(No Model.) 2 Sheets—Sheet 1.

W. S. HORRY.

DYNAMO ELECTRIC MACHINE.

No. 306,687. Patented Oct. 14, 1884.

Fig. 1.

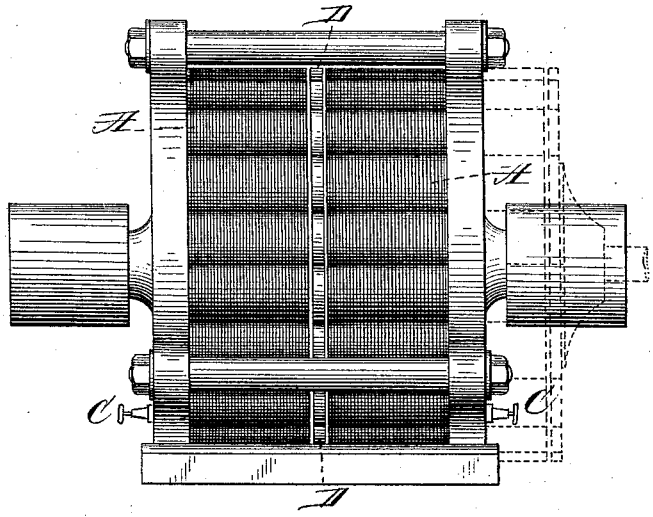


Fig. 2.

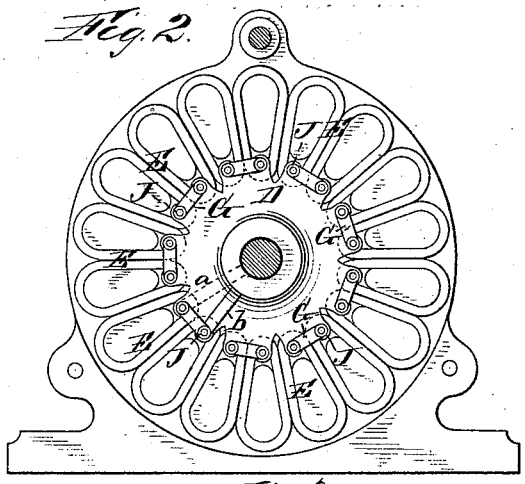
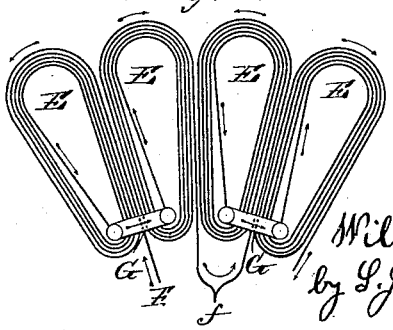


Fig. 3.



Witnesses.
John W. Apley
H. D. Quay

Inventor.
William Smith Horry
by L. J. Gordon, his Atty.

(No Model.) 2 Sheets—Sheet 2.

W. S. HORRY.

DYNAMO ELECTRIC MACHINE.

No. 306,687. Patented Oct. 14, 1884.

Fig. 4.

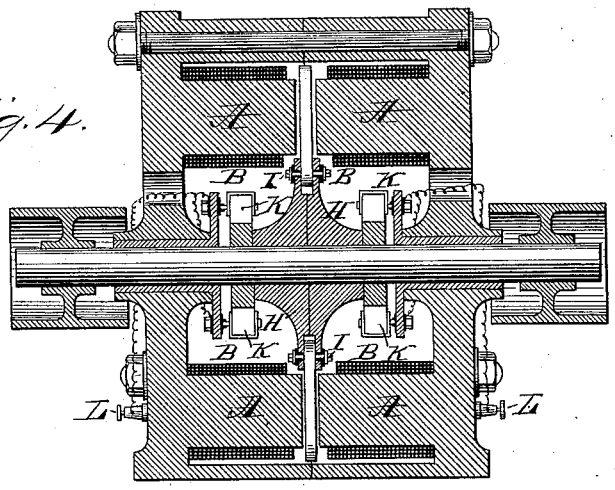


Fig. 5.

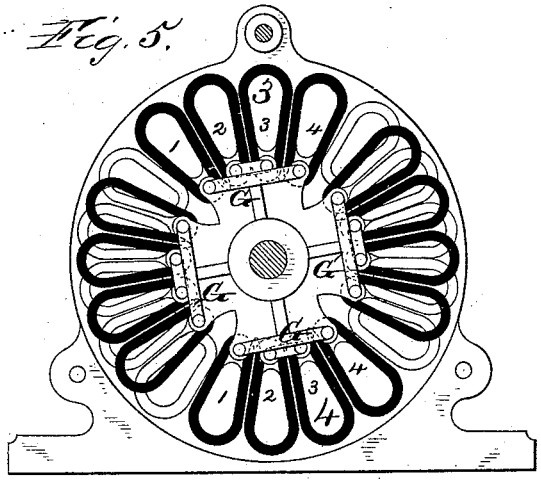


Fig. 6.

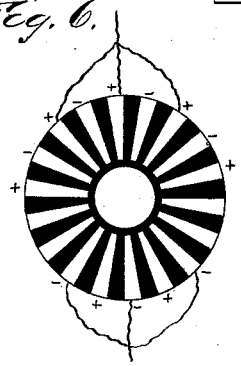
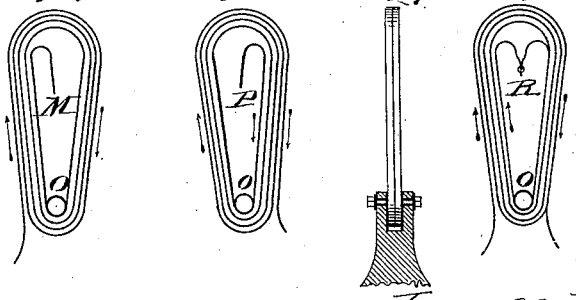


Fig. 7. Fig. 8. Fig. 9. Fig. 10.



Witnesses.
John W. Ripley
D. D. Quay

Inventor.
William Smith Horry
by S. J. Gordon his Atty.

UNITED STATES PATENT OFFICE.

WILLIAM SMITH HORRY, OF LONDON, ENGLAND, ASSIGNOR OF ONE-HALF TO SOLOMON J. GORDON, OF NEW YORK, N. Y.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 306,687, dated October 14, 1884.

Application filed October 3, 1883. (No model.) Patented in England December 16, 1882, No. 6,019.

To all whom it may concern:

Be it known that I, WILLIAM SMITH HORRY, of London, England, have invented a new and useful Machine for the Generating of Dynamo-Electric Currents, (for which I have obtained a patent in Great Britain, No. 6,019, bearing date December 16, 1882,) of which the following is a specification.

My invention relates to that class of dynamo-electric generators known as "multipolar machines;" and it consists of the formation of the armatures of such machines of pear, oval, or oblong shaped coils, of iron, copper, or other good conducting wire, square rod, or strip of any one of these metals of narrow size or width, formed into segments and arranged about and secured to a common center boss or hub in such a manner as to radiate therefrom like the spokes of a wheel, and so connected together as to form one continuous or several groups of conductors, the number of spokes or segments in an armature being determined by the class of work for which the machine is intended to be used.

The object of my invention is to so construct and arrange the parts of such dynamo-electric machines as to admit of the individual parts being readily removed when worn or injured, and to cheapen their production while maintaining their efficiency. I attain this object by a mode of construction substantially as described in the following specification, and shown in the accompanying drawings, in which—

Figure 1 is a side view of a generator embodying my invention, showing in dotted lines a separate exciting-armature arranged outside of the main frame and polar projections for exciting the same. Fig. 2 is a view of the same with one side of the frame removed, showing an armature arranged for producing an alternating current. Fig. 3 is a detail showing the method of connecting the segments of the armature shown in Fig. 2. Fig. 4 is a vertical longitudinal section of a machine arranged for producing continuous currents. Fig. 5 is a view of the same with one side of the frame removed to show the arrangement of the segments of the armature. Fig. 6 is a view of a commutator, showing the method of connecting the segmental armature groups, shown in Fig. 5, thereto. Figs. 7, 8, 9, and 10 are details showing the method of constructing and connecting the segments of an armature, as shown in Fig. 5.

The armature, consisting of the pear-shaped, oval, or oblong segments arranged about and secured to a metallic boss or hub of brass or gun-metal, is mounted upon an iron or steel spindle, which passes through and is insulated from the hub of the armature.

