

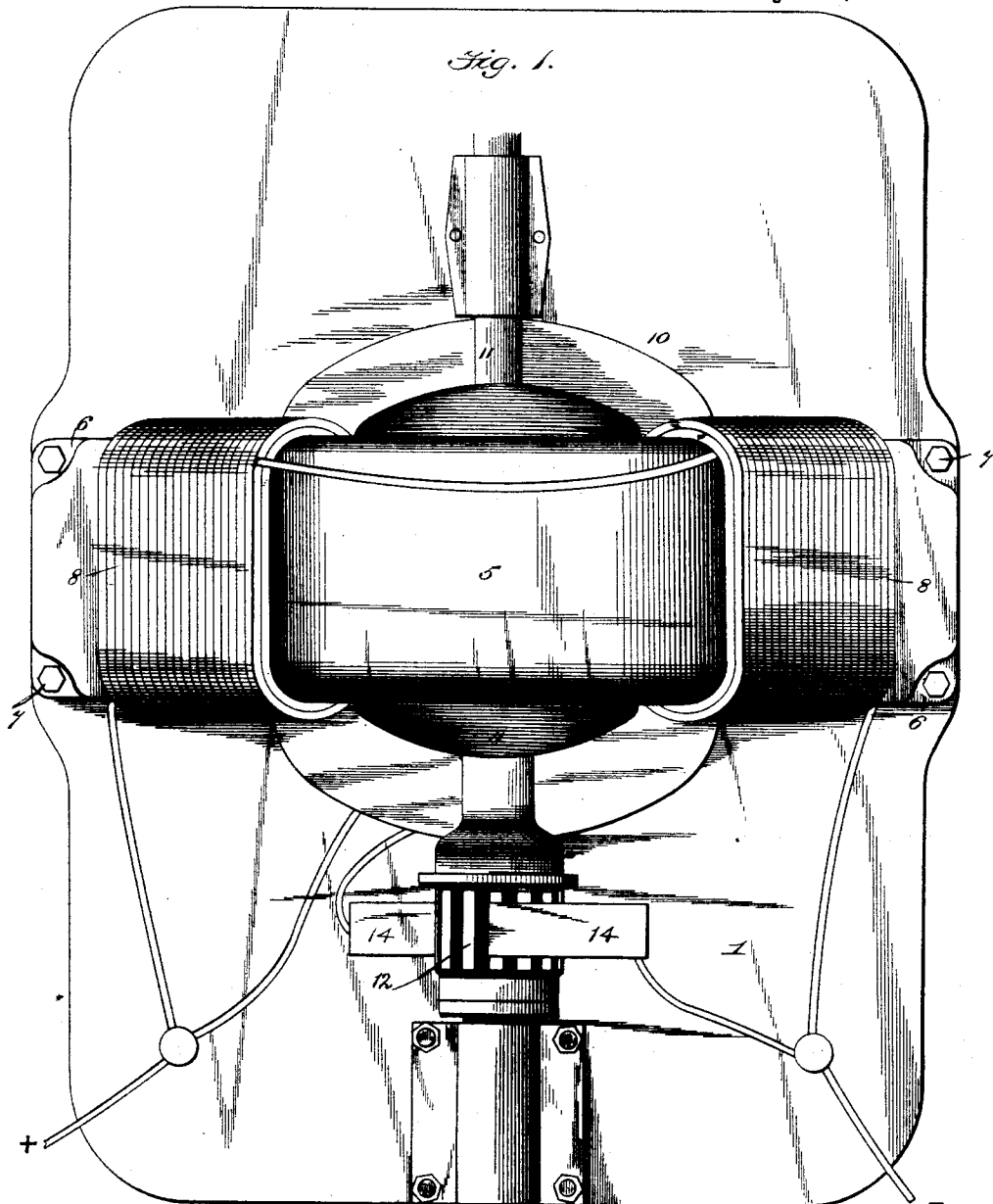
(No Model.)

2 Sheets—Sheet 1.

J. C. LINCOLN.
ELECTRIC MOTOR.

No. 539,277.

Patented May 14, 1895.



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Fig. 2.

