

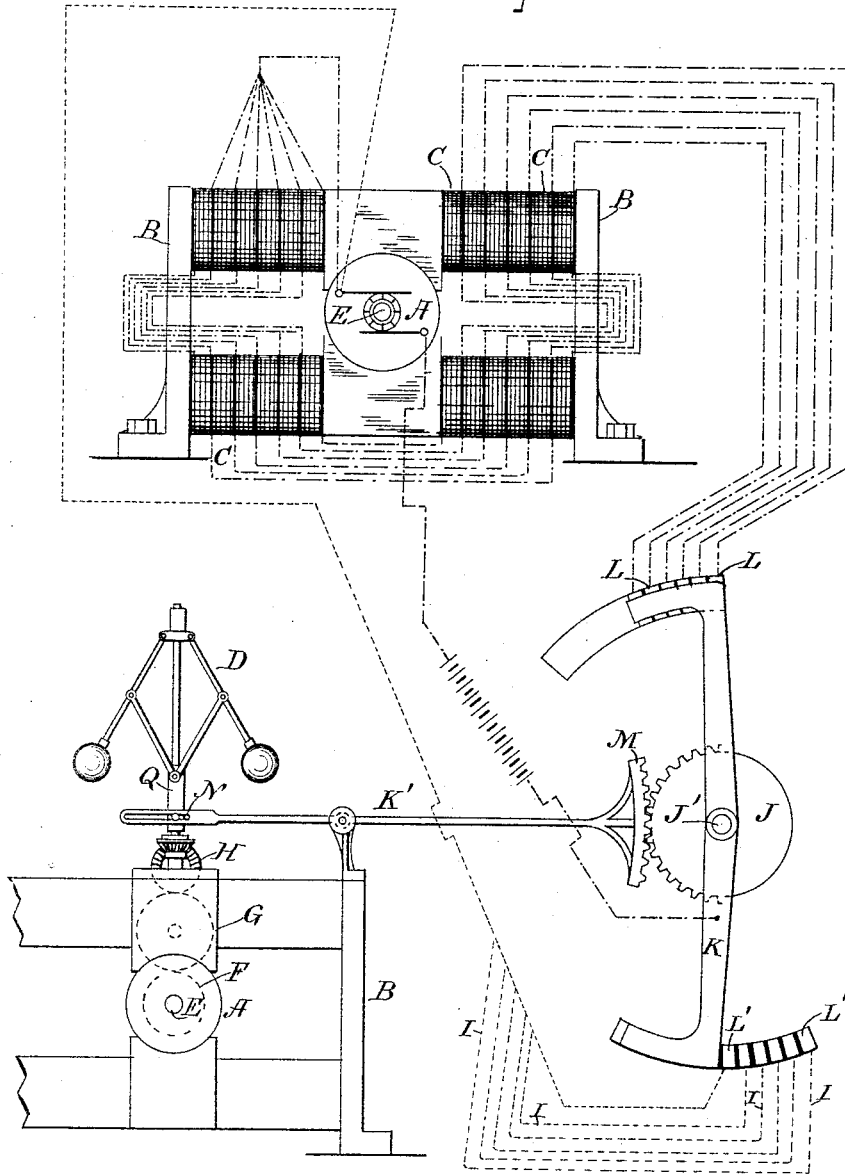
J. BEATTIE, Jr.

ELECTRIC MOTOR.

No. 346,527.

Patented Aug. 3, 1886.

Fig. 1.



ATTEST:

