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D E C I S I O N
of 3 May 2006

Case Number: T 0807/05 - 3.2.06

Application Number: 99200938.1

Publication Number: 1038627

IPC: B23K 11/14

Language of the proceedings: EN

Title of invention:
Method and device for formation of a projection welding connection for metal sheet

Applicant:
AL-S Technology B.V.

Opponent:
-

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes) - after amendment"

Decisions cited:
-

Catchword:
-

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Case Number: T 0807/05 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 3 May 2006

Appellant: AL-S Technology B.V.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 11 February 2005 refusing European application No. 99200938.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. Alting van Geusau
Members: G. Pricolo
K. Garnett

Summary of Facts and Submissions

I. European patent application No. 99200938.1 published under No. 1 038 627 was refused by the Examining Division by decision posted on 11 February 2005.

II. The Examining Division held that the subject-matter of claim 1 filed on 5 July 2004 did not involve an inventive step in the light of the prior art known from

D1: WO-A-99/03634,

which technical content included, by way of reference, teachings of document

D2: US-A-4 417 122.

D1 did not disclose the numerical value of the force applied to the plate parts to be welded together by means of projection welding and the dimensional values of the projection provided in one of the plate parts. The skilled person would therefore carry out experiments to find appropriate values. In doing so, and having regard to the fact that the applicant did not show that any of the alleged advantages were due in any way to the values specified in claim 1, the skilled person would directly arrive at a method falling within the scope of claim 1.

III. On 4 April 2005 the appellant (applicant) lodged an appeal against this decision. The payment of the prescribed appeal fee was recorded on 13 April 2005. The statement setting out the grounds of appeal was received on 17 June 2005.

IV. In a communication accompanying the summons to oral proceedings pursuant to Article 11(1) of the Rules of Procedure of the Boards of Appeal, the Board expressed the preliminary opinion that the feature of claim 1 according to which the projection had a length of 1,4 to 10 mm at the base could not be derived from the application as filed. The original application, filed in Dutch, disclosed that the projection had a size of 1,4 by 10 mm. As regards inventive step, it appeared that the findings of the Examining Division were correct. In particular, the specific form and dimensions of the projection recited in claim 1 did not appear to directly result in any special technical effects.

V. Oral proceedings took place on 3 May 2006.

The applicant filed an amended claim together with an amended description (pages 1 to 3) and requested that the decision under appeal be set aside and that a patent be granted on the basis of the documents presented during oral proceedings together with the figures as originally filed (Figures 1 to 3).

VI. The single claim of the patent application reads as follows:

"1. Method for manufacturing a projection weld connection for plate material of electrically conductive material, whereby in one of the plates (1) to be welded a projection (2) of triangular cross-section has been preformed,
- placing the plates (1,4) in juxtaposition to overlap another,

- compressing the plates from one side at the location of the projection with a pressing unit (8) and
- welding the plates together at the location of the projection with a rush of current of a short duration, the current being applied to the upper lying plate from the side of the pressure unit and being removed from the underlying plate

characterized in that the projection is formed in the underlying plate such that it has a 1.4 to 10 mm size at its base and extends from 0.6 to 0.8 mm above the plate, the force applied with the pressure unit is between 300 and 1800 Newtons and the welding current is about 15000-50000 Amperes during 1 to 10 milliseconds."

VII. The arguments of the appellant in support of its request can be summarized as follows:

The inventive concept underlying the patent application consisted in the provision of a projection having specific shape and size in combination with the application of a welding current and a pressing force having specific values within the ranges recited in claim 1. This particular combination enabled the production of a strong structural welded connection between the plates, without leaving any traces in the visible part of the upper lying plate. The reason for this was that, due to the shape and size of the projection, the welding energy was concentrated at the location where the projection in the underlying plate contacted the upper lying plate, whereby a satisfactory weld could be obtained with a minimum energy input. This technical effect was obtained independently of the specific thickness and material of the plates and,

because of the method being applicable to different materials, led to substantial production advantages.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The claim includes the features of claim 1 of the application as filed, and additionally defines the following features:
(i) the projection is of triangular cross-section;
(ii) the plates are placed in juxtaposition to overlap another,
(iii) the projection is formed in the underlying plate such that it has a 1.4 to 10 mm size at its base and extends from 0.6 to 0.8 mm above the plate.

Feature (ii) is clearly derivable from Fig. 3 and the first paragraph of page 3 of the application as filed. Features (i) and (iii) are derivable from claim 7 of the original application. In this respect, it is noted that the "original application" for the purposes of Article 123(2) EPC is the application filed in Dutch pursuant to Article 14(2) EPC (see also Rule 7 EPC), not the English translation filed subsequently. The reference, in claim 7 of the English translation, to a projection having "a length of 1.4-10 millimeter" is clearly an erroneous translation of the original Dutch text "een lengte van 1.4 bij 10 millimeter". Claim 7 of the English translation should in fact read: "a length of 1.4 by 10 millimeter".

