A. TUERK.

ELECTRIC CLOCK.

APPLICATION FILED AUG. 9, 1909.

1,015,748. Patented Jan. 23, 1912.

Fig. 1.

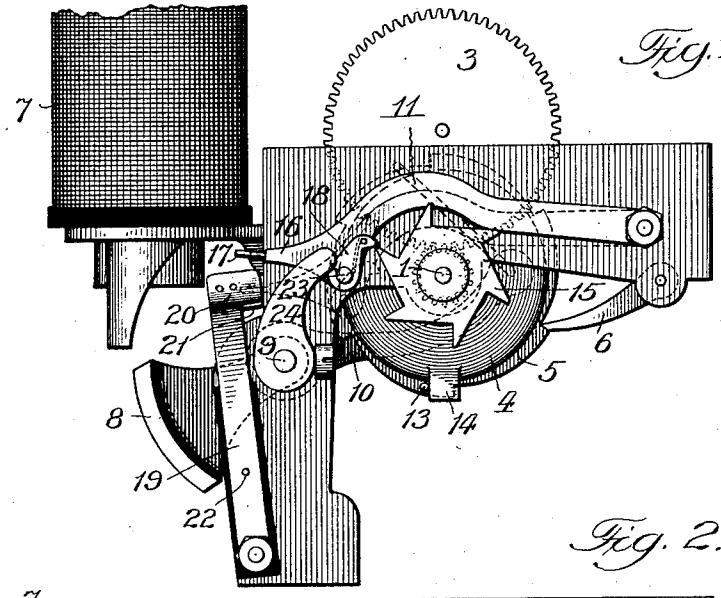


Fig. 2.

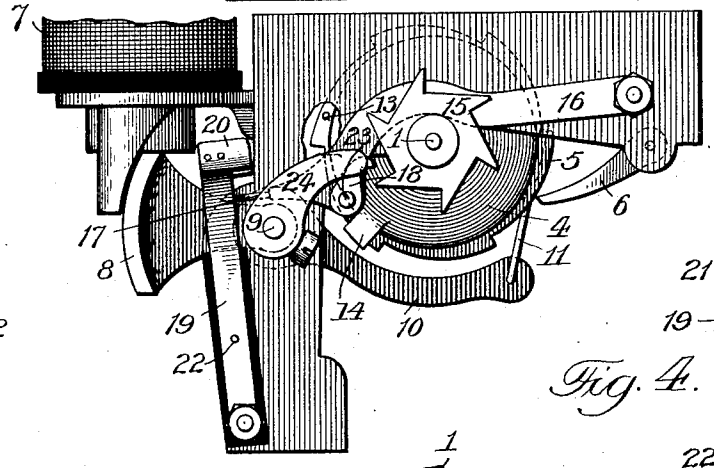


Fig. 5.

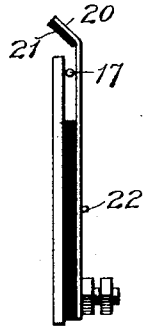


Fig. 4.

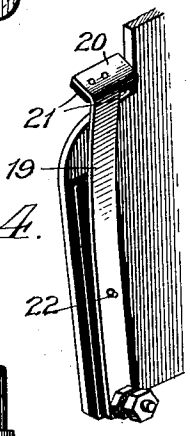
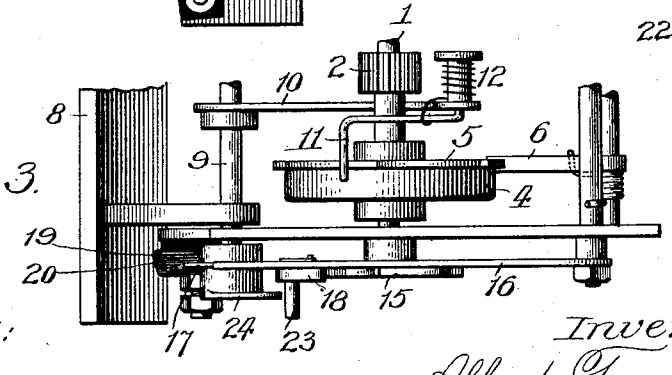


Fig. 3.



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ELECTRIC CLOCK.

1,015,748. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed August 9, 1909. Serial No. 511,897.

To all whom it may concern:

Be it known that I, ALBERT TUERK, 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 the winding train is electrically wound by the closure of the circuit at regular intervals by the movement of a part of the clock mechanism, an example of which forms the subject matter of my prior Patent No. 698,158, dated April 22, 1902. And the present improvement has for its object, to provide a simple and efficient structural arrangement and combination of the circuit controlling mechanism, by means of which the period during which the closure of the operating electric circuit, and consequent drain on the operating battery, is reduced to a minimum, with a corresponding economy in the operation of the clock, all as will hereinafter more fully appear.

