J. STEIGER & J. BESANÇON.

SECONDARY ELECTRIC CLOCK.

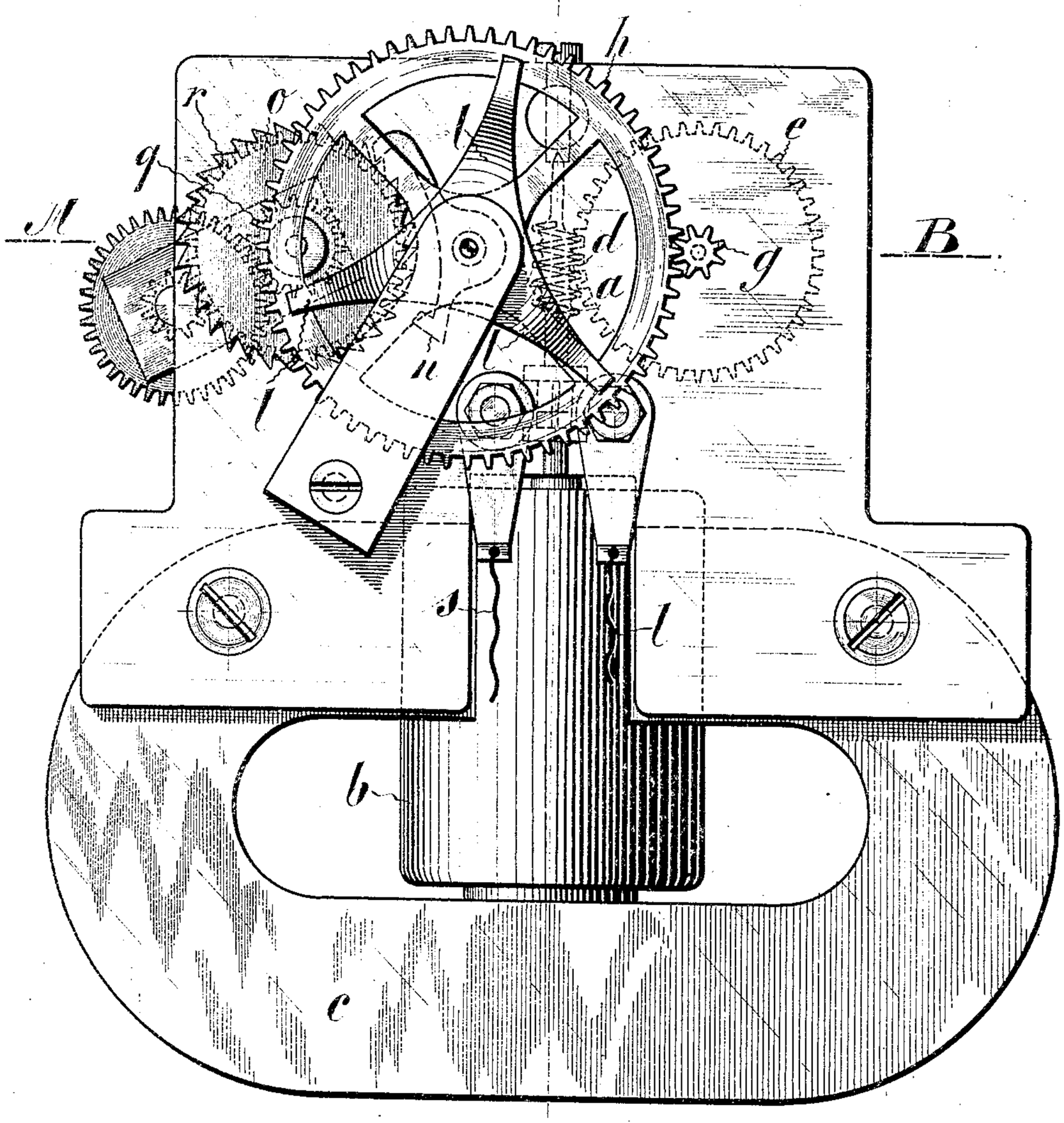
APPLICATION FILED JULY 7, 1908.

