

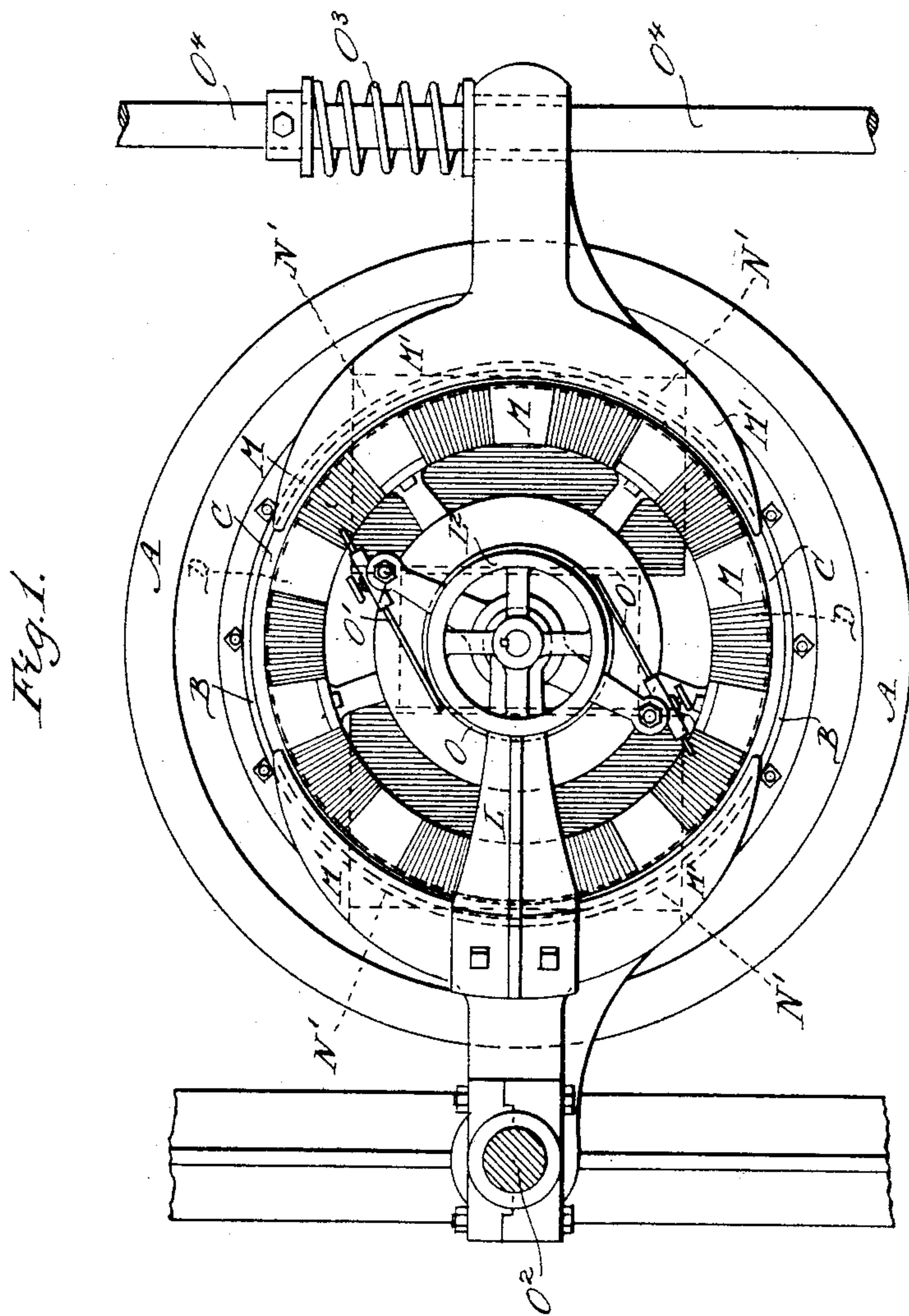
(No Model.)

4 Sheets—Sheet 1.

E. M. BOYNTON.
ELECTRIC LOCOMOTIVE.

No. 446,821.

Patented Feb. 17, 1891.



WITNESSES:

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INVENTOR

E. M. Boynton

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Fig. 2.

