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

Case Number: T 0197/96 - 3.3.2

Application Number: 90900829.4

Publication Number: 0446290

IPC: A61K 7/42

Language of the proceedings: EN

Title of invention:
Titanium Dioxide Sunscreens

Patentee:
The Boots Company Plc

Opponent:
Goldwell AG

Headword:
Coated dioxide particles/THE BOOTS COMPANY PLC

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step no - obvious alternative"

Decisions cited:
-

Catchword:
-

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Case Number: T 0197/96 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 26 April 1999

Appellant: (Opponent)
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Representative:
-

Respondent: (Proprietor of the patent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 13 February 1996 rejecting the opposition filed against European patent No. 0 446 290 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: C. Germinario
Members: J. Riolo
A. C. G. Lindqvist

Summary of Facts and Submissions

I. European Patent No. 0 446 290 entitled "Titanium Dioxide Sunscreens" based on application No. 90 900 829.4 was granted on the basis of a first set of 18 claims for the Contracting States AT, BE, CH, DE, FR, GB, IT, LI, LU, NL and SE and a second set of 18 claims for the Contracting State ES.

The text of claims 1 and 13 of the first set of claims reads as follows:

"1. Titanium dioxide particles having a mean primary particle size of less than 100 nm, each of said particles being substantially coated with phospholipid."

"13. A sunscreen composition which comprises 0.5 to 50% by weight of titanium dioxide particles as claimed in any one of claims 1 to 12, together with a cosmetically acceptable carrier."

II. Notice of opposition was filed against the granted patent by the Appellant, requesting revocation of the patent for lack of inventive step under Article 100(a) EPC.

The following documents, inter alia cited during the proceedings before the Opposition Division, remain relevant for the present decision:

(1) W.-D. Griebler, Seifen-Öle-Fette-Wasche 113, No. 20, (1987), pages 765 to 771

(6) EP-A-200 839

(7) GB-A-2 184 356

III. By decision posted on 13 February 1996, the Opposition Division held that the subject-matter of the patent as granted met the requirements of Article 52(1) and 56 EPC and rejected the opposition under Article 102(2) EPC.

In the Opposition Division's opinion, the problem to be solved by the present invention, with respect to document (1), which was regarded as the closest state of the art, was to disperse titanium dioxide particles smaller than 100 nm.

This problem was solved by coating said particles with phospholipid.

Although the treatment of titanium dioxide pigments with phospholipid was described in many cited prior art documents, the Opposition Division was of the view that the pigment-grade (200 nm) and fine-grade (smaller than 100 nm) titanium dioxide particles had to be considered as different products, since they had strongly different physical and chemical properties and gave rise to different problems of dispersibility and stability.

Accordingly the Opposition Division was of the opinion that prior documents dealing with pigment-grade particles (such as document (6)) could not be combined with the closest prior art, document (1).

On the other hand, document (7), which also described fine titanium dioxide particles in a sunscreen composition, solved the dispersion problem by different means, ie coating the particles with polysiloxanes instead of phospholipid.

For this reason, the Opposition Division concluded that there was no teaching in the available prior art which made it obvious to coat titanium dioxide particles smaller than 100 nm with phospholipid in order to have stable, transparent dispersions with high UV-absorption activity.

IV. The Appellant (Opponent) lodged an appeal against the said decision.

V. Oral proceedings were held before the Board on 26 April 1999.

VI. During the oral proceedings, the Appellant specifically discussed documents (6) and (7). In his submission, document (7) taught that the hydrophobicity and dispersibility of the microfine titanium dioxide particles used in sunscreen compositions could be improved by using an organo-silicone coating, while document (6) advocated the coating with hydrogenated lecithin of pigmentary titanium dioxide in cosmetic compositions. He therefore concluded that, since the problem of dispersion was the same independently of the titanium dioxide particle size, the skilled person would have applied the same means used for the pigments of (6) to the microfine titanium dioxide particles of (7) as well.

Accordingly, the Appellant concluded that the subject-matter of the patent in suit was obvious in the light of the combination of the teachings of documents (7) and (6).

VII. The Respondent (Patentee) for his part contended that the subject-matter of the patent in suit involved an inventive step because the prior disclosure relating to titanium dioxide as pigment belonged to a completely unrelated technical field (visible white pigment and paints versus transparent UV sunscreen) so that the skilled person would not have looked for a solution of the technical problem in these fields, i.e. in document (6).

Furthermore, so he argued, a skilled formulator knowing that lecithin coating was sufficient to stabilise pigmentary titanium dioxide could not conclude that this coating would have been sufficient to stabilise the more unstable microfilm titanium dioxide.

