(No Model.) 2 Sheets—Sheet 1.

# A. E. VIDAL & G. HERVIEU.

## ELECTRIC CLOCK WINDING MECHANISM.

No. 521,396. Patented June 12, 1894.

FIG. 1.

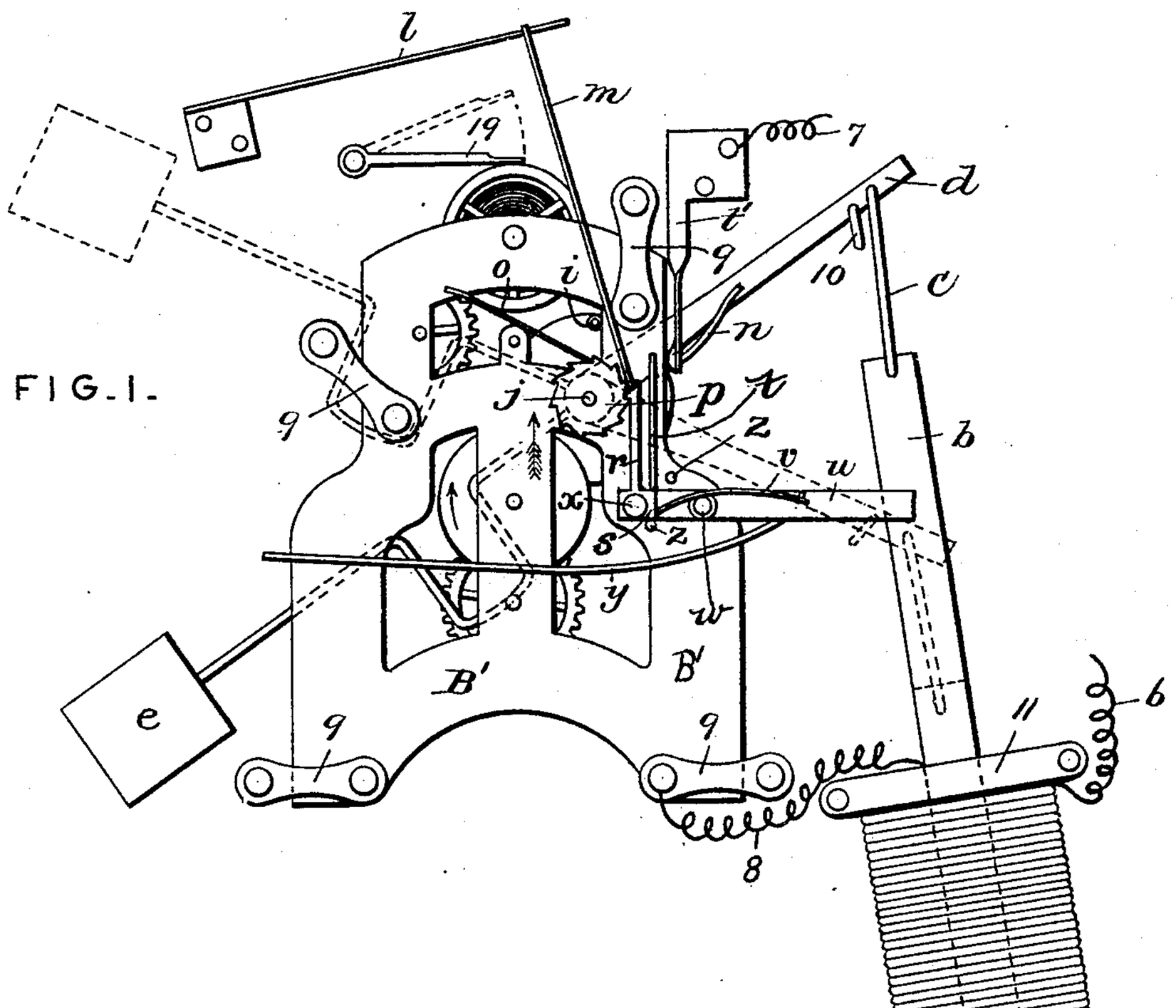
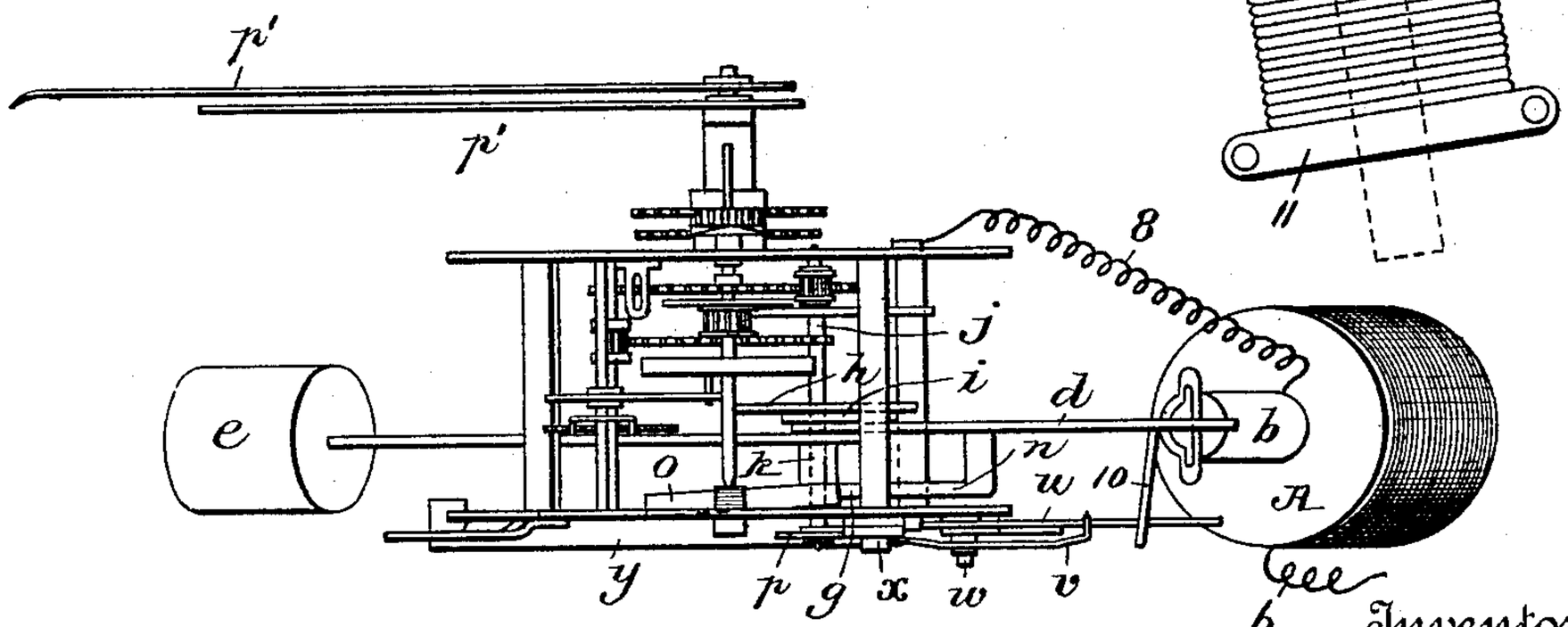



