No. 764,911. PATENTED JULY 12, 1904.

H. CAMPICHE.

ELECTRIC CLOCK.

APPLICATION FILED FEB. 25, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

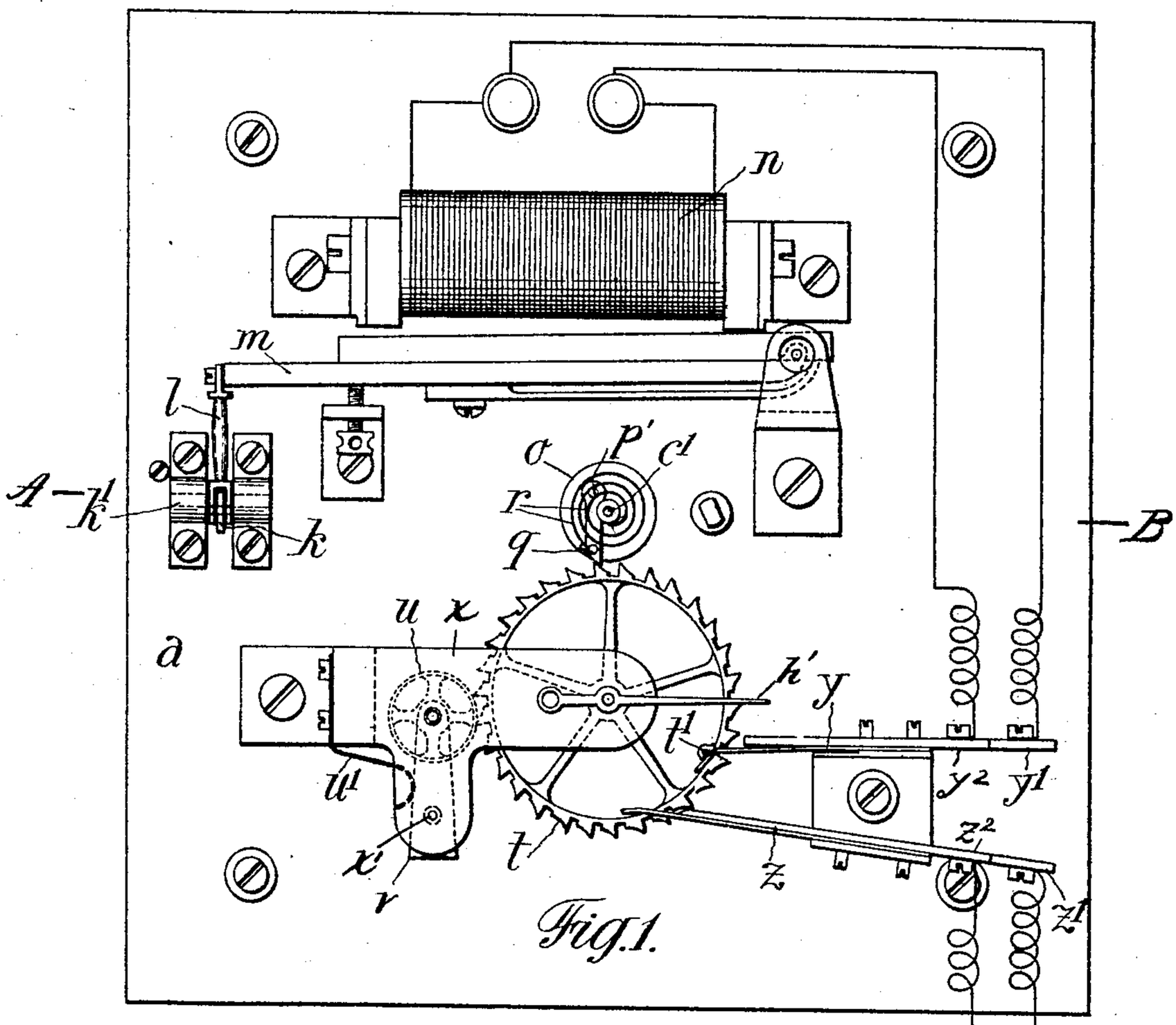

Fig. 1.

