(No Model.) 2 Sheets—Sheet 1.

B. F. MERRITT & J. M. JOY.

AUTOMATIC GOVERNING DEVICE FOR MOTORS.

No. 558,507. Patented Apr. 21, 1896.

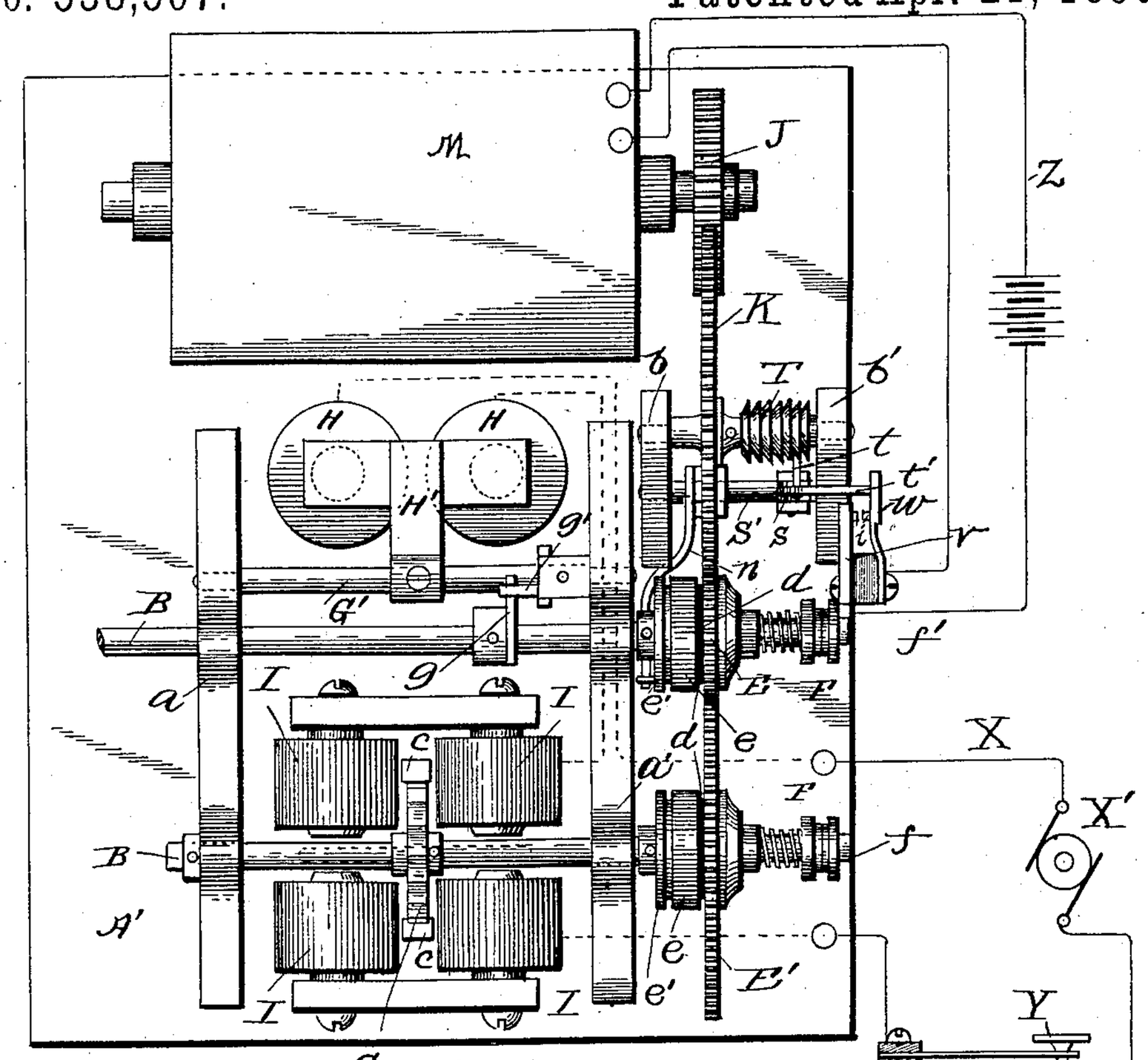

Fig. 1.