FIG. 2.




Witnesses
Harry L. Amer.
John C. Wilson

Inventors.
Adolph Edward Vidal
Gaston Hervieu.
by Whitman & Wilkinson,
Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

# A. E. VIDAL & G. HERVIEU.

## ELECTRIC CLOCK WINDING MECHANISM.

No. 521,396. Patented June 12, 1894.

FIG. 3.

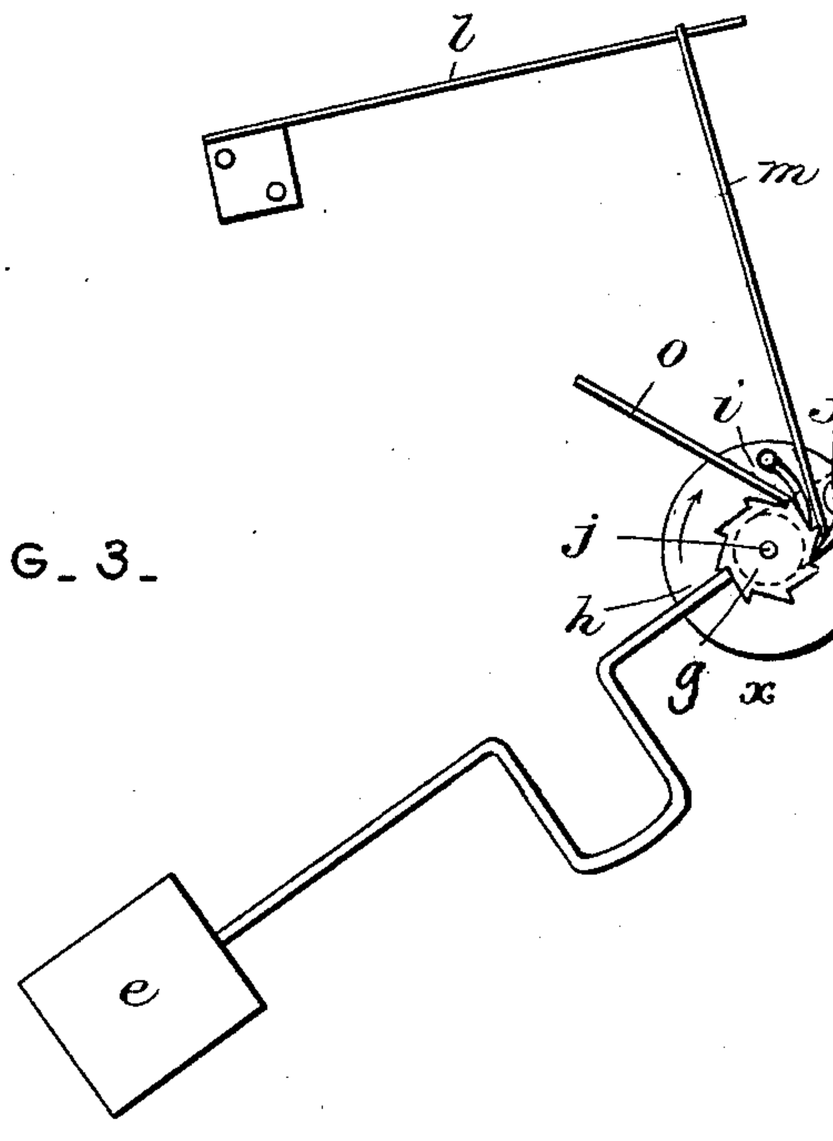



FIG. 5.

