R. E. BARKER.

ELECTRIC MOTOR.

APPLICATION FILED OCT. 14, 1907.

919,523. Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

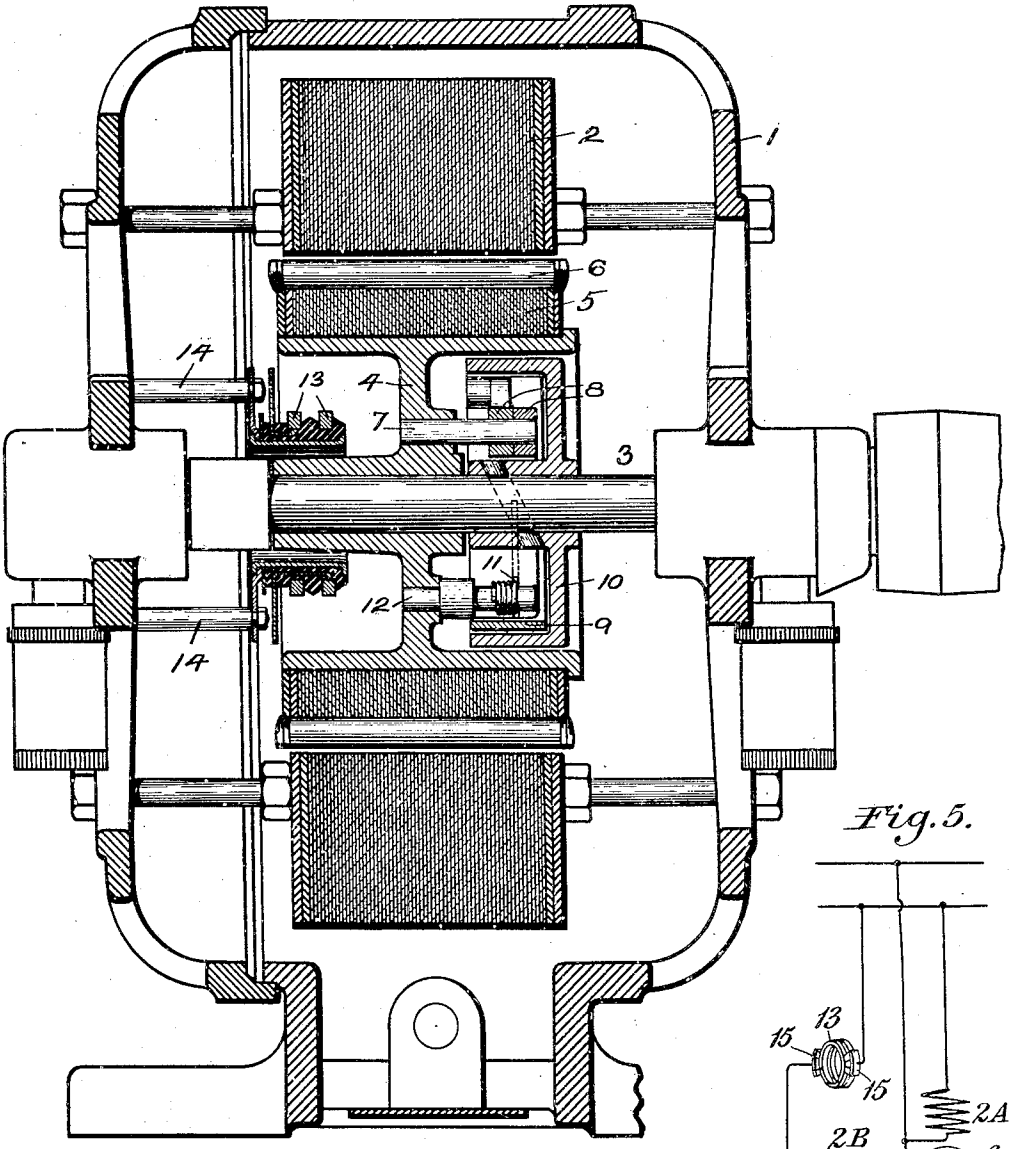


Fig. 5.

Witnesses

W. Ray Taylor.

J. Ellis Glen

Inventor,

Ralph E. Barker,

By Albert G. Davis

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2 SHEETS—SHEET 2.

Fig. 2.

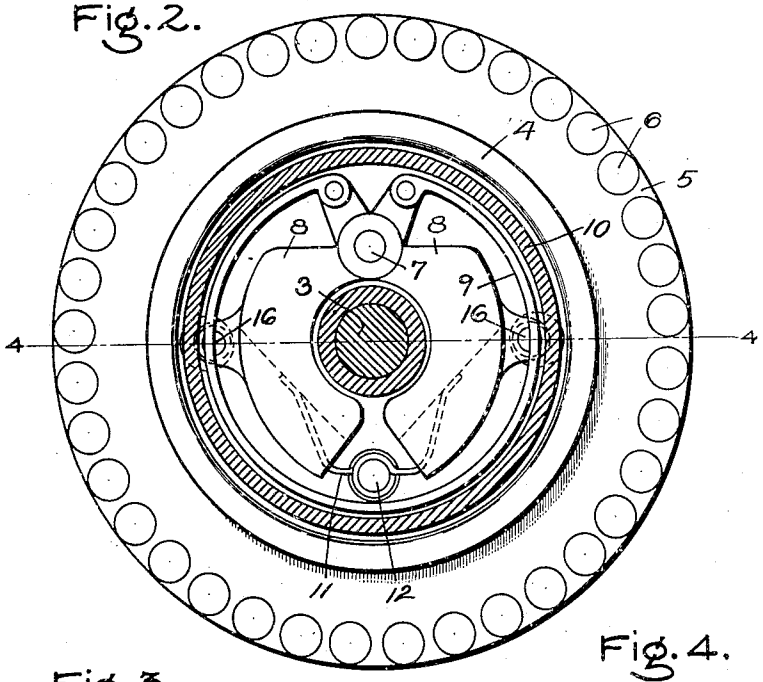


Fig. 3.

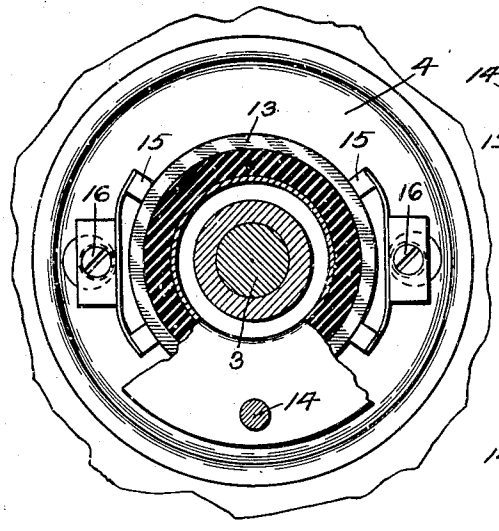
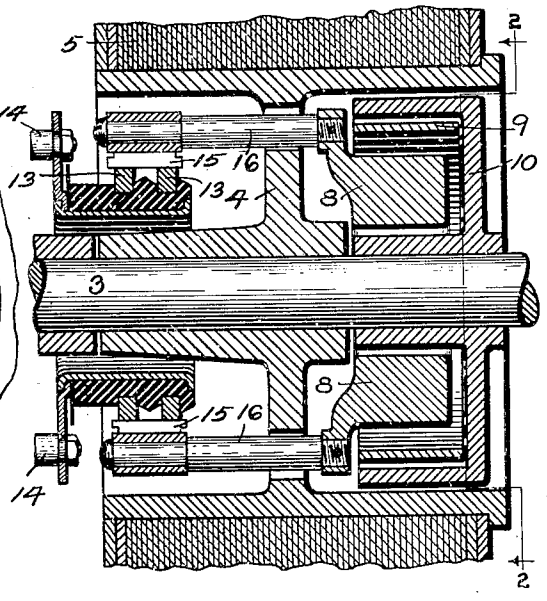


Fig. 4.



Witnesses:

W. Ray Taylor.

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UNITED STATES PATENT OFFICE.

RALPH E. BARKER, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC MOTOR.

No. 919,523. Specification of Letters Patent. Patented April 27, 1909.

Application filed October 14, 1907. Serial No. 397,272.

To all whom it may concern:

Be it known that I, RALPH E. BARKER, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electric Motors, of which the following is a specification.

My invention relates to electric motors, and particularly to single-phase induction motors. Motors of this type have no starting torque, unless special means are provided for producing it. It is therefore common practice to provide a starting circuit which is opened as soon as the motor is up to speed. Even when such a starting circuit is provided, the starting torque is small especially when the armature is of the squirrel cage type without starting resistance. Consequently, such motors, especially in small sizes, are often arranged with the armature loosely mounted on the shaft, and with a clutch, automatic or otherwise, for connecting the armature to the shaft when the armature is up to speed. By means of this combination the armature may start freely, and is not loaded until it is up to speed; at which time the torque is much greater than at starting.