2.2 The description has been amended to take into account the relevant state of the art (document D1) and has been adapted to the new claims.

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

3. *Inventive step*

3.1 The Board agrees with the Examining Division that the method disclosed by D1 in connection with Figs. 1 to 4 of D1 represents the closest prior art. This is a method for manufacturing a projection weld connection for plate material of electrically conductive material, which comprises the combination of features defined in the preamble of claim 1, namely:
- a projection (14) of triangular cross-section has been preformed in one of the plates (12) to be welded (see Fig. 2),
- the plates (11, 12) are placed in juxtaposition to overlap another,
- the plates are compressed from one side at the location of the projection with a pressing unit (17) and
- the plates are welded together at the location of the projection with a rush of current of a short duration, the current being applied to the upper lying plate from the side of the pressure unit and being removed from the underlying plate (see Fig. 4, page 6, lines 6 to 22).

Since D1 specifically refers (see page 6, lines 23 to 26) to the operation of the welding arrangement explained in D2, the disclosure of D1 additionally

includes the feature disclosed in D2 (see column 7, line 67 to col. 8, line 4), of supplying a weld current of 25000 amperes for a period of 3 to 4 milliseconds. These values fall within the claimed ranges of 15000-50000 Amperes and 1 to 10 milliseconds.

In accordance with the findings of the Examining Division, D1 is silent about the dimensions of the bead or projection (see page 3, line 15) formed in the underlying plate and also about the value of the force applied with the pressure unit. The Board however disagrees with the Examining Division in respect of the interpretation of the term "bead" used in D1. In the Board's view, the term "bead" does not clearly and unambiguously imply an "oblong projection", since a bead is not necessarily oblong but can also be in the form of e.g. a blob (such as a localized weld bead provided by a blob of metal). Therefore, D1 does not disclose a projection having an elongated shape.

3.2 Accordingly, the subject-matter of the claim differs from the method of D1 by the following features:
(i) the projection has a 1,4 by 10 mm size at the base and extends from 0,6 to 0,8 mm above the plate;
(ii) the pressure applied is between 300 and 1800 N.

3.3 During the oral proceedings, the appellant submitted that the provision of a projection having this specific shape (triangular cross-section and rectangular base) and these dimensions in combination with the application of a welding current and a pressing force within the ranges recited in claim 1, enabled a strong structural welded connection to be obtained between the plates without leaving any traces in the visible part

of the upper lying plate (see also par. [0005] of the application as published), independently of the material of the plates and of the thickness thereof. The appellant explained that this technical effect was due to the fact that the specific shape and size of the projection in combination with the delivery of a specific rush of current caused a concentration of the welding energy at the location where the projection in the underlying plate contacted the upper lying plate, i.e. only where it was needed for forming a weld, whereby the energy input could be minimized. In view of this reasonable theoretical explanation, and in the absence of any elements which could seriously put in doubt the appellant's assertions, the Board is satisfied that the above-mentioned technical effect is the direct consequence of the combination of features of claim 1.

3.4 Since in D1 some discoloration or marking of the plates occurs (see page 2, lines 28, 29) and weaker weld connections are obtained (because, in accordance with the appellant's submissions, in D1 the welding energy is not so concentrated as in the method of the present application), the objective technical problem solved can be regarded as providing a stronger connection without leaving any marks in the visible part of the upper lying plate.

3.5 The Board agrees with the view of the Examining Division that a skilled person, when putting in practice the method of D1, could be expected to experiment so as to arrive at appropriate dimensions for the projection. However, the Board cannot agree with the Division in its view that the skilled person

would directly arrive, as a result of these experiments, at a projection having the specific size and dimensions claimed. As a matter of fact, D1 neither discloses a projection having an elongate shape, nor suggests that the shape and dimensions of the projection are of any importance for avoiding traces in the visible part of the upper lying plate. Therefore, although the skilled person can be expected to find, as the result of experiments, appropriate dimensions for the projection allowing to provide a weld having a sufficient strength and some discoloration or marking as disclosed by D1, he would not be prompted by the disclosure of D1 to aim the experiments at finding suitable shape and dimensions of the projection which allow to obtain a stronger connection without leaving any traces in the visible part of the upper lying plate. Since also the remaining available prior art does not include any indications to this effect, the skilled person would not arrive in an obvious manner to the claimed subject-matter.

3.6 It follows that the subject-matter of the claim involves an inventive step (Article 56 EPC).

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 the documents presented during the oral proceedings together with the originally filed drawings.

The Registrar: The Chairman:

C. Eickhoff P. Alting van Geusau