(No Model.)

J. W. EASTON.

AUTOMATIC TIGHTENING DEVICE FOR ARMATURES OF DYNAMO ELECTRIC MACHINES.

No. 383,114. Patented May 22, 1888.

Fig. 2.

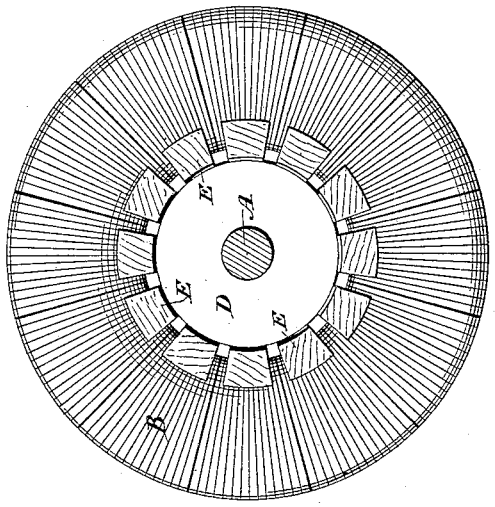


Fig. 1.

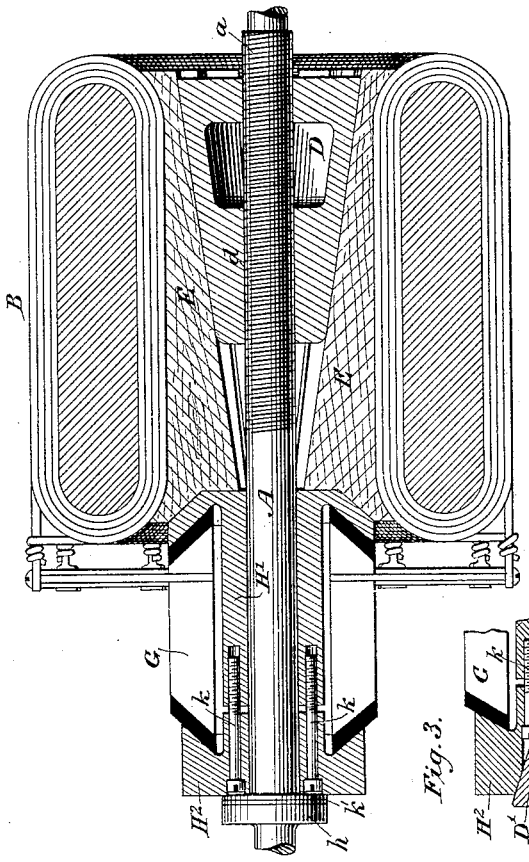
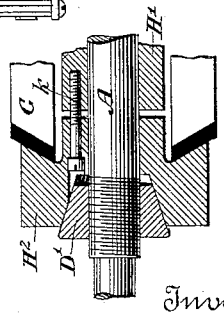


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC TIGHTENING DEVICE FOR ARMATURES OF DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 383,114, dated May 22, 1888.

Application filed April 13, 1886. Serial No. 198,686. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. EASTON, a subject of the Queen of Great Britain, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Automatic Tightening Devices for Armatures of Electric Generators, of which the following is a specification.

The invention relates to the mounting of the armatures of electric generators and motors upon their shafts, and its object is to provide automatically-operating mechanism for increasing the pressure by which the armature is bound to the shaft whenever there is any tendency upon the part of the former to slip. The armatures of this class of machines are usually secured to their shafts either by metallic arms or spiders or by wedges or blocks of wood or other similar material driven between the shaft and the inner surface of the armature. When from any cause the parts become loosened sufficiently to allow more or less movement, the machine must be stopped and the parts tightened up by hand.

My invention consists in providing means for automatically tightening the armature whenever it is necessary by the operation of the machine itself.

In carrying out the invention there is placed within the armature a series of supporting-blocks which, when in position, form a cylindrical casing having a tapering or conical internal surface. Within these blocks there extends a tapering wedge, the outer surface of which conforms to the inner surface of the blocks. This wedge screws upon the armature-shaft, and the thread upon the shaft is formed in such direction that the operation of the machine tends to screw the wedge within the circle of the blocks and expand them.

In the accompanying drawings, Figure 1 is a transverse section of a machine embodying the features of the invention, and Fig. 2 is an end view. Fig. 3 illustrates a slight modification.

Referring to the figures, A represents the shaft of a dynamo-electric generator, and B its armature. Upon the shaft there is formed a screw-thread, *a*, and this turns in a metallic wedge, D, provided with an internal screw, *d*. The screw and thread are so formed that the revolution of the shaft will tend to move the wedge in the direction of its smaller end. The wedge is tapering in form, and fits within a cylindrical series of blocks, E, of wood or other preferably non-conducting material. The inner surfaces of these blocks conform generally to the outer surface of the wedge, and the outer surfaces of the blocks press against the inner surface of an armature, F, of any suitable character. It is designed that the revolution of the shaft shall tend to press the wedge farther within the blocks, thus expanding them and causing them to press more tightly against the surface of the armature. The blocks E are preferably separated from each other a slight distance, but are sufficiently near together to give a firm support to the armature.

For the purpose of causing the blocks to hold tightly to the armature, and at the same time to prevent them from injuring the wire, they are preferably covered upon their outer surfaces by paddings of cotton cloth or other suitable material coated with varnish, shellac, glue, or other substance adapted to harden and seal the parts together.

Upon the shaft A there is formed a collar or shoulder, *h*, which is designed to prevent the commutator G and the armature from displacement longitudinally. The commutator is of any suitable character, preferably formed of plates which are held in position by suitable clamping-plates, H′ and H², which are bound together by suitable screws, *k k*. The plate H′ presses against the ends of the blocks E, and the plate H² is prevented from slipping by reason of the collar *h*. Anti-friction washers *k′* preferably intervene between the plates H² and the collar *h*. These allow all of the parts to turn together in case there is a movement of the armature with reference to the shaft. It is evident that the entire system will be bound together firmly by reason of the wedges, and the moment the draft upon the armature exceeds the friction between the shaft and the armature the shaft will turn within its bearings and move the wedges forward, thus expanding the blocks and causing them to press the armature more firmly.

In putting the machine together the armature F is preferably placed upon end upon a block supporting the wedge D. The blocks

E are then inserted, and the commutator is also placed in position upon the wedges B. The shaft is then inserted and screwed into the wedge B until the latter is drawn into the blocks, expanding them, and causing the several parts to be bound together with sufficient firmness to prevent accidental displacement during the further adjustment of the parts. The wedge D is of such length that it will be drawn within the blocks B, so that the ends of the latter project beyond the widened end of the wedge. This insures that the parts will be bound together with the plate H^2 against the shoulder. When the parts are thus partially fixed in position, the shaft is placed in suitable bearings, and the position of the armature is adjusted so that it will be concentric with the shaft and revolve true. This is conveniently accomplished by adjusting the position of the individual blocks B. The armature F and the other movable parts are then held, while the shaft A is revolved until the tension required to turn the shaft is equal to that which is to be applied to it to revolve the armature. The connections between the armature-coils and the contact-points are then made in any suitable manner.

If the machine is to be employed as a motor, the direction of the screw upon the shaft should be such that the forward pull of the armature against the resistance due to the load applied to the shaft will tend to tighten the parts as before.

In Fig. 3 a modification is illustrated, in which an additional wedging-nut is employed. This screws toward the center of the armature from the opposite end of the commutator. The screw-threads upon the shaft to which the wedges or nuts D and D′ are applied are the reverse of each other. The nut D′ is shown as being shorter than the nut D.

I claim as my invention—

The combination of the armature-shaft of an electric machine, an armature movable thereon, an automatic tightening device coupling the armature to the shaft, whereby the normal movement of the shaft during its operation tends to tighten the grip of the armature upon the shaft, and a commutator coupled to and moving with the armature independently of the shaft.

In testimony whereof I have hereunto subscribed my name this 25th day of March, A. D. 1886.

JAMES W. EASTON.

Witnesses:

THOS. TRYON,

CHARLES A. TERRY.