

(No Model.)

4 Sheets—Sheet 1.

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

No. 465,361.

Patented Dec. 15, 1891.

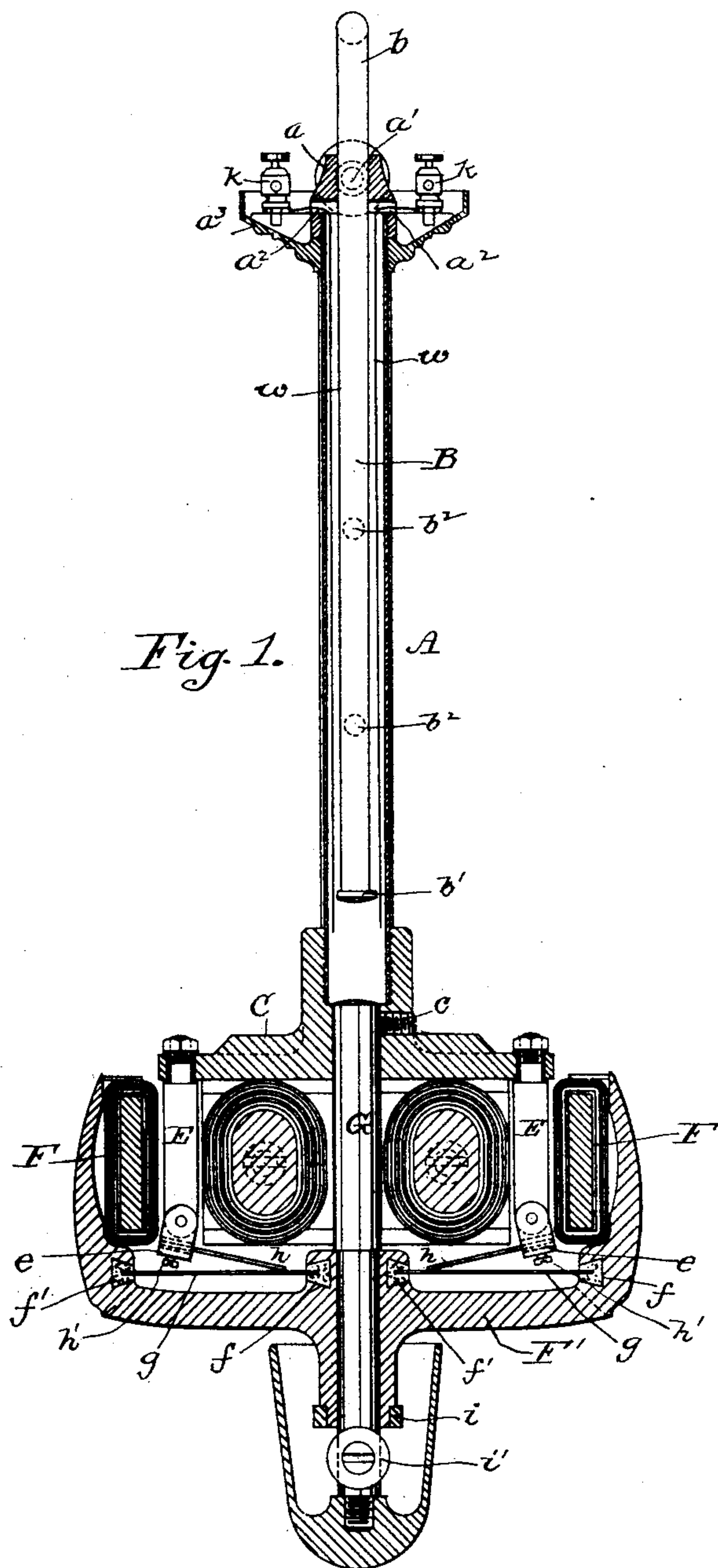


Fig. 1.