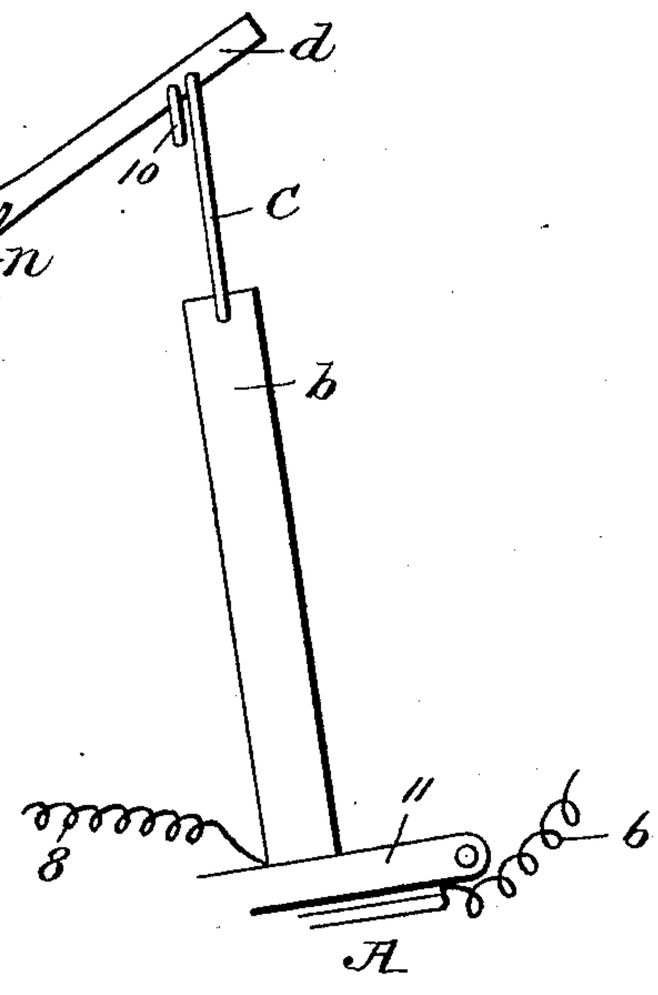



FIG. 4.

