(No Model.)

E. WESTON.

DYNAMO ELECTRIC MACHINE.

No. 256,778. Patented Apr. 18, 1882.

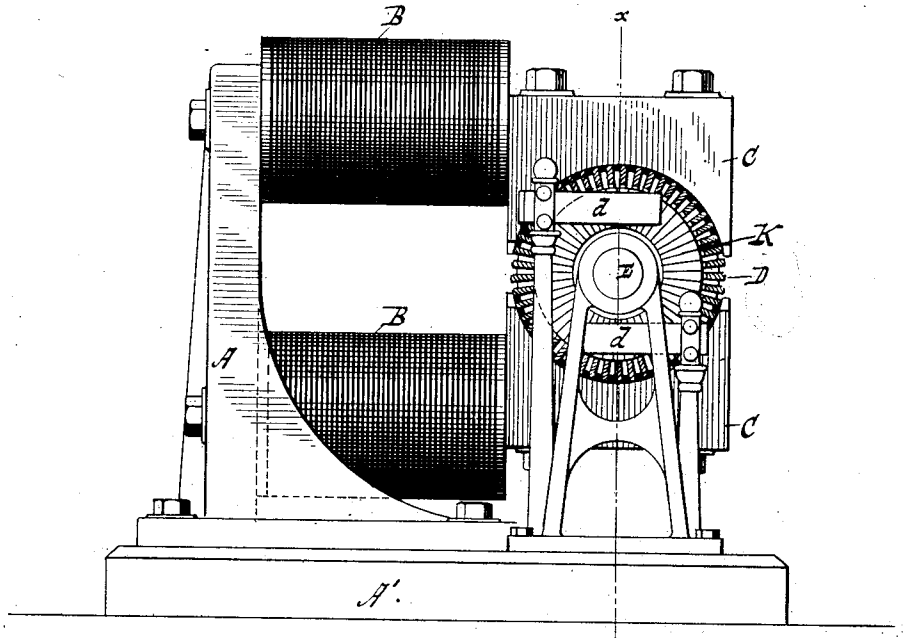


Fig. 1.

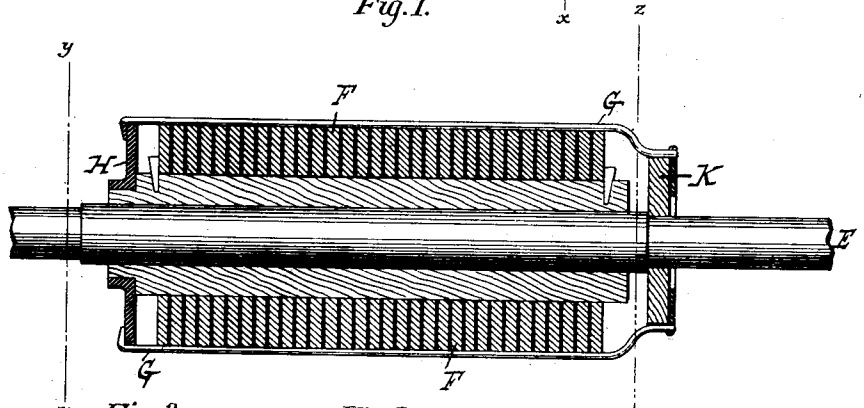


Fig. 2.

Fig. 3.

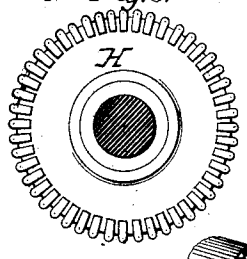


Fig. 4.

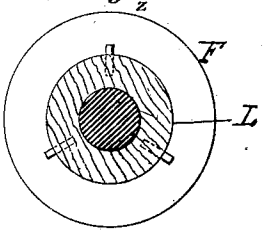
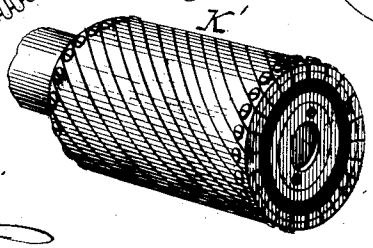


Fig. 5.



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DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 256,778, dated April 18, 1882.

Application filed February 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWARD WESTON, a subject of the Queen of Great Britain, and resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention concerns the construction of dynamo-electric machines, having reference particularly to such as employ a cylindrical core or armature upon which conductors are wound in a manner to pass through the magnetic field at right angles to the field of force and are connected to insulated segments of a commutator. In such machines the convolutions of wire are carried from one side of the armature to the other by winding them upon the cylinder in a direction parallel to the axis. By this method of winding as ordinarily carried out there is formed at each end of the cylinder a mass of inert wire, due to the bending over and overlapping of the conductors. This is attended with many disadvantages, which are the greater as the size of the conductors or number of the convolutions is increased, as it adds very considerably to the length of the armature, and in some instances interferes seriously with mounting the cylinder on a shaft. With a view mainly to reducing the amount of inert conductors thus formed, to shortening the armature without impairing its efficiency, and to avoid bending the conductors over the ends of the same I employ, in conjunction with the conductors lying parallel with the axis of the cylinder, an end cross connecting-piece formed from and independently of the said conductors, and to which the ends of the conductors are mechanically attached in lieu of being bent and wound over the cylinder ends. These cross connecting-pieces afford a convenient means of connecting the lengths of active conductors on opposite sides of the cylinder, whatever may be the manner in which the said conductors are disposed—as, for instance, a number of conductors may be connected with one cross connecting-piece, or a single cross connecting-piece may be employed for each pair or couple of conductors. In either case the connecting-pieces may be so formed as to occupy but little space, and a compact and efficient armature constructed by employing them.

The means of forming the requisite connections according to my invention I will illustrate by reference to the accompanying drawings, in which is represented a machine of a type shown and described by me in another application—to wit, No. 43,930—and in which the conductors, enveloping the armature, are wound and connected in such manner as to form with the external circuit a number of branch circuits arranged with relation thereto in multiple arc. In this machine, as explained in my said application, the ends of the active conductors are connected to opposite segments of the commutator, and are carried around the cylindrical armature. In order to avoid the crossing or overlapping of the conductors, which this requires, I employ a plate or disk, to which the several conductors are mechanically connected in a manner to afford good electrical contact. By this means the cross-connection forms a common means of communication between the inner or rear ends of every conductor with all the others, and as the currents generated by the motion of the armature are in one-half the conductors of opposite direction to those in the rest, the result will be that with a properly-formed commutator the segments on opposite sides of a line bisecting the same will be of opposite polarity, and brushes applied thereto will take off a current.

I do not restrict myself to the use of a cross connecting-piece of any special form or size, excepting, of course, that it should have a cross-sectional area at least equal to that of the conductors which it connects. For instance, the connecting-piece may be formed as a strip, bent at the point where it meets the shaft, so as to pass around it, or formed with an annulus at that point to permit the passage of the shaft. In case a number of strips be employed they can be swaged or formed into shapes which will permit them to interlock and also lie in a measure side by side, proper precautions being taken, of course, to insulate them according to the necessities of the case. The point I have in view is to avoid accumulation of inert conductors at the end or ends of the armature, and also to provide a conven-

ient means by which longitudinal conductors on opposite sides of the armature may be connected together, whatever be the particular system of winding adopted. These and other advantageous results I obtain by the employment, as above described, of a cross connecting-piece, which is formed separately from and independently of the conductors, and is mechanically attached to them in the process of building up the armature.

In the accompanying drawings, Figure 1 is a view in elevation of a machine involving the invention; Fig. 2, a sectional view on the line *x x* of the armature; Fig. 3, a rear view of the armature, showing the connecting-piece and conductors attached thereto, and the shaft in section on the line *y y* of Fig. 2; Fig. 4, an end view of the armature and section of shaft on line *z z* of Fig. 2. Fig. 5 is a perspective view of a modified form of commutator.

The machine is mounted on a base, A′, the field-magnets B B secured to a standard or frame, A, and the armature D mounted in suitable bearings in position to revolve between pole-pieces C C.

The armature, as illustrated in the drawings, is shown to consist of an insulating-hub, L, mounted on a shaft, E. On this hub a number of iron rings, F F, are strung and insulated from one another. At the rear or pulley end of the armature is fixed a copper connecting-piece, H, which is here shown as a circular plate with an annulus, through which the shaft E passes. The conductors G G are laid longitudinally along the cylindrical core formed by the rings F, and at the rear end are connected in any proper manner to the connecting-piece H, while these free ends are carried over to the other end of the cylinder, as shown in Fig. 1, and connected to insulated segments of a commutator, K. This latter, as shown in Figs. 1 and 2, consists of an insulating-disk, to the face of which metal segments are connected, corresponding in number to the longitudinal conductors F F. With a commutator of this description brushes *d d* are to be employed, which press against a number of the segments simultaneously, and thus connect the conductors joined there to a multiple arc. Instead of this commutator, however, others may be employed—such, for instance, as is illustrated in Fig. 5, where the segments, formed as spirals, are attached to an insulated sleeve and connected to the armature-conductors in a manner similar to that illustrated in Fig. 1. The brushes bear upon this commutator at two points, the spiral form of the segments serving to keep a number of active conductors in electrical connection with the brushes simultaneously.

In principle of construction and in operation the above-described machine is substantially the same as that shown and described in my previous application, above referred to, the means of connecting the conductors at the end of the cylinder herein set forth being the only feature of material difference.

It will be understood that the character of the cross connecting-pieces H, or the number of said pieces employed, will be largely governed by the character of the armature and the purposes to which it is to be applied.

Having described my invention and the manner in which the same is or may be carried into effect, what I claim as new, and desire to secure by Letters Patent, is—

In a dynamo-electric machine, a rotating armature, the longitudinal conductors of which are connected across the end or ends of the armature by a connecting-piece formed separately from and independently of the said conductors, and to which the ends of the conductors are mechanically attached or united, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 20th day of February, A. D. 1882.

EDWARD WESTON.

Witnesses:

W. FRISBY,

HENRY A. BECKMEYER.