

(No Model.)

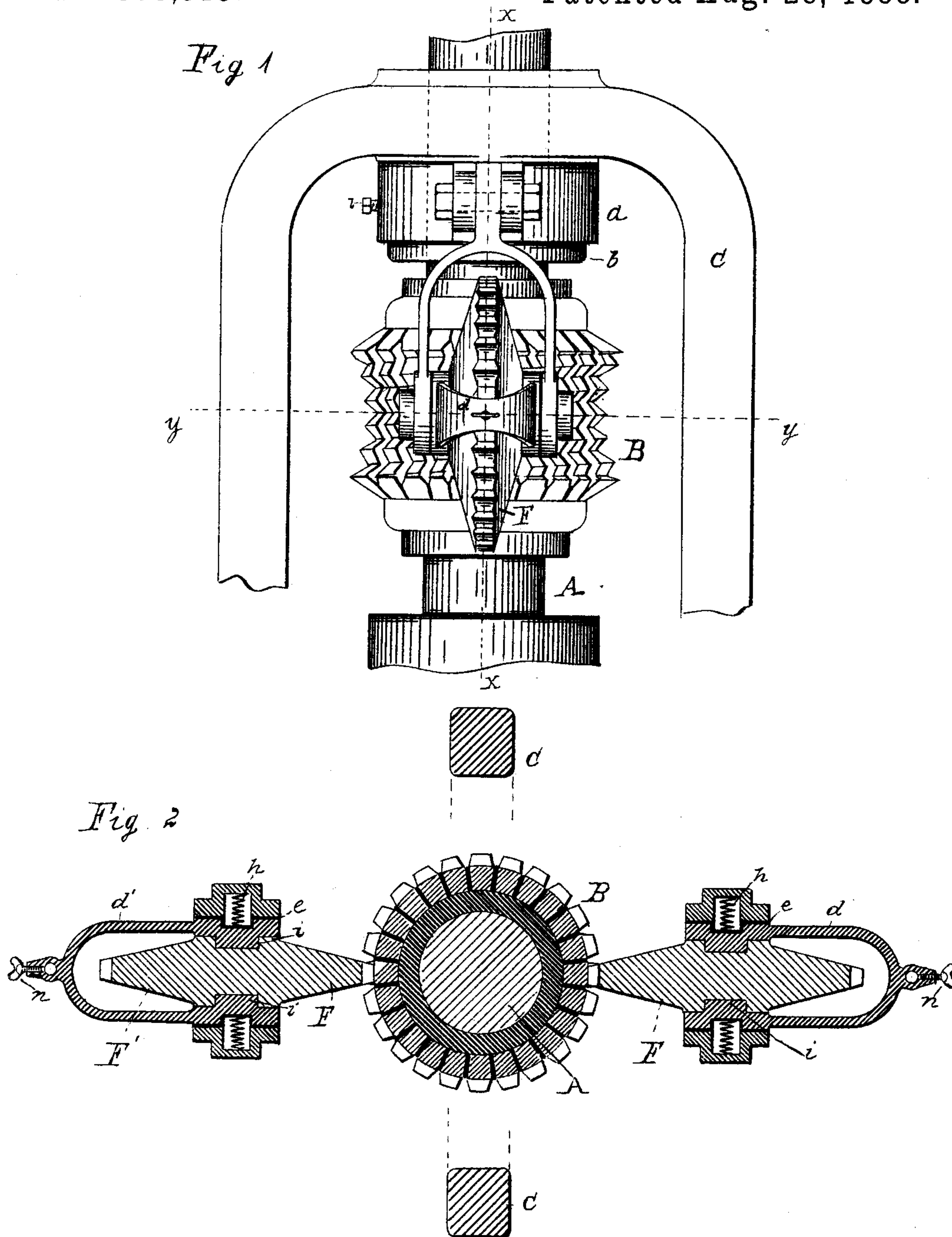
2 Sheets—Sheet 1.

J. T. VAN GESTEL.

# COMMUTATOR FOR DYNAMO ELECTRIC MACHINES.

No. 388,513.

