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Bezeichnung der Erfindung: Drier, particularly for plastic material
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : B29B 3/04

ENTSCHEIDUNG / DECISION
vom / of / du 6 May 1988

Anmelder / Applicant / Demandeur : SOREMA s.r.l.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56

Kennwort / Keyword / Mot clé : Inventive step (yes)

Leitsatz / Headnote / Sommaire

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Case Number : T 300/87 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 6 May 1988

Appellant : SOREMA s.r.l.
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Decision under appeal : Decision of Examining Division 093 of the European Patent Office dated 5 February 1987 refusing European patent application No. 82 200 009.7 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : C. Maus
Members : C. Andries
W. Moser

Summary of Facts and Submissions

I. European patent application No. 82 200 009.7, filed on 7 January 1982 (publication No. 0 060 572) with a claimed priority date of 17 March 1981 based on an Italian patent application was refused by the decision of the Examining Division 93 dated 5 February 1987.

This decision was based on Claims 1 to 3 received on 2 August 1985.

II. The reason given for the refusal was that the subject-matter of Claim 1 did not involve an inventive step.

The Examining Division held that, apart from the material directing means, there was no constructional difference between the drier according to Claim 1 and the drier according to DE-A-2 126 069 (D1). If the prior art drier were turned in use by 90°, it would then operate in exactly the same way. The idea to provide for material directing means was on the other hand considered to lie within the scope of the customary practice followed by persons skilled in the art.

III. On 22 March 1987, the Appellant lodged an appeal against this decision. The appeal fee and the Statement of Grounds were received on 26 March and 26 May 1987, respectively.

IV. The Appellant requested that the Decision under appeal be set aside.

He asserted that the drier claimed in Claim 1 is constructionally and functionally different from the prior art disclosed in D1.

V. During the procedure before the Board of Appeal, the Appellant submitted new Claims 1 to 3, and new pages 2, 3 and 3 bis of the description on 14 January 1988 and requested the grant of the patent on the basis of the valid documents.

The valid Claim 1 reads as follows:

"Drier, particularly for plastic material, comprising a rotor (1) formed by a plurality of radial walls (6) defining outwardly open radial ducts (7), means (8) for directing wet material to be dried into the center of the rotor, means (2) for rotating said rotor (1) so as to centrifugate said material outwardly together with conveyance air generated by the rotor, a first scroll (9) around said rotor (1) to receive and convey towards an outlet (13) said material and said conveyance air, a bored grating (14) arranged in a lateral wall portion of said first scroll (9) in such a position as to receive the impact of the material centrifugated by the rotor (1) and to allow the outflow of a part of said conveyance air and of the liquid which separates from said material because of said impact and the crossing of the material by said conveyance air, and a second scroll (16) around said portion of the first one (9) to receive and convey towards a discharge (18) said conveyance air and said liquid passed through the grating (14), characterised in that said rotor (1) is rotated about a vertical axis and said material directing means (8) are arranged to charge said rotor (1) along said vertical axis from above, said rotor (1) further comprising a bottom base plate (4) which cooperates with said radial walls (6) to cause said radial ducts (7) to be upwardly open and downwardly closed for collecting the wet material."

Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC; it is, therefore, admissible.

2. There are no formal objections on the basis of Articles 84 and 123(2) and Rule 29 EPC to the current version of the claims and to the amended description, since the claims are clear, concise and supported by the description; since Claim 1 is arranged in an appropriate two-part form; and since the application is not amended in such a manner that it contains subject-matter which extends beyond the content of the application as filed.

3. None of the available prior art documents discloses a drier comprising all the features set forth in Claim 1, so that the subject-matter of Claim 1 is novel. Since there were no doubts with respect to novelty, there is no need for a detailed discussion of that matter.

4. It remains to be examined whether the subject-matter of Claim 1 involves an inventive step. In this respect the following should be observed:

4.1 The closest prior art, to which the pre-characterising portion of Claim 1 is related, is reflected by US-A-3 045 359 (D2). It describes a rotor directly centrifugating the material, using thereby the same working principle as the drier according to Claim 1 of the present application, whereas in the embodiment according to D1, which was wrongly considered by the Examining Division as representing the closest prior art, the material is not centrifugated by the rotor or by its ducts, but in which only the air is centrifugated by the rotor and acts on the

material. Such an indirect action of the rotor on the material is more remote from the subject-matter of Claim 1 than the action disclosed in D2.

4.2 Document D2 discloses a drier, particularly for plastic material, comprising a rotor, means for directing wet material to be dried into the centre of the rotor, means of rotating said rotor so as to centrifugate said material outwardly together with conveyance air generated by the rotor, a first scroll around said rotor to receive and convey towards an outlet said material and said conveyance air, a bored grating arranged in a lateral wall portion of said first scroll in such a position as to receive the impact of the material centrifugated by the rotor and to allow the outflow of a part of said conveyance air and of the liquid which separates from said material because of said impact and the crossing of the material by said conveyance air, and a second scroll around said portion of the first one to receive and convey towards a discharge said conveyance air and said liquid passed through the grating. Said rotor is rotated about a horizontal axis and is formed by a plurality of radial walls which cooperate to define a plurality of outwardly open radial ducts for centrifugating the material.

