No. 874,941. PATENTED DEC. 31, 1907.

U. L. COLLINS.

ELECTRIC CLOCK.

APPLICATION FILED MAR. 13, 1907.

FIG. 4.

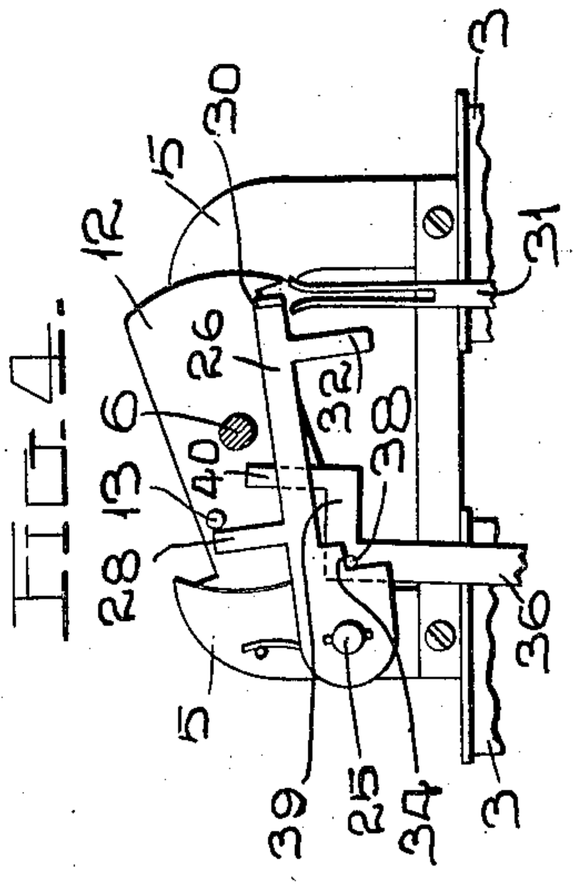


FIG. 5.

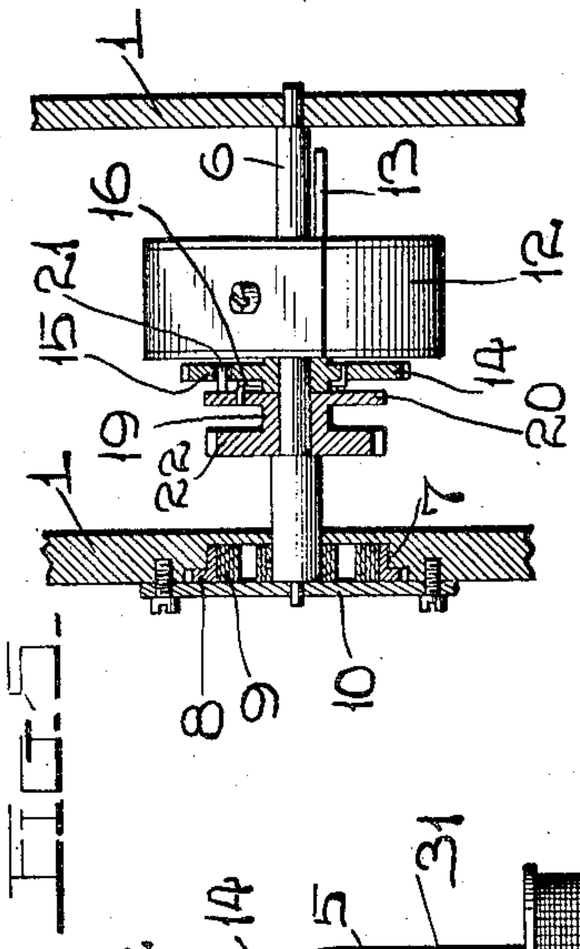


FIG. 7.

