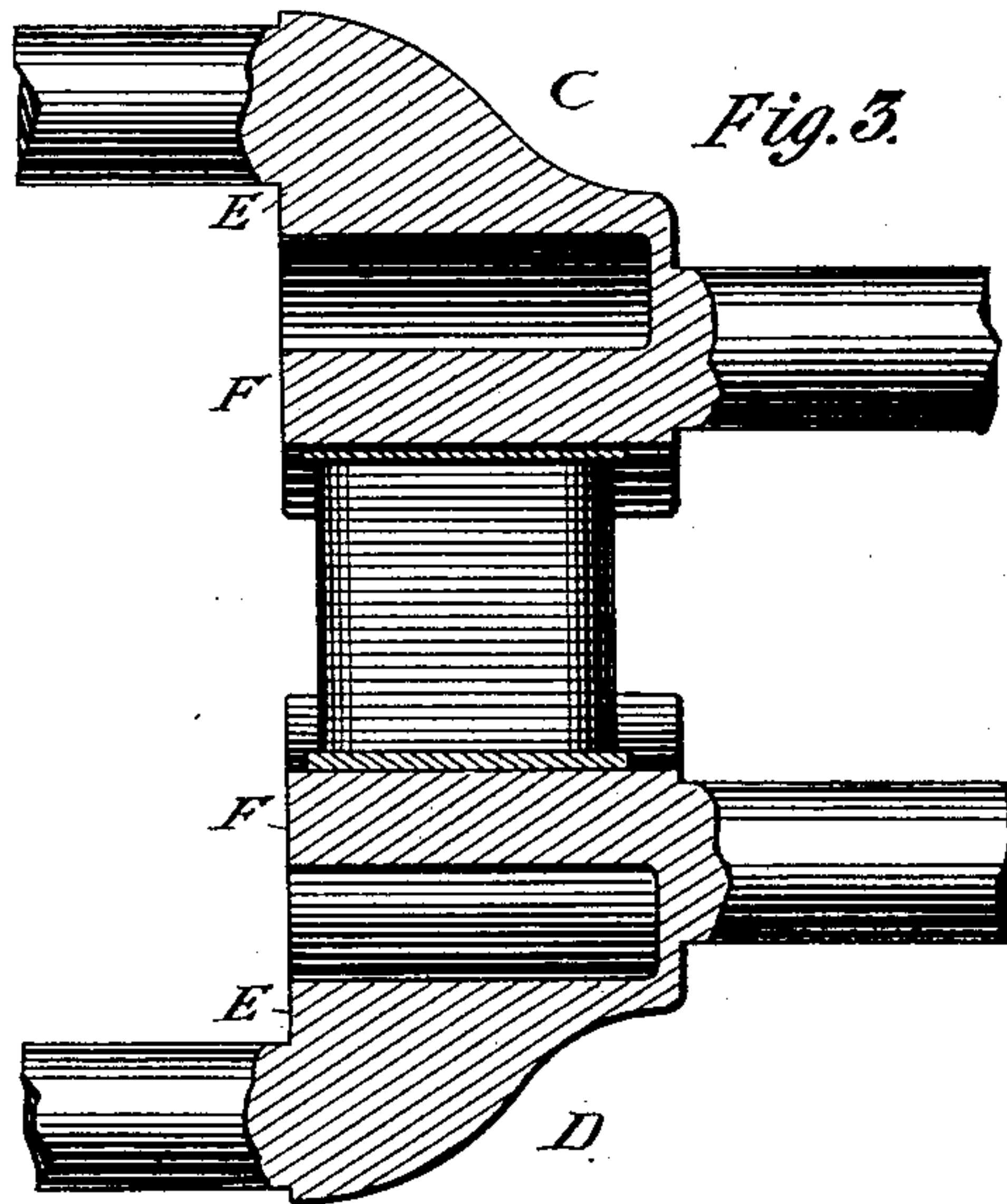
