

BESCHWERDEKAMMERN  
DES EUROPÄISCHEN  
PATENTAMTS

BOARDS OF APPEAL OF  
THE EUROPEAN PATENT  
OFFICE

CHAMBRES DE RECOURS  
DE L'OFFICE EUROPEEN  
DES BREVETS

**Internal distribution code:**

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen

**D E C I S I O N**  
**of 20 April 1998**

**Case Number:** T 0731/95 - 3.2.5

**Application Number:** 88304115.4

**Publication Number:** 0294034

**IPC:** B21D 26/02

**Language of the proceedings:** EN

**Title of invention:**

Method of forming box-like frame members

**Patentee:**

TI Corporate Services Limited

**Opponents:**

Benteler AG  
Gesensschmiede Schneider GmbH  
Adam Opel Aktiengesellschaft

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

-

**Decisions cited:**

-

**Catchword:**

-



Europäisches  
Patentamt

European  
Patent Office

Office européen  
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0731/95 - 3.2.5

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.5  
of 20 April 1998

**Other party:**  
(Opponent I)

Benteler AG  
Residenzstrasse 1  
33104 Paderborn (DE)

**Representative:**

Bockermann, Rolf, Dipl.-Ing.  
Patent- und Rechtsanwälte  
Oidtman, Paul Heinz, Dr. -Ing.  
Bockermann, Rolf, Dipl.-Ing.  
Bergstrasse 159  
44791 Bochum (DE)

**Appellant:**  
(Opponent II)

Gesensschmiede Schneider GmbH  
Ulmerstrasse 112  
7080 Aalen (DE)

**Representative:**

Neidl-Stippler, Cornelia, Dr.  
Patentanwälte Neidl-Stippler & Partner  
Rauchstrasse 2  
81679 München (DE)

**Other party:**  
(Opponent III)

Adam Opel Aktiengesellschaft  
Patentwesen  
Postfach 17 10  
65407 München (DE)

**Respondent:**  
(Proprietor of the patent)

TI Corporate Services Limited  
Foxcombe Court  
Abingdon Business Park  
Abingdon, Oxon OX14 1DZ (GB)

**Representative:**

Grünecker, Kinkeldey,  
Stockmair & Schwanhäusser  
Anwaltssozietät  
Maximilianstrasse 58  
80538 München (DE)

Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 29 June 1995 rejecting the opposition filed against European patent No. 0 294 034 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: W. D. Weiß  
Members: A. Burkhart  
A. C. G. Lindqvist

## Summary of Facts and Submissions

- I. Three oppositions were filed against the European patent No. 0 294 034 on grounds of Articles 100(a) (lack of novelty and inventive step) and 100(b) EPÜ (insufficient disclosure). The Opposition Division decided to reject the oppositions finding that the invention was disclosed in a manner sufficiently clear and complete to be carried out by a person skilled in the art and further finding that the 13 documents cited were not apt to prejudice the novelty or the inventive step of the claimed subject-matter.

The independent Claim 1 of the patent as granted reads as follows:

"1. Method of forming a box section frame member (16) of which at least an elongate portion is of uniform smooth continuous cross section having at least two opposed and planar side faces (17) and (19), characterized by providing a tubular blank (15) having a continuous smooth arcuate cross section; positioning the blank between open die sections (11 and 13) each having a die cavity portion (35 and 37) and a mating surface portion (47), which die sections in the closed position have the mating surface portion (47) of each section in mating engagement with the mating surface of each adjacent section and define a cavity with a smooth continuous box cross section having rounded corners (39) and corresponding to that of the final frame member (16) and being no more than about 5% larger in circumference than the original circumference of the tubular blank (15); applying internal fluid pressure to the blank (15) during its compression by the sections (11, 13), said pressure acting on the wall of the blank (15) adjacent to the corners to force the wall towards the corners (39) and to cause the wall to slip

transversely over the inner surface of the die cavity, the pressure being at least sufficient to overcome frictional force tending to resist such transverse slippage, the wall of the blank being thereby maintained or withdrawn within the envelope defined by the die cavity and not being pinched between adjacent mating surfaces (47) of the die sections, said pressure being less than the yield limit of the wall of the blank (15); closing the die sections (11 and 13) after pressurising the blank (15), to deform the blank (15) inwardly in the areas (49) corresponding to the opposed planar side faces (17 and 19) and to force the blank (15) fully into the corners of the box section of the die cavity; expanding the blank (15) circumferentially by increasing the internal fluid pressure within the blank (15) above the yield limit of the wall until all exterior surfaces of the blank (15) conform to the cavity; separating the die sections (11 and 13); and removing the expanded blank (16) from the die."

II. The appellant (opponent II, Gesenkschmiede Schneider GmbH) has appealed against this decision only maintaining the grounds that the claimed subject-matter is not novel with respect to the document

D6: EP-A-0 195 157, or

at least does not involve an inventive step when additionally considering the documents

D4: GB-A-519 593,

D5: GB-A-523 948, and

D9: "Metalworking production" 1968, pages 73 to 81.

III. The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed and, on an auxiliary basis, that oral proceedings be summoned.

The two parties as of right (opponent I, Benteler AG, and opponent III, Adam Opel AG) did not submit any request during of the appeal proceedings.

IV. The appellant, in its grounds of appeal, argued as follows:

The decision under appeal had offended against the requirements of Article 113 EPC, because not all the reasons, in particular those concerning novelty and inventive step, submitted by the appellant had been considered.

Document D6 disclosed nearly all the features of Claim 1. It merely did not disclose explicitly that the concave blank was produced in the final die. There was, however, no reason to assume that a separate die had to be used. On the contrary, the requirement of economical production called for a process which used only one die to perform all its steps. The person skilled in the art carrying out the teaching of document D6 had only to choose the simplest way at its disposal for this purpose. If not the general knowledge of the skilled person alone at least the disclosure of the documents D9, D4, or D5 would inevitably lead to the invention.

V. The respondent argued as follows:

The minutes of the Oral Proceedings and the decision under appeal proved that the Opposition Division had extensively discussed the issues of novelty and inventive step.

Document D6 did not disclose the essential feature of the invention that an internal pressure less than the yield strength is applied during die closure.

Document D9 concerned the problem to avoid the disadvantageous effects of wrinkling and recess forming in a bulging process and was not relevant to the basic problem of the patent in suit. Also the documents D4 and D5 were not concerned with the problem of pinching a blank between mating die sections.

### Reasons for the Decision

#### 1. Novelty

The appellant, in its grounds of appeal alternatingly cites documents EP 0 194 157 and EP 0 195 157. In both cases only document D6 (EP-A-0 195 157) can be meant, because EP-A-0 194 157 refers to a "Gas burner". EP-B-0 195 157, which also referred to, is not prepublished and, therefore, does not form part of the state of the art in the meaning of Article 54(2) EPC.

Only document D6 has been cited by the appellant with the assertion that the disclosure of this document at least implicitly suggests the subject-matter of Claim 1 of the patent in suit.

According to its Claim 1, document D6 discloses a process which includes the steps of

- providing a tubular blank ...;
- deforming the side walls of the blank inwardly ...; providing the blank ...with a cross section including ... concavely curved side wall portions;

- enclosing the deformed tubular blank within a sectional die having at least two cooperating sections ...; - expanding the blank circumferentially by application of internal fluid pressure until all exterior surfaces of the blank conform to the surfaces of the die cavity; - separating the die sections;
  
- removing the expanded blank from the die.

The Board agrees with the appellant that the wording of Claim 1 of document D6 is silent about the method used to shape the "inwardly recessed concavely curved side-wall portions". The wording is clear, however, in expressing that the shaping step is done before the enclosing step and that internal fluid pressure is applied during the expanding step, hence after the enclosing step.

This interpretation of the wording of Claim 1 of document D6 is explicitly confirmed by its description (cf. the paragraph bridging the pages 7 and 8, and page 10, second paragraph).

In contrast thereto, Claim 1 of the patent in suit comprises the steps of

- providing a tubular blank having a smooth arcuate cross section;
  
- positioning the blank between open die sections;
  
- applying internal fluid pressure to the blank during its compression by the die sections, ... said pressure being less than the yield limit of the wall of the blank; - closing the die sections after pressurizing the blank, to deform the blank inwardly in the areas corresponding to the opposed

planar side faces and to force the blank fully into the corners of the box section of the die cavity;  
expanding the blank circumferentially by increasing the internal fluid pressure within the blank above the yield limit of the wall ... .

Consequently, the subject-matter of Claim 1 of the patent in suit differs principally from the disclosure of document D6 in that the shape of the blank described in D6 as "arcuate cross-section including opposed inwardly recessed concavely curved side-wall portions" is created by a certain fluid pressure being applied during the compression of the blank by the die sections during their movement into the closed position.

The respondent has called this difference the essential feature of the patent in suit (cf. letter dated 8 February 1996, page 2, third paragraph).

The subject-matter of Claim 1 is, therefore, novel.

2. *Inventive step*

2.1 The description of the patent in suit identifies its subject-matter to be a modification of the subject-matter of document D6. The Board is in agreement with the parties that this document is still the prior art lying closest to the subject-matter of the patent in suit.