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*Robert Bennett.*

INVENTORS:

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*Edwin H. Bennett, Jr.*  
BY *Henry Calvert*  
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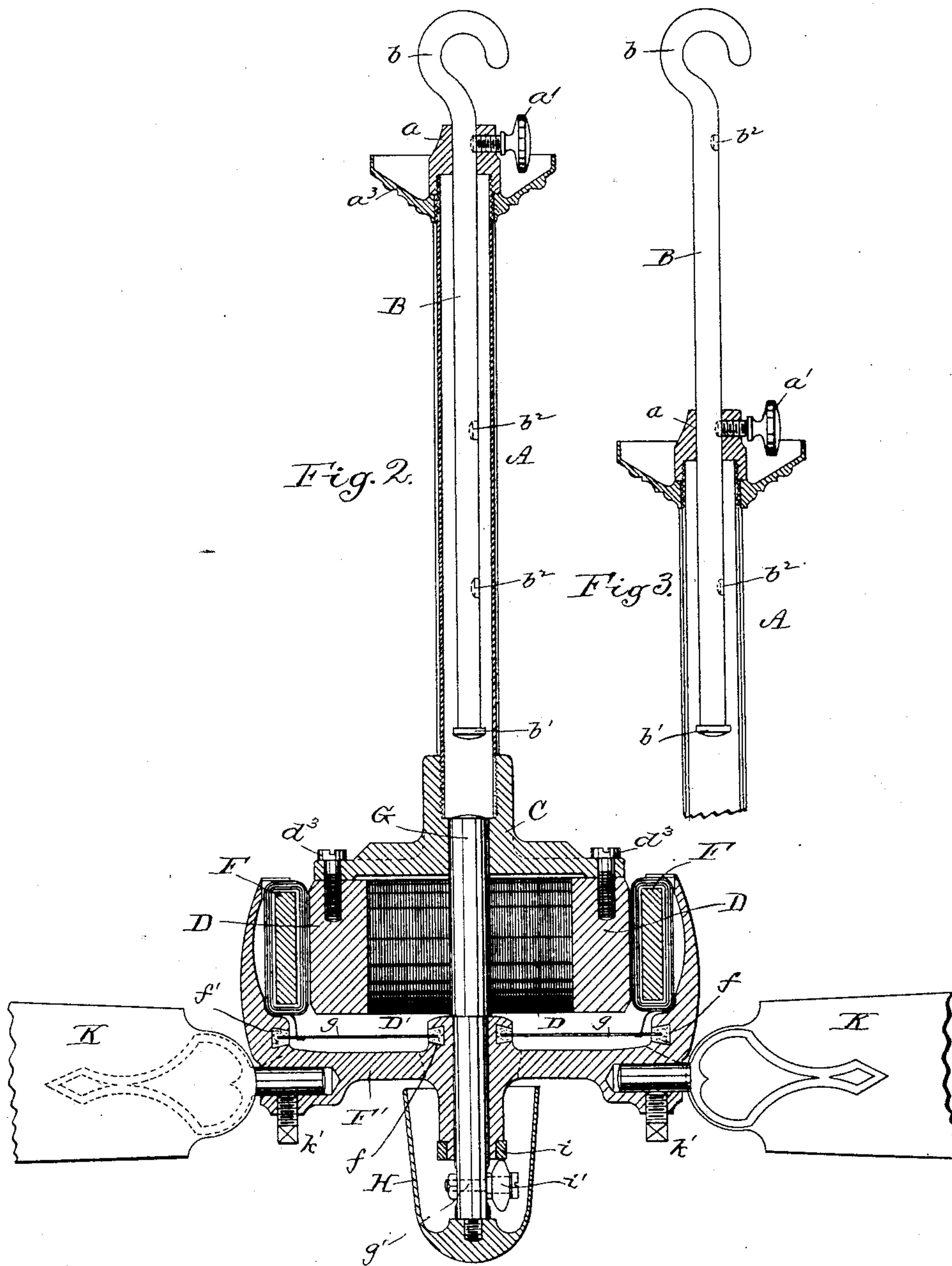
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Fig. 4.

