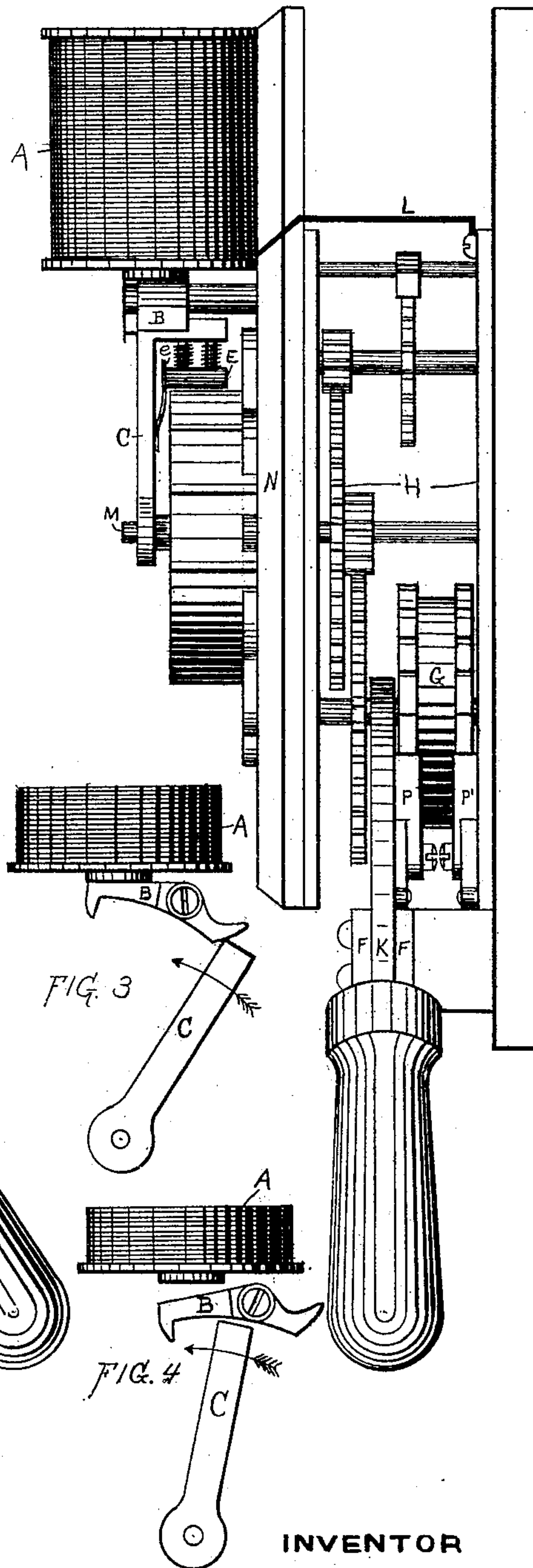
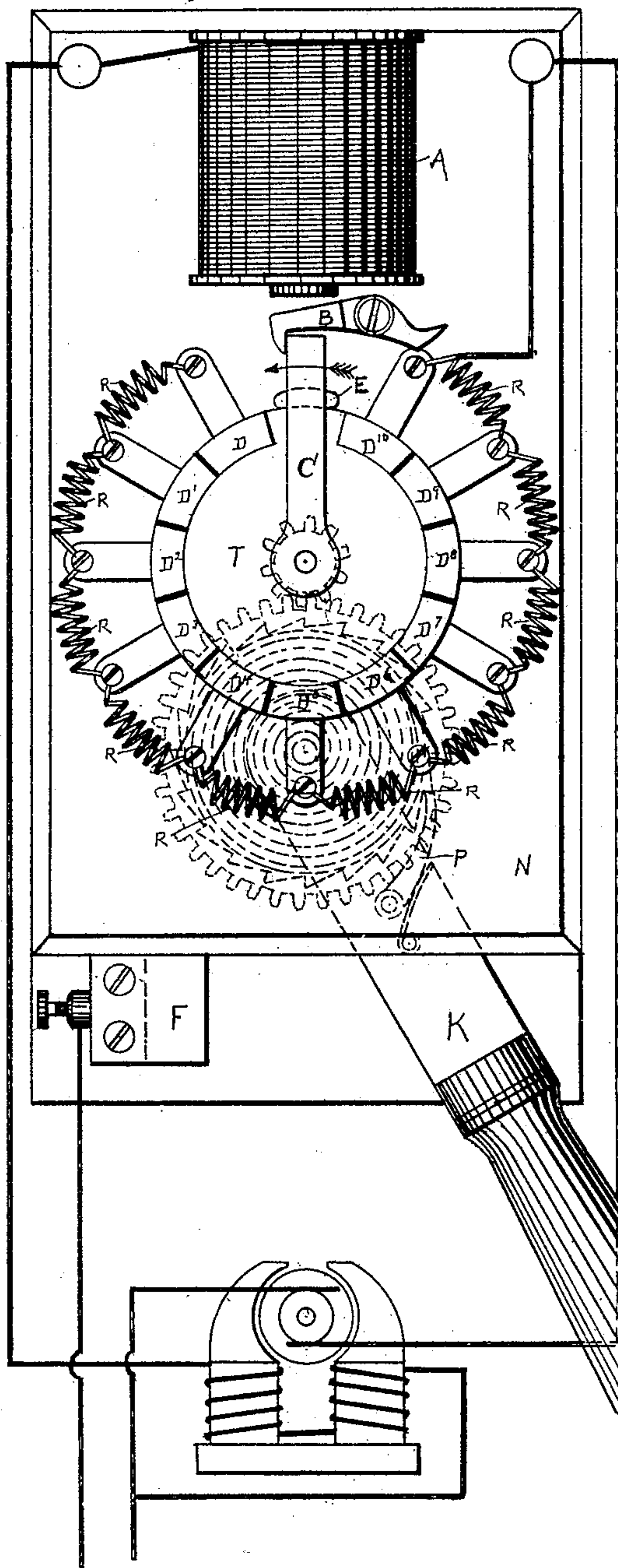


