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Datasheet for the decision of 8 March 2007

Case Number: T 1012/05 - 3.4.01

Application Number: 02002842.9

Publication Number: 1239289

IPC: G01P 3/44

Language of the proceedings: EN

Title of invention:
Sealing device with sensor for a rolling bearing

Applicant:
SKF INDUSTRIE S.p.A.

Opponent:
-

Headword:
Sealing device with sensor for a rolling bearing

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 1012/05 - 3.4.01

D E C I S I O N
of the Technical Board of Appeal 3.4.01
of 8 March 2007

Appellant: SKF INDUSTRIE S.p.A.
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Representative: Lotti, Giorgio
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 17 March 2005 refusing European application No. 02002842.9 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: B. Schachenmann
Members: H. Wolfrum
G. Assi

Summary of Facts and Submissions

I. European patent application 02 002 842.9 (publication No. 1 239 289) was refused by a decision of the examining division dispatched on 17 March 2005, on the ground of lack of novelty of the subject-matter of claims 1 and 2 then on file.

II. The applicant lodged an appeal against the decision and paid the prescribed fee on 17 May 2005. On 15 July 2005 a statement of grounds of appeal was filed together with a new version of claims 1 and 2, corresponding, apart from minor linguistic amendments, to the claims on which the contested decision had been based.

III. On 2 November 2006 the appellant was summoned to oral proceedings to take place on 8 March 2007.

In a communication dated 23 November 2006 the board gave a preliminary view on the issues to be addressed during the oral proceedings, in particular novelty and inventive step (Articles 52(1), 54(1) and (2) and 56 EPC). Reference was made *inter alia* to document :

D1: EP-A-0 520 853.

IV. The appellant did not respond to the board's communication but informed the board by facsimile of 1 February 2007 that it did not want to attend the oral proceedings.

V. Oral proceedings were held on 8 March 2007 in the absence of the appellant.

VI. The appellant has requested in writing that the decision under appeal be set aside and a patent be granted on the basis of claims 1 and 2 filed with the statement of grounds of appeal on 15 July 2005.

VII. Claim 1 of the appellant's request reads as follows :

"1. *A sealing device with a sensor for a rolling bearing comprises :*
- a sealing shield (7) mounted between two races of the rolling bearing (2);
- an encoder wheel (8) arranged inside the rolling bearing (2) between the two races and the shield (7),
- a detecting sensor (9) arranged frontally in relation to the encoder wheel (8) in a respective housing (10) presented by the shield (7); the sensor (9) comprising a detection surface (9s) and being)is[sic!] *positioned inside the housing (10) in such a way that the detection surface (9s) directly faces the encoder wheel (8);*
- the housing (10) comprising a support wall (16) :[sic!] *which supports the sensor (9) in a stable operating configuration suitable for detecting, in which the detection surface (9s) directly faces the encoder wheel (8); which defines a substantially annular window (15) through the said)*[sic!] *shield (7) ;*[sic!] *and is made of substantially elastic material; the sealing device being characterized by the fact that the support wall (16) presents a continuous sealing lip (17) which is arranged in direct contact with a lateral surface (91) of the said sensor (9) and which presents a substantially conical conformation arranged in such a way that its own top part is opposite the rolling bearing (2) in relation to the shield (7).*"

Claim 2 is a dependent claim.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Amendments*

The subject-matter of present claim 1 is identical to that of originally-filed claims 1 to 4. Apart from a change of the two-part form, differences in wording are purely of linguistic nature. Claim 2 is identical to originally-filed claim 5.

The board is thus satisfied that the claims on file comply with the requirement of Article 123(2) EPC.

3. *Novelty and inventive step*

3.1 Document D1 (see in particular Figures 1 to 4 and the corresponding description) discloses a sealing device 10 with a sensor 12 for a rolling bearing. An "armature annulaire 11" constitutes a sealing shield which is mounted between the two races 1 and 2 of the bearing and has an elastomeric material 21 formed thereon (column 2, lines 53 to 57). The sensor is arranged in the sealing shield so that its detection surface directly faces an encoder wheel 16 (Figure 1). More specifically, the sensor is housed in a mounting window 30 provided in a stiffening fold 22 of the

sealing shield and a coextending opening 34 ("orifice de réception") in a mounting piece 33 formed by the elastomeric material of the shield (Figures 2 to 4 and 6; and column 3, lines 13 to 52). The mounting piece possesses a conical shape with its top part facing away from the bearing and sealing shield, as is shown in Figures 1, 2 and 4. The elastomeric material may be moulded after assembly of the sensor within the mounting window (column 3, lines 44 to 52).

3.2 According to the appellant, the technical problem solved by the invention was to provide a cushioned and sealed support element for the sensor without having any barrier between the sensor and the encoder wheel.

