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D E C I S I O N
of 30 November 2001

Case Number: T 0894/99 - 3.3.5

Application Number: 95940586.1

Publication Number: 0796135

IPC: B01D 53/50

Language of the proceedings: EN

Title of invention:
Flue gas scrubbing apparatus

Applicant:
Marsulex Environmental Technologies, LLC

Opponent:

-

Headword:
Scrubber/MARSULEX

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - yes, non-obvious alternative"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0894/99 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 30 November 2001

Appellant: Marsulex Environmental Technologies, LLC
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Pennsylvania 17046 (US)

Representative: Britter, Keith Palmer
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 10 May 1999
refusing European patent application
No. 95 940 586.1 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: G. J. Wassenaar
M. B. Günzel

Summary of Facts and Submissions

- I. European patent application No. 95 940 586.1, based on the International Application No. PCT/US95/14178, published under No. WO 96/17670, was refused by a decision of the Examining Division. The decision was taken on the basis of the set of claims 1 to 8, filed during the PCT procedure.
- II. The Examining Division held that the subject matter of claim 1 lacked an inventive step. Reference was made to:
- D1: GB-A-2 101 497 and
- D2: DE-A-4 003 370.
- III. The appellant lodged an appeal against this decision. In the statement of grounds of appeal the appellant indicated that, should the Appeal Board consider that the rejected claim 1 was not inventive over the teaching of D1, the applicant was prepared to amend the main claim as submitted therewith.
- IV. In a communication under Article 110(2) EPC, the Board expressed a preliminary opinion that the subject-matter of rejected claim 1 was not supported by the description and thus open to objection under Article 84 EPC, but that the amended claim 1 as submitted with the grounds of the appeal seemed to fulfil the requirements of the EPC.
- V. In the letter dated 19 October 2001, the appellant indicated that he wished to proceed on the basis of claim 1 submitted with the grounds of the appeal. An

amended set of claims 1 to 8 and an amended description with pages 1 to 17 were submitted. Claim 1 reads as follows:

"Scrubbing apparatus (210) for removing gases and particulate matter in flue gases, the scrubbing apparatus comprising:
a passage (214) of constant cross-section having a lower and an upper end;
an inlet (212) to the passage (214) through which flue gases are introduced into the passage (214);
an enclosure (228) disposed adjacent the inlet (212) and within the passage (214), the enclosure (228) having an upper end joined to the passage (214) and a lower end defining an opening for the flue gases introduced into the passage (214) through inlet (212), the opening being disposed below at least a portion of the inlet (212) and the upper end of the enclosure (228) having a larger diameter than the lower end of the enclosure (228);
means (216, 218) for introducing a fluid into the enclosure (228) so as to remove gases and particulate matter from the flue gases; and
an outlet (224) disposed at the upper end of the passage (214) through which gases escape the passage (214)."

VI. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 8 and description pages 1 to 17 filed with the letter dated 19 October 2001.

Reasons for the Decision

1. The appeal is admissible.
2. Present claim 1 differs from claim 1 as originally filed by the requirements that the passage (214) has a constant cross-section and that the upper end of the enclosure (228) has a larger diameter than the lower end thereof. These amendments are clearly based on Figure 3 and its description on page 11, lines 11 to 34 of the application as originally filed.

The subject-matter of claim 2 is based on original claims 2 and 11 in connection with page 11, line 34 to page 12, line 5 and page 13, lines 8 to 12 of the original application. These text passages do not explicitly disclose that the enclosure (228) is located at an elevation not greater than that of the inlet (212). This feature is, however, clearly disclosed in Figure 2 and Figure 3 and thus not limited to one specific embodiment.

The subject-matter of claim 3 is based on original claims 3, 12 and 13, together with the explanation given on page 12, lines 9 to 28 and the embodiment shown in Figure 3.

The subject-matter of claims 4 to 8 is based on original claims 5 to 9 respectively. The Board is satisfied that in view of Figure 3 in the present case the amended reference in these claims to "any of the preceding claims instead of "claim 1" in the corresponding claims as filed does not introduce new matter.

The amendments in the text of the description are in conformity with the amended claims and do not introduce subject-matter which extends beyond the content of the application as filed. The amendments thus fulfil the requirements of Article 123(2) EPC.

3. None of the cited documents discloses a scrubber having in combination all the features of present claim 1. The invention is thus novel within the meaning of Article 54(1) and (2) EPC.

4. In the Board's view D2 represents the closest prior art. It discloses a scrubber tower of essentially constant-cross section comprising an enclosure disposed adjacent the inlet, the upper end of the enclosure, having a larger diameter than the lower end, is joined to the tower. The cylindrical wall of the enclosure comprises an opening for the flue gases. The enclosure is shaped to form a pool for scrubber liquid, so that the opening for the flue gases is necessarily situated substantially above the lower end of the enclosure (see Figures 1 to 4). With respect to conventional scrubbing towers the construction according to D2 allows a reduction of the height of the tower (page 3, lines 55 to 62).

The aim of the invention as originally presented was to minimize the height of a flue gas spray tower for the purpose of minimizing construction, operational and maintenance costs (page 4 of the published PCT application). It has, however, not been demonstrated that with respect to D2 the height of the spray tower could be reduced. It is also not evident that by the construction as now claimed the height of the spray tower could be actually reduced with respect to the

spray tower according to D2. Under these circumstances the Board can only consider as the problem underlying the invention the provision of a further scrubbing apparatus of relatively low height. In conformity with present claim 1 this problem is solved by providing in the spray tower an enclosure whereby the opening for the flue gases is defined by the lower end of the enclosure, which is disposed below at least a portion of the inlet.

5. Since the concept of D2 requires a closed bottom in the enclosure in order to obtain a reservoir for the spray fluid, D2 cannot provide any incentive for the present modification.

D1 relates to a combined scrubber and cyclone. Although it discloses the presence of an enclosure with sprayers for introducing the wash fluid and having an open lower end for introducing the flue gas, it requires at the same time a tower construction with an tapered bottom part. Thus there is no constant cross-section of this part, which is an essential feature of present claim 1.

D3 concerns an apparatus for wet purification and evaporative cooling of hot gases which also comprises an enclosure with sprayers for wash fluid where the flue gases are introduced through the lower opening of the enclosure situated below the entrance of the flue gases in the tower. Here again the tower has a tapered bottom part which does not allow a relatively low tower construction.

In the Board's opinion the skilled person would not combine the teaching of D1 and D3 of using an enclosure which lower end defines an opening for the flue gases,

with the teaching of D2, because said teaching of D1 and D3 was incompatible with the concept of D2 to form a pool of wash fluid at the bottom of the enclosure. In order to arrive at an scrubbing apparatus according to present claim 1 the concept underlying the scrubber apparatus of D2 had to be abandoned. The other documents on file, not mentioned in the contested decision, do not provide any incentive for the radical modification of the apparatus according to D2 necessary to arrive at the apparatus as now claimed either. The subject-matter of claim 1, therefore, does not follow in an obvious manner from the state of the art and thus involves an inventive step within the meaning of Article 56 EPC.

6. The subject-matter of claims 2 to 8, defining subject-matter of more limited scope, comprising all the features of claim 1, likewise involve an inventive step. The description has been adapted to the amended set of claims in accordance with Rule 27 EPC.

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 to grant a patent with claims 1 to 8 and a description according to pages 1 to 17 filed with the letter dated 19 October 2001 and Figures 1 to 3 according to the published PCT application.

The Registrar:

The Chairman:

U. Bultmann

R. Spangenberg