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Datasheet for the decision of 29 October 2008

Case Number: T 0092/06 - 3.4.03

Application Number: 00303921.1

Publication Number: 1056099

IPC: H01C 10/30

Language of the proceedings: EN

Title of invention:
Resistor excellent in micro-linearity characteristic and wear resistance and variable resistor using the same

Applicant:
ALPS ELECTRIC CO., LTD.

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 84, 88, 87

Keyword:
"Lack of clarity (no)"

Decisions cited:
G 0002/98

Catchword:
Reasons 4 to 7

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0092/06 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 29 October 2008

Appellant: ALPS ELECTRIC CO., LTD.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 23 August 2005 refusing European application No. 00303921.1 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: R. G. O'Connell
Members: V. L. P. Frank
U. Tronser

Summary of Facts and Submissions

I. This is an appeal from the refusal of application 00 303 921 for lack of clarity (Article 84 EPC 1973).

The application was filed on 10 May 2000, claiming the priority of JP 14 501 199 filed on 25 May 1999.

II. The appellant applicant requested that the decision under appeal be set aside and that a patent be granted on the basis of the current set of claims or that the case be remitted for further prosecution.

III. Claim 1 reads as follows:

"A resistor containing 15 to 20 % by volume of carbon black and 15 to 20 % by volume of ground carbon fiber particles in a resistor base material, wherein the particle size distribution of the carbon fiber, as measured by a laser diffraction-diffusion method, is approximately equal to a logarithmic normal distribution and 80 % by volume or more carbon fiber of the whole carbon fiber is included in the particle size range from 1 to 20 µm."

IV. The following postpublished documents are cited in this decision:

D2: "Particle size analysis by laser diffraction: ISO 13320, standard operating procedures, and Mie theory" by R. M. Jones, American Laboratory, January 2003

D3: CILAS, "Theory: From the diffraction pattern to the distribution size" (http://www.particle-size-analyser.com/laser_diffraction_in_5_minutes.pdf)

D4: Beckman Coulter UK Ltd., "Particle size analysis – Evaluating laser diffraction systems in the light of ISO 13320-1" (http://www.beckman.com/literature/Bioresearch/ta-403.pdf).

D5: Printout of the online catalogue of the Beuth Verlag of the entry for the ISO 13320-1 standard, stating the publication date of ISO 13320 as November 1999 (http://www.beuth.de/langanzeige/ISO+13320-1/de)

Document D2 was cited in the decision under appeal; documents D3 to D5 were annexed to communications of the board.

V. The examining division found that the application did not meet the requirements of Article 84 EPC 1973, because it was not possible to decide unambiguously at the date of priority whether a resistor fell within the claim. Depending on the assumptions made on the particle-light-interaction, laser-diffusion-diffraction methods led to different results. Document D2 stated that at the end of the 90s (the claimed priority date of the present application) no standardisation for particle size measurements by the laser-diffusion-diffraction method existed. Two different models describing the interaction between the particles and the laser light, the Fraunhofer and the Mie model, were used at that time leading to different results for

particles with dimensions below some 10 µm. As regards the Mie model, no standardisation of the complex refractive indices for different particle materials existed.

VI. The appellant applicant argued essentially as follows:

– Exhibit 1, which was a scanning electron microscope photograph of ground (milled) carbon fibre, showed that the carbon fibre particles used in the present invention were nearly spherical. Therefore the standard theory relating to laser-diffraction-diffusion methods applied and the size and distribution of the carbon fibres could be measured by any laser diffraction-diffusion method.

– Exhibits 2(A), 2(B) and 2(C) were measurements of the particle size distribution made by a laser diffraction-diffusion method from samples of the same production lot. Although there were differences in the precise measurements, the measurements confirmed that the carbon fibre particle distributions were as specified in claim 1. Thus, different samples from the same production lot resulted in the same general distribution and would enable a skilled person to determine whether a sample fell within the terms of the claim or not.

– Exhibit 3 was related to a sample from the same production lot as in Exhibit 2 but using a different laser diffraction-diffusion measurement equipment. Even though a completely different equipment was used, and no information had been given about the use of any particular physical model, a particle

size distribution was obtained that also fell under the terms of claim 1.

– Therefore any laser diffraction-diffusion method, regardless of settings or physical models or principle models or assumptions could be used to obtain the necessary data to determine whether a particular sample fell within the claim or not.

It was further stated that the apparatus used for the particle size distribution measurements was a Partica LA-950, manufactured by Horiba, which complied with the International Standard ISO 13320.

Reasons for the Decision

1. The appeal is admissible.

2. *Technical background*

2.1 The application is directed to a resistor containing carbon black and ground carbon fibre particles in a resistor base material, wherein the particle size distribution of the carbon fibres, as measured by a laser diffraction-diffusion method, has the properties specified in claim 1.

2.2 Laser diffraction-diffusion measurements are a standard tool when determining particle size distribution. The sample to be measured is prepared so that a homogeneous suspension of the particles in a suitable medium is obtained. When the suspension is exposed to a monochromatic laser beam a diffraction pattern arises.

This pattern gives the light scattering intensity as a function of the diffraction angle, where the diffraction angle depends *inter alia* on the particle size. In the case of a distribution of particle sizes a complicated pattern is obtained which may be considered in a first approximation as the superposition of the patterns for each particle size (this approximation is essentially the Fraunhofer hypothesis). The Mie theory is the more rigorous optical solution but requires that the refractive index of the suspending medium and that of the particles as well as the particle's absorbency with respect to the irradiating light source be known. More detailed explanations are given in documents D3 and D4.

2.3 When calculating the particle size distribution from the light diffraction pattern the Fraunhofer approximation and the Mie theory give different results for particles smaller than about 50 µm (D4, page 8, "Adequacy of the optical model"). It is therefore recommended in ISO 13320 that the Fraunhofer approximation be used for particles larger than 50 µm while the Mie theory should be used for particles smaller than that (D2, page 46, rightmost column, 2nd paragraph).

3. Consequently, in order to determine whether the feature of claim 1 that "80 % by volume or more carbon fiber of the whole carbon fiber is included in the particle size range from 1 to 20 µm" is fulfilled or not the optical model underlying the calculation has to be known, since for this particle size range (< 50 µm) the Fraunhofer approximation and the Mie theory produce different particle size distributions according to ISO 13320.

4. The examining division found that the definition of the resistor of claim 1 was unclear (Article 84 EPC 1973) for the reason that **at the claimed (Paris Convention) priority date** the skilled person would have been unable to decide unambiguously whether a given resistor fell within the definition, since the priority document did not disclose which optical model (Fraunhofer approximation or Mie theory) was to be employed for interpreting the data.

5. The decision under appeal does not indicate any express legal basis for its conclusion that a lack of clarity at the priority date entails refusal. However, the observation: *"A clarification of claim 1 by amendment is not possible, since the whole application does not contain any information on the physical model used"* (decision under appeal, point 5), suggests a reasoning based on a lack of clarity at the priority date which had not been remedied at the filing date - since the originally filed application documents were identical to the priority document - and which could only be remedied subsequently by an impermissible subject-matter adding amendment.

6. This reasoning, albeit plausible, is unsound.

6.1 In the present quite unusual circumstances the issuing of ISO 13320, published in November 1999 according to D5 (ie after the convention priority date but before the filing date of the application), **is not prejudicial, but rather beneficial evidence of the common general knowledge in the art at (at least) the filing date,** that for particle sizes below 50 µm the Mie theory

should be applied, thus disambiguating the alleged lack of clarity in the definition of the resistor in claim 1. In effect the publication of ISO 13320 at a date intermediate between the priority and the filing dates expanded the state of the art, including the common general knowledge in the art, so that the understanding of the invention by the person skilled in the art differed at the respective dates. In effect the change in the state of the art in the priority interval added the subject-matter (ie the information) which on the basis of the evidence available was required to clarify the claim - by amending the interpretation of an unamended text.

6.2 In order to apply the Mie theory the complex refractive indices of the medium and of the particles have to be known. The examining division objected therefore in the decision under appeal that, as no standardisation of these indices existed, the subject-matter of claim 1 could not be determined. However, the board cannot recognize any reason that would hinder the skilled person to determine these complex refractive indices at the specific wavelength of the laser light, as the particles are identified in the claim as ground carbon fibres and there are only a limited number of adequate suspension mediums. The board therefore concludes that claim 1 of the application is clear within the meaning of Article 84 EPC 1973 in this respect also.

6.3 It follows that the refusal ground of (irremediable) lack of clarity was not well founded.

7. On the face of the evidence presently available it appears that claim 1 was not clear at the claimed

convention priority date. This would in turn cast doubt on the priority claimed being for the same invention within the meaning of Article 87 EPC and Article 88 EPC (G 2/98, OJ 2001, 413). Absent any intervening prior art prejudicial to novelty or inventive step it would be premature to decide this question now. It need hardly be said that an invalid priority claim is not as such a bar to the grant of a patent.

8. As the examination of the further requirements of the EPC has not yet been carried out, remittal of the case for further prosecution pursuant to Article 111(1) EPC 1973 is appropriate.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

Registrar Chair

S. Sánchez Chiquero R. G. O'Connell