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D E C I S I O N
of 26 May 1999

Case Number: T 0818/97 - 3.2.3

Application Number: 90911455.5

Publication Number: 0463121

IPC: B24C 1/00

Language of the proceedings: EN

Title of invention:
Process for removing coatings from sensitive substrates, and blasting media useful therein

Patentee:
Church & Dwight Co., Inc.

Opponent:
Solvay (Société Anonyme)

Headword:
-

Relevant legal provisions:
EPC Art. 100(a), (b)

Keyword:
"Sufficency of disclosure; measurement method"
"Inventive step (recognised)"

Decisions cited:
T 0171/84

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0818/97 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 26 May 1999

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 26 June 1997 rejecting the opposition filed against European patent No. 0 463 121 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: J. du Pouget de Nadaillac
J. P. B. Seitz

Summary of Facts and Submissions

I. The appeal is directed against the decision dated 26 June 1997 of an opposition division of the European Patent Office, which rejected the opposition filed against the European patent EP-B1-0 463 121.

II. Claim 1 of said patent, as granted, reads as follows:

"A process for removing coatings from sensitive metal and composite surfaces, which comprises blasting said surfaces with a compressed air stream under pressures of 68.95-1034.22 kPa (10-150 psi), said stream containing as a blasting medium water-soluble bicarbonate particles selected from the group consisting of alkali metal and ammonium bicarbonates, **characterized in that** the process is carried out with a compressed air stream that is saturated with moisture, said bicarbonate particles having particle sizes within the range of 250-500 microns, in admixture with at least 0.2% of a hydrophobic silica flow/anti-caking agent, by weight of the bicarbonate."

Claim 6 of said patent, as granted, has the following wording:

"A blasting medium for removing coatings from sensitive metal and composite surfaces, which consists essentially of water-soluble bicarbonate particles selected from the group consisting of alkali metal and ammonium bicarbonates, **characterized in that** said bicarbonate particles have particle sizes within the range of 250-500 microns, in admixture with at least

0.2% of a hydrophobic silica flow/anti-caking agent, by weight of the bicarbonate."

III. The opponent (appellant) lodged the appeal on 19 July 1997 and paid the appeal fee on 19 August 1997. In his statement of grounds received on 31 October 1997, he maintained two of the objections raised before the first instance, namely that the patent in suit does not disclose the invention in a manner sufficiently clear to be carried out by a person skilled in the art (Article 100(b) EPC), insofar as it does not disclose the measurement method for the particle size of the blasting medium, and further that the invention as claimed does not involve an inventive step (Article 100(a) EPC). He also filed new documents D13 to D15, additionally to the documents D1 to D12 filed during the opposition proceedings (see below).

The patentee (respondent) in a written reply received on 19 May 1998 contested the arguments of the appellant and filed in support of his submission Exhibits A and B with, further, an affidavit of the inventor.

IV. Oral proceedings took place on 26 May 1999. During these proceedings, the parties relied essentially on the following documents among those cited:

D1: Particle Size Measurement, T. Allen, 1975, published by Chapman and Hall, London, pages 74 to 76 and 85 to 121.

D3: Letter dated 17 January 1990 of the applicant during the US proceedings concerning US-application 323412 (priority document).

D4: Décapage mécanique par grenaillage, R. Proner, Techniques de l'Ingénieur, pages M1494-1 to 12.

D5: Metal Handbooks, 9th Edition, vol. 5, 1987, pages 83 to 96, American Society for Metals.

D6: Brochure "Micro Blaster" of Comco Inc., 1986.

D9: GB-A-1 021 751.

D11: Fine Particle Measurement, C.ORR.., New York, The Macmillon Co., 1959, pages 6 and 7.

D12: Chemical Engineers Handbook, 4th Edition, 1963, McGraw-Hill Book Co., page 21-51.

D14: Brochure BI.EX from the appellant, pages 17 to 19 (not dated).

D15: Notice CER 91/805, Bicarbonate de Soude (1991).

Exhibit A: Treatise on Powder Metallurgy, vol. I, pages 131, 132; 1949; Interscience Publishers, Inc. (New York).

Exhibit B: Metal Handbooks, 9th Edition, vol. 7, pages 214, 215; American Society for Metals.

V. The appellant argued as follows:

(a) As to the alleged lack of disclosure:

A feature of the present invention is the size range of 250 to 500 microns of the bicarbonate

particles. The patent in suit, however, does not mention the method of measuring said size. Several documents show that at least six different methods can be used therefor and that, moreover, the result varies according to the method, which is used. Differences of about 28% in the results can be found between different methods (see in this respect Exhibit B and D15).

