

J. A. KINGDON.
DYNAMO ELECTRIC MACHINE.

No. 412,854.

Patented Oct. 15, 1889.

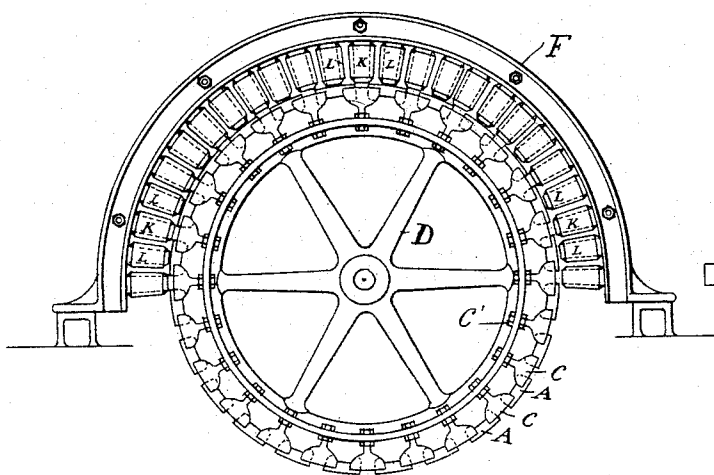


Fig. 1.

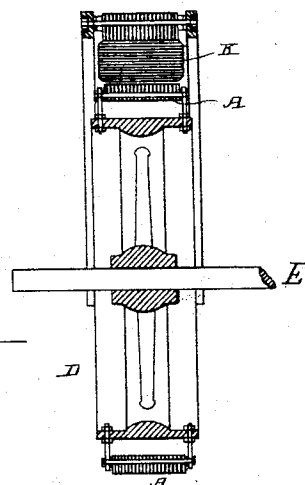


Fig. 2.

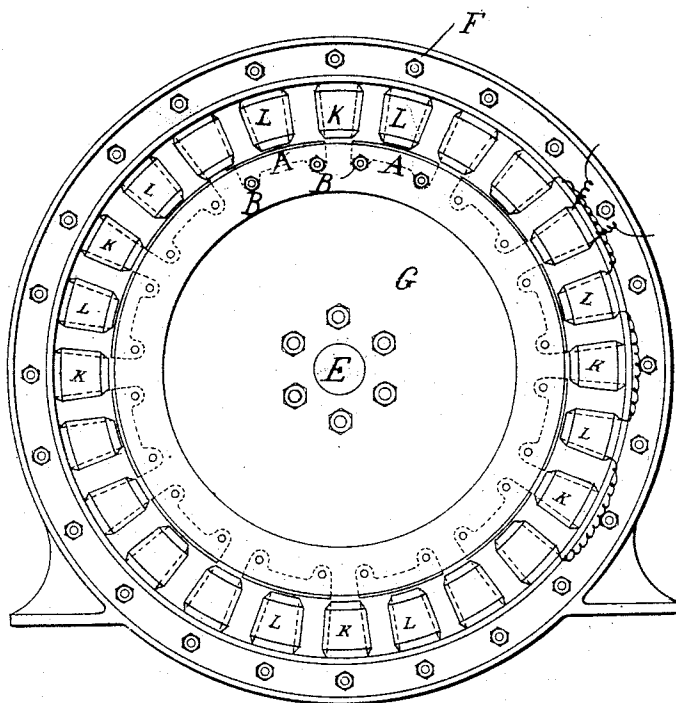


Fig. 3.

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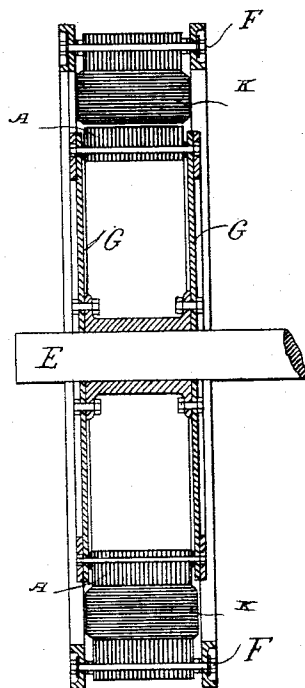


Fig. 4.

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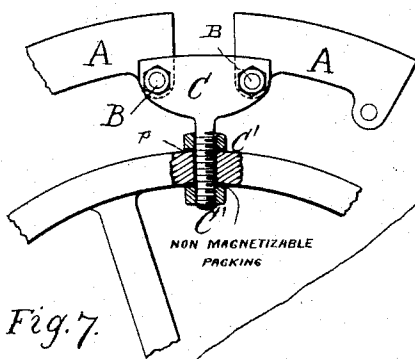


Fig. 7.

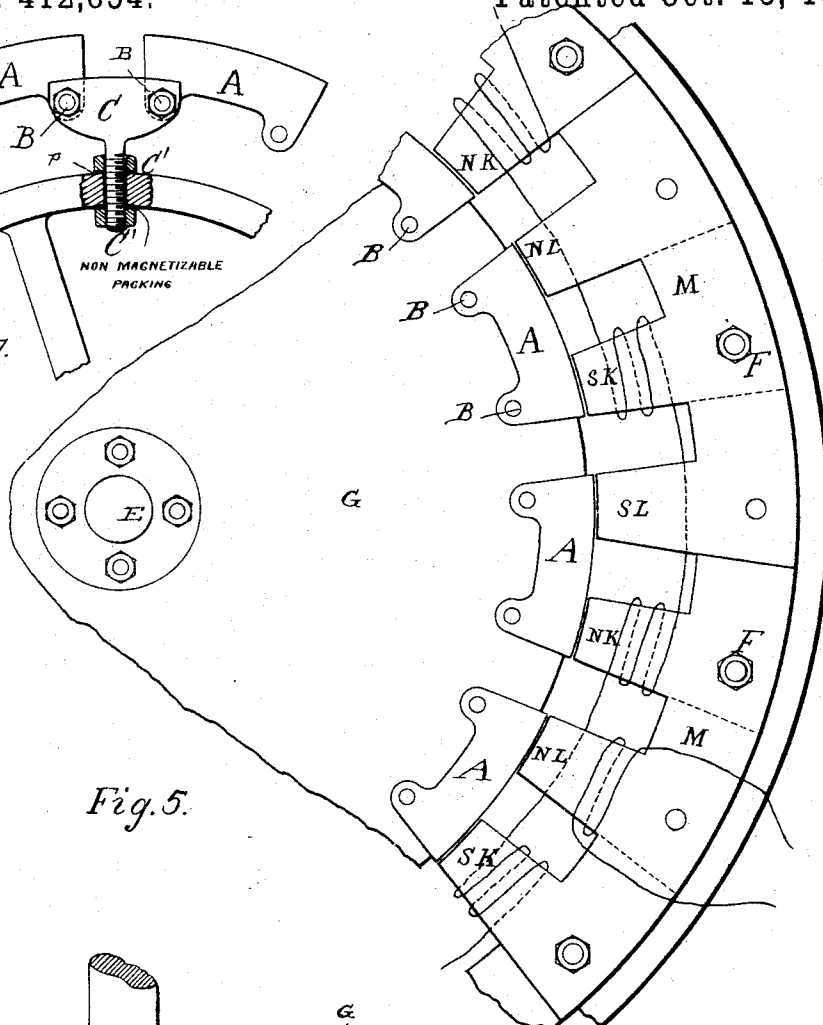


Fig. 5.

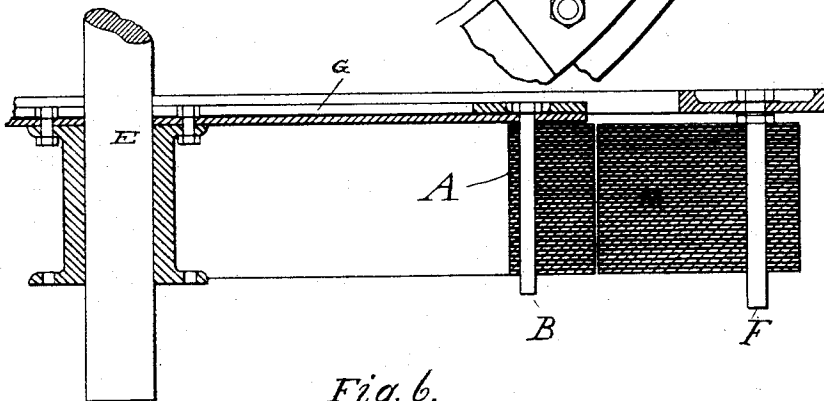


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN AUGUSTINE KINGDON, OF LONDON, ENGLAND.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 412,854, dated October 15, 1889.

