No. 750,492. PATENTED JAN. 26, 1904.

F. SCHMIDT.

ELECTRIC CLOCK.

APPLICATION FILED MAY 9, 1903.

NO MODEL.

Fig. 1.

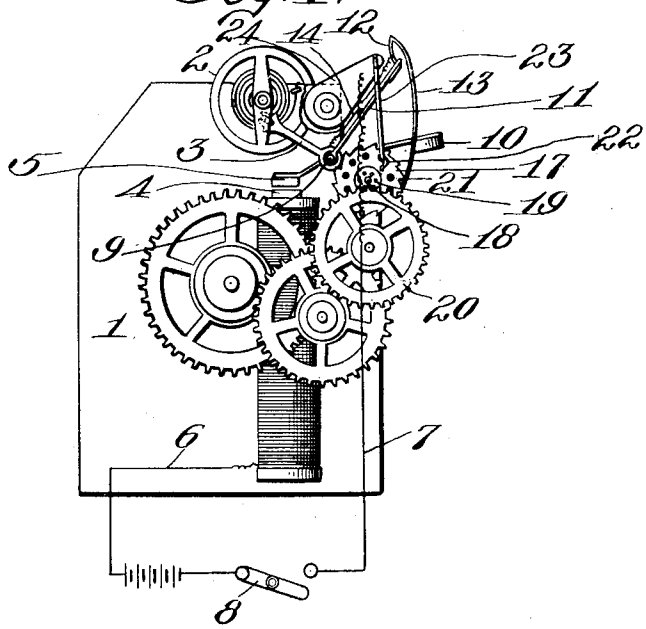


Fig. 2.

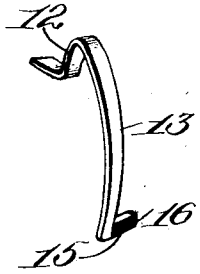


Fig. 3.

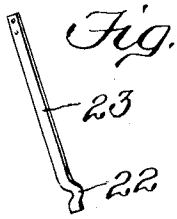


Fig. 4.

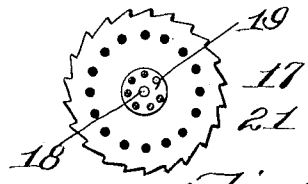


Fig. 6.

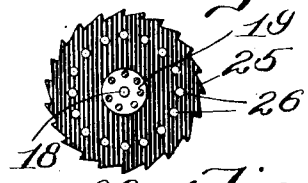


Fig. 8.



Fig. 5

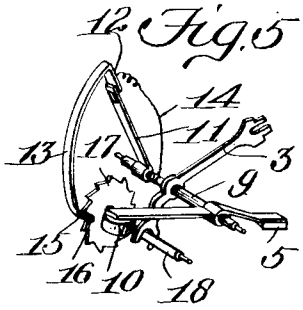
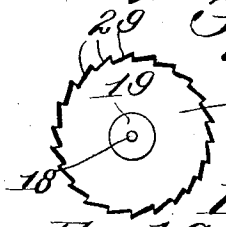


Fig 7.



Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 750,492. Patented January 26, 1904.

UNITED STATES PATENT OFFICE.

FRED SCHMIDT, OF OAK STATION, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO HENRY BAUER, OF LOCK NO. 3, ALLEGHENY COUNTY, PENNSYLVANIA.

ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 750,492, dated January 26, 1904.

Application filed May 9, 1903. Serial No. 156,477. (No model.)

To all whom it may concern:

Be it known that I, FRED SCHMIDT, a subject of the Emperor of Germany, residing at Oak Station, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Mechanisms for Electrically Operating Clocks, of which the following is a specification.

This invention relates to certain new and useful improvements in mechanisms for electrically operating clocks and is also adapted for use in connection with the operating of watches or wherever it is applicable.

The invention aims to construct a new and novel mechanism adapted for use for electrically operating clocks or watches, said mechanism dispensing with the use of the ordinary springs, weights, or other like devices generally employed for operating clock or watch movements.

The invention aims to construct a mechanism for the purpose herein specified, which shall be extremely simple in its construction, strong, durable, efficient in its operation, and comparatively inexpensive to set up or manufacture.

