

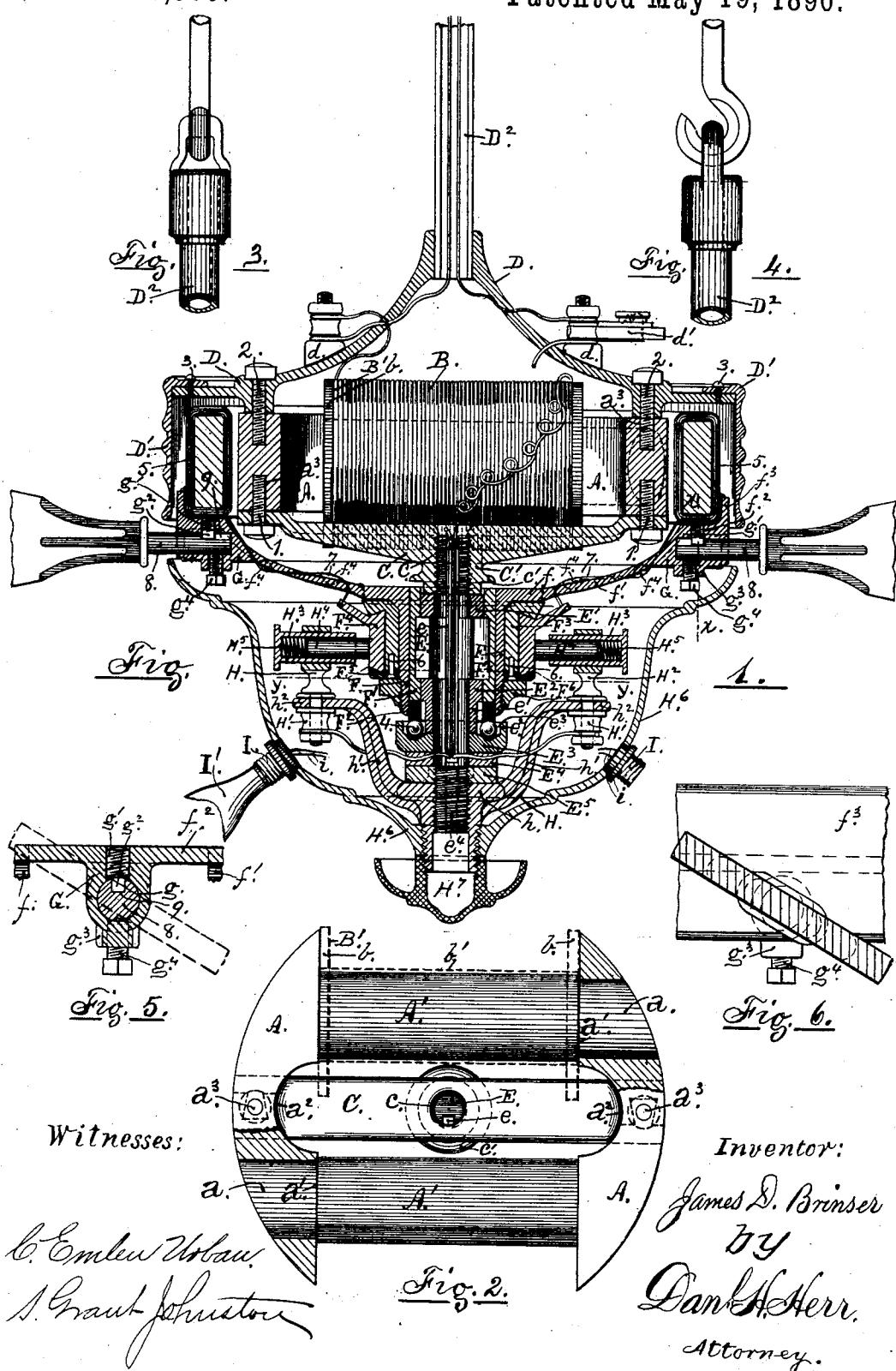
(No Model.)

J. D. BRINSER.  
ELECTRIC MOTOR FAN.

2 Sheets—Sheet 1.

No. 560,569.