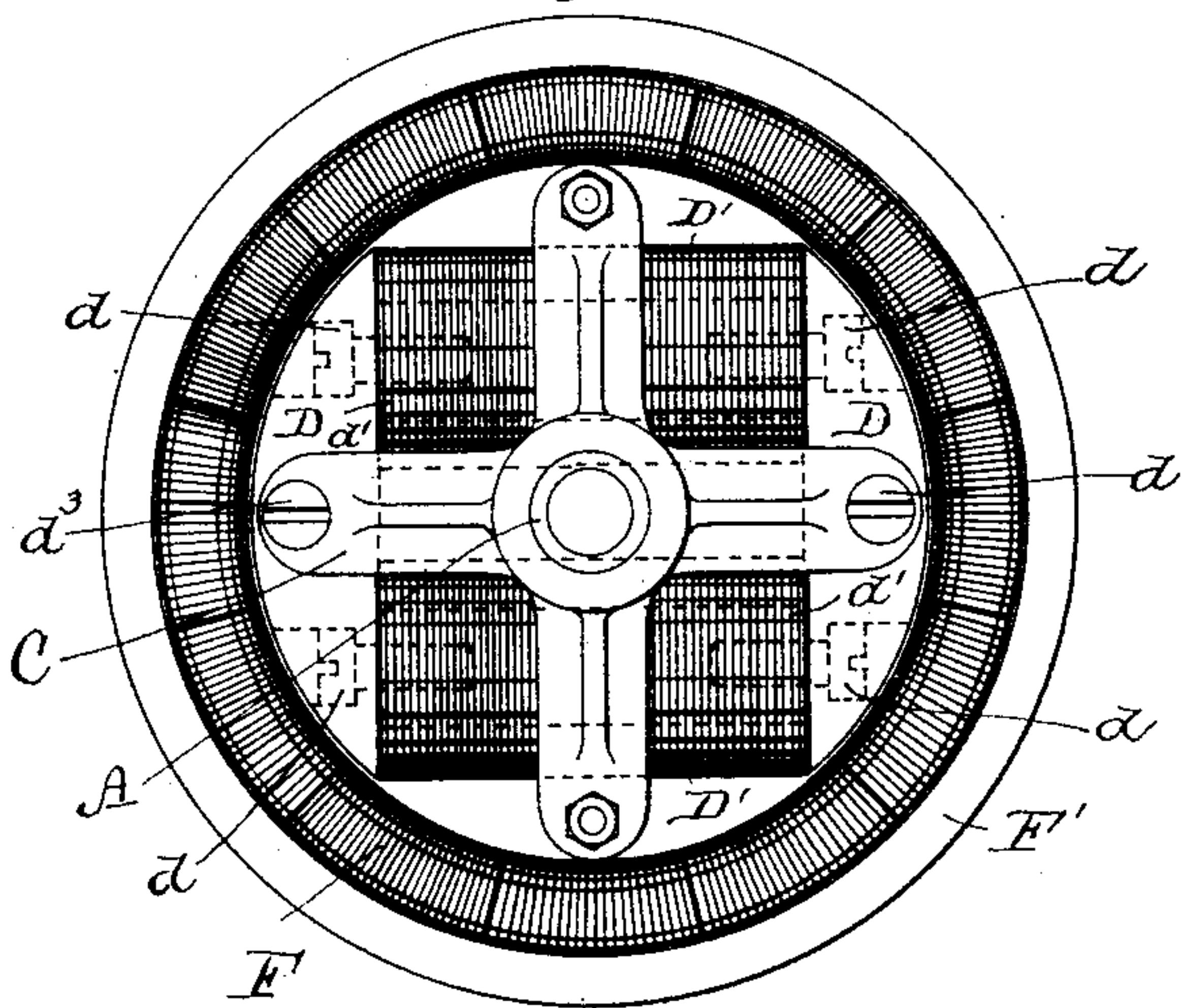
