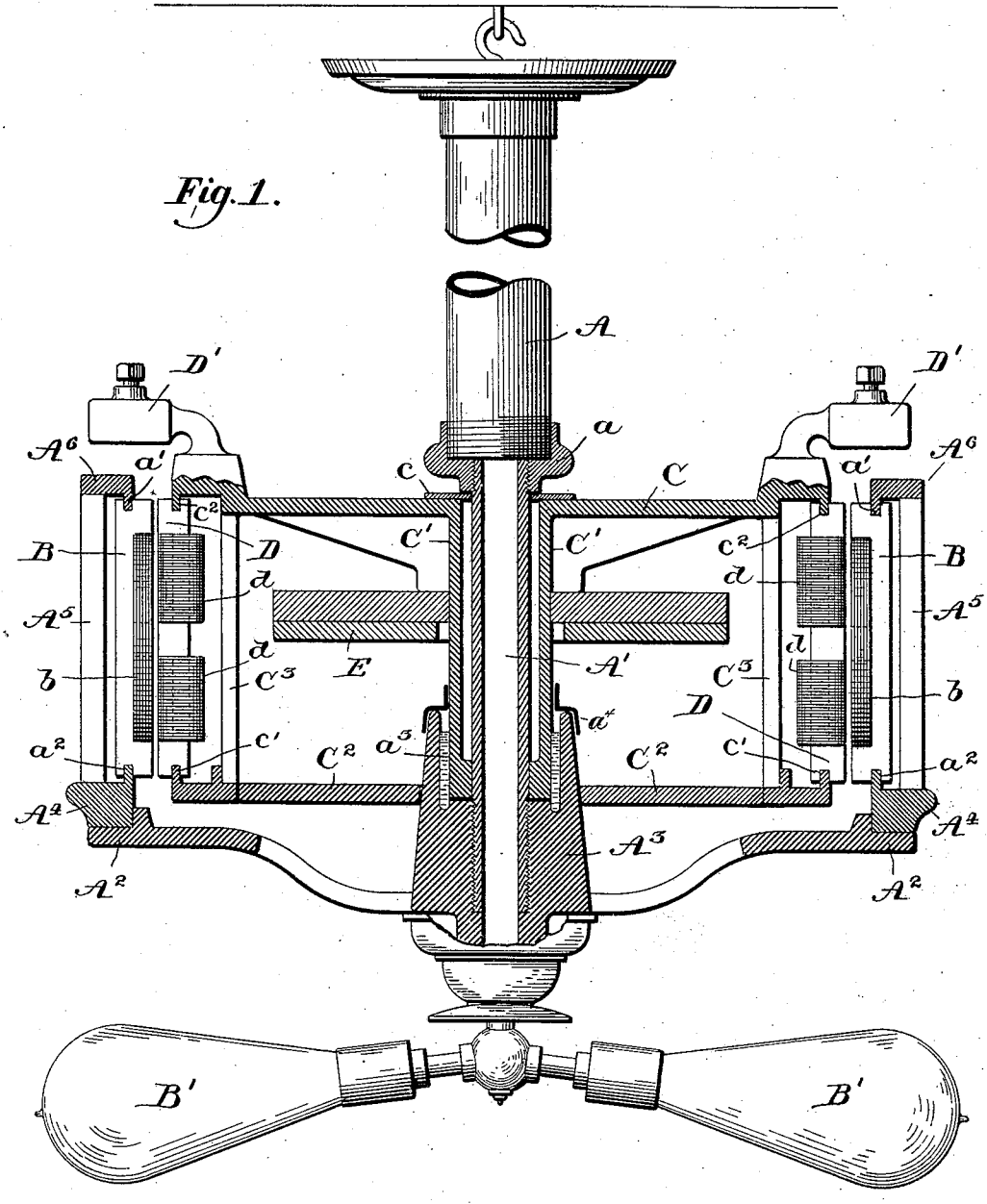
(No Model.) 3 Sheets—Sheet 1.

G. J. SCOTT.

ELECTRIC MOTOR.

No. 564,455. Patented July 21, 1896.

Fig. 1.



Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

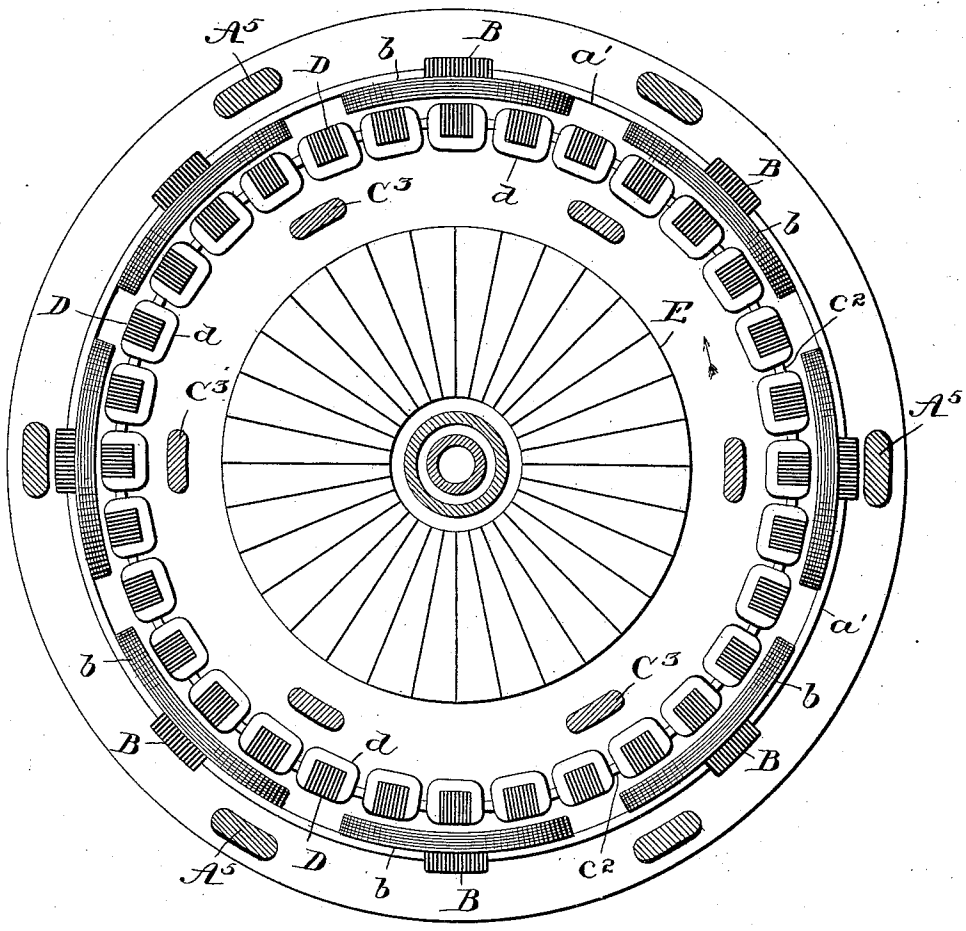
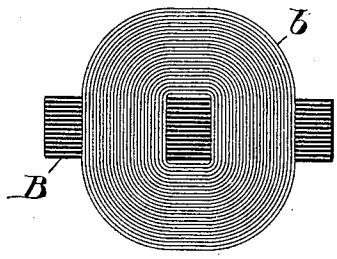


