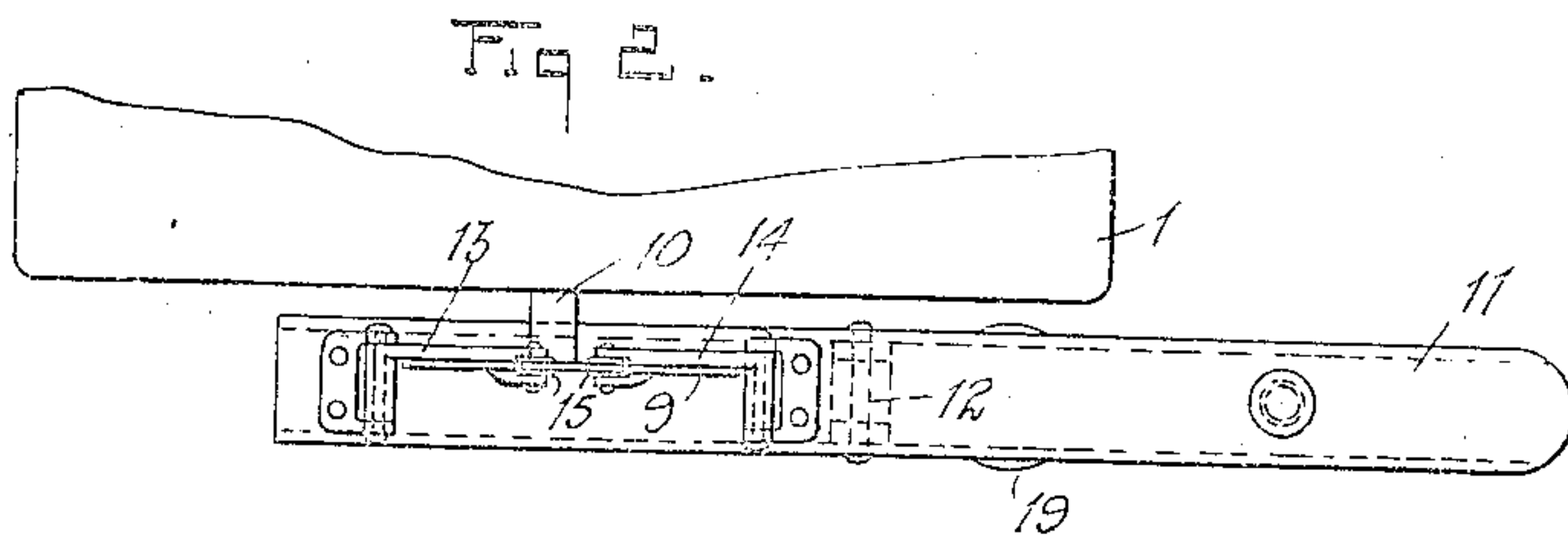
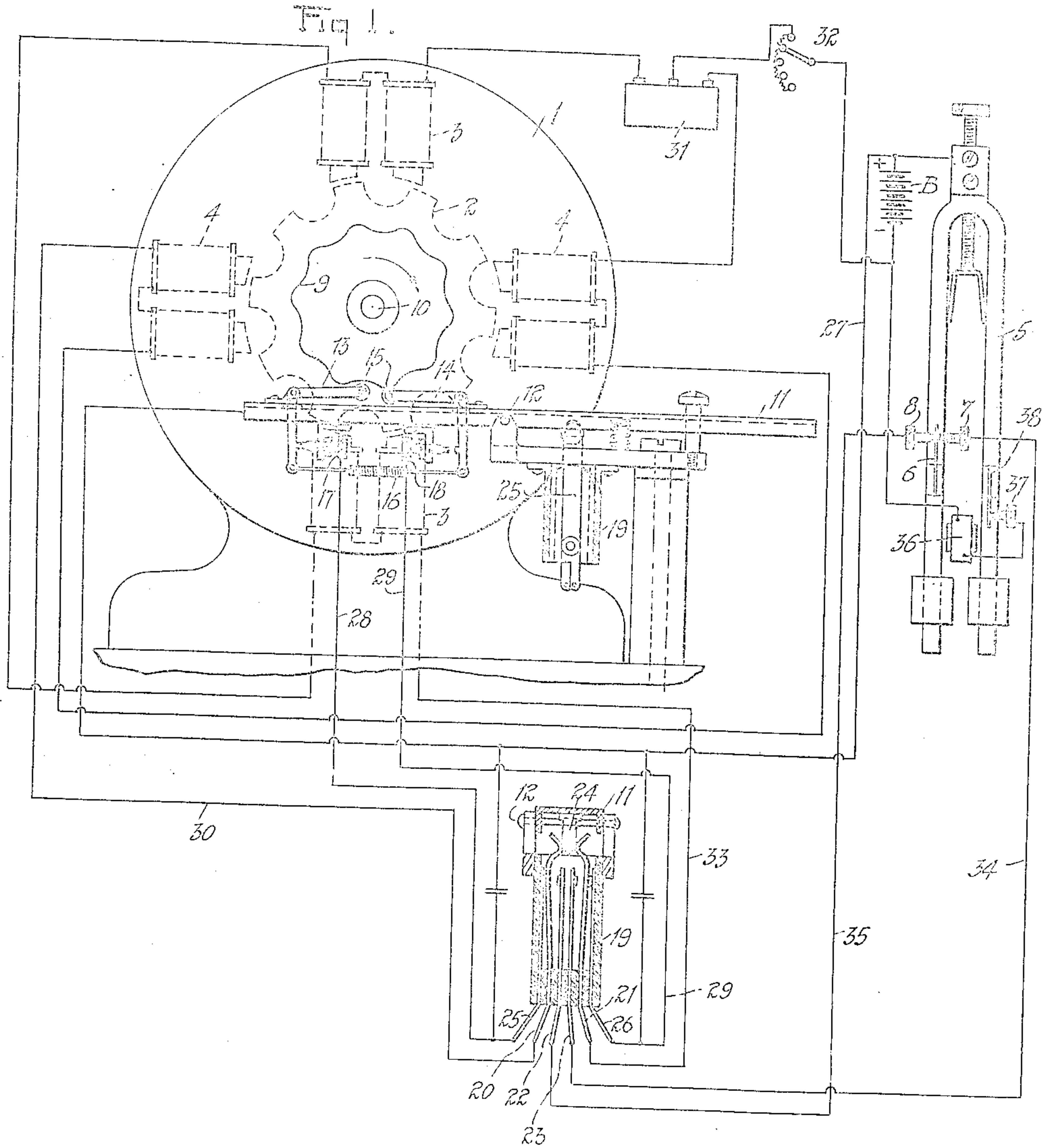


