W. H. THOMPSON.

ELECTRIC AUTOMOBILE CLOCK.

APPLICATION FILED JUNE 6, 1911.

1,024,709.

Patented Apr. 30, 1912

4 SHEETS—SHEET 1.

Fig. 2.

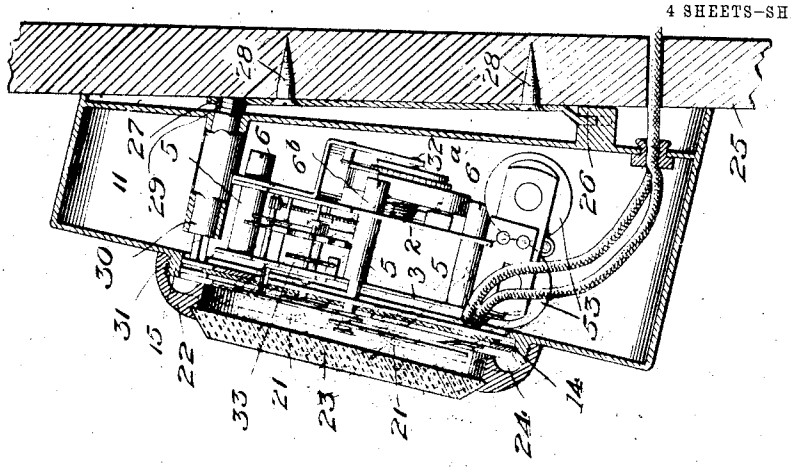
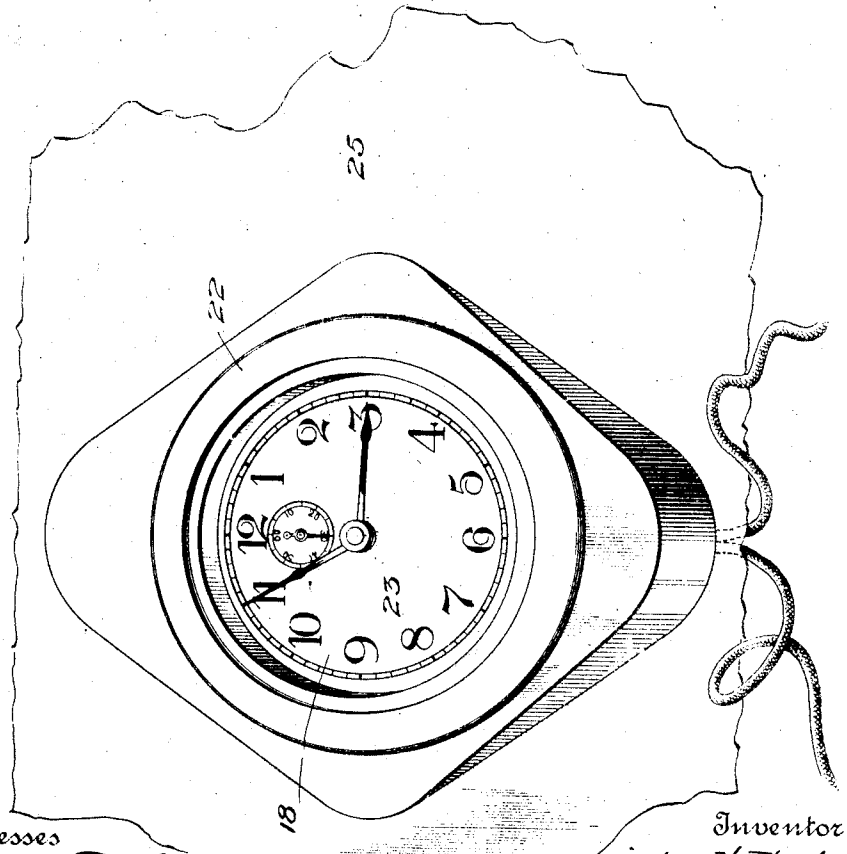



Fig. 1.




Witnesses

Inventor

William H. Thompson

by Henry N. Cobb

his Attorney

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4 SHEETS—SHEET 2.

Fig. 4.