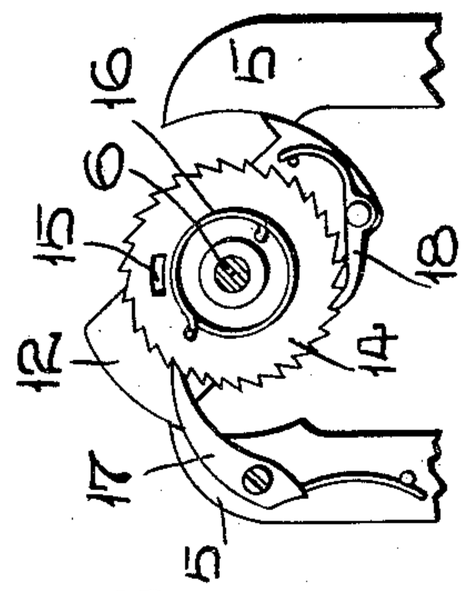


FIG. 6.

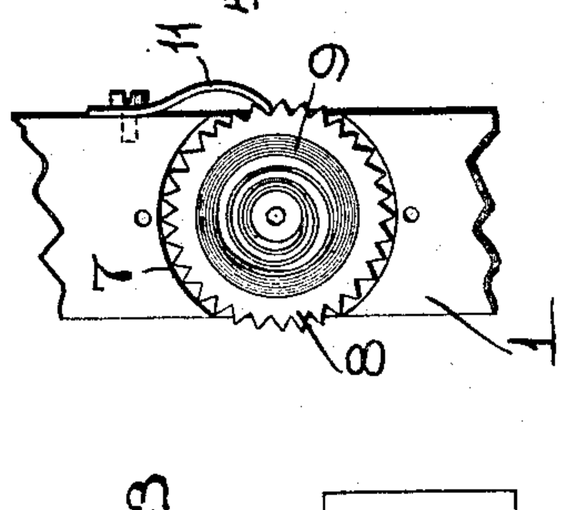


FIG. 1.

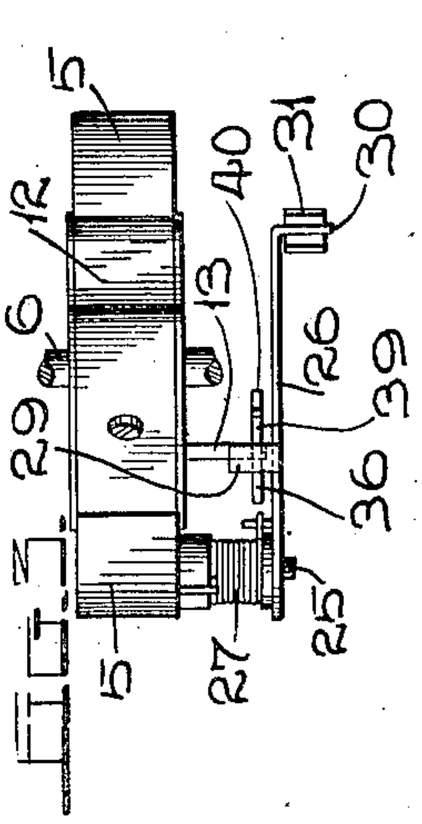


FIG. 2.

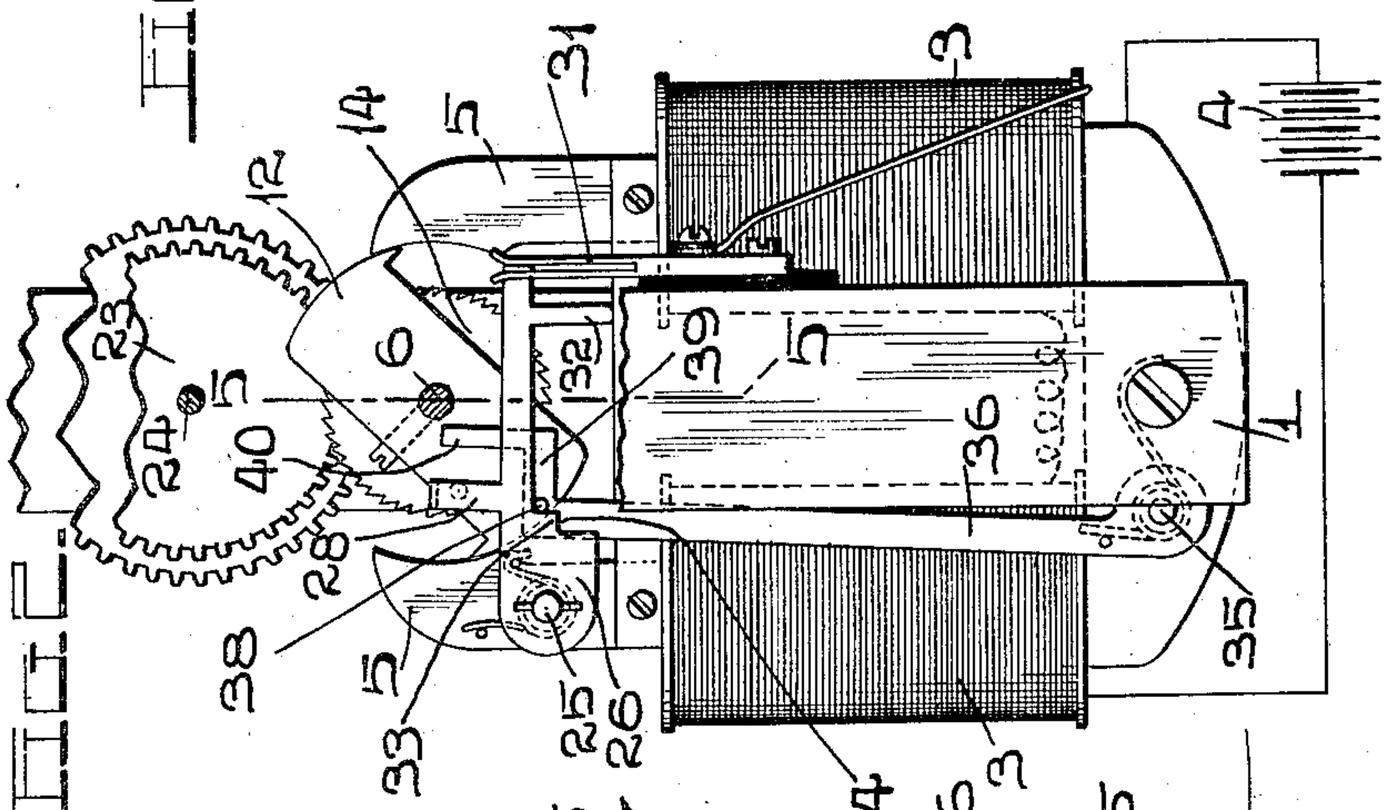
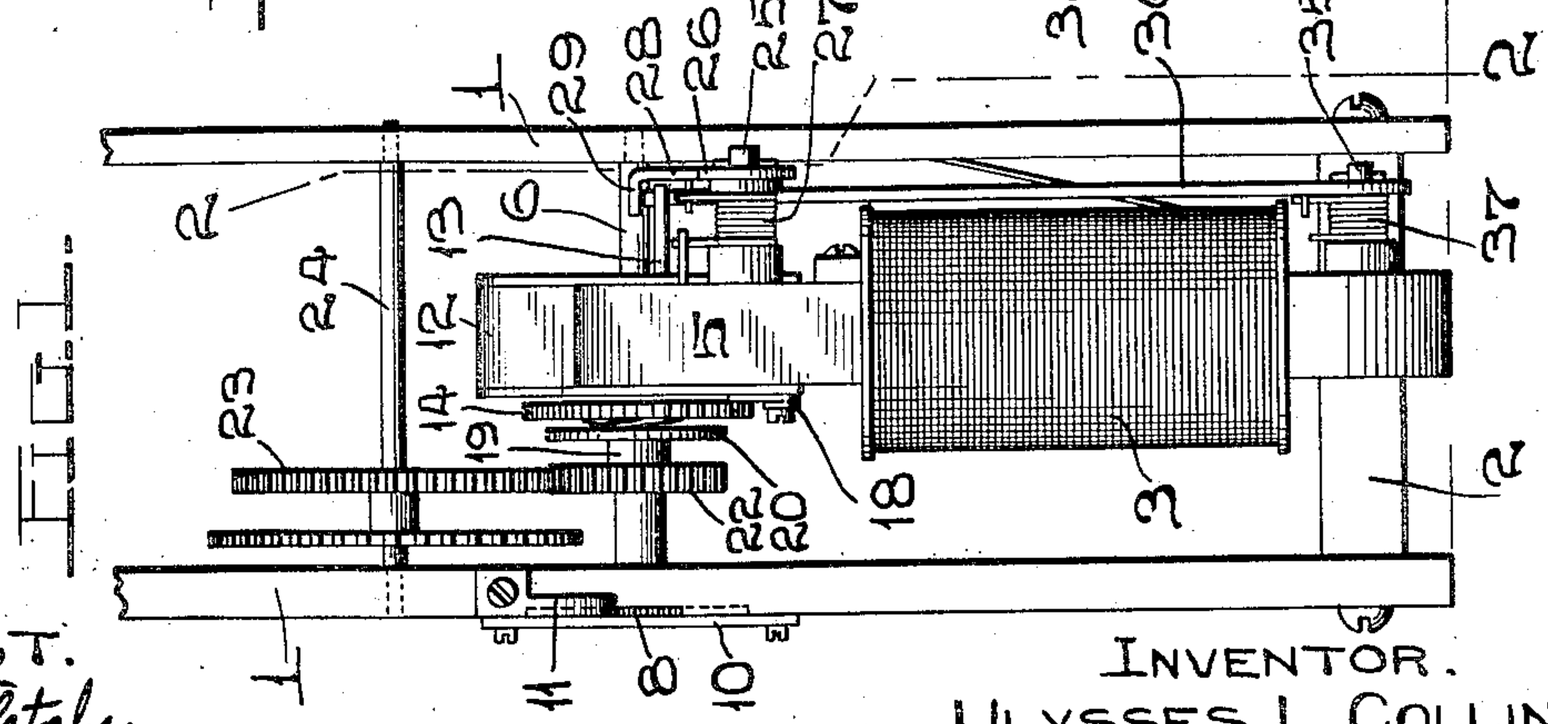


