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File Number: T 0777/91 - 3.4.1

Application No.: 86 305 184.3

Publication No.: 0 207 801

Title of invention: Cathode/ground shield arrangement in a target for a sputter coating apparatus

Classification: H01J 37/34

DECISION  
of 4 May 1993

Applicant: Westinghouse Electric Corporation

Headword:

EPC Rule 29(1)

Keyword: "Essential features of the invention (yes, after amendment)"



Case Number : T 0777/91 - 3.4.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.1  
of 4 May 1993

**Appellant :** Westinghouse Electric Corporation  
Westinghouse Building  
Gateway Center  
Pittsburgh  
Pennsylvania 15235 (US)

**Representative :** van Berlyn, Ronald Gilbert  
23, Centre Heights  
London NW3 6JG (GB)

**Decision under appeal :** Decision of the Examining Division of the  
European Patent Office dated 27 June 1991  
refusing European patent application  
No. 86 305 184.3 pursuant to Article 97(1) EPC.

**Composition of the Board :**

**Chairman :** G.D. Paterson  
**Members :** R.K. Shukla  
Y. van Henden

**Summary of Facts and Submissions**

- I. The present appeal lies from a decision of the Examining Division refusing the application for contravening the requirements according to Rule 29(1) EPC. In particular, the Examining Division considered that independent Claim 1 which was amended in response to a communication pursuant to Article 96(2) did not specify all the technical features essential to solving the problem described in the application, namely, of preventing short circuit between the cathode and the ground shield by flakes of the sputtering material.
- II. Claim 1 forming the basis of the contested decision has the following wording:

"A sputter-coating-apparatus target comprising an elongate cathode, sputter target material disposed on an outer surface of the cathode on one side thereof, and a ground shield having the cathode disposed therein and including walls which surround the cathode, said ground shield enclosing the cathode on all sides thereof except said one side where the ground shield is open so as to leave said target material exposed, and said cathode and the ground shield being separated and electrically isolated from each other by a gap defined therebetween, characterized by means (90) mounted on a peripheral edge portion (66) of said outer surface (60) of the cathode (56) and forming a continuous peripheral ledge (94) which extends laterally outward beyond said peripheral edge portion (66) and overhangs said gap (96) and the adjacent edges (86) of said walls (88) of the ground shield (84) in spaced relationship therewith, whereby said gap (96) opens outwardly sideways relative to the cathode surface having said sputter target material disposed thereon."

III. The Applicant lodged an appeal against the decision and requested the grant of a patent on the basis of a new Claim 1 containing the following amendment:

after "means (90)", insert "in electrical contact with said sputter target material".

IV. In his written statement setting out the grounds of appeal, the Appellant submitted that the amended wording of the claim makes it clear that the prior art problem of short circuiting by flakes across the gap between the target material and the cathode is eliminated by the present invention.

**Reasons for the Decision**

1. In the application documents as filed, it is disclosed on page 8, lines 26 to 29 that strips 90, which correspond to means (90) in Claim 1, are electrically conductive and of the same polarity as the cathode. The amendments to Claim 1 specifying that the means (90) are in electrical contact with the sputter-target material have, therefore, a basis in the original description so that the amended subject-matter does not extend beyond the content of the application as filed (Article 123(2) EPC).

2.

2.1 The present invention relating to a sputter coating apparatus is a modification of a sputter coating apparatus known from the prior art document US-A-4 560 462. As acknowledged in the application in suit (see column 2, lines 6 to 29 and Figures 3, 7 and 8 of the published application), this prior art apparatus comprises an elongate cathode (56) and a sputter target material (58) disposed on an outer surface of the cathode

on one side thereof. In order to confine the sputtering to the sputter-target material only and prevent sputtering of any of the remaining exposed cathode surface, in the prior art apparatus a ground shield (64) is provided which encloses the cathode on all sides except the side on which the sputter-target material is provided so as to leave the latter exposed. The ground shield and the cathode are physically separated and electrically isolated from each other by a gap defined therebetween.

2.2 As disclosed in the application in suit, this gap between the cathode and the ground shield occasionally gives rise to a problem insofar as flakes of sputtered material land across the gap and bridge it so as to short-circuit the oppositely charged ground shield and cathode (see column 2, lines 30 to 42 of the published application).

2.3 In order to overcome the above problem, in the present invention as described and claimed, the prior art sputter-coating apparatus as described above is modified by the provision of a continuous peripheral ledge (94) which is mounted on a peripheral edge portion of the outer surface (60) of the cathode so that the ledge hangs over the gap (96) between the ground shield and the cathode and the adjacent edges of the walls of the ground shield in spaced relationship therewith. Moreover, the ledge is in electrical contact with the cathode. The gap, as a result, opens outwardly sideways, in contrast to opening inwardly sideways as in the prior art, relative to the cathode surface provided with the sputter-target material (see column 5, line 40 to column 6, line 32; Figure 7, 8, 9 and 10). Consequently, as correctly pointed out by the Appellant, any falling flakes of the sputtered material will not be able to bridge the gap between the cathode and the ground shield so that the problem of short-circuit does not arise. Thus, in the

Board's view, claimed subject-matter contains all the necessary technical features.

- 2.4 According to the invention as claimed, the peripheral ledge, which is not shielded by the ground shield, is maintained at the same electrical potential as the cathode, so that it will be subjected to ion bombardment during the sputtering. Consequently, as correctly observed by the Examining Division in its decision, along with the sputter-target material, the material of the peripheral ledge is also likely to be sputtered. In the Board's view, however, this is of no relevance since the present invention, as pointed out earlier, is solely concerned with preventing short-circuiting of **the gap between the cathode and the ground shield** (see column 2, lines 30 to 42).
3. For the foregoing reasons, in the Board's judgment, Claim 1 as amended meets the requirements of Rule 29(1) 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 grant a patent on the basis of Claim 1 as in section II with the amendments shown in section III above.

The Registrar

The Chairman

M. Beer

G.D. Paterson