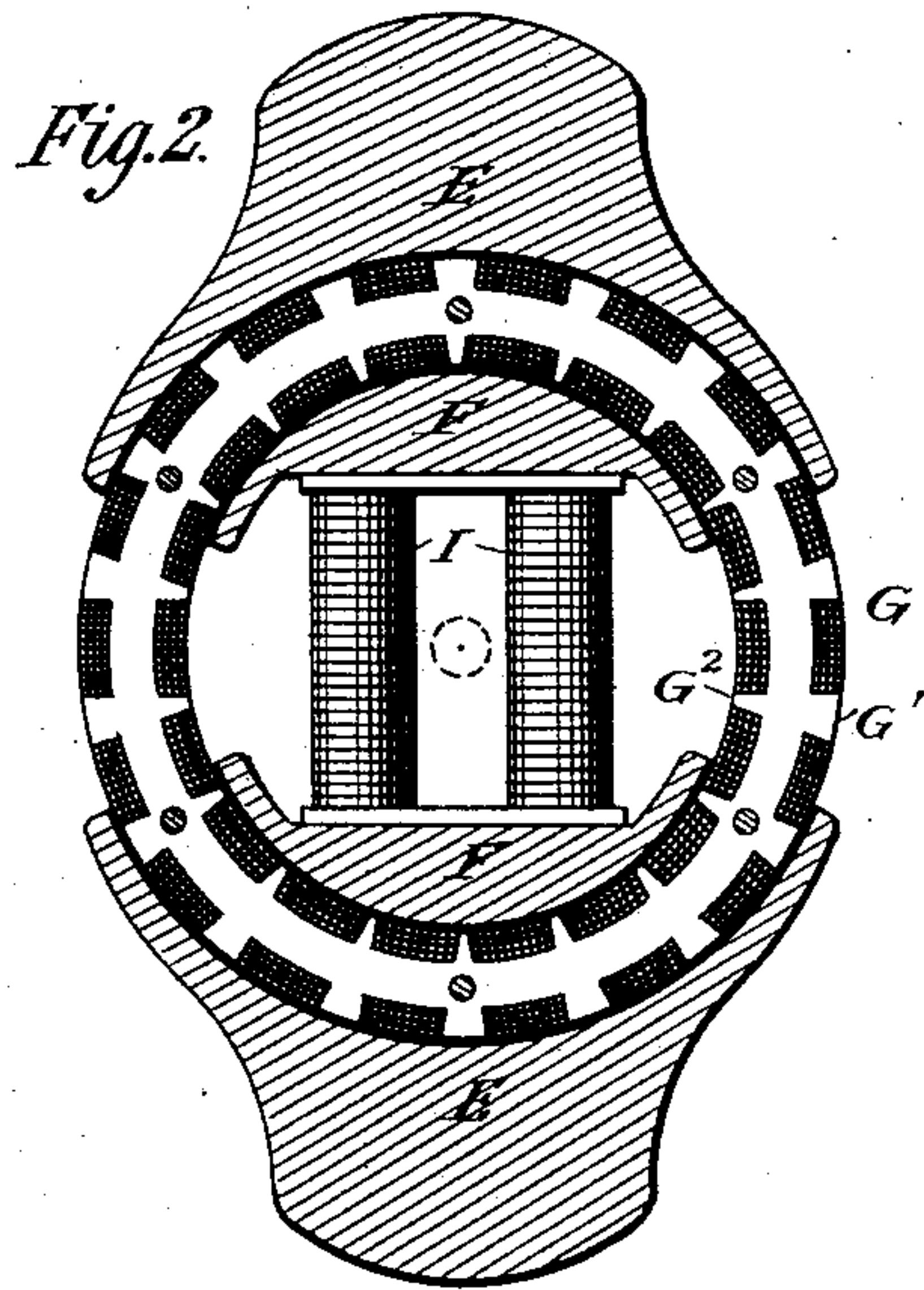
