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**Datasheet for the decision
of 14 December 2010**

Case Number: T 2322/09 - 3.2.06

Application Number: 05710944.9

Publication Number: 1737590

IPC: B21D 17/02

Language of the proceedings: EN

Title of invention:

Local forming, locally formed work piece and tool for such forming

Applicant:

Benteler Automobiltechnik GmbH

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Relevant legal provisions (EPC 1973):

EPC Art. 54(2), 56

Keyword:

"Amendments (allowable)"

"Novelty (yes)"

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 2322/09 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 14 December 2010

Appellant: Benteler Automobiltechnik GmbH
(Applicant) Elsener Strasse 95
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Representative: Ksoll, Peter
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 16 July 2009
refusing European patent application
No. 05710944.9 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Pricolo
R. Menapace

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division, posted on 16 July 2009, refusing the European patent application 05 710 944.9.

II. The Examining Division considered that the subject-matter of the independent claims lacked novelty (Article 54(2) EPC 1973) in view of the disclosure of document

D1 : US-A-4 532 793, and of document

D3 : US-B1-6 550 302.

As regards the dependent claims, the Examining Division considered that they were not allowable for lack of novelty over D1 and D3, or for lack of inventive step (Article 56 EPC 1973) over these documents, additionally having regard to the disclosure of document

D2 : FR-A-2 692 504.

III. The appellant (applicant) filed a notice of appeal on 27 August 2009 and paid the appeal fee on the same day. With the statement setting out the grounds of appeal, received at the European Patent Office on 16 November 2009, the appellant filed amended application documents and requested that a patent be granted on the basis thereof.

IV. In a communication dated 26 March 2010, the Board issued a preliminary assessment of the case according

- to which, in particular, the amended claims did not comply with Article 123(2) EPC.
- V. In reply to the communication, the applicant filed amended application documents with letter dated 28 May 2010.
- VI. Following a telephone consultation on 1 October 2010 between the rapporteur of the Board and the representative of the applicant, during which it was agreed for oral proceedings to be held on 14 December 2010, the Board issued summons to oral proceedings together with a further communication. In the communication the Board expressed the provisional opinion that the application documents still contravened Article 123(2) EPC.
- VII. In preparation for the oral proceedings, the appellant filed with letter dated 12 November 2010 amended application documents forming the basis for an auxiliary request.
- VIII. Oral proceedings, at the end of which the decision of the Board was announced, took place on 14 December 2010.
- The appellant (opponent) requested that the decision under appeal be set aside and a patent granted with the claims according to the "main request" and an amended description, both as submitted during the oral proceedings, and Figures 1 to 10 as filed with the letter of 12 November 2010.
- IX. The independent claims under consideration read as follows:

"1. Method for local forming of a hollow profile (1,12) preferably an impact absorbing member (14), where a force is applied to a forming tool for forming a part of said profile (1, 12) and where a predefined local area (6) of the profile (1,12) is heated rapidly to a temperature where the yield stress of the material in the said area (6) is substantially lower than the yield stress of the surrounding colder material by an induction coil (2) and that this heated area (6) is formed by pressing the forming tool into the heated area (6) while the surrounding colder material of the profile (1,12) is maintained substantially unaffected of the forming operation, whereby the induction coil (2) is placed in the immediate neighbourhood of or on the surface (3) of the profile side wall (4,15) for heating the area (6) and whereby the forming tool is a stamp (5), which is placed inside the induction coil (2) for performing the forming operation."

"2. Method for local forming of a hollow profile (1,12) preferably an impact absorbing member (14), where a force is applied to a forming tool for forming a part of said profile (1,12) and where a predefined local area (6) of the profile (1,12) is heated rapidly to a temperature where the yield stress of the material in the said area (6) is substantially lower than the yield stress of the surrounding colder material by an induction coil (2) and that this heated area (6) is formed by pressing the forming tool into the heated area (6) while the surrounding colder material of the profile (1,12) is maintained substantially unaffected of the forming operation, whereby the induction coil (2) is placed in the immediate neighbourhood of or on the surface (3) of the profile side wall (4,15) for heating

the area (6) and whereby the forming tool is a rotating tool (22) or a sliding tool (26), which is placed inside the induction coil (2) and the forming tool in combination with the induction coil (2) is moved relative to the hollow profile (1,12) for performing the forming operation."