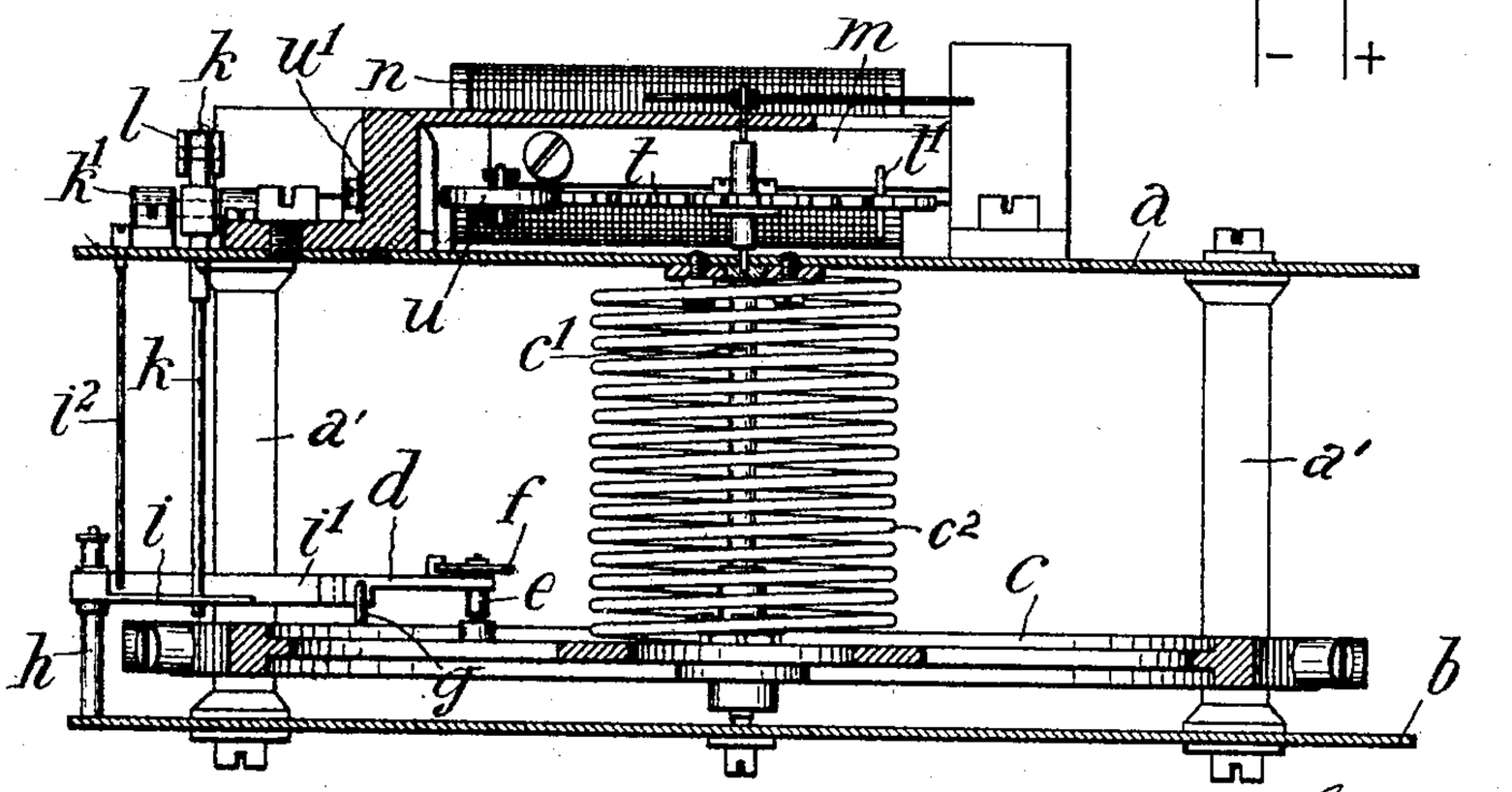

Fig. 2.

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NO MODEL. 2 SHEETS—SHEET 2.

