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Datasheet for the decision of 3 September 2013

Case Number: T 0935/11 - 3.2.01

Application Number: 00128656.6

Publication Number: 1186512

IPC: B62D 5/04

Language of the proceedings: EN

Title of invention:
Electric power steering device

Patent Proprietor:
JTEKT Corporation

Opponents:
ZF Lenksysteme GmbH
IMS Gear GmbH

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 84

Keyword:
"Clarity (no)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0935/11 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 3 September 2013

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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 21 February 2011 revoking European patent No. 1186512 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman: G. Pricolo
Members: W. Marx
D. T. Keeling

Summary of Facts and Submissions

I. On 20 April 2011 the appellant (patentee) lodged an appeal against the decision of the opposition division posted on 21 February 2011 on the revocation of the European patent No. 1 186 512 and paid the appeal fee. The statement setting out the grounds of appeal was received on 20 June 2011.

II. In its decision the opposition division held that the subject-matter of claim 1 as amended in opposition proceedings did not comply with the requirements of Article 84 EPC 1973.

III. In the course of the appeal proceedings the parties made reference, inter alia, to the following documents filed by the two respondents in opposition proceedings (opponent I: D6, D15, D16; opponent II: D5', D6'):

D5: Technische Thermoplaste Polyamide, Kunststoff-handbuch 3/4, herausgegeben von Dr. Ludwig Bottenbruch und Dr. Rudolf Binsack, 1998, Carl Hanser Verlag München Wien, Seiten 263, 276-282

D6: Europäische Norm EN ISO 307, November 1997, "Kunststoffe - Polyamide - Bestimmung der Viskositätszahl"

D5': Europäische Norm EN ISO 307, August 2003, "Kunststoffe - Polyamide - Bestimmung der Viskositätszahl"

D6': ASTM D 789 - 98, published January 1999, "Standard Test Methods for Determination of Relative Viscosity and Moisture Content of Polyamide (PA)"

D15: ASTM D 789 - 06a, published September 2006, "Standard Test Methods for Determination of Solution Viscosities of Polyamide (PA)"

D16: LAUDA TecInfo Viskosimetrie Nr. 2, LAUDA Dr. R. Wobser GmbH & CO. KG, Lauda-Königshofen, Deutschland

IV. In the oral proceedings before the board, held on 3 September 2013, the appellant requested that the decision under appeal be set aside and that the patent be maintained in the amended version as filed on 28 March 2008 in opposition proceedings (Main Request) or, in the alternative, according to one of the auxiliary requests as filed with the statement setting out the grounds of appeal.

The respondents requested that the appeal be dismissed.

V. Claim 1 according to the Main Request reads as follows, with the **feature** added to **claim** 1 as **granted** during the opposition procedure being highlighted in **bold**:

"An electric power steering device for transmitting the rotation of an electric actuator (8) for generating auxiliary steering power to a vehicle wheel by way of a worm (9) and a worm wheel (10), which meshes with said worm (9), wherein said worm wheel (10) is molded from a synthetic resin material, characterized in

that the relative viscosity (VR) of said molded worm wheel (10), **which is measured using a formic acid method**, is greater than or equal to 100 and less than or equal to 300,

that said synthetic resin material is a nylon-based synthetic resin material,

that said worm wheel (10) is injection molded from said synthetic resin material, and
that said synthetic resin material is a pure material."

With its statement setting out the grounds of appeal, the appellant filed amended versions of claim 1 designated as "Auxiliary Request I" and "Auxiliary Request II", specifying the synthetic resin material, which also comprise the feature added to claim 1 as granted according to the Main Request.

VI. The appellant argued essentially as follows:

The method for measuring the relative viscosity using a formic acid was well-known in the prior art. Document D16 referred to ASTM D 789 as Standard Test Methods for Determination of Relative Viscosity of Polyamide, which was also used by the inventors for measuring relative viscosity. According to D15 (see items 9.1 and 9.2), the solvent used in ASTM D 789 was formic acid and the Ubbelohde-type viscometer was specified as the referee method for measuring relative viscosity. Although some companies (e.g. BASF) might apply their own standards for measuring relative viscosity and also use formic acid as solvent, the skilled person would not adhere to measuring standards of companies not being identical to the applicant of the contested patent. Concerning the choice of method one had to consider the country the inventors came from, but D16 proved that also European company LAUDA considered ASTM D 789 as the Standard Test Method. Document D6 (EN ISO 307) also referred to the "relative viscosity" determined in accordance with ASTM D 789 and distinguished the "relative viscosity"

from the "viscosity number" determined in accordance with EN ISO 307.

The contested feature "using **a** formic acid method" reflected that the skilled person knew that different standards existed for measuring relative viscosity. It was not contested that different measuring standards provided different measuring results, in particular since the formula for determining relative viscosity used in ASTM D 789 (see D15, para. 9.3.7) was different from the one used in EN ISO 307 (see D6, para. 11) which was based on a ratio of efflux times. However, it was obvious for the person skilled in the art in Europe reading claim 1 ("… the relative viscosity … which is measured using a formic acid method … nylon-based synthetic resin material …") that the standard test method to be applied for determination of the relative viscosity was ASTM D 789, said standard being the one mostly used in industry. Already an Internet search using the relevant search terms according to claim 1 mainly provided ASTM D 789 as test method.

