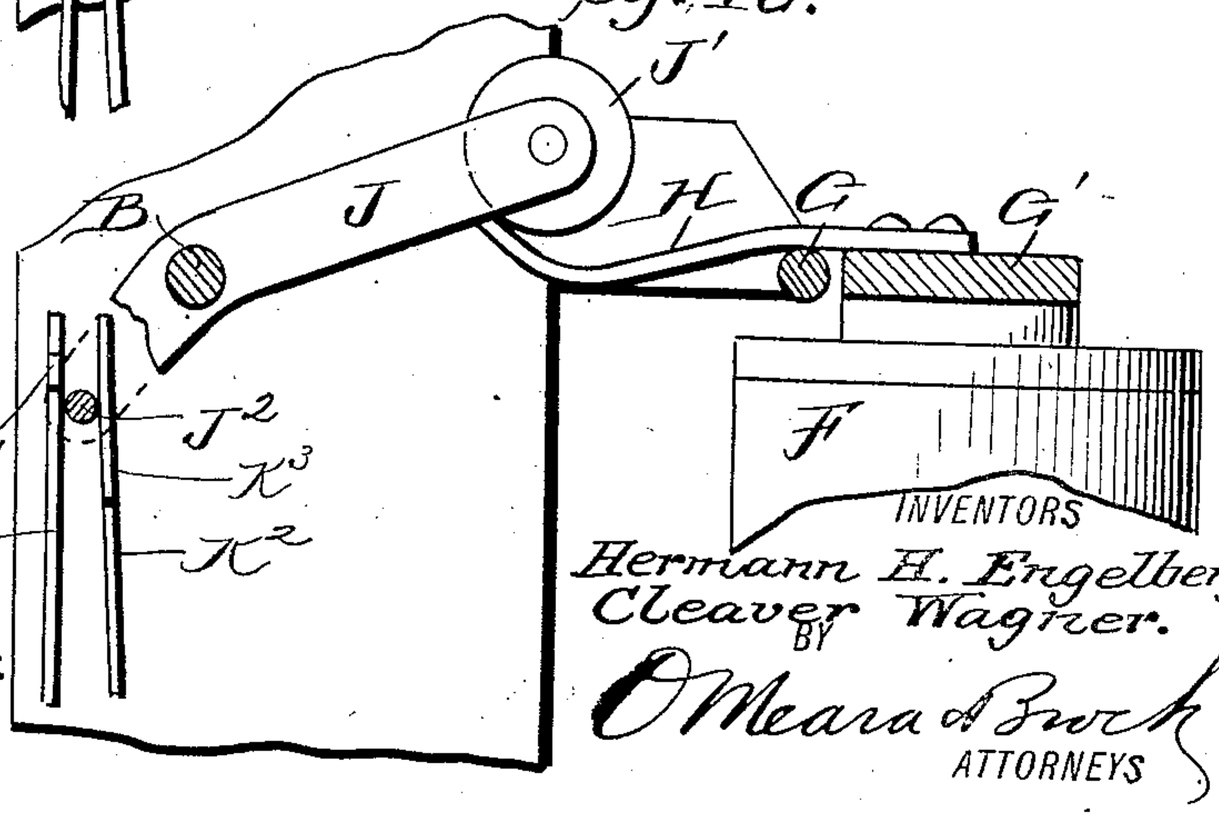


Fig. 10.



