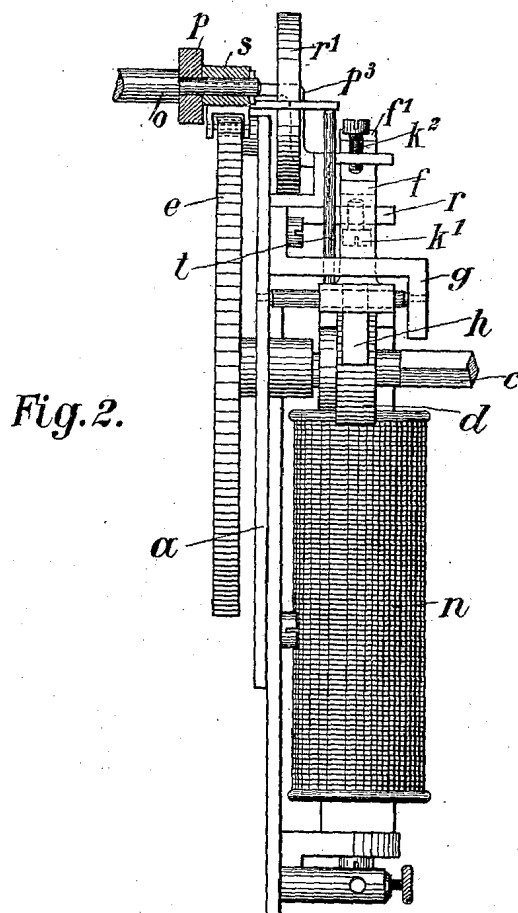


No. 834,708.

PATENTED OCT. 30, 1906.

H. CAMPICHE.
SECONDARY ELECTRIC CLOCK.
APPLICATION FILED MAY 24, 1905.

3 SHEETS—SHEET 2.



Witnesses

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Inventor.

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3 SHEETS—SHEET 3.

Fig. 3.

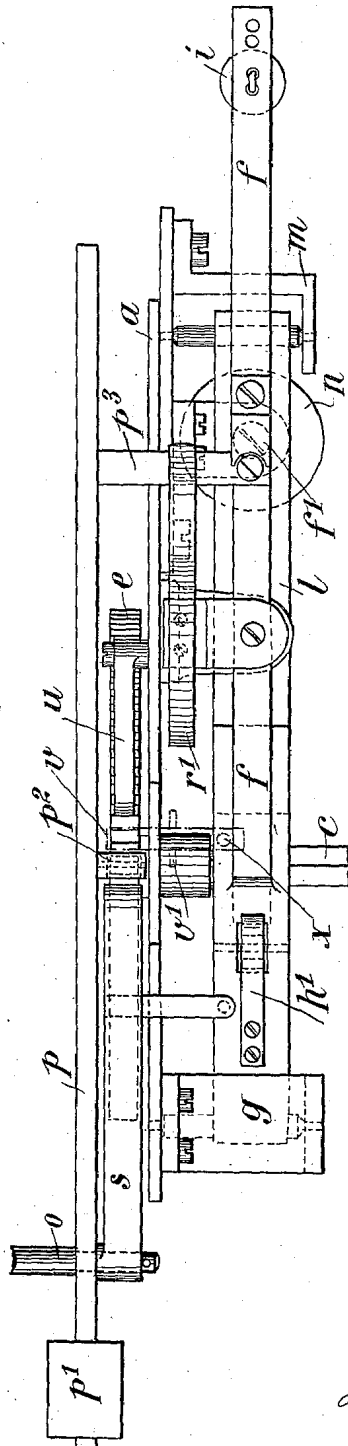
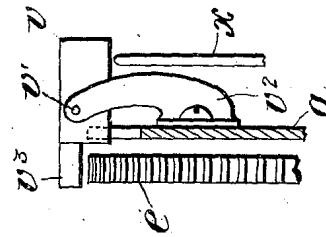


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRI CAMPICHE, OF GENEVA, SWITZERLAND.

SECONDARY ELECTRIC CLOCK.

No. 884,708.

Specification of Letters Patent.

Patented Oct. 30, 1906.

Application filed May 24, 1905. Serial No. 261,938.

To all whom it may concern:

Be it known that I, HENRI CAMPICHE, of Geneva, Switzerland, have invented certain new and useful Improvements in Secondary Electric Clocks, of which the following is a specification.