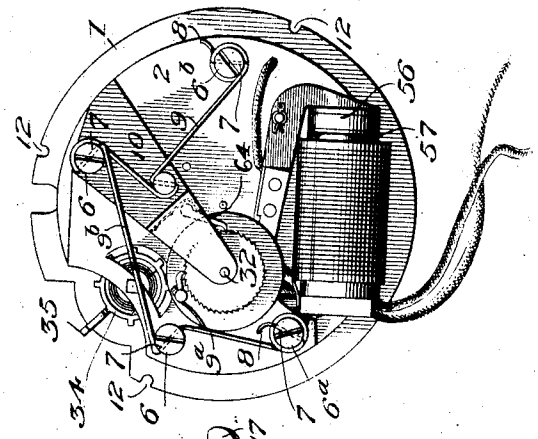


Fig. 5.

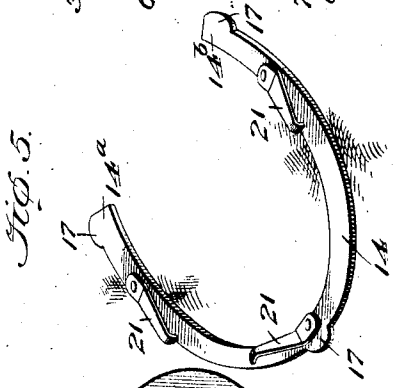
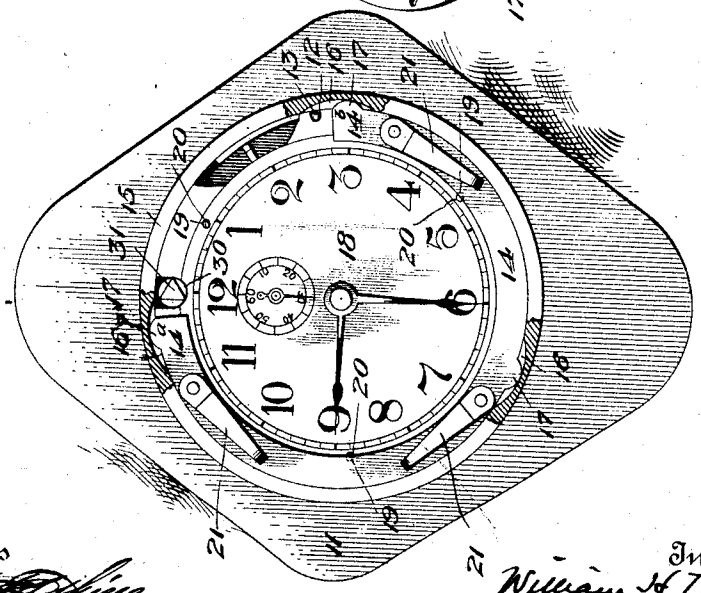


Fig. 3.



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4 SHEETS-SHEET 3.

Fig. 6.

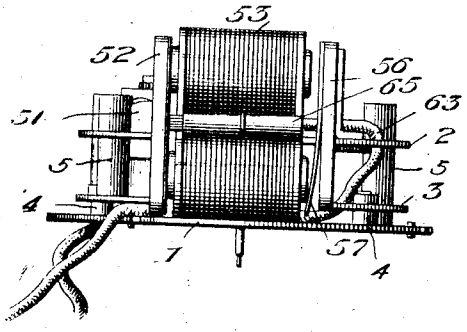



Fig. 7.