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

G. J. SCOTT.

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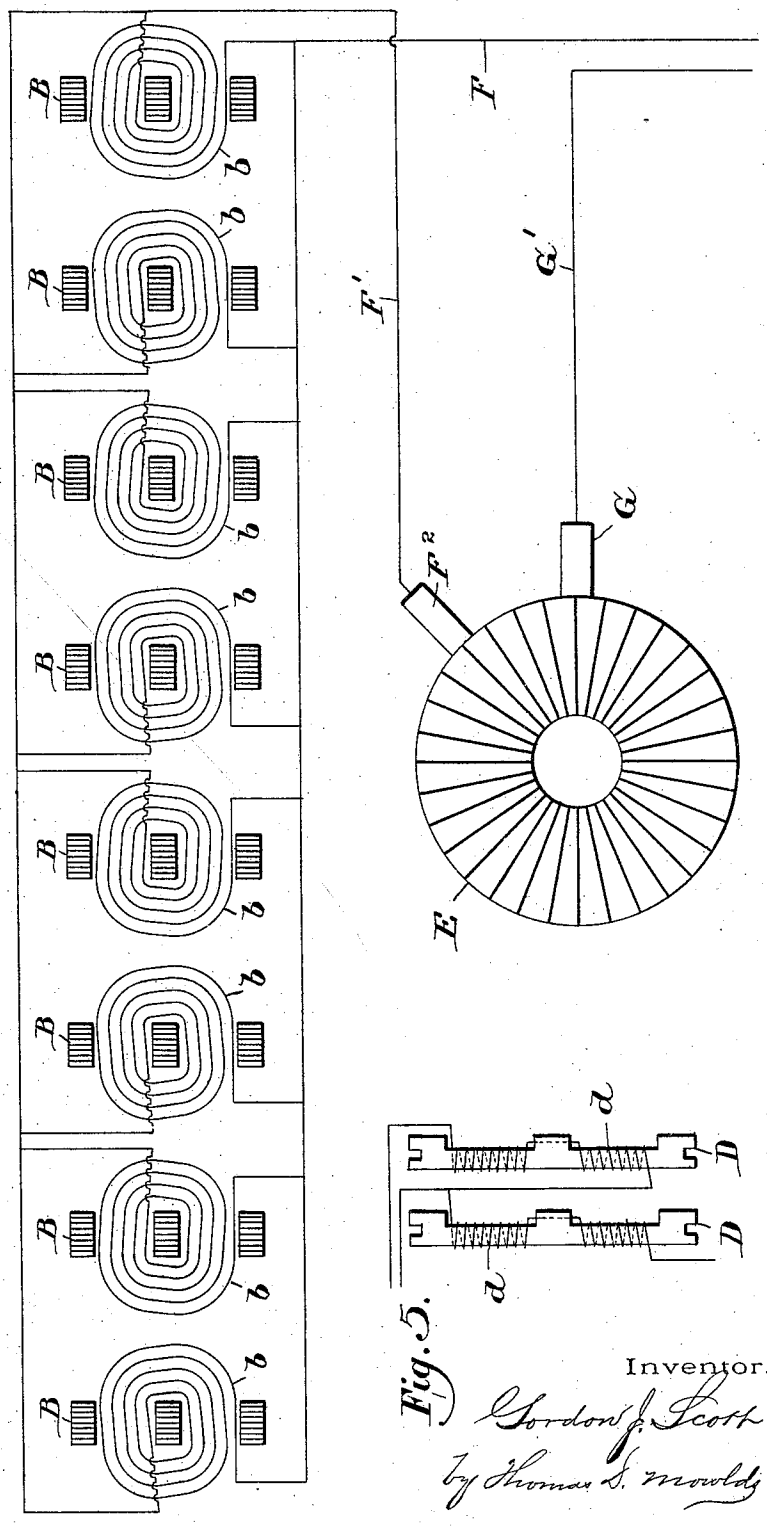

Fig. 4.

Fig. 5.

Witnesses.

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UNITED STATES PATENT OFFICE.

GORDON J. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 564,455, dated July 21, 1896.

Application filed September 19, 1895. Serial No. 562,928. (No model.)

To all whom it may concern:

Be it known that I, GORDON J. SCOTT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Motors; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electric motors, and the object of my improvement is to construct a light and comparatively powerful motor. In pursuance of this object I construct the several parts of the motor in the manner hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a fan-motor embodying my invention suspended from the ceiling of a room and having electric lights attached under the motor. Fig. 2 is a horizontal sectional view of the motor, showing the coils and cores in plan. Fig. 3 is a face view of one of the field-magnets. Fig. 4 is a diagram showing windings and connections of the field-magnets. Fig. 5 is a view of one of the armature-magnets, showing the shape of the cores and the manner of winding the coils thereon.

Referring to the drawings, A indicates a metal tube by which the motor is suspended from the ceiling; A′, a smaller steel tube connected to the tube A by means of the screw-sockets *a*, and A^2 indicates the base or bottom part of the motor.

A^3 is a central screw-threaded portion of the bottom part connecting with the lower end of the steel tube A′.

A^4 is an iron ring secured upon the base-plate A^2, and A^5 are supports secured upon the ring A^4 at suitable intervals. The ring A^4 and the supports A^5 may be made separately or they may be cast integral with the base-plate A^2, if desired.

A^6 is a ring surmounting the support A^5 and bolted thereto.

The rings A^4 and A^6 are similar in construction and have formed thereon the lips or projections *a′* and a^2, which serve to hold the field-magnets in position.

The laminated iron cores B of the field-magnets are made of thin flat strips of metal cut to the shape shown, and insulated one from the other when they are assembled together. The field-magnet coils *b* are wound around the middle pole of the core and are circular and flat, or disk-shaped, as shown in Fig. 3.

A flat circular casting C forms the top of the armature, and C′ is a tubular extension cast integral with the top C and fitting around the small steel tube A′ in the manner shown in Fig. 1. A covering-ring *c* fits around the tube A′ and is fastened to the top C, and a flat circular casting C^2 forms the bottom of the armature.