Patented May 19, 1896.



Witnesses:

C. Emile Urban.  
A. Grant Johnston

Inventor:

James D. Brinser  
by  
Dank Herr.  
Attorney.

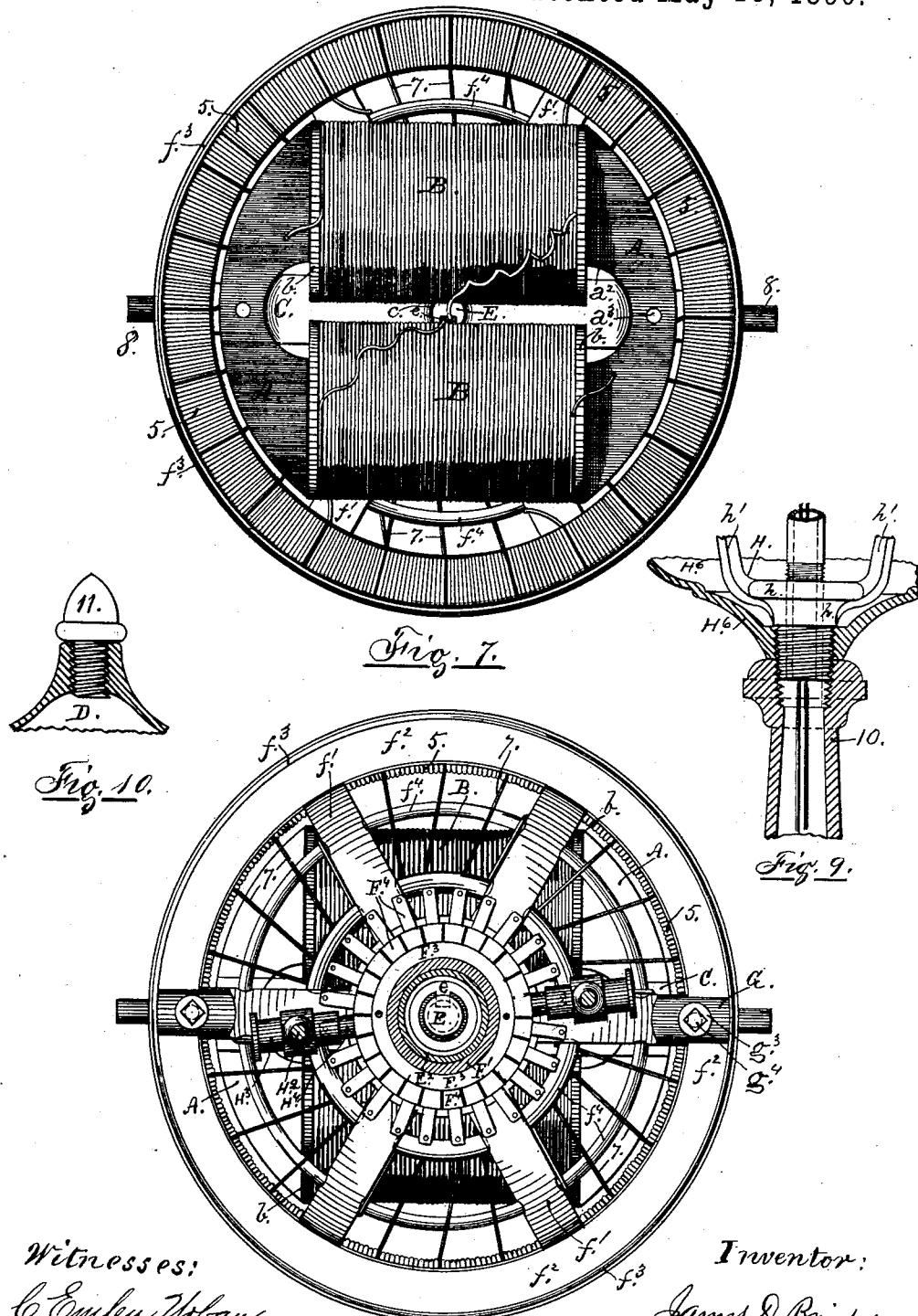
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Witnesses:

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC-MOTOR FAN.