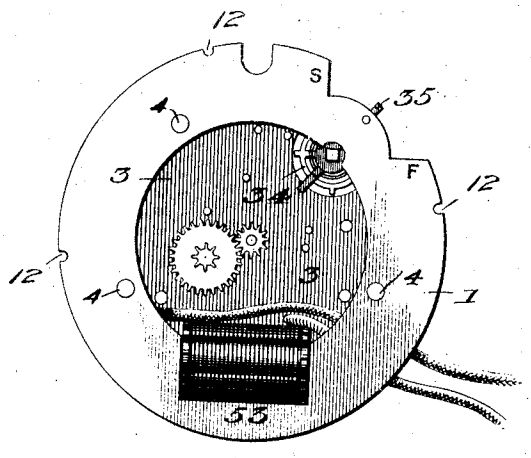
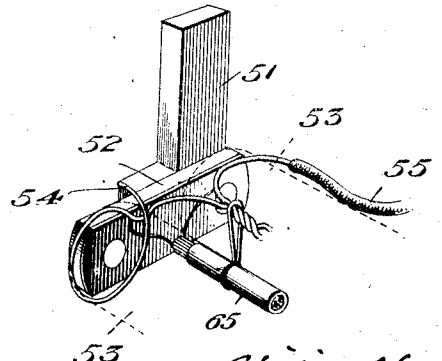



Fig. 8.




Witnesses

Inventor

William H. Thompson

By Henry N. Coffin

Attorney

W. H. THOMPSON.

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4 SHEETS—SHEET 4.

Fig. 9.

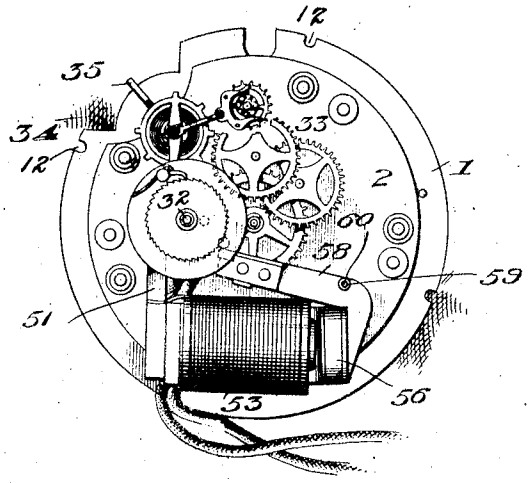



Fig. 10.

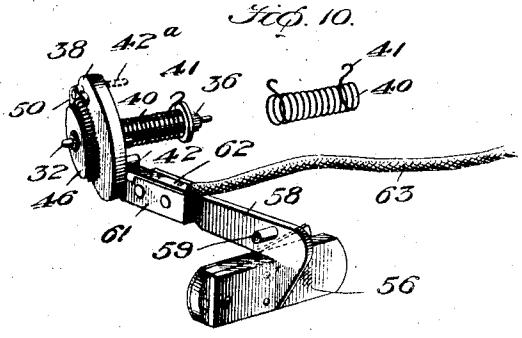
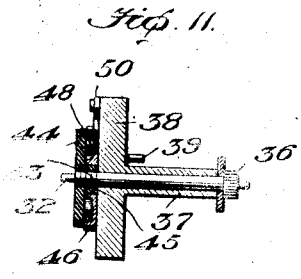



Fig. 11.



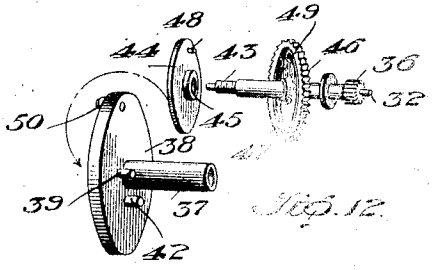




Fig. 12.


Witnesses

Inventor

William H. Thompson

By Henry A. Toppan

His Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM HENDERSON THOMPSON, OF MEMPHIS, TENNESSEE, ASSIGNOR TO THOMPSON ELECTRIC CLOCK COMPANY, OF MEMPHIS, TENNESSEE, A CORPORATION OF TENNESSEE.

## ELECTRIC AUTOMOBILE-CLOCK.

1,024,709. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed June 6, 1911. Serial No. 631,637.

*To all whom it may concern:*

Be it known that I, WILLIAM H. THOMPSON, a citizen of the United States, residing at Memphis, county of Shelby, and State of Tennessee, have invented certain new and useful Improvements in Electric Automobile-Clocks, of which the following is a specification.

This invention relates to electric automobile clocks.

Clocks intended for use on automobiles are subject to constant vibration while the car is in service, are liable to be wound at irregular periods or allowed to run down through carelessness and soon deteriorate on account of the conditions they meet with in use.

My invention has for its object the provision of a clock particularly adapted for use on automobiles, although designed for use on locomotives, vessels, and other vehicles, which will be so constructed that the parts thereof cannot jar loose or the adjustment thereof be affected due to vibration to which the clock is subjected; a novel clock which will be electrically wound at intervals, but will be spring-operated at all times, thus insuring accuracy in running, obviating the necessity of winding by hand, and rendering it unnecessary to pay attention to the clock after it has once been started and regulated, for long periods of time.

In carrying out this invention, I provide an electrically wound, spring-operated clock of novel construction, whose train is driven by a spring, electro-magnetically operated means being employed to periodically rewind the spring which is caused to operate by the unwinding of the spring, together with a novel power-retaining device adapted to maintain the continuity of operation of the clock train during the practically instantaneous rewinding of the power spring so that the regularity of the beat will not be interrupted and no time will be lost, due to rewinding of the power spring.

The invention is carried out, further, by the elimination of all screw fastenings except those which connect together the main plates of the frame which carries the train or movement, and providing an interlocking wiring for such screws as are employed, whereby they are prevented from backing out or becoming loosened on account of the vibration to which the clock is subjected when used on an automobile or other vehicle. By this arrangement, the rigidity of all connections is insured, causing the various wheels of the movement or train to run true at all times.

The invention is carried out, further, by the provision of a novel retaining member for holding the entire movement in its case, thus obviating the necessity of employing screws for that purpose, which will not jar loose; and, further, to associate this retaining member with the bezel in such manner that the bezel cannot unscrew on account of any vibration to which it is subjected.

Preferably, the clock is incased in a shell having means for its attachment to the dash of the automobile or to any other part thereof in such manner that the clock can only be removed by the application of a special key.

The foregoing, and other, ends of the invention are set forth fully hereinafter and recited in the appended claims.

In the accompanying drawings: Figure 1 is a view looking toward the front of the clock, as applied to the dash of an automobile; Fig. 2, a vertical section therethrough; Fig. 3, a front view with the bezel removed and the retaining ring in position; Fig. 4, a view looking toward the inner face of the clock movement; Fig. 5, a detail perspective of the retaining ring; Fig. 6, an elevation looking toward the magnets of the movement; Fig. 7, a view looking toward the outer face of the movement; Fig. 8, a detail, showing the arrangement of the spark-absorbing shunt for the electro-magnet and the manner of mounting the latter; Fig. 9, a view like Fig. 4, but with the back plate removed; Fig. 10, a perspective detail of the armature, its lever, and the rewinding and driving mechanism for the clock train; Fig. 11, a longitudinal section through the rewinding and driving mechanism, the power spring being removed; and Fig. 12, a perspective view of the driving and power-retaining mechanism, the power spring being omitted and the parts shown in detached relation.

The operative parts are carried by a front ring 1, a back or rear plate 2 and a front plate 3. The ring 1 and front plate 3 are separated and permanently connected by rivets or the like 4. Riveted to the front plate 3 and spacing the back plate 2 there-

from, are pillars 5. All parts of the movement or train have their bearings, with the exception of the shaft or arbor for the power spring, in the plates 2 and 3.

Referring to Fig. 4, there are screwed into the pillars 5, the screws 6 which hold the plate 2 against said pillars. These screws are provided with apertures 7, preferably extending diametrically through their heads. Wound once or twice around the end screws $6^a$, $6^b$, or, bent laterally in relation thereto, are the ends 8 of the locking wire 9 which, intermediate its ends, passes through the apertures 7 of all of the screws in such manner that the screws tend to mutually screw up or tighten each other. However, assuming that all of the screws are right-hand screws, if the screw $6^a$ tended to unscrew or loosen, the tension it would exert on the stretch $9^a$ of the wire 9 would be to tighten the next screw. Simi rly, if the screws at the ends of the stretch $9^b$ tended to back out or loosen, they would mutually tend to tighten each other with the remaining stretches of the wire 9. The arrangement of the wire is such that it passes from the end of an aperture 7 to screw to the opposite end of the aperture 7 of the next screw. This wiring absolutely prevents any loosening of the screws, and as said screws are the only ones in the clock, it is impossible for the screws to become loose or any part of the movement to slip from its bearings. By this arrangement, I obviate the necessity of providing separate locking devices for the screws and, no matter how great the vibration of the automobile or other vehicle may be, the parts cannot become deranged thereby. The bridge 10 for the power-shaft is held by screws which are prevented from loosening by the wire 9.

