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**Datasheet for the decision
of 12 January 2011**

Case Number: T 1206/08 - 3.2.08

Application Number: 03755313.8

Publication Number: 1514034

IPC: F16C 31/04

Language of the proceedings: EN

Title of invention:

Ball bearing

Applicant:

THE ANSPACH EFFORT, INC.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

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Keyword:

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1206/08 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 12 January 2011

Appellant:
(Applicant)

THE ANSPACH EFFORT, INC.
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FL 33410 (US)

Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 30 January 2008
refusing European patent application
No. 03755313.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: M. Alvazzi Delfrate
E. Dufrasne

Summary of Facts and Submissions

I. By its decision posted on 30 January 2008 the examining division refused European patent application No. 03 755 313.8.

II. The examining division held that the subject-matter of claim 1 of both requests then on file lacked an inventive step in view of

D2: US-A-3 043 634 in conjunction with

D4: US-A-3 514 166.

The decision further cited the following documents:

D1: DE -U- 20 104 813;

D3: GB-A- 2 107 003;

D5: US-A- 3 271 087;

D6: FR-A-466 728; and

D7: US-A-2 057 391

III. The appellant (applicant) lodged an appeal against that decision on 27 March 2008, paying the appeal fee on the same day. The statement setting out the grounds for appeal was filed on 9 June 2008.

IV. The appellant requests that a patent be granted on the basis of

claims 1 to 12 of the main request filed by telefax dated 1 November 2010;

description pages 1 to 3, 5, 10 to 12 filed by telefax dated 1 November 2010 and pages 5 to 9 as originally filed; and

drawing sheets 1/5 to 5/5 as originally filed.

As an alternative it requests that a patent be granted on the basis of either the first or second auxiliary request as filed by telefax dated 27 August 2010.

V. The main request comprises independent claims 1 and 11, which read as follows:

"1. A combination of a ball bearing construction and a rotary shaft, the ball bearing construction including a cage (40,50,84), wherein said cage (40,50,84) has a sleeve-like main body (41,89), said main body (41,89) having an upper cylindrically shaped surface (43,91) and an inner cylindrically shaped surface (45,93) concentric to said upper cylindrically shaped surface (43,91), the cage having a plurality of circumferentially spaced holes (46,48,52,56,60,82) formed in said main body and extending therethrough, said plurality of circumferentially spaced holes defining a first row (42,54), and a second row (44,58) of a plurality of circumferentially spaced holes (46,48,52,56,60,82), said second row being axially spaced from said first row, a plurality of spherically shaped balls (26,80) mounted in each of said plurality of holes (46,48,52,56,60,82) of said first row and being retained thereby, and a plurality of additional spherical balls (26,80) mounted in each of said circumferentially spaced holes of said second row (44) and being retained thereby, each of said spherically

shaped balls (26,80) of said plurality of spherically shaped balls including an upper rolling surface (47,83) and a lower rolling surface (49,85) wherein said upper rolling surface (47,83) of each of said spherically shaped balls (26,80) of said plurality of spherically shaped balls extends above the upper cylindrically shaped surface of said main body of said cage (40,50,84) and said lower rolling surface (49,85) of each of said spherically shaped balls extends below the inner cylindrically shaped surface of said main body of said cage (40,50,84), and each of said plurality of additional spherical balls (26,80) having an upper rolling surface (47,83) and a lower rolling surface (49, 85) whereby said upper rolling surface (47,83) extends beyond the upper cylindrically shaped surface (43,91) of said main body of said cage (40,50,84) and said lower rolling surface (49,85) extends below the inner cylindrically shaped surface of the main body of said cage (40,50,84), wherein said ball bearing construction supports said rotary shaft (70) and said lower rolling surface (49,85) of each of said plurality of spherically shaped balls and said plurality of additional spherical balls extends below the inner cylindrically shaped surface of said main body of said cage (40,50,84) and engages said rotary shaft (70), and wherein the holes of said first row of circumferentially spaced holes are laterally offset with respect to each other, and the holes of said second row of a plurality of circumferentially spaced holes are laterally offset with respect to each other, said plurality of holes (46,48,52,56,60,82) of said first row and said second row each being oriented to define a helical pattern, such that each of said plurality of spherically shaped balls and said

plurality of additional spherical balls rides in its own independent circumferential track on rotation of the rotary shaft (70)."

"11. A method of installing a ball bearing (74) comprising the steps of:

- i) providing a cage (84), wherein said cage (84) has a sleeve-like main body, said main body (89) having an upper cylindrically shaped surface (91) and an inner cylindrically shaped surface (93) concentric to said upper cylindrically shaped surface (91), the cage having a plurality of conically shaped holes (82) concentrically mounted there around, the holes defining a first row and a second row of a plurality of circumferentially spaced holes (82), said second row being axially spaced from said first row; wherein said holes of said first row of circumferentially spaced holes are laterally offset with respect to each other, and said holes of said second row of a plurality of circumferentially spaced holes are laterally offset with respect to each other, said plurality of holes (82) of said first row and said second row each being oriented to define a helical pattern, and wherein said ball bearing (74) supports a rotary shaft (70) in a tubular member (72) defining a bearing cavity, and the method further comprises the steps of:
 - ii) mounting the cage (84) on the rotary shaft (70);
 - iii) coating the holes (82) of the cage (84) with a grease;
 - iv) inserting a spherical ball (80) into each of said holes (82);
 - v) inserting the cage (84) with the spherical balls (80) into the bearing cavity so that the upper rolling surface (83) of each spherical ball (80) bears against

the tubular member (72) and the lower rolling surface (85) of each spherical ball (80) bears against the shaft (70), each of said balls riding in its own independent circumferential track."