Patented Aug. 28, 1888.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

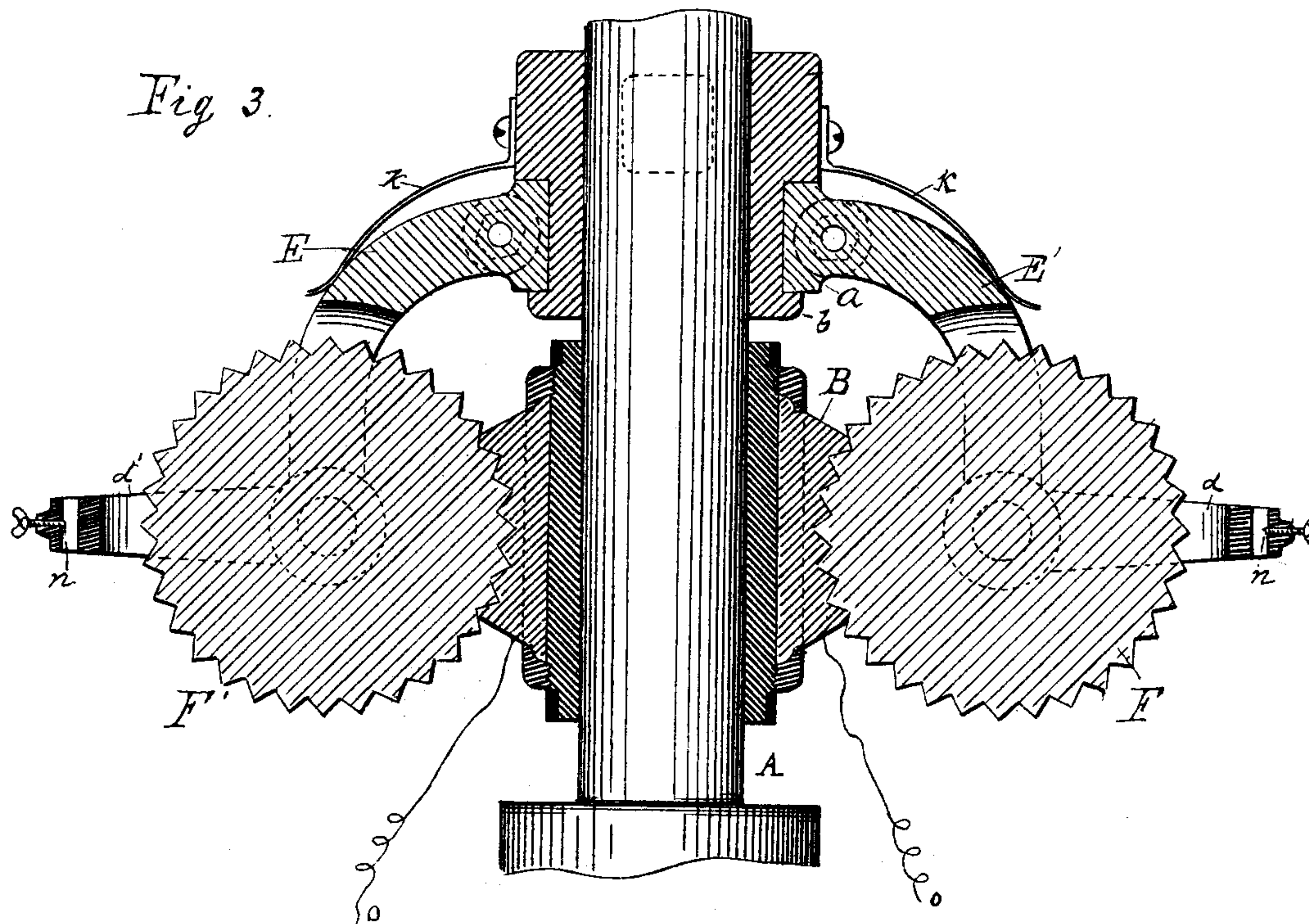
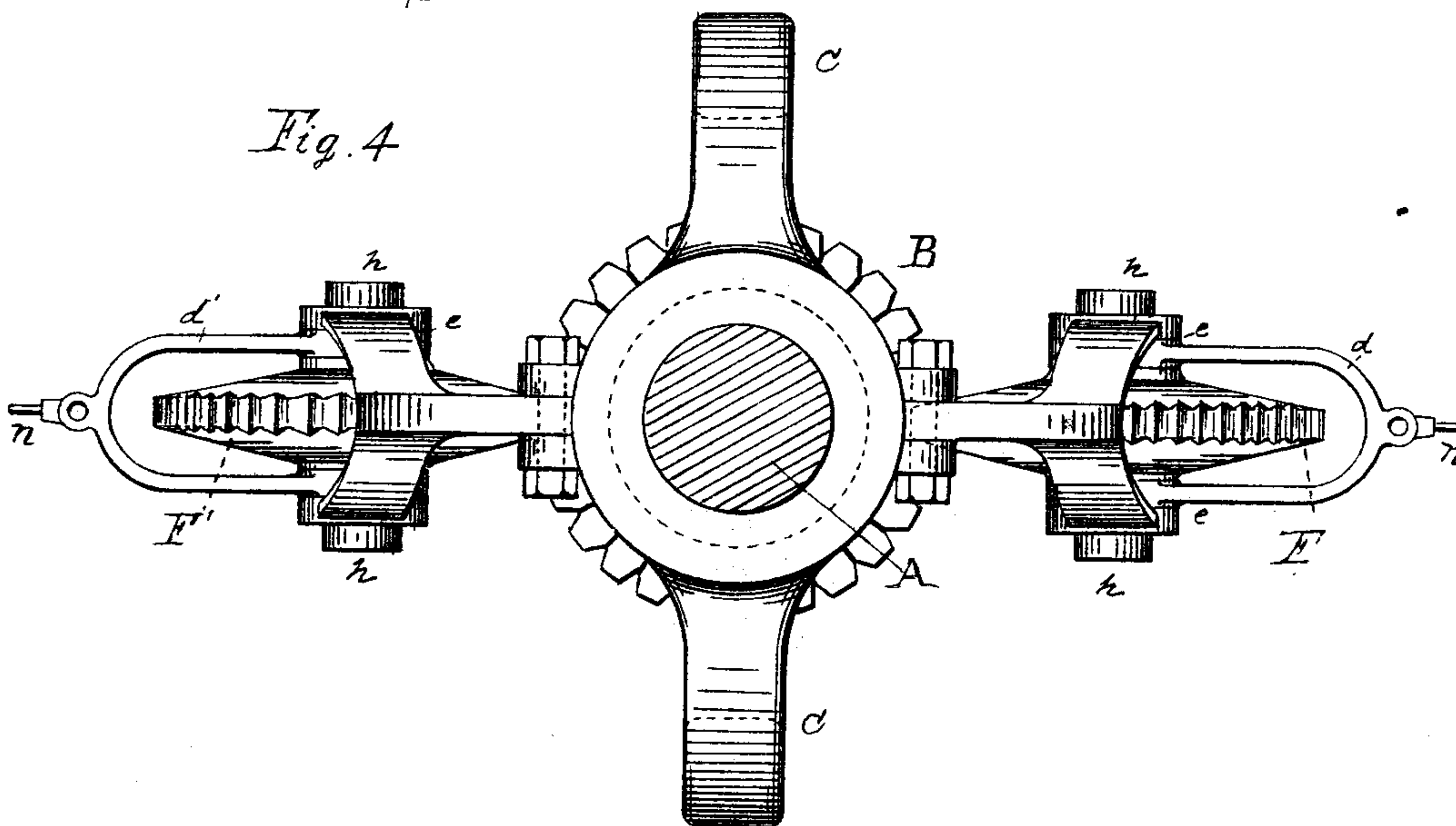


