(No Model.)

C. H. POND & A. S. MUNGER.

SECONDARY ELECTRIC TOWER CLOCK.

No. 305,632. Patented Sept. 23, 1884.

Fig. 2,

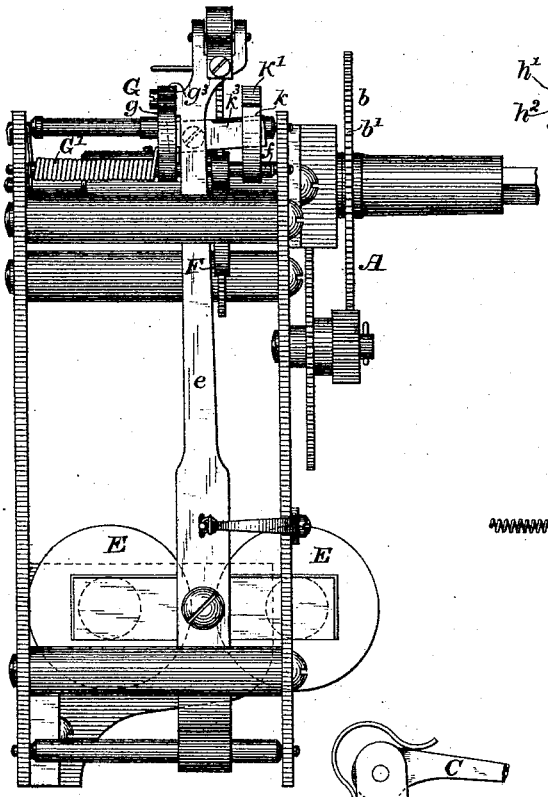


Fig. 1,

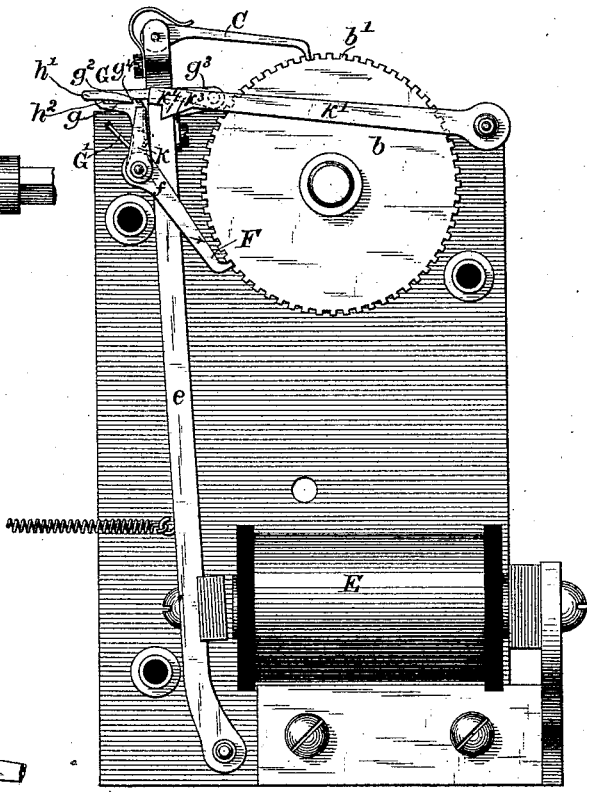
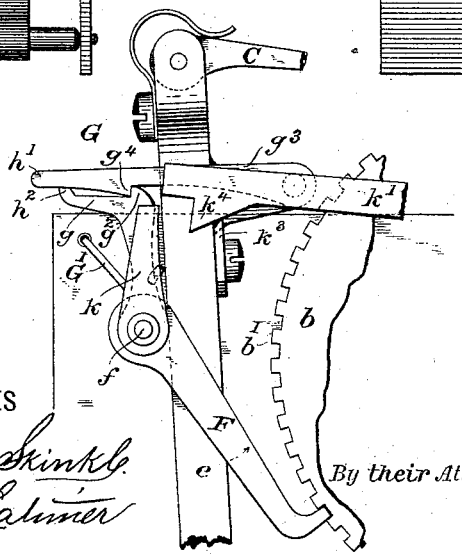


Fig. 3.



WITNESSES

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CHESTER H. POND, OF NEW YORK, AND ALFRED S. MUNGER, OF BROOKLYN, ASSIGNORS TO THE TIME TELEGRAPH COMPANY, OF NEW YORK, N. Y.

SECONDARY ELECTRIC TOWER-CLOCK.

SPECIFICATION forming part of Letters Patent No. 305,632, dated September 23, 1884.

Application filed September 24, 1883. (No model.)

To all whom it may concern:

Be it known that we, CHESTER H. POND and ALFRED S. MUNGER, citizens of the United States, residing, respectively, in New York, in the county and State of New York, and in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Secondary Electric Tower-Clocks, of which the following is a specification.

The object of our invention is to produce a movement for secondary electric clocks which shall not be liable to be too rapidly advanced under the successive impulses imparted to the driving-wheel, nor subject to a retrograde movement when released from the retaining click or dog. Such provisions are especially desirable in secondary electric clocks designed to control the movements of heavy hands, such as are employed for tower-clocks.

The invention consists in organizing the mechanism as follows: The driving-wheel of a secondary electric clock of usual construction is provided with a detaining click or dog, which normally engages the teeth of the wheel, thus preventing an accidental movement of the same. The forward movement of the driving-pawl, however, first causes this click to be disengaged from the teeth of the wheel through the agency of a tripping device, thus permitting an advance of the same. The click is then allowed to fall against the next tooth in such manner as to enter the succeeding space when the wheel has completed its advance movement. The moment the click enters this space it is momentarily locked therein, thus effectually preventing it from being thrown out by a rebound. The return of the pawl to its former position causes the same to engage the succeeding tooth, and the tripping device to be placed in a position to repeat the operation at the next forward movement of the pawl.

