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D E C I S I O N
of 5 February 1998

Case Number: T 0959/97 - 3.2.1

Application Number: 93203340.0

Publication Number: 0600559

IPC: F16C 33/66, F16C 33/78

Language of the proceedings: EN

Title of invention:
Rolling element bearing system comprising a filtering seal

Applicant:
SKF Industrial Trading & Development Co, B.V.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0959/97 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 5 February 1998

Appellant: SKF Industrial Trading & Development Co, B.V.
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Decision under appeal: Decision of the Examining Division of the European Patent Office posted 11 April 1997 refusing European patent application No. 93 203 340.0 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: F. A. Gumbel
Members: P. Alting van Geusau
V. Di Cerbo

Summary of Facts and Submissions

I. European patent application No. 93 203 340.0 (publication No. 0 600 559) was refused by the Examining Division with decision dated 11 April 1997.

The Examining Division was of the opinion that the subject matter of claim 1, filed with letter dated 7 September 1995, lacked novelty having regard to the prior art disclosed in

D1: DE-U-90 02 218.

In particular, the Examining Division considered that the sealing rings (25, 26) on the right hand side of the bearing of Figure 3 of D1, would promote fluid flow out of the gap. The rings therefore functioned as pumping means in the sense of the integrated pumping means claimed in the patent application.

II. The appellant (applicant) filed an appeal against this decision on 13 June 1997 and paid the appeal fee on the same day. The statement of grounds of appeal was filed on 21 August 1997.

III. On 10 December 1997 the appellant was informed by telephone that the Board considered the current set of claims in principle acceptable. However, some clarifications and corrections appeared to be necessary and it was therefore suggested to file a new set of claims and an adapted description amended to take account of the discussed deficiencies.

IV. With letter dated 20 January 1998 the appellant filed new claims 1 to 11, a new description, pages 1 to 6 and new Figures 1 to 6.

By implication the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the newly filed documents.

Claim 1 reads as follows:

"1. Rolling element bearing system comprising at least one rolling element bearing (1) with an outer race (2, 21, 51, 57) and an inner race (5, 20, 50, 58) which enclose a space containing rolling elements, which space is confined to the outside by means of sealing rings (9, 24, 25, 28, 54, 55), the rolling element bearing system further comprising filtering means (19, 26, 30, 53, 64, 71) for preventing the ingress of contaminations into said space with the lubricant, characterised in that at least one of said sealing rings and/or one of the races is provided with flow generating means (12, 14, 15, 54, 55, 56) for pumping said lubricant out of said space, thereby generating an underpressure in said space which causes lubricant to flow from the outside through the filtering means (19, 26, 30, 53, 64, 71) into said space."

VI. In support of the request for grant of a patent the appellant relied essentially on the following submissions:

The rolling element bearing system disclosed in D1 concerned a protective arrangement avoiding contaminated oil entering a bearing. The arrangement comprised a centrifugal disc, which prevented oil from entering directly into the bearing and at the same time threw oil onto a seal having filtering means. So only filtered oil was allowed to enter the bearing.

All the embodiments disclosed in D1 functioned in the same manner and therefore the notion of generating an underpressure was not at all hinted at in D1.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The subject-matter of the current claim 1 is based on the originally filed claims 1 and 2 and further comprises a specification of the flow of lubricant from the outside through the filtering means into the bearing. Such a direction of lubricant-flow follows immediately from the explanations in respect of the embodiments disclosed in the description in relation to Figures 1 to 6.

2.2 The dependent claims 2 to 11 are mere repetitions of the originally filed claims 3 to 12.

2.3 In view of these assessments the subject-matter of the present claims is supported by the application in its originally filed form and therefore no objections arise in respect of the requirements of Article 123(2) EPC.

2.4 The description and drawings were brought into line with the subject-matter now claimed. These application documents do not give rise to objections under the EPC either.

3. *Novelty*

3.1 Document D1 discloses a rolling element bearing system comprising the combination of precharacterising features of claim 1.

