(No Model.)

F. E. GIROD.

ELECTRIC CLOCK STRIKING MECHANISM.

No. 569,099. Patented Oct. 6, 1896.

Fig. 2.

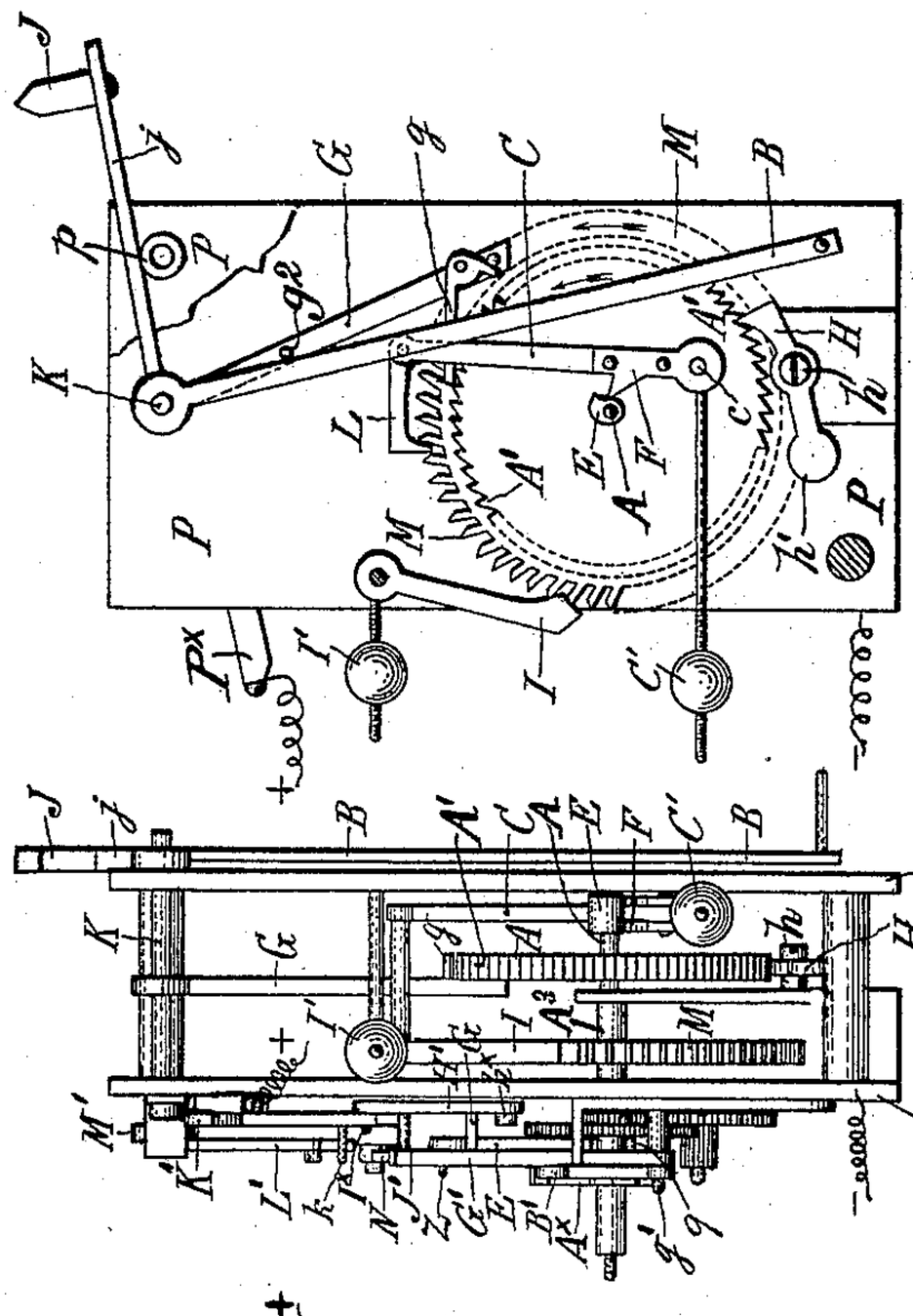
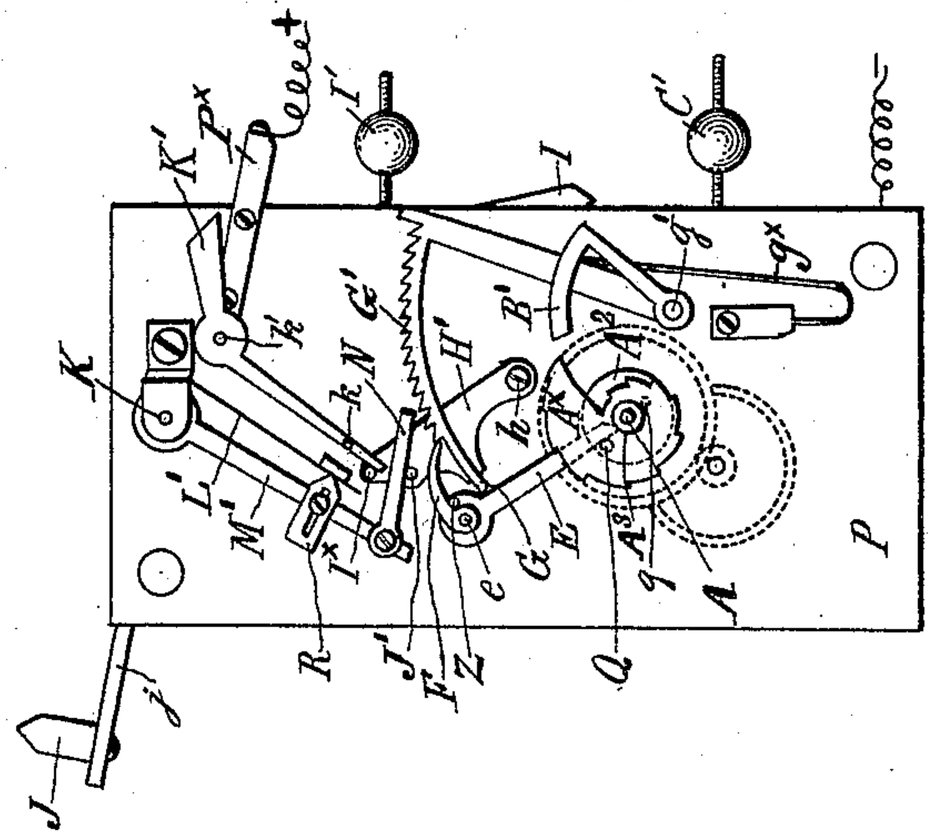


