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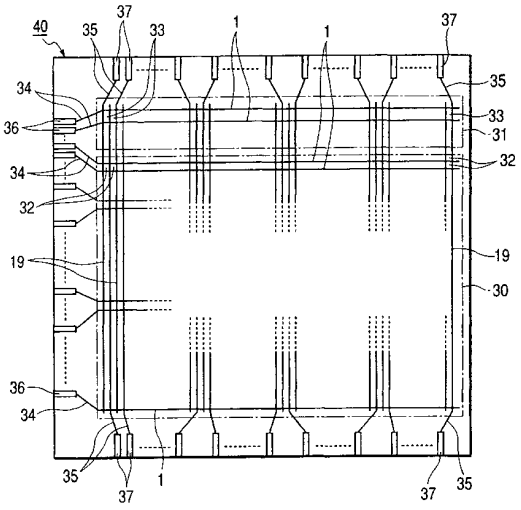
(54) **Active matrix type liquid crystal display**

(57) In an active matrix type liquid crystal display, there will be provided a liquid crystal display capable of preventing flickers from occurring even if the same potential may be applied to an opposite electrode without dividing an opposite electrode between a main display area (30) and a sub-display area (31) having pixel areas different in size respectively. On the surface of a TFT array substrate (40), a plurality of main scanning lines (1) and signal lines (19) are formed to intersect each other in a matrix shape, and in the vicinity of these intersected portions, there are respectively formed TFTs having gate electrodes connected to the scanning lines, pixel electrodes connected to TFTs, and a capacity electrode for forming storage capacity between it and the scanning lines. Also, on the TFT array substrate, there are formed a main display area having pixel areas equal to one another in size, each of the pixel area being enclosed with a plurality of scanning lines and signal lines, and a sub-display area having pixel area different, in size, from the pixel areas in the main display area, and on the opposite substrate, the opposite electrode is formed on the surface on the liquid crystal layer side. A ratio of the minimum space Db between each pixel electrode, the scanning line for driving it and the gate electrode in the sub-display area, to maximum space d between the opposite surfaces of the substrates is set to one or more, to thereby prevent flickers from occurring.

FIG. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 00 30 5778

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 673 986 A (HITACHI LTD) 27 September 1995 (1995-09-27) * page 7, line 45 - line 46 * * page 8, line 18 - line 21 * * page 9, line 52 - line 55 * * figure 3A * ---	1,2	G02F1/1343 G02F1/1368
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 09, 31 July 1998 (1998-07-31) -& JP 10 104664 A (SHARP CORP), 24 April 1998 (1998-04-24) * abstract * ---	1,2	
P,A	EP 1 006 720 A (ALPS ELECTRIC CO LTD) 7 June 2000 (2000-06-07) * paragraph '0010! * * figure 1 * ---	1,2	
X	EP 0 466 377 A (IBM) 15 January 1992 (1992-01-15) * page 2, line 33 - line 44 * * page 3, line 1 - line 4; figure 4 * ---	3,5, 12-14	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G02F
X	US 4 812 017 A (PIPER WILLIAM W) 14 March 1989 (1989-03-14) * column 2, line 40 - column 3, line 4; figure 1 * ---	3,5,13	
E	EP 1 093 009 A (ALPS ELECTRIC CO LTD) 18 April 2001 (2001-04-18) * paragraph '0017! * -----	3,5,13	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	7 June 2004	Petitpierre, O

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

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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:

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 00 30 5778

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: 1,2

   The essential features of these claims link the spacing between pixel electrodes and scanning lines with the cell gap, independently of (i) the resistance of any of the lines, (ii) the overlap area of scanning and signal lines, (iii) the TFT channel width, or (iv) the pixel storage capacity.

2. Claims: 3-15

   The essential features of these claims relate to the difference in (i) line resistance, (ii) overlap area of scanning and signal lines, (iii) TFT channel width, or (iv) pixel storage capacity between the main display area and the sub-display area, independently of the cell gap.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 30 5778

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
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07-06-2004

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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)	有源矩阵型液晶显示器		
公开(公告)号	EP1069463A3	公开(公告)日	2004-08-04
申请号	EP2000305778	申请日	2000-07-07
[标]申请(专利权)人(译)	阿尔卑斯电气株式会社		
申请(专利权)人(译)	ALPS ELECTRIC CO.，LTD.		
当前申请(专利权)人(译)	ALPS ELECTRIC CO.，LTD.		
发明人	NAKANO, AKIRA, ALPS ELECTRIC CO. LTD.		
IPC分类号	G02F1/133 G02F1/1333 G02F1/1343 G02F1/1362 G02F1/1368		
CPC分类号	G02F1/134336 G02F1/136213 G02F1/1368 G02F2001/133388 G02F2201/123		
优先权	1999332053 1999-11-22 JP 1999201688 1999-07-15 JP		
其他公开文献	EP1069463A2		
外部链接	Espacenet		

摘要(译)

在有源矩阵型液晶显示器，有将提供一种能够防止闪烁的发生，即使相同的电势可以在不分割的主显示区域（30）之间的相对电极被施加到对置电极的液晶显示器和子显示区域（31）具有分别尺寸不同的像素区域。在TFT阵列基板（40）的表面上，多条主扫描线（1）和信号线（19）形成为以矩阵形状彼此交叉，并且在这些相交部分的附近，分别有形成的TFT具有连接到扫描线的栅电极，连接到TFT的像素电极，以及用于形成存储的电容电极它与扫描线之间的容量。此外，在TFT阵列基板上，形成具有尺寸彼此相等的像素区域的主显示区域，每个像素区域被多条扫描线和信号线包围，以及具有像素的子显示区域在与主显示区域中的像素区域不同的区域中，在相对基板上，在液晶层侧的表面上形成相对电极。每个像素电极，用于驱动它的扫描线和子显示区域中的栅电极之间的最小空间Db与基板的相对表面之间的最大空间d的比率被设定为一个或多个，从而防止闪烁的发生。

FIG. 1