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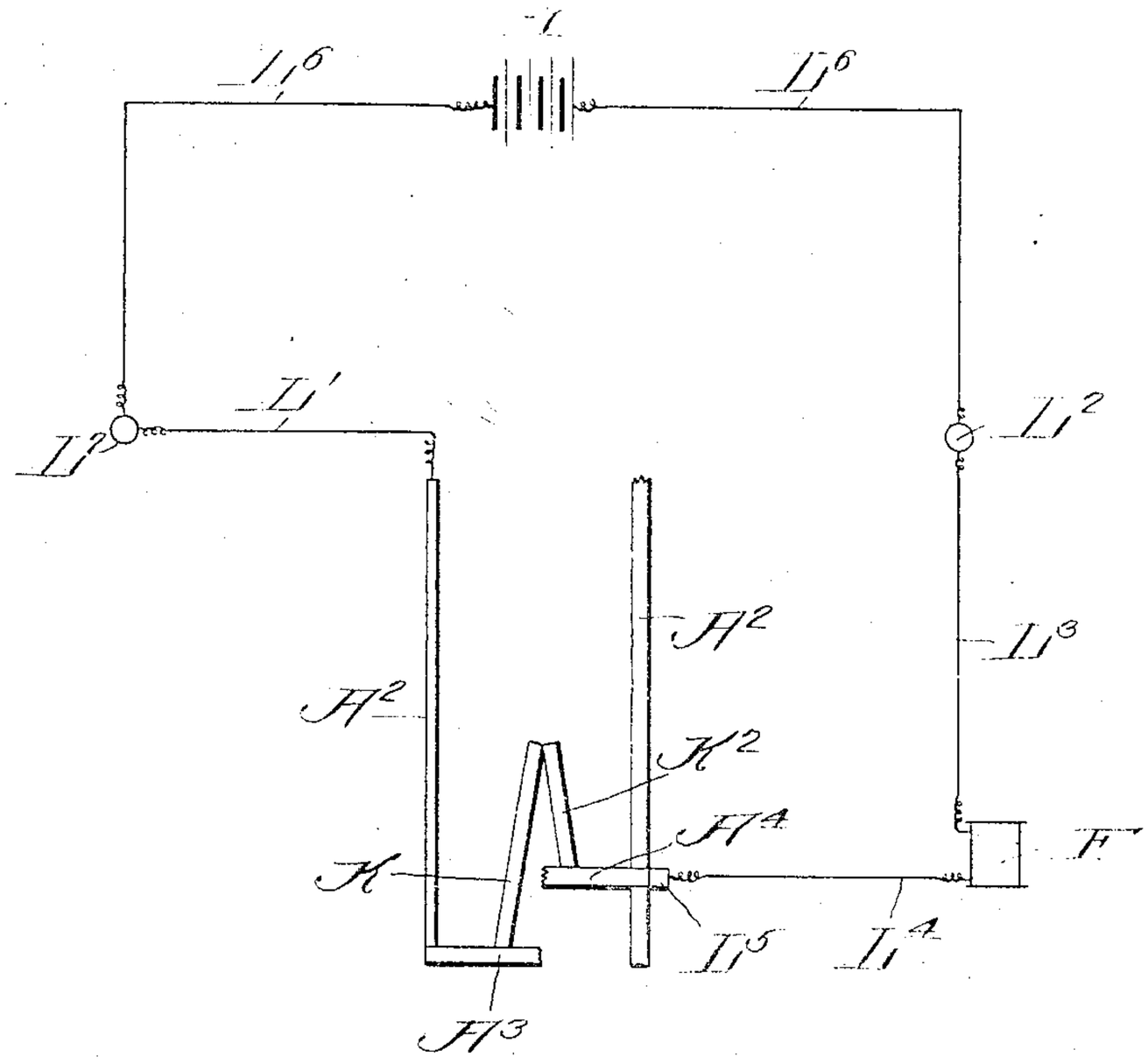
4 SHEETS—SHEET 4.

Fig. 12.



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ELECTRIC CLOCK.

No. 912,235. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed June 21, 1905. Serial No. 266,366.

To all whom it may concern:

Be it known that we, HERMANN H. ENGELBERG and CLEAVER WAGNER, citizens of the United States, residing at Danville, in the county of Montour and State of Pennsylvania, have invented a new and useful Improvement in Electric Clocks, of which the following is a specification.

This invention relates to an electrical operated clock in which the making and breaking of an electrical circuit automatically places a coil-spring under tension and it will be obvious therefore, that as long as the mechanism is in working order and the electrical circuit is complete, that is connected to the proper source of power, that the clock will not run down.

The object of the invention is a clock mechanism in which an armature is drawn to the poles of an electro-magnet by the energizing of said magnet and withdrawn by the action of a spring upon the automatic breaking of the electrical circuit, in which the magnet is placed.

A further object of the invention is to provide means by which this movement of the armature is converted into a rotary movement in the arbor carrying the great wheel of the clock mechanism.

In the drawings forming a part of this specification:—Figure 1 is a side elevation of the frame, and mechanism attached thereto, the dial hands and casing all being removed. Fig. 2 is a plan view of Fig. 1. Fig. 3 is a vertical section taken transversely through the pillars and arbors. Fig. 4 is an end view. Figs. 5 and 6 are detail views of spring contact plates removed from the clock. Fig. 7 is an enlarged detail view showing the circuit making and breaking mechanism, parts being broken away and parts in section. Fig. 8 is a detail side elevation of the contact strips and coöperating parts, portions of the strips being broken out. Fig. 9 is a detail view of the circuit making and breaking mechanism omitting parts shown in Fig. 7, the circuit being closed. Fig. 10 is a similar view, the circuit being open. Fig. 11 is a detail of the winding spring and connected parts. Fig. 12 is a diagram of the circuits.

In these drawings A represents a segmental base provided at each end with vertical standards A′ suitably perforated and countersunk so that they can be secured by means of screws within a casing. Intermediate the ends of the base and arranged upon opposite sides of the same, are two vertical plates A^2 which are connected by pillars A^3, A^4 and A^5. In the plates A^2 are journaled arbors B, C, D and E.

