

No. 737,781.

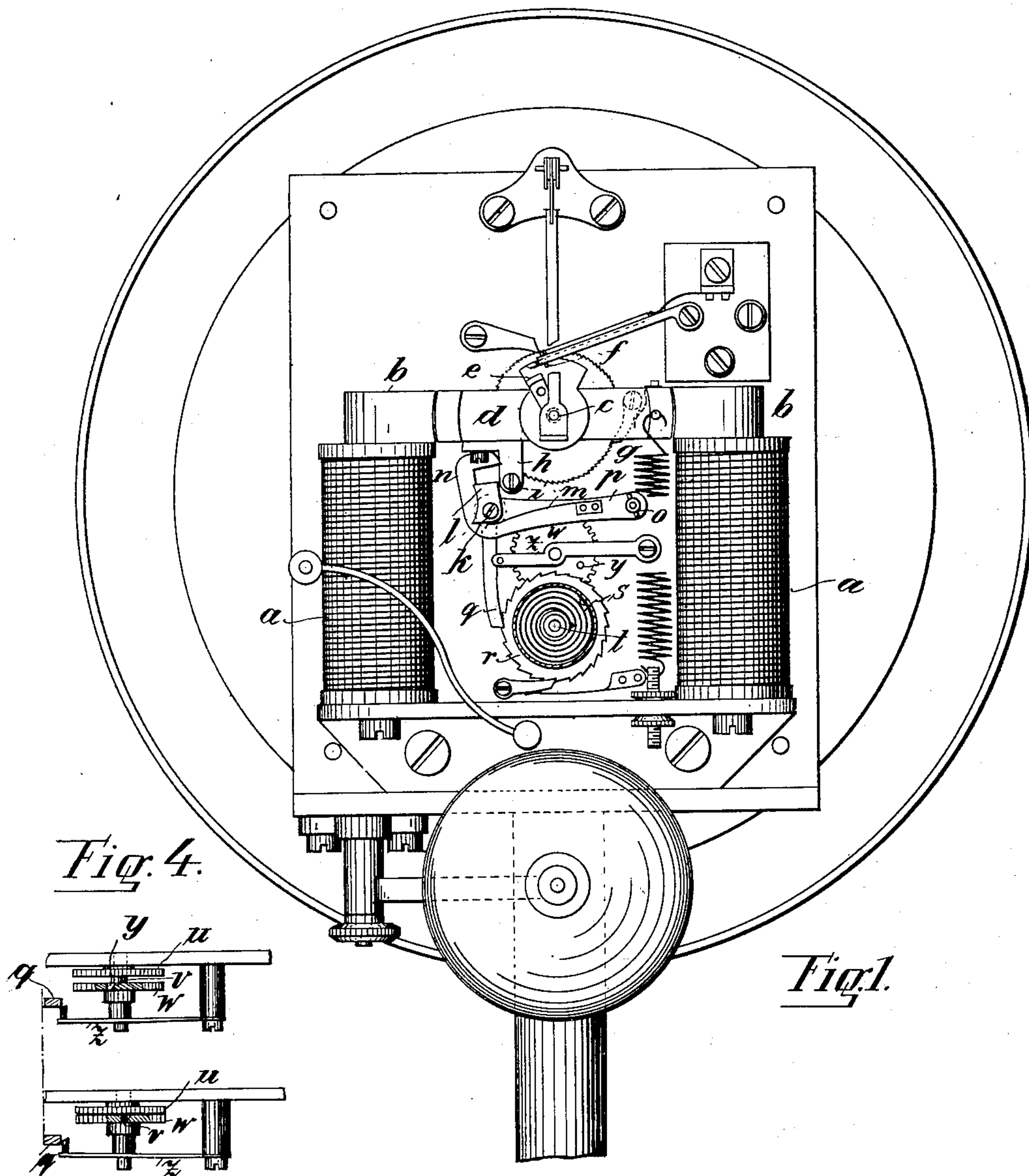
PATENTED SEPT. 1, 1903.

