

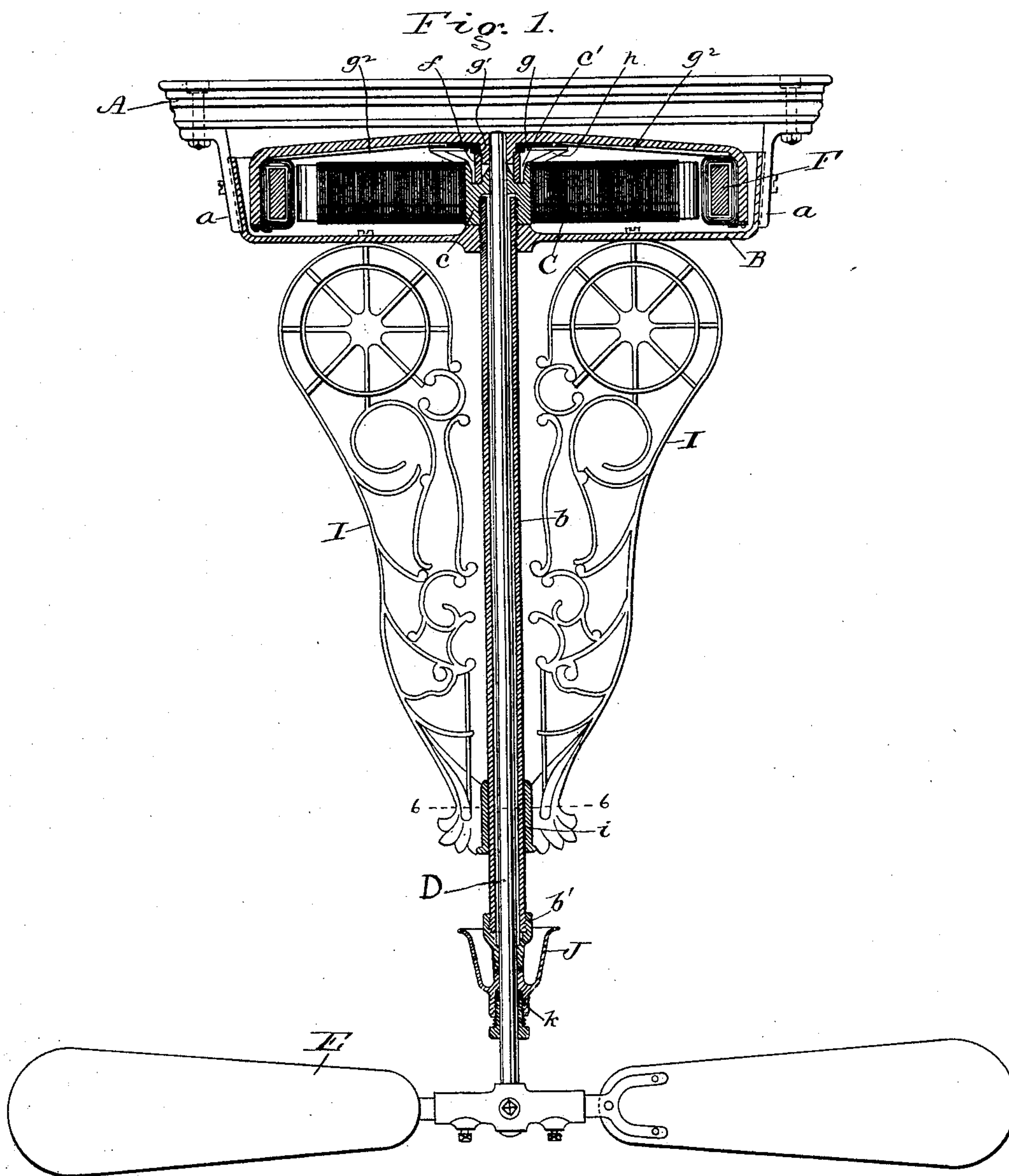
(No Model.)

4 Sheets—Sheet 1.

P. DIEHL.
ELECTRIC FAN.

No. 417,474.

Patented Dec. 17, 1889.



WITNESSES:

H. C. Burkman
J. G. Meyers.

INVENTOR:

Philip Diehl
BY *Henry Calver*
ATTORNEY

(No Model.)