SPECIFICATION forming part of Letters Patent No. 560,569, dated May 19, 1896.

Application filed July 12, 1894. Serial No. 517,268. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES D. BRINSER, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Electric-Motor Fans; and I 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.

This invention relates to improvements in an electric-motor fan adapted to be suspended from a ceiling or supported on the upper end of a vertical column resting on a floor, and is of that class in which horizontal fan-blades have their shafts secured into specially-constructed sockets placed in the periphery of an armature-carrier rotating about a centrally-located magnetic field known to the trade as a "field-magnet."

The objects of the invention will clearly appear in the following description, and its elements will be distinctly set forth in the claims.

The invention consists, first, in the special construction of the pole-pieces and coil-cores of the field-magnet; second, in the special construction of the sockets receiving the ends of the shafts of the fan-blades; third, in the special construction of the bearing and sleeve of the armature-carrier, and, fourth, in providing the motor-housing of the fan with electrolier-sockets, whereby incandescent lamps may be secured thereto for illuminating purposes.

The purposes of the invention are attained by the mechanism and devices illustrated in the accompanying drawings, in which similar letters and figures of reference designate like parts throughout the several views, and in which—

Figure 1 is a vertical section of a suspended fan embodying the elements of the invention, the upper end of the suspending-shaft being broken away and shown in separate views in Figs. 3 and 4. Fig. 2 is a plan of the pole-pieces detached from Fig. 1, partially in horizontal section, showing the supporting-yoke in full and dotted lines in place on the under side; Fig. 5, an enlarged section of a portion

of the armature-carrier, taken on the line *x-x* in Fig. 1, viewed from the right, dotted lines showing the inclination of the fan-blades; Fig. 6, a similar view of the same portion completed; Fig. 7, a top view of Fig. 1 completed, 55 with the upper housing and fan-blade portions removed; Fig. 8, a bottom view of the same with the parts below the line *y-y* in Fig. 1 removed, and Figs. 9 and 10 modifications of the upper and lower ends of Fig. 1 as they 60 appear when the fan is secured to the top of a floor-column.

In the construction of the field-magnets of motors for electric fans of this class it has been the practice heretofore to make the pole-pieces of cast and the cores of the coils of wrought iron and joining them together by butting the ends of the cores against the inner faces of the pole-pieces, securing them in position by means of screws or bolts having 70 their shafts passed through the bodies of the pole-pieces, their inner ends tapped into the axes of the cores, and their heads countersunk or embedded into the outer faces of said pole-pieces. To secure great compactness of the 75 magnetic field, simplicity of form, uniformity of metallic fiber or texture, continuity of lines of conductivity without the many fractures, seams, or joints unavoidable heretofore, as well as to permit various coils to be readily 80 applied to meet the conditions of the different electric sources or plants in connection with which said fans may be used, and to allow those burned out to be replaced by new ones, the following construction is preferred: 85

The framework or base of the field-magnet here referred to is made of a good quality of Norway or Sweden iron forged in two pieces, and they are exact counterparts of each other, so as to be interchangeable. They consist 90 of each of a pole-piece *A* and a coil-core *A'*, integrally made or joined at one end, and the cores have their forward or free ends *a* and *a'* slightly reduced in diameter and closely fitted into corresponding orifices in the other ends 95 of the pole-pieces, which have their inner faces resting against the small shoulders formed by said reduction, as at *a'* and *a*. (Best shown in Fig. 2.) The pole-pieces have each a central cut-out *a<sup>2</sup>* to reduce metal and 100

are provided in their upper and lower faces with screw-threaded orifices  $a^3$  to receive attaching or securing screws, to be hereinafter described.

5 B designates the usual wire coils, which, for the purposes of this invention, are wound upon spools B', having non-magnetic ends b, of any suitable fibrous substance, secured to the ends of magnetic ferrules b' of light metallic tubing, adapted, closely fitting, to sleeve upon the cores A'. A spool in dotted lines is shown in place on the upper core in Fig. 2, and spools, with coils thereon, are shown in Figs. 1, 7, and 8.