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JEAN T. VAN GESTEL, OF NEW YORK, N. Y., ASSIGNOR TO THE VAN GESTEL MANUFACTURING COMPANY, OF NEW YORK.

## COMMUTATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 388,513, dated August 28, 1888.

Application filed September 10, 1887. Serial No. 249,318. (No model.)

*To all whom it may concern:*

Be it known that I, JEAN T. VAN GESTEL, a subject of the King of The Netherlands, residing at New York, in the county and State of New York, have invented a new and useful Collector or Commutator for Dynamo-Electric Machines or Electric Motors, of which the following is a specification.

In the collectors generally used on dynamos and electric motors the contact made by the brushes is imperfect, and the electrical connection is correspondingly poor. Moreover, the brushes wear away rapidly under the friction with the commutator, so that the point of contact is continually shifting, and constant attention is required in readjusting the brushes or replacing them. Another difficulty with these collectors is the sparking that occurs so constantly, and this is to a large extent caused by the poor contact of the brushes and by the shifting of the point of contact, as above described. One of the results of the continued friction upon one point on the brushes is their excessive heating, and as this is greatly increased when sparking occurs there is constant danger of injuring or destroying the brushes.

It is the object of my invention to overcome these difficulties, and I accomplish these results by the mechanism illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of the entire collector and its connections, supposing the shaft of the armature to be horizontal. Fig. 2 is a section through line *yy* in Fig. 1. Fig. 3 is a transverse section through line *xx* in Fig. 1, and Fig. 4 is an end view of the device.

Similar letters represent similar parts in all of the figures.

A is the shaft of the armature of a dynamo-electric machine or of an electric motor, upon which is placed a commutator composed of insulated bars of copper or other suitable material and constructed on any of the ordinary plans. The face of this commutator is made concave and a screw-thread is cut upon it, thus forming a worm.

