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D E C I S I O N
of 21 July 1998

Case Number: T 0493/96 - 3.2.1

Application Number: 90116880.7

Publication Number: 0415459

IPC: F16D 69/02

Language of the proceedings: EN

Title of invention:
Friction material and method of manufacturing therefor

Patentee:
Sumitomo Electric Industries, Ltd.

Opponent:
Verband der Reibbelagindustrie e.V.

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 99(1), 123(2), 123(3)

Keyword:
"Admissibility of opposition (yes) - no legitimate doubt as to identity of opponent"
"Addition of subject-matter (no)"
"Extension of scope (no)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
T 0635/88, T 0798/93

Catchword:
-

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Case Number: T 0493/96 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 21 July 1998

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 1 April 1996 concerning maintenance of European patent No. 0 415 549 in amended form.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
V. Di Cerbo

Summary of Facts and Submissions

I. European patent No. 0 415 459 was granted on 13 April 1994 on the basis of European patent application No. 90 116 880.7.

II. The granted patent was opposed by the present appellants on the grounds that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC). Of the prior art documents relied upon in the course of the opposition proceedings only the following have played any significant role on appeal:

(D1) US-A-4 735 975
(D3) EP-A-0 050 377
(D7) US-A-3 269 976

III. With its decision posted on 1 April 1996 the Opposition Division held that the patent could be maintained in amended form on the basis of independent claims 1 and 5 submitted during the oral proceedings held before it on 8 March 1996.

IV. An appeal against that decision was filed on 22 May 1996 and the fee for appeal paid at the same time. The appellants requested that the decision under appeal be set aside and the patent revoked in its entirety.

The statement of grounds of appeal was received on 31 July 1996. With the statement of grounds the appellants submitted scanning electron micrographs of a friction material "JURID 595" which had allegedly been on the market since 1985.

V. In a counterstatement received on 12 December 1996 the respondents (proprietors of the patent) queried the status of the appellants as the genuine opponents and with reference to decision T 635/88 (OJ EPO 1993, 608) requested that the appellants provide appropriate evidence in this respect. If this was not done then the opposition should be rejected as inadmissible. The respondents also argued that the newly alleged prior use was insufficiently substantiated.

VI. With a letter dated 6 June 1997 the appellants gave some brief information on their status and function and further information on the alleged prior use of "JURID 595". Some documentary evidence in this latter respect was filed with letter of 22 July 1997.

VII. In a communication of the Board pursuant to Article 11(2) RPBA dated 6 October 1997, the Board stated *inter alia* its provisional opinion that having regard to decision T 798/93 (OJ EPO 1997, 363) there was no reason to require the appellants to submit evidence confirming their status as opponents and that the new allegation of prior use should be disregarded pursuant to Article 114(2) EPC.

VIII. Oral proceedings before the Board were held on 21 July 1998.

At the oral proceedings the respondent submitted a revised version of claim 5 to replace the version agreed by the Opposition Division and requested maintenance of the patent in amended form on the basis of this claim together with existing claims 1 to 4 and 6.

Independent claims 1 and 5 read as follows:

"1. A friction material formed of thermosetting resin including a fibered substance as a main material and granules adjusting friction and wearing, said granules comprising inorganic substances having a plane netlike cystal structure, characterized in that said granules consist of said inorganic substances and a binder and are scattered in the friction material such that the crystal layers are arranged approximately in parallel to the friction surface and separation between layers of crystals of said inorganic substance occurs approximately along the direction of the surface of the friction material."

"5. A method of manufacturing a friction material formed of thermosetting resin including a fibered substance as a main material and granules adjusting friction and wearing, said granules consisting of an inorganic substance having a plane netlike crystal structure and a binder, and said method of manufacturing a friction material comprising the steps of:

granulating by a binder of at least a part of said inorganic substance without curing for forming said granules consisting of said inorganic substance and a binder

deforming the configuration of the granulation of said granules to be flat by both or either of pressure and heat during formation of said friction material from said thermosetting resin, said fibered substance and said granules

curing the friction material, and

abrading the friction material including said granules the configuration of granulation of which is flattened by formation to have a prescribed thickness."

