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European Patent Office

SUPPLEMENTARY EUROPEAN SEARCH REPORT

Application Number
EP 98 92 6086

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 672 886 A (CRANE AND KINGSBURY) 20 September 1995 (1995-09-20) * page 4, line 11 - line 14; figures 1A,B *		G01B7/00 F16C39/06
A	US 5 300 842 A (GE) 5 April 1994 (1994-04-05) * column 1, line 54 - column 2, line 4; figure 1A *		
A	G.JONES: "Magnetic bearings promise reduced operation and maintenance costs" NUCLEAR ENGINEERING INTERNATIONAL, vol. 35, no. 435, 1 October 1990 (1990-10-01), pages 67-68, XP000201518 Sutton, Surrey (GB) * page 67; figure 1 *		
A	JP 58 034226 A (SEIKO) 28 February 1983 (1983-02-28) * figures 2,3 *		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	US 3 865 442 A (USA NASA) 11 February 1975 (1975-02-11) * column 5, line 25 - line 50; figure 2 *		G01B F16C

The supplementary search report has been based on the last set of claims valid and available at the start of the search.

Place of search	Date of completion of the search	Examiner
MUNICH	4 September 2001	Mielke, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C04)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 92 6086

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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04-09-2001

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EP 672886 A	20-09-1995	US 5696444 A	09-12-1997
		JP 8043010 A	16-02-1996
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US 5300842 A	05-04-1994	NONE	
JP 58034226 A	28-02-1983	NONE	
US 3865442 A	11-02-1975	GB 1342919 A	10-01-1974
		NL 7117253 A	26-06-1972

Claims

1. A magnetic bearing, comprising:

a stator assembly in which a magnetic flux path is generated for supporting a mass; and

a sensor positioned in the stator assembly for sensing flux in the magnetic flux path;

wherein the stator assembly is operatively configured in combination with the sensor such that in the stator assembly a flux density in the magnetic flux path in the area of the sensor is substantially similar to or less than a flux density elsewhere in the stator assembly along the magnetic flux path.

2. The magnetic bearing of claim 1, wherein the stator assembly includes a gap in which the sensor is located and the magnetic flux path in the area of the gap comprises a main flux path and a secondary flux path in parallel with the main flux path, the secondary flux path traversing the gap.

3. The magnetic bearing of claim 2, wherein the stator assembly comprises a curved backiron portion having two legs extending radially inward and a bulge portion located between the two legs and also extending radially inward, and the gap is formed within the backiron portion proximate the bulge in which the sensor is located.

4. The magnetic bearing of claim 3, further comprising at least one notch in the backiron portion on a side radially opposite the bulge.

5. The magnetic bearing of claim 2, wherein the stator assembly includes at least one actuator for supporting the mass based on a drive current applied to the at least one actuator, and a flux density of the secondary flux path is generally linearly related to the drive current.

6. The magnetic bearing of claim 1, wherein the sensor comprises a Hall effect device.

7. A position sensing system, comprising:

the magnetic bearing of claim 1; and

means for processing an output of the sensor to determine a position of the supported mass.

8. An active magnetic bearing system, comprising:

the magnetic bearing of claim 1, the magnetic bearing including at least one actuator for supporting the mass based on a drive current applied to the at least one actuator; and

means for controlling the drive current applied to the at least one actuator based on an output of the sensor.

9. A magnetic bearing, comprising:

a stator assembly in which a magnetic flux path is generated for supporting a mass; and

a sensor included in the stator assembly along the magnetic flux path for sensing flux in the magnetic flux path;

wherein the stator assembly is shaped for minimizing deleterious effects, caused by the presence of the sensor, on a flux distribution in the magnetic flux path in the stator assembly.

10. The magnetic bearing of claim 9, the stator assembly comprising a curved backiron portion having two legs extending radially inward and a gap within the backiron portion in which the sensor is located.

11. The magnetic bearing of claim 10, wherein the backiron portion includes a bulge portion which extends radially inward and the gap within the backiron portion is proximate the bulge.

12. The magnetic bearing of claim 11, wherein the sensor is positioned at a location within the stator assembly along a secondary flux path which is in parallel with a main flux path generated by the magnetic bearing.

13. The magnetic bearing of claim 11, wherein the gap is located at an edge of the bulge.

14. The magnetic bearing of claim 11, wherein the gap is located in an interior portion of the bulge.

15. The magnetic bearing of claim 14, further comprising at least one notch in the backiron portion on a side radially opposite the bulge.

16. The magnetic bearing of claim 9, wherein the sensor comprises a Hall effect device.

17. The magnetic bearing of claim 9, wherein the sensor comprises a coil.

18. A position sensing system, comprising:

the magnetic bearing of claim 9; and

means for processing an output of the sensor to determine a position of the supported mass.

19. An active magnetic bearing system, comprising:

the magnetic bearing of claim 9, the magnetic bearing including at least one actuator for supporting the mass based on a drive current applied to the at least one actuator; and

means for controlling the drive current applied to the at least one actuator based on an output of the sensor.

20. A magnetic bearing, comprising:

a stator assembly in which a magnetic flux path is generated for supporting a mass; and

a sensor positioned in the stator assembly for sensing flux in the magnetic flux path;

wherein the stator assembly is operatively configured such that a cross-sectional area of the stator assembly available to flux in the magnetic flux path in the area of the sensor is substantially similar to or greater than a cross-sectional area of the stator assembly available to flux in the magnetic flux path elsewhere in the stator assembly.

21. The magnetic bearing of claim 20, wherein the stator assembly is shaped such that in the area of the sensor the magnetic flux path comprises a main flux path adjacent the sensor and a secondary flux path which intersects the sensor.

22. The magnetic bearing of claim 21, wherein the flux density in the secondary flux path is substantially less than the flux density in the main flux path.

23. The magnetic bearing of claim 21, wherein the stator assembly includes at least one actuator for supporting the mass based on a drive current applied to the at least one actuator, and a flux density of the secondary flux path is generally linearly related to the drive current in a range of operation of the magnetic bearing.

24. A position sensing system, comprising:

the magnetic bearing of claim 20; and

means for processing an output of the sensor to determine a position of the supported mass.

25. An active magnetic bearing system, comprising:

the magnetic bearing of claim 20, the magnetic bearing including at least one actuator for supporting the mass based on a drive current applied to the at least one actuator; and

means for controlling the drive current applied to the at least one actuator based on an output of the sensor.

26. An electric apparatus, comprising:

a magnetic core member in which a magnetic flux path is generated for performing a function; and

a sensor included in the magnetic core member along the magnetic flux path for sensing flux in the magnetic flux path;

wherein the magnetic core member is shaped for minimizing deleterious effects, caused by the presence of the sensor, on a flux distribution in the magnetic flux path in the magnetic core member.

27. The electric apparatus of claim 26, wherein the magnetic core member includes a stator assembly comprising a curved backiron portion having two legs extending radially inward and a gap within the backiron portion in which the sensor is located.

28. The electric apparatus of claim 27, wherein the backiron portion includes a bulge portion which extends radially inward and the gap within the backiron portion is proximate the bulge.

29. The electric apparatus of claim 28, wherein the sensor is positioned at a location within the stator assembly along a secondary flux path which is in parallel with a main flux path generated by the magnetic bearing.

30. The electric apparatus of claim 28, wherein the gap is located at an edge of the bulge.

31. The electric apparatus of claim 28, wherein the gap is located in an interior portion of the bulge.

32. The electric apparatus of claim 28, further comprising at least one notch in the backiron portion on a side radially opposite the bulge.

33. The electric apparatus of claim 26, wherein the sensor comprises a Hall effect device.