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**D E C I S I O N**  
**of 17 January 2003**

**Case Number:** T 0004/00 - 3.2.6

**Application Number:** 93401941.5

**Publication Number:** 0584000

**IPC:** B23K 35/38

**Language of the proceedings:** EN

**Title of invention:**  
Shielding gases for arc welding

**Patentee:**  
CANADIAN LIQUID AIR LTD, AIR LIQUIDE CANADA LTEE

**Opponent:**  
LINDE AKTIENGESELLSCHAFT

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 52  
EPC R. 9(3), 76

**Keyword:**  
"Refusal of request for correction of the minutes of oral proceedings is not within the competence of the formalities officer"  
"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**  
-

**Catchword:**

Points of a graph in a diagram in a prior art document do not represent a disclosure of the corresponding values read from the scales of the diagram, if the accuracy of the graph in the diagram cannot be established.



Case Number: T 0004/00 - 3.2.6

**D E C I S I O N**  
**of the Technical Board of Appeal 2.6**  
**of 17 January 2003**

**Appellant:** LINDE AKTIENGESELLSCHAFT  
(Opponent) Zentrale Patentabteilung  
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**Representative:** -

**Respondent:** CANADIAN LIQUID AIR LTD  
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**Representative:** Le Moenner, Gabriel  
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**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 29 October  
1999 concerning maintenance of European patent  
No. 0 584 000 in amended form.

**Composition of the Board:**

**Chairman:** P. Alting van Geusau  
**Members:** H. Meinders  
M.-B. Tardo-Dino

## Summary of Facts and Submissions

- I. The appeal is from the interlocutory decision of the Opposition Division posted on 29 October 1999, maintaining European Patent No. 0 584 000 in amended form.
- II. In its decision the Opposition Division considered that the subject-matter of independent claims 1 and 5 as amended fulfilled the requirements of novelty and inventive step. Of the documents brought forward in the opposition proceedings the following have been relied upon by the opponent in the present appeal:
- E4: "Select the best shielding gas blend for the application", K.A. Lyttle, W.F.G. Stapon, Welding Journal, November 1990, p. 21-27.
- E12: US-A-3 935 421
- E13: GB-A-0 746 127
- E14: US-A-3 496 323.
- III. Against this decision an appeal was filed by the Appellant (Opponent) on 23 December 1999, with payment of the appeal fee on that same day. The statement of grounds of appeal was filed on 8 March 2000.

The appellant-opponent requested setting aside the decision under appeal and revocation of the patent in its entirety. It further requested correction, by the Board of Appeal, of the minutes of the oral proceedings before the opposition division, subsidiarily an order of the Board that these minutes be corrected by the

opposition division.

IV. Oral proceedings were held on 17 January 2003, in which the Respondent (Patentee) requested that the appeal be dismissed and the patent maintained with claims 1-5 filed with letter of 13 December 2002 and description pages 1-5 as filed during the oral proceedings before the Board.

Independent claim 1 (corresponding to claim 1 as maintained by the opposition division) reads:

"A method for flux cored arc welding with a consumable wire electrode including:

- a) forming an arc between the consumable wire electrode and a workpiece;
- (b) maintaining an arc voltage between said flux cored wire electrode and workpiece;
- (c) transferring metal from the electrode to the workpiece; and
- (d) shielding the arc with a gas mixture of helium, carbon dioxide and argon;

characterised by said gas mixture being 9-11% by volume helium, 14-16% by volume carbon dioxide and the balance argon."

Independent claim 4 (corresponding to claim 5 as maintained by the opposition division) reads:

"A shielding gas for flux cored arc welding with a

consumable flux cored wire electrode, comprising a gas mixture of helium, carbon dioxide and argon, characterised by said gas mixture being 9-11% by volume helium, 14-16% by volume carbon dioxide and the balance argon."

- V. The arguments of the appellant-opponent can be summarised as follows:

The minutes of the oral proceedings were to be corrected as they did not reflect the essential argumentation of the opponent regarding lack of novelty/inventive step with respect to the diagram of figure 2 of E14 as brought forward for the first time in oral proceedings before the opposition division. According to the communication of 7 December 1999 this request was refused and by the reference to Article 106-108 in that communication such a request was apparently to be addressed to the Board, when appealing the decision of the opposition Division to maintain the patent. In addition, the opposition division had informed the opponent by telephone that correction of the minutes could only be achieved via an appeal.

