

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 89308020.0

51 Int. Cl.<sup>5</sup>: H01J 31/12, H01J 3/02

22 Date of filing: 07.08.89

30 Priority: 08.08.88 JP 197411/88

43 Date of publication of application:  
14.02.90 Bulletin 90/07

84 Designated Contracting States:  
DE FR GB NL

98 Date of deferred publication of the search report:  
17.10.90 Bulletin 90/42

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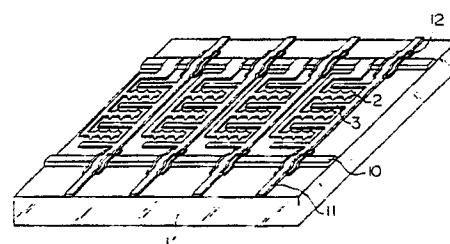
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54 **Image display apparatus and method of fabrication thereof.**

57 An image display apparatus comprising an insulating substrate (1) having electron sources (13) controlled by X-Y matrix electrodes (10, 11) and a face plate (4) coated with a phosphor material in opposed relationship with the substrate is disclosed. An electron source at each intersection of the X-Y matrix control electrodes is made up of a plurality of cold cathodes (2) connected to an X-control electrode (10) and a plurality of gate electrodes (3) connected to a Y-control electrode (11) opposed to the cold cathodes in the same plane, and the electron source is formed on the substrate surface on other than the X- and Y-control electrodes. A voltage applied between the cold cathodes and gate electrodes arranged in opposed relations on the same surface causes a high electric field of about  $10^7$  V/cm at the forward end of the cold cathodes leading to an electron emission. A part of electrons thus

emitted enters the anodes directly. Another part of electrons flow into the opposed gate electrodes to generate secondary electrons in the surface of the gate electrodes. The secondary electrons thus generated are accelerated by the positive voltage (anode voltage) applied to the phosphor surface of the opposed face plate and bombarded on the phosphor material, which is thus illuminated.

FIG. 4





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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       |                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                      | Relevant to claim                                                                                                                                                                                                                                                                     | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A                                                                                                                                                                                                                       | EP-A-0172089 (COMMISSAIRIAT A L'ENERGIE ATOMIQUE)<br>* page 8, line 26 - page 9, line 11 *<br>* page 10, line 28 - page 11, line 16 *<br>* page 16, lines 17 - 26; figure 3 *<br>----                                                              | 1-4                                                                                                                                                                                                                                                                                   | H01J31/12<br>H01J03/02                        |
| A                                                                                                                                                                                                                       | DISPLAYS (C.A.E TECHNICAL NOTE)<br>January 1987, GRENOBLE, FR<br>pages 37 - 40; G.LABRUNIE et al.:<br>"NOVEL TYPE OF EMISSIVE FLAT PANEL DISPLAY: THE<br>MATRIXED COLD-CATHODE MICROTIP FLUORESCENT<br>DISPLAY"<br>* the whole document *<br>----- | 1-4                                                                                                                                                                                                                                                                                   |                                               |
|                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       | TECHNICAL FIELDS<br>SEARCHED (Int. Cl.5)      |
|                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       | H01J31/00<br>H01J29/00<br>H01J03/00           |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       |                                               |
| Place of search<br>THE HAGUE                                                                                                                                                                                            |                                                                                                                                                                                                                                                    | Date of completion of the search<br>22 AUGUST 1990                                                                                                                                                                                                                                    | Examiner<br>ROWLES K. E. G.                   |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                       |                                               |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                                                                                                                                    | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                               |