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**Datasheet for the decision  
of 15 December 2016**

**Case Number:** T 2442/13 - 3.2.01  
**Application Number:** 06254583.5  
**Publication Number:** 1759955  
**IPC:** B62D1/20, B62D7/22, F16D3/06,  
B62D1/16  
**Language of the proceedings:** EN

**Title of invention:**  
Bush, particularly for vehicle steering column

**Applicants:**  
NSK Steering Systems Europe Limited  
NSK Ltd.

**Headword:**

**Relevant legal provisions:**  
EPC Art. 54(1), 56, 123(2)

**Keyword:**  
Amendments - allowable (yes)  
Novelty - (yes)  
Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 2442/13 - 3.2.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 15 December 2016**

**Appellant:** NSK Steering Systems Europe Limited  
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**Appellant:** NSK Ltd.  
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**Representative:** Ljungberg, Robert  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 19 July 2013  
refusing European patent application No.  
06254583.5 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** G. Pricolo  
**Members:** H. Geuss  
O. Loizou

## Summary of Facts and Submissions

- I. The applicants' appeal is directed against the decision of the Examining Division of the European Patent Office posted on 19 July 2013 refusing European patent application No. 06254583.5 pursuant to Article 97(2) EPC.
- II. During oral proceedings held on 15 December 2016 the appellants (applicants) requested that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims of the main request and description filed during oral proceedings and the drawings of the application as originally filed.
- III. The following documents are cited in this decision:

US 5758545

(D1)

- IV. Claim 1 according to the main request reads as follows:

A temperature compliant bush (3) for insertion between two relatively slideable, inter-engaging inner and outer members (1, 2), the bush (3) having, around the circumference of the bush(3), at least one portion (4) which is of thinner cross-section than the remainder of the bush (3) and which is arranged so as to accommodate expansion and/or contraction between the members (1, 2) under a varying temperature load produced by and between one of the members (1,2) and the other member (1,2) and/or the bush (3), in order to accommodate the temperature differential so produced, characterised by the sectional shape of the bush (3) being of closed form, and the or each portion (4) having a corrugated profile constituting means to reduce loading

differential between the inner and outer members (1,2) at different temperatures.

- V. The appellants' submissions as relevant to the present decision may be summarized as follows:

Since the technical concepts of D1 and the present invention are completely different, there is no possibility for the skilled person to adapt the bush of D1 without an inventive step. The invention solves the objective problem of providing a bush, which allows a very stable connection between inner and outer members of a vehicle steering column, whereby a temperature dependent expansion/contraction of the members does not influence negatively the operating behaviour of the steering column. Document D1 is the closest prior art document. D1 discloses a sheath for insertion between the inner and outer tubes of a steering column, the sheath being provided with projecting elements that contact the tubes, thereby dampening the radial play between the inner and outer tubes (cf. column 2, lines 29 to 36, Figures 4c and 5). This however results in an unstable connection between the two tube members, as it still allows, between them, a tilting or a translational movement in a direction perpendicular to the axis. According to the invention, in order to guarantee a stable connection between the tubes and, at the same time, reduce the load produced by the influence of temperature, there is provided a bush with at least a portion of a corrugated profile and a sectional shape of closed form, which allows the areas of the bush outside the portion(s) of corrugated profile (so called remainder of the bush) to mate the inner and outer tubes, thereby providing a large contact area between the bush and the tubes whilst allowing for deformation of the bush.

## **Reasons for the Decision**

1. The appeal is admissible.
  
2. Claim 1 is based on claim 1 as originally filed and further includes the following features:
  - the portion which is of thinner cross-section is "around the circumference of the bush";
  - the sectional shape of the bush is of closed form.These features are literally mentioned the description of the application as filed, see page 5, line 4, and page 6, line 19, and it is clear for the skilled reader that they apply to the invention in a general context.

The dependent claims 2 to 17 are based on dependent claims 2, 6 to 9, 3 to 5 and 10 to 17 of the application as filed. The structure of the dependent claims has been amended in order to remedy a lack of clarity raised by the Board during oral proceedings. The features of claims 3, 4 and 5 as originally filed have been made dependent on claim 9 as originally filed (now claim 6) since the features of these claims relate to the assembly and not to the bush.

The description is amended to bring it into conformity with the amended claims and to acknowledge the state of the art according to D1.

Accordingly, the amendments made do not give rise to objections under Article 123(2) EPC.

3. The subject-matter of claim 1 according to the main request is novel in view of document D1. Furthermore,

the invention according to claim 1 is based on inventive step (cf. Articles 54, 56 EPC).

3.1 Document D1, in particular the embodiment of Fig. 2, is considered as being the closest prior art document. The subject-matter of claim 1 differs from the bush according to this embodiment of D1 by the features of the characterizing portion:

- the sectional shape of the bush (3) is of closed form
- and
- the or each portion (4) has a corrugated profile.

As a matter of fact, the first distinguishing feature implies that the sectional shape of the whole bush is of closed form. In D1, the bush is provided with openings in correspondence of the projecting elements (tongues 7 in Fig. 2) and thus has at those locations an open section. As regards corrugated profiles, there are none in the embodiment of Fig. 2. A corrugated profile might be recognised in the embodiment of Fig. 6; however, in this embodiment the whole of the bush has a corrugated profile.

Therefore, the subject-matter of claim 1 is novel.

3.2 The objective problem solved by these features is seen in the provision of a bush which allows a stable connection between the inner and outer member and at the same time allows for temperature dependent expansion/contraction of those members.

D1 discloses (cf. column 2, lines 29 to 36, Figures 4c and 5) projecting elements of a sheath which contact

the inner and outer tubes, thereby dampening the radial play between the inner and outer tubes. This however results in an unstable connection between the two tube members, as it still allows, between them, a tilting or a translational movement in a direction perpendicular to the axis.

In order to guarantee a stable connection between the tubes and, at the same time, reducing the load produced by the influence of temperature, the invention provides a bush with at least a portion of corrugated profile and a sectional shape of closed form, which allows the areas of the bush outside the corrugated profile (so called remainder of the bush) to mate the inner and outer tubes, thereby providing a large contact area between the bush and the tubes, the portion of corrugated profile allowing for deformation of the bush.

The technical concepts of D1 and of the present invention being thus very different, the Board does not see any motivation for the skilled person to modify the bush of D1 as required by the characterizing portion of claim 1.

4. Considering that the examining division had already issued on 16 November 2012 a communication under Rule 71 (3) EPC (intention to grant), based on a claim 1 which subject-matter essentially does not go beyond that of present claim 1 (claim 1 according to the Rule 71(3) EPC communication recited "single-piece bush", and the intended meaning of this feature essentially corresponds to the feature of present claim 1 that the sectional shape of the bush is of closed form), and that the impugned decision only deals with document D1, there is no need to explain why, in the Board's view,



the further documents cited in the search report are less relevant than document D1 .

5. Accordingly, claim 1, together with claims 2 to 17 (that all include a bush having the features of claim 1), the description as amended and the figures as filed form a suitable basis for the grant of a patent.

## 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 with the order to grant a patent on the basis of the following:

Description:

Columns 1-4 as filed during oral proceedings  
(annex 2);

Claims:

No 1-17 of the main request as filed during oral  
proceedings (annex 1);

Drawings:

Fig. 1-5 as originally filed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated