No. 830,971. PATENTED SEPT. 11, 1906.

U. L. COLLINS.

ELECTRIC CLOCK.

APPLICATION FILED SEPT. 18, 1905.

FIG. 3.

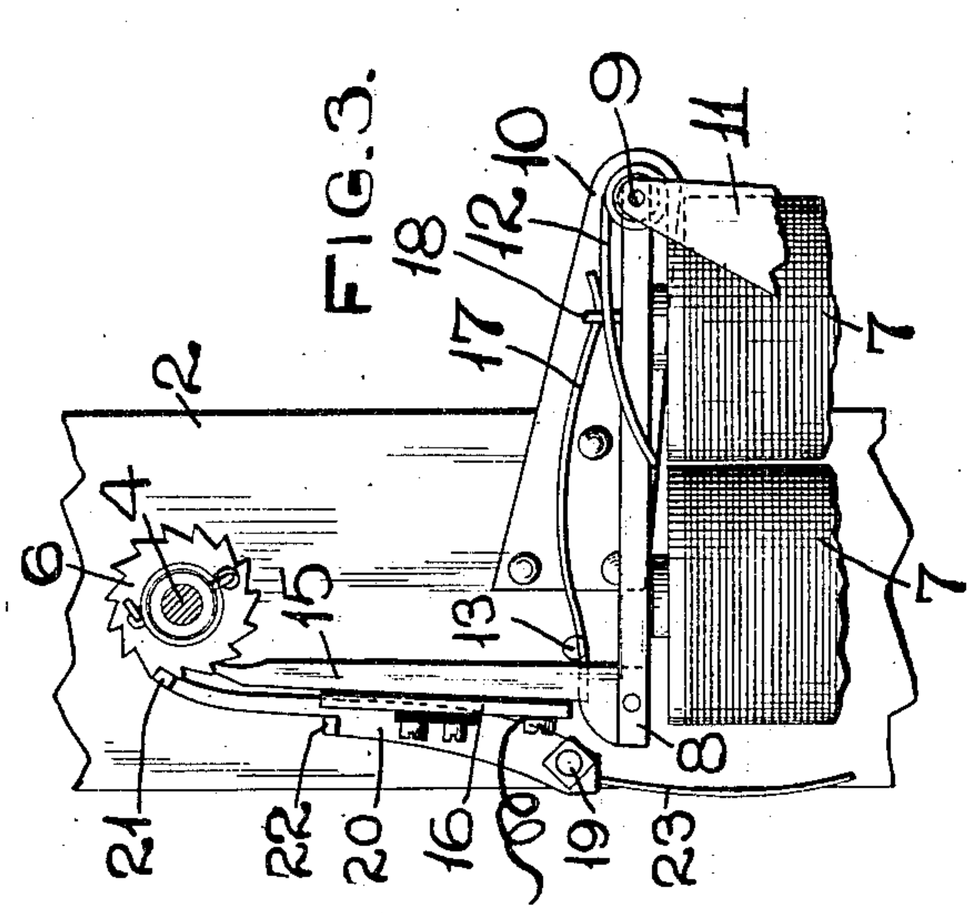

FIG. 4.

