

38. HOROLOGY,
Clocks, Electric,
Secondary,
Escapement.

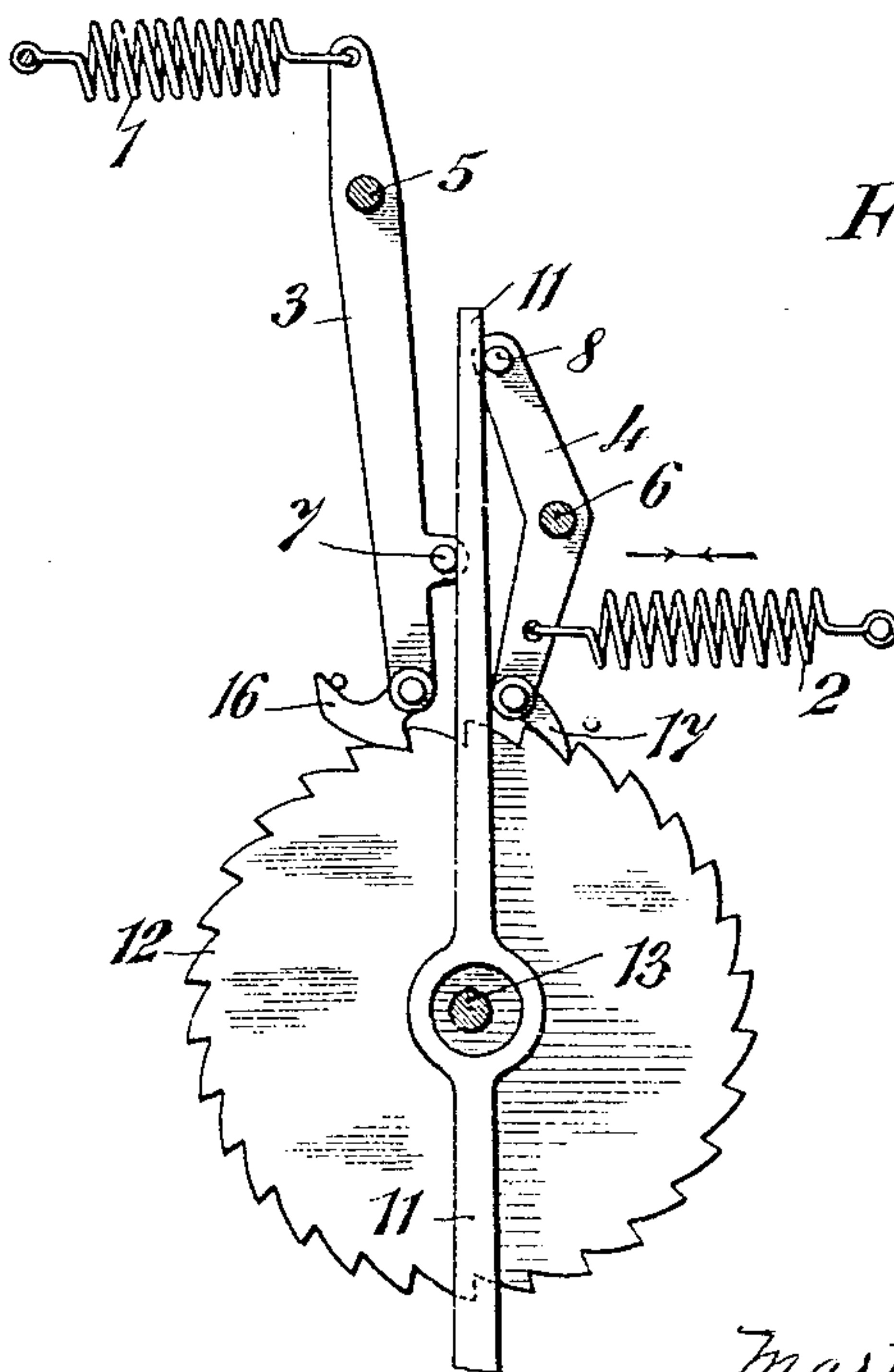
