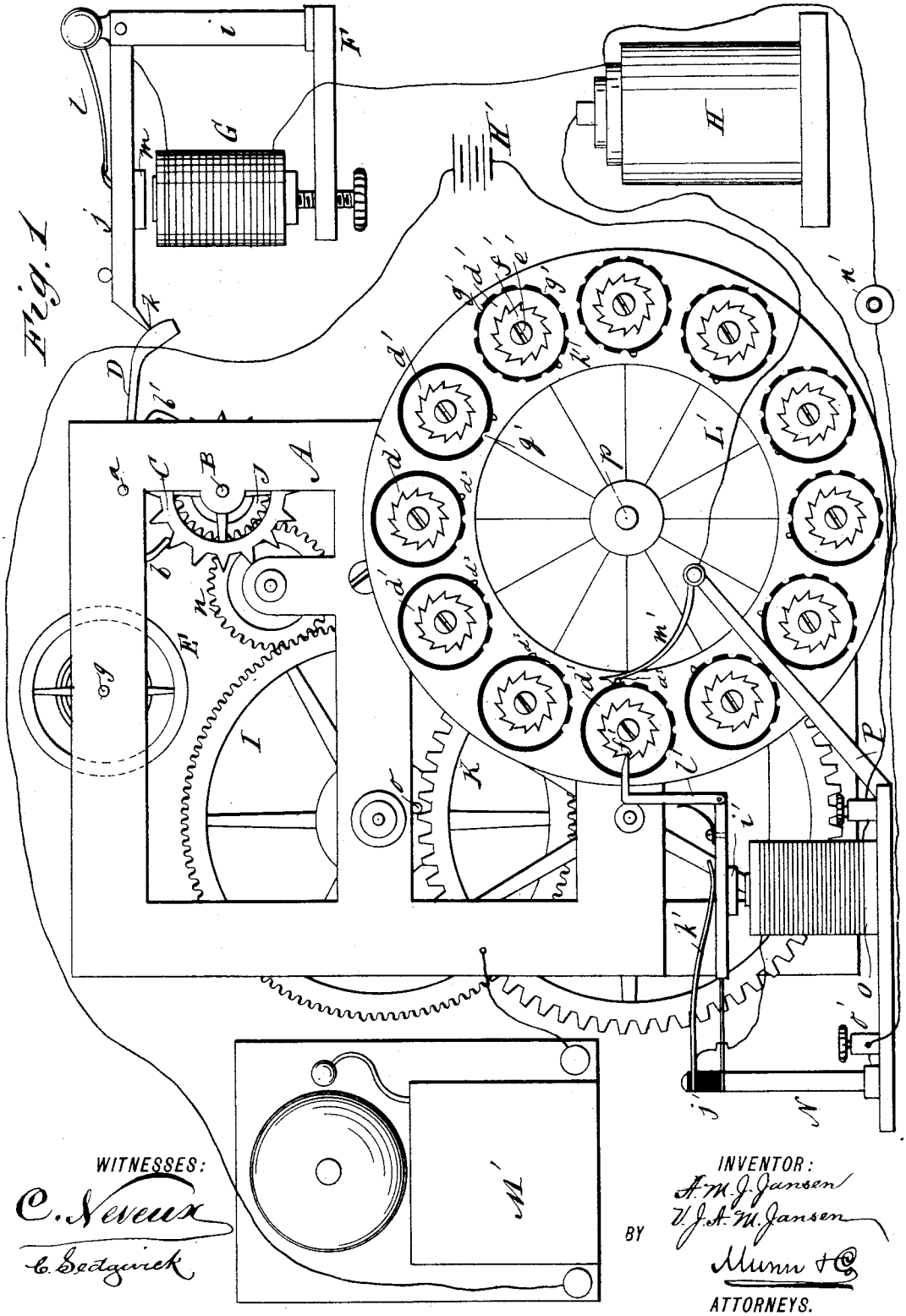
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ELECTRIC STRIKING AND REPEATING CLOCK.

No. 402,329. Patented Apr. 30, 1889.

Fig. 1.