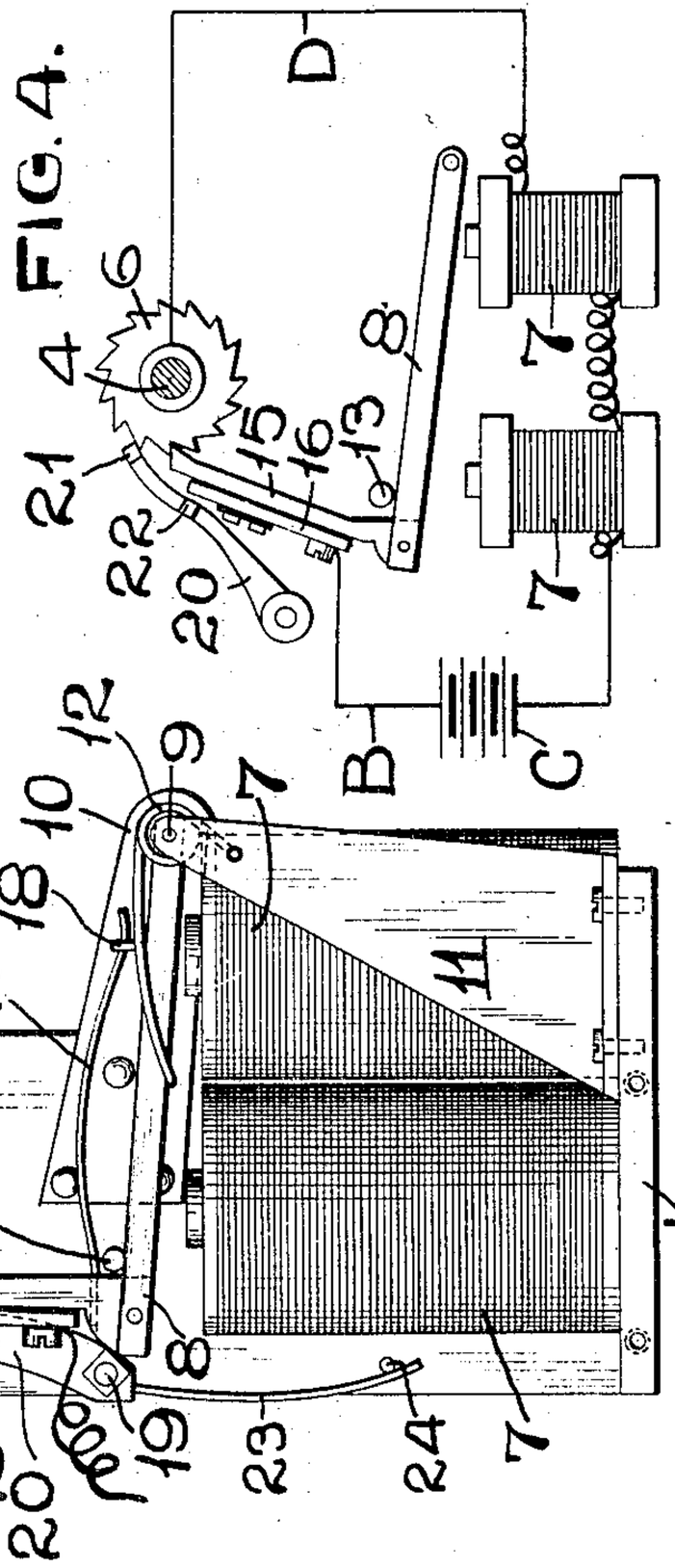

FIG. 2.

