

C. E. MATHIESEN.
ELECTRIC CLOCK.
APPLICATION FILED NOV. 19, 1910.

995,797.

Patented June 20, 1911.

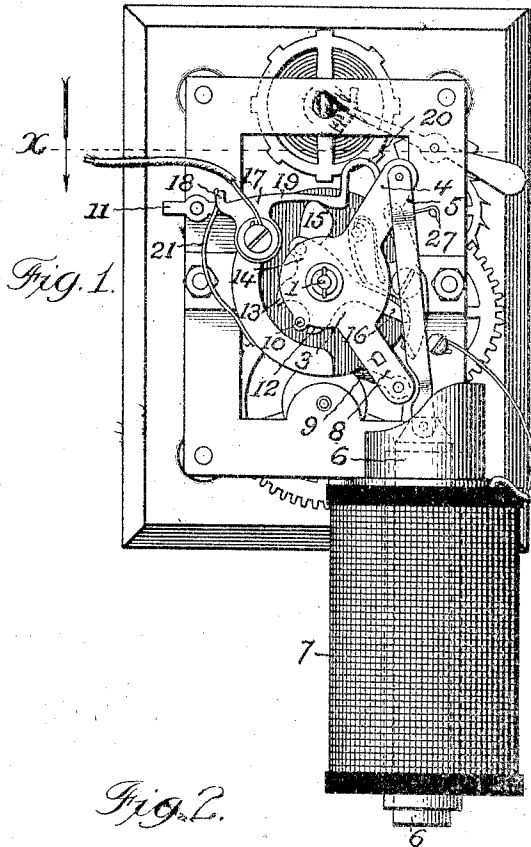


Fig. 2.

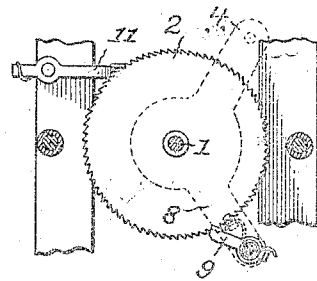
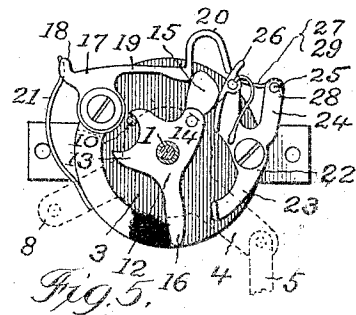
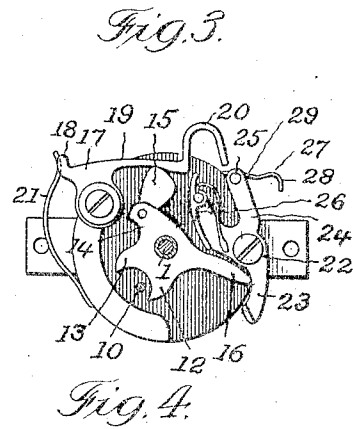
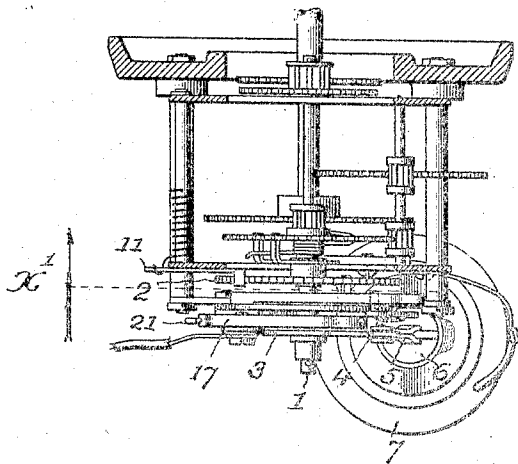


Fig. 6.

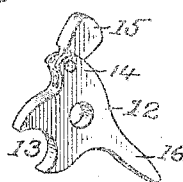
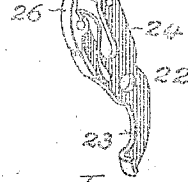


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ELECTRIC CLOCK.

995,797.

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To all whom it may concern:

Be it known that I, CARL E. MATHIESEN, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification.

This invention relates to that class of electric clocks in which an electrically actuated mechanism operates automatically and at regular intervals to wind up the escapement controlled mechanism of the clock. And the present improvement has for its object to provide a simple and efficient contact making mechanism for the operating electro-magnet, in which a very rapid making and breaking of the circuit is effected in the periodical winding operations, with consequent economy in the expenditure of the motive force of the primary battery generally employed in the present class of clocks, and with which the noise and friction of the parts in action is reduced to a minimum, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1, is a rear elevation of an ordinary form of clock mechanism having the present invention applied. Fig. 2, is a horizontal sectional elevation of the same, on line $x-x$, Fig. 1. Figs. 3 and 4, are detail sectional elevations of the present circuit making and breaking mechanism in two different positions, the operating arm thereof being removed. Fig. 5, is a detail sectional elevation on line $x'-x'$, Fig. 2, showing the pawl and ratchet connection between the operating frame and the ratchet wheel of the primary shaft of the clock mechanism. Fig. 6, is a detail perspective view of operating spider. Fig. 7 is a similar view of the secondary contact member.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents the primary driving shaft of the clock mechanism. Said shaft is journaled in the usual clock frame and has operative connection with the clock hands by the usual train of gear wheels, and like connection with the

escapement by a corresponding train of gear wheels as usual in clock movements. In the construction shown in the drawings the shaft 1 projects at the rear of the clock mechanism to form a bearing trunnion for the parts of the circuit making mechanism hereinafter described.

