

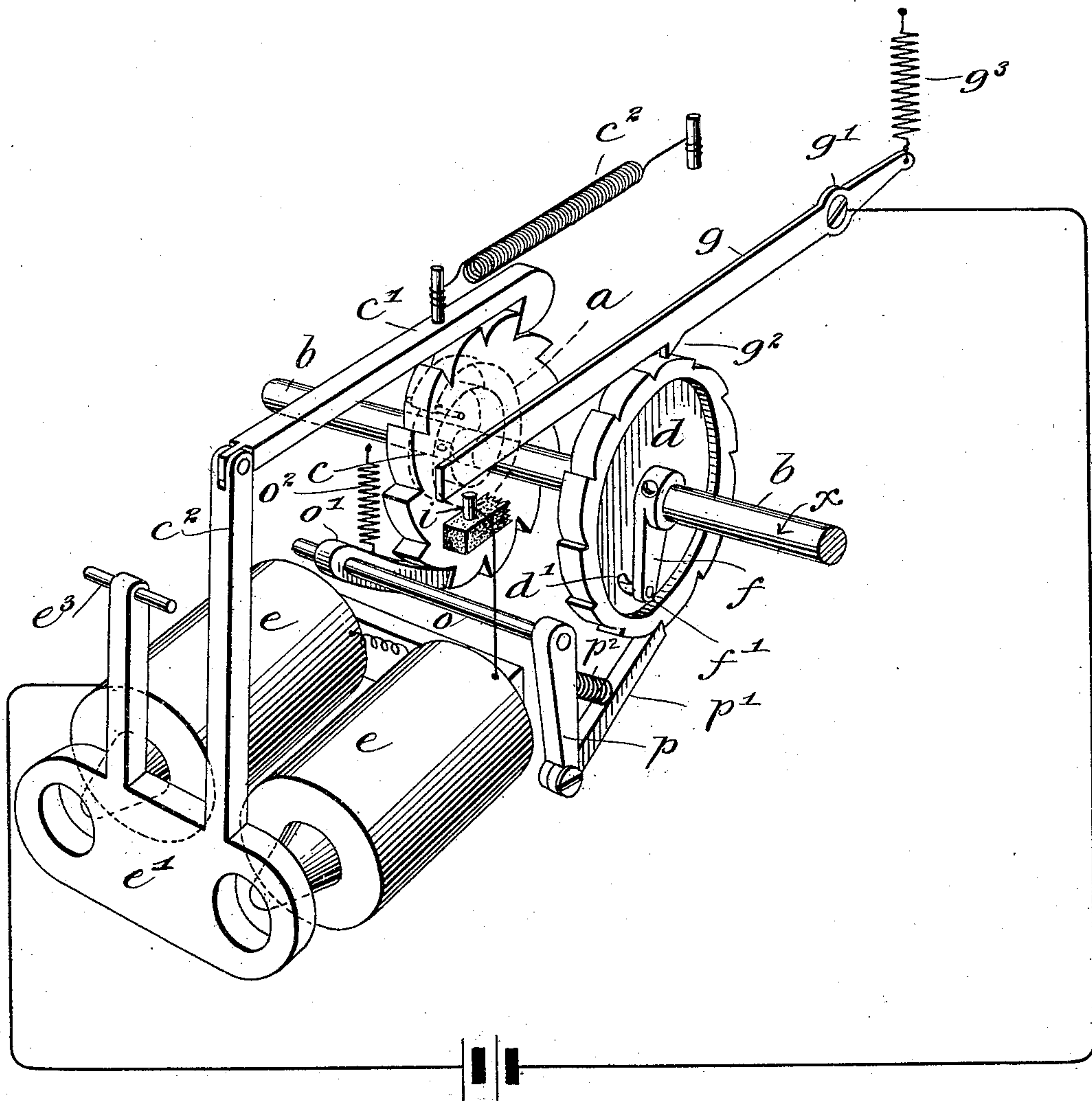
No. 647,309.

Patented Apr. 10, 1900.

A. LÜNGEN.
ELECTRIC CLOCK.

(Application filed Aug. 19, 1899.)

(No Model.)



WITNESSES:

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ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 647,309, dated April 10, 1900.

Application filed August 19, 1899. Serial No. 727,758. (No model.)

To all whom it may concern:

Be it known that I, ADAM LÜNGEN, a citizen of the United States, residing at the city of New York, in the borough of Bronx and State of New York, have invented certain new and useful Improvements in Electric Clocks, of which the following is a full, clear, and exact description.

This invention relates to electric self-winding clocks, the object being to provide a simple and cheap mechanism which will not consume any more power than is actually needed to do the winding.

The invention involves mechanism which holds the circuit closed just long enough to store a given amount of power in the spring and no longer; and it will be described hereinafter with reference to the accompanying drawing, in which the figure is a perspective view of the electric winding mechanism and that portion of a clock-train to which it is attached.

