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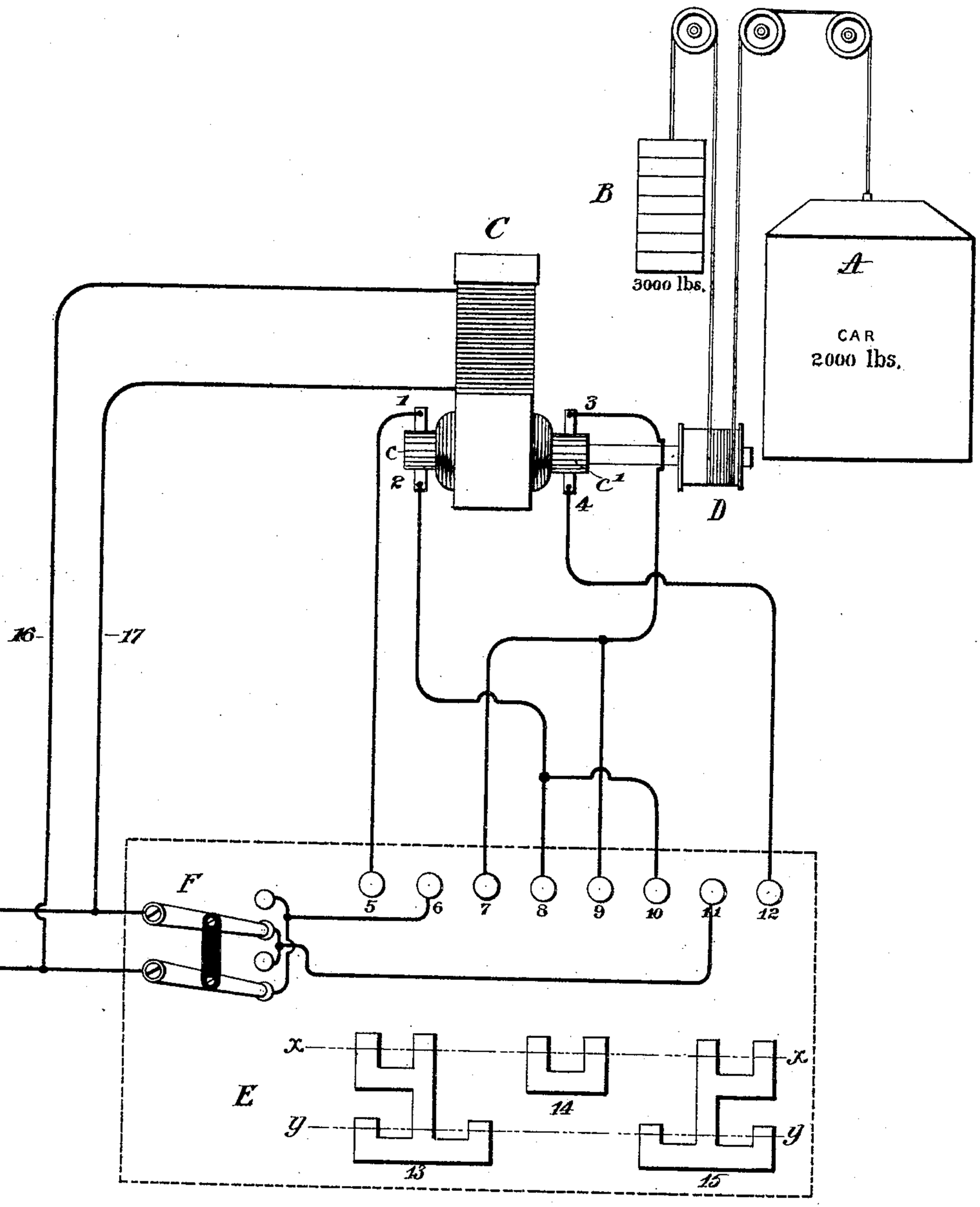
N. O. LINDSTROM.

ELECTRIC ELEVATOR.

(Application filed Feb. 4, 1901.)

(No Model.)



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NILS O. LINDSTROM, OF NEW YORK, N. Y., ASSIGNOR TO ALONZO B. SEE AND WALTER L. TYLER, OF SAME PLACE.

ELECTRIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 673,169, dated April 30, 1901.

Application filed February 4, 1901. Serial No. 45,845. (No model.)

To all whom it may concern:

Be it known that I, NILS O. LINDSTROM, a citizen of the United States, residing at the city of New York, in the borough of Queens and State of New York, have invented certain new and useful Improvements in Electric Elevators, of which the following is a full, clear, and exact description.

