

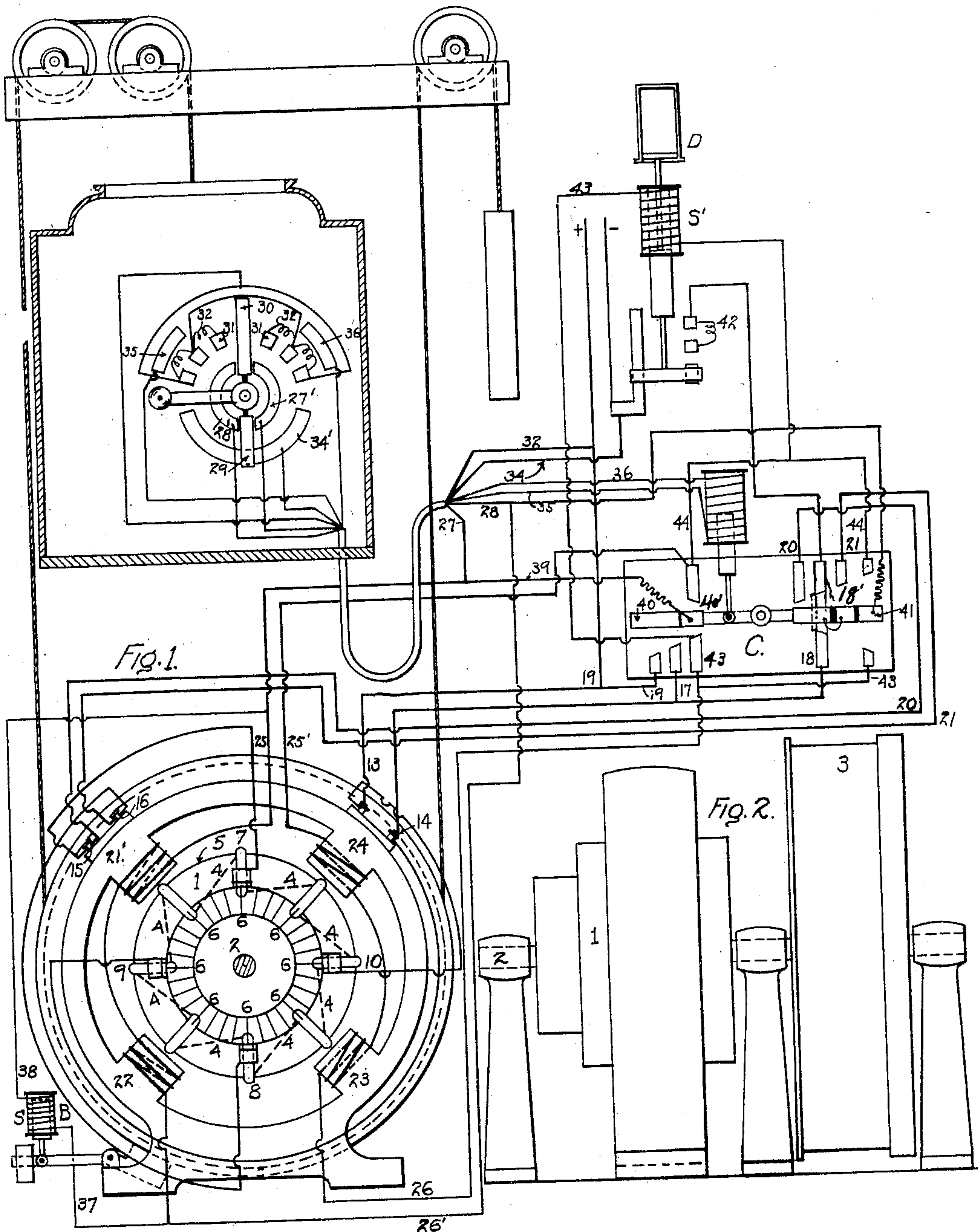
No. 745,534.

PATENTED DEC. 1, 1903.