Therefore, it was not sufficient for the Appellant merely to demonstrate that the skilled person **could** have used a phospholipid as a coating for microfine titanium dioxide particles but rather whether he **would** have done it in the light of the prior-art teachings.

VIII. The Appellant requested that the decision under appeal be set aside and that Patent No. 0 446 290 be revoked.

The Respondent requested that the appeal be dismissed and that the patent be maintained.

Reasons for the Decision

1. The appeal is admissible.

2. The only question to be considered in the present decision is whether or not the subject-matter of Claim 1 involves an inventive step within the meaning of Articles 52(1) and 56 EPC.

2.1 In the Board's opinion document (7) represents the closest state of the art. In fact, this document offers not only all of the same technical teaching as document (1), but gives additional important technical information absent in (1). This opinion has been shared by the parties.

In detail, document (7) concerns anti-suntan cosmetic compositions comprising zinc oxide. The composition may also contain finely divided titanium oxide of size 30 to 70 mμ (ie nm). The microfine titanium dioxide particles as such are disclosed in reference example 2 and in figures 5 and 6. They are said to be very effective for ultraviolet rays in both the UV-A and the UV-B regions while they remain transparent in visible light (page 1, lines 5 to 7, lines 44 to 47 and figure 6, curve c; page 8, lines 6 to 14 and figure 5).

In addition, said document deals with the dispersibility problem of the microfine titanium dioxide particles. It says that, because of their high surface activity, the microfine titanium dioxide particles tend to coagulate or to clump and have poor dispersibility (page 3, line 6). In order to prevent coagulation, the document advocates hydrophobicising

the outer surface of the microfine titanium dioxide particles by means of organo-silicone oils, metal soaps or dialkyl phosphate (page 2, lines 54 to 62, page 3, lines 7 to 9).

Moreover, figure 6 illustrates that the microfine TiO_2 particles hydrophobicised with silicon oils have better dispersibility and better ultraviolet ray absorbency than the corresponding microfine titanium dioxide particles treated with metal soaps. In fact, these latter have been found to coagulate, which appreciably increases UV transmittance and impairs the ultraviolet ray screen effect (reference example 2, page 8, lines 28 and 29).

The Board recognises that the comparative examples reported in the patent in suit demonstrate that the sunscreen compositions comprising the phospholipid-coated particles according to claim 1 do indeed have an improved UV screening efficiency over the aluminium stearate coated particles sold under the trade name MT100T and falling, as recognised by both parties, within the meaning of "metal soap" used in (7).

However, from document (7) it is also evident that such an improved effect over metal soap coatings had already been achieved by using a silicone coating, as proved by the comparison of curves C and A in figure 6 and explained on page 8, lines 28 to 33 of (7). Yet, no improved property of the claimed particles over said silicone-coated particles was demonstrated by the respondent.

2.2 Under these circumstances, the Board maintains that no

improvement over the closest prior art can be taken into account in identifying the technical problem to be solved by the invention. Such problem is therefore that of providing alternative fine-size (less than 100 nm) titanium dioxide particles having UV screening properties.

The problem is solved by the microfine titanium dioxide particles coated with phospholipid according to claim 1.

2.3 Since the examples disclosed in the patent in suit highlight the UV absorbing properties imparted to sunscreen compositions by the microfine titanium dioxide particles of claim 1, the Board is satisfied that the problem has been solved.

2.4 Thus the question to be answered is whether the proposed solution was obvious for the skilled person in the light of prior-art documents (6) and (7).

As already discussed above (point 2.1), document (7) makes plain the dependency of UV screening properties of titanium dioxide particles on the dispersibility of these particles (see reference example 2) and the dependency of dispersibility on the hydrophobicity of the particles (page 2, lines 60 to 63; page 3, lines 6 to 9). It is therefore evident to the Board that the skilled person, faced by the technical problem to be solved, would have focused his attention on alternative hydrophobic coatings. However, this document does not suggest the use of phospholipids as coating. Therefore no hint as to the proposed solution could be found in the closest prior art itself.

On the other hand, document (6) is concerned, among other objects, with the problem of increasing the water repellency (ie hydrophobicity) of pigment-grade particles, such as titanium dioxide, used in cosmetic compositions inter alia for protection against sun rays (page 2, lines 14 to 19 and page 6, lines 14 to 19, example 3, 5B; page 6, lines 14 to 19).

Document (6) teaches, moreover, that while metal soaps do not impart sufficient water repellency, pigments treated with silicone derivatives exhibit an excellent water repellency.