The subject-matter of claim 1 differed from the sealing device known from document D1 in the following aspects:

(i) the claimed subject-matter required a housing comprising a support wall which defined a substantially annular window and supported the detecting sensor by presenting a continuous sealing lip arranged in direct and continuous contact with the lateral surface of the sensor and presenting a conical conformation pointing away from the roller bearing, and

(ii) the sensor was arranged frontally in relation to the encoder wheel.

In distinction thereto, document D1 disclosed a device in which the sensor was rigidly arranged and positioned inside a cavity formed in annular stiffening fold and filled with elastomeric material, with the elastomeric

material supporting the sensor. Sealing was achieved by a sealing sleeve formed around a lead to the sensor. Moreover, the sensor faced the encoder wheel radially.

3.3 The examining division considered mounting window 30, 34 provided in fold 22 and elastomeric material 21 of sealing shield 11 as shown in Figure 4 of document D1 to constitute a housing with a support wall within the meaning of claim 1 in suit. Moreover, as required by claim 1, the sealing shield of the known device defined a sealing lip 33 which was in direct contact with a lateral surface of the sensor and which formed a substantially outwardly facing conical shape, such that the sensor was sealingly embedded in the window.

3.4 As regards the alleged differences under (i), the appellant has not convincingly argued why window 30 and opening 34 of the mounting piece of document D1 would not provide a "housing" for the sensor in the general meaning of the term used in claim 1 in suit. Moreover, in particular in the case of the known example of the elastomeric material being moulded around stiffening fold 22 and sensor 12 so as to form the inner surface of window 30 and the inner walls of opening 34 of the mounting piece (see Figure 4), the elastomeric material provides quite naturally a support wall establishing a continuous sealing in direct contact with a lateral surface of the sensor.

In this respect, the board cannot share the appellant's view that in the known device the sealing function for the sensor was provided exclusively by a sealing sleeve formed around a cabling extending from the sensor. In fact, it is evident from Figures 2 and 4 and

the description in column 3, lines 42 to 52, of D1 that sleeve 36 may be formed by an element which is separate from mounting piece 33 of the sensor and serves only as a "complementary" sealing for the electrical connection 37 to sensor 12.

Furthermore, as regards an alleged difference between the claimed "annular" shape of the window defined by the housing or support wall and a cylindrical shape of the window housing the sensor in the sealing device of document D1, the board, based on what is shown in the sole figure of the application, interprets the term "annular" as referring to a window which encircles in a conformal manner the outer surface of the sensor. The same structure, however, is shown by document D1.

With respect to the alleged difference under (ii), the board notes that the term "frontally" merely indicates that in a certain, unspecified direction of view the sensor is arranged in front of the encoder wheel. In the sealing device of document D1 this direction happens to point along the radial extension of the rolling bearing. Besides, it is not evident nor argued by the appellant that a specific technical effect would be achieved by aligning sensor and encoder wheel along the axis of rotation of the rolling bearing, instead of aligning them radially, as shown in Figure 1 of D1.

3.5 It follows from the above considerations that the claimed subject-matter differs from the sealing device known from document D1 in the feature that the support wall which seals the lateral surface of the sensor presents a "sealing lip".

Whether mounting piece 33 shown in Figures 1, 2 and 4 of document D1 could be considered to constitute a "sealing lip", as argued by the examining division, is debatable and depends on the meaning attributed to this term.

In the terminology of document D1, a distinction is made in this respect between the term "queue de montage" used for referring to the mounting piece 33 which receives and seals the sensor and the term "lèvre d'étanchéité" used for referring to a radial extension 13 of the mounting piece which provides a sliding radial seal of the sealing device to one of the races and is formed from the same elastomeric material 21 (cf. column 3, lines 33 to 40). On the other hand, it is implicit to claim 1 and apparent from the sole embodiment shown by the figure of the application in suit that the sealing lip does not only seal the sensor with respect to the housing but in fact also serves for mechanically fixing the sensor within the rolling bearing.

It follows from these observations that, although the mounting piece housing the sensor in the sealing device known from document D1 may not be referred to as a "sealing lip" *strictu sensu*, it is at any rate functionally equivalent to what is disclosed as a sealing lip of conical conformation by the present application. In both cases the skilled person has to find the optimal balance between a desirable degree of resilience of the sealing, on the one hand, and the requirement for a sufficiently robust mechanical fixation of the sensor in the sealing device, on the other hand. Therefore, depending on demands arising

from respective operating conditions for the rolling bearing, the skilled person would have regarded it a viable option to give the mounting piece for the sensor, where appropriate, a shape which closer resembles that of a conventional sealing lip.

3.6 For these reasons, the board has arrived at the conclusion that, on the basis of the teaching provided by document D1, no exercise of inventive skill would have been required for the skilled person to devise a sealing device as claimed by claim 1 in suit.

The appellant's request is therefore not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Sánchez Chiquero B. Schachenmann