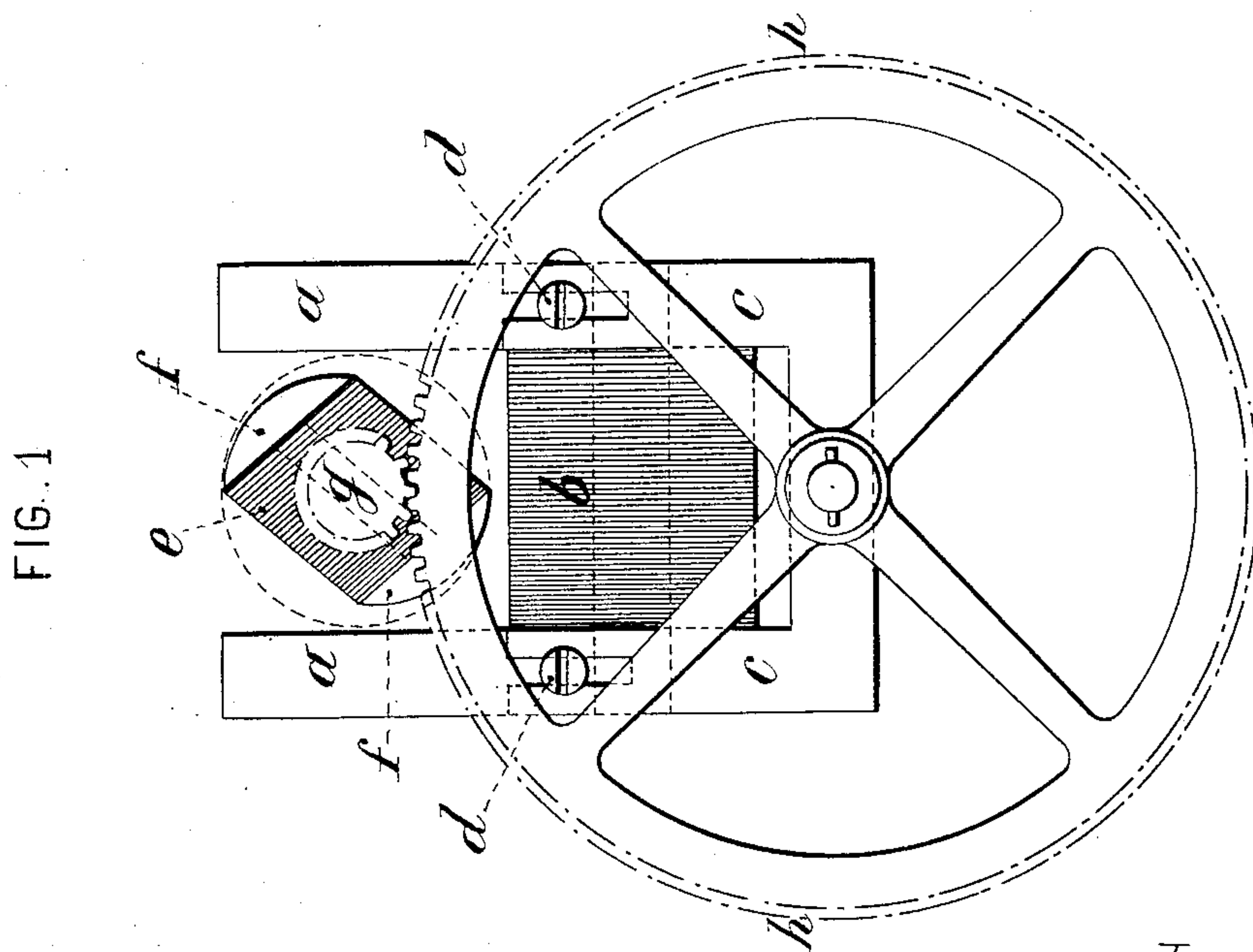