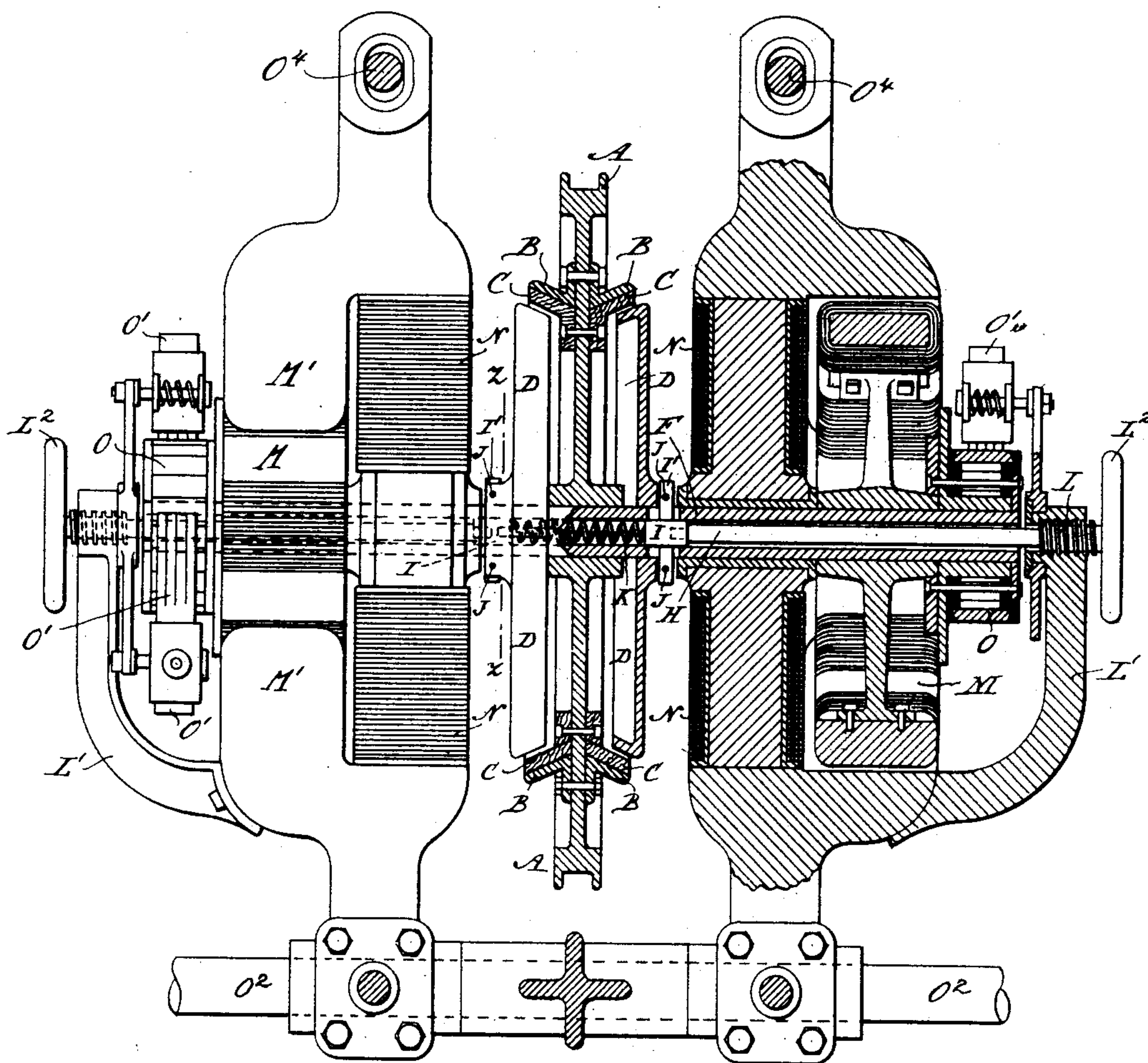
