BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [ ] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 5 November 2010

Case Number: T 2297/08 - 3.2.08

Application Number: 02021936.6

Publication Number: 1286075

IPC: F16D 23/14

Language of the proceedings: EN

Title of invention:
Clutch release bearing

Patent Proprietor:
NSK LTD

Opponent:
SKF FRANCE

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step - main and third auxiliary request - no"
"Allowability of amendments - first and second auxiliary requests - no"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 2297/08 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 5 November 2010

Appellant: (Opponent)
SKF FRANCE
34, avenue des Trois Peuples
F.-78180 Montigny le Bretonneux (FR)

Representative:
Casalonga, Axel
Casalonga & Partners
Bayerstraße 73
D-80335 München (DE)

Respondent: (Patent Proprietor)
NSK LTD
OHSAKI 1-chome
Shinagawa-ku
Tokyo (JP)

Representative:
MacDougall, Donald Carmichael
Marks & Clerk LLP
Aurora
120 Bothwell Street
Glasgow G2 7JS (GB)

Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted on 7 October 2008 concerning maintenance of European patent No. 1286075 in amended form.

Composition of the Board:

Chairman: T. Kriner
Members: P. Acton
U. Tronser

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal, received at the EPO on 5 December 2008, against the opposition division's decision posted on 7 October 2010 rejecting the opposition against European patent EP-B-1 286 075. The appeal fee was paid simultaneously and the statement of grounds was received on 6 February 2009.

II. Oral proceedings took place before the board of appeal on 5 November 2010.

The appellant requests that the decision under appeal be set aside and that the European patent be revoked.

The respondent (patentee) requests that the appeal be dismissed or in the alternative that the patent be maintained on the basis of one of the auxiliary requests 1 to 3 submitted with letter dated 20 August 2009.

III. Independent claim 1 as granted reads:

"A clutch release bearing (10) comprising:
an outer ring (12); a rotatable inner ring (11) having an outer diameter; and rolling members (15) provided between the outer ring (12) and the inner ring (11), and a seal (17) fixed to the outer ring (12),

and comprising a labyrinth seal section (17c) located in an external portion of the bearing (10) to form a labyrinth seal with the inner ring (11) (feature A),

and a contact seal section (17b) located in an internal portion of the bearing (10), and having a root portion (17d) with a thickness and a contact portion (17b) with a thickness, the contact portion (17b) being in a slight contact relationship with the inner ring (11) characterised in that
the ratio of the interference with respect to the outer diameter of the inner ring (11) is from 1/1000 to 1/100 (feature B),
the thickness of the root portion (17d) being smaller than the thickness of the contact portion (17b) (feature C)."

Claim 1 according to the first auxiliary request differs from claim 1 as granted in that it further comprises the feature according to which

"the root portion (17d) has a cantilever arm structure and extends from the labyrinth seal section (17b) inward in the axial direction, the contact portion (17b) is supported by the root portion (17d)".

Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request in that it further comprises the feature according to which

"the outer peripheral surface of the inner ring (11) which is in contact with the contact portion (17b) and faces the labyrinth seal section (17c) is made as a single cylindrical shape parallel to the axis of the inner ring (11)".

Claim 1 according to the third auxiliary request differs from claim 1 as granted by the additional feature according to which

"the contact seal section (17b) has a triangular shape in cross-section".

The designations of the features (A to C) have been inserted by the board.

IV. The following documents played a role for the present decision:

D1: DE-A-197 09 056
D3: DE-A-195 03 217
D4: US-A-3 642 335
D6: DE-A-195 27 340

V. The appellant's arguments can be summarised as follows:

(a) Main request

The subject-matter of claim 1 as granted differed from the bearing according to D6 only by the position of the labyrinth seal with respect to the contact seal and by the specific choice of the ratio of interference between the contact seal lip and the inner ring (features A and B).

Particularly, D6 disclosed (see Figures 1 and 7) a seal with a labyrinth portion (10d) and a contact portion (10) whereby the thickness of the root portion was smaller than the thickness of the contact portion. This document further pointed out (see column 2, lines 45 to

50) that this specific geometry led to reduced rubbing noise of the seal.

Starting from D6, the object to be achieved by the bearing according to claim 1 resided in enhancing the sealing effect towards the outside.