(No Model.)

E. P. SHARP.
STARTING DEVICE FOR ELECTRIC MOTORS.

No. 451,212.
FIG. 1

Patented Apr. 28, 1891.
FIG. 2



WITNESSES:

H. L. Goburn
H. A. Martin

INVENTOR

Edward P. Sharp
By Charles Carr
att'y.

UNITED STATES PATENT OFFICE.

EDWARD P. SHARP, OF BOSTON, MASSACHUSETTS.

STARTING DEVICE FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 451,212, dated April 28, 1891.

Application filed December 5, 1890. Serial No. 373,692. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. SHARP, of the city of Boston, county of Suffolk, and State of Massachusetts, have invented an Improve-
5 ment in Starting Devices for Electric Motors, of which the following, taken together with the accompanying drawings and letters of reference marked thereon, forms a complete description.

10 The nature of my invention relates to the means or device employed to control the automatically-rotating and complete circuit-traveling rheostat contact-arm, together with the necessary related parts, connections, and
15 combinations hereinafter set forth, the object being to control and safely graduate the amount of the electrical current passing to the motor.

Referring to the drawings, Figure 1 is a
20 plan illustrating my invention. Fig. 2 is a side elevation. Fig. 3 is a plan of parts. Fig. 4 is also a plan of parts.

Like letters refer to the same or corresponding parts in all the figures.

25 Referring to the details of construction, D indicates a series of contact blocks or plates, numerals being used to designate the individuals. These blocks are arranged in a circle around a circular insulator T, and, except
30 a slight space opposite to magnet A, are connected through resistances, which may be placed in any convenient location, and are represented by the coils R. An arm C is fixed upon a shaft central to the series and extends
35 radially to the outer periphery of the circular series of contact-blocks carrying a brush E and an auxiliary brush e. The brush E is pressed into contact with blocks D by means of a suitable spring or springs, while e is, if
40 preferred, a spring of itself and serves to more directly connect the arm C with brush E. The shaft M, carrying arm C, has a gear-wheel which meshes with a train having an actuating spring or weight and an escapement or
45 other governor, and a ratchet-lever K is provided for winding the spring, and is at the same time a switch-lever to make contact with the contact-block F, having binding-post and connection to line.