Because the former representative acting for the opponent at the oral proceedings before the opposition division had left the opponent's company, it was not possible to submit further information other than what already was on file in support of the request for correction.

As to the substance of the patent in suit, the gas composition of claim 4 was not novel in respect of the diagram of figure 2 of E14, showing 6 graphs relating ternary gas mixtures of Ar, CO<sub>2</sub> and helium to

penetration depths between 0.070 and 0.120 inch.

Any point between these graphs related to only one specific ternary gas mixture and was as such disclosed. The gas mixture as claimed in claim 4 was thus already known, as it lay between the graphs for 0.080 and 0.090 inch. In fact, the first maximum (from the left of figure 2) of the graph for 0.080 inch penetration depth lay within the ranges claimed in claim 4, in particular if the normal margin of accuracy of 0.5% was applied to the values of the claimed range.

If the subject-matter of claim 4 were to be considered as a selection invention, one of the conditions established by the case law of the Boards of Appeal for such a selection to be novel, namely that the claimed range was sufficiently far removed from embodiments comprised in the state of the art, was not fulfilled either.

The gas mixture of claim 4 did not involve an inventive step as the skilled person would have no difficulty in trying out different gas compositions close to the one disclosed in column 6, lines 66-75, consisting of 20% carbon dioxide, 10% helium, balance argon.

The method according to claim 1 did not involve an inventive step as the application of the gas mixture known from E14 to flux cored arc welding was evident, taking account of either E12 or E4, or in view of the combination of teachings of E12 and E13.

VI. The Respondent's submissions can be summarised as follows:

The Opposition Division had the power to decide what was relevant for the minutes of the oral proceedings before it and what was not; as E14 was not particularly relevant the minutes correctly reflected the essential arguments developed in the oral proceedings.

The graphs of figure 2 of E14 were only approximate contour lines for equal penetration, roughly drawn, on the basis of a very limited number of tests of which the results were marked as penetration depths in the diagram of figure 2. None of these actually measured values coincided with the graph for 0.080 inch penetration depth. In fact a specific measurement of a penetration depth of 0.080 inch did not even lie on the graph for that penetration depth. The description did not contain any statements in relation to that specific graph. Thus it could only be seen as a schematic representation of expected penetration depths. In fact, the whole disclosure of E14 was directed at very different gas compositions, namely those for which high penetration depths could be achieved with as little CO<sub>2</sub> as possible, resulting in much higher helium contents than claimed.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Request for correction of the minutes before the Opposition Division*
  - 2.1 The Board establishes from the file that the minutes of the oral proceedings before the Opposition Division were sent to the parties on 29 October 1999. The



opponent requested correction thereof with letter of 8 November 1999. With communication of 7 December 1999 the formalities officer replied thereto as follows:

"An interlocutory decision has been decided during the oral proceedings. Therefore the minutes of the oral proceedings are maintained. Your attention is drawn to Art. 106 to 108 EPC (possibility of appeal)."

2.2 If a party to oral proceedings considers the minutes thereof not fulfilling the requirements of Rule 76 EPC ("Minutes of oral proceedings .... shall be drawn up containing the essentials of the oral proceedings ....., the relevant statements by the parties, ..."), it should file a request to that effect, with a proposed correction, as soon as possible after receipt of the minutes in question. That condition is fulfilled by the request dated 8 November 1999.

2.3 The brief communication of the formalities officer dated 7 December 1999 informs the parties that the minutes of the oral proceedings are maintained. This can only be interpreted by the Board as a decision to reject the request for correction of the minutes.

The department competent to decide on requests for correction of the minutes is the department which drew them up in the first place, in this case the Opposition Division (Rule 76(3) EPC). Thus the Board cannot itself decide on the correction.

2.4 According to Rule 9(3) EPC the President of the European Patent Office may entrust to employees who are not technically or legally qualified examiners the execution of individual duties falling to the

Opposition Divisions and involving no technical or legal difficulties. The relevant "Notice of the Vice-President DG2 concerning the entrustment to formalities officers of certain duties normally the responsibility of the opposition divisions" (see for the latest version OJ EPO 1999, 504) does not mention the entrustment to the formalities officer of the responsibility for decisions on requests for correction of the minutes of oral proceedings.

- 2.5 It is furthermore evident that such decisions cannot be taken by the formalities officer as that would be contrary to the requirements of Rule 76(3) EPC, from which it is clear that only members of the Opposition Division, i.e. members who have been present at the oral proceedings, bear responsibility for the minutes.

The decision by the formalities officer to not allow the correction of the minutes was therefore taken *ultra vires* and thus constitutes a procedural violation.

- 2.6 The Board has considered whether the procedural violation was **substantial**, so as to warrant an immediate remittal to the first instance.

The minutes in question mention that the Opponent "argued that the subject-matter of claims 1 and 5 (method and gas mixture), was anticipated by document E14" and that "the document did disclose the mixture". This documents that E14 had been brought forward in the oral proceedings for an attack of lack of novelty of the claimed mixture.

The decision under appeal, page 4, itself discusses briefly the question whether figure 2 of E14 discloses

a specific gas mixture or not. According to the decision the claimed specific gas mixture was not disclosed in E14, referring to Guidelines C-IV, 7.4, which deal with the question whether a claimed specific embodiment is novel with respect to a generic disclosure. Thus the right to be heard (Article 113(1) EPC) has not been violated.

The appellant-opponent only argued that the minutes did not properly reflect what was brought forward in the oral proceedings, not that the outcome of the decision would have been different, had the minutes been correct.

The procedural violation thus was not the reason for the appeal. The appellant-opponent would have had to appeal anyway on the substantive issues of the decision under appeal.

The Board therefore concludes that the procedural violation is not substantial in the sense that the outcome of the proceedings would not have been different had it not occurred. Therefore there is no reason for an immediate remittal of the case to the first instance.

2.7 The opponent's argumentation regarding the disclosure of E14, in particular its figure 2, as submitted in its letter of 8 November 1999 and in the appeal is now on file. The representative of the opponent present at the oral proceedings in question is no longer available to provide his recollection of those proceedings.

Under these circumstances the Board concludes that it would serve no purpose to order the Opposition Division

to decide on the request for correction of the minutes.

2.8 The request for correction of the minutes by the Board itself or by the opposition division cannot therefore be allowed.

3. *Novelty (Article 54 EPC)*

The subject-matter of claim 4 is novel as there is no prior art disclosing the claimed gas mixture having 9-11% by volume helium, 14-16% by volume carbon dioxide and the balance argon.

3.1 The appellant-opponent argued that any point of the diagram of figure 2 of E14 lying between the graphs for 0.070 and 0.120 inch penetration depth corresponded to one single gas mixture. Therefore all gas mixtures between these lines were disclosed. As the combination of ranges for carbon dioxide and helium of the claimed gas mixture, when drawn in that diagram, formed a small field lying between the lines for 0.080 and 0.090 inch penetration depth, the gas mixtures within that field were unambiguously disclosed for the above-mentioned reason, rendering the subject-matter of claim 4 not novel.

The Board cannot concur with this argument. As specific gas mixtures between the graphs drawn in figure 2 there are only disclosed those relating to specific penetration depth measurements, e.g. the values 88, 83, 92, 100, etc. These correspond to tests wherein a gas mixture with 15% carbon dioxide content and the remainder argon (85% at the value "88") is used in which argon is subsequently partially replaced by helium (5, 15, 25%, etc.). None of these specific

mixtures fall within the field representing the claimed gas mixture.

- 3.2 The appellant-opponent further submitted that part of the graph for the penetration depth of 0.080 inch traversed the field representing the claimed gas mixture, in particular considering the variation of plus or minus 0,5% applicable to these gas mixtures, which enlarged the field actually claimed to 8,5-11,5% helium, 13,5 to 16,5% carbon dioxide, the balance argon.

The Board is of the opinion that to be novelty destroying for the claimed ranges of the components of the gas mixture, the skilled reader should be able to directly and unambiguously derive from this part of the graph at least one specific gas mixture composition relevant for the claimed ranges.

However, the description of E14 notes that these graphs are **approximate** contour lines of equal penetration, established on the basis of measurements of the penetration depth obtained in tests with a number of gas mixtures. Thus the graphs themselves do not represent **measured values**; only some of the measured penetration depths actually lie on the graphs, and it is observed that in particular the measurement of a penetration depth of 0.080 inch with a gas mixture of 35% helium, 5% carbon dioxide, remainder argon does **not** lie on the graph for 0.080 inch penetration depth.

By which (mathematical?) means the graphs have been established, is not mentioned in E14. It is, further, observed that the number of tests available for establishing the 0.080 penetration depth graph was

rather limited (10), particularly for determining the location of the maximum for the carbon dioxide percentage in the diagram. Depending on the method used for drawing the graph this maximum and the contour of the graph around it could easily shift or change shape and thus fall outside the field claimed.

Thus the graph for 0.080 inch penetration depth as drawn in the diagram cannot be considered sufficiently accurate so as to be able to derive any specific percentages for helium and carbon dioxide from it.

- 3.3 Finally, the appellant-opponent contended that the claimed gas mixture constituted a selection within the ranges discussed in E14. However, one of the conditions for recognising novelty of such subject-matter, namely that the claimed range should be sufficiently far removed from the known range illustrated by means of the examples discussed in E14, was not fulfilled. E14 disclosed for instance a value of 10% helium for a penetration depth of 0.090 inch, and depths of 0.083 and 0.092 inch for 5 and 15% helium, each combined with 15% carbon dioxide. All these values were very close to the claimed ranges for helium and carbon dioxide.

Irrespective of whether the claimed invention is to be considered a "selection invention", the Board observes that the invention concerns a gas mixture of helium, carbon dioxide and the remainder argon, thus the value disclosed in column 6, line 73 of E14 of 10% helium should not be seen in isolation, but can only be considered in its combination with the appropriate percentage carbon dioxide relating thereto. For the reasons mentioned above, point 3.2, the graphs are considered not accurate enough to provide a **specific**

reading for the carbon dioxide percentage for the intersection of the 0.090 inch graph with the helium 10% line. If any reading were to be performed it would result in "about 20%" carbon dioxide. This value, however, is sufficiently far removed from the claimed narrow range of 14-16% carbon dioxide.

The helium percentages relating to the two measurements of 0.083 and 0.092 inch penetration depth are 5 and 15% respectively, both for 15% carbon dioxide, which also are sufficiently far removed from the claimed range of 9-11% helium.

- 3.4 In view of the above the Board considers that the subject-matter of claim 4 is novel (Article 54 EPC).

As the gas mixture is novel, its use in a method for flux cored arc welding according to claim 1 is also novel.

4. *Inventive step (Article 56 EPC)*

- 4.1 The appellant-opponent argued that for the gas mixture of claim 4 the use for flux cored arc welding did not impose a limitation on the mixture itself, thus the problem to be solved was not one of limiting fumes, but only of finding alternative gas mixtures. In view of the ternary gas mixtures disclosed in E14 the skilled person would try out other gas mixtures and thus arrive at one falling in the ranges claimed.

The Board is of a different opinion. For inventive step to be at stake, the prior art should at least provide the skilled person with an indication in the direction of a gas mixture comprising helium and carbon dioxide

in the ranges claimed.

E14, however, teaches rather the opposite, as its object is to achieve as high a penetration depth as possible, with as low as possible carbon dioxide content of the gas mixture. For that purpose it suggests to use ternary gas mixtures with 1-15% carbon dioxide, 40-60% argon (thus with 25-59% helium), or with 1-15% carbon dioxide and 60-80% helium, remainder argon. This leads away from a mixture with 9-11% helium.

E4 suggests that ternary gas mixtures containing carbon dioxide, helium and argon provide positive results when performing flux cored arc welding, however none of the suggested mixtures come anywhere near the claimed ranges.

None of the other documents available on the file provide hints in the direction of the claimed ranges either.

- 4.2 As the gas mixture of claim 4 is inventive for the reasons mentioned above, the method of claim 1 using said gas mixture as a shielding gas in flux cored arc welding necessarily also involves an inventive step.

The appellant-opponent argued that the combination of the teachings of E12 (relating to flux cored arc welding with a "conventional gas") and E13 (disclosing a gas mixture with at least 3% carbon dioxide, argon and helium) put into question inventive step of the subject-matter of claim 1. This cannot be followed either as there is no indication in E13 of a helium content between 9 and 11%, nor of the specific choice



of a carbon dioxide content of between 14 and 16%. The latter, according to the preferred embodiment, should lie between 3 and 10%. Further, E12 describes the conventional gases as being carbon dioxide, argon, carbon dioxide-argon mixtures, helium or argon-oxygen mixtures. Thus for the conventional gas no ternary gas mixtures are considered.

As E14 does not suggest a gas mixture in the claimed range, the application of the teaching of E14 to flux cored arc welding as discussed in either E12 or E4 as suggested by the appellant-opponent cannot lead in an obvious way to the subject-matter of claim 1 either.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The request for correction of the minutes is rejected.
3. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

claims 1 to 5 filed with letter of 13 December 2002,

pages 1 to 5 as filed during the oral proceedings.

The Registrar:

The Chairman:

M. Patin

P. Alting van Geusau