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**Datasheet for the decision
of 11 September 2017**

Case Number: T 2206/14 - 3.2.03

Application Number: 05014064.9

Publication Number: 1612485

IPC: F23Q7/00

Language of the proceedings: EN

Title of invention:

Glow plug

Patent Proprietor:

NGK SPARK PLUG CO., LTD.

Opponent:

BorgWarner BERU Systems GmbH

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Decisions cited:

Catchword:



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Case Number: T 2206/14 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 11 September 2017

Appellant: BorgWarner BERU Systems GmbH
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
9 October 2014 concerning maintenance of the
European Patent No. 1612485 in amended form.**

Composition of the Board:

Chairman G. Ashley
Members: Y. Jest
E. Kossonakou

Summary of Facts and Submissions

I. By its decision posted on 9 October 2014 the opposition division decided that European patent Nr. 1612485 could be maintained in amended form on the basis of claims 1 to 12 of auxiliary request 1 filed with letter dated 12 December 2013.

In its interlocutory decision, the opposition division held that the grounds of lack of novelty and inventive step (Article 100(a) EPC) raised by the opponent against the claimed subject-matter did not prejudice the maintenance of the patent.

II. The opponent lodged an appeal against this interlocutory decision and paid the appeal fee on 24 November 2014. The statement of the grounds of appeal was submitted on 11 December 2014.

III. The parties made the following requests:

The opponent (appellant) requested that the decision under appeal be set aside and the patent be revoked.

The proprietor (respondent) requested that the patent be maintained in an amended form on the basis of the set of claims 1 to 11 filed as "new third auxiliary request" during the oral proceedings.

IV. Independent claim 1 has the following wording:

"A glow plug (1) comprising:
a ceramic heater (30) including a heating element (32) provided in a tip end side thereof said heating element (32) being capable of generating heat upon energization;

a cylindrical metal shell (10) which has a shaft hole (13, 61), which houses a rear end portion of said ceramic heater (30) in said shaft hole (13, 61), and which holds said ceramic heater (30) in said shaft hole (13, 61) directly or via another member; and a center pole (20) including:
a terminal portion (70) provided in a rear end of said center pole (20), said terminal portion (70) being supplied with electric power from an outside directly or via another member; and
a heater connecting portion (21, 23) having a hole provided in a tip end of said center pole (20), a rear end portion of said ceramic heater (30) being mechanically rigidly fitted into said hole, wherein the center pole (20) includes
a stress releasing portion (26) having the smallest diameter of the center pole (20) in an area between said heater connecting portion (21, 23) and said terminal portion (70);
wherein said heater connecting portion comprises:
a cylindrical member (21); and
a center-pole fitting portion (23) fitted into said cylindrical member (21)."

V. State of the art

The following documents cited in the disputed decision, were referred to, among others, by the appellant in the appeal proceedings:

D3 DE-C- 36 07 888
D5 DE-A- 102 49 408

In addition the appellant cited with the grounds of appeal document DE-A- 103 46 294 (D13).

VI. The arguments presented by the appellant, insofar as they are relevant for the present decision, can be summarised as follows:

(a) Document D13

Document D13 should be admitted into the appeal proceedings.

In the contested decision the opposition division considered that the claimed subject-matter differed from the cited prior art *inter alia* by the feature of claim 1 defining that a heater connecting portion had a hole provided in a tip end of said center pole, with the rear end portion of said ceramic heater being mechanically rigidly fitted into said hole. Document D13 was filed with the grounds of appeal in direct reaction to findings of the contested decision. Since D13 clearly disclosed not only this feature but also all the remaining features of claim 1, it was highly relevant, not only in combination with D4 or D6 for the issue of inventive step, but also alone as novelty-destroying state of the art.

(b) Article 56 EPC

The claimed subject-matter lacked inventive step since it was obviously derivable from the combination of the state of the art disclosed in documents D3 and D5.

(i) Starting from D5

The claimed glow plug was distinguished over D5 only by the feature defining the stress releasing portion of the center pole having a reduced diameter.

The objective problem corresponded to the one described in the patent, namely preventing the ceramic from being

damaged by vibrations or other mechanical forces applied to the plug.

The skilled person would find a solution to that problem in D3 which suggested to form the central portion of the center pole (14,15,15b,16) in form of a thin wire 16 (D3: especially Figures 13 and 14; column 6, lines 26 to 30 and 58 to 66).