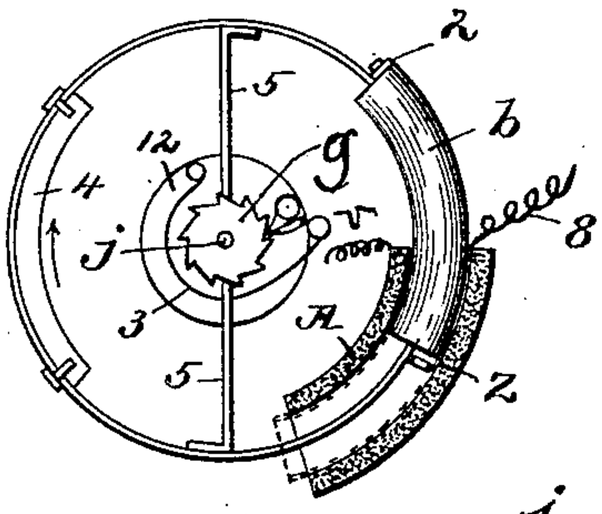
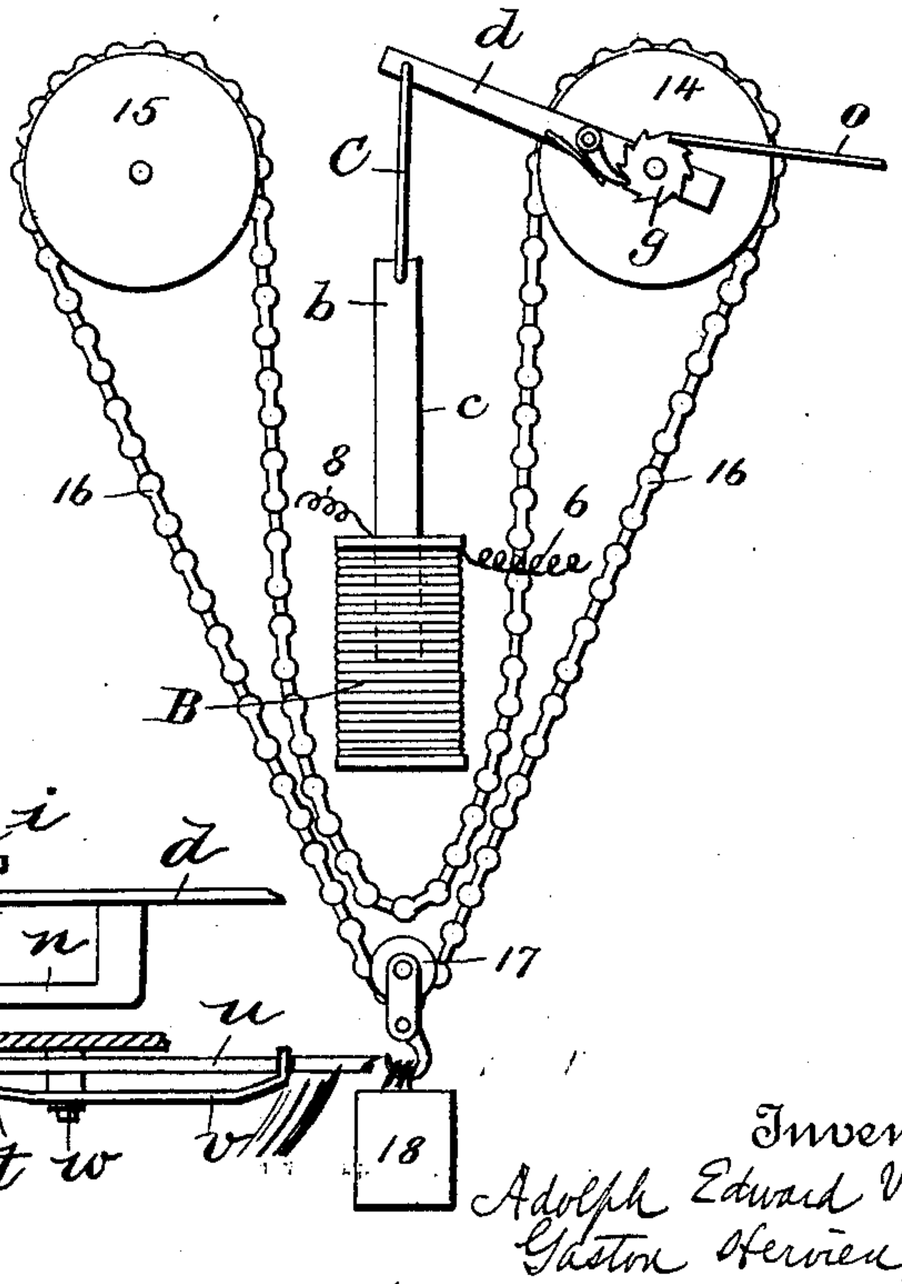
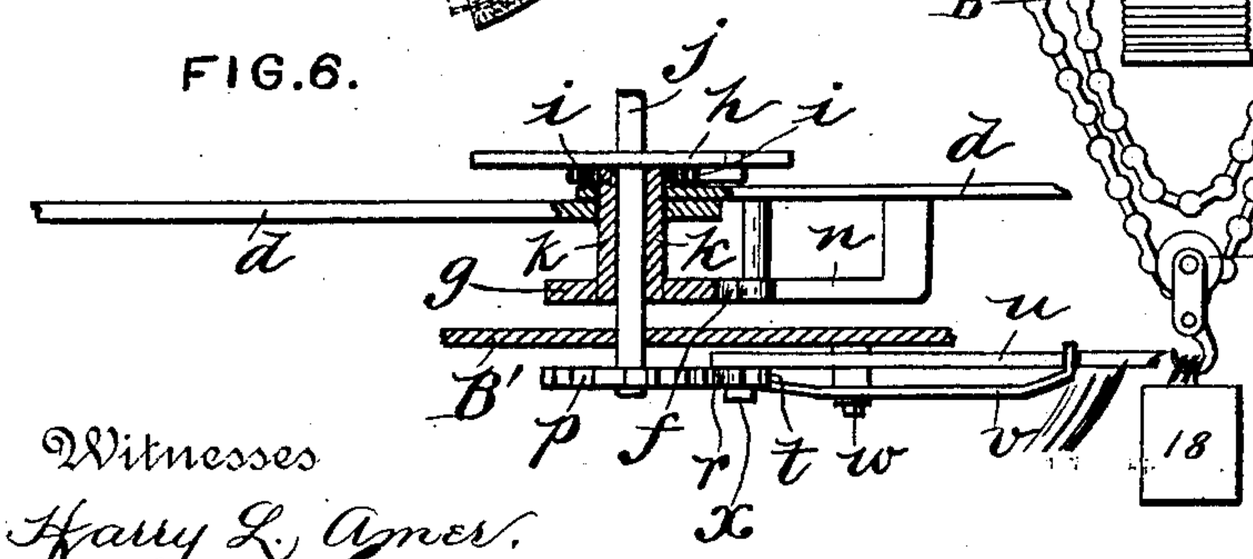



FIG. 6.