D4 disclosed the provision of a contact seal (43) and two labyrinth seal portions (42, 44), one at the external side and the other at the internal side of the contact seal. The two labyrinth seal lips were independent from each other (see column 3, lines 16 to 17) and the lip positioned at the external side was designed so as to prevent the entry of dust, water and other foreign matter into the seal (see column 2, lines 48 to 50). Consequently, D4 suggested the provision of an external labyrinth seal in addition to a contact seal in order to enhance the sealing effects towards the outside. Therefore, it was obvious for the skilled person to provide the seal according to D6 with another labyrinth seal in order to achieve the object posed.

The claimed range of interference between the contact seal lip and the inner ring was broad, arbitrary and lay within the range which was normally selected by the skilled person, who was aware that a too tight contact led to wear of the seal lip and that a too light contact resulted in bad sealing characteristics.

Therefore, the subject-matter of claim 1 did not involve an inventive step.

(b) First and second auxiliary requests

The subject-matter of claim 1 according to the first and second auxiliary requests extended beyond the content of the application as filed and of the parent application, since they did not disclose a "cantilever structure".

(c) Third auxiliary request

Since D6 further disclosed, for example in Figure 7, that the contact section had a triangular shape, the subject-matter of claim 1 did not involve an inventive step either.

VI. The respondent's arguments can be summarised as follows:

(a) Main request

Granted claim 1 differed from D6 not only in features A and B but additionally in that the thickness of the root portion was smaller than the thickness of the contact portion (feature C). D6 namely disclosed only that the region 11 had approximately the same thickness as the contact portion 10 (see column 5, lines 5 to 8).

The problem to be solved by the patent in suit was to reduce the rubbing noise between the diaphragm spring and the inner ring (see e.g. [0029]). D6, in contrast, dealt with reducing the rubbing noise created between the seal and the inner ring. Consequently, the two seals solved different problems. Moreover, defining the object to be achieved as an improvement of the sealing

effect towards the outside was based on hindsight and oversimplified.

Firstly, the skilled person would not have used the seal according to D4 in the bearing according to D6, since D4 related to an axial contact seal while D6 explicitly referred to a radial contact seal.

Furthermore, it was clear from D6 (see column 6, lines 36 to 44 and Figures 4, 5a to 5c) that a very specific orientation of the contact portion was necessary in order to achieve good sealing qualities. Therefore, the ratio of interference of the seal according to D6 was a crucial design step and the claimed ratio of interference could not be considered to be an arbitrary choice within a range of values from which the skilled person would obviously choose.

Finally, the chosen range led to a specific technical effect, as could be deduced from paragraph [0038] in combination with [0037].

Therefore, the subject-matter of claim 1 could not be reached in an obvious way and it involved an inventive step.

(b) First and second auxiliary requests

While paragraph [0038] of the originally filed application described a cantilever arm portion, the drawings clearly disclosed a cantilever arm structure. Particularly, Figure 4 showed that portion 17c had a cantilever shape and hence the seal as a whole could be considered to represent a cantilever structure.

Therefore, claim 1 according to the first and second auxiliary requests complied with the requirements of Article 123(2) EPC.

(c) Third auxiliary request

The respondent did not deny that D6 discloses a contact seal portion having a triangular shape.

Reasons for the Decision

1. The appeal is admissible.

2. Main request and third auxiliary request

2.1 D6, which is considered to represent the closest prior art, undisputedly discloses (see in particular the embodiments of Figures 1 and 7):

A clutch release bearing comprising: an outer ring (2); a rotatable inner ring (1) having an outer diameter; and rolling members (within the cage 3) provided between the outer ring and the inner ring, and a seal (5) fixed to the outer ring (2), and comprising a labyrinth seal section (10d) located in an internal portion of the bearing to form a labyrinth seal with the inner ring (1), and a contact seal section (10) located in an external portion of the bearing, and having a root portion with a thickness and a contact portion with a thickness, the contact portion being in a slight contact relationship with the inner ring (1) and having a triangular shape in cross-section.

D6 further shows in Figures 6 and 7 that the thickness of the root portion is smaller than the thickness of the contact portion. It is correct that column 5, lines 5 to 8 describe the vertical region 11 of the seal as being essentially of the same thickness as the contact portion. However, this passage refers to the embodiment of Figure 1 and not to the one of Figure 7 which shows an embodiment having a thinned root portion. Moreover, it compares the size of the vertical portion 11, and not that of the root portion, with the size of the contact portion 10 and hence defines a different relation between parts of the seal than the one claimed. Furthermore, D6 teaches (see column 2, lines 24 to 50) that by increasing the volume of the nose of the contact lip without increasing the size of its root portion, the rubbing noise can be reduced. Therefore, contrary to the respondent's view, D6 discloses feature C as well.

