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Datasheet for the decision of 25 January 2017

Case Number: T 0315/14 - 3.2.03

Application Number: 11176382.7

Publication Number: 2416100

IPC: F26B9/06, F26B17/14

Language of the proceedings: EN

Title of invention:
Hopper structure for a dehumidification plant and method for dehumidifying granular plastic material

Applicant:
Moretto S.P.A.

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - after amendment (yes)

Decisions cited:

Catchword:

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Case Number: T 0315/14 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 25 January 2017

Appellant: (Applicant)	Moretto S.P.A. Via dell'Artigianato, 3 35010 Massanzago (Padova) (IT)
Representative:	Zanettin, Gianluigi Jacobacci & Partners S.p.A. Via Berchet, 9 35131 Padova (IT)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 12 September 2013 refusing European patent application No. 11176382.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Ashley
Members:	V. Bouyssy
	E. Kossonakou

Summary of Facts and Submissions

I. European patent application No. 11 176 382.7 (in the following: "the application") relates to a hopper structure for the dehumidification of granular plastic material.

II. The examining division decided that apparatus claim 1 and method claim 13 as originally filed lacked an inventive step. The examining division thus refused the application.

III. This decision was appealed by the applicant (in the following "the appellant").

IV. With the summons to oral proceedings, the Board sent a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA) indicating its preliminary opinion of the case. In this communication, the Board raised a new objection under Article 56 EPC against the appellant's main request and auxiliary requests and a new objection under Article 123(2) EPC against the second auxiliary request.

V. In response to the summons, the appellant filed a new main request with letter dated 14 June 2016, which was said to substitute all previous requests on file.

VI. The Board issued a communication, dated 5 July 2016, to clarify that the description must be brought into conformity with the amended claims and that the closest prior art document should be identified in the description and the relevant background art disclosed therein should be clearly acknowledged.

VII. In response to this communication, with letter of 8 July 2016, the appellant filed a set of amended claims as a new main request replacing the previous main request and amended description pages, requesting that the decision under appeal be set aside and a patent be granted on that basis.

VIII. Claims

Independent claim 1 is directed to the following subject-matter (the feature breakdown is introduced for further reference; compared with claim 1 as originally filed, added features are indicated in bold, deleted passages in strike-through):

(a) A hopper structure for the dehumidification of granular plastic material by means of a dehumidifying process fluid, including:
(b) a main body (1a), bearing, at the top in use, a closure wall (1b) with loading opening or mouth (4a) for the granular plastic material to be treated;
(c) at least one discharge mouth or opening (4c) for the process fluid provided on said main body (1a) or on said closure wall (1b),
(d) a tapered lower section (1c) terminating with a discharge opening (4b) for the dehumidified granular plastic material,
(e) an insert member (3) fluid-sealed and positionable in the main body (1a) and in the tapered section (1c) so as to delimit an annular air space (AG) therewith, said insert member (3) comprising at least one conical or frustoconical lower part (3a), which tapers towards bottom, and an upper part (3b), and

(f) at least one dehumidifying fluid feed duct (26) to said annular air space (AG),

~~characterized in that~~ **wherein**

(g) the lower tapered section (1c) comprises at least one pair of walls or wall segments: a wall or wall segment (9, 23, 22) at least partially enclosing the other wall or wall segment (8, 21), so as to delimit at least one chamber (25) therewith that is outside said annular air space (AG) and in fluid communication therewith, said at least one chamber (25) being feedable with dehumidifying process fluid from said at least one feed duct (26) oriented tangentially or parallel to said enclosing wall or wall segment (9, 23, 22), **and**

(h) wherein said upper part (3b) of said insert member (3) is cylindrical and

(i) wherein said lower tapered section (1c) comprises an upper frustoconical segment (21), a cylindrical intermediate segment (22) and a lower frustoconical segment (23),

(j) the intermediate segment (22) and the lower frustoconical segment (23) constituting a wall enclosing the upper frustoconical segment (21),