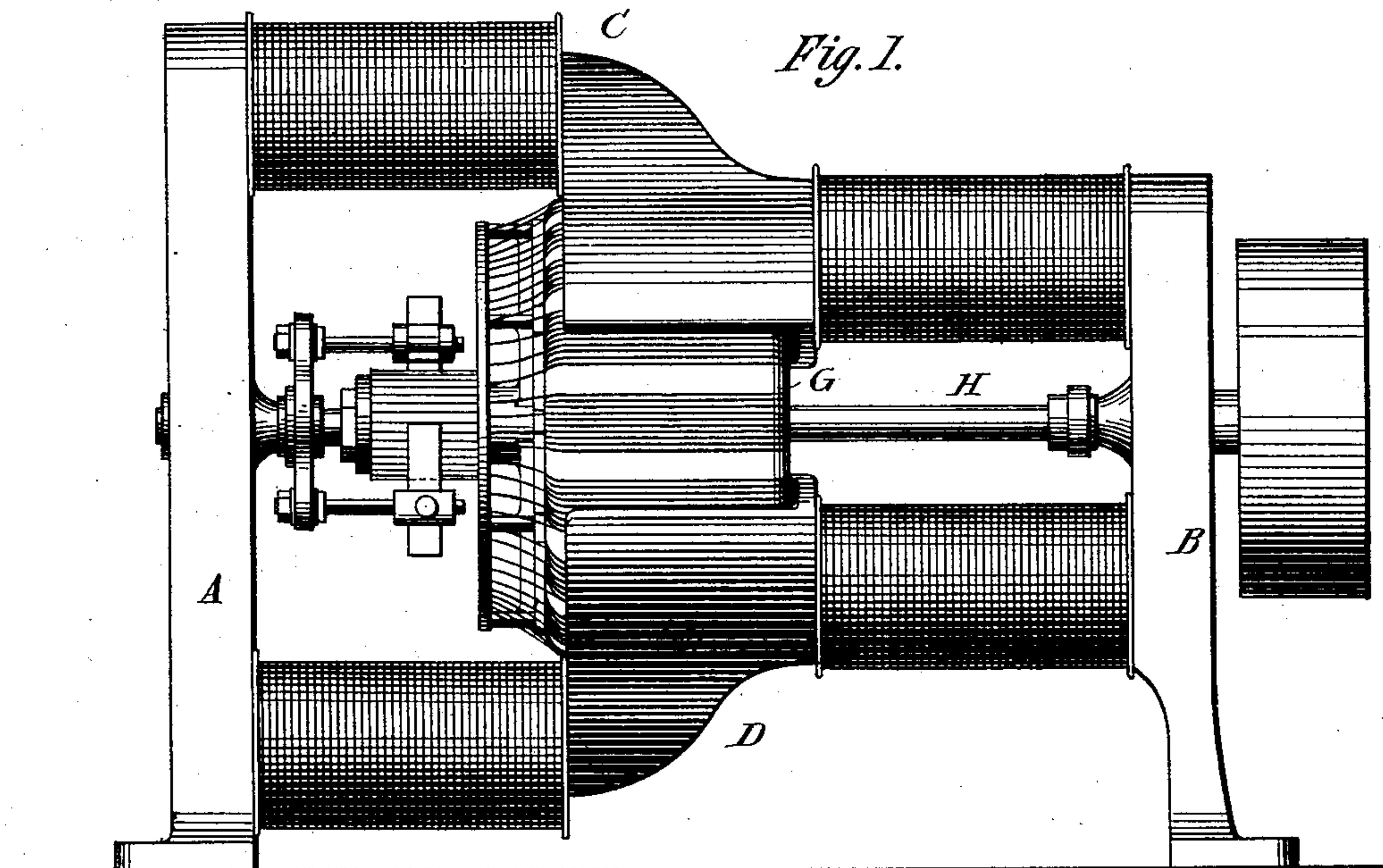