In the accompanying drawings: Figure 1, is a detail front elevation of the present circuit controlling mechanism, in a position previous to an automatic tensioning of the spring by the electro-magnetic winding mechanism, as well as to an initial tension of said spring in starting the clock running. Fig. 2, is a similar view of the same after the tensioning has been attained and with the mechanism in normal condition for running. Fig. 3, is a detail plan of the same. Fig. 4, is a detail perspective view of the spring contact member and its support. Fig. 5, is an end elevation of the same.

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

Referring to the drawings, 1 represents the main shaft carrying the usual pinion 2, having driving engagement with a gear wheel 3 of the train which carry the hands and escapement of the clock.

4 is a disk fixed on the main shaft 1, and preferably of the cup shape shown to provide a containing chamber or cavity for the usual coiled operating spring of the clock mechanism.

5, is a ratchet disk loosely mounted on the main shaft 1, and forming an end closure for the spring containing cavity of the disk 4, aforesaid. The coiled operating spring of the clock mechanism, above referred to, is connected at one end to said disk 5, and at the other end to the aforesaid disk 4, as usual in the present type of electric clocks.

6, is a spring pawl pivoted on the clock frame and engaging the peripheral ratchet teeth of the disk 5 to prevent retrograde movement of the same in the periodic winding operation, such periodic winding being effected by the mechanism now to be described.

7 is the operating electro-magnet secured to the clock frame, and 8 is the oscillating armature thereof, journaled by a shaft 9 on the clock frame; said armature is provided with an arm 10 which projects to the remote side of the ratchet disk 5 aforesaid, and carries at its free end a pull pawl 11, the free end of which rides upon the upper or crown portion of said ratchet disk and has operative engagement with the ratchet teeth thereof to impart intermittent winding rotation to said disk and clock spring connected thereto, in the continued operation of the mechanism. 12 is a coiled spring carried by the aforesaid arm 10 and engaging the pull pawl 11 to hold the point thereof to its bearing on the ratchet periphery of the ratchet disk 5.

13 is a lateral pin or projection on the ratchet disk 5, near its periphery, and 14 is a stop lug or projection on the spring containing disk 4, and located in the path of the aforesaid pin 13 to limit the unwinding action of the parts under the stress of the clock spring. With the pin 13 resting against the stop lug 14, as illustrated in Fig. 1, further unwinding of the clock spring is prevented and the mechanism comes to a rest. In the normal operation of the mechanism, the pin 13, and stop lug 14, travel in the same circular path, the movement of the stop lug 14 being continuous and in unison with the running of the clock mechanism and its escapement, while the movement of the pin 13, is intermittent and in unison with the movement of the ratchet disk and its pull pawl 11, before described. The said pin 13 advances an intermittent step at each automatic winding operation, and is followed by the stop lug 14 moving continuously under the unwinding stress of the clock spring.

15 is the circuit controlling disk of the present mechanism, fixed on the main shaft

1 and having a series of radial lifting teeth, corresponding in number to the ratchet teeth of the disk 5, and preferably six in number as shown.

16 is a horizontal lever pivoted to the clock frame at one side of the aforesaid controlling disk 15, and extending across the frame with its free end provided with a contact finger 17, and with a spring pawl 18 arranged in the path of the lifting teeth of the aforesaid circuit controlling disk 15, so that in the slow rotation of said disk, the said lever will be raised a predetermined distance and allowed to drop, as hereinafter more fully set forth. The aforesaid pawl 18 is of the spring form shown and described, in order that it may be forcibly pushed out of the way by the teeth of the controlling disk 15, so as not to impede the initial tensioning of the clock spring by a manual manipulation of the armature and its connections.

19 is an upright spring contact member attached at its lower end in an insulated manner on the clock frame, and provided at its upper end with an offset portion 20, arranged in the path of the contact finger 17, before described, and adapted in connection therewith to form the respective contact members of the circuit controlling mechanism of the clock. Said offset portion 20 is inclined as shown and has on its rear side a plate of insulating material 21. By the above described attachment of the spring contact member 19 at its lower end, its outward movement takes place freely upon its attaching means, whereas in its inward movement, the main portion of the member rests against its insulating attaching base, and its comparatively short upper end receives all the deflection and insures a forcible rub between the contact finger 17 and the offset portion 20, to maintain the surfaces thereof in perfect electrical conductive condition.

23 is a laterally projecting pin on the lever 16, and preferably the pivot pin of the spring pawl 18, aforesaid.