Therefore, claim 1 according to the Main Request as well as claim 1 according to the auxiliary requests described the invention in a clear manner.

VII. The respondents' arguments relevant to the present decision can be summarized as follows:

According to the wording of claim 1 "using **a** formic acid method" (and also the corresponding passage in the description of the contested patent, see page 4, lines 8 to 13), no specific formic acid method was meant. In fact, different methods for measuring relative viscosity

using formic acid were known, and it was not clear from the claim and the application documents which method and which measuring conditions (such as concentration of the formic acid and the type of viscometer) were used for measuring relative viscosity and whether a standard test method had to be used at all.

Relative velocity was a well-defined quantity (see D16) defined as the ratio of viscosity of the solution and viscosity of the solvent, and claim 1 only specified in addition the use of formic acid as solvent. The different measuring methods did not lead to the same result within measuring tolerance, due to the influence of, in particular, the amount of formic acid in relation to the added polyamide, concentration of the formic acid and the measuring method itself.

Document D16 (see table 5 and 6) listed international and DIN standards for measuring viscosity of plastics, not including Japanese standards, all calculating (see D16, page 1, first para.) the relative velocity as result of the measurement. In particular, three standards were known, each using different amounts of polyamide/nylon and formic acid for preparing the test solution: the American standard ASTM D 789 developed by the American National Standard Institute (see D6' or D15: 11 g nylon in 100 ml polyamide), a Japanese standard referred to in D5' (allegedly using 1g/dl), and the European standard EN ISO 307 (see D6 or D5', para. 5.1.2, 9.2, 8, 10.2: 250 g polyamide in 50 ml formic acid). The person skilled in the art did not know which method to apply. In Europe he would be tempted to use EN ISO 307; however, when taking into account the nationality of the inventor, he would consider whether a Japanese standard

should be used instead. Moreover, due to the different grades of concentration of polyamide in formic acid (which differed e.g. by a factor of 22 between ASTM and EN ISO standard), different values of relative viscosity were measured according to the different standards. Also when determining the viscosity number according to EN ISO 307 (see D6, part 11, note 7), it was first necessary to determine the relative viscosity, represented by the ratio of the efflux times for the sample solution and for the solvent. Based on conversion rules described in D5' (pages 16, 13 and formulas (4) and (1)), values of relative viscosity for PA6 in the range of 100 to 300 measured according to ASTM D 789 corresponded to values of 2.01 to 2.53 measured according to EN ISO 307 (both using 90% formic acid). Besides, other pieces of prior art (see D5, page 281) even showed that other concentrations of formic acid (64,5% or 85%) were used.

Reasons for the Decision

1. The appeal is admissible.

2. *Clarity (Article 84 EPC 1973)*

2.1 Claim 1 of the present Main Request corresponds to granted claim 1 as amended during opposition proceedings by adding a feature ("using a formic acid method") taken from the description. The Opposition Division correctly judged that this amendment was open to objections under Article 84 EPC 1973.

2.2 In the present case, the added feature specifies that the parameter "relative viscosity", characterizing the claimed product, is determined "using a formic acid method". Since the description is silent about further details regarding said method, the claim itself must be sufficiently clear, when read by the person skilled in the art, that the parameter can be clearly and reliably determined. According to the established case law of the boards of appeal regarding characterisation of a product by a parameter (see Case Law of the Boards of Appeal, 6th edition 2010, II.B.1.1.2, page 256), indication in the claim of the method of determination and the conditions of measurement "would only become superfluous, provided it could be shown that the skilled person would know from the outset which method and conditions to employ because, e.g., this methodology was the methodology commonly used in the technical field, or that all the methodologies known in the relevant technical field for determining this parameter would yield the same result within the appropriate limit of measurement accuracy".

2.3 As convincingly shown by the respondents during oral proceedings, calculation of relative viscosity according to the European standard EN ISO 307 (D5', D6) provides different values compared to determination of relative viscosity according to the American standard ASTM D 789 (D6' or D15). A relative viscosity in the range of 100 to 300 determined according to ASTM D 789 corresponds to a range of 2.01 to 2.53 for polyamide of type PA6 when determined according to EN ISO 307. This could be derived from the conversion formulas for PA6 in document D5' (pages 13 and 16, formulas (1) and (4)), or identical calculations in the older version of

standard EN ISO 307 according to D6 (published before the priority date of the contested patent). Although both standards use 90% formic acid solution, they differ in their test conditions in so far as different preparation steps are used for preparing the test solution resulting in different grades of concentration of polyamide in formic acid (ASTM D 789, see D6', para. 9.2.5.1: 11 g of nylon in 100 ml formic acid; EN ISO 307, see D6, para. 10.2 together with para. 8.1: 250 g polyamide in 50 ml formic acid). This shows that already two different methodologies known for determining the parameter "relative viscosity" exist which do not yield the same result within the appropriate limit of measurement accuracy.