This invention relates to the control of electric elevators. A preferred method of operating electric elevators is to provide a counterweight for the car which is heavier than the car itself, but which may become overbalanced by the weight of the passengers, since this method reduces the average work upon the motor. In operating such an elevator it sometimes happens that the counterweight lifts the car, in which case the driving-motor is itself driven and becomes a generator, sending current out to the line, while at other times the relative weights may be so adjusted by the number of passengers that the machine acts as a motor to either lift the car or lift the counterweight. In any case there is no certain means of indicating to the attendant in the car under what condition the actuating-machine is running at any particular time, and he, therefore, is not in a position to select what kind of regulating means shall be used in a given instance to alter the speed of the machine. For instance, if the machine is running as a motor its speed could be reduced by throwing resistance into the circuit; but if the machine happened to be running as a generator the resistance thrown in would increase its speed.

In slow-speed elevators it is not necessary to provide more than one speed for actuating the machine, as the brake can be relied upon to graduate a stop sufficiently to avoid a shock, and accurate stops at landings are easily accomplished; but in high-speed elevators it is essential that the speed of the actuating-machine be reduced before stopping at a landing by some other means than a brake, as the action of the brake on a car traveling at a high speed would inflict a serious shock on the car and its load. Furthermore, an accurate stop at a landing cannot usually be accomplished when a car is running at high speed without first slowing down to a certain extent. Hence for high-speed overcounterweighted elevators it is desirable to provide means for automatically varying the speed of the actuating-machine regardless of whether it is running as a motor or as a generator, and to accomplish this I conceived the idea of providing the armature of the machine with a plurality of independent circuits, which are independently commutated, and connecting the said circuits in series or parallel or in any combination thereof to obtain a variation of speed, as in that case the speed of the machine would be the same regardless of whether it be acting as a dynamo or as a motor.

In the accompanying drawing the figure is a diagrammatic representation of the circuits and apparatus constituting my invention in its broadest conception.

A indicates the elevator-car, and B a counterweight heavier than the car, but lighter than the car when it is full of passengers. The cord sustaining the car and counterweight passes over suitable guide-sheaves *a* to a winding-drum D. On the drum-shaft or geared thereto is an electric motor C, whose armature is wound with two independent circuits, (represented by the respective commutators *c* and *c'*.) The brushes for the commutator *c* are indicated by 1 and 2, and those for the commutator *c'* by 3 and 4.

In the car A there is supposed to be located an electric switch, to be operated by the attendant for the purpose of starting, stopping, and controlling the speed of the motor C. This electric switch for convenience of illustration is shown in diagram only and located outside of the car A in the space inclosed by the dotted lines E. This switch consists of a set of contacts or fingers (indicated by 5, 6, 7, 8, 9, 10, 11, and 12) and three metallic plates or connectors 13, 14, and 15, of odd shape, adapted to coöperate with the contacts 5 to 12, to vary the connections, as will be explained. At F is indicated a pole-changing switch for reversing the armature-current whenever it is desired to reverse the machine.

The main wires (indicated by the plus and minus signs) lead to the contacts 6 and 11, respectively, and from these wires a branch circuit 16 17 leads through the field-magnet

of the motor to keep it constantly energized. Contact 5 connects with the brush 1, contact 7 connects with brush 3, contact 8 connects with brush 2, contact 9 also connects with brush 3, contact 10 also connects with brush 2, and contact 12 connects with brush 4. To start the machine slowly, the attendant moves the switch to the first position, at which point it will be understood that the contacts 5 to 12 occupy the line *x x* approximately. In this position it will be seen that the two armature-circuits are connected in series with each other and the machine will run at its slower speed. To increase the speed, the contacts 5 to 12 are moved to the line *y y*. In this position the two armature-circuits are connected in parallel with each other and the machine runs at its highest speed. Removing the contacts 5 to 12 from the plates 13, 14, and 15 entirely breaks the circuit and stops the machine. By throwing the pole-changer F to the other position and then manipulating the main switch as before the car will travel in the opposite direction at the successively higher and lower speeds. These speeds will be obtained whether the machine is operating as a motor or as a dynamo, since the described connections will have the same effect in either case. I am therefore able to alter the speed of the machine directly and without the complication due to the manipulation of rheostats or other apparatus external to the machine.

Having described my invention, I claim—

In an electric elevator, the combination of a car, a counterweight therefor in excess of the weight of the car whereby the actuating-machine will at times be a motor and at other times a generator, an actuating electric machine adapted to run either as a motor or as a generator, a switch in the car, the said machine being provided with circuits connected with said switch whereby an operation of the switch to change the speed of the machine will effect the desired result whether the machine be running as a motor or as a generator.

In witness whereof I subscribe my signature in presence of two witnesses.

NILS O. LINDSTROM.

Witnesses:

WM. A. ROSENBAUM,

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