919,790.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

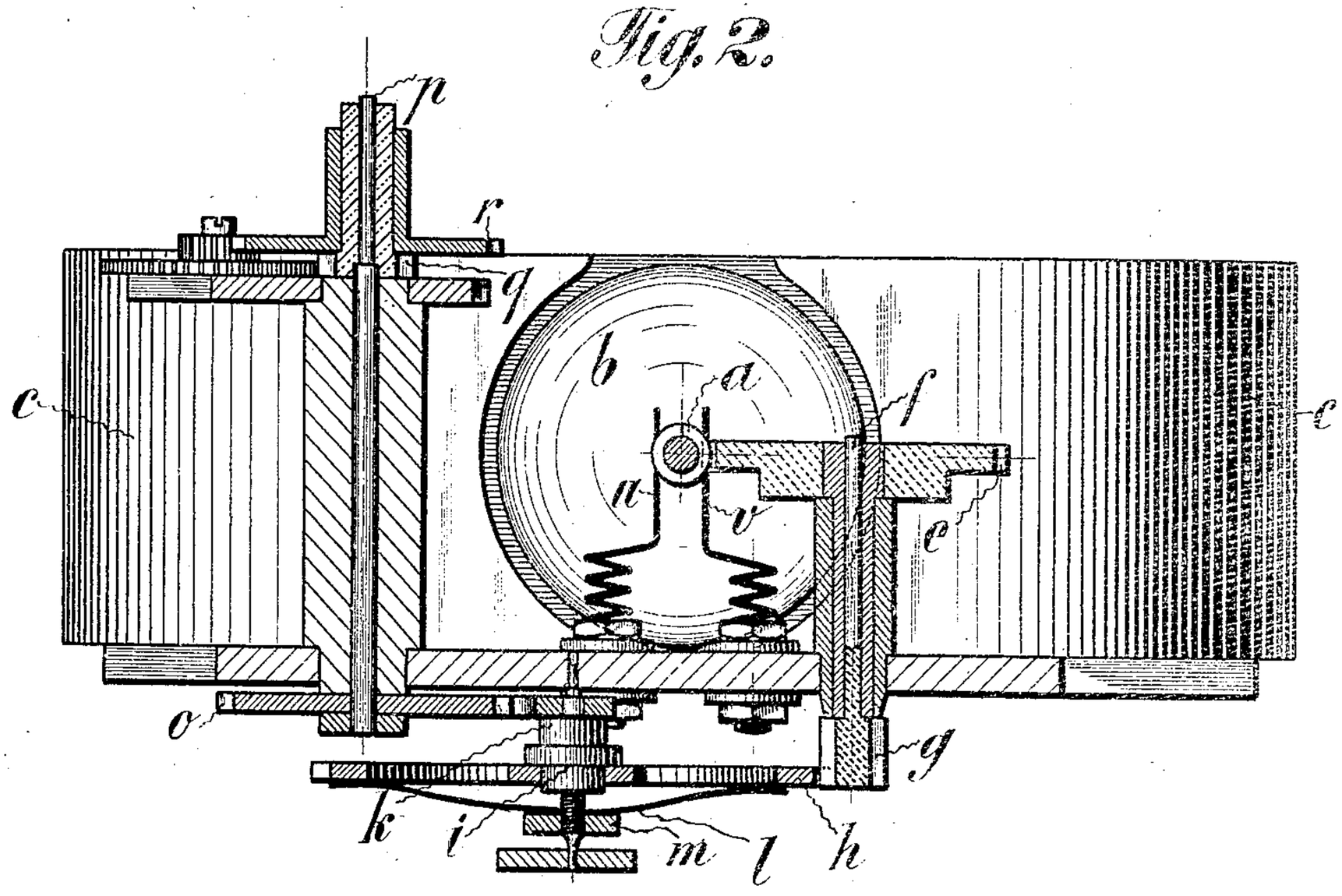
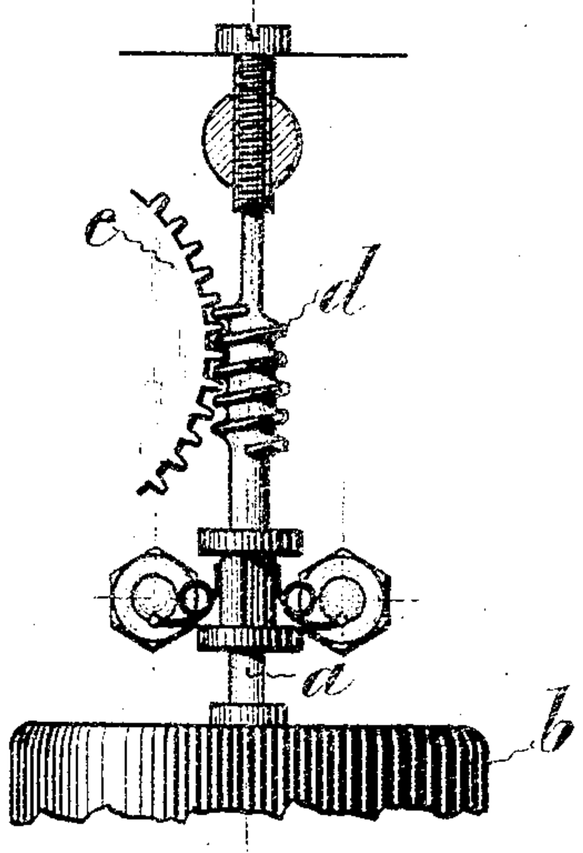


Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB STEIGER AND JAMES BESANCON, OF LA CHAUX-DE-FONDS, SWITZERLAND.