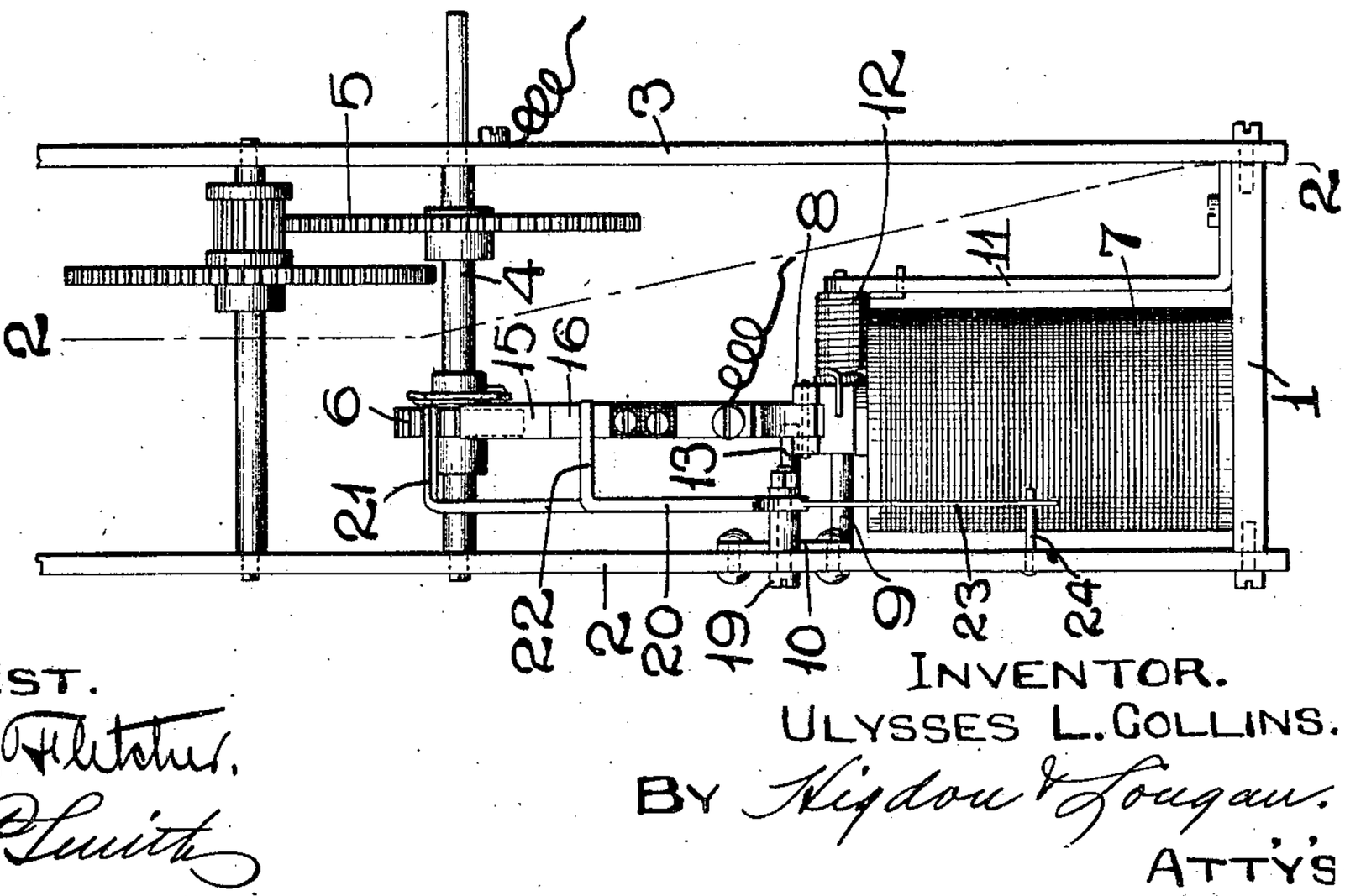

FIG. 1.

ATTEST.

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ELECTRIC CLOCK.

No. 830,971. Specification of Letters Patent. Patented Sept. 11, 1906.

Application filed September 18, 1905. Serial No. 278,867.

To all whom it may concern:

Be it known that I, ULYSSES L. COLLINS, a citizen of the United States, and a 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 means whereby the propulsion-spring of a clock is intermittently wound through the action of electromagnets.

The object of my invention is to construct a simple winding mechanism composed of a minimum number of parts, and which winding mechanism is arranged adjacent one of the side plates of a clock mechanism in order that the opposite side plate may be readily removed to clean or repair the clock mechanism without disturbing the winding mechanism.

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

Figure 1 is an end view of the lower portion of a clock-frame equipped with my improved device. Fig. 2 is a vertical section taken on the line 2 2 of Fig. 1. Fig. 3 is a detail view analogous to Fig. 2 and showing the armature pulled downwardly by the cores of the magnet-coils. Fig. 4 is a diagrammatic view illustrating the electric connections of my improved device.

Referring by characters to the accompanying drawings, 1 indicates the base-plate, to which is secured the vertically-arranged side plates 2 and 3 of the clock-frame. Arranged in suitable bearings in the plates 2 and 3 is a transverse shaft 4, which is one of the shafts of the clock mechanism and on which is located a gear-wheel 5, that drives other gearing of the clock mechanism suitably arranged in the frame above the shaft 4. Located upon this shaft 4 is a ratchet-wheel 6, the teeth of which are so disposed as that they are engaged by a pawl, (hereinafter specified.) Said wheel and the shaft 4 will be driven in the direction indicated by the arrow A, Fig. 2. Arranged on the base 1 is a pair of electromagnets 7, which are electrically connected, and an armature 8, in the form of a bar, is arranged to operate above the cores of said coils, one end of which armature is fixed upon a shaft 9. The ends of this shaft are journaled in a bracket 10, that extends outwardly from the side plate 2, and in the upper end of a bracket 11, that extends upwardly from the base 1, and wound upon this shaft 9 is a coil-spring 12, one end of which extends forwardly and is bent beneath the center of the armature 8. The opposite end of this coil-spring is fixed in the bracket 11. The normal tendency of this spring is to draw the armature upwardly away from the cores of the magnets 7, and the upward movement of said armature is limited by a pin 13, projecting outwardly from the plate 2.

Pivotally mounted on the free end of the armature 8 is a vertically-arranged pawl 15, the point of which engages the teeth of the ratchet-wheel 6. Arranged on the back of this pawl 15 and insulated therefrom is a plate 16, and secured to the base of said pawl is one end of a bow-spring 17, the free end of which engages beneath a hook 18, carried by the armature 8, the normal tendency of the tension of which spring is to maintain the point of the pawl in engagement with the teeth of the ratchet-wheel 6.