On either side of and in close contiguity to the spokes, sections, or segments of the armature are a series of electro-magnets, the iron cores of which may form part of the frame of the machine, being cast with it, or may be of wrought-iron and be bolted or riveted to it; or these wrought-iron cores can be cast in the cast-iron sides, the metal being run around them in the usual manner; or the cores and side frames can be made of malleable iron. The electro-magnets forming the field are so wound with copper strip or wire as to present, when excited by an electric current, alternate N and S poles to the sections or segments forming the armature as it turns between them, so that a current taken from such armature would be of alternate direction.

The field or inducing magnets can be excited separately, or a portion of the whole current derivable from the armature may be used for the purpose, a commutator being employed to convert the alternate currents into currents of one direction. If a portion only of such current be used, the field-magnets can be wound with wire of a high resistance, and may form a shunt to the external circuit and machine. When a separate exciter is inconvenient, and an alternating current is required, I employ a supplementary armature (see dotted lines, Fig. 1) attached to the spindle carrying the armature from which the alternating current is produced. This supplementary armature may be similar to that described, or it may consist of wire coils, plain copper bars or plates, and be mounted outside the frame, the cores of the field-magnets being prolonged through the frame upon that side; or suitable bosses for the armature employed may be cast upon it and wound with wire or strip. The supplementary armature sends the current induced by these electro-magnets around them,

and also around those exciting the internal or main armature, the current being commutated for the purpose and direct. The internal or main armature has one end of its wire or strip (see *a*, Fig. 2) fastened to the spindle, and the other (see *b*, Fig. 2) to an insulated collar provided for it upon the spindle, and upon closing the circuit an alternating current is obtained.

Referring to the drawings, A indicates the electro-magnets, the cores of which are shown cast in one piece with the frame, and are also shown by the dotted lines, Fig. 1, extending beyond and outside of the frame, as mentioned above. These electro-magnets are wound with copper wire or strip B, the ends of which are brought down to the terminals C. The armature D is composed of copper wire or strip thoroughly insulated between the layers, and the induced currents, entering the armature segments E at F, (see Fig. 3,) traverse the wire or strip of each of the coils or segments and the links G connecting them together in the direction of the arrows, reversing its direction in each of the segments. The armature-segments are held in position by means of the hub or cheek plates H, (see Fig. 4,) insulated bolts I passing through holes in the tooth-like projections J, forming the peripheries of the hub or cheek plates, to secure the segments thereto, and at the same time, by means of the links G, making the circuit between contiguous segments, the outer strip or wire being connected by riveting or soldering, as at *f*, Fig. 3, thus making the armature one continuous conductor. Another form of armature for direct currents is shown at Fig. 5, the coils, sections, or segments of which, instead of forming one continuous conductor, are arranged in segmental groups, each segmental group being an independent open or closed circuit. The groups or segments are so mounted as to cut the magnetic field at different times, and in order to obtain sufficient electro-motive force I use two or more coils side by side, narrow copper strips or wire being used. (See Figs. 7, 8, 9, and 10.)

Figs. 7 and 8 show two segments to be arranged side by side, Fig. 9 being an edge view of the same when so placed, the conducting ends M P of which are to be connected together, as shown at R, Fig. 10, and the bolt O fastening each segment to the cheek-plate is in this instance insulated from the segment, the current traversing the group, as shown by the arrows, the end of the wires of each group being led to the plates in the commutator, as shown at Fig. 6. Taking group 3, Fig. 5, the current from segments 1 2 3 4 is conducted to and divided between the plus leaves of the commutator, as shown at Fig. 6, the current from the segments 1 2 3 4, group 4, being divided in a similar manner among the minus leaves, as at Fig. 6, the current being collected by two, four, or more brushes placed in suitable positions. In the alternating machine, Fig. 4, these brushes K are shown attached to but insulated from a metal sleeve which forms the bushing for the spindle, wires being led from each brush to the terminals L L.

Having fully described my invention, what I desire to secure by Letters Patent is—

In a dynamo-electric machine, the combination of the segmental conductors E, sectional hub H, securing and conducting pins I, and links G, when combined and arranged as and for the purpose specified.

WILLIAM SMITH HORRY.

Witnesses:
JOHN W. RIPLEY,
O. MATHER.