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D E C I S I O N
of 14 August 2001

Case Number: T 0052/98 - 3.3.6

Application Number: 93904939.1

Publication Number: 0625179

IPC: C10C 3/02

Language of the proceedings: EN

Title of invention:
Process for increasing pitch yield from coal tar

Applicant:
REILLY INDUSTRIES, INC.

Opponent:
-

Headword:
Binder pitch/REILLY

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty - yes (boiling temperature of liquid mixture not equivalent to vapour phase temperature)"
"Inventive step - yes (non-obvious alternative)"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0052/98 - 3.3.6

D E C I S I O N
of the Technical Board of Appeal 3.3.6
of 14 August 2001

Appellant: REILLY INDUSTRIES, INC.
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Representative: Bannermann, David Gardner
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 5 August 1997 refusing European patent application No. 93 904 939.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. Krasa
Members: G. Dischinger-Höppler
C. Rennie-Smith

Summary of Facts and Submissions

I. European patent application No. 93 904 939.1 relating to a process for increasing pitch yield from coal tar was refused by a decision of the Examining Division. The decision was based on an amended set of claims.

II. The grounds for refusal were lack of novelty in view of document

(1) JP-B-46 024 920 (English translation).

The Examining division in particular held that

(a) the crude tar of document (1) contained the usual amount of tar acid of 1 to 5% by weight;

(b) distilling "until the liquid temperature had reached 370°C" or respectively 360°C in accordance with the examples of document (1) equated to the method claimed in the application where distilling is performed by "taking fractions that boil up to 360°C"; and

(c) the softening point of the recovered pitch was not a feature of the process but merely a result thereof.

III. The Appellant lodged an appeal against this decision. Reference was made to an affidavit of Mr Roder, the inventor of the present patent, filed during the Examining procedure with a letter dated 11 April 1996.

IV. In responses to two communications of the Board, the Appellant filed each time a new set of claims and a comparative example. The only independent claim of the last and valid set, filed with its letter of 30 April 2001, reads as follows:

"1. A process for obtaining an increased pitch yield from crude coal tar while producing a binder pitch, characterized by treating a crude coal tar material having a tar acid content of 1 to 5 weight percent by reaction with formaldehyde in a molar ratio of at least 1:2 with respect to the tar acids for a period of at least 1 hour at a temperature of at least 40°C, distilling said treated coal tar material taking fractions that boil up to 360°C."

V. The Appellant's arguments can be summarized as follows:

- The claimed subject-matter was distinguished from the process disclosed in document (1), the only prior art relied upon by the Examining Division, in that the tar acid content in the coal tar used was much lower and in that distillation was carried out by taking fractions that boil up to about 360°C.

- According to document (1), distillation was carried out until the liquid had reached 370°C which corresponded to a much lower vapour phase temperature, i.e. temperature of fractions to be taken, of around 330°C, as indicated in Mr Roder's declaration.

- The claimed subject-matter permitted omission of the lengthy thermal after treatment necessary

according to document (1) for obtaining acceptable softening points.

- It was evident from the comparative example filed with letter dated 30 April 2001 that using the prior art temperature conditions would not give the desired results.

VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 and 3 to 7 as submitted with its letter dated 30 January 2001 and Claim 2 as submitted by telefax of 23 May 2001.

Reasons for the Decision

1. *Amendments (Article 123(2) EPC)*

1.1 Concerning Claim 1:

The feature that binder pitch is obtained as a final product of the claimed process is disclosed on page 2, lines 15 to 21 and page 8, lines 24 to 29 of the application as filed.

The tar acid content of between 1 to 5% by weight of the crude coal tar is disclosed on page 2, lines 1 to 2 and page 4, lines 13 to 19 of the application as filed.

The conditions concerning the molar ratio of formaldehyde/tar acid, reaction time and reaction temperature is the subject-matter of original Claim 2.

The feature concerning distillation of the treated coal

tar by taking fractions that boil up to 360°C is given on page 8, lines 13 to 15 of the application as filed, where it is said that "the distillation itself can be performed in a conventional manner, for example taking fractions that boil up to about 360°C" as the only information about the performance of the distillation step.

1.2 Concerning dependent Claims 2 to 7:

Claims 2 to 6 correspond to original Claims 3 to 5, 7 and 8.

The feature of Claim 7 is disclosed on page 5, lines 18 to 23 of the application as filed as the preferred molar ratio of formaldehyde/tar acid.

1.3 In summary, the Board concludes that the amendments made to the claims meet the requirements of Article 123(2) EPC and do not give rise to objections under Article 84 EPC.

2. *Novelty*

Lack of novelty is in dispute in view of the process disclosed in document (1). The only point at issue is whether document (1) discloses

- a content of 1 to 5% of tar acid of the crude coal tar; and

- a performance of the distillation by taking fractions that boil up to 360°C.

Concerning the tar acid content in the coal tar used,

document (1) does not contain any clear and unambiguous disclosure that the coal tar to be used is one of the "usual" types, as mentioned in the application in suit (page 2, lines 1 to 2), which contains 1 to 5% by weight of tar acid. Document (1) discloses two distinct figures for the amount of this component, namely 10.3 or 27.5%, for two different temperatures in a "fractionalizing test" (table on page 6). Whilst realising that it is not indicated in document (1) whether these percentages relate to the weight of the tar, the figures are not, for this reason alone, meaningless, particularly since document (1) points to the addition of phenols in order to increase the tar acid content if necessary (page 5, paragraph 4). Therefore, it is concluded that the process of document (1) requires that the coal tar to be used initially contains a certain minimum amount of tar acids.