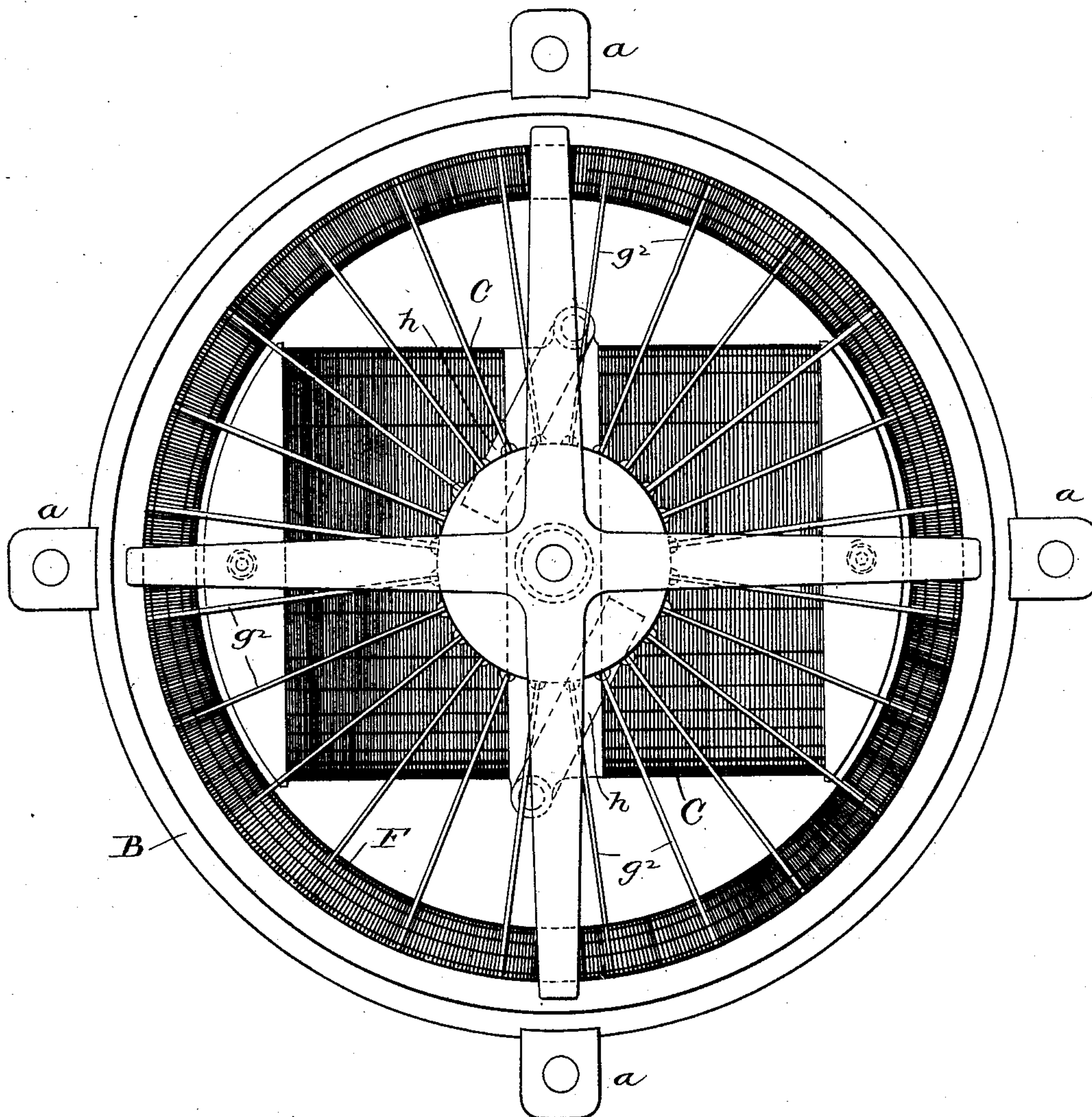
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Fig. 2.



WITNESSES:

A. V. Cushman
J. G. Meyer

INVENTOR:

Philip Diehl
BY *Henry Carter*
ATTORNEY

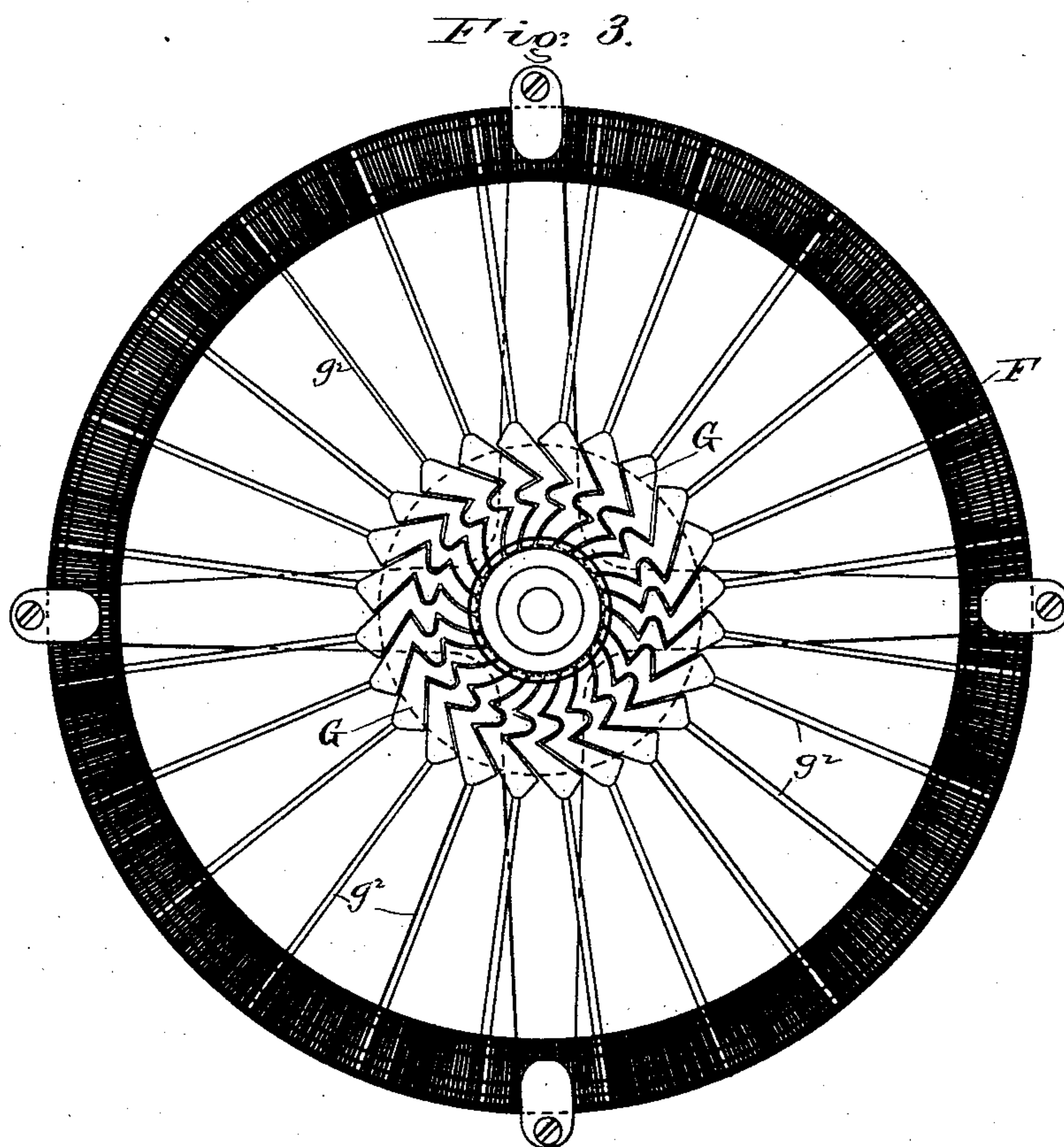
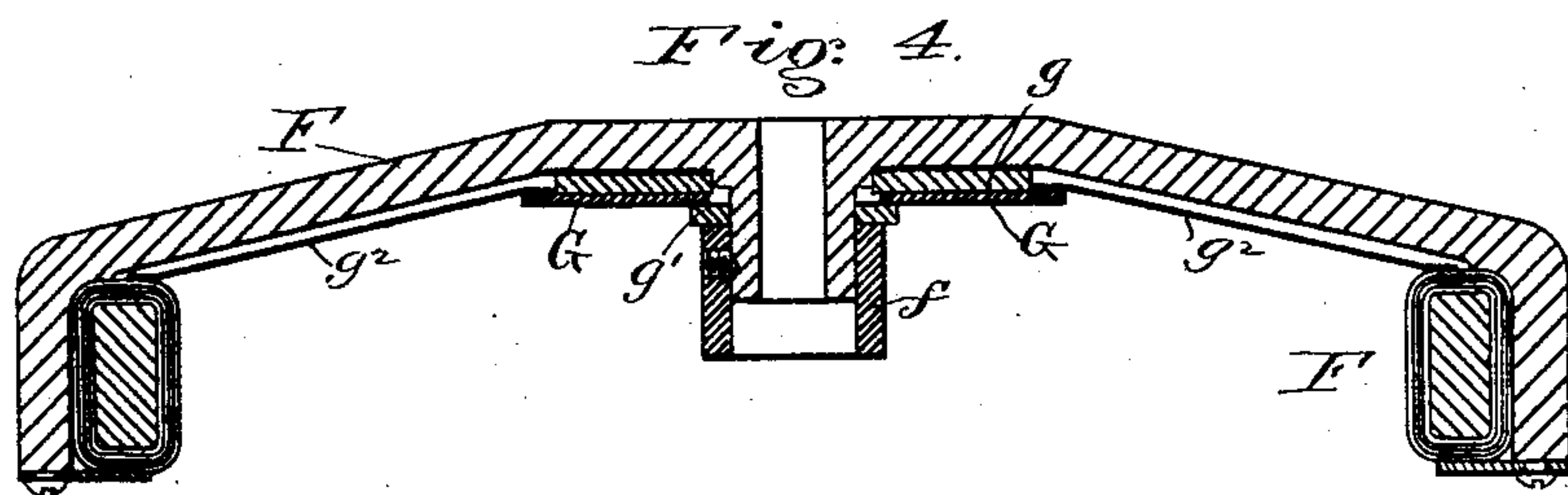
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No. 417,474.

