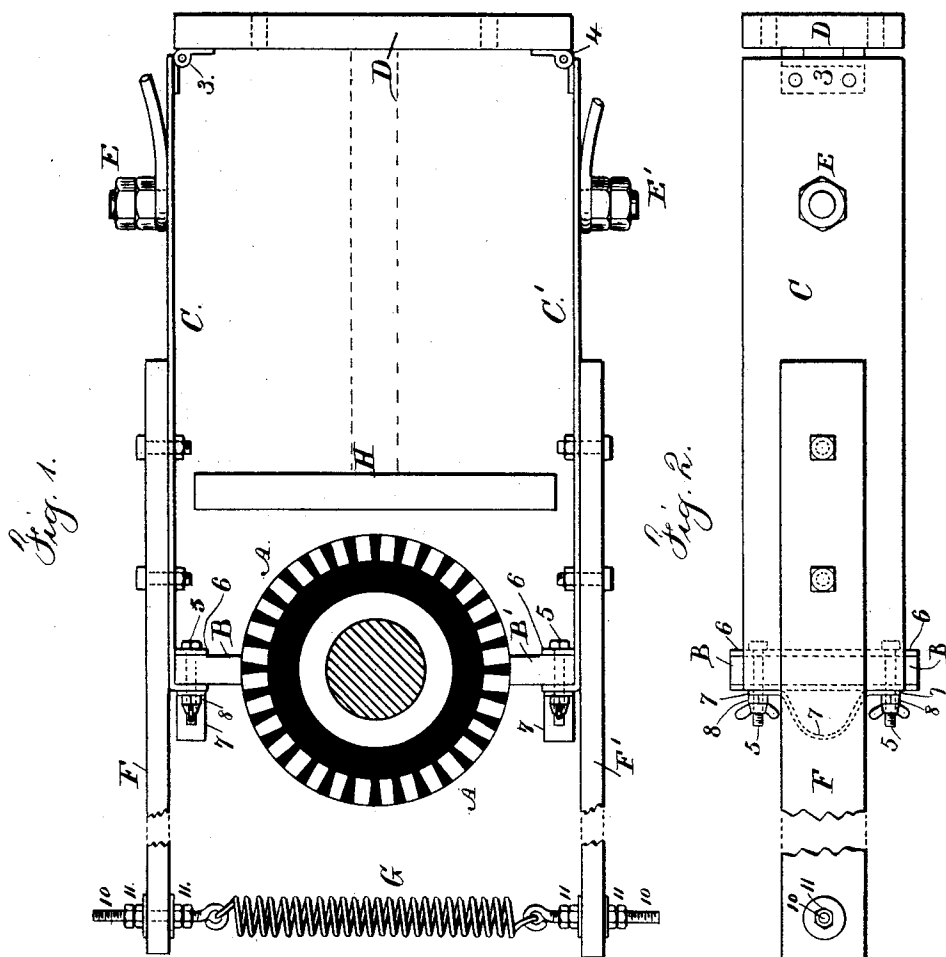


(No Model.)

A. A. INGRAHAM.
COMMUTATOR FOR ELECTRIC MOTORS.

No. 427,235.

Patented May 6, 1890.



Witnesses

Chas. H. Smith
J. Stail

Inventor

Arnold A. Ingraham
per Lemuel W. Serrell

att'y

UNITED STATES PATENT OFFICE.

ARNOLD A. INGRAHAM, OF NEW YORK, N. Y.

COMMUTATOR FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 427,235, dated May 6, 1890.

Application filed August 16, 1889. Serial No. 320,972. (No model.)

To all whom it may concern:

Be it known that I, ARNOLD A. INGRAHAM, of the city and State of New York, have invented an Improvement in Commutators for Electric Motors, of which the following is a specification.

This improvement is especially adapted to electric motors for railway-cars in which the motor has to run in opposite directions for propelling the car either one way or the other way. I make use of contact-blocks, preferably of carbon, supported by hinged arms, to which the electric-circuit wires are connected, and the pressure is regulated by an adjustable spring acting upon the lever-extensions of the arms holding the contact-blocks.

In the drawings, Figure 1 is an elevation of the contact-blocks and the devices for holding the same, and Fig. 2 is a side view of one of the hinged arms for supporting such contact-blocks.

The circular range of contact-plates is represented at A, and this may contain any desired number of plates or strips, according to the armature made use of, and the contact-blocks B B' are preferably of carbon and of the proper size and shape to act with the commutator-plates.

Each contact-block is within a metallic holder upon the metallic arm C or C', and these arms are hinged at 3 4 to the insulating-support D, which may be of wood or other non-conducting material and bolted to the frame of the motor. The ends of these metallic arms C C' are bent at right angles to form flanges, against which the respective contact-blocks are clamped by the bolts 5 and follower 6, and it is preferable to make use of the bow-springs 7, with notched ends resting against the nuts 8 to prevent such nuts working loose, and it is to be understood that these nuts 8, followers 6, and bolts 5 securely fasten the contact-blocks B B' to the respective metallic arms C C', and these contact-blocks, being at opposite sides of the commutator-cylinder A, convey the electric current through such contact-blocks to the metallic arms and the circuit-connecting screws E E' and wires leading to the storage-batteries or other source of electric motive force, and the hinges 3 and 4 allow the metallic arms C C' to swing and the blocks B B' to remain

in contact with the commutator-plates as the ends of such blocks wear away, or as the parts of the motor may be exposed to slight changes of position due to the oscillation or vibration of the car in traveling upon the track.

The wooden arms F F' are bolted to the metallic arms C C' and extend beyond the same, and the contractile spring G is between the outer ends of such arms, and is adjustable by the screws 10 and nuts 11, for varying the pressure applied to keep the blocks B B' into contact with the commutator-plates, and it will be apparent that the pressure applied to the respective plates must be uniform, as the spring G exerts as much power upon one of the blocks B as on the other B'. These arms F F', of wood or other insulated material, may be of any desired length and exert the proper leverage in pressing the blocks B B' against the commutator-plates.

If the carbon brushes or blocks should wear away too much, the metal holders for the same would come into contact with the commutator-plates and injure the same. To prevent this the cross-bar or stop H, of insulating material, is provided to limit the movement of the holders toward the commutator-plates. This stop may be supported in any convenient manner. I have shown by dotted lines a connection to the support D.

I claim as my invention—

1. The combination, with the commutator-plates and the blocks B B', of the hinged metallic arms C C', to which the commutator-blocks are attached, the insulating-arms F F', extending from the metallic arms C C', and the contractile spring G between the outer ends of such insulating-arms, substantially as set forth.

2. The combination, with the commutator-blocks B B', the holders for the same, and the metallic arms C C', to which the commutator-blocks and holders are connected, of insulating-extensions to the arms and a spring to draw the arms toward each other, and a stop H to limit the movement, substantially as set forth.

Signed by me this 13th day of August, 1889.

ARNOLD A. INGRAHAM.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.