FILE HISTORY

US 6,594,143

PATENT:	6,594,143
INVENTORS:	YANO TAKAKAZU MIWA TOMOO SATO YASUHIRO OGAWA TOSHIHISA NISHIYAMA MICHIAKI BABA MASATAKE OKABE HIKARU FUJISHIRO FUMIHIKO KATO KATSUHIRO MIKAMI KAZUAKI FUKUYOSHI HIROKAZU
TITLE:	Liquid crystal module mounting structure and mobile terminal mounted with the same
APPLICATION NO:	US1999459280A
FILED:	13 DEC 1999
ISSUED:	15 JUL 2003
COMPILED:	11 MAR 2022

BEST COPY

[redacted]

Class	Subclass
361	681

ISSUE CLASSIFICATION

PATENT NUMBER

6594143

6594143

U.S. UTILITY Patent Application

O.I.P.E.	PATENT DATE
SCANNED LA Q.A. RG	JUL 15 2003

CLASS	SUBCLASS	ART UNIT	EXAMINER
361	681	2837	LE, THAO

TITLE OF INVENTION:

APPLICANT(S):

[redacted]

ISSUING CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)	
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)
361	681		

INTERNATIONAL CLASSIFICATION

H02K 7/00

☐ Continued on Issue Slip Inside File Jacket

4/25/03 Formal Drawings (25 shts) set 12/3/99

☐ TERMINAL DISCLAIMER	DRAWINGS			CLAIMS ALLOWED	
	Sheets Drwg.	Figs. Drwg.	Print Fig.	Total Claims	Print Claim for O.G.
	25	25	5	3	1

☐ The term of this patent subsequent to _____ (date) has been disclaimed.

☐ The term of this patent shall not extend beyond the expiration date of U.S Patent. No. _____

☐ The terminal ____ months of this patent have been disclaimed.

THANH-TAM LE (Assistant Examiner) 12/9/02 (Date)

LYNN D. FEILD
PRIMARY EXAMINER

(Primary Examiner) 12/10/02 (Date)

Yolanda Robinson (Legal Instruments Examiner) 11/5/03 (Date)

NOTICE OF ALLOWANCE MAILED

12/13/02

ISSUE FEE (W)

Amount Due	Date Paid
$1580.00	3-12-03

ISSUE BATCH NUMBER

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The information disclosed herein may be restricted. Unauthorized disclosure may be prohibited by the United States Code Title 35, Sections 122, 181 and 368. Possession outside the U.S. Patent & Trademark Office is restricted to authorized employees and contractors only.

Form PTO-436A
(Rev 6/99)

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(Attached in pocket on inside flap)

D. RICH

[redacted]

Formal Drawings (shts) set

FORMAL DRAWINGS

[redacted]

(FACE)

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 2 of 438

LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Transaction History

Date	Transaction Description
12-13-1999	Workflow - Drawings Finished
12-13-1999	Workflow - Drawings Matched with File at Contractor
12-13-1999	Workflow - Drawings Finished
12-13-1999	Workflow - Drawings Matched with File at Contractor
12-13-1999	Workflow - Drawings Finished
12-13-1999	Workflow - Drawings Matched with File at Contractor
12-16-1999	Initial Exam Team nn
02-04-2000	Application Dispatched from OIPE
02-18-2000	Request for Foreign Priority (Priority Papers May Be Included)
03-03-2000	Information Disclosure Statement (IDS) Filed
03-03-2000	Information Disclosure Statement (IDS) Filed
03-06-2000	Transfer Inquiry
03-06-2000	Transfer Inquiry
03-14-2000	Case Docketed to Examiner in GAU
01-12-2001	Case Docketed to Examiner in GAU
03-26-2001	Restriction/Election Requirement
03-27-2001	Mail Restriction Requirement
04-26-2001	Response to Election / Restriction Filed
05-01-2001	Date Forwarded to Examiner
05-21-2001	Non-Final Rejection
05-23-2001	Mail Non-Final Rejection
08-13-2001	Information Disclosure Statement (IDS) Filed
08-13-2001	Information Disclosure Statement (IDS) Filed
08-23-2001	Response after Non-Final Action
08-29-2001	Date Forwarded to Examiner
11-05-2001	Final Rejection
11-07-2001	Mail Final Rejection (PTOL - 326)
01-22-2002	Information Disclosure Statement (IDS) Filed
01-22-2002	Information Disclosure Statement (IDS) Filed
02-07-2002	Continuing Prosecution Application - Continuation (ACPA)
02-07-2002	Workflow - Request for CPA - Begin
02-19-2002	Date Forwarded to Examiner
02-19-2002	Disposal for a RCE / CPA / R129
03-25-2002	Non-Final Rejection
03-26-2002	Mail Non-Final Rejection
05-24-2002	Response after Non-Final Action
05-30-2002	Date Forwarded to Examiner
05-30-2002	Correspondence Address Change
06-18-2002	Information Disclosure Statement (IDS) Filed
06-18-2002	Information Disclosure Statement (IDS) Filed
07-01-2002	Mail Final Rejection (PTOL - 326)
07-01-2002	Final Rejection
10-01-2002	Response after Final Action
10-04-2002	Date Forwarded to Examiner
10-08-2002	Mail Advisory Action (PTOL - 303)
10-08-2002	Advisory Action (PTOL-303)
10-15-2002	Interview Summary Record
10-15-2002	Interview Summary Record
11-15-2002	Mail Examiner Interview Summary (PTOL - 413)
12-12-2002	Case Docketed to Examiner in GAU
12-13-2002	Mail Notice of Allowance
01-13-2003	Workflow - Informational Disclosure Statement - Finish

01-13-2003	Workflow - Informational Disclosure Statement - Begin
01-13-2003	Dispatch to Publications
01-15-2003	Dispatch to Publications
01-17-2003	Receipt into Pubs
01-21-2003	Workflow - File Sent to Contractor
01-21-2003	Receipt into Pubs
01-31-2003	Workflow - File Sent to Contractor
01-31-2003	Receipt into Pubs
02-26-2003	Information Disclosure Statement (IDS) Filed
02-26-2003	Information Disclosure Statement (IDS) Filed
03-12-2003	Issue Fee Payment Verified
03-12-2003	Issue Fee Payment Verified
03-12-2003	Issue Fee Payment Verified
03-12-2003	Miscellaneous Incoming Letter
03-12-2003	Workflow - Informational Disclosure Statement - Begin
03-12-2003	Issue Fee Payment Received
04-04-2003	Receipt into Pubs
04-11-2003	Receipt into Pubs
04-24-2003	Receipt into Pubs
04-25-2003	Application Is Considered Ready for Issue
05-09-2003	Receipt into Pubs
05-14-2003	Receipt into Pubs
05-16-2003	Receipt into Pubs
06-10-2003	Mail Examiner's Amendment
06-16-2003	Receipt into Pubs
06-26-2003	Issue Notification Mailed
07-15-2003	Recordation of Patent Grant Mailed
07-15-2003	Patent Issue Date Used in PTA Calculation
09-17-2004	Correspondence Address Change
05-26-2011	Correspondence Address Change
05-27-2011	Change in Power of Attorney (May Include Associate POA)
07-18-2018	Correspondence Address Change
07-19-2018	Email Notification
07-19-2018	Change in Power of Attorney (May Include Associate POA)

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JC994 U.S. PTO
09/459280
12/13/99

INITIALS

CONTENTS

		Date Received (Incl. C. of M.) or Date Mailed			Date Received (Incl. C. of M.) or Date Mailed
1.	Application ____ papers.		42.		
2.	Priority Paper	2/18/00	43.		
3.	IDS	3-3-00	44.		
4.	Restriction	3/27/01 ma 4-26-01	45.		
5.	Election		46.		
6.	Rej. (3)	5/23/01	47.		
7.	IDS	8-13-01	48.		
8.	AMDT. A	8/23/01	49.		
9.	F. Rej. (3)	11/7/01 JC	50.		
10.	IDS	1-22-02	51.		
11.	CPA	2/7/02	52.		
12.	RE AMDT. B	2/7/02	53.		
13.	Rej. (3)	3/26/02 JC	54.		
14.	Address change	5-24-02	55.		
15.	Amendt C	5-24-02	56.		
16.	F. Rej. (3)	7/10/02 JC	57.		
17.	IDS	6-8-02	58.		
18.	AMDT. DUE	10/1/02	59.		
19.	Advisory Action	10.8.2 JC	60.		
20.	Interview Summary	10/8/02	61.		
21.	AMDT. E (RCE)	10/23/02	62.		
22.	Supp. AMDT. F	12/6/02	63.		
23.	Allowance	12/31/02 JC	64.		
24.	IDS	2/26/03	65.		
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26.	IDS	1/13/03	67.		
27.	QUERY 10-28-03	6/13/02	68.		
28.	Supp. 37	6/10/03	69.		
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ISSUE SLIP STAPLE AREA (for additional cross references)

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION	MG		12/22/99
O.I.P.E. CLASSIFIER		4.9.	1/10/00
FORMALITY REVIEW			
RESPONSE FORMALITY REVIEW	DM	72223	2-3-00

INDEX OF CLAIMS

✓	Rejected	N	Non-elected
=	Allowed	I	Interference
—	(Through numeral)... Canceled	A	Appeal
÷	Restricted	O	Objected

Claim Final	Claim Original	Date				
	1	3/17/01	5/9/01	10/3/01	4/12/02	
	2	✓	✓	✓	—	+
	3	✓	✓	✓	—	
	4	N	—	—		
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If more than 150 claims or 10 actions
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SEARCHED

Class	Sub.	Date	Exmr.
349			
~~349~~	58	5/9/01	TL.
361	681	"	"
	683	"	"
Update		11/61	TL
248	917	3/02	TL
	921	"	"
	560	"	"
Update		6/2/02	"
Update		12/9/02	"

INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.
Same	as above		
		~~12/~~ 12/09/02	TL

SEARCH NOTES
(INCLUDING SEARCH STRATEGY)

	Date	Exmr.
J. Dudek } (Class 361)	5/9/01	TL.
L. Lea } (Class 361)	"	"
N. Abrams (Class 439)	"	"
~~Typed~~		
T. Tosz (349)	3/02	TL.

(RIGHT OUTSIDE)

US006594143B2

(12) **United States Patent**
Yano et al.

(10) **Patent No.: US 6,594,143 B2**
(45) **Date of Patent: *Jul. 15, 2003**

(54) **LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME**

(75) Inventors: **Takakazu Yano**, Tokyo (JP); **Tomoo Miwa**, Tokyo (JP); **Yasuhiro Sato**, Tokyo (JP); **Toshihisa Ogawa**, Tokyo (JP); **Michiaki Nishiyama**, Tokyo (JP); **Masatake Baba**, Tokyo (JP); **Hikaru Okabe**, Tokyo (JP); **Fumihiko Fujishiro**, Tokyo (JP); **Katsuhiro Kato**, Tokyo (JP); **Kazuaki Mikami**, Tokyo (JP); **Hirokazu Fukuyoshi**, Tokyo (JP)

(73) Assignee: **NEC Corporation**, Tokyo (JP)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/459,280**

(22) Filed: **Dec. 13, 1999**

(65) **Prior Publication Data**

US 2002/0064036 A1 May 30, 2002

(30) **Foreign Application Priority Data**

Dec. 11, 1998 (JP) 10-353579

(51) **Int. Cl.**[7] **H05K 7/00**
(52) **U.S. Cl.** **361/681**
(58) **Field of Search** 349/58; 361/681, 361/683; 248/917, 921, 560

(56) **References Cited**

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(List continued on next page.)

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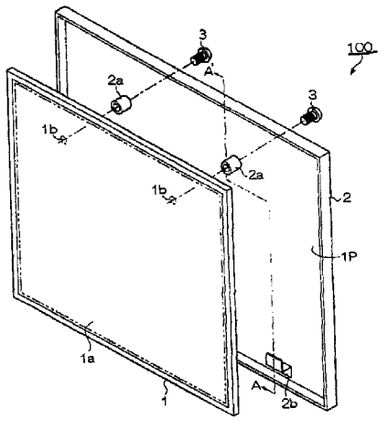
Korean Office Action dated Jan. 30, 2003, with Japanese and partial English translations.

Primary Examiner—Lynn D. Feild
Assistant Examiner—Thanh-Tam Le
(74) *Attorney, Agent, or Firm*—McGinn & Gibb, PLLC

(57) **ABSTRACT**

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises: at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

3 Claims, 25 Drawing Sheets



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KR	1999-0066163	8/1999

* cited by examiner

FIG. 1 prior art

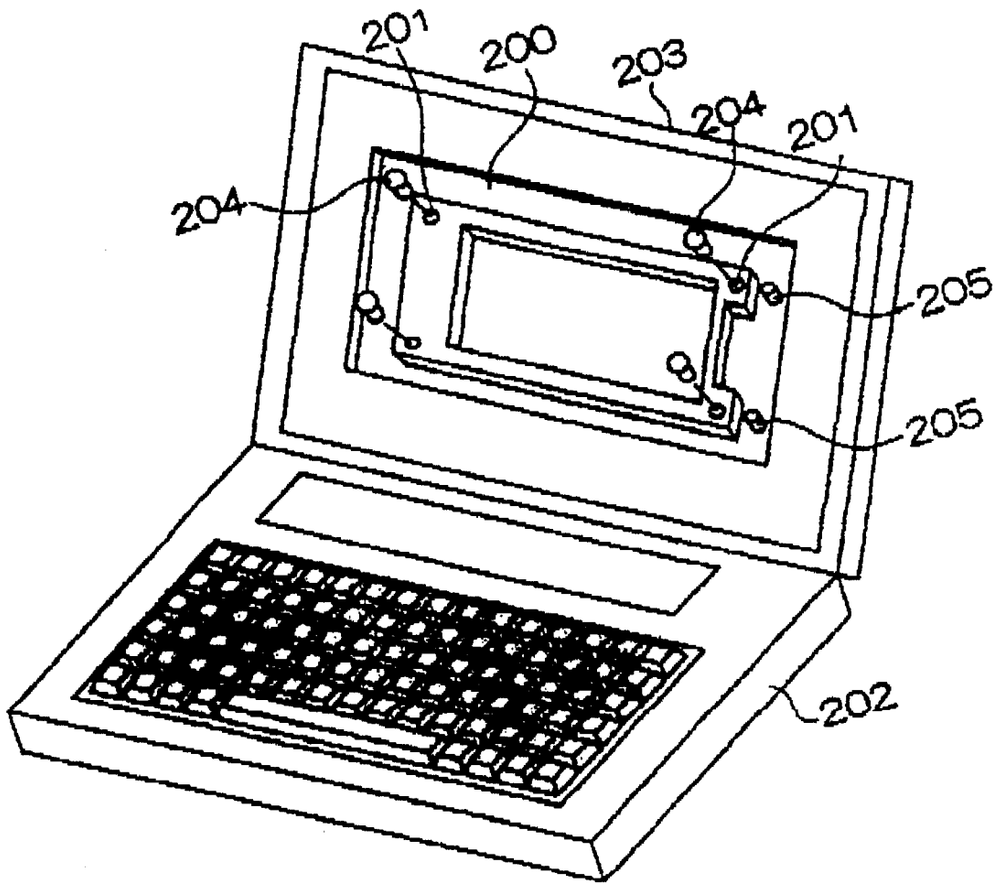
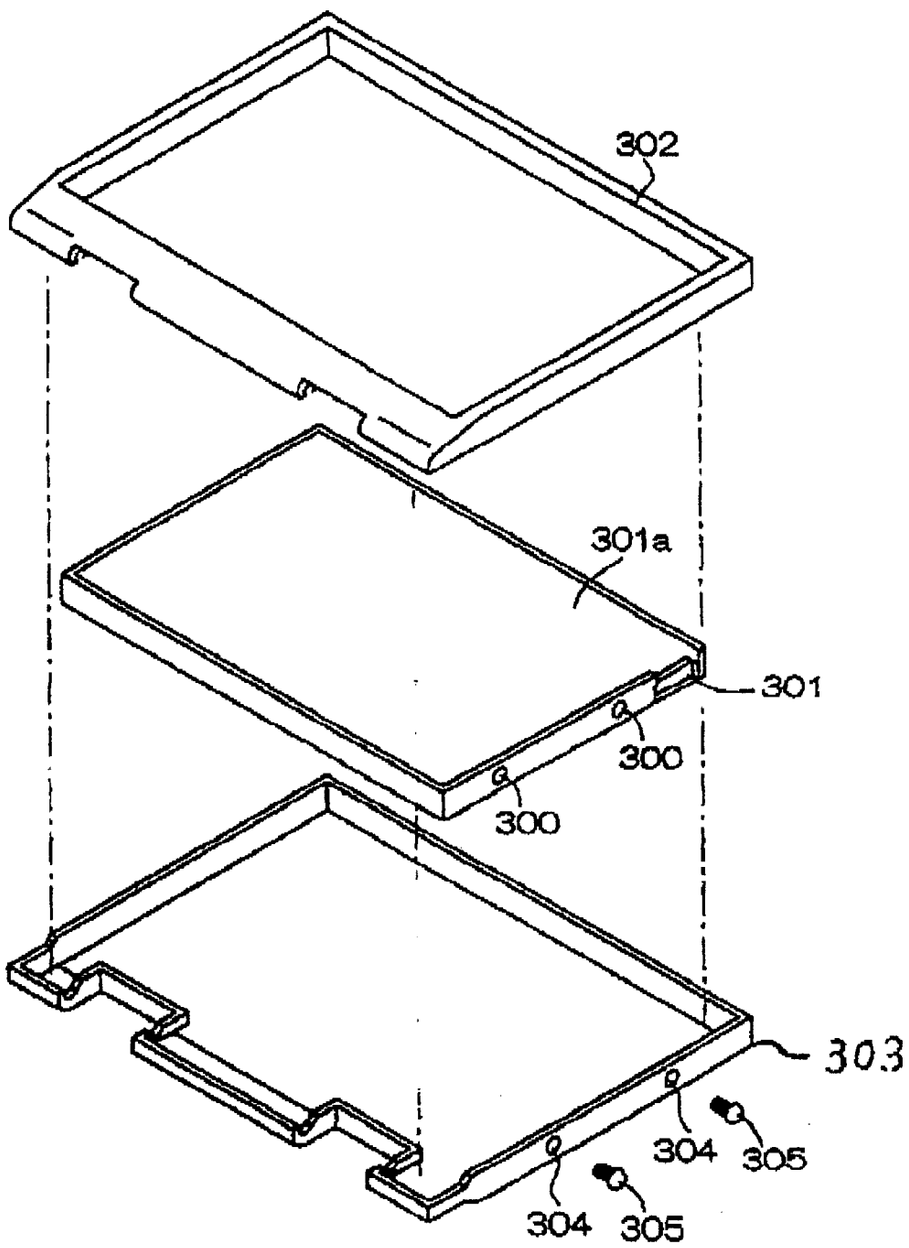


FIG. 2 prior art



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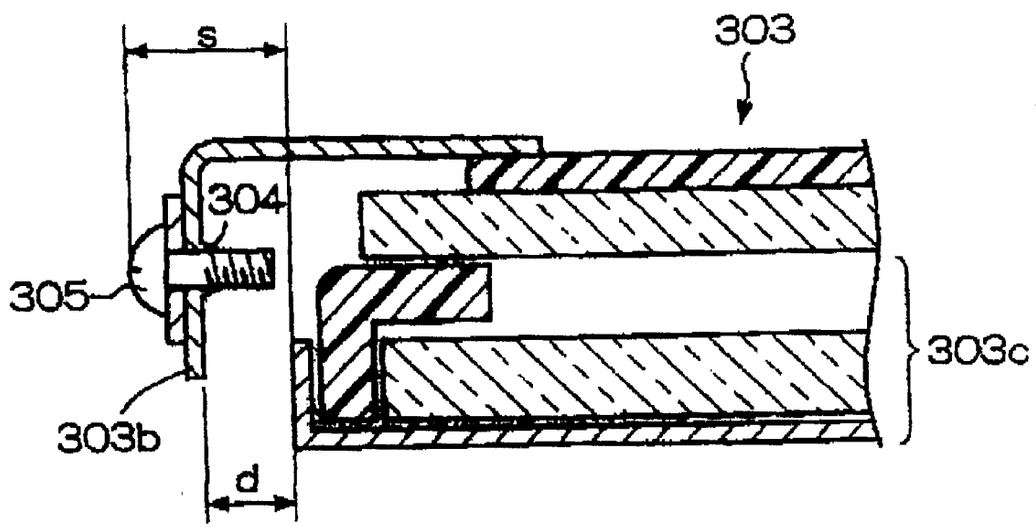
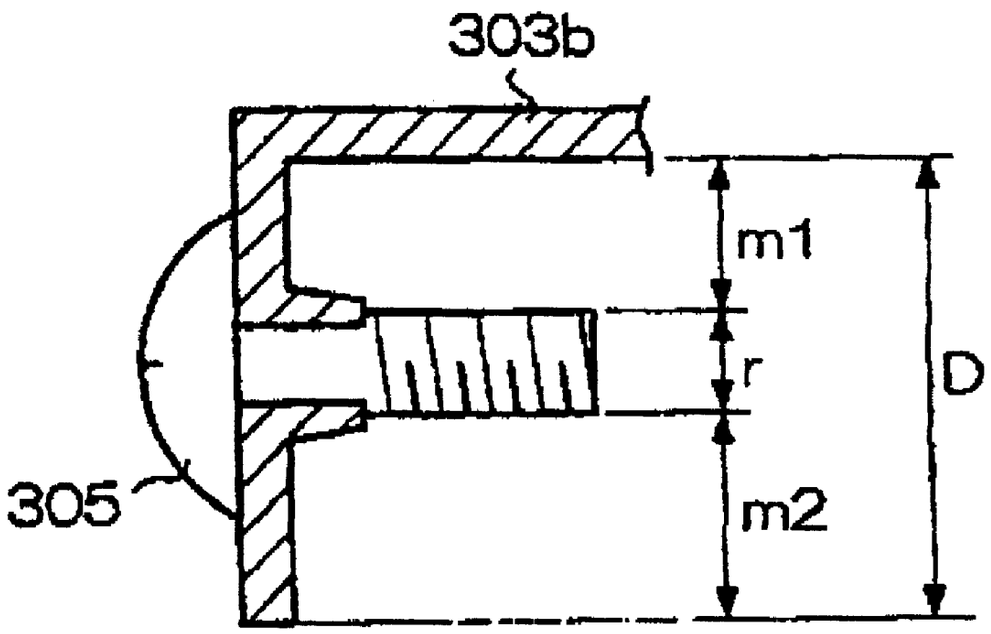


FIG. 4 prior art



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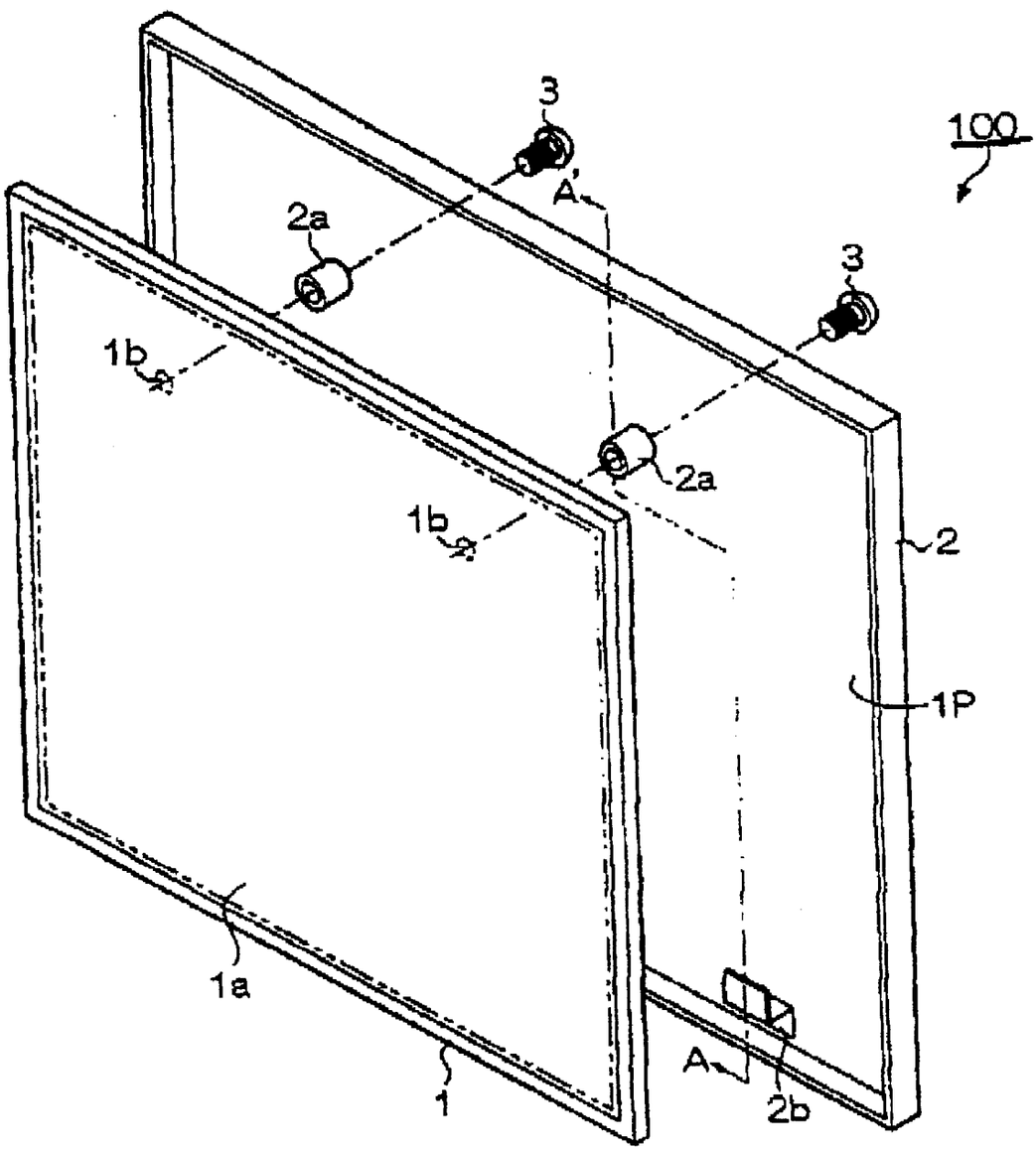
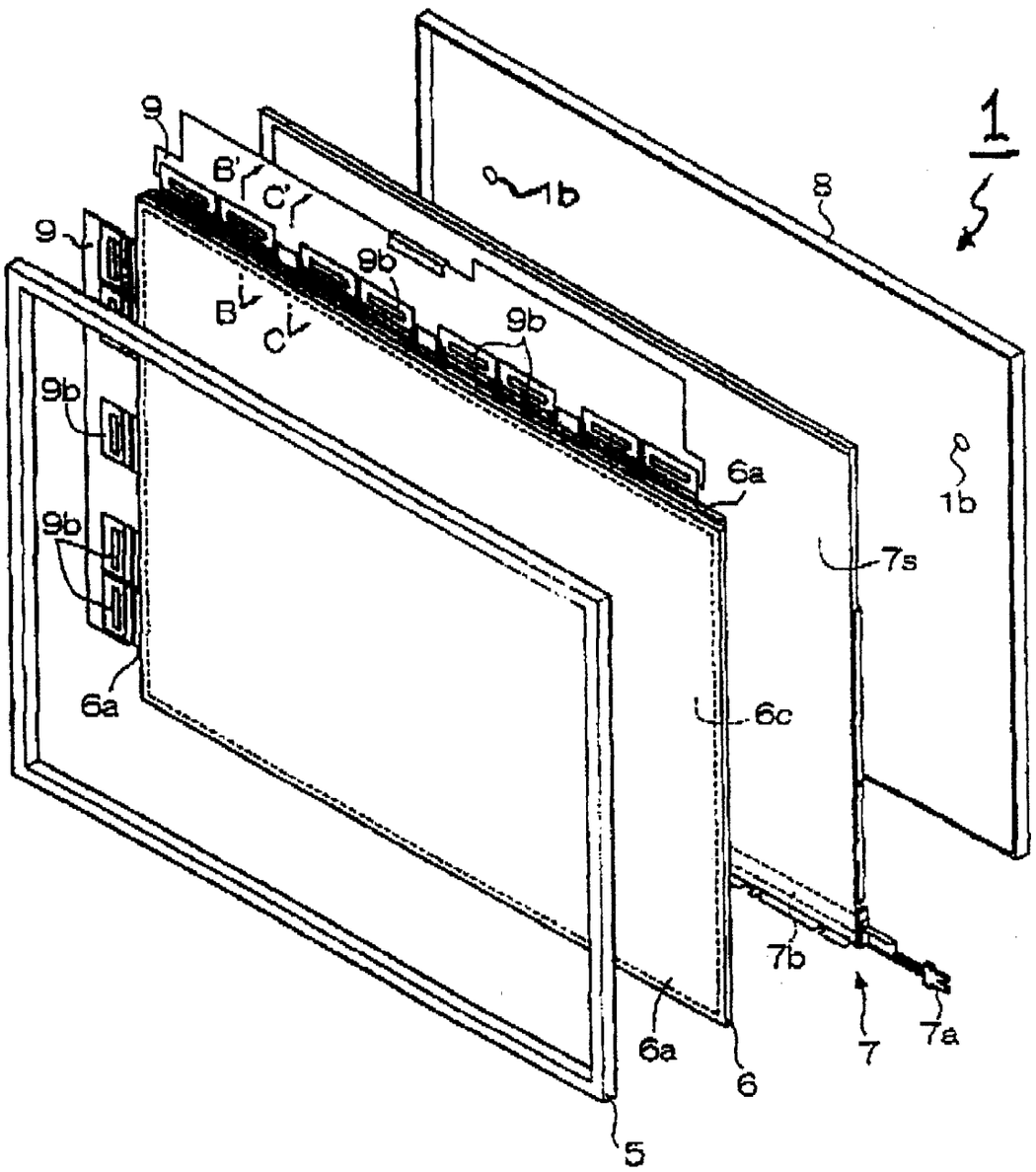


FIG. 6



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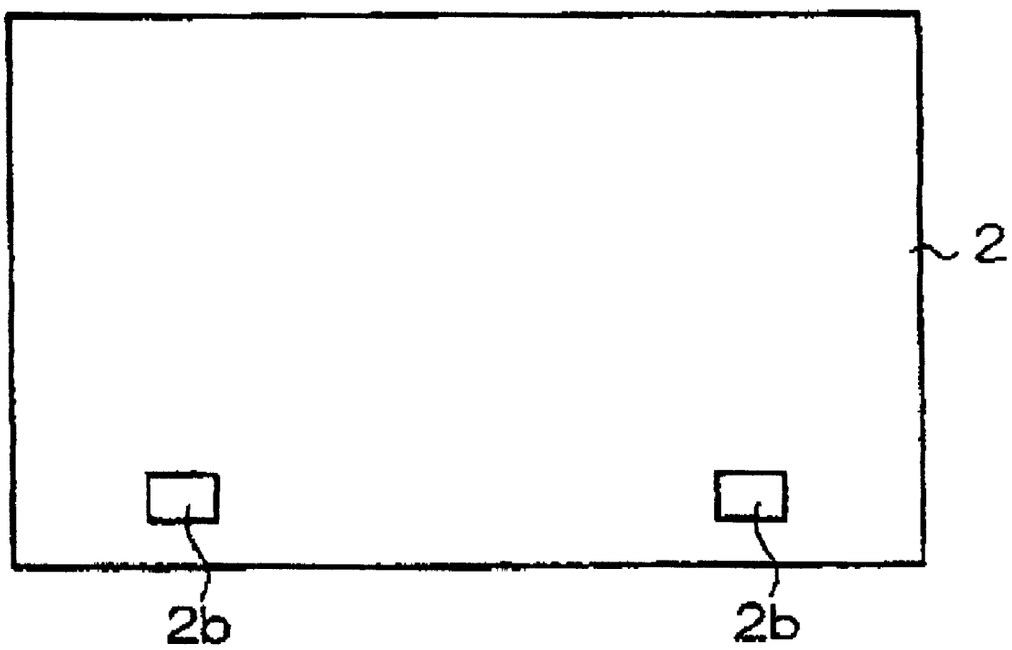
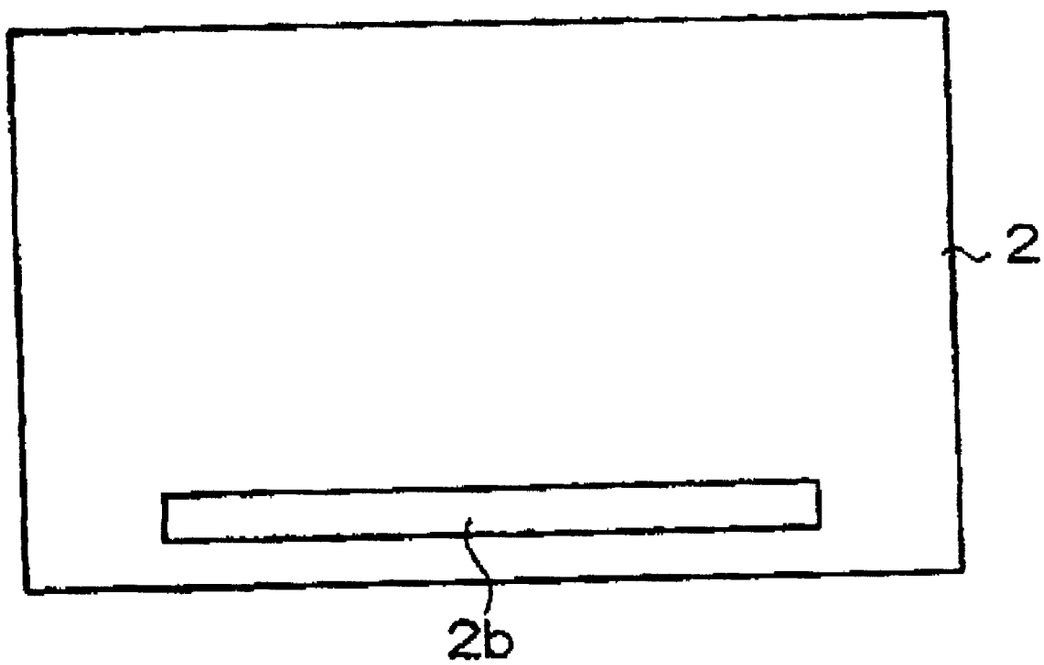


FIG. 8



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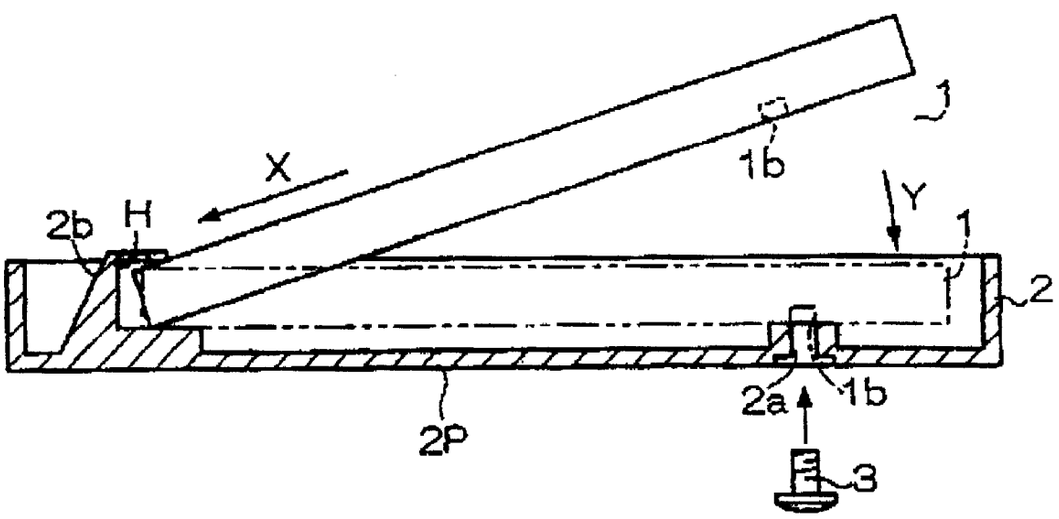

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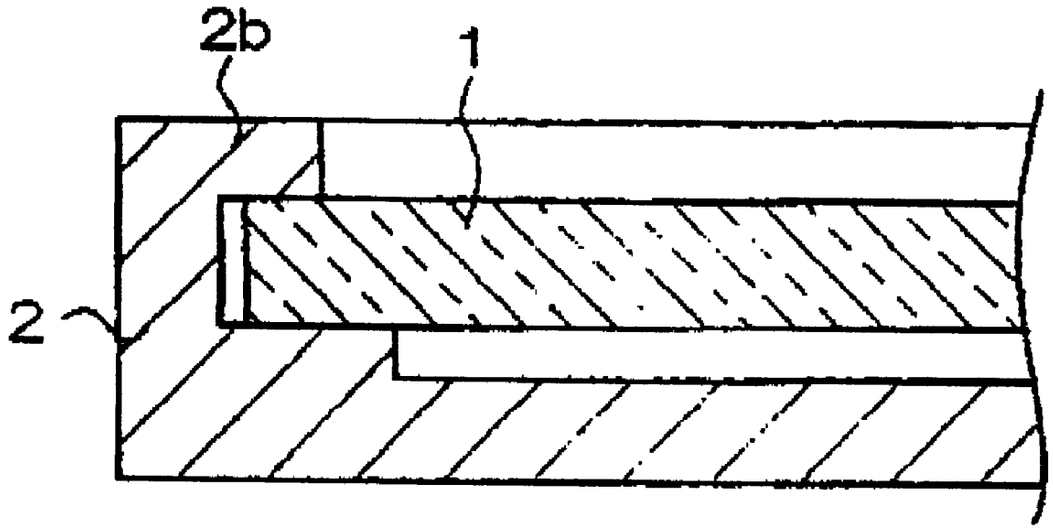

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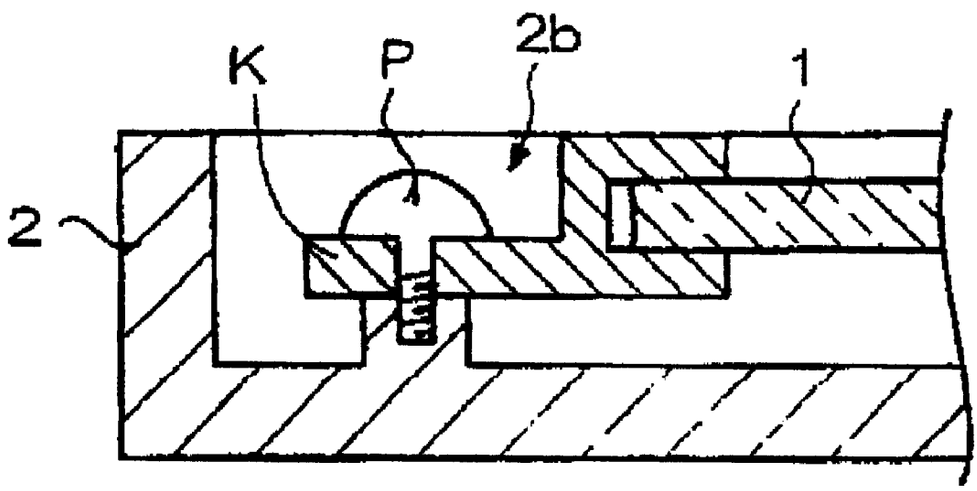


FIG. 10C

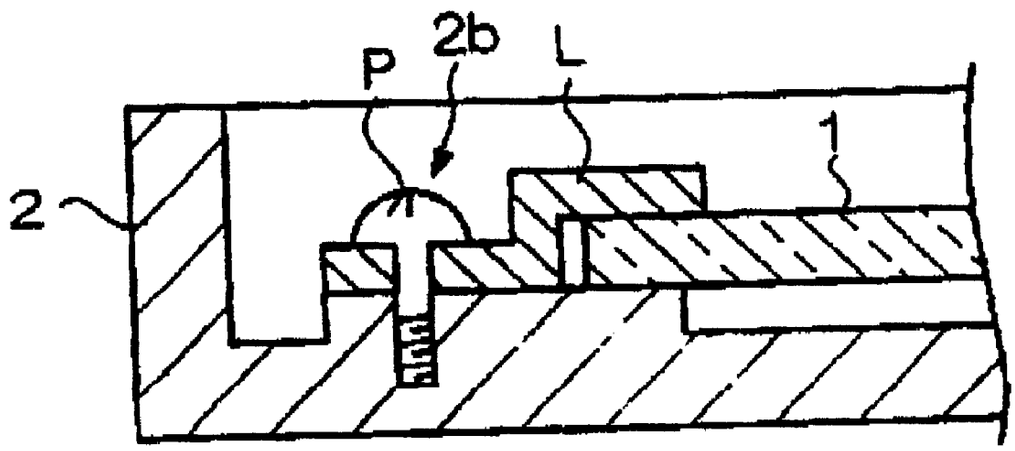


FIG. 11

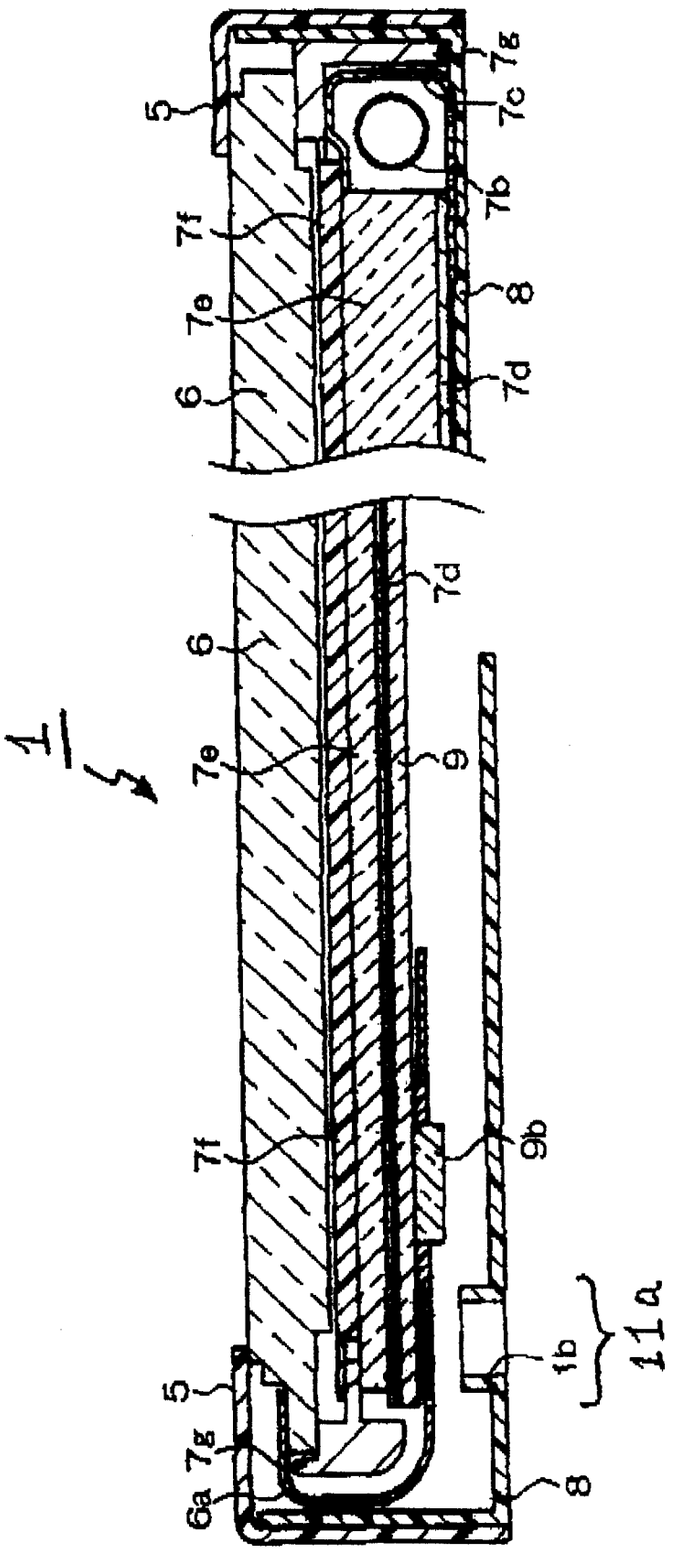


FIG. 12

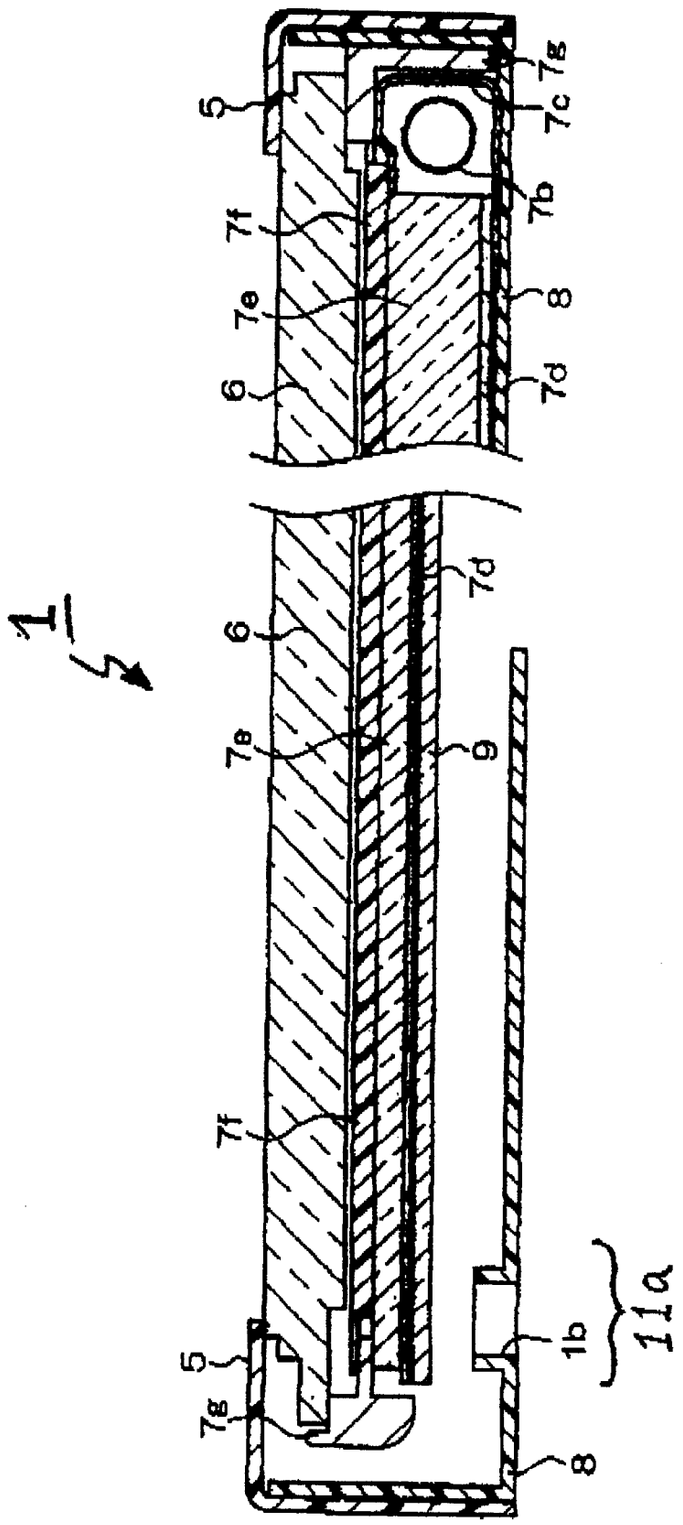


FIG. 13

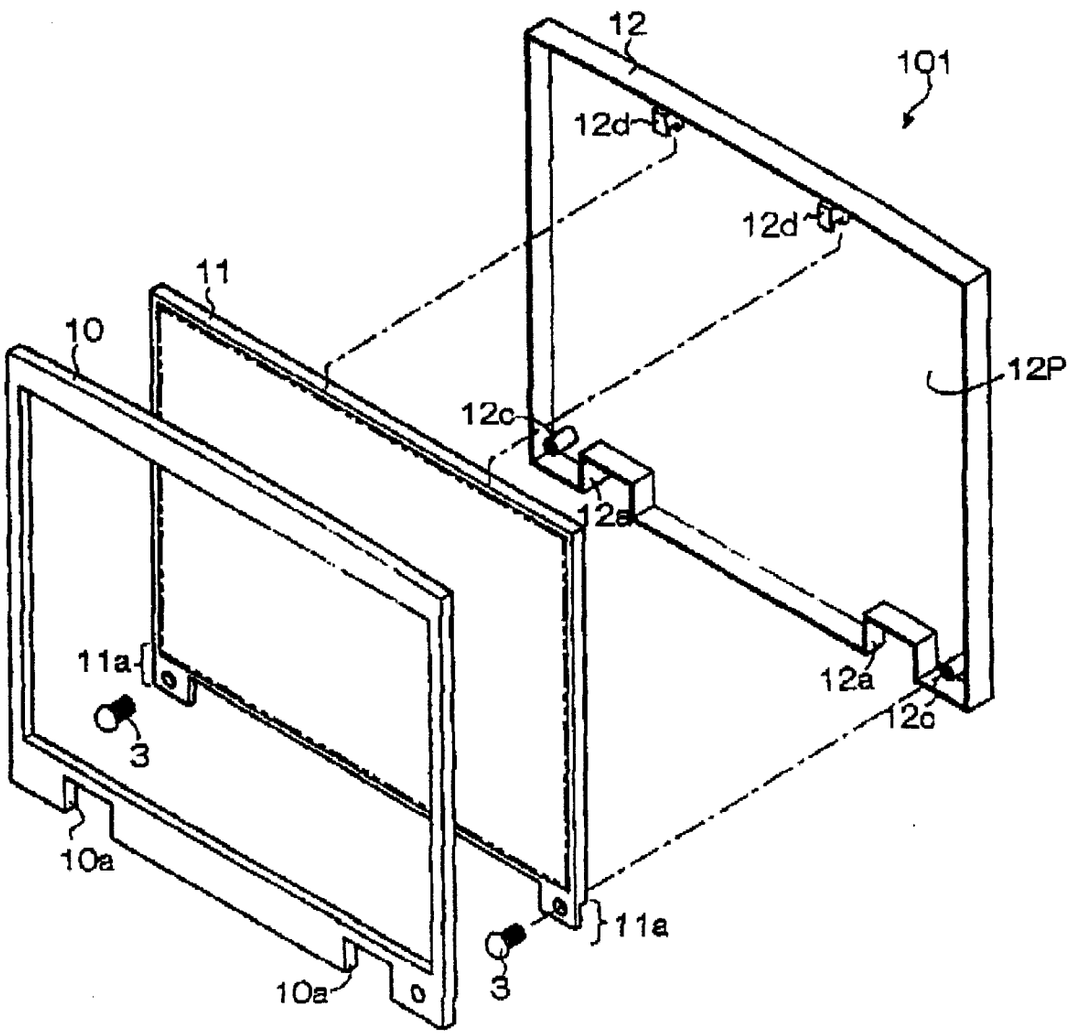
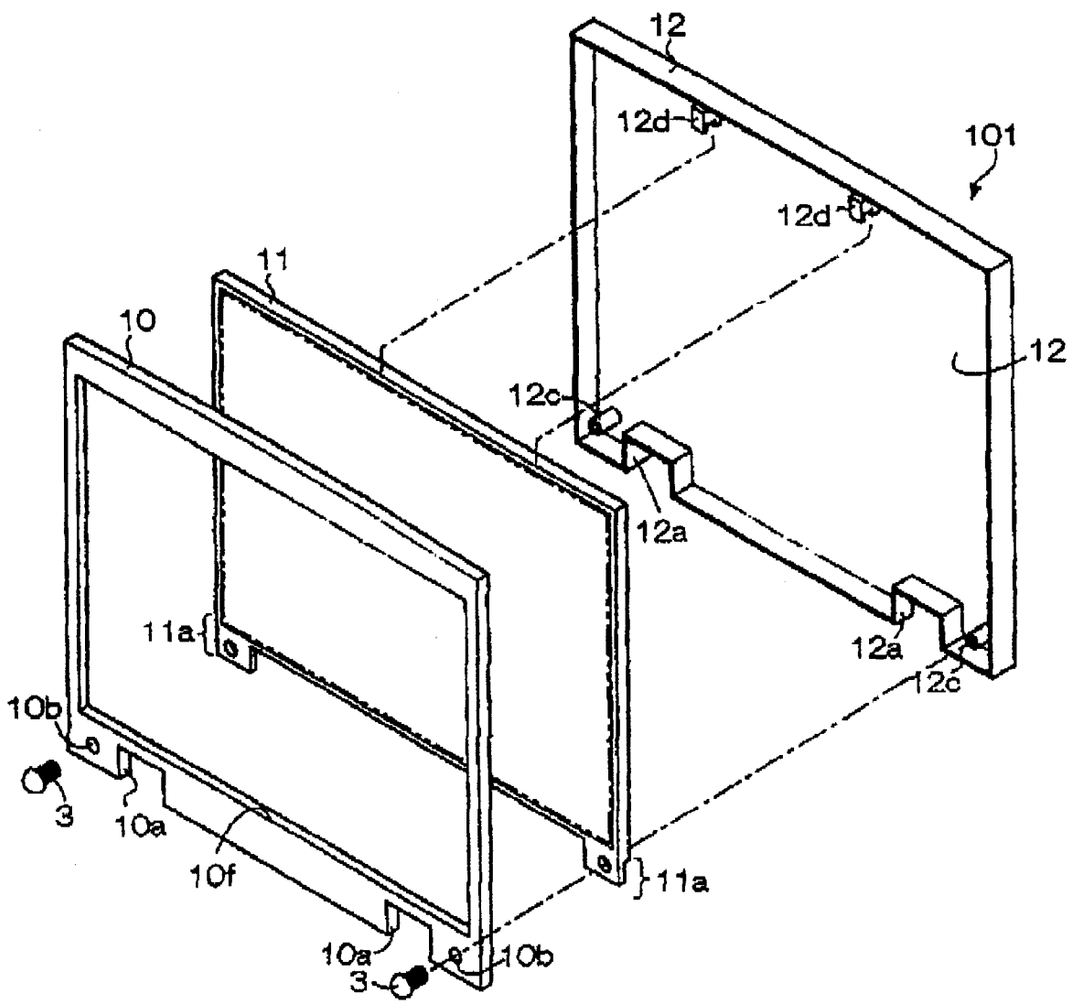


FIG. 14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11a
12a
12c
10b
3
10a
10f
11a
10a
10b
3

FIG. 15

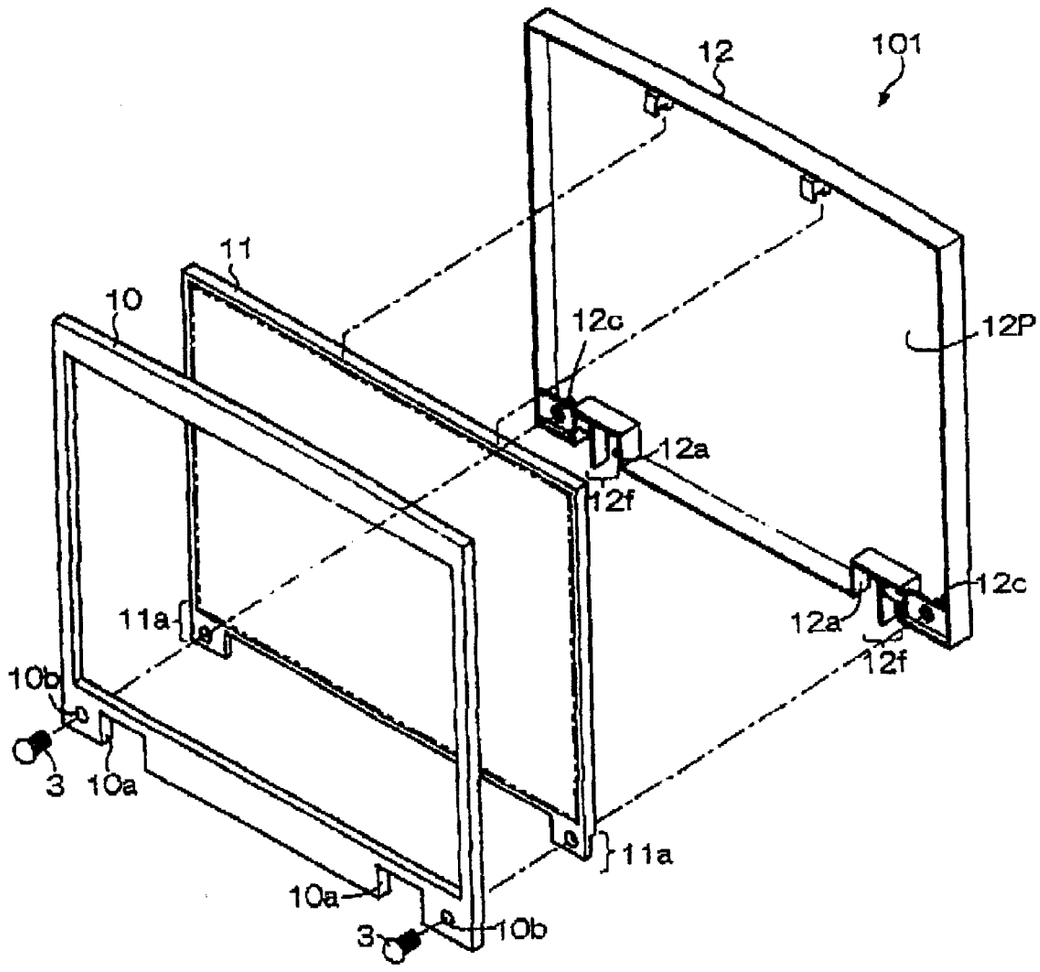

12
101
11
10
12c
12P
12a
12f
12c
11a
12a
12f
10b
3
10a
11a
10a
3
10b

FIG. 16

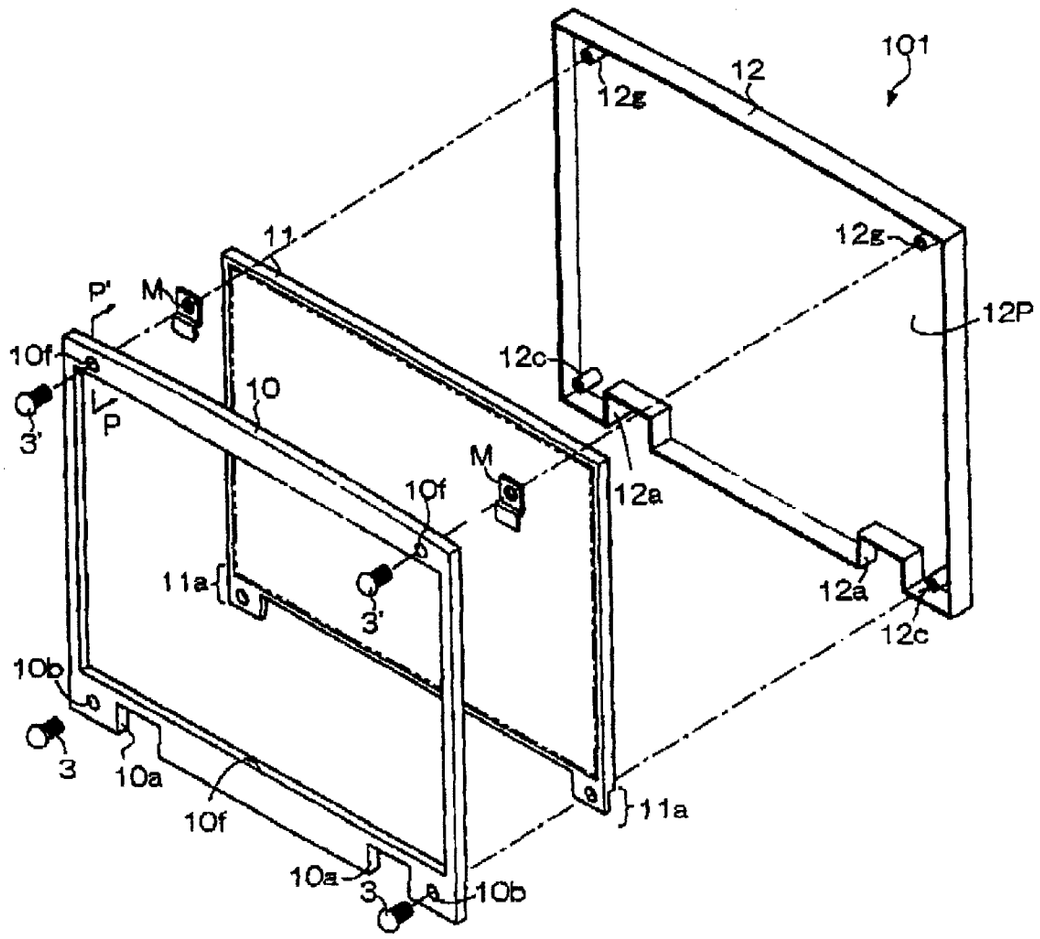

101
12
12g
12g
12P
11
P'
M
10f
3'
P
10
12c
12a
M
10f
11a
3'
12a
12c
10b
3
10a
10f
11a
10a
3
10b

FIG. 17

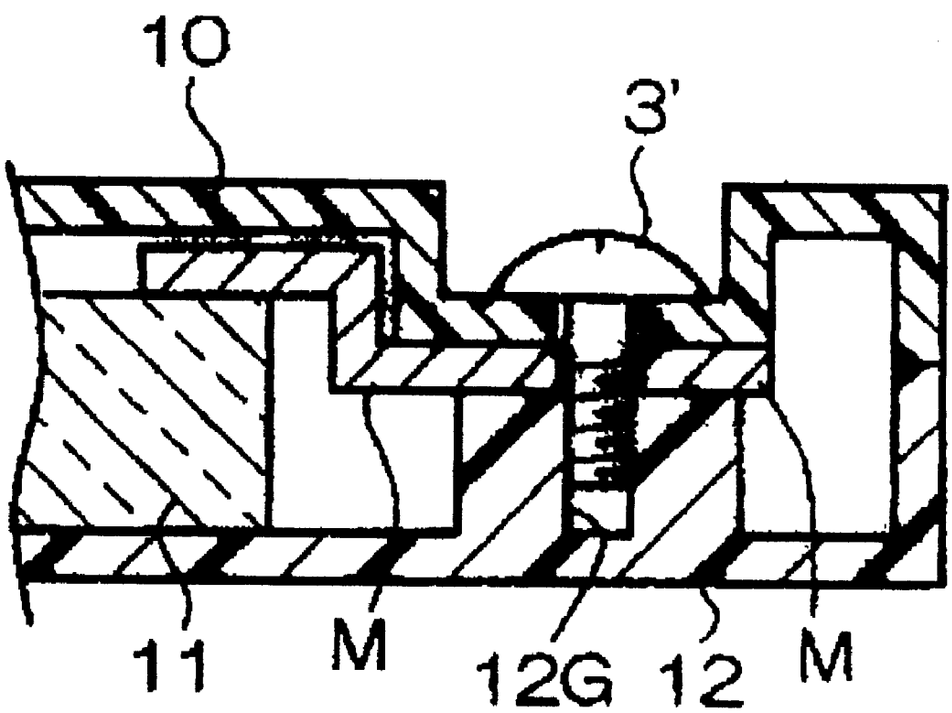


FIG. 18

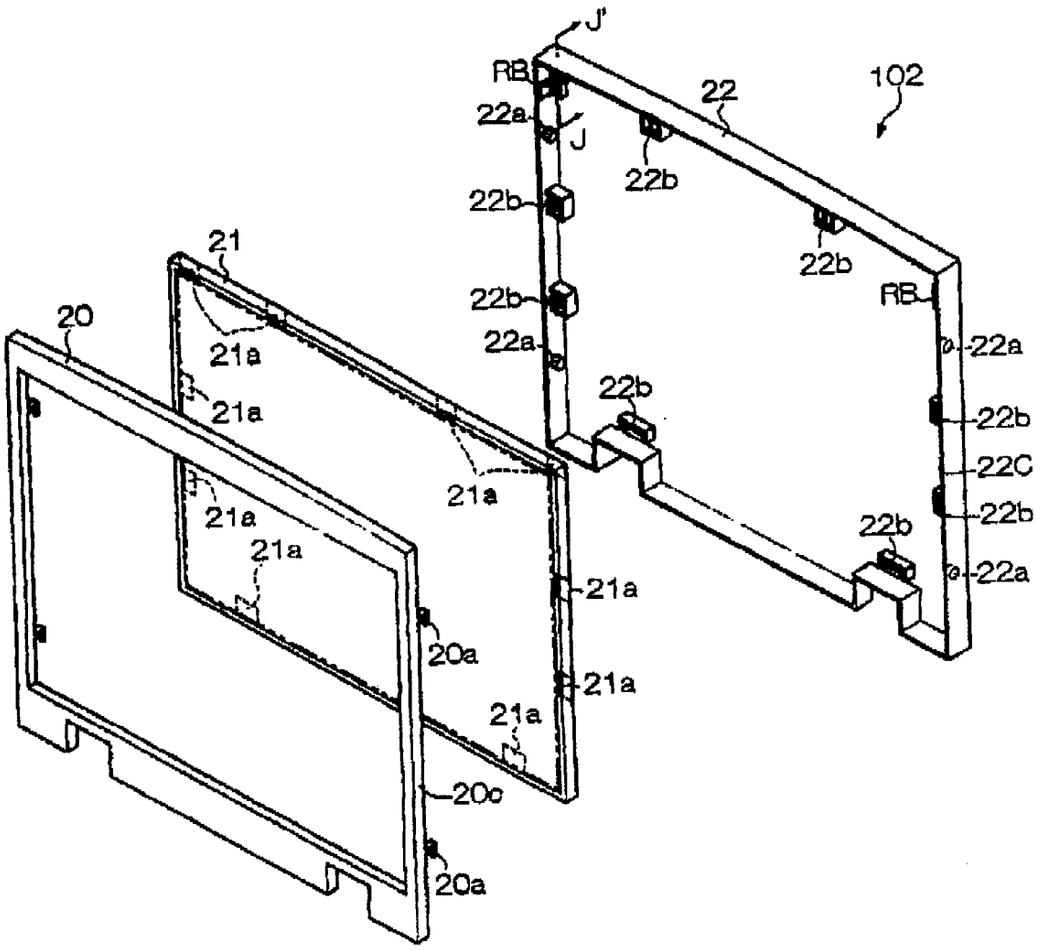

J'
RB
22
102
22a
J
22b
22b
22b
22b
21
20
21a
22a
21a
22b
22b
22C
22b
21a
22b
22a
21a
21a
20a
21a
21a
20c
20a

