

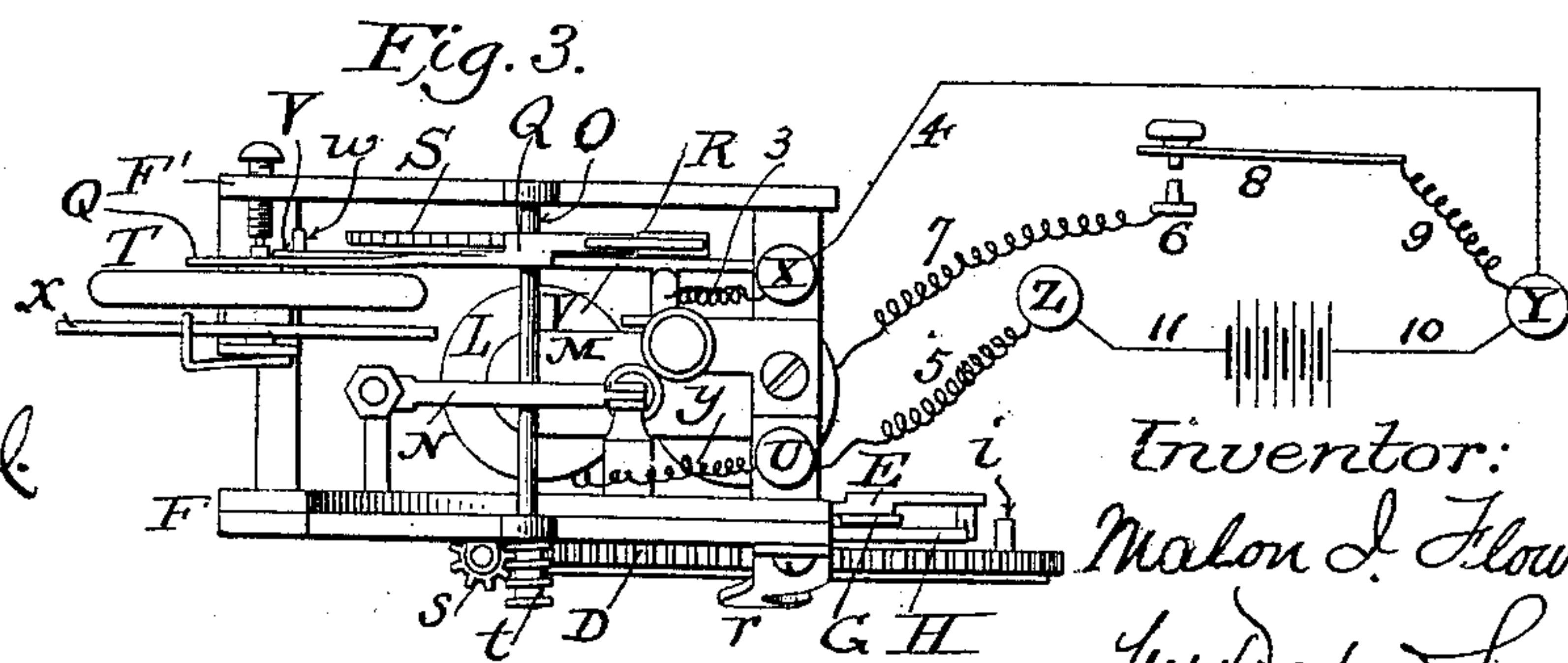
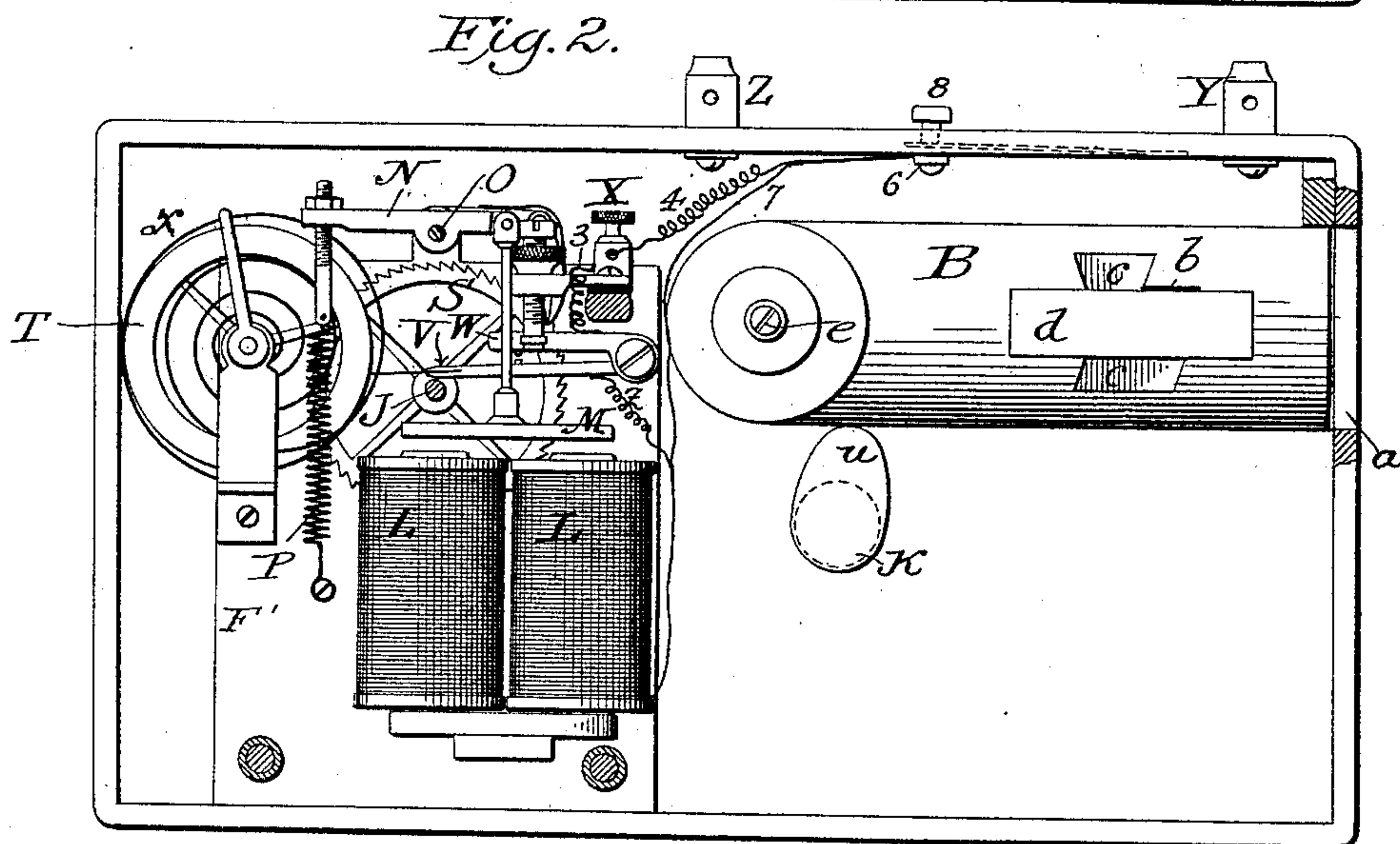