50 A magnet or magnetic coil A is provided, having, as shown, a magnetic connection to

the motor and another L to the bed-plate and shaft M. Contact-block D¹⁰ has also connection to the motor, as shown.

A tilting or oscillating armature B is piv- 55
oted between arm C and the magnet A. This armature has at one end a hook or latch projection in the direction of arm C and at the opposite end beyond its axis or pivot a cam-shaped or inclined end. When the coil 60
A receives the magnetic current and becomes a magnet, the hook end of the armature is drawn to it from the position shown in Fig. 1, whereby arm C is released and travels, propelled by the clock-work, (spring and gears 65
before described,) to the left around its circuit, making contact with one after another of the contact-blocks until it comes into engagement with the cam end of the armature B, as shown in Fig. 3, which brings it to a stop 70
and retains it until the electric current ceasing again renders coil A inactive. When this occurs, the armature falls away by gravity, a spring force, or the pressure of arm C against the cam end and, as in Fig. 4, allows the arm 75
C to move on until it is arrested and held by the armature-hook end, as in Fig. 1. Whenever the current is let on and coil A again becomes active, the same operation is repeated.

The result of the described process is that 80
when switch-lever K closes the circuit at K F the electric current passes through lever K, the clock-work, and wire L to coil A, causing it to become a magnet, drawing armature B and hook away from arm C and allowing arm 85
C to start on its circuit to the left. When arm C reaches block D, the current passes through it and all the resistances to the motor. As the arm C moves onto block D', D and one resistance R are cut out; as it makes contact with 90
D² another is cut out, and so on to D¹⁰, when all are cut out and the current passes direct to the motor.

The motor is indicated at the left or bottom of the sheet, Fig. 1.

I claim— 95

1. The combination, with a magnet in the main-line circuit and a rotary contact-arm and resistances, of an oscillating armature constructed as described—viz., having at one of 100
its ends a hook for holding in check the rotating contact-arm and at an opposite extrem-

ity beyond its pivot of oscillation the cam-shaped stop—substantially as and for the purpose set forth.

2. The combination of the double or hook and cam ended armature and the rotary contact-arm and resistances, said armature being pivoted with the hook and contact end opposite the magnet and the cam end opposite to and for stopping the said arm at the last contact in the series of resistances, substantially as described.

3. The rotary arm having its right-angular brush and periphery contact with the resistance-blocks, in combination with an oscillating double-ended hook and cam-stop armature and line-magnet, substantially as described.

4. The rotary contact-arm C, having contact-brushes depending therefrom and pressed radially toward its axis into contact with the exterior circumference or periphery surface of the circular series of contact-blocks, in combination with said series of contact-blocks, a magnet in the line, and a latch-armature, substantially as described.

5. The inclined stop and attached hook-armature centrally pivoted, in combination with and arranged between the magnet A in the line and the rotary rheostat-arm C, substantially as and for the purpose set forth.

6. In a rheostat, a circular series of contact-blocks and resistances and a mechanically-rotated contact-arm to cut out consecutively from the circuit the resistances, in combination with a double-ended oscillating armature hook and stop for controlling said arm by alternately releasing and detaining it by and responsively to the action and inaction of a magnet in the line, substantially as described.

7. The described hook and stop armature centrally pivoted between and in combination with the rotary rheostat-arm and a main-line magnet for controlling the said rheostat-arm by means of said magnet, substantially as described.

EDWARD P. SHARP.

Witnesses:

HOWARD L. COBURN,
WALDO A. MARTIN.