Application filed May 28, 1888. Serial No. 275,339. (No model.) Patented in England December 3, 1886, No. 15,837; in Germany December 24, 1886, No. 41,795; in France September 8, 1887, No. 185,719, and in Belgium September 12, 1887, No. 78,844.

To all whom it may concern:

Be it known that I, JOHN AUGUSTINE KINGDON, a resident of London, England, and a subject of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, have invented an Improvement in Dynamo-Electric Machinery, (for which I have obtained Letters Patent in Great Britain under No. 15,837, dating from the 3d of December, 1886, and in Germany under No. 41,795, dating from the 24th of December, 1886; in France under No. 185,719, dating from the 8th of September, 1887, and in Belgium under No. 78,844, dating from the 12th of September, 1887,) of which the following is a specification.

My invention relates to that class of dynamo-electric machines which have both the field or primary magnets and the secondary or induced magnets fixed, the change of direction of magnetic lines of force being effected by the passage, preferably by rotation, of soft-iron inductors in close proximity to the poles of the primary and secondary magnets, thus generating an electro-motive force in the conducting-wire around the secondary magnets.

My invention consists in the method of construction of the inductive parts and their method of application to any convenient rotating drum or fly-wheel of any commercial engine, and in the construction of the primary and secondary magnets and of the inductors to prevent the production of Foucault or eddy currents in the cores of the primary or secondary magnets or inductors, and in the general construction of the machinery.

In order that my invention may be the better understood, I now proceed to describe the same in relation to the drawings hereunto annexed, reference being had to the letters and figures marked thereon.

Like letters refer to like parts throughout the drawings.

Figure 1 is a general elevation of my dynamo-electric machine as conveniently applied to the fly-wheel of any ordinary commercial engine. Fig. 2 is a transverse section of the same. Fig. 3 is a general elevation of my dynamo-electric machine as formed upon an independent drum driven by any

convenient means. Fig. 4 is a sectional elevation of the same. Fig. 5 is a detail detached view of the inductors and magnets with front part removed. Fig. 6 is a sectional plan of the same. Fig. 7 is a detail view showing the method of attachment of the inductors to a drum or fly-wheel.

As it is of great commercial advantage to be able readily to apply inductors to the periphery of the fly-wheel of any commercial engine or other similar pulley or drum, I construct my inductors in the form of successive bundles of soft-iron plates A A, secured by, preferably, insulated bolts B, or similar attachments, and connected by non-magnetizable links C—such as brass or bronze—so as to form an endless chain of inductors and links. Where the bolt-holes are placed low down in the inductor-plates, as shown in Fig. 5, I find that the bolts are so far removed from the magnetic lines that the insulation of the bolts may be dispensed with. The inductors are thus magnetically insulated from one another and also by the form of the links, or by non-magnetizable packing p, Fig. 7, from the periphery of the fly-wheel D of any commercial engine or from any axis E which may be constructed of iron and from which they obtain their rotative movement. In some cases, where the magnetic leakage is inconsiderable, I omit the non-magnetic packing, simply bolting the inductors between two disks G, of steel, wrought-iron, or other suitable material, as shown in Figs. 3 and 4. The laminating of the said inductors is employed to prevent the generation of Foucault or eddy currents and should be in planes parallel to the motion of the lines of magnetic force. The plates are separated by paraffined paper or varnish or other insulating material.

In Fig. 1 and detail Fig. 7 I show a method of attachment by means of which the inductors A can be conveniently adjusted by nuts C' C', so as to make the diameter of the inductor-ring the same in every part.

Where great strength is necessary, I make the links C of phosphor-bronze.

The primary and secondary magnets K L may be used in any convenient number, either partially enveloping the periphery of the revolving inductors, as in Fig. 1, where

the diameter of the inductor-wheel is large, or completely enveloping the inductors, as in Fig. 3, where the diameter of the inductor-wheel is small.