Witnesses
Harry L. Ames.
John L. Wilkinson.

Inventors:
Adolph Edward Vidal,
Gaston Hervieu,
by Whitman & Wilkinson
Attorneys.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

ADOLPH EDWARD VIDAL AND GASTON HERVIEU, OF LONDON, ENGLAND.

## ELECTRIC CLOCK-WINDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 521,396, dated June 12, 1894.

Application filed September 30, 1892. Renewed November 1, 1893. Serial No. 489,761. (No model.)

*To all whom it may concern:*

Be it known that we, ADOLPH EDWARD VIDAL, gentleman, a subject of the Queen of Great Britain, residing at 20 Central Hill, Norwood, London, in the county of Surrey, England, and GASTON HERVIEU, engineer, a citizen of the French Republic, residing at 73 Cambridge Road, Hammersmith, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Electrical Winding Mechanism for Clock-Movements, of which the following is a specification.

This invention refers to electrical winding mechanism for clock movements and its object is to wind up the spring or weight at intervals (automatically) to the same extent as either have become unwound during a short time of working. Various attempts have been made to attain this object by the use of electro magnets but it has been found in practice that the distance that the armature has to be attracted has been too great, now to obviate this objection according to this invention instead of ordinary electro magnets we employ a solenoid or solenoids by which we are enabled to get a much longer "pull" than with an ordinary electro magnet as heretofore employed.

One way of carrying out this invention is to connect to the core of the solenoid one end of an arm the other end of which is connected to the arbor (so as to work loosely thereon) on which the spring that works the clock mechanism is mounted which should be the minute or any other wheel of the train so that a weak spring may be used. To the aforesaid arm we connect a click or clicks which take or takes into a ratchet wheel or wheels fixed on to the arbor on which the spring is mounted so that upon the solenoid being excited the core will be drawn in and thus wind the spring to the same extent as it has become unwound during the short interval of working. The length of stroke of the core of the solenoid and the number of teeth in the ratchet wheel being such as to carry out this object. Suitable mechanism operated by the clock mechanism is provided in order to open and close the electric circuit at the proper times and the core of the solenoid may be brought back again by a small spring and we weight the other end of the aforesaid arm so as to counterbalance the weight of the core so that the clock may go in any position. The battery may consist of two or more dry cells so that the whole may be combined in a compact form. For movements worked by weight power we connect the core of the solenoid to one end of an arm the other end of which works loosely on an arbor of a chain wheel on the said arbor is also fixed a ratchet wheel into which a click fixed on the aforesaid arm engages; another chain wheel is used instead of the ordinary cord drum over the two said chain wheels passes an endless chain so as to hang loosely between same this chain passing also under the pulley fixed on to the weight. And in order that our said invention may be better understood we will now describe the same with reference to the accompanying sheets of drawings, in which—

Figure 1 shows elevation of a lever clock movement constructed according to our invention; Fig. 2 top plan of Fig. 1. Fig. 3 is a partial vertical section taken immediately in the rear of the rear plate of the frame B'. Figs. 4 and 5 show modified forms of the manner of applying our invention, the latter showing it applied to a clock driven by a weight. Fig. 6 is a detail partial sectional view taken through the pinion *j* and part carried thereon.

The wheels not lettered are those of the ordinary clock train and are only shown to indicate more clearly the position of our improved mechanism.

Similar letters and figures of reference are employed to denote the same parts in all the views.

