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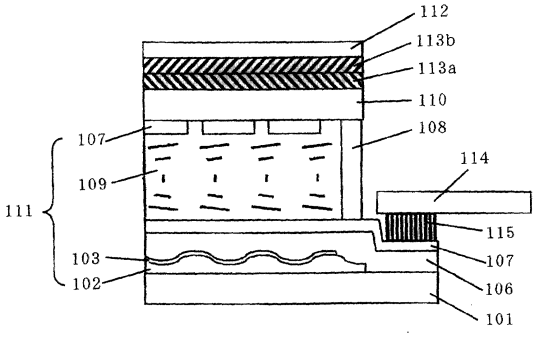
(54) Reflective liquid crystal display device

(57) A liquid crystal cell and an external circuit can be connected favorably. The terminal does not require undulated layer and flattened layer. Hence, the reliability of electric connection and physical connection of the terminal and transparent electrode can be enhanced. A reflective liquid crystal display element includes a lower substrate, an undulated layer, a reflective layer, a flattened layer, a transparent electrode, a sealant, a liquid crystal layer, an upper transparent substrate, a liquid crystal cell, a polarizing film, a first birefringent film, a second birefringent film, an external circuit board, and an anisotropic conductive adhesive. It further comprises a liquid crystal cell filling between an upper transparent substrate and lower substrate with liquid crystal, a polarizing film disposed at the upper transparent substrate side of the liquid crystal cell, a birefringent film layer disposed between the polarizing film and liquid crystal cell, and light reflecting means disposed at the lower substrate side of the liquid crystal cell. Undulated layer is not formed in the connection terminal between the lower substrate side of the liquid crystal cell and the external circuit board.

FIG. 1A



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3635

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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	ANONYMOUS: "Organic Resin Structure in Liquid Crystal Cell for Cell Thickness Control" IBM TECHNICAL DISCLOSURE BULLETIN, vol. 40, no. 12, 1 December 1997 (1997-12-01), pages 117-118, XP002196932 New York, US * the whole document * ---	1-5	G02F1/13 G02F1/1335 G02F1/1345
A	"COLOR LIQUID CRYSTAL DISPLAY" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 36, no. 5, 1 May 1993 (1993-05-01), page 483 XP000409069 ISSN: 0018-8689 * the whole document * ---	1-5	
A	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 03, 31 March 1999 (1999-03-31) -& JP 10 325953 A (SONY CORP), 8 December 1998 (1998-12-08) * abstract * ---	1-5	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G02F
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	28 August 2002	Kiernan, 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

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European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 00 12 3635

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: 1-5

   Independent device claims 1 and 3, concern the definition of the various structural features of a reflective liquid crystal display element. The contribution of the claimed subject-matter to the state of the art, concerns the specific positioning of a light shielding layer within the display device. In particular, the light shielding layer is defined as being disposed so as to suppress electric contact between the conductive portion of the reflective layer and the lower transparent electrode.

2. Claims: 6-22

   The subject-matter of independent device claims 6, 10 and 14 also concern reflective liquid crystal display devices. However, in this case the contribution to the state of the art concerns the technical feature whereby a connection terminal, located in a peripher portion of the lower substrate, said lower substrate and connection terminal being connected only through the lower transparent electrode

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3635

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)
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A	WO 98 52093 A (HIRAKI HAJIME ;UEKI SHUN (JP); MINOURA KIYOSHI (JP); MITSUI SEIICH) 19 November 1998 (1998-11-19) * figure 13 *	6,10,14	
P,A	-& EP 0 989 441 A (SHARP KABUSHI KAISHA) 29 March 2000 (2000-03-29) * figure 13 *	6,10,14	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	28 August 2002	Kiernan, L

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 12 3635

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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28-08-2002

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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)	反射式液晶显示装置		
公开(公告)号	EP1111436A3	公开(公告)日	2002-10-23
申请号	EP2000123635	申请日	2000-10-30
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)	东芝松下显示技术有限公司.		
[标]发明人	HATANAKA TAKAYUKI FUJITA SHINGO NISHINAKA MASAKI MIZUNO HIROSHI OGAWA TETSU		
发明人	HATANAKA, TAKAYUKI FUJITA, SHINGO NISHINAKA, MASAKI MIZUNO, HIROSHI OGAWA, TETSU		
IPC分类号	G02F1/133 G02F1/1335 G02F1/13363 G02F1/1345 G02F1/13		
CPC分类号	G02F1/1345 G02F1/133512 G02F1/133553 G02F1/13363		
优先权	1999364636 1999-12-22 JP 1999364642 1999-12-22 JP 1999364640 1999-12-22 JP		
其他公开文献	EP1111436A2		
外部链接	Espacenet		

摘要(译)

可以有利地连接液晶单元和外部电路。终端不需要波纹层和平坦层。因此，可以提高端子和透明电极的电连接和物理连接的可靠性。一种反射型液晶显示元件，包括下基板，波纹层，反射层，平坦层，透明电极，密封剂，液晶层，上透明基板，液晶盒，偏振膜，第一双折射薄膜，第二双折射薄膜，外部电路板和各向异性导电粘合剂。它还包括在上透明基板和下基板之间填充液晶的液晶单元，设置在液晶单元的上透明基板侧的偏振膜，设置在偏振膜和液晶单元之间的双折射膜层，光反射装置设置在液晶盒的下基板侧。在液晶单元的下基板侧和外部电路板之间的连接端子中没有形成波状层。

FIG. 1A