FIG. 3.



ATTEST.

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INVENTOR.

ULYSSES L. COLLINS.

BY Higdon & Dougan.

ATTY'S

UNITED STATES PATENT OFFICE.

ULYSSES L. COLLINS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO COLLINS ELECTRIC CLOCK COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

ELECTRIC CLOCK.

No. 874,941. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed March 13, 1907. Serial No. 362,119.

To all whom it may concern:

Be it known that I, ULYSSES L. COLLINS, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Electric Clocks, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates generally to electric clocks, and more particularly to an electrically operating winding mechanism therefor, and the object of my invention is to construct a simple, inexpensive winding device, which can be readily applied to a clock mechanism, and which device is positive in action, easily repaired, and in which there is no reverse or lost motion.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of the lower portion of the frame of a clock with my improved winding mechanism in position thereon; Fig. 2 is an elevation, partly in section, which view is taken on the line 2—2 of Fig. 1; Fig. 3 is a plan view of the armature, and a spring actuated lever adjacent said armature, and which is provided with a contact finger; Fig. 4 is an elevation of the upper ends of the magnet cores, with the armature drawn into position between said upper ends, and the contact finger shown in open position; Fig. 5 is a vertical section taken on the line 5—5 of Fig. 2; Fig. 6 is an elevation of a portion of the clock frame, showing the clock spring and detention wheel therefor; Fig. 7 is an elevation of the rear side of the armature, and showing a ratchet wheel carried thereby, and also showing the upper end of the magnet cores.

