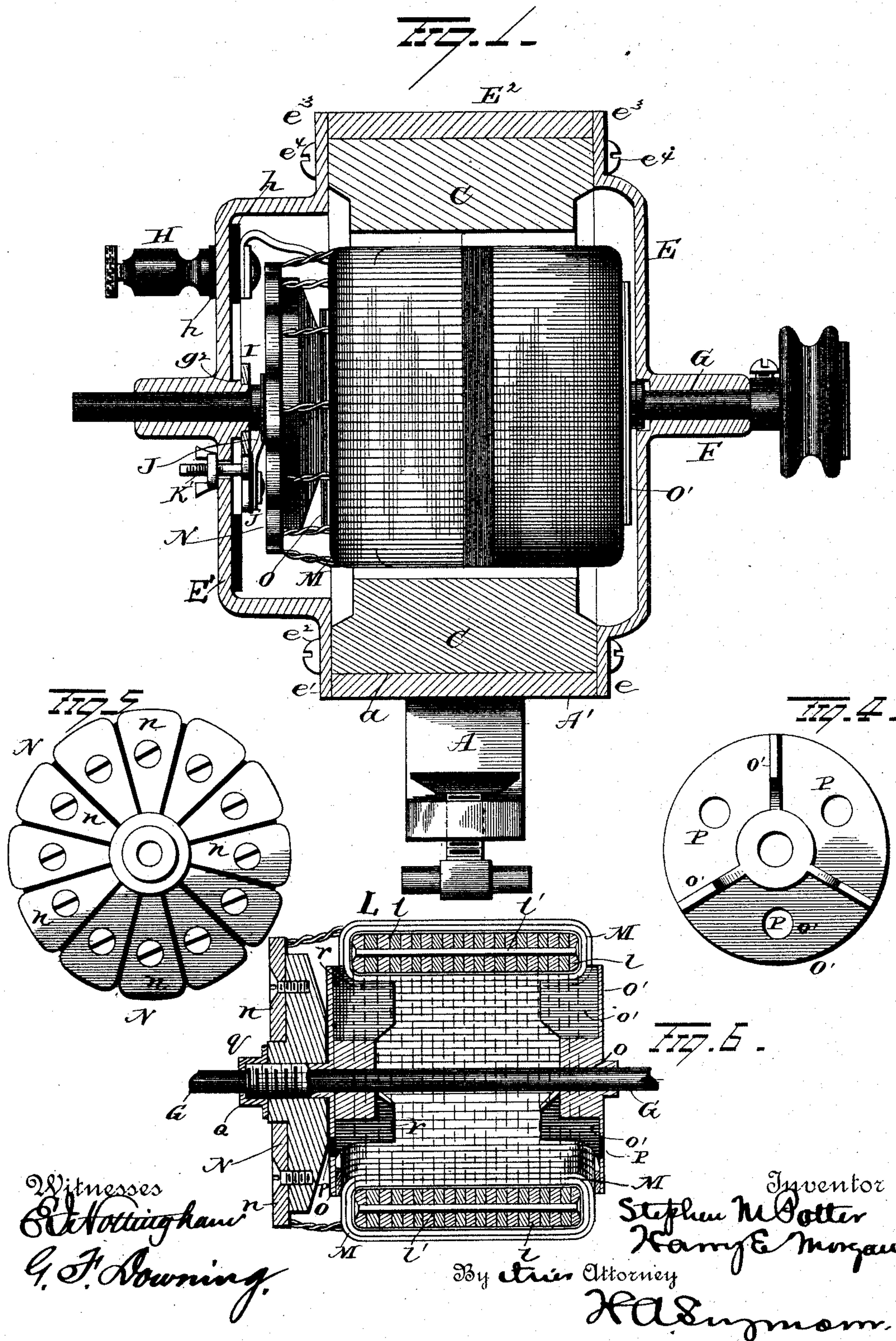


(No Model.)