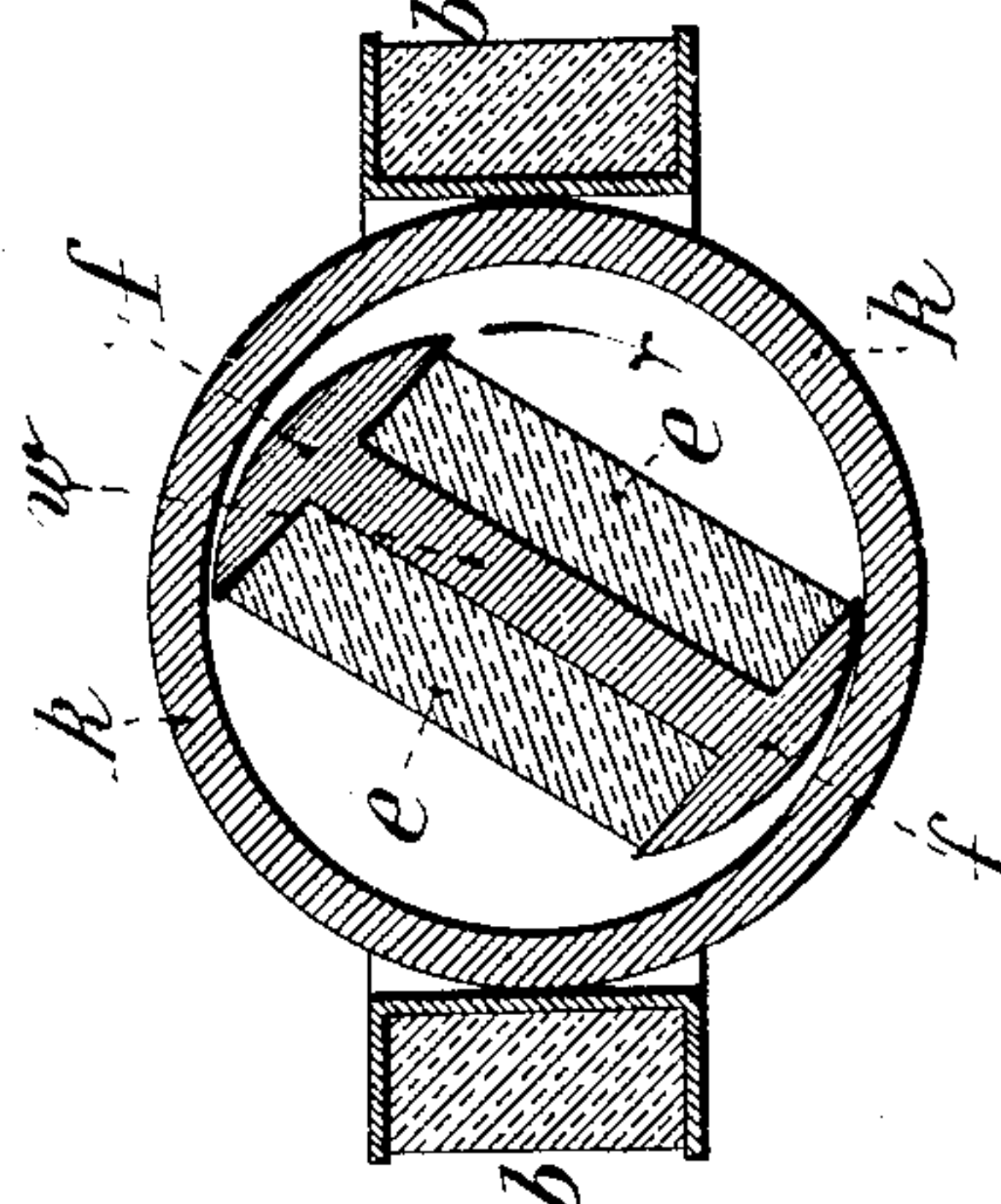
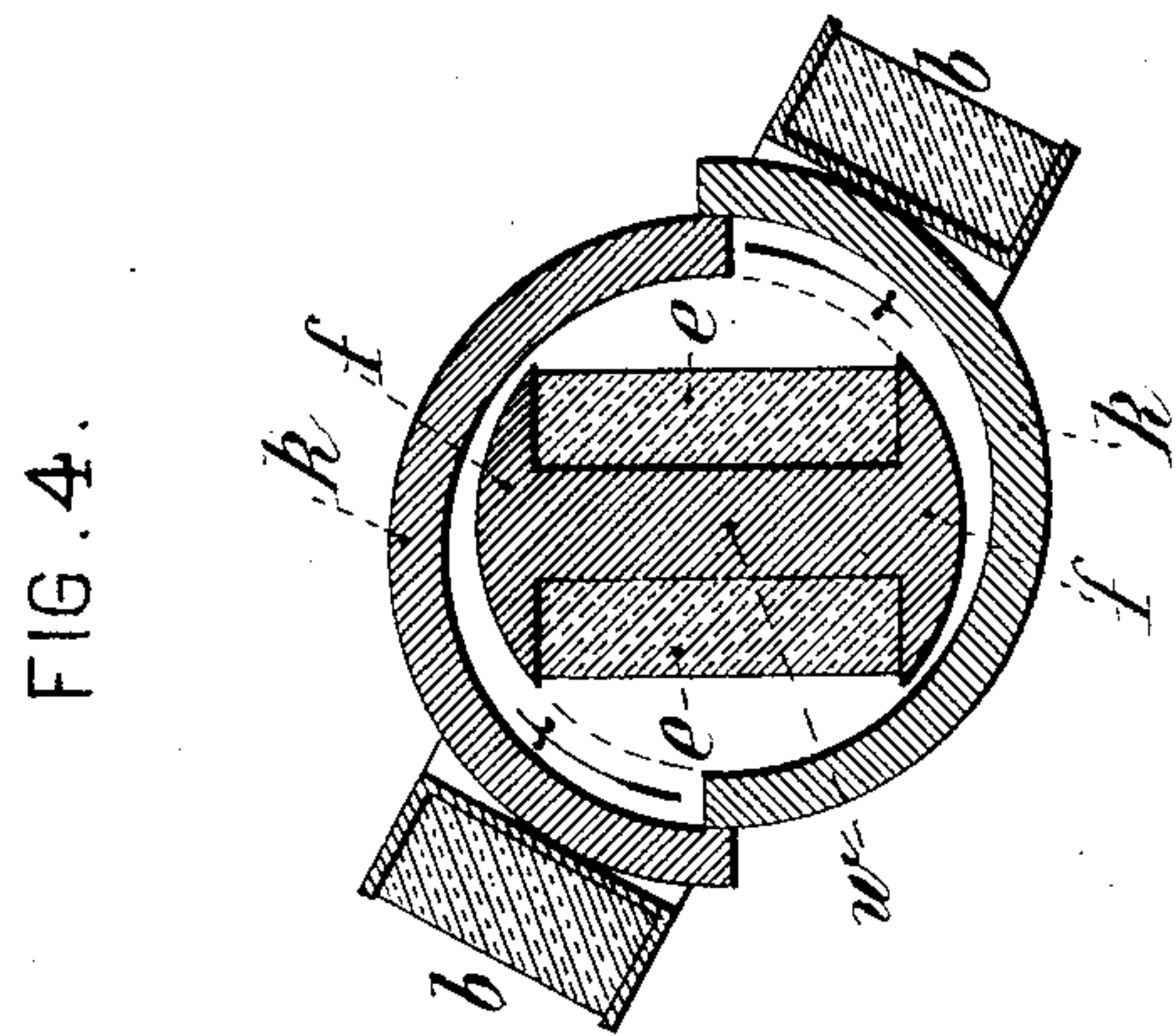
