

No. 831,446.

PATENTED SEPT. 18, 1906.

M. C. A. LATOUR.
ALTERNATING CURRENT MOTOR.
APPLICATION FILED JAN. 21, 1905.

Fig. 1.

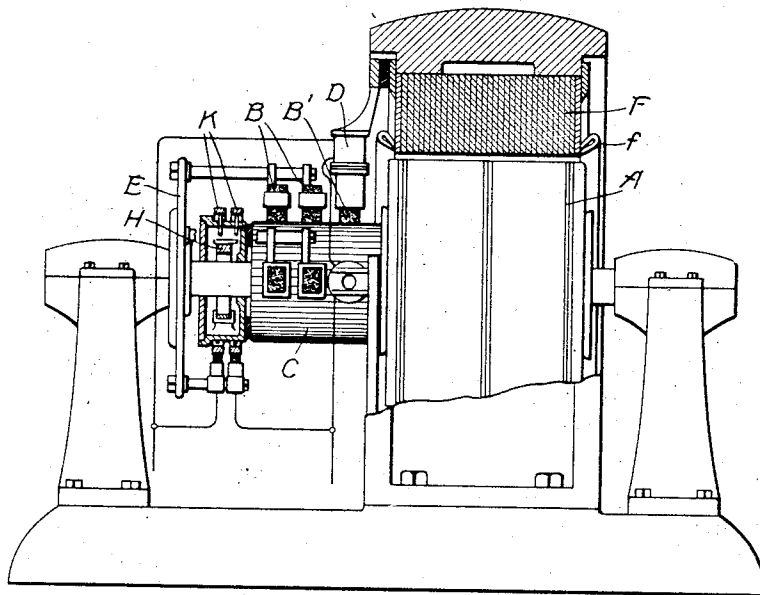


Fig. 2.

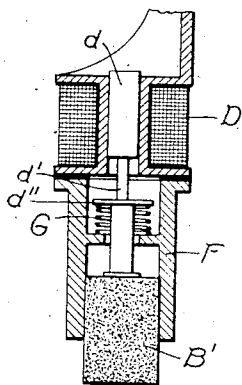
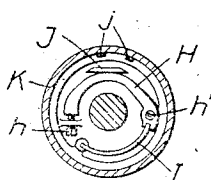


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

MARIUS C. A. LATOUR, OF PARIS, FRANCE, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ALTERNATING-CURRENT MOTOR.

No. 831,446.

Specification of Letters Patent.

Patented Sept. 18, 1906.

Application filed January 21, 1905. Serial No. 242,086.

To all whom it may concern:

Be it known that I, MARIUS C. A. LATOUR, a citizen of France, residing at Paris, France, have invented certain new and useful Improvements in Alternating-Current Motors, of which the following is a specification.

My invention relates to alternating-current motors of the commutator type; and its object is to improve the operation and efficiency of such machines.

As is well understood in the art, the armature-currents are generally a maximum at starting, and the currents induced in the armature-coils short-circuited by the brushes are much greater at starting than when the motor is up to speed, both because the motor-currents and the resultant fields are stronger at starting and also because there is present no electromotive force due to rotation which may serve to reduce the amount of short-circuited current. In order to prevent undue heating of the brushes and commutator at starting, it is necessary to provide a large brush contact-surface to carry the heavy short-circuited currents. When the motor is up to speed, this large brush contact-surface is not required and produces unnecessary losses due to the excessive brush-friction. By my invention I provide a novel arrangement of brushes, whereby sufficient brush contact-surface is afforded at the start for satisfactorily handling the starting-currents with means for reducing the brush contact-surface as the motor speeds up, thereby eliminating losses due to unnecessary brush-friction.

My invention consists in providing automatic means for lifting a portion of the brushes out of engagement with the commutator without changing the circuit connections of the motor as the motor speeds up.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows an alternating-current motor with brushes arranged in accordance with my invention. Fig. 2 shows a detail of the brush-lifting device, and Fig. 3 shows a detail of the controlling means for the brush-lifting device.

