No. 859,368. PATENTED JULY 9, 1907.

P. J. COLLINS.

DYNAMO ELECTRIC MACHINE.

APPLICATION FILED NOV. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

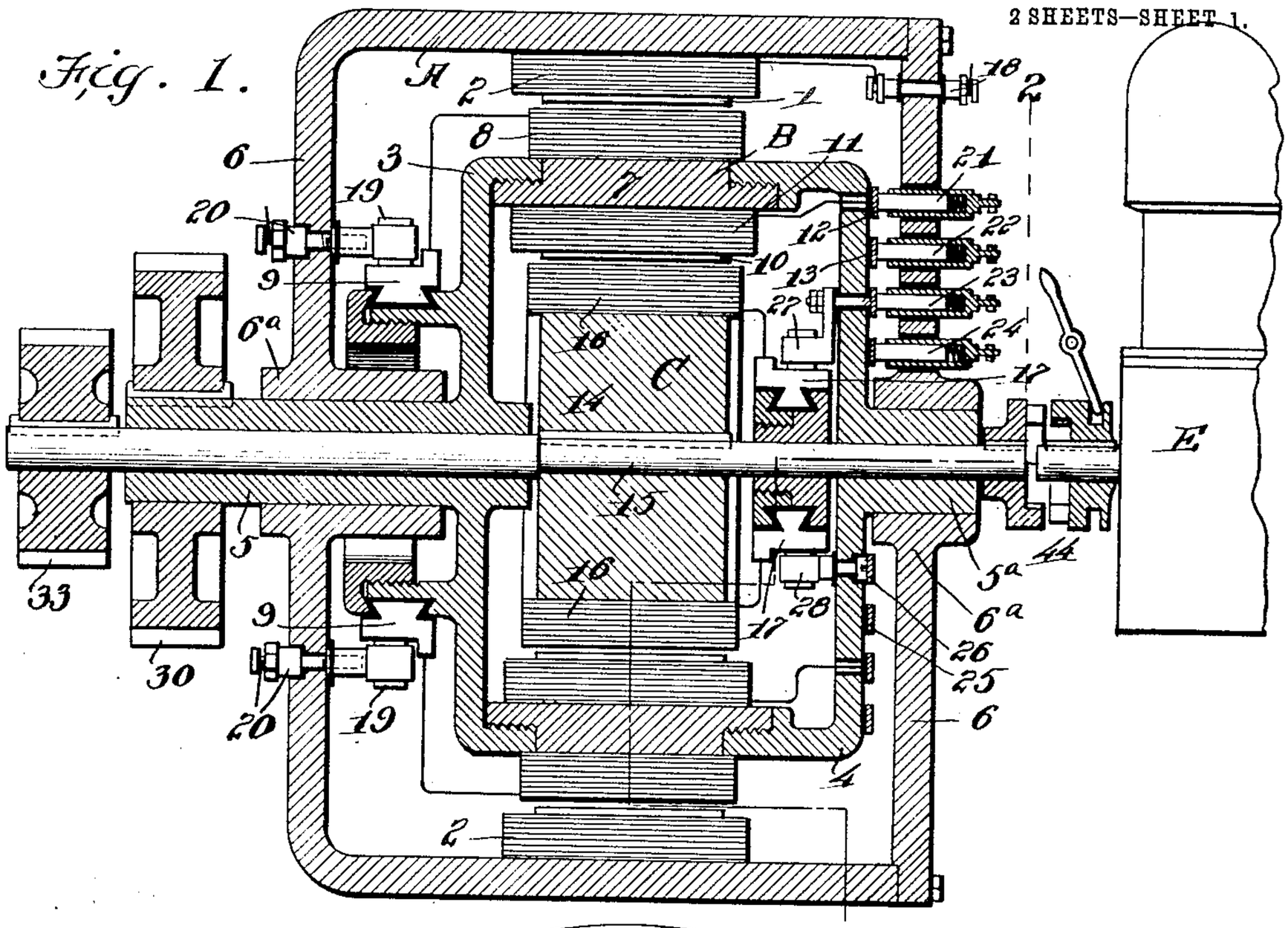

Fig. 2.

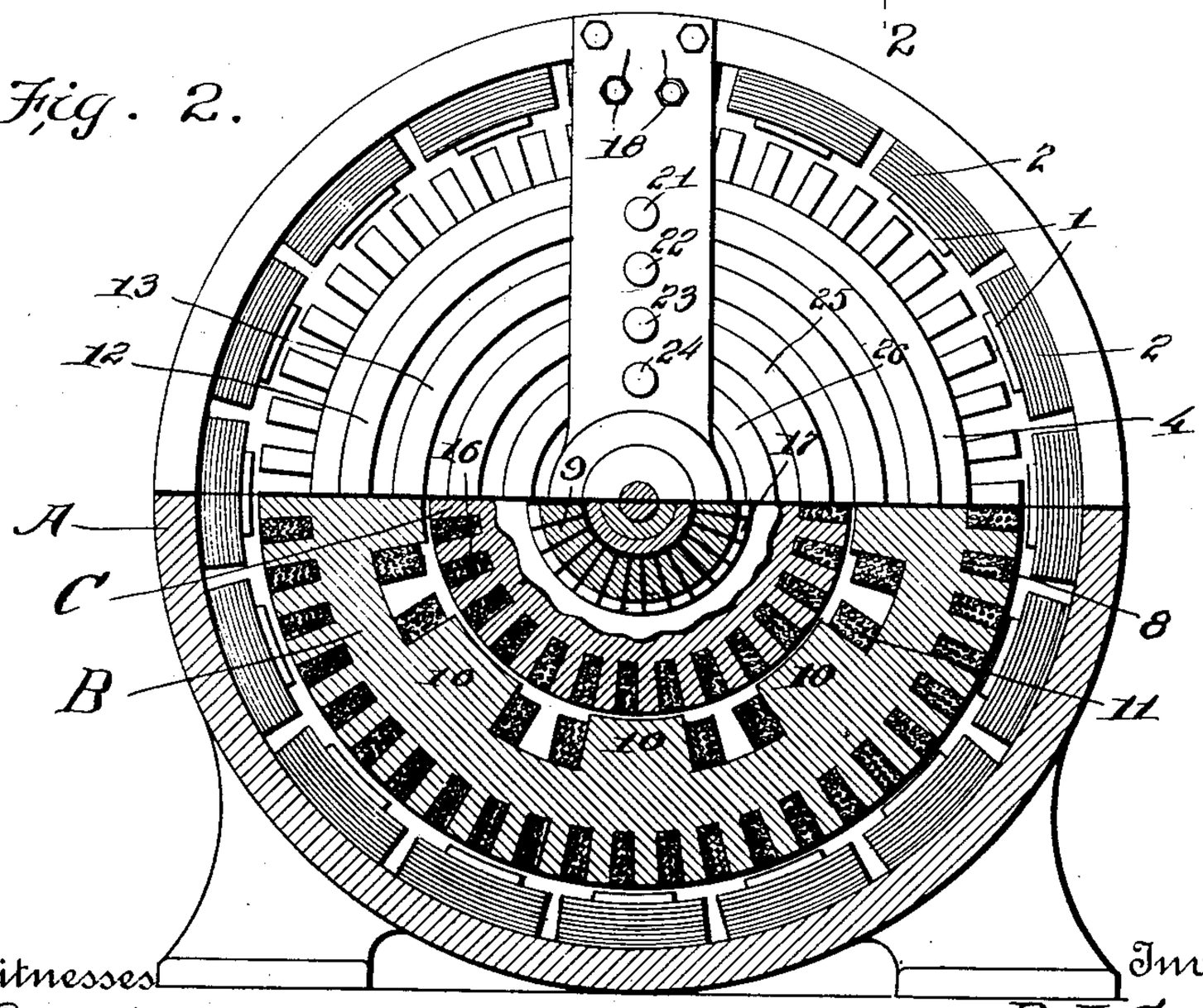

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Fig. 3.

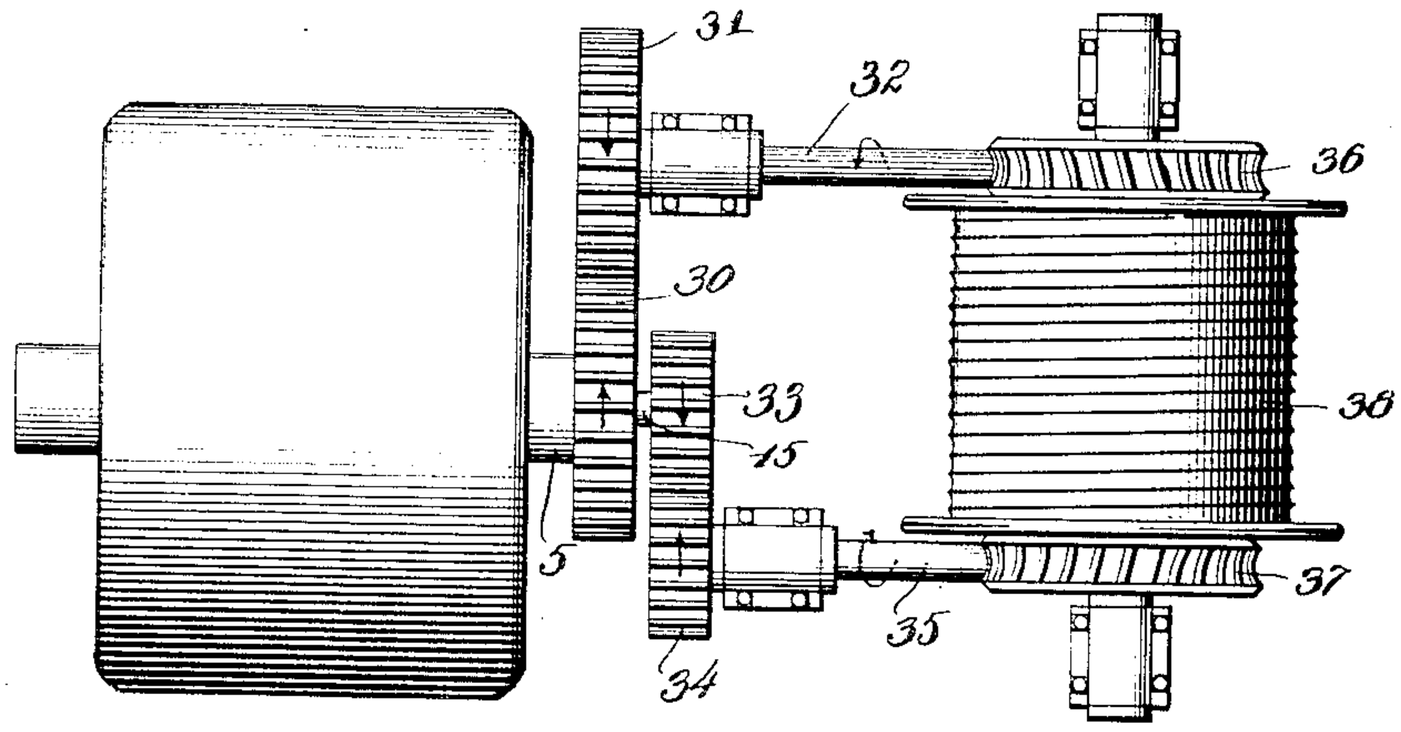
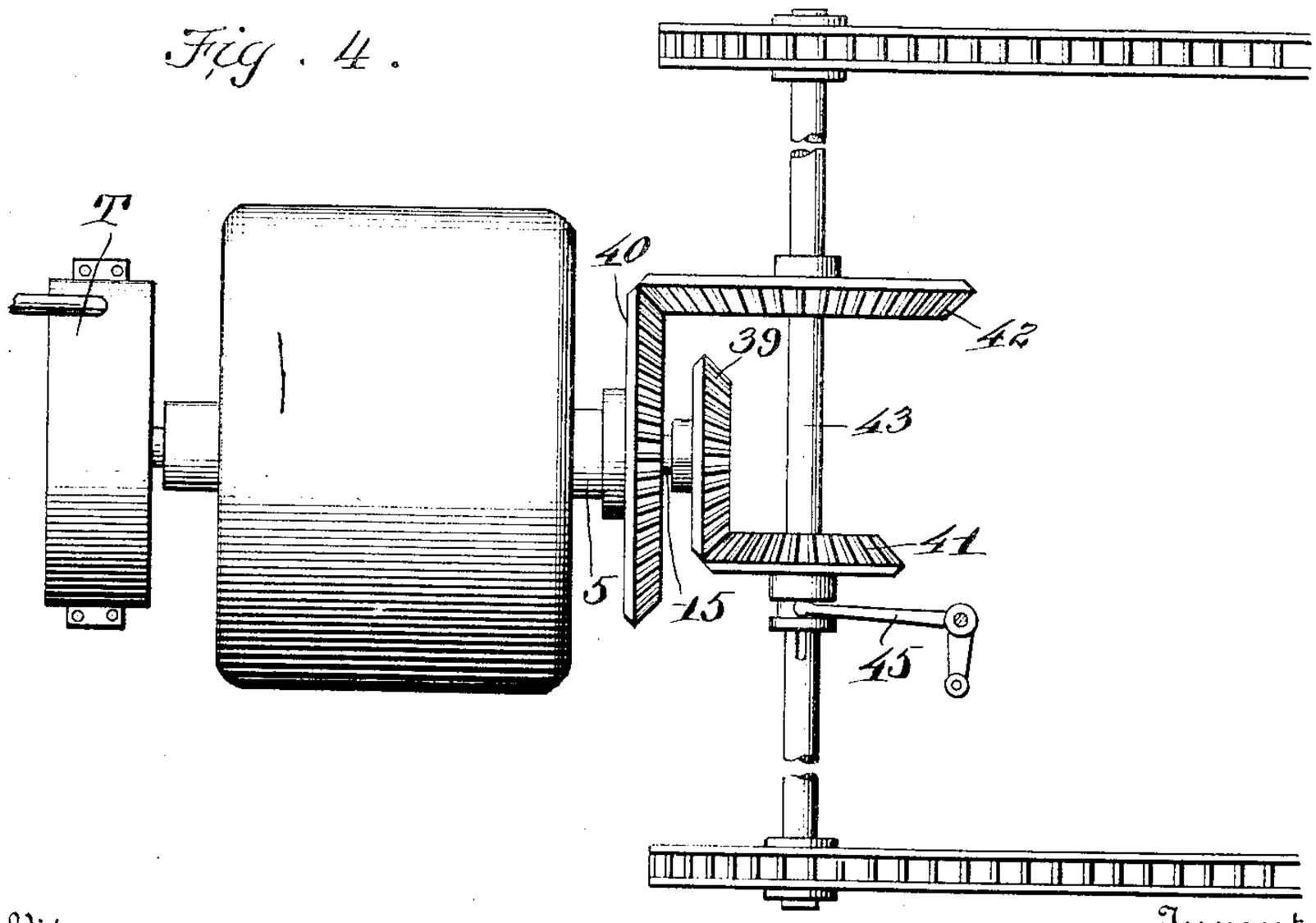


