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M. CORNU

1,913,264

TURBO-ALTERNATOR

Filed May 31, 1932

Fig. 1.

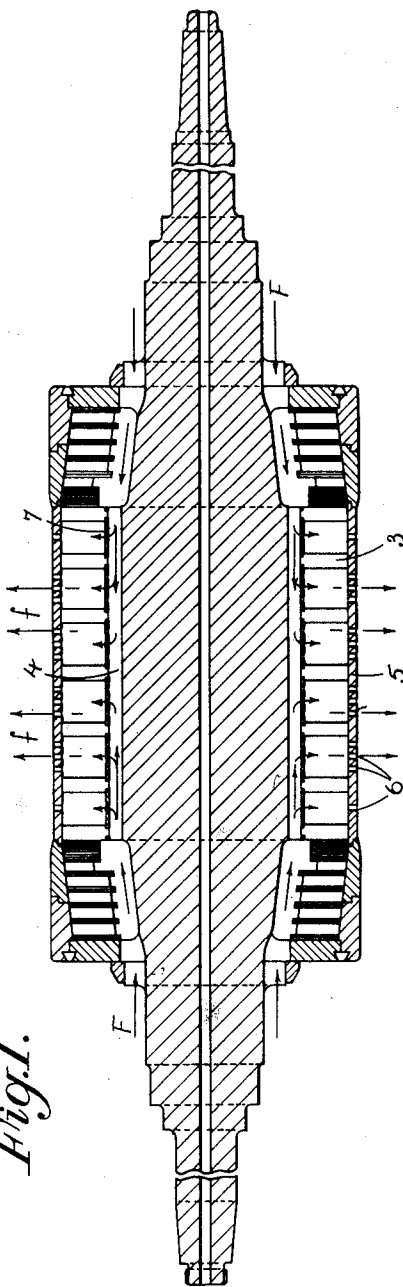


Fig. 2.

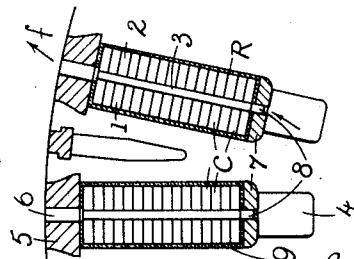
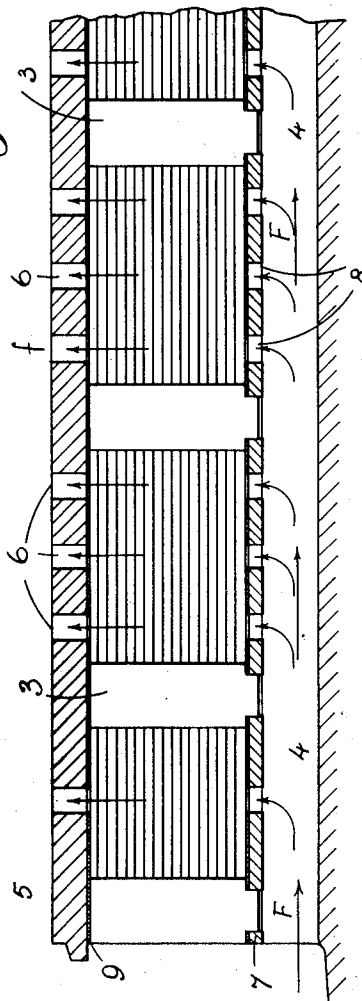


Fig. 3.



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UNITED STATES PATENT OFFICE

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TURBO-ALTERNATOR

Application filed May 31, 1932, Serial No. 614,541, and in Belgium June 5, 1931.

This invention relates to the cooling of the rotors of turbo-alternators.

In the systems of rotor construction ordinarily employed, the conductors located in the grooves or slots formed in the magnetic mass, are separated from this mass by insulating tubes.

Satisfactory cooling of the rotor windings thus arranged is difficult to carry out, the cooling usually taking place in the following manner: the heat given off in the conductors passes through the insulating tubes and reaches the mass of the rotor, whence the heat is removed by means of a cooling fluid.

The present invention has for its object to provide a new or improved method of cooling in which:—

(a) the conductors are in direct contact with the cooling fluid over a large surface, which arrangement allows of removing a large portion of the heat given off in these conductors.

(b) the conductors are supported as usual, by insulating tubes in contact with the mass of the rotor, from which there results the possibility of dissipating the remainder of the heat through the insulating tubes, into the metal of the rotor, in the customary manner.

The invention consists essentially in dividing the conductors of each slot into stacks between which are formed radial channels offering a passage for the cooling fluid, which is supplied by longitudinal channels at the bottom or inner end of the slot and escapes from the rotor at the outer end of the radial channels.

Upon the accompanying drawing, to which reference is made in the following description, one example of carrying out the invention has been represented. In this drawing,—

Figure 1 is a longitudinal section of a wound rotor.

Figure 2 is a partial transverse section of the same rotor.

Figure 3 is a partial longitudinal section corresponding with Figure 1, but on a larger scale.

In these figures the same reference letters and numerals designate the same parts.

The conductors C located in the slot R, with the interposition of insulating tubes 9, are arranged in such a manner that they form two stacks 1 and 2, separated by insulating spacers 3 (Figure 2). Figures 1 and 3 show the arrangement of the insulating spacers 3, which are suitably proportioned and fixed in any suitable manner, at regular intervals in the longitudinal direction.

The slots R are provided at their bottom or inner end with a longitudinal channel 4 (Figures 1 and 2).

Lastly the upper locking wedges 5 for the slots R are pierced with holes 6, as also is the case for the bottom keys or wedges 7, which are furnished with holes 8.

The cooling fluid delivered at each extremity of the rotor into the passages 4, by any suitable arrangement, circulates in the manner shown by the arrows F. This fluid, upon reaching the bottom channel 4 of each slot R, penetrates radially by the holes 8 between the stacks 1 and 2, into the spaces formed between the insulating spacers 3; the fluid passes out by the holes 6, as shown by the arrows f, after having by reason of its direct contact with the conductors C, removed the larger part of the heat given off in the said conductors. In addition to this direct cooling, the invention also maintains the evacuation of the residual heat units through the usual insulating tubes towards the mass of the rotor, whence these heat units can be removed or dissipated in the customary manner.

The improved method of cooling, according to the invention, thus possesses the two characteristic features pointed out above.

It is naturally permissible without departing from the scope of the invention, to carry out modifications embodying the same characteristics.

What I claim is:—

1. In a slot-wound electrical machine rotor, a conductor assembly comprising subdivided conductors arranged in radial stacks, insulating spacers at regular intervals in the length of the slot, said spacers separating said stacks from one another, and the longitudinal gaps between said spacers forming

channels for the passage of cooling fluid, a supporting wedge at the bottom of the slot, said slot having a longitudinal channel beneath said wedge for the admission of fluid
5 thereto through holes in said wedge, and a closing wedge at the top of the slot, said closing wedge furnished with holes for the escape of the fluid from said channels.

2. In a slot-wound electrical machine rotor,
10 a slot conductor assembly comprising two interspaced stacks of superposed part conductors, corresponding members of said stacks forming subdivisions of a single conductor, a plurality of insulating spacers extending
15 radially of the slot, between said two stacks and at intervals apart, an insulating tube surrounding said two stacks, a supporting wedge adapted to rest upon a narrowed inner end of the slot and a closing wedge for the
20 outer end of the slot, said wedges having holes communicating with the gaps between said spacers, for passage of cooling fluid from the inner end of the slot, between said two stacks and out at the periphery of the rotor.
25 In testimony whereof I have affixed my signature.

MAURICE CORNU.

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