000674

Europäisches Patentamt
Beschwerdekammern

European Patent Office
Boards of Appeal

Office européen des brevets
Chambres de recours

Veröffentlichung im Amtsblatt	Ja/Nein
Publication in the Official Journal	Yes/No
Publication au Journal Officiel	Oui/Non

Aktenzeichen / Case Number / N° du recours : T 56/85

Anmeldenummer / Filing No / N° de la demande : 81 200 472.9

Veröffentlichungs-Nr. / Publication No / N° de la publication : 039 968

Bezeichnung der Erfindung: Wheel bearing assembly
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : F16C33

ENTSCHEIDUNG / DECISION

vom / of / du 6 June 1986

Anmelder / Applicant / Demandeur : SKF Engingeering and Reasearch Centre B.V.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Art. 52(1), 56
"Inventive step"

Leitsatz / Headnote / Sommaire

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 56 /85

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 6 June 1986

Appellant : SKF Engineering and Research Centre B.V.
Kelvinbaan 16
P.O. Box 50
NL-3430 AB Nieuwegein

Representative :

Decision under appeal : Decision of Examining Division 115 of the European Patent Office dated 07.11.83 refusing European patent application No 81 200 472.9 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : M. Huttner
Member : P. Delbecque
Member : P. Ford

Summary of Facts and Submissions

I European patent application No. 81 200 472.9 filed on 1 May 1981 (publication No. 0 039 968) claiming a priority of 9 May 1980 was refused by a decision of the Examining Division 115 of 19 September 1984.

The reason given for the refusal was that the subject-matter of the claims lacked inventive step with regard to GB-A-1 539 108 and 1 298 552.

II On 15 November 1984 the Appellant lodged an appeal against the decision. The appeal fee was paid on 26 November 1984. The Statement of Grounds was filed 16 January 1985 and accompanied by a new Claim 1 and new figures 1 and 2 carrying additional reference numerals.

III In a communication of 13 September 1985 the Rapporteur of the Board of Appeal drew the Appellant's attention additionally to US-A-3 757 883 and formulated objections as to the patentability of the application in its then effective form.

IV As a result of the objections raised by the Board of Appeal during the procedure before the Board, on 9 April 1986 the Appellant submitted new Claims 1 to 4 and an adapted description with drawings. On 16 May 1986 some minor amendments to the description were communicated. The more restricted main claim starts from a state of the art known from the US-A-3 757 883 and reads as follows:

"Wheel bearing assembly comprising a preloaded and adjusted rolling bearing unit which consists of an inner- and outer-ring each being homogeneous with an attachment flange and between which two rows of rolling elements are provided that are sealed-off against dirt and to which unit a homokinetic

coupling (2) is connected by welding the outer-ring (11) of said coupling comprising a projecting part (12) positioned inside the bearing and restricted by a shoulder (12a) which bears against the end-part (5a) of said bearing inner-ring, characterized in that said projecting part (12) is tapered to converge outward relative to the outer-ring (11) of said homokinetic coupling (2) and the portion of the interior surface of the inner-ring (5) of the bearing (1) that encloses said projection is correspondingly tapered to diverge outward said projecting part being connected to said inner-ring (5) by a weld encased between said bearing inner-ring (5) and said projecting part (12), the weld having been made by electron beam or laser welding which energy beam has been directed from the open end of said inner-ring (5)."

V For the original description and drawings reference is made to the file.

Reasons for the Decision

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

2. The content of the most recently submitted Claim 1 corresponds essentially to the original Claims 1, 2 and 6. The part dealing with the "sealing-off against dirt" is to be found in the original description (page 3, lines 34 to 36), while the part dealing with the restriction forming a "shoulder which supports against the end-part of said bearing inner-ring" and the part dealing with the weld being encased between the inner-ring and the projecting part are clearly to be seen in and their function understood from the two original figures.

Claim 1 therefore satisfies Article 123(2) EPC as it does not contain subject-matter which extends beyond the content of the application as filed.

Claims 2 to 4 correspond to the original Claims 3 to 5 and the new description constitutes merely an adaptation to the new Claim 1 and a more accurate acknowledgement of the prior art and of the problem to be solved and of the solution reached by the invention.

The new figures differ from the original ones only by the insertion of new reference numbers.

Therefore also those parts of the application do not contravene against Article 123(2) EPC.

3. The preamble of Claim 1 is correctly based on the closest known state of the art constituted by US-A-3 757 883, which discloses a wheel bearing assembly incorporating in combination all features stated in that preamble.

4. As none of the citations uncovered by the search report reveals a tapered connection between the projecting part of the homokinetic connection and the inner bearing ring, the subject-matter of Claim 1 proves to be novel (Article 54 EPC).

5. Due to the cylindrical form of the projecting part of the coupling housing and of the cooperating inner-ring and due to the relative positions of the mating surfaces in the construction according to the mentioned US-A-3 757 883 electron-beam welding cannot be used and a weld can only be made at the end part of the coupling housing.

Moreover the couplings according to the state of the art documents GB-A-1 298 552 and 1 358 842 require interference fit of the cylindrical surfaces to be connected and so does the coupling according to US-A-3 757 883.

6. The problem to be solved by the present application is to provide a bearing assembly of the type described in the US-A-3 757 883, having a very strong connection produced by welding between bearing and homokinetic coupling parts without requiring an interference fit of the mating surfaces, which interference fit would require high tolerances of the surfaces to be connected.

The problems underlying the application are solved by the features set forth in Claim 1.

7. It remains to be examined whether the subject-matter of Claim 1 involves an inventive step.

7.1 From the connections known from the citations it becomes clear that the elements to be connected are first joined by interference fit and then welded together.

In contrast thereto, the Appellant departed from the known arrangement where the elements present cylindrical connecting faces necessitating high tolerances for the interference fit. The projecting part of one element is tapered and the enclosing part of the other element is correspondingly tapered. This not only avoids the high tolerances of the mating surface, but by choosing the right direction of the taper it also permits an easy access of the welding beam (electron beam or laser) to the mating surfaces from the open end of the inner ring which results in a deep laying weld between the connected parts.

7.2 These characterising features are not to be found in the known prior art documents nor is there an indication which would lead the person skilled in the art to apply them.

8. For the foregoing reasons, the technical problem of the application as set forth in the description is solved by the features of Claim 1 in a non-obvious way, thus involving an inventive step.

Claim 1 is therefore allowable (Article 52(1) and Article 56 EPC).

9. The dependent Claims 2 to 4 having as subject-matter merely particular embodiments of the invention as claimed in Claim 1, on which they depend, are likewise allowable.

Order

For these reasons

it is decided that:

1. the decision of the Examining Division is set aside;

2. the case is remitted to the Examining Division with the order to grant a European patent on the basis of the description, Claims 1 to 4 and the drawings as received on 9 April 1986 with the corrections dated 14 May 1986.

The Registrar: The Chairman:

B .A. Norman M. Huttner