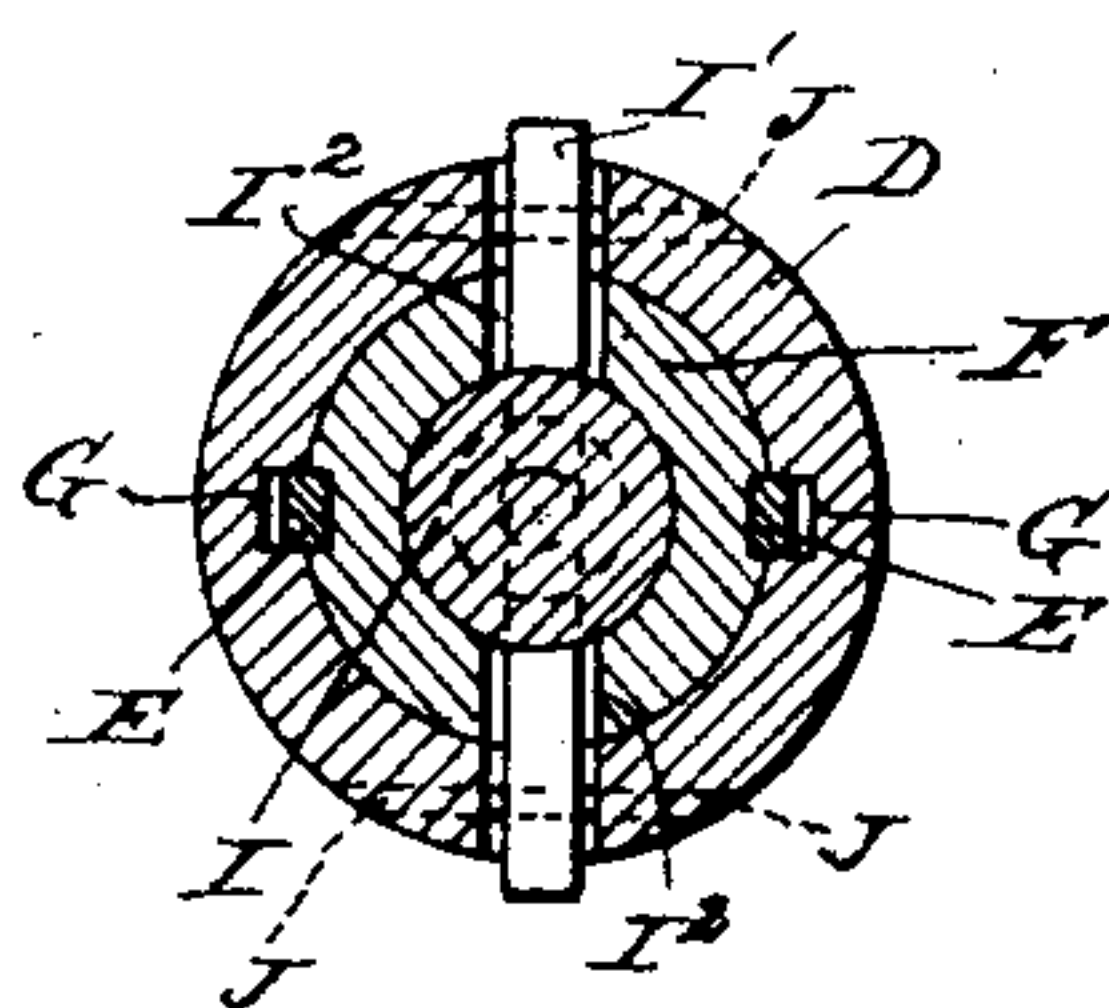


Fig. 3.



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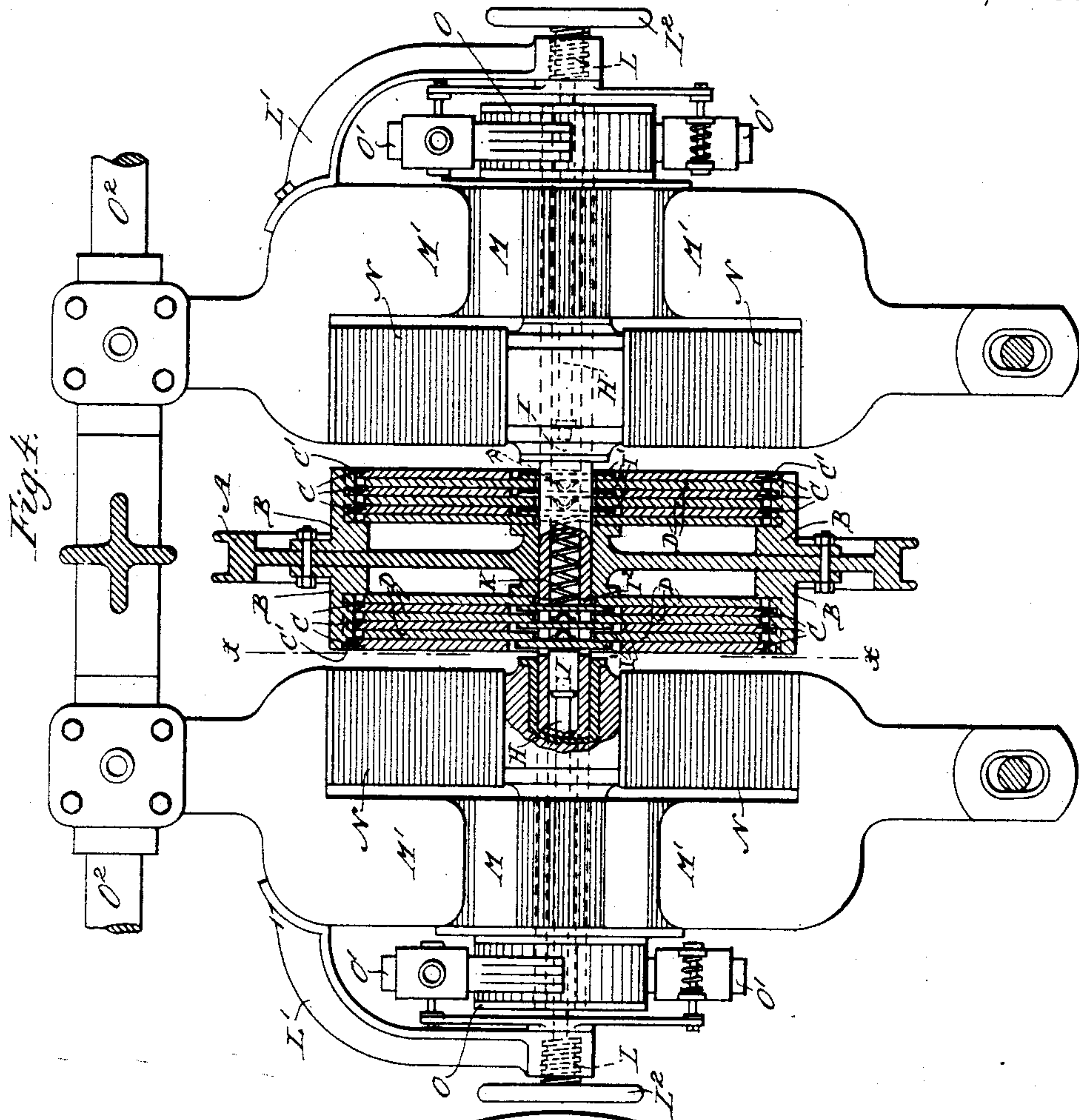
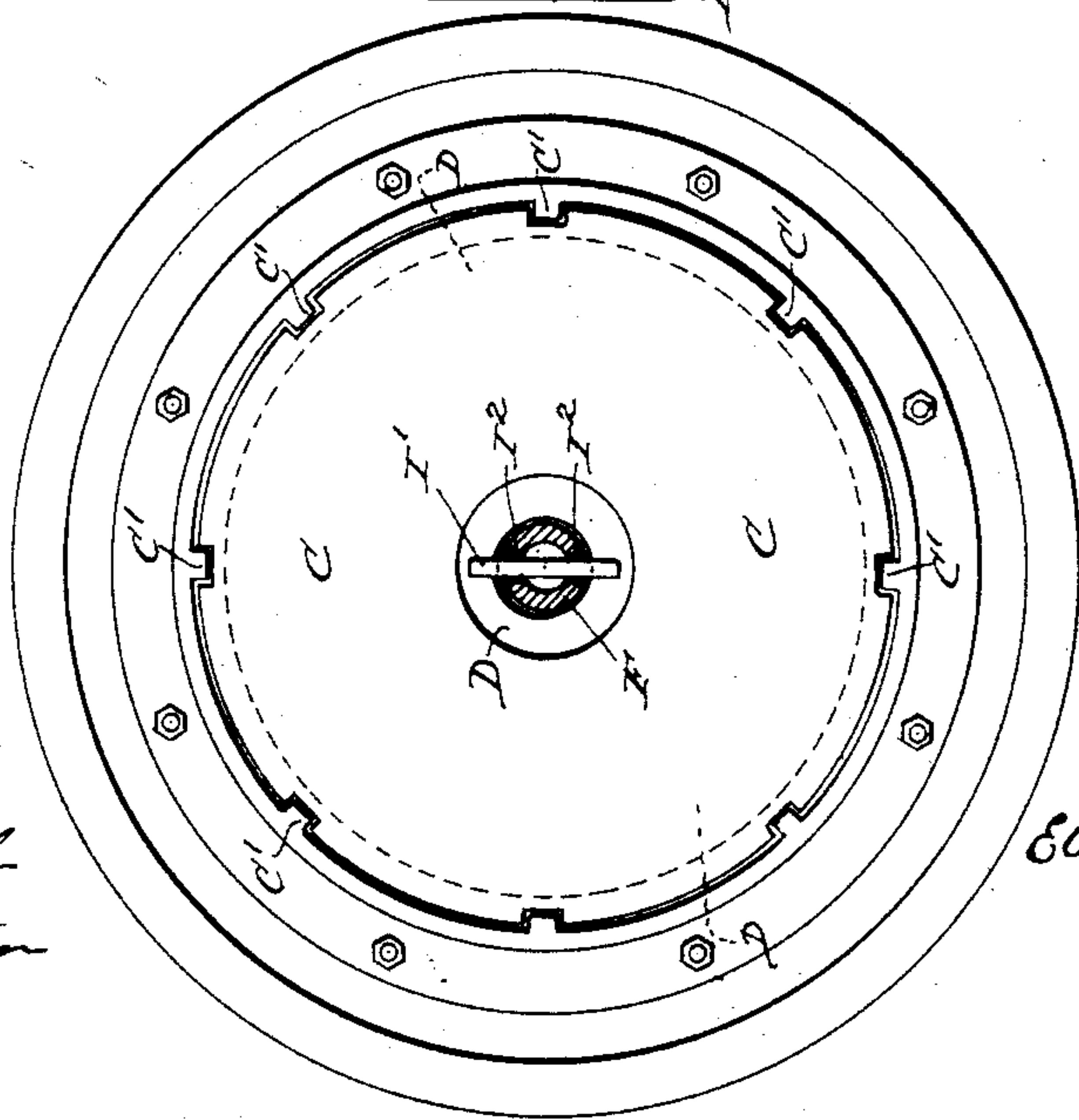


Fig. 5.



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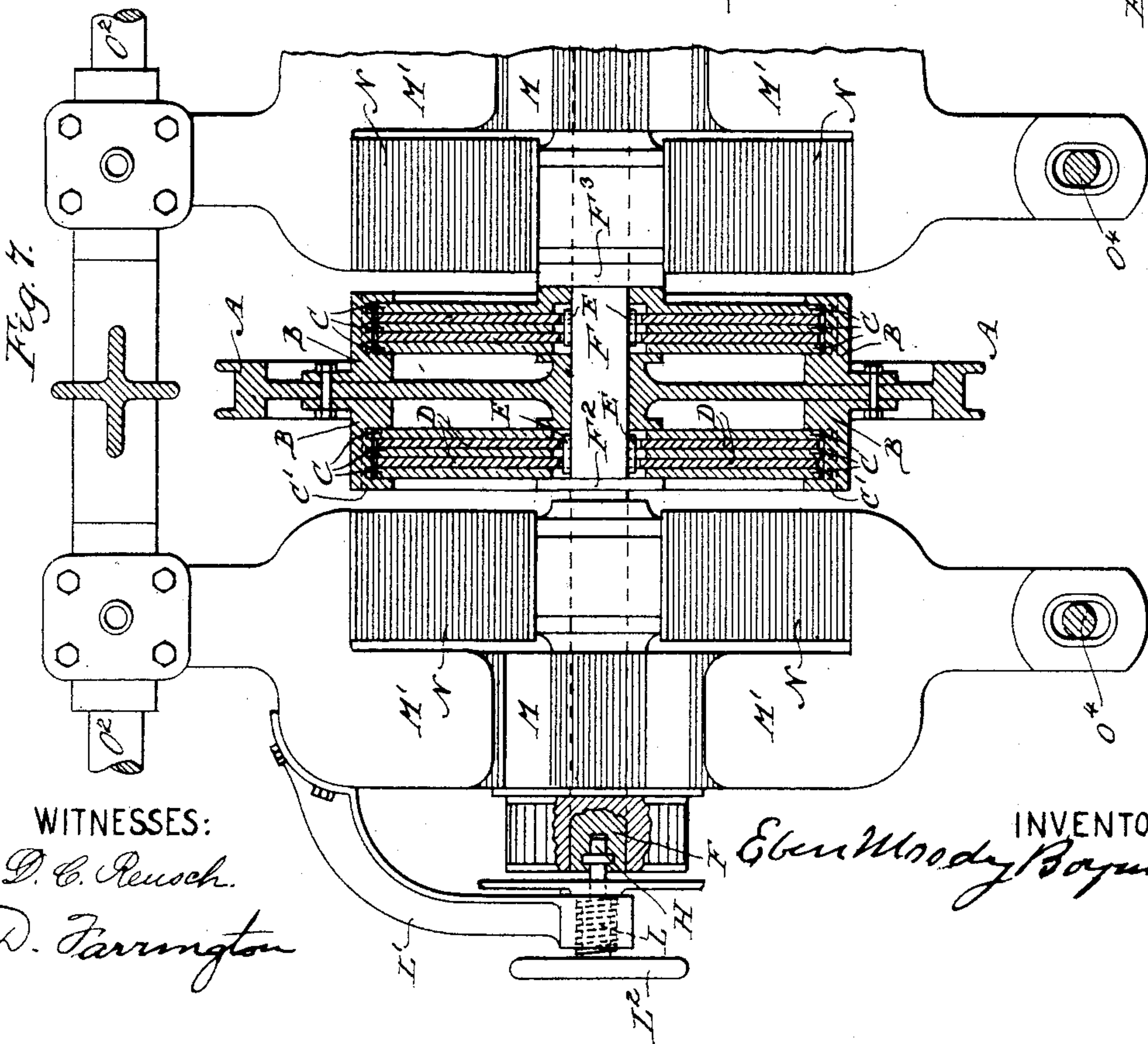
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WITNESSES:

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UNITED STATES PATENT OFFICE.

EBEN MOODY BOYNTON, OF WEST NEWBURY, MASSACHUSETTS.

ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 446,821, dated February 17, 1891.

Application filed October 17, 1890. Serial No. 368,457. (No model.)

To all whom it may concern:

Be it known that I, EBEN MOODY BOYNTON, of West Newbury, county of Essex, State of Massachusetts, have invented certain new and
5 useful Improvements in Electric Motor Friction-Clutches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

10 My invention relates to improved means for connecting the armature-shaft of an electric motor directly with the driving-wheel of my bicycle or other car without intermediate
15 gearing. It being known that the power needed for setting a car in motion is largely in excess of the one needed for sustaining the motion, it also being known that the starting of an electric motor produces a very small counter electro-motive force, it follows that
20 if the armature and driving-wheel were rigidly fastened on the same shaft there would necessarily flow such a heavy current through the armature at the moment of starting that in all probability the insulation would be de-
25 stroyed. To overcome this difficulty it is my intention to so connect my motor with the driving-shaft that the motor can start without load and with a small current running through the armature and then gradually in-
30 crease the load and current. As in the meantime, also, the counter electro-motive force is increasing, the danger of overheating the armature is decreased to a minimum.

Reference is to be had to the accompanying
35 drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a side elevation of the motor with friction-clutch; Fig. 2, a plan view
40 of the same, partly in section. Fig. 3 is a section taken on the line $z z$, Fig. 2, illustrating the connection between the shaft and friction-cone. Fig. 4 is a plan view, partly in section, of another form, in which friction-plates are substituted for the friction-cone;
45 Fig. 5, a sectional elevation of the same, taken on the line $x x$, Fig. 4. Fig. 6 is a plan view, partly in section, of a variation of Fig. 4, in which the friction-coupling can be operated
50 from one side alone. Fig. 7 is a plan view, partly in section, illustrating a method of operating the coupling by moving the shaft in

a longitudinal direction. Fig. 8 is a detail view illustrating the connection between the friction-plates and driving-shaft.