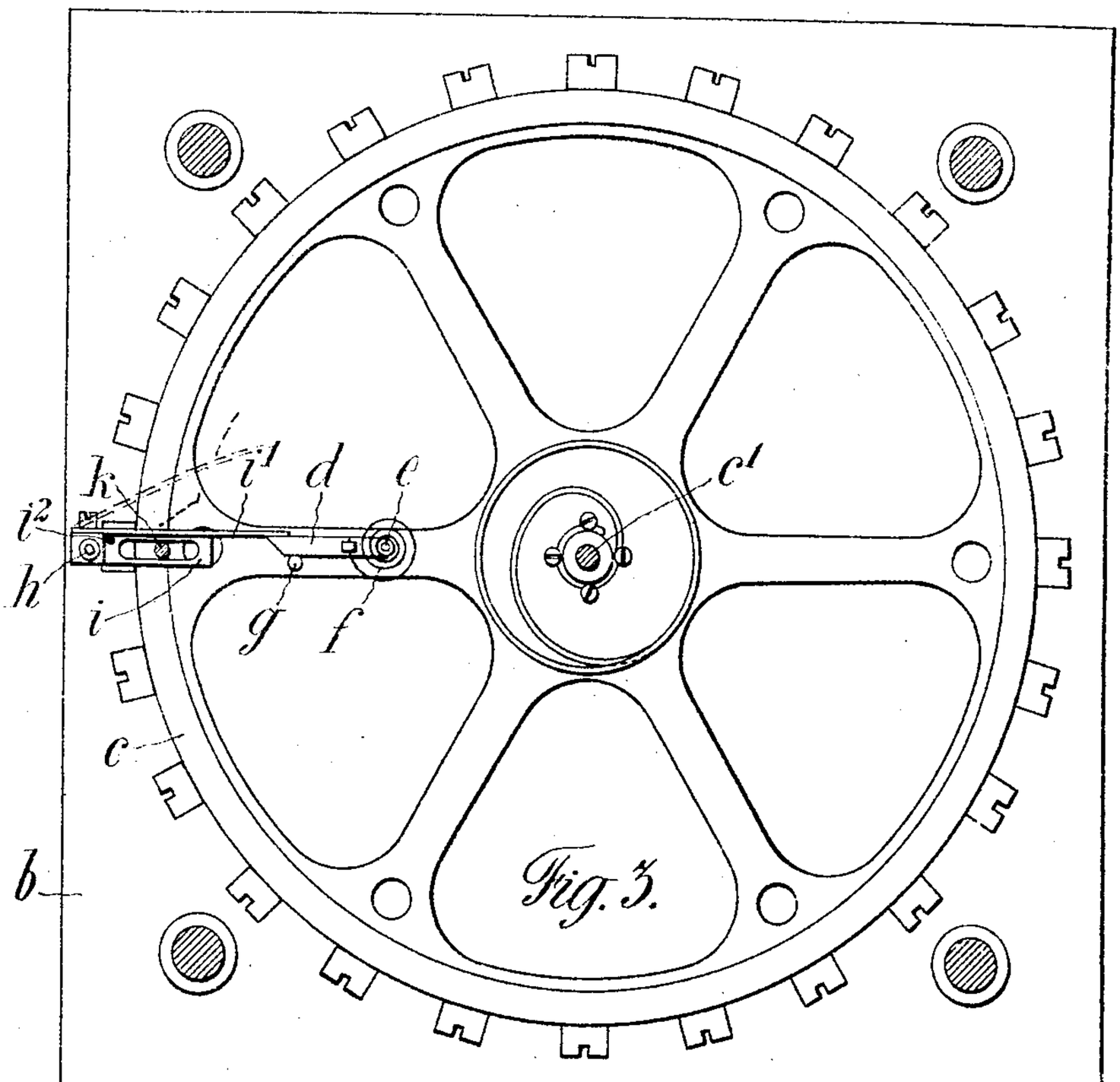


Fig. 3.

