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Datasheet for the decision of 30 May 2012

Case Number: T 1044/10 - 3.2.08

Application Number: 04255582.1

Publication Number: 1517062

IPC: F16D 69/02

Language of the proceedings: EN

Title of invention:
High coefficient friction material with symmetrical friction modifying particles

Applicant:
BorgWarner, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1044/10 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 30 May 2012

Appellant: (Applicant)
BorgWarner, Inc.
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Auburn Hills, MI 48326-2872 (US)

Representative:
Hedges, Martin Nicholas
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Decision under appeal:
Decision of the Examining Division of the European Patent Office posted 26 November 2009 refusing European patent application No. 04255582.1 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: M. Alvazzi Delfrate
D. T. Keeling

Summary of Facts and Submissions

I. By decision posted on 26 November 2009 the examining division refused European patent application No. 04 255 582.1.

II. The appellant lodged an appeal against this decision on 25 January 2010, paying the appeal fee on the same day. The statement setting out the grounds of appeal was filed on 26 March 2010.

III. The appellant requests that the appealed decision be set aside and that a patent be granted on the basis of the sole request filed with letter dated 3 April 2012.

IV. Claim 1 reads as follows:

"A friction material comprising a base material impregnated with at least one curable resin, the base material comprising i) a porous primary layer comprising a fibrous base material, and ii) a secondary layer comprising geometrically symmetrically shaped friction modifying particles at least partially covering an outer surface of the fibrous base material; wherein the geometrically symmetrically shaped friction modifying particles comprise a mixture of carbon particles and silica particles, the geometrically symmetrically shaped friction modifying particles being present at 0.2 to 80%, by weight, based on the weight of the primary layer, and wherein the geometrically symmetrically shaped friction modifying particles comprise 20% to 35%, by weight, of silica particles, and 65% to 80%, by weight, of carbon particles, based

on the total weight of the geometrically symmetrically shaped friction modifying particles."

V. The following documents play a role in the present decision:

D1: EP -A- 1 203 897;

D3: M. W. Anderson et al.: "Hierarchical Pore Structures through Diatom Zeolization" ANGEWANDTE CHEMIE, INTERNATIONAL EDITION, vol. 39, no. 15, 2000, pages 2707-2710;

D4: Y. Wang et al.: "Zeolization of diatomite to prepare hierarchical porous zeolite materials through a vapor-phase transport process" JOURNAL OF MATERIALS CHEMISTRY, vol. 12, 2002, pages 1812-1818; and

D5: Z. Liu et al.: "Synthesis of $ZnFe_2O_4/SiO_2$ composites derived from a diatomite template" BIOINSPIRATION AND BIOMIMETICS, vol. 2, 2007, pages 30-35.

VI. In support of its request the appellant argued essentially as follows:

D1 did not disclose a secondary layer comprising geometrically symmetrically shaped friction modifying particles that included a mixture of silica particles and carbon particles in which the silica particles were present at 20% to 35%, by weight, and the carbon particles were present at 65% to 80%, by weight, each based on the total weight of the geometrically symmetrically shaped friction modifying particles. This composition had been found to provide advantageous

results and was not hinted to by D1. First, D1 did not mandate the inclusion of both silica particles and carbon particles in the secondary layer. Such a combination of particles was just one of many possible combinations that might derive from the particle options listed in this document for the preparation of the secondary layer. Second, there was no relevant teaching in D1 that would have suggested the particular weight percent ranges called for in claim 1, should silica particles and carbon particles be chosen as friction modifying particles. The notion that a person skilled in the art could have easily conceived the friction material described in claim 1 using the generalized teachings of D1 along with routine experimentation seemed to be premised on a hindsight consideration of the prior art rather than what obvious direction the skilled reader would have actively derived from D1.

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

Reasons for the Decision

1. The appeal is admissible.

2. Inventive step

2.1 D1 discloses a friction material comprising a base material impregnated with at least one curable resin, the base material comprising a porous primary layer comprising a fibrous base material, and a secondary layer comprising friction modifying particles at least

partially covering an outer surface of the fibrous base material (see claim 1 and paragraph [0024]), wherein the friction modifying particles are present at 0.2 to 20% by weight, based on the weight of the primary layer (see claim 23).

2.2 However, D1 does not disclose that the friction modifying particles are geometrically symmetrically shaped particles, which comprise 20 % to 35%, by weight, of silica particles and 65% to 80%, by weight, of carbon particles, based on the total weight of the geometrically symmetrically shaped friction modifying particles.

Whether or not it was obvious to provide these features must be assessed in the light of the object to be achieved by the claimed invention and cannot be simply established on the basis of the presence or lack in D1 of an explicit teaching in this direction.

2.3 Although the appellant submitted that the particular values according to claim 1 had been found to provide advantageous results, said unspecified advantages cannot be derived from the application as filed and no evidence has been provided to support them. Therefore, the object underlying the claimed invention starting from D1 is to be seen merely in the selection of an appropriate material for the secondary layer.

In view of this object each of the possible compositions compatible with the teaching of D1 was an obvious choice. According to D1 useful friction modifying particles include silica particles; resin powders such as phenolic resins, silicone resins epoxy

resins and mixtures thereof; partial and/or fully carbonized carbon powders and/or particles and mixtures thereof; and mixtures of such friction modifying particles. Hence, a mixture of silica particles and carbon particles is a possible obvious choice for the secondary layer.

Diatomaceous earth, Celite ®, Celatom ®, and/or silicon dioxide are disclosed as especially useful silica particles (see paragraph [0060] and claims 5 and 25). These preferred silica particles correspond to the preferred ones according to the application in suit (see paragraph [0071] of the application) and are geometrically symmetrically shaped (see for instance D3, Figure 2, or D4, Figure 1 or D5, Figure 1). This shape is also common for carbon powder. Hence, a mixture of geometrically symmetrically shaped silica and carbon particles is compatible with the teaching of D1. Therefore, it was obvious to choose this shape to achieve the object above.

As no specific composition is taught in D1, the choice of an amount comprised between 20 and 35 in weight % for the silica particles and one between 65 and 80 weight% for the carbon particles is a possible one. Accordingly, since no advantage can be associated with the composition according to present claim 1, its choice has to be regarded as an arbitrary selection among the possible compositions for carrying out the teaching of D1. Hence, no inventive activity was required to choose it in order to achieve the object above.

As a consequence, although D1 neither mandates the inclusion in the secondary layer of both carbon and silica particles nor explicitly teaches the particular weight ranges stated in claim 1, the choice of the composition according to said claim for the secondary layer to achieve the object above was obvious.

Accordingly, the subject-matter of claim 1 does not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

V. Commare T. Kriner