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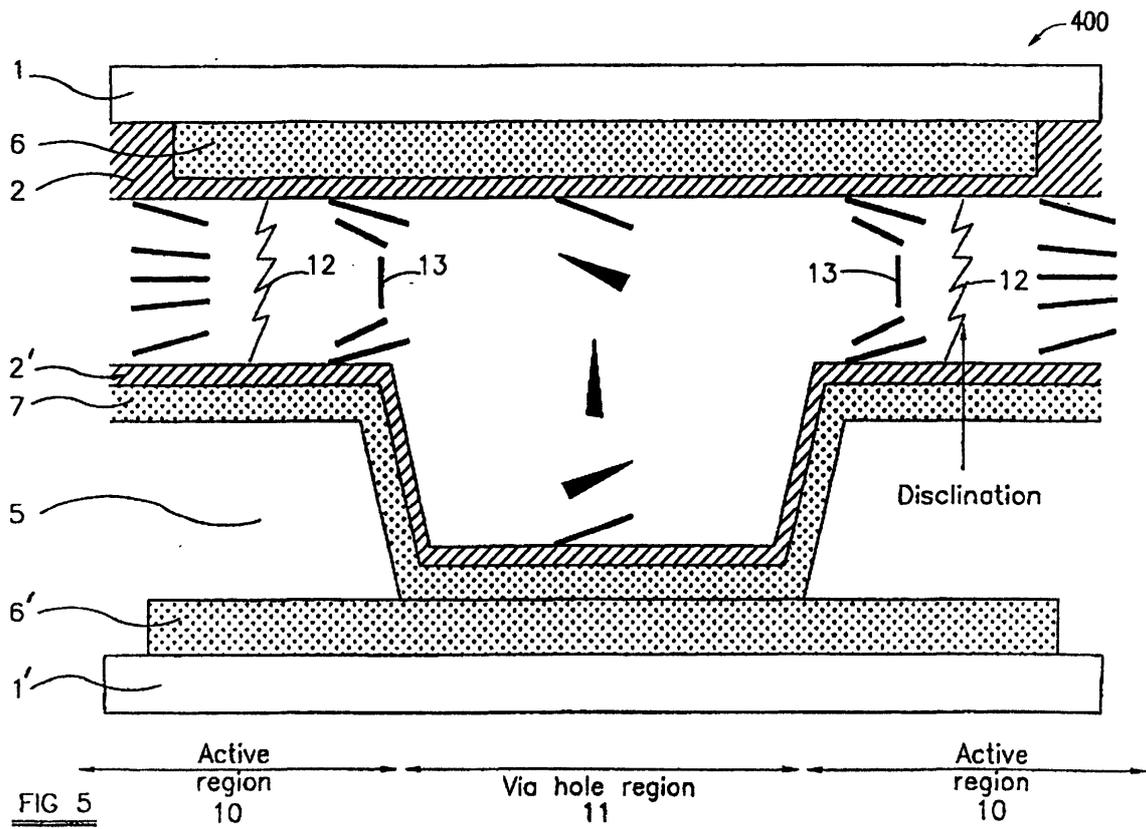 **Nagoya-shi, Aichi (JP)**

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(54) **Liquid Crystal Display Device**

(57) A liquid crystal display device comprises: a layer of a chiral liquid crystal material disposed between first and second substrates (1,1'); and means for applying a voltage (6,6',7) across the liquid crystal layer. A first region of the liquid crystal layer is an active region (10) for display and a second region of the liquid crystal layer is a nucleation region (11) for generating a desired liquid crystal state in the first region when a voltage is applied across the liquid crystal layer. The ratio of the thickness d of the liquid crystal layer to the pitch p of the liquid crystal material has a first value $(d/p)_A$ in the first region of the liquid crystal layer and has a second value $(d/p)_N$ different from the first value in the second region of the liquid crystal layer. The value $(d/p)_N$ of the ratio of the thickness d of the liquid crystal layer to the pitch p of the liquid crystal material in the second region of the liquid crystal layer is selected such that, when no voltage is applied across the liquid crystal layer, the liquid crystal state stable in the second region of the liquid crystal layer is topologically equivalent to the desired liquid crystal state under application of a voltage.

