

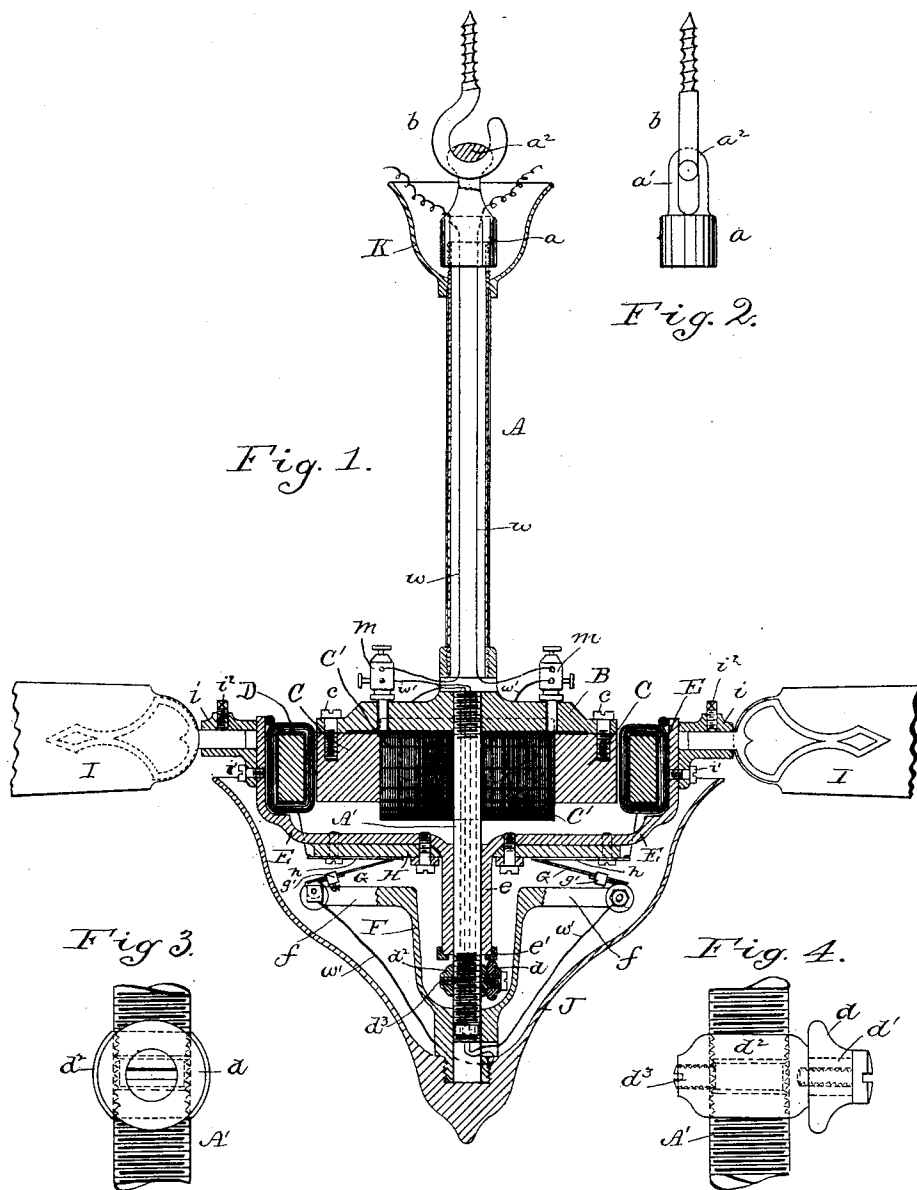
(No Model.)

2 Sheets—Sheet 1.

P. DIEHL & E. H. BENNETT, Jr.
ELECTRIC FAN.

No. 465,360.

Patented Dec. 15, 1891.



WITNESSES:

O. E. Hunt.
J. G. Myers Jr.

INVENTORS:
Philip Diehl and
Edwin H. Bennett, Jr.
BY *Henry K. Adams*
ATTORNEY.

