

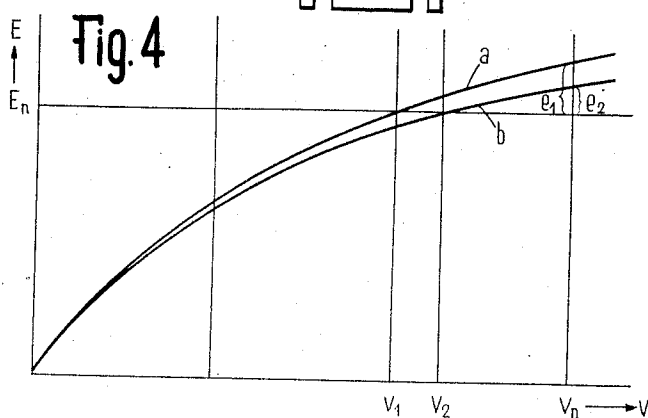
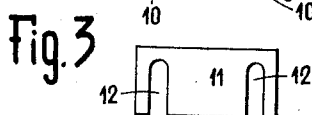
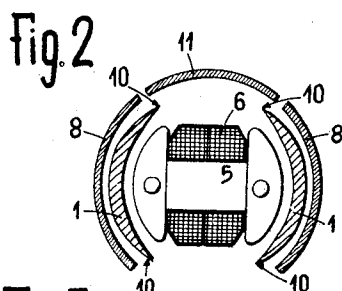
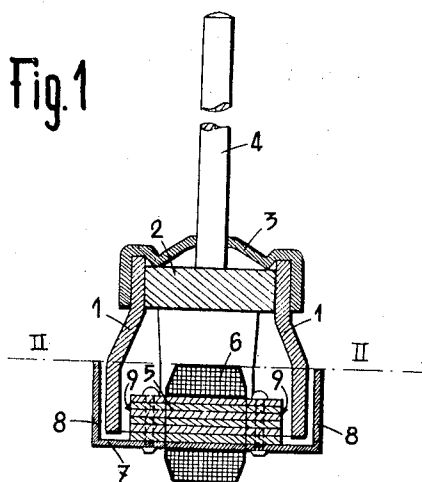
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G. GIRARD

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MAGNETO ELECTRIC GENERATOR

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INVENTOR

GEORGES GIRARD

By *Young, Emery & Thompson*
ATTYS.

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MAGNETOELECTRIC GENERATOR

Georges Girard, Geneva, Switzerland, assignor to
Magnetos Lucifer S. A., Geneva, Switzerland, a
corporation of Switzerland

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This invention relates to magnetoelectric generators of the kind in which the armature has double pole pieces adapted to provide annularly extending passages through which the pole shoes of the inductor pass to secure duplex flux intake. This kind of generator is generally satisfactory in that it renders it possible to reduce the loss of flux due to leakage, so that it has been possible to reduce the size of a generator for a given output. Nevertheless, these generators, especially those with a small number of poles, do not give entire satisfaction because they offer resistance to driving torque which varies very considerably according to the angular position of the inductor pole shoes with relation to the double pole pieces of the armature.

In fact, due to the duplex flux intake, the induction in the armature varies very abruptly at the moment when the inductor pole shoes enter or leave the passages formed by the double pole pieces. This abrupt variation in induction results in a corresponding variation in the driving torque of the generator.

The present invention has for its object to provide an improved magnetoelectric generator of the kind referred to, whereby the above-mentioned disadvantage may be obviated.

According to the present invention, in a magnetoelectric generator of the kind referred to, there are provided means adapted to create a progressive variation of the flux passing through the armature when the pole shoes move away from or approach the inlet of the passages formed by the double pole pieces of the armature. For this purpose the inductor pole shoes may be provided with lateral edge parts of a tapered shape in cross-section. Furthermore, the generator may comprise at least one magnetic shunt provided between the lateral edges of the armature pole pieces. Conveniently, such magnetic shunt is arranged between the lateral edges of the outer parts of the double armature pole pieces. The magnetic shunt may be slotted for the purpose hereinafter described.

The invention is hereinafter described by way of example with reference to the accompanying diagrammatic drawing, in which:

Fig. 1 is an axial section illustrating one embodiment according to the invention;

Fig. 2 is a section on the line II-II of Fig. 1;

Fig. 3 is a detail view; and

Fig. 4 is a diagram showing the voltage at the terminals of the generator as a function of the speed of rotation.

In the particular embodiment of generator

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illustrated in the drawing, the inductor comprises two pole shoes 1 of mild steel which are held closely to the outer faces of a permanent magnet 2 by means of a clamping member 3. The whole assemblage is fixed rigidly on a shaft 4.

The armature comprises a core 5 consisting of H-shaped plates and provided with a winding 6. The lower plate 7 is extended and bent angularly so that each of its extremities 8 is parallel with one of the outer faces 9 of the core 5. Consequently, each extremity 8 forms, with the respective face 9, an annularly extending passage through which the pole shoes 1 of the inductor pass. These pole shoes 1 present thinned lateral edge parts and terminate in a sharp edge 10. Seen in cross-section (Fig. 2), the pole shoes present at each of their extremities a tapered shape.

Between the lateral edges of the extremities 8 of the lower plate 7, is arranged a magnetic shunt 11 consisting of a piece of soft iron which may be provided with slots 12. These slots vary in number and length and they are intended to regulate the amount of the magnetic resistance of the shunt.