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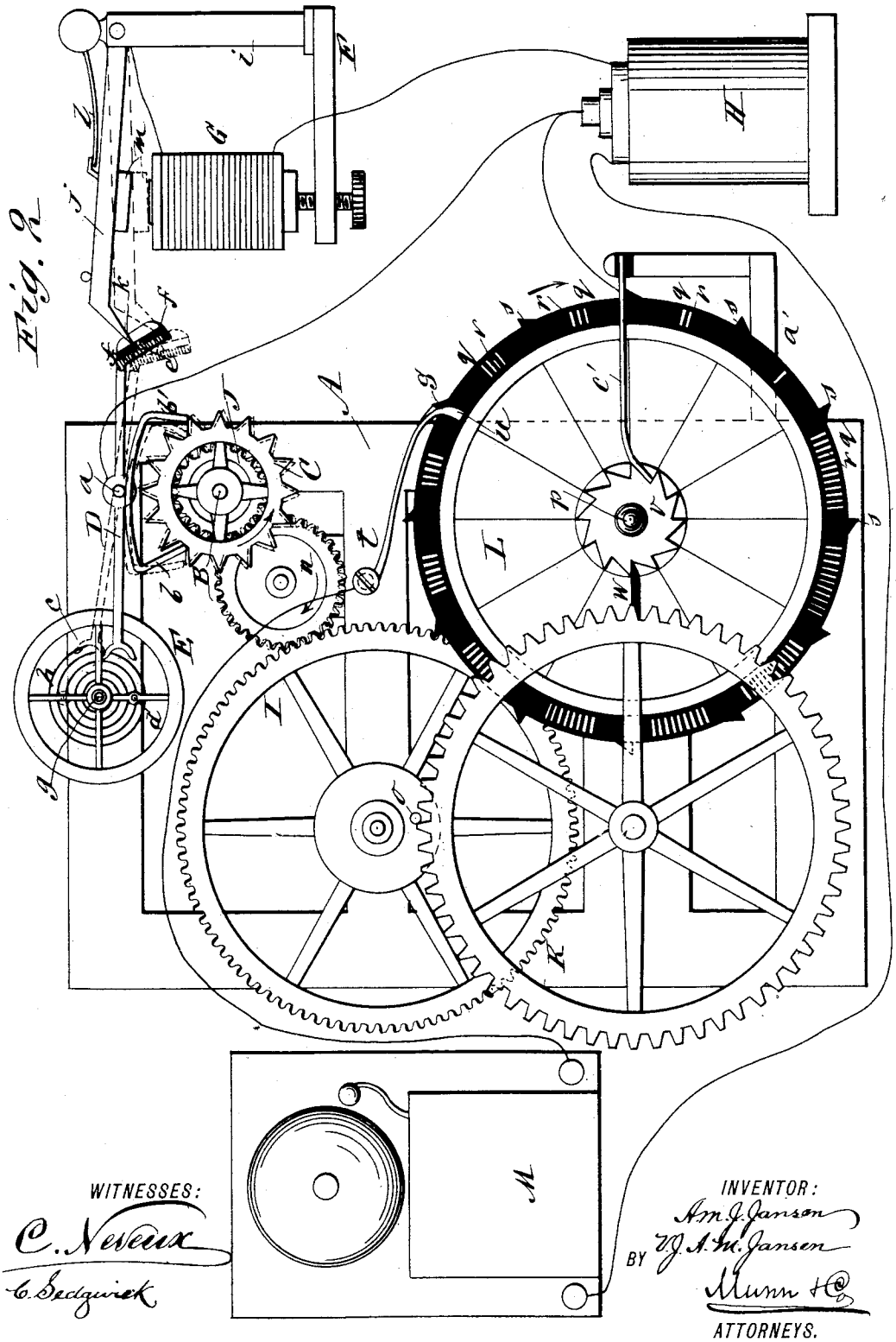
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Fig. 2.



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UNITED STATES PATENT OFFICE.

ALPHONSE M. J. JANSEN AND VINCENT J. A. M. JANSEN, OF SAN WILLIBRORDO, CURAÇOA.

ELECTRIC STRIKING AND REPEATING CLOCK.

SPECIFICATION forming part of Letters Patent No. 402,329, dated April 30, 1889.

Application filed October 9, 1888. Serial No. 287,667. (No model.)

To all whom it may concern:

Be it known that we, ALPHONSE M. J. JANSEN and VINCENT J. A. M. JANSEN, of San Willibrordo, Curaçoa, have invented a new and Improved Electrical Clock, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a side elevation of our improved electrical clock, and Fig. 2 is a vertical transverse section with the repeating mechanism omitted.

The object of the invention is to construct a clock in which the time-movement as well as the striking mechanism will be operated by electricity.

