(No Model.)

C. M. CROOK.

SELF WINDING MECHANISM FOR ELECTRIC CLOCKS.

No. 573,430. Patented Dec. 15, 1896.

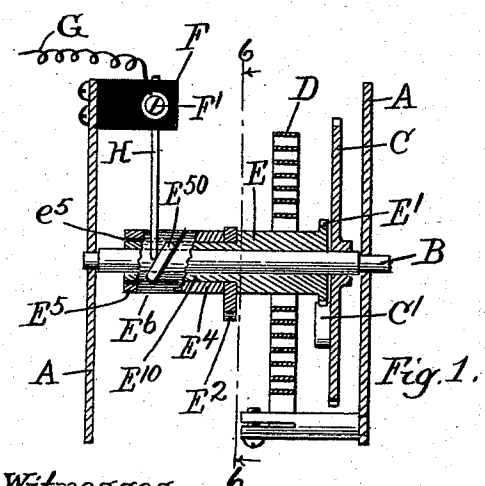

Fig. 1.

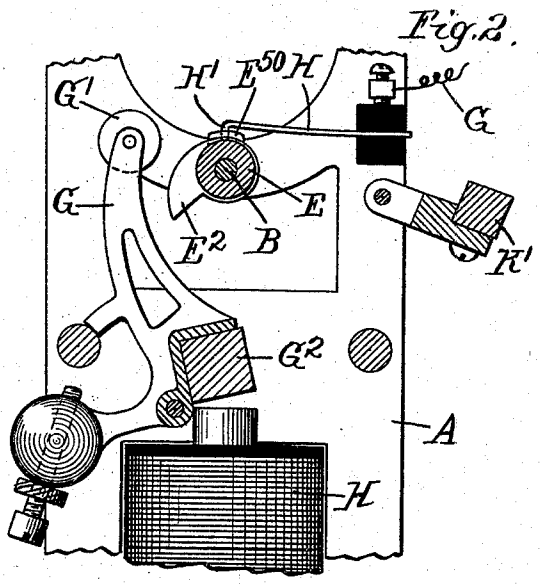

Fig. 2.

Witnesses.
E. F. Wray.
Jean Elliott.

Inventor.
Chas. M. Crook
by Burton & Burton
his attys

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

UNITED STATES PATENT OFFICE.

CHARLES M. CROOK, OF ELGIN, ILLINOIS.

SELF-WINDING MECHANISM FOR ELECTRIC CLOCKS.

SPECIFICATION forming part of Letters Patent No. 573,430, dated December 15, 1896.

Application filed April 20, 1896. Serial No. 588,267. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. CROOK, a citizen of the United States, residing at Elgin, county of Kane, and State of Illinois, have invented certain new and useful Improvements in Self-Winding Mechanism for Electric Clocks, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to clock-movements designed to be actuated by a spring or weight, which is wound up at short intervals by the movement of an armature of an electromagnet in a circuit, which is periodically energized through the medium of the circuit-closing devices which the clock-movement contains, and to such clock-movements which are set or synchronized periodically by similar means.

It consists in improvements in the circuit making and breaking device or automatic switch pertaining to the winding mechanism.

In the drawings, Figure 1 is a partly-sectional detail plan of the automatic switch and portions of the train associated with the same shaft, the section where made being axial with respect to the shaft. Fig. 2 is a section in the plane of the line 6 6 on Fig. 1, showing, in addition to the parts seen in Fig. 1 at such plane, the magnet armature and lever and the armature and portion of the lever pertaining to the synchronizing mechanism.

A A are the front and rear plates, respectively, of the frame in which the movement is mounted.

B is the shaft of the prime wheel of train C, said wheel being fixed rigidly upon the shaft and provided with a pawl C′, which is adapted to engage with the ratchet-flange E′, with which the forward end of the sleeve E is provided, said sleeve being the spring barrel or drum on which the mainspring E is coiled, said sleeve being loose on the shaft B.

E^2 is a cam which is spiral in character, though it involves only one coil of the spiral. This cam is rigid with the sleeve E and receives the pressure on its periphery of an abutment, preferably a roll-stud G′, which is carried by the lever-arm G, which is rigid with the armature G^2, which pertains to the magnet H. It will be understood from this structure that when the armature is attracted by the magnet, when the latter is energized, the abutment G′, being pressed upon the periphery of the cam E^2, rotates the sleeve E, winding up the spring D, while the pawl drags over the ratchet-flange, and the winding being completed and the magnet deënergized, permitting the armature to retreat, withdrawing the abutment from the cam, the reaction of the spring in unwinding rotates the sleeve in the reverse direction, causing the ratchet-flange, by means of the pawl engaged with it, to rotate the wheel C and the entire train following. The opening and closing of the circuit through which the magnet is energized is effected by the devices which will now be described.

