

E. F. W. ALEXANDERSON.
HIGH FREQUENCY ALTERNATOR.
APPLICATION FILED NOV. 4, 1918.

1,369,601.

Patented Feb. 22, 1921.

Fig. 1.

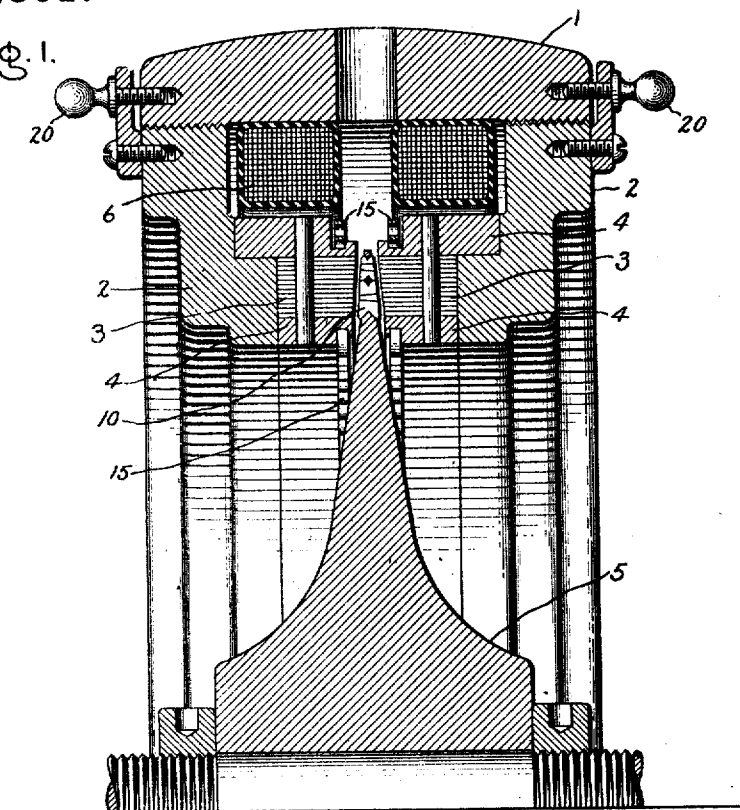


Fig. 2.

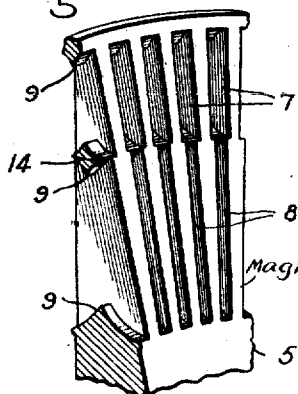


Fig. 3.

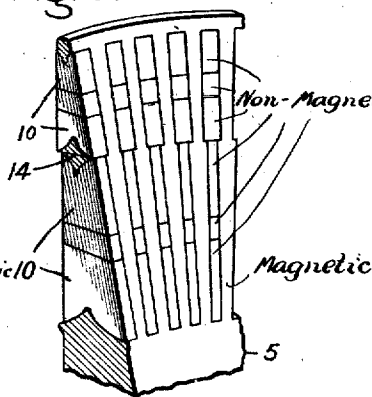
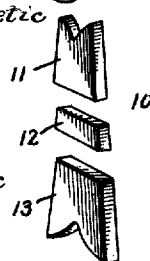


Fig. 4.



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UNITED STATES PATENT OFFICE.

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HIGH-FREQUENCY ALTERNATOR.

1,369,601.

Specification of Letters Patent.

Patented Feb. 22, 1921.

Application filed November 4, 1918. Serial No. 260,991.

To all whom it may concern:

Be it known that I, ERNST F. W. ALEXANDERSON, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in High-Frequency Alternators, of which the following is a specification.

My invention relates to high frequency alternators, and particularly to the type of alternators disclosed in United States Letters Patent No. 1,008,577 and No. 1,110,029, issued in my name.

The objects of my present invention are to provide an improved construction for such type of alternator whereby a more efficient, rugged and more easily manufactured machine is produced than formerly.

More especially, the objects of this invention are to improve the structure of the rotor, or inductor, so as to provide a more efficient distribution of the magnetic and non-magnetic material thereon, without impairing any of the mechanical properties thereof.

In carrying this invention into effect, I provide two circumferential rows of radial slots in the inductor and arrange inserted material in these two circumferential rows of slots in order that the strains occasioned by the retaining of this inserted material in place are not wholly sustained by the outer rim of the rotor but are distributed over an inner as well as the outer rim.

