

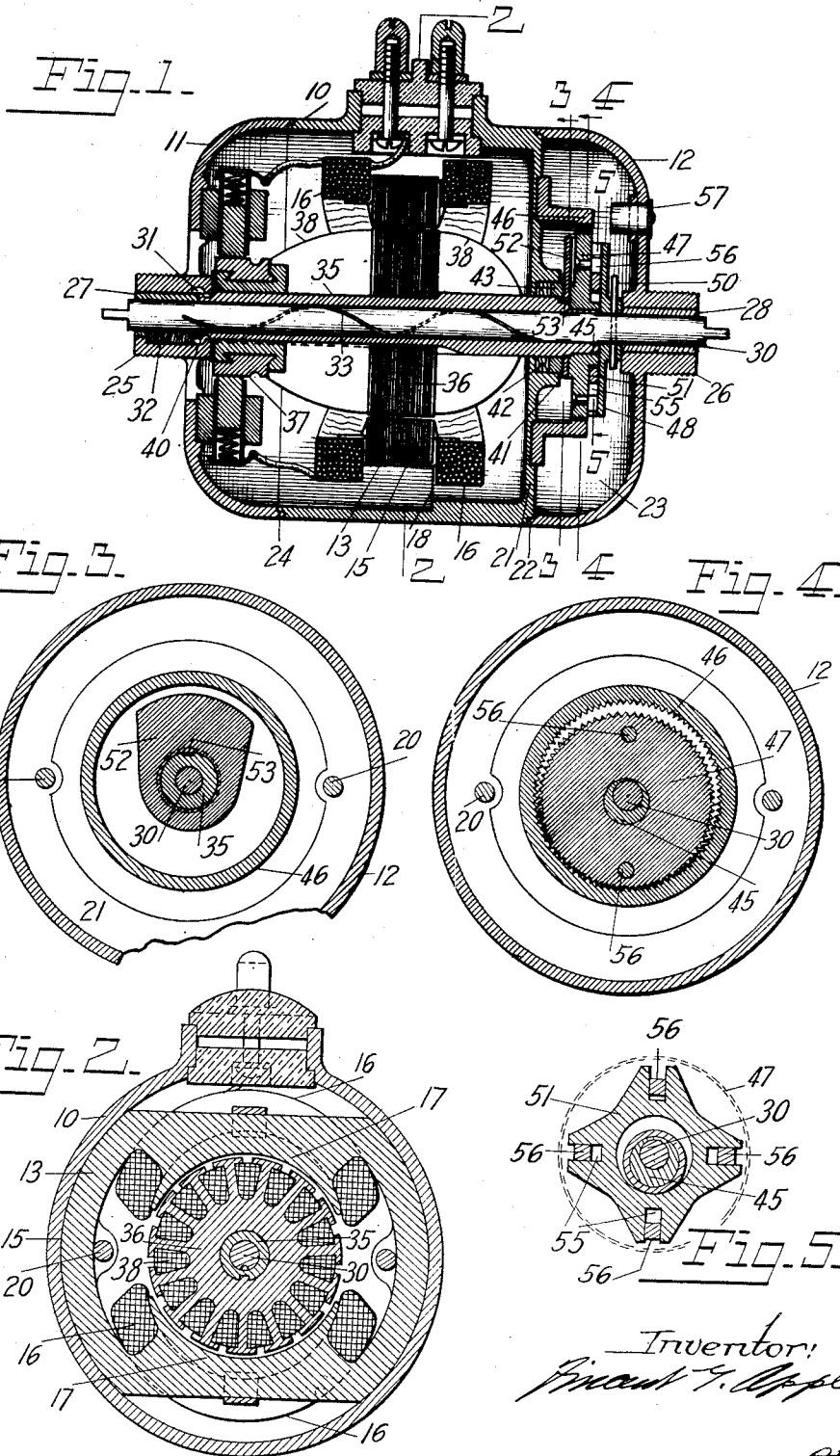
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GEARED MOTOR

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UNITED STATES PATENT OFFICE

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GEARED MOTOR

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This invention relates particularly to high speed motors having means incorporated in their construction connecting the high speed armature to the power shaft to operate the power shaft at relatively low speed.

An object of the invention is to provide a compact structure of few parts and low cost having at the same time high ratio speed reducing gearing connecting the armature to the power shaft.

Another object is to provide effective lubricating means whereby all of the moving mechanism is oiled through one opening.

Another object is to carry the lubricant to the commutator end bearing with minimum danger of getting it on the commutator and brushes.

These and other objects are attained in the structure hereinafter specifically described, reference being had to the drawing wherein—

Figure 1 is a vertical axial section through a mechanism embodying my invention.

Figs. 2, 3, 4 and 5 are transverse sections taken through Fig. 1 at 2—2, 3—3, 4—4 and 5—5, respectively.

Similar numerals refer to similar parts throughout the several views.

The housing of the geared motor is divided into three main parts, namely, the field ring 10, the brush cover 11 and the gear cover 12. The field core 13 is built up of laminæ 15 and has coils 16 wound about the poles 17. The wound core is held in the ring against shoulder 18 by bolts 20.

The ring 10 has an end wall 21 and a rabbet 22 to hold gear cover 12 supported in concentric relation, whereby a substantially closed chamber 23 is provided for the gear mechanism. The other end of the ring has a similar rabbet 24 to concentrically support the brush cover 11.