15 C designates a bar or yoke secured to the under faces of the pole-pieces by means of screws 1, passed through its ends and into the orifices  $a^3$  of said pole-pieces. Vertically through the center of the yoke is a screw-threaded orifice c, surrounded on the under side by a downwardly-extending tubular projection C', having around its convex face a ring flange or shoulder c' to stop the upward movement of the working parts placed below.

25 This yoke serves to bind said pole-pieces together, secure the coils in place, and complete the field-magnet, as well as to support the revolving armature-carrier, its bearing, the brush-holder yoke, an ornamental housing or

30 cover, and an ornamental pendant to finish the same.

To the top of the field-magnet, by means of screws 2, passed through its body and into the orifices  $a^3$  in the upper faces of the pole-pieces, is secured a non-magnetic housing or covering D, having secured to its outer edge by rivets or screws 3 a peripheral rim or flange D' to cover the revolving armature, yet to be described. This housing is provided

35 with binding-posts d, to which are secured the field-magnet wires, as well as the wires from the electric source or plant, and to one of these posts is secured a fuse-block d' to break the electric connection when a suddenly-increased voltage occurs, which block

40 may be made the subject of a separate patent in an application to be hereafter made, while into the top center of the housing is secured the lower end of a rod or tube D<sup>2</sup>, Fig. 1, by

45 means of which the fan is suspended from a ceiling by the broken-away end and hook shown in Figs. 3 and 4.

50 Into the orifice c of the yoke is secured the upper end of a rod or shaft E, also screw-threaded at its lower end, and in the greater portion of its body, from the top, is formed a key-seat or groove e for the passage of the coil-wires to the commutator-brushes. At

55 prescribed points hardened-steel collars E' and E<sup>2</sup> are secured to the body of this shaft to form vertical bearings against which the armature-carrier sleeve rotates. Butting against the lower end of the collar E<sup>2</sup>, which is prolonged and slightly reduced circumferentially, as shown at e', is a collar or washer E<sup>3</sup>, having an upwardly-projecting rim e<sup>2</sup>,

60 forming an annular recess e<sup>3</sup>, provided with

a V-grooved bottom, in which balls 4 roll to form a bearing for the revolving armature-carrier. This collar rests on a washer E<sup>4</sup>, 70 provided in its upperface with a radial groove in the cut-away portion (not shown in the drawings) for the passage of the wires to and from the coils and connecting the brushes, as shown in Fig. 1, while a jam-nut E<sup>5</sup>, screwed 75 onto the threaded lower end of the shaft, serves to bind these several parts together and hold them securely in place.

F designates a cylindrical sleeve or tube of approved dimensions, provided on its inner 80 face with a tubular lining F', made of met-aline or other approved substance, fitted closely above and below to the convex surface of collar-bearings E' and E<sup>2</sup>, before mentioned, so as to constitute the wearing or rubbing faces against said bearings, while below and also within the tube F is a hardened-steel collar-ring F<sup>2</sup> to rotate on top of the balls 4, likewise before mentioned. Integral with the upper end of the tube F is an outwardly-extending ring-flange f, provided with radially-projecting and upwardly-curving arms f', having at their outer extremities a horizontal ring or flange f<sup>2</sup>, provided on its outer edge with an upwardly and downwardly extending 95 peripheral rim f<sup>3</sup> and supporting on its upper face, within said rim, the coil-sections 5 of the revolving armature. (See Figs. 1, 7, and 8.) The tube or sleeve F is also provided externally with a tubular body F<sup>3</sup>, into 100 which are embedded the sections F<sup>4</sup> of a cylindrical commutator, and the sections are held upwardly in place by a dovetailed ring-washer F<sup>5</sup>, affixed to the lower edge thereof by screws 6, tapped into said body, while a 105 jam-nut F<sup>6</sup>, screwed onto the lower end of the sleeve F, serves to secure the commutator to said sleeve, and wires 7, stretched over beams f<sup>4</sup>, secured to the arm f', serve to connect the commutator-sections with the sections of the 110 armature-ring.