Patented Dec. 17, 1889.



WITNESSES:

A. V. Buchanan
J. G. Meyer

INVENTOR:

Philip Diehl
BY *Henry Falver*
ATTORNEY

(No Model.)

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Fig. 5.

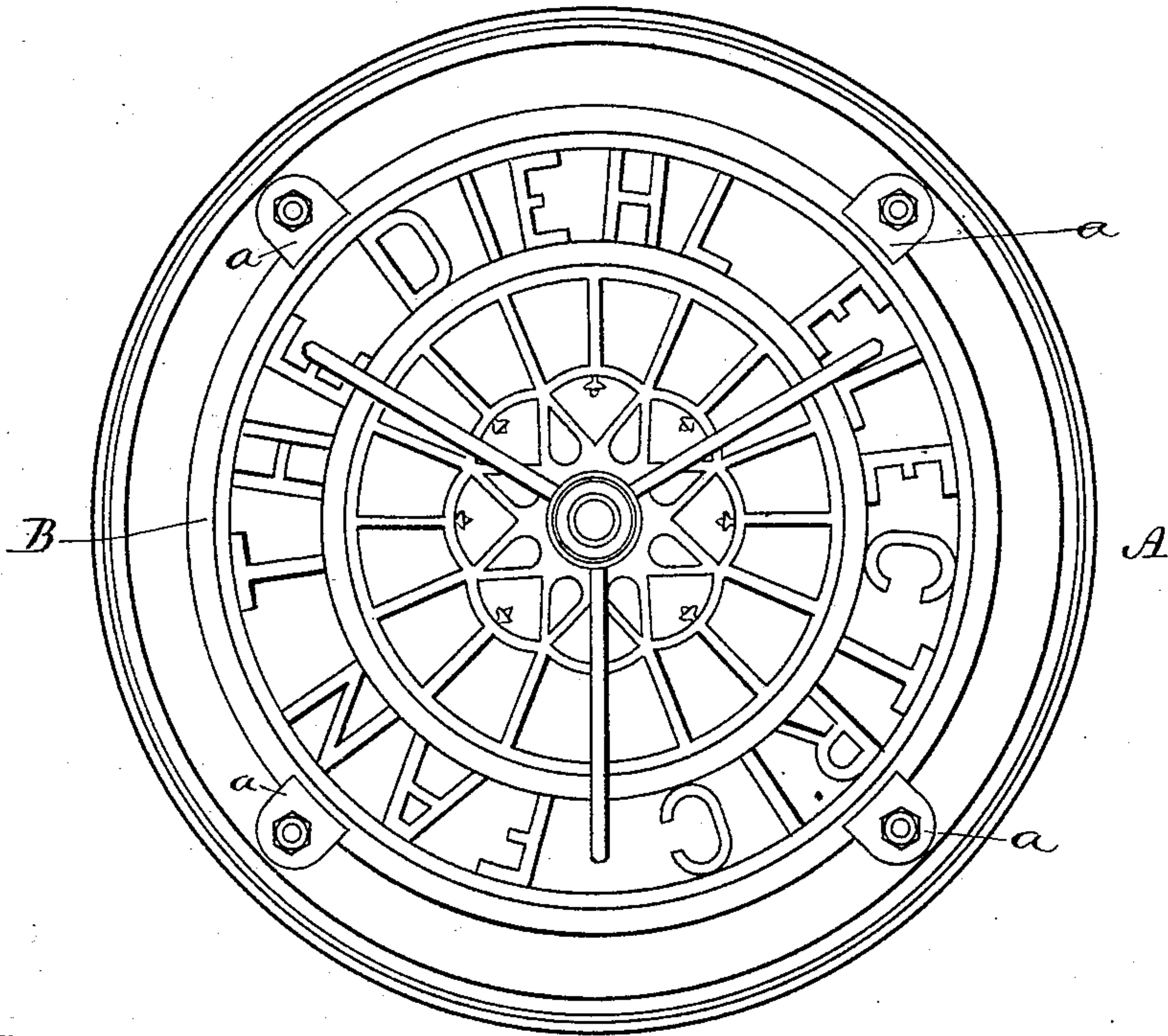


Fig. 7.

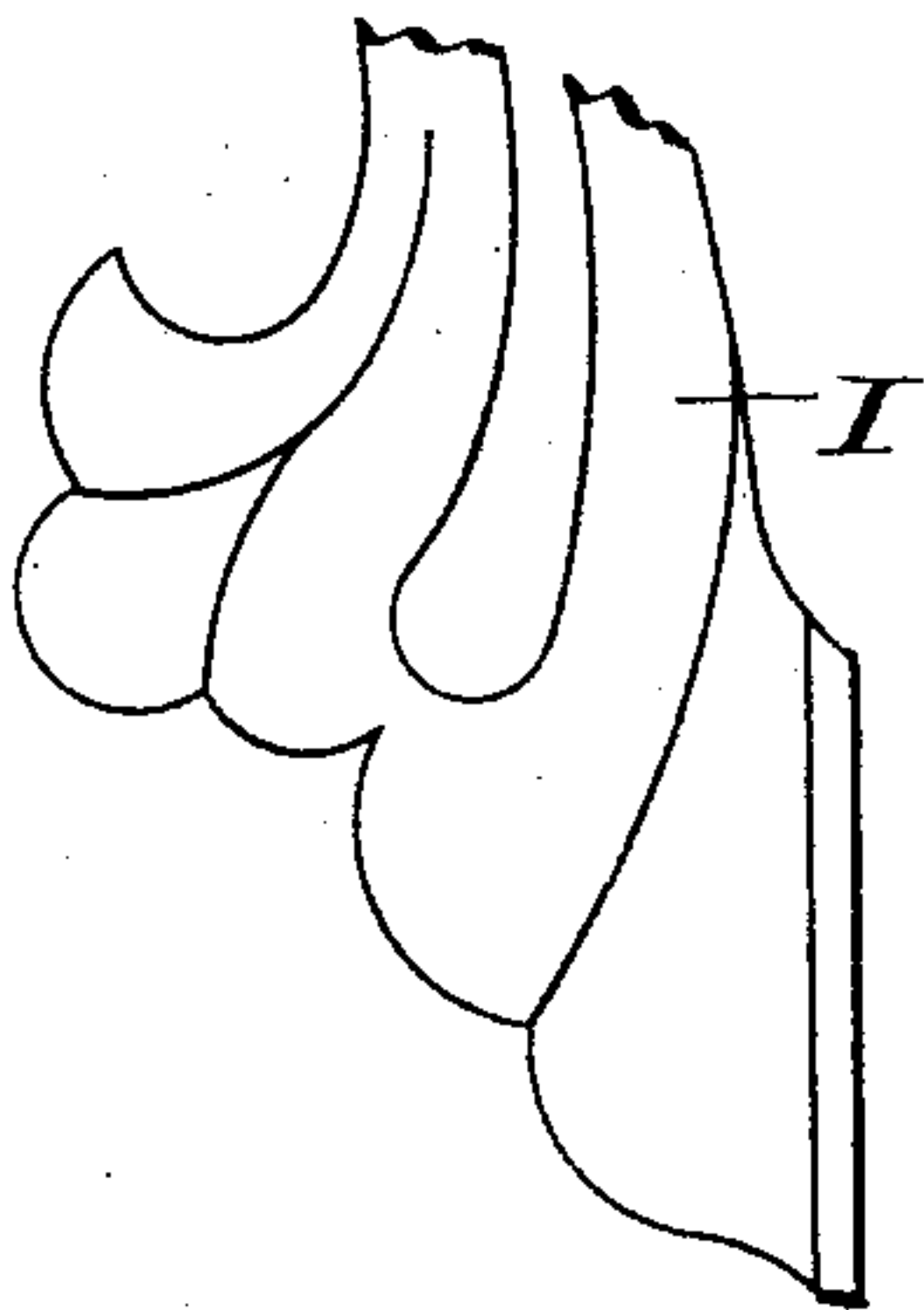


Fig. 6.