Hubs 25 and 26 centrally located in covers 11 and 12 carry bearing bushings 27 and 28 respectively, which provide rotative support for the power shaft 30. An annular groove 31 extends around the inside of hub 25 near its inner end, and bushing 27 is of proper length to extend from the outer end of the hub to the middle of this groove 31. A wick

32 of felt or similar absorptive material is seated in the hub 25 level with the bottom of groove 31 and extends upwardly through an appropriate slot in bushing 27 to make contact with the power shaft 30. A helical groove 33 in the outer surface of shaft 30 connects the interior wall of bushing 27 with the gear chamber 23, the helix being right or left hand, depending on the direction of rotation of the shaft, being thus adapted to move a slight amount of lubricant from chamber 23 through the armature sleeve 35 to the interior of bushing 27.

The armature sleeve 35 is revoluble about shaft 30 and has its bearing thereon. The core 36, the commutator 37 and the winding 38 are all secured to this sleeve to revolve therewith. At the commutator end the sleeve extends into the hub 25 to the middle of groove 31 where it meets bushing 27. An annular groove 40 encircles the sleeve near the end, the middle of this groove being at the edge of the groove 31. The greater part of the oil carried by groove 33 from gear chamber 23 flows past the point of juncture between the end of the sleeve 35 and the bushing 27, and into the bushing 27, but such part of the oil as escapes through this juncture passes radially outward, is caught by the annular groove 31 and absorbed by the wick 32. This construction effectively prevents oil escaping and passing outwardly along the end of the commutator to the brush track.

Where sleeve 35 passes through end wall 21 there is a hub 41 which contains a felt washer 42 to prevent escape of lubricant from chamber 23 and a fibre washer 43 to limit end movement of the gear mechanism. The outer end of sleeve 35 is turned eccentric to the remainder of the sleeve as at 45. This eccentric is employed to operate an epicyclic gear.

The gear mechanism comprises the stationary ring gear 46 secured to and held in fixed position on end wall 21, the epicyclic gear 47 mounted on the eccentric 45 which has free rotative movement therein, the driven plate 48 which is secured to the power shaft 30 by pin 50, the universal plate 51 which connects the driven plate and the

epicyclic gear in such a manner that the epicyclic gear may transmit its rotative movement thereto without at the same time transmitting its eccentric movement, and the balance weight 52 which consists of a sheet metal stamping having an integral key 53 extending into a corresponding keyway in sleeve 35. The balance weight 52 is so located as to compensate for the unbalanced effect produced by movement of the epicyclic gear. The universal plate has four radial slots 55. Two of these slots are occupied by pins 56 extending from gear 47 and the other two by two similar pins 56 extending from driven plate 48. A single oil cup 57 is provided and through this the entire motor is lubricated.

It will be apparent that with the mechanism shown a great reduction in speed is accomplished between the armature and the power shaft with few and simple parts, for example, if, in the embodiment shown, the ring gear has eighty-one teeth and the epicyclic gear has eighty, one revolution of the armature in one direction will produce one-eighthieth of a revolution of the power shaft in the opposite direction.

Less reduction in speed may be had by increasing the difference between the number of teeth of the ring and epicyclic gears. Thus, if the ring has eighty-four teeth and the epicyclic gear has eighty, one revolution of the armature in one direction will produce four-eighthieths, or one-twentieth of a revolution of the power shaft.

I am aware that epicyclic gearing has heretofore been employed in a geared motor, and I therefore do not claim the idea broadly, but in the view that a new and useful result is had in the modification and rearrangement of the several parts.

I claim:

1. The combination, in a geared motor, of a motor housing, a power shaft, a bearing for said shaft in each end wall of said housing, an armature sleeve between said bearings revolvable about said shaft, an armature on said sleeve, a partition wall, intermediate the end walls of said housing, dividing the housing into a gear compartment and a motor compartment, said gear compartment being adapted to contain a supply of lubricant, the end of said sleeve extending through a close fitting opening in said partition wall into said gear compartment and having an eccentric portion at the end within the gear compartment, and said shaft having a helical groove around its diameter extending from a point within the gear compartment, through the sleeve, and into the shaft bearing at the other end of the sleeve, an external gear on said eccentric portion and concentric therewith, an internal ring gear nonrotatably secured to the housing, concentric with the power shaft, surrounding and in mesh with said external gear, a driven

plate secured to said power shaft, a universal plate having four equally spaced radial slots between the external gear and the driven plate, two pins extending from the external gear into diametrically opposite slots, and two similar pins extending from the driven plate into the other two slots.

2. The combination, in a geared motor, of a motor housing, a power shaft, a bearing for said shaft in each end wall of said housing, an armature sleeve between said bearings revolvable about said shaft, an armature on said sleeve, a partition wall intermediate the end walls of said housing dividing the housing into a motor compartment and a gear compartment, the gear compartment being adapted to contain a supply of lubricant, the end of said sleeve extending through a close fitting opening in said partition wall into said gear compartment, reduction gearing within said gear compartment operatively connecting said end of said sleeve to said shaft, said shaft having a helical groove beginning in the gear compartment and extending through the armature to the interior of the shaft bearing in the end wall of the motor compartment, said groove being adapted to convey lubricant from said gear compartment to the motor compartment bearing, said motor compartment bearing having no other means of lubrication.

In testimony whereof I affix my signature.
VINCENT G. APPLE.