E^4 is a sleeve or collar which is driven tight onto the reduced rear portion E^{10} of the sleeve E, being set up against the rear side of the cam E′. The rear end of this sleeve is cut off obliquely at an angle of about forty-five degrees, and behind it, on the sleeve E, a complementary sleeve or collar E^5, having its forward end cut at the same oblique angle, is passed over the rear reduced end of the sleeve E, an insulating sleeve or lining e^5 being interposed. The oblique ends of the two sleeves E^4 and E^5 are also insulated from each other by an interposed annulus E^6, of mica. Along the forward oblique edge of the sleeve or collar E^5 a boss or extended tooth E^{50} projects radially from the cylindrical surface of the sleeve.

F is a post secured to the frame, having binding-screw F′ for connecting the circuit-wire G. Rigid with this post and in electrical connection with the circuit-wire is the spring-arm H, which extends toward the plane of the path of rotation of the boss E^{50} and at the end is bent at an angle, forming a finger H′, which extends radially with respect to the shaft B into the path of the boss at a position adapting it to collide with the boss at about the middle point of the length of the latter when in the rotation of the shaft the boss comes around to the position of the finger. Fig. 1 shows the boss at the instant of collision with the finger and before the continued rotation of the boss has produced any flexure of the finger. The further rotation of the sleeve carrying the boss persistently against

the finger will evidently spring the arm H aside until the finger H′ has been cleared by the boss, whereupon, the arm recovering its normal straight form, the finger clears the end of the boss and is in position to collide with the opposite side of the boss when the direction of the rotation of the sleeve is reversed. The point of the finger bears at all times upon the cylindrical surface of the sleeve, made up of E^5 and E^4. When the finger is on the forward side of the boss E^{50}, its point is in contact with the sleeve E^4, which being not insulated in any manner from the case or frame completes the circuit, causing the magnet to be energized and to attract the armature, so that the abutment G′ is driven upon the periphery of the cam E^2, causing the sleeve E to be rotated and the spring D to be wound. The rotation, however, of the sleeve in the winding direction carrying the boss E^{50} against the finger H′, springs the arm H aside, putting it under a tension which causes it to spring back as soon as the boss passes the finger; and as soon as this occurs the end of the finger passes off the sleeve E^4 onto the insulated sleeve E^5, breaking the circuit, deenergizing the magnet and permitting its armature to be withdrawn, withdrawing the abutment from the cam, and permitting the spring to again react and rotate the sleeve E^4 and run the train until the rear side of the boss, colliding with the finger H′, springs the arm H rearward, putting it under tension, from which it reacts as soon as the boss passes the finger, which again comes back onto the uninsulated sleeve, reëstablishes the circuit, and causes the winding operation to be repeated.

I claim—

1. In combination with the winding shaft, drum or barrel, two contact-pieces rigid therewith, one insulated and the other uninsulated, the insulated piece having a boss oblique to the axis; the winding-magnet and the circuit through which it is energized comprising the uninsulated contact-piece, and a spring-arm having a finger adapted to bear upon said contact-pieces and standing in the path of rotation of the oblique boss, the arm being adapted to be sprung aside by the oblique boss to allow the latter, rotating in either direction, to pass the finger, whereby the contact of the finger is shifted from one of said contact-pieces to the other.

2. In combination with the winding shaft, drum or barrel, two contact-pieces rigid therewith, one insulated and the other uninsulated, the winding-spring and the circuit through which it is energized comprising an uninsulated contact-piece, and a spring-arm having a finger which bears on said contact-pieces, the insulated contact-piece having a boss extending in a plane oblique to the axis, and adapted, as it rotates in the direction to wind up the spring, to collide with the finger on the side toward the uninsulated contact-piece, and as it rotates in the opposite direction, to collide with said finger on the side toward the insulated piece.

3. In combination, substantially as set forth, the winding shaft, drum or barrel having the two sleeves E^4 and E^5, insulated from each other at a plane oblique to the axis, the sleeve E^5 being further fully insulated and having the oblique boss E^{50} extending along the oblique insulated edge of said sleeve, the winding-magnet and its armature and the circuit through which the magnet is energized, comprising a spring-arm H, having a finger which bears upon the surface of said sleeves and extends in the path of rotation of the oblique boss.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 13th day of April, 1896.

C. M. CROOK.

Witnesses:
CHAS. S. BURTON,
JEAN ELLIOTT.