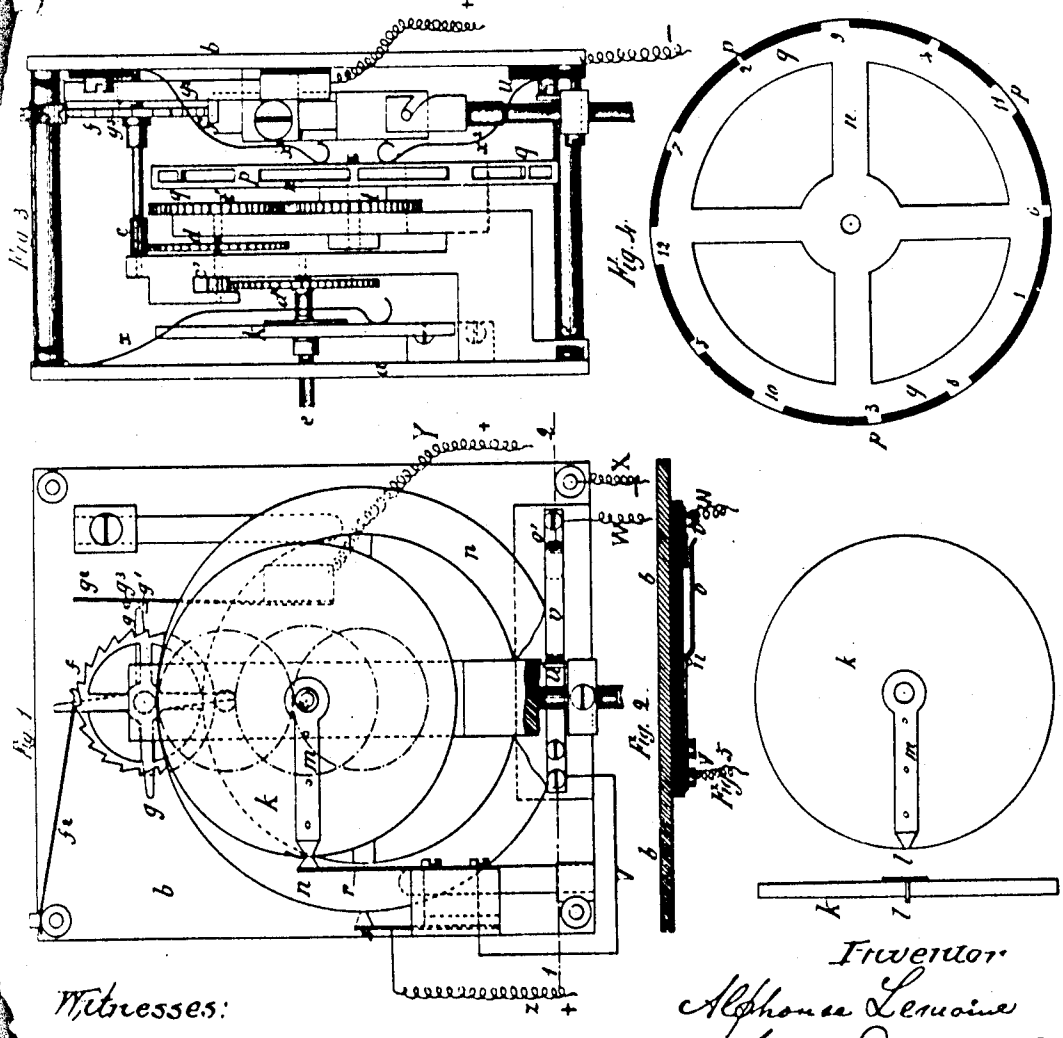
(No Model.)

A. LEMOINE.

STRIKING DEVICE FOR ELECTRIC AND OTHER CLOCKS.

No. 256,709. Patented Apr. 18, 1882.



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ALPHONSE LEMOINE, OF PARIS, FRANCE.

STRIKING DEVICE FOR ELECTRIC AND OTHER CLOCKS.

SPECIFICATION forming part of Letters Patent No. 256,709, dated April 18, 1882.

Application filed December 9, 1881. (No model.) Patented in France October 24, 1881.

To all whom it may concern:

Be it known that I, ALPHONSE LEMOINE, of Paris, France, have invented a new and Improved Striking Device for Electric and other Clocks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed sheets of drawings, making a part of the same.

The invention consists in a striking device for electric or other clocks, consisting of an insulated disk provided with a conducting-segment and a conducting-disk having projections, in combination with a connecting conductor-strip, two insulator contact-springs, and two contact-springs operated by an insulated pin mounted in the pendulum, the whole actuated to make and break an electric circuit a suitable number of times at the end of each hour and cause the sounding device to strike the hour, as described.

Figure 1 shows the elevation of the mechanism, the plate being suppressed. Fig. 2 shows a section through the line 1 2 of Fig. 1. Fig. 3 shows the side view of the mechanism. Fig. 4 represents the elevation of the striking-disk which is provided with the several contacts of the different hours. Fig. 5 shows the front and side elevations of the striking-disk which is provided with the contact acting only every hour.