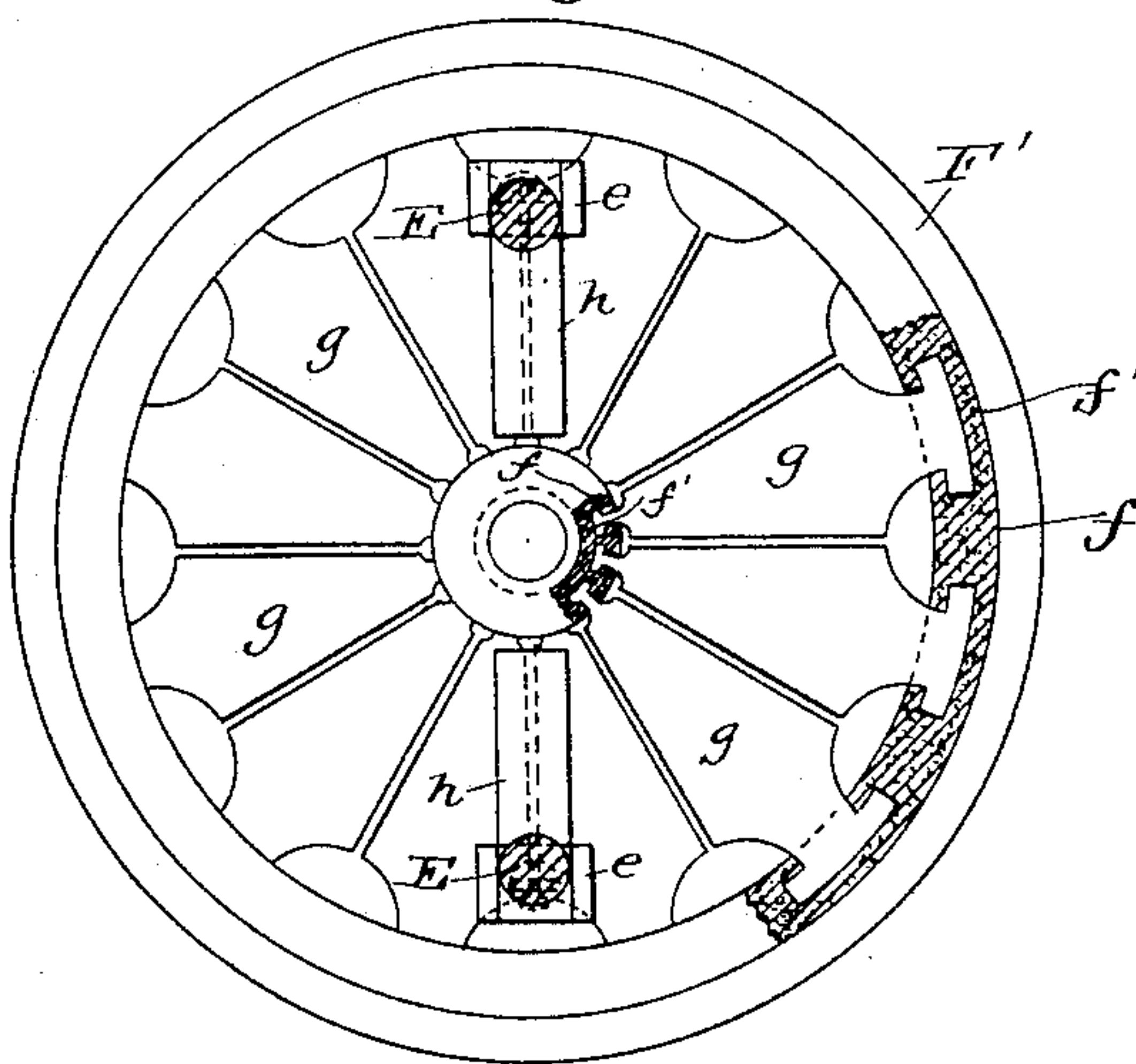


Fig. 5.



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(No Model.)

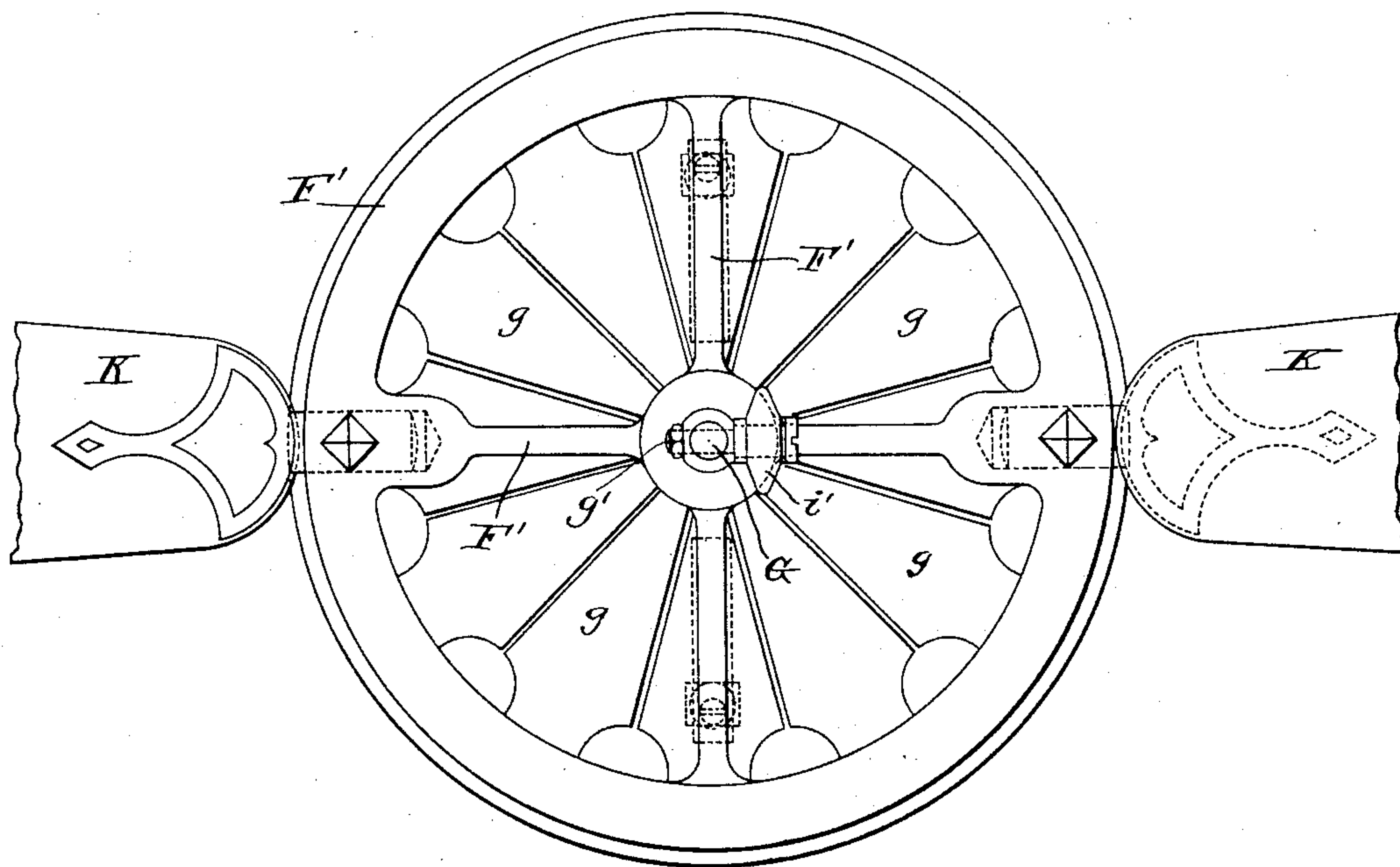
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*Fig. 6.*



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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. 465,361, dated December 15, 1891.

Application filed April 8, 1891. Serial No. 388,133. (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 attached to a rotating armature wheel or carrier, and more particularly to that class thereof intended to be suspended from the ceilings of rooms, the object of our invention being to simplify the construction and improve the convenience and efficiency of fans of the character referred to.

In the accompanying drawings, Figures 1 and 2 are vertical sections in planes at right angles to each other of our improved fan. Fig. 3 is a detail showing the support in a different position of adjustment from that shown in Fig. 2. Fig. 4 is a plan view of the field-magnet and armature. Fig. 5 is a plan view, partly broken away, of the commutator; and Fig. 6 is a bottom view of the armature-wheel.

A denotes a tubular support, preferably provided at its upper end with a collar *a*, in which is tapped a set-screw *a'*, having apertures *a''*. Passing through said collar is an extension supporting-rod B, provided at its upper end with a hook *b* and at its lower end with a head or enlargement *b'*, said rod preferably having a series of recesses *b''* for the reception of the end of the set-screw *a'*, so that the fan may be properly adjusted to ceilings of different heights and locked or secured in different positions of adjustment. The enlargement *b'* at the lower end of the rod B prevents the fan-support A from accidentally slipping off from said rod.

It will of course be understood that the recesses *b''* may be omitted, if desired, and that a different form of locking device from that shown for securing the rod and shaft together may be employed.

To the lower end of the support or tube A

is attached the supporting-piece C, to which are secured the pole-pieces D of the field-magnet, and to said pole-pieces are attached, by screws *d*, the cores *d'* of the coils D'.

E denotes the supports for the pivoted brush-holders *e*, said supports being insulatingly attached to the said supporting-piece C and extending downward between the coils D' and the armature-ring F, as more clearly shown in Fig. 1.