G. R. BENJAMIN.
STARTING DEVICE FOR LA COUR MOTORS.
APPLICATION FILED JULY 3, 1915.

1,284,219.

Patented Nov. 12, 1918.



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UNITED STATES PATENT OFFICE.

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STARTING DEVICE FOR LA COUR MOTORS.

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Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed July 3, 1915. Serial No. 37,825.

To all whom it may concern:

Be it known that I, GEORGE R. BENJAMIN, a citizen of the United States of America, and a resident of Jersey City, county of Hudson, and State of New Jersey, have invented certain new and useful Starting Devices for La Cour Motors, of which the following is a specification.

My invention relates to starting devices for La Cour motors, sometimes termed "phonic wheel" motors. As is well known, such motors comprise a toothed wheel, forming an armature, and two or more magnets arranged to act upon such armature and which are also arranged to be energized and deenergized in alternation. Such energization and deenergization of magnets is usually effected by contact means operated by a tuning fork, vibrating reed, or other member which will operate at a very uniform speed. These La Cour motors are not self-starting, but require to be spun up to a rotative speed, approximately corresponding to the speed of vibration of the controlling fork or vibrating reed, by hand or by other means. It is frequently inconvenient to do this. My invention comprises means whereby once the wheel of the motor be given a slight rotative motion, that rotation will be continued with progressively increasing speed, until the wheel reaches a speed corresponding to that of the tuning fork or vibrating reed which is to control it.

The object of my invention is to facilitate the starting of La Cour motors, and to do this by simple means.

I will now proceed to describe my invention with reference to the accompanying drawings, and will then point out the novel features in claims. In said drawings:

Figure 1 shows, more or less diagrammatically, a La Cour motor having my improved starting device applied thereto.