E. SCHULTZ.
SELF WINDING ELECTRIC CLOCK.

APPLICATION FILED JULY 2, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
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J. B. Roman

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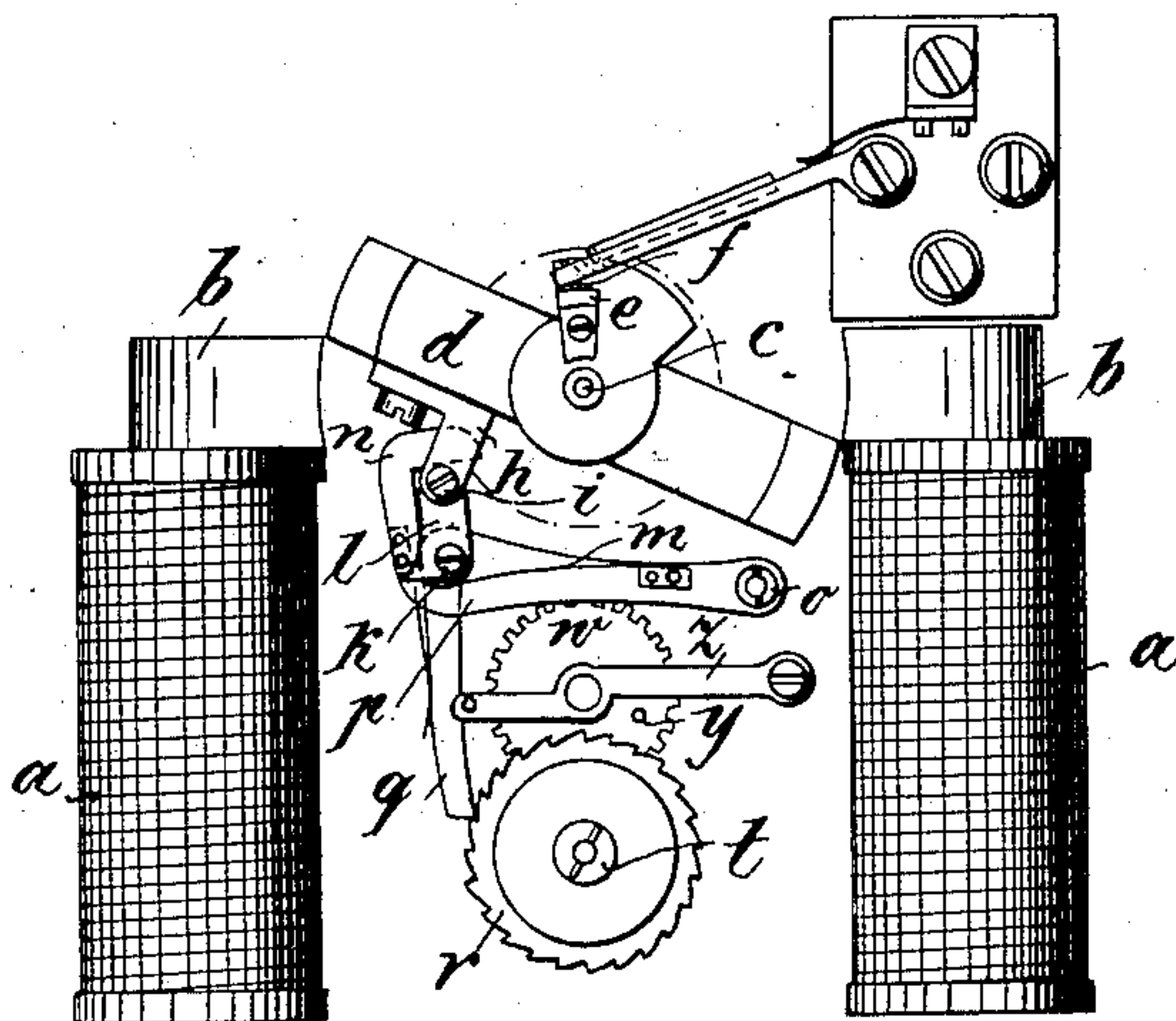
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NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

NO MODEL.