FIG. 4

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400

1

6

2

12 13 13 12

2'

7

5

Disclination

6'

1'

| Active region 10 | Via hole region 11 | Active region 10 |

FIG 5

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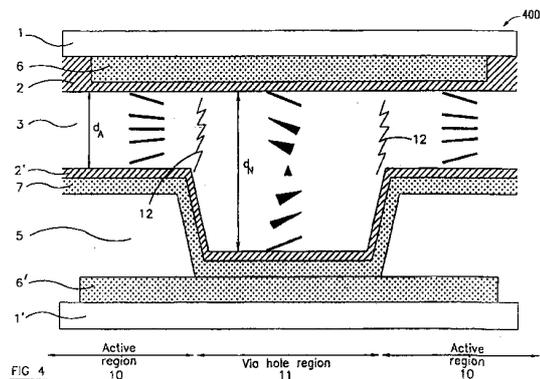
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EUROPEAN SEARCH REPORT

Application Number

EP 01 30 1063

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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)
D,A	BOS P J ET AL: "THE PI-CELL: A FAST LIQUID-CRYSTAL OPTICAL-SWITCHING DEVICE" MOLECULAR CRYSTALS AND LIQUID CRYSTALS (INC. NONLINEAR OPTICS), GORDON AND BREACH SCIENCE PUBLISHERS, READING, GB, vol. 113, no. 1 - 4, 1984, pages 329-339, XP002053315 * the whole document *	1-27	G02F1/139
D,A	NOGUCHI M ET AL: "P-61: THE PHASE INITIALIZATION IN THE PI-CELL" 1997 SID INTERNATIONAL SYMPOSIUM DIGEST OF TECHNICAL PAPERS. BOSTON, MAY 13 - 15, 1997, SID INTERNATIONAL SYMPOSIUM DIGEST OF TECHNICAL PAPERS, SANTA ANA, SID, US, vol. 28, 13 May 1997 (1997-05-13), pages 739-742, XP000722803 ISSN: 0097-966X * the whole document *	1-27	
A	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 09, 31 July 1998 (1998-07-31) & JP 10 104612 A (INTERNATL BUSINESS MACH CORP <IBM>), 24 April 1998 (1998-04-24) * abstract * -& US 6 137 554 A (NAKAMURA HAJIME) 24 October 2000 (2000-10-24)	1-27	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	26 February 2003	Lerbinger, K

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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.** EP 01 30 1063

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

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专利名称(译)	液晶显示装置		
公开(公告)号	EP1124153A3	公开(公告)日	2003-04-23
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[标]申请(专利权)人(译)	夏普株式会社		
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优先权	2000024636 2000-10-09 GB 2000002733 2000-02-08 GB		
其他公开文献	EP1124153A2		
外部链接	Espacenet		

摘要(译)

一种液晶显示装置，包括：一层手性液晶材料，设置在第一和第二基板（1,1'）之间;和用于在液晶层上施加电压（6,6'，7）的装置。液晶层的第一区域是用于显示的有源区域（10），液晶层的第二区域是成核区域（11），用于在施加电压时在第一区域中产生期望的液晶状态。液晶层。液晶层的厚度d与液晶材料的间距p的比率在液晶层的第一区域中具有第一值（d/p）A并且具有第二值（d/p）N与液晶层的第二区域中的第一值不同。选择液晶层的厚度d与液晶层的第二区域中的液晶材料的间距p的比值（d/p）N，使得当没有施加电压时，在液晶层中，在液晶层的第二区域中稳定的液晶状态在拓扑上等效于施加电压时所需的液晶状态。

FIG 4

| Active region 10 | Via hole region 11 | Active region 10 |