To the under face of the ring f<sup>2</sup>, inside of the rim f<sup>3</sup>, radially extending and oppositely disposed, being rigidly secured to the armature-carrier, are placed the fan-blade supporters G of the invention. In the drawings they are shown to be integral with the carrier, and they have partially-cylindrical bodies provided lengthwise with axial bores g to receive the fan-blade shafts 8. From above 120 are tapped through said bodies screws g', having flattened ends or points g<sup>2</sup> within said bores to engage grooves or key-seats 9 in said shafts to keep the shafts from turning, and below are lugs g<sup>3</sup>, through which set-screws 125 g<sup>4</sup> serve to keep the shafts from slipping out. The grooves 9 must be cut into the shafts, with reference to the blades thereto attached, in such a position as to give to said blades the desired degree of inclination, which in 130 the drawings is about thirty degrees from the horizontal. (See Figs. 1, 5, 6, and 8.)

Onto the lower end of the shaft E is screwed the base or hub h of a yoke H, having oppo-

sitely-disposed and upwardly-extending arms  $h' h'$  with horizontally-disposed free ends  $h^2 h^2$ , to which are secured, below, binding-posts  $H' H'$  for the wires from the coils, and above, 5 the bases of columns  $H^2 H^2$ , having screwed

through their upper ends horizontally-disposed tubes  $H^3 H^3$ , supporting in their axial bores commutator-brushes  $H^4 H^4$ , and coiled springs  $H^5 H^5$  behind the brushes serve to 10 keep the forward end of said brushes in close contact with the commutator, Figs. 1 and 8.

Onto the lower end  $h^3$  of the hub  $h$ , which is prolonged and provided with external screw-threads for this purpose, is screwed an 15 ornamental inverted cup or framework  $H^6$  to serve as a housing to the lower mechanism of the fan, and the remaining threads serve to hold in place any cap or cup  $H^7$  as an ornamental pendant to finish this end of the fan. 20

The housing  $H^6$  at any approved points is provided with ordinary electrolier-sockets, and their wires  $i$  (shown in part in the drawings) are passed up through the groove  $e$  to above the coils  $B$ , where their upper ends 25 may be joined to the wires to and from the electric source, or they may be carried up through the tube  $D^2$  and have said ends separately connected with said electric source. In Fig. 1 a portion of an incandescent-lamp 30 globe is shown in place on the left and on the right a socket appears alone.

Removing the cap or cup  $H^7$  from the lower end, screwing it into the top of a column 10, Fig. 9, also removing the tube or shaft  $D^2$  from the center of the top housing and putting in place any ornamental finial, as an 35 acorn 11, Fig. 10, it becomes a column-fan; but in this case the wires from the electric source will pass upward within the shaft of 40 the column, Fig. 9, to the binding-posts, and the groove  $e$  of the shaft  $E$  will have to be extended the whole way through, as indicated by dotted lines  $e^4$ , Fig. 1, for the passage of 45 said wires.

It will here be observed that instead of the rod or shaft  $E$  above described a tube may be used, when the groove or key-seat  $e$  may be omitted, for the wires may be passed through the bore of the tube. This construction does not involve any new invention and 50 is so evident that its separate illustration was deemed superfluous.

The invention having been thus fully described and the manner in which it is performed distinctly set forth, what is considered new, and desired to be secured by Letters Patent, is—

1. In a field-magnet to be placed within the ring of the revolving armature of a motor for 55 an electric fan, the herein-described wrought-iron base comprising two oppositely-disposed pole-pieces and two perpendicularly-placed coil-cores between said pole-pieces; a pole-piece and a coil-core integrally joined at one 60 end, forged in one piece; each core having its diametrically-reduced forward end closely fitted into the orifices in the orifice in the free

end of the opposite pole-piece; the cores adapted to have spools with wire coils sleeved thereon, and means provided to hold the pole-pieces in position, substantially as hereinbefore set forth. 70

2. In a wrought-iron base of a field-magnet of the character described, the opposite pole-pieces  $A$  and  $A'$ , and the coil-cores  $A'$  and  $A'$  75 at right angles therewith; a pole-piece and a core integrally joined at one end, having been forged in one piece; the diametrically-reduced forward ends of the cores fitted into the orifices in the other ends of the pole-pieces, said 80 ends resting against the shoulders  $a'$  and  $a'$  of the cores; said cores adapted to receive and hold the coil-spoils as shown; and means provided, such as the yoke-bar  $C$  having its extremities secured to the under faces of the 85 pole-pieces to bind them together and hold them in position, substantially as set forth.