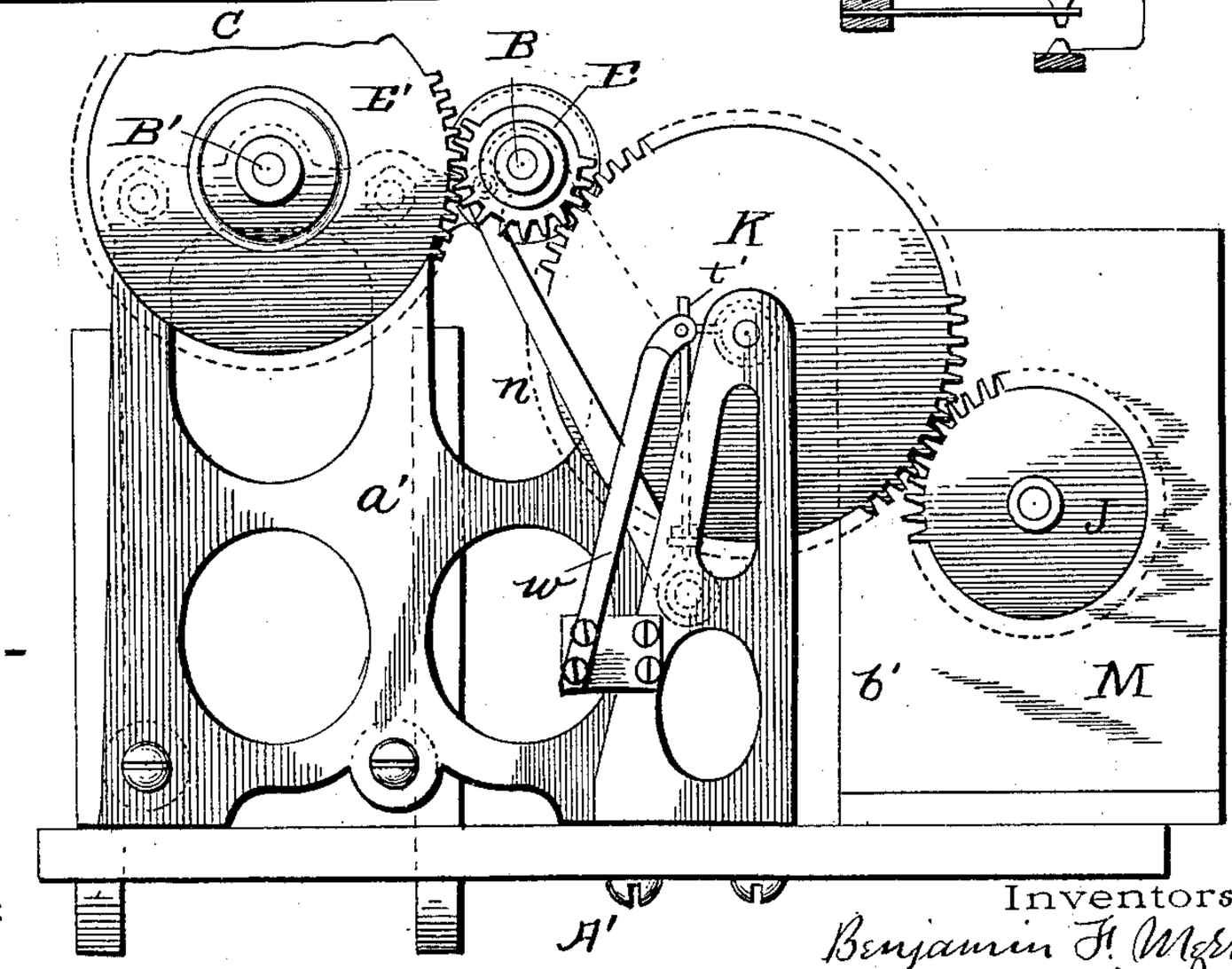

Fig. 2.

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By C. H. Duell
Their Attorney.

(No Model.) 2 Sheets—Sheet 2.

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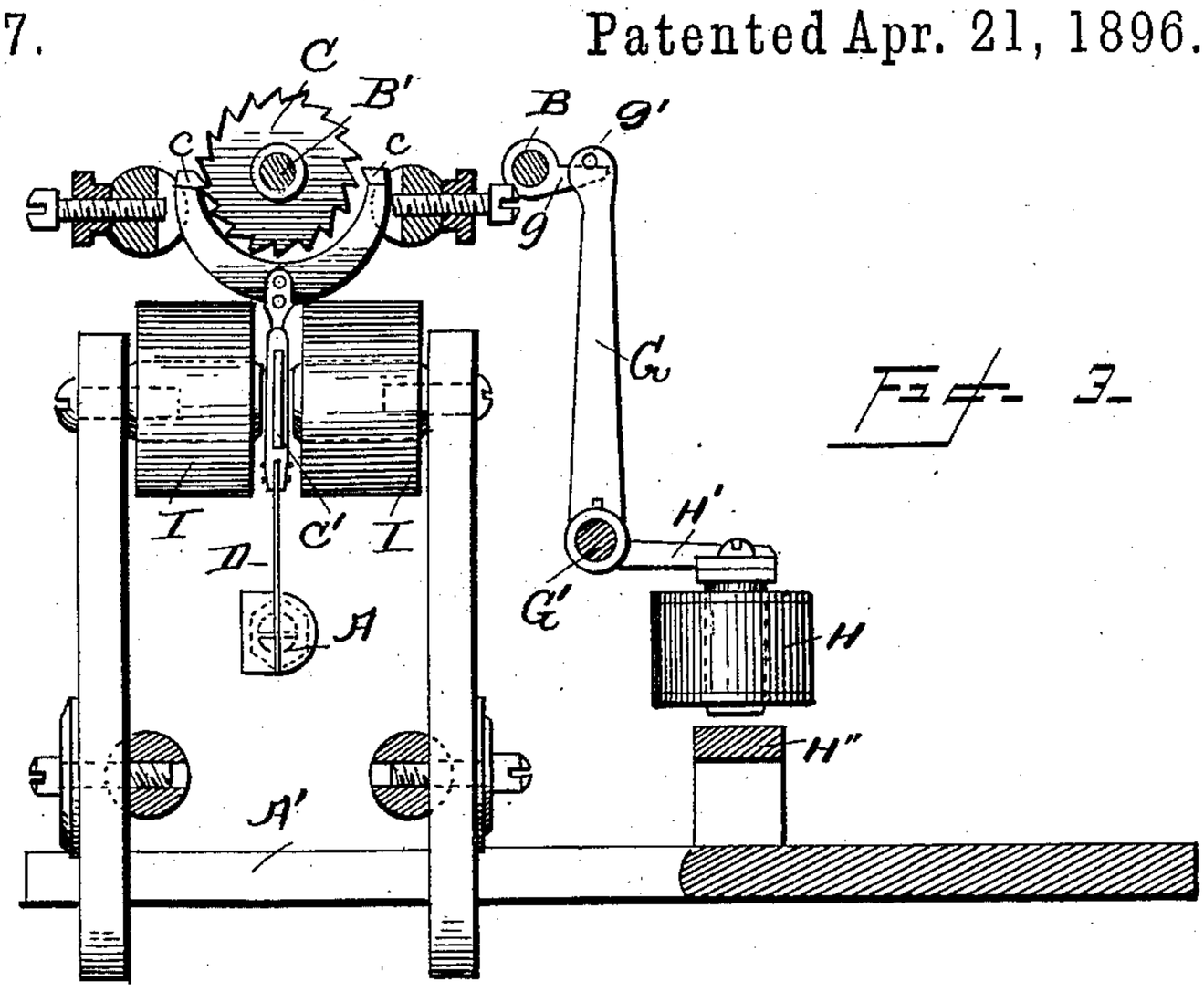

Fig. 3.