The clock-spring *a* (shown in dotted lines) has one end attached to the shaft *b* and the other attached to ratchet-wheel *c*, whose teeth are rather deeply cut. Engaging with the ratchet-wheel for the purpose of rotating it is a pawl *c'*, hinged to the end of an armature-lever *c''*, which is pivoted at *e''* and carries the armature *e'* of an electromagnet *e*. Each stroke of the magnet rotates the ratchet-wheel the space of one notch, the pawl being immediately returned to its normal position when the circuit is broken by spring *c''*. On shaft *b* is loosely hung a notched wheel *d*, having notches in its periphery equal in number to the teeth on the ratchet-wheel. These notches are formed by a radial and an angular cut, a space between them being occupied by the circular periphery of the wheel. The shaft also carries an arm *f*, tightly secured thereon, provided with a pin *f'* at its outer end, which passes into a slot *d'* in the wheel. Since the arm moves with the shaft, the engagement of the pin which it carries with the end of the slot will cause the notched wheel to rotate with the shaft, whereas a reverse movement of the wheel, equal to the length of the slot, may be made unaccompanied by the arm. A circuit-closing lever *g* is pivoted at *g'* and provided with a tooth *g''*, which rides upon the periphery of the notched wheel.

The weight of the lever or the spring *g''* causes the tooth to fall into a notch of the wheel whenever one is presented to it, and in this position the end of the lever is in contact with the pin *i* to close the circuit through the magnet. Running parallel to shaft *b* is another shaft *o*, upon which is securely fastened a pawl *o'*, whose point is held in contact with the periphery of ratchet-wheel *c* by a spring *o''*. There is also rigidly attached to this shaft a crank-arm *p*, carrying a pawl *p'*, which engages with the notches in the periphery of wheel *d*, being held thereto by spring *p''*. The rotation of the ratchet-wheel *c* under the action of the magnet causes pawl *o'* to move out and in as it rides over a tooth of the wheel, thus rocking shaft *o* and imparting such movement to the pawl *p'*, which thereby engages the notched wheel and moves it the space of one tooth.

The operation is as follows: When the clock is running, shaft *b* turns in the direction indicated by arrow *x*. The pin in arm *f* is against the end of the slot and carries the notched wheel with it, the lever *g* riding upon the periphery of the wheel and holding the electric circuit open. When wheel *d* presents a notch to the tooth *g''* of the circuit-controlling lever, the tooth drops into it and closes the circuit *g i*, which energizes magnet *e*, causing it to attract its armature and pull upon pawl *c'*, thus winding up the spring to the extent of one tooth on the ratchet-wheel *c*. As said ratchet-wheel turns it first throws the end of pawl *c'* downward or away from its center by the rise of the tooth; this draws back the pawl *p'* until it falls into a notch of wheel *d*, at about which time pawl *o'* clears the end of the tooth over which it has been riding and is pulled inward, causing pawl *p'* to rotate wheel *d* far enough to lift tooth *g''* onto the circular portion of the periphery of the wheel. This it does without any opposition on the part of the arm on account of the slot *d'*. The wheel simply runs ahead of the arm. In the continued movement of the clock-train the pin in arm *f* first traverses the slot in the wheel and thereafter carries the wheel along until another notch in its periphery is presented to the circuit-controlling lever, when the same operations are repeated. It will be observed that the closing

of the magnet-circuit is followed by the opening of it as soon as the armature completes its forward stroke, during which the winding of the spring is accomplished, the mechanism 5 that makes this possible being the independent motion between the arm *f* and wheel *d*. If these were not provided, the circuit would remain closed until by the very slow movement of shaft *b* the lever *h* was finally lifted, 10 thus unnecessarily consuming battery-power.

Having described my invention, I claim—

1. An electric winding mechanism comprising a circuit-controller and a notched wheel operating it at regular intervals, an electro- 15 magnet, a ratchet-wheel rotated thereby and a rock-shaft moved by said ratchet-wheel and itself moving the notched wheel, substantially as described.

2. In an electric-clock-winding mechanism, 20 the combination of the winding ratchet-wheel, the notched wheel, the circuit-closing lever riding on the periphery of the ratchet-wheel and adapted to drop into its notches suc-

sively, a shaft upon which the notched wheel has a limited independent motion, and con- 25 nections between the ratchet-wheel and the notched wheel whereby the latter is caused to move independently of its shaft when the former is moved, substantially as described.

3. The combination of an electromagnet, a 30 pawl operated thereby, a ratchet-wheel rotated by the pawl, a rock-shaft moved by the ratchet-wheel, a pawl carried by the rock-shaft, a notched wheel loose on its shaft and moved by the last-mentioned pawl, means for 35 causing the notched wheel to travel with its shaft and a circuit-controlling lever operated by the notched wheel, substantially as described.

In witness whereof I subscribe my signa- 40 ture in presence of two witnesses.

ADAM LÜNGEN.

Witnesses:

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