Our invention consists, in the combination, with an impulse-wheel and pallets, of a lever operated by an electro-magnet and adapted to propel the impulse-wheel; also, in the combination with the time-movement of a strike wheel connected with the said time-movement so as to be moved intermittently, the wheel being provided with electrical contacts for completing the bell-circuit.

It also further consists in the combination, with the strike-wheel and its actuating mechanism, of a wheel carrying a series of repeating-wheels, one for each hour, the repeating-wheels being constructed to make as many electrical contacts during every revolution as are necessary to make the stroke for the hour.

In the frame A is journaled an arbor, B, upon which is secured an impulse-wheel, C. Above the said wheel and in the said frame A is journaled an arbor, *a*, carrying the pallets *b b'*, which engage the impulse-wheel C. To the arbor *a* is secured a lever, D, one end of which carries the usual fork, *c*, for engaging the roller *d* of the balance E. The opposite end of the lever D is bent downward in the plane of the lever at an angle of about sixty degrees, and is provided with an electrical contact-point, *e*, and with insulation *f* upon opposite sides of the contact-point. The arbor *g* of the balance E is journaled in the frame A, and said balance is provided with the usual hair-spring, *h*.

To an L-shaped frame, F, held by a fixed support near the frame A, is attached an electro-magnet, G, and to the upright arm *i* of the said frame F is pivoted an armature-lever, *j*, the free end of which is provided with a contact-point, *k*, capable of touching the contact-point *e* of the lever D. To the upright *i* is secured a flat spring, *l*, which tends to lift the armature-lever. The armature-lever *j* holds the armature *m* within the influence of the magnet G, and the said magnet G is connected up in the circuit of the battery H, so that the current passes from the battery to the magnet, thence to the armature-lever *j*, thence to the lever D, and through the arbor *a* to the battery.

The balance E being set in vibration, the lever D is oscillated in the usual way, and as the contact-point *e* is carried upward it strikes the contact-point *k*, carried by the lever *j*, completing the electric circuit of the battery H and causing the armature *m* to drop upon the magnet G, thereby giving the lever D an impulse which carries forward the lever D after the armature-lever *j* has completed its stroke, thereby interrupting the electric circuit and causing the armature-lever to be released, when the spring *l* carries it back to the point of starting. When the return movement of the balance E carries the lever D in the opposite direction, the contact-point *e* is again brought into contact with the point *k* on the armature-lever *j*, and the operation just described is repeated.

In the frame A is journaled a spur-wheel, I, which receives motion from a spur-wheel, J, on the arbor B through the intermediate wheel, *n*, also journaled in the frame A. The size of the wheel I relative to the wheel J is such as to cause the said wheel I to revolve once in a minute. From the boss of the wheel I projects a stud, *o*, which engages a tooth of the wheel K once during each revolution of the wheel I, and the wheel K is provided with sixty teeth, so that it makes one revolution in one hour.

Upon the arbor *p*, journaled in the frame A, is secured a wheel, L, carrying an insulating-

rim, q, provided with contact-bars r, which are in electrical connection with the wheel L. The periphery of the wheel L is divided into twelve divisions, representing the twelve hours, and the said divisions are provided with from one to twelve contact-bars r, respectively, according to their location. Between each set of contact-bars a ratchet-tooth, s, projects from the periphery of the said wheel. A spring-pawl, t, is attached to the side of the frame A and adapted to engage the ratchet s. The pawl is provided with a side spring, u, arranged to contact with the bars r as they are carried past the said spring u.

To the arbor p is secured a ratchet-wheel, v, having twelve teeth corresponding with the twelve divisions in the periphery of the wheel L, and to the side of the wheel K is secured an arm, w, of insulating material, which engages the ratchet-wheel v and is capable of moving said ratchet-wheel one notch at a time. The arbor p is provided with a knob on the end thereof for convenience in setting the clock-work.

To an angle-arm, a', projecting from the frame A is secured an electrical contact-spring, c', which is electrically insulated from the said arm. The battery H is connected by one of its poles with the spring c', and by the other pole with one terminal of the mechanism of a single-stroke electric bell, M, of ordinary construction, the other terminal of the said bell being connected electrically with the spring t.

As the wheel K is engaged by the pin o, carried by the wheel I, while the arm w is in engagement with the ratchet-wheel t, the wheel L is moved forward one-twelfth of a revolution, thereby carrying one of the twelve spaces of its periphery under the pawl t and past the spring u. In the passage of a section of the periphery of the wheel L under the spring u the contact-bars r touch the said spring and complete as many electrical contacts as are necessary to secure the required number of strokes of the bell for the hour represented by that particular section of the wheel L. The wheel L, by virtue of its connection with the time-movement, is carried forward with a speed controlled entirely by the movement of the wheel K.