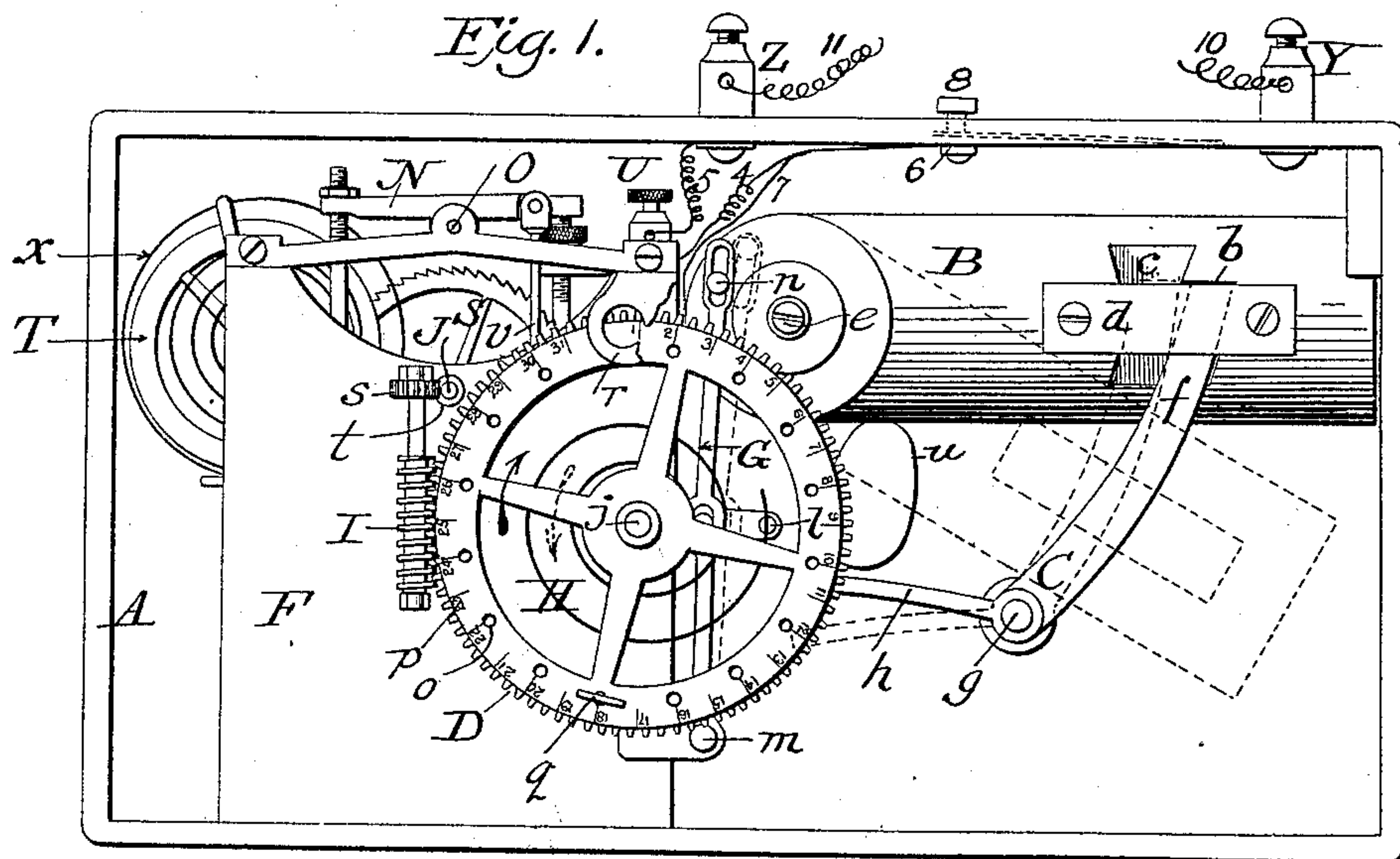
(No Model.)