A shows a solenoid the core *b*. being connected by a link *c*. to the arm *d*. the other end of this arm is provided with a weight *e*. in order to counter balance the weight of the core *b*. *f*. is a click pivoted to arm *d*. and engaging with ratchet wheel *g*. fixed on the arbor *j*. of the second wheel of the clock train. The click *f*. is kept in contact with ratchet *g*. by a spring *n*. The arm *d*. works loosely on the arbor *j*. and a small main spring *i*. is fixed at one end to a collar *k*. of ratchet wheel *g*. revolving on this arbor and at the other end to the disk *h*. which is fixed on the arbor *j*. so that as the core *b*. is drawn down each time the solenoid is excited it will cause the ratchet wheel *g*. to be turned

by the click *f.* the distance of one tooth and thus wind the main spring *i.* to the same extent as it has become unwound in working the clock since the last contact took place.

Although we have described and shown the ratchet *g.* collar *k.* arm *d.* disk *h.* main spring *i.* as mounted on the arbor *j.* which we prefer we do not intend to limit ourselves to this as these may be mounted on another arbor of the clock train. The arm *d.* is brought back to its normal position by the spring *l.* and wire *m.* *o* is a click to prevent the spring unwinding. *p'.* clock hands.

We will now describe our mechanism for completing and breaking the electric circuit at the proper times which in this case is arranged to take place sixty-four times in the course of an hour. This mechanism is shown detached at Fig 1 for sake of clearness.

On one of the arbors of the clock train we fix another ratchet wheel *p.* We prefer to fix it on the same arbor as that on which the ratchet *g.* is fixed as shown in the drawings in which case it must be provided with the same number of teeth as the ratchet wheel *g.;* but if it is fixed on a different arbor of the train of wheels the number of teeth must be such as to still give the same number of electric contacts in the same time. With the ratchet wheel *p.* a click *r.* engages, this click is fixed to or formed with the piece *s.* to which also is connected a contact piece *t. t'* is the other contact piece the piece *s.* is pivoted at *x.* to an arm *u.* which latter is pivoted at *w.* to the frame B'. *v.* is a spring to keep the click *r.* against the ratchet wheel *p.* *y.* is another spring to press the arm *u.* up to its normal position, the action of the arm *u.* is regulated by the two stop pins *z. z.*

Fig. 4 shows a modification of the mechanism. In this case 1. shows a section of a flat ring or wheel working loosely on the arbor *j.* the core *b.* of the solenoid in this case is radial and is fixed in the section of ring 1. at 2. 2. the bobbin of the solenoid A, being also radial and fixed in such position that the core *b.* can work freely therein when the solenoid is excited and when the electric contact is broken the spring 3 brings the core back ready to be drawn in to the bobbin again on the next contact taking place and so on so that the wheel 1. oscillates at each make and break of the electric circuit. 4 is a weight attached to the ring 1 to counter balance the weight of the core *b.* of the solenoid A. 5, shows spokes of wheel fastened to a boss 12. The bobbin A. is fastened to the bed plate or frame by straps 11, as in Fig. 1.

The rest of the mechanism is precisely the same as described with reference to Figs. 1, 2 and 3. but of course dispensing with the straight solenoid, the arm *d,* spring *l.* wire *m.* weight *e.* and link *c.* According to this modification the mechanism is far more compact. The wires 6 and 7. communicate with the poles of a battery (which latter is not shown) and the circuit is completed through the clock movement by the wires 7 and 8. when contact is made as aforesaid the current thus passes through the solenoid A. 9 shows bracket pieces for fastening frame B'. to a bed plate or case of clock.