Referring by numerals to the accompanying drawings:—The two parts of the clock frame 1 are connected at their lower ends by the transverse bar 2, and supported by said bar is a pair of magnet coils 3, which are in circuit with a suitable battery 4, or other source of electrical energy; and projecting from the upper ends of said magnet coils are the tops of the magnet cores 5. A shaft 6 is transversely positioned between the upper ends of the cores 5, the ends of which shaft are journaled for rotation in the clock frame 1, and formed in the outer portion of one of the parts of the frame, around one end of this shaft 6, is a recess 7, in which is journaled for rotation a ratchet wheel 8, in the form of a ring, and fixed to the inner side thereof is the end of a convolute spring 9, the inner end of which is fixed on the corresponding end of the shaft 6. The outer face of the ratchet wheel 8, and the spring 9, are inclosed by a plate 10, fixed to the outer face of the clock frame, and engaging the teeth of the ratchet wheel 8 is a spring pawl 11, which is fixed to the clock frame. Fixed on the center of the shaft 6 and operating between the tops of the magnet cores 5, is an armature 12, from the front side of which projects a pin 13, and loosely mounted on the shaft 6, immediately to the rear of this armature, is a ratchet wheel 14, in which is formed a short segmental slot 15, and to which ratchet wheel is fixed one end of a small coil spring 16. The teeth of the ratchet wheel 14 are engaged by a spring actuated pawl 17, pivotally mounted on the rear side of one of the magnet cores; and also by the point of a pawl 18 pivotally arranged on the rear side of the armature 12. Arranged for rotation on the shaft 6, adjacent the ratchet wheel 14, is a hub 19, with one end of which is formed integral a disk 20, carrying a pin 21 which engages in the slot 15, and in which disk is seated the end of the coil spring 16, opposite the end which is seated in the ratchet wheel 14. Formed integral with the opposite end of the hub 19 is a pinion 22, which meshes with a gear wheel 23 carried by a shaft 24, and which last mentioned parts are part of the ordinary clock mechanism.

Pivotally mounted on a pin 25, which projects from the front side of the left hand one of the magnet cores 5, is one end of a horizontally disposed arm 26, and arranged on said pin 25 is a helical coil spring 27, one end of which is fixed to the rear side of the arm 26, and the opposite end engaging a pin or projection on the left hand magnet core; and the tendency of this spring is to move the free end of the arm 26 downward. Formed integral with the top of the arm 26 is an upwardly projecting plate 28, with the upper end of which is formed integral a rearwardly projecting finger 29 which normally occupies a position in the path of travel of the outer end of the pin 13. The free end of the arm 26 is

bent forwardly at right angles, as designated by 30, and said forwardly bent end is adapted to engage in the bifurcated upper end of a contact plate 31 which is fixed to and insulated from the clock frame 1, and which plate is electrically connected to one of the magnet coils. Formed integral with the under side of the arm 26, adjacent its outer end, is a post 32, which is adapted to contact with a block carried on top of the magnet coils to limit the downward movement of the free end of said arm. The left hand end of the arm 26 is much wider than the right hand end, and formed integral with said arm, at the offset between the wide and narrow portions, in a shoulder 33, the under side 34 of which is slightly inclined relative a horizontal line.

Projecting from the base of the magnet coil frame is a pin 35, on which is pivotally mounted the lower end of a vertically arranged arm 36, and located on said pin 35 is a helical coil spring 37, one end of which is connected to the arm 36, and the opposite end being connected to the bar 2. The upper end of this lever 36 terminates adjacent the shoulder 33 formed on the arm 26, and seated in said upper end is a horizontally disposed pin 38 which is adapted to engage against the under side of the arm 26 on the vertical side of the shoulder 33, and also against the inclined lower edge 34 of said shoulder. Formed integral with the upper end of the lever 36 is a short horizontally disposed arm 39, with the outer end of which is formed integral a vertically disposed finger 40, which lies in the path of travel of the pin 13 carried by the armature 12.

While the clock is in operation, the parts are in the position as seen in Fig. 4, with the free end of the arm 26 elevated from the bifurcated plate 31, and the pin 38 occupies a position beneath the shoulder 33, thus holding said arm elevated; and, when so positioned, the circuit through the magnet coils is open. The power of the coil spring 37 normally forces the lever 36 toward the left, thus holding the pin 38 in proper position beneath the shoulder 33.