24 is a wiper arm moving with the armature 8, and adapted in the active movement of said armature to contact with the aforesaid lateral pin 23, and impart a rapid downward movement of the contact finger 17 past the offset contact portion 20, aforesaid, and as more fully described in the operation of the mechanism.

The operation of the mechanism is as follows: With the parts in the position illustrated in Fig. 2, the operator manually closes the circuit any desired number of times upon the electro-magnet 7 to effect an initial winding of the clock spring and move the pin 13 of the winding ratchet disk 5 a corresponding distance in advance of the stop lug 14 of the clock spring carrying disk or barrel 4. With such initial winding the mechanism begins to run and as the clock spring gradually unwinds and a corresponding movement of the circuit controlling disk 15 takes place, with one of its lifting teeth in engagement with and lifting the horizontal lever 16, through its spring pawl 18, to its full height, after which said lever is allowed to drop. In the rising movement of said lever its contact finger 17 moves behind the offset portion 20 of the spring contact member 19, and against the insulating plate 21 thereof, so that no electrical contact between the parts takes place. In the falling movement of said lever, the contact finger 17 drops on to the face of the offset portion 20, establishing electrical contact, to energize the electro-magnet 7, and cause an active movement of the armature 8, to wind the main clock spring through the intermediate mechanism heretofore described. As the winding movement nears its finish, and with the adjacent tooth of the ratchet disk 5 past the pawl 6, the wiper arm 24 in its continued movement in unison with the armature engages against the lateral pin 23 of the lever 16, to force the same downward. With such downward movement of the lever 16 the contact finger 17 is rapidly moved down to break its electrical contact with the offset contact portion 20 of the upright contact member 19, to open the operating electric circuit and permit of a return of armature 8 of the electro-magnet 7 to its original position ready for a repetition of the cycle of operations just described. With such construction the period during which electrical connection prevails is reduced to a minimum, while insuring a proper winding operation, and in consequence aids materially in the economical operation of the clock.

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 a main shaft, a circuit controlling disk on said shaft and formed with a series of lifting fingers, a lever pivoted on the clock frame and having at its free end a contact finger and in adjacent relation thereto a pawl adapted for lifting engagement with the lifting fingers aforesaid, a spring contact member having an offset portion in line with said contact finger, and a wiper arm moving in unison with the electro-magnetic mechanism and adapted to impart positive movement to the lever and its contact finger.

2. In an electric clock, the combination of a main shaft, a circuit controlling disk on said shaft and formed with a series of lifting fingers, a lever pivoted on the clock frame and having at its free end a contact finger and in adjacent relation thereto a

pawl adapted for lifting engagement with the lifting fingers aforesaid, a spring contact member having an offset portion in line with said contact finger, a plate of insulating material secured to the rear of said offset portion, and a wiper arm moving in unison with the electro-magnetic mechanism and adapted to impart positive movement to the lever and its contact finger.

3. In an electric clock, the combination of a main shaft, a ratchet disk mounted loosely on said shaft, a spring containing drum fixed on said shaft, an electro-magnet, an oscillating armature, an arm carried by said armature, a pull pawl on said arm having riding engagement with the periphery of the ratchet disk, a stop pin on the ratchet disk, a stop lug on the spring containing drum, and means for periodically energizing the electro-magnet.

4. In an electric clock, the combination of a main shaft, a ratchet disk mounted loosely on said shaft, a spring containing drum fixed on said shaft, an electro-magnet, an oscillating armature, an arm carried by said armature, a pull pawl on said arm having riding engagement with the periphery of the ratchet disk, a circuit controlling disk on said shaft and formed with a series of lifting fingers, a lever pivoted on the clock frame and having at its free end a contact finger and in adjacent relation thereto a pawl adapted for lifting engagement with the lifting fingers aforesaid, a spring contact member having an offset portion in line with said contact finger, and a wiper arm moving in unison with the armature aforesaid and adapted to impart positive movement to the lever and its contact finger.

5. In an electric clock, the combination of a main shaft, a ratchet disk mounted loosely on said shaft, a spring containing drum fixed on said shaft, an electro-magnet, an oscillating armature, an arm carried by said armature, a pull pawl on said arm having riding engagement with the periphery of the ratchet disk, a circuit controlling disk on said shaft and formed with a series of lifting fingers, a lever pivoted on the clock frame and having at its free end a contact finger and in adjacent relation thereto a pawl adapted for lifting engagement with the lifting fingers aforesaid, a spring contact member having an offset portion in line with said contact finger, a plate of insulating material secured to the rear of said offset portion, and a wiper arm moving in unison with the armature aforesaid and adapted to impart positive movement to the lever and its contact finger.

Signed at Chicago, Illinois, this 27th day of July 1909.

ALBERT TUERK.

Witnesses:
PAUL J. TOTZKE,
ROBERT BURNS.