Fig. 3.

Fig. 1.



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ELECTRIC CLOCK STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 569,099, dated October 6, 1896.

Application filed October 11, 1895. Serial No. 565,407. (No model.) Patented in Switzerland March 15, 1895, Nos. 10,073 and 10,074.

To all whom it may concern:

Be it known that I, FRANÇOIS ERNEST GIROD, of Geneva, Switzerland, have invented certain new and useful Improvements in Clocks, (patented in Switzerland March 15, 1895, Nos. 10,073 and 10,074,) of which the following is a specification.

The invention consists of an improved electric clock acted upon by any of the well-known systems whatever of electric pendulum and provided with suitable means for sounding the hours and halves by means of an electric bell of usual system.

The hands of my improved electric clock are acted upon by means of two cog-wheels having each sixty teeth, the one of these wheels, the seconds-wheel, being directly acted upon by a click connected to an arm of the pendulum and the other wheel, the minute-wheel, being acted upon by a click connected to a lever bearing upon a cam fixed to the first of the said wheels, the second of those wheels being thereby rotated of one of its teeth at every full revolution of the first one. To the axis of the said minute-wheel, which fulfills one revolution in an hour, there is affixed a disk provided with suitable pins for causing the sounding mechanism to be put in action every half hour; and a click is provided to the pendulum or to a lever connected to and oscillating with the pendulum, the said click being intended to, on the one hand, act upon a rack combined with the usual hour-snail for the purpose of determining the numbers of strokes which are to be sounded according to the time marked by the hands, and, on the other hand, to act upon a circuit-interrupter of an electrical bell once at each tooth of the rack acted upon by the said click connected to the pendulum, the said rack being, moreover, combined with suitable means for placing the said click and circuit-interrupter out of action when the predetermined number of strokes has been sounded and for holding the rack itself out of action until one of the pins of the above-mentioned disk again puts the device in action.

In view of having the invention the better understood, I will now proceed to describe it with reference to the accompanying drawings, making part of the present specification, and in which the same letters of reference refer in all the figures to the same parts.

Figure 1 is a front view of the clock, showing the parts of the mechanism causing the sounding of the hours, the dial and hands being withdrawn. Fig. 2 is a back view of the same clock. Fig. 3 is a view thereof in side elevation.

A is an axis bearing on the back of a plate or framing P, a minute-wheel A′, having sixty teeth, and a cam E. The said minute-wheel A′ has a click H, pivoted to a fixed point *h* and provided either with a weight *h′* or with a suitable spring engaging its teeth and preventing its being rotated more than one of its teeth at a time.

K is the axis of the pendulum B, and to the said axis K there is pivoted an arm or lever G, bearing a click *g* and an arm *j* with counterweight J, the said arm *j* bearing, when at rest, upon a stud *p*, fixed to the plate or framing P. The arm or lever G is further provided with a pin g^2, projecting into the path of the pendulum B and met by the latter when the said pendulum oscillates from left to right. When the said pendulum returns from right to left, the counterweight J causes the arm or lever G to oscillate in the same direction and the click *g* engages thereby the teeth of the minute-wheel A′ and causes the latter to be rotated of one tooth.

The minute-wheel A′ being rotated of one of its teeth at every double oscillation of the pendulum B, the axis A fulfills one rotation in every minute.