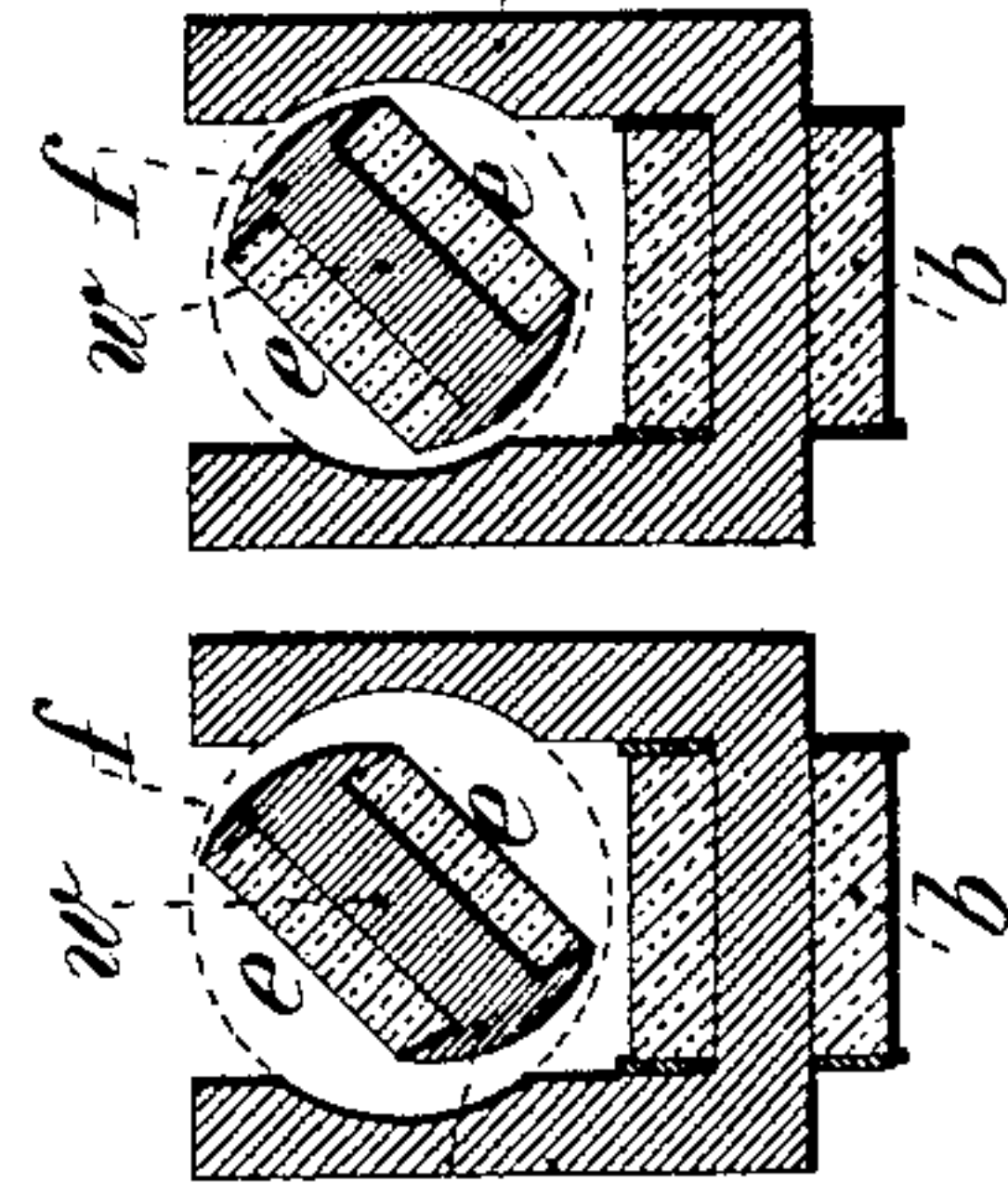