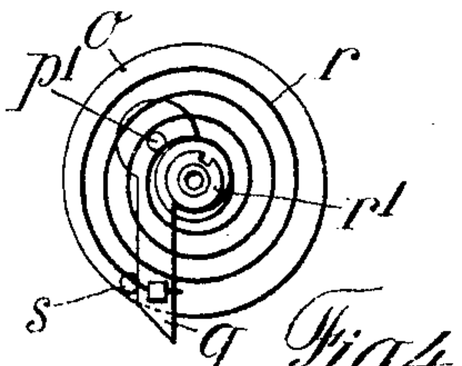


Fig. 4.

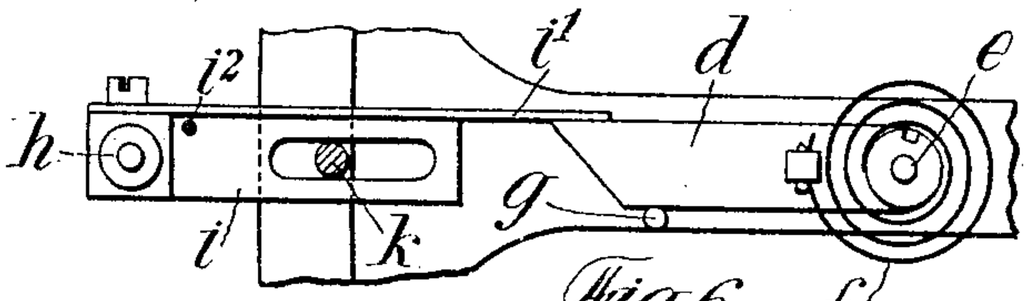
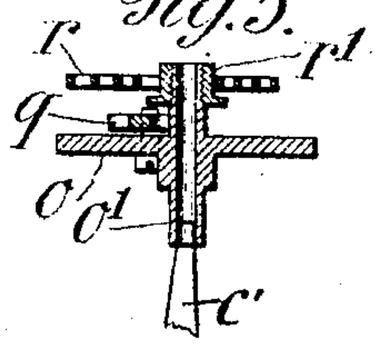


Fig. 6.

Fig. 5.



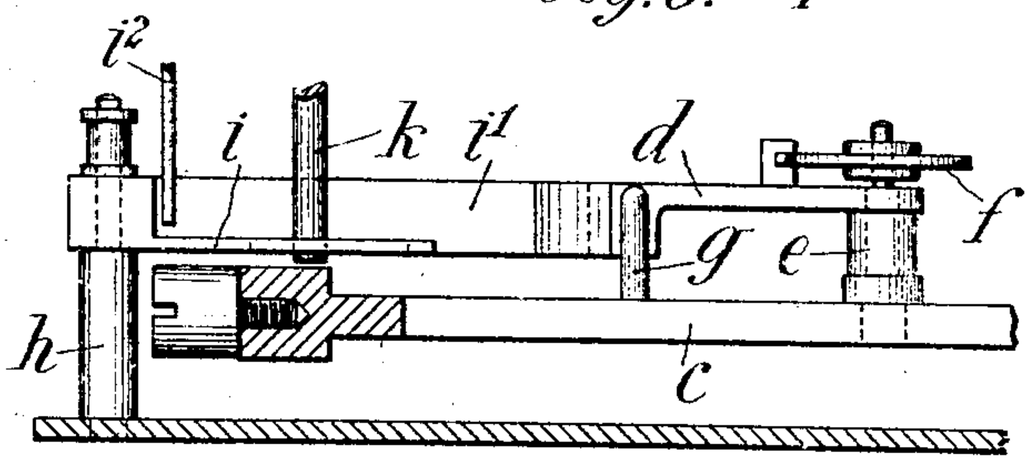


Fig. 7.

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No. 764,911. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

HENRI CAMPICHE, OF GENEVA, SWITZERLAND.

ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 764,911, dated July 12, 1904.

Application filed February 25, 1904. Serial No. 195,157. (No model.)

To all whom it may concern:

Be it known that I, HENRI CAMPICHE, a citizen of the Republic of Switzerland, residing at Geneva, Switzerland, have invented an Improvement in Electric Clocks, of which the following is a specification.