Dependent claims 2 to 4 relate to preferred embodiments of the friction material according to claim 1 and claim 6 relates to a preferred embodiment of the method according to claim 5.

IX. The arguments of the appellants in support of their request for revocation of the patent can be summarised as follows:

Present claim 5 comprised features which were not originally disclosed and was now directed to a method different from that which was the subject of granted claim 5. Thus the present claim infringed both Article 123(2) and 123(3) EPC. In particular, there was no proper basis in the original disclosure for the requirements that the inorganic substance and binder were granulated without curing and that these granules were deformed into the necessary configuration during formation of the friction material. In fact, and this had been what was defined in granted claim 5, it was clear from the original disclosure that the flattening of the granules occurred as they were being produced, not later. Furthermore, present claim 5 was now directed to a method of making a semi-finished brake pad whereas granted claim 5 was concerned only with the production of the friction material *per se*. This inadmissibly extended the ambit of the claim 5.

The method of claim 5 was in any case fully anticipated by document D1. This document also concerned the manufacture of a friction material from thermosetting resin, fibres and granules consisting of a binder and at least one of a number of powdery substances, among

which was graphite. Two ways of forming the granules were clearly and unambiguously disclosed, one involving curing of the binder and one not. When uncured granules according to the second alternative were used they would inevitably be flattened during moulding of the friction material. Although the abrading step was not specifically mentioned in the document this was in practice always done to provide friction pads of the desired nominal thickness, so that it was implicit for the person skilled in the art. In the alternative it was obvious to apply an abrading step, such as disclosed in document D3, to the friction material made by the method of document D1, so that at the very least the subject-matter of claim 5 would lack inventive step.

Since the method taught by document D5 would inevitably result in a friction material having all the features of claim 1, then the subject-matter of this claim also lacked novelty.

In the event that document D1 was held not to disclose granulation without curing then reference should be made to document D7. Here, granules consisting solely of uncured binder and graphite were pressed with other powdery materials to form brake pads. All that was missing in comparison with the claimed invention was the addition of some fibrous material, as was very well known in the art, to the mixture. Nothing of inventive significance could be seen in taking this obvious step.

Since it had not proved possible to assemble the evidence necessary fully to substantiate the public prior use of the "JURID 595" friction material, this would no longer be pursued.

X. In reply the respondents argued substantially as follows:

It would be improper from the points of view of good faith and transparency to allow an opponent to hide behind the facade of an industrial association of which he was a member. Since the appellants had done nothing to assuage the serious doubts the respondents had raised as to the true identity of the opponent, the opposition should be rejected as inadmissible.

It could not be denied that the language of the original application had suffered in translation. However, it should be kept in mind that the addressee of the application was a person skilled in the art and that this person would do his best to make technical sense of it. On this basis it was clear from a number of passages in the original application that the granules were flattened into the configuration necessary to give the required orientation of the crystal layers at the stage when the friction material was formed under the action of heat or pressure or both and that to allow this the granules were left uncured before this stage. In comparison with granted claim 5 the present claim 5 merely set out these technical facts more clearly. Thus nothing had been added to the claim which could offend against Article 123(2) EPC and the scope of the claim had not been inadmissibly broadened in contravention of Article 123(3) EPC.

Document D1 did not disclose granules which consisted solely of inorganic substances having the required crystal structure and a binder. Nor did it disclose preparing such granules without curing the binder. In fact, the implicit teaching of D1, as it would be understood by the person skilled in the art, was that curing of the binder of the granules was an essential step for the achievement of the goal to which the

document was directed. If, however, the granules were already cured before hot pressing of the friction material took place then they would not be flattened at this stage in order to bring about the required orientation of the crystal layers of the graphite. Thus the subject-matter of claims 1 and 5 was both novel and inventive with respect to this state of the art.

Contrary to what had been asserted by the appellants document D7 did not disclose granules made up of a binder and graphite which were then pressed with other substances to form a friction brake pad. Thus this document was irrelevant to the patentability of the claimed invention.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64; it is therefore admissible.