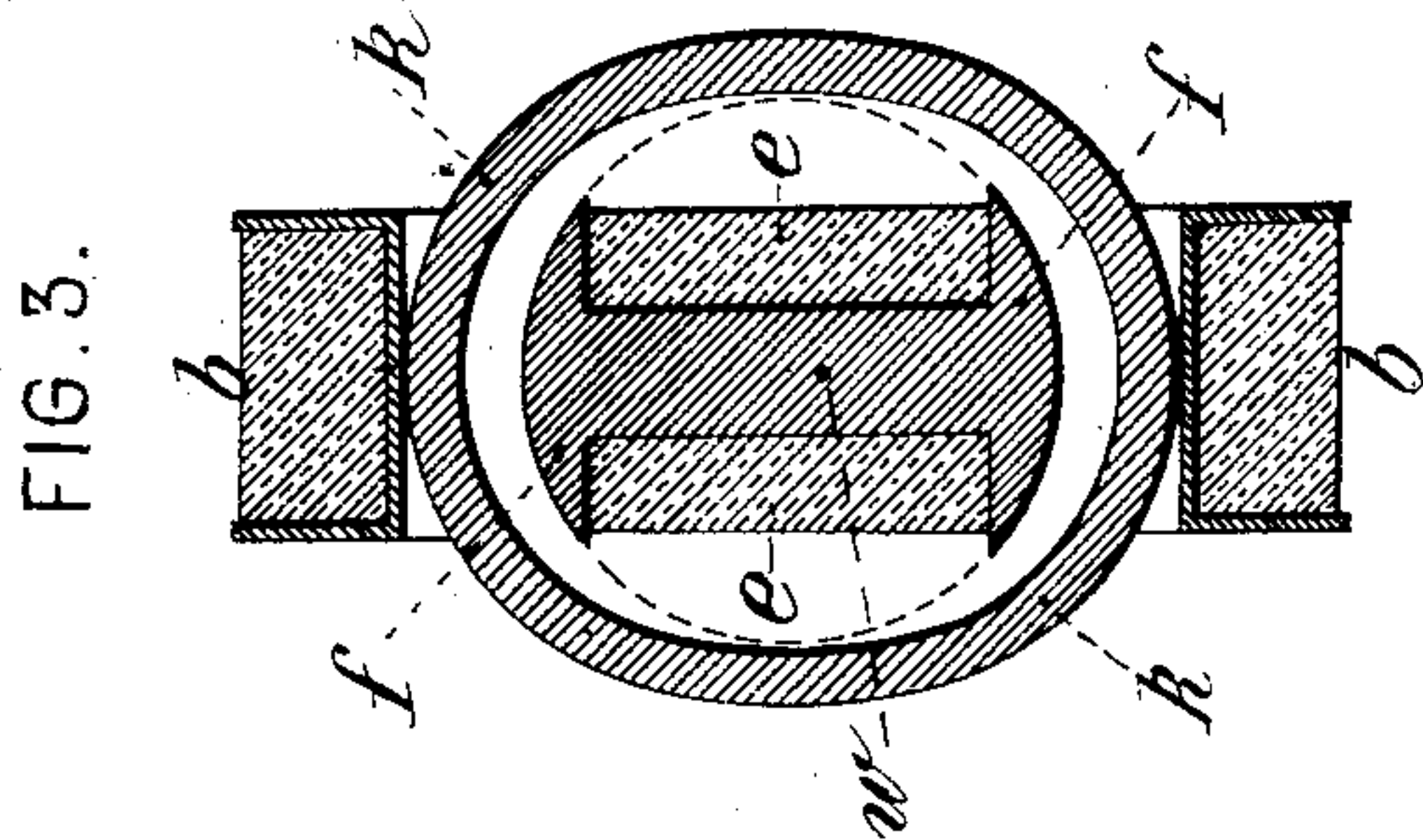