2 Sheets—Sheet 1.

M. I. FLOWERS.  
ELECTRIC TIME LOCK.

No. 446,967.

Patented Feb. 24, 1891.



Witnesses:

James F. Duhamel  
Horace A. Dodge

Inventor:

Malon I. Flowers  
by Dodge & Sons,  
Attys.

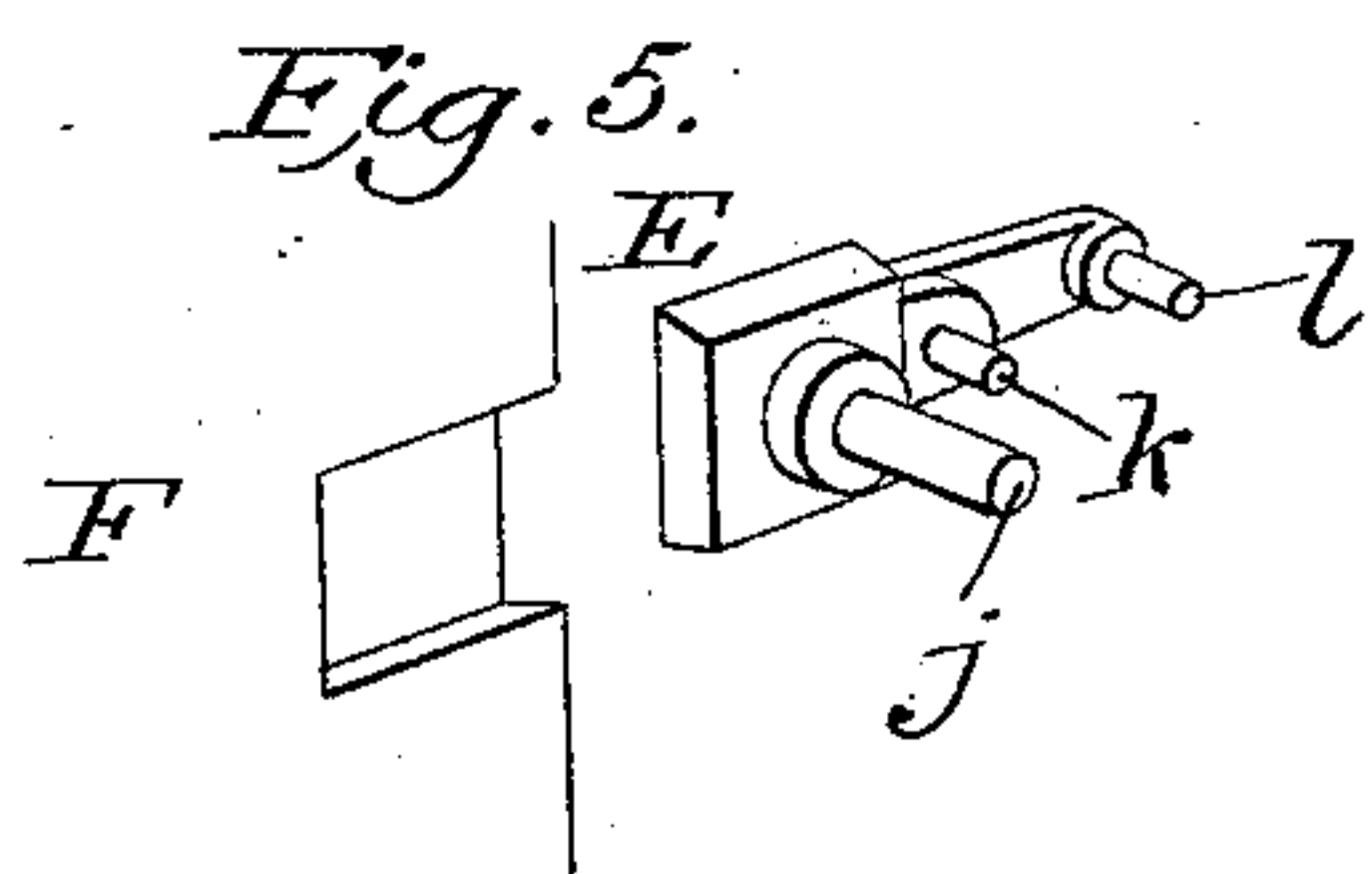
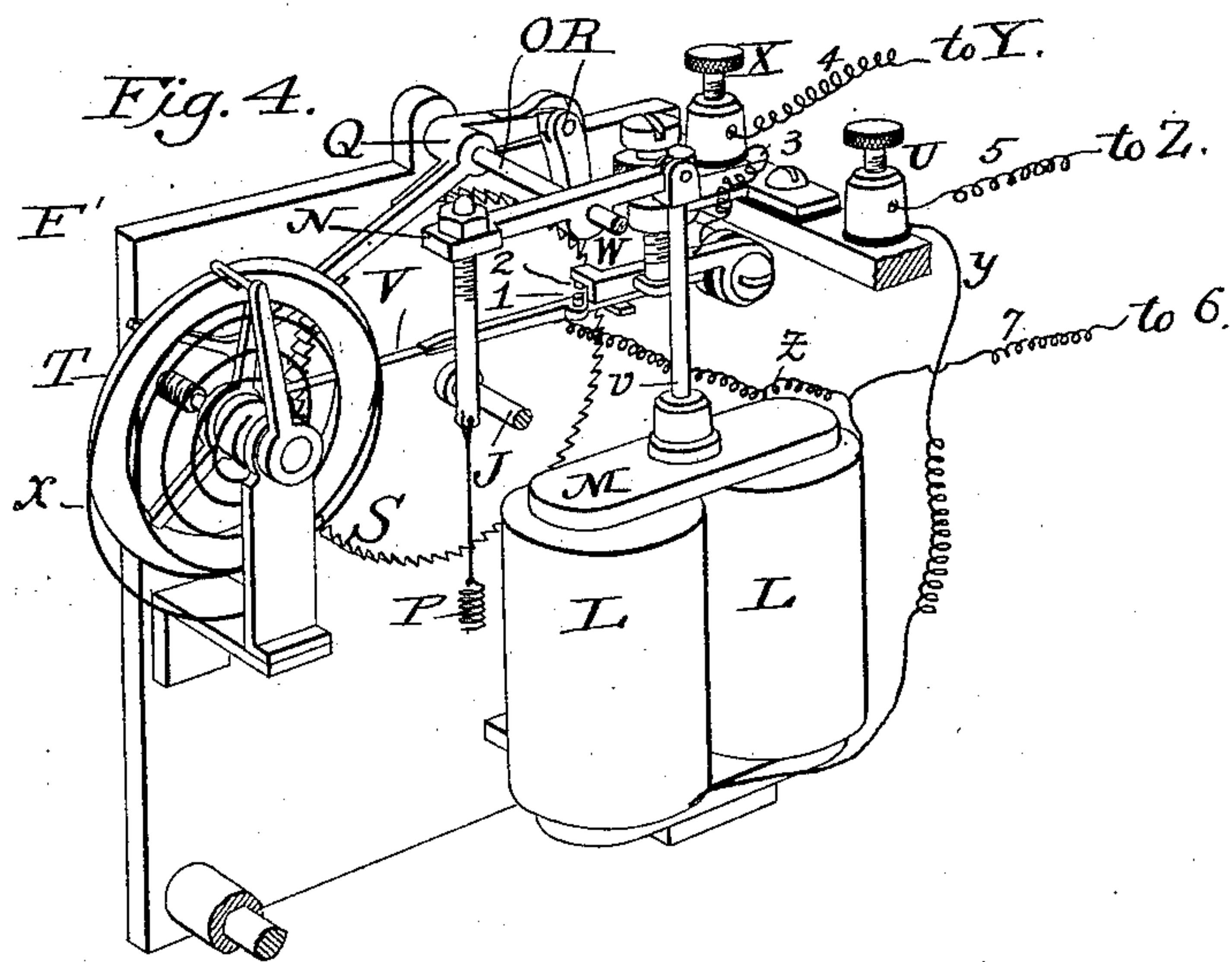
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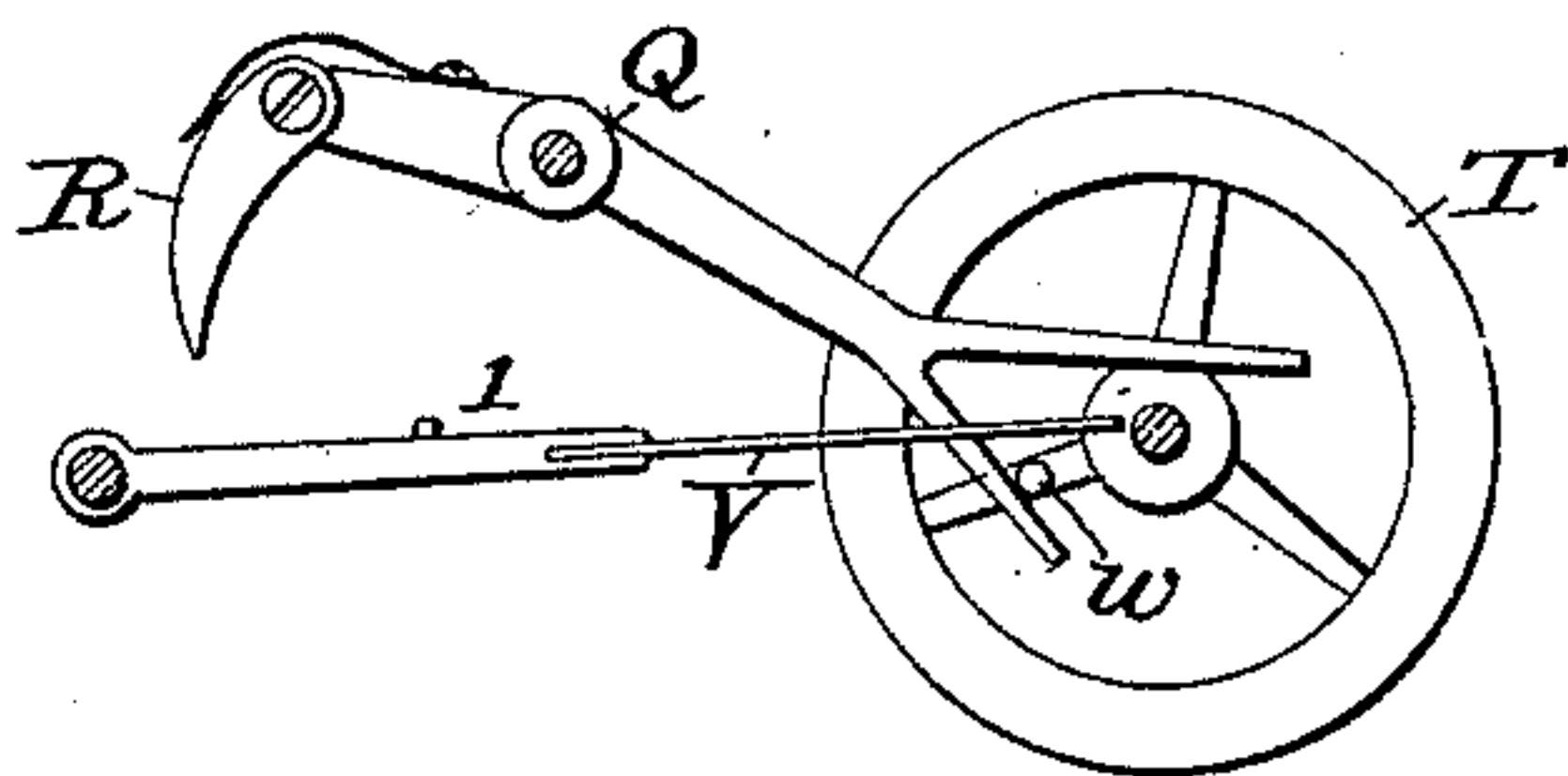
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*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

MALON I. FLOWERS, OF SPRINGFIELD, MISSOURI, ASSIGNOR OF TWO-THIRDS TO JAMES E. JONES AND C. W. PRICE, BOTH OF OKLAHOMA CITY, OKLAHOMA TERRITORY.

## ELECTRIC TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 446,967, dated February 24, 1891.

Application filed May 5, 1890. Serial No. 350,609. (No model.)

*To all whom it may concern:*

Be it known that I, MALON I. FLOWERS, a citizen of the United States, residing at Springfield, in the county of Greene and State of Missouri, have invented certain new and useful Improvements in Electric Time-Locks, of which the following is a specification.

My invention relates to that class of time-locks in which motion is imparted to the time movement through or by means of an electro magnet or magnets; and the invention consists in the combination, with an electric motor, of a time-dial, a check-bolt, and intermediate connections, whereby at a predetermined time the check-bolt will be actuated or released to permit the locking mechanism proper to be actuated.

The invention further consists in various other features and combinations hereinafter set forth and claimed.

In the drawings, Figure 1 is a face view of my improved mechanism; Fig. 2, a similar view with a part of the frame-work and time-dial removed; Fig. 3, a top plan view; Figs. 4, 5, and 6, views of detached parts of the mechanism.

A indicates a box or casing having an opening *a* in one wall, into line with which a hinged or pivoted check-bolt B is adapted to be held by means of a dog C.

A part of the bolt-work of the safe or vault or a dog connected with said bolt-work is designed to be projected into or through the opening *a* when the bolt-work is being retracted and the safe or vault opened. So long as the bolt remains in the position indicated in full lines in Figs. 1 and 2 of course the dog cannot be projected into the case, and consequently the bolt-work of the safe cannot be opened until the check-bolt B is permitted to fall into the position shown by dotted lines in Fig. 1, as hereinafter more fully set forth.

It is not intended that any great amount of strain shall come upon the check-bolt B, its main purpose being to prevent a slight movement of other and stronger mechanism connected with or forming part of the bolt mechanism of the safe or vault, which latter forms no part of the present invention.

The bolt B is provided on its side face with

a shoulder *b* and with a groove *c*, across which will advisably be secured a guard-plate *d*, the groove being concentric with the bolt-pivot *e*, so that when the arm *f* of the dog is thrown out of engagement with the shoulder *b* and into alignment with the groove *c* the bolt may fall, as indicated by dotted lines in Fig. 1.

The dog C, which is merely an elbow-lever pivoted at *g* to the casing A, comprises two arms *f* and *h*, one of which *h* is normally in the path of a pin or stud *i*, projecting from the rear face of a gear-wheel D, (which I term the "time-wheel,") so that as the said wheel rotates its pin *i* will strike the arm *h*, depress it, and throw the arm *f* into alignment with the groove *c* and permit the bolt to fall.

E indicates a block which is adapted to slide back and forth upon or relatively to a plate F, forming a part of the frame-work of the motor, as shown in Fig. 5, the said block being provided with a stud or axle *j*, upon which wheel D is mounted a pin or stud *k* to engage an upright lever G and a lug *l* to hold one end of a spring H, coiled about the axle of the wheel and secured at its inner end to the said wheel.

The lever G is pivoted at its lower end, as at *m*, to the plate F, and is slotted at its upper end to receive a screw or stud *n*, projecting from the face of the bolt at its inner end. The wheel D is provided with a series of holes or openings *o*, corresponding to the graduations *p*, (in the present instance, hours,) the said openings being adapted to receive a removable set-pin *q*. (Shown in Fig. 1.) A combined stop and pointer *r* is secured to the plate F in such position as to be in the way of the set-pin *q*, and thereby limit and stop the backward movement of the time-wheel when the latter is released by the means hereinafter described.

A worm I, journaled upon the face of plate F and having a worm-wheel *s* at its upper end, serves to rotate or turn the time-wheel D in the direction of the arrow in Fig. 1, motion being imparted to the worm I through the intervention of a worm *t*, secured to the driven shaft J of the motor and engaging the worm-wheel *s*.

