



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**01.09.2004 Bulletin 2004/36**

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

(43) Date of publication A2:  
**23.10.2002 Bulletin 2002/43**

(21) Application number: **02251953.2**

(22) Date of filing: **19.03.2002**

(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**

(72) Inventors:  
• **Yoshii, Katsumasa, C/o Alps Electric Co., Ltd.  
Ota-ku, Tokyo (JP)**  
• **Moriike, Tatsuya, C/o Alps Electric Co., Ltd.  
Ota-ku, Tokyo (JP)**  
• **Kano, Mitsuru, C/o Alps Electric Co., Ltd.  
Ota-ku, Tokyo (JP)**

(30) Priority: **19.04.2001 JP 2001121206**

(71) Applicant: **ALPS ELECTRIC CO., LTD.  
Ota-ku Tokyo (JP)**

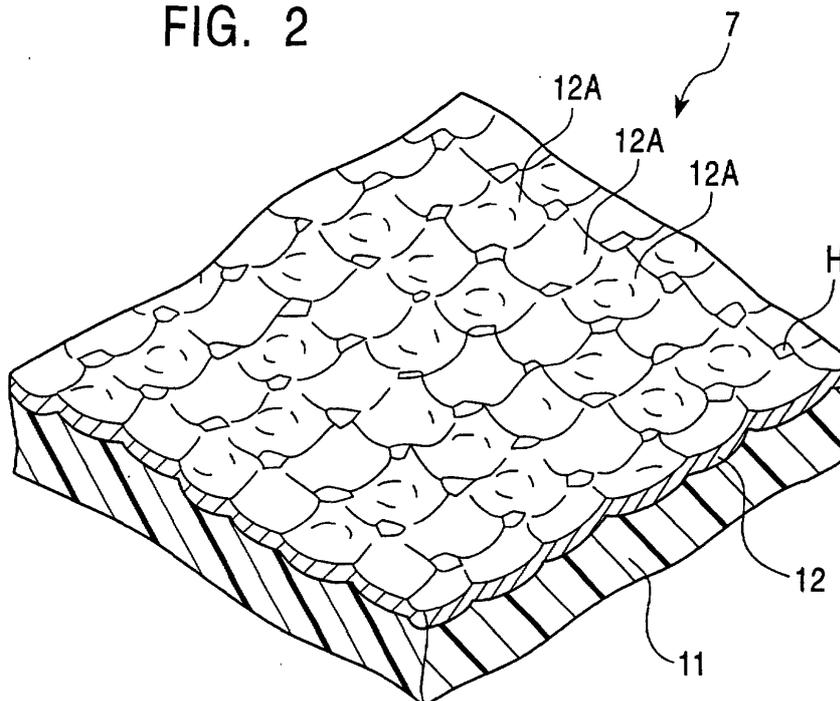
(74) Representative: **Kensett, John Hinton  
Saunders & Dolleymore,  
9 Rickmansworth Road  
Watford, Hertfordshire WD18 0JU (GB)**

(54) **Liquid crystal display device with improved viewing angle**

(57) A liquid crystal display device including a reflector (7) is provided. When an angle between a direction of a normal line with respect to a display surface of the liquid crystal display device and a main viewing direction

is from 0 degrees to 20 degrees, a reflection ratio peak value of light incident upon the liquid crystal display device and reflected by the reflector is set so as to occur within a range of 20 degrees from the normal line direction.

**FIG. 2**





European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 02 25 1953

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)
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 14, 22 December 1999 (1999-12-22) -& JP 11 242105 A (ALPS ELECTRIC CO LTD), 7 September 1999 (1999-09-07) * abstract *	1-8	G02F1/1335
E	-& US 6 429 919 B1 (MIURA AKITO ET AL) 6 August 2002 (2002-08-06) * column 7, line 3 - line 19 * * column 10, line 46 - column 11, line 5 * * figures 1,7,8 *	1-8	
P,X	EP 1 174 735 A (ALPS ELECTRIC CO LTD) 23 January 2002 (2002-01-23) * paragraphs [0052] - [0054] * * paragraphs [0065] - [0070] * * paragraph [0078] * * figures 6,8,9A,9B,12 *	1-6,8	
A	US 6 199 992 B1 (TANADA TETSUSHI) 13 March 2001 (2001-03-13) * the whole document *	1-8	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	US 6 130 736 A (OMOTE KENJI ET AL) 10 October 2000 (2000-10-10) * the whole document *	1-8	G02F
-----			
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		8 July 2004	Ammerlahn, D
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 92 (P04C01)

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

EP 02 25 1953

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.

08-07-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 11242105	A	07-09-1999	CN 1209566 A ,B	03-03-1999
			KR 272883 B1	15-11-2000
			TW 496992 B	01-08-2002
			US 6421106 B1	16-07-2002
			US 6429919 B1	06-08-2002
-----				
US 6429919	B1	06-08-2002	JP 11052110 A	26-02-1999
			JP 11042649 A	16-02-1999
			JP 11242105 A	07-09-1999
			CN 1209566 A ,B	03-03-1999
			KR 272883 B1	15-11-2000
			US 6421106 B1	16-07-2002
-----				
EP 1174735	A	23-01-2002	JP 2002022913 A	23-01-2002
			CN 1331464 A	16-01-2002
			EP 1174735 A2	23-01-2002
			US 2004056996 A1	25-03-2004
			US 2004056997 A1	25-03-2004
			US 2002030774 A1	14-03-2002
			JP 3515544 B2	05-04-2004
			JP 2002082213 A	22-03-2002
JP 2002328368 A	15-11-2002			
-----				
US 6199992	B1	13-03-2001	JP 10253810 A	25-09-1998
			JP 10312165 A	24-11-1998
			TW 531685 B	11-05-2003
-----				
US 6130736	A	10-10-2000	JP 11002807 A	06-01-1999
			JP 11014982 A	22-01-1999
			CN 1202633 A ,B	23-12-1998
			US 6219120 B1	17-04-2001
			US 6141073 A	31-10-2000
-----				

专利名称(译)	具有改善的视角的液晶显示装置		
公开(公告)号	<a href="#">EP1251390A3</a>	公开(公告)日	2004-09-01
申请号	EP2002251953	申请日	2002-03-19
[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.		
[标]发明人	YOSHII KATSUMASA C O ALPS ELECTRIC CO LTD MORIIKE TATSUYA C O ALPS ELECTRIC CO LTD KANO MITSURU C O ALPS ELECTRIC CO LTD		
发明人	YOSHII, KATSUMASA, C/O ALPS ELECTRIC CO., LTD. MORIIKE, TATSUYA, C/O ALPS ELECTRIC CO., LTD. KANO, MITSURU, C/O ALPS ELECTRIC CO., LTD.		
IPC分类号	G02F1/1335		
CPC分类号	G02F1/133553 G02F1/133555		
优先权	2001121206 2001-04-19 JP		
其他公开文献	EP1251390A2		
外部链接	<a href="#">Espacenet</a>		

摘要(译)

提供一种包括反射器 ( 7 ) 的液晶显示装置。当法线方向相对于液晶显示装置的显示表面与主观察方向之间的角度为0度至20度时，入射在液晶显示装置上的光的反射率峰值和由反射器反射的反射被设定为在与法线方向成20度的范围内。