5 The cores of the primary and secondary magnets, with their magnetic attachments at the base of the cores, which are known as "yokes," are conveniently formed of plates of soft iron M, Figs. 5 and 6, preferably insulated from one another by paraffined paper, varnish, or other suitable material, interposed flatwise between them, as represented by the heavier black lines at M in Fig. 6, and preferably divided in planes parallel to the motion
10 of the lines of magnetic force. These plates, which may be cheaply produced in quantities by stamping, are put together preferably by overlapping one another, as shown in Fig. 5, so as to break joint, and thus make a continuous ring of considerable strength, and also providing as much magnetic continuity as possible between adjacent cores. The bolts F, which hold the magnet-plates together, are set back as far as possible in the
15 yokes, so that they may not be cut by the magnetic lines of force, which would give rise to heating and loss of power, owing to the generation of Foucault currents. The ends of the cores project toward the rotating inductors, so as to be in close proximity to the latter, and these cores are wound with coils of insulated copper wire of any suitable section. The alternate poles K K, which are the primary magnets, have their coils connected
20 either in parallel or series, or, as convenient, with any external source of electricity, such as batteries or an independent dynamo. The secondary-magnet poles L L, which are conveniently alternate to the former, are also
25 wound with such section of insulated conducting-wire as may be desired, in which the induced currents are generated, as hereinafter explained. Both primary and secondary coils may be conveniently prepared separately by winding wire on wooden or other bobbins and slipping them onto their respective
30 cores. The induced currents from all or any of the secondary coils may be collected either in parallel or in series, or otherwise, and without a commutator, thus forming an alternating working-current. The length of the inductors A must be so proportioned as to simultaneously magnetically connect adjacent pairs of poles of the said primary and
35 secondary magnets with one another, respectively, as shown in Fig. 5; but I do not confine myself to the exact proportions shown in the drawings.

The inductor-plates are shaped as shown
40 in Fig. 5 in order to prevent the magnetic lines of force cutting the bolts B, which in this case may be uninsulated. The primary-magnet poles K K are magnetized alternately "north and south by the external primary current, as indicated by the letters N and S in
45 Fig. 5.

As the inductors are carried round in prox-

imity to the primary and secondary magnet poles, the secondary magnets L L become by induction alternately north and south poles, according as they are magnetically connected by the passing inductors with a south or a north primary magnetic pole. The secondary magnets thus have their magnetism continually reversed and alternating currents
50 are generated in the coils with which they are wound.

The primary magnets may be made separately from the secondary magnets, both being fixed as before.

No commutator or sliding contacts are required at all upon the rotating portion of the mechanism for the collection of the working-current, nor is any insulation of the rotating drum or fly-wheel required, thus making this form of dynamo peculiarly applicable
55 direct to the fly-wheel of any commercial engine, the working-currents being collected from the fixed portion of the apparatus. All insulated copper-wire winding for the conveyance of electrical currents is applied only to the fixed part of the apparatus, thus avoiding the great tendency to destruction of insulation common to all dynamos in which insulated copper wire is caused to revolve at
60 a high speed. By direct application to the fly-wheel of an engine great circumferential speed is attained with comparatively slow rotation.

The combination of the inductors with the fly-wheel of any commercial engine will not prevent the spare power of the engine from being used for other purposes.

The primary magnets may be of permanently-magnetized steel, if desired, instead
65 of externally-excited electro-magnets.

Such a dynamo may be used as an electro-motor by inversion of the currents.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be carried into effect, be it known that I am aware that inductive generators of the principle of generation hereinabove described are already known, but not of the convenient, efficient,
70 and commercially-valuable improved construction hereinabove described.

What, therefore, I claim is—

1. A chain of soft-iron laminated inductors separated from one another by non-magnetic spaces, and connected by side links or equivalent disks, so as to be applicable to the periphery of a fly-wheel or drum, or to form the periphery of a drum, in combination with a series of fixed alternate primary and secondary electro-magnets K L, whose cores are composed of laminated rake-shaped plates and wholly or partially surrounding the inductor-drum.

2. In a dynamo-electric machine, the inducting-surface in the form of an endless chain of inductors A, formed of insulated plates and supported and connected by non-magnetizable links C C, so that they may be

conveniently constructed and combined with the periphery of any known fly-wheel or drum, substantially as described.

3. The cores of the primary and secondary
5 electro-magnets in a dynamo-electric machine, composed of bundles of soft-iron plates insulated from one another and of a rake shape, breaking joint, so as to overlap one another and to give rigidity and as much
10 magnetic continuity between adjacent cores as possible, substantially as described.

4. The inductor-plates A, having perforated lugs which project opposite their peripheral edges, in combination with bolts B,

passing through said lugs to hold the plates 15 together, and thus located so that they are not cut by the lines of magnetic force, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of 20 two subscribing witnesses.

JOHN AUGUSTINE KINGDON.

Witnesses:

ALBERT E. NASH,

1 *Queen Victoria Street, London, E. C., Clerk.*

FRED CHEESWRIGHT,

Notary Public, St. Dunstan's Hill, London.