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File Number: T 329/90 - 3.2.3
Application No.: 86 308 731.8
Publication No.: 0 226 324
Title of invention: Surface combustion radiant

Classification: F23D 14/14, F24C 15/24, F24C 3/08

D E C I S I O N
of 8 May 1991

Applicant: Morgan Refractories Limited

Headword: Surface combustion radiant/MORGAN
EPC Articles 54, 56
Keyword: "Novelty", "Inventive step" (yes, after amendment of claim)

Headnote



Case Number : T 329/90 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 8 May 1991

Appellant : Morgan Refractories Limited
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Representative : Farwell, William Robert et al.
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Decision under appeal : Decision of Examining Division 2.3.01.072 of the
European Patent Office dated 14 November 1989,
dispatched in writing on 21 December 1989,
refusing European patent application
No. 86 308 731.8 pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : C.T. Wilson
Members : H. Andrä
J.-C. Saisset

Summary of Facts and Submissions

I. European patent application No. 86 308 731.8, filed on 10 November 1986 and published on 24 June 1987 was refused by a decision of the Examining Division dated 14 November 1989 and dispatched in writing on 21 December 1989.

II. The decision was based on Claims 1 to 9 filed on 12 February 1988 according to the main request, and on two further restricted independent claims according to a first and a second subsidiary request.

The reasons given for the refusal were that the subject-matter of Claim 1 according to the main request lacked novelty and that the subject-matter of Claim 1 according to the first and second subsidiary request did not involve an inventive step in view of the prior art disclosed in DE-B-1 116 615.

III. On 15 February 1990 the Appellant lodged an appeal against this decision by telefax together with payment of the appeal fee, the notice of appeal being confirmed by letter received on 17 February 1990. The statement of grounds of appeal was submitted on 9 April 1990. It was requested to grant a patent based on Claims 1 to 9 filed on 12 February 1988 according to the main request. Furthermore, seven sets of claims were filed constituting subsidiary request Nos. 1 to 7.

IV. In a communication pursuant to Article 11(2) RPBA dated 11 October 1990 the Board expressed a provisional opinion stating that the subject-matter of the independent claims according to the main request and according to subsidiary request Nos. 1 to 7 as far as the features of these claims have a basis in the originally filed documents does not appear to involve an inventive step.

- V. In response to the summons for oral proceedings dated 11 October 1990 the Appellant filed a new set of Claims 1 to 4 by letter dated 16 January 1991 apparently constituting subsidiary request No. 8 and a modification to the new Claim 1 apparently constituting subsidiary request No. 9.
- VI. In the oral proceedings of 4 March 1991 the Appellant filed a new Claim 1 which should be followed by Claims 2 to 4 submitted with the letter dated 16 January 1991, withdrawing the preceding main request and subsidiary requests Nos. 1 to 9.
- VII. At the end of the oral proceedings the Board decided that the proceedings are to be continued in writing on the basis of the above-requested Claims 1 to 4 (cf. point VI) and that the Appellant should file a revised description within 2 months.
- VIII. After a telephone call from the Rapporteur dated 2 April 1991, the Appellant filed new pages 1 and 1a of the description on 20 April 1991 requesting additionally minor amendments to the description to be agreed upon and effected by the Board.
- IX. The Appellant argued essentially in support of his request that given the fact that in the radiant known from DE-B-1 116 615 the bars are scarcely wider than the ports it would be in any case surprising if the bars did not radiate throughout. In contrast to this, the ports according to the invention are narrow in relation to the bars as disclosed in figures 1, 3a, 6 and 9 of the drawings. A quantification of the feature concerning the narrowness of the ports was not possible from the existing disclosure but the test of visible radiation from the

flanks but not the tops of the bars would give certainty to the claims.

X. Subsisting Claim 1 reads as follows:

"1. A radiant, for a self-aerating burner, having a multiplicity of ports passing gas/air mixture for combustion at the surface of the radiant, wherein the ports (12) are provided in discrete areas (11), (22) that alternate with unported areas formed by angled unported flanks of raised bars (10), (21), the ports being narrow in relation to the width of the bars so as to give in operation visible radiation from the unported areas by impingement of flame but not from the tops of the bars."

