

No. 742,280.

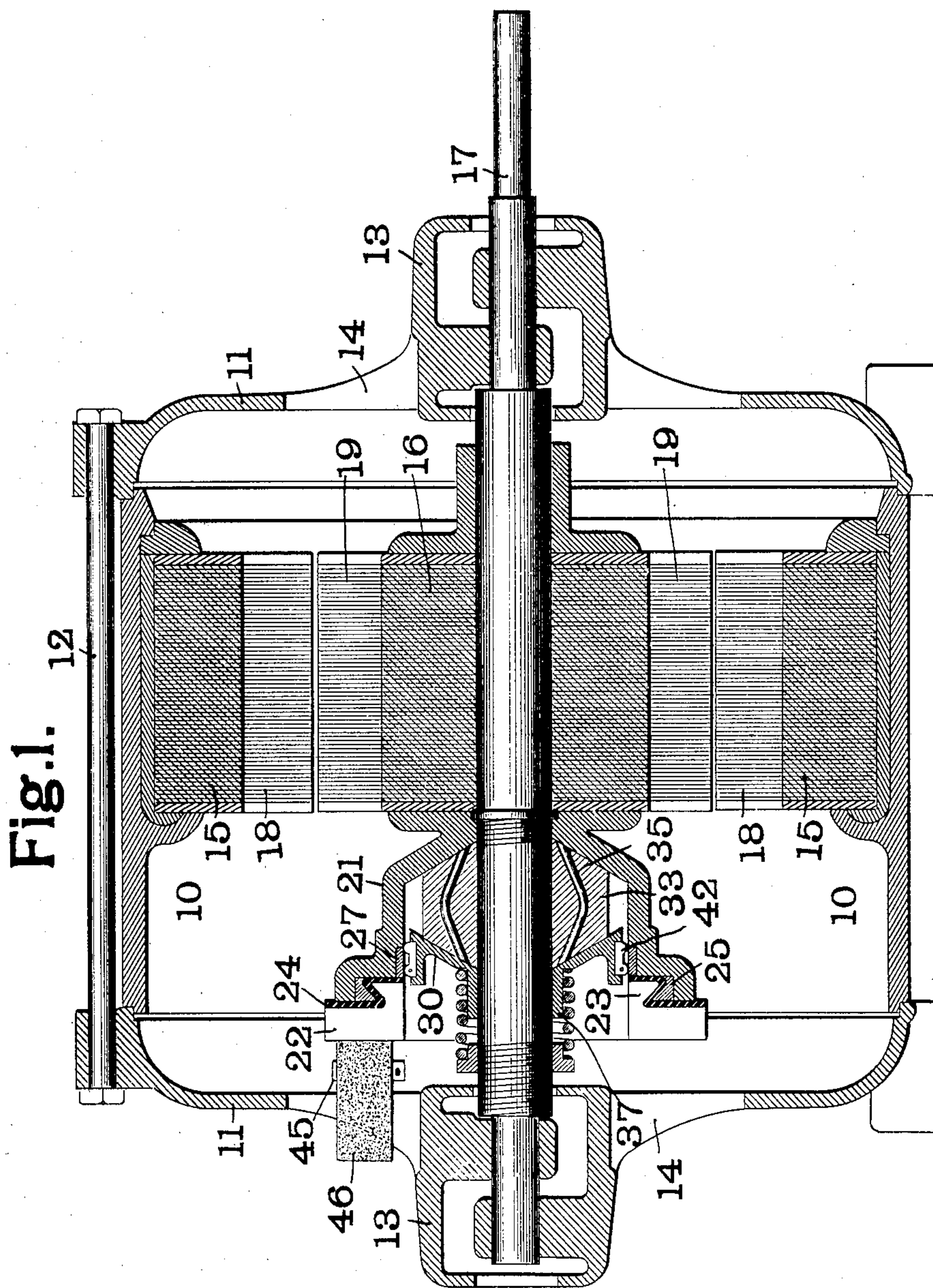
PATENTED OCT. 27, 1903.

J. H. BLAIR.
ELECTRIC MOTOR.

APPLICATION FILED MAR. 21, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

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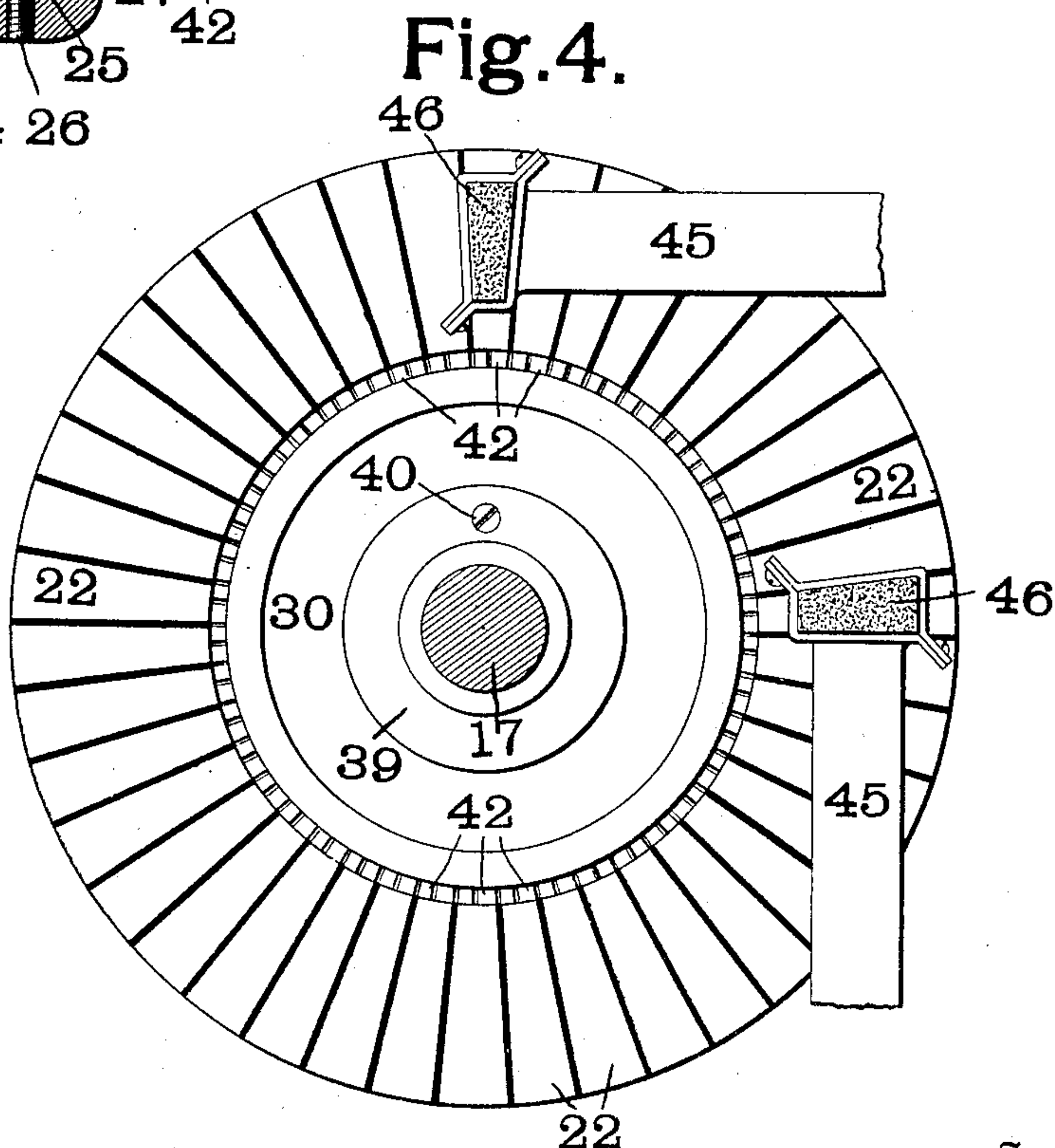
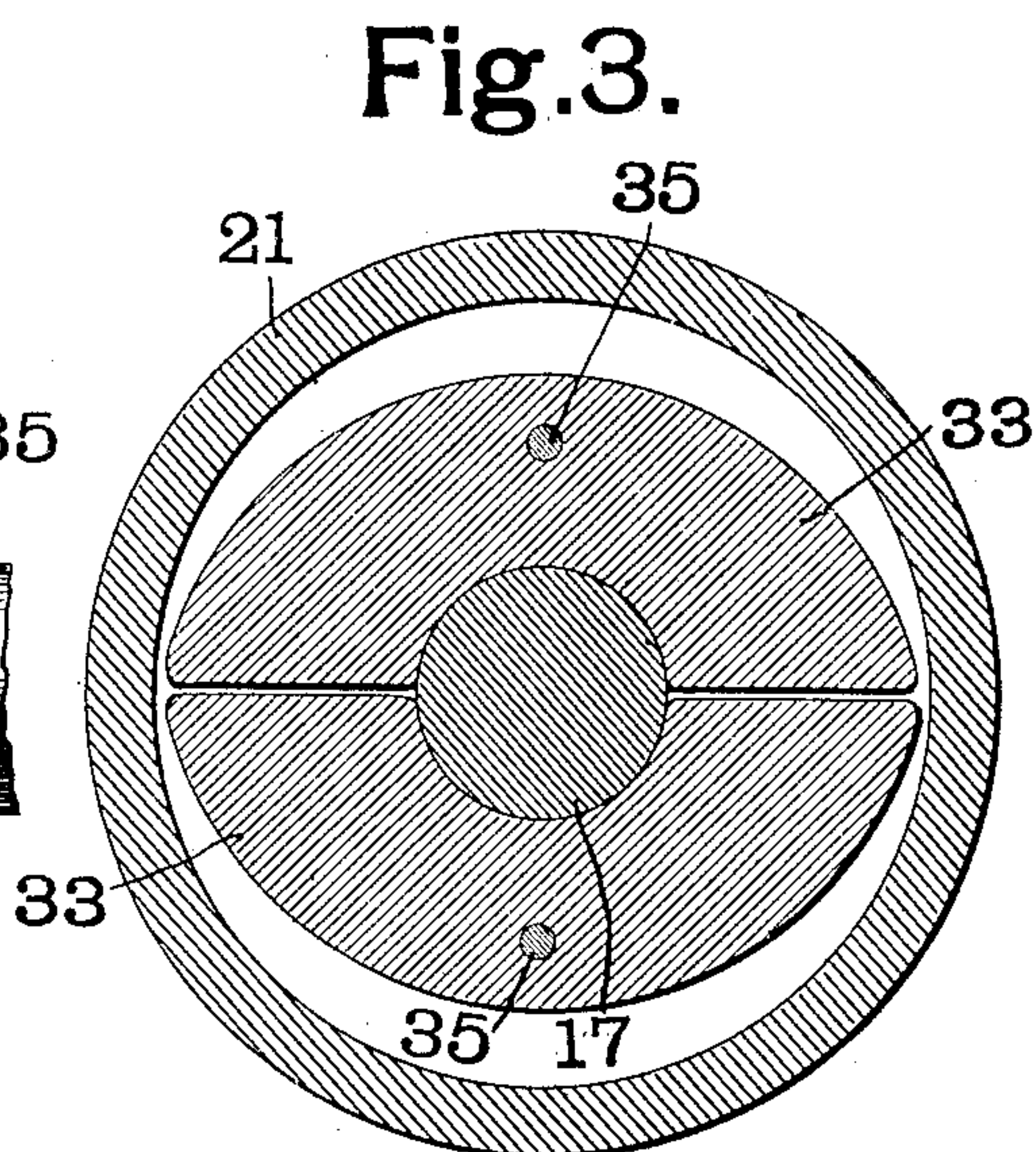