In the complete clock shown in Fig. 1 a repeating-wheel, L′, is secured to the arbor p outside of the wheel L, and upon the face of the said repeating-wheel L′, opposite each hour-space of rim q of the wheel L, is pivoted a circuit-controlling wheel, d', on a screw, e', and to the side of the said wheel is attached a ratchet-wheel, f', having twelve ratchet-teeth. In the periphery of the wheel are arranged contact-points g', which are in electrical communication with the wheel, but insulated from each other by an insulating-band, h'. Each wheel d' carries as many contact-points g' as are necessary for producing the number of strokes of the bell required for the hour represented by the wheel. For example, the wheel d', representing one o'clock, has one contact-point g', the wheel representing two o'clock has two contact-points g', &c. Each wheel d' is provided with a lug, d^3, which is engaged by the spring m' once during each revolution of the wheel d', thus preventing the wheel from turning beyond the prescribed limit.

Upon a fixed support near the frame A is secured a right-angled frame, N, which supports the electro-magnet O, and also the vibratory armature i', and the insulating-piece j', which supports the contact-spring k'. To the free end of the vibratory armature i' is pivoted a hooked pawl, l', which engages the ratchet-wheel f'. An arm, P, attached to the frame N, extends toward the center of the wheel L and carries a contact-spring, m', which touches the periphery of the wheel d'.

When the repeating-wheel L′ is turned, it brings one of wheels d' into engagement with the contact-spring m', which also brings the ratchet-wheel f' belonging to that wheel into engagement with the pawl l'.

One pole of the battery H is connected with a push-button, n', which in turn is connected with a binding-post, o', on the frame N. The binding-post o' is connected through the upright of the said frame with the vibratory armature i'. From the said armature the circuit is through the contact-spring k', the magnet O, back to the opposite pole of the battery. Upon pressing the push-button n' the circuit of the magnet O is closed and the armature i' set in vibration, causing the pawl l' to engage the teeth of the ratchet-wheel f' in succession, thus rotating the wheel d'.

The contact-spring m', which touches the periphery of the wheel d', is connected electrically with one pole of the battery H′, the other pole of the battery being connected electrically with the electric bell M′, which, in turn, is connected with the frame of the clock. As the contact-pieces g' pass the end of the contact-spring m', the circuit of the bell M′ is closed, causing the bell-hammer to strike the bell, the number of strokes corresponding with the number of contact-points g' carried by the wheel. It will thus be seen that at any time when it is desired to cause the clock to strike the hour it is only necessary to press the button n'.

One or more bells, M′, may be connected with the repeating part of the clock, and one or more push-buttons with suitable circuit may be provided, so that the clock may be made to repeat at distant points.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. In an electric clock, the combination of the impulse-wheel C, pallets b b', the arbor a, carrying the said pallets, the lever D, provided with a contact-point, e, the balance-wheel and roller E d, for engaging said lever, the electro-magnet G, and the armature-lever j,

provided with a contact-point, *k*, substantially as described.

2. In an electric clock, the combination of the impulse-wheel C, the pallets *b b'*, engaging said impulse-wheel, the lever D, provided with the fork *d* and the contact-point *e*, the balance E, the electro-magnet G, the armature-lever *j*, provided with a contact-point, *k*, and the retractile spring *l*, substantially as described.

3. In an electric clock, the combination, with a time-movement of a clock, of the wheel K, arranged to be moved by step-by-step mechanism, and provided with the arm *w*, the strike-wheel L, provided with the insulated contact-bars *r*, the ratchet-wheel *v*, the contact-spring *u*, the electric bell M, the battery H, and circuit-connections, substantially as shown and described.

4. In an electric clock, the combination, with a time-movement, of a repeating-wheel, L', arranged to be moved by a step-by-step movement, a series of contact making and breaking wheels, *d'*, carried by the repeating-wheel L', the electro-magnet O, the vibratory armature *i'*, carrying the pawl *l'*, the contact-spring *m'*, the battery H', and electrical connections, substantially as described.

5. In an electric clock, a repeating-wheel, L', a series of contact-wheels carried by the said repeating-wheel and provided with contact-points representing hours, and mechanism, substantially as described, for rotating the contact-wheels.

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J. WINDER.