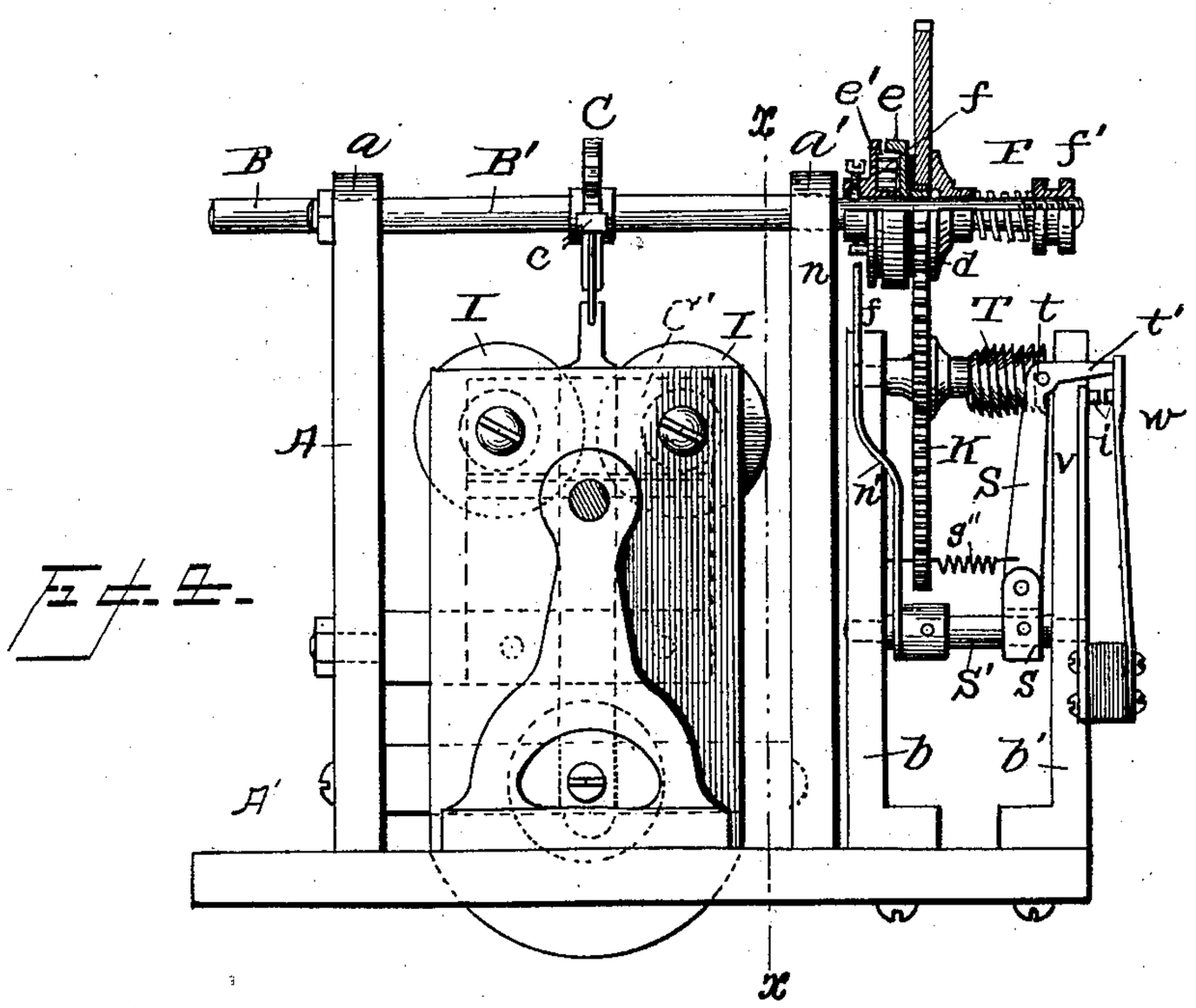

Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

BENJAMIN F. MERRITT, OF NEWARK, NEW JERSEY, AND JOIIN M. JOY, OF NEW YORK, N. Y., ASSIGNORS TO THE CONSOLIDATED TELEGRAPH AND NEWS COMPANY, OF NEW YORK.

AUTOMATIC GOVERNING DEVICE FOR MOTORS.

SPECIFICATION forming part of Letters Patent No. 558,507, dated April 21, 1896.

Application filed June 29, 1895. Serial No. 554,476. (No model.)

To all whom it may concern:

Be it known that we, BENJAMIN F. MERRITT, of Newark, in the county of Essex, in the State of New Jersey, and JOHN M. JOY, of the city of New York, in the county of New York, and in the State of New York, have invented new and useful Improvements in Automatic Governing Devices for Motors, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

Our invention relates to automatically-governing devices for electric motors; and the object is to provide means by which an electric motor may be automatically started and stopped by the depression and release of a key at a distance from the motor.

Our invention may be applied to printing-telegraph instruments, winding mechanism of clocks, and any other analogous devices adapted to be operated intermittently and from a distance. Several motors and their governing devices connected in the same circuit may be controlled by a single key, or several keys may be employed at a station or several stations, as desired.