Fig. 3 is a face view of the shunt 11 developed.

The working of the generator described is similar to the working of known generators with double flux intake. The variation, however, of the induction in the armature when the pole shoes 1 leave the passages formed by the double armature pole pieces, or enter the same, is not so abrupt. In fact, owing to the tapered shape of the lateral edge parts of the pole shoes 1, the saturation of these parts limits the induction in the armature at least so long as the pole shoes are only slightly engaged in the passages. Consequently, instead of the entry of the pole shoes into the passages causing an abrupt increase of the induction in the armature and therefore an abrupt increase of the driving torque necessary, a progressive variation of the induction is obtained which extends over an angular displacement of the inductor, the extent of which depends upon the more or less tapered shape of the lateral edge parts of the pole shoes 1.

The effect of the tapered shape of the lateral edge parts of the pole shoes 1 is increased by the magnetic shunt 11 which partly short-circuit the poles of the armature. In fact, this shunt 11 takes up a portion of the dispersion flux of the inductor, when the pole shoes 1 are disengaged or partly disengaged from the said passages. The flux taken up by the shunt 11 passes through the armature and helps in extending the zone along which the variation of the induction in the arma-

ture extends. Hence, the shunt also has the effect of reducing the variation of the driving torque.

Furthermore, the shunt 11 alters the curve of the voltage measured at the ends of the winding 6 shown as a function of the speed of rotation of the inductor.

Fig. 4 is a diagram indicating the value of said voltage E shown in ordinate as a function of the speed of rotation v of the inductor shown in abscissae.

In this diagram the curve a indicates the values of E measured on a known generator with double flux intake. The curve b indicates the values of E measured on a generator according to the invention.

In comparing these two curves a and b , it will be seen that in the generator made according to the invention, the voltage E_n is obtained for a speed v_2 which is about 10% higher than the speed v_1 for which said voltage E_n is obtained with a generator of the known type.

On the other hand, under the normal running speed vn , the excess voltage e_2 measured on the generator made according to the invention is only 40% higher than E_n , whilst the excess voltage e_1 measured on a generator of a known type is about 65% of the normal voltage E_n .

This reduction in the excess voltage under normal running speed of the generator represents an important additional advantage of the generator according to the invention.

In fact, in the case of a generator intended, for instance, to supply a cycle headlamp, it is necessary that the normal voltage E_n should be reached at a speed corresponding to approximately two thirds of the normal running speed of the machine so that the cyclist may have sufficient light when starting or slowing down. On the other hand, it is of considerable importance that the excess voltage under normal running conditions should be reduced so as to avoid an excessive shortening of the life of the lamp-bulbs. It will be seen that with the generator constructed according to the invention, although the voltage E_n is obtained for a running speed similar to the speed required to obtain said voltage with a generator of a known type, at the normal running speed of the machine, a much smaller excess voltage is obtained. In fact, the excess voltage produced by a generator of a known type is 150% higher than the excess voltage made by the generator according to the invention.

It will be understood that the invention is not limited to the particular embodiment hereinbefore described. For instance, the passage provided by the double pole pieces may present in cross-section gradually widening extremities so as to increase the air gap at these points. Furthermore, the lateral edges of the extremities 8 may be cut slantwise. Moreover, a second shunt may be arranged symmetrically with respect to the shunt 11 shown in the drawing.

I claim:

1. A magnetolectric generator comprising a shaft, a magnet mounted upon said shaft, two diametrically opposite pole shoes extending from said magnet in the axial direction, the extending parts of said shoes being of arcuate shape and having tapered lateral edge parts, and an armature having a core presenting inner and outer oppositely disposed pole pieces providing annularly extending passages in which said pole shoes operate.

2. A magnetolectric generator comprising a shaft, a magnet mounted upon said shaft, two diametrically opposite pole shoes extending from said magnet in the axial direction, the extending parts of said shoes being of arcuate shape and having tapered lateral edge parts, an armature having a core presenting inner and outer oppositely disposed pole pieces providing annularly extending passages in which said pole shoes operate, and at least one magnetic shunt in the form of a soft iron plate extending between the lateral edges of said pole pieces.

3. A magnetolectric generator comprising a shaft, a magnet mounted upon said shaft, two diametrically opposite pole shoes extending from said magnet in the axial direction, the extending parts of said shoes being of arcuate shape and having tapered lateral edge parts, an armature having a core presenting inner and outer oppositely disposed pole pieces providing annularly extending passages in which said pole shoes operate, and at least one magnetic shunt in the form of a soft iron plate extending between the lateral edges of said outer armature pole pieces.

4. A magnetolectric generator comprising a shaft, a magnet mounted upon said shaft, two diametrically opposite pole shoes extending from said magnet in the axial direction, the extending parts of said shoes being of arcuate shape and having tapered lateral edge parts, an armature having a core presenting inner and outer oppositely disposed pole pieces providing annularly extending passages in which said pole shoes operate, and at least one magnetic shunt in the form of a soft iron plate extending between the lateral edges of said outer armature pole pieces, said magnetic shunt having transverse slots therein.

GEORGES GIRARD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
501,532	Offrell	July 18, 1893
2,057,241	Martin	Oct. 13, 1936
2,062,938	Ruppe	Dec. 1, 1936
2,192,073	Giskes	Feb. 27, 1940
2,364,140	Harmon	Dec. 5, 1944