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**Datasheet for the decision
of 8 February 2011**

Case Number: T 1631/08 - 3.2.08

Application Number: 02718593.3

Publication Number: 1382867

IPC: F16C 19/52

Language of the proceedings: EN

Title of invention:
Wheel bearing device

Applicant:
NTN Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 1631/08 - 3.2.08

DECISION
of the Technical Board of Appeal 3.2.08
of 8 February 2011

Appellant: NTN Corporation
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Osaka-shi, Osaka 550-0003 (JP)

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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 8 April 2008
refusing European patent application
No. 02718593.3 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: M. Alvazzi Delfrate
E. Dufrasne

Summary of Facts and Submissions

- I. By decision given to the post on 8 April 2008 the examining division refused European Patent application No. 02 718 593.3.
- II. The appellant (applicant) lodged an appeal against that decision on 16 June 2008, paying the appeal fee on the following day. The statement setting out the grounds of appeal was filed on 6 August 2008.
- III. Oral proceedings before the board of appeal took place on 8 February 2011.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 6 filed with letter of 6 July 2010.

- IV. Claim 1 reads as follows:

"A wheel bearing device for supporting a wheel such as to be rotatable relative to a vehicle body, comprising: an outer member 10 having double-row outer 11 races on an inner periphery thereof; an inner member 20 having double-row inner races 21, 22 respectively opposite the outer races on an outer periphery thereof; double-row rollers 50 interposed between the respective races of the outer member and the inner member; and a wheel flange 31 for attachment of a wheel provided to either one of the outer member and the inner member, wherein the bearing device has a negative bearing clearance whose dimension is controlled, and the bearing device includes rotation speed sensing means 80

having a multipole encoder 81 attached to a rotating member and a sensor 82 for sensing a change in magnetic flux caused by rotation of the encoder, so as to determine speed of rotation of the rotating member based on detected data from the sensor, characterised in that the bearing preload is set in the range 981 to 9810 N, and the inner member 20 includes a first inner member 30 having an inner race of the outboard side and a second member 40 having an inner race of the inboard side, the first inner member 30 and the second inner member 40 being coupled by swaging, and further including a sealing assembly 13, 14 for sealing a space between the inner member and the outer member, wherein the encoder 81 is attached to a slinger 132 which forms a rotating member of the sealing assembly and wherein said sensor 82 is attached to the outer member 40, wherein one side face of the wheel flange forms a brake rotor attachment surface 33, the surface vibration of the brake rotor attachment surface is restricted not to exceed a maximum vibration amplitude of 50 μm when the inner member 20 is rotated relative to the fixed outer member 10."

V. The following documents are relevant for the present decision:

D2: EP -A- 0 936 086; and

D4: EP -A- 1 000 772.

VI. The arguments of the appellant can be essentially summarised as follows:

The wheel bearing device according to claim 1 was distinguished from the device shown in D2 by the

control of the dimension of the negative bearing clearance, by the ranges of the bearing preload and maximum vibration amplitude, and by the attachment of the sensor to the outer member.

It was true that the latter feature did not require an inventive activity. However, the other distinguishing features which served to achieve the object of enhancing the operability of the ABS system were not suggested by the prior art. Consequently, the subject-matter of claim 1 involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. Inventive step
 - 2.1 D2 undisputedly discloses a wheel bearing device for supporting a wheel such as to be rotatable relative to a vehicle body, comprising:
 - an outer member (1) having double-row outer races (3) on an inner periphery thereof;
 - an inner member (6a, 50) having double-row inner races (8) respectively opposite the outer races on an outer periphery thereof;
 - double-row rollers (12) interposed between the respective races of the outer member and the inner member; and
 - a wheel flange (7) for attachment of a wheel provided to the inner member, wherein the bearing device has a negative bearing clearance (see paragraph [0228]), and the bearing device includes rotation speed sensing

means having a multipole encoder (76) attached to a rotating member and a sensor (48) for sensing a change in magnetic flux caused by rotation of the encoder, so as to determine the speed of rotation of the rotating member based on detected data from the sensor, wherein the inner member includes a first inner member (6a) having an inner race on the outboard side and a second member (50) having an inner race on the inboard side, the first inner member and the second inner member being coupled by swaging, and further including a sealing assembly (19a) for sealing a space between the inner member and the outer member, wherein the encoder is attached to a slinger (77) which forms a rotating member of the sealing assembly, wherein one side face of the wheel flange forms a brake rotor attachment surface.