To this end the invention consists of the novel combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification and illustrating my new and novel mechanism for electrically operating clock or watch movements as applied to a clock-movement.

In the drawings, Figure 1 is an elevation of the operating mechanism as applied to a clock-movement. Fig. 2 is a perspective view of the operating-lever of the movement-operating mechanism. Fig. 3 is an elevation of the circuit-forming arm of the movement-operating mechanism. Fig. 4 is an elevation of the movement impulse-wheel of the movement-operating mechanism. Fig. 5 is an elevation of a portion of the movement-operating mechanism. Figs. 6 and 7 are elevations of modified forms of impulse-wheels. Fig. 8 is a modified form of operating-lever used in connection with the impulse-wheel shown in Fig. 7.

Referring to the drawings by reference characters, 1 denotes a suitable clock-movement, provided with a spring-actuated balance-wheel 2, which coöperates with the escapement-lever 3, the latter forming a part of the operating mechanism for the movement 1.

Arranged in suitable relation and forming a part of the operating mechanism for the movement 1 is a magnet 4, having a counterbalanced armature 5 coöperating therewith. The reference characters 6 7 denote the leading-in or circuit-forming wires and which communicate with a source of electrical energy. The leading-in wire 6 is suitably connected to the magnet 4, and the connection formed by the leading-in wire 7 will be hereinafter referred to. If desired, a suitable switch 8 may be employed for cutting out the circuit entirely.

The armature 5 is mounted upon a rock-shaft 9 and has its outer end provided with a weight 10, and its inner end extends over the top of the magnet 4. The position of the armature is such that when the magnet is energized it will be attracted thereto and rock the shaft 9, as the armature is fixed to the shaft 9. The latter is suitably insulated from its supports. The rock-shaft 9 has mounted thereon the escapement-lever 3, the latter being insulated from the shaft 9. The free end of the lever is bifurcated and is adapted to be engaged by the balance-wheel 2, so as to rock the shaft 9 in an opposite direction to that given the shaft when the armature 5 is attracted by the magnet. The function of this movement will be hereinafter referred to. The shaft 8 also carries an upwardly and outwardly extending supporting-arm 11, which is suitably insulated therefrom and has its free or outer end connected, by means of the spring 12, to the operating-lever 13. The spring 12 is electrically connected to the rock-shaft 9 by means of the wire 14. The lower end of the

lever 13 terminates in a hook 15, the latter being insulated, as at 16, for a function to be hereinafter referred to.

The reference character 17 denotes the impulse-wheel for the movement 1, and this wheel 17 may also be termed the "circuit breaker and maker." The wheel 17 is mounted upon and suitably insulated from the shaft 18, which is provided with the pinion 19, meshing with the gear-wheel 20 of the movement 1. When the shaft 18 is rotated by means of the impulse-wheel 17, the pinion 19, meshing with the gear-wheel 20, will impart movement thereto, thereby operating the movement 1. The impulse-wheel 17 is toothed, so that the teeth thereof can be engaged by the hooked end 15 of the operating-lever 13, and when the lever is elevated through the rocking of the shaft 9 when the magnet 4 is energized and the armature 5 attracted thereto the hooked end 15 of the lever 13 will carry the impulse-wheel 17 therewith and rotate the shaft 18. The impulse-wheel 17 has one face thereof provided with a series of insulations in the form of disks suitably spaced apart, as at 21, and these insulations are adapted to break the circuit in a manner as hereinafter referred to. The face of the impulse-wheel, which is provided with the insulations, is engaged by the lower end 22 of the circuit-forming arm 23. The latter is formed of spring metal, so that it will always bear against the insulated face of the impulse-wheel 17. The upper end of the circuit-forming arm 23 is secured to a connecting-arm 24, the latter in turn being attached to the leading-in wire 7.

