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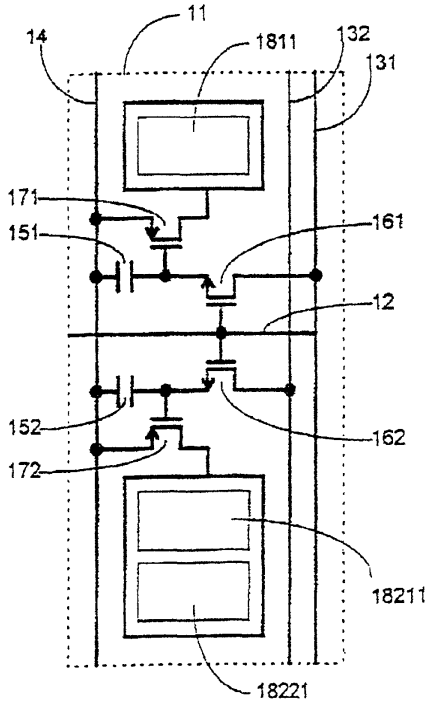
(54) Organic electroluminescent display device

(57) The invention provides a method and apparatus to obtain accurate gradation by obtaining an accurate ratio of light emitting parts in a display device which implements gradation by forming a plurality of TFTs and a plurality of OELDs in each pixel, interconnecting the TFTs and OELDs, and switching an on and off state of the TFTs, and controlling a light emitting area of the OELDs. A plurality of OELDs have the same shape, and gradation can be implemented by controlling the number of OELDs that emit light at a given time. Preferably a plurality of OELDs have a round shape. Also preferably plurality of OELDs are arranged at the same interval in a vertical and/or horizontal direction. According to this structure, because the light emitting areas of the plurality of OELDs become equal to each other, by controlling the number of OELDs, a ratio of the light emitting areas can be accurately obtained.

Fig. 7



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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 9261

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.7)
A	SARMA K R ET AL: "ACTIVE-MATRIX LCDS USING GRAY SCALE IN HALFTONE METHODS" PROCEEDINGS OF THE SID,US,SOCIETY FOR INFORMATION DISPLAY. PLAYA DEL REY, CA, vol. 31, no. 1, 1990, pages 7-11, XP000115902 * page 7, right-hand column, paragraph 2 - page 9, left-hand column, paragraph 1 * * figures 2-5 * ---	1	G09G3/32
P,A, D	EP 0 949 603 A (SEIKO EPSON CORP) 13 October 1999 (1999-10-13) * column 6, line 5 - line 44 * * figures 1,2 * ---	1	
A	US 5 585 695 A (KITAI ADRIAN H) 17 December 1996 (1996-12-17) * abstract * ---	2	
A	JP 56 088193 A (CITIZEN WATCH CO LTD) 17 July 1981 (1981-07-17) * the whole document * ---	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	JP 61 022326 A (CITIZEN TOKEI KK) 30 January 1986 (1986-01-30) * the whole document * ---	1	G09G
A	US 5 714 968 A (IKEDA NAOYASU) 3 February 1998 (1998-02-03) -----		

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
MUNICH	17 January 2003	Farricella, L

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-6

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 02 07 9261

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-6

   A display device comprising in each pixel a plurality of transistors and a plurality of subpixels, the subpixels being formed by a organic electro-luminescent elements having all the same emitting area.

2. Claims: 7-9

   A method of forming a display device comprising a step of forming a plurality of organic electro-luminescent elements having the same area by an ink-jet process.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 07 9261

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-01-2003

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		EP 0949603 A1	13-10-1999
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	有机电致发光显示装置		
公开(公告)号	EP1288903A3	公开(公告)日	2003-06-25
申请号	EP2002079261	申请日	2000-01-18
[标]申请(专利权)人(译)	精工爱普生株式会社		
申请(专利权)人(译)	SEIKO EPSON CORPORATION		
当前申请(专利权)人(译)	SEIKO EPSON CORPORATION		
发明人	KIMURA, MUTSUMI, SEIKO EPSON CORPORATION		
IPC分类号	G09G3/20 G06T5/00 G09F9/00 G09F9/30 G09G3/30 G09G3/32 H01L27/32 H01L51/50 H05B33/12 H05B33/14 H05B33/26		
CPC分类号	H01L27/326 G09G3/2074 G09G3/3208 G09G3/3258 G09G2300/0443 G09G2300/0465 G09G2300/0842 H01L27/3246 H01L27/3295		
代理机构(译)	斯特，CLIFFORD MARK		
优先权	1999021623 1999-01-29 JP 1999301448 1999-10-22 JP		
其他公开文献	EP1288903A2		
外部链接	Espacenet		

摘要(译)

本发明提供了一种方法和装置，通过在显示装置中获得精确的发光部分比率来获得精确的灰度，该显示装置通过在每个像素中形成多个TFT和多个OELD来实现灰度，互连TFT和OELD，以及切换TFT的导通和截止状态，以及控制OELD的发光区域。多个OELD具有相同的形状，并且可以通过控制在给定时间发光的OELD的数量来实现灰度。优选地，多个OELD具有圆形形状。同样优选地，多个OELD在垂直和/或水平方向上以相同的间隔排列。根据该结构，因为多个OELD的发光区域彼此相等，所以通过控制OELD的数量，可以精确地获得发光区域的比率。

Fig. 7