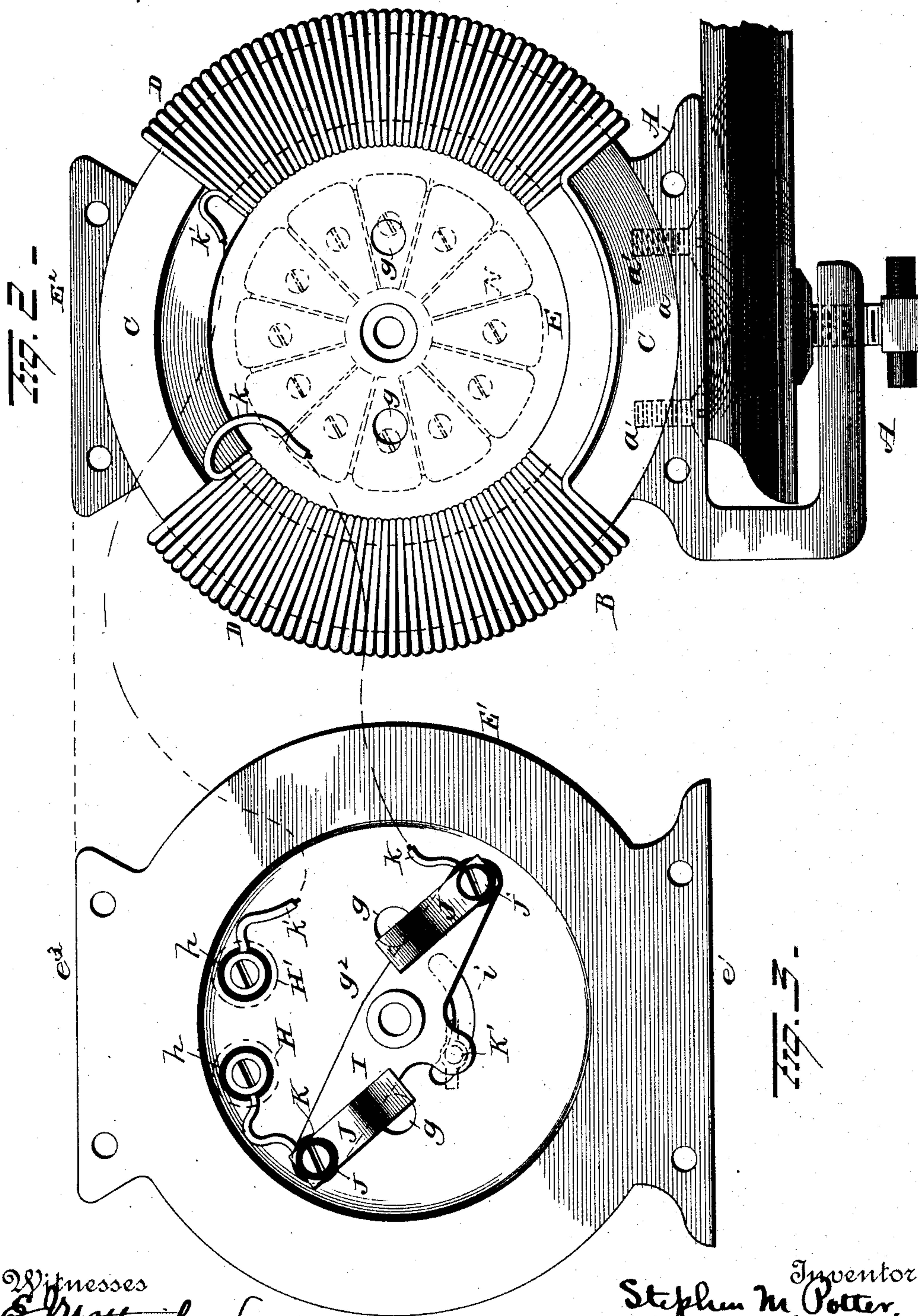
2 Sheets—Sheet 1.