Fig. 4.



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UNITED STATES PATENT OFFICE.

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DYNAMO-ELECTRIC MACHINE.

No. 859,368. Specification of Letters Patent. Patented July 9, 1907.

Application filed November 16, 1904. Serial No. 233,014.

To all whom it may concern:

Be it known that I, PATRICK J. COLLINS, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

This invention relates to improvements in dynamo electric machines, the details and advantages of which will be made clear from the following specification, taken in connection with the accompanying drawing, in which—

Figure 1 is a vertical section through a dynamo electric machine embodying my improvements, the section being taken on the line of the shafts; Fig. 2 is a right-hand end view of Fig. 1, partly in section on the line 2—2 of Fig. 1; Fig. 3 is a plan view showing the shafts of the machine geared to the worm shafts of an elevator hoist; Fig. 4 is a plan view showing the shafts of the rotary elements of the machine geared to a shaft arranged at right angles to the machine shafts.

Referring to Figs. 1 and 2 of the drawing, A indicates a stationary field frame having on its interior a circular series of pole-pieces 1 surrounded by field coils 2, and comprising the stationary element of my machine. Within said stationary outer element is arranged an intermediate rotary element B which is supported by disks or spiders 3 and 4 upon tubular shaft sections 5 and 5ª respectively, which latter are journaled in bearings 6ª in the end frames 6 of the stationary element. The intermediate member B comprises an iron ring core 7 having, as shown, armature coils 8 wound within slots in its outer side and connected to a commutator 9, carried by the spider 3, and having a circular series of pole-pieces 10 on its interior, said pole-pieces having thereon field coils 11, the ends of which are connected to two insulated contact rings 12 and 13 arranged upon the face of the spider 4. Within the intermediate rotary member B is arranged a rotary member C, comprising an iron core 14, which is keyed or otherwise secured to a shaft 15, and having armature coils 16 wound within slots at its periphery and connected to a commutator 17 upon the shaft 15. The shaft 15 is journaled within the tubular shaft sections 5 and 5ª which carry the intermediate rotary member B.

Current for operating the machine is admitted to the field-coils of the stationary member through binding posts 18 connected to the terminals of said coils, and current is admitted to the armature coils 8 of the intermediate rotary member by means of brushes 19, resting upon the commutator 9 and held within brush holders 20, which are supported by and insulated from the rear end frame or hanger 6. It will be evident that when current is admitted to the outer field coils of the stationary member, and to the coacting armature coils of the intermediate member, the latter member will rotate in the same manner as the armature of any ordinary electric motor. Current is admitted to the field coils 11 of the intermediate rotary member through spring-pressed brushes 21 and 22 supported within insulated bushings in the front hanger 6 of the machine, and bearing upon the insulated contact rings 12 and 13 respectively. Current is admitted to the armature coils of the inner rotary member C through similar spring-pressed brushes 23 and 24 bearing upon contact rings 25 and 26 respectively, arranged upon the front spider 4, said rings being electrically connected to brushes 27 and 28 supported in said spider and bearing upon the commutator 17. It will be apparent that when current is admitted to the field coils 11 of the intermediate member, and to the armature coils 16 of the inner rotary member, the latter will rotate.

Any suitable form of switch or controlling device may be used, and in practice, the coils may be so wound and connected to the current source that the members B and C will rotate in opposite directions. While there are but three members in all, namely, the stationary member, and the intermediate and inner rotary members, there are two sets of armature coils and two sets of field coils, each set as efficient as in a single motor. In other words my device is in effect two motors arranged in a very compact form on a single frame and within a single casing.

In Fig. 3 I have shown a spur gear 30 upon the tubular shaft of the intermediate rotary member, said gear meshing with a gear 31 upon a shaft 32, and a gear 33, is arranged upon the shaft 15 of the inner rotary member and meshes with a gear 34 upon a shaft 35 arranged parallel with the shaft 32. The ratio between the gears 30 and 31 is the same as that between the gears 33 and 34. The parallel driven shafts 32 and 35 may be the worm shafts of an elevator or hoist meshing with worm-wheels 36 and 37 respectively, at the ends of a hoisting drum 38 (Fig. 3), or any suitable arrangement of gearing may be used to connect the shafts of the two rotary members to the mechanism which is to be operated. In Fig. 4 I have shown bevel gears 39 and 40 upon the shafts 15 and 5, these gears meshing with similar gears 41 and 42 upon a shaft 43 at right angles to the shafts of the machine. As the shafts 5 and 15 turn in opposite directions, the gears 41 and 42 will rotate in the same direction and turn the shaft 43, which may be the driving axle of a motor vehicle, a countershaft, or the worm shaft of an elevator, or which may be geared in any desirable way to the load.

In Fig. 1, E indicates a small prime motor which may be connected to the shaft of the inner rotary member by a clutch 44, where the machine is to be used on automobiles, for the purpose or driving said member to generate current and charge the batteries upon the vehicle, when the latter is at rest, or traveling down grade. In such case, of course, the shaft of the inner member would be thrown out of gear with the driving axle by suitable clutch mechanism, while the intermediate member would remain in gear with the driving axle, and would either be rotated by the gravity and momentum of the vehicle, or remain stationary, in case the vehicle is, at the time stopped. In Fig. 4 I have shown the gear 41 movable upon the shaft 43 by means of a lever 45, so that the said gear may be disengaged from the gear 39 to permit the inner armature to be driven by a prime motor, which may be a turbine T permanently connected to the armature shaft, or the engine E, Fig. 1, connected by a clutch.

It will be evident that the intermediate rotary member, instead of being a combined field and armature, may be a double armature or a double field, or instead of having interior field coils and exterior armature coils, these may be reversed, the inner and outer members being arranged with field or armature windings, according to the changes made in the intermediate rotary member, in this respect. It will also be evident, that the machine may be electrically connected in such a way, that both the intermediate and internal member may rotate in the same direction.

Having described my invention, what I claim, and desire to secure by Letters Patent, is:

1. In a dynamo electric machine, an outer stationary member, an inner rotatable member, an intermediate rotatable member coacting with said inner and outer members, and a mechanical driving connection between said rotatable members.

2. In a dynamo electric machine, an outer stationary member, an intermediate rotatable member coacting with said outer member and having a tubular shaft, an inner rotatable member coacting with said intermediate member and having a shaft within the tubular shaft of the intermediate member, and gearing between said rotatable members.

3. In a dynamo electric machine, an outer stationary member having field coils thereon, an inner rotatable member having armature coils thereon, an intermediate rotatable member having both armature and field coils thereon, and means for gearing said rotatable members together.

4. The combination with a dynamo electric machine comprising an outer stationary member, an intermediate rotatable member having a tubular shaft, and an inner member having a shaft journaled in the shaft of the intermediate member, of gearing connecting said shafts to the load to be driven.

5. The combination with a dynamo electric machine comprising an outer stationary member, an intermediate rotatable member having a tubular shaft, and an inner member having a shaft journaled in the shaft of the intermediate member, of gearing connecting said shafts to the load to be driven, an engine arranged to rotate the inner member, and means for disconnecting said inner member from the load.

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

PATRICK J. COLLINS.

Witnesses:
ROBT. J. MURRAY,
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