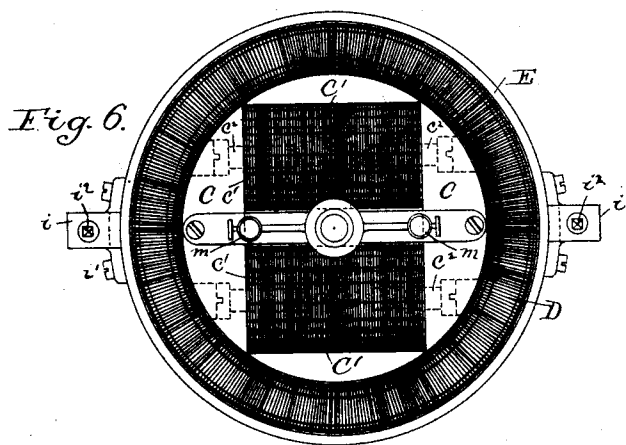
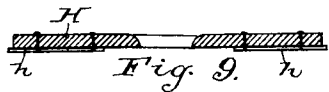
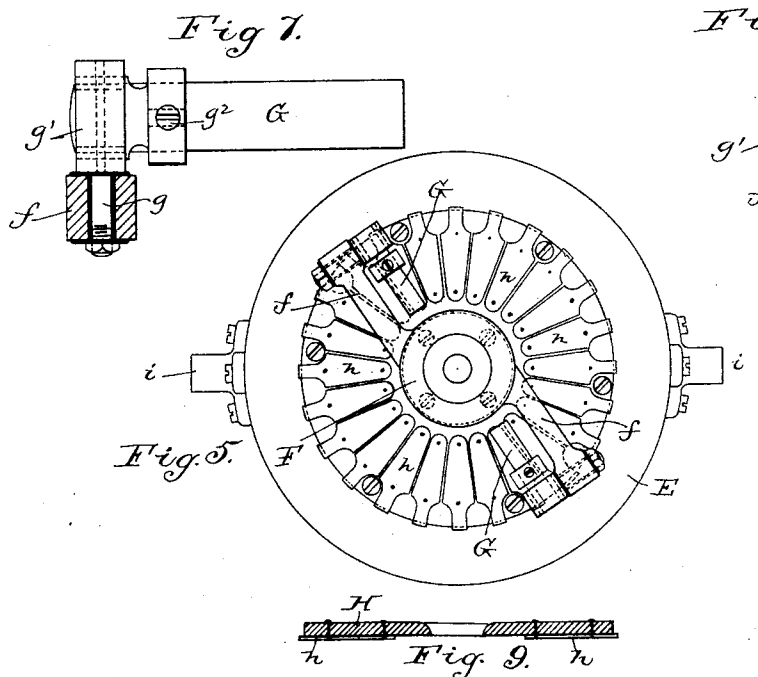
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WITNESSES:

C. E. Hunt,
J. G. Myers Jr.

INVENTORS:

Philip Diehl &
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UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, AND EDWIN H. BENNETT, JR., OF BAYONNE,
NEW JERSEY.

ELECTRIC FAN.

SPECIFICATION forming part of Letters Patent No. 465,360, dated December 15, 1891.

Application filed April 4, 1891. Serial No. 387,645. (No model.)

To all whom it may concern:

Be it known that we, PHILIP DIEHL, residing at Elizabeth, county of Union, and EDWIN H. BENNETT, Jr., residing at Bayonne, county of Hudson, State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Electric Fans, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to that class of electric fans in which the fan-blades are carried by the frame of the revolving armature, and more particularly to fans which are to be suspended, the object of our invention being to improve the construction of fans of this class so that they may be cheaply manufactured and will run with a minimum of power, and so that they will combine efficiency with convenience to the greatest possible extent.

In the accompanying drawings, Figure 1 is a vertical section of our improved fan. Fig. 2 is a detail view of the hook and eye or loop by which the fan is to be suspended. Figs. 3 and 4 are detail views, on a larger scale, of the roller-bearing and adjacent parts. Fig. 5 is a bottom view with the lower casing and fan-blades omitted to show the commutator and brushes. Fig. 6 is a plan view of the field-magnet and armature. Figs. 7 and 8 are detail views to show the hinged connections of the brush-holders with their supporting arms. Fig. 9 is a cross-section of the commutator-disk.

A denotes the fan-supporting spindle, made in the form of a tube and provided at its upper end with a collar *a*, which may be screwed thereto, and which is provided with an eye or loop *a'* to be engaged by the suspending-hook *b*. The top portion *a''* of this loop or eye resting in said hook is of such form in cross-section, as clearly shown in Fig. 1, as to completely fill the bearing portion of the hook, so that there will be no torsional movement of the eye in the hook, while at the same time the fan will be free to swing in any direction. In other words, the contiguous bearing portions or meeting faces of the hook and eye are of corresponding shape cross-wise of the eye, the face of the eye being convex and the face of the hook concave. This

construction insures that the said meeting faces will fit closely together, so that when the current is turned on to start the fan there will be no torsional backward jerk of the eye in the hook, which would have a tendency to turn or screw out the hook.

Attached to the lower end of the tube A is a non-magnetic motor-support B, into which is screwed a tube or hollow shaft A'. The field-magnet consists of the pole-pieces C, attached to said support by the screws *c*, and the coils C', surrounding wrought-iron bars *c'*, (denoted by dotted lines in Fig. 6,) said pole-pieces being attached to said bars by screws *c''*.