My invention relates to electric clocks, and has particular reference to secondary electric clocks having receiving-dials of large dimensions. The hands of these clocks, owing to their size and inertia, are liable to jump more than one minute or other predetermined interval at each impulse caused by the regulator of the installation. Furthermore, as these hands are generally placed out of doors their motions are liable to be influenced by the wind. Now of course this might be avoided by simply covering the hands and the dial with a protecting-glass; but this would be very inconvenient for very large dials and would be prejudicial to the reading of the time on account of reflections or condensations which would prevent the hands being seen.

The object of the present invention is the construction of mechanism intended to exactly control the motion of the minute-hand for a predetermined division of the dial—for instance, minute by minute—whatever may be the dimensions of the said hands. This is effected, on the one hand, by constructing the motive device for causing the advance of the hand in such a manner as to allow the same to operate, if necessary, during a whole minute whenever a resistance is opposed to the movement of the hand—for instance, by the wind. Further, a multiple stopping device is provided to prevent the hand from jumping more than one division at each impulse received.

In the drawings, Figure 1 is an elevation of the back of the device. Fig. 2 is a vertical section on the line A B of Fig. 1 shown from left to right. Fig. 3 is a plan, and Fig. 4 is a partial section through the pawl *v* and parts associated therewith.

a is the plate to which is secured the dial *b*.

The axis *c* of the minute-hand carries a small ratchet-wheel *d*, having sixty sharp teeth and intended to cause the rotation of the hands, and *e* is a large stop-wheel provided with sixty straight teeth and intended to prevent the hand jumping more than one tooth at each impulse.

There is provided a driving or propelling lever *f*, pivoted to a suitable bracket or

bridge *g*, which is secured to the frame *a* of the mechanism. Said lever *f* carries a movable weight *i* and a pawl *h*, held by a spring *h'* and engaging the teeth of the propelling ratchet-wheel *d*. The stroke of the propelling-lever *f* is limited in either direction by suitable screws *k'* and *k''* or other adjustable abutments in a bracket secured to the frame *a*, and the downward or gravity movement of said lever *f* due to its own mass and that of the weight *i* is intended to cause the propelling of the minute-hand by the pawl-and-ratchet wheel whenever the stop-wheel *e* is freed by the stopping devices, which will be hereinafter described.

In its normal position the propelling-lever *f* rests upon the screw or abutment *k'*; but once a minute it is lifted by the horizontal arm of a crank-lever *l*, which is pivoted to a bracket *m*, screwed to the frame. The vertical arm *l'* of said lever forms the armature *l''* of an electromagnet *n*, and said vertical arm *l'* carries an adjustable counterweight *l'''*, and said armature is intended to be attracted by the electromagnet *n*.

There is further provided a rocking stop-lever *p*, pivoted upon the stud *o* and having one fixed tooth *p''*, intended to engage one at a time the teeth of said large stop-wheel *e* and to prevent the hand jumping through an angle corresponding to more than one tooth of the wheel at each impulse. The lever *p* has a movable weight *p'*. The said rocking lever *p* carries a bent-arm *p''*, with an adjustable stopping-screw *q*, which from above bears against the propelling-lever *f*, so that the said stop-lever *p* is lifted by the screw *q* and arm *p''* simultaneously with the upward movement of the propelling-lever *f* at each action of the electromagnet *n* upon its armature *l''*.

The propelling-lever *f* is provided with a stop *f'*, notched in its outer end for the screw *q* and intended to limit the upward excessive stroke of the lever *p*, caused by any rebound. To a stationary bracket member *r* of the frame *a* there is fixed a spring *r'* by screws, (shown by dotted lines,) the free end of which spring bears downward upon the arm *p''* of the lever *p* in order to prevent sudden jumps of the latter.

To a secondary lever *s*, which is pivoted to the same pivot-stud *o* as is the stop-lever *p*, there is provided a secondary stop-tooth intended to engage one at a time the teeth of the stop-wheel *e*. A vertical pin *t*, fastened

to and rising from the propelling-lever *f*, is designed to act upon the said secondary lever *s* and to throw it upward whenever said propelling-lever *f* is lifted by the armature of the electromagnet *n* and to disengage its stop-tooth from a tooth of the stop-wheel *e*.