2.2 Starting from D6, the technical object to be achieved by the bearing according to claim 1 has to be regarded as to provide a bearing with increased sealing effects.

The respondent's argumentation that this object was oversimplified and based on hindsight is not convincing. The essential difference between the clutch release bearing according to claim 1 of the main request and of the third auxiliary request with respect to D6 is the provision of a labyrinth seal on the external side of the bearing, which obviously results in an improved sealing effect. The further difference, the selection of a certain ratio of interference, obviously serves to balance the noise generation and the sealing effect of the contact seal portion.

Therefore, it also contributes to achieving a good sealing effect. Moreover, even the patent in suit itself defines the object as to provide a clutch release bearing with increased sealing effects (see paragraph [0008]).

The object above is achieved by the provision of a seal wherein:

- a labyrinth seal is positioned on the external portion of the bearing (feature A),
- the ratio of the interference with respect to the outer diameter of the inner ring is from 1/1000 to 1/100 (feature B).

2.3 The skilled person would take the seal according to D4 into consideration in order to improve the sealing effect of the seal according to D6, since D4 refers to a seal for a bearing and suggests the provision of a labyrinth seal extending outwardly from a contact seal, chiefly for preventing the entry of water, dust and other foreign matter (see column 2, lines 48 to 50) and hence for increasing the sealing effect. This external labyrinth seal does not interact with the intermediate contact lip and the inner labyrinth lip (see column 2, lines 50 to 53 and column 3, lines 15 to 16) and hence exercises its positive effects irrespective of the position (radial or axial) of the contact lip. Therefore, it is obvious for the skilled person to use an outer labyrinth seal according to D4 in the bearing according to D6 in order to achieve the object underlying the patent in suit.

The ratio of interference between the inner ring and the contact seal lip according to feature B covers a broad range. It is well known to the skilled person that a high interference leads to a high wear of the sealing lip and that a too low interference does not guarantee the desired sealing effect. Moreover, the respondent was not able to show any special technical effect based on the claimed specific values of interference. The passage of the patent in suit he cited to show that feature B had a technical effect (see column 8, lines 32 to 38) merely discloses that a pressing force suitable for suppressing the rubbing noise is achieved by the combination of a specific ratio of interference and a root's thickness. However, since the claim is silent about the root's thickness, no special technical effect can be linked to the envisaged ratio of interference on its own.

D6 is generally silent about the ratio of interference. The passage cited by the respondent (column 6, lines 36 to 44), which refers to problems relating to a seal tip with a geometry according to Figure 4, deals with a seal where the contact with the inner ring occurs along a line 10c. However, in the embodiments of Figures 6 and 7 disclosing the features set out under 2.1 above, the contact between the seal lip and the inner ring occurs punctually, since the seal has a triangularly shaped lip. This geometry prevents automatically the potential opening of the seal towards the outside which could occur in case of a linear contact. Therefore, for a seal with the geometry of Figures 6 and 7 the objection relating to the specific orientation and ratio of interference does not apply.

Hence, the choice of this range has to be considered as a standard design procedure aiming at an optimal compromise between wear and duration of the seal and the sealing effect.

Therefore, the subject-matter of claim 1 as granted and of claim 1 according to the third auxiliary request does not involve an inventive step.

3. First and second auxiliary requests

Claim 1 according to the first and second auxiliary requests comprises the feature according to which the root portion has a cantilever arm structure. The application as originally filed discloses that the contact or lip portion is supported by a "cantilever arm portion" (see [0038]), i.e. an arm portion which has a cantilever shape. However, the wording "cantilever arm structure" has never been used in the originally filed application or the parent application. Since the term "structure" is not an equivalent for the term "portion", and since the expression "cantilever arm structure", therefore, has a different meaning from the expression "cantilever arm portion", it encompasses embodiments of the root portion which are not disclosed in the application as originally filed.

As mentioned by the respondent, Figure 4 does indeed show that the part 17c has a cantilever shape. However, this does not mean that the root portion has a cantilever arm structure, since this part represents the labyrinth seal and hence is not part of the root portion of the contact seal portion.

Therefore, contrary to the respondent's submissions, the figures and in particular Figure 4 do not disclose that the root portion has a cantilever arm structure. Consequently, claim 1 according to the first and second auxiliary requests does not comply with the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

V. Commare T. Kriner