As explained in detail in the preceding chapter of this decision, this document discloses the measure that a tubular blank has to be subjected to a preforming step, to deform the side walls of the blank inwardly and thereby form the side walls with inwardly recessed concavely curved side walls in the final frame member,

before being placed loosely within the cavity portion of the lower half of the final form die (cf. D6, page 10, second paragraph). Moreover, Claim 1 of D6 is quite clear in that fluid pressure is first applied after enclosing the deformed tubular blank.

- 2.2 The patent in suit thus having correctly acknowledged this closest prior art (cf. EP-B-0 294 034, column 1, lines 3 to 34), its analysis of the drawbacks of this known method and the technical problem to be solved by the subject-matter of claim 1 of the patent in suit also persist to be valid. This problem underlying the subject-matter of the patent in suit is to provide a simple method of forming a box section frame member without the necessity of a separate preforming step (cf. EP-B-0 294 034, column 1, lines 41 to 44).

This problem is solved by the method according to Claim 1, in particular by the measure that an internal fluid pressure of less than the yield limit of the wall of the blank is applied to the tubular blank during the compression of the blank by the die sections during their movement into the closed position.

Contrary to the assertions of the appellant, document D6 does neither explicitly teach such a measure nor does it hint at any reason for why a person skilled in the art which carries out this known method should apply any fluid pressure during this closing phase.

- 2.3 Document D9 concerns the art of forming branched tube components by bulging, hence an art different to that of forming box section frame members.

The appellant has since its grounds of opposition maintained the assertion that this document disclosed the effect that increasing interior pressure resulted in a retraction of the blank at its lateral walls similar to what was shown in Figure 4 of the patent in suit and has referred in this context to page 74, second column, in particular second paragraph, of document D9. This passage, however, refers to a split die which, after insertion of the blank to be bulged, is closed and then hydraulic pressure is built up inside the tube. "When the pressure is sufficient to start bulging, the ends of the tube are pushed inwards. this makes the pipe wall area flow into the branch cavity of the die." Since flowing only occurs at a stress beyond the yield limit, this bulging step, at best, would correspond to the conforming step according to claim 1 of the patent in suit, but has nothing in common with the preceding step of applying a fluid pressure below the yield limit of the wall of the blank during its compression by the closing die sections.

- 2.4 Documents D4 and D5 are concerned with the forming of heat exchanger tubes of either hexagonal or circular cross-section from tubular blanks.

In one version of the known process, the interior of the blank is pressurized by means of an incompressible liquid to a pressure lower than the final forming pressure during the closing of the die sections. This is, however, done to prevent crinkling of the blank by the provision of an internal support. In neither of these two documents there is any hint to the respect that such a pressurisation could contribute to solve the problem of pinching. On the contrary, in order to avoid the problem of pinching there is suggested to choose the cross-section of the tubular blank about 25% smaller than that of the final product (cf. D5, page 1, line 93, to page 2, line 7) or to position the

separation of the formers along a plane containing a diagonal of the hexagon to which the tube is to be pressed (cf. D4, page 6, line 124, to page 7, line 3). Both these measures are not applicable in the manufacture of box section frame members the blank of which, according to claim 1 of the patent in suit, may be not by more than 5% smaller in circumference than the final product.

Consequently, a person skilled in the art starting from document D6 as the closest prior art and aiming at solving the technical problem set out above would not receive any guidance to the subject-matter of claim 1 by these two documents.

3. The grounds according to Article 100 EPC which have been addressed by the appellant do, therefore, not prejudice the maintenance of the patent unamended.
4. The appellant has objected, that the decision under appeal was not sufficiently reasoned, because the Opposition Division had only dealt with the ground of insufficient disclosure and not with the grounds of novelty and inventive step.

The Board, however, can find no facts in the file which could possibly justify such an objection.

According to the minutes of the oral proceedings before the Opposition Division, the issues of novelty and inventive step have been extensively discussed. Moreover, points 2 to 5 of the decision under appeal (four and a half pages) are dedicated to the discussion of novelty and inventive step.

The Board, therefore, cannot find any violation of the requirements of Article 113 nor of Rule 68(2) EPC.

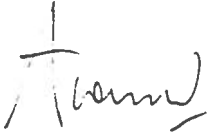
5. In view of the above, the auxiliary request of the respondent to oral proceedings did not become effective.

**Order**

**For these reasons it is decided that:**

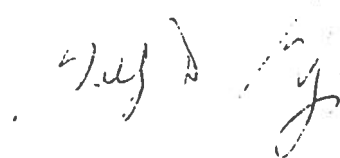
The appeal is dismissed.

The Registrar:



A. Townend

The Chairman:



W. D. Weiß