In Fig. 1, A represents the armature, and F the field, of an alternating-current machine. The field is provided with field-coils *f*, which may be of the distributed or concentrated type. The armature is provided with the

commutator C, on which bear the usual sets of axially-alined brushes B B, supported on the usual yoke E. In addition to these brushes I provide in each set auxiliary brushes B', which are controlled by electromagnets D, supported from the frame of the machine, by means of which the brushes B' may be lifted out of engagement with the commutator C. This lifting of the auxiliary brushes merely reduces the number of brushes in each set, thereby diminishing brush-friction and losses without changing the circuit connections of the machine.

One suitable construction of the electromagnets is shown in Fig. 2, in which the core *d* of the magnet D carries a spindle *d'*, at the lower end of which is secured the brush B', vertically movable in the inclosing box or casing F. The spindle *d'* carries a collar or washer *d''*, against which bears a compression-spring G. This spring tends to lift the core *d* and brush B', while the coil D when energized tends to pull the core *d* downward, forcing the brush B' against the commutator-surface. Thus if means are provided for energizing the coil D at the start the brush B' may be held in engagement with the commutator, and if the coil D is deenergized as the motor speeds up the spring B will lift the brush B' away from the commutator, thereby preventing unnecessary brush-friction.

One arrangement for controlling coil D is shown in Figs. 1 and 3. H represents an arm pivoted at *h'* and held against the stop *h* by the spring I when the motor is at rest. The arm H carries a bridging member J, which is adapted when the arm H is moved outwardly by centrifugal force to engage the contact *j*, carried by the collector-rings K. Thus as the speed of the motor passes a predetermined limit the collector-rings K will be electrically connected by contact J. This action may be utilized to short-circuit the magnet-coils D, as is indicated in Fig. 1, thereby allowing the springs to lift the brushes B' out of engagement with the commutator.

Obviously, other arrangements for lifting brushes B' at predetermined speed may be substituted for the arrangement shown. Accordingly, I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an alternating-current machine of the commutator type, means for automatically lifting a portion of the brushes out of engagement with the commutator without changing the circuit connections of the machine when the speed of the machine rises above a predetermined limit.
2. In an alternating-current machine of the commutator type, electrically-controlled means for automatically lifting a portion of the brushes out of engagement with the commutator without changing the circuit connections of the machine when the speed of the machine rises above a predetermined limit.
3. In an alternating-current machine of the commutator type, electrically-controlled means for automatically lifting a portion of the brushes out of engagement with the commutator without changing the circuit connections of the machine, and a centrifugal device controlling said lifting means.
4. In an alternating-current machine of the commutator type, electromagnets operatively connected to a portion of the commutator-brushes and adapted when energized to hold said brushes in engagement with the commutator, and springs opposing the action of said magnets and tending to lift said brushes from the commutator, the electrically-controlled brushes being arranged in axially-aligned sets with the other brushes so that the

lifting of the electrically-controlled brushes from the commutator does not change the circuit connections of the machine.

5. In an alternating-current machine of the commutator type, electromagnets operatively connected to a portion of the commutator-brushes and adapted when energized to hold said brushes in engagement with the commutator, springs opposing the action of said magnets and tending to lift said brushes from the commutator, and a centrifugal device controlling the circuits of said magnets, the electrically-controlled brushes being arranged in axially-aligned sets with the other brushes so that the lifting of the electrically-controlled brushes from the commutator does not change the circuit connections of the machine.

6. In an alternating-current machine, a distributed armature-winding provided with a many-part commutator, a plurality of sets of axially-aligned brushes bearing on said commutator, and means for automatically lifting a portion of the brushes of each set out of engagement with the commutator when the speed of the machine rises above a predetermined limit.

In witness whereof I have hereunto set my hand this 17th day of January, 1905.

MARIUS C. A. LATOUR.

Witnesses:

HELEN ORFORD,
E. C. HOLLISTER.