My invention relates to electric clocks particularly adapted for marine purposes, and in carrying out the same I employ a balance-wheel, an escapement-wheel, an electromagnet, means actuated by energizing the electromagnet to give an impulse to the balance-wheel, means actuated by the oscillation of the balance-wheel to rotate the escapement-wheel, means for preventing more than a given movement at one time to the escapement-wheel, means for closing a circuit to the electromagnet intermittently by means of the escapement-wheel, and means for closing a distributing-circuit to other electric clocks.

In the drawings, Figure 1 is a plan of my improved electric clock without its casing. Fig. 2 is a vertical section on the line A B, Fig. 1. Fig. 3 is a horizontal section taken immediately below the upper plate. Fig. 4 is a plan of the device for actuating the escapement-wheel, and Fig. 5 is an axial section of the same. Fig. 6 is a plan of a portion of the balance-wheel, showing the parts employed to actuate the balance-wheel; and Fig. 7 is an elevation of the same, Figs. 4, 5, 6, and 7 being made on a larger scale than the views shown in Figs. 1, 2, and 3.

a b represent plates connected together in a horizontal position and parallel to one another by means of posts *a'* or otherwise. Between the plates *a b* is a balance-wheel *c*, mounted in suitable bearings and provided with a spiral spring c^2, one of the ends of which is made fast in the plate *a* and the other in the balance-wheel. The balance-wheel *c* is provided with an arm *d*, pivotally connected to a pin *e*, secured at a suitable position in the balance-wheel *c*. *f* represents a coiled spring by means of which the arm *d* is normally kept in contact with a stop-pin *g*, also connected to the balance-wheel *c*.

A standard *h* is secured in the plate *b*, and pivotally connected to the standard *h* is a rocking lever *i*, provided with a spring *i'*, the end of which is adapted to come in contact with the end of the arm *d*, but which is normally held in the position shown in dotted lines in Fig. 3 away from the end of the arm *d* by means of a spring i^2, secured in the plate *a*. The rocking lever *i* is provided with a longitudinal slot through which the lower end of a lever *k* passes, the lever *k* being pivotally connected in suitable bearings *k'*, fixed on the top of the upper plate *a*.

n represents an electromagnet, and *m* the armature of the same. The end of the armature *m* is connected to the upper end of the lever *k* by means of a link *l*. I also employ a disk *o*, (see particularly Figs. 4 and 5,) provided with a tubular axis *o'*, by means of which the disk *o* is connected to the upper end of the shaft *c'* of the balance-wheel *c* by forcing the tubular axis *o'* over the slightly-conical end of the shaft *c'*.

The disk *o* is provided with a pin *p'*, to which is pivotally connected an arm *q*.

r represents a spring secured to the axis of the disk *o* or by means of a nipple *r'* or otherwise and also connected to the end of the arm *q*, the function of the spring being to normally maintain the arm *q* against a pin *s*, also fixed in the disk *o*. An escapement-wheel *t* is mounted at the side of the disk *o* in such a position that the end of the arm *q* is adapted to engage the teeth of the escapement-wheel *t* to actuate the same when the balance-wheel *c* is oscillating, and it will be readily understood that when the oscillation is in one direction the arm *q* will engage a tooth of the escapement-wheel and impart to the same a partial rotation, whereas with the oscillation in the opposite direction the arm *q* will slip over the next succeeding tooth. I also employ a roller *u*, pivotally connected to a lever *v*, which in turn is also pivotally connected to a bridge *x* at *x'*, and the periphery of the roller is maintained in position against the teeth of the escapement-wheel by means of a

spring u', so as to prevent more than the required movement at one time of the escapement-wheel.

y z represent two insulated contact-springs upon opposite sides of an insulating support-block. y' y^2 and z' and z^2 represent pairs of contact-bars also on opposite sides of the same insulating support-block. While the drawings show but one spring y and one spring z, there are two each of such springs placed in the same vertical planes agreeing with the bars y' y^2 and z' z^2. The bars y' y^2 are the terminals of the circuit leading to the electromagnet n, and the electrical connection with the springs y is made by a pin t', fixed in the escapement-wheel t, so that the circuit through the magnet is completed once every time the escapement-wheel revolves. The bars z' z^2 are the terminals of the circuit leading to one or more electric clocks, and the electric connection for completing this circuit is formed by the contact of said pin t' with the free ends of the springs z in the movement of the escapement. The arrangement of the parts is such that the electric circuit is closed at the moment when the arm of the balance-wheel c is within the reach of the rocking lever i, so that the resulting attraction of the armature m causes an impulse to be given by said rocking lever i to the balance-wheel c.