Reasons for the Decision

1. The appeal is admissible.
2. D6 discloses a bearing with a structure similar to the one claimed and for the same use, namely supporting rotary members. Therefore, it represents the most relevant state of the art.
3. D6 discloses a combination of a ball bearing construction and a rotary shaft (see page 1, lines 31-32), the ball bearing construction including a cage, wherein said cage has a sleeve-like main body ("cage"), said main body having an upper cylindrically shaped surface and an inner cylindrically shaped surface concentric to said upper cylindrically shaped surface (see Figure 4), the cage having a plurality of circumferentially spaced holes formed in said main body and extending therethrough, said plurality of circumferentially spaced holes defining a first row, and a second row of a plurality of circumferentially spaced holes, said second row being axially spaced from said first row (see Figure 7), a plurality of spherically shaped balls ("billes") mounted in each of said plurality of holes of said first row and being retained thereby, and a plurality of additional spherical balls mounted in each of said circumferentially spaced holes of said second row and

being retained thereby, each of said spherically shaped balls of said plurality of spherically shaped balls including an upper rolling surface and a lower rolling surface wherein said upper rolling surface of each of said spherically shaped balls of said plurality of spherically shaped balls extends above the upper cylindrically shaped surface of said main body of cage and said lower rolling surface of each of said spherically shaped balls extends below the inner cylindrically shaped surface of said main body of said cage and each of said plurality of additional spherical balls having an upper rolling surface and a lower rolling surface whereby said upper rolling surface extends beyond the upper cylindrically shaped surface of said main body of said cage and said lower rolling surface extends below the inner cylindrically shaped surface of the main body of said cage (see Figures 1 and 4), wherein said ball bearing construction supports said rotary shaft and said lower rolling surface of each of said plurality of spherically shaped balls and said plurality of additional spherical balls extends below the inner cylindrically shaped surface of said main body of said cage, and wherein the holes of said first row of circumferentially spaced holes are laterally offset with respect to each other, and the holes of said second row of a plurality of circumferentially spaced holes are laterally offset with respect to each other, said plurality of holes of said first row and said second row each being oriented to define a helical pattern (see Figure 7 and page 2, lines 4-12), such that each of said plurality of spherically shaped balls and said plurality of additional spherical balls rides in its own independent

circumferential track on rotation of the rotary shaft (see page 2, lines 4-12).

4. Compared to D6, D2 is a less promising starting point, since this document deals essentially with bearings for rectilinear motion. Even if it states, in column 1, lines 8-11, that the invention to which it relates can be applied to rotary bearings, it does not disclose how this is to be done.
5. Starting from D6, the object to be achieved by the combination of claim 1 of the main request is to enhance the life of the bearing for high speed operation (see page 4, lines 19-22).

This object is achieved in that, contrary to D6 wherein an inner race ("chemin de roulement intérieur") is foreseen (see D6, page 1, lines 26-32), the balls engage the rotary shaft. Thanks to this arrangement significantly larger balls can be used, affording a lower spin rate of each of the balls and a larger wearing surface, which result in improved wear characteristics and hence a longer life of the bearing (see page 6, lines 10-24).

6. The prior art does not render it obvious to achieve that object by the claimed combination.

D6 itself leads away from the claimed invention, since it presents the inner race as an essential component (see page 1, lines 25-45).

D2 discloses in Figure 1 a bearing wherein the balls are arranged so as to engage the shaft. However, this

bearing is, contrary to that shown in D6, for rectilinear motion. Therefore, the person skilled in the art would not consider the teaching of D2 to improve the performance of the bearing of D6. Moreover, D2 does not mention any advantage in engaging the shaft with the balls. Accordingly, even considering this document, the person skilled in the art would not find any suggestion to modify the bearing disclosed in D6 in the claimed way in order to achieve the above object.

D1, D3 to D5 and D7 are less relevant. D1 and D4 relate to bearings for linear motion and D3, D5 and D7 do not disclose a bearing which comprises balls engaging a rotary shaft.

Accordingly, the subject-matter of claim 1 involves an inventive step.

7. The method of claim 11 results in a combination corresponding in essence to that of claim 1. In particular said combination includes the fact that the balls bear against the rotary shaft. Therefore, the claimed method involves an inventive step for the same reasons as given for claim 1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent on the basis of
 - claims 1 to 12 of the main request filed by telefax dated 1 November 2010;

 - description pages 1 to 3, 5, 10 to 12 filed by telefax dated 1 November 2010 and pages 5 to 9 as originally filed;

 - drawing sheets 1/5 to 5/5 as originally filed.

The Registrar:

The Chairman:

V. Commare

T. Kriner