Our invention consists in the combination, with an electric motor, gearing and shaft to be driven, of a screw or worm on one of the shafts of the gearing, a lever having a point adapted to engage the screw, a circuit maker and breaker in the path of the lever and connected to the terminals of the motor-circuit, a flexible coupling between the gearing and the shaft to be driven, means to stop the said shaft operated by an electromagnet, an electric circuit, including a circuit maker and breaker, and means to separate the point from the screw; and our invention consists in certain other combinations of parts hereinafter described, and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a top plan view of the devices. Fig. 2 is an end view. Fig. 3 is a sectional view on line $x\,x$ of Fig. 4, and Fig. 4 is the front side elevation of the apparatus.

Referring specifically to the drawings, A is the frame, having four uprights, two main uprights a and a', arranged opposite each other, and two smaller uprights b and b', also arranged opposite each other on the right, all of said uprights being mounted on a base A'.

B is the shaft to be driven, and is shown broken away in the drawings. The said shaft may be connected directly or through any suitable gearing with the mechanism or instrument to be driven, which, for the sake of simplicity and brevity, is not shown. The shaft B is supported by bearings in the uprights a and a'.

B' is another shaft supported by bearings in the same uprights. This shaft extends parallel to the other shaft and lies in the same horizontal plane. If desired, this shaft may also be connected through gearing or directly with the mechanism to be driven. The rotation of the shafts is governed by means consisting of an escape-wheel C, the escape-wheel being governed by the armature C', which carries at its upper and free end the pallets $c\,c$ to engage the teeth on the wheel.

The armature may be pivoted, as usual, but is preferably mounted on the upper end of a spring D, rigidly secured at its lower end to the frame A. When in its normal position, the spring extends in a vertical position, its center or neutral line being on a plane extending through the axis of the escape-wheel shaft.

The motion to rotate the shafts B and B' is preferably imparted, as shown, through friction-couplings, by the gear-wheels E and E', which are in mesh with each other and form part of the train of gearing connected to the electric motor M. Between each of the said gear-wheels and circular plates e, on their respective shafts, is placed a disk d of flexible friction-giving material, as cloth, and between the plate e and a similar plate e' is a flat coil-spring f, similar to a clock-spring, of sufficient power to start the rotation of the shaft while its gear-wheel and its attendant friction device are at rest and to continue its movement until the motor has started and gained a certain amount of speed. The spring f is fast to e at its outer end and to e' at its inner end in a manner well known and not necessary to be described. The plate or disk e' is securely pinned to the shaft. The spiral

spring F, with its controlling tension-nuts f', acts to press the gear-wheel against its friction-disk d, and thus to give motion to the parts e and e'.

The power-driven gear-wheels E and E′ are carried loosely on their shafts and actuate, through the friction-disks d d, the parts e e, also carried loosely on the shafts. The parts e e give motion in turn to the plates e' e' through the coil-springs f f. The plates e e being secured rigidly to their respective shafts, they are rotated together.

The rotary motion of the shaft B is governed by the engagement of the flier g with the stop-pin g', carried on the end of an arm G, supported and rocked by shaft G′, the shaft being oscillated by the electromagnet H, connected in the main line X.

The motion of the flier g and shaft G′ with its attendant arm and stop-pin and the magnet is similar in some respects to the operation of such parts in printing-telegraph receivers. The controlling-magnets I of the escapement c c and the magnet H may be connected in series or multiple in the main line. The main line is connected to a source of alternating currents X′, suitably located.

We do not wish to be limited to the form of the electric circuits and sources of current indicated in the drawings for energizing the magnets in our apparatus, as it will be obvious that these may be altered or changed in various ways without departing from our invention.

The magnet H is suspended by its yoke on an arm H′, which is rigidly secured to the shaft G′, and the armature H″ is stationary on the frame A. When at rest or in its normal position, the flier g and pin g' are in engagement with each other as shown in Fig. 3. At the instant, however, an impulse is sent over the line by depressing the key Y the magnet H is energized and attracted to its armature H″, thus causing the shaft G′ and its attendant arm and stop-pin to rotate and allow the flier g to revolve.