(ii) Starting from D3

Prior art document D3 (see especially Figures 13 and 14) disclosed all the features of claim 1 except the feature defining the connecting means between the heater and the center pole. In D3 the connection between center pole and heater was made in a similar but reverse manner, since the tip end 15b of the center pole (14-16) in D3 was inserted into a hole provided at the end portion of the heater (20).

The objective problem consisted therefore in providing an equivalent alternative connection between the heater and the center pole.

The person skilled in the art would be prompted by the hint in lines 15 to 17 of column 13 of D3 which suggested modification of the form and structure of the heater and of the electrical connections.

He could find an adequate alternative in D5 for changing the form of the connection and would thereby arrive at the claimed structure.

VII. The respondent submitted essentially the following arguments:

(a) Document D13

Document D13, which was cited for the first time with the appeal grounds, could and should have been

submitted during the opposition proceedings. There was no justification for introducing D13 into the appeal proceedings or for considering the novelty objection based thereon.

(b) Inventive step

The person skilled in the art, when considering D5 and D3, would not have arrived at the claimed construction. A combination of D3 with D5 would be technically illogical. Starting from D5 as closest prior art the person skilled in the art would envisage several technical options, all different from D3, for preventing deterioration of the heater when being electrically connected. Accordingly, claim 1 involved an inventive step.

VIII. At the end of the oral proceedings on 11 September 2017 the board pronounced its decision.

Reasons for the Decision

1. Admittance of D13 into the proceedings
- 1.1 It is established case law that according to Article 12(4) of the Rules of Procedure of the Boards of Appeal RPBA, a board has the discretionary power to hold inadmissible facts and evidence which could have been presented in the first instance proceedings.
- 1.2 In the present case, the board considers that document D13 submitted with the grounds of appeal could/should have been presented before the opposition division, since the board cannot identify any plausible reason in this specific case for filing D13 only in the appeal proceedings. In principle, documents could be admitted

in the case of e.g. a normal reaction to a late turn of events in the opposition (oral) proceedings or an unexpected interpretation of facts or law by the opposition division at a late stage or in the decision. However, none of these exceptions applies to the case at hand since the features concerning the center pole and the mechanically rigid fitting were already present in claim 1 as granted and discussed in detail during the opposition procedure.

1.3 When exercising its discretionary power pursuant to Articles 12(4) and 13(1) RPBA the board considered also the following aspects.

In its statement setting out the grounds of appeal the appellant cited D13 as being relevant in combination with other pieces of evidence cited during the opposition procedure for the issue of inventive step. During the oral proceedings before the board the appellant used for the first time document D13 for founding a new novelty attack. The board considers that the objection of lack of novelty based on D13 should/could have been presented in the first instance proceedings, since claim 1 as granted was even broader than claim 1 under consideration. According to established case law (Case Law, 8th edition 2016, IV.C. 1.3.14a)), in exercising its discretion, the board could make the admission of a citation into appeal proceedings dependent on whether it is *prima facie* relevant, but the board is not obliged to do so, because otherwise an opponent could easily submit a (highly) relevant citation for the first time in the statement setting out the grounds of appeal and expect the citation to be admitted automatically into the appeal proceedings on grounds of relevance.

In conclusion the board decides not to allow document D13 into the appeal procedure and to disregard the novelty attack based on D13 as well as any inventive step attacks which were partly based on D13.

2. Inventive step

2.1 Combination D5 with D3

The board considers that D5 represents the closest prior art since it discloses a glow plug comprising: a ceramic heater including a heating element (30) provided in a tip end side thereof, said heating element (30) being capable of generating heat upon energization;

a cylindrical metal shell (10) having a shaft hole (16), which houses a rear end portion of said ceramic heater in said shaft hole (16) and which holds said ceramic heater in said shaft hole directly or via another member;

and a center pole (40) including:

a terminal portion (42, 44) provided in a rear end of said center pole, said terminal portion (42, 44) to be supplied with an electric power from an outside directly or via another member,

a heater connecting portion (50) having a hole provided at a tip end (41) of said center pole, a rear end portion of said ceramic heater being mechanically rigidly fitted into said hole (*the board considers this feature to be implicitly disclosed since the connecting portion is defined in D5 as being a "Metallverbindungskappe (50)", which implies a mechanical fitting*)

wherein said heater connecting portion (50) comprises a first cylindrical member (52) and a center-pole fitting portion (43) fitted into said first cylindrical member

(52) and a second cylindrical member (51) and a heater fitting portion (32) fitted into said second cylindrical member (52) (see figures 1 to 5).