FIG. 19

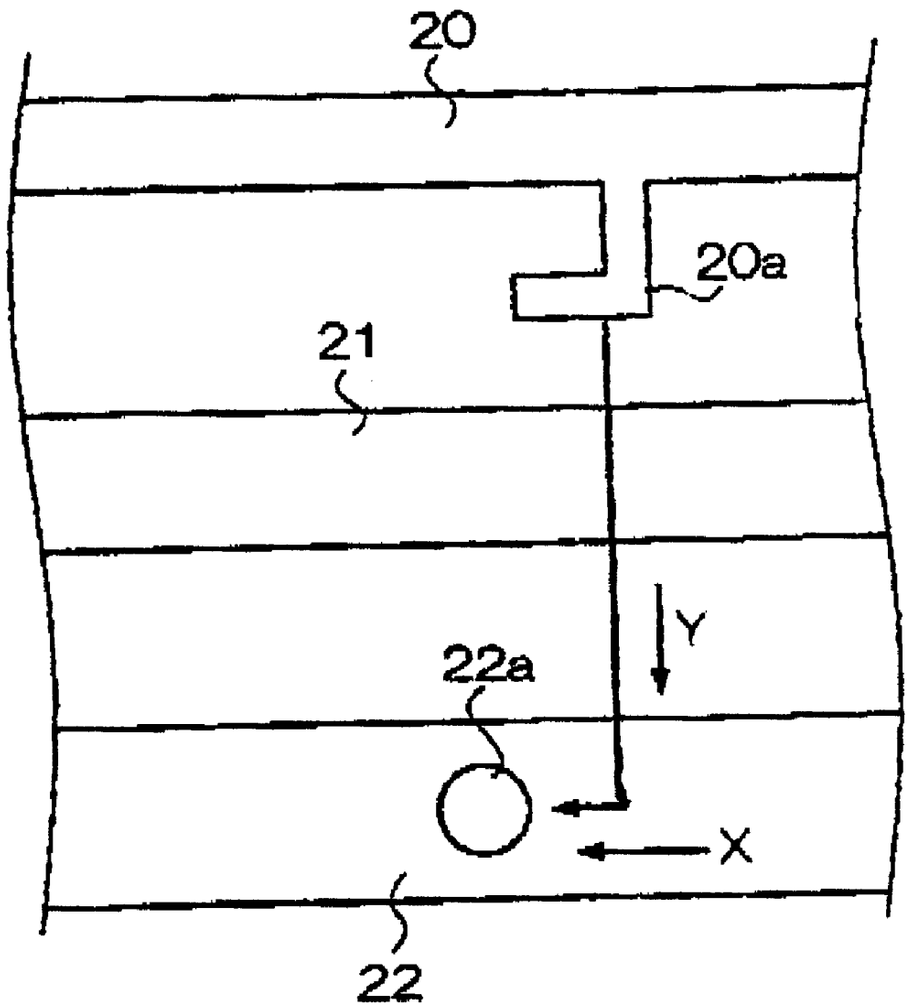


FIG. 20

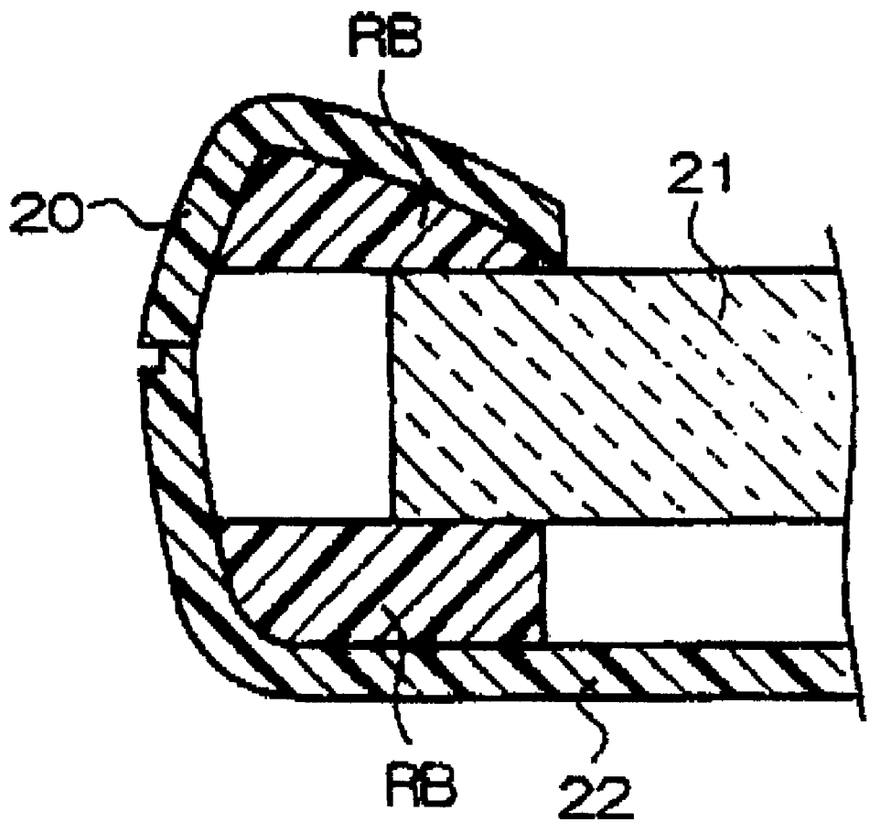


FIG. 21

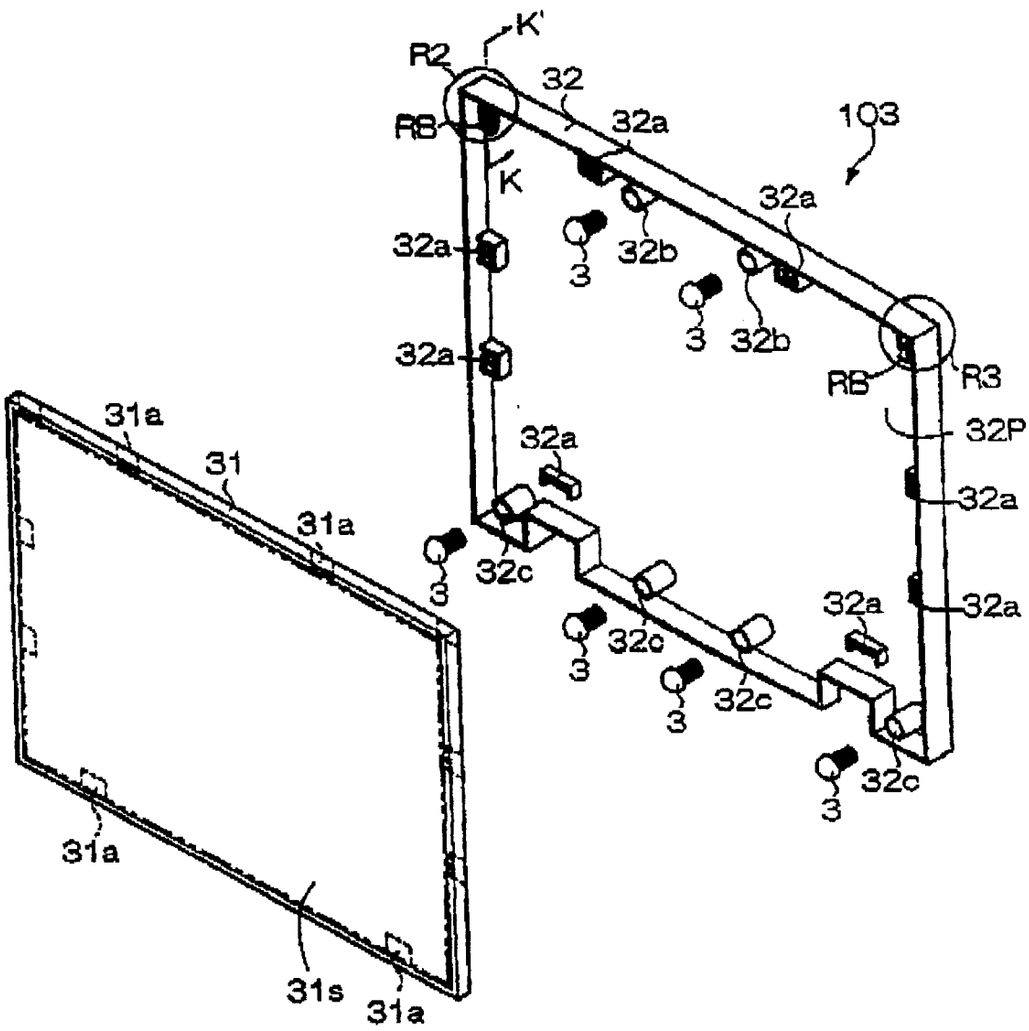

K'
R2
32
RB
32a
103
K
32a
32a
3
32b
3
32b
32a
RB
R3
32P
31a
31
32a
31a
32a
3
32c
32a
3
32c
3
32c
3
32c
31a
31s
31a

FIG. 22

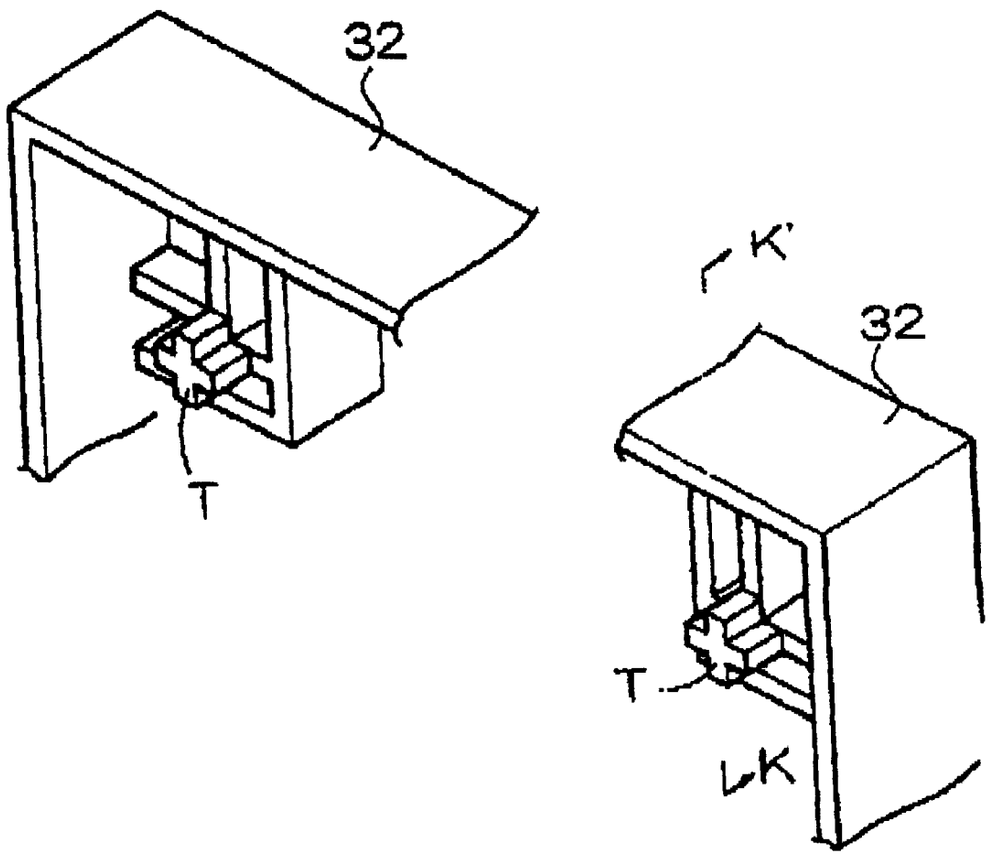
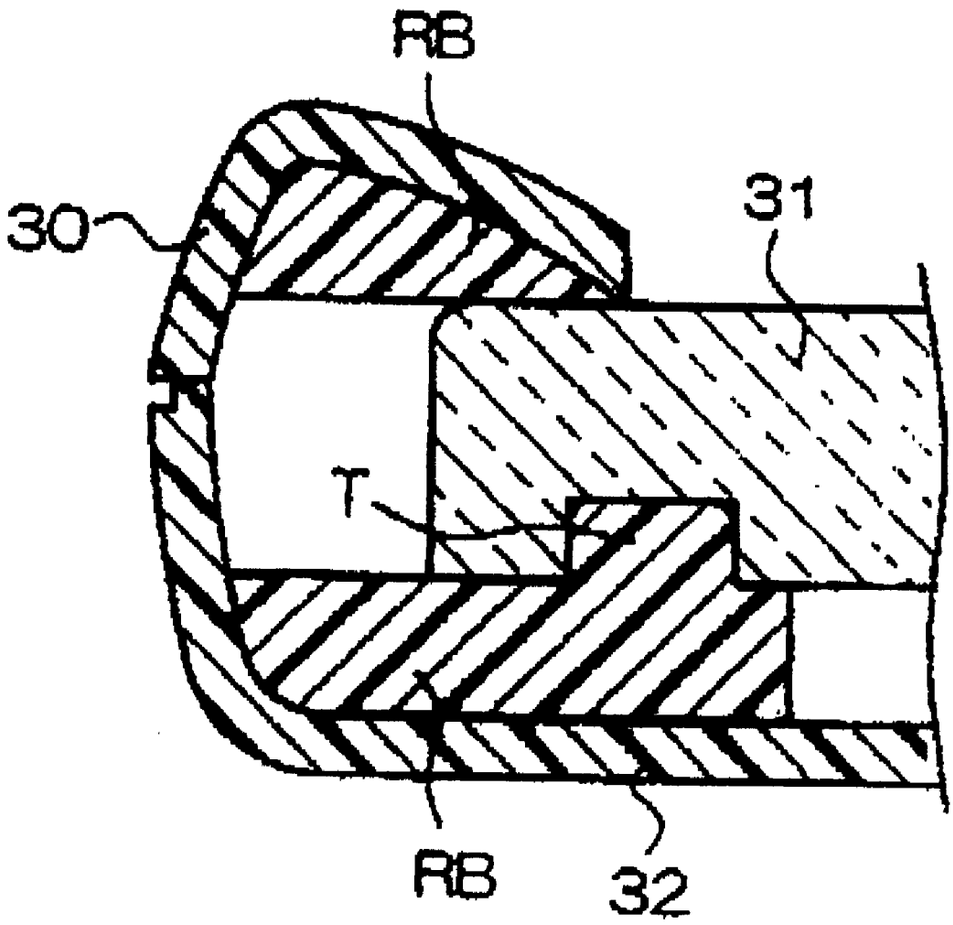


FIG. 23



LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

BACKGROUND OF THE INVENTION

The present invention relates to a liquid crystal module mounting structure, and more particularly to a structure for mounting a liquid crystal module serving as a display to a mobile terminal such as a note type personal computer.

A liquid crystal module mounted to a note type personal computer will be described. FIG. **1** is a perspective view illustrative of a note type personal computer mounted with a liquid crystal module serving as a display. The note type personal computer comprises a body **202** and a cover **203**, A liquid crystal module **200** serving as a display of the computer is mounted to the cover **203**. The liquid crystal module **200** has a peripheral region surrounding a display area, and this peripheral region has a plurality of screw holes **201**. The cover **203** also has screw holes **205** at positions corresponding to the screw holes **201** of the liquid crystal module **200**. The liquid crystal module **200** is fixed to the cover **203** by screws **204** which are driven tightly into the screw holes **201** and the screw holes **205**. The display area of the liquid crystal module **200** is smaller in size than an entire part of the liquid crystal module **200** by the peripheral region on which the screw holes **201** are formed. Namely, it is difficult to enlarge the display area of the liquid crystal module **200** without enlargement of the cover **203**.

Further, a thickness of the liquid crystal module **200** is decided dependent upon the necessary length of the screws **201** on the basis of the necessary strength in tightly fixing the liquid crystal module **200** to the cover **203**. Namely, it is difficult to reduce the thickness of the liquid crystal module **200** with keeping the necessary fixing strength.

In order to have solved the above problems with the conventional liquid crystal module mounting structure of FIG. **1**, a side mount type liquid crystal module has been proposed. FIG. **2** is a perspective view illustrative of decomposed side mount type liquid crystal module mounting structure. A liquid crystal module **301** has two opposite side faces which are vertical to a display surface **301***a* of the liquid crystal module **301**. Each of the two opposite side faces has two screw holes **300** which axes are parallel to the display surface **301***a*. The liquid crystal module **301** is engaged within inside walls of a bottom frame **303**. The bottom frame **303** has two opposite side faces, each of which has two screw holes **304** at positions corresponding to the screw holes **300** of the liquid crystal module **301**. The liquid crystal module **301** is engaged within the bottom frame **303**, whereby the screw holes **300** of the liquid crystal module **301** are aligned to the corresponding screw holes **304** of the bottom frame **303**. Screws **305** are driven tightly into the screw holes **300** and the screw holes **304**, so as to tightly fix the liquid crystal module **301** to the bottom frame **303**. A top frame **302** is placed on the bottom frame **303**.

The above side mount type liquid crystal module has the following disadvantage. FIG. **3** is a fragmentary cross sectional elevation view illustrative of a mounting structure of a side mount type liquid crystal module to an outside frame. A liquid crystal module **303** is engaged within an outside frame **303***b*, wherein a distance "d" is present between an inside wall of the outside frame **303***b* and a side face of a back-light portion **303***c* of the liquid crystal module **303**, so that a screw **305** is driven into screw holes to penetrate the outside frame **303***b* and enters into the side portion of the liquid crystal module **303**. The distance "d" is necessary as a margin for driving the screw **305**. This distance "d" as the screw margin results in widening the liquid crystal module **303**.

FIG. **4** is a fragmentary cross sectional elevation view illustrative of a side portion having a screw hole of an outside frame shown in FIG. **3**. In view of securing a sufficient strength, a screw hole formation region for forming a screw hole for a screw **305** is made of a metal material, which is heavy more than a resin of a body of the outside frame **303***b*. The metal screw hole formation region of the outside frame **303***b* results in increase in weight of the mobile terminal.

With reference back to FIG. **3**, a head of the screw **305** projects from the side face of the outside frame **303***b* in a horizontal direction or a width direction, whereby a distance or margin "s" is present between the head of the screw **305** and the side face of the back-light portion **303***c* of the liquid crystal module **303**. This distance or margin "s" widens the width of the liquid crystal module **303**, whereby the width of the mobile terminal is also widen.

Furthermore, a display area of the display surface of the liquid crystal module is smaller than the area of the cover of the mobile terminal by the length of the screw extending in the parallel direction to the display surface of the liquid crystal module.

Moreover as shown in FIG. **4**, the screw formation region for forming the screw hole has a side or dimension "D" which is defined by a sum of a diameter "r" of the screw **305**, and first and second margins "m**1**" and "m**2**", for which reason a reduction in thickness of the liquid crystal module is limited by the dimension "D".

The above described side mount liquid crystal module has a further disadvantage that if the mobile terminal mounted with the side mount liquid crystal module receives an external shock, then a mechanical stress due to the received shock is concentrated to the screw formation region of the outside frame. This mechanical stress concentration may provide damages to the liquid crystal panel and the outside frame.

As described above, the screw formation region of the outside frame is made of a metal material, for which reason when the screw is driven through the screw hole in the screw formation region made of the metal material, then it is possible that a metal broken piece is generated, whereby the metal broken piece may form a short circuit on an electronic circuit.

The above screw formation region of the side mount type liquid crystal module is required to be formed to avoid a driver IC provided on the module. This means that a freedom in design of signal lines of the driver IC is reduced. The screw formation region of the side mount type liquid crystal module makes it difficult to obtain an optimum layout of the signal lines of the driver IC.

The cover of the mobile terminal has the screw receiving portion for receiving the screw, for which reason a slide mold is necessary to form the cover. This means that the cost for forming the manufacturing line is high.

The screw receiving portion of the cover comprises a recessed portion which extends from the side face to an inside portion of the cover. The extension of the recessed portion as the screw receiving portion makes widen the width of the cover.

The side mount type liquid crystal module is inconvenient in removing the liquid crystal module from the cover by removing the screws in side direction.

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The screw receiving portions are provided on side portions of the cover, for which reason the screw hole formation region is required to have a high strength by use of a high strength metal such as Mg allow which is, however, expensive and heavy and has a low formability.

In the above circumstances, it had been required to develop a novel liquid crystal module mounting structure for a mobile terminal free from the above problem.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a novel liquid crystal module mounting structure free from the above problems.

It is a further object of the present invention to provide a novel liquid crystal module mounting structure which allows a reduction in thickness of a liquid crystal module mounted on a mobile terminal.

It is a still further object of the present invention to provide a novel liquid crystal module mounting structure which improves a reliability.

It is yet a further object of the present invention to provide a novel liquid crystal module mounting structure which allows an increased ratio in area of a display area of the liquid crystal module to a cover on which the liquid crystal module is mounted.

It is a further more object of the present invention to provide a novel liquid crystal module mounting structure which is convenient for attachment of the liquid crystal module to a mobile terminal.

It is moreover object of the present invention to provide a novel liquid crystal module mounting structure which is convenient for removal of the liquid crystal module from a mobile terminal.

It is another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure free from the above problems.

It is further another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which allows a reduction in thickness of a liquid crystal module mounted on a mobile terminal.

It is still another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which improves a reliability.

It is yet another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which allows an increased ratio in area of a display area of the liquid crystal module to a cover on which the liquid crystal module is mounted.

It is an additional object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which is convenient for attachment of the liquid crystal module to a mobile terminal.

It is still additional object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which is convenient for removal of the liquid crystal module from a mobile terminal.

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises: at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

The second present invention provides a cover for a device, the cover has a display device which comprising a liquid crystal module mounted on a frame member by a mounting structure of the first present invention.

The third present invention provides a mobile terminal comprising a body and a cover of the second present invention.

The above and other objects, features and advantages of the present invention will be apparent from the following descriptions.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments according to the present invention will be described in detail with reference to the accompanying drawings.

FIG. **1** is a perspective view illustrative of a note type personal computer mounted with a liquid crystal module serving as a display.

FIG. **2** is a perspective view of decomposed side mount type liquid crystal module mounting structure.

FIG. **3** is a fragmentary cross sectional elevation view illustrative of a mounting structure of a side mount type liquid crystal module to an outside frame.

FIG. **4** is a fragmentary cross sectional elevation view illustrative of a side portion having a screw hole of an outside frame shown in FIG. **3**.

FIG. **5** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a first embodiment in accordance with the present invention.

FIG. **6** is a perspective view illustrative of individual components of a liquid crystal module shown in FIG. **5** in a first embodiment in accordance with the present invention.

FIG. **7** is a plane view illustrative of the bottom frame with two fixing parts provided separately for fixing the liquid crystal module to the bottom frame shown in FIG. **5**.

FIG. **8** is a plane view illustrative of the bottom frame with a single fixing part provided for fixing the liquid crystal module to the bottom frame as a modification to the two fixing parts of FIG. **7**.

FIG. **9** is a cross sectional elevation view illustrative of a mounting method of mounting a liquid crystal module to a bottom frame shown in FIG. **5** taken along an A–A' line of FIG. **5**.

FIG. **10**A is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and a modified fixing part of the bottom frame.

FIG. **10**B is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and another modified fixing part of the bottom frame.

FIG. **10**C is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and still another modified fixing part of the bottom frame.

FIG. **11** is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure with a liquid crystal driver circuit **9***b* taken along a B–B' line of FIG. **6**.

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FIG. **12** is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure free of a liquid crystal driver circuit **9***b* taken along a C–C' line of FIG. **6**.

FIG. **13** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a second embodiment in accordance with the present invention.

FIG. **14** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a third embodiment in accordance with the present invention.

FIG. **15** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fourth embodiment in accordance with the present invention.

FIG. **16** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fifth embodiment in accordance with the present invention.

FIG. **17** is a fragmentary cross sectional elevation vie illustrative of a metal member sandwiched between peripheral portions around the screws of he top frame and the bosses of the bottom frame in FIG. **16**.

FIG. **18** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a sixth embodiment in accordance with the present invention.

FIG. **19** is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. **18**.

FIG. **20** is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a J–J' line of FIG. **18**.

FIG. **21** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a seventh embodiment in accordance with the present invention.

FIG. **22** is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. **21**.

FIG. **23** is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a K–K' line of FIG. **21**.

DISCLOSURE OF THE INVENTION

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises: at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

It is preferable that the plurality of connecting members are in contact with dead spaces of the liquid crystal module.

It is further preferable that the connecting members comprise plural sets of a screw, a boss formed on the frame member, and a screw hole formed on the liquid crystal module at its position corresponding to the boss.

It is further more preferable that the connecting members further comprise at least a fixing member provided on the frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is moreover preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the frame member, a metal plate having a screw hole aligned to the boss, and a screw hole formed on the liquid crystal module at its position corresponding to the boss.

It is further preferable that the connecting members further comprise at least a fixing member provided on the frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the liquid crystal module is sandwiched between first and second frame members which are also fixed to each other via the plurality of connecting members.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame member at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the fist frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a metal plate having a screw hole aligned to the boss, and a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a

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grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is further preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise a plurality of ribs provided along a peripheral of the first frame member, and a plurality of contact regions along a peripheral of the liquid crystal module at corresponding positions to the ribs, so that the contact regions are in contact with the ribs.

It is farther preferable that the first frame and the second frame members have paired connecting parts which connect the first frame member to the second frame member, so that the liquid crystal module is sandwiched between the first frame member and the second frame member, and the contact regions are in contact with the ribs.

It is also preferable that the connecting members further comprise plural sets of a screw, a boss formed on the first frame member, a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame member at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is further preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is further preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a metal plate having a screw hole aligned to the boss, and a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame at its position corresponding to the first screw hole.

It is moreover preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

The second present invention provides a cover for a device, the cover has a display device which comprising a liquid crystal module mounted on a frame member by a mounting structure of the first present invention.

The third present invention provides a mobile terminal comprising a body and a cover of the second present invention.

Preferred Embodiment

First Embodiment

A first embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **5** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a first embodiment in accordance with the present invention. A liquid crystal module **1** is mounted to a bottom frame **2** of a cover **10** of a personal computer. The bottom frame **2** has a bottom face **1**P which has two bosses **2***a* which extend in a vertical direction to the bottom face **1**P. The liquid crystal module **1** has a display surface **1***a*. The liquid crystal module **1** has two screw holes **1***b* at positions corresponding to the bosses **2***a* of the bottom frame **2**. The liquid crystal module **1** is aligned to the bottom frame **2** so that the screw holes **1***b* of the liquid crystal module **1** correspond in position to the bosses **2***a* of the bottom frame **2**. Screws **3** are driven from an opposite face to the face **1**P through the bosses **2***a* to the screw holes **1***b*, whereby the liquid crystal module **1** is mounted or fixed to the bottom frame **2**.

FIG. **6** is a perspective view illustrative of individual components of a liquid crystal module shown in FIG. **5**. The liquid crystal module **1** comprises a front frame **5**, a liquid crystal display panel **6**, a back-light unit **7** and a back frame **8**. The liquid crystal display panel **6** and the back-light unit **7** are laminated to each other so that laminations of the liquid crystal display panel **6** and the back-light unit **7** are sandwiched between the front frame **5** and the back frame **8**. The back frame **8** has the two screw holes **1***b* into which the screws are driven through the bosses of the bottom frame **2**. The liquid crystal display panel **6** is provided with a printed circuit board **9** having a driver circuit **9***b*. The driver circuit **9***b* of the printed circuit board **9** is electrically connected through a flexible wiring board **6***a* to the liquid crystal display panel **6**, so that the driver circuit **9***b* of the printed circuit board **9** generates control signals on the basis of image data entered form an external device and the control signals are then transmitted through the flexible wiring board **6***a* to the liquid crystal display panel **6**, whereby the liquid crystal display panel **6** controls liquid crystal cells in accordance with the control signals. The back-light unit **7** accommodates a fluorescent lamp **7***b* at its right side. The fluorescent lamp **7***b* turns on a light by a power supplied from a power terminal **7***a*.

The fluorescent lamp **7***b* radiates a light which propagates from the top side of the back-light unit **7** to the bottom side thereof. The back-light unit **7** also has a reflective mirror not illustrated. The light radiated from the fluorescent lamp **7***b* is transmitted with a uniform intensity from a front face **7***c* of the back-light unit **7** to a back face **6***c* of the liquid crystal display panel **6**, whereby images and characters are displayed on the front face **6***b* of the liquid crystal display panel **6** with an incident light which has been adjusted in intensity.

For assembling the liquid crystal module, the flexible wiring board **6***a* is folded and sandwiched between the back-light unit **7** and the back frame **8** to fixe the printed circuit board **9**.

With reference back to FIG. **5**, the bottom frame **2** has two fixing parts **2***b* for fixing the liquid crystal module **1** to the bottom frame **2**. The shape of the fixing parts **2***b* may be modified provided the fixing parts **2***b* are usable for fixing the liquid crystal module **1** to the bottom frame **2**.

FIG. **7** is a plane view illustrative of the bottom frame with two fixing parts provided separately for fixing the liquid crystal module to the bottom frame shown in FIG. **5**. The fixing parts **2***b* may be provided separately on a lower

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region of the bottom frame **2**. As a modification, three or more fixing pans **2***b* may also be provided separately on a lower region of the bottom frame **2**.

FIG. **8** is a plane view illustrative of the bottom frame with a single fixing part provided for fixing the liquid crystal module to the bottom frame as a modification to the two fixing parts of FIG. **7**. The single fixing part **2***b* may be provided which extends in a horizontal direction parallel to a side of the bottom frame **2**.

FIG. **9** is a cross sectional elevation view illustrative of a mounting method of mounting a liquid crystal module to a bottom frame shown in FIG. **5** taken along an A–A' line of FIG. **5**. The fixing part **2***b* of the bottom frame **2** comprises a grooved or recessed member, wherein a thickness of the fixing part **2***b* is reduced toward a front side of the bottom frame **2** so that a front side portion of the bottom frame **2** is so thin as being flexible. The liquid crystal module **1** is moved in an X-direction so that a one side edge of the liquid crystal module **1** is inserted into the groove "H" of the fixing part **2***b* of the bottom frame **2**, before an opposite side edge of the liquid crystal module **1** is moved in a Y-direction so that the liquid crystal module **1** becomes accommodated within the bottom frame **2**. The screws **3** are driven through the bosses **2***a* of the bottom frame **2** to the screw holes **1***b*, whereby the liquid crystal module **1** is fixed to the bottom frame **2**. The cross sectional shape of the fixing part **2***b* of the bottom frame **2** shown in FIG. **9** is mere one example, and it is of course possible to modify the cross sectional shape of the fixing part **2***b*.

FIG. **10**A is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and a modified fixing part of the bottom frame. The fixing part **2***b* of the bottom frame **2** comprises a grooved or recessed member, wherein a thickness of the fixing part **2***b* is uniform so that a front side portion of the bottom frame **2** is so thick.

FIG. **10**B is a fragmentary, cross sectional elevation view illustrative of one side edge of the liquid crystal module and another modified fixing part of the bottom frame. The fixing part **2***b* of the bottom frame **2** comprises a separate metal fitting "K" which has screw holes through which screws "P" are driven into screw holes of the bottom frame **2** so that the separate metal fitting "K" is fixed to the bottom frame **2** by the screws "P". The separate metal fitting "K" has a grooved or recessed portion which receives one side edge of the liquid crystal module **1**. A thickness of the separate metal fitting is uniform. The screw holes of the bottom frame **2** are formed in a dead space provided for a hinged portion for mounting a cover **100** to the body of the personal computer Namely, a dead space of the cover is utilized to suppress enlargement in size of the cover.

FIG. **10**C is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and still another modified fixing part of the bottom frame. The fixing part **2***b* of the bottom frame **2** comprises a separate metal fitting "L" which has screw holes through which screws "P" are driven into screw holes of the bottom frame **2** so that the separate metal fitting "L" is fixed to the bottom frame **2** by the screws "P". The separate metal fitting "L" has a L-shaped bent portion which forms a recess or groove together with a ridged portion of the bottom frame **2**, wherein a flat portion of the separate metal fitting "L" is fitted with a surface of the ridged portion. The screw holes are formed in the flat portion of the separate metal fitting "L". The recess and groove is formed between the bent portion of the separate metal fitting "L" and the ridged portion of the bottom frame **2**. The one side edge of the liquid crystal module **1** is inserted into the recess and groove defied between the bent portion of the separate metal fitting "L" and the ridged portion of the bottom frame **2**. A thickness of the separate metal fitting "L" is uniform. The screw holes of the bottom frame **2** are formed in a dead space provided for a hinged portion for mounting a cover **100** to the body of the personal computer. Namely, a dead space of the cover is utilized to suppress enlargement in size of the cover.

FIG. **11** is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure with a liquid crystal driver circuit **9***b* taken along a B–B' line of FIG. **6**. FIG. **12** is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure free of a liquid crystal driver circuit **9***b* taken along a C–C' line of FIG. **6**. The screw holes **1***b* may be formed at any positions of the back frame **8** unless heads of the screws are made into contact with internal components of the liquid crystal module **1** such as the board **9** on which the driver circuit **9***b* is formed. The presence of screw hole formation regions **11***a* for forming the screw holes **1***b* does never enlarge in size of the cover **100** and a large ratio in area of the liquid crystal module **1** to the cover **100** may be made larger than the conventional structures described above.

The back-light unit **7** comprises a lamp **7***b*, a reflector **7***c*, a reflecting sheet **7***d*, an optical guide plate **7***e*, an optical sheet **7***f* and a mounting frame **7***g*. The lamp **7***b*, the reflector **7***c*, the reflecting sheet **7***d*, the optical guide plate **7***e*, and the optical sheet **7***f* are laminated. One side edge of the laminations is engaged with the mounting frame **7***g*. The laminations are sandwiched between the front frame **5** and the back frame **8**. The reflector **7***c* is provided for reflecting a light radiated from the lamp **7***b* to allow the light to propagate toward the optical guide plate **7***e*.

The optical guide plate **7***e* has a width defined in a direction parallel to the interfaces of the above laminations, so that the optical guide plate **7***e* causes a light radiated form the lamp **7***b* to be diffused. The diffused light is then reflected by the reflecting sheet **7***d*. The reflected light is transmitted through the optical sheet **7***f* to the liquid crystal display panel **6**. The optical sheet **7***f* contributes to have the diffused light uniform in brightness.

In accordance with the above first embodiment, the liquid crystal module **1** is fixed to the bottom frame **2** by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions **11***a* forming the screw holes **1***b* does never enlarge in size or area of the cover **100**, whereby a large ratio in area of the display surface **1***a* of the liquid crystal module **1** to the cover **100** may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module **1** to the bottom frame and also convenient to remove the liquid crystal module **1** from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wing of the flexible board to the driver circuit **9***b* mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Second Embodiment

A second embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **13** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a second embodiment in accordance with the present invention. A cover **101** of the personal computer comprises a top frame **10**, a liquid crystal module **11** and a bottom frame **12**. The liquid crystal module **11** is sandwiched between the top frame **10** and the bottom frame **12**. The liquid crystal module **11** is mounted to the bottom frame **12**. The liquid crystal module **11** has the same structure as shown In FIG. **6** except that the outside frame **5** has two screw hole formation parts **11***a* which extend from opposite edge portions of a bottom side of the outside frame **5**. The detailed descriptions about the structure of the liquid crystal module **11** are eliminated to prevent duplicate descriptions. The top frame **10** has two recessed portions **10***a* on the bottom side of the top frame **10**. The bottom frame **12** has two recessed portions **12***a* on the bottom side of the bottom frame **12**. The recessed portions **10***a* of the top frame **10** correspond in position to the recessed portions **12***a* of the bottom frame **12**. The bottom frame **2** has a bottom face **12**P which has two bosses **12***c* which extend in a vertical direction to the bottom face **12**P. The bottom frame has two fixing parts **12***d* on the top side of the bottom frame **12**. The fixing parts **12** have recessed or grooved portions. The liquid crystal module **11** is aligned to the bottom frame **12** so that the top side of the liquid crystal module **11** comes engaged into the recessed or grooved portions of the fixing parts **12***d*. Subsequently, the screw holes of the liquid crystal module **11** is aligned to the bosses **12***c* of the bottom frame **12**. Screws **3** are driven in a vertical direction to the surfaces of the bottom frame **12** and the liquid crystal module **11**. The screws **3** are thus driven from the screw holes of the liquid crystal module **11** to the bosses **2***a* to the bottom frame, whereby the liquid crystal module **11** is mounted or fixed to the bottom frame **12**. Hinges are attached to the recessed portions **10***a* of the top frame **10** and also attached to the recessed portions **12***a* of the bottom frame **12**. The top frame **10** is attached to the bottom frame **12**, whereby the liquid crystal module **11** is sandwiched between the top frame **10** and the bottom frame **12**.

The liquid crystal module **11** is moved in a tilting direction from the surface of the bottom frame **12** so that one side edge of the liquid crystal module **11** is inserted into the grooved portions of the fixing parts **12***d* of the bottom frame **12**. The fixing parts **12***d* may be any one of various shapes as shown in FIGS. **9** and **10**A through **10**C. The opposite side of the liquid crystal module **11** to the above one side is moved toward the bottom frame **12** in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module **11** come together with the bosses **12***c* of the bottom frame **12**. The screws **3** are driven in the direction vertical to the surface of the liquid crystal module **11** so that the screws **3** come engaged into the screw holes of the liquid crystal module **11** and the bosses **12***c*, whereby the liquid crystal module **11** is fixed to the bottom frame **12**.

The liquid crystal module **11** is fixed to the bottom frame **12** by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions **11***a* forming the screw holes does never enlarge in size or area of the cover **101**, whereby a large ratio in area of the display surface of the liquid crystal module **11** to the cover **101** may be obtained.

The screws **3** arc driven in a direction vertical to the surface of the bottom frame **12**, for which reason it is convenient to attach the liquid crystal module **11** to the bottom frame **12** and also convenient to remove the liquid crystal module **11** from the bottom frame **12**. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions **11***a* forming the screw holes are positioned in dead spaces of the liquid crystal module **11** so as to provide no influence to the circuits of the liquid crystal module **11**, and the screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason the thickness of the cover **101** may be decided on the basis of the thickness of the liquid crystal module **11**.

The screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module **11** to the bottom frame **12** with use of only three or more screws **3** which are not aligned on a single straight line, without using the fixing parts **12***d*.

In accordance with the above second embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes **1***b* does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Third Embodiment

A third embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **14** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a third embodiment in accordance with the present invention. A cover **101** of the personal computer comprises a top frame **10**, a liquid crystal module **11** and a bottom

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frame **12**. The liquid crystal module **11** is sandwiched between the top frame **10** and the bottom frame **12**. The liquid crystal module **11** is mounted to the bottom frame **12**. The liquid crystal module **11** has the same structure as shown in FIG. **6** except that the outside frame **5** has two screw hole formation parts **11***a* which extend from opposite edge portions of a bottom side of the outside frame **5**. The detailed descriptions about the structure of the liquid crystal module **11** are eliminated to prevent duplicate descriptions. The top frame **10** has two recessed portions **10***a* on the bottom side of the top frame **10**. The bottom frame **12** has two recessed portions **12***a* on the bottom side of the bottom frame **12**. The recessed portions **10***a* of the top frame **10** correspond in position to the recessed portions **12***a* of the bottom frame **12**. The bottom frame **2** has a bottom face **12**P which has two bosses **12***c* which extend in a vertical direction to the bottom face **12**P. The bottom frame has two fixing parts **12***d* on the top side of the bottom frame **12**. The fixing parts **12** have recessed or grooved portions. The top frame **10** also has two screw holes **10***b* at corresponding positions to the screw holes of the liquid crystal module **11**. The liquid crystal module **11** is aligned to the bottom frame **12** so that the top side of the liquid crystal module **11** comes engaged into the recessed or grooved portions of the fixing parts **12***d*. Subsequently, the screw holes of the liquid crystal module **11** is aligned to the bosses **12***c* of the bottom frame **12**. Further, the top frame **10** is aligned to the bottom frame **12** so that the screw holes **10***b* are aligned or correspond to the screw holes of the liquid crystal module **11** and the bosses **12***c* of the bottom frame **12**. Screws **3** are driven in a vertical direction to the surfaces of the top frame, the bottom frame **12** and the liquid crystal module **11**, The screws **3** are thus driven from the screw holes **10***b* of the top frame **10** through the screw holes of the liquid crystal module **11** to the bosses **2***a* of the bottom frame **12**, whereby the liquid crystal module **11** is mounted or fixed to the bottom frame **12** and the top frame **10** is also mounted or fixed to the bottom frame **12**. As a result, the liquid crystal module **11** is sandwiched between the bottom frame **12** and the top frame **10**.

The liquid crystal module **11** is moved in a tilting direction from the surface of the bottom frame **12** so that one side edge of the liquid crystal module **11** is inserted into the grooved portions of the fixing parts **12***d* of the bottom frame **12**. The fixing parts **12***d* may be any one of various shapes as shown in FIGS. **9** and **10**A through **10**C. The opposite side of the liquid crystal module **11** to the above one side is moved toward the bottom frame **12** in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module **11** come together with the bosses **12***c* of the bottom frame **12**. The top frame **10** is subsequently aligned to the bottom frame **12** so that the screw holes **10***b* of the top frame **10** are aligned or correspond to the screw holes of the liquid crystal module **1** and the bosses **12***c* of the bottom frame **12**. The screws **3** are driven in the direction vertical to the surface of the liquid crystal module **11** so that the screws **3** come engaged into the screw hoes **10***b* of the top frame **10**, the screw holes of the liquid crystal module **11** and the bosses **12***c* of the bottom frame **12**, whereby the liquid crystal module **11** is fixed to the bottom frame **12**.

The liquid crystal module **11** is fixed to the bottom frame **12** by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions **11***a* forming the screw holes does never enlarge in size or area of the cover **101**, whereby a large ratio in area of the display surface of the liquid crystal module **11** to the cover **101** may be obtained.

The screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason it is convenient to attach the liquid crystal module **11** to the bottom frame **12** and also convenient to remove the liquid crystal module **11** from the bottom frame **12**. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions **11***a* forming the screw holes are positioned in dead spaces of the liquid crystal module **11** so as to provide no influence to the circuits of the liquid crystal module **11**, and the screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason the thickness of the cover **101** may be decided on the basis of the thickness of the liquid crystal module **11**.

The screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module **11** to the bottom frame **12** with use of only three or more screws **3** which are not aligned on a single straight line, without using the fixing parts **12***d*.

In accordance with the above third embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Fourth Embodiment

A fourth embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **15** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fourth embodiment in accordance with the present invention. A cover **101** of the personal computer comprises a top frame **10**, a liquid crystal module **11** and a bottom frame **12**. The liquid crystal module **11** is sandwiched between the top frame **10** and the bottom frame **12**. The liquid crystal module **11** is mounted to the bottom frame **12**. The liquid crystal module **11** has the same structure as shown in FIG. **6** except that the outside frame **5** has two

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screw hole formation parts **11***a* which extend from opposite edge portions of a bottom side of the outside frame **5**. The detailed descriptions about the structure of the liquid crystal module **11** are eliminated to prevent duplicate descriptions. The top frame **10** has two recessed portions **10***a* on the bottom side of the top frame **10**. The bottom frame **12** has two recessed portions **12***a* on the bottom side of the bottom frame **12**. Each of the recessed portions **12***a* of the bottom frame **12** is provided with a fixing plate **12***f* which has an extension portion which cover the boss **12***c*, wherein the extension portion has a screw hole which correspond to the boss **12***c*. The recessed portions **10***a* of the top frame **10** correspond in position to the recessed portions **12***a* of the bottom frame **12**. The bottom frame **2** has a bottom face **12**P which has two bosses **12***c* which extend in a vertical direction to the bottom face **12**P. The bottom frame has two fixing parts **12***d* on the top side of the bottom frame **12**. The fixing parts **12** have recessed or grooved portions. The top frame **10** also has two screw holes **10***b* at corresponding positions to the screw holes of the liquid crystal module **11**. The liquid crystal module **11** is aligned to the bottom frame **12** so that the top side of the liquid crystal nodule **11** comes engaged into the recessed or grooved portions of the fixing parts **12***d*. Subsequently, the screw holes of the liquid crystal module **11** is aligned to the bosses **12***c* of the bottom frame **12**, wherein the screw hole formation regions **11***a* is fitted to the bosses **12***c* through the extension portion of the fixing plate **12***f* in order to secure a large contact area between the screw hole formation regions **11***a* and the extension portion of the fixing plate **12***f*, whereby a fixing strength between the liquid crystal module **1** and the bottom frame **12** is increased. Further, the top frame **10** is aligned to the bottom frame **12** so that the screw holes **10***b* are aligned or correspond to the screw holes of the liquid crystal module **11** and the bosses **12***c* of the bottom frame **12**. Screws **3** are driven in a vertical direction to the surfaces of the top frame, the bottom frame **12** and the liquid crystal module **11**. The screws **3** are thus driven from the screw holes **10***b* of the top frame **10** through the screw holes of the liquid crystal module **11** to the screw holes of the fixing plate **12***f* and the bosses **2***a* of the bottom frame **12**, whereby the liquid crystal module **11** is mounted or fixed to the bottom frame **12** and the top frame **10** is also mounted or fixed to the bottom frame **12**. As a result, the liquid crystal module **11** is sandwiched between the bottom frame **12** and the top frame **10**.

The liquid crystal module **11** is moved in a tilting direction from the surface of the bottom frame **12** so that one side edge of the liquid crystal module **11** is inserted into the grooved portions of the fixing parts **12***d* of the bottom frame **12**. The fixing parts **12***d* may be any one of various shapes as shown in FIGS. **9** and **10**A through **10**C. The opposite side of the liquid crystal module **11** to the above one side is moved toward the bottom frame **12** in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module **11** come together with the screw holes of the fixing plates **12***f* covering the bosses **12***c* of the bottom frame **12**. The top frame **10** is subsequently aligned to the bottom frame **12** so that the screw holes **10***b* of the top frame **10** are aligned or correspond to the screw holes of the liquid crystal module **1**, the screw holes of the fixing plate **12***f* and the bosses **12***c* of the bottom frame **12**. The screws **3** are driven in the direction vertical to the surface of the liquid crystal module **11** so that the screws **3** come engaged into the screw holes **10***b* of the top frame **10**, the screw holes of the liquid crystal module **11** and the screw holes of the fixing plate **12***f* and the bosses **12***c* of the bottom frame **12**, whereby the liquid crystal module **11** is fixed to the bottom frame **12**.

The screw hole formation regions **11***a* is fitted to the bosses **12***c* through the extension portion of the fixing plate **12***f* in order to secure a large contact area between the screw hole formation regions **11***a* and the extension portion of the fixing plate **12***f*, whereby a fixing strength between the liquid crystal module **1** and the bottom frame **12** is increased.

The liquid crystal module **11** is fixed to the bottom frame **12** by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions **11***a* forming the screw holes does never enlarge in size or area of the cover **101**, whereby a large ratio in area of the display surface of the liquid crystal module **11** to the cover **101** may be obtained.

The screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason it is convenient to attach the liquid crystal module **11** to the bottom frame **12** and also convenient to remove the liquid crystal module **11** from the bottom frame **12**. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions **11***a* forming the screw holes are positioned in dead spaces of the liquid crystal module **11** so as to provide no influence to the circuits of the liquid crystal module **11**, and the screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason the thickness of the cover **101** may be decided on the basis of the thickness of the liquid crystal module **11**.

The screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module **11** to the bottom frame **12** with use of only three or more screws **3** which are not aligned on a single straight line, without using the fixing parts **12***d*.

In accordance with the above fourth embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screw hole formation regions is fitted to the bosses through the extension portion of the fixing plate in order to secure a large contact area between the screw hole formation regions and the extension portion of the fixing plate, whereby a fixing strength between the liquid crystal module and the bottom frame is increased.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Fifth Embodiment

A fifth embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **16** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fifth embodiment in accordance with the present invention. A cover **101** of the personal computer comprises a top frame **10**, a liquid crystal module **11** and a bottom frame **12**. The liquid crystal module **11** is sandwiched between the top frame **10** and the bottom frame **12**. The liquid crystal module **11** is mounted to the bottom frame **12**. The liquid crystal module **11** has the same structure as shown in FIG. **6** except that the outside frame **5** has two screw hole formation parts **11***a* which extend from opposite edge portions of a bottom side of the outside frame **5**. The detailed descriptions about the structure of the liquid crystal module **11** are eliminated to prevent duplicate descriptions. The top frame **10** has two recessed portions **10***a* on the bottom side of the top frame **10**. The bottom frame **12** has two recessed portions **12***a* on the bottom side of the bottom frame **12**. The recessed portions **10***a* of the top frame **10** correspond in position to the recessed portions **12***a* of the bottom frame **12**. The bottom frame **2** has a bottom face **12**P which has two bosses **12***c* and two bosses **12***g* which extend in a vertical direction to the bottom face **12**P. The top frame **10** also has two screw holes **10***b* at corresponding positions to the screw holes of the liquid crystal module **11**. The top frame **10** also has two screw holes **10***f* at corresponding positions to the bosses **12***g* of the bottom frame **12**. In this embodiment, in place of fixing parts, not only the two bosses **12***c* are provided near the bottom side of the bottom frame **12** but also the bosses **12***g* are provided near the top side of the bottom frame **12**. The top frame **10** also has not only the screw holes **10***b* corresponding to the bosses **12***c* of the bottom frame **12** but also the screw holes **10***f* corresponding to the bosses **12***g* of the bottom frame **12**. The screw holes **10***f* of the top frame **10** is made into contact through metal members "M" to the bosses **12***g* of the bottom frame **12**. The metal members "M" have L-shaped bent portions which are to be engaged with the top side of the liquid crystal module **1** when the liquid crystal module **1** is sandwiched between the top frame **10** and the bottom frame **12**. The liquid crystal module **11** is aligned to the bottom frame **12** so that the screw holes of the liquid crystal module **11** are aligned to the bosses **12***c* of the bottom frame **12**. Further, the top frame **10** is aligned to the bottom frame **12** so that the screw holes **10***b* of the top frame **10** are aligned or correspond to the screw holes of the liquid crystal module **11** and the bosses **12***c* of the bottom frame **12**, whilst the screw holes **10***f* of the top frame **10** are aligned or correspond to the screw holes of the metal members "M" and the bosses **12***g* of the bottom frame **12**. Namely, the screw holes **10***f* of the top frame **10** is made into contact through the screw holes of the metal members "M" to the bosses **12***g* of the bottom frame **12**, whereby the metal members "M" are sandwiched between peripheral portions around the screws **10***f* of he top frame **10** and the bosses **12***g* of the bottom frame **12**. Simultaneously, the L-shaped bent portions of the metal members "M" are fitted with the top side of the liquid crystal module **11**. Since the metal members "M" are fixed between the peripheral portions around the screws **10***f* of he top frame **10** and the bosses **12***g* of the bottom frame **12**, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module **11**. Screws **3** are driven in a vertical direction to the surfaces of the top frame, the bottom frame **12** and the liquid crystal module **11**. The screws **3** are thus driven from the screw holes **10***b* of the top frame **10** through the screw holes of the liquid crystal module **11** to the bosses **12***c* of the bottom frame **12**. Screws **3'** are also driven in a vertical direction to the surfaces of the top frame, the bottom frame **12** and the liquid crystal module **11**. The screws **3'** are thus driven from the screw holes **10***f* of the top frame **10** through the screw holes of the metal members "M" to the bosses **12***c* of the bottom frame **12**, whereby the metal members "M" are fixed between the peripheral portions around the screws **10***f* of he top frame **10** and the bosses **12***g* of the bottom frame **12**, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module **11**. Therefore, the liquid crystal module **11** is mounted or fixed to the bottom frame **12** and the top frame **10** is also mounted or fixed to the bottom frame **12**. As a result, the liquid crystal module **11** is sandwiched between the bottom frame **12** and the top frame **10**.

FIG. **17** is a fragmentary cross sectional elevation vie illustrative of a metal member sandwiched between peripheral portions around the screws of he top frame and the bosses of the bottom frame in FIG. **16**. The screws **3'** are also driven in a vertical direction to the surfaces of the top frame, the bottom frame **12** and the liquid crystal module **11**. The screws **3'** are thus driven from the screw holes **10***f* of the top frame **10** through the screw holes of the metal members "M" to the bosses **12***c* of the bottom frame **12**, whereby the metal members "M" are fixed between the peripheral portions around the screws **10***f* of he top frame **10** and the bosses **12***g* of the bottom frame **12**, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module **11**. Therefore, the liquid crystal module **11** is mounted or fixed to the bottom frame **12** and the top frame **10** is also mounted or fixed to the bottom frame **12**. As a result, the liquid crystal module **11** is sandwiched between the bottom frame **12** and the top frame **10**.

The liquid crystal module **11** is fixed to the bottom frame **12** by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions **11***a* forming the screw holes does never enlarge in size or area of the cover **101**, whereby a large ratio in area of the display surface of the liquid crystal module **11** to the cover **101** may be obtained.

The screws **3** and **3'** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason it is convenient to attach the liquid crystal module **11** to the bottom frame **12** and also convenient to remove the liquid crystal module **11** from the bottom frame **12**. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions **11***a* forming the screw holes are positioned in dead spaces of the liquid crystal module **11** so as to provide no influence to the circuits of the liquid crystal module **11**, and the screws **3** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason the thickness of the cover **101** may be decided on the basis of the thickness of the liquid crystal module **11**.

The screws **3** and **3'** are driven in a direction vertical to the surface of the bottom frame **12**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

In accordance with the above fifth embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the

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presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Sixth Embodiment

A sixth embodiment according to the present invention will be described in detail with reference to the drawings FIG. **18** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a sixth embodiment in accordance with the present invention. A cover **102** of the personal computer comprises a top frame **20**, a liquid crystal module **21** and a bottom frame **22**. The liquid crystal module **21** is sandwiched between the top frame **20** and the bottom frame **22**. The liquid crystal module **21** is mounted to the bottom frame **22**. The liquid crystal module **21** has the same structure as shown in FIG. **6** except for the following descriptions. The detailed descriptions about the structure of the liquid crystal module **11** are eliminated to prevent duplicate descriptions.

The top frame **20** has opposite side beams **20***c*, each of which has two hooks **20***a*. The bottom frame **22** has opposite side beams **22***c*, each of which has two bosses **22***a* extending in a direction parallel to the face of the bottom frame **22**. The two bosses **22***a* are positioned to correspond to the hooks **20***a* of the top frame **20**, so that the two bosses **22***a* are engaged to the hooks **20***a* of the top frame **20**.

The bottom frame **22** has a bottom face **22**P. The bottom frame **22** has two rib portions "RB" at two top corners of the bottom frame **22**. The bottom frame **22** also has a top side beam on which two ribs **22***b* are provided. The bottom frame **22** also has a right side beam on which two ribs **22***b* are provided. The bottom frame **22** also has a left side beam on which two ribs **22***b* are provided. The bottom frame **22** also has a bottom side beam having two recessed or grooved portions on which two ribs **22***b* are provided. The top frame **20** also has ribs not illustrated but positioned in correspondence to the rib portions "RB" and the ribs **22***b* of the bottom frame **22**. The liquid crystal module **21** has an outside frame which has ten contact regions **21***a* which are made into contact with the rib portions "RB" and the ribs **22***b* of the bottom frame **22** and also contact with the non-illustrated ribs of the top frame **20**. Namely, the contact regions **21***a* of the liquid crystal module **21** are tightly sandwiched between the ribs of the top frame **20** and the bottom frame **22**.

The top frame **20** and the bottom frame **22** are combined to sandwich the liquid crystal module **21**, wherein the hooks **20***a* of the top frame **20** come engaged into the corresponding bosses **22***a* of the bottom frame **22**. FIG. **19** is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. **18**. The top frame **20** is moved in a Y-direction so that a position of the hook **20***a* is made correspond to the boss **2***a* of the bottom frame **22** before the top frame **20** is moved in an X-direction so that the hook **20***a* is inserted into the boss **22***a*, whereby the top frame **20** and the bottom frame **22** are combined to each other so as to sandwich the liquid crystal module **21**, wherein the contact regions **21***a* of the liquid crystal module **21** are tightly sandwiched between the rib portions "RB" and the ribs **22***b* of the bottom frame **22** and the non-illustrated ribs of the top frame **20**.

FIG. **20** is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a J–J' line of FIG. **18**. Each of the two top corners of the liquid crystal module **21** is tightly sandwiched between the rib portions "RB" of the top frame **20** and the bottom frame **22**.

It is possible to further provide cushion members or adhesives between the contact regions **21***a* of the liquid crystal module **21** and the rib portions "RB" and the ribs **22***b* of the bottom frame **22** to prevent any displacement of the liquid crystal module **21**. It is also possible to further provide cushion members or adhesives between the contact regions **21***a* of the liquid crystal module **21** and the non-illustrated rib portions and the non-illustrated ribs of the top frame **20** to prevent any displacement of the liquid crystal module **21**.

The liquid crystal module **21** is fixed to the bottom frame **22** by the above described novel mounting or fixing structure, so that the presence of the rib portions "RB" and the ribs **22***b* of the bottom frame **22** as well as the presence of the contact regions **21***a* of the liquid crystal module **21** do never enlarge in size or area of the cover **102**, whereby a large ratio in area of the display surface of the liquid crystal module **21** to the cover **102** may be obtained.

The ribs are used to fix the liquid crystal module **21** to the top frame **20** and to the bottom frame **22** without using any screws. This means that no screw holes are required to be formed in the liquid crystal module **21**, whereby no damage nor load is applied to the liquid crystal module **21**.

Further, the rib portions and the ribs of the top and bottom frames **20** and **22** as well as the contact regions of the liquid crystal module **21** are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module **21**, for which reason the thickness of the cover **102** may be decided on the basis of the thickness of the liquid crystal module **21**.

The rib portions and the ribs of the top and bottom frames **20** and **22** as well as the contact regions of the liquid crystal module **21** are used to fix the liquid crystal module **21** to the top and bottom frames **20** and **22**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

In accordance with the above sixth embodiment, The liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the rib portions and the ribs of the bottom frame as well as the presence of the contact regions of the liquid crystal module do never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

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The ribs are used to fix the liquid crystal module to the top frame and to the bottom frame without using any screws. This means that no screw holes are required to be formed in the liquid crystal module, whereby no damage nor load is applied to the liquid crystal module.

Further, the rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are used to fix the liquid crystal module to the top and bottom frames, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Seventh Embodiment

A seventh embodiment according to the present invention will be described in detail with reference to the drawings. FIG. **21** is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a seventh embodiment in accordance with the present invention. A cover **103** of the personal computer comprises a top frame not illustrated, a liquid crystal module **31** and a bottom frame **32**. The liquid crystal module **31** is sandwiched between the non-illustrated top frame and the bottom frame **32**. The liquid crystal module **31** is mounted to the bottom frame **32**. The liquid crystal module **31** has the same structure as shown in FIG. **6** except for the following descriptions. The detailed descriptions about the structure of the liquid crystal module **31** are eliminated to prevent duplicate descriptions.

The bottom frame **32** has two bosses **32***c* extending in a direction parallel to a bottom face **32**P of the bottom frame **32**. The two bosses **32***c* are positioned near the bottom two corners of the bottom frame **32**. The bottom frame **32** has two rib portions "RB" at two top corners "R**2**" and "R**3**" of the bottom frame **32**. The bottom frame **32** also has a top side beam along which two ribs **32***a* and two bosses **23***b* are provided. The bottom frame **32** also has a right side beam along which two ribs **32***a* are provided. The bottom frame **32** also has a left side beam along which two ribs **32***a* are provided. The bottom frame **32** also has a bottom side beam having two recessed or grooved portions along which two ribs **32***a* are provided. Four bosses **23***c* are further provided along the bottom side beam of the bottom frame **32**. The liquid crystal module **31** has an outside frame which has ten contact regions **31***a* which are made into contact with the rib portions "RB" and the ribs **32***a* of the bottom frame **32** and also contact with the non-illustrated ribs of the top frame **30**. Namely, the contact regions **31***a* of the liquid crystal module **31** are tightly sandwiched between the ribs of the top frame **30** and the bottom frame **32**.

The top frame **30** and the bottom frame **32** are combined to sandwich the liquid crystal module **31**, wherein the hooks **30***a* of the top frame **30** come engaged into the corresponding bosses **32***a* of the bottom frame **32**. FIG. **22** is a fragmentary schematic view illustrative of tight and left top corners having rib portions "RB" of the bottom frame shown in FIG. **21**. The right and left top corners "R**3**" and "R**2**" have rib portions "RB". Each of the rib portions "RB" has a cross-shaped projection "T" which projects in a direction perpendicular to the bottom face **32**P of the bottom frame **32**. The liquid crystal module **31** has cross shaped recessed portions which are not illustrated but at two right and left corners of the liquid crystal modules **31**, so that the cross shaped recessed portions of the liquid crystal module **31** correspond in position to the cross-shaped projections "T" of the rib portions "RB" of the bottom frame **32**.

FIG. **23** is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a K–K' line of FIG. **22**. Each of the two top corners of the liquid crystal module **31** is tightly sandwiched between the rib portions "RB" of the top frame **30** and the bottom frame **32**. The cross-shaped projections "T" of the rib portions "RB" of the bottom frame **32** are engaged into the cross shaped recessed portions of the liquid crystal module **31** for securely positioning the liquid crystal module **31** to the top and bottom frames **30** and **32** without any displacement.

With reference back to FIG. **21**, the bottom frame **32** has the six bosses **32***b*. The top frame not illustrated also has six screw holes at positions corresponding to the six bosses **32***b* of the bottom frame **32**, so that the top frame not illustrated is fixed to the bottom frame **32** through screws **3**. The screws **3** are driven in a direction vertical to the bottom face **32**P of the bottom flame **32** so that the screws **3** are driven from the screw holes of the top frame not illustrated into the bosses **32***b* of the bottom frame **32**. The liquid crystal module **31** is fixed between the top frame **30** and the bottom frame **32** by having the contact regions **31***a* of the liquid crystal module **31** are toughly sandwiched between the rib portions "RB" and the ribs of the top and bottom frames **30** and **32**.

It is possible to further provide cushion members or adhesives between the contact regions **31***a* of the liquid crystal module **31** and the rib portions "RB" and the ribs **32***b* of the bottom frame **32** to prevent any displacement of the liquid crystal module **31**. It is also possible to further provide cushion members or adhesives between the contact regions **31***a* of the liquid crystal module **31** and the non-illustrated rib portions and the non-illustrated ribs of the top frame **30** to prevent any displacement of the liquid crystal module **31**.

The liquid crystal module **31** is fixed to the bottom frame **32** by the above described novel mounting or fixing structure, so that the presence of the rib portions "RB" and the ribs **32***b* of the bottom frame **32** as well as the presence of the contact regions **31***a* of the liquid crystal module **31** do never enlarge in size or area of the cover **103**, whereby a large ratio in area of the display surface of the liquid crystal module **31** to the cover **103** may be obtained.

The ribs are used to fix the liquid crystal module **31** to the top frame **30** and to the bottom frame **32** without forming any screws to the liquid crystal module **31**. This means that no screw holes are required to be formed in the liquid crystal module **31**, whereby no damage nor load is applied to the liquid crystal module **31**.

Further, the rib portions and the ribs of the top and bottom frames **30** and **32** as well as the contact regions **31***a* of the liquid crystal module **31** are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module **31**, for which reason the thickness of the cover **103** may be decided on the basis of the thickness of the liquid crystal module **31**.

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The rib portions and the ribs of the top and bottom frames **30** and **32** as well as the contact regions **31***a* of the liquid crystal module **31** are used to fix the liquid crystal module **31** to the top and bottom frames **20** and **32**, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

In accordance with the above seventh embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the rib portions and the ribs of the bottom frame as well as the presence of the contact regions of the liquid crystal module do never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The ribs are used to fix the liquid crystal module to the top frame and to the bottom frame without using any screws. This means that no screw holes are required to be formed in the liquid crystal module, whereby no damage nor load is applied to the liquid crystal module.

Further, the rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are used to fix the liquid crystal module to the top and bottom frames, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

Whereas modifications of the present invention will be apparent to a person having ordinary skill in the art, to which the invention pertains, it is to be understood that embodiments as shown and described by way of illustrations are by no means intended to be considered in a limiting sense. Accordingly, it is to be intended to cover by claims all modifications which fall within the spirit and scope of the present invention.

What is claimed is:

1. An electric apparatus, comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof;

a liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module.

2. The electric apparatus of claim **1**, further comprising:

at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.

3. The electric apparatus of claim **2**, wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.

* * * * *

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L NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/459,280	12/13/99	345	2772	PF-2503/NEC/

TAKAKAZU YANO, TOKYO, JAPAN; TOMOO MIWA, TOKYO, JAPAN; YASUHIRO SATO, TOKYO, JAPAN; TOSHIHISA OGWA, TOKYO, JAPAN; MICHIAKI NISHIYAMA, TOKYO, JAPAN; MASATAKE BARA, TOKYO, JAPAN; HIKARU OKABE, TOKYO, ~~DEM REP OF KOREA~~; FUMIHIKO FUJISHIRO, TOKYO, JAPAN; KATSUHIRO KATO, TOKYO, JAPAN; KAZUAKI MIKAMI, TOKYO, JAPAN; HIROKAZU FUKUYOSHI, TOKYO, JAPAN.

CONTINUING DOMEST C DATA********
VERIFIED

None, TL

371 (NAT'L STAGE) DATA********
VERIFIED

None, TL

FOREIGN APPLICATIONS********
VERIFIED JAPAN 10-353579 12/11/98

Yes, TL

IF REQUIRED, FOREIGN FILING LICENSE GRANTED 02/03/00

Foreign Priority claimed / 35 USC 119 (a-d) conditions met	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☒yes ☐no / ☒yes ☐no ☐Met after Allowance	JPX	25	31	1
Verified and Acknowledged _____ Examiner's Initials _____ Initials				

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ARLINGTON VA 22209

TITLE
LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

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PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

12/29/1999 MGORDON 00000015 09459280

01 FC:101	760.00 OP
02 FC:103	198.00 OP

PTO-1556
(5/87)
*U.S. GPO 1998-433-214/60404

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Express Mail Label No.

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
pf-2503/NEC/US/mh

Total Pages in this Submission

12/13/99

TO THE ASSISTANT COMMISSIONER FOR PATENTS
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Washington, D.C. 20231

U.S. PTO 09/459280 12/13/99

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

and invented by:

Takakazu Yano, Tomoo Miwa, Yasuhiro Sato, Toshihisa Ogawa, Michiaki Nishiyama, Masatake Baba, Hikaru Okabe, Fumihiko Fujishiro, Katsuhiro Kato, Kazuaki Mikami, and Hirokazu Fukuyoshi

If a CONTINUATION APPLICATION, *check appropriate box and supply the requisite information:*

☐ **Continuation** ☐ **Divisional** ☐ **Continuation-in-part (CIP)** of prior application No.: _____

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Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 62 pages and including the following:
   - a. ☒ Descriptive Title of the Invention
   - b. ☐ Cross References to Related Applications *(if applicable)*
   - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
   - d. ☐ Reference to Microfiche Appendix *(if applicable)*
   - e. ☒ Background of the Invention
   - f. ☒ Brief Summary of the Invention
   - g. ☒ Brief Description of the Drawings *(if drawings filed)*
   - h. ☒ Detailed Description
   - i. ☒ Claim(s) as Classified Below
   - j. ☒ Abstract of the Disclosure

P01ULRG/REV04

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UTILITY PATENT APPLICATION TRANSMITTAL
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Total Pages in this Submission

Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
   a. ☐ Formal Number of Sheets _____
   b. ☒ Informal Number of Sheets **25 (Figs. 1-23)**

4. ☒ Oath or Declaration
   a. ☒ Newly executed *(original or copy)* ☐ Unexecuted
   b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
   c. ☒ With Power of Attorney ☐ Without Power of Attorney
   d. ☐ *DELETION OF INVENTOR(S)*
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Computer Program in Microfiche *(Appendix)*

7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
   a. ☐ Paper Copy
   b. ☐ Computer Readable Copy *(identical to computer copy)*
   c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers *(cover sheet & document(s))*

9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*

10. ☐ English Translation Document *(if applicable)*

11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations

12. ☐ Preliminary Amendment

13. ☒ Acknowledgment postcard

14. ☐ Certificate of Mailing
   ☐ First Class ☐ Express Mail *(Specify Label No.):* _____

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UTILITY PATENT APPLICATION TRANSMITTAL
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Total Pages in this Submission

Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☐ Additional Enclosures *(please identify below):*

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra		Rate	Fee
Total Claims	31	- 20 =	11	x	$18.00	$198.00
Indep. Claims	1	- 3 =	0	x	$78.00	$0.00
Multiple Dependent Claims (check if applicable) ☐						$0.00
					BASIC FEE	$760.00
OTHER FEE *(specify purpose)*						$0.00
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Sean McGinn
Signature

Dated: **December 13, 1999**

Sean M. McGinn, Esq.
Reg. No.: 34,386

cc:

Customer No.: 21254

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Express Mail Label No. duplicate

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No. pf-2503/NEC/US/mh

Total Pages in this Submission

TO THE ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231

JC994 U.S. PTO 09/459280 12/13/99

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

and invented by:

Takakazu Yano, Tomoo Miwa, Yasuhiro Sato, Toshihisa Ogawa, Michiaki Nishiyama, Masatake Baba, Hikaru Okabe, Fumihiko Fujishiro, Katsuhiro Kato, Kazuaki Mikami, and Hirokazu Fukuyoshi

If a CONTINUATION APPLICATION, *check appropriate box and supply the requisite information:*

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Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 62 pages and including the following:
   - a. ☒ Descriptive Title of the Invention
   - b. ☐ Cross References to Related Applications *(if applicable)*
   - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
   - d. ☐ Reference to Microfiche Appendix *(if applicable)*
   - e. ☒ Background of the Invention
   - f. ☒ Brief Summary of the Invention
   - g. ☒ Brief Description of the Drawings *(if drawings filed)*
   - h. ☒ Detailed Description
   - i. ☒ Claim(s) as Classified Below
   - j. ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
   a. ☐ Formal Number of Sheets _____
   b. ☒ Informal Number of Sheets **25 (Figs. 1-23)**
4. ☒ Oath or Declaration
   a. ☒ Newly executed *(original or copy)* ☐ Unexecuted
   b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
   c. ☒ With Power of Attorney ☐ Without Power of Attorney
   d. ☐ *DELETION OF INVENTOR(S)*
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
   The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
   a. ☐ Paper Copy
   b. ☐ Computer Readable Copy *(identical to computer copy)*
   c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☐ Additional Enclosures *(please identify below):*

Fee Calculation and Transmittal

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For	#Filed	#Allowed	#Extra		Rate	Fee
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MCGINN & GIBB, P.C.
A PROFESSIONAL LIMITED LIABILITY COMPANY
PATENTS, TRADEMARKS, COPYRIGHTS, AND INTELLECTUAL PROPERTY LAW
1701 CLARENDON BOULEVARD, SUITE 100
ARLINGTON, VIRGINIA 22209
TELEPHONE (703) 294-6699
FACSIMILE (703) 294-6696

APPLICATION FOR UNITED STATES LETTERS PATENT

APPLICANTS: Takakazu Yano, Tomoo Miwa, Yasuhiro Sato, Toshihisa Ogawa, Michiaki Nishiyama, Masatake Baba, Hikaru Okabe, Fumihiko Fujishiro, Katsuhiro Kato, Kazuaki Mikami, and Hirokazu Fukuyoshi

FOR: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

DOCKET NO.: pf-2503/NEC/US/mh

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LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

BACKGROUND OF THE INVENTION

The present invention relates to a liquid crystal module mounting structure, and more particularly to a structure for mounting a liquid crystal module serving as a display to a mobile terminal such as a note type personal computer.

A liquid crystal module mounted to a note type personal computer will be described. FIG. 1 is a perspective view illustrative of a note type personal computer mounted with a liquid crystal module serving as a display. The note type personal computer comprises a body 202 and a cover 203. A liquid crystal module 200 serving as a display of the computer is mounted to the cover 203. The liquid crystal module 200 has a peripheral region surrounding a display area, and this peripheral region has a plurality of screw holes 201. The cover 203 also has screw holes 205 at positions corresponding to the screw holes 201 of the liquid crystal module 200. The liquid crystal module 200 is fixed to the cover 203 by screws 204 which are driven tightly into the screw holes 201 and the screw holes 205. The display area of the liquid crystal module 200 is smaller in size than an

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entire part of the liquid crystal module 200 by the peripheral region on which the screw holes 201 are formed. Namely, it is difficult to enlarge the display area of the liquid crystal module 200 without enlargement of the cover 203.

Further, a thickness of the liquid crystal module 200 is decided dependent upon the necessary length of the screws 201 on the basis of the necessary strength in tightly fixing the liquid crystal module 200 to the cover 203. Namely, it is difficult to reduce the thickness of the liquid crystal module 200 with keeping the necessary fixing strength.

In order to have solved the above problems with the conventional liquid crystal module mounting structure of FIG. 1, a side mount type liquid crystal module has been proposed. FIG. 2 is a perspective view illustrative of decomposed side mount type liquid crystal module mounting structure. A liquid crystal module 301 has two opposite side faces which are vertical to a display surface 301a of the liquid crystal module 301. Each of the two opposite side faces has two screw holes 300 which axes are parallel to the display surface 301a. The liquid crystal module 301 is engaged within inside walls of a bottom frame 303. The bottom frame 303 has two opposite side faces, each of which has two screw holes 304 at positions corresponding to the screw holes 300 of the liquid crystal module 301. The liquid crystal module 301 is engaged within the bottom frame 303, whereby the screw holes 300 of the liquid crystal module 301 are aligned to the corresponding screw holes 304 of the bottom frame 303. Screws 305 are driven tightly into the screw holes 300 and the screw holes 304, so as to

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tightly fix the liquid crystal module 301 to the bottom frame 303. A top frame 302 is placed on the bottom frame 303.

The above side mount type liquid crystal module has the following disadvantage. FIG. 3 is a fragmentary cross sectional elevation view illustrative of a mounting structure of a side mount type liquid crystal module to an outside frame. A liquid crystal module 303 is engaged within an outside frame 303b, wherein a distance "d" is present between an inside wall of the outside frame 303b and a side face of a back-light portion 303c of the liquid crystal module 303, so that a screw 305 is driven into screw holes to penetrate the outside frame 303b and enters into the side portion of the liquid crystal module 303. The distance "d" is necessary as a margin for driving the screw 305. This distance "d" as the screw margin results in widening the liquid crystal module 303.

FIG. 4 is a fragmentary cross sectional elevation view illustrative of a side portion having a screw hole of an outside frame shown in FIG. 3. In view of securing a sufficient strength, a screw hole formation region for forming a screw hole for a screw 305 is made of a metal material, which is heavy more than a resin of a body of the outside frame 303b. The metal screw hole formation region of the outside frame 303b results in increase in weight of the mobile terminal.

With reference back to FIG. 3, a head of the screw 305 projects from the side face of the outside frame 303b in a horizontal direction or a width direction, whereby a distance or margin "s" is present between the head of the screw 305 and the side face of the back-light portion 303c of

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the liquid crystal module 303. This distance or margin "s" widens the width of the liquid crystal module 303, whereby the width of the mobile terminal is also widen.

Furthermore, a display area of the display surface of the liquid crystal module is smaller than the area of the cover of the mobile terminal by the length of the screw extending in the parallel direction to the display surface of the liquid crystal module.

Moreover as shown in FIG. 4, the screw formation region for forming the screw hole has a side or dimension "D" which is defined by a sum of a diameter "r" of the screw 305, and first and second margins "m1" and "m2", for which reason a reduction in thickness of the liquid crystal module is limited by the dimension "D".

The above described side mount liquid crystal module has a further disadvantage that if the mobile terminal mounted with the side mount liquid crystal module receives an external shock, then a mechanical stress due to the received shock is concentrated to the screw formation region of the outside frame. This mechanical stress concentration may provide damages to the liquid crystal panel and the outside frame.

As described above, the screw formation region of the outside frame is made of a metal material, for which reason when the screw is driven through the screw hole in the screw formation region made of the metal material, then it is possible that a metal broken piece is generated, whereby the metal broken piece may form a short circuit on an electronic circuit.

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The above screw formation region of the side mount type liquid crystal module is required to be formed to avoid a driver IC provided on the module. This means that a freedom in design of signal lines of the driver IC is reduced. The screw formation region of the side mount type liquid crystal module makes it difficult to obtain an optimum layout of the signal lines of the driver IC.

The cover of the mobile terminal has the screw receiving portion for receiving the screw, for which reason a slide mold is necessary to form the cover. This means that the cost for forming the manufacturing line is high.

The screw receiving portion of the cover comprises a recessed portion which extends from the side face to an inside portion of the cover. The extension of the recessed portion as the screw receiving portion makes widen the width of the cover.

The side mount type liquid crystal module is inconvenient in removing the liquid crystal module from the cover by removing the screws in side direction.

The screw receiving portions are provided on side portions of the cover, for which reason the screw hole formation region is required to have a high strength by use of a high strength metal such as Mg allow which is, however, expensive and heavy and has a low formability.

In the above circumstances, it had been required to develop a novel liquid crystal module mounting structure for a mobile terminal free from the above problem.

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SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a novel liquid crystal module mounting structure free from the above problems.

It is a further object of the present invention to provide a novel liquid crystal module mounting structure which allows a reduction in thickness of a liquid crystal module mounted on a mobile terminal.

It is a still further object of the present invention to provide a novel liquid crystal module mounting structure which improves a reliability.

It is yet a further object of the present invention to provide a novel liquid crystal module mounting structure which allows an increased ratio in area of a display area of the liquid crystal module to a cover on which the liquid crystal module is mounted.

It is a further more object of the present invention to provide a novel liquid crystal module mounting structure which is convenient for attachment of the liquid crystal module to a mobile terminal.

It is moreover object of the present invention to provide a novel liquid crystal module mounting structure which is convenient for removal of the liquid crystal module from a mobile terminal.

It is another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved

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liquid crystal module mounting structure free from the above problems.

It is further another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which allows a reduction in thickness of a liquid crystal module mounted on a mobile terminal.

It is still another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which improves a reliability.

It is yet another object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which allows an increased ratio in area of a display area of the liquid crystal module to a cover on which the liquid crystal module is mounted.

It is an additional object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which is convenient for attachment of the liquid crystal module to a mobile terminal.

It is still additional object of the present invention to provide a novel mobile terminal mounted with a liquid crystal module by an improved liquid crystal module mounting structure which is convenient for removal of the liquid crystal module from a mobile terminal.

The present invention provides a mounting structure for

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mounting a liquid crystal module having a display area. The mounting structure comprises : at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

The second present invention provides a cover for a device, the cover has a display device which comprising a liquid crystal module mounted on a frame member by a mounting structure of the first present invention.

The third present invention provides a mobile terminal comprising a body and a cover of the second present invention.

The above and other objects, features and advantages of the present invention will be apparent from the following descriptions.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments according to the present invention will be described in detail with reference to the accompanying drawings.

FIG. 1 is a perspective view illustrative of a note type personal computer mounted with a liquid crystal module serving as a display.

FIG. 2 is a perspective view of decomposed side mount type liquid crystal module mounting structure.

FIG. 3 is a fragmentary cross sectional elevation view illustrative

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of a mounting structure of a side mount type liquid crystal module to an outside frame.

FIG. 4 is a fragmentary cross sectional elevation view illustrative of a side portion having a screw hole of an outside frame shown in FIG. 3.

FIG. 5 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a first embodiment in accordance with the present invention.

FIG. 6 is a perspective view illustrative of individual components of a liquid crystal module shown in FIG. 5 in a first embodiment in accordance with the present invention.

FIG. 7 is a plane view illustrative of the bottom frame with two fixing parts provided separately for fixing the liquid crystal module to the bottom frame shown in FIG. 5.

FIG. 8 is a plane view illustrative of the bottom frame with a single fixing part provided for fixing the liquid crystal module to the bottom frame as a modification to the two fixing parts of FIG. 7.

FIG. 9 is a cross sectional elevation view illustrative of a mounting method of mounting a liquid crystal module to a bottom frame shown in FIG. 5 taken along an A-A' line of FIG. 5.

FIG. 10A is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and a modified fixing part of the bottom frame.

FIG. 10B is a fragmentary cross sectional elevation view

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illustrative of one side edge of the liquid crystal module and another modified fixing part of the bottom frame.

FIG. 10C is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and still another modified fixing part of the bottom frame.

FIG. 11 is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure with a liquid crystal driver circuit 9b taken along a B-B' line of FIG. 6.

FIG. 12 is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure free of a liquid crystal driver circuit 9b taken along a C-C' line of FIG. 6.

FIG. 13 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a second embodiment in accordance with the present invention.

FIG. 14 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a third embodiment in accordance with the present invention.

FIG. 15 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fourth embodiment in accordance with the present invention.

FIG. 16 is a perspective view illustrative of a liquid crystal

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module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fifth embodiment in accordance with the present invention.

FIG. 17 is a fragmentary cross sectional elevation vie illustrative of a metal member sandwiched between peripheral portions around the screws of he top frame and the bosses of the bottom frame in FIG. 16.

6 FIG. 18 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a sixth embodiment in accordance with the present invention.

FIG. 19 is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. 18.

FIG. 20 is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a J-J' line of FIG. 18.

7 FIG. 21 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a seventh embodiment in accordance with the present invention.

FIG. 22 is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. 21.

FIG. 23 is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched

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between rib portions of the top frame and the bottom frame taken along a K-K' line of FIG. 21.

DISCLOSURE OF THE INVENTION

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises : at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

It is preferable that the plurality of connecting members are in contact with dead spaces of the liquid crystal module.

It is further preferable that the connecting members comprise plural sets of a screw, a boss formed on the frame member, and a screw hole formed on the liquid crystal module at its position corresponding to the boss.

It is further more preferable that the connecting members further comprise at least a fixing member provided on the frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is moreover preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of

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the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the frame member, a metal plate having a screw hole aligned to the boss, and a screw hole formed on the liquid crystal module at its position corresponding to the boss.

It is further preferable that the connecting members further comprise at least a fixing member provided on the frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the liquid crystal module is sandwiched between first and second frame members which are also fixed to each other via the plurality of connecting members.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a first screw hole formed on the liquid crystal module at its position corresponding to the

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boss and a second screw hole formed on the second frame member at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a metal plate having a screw hole aligned to the boss, and a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of

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the liquid crystal module.

It is further preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is also preferable that the connecting members comprise a plurality of ribs provided along a peripheral of the first frame member, and a plurality of contact regions along a peripheral of the liquid crystal module at corresponding positions to the ribs, so that the contact regions are in contact with the ribs.

It is further preferable that the first frame and the second frame members have paired connecting parts which connect the first frame member to the second frame member, so that the liquid crystal module is sandwiched between the first frame member and the second frame member, and the contact regions are in contact with the ribs.

It is also preferable that the connecting members further comprise plural sets of a screw, a boss formed on the first frame member, a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame member at its position corresponding to the first screw hole.

It is further preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member

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comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is further preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

It is further preferable that the connecting members comprise plural sets of a screw, a boss formed on the first frame member, a metal plate having a screw hole aligned to the boss, and a first screw hole formed on the liquid crystal module at its position corresponding to the boss and a second screw hole formed on the second frame at its position corresponding to the first screw hole.

It is moreover preferable that the connecting members further comprise at least a fixing member provided on the first frame member and the at least fixing member has a grooved portion which receives one side edge of the liquid crystal module.

It is further more preferable that the at least fixing member comprises a single fixing member which extends along the one side edge of the liquid crystal module.

It is also preferable that the at least fixing member comprises a plurality of fixing members which are provided separately and distanced along the one side edge of the liquid crystal module.

The second present invention provides a cover for a device, the cover has a display device which comprising a liquid crystal module mounted on a frame member by a mounting structure of the first present

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invention.

The third present invention provides a mobile terminal comprising a body and a cover of the second present invention.

PREFERRED EMBODIMENT

FIRST EMBODIMENT :

A first embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 5 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a first embodiment in accordance with the present invention. A liquid crystal module 1 is mounted to a bottom frame 2 of a cover 10 of a personal computer. The bottom frame 2 has a bottom face 1P which has two bosses 2a which extend in a vertical direction to the bottom face 1P. The liquid crystal module 1 has a display surface 1a. The liquid crystal module 1 has two screw holes 1b at positions corresponding to the bosses 2a of the bottom frame 2. The liquid crystal module 1 is aligned to the bottom frame 2 so that the screw holes 1b of the liquid crystal module 1 correspond in position to the bosses 2a of the bottom frame 2. Screws 3 are driven from an opposite face to the face 1P through the bosses 2a to the screw holes 1b, whereby the liquid crystal module 1 is mounted or fixed to the bottom frame 2.

FIG. 6 is a perspective view illustrative of individual components

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of a liquid crystal module shown in FIG. 5. The liquid crystal module 1 comprises a front frame 5, a liquid crystal display panel 6, a back-light unit 7 and a back frame 8. The liquid crystal display panel 6 and the back-light unit 7 are laminated to each other so that laminations of the liquid crystal display panel 6 and the back-light unit 7 are sandwiched between the front frame 5 and the back frame 8. The back frame 8 has the two screw holes 1b into which the screws are driven through the bosses of the bottom frame 2. The liquid crystal display panel 6 is provided with a printed circuit board 9 having a driver circuit 9b. The driver circuit 9b of the printed circuit board 9 is electrically connected through a flexible wiring board 6a to the liquid crystal display panel 6, so that the driver circuit 9b of the printed circuit board 9 generates control signals on the basis of image data entered form an external device and the control signals are then transmitted through the flexible wiring board 6a to the liquid crystal display panel 6, whereby the liquid crystal display panel 6 controls liquid crystal cells in accordance with the control signals. The back-light unit 7 accommodates a fluorescent lamp 7b at its right side. The fluorescent lamp 7b turns on a light by a power supplied from a power terminal 7a.

The fluorescent lamp 7b radiates a light which propagates from the top side of the back-light unit 7 to the bottom side thereof. The back-light unit 7 also has a reflective mirror not illustrated. The light radiated from the fluorescent lamp 7b is transmitted with a uniform intensity from a front face 7c of the back-light unit 7 to a back face 6c of the liquid crystal display panel 6, whereby images and characters are displayed on the front

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face 6b of the liquid crystal display panel 6 with an incident light which has been adjusted in intensity.

For assembling the liquid crystal module, the flexible wiring board 6a is folded and sandwiched between the back-light unit 7 and the back frame 8 to fixe the printed circuit board 9.

With reference back to FIG. 5, the bottom frame 2 has two fixing parts 2b for fixing the liquid crystal module 1 to the bottom frame 2. The shape of the fixing parts 2b may be modified provided the fixing parts 2b are usable for fixing the liquid crystal module 1 to the bottom frame 2.

FIG. 7 is a plane view illustrative of the bottom frame with two fixing parts provided separately for fixing the liquid crystal module to the bottom frame shown in FIG. 5. The fixing parts 2b may be provided separately on a lower region of the bottom frame 2. As a modification, three or more fixing parts 2b may also be provided separately on a lower region of the bottom frame 2.

FIG. 8 is a plane view illustrative of the bottom frame with a single fixing part provided for fixing the liquid crystal module to the bottom frame as a modification to the two fixing parts of FIG. 7. The single fixing part 2b may be provided which extends in a horizontal direction parallel to a side of the bottom frame 2.

FIG. 9 is a cross sectional elevation view illustrative of a mounting method of mounting a liquid crystal module to a bottom frame shown in FIG. 5 taken along an A-A' line of FIG. 5. The fixing part 2b of the bottom frame 2 comprises a grooved or recessed member, wherein a

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thickness of the fixing part 2b is reduced toward a front side of the bottom frame 2 so that a front side portion of the bottom frame 2 is so thin as being flexible. The liquid crystal module 1 is moved in an X-direction so that a one side edge of the liquid crystal module 1 is inserted into the groove "H" of the fixing part 2b of the bottom frame 2, before an opposite side edge of the liquid crystal module 1 is moved in a Y-direction so that the liquid crystal module 1 becomes accommodated within the bottom frame 2. The screws 3 are driven through the bosses 2a of the bottom frame 2 to the screw holes 1b, whereby the liquid crystal module 1 is fixed to the bottom frame 2. The cross sectional shape of the fixing part 2b of the bottom frame 2 shown in FIG. 9 is mere one example, and it is of course possible to modify the cross sectional shape of the fixing part 2b.

FIG. 10A is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and a modified fixing part of the bottom frame. The fixing part 2b of the bottom frame 2 comprises a grooved or recessed member, wherein a thickness of the fixing part 2b is uniform so that a front side portion of the bottom frame 2 is so thick.

FIG. 10B is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and another modified fixing part of the bottom frame. The fixing part 2b of the bottom frame 2 comprises a separate metal fitting "K" which has screw holes through which screws "P" are driven into screw holes of the bottom frame 2 so that the separate metal fitting "K" is fixed to the bottom frame 2 by the

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screws "P". The separate metal fitting "K" has a grooved or recessed portion which receives one side edge of the liquid crystal module 1. A thickness of the separate metal fitting is uniform. The screw holes of the bottom frame 2 are formed in a dead space provided for a hinged portion for mounting a cover 100 to the body of the personal computer. Namely, a dead space of the cover is utilized to suppress enlargement in size of the cover.

FIG. 10C is a fragmentary cross sectional elevation view illustrative of one side edge of the liquid crystal module and still another modified fixing part of the bottom frame. The fixing part 2b of the bottom frame 2 comprises a separate metal fitting "L" which has screw holes through which screws "P" are driven into screw holes of the bottom frame 2 so that the separate metal fitting "L" is fixed to the bottom frame 2 by the screws "P". The separate metal fitting "L" has a L-shaped bent portion which forms a recess or groove together with a ridged portion of the bottom frame 2, wherein a flat portion of the separate metal fitting "L" is fitted with a surface of the ridged portion. The screw holes are formed in the flat portion of the separate metal fitting "L". The recess and groove is formed between the bent portion of the separate metal fitting "L" and the ridged portion of the bottom frame 2. The one side edge of the liquid crystal module 1 is inserted into the recess and groove defined between the bent portion of the separate metal fitting "L" and the ridged portion of the bottom frame 2. A thickness of the separate metal fitting "L" is uniform. The screw holes of the bottom frame 2 are formed in a dead space provided

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for a hinged portion for mounting a cover 100 to the body of the personal computer. Namely, a dead space of the cover is utilized to suppress enlargement in size of the cover.

FIG. 11 is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure with a liquid crystal driver circuit 9b taken along a B-B' line of FIG. 6. FIG. 12 is a fragmentary cross sectional elevation view illustrative of a liquid crystal module having an internal structure free of a liquid crystal driver circuit 9b taken along a C-C' line of FIG. 6. The screw holes 1b may be formed at any positions of the back frame 8 unless heads of the screws are made into contact with internal components of the liquid crystal module 1 such as the board 9 on which the driver circuit 9b is formed. The presence of screw hole formation regions 11a for forming the screw holes 1b does never enlarge in size of the cover 100 and a large ratio in area of the liquid crystal module 1 to the cover 100 may be made larger than the conventional structures described above.

The back-light unit 7 comprises a lamp 7b, a reflector 7c, a reflecting sheet 7d, an optical guide plate 7e, an optical sheet 7f and a mounting frame 7g. The lamp 7b, the reflector 7c, the reflecting sheet 7d, the optical guide plate 7e, and the optical sheet 7f are laminated. One side edge of the laminations is engaged with the mounting frame 7g. The laminations are sandwiched between the front frame 5 and the back frame 8. The reflector 7c is provided for reflecting a light radiated from the lamp 7b to allow the light to propagate toward the optical guide plate 7e.

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The optical guide plate 7e has a width defined in a direction parallel to the interfaces of the above laminations, so that the optical guide plate 7e causes a light radiated form the lamp 7b to be diffused. The diffused light is then reflected by the reflecting sheet 7d. The reflected light is transmitted through the optical sheet 7f to the liquid crystal display panel 6. The optical sheet 7f contributes to have the diffused light uniform in brightness.

In accordance with the above first embodiment, the liquid crystal module 1 is fixed to the bottom frame 2 by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions 11a forming the screw holes 1b does never enlarge in size or area of the cover 100, whereby a large ratio in area of the display surface 1a of the liquid crystal module 1 to the cover 100 may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module 1 to the bottom frame and also convenient to remove the liquid crystal module 1 from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

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The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit 9b mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

SECOND EMBODIMENT :

A second embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 13 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a second embodiment in accordance with the present invention. A cover 101 of the personal computer comprises a top frame 10, a liquid crystal module 11 and a bottom frame 12. The liquid crystal module 11 is sandwiched between the top frame 10 and the bottom frame 12. The liquid crystal module 11 is mounted to the bottom frame 12. The liquid crystal module 11 has the same structure as shown in FIG. 6 except that the outside frame 5 has two screw hole formation parts 11a which extend from

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opposite edge portions of a bottom side of the outside frame 5. The detailed descriptions about the structure of the liquid crystal module 11 are eliminated to prevent duplicate descriptions. The top frame 10 has two recessed portions 10a on the bottom side of the top frame 10. The bottom frame 12 has two recessed portions 12a on the bottom side of the bottom frame 12. The recessed portions 10a of the top frame 10 correspond in position to the recessed portions 12a of the bottom frame 12. The bottom frame 2 has a bottom face 12P which has two bosses 12c which extend in a vertical direction to the bottom face 12P. The bottom frame has two fixing parts 12d on the top side of the bottom frame 12. The fixing parts 12 have recessed or grooved portions. The liquid crystal module 11 is aligned to the bottom frame 12 so that the top side of the liquid crystal module 11 comes engaged into the recessed or grooved portions of the fixing parts 12d. Subsequently, the screw holes of the liquid crystal module 11 is aligned to the bosses 12c of the bottom frame 12. Screws 3 are driven in a vertical direction to the surfaces of the bottom frame 12 and the liquid crystal module 11. The screws 3 are thus driven from the screw holes of the liquid crystal module 11 to the bosses 2a to the bottom frame, whereby the liquid crystal module 11 is mounted or fixed to the bottom frame 12. Hinges are attached to the recessed portions 10a of the top frame 10 and also attached to the recessed portions 12a of the bottom frame 12. The top frame 10 is attached to the bottom frame 12, whereby the liquid crystal module 11 is sandwiched between the top frame 10 and the bottom frame 12.

The liquid crystal module 11 is moved in a tilting direction from

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the surface of the bottom frame 12 so that one side edge of the liquid crystal module 11 is inserted into the grooved portions of the fixing parts 12d of the bottom frame 12. The fixing parts 12d may be any one of various shapes as shown in FIGS. 9 and 10A through 10C. The opposite side of the liquid crystal module 11 to the above one side is moved toward the bottom frame 12 in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module 11 come together with the bosses 12c of the bottom frame 12. The screws 3 are driven in the direction vertical to the surface of the liquid crystal module 11 so that the screws 3 come engaged into the screw holes of the liquid crystal module 11 and the bosses 12c, whereby the liquid crystal module 11 is fixed to the bottom frame 12.

The liquid crystal module 11 is fixed to the bottom frame 12 by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions 11a forming the screw holes does never enlarge in size or area of the cover 101, whereby a large ratio in area of the display surface of the liquid crystal module 11 to the cover 101 may be obtained.

The screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason it is convenient to attach the liquid crystal module 11 to the bottom frame 12 and also convenient to remove the liquid crystal module 11 from the bottom frame 12. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions 11a forming the screw

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holes are positioned in dead spaces of the liquid crystal module 11 so as to provide no influence to the circuits of the liquid crystal module 11, and the screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason the thickness of the cover 101 may be decided on the basis of the thickness of the liquid crystal module 11.

The screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module 11 to the bottom frame 12 with use of only three or more screws 3 which are not aligned on a single straight line, without using the fixing parts 12d.

In accordance with the above second embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes 1b does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw

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holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

THIRD EMBODIMENT :

A third embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 14 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a third embodiment in accordance with the present invention. A cover 101 of the personal computer comprises a top frame 10, a liquid crystal

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module 11 and a bottom frame 12. The liquid crystal module 11 is sandwiched between the top frame 10 and the bottom frame 12. The liquid crystal module 11 is mounted to the bottom frame 12. The liquid crystal module 11 has the same structure as shown in FIG. 6 except that the outside frame 5 has two screw hole formation parts 11a which extend from opposite edge portions of a bottom side of the outside frame 5. The detailed descriptions about the structure of the liquid crystal module 11 are eliminated to prevent duplicate descriptions. The top frame 10 has two recessed portions 10a on the bottom side of the top frame 10. The bottom frame 12 has two recessed portions 12a on the bottom side of the bottom frame 12. The recessed portions 10a of the top frame 10 correspond in position to the recessed portions 12a of the bottom frame 12. The bottom frame 2 has a bottom face 12P which has two bosses 12c which extend in a vertical direction to the bottom face 12P. The bottom frame has two fixing parts 12d on the top side of the bottom frame 12. The fixing parts 12 have recessed or grooved portions. The top frame 10 also has two screw holes 10b at corresponding positions to the screw holes of the liquid crystal module 11. The liquid crystal module 11 is aligned to the bottom frame 12 so that the top side of the liquid crystal module 11 comes engaged into the recessed or grooved portions of the fixing parts 12d. Subsequently, the screw holes of the liquid crystal module 11 is aligned to the bosses 12c of the bottom frame 12. Further, the top frame 10 is aligned to the bottom frame 12 so that the screw holes 10b are aligned or correspond to the screw holes of the liquid crystal module 11 and the bosses 12c of the bottom

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frame 12. Screws 3 are driven in a vertical direction to the surfaces of the top frame, the bottom frame 12 and the liquid crystal module 11. The screws 3 are thus driven from the screw holes 10b of the top frame 10 through the screw holes of the liquid crystal module 11 to the bosses 2a of the bottom frame 12, whereby the liquid crystal module 11 is mounted or fixed to the bottom frame 12 and the top frame 10 is also mounted or fixed to the bottom frame 12. As a result, the liquid crystal module 11 is sandwiched between the bottom frame 12 and the top frame 10.

The liquid crystal module 11 is moved in a tilting direction from the surface of the bottom frame 12 so that one side edge of the liquid crystal module 11 is inserted into the grooved portions of the fixing parts 12d of the bottom frame 12. The fixing parts 12d may be any one of various shapes as shown in FIGS. 9 and 10A through 10C. The opposite side of the liquid crystal module 11 to the above one side is moved toward the bottom frame 12 in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module 11 come together with the bosses 12c of the bottom frame 12. The top frame 10 is subsequently aligned to the bottom frame 12 so that the screw holes 10b of the top frame 10 are aligned or correspond to the screw holes of the liquid crystal module 1 and the bosses 12c of the bottom frame 12. The screws 3 are driven in the direction vertical to the surface of the liquid crystal module 11 so that the screws 3 come engaged into the screw holes 10b of the top frame 10, the screw holes of the liquid crystal module 11 and the bosses 12c of the bottom frame 12, whereby the liquid crystal module 11 is

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fixed to the bottom frame 12.

The liquid crystal module 11 is fixed to the bottom frame 12 by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions 11a forming the screw holes does never enlarge in size or area of the cover 101, whereby a large ratio in area of the display surface of the liquid crystal module 11 to the cover 101 may be obtained.

The screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason it is convenient to attach the liquid crystal module 11 to the bottom frame 12 and also convenient to remove the liquid crystal module 11 from the bottom frame 12. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions 11a forming the screw holes are positioned in dead spaces of the liquid crystal module 11 so as to provide no influence to the circuits of the liquid crystal module 11, and the screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason the thickness of the cover 101 may be decided on the basis of the thickness of the liquid crystal module 11.

The screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module 11 to the bottom frame 12 with use of only three or more screws 3 which are not aligned on

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a single straight line, without using the fixing parts 12d.

In accordance with the above third embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid

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crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

FOURTH EMBODIMENT :

A fourth embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 15 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fourth embodiment in accordance with the present invention. A cover 101 of the personal computer comprises a top frame 10, a liquid crystal module 11 and a bottom frame 12. The liquid crystal module 11 is sandwiched between the top frame 10 and the bottom frame 12. The liquid crystal module 11 is mounted to the bottom frame 12. The liquid crystal module 11 has the same structure as shown in FIG. 6 except that the outside frame 5 has two screw hole formation parts 11a which extend from opposite edge portions of a bottom side of the outside frame 5. The detailed descriptions about the structure of the liquid crystal module 11 are eliminated to prevent duplicate descriptions. The top frame 10 has two recessed portions 10a on the bottom side of the top frame 10. The bottom frame 12 has two recessed portions 12a on the bottom side of the bottom frame 12. Each of the recessed portions 12a of the bottom frame 12 is

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provided with a fixing plate 12f which has an extension portion which cover the boss 12c, wherein the extension portion has a screw hole which correspond to the boss 12c. The recessed portions 10a of the top frame 10 correspond in position to the recessed portions 12a of the bottom frame 12. The bottom frame 2 has a bottom face 12P which has two bosses 12c which extend in a vertical direction to the bottom face 12P. The bottom frame has two fixing parts 12d on the top side of the bottom frame 12. The fixing parts 12 have recessed or grooved portions. The top frame 10 also has two screw holes 10b at corresponding positions to the screw holes of the liquid crystal module 11. The liquid crystal module 11 is aligned to the bottom frame 12 so that the top side of the liquid crystal module 11 comes engaged into the recessed or grooved portions of the fixing parts 12d. Subsequently, the screw holes of the liquid crystal module 11 is aligned to the bosses 12c of the bottom frame 12, wherein the screw hole formation regions 11a is fitted to the bosses 12c through the extension portion of the fixing plate 12f in order to secure a large contact area between the screw hole formation regions 11a and the extension portion of the fixing plate 12f, whereby a fixing strength between the liquid crystal module 1 and the bottom frame 12 is increased. Further, the top frame 10 is aligned to the bottom frame 12 so that the screw holes 10b are aligned or correspond to the screw holes of the liquid crystal module 11 and the bosses 12c of the bottom frame 12. Screws 3 are driven in a vertical direction to the surfaces of the top frame, the bottom frame 12 and the liquid crystal module 11. The screws 3 are thus driven from the screw holes 10b of the top frame 10 through the screw

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holes of the liquid crystal module 11 to the screw holes of the fixing plate 12f and the bosses 2a of the bottom frame 12, whereby the liquid crystal module 11 is mounted or fixed to the bottom frame 12 and the top frame 10 is also mounted or fixed to the bottom frame 12. As a result, the liquid crystal module 11 is sandwiched between the bottom frame 12 and the top frame 10.

The liquid crystal module 11 is moved in a tilting direction from the surface of the bottom frame 12 so that one side edge of the liquid crystal module 11 is inserted into the grooved portions of the fixing parts 12d of the bottom frame 12. The fixing parts 12d may be any one of various shapes as shown in FIGS. 9 and 10A through 10C. The opposite side of the liquid crystal module 11 to the above one side is moved toward the bottom frame 12 in a direction vertical to the surface of the bottom frame, so that the screw holes of the liquid crystal module 11 come together with the screw holes of the fixing plates 12f covering the bosses 12c of the bottom frame 12. The top frame 10 is subsequently aligned to the bottom frame 12 so that the screw holes 10b of the top frame 10 are aligned or correspond to the screw holes of the liquid crystal module 1, the screw holes of the fixing plate 12f and the bosses 12c of the bottom frame 12. The screws 3 are driven in the direction vertical to the surface of the liquid crystal module 11 so that the screws 3 come engaged into the screw holes 10b of the top frame 10, the screw holes of the liquid crystal module 11 and the screw holes of the fixing plate 12f and the bosses 12c of the bottom frame 12, whereby the liquid crystal module 11 is fixed to the bottom frame

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12.

The screw hole formation regions 11a is fitted to the bosses 12c through the extension portion of the fixing plate 12f in order to secure a large contact area between the screw hole formation regions 11a and the extension portion of the fixing plate 12f, whereby a fixing strength between the liquid crystal module 1 and the bottom frame 12 is increased.

The liquid crystal module 11 is fixed to the bottom frame 12 by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions 11a forming the screw holes does never enlarge in size or area of the cover 101, whereby a large ratio in area of the display surface of the liquid crystal module 11 to the cover 101 may be obtained.

The screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason it is convenient to attach the liquid crystal module 11 to the bottom frame 12 and also convenient to remove the liquid crystal module 11 from the bottom frame 12. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions 11a forming the screw holes are positioned in dead spaces of the liquid crystal module 11 so as to provide no influence to the circuits of the liquid crystal module 11, and the screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason the thickness of the cover 101 may be decided on the basis of the thickness of the liquid crystal module 11.

The screws 3 are driven in a direction vertical to the surface of

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the bottom frame 12, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to fix the liquid crystal module 11 to the bottom frame 12 with use of only three or more screws 3 which are not aligned on a single straight line, without using the fixing parts 12d.

In accordance with the above fourth embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screw hole formation regions is fitted to the bosses through the extension portion of the fixing plate in order to secure a large contact area between the screw hole formation regions and the extension portion of the fixing plate, whereby a fixing strength between the liquid crystal module and the bottom frame is increased.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to

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provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

FIFTH EMBODIMENT :

A fifth embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 16 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a fifth embodiment in accordance with the present invention. A cover 101 of the personal computer comprises a top frame 10, a liquid crystal module 11 and a bottom frame 12. The liquid crystal module 11 is

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sandwiched between the top frame 10 and the bottom frame 12. The liquid crystal module 11 is mounted to the bottom frame 12. The liquid crystal module 11 has the same structure as shown in FIG. 6 except that the outside frame 5 has two screw hole formation parts 11a which extend from opposite edge portions of a bottom side of the outside frame 5. The detailed descriptions about the structure of the liquid crystal module 11 are eliminated to prevent duplicate descriptions. The top frame 10 has two recessed portions 10a on the bottom side of the top frame 10. The bottom frame 12 has two recessed portions 12a on the bottom side of the bottom frame 12. The recessed portions 10a of the top frame 10 correspond in position to the recessed portions 12a of the bottom frame 12. The bottom frame 2 has a bottom face 12P which has two bosses 12c and two bosses 12g which extend in a vertical direction to the bottom face 12P. The top frame 10 also has two screw holes 10b at corresponding positions to the screw holes of the liquid crystal module 11. The top frame 10 also has two screw holes 10f at corresponding positions to the bosses 12g of the bottom frame 12. In this embodiment, in place of fixing parts, not only the two bosses 12c are provided near the bottom side of the bottom frame 12 but also the bosses 12g are provided near the top side of the bottom frame 12. The top frame 10 also has not only the screw holes 10b corresponding to the bosses 12c of the bottom frame 12 but also the screw holes 10f corresponding to the bosses 12g of the bottom frame 12. The screw holes 10f of the top frame 10 is made into contact through metal members "M" to the bosses 12g of the bottom frame 12. The metal members "M" have L-

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shaped bent portions which are to be engaged with the top side of the liquid crystal module 1 when the liquid crystal module 1 is sandwiched between the top frame 10 and the bottom frame 12. The liquid crystal module 11 is aligned to the bottom frame 12 so that the screw holes of the liquid crystal module 11 are aligned to the bosses 12c of the bottom frame 12. Further, the top frame 10 is aligned to the bottom frame 12 so that the screw holes 10b of the top frame 10 are aligned or correspond to the screw holes of the liquid crystal module 11 and the bosses 12c of the bottom frame 12, whilst the screw holes 10f of the top frame 10 are aligned or correspond to the screw holes of the metal members "M" and the bosses 12g of the bottom frame 12. Namely, the screw holes 10f of the top frame 10 is made into contact through the screw holes of the metal members "M" to the bosses 12g of the bottom frame 12, whereby the metal members "M" are sandwiched between peripheral portions around the screws 10f of he top frame 10 and the bosses 12g of the bottom frame 12. Simultaneously, the L-shaped bent portions of the metal members "M" are fitted with the top side of the liquid crystal module 11. Since the metal members "M" are fixed between the peripheral portions around the screws 10f of he top frame 10 and the bosses 12g of the bottom frame 12, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module 11. Screws 3 are driven in a vertical direction to the surfaces of the top frame, the bottom frame 12 and the liquid crystal module 11. The screws 3 are thus driven from the screw holes 10b of the top frame 10 through the screw holes of the liquid crystal module 11 to the bosses 12c of

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the bottom frame 12. Screws 3' are also driven in a vertical direction to the surfaces of the top frame, the bottom frame 12 and the liquid crystal module 11. The screws 3' are thus driven from the screw holes 10f of the top frame 10 through the screw holes of the metal members "M" to the bosses 12c of the bottom frame 12, whereby the metal members "M" are fixed between the peripheral portions around the screws 10f of he top frame 10 and the bosses 12g of the bottom frame 12, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module 11. Therefore, the liquid crystal module 11 is mounted or fixed to the bottom frame 12 and the top frame 10 is also mounted or fixed to the bottom frame 12. As a result, the liquid crystal module 11 is sandwiched between the bottom frame 12 and the top frame 10.

FIG. 17 is a fragmentary cross sectional elevation vie illustrative of a metal member sandwiched between peripheral portions around the screws of he top frame and the bosses of the bottom frame in FIG. 16. The screws 3' are also driven in a vertical direction to the surfaces of the top frame, the bottom frame 12 and the liquid crystal module 11. The screws 3' are thus driven from the screw holes 10f of the top frame 10 through the screw holes of the metal members "M" to the bosses 12c of the bottom frame 12, whereby the metal members "M" are fixed between the peripheral portions around the screws 10f of he top frame 10 and the bosses 12g of the bottom frame 12, the L-shaped bent portions of the metal members "M" hold the top side of the liquid crystal module 11. Therefore, the liquid crystal module 11 is mounted or fixed to the bottom frame 12 and

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the top frame 10 is also mounted or fixed to the bottom frame 12. As a result, the liquid crystal module 11 is sandwiched between the bottom frame 12 and the top frame 10.

The liquid crystal module 11 is fixed to the bottom frame 12 by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions 11a forming the screw holes does never enlarge in size or area of the cover 101, whereby a large ratio in area of the display surface of the liquid crystal module 11 to the cover 101 may be obtained.

The screws 3 and 3' are driven in a direction vertical to the surface of the bottom frame 12, for which reason it is convenient to attach the liquid crystal module 11 to the bottom frame 12 and also convenient to remove the liquid crystal module 11 from the bottom frame 12. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions 11a forming the screw holes are positioned in dead spaces of the liquid crystal module 11 so as to provide no influence to the circuits of the liquid crystal module 11, and the screws 3 are driven in a direction vertical to the surface of the bottom frame 12, for which reason the thickness of the cover 101 may be decided on the basis of the thickness of the liquid crystal module 11.

The screws 3 and 3' are driven in a direction vertical to the surface of the bottom frame 12, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

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In accordance with the above fifth embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the screw hole formation regions forming the screw holes does never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason it is convenient to attach the liquid crystal module to the bottom frame and also convenient to remove the liquid crystal module from the bottom frame. This makes it easy to assemble the personal computer.

Further, the screw hole formation regions forming the screw holes are positioned in dead spaces of the liquid crystal module so as to provide no influence to the circuits of the liquid crystal module, and the screws are driven in a direction vertical to the surface of the bottom frame, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The screws are driven in a direction vertical to the surface of the bottom frame, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

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As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

SIXTH EMBODIMENT :

A sixth embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 18 is a perspective view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a sixth embodiment in accordance with the present invention. A cover 102 of the personal computer comprises a top frame 20, a liquid crystal module 21 and a bottom frame 22. The liquid crystal module 21 is sandwiched between the top frame 20 and the bottom frame 22. The liquid crystal module 21 is mounted to the bottom frame 22. The liquid crystal module 21 has the same structure as shown in FIG. 6 except for the following descriptions. The detailed descriptions about the structure of the liquid crystal module 11 are eliminated to prevent duplicate descriptions.

The top frame 20 has opposite side beams 20c, each of which has two hooks 20a. The bottom frame 22 has opposite side beams 22c, each of which has two bosses 22a extending in a direction parallel to the face of the bottom frame 22. The two bosses 22a are positioned to correspond to the hooks 20a of the top frame 20, so that the two bosses 22a are engaged to the hooks 20a of the top frame 20.

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The bottom frame 22 has a bottom face 22P. The bottom frame 22 has two rib portions "RB" at two top corners of the bottom frame 22. The bottom frame 22 also has a top side beam on which two ribs 22b are provided. The bottom frame 22 also has a right side beam on which two ribs 22b are provided. The bottom frame 22 also has a left side beam on which two ribs 22b are provided. The bottom frame 22 also has a bottom side beam having two recessed or grooved portions on which two ribs 22b are provided. The top frame 20 also has ribs not illustrated but positioned in correspondence to the rib portions "RB" and the ribs 22b of the bottom frame 22. The liquid crystal module 21 has an outside frame which has ten contact regions 21a which are made into contact with the rib portions "RB" and the ribs 22b of the bottom frame 22 and also contact with the non-illustrated ribs of the top frame 20. Namely, the contact regions 21a of the liquid crystal module 21 are tightly sandwiched between the ribs of the top frame 20 and the bottom frame 22.

The top frame 20 and the bottom frame 22 are combined to sandwich the liquid crystal module 21, wherein the hooks 20a of the top frame 20 come engaged into the corresponding bosses 22a of the bottom frame 22. FIG. 19 is a fragmentary schematic view illustrative of alignment of the top frame to the bottom frame shown in FIG. 18. The top frame 20 is moved in a Y-direction so that a position of the hook 20a is made correspond to the boss 2a of the bottom frame 22 before the top frame 20 is moved in an X-direction so that the hook 20a is inserted into the boss 22a, whereby the top frame 20 and the bottom frame 22 are combined to each

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other so as to sandwich the liquid crystal module 21, wherein the contact regions 21a of the liquid crystal module 21 are tightly sandwiched between the rib portions "RB" and the ribs 22b of the bottom frame 22 and the non-illustrated ribs of the top frame 20.

FIG. 20 is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a J-J' line of FIG. 18. Each of the two top corners of the liquid crystal module 21 is tightly sandwiched between the rib portions "RB" of the top frame 20 and the bottom frame 22.

It is possible to further provide cushion members or adhesives between the contact regions 21a of the liquid crystal module 21 and the rib portions "RB" and the ribs 22b of the bottom frame 22 to prevent any displacement of the liquid crystal module 21. It is also possible to further provide cushion members or adhesives between the contact regions 21a of the liquid crystal module 21 and the non-illustrated rib portions and the non-illustrated ribs of the top frame 20 to prevent any displacement of the liquid crystal module 21.

The liquid crystal module 21 is fixed to the bottom frame 22 by the above described novel mounting or fixing structure, so that the presence of the rib portions "RB" and the ribs 22b of the bottom frame 22 as well as the presence of the contact regions 21a of the liquid crystal module 21 do never enlarge in size or area of the cover 102, whereby a large ratio in area of the display surface of the liquid crystal module 21 to the cover 102 may

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be obtained.

The ribs are used to fix the liquid crystal module 21 to the top frame 20 and to the bottom frame 22 without using any screws. This means that no screw holes are required to be formed in the liquid crystal module 21, whereby no damage nor load is applied to the liquid crystal module 21.

Further, the rib portions and the ribs of the top and bottom frames 20 and 22 as well as the contact regions of the liquid crystal module 21 are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module 21, for which reason the thickness of the cover 102 may be decided on the basis of the thickness of the liquid crystal module 21.

The rib portions and the ribs of the top and bottom frames 20 and 22 as well as the contact regions of the liquid crystal module 21 are used to fix the liquid crystal module 21 to the top and bottom frames 20 and 22, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

In accordance with the above sixth embodiment, The liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the rib portions and the ribs of the bottom frame as well as the presence of the contact regions of the liquid crystal module do never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The ribs are used to fix the liquid crystal module to the top frame

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and to the bottom frame without using any screws. This means that no screw holes are required to be formed in the liquid crystal module, whereby no damage nor load is applied to the liquid crystal module.

Further, the rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are used to fix the liquid crystal module to the top and bottom frames, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile terminals.

SEVENTH EMBODIMENT :

A seventh embodiment according to the present invention will be described in detail with reference to the drawings. FIG. 21 is a perspective

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view illustrative of a liquid crystal module mounting structure for mounting a liquid crystal module to a bottom frame of a cover of a personal computer in a seventh embodiment in accordance with the present invention. A cover 103 of the personal computer comprises a top frame not illustrated, a liquid crystal module 31 and a bottom frame 32. The liquid crystal module 31 is sandwiched between the non-illustrated top frame and the bottom frame 32. The liquid crystal module 31 is mounted to the bottom frame 32. The liquid crystal module 31 has the same structure as shown in FIG. 6 except for the following descriptions. The detailed descriptions about the structure of the liquid crystal module 31 are eliminated to prevent duplicate descriptions.

The bottom frame 32 has two bosses 32c extending in a direction parallel to a bottom face 32P of the bottom frame 32. The two bosses 32c are positioned near the bottom two corners of the bottom frame 32. The bottom frame 32 has two rib portions "RB" at two top corners "R2" and "R3" of the bottom frame 32. The bottom frame 32 also has a top side beam along which two ribs 32a and two bosses 23b are provided. The bottom frame 32 also has a right side beam along which two ribs 32a are provided. The bottom frame 32 also has a left side beam along which two ribs 32a are provided. The bottom frame 32 also has a bottom side beam having two recessed or grooved portions along which two ribs 32a are provided. Four bosses 23c are further provided along the bottom side beam of the bottom frame 32. The liquid crystal module 31 has an outside frame which has ten contact regions 31a which are made into contact with the rib portions "RB" and the ribs 32a of the bottom frame 32 and also contact

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with the non-illustrated ribs of the top frame 30. Namely, the contact regions 31a of the liquid crystal module 31 are tightly sandwiched between the ribs of the top frame 30 and the bottom frame 32.

The top frame 30 and the bottom frame 32 are combined to sandwich the liquid crystal module 31, wherein the hooks 30a of the top frame 30 come engaged into the corresponding bosses 32a of the bottom frame 32. FIG. 22 is a fragmentary schematic view illustrative of right and left top corners having rib portions "RB" of the bottom frame shown in FIG. 21. The right and left top corners "R3" and "R2" have rib portions "RB". Each of the rib portions "RB" has a cross-shaped projection "T" which projects in a direction perpendicular to the bottom face 32P of the bottom frame 32. The liquid crystal module 31 has cross shaped recessed portions which are not illustrated but at two right and left corners of the liquid crystal modules 31, so that the cross shaped recessed portions of the liquid crystal module 31 correspond in position to the cross-shaped projections "T" of the rib portions "RB" of the bottom frame 32.

FIG. 23 is a fragmentary cross sectional elevation view illustrative of one corner of the liquid crystal module which is sandwiched between rib portions of the top frame and the bottom frame taken along a K-K' line of FIG. 22. Each of the two top corners of the liquid crystal module 31 is tightly sandwiched between the rib portions "RB" of the top frame 30 and the bottom frame 32. The cross-shaped projections "T" of the rib portions "RB" of the bottom frame 32 are engaged into the cross shaped recessed portions of the liquid crystal module 31 for securely positioning

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the liquid crystal module 31 to the top and bottom frames 30 and 32 without any displacement.

With reference back to FIG. 21, the bottom frame 32 has the six bosses 32b. The top frame not illustrated also has six screw holes at positions corresponding to the six bosses 32b of the bottom frame 32, so that the top frame not illustrated is fixed to the bottom frame 32 through screws 3. The screws 3 are driven in a direction vertical to the bottom face 32P of the bottom frame 32 so that the screws 3 are driven from the screw holes of the top frame not illustrated into the bosses 32b of the bottom frame 32. The liquid crystal module 31 is fixed between the top frame 30 and the bottom frame 32 by having the contact regions 31a of the liquid crystal module 31 are toughly sandwiched between the rib portions "RB" and the ribs of the top and bottom frames 30 and 32.

It is possible to further provide cushion members or adhesives between the contact regions 31a of the liquid crystal module 31 and the rib portions "RB" and the ribs 32b of the bottom frame 32 to prevent any displacement of the liquid crystal module 31. It is also possible to further provide cushion members or adhesives between the contact regions 31a of the liquid crystal module 31 and the non-illustrated rib portions and the non-illustrated ribs of the top frame 30 to prevent any displacement of the liquid crystal module 31.

The liquid crystal module 31 is fixed to the bottom frame 32 by the above described novel mounting or fixing structure, so that the presence of the rib portions "RB" and the ribs 32b of the bottom frame 32 as well as

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the presence of the contact regions 31a of the liquid crystal module 31 do never enlarge in size or area of the cover 103, whereby a large ratio in area of the display surface of the liquid crystal module 31 to the cover 103 may be obtained.

The ribs are used to fix the liquid crystal module 31 to the top frame 30 and to the bottom frame 32 without forming any screws to the liquid crystal module 31. This means that no screw holes are required to be formed in the liquid crystal module 31, whereby no damage nor load is applied to the liquid crystal module 31.

Further, the rib portions and the ribs of the top and bottom frames 30 and 32 as well as the contact regions 31a of the liquid crystal module 31 are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module 31, for which reason the thickness of the cover 103 may be decided on the basis of the thickness of the liquid crystal module 31.

The rib portions and the ribs of the top and bottom frames 30 and 32 as well as the contact regions 31a of the liquid crystal module 31 are used to fix the liquid crystal module 31 to the top and bottom frames 20 and 32, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

In accordance with the above seventh embodiment, the liquid crystal module is fixed to the bottom frame by the above described novel mounting or fixing structure, so that the presence of the rib portions and the

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ribs of the bottom frame as well as the presence of the contact regions of the liquid crystal module do never enlarge in size or area of the cover, whereby a large ratio in area of the display surface of the liquid crystal module to the cover may be obtained.

The ribs are used to fix the liquid crystal module to the top frame and to the bottom frame without using any screws. This means that no screw holes are required to be formed in the liquid crystal module, whereby no damage nor load is applied to the liquid crystal module.

Further, the rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are positioned in dead spaces thereof so as to provide no influence to the circuits of the liquid crystal module, for which reason the thickness of the cover may be decided on the basis of the thickness of the liquid crystal module.

The rib portions and the ribs of the top and bottom frames as well as the contact regions of the liquid crystal module are used to fix the liquid crystal module to the top and bottom frames, for which reason a high freedom in layout of wiring of the flexible board to the driver circuit mounted on the printed circuit board can be obtained.

It is possible to attach any reinforcing member such as a metal plate to each of the top and bottom frames in order to strengthen the liquid crystal module.

As a modification, the above improved mounting structure is applicable for mounting the liquid crystal module to any other devices which use the liquid crystal module as a display such as any other mobile

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terminals.

Whereas modifications of the present invention will be apparent to a person having ordinary skill in the art, to which the invention pertains, it is to be understood that embodiments as shown and described by way of illustrations are by no means intended to be considered in a limiting sense. Accordingly, it is to be intended to cover by claims all modifications which fall within the spirit and scope of the present invention.

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What is claimed is :

Sub A1

1. A mounting structure for mounting a liquid crystal module having a display area, said mounting structure comprising :

at least a frame member having a plurality of connecting members for connecting said frame member to said liquid crystal module substantially in parallel to each other,

wherein each of said connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member.

2. The mounting structure as claimed in claim 1, wherein said plurality of connecting members are in contact with dead spaces of said liquid crystal module.

3. The mounting structure as claimed in claim 1, wherein said connecting members comprise plural sets of a screw, a boss formed on said frame member, and a screw hole formed on said liquid crystal module at its position corresponding to said boss.

4. The mounting structure as claimed in claim 3, wherein said connecting members further comprise at least a fixing member provided on said frame member and said at least fixing member has a grooved portion which receives one side edge of said liquid crystal module.

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5. The mounting structure as claimed in claim 4, wherein said at least fixing member comprises a single fixing member which extends along said one side edge of said liquid crystal module.

6. The mounting structure as claimed in claim 4, wherein said at least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

7. The mounting structure as claimed in claim 3, wherein said connecting members comprise plural sets of a screw, a boss formed on said frame member, a metal plate having a screw hole aligned to said boss, and a screw hole formed on said liquid crystal module at its position corresponding to said boss.

8. The mounting structure as claimed in claim 7, wherein said connecting members further comprise at least a fixing member provided on said frame member and said at least fixing member has a grooved portion which receives one side edge of said liquid crystal module.

9. The mounting structure as claimed in claim 8, wherein said at least fixing member comprises a single fixing member which extends along said one side edge of said liquid crystal module.

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10. The mounting structure as claimed in claim 8, wherein said at least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

11. The mounting structure as claimed in claim 1, wherein said liquid crystal module is sandwiched between first and second frame members which are also fixed to each other via said plurality of connecting members.

12. The mounting structure as claimed in claim 11, wherein said connecting members comprise plural sets of a screw, a boss formed on said first frame member, a first screw hole formed on said liquid crystal module at its position corresponding to said boss and a second screw hole formed on said second frame member at its position corresponding to said first screw hole.

13. The mounting structure as claimed in claim 12, wherein said connecting members further comprise at least a fixing member provided on said first frame member and said at least fixing member has a grooved portion which receives one side edge of said liquid crystal module.

14. The mounting structure as claimed in claim 13, wherein said at least fixing member comprises a single fixing member which extends along

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said one side edge of said liquid crystal module.

15. The mounting structure as claimed in claim 13, wherein said at least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

16. The mounting structure as claimed in claim 12, wherein said connecting members comprise plural sets of a screw, a boss formed on said first frame member, a metal plate having a screw hole aligned to said boss, and a first screw hole formed on said liquid crystal module at its position corresponding to said boss and a second screw hole formed on said second frame at its position corresponding to said first screw hole.

17. The mounting structure as claimed in claim 16, wherein said connecting members further comprise at least a fixing member provided on said first frame member and said at least fixing member has a grooved portion which receives one side edge of said liquid crystal module.

18. The mounting structure as claimed in claim 17, wherein said at least fixing member comprises a single fixing member which extends along said one side edge of said liquid crystal module.

19. The mounting structure as claimed in claim 17, wherein said at

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least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

20. The mounting structure as claimed in claim 11, wherein said connecting members comprise a plurality of ribs provided along a peripheral of said first frame member, and a plurality of contact regions along a peripheral of said liquid crystal module at corresponding positions to said ribs, so that said contact regions are in contact with said ribs.

21. The mounting structure as claimed in claim 20, wherein said first frame and said second frame members have paired connecting parts which connect said first frame member to said second frame member, so that said liquid crystal module is sandwiched between said first frame member and said second frame member, and said contact regions are in contact with said ribs.

22. The mounting structure as claimed in claim 20, wherein said connecting members further comprise plural sets of a screw, a boss formed on said first frame member, a first screw hole formed on said liquid crystal module at its position corresponding to said boss and a second screw hole formed on said second frame member at its position corresponding to said first screw hole.

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23. The mounting structure as claimed in claim 22, wherein said connecting members further comprise at least a fixing member provided on said first frame member and said at least fixing member has a grooved portion which receives one side edge of said liquid crystal module.

24. The mounting structure as claimed in claim 23, wherein said at least fixing member comprises a single fixing member which extends along said one side edge of said liquid crystal module.

25. The mounting structure as claimed in claim 23, wherein said at least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

26. The mounting structure as claimed in claim 22, wherein said connecting members comprise plural sets of a screw, a boss formed on said first frame member, a metal plate having a screw hole aligned to said boss, and a first screw hole formed on said liquid crystal module at its position corresponding to said boss and a second screw hole formed on said second frame at its position corresponding to said first screw hole.

27. The mounting structure as claimed in claim 26, wherein said connecting members further comprise at least a fixing member provided on said first frame member and said at least fixing member has a grooved

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portion which receives one side edge of said liquid crystal module.

28. The mounting structure as claimed in claim 27, wherein said at least fixing member comprises a single fixing member which extends along said one side edge of said liquid crystal module.

29. The mounting structure as claimed in claim 27, wherein said at least fixing member comprises a plurality of fixing members which are provided separately and distanced along said one side edge of said liquid crystal module.

30. A cover for a device, said cover has a display device which comprising a liquid crystal module mounted on a frame member by a mounting structure as claimed in claim 1.

31. A mobile terminal comprising a body and a cover as claimed in claim 30.

add 7

add 32 7

add 7

add 31

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ABSTRACT OF THE DISCLOSURE

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises : at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

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FIG. 1 prior art

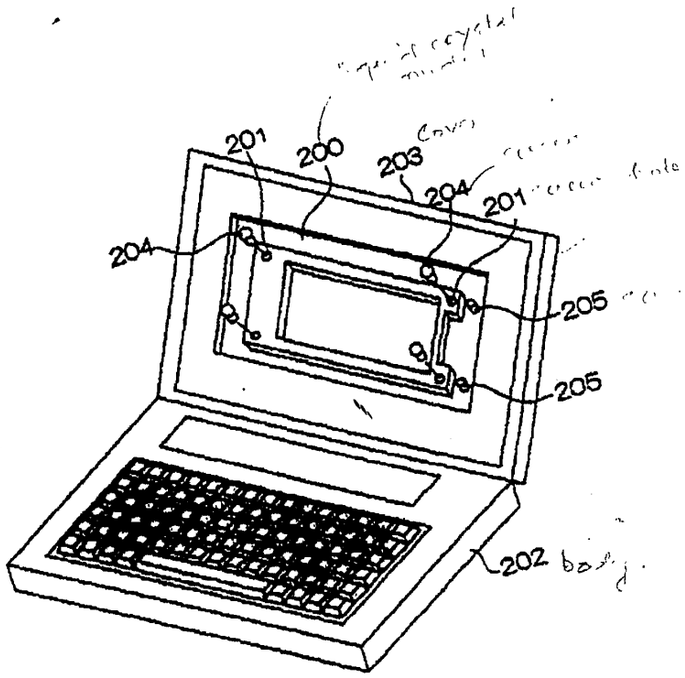

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FIG. 2 prior art

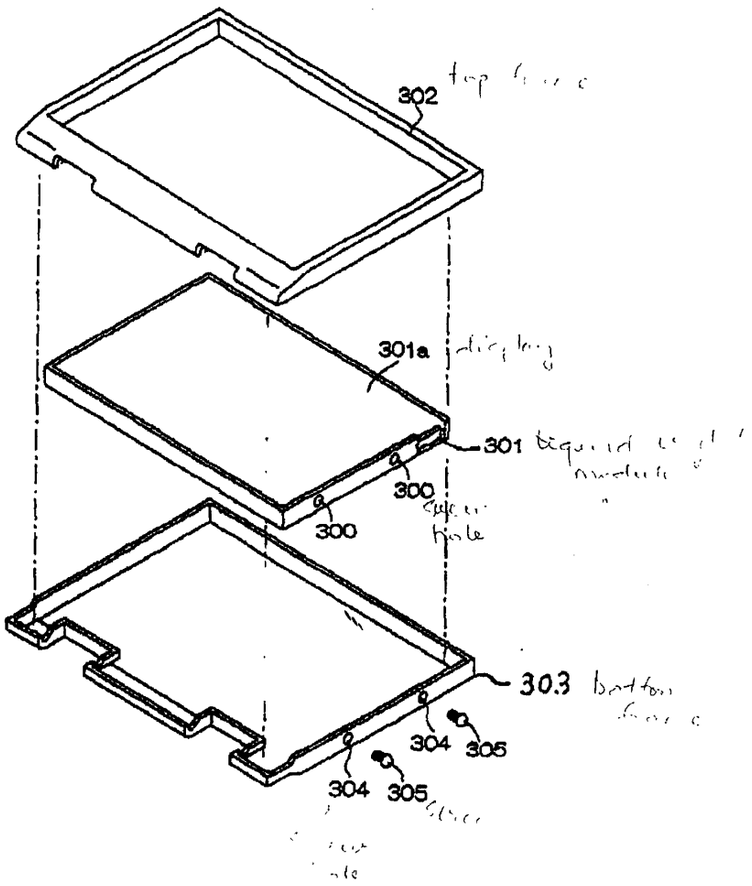

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FIG. 3 prior art

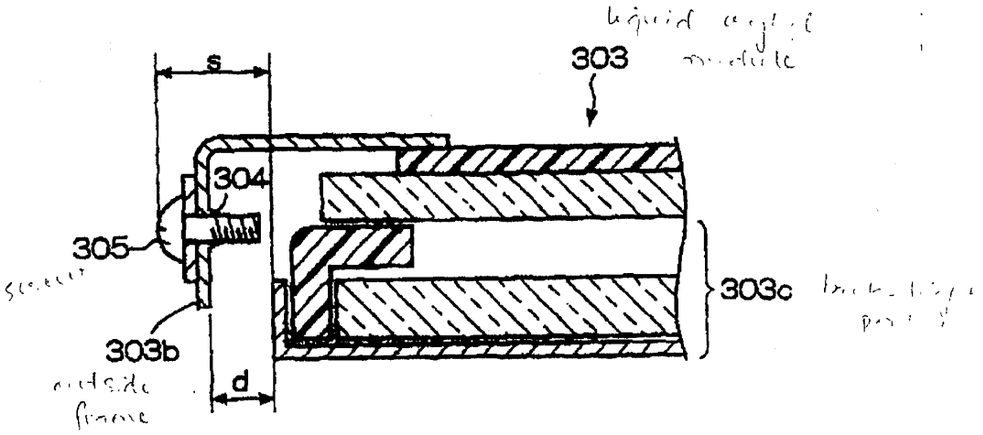

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FIG. 4 prior art

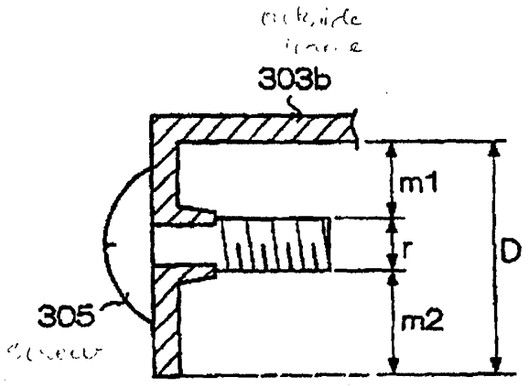

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FIG. 5

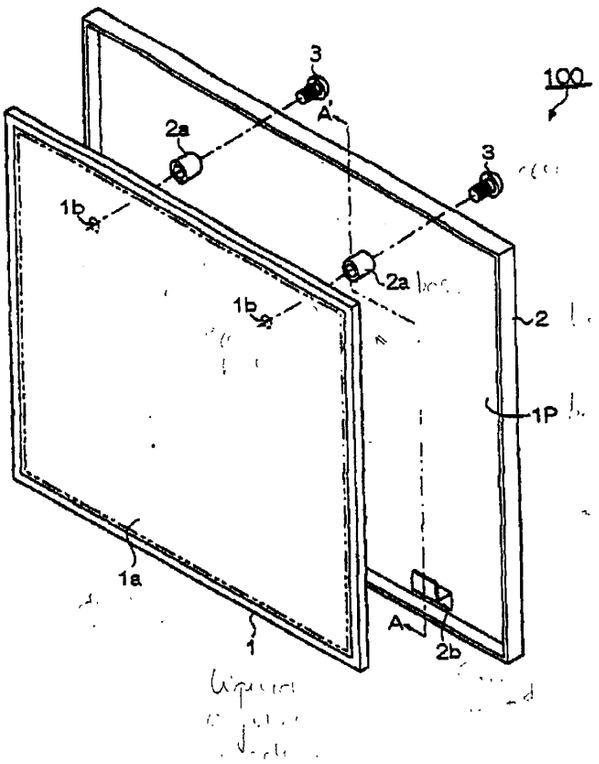

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FIG. 6

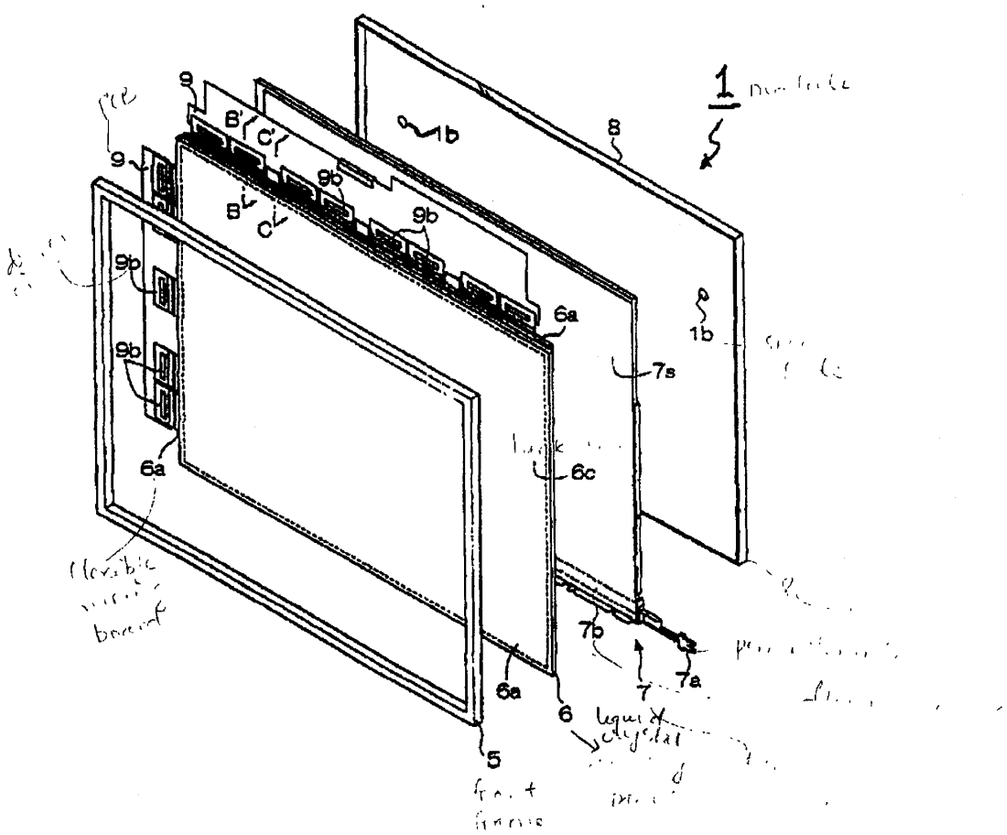

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FIG. 7

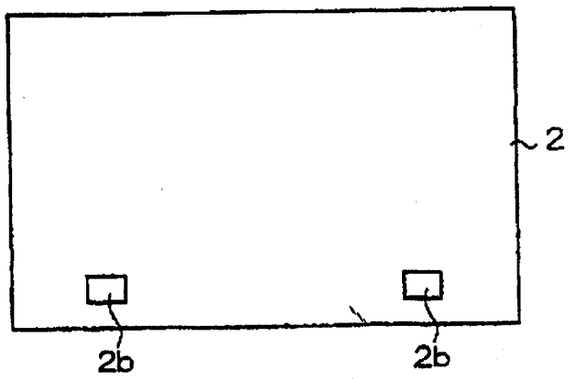

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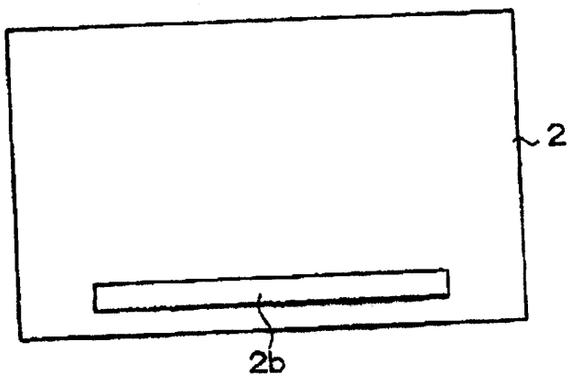
FIG. 8



PRINT OF DRAWINGS
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FIG. 9

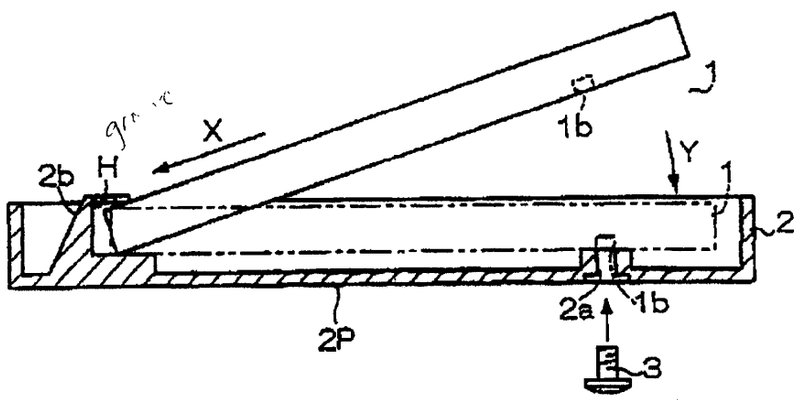

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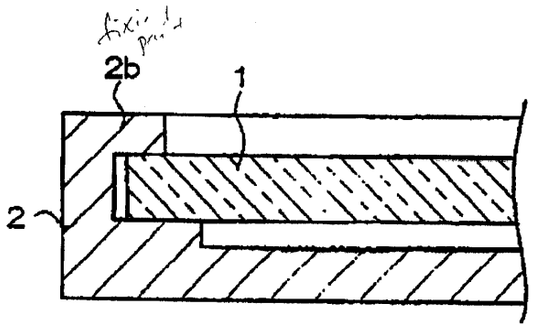
FIG. 10A



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PRINT OF DRAWINGS
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FIG. 10B

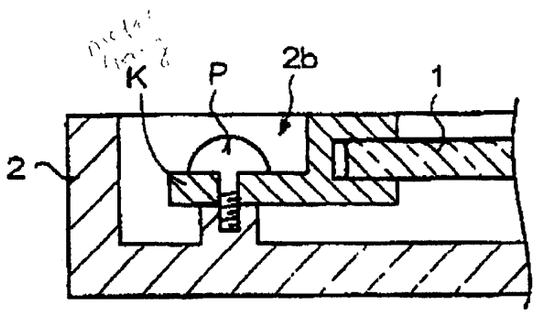

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FIG. 10C

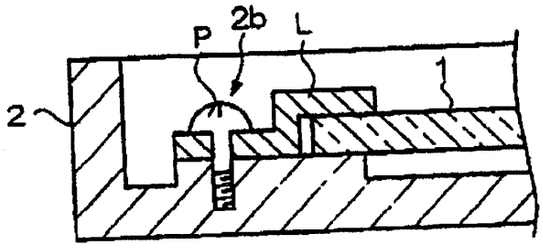

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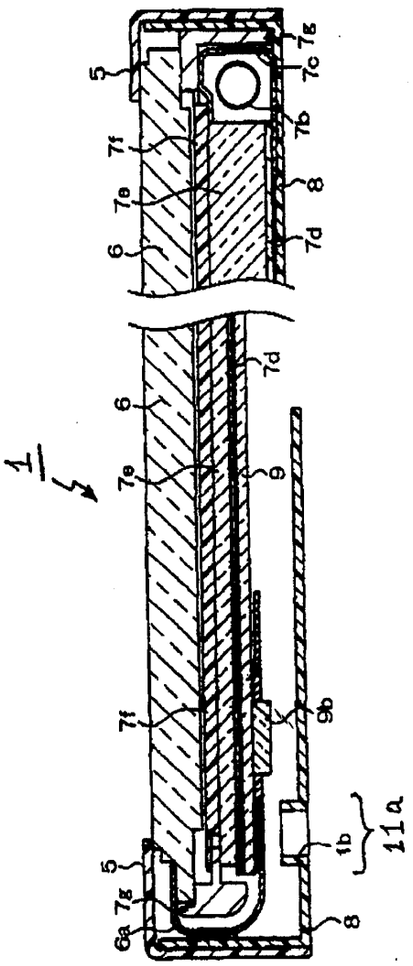
FIG. 11



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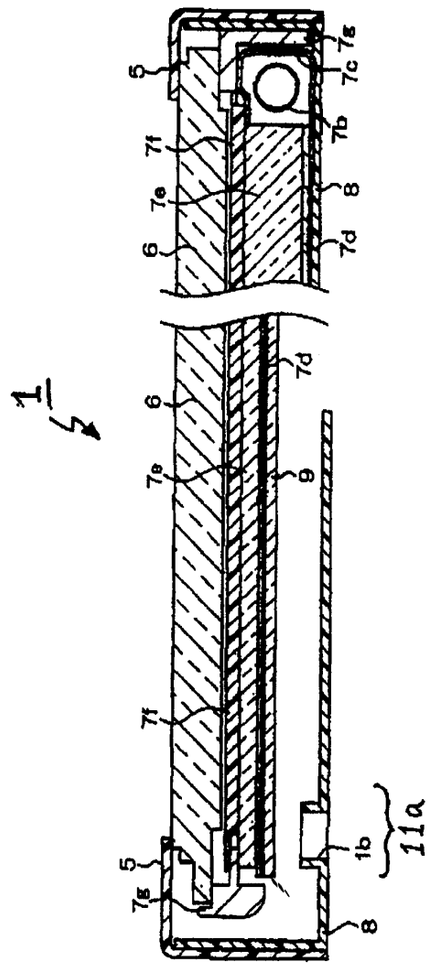

FIG. 12

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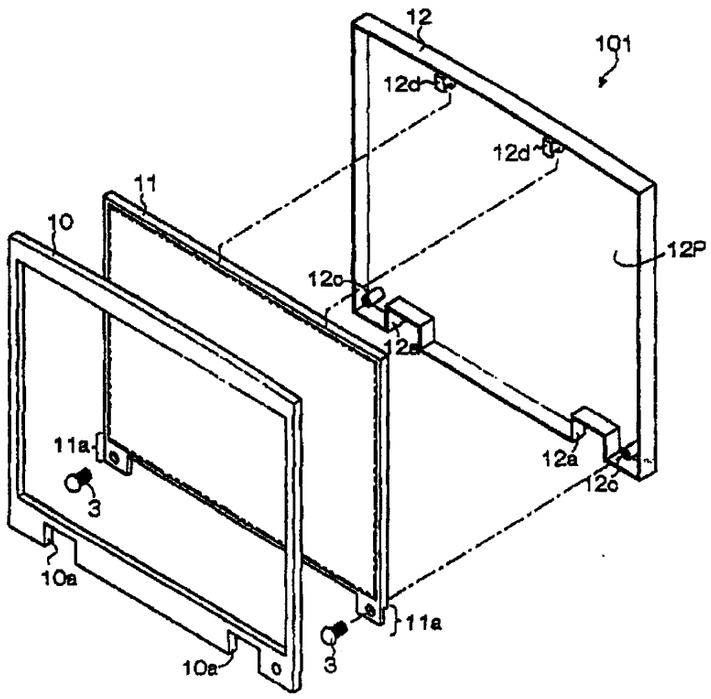
FIG. 13



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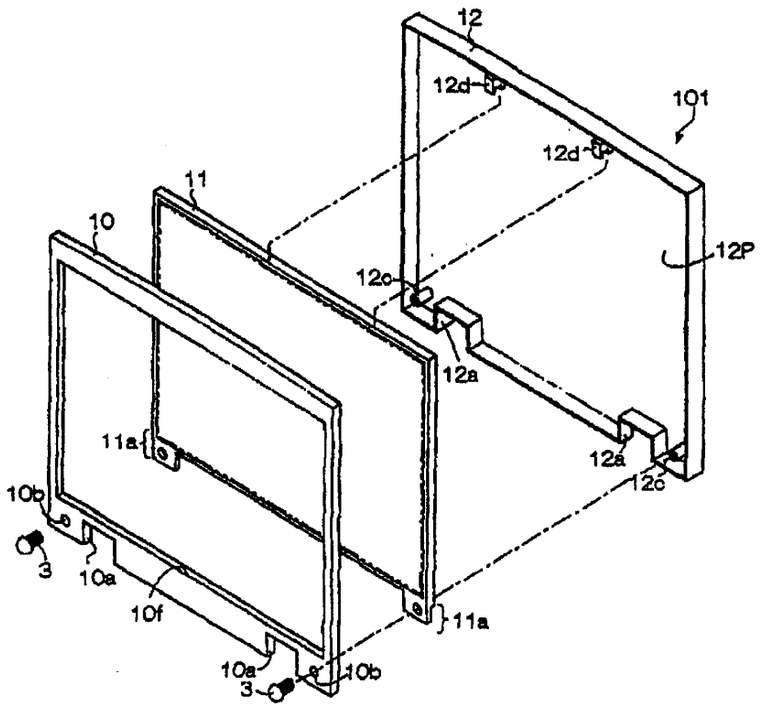

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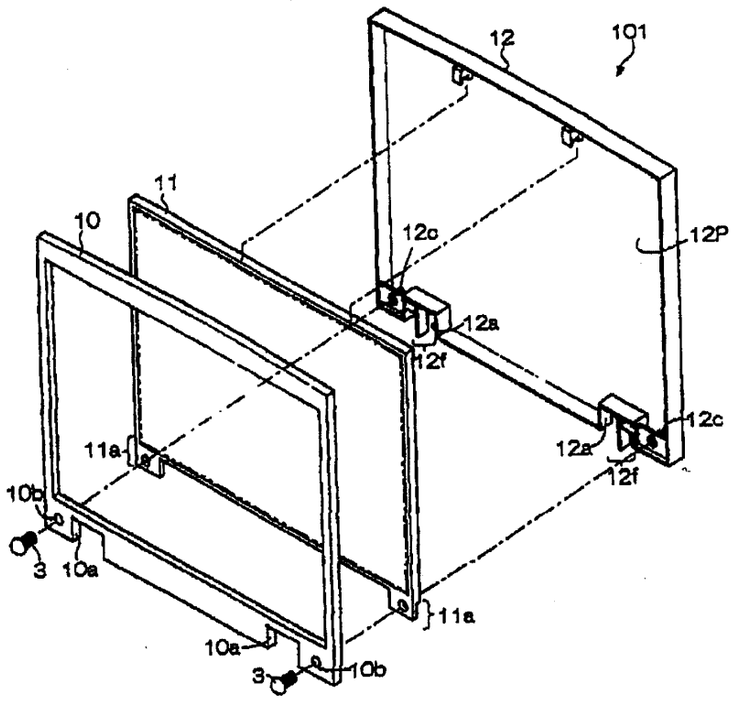

PRINT OF DRAWINGS
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FIG. 16

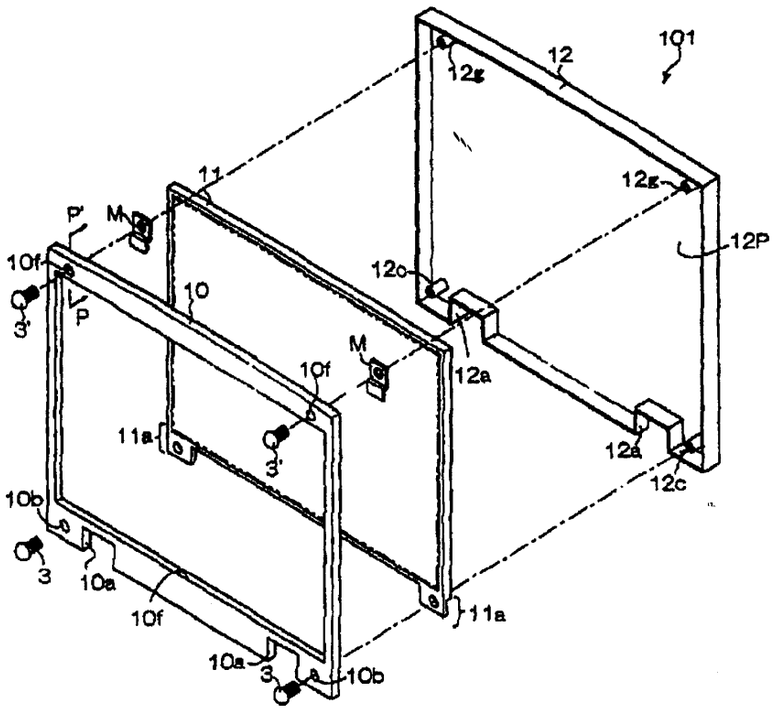
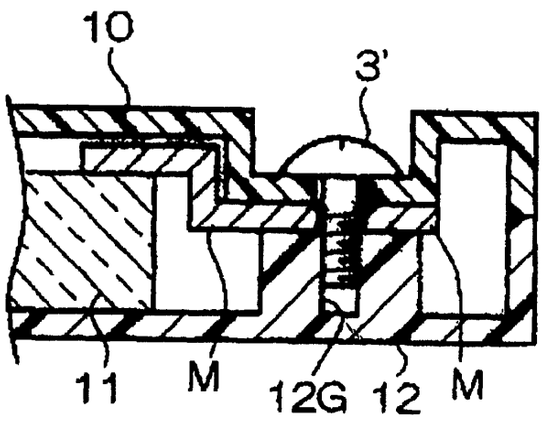


FIG. 17



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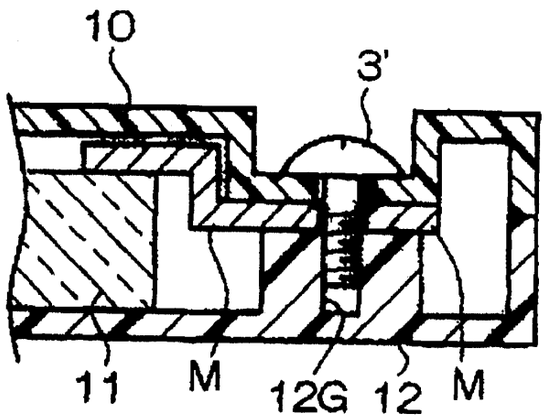

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FIG. 18

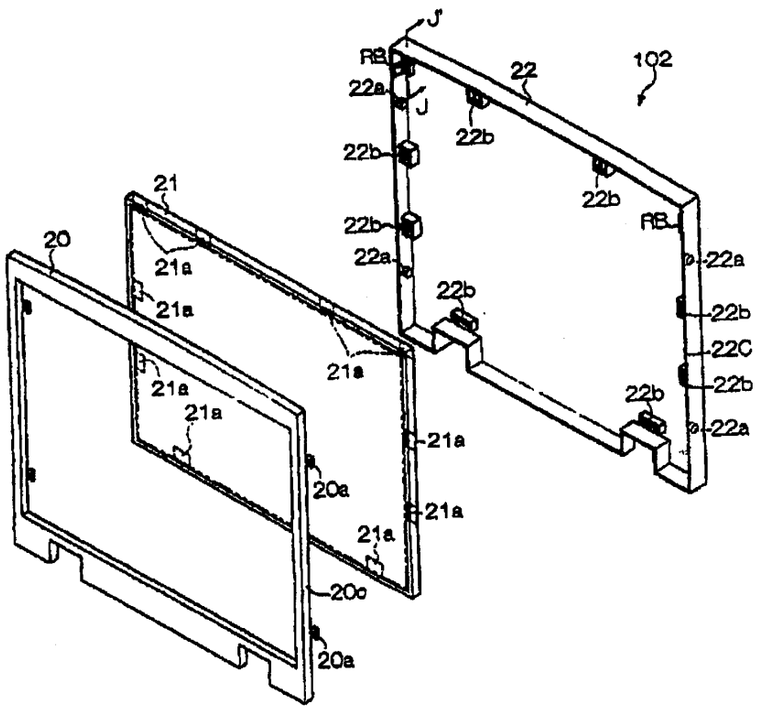

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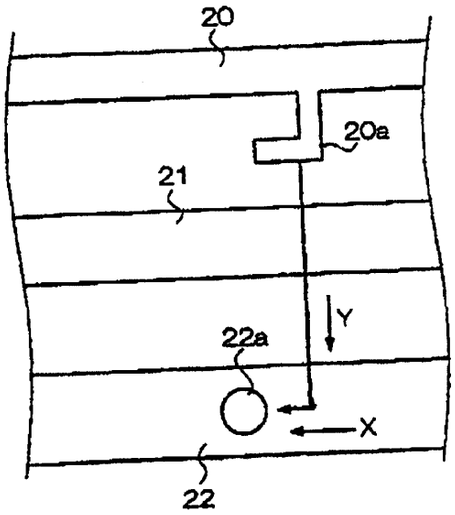
FIG. 19



PRINT OF DRAWINGS
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FIG. 20

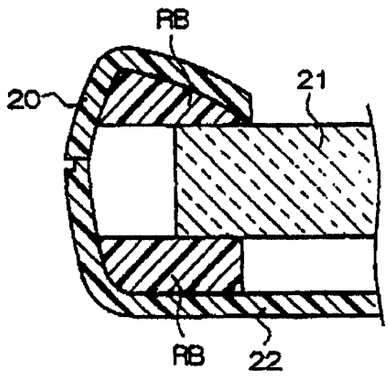

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FIG. 21

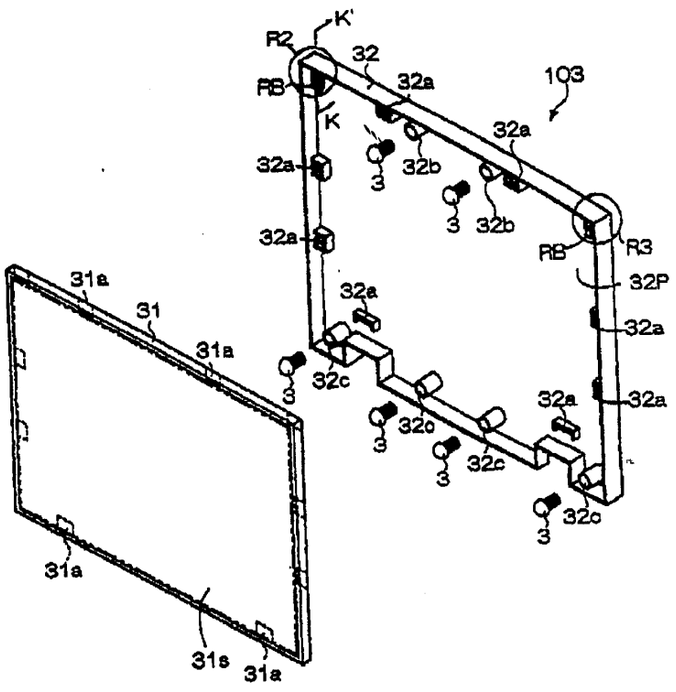

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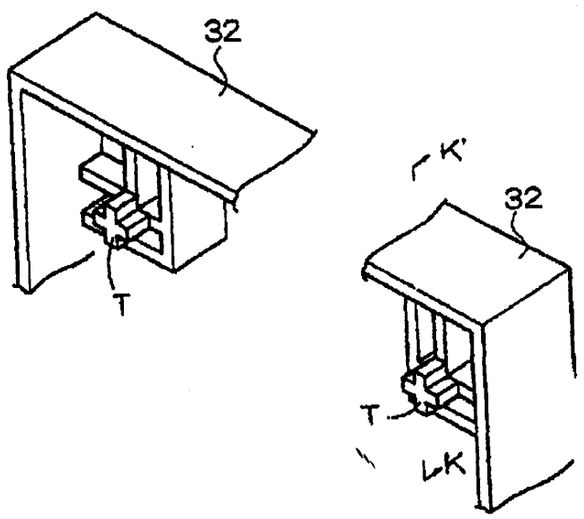
FIG. 22



SCANNED 4

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FIG. 23

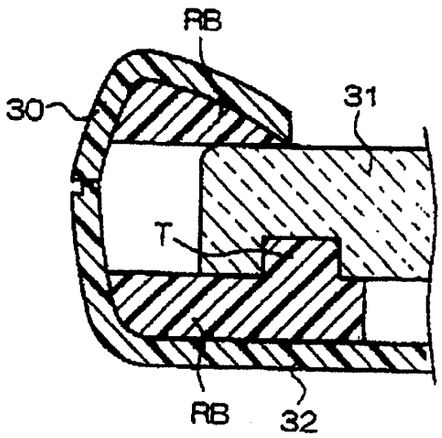

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FIG. 1 prior art

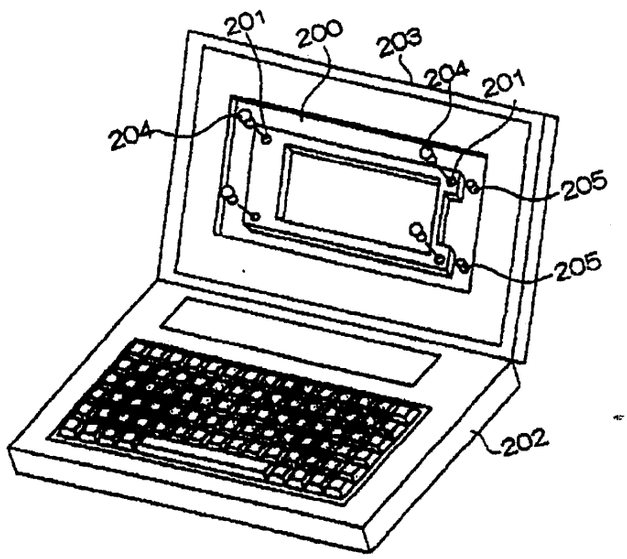

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FIG. 2 prior art

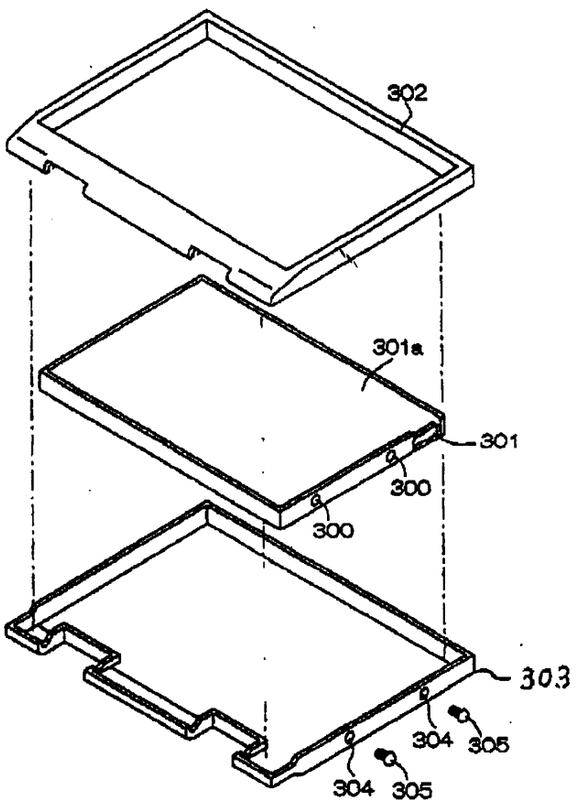
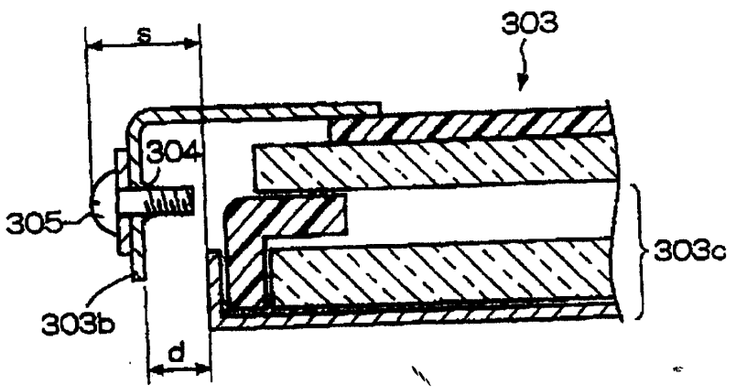


FIG. 3 prior art



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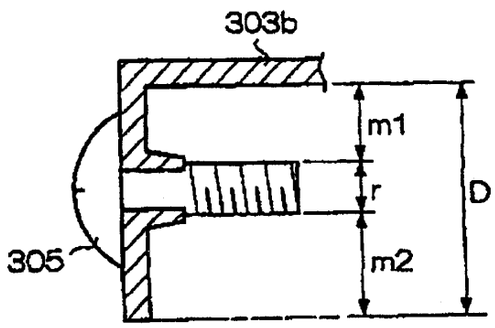

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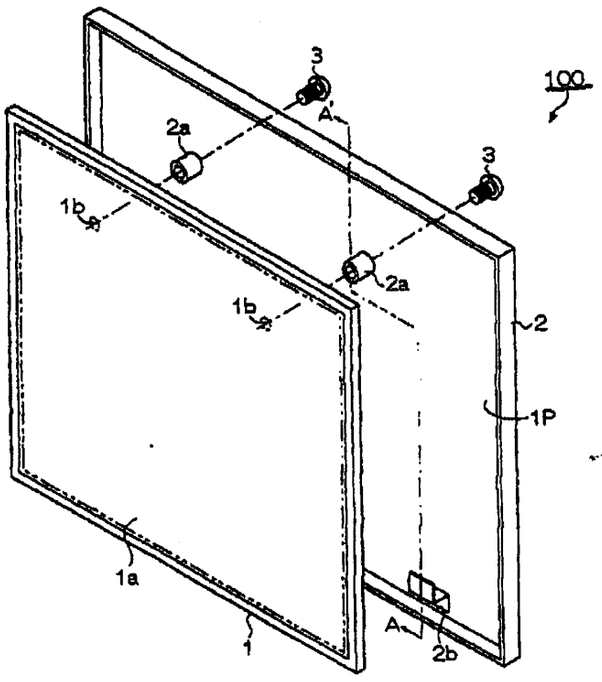

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FIG. 6

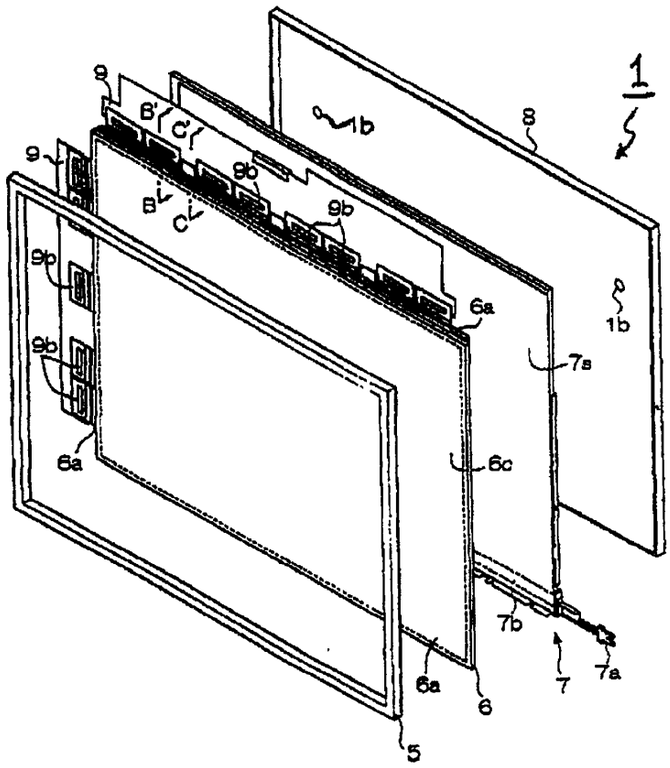

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FIG. 7

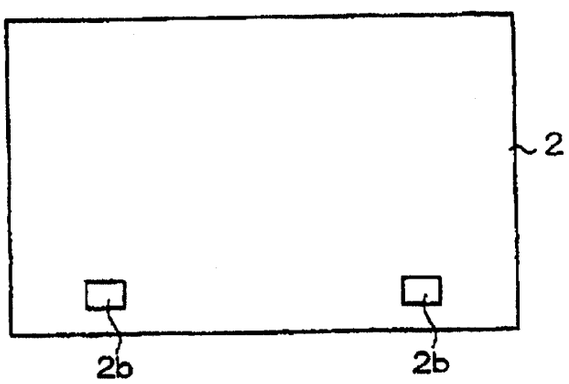

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FIG. 8

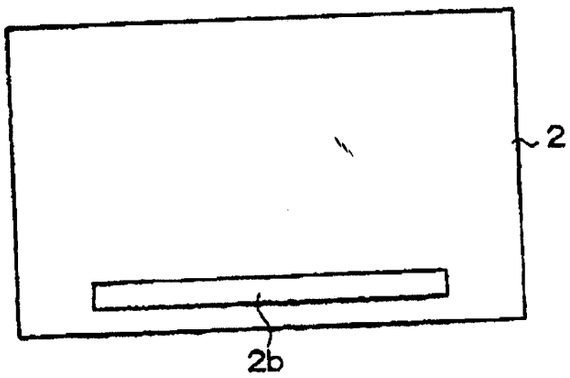

FIG. 9

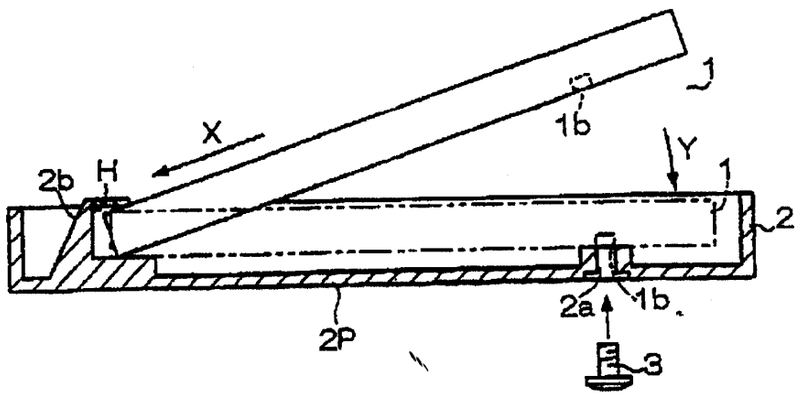

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FIG. 10A

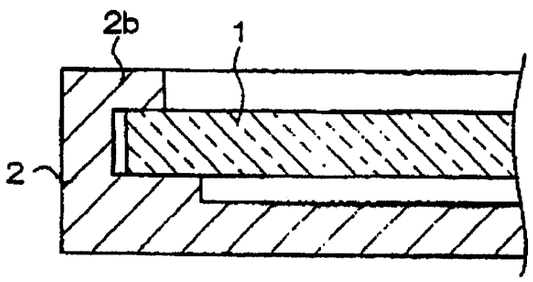

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FIG. 10B

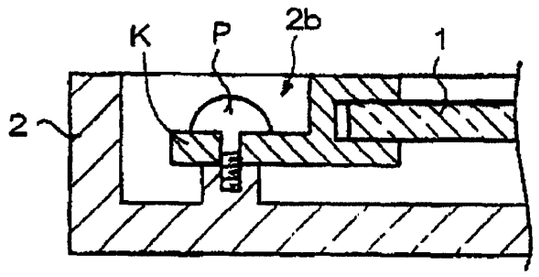

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FIG. 10C

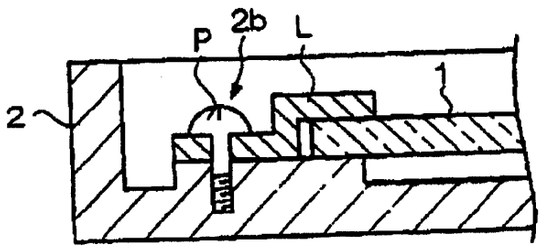

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FIG. 11

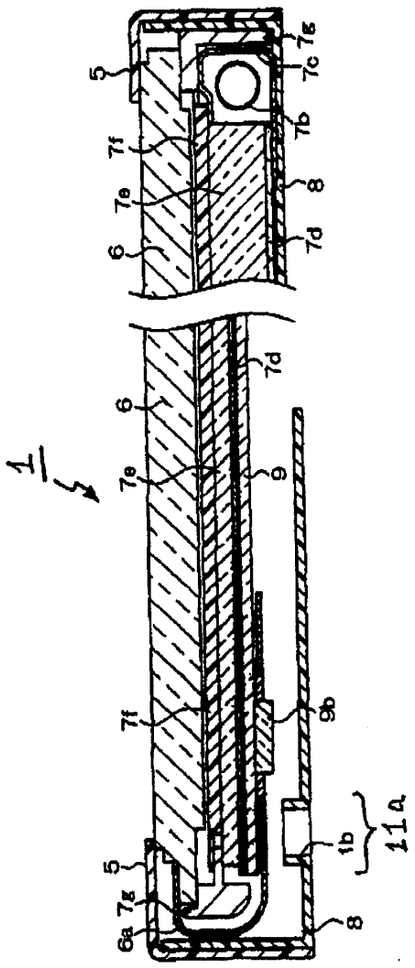

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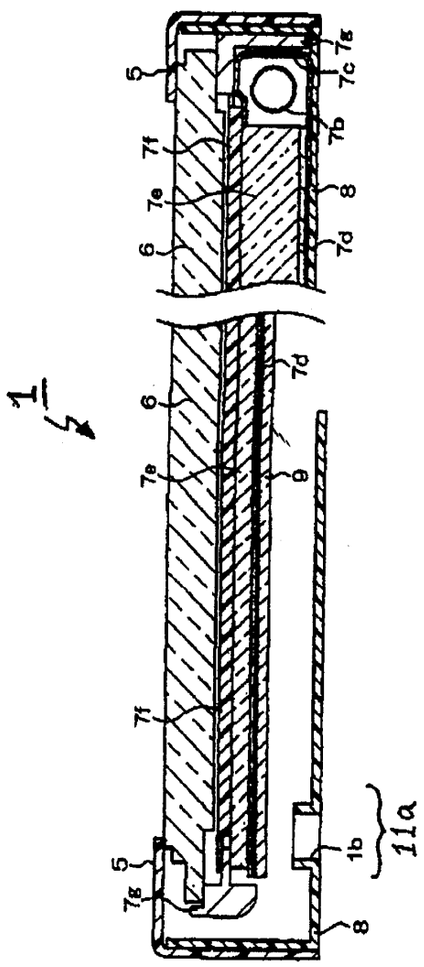
FIG. 12



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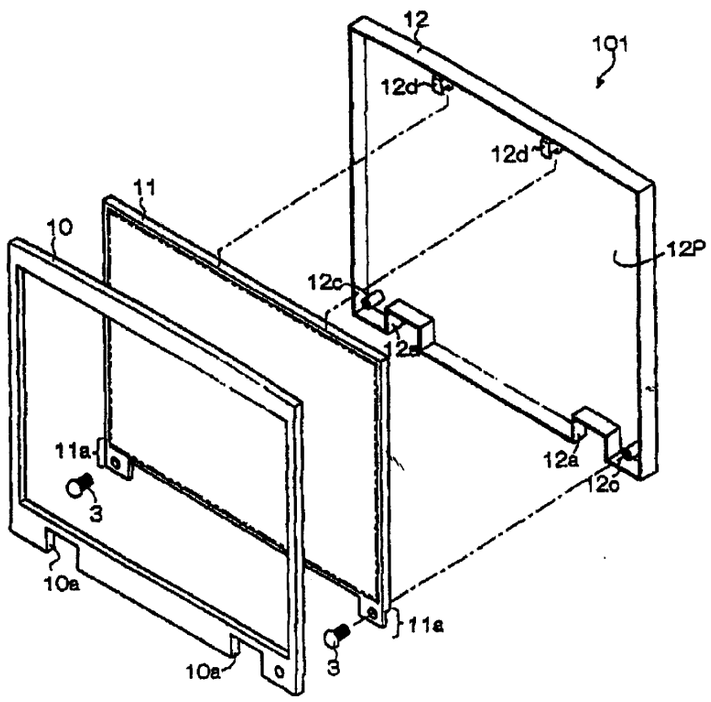

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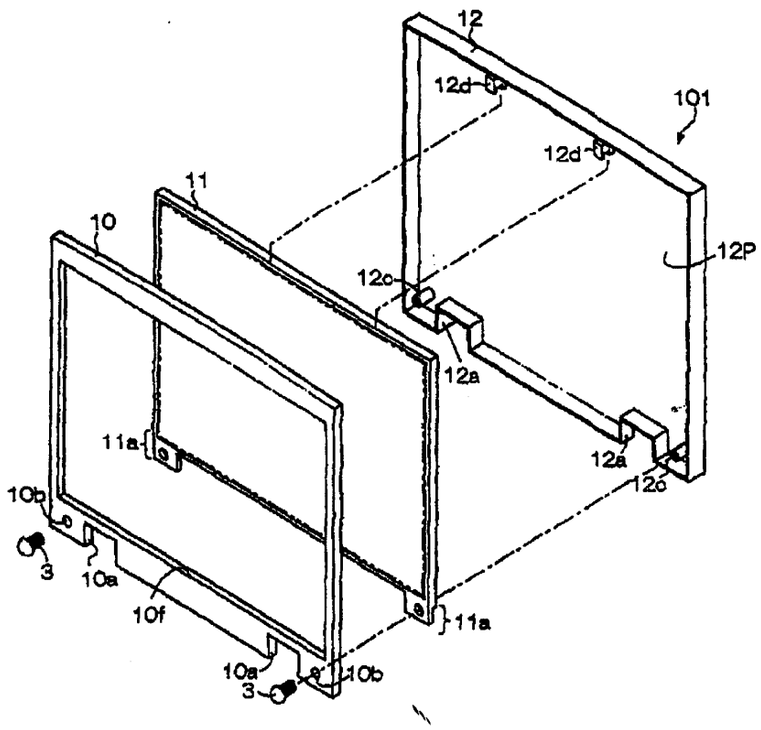
FIG. 14



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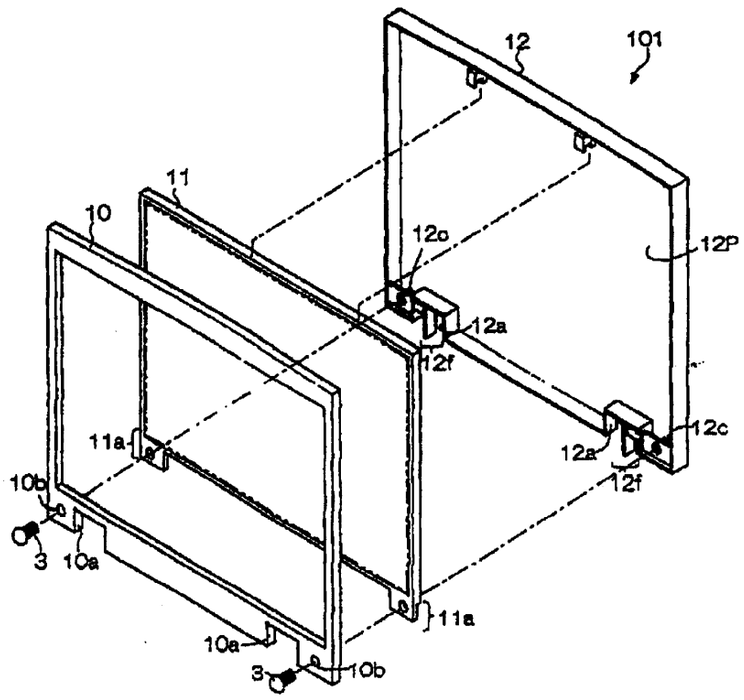

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FIG. 16

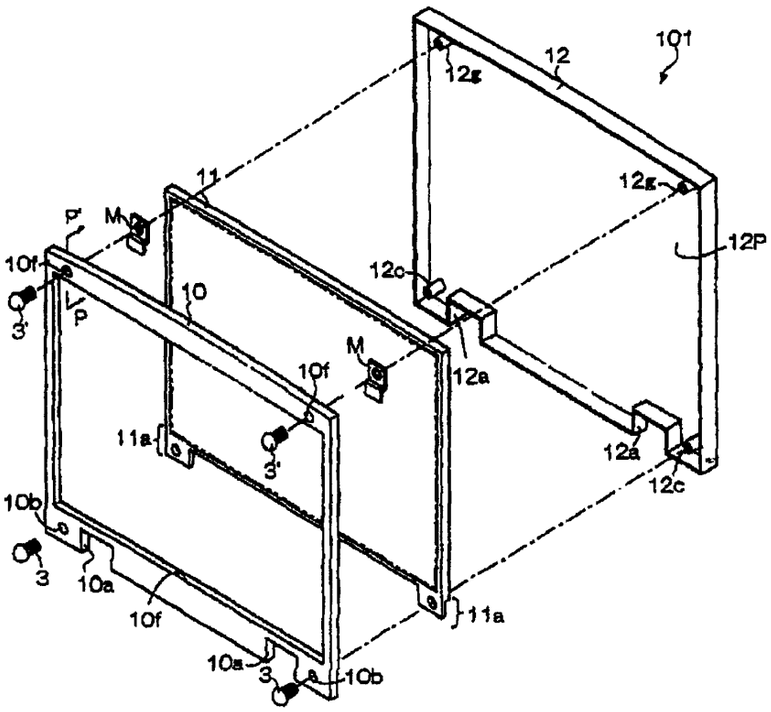

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FIG. 17

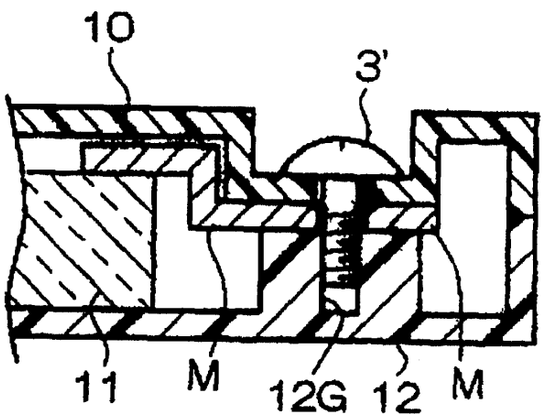

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FIG. 18

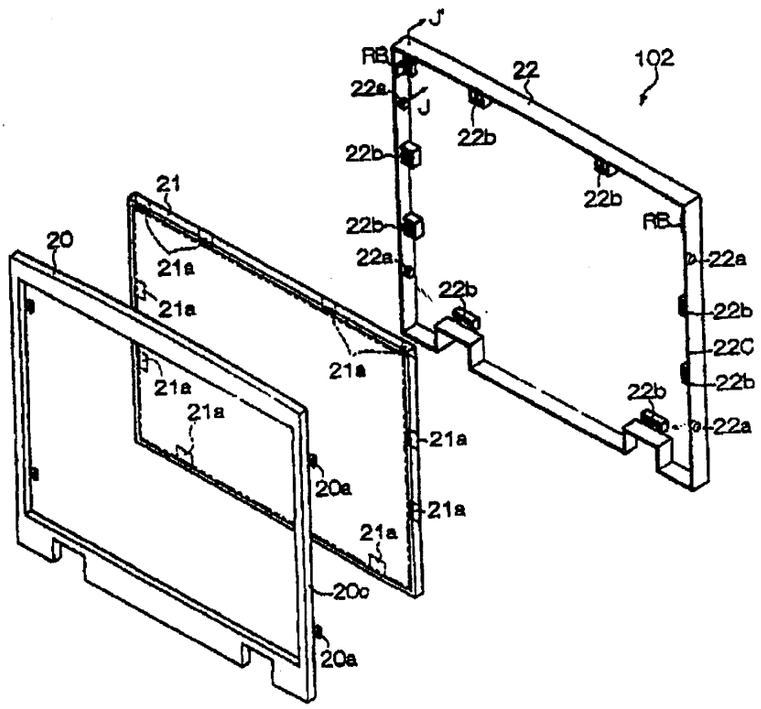

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FIG. 19

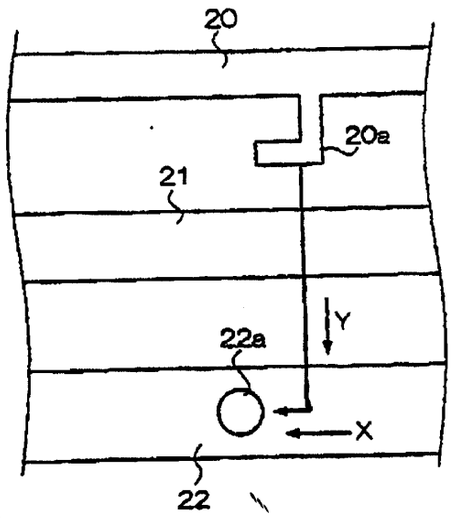

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FIG. 20

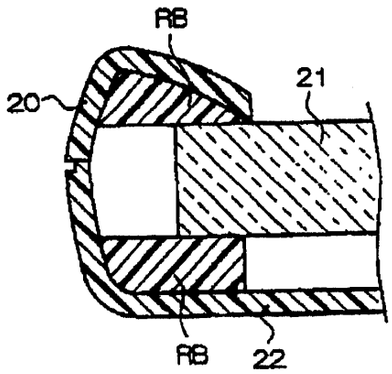

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FIG. 21

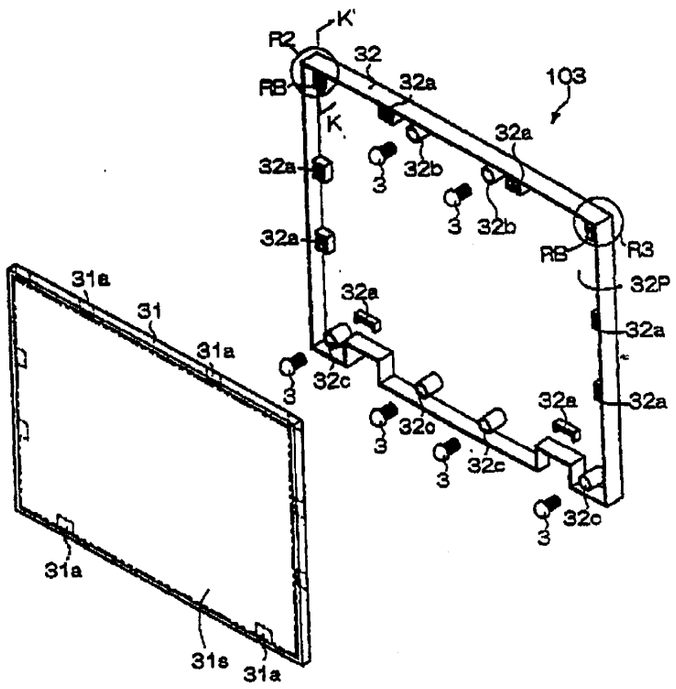

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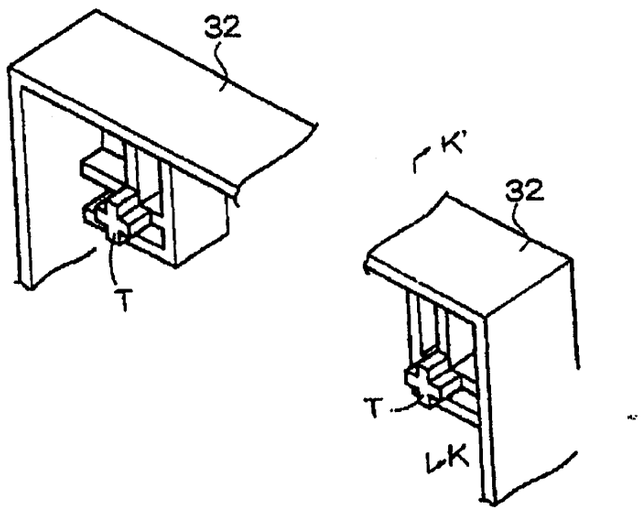
FIG. 22



SCANNED 4

PRINT OF DRAWINGS
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FIG. 23

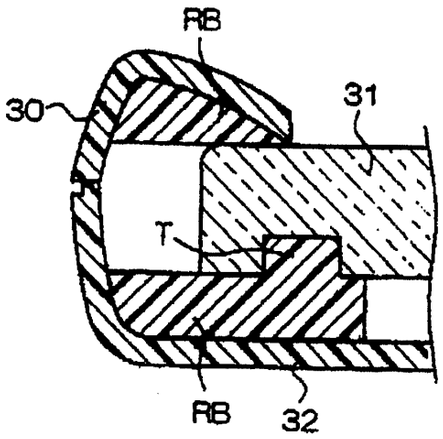

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FIG. 1 prior art

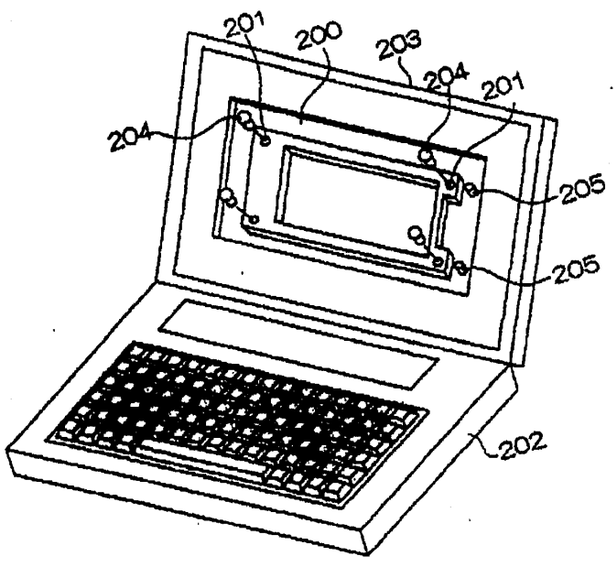

FIG. 2 prior art

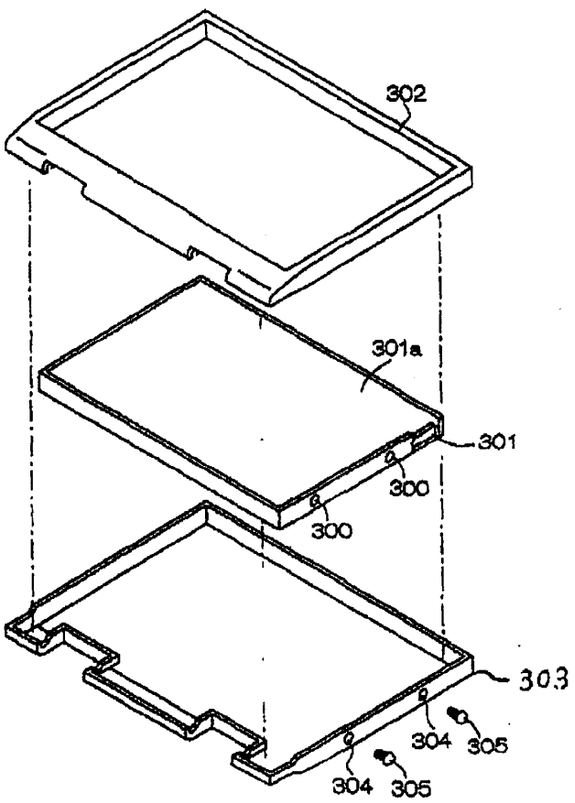

FIG. 3 prior art

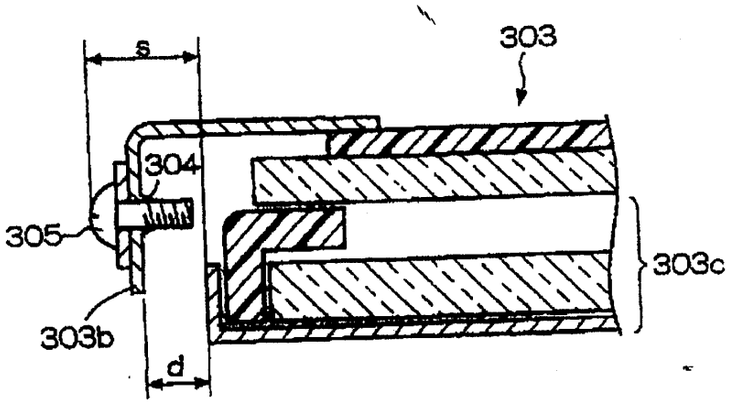

FIG. 4 prior art

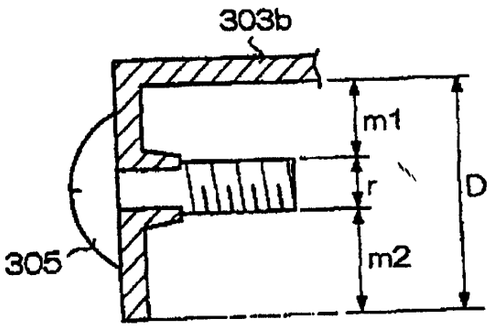

FIG. 5

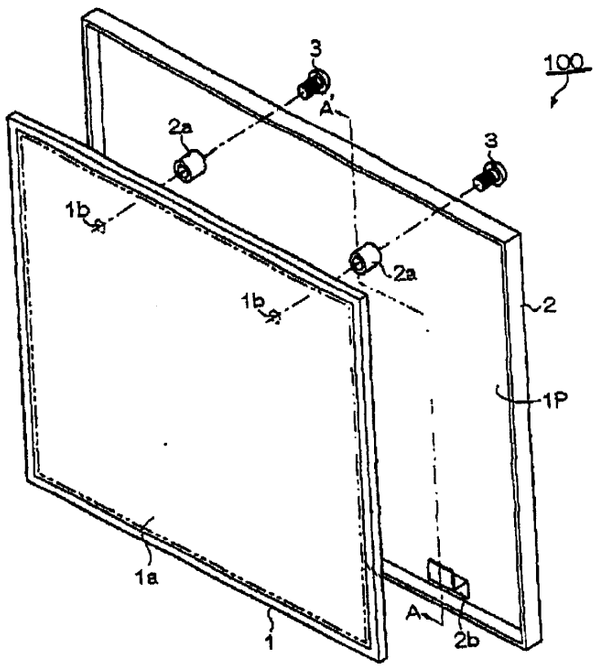

FIG. 6

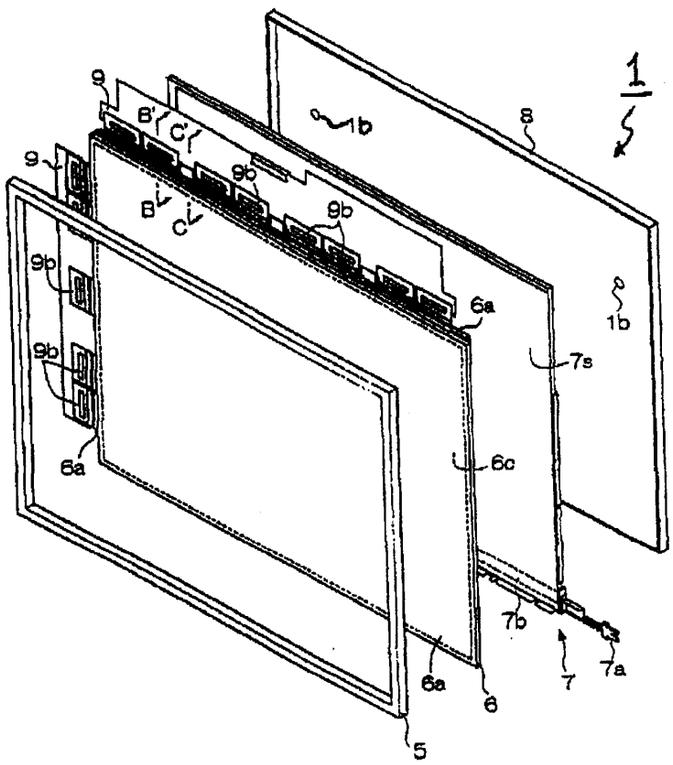

FIG. 7

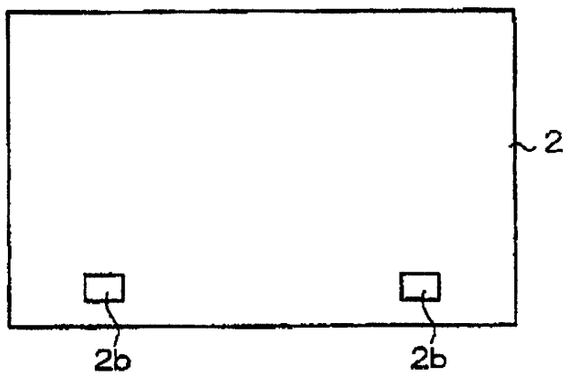

FIG. 8

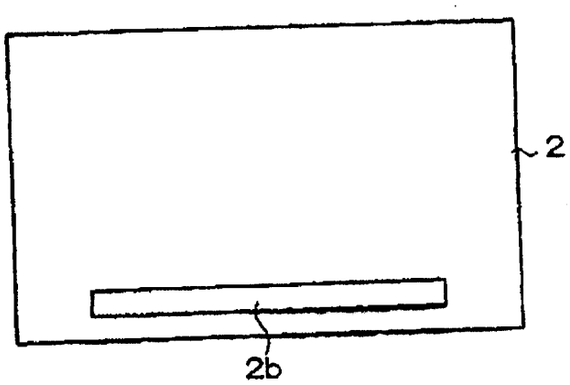

FIG. 9

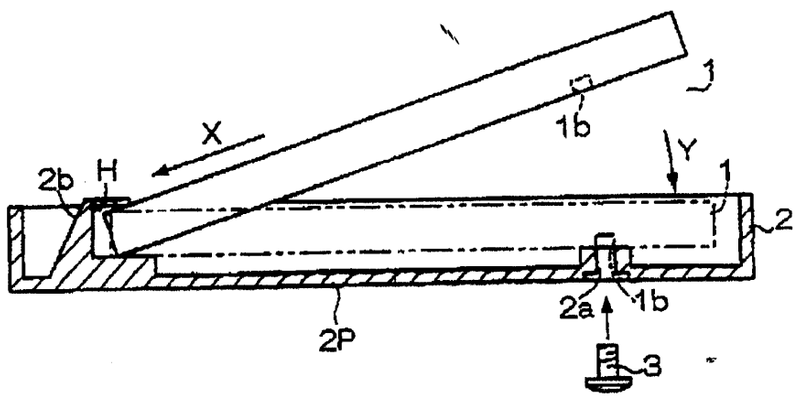

FIG. 10A

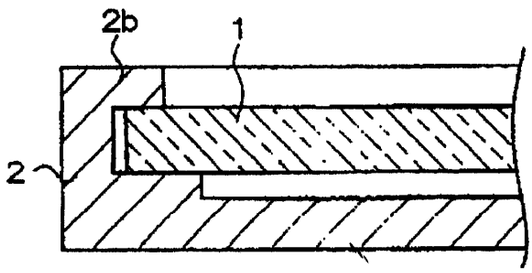

FIG. 10B

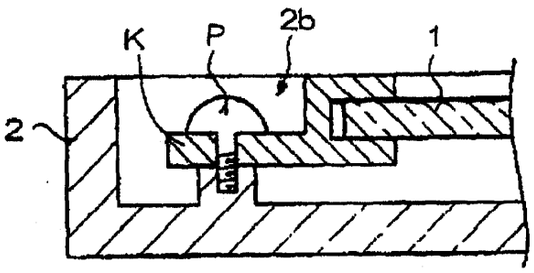

FIG. 10C

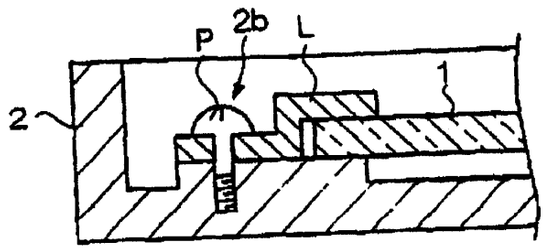

FIG. 11

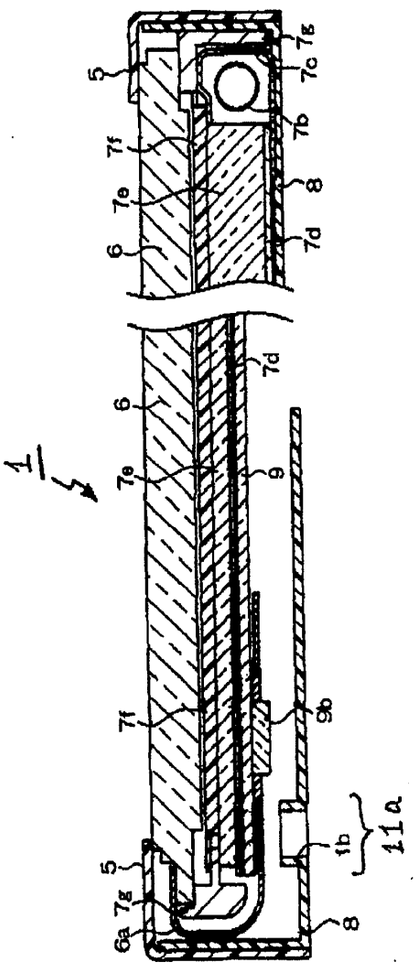

FIG. 12

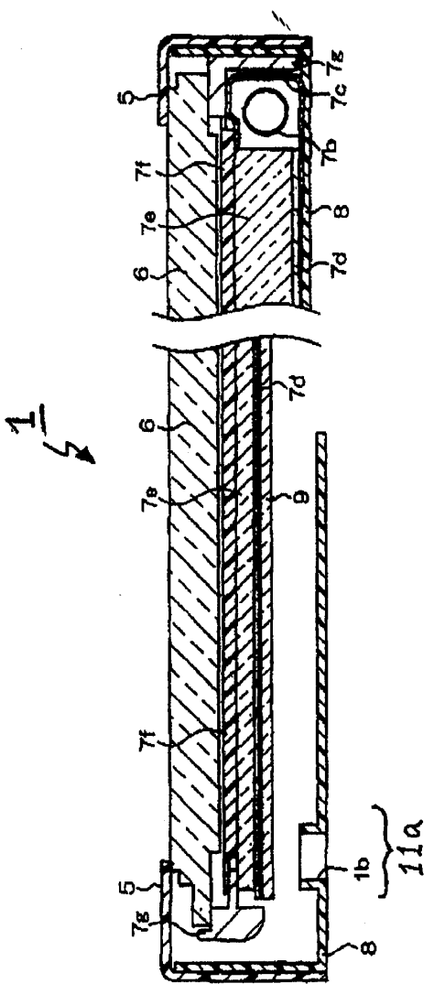

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FIG. 13

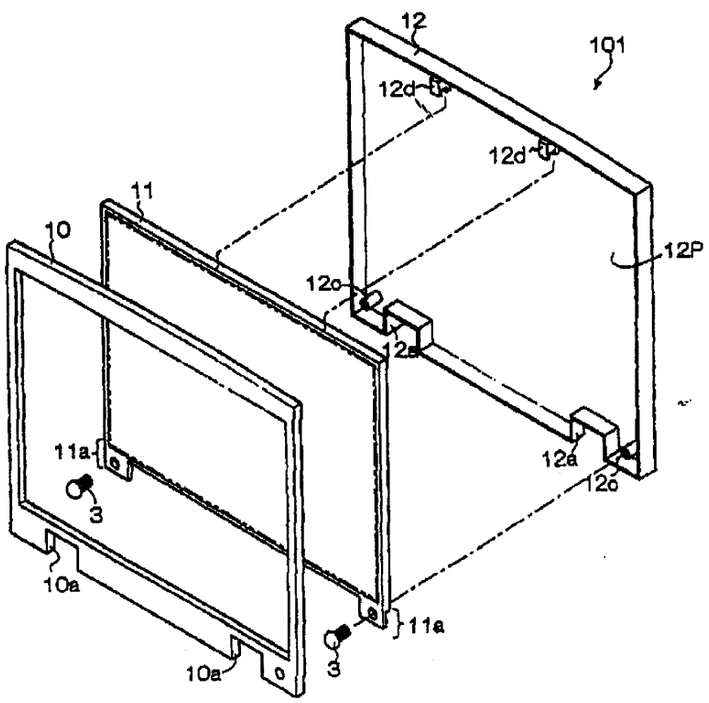


FIG. 14

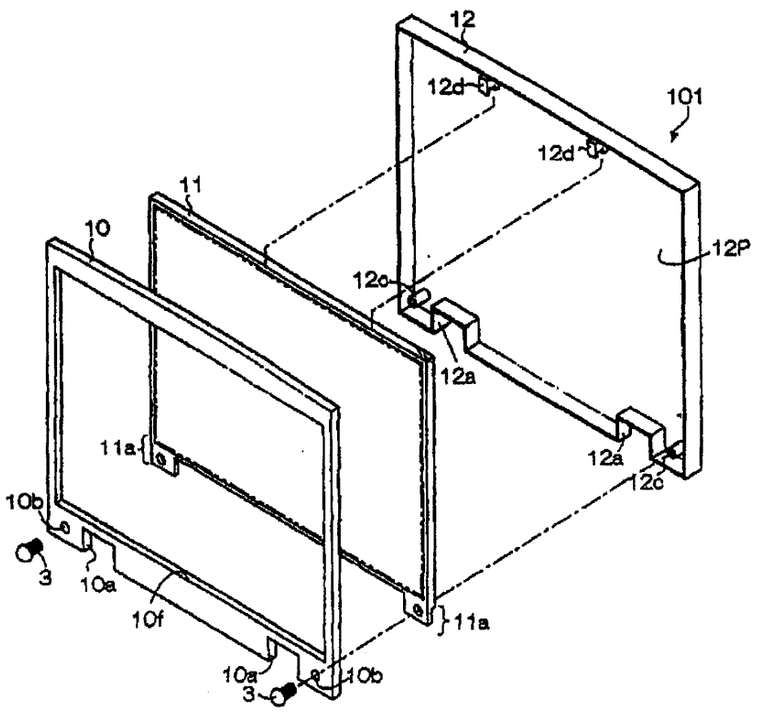

12
12d
12d
101
11
10
12P
12c
12a
11a
12a
12c
10b
3
10a
10f
11a
10a
3
10b

FIG. 15

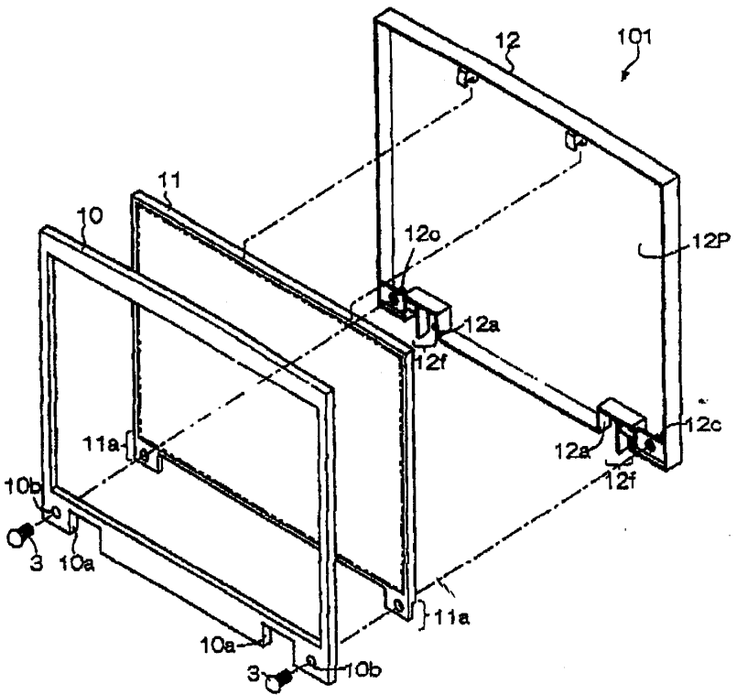

12
101
11
10
12c
12P
12a
12f
12c
12a
12f
11a
10b
3
10a
11a
10a
3
10b

FIG. 16

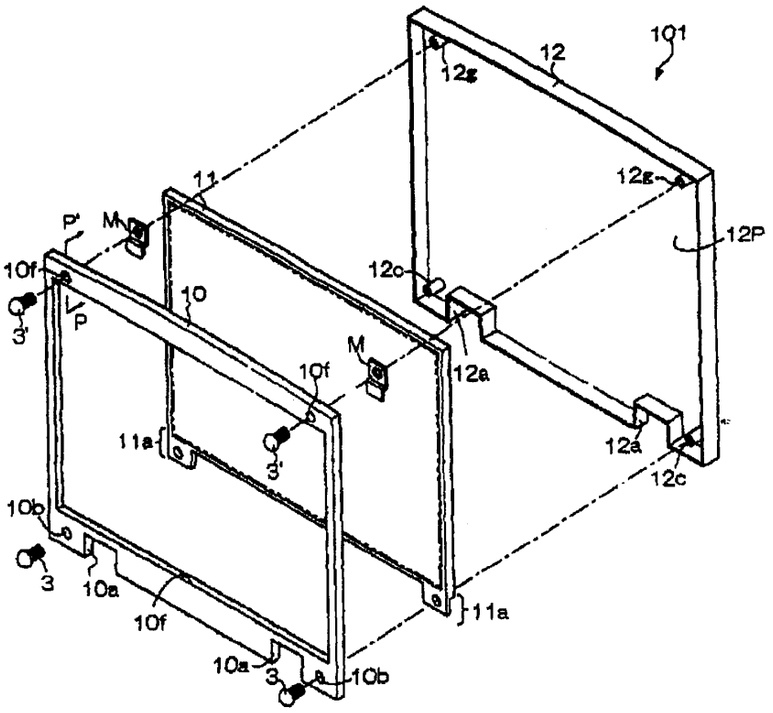

101
12
12g
12g
12P
11
P'
M
10f
12c
10
3'
P
M
10f
12a
11a
3'
12a
12c
10b
3
10a
10f
11a
10a
3
10b