In the present arrangement the pin or stud



*i* on the time-wheel D is located behind the number "9" on the dial or wheel D; but this is merely an arbitrary arrangement and may be changed. The operation of this part of my invention is as follows: Suppose the safe is to be closed at three p. m. not to be opened for eighteen hours, until nine a. m. the next day. The set pin *q* is placed in the opening *o* opposite the number "18" on the dial or wheel D, and the latter, after being turned back so that the set-pin shall be in contact with the stop *r*, will be moved over into engagement with the worm I. Motion imparted to the worm by the motor is communicated to the dial or time-wheel D, and the latter is caused to turn in the direction of the arrow until the pin or stud *i* strikes against the arm *h* of the elbow-lever or dog C, the time occupied by the wheel in thus moving to bring its stud in position to strike the dog being eighteen hours. As soon as the dog or lever C is rocked upon its pivot the bolt will fall, as before explained; but in thus falling the pin or stud *n* thereon will draw the upper end of the lever G outward, and, as this lever is connected with the axle-block E, carrying the axle *j*, it will be seen that the block E and the wheel D, carried thereby, will be moved laterally, as indicated by the dotted lines in Fig. 1. As the wheel D is thus moved laterally out of engagement with the worm the coiled spring II, which was put under tension during the rotation of the wheel by the worm, will return the wheel to its normal position relatively to its axle—that is to say, the spring will turn the wheel backward upon its stud or axle until the set-pin *q* comes into contact with the stop *r* and prevents further backward rotation. By this arrangement it becomes unnecessary to reset the wheel each day, unless it should be desired to change or vary the length of time the safe is to remain closed. The bolt will fall of its own weight when released, and in order to raise it to its proper position and throw the wheel D into engagement with its actuating-worm I employ a knob K, which, as shown in Fig. 1, is provided with an arm or eccentric *u*, adapted to bear against the under side of the bolt and raise the latter as the knob is turned. When the bolt is brought into proper position, the arm *f* of the dog will fall beneath the shoulder *b* and hold the bolt in position. The bolt B is designed to dog or prevent the actuation of the ordinary bolt-work, and it is immaterial whether this bolt engage one of the bolts ordinarily used or be used merely for the purpose of closing an opening adapted to receive the ordinary locking-bolt. For this reason I term the bolt B a "check-bolt," and mean to include thereby any device operating in substantially the same way to produce substantially the same results. The means or mechanism by which motion is imparted to the worm I and wheel D will now be explained, reference being had particularly to Figs. 2, 3, and 4.

L L indicate a pair of electro-magnets, and M an armature therefor connected by means of a rod *v* with one end of a rocking arm or lever N, secured to a shaft O, journaled in the plates F F', the opposite end of said arm or lever being connected with a coiled spring P, attached at its lower end to the frame-work. Q indicates a second lever attached to shaft O and oscillating therewith, one end of said lever being provided with a spring-actuated pawl R to engage a ratchet-wheel S, secured upon shaft J, while the opposite end of the lever is forked to straddle a pin *w*, projecting from the balance-wheel T. This balance-wheel is journaled in suitable brackets in the frame-work, and will advisably be provided with a spring *x*, which, acting in conjunction with forked lever Q, imparts an oscillating movement to the wheel in the same manner, essentially, as in clocks. A wire *y* extends from a binding-post U, suitably insulated from the frame-work F F' to one of the magnets, and a wire *z* extends from the inner end of an arm V to the other electro-magnet. This arm V, which is insulated from the frame-work, to which it is secured, extends forwardly in the path of the pin or stud *w* of the balance-wheel, so that every time the wheel oscillates in one direction it will raise the arm and carry the platinum point 1 into contact with a similar point 2, carried by an insulated overhanging arm or bracket W and hold it there until the balance-wheel T rotates far enough to let the arm V drop off from pin *w*, and in thus falling break the circuit. As the wheel T oscillates its pin or stud *w* is carried upward, and in thus rising it engages and lifts the arm V, so that about the time the pin or stud reaches a position almost over the shaft of wheel T the circuit will be completed at 1 2 and the magnets L L energized. The energization of the magnets causes the forked end of the lever Q to be thrown upward and the wheel (and the pin *w*, attached rigidly to wheel T and still within the fork of the lever Q) oscillated or rocked against the tension of the spring *x*, which finally checks it and throws it back again. The circuit remains closed only a short time, for just before or as soon as the pin *w* reaches the limit of its upward movement the arm V will ride off the pin, the resiliency of the arm returning it to its normal position, and thereby destroying the circuit. A wire 3 extends from the arm or bracket W to a suitably-insulated binding-post X on the frame-work, while a wire 4 extends from the post X to a similar post Y on the box or casing A. From the binding-post U a wire 5 extends to a similar binding-post Z on the box or casing.

Within the box or casing is a plate 6, which is connected with the windings of the electro-magnets by means of a wire 7. A spring contact-arm 8, adapted to be moved into and out of contact with the plate 6, is connected by means of a wire 9 with the binding-post



Y, while the binding-posts Y Z will be connected with a battery or other source of supply by means of wires 10 and 11.

