



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 245 995 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
15.12.2004 Bulletin 2004/51

(51) Int Cl.7: **G02F 1/13363, G02F 1/1335,
G02F 1/139**

(43) Date of publication A2:
02.10.2002 Bulletin 2002/40

(21) Application number: **02007411.8**

(22) Date of filing: **28.03.2002**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

- **Sato, Ichiro**
Kyotanabe-shi, Kyoto-fu (JP)
- **Ogawa, Shinji**
Neyagawa-shi, Osaka-fu (JP)
- **Yamakita, Hiroyuki**
Osaka-shi, Osaka-fu (JP)

(30) Priority: **30.03.2001 JP 2001098658**

(71) Applicant: **MATSUSHITA ELECTRIC INDUSTRIAL
CO., LTD.**
Kadoma-shi, Osaka-fu (JP)

(74) Representative: **Grünecker, Kinkeldey,
Stockmair & Schwanhäusser Anwaltssozietät**
Maximilianstrasse 58
80538 München (DE)

(72) Inventors:
• **Nishiyama, Kazuhiro**
Hirakata-shi, Osaka-fu (JP)

(54) **Liquid crystal display device**

(57) A liquid crystal display device comprises two substrates (111, 134), two electrodes (115, 133) arranged between the substrates (111, 134), a liquid crystal layer (120) disposed between the electrodes (115, 133) and having a retardation when giving a black display, and retardation layers (116, 132) positioned between the liquid crystal layer (120) and the substrates (111, 134). The sum of the retardation value of the liquid crystal layer (120) and the retardation values of the retardation layers (116, 132) is approximately zero for light incident on the substrate (134) when a voltage for giving the black display is applied across the electrodes (115, 133).

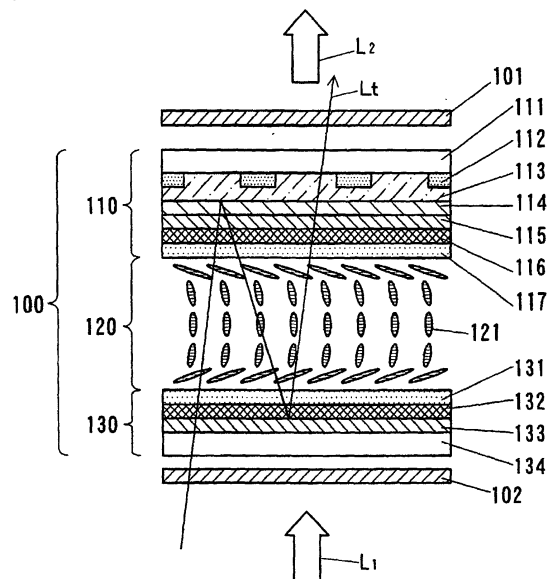


Fig.1

EP 1 245 995 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 00 7411

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)
D,Y	WO 01/09673 A (NAKAO KENJI ; HATTORI KATSUJI (JP); UEMURA TSUYOSHI (JP); ISHIHARA SHO) 8 February 2001 (2001-02-08) * abstract *	1-8	G02F1/13363 G02F1/1335 G02F1/139
P,Y	-& EP 1 118 902 A (MATSUSHITA ELECTRIC IND CO LTD) 25 July 2001 (2001-07-25) * the whole document *	1-8	
Y	EP 0 840 160 A (SHARP KK) 6 May 1998 (1998-05-06) * column 15, line 31 - column 16, line 47; figure 22 *	1-3,8	
Y	EP 0 656 560 A (OPTICAL IMAGING SYST) 7 June 1995 (1995-06-07) * abstract * * page 19, line 53 - page 20, line 31; figure 22 *	1,2,4-6	
Y	US 6 157 427 A (JUDGE LESLEY ANNE ET AL) 5 December 2000 (2000-12-05) * abstract * * column 3, line 58 - column 5, line 22; figures 1-3 *	1,2,7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G02F
Y	US 5 907 378 A (ABILEAH ADIEL ET AL) 25 May 1999 (1999-05-25) * abstract * * column 34, line 21 - column 35, line 46; figure 46 *	1,2,7	

-The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 July 2004	Examiner Ammerlahn, D
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03/82 (P04/C01)

**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:

1-9



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: 1-9

liquid crystal display device with retardation compensation
which is provided by a layer which also exhibits another
function (such as colour filter, alignment layer, electrode)

2. claims: 10,11

liquid crystal display device with particular colour filters

3. claims: 12-14

liquid crystal display device with a backlight and
particular light control means

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 02 00 7411

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.