(No Model.)

G. TROUVÉ.
ELECTRIC MOTOR.

No. 308,534.

Patented Nov. 25, 1884.



Witnesses.
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UNITED STATES PATENT OFFICE.

GUSTAVE TROUVÉ, OF PARIS, FRANCE.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 308,534, dated November 25, 1884.

Application filed June 24, 1884. (No model.) Patented in France May 8, 1880, No. 136,560, and in England October 2, 1880, No. 4,009.

To all whom it may concern:

Be it known that I, GUSTAVE TROUVÉ, of the city of Paris, France, have invented a new and useful System of Electric Motor or Dynamo-Machine, of which the following is a full, clear, and exact description, the same having been patented in France on the 8th of May, 1880, No. 136,560, and in Great Britain on the 2d of October, 1880, No. 4,009.

10 The said invention relates to electromotors; and it consists in employing a modification of a Siemens or other similar coil or armature, in combination with an electro-magnet constructed and arranged in the manner hereinafter described. The Siemens armatures, as heretofore employed, revolve concentrically to the exciter in such a manner that on starting the motor there exists a dead-point or an angle of indifference to motion of nearly 20 twenty-five degrees, and corresponding to the distance traversed by the cylindrical polar surfaces of the armature, during which any part of the said surfaces is opposite the poles of the magnet. During this fraction of a 25 revolution the two magnetic surfaces, which are intended to react upon each other, remain at the same distance apart, so that for a time the armature has no inducement to rotate. According to the present invention this defect is obviated either by constructing the armature with a core presenting polar surfaces which are eccentric to the axis of revolution, or by making the surfaces of the core concentric with the axis of revolution, while the exciter presents curved surfaces which are eccentric to the said axis. By means of this arrangement the space between the surfaces is gradually contracted until the moment when repulsion commences, the speed being thus 40 accelerated up to the point which is magnetically the nearest; and in order that the said invention may be fully understood I shall now proceed more particularly to describe the same, and for that purpose shall refer to the several figures on the annexed sheet of drawings, the same letters of reference indicating corresponding parts in all the corresponding figures.

50 Figure 1 of the accompanying drawings represents a side elevation of a motor constructed according to the said invention,

with an eccentric armature and a magnet having straight poles; and Figs. 2 and 2^a represent modifications of this arrangement hereinafter described. Figs. 3 and 4 are sectional views illustrating two other modifications of the invention, in which the surfaces of the armature are made concentric with the axis, the surfaces of the exciter being eccentric to the same. Fig. 5 is a sectional view 60 of a further modification, according to which an armature having eccentric surfaces is caused to rotate in the interior of a circular exciter.