The winding operation of my improved clock is as follows: The power spring 9, when wound up, causes the shaft 6 to rotate, consequently carrying the armature 12 from an approximate horizontal position between the upper ends of the cores 5 into an inclined position, and during this movement of the armature, which is of course very slow, the pawl 18 engages with the ratchet wheel 14, and correspondingly rotates the same, and the engagement of the pin 21 in the slot 15 consequently rotates the disk 20, hub 19, and pinion 22. This rotary motion is transmitted to the gear wheel 24 and consequently to the clock mechanism in the upper portion of the frame 1. When the armature 12 has reached an approximate vertical position, the pin 13 strikes against the finger 40, thus carrying the upper end of the lever 36 to the right, and in turn carrying the pin 38 along the inclined under side of the shoulder 33 until said pin passes beyond the vertical side of said shoulder; and, when this point is reached, the power stored in the spring 27 throws the outer end of the arm 26 downwardly, thus carrying the contact finger 30 into the bifurcated upper end of the plate 31, thus establishing the circuit through the magnet coils. As these magnet coils are energized, the armature 12 will be instantly drawn into a horizontal position between the upper ends of the cores 5; and, in so doing, the pin 13 carried by the armature, strikes against the under side of the finger 29, carrying the same upward a short distance, which action raises the free end of the arm 26, withdrawing the finger 30 from the bifurcated plate 31, and thus breaks the circuit. As soon as the arm 26 has been elevated a sufficient distance, the pin 38 will ride off from the vertical side of the shoulder 33, and drop into position beneath the inclined under side of said shoulder, thus holding the arm in its elevated position, and which action of the arm 36 is brought about by the action of the spring 37 which normally moves the upper end of said lever toward the left. When the armature 12 is swung into a horizontal position, the power spring 9 is correspondingly wound on the interior of the ratchet wheel 8; and during the movement of the armature, the pawl 18 moves past a number of the teeth on the periphery of said ratchet wheel, which latter is held against movement in a reverse direction by the pawl 17. The spring 16, connecting the ratchet wheel 14 and disk 20, together with the pin and slot connection between said parts, provide for taking up any lost or reversed motion during the action of the armature, and the tension of the power spring 9 can be regulated or taken up by winding up the ratchet wheel 8 to which the outer end of the spring 9 is fixed.

A winding mechanism of my improved construction is very simple, easily applied to a clock frame, is automatic and accurate in operation, and requires the use of but a small battery, or other source of electrical supply.

I claim:—

1. In an electric clock, a pair of magnet coils, the cores of which are extended, a shaft journaled between the ends of the cores, an armature fixed on said shaft, a spring fixed to and adapted to be wound by the shaft when rotated in one direction, connections between the shaft and the clock gearing, an electric circuit in which the coils are located, an arm pivoted to one of the magnet cores for opening and closing the circuit, an arm pivoted at its lower end to

the magnet frame, a pin carried by the upper end of said arm for engaging beneath the contact arm to hold the same elevated when the circuit is open, and means carried by the armature for actuating the pin carrying arm to release the contact arm.

2. In an electric clock, a pair of magnet coils, the cores of which are extended, an armature arranged for operation between the extended ends of the cores, a power spring connected to and arranged to be wound up for moving the armature in one direction, suitable driving connections actuated by the power stored in the spring for moving the clock mechanism, an electric circuit in which the coils are located, an arm pivoted to one of the magnet cores for opening and closing the electric circuit, an arm pivoted to the magnet frame, a pin carried by the upper end of the arm to engage beneath the contact arm to hold the same elevated when the circuit is open, and means carried by the armature for actuating the pin carrying arm to release the contact arm, and which means also elevates the contact arm.

3. In an electric clock, a pair of magnet coils, the cores of which are extended, a shaft journaled between the ends of the cores, an armature fixed on said shaft, a spring fixed to and adapted to be wound by the shaft when rotated in one direction, means connected to the outer end of said spring whereby the tension of the same is varied, connection between the shaft and the clock gearing, an electric circuit in which the coils are located, an arm pivoted to one of the magnet cores for opening and closing the circuit, an arm pivoted to the magnet frame, a pin carried by the upper end of said arm for engaging beneath the contact arm to hold the same elevated when the circuit is open, and means carried by the armature for actuating the pin carrying arm to release the contact arm, and which means is adapted to elevate the contact arm.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

ULYSSES L. COLLINS.

Witnesses:

M. P. SMITH,

E. L. WALLACE.