It is true that, as submitted by the appellant, D2 does not disclose the control of the dimension of the clearance. However, the act of controlling said dimension is a process step while claim 1 is directed to a device. The sole device feature resulting from said process step is a negative bearing clearance, which, as detailed above, is known from D2. Therefore, the fact that its negative bearing clearance dimension is controlled cannot distinguish the claimed device from that shown in D2.

Hence the bearing device according to claim 1 differs from that known from D2 in that

(a) the bearing preload is set in the range 981 to 9810 N;

(b) the surface vibration of the brake rotor attachment surface is restricted so as not to exceed a maximum vibration amplitude of 50 μm when the inner member is rotated relative to the fixed outer member; and

(c) the sensor is attached to the outer member.

2.2 As to the choice of attaching the sensor to the outer member (feature (c)) it is pointed out that in the device of D2 the sensor 48 is supported on a fixed portion, such as the suspension unit or the like (see paragraph [0203]). Since according to D2 the outer member (1) is a fixed element supported by the suspension unit (see for instance paragraph [0084]), its choice as a fixed portion, as acknowledged by the appellant itself, was obvious.

2.3 With respect to features (a) and (b) the appellant submitted that they enhanced the operability of the ABS system, which should thus be seen as the object underlying the claimed invention.

When examining inventive step the formulation of the object underlying the claimed invention should be made on the basis of the technical effect(s) which can be derived from the application as filed as resulting from the distinguishing feature(s). However, in the present case no effect of features (a) and (b) on the operability of the ABS system is derivable from the application.

2.4 The maximum vibration amplitude to 50 μm is rather associated with a reduction of brake judder and local wear of the brake (see page 5, line 22 to page 6,

line 18 and page 19, lines 13 to 24). Therefore, the appellant's argument is not convincing and the object underlying the claimed invention with respect to feature (b) when starting from the device disclosed in D2 is to reduce brake judder and local wear of the brake.

D4 is concerned with reducing brake judder and local wear of the brake in a wheel bearing assembly (see paragraphs [0009] and [0010]). Hence it would have been considered by the person skilled in art trying to achieve the object above.

To this aim D4 teaches to restrict the surface vibration of the brake rotor attachment surface in such a way as not to exceed a maximum vibration amplitude of 50 μm (see paragraphs [0012] and [0014]). Hence, the teaching of D4 rendered it obvious that the object above could be achieved by restricting the surface vibration of the brake rotor attachment surface in accordance with feature (b) of claim 1.

2.5 With respect to feature (a) the application as originally filed states that the bearing preload may be set in the range of 981 to 9810 N so as to enhance the joint strength of the inner ring and the wheel hub (see page 21, lines 17 to 23).

The provision of a bearing preload is already described in D2 (see column 32, lines 42 to 46). Furthermore, D4 teaches to preload a bearing assembly to increase its rigidity (see paragraphs [0068], [0083] and [0098]). In this way the joint strength of the inner ring and the wheel hub is enhanced. It is true that neither D2 nor

D4 disclose any specific value of the bearing preload. However, the patent in suit does not disclose any relevance of the limits of the range for the bearing preload according to claim 1. Therefore, said range must be considered as a random selection. The choice of a bearing preload within said range would hence have been merely one of a number of possible obvious choices for carrying out the teaching of D2 or D4, especially in view of the fact that the range from 981 to 9810 N, allowing a factor 10 variation of the preload, is very broad.

2.6 In view of the considerations above, the subject-matter of claim 1 does not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

V. Commare

T. Kriner