(No Model.) 2 Sheets—Sheet 1.

W. A. ANTHONY.

STARTING SWITCH FOR ELECTRIC MOTORS.

No. 421,090. Patented Feb. 11, 1890.

Fig. 1

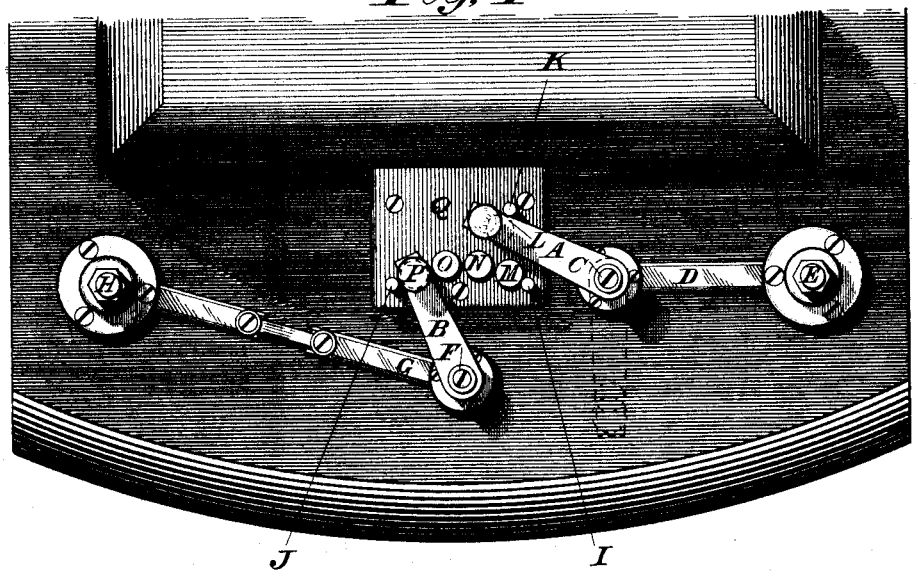
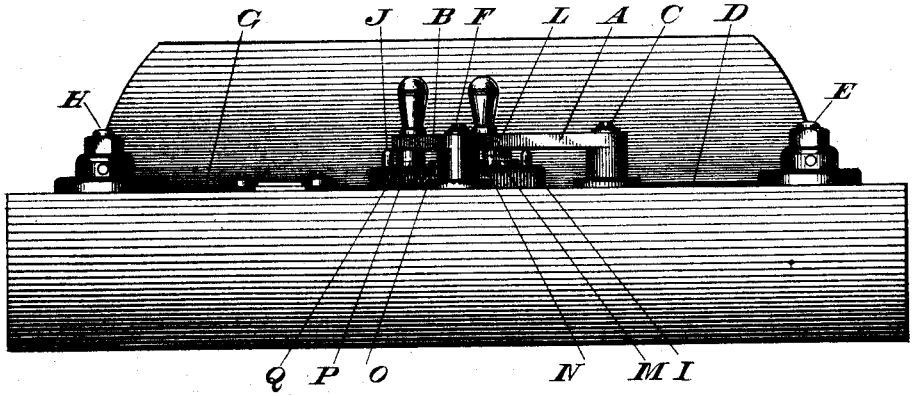


Fig. 2



Witnesses:

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H. P. Williams.

Inventor:

William A. Anthony

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his Attorney

(No Model.) 2 Sheets—Sheet 2.

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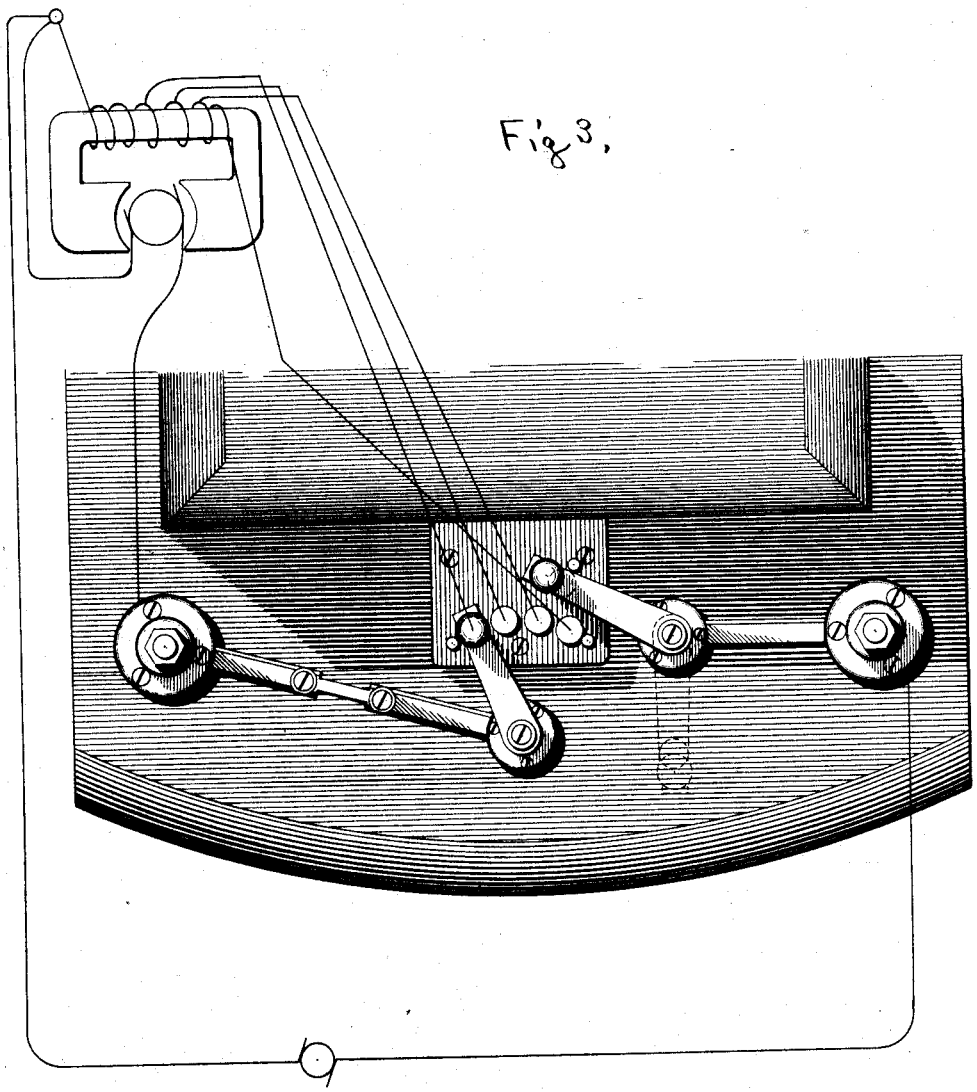

