

H. L. BARNHOLDT.
INDUCTION MOTOR.
APPLICATION FILED OCT. 31, 1907.

919,524.

Patented Apr. 27, 1909.

Fig. 1.

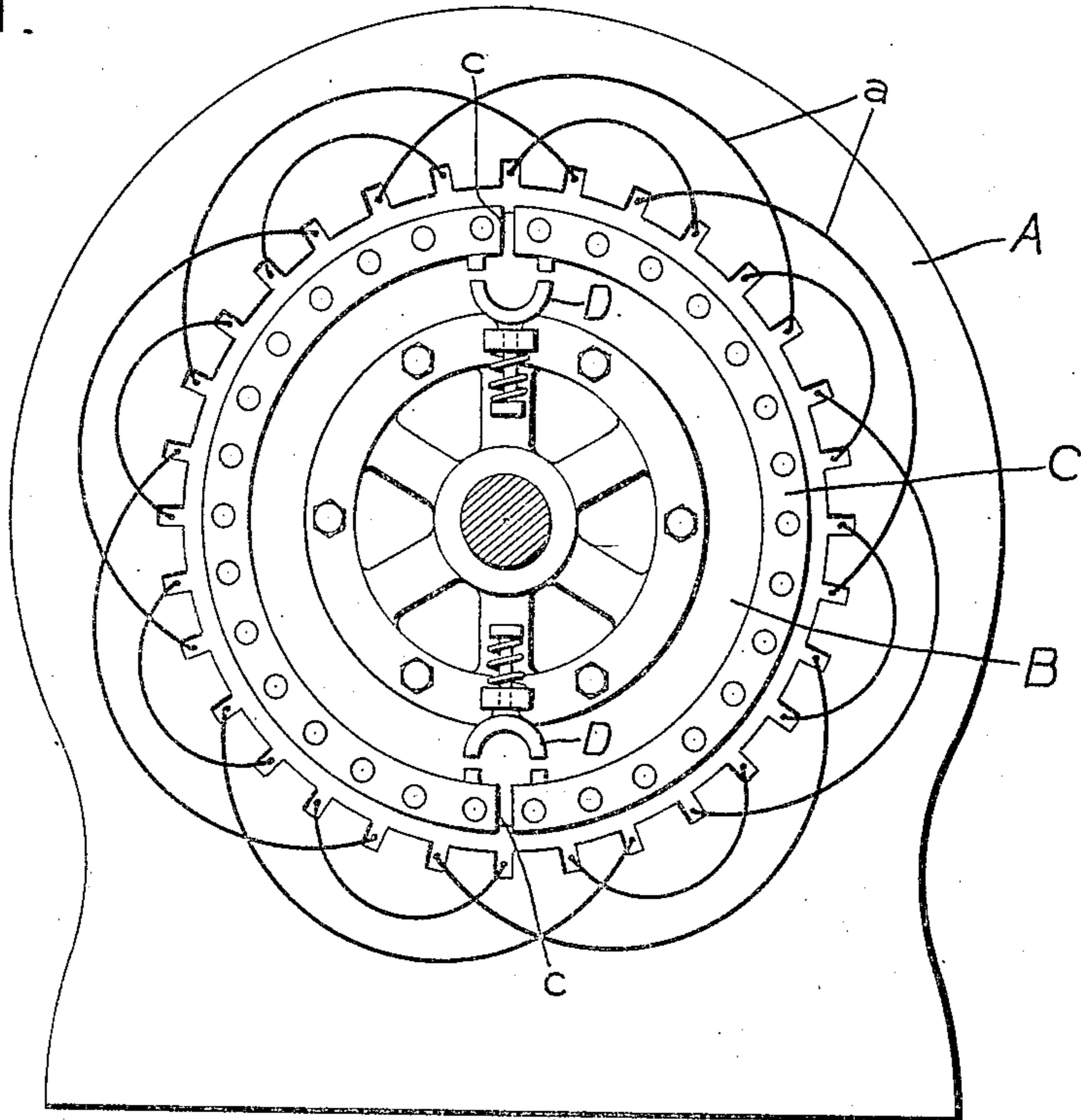
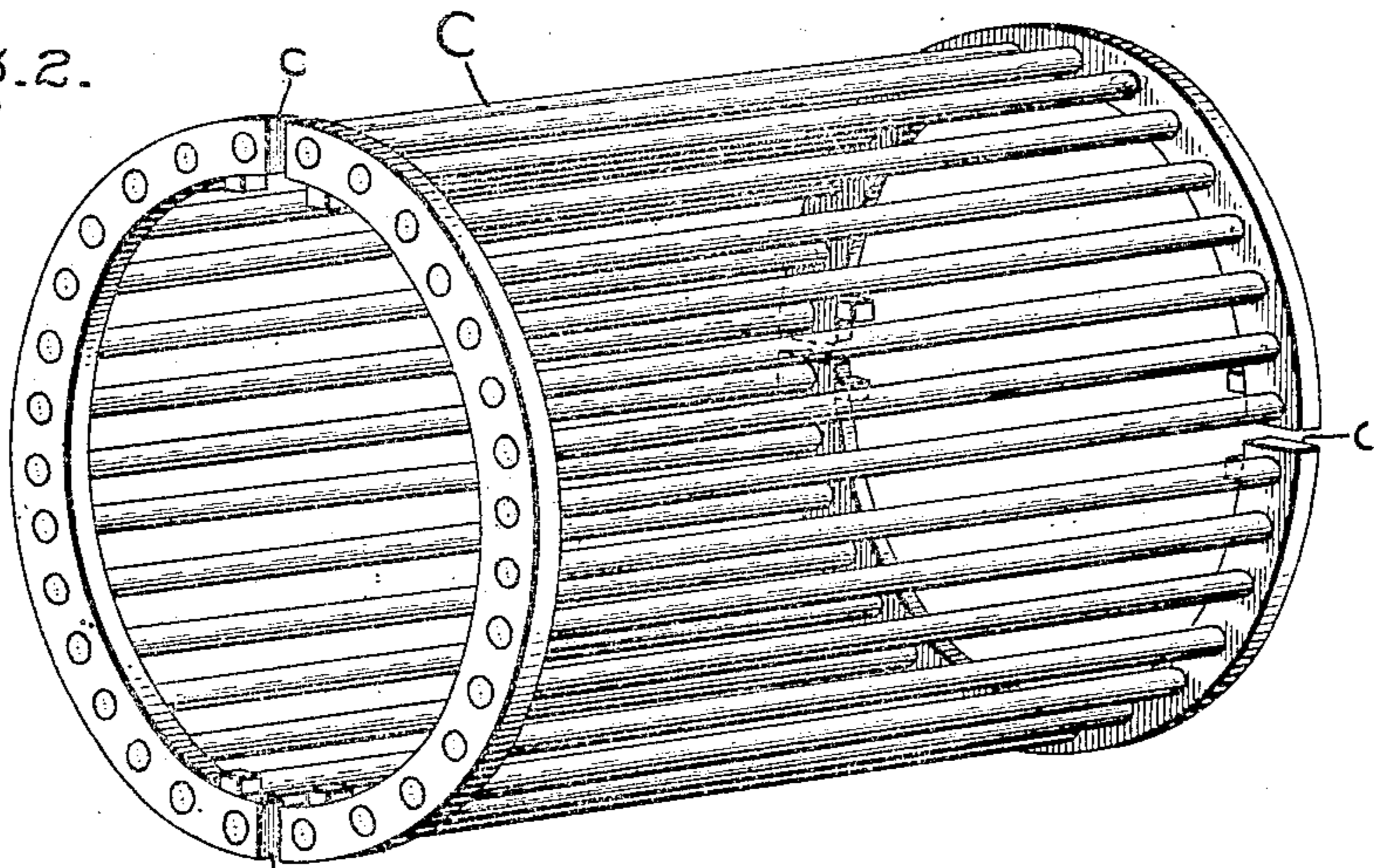


