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(54) Liquid crystal display with wide viewing angle range

(57) In a liquid crystal display having a wide viewing angle range, comprising a first and a second retardation film each having negative optical anisotropy with its axial direction of anisotropy being tilted in a predetermined direction with respect to the normal line to the film plane, the first retardation film is inserted between a liquid crystal cell including a pair of alignment layers each on a substrate and a front polarizer and the second retardation film is inserted between the liquid crystal cell and a rear polarizer, respectively, such that the projection on the film planes of the axial directions are parallel to the aligning treatment directions of the liquid crystal cell. A third retardation film having refractive index anisotropy in the film plane is arranged between the first retardation film and the adjacent front polarizer such that the maximum refractive index direction in the film plane becomes parallel or perpendicular to the absorption axis of the front polarizer. The retardation difference generated by light that falls on the liquid crystal display along a direction which is oblique with respect to the normal direction is compensated by the third retardation film. Residual retardation in liquid crystal molecules near the substrate of the liquid crystal layer is compensated by the first and second retardation films. Hence, high-contrast display at a wide viewing angle can be obtained independently of the incident angle.

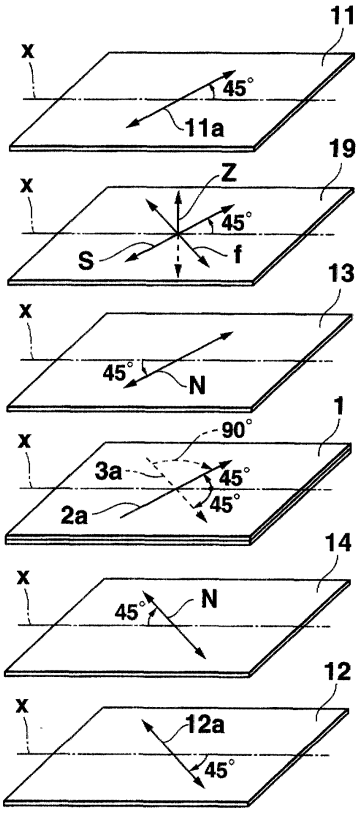

FIG.1

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EUROPEAN SEARCH REPORT

Application Number
EP 00 11 3712

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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 0 487 359 A (SHARP KK) 27 May 1992 (1992-05-27) * page 8, line 14 - page 9, line 6 * * figures 10,11 * ---	1-14	G02F1/13363
A	US 5 895 106 A (XU GANG ET AL) 20 April 1999 (1999-04-20) * column 7, line 14 - column 8, line 42 * * column 11, line 63 - column 12, line 12 * * figure 5 * ---	1-14	
P,A	EP 0 962 805 A (OPTICAL IMAGING SYST) 8 December 1999 (1999-12-08) * column 6, line 56 - column 8, line 26 * * column 11, line 36 - line 47 * * figure 1A * ---	1-14	
E	FR 2 789 186 A (SEXTANT AVIONIQUE) 4 August 2000 (2000-08-04) * page 7, line 31 - page 8, line 30 * * figure 3 * -----	1-14	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)
G02F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	18 November 2002	Petitpierre, O

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	具有宽视角范围的液晶显示器		
公开(公告)号	EP1069461A3	公开(公告)日	2003-01-22
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IPC分类号	G09F9/00 G02F1/133 G02F1/1335 G02F1/13363		
CPC分类号	G02F1/133632 G02F1/133634 G02F2413/105		
优先权	1999185974 1999-06-30 JP		
其他公开文献	EP1069461A2 EP1069461B1		
外部链接	Espacenet		

摘要(译)

在具有宽视角范围的液晶显示器中，每个都具有负光学各向异性的第一和第二延迟膜插入在它们之间，其中轴向上的折射率相对于膜平面的法线在预定方向上倾斜。液晶单元包括一对基板和前偏振器，分别位于液晶单元和后偏振器之间，使得沿着轴向的膜平面的方向分量沿着液晶单元的对准处理方向设定。在膜平面中具有折射率各向异性的第三延迟膜布置在第一延迟膜和相邻的前偏振器之间，使得膜平面中的最大折射率方向变得平行于或垂直于前偏振器的吸收轴。由相对于法线方向倾斜地入射在液晶显示器上的光产生的延迟差由第三延迟膜补偿。通过第一和第二延迟膜补偿液晶层基板附近的液晶分子中的残余延迟。因此，可以独立于入射角获得宽视角下的高对比度显示。

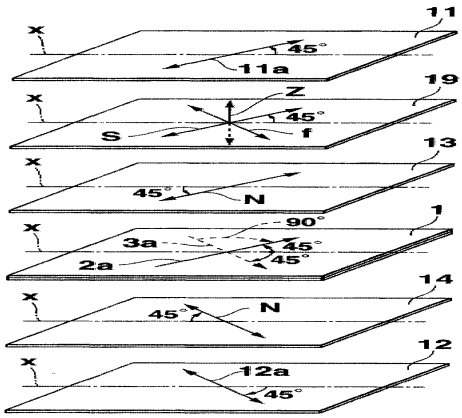

FIG.1