The embodiments of the bearing system disclosed in D1 aim at the avoidance of contaminated oil entering the bearing. To this effect, an oil throwing plate is attached to the rotating bearing ring which throws oil at a filtering element via which cleaned oil may enter the bearing (see last two paragraphs on page 1 of D1).

3.2 The Examining Division considered the embodiment shown in Figure 3 on the right hand side particularly relevant since that embodiment comprised two discs partly overlapping each other and delimiting a narrow radially oriented gap, a configuration which was considered to function as suction pumping means in accordance with the characterising features of claim 1.

However, although in principle an arrangement of rotating discs may function as a pump, the relevant question to be answered in the present case is whether, considering the disclosure of D1 in an objective manner and thus without the benefit of hindsight, it is immediately apparent to the skilled person that a pumping effect is present.

In this respect it is to be noted that the arrangements shown in Figures 3 and 4 are defined as "labyrinth sealing means" (see line 27 on page 3) and that, as concerns the two discs 25 and 26 shown in the embodiment on the right hand side of Figure 3, a "seal", in particular a "labyrinth seal", is formed by these two discs (see lines 11 and 12 and line 20 on page 4, respectively). Since the function of a seal is incompatible with that of a pump, D1 cannot be considered to disclose a pumping function of the discs 25 and 26.

Furthermore, in order to give a hint in the direction of an appreciable pumping effect, the combination of details such as the overlap of the discs 25 and 26, the

size of the gap and the viscosity of the lubricant is important. Since any such detail is lacking in D1, the unprejudiced reader would not derive the notion of generating an underpressure in the bearing and there is thus no reason why the skilled person would envisage the discs 25 and 26 to provide a pumping effect for pumping lubricant out of the bearing. Therefore, when considered on its merits and in an objective manner, D1 does neither disclose nor does it imply a pumping effect of the discs 25 and 26.

3.3 Also none of the other available prior art documents discloses a rolling element bearing system having sealing rings or bearing races for pumping lubricant out of the bearing so that novelty of the subject-matter of claim 1 can be concluded.

4. *Inventive step*

4.1 Starting from the rolling element bearing known from D1 the object of the present application can be seen in the provision of a reliable feed of clean lubricant oil for a rolling element bearing system.

This object is achieved by the features of claim 1. While pumping lubricant out of the bearing the generated underpressure causes lubricant to flow from the outside through the filtering means into the bearing thereby providing forced lubrication of the bearing. Constant refreshment of the lubricant is guaranteed and any contaminations produced inside the bearing will be discharged from the bearing space together with the flow of lubricant thus generated (see page 2, lines 11 to 14 of the present application).

4.2 D1 does not disclose forced lubrication by pumping means generating an underpressure in the bearing but rather relies on throwing lubricant on the filtering means from which the lubricant flows into the bearing, presumably, by means of gravity. As is indicated in D1, used oil may flow back to the outside of the bearing but also here no mention is made or suggestion is given that such function is achieved by pumping means generating an underpressure in the bearing.

4.3 It is to be observed that the other available documents concern documents cited in the European search report and that they were classified as documents belonging to the technological background. The Board supports this opinion since none of these documents discloses or hints at the characterising features of claim 1, in particular the forced lubrication of a rolling element bearing system by pumping means provided by the bearing's sealing rings or its races.

4.4 Summarising, in the Board's judgment, the proposed solution to the technical problem underlying the patent in suit defined in the independent claim 1 is not obvious with respect to the available prior art and accordingly involves an inventive step. Therefore this claim and its dependent claims 2 to 11, relating to particular embodiments of the invention pursuant to Rule 29(3) EPC, can form the basis for grant of a patent (Article 52(1) EPC).

The description and drawings are in agreement with the actual wording and scope of the claims. Hence these documents are also suitable for the grant of a patent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent with the following documents:

   - Claims 1 to 11,

   - Description pages 1 to 6,

   - Figures 1 to 6,

   as filed with letter dated 20 January 1998.

The Registrar: The Chairman:

S. Fabiani F. Gumbel