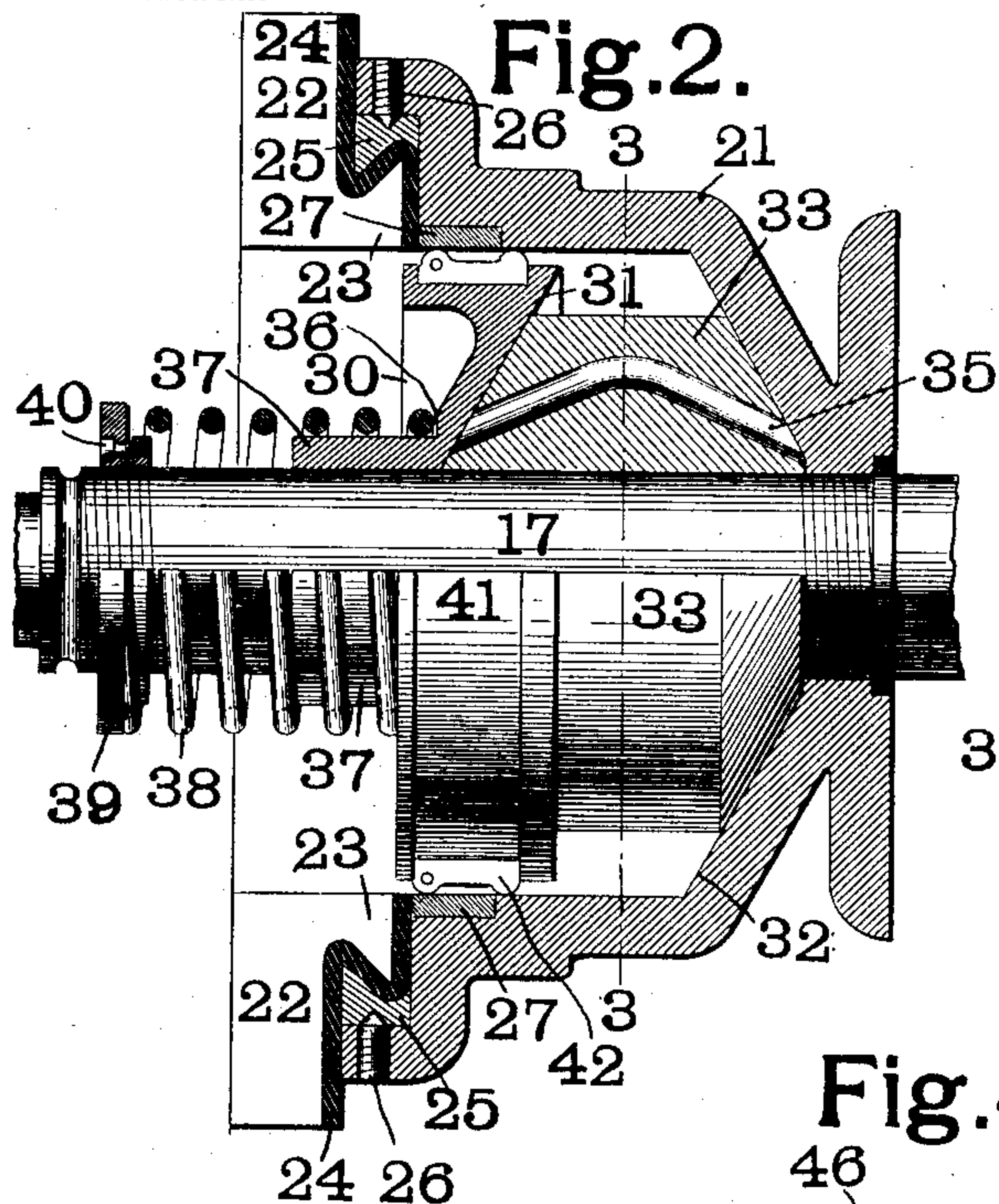
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UNITED STATES PATENT OFFICE.