Fig. 3.

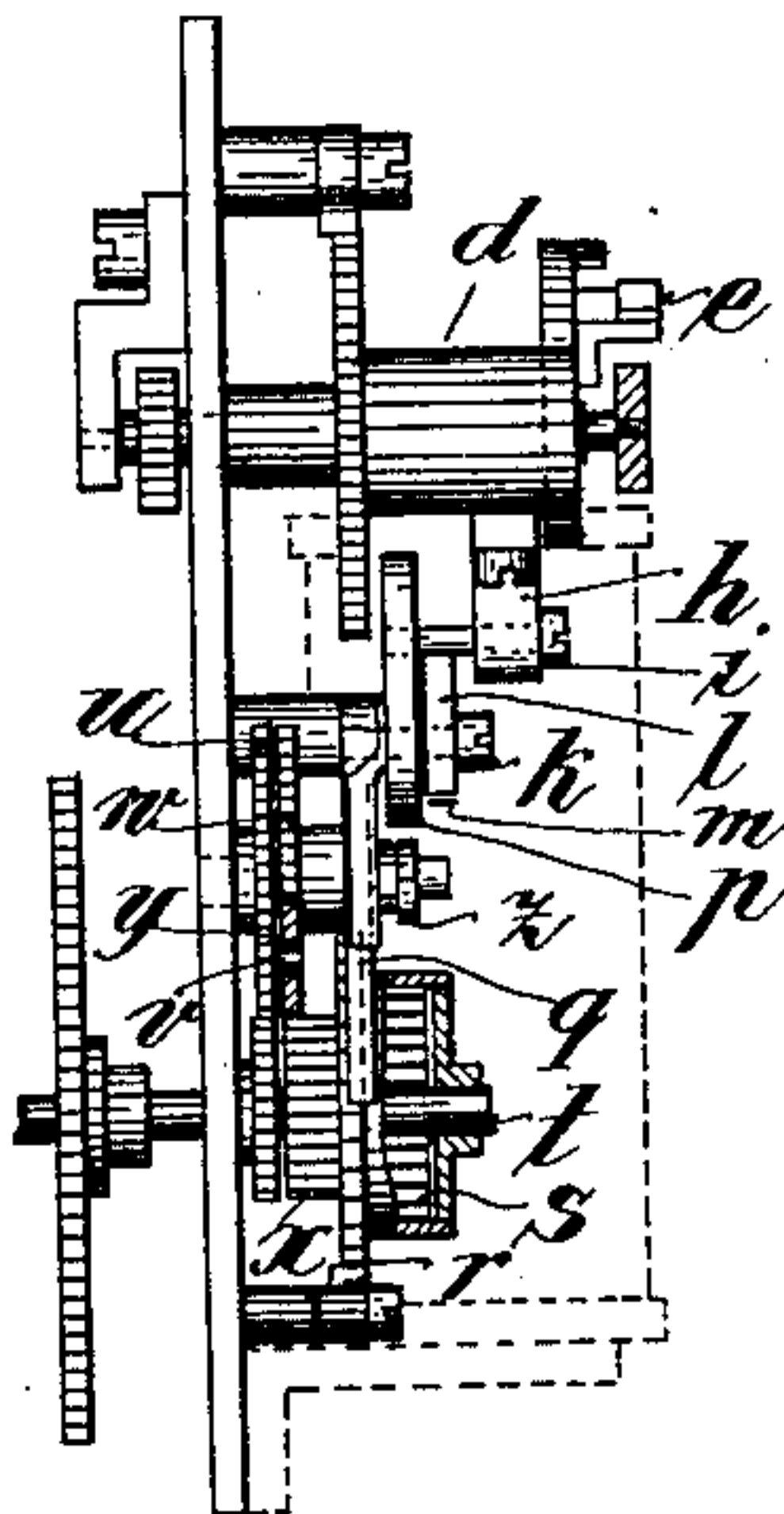