Fig. 2.



Witnesses: c
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by *Alfred S. Davis*
Att'y

UNITED STATES PATENT OFFICE.

HAROLD L. BARNHOLDT, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INDUCTION-MOTOR.

No. 919,524.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed October 31, 1907. Serial No. 400,013.

To all whom it may concern:

Be it known that I, HAROLD L. BARNHOLDT, a subject of the King of Sweden, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Induction-Motors, of which the following is a specification.

My invention relates to induction motors of the squirrel-cage type, and its object is to improve the starting characteristics of the motor without injuriously affecting the operation of the motor when up to speed.

The squirrel-cage winding, which is ordinarily used in induction motors that are not required to start under load, possesses marked advantages in simplicity and economy of construction, but the starting torque of a squirrel-cage motor is comparatively low and the starting current is comparatively high. It is known that by cutting the end-rings of a squirrel-cage motor, so as to interrupt their continuity at a number of points, the starting torque of the motor may be increased and the starting current diminished, but cutting the end-rings has a bad effect on the operation of the motor when up to speed, for it increases the slip and reduces the efficiency,—that is, its effect both at starting and at full speed is similar to that produced by increasing the ohmic resistance of the winding. By my invention the advantages of cutting the end-rings are obtained at starting without impairing the full-speed operation.

My invention consists in cutting the end-rings and providing means for closing the breaks in the end-rings when the motor is up to speed. This may be accomplished automatically by employing centrifugal contacts adapted to bridge the breaks in the end-rings.

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

Figure 1 shows a diagrammatic end view of an induction motor arranged in accordance with my invention, and Fig. 2 is a perspective view of the squirrel-cage winding.

In the drawing, A represents the stator or

primary member of the motor, which is shown provided with a two-phase four-pole winding *a*.

B represents the rotor or secondary member, which carries a squirrel-cage winding C. The end-rings of this winding are cut at a plurality of points indicated at *c*, and centrifugally-actuated contacts D are carried by the rotor, which are adapted to be thrown outward by centrifugal force when the motor is up to speed, so as to bridge the breaks in the end-rings. With this construction the advantages of cut end-rings are obtained at starting, while at full speed the motor operates as though the end-rings were continuous, as in the standard squirrel-cage motor.

In the drawings I have shown one cut per pair of poles in each end-ring, but I do not limit myself to this number. I have found by test that the greater the number of cuts in the end-rings, the smaller is the starting-current, but if the number of cuts is too great, the starting torque also falls off rapidly. The number of cuts in each case will be proportioned to the service required of the motor.

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. An induction motor having on its secondary member a single squirrel-cage winding with end-rings open-circuited at a plurality of points, said end-rings forming the only connections between the conductors of said winding, and means for closing the breaks in the end-rings when the motor is up to speed.

2. An induction motor having on its secondary member a single squirrel-cage winding with end-rings open-circuited at a plurality of points, said end-rings forming the only connections between the conductors of said winding, and automatic means for closing the breaks in the end-rings when the motor is up to speed.

3. An induction motor having on its sec-

ondary member a single squirrel-cage winding with end-rings open-circuited at a plurality of points, said end-rings forming the only connections between the conductors of
5 said winding, and centrifugally-actuated contacts arranged to bridge the breaks in the end-rings when the motor is up to speed.

In witness whereof, I have hereunto set my hand this 29th day of October, 1907.

HAROLD L. BARNHOLDT.

Witnesses:

EUGENE NEWNHAM,
A. S. PERKINS.