2. *Admissibility of the opposition*

The respondents have called into question whether the appellants, a registered association of friction material manufacturers and as such a legal person within the meaning of Article 99(1) EPC, are the true opponents. They suspect that the latter are in fact one of the member companies of the association which is therefore not acting on its own behalf but rather as a puppet or "man of straw". With reference to decision T 635/88 (OJ EPO 1993, 608) they have therefore requested that the appellants provide evidence that they are acting in their own interest and at their own cost.

On this issue the Board concurs with the findings of decision T 798/93 (supra) which reviewed a number of previous decisions, including that relied upon by the appellants, and came to the conclusion that it followed from the expression "any person" used in Article 99(1) EPC that the EPO was fully entitled to take declarations of identity at their face value and was not obliged to make enquiries into an opponent's real identity by questioning the veracity of his declaration merely on the basis of doubts or suspicions about the opponent's actual declared identity. If, however, the veracity of the statements of identity was challenged on the basis of cogent evidence, an invitation to the named opponent to provide evidence as to his "true identity", for example by a sworn statement, could be justified.

In the present case no such cogent evidence has been presented by the appellants who have done no more than merely to state their suspicions in this respect. Their request that the opposition be deemed inadmissible on this basis is therefore rejected.

3. *Articles 123(2) and (3) EPC*

In comparison with granted claim 1 the present claim has been amended to make it clear that the stated way of separation of the crystal layers of the inorganic substance is achieved by virtue of the fact that these layers are "arranged approximately in parallel to the friction surface". A literal basis for this amendment, which was not challenged by the appellants, is not to be found in the original application. However, the

principle involved, which in any case appears to be more or less self-evident, is expressed in equivalent terms at page 13, lines 11 to 17; page 18, lines 16 to 21 and page 19, lines 17 to 23 of the original description.

Present claim 1 has also been restricted in respect to the granted claim by the requirement that the granules "consist of" the binders and the inorganic substances with a plane netlike crystal structure, in other words do not contain any other constituents. The basis of this amendment, which has also not been challenged by the appellants, is to be found in the preferred embodiments disclosed in the original application, all of which comprise granules consisting only of the constituents stated in the claim.

Claim 1 therefore meets the requirements of Articles 123(2) and (3) EPC.

The previously mentioned restriction to granules consisting of the binder and relevant inorganic substances has also been incorporated into present claim 5. Furthermore, the claim has been amended to indicate that it is at least a part of these "inorganic substances" that is granulated with the binder, it being possible - see page 19, lines 10 and 11 of the original application - also to incorporate an ungranulated amount of these substances into the friction material. The present wording of the claim in this respect is in the circumstances the only sensible interpretation of the rather obscure statement in granted claim 5 that the first step comprised "granulating by a binder at least a part of said granule formed of an inorganic substance". Both of these amendments are uncontentious. What is however highly contentious is the fact that the claim now specifies a method in which granulation is performed

without curing and then the granules are flattened by pressure and/or heat during formation of the friction material from the granules, resin and fibres. In the opinion of the appellants no such method was ever originally disclosed. Instead they take the view that the original application only taught the person skilled in the art to produce flattened granules during the actual granulation step, there being no subsequent deformation as the friction material was pressed into shape, and that such a method was the subject-matter of granted claim 5.

The respondents have candidly admitted that the syntax and terminology of the original application leave much to be desired. Nevertheless, they have sought to demonstrate that the person skilled in the art would find in that application several unambiguous indications that the method of making the friction material was as stated in present claim 5. In the opinion of the Board they have indeed succeeded in doing so. In particular, reference should be had first of all to the description on pages 10 to 12 of the preparation of various specific examples of granule for incorporation into a friction material. Of these only one "F-6" comprises cured granules, see page 10, lines 14 to 19, and it can be seen from Figure 2 that this example had the highest brake noise occurrence ratio, the phenomenon the invention sets out to minimise. The deleterious effect of curing the granules is also stated in general terms on page 13 at lines 1 to 5. At page 10, lines 22 to 25, it is further stated that the "uncured granulated substances of the abraded surfaces of the disc brake pads containing the granulated substances were extended by 10% or more and those of C-1, D, E, H, and I were extended by 30% or more". (In all of those quoted examples granulation was by means of a rotary pan.) In the circumstances it is difficult to see how this passage could be interpreted