The escapement-wheel t is preferably provided with thirty teeth, and its arbor carries a hand h', marking the seconds on a suitable dial, and as the balance-wheel oscillates once a second it causes the escapement-wheel to advance one tooth for every complete oscillation of the balance-wheel, and consequently every time the escapement-wheel is actuated the hand carried by the same will advance two divisions on the seconds-dial.

The armature m may be combined with any suitable device for actuating the minute and hour hands of a secondary or receiving clock situated in the neighborhood of the mechanism hereinbefore described, and, moreover, the armature m may also be combined with the circuit of several receiving-clocks to indicate the time in different parts of a ship. It will also be manifest that the number of teeth in the escapement-wheel may be varied and that said wheel may be provided with a plurality of contact-pins in order that as many impulses as may be desired in one revolution of the escapement-wheel may be made.

I claim as my invention—

1. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of means actuated by the electromagnet for imparting an impulse to the balance-wheel, means actuated by the oscillation of the balance-wheel to rotate the escapement-wheel, and means for intermittently closing the circuit to the electromagnet.

2. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of an arm pivoted to said balance-wheel, a pin fixed in said balance-wheel, a spring adapted to hold said arm normally against said pin, means actuated by the electromagnet for contacting with said arm to impart an impulse to the said balance-wheel, means actuated by the oscillation of the balance-wheel to rotate the escapement-wheel, and means for intermittently closing the circuit to the electromagnet.

3. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of an arm pivoted to said balance-wheel, a pin fixed in said balance-wheel, a spring adapted to hold said arm normally against said pin, means actuated by the electromagnet for contacting with said arm to impart an impulse to the said balance-wheel, a standard, a lever having a slot therein pivotally connected to said standard, a spring fixed to said lever and adapted to contact with the end of said arm, a spring for normally holding said lever with the end of its spring away from said arm, a lever passing through the slot in the aforesaid lever, a link connecting the end of the last aforesaid lever with the armature of the electromagnet, means actuated by the oscillation of the balance-wheel to rotate the escapement-wheel, and means for intermittently closing the circuit to the electromagnet.

4. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of means actuated by the electromagnet for imparting an impulse to the balance-wheel, a disk, an arm pivotally connected to said disk, a pin fixed in said disk, a spring adapted to maintain said arm normally in position against said pin, the end of said arm being adapted to engage the teeth of the escapement-wheel, and means for intermittently closing the circuit to the electromagnet.

5. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of means actuated by the electromagnet for imparting an impulse to the balance-wheel, a disk, an arm pivotally connected to said disk, a pin fixed in said disk, a spring adapted to maintain said arm normally in position against said pin, the end of said arm being adapted to engage the teeth of the escapement-wheel, a contact-pin carried by said escapement-wheel, and a pair of spring-contacts against which the said contact-pin is adapted to bear to close the circuit to the electromagnet.

6. In an electric clock, the combination with an electromagnet, a balance-wheel and an escapement-wheel, of means actuated by the electromagnet for imparting an impulse to the balance-wheel, a disk, an arm pivotally connected to said disk, a pin fixed in said disk, a

spring adapted to maintain said arm normally in position against said pin, the end of said arm being adapted to engage the teeth of the escapement-wheel, a contact-pin carried by said escapement-wheel, and a second pair of spring-contacts against which the said contact-pin is also adapted to bear to close a circuit to secondary clocks.

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

HENRI CAMPICHE.

Witnesses:
L. H. MUNIER,
E. IMER-SCHNEIDER.