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File Number: T 84/89
Application No.: 84 904 273.4
Publication No.: 0 168 409
Title of invention: Material vapor deposition technique

Classification: C23C 16/44

D E C I S I O N
of 8 February 1991

Applicant: American Telephone & Telegraph Company

Headword:

EPC Article 54(1)

Keyword: "Novelty (yes, after amendment)" - "Remittal to Examining
Division"

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 84/89

D E C I S I O N
of the Technical Board of Appeal
of 8 February 1991

Appellant : American Telephone & Telegraph Company
550 Madison Avenue
New York NY 10022 (US)

Representative : AT & T Intellectual Property Division
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Decision under appeal : Decision of Examining Division 2106.018 of the
European Patent Office dated 24 August 1988
refusing European patent application
No. 84 904 273.4 pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : E. Turrini
Members : C. Black
L. Mancini

Summary of Facts and Submissions

I. European patent application No. 84 904 273.4 based on International Application PCT/US 84/01813 (International publication No. WO 85/03088) was refused by decision of the Examining Division.

II. The decision was based on Claims 1 to 9 received 18 April 1987 of which Claim 1 reads as follows:

A process for forming a material layer on a surface of a substrate comprising the steps of forming a precursor gaseous flow and directing said flow with a directing means to contact said substrate, thereby inducing formation of said material layer, CHARACTERISED IN THAT 1) said surface of said substrate is, during said formation, spaced an average distance less than $1/4$ the substrate effective radius from a directing surface defined from said directing means by translating an incompressible imaginary sphere having a diameter of $1/10$ the substrate effective radius along all accessible surfaces of said directing means and 2) at least 50 percent of said gas flow that contacts said substrate undergoes said contact initially at an interior point of said surface before it cuts a plane that is tangent to the periphery of said substrate and normal to the surface of said substrate upon which deposition is desired.

Claims 2 to 9 are dependent claims relating to particular embodiments of the process according to Claim 1.

III. The reason for the refusal was that the subject-matter of Claim 1 was not novel having regard to the disclosure in US-A-2 789 064.

- IV. An appeal was lodged against this decision. The Appellant (applicant) requested that the decision be cancelled in its entirety and a patent granted. The essence of the Appellant's argument was that the subject-matter of the application involves a discrete substrate whereas US-A-2 789 064 discloses only continuous deposition on a moving continuous substrate.
- V. In a communication in accordance with Article 110(2) EPC the Board gave the provisional opinion that the claims of the application in suit were neither explicitly nor implicitly limited to deposition on to a discrete substrate. The disclosure in US-A-2 789 064 read on to the wording of Claim 1, so that the Examining Division appeared to be correct in finding lack of novelty. The Appellant was invited to file amended claims which brought out the alleged distinction.
- VI. In response, the Appellant filed an amended set of claims of which Claim 1, the only independent claim, reads as follows:

A process for forming a material layer on a surface of a substrate comprising the steps of forming a precursor gaseous flow and directing said flow with a directing means to contact said substrate, thereby inducing formation of said material layer, CHARACTERISED IN THAT the substrate is discrete with a defined periphery, in that said surface of said substrate is, during said formation, spaced an average distance less than $1/4$ the substrate effective radius from a directing surface defined from said directing means by translating an incompressible imaginary sphere having a diameter of $1/10$ the substrate effective radius along all accessible surfaces of said directing means; and in that at least 50 percent of said gas flow that contacts said

substrate undergoes said contact initially at an interior point of said surface and extends radially before it cuts a plane that is tangent to the periphery of said substrate and normal to the surface of said substrate upon which deposition is desired.

The Appellant submitted that the amended claim was now clearly distinguished from US-A-2 789 064, and in effect is requesting that the decision under appeal be set aside and a patent granted on the basis of the claims now under consideration.

Reasons for the Decision

1. The appeal is admissible.
2. Claim 1 forming the basis of the decision refusing the application is substantially identical with that originally filed. Claim 1 now under consideration includes the features that the substrate is discrete with a defined periphery (lines 6, 7 as numbered) and that the words "and extends radially" have been introduced after "said surface" (lines 14, 15). Neither of these amendments are considered as contravening Article 123(2) EPC. The substrate is certainly discrete, since all of those disclosed are disc-shaped semi-conductor substrates. As for the periphery, this is either circular, as in the discs, or such that the substrate can have an effective radius which is that of an imaginary circle having the same area as the deposition surface of the substrate (page 4, lines 1 to 4). Moreover, the periphery must be such that there can be a tangential plane normal to the substrate surface at all points of the periphery (Claim 1; page 3, line 36 to page 4, line 1; page 5, line 37 to page 6, line 2). Therefore, the

periphery can be said to be defined. The insertion "and extends radially" finds a basis in Figure 4 and the description, page 7, lines 18 to 22.

3. US-A-2 789 064 discloses only continuous deposition on a moving continuous substrate in the form of a strip (column 1, lines 15 to 21, 56 to 60, column 2, lines 49, 50). In this art the average skilled person distinguishes between continuous deposition on a moving continuous substrate and non-continuous deposition on a discrete substrate. In the Board's view this distinction is brought out by the wording "discrete with a defined periphery" even though a continuous substrate is, in the end, finite and, therefore, might be said to be discrete. It is true that Claim 1 does not say that the substrate is stationary, possibly so as not to exclude the embodiment referred to on page 5, lines 18 to 21 in which the substrate may rotate. However, it does not appear that the wording of the claim would permit any translational movement of the substrate during deposition, except for the unlikely possibility that substrate and directing means moved together. In any case, the description (figures and examples) confirms that the substrate does not undergo any movement other than rotational during deposition and also the summary of the invention on page 3 refers to "positioning" the substrate (line 28), implying that the location of the substrate is fixed in relation to the directing means.

Of course, a plurality of discrete substrates could be coated continuously by mounting them on a continuous strip. Such a possibility is not disclosed in US-A-2 789 064 and even if it were, the periphery of each advancing substrate would be contacted by the gas flow before an internal region.

Accordingly, the subject-matter of Claim 1 is considered to be novel with regard to the disclosure in US-A-2 789 064.

4. During the examination procedure, the Examining Division also raised the question of lack of novelty of original Claim 1 having regard to the disclosure in US-A-2 689 807. Here an article 19, such as a molybdenum turbine bucket, is disposed within a porous container 17 and supported therein by being embedded in coarse granular refractory material 20. The function of container 17 and material 20 is to provide surfaces other than that of article 19 for an initial decomposition of the material to be deposited. However, even if the surface of the refractory material 20 contacting the article 19 could be considered as functioning as a directing surface as in Claim 1 of the application in suit, it would seem that the precursor gas would be so slowed down by passage through the container 17 that it will reach the surface of article 19 more or less uniformly. In any case, since the article 19 is three-dimensional it cannot have a periphery such that a surface or plane which is tangential to the periphery is also normal to the surface of the substrate as required by Claim 1. Claim 1 is, therefore, also considered to be novel in the light of this disclosure.
5. The application was refused solely on the ground of lack of novelty. The question of inventive step was touched on during the examination procedure but only in respect of dependent claims. Further, in view of their finding of lack of novelty, the Examining Division did not investigate other requirements of the EPC, nor was it necessary for them to do so. In the circumstances, the Board considers it appropriate to make use of its powers under Article 111(1) EPC to remit the case to the Examining Division to continue examination of the application.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division with the order to continue the examination on the basis of Claims 1 to 8 accompanying the Appellant's letter of 25 October 1990 and received 31 October 1990, and Claim 9 as originally filed.

The Registrar:

The Chairman:

P. Martorana

E. Turrini