*J. A. Hurdle*

*Edward P. Thompson*

INVENTOR

*John Beattie Jr.*

By

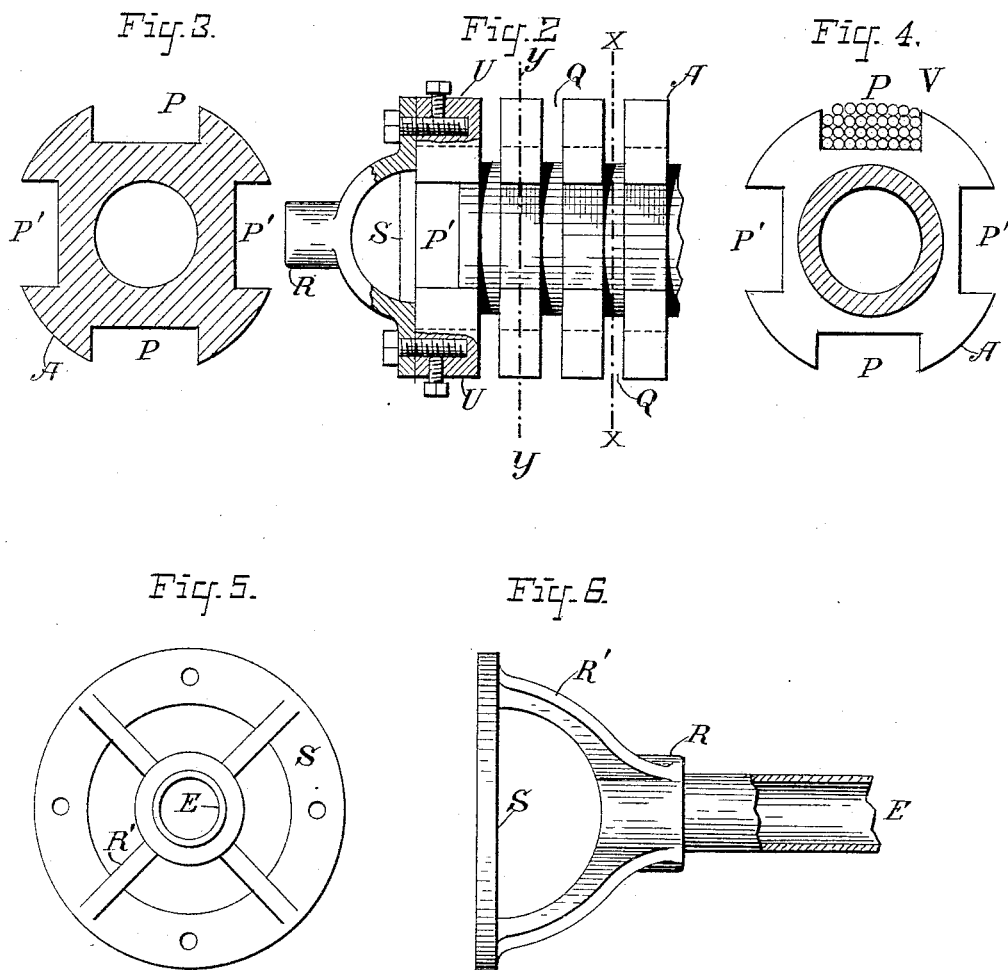
*W. S. Johnston*  
Attorney

J. BEATTIE, Jr.

ELECTRIC MOTOR.

No. 346,527.

Patented Aug. 3, 1886.



ATTEST:

*J. A. Mudd*  
*Edward P. Thompson*

INVENTOR:

*John Beattie Jr.*

By *W. J. Johnston*  
*Attorney*

# UNITED STATES PATENT OFFICE.

JOHN BEATTIE, JR., OF WESTPORT, MASSACHUSETTS.

## ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 346,527, dated August 3, 1886.

Application filed March 15, 1886. Serial No. 195,377. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BEATTIE, JR., a citizen of the United States, and a resident of Westport, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Automatic Electric-Motor Systems, described, claimed, and shown in the following specification, claims, and drawings.

My invention relates to an automatic electric-motor system comprising an armature, field-magnets, a ball-governor, and auxiliary or external resistances adapted to be substituted automatically for one or more of the coils composing the field-magnets.

The object of the invention is to obtain, by simple means, a steady main-line current, even when one or more lamps are cut in or out, either accidentally or for a purpose.

The system including my invention consists of an armature provided with two sets of grooves—the one longitudinal and the other circular—around the axis of the armature, and with a groove running across each end of the armature; of field-magnets provided with several independent coils upon each leg or arm of the magnets; of a governor geared to the armature-shaft and to a lever which is adapted by its movements to cut out one or more of the field-magnet coils and to substitute therefor one or more equivalent coils which are not a part of the field-magnets.

In order to illustrate the practical manner of carrying out the invention drawings are hereunto annexed and described, in which similar letters of reference represent corresponding elements, and in which each part referred to is designated by a single letter.

The materials of construction employed, the exact forms of design, and the proportional dimensions are not alluded to, as they are best determined upon by those versed in the art.