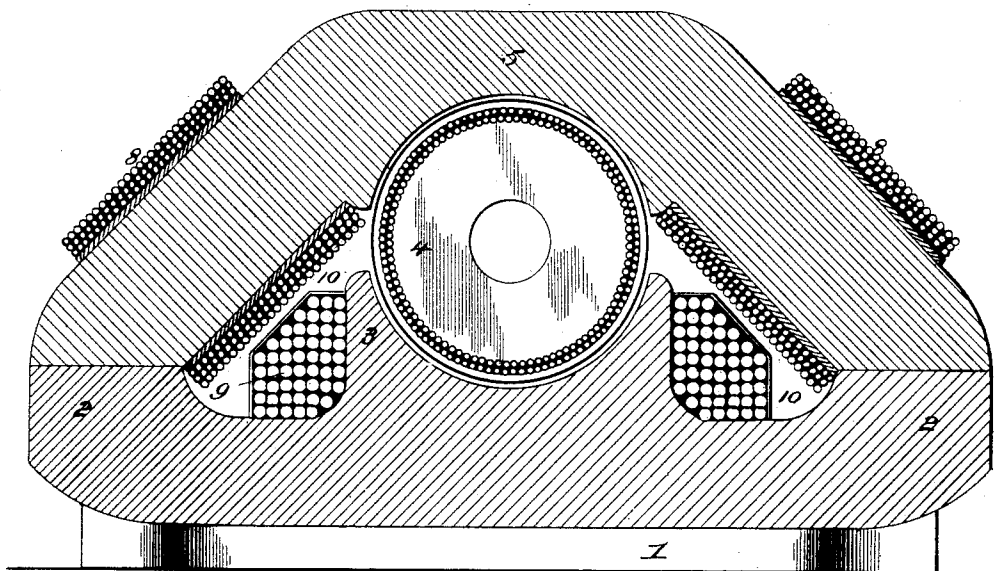


Fig. 3.

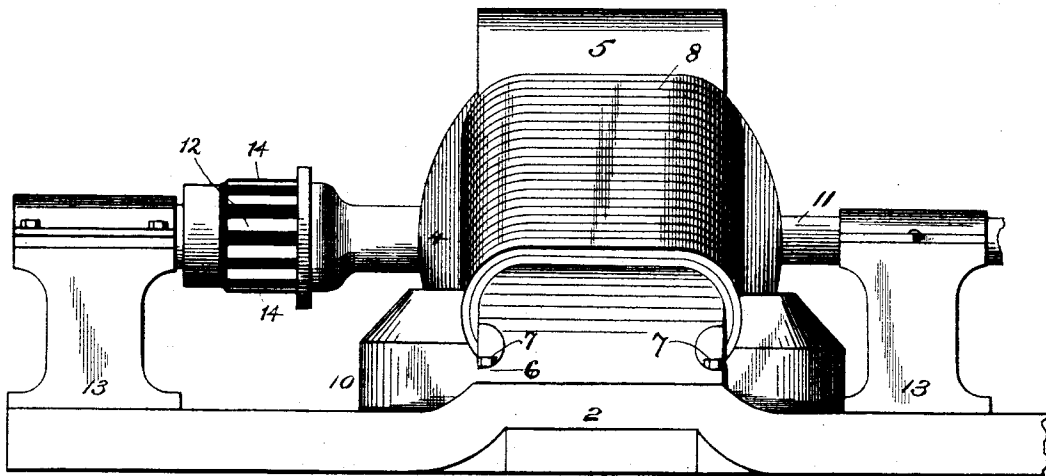
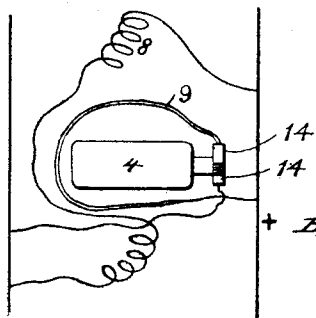


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN C. LINCOLN, OF ROCHESTER, NEW YORK, ASSIGNOR TO L. S. GRAVES
& SON, OF SAME PLACE.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 539,277, dated May 14, 1895.

Application filed January 16, 1892. Serial No. 418,258. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. LINCOLN, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Electric Motors; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures of reference marked thereon.

My present invention has for its object to provide an improved electric motor possessing great torque and particularly adapted for electric elevators, though capable of other uses, and which shall possess all the advantages of both series and shunt wound motors and obviate to a great extent the disadvantages of both classes, and it further has for its object to produce a machine that is simple and cheap in construction, and the parts of which are easily assembled.

To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter fully described and the novel features pointed out particularly in the claims at the end of this specification.