otherwise than as meaning that the granules had been flattened after granulation, namely as the disc brake pad was formed. There follows on pages 17 to 19, with reference to Figure 4, a further description of the manufacture of disc brake pads from granules, resin and fibres. .In this context it is stated on page 18, at lines 11 to 16, that "Then, the binder for granulation can be softened and fluidized by heat or both heat and pressure in forming a friction material and the configuration of thus formed granulated substance is extended flat, differently from the original configuration. By using such binder, inorganic blocks of the plane netlike crystal structure such as mica are scattered in the surface of the friction material to be arranged along the direction of the friction and consequently, microseparation is liable to occur to effectively reduce brake noise of the brake."

Thus this passage confirms the impression gained from the passage on page 10 quoted above that the necessary flattening of the granules occurs on formation of the brake pad.

The respondents for their part rely on different passages of the original description and on Figure 4 itself in support of their view that flattening of the granules occurs at a different, earlier, stage in the manufacturing method. In particular, it is said on page 15, at lines 3 to 6, that the "method of compressing the block into a thin seat by a roll", i.e. one of the proposed granulation methods, "exceptionally allows mica and graphite to be arranged in one direction, which effectively prevents brake noise". Certainly, one interpretation of this passage is that one particular method of granulation leads to flattened granules in which the mica or graphite particles are arranged with the planes of their crystal structure approximately in the plane of the granules. That does not, however,

preclude that these granules are further flattened by pressure and/or heat as the friction material is formed, which is in fact confirmed by the passage at page 10, lines 22 to 25, quoted above to the effect that all examples of uncured granules (i.e. including "F-4", the only one made with a roll) are extended by 10% or more.

The second passage relied upon by the appellants is found in the last paragraph of page 19 of the original application and reads "since the inorganic substance such as mica having the plane netlike crystal structure is granulated by the binder, which is formed without being cured, so that the configuration of the granulation of mica or the like is made flat, micro-separation is liable to occur in the friction surface of the disc brake pad."

This passage refers to the method portrayed schematically in the block diagram of Figure 4 of which box 102 contains the text "Flattening configuration of granulation of mica or the like by forming granulated mica or the like by either or both of the pressure and heat".

The appellants interpret these two statements as meaning that the granules are "made" or "formed" in a flattened state, so that there is no subsequent flattening of them to achieve the desired crystal orientation.

Here it has to be emphasised that the method referred to involves granulation by means of a rotary pan which would appear unlikely from basic technical considerations to give flattened granules with a preferred orientation of the crystals of inorganic substance contained in them. In the light of this and having regard to the passage at page 18, lines 11 to

16, quoted above, which also relates specifically to the method of Figure 4, it is difficult to square the interpretation adopted by the appellants with the technical facts and the remainder of the application. As a consequence the Board cannot accept that this would be the meaning the person skilled in the art would attach to these statements, when viewed in their proper context.

The Board is therefore satisfied that the original application, when seen as a whole, discloses the method defined in present claim 5. The requirement of Article 123(2) EPC is therefore met. For analogous reasons the Board is also satisfied that the reference in granted claim 5 to "deforming the configuration of the granulation of said granule to be flat by forming said granulated granule by both or either of pressure and heat" would not be understood by the person skilled in the art, when read in the context of the rest of the claim and in the light of the description, as meaning that the granules were necessarily produced in a flattened state by the granulation process, so that present claim 5, which makes it clear that the deformation referred to occurs on formation of the friction material, does not infringe Article 123(3) EPC in this respect.