R. C. SMITH.
ELECTRICAL ELEVATOR.
APPLICATION FILED JUNE 14, 1901.

2 SHEETS—SHEET 1.

NO MODEL.



WITNESSES:

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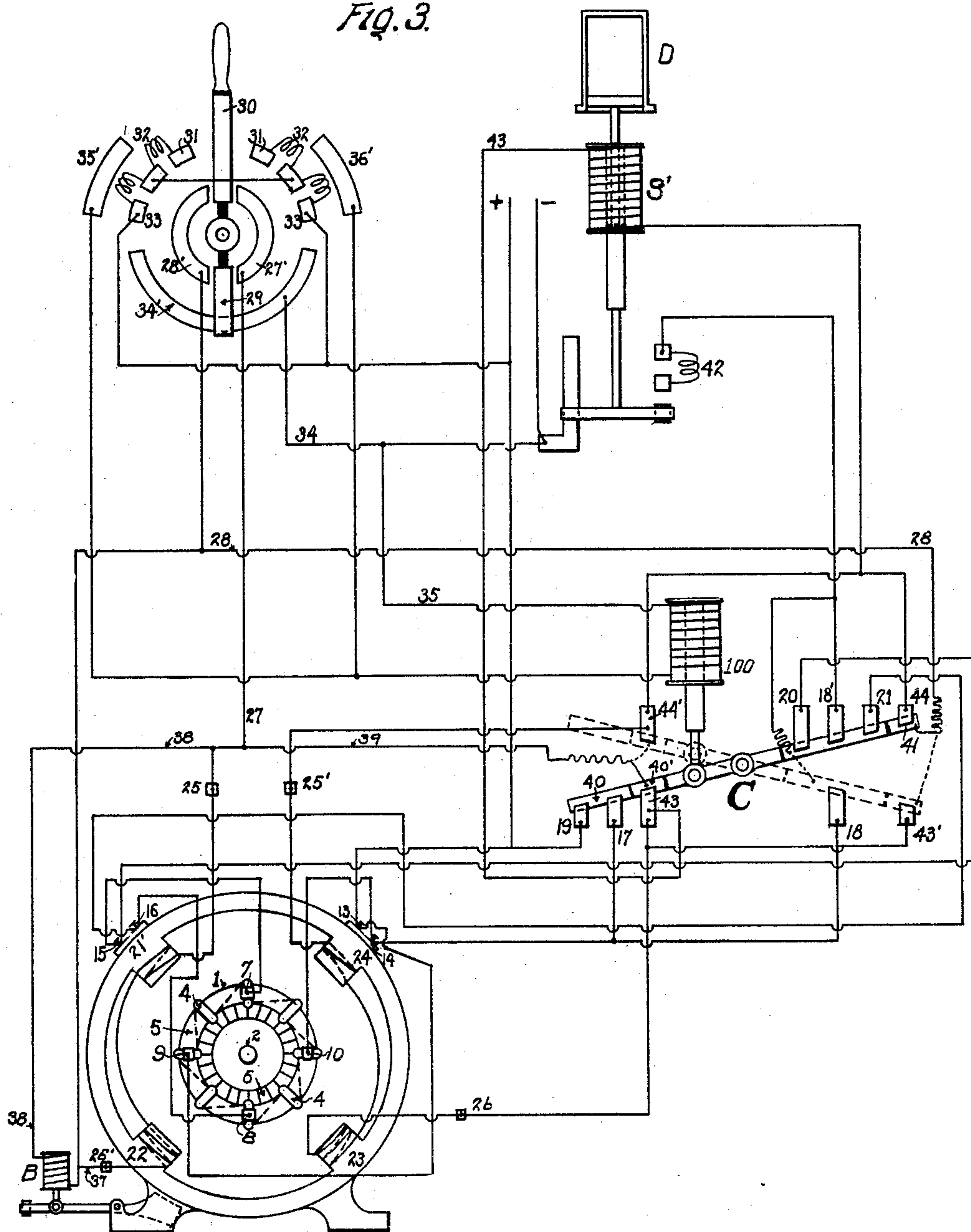
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2 SHEETS—SHEET 2.