The movement is supported in a suitable shell 11 by notches or apertures 12 in the ring 1 received by suitable pins or dowels 13 on the shell, and by the retaining ring 14 shown in Fig. 5. The ring 14 is resilient and constitutes the greater part of a circle, the arms or ends $14^a$ and $14^b$ being adapted to spring toward each other to enable the ring to be snapped into the raised rim 15 on the shell 11. The rim 15 is provided with concavities or slots 16 which receive projecting parts or lugs 17 on the ring 14, whereby said ring is securely retained and cannot jar loose. The dial 18 is overlapped by the ring 14 and held in position without requiring screws or other fastenings, said dial being provided with holes 19 for the reception of pins 20 on the ring 1 to prevent it from twisting. By holding the dial with the ring 14 and doing away with fastening screws for said dial, I overcome the chipping or breaking of the enamel of the dial which has heretofore occurred in clocks, regardless of the movement or train thereof, due to the pressure of the screws at the different points, for it will be observed that the ring 14 bears evenly upon the dial and clamps it against the frame ring 1 for nearly its entire circumference. The retaining ring 14 is provided with spring fingers 21 at three points thereof and disposed substantially at the apices of an imaginary triangle.

The bezel 22 (Figs. 1 and 2) carries a glass 23 which is set therein when the bezel is hot so that on cooling and consequent contraction, the bezel firmly holds the glass, and thus at this point there can be no loosening. The bezel is internally screw-threaded and screws on the externally screw-threaded rim 15, said bezel being provided with a circular channel 24 which receives the spring fingers 21, thereby confining them against lateral shifting, said fingers bearing frictionally against the bezel, and by outward pressure thereagainst, causing the screw-threads on the bezel and rim to be locked together so that the bezel is not liable to become loosened on account of any vibration to which the clock may be subjected.

The shell 11 may be of any preferred shape and construction and fastened in any desired manner to the dash 25 of the automobile, or secured in any manner to a similar object. I prefer, however, to provide a lip 26 on the back of the shell to receive the lower bifurcated end of a plate 27 which is fastened by screws 28 to the dash 25 and has at its upper end a screw socket 29 for the reception of the screw-threaded end of a rotatable lug 30 which terminates at the front end in a polygonal part 31 projecting through the edge of the dial 18 so that the clock may be fastened by a key to the dash 25 and hence be incapable of removal by unauthorized persons.

The power-shaft 32 is journaled in the bridge 10 and the plate 3. The entire clock train (Figs. 4, 7 and 9), is shown at 33, and the balance wheel 34 having the usual regulator 35, is driven from said shaft through the pinion 36 (Figs. 10, 11 and 12). Loose on the shaft 32 is the spring winding sleeve 37 which has an actuating wheel or disk 38 provided with a pin 39 to which one end of a power-spring 40 (Fig. 10) is connected, said power-spring encircling the sleeve 37 and having its other end 41 connected to a pin, not shown, on the plate 3. The disk 38 is also provided with a contact pin 42. Screwed on the threaded part 43 of shaft 32 is a driving disk 44 having a hub 45 on which is loosely mounted a ratchet wheel 46 which has a concavity containing a circular spring 47, such as shown in Fig. 12. One end of the spring is hooked around a pin 48 on the driving disk 44 and the other end is connected at 49 to the ratchet wheel 46, in consequence of which it will be observed that the ratchet wheel may be turned in re-

lation to the shaft 32 and in relation to the disk 44 carried thereby, in doing which the spring 47 is coiled or placed under tension. This relative turning is, in practice, of no great distance, but it is sufficient to store in the spring 47 enough power to drive, with regularity, the clock train when the spring 40 is being rewound, as will presently appear.