C is a portion of the frame of the machine, and upon it is formed a hub, *b*, which carries a loose ring, *a*, which turns freely in a channel cut in the hub. Connected to this ring on its two opposite sides by hinges or pivots are

two curved arms, *E E'*, which separate at their ends and form forks. Between each fork is fixed a V-shaped frame, *d d'*, which is insulated from the arms *E E'* by a layer of suitable material, as shown at *e* in Fig. 2. Stud *i i*, upon the inner sides of the frames *d d'*, carry the collector-wheels *F F'*, of brass or other good conducting material, whose planes are parallel with the axis of the commutator. These wheels *F F'* are free to revolve upon the studs *i i*, and across their faces are cut teeth of proper form and pitch to engage and work with the worm of the commutator B. Springs *h h* may be used to press the frames *d d'* against the collector-wheels to secure a good electrical contact between them, and other springs, *K K*, secured to the frame C, press upon the arms *E*, and thus keep the wheels *F F'* firmly against the commutator B. A set-screw, *l*, secures the ring *a* in any desired position upon the hub *b*. The wires of the electrical circuit are connected with the frames *d d'* by the screws *n n*, and *o o* show wires from the armature connected with the bars of the commutator. The faces of the wheels *F F'* are shown as being the same width as the bars of the commutator; but they may be made wider or narrower, according to the arrangement of the commutator or to suit the requirements of adjustment in a particular machine.

The operation of the device is as follows: The revolving armature of the machine, whether a generator or a motor, turns the shaft A, and with it the worm-commutator B. As this turns, every bar or section successively engages with the collector-wheels *F* and *F'*, and on account of the large surface offered by the screw-thread a very perfect electrical connection between the collector-wheels and the commutator-bars is established. This is fully shown in Fig. 3 of the drawings. The electricity thus passes freely to or from the commutator through the wheels *F* and *F'* and the arms *d*, which are directly connected with the outside circuit. As the worm-commutator revolves, the action of the thread upon it turns the wheels *F* and *F'*, so that a new surface is constantly being brought in contact with the worm, and as the revolution of the wheels is slow in relation to that of the worm, and as the surfaces presented by them to the air are



large, there is no heating of the wheels, as is common with the ordinary brushes.

The adjustment of the collector-wheels  $F F'$  around the commutator  $B$  is effected as follows: The set screw  $l$  being loosened, the ring  $a$  may be turned upon the hub  $b$  and carries with it the arms  $E E'$  and the wheels  $F F'$ , which may thus be placed at any desired points upon the commutator  $B$ , where they are again secured by the set-screw  $l$ . The most delicate adjustment is thus possible, and there is no danger of the adjustment being altered by the wearing of the points of contact.

It will be seen from the foregoing that the difficulties of adjustment, heating, and sparking, which arise from the use of brushes and similar collectors, are wholly absent in this apparatus, and that when once properly adjusted no special attention is required to keep this portion of the machine in proper working order.

What I claim, and desire to secure by Letters Patent, is—

1. A collector or commutator for dynamo-electric machines or electric motors, consisting of a worm-gear placed upon the armature-shaft of the machine, the face of the gear being composed of bars of copper or other suitable material mutually insulated and placed parallel with the shaft, the same being connected severally with the different coils of the armature, and two collector-wheels of similar conductive material having teeth which correspond and mesh with the thread of the worm placed on diametrically-opposite sides of the worm, and having their axes at right angles with the worm-shaft, the said wheels being connected with the two extremities of the external electric circuit.

2. In a dynamo-electric machine or electric motor, the combination of a bar-commutator whose face is constructed in the form of a worm-gear, with two collector-wheels having teeth around their peripheries formed to mesh with the worm-commutator, the said collector-wheels being adjustably attached to the frame of the machine on opposite sides of the commutator and being insulated from said frame, but electrically connected with the two extremities of the external electric circuit.

3. In a dynamo-electric machine or electric motor, the combination of the commutator  $B$ , situated upon the armature-shaft and having its face in the form of a screw-gear, with the collector-wheels  $F F'$  gearing therewith, and the arms  $E E'$  supporting said wheels, as above described.

4. The combination of a bar-commutator,  $B$ , having a screw-thread cut about its face, and the collector-wheels  $F$  and  $F'$ , which have teeth around their faces which mesh with the thread upon the commutator, with the hinged supporting-arms  $E E'$ , the ring  $a$ , and hub  $b$ , as herein set forth.

5. In a dynamo-electric machine or motor, the combination of the worm-shaped commutator  $B$  and the collector-wheels  $F F'$ , gearing therewith, with the frame  $d$ , insulators  $e$ , hinged arms  $E E'$ , springs  $K$ , ring  $a$ , and hub  $b$ , all as above described and set forth.

JEAN T. VAN GESTEL.

Witnesses:

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I. B. RIPINSKY.