However, in order to improve even further the properties of the compositions, this document teaches to use hydrogenated lecithin, which is also envisaged as a suitable phospholipid in the patent in suit (see page 2, line 33 and example 11), rather than silicone derivates. It was in fact observed that hydrogenated lecithin, while maintaining the desired water repellency, avoided the problems typical of silicone-treated pigments, such as inferior adhesion to the skin and a tendency to dry the skin and to feel coarse (see page 1, second paragraph to page 2 line 19; page 10, example 3, in particular lines 20 to 24; example 4 and comparative example 3, in particular page 11, lines 24 to 26; and page 12, lines 1 to 12).

Thus, in the Board's judgement, document (6) offers clear guidance as to the alternative products, which can be used to replace the known metal soaps or organo-silicone derivatives for preparing titanium dioxide particles having good properties and hydrophobicity regardless of their size.

2.5 The Respondent stressed that the skilled person had no incentive to consider document (6) and to combine it with document (7). In fact, so he argued, document (6) related to the treatment of pigment-grade titanium dioxide particles, whereas the present invention related to fine-grade titanium dioxide particles, which were different and non-interchangeable products. He therefore concluded that document (6) would have been of no interest to a practician in the field of microfine titanium dioxide as these materials were used for different purposes.

In any case, the skilled person would not have expected that the positive results observed with pigment-grade titanium dioxide particles coated with hydrogenated lecithin could be reproduced on fine-grade particles, due to the different chemical and physical features of the two materials.

2.6 The Board cannot share the Respondent's opinion. Like document (7), document (6) also describes cosmetic compositions in solid and liquid (emulsion) form comprising inter alia hydrophobic particles of titanium dioxide (page 6 and example 5B). Therefore, in the Board's view (6) and (7) belong to the same technical field.

For this reason, it must be concluded that the skilled person, who is an expert in the formulation of cosmetic compositions and has necessarily knowledge of the dispersibility problems of cosmetic particles in general, would also have considered document (6) as a relevant prior art when looking for an alternative solution for imparting hydrophobicity and

dispersibility to microfine titanium dioxide particles.

Moreover he would have found the link between coarse and fine particles in the same document (6). In the section "Background of the invention" it is explained that in order to improve the properties of cosmetic pigments, including titanium dioxide particles, the pigments are made water- repellent with a coating of hydrophobic substances such as metal soaps or organo-silicones. Since these known means are not completely satisfactory, the document discloses the use of hydrogenated lecithin.

On the other hand, document (7) clearly teaches that the same known hydrophobic coatings, ie metal soaps or organo-silicones, can be used also on fine-grade titanium dioxide particles in order to achieve the same effect achieved in (6) on pigment-grade particles, ie enhancing the particle hydrophobicity, this result being obtained without affecting the original UV screening properties of the non-coated particles (as illustrated in Figure 6 of document (7)). Therefore, contrary to the Respondent's opinion, the skilled person was well aware that the treatment of titanium oxide particles with the same hydrophobic coating gave the same results regardless of the size of the particles. Accordingly, there was no reason for him to disregard the suggestion given by (6) that he could replace the known hydrophobic coating by hydrogenated lecithin also in the case of fine-grade titanium dioxide particles.

Therefore, the Board is convinced that the person skilled in the art faced with the technical problem

would have considered hydrogenated lecithin of (6) (ie a phospholipid within the scope of claim 1) as the most obvious solution to said problem.

2.7 Finally, the Respondent addressed the problem of the stability of emulsion/suspension of microfine titanium dioxide particles. He argued that, because of their greater surface activity, these emulsions would have been more difficult to stabilize than the pigment-grade emulsions described in (6). For this reason, the skilled formulator would not have taken into consideration, for coating microfine titanium dioxide particles, the coating described in (6) for pigment-grade titanium dioxide.

The Board does not dispute that a problem of stability exists, but also considers that it is a general problem well known to the skilled person since it applies to any emulsion or suspension system. On the other hand, the respondent failed to provide any convincing evidence that the stability problem of microfine particles would have amounted to a technical prejudice that would have dissuaded the skilled practician from taking into account a coating otherwise unambiguously suggested in the prior art.

Therefore, the Board holds that the different stability of titanium dioxide having different particle sizes would not have prevented the skilled person from considering the hydrogenated lecithin coating described in (6) as a valid alternative to the coating described in the closest prior art.

In view of the foregoing the Board judges that the

subject-matter of claim 1 does not involve an inventive step as required by Article 56 EPC.

Since Claim 1 of the unique set of claims is not allowable, there is no need for the Board to consider the remaining claims.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

P. Martorana C. Germinario