Reasons for the Decision

1. The appeal is admissible.
2. **Amendments**
 - 2.1 Claim 1 is based essentially on the originally filed Claim 1.

The wording of original Claim 1 "...that alternate with raised non-ported bars with angled flanks..." has been replaced by the wording "...that alternate with unported areas formed by angled unported flanks of raised bars...". This clarifying amendment is based upon page 8, lines 20 to 27 of the original description in combination with figure 3a of the original drawings.

The further feature to which Claim 1 has been restricted "the ports being narrow in relation to the width of the bars..." can be derived from figures 1, 3a, 3b, 6 and 9 of

the original drawings in combination with the numerical values for the port diameters and the bar spacing and bar width, respectively, as disclosed on page 3, paragraph 3, and page 8, lines 20 to 27, of the original description.

This further feature meets the requirement of clarity pursuant to Article 84 EPC when interpreted by the description and the drawings as stipulated by Article 69(1) EPC. The values of the port diameter and the bar width as disclosed in the original description (cf. the passages cited hereinabove) provide the basis for interpreting the said feature by indicating the order of magnitude of the relation port diameter/bar width envisaged (cf. also Appellant's letter dated 20 March 1989, page 4, last paragraph to page 5, first paragraph).

The one-part form of independent Claim 1 is considered appropriate in the present case since the two-part form pursuant to Rule 29(1) EPC might lead to an artificial and lengthy claim having regard to the disclosure of the relevant prior art (DE-B-1 116 615).

- 2.2 Claim 2 contains the features of original Claims 6 and 7 and Claims 3 and 4 are based upon original Claims 8 and 9, respectively.
- 2.3 All claims therefore meet the requirements of Article 84 and 123(2) EPC.
- 2.4 Having regard to the description the amendments filed on 20 April 1991 concern the indication of the background art and the adaptation of the description to the claims pursuant to Rule 27(1)(c) and (d) EPC. These amendments are not, therefore, objectionable under Article 123(2) EPC.

3. **Novelty**

3.1 The closest prior art with regard to the subject-matter of Claim 1 is disclosed in DE-B-1 116 615. This document discloses a burner having a radiant with a multiplicity of ports passing gas/air mixture for combustion at the surface of the radiant wherein the ports are provided in discrete areas that alternate with unported areas formed by angled unported flanks of raised bars, the radiant giving in operation visible radiation from its surface by impingement of flame.

3.2 The radiant according to Claim 1 differs from this known radiant by the ports being narrow in relation to the width of the bars so as to give in operation visible radiation from the unported areas but not from the tops of the bars.

3.3 The other citations contained in the search report do not come closer to the subject-matter of Claim 1 than the radiant known from DE-B-1 116 615. In particular, none of these documents describes a radiant disclosing the above-cited distinguishing feature (cf. paragraph 3.2).

3.4 Hence, Claim 1 contains novel subject-matter and thus complies with the requirement of Article 52 EPC with regard to novelty.

4. **Inventive step**

4.1 The above-cited distinguishing feature has the effect that visible radiation is limited to discrete areas of the flanks of the bars whereas in the radiant known from DE-B-1 116 615 the flanks of the bars give visible radiation throughout (cf. column 3, lines 2 to 9, of the citation).

The objective problem underlying the subject-matter of Claim 1 may, therefore, be seen in reducing the heat output from a given radiant area. Further aspects of the problem which the Appellant has set himself concern an improved radiant heat output related to gas input and good luminous appearance when operating under reduced gas input rates.