In the patent in suit, as originally filed, a larger size range of 10 to 500 microns was given and there is no indication that different methods may have been used according to different ranges, for example one method for the range 10 to 250 microns and another method for the range 250 to 500. A single and same method was therefore used for the whole originally disclosed range. For the lower level of this range, namely 10 microns, the screening method is not appropriate, as indicated by some documents: D14, for example, discloses that this method cannot be used for the range 16 to 24 microns, and according to D11, only sizes above 40 microns can be measured by screening. The inventor himself in his declaration or affidavit does not indicate clearly which method he has applied.

Hence, the person skilled in the art is unable to know or to deduce from the disclosure of the patent in suit which method would be correct and he has no reason to prefer any one among the six possible methods.

(b) As to the inventive step:

The nearest prior art, namely D3, discloses a blasting medium consisting of bicarbonate particles of the type claimed in the patent in suit mixed with 0.5% by weight of the same hydrophobic silica flow agent. As to the bicarbonate, particle sizes of 65 to 70 microns are given. Thus, the subject-matter of the product claim, namely claim 6, of the patent in suit differs solely by the size range, which lies between 250 to 500 microns.

This claimed range can only be seen as the result of an arbitrary choice, since it is well-known that the determination of the particle size has to be selected according to the material to be treated and to the desired surface finish, as indicated in the description of the patent in suit (column 1, lines 41 to 42; column 2, line 51). The documents D5 and D6 provide a similar teaching, disclosing for example several kinds of abrasive material together with their typical applications or abrasive particle sizes selected with respect to the desired finish of the treated surface. The appropriate size is usually determined by means of tests.

For a person skilled in the art, it is moreover obvious that the larger the particles, the greater the impact, so that the blasting operation is realized quicker. Therefore, the results given in the affidavit are not surprising.

The use of saturated air according to the method claim 1 is also obvious, since it is always

desired to avoid the expensive production of dry air. Moreover, this feature does not improve the blasting effect.

VI. The respondent essentially replied as follows:

Most of the cited documents clearly show that the most popular and commonly used method for measuring particle sizes is the screening method. Exhibit (B) moreover gives a size range from 5 to more than 500 microns of particle sizes, which can be measured by this method. Therefore, it is clear that this method is to be applied, when no indication of a specific method is given; should it have been intended that another method be used, it would have been expressly indicated.

Documents D3 and D6 are concerned with blasting methods in laboratories or particular places, in which dry air has to be provided. The present invention, however, aims at blasting for commercial uses, thus in an environment in which natural, that is to say humidity saturated air in most cases, is present. The claimed solution moreover is to be seen not only in the large sizes of the bicarbonate particles, but also in the combination of such particles with the flow/anti-caking agent. Before the present invention, there was a prejudice to employ large particles, since it was thought that damage to the treated surface would result, and bicarbonate compositions were exclusively used in a quite dry air.

V. The appellant requests that the decision under appeal be set aside and that the patent be revoked.

The respondent requests that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Sufficiency of disclosure (Article 100(b) EPC)*

2.1 In the originally filed description and claims of the patent in suit, bicarbonate particles having particle sizes within the range of 10 to 500 microns were disclosed, and a preferred range of 250 to 300 microns was cited. Average particle sizes were also mentioned. However these data were given without providing any details regarding the method by which the particle sizes are to be measured. From several cited documents it is clear that different methods for measuring particle sizes were known before the priority date of the patent in suit and, further, that substantially different measurements are obtained, depending on the method which is used (see in these respects Exhibit B, Table 1; D15, page 5). Thus, in order to be able to carry out the present invention, the person skilled in the art must be able to determine the method for measuring the particle sizes.

2.2 In the present circumstances however the skilled person must be assumed to know that the most usual method therefor is the screening method, since it is the quickest and cheapest. This is confirmed by basic handbooks and textbooks, which represent the average technical knowledge of a skilled person (see e.g. decision T 171/84 (OJ EPO 1986, 95). According to D1,

page 113, "sieving is probably the easiest and certainly the most popular method of size analysis"; In document D5, which specifically concerns abrasive blasting cleaning, the size specifications are all given in relation with screen openings, reference being made to US mesh or US standard screens; Exhibit (A) indicates that "particle size distribution of most metal powders ... is determined by conventional screen test methods. For many applications this type of test is sufficient to determine the suitability of the powder..."; Exhibit (B) also confirms this point: "Sieve analysis is the most widely used method for determining particle size distribution of metal powders". Even if metal powders are most mentioned, it is clear that most kinds of particulate solids are concerned.