While a starting switch and clutch have both been employed heretofore in single motors, these two devices have, so far as I know, been entirely independent of each other.

My invention consists in providing a single centrifugal device and operative connections therefrom to both the controlling switch and the clutch, so that automatic operation of both is obtained without the necessity of employing more than one centrifugal device.

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

Figure 1 shows a cross-sectional side elevation of a single-phase motor arranged in accordance with my invention; Fig. 2 shows an end-elevation of the motor-armature in partial cross-section on the line 2 2 of Fig. 4; Fig. 3 shows a detail view of the controlling switch for the starting circuit; Fig. 4 shows a detail cross-sectional view on the line 4 4 of Fig. 2; and Fig. 5 is a diagram of the motor circuits.

In the drawings, 1 represents the motor-frame, which supports the laminated stator core 2. The stator winding, which is not shown, may be of any suitable type.

3 represents the armature-shaft journaled in suitable bearings in the motor-frame.

4 represents a supporting member or spider loosely mounted on the shaft, and carrying the laminated armature core 5. This core, which over-hangs the spider 4 on each side, carries the armature conductors 6, which are arranged to form a squirrel-cage winding of ordinary construction.

7 represents a pin carried by the spider 4 on which are provided a pair of centrifugal weights 8. These weights, when thrown out by centrifugal force, expand the friction-ring 9, bringing it into engagement with the inner surface of the clutch 10, which is fast to the shaft 3. The centrifugal weights, the expansible ring 9 and the member 10 form an automatic clutch for connecting the armature to the shaft when the armature is up to speed. A spring 11 carried on the pin 12 presses the centrifugal weights together, and when the motor is at rest, holds them in the position shown in Fig. 2.

13 represents a pair of stationary collector rings, which are supported on the pins 14 carried in the motor frame. Contacts 15, shown in Figs. 3 and 4, bear on the rings 13 when the armature is at rest, and form with the rings a controlling switch for the starting circuit of the motor. The contacts 15 are carried on pins 16, which, in turn, are supported by the centrifugal weights 8. When the weights are thrown apart by centrifugal force, the movement of the pins 16 lifts the contacts 15 from the collector-rings 13 so as to open the starting circuit of the motor.

The circuit connections of the motor are shown in Fig. 5, in which 6 represents the squirrel-cage winding, 2^A the main winding, and 2^B the starting winding on the stator. This latter winding is connected in parallel with the main winding 2^A through collector rings 13 and centrifugal contacts 15, so that its circuit is closed at starting, but is opened when the motor gets up to speed.

By means of the construction described, one centrifugal device serves both to clutch

the armature to the shaft and to open the starting circuit when the motor is up to speed.

By the use of a central spider and the overhanging core, and by placing the clutch beneath the overhang on one side of the spider and the controlling switch on the other side, a compact construction is secured.

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 electric motor, a shaft, an armature loosely mounted thereon, centrifugally-operated means carried by the armature for clutching the armature to the shaft, contacts controlling the starting connections of the motor, and operative connections between said centrifugally-operated means and said contacts.

2. In an electric motor, a shaft, an armature loosely mounted thereon, a clutch for connecting shaft and armature together, a controlling switch for the motor, a centrifugal device carried by the armature, and operative connections from said device to both said clutch and said switch.

3. In an electric motor, a shaft, an armature loosely mounted thereon, a clutch for connecting shaft and armature together, stationary contacts, contacts carried by the armature adapted to engage the stationary contacts, a centrifugal device, and operative connections from said device to both said clutch and the last mentioned contacts.

4. In an electric motor, a shaft, a spider loosely mounted on said shaft, a laminated armature core carried by said spider and overhanging it on each side, a clutch on one side of the spider beneath the overhung core adapted to connect the shaft and spider together, a controlling switch having its stationary contacts supported on the other side of the spider beneath said core, a centrifugal device carried by the spider, and operative connections from said device to both said clutch and said switch.

5. In an electric motor, a shaft, a spider loosely mounted on said shaft, a laminated armature core carried by said spider and overhanging it on each side, a clutch on one side of the spider beneath the overhung core adapted to connect the shaft and spider together, a controlling switch comprising stationary collector rings surrounding the shaft on the other side of the spider beneath said core and contacts carried by the spider adapted to engage said rings, a centrifugal device carried by the spider, and operative connections from said device to both said clutch and said contacts.

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

RALPH E. BARKER.

Witnesses:

JOHN A. McMANUS, Jr.,

PHILIP F. HARRINGTON.