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Datasheet for the decision of 1 April 2019

Case Number: T 0371/14 - 3.5.02

Application Number: 08152184.1

Publication Number: 1993325

IPC: H05B7/14, H05B7/085

Language of the proceedings: EN

Title of invention:
Graphite electrode of increased length

Patent Proprietor:
GrafTech International Holdings Inc.

Opponent:
SHOWA DENKO CARBON Germany GmbH

Relevant legal provisions:
EPC Art. 56
EPC R. 80

Keyword:
Inventive step - main request (no) - first auxiliary request (no)
Amendment occasioned by ground for opposition - (no)

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Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0371/14 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 1 April 2019

Appellant: (Patent Proprietor)	GrafTech International Holdings Inc. 982 Keynote Circle Brooklyn Heights, OH 44131 (US)
Representative:	TL Brand & Co 50 Eastcastle Street London W1W 8EA (GB)
Respondent: (Opponent)	SHOWA DENKO CARBON Germany GmbH Werner-von-Siemens-Straße 18 86405 Meitingen (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 7 January 2014 revoking European patent No. 1993325 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	C. Vassoille
	W. Ungler

Summary of Facts and Submissions

I. This is an appeal of the patent proprietor against the decision of the opposition division to revoke European patent no. 1 993 325 for lack of inventive step.

II. The following documents are relevant for the present decision:

D10: US 2006/0140244 A1
D11: IEC International Standard 60239 "Graphite electrodes for electric arc furnaces - Dimensions and designation"
D12: NEMA Standards Publication CG 1-2001 "Manufactured Graphite/Carbon Electrodes"

III. The parties were summoned to oral proceedings. In a communication under Article 15(1) RPBA annexed to the summons, the board set out their preliminary observations on the appeal, concluding *inter alia* that the subject-matter of claim 1 of the main request as well as that of the first and second auxiliary requests did not seem to involve an inventive step in the sense of Article 56 EPC.

IV. With letter of 14 March 2019, the appellant withdrew their request for oral proceedings. As a consequence, oral proceedings before the board were cancelled.

The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained according to the modified main request, or if this was not possible, according to the first or the second auxiliary request, each of these requests filed with the statement of grounds of appeal dated 7 May 2014.

The respondent (opponent) requested that the decision under appeal be maintained. The board interprets this as a request to dismiss the appeal. Oral proceedings were requested only as an auxiliary measure if this request could not be granted.

V. Claim 1 of the appellant's main request, which is identical to claim 1 of the patent as granted, reads as follows:

"A monolithic graphite electrode (10/20) comprising a main body (12/22), the body having a length of more than 3300 mm, wherein either:
the main body includes a pair of end faces (14/24), each face includes a socket (16/26); or
the electrode includes an end face having a socket at one end of the body and a threaded tang (28) at a second end of the body."

VI. Claim 1 of the appellant's first auxiliary request reads as follows:

"A monolithic graphite electrode (10/20) comprising a main body (12/22), the body having a length of more than 3300 mm, wherein:
the main body includes a pair of end faces (14/24), each face includes a socket (16/26)."

VII. Claim 1 of the appellant's second auxiliary request reads as follows:

"An electrode column comprising a plurality of monolithic graphite electrodes (10/20) comprising a main body (12/22), the body having a length of more than 3300 mm, wherein

the main body includes a pair of end faces (14/24), each face includes a socket (16/26), and wherein the column has an overall length of at least 6350 mm and less than two joints."

New independent claim 6 of the appellant's second auxiliary request reads as follows:

"A method for increasing the length of an electrode to minimize the occurrence of an electrode joint in an electrode column for a given length, the method comprising forming the electrode column according to any one of claims 1 to 5."

VIII. The arguments of the appellant as far as they are relevant for the present decision are as follows:

The subject-matter of claim 1 differed from that of document D10 in that the graphite electrode was monolithic, i.e. it was constituted by one "component graphite electrode" rather than two or more assembled "component graphite electrodes".

The technical effect of the electrode being monolithic compared to the electrode of D10 was that the electrode did not have a joint. The joints between two adjacent component electrodes were an area of concern for an operator of an electric arc furnace, since they constituted the weak points of electrodes. By forming an electrode as a monolithic electrode rather than as an electrode formed of two component electrodes, the number of joints in an electrode column could be reduced. The fewer joints were present, the lower was the breakage rate of the electrodes.

The objective technical problem could therefore be formulated as how to provide a graphite electrode with a reduced breakage rate.

A solution to this problem was not taught by D10 either alone or in combination with the common general knowledge of the skilled person. The skilled person did not find any hint in D10 alone for the solution according to the invention, because D10 was not concerned with the problem of reducing the breakage rate of electrodes. Rather, D10 aimed to solve the problem of reducing the number of on-furnace additions to reduce the down time which resulted from such additions (see paragraph [0009] of D10). D10 solved this problem by producing an extended graphite electrode comprising two component graphite electrodes (see paragraphs [0017] and [0019] of D10). D10 therefore increased the number of joints in the electrode column, thereby making the column more susceptible to damage. The electrode of D10 therefore lacked an advantage of the present invention.