The last objection of the appellants against present claim 5 is that it has been laterally shifted in comparison with granted claim 5 insofar as it is now in effect directed to the manufacture of a semi-finished brake pad whereas before it merely concerned the compounding of a friction material. The Board can find no merit in that argument. Since granted claim 5 already contained a reference to "abrading the friction material...to have a prescribed thickness" it is apparent that it too was directed to manufacture of a semi-finished product, not withstanding the fact that

the claim did not explicitly include the nevertheless implicitly required step of forming the friction material from the granules, resin and fibres. Thus present claim 5 also in this respect meets the requirement of Article 123(3) EPC.

The amendments made to the description of the patent specification in the course of the opposition proceedings do not go beyond what was necessary to bring this into line with the terms of the amended claims and to refer to document D1 as relevant background art.

In summary, the amendments on the basis of which maintenance of the patent is requested are formally admissible.

4. *Novelty and inventive step*

As portrayed in the introductory description of the patent specification the aim of the claimed invention is to provide a friction material in which brake noise is reduced without a reduction of the braking friction coefficient (page 3, lines 8 to 10). In this context it has already been mentioned at page 2, lines 46 to 50, that the addition of a solid lubricant such as graphite will reduce brake noise, the large quantity of graphite needed for this purpose however also significantly reducing the friction coefficient.

In very general terms, what the invention proposes to do is to arrange the particles of graphite, mica or other inorganic substance with a "plane netlike crystal structure" in such a way that the crystal layers are approximately parallel to the friction surface of the material. As a consequence there will be on braking micro-separation of the particles along these planes

which will suppress the stick-slip phenomenon and hence brake noise. In comparison with a material in which corresponding particles are incorporated randomly they are therefore used much more efficiently, so that a smaller quantity is required to give the desired reduction in brake noise. The required alignment of the individual particles is achieved by incorporating them in granules which consist of the particles and an uncured binder; these granules are then compounded with thermosetting resin and fibres to form a mixture which is then treated by heat and/or pressure to produce the friction material; since the binder in the granules is uncured the granules are flattened in the course of this treatment, thus bringing about a rearrangement of the particles in the manner desired. According to the respondents, although the patent specification itself is silent on this, the rearrangement of the particles is assisted by the fact that no other materials apart from the particles and the binder are present in the granules.

The main citation of the appellants, document D1, is concerned with providing a friction material having low brake "fade" (i.e. the reduction in friction coefficient as the friction material heats up). According to the introductory description of document D1 fade can be attributed to the release of a gas on decomposition of the friction material at high temperatures. It is therefore proposed to increase the porosity of the friction material to allow the gas to escape. To do this it is proposed (cf. claim 1 of the document) to form the friction material of 40 to 95% by volume of granular material and a thermosetting binder resin for the granular material, the granular material having been produced by binding at least one powder material with a binder resin and having a particular

stated particle size. The powder material may be organic (e.g. cashew nut shell dust or rubber powder), inorganic (e.g. barium sulphate, antimony sulphide or calcium carbonate) metallic (e.g. copper or iron) or a lubricant (e.g. graphite or molybdenum disulphide).

The appellants concede that document D1 makes no mention of any particular orientation of the graphite particles incorporated into the friction material. In their opinion, however, all of the steps of present claim 5 are either explicitly or implicitly disclosed in this document, so that not only does the subject-matter of that claim lack novelty but also that of claim 1, since the disclosed method would inevitably lead to the product defined there. In principle the Board accepts the logic of that approach. For the following reasons it is however not satisfied that the appellants have succeeded in showing that the method disclosed in document D1 corresponds to that defined in present claim 5.

In the first place, the Board cannot accept the argument of the appellants that the reference in claim 1 of document D1 to the granular material being produced from "at least one" powder material and a binder resin, in combination with the presence of graphite among the list of possible powder materials, constitutes a direct and unambiguous disclosure of a granular material consisting only of graphite and binder. In this context it is appropriate to refer to the only composition of granular material specifically disclosed according to Table 1 in which graphite makes up only slightly less than 20% by volume of the various powder materials (five in all) which are present. Also of interest in this respect is the fact that the preferred composition of granular material comprises both an inorganic powder material and a powdery lubricant, cf. claim 3.

Secondly, the Board is not convinced that document D1, when read as a whole, makes an unambiguous disclosure of the binder of the granules not being cured. According to column 2, lines 30 to 33, of the citation the granules to be used should have a dense and tough structure. At column 3, lines 7 to 12, it is stated that the granular material should have such strength that it is not broken under subsequent moulding conditions since if the granules are broken, the required porosity is not obtained. The person skilled in the art will take these general conditions into account when evaluating what document D1 says about how the granular material should be produced. The passage particularly relied upon by the appellants in this context (column 2, lines 43 to 49) reads as follows:

"Granulation of the powder material may be carried out by any of a number of conventional methods, for example, by rolling granulation or extrusion granulation. Alternatively, the powder material and the binder may be molded by compression or extrusion molding to form a more dense molded article and then ground to form the granular material."

The appellants also placed great weight on the schematic representation of the overall manufacturing process contained in Figure 2. Here three boxes labelled "molding", "cure" and "comminution" represent the main path for producing the granular material. Alongside them, in a parallel alternative path is a single box labelled "granulation". From this the appellants draw the conclusion that the alternative granulation method does not involve curing since if it did, then it would be shown in the Figure.

Now, whether the fact that a process step is not mentioned in a prior art document or a particular passage of that document will be understood by the person skilled in the art as meaning that that process step is definitely not performed depends on the particular circumstances of the case. Interestingly, the appellants argue conversely with respect to the abrading step; namely that document D1 implicitly discloses it, although it is not mentioned there. In the present case all of the particular examples disclosed in the document use granular material which was produced by the method of moulding, curing and comminuting. There is no doubt that this method will give granular material with the required strength. In the light of that requirement the person skilled in the art would however have genuine reason for doubt as to whether granulation by some conventional method, without subsequent curing of the granules, would be likely to lead to what is needed. Accordingly the absence of curing being mentioned in the context of this alternative route towards a granular material cannot be seen as being equivalent to a genuine disclosure of no such curing taking place.

Thus the Board has come to the conclusion that document D1 does not anticipate the subject-matter of present claim 5 with respect to either the composition of the granules or the uncured nature of the binder in them. For completeness it should also be added that there is no implicit disclosure of an abrading step in document D1, although it can be accepted that this step is conventional in the art, as witnessed by document D3.

As a consequence of the above it is apparent that the subject-matter of claim 1 is also novel with respect to D1 since the composition of the granules is not as required and the use of pre-cured granules would not lead to the stated orientation of the graphite particles.

The appellants have made no real attempt to argue that the subject-matter of claims 1 and 5 would lack inventive step if held to be novel with respect to document D1 (apart from if the only difference was to be seen in the abrading step in which case document D3 was prayed in aid). That is understandable, given that the claimed invention and document D1 are directed to solutions of completely different technical problems. Certainly, the Board can see no obvious reason why the person skilled in the art would modify the teaching of document D1 to use granular material consisting only of graphite and binder and to leave that binder uncured in the expectation of any technical advantage.

Instead, the appellants rely much more on document D7 with respect to the question of inventive step. In their opinion the only distinction between the claimed invention and what is disclosed in document D7 is that in the latter the friction material does not comprise fibres. This argument appears to be based on a misunderstanding. The friction material of document D7 comprises graphite "granules", metal "granules" and a thermosetting resin. Preferably the graphite granules and the resin are intimately admixed before being mixed with the metal granules. It is not however said that the graphite granules consist of graphite particles and an uncured binder and indeed no information at all is given as to how these granules are obtained. Thus, it is in no way possible to equate these granules with those to be found in the claimed invention.

In summary, the Board has therefore come to the conclusion that the subject-matter of present claims 1 and 5 is novel and involves an inventive step with respect to the state of the art relied upon (Articles 52(1), 54, and 56 EPC):

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

   Claims 1 to 4 and 6, description and drawings underlying the decision under appeal; claim 5 as submitted at the oral proceedings.

The Registrar: The Chairman:

S. Fabiani F. Gumbel