C^3 C^3 are vertical supports connecting the parts C C^2 together.

c′ c^2 are projecting lips cast on the parts C and C^2 for the purpose of holding armature-magnets in position.

D D are the laminated iron cores of the armature-magnets, being the same shape as the iron cores of the field-magnets; and *d d* are the spool-shaped coils of the armature-magnets. These coils are wound circumferentially around the cores in different directions on the opposite ends of said cores, in the manner shown in Fig. 5. The commutator is indicated by E, and the sockets into which the ends of the fan-blades are inserted by D′.

a^3 is an oil-cup surrounding the end of the tube C′.

a^4 is a cover over the oil-cup a^3, and B′ B′ are two incandescent lights secured to the bottom of the stationary part of the motor.

The coils of the armature-magnets being wound circumferentially in different directions on each end of the several magnets, the ends of said magnets are both north or both south, according to the direction of the current, while the middle or consequent pole is opposite in sign to said end poles. The commutator being cross-connected, only two brushes are used.

The several parts of the motor being assembled in the manner shown and the several

wires of the field and armature magnets being properly connected, the current of electricity enters from the line-wire F, passing through the field-magnets and out along the wire F′ into the commutator through the brush F^2 into the armature-magnets and out at the brush G and along the outgoing wire G′. As the armature-magnets come centrally opposite the field-magnets the direction of the electric current in their coils is reversed, and in receding from such central position the poles and coils of the armature and field repel each other, while the armature magnets and coils that are approaching the field magnets and coils are attracted toward said field-magnets, thus producing the forward circular movement of the armature in the direction indicated by the arrow in Fig. 2.

In my improved motor, as above described, the armature-coils are spool-shaped and arranged in pairs upon cores which are parallel with the axis of the armature, the cores having middle and end poles and the coils being arranged on both sides of the middle poles. The field-coils have cores with middle and end poles which lie in the same transverse planes, respectively, as the middle and end poles of the armature-cores. These field-coils are comparatively thin and flat and are disk-shaped, being arranged or wound around the middle poles of their respective cores, as shown particularly in Figs. 1 and 3. These field-coils are of such area that they cover several of the armature-coils—three, as shown in the drawings.

The inner and outer edges of each field-coil are respectively opposite or substantially opposite the inner and outer ends, respectively, of a pair of armature-coils when the cores of the field and armature coils are opposite. By this arrangement I am able to secure the maximum effect or torque from given sizes of coils.

Having described my invention, what I claim is—

1. In an electric motor, the rings A^4 and A^6, holding between them the field-magnets and supported by the base A^2, having the central cup-shaped portion A^3, connected to the tube A′, in combination with the circular top C, carrying the armature-magnets and provided with the tubular portion C′, surrounding the tube A′, fitting into and supported by the cup-shaped base A^3, substantially as shown and described.

2. In an electric motor, the rings A^4 and A^6, provided with the lips or projections a', a^2, and holding between them field-magnets composed of the laminated cores B, and flat coils b, the base A^2, having the central cup-shaped part A^3, connected to the supporting-pipe A′, in combination with the circular top C, provided with the tubular central portion C′, the ring C^2, and the armature-magnets composed of the laminated iron cores D, and coils d, all arranged substantially as and for the purpose described.

3. In an electric motor, the armature having a series of cores on its periphery and parallel with its axis, and on each core a pair of oppositely-wound spool-shaped coils including between them a middle or consequent pole, in combination with a field consisting of a series of cores having middle poles in the plane of the consequent poles of the armature, and flat disk-shaped coils surrounding said middle poles, the relative sizes of said coils being such that the inner and outer edges of the field-coils are substantially in the same transverse planes as the inner and outer ends of the armature-coils and the coils being so arranged that each field-coil extends over a plurality of armature-coils, as set forth.

4. In an electric motor, the fixed rings A^4, A^6, having opposite flanges a', a^2, the laminated cores B supported by said flanges, each having a middle and two end poles, and comparatively large flat disk-like coils surrounding said middle poles, in combination with the armature having upper and lower plates C, C^2, opposite peripheral flanges c', c^2, on said plates, laminated cores supported by said flanges and having middle and end poles and oppositely-wound spool-shaped coils on said cores between the middle and end poles; the inner and outer edges of the field-coils being substantially in the same transverse planes as the inner and outer ends of the armature-coils respectively, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GORDON J. SCOTT.

Witnesses:
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THOS. D. MOWLDS.