Pivoted to the actuating wheel or disk 38 is a pawl 50 which is made to engage with the ratchet wheel 46 by the turning of the disk 38 by the spring 40, and thus, through the intervention of spring 47, the motion imparted to the ratchet wheel 46 is imparted to the driving disk 44, which thereupon turns the driving shaft 32, and through the pinion 36, the clock train is operated.

Suitably secured to the plates 2 and 3 is a plate 51 (Fig. 8) to which is riveted the yoke 52 of the cores of an electro-magnet whose coils are shown at 53, Fig. 6. One of the terminals of said coils is secured to the member 51 in any permanent fashion at 54, the other terminal being shown at 55, and is adapted to lead to any suitable source of electrical current, such as a battery.

Referring to Figs. 4, 9 and 10, 56 designates an armature for the electro-magnet, this armature being provided with a leaf spring 57 which bears against one of the magnet cores or poles and serves the double purpose of preventing the armature from sticking to the poles by the residual magnetism thereof and for normally holding the armature away from said poles. The armature is connected to an angular lever 58 which has a hub 59 pivoted on a pin 60 carried by the plate 2. Mounted on insulated material 61 on the free end of the lever 58 is a contact member 62 which is connected to the terminal 63 also leading to the source of electrical generation, such as a battery. The contact member 62 is adapted to be engaged by the contact pin 42 on the turning of the disk 38, due to the unwinding of the spring 40.

If it be assumed that the power spring 40 has been wound, the contact pin 42 will then be in a position substantially that shown by dotted lines $42^a$, Fig. 10. The uncoiling tendency of spring 40, operating through disk 38, pawl 50, ratchet wheel 46, spring 47, and disk 44, causes the shaft 32 to be positively and regularly driven, and thus the train is operated. When the contact pin 42 engages the contact 62 on the lever 58, as shown by full lines in Fig. 10, the circuit to the electro-magnet will be completed, whereupon it will immediately attract the armature 56, in doing which the lever 58 will be turned on its pivot 60 with a snap action and the engagement of the lever with the contact pin 42 will cause the disk 38 to be kicked backward so that the pin 42 will assume the dotted-line position $42^a$, Fig. 10, thereby rewinding the spring 40, during which operation the pawl 50 will drag idly on the ratchet wheel 46, but the ratchet wheel will be prevented from backward rotation by a retaining ratchet 64, Fig. 4. During the rewinding of the spring by the operation just set forth, there would be a tendency toward cessation of the turning of the train of wheels. To compensate for this and to enable the train to continuously operate, even during the almost instantaneous kicking back of the disk 38, the spring 47 having been placed under tension, tends to uncoil and, therefore, to continue the application of spring power to the shaft 32, resulting in a continuity of driving of the clock train and insuring the keeping of correct time. The play of the armature 56 being limited, the lever 58 only moves a slight distance and consequently the electric contact between the members 42 and 62 is of exceedingly brief duration and the rewinding of the spring and the breaking of the electrical circuit is almost instantaneous so that very little electrical current is required to operate the clock, a few cells of dry battery being sufficient to run it for an indefinite period.

To prevent sparking between the contacts 42 and 62 with its resultant tendency to corrode them, I provide a shunt 65, Fig. 8, of fine wire on the coils 53 of the electro-magnet which prevents sparking at the contacts.

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

In a clock, the combination with the train, of a driving shaft therefor, a driving disk secured to the shaft, a ratchet wheel having a loose relationship to the shaft and disk aforesaid, a spring interposed between the ratchet wheel and the aforesaid disk and affording a connection therebetween, an actuating disk having a pawl engaged with the ratchet wheel aforesaid, a driving spring engaged with the actuating disk, a contact member carried by the actuating disk, an electro-magnet, an armature therefor, a lever which carries said armature, and a contact carried by the lever which is adapted to be engaged by the contact member aforesaid on the unwinding of the driving spring, said contacts being in the circuit of the electro-magnet.

In testimony whereof, I hereunto affix my signature in presence of two witnesses.

WILLIAM HENDERSON THOMPSON.

Witnesses:

A. GOODMAN,

JOSEPH GOODMAN.