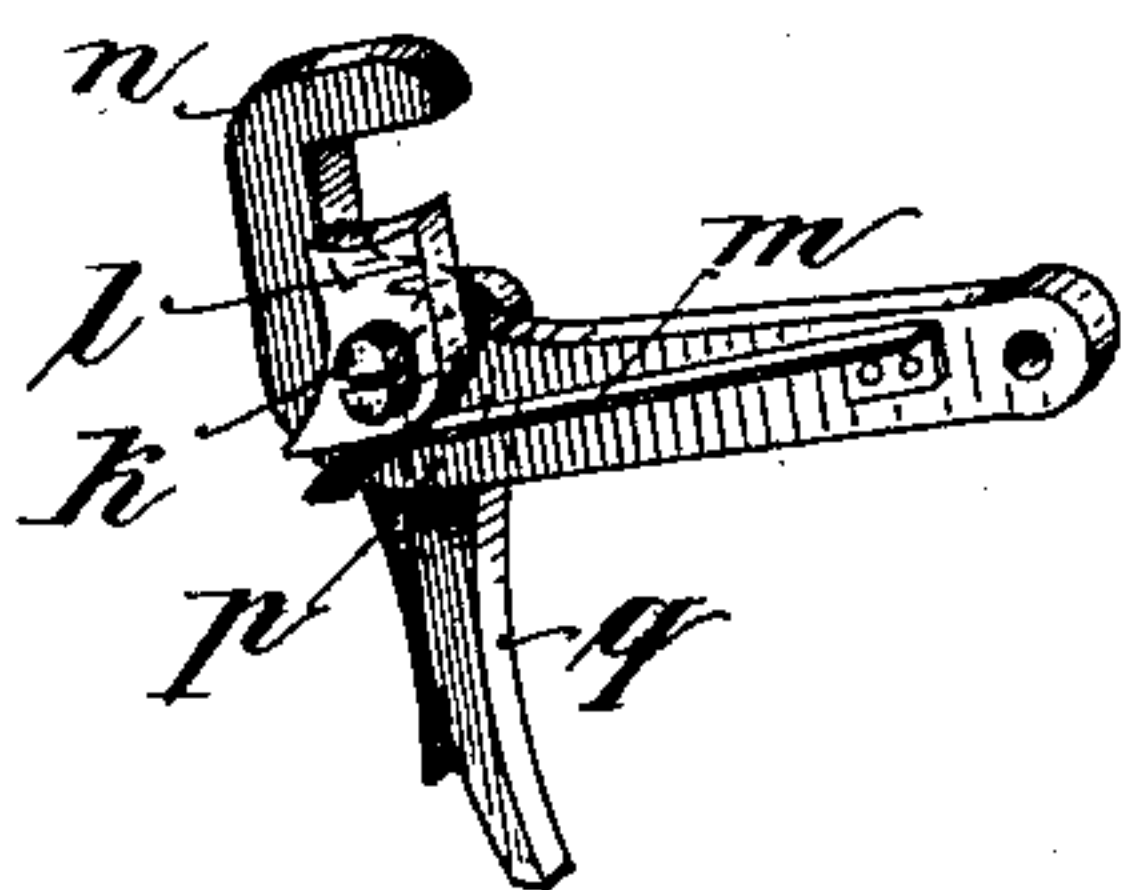


Fig. 5.



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UNITED STATES PATENT OFFICE.

EMIL SCHULTZ, OF POTSDAM, GERMANY, ASSIGNOR TO MAX MÖLLER, OF
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SELF-WINDING ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 737,781, dated September 1, 1903.

Application filed July 2, 1901. Serial No. 66,882. (No model.)

To all whom it may concern:

Be it known that I, EMIL SCHULTZ, a subject of the Emperor of Germany, residing at Potsdam, Germany, have invented certain
5 new and useful Improvements in Electric-Clock-Winding Mechanism, of which the following is a full, clear, and exact description.

My invention relates to improvements in electric-clock-winding mechanism; and the
10 objects of the improvement are, first, to drive the time mechanism and to wind up the striking mechanism by the oscillation of a single armature, and, second, to provide means to automatically put the spring of the striking
15 mechanism in and out of gear with the oscillating armature, according to whether the tension of said spring is sufficient or not.

Figure 1 represents an elevation; Fig. 2, a detached elevation with the parts in a different position; Fig. 3, a side elevation, and
20 Fig. 4 plan views. Fig. 5 is a perspective of the latch *l*, lever *p*, pawl *q*, and spring *m*.

The electromagnet *a* is provided with pole-pieces *b*, between which oscillates an armature *d*, freely swinging on a spindle *c*. After
25 the armature has been attracted (which is caused by a contact-pin *f*, which from time to time comes into metallic contact with a contact-plate *e*) a spring *g* (shown broken)
30 becomes operative, having been put under tension while the armature was being attracted, the spring causing the return motion of the armature while losing its tension. In the return motion the armature actuates the
35 driving-train of the clock. All these parts of the clock are of known construction and operation. On the return motion of the armature, which after having been attracted has about the position shown in Fig. 1, a pin *i*,
40 firmly connected with the armature by an arm *h*, will first run free, but will presently press against a latch *l*, rotating on a screw-bolt *k*. This latch will yield, but will be returned to its original position by a
45 spring *m* not long before the armature assumes the position shown in Fig. 2. In passing onward the pin *i* after the latch *l* has slipped back will come into contact with the nose *n* of a J-shaped lever *p*, fulcrumed at *o*,
50 and will slightly turn this lever until the parts have reached the position shown in Fig.

2. In this position the armature *d* is again attracted, when it will push downward the latch *l*, and therefore the lever *p*, jointed to it. The impact is transmitted by a pawl *q* 55 on the lever *p* to a ratchet-wheel *r*, which is rotated thereby. With the wheel *r* rotates a spring-barrel, within which is a spring, *s* one end of which is connected in the usual manner with the spring-barrel, while the other end 60 is attached to a sleeve keyed upon a spindle *t*. When the spring *s* has been wound up sufficiently, the spindle *t* will rotate as soon as the striking-train is released and will actuate the same. With the spindle *t* rotates a train con- 65 sisting of two toothed wheels, one of which, *u*, is provided with a pin *v*. A toothed wheel *w*, capable of sliding on its spindle, faces the toothed wheel *u*, and this engages with a toothed wheel *x* on the barrel of springs *s*, this 70 wheel *x* having broad teeth. The toothed wheel *w* has a perforation at *y*, terminating in an inclined plane. A spring *z* carries at its end a pin with an inclined face, and this spring has a tendency to push the wheel *w* 75 against the wheel *u*, the pawl *q* being pushed aside by said pin and thrown out of engagement with the teeth of the ratchet-wheel *r*. The wheels *u* and *w* have the same number of teeth, also the two pinions on the spindle 80 *t*, which engage with the same.

The operation of the mechanism arranged as described is as follows: When there is no tension on the spring *s* and the pawl *q* is alternately raised and lowered by the oscilla- 85 tion of the armature *d*, the toothed wheel *r*, with which the pawl engages, will be turned in the same direction. This rotation effects the winding up of the springs *s* and also rotation of the cog-wheel *x*, which rotates the 90 toothed wheel *w*, engaging with same. When the spring *s* has been wound up to the given extent, the toothed wheel *w* has been turned so far that the hole *y* in the same faces the pin *v* in the wheel *u*. As already mentioned, 95 the spring *z* tends always to carry the wheel *w* toward the wheel *u*, and when the position just referred to is reached this is effected. In this movement the pin on the spring *z* will push aside the pawl *q*, so that now the 100 armature oscillates without further winding up the spring *s*. The spring thus has a cer-

tain tension which is so chosen as to give power for about forty strokes of the hammer. If now the striking-train actually becomes operative, which is effected with unwinding of the spring *s* and rotation of the spindle *t*, then the toothed gear will turn with same, one wheel of which, *u*, carries the pin *v*. This pin slips upward on the inclined face of the hole *y*, pressing back the toothed wheel *w*, and with it the spring *z*. This again releases the pawl *q*, which springs into engagement with the teeth of the wheel *r*. The next oscillation of the armature will therefore again wind the spring *s*. It is necessary to provide the power of the train as above stated, as in the higher hours of the day much work is required of the striking-train, and this can only be attained by collecting the power in the spring *s* when the work demanded is small.

Having thus described my invention, I declare that what I claim, and desire to secure by Letters Patent, is—

1. The combination in an electric clock of an electromagnet; an armature adapted to be periodically turned by said electromagnet; a spring adapted to turn said armature contrary to the attraction of said electromagnet; means to drive the time mechanism by the oscillation of said armature; a pin secured to said armature; a lever adapted to be raised by said pin when said armature turns in one direction; a spring-held latch pivoted to said lever and adapted to be lowered when the armature is attracted; a second spring-pawl pivoted to said lever, and a ratchet-wheel in engagement with said second spring-pawl and adapted to be operated by the oscillation of the armature for the purpose set forth.

2. The combination in an electric clock of an electromagnet; an armature adapted to be periodically turned by said electromagnet; a spring adapted to turn said armature contrary to the attraction of said electromagnet; means to drive the time mechanism by the oscillation of said armature; a pin secured to said armature; a lever adapted to be raised by said pin when the armature turns in one direction; a spring-held latch pivoted to said lever and adapted to be lowered when the armature is attracted; a spring-held pawl pivoted to said lever; a ratchet-wheel in engagement with said spring-held pawl; a toothed wheel adapted to be secured to the spring-casing of striking mechanism; a second toothed wheel in engagement with said first toothed wheel and having a hole in the face thereof; a third toothed wheel loose on the axis of said second toothed wheel; a fourth toothed wheel engaging with said third

toothed wheel; a pin secured to said third toothed wheel and so disposed as to face in a certain position the opening in said second toothed wheel; a spring pressing said second and third toothed wheels together; and a stop secured to said spring and so disposed as to press said second pawl out of engagement with said ratchet-wheel when said spring is released; substantially as set forth.

3. The combination in an electric clock of a periodically-oscillating armature, loose on the driving-shaft of the clockwork; and means adapted to operate striking mechanism by the reciprocation of said armature.

4. The combination in an electric clock of a periodically-oscillating armature loose on the driving-shaft of the clockwork; a pin connected to, and reciprocating with, said armature; a lever so disposed as to be raised by said pin when the armature turns in one direction; a spring-held latch pivoted to said lever in the path of said pin; a spring-held pawl pivoted to said lever; and a ratchet-wheel adapted to be turned by said spring-held pawl, for the purpose, set forth.

5. The combination in an electric clock of a periodically-oscillating armature loose on the driving-shaft of the clockwork; a pin connected to, and reciprocating with, said armature; a lever so disposed as to be raised by said pin when the armature turns in one direction; a spring-held latch pivoted to said lever in the path of said pin; a spring-held pawl pivoted to said lever; a ratchet-wheel in engagement with said spring-held pawl; a toothed wheel adapted to be secured to the spring-casing of a striking mechanism; a second toothed wheel in engagement with said first toothed wheel and having a hole in the face thereof; a third toothed wheel loose on the axis of said second toothed wheel; a fourth toothed wheel engaging with said third toothed wheel; a pin secured to said third toothed wheel and so disposed as to face in a certain position the opening in said second toothed wheel; a spring pressing said second and third toothed wheels together; and a stop secured to said spring and so disposed as to press said second pawl out of engagement with said ratchet-wheel when said spring is released; substantially as, and for the purpose, set forth.

In witness whereof I have hereunto signed my name, this 15th day of June, 1901, in the presence of two subscribing witnesses.

EMIL SCHULTZ.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.