S. M. POTTER & H. E. MORGAN.
ELECTRIC MOTOR OR DYNAMO ELECTRIC MACHINE.
No. 428,782. Patented May 27, 1890.



2 Sheets—Sheet 2.

Patented May 27, 1890.



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UNITED STATES PATENT OFFICE.

STEPHEN MERRITT POTTER AND HARRY ERNEST MORGAN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC MOTOR OR DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,782, dated May 27, 1890.

Application filed June 27, 1889. Serial No. 315,711. (No model.)

To all whom it may concern:

Be it known that we, STEPHEN MERRITT POTTER and HARRY ERNEST MORGAN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Motors or Dynamo-Electric Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to an improvement in electric motors or dynamo-electric machines, the object being to provide simple and efficient means for ventilating the armature.

A further object is to provide an improved construction of armature whereby the armature caps or heads serve the double purpose of supporting the armature-core and coils wound thereon, and also of conveying currents of air through the interior of the armature and in contact with the armature-coils.

A further object is to provide improved means for detachably securing the commutator in place.

A further object is to provide improved means for adjustably mounting the commutator-brushes on the motor-casing.

A further object is to provide simple and effective construction of casing and clamp, whereby the latter serves as the base-block for the machine and as a support for the end casings or caps.

With these ends in view our invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of our improved motor. Fig. 2 is an end view with the cap removed. Fig. 3 is a detached view of one end of the casing, showing the commutator-brushes adjustably mounted thereon. Fig. 4 is a detached view of one of the armature caps or heads. Fig. 5 is a view of the commutator. Fig. 6 is a sectional view of the armature.

A represents a clamp by which the motor may be attached to a table or other support. Clamp A is constructed with a block A', provided with a curved seat *a*, in which is received one of the pole-pieces of the field-magnet B, which is fastened to the block A' by means of screws *a' a'*. Field-magnet B consists of an iron ring provided with pole-pieces C C, the portions of the ring situated between the pole-pieces being reduced in size or cross-section and provided with the field-coils D D, of insulated wire of suitable size and amount. The opposite sides or faces of the block A' are planed off, so as to form seats for the attachment of the downwardly-projecting wings *e e'*, which are preferably formed integral with the end casing or caps E E' of the motor and which are fastened to the block by means of the screws *e²*. These end casings are also provided with upwardly-projecting wings *e³ e³*, which are fastened to a frame E² by screws *e⁴*. The frame is made to conform to the shape of the upper pole-piece, and hence occupies but little space, and at the same time serves as a means for securing the upper portions of the end casing in place. It will thus be observed that while the end casings serve to protect and inclose the working parts of the motor they are disconnected from the cores or pole-pieces of the field-magnets.

Each cap is constructed with an elongated box F, which boxes support the ends of the armature-shaft G and constitute its end bearings. Each one of the caps E E' is also provided with one or more holes *g* for the admission and discharge of air. The holes *g* are located in such relation to holes formed in the armature-heads, as will be hereinafter described, that the air will be freely admitted to and discharged from the casing and be caused to flow in direct contact with the armature-coils, and thereby reduce the heating of the armature to the minimum.

To the cap E' are secured the binding-posts H H', which are insulated from the cap by the insulating-washers *h*.

The motor is included in the circuit of any

generator or battery by connecting the ends of the circuit with the binding-posts II II'.

Upon the armature-shaft G within the casing or upon a stud g^2 on the inner surface of the casing is loosely mounted a bar I, to the opposite ends of which are detachably secured the commutator-brushes J J by the screws j , the latter being inserted in insulated blocks or washers K, whereby the brushes are insulated from each other and from the bar supporting them. To the bar I is fastened a screw K', which extends through an arc-shaped slot i , formed in the casing. By loosening the screw slightly the bar and commutator-brushes may be moved sufficiently to adjust the latter, and then by tightening the screw the commutator-brushes are firmly clamped against accidental displacement. Commutator-brushes are connected to the end of the field-magnet conductor by a flexible wire k and to one of the binding-posts by a flexible conductor k' , and hence the bar supporting the commutator may be readily adjusted without disturbing or impairing the circuit-connections.