2 is a ratchet disk mounted upon the aforesaid driving shaft 1 and connected thereto either in a positive manner by a cross pin or the like, or in a yielding manner by an interposed spring connection between the parts, in accordance with the particular type of electric clocks to which the present invention may be applied. Both of said connections are quite common to electric clocks now on the market and are equally adapted for use in connection with the novel circuit making mechanism of the present invention.

3 is an oscillating frame loosely mounted on the aforesaid shaft 1 and having a series of radial arms for operative connection as follows: 4 is an arm on said frame 3, connected by link 5 with the armature 6 of the solenoid electro-magnet 7, by which intermittent oscillatory reciprocation is imparted to the frame 3, in the operation of the clock. While the arrangement above described and shown in the drawings is preferred, it is within the scope of the present invention to use any other ordinary type of electro-magnet and armature connections to the arm 4 of the oscillatory frame 3 aforesaid.

8 is a secondary arm on the aforesaid frame 3, and upon which is carried a spring pawl 9 adapted to engage the aforesaid ratchet disk 2 and transmit thereto the movement of the armature 6 in one direction.

10 is a lateral stud on the aforesaid frame 3 for operative engagement with the vibratory spider hereinafter described.

11 is a spring pawl carried by the clock frame and engaging the aforesaid ratchet disk 2 to prevent retrograde movement of the same.

12 is the vibratory spider above referred to, and which is loosely mounted on the aforesaid shaft 1, and at the side of the oscillating frame 3, aforesaid. Said spider comprises a forked extension 13, the space

between the forks being adapted to receive the aforesaid lateral stud 10 of the frame 3, and the parts are preferably so proportioned that there is some play between the parts with a corresponding initial lost motion in the operation of the frame 3 upon the spider 12, so that said frame 3 may gain momentum before operatively engaging the spider 12.

14 is a bracket extension on the spider 12, for the pivotal attachment of a lifting toe 15, by which the hereinafter described primary contact member is periodically raised in the operation of the mechanism.

16 is a wiper arm forming a part of the spider 12 and projecting therefrom in a direction opposite to the aforesaid extension 14. Said wiper arm is adapted for operative engagement with the secondary contact member hereinafter described.

17 is the primary contact member or arm above referred to, and which is pivoted near one end on the supporting frame of the mechanism. Near its pivot end said member is provided with an angle lug 18 against which the spring hereinafter described has bearing. Said member 17 comprises an approximately straight middle portion 19 and an inverted U shape end portion 20, as shown, and extends into the path of the aforesaid lifting toe 15, which in its active throw bears beneath the portion 19 to lift the same, the lifting action continuing until the end of the portion 19 is reached, when the said member or arm is free to descend under the stress of the spring hereinafter described, and with the lifting toe 15 free to move in the recess of the inverted U shape portion 20. In the described descent of the arm or member 17, the free end of its inverted U shape portion 20 is adapted to have electric contact with the secondary contact member hereinafter described.

21 is a spring attached to the supporting frame of the mechanisms and adapted to bear against the angle lug 18 of the primary contact member 17 to effect a rapid movement thereof in the active throw of the same above described.

22 is the companion or secondary contact member above referred to; also pivoted on the supporting frame, and extending in substantially right-angle relation to the primary contact member 17 above described.

Said secondary contact member 22 has a depending arm 23 which projects into the path of the wiper arm 16 before described for operative engagement therewith, and an opposed arm 24, that is forked to form a pair of prongs. The outer of said prongs carries a lateral stop pin 25, while the inner prong carries a yielding or rocking contact plate 26 located in the path of the free end of the inverted U shape portion 20 of

the primary contact member 17 above described. While said contact plate 26 may be fixed, it is preferred that the same be of the rocking type shown, in order that the same may rock during the active sliding movement of the before described contact point, and with a view to insure effective electric contact with a minimum amount of friction.

27 is a horizontal spring plate attached at one end to the supporting frame of the mechanism, with its free end formed with a hook 28. Adjacent to said hook 28, the spring plate 27 is formed with a curved portion or ridge 29 which projects into the path of the lateral stop pin 25 of the secondary contact member 22, before described, to afford yielding resistance to the movement of said pin into and out of engagement with said hook.

