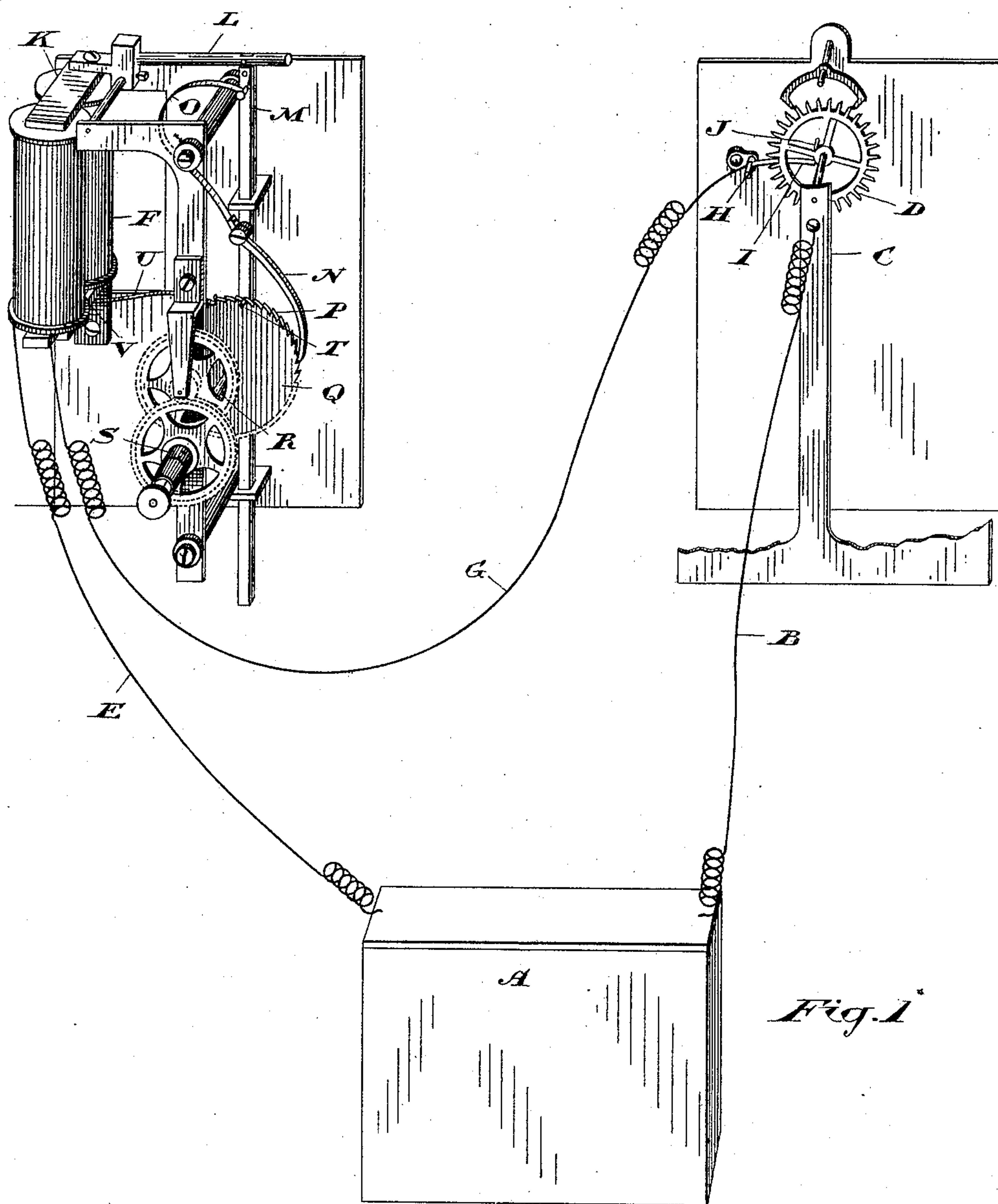


(No Model.)

F. A. ELLIS.  
ELECTRIC CLOCK.

No. 467,748.

Patented Jan. 26, 1892.



Witnesses

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# UNITED STATES PATENT OFFICE.

FRANK A. ELLIS, OF TORONTO, CANADA.

## ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 467,748, dated January 26, 1892.

Application filed June 13, 1891. Serial No. 396,099. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK ALEXANDER ELLIS, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented a certain new and useful Improvement in Electrical Clocks, of which the following is a specification.

The object of the invention is to provide simple mechanism by which a number of clocks may be accurately operated by and from a standard clock; and it consists in the peculiar construction, arrangement, and combinations of parts hereinafter more particularly described, and then definitely claimed.

The drawing represents a perspective view of the parts involved in my invention.

A represents an ordinary battery; B, the wire connecting the battery A to the metal frame C, in which the spindle of the escape-wheel D is journaled.

E is a wire connecting the battery A to the magnet F, and G is a wire connecting the magnet F to the metal post H, which is suitably insulated from the frame of the clock and has a light metal spring I extending from it in the path of a metal pin J, extending from the escape-wheel D. In this arrangement the magnet F will only be magnetized when the pin J is in contact with the spring I.

K is an armature from which a lever L extends. On the end of this lever I flexibly suspend a bar M, the weight of which is sufficient to keep the armature K clear of the magnet F, except when the circuit is made by contact between the spring I and the pin J, the strength of the current thus created being sufficient to draw the armature K into contact with the magnet F, and thereby raise the bar M, which, as before stated, is sufficiently heavy to draw the armature K away from its magnet the instant the current is broken by the pin J clearing itself of the spring I.

N is a pawl pivoted on the bar M and preferably actuated by a light spring O in such a manner as to hold the nose of the pawl N in constant contact with the ratchet-teeth P, formed on the wheel Q, which is fixed to the spindle R of the minute-hand. This spindle is suitably geared, as indicated, to the spindle S of the hour-hand.

Assuming that the escape-wheel D represents the escape-wheel of a standard clock from which it is designed to operate one or more clocks, consisting merely of minute and hour hands arranged in connection with a clock-dial, it follows, therefore, that each revolution of the escape-wheel D causes the pin J to fall in contact with the spring I, which contact is broken almost instantaneously by the pin J passing the spring I, which spring is extremely light, so that it will not interfere with the free revolving of the escape-wheel. The instant that the contact described is made the armature K is drawn toward its magnet F, thus raising the bar M so as to bring the nose of the pawl N opposite to a fresh tooth formed on the wheel Q. The instant that contact ceases between the pin J and the spring I the weight of the bar M causes it to fall, the said weight being sufficient to make the ratchet-wheel Q revolve the distance of a single tooth, and as this ratchet-wheel Q is fixed to the minute-spindle R, which is geared to the hour-spindle S, the said spindles are caused to revolve a sufficient distance to indicate a minute and corresponding fraction of an hour. A pin T, extending from the bar M, comes in contact with the ratchet-wheel Q when the bar M has fallen sufficiently far to give the desired movement to the wheel Q. This pin prevents the bar M falling farther than the required distance to accomplish the desired end, and it also assists in preventing the wheel Q from revolving. A light spring-pawl U, connected at one end to the frame V and designed to engage its other end with the ratchet-teeth P on the wheel Q, effectually prevents the wheel Q from being revolved in the reverse direction by the upward movement of the pawl N when the bar M is raised, as before described.

From this description it will be seen that by my invention I provide simple mechanism by which a number of clocks may be accurately operated by and from a standard clock.

What I claim as my invention is—

1. A vertical bar M, suspended from the arm or lever L, connected to the armature K, a pawl N, pivoted on the bar M and designed to engage with the teeth P, a spring O, designed to act against the pawl N, a pin T, ex-



tending from the bar M and designed to come in contact with the teeth P when the bar has fallen, in combination with an electric circuit extending from the magnet F to the escape-wheel or other moving part of a clock by which the said circuit may be made and broken at stated intervals, substantially as and for the purpose specified.

2. A vertical bar M, suspended from the arm or lever L, connected to the armature K, a pawl N, pivoted on the bar M and designed to engage with the teeth P, a spring O, designed to act against the pawl N, a pin T, extending from the bar M and designed to come in contact with the teeth P when the bar has fallen, the spring-pawl U, engaging with the teeth P, in combination with an electric circuit extending from the magnet F to the escape-wheel or other moving part of a clock by which the said circuit may be made and broken at stated intervals, substantially as and for the purpose specified.

3. A vertical bar M, suspended from the

arm or lever L, connected to the armature K, a pawl N, pivoted on the bar M and designed to engage with the teeth P, a spring O, designed to act against the pawl N, a pin T, extending from the bar M and designed to come in contact with the teeth P when the bar has fallen, the spring-pawl U, engaging with the teeth P, in combination with the wire E, connecting the magnet F to the battery A, the wire G, connecting the magnet F to the insulated post H, the wire B, connecting the battery A to the frame C, in which the escape-wheel D is journaled, a pin F, extending from the escape-wheel D and designed to come in contact with the spring I, which is connected to the post H, substantially as and for the purpose specified.

Toronto, May 21, 1891.

FRANK A. ELLIS.

In presence of—

I. EDW. MAYBEE,  
W. G. McMILLAN.