In the Board's judgment, therefore, the skilled person would realise in the absence of any indication to use other methods that the screening method is to be used, more especially as testing standards for this method are well-known and were established in 1970 (Exhibit B).

2.3 The argument of the appellant, that document D15 shows that one of the largest manufacturers of bicarbonate uses two other methods, is not convincing, because first one must expect that a firm producing the powder itself relies on more precise methods than the users of this powder, and secondly the document D15 concerns a comparison between two nearly identical bicarbonate powders produced by competitors. In such a case, finer analyses are required. Moreover, in this paper, the two methods are specified, whereas in the case at issue,

the Board bases it conclusion on the absence of any information as to the used method.

2.4 The appellant also argued that the sieving method would not have been seriously considered by the skilled person because of the lower limit of the range originally disclosed.

It is true that some of the cited documents are negative in respect of measurements of particle sizes lower than about 40 microns by the screening method. D1, on the same page 113, already mentioned above, discloses that sieving is restricted to powders having the greater proportion coarser than 75 microns. D11 gives a lower limit of 40 microns for sieve methods, whereas D12 mentions standard sieve No. 400 for 37 microns as the lower level.

However, from some of these documents and others, it can be seen nevertheless that the lower limit of 10 microns is not in consistent with the use of the sieving method. D1, once more, but this time on page 120, discloses micromesh sieving available in aperture size from 5 to 150 microns (D5 also gives a size range of 10 to 100 microns for microabrasive blasting). Exhibit B, Table 1, lists the different measurement methods for particle size together with their useful size range; For the sieving method, a size range between 5 to 800 microns is given. D9, page 3, lines 48 to 53, mentions sieve analysis for sizes between 30 to 5 microns.

The conclusion which can be drawn from this information is that it may not be easy to measure particle sizes

between 40 to 5 microns by screening, but that it is nevertheless quite possible, so that in any case the mention of a lower limit of 10 microns is not inconsistent with the use of the conventional screening method.

2.5 Moreover, the person skilled in the art is made aware by the originally filed description of the patent in suit of a number of patent specifications relating to previous applications of sodium bicarbonate or other blasting media, and it is clear from the whole above description that the aim of the present invention was to improve the properties of the blasting medium disclosed in these documents.

It is to be assumed that the skilled person seeking to overcome the absence of any information on the measuring method would look through these citations. The US Patent No. 4 731 125, column 3, advises him that "blast media such as ... are generally classified as to particle size by US standard size sieves", and having regard more particularly to the prior art on sodium carbonate, US 4 174 571, column 4, and US 4 412 402, bottom of column 6, disclose:

"Although the particle size is not critical, it is preferred for most purposes to employ screened particles of sizes passing through screens in the range from about 140 to 200 mesh".

US 4 214 871 also mentions "sieve sizes" (column 3, lines 62 to 64, and column 4, line 7).

Thus, the skilled person can also directly derive from

these citations that the determination of the particle sizes in the patent in suit is likewise made by sieving, in view of the fact that the patent refers to these documents when disclosing the aim of the present invention.

2.6 For all these reasons, the disclosure of the patent in suit is considered to be sufficient to enable the skilled person to carry out the claimed invention (Article 100(b) EPC).

3. *Inventive step*

3.1 According to the citation D3, an abrasive blasting medium was marketed prior to the priority date of the patent in suit, said medium consisting of sodium bicarbonate particles having an average size within the range of about 65 to 70 microns, in admixture with 0.5% by weight of a hydrophobic silica flow aid. This abrasive medium was sold for use in laboratory scale miniature abrasive blasting equipment (see in this respect D6) employed for cleaning and debarring electronic printed circuit boards, one requirement of this equipment being the provision of a very dry and pressurized air stream.

This prior art product represents the closest prior art.

3.2 An object of the present invention is to improve this blasting medium so that it can be used on large scales in a natural environment, that it to say in a process employing compressed air streams **saturated with moisture**, applied for example for removing coatings of

sensitive surfaces, such as the exterior surfaces of modern aircraft.