JOSEPH H. BLAIR, OF ST. LOUIS, MISSOURI, ASSIGNOR TO WAGNER ELECTRIC MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 742,280, dated October 27, 1903.

Application filed March 21, 1903. Serial No. 148,824. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH H. BLAIR, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have
5 invented a certain new and useful Electric Motor, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being
10 had to the accompanying drawings, forming part of this specification.

My invention relates to a novel device for automatically reorganizing the armature-circuits of single-phase alternating-current motors of the self-starting variety, and has for
15 its object the production of an automatic short-circuiting device for the armature-windings in which the relatively movable parts make rubbing contact with one another, thereby insuring the maintenance of clean
20 surfaces, and consequently perfect electrical connection.

In the drawings forming part of this specification, in which like characters of reference
25 refer to similar parts in the different views, Figure 1 is a vertical longitudinal section through a motor embodying a form of my invention. Fig. 2 is a vertical section, on an enlarged scale, of the short-circuiting device
30 shown in Fig. 1. Fig. 3 is a vertical cross-section on the line 3-3 of Fig. 2; and Fig. 4 is an end view of the short-circuiting device, showing also the position of the brushes on the commutator-ring.

35 The motor-casing consists of three parts—a middle portion 10 and end pieces 11, which are fastened together by through-bolts 12. The end pieces 11 are provided with suitable boxes 13, and ventilating-openings are formed
40 in said end pieces by cutting the same away around said boxes, as shown at 14 in Fig. 1. The stationary member or field of the motor 15 is fastened to the inside of the motor-casing, as is usual in motors of this type. The
45 rotary member or armature 16 of the motor is rigidly mounted upon the shaft 17, the ends of which are journaled in the boxes 13. The field 15 of the motor is provided with polar projections 18, and the armature 16 is
50 provided with similar polar projections 19.

All of these parts are of usual and well-known construction and are therefore not more particularly described herein.

Screwed upon the shaft 17 and adapted to rotate therewith is a cup-shaped casing 21, 55 upon the rim of which the commutator for the armature-winding is fastened, as hereinafter described. This commutator is, as usual, composed of a large number of conducting segments or contacts 22, suitably insulated from one another and assembled in the form of a ring. These segments 22 are provided with lugs 23 and are held together by an insulating-ring 24, surrounding the lugs 23 and clamped in place by a beveled ring 65 25, held in position by set-screws 26, as shown in Fig. 3. A continuous conducting-ring 27 is set into the inner face of the cup-shaped casing 21 and is insulated from the contacts 22 by the insulating-collar 24. 70

30 is an annular member surrounding the shaft 17. The inner face 31 of this member 30 is beveled or inclined, as shown in Figs. 1 and 2, and the cup-shaped casing 21 is provided with an oppositely-inclined face 32. 75 Between these two inclined faces 31 and 32 are segmental pieces 33, which are also provided with oppositely-inclined or beveled faces corresponding to the inclined faces 31 and 32. The shape of these pieces 33 will be 80 best understood from Figs. 2 and 3. They are loosely mounted upon the shaft 17, but are adapted to rotate therewith, as hereinafter described. These parts 33 I prefer to make of a soft composition metal, such as 85 Babbitt metal, and I embed in them hard-metal pieces 35, which terminate at the oppositely-inclined faces of these segmental pieces and furnish a durable surface to prevent excessive wear. 90

37 is a sleeve mounted on the shaft 17 and carrying the annular member 30. Surrounding said sleeve 37 and abutting at one end against a shoulder 36, formed on the annular member 30, is a helical spring 38. The other 95 end of this spring abuts against a split collar 39 upon the shaft 17 and locked against rotation by means of the set-screw 40.

The outer surface of the collar 30 is provided with a groove 41, in which a number of 100

contact-pieces 42 are loosely carried. But two of these contact-pieces 42 are shown in Figs. 1 and 2. There are, however, a large number of them, forming a practically-continuous ring around the collar 30, as indicated in Fig. 4. Each of these contact-pieces 42 is provided at its ends with rounded shoulders, forming rubbing-surfaces adapted to make contact with the conducting-ring 27 and the insulated contacts 22, as hereinafter described. A certain amount of play or free motion is allowed these contact-pieces 42 between the bottom of the groove 41 and the parts against which their rubbing-surfaces are adapted to bear. It has been found that this play increases with the use of the device due to the wearing away of the rubbing-surfaces.

45 represents brush-holders carrying brushes 46, adapted to bear on the insulated contacts 22 of the commutator-ring. These brushes perform the ordinary function of brushes of this type of motors and may remain constantly upon the commutator or may be raised therefrom after the insulated contacts 22 have been short-circuited, as hereinafter described.