In this instrument an electric motor of any desirable type, deriving its current from any suitable source, is applied to the train of gearing hereinbefore mentioned. This motor is provided with an automatic cutting-out device, by which, when the transmitting-operator has released the key, the motor is stopped. This action is effected by the following means: The motor-pinion J engages the gear-wheel K, which in turn engages with the gear-wheel E, mounted on the shaft B. Were there no attendant mechanism, both shafts B and B′ would revolve in opposite directions and proportionally. Upon the shaft carrying the gear-wheel K is mounted a worm T, with which a point t, carried on the end of a pivoted arm S, engages. The point t with the finger t', when in a position at the right-hand end of travel in the worm, presses on a spring w and forces it away from the stationary spring v, opening the electric circuit Z between the points of contact i on and between the inner sides of the springs, the said circuit being the driving-circuit of the motor M. The arm S is pivoted at its lower end in a block s on a shaft S′ to move in the plane of the axis of the shaft, and this allows it to be moved universally. A spring g'', connected to the said arm, returns its free end to its original position to the left-hand end of the worm T when the point is released therefrom. The said point is released by rocking the shaft S′ on its bearings. The shaft S′ is rotated by the engagement of a pin n, mounted on one of the plates or disks e', which is rigidly connected to shaft B, with an arm n' extending upward from the shaft S′.

It is obvious that upon rotating the shaft B after the machine has been stopped the shaft S′ will be oscillated by the arm n' to throw the point t out of engagement with the worm T, allowing the contact-points on the springs w and v to close the circuit Z and start the motor M. As before explained, the power for starting the apparatus is obtained from the coil-springs f f, the said springs being wound by the motor after the apparatus has been stopped, but before the motor has stopped.

Certain matters shown are not claimed herein, but are covered in another application filed June 29, 1895, Serial No. 554,475.

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

1. The combination with an electric motor, a train of gearing and the shaft to be driven, of a worm mounted upon and secured to one of the shafts of the gearing, a lever having its free end universally movable, a point carried on its free end to engage the worm, a circuit maker and breaker in the path of the lever and connected to terminals of the motor-circuit, a spring connected to the lever, a shaft for the said lever, an arm secured to the shaft, a pin carried by a disk secured to one of the shafts to engage the arm, and means to start the rotation of the shaft, as set forth.

2. The combination with an electric motor, a train of gearing and the shaft to be driven, of a worm mounted upon and secured to one of the shafts of the gearing, a lever having its free end universally movable, a point carried on its free end to engage the worm, a circuit maker and breaker in the path of the lever and connected to terminals of the motor-circuit, a spring connected to the lever, a shaft for the said lever, an arm secured to the shaft, a pin carried by a disk secured to one of the shafts to engage the arm, a coil-spring between the shaft to be driven and the gearing, and means whereby the said shaft may be released as set forth.

3. The combination with an electric motor, a train of gearing and the shaft to be driven, of a worm mounted upon and secured to one of the shafts of the gearing, a lever having its free end universally movable, a point carried

on its free end to engage the worm, a circuit maker and breaker in the path of the lever and connected to terminals of the motor-circuit, a spring connected to the lever, a shaft for the said lever, an arm secured to the shaft, a pin carried by a disk secured to one of the shafts to engage the arm, a coil-spring between the shaft to be driven and the gearing, an arm carried on said shaft, a lever carrying a pin to engage the arm, and an electromagnet to operate the lever to release the shaft, as set forth.

4. The combination with an electric motor, a train of gearing and the shaft to be driven, of a worm mounted upon and secured to one of the shafts of the gearing, a lever having its free end universally movable, a point carried on its free end to engage the worm, a circuit maker and breaker in the path of the lever and connected to terminals of the motor-circuit, a spring connected to the lever, a shaft for the said lever, an arm secured to the shaft, a pin carried by a disk secured to one of the shafts to engage the arm, a coil-spring between the shaft to be driven and the gear-wheel thereon, a friction-coupling for the shaft, an arm carried on said shaft, a lever carrying a pin to engage the arm, and an electromagnet to operate the lever to release the shaft, as set forth.

In testimony whereof we have hereunto signed our names.

BENJAMIN F. MERRITT. [L. S.]
JOHN M. JOY. [L. S.]

Witnesses:
GEORGE L. HOFFMAN,
HENRY HERROLD.