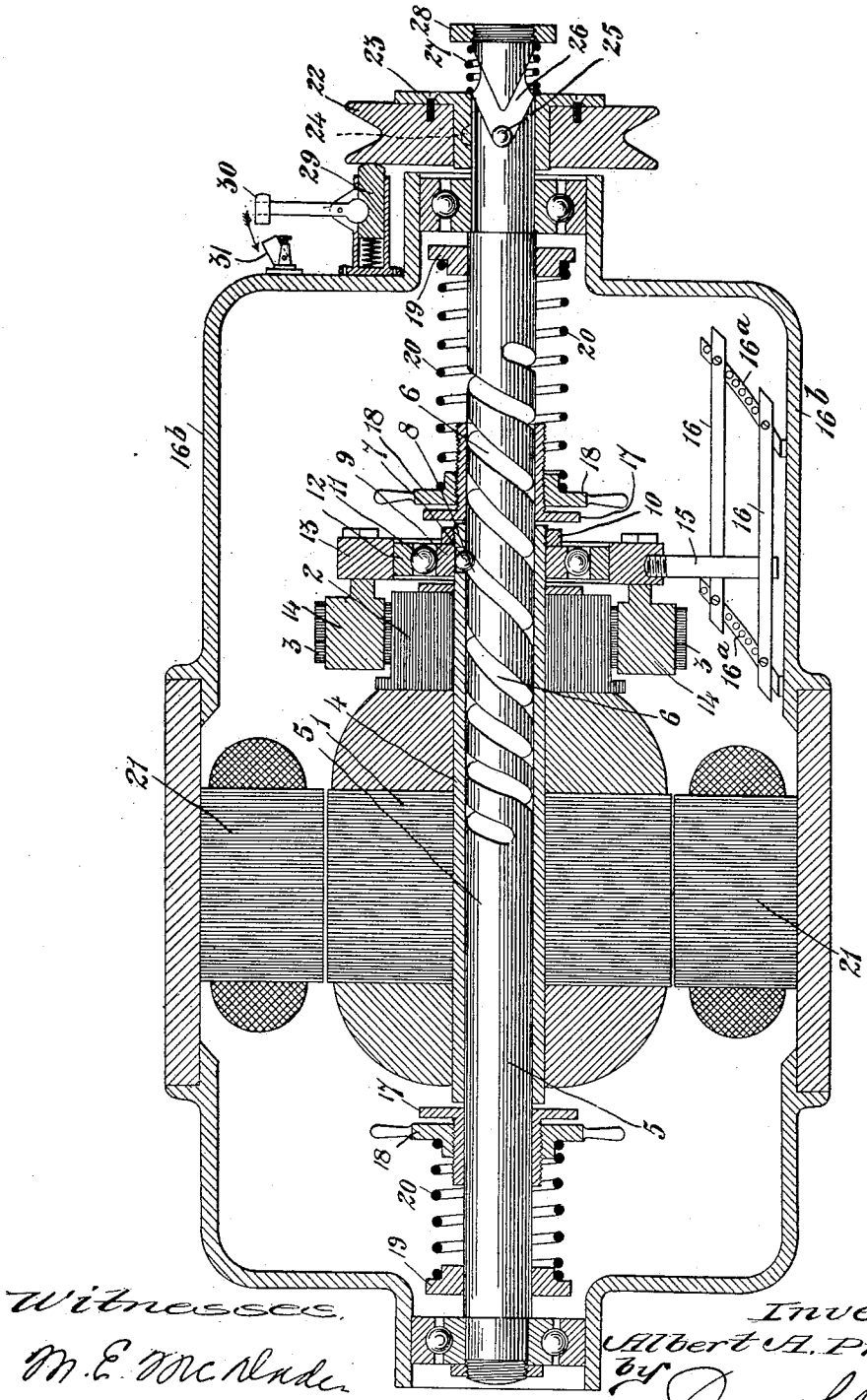
A. A. PRICE.

DYNAMO ELECTRIC MACHINE.

APPLICATION FILED JULY 31, 1913.

1,131,551.

Patented Mar. 9, 1915.



Witnesses.

M. E. McNabb

C. E. Keeler

Inventor

Albert A. Price

by

James L. Norris,

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT ALEXANDER PRICE, OF LONDON, ENGLAND.

DYNAMO-ELECTRIC MACHINE.

1,131,551. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed July 31, 1913. Serial No. 782,315.

To all whom it may concern:

Be it known that I, ALBERT ALEXANDER PRICE, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in and Relating to Dynamo-Electric Machines, of which the following is a specification.

This invention relates chiefly to that class of dynamos in which the armature has a longitudinal spiral movement along its shaft due to the increase of pull between the armature and the field magnets after a predetermined speed has been attained, such movement making connection between the battery and the dynamo, and regulating the voltage by the resistance to the magnetic lines of force passing from the poles through the armature, this resistance being due to a varying air gap.

The invention is particularly applicable to such class of machinery where saving of power is a great consideration and automatic regulation is essential for maintaining a steady output in machines liable to erratic fluctuations of speed.

The principal object of this invention is to construct the shaft or the sleeve carrying the armature with a spiral groove cut geometrically progressive or of varied pitch so that the longitudinal spiral movement of the armature can be continued for an unlimited distance without the necessity of increasing the diameter of the shaft or sleeve and such movement will be gradual and steady and will not change quickly as would be the case with an ordinary constant pitch groove should the engine or driver quickly increase its speed from any cause, that is to say the longitudinal spiral movement of the armature is gradually checked owing to the greater resistance due to the diminution of pitch of the groove.

Another object is to mount the brush gear on a cage surrounding two rings connected together by a race of balls and connecting such cage with adjustable slide rests so that the brushes move longitudinally and parallel with the armature and reverse themselves according to reversals of the direction of rotation.

In describing my invention I refer to generators which I construct in such manner as to be adjusted for any required output within reasonable range and to keep such output at a constant pressure through a wide range of speed without wasting energy through resistance coils.

To enable my invention to be more clearly understood and for the purpose of carrying the invention into effect I refer to the accompanying drawings in which the figure is a section of an apparatus for running in either direction.

I construct an armature 1 with commutator 2 and brushes 3 on a tube 4 which is carried by the driving shaft 5 having a spiral groove or channel 6, this groove being geometrically progressive, or of varied pitch.

At the end of tube 4 holes 7 are formed to receive balls 8 which protrude to engage in groove 6 and are held in position by ring 9 which is rigidly fixed on tube 4 by lock nut 10; the ring 9 has a ball race 11 with an outer ring 12 which carries a cage 13 for inclosing ball race 11 and carrying the brush holders 14. At the base of cage 13 is a rod 15 which abuts against slide rests 16, 16, which are adjustably secured to arms 16^a fixed to the casing 16^b. At both ends of shaft 5 buffers 17 are loosely mounted with regulating wheels 18, 18, and fixed collars 19, 19, between which are springs 20, 20.

The armature 1 is held in normal position with regard to the pole magnets 21, 21, by springs 20, 20, the tension of which is adjusted by the regulating wheels 18, 18, on the buffers 17, 17, and the armature 1 is kept in that position until a required output is generated, when with increase of speed the magnetic resistance between the armature 1 and pole magnets 21, 21, will cause tube 4 with ball 8 to pull against the progressive groove 6 on shaft 5 winding and pressing the armature 1 against buffer 17 and spring 20 according to the direction of rotation to a less magnetic field and so on with augmentation of speed, the same action taking place on reduction of speed but in the opposite direction the armature 1 winding back into a stronger magnetic field.

According to the construction shown, if the direction of rotation be away from the observer the armature 1 moves to the left and on the reverse direction it moves to the right, the brushes 3 taking their position accordingly by the ring 12 carrying the cage 13 revolving on ball race 11 carrying rod 15 to either slide rest 16, 16, which are spaced according to requirements.

The regulation of output can be adjusted to be maintained equal on either the for-

ward or reverse drive with variation of speed, or adjusted for a given output to remain constant on the forward drive and a higher output to remain constant on reverse drive or vice versa.

In generators being used for charging batteries of accumulators where it is necessary to cut in or out the circuit automatically I use the driving pulley 22 which is bushed with a flanged liner 23, the flange being screwed to the face of pulley 22 and the liner 23 having a recess or hole 24 to take a ball 25 which protrudes, to engage in the groove 26 on shaft 5. The pulley 22 with ball 25 is held at the end or apex of the groove by a spring 27 against the nut 28. In its stationary position the pulley 22 is pressed against a spring buffer 29 keeping an arm 30 away from contact plates 31 cutting out the circuit, when the machine is in motion the pull of the driving belt causes pulley 22 to slide end on along the groove against spring 27 releasing the spring buffer 29 causing the arm 30 to engage with contact plates 31 and cut in the circuit.

In the operation of a dynamo electric machine constructed as shown in the present instance the groove 6 and the coöperating ball 8 will cause the armature to shift axially of the shaft either to the left or the right in the drawing according to the direction in which the shaft is driven, thereby displacing the armature relatively to the field or pole pieces and accordingly regulating the output of the generator.

What I do claim as my invention and desire to secure by Letters Patent is:—

1. In a dynamo electric machine, the combination of an armature, an armature shaft formed with a spiral groove of diminishing pitch toward one end of the shaft, and means operative in said groove and coöperative with the armature to shift the armature axially with respect to the shaft upon the occurrence of relative rotation between the shaft and armature.

2. In a dynamo electric machine, the combination of a driving shaft formed with a spiral groove having a diminishing pitch toward opposite ends of the shaft, an armature mounted on the shaft, and means operative in said groove and coöperative with the armature to cause axial movement of the armature relatively to the shaft upon the occurrence of relative rotation between the shaft and armature.

3. In a dynamo electric machine, the combination of a driving shaft formed with a spiral groove of diminishing pitch toward one end, an armature mounted on the shaft and having a commutator movable therewith, a brush holder rotatable relatively to the armature but movable axially therewith, and means operative in said groove of the shaft and coöperative with the armature to produce axial movement of the armature, commutator and brush holder relatively to the shaft when relative rotation occurs between such parts and the shaft.

4. In a dynamo electric machine, the combination of a driving shaft formed with a spiral groove of diminishing pitch toward its ends, an armature and commutator mounted on the shaft and capable of axial and rotary movements relatively to the shaft, a brush holder rotatable relatively to the armature and commutator and movable axially therewith, means coöperative with the brush holder to hold the latter in either of two positions according to the direction of rotation of the armature and commutator, and means operative in said groove of the shaft and coöperative with the armature to cause axial movement of the armature, commutator and brush holder upon the occurrence of relative rotation of such parts with respect to the shaft.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALBERT ALEXANDER PRICE.

Witnesses:
P. E. MATTOCKS,
WM. O. BROWN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."