Fig. 3.



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RUDOLPH C. SMITH, OF YONKERS, NEW YORK.

ELECTRICAL ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 745,534, dated December 1, 1903.

Application filed June 14, 1901. Serial No. 64,506. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH C. SMITH, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Electrical Elevators, of which the following is a specification.

The object of my invention is to provide a novel combination of electrical and mechanical instrumentalities to drive the hoisting-drum of an electric elevator direct without the noise, jar, or shock which is inherent in any gear-driven drum-elevator, and I obtain this result by a novel combination of electrical starting and controlling with a specially-wound multipolar motor. This combination is represented in diagram form in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of the motor and its circuit connections with the change-switch and the car-operating switch of the elevator. Fig. 2 is an elevation of the multipolar motor shown as connected with the elevator-drum; and Fig. 3 is a further diagrammatic view showing, on an enlarged scale, the motor, circuit connections, change and operating switches.

The numeral 1 designates the armature of the motor, which is properly fastened to the drum-shaft 2 and is consequently in direct connection with the hoisting-drum 3.

4 4 designate the armature-coils, which are wound continuously around the ring-core 5, as is usual in the Gramme drum armature-winding. These coils are connected to corresponding commutator-bars 6.

The construction of the electrical parts as regards proportion of wire, of field and armature-cores, number of bars, &c., is well known and requires no special description.

Four brushes 7 8 9 10 are kept in contact by means of proper brush-holders with commutator-bars in the usual way and make the proper connection to receive and discharge the electrical fluid and for the control and regulation of the speed, as will be hereinafter described. Brushes 9 and 10 are respectively connected to the terminals 13 and 14, and the brushes 7 8 are respectively connected to the terminals 15 and 16 and from there to the change-switch C respectively from terminal

13 to 19 and from 14 to 17 and 18 and from terminal 15 to contact 20 and from terminal 16 to contact 21.

The field has four poles with shunt-winding 21' 22 23 24, which are connected in series parallel, so as to be able to reverse the winding of half the number of poles, as will be described. This is an unusual arrangement in multipolar motors.

The terminals of the field 25 26 are connected to the operating-switch in the car by the well-known flexible cable attached in the middle of the height of the elevator-shaft and long enough to allow the car to complete its travel in either direction. Terminal wire 25 is connected to terminal plate 27', and terminal 26' to contact-plate 28'. The bridge-contacts 29 and 30, which move with a handle of the contact-arm, connect 27' to the contact 31 through resistances 32 to the plus terminals 33 or connect 28' through the contact-plate 34' to the minus terminal. Two contact-plates 35' and 36' are connected to the circuit of the solenoid 100 of the change-switch C. A branch circuit 37 38 leads from the field-wires to the brake B, and this circuit is closed whenever the field is excited and is opened whenever the field-current is cut off. The solenoid S' will release the brake whenever the circuit is closed and put on the brake to hold the load whenever the handle of the switch in the car is placed in the stopping position with the switch open. From the circuit leading to the contact-plate 27' of the switch in the car branches out circuit 39 to the contact-arm 40' of the change-switch C, and from the circuit leading to 28' is a branch to the contact-arm 41.

The solenoid S' of the rheostat 42 connects said rheostat to the minus line and cuts out the resistances in the usual way under the control of the dash-pot D. The exciting-current for the solenoid S' is taken from the terminal 43. This terminal 43 is also connected to the field-terminal 26 of the lower coil and to the terminal 43'. The solenoid-circuit is connected to the terminals 44 and 44' of the change-switch C. The terminal 25' of the upper pole 24 is connected to terminal 44'. Normally the contact-arm 40 of the change-switch is held to contact with terminals 19 17 43, while the arm 41 is in contact with ter-

minals 20 18' 21 44. The rheostat-brush is shown in its lowest position and has opened the main line.