In the accompanying drawings, which illustrate our invention, Figure 1 is a front elevation of the clock mechanism, and Fig. 2 is a side elevation of the same. Fig. 3 illustrates certain details in the construction of the locking device.

Referring to the drawings, A represents a train of wheels adapted to revolve the hands of the clock before a dial in their proper relative periods. The driving-wheel *b* of this train is preferably constructed with square teeth *b'*, and arranged to be advanced step by step by means of a pawl, C. This pawl is pivoted upon an armature-lever, *e*, of an electro-magnet, E. The electro-magnet E is designed to be included in circuit with any suitable device for completing and interrupting the connections of a battery with the proper frequency for propelling the hands in their required periods.

The movements of the wheel *b* are checked by means of a dog or click, F, which is carried upon an arbor, *f*, and normally forced toward the wheel by means of a coil-spring, G', surrounding the arbor. One end of this spring is fastened to the dog and the other attached to the frame of the mechanism, and it acts, in a manner well understood, to force the click in the direction indicated by the arrow. So long as the dog engages the wheel the latter is prevented from moving in either direction, and it is evident that the wheel must be disengaged from the dog before it can be advanced by the action of the pawl. This end is accomplished by means of a tripping device, G, which consists of a plate, *g*, attached to the arbor *f*, and carrying a detent, g^2, upon its upper surface. A latch or hooked pawl, g^3, is pivoted to the armature-lever, and carries at its end a catch or hook, g^4, which is adapted to fall behind the projection g^2 when the lever is in its backward position, and the dog or click F engages the teeth of the wheel. When, however, the armature-lever is moved forward, the tripping device G serves to turn the arbor and thus throw the dog F out of engagement with the wheel, thus permitting the latter to be advanced. It will be observed, however, that a slight forward movement of the lever and pawl must take place before the wheel is freed from the dog. This may be provided for either by causing the pawl to normally fall back at each movement a slight distance farther than is necessary to engage the succeeding tooth, and thus allow it to subsequently move a sufficient distance forward before striking that tooth to accomplish the desired result; or the dog may be constructed to permit the necessary ad-

vancement by forming the engaging-stop of less thickness than the width of the space between two successive teeth, thus permitting a slight movement of the wheel, notwithstanding the engagement of the click. The former method, however, is preferable.

For the purpose of causing the dog or click F to assume the required position for engaging the wheel immediately after the latter has advanced a sufficient distance to carry the space in which the click previously rested beyond its reach, the latch g^3 is constructed with an extension, k', which rests upon an arm, k^2, of the detent g^2. As the arbor is revolved by the action of the lever and driving-pawl, the arm k^2 serves to raise the extension k', thus lifting the latch out of engagement with the detent. The dog is then again impelled toward the wheel and strikes against the face of the succeeding tooth. The continued advancement of the wheel under the influence of the pawl causes this tooth to pass from beneath the dog, which thereupon falls into the succeeding space, effectually preventing the wheel from advancing more than one tooth. The time during which the dog is held away from the wheel is necessarily so short that it would be practically impossible for the wheel to advance more than one tooth at each movement of the armature-lever.

For the purpose of further providing against an accidental displacement of the dog, a locking device is provided for holding the dog in engagement with the wheel when the pawl is in its forward position. This device consists of a stop, k, carried upon the arbor f, and an arm, k', which is pivoted to the frame of the mechanism and rests upon an arm, k^3, extending from the lever e. A bevel-faced projection, k^4, is formed on the under side of the arm k', and by resting at its thicker portion upon the arm k^3 serves to normally hold the arm k' out of the path of the stop or block k. When, however, the lever is moved forward, the arm k^3 moves along the under surface of the bevel-faced projection k^4, and thus permits the arm k' to fall. As soon as the lever and driving-pawl have advanced a sufficient distance to permit the dog to again engage the teeth of the wheel, the arm k' falls behind the stop or block k, thus effectually preventing the dog from rebounding.

We claim as our invention—

1. The combination, substantially as hereinbefore set forth, with the train mechanism of an electric clock, of a driving-pawl for advancing and a dog or click for engaging the same, a hooked pawl moving with said driving-pawl, an arm moving with said click, and means, substantially such as described, for causing said hooked pawl to successively engage and release said arm at each forward movement of said driving-pawl.

2. The combination, substantially as hereinbefore set forth, of a toothed wheel, a pawl and lever for actuating the same, a dog or click for locking the same, a tripping device acting to momentarily disengage said dog from said wheel during the advance movement of said pawl, and a locking device serving to lock said dog between the teeth of said wheel when it again engages the same.

3. The combination, substantially as hereinbefore set forth, with the train mechanism of an electric clock, of a retaining click or dog applied to one of the wheels of said mechanism, and a locking device serving to lock said click between the teeth of said wheel when it first engages the same.

4. The combination, substantially as hereinbefore set forth, with the driving-wheel of an electric clock, of a pawl for advancing the same step by step, which pawl is constructed to receive an initial advance movement between the teeth of said wheel without actuating the same, and a locking-pawl for said wheel, which is actuated during such initial movement.

5. The combination, substantially as hereinbefore set forth, of the wheel b, the pawl C, the lever e, the dog F, and the tripping device G.

6. The combination, substantially as hereinbefore set forth, of the wheel b, the pawl C, the lever e, the dog F, the tripping device G, and the locking-lever k', block k, arm k^3, and projection k^4.

In testimony whereof we have hereunto subscribed our names this 22d day of September, A. D. 1883.

CHESTER H. POND.
ALFRED S. MUNGER.

Witnesses:
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