The patent in suit solves this problem by mixing bicarbonate particles having particle sizes within the range of 250 to 500 microns with the hydrophobic silica flow/anti-caking agent (claim 6). Other advantages, such as the flow characteristics, the caking resistance, the long-term storage stability and a more efficient removal of coatings, are obtained. Test results as to these last two properties were filed by the respondent, (see D3), at least in the particle size range of 250 to 300 microns. The appellant has disputed the evidence provided by these tests, but he has provided no evidence that they were wrong.

3.3 Even if the only distinguishing feature of the independent product claim 6 vis-à-vis the closest prior art is the claimed range of particle sizes, that does not prevent the solution from being a combination of these "large" particles (compared to those according to D3) with the hydrophobic silica anti-caking/flow agent. The appellant himself has in fact recognised this combination of means by arguing that, for a skilled person who wishes to improve the long-term storage stability of the blasting media known from D3, it is obvious to use larger particles in combination with the anti-caking agent, since the ratio surface/volume is better (lower specific surface).

As far as obviousness is concerned, he has however provided no evidence in support of this argument, so that it can only be seen as the result of an a posteriori view.

3.4 The use of bicarbonate particles having the claimed particle sizes has been described in none of the cited documents. A record of the cited prior art shows that citation D6 mentions a range of 20 to 150 microns for bicarbonate as blasting medium, said range including the range 65 to 70 microns of the closest prior art according to D3. For fire-fighting preparations, D9 discloses a range lower than 251 µ for the material sodium bicarbonate. In D15, samples of sodium bicarbonate powders used for surface treatment were examined as to their properties; The measured size range of the particles were between 62 (or 78) microns and 215 (or 275) microns, the obtained results differing according to the measurement method used, namely the ROTAP method, which is a screening method (see D12), for the first given results, and a laser method for the results in brackets. From this whole record, it appears that the general tendency was to use sodium bicarbonate powders with particle size ranges lower than 250 microns. The present invention goes against this trend.

3.5 The appellant has pointed out that, in the citation D5, Table 9 on page 91, most of the abrasive media used for dry blasting non ferrous metals as non-metallic materials are given as having particle sizes about 300 microns (standard screen size 50). In the mentioned table, however, said size level is only related to sand as abrasive material, and not to sodium bicarbonate.

Because of their quite different hardnesses, these two materials cannot be compared to each other.

The appellant also argued that it was well known that the particle size has an effect on the production rate and on the surface finish, as indicated by D4, page 4, and that the most suitable particle size can easily be selected by means of routine tests. Document D5, pages 85 and 86, was also mentioned. This argument is not convincing, since D4, as well as D5, teaches that:

(i) "The smaller the abrasive particle, the finer the surface finish and the greater the surface coverage".

(ii) "The larger the abrasive particle, the greater the impact".

Having in mind that sodium bicarbonate had been selected as abrasive material because of its softness, it would appear inconsistent to want to increase the impact and, thus, to choose large particles. The person skilled in the art, who wants to increase the performance of the abrasive particles, would on the contrary be incited to select smaller particles, since the surface coverage is greater, so that the blasting is more efficient. Thus, D4 and D5 give the skilled person rather an incentive to try to use fine particles.

3.6 Consequently, the Board concludes that the appellant has not established that there was any suggestion in any of the cited prior art documents that the blasting medium as claimed in claim 6 of the patent in suit

would be an improved abrasive medium, whatever the aim of that improvement might be.

Therefore, the subject-matter of said claim 6 implies an inventive step.

3.7 Since claim 1 concerns a process requiring **the use** of the product according to claim 6, it is necessarily patentable.

Moreover, no citation, among those cited, suggests using the blasting medium according to claim 6 in an air stream, which is saturated with moisture. As seen above, the closest prior art, namely D3, requires a very dry air for a mixture of sodium bicarbonate particles with an anti-caking agent. D6, which relates to the blasting device for the blasting medium according to D3, confirms this requirement. Citation D5, which is a handbook on abrasive blast cleaning and provides a rather exhaustive teaching on the subject, also insists on the necessity of dry air, in particular with portable air blasting methods; sodium bicarbonate is not mentioned in this citation, but the requirement is to be expected higher with this material, since its tendency to cake is well-known.

In the absence of any suggestion in the prior art to operate without the use of dry air, the method of claim 1 comprises an inventive step.

4. Dependent claims 2 to 5 concern particular embodiments of the method claimed in claim 1, whereas dependent claims 7 to 9 concern particular embodiments of the blasting medium according to claim 6. Therefore, they

can likewise be maintained.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

N. Maslin C. T. Wilson