The operation is as follows: The current 5 entering through wire 11 and binding-post Z passes through wire 5, binding-post U, and wire y, about the electro-magnets L L, and would finally pass out through wire z, arms V W, wire 3, binding-post X, wire 4, binding- 10 post Y, and wire 10 were it not for the fact that the contacts 1 and 2 are normally separated and keep the circuit open. In order, therefore, to complete the circuit and energize the magnets, the switch or spring-arm 8 is brought 15 into contact with plate 6, and the current is completed through wire 11, post Z, wire 5, post U, electro-magnets L L, wire 7, switch 6 8, wire 9, post Y, and wire 10, which goes to the battery. As soon as this energization of 20 the magnets is effected and the armature attracted the switch 6 8 is opened again, thereby causing a disenergization of the magnets and a release of the armature. In the move- 25 ment of the armature toward the magnets the levers N Q were rocked, the spring P put under tension, and the wheel S and shaft J turned or rotated through the engagement of the pawl R with the wheel; but as soon as 30 the switch 6 8 is opened, so as to destroy the circuit and release the armature, as before described, the spring P will rock and return the levers N Q to their normal positions, and the lever Q in thus rocking imparts an oscillating motion to the balance-wheel T, which 35 motion is maintained partly by the hair-spring x. As the wheel thus oscillates the contact-point 1 on the arm V is brought alternately into and out of contact with the point 2 on the arm W, and in this way motion is imparted to the worm I during the 40 time for which the time-wheel or dial is set.

The construction of the switch 6 8 may obviously be varied considerably without departing from the spirit of my invention. So, 45 too, the location of the switch is a matter of minor importance; but it will preferably be located outside of and away from the box or casing A.

It will be found advisable to connect the 50 binding-posts U and X with a battery which shall be located outside of the safe or compartment locked, so that in case the battery located within the safe or compartment should fail to operate and render the unlocking of 55 the bolt B impossible by the ordinary means the magnets may be energized from without by such persons as are cognizant of the location of the switch placed in the circuit leading from the binding-posts Q X to the out- 60 side battery.

Having thus described my invention, what I claim is—

1. In combination with a check-bolt, a dog for engaging said bolt, a time-wheel or dial 65 for actuating the dog, means for rotating the wheel or dial, and connections, substantially

such as shown, for throwing the wheel out of engagement with its actuating mechanism.

2. The combination, with the check-bolt, dog, and time-wheel, arranged substantially 70 as shown, of means for actuating the wheel and intermediate connections between the bolt and the axle of the wheel, whereby when the bolt is released the wheel is disconnected from its actuating mechanism. 75

3. The combination, with bolt B and dog C, of a wheel D, means for rotating the wheel and thereby actuating the dog, a stop r, a set-pin q, carried by the wheel, a spring secured to the wheel, and means for releasing the 80 wheel.

4. The combination, with the bolt B and dog C, of a wheel D, adapted to release the dog, a sliding block E, upon which said wheel is journaled, a lever connecting the bolt and 85 block, and a worm for imparting motion to the wheel, all substantially as shown.

5. In combination with the bolt B, a dog C, wheel E, and connections substantially such as shown, the knob provided with an arm or 90 eccentric adapted to raise the bolt and throw the wheel into engagement with its operating mechanism.

6. In combination with pivoted bolt B, having shoulder b, a groove c, concentric with 95 its pivot, and the pivoted dog C, comprising two arms f and h.

7. In an electric time-lock, the combination, with a bolt, dog, and time-wheel, arranged and operating substantially as shown, of an elec- 100 tric motor for imparting a continuous motion in one direction to the wheel and a switch adapted to momentarily complete the circuit and put the motor in motion.

8. In an electric time-lock, the combination, 105 with a bolt, dog, and time-wheel, of an electro-magnet and its armature, arms V and W, provided with contact-points 1 2, means for actuating one of the arms V, actuated by the magnet, wire z, connecting the windings 110 of the magnet with the arm V, wires 3 and y, extending, respectively, from the arm W and the magnet to binding-posts X and U, and wires 4 and 5, extending from the posts X and U to a battery. 115

9. In an electric time-lock, the combination, with the dial or time-wheel and the driven shaft F for imparting motion thereto, of a ratchet-wheel S, secured to the shaft, a rock-shaft O, levers N Q, secured thereto, a pawl 120 R, carried by one end of lever Q, to engage wheel S, a balance-wheel T, arms V W, provided with suitable contact-points, a pin w, carried by the balance-wheel, to engage the forked end of lever Q and also to actuate 125 the arm V, an electro-magnet, an armature therefor connected with one end of lever N, a spring P, connected with the opposite end of the lever, a battery, and suitable connections. 130

10. In an electric time-lock, the combination, with the time-wheel or dial D, of an electric

motor for imparting motion thereto, a normally-open circuit in which said motor is included, and an exciting-circuit provided with a switch.

5 11. In combination with casing A, having opening *a*, bolt B, dog C, and time-wheel D, an electric motor for imparting motion to the wheel.

10 12. In an electric time-lock, the combination, with a bolt, dog, and time-wheel arranged to operate substantially as shown, of an electric

motor for imparting a continuous motion in one direction to the time-wheel, and means without the lock-case for completing the circuit and putting the motor in motion.

15 In witness whereof I hereunto set my hand in the presence of two witnesses.

MALON I. FLOWERS.

Witnesses:

W. A. LONG,

JOHN L. TRUNNELL.