



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
27.03.2002 Bulletin 2002/13

(51) Int Cl.⁷: **G02F 1/1335**

(43) Date of publication A2:
12.07.2000 Bulletin 2000/28

(21) Application number: **00100346.6**

(22) Date of filing: **07.01.2000**

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

(30) Priority: **07.01.1999 JP 234599**

(71) Applicant: **MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
Kadoma-shi, Osaka 571-8501 (JP)

(72) Inventors:
 • **Hatanaka, Takayuki**
Kanazawa-shi, Ishikawa 921-8147 (JP)
 • **Fujita, Shingo**
Ishikawa-gun, Ishikawa 921-8802 (JP)
 • **Ogawa, Tetsu**
Kanazawa-shi, Ishikawa 921-8036 (JP)

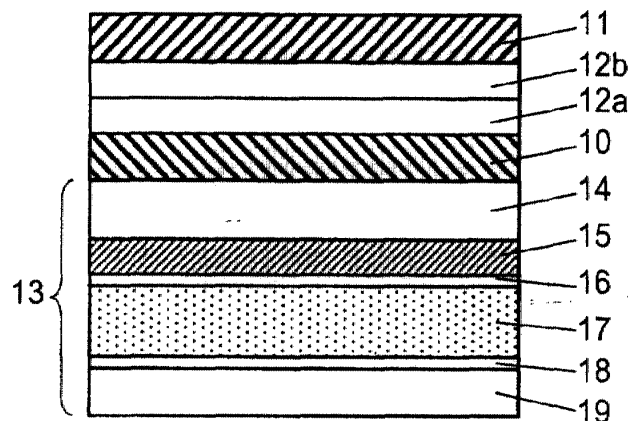
(74) Representative: **Kügele, Bernhard et al**
Novagraaf SA
25, Avenue du Pailly
1220 Les Avanchets - Geneva (CH)

(54) **Reflective liquid crystal display device**

(57) A reflective liquid crystal display device employing only one sheet of polarizer film, the liquid crystal display device comprising: a liquid crystal cell (13) comprising liquid crystal sealed between a pair of substrates (14 and 19), a polarizer film (11), two sheets of retardation film (12a and 12b), a scattering film (10), and a specular reflector (18). The twisting angle of the liquid crystal is between 220° and 260°. The retardation n L C-dLC of the liquid crystal is between 700 nm and 1000 nm,

and the retardation of the retardation films is |Rfilm(2) - Rfilm(1)| 200nm. A specific angular relationship is established among the alignment of the liquid crystal molecules, the slow axis of the two sheets of retardation film, and the absorption axis of the polarizer. This configuration provides the reflective liquid crystal display device with a bright white display, an achromatic black and white display with high contrast, and less dependence on viewing angle.

FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0346

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)
	-----		G02F1/1335
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
MUNICH	5 February 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			

EPO FORM 1503 03/92 (P04C01)

专利名称(译)	反射式液晶显示装置		
公开(公告)号	EP1018663A3	公开(公告)日	2002-03-27
申请号	EP2000100346	申请日	2000-01-07
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)	松下电器产业株式会社		
[标]发明人	HATANAKA TAKAYUKI FUJITA SHINGO OGAWA TETSU		
发明人	HATANAKA, TAKAYUKI FUJITA, SHINGO OGAWA, TETSU		
IPC分类号	G02F1/1335 G02F1/13363 G02F1/139		
CPC分类号	G02F1/1397 G02F1/13363 G02F2203/02		
优先权	1999002345 1999-01-07 JP		
其他公开文献	EP1018663A2		
外部链接	Espacenet		

摘要(译)

一种仅采用一片偏振膜的反射型液晶显示装置，该液晶显示装置包括：液晶盒（13），包括密封在一对基板（14和19）之间的液晶，偏振膜（11），两片延迟膜（12a和12b），散射膜（10）和镜面反射器（18）。液晶的扭转角在220°和260°之间。液晶的延迟 $n_L C \cdot d$ 在700nm和1000nm之间，并且延迟膜的延迟为 $|R_{film}(2) - R_{film}(1)|$ 。为200nm。在液晶分子的排列，两片延迟膜的慢轴和偏振器的吸收轴之间建立特定的角度关系。该配置为反射型液晶显示装置提供亮白色显示，具有高对比度的消色差黑白显示，并且对视角的依赖性较小。

FIG. 1