In these figures similar letters of reference indicate similar parts.

a is the plate, and *b* the counter-plate, upon which are journaled the axles of the clock-work, which consists only of two pinions, *c c'*, and two wheels, *d d'*, the latter of which is mounted on the minute's axle *e*. This clock-work is actuated by the impulse imparted to the pendulum by the electric current.

f is the ratchet, actuated by the pawl *f'* of the pendulum.

f^2 is a spring preventing said ratchet from turning more than one tooth at a time.

g is the star-wheel which closes the circuit in the electro-magnet.

g' is the contact-piece, mounted on an insulated spring, g^2, which, when at rest, bears against an insulating-pin, g^3.

My striking device, acting without the aid of any spring, consists of two disks and two contacts which close at the required moment, an electric circuit in which is placed any suitable sounding device—such as bell, spring, &c.—the hammer of which is actuated by an electro-magnet. The disk *k* is made of ivory, ebonite, or any other insulating material, and has attached to its periphery a metallic or conducting segment, *l*, the length of which is sufficient to close the electric circuit at every hour for space of time long enough to admit of twelve strokes being made. The segment *l* is electrically connected with the clock-work by means of a metallic strip, *m*, and thereby communicates with the metallic part of another disk, *n*, provided with circumferential projections *p* and inclosed between two insulating-rings, *q*. The projections *p* are of different lengths, so as to close the electric circuit during the time necessary for the striking of one, two, three, four, &c., strokes. The peripheries of both the disks *k* and *n* bear upon contact-springs *r* and *s*, respectively insulated from the clock-work. The disk *n* is so driven that its circumferential projections bear successively at every hour and in the proper order against the contact-spring *s*. This result may be obtained by causing the said disk *n* to make in an hour any number of revolutions plus one-twelfth of a revolution; but in order to simplify the gearing I generally prefer to cause the disk to make any number of revolutions plus five-twelfths of a revolution, and for this purpose I impart motion to said disk by means of two toothed wheels. One wheel, *t*, having twenty-four teeth, is fixed to the disk, while the other, *t'*, is fastened to the intermediate axle of the clock-work. The proper number of strokes is made by the pendulum, which is provided to this end with an ivory pin, *u*, pressing at each oscillation of said pendulum upon a spring, *v*, forming one of the poles of the electric circuit, while the other pole is formed by another spring, *v'*. For instance, let us assume that during the passage of the segment *l* upon the contact-spring *r* the projection of the disk *n* corresponding to five o'clock passes upon the contact-spring *s*. The electric circuit, being closed by both the disks, will be interrupted only by the distance which separates the spring *v* from the spring *v'*. Therefore at each pressure the springs *v* and *v'* one on the other by

action of the pin *u* the circuit will be closed, and one stroke of the bell placed in the said circuit will take place. The length of each projection *p* of the disk *n* being suitably calculated, the circuit will be closed for a space of time sufficient to allow of the striking of the hour marked by the hands on the dial.

I wish to remark that the above-mentioned result—*i. e.*, the proper striking of hours—would be obtained also by cutting on each of the projections *p* a number of teeth equal to the number of strokes to be made for the hour, to be struck correspondingly to said projection. In this case the springs *v* and *v'* would be suppressed. The strokes would be produced by the successive make and break of the circuit effected by the passage of said teeth on the contact-spring *s*. Nevertheless the above arrangement necessitates less precision in the putting together of the clock and produces greater regularity in the striking of the hours. The mode of driving the disk *n* may, however, be varied without changing in any way the nature of my invention.

In the drawings, X and Y are the conductors of the battery which maintains the movement of the clock-work. If the springs *v* and *v'* are used, as shown, the electrical connections are as follows: The wire W from one pole of the battery for the striking device is connected to the spring *v'*, while another wire, V, connects the spring *v* with the contact *r*, so that the electric current flows into the strip *m* and passes by the clock-work and the projections *p* of the disk *n* to the contact *s*, from which it is closed into the battery by the return-wire Z. The sounding device (which is not shown in the drawings) is placed at any point of this electric circuit.

The striking device may also strike the half-hours and the quarter-hours. It will be readily understood that it would be sufficient for doing so to provide the disk *n* with twenty-four or forty-eight projections suitably calculated instead of twelve, and to add other contacts or segments on the disk *k*. A special disk might, however, be employed for the striking of the quarter-hours and half-hours.

In practice I preferably place the battery in a drawer in the base of the clock-case. The electro-magnet and the sounding device may also be placed in said drawer.

As in all clock-works, when putting them together, it is necessary to allow a certain looseness between the different pieces, I employ springs *x*, *x'*, and *x²*, which respectively bear on the disks *k* and *n* and constantly press said disks backward. The loose work is therefore maintained always in the same position and cannot interfere with the precision of the clock.

Although I have represented my invention as applied to an electric clock, it will be understood that it may also be applied to all spring-clocks of any description, or to any time-piece capable of driving the above-mentioned contact-disks.

One of my striking devices mounted on a clock allows of the simultaneous striking of the hours in the different apartments of a house or in other places. It is sufficient for this purpose to place in the electric circuit a suitable number of sounding devices.

I claim—

A striking device for electric or other clocks, consisting of an insulated disk, *k*, provided with a conducting-segment, *l*, and a conducting-disk, *n*, having projections *p*, in combination with a connecting conductor-strip, *m*, two insulated contact-springs, *r s*, and two contact-springs, *v v'*, operated by an insulated pin, *u*, mounted in the pendulum, the whole actuated to make and break an electric circuit a suitable number of times at the end of each hour and cause the sounding device to strike the hour, as described.

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