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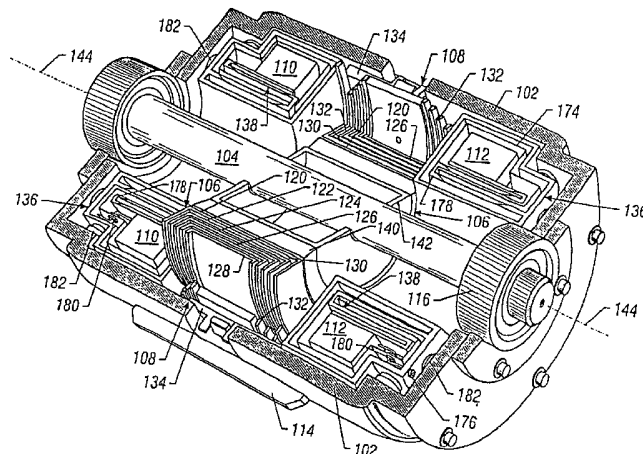
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(54) Title: HOMOPOLAR MACHINE WITH SHAFT AXIAL THRUST COMPENSATION FOR REDUCED THRUST BEARING WEAR AND NOISE



(57) Abstract: A homopolar machine produces an axial counter force on the rotating shaft (104) to compensate for the load on the shaft's thrust bearing (109) to reduce wear and noise and prolong bearing life. The counter force is produced through magnetic interaction between the shaft and the machine's field coils (110/112) and is created by changing the current excitation of the field coils, which results in a magnetic flux asymmetry in an inner flux return coupled to the shaft. The homopolar machine may also have a configuration that uses current collectors (132) that maintain substantially constant contact pressure in the presence of high magnetic fields to improve current collector performance. The current collectors are flexible and may be made from either electrically conductive fibers or stacked strips such that they bear up against the armature (106) so that the pressure is maintained by the spring constant of the current collector material. The machine may also have a configuration where the brushes are oriented so that the current is aligned with the local magnetic field to reduce the lateral electromagnetic forces on the brushes.



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US CL : 310/178

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 310/178, 219, 231, 232, 238, 239

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,821,659 A (SMITH) 13 October 1998, c.2, lines 34-41.	1, 5, 9
A	US 4,271,369 A (STILLWAGON) 02 June 1981c.6, lines 34-37, 40-45, Figs.2-3.	1, 5, 9
A	US 6,245,440 B1 (KUHLMANN-WILSDORF et al.) 12 June 2001, c.10, lines 12-19, c.18, lines 30-36 and 50-64.	12-16
A	US 5,349,256 A (HOLLIDAY) 20 September 1994, c.11, lines 14-19; c.12, lines 54-65, c.3 lines 10-14, c.4, lines 25-28; Figs.10-12.	17, 20, 29
A	US 4,581,555 A (KUZNETSOV et al.) 08 April 1986, Fig.1.	17, 20, 29

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

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