There is further provided a pawl *u*, pivoted to the frame *a* and operating through the action of gravity to engage one at a time the teeth of the stop-wheel *e*, and there may be provided a fourth or supplemental stop-lever or detent engaging a tooth at a time of the stop-wheel *e* and acted upon by a suitable projection of the propelling-lever in such a manner as to engage the said teeth the very moment the other stop-teeth are disengaged from the same.

With a view of rendering the drawing perfectly clear this fourth stop lever or detent *v* is shown in dotted lines in Figs. 1 and 3 and in side elevation in Fig. 4. This stop-lever *v* is mounted pivotally on a pin *v'*, fixed in a bracket *v''*, secured in a suitable position on the plate *a*. The lever *v* is provided with a reduced end *v''*, adapted to enter between the teeth of the stop-wheel *e*, and it is overbalanced at the opposite end so that normally the lever is maintained by gravity in the position shown in Fig. 4. A vertical rod *x* is so placed in the lever *f* that when the latter is raised the rod *x* raised thereby engages the overbalanced end of the stop-lever *v*, raising the same, and thereby lowering the reduced end *v''* into engagement with the teeth of the stop-wheel *e*, and this action takes place simultaneously with the release of the stop-wheel *e* from the stop *p''* on the lever *p* and also the stop *u* and the lever *s*, so that the stop-wheel cannot be moved in either direction until after the beginning of the return movement of the lever *f*, which releases the stop-lever *v*.

The stop-tooth *p''* and the ends of the levers *s* and *v* are each preferably provided with a roller adapted to enter the peripheral notches of the stop-wheel *e* between the teeth.

In the operation of my improved device whenever the electromagnet *n* of the receiver connected to the circuit of a regulator-clock of any system whatever is supplied with current it attracts its armature *b'*, the horizontal arm *l* of which is thereby raised and the propelling-lever *f* is simultaneously lifted sufficiently to advance the pawl *h* one tooth on the wheel *d*. In its rising movement the propelling-lever *f* lifts the stopping-lever *p* and its fixed stop-tooth *p''* and also the secondary stop-lever *s*, disconnecting their ends from the teeth of the stop-wheel *e*, and at the

same time the rod *x* tilts the stop-lever *v*, causing the same to engage with the teeth of the stop-wheel *e*. When the current is broken, the armature of the magnet is released, thereby permitting the lever *f* to descend. The downward movement of the lever *f* releases the stop-lever *v*, so that a predetermined portion of a revolution may be imparted to the stop-wheel *e* by means of the pawl *h* and wheel *d*, a greater movement than that predetermined being made impossible by the stop *k'*, and the stops on the ends of the levers *p* and *s* dropping back, respectively, into the next succeeding teeth of the stop-wheel *e*, so that when the lever *f* has again reached the bottom of its stroke the three stop-teeth *p''*, *s*, and *u* lock the wheel *e* in quite a safe manner until the next impulse caused by the electromagnet *n* acting upon the lever *f*.

I claim as my invention—

1. In a secondary electric clock, the combination with an armature and an electromagnet *n* for attracting the same, of a driving-lever *f* actuated thereby, a stop-wheel *e*, a pawl *h* and ratchet *d*, a stop-lever *p*, a tooth *p''* fixed thereon and a stop-pawl *s* for engaging and holding the stop-wheel *e*.

2. In a secondary electric clock, the combination with a driving-lever *f*, adjustable stops *k'* and *k''* for limiting the movement thereof, and a stop *f'* secured to said lever, of a lever *p*, an arm *p''* secured thereto, a set-screw *q* in said arm and a spring *r'* bearing upon said arm.

3. In an electric clock, an electromagnet and its armature, a pivoted and weighted driving-lever *f*, a pawl pivoted thereto, a ratchet-wheel *d*, engaged by the pawl, its axis *c* and a stop-wheel *e* fixed to the said axis *c*, a pivoted stop-lever *p* and means thereon disengaged from the stop-wheel *e* at the beginning of the starting or upward stroke of the driving-lever, a stop-lever or supplementary detent *v* and means causing the same to engage the stop-wheel at the end of the starting or upward stroke of the driving-lever and one or more pawls such as *s* and *u* to lock the stop-wheel *e* as soon as the driving-lever reaches the end of its active or downward stroke substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRI CAMPICHE.

Witnesses:

L. H. MUNICOR,
G. IMER.