Upon the arbor B is fixed a ratchet wheel B′, and upon the arbor C is fixed the third wheel C′ and a pinion C^2 which pinion is driven from the arbor B, by the great wheel M. The arbor D carries the scape wheel D′ and a pinion D^2 meshing with the third wheel C′. A verge E′ is carried by the arbor E, and is controlled by the usual regulating lever E^2. Upon the base A is mounted an electro-magnet F, and an armature plate G′ is mounted upon a pivot pin G journaled in parallel lugs A^6 projecting from the plates A^2.

A curved arm H extends rearwardly or inwardly from the armature plate and as the plate is drawn downwardly into contact with the poles of the magnet, the curved arm H is lifted vertically and actuates a rocking lever J, which carries at its forward end an anti-friction roller J′ which is engaged by and travels upon the arm H. The lever J, is pivotally mounted and rocks upon the arbor B and at the end opposite the roller J′, carries a pin J^2 adapted to engage a projection or tooth K′ formed on a spring contact plate K and in operation the pin J^2, describes an arc in the path of which the said tooth lies and alternately presses the contact plate K into engagement with a spring contact plate K^2, as it passes over the outer face of the tooth K′ and as it passes over the inner face of the said tooth and passes between the tooth K′ and an insulating strip K^3, carried by the spring contact plate K^2, lifts the two contacts apart, thus breaking the circuit and deënergizing the electro-magnet F.

The spring contact plates K and K^2 are bifurcated at their lower ends and are held by suitable screw K^4 to one of the lower pillars A^3, and to the pillar A^5, respectively. The lever J carries upon one side the pin J^5, and a coil spring J^3, is secured at its lower end to a pillar A^3 and at its upper end to the said pin and by drawing the roller end of the lever J downward, causes the said roller to remain in engagement with the curved portion of the arm H, depressing the said arm and lifting the armature G′, as soon as the magnet F is deënergized.

A spring pawl J^4, is also connected at one end, to the pin J^5 and engages the teeth of

the ratchet wheel B′ and drives the said wheel as the roller end of the lever J is drawn downwardly by the spring J^3 slipping on the ratchet teeth as the arm moves upwardly.

A spring pawl B^3 is connected at its lower end to the pillar A^5 and prevents reverse rotation of the wheel B′. An insulated plate L is carried by one of the plates A^2 and at right angles to said plate and is provided with a contact strip L′ which extends from a binding post L′ carried by the strip L, to the plate A^2.

A similar binding post L^2 is arranged adjacent the cpposite end of the strip L, and is connected by an electrical conductor L^3, to the magnet F which is also connected by a wire L^4 to a binding post L^5 arranged on the plate A^2.

Upon the arbor B and between the ratchet wheel B′, and the great wheel M, is arranged a coil spring B^2 one end of the said spring being connected to the ratchet wheel B′, and the other end to the great wheel M. The object of this spring is to prevent the hands jumping when the armature is drawn downward and the coil spring J^3 is placed under tension. The arbor B also carries the usual cannon pinion M′, the wheel M^2 and a pinion M^3.

Upon a stub shaft N, is mounted a wheel O, meshing with the pinion M^3, and carrying a pinion O′ meshing with the wheel M^2. These last mentioned parts constitute a portion of the usual clock train. The binding posts L^2 and L^7 are connected in a circuit with any desired source of electrical energy as a battery 1 by the conductor L^6 and the pillar A^4 which carries at one end the binding post L^5 is carefully insulated from the plate A^2. The electrical circuit to the magnet F is through the binding post L^7 the strip L′ connected to the said post, the plate A^2, the pillar A^3, to which the spring contact plate K is connected, the spring contact plate K, the contact plate K^2, the pillar A^4, the binding post L^5, the wire L^4, the electro-magnet, the wire L^3, the other binding post L^2, and thence to the exterior circuit.

We employ a suitable battery as a source of energy the exterior circuit being completed through battery wires L^7.

It will be noted that the contact spring K is slotted as shown at K^5 at its lower end and is recessed on one side as shown at K^6. A screw K^7 is threaded into a pillar A^3 adjacent the spring strip K and carries a disk K^8, which disk engages the recess K^6. The object of this is to adjust the contact strip K when first placed in position, as the strip will be raised or lowered by turning the screw K^7 to right or left. When the proper adjustment is secured the strip is clamped in position by means of the screw K^4.

Having thus fully described our invention, what we claims as new and desire to secure by Letters Patent, is:—

1. In an electrically wound clock, a magnet, an armature, an arm carried by the armature, a rocking lever engaged by said arm, a pin carried by the lever, two spring contact plates, and a tooth formed on one spring contact plate and engaged by the pin, said pin alternately separating and pressing together the contact plates, as and for the purpose set forth.

2. In an electric clock, a circuit-making and breaking device comprising a spring contact plate having a tooth, a second spring contact plate having an insulated portion, a rocking lever, a pin carried by the lever alternately passing over the outer and inner faces of the tooth and engaging the insulated portion of the other contact plate when in engagement with the inner face of the tooth and means for automatically rocking said lever.

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