

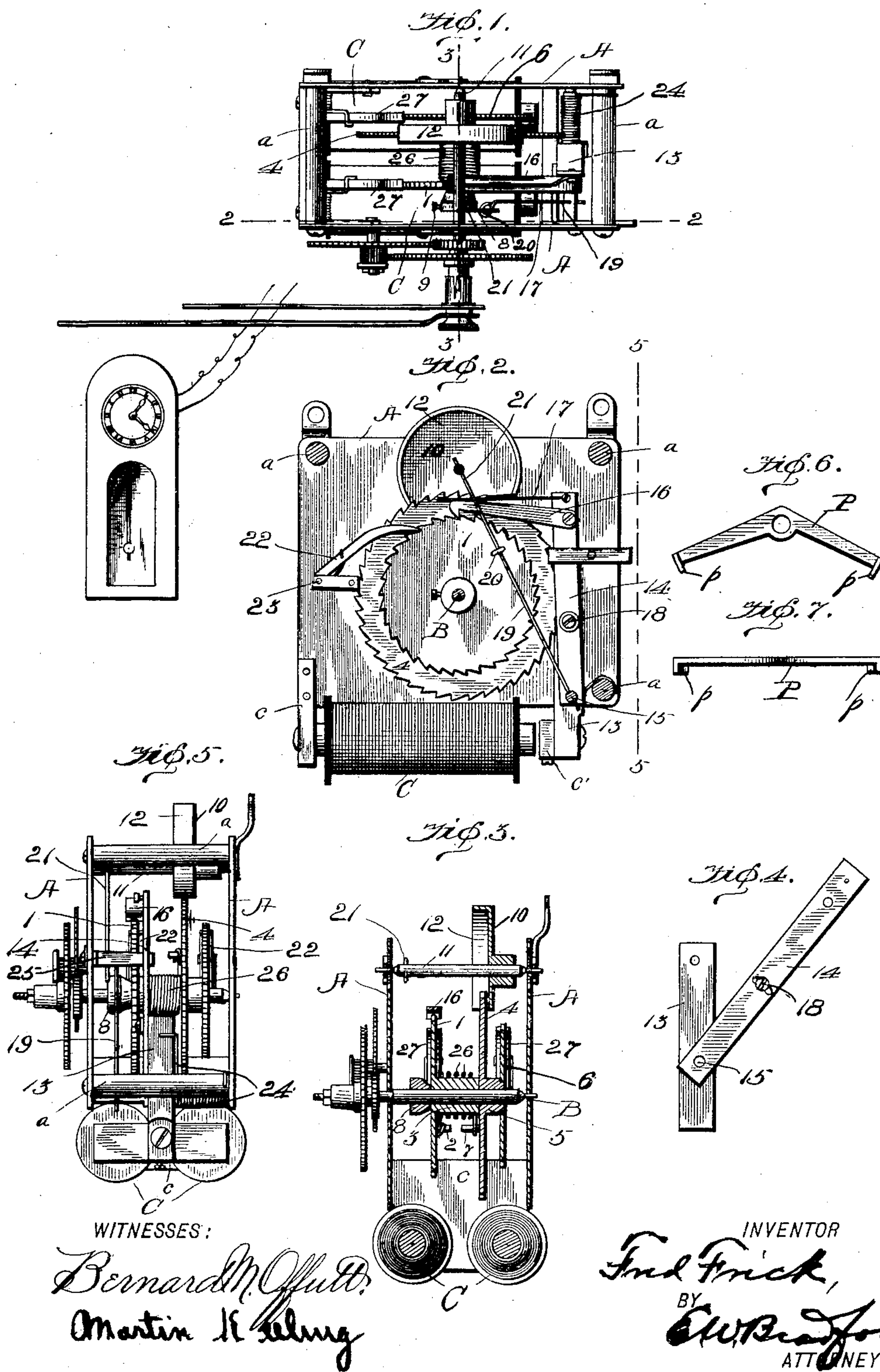
No. 702,299.

Patented June 10, 1902.

F. FRICK.  
ELECTRIC CLOCK.

(Application filed Sept. 16, 1901.)

(No Model.)





# UNITED STATES PATENT OFFICE.

FRED FRICK, OF WAYNESBORO, PENNSYLVANIA.

## ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 702,299, dated June 10, 1902.

Application filed September 16, 1901. Serial No. 75,492. (No model.)

*To all whom it may concern:*

Be it known that I, FRED FRICK, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification.