The insulation of the hooked end 15 of the lever 13 is such that when the lever 13 is elevated the non-insulated portion of the hooked end 15 will contact with one of the teeth of the impulse-wheel 17; but when the lever 13 is lowered the insulated portion 16 of the hooked end 15 will ride over the teeth of the impulse-wheel 17. When the impulse-wheel 17 is rotated, or rather when an impulse is given to the wheel 17, the circuit-forming arm 23 or the lower end 22 of the circuit-forming arm will ride against the insulated face of the impulse-wheel 17, and when the end 22 of the circuit-forming arm bears against the non-insulated portion of the insulated face of the impulse-wheel 17 the circuit will be closed; but as soon as the end 22 engages with the insulations the circuit will be open. The impulse given to the wheel 17 by the operating-lever 13 is such as to carry the insulation in the form of the disk 21 past the hooked end 22 of the circuit-forming arm 23, and just as this movement is accomplished the insulated portion 16 of the hooked end 15 of the operating-lever 13 will be in engagement with the impulse-wheel 17, thereby opening the circuit. If this insulated portion 16 of the lever 13 were not in contact with the impulse-wheel 17, then the circuit would be closed, for the reason that the end 22 of the circuit-forming arm would be bearing against an uninsulated portion of the insulating-face of the impulse-wheel 17. When the circuit is open, the shaft 9 is rocked in a counter direction, owing to the armature 5 being counterbalanced and also owing to the assistance of the balance-wheel 2, which acts upon the escapement-lever 3.

From the foregoing description it is evident that when the circuit is formed the armature 5 will be attracted, thereby elevating the lever 13, and the latter carries the impulse-wheel 17 therewith, consequently operating the movement 1, and that when the circuit is open the lever 13 will be lowered, owing to the action of the counterbalanced armature and escapement-lever 3 and balance-wheel 2, and that when the end 15 of the lever 13 rides over the teeth of the impulse-wheel 17 until the uninsulated portion of the hooked end 15 contacts with the teeth the circuit will be again closed and the impulse-wheel 17 again operated in the manner as set forth.

In Fig. 6 a modified form of impulse-wheel is shown, which is indicated by the reference character 25. In this construction of impulse-wheel contacts 26 are provided instead of insulations. This is obtained by insulating entirely one face of the wheel 25 and providing said wheel 25 with the raised contacts 27, which extend through the insulations.

In Fig. 7 another modified form of impulse-wheel is shown, which is indicated by the reference character 28, and this modified construction consists of providing the upper portion of each of the teeth with an insulation, as at 29.

In Fig. 8 is illustrated the form of operating-lever employed in connection with the modified form of impluse-wheel shown in Fig. 7. This modified form of lever 30 is not insulated—that is to say, the hooked end 31 thereof is not insulated—as it is not necessary, owing to the fact that the teeth of the impulse-wheel 28 are suitably insulated in the manner just referred to.

The circuit passes through the armature-shaft 9, wire 14, spring 12, lever 13, impulse-wheel 17, connecting-arm 20, and wire 7, as well as wire 6, to the magnet 4.

When my improved mechanism is used in connection with a watch, a small battery is mounted therein to supply electrical energy. The various parts forming the mechanism for operating a watch-movement are arranged within the watchcase. This can be accomplished by the removal of the various parts of the watch-movement which are not necessary, owing to the fact that the necessary parts of the movement are operated by the mechanism hereinbefore set forth in connection with the operation of the clock-movement.

It will be evident that the operating mechanism hereinbefore described can be applied to any sized clock or watch movement with-

out changing or enlarging the size of the said movement and that it is also particularly adapted for use for operating old clock or watch movements, for the reason that no additions are necessary—simply the removal of certain parts of the movement and the application thereto of the operating mechanism hereinbefore described, which can be readily placed in position or attached to the movement.

It is thought the many advantages of my improved mechanism for electrically operating clock or watch movements can be readily understood from the foregoing description, taken in connection with the accompanying drawings, and it will furthermore be evident that changes, variations, and modifications can be resorted to without departing from the spirit of the invention or sacrificing any of its advantages, and I therefore do not wish to restrict myself to the details of construction hereinbefore described, and as shown in the accompanying drawings, but reserve the right to make such changes, variations, insulations, and modifications as come properly within the scope of the protection prayed.

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

1. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, an insulated impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, electrically-operated means engaging with said wheel for imparting an impulse thereto, and means bearing against said wheel for opening and closing the circuit when the wheel is operated.

2. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, an insulated impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, electrically-operated, counterbalanced means engaging with said wheel for imparting an impulse thereto, and means bearing against said wheel for opening and closing the circuit when the wheel is operated.