Fig. 5. shows our invention adapted to wind clocks worked by a weight instead of a spring in this figure the winding ratchet *g.* is fixed to a chain wheel 14, so as to turn on same arbor with it and we use another chain wheel 15. which latter takes the place of the cord drum employed in ordinary clock movements worked by a weight and to this wheel 15 the contact ratchet *p.* may be attached. Over the wheels 14 and 15 we pass an endless chain 16 which also passes under the pulley 17 on which the weight 18 is suspended this chain must hang down loosely between the wheels 14 and 15 so as to allow the weight to be wound up when the arm *d.* is drawn down by the solenoid. The clock train is actuated by a toothed wheel connected to wheel 15. 19 shows a break on to the balance for stopping the clock train when required as shown in Fig. 1. The action of our improved winding mechanism is as follows. The spring *i.* being first fully wound up by pulling the arm *d.* down a sufficient number of times to attain this the clock will thus be set going and upon the ratchet wheel *p.* turning the distance of one tooth in the direction of the arrow's flight it will on account of the form of its teeth force the click *r.* outward and with it also the contact piece *t* which will come in contact with piece *t'* thus completing the electric circuit upon which the solenoid will be excited and thus the core *b.* will be drawn into the bobbin A and pull down arm *d.* and by means of the pin 10 acting on the arm *u.* will depress this latter and by so doing will raise the click *r.* so that it may fall over the tooth and thus break contact by allowing the contact piece *t.* to return to its normal position the core *b* will then be brought back to the position shown on drawings by the spring *l.* and wire *m.* by the above action the click *f.* will turn the ratchet wheel *g.* the distance of one tooth and thus wind up the spring or weight to the same extent as either of these have become unwound.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an electrically actuated winding mechanism, the combination with an arbor of a ratchet wheel mounted thereon, connected with a suitable source of power, of a suitable solenoid core adapted to drive the said ratchet wheel, a second ratchet wheel mounted on the said arbor, and having the same pitch as the first named ratchet wheel, a contact piece actuated by the last named ratchet wheel, a solenoid and an electric circuit including the said contact maker and solenoid, substantially as described.

2. In an electrically actuated winding mechanism the combination with a ratchet wheel connected with a suitable source of power, of

a suitable solenoid core adapted to drive the said ratchet wheel, a second ratchet wheel driven by the said motive power, a click and contact piece adapted to bear on the said last named ratchet wheel, a pivoted arm carrying the said click and contact piece, and adapted to be struck by the said armature, a fixed contact piece, a solenoid, and an electrical circuit including the said contact pieces, and solenoid, substantially as described.

3. In an electrically actuated winding mechanism, the combination with a ratchet wheel, connected with a suitable source of power, of an armature adapted to drive the said ratchet wheel, of a second ratchet wheel driven by the said power, a click and contact piece secured together and pivoted on a suitable support, the said click bearing on the said last named ratchet wheel, a fixed contact piece, a magnet adapted to actuate the said armature, and an electrical circuit including the said contact pieces and magnet, substantially as described.

4. In an electrically actuated winding mechanism, the combination with a ratchet wheel, connected with a suitable source of power, of an armature adapted to drive the said ratchet wheel, connected with a suitable source of power, of an armature adapted to drive the said ratchet wheel, a second ratchet wheel driven by the said power, a pivoted arm adapted to be struck by the said armature, a click and contact piece secured together and pivoted on the said arm, the said click bearing on the said last named ratchet wheel, a fixed contact piece, a magnet adapted to actuate the said armature, and an electrical circuit including the said contact pieces and magnet, substantially as described.

5. In an electrically actuated winding mechanism, the combination with an arbor, of a ratchet wheel, mounted thereon, a spring having its opposite ends secured to the said ratchet wheel and arbor, of an arm pivoted on the said arbor, and having a dog engaging the said ratchet wheel, an armature secured to the said arm, a second ratchet wheel, driven by the said spring a second pivoted arm adapted to be struck by the armature arm, a click having a contact piece secured thereto pivoted on the second arm, a fixed contact piece, a magnet adapted to attract the said armature, and an electrical circuit including the coils of the said magnet and the said contact pieces, substantially as described.

ADOLPH EDWARD VIDAL.
GASTON HERVIEU.

Witnesses:
A. MERES,
A. BONNETT.