FIG. 17

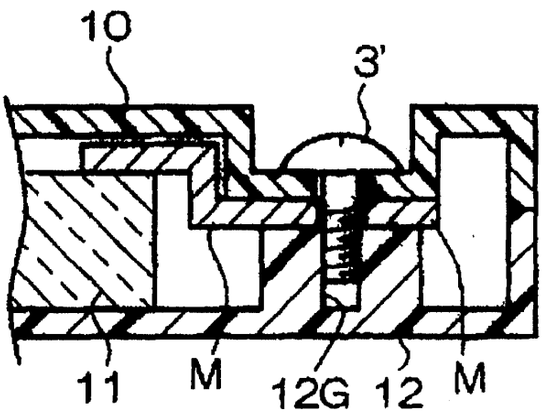
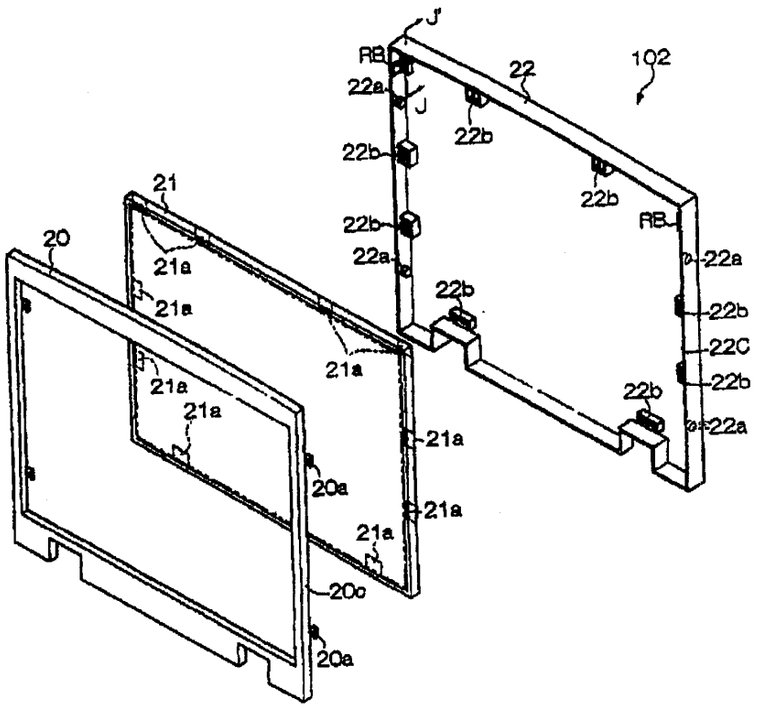


FIG. 18


J
RB
22
102
22a
J
22b
22b
22b
22b
RB
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22a
22b
22b
22C
22b
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21a
21a
20
20a
20c
20a

FIG. 19

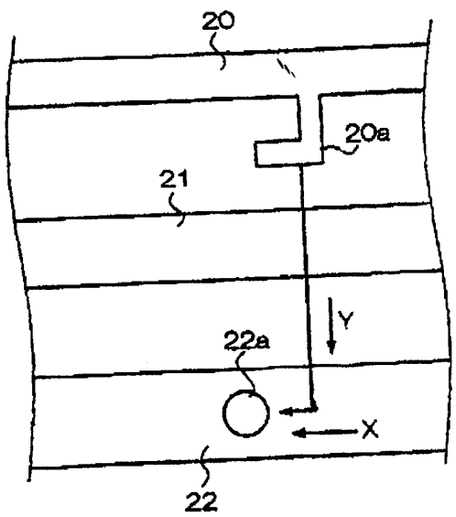


FIG. 20

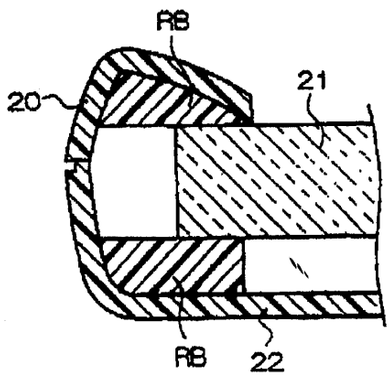
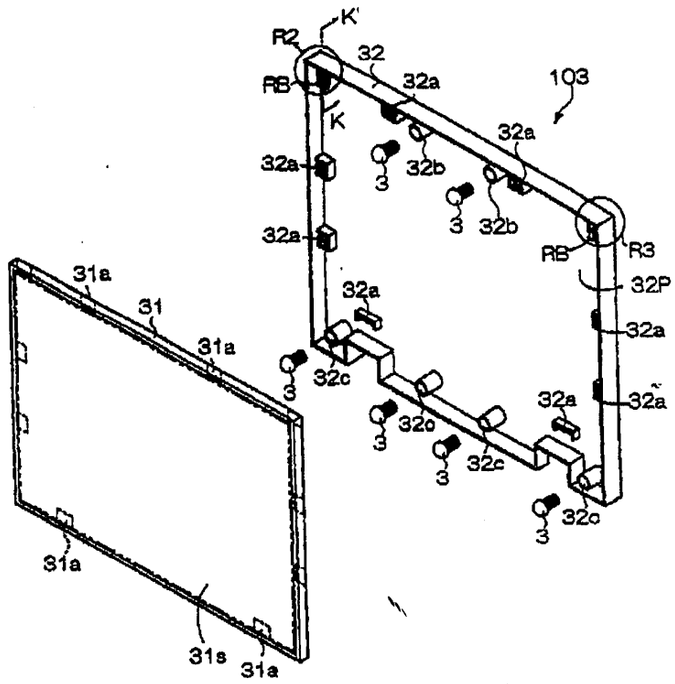


FIG. 21


K'
R2
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RB
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32b
3
32b
32a
RB
R3
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32a
32a
31a
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32c
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31s
31a

FIG. 22

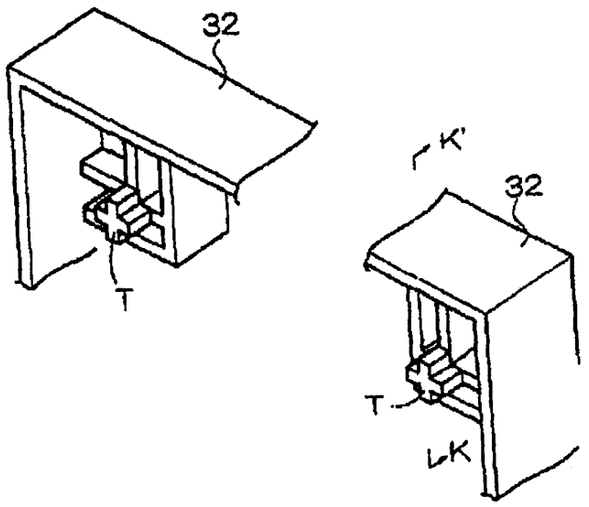

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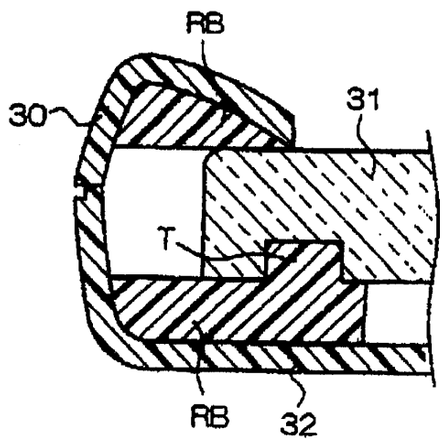
FIG. 23



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Application for United States Patent

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

the specification of which:

(check one)

☒ is attached hereto

☐ was filed on _____, as Application Serial No. _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56*

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			priority claimed	
10-353579	Japan	12/12/1998	x	
(Number)	(Country)	(Day/Month/Year Filed)	yes	no
(Number)	(Country)	(Day/Month/Year Filed)	yes	no
(Number)	(Country)	(Day/Month/Year Filed)	yes	no

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status: patented, pending, abandoned)

Power of Attorney: As a named inventor, I hereby appoint Sean M. McGinn, Reg. 34,386, and Frederick W. Gibb, III, Reg. No. 37,629 as attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. All correspondence should be directed to McGinn & Gibb, P.C., 1701 Clarendon Boulevard, Suite 100, Arlington, Virginia 22209. Telephone calls should be directed to McGinn & Gibb, P.C. at (703) 294-6699.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful

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false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Inventor Takakazu YANO

Inventor's Signature Takakazu Yano Date December 10, 1999

Residence Tokyo, Japan

Citizenship Japanese

Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo Japan

Full Name of Second Joint Inventor, If Any Tomoo MIWA

Inventor's Signature Tomoo Miwa Date December 10, 1999

Residence TOkyo, Japan

Citizenship Japanese

Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo Japan

Full Name of Third Joint Inventor, If Any Yasuhiro SATO

Inventor's Signature Yasuhiro Sato Date December 10, 1999

Residence Tokyo, Japan

Citizenship Japanese

Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo Japan

Full Name of Fourth Joint Inventor, If Any Toshihisa OGAWA

Inventor's Signature Toshihisa Ogawa Date December 10, 1999

Residence Tokyo, Japan

Citizenship Japanese

Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo Japan

[illegible]

[illegible]

[illegible]

[illegible]

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Hisense v. Vista Peak - IPR2023-00725
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[redacted]

Full Name of [redacted] fifth
[redacted] Inventor Michiaki NISHIYAMA
Inventor's Signature Michiaki Nishiyama Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of [redacted] sixth
Joint Inventor, If Any Masatake BABA
Inventor's Signature Masatake Baba Date December 10, 1999
Residence TOkyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of [redacted] seventh
Joint Inventor, If Any Hikaru OKABE
Inventor's Signature Hikaru Okabe Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of [redacted] EIGHTH
Joint Inventor, If Any Fumihiko FUJISHIRO
Inventor's Signature Fumihiko Fujishiro Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

[redacted]

[redacted]

[redacted]

[redacted]

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~~False statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.~~

Full Name of ~~Sole~~ ninth
~~or First~~ Inventor Katsuhiro KATO
Inventor's Signature Katsuhiro Kato Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of ~~Second~~ tenth
Joint Inventor, If Any Kazuaki MIKAMI
Inventor's Signature Kazuaki Mikami Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of ~~Third~~ eleventh
Joint Inventor, If Any Hirokazu FUKUYOSHI
Inventor's Signature Hirokazu Fukuyoshi Date December 10, 1999
Residence Tokyo, Japan
Citizenship Japanese
Post Office Address NEC Corporation of 7-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Full Name of Fourth
Joint Inventor, If Any
Inventor's Signature Date
Residence
Citizenship
Post Office Address

(An additional sheet(s) is/are attached hereto if the present invention includes more than four inventors.)

*Title 37, Code of Federal Regulations, § 1.56:

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith toward the Patent and Trademark Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is canceled or withdrawn from consideration, or the application becomes abandoned.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and (1) it establishes, by itself or in combination with other information, a prima facie case of unpatentability; or (2) it refutes, or is inconsistent with, a position the applicant takes in: (i) opposing an argument of unpatentability relied on by the Office, or (ii) asserting an argument of patentability.

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2772

#2/Priority Pa. Mailed 3/18/00

PF-2503/NEC/US/mh

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Yano et al.

Serial No.: 09/459,280

Filing Date: December 13, 1999

OIPE JC85 FEB 18 2000 PATENT & TRADEMARK OFFICE

RECEIVED FEB 22 2000 GROUP 2700

Group Art Unit: 2772

Examiner: Unknown

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

SUBMISSION OF PRIORITY DOCUMENT

Sir:

Submitted herewith is a certified copy of Japanese Application Number 10-353579 filed on December 11, 1998, upon which application the claim for priority is based.

Respectfully submitted,

Sean M. McGinn
Registration No. 34,386

Date: 2/18/00

McGinn & Gibb, P.C.
Intellectual Property Law
1701 Clarendon Boulevard, Suite 100
Arlington, Virginia 22209
(703) 294-6699
Customer No. 21254

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日 本 国 特 許 庁

PATENT OFFICE
JAPANESE GOVERNMENT

03

別紙添付の書類に記載されている事項は下記の出願書類に記載されている事項と同一であることを証明する。

This is to certify that the annexed is a true copy of the following application as filed with this Office.

出 願 年 月 日
Date of Application: １９９８年１２月１１日

出 願 番 号
Application Number: 平成１０年特許願第３５３５７９号

出 願 人
Applicant (s): 日本電気株式会社

１９９９年 ９月１７日

特 許 庁 長 官
Commissioner,
Patent Office 近 藤 隆 彦

出証番号 出証特平１１－３０６３０８２

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【書類名】　特許願

【整理番号】　74610306

【提出日】　平成10年12月11日

【あて先】　特許庁長官　殿

【国際特許分類】　G06F　9/00

【発明の名称】　液晶モジュール支持構造及びこれを搭載する携帯用端末装置

【請求項の数】　16

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　箭野　貴一

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　三輪　知生

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　佐藤　靖祥

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　小川　俊尚

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　西山　倫明

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　馬場　正武

【発明者】

【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内

【氏名】　岡部　晃

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【発明者】
【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内
【氏名】　藤城　文彦
【発明者】
【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内
【氏名】　加藤　雄大
【発明者】
【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内
【氏名】　三上　和明
【発明者】
【住所又は居所】　東京都港区芝五丁目７番１号　日本電気株式会社内
【氏名】　福吉　弘和
【特許出願人】
【識別番号】　000004237
【氏名又は名称】　日本電気株式会社
【代理人】
【識別番号】　100108578
【弁理士】
【氏名又は名称】　高橋　詔男
【選任した代理人】
【識別番号】　100064908
【弁理士】
【氏名又は名称】　志賀　正武
【選任した代理人】
【識別番号】　100101465
【弁理士】
【氏名又は名称】　青山　正和
【選任した代理人】
【識別番号】　100108394

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【弁理士】

【氏名又は名称】　今村　健一

【選任した代理人】

【識別番号】　100108453

【弁理士】

【氏名又は名称】　村山　靖彦

【選任した代理人】

【識別番号】　100100077

【弁理士】

【氏名又は名称】　大場　充

【手数料の表示】

【予納台帳番号】　008707

【納付金額】　21,000円

【提出物件の目録】

【物件名】　明細書　1

【物件名】　図面　1

【物件名】　要約書　1

【包括委任状番号】　9709418

【プルーフの要否】　要

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【書類名】　明細書

【発明の名称】　液晶モジュール支持構造及びこれを搭載する携帯用端末装置

【特許請求の範囲】

【請求項１】　コンピュータ本体の少なくとも一つの面を覆う蓋体に板状の液晶モジュールを取り付けてなる携帯用端末装置において、

前記蓋体は、前記液晶モジュールの一方の面に重ねられる底板を有し、

前記底板にこれと交差する方向に向けて挿入された連結部材によって前記液晶モジュールと底板とが固定されたことを特徴とする液晶モジュール取り付け構造。

【請求項２】　前記連結部材は、前記底板を貫通して、前記液晶モジュール自体にねじ込まれるネジ部材であることを特徴とする請求項１記載の液晶モジュール取り付け構造。

【請求項３】　前記連結部材は、前記底板を貫通して、該液晶モジュールを前記底板との間に挟む部材にねじ込まれるネジ部材であることを特徴とする請求項１記載の液晶モジュール取り付け構造。

【請求項４】　前記液晶モジュールの縁が挿入される溝を前記蓋体の一の縁に沿って設け、該溝から離れた位置に前記連結部材を設けたことを特徴とする請求項１ないし３のいずれかに記載の液晶モジュール取り付け構造。

【請求項５】　前記ねじ部材が複数であることを特徴とする請求項１ないし３のいずれかに記載の液晶モジュール取り付け構造。

【請求項６】　前記蓋体とコンピュータ本体とは、前記蓋体の一の縁に沿う軸を中心として回動可能に連結されたことを特徴とする請求項１ないし４のいずれかに記載の液晶モジュール取り付け構造。

【請求項７】　前記液晶モジュールの輪郭に近似した平面形状をなす枠体が前記底板とほぼ平行に設けられ、これら底板と枠体との間に前記液晶モジュールが配置されたことを特徴とする請求項１ないし６のいずれかに記載の液晶モジュール取り付け構造。

【請求項８】　前記蓋体とコンピュータ本体とは、蓋体の縁部から面方向外

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方に突出する凸部を、コンピュータ本体の縁部から面方向内方に凹んだ凹部へ挿入してなる連結部を介して、前記縁部と平行な軸を中心に回動可能に連結されたことを特徴とする請求項１ないし７のいずれかに記載の液晶モジュール取り付け構造。

【請求項９】　前記底板または枠体の少なくとも一方と前記液晶モジュールとが前記凸部で連結されたことを特徴とする請求項８に記載の液晶モジュール取り付け構造。

【請求項１０】　前記連結部材は前記底板と前記枠体とを互いに連結するボルトであり、前記液晶モジュールには、このボルトが貫通する貫通孔が設けられたことを特徴とする請求項７ないし９のいずれかに記載の液晶モジュール取り付け構造。

【請求項１１】　コンピュータ本体の少なくとも一つの面を覆う蓋体に板状の液晶モジュールを取り付けてなる携帯用端末装置において、

前記蓋体は、前記液晶モジュールの一方の面に重ねられる底板を有し、

前記液晶モジュールの輪郭に近似した平面形状をなす枠体が前記底板とほぼ平行に設けられ、これら底板と枠体との間に前記液晶モジュールが配置されてなり、　前記底板と前記枠体との間には、これらを互いに連結する連結機構が設けられたことを特徴とする液晶モジュール支持構造。

【請求項１２】　前記底板と枠体とのいずれか一方には、前記液晶モジュールの所定位置に設けられた孔に挿入される突起が面から突出して設けられたことを特長とする請求項１１に記載の液晶モジュール取り付け構造。

【請求項１３】　前記連結機構は、前記底板または枠体のいずれか一方にその内面とほぼ平行に設けられた連結片と、いずれか他方に設けられて前記連結片と係合する突起部とから構成されたことを特徴とする請求項１１または１２に記載の液晶モジュール支持構造。

【請求項１４】　前記蓋体とコンピュータ本体とは、蓋体の縁部から面方向外方に突出する凸部を、コンピュータ本体の縁部から面方向内方に凹んだ凹部へ挿入してなる連結部を介して、前記縁部と平行な軸を中心に回動可能に連結されたことを特徴とする請求項１１ないし１３のいずれかに記載の液晶モジュール取

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り付け構造。

【請求項１５】　前記底板または枠体の少なくとも一方と前記液晶モジュールとが連結されたことを特徴とする請求項１４に記載の液晶モジュール取り付け構造。

【請求項１６】　請求項１ないし１５のいずれかに記載の液晶モジュール取り付け構造によって液晶モジュールが蓋体に固定されたことを特徴とする携帯用端末装置。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】

本発明は、ノート型パソコン（パーソナルコンピュータ）等の携帯用端末装置に表示装置として取り付けられる液晶モジュールの取り付け構造に係わるものである。

【０００２】

【従来の技術】

従来の液晶モジュールは、図２０に示すように液晶モジュール２００の側面から表示面に平行な方向に突出し、正面方向から固定するように設けられたねじの形成部２０１により、ノート型パソコン２０２等の蓋部２０３に、蓋部２０３に設けられた固定部２０５へネジ２０４によりねじ止めで固定されていた。

しかしながら、従来の液晶モジュールには、正面に設けられたねじの形成部の側面から突出した長さだけ、蓋部の全体の面積に対して液晶表示面の面積の比率が小さくなるという欠点がある。

【０００３】

また、従来の液晶モジュールには、側面にねじの形成部が突出している長さだけ、筐体が大きくなる問題がある。

さらに、従来の液晶モジュールには、正面からねじ止めするため、厚みが固定強度を満足させるねじの長さで決められるという欠点がある。

【０００４】

このため、上述した従来の液晶モジュールの欠点を解決するため、図２１に示

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す、ねじの形成部３００が液晶モジュール３０１の側面に設けられたサイドマウント形式の液晶モジュールが用いられている。この結果、サイドマウント形式の液晶モジュールは、側面から突出したねじ形成部が無い分、厚さ及び横方向の幅が改善されている。

【０００５】

サイドマウント方式は、下フレーム３０３に液晶モジュール３０１を表示面３０１ａを上にした状態で挿入し、下フレーム３０３のネジ穴３０４からネジ３０５により、下フレーム３０３の側壁に液晶モジュール３０１を固定する。

【０００６】

【発明が解決しようとする課題】

しかしながら、上述したサイドマウント形式の液晶モジュール３０３は、図２２に示すように外枠フレーム３０３ｂの側面と、Ｂ／Ｌ（バックライト部）３０３ｃの側面との距離、すなわち、ねじ形成部の奥行きの長さｄだけモジュールの幅が大きくなる欠点がある。

【０００７】

また、上述したサイドマウント形式の液晶モジュール３０３は、図２３に示すように一般にねじ形成部が金属材料で形成されているため、外枠のねじ形成部の部分の重さの分、携帯端末機器の全体の重量を増加させる問題がある。

さらに、サイドマウント形式の液晶モジュール３０３は、ねじ形成部の奥行きの長さｓ、すなわちネジ３０５の長さだけモジュールの幅が大きくなるため、携帯端末機器の筐体が全体的に大きくなる問題がある。

【０００８】

また、サイドマウント形式の液晶モジュールは、表示面に平行なねじ形成部の奥行きの分、蓋部の全体の面積に対して液晶表示面の面積の比率が小さくなるという欠点がある。

さらに、サイドマウント形式の液晶モジュールは、表示面に対して垂直方向の外枠のねじ形成部の厚さＤが、ねじ穴形成のために使用するねじの直径ｒ及び余裕の長さm1,m2の分必要であり、所定の値以上に薄くできない欠点がある。

【０００９】

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さらにまた、サイドマウント形式の液晶モジュールは、装着された情報機器が衝撃を受けた場合、外枠のねじ形成部に衝撃の応力が集中し、液晶パネル及び外枠がダメージを受けて壊れやすくなる欠点がある。

加えて、サイドマウント形式の液晶モジュールは、一般に外枠のねじ形成部が金属で形成されているため、ねじ穴３０４を形成した後に携帯機器の蓋にねじ止めするときに、ねじがねじ穴に挿入される時点で金属の異物片が発生し、電子回路の配線がショートして誤動作する問題がある。

【００１０】

さらに、サイドマウント形式の液晶モジュールは、液晶デバイスを駆動するためにモジュール内に設けられたドライバＩＣ（集積回路）を避けて、ねじ形成部を形成する必要があるため、設計の自由度が低くなる、すなわちドライバの信号線の最適レイアウトが出来ない欠点がある。

【００１１】

また、さらにサイドマウント形式の液晶モジュールを取り付ける携帯用端末装置の蓋は、ネジ受け部を形成するため、スライド金型が必要となり、製造ライン形成のコストが高くなる欠点がある。

さらに、また前述した携帯用端末装置の蓋は、側面にネジ３０５の頭部分がでないように、ネジ受け部を側面から内部方向に凹状に形成するため、この内部方向に張り出す長さの分、蓋の幅が大きくなる。

【００１２】

加えて、従来のサイドマウント形式の携帯用端末装置は、液晶モジュールの脱着を行う場合、正面からネジの取り外し処理を行う工程に比較し、ネジ受け部が横に位置しているので、液晶モジュールの脱着工程が煩雑となるため、作業効率が低下する。

【００１３】

また、従来のサイドマウント形式の携帯用端末装置は、ネジ受け部が横に位置しているので、液晶モジュールを固定する蓋のネジ穴３０４の部分の強度を高くする必要があるため、強度向上に蓋の材質としてＭｇ合金等の強度の高い金属が必要となり、これらの金属の材料費が高く、かつ強度の高さから成形工程の処理

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効率が低くなり、さらに蓋の重量が重くなる欠点がある。

【００１４】

本発明はこのような背景の下になされたもので、実装した場合の厚さを薄くし、また信頼性を向上させ、かつ携帯用端末装置の蓋の表面積に対する表示面積の比率を向上させ、加えて携帯用端末装置からの実装及び脱着処理を容易とする液晶モジュール及び携帯用端末装置を提供する。

【００１５】

【課題を解決するための手段】

請求項１記載の発明は、コンピュータ本体の少なくとも一つの面を覆う蓋体に板状の液晶モジュールを取り付けてなる携帯用端末装置において、前記蓋体は、前記液晶モジュールの一方の面に重ねられる底板を有し、前記底板にこれと交差する方向に向けて挿入された連結部材によって前記液晶モジュールと底板とが固定されたことを特徴とする液晶モジュール取り付け構造。

【００１６】

請求項２記載の発明は、請求項１記載の液晶モジュール取り付け構造において、前記連結部材が、前記底板を貫通して、前記液晶モジュール自体にねじ込まれるネジ部材であることを特徴とする。

【００１７】

請求項３記載の発明は、請求項１記載の液晶モジュール取り付け構造において、前記連結部材が、前記底板を貫通して、該液晶モジュールを前記底板との間に挟む部材にねじ込まれるネジ部材であることを特徴とする。

【００１８】

請求項４記載の発明は、請求項１ないし３のいずれかに記載の液晶モジュール取り付け構造において、前記液晶モジュールの縁が挿入される溝を前記蓋体の一の縁に沿って設け、該溝から離れた位置に前記連結部材を設けたことを特徴とする。

【００１９】

請求項５記載の発明は、請求項１ないし３のいずれかに記載の液晶モジュール取り付け構造において、前記ねじ部材が複数であることを特徴とする。

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請求項６記載の発明は、請求項１ないし４のいずれかに記載の液晶モジュール取り付け構造において、前記蓋体とコンピュータ本体とが、前記蓋体の一の縁に沿う軸を中心として回動可能に連結されたことを特徴とする。

【００２０】

請求項７記載の発明は、請求項１ないし６のいずれかに記載の液晶モジュール取り付け構造において、前記液晶モジュールの輪郭に近似した平面形状をなす枠体が前記底板とほぼ平行に設けられ、これら底板と枠体との間に前記液晶モジュールが配置されたことを特徴とする。

【００２１】

請求項８記載の発明は、請求項１ないし７のいずれかに記載の液晶モジュール取り付け構造において、前記蓋体とコンピュータ本体とが、蓋体の縁部から面方向外方に突出する凸部を、コンピュータ本体の縁部から面方向内方に凹んだ凹部へ挿入してなる連結部を介して、前記縁部と平行な軸を中心に回動可能に連結されたことを特徴とする。

【００２２】

請求項９記載の発明は、請求項８に記載の液晶モジュール取り付け構造において、前記底板または枠体の少なくとも一方と前記液晶モジュールとが前記凸部で連結されたことを特徴とする。

【００２３】

請求項１０記載の発明は、において、前記連結部材が前記底板と前記枠体とを互いに連結するネジ部材であり、前記液晶モジュールには、このネジ部材が貫通する貫通孔が設けられたことを特徴とする請求項７ないし９のいずれかに記載の液晶モジュール取り付け構造。

【００２４】

請求項１１記載の発明は、液晶モジュール支持構造において、コンピュータ本体の少なくとも一つの面を覆う蓋体に板状の液晶モジュールを取り付けてなる携帯用端末装置において、前記蓋体は、前記液晶モジュールの一方の面に重ねられる底板を有し、前記液晶モジュールの輪郭に近似した平面形状をなす枠体が前記底板とほぼ平行に設けられ、これら底板と枠体との間に前記液晶モジュールが配

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置されてなり、　前記底板と前記枠体との間には、これらを互いに連結する連結機構が設けられたことを特徴とする。

【００２５】

請求項１２に記載の発明は、請求項１１に記載の液晶モジュール取り付け構造において、前記底板と枠体とのいずれか一方には、前記液晶モジュールの所定位置に設けられた孔に挿入される突起が面から突出して設けられたことを特長とする。

【００２６】

請求項１３記載の発明は、請求項１１または１２に記載の液晶モジュール支持構造において、前記連結機構が、前記底板または枠体のいずれか一方にその内面とほぼ平行に設けられた連結片と、いずれか他方に設けられて前記連結片と係合する突起部とから構成されたことを特徴とする。

【００２７】

請求項１４記載の発明は、請求項１１ないし１３のいずれかに記載の液晶モジュール取り付け構造において、前記蓋体とコンピュータ本体とが、蓋体の縁部から面方向外方に突出する凸部を、コンピュータ本体の縁部から面方向内方に凹んだ凹部へ挿入してなる連結部を介して、前記縁部と平行な軸を中心に回動可能に連結されたことを特徴とする。

【００２８】

請求項１５記載の発明は、請求項１４に記載の液晶モジュール取り付け構造において、前記底板または枠体の少なくとも一方と前記液晶モジュールとが連結されたことを特徴とする。

請求項１６記載の発明は、携帯用端末装置において、請求項１ないし１５のいずれかに記載の液晶モジュール取り付け構造によって液晶モジュールが蓋体に固定されたことを特徴とする。

【００２９】

【発明の実施の形態】

以下、図面を参照して本発明の実施形態について説明する。

＜第一の実施形態＞

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図１は本発明の第一の実施形態によるパーソナルコンピュータの蓋１００を構成する組立部品の組立状態を示す概念図である。この図において、１は液晶モジュールであり、２はパーソナルコンピュータの蓋１００の下フレームである。

【００３０】

下フレーム２には、下フレーム２の底面１Ｐに、この底面１Ｐに垂直方向に突出したボス２ａが形成されている。そして、液晶モジュール１は、下フレーム２に表示面１ａを正面に向け、裏面のねじ穴１ｂを下フレーム２のボス２ａを介して、底面２Ｐに垂直に止められるねじ３により下フレーム２へ固定されている。

【００３１】

液晶モジュール１は、図２に示す各部品で構成されている。図２は、液晶モジュール１の構成を示す概念図である。図に示すように、液晶モジュール１は、ＬＣＤ（液晶デバイス）パネル６とＢ／Ｌ（バックライト）ユニット７とが重ね合わされて、表枠体５と裏枠体８とで挟んだ形状で構成されている。図１に示すねじ穴１ｂは、裏枠体８に形成されている。

【００３２】

９はプリント基板であり、液晶駆動ドライバ９ｂが実装されている。液晶駆動ドライバ９ｂは、外部機器から入力される画像データに基づき、制御信号をフレキシブル基板配線６ａを介してＬＣＤパネル６へ出力し、液晶素子の制御を行う。Ｂ／Ｌユニット７には、右端に蛍光ランプ７ｂが内蔵されている。蛍光ランプ７ｂは、電源端子７ａから供給される電力により点灯される。

【００３３】

そして、この蛍光ランプ７ｂが放射する光は、Ｂ／Ｌユニット７を上から下の方向へ拡散する。この結果、蛍光ランプ７ｂが放射する光は、図示しない反射鏡によりＢ／Ｌユニット７の表面７ｃから均一な強度で、ＬＣＤパネル６の裏面６ｃに放射される。これにより、ＬＣＤパネル６の表面６ｂには、入射される光が調節されることで画像及び文字が表示される。

【００３４】

また、この液晶モジュールが組み立てられるとき、プリント基板９は、フレキシブル基板配線６ａを折り曲げて、Ｂ／Ｌユニット７と裏枠体８の間に挟み込む

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様に固定される。

【００３５】

図１に示す下フレーム２には、液晶モジュール１を固定する固定部２ｂが形成されている。この固定部２ｂの形状は、液晶モジュール１を固定出来ればどの様な形状でもかまわない。例えば、図１の固定部２ｂは、図３に示す様に、下フレーム２の下部領域に分離して形成して有るが、図４に示す様に固定部２ｂが下フレーム２の下端に平行に直線上に形成されていても良い。また、図３に示すように固定部２ｂを分離して構成した場合、固定部２ｂの数は、１以上で有ればいくつでも良い。

【００３６】

次に、図５に、下フレーム２に対する液晶モジュール１の固定方法を示す。図５は、図１における液晶モジュール１及び下フレーム２のＡ－Ａ’での線視断面図である。始めに、図に示すようにＸ方向に固定部２ｂの溝部Ｈへ液晶モジュール１の端部を挿入する。この挿入の後、液晶モジュール１をＹ方向へ倒し、液晶モジュール１裏面にあるネジ穴１ｂにボス２ａを介して、底面２Ｐに垂直方向にネジ３を締めて、液晶モジュール１は下フレーム２に固定される。

【００３７】

また、図２、図３及び図４の固定部２ｂは、図５に示す形状でなく、図６に示す形状で形成することも可能である。図６（ａ）の固定部２ｂは、下フレーム２の側面の一部をコの字状に形成して実現している。また、図６（ｂ）の固定部２ｂは、コ字上の溝部を有する固定金具Ｋを別に作成し、この固定金具ＫをネジＰにより下フレーム２に固定して形成されている。

【００３８】

さらに、図６（ｃ）の固定部２ｂは、底面２Ｐとコ字状の溝を形成する固定金具Ｌを別に作成し、この固定金具ＬをネジＰにより下フレーム２の底面２Ｐに固定して形成されている。ここで、図６（ｂ）及び図６（ｃ）のネジＰを止めるネジ穴は、蓋１００を図示しないパーソナルコンピュータへ取り付けるヒンジ部を設ける領域の空きスペースに形成する。これにより、蓋１００の空きスペースを利用することができ、蓋１００の面積が大きくならない。

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【００３９】

次に、液晶モジュール１の裏面に形成されるネジ穴１ａの位置の自由度について図７及び図８を用いて説明する。図７は、図１における液晶ドライバ９ｂが有るＢ－Ｂ’における液晶モジュール１の線視断面図であり、図８は、図１における液晶ドライバ９ｂが無いＣ－Ｃ’における液晶モジュール１の線視断面図である。ここで、図７及び図８におけるネジ穴１ｂは、任意の位置に形成することが出来る。

【００４０】

図５において、ネジ穴１ｂの位置は、液晶駆動ドライバ９ｂが実装されている基板９等の内部の部品に、ネジ３の先端部が接触しない位置で有れば、裏枠体８の図における下部領域のどこに形成しても良い。これにより、液晶モジュール１１のネジ部１１ａを構成しても蓋１００全体の面積は大きくならず、蓋１００の面積に対する液晶モジュール１１の比率を大きくすることが出来る。

【００４１】

Ｂ／Ｌユニット７は、ランプ７ｂ、リフレクタ７ｃ、反射シート７ｄ、導光板７ｅ、光学シート部７ｆ及び支持枠体７ｇで構成されている。すなわち、Ｂ／Ｌユニット７は、支持枠体７ｇをガイドとしてランプ７ｂ、リフレクタ７ｃ、反射シート７ｄ、導光板７ｅ及び光学シート部７ｆを重ね、表枠体５と裏枠体８とで挟んで構成されている。リフレクタ７ｃは、ランプ７ｂから放射される光の進行を導光板７ｅの方向へするため、ランプ７ｂから放射される光を反射させる。

【００４２】

導光板７ｅは、図の上から下方向に向かい厚さが薄く形成され、ランプ７ｂから放射される光を図の上から下方向へ拡散する。そして、この拡散された光は、反射シート７ｄにより反射され、光学シート部７ｆを介して、ＬＣＤパネル６へ放射される。このとき、拡散された光は、光学シート部７ｆにおいて輝度が均一化される。

【００４３】

本実施形態は、上述してきた固定方法により、液晶モジュール１を下フレーム２に固定するため、ネジ部１ｂを構成しても蓋１００の底面２Ｐの平行な方向へ

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の影響が無く、蓋１００全体の面積は大きくならず、蓋１００の面積に対する液晶モジュール１の表示面１ａの比率を大きくすることが出来る。

また、本実施形態は、液晶モジュール１の下フレーム２からの脱着が、ネジ止めを含めて底面２Ｐに対して垂直に行うことが出来るため、ネジ止めの工程が簡易に行え、パーソナルコンピュータの組立の処理効率が向上する。

【００４４】

さらに、本実施形態は、液晶モジュール１の回路部に影響を与えない空きスペースにおいて、ネジ止めを底面１Ｐに対して垂直に行うため、蓋１００の厚さを液晶モジュール１の厚さを基準に設計できる。

加えて、本実施形態は、液晶モジュール１を横からのネジ止めによる固定を行わないため、ドライバＩＣ９ｂの実装されたプリント基板９へのフレキシブル基板を自由に配線することが可能なため、ドライバＩＣ９ｂの信号線の自由度を向上することが出来る。

【００４５】

＜第二の実施形態＞

図９は本発明の第二の実施形態によるパーソナルコンピュータの蓋１０１を構成する組立部品の組立状態を示す概念図である。この図において、１０は上フレームであり、１１は液晶モジュールであり、１２は下フレームである。前記パーソナルコンピュータの蓋１０１は、液晶モジュール１１を上フレーム１０と下フレーム１２とで挟んだ構成となっている。

【００４６】

また、液晶モジュール１１は、第一の実施形態の液晶モジュール１の表枠部５にネジ穴部１１ａが形成されたものであり、他の構成は第一の実施形態の液晶モジュール１と同様である。このため、液晶モジュール１１の構成の説明は、これを省略する。

図９における下フレーム１２の領域１２ａ及び上フレーム１０の領域１０ａには、構成された蓋１０１を図示しないパーソナルコンピュータへ取り付けるための金具、すなわちヒンジ部が設けられる。

【００４７】

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このため、この金具、すなわち下フレーム１２の底面１２Ｐのヒンジ部を取り付ける領域に、この底面１２Ｐに対して垂直方向に突出したネジ受けの固定部１２ｃを形成する。

下フレーム１２に対する液晶モジュール１１の装着方法は、図９に示す実線のように固定部１２ｄの溝に液晶モジュール１１の端部を挿入する。

【００４８】

そして、液晶モジュール１１は、固定部１２ｃへ底面１２Ｐに垂直方向に締め込まれるネジ３のネジ止めにより、下フレーム１２に固定される。その後、領域１０ａ及び領域１２ａへ図示しないヒンジ部を装着し、上フレーム１０を下フレーム１２へ装着して蓋１０１の組立を終了する。

【００４９】

また、図１０に示す様に、上フレーム１０における枠を含む２次元平面１０ｆにネジ穴１０ｂを形成して、液晶モジュール１１のネジ穴部１１ａを下フレーム１２に上フレーム１０の装着方向へ締め込むネジ３により、液晶モジュール１１を蓋１０１内において固定することも出来る。

【００５０】

また、液晶モジュール１１のもう一方の端部の固定は、第一の実施形態に用いた固定部２ｂ（図２、図３及び図４）と同様固定部１２ｄを用いる。

液晶モジュール１１の取り付け方法は、液晶モジュール１１の一方の端部を固定部１２ｄの溝部に挿入し、液晶モジュール１１の他方の端部のネジ穴部１１ａのネジ穴と固定部１２ｃのネジ穴とが重なる状態にする。そして、液晶モジュール１１は、ネジ３を底面１２Ｐに垂直方向に締め込むことにより下フレーム１２へ固定される。

【００５１】

上述してきた固定方法により、液晶モジュール１１のネジ部１１ａを構成しても蓋１００全体の面積は大きくならず、蓋１０１の面積に対する液晶モジュール１１の比率を大きくすることが出来る。

また、液晶モジュール１１の下フレーム１２からの脱着が底面１２Ｐに対して垂直に行うことが出来るため、ネジ止めなどの工程が簡易に行え、パーソナルコ

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ンピュータの組立の処理効率が向上する。

【００５２】

さらに、本実施形態は、液晶モジュール１１の回路部に影響を与えない空きスペースにおいて、ネジ止めを底面１２Ｐに対して垂直に行うため、蓋１００の厚さを液晶モジュール１１の厚さを基準に設計できる。

加えて、本実施形態は、液晶モジュール１１を横からのネジ止めによる固定を行わないため、ドライバＩＣ９ｂの実装されたプリント基板９へのフレキシブル基板を自由に配線することが可能なため、ドライバＩＣ９ｂの信号線の自由度を向上することが出来る。

【００５３】

さらに、図１１に示すように、図示しないパーソナルコンピュータ本体と、液晶モジュール１１の組み込まれた蓋１０１との開閉のためのヒンジ部１２ｅに固定板１２ｆを設ける。そして、この固定板１２ｆに形成されたネジ穴を介して固定部１２ｃのネジ穴に、底面１２Ｐに対して垂直方向にネジ３を締め、液晶モジュール１１の固定を行うことも可能である。

【００５４】

これにより、図９及び図１０の効果に加えて、固定板１２ｆが固定部１２ｃとネジ部１１ａとの間に挿入されるため、液晶モジュール１１のネジ部１１ａと固定部１２ｃとの接触面積が大きくなり、図８及び図９に示した固定状態に比較して、液晶モジュール１１の固定強度が増加する。

【００５５】

また、図８、図９及び図１０に示す液晶モジュール１１と下フレーム１２とに固定部１２ｄを用いずに、第一の実施形態と同様に液晶モジュール１１の裏面にネジ穴を形成し、かつ下フレーム１２にもネジ穴を形成し、液晶モジュール１１を下フレーム１２をネジにより、すなわち液晶モジュール１１をネジ止めのみで固定することも可能である。上フレーム１０には、ネジ穴１０ｈが形成されている。この場合、ネジ止めを行う液晶モジュール１１のネジ形成部１１ａと液晶モジュール１１の裏面のネジ穴との合計数は、３つ以上であれば良い。

【００５６】

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次に、第二の実施形態の他の構成として、図１２に示すように、上述したコの字部材に変えて、下フレーム１２にネジ部１２Ｇを形成し、金具Ｍを下フレーム１２と上フレーム１０とで固定させる。そして、液晶モジュール１１の端部は、この金具Ｍと下フレーム１２とに挟まれることにより、蓋１０１内部で固定される。ここで、金具Ｍを留めるネジ3’は、上フレーム１０と下フレーム１２とを留めるネジと共通化する。

【００５７】

図１３を用いて、液晶モジュール１１が、金具Ｍと下フレーム１２とにより固定される状態を示す。図１３は組み立てられたネジ部１２ｈの部分のＰ－Ｐ’における線視断面図である。

金具Ｍは、上フレーム１０と下フレーム１２との間でネジ3’により固定され、さらに液晶モジュール１１は、金具Ｍと下フレーム１２との間で蓋１０１内に固定されている。

【００５８】

上述してきた固定方法により、液晶モジュール１１を下フレーム１２に固定するため、ネジ部１１ａを構成しても、蓋１０１の底面１２Ｐの平行な方向への影響が無く、蓋１０１全体の面積は大きくならず、蓋１０１の面積に対する液晶モジュール１１の比率を大きくすることが出来る。

また、本実施形態は、液晶モジュール１１の下フレーム１２からの脱着が、ネジ止めを含めて底面１２Ｐに対して垂直に行うことが出来るため、ネジ止めの工程が簡易に行え、パーソナルコンピュータの組立の処理効率が向上する。

【００５９】

さらに、本実施形態は、液晶モジュール１１の回路部に影響を与えない空きスペースにおいて、ネジ止めを底面１１Ｐに対して垂直に行うため、蓋１０１の厚さを液晶モジュール１１の厚さを基準に設計できる。

加えて、本実施形態は、液晶モジュール１１を横からのネジ止めによる固定を行わないため、液晶モジュール１１内のドライバＩＣ９ｂの実装されたプリント基板９へのフレキシブル基板を自由に配線することが可能なため、ドライバＩＣ９ｂの信号線の自由度を向上することが出来る。

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【００６０】

＜第三の実施形態＞

図１４は本発明の第三の実施形態によるパーソナルコンピュータの蓋１００を構成する組立部品の組立状態を示す概念図である。この図において、２０は上フレームであり、２１は液晶モジュールであり、２２は下フレームである。前記パーソナルコンピュータの蓋１００は、液晶モジュール２１を上フレーム２０と下フレーム２２とで挟んだ構成となっている。

また、液晶モジュール２１は、第一の実施形態の液晶モジュール１の構成と同様のため、液晶モジュール２１の構成の説明は、これを省略する。

【００６１】

上フレーム２０の左右の側面２０ｃには、この側面２０ｃと平行方向にアゴ部２０ａが形成されている。また、下フレーム２２の左右には、上フレーム２０のアゴ部２０ａを引っかけるボス部２２ａが側面２２ｃの内側に、この側面２０ｃの垂直方向に設けられている。

【００６２】

さらに、下フレーム２２の底面２２Ｐの周辺部には、液晶モジュール２１と下フレーム２２との取り付け方向にリブ部ＲＢ及びリブ２２ｂが形成されている。上フレーム２０にも、上フレーム２０と下フレーム２２とを重ね合わせて組み立てた場合、上述した下フレーム２２のリブ部ＲＢ、リブ２２ｂと対向する位置に図示しないリブが形成されている。そして、液晶モジュール２１の外枠の領域２１ａの部分が点線で示される対向するリブ同士により、組立方向、すなわち底面２２Ｐに垂直方向において固定される。

【００６３】

取り付け方は、下フレーム２２のリブ部ＲＢ、リブ２２ｂと、上フレーム２０の対向するリブとが、図中の破線で示される方向に液晶モジュール２１の領域２１ａを挟むように、上フレーム２０と下フレーム２２とを重ね合わせる。そして、実線で対応するアゴ部２０ａとボス部２２ａとを、図１５に示すように少しずらした状態でＹ方向から重ね合わせ、Ｘ方向にずらしてアゴ部２０ａをボス２２ａへ引っかけて下フレーム２２に上フレーム２０を固定する。図１５は、蓋１０

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２の組立工程を説明する概念図である。

【００６４】

また、液晶モジュール２１が上フレーム２０と下フレーム２２との間で充分固定されるために、図１６に示すように上フレーム２０及び下フレーム２２の内側面に液晶モジュール２１の固定用のリブ部ＲＢを形成する。図１６は、図１４におけるＪ－Ｊ’におけるリブ部ＲＢの線視断面図である。

【００６５】

さらに、上フレーム２０のリブ部ＲＢ、リブ２２ｂと液晶モジュール２１との間、または下フレーム２２のリブ部ＲＢ、リブ２２ｂと液晶モジュール２１との間、あるいは双方のリブ部ＲＢと液晶モジュール２１との間にクッション材や接着材を設けることで、さらに液晶モジュール２１の位置の変化を防止できる。

【００６６】

本実施形態は、上述してきた固定方法により、上フレーム２０と下フレーム２２とに、それぞれ液晶モジュール２１を固定するリブ及びリブ部を形成しても、蓋１０２の底面２２Ｐの平行な方向への影響が無く、蓋１０２全体の面積は大きくならず、蓋１０２の面積に対する液晶モジュール２１の比率を大きくすることが出来る。

【００６７】

また、本実施形態は、上述してきた固定方法により、上フレーム２０と下フレーム２２とリブとにより液晶モジュール２１を底面２２Ｐに対して垂直方向に固定するので、液晶モジュール２１に対して、ネジ穴を設けるなどの工程上の負荷を掛けないで済む効果がある。

【００６８】

さらに、本実施形態は、液晶モジュール２１の回路部に影響を与えない空きスペースにおいて、ネジ止めを底面２１Ｐに対して垂直に行うため、蓋１０２の厚さを液晶モジュール２１の厚さを基準に設計できる。

加えて、本実施形態は、液晶モジュール２１を横からのネジ止めによる固定を行わず、液晶モジュール２１内のドライバＩＣ９ｂの実装されたプリント基板９へのフレキシブル基板を自由に配線することが可能なため、ドライバＩＣ９ｂの

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信号線の自由度を向上することが出来る。

【００６９】

＜第四の実施形態＞

図１７は、本発明の第四の実施形態によるパーソナルコンピュータの蓋１０３を構成する組立部品の組立状態を示す概念図である。この図において、３１は液晶モジュールであり、３２は下フレームである。前記パーソナルコンピュータの蓋１０３は、液晶モジュール３１を図示しない上フレームと下フレーム３２とで挟んだ構成となっている。

また、液晶モジュール３１は、第一の実施形態の液晶モジュール１の構成と同様のため、液晶モジュール３１の構成の説明は、これを省略する。

【００７０】

下フレーム３２の底面３２Ｐの周辺部には、底面３２Ｐに垂直な方向にリブ３２ａ及びリブ部ＲＢが形成されている。また、下フレーム３２には、蓋１０３と図示しないパーソナルコンピュータとを接続するためのヒンジ部の設けられる領域３２ｆにネジ部３２ｃが底面３２Ｐに垂直方向に突出して形成される。同様に、ネジ部３２ｂは、底面３２Ｐに、底面３２Ｐに垂直に突出して形成される。

【００７１】

さらに、下フレーム３２の角部Ｒ２及び角部Ｒ３にはリブ部ＲＢが形成される。このリブ部ＲＢは、図１８に示すようにアライメントも兼ねて形成されている。また、図示しない上フレームの内面には、例えば液晶モジュール３１と下フレーム３２との取り付け方向の、下フレーム３２のリブ３２ａに対向する位置にリブが形成されている。

【００７２】

図１８（ａ）は、領域Ｒ２のリブ部ＲＢであり、図１８（Ｂ）は領域Ｒ３のリブ部ＲＢである。上部から見るとリブ部ＲＢには、十字状の突起部Ｔが底面３２Ｐに垂直に突出して形成されている。図１９は、図１６におけるＫ－Ｋ’の線視断面図を示している。図に示す様に、液晶モジュール３１は、上フレーム３０のリブ部ＲＢと下フレーム３２のリブ部ＲＢとに挟まれて固定されている。また、下フレーム３２のリブ部ＲＢの突起部Ｔは、液晶モジュール３１の枠部分の凹部

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に挿入されて位置決めが行われる。

【００７３】

取り付け方は、図１７において、取り付け方向を示す破線に従い、上フレーム３０（図１９）と下フレーム３２とを重ね合わせ、下フレーム３２のリブ３２ａ及びリブ部ＲＢと、上フレーム３０の内面における下フレーム３２のリブ３２ａ及びリブ部ＲＢに対向するリブとにより、液晶モジュール３１の領域３１ａを底面３２Ｐに対して垂直方向に挟み込んで組み立てる。

【００７４】

ここで、上フレーム３０（図１９）には、上フレーム３０と下フレーム３２とを重ね合わせた場合、下フレーム３２のネジ部３２ｃ及びネジ部３２ｂと重なる部分に取り付け方向に向かいネジ部を設ける。これにより、上フレーム３０と下フレーム３２とは、底面３２Ｐに垂直にネジ３により締めて固定することが出来る。また、液晶モジュール３１は、上フレーム３０のリブと、下フレーム３２のリブ部ＲＢ及びリブ３２ａとの間で固定される。

【００７５】

また、上フレーム３０の図示しないリブと液晶モジュール３１との間、または下フレーム３２のリブ部ＲＢ及びリブ３２ａと液晶モジュール３１との間、あるいは双方のリブ部ＲＢと液晶モジュール３１との間にクッション材や接着材を設けることで、さらに液晶モジュール３１の蓋１０３内におけるガタツキを防止できる。

【００７６】

上述してきた固定方法により、上フレーム３０と下フレーム３２とに、それぞれ液晶モジュール３１を固定するリブ及びリブ部を形成しても、蓋１０３の底面３２Ｐの平行な方向への影響が無く、蓋１０３全体の面積は大きくならず、蓋１０３の面積に対する液晶モジュール３１の比率を大きくすることが出来る。また、上述してきた固定方法は、リブ部ＲＢにより液晶モジュール３１を固定するので、液晶モジュール３１に対して、ネジ穴を設ける等の負荷を掛けないで済む効果がある。

【００７７】

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さらに、本実施形態は、液晶モジュール３１の回路部に影響を与えない空きスペースにおいて、ネジ止めを底面３１Ｐに対して垂直に行うため、蓋１０３の厚さを液晶モジュール３１の厚さを基準に設計できるので、蓋１０３の厚さにネジ３のサイズによる影響がない。

加えて、本実施形態は、液晶モジュール３１を横からのネジ止めによる固定を行わないため、液晶モジュール３１内のドライバＩＣ９ｂの実装されたプリント基板９へのフレキシブル基板を自由に配線することが可能なため、ドライバＩＣ９ｂの信号線の自由度を向上することが出来る。

【００７８】

また、第一の実施形態から第四の実施形態まで、ネジ止めなどの液晶モジュールの脱着工程が、液晶モジュールの表示部に垂直方向から行えるため、組立行程における液晶モジュールの取り付け等の脱着処理が簡易に行え、組立の能率を向上させることが可能となる。

さらに、第一の実施形態から第四の実施形態まで、上フレーム及び下フレームに対して、板金等の補強部材を取り付けることにより、液晶モジュールのたわみやゆがみに対する強度を向上させることが出来る。

【００７９】

以上、本発明の第一の実施形態から第四の実施形態までを図面を参照して詳述してきたが、具体的な構成はこの実施形態に限られるものではなく、本発明の要旨を逸脱しない範囲の設計変更等があっても本発明に含まれる。

また、本発明は、第一の実施形態から第四の実施形態までパーソナルコンピュータで説明してきたが、表示部に液晶モジュールを使用する他の携帯用端末装置にも応用できる。

【００８０】

【発明の効果】

本実施形態は、液晶モジュールと蓋体とが、前記底板から垂直方向に連結部材により固定されるため、蓋体の横方向への影響が無く、液晶モジュールを底板に固定するための連結部を構成しても、蓋体全体の面積は大きくならず、蓋体の面積に対する液晶モジュールの表示面の比率を大きくすることが可能である。

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また、本実施形態は、液晶モジュールと蓋体とが、前記底板から垂直方向に連結部材により固定されるため、液晶モジュールの底板からの脱着が、連結部の処理を含めて底板に対して垂直に行うことが出来、液晶モジュールと蓋体との連結の工程が簡易に行え、パーソナルコンピュータの組立の処理効率が向上する。

【００８１】

さらに、本実施形態は、液晶モジュールと蓋体とが、前記底板から垂直方向に連結部材により固定されるため、液晶モジュールの回路部に影響を与えない空きスペースにおいて連結部を構成できるので、連結部を含めた蓋体の厚さを液晶モジュールの厚さを基準に設計できる。

加えて、本実施形態は、液晶モジュールと蓋体とが、前記底板から垂直方向に連結部材により固定され、液晶モジュールを横からの連結処理による固定を行わないため、ドライバＩＣの実装されたプリント基板へのフレキシブル基板配線を自由に引き回すが可能であり、ドライバＩＣの信号線の自由度を向上させることが出来る。

【図面の簡単な説明】

【図１】　本発明の第一の実施形態によるパーソナルコンピュータの蓋１００を構成する組立部品の組立状態を示す概念図である。

【図２】　図１に示す蓋１００に組み込まれる液晶モジュール１の構成を示す概念図である。

【図３】　図１に示す蓋１００の下フレーム２に形成される固定部２ｂの形状の一例を示す概念図である。

【図４】　図１に示す蓋１００の下フレーム２に形成される固定部２ｂの形状の一例を示す概念図である。

【図５】　図１に示す液晶モジュール１及び下フレーム２のＡ－Ａ’における線視断面図である。

【図６】　図１に示す蓋１００の下フレーム２に形成される固定部２ｂの形状の他の形状を示す断面図である。

【図７】　図２に示す液晶モジュール１のＢ－Ｂ’における線視断面図である。

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【図８】　図２に示す液晶モジュール１のＣ－Ｃ’における線視断面図である。

【図９】　本発明の第二の実施形態によるパーソナルコンピュータの蓋１０１を構成する組立部品の他の組立状態を示す概念図である。

【図１０】　本発明の第二の実施形態によるパーソナルコンピュータの蓋１０１を構成する組立部品の他の組立状態を示す概念図である。

【図１１】　本発明の第二の実施形態によるパーソナルコンピュータの蓋１０１を構成する組立部品の他の組立状態を示す概念図である。

【図１２】　本発明の第二の実施形態によるパーソナルコンピュータの蓋１０１を構成する組立部品の他の組立状態を示す概念図である。

【図１３】　図１２における組み立てられたネジ部１２ＧのＰ－Ｐ’での線視断面図である。

【図１４】　本発明の第三の実施形態によるパーソナルコンピュータの蓋１０２を構成する組立部品の他の組立状態を示す概念図である。

【図１５】　図１４に示す蓋１０２の組立工程を説明する概念図である。

【図１６】　図１４における組み立てられたリブ部ＲＢのＪ－Ｊ’での線視断面図である。

【図１７】　本発明の第四の実施形態によるパーソナルコンピュータの蓋１０３を構成する組立部品の他の組立状態を示す概念図である。

【図１８】　リブ部ＲＢの構成を示す下フレームの角部の領域の射示図である。

【図１９】　図１７における組み立てられたリブ部ＲＢのＫ－Ｋ’での線視断面図である。

【図２０】　従来例によるパーソナルコンピュータの蓋１０３を構成する組立部品の他の組立状態を示す概念図である。

【図２１】　従来のサイドマウント形式によるパーソナルコンピュータの蓋１０２を構成する組立部品の他の組立状態を示す概念図である。

【図２２】　従来のサイドマウント形式におけるネジ形成部の構造を示す断面図である。

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【図２３】　従来のサイドマウント形式におけるネジ形成部の構造を示す断面図である。

【符号の説明】

１０、２０、３０　上フレーム

１、１１、２１、３１　液晶モジュール

２、１２、２２、３２　下フレーム

３　ネジ

５　表枠体

６　ＬＣＤパネル

７　Ｂ／Ｌユニット

８　裏枠体

９　プリント基板

９ｂ　ドライバＩＣ

１００、１０１、１０２、１０３　蓋

ＲＢ　リブ部

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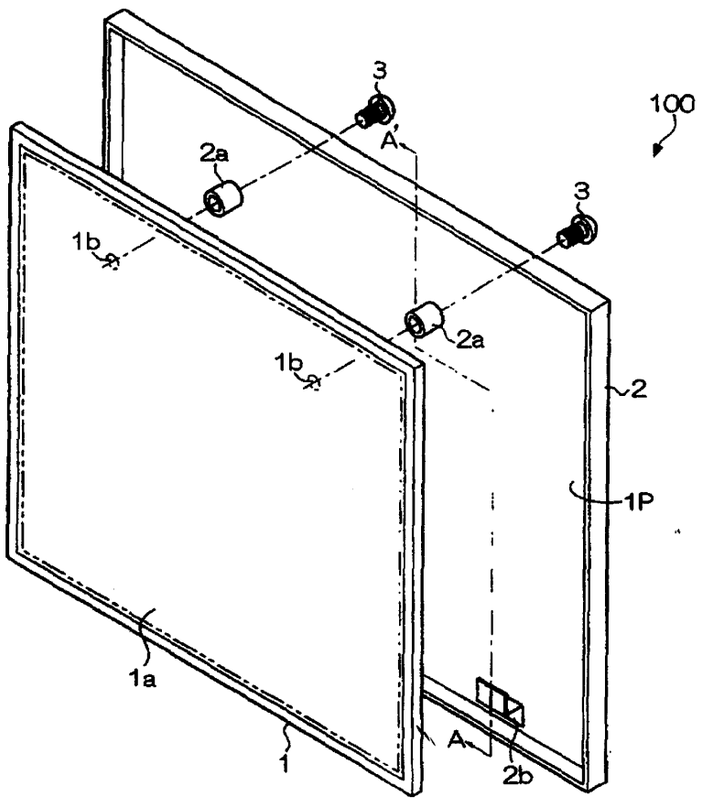
【書類名】　　図面

【図１】



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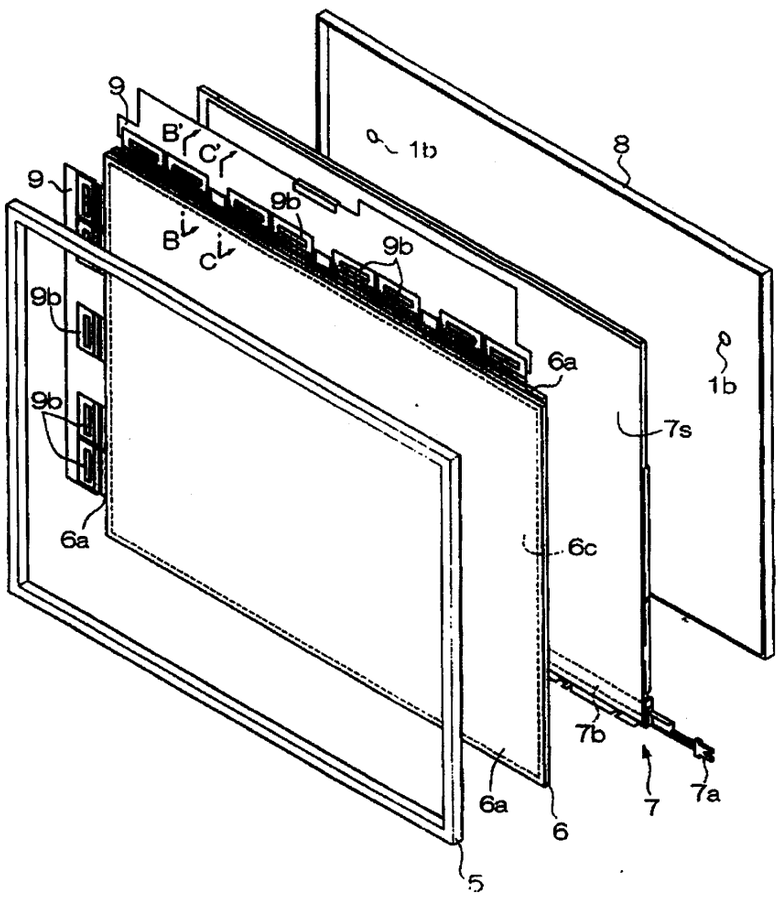
【図２】



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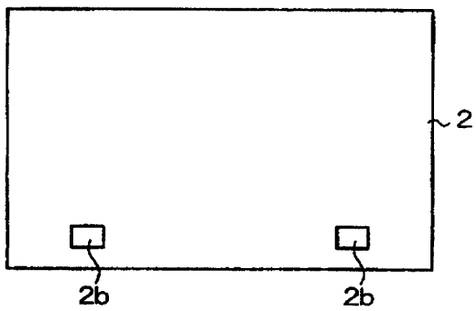
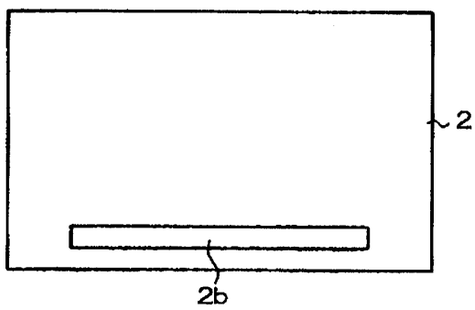
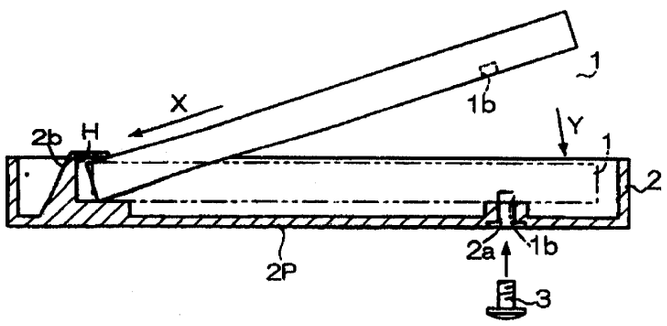
【図３】