The operation is as follows: The operator
 5 turns the handle of the car-switch clockwise and closes the circuit from the plus line through contact-plate 36', through the solenoid 100 of the change-switch, and by way of the wire 35 and its connection to 34 to the minus
 10 line. The plus current will also enter from wire 32 and contact-plate 31 over the bridge 30 to the plate 27' and from 27' by way of the flexible cable and wire 27 to the field-pole 21', and the parallel branch will be from wire 27
 15 to contact arm-plate 40', to 44', (when the switch C is in the dotted position shown,) to 25', and around the coil 24 to coil 23, to contact 43, and thence to contact-plate 41, to contact-plate 28', and by way of the bridge 29 to
 20 the minus line 34. This direction of current will make the poles 21' and 24 north poles and poles 22 and 23 south poles—that is to say, the motor will have the field of a bipolar motor with two adjacent south poles, and the
 25 contact-arm 40' connects to the terminal 44', also the contact-arm 41 to the contact-plate 43'. The circuit through the solenoid S' is made by way of line 27, contact 44', through solenoid S', wires 43 to 43' and contact-plate
 30 41 to 28 and out by contact-plate 34'. The plus line is permanently connected to the brush-terminal 13 and to the brush 9, while the minus line is connected to contact-plate 18 and to brush 10, and the brushes 8 and 7
 35 are cut out. It is evident that the motor will start and turn slowly in a clockwise direction at its slowest speed. The slow speed is made possible as well by the series connections of the armature-windings as by the strong field.
 40 To increase the speed, the operator moves the handle back to open the circuit 35 36', which will cause the arm 40 of the change-switch to drop and to connect the brushes 9 and 10 to the plus line and the brushes 7 and 8 to the
 45 terminal plates 20 and 21 and to the minus line, at the same time reversing the field of the poles 24 and 23 by means of the connection of 23 to 24 and of the other contacts 40' to 43. The motor will now speed up, first
 50 by reason of the weak field and secondly by the reason of the double-armature connections.

By the combination of the means above described a wide and gradual change in the
 55 speed may be effected, as the field control usually allows a change of two-thirds of the speed, while the series-multiple control makes

a change to one-half of the speed possible, or using both together the total reduction of one-third of the speed is easily obtainable. 60

The reversing of the movement of the elevator-car is done by changing the direction of the total field-current and need not be described, as it leaves the armature-current unchanged, as is well understood, this reversing being accomplished by turning the
 65 bridge-contacts 29 30 (or the handle of the car-switch) counterclockwise, which reverses the entire field of the motor.

I do not limit myself to the particular construction, as a great many forms of switches, connections, and relays for the purpose of operating with small currents are well known in the art. 70

What I claim as my invention is— 75

1. The combination of a multipolar motor with the field-winding connected in shunt, an automatic rheostat for the armature-circuit, means to reverse the field, and means to arrange the field with adjacent or alternate
 80 poles, and a switch for changing from single-parallel two-brush connection to double-parallel four-brush connection, substantially and for the purpose described.

2. The combination of an elevator with a
 85 switch in the car, a multipolar motor with the field-winding connected in shunt, an automatic rheostat in the armature-circuit, means to reverse the field, and means to arrange the field with adjacent or alternate poles, and a
 90 switch for changing from single-parallel two-brush connection to double-parallel four-brush connection, substantially and for the purpose described.

3. The combination of an elevator with a
 95 multipolar motor with the field-winding connected in shunt, a switch in the car, electrical connections to the motors of a switch, electrical connections from the motor-switch, an automatic rheostat for the armature-circuit, means to reverse the field, and means to arrange the field with adjacent or alternate
 100 poles, and a switch for changing from single-parallel two-brush connection to double-parallel four-brush connection; substantially and
 105 for the purpose described.

Signed at New York, in the county of New York and State of New York, this 13th day of June, A. D. 1901.

RUDOLPH C. SMITH.

Witnesses:

CHAS. C. GILL,
 GUNDER GUNDERSON.