Fig 3.

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UNITED STATES PATENT OFFICE.

WILLIAM A. ANTHONY, OF MANCHESTER, CONNECTICUT, ASSIGNOR TO THE MATHER ELECTRIC COMPANY, OF SAME PLACE.

STARTING-SWITCH FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 421,090, dated February 11, 1890.

Application filed March 21, 1889. Serial No. 304,154. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. ANTHONY, of Manchester, Connecticut, have invented a new and useful Starting-Switch for Electric Motors, of which the following description and claim constitute the specification, and which is illustrated by the accompanying two sheets of drawings.

This invention is a starting-switch which is so constructed as to invariably interpose a large resistance between the main-line conductor and the armature of the motor when the current is first turned on to the armature, and as to enable that resistance to be easily and gradually lessened by the manager of the machine as the speed of the armature increases, and a counter-current is generated therein to act as a resistance to the current coming from the main line.

Figure 1 of the drawings is a plan of this switch as located conveniently upon the base of an electric motor, and Fig. 2 is a front elevation of what is shown in Fig. 1. Fig. 3 is a plan of this switch, showing the motor and its field-magnet coils diagrammatically delineated in relation to the switch.

The letters A and B indicate swinging arms, which constitute the moving parts of the switch. The arm A is electrically connected, through the pivot C, the conductor D, and the binding-post E, with one branch of the main line, and the arm B is connected through the pivot F, the conductor G, and the binding-post H, to one of the brushes of the armature. The other branch of the main line is connected to a binding-post on the opposite side of the machine, as shown in Fig. 3, and that binding-post is connected to the other armature-brush and to one extreme end of the field-wire. The upward or inward swing of the arm A is limited by the stop K, but that arm is not limited in its downward swing. The swing of the arm B is limited in one direction by the stop J and is limited in the other direction by the stop I.

The letter L indicates the only contact-point with which the arm A makes connection, while the letters M, N, O, and P indicate four contact-points with which the arm B makes connections, respectively, at different times, and the upper surfaces of which are all on the same plane and on a lower plane than the upper surface of the contact-point L. The contact-point L is electrically and directly connected with the contact-point M by a conductor which passes from the lower end of one to the lower end of the other under the plate Q. The contact-point M is also connected directly to the other extreme end of the field-wire, while the contact-point N is connected to the field-wire a little distance from that extreme end, and the contact-point O is connected to the field-wire still farther from that extreme end, and the contact-point P is connected to the field-wire at a point still farther inward thereon, so that the resistance to the passage of electricity along the field-wire from the point M to the point P is about that through which the normal current for the armature would flow when the normal difference of potential exists between its terminals and the armature is at rest.

The mode of operation is as follows: When the motor is to be started, the arm A is turned from its dotted position in Fig. 1, over the contact-points M and N, without touching them, and upon the contact-point L. Thereupon that part of the current which when the armature is in full motion is designed to pass directly from the contact-point M to the arm B and thence into the armature must pass through that part of the field-wire which is interposed between the contact-points M and P before it can reach the arm B and is diminished in volume by the resistance. That diminished volume of current is sufficient to gradually start the armature, and as the armature increases in its speed it acts as a generator to develop a counter-current, and thus diminishes the amount of current flowing through it. Thereupon the arm B may be safely turned from the contact-point P to the contact-point O and then to the contact-point N, and finally to the contact-point M, so as to cut out all portions of the field-wire from the armature-circuit.

A special feature of this invention consists in the fact that the arm A cannot be turned into contact with the point L except when the arm B is turned to the position shown in Fig. 1 and out of contact with the points M, N, and O and in contact with the point P. Therefore this invention renders it impossi-

ble for the manager of the motor to injure the armature by ignorantly, carelessly, or inadvertently turning its entire current through its brushes before the armature has begun to revolve.

It will be understood that the ends and adjacent sides of the arms A and B must be composed of insulating material in order to prevent a short circuit between those arms in case of their accidental contact.

I claim as my invention—

In an electric switch, the combination of the arm A and its contact-point L with the arm B and a plurality of contact-points thereof, the upper surfaces of the last-mentioned contact-points being on one plane and the upper surface of the first-mentioned contact-point being on a higher plane, all combined and operating together substantially as described.

Hartford, Connecticut, March 19, 1889.

WILLIAM A. ANTHONY.

Witnesses:
ALBERT H. WALKER,
PHEBIE A. PHELPS.