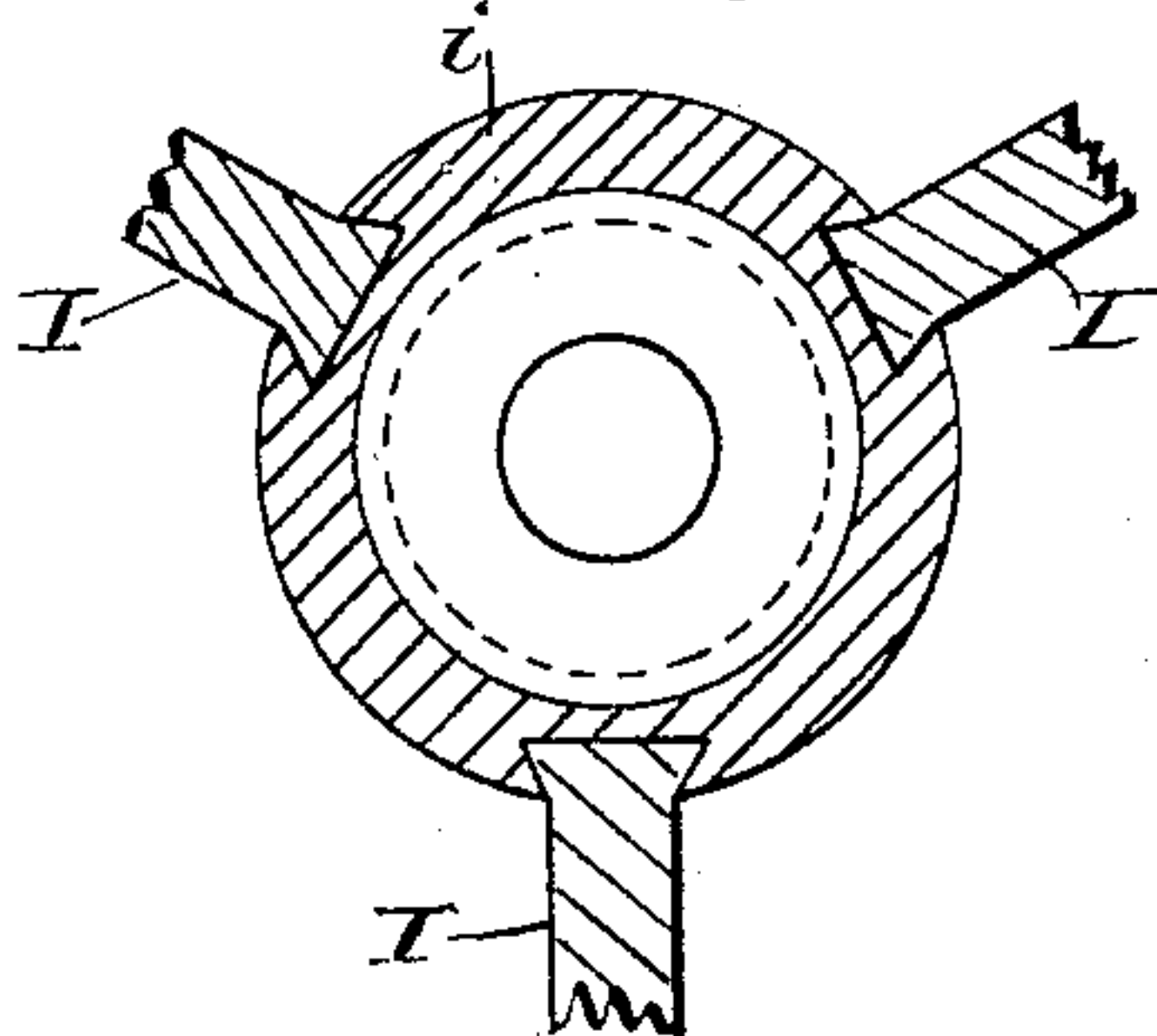
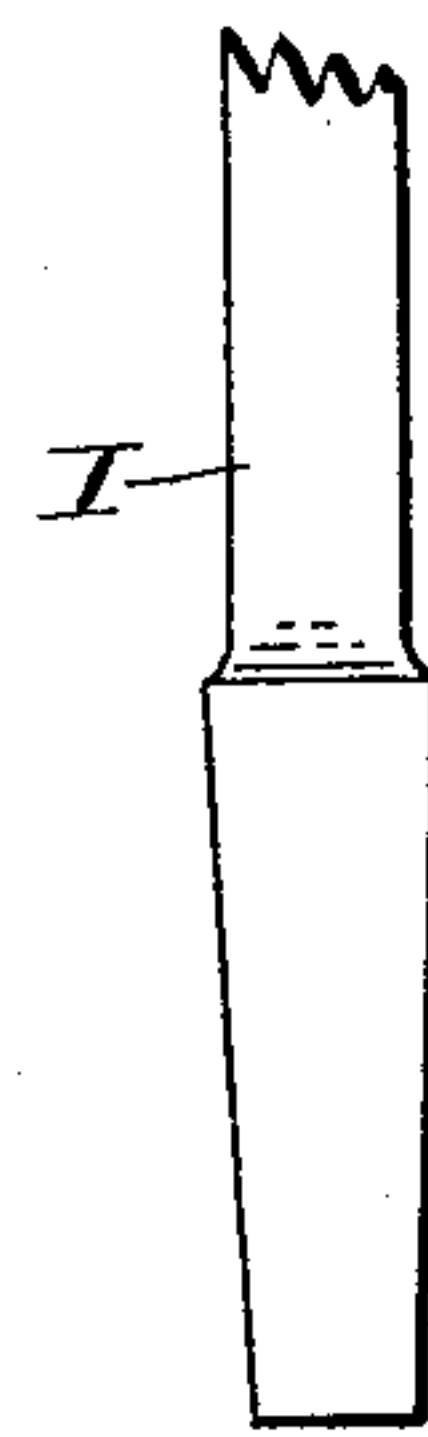