- X. As regards inventive step, the appellant essentially submitted that none of the available documents suggested to the skilled person to modify the closest prior art, represented by a method in accordance with document D1, such that the induction coil and the forming tool were on the same side of the workpiece.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments*
 - 2.1 The basis for the features defined in the portion that claims 1 and 2 have in common (the portion from the initial word "Method" up to the sentence "*whereby the induction coil is placed in the immediate neighbourhood of or on the surface of the profile side wall for heating the area*") is found in claims 1, 2, 10 of the application as filed, and in the passages of the description of the application as filed on page 1, lines 29, 30 ("*hollow profile*", cf. also page 7, line 21 and the figures), and on page 3, lines 14-17 ("*rapid local heating ... by means of an induction coil ... until a temperature is reached where the yield stress of the material is substantially lower than the*

surrounding material"). As regards the features taken from the description, they are disclosed in a general context and therefore their inclusion in the (originally disclosed) specific combination of features of claims 1, 2 and 10 of the application as filed does not introduce subject-matter extending beyond the content of the application as filed (Article 123(2) EPC).

2.2 Claim 1 is restricted to the embodiment according to claim 3 of the application as filed, which defines that the forming tool is a stamp. Claim 1 further includes the feature that the stamp is "*placed inside the induction coil for performing the forming operation*", which is clearly and unambiguously disclosed in connection with the first embodiment described in the description (see in particular page 6, lines 25-29) with reference to Figs. 1 to 3 of the application as filed. Although Figs. 1 and 3 show further details of the embodiment, such as specific shapes for the stamp and the coil, the figures are described in general terms ("an induction coil", "a stamp") without reference to these further details. It is therefore clear that the above-mentioned feature according to which the stamp is inside the induction coil is to be considered in the general context of the original disclosure relating to the provision of a stamp and an induction coil (i.e. the disclosure of claims 2 and 3 of the application as filed).

2.3 Claim 2 instead is restricted to the alternative embodiments defined in claims 5 and 6 of the application as filed according to which the forming operation is performed by pressing a rotating tool or a

sliding tool. Claim 2 further includes the features that the forming tool is placed inside the induction coil and that the forming tool in combination with the induction coil is moved relative to the hollow profile for performing the forming operation. These features are clearly and unambiguously disclosed in the description of the application as filed (see in particular page 9, line 24 to page 10, line 14) in connection with the embodiments described with reference to Figs. 11 and 12, according to which the forming tool is a rotating tool or a sliding tool. Here also, it is clear that these features are to be considered in the general context of the original disclosure of claims 5 and 6 of the application as filed, as their are not functionally or structurally related to other features of the disclosed embodiments (such as the specific shape of the forming tool or of the coil).

- 2.4 Therefore, the amendments made to the independent claims are not objectionable under Article 123(2) EPC.
- 2.5 The additional feature of dependent claim 3, according to which the forming operation is performed without a backing tool, is disclosed as a preferred feature in the introductory portion of the description (page 2, line 23). Claim 3 therefore does not include subject-matter extending beyond the content of the application as filed.
- 2.6 The description and the figures of the patent in suit have been amended to bring them into conformity with the new claims. The parts of the description and the figures that relate to embodiments that no longer fall

under the scope of the claims have been deleted.

Document D1 has been acknowledged in the description as background art.

2.7 Therefore, the amendments made meet the requirements of Article 123(2) EPC.

3. *Novelty*

3.1 Using the wording of the claims of the present application, D1 discloses, with reference to the embodiment according to Fig. 3, a method for local forming of a workpiece (11), where a force is applied to a forming tool (5) for forming a part of said workpiece and where a predefined local area (11a) of the workpiece is heated rapidly to a temperature where the yield stress of the material in the said area is substantially lower than the yield stress of the surrounding colder material by an induction coil (12) and where this heated area is formed by pressing the forming tool into the heated area while the surrounding colder material of the workpiece is maintained substantially unaffected of the forming operation (see in particular col. 4, lines 41-51). D1 further discloses that the forming tool is a stamp (drawing plunger 5, see col. 4, line 16).

According to the teaching of D1, the workpiece is a metal sheet and the induction coil is disposed within the cavity of a drawing ring which is placed on the opposite side of the metal sheet on which the stamp is pressed (in Fig. 3 the stamp is above the workpiece whilst the drawing ring is below it).

Therefore, D1 does not disclose the features of claims 1 and 2 according to which the workpiece is a hollow profile, the induction coil is placed in the immediate neighbourhood of or on the surface of the profile side wall for heating the area, and the forming tool is placed inside the induction coil for performing the forming operation.

Furthermore, D1 does not disclose the other features of claim 2 according to which the forming tool is a rotating tool or a sliding tool, and the forming tool in combination with the induction coil is moved relative to the hollow profile for performing the forming operation.