13-07-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0109673	A	08-02-2001	CN 1316064 T	03-10-2001
			EP 1118902 A1	25-07-2001
			WO 0109673 A1	08-02-2001
			JP 2001188226 A	10-07-2001
			JP 2002116439 A	19-04-2002
			TW 538268 B	21-06-2003

EP 1118902	A	25-07-2001	EP 1118902 A1	25-07-2001
			CN 1316064 T	03-10-2001
			WO 0109673 A1	08-02-2001
			JP 2001188226 A	10-07-2001
			JP 2002116439 A	19-04-2002
			TW 538268 B	21-06-2003

EP 0840160	A	06-05-1998	GB 2318878 A	06-05-1998
			EP 0840160 A2	06-05-1998
			JP 10161112 A	19-06-1998
			KR 256434 B1	15-05-2000
			US 6577364 B1	10-06-2003
			US 6204904 B1	20-03-2001

EP 0656560	A	07-06-1995	US 5499126 A	12-03-1996
			AT 272851 T	15-08-2004
			CA 2137044 A1	03-06-1995
			DE 69433932 D1	09-09-2004
			EP 0656560 A2	07-06-1995
			JP 7199173 A	04-08-1995
			US 5818615 A	06-10-1998
			US 6169590 B1	02-01-2001

US 6157427	A	05-12-2000	JP 11072621 A	16-03-1999

US 5907378	A	25-05-1999	US 5706068 A	06-01-1998
			US 5570214 A	29-10-1996
			US 6028651 A	22-02-2000
			US 5859681 A	12-01-1999
			US 5793458 A	11-08-1998
			US 5694187 A	02-12-1997
			CA 2137047 A1	16-06-1995
			EP 0667553 A2	16-08-1995
			JP 7199176 A	04-08-1995
			US 6229588 B1	08-05-2001
			US 6023317 A	08-02-2000
			US 5594568 A	14-01-1997
			US 5576861 A	19-11-1996
			US 6226065 B1	01-05-2001

EPO FORM P0459

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

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 00 7411

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.

13-07-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5907378	A	US 5657140 A	12-08-1997
		US 5737048 A	07-04-1998
		US 5739881 A	14-04-1998

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)	液晶显示装置		
公开(公告)号	EP1245995A3	公开(公告)日	2004-12-15
申请号	EP2002007411	申请日	2002-03-28
申请(专利权)人(译)	松下电器产业有限公司.		
当前申请(专利权)人(译)	松下电器产业有限公司.		
[标]发明人	NISHIYAMA KAZUHIRO SATO ICHIRO OGAWA SHINJI YAMAKITA HIROYUKI		
发明人	NISHIYAMA, KAZUHIRO SATO, ICHIRO OGAWA, SHINJI YAMAKITA, HIROYUKI		
IPC分类号	G02F1/1335 G02F1/13363 G02F1/139		
CPC分类号	G02F1/1395 G02F1/133514 G02F1/13363 G02F2001/133565 G02F2413/02		
优先权	2001098658 2001-03-30 JP		
其他公开文献	EP1245995A2		
外部链接	Espacenet		

摘要(译)

液晶显示装置包括两个基板 (111,134) , 设置在基板 (111,134) 之间的两个电极 (115,133) , 设置在电极 (115,133) 之间的液晶层 (120) 和具有当给出黑色显示时延迟, 以及位于液晶层 (120) 和基板 (111,134) 之间的延迟层 (116,132) 。当施加用于给出黑色显示的电压时, 对于入射在基板 (134) 上的光, 液晶层 (120) 的延迟值和延迟层 (116,132) 的延迟值之和近似为零。电极 (115,133) 。

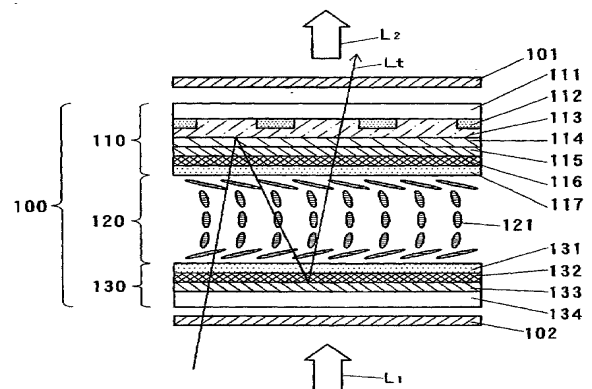


Fig.1