(k) the upper frustoconical segment (21) having conicity (β) lower than the conicity (α) of said lower frustoconical segment (23) and being extended therein so as to delimit said chamber (25), said upper frustoconical segment (21):

(l) - being extended inside and over the entire length of the intermediate (22) and lower segments (23);

(m) - communicating at its own lower end with a discharge mouth (4b); and

(n) - communicating and being connected with a sleeve duct (24), to which the lower end of said lower frustoconical segment (23) is also connected,

(o) wherein said chamber (25) is in fluid communication with said annular air space (AG) through a plurality of small holes (27),

(p) said plurality of small holes (27) being made at a band of said upper frustoconical segment (21) for a height corresponding to at least the height of said intermediate section (22)."

Dependent claims 2 to 6 define preferred embodiments of the hopper structure of claim 1.

Independent method claim 7 is directed to a method of dehumidifying plastic granular material using the hopper structure of any of claims 1 to 6. Dependent claim 8 defines a preferred embodiment of this method.

Independent claim 9 relates to a treatment plant for granular plastic material, comprising a hopper as defined in any of claims 1 to 6.

IX. Prior art

The following prior art documents were cited in the search report:

D1: FR 2 674 944 A1
D2: EP 2 090 856 A1
D3: US 3,634,949 A
D4: DE 849 830 C

The following prior art document was cited by the examining division in its communication of 6 September 2012:

D5: WO 02/36255 A1

X. The arguments of the appellant, insofar as relevant for the present decision, can be summarised as follows:

(a) Article 123(2) EPC

The amended claims correspond essentially to the claims of the second auxiliary request filed with the statement of grounds of appeal dated 10 January 2014. Claim 1 has been amended to overcome the objection under Article 123(2) EPC in the Board's communication pursuant to Article 15(1) RBPA. It corresponds essentially to a combination of claims 1, 3 to 8 and 10 as originally filed. Support for features (j) and (k) of claim 1 can be found on page 15, lines 7 to 23 and figure 5 of the application as originally filed.

(b) Inventive step

Figures 3a, 3b and 3c of D2 disclose hopper structures forming the closest prior art. Claim 1 differs from each of these structures in that it comprises features (f), (g) and (i) to (p) and is thus adapted for the dehumidification of granular plastic material by means of a dehumidifying process fluid, as required by feature (a). Features (f), (g) and (o) allow the creation of a whirling flow of fluid in a chamber outside the air space containing the granules and a uniform distribution of fluid into this air space. Features (i) to (l) result in that this outside chamber has a cross section which diverges upwardly, so that the fluid will flow mainly in the upper portion of the chamber. This reduces the risk of fluid exiting through the discharge opening while by-passing the granules inside the air space, which is advantageous for the dehumidification of the granules. The position of the

small holes as defined by feature (p) is chosen in order to enhance this effect.

The technical objective problem deriving from differentiating features (f), (g) and (i) to (p) is how to dehumidify or dry the granules in a uniform manner.

Dl discloses the provision of features (f), (g) and (o) to solve this problem but it fails to disclose features (i) to (n) and (p) of claim 1. In particular, in figure 2 of D1, air chamber 5 has an upwardly converging rather than diverging cross section.

Reasons for the Decision

1. Admissibility of appellant's request

1.1 The set of claims of the current request differs from that of the second auxiliary request filed with the statement of grounds of appeal dated 10 January 2014 in that claim 1 has been further limited with features (i) to (p).

1.2 These amendments are in response to objections under Articles 123(2) and 56 EPC which were raised for the first time in the Board's communication of 5 July 2016 pursuant to Article 15(1) RPBA. They clearly overcome all outstanding objections without introducing any new issues.

1.3 For these reasons, the Board decides to admit the appellant's request into the proceedings and to consider it, in accordance with Rule 137(3) EPC (which is applicable by virtue of Rule 100(1) EPC) and Article 13(1) and (3) RPBA.

2. Amendments

2.1 Claim 1 differs from claim 1 as originally filed in that features (h) to (p) have been incorporated in it. This amendment is supported by the information in the application documents as originally filed. Support for features (h) and (l) to (p) can be found in claims 10 and 4 to 8 respectively of the original application. Support for features (i) to (k) can be found on page 15, lines 7 to 23, figures 4 and 5 and claim 3 of the original application.

2.2 In conclusion, the amendments to claim 1 meet the requirements of Article 123(2) EPC.

3. Inventive step

3.1 Among the prior art documents cited in the search report, D2 forms the most promising starting point for the assessment of inventive step. In the original application, D2 is presented as the starting point for the invention and the hopper structure disclosed in D2 resembles most the preferred embodiments in figures 4, 6, 7, 9b, 14 of the application.

3.2 Figures 3a, 3b and 3c of D2 show a number of hopper structures for containing granular plastic material, each comprising features (b) to (e) and (h) of claim 1. It is implicitly disclosed in D2 that the hollow insert of these hopper structures is fluid-sealed when these structures are carrying out dehumidification in the absence of circulating hot and dried air (see paragraph 29, "if desired" and figures 3a to 3c compared to figure 5; claim 1 and dependent claim 11).

3.3 The hopper structure according to claim 1 thus differs from each of these hopper structures disclosed in D2 by feature (a) (i.e. the hopper structure is adapted "for the dehumidification of granular plastic material by means of a dehumidifying process fluid") and by features (f), (g) and (i) to (p).

3.4 Thanks to these features, a dehumidifying process fluid can be fed from the feed duct into the chamber outside the annular space so as to create a whirling flow of fluid in the chamber. From there, the fluid passes into the air space via the plurality of small holes thus hitting the granules loaded in the air space. The fluid will then rise upwardly along the air space, between the granules, before it exits through the discharge mouth. The distinguishing features thus allow a uniform distribution of dehumidifying process fluid into the air space containing the granules and a uniform dehumidification of the granules.

3.5 Starting from D2, the technical problem objectively solved by features (a), (f), (g) and (i) to (p) can thus be formulated as how to dehumidify or dry the granules in a uniform manner.

3.6 The claimed solution to this problem is not part of common general knowledge of the skilled person and is neither disclosed nor suggested in the cited prior art documents.

3.7 D1 discloses a hopper for drying of granular plastic material by means of drying air, wherein the tapered lower part of the hopper is covered by a perforated conical wall 4 forming an annular space 5 into which drying air is fed through a tangential pipe 7, whereby a whirling flow of drying air is created in chamber 5

which results in a uniform air flow into granules (page 3, line 29 to page 4, line 3; page 4, lines 18 to 29). Thus, D1 addresses the objective problem and teaches that it can be solved by way of features (f), (g) and (o). However, D1 fails to disclose distinguishing features (i) to (n) and (p), in particular features (i) to (l) which result in an upwardly diverging cross section for the outside chamber (see figure 5 in the application). In fact, it is apparent in figure 2 of D1 that the lowest part of enclosing wall 2 has a taper angle that is greater than that of perforated wall 4, so that air chamber 5 has a cross-section which is downwardly diverging and this shape is substantially opposite to that resulting from features (i) to (l).

3.8 D5 teaches away from the claimed solution. Indeed, it is the gist of D5 that, to minimise any friction between granules and gassing area, there are no perforations or any gassing slots on non-vertical, e.g. conical surfaces of the hopper, and that gassing occurs only in a cylindrical, i.e. non-conical area of the hopper structure (claim 1; page 7, bottom paragraph; gassing area 7 in Figures 3 and 4).

3.9 In conclusion, with regard to the prior art on file, the subject-matter of claim 1 involves an inventive step in accordance with Article 56 EPC.

3.10 The above reasoning applies also to the subject-matter of independent claims 7 and 9.

4. The description has been brought into conformity with the amended claims.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division with the order to grant a patent in the following version:
   - claims 1 to 9 filed with letter 8 July 2016 as main request;
   - description pages 2 to 30 filed with letter 8 July 2016; and
   - figures 1 to 14 of the application as originally filed.

The Registrar: The Chairman:

C. Spira G. Ashley

Decision electronically authenticated