SECONDARY ELECTRIC CLOCK.

No. 919,790. Specification of Letters Patent. Patented April 27, 1909.

Application filed July 7, 1908. Serial No. 442,334.

To all whom it may concern:

Be it known that we, JACOB STEIGER and JAMES BESANÇON, of La Chaux-de-Fonds, in the Canton of Neuchâtel, Republic of Switzerland, have invented a new and useful Improvement in Secondary Electric Clocks, of which the following is a specification.

The invention relates to a secondary electric clock the pallet of which, acting on the wheel operating the hands, is actuated by a system of wheels driven by an electric motor.

The invention is illustrated by way of example in the accompanying drawing Figure 1 of which is an elevation showing the clock without dial or hands. Fig. 2 is a section through the line A—B of Fig. 1. Fig. 3 shows a detail.

As shown, the shaft *a* of a small electric motor constituted by the rotating armature *b* and the field magnets *c*, carries a worm *d* operating a worm wheel *e* fixed to one end of a shaft *f* whose other end carries a pinion *g* which engages with a wheel *h* adjusted by easy friction on the journal *i* of a shaft or arbor *k* by means of a spring *l* with three branches adapted to be pressed at will against the said wheel *h* by means of a nut *m* (Fig. 2) screwed on a screw-threaded part of the shaft *k*.

The shaft or arbor *k* carries, fixed on it, a pallet *n* acting on the teeth of a wheel *o* fixed to one end of a set-hands arbor *p* whose other end carries the cannon pinion *q* of which the cannon is intended to carry the minute hand and on which is placed the cannon wheel *r* intended to carry the hour hand. This cannon pinion and this cannon wheel gear with a minute wheel transmission of the usual type. The pallet *n* acts on the teeth of the wheel *o* in the same manner for example as indicated in the Swiss Patent 37373; that is to say, that for each semi-oscillation of the pallet the wheel *o* rotates one half tooth.

The current transmitted to the motor by the main clock every minute in a contrary direction imparts to the armature *b* of the motor a sufficient speed of rotation which permits of advancing for one half tooth the wheel *o* by the semi-oscillation of the pallet. The period during which the current passes to the motor through the conductors *s*, *t* and the brushes *u*, *v* is such that the armature makes several rotations after the pallet has effected its semi-oscillation, but, as the pallet abuts against its wheel *a*, the wheel *h* revolves idly on the shaft *k* owing to its adjustment by easy friction. There is thus no shock in the transmission from the motor to the hands, and the advancement of the hand minute by minute, is effected silently. Instead of the wheel *h* being adjusted by easy friction on its shaft, one of the toothed members carrying this wheel, for example the wheel *e* or the pinion *g*, might be adjusted in like manner.

The form and dimensions of the members described, the adjustable arrangement of the wheel *h* on its shaft and the number of teeth of the pinions and wheels may vary.

Having now described our invention, we claim as new and wish to secure by Letters Patent:—

1. In a secondary electric clock, the combination of a wheel to transmit motion to the hands, a pallet coacting with said wheel, and an electric motor having a rotary armature which makes complete revolutions and by which said pallet is actuated.

2. In a secondary electric clock, the combination of a hand-operating wheel, a pallet coacting therewith, and a rotary electric motor unlimited in its rotary movement and connected with the pallet to actuate the same.

3. In a secondary electric clock, the combination with the hand-operating wheel, and a pallet coacting therewith, of a rotary electric motor driven alternately in opposite directions, and a lost-motion connection between said motor and said pallet.

4. In a secondary electric clock, the combination of a hand-operating wheel, an arbor, a pallet fixed to said arbor and coacting with said wheel, a wheel mounted frictionally on said arbor, and means to drive said wheel.

5. In a secondary electric clock, the combination of a hand-operating wheel, an arbor, a pallet fixed to said arbor and coacting with said wheel, a toothed wheel mounted frictionally on said arbor, and means to positively drive said toothed wheel alternately in opposite directions.

6. In a secondary electric clock, the combination with the pallet, and the hand-operating wheel operated thereby, of a rotary electric motor so connected with the pallet that the latter is driven only to a certain extent, regardless of the number of revolutions of the motor.

7. In a secondary electric clock, the com-

bination of a hand-operating wheel, a pallet coacting therewith, an arbor to which the pallet is fixed, a wheel frictionally mounted on said arbor, and a rotary electric motor geared to said wheel and by which the same is rotated alternately in opposite directions.

8. In a secondary electric clock, the combination of a rotary electric motor, a toothed wheel positively driven thereby, a hand-operating wheel, a pallet coacting therewith, and a lost-motion connection between said pallet and said first-named wheel.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

JACOB STEIGER.
JAMES BESANÇON.

Witnesses:
ARNOLD E. KOFFEY,
C. DUBOIS.