3. The combination in a field-magnet of a motor for an electric fan of the character described, with the forged pole-pieces,  $A$  and  $A'$ , 90 and the forged coil-cores,  $A'$  and  $A'$ , each core having one end integrally joined to one end of a pole-piece and the other end closely fitted into the orifice in the other end of the opposite pole-piece, said end placed against the 95 shoulder  $a'$  of the core, of the spools,  $B'$  and  $B'$ , provided with the non-magnetic end disks,  $b$  and  $b$ , having their centers secured to the ends of the magnetic ferrules,  $b'$  and  $b'$ , 100 sleeved upon the cores as shown; the magnetic field-coils,  $B$  and  $B$ , wound upon said spools as shown and electrically connected with the brushes of a cylindrical commutator and, through binding-posts  $d$  as shown, with an electric source or plant; and, means provided, such as the yoke-bar  $C$  having its ends 105 secured to the under sides of the pole-pieces to bind them together and to hold the rest of the mechanism in position, substantially as set forth. 110

4. The combination in an electric fan having a field-magnet, as described, and the bar-yoke,  $C$ , with the central orifice,  $c$ , having its extremities secured to the under faces of the pole-pieces of said magnet, with a shaft,  $E$ , 115 provided with means for the passage of wires along its body, its upper end screw-threaded and secured into the orifice,  $c$ , of the yoke, and its lower end also screw-threaded, as shown; having the ring-bearings  $E'$  and  $E^2$ , 120 the washer  $E^3$  with the annular recess  $e^3$  having the V-grooved bottom and the balls 4 therein, the washer  $E^4$ , and the jam-nut  $E^5$ , all secured to the body of the shaft, as shown, of the cylindrical sleeve,  $F$ , having the tubular lining,  $F'$ , and the bearing-ring,  $F^2$ , within the sleeve, as shown; having means provided, at its upper end, to carry the armature-ring, and, on the outer face of its body, to support the cylindrical commutator; the whole substantially as described and for the purpose hereinbefore set forth. 125

5. The combination in an electric fan having a ring-armature to revolve about a central

field-magnet by means of a cylindrical commutator mounted on the carrier-sleeve rotating on a shaft having its upper end supported below the center of said field-magnet, with 5 the peripheral ring-flange of said carrier, of the oppositely and radially disposed fan-blade supporters, G, secured to the under face of said flange; said supporters having the blade-shaft bores, g, at the axes thereof; the screws, 10 g', with the flattened ends, g<sup>2</sup>, within the bores, tapped, downwardly extended, through the tops of the bodies of the supporters, and the set-screws, g<sup>4</sup>, upwardly extended, through the boss-lugs, g<sup>3</sup>, the whole adapted to hold 15 the fan-blades in fixed position, all substantially as described, and for the purpose set forth.

6. The combination in an electric fan having a revolving armature-carrier, as shown, 20 with the fan-blade supporters, G, secured to

the under side of said carrier, as shown, the blade-shaft bores, g, in the axes of the bodies of said carriers, the guide-pins, g<sup>2</sup>, in the upper portions of said bores, and the set-screws, g<sup>4</sup>, through their bottoms, of the blade-shafts, 25 8, with the guide-grooves, g, in their tops, inserted into the bores, g, of the supporters, the grooves, g, in engagement with the pins, g<sup>2</sup>, and the set-screws, g<sup>4</sup>, screwed home, and the fan-blades, having the desired degree of inclination, secured to the forward ends of said shafts, all substantially as described and for the purpose hereinbefore set forth. 30

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

JAMES D. BRINSER.

Witnesses:

EDWIN BOOKMYER,  
EDWIN H. BOOKMYER.