It is noted that the measurement procedure according to both standards (ASTM D 789, see D6', and EN ISO 307, see D6) implies the relative viscosity as the directly measurable parameter, which is mentioned in D6' explicitly, and which is obvious from the formulas described in D6 (formula (4) derived from formula (1), showing that the ratio of viscosities of solution and solvent is determined, which represents the relative viscosity, based on the ratio of measured efflux times, see note 7 in para. 11). In D6, the value of relative viscosity is finally converted into a viscosity number as the characteristic value (which additionally considers the value of concentration of the polyamide in the solution). This is further confirmed by late-published document D16, which provides support for the knowledge of the person skilled in the art that the methods for determination of solution viscosities are specified in international and DIN standards (the most important standards listed in table 5 and 6), all

providing as measurement result the relative viscosity (see first para. on page 1), which is represented by the ratio of the absolute viscosities of solution and solvent (see definition of viscosity values in table 2). Such definition of relative viscosity is to be found in both standards ASTM D 789 (D6') and EN ISO 307 (D6, see equation (1)).

2.4 As the known methodologies for determining the parameter "relative viscosity" do not yield the same result within the appropriate limit of measurement accuracy, which was also finally admitted by the appellant during oral proceedings, it remains to be discussed whether the skilled person would know from the outset which method and conditions to employ.

It was agreed by the appellant that the skilled person knew that different standards existed for measuring relative viscosity, as reflected by the use of the indefinite article in the feature under discussion ("using **a** formic acid method"). However, the appellant alleged that the standard test method to be applied for determination of the relative viscosity when reading claim 1 was ASTM D 789, because it was the method mostly used in the industry. This was supported by the fact that a search in the Internet for methods for determining the relative viscosity mainly resulted in citations of ASTM D 789. Moreover, the appellant cited document D16 to prove that also European company LAUDA considered ASTM D 789 as the standard test method.

Even when accepting that the skilled person when reading claim 1 would not consider companies' internal standards, the board is not convinced that the skilled

person would know from the outset that only the American standard ASTM D 789 for measuring relative viscosity of polyamide/nylon had to be applied. First of all, as the contested European patent was filed by a Japanese applicant, the board has serious doubts that the person skilled in the art would only consider the American standard ASTM D 789 when determining relative viscosity of polyamide/nylon using formic acid, in particular since further standards exist, such as the European standard EN ISO 307. Moreover, the non-exhaustive list in D16 (table 5 and 6) just cites some international and national standards, and does not exclude other standards, such as Japanese standards, that might exist. Finally, there are indications in the cited prior art (see D5, page 281) that the person skilled in the art might use formic acid having a concentration of 64,5% or 85% different from 90% when measuring viscosity of polyamide.

The fact that the title of ASTM D 789 according to D6' (as mentioned in D16) explicitly mentions the parameter "relative viscosity", whereas according to the title of EN ISO 307 (see D6) the "viscosity number" is determined, is not enough to prove that the skilled person would definitely employ the standard ASTM D 789. As mentioned already above with regard to D16, the skilled person knows that different methods for measuring viscosities of polyamide/nylon exist which rely on a measurement of the relative viscosity, and further characteristic viscosity values can be directly derived therefrom (see D16, table 2: specific viscosity, reduced viscosity or viscosity number, …). Moreover, the board observes that in a later edition of the standard ASTM D 789 (see D15: "Determination of

Solution Viscosities of Polyamide") the title does not contain the term "relative viscosity" any more.

Also document D16 from company LAUDA, listing (see table 6) national and international standards for measuring solution viscosity, does not prove that ASTM D 789 is used as common standard in Europe, since D16 also mentions standard EN ISO 307 in this context.

Since the claimed parameter "relative viscosity" is a well-defined quantity (see D16 or D6') that should fall within the claimed range of 100 to 300 and since neither the claim wording "using **a** formic acid method", also when considering "nylon-based synthetic resin material", nor the corresponding passages in the description, point to a specific method for determining said parameter, the board considers it to be purely speculative to argue that the skilled person would inevitably use the American standard ASTM D 789 as the predominant standard. Apart from the mere allegation that the American standard is the one mostly used in the industry or the one that would mainly be retrieved when searching the Internet, no further evidence was provided showing that the skilled person would not take into consideration other standards such as the European standard.

2.5 From the above it follows that the added feature "using a formic acid method", which tries to define the method of determination of the parameter "relative viscosity", introduces a lack of clarity because it is not clear what method is to be used and which conditions of measurement apply for measuring the parameter "relative viscosity". There is no convincing evidence that a

common methodology is used in the technical field under consideration for measuring this parameter. On the contrary, as shown above, there exist different international standards, in particular ASTM and EN ISO, which could be used to measure said parameter, and which lead to different results.

2.6 Therefore, since claim 1 does not comply with Article 84 EPC 1973, the Main Request must be refused. The same applies for all of the auxiliary requests, as they include either claim 1 according to the Main Request or modified versions of claim 1 that also contain the above-mentioned feature "using a formic acid" which results in a lack of clarity.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Vottner G. Pricolo