My said invention consists in an improved construction of "secondary" clocks for use in an electric-clock system whereby a positive driving pressure of uniform power is at all times exerted against the escapement-wheel for driving the hands forward, and, further, whereby the movement is rendered positive and uniform regardless of the position of the hands or their relative gravity, all of which will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a top or plan view of the mechanism of a secondary clock embodying my said invention; Fig. 2, a section through the same on the dotted line 2 2 in Fig. 1; Fig. 3, a transverse section on the dotted line 3 3 in the same figure; Fig. 4, a detail view of the armature-lever separately; Fig. 5, a rear elevation as seen looking in the direction indicated by the arrows from the dotted line 5 5 in Fig. 2, and Figs. 6 and 7 views illustrating a modified form of pallet.

In said drawings the portions marked A represent the side plates forming part of the frame, B the arbor on which the hands are mounted, and C the magnets.

The plates A are secured together by rods or posts *a* in the usual or any approved manner to form the frame for supporting the mechanism. The arbor B is mounted in the frame in the well-known manner. The magnets C are preferably mounted to extend across the bottom of the frame, being secured to a bar or yoke *c*, which is rigidly fastened between the side plates A, as shown. These portions and the ordinary train of gear by which the hands are connected to revolve at the proper relative speeds are all of common or any appropriate construction and arrangement and need no special description, being shown to illustrate a complete device for the

purpose of making the invention more easily understood.

A winding ratchet-wheel 1 is mounted loosely on arbor B, having a pin 2 extending out from one side and pivoted with a long hub 3 on the same side. The escapement-wheel 4 is mounted rigidly on said arbor alongside the outer end of said hub, and on the outer end of its hub 5 is mounted a backlash ratchet-wheel 6. The escapement 4 is also provided with a pin 7, similar to pin 2 and projecting from its side adjacent to the ratchet-wheel 1. The hub 3 is secured in place on the arbor by a collar 8, provided with a set-screw 9. The verge or pallet 10 is mounted on an arbor 11 directly above the escapement-wheel 4 and is formed in a novel manner. It consists of a disk with an appropriate hub for securing it to the arbor and provided with a flange 12 around its outer edge. One side is then cut off, the cut through the flange being made to conform to the size of the tooth with which it will make contact in operation in order that there may be no binding in operation. I find that this form of pallet can be made at much less expense than the ordinary form, as the interior of the flange can be quickly and easily ground to a true circle on a grinding-machine and the faces formed with little labor and for these reasons prefer to use it; but, as will be readily understood, any form of pallet may be used, if preferred. An armature *c'* is mounted on the end of a lever 13, adjacent to the pole of magnet C, said lever being mounted on an arbor 15 and provided with an extension 14, to the outer end of which is pivoted a pawl 16, which engages with the teeth of ratchet-wheel 1. A spring 17, connected at one end with the top of part 14, bears upon the top of said pawl 16 and holds it into engagement with said teeth. The part 14 is secured to part 13 by being pivoted at one end on arbor 15, and at a point above a clamping-screw passes through a slot therein and into a screw-threaded perforation in part 13, thus permitting the part 14 to be adjusted to bring the engaging point of the pawl into proper relation with the teeth of wheel 1. An arm 19 is mounted in a transverse perforation in arbor 15 and extends upwardly toward arbor 11, being formed



with a loop or socket 20 on its upper end. A similar arm 21 is mounted in arbor 11 and extends downwardly, its lower end projecting into said loop or socket. A pawl 22, pivoted  
 5 on a stud on one side of the frame, engages with the teeth of ratchet-wheel 1 and prevents any back movement thereof, a spring 22 operating to hold said pawl into engagement at all times. Around arbor 15 is coiled a spring  
 10 24, which bears at its front end against the rear side of lever 13 and tends to throw it and the pawl 16 forward, a stop 25 being provided against which the front edge of part 14 strikes to limit the forward movement of the pawl to  
 15 the proper point. Around the hub 3 is mounted a coiled spring 26, one end of which is attached to the pin 2 of ratchet-wheel 1 and the other end of which is attached to pin 7 of the escapement-wheel 4. A pawl 27, similar  
 20 to pawl 22 and mounted on the opposite side of the frame, engages the teeth of ratchet-wheel 6 and holds it against any backward movement.

