L. [illegible] JOUVERT & A. [illegible] E. PERRAND.

ANTISPA[illegible] DEVICE FOR DYNAMO ELECTRIC MACHINES.

APPLICATION FILED [illegible], 1913.

1,101,384. Patented June 23, 1914.

Fig. 5.

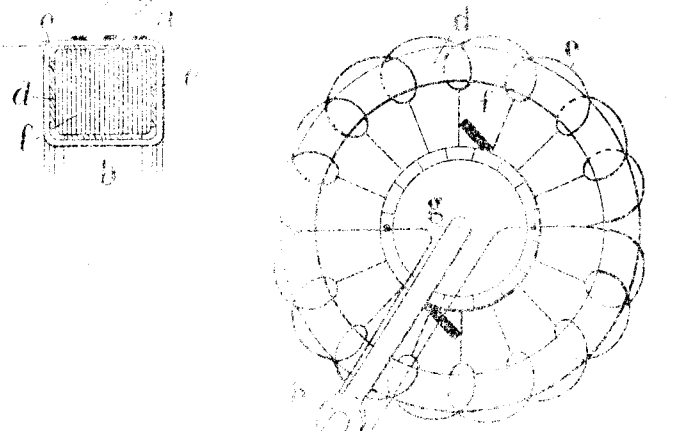


Fig. 2.

Fig. 3.



Fig. 4.

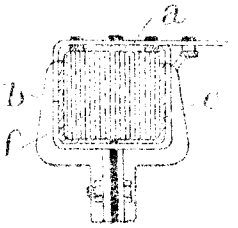
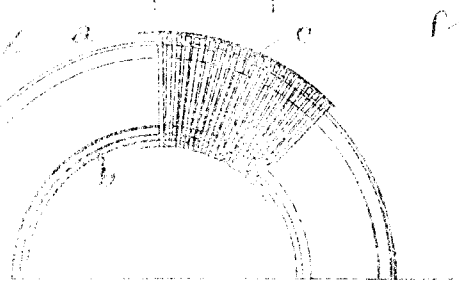


Fig. 6.



WITNESSES

[illegible]

[illegible]

INVENTORS

Louis Rene Jouvert

Alphonse François Ernest Perrand

By Pierce & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

LOUIS RENÉ AUVERT AND ALPHONSE FRANÇOIS ERNEST FERRAND OF PARIS, FRANCE.

ANTISPARKING DEVICE FOR DYNAMO-ELECTRIC MACHINES.

1,101,384. Specification of Letters Patent. Patented June 23, 1914.

Application filed July 25, 1908. Serial No. 445,432.

To all whom it may concern:

Be it known that we, LOUIS RENÉ AUVERT and ALPHONSE FRANÇOIS ERNEST FERRAND, both of 20 Boulevard Diderot, in the city of Paris, Republic of France, engineers, have invented an Antisparking Device for Dynamo-Electric Machines, of which the following is a full, clear, and exact description.

Rotary transformers are already known by means of which monophase or polyphase alternating currents can be transformed into continuous current of variable tension by the simple lag of the brushes. In principle, these appliances consist of a rotor composed of a ring provided with coils, rings introducing the alternating currents, commutators and brushes collecting the continuous current on the commutators. Such a transformer is set forth in the French patent to Auvert and Ferrand #323,126.

The useful fluxes generated by the coils form magnetic circuits which are completely closed in the ring itself. The coils, connections and the position of the brushes are combined in such a manner that when the whole is in synchronous rotation, the brushes mounted on the commutators collect a practically continuous current the mean differences of potential between the commutator brushes remains constantly of the same kind and at a certain mean value, which mean value moreover, may be regulated by simply shifting the brushes of these commutators.

The power of an apparatus of this type is easily limited by the appearance of sparks at the commutators; the formation of sparks depends on the tension between the plates of the commutator, and also on the tension of reactance of the sections of the coil.

The permissible tension between the plates of the commutator may be heightened by employing the well known means of connecting the sections of the coil to the plates of the commutator by the aid of resistance connections, but, in order to lessen the tension of reactance, it is necessary to reduce the self-induction of the sections of the coil, by preventing the formation of the parasitic fluxes which are completed by the air in the vicinity of the ring, under the action of the intense and highly fluctuating currents traversing the commutator sections.

The subject of the present invention is a device enabling parasitic fluxes to be almost entirely suppressed in this type of apparatus and consequently reducing the tension of reactance of the commutator sections to a very low figure, which tension forms the chief cause of the production of sparks at the commutators.

In principle, the invention consists in surrounding the ring of the transformer with a metallic casing, in such a manner that the parasitic fluxes are compelled to traverse metallic screens in which are generated secondary currents tending to nullify these parasitic fluxes.