Concerning the distilling conditions, the Board considers that the term "taking fractions that boil up to 360°C" is to be understood as collecting all **fractions having a boiling point** up to this temperature value. Document (1) discloses distillation "until **the liquid temperature** had reached 370°C" or respectively "360°C" (Examples 1 to 4). It is to be expected from the laws of physics that under atmospheric pressure the temperature of a boiling liquid mixture is distinctly higher than the boiling temperature of a fraction which can be distilled off (see textbooks on physical chemistry, e.g. Walter J. Moore, "Physikalische Chemie", 4th ed., Walter de Gruyter, 1973, pages 272 to 273, Figure 7.7 and paragraph 12). In the absence of any other evidence, the Board accepts the statement in the affidavit of Mr Roder that liquid distillation temperatures of about 370°C correspond to vapour phase

temperatures of the order of 330°C.

Document (1) does not, therefore, disclose performance of the distillation by collecting those fractions which boil up to 360°C.

For these reasons, the subject-matter of Claim 1 is not anticipated by the teaching of document (1).

3. *Inventive step*

The only question that remains to be dealt with in the present appeal is, therefore, that of inventive step.

3.1 The application in suit relates to a process for obtaining an increased yield of coal tar pitch by distillation of a crude coal tar material (page 1, lines 3 to 8), wherein the product pitch is suitable for use as a binder in the formation of electrodes for use in the metal industry; as does document (1) (page 2, lines 9 to 10 and page 3, last paragraph) which thus forms a suitable starting point for assessing inventive step.

3.2 According to the application in suit, the pitches preferably have softening points in the range of 100 to 120°C (page 8, lines 19 to 29 and Examples 2 to 6).

It follows from the Examining procedure that the softening points mentioned in the application have been determined by the so-called Mettler method (affidavit of Mr Roder) whereas those of document (1) have been determined by the mercury method (page 6, application Example 1). It further follows from the Examining procedure that, for comparison, the softening points of

document (1) must be increased by 15°C to be converted to Mettler values. Accordingly, the pitches obtained in accordance with Examples 2 and 3 of document (1) as well as the comparative example (paragraph bridging pages 6 and 7) have Mettler softening points within the desired range, namely 102.5°C, 104°C and 100°C.

However, in order to obtain a softening point of this level, the particular process of document (1) requires a time-consuming thermal after treatment unlike the claimed process (page 5, second paragraph and Examples).

3.3 Therefore, an existing technical problem to be solved by the claimed subject-matter can be seen in the avoidance of that thermal treatment, whilst still achieving products with comparable softening points.

As compared with document (1), the means given in Claim 1 of the application in suit for solving this problem consist in using as a starting material a crude coal tar having a tar acid content of 1 to 5% by weight and in performing the distillation by taking fractions boiling up to 360°C.

Assuming that the examples given in the application in suit have been made under the distillation conditions indicated in the description by taking those fractions which boil up to 360°C, it follows that this problem is actually solved, however, at the expense of the product yield. Compared with the 70 to 80% yield achieved in document (1) (see page 6, first line and Examples), the 55% by weight yields obtained according to the application in suit (see Table 2) are much lower.

The Appellant, with its letter dated 30 April 2001, refiled Example 4 of the application in suit together with a comparative example, the only difference being that whilst according to Example 4 fractions boiling up to 360°C are taken, the fractions taken in the comparative example boil only up to 330°C. It is shown that only the higher distillation temperature yields pitches displaying a softening point of above 100°C. The Board accepts, therefore, the comparative example as being representative of the prior art insofar as product yield is not in issue, and as evidence showing that the lower distillation temperature of document (1) would not, in the absence of a thermal after-treatment, give a pitch having the desired softening point.

3.4 The question remaining to be decided is, therefore, whether it was obvious in the light of the available prior art to use, for the manufacture of pitches with a softening point high enough to be suitable as binder pitch as known from document (1), a crude coal tar containing 1 to 5% by weight of tar acids and to perform distillation by taking fraction boiling up to 360°C in order to avoid thermal after-treatment whilst achieving a product of comparable softening point.

Document (1) does not give any hint in this respect. The core teaching of this document consists, first, in the provision of a high tar acid content in the crude tar, if necessary obtained by the addition of phenols where the phenol content (= tar acid content; see application in suit, page 4, lines 22 to 25) of the feed coal tar is especially low, in order to achieve high pitch yields (page 4, third paragraph to page 5, fourth paragraph and pages 6 to 7, Application Example 1 and comparative example) and, second, in the

necessity of a thermal after-treatment to increase the softening point (Application Example 1).

The other documents on file have been cited in the European Search Report. These documents do not disclose the use of crude coal tar in combination with the particular distillation temperature.

3.5 The Board holds, therefore, that the cited prior art documents either alone or in combination do not render obvious the claimed solution of the present technical problem, and concludes that the process of Claim 1 is based on an inventive step as required by Article 56 EPC.

Dependent Claims 2 to 7, which refer to preferred embodiments of Claim 1, are based on the same inventive concept and derive their patentability from that of Claim 1.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent in the following version:

Description:
Pages 1, 2, 6, 7, 9, 10 and 11 as originally filed.
Page 3 filed by telefax of 23 May 2001.
Pages 4, 5, 8 and 12 filed with letter of 30 May 2001.

Claims:

Claims 1 and 3 to 7 filed with letter of 30 April 2001.

Claim 2 filed by telefax of 23 May 2001.

The Registrar: The Chairman:

G. Rauh P. Krasa