The reference in D10 to "re-tooling" being "not economically feasible" (see last sentence of paragraph [0011] of D10) would deter the skilled person from retooling. Furthermore, paragraph [0010] of D10 mentioned that the origin of the length convention set by the standard bodies was unclear. The length convention constituted a strong technical prejudice in the technical field at the priority date of the patent and the unclear origin of the length convention substantiated the desire for the skilled person to adhere to the standard because it avoided taking unnecessary risks. Given that the skilled person would not act in an inventive manner, he would have adhered to the standard length.

The opposition division's assertion that the maximum length of graphite electrodes stated in D10 may be based on special premises or the personal view of the author, was not correct, which was proven by D11 and D12. Documents D11 and D12 demonstrated a prejudice in the art against the manufacturing of longer monolithic electrodes. In deciding to provide graphite electrodes which exceeded the length stipulated by standards bodies, the inventors of the present invention overcame a clear prejudice in the art, thereby clashing with the prevailing teaching of experts in the field.

The respondent, which was a competitor of the appellant, had used and enjoyed considerable commercial success as a result of marketing electrodes according to claim 1. This clearly indicated that the subject-matter of claim 1 involved an inventive step.

As regards the subject-matter of claim 1 of the first auxiliary request, the advantage of the present invention in reducing the number of joints in an electrode column and hence the breakage rate of the electrodes was particularly marked with respect to pin-jointed electrodes. Use of an electrode according to claim 1 of the first auxiliary request therefore was particularly advantageous in reducing the occurrence of joints and hence the breakage rate. The electrode of D10 lacked the advantage of the present invention. The subject-matter of claim 1 of the first auxiliary request was therefore inventive over D10.

The second auxiliary request was based on the first auxiliary request submitted during the oral proceedings before the opposition division, which was however not admitted into the proceedings. The opposition division,

in exercising its discretion not to admit the former first auxiliary request, applied the wrong criterion, namely the late filing of the respective request. The second auxiliary request should therefore be admitted into the appeal proceedings.

The second auxiliary request included a new independent Claim 6, the subject-matter of which complied with the requirements of Articles 123(2) and (3) EPC. The subject-matter of claim 6 was also based on an inventive step in view of document D10.

IX. The arguments of the respondent as far as they are relevant for the present decision are as follows:

D10 was considered to be the closest prior art. If the objective technical problem was considered to be to find an alternative way to produce longer electrodes, the solution to this problem was already described in document D10. D10 disclosed that longer monolithic electrodes could be produced by "re-tooling". None of documents D11 to D16 supported the appellant's assertion that there has been a prejudice regarding the manufacturing of longer monolithic electrodes. It was particularly clear from the documents submitted by the appellants that the provision of a standard meant neither that the standard was generally accepted by the concerned entities, nor that its content necessarily had to be implemented.

Document D10 specifically mentioned that the origin of the length convention, restricting electrodes to a length of 2700 mm with an accepted variation of +/-150 mm or +/-195 mm depending on the standard employed, was unclear. This statement encouraged the skilled person to deviate from the length convention. The statement in

paragraph [0011] of D10 that retooling was necessary to produce longer electrodes would not have prevented the skilled person from doing so. Rather, in the context of a restructuring of production facilities, also retooling would have been considered by the person skilled in the art.

The fact that claim 1 of the first auxiliary request was restricted to the first alternative of claim 1 of the main request did not change the fact that the subject-matter of claim 1 did not involve an inventive step.

The introduction of new independent claim 6 of the second auxiliary request was not occasioned by a ground for opposition, contrary to the requirements of Rule 80 EPC.

Reasons for the Decision

1. The appeal is admissible

2. Main request - inventive step (Article 56 EPC)

2.1 It is undisputed that document D10 represents the closest prior art. On the basis of this document, different objective technical problems have been formulated by the parties as well as by the opposition division. The board is however not convinced that any of these formulations is appropriate. Moreover, in view of the specific circumstances of the present case, the board does not consider the problem-and-solution approach for the assessment of inventive step to be fully appropriate.

2.2 Document D10 is a patent publication which has the same inventor as the contested patent and relates to the same technical field, namely extended length graphite electrodes for electric arc furnaces. Paragraph [0009] of D10 discloses that reducing the number of on-furnace additions or shop floor joinders is desired by the operators of electric arc furnaces in order to reduce the down time occasioned by additions and joinders and further reduce the hazards of such activities. This object is entirely in accordance with that of the contested patent (see in particular paragraph [0015]: "...method of reducing electrode additions at the furnace..." (emphasis added)).

2.3 In order to solve this problem, document D10 in paragraph [0011] describes a first solution, which corresponds to the solution of the contested patent, namely the manufacturing of longer monolithic electrodes, which requires "re-tooling" of manufacturing equipment. This first solution is however considered in D10 to be "not economically feasible". The second solution, which is indisputably the preferred solution of D10, is the joining of at least two component graphite electrodes to form a single joined graphite electrode, which is thereafter transported to the electric arc furnace facility. According to paragraph [0017], these joined extended graphite electrodes may have a length of at least about 3600 mm. The first as well as the second solution thus solve the problem of how to reduce electrode additions at the furnace.

2.4 For the assessment of inventive step, the question that has to be answered in the present case is therefore solely that of whether the claimed solution can involve an inventive step in the sense of Article 56 EPC if, in

order to arrive at the claimed solution, the person skilled in the art had to do nothing more than to ignore an economic disadvantage of this solution identified in the closest prior art document.

2.5 The board has come to the conclusion that the question must be answered in the negative. The board is particularly not convinced by the appellant's argument that in view of the conventional electrode length standards there was "a strong technical prejudice in the technical field" and since the skilled person did not behave in an inventive manner, he would have adhered to the standard graphite electrode lengths.

2.6 In particular, the appellant has failed to demonstrate the existence of a corresponding prejudice in the technical field against manufacturing graphite electrodes that are longer than defined in the pertinent standards. Documents D11 and D12, both filed by the appellant with the statement of grounds of appeal, refer to maximum electrode length standards. The board does not agree with the appellant that the presence of a standard necessarily implies the presence of a technical prejudice in the art against the manufacturing of longer monolithic graphite electrodes. To the contrary, document D10 in paragraph [0010] explicitly calls into question the origin and significance of the conventional electrode length standards:

"Conventionally, graphite electrodes are manufactured in nominal lengths, in accordance with standards [...] (the original genesis of this length convention is unclear; however, the belief is that manufacture and/or transport of longer electrodes was viewed as

impractical when the electric arc furnace industry was developing)".

Moreover, document D10 clearly discloses the provision of "longer electrodes" or an "extended length graphite electrode" (see paragraphs [0011] and [0013]), wherein the terms "longer" and "extended" clearly refer to electrodes being longer than the nominal lengths set in accordance with several standards. Therefore, the board is convinced that the person skilled in the art would have recognised in D10 a departure from the conventional length standards.

2.7 The board further notes that the appellant has not disputed that the option of retooling of manufacturing equipment to produce longer monolithic electrodes would not have posed a technical problem to the skilled person. The board also notes in this context that the patent contains no teaching as to how this economic drawback might be addressed, so that it must be assumed that the drawback does apply to the electrode of the claimed invention.

2.8 As a consequence, the board has come to the conclusion that the person skilled in the art, in order to arrive at the claimed solution, had to do nothing more than to ignore the economic drawback identified in document D10, which the skilled person would have done to benefit from the technical advantages of such a solution, such as a reduced breakage rate. The subject-matter of claim 1 therefore does not involve an inventive step in the sense of Article 56 EPC.

2.9 Given the above conclusion, the question as to whether the respondent commercially uses an electrode

comprising the features of claim 1, is irrelevant for the assessment of inventive step in the present case.

3. First auxiliary request - inventive step (Article 56 EPC)

3.1 Claim 1 of the first auxiliary request differs from claim 1 of the main request only in that the second alternative of the electrode has been deleted. Claim 1 according to the first auxiliary request thus refers to a main body including a pair of end faces, wherein each face includes a socket.

3.2 The board considers the amendment of claim 1 not to be significant and even if it were considered as not being implied in document D10, it would nonetheless be trivial for the skilled person, who would immediately recognise from D10 that any joint between two electrode bodies requires that the end of one body has a socket and the end of the other has a tang. The board's reasoning with regard to the main request therefore also applies to the first auxiliary request.

3.3 As a consequence, the board has come to the conclusion that the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step contrary to the requirements of Article 56 EPC.

4. Second auxiliary request - amendments of the European patent (Rule 80 EPC)

4.1 The question as to whether the former first auxiliary request, filed before the opposition division and on which the present second auxiliary request is based at least in part, should have been admitted into

proceedings can remain unanswered, because in any event the second auxiliary request is not allowable.

4.2 As has been argued by the respondent, claim 6 of the second auxiliary request does not comply with the requirements of Rule 80 EPC. In particular, the board is not convinced by the appellant's argument that claim 6 was introduced to overcome a lack of inventive step objection. Rather, the amendment as regards the introduction of new claim 6 is not occasioned by a ground for opposition and certainly does not overcome any of the inventive step objections with respect to the subject-matter of claim 1. To the contrary, the introduction of claim 6 raises new issues, in particular the question as to whether the subject-matter of this claim complies with the requirements of Article 123(2) EPC. The introduction of the independent claim 6 therefore contravenes Rule 80 EPC and the second auxiliary request is consequently not allowable.

4.3 With regard to the subject-matter of claim 1, the board further notes that the electrode column according to claim 1 cannot be put into practice. Any joint between two electrode bodies requires that the end of one body has a socket and the end of the other has a tang. The claimed electrode column however consists of monolithic graphite electrodes, whose main bodies have end faces which exclusively consist of sockets. A joint and consequently an electrode column thus cannot be formed by combining such electrodes.

5. Conclusion

5.1 As all of the requests of the appellant were not allowable, the board had to accede to the request of the respondent to dismiss the appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated