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D E C I S I O N
of 6 November 2001

Case Number: T 0239/98 - 3.2.5

Application Number: 87870118.4

Publication Number: 0259290

IPC: B29B 7/88

Language of the proceedings: EN

Title of invention:
PVdF-based powder coatings

Patentee:
ATOFINA Research

Opponent:
ELF ATOCHEM NORTH AMERICA, INC.

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 0239/98 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 6 November 2001

Appellant: ATOFINA Research
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Representative: Leyder, Francis
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Respondent: ELF ATOCHEM NORTH AMERICA, INC.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 30 December 1997
revoking European patent No. 0 259 290 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: W. Moser
Members: W. R. Zellhuber
P. E. Michel

Summary of Facts and Submissions

- I. The appellant (patent proprietor) lodged an appeal against the decision of the Opposition Division revoking the European patent No. 0 259 290.
- II. An opposition was filed against the patent as a whole and based on Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC). The Opposition Division held that the grounds for opposition cited in the Article 100(a) EPC prejudiced the maintenance of the patent having regard to the cited documents.
- III. Oral proceedings were held before the Board of Appeal on 6 November 2001. The respondent (opponent), although duly summoned by the Board, was not represented at these proceedings.
- IV. The appellant requested that the decision under appeal be set aside and that the patent be maintained, on the basis of the following documents:
 - (a) main request: patent as granted; or
 - (b) first auxiliary request: claims 1 to 13 filed as first auxiliary request on 25 November 1997; or
 - (c) second auxiliary request: claims 1 to 13 submitted during oral proceedings; or
 - (d) third auxiliary request: claims 1 to 13 filed as second auxiliary request on 25 November 1997; or

- (e) that the case be remitted to the Opposition Division for further prosecution.

The respondent requested that the appeal be dismissed.

- V. Claim 1 of the patent in suit as granted (main request) reads as follows:

"1. Process for preparing pigmented PVdF-based powder coating products, comprising the steps of:

- (i) mixing PVdF resin with one or more compatible thermoplastic resins and one or more pigments;
- (ii) extruding and granulating the resulting mixture; and
- (iii) cryogenically grinding the pellets, and sieving out particles."

Claim 1 according to the first auxiliary request reads as follows:

"1. Process for preparing pigmented PVdF-based powder coating products, comprising the steps of:

- (i) mixing PVdF resin with one or more compatible thermoplastic resins, one or more pigments; and up to 3 wt% of a flow promoting agent based on the total weight of the mixture;
- (ii) extruding and granulating the resulting mixture; and
- (iii) cryogenically grinding the pellets, and sieving

out particles."

Claim 1 according to the second auxiliary request reads as follows:

"1. Process for preparing pigmented PVdF-based powder coating products without the use of solvents, comprising the steps of:

- (i) mixing PVdF resin with one or more compatible thermoplastic resins, one or more pigments; and up to 3 wt% of a flow promoting agent based on the total weight of the mixture;
- (ii) extruding and granulating the resulting mixture; and
- (iii) cryogenically grinding the pellets, and sieving out particles."

Claim 1 according to the third auxiliary request reads as follows:

"1. Process for preparing pigmented PVdF-based powder coating products, comprising the steps of:

- (i) mixing PVdF resin with one or more compatible thermoplastic resins and one or more pigments;
- (ii) extruding and granulating the resulting mixture; and
- (iii) cryogenically grinding the pellets, and sieving out particles; wherein in the grinding step (iii) the pellets are cryogenically ground in a

hammer mill wherein a rotating shaft carries hammers which break the pellets on fixed shapes in a casing of the hammer mill and hammer them through a sieving lining at the bottom of the hammer mill."

VI. In the course of the appeal procedure, the following documents have, *inter alia*, been referred to:

- E4: Pennwalt, Technical Data Research Chemical; "Kynar®/Acrylic Alloys RC-9637 and RC-9638"; July 22, 1980;
- E9: US-A 4 179 542;
- E14: *Plastics Design & Processing*, "Grinding the Tough Plastics At Cryogenic Temperatures"; February 1977;
- E16: Pennwalt, Technical Data; "Kynar® Powder Coatings Electrostatic Spray"; July 1, 1977;
- E27: *Encyclopedia of Polymer Science & Technology*, "Plastics, Resins, Rubbers, Fibers"; Supplemental Volume 1; 1976; pages 544 to 548;
- E19, E21 to E25: documents concerning business relations between, on the one hand, the company Pennwalt Corporation and, on the other, the companies The Polymer Corporation (E19), PPG (E21), Becker Pulver AB (E22), Teodur N.V. (E23), The Dexter Corporation (E24), and Sigma Coatings (E25), respectively.

VII. In the written and oral procedure, the appellant

argued essentially as follows:

1. The subject-matter of claim 1 according to the main request was novel, since none of the cited documents which had been made available to the public before the priority date of the patent in suit, i.e. documents E4, E9, E14, E16 and E27, disclosed the process of claim 1, in particular, a process wherein PVdF resin was mixed with one or more compatible thermoplastic resins and one or more pigments, and wherein the resulting mixture was extruded and granulated.

Moreover, claim 1 according to the main request had to be construed as meaning that the mixture mentioned in step ii) contained only the components mentioned in step i) of claim 1 according to the main request.

Document E9, however, suggested a process wherein a pure PVdF resin was mixed with a fluxing agent such as dimethyl phthalate (DMP). Although a fluxing agent had the same function as a flow promoting agent, which was suggested as additive in the patent in suit, it differed from the latter in that it consisted of a material which evaporated during heating and which had to be added in higher amounts. The process according to claim 1 of the main request thus further differed from the process disclosed in document E9 in that it did not make use of a fluxing agent.

2. Documents E19 and E21 to E25 concerned correspondence between commercial companies, which had not been available to the public.

3. The subject-matter of claim 1 according to the main request also involved an inventive step.

Document E9 represented the closest prior art. It disclosed a process for preparing a powder coating by using a PVdF resin which was mixed neither with a pigment nor another resin. Moreover, it suggested using DMP, a latent solvent, as fluxing agent.

The problem underlying the patent in suit was to provide a solventless process for obtaining pigmented PVdF powder coatings.

The problem was solved by a process according to claim 1 according to the main request, which was not suggested by the prior art.

Document E4 disclosed thermoplastic alloys comprising PVdF resin, a compatible acrylic polymer and pigments. However, Document E4 represented a provisional data sheet, and, in a footnote, the editor noted that no guarantees were made. Thus, a person skilled in the art would not take into consideration the content of such a document. Moreover, document E4 concerned applications such as mouldings rather than a process for obtaining a powder coating.

Furthermore, the production of an improved pigmented PVdF-based powder coating had required great skill. Documents E21 to E25, which represented internal and thus documents not available to the public, referred to technical problems, which had had to be solved in order to

obtain a pigmented PVdF-based powder for powder coatings. Even a highly competent company such as Pennwalt Corporation had not been able to suggest a solution.

Consequently, the process according to claim 1 of the main request was not obvious and thus involved an inventive step.

4. Claim 1 of the first auxiliary request specified that the mixture comprises up to 3% of a flow promoting agent based on the total weight of the mixture.

Documents E4 and E16 were silent about any flow promoting agent, and, in example 27 of document E9, the addition of 15% of DMP as fluxing agent was suggested.

Nevertheless, it was admitted that the addition of a flow promoting agent fell within customary practice of a person skilled in the art and did not represent the invention of the patent in suit.

5. Claim 1 of the second auxiliary request concerned a process for preparing pigmented PVdF-based powder coating products without the use of solvents.

Document E9, however, suggested the use of a latent solvent, for example DMP, as fluxing agent. Instead of DMP, the patent in suit suggested the use of acrylic resins having a relatively low molecular weight as flow promoting

agents. Thus, document E9 did not suggest PVdF powder coatings which were prepared without the use of any solvent.

Furthermore, the subject-matter of claim 1 according to the second auxiliary request also was not obvious with regard to the prior art as disclosed in documents E27 and E4.

Document E27 disclosed powder coatings in general without making a reference to PVdF resins. Document E4 did not concern powder coatings. Moreover, it suggested an alloy comprising a specific acrylic polymer, namely Rohm & Haas's "Plexiglas VS". The fact that document E19, cf. in particular, page 3 of the Final Report drafted by E.J. Bartosczek, mentioned that "Plexiglas VS" was not really ideal and that other modifiers should be evaluated, showed that a person skilled in the art would not have considered "Plexiglas VS" to be a candidate for preparing a PVdF powder coating.

Therefore, a combination of the teaching of documents E27 and E4 was not obvious.

6. Claim 1 according to the third auxiliary request specified that the pellets were cryogenically ground in a hammer mill wherein a rotating shaft carried hammers which broke the pellets on fixed shapes in a casing of the hammer mill and hammered them through a sieving lining at the bottom of the hammer mill.

Although hammer mills were commonly known per se,

the use of a hammer mill as specified in claim 1 was not obvious. Document E27 showed that there was a large number of different grinding devices. The patent in suit suggested just one type of that great number of different mills, namely a hammer mill. Moreover, the only hammer mill disclosed in document E27 did not appear to relate to a mill wherein the hammer touched the screen. The invention did not consist in a proposal of a new hammer mill. However, the selection of a hammer mill suitable for solving the problem of producing a pigmented PVdF-based powder coating required an inventive step.

Furthermore, although documents E23 to E25 had not been made available to the public, they, nevertheless, made mention of the importance of selecting an appropriate mill. Document E25 even comprised a hand-written note arguing against the use of a hammer mill (cf. fourth sheet, Salesman's Call Report of 21 February 1985).

Therefore, the subject-matter of claim 1 involved an inventive step.

VIII. In the written procedure, the respondent argued essentially as follows:

The content of documents E19 and E24 had not been subject to any secrecy agreement and, therefore, it had been made available to the public before the priority date of the patent in suit. These documents disclosed a process as claimed in claim 1 of the main request and in claim 1 of the first auxiliary request.

Furthermore, there was no distinction between a "fluxing agent", and a "flow promoting agent", both doing the same job, namely helping the deposited powder to collapse and "flow out" into a uniform film.

The subject-matter of claim 1 according to the third auxiliary request did not involve an inventive step with regard to the prior art as disclosed in documents E19, E14 and E27, which all suggested using hammer mills in a process for preparing powder coatings. In hammer mills, particles were urged out through the sieving line by the action of the hammers. The words of claim 1 according to the third auxiliary request were simply a slightly unusual English description of the action of any hammer mill.

With respect to the subject-matter of the second auxiliary request, the Board has not received any submission from the respondent.

Reasons for the Decision

1. *Prior art*

Documents E4, E9, E14, E16 and E27, undisputedly, represent prior art pursuant to Article 54(2) EPC.

Documents E19 and E21 to E25, however, represent documents concerning business relations between the company Pennwalt Corporation and other companies. The Board considered that the question of whether or not the content of these documents had been made available to the public before the priority date of the patent in suit had to be dealt with only if the answer to it

became decisive. Since, as will become obvious hereinafter, this is not the case, these documents are thus not further considered.

2. *Novelty*

None of the cited documents, which, undisputedly, had been published before the priority date of the patent in suit, discloses a process for preparing pigmented PVdF-based powder coating products comprising the steps of mixing PVdF resin with a compatible thermoplastic resin and a pigment, extruding and granulating the resulting mixture, and cryogenically grinding the pellets.

- 2.1 Document E9, cf. col. 10, Example 27, discloses the preparation of a PVdF-based powder topcoating comprising the steps of blending PVdF powder resin (Kynar® 961) with dimethyl phthalate (DMP), extruding and granulating the resulting mixture, cryogenically grinding the pellets by using a hammer mill, and classifying the resultant powder by screening.

Document E9 does not disclose mixing PVdF resin with a compatible thermoplastic resin and a pigment.

- 2.2 Document E4, cf. first page, discloses a thermoplastic alloy of a PVdF resin (Kynar® PVdF grade 901) and an acrylic polymer. It makes mention of the excellent compatibility of PVdF and acrylates and, as an advantage over a pure PVdF resin (Kynar®), a better pigment acceptance. Potential applications for these alloys include protective cladding for UV sensitive plastics, decorative laminates, films, sheets, and mouldings for the construction.

Document E4 does not refer to PVdF-based powder coatings and their preparation.

2.3 Document E16 discloses a fine PVdF powder (Kynar® 960ES) designed for clear or pigmented powder coatings to be applied by electrostatic spraying. Document E16 does not describe a process for the preparation of a pigmented PVdF-based powder comprising a compatible thermoplastic.

2.4 Document E27 relates to powder coatings and their preparation without the use of solvents, cf. page 544, third paragraph. The process of manufacturing powders, cf. page 545, Figure 1, comprises the steps of mixing all the components such as polymer, flow-control additives and pigments, extruding and granulating the resulting mixture, and cryogenically grinding the pellets. The grinding operation is carried out by using a mill such as a hammer mill, wherein hammer-liner clearance and screen size are two factors which control the size of the powder produced by this grinder, cf. page 546, second paragraph.

Document E27 does not explicitly suggest a process comprising the step of mixing a PVdF resin, a compatible thermoplastic resin and a pigment.

2.5 Document E14 relates to powder coatings and processes for making such coatings. The powder coatings are finely powdered synthetic compounds consisting of thermoplastics or thermosets with additives such as pigments, plasticisers etc. (cf. page 17, left column). The powders include, among others, fluorocarbons. One of the most commonly used devices for grinding materials into powder is a hammer mill,

and, normally, the hammers of a hammer mill are so spaced on a rotor as to wipe the whole area of the screen and also the path of the product being ground, cf. page 15, right column. A correct particle size can be accomplished in a hammer mill by proper selection of screens, speeds, blades and with liquid nitrogen injection, cf. page 17, centre column.

Document E14 does not disclose mixing PVdF resin with a compatible thermoplastic resin and a pigment.

2.6 Therefore, the subject-matter of claim 1 according to main request is novel within the meaning of Article 54 EPC with regard to the published prior art.

2.7 The independent claims according to the first, second and third auxiliary requests comprise all the features of claim 1 according to the main request. Accordingly, the subject-matter of these claims also is novel.

3. *Inventive step*

3.1 Claim 1 of the main request concerns a process which differs from the process disclosed in document E9 in that it comprises the step of mixing PVdF resin with one or more compatible thermoplastic resins and a pigment.

It was known in the prior art (cf. page 2, lines 19 and 20 of the patent in suit and document E14), to obtain pigmented PVdF coatings from a mixture of powdered pigment and PVdF. However, several disadvantages, such as poor wettability of the pigment by the resin and a lack of long term stability, have been observed, cf. page 2, lines 20 to 23 of the

patent in suit.

Therefore, the object underlying the patent in suit may be seen in providing an improved process for obtaining pigmented PVdF powder coatings.

The solution proposed in claim 1 consists in that the PVdF resin is mixed with a compatible thermoplastic resin and a pigment.

However, document E4 discloses an alloy of a PVdF resin and a compatible thermoplastic resin and makes mention of the better pigment acceptance of such an alloy over "Kynar®" and thus over a pure PVdF resin. Accordingly, a person skilled in the art would obviously consider using such an alloy in order to improve the pigment acceptance of a PVdF-based powder coating material.

The footnote on page 1 of document E4 represents a general notice of the editor of the Technical Data sheet denying any guarantee, inter alia, because the conditions of handling and use of the products is beyond its control. The Board considers that such a general and formal remark does not form a reason for disregarding the content of that data sheet.

The subject-matter of claim 1 according to the main request, therefore, does not involve an inventive step within the meaning of Article 56 EPC with regard to the prior art as disclosed in documents E9 and E4.

3.2 Contrary to the appellant's point of view, the process according to claim 1 of the main request does not differ from the process disclosed in document E9 in

that it does not make use of a fluxing agent. Claim 1 according to the main request comprises the feature of mixing PVdF resin with a compatible thermoplastic and a pigment, but does not indicate that further components, in particular a fluxing agent or a latent solvent, should be excluded.

Furthermore, the Board does not agree to the appellant's argument that the remarks on technical problems and the need to evaluate other substances in documents E21 to E25 may form a support for an inventive step. These pieces of information, which are regarded by the appellant as not having been made available to the public before the priority date of the patent, do not hinder a person skilled in the art, at the priority date of the patent in suit, from considering the suggestions made in the published documents, which, as shown above, lead to a process as claimed in claim 1 of the main request.

Consequently, the main request is not allowable.

- 3.3 Claim 1 according to the first auxiliary request comprises, in addition to claim 1 of the main request, the feature of mixing PVdF resin with up to 3% of a flow promoting agent based on the total weight of the mixture.