Figures 1, 2, 3 and 4 represent typical examples of various forms that can be given to these screens surrounding the ring of a transformer of alternating currents into continuous current, and Fig. 5 is a diagrammatic perspective view of the improvement in place.

In Figs. 1 and 2 the ring is provided with four screens *a*, *b*, *c*, *d*; the screens *a* and *b* are cylindrical, the screens *c* and *d* are cheeks applied against the outermost plates of the ring. Fig. 1 shows part of the coil *e*, Fig. 2, which is a section shows only one turn of the coil.

It is easily seen that the magnetic circuit which tends to form around the turn being completed by the air in the vicinity of the rim, is compelled to traverse the screens *a*, *b*, *c*, *d*. It sets up secondary currents in these screens, and everything proceeds as in the case of a statical transformer with the turn of the coil as primary member, with the secondary member formed by the metallic screens of extremely low resistance in short circuit. It is known that an arrangement of this kind corresponds to the almost complete suppression of the self-induction of the primary member, that is to say, in this particular instance of the turn of the coil. Hence, the commutation can be effected with a tension of reactance that is weaker in proportion as the section chosen for the screens is greater.

Fig. 3 shows another possible arrangement of the screens. In this figure, the screens are three in number, *a*, *b*, *c*, of which *a* is cylindrical, while the two pieces *b* and *c* are identical and may be cast; they may be made in one piece (Fig. 4) with the lugs for bolting together the plates of the ring.

It is necessary that the screens as a whole, should not constitute a completed circuit con-

centric with the coil that is to say, surrounding the ring, for, under the action of the principal fluxes, whose circuits are entirely completed in the ring, secondary currents of considerable importance would be set up in these screens, the result being equivalent to the short circuiting of the generating source of the alternating currents.

It is understood that the arrangements illustrated in the drawings accompanying this application are merely given as typical examples, since the screens may be shaped in any other way considered likely to increase facility of construction.

The invention may be applied directly to all rotary transformers for transforming monophase or polyphase alternating currents into continuous current of variable tension by the simple lag of the brushes, and of which the useful magnetic circuits are entirely completed in a ring. For a given size, it enables the power of these machines to be considerably augmented without any appreciable increase of weight, because it enables more powerful currents to be dealt with per line of brushes on the commutators while almost entirely suppressing the tension of reactance of the commutated sections.

In Fig. 5 *d* indicates the screen surrounding the ring, *e* the coil, *f* the collector, and *g* the shaft. Two rings *h* and *i* are mounted on the shaft to which are connected the coils *e*, and the said rings are connected to the secondary of a transformer *t*. The rotating part *m* of a synchronous motor is also mounted on the shaft, the stator of the said motor being energized by a current coming from the dynamo *n*. Rings *o* and *p* are arranged on the shaft, the said rings being connected to the coils of the rotating part and to the secondary of the transformer *t*.

Claims.

1. In an anti-sparking device for converters, an annular core, a primary coil for said core, said coil being wound so as to magnetize the core circularly, and means for confining the useful magnetic fluxes to the core, said means comprising a plurality of magnetic screen members disposed externally of said core, said screen members being spaced apart.

2. In an anti-sparking device for converters, an annular core, a primary coil for said core, said coil being wound so as to magnetize the core circularly, and means for confining the useful magnetic fluxes to the core, said means comprising a plurality of magnetic screen members disposed between the core and the primary coil, said screen members being spaced apart at their adjacent edges.

3. In an anti-sparking device for converters, an annular core, a primary coil for said core, said coil being wound so as to magnetize the core circularly, and means for confining the useful magnetic fluxes to the core, said means comprising a pair of concentric, cylindrical, magnetic screens, one of said screens being arranged inside and the other outside of the core, and annular screens, one at each side of the core, the screens being spaced apart at their adjacent edges.

4. In an anti-sparking device for converters, an annular core, a primary coil for said core, said coil being wound so as to magnetize the core circularly, means for confining the useful magnetic fluxes to the core, said means comprising a pair of concentric, cylindrical, magnetic screens, one of said screens being arranged inside and the other outside of the core, and annular screens, one at each side of the core, the screens being disposed between the core and the primary coil and being spaced apart at their adjacent edges.

The foregoing specification of our "device for effecting the almost complete suppression of parasitic fluxes in rotary transformers, without air-gap, for converting monophase and polyphase alternating currents into continuous current" signed by us.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

LOUIS RENÉ AUVERT.
ALPHONSE FRANÇOIS ERNEST FERRAND.

Witnesses:
GEORGES CHARLES COQUET,
RENÉ JULES CHIRIOT.