The operation is as follows: The parts being arranged as shown and described, wheel  
 25 1 is turned on the arbor B to wind the spring 26 to the required tension, pawl 22 operating to hold said wheel from backward movement. The force of said spring is thus directed  
 30 against pin 7 of wheel 4, normally tending to force said wheel and the arbor on which it is mounted and the hand operating-gear driven thereby forward under a constant and uniform pressure. The pallet 10 holds said  
 35 wheel and governs its movement and is operated by the magnet as follows: The circuit being closed by the master-clock M, as is well understood, the magnet is energized, which draws down the armature C and turns  
 40 the arbor 15, on which it is mounted. The arm 19 is thus carried forward and through the arm 21 rocks the arbor 11, on which the pallet is mounted, to release the tooth of the escapement-wheel with which it is engaged  
 45 on one side and fall into engagement with a tooth on its opposite side, the spring 26 operating to force said escapement-wheel forward the distance permitted by said pallet, which is the space of half a tooth. The circuit being broken, the spring 24 immediately  
 50 throws the parts back into their first position, the escapement-wheel being again permitted to move the space of half a tooth under the force of spring 26. The pawl 16 has at the  
 55 same time and by the same movement of arbor 15 through the lever 13 14 and pawl 16 operated to move winding ratchet-wheel 1 the same distance with the escapement-wheel 4, and thus maintains the tension of the  
 60 spring 26 as desired. By this arrangement, as will be seen, every movement is positive, there is no possibility of slipping or too rapid movement when the weight of the hands is not the same, as in some clocks of this character, and a positive force is directed against  
 65 the mechanism for moving it forward at all times. In Figs. 6 and 7 a form of pallet is

shown wherein substantially the same advantages are secured, the engaging points or  
 projections *p* being formed on the ends of the  
 70 arms P to project out from the side at right angles therewith, being ground on the arc of a circle and cut as are the engaging points of the pallet shown in the principal views.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric clock, the combination of an escape-wheel, means for applying power to said escape-wheel, and means for controlling the movement of said escape-wheel, which  
 80 last means is operated by the means for applying the power to the escape-wheel.

2. In a secondary clock, the combination, of the frame, the magnet, the armature, the  
 85 driving mechanism, an escapement-wheel mounted on an arbor, a wheel mounted loosely on said arbor alongside said escapement-wheel, a spring connected to the escapement-wheel at one end and connected at its other end  
 90 to said loosely-mounted wheel, connections from the armature to said escapement-wheel for controlling its movement, and connections from said armature to said loosely-mounted wheel for moving it with said escapement-  
 95 wheel, substantially as set forth.

3. An electric clock comprising an escapement-wheel connected with means for holding it under a constant forward tension, means for maintaining the tension, means for  
 100 controlling the escapement-wheel, and an armature connected both with the means for maintaining the tension of the escapement-wheel, and with the means for controlling its movement, whereby both are operated  
 105 from the same armature, substantially as set forth.

4. In an electric clock, the combination, of the frame, and the operating mechanism comprising a magnet, an armature, a pivoted lever  
 110 connected with said armature, an escapement-wheel, the pallet, a connection between said pallet and said lever, a connection between said lever and a winding-wheel, said winding-wheel, a coiled spring mounted  
 115 around the arbor on which said wheels are mounted with one end connected to the escapement-wheel and the other to said winding-wheel, and means for holding said parts against backward movement, substantially  
 120 as set forth.

5. In an electric clock, the combination, of the frame, the magnet, the train of gears, the escapement-wheel mounted rigidly on its arbor, said arbor, the pallet also mounted rigidly  
 125 on its arbor, said arbor, a second wheel mounted loosely on the escapement-wheel arbor alongside said escapement-wheel, a coiled spring surrounding said arbor and connected at one end to said escapement-wheel  
 130 and at its other end to said loosely-mounted wheel, means for holding said wheels against backward movement, an armature mounted on one end of a lever adjacent to the pole of



the magnet, said lever mounted on an arbor, said arbor, a connection from said arbor to the arbor of the pallet for operating said pallet, and a pawl on said lever engaging the  
5 teeth of said loosely-mounted wheel for advancing it as said escapement-wheel advances, whereby the tension of said spring is maintained, substantially as set forth.

6. An electric clock comprising an escape-  
10 wheel, a spring arranged with its tension directed to move said escape-wheel forward, means for positively locking and releasing said escape-wheel, and a single operating mechanism to maintain the tension of the  
15 spring and to operate the escape-wheel-controlling device, substantially as set forth.

7. In an electric clock, the combination of the escapement-wheel, means for positively locking and releasing said escapement-wheel,  
20 a spring for forcing the said escapement-wheel forward, mechanism for winding said spring to maintain its tension, and an armature connected both with the escapement-wheel-controlling device and the mechanism  
25 for winding the spring for operating them,

whereby both are positively and simultaneously operated, substantially as set forth.

8. In an electric clock, the combination of an escapement-wheel, means for controlling it, means for operating it, a single armature  
30 connected to both the controlling and the operating means, and the magnet for controlling the operation of the armature, substantially as set forth.

9. In an electric clock, the escapement-  
35 wheel, the pallet or verge, the magnet, an armature, a connection from said armature to said verge for operating it, a spring for forcing the escapement-wheel forward, and mechanism for maintaining the tension of said  
40 spring operated through a connection with the same armature, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Waynesboro, Pennsylvania, this 12th day of September, A. D. 1901.

FRED FRICK. [L. S.]

Witnesses:

J. G. BENEDICT,  
ALF. N. RUSSELL.