The addition of flow promoting agents to mixtures for preparing powder coatings, however, is generally known, cf. document E27, page 544, penultimate line.

Furthermore, it falls within customary practice of a person skilled in the art to select the percentage of a flow promoting agent to be added to the mixture in

accordance with the prevailing conditions.

Therefore, the subject-matter of claim 1 according to the first auxiliary request does not involve an inventive step within the meaning of Article 56 EPC. In addition, the appellant confirmed that the use of flow promoting agents represents common practice.

Therefore, the first auxiliary request is not allowable, either.

- 3.4 Claim 1 according to the second auxiliary request comprises the features of claim 1 of the first auxiliary request. In addition, it specifies that the process is a process for preparing pigmented PVdF-based powder coating products without the use of solvents.

With regard to the subject-matter of that claim, document E27 may be regarded as representing the closest prior art, because it discloses a process for preparing pigmented powder coating products without the use of solvents, cf. paragraph 2.4 above.

Starting from document E27 as closest prior art, the object underlying the patent in suit may be seen in providing an improved process for obtaining solventless pigmented powder coatings.

The solution suggested in claim 1 according to the second auxiliary request consists in a process wherein a PVdF resin is mixed with a compatible thermoplastic resin and a pigment, and in that the amount of a flow promoting agent is set to being up to 3% based on the total weight of the mixture.

However, PVdF resin is known as a resin which is particularly suitable for the preparation of powder coatings, cf. documents E9, E14 and E16. Thus, a person skilled in the art would obviously consider using PVdF resin and, in particular, an alloy of PVdF resin and a compatible thermoplastic resin, in order to improve the pigment acceptance, cf. document E4. Since, as pointed out above, the selection of a suitable amount of a flow promoting agent falls within the customary practice of a person skilled in the art, the subject-matter of claim 1 according to the second auxiliary request thus does not involve an inventive step.

Therefore, the second auxiliary request is not allowable, either.

- 3.5 Claim 1 according to the third auxiliary request comprises the features of claim 1 according to the main request. It further specifies that, in the grinding step, the pellets are cryogenically ground in a hammer mill wherein a rotating shaft carries hammers which break the pellets on fixed shapes in a casing of the hammer mill and hammer them through a sieving lining at the bottom of the hammer mill.

As already pointed out in paragraph 2.1 above, document E9, which may be regarded as closest prior art with respect to the subject-matter of claim 1 of the third auxiliary request, already suggests using a hammer mill. Since hammer mills are generally known means for preparing powder coatings, a person skilled in the art would obviously take into consideration selecting a hammer mill also for grinding pellets made of a mixture comprising a PVdF resin, a compatible

thermoplastic resin and a pigment. Furthermore, a hammer mill, in general, comprises hammers mounted on a shaft which break the pellets on fixed shapes and the broken pellets are urged out through a sieving lining at the bottom of the hammer mill, cf. document E27, page 547, Fig. 4 and document E14, page 15, left column, third paragraph.

Thus, claim 1 of the third auxiliary request only suggests selecting a type of mill which is commonly used for the intended purpose and describes the functioning of such mills.

There is no support in the patent in suit that by the term "... hammer them through ...", used in claim 1 of the third auxiliary request, a method different from that in commonly known hammer mills is carried out. Furthermore, the appellant confirmed that the patent in suit does not concern a new type of hammer mill, and the patent in suit, cf. page 3, lines 34 to 35 of the description discloses that cryogenically grinding the pellets may be done by any suitable means which allows suitable particles to be obtained.

Therefore, the subject-matter of claim 1 according to the third auxiliary request does not involve an inventive step with regard to the prior art as disclosed in documents E9, E4 and E27 or E14.

The third auxiliary request is thus also not allowable.

4. Since the subject-matter of either of the independent claims of the main and auxiliary requests does not involve an inventive step with regard to the published

prior art as disclosed in documents E4, E9, E14, E16 and E27, the question of whether or not the content of documents E19 and E21 to E25 had been made available to the public before the priority date of the patent had not to be dealt with.

5. As regards the appellant's request to remit the case to the Opposition Division for further prosecution, it has to be borne in mind that, under Article 111(1) EPC, the Board has a discretionary power either to decide on the appeal or to remit the case to the department which was responsible for the decision under appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Dainese

W. Moser