Fig. 8.



WITNESSES:

H. V. Burkman
J. G. Meyers

INVENTOR:

Philip Diehl
BY *Henry Salter*
ATTORNEY

UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, NEW JERSEY.

ELECTRIC FAN.

SPECIFICATION forming part of Letters Patent No. 417,474, dated December 17, 1889.

Application filed August 15, 1889. Serial No. 320,853. (No model.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, 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.

My invention has for its object to provide an electric fan which may be made at little cost, which will run easily and noiselessly, and which may be turned backward without danger of injuring the commutator, the different parts thereof being so constructed as to be easily assembled.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved electric fan. Fig. 2 is a plan view of the armature, field-magnet, and support. Fig. 3 is a detail bottom view of the armature and the commutator. Fig. 4 is a section of the armature and commutator. Fig. 5 is a bottom view of the base-piece and open-work support, showing also the braces. Fig. 6 is a detail section, on an enlarged scale, on line 6 6, Fig. 1; and Figs. 7 and 8 are side and edge views, respectively, of the lower end of one of the open-work braces.

A denotes a base-piece, (preferably of wood,) to which are removably secured the small brackets or arms *a*, the vertical parts of which are inwardly inclined, as shown in Fig. 1, and to the said brackets or arms is attached the circular support B, which sustains the weight of the motor and fan, and which is preferably an open-work ornamental casting with inclined sides embraced by the brackets *a*.

The inclined brackets or arms *a*, in connection with the support B, having inclined sides, afford a ready and convenient construction of parts in securing the said support in place. Either three or four of the arms or brackets *a* are employed. In placing the fan in position two of the said inclined brackets or arms are first attached to the base-piece A and then the support B is lifted to place, and the other bracket or brackets are then attached to the said base-piece, and, owing to the fact that the support B, with its inclined sides, is largest at top, it will be held in place by wedging action, as will be evident, but may be further secured by set-screws passing

through the brackets *a*, as shown in Fig. 1, if desired.

The support of frame B is formed with an open top, which is found convenient in assembling the parts, as the field-magnet and armature are placed in position from the upper side thereof, and the parts are thus readily assembled together prior to placing the said support, with the parts sustained thereby, in operative position, as just above described.