Attached to the supporting-piece C by set-screw *c* is a rod G, which serves as a bearing-support for the hub of the armature wheel or carrier F', said wheel being provided with inner and outer circular grooves *f*, in which the ends of the commutator-sections *g* are held by being embedded in plastic material *f''*, with which said grooves are filled, the ends of said sections being preferably T-shaped, as shown in Fig. 5, for greater security in holding them in place. The commutator-sections *g* are open or separated from each other, so that any dust or dirt which may get into the commutator or which results from wear may readily escape downward between said sections, keeping the contact-faces thereof clean, and by forming the wheel or carrier F' open underneath the commutator-sections the dirt can readily drop through. The commutator-sections, except at their ends, are supported clear of the wheel by which they are carried. The brushes *h* are removably attached by screws *h'* to the brush-holders *e*, pivoted to the lower ends of the supports E, said brushes being set radially to the commutator-sections and having their inner ends resting in contact therewith.

To the lower end of the armature carrier or wheel F' is attached a hardened-steel collar *i*, resting on a hardened-steel roller-bearing *i'*, carried by a pin or stud *q'*, extending through the shaft or rod G, and to the extreme lower end of the said rod is screwed the oil-cup H, inclosing said roller-bearing and the lower end of the hub of the wheel F'. By attaching the oil-cup H to the lower end of the stationary shaft G, on which the armature-wheel rotates, said cup is adapted to be removed for refilling without disturbing any of the other parts, as there is nothing on said



shaft below said cup. These features of our invention—to wit, the roller-bearing on which the hub of the armature-carrier rests, and the oil-cup in which said roller-bearing is arranged—are, however, not claimed, broadly, in this application, but are embraced by our application, Serial No. 387,645, filed April 4, 1891.

At the upper end of the support A is a cup or housing  $a^3$ , inclosing the supports for the binding-posts  $k$ , to which are connected the conducting-wires  $w$ , running to and from the motor.

The shanks of the fan-blades K are entered into holes in the wheel or carrier F', where they are secured by the set-screws  $k'$ .

We claim—

1. The combination, with the depending tubular support A, provided at its lower end with the supporting-piece C, of the field-magnet depending from said supporting-piece, a stationary shaft G, fixed to said supporting-piece, a rotary armature having its bearing on said stationary shaft, a supporting-rod B within said tubular support A, and a locking device for securing said rod and tubular support together.

2. In an electric fan, the combination, with the field-magnet and the armature-ring, of the armature wheel or carrier provided with inner and outer grooves, the commutator-sections having their ends embedded in plastic material in said grooves, the brushes, the brush-holders, and supports for the latter.

3. A commutator for electric motors, consisting of a wheel provided with inner and outer grooves and a series of commutator-sections having T-shaped ends embedded in plastic material in said grooves.

4. A commutator for an electric fan, consisting of a wheel or carrier and a series of commutator-sections having their ends embedded in plastic material in said wheel, said sections being open or separated from each

other and supported clear of said wheel, except at their ends.

5. A commutator for an electric fan, consisting of an open wheel or carrier and a series of commutator-sections having their ends embedded in plastic material in said wheel and being open or separated from each other and supported clear of said wheel, except at their ends, so that dust and dirt may readily escape.

6. The combination, with the tubular support A, provided at its lower end with a supporting-piece C, the stationary shaft G, fixed to said supporting-piece, and the rotary armature-wheel journaled in said fixed shaft.

7. In an electric fan, the combination, with the armature-wheel and the stationary shaft on which said armature-wheel revolves, of a pin or stud, as  $g'$ , passing through said shaft a roller bearing on said pin or stud and against which the lower end of the hub of said wheel rests.

8. In an electric fan, the combination, with the armature wheel and shaft on which said wheel revolves, of a roller-bearing on which the lower end of the hub of said wheel rests and an oil-cup on the extreme lower end of said shaft and in which said roller-bearing is arranged.

9. In an electric fan, the combination, with a stationary shaft on which the armature wheel revolves, of an oil-cup on the extreme lower end of said shaft and which is thus adapted to be removed for refilling without disturbing any other parts, said oil-cup having an imperforate bottom.

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

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E. H. BENNETT, JR.

Witnesses:

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