【図４】



【図５】



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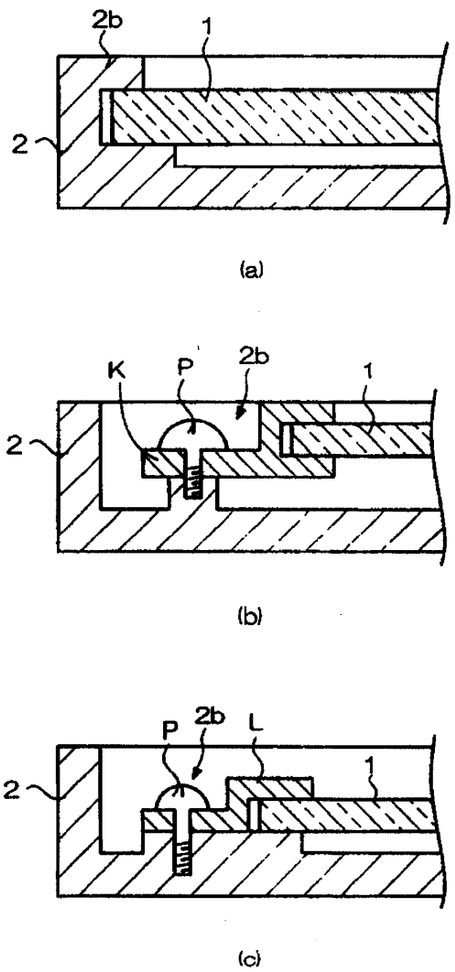
【図６】



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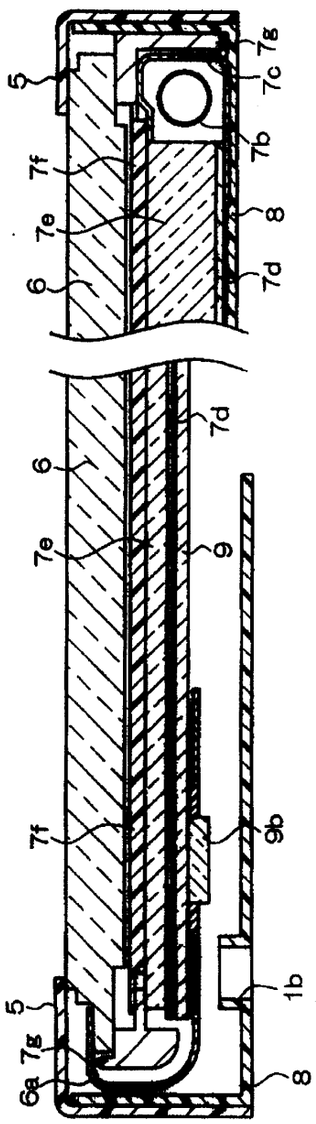
【図７】



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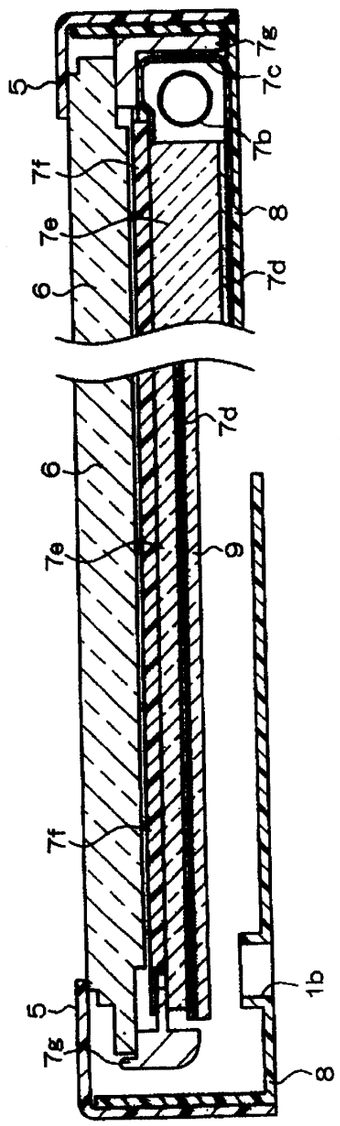
【図８】



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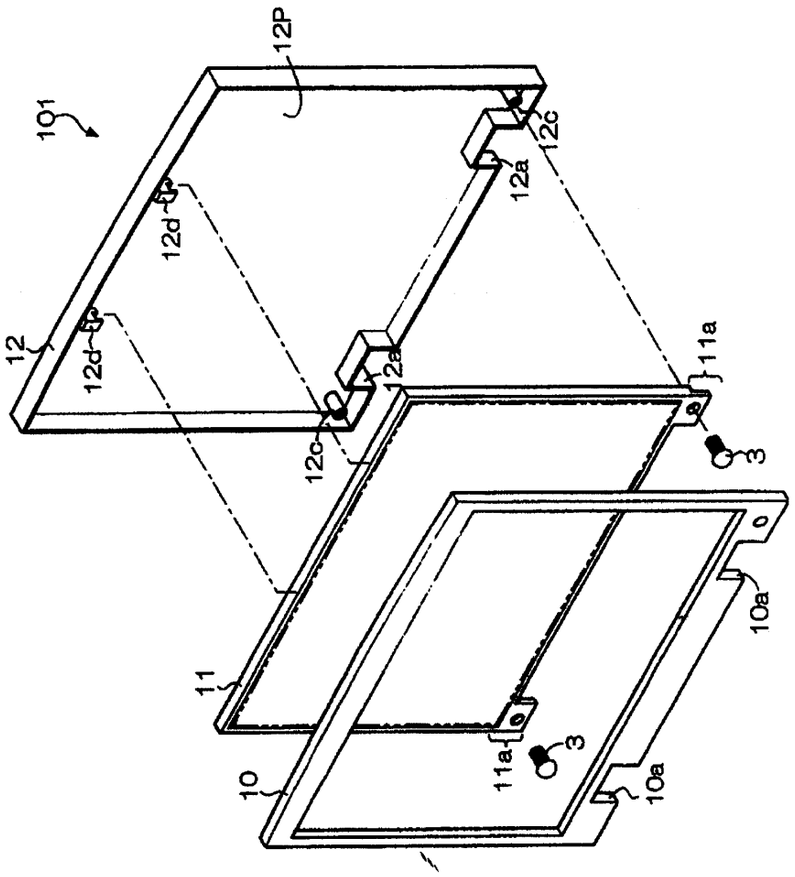
【図９】



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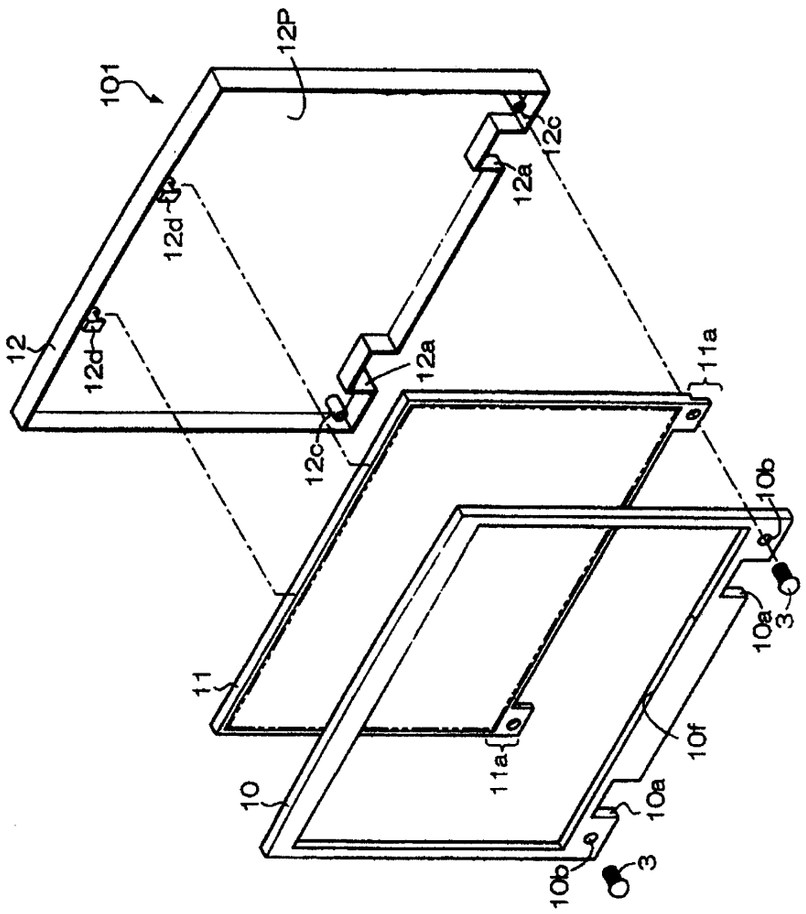
【図１０】



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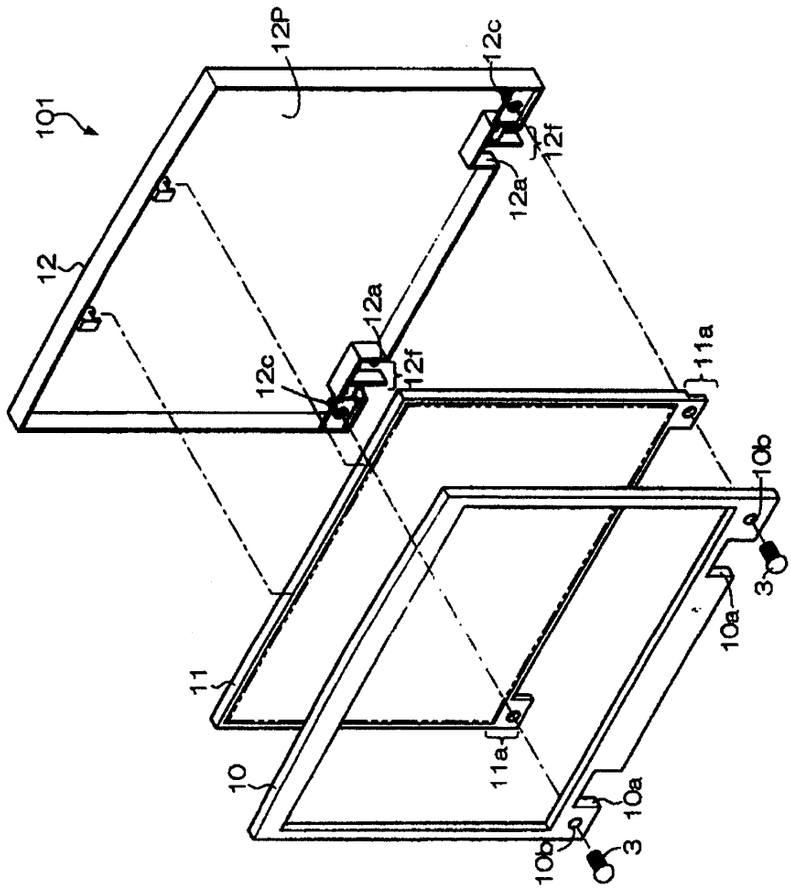
【図１１】



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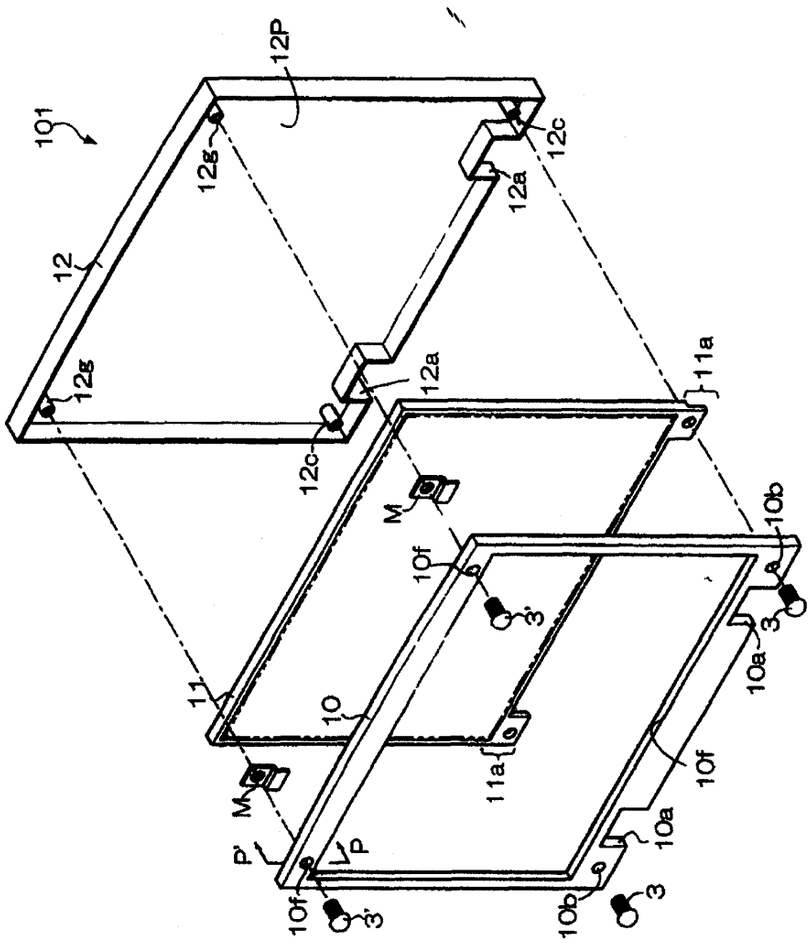
【図１２】



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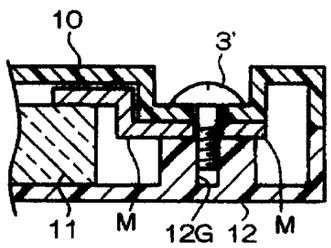
【図１３】



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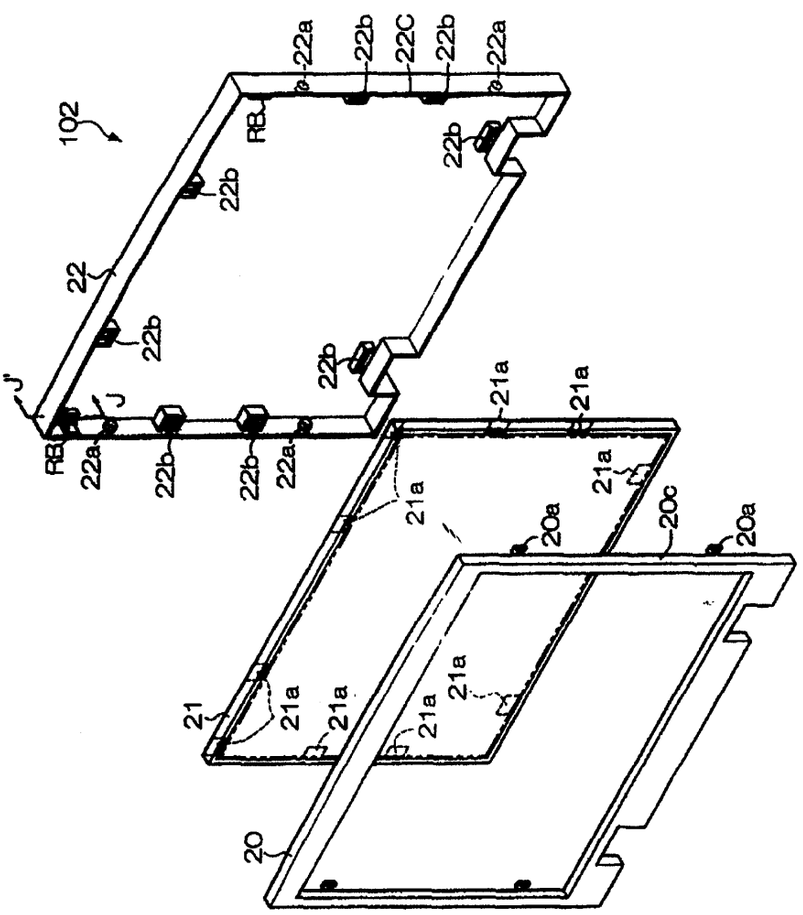
【図１４】



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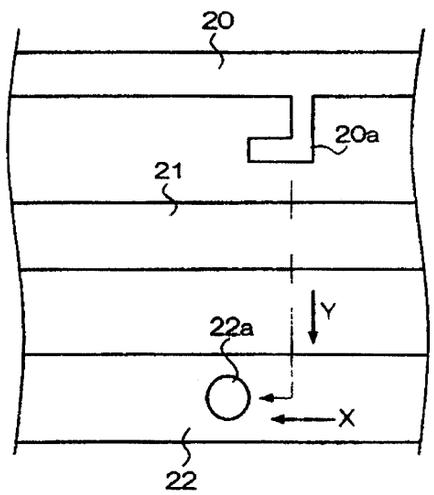
【図１５】



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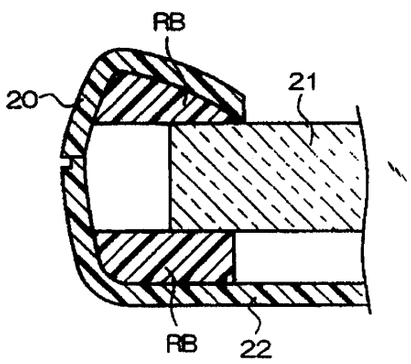

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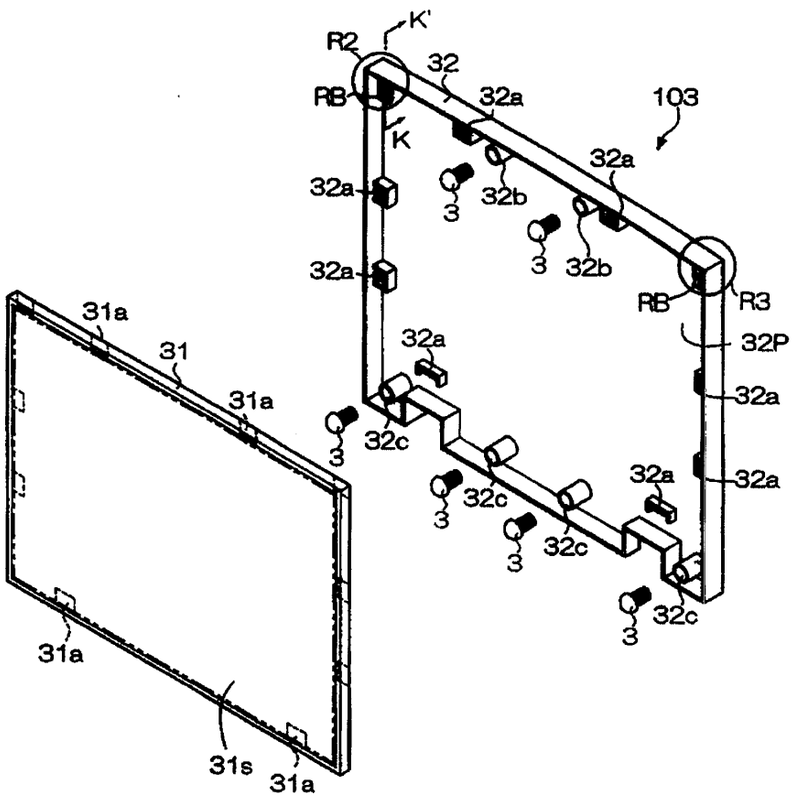
【図１７】



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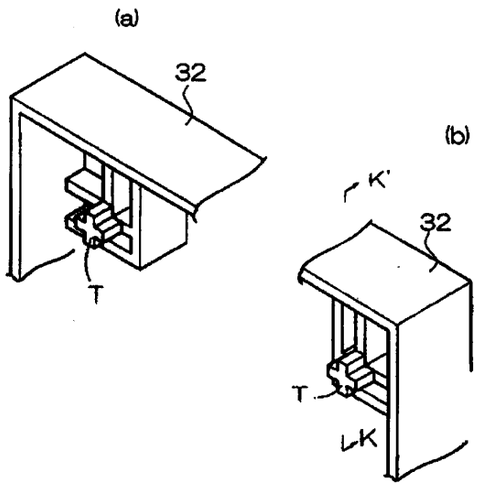
【図１８】



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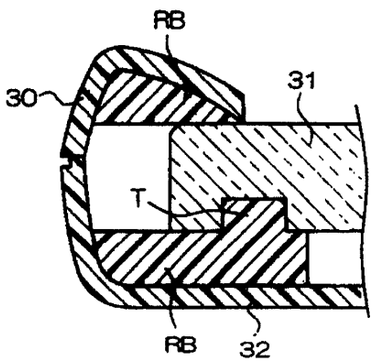

出証特平１１－３０６３０８２

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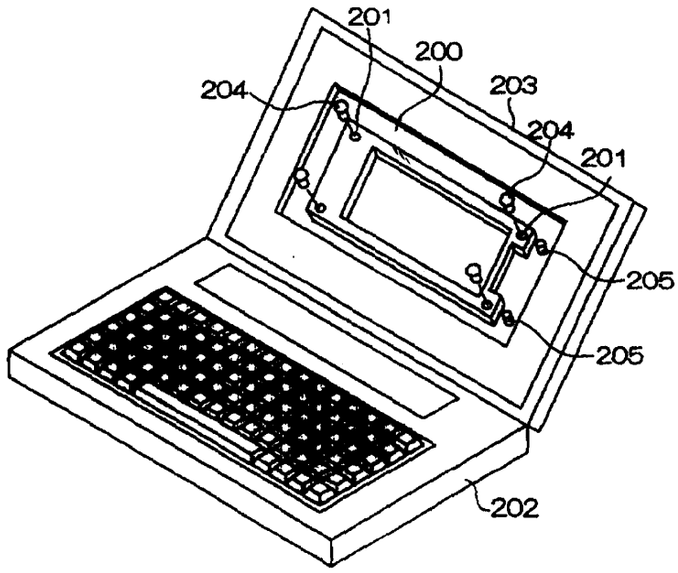
【図２０】



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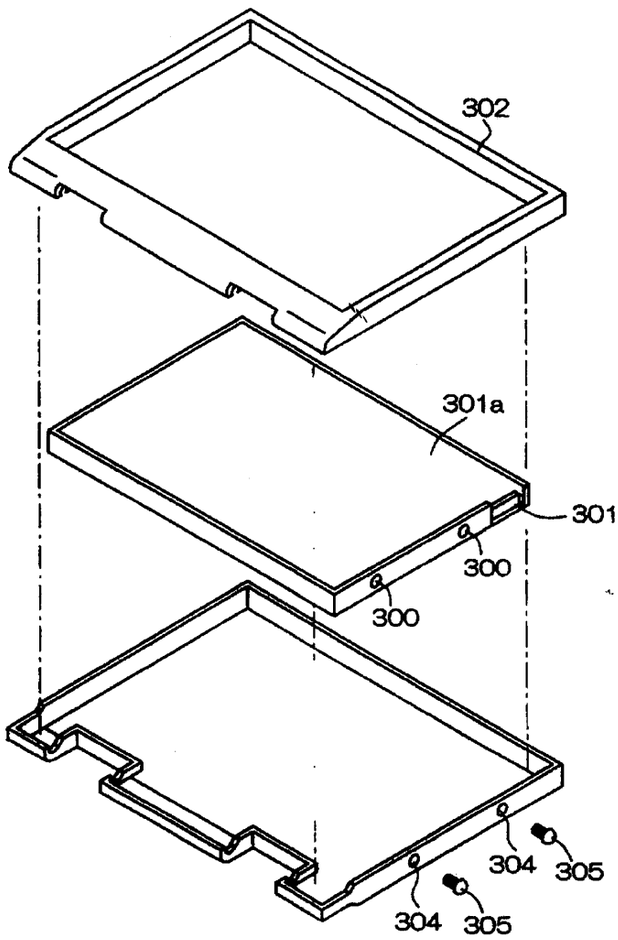
【図２１】



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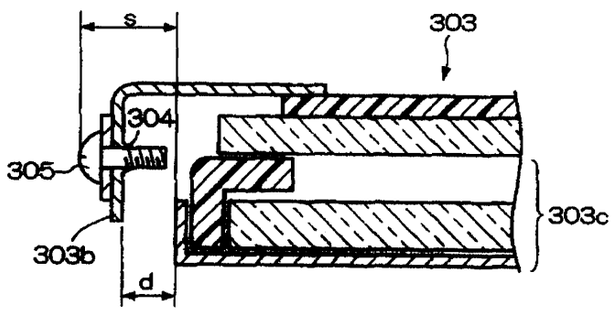
【図２２】



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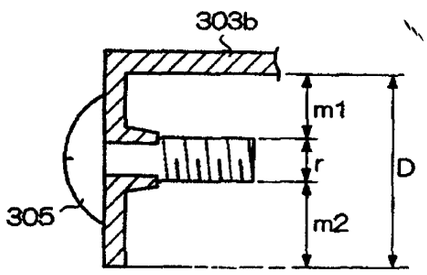

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【書類名】　　要約書

【要約】

【課題】　実装した場合の厚さを薄し、信頼性を向上させ、かつ携帯用端末装置の蓋の表面積に対する表示面積の比率を向上させ、加えて携帯用端末装置からの実装及び脱着処理を容易とする液晶モジュール及び携帯用端末装置を提供する。

【解決手段】　１は液晶モジュールであり、２はパーソナルコンピュータの蓋１００の下フレームである。液晶モジュール１は、下フレーム２に表示面１ａを正面に向け、裏面のねじ穴１ｂを下フレーム２のボス２ａを介してねじ３により下フレーム２へ固定されている。下フレーム２には、液晶モジュール１を固定する固定部２ｂが形成されている。この固定部２ｂの形状は、液晶モジュール１を固定出来ればどの様な形状でもかまわない。

【選択図】　　図１

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【書類名】　職権訂正データ
【訂正書類】　特許願

＜認定情報・付加情報＞
【特許出願人】
【識別番号】　000004237
【住所又は居所】　東京都港区芝五丁目７番１号
【氏名又は名称】　日本電気株式会社
【代理人】　申請人
【識別番号】　100108578
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　高橋　詔男
【選任した代理人】
【識別番号】　100064908
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　志賀　正武
【選任した代理人】
【識別番号】　100101465
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　青山　正和
【選任した代理人】
【識別番号】　100108394
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　今村　健一
【選任した代理人】
【識別番号】　100108453
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　村山　靖彦
【選任した代理人】
【識別番号】　100100077
【住所又は居所】　東京都新宿区高田馬場３丁目２３番３号　ＯＲビル　志賀国際特許事務所
【氏名又は名称】　大場　充

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出 願 人 履 歴 情 報

識別番号　　〔０００００４２３７〕

１．変更年月日　　１９９０年　８月２９日
［変更理由］　新規登録
住　所　　東京都港区芝五丁目７番１号
氏　名　　日本電気株式会社

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PF-2503/NEC/US/mh

2-1-00 #3 IDS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

RECEIVED
MAR 06 2000
Group 2700

OIPE JC67
MAR 03 2000
PATENT & TRADEMARK OFFICE

RECEIVED
MAR 06 2000
Group 2700

In re patent application of

Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2835

Filing Date: December 13, 1999 Examiner: Unknown Vigushin

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following documents cited in the Japanese Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. Copies of the listed documents are provided herewith for the convenience of the Examiner.

In compliance with the requirements of 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1.56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the references were cited. The relevance to the pending U.S. patent application is that the references were cited in a foreign patent application on the same subject matter. However, no independent analysis of the references, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the references are relevant or material to the claims. They are only cited as constituting related art of which the applicant is aware.

I hereby certify that each item of information contained in this Information Disclosure Statement was cited in a communication received from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.

P7-2503/NEC/US/mh

It is respectfully requested that the listed references be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

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MAR 06 2000
Group 2700

Respectfully submitted,

Sean M. McGinn
Registration No. 34,386

Date: 3/3/00

McGinn & Gibb, P.C.
Intellectual Property Law
1701 Clarendon Boulevard, Suite 100
Arlington, Virginia 22209
(703) 294-6699
Customer No. 21254

INFORMATION DISCLOSURE CITATION *(Use several sheets if necessary)*	Docket Number (Optional) PF-2503/NEC/US/m	Application Number 09/459,280
	Applicant(s) Yano et al.	
	Filing Date December 13, 1999	Group Art Unit 2772

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Group 2700

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PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
TL		4-359221	12/11/92	JAPAN				✓
		5-150225	6/18/93	JAPAN				✓
		5-53099	3/5/93	JAPAN				✓
		8-179288	7/12/96	JAPAN				✓
TL		8-179699	7/12/96	JAPAN				✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		Japanese Office Action dated December 14, 1999 with partial translation

EXAMINER	DATE CONSIDERED
T. LE	5/9/01

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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INFORMATION DISCLOSURE CITATION *(Use several sheets if necessary)*	ATTY DOCKET NO. PF-2503/NEC/US/ml	SERIAL NO. 09/459,280
	APPLICANT(S) Yano et al.	
	FILING DATE December 13, 1999	GROUP 2772

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

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Group 2700

OIPE JC67 MAR 03 2000 PATENT & TRADEMARK OFFICE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		8-314389	11/29/96	JAPAN				✓
		9-113880	5/2/97	JAPAN				✓
		9-146466	6/6/97	JAPAN				✓
		9-292934	11/11/97	JAPAN				✓
TL		10-268272	10/9/98	JAPAN				✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

EXAMINER	DATE CONSIDERED
T. LE	5/9/01

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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INFORMATION DISCLOSURE CITATION *(Use several sheets if necessary)*	ATTY DOCKET NO. PF-2503/NEC/US/m	SERIAL NO 09/459,280
	APPLICANT(S) Yano et al.	
	FILING DATE December 13, 1999	GROUP 2772

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

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Group 2700

OIPE JC67
MAR 03 2000
PATENT & TRADEMARK OFFICE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		11-85319	3/30/99	JAPAN				✓
TL		3051488	6/10/98	JAPAN				✓
TL		63-11620	1/26/88	JAPAN				✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

EXAMINER	DATE CONSIDERED
T. LE 5/9/01	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Other Prior Art

According to the information contained in form PTO-1449 or PTO-892, there are one or more other prior art/non-patent literature documents missing from the original file history record obtained from the United States Patent and Trademark Office. Upon your request we will attempt to obtain these documents from alternative resources. Please note that additional charges will apply for this service.

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

Transaction History Date 2001-03-
Date information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov

BEST COPY

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/459,280	12/13/99	YAHO	1 PI 2503/PLC/

EXAMINER	
ART UNIT	PAPER NUMBER
	2839

DATE MAILED: 03/27/01

MMC2 0327

MCGINN & GIBB P C
LIMITED LIABILITY COMPANY
INTELLECTUAL PROPERTY LAW
1701 CLARENDON BOULEVARD SUITE 100
ARLINGTON VA 22209

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)
*U.S. GPO: 2000-473-000/44602

1- File Copy

Office Action Summary	Application No.	Applicant(s)	
	09/459,280	YANO ET AL.	
	Examiner	Art Unit	
	Thanh-Tam Le	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *12/13/99* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claims *1-31* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s) _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

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Hisense v. Vista Peak - IPR2023-00725
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DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species of the claimed invention:

The species are as follows:

Group I, Figures 5-12.

Group II, Figures 13-17.

Group III, Figures 18-20.

Group IV, Figures 21-23.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, none claim is generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1,48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(l).

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam Le (Tammy) whose telephone number is (703) 306-5711. The examiner can normally be reached on Monday to Friday from 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached on (703) 308-3119. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Thanh-Tam Le
Examiner, AU 2839
3/19/01

BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

OIPE
APR 2 6 2001
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Yano et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filed: December 13, 1999 Examiner: Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

RECEIVED

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

RESPONSE TO FIRST OFFICE ACTION AND ELECTION OF SPECIES REQUIREMENT

Sir:

In response to the Office Action dated March 27, 2001, please consider the following:

REMARKS

In response to the Examiner's Election of Species requirement, Applicant hereby elects the invention of Species I of Figs. 5-12, on which the at least claims 1-3, 11 and 30-31 are readable, without traverse. Applicant reserves the opportunity to file a Divisional Application for the non-elected species later.

Early, favorable prosecution on the merits is respectfully requested.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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A conditional petition is made for any extension of time which may become necessary. The Commissioner is authorized to charge any fees for such extension and to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Sean M. McGinn
Reg. No. 34,386

Date: April 26, 2001
McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182-3817
(703) 761-4100
Customer No. 21254

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/459,280	12/13/99	YANO T	PF-2503/NEC/

EXAMINER	
LE,T	
ART UNIT	PAPER NUMBER
2839	

DATE MAILED: 05/23/01

MMC2/0523
MCGINN & GIBB P C
LIMITED LIABILITY COMPANY
INTELLECTUAL PROPERTY LAW
1701 CLARENDON BOULEVARD SUITE 100
ARLINGTON VA 22209

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev.11/00)

1- File Copy

Office Action Summary	Application No.	Applicant(s)	
	09/459,280	YANO ET AL.	
	Examiner	Art Unit	
	Thanh-Tam T Le	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1 704(b).

Status

1)☒ Responsive to communication(s) filed on 5/1/01 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) 4-10 and 12-29 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) 1-3,11,30 and 31 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

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DETAILED ACTION

Election/Restrictions

1. In response to the Election Species requirement paper No. 5, applicant elects the invention of Species I of Figs. 5-12, claims 1-3, 11 and 30-31.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichikawa et al. (5,486,942).

Ichikawa et al., figure 3, disclose a mounting structure for mounting a liquid crystal module (600) having a display area (60). The mounting structure comprising at least a frame member (61) having a plurality of connecting members (61a-1) for connecting the frame member to the liquid crystal module substantially in parallel to each other. Wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

Regarding claim 2, Ichikawa et al., figure 3, disclose wherein the plurality of connecting members are in contact with dead spaces of the liquid crystal module.

Regarding claim 3, Ichikawa et al., figure 3, disclose wherein the connecting members comprising plural sets of a screw (64), a boss (61a-1) formed on the frame member, and a screw hole (63f) formed on the liquid crystal module at its position corresponding to the boss.

Regarding claim 11, Ichikawa et al., figure 3, disclose wherein the liquid crystal module is sandwiched between first and second frame members (61 and 65) which are also fixed to each other via the plurality of connecting members.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al. (5,486,942) in view of applicant's submitted prior art.

Ichikawa et al. disclose the instant claimed invention except for a cover and a body.

Applicant's submitted prior art, figure 1, discloses a cover (203) and a body (202). It would have been obvious to one of ordinary skill in the art at the time the invention was made have the cover and the body as suggested by Applicant's submitted prior art, in order to protect the liquid crystal module.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bang discloses an apparatus for reducing impacts on a hard disk assembly, Simon et al. disclose an instrument cluster, Yeager et al. disclose an adapter for various LCD sizes in a computer, Min discloses a method and apparatus of coupling liquid crystal panel for liquid crystal display, Seto et al. disclose an electronic apparatus, Yamamoto et al. disclose a back light assembly for flat panel display and Kim discloses a structure for protecting electronic systems from impact and portable computer with such a structure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam Le (Tammy) whose telephone number is (703) 306-5711. The examiner can normally be reached on Monday to Friday from 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached on (703) 308-3119. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Thanh-Tam Le
Examiner, AU 2839
5/9/01

Notice of References Cited	Application/Control No. 09/459,280	Applicant(s)/Patent Under Reexamination YANO ET AL.	
	Examiner Thanh-Tam T Le	Art Unit 2839	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
	A	US-5,486,942-	01-1996	Ichikawa et al.	359	83
	B	US-5,535,092-	07-1996	Bang	361	685
	C	US-5,959,844-	09-1999	Simon et al.	361	759
	D	US-6,002,582-	12-1999	Yeager et al.	361	681
	E	US-6,094,340-	07-2000	Min	361	681
	F	US-6,101,089-	08-2000	Seto et al.	361	687
	G	US-6,130,658-	10-2000	Yamamoto et al.	345	102
	H	US-6,151,207-	11-2000	Kim	361	681
	I	US- -				
	J	US- -				
	K	US- -				
	L	US- -				
	M	US- -				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification	
	N	- -					
	O	- -					
	P	- -					
	Q	- -					
	R	- -					
	S	- -					
	T	- -					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action (See MPEP § 707 05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

7/IDS Theresa 8-21-01

In re patent application of

Yano et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, T.

For: LIQUID CRYSTAL DISPLAY MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following documents cited in the Japanese Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. Copies of the listed documents are provided herewith for the convenience of the Examiner.

In compliance with the requirements of 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1.56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the references were cited. The relevance to the pending U.S. patent application is that the references were cited in a foreign patent application on the same subject matter. However, no independent analysis of the references, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the references are relevant or material to the claims. They are only cited as constituting related art of which the applicant is aware.

I hereby certify that each item of information contained in this Information Disclosure Statement was the first citation of that item by a foreign patent office in a counterpart foreign application, which occurred not more than three months prior to the filing of this statement.

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It is respectfully requested that the listed references be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

Respectfully submitted,

Matthew G. Dyor
Registration No. 45,278

Date: 8/13/01

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

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INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

ATTY DOCKET NO:	SERIAL NO
PF-2503/NE(/mh	09/459,280
Yano et al.	
FILING: December 13, 1999	GROUP: 2839

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

OIPE JC#52
AUG 1 3 2001
PATENT & TRADEMARK OFFICE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		9-113880	05/02/97	Japan	—	—		✓
		5-150224	06/18/93	Japan	—	—		✓
		8-211964	08/20/96	Japan	—	—		✓
		4-55619	05/13/92	Japan	—	—		✓
TL		9-146466	06/06/97	Japan				✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

EXAMINER	DATE CONSIDERED
T. LE	10/01

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

TC2

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Hisense v. Vista Peak - IPR2023-00725
Page 269 of 438

INFORMATION DISCLOSURE CITATION *(Use several sheets if necessary)*	ATTY DOCKET NO. PF-2503/NEC ./mh	SERIAL NO. 09/459,280
	APPLICANT(S) Yano et al.	
	FILING DATE December 13, 1999	GROUP 2839

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

OIPE JC1522 AUG 13 2001 PATENT & TRADEMARK OFFICE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		4-331976	11/19/92	Japan	—	—		✓
TL		8-114788	05/07/96	Japan	—	—		✓
TL		4-51595	02/20/92	Japan	—	—		✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

			Japanese Office Action dated June 12, 2001, with partial translation.

EXAMINER	DATE CONSIDERED
T. LE	3/21/02

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609, Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Other Prior Art

According to the information contained in form PTO-1449 or PTO-892, there are one or more other prior art/non-patent literature documents missing from the original file history record obtained from the United States Patent and Trademark Office. Upon your request we will attempt to obtain these documents from alternative resources. Please note that additional charges will apply for this service.

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

OIPE JC174
AUG 2 3 2001
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Shaw
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Takakazu Yano et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filed: December 13, 1999 Examiner: T. Le

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

AMENDMENT UNDER 37 C.F.R. §1.111

Sir:

In response to the Office Action dated May 23, 2001, please amend the above-identified application as follows:

IN THE CLAIMS:

Please cancel claims 4-10 and 12-29 without prejudice or disclaimer.

Please amend the following claims:

1. (Amended) A mounting structure for mounting a liquid crystal module having a display area, said mounting structure comprising:

at least a frame member having a plurality of frame-to-liquid-crystal-module connecting members for connecting said frame member to said liquid crystal module substantially in parallel to each other,

wherein each of said frame-to-liquid-crystal-module connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member.

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Please add the following new claim:

--32. A mounting structure for mounting a liquid crystal display (LCD) module having a display area comprising:

a frame member;

a plurality of frame-to-LCD connecting members removably attached to said frame member,

wherein each of said frame-to-LCD connecting members extends between said LCD module and said frame member in a direction vertical to a surface of said frame member.

33. The mounting structure as claimed in claim 1, wherein each of said frame-to-liquid-crystal-module connecting members is positioned inside peripheral sides of said liquid crystal module in a plan view with reference to a surface of said liquid crystal module.

34. A mounting structure for mounting a liquid crystal display (LCD) module having a display area comprising:

a frame member;

a plurality of frame-to-LCD connecting members removably attached to said frame member;

wherein each of said frame-to-LCD connecting members extends between said LCD module and said frame member in a direction vertical to a surface of said frame member, and each of said frame-to-LCD connecting members is positioned inside peripheral sides of said liquid crystal module in a plan view with reference to a surface of said liquid crystal module.--

REMARKS

Claims 1-3, 11, and 30-34 are all claims presently pending in the application. New claim 32 has been added to more completely define the invention. Claims 1-3 and 11 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Ichikawa et al. (U.S. Pat. 5,486,942). Claims 30 and 31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ichikawa et al. (U.S. Pat. 5,486,942) in view of Applicant's submitted prior art.

These rejections are respectfully traversed in view of the following discussion.

Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current amendment. The attached page is captioned "**VERSIONS WITH MARKINGS TO SHOW CHANGES MADE**".

It is noted that the amendments are made only to more particularly point out the invention for the Examiner and not distinguishing the invention over the prior art, for narrowing the scope of the claims, or for any reason related to a statutory requirement for patentability.

I. THE CLAIMED INVENTION

The present invention is directed to a mounting structure for mounting a liquid crystal module having a display area. The mounting structure includes a frame member having a number of connecting members which connect the frame member to the liquid crystal module substantially in parallel to each other. Each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member. In one embodiment, the connecting members are in contact with dead spaces of the liquid crystal display.

This configuration provides a large display area of the liquid crystal module in relation to the size of the cover.

II. THE PRIOR ART REJECTIONS

A. The 35 U.S.C. § 102 Rejection of Ichikawa

The Examiner asserts:

" Ichikawa et al., figure 3, disclose a mounting structure for mounting a liquid crystal module (600) having a display area (60). The mounting structure comprising at least a frame member (61) having a plurality of connecting members (61a-1) for connecting the frame member to the liquid crystal module substantially in parallel to each other. Wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction to a surface of the frame member."

However, in contrast to the claimed invention, Ichikawa et al. discloses a method for mounting a liquid crystal (LCD) display in a portable computer that includes mounting resilient shock mounts on the edges of the LCD assembly, installing the LCD assembly and shock mounts into a housing, placing a horizontal plate into the housing over the LCD assembly and shock mounts (wherein the horizontal plate covers the shock mounts), and joining the horizontal plate to the housing plate to the housing to form the mounting structure. The shock mounts are compressed during the joining step. The LCD assembly is supported by the forces exerted by the housing and horizontal plate against the shock mounts, and is not directly connected to the housing or the horizontal plate.

Accordingly, contrary to the present invention, Ichikawa is directed to a method for mounting an LCD display wherein the LCD is supported by forces exerted on the housing (e.g., friction forces), and not by connecting members. In fact, in complete contrast to the present invention, Ichikawa states that "mounting structures 100 (first embodiment), 400

(second embodiment), and 600 (third embodiment) allow the LCD glass plates to float with respect to the housing." Column 7, lines 41-43. Instead of securing the LCD glass plate to the frame, as described and claimed, Ichikawa's system avoids directly connecting the LCD glass plate to the frame so that "[t]he housing may be deformed or otherwise stressed by dropping or compressing its associated portable computer, but the LCD glasses remain relatively flat and cushioned from the shock and load." Column 7, lines 43-47.

It is further noted that Ishikawa et al. discloses connecting members 61a-1 adjacent to four corners of a frame member 61. When an LCD 60 is mounted indirectly via an LCD frame 63 to the frame member 61, the connecting members 61a-1 are positioned lower than upper than top and bottom sides of the LCD 60. Namely, in a plan view, the connecting members 61a-1 are positioned inside of the frame members 61 and outside of the peripheral edges of the LCD 60. This structure reduces a display area of the LCD 60.

By contrast, the present invention provides a connecting structure which allows a maximum display area with reference to the frame member, wherein in the plan view, the connecting members are positioned not only inside of the frame member but also inside of the peripheral edges of the LCD as illustrated in FIGS 5 and 9. This structure does not reduce a display area of the LCD. The structure of the present invention is more suitable than the Ishikawa's structure for possible increasing the display area with reference to the frame member.

The present invention is further distinguishable from Ishikawa in the positions of the connecting members with reference to the peripheral sides of the LCD and the frame member

Hence, turning to the clear language of the claims, there is no teaching or suggestion of a mounting structure "wherein each of said frame-to-liquid-crystal-modules connecting

members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member."

B. The 35 U.S.C. § 103 rejection of Ichikawa and Figure 1

The Examiner asserts:

"Ichikawa et al. disclose the instant claimed invention except for a cover and a body. Applicant's submitted prior art, figure 1, discloses a cover (203) and a body (202). It would have been obvious to one of ordinary skill in the art at the time the invention was made [to] have the cover and the body as suggested by Applicant's submitted prior art, in order to protect the liquid crystal module."

Applicant's Figure 1 describes a note type personal computer having a body 202 and a cover 203. A liquid crystal module 200 serving as a display of the computer is mounted to the cover 203. The liquid crystal module 200 has a peripheral region surrounding a display area, and this peripheral region has a plurality of screw holes 201. The cover 203 also has screw holes 205 at positions corresponding to the screw holes 201 of the liquid crystal module 200. The liquid crystal module 200 is fixed to the cover 203 by screws 204 which are driven tightly into the screw holes 201 and the screw holes 205. The display area of the liquid crystal module 200 is smaller in size than the peripheral region.

Figure 1, however, fails to make up for the deficiencies of Ichikawa. Specifically, Figure 1 fails to teach or suggest a mounting structure "wherein each of said frame-to-liquid-crystal-modules connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member" (emphasis Applicant's), as defined by independent claim 1. Instead, Figure 1

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Hisense v. Vista Peak - IPR2023-00725
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discloses attaching the frame to a peripheral region which surrounds the liquid crystal display. Accordingly, as stated in the Background section of the present Application, "it is difficult to enlarge the display area of the liquid crystal module without enlargement of the cover." Hence, both Ichikawa and Figure 1 fail to teach or suggest a mounting structure "wherein each of said frame-to-liquid-crystal-modules connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member." Accordingly, claim 1 is patentable over the cited references as are claims 3, 11, and 30, and 33, each of which depends from claim 1.

Furthermore, claim 32 is patentable because it also recites a mounting structure "wherein each of said frame-to-liquid-crystal-modules connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member."

Additionally, regarding claim 34, the cited references fail to teach or suggest a mounting structure "wherein each of said frame-to-LCD connecting members extends between said LCD module and said frame member in a direction vertical to a surface of said frame member, and each of said frame-to-LCD connecting members is positioned inside peripheral sides of said liquid crystal module in a plan view with reference to a surface of said liquid crystal module." Accordingly, claim 34 is patentable for at least this reason.

For the reasons stated above, the claimed invention is fully patentable over the cited references.

Further, the other prior art of record has been reviewed, but it too even in

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combination with Ichikawa and Figure 1, fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 1-3, 11, and 30-34, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time. Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview. The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 8/23/01

Matthew G. Dyor
Reg. No. 45,278

McGinn & Gibb, PLLC
8321 Old Courthouse Rd. Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

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Hisense v. Vista Peak - IPR2023-00725
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VERSION WITH MARKINGS TO SHOW CHANGES MADE:

IN THE CLAIMS:

1. (Amended) A mounting structure for mounting a liquid crystal module having a display area, said mounting structure comprising:

at least a frame member having a plurality of frame-to-liquid-crystal-module connecting members for connecting said frame member to said liquid crystal module substantially in parallel to each other,

wherein each of said frame-to-liquid-crystal-module connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member.

Transaction History Date 2001-11-
Date information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov

UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/459,380	12/13/99	YANO	[illegible]

MMC2/1107

MCGINN & GIBB P C
LIMITED LIABILITY COMPANY
INTELLECTUAL PROPERTY LAW
1701 CLARENDON BOULEVARD SUITE 100
ARLINGTON VA 22209

EXAMINER	
LE,T	
ART UNIT	**PAPER NUMBER**
2839	9

DATE MAILED: 11/07/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

PTO-90C (Rev. 2/95)
*U.S. GPO: 2000-473-000/44602

1- File Copy

Office Action Summary	Application No.	Applicant(s)	
	09/459,280	YANO ET AL	
	Examiner	Art Unit	
	Thanh-Tam T Le	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a) In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U S C § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1 704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2001* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C D. 11, 453 O.G 213.

Disposition of Claims

4)☒ Claim(s) *1-3,11 and 30-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,11 and 30-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C § 119(a)-(d) or (f)

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15)☒ Notice of References Cited (PTO-892)
16)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7
18)☐ Interview Summary (PTO-413) Paper No(s) _____
19)☐ Notice of Informal Patent Application (PTO-152)
20)☐ Other:

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 282 of 438

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 11 and 32-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichikawa et al. (5,486,942).

Ichikawa et al., figure 6A, disclose a mounting structure for mounting a liquid crystal module (63) having a display area. The mounting structure comprising at least a frame member (61) having a plurality of frame-to-liquid-crystal-module connecting members (61a-1) for connecting the frame member to the liquid crystal module substantially in parallel to each other. Wherein each of the frame-to-liquid-crystal-module connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

Regarding claim 2, Ichikawa et al., figure 6A, disclose the plurality of connecting members are in contact with dead spaces of the liquid crystal module.

Regarding claim 3, Ichikawa et al., figure 6A, disclose the connecting members comprising plural sets of a screw (64), a boss (61a-1) formed on the frame member, and a screw hole (63f) formed on the liquid crystal module at its position corresponding to the boss.

Regarding claim 11, Ichikawa et al., figure 6A, disclose the liquid crystal module is sandwiched between first and second frame members (61 and 65) which are also fixed to each other via the plurality of connecting members.

Regarding claim 33, each of the frame-to-liquid-crystal-module connecting members is positioned inside peripheral sides of the liquid crystal module in a plan view with reference to a surface of the liquid crystal module.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al. (5,486,942) in view of applicant's submitted prior art.

Ichikawa et al. disclose the instant claimed invention except for a cover and a body.

Applicant's submitted prior art, figure 1, discloses a cover (203) and a body (202). It would have been obvious to one of ordinary skill in the art at the time the invention was made have the cover and the body as suggested by Applicant's submitted prior art, in order to protect the liquid crystal module.

Response to Arguments

5. Applicant's arguments filed 8/29/01 have been fully considered but they are not persuasive.

Regarding claims 1, 32 and 34, Ichikawa et al., figure 6A, disclose a plurality of frame-to-liquid-crystal-module connecting members (61a-1). These connecting members used to connect the frame member (61) and the liquid crystal module (63) together (Ichikawa et al., column 6, lines 46-50).

The Examiner cited that Ichikawa et al., figure 6A, disclose a mounting structure for mounting a liquid crystal module (63). The mounting structure comprising at least a frame member (61) having a plurality of frame-to-liquid-crystal-module connecting members (61a-1). Therefore, each of the frame-to-liquid-crystal-module connecting members (61a-1) is positioned inside peripheral sides of the liquid crystal module (63) in a plan view with reference to a surface of the liquid crystal module (61).

Regarding claims 30 and 31, although applicant's submitted prior in figure 1 fails to teach a mounting structure "wherein each of the frame-to-liquid-crystal-module connecting members extends between said liquid crystal module and said frame member in a direction vertical to a surface of said frame member" as defined by independent claim 1, but Ichikawa et al., figure 6A discloses all of those limitation. Therefore, the combination of applicant's submitted prior and Ichikawa et al. meet the claimed limitation.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam T Le whose telephone number is (703) 306-5711. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (703) 308-3119. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

TL
November 2, 2001

Notice of References Cited	Application/Control No. 09/459,280	Applicant(s)/Patent Under Reexamination YANO ET AL	
	Examiner Thanh-Tam T Le	Art Unit 2839	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification	
	A	US-6,229,695-B1	05-2001	Moon	361	683
	B	US-6,252,768-B1	06-2001	Lin	361	687
	C	US-6,262,883-B1	07-2001	Kim	361	680
	D	US-6,272,006-B1	08-2001	Lee	361	681
	E	US-6,276,655-B1	08-2001	Byoun	248	923
	F	US-6,297,955-B1	10-2001	Frank, Jr. et al.	361	686
	G	US-6,310,767-B1	10-2001	Spear et al.	361	681
	H	US- -				
	I	US- -				
	J	US- -				
	K	US- -				
	L	US- -				
	M	US- -				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification	
	N	- -					
	O	- -					
	P	- -					
	Q	- -					
	R	- -					
	S	- -					
	T	- -					

NON-PATENT DOCUMENTS

*		Include as applicable Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707 05(a))
Dates in MM-YYYY format are publication dates Classifications may be US or foreign.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 288 of 438

2839

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of Takakazu YANO

RECEIVED
JAN 30 2002
TC 2800 MAIL ROOM

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, T.

OIPE JC38
JAN 22 2002
PATENT & TRADEMARK OFFICE

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINATION MOUNTED WITH THE SAME

10
IDS
Attorney
2-1-02

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following documents cited in the Japanese Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. Copies of the listed documents are provided herewith for the convenience of the Examiner.

In compliance with the requirements of 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1.56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the reference was cited. The relevance to the pending U.S. patent application is that the reference was cited in a foreign patent application on the same subject matter. However, no independent analysis of the reference, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the references are relevant or material to the claims. They are only cited as constituting related art of which the applicant is aware.

Submitted herewith is the Information Disclosure Statement fee of $180.00.

I hereby certify that each item of information contained in this Information Disclosure Statement was the first citation of that item by a foreign patent office in a counterpart foreign

01/28/2002 CVDTIII 00000102 09459280
01 FC:125 180.00 OP

application, which occ' d not more than three months prior to filing of this statement.

It is respectfully requested that the listed references be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

Respectfully submitted,

Frederick E. Cooperrider
Registration No. 36769

Date: 1/22/02

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

JAN 2 2 2002 PATENT & TRADEMARK OFFICE

Docket Number (Optional)	Application Number
PF-2503/NE(	09/459,280
Applicant(s)	
Yano, et al	
Filing Date	**Group Art Unit**
December 13, 1999	2839

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
TL		10-301095	11/13/98	JAPAN	—	—		✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		Japanese Office Action dated October 23, 2001.

EXAMINER	DATE CONSIDERED
T. LE	3/21/02

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 291 of 438

Express Mail Label No.

CPA/2839

CONTINUED PROSECUTION APPLICATION (CPA) REQUEST TRANSMITTAL (Large Entity)

Submit an original, and a duplicate for fee processing.

(Only for Continuation or Divisional Applications Under 37 CFR 1.53(d))

Docket No.
PF-2503/NEC/US/mh

☐ **DUPLICATE** *(Check box if applicable)*

First Named Inventor	Examiner	Group/Art Unit
Yano	**Le, T.**	**2839**

#11 CPA Staff 2/19/02

OIPE
FEB 07 2002
PATENT & TRADEMARK OFFICE

Address to:
Assistant Commissioner for Patents
Box CPA
Washington, D.C. 20231

This is a request for filing a ☒ continuation, or ☐ divisional application under 37 CFR 1.53(d), (continued prosecution application (CPA)) of prior application number **09/459,280** filed on **December 13, 1999** and entitled:

LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

1. ☐ Enter the unentered amendment previously filed on _____ under 37 CFR 1.116 in the prior nonprovisional application.
2. ☒ A preliminary amendment is enclosed.
3. ☐ This application is being filed by fewer than all the inventors named in the prior application, 37 CFR 1.53(d)(4).
   a. ☐ ***DELETE*** the following inventor(s) named in the prior nonprovisional application:

   b. ☐ The inventor(s) to be deleted are set forth on a separate sheet attached hereto.
4. ☐ A new power of attorney or authorization of agent is enclosed.
5. ☐ An Information Disclosure Statement (IDS) is enclosed:
   a. ☐ PTO-1449
   b. ☐ Copies of IDS Citations
6. ☐ The fee for this application is calculated as follows:

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra		Rate	Fee
Total Claims	6	- 20 =	0	x	$18.00	$0.00
Indep. Claims	2	- 3 =	0	x	$84.00	$0.00
Multiple Dependent Claims (check if applicable)		☐				$0.00
					BASIC FEE	$740.00
					TOTAL FILING FEE	$740.00

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01 FC:151 740.00 OP

P21LARGE/REV07

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 292 of 438

CONTINUED PROSECUTION APPLICATION (CPA) REQUEST TRANSMITTAL (Large Entity)
(Only for Continuation or Divisional Applications Under 37 CFR 1.53(d))

7. ☒ The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. **50-0481**

   - ☐ fees required under 37 C.F.R. 1.16.
   - ☒ fees required under 37 C.F.R. 1.17.
   - ☒ fees required under 37 C.F.R. 1.18. (Deficiencies Only)

8. ☑ A check in the amount of **$740.00** is enclosed.

9. ☐ Also enclosed:

10. ☑ The prior application's correspondence address will carry over to this CPA UNLESS a new correspondence address is provided below:

Mcginn & Gibb, PLLC
8321 Old Courthouse Road
Suite 200
Vienna, Virginia 22182

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 293 of 438

BEST COPY

CONTINUED PROSECUTION APPLICATION (CPA) REQUEST TRANSMITTAL (Large Entity)
(Only for Continuation or Divisional Applications Under 37 CFR 1.53(d))

TECHNOLOGY CENTER 2800

NOTES

Submit an original, and a duplicate for fee processing.

FILING QUALIFICATIONS: The prior application must be a nonprovisional application that is either: (1) complete as defined by 37 C.F.R. 1.51(b); or (2) the national phase of an international application in compliance with 35 U.S.C. 371. A Notice will be given if a patent issuing from a CPA, except for reissues and designs, is not entitled to patent term adjustment and is subject to the twenty-year patent term provided by 35 U.S.C. 154(a)(3). If the prior application is a CPA, it may have been filed before or after June 8, 1995.

CPA NOT PERMITTED: A continuation-in-part application cannot be filed as a CPA under 37 C.F.R. 1.53(d), but must be filed under 37 C.F.R. 1.53(b).

EXPRESS ABANDONMENT OF PRIOR APPLICATION: The filing of this CPA is a request to expressly abandon the prior application as of the filing date of the request for a CPA. 37 C.F.R. 1.53(b) must be used to file a continuation, divisional or continuation-in-part of an application that is not to be abandoned.

ACCESS TO PRIOR APPLICATION: The filing of this CPA will be construed to include a waiver of confidentiality by the Applicant under 35 U.S.C. 122 to the extent that any member of the public who is entitled under the provisions of 37 C.F.R. 1.14 to access to, copies of, or information concerning, the prior application may be given similar access to, copies of, or similar information concerning, the other application or application in the file jacket.

35 U.S.C. 120 STATEMENT: Since CPA practice under 37 C.F.R. 1.53(d) for prior application is needed in the first sentence of the specification, one must be submitted. If the sentence referencing the prior application is submitted, it will not be entered. A request for a CPA is the specific reference required by 35 U.S.C. 120 and to every application assigned the application number identified in such request, 37 C.F.R. 1.78(a).

Dated: 2/7/02

Frederick Cooperrider
Signature

Frederick E. Cooperrider, Esquire
Typed or printed name

36,769
Registration Number (if applicable)

☐ Inventor(s)

☐ Assignee of complete interest

☒ Attorney or agent of record

cc:

#12/Re. Amdt. B
Shaver
2/19/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

OIPE SC17
FEB 07 2002
PATENT & TRADEMARK OFFICE

In re Application of

ano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to further evaluation on the merits, please amend the above-identified Application as follows:

IN THE CLAIMS:

Please cancel all currently pending claims 1, 3, 11, and 30-34 without prejudice or disclaimer.

Please add the following new claims 35-40, as follows:

Sub C1

35. (New) A mounting structure for mounting a liquid crystal module, comprising:

a frame member;

a liquid crystal module having a back face area opposite to a liquid crystal front area; and

at least one screw to fix said frame member to said back face area.

36. (New) The mounting structure of claim 35, further comprising:

sub C' cont'd

at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.

37. (New) The mounting structure of claim 35, wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.

38. (New) The mounting structure of claim 35, further comprising:

at least one grooved portion provided on a confronting face of said frame member, said at least one grooved portion being positioned so as to receive a side of said liquid crystal module.

B1

39. (New) The mounting structure of claim 36, further comprising:

at least one grooved portion provided on a confronting face of said frame member, said at least one grooved portion being positioned so as to receive a side of said liquid crystal module,

C

wherein said at least one spacer has a height such that said liquid crystal module, when mounted to said frame member through said at least one spacer and said at least one grooved portion, has a substantially uniform distance from said frame member so that said liquid crystal module is substantially parallel to said frame member.

40. (New) An electronic device having a liquid crystal display, comprising:

a liquid crystal module having said liquid crystal display as a front surface area and having a back face opposite to said liquid crystal front area;

a frame upon which to mount said liquid crystal display to said electronic device, and

at least one screw to attach said liquid crystal module to said frame, wherein said at least one screw attaches to said back face of said liquid crystal module.

REMARKS

New claims 35-40 are all the claims presently pending in the Application. All previously-pending claims have been canceled and replaced by these new claims. Applicants believe these new claims place the Application in condition for immediate allowance. No new matter has been introduced. These new claims are directed to the embodiment as previously elected in response to the Examiner's Election of Species Requirement.

Attached hereto is a marked up version of the changes made in the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

I. THE CLAIMED INVENTION

As disclosed and claimed, the claimed invention is directed to a mounting structure for mounting a liquid crystal module including a frame member, a liquid crystal module having a back face area opposite to a liquid crystal front area, and at least one screw to fix the frame member to the back face area. This technique allows the liquid crystal module to be reduced in size since no additional area need be provided around the periphery of the liquid crystal front area for mounting to the frame.

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 5,486,942 to Ichikawa et al discloses the invention as defined by canceled claims 1, 3, 11, and 30-34.

However, a key aspect of the present invention as described by these new claims is that it provides a technique in which the LCD module can be attached to the frame without taking up additional front surface area than that used for the display area. This technique has the advantage that the display area can be increased to a maximum since no periphery area is required for mounting the LCD module to the frame.

In contrast, Ichikawa discloses that the liquid crystal module has four additional areas having screw holes through which mounting screws penetrate to reach the underlying frame member. These four additional areas are outside the liquid crystal display area of the liquid crystal module and make it difficult to realize a further size reduction of the liquid crystal module.

The Ichikawa reference fails to teach, suggest, or render obvious the technique of the invention as claimed by new claims 35-40.

Hence, turning to the clear language of the claim, there is no teaching or suggestion of "... a liquid crystal module having a back face area opposite to a liquid crystal front area; and at least one screw to fix said frame member to said back face area".

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-40, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application

to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 2/7/02

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

Version with Markings to Show Changes Made

All currently pending claims 1, 3, 11, and 30-34 have been canceled.
The following new claims 35-40 are added, as follows:

35. (New) A mounting structure for mounting a liquid crystal module, comprising:
a frame member;
a liquid crystal module having a back face area opposite to a liquid crystal front area; and
at least one screw to fix said frame member to said back face area.

36. (New) The mounting structure of claim 35, further comprising:
at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.

37. (New) The mounting structure of claim 35, wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.

38 (New) The mounting structure of claim 35, further comprising:
at least one grooved portion provided on a confronting face of said frame member, said at least one grooved portion being positioned so as to receive a side of said liquid crystal module.

39. (New) The mounting structure of claim 36, further comprising:
at least one grooved portion provided on a confronting face of said frame member, said at least one grooved portion being positioned so as to receive a side of said liquid crystal module,
wherein said at least one spacer has a height such that said liquid crystal module, when mounted to said frame member through said at least one spacer and said at least one grooved portion, has a substantially uniform distance from said frame member so that said liquid crystal module is substantially parallel to said frame member.

40. (New) An electronic device having a liquid crystal display, comprising:
a liquid crystal module having said liquid crystal display as a front surface area and having a back face opposite to said liquid crystal front area;
a frame upon which to mount said liquid crystal display to said electronic device; and
at least one screw to attach said liquid crystal module to said frame, wherein said at least one screw attaches to said back face of said liquid crystal module.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D C 20231
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

7590 03/26/2002

MCGINN & GIBB P C
LIMITED LIABILITY COMPANY
INTELLECTUAL PROPERTY LAW
1701 CLARENDON BOULEVARD SUITE 100
ARLINGTON, VA 22209

EXAMINER	
LE, THANH TAM T	
ART UNIT	PAPER NUMBER
2839	

DATE MAILED. 03/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)	
	09/459,280	YANO ET AL.	
	Examiner	Art Unit	
	Thanh-Tam T. Le	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1 136(a) In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S C § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment See 37 CFR 1 704(b)

Status

1)☒ Responsive to communication(s) filed on 2/19/02 .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 2 and 35-40 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 35-40 is/are rejected.

7)☒ Claim(s) 2 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7,10 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

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Hisense v. Vista Peak - IPR2023-00725
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DETAILED ACTION

Claim Objections

1. Claim 2 is objected to because of the following informalities:

Applicant has been canceled claims 1 and 3-34, but forgot to cancel claim 2.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention

3. Claim 37 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 37, "said at least one spacer" lack an antecedent basis.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application

being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 35-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim (6,151,207).

Regarding claims 35 and 40, Kim, figure 2, discloses a mounting structure for mounting a liquid crystal module comprising a frame member (18), a liquid crystal module (20) having a back face area (A, attached sheet) opposite to a liquid crystal front area (B, attached sheet) and at least one screw (24) to fix the frame member to the back face area.

Regarding claim 36, Kim, figure 2, discloses at least one spacer (22) through which at least one of the at least one screw passes through to join the liquid crystal module to the frame member.

Regarding claim 37, Kim, figure 2, discloses at least one spacer comprises a boss (22) provided on a confronting face of the frame member.

Regarding claim 38, at least one grooved portion (C, inner surface of the frame' edges, attached sheet) provided on a confronting face of the frame member. The at least one grooved portion being positioned so as to receive a side of the liquid crystal module.

Regarding claim 39, Kim, figure 2, discloses the at least one spacer has a height such that the liquid crystal module, when mounted to the frame member through the at least one spacer and the at least one grooved portion, has a substantially uniform

distance from the frame member so that the liquid crystal module is substantially parallel to the frame member.

Response to Arguments

6. Applicant's arguments with respect to claims 35-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam T. Le whose telephone number is (703) 306-5711. The examiner can normally be reached on 7:30-5:00.

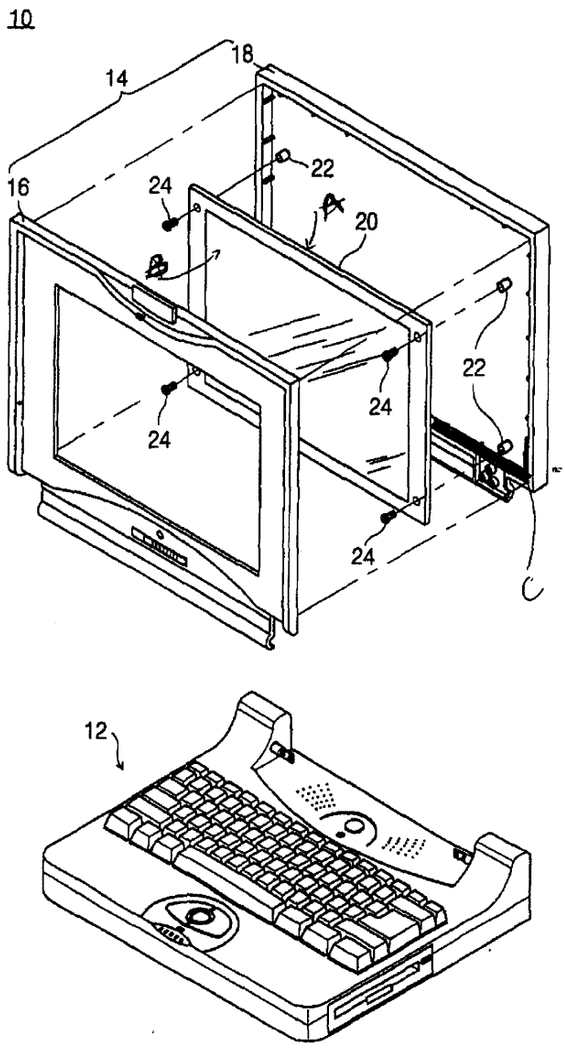
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (703) 308-3119 The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TL.
March 24, 2002

BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Fig. 2



03/21/2002, EAST Version: 1.02.0008

OIPE
MAY 24 2002
PATENT & TRADEMARK OFFICE

15/C
T. BELL
5-30-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner Le, T.

RECEIVED
MAY 28
TECHNOLOGY CENTER 2800

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

AMENDMENT UNDER 37 C.F.R. §1.111

Sir:

In response to the Office Action dated March 26, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:

Please cancel claim 2 and 38-40 without disclaimer or prejudice.
Please revise claims 35-37 to read as follows:

35. (Amended) An electric apparatus having a mounting structure for mounting a liquid crystal module, said electric apparatus comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass for mounting a liquid crystal module;

a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and screwing into said

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Hisense v. Vista Peak - IPR2023-00725
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threaded screw hole on said back face area.

36. (Amended) The electric apparatus of claim 35, further comprising:

at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.

37. (Amended) The electric apparatus of claim 36, wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.

Please add new claims 41 and 42, to read as follows:

41. (New) A liquid crystal display (LCD) module, comprising:

a liquid crystal display panel having a front display face and a back face opposite said front display face, said front display face forming a front face of said LCD module; and,

a back frame forming a back face area of said LCD module, said back frame having at least one threaded screw hole to serve as an attachment for a mounting screw, wherein said mounting screw serves to mount said LCD module to an electronic apparatus.

42. (New) The LCD module of claim 41, further comprising:

a front frame shaped to fit around a periphery of said front display face of said liquid crystal display panel and to sandwich said liquid crystal display panel between said front frame and said back frame.

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REMARKS

Attached hereto is a marked up version of the changes made in the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Claims 35-37, 41, and 42 are all of the claims pending in the present Application. Claims 2 and 38-40 have been canceled. New claims 41 and 42 have been added. Claim 37 stands rejected under 35 USC §112, second paragraph, as being indefinite. Claim 37 has been amended to overcome this rejection. Claims 35-37 stand rejected under 35 USC §102(e) as anticipated by US Patent 6,151,207 to Kim.

This rejection is respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, the present invention is directed to a mounting structure for mounting a liquid crystal module having a display area on a front surface In one preferred embodiment, the mounting structure includes a frame member which fixes to the back face of the liquid crystal module using at least one screw that passes through a hole in the frame to screw into a screw hole in the back face of the LCD module.

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 6,151,207 to Kim discloses the invention as defined by claim 35.

However, a key aspect of the present invention as described by these two claims is that it provides a technique in which the LCD module can be attached to the frame without taking

up additional front surface area. This result is achieved by using screw holes on the back surface of the LCD module. This technique has the advantage that the display area can be increased to a maximum without limitation of a periphery area required for mounting the LCD module to the frame.

The Kim reference fails to teach, suggest, render obvious, or even hint at this technique. More specifically, Kim teaches a method of mounting a flat display panel 20, considered in the rejection as an LCD module, in which screws 24 pass through the LCD module 20 to attach the module to the back frame member 18, using threaded bosses 22. Kim makes no suggestion to pass the attachment screws 24 through the back frame member 18 to attach the LCD module 20 to the back frame member 18, let alone suggesting to have a threaded screw hole on the back surface of the LCD module 20 to which the mounting screw 24 attaches to the back surface.

Hence, turning to the clear language of the claim, there is no teaching or suggestion of "... a frame member having at least one hole in a first predetermined location through which a screw can pass; a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a threaded screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and screwing into said threaded screw hole on said back face area", as required by claim 35.

For this reason, the claimed invention is fully patentable over the cited references.

Further, the other prior art of record has been reviewed, but it too even in combination with Kim, either alone or in combination, fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-37, 41, and 42, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 5/24/02

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 2 and 38-40 have been canceled.

Claims 35-37 have been revised, as follows:

35. (Amended) [A] An electric apparatus having a mounting structure for mounting a liquid crystal module, said electric apparatus comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass for mounting a liquid crystal module;

a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and screwing into said threaded screw hole on said back face area.

36. (Amended) The [mounting structure] electric apparatus of claim 35, further comprising

at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.

37. (Amended) The [mounting structure] electric apparatus of claim [35] 36, wherein said at least one spacer comprises a boss provided on a confronting face of said frame member

The following new claims 41 and 42 have been added:

41. (New) A liquid crystal display (LCD) module, comprising:

a liquid crystal display panel having a front display face and a back face opposite said front display face, said front display face forming a front face of said LCD module; and,

a back frame forming a back face area of said LCD module, said back frame having at least one threaded screw hole to serve as an attachment for a mounting screw, wherein said mounting screw serves to mount said LCD module to an electronic apparatus.

42. (New) The LCD module of claim 41, further comprising:

a front frame shaped to fit around a periphery of said front display face of said liquid crystal display panel and to sandwich said liquid crystal display panel between said front frame and said back frame.

Docket No. PF-2503/NEC/US/mh

#14
T. Bell
6·30·02

OIPE
MAY 24 2002
JC98
U.S. PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Takakazu Yano, et al.

Serial No.: 09/459,280

Group Art Unit: 2839

Filing Date: December 13, 1999

Examiner: Thanh Tam T. Le

RECEIVED
MAY 29 2002
TECHNOLOGY CENTER 2800

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

NOTICE OF CHANGE OF ADDRESS

Sir:

Please be advised that the correspondence address of attorneys of record in the above-identified application has been changed to:

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
Customer No.: 21254

Please change the records in regard to the above-identified application accordingly and direct all telephone calls to the number shown below.

Respectfully submitted,

Frederick E. Cooperrider
Registration No. 36,769

Date: 5/24/02

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road; Suite 200
Vienna, Virginia 22182-3817
(703) 761-4100
Customer No. 21254

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 313 of 438

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2002-05-30

Document Title - USPTO Communication Re: Change of Address

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

PF-2503/NEC/US/mh

#17
2839
IDS
7-5a

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Thanh Tam T. Le

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

RECEIVED
JUL 24 2002
TECHNOLOGY CENTER 2800

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following documents cited in the Korean Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. Copies of the listed documents are provided herewith for the convenience of the Examiner.

In compliance with the requirements of 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1 56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the reference was cited The relevance to the pending U.S. patent application is that the reference was cited in a foreign patent application on the same subject matter. However, no independent analysis of the reference, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the references are relevant or material to the claims. They are only cited as constituting related art of which the applicant is aware.

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Hisense v. Vista Peak - IPR2023-00725
Page 315 of 438

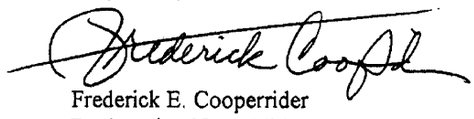
PF-2503/NEC/US/mh

I hereby certify that each item of information contained in this Information Disclosure Statement was the first citation of that item by a foreign patent office in a counterpart foreign application, which occurred not more than three months prior to the filing of this statement.

It is respectfully requested that the listed references be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

Respectfully submitted,



Frederick E. Cooperrider
Registration No. 36,769

Date: 06/18/02

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

OIPE JC1 JUN 18 2002 PATENT & TRADEMARK OFFICE

Docket Number (Optional)	Application Number
PF-2503/NEC/US...h	09/459,280
Applicant(s)	
Yano, et al.	
Filing Date	**Group Art Unit**
December 13, 1999	2839

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
TL		5,268,816	12/07/93	Abell, Jr., et al.	—	—	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
TL		0124408	06/11/98	Korea	—	—		
TL		8-211964	08/20/96	Japan	—	—		

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		Korean Office Action dated April 30, 2002, with partial translation.

EXAMINER	DATE CONSIDERED
T. LE	1/15/03

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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Hisense v. Vista Peak - IPR2023-00725
Page 317 of 438

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

Docket Number (Optional)	Application Number
PF-2503/NEC/JS/mh	09/459,280
Applicant(s)	
Yano, et al.	
Filing Date	**Group Art Unit**
December 13, 1999	2839

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		5,268,816	12/07/93	Abell, Jr., et al.			

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
		0124408	06/11/98	Korea				
		8-211964	08/20/96	Japan				

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

		Korean Office Action dated April 30, 2002, with partial translation.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 318 of 438

Other Prior Art

According to the information contained in form PTO-1449 or PTO-892, there are one or more other prior art/non-patent literature documents missing from the original file history record obtained from the United States Patent and Trademark Office. Upon your request we will attempt to obtain these documents from alternative resources. Please note that additional charges will apply for this service.

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

21254 7590 07/01/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THANH TAM T	

ART UNIT	PAPER NUMBER
2839	

DATE MAILED: 07/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/459,280	YANO ET AL.
	Examiner	Art Unit
	Thanh-Tam T. Le	2839

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1 136(a) In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U S C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment See 37 CFR 1 704(b)

Status

1)☒ Responsive to communication(s) filed on *24 May 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D 11, 453 O G 213

Disposition of Claims

4)☒ Claim(s) *35-37,41 and 42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *35-37, 41-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1 85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of.

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No _____

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
4) ☐ Interview Summary (PTO-413) Paper No(s) _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 35-37 and 41-42 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim (6,151,207).

Regarding claims 35 and 41, Kim, figure 2, discloses a mounting structure for mounting a liquid crystal module comprising:

a frame member (18) having at least one hole (C, attachment, the hole of a boss (22));

a liquid crystal module (20) having a back face area (A, attachment) opposite to a liquid crystal front area (B, attachment). The back face having a threaded screw hole (D, attachment) in a second predetermined location corresponding to the first predetermined; and

at least one screw (24) to fix the frame member to the back face area. The at least one screw passing through the at least one hole in the frame member and screwing into the threaded screw hole on the back face area.

Regarding claim 36, Kim, figure 2, discloses at least one spacer (22) through which at least one of the at least one screw passes through to join the liquid crystal module to the frame member.

Regarding claim 37, Kim, figure 2, discloses at least one spacer comprises a boss (22) provided on a confronting face of the frame member.

Regarding claim 42, Kim, figure 2, discloses a front frame (16) shaped to fit around a periphery of the front display face of the liquid crystal display panel and to sandwich the liquid crystal display panel between the front frame and the back frame.

Response to Arguments

3. Applicant's arguments filed 5/24/02 have been fully considered but they are not persuasive.

Applicant argued that there is no teaching of "... a frame member having at least one hole ..... through which a screw can pass; .... the at least one screw passing through the at least one hole in the frame member and screwing into the threaded screw hole one the back face area".

The Examiner disagrees.

Kim, figure 2 and column 4, lines 51-64, discloses a frame member (18) having a hole, a liquid crystal module (20) have another hole and a screw (24) passing through liquid crystal module hole and screwing into the back frame hole.

Therefore, Kim is still a good reference for the final rejection.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam T. Le whose telephone number is (703) 306-5711. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (703) 308-3119. The fax phone numbers

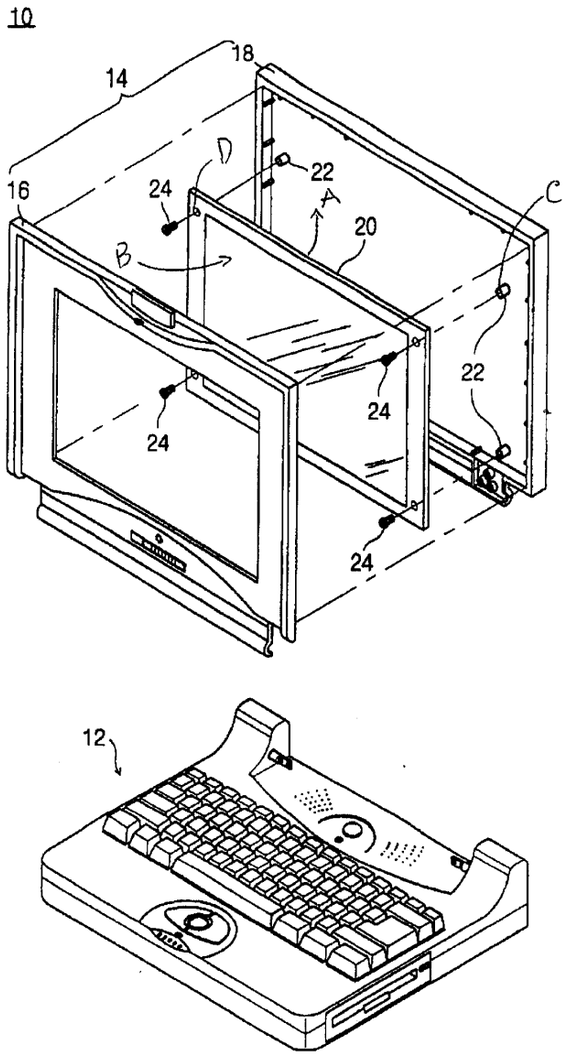
for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TL.
June 21, 2002

BRIAN SIRCUS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Fig. 2



06/21/2002, EAST Version: 1.03.0002

OIPE JC76
OCT 0 1 2002
PATENT & TRADEMARK OFFICE

Duplicate Submittal - originally submitted by fax.

AF

#18/Amdt. due 10/4/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

RECEIVED
OCT -3 2002
2800 MAIL ROOM

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231
Box AF

AMENDMENT UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated July 1, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:
Please cancel claims 41 and 42 without prejudice or disclaimer.
Please revise claim 35 to read as follows:

35. (Amended) An electric apparatus, comprising:

Do Not Enter. TL.

a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof;

a liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing

into said threaded screw hole on said back frame of said liquid crystal module.

REMARKS

Applicants wish to thank the Examiner for taking time to conduct a telephone interview on September 25, 2002, with the Applicants' representative. During that telephone interview, it was understood by Applicants' representative that the wording of claim 35, as revised above, clarifies the present invention in terminology that is not reasonably construed as reading on the prior art of record.

Attached hereto is a marked up version of the changes made to the claims by the current Amendment. The attached page is captioned "**Version with markings to show changes made.**"

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Entry of this Amendment is proper under 37 C.F.R. §1.116 since no new claims are presented, no new issues are raised, and the claim amendment merely clarifies the wording for the benefit of the Examiner.

Claims 35-37 are all of the claims pending in the present Application. Claims 41 and 42 are canceled above All pending claims stand rejected under 35 USC §102(e) as anticipated by US Patent 6,151,207 to Kim.

This rejection is respectfully traversed in view of the following discussion

I. THE CLAIMED INVENTION

As described and claimed, the present invention is directed to a mounting structure for mounting a liquid crystal module having a display area on a front surface. In one preferred embodiment, the mounting structure includes a frame member which fixes to the back face of the liquid crystal module using at least one screw passing through a hole in the frame from the back side of the frame member to screw into a screw hole in the back face of the LCD module.

One advantage of the present invention is that an LCD module can be attached to a mounting frame without taking up additional front surface area.

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 6,151,207 to Kim discloses the invention as defined by claims 35-37.

However, a key aspect of the present invention as described by these claims is that it provides a technique in which the LCD module can be attached to the frame without taking up additional front surface area. This result is achieved by using screw holes on the back surface of the LCD module This technique has the advantage that the display area can be increased to a maximum without limitation of a periphery area required for mounting the LCD module to the frame.

That is, the subject matter of the present invention is that at least one screw penetrates through at least one hole of the frame member from a back side of the frame member, and the at least one screw is screwed into the screw hole over the back frame of the liquid crystal

module so that the at least one screw fixes the liquid crystal display module to the frame member. This structure feature of the present invention allows that an overlapping area on an opposite surface to the display surface be useful for fixing the liquid crystal module to the frame member, wherein the overlapping area extends overlapping the display area on the display surface in view of the vertical direction to the display surface. This structural feature makes it unnecessary to provide any additional area such as a peripheral area, and makes it possible to avoid any increase in the area necessary to attach an LCD module.

The rejection on record fails to heed the plain language meaning of the claims. The Examiner refers to Figure 2 and column 4, lines 51-64 of Kim. However, the Kim reference fails to teach, suggest, render obvious, or even hint at the technique described in the claims. More specifically, Kim teaches a method of mounting a flat display panel 20, considered in the rejection as an LCD module, in which screws 24 pass through the LCD module 20 to attach the module to the back frame member 18, using threaded bosses 22. Kim makes no suggestion to pass the attachment screws 24 through the back frame member 18 to attach the LCD module 20 to the back frame member 18, let alone suggesting to have a threaded screw hole on the back surface of the LCD module 20 to which the mounting screw 24 attaches to the back surface.

Indeed, Kim does not even recognize the benefit of saving additional front surface area of an LCD module, let alone building the structure of the present invention that achieves such functional advantage.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof; a liquid crystal module having a liquid crystal

display panel as a front display area and a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module a back frame forming a back face area of said LCD module, said back frame having at least one threaded screw hole to serve as an attachment for a mounting screw, wherein said mounting screw serves to mount said LCD module to a mounting frame member used on an electronic apparatus" (emphasis by Applicants).

For this reason, the claimed invention is fully patentable over the cited reference.

Further, the other prior art of record has been reviewed, but it too even in combination with Kim fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-37, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 9/27/02

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 708-7724 this Amendment under 37 CFR §1.116 to Examiner Thanh-Tam T. Le on September 27, 2002.

9/27/02

Frederick E. Cooperrider
Reg. No. 36,769

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 332 of 438

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS
Claim 35 has been revised, as follows:

35. (Amended) An electric apparatus [having a mounting structure for mounting a liquid crystal module, said electric apparatus], comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof [for mounting a liquid crystal module];

a liquid crystal module having [a back face area opposite to] a liquid crystal display panel as a front display area [, said back face area having a] and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said liquid crystal module to said frame member [to said back face area, said at least one screw] by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back [face area] frame of said liquid crystal module.

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

21254 7590 10/08/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THANH TAM T	
ART UNIT	**PAPER NUMBER**
2839	

DATE MAILED: 10/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Advisory Action	Application No.	Applicant(s)	
	09/459,280	YANO ET AL.	
	Examiner	Art Unit	
	Thanh-Tam T. Le	2839	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.

b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f)

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1 ☐ A Notice of Appeal was filed on ____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☒ The proposed amendment(s) will not be entered because:

(a) ☒ they raise new issues that would require further consideration and/or search (see NOTE below);

(b) ☐ they raise the issue of new matter (see Note below);

(c) ☒ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

(d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: *The amendment to claim 35 raises new issues.*

3. ☐ Applicant's reply has overcome the following rejection(s): ____.

4. ☐ Newly proposed or amended claim(s) ____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☐ The a)☐ affidavit, b)☐ exhibit, or c)☐ request for reconsideration has been considered but does NOT place the application in condition for allowance because: ____.

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a)☒ will not be entered or b)☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: *None*.

Claim(s) objected to: *None*.

Claim(s) rejected: *35-37, 41-42*.

Claim(s) withdrawn from consideration: ____

8. ☐ The proposed drawing correction filed on ____ is a)☐ approved or b)☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). ____.

10. ☐ Other: ____

LYNN FIELD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 335 of 438

Interview Summary	Application: 09/459,280	Applicant(s): YANO ET AL.	
	Examiner: Lynn D. Feild	Art Unit: 2835	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Lynn D. Feild*. (3)_____.

(2) *Fred Cooperrider*. (4)_____.

Date of Interview: *15 October 2002* .

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____ .

Claim(s) discussed: *35* .

Identification of prior art discussed: *Kim* .

Agreement with respect to the claims f)☐ was reached. g)☒ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *The examiner's supervisor concurred that the Kim reference is properly applied to the claims in the final rejection of July 1, 2002. Applicant's amendment after final raises new issues affecting the scope of the claims. Upon filing an RCE the amendment will be considered. The screw passing through a hole on the back side of the frame and screwing into a screw hole on the back frame of the liquid crystal module is a new issue not previously considered* .

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

i)☐ It is not necessary for applicant to provide a separate record of the substance of the interview(if box is checked).

Unless the paragraph above has been checked, THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

LYNN FIELD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 336 of 438

FACSIMILE COVER PAGE
(THIS COVER PAGE + 7 PAGES)

To: Examiner T. Le, Group Art Unit:2839 FAX: (703) 308-7722

From: Frederick E. Cooperrider #36,769
McGinn&Gibb, PLLC
Ph: (703) 761-2377

In re Application of Yano et al

Serial No.: **09/459,280** Filed: December 13, 1999

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Contents:
1. Amendment Under 37 CFR §1.116 (5 pages)
2. Petition and Fee for Extension of Time Under 37 CFR §1.136(a) (2 copies)

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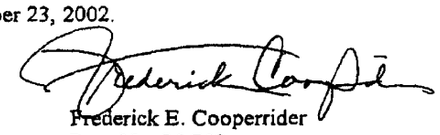
CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 308-7722 the enclosed Amendment under 37 CFR §1.116 and the enclosed Petition and Fee for Extension of Time Under 37 CFR §1.136(a) to Examiner Thanh-Tam T Le on October 23, 2002.



Frederick E. Cooperrider
Reg. No. 36,769

#21 | Amdt. E(46)
Shaun 10/29/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231
Box AF

AMENDMENT UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated July 1, 2002, please amend the above-identified application as follows.

IN THE CLAIMS:
Please cancel claims 41 and 42 without prejudice or disclaimer.

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REMARKS

Applicants wish to thank Supervisor Field and the Examiner Le for taking time to conduct a second telephone interview on October 15, 2002, with the Applicants' representative. During that telephone interview, it was understood by Applicants' representative that the reason for the Advisory Action mailed October 8, 2002, is that Applicant failed to adequately point out in the Amendment filed October 1, 2002, a clear rationale as to why the Final Rejection dated July 1, 2002, fails as a proper rejection under 35 USC §102. This Amendment addresses the Examiner's concern by clearly articulating why the Final Rejection plainly fails as a *prima facie* rejection.

OK to Enter TL.

Attached is a Petition and Fee for Extension of Time Under 37 CFR §1.136 for a one-

month extension of time

Entry of this Amendment is proper under 37 C.F.R. §1.116 since no new claims are presented, no new issues are raised, and this Amendment documents, for the purpose of appeal, the Applicants' position as to why the rejection of record clearly fails to provide a reasonable interpretation of the plain language of the claims That is, Applicants believe that the claim language on record requires no additional modification to clearly differentiate from the Kim reference.

Claims 35-37 are all of the claims pending in the present Application. Claims 41 and 42 are canceled above. All pending claims stand rejected under 35 USC §102(e) as anticipated by US Patent 6,151,207 to Kim.

This rejection is respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, the present invention is directed to a mounting structure for mounting a liquid crystal module having a display area on a front surface. In one preferred embodiment, the mounting structure includes a frame member which fixes to the back face of the liquid crystal module using at least one screw passing through a hole in the frame from the back side of the frame member to screw into a screw hole in the back face of the LCD module

One advantage of the present invention is that an LCD module can be attached to a mounting frame without taking up additional front surface area

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 6,151,207 to Kim discloses the invention as

defined by claims 35-37.

However, a key aspect of the present invention as described by these claims is that it provides a technique in which the LCD module can be attached to the frame without taking up additional front surface area. This result is achieved by using screw holes on the back surface of the LCD module. This technique has the advantage that the display area can be increased to a maximum without limitation of a periphery area required for mounting the LCD module to the frame.

That is, the subject matter of the present invention is that at least one screw penetrates through at least one hole of the frame member from a back side of the frame member, and the at least one screw is screwed into the screw hole over the back frame of the liquid crystal module so that the at least one screw fixes the liquid crystal display module to the frame member. This structure feature of the present invention allows that an overlapping area on an opposite surface to the display surface be useful for fixing the liquid crystal module to the frame member, wherein the overlapping area extends overlapping the display area on the display surface in view of the vertical direction to the display surface. This structural feature makes it unnecessary to provide any additional area such as a peripheral area, and makes it possible to avoid any increase in the area necessary to attach an LCD module.

Kim clearly does not even recognize the benefit of saving additional front surface area of an LCD module, let alone building the structure of the present invention that achieves such functional advantage.

In the Final Rejection, relative to claim 35, the Examiner relies on Figure 2 of Kim (see the attached figure as marked by the Examiner). Applicants respectfully assert that the rejection on record fails to heed the plain language meaning of claim 35, as follows.

The Examiner says that Kim teaches: "... [A] mounting structure for mounting a liquid crystal module comprising:

a frame member (18) having at least one hole (C, attachment, the hole of a boss (22));

a liquid crystal module (20) having a back face area (A, attachment) opposite to a liquid crystal front area (B, attachment). The back face having a *threaded screw hole* (D, attachment) in a second predetermined location corresponding to the first predetermined; and

at least one screw (24) to fix the frame member to the back face area. The at least one screw passing through the at least one hole in the frame member and *screwing into* the threaded screw hole on the back face area." (Emphasis by Applicants)

The problems with the above Examiner's analysis are at least the following:

1. The hole (labeled D by the Examiner) is not a "*threaded* screw hole" as required by the second limitation of claim 35 That is, by one of ordinary skill in the art, this terminology requires that hole D be *threaded* to accept a screw. Applicants assert that this terminology would not mean "a hole through which a threaded screw passes", as the Examiner would have to be interpreting it; and

2. The final phraseology of the final limitation of claim 35 is also clearly not demonstrated by Figure 2 of Kim. That is, screw 24 does not "screw into" hole D, as required by the plain language of claim 35.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a *threaded* screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and *screwing into* said threaded screw hole on said back face area." (emphasis by Applicants).

For this reason, the claimed invention is fully patentable over the cited reference.

Further, the other prior art of record has been reviewed, but it too even in combination

with Kim fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-37, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 10/23/02

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

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OCT 23 2002
TECHNOLOGY CENTER 2800

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 308-7722 this Amendment under 37 CFR §1.116 to Examiner Thanh-Tam T Le on October 23, 2002.

Frederick E. Cooperrider
Reg. No. 36,769

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

PETITION AND FEE FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)

Sir:

Applicant hereby petitions for a 1-month extension of time to respond to the Office Action mailed July 1, 2002. The Commissioner is hereby authorized to charge Attorney's Deposit Account No. 50-0481 for the extension fee in the amount of $110.00. An Amendment responsive to the outstanding Office Action is being filed simultaneously herewith. A duplicate copy of this sheet is enclosed.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 10/23/02

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Rd. Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

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OCT 23 2002
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No : 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C 20231

PETITION AND FEE FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)

Sir:

Applicant hereby petitions for a 1-month extension of time to respond to the Office Action mailed July 1, 2002. The Commissioner is hereby authorized to charge Attorney's Deposit Account No. 50-0481 for the extension fee in the amount of $110.00 An Amendment responsive to the outstanding Office Action is being filed simultaneously herewith. A duplicate copy of this sheet is enclosed.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No 50-0481.

Respectfully Submitted,

Date: 10/23/02

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Vienna, VA 22182-3817
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(Third (Second Submittal by Fax) 11/20/02 (Per telecon 11/20/02 with Examiner Le, phone has not received this After Final Amendment)

FACSIMILE COVER PAGE
(THIS COVER PAGE + 7 PAGES)

872-9319

To: Examiner T. Le, Group Art Unit:2839 FAX: (703) ~~308-7722~~ and to fax (703) ~~308~~-7722

From: Frederick E. Cooperrider #36,769
McGinn&Gibb, PLLC
Ph: (703) 761-2377

In re Application of Yano et al

Serial No.: **09/459,280** Filed: December 13, 1999

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Contents:
1. Amendment Under 37 CFR §1.116 (5 pages)
2. Petition and Fee for Extension of Time Under 37 CFR §1.136(a) (2 copies)

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CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 308-7722 the enclosed Amendment under 37 CFR §1.116 and the enclosed Petition and Fee for Extension of Time Under 37 CFR §1.136(a) to Examiner Thanh-Tam T. Le on October 23, 2002.

Frederick E. Cooperrider
Reg. No. 36,769

Third transmission sent 11/20/02 to fax number (703) 872-9319 and (703) 308-7722 Frederick Cooperrider #36,769

Second Submission — sent 10/29/02 to fax 703-872-9319 since Examiner Le had not yet received the first transmission filed on 10/23/02.

Frederick Cooperrider #36,769

Received from < 703 761 2375 > at 11/20/02 4:03:44 PM [Eastern Standard Time]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231
Box AF

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NOV 2 0 2002
TECHNOLOGY CENTER 2800

AMENDMENT UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated July 1, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:
Please cancel claims 41 and 42 without prejudice or disclaimer.

REMARKS

Applicants wish to thank Supervisor Field and the Examiner Le for taking time to conduct a second telephone interview on October 15, 2002, with the Applicants' representative. During that telephone interview, it was understood by Applicants' representative that the reason for the Advisory Action mailed October 8, 2002, is that Applicant failed to adequately point out in the Amendment filed October 1, 2002, a clear rationale as to why the Final Rejection dated July 1, 2002, fails as a proper rejection under 35 USC §102. This Amendment addresses the Examiner's concern by clearly articulating why the Final Rejection plainly fails as a *prima facie* rejection.

Attached is a Petition and Fee for Extension of Time Under 37 CFR §1.136 for a one-

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month extension of time.

Entry of this Amendment is proper under 37 C.F.R. §1.116 since no new claims are presented, no new issues are raised, and this Amendment documents, for the purpose of appeal, the Applicants' position as to why the rejection of record clearly fails to provide a reasonable interpretation of the plain language of the claims. That is, Applicants believe that the claim language on record requires no additional modification to clearly differentiate from the Kim reference.

Claims 35-37 are all of the claims pending in the present Application. Claims 41 and 42 are canceled above. All pending claims stand rejected under 35 USC §102(e) as anticipated by US Patent 6,151,207 to Kim.

This rejection is respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, the present invention is directed to a mounting structure for mounting a liquid crystal module having a display area on a front surface. In one preferred embodiment, the mounting structure includes a frame member which fixes to the back face of the liquid crystal module using at least one screw passing through a hole in the frame from the back side of the frame member to screw into a screw hole in the back face of the LCD module.

One advantage of the present invention is that an LCD module can be attached to a mounting frame without taking up additional front surface area.

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 6,151,207 to Kim discloses the invention as

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Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 347 of 438

defined by claims 35-37.

However, a key aspect of the present invention as described by these claims is that it provides a technique in which the LCD module can be attached to the frame without taking up additional front surface area. This result is achieved by using screw holes on the back surface of the LCD module. This technique has the advantage that the display area can be increased to a maximum without limitation of a periphery area required for mounting the LCD module to the frame.

That is, the subject matter of the present invention is that at least one screw penetrates through at least one hole of the frame member from a back side of the frame member, and the at least one screw is screwed into the screw hole over the back frame of the liquid crystal module so that the at least one screw fixes the liquid crystal display module to the frame member. This structure feature of the present invention allows that an overlapping area on an opposite surface to the display surface be useful for fixing the liquid crystal module to the frame member, wherein the overlapping area extends overlapping the display area on the display surface in view of the vertical direction to the display surface. This structural feature makes it unnecessary to provide any additional area such as a peripheral area, and makes it possible to avoid any increase in the area necessary to attach an LCD module.

Kim clearly does not even recognize the benefit of saving additional front surface area of an LCD module, let alone building the structure of the present invention that achieves such functional advantage.

In the Final Rejection, relative to claim 35, the Examiner relies on Figure 2 of Kim (see the attached figure as marked by the Examiner). Applicants respectfully assert that the rejection on record fails to heed the plain language meaning of claim 35, as follows.

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The Examiner says that Kim teaches: "... [A] mounting structure for mounting a liquid crystal module comprising:

a frame member (18) having at least one hole (C, attachment, the hole of a boss (22));

a liquid crystal module (20) having a back face area (A, attachment) opposite to a liquid crystal front area (B, attachment). The back face having a *threaded screw hole* (D, attachment) in a second predetermined location corresponding to the first predetermined; and

at least one screw (24) to fix the frame member to the back face area. The at least one screw passing through the at least one hole in the frame member and *screwing into* the threaded screw hole on the back face area." (Emphasis by Applicants)

The problems with the above Examiner's analysis are at least the following:

1. The hole (labeled D by the Examiner) is not a "*threaded* screw hole" as required by the second limitation of claim 35. That is, by one of ordinary skill in the art, this terminology requires that hole D be *threaded* to accept a screw. Applicants assert that this terminology would not mean "a hole through which a threaded screw passes", as the Examiner would have to be interpreting it; and

2. The final phraseology of the final limitation of claim 35 is also clearly not demonstrated by Figure 2 of Kim. That is, screw 24 does not "screw into" hole D, as required by the plain language of claim 35.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a *threaded* screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and *screwing into* said threaded screw hole on said back face area." (emphasis by Applicants).

For this reason, the claimed invention is fully patentable over the cited reference.

Further, the other prior art of record has been reviewed, but it too even in combination

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with Kim fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-37, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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Respectfully Submitted,

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Frederick E. Cooperrider
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McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
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Customer No. 21254

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NOV 20 2002
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CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile to (703) 308-7722 this Amendment under 37 CFR §1.116 to Examiner Thanh-Tam T. Le on October 23, 2002.

Frederick E. Cooperrider
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

PETITION AND FEE FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)

Sir:

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8321 Old Courthouse Rd. Suite 200
Vienna, VA 22182-3817
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Please cancel claims 41 and 42 without prejudice or disclaimer.

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Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... a liquid crystal module having a back face area opposite to a liquid crystal front area, said back face area having a *threaded* screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said frame member to said back face area, said at least one screw passing through said at least one hole in said frame member and *screwing into* said threaded screw hole on said back face area." (emphasis by Applicants).

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In re Application of

Yano et al

Serial No.: 09/459,280 Group Art Unit:2839

Filed: December 13, 1999 Examiner:Le, T.

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Washington, D.C. 20231

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

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Serial No.: 09/459,280 Group Art Unit:2839

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#22/Supp. Amdt. 12/12/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Yano et al

Serial No. 09/459,280 Group Art Unit:2839

Filed. December 13, 1999 Examiner:Le, T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231
Box AF

SUPPLEMENTAL AMENDMENT UNDER 37 C.F.R. §1.116

Sir:

In response to the Office Action dated July 1, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:
Please cancel claims 41 and 42 without prejudice or disclaimer.
Please revise claim 35 to read as follows:

35. (Amended) An electric apparatus, comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof,

a liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing

Hisense - Exhibit 1002
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Page 360 of 438

f1

into said threaded screw hole on said back frame of said liquid crystal module.

REMARKS

Applicants wish to thank the Examiner for taking time to conduct a telephone interview on December 6, 2002, with the Applicants' representative. During that telephone interview, it was understood by Applicants' representative that the Examiner prefers the wording of claim 35, as revised above, to that of the wording of the Amendment Under 37 CFR 1.116 originally filed on October 23, 2002. Applicants consider this submission as being response to the Examiner's specific request, so that no additional time extension is required

Attached hereto is a marked up version of the changes made to the claims by the current Amendment. The attached page is captioned "**Version with markings to show changes made.**"

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art or for statutory requirements directed to patentability.

It is further noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Entry of this Amendment is proper under 37 C.F.R. §1.116 since no new claims are presented, no new issues are raised, and the claim amendment merely clarifies the wording for the benefit of the Examiner.

Claims 35-37 are all of the claims pending in the present Application. Claims 41 and 42 are canceled above. All pending claims stand rejected under 35 USC §102(e) as

Hisense - Exhibit 1002
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anticipated by US Patent 6,151,207 to Kim.

This rejection is respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

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One advantage of the present invention is that an LCD module can be attached to a mounting frame without taking up additional front surface area.

II. THE PRIOR ART REJECTION

The Examiner asserts that US Patent 6,151,207 to Kim discloses the invention as defined by claims 35-37.

However, a key aspect of the present invention as described by these claims is that it provides a technique in which the LCD module can be attached to the frame without taking up additional front surface area. This result is achieved by using screw holes on the back surface of the LCD module. This technique has the advantage that the display area can be increased to a maximum without limitation of a periphery area required for mounting the LCD module to the frame.

That is, the subject matter of the present invention is that at least one screw penetrates through at least one hole of the frame member from a back side of the frame member, and the

Received from < 703 761 2375 > at 12/9/02 4:02:18 PM [Eastern Standard Time]

at least one screw is screwed into the screw hole over the back frame of the liquid crystal module so that the at least one screw fixes the liquid crystal display module to the frame member. This structural feature of the present invention allows that an overlapping area on an opposite surface to the display surface be useful for fixing the liquid crystal module to the frame member, wherein the overlapping area extends overlapping the display area on the display surface in view of the vertical direction to the display surface. This structural feature makes it unnecessary to provide any additional area such as a peripheral area, and makes it possible to avoid any increase in the area necessary to attach an LCD module.

The rejection on record fails to heed the plain language meaning of the claims. The Examiner refers to Figure 2 and column 4, lines 51-64 of Kim. However, the Kim reference fails to teach, suggest, render obvious, or even hint at the technique described in the claims. More specifically, Kim teaches a method of mounting a flat display panel 20, considered in the rejection as an LCD module, in which screws 24 pass through the LCD module 20 to attach the module to the back frame member 18, using threaded bosses 22. Kim makes no suggestion to pass the attachment screws 24 through the back frame member 18 to attach the LCD module 20 to the back frame member 18, let alone suggesting to have a threaded screw hole on the back surface of the LCD module 20 to which the mounting screw 24 attaches to the back surface.

Indeed, Kim does not even recognize the benefit of saving additional front surface area of an LCD module, let alone building the structure of the present invention that achieves such functional advantage.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of "... a frame member having at least one hole in a first predetermined location through

Received from < 703 761 2375 > at 12/9/02 4:02:18 PM [Eastern Standard Time]

which a screw can pass from a back side thereof; a liquid crystal module having a liquid crystal display panel as a front display area and a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module a back frame forming a back face area of said LCD module, said back frame having at least one threaded screw hole to serve as an attachment for a mounting screw, wherein said mounting screw serves to mount said LCD module to a mounting frame member used on an electronic apparatus" (emphasis by Applicants).

For this reason, the claimed invention is fully patentable over the cited reference.

Further, the other prior art of record has been reviewed, but it too even in combination with Kim fails to teach or suggest the claimed invention.

III. Formal matters and Conclusion

In view of the foregoing, Applicant submits that claims 35-37, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Received from < 703 761 2375 > at 12/9/02 4:02:18 PM [Eastern Standard Time]

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 12/09/02

Frederick E Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254

CERTIFICATION OF TRANSMISSION

I certify that I transmitted via facsimile this Supplemental Amendment under 37 CFR §1.116 to Examiner Thanh-Tam T. Le on December 9, 2002, as requested to (703) 746-7030.

Frederick E. Cooperrider
Reg. No. 36,769

Received from < 703 761 2375 > at 12/9/02 4:02:18 PM [Eastern Standard Time]

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claim 35 has been revised, as follows:

35. (Amended) An electric apparatus [having a mounting structure for mounting a liquid crystal module, said electric apparatus], comprising:

a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof [for mounting a liquid crystal module];

a liquid crystal module having [a back face area opposite to] a liquid crystal display panel as a front display area [, said back face area having a] and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and

at least one screw to fix said liquid crystal module to said frame member [to said back face area, said at least one screw] by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back [face area] frame of said liquid crystal module.

Received from < 703 761 2375 > at 12/9/02 4:02:18 PM [Eastern Standard Time]

Transaction History Date 2002-12-
Date information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov

Notice of Allowability	Application No.	Applicant(s)
	09/459,280	YANO ET AL
	Examiner	Art Unit
	Thanh-Tam T. Le	2839

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/9/02*.
2. ☒ The allowed claim(s) is/are *35-37*.
3. ☒ The drawings filed on *13 December 1999* are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the.
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3 ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
   (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

8. ☐ CORRECTED DRAWINGS must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No. ____.
   (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
   (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1☐ Notice of References Cited (PTO-892)
2☐ Notice of Informal Patent Application (PTO-152)
3☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
4☐ Interview Summary (PTO-413), Paper No.____ .
5☐ Information Disclosure Statements (PTO-1449), Paper No. ____.
6☐ Examiner's Amendment/Comment
7☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
8☒ Examiner's Statement of Reasons for Allowance
9☐ Other

LYNN FIELD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 367 of 438

Allowable Subject Matter

1. Claims 35-37 allowed.

2. The following is an examiner's statement of reasons for allowance:

None of the reference discloses at least one screw to fix the liquid crystal module to the frame member by passing through the at least one hole in the frame member from the back side and screwing into the threaded screw hole on the back frame of the liquid crystal module, in combination with the other claimed elements of the embodiments recited.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Tam T. Le whose telephone number is (703) 306-5711. The examiner can normally be reached on 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached on (703) 308-2710. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TL.
December 9, 2002

LYNN FIELD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D C 20231
www uspto gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

21254 7590 12/13/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THANH TAM T	
ART UNIT	**CLASS-SUBCLASS**
2839	361-681000

DATE MAILED: 12/13/2002

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

TITLE OF INVENTION: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1280	$300	$1580	03/13/2003

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (REV 04-02) Approved for use through 01/31/2004.

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Hisense v. Vista Peak - IPR2023-00725
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Box ISSUE FEE**
Commissioner for Patents
Washington, D.C. 20231
Fax (703)746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

21254 7590 12/13/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

TITLE OF INVENTION: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1280	$300	$1580	03/13/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, THANH TAM T	2839	361-681000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☐ Issue Fee
☐ Publication Fee
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Commissioner is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Commissioner for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature) (Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE(S)

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Hisense v. Vista Peak - IPR2023-00725
Page 371 of 438

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

21254 7590 12/13/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THANH TAM T	
ART UNIT	**PAPER NUMBER**
2839	

DATE MAILED: 12/13/2002

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The patent term adjustment to date is 0 days. If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the term adjustment will be 0 days.

If a continued prosecution application (CPA) was filed in the above-identified application, the filing date that determines patent term adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system. (http://pair.uspto.gov)

Any questions regarding the patent term extension or adjustment determination should be directed to the Office of Patent Legal Administration at (703)305-1383.

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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Page 372 of 438

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D C 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

21254 7590 12/13/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817
UNITED STATES

EXAMINER	
LE, THANH TAM T	

ART UNIT	PAPER NUMBER
2839	

DATE MAILED. 12/13/2002

Notice of Fee Increase on January 1, 2003

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after January 1, 2003, then the amount due will be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there will be an increase in fees effective on January 1, 2003. See Revision of Patent and Trademark Fees for Fiscal Year 2003: Final Rule, 67 Fed. Reg. 70847, 70849 (November 27, 2002).

The current fee schedule is accessible from: http://www.uspto.gov/main/howtofees.htm.

If the issue fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due," but not the correct amount in view of the fee increase, a "Notice to Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice to Pay Balance of Issue Fee," if the response to the Notice of Allowance and Fee(s) due form is to be filed on or after January 1, 2003 (or mailed with a certificate of mailing on or after January 1, 2003), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004.

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Page 373 of 438

#26

2 HM

2839

OIPE JC109 JAN 13 2003 PATENT & TRADEMARK OFFICE

Docket No. PF-2503/NEC/US/mh

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of: Allowed: December 13, 2002

Takakazu Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, Thanh Tam T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

RECEIVED JAN 15 2003 TC 2800 MAIL ROOM

REQUEST FOR ACKNOWLEDGMENT OF INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant respectfully requests that the Information Disclosure Statement, filed on June 18, 2002, citing USPN 5,268,816, 0124408, and JP 8-211964 be officially considered of record. For the Examiner's convenience, another PTO-1449 form is attached hereto.

A Notice of Allowance was issued on December 13, 2002. However the references were not considered.

Therefore, Applicant respectfully requests that the Examiner officially acknowledge the Information Disclosure Statement submitted on June 18, 2002 and make of record the references.

Respectfully submitted,

Frederick Cooperrider

Frederick E. Cooperrider
Registration No.: 36,769

Date: 1/13/03

McGinn & Gibb, P.C.
8321 Old Courthouse Road
Suite 200
Vienna, VA 22182
Customer No. 21254

Match and Return

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 374 of 438

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

Docket Number (Optional)	Application Number
PF-2503/NEC/USmh	09/459,280
Applicant(s)	
Yano, et al.	
Filing Date	**Group Art Unit**
December 13, 1999	2839

JAN 13 2003 PATENT & TRADEMARK OFFICE

RECEIVED JAN 15 2003 TC 2800 MAIL ROOM

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REF	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
TL		5,268,816	12/07/93	Abell, Jr., et al.	—	—	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
TL		0124408	06/11/98	Korea	—	—		
TL		8-211964	08/20/96	Japan	—	—		

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

TL		Korean Office Action dated April 30, 2002, with partial translation.

EXAMINER	DATE CONSIDERED
T. LE	4/21/03

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
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PA-FOC

#27

QUERY CONTROL FORM				RTIS USE ONLY	
Application No.	09/592,220	Prepared by	TW	Tracking Number	7168297
Examiner-GAU	Feild- 2839	Date	5-20-03	Week Date	2-3-03
		No. of queries	1		

JACKET			
a. Serial No.	f. Foreign Priority	k. Print Claim(s)	(p.) PTO-1449
b. Applicant(s)	g. Disclaimer	l. Print Fig.	q. PTOL-85b
c. Continuing Data	h. Microfiche Appendix	m. Searched Column	r. Abstract
d. PCT	i. Title	n. PTO-270/328	s. Sheets/Figs
e. Domestic Priority	j. Claims Allowed	o. PTO-892	t. Other

SPECIFICATION

a. Page Missing
b. Text Continuity
c. Holes through Data
d. Other Missing Text
e. Illegible Text
f. Duplicate Text
g. Brief Description
h. Sequence Listing
i. Appendix
j. Amendments
k. Other

CLAIMS

a. Claim(s) Missing
b. Improper Dependency
c. Duplicate Numbers
d. Incorrect Numbering
e. Index Disagrees
f. Punctuation
g. Amendments
h. Bracketing
i. Missing Text
j. Duplicate Text
k. Other

MESSAGE

There is AN IDS in the file dated 3-12-03 where the references are neither crossed out or initialed. Should these references be printed? If not, please cross out

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Thank You

initials TW

RESPONSE

The supplemental Allowance is being sent out.

TL

initials

E-5 (Rev. 10/01/02)

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Page 376 of 438

OIPE JC34
FEB 26 2003
PATENT & TRADEMARK OFFICE

Docket No. PH-2503/NEC/US/n.

#24/IDS 2&3
4-14-03

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, Thanh Tam T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following document cited in the Korean Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. A copy of the listed document is provided herewith for the convenience of the Examiner.

In compliance with the requirements under 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1.56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the reference was cited. The relevance to the pending U.S. patent application is that the reference was cited in a foreign patent application on the same subject matter. However, no independent analysis of the reference, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the reference is relevant or material to the claims. It is only cited as constituting related art of which the applicant is aware.

Submitted herewith is a check in the amount of $180.00 to cover the IDS fee.

I hereby certify that each item of information contained in this Information Disclosure Statement was the first citation of that item by a foreign patent office in a counterpart foreign application, which occurred not more than three months prior to the filing of this statement.

It is respectfully requested that the listed reference be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

Respectfully submitted,

180.00 OP

Frederick E. Cooperrider
Registration No. 36,769

Date: 2/26/03

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 377 of 438

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

ATTY DOCKET NO.	SERIAL NO.
PF-2503/NEC/US/mh	09/459,280
Yano, et al.	
FILING	GROUP
December 13, 1999	2839

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

OIPE
FEB 26 2003
JC34
PATENT & TRADEMARK OFFICE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS*	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		1999-0066163	08/16/99	Korea	—	—		✓
~~TL~~								

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

TL			Korean Office Action dated January 30, 2003, with Japanese and partial English translations.

EXAMINER	DATE CONSIDERED
T. LE	6/4/03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 378 of 438

Other Prior Art

According to the information contained in form PTO-1449 or PTO-892, there are one or more other prior art/non-patent literature documents missing from the original file history record obtained from the United States Patent and Trademark Office. Upon your request we will attempt to obtain these documents from alternative resources. Please note that additional charges will apply for this service.

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

UNI. 013
FEC/NCW

Attorney's Post Card Filing Receipt

Serial Number: 09/459,280 Papers Filed On: 2/26/03

Attorney's Docket Number: PF-2503/NEC/Uf/mh ☒ Patent ☐ Trademark

Applicant's Name: Yano, et al. Application Filing Date: 12/13/99

Papers Filed Herewith:

☐ Amendment ☐ Request for Extension of Time ☐ CPA Request

☐ Notice of Appeal ☐ Appeal Brief (in triplicate) ☐ Reply Brief

☒ IDS ☒ 1449 Form w/ 1 Documents ☐ Priority Document(s)

☐ Assignment ☐ Recordation Cover Sheet ☐ Formal Drawings

☐ Drawing Corrections ☐ Issue Fee Transmittal ☐ Missing Parts

☒ Other Korean OA dated 01/30/03; with Japanese and partial English translations

Fees Filed Herewith: $ 180.00 ☒ Check ☐ Charge Deposit Account: _____

#8412 Hand Delivered

OIPE FEB 26 2003 JC34 PATENT & TRADEMARK OFFICE

Transaction History Date 2003-03-
Date information retrieved from USPTO Patent Application Information Retrieval (PAIR) system records at www.uspto.gov

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B/H

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Box ISSUE FEE
Commissioner for Patents
Washington, D.C. 20231
Fax (703)746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

21254 7590 12/13/2002

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
Hand Delivered (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

TITLE OF INVENTION: LIQUID CRYSTAL MODULE [illegible] STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Match & Return

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1280	$300	$1580	03/13/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
LE, THANH TAM T	2839	361-681000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 McGinn & Gibb, PLLC
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: NEC Corporation
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Tokyo, JAPAN

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☒ Issue Fee
☒ Publication Fee
☒ Advance Order - # of Copies 5

4b. Payment of Fee(s):

☒ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Commissioner is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-0481 (enclose an extra copy of this form). Def. only

Commissioner for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature) Reg. No. (Date)
Frederick Cooper 36,769 03/12/03

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

03/18/2003 MBERHE1 00000062 09459280
01 FC:1501 1300.00 OP
02 FC:1504 300.00 OP
03 FC:8001 15.00 OP

TRANSMIT THIS FORM WITH FEE(S)

PTOL-85 (REV. 04-02) Approved for use through 01/31/2004. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Docket No. PF-2503/NEC/US 1

#25/Letter Re 1 Shaver 4-14-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

OIPE JC26 MAR 12 2003 PATENT & TRADEMARK OFFICE

In re patent application of Allowed: December 13, 2002

Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, Thanh Tam T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

REQUEST FOR ACKNOWLEDGMENT OF INFORMATION DISCLOSURE STATEMENT

Sir:

Applicant respectfully requests that the Information Disclosure Statement filed on June 18, 2002, citing USPN 5,268,816, Korean 0124408 and JP 8-211964, and the Information Disclosure Statement filed on February 26, 2003, citing Korean 1999-0066163 be officially considered of record. For the Examiner's convenience, two new PTO-1449 forms are attached hereto.

Per our telephone conversation of March 12, 2003 with Examiner Le, the Information Disclosure Statement submitted to the USPTO on February 26, 2003, does not show as having been received.

Therefore, also attached hereto is a copy of the Submission of that Information Disclosure Statement filed February 26, 2003, together with a copy of the postcard with the PTO stamp from that day, as well as a copy of the documents filed on February 26, 2003. No fee is due.

Respectfully submitted,

Frederick E. Cooperrider
Registration No. 36,769

Date: 3/12/03

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

12/02

Docket No. PF-2503/NEC/US/mh

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

OIPE JG26 MAR 12 2003 PATENT & TRADEMARK OFFICE

In re patent application of

Yano, et al.

Serial No.: 09/459,280 Group Art Unit: 2839

Filing Date: December 13, 1999 Examiner: Le, Thanh Tam T.

For: LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

Assistant Commissioner of Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

Under the provisions of 37 CFR §1.97 through §1.99 and pursuant to applicant's duty of disclosure under 37 CFR §1.56, applicant respectfully brings the following document cited in the Korean Office Action and listed on the attached form PTO-1449, to the attention of the Examiner in charge of the above-identified application. A copy of the listed document is provided herewith for the convenience of the Examiner.

In compliance with the requirements under 37 CFR §1.98(a)(3), as a concise statement of relevance, as it is presently understood by the individual designated in 35 U.S.C. §1.56(c) most knowledgeable about the content of the information, the undersigned attorney of record submits a translation of portions of an official action by a foreign examiner in which the reference was cited. The relevance to the pending U.S. patent application is that the reference was cited in a foreign patent application on the same subject matter. However, no independent analysis of the reference, the accuracy of the statement of the foreign examiner or the claims of the foreign application under the laws of that country or the United States relative to the subject matter claimed in the present application has been made, the present understanding of the contents thereof by the undersigned being based on the translation of the foreign examiner's comments submitted herewith.

This citation does not constitute an admission that the reference is relevant or material to the claims. It is only cited as constituting related art of which the applicant is aware.

Submitted herewith is a check in the amount of $180.00 to cover the IDS fee.

I hereby certify that each item of information contained in this Information Disclosure Statement was the first citation of that item by a foreign patent office in a counterpart foreign application, which occurred not more than three months prior to the filing of this statement.

It is respectfully requested that the listed reference be considered by the Examiner and formally made of record in this application.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-0481.

Respectfully submitted,

Frederick E. Cooperrider
Registration No. 36,769

Date: 2/26/03

McGinn & Gibb, PLLC
Intellectual Property Law
8321 Old Courthouse Road, Suite 200
Vienna, VA 22182-3817
(703) 761-4100
Customer No. 21254

INFORMATION DISCLOSURE CITATION

(Use several sheets if necessary)

ATTY DOCKET NO.	SERIAL NO.
PF-2503/NEC/US/mh	09/459,280
Yano, et al.	
FILING	GROUP
December 13, 1999	2839

OIPE
MAR 12 2003
PATENT & TRADEMARK OFFICE

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
TL		1999-0066163	08/16/99	Korea	—	—		✓

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

TL			Korean Office Action dated January 30, 2003, with Japanese and partial English translations.

EXAMINER	DATE CONSIDERED
T LE	6/403

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 384 of 438

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/459,280	12/13/1999	TAKAKAZU YANO	PF-2503/NEC/	9955

21254 7590 06/10/2003

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
LE, THANH TAM T	
ART UNIT	PAPER NUMBER
2839	

DATE MAILED: 06/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

SUPPLEMENTAL

Notice of Allowability

Application No.	Applicant(s)	
09/459,280	YANO ET AL	
Examiner	**Art Unit**	
Thanh-Tam T. Le	2839	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/28/03.
2. ☐ The allowed claim(s) is/are ____.
3. ☐ The drawings filed on ____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f)
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. ____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17 2(a)).

   * Certified copies not received: ____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C § 119(e) (to a provisional application)
   (a) ☐ The translation of the foreign language provisional application has been received
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C §§ 120 and/or 121

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below Failure to timely comply will result in ABANDONMENT of this application **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

8. ☐ CORRECTED DRAWINGS must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No. ____.
   (b) ☐ including changes required by the proposed drawing correction filed ____, which has been approved by the Examiner
   (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No ____

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1☐ Notice of References Cited (PTO-892)
2☐ Notice of Informal Patent Application (PTO-152)
3☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
4☐ Interview Summary (PTO-413), Paper No. ____
5☒ Information Disclosure Statements (PTO-1449), Paper No. 24,25
6☐ Examiner's Amendment/Comment
7☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
8☐ Examiner's Statement of Reasons for Allowance
9☐ Other

LYNN FEILD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 386 of 438

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2003-07-15

Document Title - USPTO Grant

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The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2004-09-17

Document Title - USPTO Communication Re: Change of Address

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File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2011-05-26

Document Title - USPTO Communication Re: Change of Address

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/459,280	12/13/1999	TAKAKAZU YANO	

CONFIRMATION NO. 9955

POA ACCEPTANCE LETTER

23623
TUROCY & WATSON, LLP
127 Public Square
57th Floor, Key Tower
CLEVELAND, OH 44114

OC000000047911785

Date Mailed: 05/27/2011

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/20/2011.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/deelliott/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 390 of 438

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2018-07-18

Document Title - USPTO Communication Re: Change of Address

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The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2018-07-19

Document Title - USPTO Communication Re: Power of Attorney

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整理番号　７４６１０３０６　　発送番号　１６７８４８
発送日　平成１３年　６月１２日　　１／　２

拒絶理由通知書

特許出願の番号	平成１０年　特許願　第３５３５７９号
起案日	平成１３年　６月　１日
特許庁審査官	塩澤　克利　　７７１６　３Ｘ００
特許出願人代理人	高橋　詔男　　（外　３名）様
適用条文	第２９条第２項

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から６０日以内に意見書を提出して下さい。

理　由

この出願の下記の請求項に係る発明は、その出願前日本国内又は外国において頒布された下記の刊行物に記載された発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第２９条第２項の規定により特許を受けることができない。

記　　（引用文献等については引用文献等一覧参照）

・請求項　　１～６
・引用文献等　　１～３
・請求項　　７～８
・引用文献等　　２、３
・請求項　　９～１１
・引用文献等　　２～４
・請求項　　１２～１６
・引用文献等　　２～５

続葉有

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 393 of 438

続　紙

・備考
引用文献１には、液晶表示体モジュールの面に重ねられるブラケットと液晶表示体モジュールとを当接面に対して直交する方向に取付ねじで固定する構成が記載されている。
引用文献２には、ＬＣＤユニットに取り付けた固定具を内側カバーのコンピュータ本体との起伏階転用の連結凸部でねじ固定した構成が記載されている。
引用文献３には、ＬＣＤユニットをＬＣＤ下ケース（蓋体に相当）に固定する構成が記載されている。
引用文献４には、保護カバーを主ディスプレイ・ケーシングにねじ固定することにより、保護カバーと主ディスプレイ・ケーシングとの間でモニター表示部を挟持する構成が記載されている。
引用文献５には、リアルシールドケースとフロントシールドケースとをそれぞれに設けた連結機構により固定する構成が記載されている。
・引用文献等一覧
１．特開平９－１１３８８０号公報
２．特開平５－１５０２２４号公報
３．特開平８－２１１９６４号公報
４．実願平２－９７６５１号（実開平４－５５６１９号）のマイクロフィルム
５．特開平９－１４６４６６号公報

この拒絶理由通知書中で指摘した請求項以外の請求項に係わる発明については、現時点では、拒絶の理由を発見しない。拒絶の理由が新たに発見された場合には拒絶の理由が通知される。

先行技術文献調査結果の記録

・調査した技術分野　　ＩＰＣ第７版　Ｇ０９Ｆ　９／００、Ｇ０２Ｆ１／１３３３、Ｈ０５Ｋ３／３４

・先行技術文献
１．特開平４－３３１９７６号公報
２．特開平８－１１４７８８号公報
３．特開平４－５１５９５号公報

この先行技術文献調査結果は、拒絶理由を構成するものではない。

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 394 of 438

UNI.013

The applicant asserts the following in the Opinion Document dated August 10 2001. "Since the characteristics of the construction of the invention of the present application improve the display area ratio, "the "liquid crystal module" is secured from the rear surface of the "bottom plate" by means of a screw ("coupling member") relative to "the crystal module display region" in order to improve the display surface area ratio. Furthermore,... the display area ratio can be improved." (from line 23 on page 1). "On the one hand, Citations 1-3, in the region on the external side separated from the display region of any of the crystal modules, screw stops the crystal module and the bottom plate. Because of this,... the display area ratio is completely reduced." (From line 5 of page 2).

However, since securing other constructed products with a screw from the rear side of the liquid crystal module display region is known, for example, from such as that recorded in Construction 43 of Figure 12 of Japanese Laid Open Patent Application Hei 10-301095, as indicated in Citation 1, the point of stopping a screw (Construction 8 of Fig. 4) from the rear side of the display region of the liquid crystal module is not recognized as being something of exceptional difficulty to one skilled in the art.

整理番号　７４６１０３０６　　発送番号　５２６０８８
発送日　平成１３年１０月２３日　　１／　１

拒絶査定

特許出願の番号	平成１０年　特許願　第３５３５７９号
起案日	平成１３年１０月１６日
特許庁審査官	仁木　浩　　８０１１　３Ｘ００
発明の名称	液晶モジュール支持構造及びこれを搭載する携帯用端末装置
特許出願人	日本電気株式会社
代理人	高橋　詔男（外　３名）

この出願については、平成１３年　６月　１日付け拒絶理由通知書に記載した理由によって、拒絶をすべきものである。

なお、意見書並びに手続補正書及び誤訳訂正書の内容を検討したが、拒絶理由を覆すに足りる根拠が見いだせない。

備考

出願人は平成１３年８月１０日付けの意見書において以下の主張を行っている。

「本願発明の構成の特徴は、表示面積比率を向上させるため、「液晶モジュール」と「底板」とを、「液晶モジュールの表示領域」に対応する「底板」の裏面から、「液晶モジュール」をねじ（「連結部材」）により固定している。したがって、・・・表示面積比率を向上することができる。」　（第１ページ２３行～）

「一方、引例１～引例３は、いずれも液晶モジュールの表示領域をはずれた外側の領域で、この液晶モジュールと底板とをねじ止めしている。このため、・・・表示面積比率が減少してしまう。」（第２ページ第５行～）

しかしながら、液晶モジュールの表示領域の裏側からねじで他の構成部品を固定することは例えば特開平１０－３０１０９５号公報の図１２の構成４３に記載されているように周知であることから、引例１に記載されたねじ（図４の構成８）を液晶モジュールの表示領域の裏側から止める点が当業者にとって格別なものとは認められない。

したがって、上記の出願人の主張を採用することができない。

上記はファイルに記録されている事項と相違ないことを認証する。
認証日　平成１３年１０月１７日　　経済産業事務官　塚本　佳雅

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〈翻訳文〉

発送番号：9-5-2002-015440271
発送日付：2002.04.30
提出期日：2002.06.30

Your Ref.: PF-2504/NEC/KO/mh
Our Ref.: P99091-UNI
出願番号：10-1999-0056493

特許庁

意見提出通知書

出 願 人　氏名 日本電気株式会社(出願人ｺｰﾄﾞ：519980608801)
　　住所 日本国東京都港区芝5丁目7番1号
代 理 人　氏名 崔遠龍
　　住所 ソウル江南区駅三洞823-1 豊林ﾋﾞﾙ 5階
出願番号　10-1999-0056493
発明の名称　LIQUID CRYSTAL MODULE SUPPORTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

この出願に対する審査結果、下記のような拒絶理由があり特許法第63条の規定によりこれを通知しますので、意見があったり補正が必要な場合には上記の提出期日までに意見書または/及び補正書を提出して下さい。(上記の提出期日に対して毎回1ヶ月単位で延長を申請することができ、この申請に対して別途の期間延長承認の通知はしません。)

【理由】

この出願の特許請求範囲第1～16項に記載された発明は、その出願前にこの発明が属する技術分野で通常の知識を有した者が下記に指摘したことにより容易に発明することができるものであるため、特許法第29条第2項の規定により特許を受けることができません。

【下記】

1. 本願は蓋体の底板に液晶モジュールを実装し、上記の底板と交差する方向に挿入された連結部材により液晶モジュールを固定することを特徴とする液晶モジュール取付構造に関するもので、本願と引用発明1(米国特許公報5268816、1993.12.7.公告)、引用発明2(日本公開特許公報1998-211964、1996.8.20.公開)及び引用考案(実用新案公報1998-124408、1998.6.11.公報)を比較してみると、本願の請求範囲第1～5項の蓋体、底板、連結部材を用いた液晶モジュール取付構造は引用考案の後面カバー10、シールドプレート11、装着板14を利用したLCD12の装着構造に対応され、第6～8項の蓋体と底板と液晶モジュールと縁体をコンピュータ本体に連結する液晶モジュール取付構造は引用発明1のtop cover 16、rear screen cover 32、display screen 30、front screen cover 31がhinge portion 89によりbottom cover 12に結合する構造に対応され、第9～第10項の底板や縁体が液晶モジュールと蓋体の凸部で連結された液晶モジュール取付構造は引用発明2のLCD 1がLCD上フレーム17の脚20を介してLCD下ケース22の凸部でねじで連結される構造に対応され、第11～13項の連結片と突起部で構成された連結機構を利用して底板と縁体を連結する構造は引用発明1のrear screen cover 32とfront screen cover31を連結する構造に対応され、第14～15項の胴体とコンピュータ本体との連結構造は引用発明1のtop cover 16とbottom cover 12の連結構造、引用発明2のシールドプレート11とLCD12の連結構造に対応され、第16項の蓋体に液晶モジュールを固定する構造は引用考案のLCD12を後面カバー10に固定する構造及び引用発明1のtop cover 16とbottom cover 12の連結構造に対応されて構成要素の採択困

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難性が認められず、液晶モジュールの表示面比率を大きくすることができ、コンピュータの組み込み効率を向上させることができるという本願の目的及び効果かつ引用考案及び引用発明1、2の構成から予測可能なものであるところ、本願は当業者が引用考案及び引用発明1、2の結合から容易に発明することができるものと判断されます。

この出願は明細書または図面及び特許請求範囲の記載が下記に指摘したように不備で特許法第42条第3項及び第4項の規定による要件を満たすことができないため、特許を受けることができません。

1. 詳細な説明で次の事項が不明瞭です。

1) 詳細な説明の構成要素と対応される符号が全般的に互いに一致していない(例：ねじ溝(1a)、ねじ溝は1bであり、1aは表示面である等多数)。

2) 詳細な説明に当業者が容易に実施することができる程に本願構成要素間の相互結合関係が記載されていない。

2. 請求範囲で次の事項が不明瞭です。

1) 第1項～第16項は発明が明確で簡潔に記載されていない。
(例：第1項の“これ”“間に挟む部材”等請求範囲全般に亘って指示するところが不分明な記載が多数あり保護を受けようとする事項が不分明である)。

2) 第6、8項には盤体とコンピュータ本体の連結のための構成要素が記載されていない。

3) 第14項は請求範囲の作成方法に違背される(第14項は第11～第13項の従属項であるが引用項などに胴体がなく、第13項は複数の項を引用する従属項として第14項の引用項になることができない)。

【添付】
添付1 米国特許公報5268816号の写し 1部
添付2 登録実用新案公報1998-124408号の写し 1部
添付3 日本公開特許公報1996-211964号の写し 1部 以上。

2002.04.30

特許庁 審査4局
審査官

UNI.013

출력 일자: 2002/5/2

발송번호 : 9-5-2002-015440271
발송일자 : 2002.04.30
제출기일 : 2002.06.30

수신 : 서울 강남구 역삼동 823-1 풍림빌딩 5층(
최달용국제특허법률사무소)
최달용 귀하

135-080

특허청
의견제출통지서

출원인 명칭 닛뽄덴끼 가부시끼가이샤 (출원인코드: 519980608801)
주소 일본국 도요쿄오도 미나토구 시바 5쵸오메 7반 1고

대리인 성명 최달용
주소 서울 강남구 역삼동 823-1 풍림빌딩 5층(최달용국제특허법률사무소)

출원번호 10-1999-0056493

발명의 명칭 액정모듈 지지구조 및 이것을 탑재하는 휴대용 단말장치

이 출원에 대한 심사결과 아래와 같은 거절이유가 있어 특허법 제63조의 규정에 의하여 이를 통지하오니 의견이 있거나 보정이 필요할 경우에는 상기 제출기일까지 의견서 또는/및 보정서를 제출하여 주시기 바랍니다. (상기 제출기일에 대하여 매회 1월 단위로 연장을 신청할 수 있으며, 이 신청에 대하여 별도의 기간연장승인통지는 하지 않습니다.)

[이 유]

이 출원의 특허청구범위 제 1~16항에 기재된 발명은 그 출원전에 이 발명이 속하는 기술분야에서 통상의 지식을 가진 자가 아래에 지적한 것에 의하여 용이하게 발명할 수 있는 것이므로 특허법 제29조제2항의 규정에 의하여 특허를 받을 수 없습니다.

- 아 래 -

1. 본원은 무선통신기기의 하우징에 액정모듈을 실장하고 상기 하우징과 교차하는 방향으로 삽입된 연결부재에 의해 액정모듈을 고정하는 것을 특징으로 하는 액정모듈 부착구조에 관한 것으로, 본원과 인용발명1(미국특허공보 5268816, 1993. 12. 7 공고), 인용발명2(일본공개특허공보 1996-211964, 1996. 8. 20 공개) 및 인용고안(실용신안공보 1998-124408, 1998. 6. 11 공고)을 비교하여 보면, 본원의 청구범위 제1~5항의 무선통신기기, 하우징, 연결부재를 이용한 액정모듈 부착구조는 인용고안의 후면커버10, 시일드플레이트11, 장착판 14를 이용한 LCD12의 장착구조에 대응되고, 제6~8항의 무선통신기기와 하우징과 액정모듈과 테두리체를 컴퓨터 본체에 연결하는 액정모듈부착구조는 인용발명1의 top cover 16, rear screen cover 32, display screen 30, front screen cover 31이 hinge portion 89에 의해 bottom cover 12에 결합하는 구조에 대응되며, 제9~제10항의 바닥판이나 테두리체가 액정모듈과 무선통신기기의 본체부에서 연결된 액정모듈부착구조는 인용발명2의 LCD 1이 LCD스프레임 17의 pin 20을 통해 LCD下케이스 22의 본체부에서 나사로 연결되는 구조에 대응되며, 제11~13항의 연결편과 돌기부로 구성된 연결기구를 이용하여 바닥판과 테두리체를 연결하는 구조는 인용발명1의 rear screen cover 32와 front screen cover 31을 연결하는 구조에 대응되며, 제14~15항의 몸체와 컴퓨터 본체와의 연결구조는 인용발명1의 top cover 16과 bottom cover 12의 연결구조, 인용발명2의 시일드플레이트 11과 LCD12의 연결구조에 대응되며, 제16항의 무선통신기기에 액정모듈을 고정하는 구조는 인용고안의 LCD12를 후면커버 10에 고정하는 구조 및 인용발명1의 top cover 16과 bottom cover 12의 연결구조에 대응되어 구성요소의 채택관련성이 인정되지 않으며, 액정모듈의 표시면 비율을 크게 할 수 있고 컴퓨터의 조립효율을 향상시킬 수 있다는 본원의 목적 및 효과 또한 인용고안 및 인용발명1, 2의 구성으로부터 예측가능한 것인바, 본원은 당업자가 인용고안 및 인용발명1, 2의 결합으로부터 용이하게 발명할 수 있는 것으로 판단됩니다.

이 출원은 명세서 또는 도면 및 특허청구범위의 기재가 아래에 지적한 바와 같이 불비하여 특허법 제42조제3항 및 제4항의 규정에 의한 요건을 충족하지 못하므로 특허를 받을 수 없습니다.

1. 상세한 설명에서 다음 사항이 불명료합니다.
1) 상세한 설명의 구성요소와 대응되는 부호가 전반적으로 서로 일치하지 않음(예 : 나사구멍(1a), 나사구멍은 1b이며, 1a는 표시면임 등 다수).
2) 상세한 설명에 당업자가 용이하게 실시할 수 있을 정도로 본원 구성요소간의 상호 결합관계가 기재되어 있지 않음.

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2. 청구범위에서 다음 사항이 불명료합니다.
1) 제1항~제16항은 발명이 명확하고 간결하게 기재되어 있지 않음
(예 : 제1항의 "이것", "사이에 끼는 부재" 등 청구범위 전반에 걸쳐 지시하는 바가 불분명한 기재가 다수 있어 보호받고자 하는 사항이 불분명함.
2) 제6, 8항에는 두 객체와 컴퓨터 본체의 연결을 위한 구성요소가 기재되어 있지 않음.
3) 제14항은 청구범위 작성방법에 위배됨(제14항은 제11~제13항의 종속항이나 인용항들에 종체가 없으며, 제13항은 복수의 항을 인용하는 종속항으로서 제14항의 인용항이 될 수 없음).

[첨 부]
첨부 1 미국특허공보5268816
첨부2 등록실용신안공보 1998-124408
첨부3 일본공개특허공보 1996-211964 끝.

2002.04.30

특허청 심사4국

통신 심사담당관실 심사관 박형식

<<안내>>

문의사항이 있으시면 ☎ 042)481-5710 로 문의하시기 바랍니다.

특허청 직원 모두는 깨끗한 특허행정의 구현을 위하여 최선을 다하고 있습니다. 만일 업무처리과정에서 직원의 부조리행위가 있으면 신고하여 주시기 바랍니다.
▶ 홈페이지(www.kipo.go.kr)내 부조리신고센터

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<翻訳文>

発送番号：9-5-2003-003715164
発送日付：2003.01.30
提出期日：2003.03.30

Your Ref.: PF-2504/NEC/KO/mh
Our Ref.: P99091-UNI
出願番号：10-1999-0056493

特許庁

意見提出通知書

出願人　名称 日本電気株式会社（出願人コード：519980606801）
　　住所 日本国東京都港区芝5丁目7番1号
代理人　氏名 弁理士
　　住所 ソウル江南区駅三洞823-1 景林ビル 5階
出願番号　10-1999-0056493
発明の名称　LIQUID CRYSTAL MODULE SUPPORTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

この出願に対する審査結果、下記のような拒絶理由があり特許法第63条の規定によりこれを通知しますので、意見があったり補正が必要な場合には上記の提出期日までに意見書または/及び補正書を提出して下さい。（上記の提出期日に対して毎回1ヶ月単位で延長を申請することができ、この申請に対して別途の期間延長承認の通知はしません。）

【理由】

この出願発明はその出願した日の前に出願した出願としてこの出願後に公開された1999年特許登録出願第1833号（特許1999-65163号公開公報参照）の出願書に最初に添付した明細書または図面に記載された発明と同一なものであるため（この出願の発明者がその出願前に出願した上記発明者と同一でなく、かつこの出願時出願人がその出願前に出願した上記特許登録出願の出願人と同一でない）、特許法第29条第3項の規定により特許を受けることができません。

－下　線－

1. 本願の請求範囲第17項乃至第23項は、液晶モジュールと筐体が上記の底板から垂直方向に連結部材により固定されるため、筐体の横方向への影響が液晶モジュールを底板に固定するための連結部を構成しても筐体の全体の面積が大きくならず、筐体の面積に対する液晶モジュールの表示面の比率を大きくすることができる液晶ディスプレイに関するもので有り、

99-66163

引用参証（公開特許公報1999-65163、1999.1.22出願、1999.8.16公開）は、LCDモジュールの後面に形成されたマウントホールとノートPCバックケースの挿入ホールを介してインナーナットとしてノートPCバックケースの後面から結合することによりLCDモジュール自体の大きさが減少し、これによりノートブックコンピュータの大きさが小さくなり、重さが軽くなり、また作業が容易かつ信頼性が向上されるようにしたLCDモジュールの結着構造に関するもので、

本願と引用参証を比較してみると、

本願と引用参証共に液晶モジュールと筐体が上記底板から垂直方向に連結部材により固定されて筐体の横方向への影響が液晶モジュールを底板に固定するための連結部

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を構成しても、基体全体の面積が大きくならず、基体の面積に対する液晶モジュールの表示面の比率を大きくすることができるようにするという目的及び効果が同一であり、

構成においても、本願の特徴的技術構成である液晶ディスプレイのディスプレイ領域に対応する領域内に備えられた貫通孔、貫通孔を通過する固定部材は引用参証のマウントホール、インナーナットとそれぞれ同一であるところ、

本願の請求範囲第17項乃至第23項は引用参証と実質的に同一なものと判断されます。

この出願は特許請求範囲の記載が下記に指摘したように不備で特許法第42条第4項の規定による要件を満たすことができないため、特許を受けることができません。

- 下 記 -

1. 請求範囲第17項及び第21項に"液晶ディスプレイパネルが取り付けられたねじを有したベース部材"と記載しているが、詳細な説明にベース部材に対する記載されていないところ、請求範囲第17項及び第21項は詳細な説明により裏付けられるとみられません。

2. 請求範囲第18項及び第22項で"電気装置の一部分"が指示するところが不分明であるため、発明が明確かつ簡潔に記載されているとみることができません。

【添付】
添付1 韓国公開特許公報1999-66163号(1999.08.16) 1部 以上。

2003.01.30

1999-66163

特許庁 審査4局
審査官

UNI.013

송달 일자: 2003/2/3

발송번호 : 9-5-2003-0037715184
발송일자 : 2003.01.30
제출기일 : 2003.03.30

수신 : 서울 강남구 역삼동 823-1 동림빌딩 5층(
최달용국제특허법률사무소)
최달용 귀하

135-080

특허청
의견제출통지서

출원인 명칭 닌텐도엠이 가부시키가이샤 (출원인코드: 519980006801)
주소 일본국 도요코오도 미나토구 사바 5쵸오메 7반 1고

대리인 성명 최달용
주소 서울 강남구 역삼동 823-1 동림빌딩 5층(최달용국제특허법률사무소)

출원번호 10-1999-0056423

발명의 명칭 액정모듈 지지구조 및 이것을 구비하는 휴대용 단말장치

이 출원에 대한 심사결과 아래와 같은 거절이유가 있어 특허법 제63조의 규정에 의하여 이를 통지하오니 의견이 있거나 보정이 필요할 경우에는 상기 제출기일까지 의견서 또는/및 보정서를 제출하여 주시기 바랍니다. (상기 제출기일에 대하여 매회 1월 단위로 연장을 신청할 수 있으며, 이 신청에 대하여 별도의 기간연장승인통지는 하지 않습니다.)

[이 유]

이 출원발명은 그 출원한 날전에 또 출원으로서 이 특허출원 후에 공개된 1998년 특허출원(특허 제 1833호(특허 1998-66163호 공개공보참조)의 명세서에 최초로 첨부된 명세서 또는 도면에 기재된 발명과 동일한 것이므로 (이 출원의 발명자가 그 출원전에 출원한 상기 선출원의 출원인과 동일하지 않으며 또한 이 출원시 출원인이 그 출원전에 출원한 상기 선출원발명의 출원인과 동일하지 않음) 특허법 제29조제3항의 규정에 의하여 특허를 받을 수 없습니다.

- 아 래 -

1. 본원의 청구범위 제17항 내지 제23항은 액정모듈과 무선체가 상기 바닥판으로부터 수직방향으로 연결부재에 의해 고정되기 때문에 무선체의 가로방향으로의 힘이 액정모듈을 바닥판에 고정하기 위한 연결부를 구성하더라도, 무선체 전체의 면적이 커지지 않고, 무선체의 면적에 대한 액정모듈의 표시면의 비율을 크게 할 수 있도록 한다는 액정디스플레이에 관한 것이며,

인용발명(공개특허공보 1998-66163, 1998. 1. 26 공개, 1999. 8. 16 유가)은 LCD 모듈의 후면에 알루미 아몰드틀과 노트 PC 백 케이스의 실딩플럭 형하여 인너너트로서 노트 PC 백 케이스의 추면으로부터 결합으로서 LCD 모듈 자체의 크기가 감소하여 이에 따라 노트북 컴퓨터의 크기가 작아지고 무게가 가벼워지며, 또한 작업이 용이하고 신뢰성이 향상되도록 한 멀씨디 모듈의 장착구조에 관한 것으로

본원과 인용발명을 비교하여 보면,

본원과 인용발명은 모두 액정모듈과 무선체가 상기 바닥판으로부터 수직방향으로 연결부재에 의해 고정되어 무선체의 가로방향으로의 힘이 액정모듈을 바닥판에 고정하기 위한 연결부를 구성하더라도, 무선체 전체의 면적이 커지지 않고, 무선체의 면적에 대한 액정모듈의 표시면의 비율을 크게 할 수 있도록 한다는 목적 및 효과가 동일하고,

구성에 있어서도 본원의 특징적 기술구성인 액정디스플레이의 디스플레이 영역에 대응하는 위치에 구비된 관통구멍, 관통구멍을 통과하는 고정부재는 인용발명의 이면프레임, 인너너트와 각각 동일한바,

본원의 청구범위 제17항 내지 제23항은 인용발명과 실질적으로 동일한 것으로 판단됩니다.

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출력 일자: 2003/2/3

이 출원은 특허청구범위의 기재가 아래에 지적한 바와 같이 불비하여 특허법 제42조제4항의 규정에 의한 요건을 충족하지 못하므로 특허를 받을 수 없습니다.

- 아 래 -

1. 청구범위 제17항 및 제21항에 "백색 디스플레이 패널이 부착된 리지를 가진 베이스 부재"라고 기재하고 있으나 상세한 설명에 베이스 부재에 대한 기재가 되어 있지 않는바, 청구범위 제17항 및 제21항은 상세한 설명에 의해 뒷받침된다고 볼 수 없습니다.

2. 청구범위 제18항 및 제22항에서 "결기홈의 일부분"이 지시하는 바가 불분명하여 발명이 명확하고 간결하게 기재되어 있다고 볼 수 없습니다.

[첨 부]
참부1 한국공개특허공보 1999-65183호(1999.08.16) 1부 끝.

2003.01.30

특허청 심사4국

통신심사담당관실 심사관 김동성

심사관 박형식

<<안내>>

문의사항이 있으시면 ☎ 042-481-5710 로 연락하시기 바랍니다.

특허법 등에 따르는 제출한 기여특허에 우편을 위해서 최선을 다하고 있습니다. 만일 업무처리과정에서 착오로 부족하게 되었다면 신고하여 주시기 바랍니다.
▶ 홈페이지(www.kipo.go.kr)내 부조리신고센터

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韓国公開特許公報(1999-0066163)

(57)請求範囲

請求項 1.

ノートブックコンピュータのケースにLCDモジュールを装着する構造において、

前記LCDモジュールの後面4角に内部にねじが形成されたマウントホールが形成され、前記バックケースの前記マウントホールに対応する位置に挿入ホールが形成されてインナーナットが前記挿入ホールを介して前記マウントホールのねじに結合されることを特徴とするLCDモジュールの装着構造。

請求項 2.

前記挿入ホールが形成される位置に前記インナーナットを受容する受容ホールが形成されることを特徴とする請求項1記載のLCDモジュールの装着構造。

請求項 3.

前記受容ホールは前記ノートブックコンピュータのバックケースと一体に形成されることを特徴とする請求項2記載のLCDモジュールの装着構造。

공개특허특1999-0086163

(19) 대한민국특허청(KR)
(12) 공개특허공보(A)

(51) Int. Cl.[6]
G09F 1/16

(11) 공개번호 특1999-0086163
(43) 공개일자 1999년08월16일

(21) 출원번호 10-1998-0001533
(22) 출원일자 1998년01월22일

(71) 출원인 삼성전자 주식회사 윤종용

(72) 발명자 경기도 수원시 팔달구 매탄3동 416
이익환

(74) 대리인 경기도 용인시 기흥읍 농서리 산 24
임광섭, 정영명, 최재희

심사청구 : 없음

(54) 엘씨디 모듈의 결착구조

요약

LCD 모듈의 후면에 형성된 마운트홈과 노트 PC 의 케이스의 삽입돌을 이용하여 인너너트로서 노트 PC 의 케이스의 후면으로부터 결합함으로서 LCD 모듈 자체의 크기가 감소하며 이에 따라 노트북 컴퓨터의 크기가 작아지고 무게가 가벼워지며, 또한 작업이 용이하고 신뢰성이 향상되는 이점이 있다.

대표도

도3

명세서

도면의 간단한 설명

도 1은 일반적인 LCD 모듈의 결착구조를 개략적으로 나타낸 사시도이고,

도 2는 본 발명에 의한 LCD 모듈의 구조를 개략적으로 나타낸 평면도이며,

도 3은 본 발명에 의한 LCD 모듈과 노트 PC 의 케이스가 결합된 상태를 나타낸 단면도이다.

<도면의 주요부분에 대한 부호의 설명>

1 : LCD 모듈 10 : 몸 사시
20 : 마운트부 22 : 인너너트
23 : 삽입돌 24 : 마운트홈
25 : 수용홈 30 : LCD 패널
50 : 노트북 컴퓨터 백 케이스
60 : 노트북 컴퓨터 프론트 케이스

발명의 상세한 설명

발명의 목적

발명이 속하는 기술 및 그 분야의 종래기술

본 발명은 LCD 모듈의 결착구조에 관한 것으로, 더욱 상세하게는 LCD 모듈을 백 마운팅(back mounting) 방식으로 결착하기 위한 LCD 모듈의 결착구조에 관한 것이다.

일반적으로 널리 사용되고 있는 표시장치로 중의 하나인 CRT(cathode ray tube)는 TV를 비롯해서 계측기기, 정보 단말기 등의 모니터에 주로 이용되고 있으나, CRT 자체의 무게나 크기로 인해 전자 제품의 소형화, 경량화의 요구에 적극 대응할 수 없었다. 이러한 CRT를 대체하기 위해 소형, 경량화의 장점을 갖고 있는 LCD 모듈이 활발하게 개발되어 왔으며, 최근에는 평판 표시장치로서의 역할을 충분히 수행할 수 있을 정도로 개발되어 LCD 모듈의 수요가 증가하고 있다.

일반적으로 현재 시중 판매 중인 대부분의 노트북 컴퓨터에는 표시장치로서 LCD 모듈이 채용되고 있다. 따라서 노트북 컴퓨터가 소형화, 경량화되어 가고 있는 실정에서 LCD 모듈의 소형화 및 경량화는 필수적인 요건이 되고 있다. 이는 노트북 컴퓨터에 있어서 LCD 모듈은 가장 큰 면적과 무게를 차지하고 있기 때문이다.

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이와 같이 LCD 모듈의 면적을 줄이기 위한 시도로 LCD 모듈을 노트북 컴퓨터의 케이스(이하 '노트 PC 케이스'라 함)에 장착하는 방식에 대한 검토가 연구되어 졌다.

발명이 이루고자하는 기술적 과제

도 1을 참조하면, 톱 마운팅(top mounting) 방식에 적용되는 LCD 모듈이 도시되어 있다. 즉, 노트 PC 케이스와 결합시키기 위해서 LCD 모듈(1)의 측면에 마운트부(20)를 형성되어 있다. 이에 따라 전체적인 LCD 모듈의 크기가 커진다는 문제점이 있다.

여기서, 미도시 부호 10은 램 시시이고 30은 LCD 모듈이다.

또한, 사이드 마운팅(side mounting) 방식으로 결합할 수 있는 바, 이 경우에는 필요한 면적을 최소화시킬 수는 있지만, 결합하는 과정이 어렵고 신뢰성이 저하한다는 문제점이 있다.

따라서, 본 발명은 상기와 같은 문제점을 감안하여 안출된 것으로써, 노트 PC 케이스와 LCD 모듈을 탑 마운팅 방식으로 결합시켜 LCD 모듈의 크기를 줄이는데 있다.

발명의 구성 및 작용

본 발명에 따르면, 노트북 컴퓨터의 케이스에 LCD 모듈을 장착하는 구조에 있어서, LCD 모듈의 후면 네 모서리에 내부에 나사가 형성된 마운트홀이 형성되고, 탑 케이스에는 마운트홀에 대응하는 위치에 삽입홀이 형성되어 인너너트가 삽입홀을 통하여 마운트홀의 나사에 결합된다.

이때, 바람직하게, 삽입홀이 형성되는 위치에 인너너트를 수용하는 수용홀이 형성될 수 있다. 수용홀은 사출성형에 의해 노트북 컴퓨터의 탑 케이스와 일체로 형성될 수 있다.

이하 본 발명에 의한 LCD 모듈의 장착구조를 첨부된 도면 도 2 및 도 3을 참조하여 설명하면 다음과 같다.

LCD 모듈(1)의 후면에는 노트 PC 탑 케이스(50)와 결합하기 위한 마운트홀(24)이 네 모서리에 형성된다. 마운트홀(24)의 내부에는 인너너트(22)와 나사 결합할 수 있도록 나사가 형성된다.

또한 노트 PC 탑 케이스(50)에는 LCD 모듈(1)의 마운트홀(24)에 대응하는 위치에 삽입홀(23)이 형성된다. 또한 바람직하게 인너너트(22)가 노트 PC 탑 케이스(50) 외측으로 돌출되지 않도록 수용홀(25)이 형성된다. 바람직하게, 수용홀(25)은 노트 PC 탑 케이스(50)를 사출 성형할 때, 일체로 형성할 수 있다.

이와 같은 구조의 LCD 모듈(1)을 노트 PC에 조립하는 방법에 대해 설명한다.

먼저, LCD 모듈(1)의 마운트홀(22)과 노트 PC 탑 케이스(50)의 삽입홀(23)의 중심이 일치하도록 정렬시킨다.

이어 노트 PC 탑 케이스(50)의 후면으로부터 인너너트(22)를 끼우면, 인너너트(22)는 삽입홀(23)을 통과하여 마운트홀(24) 내부에 형성된 나사와 결합하여 LCD 모듈(1)을 노트 PC 탑 케이스(50)에 고정시키게 된다. 이때, 바람직하게 인너너트(22)는 수용홀(25)에 용이하게 수용되어 노트 PC 탑 케이스(50)의 외측으로 돌출되지 않는다.

이후, 노트 PC 프론트 케이스(60)를 노트 PC 탑 케이스(50)와 결합시킴으로서 조립을 완료한다.

한편, 노트 PC 탑 케이스(50)와 LCD 모듈이 결속하는 부위에는 인너너트(22)가 과도하게 돌려져서 어느 한 쪽이 파손되는 것을 방지하기 위하여 고무패킹 등의 완충체를 삽입할 수 있다.

발명의 효과

이상에서 설명한 바와 같이 본 발명에 따른 LCD 모듈의 장착구조를 이용하는 경우 몇 가지 이점을 갖는다.

먼저, LCD 모듈과 노트 PC 탑 케이스와의 결합을 탑 마운팅 방식을 적용하기 때문에, 이를 위한 LCD 모듈 자체의 크기가 감소하며 이에 따라 노트북 컴퓨터의 크기가 작아지고 무게가 가벼워진다는 이점이 있다.

또한, 노트 PC 탑 케이스의 후면으로부터 인너너트를 삽입하기 때문에 작업이 용이하고 신뢰성이 향상된다는 이점이 있다.

(57) 청구의 범위

청구항 1

노트북 컴퓨터의 케이스에 LCD 모듈을 장착하는 구조에 있어서,

상기 LCD 모듈의 후면 네 모서리에 내부에 나사가 형성된 마운트홀이 형성되고, 상기 탑 케이스의 상기 마운트홀에 대응하는 위치에 삽입홀이 형성되어 인너너트가 상기 삽입홀을 통하여 상기 마운트홀의 나사에 결합되는 것을 특징으로 하는 LCD 모듈의 장착구조.

청구항 2

제 1 항에 있어서, 상기 삽입홀이 형성되는 위치에 상기 인너너트를 수용하는 수용홀이 형성되는 것을 특징으로 하는 LCD 모듈의 장착구조.

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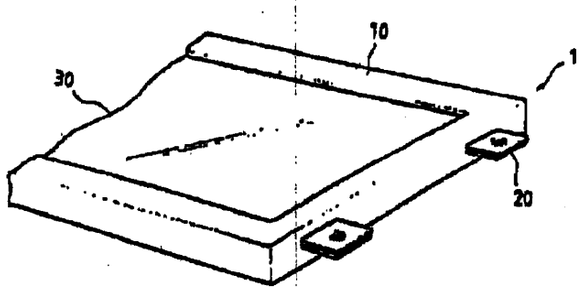
청구항 3

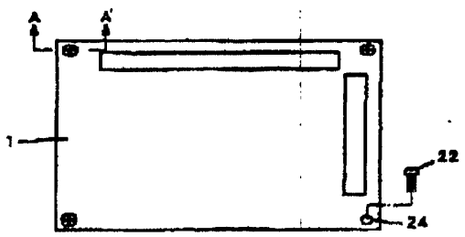
제 2 항에 있어서, 상기 수평홈은 상기 노트북 컴퓨터의 상 케이스와 일체로 형성되는 것을 특징으로 하는 LCD 모듈의 결합구조.

도면

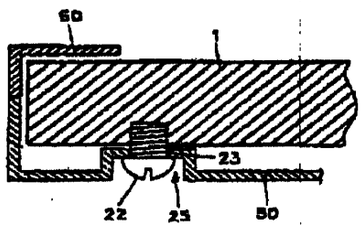
도면1



도면2



도면3



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<翻訳文>

発送番号：8-5-2003-003715184
発送日付：2003.01.30
提出期日：2003.03.30

Your Ref.: PF-2504/NEC/KO/mh
Our Ref.: P99091-UNI
出願番号：10-1999-0056493

特許庁

意見提出通知書

出願人　名称　日本電気株式会社（出願人コード：519980606801）
　　住所　日本国東京都港区芝5丁目7番1号
代理人　氏名　権 鉉雨
　　住所　ソウル江南区駅三洞823-1 愛林ビル 5階
出願番号　10-1999-0056493
発明の名称　LIQUID CRYSTAL MODULE SUPPORTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

この出願に対する審査結果、下記のような拒絶理由があり特許法第63条の規定によりこれを通知しますので、意見があったり補正が必要な場合には上記の提出期日までに意見書または/及び補正書を提出して下さい。（上記の提出期日に対して毎回1ヶ月単位で延長を申請することができ、この申請に対して別途の期間延長承認の通知はしません。）

【理由】

この出願発明はその出願した日の前に出願した出願としてこの出願後に公開された1999年特許登録出願第7833号（特許1999-66163号公開公報参照）の出願書に最初に添付した明細書または図面に記載された発明と同一なものであるため（この出願の発明者がその出願前に出願した上記発明者と同一でなく、かつこの出願時出願人がその出願前に出願した上記特許発明出願の出願人と同一でない）、特許法第29条第3項の規定により特許を受けることができません。

－下　線－

1. 本願の請求範囲第17項乃至第23項は、液晶モジュールと筐体が上部の底板から垂直方向に連結部材により固定されるため、筐体の横方向への影響が液晶モジュールを底板に固定するための連結部を構成しても筐体の全体の面積が大きくならず、筐体の面積に対する液晶モジュールの表示面の比率を大きくすることができる液晶ディスプレイに関するものであり、

1999-66163

引用参照（公開特許公報1999-66163、1999.1.22出願、1999.8.16公開）は、LCDモジュールの後面に形成されたマウントホールとノートPCバックケースの挿入ホールを介してインナーナットとしてノートPCバックケースの後面から結合することによりLCDモジュール自体の大きさが減少し、これによりノートブックコンピュータの大きさが小さくなり、重さが軽くなり、また作業が容易かつ信頼性が向上されるようにしたLCDモジュールの結合構造に関するもので、

本願と引用参照を比較してみると、

本願と引用参照共に液晶モジュールと筐体が上部底板から垂直方向に連結部材により固定されて筐体の横方向への影響が液晶モジュールを底板に固定するための連結部

UNI. 013

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を構成しても、基体全体の面積が大きくならず、基体の面積に対する液晶モジュールの露出面の比率を大きくすることができるようにするという目的及び効果が同一であり、

構成においても、本願の特徴的技術構成である液晶ディスプレイのディスプレイ領域に対応する領域内に備えられた貫通孔、貫通孔を通過する固定部材は引用参照のマウントホール、インナーナットとそれぞれ同一であるところ、

本願の請求範囲第17項乃至第23項は引用参照と実質的に同一なものと判断されます。

この出願は特許請求範囲の記載が下記に指摘したように不備で特許法第42条第4項の規定による要件を満たすことができないため、特許を受けることができません。

- 下 記 -

1. 請求範囲第17項及び第21項に"液晶ディスプレイパネルが取り付けられたねじを有したベース部材"と記載しているが、詳細な説明にベース部材に対する記載されていないところ、請求範囲第17項及び第21項は詳細な説明により裏付けられるとみられません。

2. 請求範囲第18項及び第22項で"電気装置の一部分"が意味するところが不分明であるため、発明が明確かつ簡潔に記載されているとみることができません。

【添付】
添付1 韓国公開特許公報1999-66163号(1999.08.16) 1部 以上。

2003.01.30

→1999-66163

特許庁 審査4局
審査官

UNI.013

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韓国公開特許公報(1999-0066163)

(57)請求範囲

請求項 1.

ノートブックコンピュータのケースにLCDモジュールを結着する構造において、

前記LCDモジュールの後面4角に内部にねじが形成されたマウントホールが形成され、前記バックケースの前記マウントホールに対応する位置に挿入ホールが形成されてインナーナットが前記挿入ホールを介して前記マウントホールのねじに結合されることを特徴とするLCDモジュールの結着構造。

請求項 2.

前記挿入ホールが形成される位置に前記インナーナットを受容する受容ホールが形成されることを特徴とする請求項1記載のLCDモジュールの結着構造。

請求項 3.

前記受容ホールは前記ノートブックコンピュータのバックケースと一体に形成されることを特徴とする請求項2記載のLCDモジュールの結着構造。

송달 일자: 2003/2/8

발송번호 : 9-5-2003-003715184
발송일자 : 2003.01.30
제출기일 : 2003.03.30

수신 : 서울 강남구 역삼동 823-1 중앙빌딩 5층(
최덕규국제특허법률사무소)
최달용 귀하

135-080

특허청
의견제출통지서

출원인 명칭 닛폰덴키 가부시키가이샤 (출원인코드: 519980006601)
주소 일본국 도요코오들 미나토구 시바 5쵸오메 7반 1고

대리인 성명 최달용
주소 서울 강남구 역삼동 823-1 중앙빌딩 5층(최달용국제특허법률사무소)

출원번호 10-1999-0058483

발명의 명칭 액정모듈 지지구조 및 이것을 구비하는 휴대용 단말장치

이 출원에 대한 심사결과 아래와 같은 거절이유가 있어 특허법 제66조의 규정에 의하여 이를 통지하오니 의견이 있거나 보정이 필요할 경우에는 상기 제출기일까지 의견서 또는/및 보정서를 제출하여 주시기 바랍니다. (상기 제출기일에 대하여 매회 1월 단위로 연장을 신청할 수 있으며, 이 신청에 대하여 별도의 기간연장승인통지는 하지 않습니다.)

[이 유]

이 출원발명은 그 출원한 날전에 국내 출원으로서 이 출원후에 공개된 1999년 특허출원 제 1533호(특허 1999-001533호 명기공보발행)의 출원서에 최초로 첨부된 명세서 또는 도면에 기재된 발명과 동일한 것이므로 (이 출원의 발명자가 그 출원전에 출원된 상기 특허출원의 발명자와 동일하지 않으며 또한 이 출원시 출원인이 그 출원전에 출원된 상기 특허출원의 출원인과 동일하지 않음) 특허법 제29조제3항의 규정에 의하여 특허를 받을 수 없습니다.

- 아 래 -

1. 본원의 청구범위 제17항 내지 제23항은 액정모듈과 투명체가 상기 방향으로부터의 수직방향으로 접착부재에 의해 고정되어 투명체의 기포방향으로의 힘이 액정모듈을 밀착방에 고정하기 위한 연결부를 구성하더라도, 투명체 전체의 면적이 커지지 않고, 투명체의 면적에 대한 액정모듈의 표시면의 비율을 크게 할 수 있도록 한다는 목적 및 효과가 불명하고,

인용발명(공개특허공보 1999-05193, 1999. 1. 25 공개, 1999. 8. 16 공개)은 LCD 모듈의 후면에 형성된 마운팅홀과 노트 PC 백 케이스의 상부표면 후방에 인터너셔널로서 노트 PC 백 케이스의 표면으로부터 돌출하도록 LCD 모듈 자체의 크기가 감소하여 이에 따라 노트북 컴퓨터의 크기가 축아지고 무게가 가벼워지며, 또한 작업이 용이하고 신뢰성이 향상되도록 한 액시디 모듈의 장착구조에 관한 것으로

본원과 인용발명을 비교하여 보면,

본원과 인용발명은 모두 액정모듈과 투명체가 상기 방향으로부터의 수직방향으로 접착부재에 의해 고정되어 투명체의 기포방향으로의 힘이 액정모듈을 밀착방에 고정하기 위한 연결부를 구성하더라도, 투명체 전체의 면적이 커지지 않고, 투명체의 면적에 대한 액정모듈의 표시면의 비율을 크게 할 수 있도록 한다는 목적 및 효과가 불명하고,

구성에 있어서도 본원의 특징적 기술구성인 액정디스플레이의 디스플레이 영역에 대응하는 범위내에 구비된 결합구멍, 결합구멍을 통과하는 고정부재는 인용발명의 마운팅홀을, 인너너셔널 각각 동일하다.

본원의 청구범위 제17항 내지 제23항은 인용발명과 실질적으로 동일한 것으로 판단됩니다.

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출력 일자: 2003/2/3

이 출원은 특허청구범위의 기재가 아래에 지적한 바와 같이 명비하여 특허법 제42조제4항의 규정에 의한 요건을 충족하지 못하므로 특허를 받을 수 없습니다.

- 아 래 -

1. 청구범위 제17항 및 제21항에 "베젤 디스플레이 패널이 부착된 리지를 가진 베이스 부재"라고 기재하고 있으나 상세한 설명에 베이스 부재에 대한 기재가 되어 있지 않는바, 청구범위 제17항 및 제21항은 상세한 설명에 의해 뒷받침된다고 볼 수 없습니다.

2. 청구범위 제18항 및 제22항에서 "결기홈의 일부분"이 지시하는 바가 명확하여 범위이 명확하고 간결하게 기재되어 있다고 볼 수 없습니다.

[첨 부]
첨부1 한국공개특허공보 1999-65166호(1999.08.16) 1부 끝.

2003.01.30

특허청 심사4국

통신심사담당관실 심사관 김용선

심사관 박형식

<<안내>>

문의사항이 있으시면 ☎ 042-481-5710 로 연락하시기 바랍니다.

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공개특허특1999-0066163

(19) 대한민국특허청(KR)
(12) 공개특허공보(A)

(51) Int. Cl.[6]
G06F 1/16

(11) 공개번호 특1999-0066163
(43) 공개일자 1999년08월16일

(21) 출원번호 10-1998-0001833
(22) 출원일자 1998년01월22일

(71) 출원인 삼성전자 주식회사 김광호
경기도 수원시 팔달구 매탄3동 416
(72) 발명자 이익종
경기도 용인시 기흥읍 농서리 산 24
(74) 대리인 임창세, 정연영, 최재희

심사청구 : 없음

(54) 패널과 모듈의 결합구조

요약

LCD 모듈의 후면에 형성된 마운트부과 노트 PC 백 케이스의 삽입홈을 통하여 인너너트로서 노트 PC 백 케이스의 후면으로부터 결합함으로서 LCD 모듈 자체의 크기가 감소하여 이에 따라 노트북 컴퓨터의 크기가 작아지고 무게가 가벼워지며, 또한 작업이 용이하고 신뢰성이 향상되는 이점이 있다.

대표도

도3

명세서

도면의 간단한 설명

도 1은 일반적인 LCD 모듈의 결착구조를 개략적으로 나타낸 사시도이고,

도 2는 본 발명에 의한 LCD 모듈의 구조를 개략적으로 나타낸 평면도이며,

도 3은 본 발명에 의한 LCD 모듈과 노트 PC 백 케이스가 결합된 상태를 나타낸 단면도이다.

<도면의 주요부분에 대한 부호의 설명>

1 : LCD 모듈	10 : 몸 사시
20 : 마운트부	22 : 인너너트
23 : 삽입홈	24 : 마운트홈
25 : 수용홈	30 : LCD 패널
50 : 노트북 컴퓨터 백 케이스	
60 : 노트북 컴퓨터 프론트 케이스	

발명의 상세한 설명

발명의 목적

발명이 속하는 기술 및 그 분야의 종래기술

본 발명은 LCD 모듈의 결착구조에 관한 것으로, 더욱 상세하게는 LCD 모듈을 백 마운팅(back mounting) 방식으로 결착하기 위한 LCD 모듈의 결착구조에 관한 것이다.

일반적으로 널리 사용되고 있는 표시장치를 예로 하나인 CRT(cathode ray tube)는 TV를 비롯해서 계측기기, 정보 단말기 등의 모니터에 주로 이용되고 있으나, CRT 자체의 무게나 크기로 인해 전자 제품의 소형화, 경량화의 요구에 적절 대응할 수 없었다. 이러한 CRT를 대체하기 위해 소형, 경량화의 장점을 갖고 있는 LCD 모듈이 활발하게 개발되어 왔으며, 최근에는 평판 표시장치로서의 역할을 충분히 수행할 수 있을 정도로 개발되어 LCD 모듈의 수요가 증가하고 있다.

일반적으로 현재 시중 판매 제품들의 노트북 컴퓨터에는 표시장치로서 LCD 모듈이 채용되고 있다. 따라서 노트북 컴퓨터가 슬림화, 경량화되어 가고 있는 실정에서 LCD 모듈의 슬림화 및 경량화는 필수적인 요건이 되고 있다. 이는 노트북 컴퓨터에 있어서 LCD 모듈은 가장 큰 면적과 무게를 차지하고 있기 때문이다.

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이와 같이 LCD 모듈의 면적을 줄이기 위한 시도로 LCD 모듈을 노트북 컴퓨터의 케이스(이하 '노트 PC 케이스'라 함)에 장착하는 방식에 대한 검토가 연구되어 졌다.

발명이 이루고자하는 기술적 과제

도 1을 참조하면, 톱 마운팅(top mounting) 방식에 적용되는 LCD 모듈이 도시되어 있다. 즉, 노트 PC 케이스와 결합시키기 위해서 LCD 모듈(1)의 측면에 마운트부(20)를 형성되어 있다. 이에 따라 전체적인 LCD 모듈의 크기가 커진다는 문제점이 있다.

여기서, 미도시 부호 10은 탑 사시이고 30은 LCD 모듈이다.

또한, 사이드 마운팅(side mounting) 방식으로 장착할 수 있는 바, 이 경우에는 필요한 면적을 최소화시킬 수는 있지만, 장착하는 작업이 어렵고 신뢰성이 저하한다는 문제점이 있다.

따라서, 본 발명은 상기와 같은 문제점을 감안하여 안출된 것으로서, 노트 PC 케이스와 LCD 모듈을 백 마운팅 방식으로 결합시켜 LCD 모듈의 크기를 줄이는데 있다.

발명의 구성 및 작용

본 발명에 따르면, 노트북 컴퓨터의 케이스에 LCD 모듈을 장착하는 구조에 있어서, LCD 모듈의 후면 네 모서리에 내부에 나사가 형성된 마운트홀이 형성되고, 백 케이스에는 마운트홀에 대응하는 위치에 삽입홀이 형성되어 인너너트가 삽입홀을 통하여 마운트홀의 나사에 결합된다.

이때, 바람직하게, 삽입홀이 형성되는 위치에 인너너트를 수용하는 수용홈이 형성될 수 있다. 수용홈은 사출성형에 의해 노트북 컴퓨터의 백 케이스와 일체로 형성될 수 있다.

이하 본 발명에 의한 LCD 모듈의 결착구조를 첨부된 도면 도 2 및 도 3을 참조하여 설명하면 다음과 같다.

LCD 모듈(1)의 후면에는 노트 PC 백 케이스(50)와 결합하기 위한 마운트홀(24)이 네 모서리에 형성된다. 마운트홀(24)의 내부에는 인너너트(22)와 나사 결합할 수 있도록 나사가 형성된다.

또한 노트 PC 백 케이스(50)에는 LCD 모듈(1)의 마운트홀(24)에 대응하는 위치에 삽입홀(23)이 형성된다. 또한 바람직하게 인너너트(22)가 노트 PC 백 케이스(50) 외측으로 돌출되지 않도록 수용홈(25)이 형성된다. 바람직하게, 수용홈(25)은 노트 PC 백 케이스(50)를 사출 성형할 때, 일체로 형성할 수 있다.

이와 같은 구조의 LCD 모듈(1)을 노트 PC에 조립하는 방법에 대해 설명한다.

먼저, LCD 모듈(1)의 마운트홀(22)과 노트 PC 백 케이스(50)의 삽입홀(23)의 중심이 일치하도록 정렬시킨다.

이어 노트 PC 백 케이스(50)의 후면으로부터 인너너트(22)를 끼우면, 인너너트(22)는 삽입홀(23)을 통과하여 마운트홀(24) 내부에 형성된 나사와 결합하여 LCD 모듈(1)을 노트 PC 백 케이스(50)에 고정시키게 된다. 이때, 바람직하게 인너너트(22)는 수용홈(25)에 완전히 수용되어 노트 PC 백 케이스(50)의 외측으로 돌출되지 않는다.

이후, 노트 PC 프론트 케이스(60)를 노트 PC 백 케이스(50)와 결합시킴으로서 조립을 완료한다.

한편, 노트 PC 백 케이스(50)와 LCD 모듈이 결착하는 부위에는 인너너트(22)가 과도하게 돌려져서 어느 한 쪽이 파손되는 것을 방지하기 위하여 고무패킹 등의 완충재를 삽입할 수 있다.

발명의 효과

이상에서 설명한 바와 같이 본 발명에 따른 LCD 모듈의 결착구조를 이용하는 경우 몇 가지 이점을 갖는다.

먼저, LCD 모듈과 노트 PC 백 케이스와의 결합을 백 마운팅 방식을 적용하기 때문에, 이를 위한 LCD 모듈 자체의 크기가 감소하여 이에 따라 노트북 컴퓨터의 크기가 작아지고 무게가 가벼워진다는 이점이 있다.

또한, 노트 PC 백 케이스의 후면으로부터 인너너트를 삽입하기 때문에 작업이 용이하고 신뢰성이 향상된다는 이점이 있다.

(57) 청구의 범위

청구항 1

노트북 컴퓨터의 케이스에 LCD 모듈을 장착하는 구조에 있어서,

상기 LCD 모듈의 후면 네 모서리에 내부에 나사가 형성된 마운트홀이 형성되고, 상기 백 케이스의 상기 마운트홀에 대응하는 위치에 삽입홀이 형성되어 인너너트가 상기 삽입홀을 통하여 상기 마운트홀의 나사에 결합되는 것을 특징으로 하는 LCD 모듈의 결착구조.

청구항 2

제 1 항에 있어서, 상기 삽입홀이 형성되는 위치에 상기 인너너트를 수용하는 수용홈이 형성되는 것을 특징으로 하는 LCD 모듈의 결착구조.

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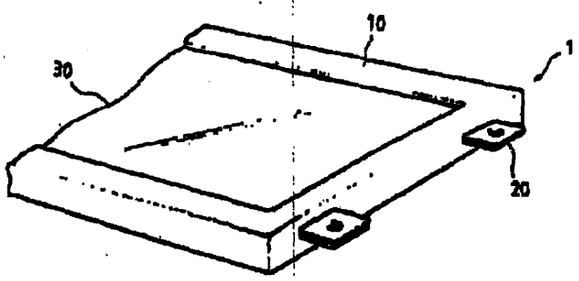
청구항 3

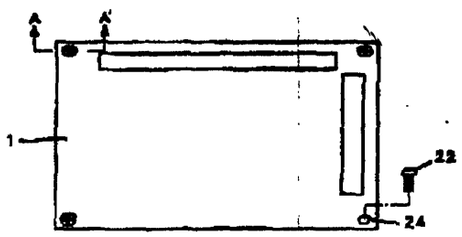
제 2 항에 있어서, 상기 수용용기 상기 노트북 컴퓨터의 백 케이스와 일체로 형성되는 것을 특징으로 하는 LCD 모듈의 결합구조.

도면

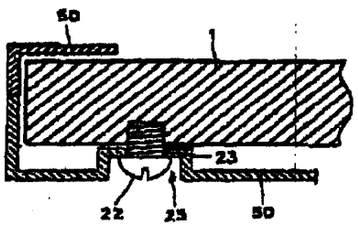
도면1



도면2



도면3



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UNI.013

1. Claims 17 to 23 of the present application relate to a liquid crystal display wherein, since the liquid crystal module and the main body are fixed by a coupling member in the perpendicular direction from the bottom plate, even if the lateral influence of the essential elements is such that a coupling member is constructed to fix the liquid crystal module to the bottom plate, the surface characteristics of the entire common do not become great, and the ratio between the surface of the liquid crystal module relative to the surface characteristics of the common body can be made larger.

The Citation proofs (1989-65163 application 01/22/1998; laid open 08/16/1998) relate to the coupling adhesion of an LCD module wherein, the size of the LCD module itself can be reduced by coupling it from a special surface of the notebook PC backcase as an inner nut, through mounting holes formed in the bottom surface of the LCD module and the insertion holes of the notebook PC backcase, thereby reducing the size of the notebook computer, lightening the weight, and improving the simplicity and reliability of the operation.

In comparing the present application with the Citation, by fixing a common body with the liquid crystal module by means of a coupling member which is perpendicular to the bottom plate, even if a coupling member is constructed for fixing the liquid crystal module to the bottom, the lateral influence of the lid body, will not exert great surface characteristics of the entire common body. If the ratio between the bottom surface of the liquid module relative to the surface characteristics of the common body is increased, then the objective and effect are the same.

Even with these characteristics, pass through holes provided within the special region relative to the fixed region display of the liquid crystal display which comprises the patent technology construction of the present application, and the fixed member which passes through the pass through holes respectively correspond to the mounting holes and inner nut described in the Citations.

UNI.013

1. Claims 17 to 23 of the present application relate to a liquid crystal display wherein, since the liquid crystal module and the main body are fixed by a coupling member in the perpendicular direction from the bottom plate, even if the lateral influence of the essential elements is such that a coupling member is constructed to fix the liquid crystal module to the bottom plate, the surface characteristics of the entire common do not become great, and the ratio between the surface of the liquid crystal module relative to the surface characteristics of the common body can be made larger.

The Citation proofs (1989-65163 application 01/22/1998; laid open 08/16/1998) relate to the coupling adhesion of an LCD module wherein, the size of the LCD module itself can be reduced by coupling it from a special surface of the notebook PC backcase as an inner nut, through mounting holes formed in the bottom surface of the LCD module and the insertion holes of the notebook PC backcase, thereby reducing the size of the notebook computer, lightening the weight, and improving the simplicity and reliability of the operation.

In comparing the present application with the Citation, by fixing a common body with the liquid crystal module by means of a coupling member which is perpendicular to the bottom plate, even if a coupling member is constructed for fixing the liquid crystal module to the bottom, the lateral influence of the lid body, will not exert great surface characteristics of the entire common body. If the ratio between the bottom surface of the liquid module relative to the surface characteristics of the common body is increased, then the objective and effect are the same.

Even with these characteristics, pass through holes provided within the special region relative to the fixed region display of the liquid crystal display which comprises the patent technology construction of the present application, and the fixed member which passes through the pass through holes respectively correspond to the mounting holes and inner nut described in the Citations.

It is judged that Claims 17 to 23 of the Scope of Claims of the present application are substantially the same as the Citation proofs.

Since the notations of the Scope of Patent Claims are deficient as indicated below, the present application does not satisfy the stipulations of Article 42 Section 4 of the Patent Law an cannot be granted a patent.

Postscript

1. In Claims 17 to 21 of the Scope of Claims, reference is made to "a base member to which the liquid crystal display panel is attached by a screw. However, there is nothing recorded relating to a base member in the Detailed Explanation. Neither can its attachment be understood from the Detailed Explanation of Claims 17 to 21.

2. Since the reference to a "part of an electrical device" is unclear in Claims 1 to 22 in the Scope of Claims, it cannot be recognized that the invention is clearly and adequately stated.

Addendum

Addenda 1: Korean Laid Open Patent 1998-56763 (08/16/1999)
One copy

→ 1999-66163

End of text.

It is judged that Claims 17 to 23 of the Scope of Claims of the present application are substantially the same as the Citation proofs.

Since the notations of the Scope of Patent Claims are deficient as indicated below, the present application does not satisfy the stipulations of Article 42 Section 4 of the Patent Law an cannot be granted a patent.

Postscript

1. In Claims 17 to 21 of the Scope of Claims, reference is made to "a base member to which the liquid crystal display panel is attached by a screw. However, there is nothing recorded relating to a base member in the Detailed Explanation. Neither can its attachment be understood from the Detailed Explanation of Claims 17 to 21.

2. Since the reference to a "part of an electrical device" is unclear in Claims 1 to 22 in the Scope of Claims, it cannot be recognized that the invention is clearly and adequately stated.

Addendum

Addenda 1: Korean Laid Open Patent 1998-56763 (08/16/1999)
One copy

→ 1999-66163

End of text.

M&G0002E
UN1.013

Claims 1-3, 5-7, 10-13, 15, and 16
Citations 1 and 2

Claim 4
Citations 1-3

Claims 8, 9, and 14
Citations 1-4

Remarks:

In Citation 1, reference is made to construction which fixes the DLC unit by means of a screw, from the direction perpendicular to the surface of the LDC lower cover.

In Citation 2, reference is made to construction for placing an attachment hole SH midway from the corner to a specified distance.

In Citation 3, reference is made to the engagement and fixing of an end in an indentation.

In Citation 4, reference is made to construction in which the display and the main body are rotatably coupled by an indention/protrusion component.

UNI.013

1. The present application relates to construction which includes a liquid crystal module, wherein a liquid crystal module is secured by a coupling member inserted in a direction in which it intersects with a bottom plate, the liquid crystal module being mounted onto the bottom plate of the lid. In comparing the present invention with Citation 1 (United States Patent 5268816, issued December 7, 1993) and the Citation Utility Model Proposal (Utility Model Proposal 1998-174408, issued June 11th, 1998) construction in which a liquid crystal module is provided which uses a lid, a base plate, and a coupling member such as that disclosed in Claims 1 through 5 of the Scope of Claims of the present application corresponds to the adhering construction of LCD 12 which uses a rear surface cover 10, a shield plate 11, and an adhering plate 14, as described in the Citation Utility Model Proposal. Construction which is provided with a liquid crystal module and which couples the lid, bottom plate, liquid crystal module and insulating body to a computer main body corresponds to construction in which a top cover 16, rear screen cover 32, display screen 30 and a front screen cover 31 are coupled with a bottom cover 12 by means of a hinge 39, as described in Citation invention 1. Construction with a provided liquid crystal module in which the bottom plate and insulating body of Claims 9-10 are coupled with the liquid crystal module and lid protrusion corresponds to construction in which the LCD 1 of the Citation invention 2 is coupled by screwing the protrusion of the LCD lower case 22 through the resin 20 of the frame 17 on the LCD. Construction which couples a base plate and insulating body with a coupling mechanism constructed with the coupling piece and protrusion described in Claims 11-13 corresponds to the construction or coupling rear screen cover 32 and the front screen cover 31 described in Citation 1, and the coupling construction of the trunk and computer main body of Claims 14-15, corresponds to the coupling construction of the top cover 16 and the bottom cover 12 of Citation invention 1, and the shield plate 11 and LCD 12 of Citation invention 2. Construction which secures the liquid crystal module to the lid, as described in Claim 16 corresponds to the coupling construction of the top cover 16 and the bottom cover 12 described in Citation invention 1, and there is no recognized difficulty to the adoption of the essential construction elements. The proportional display surface of the liquid crystal module can be enlarged,

improving the efficiency of computer assembly, and the objective and effect of the present application can be projected from the construction of the Utility Model Citation, and Citation invention's 1 and 2. Hence, the present invention is judged to the something which could be easily invented from a combination of the Utility Model Citation and from Citation invention 1 and 2.

Addenda

Addendum 1: Citation 1 (Japanese Laid Open Patent Sho 55-146965)

Addendum 2: Citation 2 (Japanese Laid Open Patent Hei 6-151734)

UNI.013

Claims 1-6
Citations 1-3
Claims 7-8
Citations 2 and 3
Claims 9-11
Citations 2-4
Claims 12-16
Citations 2-5

Remarks:

In Citation 1, reference is made to construction in which a bracket built up on the liquid crystal display model surface is secured with a screw in a direction directly orthogonal to the abuting surface of the module of the liquid crystal display body.

In Citation 2, reference is made to construction in which a securing tool attached to the LCD unit is secured with a tool to the coupling protrusion used in the protruding step rotation with the computer main body of an internal cover.

In Citation 3, reference is made to construction which secures the LCD unit to the LCD lower case (corresponding to the lid).

In Citation 4, reference is made to construction in which a monitor display is interposed between the protective cover and the primary display casing, by securing the protective cover to the primary display casing with a screw.

In Citation 5, reference is made to construction in which securement is accomplished by respective attachment to a real shield case and a front shield case.

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PTO 1449 CHECKLIST

Serial No. 09459280

Examiner: _____

Date to Examiner 3-23-00

For each considered document, both the month an
MUST be provided - no exceptions. Class and subcla
MUST either be provided or the space lined throug
Examiners name and the date the disclosure citatio
considered MUST be provided at the bottom of the PTO 1

CHECK OFF THE FOLLOWING ITEMS AS COMPLE

For each citation considered:

1. ☐ Initials inserted in left-hand column for each citation considered

2. ☐ Month ☐ Year - inserted in appropriate box (if unavailable, citat
incomplete - go to item 4)

3. ☐ Class ☐ Subclass - inserted in appropriate box (if unavailable, citat
still proper, but you MUST draw a line through each blank space)

For each citation not considered or incomplete:

4. ☐ Citation lined through if not considered or incomplete

At bottom of PTO 1449:

5. ☐ Examiner's name in appropriate place

6. ☐ Enter the date citations were considered in the appropriate place

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
Page 426 of 438

BEST COPY

PTO - 1449 CHECKLIST

Serial No. 09459280

Examiner: _____

Date to Examiner: _____

For each considered document, both the month and year MUST be provided - no exceptions. Class and subclass data MUST either be provided or the space lined through. The Examiners name and the date the disclosure citation was considered MUST be provided at the bottom of the PTO 1449.

CHECK OFF THE FOLLOWING ITEMS AS COMPLETED

For each citation considered:
1. ☐ Initials inserted in left-hand column for each citation considered

2. ☐ Month ☐ Year - inserted in appropriate box (if unavailable, citation is incomplete - go to item 4)

3. ☐ Class ☐ Subclass - inserted in appropriate box (if unavailable, citation is still proper, but you MUST draw a line through each blank space).

For each citation not considered or incomplete:
4. ☐ Citation lined through if not considered or incomplete

At bottom of PTO 1449:
5. ☐ Examiner's name in appropriate place

6. ☐ Enter the date citations were considered in the appropriate place

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2001

Application or Docket Number: 09/459,280

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS		
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	minus 20=	*
INDEPENDENT CLAIMS	minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	370.00	OR	BASIC FEE	740.00
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

C

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 5	Minus	** 20	=
Independent	* 2	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

D

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 3	Minus	** 20	=
Independent	* 1	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT FEE		OR	TOTAL ADDIT. FEE	

E

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 3	Minus	** 20	=
Independent	* 1	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Hisense - Exhibit 1002
Hisense v. Vista Peak - IPR2023-00725
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PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2000

Application or Docket Number

CPA

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE	FEE		RATE	FEE
BASIC FEE				355.00	OR		710.00
TOTAL CLAIMS	minus 20=	*	X$ 9=		OR	X$18=	
INDEPENDENT CLAIMS	minus 3 =	*	X40=		OR	X80=	
MULTIPLE DEPENDENT CLAIM PRESENT			+135=		OR	+270=	
			TOTAL		OR	TOTAL	710.00

* If the difference in column 1 is less than zero, enter "0" in column 2

Pas B

CLAIMS AS AMENDED - PART II

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 17	Minus	** 20	=
Independent	* 2	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY RATE	ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X40=		OR	X80=	
+135=		OR	+270=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

CA C

PATENT APPLICATION FEE DETERMINATION RECORD
Effective November 10, 1998

Application or Docket Number

CLAIMS AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA
BASIC FEE		
TOTAL CLAIMS	31 minus 20=	* 11
INDEPENDENT CLAIMS	1 minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT		

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
	380.00	OR		760.00
X$ 9=		OR	X$18=	198
X39=		OR	X78=	
+130=		OR	+260=	
TOTAL		OR	TOTAL	958

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 4	Minus	** 31	=
Independent	* 3	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X$ 9=		OR	X$18=	
X39=		OR	X78=	
+130=		OR	+260=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	* 3	Minus	** 31	=
Independent	* 1	Minus	*** 3	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
~~X$ 9=~~		OR	X$18=	
X39=		OR	X78=	
+130=		OR	+260=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				

RATE	ADDI-TIONAL FEE		RATE	ADDI-TIONAL FEE
X$ 9=		OR	X$18=	
X39=		OR	X78=	
+130=		OR	+260=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
***If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

FORM PTO-875
(Rev. 11/98)
*U.S. Government Printing Office: 1999 — 459-072/19142
Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Derwent Innovation Patent Export, 2022-03-11 00:40:14 +0000

Search results for: PNS=(US6594143);
Collections searched: DWPI; ARIPO grant; Argentina UM; Argentina app; Armenia grant; Australia UM; Australia app; Australia grant; Austria UM; Austria app; Austria grant; Belarus UM; Belarus grant; Belgium app; Belgium grant; Brazil UM; Brazil app; Brazil grant; Bulgaria UM; Bulgaria app; Bulgaria grant; Canada app; Canada grant; China, Mainland UM; China, Mainland app; China, Mainland grant; Colombia app; Costa Rica UM; Costa Rica app; Croatia UM; Croatia app; Croatia grant; Cuba app; Cuba grant; Czech Republic UM; Czech Republic app; Czech Republic grant; Czechoslovakia grant; Denmark UM; Denmark app; Denmark grant; Estonia UM; Estonia app; Estonia grant; Eurasian (EAPO) grant; Europe (EP) app; Europe (EP) grant; Finland app; Finland grant; France app; France grant; Georgia grant; German Democratic Republic app; German Democratic Republic grant; Germany UM; Germany app; Germany grant; Greece app; Greece grant; Gulf Cooperation Council grant; Hong Kong UM; Hong Kong app; Hong Kong grant; Hungary grant; Iceland grant; India app; India grant; Indonesia UM; Indonesia app; Ireland UM; Ireland app; Ireland grant; Israel grant; Italy grant; Italy grant; Italy grant; Italy grant; Japan UM; Japan app; Japan grant; Korea UM; Korea app; Korea grant; Latvia grant; Lithuania grant; Luxembourgh app; Luxembourgh grant; Malaysia app; Malaysia grant; Mexico app; Mexico grant; Moldova UM; Moldova grant; Monaco grant; Mongolia UM; Mongolia grant; Morocco app; Morocco grant; Netherlands app; Netherlands grant; New Zealand grant; Norway app; Norway grant; OAPI grant; PCT (WO) app; Philippines UM; Philippines app; Philippines grant; Poland UM; Poland grant; Portugal UM; Portugal app; Portugal grant; Romania UM; Romania app; Romania granted; Russia UM; Russia app; Russia grant; Serbia UM; Serbia app; Serbia grant; Singapore app; Singapore grant; Slovakia UM; Slovakia app; Slovakia grant; Slovenia UM; Slovenia grant; South Africa app; Spain UM; Spain app; Spain grant; Sweden app; Sweden grant; Switzerland app; Switzerland grant; Taiwan UM; Taiwan appl; Taiwan grant; Thailand UM; Thailand app; Thailand grant; Tunisia app; Turkey UM; Turkey app; Turkey grant; UK app; UK grant; USSR grant; Ukraine UM; Ukraine grant; United States app; United States grant; Uruguay app; Vietnam UM; Vietnam app; Vietnam grant; Other

Table of Contents

1. US6594143B2 Liquid crystal module mounting structure and mobile terminal mounted with the same

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Hisense v. Vista Peak - IPR2023-00725
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Family 1/1

1 record(s) per family

Record 1/1 US6594143B2 Liquid crystal module mounting structure and mobile terminal mounted with the same

Title: Liquid crystal module mounting structure and mobile terminal mounted with the same
Title - DWPI: Liquid crystal module attachment structure for notebook type personal computer, includes screw thrust from lower frame of lid into liquid crystal module so as to fix lower frame with liquid crystal module
Priority Number: JP1998353579A
Priority Date: 1998-12-11
Application Number: US1999459280A
Application Date: 1999-12-13
Publication Date: 2003-07-15
IPC Class Table:

IPC	Section	Class	Subclass	Class Group	Subgroup
G09F000900	G	G09	G09F	G09F0009	G09F000900
G02F000113	G	G02	G02F	G02F0001	G02F000113
G02F00011333	G	G02	G02F	G02F0001	G02F00011333
G06F000116	G	G06	G06F	G06F0001	G06F000116

IPC Class Table - DWPI:

IPC - DWPI	Section - DWPI	Class - DWPI	Subclass - DWPI	Class Group - DWPI	Subgroup - DWPI
G06F000116 (IPC 1-7)	G	G06	G06F	G06F0001	G06F000116 (IPC 1-7)
G02F000113	G	G02	G02F	G02F0001	G02F000113
G02F00011333	G	G02	G02F	G02F0001	G02F00011333
G06F000116	G	G06	G06F	G06F0001	G06F000116
G09F000900	G	G09	G09F	G09F0009	G09F000900

Assignee/Applicant: NEC Corporation,Tokyo,JP

Hisense - Exhibit 1002
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JP F Terms:

JP FI Codes:

Assignee - Original: NEC Corporation

Any CPC Table:

Type	Invention	Additional	Version	Office
Current Current	**G02F 1/133308** G06F 1/1637	G02F 2201/46	20130101 20130101	EP EP
Current	G06F 1/16	-	20130101	KR

ECLA: G02F00011333E | G06F000116P9D | S02F020146

Abstract:

The present invention provides a mounting structure for mounting a liquid crystal module having a display area. The mounting structure comprises: at least a frame member having a plurality of connecting members for connecting the frame member to the liquid crystal module substantially in parallel to each other, wherein each of the connecting members extends between the liquid crystal module and the frame member in a direction vertical to a surface of the frame member.

Language of Publication: EN

INPADOC Legal Status Table:

Gazette Date	Code	INPADOC Legal Status Impact
2018-02-28	AS	-
Description: ASSIGNMENT VISTA PEAK VENTURES, LLC, TEXAS ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:GETNER FOUNDATION LLC; REEL/FRAME:045469/0023 2018-02-13		
2014-12-29	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 12		
2011-05-10	AS	-
Description: ASSIGNMENT GETNER FOUNDATION LLC, DELAWARE ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:NEC CORPORATION; REEL/FRAME:026254/0381 2011-04-18		
2010-12-16	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 8		

2010-06-07	AS	-
Description: ASSIGNMENT NEC CORPORATION, JAPAN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:NEC LCD TECHNOLOGIES, LTD.; REEL/FRAME:024492/0176 2010-03-01		
2010-06-07	AS	-
Description: ASSIGNMENT NEC CORPORATION,JAPAN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:NEC LCD TECHNOLOGIES, LTD.; REEL/FRAME:024492/0176 2010-03-01		
2006-12-26	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 4		
2003-06-26	STCF	-
Description: INFORMATION ON STATUS: PATENT GRANT PATENTED CASE		
2003-04-21	AS	-
Description: ASSIGNMENT NEC LCD TECHNOLOGIES, LTD., JAPAN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:NEC CORPORATION; REEL/FRAME:013983/0417 2003-04-01		
2000-02-18	AS	-
Description: ASSIGNMENT NEC CORPORATION, JAPAN ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNORS:YANO, TAKAKAZU; MIWA, TOMOO; SATO, YASUHIRO; AND OTHERS; REEL/FRAME:010611/0090 1999-12-10		

Post-Issuance (US):

Reassignment (US) Table:

Assignee	Assignor	Date Signed	Reel/Frame	Date
VISTA PEAK VENTURES LLC,PLANO,TX,US	GETNER FOUNDATION LLC	2018-02-13	045469/0023	2018-02-28
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: ASCENDA LAW GROUP 333 W. SAN CARLOS ST. SUITE 200 SAN JOSE, CA 95110				
GETNER FOUNDATION LLC,DOVER,DE,US	NEC CORPORATION	2011-04-18	026254/0381	2011-05-10
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: TUROCY & WATSON, LLP 127 PUBLIC SQUARE 57TH FLOOR, KEY TOWER CLEVELAND, OH 44114				

NEC CORPORATION,MINATO-KU, TOKYO,JP	NEC LCD TECHNOLOGIES, LTD.	2010-03-01	024492/0176	2010-06-07
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, NW SUITE 800 WASHINGTON, DC 20037				
NEC LCD TECHNOLOGIES LTD.,KAWASAKI, KANAGAWA,JP	NEC CORPORATION	2003-04-01	013983/0417	2003-04-21
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: MCGINN & GIBB, PLLC SEAN M. MCGINN 8321 OLD COURTHOUSE ROAD SUITE 200 VIENNA, VA 22182-3817				
NEC CORPORATION,TOKYO,JP	YANO, TAKAKAZU	1999-12-10	010611/0090	2000-02-18
	MIWA, TOMOO	1999-12-10		
	SATO, YASUHIRO	1999-12-10		
	OGAWA, TOSHIHISA	1999-12-10		
	NISHIYAMA, MICHIAKI	1999-12-10		
	BABA, MASATAKE	1999-12-10		
	OKABE, HIKARU	1999-12-10		
	FUJISHIRO, FUMIHIKO	1999-12-10		
	KATO, KATSUHIRO	1999-12-10		
	MIKAMI, KAZUAKI	1999-12-10		
	FUKUYOSHI, HIROKAZU	1999-12-10		
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: MCGINN & GIBB, P.C. SEAN M. MCGINN, ESQ. 1701 CLARENDON BLVD., SUITE 100 ARLINGTON, VA 22209				

Maintenance Status (US):

Litigation (US): 2021-07-14 2021 Vista Peak Ventures, LLC Xianyang CaiHong Optoelectronics Technology Co., Ltd. Hisense Co. Ltd. Hisense Visual Technology Co., Ltd. Hisense International Co., Ltd. Hisense Import & Export Co. Ltd. Hisense International (HK) Co., Ltd. Hisense Electronica Mexico S.A. de C.V. Hisense International (Hong Kong) America Investments Co., Ltd. E.D. Texas 2:21cv00260 | 2020-11-05 2020 Vista Peak Ventures, LLC HKC Corporation Limited

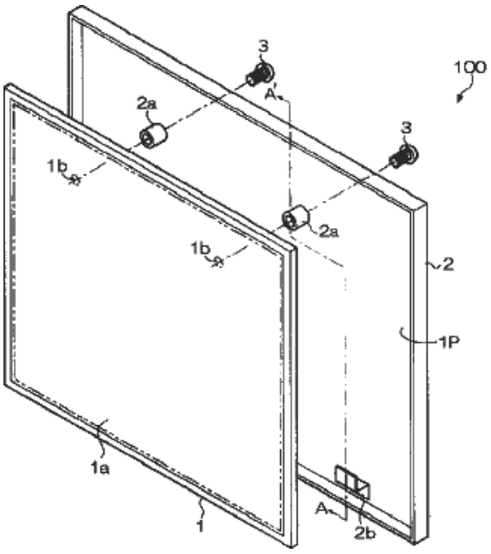
HKC Overseas Limited Chongqing HKC Optoelectronics Technology Co., Ltd. E.D. Texas 2:20cv00354 | 2020-08-05 2020 Vista Peak Ventures, LLC Hannstar Display Corporation E.D. Texas 2:20cv00252 | 2019-05-23 2019 Vista Peak Ventures, LLC TCL Corporation TCL Electronics Holdings Limited E.D. Texas 2:19cv00191

Opposition (EP):

License (EP):

EPO Procedural Status:

Front Page Drawing:



Priority Number - DWPI: JP1998353579A
Priority Date - DWPI: 1998-12-11
Assignee - Current US: VISTA PEAK VENTURES LLC

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United States Patent and Trademark Office
Office of the Commissioner for Patents

LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME

PATENT #	APPLICATION #	FILING DATE	ISSUE DATE
6594143	09459280	12/13/1999	07/15/2003

Payment Window Status

No maintenance fees are due.

WINDOW	STATUS	FEES
11.5 Year	Closed	Paid

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	07/15/2006	01/17/2007	07/16/2007	Closed	Paid
7.5 Year	07/15/2010	01/19/2011	07/15/2011	Closed	Paid
11.5 Year	07/15/2014	01/16/2015	07/15/2015	Closed	Paid

Patent Holder Information

Customer # 23623

Entity Status UNDISCOUNTED

Phone Number 2166968730

Address
AMIN, TUROCY & WATSON, LLP
200 Park Avenue
Suite 300
Beachwood, OH 44122
UNITED STATES