When a Siemens armature with eccentric- 65 ally-arranged poles is employed, the apparatus may be arranged in the manner shown in Fig. 1. A suitable electro-magnet, *a*, provided with a coil, *b*, is fixed to a copper support, *c*, by means of set-screws *d*, so as to be capable of 70 adjustment, and a Siemens armature, *e*, constructed as hereinafter described, is arranged upon suitable bearings, so as to revolve between the poles of the said magnet. The poles of the magnet *a* may present flat surfaces 75 on the sides facing the armature, as shown in Fig. 1, or curved surfaces, as shown in Figs. 2 and 2^a. The armature *e* is provided with a core, *w*, Figs. 2 and 2^a, the extremities of which are so formed as to present surfaces *f*, 80 eccentric to the axis upon which the armature revolves. This axis is provided with a pinion, *g*, Fig. 1, in gear with a toothed wheel, *h*, or other suitable device from which motion may be imparted to any apparatus to be driven, 85 and the motor itself is inclosed in a suitable casing supporting the bearings of the said axis and other parts of the machine. In working this motor the polar surfaces *f* of the armature, which, as hereinbefore described, 90 do not form portions of a cylinder the axis of which coincides with the axis of rotation, but are eccentric to the latter axis, continue to gradually approach the polar surfaces of the magnet *a* until their rear edges have passed 95 the magnet, at which moment the action of repulsion commences, so that the dead-point is practically *nil*.

According to other modifications of the said invention, which are illustrated in Figs. 3 and 100 4, the surfaces *f* of the revolving core *w* are made concentric with the axis of revolution,

but are so arranged as to revolve within the poles of a stationary exciter, *k*, presenting concave surfaces which form curves eccentric to the axis of revolution of the core, the concave surfaces being of an oval form, for example, as shown in Fig. 3, or presenting two curves in the form of a volute, as shown in Fig. 4; or, the apparatus may be further modified in the manner illustrated in Fig. 5, the core being provided with eccentric surfaces, as in the arrangement first hereinbefore described, and arranged to revolve in the interior of a stationary circular exciter presenting a concave surface concentric with the axis of revolution.

The apparatus constructed as hereinbefore described possesses the following advantages: First, it occupies a very small space in proportion to its power, and its cost is very moderate; second, the electro-magnetic effects are utilized under the most favorable conditions, the inductor being in very close proximity to the revolving core, and almost entirely surrounding the latter in the arrangements shown in Figs. 3, 4, and 5; third, dead-points are entirely avoided with the employment of only one movable electro-magnet; fourth, by arranging two magnets on the same circuit, so that they shall react directly upon each other, the power may be indefinitely increased, as well as the power of the current employed, the only limit to the power being the strength of the materials used in the construction of the apparatus; fifth, very high rates of speed may be obtained with this apparatus; sixth, no sparks are produced at the commutator, the current never being interrupted, and only changing its direction in the Siemens armature at each half-revolution; seventh, the apparatus is reversible—that is to say, that instead of serving as a motor it may be utilized as a dynamo-electric machine or producer of electricity. This reversibility may be obtained

without any modification in the above-described motor. However, in the case of small apparatus—such as those employed for medical purposes or for telephonic calls or bells—I preferably employ a steel core instead of the soft-iron core *a a*. The speed of rotation must be effectively very high to produce the excitation of so small machines having a soft-iron core. On the other hand, the tempered-steel core, employed in this case as an electro-magnet, acts as a permanent magnet when the machine is put in motion, so that the speed necessary for producing the excitation may be reduced.

Some applications may require a motive power greater than the power of one of the above-described motors. In this case I may combine several sets of pieces of the same size, and by this means I may practically and surely obtain, by the addition of the effects of each set of pieces, motors having a motive power approximately equal to their weight in kilograms.

Motors constructed according to the said invention may be employed for driving machinery or apparatus of various descriptions, such as bicycles, tricycles, and other vehicles. Among other applications may also be mentioned its use for marine propulsion.

I claim—

In an electric motor or dynamo-machine, the combination of one or more coils or armatures of the description known as “Siemens coil” and one or more exciters or magnets, the acting surfaces of the two being arranged eccentrically to each other, substantially as and for the purposes hereinbefore described, and illustrated in the annexed drawings.

GUSTAVE TROUVÉ.

Witnesses:

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