L represents the armature, the core of which is composed of a series of insulated metal rings l , fastened together by a pin l' . Around the core are wound the armature-coils M, which are connected to the segments n of the commutator N. The opposite ends of the armature are provided with caps or heads O O', each consisting of a metal disk provided with a hub o , which is supported on the armature-shaft. On the interior of each disk or head are formed inwardly-projecting radial wings o' , (three or more,) which extend within and support the armature-core. Each armature-head is provided with perforations P, which are located near the outer edge of the head and between the radial wings o' . The armature-head O is constructed with a sleeve Q, threaded at its outer end, and upon which is mounted the commutator, which is secured thereon by the nut q . Armature head or disk O' is provided with deflectors or curved wings r , one at the side of each perforation formed therein.

In the operation of the motor the wings r serve to draw air through the perforations in the casing, and, owing to the fact that the holes in the armature-head are located near its outer edge and between the inwardly-projecting radial wings, the air thus drawn in is caused to flow in direct contact with the inner halves of the armature-coils, and thus thoroughly ventilate and prevent them from becoming unduly heated. The air thus drawn through the interior of the armature and in contact with the armature-coils is discharged through the openings in the opposite armature-head and caused to flow around and in contact with the commutator and commutator-brushes and outwardly through the exit-holes in the other cap or end casing of the

motor, and hence the temperature of the commutator and its brushes is reduced to the minimum.

An electric motor or dynamo-machine constructed in accordance with our invention comprises few parts, which are simple in manufacture, are readily adjusted without taking the machine apart, may be quickly separated for the purpose of inspection or repair, and are durable and efficient in use.

In view of the fact that our improvement is applicable to dynamo-machines as well as electric motors, we would have it understood that our claims comprehend the invention whether embodied in motors or generators.

It is evident that many slight changes in the construction and relative arrangement of parts might be resorted to without departing from the spirit and scope of our invention, and hence we would have it understood that we do not restrict ourselves to the particular construction and arrangement of parts shown and described; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the field-magnet, armature, and end casings inclosing the field-magnet and armature, of a commutator connected with the armature, an adjustable bar located within the casing, commutator-brushes mounted on said adjustable bar, and a device connected with the adjustable bar and extending through the end casing for imparting adjustment to the bar and brushes, substantially as set forth.

2. The combination, with a flat commutator-disk located adjacent to one end of the armature, of a bar adjustably mounted within the casing, commutator-brushes connected with the opposite ends of the bar and insulated therefrom, and an adjusting-screw connected with said bar and extending through a slot in the cap and adapted to secure the bar and commutator-brushes in any desired adjustment, substantially as set forth.

3. The combination, with the armature-core, of end disks constructed with hubs which are mounted upon the armature-shaft and are provided with laterally-projecting radial wings which extend into and support the armature, said disks being furnished with air-openings which are located between said radial wings and near the outer edge of the disk, substantially as set forth.

4. The combination, with an armature, of a perforated supporting-disk provided with a sleeve and a disk-commutator secured to said sleeve, substantially as set forth.

5. The combination, with an armature and a supporting-disk provided with a sleeve which is mounted on the armature-shaft, of a disk-commutator mounted on said sleeve and secured thereto, substantially as set forth.

6. The combination, with an armature and
a supporting-disk provided with a screw-
threaded sleeve which is mounted on the arm-
ature-shaft, of a disk-commutator mounted
5 on said sleeve and a nut for securing the
commutator-disk in place, substantially as
set forth.

In testimony whereof we have signed this

specification in the presence of two subscrib-
ing witnesses.

STEPHEN MERRITT POTTER.
HARRY ERNEST MORGAN.

Witnesses:

BENSON P. COOPER,
A. C. ARMBRUSTER.