Fig. 2 shows a top view of the starting device.

In the drawings 1 designates the usual fly wheel of a La Cour motor, behind which I have shown, in Fig. 1, and in dotted lines, the usual toothed armature wheel and the usual magnets 3—3 and 4—4, connected in multiple groups of two each. 5 designates a controlling device consisting in this instance of an electrically driven tuning fork, one tine of which carries a contact spring 6 playing between adjustable contact screws

7 and 8, one of which screws is connected, as hereinafter shown, to one set of magnets 3—3, the other screw being connected to the other set of magnets 4—4. 9 designates a cam wheel mounted upon the shaft 10 of the fly wheel 1 and armature wheel 2, the teeth of this cam wheel corresponding generally to the teeth of the armature wheel 2. 11 designates a spring-pressed hand lever pivoted at 12 to a stationary member of the frame of the machine; and 13 and 14 designate bell crank contact levers, pivoted to this lever 11, one end of each of the bell crank levers 13 and 14 carrying an anti-friction roller 15 adapted for coaction with the cam wheel 9, the other arms of said bell crank levers being connected by a spring 16 tending to hold them against the cam wheel. Suitable contact stops 17 and 18 are provided for levers 13 and 14 respectively.

19 designates a case fixed to a suitable portion of the frame of the machine and having within it a plurality of contact springs, as shown particularly in the lower portion of Fig. 1, wherein this chamber 19 is shown in connection with the circuits which its contact springs serve. These contact springs comprise two main springs 20 and 21 which have a tendency to make contact with other springs 22 and 23, respectively, but in the lower portion of Fig. 1 are shown as separated by means of a wedge piece 24, carried by and operated by the handle 11; and these springs 20 and 21, when so separated, are in contact respectively with contact pieces 25 and 26.

The circuits are as follows:

Starting from the battery B a conductor 27 leads to hand lever 11 and thence to bell crank contact levers 13 and 14. The contact stop 17 of one of these levers, 13, is connected by a conductor 28 to contact member 25. The contact stop 18 of the other bell crank contact lever, 14, is connected by conductor 29 to contact piece 26. Contact spring 20 is connected by conductor 30 to the two magnets 4 and thence through one side of a current meter 31 and regulating rheostat 32, to the other pole of battery B. Contact spring 21 is connected by conductor 33 to magnets 3 and thence through the other side of current meter 31 and rheostat 32, to battery B. The plus pole of battery B is also connected to the base of the fork 5, and thence through the contact spring 6 on one tine of that fork

to contact screws 7 and 8 in alternation. Contact screw 7 is connected by a conductor 34 to contact spring 23; and contact screw 8 is connected by conductor 35 to contact spring 22.

Assuming that the tines of the fork 5 are in vibration, maintained, as is customary, by the usual driving magnet 36 and contact device 37—38: If now, the outer or right hand end of lever 11 be depressed slightly, and the fly wheel 1 be given a slight start in the proper direction of rotation, bell crank contact levers 13 and 14 will be operated by the cam wheel 9, and thereby magnets 3—3 and 4—4 will be energized alternately as follows: from positive pole of battery B through conductor 27 to hand lever 11 and thence through bell crank 13 and its stop 17 to contact piece 25, contact spring 20 then in contact therewith, conductor 30, and magnets 4, back to battery; or, in alternation, from lever 11, through bell crank 14, its contact stop 18, conductor 29, contact piece 26, contact spring 21, and magnets 3, back to battery. It will be seen that only a very slight push need be given to fly wheel 1 in order to start the cam 9 and cause that cam to operate the bell crank contact levers 13 and 14 two or three times; and with even one energization of magnets 3 followed by energization of magnets 4, and so on, or vice versa, the La Cour motor will "pick up"; rotation of its armature and fly wheel, and of the cam 9, then continuing because of the alternate energization and deenergization of magnets 3 and 4. Under such conditions, the La Cour motor tends to increase in speed quite rapidly, and when its speed is judged to be sufficiently high, the lever 11 is released, and then rises sufficiently to move the bell crank contact levers 13 and 14 out of the path of the cam wheel 9; the wedge 24 of the spring contact mechanism being thereby lifted, so as to permit contact springs 20 and 21 to break contact with contact pieces 25 and 26, and to make contact with contact springs 22 and 23 respectively. The circuits are then the normal circuits of a La Cour motor, the current from the positive pole of battery B passing through one tine of the fork 5 to spring 6 and thence through contact screws 7 and 8, and their circuit conductors 34 and 35, in alternation; the circuit of conductor 34 passing through contact springs 23 and 21 to conductor 33 and magnets 3, and so back to battery; the circuit of conductor 35 passing through contact springs 22 and 20 and through conductor 30 to magnets 4 and so back to battery.

What I claim is:—

1. The combination with the magnets and armature wheel of a La Cour motor, and normal operating contact means for energizing and deenergizing such magnets in alternation at a substantially uniform rate, of

starting means for such motor comprising auxiliary contact means operated by said armature wheel in its rotation, and arranged when so operated to energize the magnets of said motor in alternation, and switching means arranged at will to connect the normal operating contact means or said auxiliary contact means, alternatively, to the said magnets of the motor, said auxiliary contact means comprising means for throwing such auxiliary contact means out of mechanical operation when the switching means disconnects such auxiliary contact mechanism from the motor magnets, and a single operating device for said starting means and switching means.

2. The combination with the magnets and armature wheel of a La Cour motor, and normal operating contact means for energizing and deenergizing such magnets in alternation at a substantially uniform rate, of starting means for such motor comprising auxiliary contact means operated by said armature wheel in its rotation, and comprising a rotary member arranged to be rotated by the motor wheel, and means operated by said rotary member for energizing the magnets of the motor in alternation; and switching means arranged at will to connect the normal operating contact means or said auxiliary contact means, alternatively, to the said magnets of the motor, said auxiliary contact means comprising means for throwing such auxiliary contact means out of mechanical operation when the switching means disconnects such auxiliary contact mechanism from the motor magnets, and a single operating device for said starting means and switching means.

3. The combination with the magnets and toothed armature wheel of a La Cour motor, and normal operating contact means for energizing and deenergizing such magnets in alternation at a substantially uniform rate, of starting means for such motor comprising auxiliary contact means operated by said armature wheel in its rotation, and comprising a cam wheel arranged to be rotated by the motor wheel, and toothed in correspondence with said motor wheel, two contact mechanisms mechanically operated by said cam wheel, and circuits from said contact mechanisms to the motor magnets, all arranged to cause the energization of said motor magnets in alternation as the cam wheel rotates; and switching means arranged at will to connect the normal operating contact means or said auxiliary contact means, alternatively, to the said magnets of the motor.

4. The combination with the magnets and toothed armature wheel of a La Cour motor, and normal operating contact means for energizing and deenergizing such magnets in alternation at a substantially uniform

rate, of starting means for such motor comprising auxiliary contact means operated by said armature wheel in its rotation, and comprising a cam wheel arranged to be rotated by the motor wheel, and toothed in correspondence with said motor wheel, a pivoted lever, two contact mechanisms each having a movable member carried by said lever and arranged to be brought into operative coaction with said cam wheel by motion of said lever in one direction, said lever provided with means tending to hold it in such position that the said movable members of said contact mechanisms are out of coaction with said cam wheel, and switching means arranged at will to connect the normal operating contact means or said auxiliary contact means, alternatively, to the said magnets of the motor.

5. The combination with the magnets and toothed armature wheel of a La Cour motor, and normal operating contact means for energizing and deenergizing such magnets in alternation at a substantially uniform rate, of starting means for such motor com-

prising auxiliary contact means operated by said armature wheel in its rotation, and comprising a cam wheel arranged to be rotated by the motor wheel, and toothed in correspondence with said motor wheel, a pivoted lever, two contact mechanisms each comprising a spring actuated bell crank contact member carried by said lever and a contact stop, said lever arranged to be moved to bring such bell crank contact members into position to be operated by said cam wheel, but normally holding said bell crank contact member out of coaction with said cam wheel, and switching means arranged at will to connect the normal operating contact means or said auxiliary contact means, alternatively, to the said magnets of the motor.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE R. BENJAMIN.

Witnesses:

W. H. McELROY,
PAUL H. FRANKE.