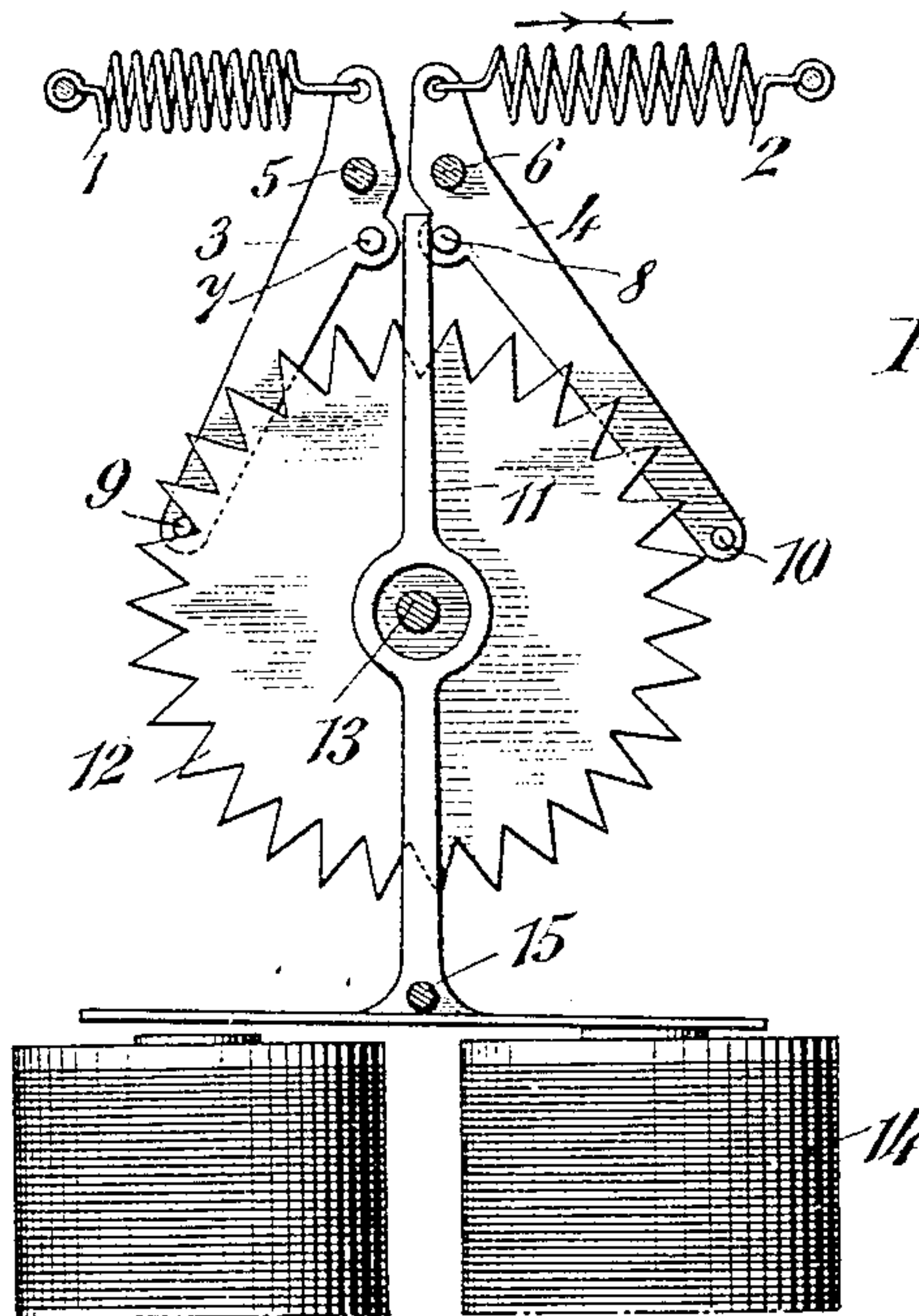
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M. FISCHER.