55 In the drawings, Figs. 1, 2, and 3, A represents the driving-wheel, on which the friction-ring B, inside provided with wooden segments C, is fastened. The driving-wheel has these rings and segments on both sides, and
60 D D are the two friction-cones to engage with same. The driving-wheel A is running loose on the hollow shaft F, while the friction-cones D D are fastened to the same in such a way that they can move in a longitudinal direc-
65 tion—as, for instance, with a feather E and slot G—as shown in Fig. 3. Projecting through the hollow shaft is the rod H, pushing against the block I. The latter is provided with a key I', that is permitted to slide in slots I² of
70 shaft F and fastened with pins J J to the hub of friction-cones D D. A spring K is situated between the two blocks I I, its purpose being to separate D D from C C when rod H is re-
75 treating. The back and forward movement of H is procured by the screw L engaging in arm L'. L² is a hand-wheel to facilitate the turning of rod H.

The operation is as follows: When turning L² in the proper direction, H is moved toward
80 block I and pushes this, and so through key I' the friction-cone D toward ring C, little by little increasing the friction between the same until at last the wheel A is given the same
85 speed as cone D. For disengaging the cone the hand-wheel is turned in the opposite direction, rod H retreats, and blocks I', driven out by spring R, follow, pushing D with it.

In Fig. 1 the mechanism for operating the cones is the same on both sides and can be
90 operated independent of each other. M is the armature. M' M' are the pole-pieces of the field-magnets, and N N are the field-magnet coils. O is the commutator; O' O', the brushes. The motors are pivoted on the shaft O², fast-
95 ened to the walls of the car. The weight of the car is transmitted to the driving-wheels through the rods O⁴ and springs O³, as illustrated in Fig. 1.

In Figs. 4, 5, 6, and 7 I use friction-plates C
100 C D D, and by lateral pressure increase the friction of their adjoining sides until they all rotate with the same speed as the armature. B B are rings fastened to driving-wheels A

and provided with projections C' C', engaging with corresponding grooves in the plates C C, so that the latter will rotate with A, but allowing them a motion parallel with the shaft. Between C C are inserted other plates D D, made to rotate with the driving-shaft by the keys I', projecting through slots I² in the shaft. Springs R tend to oppose the contact of the plates with another. The pressure on the plates is produced as in the former case, through screw I, rod H, and block I. Both systems can be operated on either side of driving-wheel independent of each other; but in Fig. 6 an arrangement is made so that both systems of plates can be operated from one side. In this case the pressure from one side to the other is procured by the block I³, resulting in a combined pressure against the collar F', fastened on shaft F.

Still a further variation is shown in Fig. 7. Here the shaft itself is solid and the plates D D connected with the same through feather and slot, as shown in detail in Fig. 8. The shaft itself is moved longitudinally. The collar F² fastened on the same will therefore press the plates toward another and against the bearing F³. The screw L has a positive connection with the shaft, so that it will follow the movements of the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the armature of an electric motor fastened on a driving-shaft, of one part of a friction-clutch rotating with the driving-shaft and engaging with the other part of the friction-clutch fastened on a driv-

ing-wheel mounted concentrically with but free from the shaft, substantially as herein shown and described.

2. The combination, with the armature of an electric motor fastened on the driving-shaft, of one part of a friction-clutch rotating with the driving-shaft, and means for bringing the same in engagement with the other part of the friction-clutch fastened on the driving-wheel mounted concentrically with but free from the shaft, substantially as herein shown and described.

3. The combination, with the armature of an electric motor fastened on the driving-shaft, of one or more friction-plates rotating with the driving-shaft and engaging with other friction-plates fastened on the driving-wheel mounted concentrically with but free from the shaft, substantially as herein shown and described.

4. The combination, with the armature of an electric motor fastened on the driving-shaft, of one or more friction-plates rotating with the driving-shaft, and means for bringing the same in engagement with the other friction-plates fastened on a driving-wheel mounted concentrically with but free from the shaft, substantially as herein shown and described.

In testimony that I claim the foregoing I have hereunto set my hand, in the presence of two witnesses, this 16th day of October, 1890.

EBEN MOODY BOYNTON.

Witnesses:

D. C. REUSCH,
D. FARRINGTON.