4.3 Due to the horizontal axis of the rotor and of the surrounding scrolls, a great part of the wet material fed to the centrifugal blower immediately falls down by gravity without entering the field of action of the centrifugal force of the rotating rotor and, therefore, without being subjected to the desired strong impact against the perforated plate (bored grating). This results in a reduced drying efficiency.

4.4 The problem underlying the invention consists in the realisation of a very efficient drier which is able to

remove great amounts of liquid from wet materials of various kind, particulary from very light materials with flat and irregular shape, such as the above mentioned thin leaves.

4.5 Since it is always the aim of a skilled person to increase efficiency, the problem as such is not based on any inventive activity.

4.6 The features mentioned in the characterising portion of Claim 1, namely:

(i) the rotor rotates about a vertical axis;
(ii) the material directing means are arranged to charge said rotor along said vertical axis from above;
(iii) the rotor comprises furthermore a bottom base plate which cooperates with the radial walls so that upwardly open radial ducts are formed for collecting the wet material

ensure that the whole of the wet material being centrally charged into the rotor is submitted to the centrifugal force generated by the rotor and consequently caused to impact violently against the bored grating of the inner scroll for drying purposes.

These features cooperate to improve the efficiency of the drier. The features (i) and (ii) eliminate the differences of the influence of gravity on the separation so that the whole of the material is submitted to about the same impact, due to the same centrifugal force. The last feature (iii) obliges the whole of the admitted material to enter in the field of action of the centrifugal force of the rotor.

4.7 A person skilled in the art, starting from a drier according to D2, which would try to obtain an increased efficiency, did not find, however, an indication in the cited prior art documents to rotate the rotor about a vertical axis and to use simultaneously a rotor having a bottom base plate which cooperates with the radial walls so that upwardly open radial ducts are obtained which can collect the whole of the wet material.

Indeed, document D1 describes a drier which comprises a rotor with a horizontal axis and which comprises important constructional and functional differences with respect to the drier according to both present Claim 1 and D2. The feeding of material and conveyance gas into the drier occurs with the help of different inlets (4 and 24, respectively). A pre-dewatering system of the material, including a converging channel (inlet 4; outlet 4a) is used. Only the conveyance gas is centrifugated by the rotor.

Equally, the drier according to US-A-3 458 045 (D3), even though it comprises a rotor having a vertical axis, leads away from the invention, since a complicated rotor is provided, fed from beneath and displacing solids and fluids upwardly, and since it makes use of a pre-dewatering system.

4.8 In order to obtain a drier according to Claim 1, the modification of a drier according to document D2 implies at least two steps: firstly the rotor has to be brought in a horizontal plane, and secondly the rotor has to be modified. However, such a combination of modifications is neither obvious for a skilled person with respect to the cited prior art documents, nor can it be considered to be a simple constructional modification which forms part of the normal considerations of a skilled design engineer.

4.9 As regards the above-mentioned important constructional and functional differences between the drier according to D1 on the one hand and the drier according to D2 or Claim 1 on the other, the construction and, consequently, the way of functioning of the drier according to D1 would have to be modified to a great extent in order to obtain a drier according to Claim 1. Therefore, the Board cannot follow the opinion of the Examining Division that the drier according to D1, if turned in use by 90°, would operate in exactly the same way as the drier claimed in the present application. By merely turning the drier according to D1 by 90° in order to bring about the rotation of the rotor around a vertical axis, the wet material inlet still remains on the lateral side of the drier-casing so that the wet material is still not centrifugated by the rotor. As already indicated, it is the air which is centrifugated by the rotor and which acts upon that wet material to whirl it over a perforated plate. There is neither an indication nor a reason why the inlet of the wet material should be changed in such a manner that it would allow the introduction of the wet material directly into the centre of the rotor, particularly since Claim 1 of D1 indicates that the wet material has to be whirled over the perforated plate.

4.10 Since no indications can be found in the cited prior art that the drying efficiency can be improved by the combination of the features mentioned in the characterising portion of Claim 1 and since the combination also cannot be considered as obvious having regard to the general technical knowledge of the skilled person, the subject-matter of Claim 1 involves an inventive step (Article 56 EPC).

5. Consequently, the drier according to Claim 1 is patentable under Article 52(1) EPC and Claim 1 is thus allowable.

6. Dependent Claims 2 and 3 concern particular embodiments of the drier according to Claim 1. They are, therefore, also allowable.

7. The description, which has been brought into accordance with the amended claims, indicates the most relevant prior art and meets the additional requirements of Rule 27 EPC.

Order

For these reasons, it is decided that:

1. The decision of the Examining Division is set aside.

2. The case is remitted to the first instance with the order to grant a European patent on the basis of:

description: - pages 1 and 4 to 7 as originally filed;
- pages 2, 3 and 3bis received on 14 January 1988;
Claims: 1 to 3, received on 14 January 1988;
drawings: sheets 1/2 and 2/2 as originally filed.

Der Geschäftsstellenbeamte Der Vorsitzende

S. Fabiani C. Maus

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