- 3.2 D3 discloses a sheet metal stamping apparatus (see Fig. 1A) comprising upper and lower dies (12, 14) and a punch. The dies and the punch are provided with heating blocks (18; see col. 14, line 59 to col. 15, line 4). There is no mention in D3 of using induction coils for the heating blocks.
- 3.3 The disclosure of D2 is analogous to that of D3. Also D2 relates to a metal sheet stamping apparatus in which the upper die (11), the lower die (12), and the punch (consisting of punch 14 and counter-punch 16) are heated. D2 is silent about induction heating. It specifically discloses heating by means of electrical resistance elements (see page 5, lines 17, 24, and page 6, lines 16 and 24).
- 3.4 Apart from D1, D2 and D3 mentioned in the decision of the Examining Division, the search report cites the following documents:

D4 : JP-A-6 297 049;

D5 : SU-A-1 409 379;

D6 : DE-A-10 128 199.

D4 (see the abstract from Patent Abstracts of Japan) relates to a hot press for forming a metal plate, the press comprising a die and a punch. An induction coil is embedded in the die for heating the metal plate. The disclosure of D6 is analogous, in that it also relates to a press comprising induction heating means for heating the workpiece (see claims 1 and 3).

D5 (see the abstract from Derwent Publications Ltd. and Fig. 1) discloses a metal sheet drawing apparatus comprising a lower die and a punch that are heated by means of inductor coils.

None of these documents discloses a method of local forming a hollow profile in which the induction coil is placed in the immediate neighbourhood of or on the surface of the profile side wall and the forming tool is placed inside the induction coil.

3.5 Therefore, the subject-matter of claims 1 and 2 is novel (Article 54(2) EPC 1973) over the cited prior art.

4. *Inventive step*

4.1 D1 represents the closest prior art because it relates to a method of local forming of a workpiece (see

col. 4, lines 46 to 51) wherein a predefined local area is heated by means of an induction coil. The other cited documents relate to metal sheet stamping, drawing or pressing, in which essentially the whole workpiece is heated and formed. Thus they represent a less appropriate starting point for the assessment of inventive step.

- 4.2 Claims 1 and 2 have in common the distinguishing features (see above point 3.1) according to which *the induction coil is placed in the immediate neighbourhood of or on the surface of the profile side wall ... and ... the forming tool is placed inside the induction coil*. These features imply that the hollow profile is formed by means of a forming tool which is provided on the same side of the workpiece as the induction coil, and the forming tool is placed inside the induction coil. Thus, these distinguishing features allow the local forming of the hollow profile by using, on a same side wall of the hollow profile, a forming tool and an induction coil in combination.

Accordingly, the common distinguishing features of claims 1 and 2 solve the technical problem of providing an effective method of local forming of a hollow profile.

- 4.3 There is no indication in the prior art that would lead the skilled person to recognize that local forming of a hollow profile might be carried out efficiently if the forming tool and the induction coil would be used in combination on a same side wall of the profile. The skilled person would derive from Fig. 3 of D1 the indication that the forming tool (5) has to stop its

descent at a distance from the induction coil 12, otherwise the latter would be damaged by the portion of the metal sheet that is deformed by the forming tool. Accordingly, D1 does not suggest that the forming tool could be situated within the induction coil.

D2 and D3 do not specifically disclose induction coils as heating elements and thus do not suggest the provision of an induction coil which is such that a forming tool can be placed within it.

D4 discloses an induction heating coil 38 which is flat and clearly not intended for being traversed from the larger punch provided on the opposite side of the metal sheet to be formed.

D5 discloses a flat induction coil 4 provided on top of a die 1 (see the Derwent abstract). This induction coil is traversed by the forming tool 2 during the forming operation. However, it is on the side of the metal sheet opposite to that on which the forming tool is pressed since it has not only the function of heating the metal sheet, excluding the central portion that is heated by the forming tool which is also provided with an induction coil (see Fig. 1), but also of supporting it.

D6 discloses in general terms the provision of inductive heating means in the forming zone of the press (see claims 1 and 5). It does not specify how the induction means would be shaped. In any case, the skilled person would derive from the disclosure of D6 in par. [0013] of the description (see also the figure) that the induction heating means would be embedded in

one of the stamping tools, whereby they would clearly not be suitable for being traversed by the other stamping tool.

- 4.4 Therefore, the solution to the above-mentioned technical problem in accordance with claims 1 and 2 is not rendered obvious by the available prior art. The subject-matter of these claims, and likewise of dependent claim 3, involves therefore an inventive step (Article 56 EPC 1973).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division with the order to grant a patent on the basis of
 - claims 1 to 3 and
 - the amended description,both filed during the oral proceedings before the Board;
 - Figures 1 to 10 as filed with letter of 12 November 2010.

The Registry

The Chairman

M. Patin

P. Alting van Geusau