It has been indicated already in the original description (see page 4, paragraph 2, and page 5, last paragraph to page 6, paragraph 3) that the radiants according to the invention reduce the heat output per unit area to a figure convenient for domestic use and that they improve the radiant efficiency and maintain good luminous appearance when operating under reduced gas input rate. Additionally, photographs of tests showing radiants giving visible radiation from the radiant surface except for the tops of the bars have been filed with letters dated 3 August 1988 and 5 April 1990. It is therefore credible to the Board that the inherent objective problem is solved by the features of Claim 1.

4.2 The perception of the problem must be regarded as a consequence of the disadvantages caused by an intensive heat output per unit area of the radiant surface. The conclusion to reduce the heat output per unit area of the radiant in order to avoid these disadvantages could have been drawn by a skilled person as a result of practical experience. Furthermore, the aim to obtain an improved efficiency of the radiant is the constant endeavour of the skilled person in the art.

The underlying problem as such is not considered, therefore, to include inventive merit.

- 4.3 In the Board's view, when considering reducing the heat output from a given radiant area the skilled person could take into account as a possible solution reducing the amount of gas/air mixture fed. He would, however, find that this measure results in a reduction of the radiant glow and that the flames would tend to become unstable retreating into the ports since in surface combustion there is little flexibility in deviating from the ideal gas/air mixture (cf. original description, page 5, lines 1 to 13, and Appellant's letter dated 16 January 1991, page 6, last paragraph).
- 4.4 DE-B-1 116 615 relied upon by the Examining Division in their decision aims at solving the problem "so developing a radiant that stability of the flame and the radiation intensity of the incandescent surface are increased" (cf. column 1, paragraph 2 of the citation).

This aim as far as radiation intensity is concerned is incompatible with the objective problem underlying the invention, namely to reduce the heat output from a given radiant area.

The skilled person would not, therefore, be induced to take account of the teaching of DE-B-1 116 615 in the search of solutions to his problem. If he nevertheless did so, he would see (cf. description column 3, lines 2 to 9 of the citation) that the known radiant is described as radiating over the whole area including the bars which is in agreement with the aim underlying the citation. Furthermore, the drawings (cf. figures 1 to 5 and figure 7) of the citation show that in the known radiant the port diameter is approximately of the order of magnitude of the bar width, no hint being further provided in the other parts of the citation to the circumstance that the relation port diameter/bar width may be different

from that illustrated in the drawings. Thus, the feature of Claim 1 that the ports are narrow in relation to the width of the bars so as to give in operation visible radiation from the unported areas but not from the tops of the bars cannot be derived from DE-B-1 116 615, the teaching of this citation leading in a different direction as seen both from the inherent problem and its solution.

- 4.5 US-A-4 340 357 which has been introduced in the examining proceedings with regard to the subject-matter of the dependent claims deals with an infrared radiation gas burner plate which is capable of rapid increase in temperature, prevents any substantial burning noise, has an improved radiant efficiency and is capable of maintaining stability in the operation of the burner. Thus, the inherent aim is different from that underlying the invention and the effect achieved with the known radiant is a uniform red-hot burning on the burner plate (cf. column 2, lines 34 to 60, of the citation).

Since neither the objective problem of the invention nor the distinguishing feature indicated in above paragraph 3.2 can be derived from US-A-4 340 357 this citation cannot suggest the solution according to Claim 1.

- 4.6 None of the other documents cited in the search report addresses the problem of reducing the heat output from a given radiant area. These documents are not, therefore, regarded as being prejudicial to Claim 1, either alone or in combination with the documents cited above.

For these reasons the Board has come to the conclusion that the subject-matter of Claim 1 involves an inventive step.

5. The patentability of the dependent Claims 2 to 4 which represent preferred embodiments of the invention is supported by the patentability of the independent 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 the patent on the basis of the following documents:

Claims: 1 to 4 filed on 16 March 1991.

Description: pages 1 and 1a filed on 20 April 1991, pages 2 to 13 as originally filed, with the amendments to the description as requested by the Appellant in his letter dated 15 April 1991, received on 20 April 1991.

Drawings: Figures 1 to 11 as originally filed.

The Registrar:



N. Maslin

The Chairman:



C.T. Wilson