silicon carbide or silicon nitride with one of the platinum metals, since the latter do not form stable carbides or nitrides, and Dr. Searcy writes that "cermets of platinum metals with silicon carbide or silicon nitride seem to be well worth investigating".

Dr. Searcy concludes his review with these words: "Unfortunately the materials that seem to have the greatest promise are rare and expensive. In certain areas of critical needs, such as in high-temperature engine parts, the high costs of such materials would not bar them, however, from limited application if they prove to be really satisfactory."

J. C. C.

References

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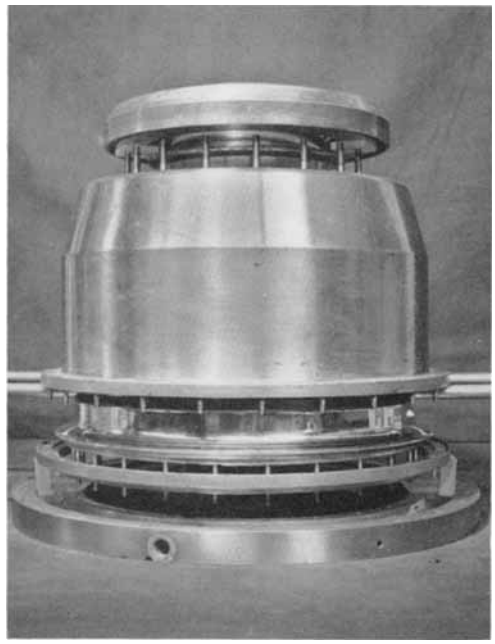
Rhodium Plating in a Homopolar Generator

Direct current electromagnetic pumps have been applied to the primary heat-transfer circuits of nuclear reactors cooled by liquid metals. They have substantial advantages for pumping liquid metals, but they require to be supplied with a very large direct current.

An experimental homopolar generator for this purpose has been designed at the Atomic Energy Research Establishment at Harwell (1) and made by A. Frazer-Nash and the Palatine Tool and Engineering Company (Surbiton) Ltd. The use of mercury collector rings in this machine has reduced the "brush drop" to a few millivolts, with a friction loss of about two per cent of the power output. These losses are remarkably small for a rating of 10,000 amp. at one volt.

The copper rotor and brush assembly is shown in the photograph, with the outer collector rings separated. When assembled and rotating, each outer collector forms a circular trough filled with mercury. The rim of each stationary inner collector is immersed in the mercury in the trough. The relative peripheral speeds of the outer and inner rings may be more than 40 feet per second, so that the hydrodynamic conditions in the channel between them are severe, and lightly protected copper rings suffered attack. A heavy electrodeposit of hard nickel, by Fescol Limited, provided resistance to erosion, and to this a deposit of 0.0001 inch of rhodium was applied by Johnson, Matthey & Co., Limited. The rhodium surface is quite inert to mercury and is free from tarnish, so that very high electrical conductivity is maintained.



Brush and rotor assembly of the homopolar generator

Reference

1 D. A. Watt .. .. The development and operation of a 10 kW homopolar generator with mercury brushes, AERE R/R 2375 (to be published in Part A, Proceedings I.E.E.)