Into the hub or central part of the support B is secured a tube *b*, and to the top of said tube is screwed the hub *c* of the stationary field-magnet C, said hub *c* forming one of the vertical bearings or steadying-points of the fan-shaft D and the bushing *b'*, screwed to the lower end of the tube *b*, forming the other vertical bearing or steadying-point for said shaft, the latter carrying the fan E at its lower end.

F is the rotating armature, secured to the upper end of the shaft D, said armature being preferably in the form of a sectional Gramme ring held in an open-work spider-wheel, as more clearly shown in Fig. 2. The weight of the armature, fan-shaft, and fan is sustained by the bearing-ring *f*, attached to the hub of the armature-wheel and received in a recess or cupped bearing *c'* in the top of the field-magnet hub *c*, said bearing being adapted to contain a quantity of oil, so that the fan will run a long time without reoiling. This feature is, however, embraced by my application, Serial No. 314,923, filed June 20, 1889, and is not herein claimed.

G denotes the commutator, consisting, preferably, of a series of flat irregular plates or sections formed with projections and notches fitting into each other, as shown in Fig. 3, so that the said sections internotch in such a way that if the armature-wheel by which they are carried be accidentally turned backward the brushes *h* will not catch between the said sections, but will ride freely over the same, and thus avoid danger of breaking the brushes, the latter being wide enough to ride safely over the internotched commutator-sections. The commutator-sections are riveted or otherwise attached to the disk or ring *g*, of fiber or other insulating material, between which and a second ring *g'*, of insulating material, the sections of the commutator may be clamped,

as shown in Fig. 4, and held in place by the bearing-ring *f*; or the said sections may be outside of the ring *g*, as shown in Fig. 1. The commutator-sections are connected with the armature-sections by the wires *g*².

The tube *b* is steadied by means of braces *I*, preferably of light open-work metal, as shown in Fig. 1, attached at their upper ends to the support *B*. These braces are connected at their lower ends to the tube *b* by a bushing *i*, having dovetailed and tapering recesses receiving the dovetailed lower ends of the braces, said lower ends being wedge-shaped or tapered edgewise, as shown in Fig. 8, so that as the said bushing is driven up from below the parts will be tightly wedged together and firmly secured.

The braces *I*, of open-work metal, have considerable width and are arranged radially to the tube *b*, so that, although light, they have considerable strength and stiffness to steady the said tube effectively.

The fan-shaft is preferably provided with an oil-cup *J*, having a stuffing-box *k* to prevent leakage of oil; but this feature is not herein claimed, as it is embraced by my application, Serial No. 320,486, filed August 12, 1889.

My improved electric fan, constructed as above described, consists of comparatively few, simple, and easily-assembled parts, and can be made at little cost, and when put into operation it runs lightly and noiselessly.

I claim—

1. In an electric motor, the combination, with the field-magnet, armature, and brushes, of a commutator consisting of a series of flat, irregular, or notched and projecting sections internotched together, as set forth.

2. The combination, with the armature-wheel carrying the sectional ring-armature, of the flat commutator-plates arranged edgewise to each other, the insulating-rings *g* and *g*', between which said commutator-plates are clamped and to the former of which rings said plates are attached, and the wires *g*², con-

necting said commutator-plates with the sections of the said armature-ring.

3. The combination, with the base-piece *A* and the inwardly-inclined arms or brackets *a*, detachably secured thereto, of the open-topped support or frame *B*, detachable from said arms or brackets and having inclined outer sides embraced thereby, and the field-magnet, armature, fan-shaft, and fan sustained by said support, substantially as set forth.

4. The combination, with the open-topped support *B*, of the field-magnet and armature above the bottom of said support, the fan-carrying shaft to which said armature is attached, the tube *b*, extending downward from said support, the bushing *i*, surrounding said tube near its lower end and having dovetailed and tapering recesses, and the wide open-work braces *I*, arranged radially to said tube, said braces being attached at their upper ends to said support and having their lower ends dovetailed and tapered to fit the said recesses in said bushing, substantially as set forth.

5. The combination, with the base-piece *A* and the inwardly-inclined arms or brackets *a*, secured thereto, of the open-topped support or frame *B*, detachable from said arms or brackets and having inclined outer sides embraced thereby, the field-magnet, armature, fan-shaft, and fan sustained by said support, the bushing *i*, surrounding the lower part of said tube and having dovetailed and tapering recesses, and the wide open-work radially-arranged braces *I*, attached at their upper ends to said support and having their lower ends dovetailed and tapered and fitted in the recesses of said bushing.

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

PHILIP DIEHL.

Witnesses:

FRED DIEHL,
W. H. MEEKER.