The armature-ring D is secured within a non-magnetic carrier E, having a hub or sleeve *e* surrounding the tube A', and provided at its lower end with a hardened-steel collar *e'*, resting on a hardened-steel bearing-roller *d*, rotating on a stud *d'*, formed on or secured to a collar *d''*, screwed onto the tube A', and secured in place by a set-screw *d'''*.

F denotes an oil-cup screwed onto the bottom of the tube A' and surrounding the roller-bearing *d* and the hub *e*, so that said parts may be immersed in oil to insure light running. The oil-cup F, as herein shown, is provided with arms *f*, to which are insulatingly secured pins *g*, on which the brush-holders *g'* are pivoted, the brushes G being removably attached to said holders by screws *g''*.

H denotes a vulcanized-fiber disk attached to the armature-carrier E, the commutator-sections *h* being riveted to said disk. The brushes G are arranged radially of the commutator and are pressed upward against the same by coil-springs *g'''* at their pivots. By arranging the brushes radially of the commutator, as shown, danger of breakage of the brushes should the armature and commutator be accidentally turned backward is avoided; and, moreover, the brushes, by being set radially, will, as they wear off, maintain their positions relative to the field-magnet.

The fan-blades I are held in brackets *i*, attached to the periphery of the armature-carrier E by screws *i'*, the shanks of said blades being held in their sockets by set-screws *i''*.

The tubular support A serves as a conduit in which the conductor-wires *w* are housed, said wires running to the binding-posts *m* on

the support B, and the tube A' also serves as a housing-conduit through which the wires *w'* running to and from the brush-holders may be passed.

- 5 The motor is preferably entirely housed below by the casing J, screwed on the hub of the oil-cup E, and the sleeve A is preferably provided at its top with a cup K, which con-
10 ceals the parts which it incloses and gives a neat finish.

By arranging the commutator below the armature and placing the brushes below the commutator any dirt resulting from the wear of the brushes and commutator-sections
15 readily escapes, falling down and being caught in the housing or casing J, the latter being imperforate to form a closed receptacle. The said casing also excludes dust from the motor and oil-cup. With the fan thus con-
20 structed it will run for an entire season when the oil-cup has once been filled with oil.

We claim—

1. A suspended electric fan provided with a tubular support forming a conduit for the
25 conductors, combined with a motor-support attached to said tubular support, and a tube attached to said motor-support and serving as a bearing for the rotary armature-carrier and as a conduit for the passage of conduct-
30 ing-wires running to brush-holders arranged below the armature, as set forth.

2. In an electric fan, the combination, with the suspended tubular support A, through which the conducting-wires pass, of the mo-
35 tor-support B, attached to the lower end thereof, a field-magnet sustained by said motor-support, a tubular bearing A', attached to said motor-support, a rotary armature mounted on said tubular bearing below said field-
40 magnet, a commutator on the lower face of said armature, and conductors passing through the said tubular bearing to the brushes of said commutator.

3. A suspended electric fan having an armature-carrier provided at its lower end with a bearing-collar, combined with a shaft on which said carrier rotates, and a bearing-roller
45 attached to said shaft and on which said collar rests.

- 50 4. The combination, in a suspended electric

fan, of a rotating armature-carrier, and a bearing-roller, on which the lower end of the hub of said carrier rests.

5. In a suspended electric fan, the combination, with the rotary armature-carrier, of a
55 roller-bearing on which the lower end of the hub of said carrier rests, and an oil-cup in which the said roller-bearing is arranged.

6. In a suspended electric fan, the combination, with a rotary armature-carrier pro-
60 vided on its lower face with a disk-commutator, of an oil-cup arranged below said armature-carrier and provided with arms, and brush-holders pivotally mounted on said arms and provided with brushes bearing against
65 the lower face of the said commutator.

7. The combination, with the support A, the motor-support B, attached thereto, and the tube A' secured to said support, of the field-
70 magnet, also secured to said support, the armature-ring D, its carrier E, having the hub or sleeve *e*, provided with the collar *e'*, the collar *d'*², attached to the said tube A' and having the stud *d'*, the roller-bearing *d*, jour-
75 naled on said stud and on which the said collar *e'* rests, the disk-commutator, the brushes, the brush-holders, and the supports for said holders.

8. The combination, with the armature-carrier E, of the brackets *i*, attached to the pe-
80 riphery of said carrier and provided with sockets, the fan-blades having shanks fitting in said sockets, and the set-screws for securing them therein.

9. In a suspended electric fan, the combi-
85 nation, with a commutator having contact-sections on its lower face, of brushes arranged below said commutator and pressing upward against said sections, and an imperforate cas-
90 ing or housing inclosing said brushes and commutator and serving to catch any dirt resulting from wear and also to exclude dust.

In testimony whereof we affix our signatures in presence of two witnesses.

PHILIP DIEHL.
EDWIN H. BENNETT, JR.

Witnesses:

W. W. COVELL,
J. F. JAQUITH.