(No Model.)

E. P. CLARK.
ELECTRIC MOTOR.

No. 359,429.

Patented Mar. 15, 1887.



WITNESSES:
Raymond James.
E. H. Stockbridge

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UNITED STATES PATENT OFFICE.

ERNEST PAUL CLARK, OF NEW YORK, N. Y., ASSIGNOR OF PART TO ANN ELIZA APPLGATE AND JAMES H. SEYMOUR, BOTH OF SAME PLACE.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 359,429, dated March 15, 1887.

Application filed November 23, 1886. Serial No. 219,703. (No model.)

To all whom it may concern:

Be it known that I, ERNEST PAUL CLARK, a citizen of the United States, residing in the city, county, and State of New York, have
5 invented certain new and useful Improvements in Electric Motors; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-
10 pertains to make and use the same.

My invention is concerned with providing means for increasing the efficiency of that class of devices known as "electric motors." It has been found in practice that rotary electric
15 motors are more efficient when the pole-pieces of the armature pass in the closest possible proximity to the field-magnet poles, while the efficiency of dynamo-electric machines is not increased by such proximity. For example,
20 taking the ring-armature as a type, it has been found that a smooth ring-armature like that of Gramme is the better form for a dynamo-electric generator, whereas the toothed ring-armature of Pacinotti is more effective for
25 use in motors.

Now, in Letters Patent of the United States No. 330,005, granted to me on the 10th of November, 1885, I have shown and described a dynamo-electric machine in which I cause
30 an armature of the Gramme type to rotate between internal and external field-magnet pole-pieces. My present invention is mainly directed to making this machine an efficient motor. To this end I employ, in place of the
35 Gramme ring, a Pacinotti ring with some alterations, and I find that the results fully warrant the change of form. The ring of Pacinotti was provided with external teeth or projections, between which the wire was
40 wound. I provide my ring with internal and external teeth or projections, those on the inside being narrowed so as to admit of the proper winding of the ring. I find that I secure far better results in this way than with a
45 ring having the external projections alone.

In the accompanying drawings, which illustrate my invention and form a part of this specification, Figure 1 is a side elevation of the motor embodying my invention. Fig. 2
50 is a detail of the ring or core upon which the armature-coils are wound, showing also a section through the inner magnet pole-pieces; and Fig. 3 illustrates the form of my field-magnet cores and pole-pieces.

Referring to the drawings by letter, A and 55 B are uprights or standards on which my motor is supported. On these standards, respectively, are mounted the magnets C and D, forming the field-magnets of my motor. The
60 cores of the two upper helices of the said magnets are preferably formed in one casting, as are also those of the two lower helices of the respective magnets. The form of the castings is shown in Fig. 3, by reference to which it
65 will be seen that each casting is so shaped as to present a pole-piece both within and without the rotating armature. The outer pole-pieces I have designated by the letter E, and the inner pole-pieces by the letter F. The
70 armature G of my motor is mounted on a shaft, H, supported by the standards A and B. The armature-core is made in the form of a ring of iron having external teeth or projections, G', and internal teeth or projections, G². The
75 armature is wound in the usual manner between the said teeth. By reference to Fig. 2 it will be seen that I re-enforce the inner pole-pieces by a magnet, I, whose helices stand at either side of the shaft H, and whose cores are
80 joined to the said inner pole-pieces.

By constructing my armature in the manner above described, and by combining with my improved armature field-magnets having internal and external pole-pieces, I find that
85 I bring the armature very effectually under the influence of my field-magnets and secure a motor of high efficiency.

The operation of my motor is the same as that of other machines of its class, and I have
90 therefore not described it in detail.

What I claim is—

In an electric motor, the combination, with a pair of field-magnets provided with external and internal pole-pieces, and a third magnet
95 whose cores are joined to the said inner pole-pieces, of a ring-armature having external and internal projections, as and for the purpose set forth.

In witness whereof I have hereunto affixed my name in the presence of two subscribing
100 witnesses.

ERNEST PAUL CLARK.

Witnesses:

GEORGE H. STOCKBRIDGE,
CHAS. H. SAAL.