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**Datasheet for the decision
of 22 February 2011**

Case Number: T 1472/09 - 3.2.08

Application Number: 04010807.8

Publication Number: 1479931

IPC: F16C 19/18

Language of the proceedings: EN

Title of invention:
Wheel support bearing assembly

Applicant:
NTN Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 111(1)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Allowability of amendment - yes"
"Remittal to department of first instance"

Decisions cited:
-

Catchword:
-



Case Number: T 1472/09 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 22 February 2011

Appellant: NTN Corporation
(Applicant) 3-17, Kyomachibori 1-chome
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 13 February 2009
refusing European patent application
No. 04010807.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: P. Acton
A. Pignatelli

Summary of Facts and Submissions

I. On 6 April 2009 the appellant (applicant) filed a notice of appeal against the examining division's decision, posted on 13 February 2009, refusing European patent application No. 04 010 807.8 (publication number EP-A-1 479 931). The appeal fee was paid simultaneously and the statement of grounds was received on 9 June 2009.

II. The decision of the examining division was based on the following documents:

D1: US-A-2003/0060294
D2: EP-A-1 110 756
D3: US-A-2002/0146185
D4: US-A-2002/0049091
D6: US-B-6 280 093.

The examining division held that the subject-matter of claim 1 of the main request then on file was not novel with respect to the teaching of each of D1 to D4, and that the subject-matter of claim 1 of the auxiliary request then on file did not involve an inventive step with respect to the teaching of D1 and D3.

III. The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of the claim filed during the oral proceedings before the Board.

IV. The claim reads as follows:

"A wheel support bearing assembly (1) for rotatably supporting a vehicle wheel, said wheel support bearing assembly (1) comprising:

an outer member (2) having an inner peripheral surface formed with a plurality of first raceways (2a, 2b);

an inner member (3) rotatably positioned inside the outer member (2) and having a corresponding number of second raceways (3a, 3b) defined therein in alignment with the first raceways (2a, 2b) in the outer member (2);

rows of rolling elements (6) made of liquid-quenched bearing steel rollingly received in part within the first raceways (2a, 2b) and in part within the second raceways (3a, 3b);

said inner member (3) including a hub axle (4), made of carbon steel, having outboard and inboard ends opposite to each other and a hub flange (22) integrally formed on an outer peripheral surface of the hub axle (4) at a location adjacent the outboard end thereof, and an inner race member (5);

said hub axle (4) having a radially inwardly depressed mount (4a) defined on its outer peripheral surface at a location adjacent the inboard end thereof, said inner race member (5) being fixedly mounted on the depressed mount (4a), one of the second raceways (3b) in the inner member (3) being defined in an outer peripheral surface of the inner race member (5) while the other

second raceway (3a) is defined in the outer peripheral surface of the hub axle (4);

said inner race member (5) having a radially inner end edge, delimited between an inner peripheral surface thereof and an annular inboard end face thereof, which is chamfered to represent a rounded inner end corner (5a), said inner race member (5) being fixed on the depressed mount (4a) by means of an annular end stop (4c) that is formed by staking the inboard end of the hub axle (4) so as to protrude radially outwardly;

a first hardened layer (20) formed by induction hardening on a surface portion of the outer peripheral surface of the hub axle (4) that is delimited between a root (22a) of the hub flange (22) on an inboard side of the hub flange (22) and the depressed mount (4a), wherein the first hardened layer (20) has a surface hardness within the range of 58 to 60 HRC and has a depth not smaller than 0.5 mm;

a second hardened layer (21) separately formed on each respective surface area of the first raceways (2a, 2b) of the outer member (2);

and the wheel support bearing assembly (1) utilizes a double row angular contact ball bearing,

wherein the first hardened layer (20) has an inboard end (C) positioned inboard relative to an inboard terminating edge (A) of said one of the second raceways (3b), in that the inboard end (C) of the first hardened layer (20) is positioned outboard relative to an inner end edge (B) of the rounded inner end corner (5a) of

the inner race member (5), and in that the inner race member (5) is made of liquid-quenched bearing steel."

Reasons for the Decision

1. The appeal is admissible.
2. The new features introduced into claim 1 as filed are disclosed in Figures 4 and 6 and in the corresponding parts of the description. Since these features were not inextricably linked with further features of the embodiments shown in these figures, the amendments comply with the requirements of Article 123(2) EPC.
3. D1, which is regarded as representing the most relevant state of the art, undisputedly discloses (see in particular Figure 2, [0046] and [0047]):

A wheel support bearing assembly (1c) for rotatably supporting a vehicle wheel, said wheel support bearing assembly (1c) comprising:

an outer member (4) having an inner peripheral surface formed with a plurality of first raceways (10);

an inner member (5b, 6) rotatably positioned inside the outer member and having a corresponding number of second raceways (12, 14) defined therein in alignment with the first raceways in the outer member; rows of rolling elements (7) made of liquid-quenched bearing steel rollingly received in part within the first raceways and in part within the second raceways (12, 14);

said inner member including a hub axle (5b), made of carbon steel (S53CG), having outboard and inboard ends opposite to each other and a hub flange (11) integrally formed on an outer peripheral surface of the hub axle (5b) at a location adjacent the outboard end thereof, and an inner race member (6);

said hub axle (5b) having a radially inwardly depressed mount (13) defined on its outer peripheral surface at a location adjacent the inboard end thereof, said inner race member (6) being fixedly mounted on the depressed mount, one of the second raceways (14) in the inner member being defined in an outer peripheral surface of the inner race member (6) while the other second raceway (12) is defined in the outer peripheral surface of the hub axle (5b);

said inner race member (6) having a radially inner end edge, delimited between an inner peripheral surface thereof and an annular inboard end face thereof, which is chamfered to represent a rounded inner end corner, said inner race member (6) being fixed on the depressed mount (13) by means of an annular end stop (42c) that is formed by staking the inboard end of the hub axle (5b) so as to protrude radially outwardly;

a first hardened layer formed by induction hardening on a surface portion of the outer peripheral surface of the hub axle (5b) that is delimited between a root of the hub flange on an inboard side of the hub flange and the depressed mount (13), wherein the first hardened layer has a surface hardness within the range of 58 to

60 HRC (HRC=58 to 60, see [0046]) and has a depth not smaller than 0.5 mm (1.5 to 3 mm see [0047]);

wherein the wheel support bearing assembly (1c) utilizes a double row angular contact ball bearing,

the inboard end of the first hardened layer is positioned outboard relative to an inner end edge of the rounded inner end corner of the inner race member (6),

and the inner race member (6) is made of liquid-quenched bearing steel (SUJ2, see [0047]).

The subject-matter of claim 1 differs from the wheel support bearing according to D1 in that:

a second hardened layer is separately formed on each respective surface area of the first raceways of the outer member; and

in that the first hardened layer has an inboard end positioned inboard relative to an inboard terminating edge of said one of the second raceways.

The first of these features, particularly the part relating to the **two separate** hardened layers of the first raceways, is not disclosed in any of the prior art documents on which the decision of the examining division is based. Since the application discloses this feature exclusively in the embodiments according to Figures 4 and 6 and nowhere in the claims or in the description, it is questionable whether or not it has been searched.

Therefore, the Board considers it appropriate to remit the case to the examining division (Article 111(1) EPC) to perform an additional search relating to this feature (if it has not yet been done) and examine the patentability of the subject-matter of claim 1 as filed during the oral proceedings, in particular with respect to Article 56 EPC.

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 for further prosecution on the basis of the claim filed during the oral proceedings before the Board.

The Registrar:

The Chairman:

V. Commare

T. Kriner