For a further understanding of the nature and objects of this invention, reference should be had to the following detailed description taken in connection with the accompanying drawing, in which;

Figure 1 is a vertical cross section of the upper half of a high frequency alternator embodying my present invention; Figs. 2 and 3 are enlarged fragmentary views showing details in the rotor construction; and Fig. 4 is a perspective view showing details in the form of the material inserted in the rotor slots.

Referring now to Fig. 1; 1 denotes the stator into which are screw-threaded a pair of ring shaped members 2-2. Each of these members carries a circumferentially extending laminated ring 3 clamped between two rings 4. These laminated rings constitute pole-pieces between which the inductor

member or rotor 5 revolves, the excitation for these rings being provided by the field windings 6, the magnetic circuit being arranged to surround these windings and pass through the rings 3 and the inductor member 5.

The air gaps between the inductor member 5 and the rings 3 are in the present case bounded by the conical surfaces whose apices lie in the axis of the rotor, and which define the taper on the edge of the inductor member and the configuration of the adjacent surfaces of the rings 3. My invention, however, is not limited to this particular form of invention.

The width of this air gap may be adjusted by rotating the ring-shaped members 2-2 in the stator 1; securing means shown at 20 being provided to hold these members 2-2 in their adjusted position.

The inductor member 5 has its edge cut through symmetrically from each side so as to form two circumferential rows 7 and 8 of radial slots having central ridges such as indicated at 9 in Fig. 2. The inductor member 5 is preferably made of magnetic material, consequently I have provided a filler 10 of non-magnetic material such as copper or non-magnetic alloy for the slots formed in the rim. The filler 10 preferably comprises three parts 11, 12 and 13, two of which, namely, 11 and 13, are made of forgings designed to fit into the four corners astride of the ridges 9. The third piece 12 is a wedge-shaped forging designed to be inserted between pieces 11 and 13 in order to force them snugly into the corners thereby completely filling each slot. These forgings may be secured in the slots in any convenient manner, for instance, by slightly upsetting the edge of the forgings along the edge of the slots.

The inner rim, shown clearly at 14, is preferably made narrow so that the upper row of inserted material may join the lower row, whereby the inner and outer radial inserts act as a single insert to permit an economical use of the copper in the armature windings. The armature windings are indicated at 15 and are fitted into radial slots formed in the face of the laminated rings 3. Any desired arrangement of these windings may be adopted but one avoiding pulsations

in the magnetic flux would of course be preferred, such as I have disclosed in the aforementioned patents.

In operation, the rotor is rotated at such velocity that the alternate changes in the density of the flux threading through the armature winding 15 occasioned by the movement of the inductor member there across, induces an E. M. F. having the desired periodicity in the windings 15.

Among the advantages accruing from my improved rotor construction is the greater radial length of inserted material which may be used in the active portion of the inductor member without putting undue mechanical strains in the spokes thereof, and the facility with which the slots may be milled from each side, leaving the central ridges resulting in a reduced cost of manufacture.

While I have here shown an embodiment of my invention which is at present, the best means known to me for carrying the same into effect, I would have it understood that this is merely illustrative and that I do not mean to be limited thereby to the precise details here disclosed since obvious alterations thereof will appear to those skilled in this art, nor in the choice of recognized equivalents except as defined in my claims hereunto annexed.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed with two circumferential rows of radial slots, and fillers disposed in said slots.

2. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots, and fillers of non-magnetic material disposed in said slots so that the upper and lower rows join to form continuous radial inserts.

3. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, and inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots symmetrically cut from both sides and

having central ridges, and fillers of non-magnetic material disposed in said slots astride said ridges.

4. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots and fillers of non-magnetic material each composed of a plurality of parts inserted in said slots so as to completely fill each slot.

5. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots having central ridges, and fillers of non-magnetic material each composed of three parts, two of said parts each being formed to fit astride one of said ridges and the third being adapted to wedge the first two parts in place.

6. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots having central ridges, and fillers of non-magnetic material each composed of a plurality of parts wedged in said slots astride said ridges so that the upper and lower rows join to form continuous radial inserts.

7. A high frequency alternator comprising a stator carrying a pair of circumferentially extending laminated rings having opposing faces, a winding carried by said faces, an inductor member adapted to be rotatively moved between said faces, said member being formed of magnetic material with two circumferential rows of radial slots symmetrically cut from both sides and having central ridges, and fillers of non-magnetic material each composed of three parts inserted in said slots so that the upper and lower rows form continuous radial inserts, two of said parts each being formed to fit astride said ridges and the third being wedged between the first two whereby the filler is retained in a manner completely filling the slot.

In witness whereof I have hereunto set my hand this first day of November 1918.

ERNST F. W. ALEXANDERSON.