Figure 1 is a general view of the system, the governor being shown in the lower part of the figure upon a skeleton motor instead of upon the dynamo itself, which is shown in the upper part of the figure; and Figs. 2, 3, 4, 5, and 6 show details of the armature. Fig. 3 is a sectional view of Fig. 2 at line *y*. Fig. 4 is the same at line *x*.

The system consists of the combination of an

armature, A, field-magnets B, wound with multiple coils C, a governor, D, geared to the shaft E of said armature by means of the intermediate gear-wheels, F G H, a series of external resistance-coils, I, a toothed wheel, J, a lever, K, fixed to the shaft J' of said wheel, and adapted to touch both the terminals L of the field-magnet coils and those L' of the resistance-coils, and a second lever, K', provided at one end with a toothed segment, M, which gears into said toothed wheel, and at the other end with a slotted head, N, which is loosely attached to the operating part O of the said governor, the first-mentioned lever being in series with one or more of said field-magnet coils, which are in parallel circuit, and with one or more of the external resistance-coils, which are also in parallel circuit.

The armature, Figs. 2, 3, 4, 5, and 6, consists of a cylinder having two rectangular grooves, P and P', extending around the same by passing along opposite sides and parallel to the armature-shaft E, and across both ends at right angles to each other, a series of deep annular grooves, Q, lying in parallel planes and perpendicular to the armature-shaft E, a hub, R, at each end of said armature, and having radial arms or spokes R', terminating in a ring, S, set-screws assisting to secure said ring to projections U upon each end of said armature, said projections being formed by the two grooves P and P', which cross at the ends of the armature, and a hollow shaft, E, secured to each hub, and projecting in opposite directions from each other, and not passing through the body of the armature.

Only one end of the armature and one hub are shown, as the other end and other hub are in every respect similar thereto. The wire is wound *à la* Siemens. It is represented at V in one of the grooves.

In Fig. 1, for the sake of clearness, the governor is represented in the lower part of the figure upon a skeleton or diagram of the motor, which is shown more fully in the upper part of the same figure.

The *modus operandi* is simply that any increase of speed in the motor causes the substitution of one or more of the resistance-coils for a like number of the field-magnet coils.

The principles of construction and operations involved in the above are evidently attained

in many variations in the specific character of the devices employed without departing from the spirit of the invention.

Having now stated the title, object, and relation of the said invention, having described its practical realization by reference to the accompanying drawings, and having particularly ascertained the manner in which the same operates to accomplish the said object, what I consider to be novel and original, and therefore claim as my invention, secured to me by the hereinbefore in part recited application for Letters Patent of the United States, is—

1. In an automatic self-regulating electric-motor system, the combination of an armature, field-magnet coils in parallel circuit, external coils or resistances, also in parallel circuit, terminals to both the above-mentioned kind of coils located in the same circumference, a lever of conducting material connecting two or more of said terminals and located in the main circuit, and a toothed wheel attached to said lever at its center and geared to a ball governor which has operating communication with the shaft of said armature.

2. In an automatic self-regulating electric-motor system, the combination of an armature, field-magnets wound with multiple coils, a governor geared to the shaft of said armature, a series of resistances, a toothed wheel, a lever fixed to the shaft of said wheel, and in contact at opposite ends with the terminals, respectively, of the said multiple coils and said re-

sistances, and a second lever provided at one end with a toothed segment, which gears into said toothed wheel, and at the other end with a slotted head, which is loosely attached to the operating part of the said governor, the first-mentioned lever being both in series with one or more of said multiple field-magnet coils, which are connected up in parallel, and with none, one, or more of said external resistances, which are also connected up in parallel circuit.

3. In an automatic self-regulating electric-motor system, an armature frame, *s*, consisting of a cylinder having two rectangular grooves extending around the said cylinder by passing along both sides in the direction of the armature-axis, and across both ends at right angles to each other, a series of deep annular grooves in parallel planes and perpendicular to said axis, a hub at each end of said armature, and having radial arms or spokes terminating in a ring, set-screws securing said ring to projections upon each end of said armature, said projections being formed by the said grooves, which cross at the ends of the armature, and a hollow shaft secured to each hub and projecting in opposite direction from each other.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 6th day of March, 1886.

JOHN BEATTIE, JR.

Witnesses:

DANIEL A. BUTLER,  
ISAAC B. TOMPKINS.