Assuming the parts are in the position shown in Figs. 1 and 2, and the clock mechanism running, the operation is as follows: The lifting toe 15 moving to the right, in the drawings, under the normal stress heretofore described, gradually lifts the primary contact member 17 until the end of the approximately straight portion 19 of said member is reached, when said member is permitted to drop suddenly under the stress of the spring 21, and in such down position the inverted U shape portion 20 of said member straddles the aforesaid lifting toe 15, while the extreme end of said portion 20 is adapted to have sliding contact with and upon the rocker plate 26 of the secondary contact member 22. In the described sliding movement of the parts the upper end of the member 22 is pushed to the left against the resistance of the curved portion 29 of the spring plate 27, until the stop pin 25 of said member reaches and is engaged by the hook 28 of said spring plate 27. The described contact is of very short duration and takes place as the armature 6 of the electro-magnet 7 nears its down position, and is adapted to close the circuit on said electro-magnet, to cause the same to lift the armature again. The described upward movement of the armature 6, is adapted, through the intermediate connections above described, to restore the mechanisms to the position first described, and in such returns of the parts, the pivoted lifting toe 15 of the operating spider 12, is adapted to flex to the right and freely pass the shoulder formed by the intersection of the straight and U shape portions 19 and 20 of the primary contact member 17. At the same time the wiper arm 16 of said operating spider, contacts with the lower arm 23 of the secondary contact member 22 to move the upper forked end of said member 22, to the left and back to its original position against

the resistance of the curved portion 29 of the spring plate 27.

As usual in the present type of electric clocks, the primary and secondary contact members 17 and 22, will be insulated from each other in any ordinary manner, and so that the electric current can only pass through the free end of the primary contact member 17 and the rocker plate 26 of the secondary contact member 22.

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

1. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame and provided with a lifting toe and a wiper arm, a vibratory primary contact member arranged in the path of said lifting toe and having a free end constituting a contact point, a secondary contact member pivoted in approximately right-angle relation to the primary contact member and having an upper arm arranged in the path of the free end of the primary contact member and a lower arm arranged in the path of the aforesaid wiper arm, and means for retarding the movement of the secondary contact member, substantially as set forth.

2. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame and provided with a lifting toe and a wiper arm, a vibratory primary contact member arranged in the path of said lifting toe and having an approximately straight middle portion and an inverted U shape end portion the free end of which constitutes a contact point, a secondary contact member pivoted in approximately right-angle relation to the primary contact member and having an upper arm arranged in the path of the free end of the primary contact member and a lower arm arranged in the path of the aforesaid wiper arm, and a spring plate having a curved portion adapted to retard the movement of the secondary contact member, substantially as set forth.

3. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame, said spider having a wiper arm and a lifting toe pivotally attached to the spider, a vibratory primary contact member arranged in the path of said lifting toe and having a free end constituting a contact point, a secondary contact member pivoted in approximately right-angle relation to the primary

contact member and having an upper arm arranged in the path of the free end of the primary contact member and a lower arm arranged in the path of the aforesaid wiper arm, and a spring plate having a curved portion adapted to retard the movements of the secondary contact member, substantially as set forth.

4. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame and provided with a lifting toe and a wiper arm, a vibratory primary contact member arranged in the path of said lifting toe and having a free end constituting a contact point, a secondary contact member pivoted in approximately right-angle relation to the primary contact member and having a lower arm arranged in the path of the aforesaid wiper arm and an upper arm forked to provide a pair of branches, a rocker plate carried by one of said branches, a lateral stud carried by the other of said branches, and a spring plate adapted to retard the movement of said secondary member by contact with the aforesaid lateral stud, substantially as set forth.

5. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame and provided with a lifting toe and a wiper arm, a vibratory primary contact member arranged in the path of said lifting toe and having an approximately straight middle portion and an inverted U shape end portion the free end of which constitutes a contact point, a secondary contact member pivoted in approximately right angle relation to the primary contact member and having a lower arm arranged in the path of the aforesaid wiper arm and an upper arm forked to provide a pair of branches, a rocker plate carried by one of said branches, a lateral stud carried by the other of said branches, and a spring plate adapted to retard the movement of the secondary member by contact with the aforesaid lateral stud, substantially as set forth.

6. The combination in a circuit controlling mechanism for electric clocks, of an oscillatory frame receiving motion from an electro-magnet, an oscillatory spider operatively connected to said frame, said spider having a wiper arm and a lifting toe pivotally attached to the spider, a vibratory primary contact member arranged in the path of said lifting toe and having a free end constituting a contact point, a secondary contact member pivoted in approximately right-angle relation to the primary

contact member and having a lower arm arranged in the path of the aforesaid wiper arm and an upper arm forked to provide a pair of branches, a rocker plate carried by one of said branches, a lateral stud carried by the other of said branches, and a spring plate adapted to retard the movement of said secondary member by contact with the

aforesaid lateral stud, substantially as set forth.

Signed at Chicago, Illinois, this 16th day of November 1910.

CARL E. MATHIESEN.

Witnesses:

ROBERT BURNS,
OTTO W. JURGENS.