In the operation of my invention the brushes 46 are placed in contact with the commutator composed of the contacts 22 when it is desired to start the motor. The operation of the motor-windings, which are connected to the contacts 22 when the brushes are on the commutator, is well known and need not be described. After the motor has started and the rotary member or armature 16 has reached its normal running speed the centrifugal force thereby generated forces the segmental pieces 33, which rotate with the armature, away from the shaft 17. The inclined sides of these pieces 33 cooperate with the oppositely-inclined surfaces 31 and 32 to force the collar 30 outward against the tension of the spring 38. This brings one end of the contact-pieces 42 into rubbing engagement with the insulated contacts 22, the other end of said contact-pieces 42 remaining in contact with the conducting-ring 27. This, it will be seen, short-circuits the insulated contacts 22, and consequently also short-circuits the armature-windings connected to said contacts in the usual way. As the contact-pieces 42 are lighter in weight than the parts 33, said contact-pieces 42 will be forced centrifugally against the conducting-ring 27 before the faces 33 have been driven centrifugally away from the shaft 17 to push forward the collar 30 to such a position as will bring the contact-pieces 42 into communication with the insulated contacts 22. The contact-pieces 42 therefore rub against the conducting-ring 27, and the insulated contacts 22 keep the connecting-surfaces clean and insure good conductivity. Any play the contact-pieces 42 may have, due either to wear or to other causes, is therefore automatically compen-

sated for. After the insulated contacts 22 have been short-circuited the brushes 46 may be raised from the commutator, thus allowing the motor to run with its armature-circuits uncommuted. When the current which energizes the motor is shut off, the speed of the armature will gradually decrease until the helical spring 38 can overcome the centrifugal force acting upon the pieces 33. The collar 30 will then be returned to its normal position, (shown in Figs. 1 and 2,) and when the brushes 46 are restored to contact with the commutator the motor is again in condition for starting.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a reciprocating member for electrically connecting said contacts, and a centrifugal device making sliding contact with said reciprocating member to actuate the same.

2. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a reciprocating member for electrically connecting said contacts, and a centrifugal device having an inclined face making sliding contact with said reciprocating member to actuate the same.

3. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a reciprocating member for electrically connecting said contacts and provided with an inclined face, and a centrifugal device having an inclined face making sliding contact with the inclined face of said reciprocating member to actuate the same.

4. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a reciprocating member for electrically connecting said contacts, an abutment, and a centrifugal device having two oppositely-inclined faces, one of said faces making sliding contact with said reciprocating member and the other of said faces making sliding contact with said abutment.

5. In an electric motor, the combination with the rotary member thereof, of a casing carried by said rotary member, insulated contacts carried by said casing, a reciprocating member for electrically connecting said contacts, and a centrifugal device within said casing for actuating said reciprocating member.

6. In an electric motor, the combination with the rotary member thereof, of a casing carried by said rotary member and forming an abutment, insulated contacts carried by said casing, a reciprocating member within said casing for electrically connecting said contacts, and a centrifugal device within said casing and having two oppositely-in-

clined faces, one of said faces making sliding contact with said reciprocating member, and the other of said faces making sliding contact with said abutment.

5 7. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a conductor stationary with respect to said contacts, and a reciprocating member making sliding contact
10 with said insulated contacts and said conductor.

8. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a conductor stationary with respect to said contacts, a reciprocating member, and a centrifugally-actuated short-circuiting device carried by said reciprocating member and making sliding contact with said insulated contacts and said
15 conductor.
20

9. In an electric motor, the combination with the rotary member thereof, of a plurality of insulated contacts, a conductor stationary with respect to said contacts, a reciprocating member making sliding contact with
25 said insulated contacts and said conductor,

and a centrifugal device for actuating said reciprocating member.

10. In an electric motor, the combination with the rotary member thereof, of a casing carried by said rotary member and forming an abutment, a plurality of insulated contacts carried by said casing, a conductor carried by said casing and stationary with respect to said insulated contacts, a reciprocating member within said casing, a centrifugally-actuated short-circuiting device carried by said reciprocating member and making sliding contact with said insulated contacts and said conductor, and a centrifugal
30 device within said casing and having two oppositely-inclined faces, one of said faces making sliding contact with said abutment and the other of said faces making sliding contact with said reciprocating member.
35 40 45

In testimony whereof I have hereunto set my hand and affixed my seal in the presence of the two subscribing witnesses.

JOSEPH H. BLAIR. [L. S.]

Witnesses:

W. A. LAYMAN,

W. A. ALEXANDER.