3. A mechanism for electrically operating clock and watch movements comprising means for establishing an electrical circuit, an insulated toothed impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, an operating-lever engaging the teeth of said wheel and when operated in one direction adapted to impart movement to said wheel, an electrically-operated means connected to said lever and adapted when the circuit is formed to impart movement in one direction to said lever thereby operating said wheel and when the circuit is broken, to return said lever to its inoperative position, and means bearing against said wheel for opening and closing the circuit when the wheel is operated.

4. A mechanism for electrically operating clock and watch movements comprising means for establishing an electrical circuit, an insulated toothed impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, an operating-lever engaging the teeth of said wheel and when operated in one direction adapted to impart movement to said wheel, an electrically-operated counterbalanced means connected to said lever and adapted when the circuit is formed to impart movement in one direction to said lever, thereby operating said wheel and when the circuit is broken, to return said lever to its inoperative position, and means bearing against said wheel for opening and closing the circuit when the wheel is operated.

5. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, an insulated impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, and an electrically-operating mechanism for operating said wheel and adapted to impart an impulse thereto.

6. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, an insulated impulse-wheel adapted to engage with and when operated to operate the movement, said wheel further adapted to make and break the circuit, and an electrically-operating counterbalanced mechanism for operating said wheel and adapted to impart an impulse thereto.

7. In combination, a rock-shaft, a counterbalanced armature carried thereby, a magnet, said magnet when energized adapted to rock said shaft in one direction, said armature rocking said shaft in the opposite direction when said magnet is deënergized, means for establishing an electrical circuit, an impulse-wheel engaging with and adapted to operate the clock or watch movement, said wheel further adapted to make and break the circuit, an insulated lever carried by said shaft and adapted to engage said wheel for imparting impulses thereto when the said magnet is energized, and means bearing against said wheel and coöperating therewith for opening and closing the circuit.

8. Mechanism for electrically operating clock and watch movements comprising a rotatable shaft, a pinion carried thereby and adapted to engage the said movement for operating it when the shaft is rotated, means for establishing an electrical circuit, an impulse-wheel carried by the said shaft and adapted when operated to rotate said shaft, said wheel further adapted to make and break the circuit, means bearing against the said wheel and

coöperating therewith for opening and closing the circuit, an operating-lever adapted to engage said wheel and when operated in one direction to impart movement to said wheel, a rock-shaft carrying the said lever and adapted to rock in opposite directions moving thereby the said lever to operative and inoperative positions, and an electrically-operated means carried by said shaft and adapted to operate the said shaft in opposite directions.

9. Mechanism for electrically operating clock and watch movements, comprising a rotatable shaft, a pinion carried thereby and adapted to engage the said movement for operating it when the shaft is rotated, means for establishing an electrical circuit, an insulated impulse-wheel carried by the said shaft and adapted when operated to rotate said shaft, said wheel further adapted to make and break the circuit, means bearing against the said wheel and coöperating therewith for opening and closing the circuit, an insulated operating-lever adapted to engage said wheel and when operated in one direction to impart movement to said wheel, a rock-shaft carrying the said lever and adapted to rock in opposite directions moving thereby the said lever to operative and inoperative position, and an electrically-operating means carried by said shaft and adapted to operate the said shaft in opposite directions.

10. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, a toothed impulse-wheel having one face suitably insulated, means bearing against said insulated face of said wheel for opening and closing the circuit, and an electrically-operating means coöperating with said wheel for operating it.

11. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, a toothed impulse-wheel having one face suitably insulated, means bearing against said insulated face of said wheel for opening and closing the circuit, and an electrically-operating counterbalanced means coöperating with said wheel for operating it.

12. A mechanism for electrically operating clock and watch movements, comprising means for establishing an electrical circuit, an insulated toothed impulse-wheel, said wheel adapted to engage with the movement and operate it, said wheel further adapted to make and break the circuit, means bearing against said wheel and coöperating therewith for opening and closing the circuit, a lever engaging with said wheel and adapted when operated in one direction to impart movement to said wheel, electrically-operating means connected with the said lever and adapted to move the said lever in opposite directions, and means coöperating with said electrically-operating means for returning said lever to its normal position.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRED SCHMIDT.

Witnesses:
ANTHONY DRAGAR,
FRED O. HENZI.