Pivotally mounted upon a pin 19, which projects laterally from the plate 2, is a lever 20, the upper end of which is provided with an integral contact-finger 21, that projects laterally and bears upon the teeth of the ratchet-wheel 6 just above the point of the pawl 15. A suitable distance below this contact-finger is a second laterally-projecting contact-finger 22, that is adapted to contact with the upper end of the plate 16. A spring 23 is fixed to the lower end of the lever 20 and extends downwardly thereform and bears upon a pin 24, carried by the plate 2, which spring by this pressure maintains the contact-finger 21 in engagement with the teeth of the ratchet-wheel 6. The fingers 21 and 22 are so arranged as that when the upper finger 21 rides off the point of one of the teeth of the ratchet-wheel 6 and drops into the deepest portion of the notches between the teeth the lower finger 22 will contact with the upper end of the plate 16, and when the pawl 15 is drawn downwardly by the action of the magnet the upper end of the plate 16 is drawn away from the contact-finger 22, for the reason that the point of said pawl engages the next adjacent teeth of the ratchet-wheel 6, and said pawl 15 is drawn away from

the contact-finger 22 by the power stored in the bow-spring 17.

The operation of my device is as follows: Whenever the electromagnets act to draw the armature down, a certain amount of power is stored in the coil-spring 12, and this power is exerted against the armature, and consequently is transmitted to the pawl 15, and the same is caused to bear upwardly against the ratchet-wheel 6, and as a result the shaft 4 is caused to rotate, and this rotation is transmitted by the gear-wheel 5 to the clock mechanism in the upper portion of the frame. Just prior to the stopping of the upward movement of the armature 8 by the pin 13 the contact-finger 21 rides off from the point of the tooth of the ratchet-wheel 6 that is above the tooth that is engaged by the pawl 15, and when this action takes place the contact-finger 22 is thrown into contact with the plate 16. This completes an electrical circuit through a suitable conductor B, that leads from the lower end of the plate 16 to a suitable battery C or other source of electrical supply, and from thence to and through the coils 7 and from thence by a suitable conductor D to the frame of the clock and from thence to the shaft 4 of the ratchet-wheel 6 and from thence to the lever 20, that carries the contact-finger 22. This impulse instantly draws the armature 8 downwardly into contact with the cores of the magnets, and this movement draws the pawl 15 downwardly until its point engages between the next adjacent lower tooth of the ratchet-wheel 6. Simultaneous with this movement the power of the bow-spring 17 draws the pawl 15 a slight distance laterally in reëngaging with the teeth of the ratchet-wheel, and this lateral movement withdraws the plate 16 from engagement with the finger 22, thus breaking the electrical circuit. This downward movement of the armature 8 stores power in the coil-spring 12, which is now exerted to move the armature 8 and pawl 15 upwardly to rotate the ratchet-wheel 6 and shaft 4.

The operation just described takes place, of course, very quickly, and is repeated as often as the contact-finger 21 rides off from the points of the teeth of the ratchet-wheel 6.

A device of my improved construction is simple, strong, and durable, is accurate and positive in action, and the entire winding mechanism need not be disturbed in any way when cleaning or repairing the clock mechanism.

I claim—

1. In a device of the class described, a driven shaft, a ratchet-wheel mounted thereon, an electromagnet, an armature therefor, a spring in which power is stored by the actuation of the armature, a pawl carried by the armature and engaging the ratchet-wheel, a lever, contact-fingers carried thereby for engaging the ratchet-wheel and the pawl, and suitable electrical connections from the lever through the coils of the electromagnet and to the ratchet-wheel; substantially as specified.

2. In an electric clock, a winding mechanism, constructed with a driven shaft, a ratchet-wheel thereon, an electromagnet, an armature therefor, a spring in which power is stored by the actuation of the armature, a pawl carried by the armature and engaging the teeth of the ratchet-wheel, a pivoted lever, a finger carried thereby for engaging upon the ratchet-wheel, a finger carried by the lever for contacting with the pawl, and suitable electrical connections from the pawl to and through the coils of the electromagnet and to the ratchet-wheel; substantially as specified.

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

ULYSSES L. COLLINS.

Witnesses:
M. P. Smith,
John C. Higdon.