The claimed glow plug thus differs from D5 by the feature of claim 1, wherein the center pole includes a stress releasing portion having the smallest diameter of the center pole in an area between said heater connecting portion and said terminal portion.

This feature provides the technical effect that when a lateral force is applied to the center pole, for example during assembly of the glow plug or during its use (mechanical vibrations), and there is a misalignment of the end faces of the center pole and ceramic heater, the stress releasing portion bends preferentially, thereby preventing the center pole and ceramic heater from being damaged (see column 8, line 54 to column 9, line 2 of the patent).

Hence, the objective problem with respect to the prior art disclosed in D5 can be defined as providing a glow plug in which the center pole and the ceramic heater is prevented from being damaged during the production process or use (see patent, column 3, lines 22 to 30).

The state of the art disclosed in D3 does not lead the person skilled in the art to the proposed solution in an obvious manner.

First the board notes that the solution offered by D3 addresses a completely different technical problem, namely to provide a glow plug in which excessive temperatures of the heater due to extreme climate and/or severe use conditions can be prevented (see column 4, lines 1 to 7). It is therefore highly questionable why the skilled person would have looked into D3 for

solving the objective problem defined when starting from D5.

Assuming that D3 would nevertheless be considered, the skilled person could be prompted by the passage at column 6, lines 58 to 66, to use a flexible metallic wire for connecting the electrode part to the heater in order to protect the heater from being damaged by external mechanical forces, e.g. vibrations. But applying this teaching to D5 would lead away from the solution suggested in D5, that the connection between the electrode and the heater is advantageously provided not by a wire but by a cylindrical connecting cap 50, see for instance page 2, lines 37 to 54. A combination of D5 with D3 would thus result in an embodiment which is considered in D5 to be part of the prior art to be improved (see especially page 2, lines 16 to 30). It may be added that if such a resulting embodiment without the connecting cap is considered, it would nevertheless lack the features of claim 1 defining that the connection is characterised by a cylindrical member and a center-pole fitting portion fitted into the cylindrical member.

Therefore the board considers that the appellant's ground of a lack of inventive step based on the combination of D5 with D3 is based on an *ex post facto* analysis in knowledge of the claimed invention.

2.2 Combination D3 with D5

In D3, and in particular in the embodiment of figures 13 and 14 referred to by the appellant, the electrical connection is characterised by a specific design of the heater 11, which is different to commonly known heaters as for example disclosed in D5. The particularity of the heater shown in D3 lies in the fact that the actual

heating portion of the ceramic heater 11 is formed by an outer surface portion of the heater (see Figures 13 and 14; column 7, lines 13 to 18 of D3).

This particular type of heater requires a special type of electrical connection, by which the center pole 15 is inserted into the hollow heater 20 so as to provide an electrical contact of the end portion 15b of the center pole with the metallic layer 31 at the internal surface of the hollow heater element 20.

Therefore, due to the different structure of the heaters of D3 and D5, it is not possible to use the connection cap of D5 as a replacement for the rod-like center pole 15 of D3.

In addition, the board shares the respondent's view that a combination of document D3 with document D5 as suggested by the appellant would not form a technically workable solution for the following considerations. The center pole 15 of D3, which forms part of the electrical connection between the heater 11 and the terminal electrode 14, is inserted into the ceramic heater. The inserted portion 15b of the center pole 15 forms a plus pole, as for example indicated in figure 13 of document D3, whereas the minus pole is provided at the outer circumferential face 20 of the ceramic heater 11. If the electrode 15b of D3 was replaced by the connecting cap member 50 disclosed in D5, the cap member would inevitably short-circuit the heater.

For these reasons, the combination of D3 with D5 is not obvious for the skilled person.

2.3 Hence, the glow plug as defined in claim 1 involves an inventive step over the teachings of D3 and D5 alone or taken in combination.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of:
 - claims 1 to 11 filed as new third auxiliary request at the oral proceedings before the board;
 - a description and figures to be adapted accordingly.

The Registrar:

The Chairman:



C. Spira

G. Ashley

Decision electronically authenticated