CLOCK CONTROLLED BY REVERSALS OF ELECTRIC CURRENT.

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Witnesses:

Harry L. Amer.
B. M. Rommels

Inventor:

Martin Fischer.
by Henry Orthof
Attys

UNITED STATES PATENT OFFICE.

MARTIN FISCHER, OF ZURICH, SWITZERLAND.

CLOCK CONTROLLED BY REVERSALS OF ELECTRIC CURRENT.

No. 844,010.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed September 1, 1904. Serial No. 223,047.

To all whom it may concern:

Be it known that I, MARTIN FISCHER, a citizen of the Republic of Switzerland, residing at Zurich, in Switzerland, have invented new and useful Improvements in Clocks Controlled by Reversals of Electric Current, of which the following is a specification.

In the hitherto usual constructions of secondary clocks controlled by reversals of electric current the arms of the ratchet-lever which actuates the escapement-wheel are formed one piece or positively connected together, and they are therefore compelled to move together by the action of the current.

Now in a secondary clock of this type constructed in accordance with this invention two separate ratchet-levers are employed, which are caused by spring-pressure to engage with the teeth of a ratchet-wheel. Each of these ratchet-levers is caused, by means of a polarized armature, to move alternately out of engagement with the teeth of the ratchet-wheel in opposition to its spring, while at the same time the other ratchet-lever is caused by its spring to engage with the teeth of the ratchet-wheel and thus to rotate the latter.

In the accompanying drawings, which illustrate, by way of example, two constructions of apparatus according to this invention, Figure 1 shows diagrammatically two ratchet-levers and the ratchet-wheel of one construction of a secondary clock controlled by reversals of electric current with the armature and electromagnet. Fig. 2 shows diagrammatically the other construction without the armature and electromagnet.

Referring first to Fig. 1, the two ratchet-levers 3 and 4 are pivoted, respectively, on axles 5 and 6 and are connected at their shorter upper arms to two tension-springs 1 and 2, respectively, which have a constant tendency to move the ratchet-pins 9 and 10, arranged on the lever-arms of the respective levers into engagement with the teeth of the ratchet-wheel 12, which is fixed on an axle 13.

A polarized armature 11, upon which an electromagnet 14 is adapted to act, is pivoted on an axle 15, so that the armature by striking in turn against each of the pins 7 and 8, provided on the ratchet-levers 3 and 4, is able to rotate the ratchet-levers on their pivots 5 and 6 in opposition to the respective springs 1 and 2. The manner of operation of this apparatus is as follows: By the action

of the current in the coils of the electromagnet 14 the armature 11 is moved alternately to the right and to the left on its axis 15, whereby it moves the ratchet-pins 9 and 10 alternately out of engagement with the teeth of the wheel 12—that is to say, while one ratchet-lever is moved out of the teeth the other ratchet-lever is simultaneously caused by its spring to act upon a tooth of the ratchet-wheel, and thus rotate the ratchet-wheel. In the construction of apparatus shown in Fig. 2 the ratchet-levers 3 and 4, which are mounted on the axes 5 and 6, are caused by means of the pawls 16 and 17 to engage with the ratchet-wheel 12.

In the construction shown in Fig. 2 I provide a pin or other abutment for each of the pawls 16 and 17 to limit their upward swing, as shown at 16' 17', respectively. The manner of operation of this construction is the same as that shown in Fig. 1. The rocking movement of the polarized armature 11 on its axle alternately to the right and to the left rotates the ratchet-wheel 12, because when the armature 11 by striking against the pin 8 of the ratchet-lever 4 moves the ratchet-pawl 17 out of one tooth-space in opposition to the spring 2 simultaneously the pawl 16 is caused, by the rotation of the ratchet-lever 3 on its axle 5, due to the action of the spring 1, to act upon a tooth of the ratchet-wheel 12. In this manner rotation of the ratchet-wheel is produced.

A single tension-spring fixed between the two long arms of the ratchet-levers 3 and 4 may be employed instead of the two springs 1 and 2.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a secondary clock, a time mechanism having a ratchet-wheel, a pair of independently-mounted ratchet-levers, a spring for each lever to urge it against the wheel and means operated by electric-current impulses to alternately move one lever out of contact with the wheel against its spring action and simultaneously release the other lever to permit its spring to urge said other lever against the wheel to drive the wheel one tooth forward.

2. In a secondary clock, a time mechanism having a ratchet-wheel, a pair of independently-mounted ratchet-levers, springs to urge each lever to move the wheel, means

to limit the movement of the independent levers from the wheel and mechanism actuated at time intervals by electric impulses to alternately move one lever from the wheel
5 and simultaneously release the other lever to allow its spring to urge said other lever against the wheel to drive it.

3. In a secondary clock, a time mechanism controlled and operated by electric im-
10 pulses having a time-wheel, two independently-pivoted ratchet-levers of different lengths, springs to urge the levers against the wheel, means to engage one of the levers above and the other below its pivot-point to
15 give said levers their idle movement, said means actuated at time intervals by electric-current impulses, substantially as described.

4. In a secondary clock, a time-wheel hav-

ing two independently-pivoted ratchet-levers of different lengths, springs to urge the levers 20 against the wheel, means to limit their idle movement, pawls pivoted at the ends of the levers to trail on said wheel and means actuated by timed electric-current impulses to give said levers and pawls their idle move- 25 ment, said means engaging one of the levers above and the other below its pivot-point, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 30 two subscribing witnesses.

MARTIN FISCHER.

Witnesses:

PAUL RUEF,
WILLIAM STEHLER.