To a fixed point *c*, connected to the framing of the work, there is pivoted a crank-lever C, having a counterweight C′ on its horizontal arm and a click L connected to its vertical arm. The latter is further provided with a nose F, bearing against the above-mentioned cam E under the action of the counterweight C′. The click L engages the teeth of an hour-wheel M, the tubular axis A^3 of which surrounds the axis A of minute-wheel A′ and which bears the minute-wheel and minute-hand, and as the cam E makes one revolution every minute the said click L acts upon one tooth of the hour-wheel M at

every revolution of the minute-wheel A′, the said hour-wheel M making thus one revolution in one hour. A click L with counterweight L′ is provided to prevent the hour-wheel M of rotating of more than one of its teeth at a time.

The tubular axis A^3 of the hour-wheel M bears a disk A^2, fixed thereon and provided with two pins Q and *q*, intended to put in action the sounding mechanism. The pin *q*, which is placed nearer to the center than the pin Q, is intended to cause the sounding of the half-hours, and the pin Q is intended to cause the sounding of the hours.

$A^\times$ is the usual hour-snail of sounding clocks or watches, intended to limit the stroke of a rack G′ by means of the one or the other of its steps. The said hour-snail is free on the tubular axis A^3 and is fixed to an hour-wheel (not shown) which bears the hour-hand. The said rack G′ is pivoted at *g′* to the plate or framing P and has an arm B′. A spring $g^\times$ tends to press the said arm B′ upon the one or the other of the steps of the snail $A^\times$. A click F, pivoted at *e* to the plate or framing P, normally engages by its own weight the teeth of the rack G′, but the lever E, which bears either on the pin Q or on the pin *q* of the disk A^2, bears a pin Z, which raises the said click F out of the teeth of the rack G′ when the said lever E is lifted either by the pin Q or by the pin *q*. In the first case the lever E is lifted to a sufficient height as to have the click F, leaving the rack G′, quite free to swing until its arm B′ meets either of the steps of the snail $A^\times$. If the lever E is lifted by the pin *q*, which is nearer to the center than the pin Q, the click F is only lifted just high enough as to allow the first tooth of the rack G′ to pass beneath it before it engages again the teeth of the said rack. In the first case the clock will be ready for sounding a number of strokes determined by the step which the hour-snail $A^\times$ will have presented to the arm B′ of the rack G′. In the second case the clock will be ready for sounding only one stroke, marking half an hour.

The sounding of the hours and halves is produced by the means of a lever M′, fixed to and oscillating with the axis K of the pendulum B. The said lever M′ bears a click N, normally engaged in the teeth of the rack G′, and an adjustable abutment R, intended to press a contact-spring L′ in contact with a projection *k* of a contact-lever K′. The latter is pivoted at *k′* to an insulated bridge $P^\times$ and connected with the one pole of an electric-bell circuit of any kind whatever, the other pole of which is connected to the metallic mass of the work and hence to the spring L′.

According to the just-described construction it is evident that at each double oscillation of the pendulum, hence of the lever M′, the latter will normally cause the rack G′ to be rocked one of its teeth, from left to right, by means of the click N and the contact-spring L′ to shut the electric circuit in meeting the lever K′. The click F, being engaged in the teeth of the rack G′, prevents the back motion of the latter. Now there is further provided a rocking lever H′, provided with two pins $I^\times$ and J′, the first of which is made of any suitable insulating material whatever and intended to press the lever K′ out of reach of the contact-spring L′, the second one being intended to disengage the click N out of the teeth of the rack G′ This double disengaging takes place when the hooked end $G^\times$ of the rack G′ has rocked the said lever H′ into the position shown in Fig. 1, that is to say, when the said rack G′ has been pressed tooth by tooth into its extreme right position in which the click F engages the first tooth of said rack G′. When the detent-lever E is lifted by the pin Q, the click F allows the rack G′ to fall down against the hour-snail $A^\times$ and hereby the hooked end $G^\times$ of the said rack G′ allows the rocking lever H′ to fall on the left and to disengage the pin $I^\times$ from the contact-lever K′ and the pin J′ from the click N. Hence each oscillation of the lever will cause the rack G to be lifted one tooth and the contact-spring L′ to shut once the circuit of the electric bell. This will occur as long as the hook $G^\times$ does not raise again the lever H′ to the right into the position shown in Fig. 1, the lever K′ out of reach of the spring L′ and the click N out of reach of the teeth of the rack G′.

Having thus fully described my invention, what I claim is—

In clocks intended to sound the hours and halves by means of an electric bell of any well-known system whatever, the combination of a lever connected to and oscillating with the pendulum with a click intended to act at each double oscillation of the pendulum upon one tooth of a rack the position of which is determined by the usual hour-snail, a contact-lever intended to shut the circuit of the electric bell once at each double oscillation of the pendulum, and a rocking lever bearing two pins intended to put the said click and contact-lever out of action when the said rack reaches its rest position, substantially as shown and described.

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

FRANÇOIS ERNEST GIROD.

Witnesses:
E. IMER-SCHNEIDER,
TH. IMER.