In the drawings, Figure 1 is a plan view of a motor constructed in accordance with my invention; Fig. 2, a sectional view on the line $x x$ of Fig. 1; Fig. 3, a side view, and Fig. 4 a diagrammatic view, of the circuits.

Similar reference-numerals indicate similar parts in the several figures.

The base 1 of the motor, which may, if desired, be cast or formed integral with the base or support of the elevator mechanism, is provided with broad pole connecting pieces 2, 2, formed upon it and also with a core piece 3 having the recessed face in which the armature 4 rotates.

The cores for the field magnets and the pole pieces therefor are preferably formed in a single piece 5 having the ends shaped to cooperate with the connecting pieces 2, 2, on the base and form a broad magnetic connection and also with the flanges 6 through which pass bolts 7 securing said piece to the base, as shown. The central part of this casting constitutes the pole piece of the field and is provided with the recessed under face, as

shown, between which and the core 3 the armature is located, said recessed portion of the latter being about the same depth as that in the core piece. The field coils 8 are of the usual style and are wound on spools of such shape as to be readily slipped on the ends of the core piece before it is secured to the base.

Surrounding the core 3, and of such size as to inclose the armature 4, is arranged a series coil 9 of heavy wire preferably arranged in a suitable frame 10 so that it can be readily placed in position before the field magnets and armature are placed on the base in assembling the parts.

The armature 4 (which may be any of the usual forms, but I prefer to use one that is drum wound) is secured as usual to its shaft 11, provided with the usual commutator 12 and is supported in boxes on brass standards 13 mounted on the base of the machine. The commutator brushes 14 may be supported in the usual or any preferred manner.

The electrical connections in the machine are as shown in Fig. 4, the line conductors being indicated by + and -. The shunt field coils 8 are connected with each other in series as shown and to the main line conductors, while the series coil 9 and the armature coil 4 are in series with each other and connected to said main line conductors. The position of the series coil 9 is such that its action directly magnetizes the armature, and the iron around it is so disposed that there can be no magnetic leakage due to this coil, which is so strong that at full load its magnetic effect is so great that the speed of the armature is only about one-half what it is when the series coil is not used. A good practical rule is to make the turns on the series coil equal the turns on the armature, so that the ampère turns or magnetizing strength on the armature and series coil shall be approximately equal at all loads, its object being to produce a large counter electromotive force when starting.

As is well known, the torque of a motor depends upon the strength of the field and the amount of current traversing the armature coils and in an ordinary shunt motor the field is constant and to produce twice the torque, requires twice the current through the armature coil and in a series motor, doubling

the current through the armature coils also doubles the current through the field coils and other things being equal the strength of the field will be twice as great as with the smaller current, which gives four times the torque. One of the great objections to the shunt motor, as an elevator motor, is, that if the whole of the current is turned on at once as is apt to be done when a heavy load is to be lifted, the armature is liable to be burned out by the current, but by the use of the series coil 9, when lifting heavy loads, or when starting, the torque of the motor will be about doubled and its use will also build up the counter electromotive force when starting, thus lessening the danger of burning out the armature from overheating.

It will be found that the motor by doing its work slower when operating on heavy loads is able to lift about twice as much with the aid of the coil 9 as it could without it.

The construction of the motor is also very simple and can be made cheaply, the parts being few.

I claim as my invention—

1. The combination with the shunt field magnet connected in series across the main line, of the armature, the series coil partially surrounding the armature and directly magnetizing it, said coil and armature being connected in series with each other across the main line, substantially as described.

2. The combination with the base having

the pole piece thereon, and the double field magnet and pole piece secured to said base, of the field magnet coils connected in series, the series coil on the first mentioned pole, and the armature connected in series with the series coil across the main line, substantially as described.

3. The combination with the base casting having the pole piece thereon and the coils surrounding it, of the double field magnet core having the concave pole piece over the first mentioned pole, the field coils, and the armature arranged between the two pole pieces, substantially as described.

4. The combination with the shunt field magnets connected in series across the main line, of the armature, the series coil and the pole piece therefor, said series coil surrounding the pole piece and partially surrounding the armature, said armature and coil being connected in series across the main line, substantially as described.

5. The combination in a motor, of the shunt field magnet coils connected in series across the main line, the armature and a series coil having approximately the same number of ampère turns as the armature, whereby the speed of the armature will be reduced with heavy loads, substantially as described.

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