

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Commissioner For Patents  
Mail Stop: NEW PATENT APPLICATION  
P.O. Box 1450  
Alexandria, VA 22313-1450

**NEW APPLICATION TRANSMITTAL FORM**

Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): **Claus H. Jorgensen**

For (title): **Portable Electronic Device**

Enclosed are the following:

- ☒ Application Cover Page
- ☒ **19** pages of Specification that consists of, **12** pages of Description, **6** pages of Claims and **1** page of Abstract;
- ☒ **6** sheet of drawings;
- ☒ Inventor(s) Declaration; (Copy)
- ☒ Preliminary Amendment;
- ☒ Priority is hereby claimed from:  
**U.S. Patent Application Number 11/393,510 filed on March 29, 2006;**
- ☐ Certified Copy of priority document(s);
- ☐ English language translation of priority document;
- ☐ Application Data Sheet;
- ☒ Information Disclosure Statement and/or Form PTO 1449 and cited non-U.S. art (if applicable);
- ☐ Assignment and Recordation Form Cover Sheet;
- ☐ Return Receipt Postcard;
- ☒ Other: **6 Replacement Sheets**

Assignment Data

- ☒ An assignment of the invention to Nokia Corporation  
☐ is attached.  
☐ will follow.  
☒ has been previously filed.

Small Entity Status

- ☐ Applicant claims small entity status.

Fees

- ☒ Utility ☐ Reissue  
☐ Design

Basic Filing Fee **\$330.00**

Excess Claim Fee

|                       | Number<br>Filed | Number<br>Extra | Rate      |     |
|-----------------------|-----------------|-----------------|-----------|-----|
| Total Claims          | 20 -20 =        | 0 x             | \$52.00   | \$0 |
| Independent<br>Claims | 3 - 3 =         | 0 x             | \$ 220.00 | \$0 |

☐ Multiple Dependent Claim Fee (\$390.00) \$

Examination Fee **\$220.00**

Patent Search Fee **\$540.00**

Exceeding of 100 sheets of paper fee (\$270.00 per each 50 sheets) \$

Assignment Recordal 0 x \$ 40.00 \$

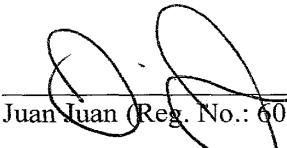
TOTAL FEES **\$1,090.00**

- ☐ A check in the amount of **\$0** in payment of the filing fee is enclosed.
- ☒ Charge **\$1,090.00** to Deposit Account No. 50-1924
- ☒ The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 1.16 and 1.17 which may be required for this communication or during the entire pendency of this patent application, or credit any overpayment, to Deposit Account No. 50-1924.

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August 20, 2010  
Date

  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: Confirmation No.:  
Applicant(s): Jorgensen, Claus H.  
Filed: Herewith  
Art Unit:  
Examiner:  
Title: Portable Electronic Device  
  
Attorney Docket No.: 891.0013.U2 (US)  
Customer No.: 29,683

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P.O. Box 1450  
Alexandria, VA 22313-1450

Preliminary Amendment

Sir:

Please amend the Application as indicated on the following pages.

**Amendments to the Specification** begin on page 2 of this paper.

**Amendments to the Claims** are reflected in the listing of claims which begin on page 3 of this paper.

**Amendments to the Drawings** begin on page 8 and include attached replacement sheets.

**Remarks** begin on page 9 of this paper.

An **Appendix** including amended drawing figures is attached following page 10 of this paper.

**Amendments to the Specification:**

Page 1, after the title, please add the following cross-reference section:

CROSS REFERENCE TO RELATED APPLICATION

This is a continuation patent application of U.S. Patent Application No. 11/393,510 filed March 29, 2006.

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

Please cancel claim(s) 1-24 without prejudice.

**Listing of Claims:**

1-24. (Canceled)

25. (New) A portable electronic device comprising:

an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

a battery located adjacent the engine section; and

a user input section located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

26. (New) A portable electronic device as in claim 25 wherein the battery is located at a lateral side of the engine section.

27. (New) A portable electronic device as in claim 25 wherein the engine section is located at opposite sides of the battery.

28. (New) A portable electronic device as in claim 25 wherein the portable electronic device comprises a first section comprising a first one-piece housing member having a general tubular shape and forming opposite exterior lateral sides of

the first section, wherein the engine section, battery and user input section are housed in the first section.

29. (New) A portable electronic device as in claim 28 wherein the portable electronic device comprises a second section pivotably connected to the first section, wherein the second section comprises a second one-piece housing member having a general tubular shape and forming opposite exterior lateral sides of the second section.

30. (New) A portable electronic device as in claim 25 wherein the portable electronic device comprises a first section pivotably connected to a second section by a hinge, wherein the hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section; and the portable electronic device further comprises a camera connected to the second section, wherein the camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of a one-piece second tubular housing member of the second section, wherein the second tubular housing member forms opposite exterior lateral sides of the second section.

31. (New) A portable electronic device as in claim 25 wherein the battery is located alongside the engine section in a substantial side by side arrangement.

32. (New) A portable electronic device as in claim 25 wherein the battery is located between two portions of the engine section.

33. (New) A portable electronic device as in claim 25 wherein the user input section comprises a keypad.

34. (New) A portable electronic device as in claim 25 wherein a width of the battery is about less than half a width of the portable electronic device.

35. (New) A portable electronic device as in claim 25 wherein a width of the engine section is about less than half a width of the portable electronic device.

36. (New) A portable electronic device as in claim 25 wherein the portable electronic device comprises a mobile phone.

37. (New) An apparatus comprising:

a housing member comprising a top end, a bottom end, a first lateral side, and a second lateral side, wherein the first and second lateral sides extend between the top end and the bottom end, and wherein a width of the housing member extends between the first lateral side and the second lateral side;

an engine section comprising a printed circuit board, a transceiver, a processor, and a memory, wherein a lateral side of the engine section is proximate the first lateral side of the housing member, and wherein a width of the engine section is about less than half the width of the housing member;

a battery adjacent the engine section, wherein a lateral side of the battery is proximate the second lateral side of the housing member, and wherein a width of the battery is about less than half the width of the housing member; and

a user input section at a front side of the housing member, wherein the user input section is disposed directly opposite the battery.

38. (New) An apparatus as in claim 37 wherein the user input section is located above the engine section and the battery, and wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

39. (New) An apparatus as in claim 37 wherein the battery is between the second lateral side of the housing member and another different lateral side of the engine section.

40. (New) An apparatus as in claim 37 wherein the engine section comprises a first portion and a second portion, and wherein the battery is located between the first portion and the second portion of the engine section.

41. (New) A method comprising:

providing an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

providing a battery located adjacent the engine section;  
and

providing a user input section above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

42. (New) A method as in claim 41 wherein the providing of the engine section and the providing of the battery further

comprises providing the engine section and the battery in a substantial side by side arrangement.

43. (New) A method as in claim 41 wherein the providing of the battery further comprises disposing the battery between two portions of the engine section.

44. (New) A method as in claim 41 wherein the providing of the engine section, the providing of the battery, and the providing of the user input section further comprises providing the engine section, the battery, and the user input section at a housing member, wherein a width of the battery is about less than half a width of the housing member, and wherein a width of the engine section is about less than half a width of the housing member.

**Amendments to the Drawings:**

The attached sheets of drawings include formal drawings for this application.

Attachment: Replacement Sheets

**REMARKS**

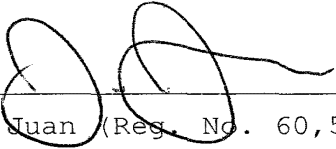
This is a continuation patent application. The parent patent application has been allowed and the issue fee has been paid.

The replacement sheets of drawings correspond to formal drawings filed during the prosecution (in response to a Notice to File Corrected Application Papers) of the parent patent application. The attached six sheets of formal drawings for Figs. 1-13 replace the original sheets of drawings.

The claims of the original parent patent application have been cancelled without prejudice above and new claims have been added to further claim the features of the invention. Support for the new claims may be found throughout the originally filed specification, claims, and drawings, for example, at paragraphs [0028] - [0034], claims 15-20, and Figs. 7-10.

Favorable consideration and allowance is respectfully requested. If there are any additional charges with respect to this Preliminary Amendment or otherwise, please charge deposit account 50-1924 for any fee deficiency. Should any unresolved issue remain, the examiner is invited to call applicant's attorney at the telephone number indicated below.

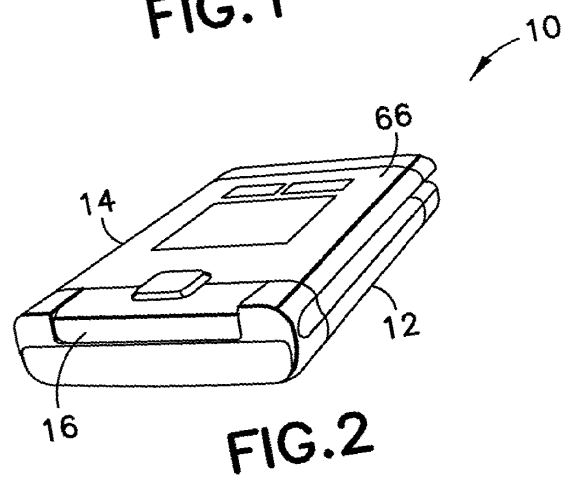
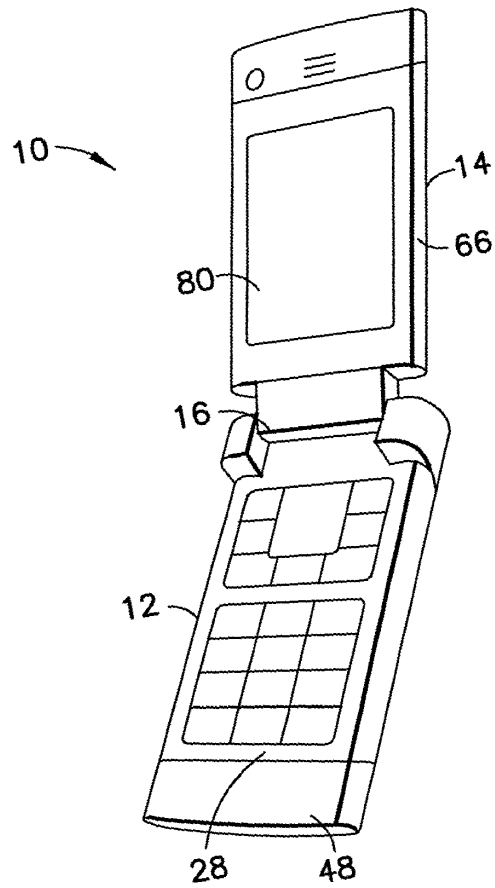
Respectfully submitted,

  
\_\_\_\_\_  
Juan Juan (Reg. No. 60,564)

8/20/2010  
Date

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203-925-9400

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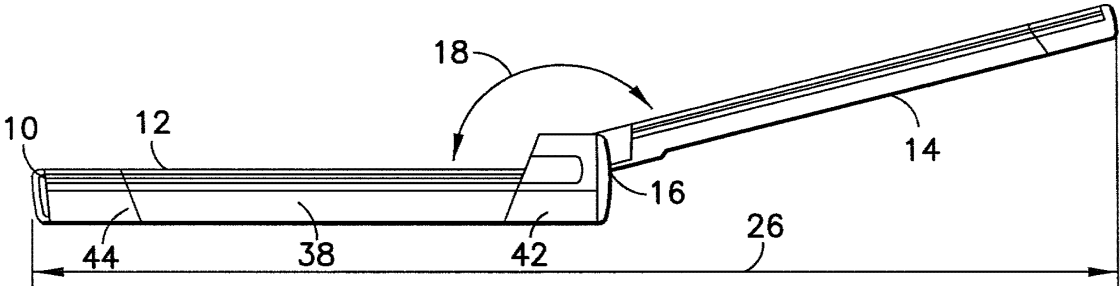


FIG. 3

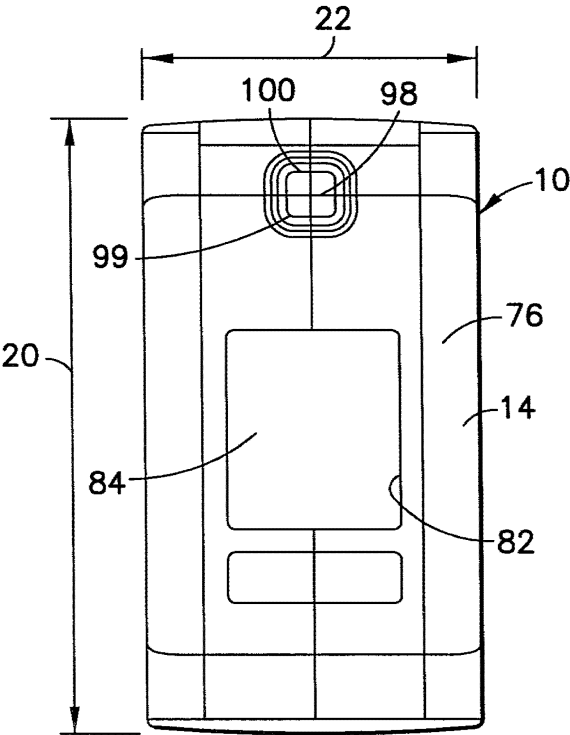


FIG. 4

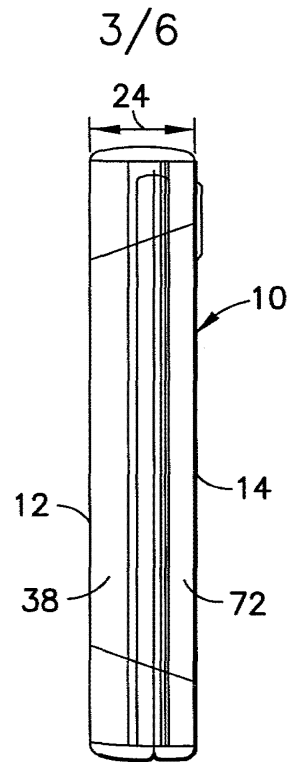


**FIG. 5**

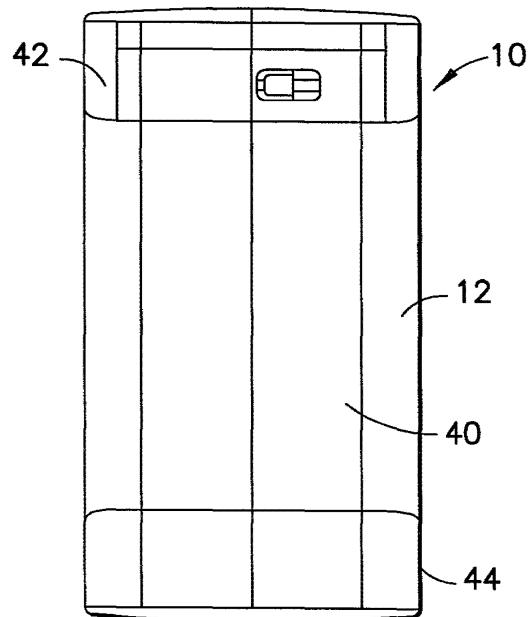


**FIG. 6**

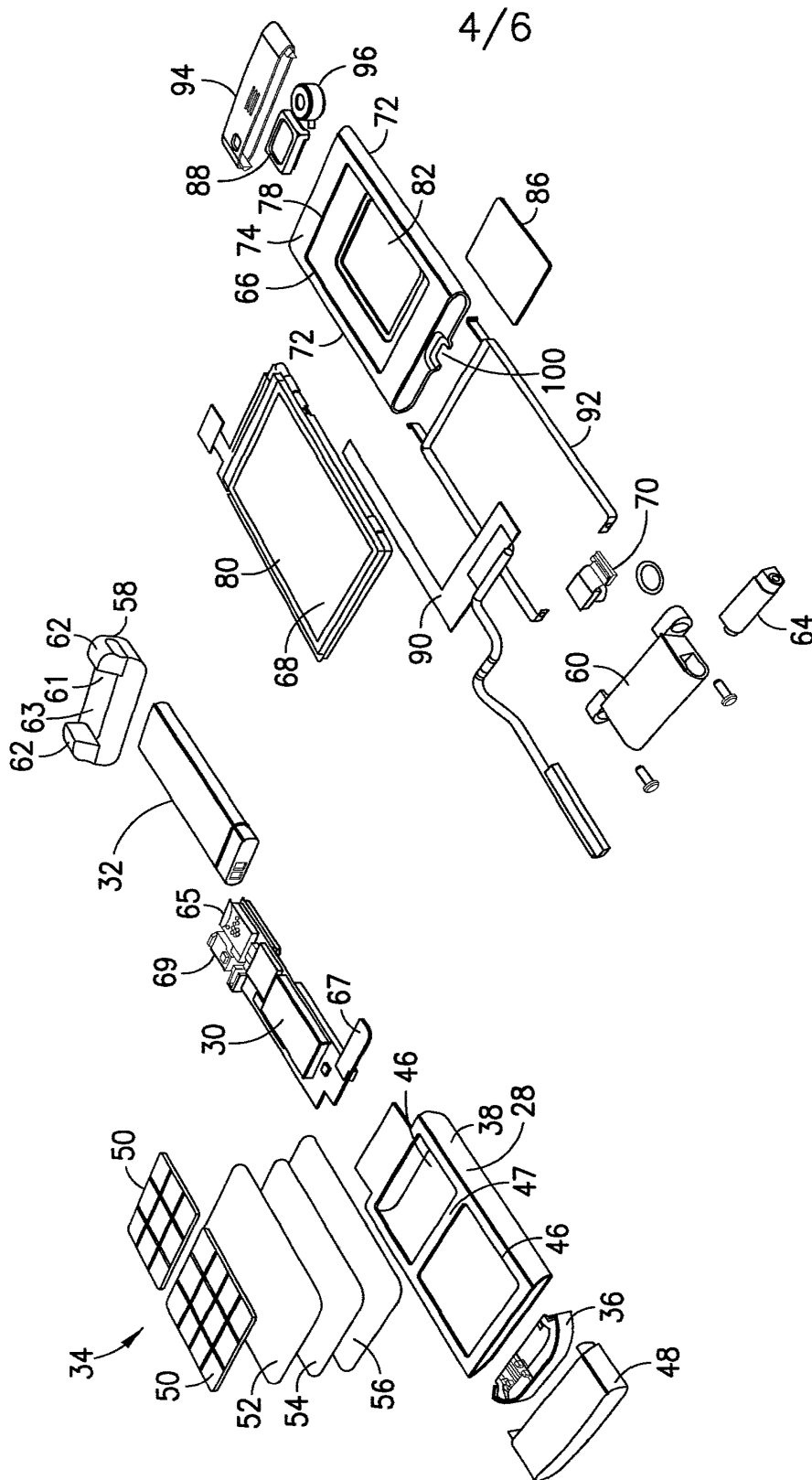


FIG.7

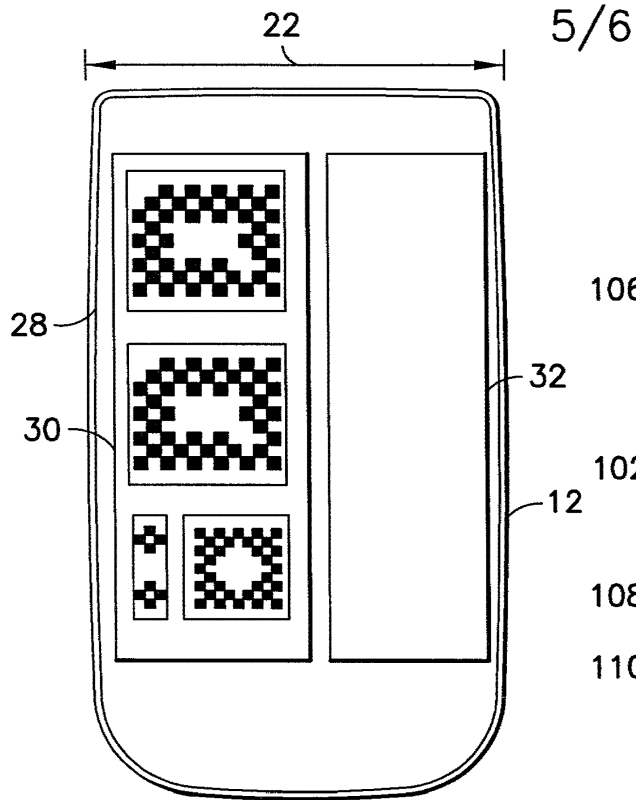


FIG. 8

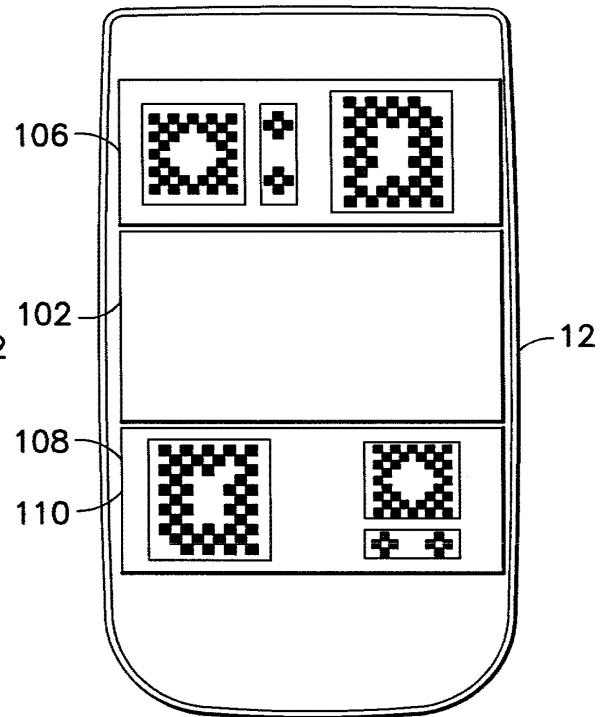


FIG. 10

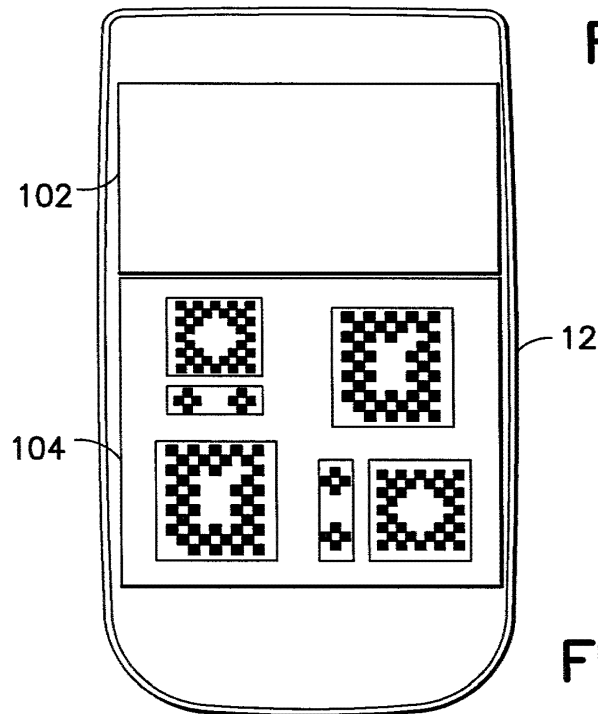


FIG. 9

6/6

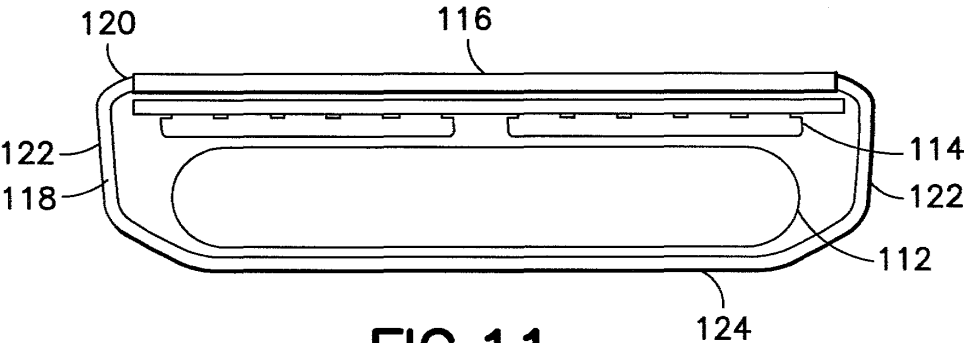


FIG. 11

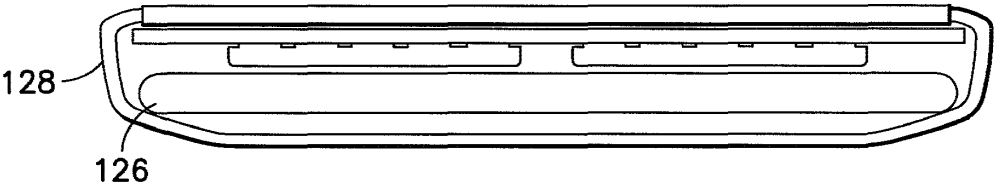


FIG. 12

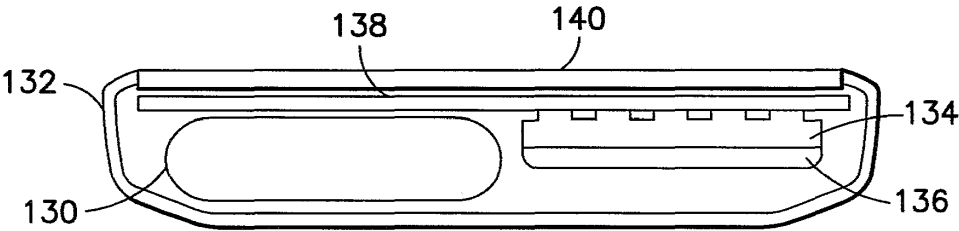


FIG. 13

| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)<br><br>Applicant(s): Claus H. Jorgensen<br><br>Filing Date: herewith |                                           | Serial No.: to be assigned<br><br><br>Group: |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------|-----------|
| <b>U.S. PATENT DOCUMENTS</b>                                                                                                                                                                                                  |                                                    |                                                                                                  |                                           |                                              |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Number-Kind Code)              | Publication Date<br>(MM-DD-YYYY)                                                                 | Name of Patentee or Applicant             | Class                                        | Sub-class |
|                                                                                                                                                                                                                               | US-DES. 427,171                                    | 06-27-2000                                                                                       | Frye et al.                               | D14                                          | 138       |
|                                                                                                                                                                                                                               | US-2005/0282593 A1                                 | 12-22-2005                                                                                       | Spence et al.                             | 455                                          | 575.3     |
|                                                                                                                                                                                                                               | US-2003/0199290 A1                                 | 10-23-2003                                                                                       | Viertola                                  | 455                                          | 575.1     |
|                                                                                                                                                                                                                               | US-2001/0034242                                    | 10-2001                                                                                          | Takagi, Hisamitsu                         | 455                                          | 550       |
|                                                                                                                                                                                                                               | US-2004/0253508 A1                                 | 12-16-2004                                                                                       | Kohri et al.                              | 429                                          | 100       |
|                                                                                                                                                                                                                               | US-6,219,257 B1                                    | 04-17-2001                                                                                       | Arnold                                    | 361                                          | 814       |
| <b>FOREIGN PATENT DOCUMENTS</b>                                                                                                                                                                                               |                                                    |                                                                                                  |                                           |                                              |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Country Code-Number-Kind Code) | Publication Date<br>(MM-DD-YYYY)                                                                 | Name Of Patentee of Applicant             | Translation?<br>Yes/No/n/a                   |           |
|                                                                                                                                                                                                                               | EP-1209880-A3                                      | 02-05-2003                                                                                       | Nokia Corporation                         | Abstract                                     |           |
|                                                                                                                                                                                                                               | EP-1533983-A1                                      | 05-25-2005                                                                                       | LG Electronics Inc.                       |                                              |           |
|                                                                                                                                                                                                                               | GB-2391740-A                                       | 02-11-2004                                                                                       | Matsushita Electrical Industrial Co. Ltd. |                                              |           |
|                                                                                                                                                                                                                               | JP-2005-318064-A                                   | 11-10-2005                                                                                       | Toshiba Corp                              |                                              |           |
|                                                                                                                                                                                                                               | EP-1496672-A1                                      | 01-12-2006                                                                                       | Matsushita Electric Industrial Co., Ltd.  |                                              |           |
| <b>OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)</b>                                                                                                                                              |                                                    |                                                                                                  |                                           |                                              |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                  |                                           |                                              |           |
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| Examiner's Signature:                                                                                                                                                                                                         |                                                    |                                                                                                  | Date Considered:                          |                                              |           |
| Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.<br>Include a copy of this citation form with your next correspondence to the Applicant(s). |                                                    |                                                                                                  |                                           |                                              |           |

COPY

Attorney Docket No.: 891.0013.U1 (US)

NC51996US

Patent Application Papers Of:

Claus H. Jorgensen

For: Portable Electronic Device

## Portable Electronic Device

### BACKGROUND OF THE INVENTION

#### Field of the Invention

[0001] The invention relates to a portable electronic device and, more particularly, to form factor configuration of a portable electronic device.

#### Brief Description of Prior Developments

[0002] Ultra thin telephone products have emerged in the market, pioneering a new approach in mechanical architecture for flip-phone designs (also known a clam-shell handset). Priority for these products is mechanical thinness, allowing the feature set and industrial design to be adjusted to suit this goal. New flip-phones include the Motorola RAZR, the Motorola V3, the Motorola V3x, the Samsung SCH-V740, the NEC L1. For example, the Motorola RAZR has a thickness of about 0.54 inch. Candy-bar shaped mobile phones can have smaller thicknesses, such as the Motorola SLIVR with a thickness of about 0.45 inch and the Motorola SCALPEL with a thickness of about 0.25 inch.

[0003] There is a desire for an architecture for an ultrathin fold product, such as a flip-phone style of mobile telephone, which can maintain aesthetic balance in proportions, and allow added thickness to avoid a "squeezed" appearance as seen with the RAZR™ mobile telephone.

## SUMMARY OF THE INVENTION

[0004] In accordance with one aspect of the invention, a portable electronic apparatus is provided comprising a first section comprising electronics; a second section movably connected to the first section by a hinge section, wherein the second section comprises a display; and an access entry provided in the hinge section adapted to allow insertion of an electrical device through the hinge section and into electrical connection with an electrical connector inside the first section.

[0005] In accordance with another aspect of the invention, a portable electronic device is provided including a first section, a second section and a connecting section. The first section has a user input section and a first tubular housing member. The first tubular housing member forms a majority of opposite exterior lateral sides of the first section. The second section has a display and a second tubular housing member. The second tubular housing member forms a majority of opposite exterior lateral sides of the second section. The connecting section movably connects the second section with the first section. The first tubular housing member at least partially houses the user input section. The second tubular housing member at least partially houses the display.

[0006] In accordance with another aspect of the invention, a mobile telephone is provided comprising an engine section comprising a printed circuit board, a transceiver, a processor and a memory; a battery located adjacent the engine section; and a user input section comprising a keypad located directly above the engine

section and the battery. The user input section is located directly opposite the battery without a portion of the engine section therebetween.

[0007] In accordance with another aspect of the invention, a portable electronic device is provided comprising a first section; a second section movably connected to the first section by a hinge; and a camera. The hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section. The camera is connected to the second section. The camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of an exterior housing of the second section.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The foregoing aspects and other features of the invention are explained in the following description, taken in connection with the accompanying drawings, wherein:

[0009] Fig. 1 is a perspective view of a mobile telephone comprising features of the invention;

[0010] Fig. 2 is a perspective view of the telephone shown in Fig. 1 in a closed configuration;

[0011] Fig. 3 is a side view of the telephone shown in Fig. 1;

[0012] Fig. 4 is a front view of the telephone shown in Fig. 2;

[0013] Fig. 5 is a side view of the telephone shown in Fig. 2;

[0014] Fig. 6 is a rear view of the telephone shown in Fig. 2;

[0015] Fig. 7 is an exploded perspective view of the telephone shown in Figs. 1-6;

[0016] Fig. 8 is a schematic view showing the layout of the engine and the battery of the telephone shown in Figs. 1-7;

[0017] Fig. 9 is a schematic view similar to Fig. 8 showing an alternate embodiment of the layout of the engine and the battery;

[0018] Fig. 10 is a schematic view similar to Fig. 8 showing another alternate embodiment of the layout of the engine and the battery;

[0019] Fig. 11 is a schematic view showing an alternate embodiment of the layout of the engine and the battery;

[0020] Fig. 12 is a schematic view similar to Fig. 11 showing an alternate embodiment of the layout of the engine and the battery; and

[0021] Fig. 13 is a schematic view similar to Fig. 11 showing an alternate embodiment of the layout of the engine and the battery.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Referring to Fig. 1, there is shown a perspective view of a portable electronic device 10

incorporating features of the invention. Although the invention will be described with reference to the exemplary embodiments shown in the drawings, it should be understood that the invention can be embodied in many alternate forms of embodiments. In addition, any suitable size, shape or type of elements or materials could be used.

[0023] In the embodiment shown, the device 10 comprises a hand-held mobile telephone. However, in alternate embodiments, features of the invention could be used in other types of portable electronic devices, such as a PDA or a hand-held gaming device for example. The telephone 10 is a flip-phone type of telephone comprising a first section 12 connected to a second section 14 by a movably connecting section 16. In this embodiment the connecting section 16 is a hinge. However, in alternate embodiments, any suitable type of movable connecting section could be provided. Fig. 1 shows the telephone 10 in an open configuration. Fig. 2 shows the telephone 10 in a closed configuration.

[0024] Referring also to Figs. 3-6, in the closed configuration, the second section 14 lies directly opposite the first section 12. The hinge 16 allows the second section 14 to pivot open to the open configuration at an angle 18 of about  $165^{\circ}$ . However, in alternate embodiments, the angle 18 could have any suitable angle. In the closed configuration, the telephone has a height 20 of about 88.7 mm, a width 22 of about 45 mm, and a thickness 24 of about 15 mm. In the open configuration, the telephone has a length 26 of about 166 mm. However, in alternate embodiments, any suitable dimensions could be provided. As seen with reference to Fig. 3, the

design shown has a substantially uniform thickness lower section 12 and a substantially uniform thickness upper section 14 along their entire lengths except for at the hinge 16. As seen best in Figs. 5 and 14, when the two sections 12, 14 are closed, the telephone 10 has a block shape with grooves along the joints at the lateral sides, but with the ends of the sections 12, 14 being at the same bottom end of the closed shape.

[0025] Referring also to Fig. 7, there is shown an exploded perspective view of the telephone 10 for details of how the small thickness 24 of about only 15 mm in a flip-phone design can be accomplished. The first section 12 generally comprises a first housing member 28, an engine 30, a battery 32, a user input section 34, and an antenna module 36. Additional components could be provided. The first housing member 28 generally comprises a one-piece tubular member. In a preferred embodiment, the tubular member is comprised of metal, such as aluminum for example. In one type of embodiment, the tubular metal member could be formed from an extruded member with holes punched into it after it is extruded. The first housing member 28 forms a majority of opposite exterior lateral sides 38 and a rear side 40 of the first section 12 (except at top and bottom ends 42, 44 of the first section). The front side of the first housing member 28 has holes 46 therethrough for portions of the user input section 34 to be located in the holes. Because of the tubular shape of the first housing member 28, the first housing member 28 has substantially open top and bottom apertures, which are slanted in the embodiment shown.

[0026] The antenna module 36 is located at the bottom aperture into the first housing member 28 and enclosed by the antenna cover 48. The antenna cover 48, such as made of plastic, is attached to the first housing member 28 at the bottom aperture to keep the antenna module 36 attached to the rest of the telephone. In one type of embodiment, the antenna module could be a STINGRAY antenna from RaySat, Inc. However, any suitable antenna module could be provided.

[0027] The user input section generally comprises keymats 50, an EL backlight foil 52, a keymat dome sheet 54 and a keymat stiffener 56. However, in alternate embodiments, any suitable user input section could be provided. The keymats 50 are located in the holes 46 of the first housing member 28. The other components of the user input section are located inside the first housing member 28. A cross bar portion 47 of the first housing member 28 is located between the two keymats 50.

[0028] The engine 30 generally comprises a printed circuit board, a transceiver, a processor, and a memory, among other components. Referring also to Fig. 8, the width of the engine 30 is only about less than half the width 22 of the telephone. The battery 32 is located adjacent the lateral side of the engine 30 and is also about less than half the width 22 of the telephone. Unlike conventional telephones which have the engine located above the battery, the configuration of the side-by-side engine/battery allows the battery and the engine to have a practical design thickness and still provide a reduced thickness 24 as compared to conventional flip-phones. The keypads are located above the engine section 30 and the battery 32, wherein the user input section 34

is located directly opposite the battery 32 without a significant portion of the engine section 30 therebetween.

[0029] The connecting section 16 has a first hinge member 58 and a second hinge member 60. The first hinge member 58 is connected to the top end of the first frame member 28 to substantially close the open top end of the first frame member 28. The first hinge member 58 also comprises a door 61 for access to the battery 32 such that the battery can be removed, and a door 63 for access to the engine 30 for inserting and removing an electronic module 65, such as a SIM card or flash memory or other memory card. The doors 61, 63 are located below the shoulders 62 such that there is a path at the connecting section 16 past the second hinge member 60. In an alternate embodiment, the connecting section 16 could have only one door; for the battery or for the electronic module or both. The door(s) is preferably connected to the rest of the first hinge member 58 by a living hinge. However, in alternate embodiments any suitable type of doorway system could be provided. In other alternate embodiments any suitable access entry could be provided. In a preferred embodiment the door(s) support the electronic device (such as the battery 32 and/or electronic module 65). The engine 30 comprises electrical connectors 67 and 69 for the electronic devices 32 and 65 to connect to inside the first section 12.

[0030] The first hinge member 58 has shoulders 62 with interior facing apertures to receive ends of the hinge module 64. The hinge module 64 is mounted in the second hinge member 60. The second hinge member 60 is sized and

shaped to pivotably fit between the shoulders 62. In an alternate embodiment any suitable type of hinge assembly could be provided, such as disclosed in U.S. Patent No. 6,900,981, and U.S. Patent Application Nos. 10/610,978, 11/055,914, 11/077,674, and 11/253,017, for example, which are hereby incorporated by reference in their entirety. In an alternate embodiment, the electronic device insertion and removal feature through a movable connection section of the invention could be used in other types of telephones having movable sections including, for example, a slide phone such as shown in U.S. Patent No. Des. 427,171 which is hereby incorporated by reference in its entirety, or could be used in other apparatus, such as a gaming device or PDA having two movable sections connected by a hinge or connecting section.

[0031] The second section 14 generally comprises a second housing member 66, a display module 68 and a camera 70. The second housing member 66 preferably comprises a one-piece member having a general tubular shape. In a preferred embodiment, the tubular member is comprised of metal, such as aluminum for example. In one type of embodiment, the tubular metal member could be formed from an extruded member with holes punched into it after extrusion. The second housing member 66 forms portions of opposite exterior lateral sides 72, a front side 74 and a rear side 76 of the second section 14. The front side of the second housing member 66 has a hole 78. A front portion 80 of the display module 68 can be located for viewing through the hole 78. The rear side of the second housing member 66 has a hole 82 therethrough. A rear portion 84 (see Fig. 4) of the

display module 68 is located for viewing through the hole 82. Front portion 80 forms a main display, and rear portion 84 forms a sub-display. A window 86 can be glued onto the sub-display 84. Because of the tubular shape of the second housing member 66, the second housing member 66 has substantially open top and bottom apertures, which are slanted in the embodiment shown.

[0032] The display module 68, camera 70 and a speaker or sound transducer 88 are coupled to the engine 30 by a flex cable assembly 90 which extends through the hinge 16. A mounting bracket 92 is provided for mounting the display module 68 inside the second housing member 66 between the second hinge member 60 and a speaker cover 94 at opposite ends of the second housing member 66. An optional second camera 96 could also be provided.

[0033] The camera 70 extends to the rear side 76 of the second section 14. The camera 70 is housed at an exterior side of the portable electronic device by a junction 98 of a cutout portion 99 of the second hinge member 60 and a cutout portion 100 of the second tubular housing member 66. The cutout portions 99, 100 project slightly from the rear side of the telephone to form a protrusion 142 (see Fig. 14). By providing a projecting portion of the housing for the camera, rather than making the housing flush with the camera, this allows the rest of the telephone to have the reduced thickness 24, but still use a standard size camera.

[0034] Referring also to Figs. 9-10, alternate embodiments of configuration of the battery relative to the engine of Fig. 8 is shown. Fig. 10 shows an embodiment where the battery 102 and engine 104 are

located in the first section 12 in a side-by-side configuration. This side-by-side configuration comprises the battery 102 being located at a top side of the engine 104 proximate the hinge end of the first section. Fig. 11 shows an embodiment where the battery 102 is located between two portions 106, 108 of the engine 110. Thus a split side-by-side configuration is provided. In both of these alternate embodiments the keypad is located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a substantial portion of the engine section therebetween.

[0035] Figs. 11-13 show other alternate embodiments of positioning the battery relative to the engine. In Fig. 11 the battery 112 is located below the engine 114. The keypad 116 is located above the engine 114. The components 112, 114, 116 are housed in a one-piece metal tubular housing member 118. The keypad is located at a hole through the front side 120 of the housing member 118. Otherwise, the housing member 118 forms enclosed lateral exterior sides 122 and rear side 124.

[0036] Fig. 12 shows an embodiment similar to Fig. 11. However, in this embodiment the battery 126 is thinner and wider than the battery 112. The tubular housing member 128 is thinner and wider than the tubular housing member 118. Fig. 13 shows another alternate embodiment. In this embodiment the battery 130 is about half the width of the tubular housing member 132. The engine 134 comprises a portion 136 located at the lateral side of the battery 130 and another portion 138 located between the battery and the keypad 140. The configurations shown

in Figs. 11-13 could be used in candy-bar style telephone handsets as well as flip-phone style handsets.

[0037] One of the features of the invention is the use of tubular members to form the major housing components of the first and second sections of the flip-phones. The tubular housing members provide an increased strength than conventional housing designs. This allows the reduction in side of the housing components versus conventional housing components and, thus, a reduction in the thickness 24 of the telephone. In addition, the side-by-side positioning of the battery/engine can further allow a reduction in thickness of the handset versus conventional stacked battery/engine handsets.

[0038]. With the present invention a user exchangeable battery and/or cards (SIM, flash and other memory cards) can be inserted and removed through the hinge end in a portable terminal. The housing of a fold phone can be extruded in one material. Extruding a housing in one material and having a user exchangeable battery (and cards) through a hinge end can be provided. With the invention a battery can be located next to the PWB on a lateral side of the phone.

[0039] It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the invention is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.

## CLAIMS

What is claimed is:

1. A portable electronic apparatus comprising:
  - a first section comprising electronics;
  - a second section movably connected to the first section by a hinge section, wherein the second section comprises a display; and
  - an access entry provided in the hinge section adapted to allow insertion of an electrical device through the hinge section and into electrical connection with an electrical connector inside the first section.
2. A portable electronic apparatus as in claim 1 wherein the access entry comprises a movable door on the hinge section.
3. A portable electronic apparatus as in claim 2 wherein the access entry comprises a living hinge connecting the door to the rest of the hinge section.
4. A portable electronic apparatus as in claim 1 wherein the access entry is sized and shaped to allow insertion of a battery through the access entry, and the electrical connector is adapted to electrically connect to the battery.
5. A portable electronic apparatus as in claim 1 wherein the access entry is sized and shaped to allow insertion of an electronic module through the access entry, and the electrical connector is adapted to electrically connect to the electronic module.

6. A portable electronic apparatus as in claim 1 wherein the access entry is sized and shaped to at least partially support the electronic device when the electronic device is fully inserted into the portable electronic device.

7. A portable electronic device comprising:

a first section having a user input section and a first one-piece tubular housing member, wherein the first tubular housing member forms a majority of opposite exterior lateral sides of the first section;

a second section having a display and a second tubular housing member, wherein the second tubular housing member forms a majority of opposite exterior lateral sides of the second section; and

a connecting section movably connecting the second section with the first section,

wherein the first tubular housing member at least partially houses the user input section, and wherein the second tubular housing member at least partially houses the display.

8. A portable electronic device as in claim 7 wherein at least one of the first and second tubular housing members comprises a metal member.

9. A portable electronic device as in claim 8 wherein the first tubular housing members comprises an extruded member.

10. A portable electronic device as in claim 7 wherein the connecting section comprises a hinge with a first hinge member forming a cap to an open end of the first tubular housing member and a second hinge member forming a cap to an open end of the second tubular housing member.

11. A portable electronic device as in claim 7 wherein the first section comprises:

an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

a battery located adjacent the engine section; and

the user input section comprises a keypad located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

12. A portable electronic device as in claim 7 wherein the connecting section comprises a hinge, wherein the hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section; and the portable electronic device further comprises a camera connected to the second section, wherein the camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of the second tubular housing member.

13. A portable electronic device as in claim 7 wherein the portable electronic device comprises a mobile telephone having a transceiver.

14. A portable electronic device as in claim 7 wherein the connecting section comprises an access entry provided in the connecting section adapted to allow insertion of an electrical device through the connecting section and into electrical connection with an electrical connector inside the first section.

15. A mobile telephone comprising:

an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

a battery located adjacent the engine section; and

a user input section comprising a keypad located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

16. A mobile telephone as in claim 15 wherein the battery is located at a lateral side of the engine section.

17. A mobile telephone as in claim 15 wherein the engine section is located at opposite sides of the battery.

18. A mobile telephone as in claim 15 wherein the mobile telephone comprises a first section comprising a first one-piece housing member having a general tubular shape and forming opposite exterior lateral sides of the first section, wherein the engine section, battery and user input section are housed in the first section.

19. A mobile telephone as in claim 18 wherein the mobile telephone comprises a second section pivotably connected to the first section, wherein the second section

comprises a second one-piece housing member having a general tubular shape and forming opposite exterior lateral sides of the second section.

20. A mobile telephone as in claim 15 wherein the mobile telephone comprises a first section pivotably connected to a second section by a hinge, wherein the hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section; and the mobile telephone further comprises a camera connected to the second section, wherein the camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of a one-piece second tubular housing member of the second section, wherein the second tubular housing member forms opposite exterior lateral sides of the second section.

21. A portable electronic device comprising:

a first section;

a second section movably connected to the first section by a hinge, wherein the hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section; and

a camera connected to the second section, wherein the camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of an exterior housing of the second section.

22. A portable electronic device as in claim 21 wherein the first section comprises:

a first tubular housing member, wherein the first tubular housing member forms a majority of opposite exterior lateral sides of the first section, and located at the first tubular section:

an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

a battery located adjacent the engine section; and

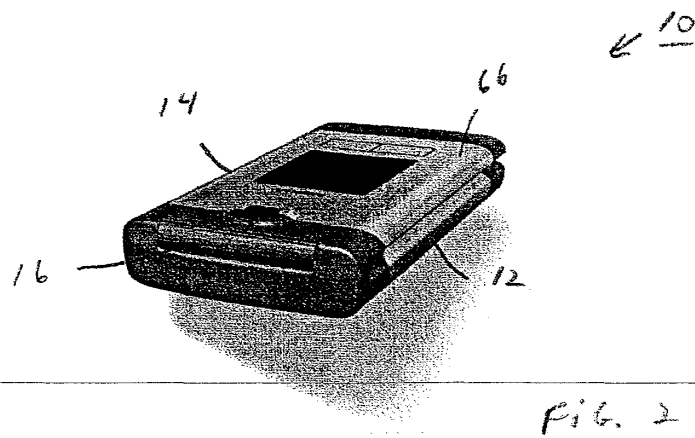
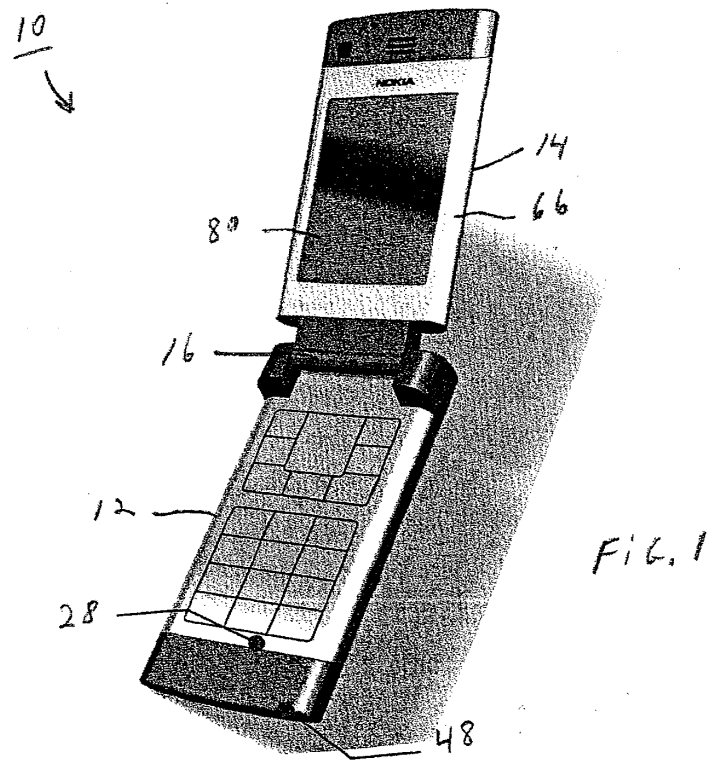
a user input section comprising a keypad located directly above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

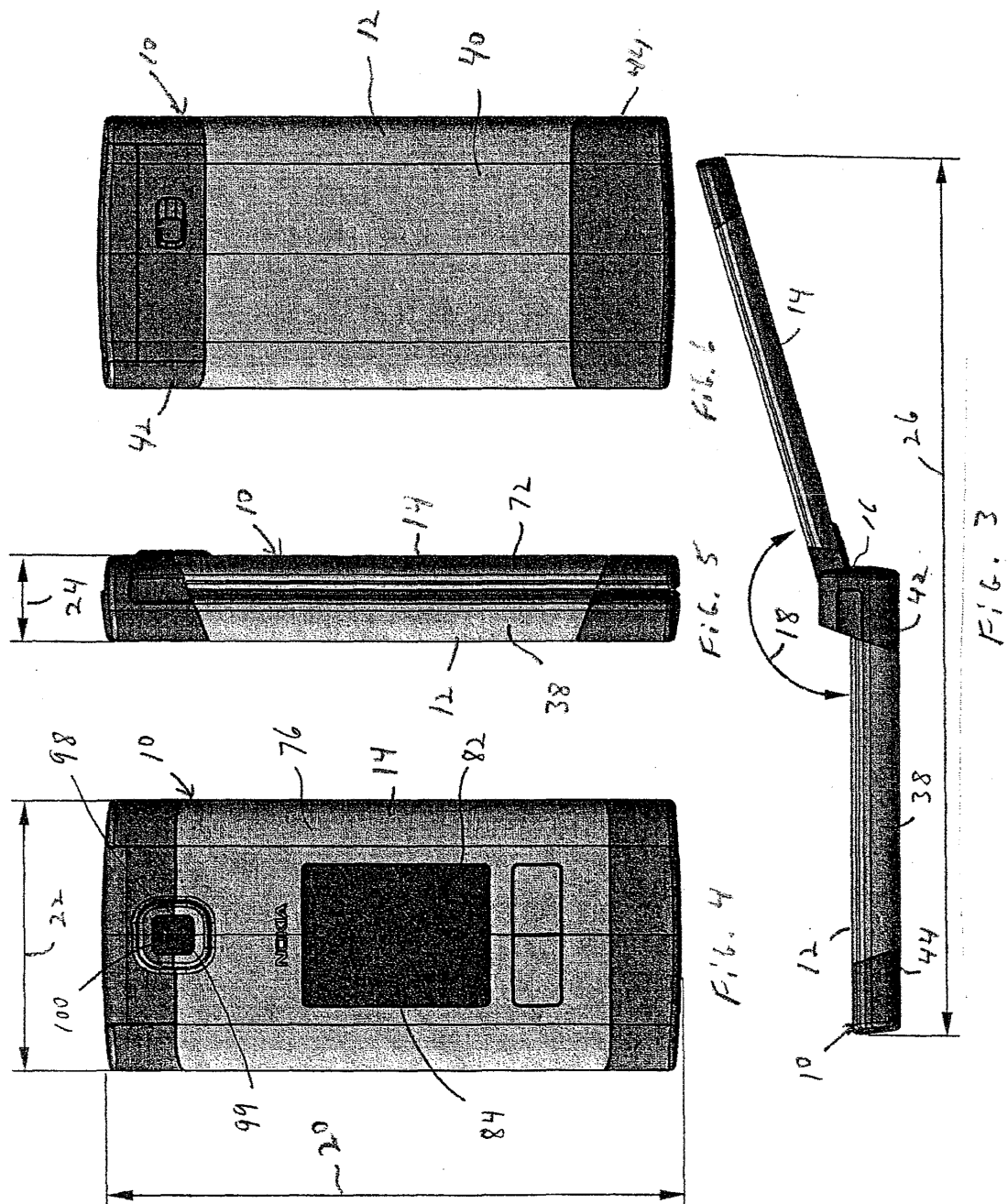
23. A portable electronic device as in claim 21 wherein the first section comprises a tubular metal housing member forming a majority of opposite exterior lateral sides of the first section, and wherein the second section comprises a tubular metal housing member forming a majority of opposite exterior lateral sides of the second section.

24. A portable electronic device as in claim 21 wherein the first and second sections each comprises tubular metal exterior housing members comprising extruded metal members.

# ABSTRACT

1 A portable electronic device including a first section, a  
2 second section and a connecting section. The first  
3 section has a user input section and a first tubular  
4 housing member. The first tubular housing member forms a  
5 majority of opposite exterior lateral sides of the first  
6 section. The second section has a display and a second  
7 tubular housing member. The second tubular housing  
8 member forms a majority of opposite exterior lateral  
9 sides of the second section. The connecting section  
10 movably connects the second section with the first  
11 section. The first tubular housing member at least  
12 partially houses the user input section. The second  
13 tubular housing member at least partially houses the  
14 display.







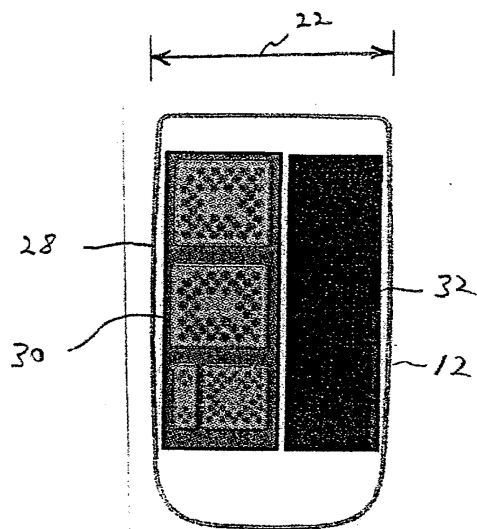


FIG. 8

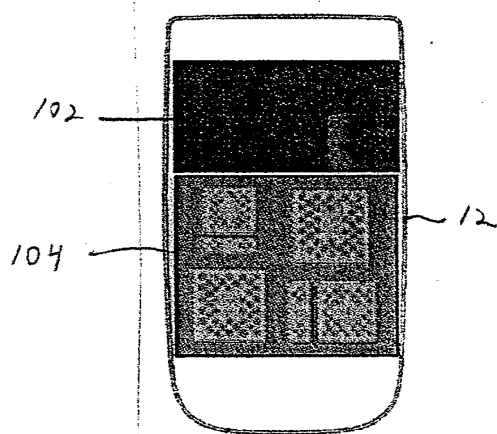


FIG. 9

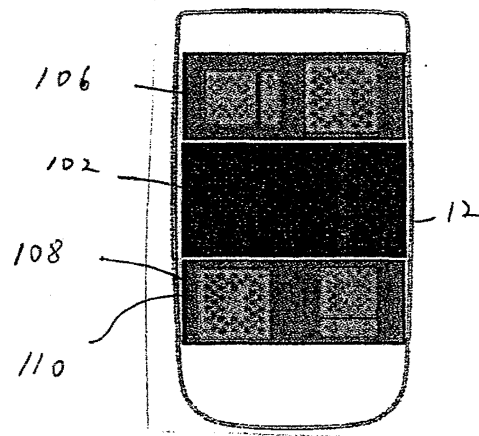
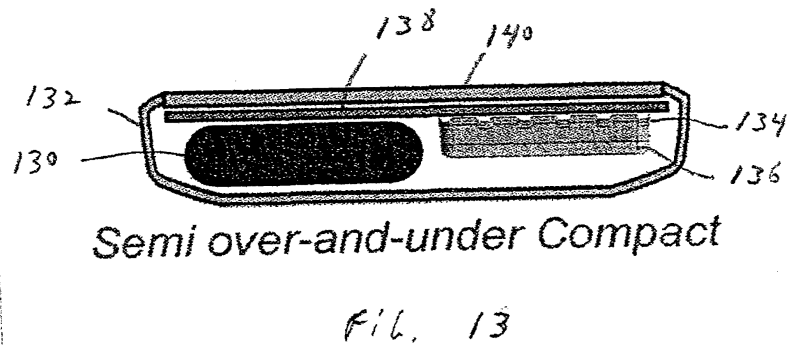
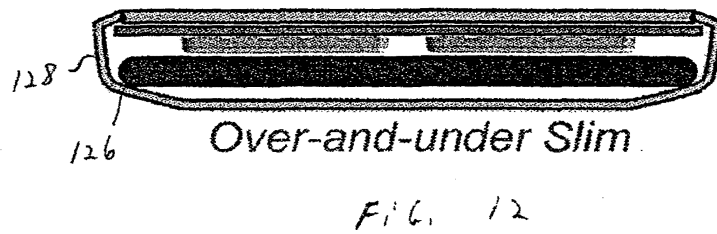
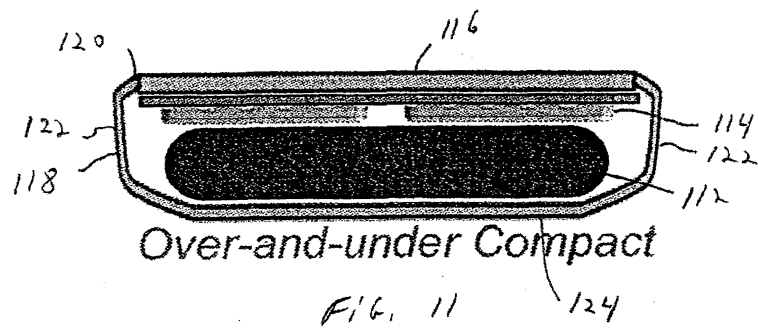


FIG. 10



**DECLARATION AND POWER OF ATTORNEY  
FOR PATENT APPLICATION**

COPY

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:

**Portable Electronic Device**

the specification of which:

(check one) ☒ is attached hereto.

☐ was filed on \_\_\_\_\_ as U.S. Application Serial No. \_\_\_\_\_, and was amended on \_\_\_\_\_ (if applicable).

☐ was described and claimed in PCT International Application Number \_\_\_\_\_ filed on \_\_\_\_\_ and

☐ as amended under PCT Article 19 on \_\_\_\_\_ (if any) and/or

☐ as amended under PCT Article 34 as published in the Annex(es) to the International Preliminary Examination Report (if any).

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 to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of this application as defined in 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(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

\_\_\_\_\_  
(Number)

\_\_\_\_\_  
(Country)

\_\_\_\_\_  
(Day/Mon/Year Filed)

☐ Yes ☐ No

I hereby claim the benefit under Title 35, United States Code, §119(e) of the United States provisional patent application(s) listed below:

(Application Serial No.)

(Filing Date)

I hereby claim 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(a) 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)

**POWER OF ATTORNEY:** As a named inventor I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the U.S. Patent and Trademark Office connected therewith:

All attorneys associated with Customer No.: 29,683

**SEND CORRESPONDENCE TO:**

**Customer No. 29,683**

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 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 INVENTOR :

LAST NAME  
Jorgensen

FIRST NAME  
Claus

MIDDLE NAME  
H.

RESIDENCE &  
CITIZENSHIP:

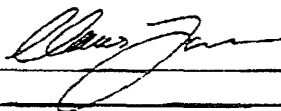
CITY & STATE OR COUNTRY  
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Denmark

POST OFFICE ADDRESS:

Kong Georgsvej 58, 1. tv  
2000 Frederiksberg  
Denmark

Signature



Date

24/3 2006

| Electronic Patent Application Fee Transmittal |          |                                 |        |                      |
|-----------------------------------------------|----------|---------------------------------|--------|----------------------|
| Application Number:                           |          |                                 |        |                      |
| Filing Date:                                  |          |                                 |        |                      |
| Title of Invention:                           |          | Portable Electronic Device      |        |                      |
| First Named Inventor/Applicant Name:          |          | Claus H. Jorgensen              |        |                      |
| Filer:                                        |          | Mark F. Harrington/Jessica Pace |        |                      |
| Attorney Docket Number:                       |          | 891.0013.U2(US)                 |        |                      |
| Filed as Large Entity                         |          |                                 |        |                      |
| Utility under 35 USC 111(a) Filing Fees       |          |                                 |        |                      |
| Description                                   | Fee Code | Quantity                        | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                 |          |                                 |        |                      |
| Utility application filing                    | 1011     | 1                               | 330    | 330                  |
| Utility Search Fee                            | 1111     | 1                               | 540    | 540                  |
| Utility Examination Fee                       | 1311     | 1                               | 220    | 220                  |
| Pages:                                        |          |                                 |        |                      |
| Claims:                                       |          |                                 |        |                      |
| Miscellaneous-Filing:                         |          |                                 |        |                      |
| Petition:                                     |          |                                 |        |                      |
| Patent-Appeals-and-Interference:              |          |                                 |        |                      |

| Description                              | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|------------------------------------------|----------|----------|--------|----------------------|
| <b>Post-Allowance-and-Post-Issuance:</b> |          |          |        |                      |
| <b>Extension-of-Time:</b>                |          |          |        |                      |
| <b>Miscellaneous:</b>                    |          |          |        |                      |
| <b>Total in USD (\$)</b>                 |          |          |        | <b>1090</b>          |

| Electronic Acknowledgement Receipt          |                                 |
|---------------------------------------------|---------------------------------|
| <b>EFS ID:</b>                              | 8258779                         |
| <b>Application Number:</b>                  | 12860234                        |
| <b>International Application Number:</b>    |                                 |
| <b>Confirmation Number:</b>                 | 9585                            |
| <b>Title of Invention:</b>                  | Portable Electronic Device      |
| <b>First Named Inventor/Applicant Name:</b> | Claus H. Jorgensen              |
| <b>Customer Number:</b>                     | 29683                           |
| <b>Filer:</b>                               | Mark F. Harrington/Jessica Pace |
| <b>Filer Authorized By:</b>                 | Mark F. Harrington              |
| <b>Attorney Docket Number:</b>              | 891.0013.U2(US)                 |
| <b>Receipt Date:</b>                        | 20-AUG-2010                     |
| <b>Filing Date:</b>                         |                                 |
| <b>Time Stamp:</b>                          | 14:35:17                        |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)     |

### Payment information:

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| Submitted with Payment                   | yes             |
| Payment Type                             | Deposit Account |
| Payment was successfully received in RAM | \$1090          |
| RAM confirmation Number                  | 543             |
| Deposit Account                          | 501924          |
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### File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/<br>Message Digest | Multi Part /.zip | Pages (if appl.) |
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|-------------------------------------------------|------------------------------------------------------|----------------------------|-----------------------------------------------------|----|----|
| 1                                               | Transmittal of New Application                       | ApplicationTransmittal.pdf | 64071<br>c2d7242d168662589c2aca10a681a733b41fea7e   | no | 3  |
| Warnings:                                       |                                                      |                            |                                                     |    |    |
| Information:                                    |                                                      |                            |                                                     |    |    |
| 2                                               | Preliminary Amendment                                | PreliminaryAmendment.pdf   | 227671<br>4e73ae6acd7cc19de22f5ee3573acc1f7e70d5f6  | no | 10 |
| Warnings:                                       |                                                      |                            |                                                     |    |    |
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| 3                                               | Drawings-only black and white line drawings          | ReplacementSheet.pdf       | 101633<br>ee1133d5cf0f8a2ab029f755f976c4865e7a4584  | no | 6  |
| Warnings:                                       |                                                      |                            |                                                     |    |    |
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| 4                                               | Information Disclosure Statement (IDS) Filed (SB/08) | IDS.pdf                    | 44548<br>90286d32b8d62cf3c2e23e8d3ccc4bb4774ecc17   | no | 2  |
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| 5                                               | Information Disclosure Statement (IDS) Filed (SB/08) | PTO1449.pdf                | 42743<br>99baf762eb46d39135ffe3377f02dbef42d323d5   | no | 1  |
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| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Fee Worksheet (PTO-875) | fee-info.pdf | 32732                                   | no      | 2 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                         |              | 320e920fcdc1ce498765fd9eae595d2745e816f |         |   |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                         |              |                                         |         |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |              |                                         |         |   |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         |              |                                         | 1875472 |   |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |                         |              |                                         |         |   |

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: Confirmation No.:  
Applicant(s): Jorgensen, Claus H.  
Filed: Herewith  
Art Unit:  
Examiner:  
Title: Portable Electronic Device  
Attorney Docket No.: 891.0013.U2(US)  
Customer No.: 29,683

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Information Disclosure Statement

(37 C.F.R. §1.97(b))

Sir:

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

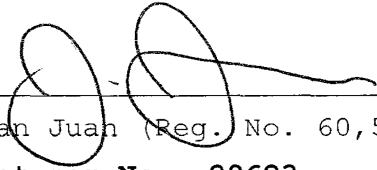
A Form PTO-1449 is enclosed for the Examiner's use which lists art cited in the parent application (Application No.: 11/393,510). In accordance with 37 C.F.R. §1.98(d) copies of the art are not included. These can be obtained by the Examiner from the file of the parent application.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the claimed invention (37 C.F.R. §1.97(g)) or that no other

possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to Patentability (37 C.F.R. §1.97(h)).

If there are any additional charges with respect to this Information Disclosure Statement or otherwise, please charge deposit account 50-1924 for any fee deficiency.

Respectfully submitted,

  
\_\_\_\_\_  
Juan Juan (Reg. No. 60,564)

8/20/2010  
\_\_\_\_\_  
Date

**Customer No.: 29683**  
Harrington & Smith,  
Attorneys At Law, LLC  
4 Research Drive  
Shelton, CT 06484-6212  
203-925-9400

Date: 08/20/10

PTO/SB/06 (12-04)

Approved for use through 7/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                      |                                    |               |              | Application or Docket Number<br><b>12/860,234</b> |              |                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------|--------------|---------------------------------------------------|--------------|---------------------|
| <b>APPLICATION AS FILED – PART I</b>                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                      |                                    |               |              |                                                   |              |                     |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                      | (Column 2)                         |               | SMALL ENTITY |                                                   | OR           |                     |
| OTHER THAN SMALL ENTITY                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                      |                                    |               |              |                                                   |              |                     |
| FOR                                                                                                                                                                                                                                                                                                                                                                                                               | NUMBER FILED                                                                                                                                                                                                         | NUMBER EXTRA                       | RATE (\$)     | FEE (\$)     | RATE (\$)                                         | FEE (\$)     |                     |
| BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                                                                                                                                                                                                                                                                                                                                                        | N/A                                                                                                                                                                                                                  | N/A                                | N/A           |              | N/A                                               | 330          |                     |
| SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m))                                                                                                                                                                                                                                                                                                                                                                       | N/A                                                                                                                                                                                                                  | N/A                                | N/A           |              | N/A                                               | 540          |                     |
| EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                                                                                                                                                                                                                                                                                                                                                                  | N/A                                                                                                                                                                                                                  | N/A                                | N/A           |              | N/A                                               | 220          |                     |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                                                                                                                                                                                   | minus 20 = 0                       | x\$26         |              | x\$52                                             | 0            |                     |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                                                                                                                                                                                                                                                                                                                                                            | 3                                                                                                                                                                                                                    | minus 3 = 0                        | x\$110        |              | x\$220                                            | 0            |                     |
| APPLICATION SIZE FEE<br>(37 CFR 1.16(s))                                                                                                                                                                                                                                                                                                                                                                          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$270 (\$135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR |                                    |               | 0            |                                                   | 0            |                     |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                      |                                    | 195           |              | 390                                               |              |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                                    | TOTAL         | 0            | TOTAL                                             | 1090         |                     |
| * If the difference in column 1 is less than zero, enter "0" in column 2.                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                      |                                    |               |              |                                                   |              |                     |
| <b>APPLICATION AS AMENDED – PART II</b>                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                      |                                    |               |              |                                                   |              |                     |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                      | (Column 2)                         |               | (Column 3)   |                                                   | SMALL ENTITY |                     |
| OTHER THAN SMALL ENTITY                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                      |                                    |               |              |                                                   | OR           |                     |
| AMENDMENT A                                                                                                                                                                                                                                                                                                                                                                                                       | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                     | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$)    | ADDITIONAL FEE (\$)                               | RATE (\$)    | ADDITIONAL FEE (\$) |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Total<br>(37 CFR 1.16(i))                                                                                                                                                                                            | Minus **                           | =             | X =          |                                                   | X =          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Independent<br>(37 CFR 1.16(h))                                                                                                                                                                                      | Minus ***                          | =             | X =          |                                                   | X =          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Application Size Fee (37 CFR 1.16(s))                                                                                                                                                                                |                                    |               |              |                                                   |              |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))                                                                                                                                                      |                                    |               | N/A          |                                                   | N/A          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                                    | TOTAL         |              | TOTAL                                             |              |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                                    | ADD'T FEE     |              | ADD'T FEE                                         |              |                     |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                      | (Column 2)                         |               | (Column 3)   |                                                   | SMALL ENTITY |                     |
| OTHER THAN SMALL ENTITY                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                      |                                    |               |              |                                                   | OR           |                     |
| AMENDMENT B                                                                                                                                                                                                                                                                                                                                                                                                       | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                     | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE (\$)    | ADDITIONAL FEE (\$)                               | RATE (\$)    | ADDITIONAL FEE (\$) |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Total<br>(37 CFR 1.16(i))                                                                                                                                                                                            | Minus **                           | =             | X =          |                                                   | X =          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Independent<br>(37 CFR 1.16(h))                                                                                                                                                                                      | Minus ***                          | =             | X =          |                                                   | X =          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | Application Size Fee (37 CFR 1.16(s))                                                                                                                                                                                |                                    |               |              |                                                   |              |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))                                                                                                                                                      |                                    |               | N/A          |                                                   | N/A          |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                                    | TOTAL         |              | TOTAL                                             |              |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                      |                                    | ADD'T FEE     |              | ADD'T FEE                                         |              |                     |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.<br>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".<br>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".<br>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1. |                                                                                                                                                                                                                      |                                    |               |              |                                                   |              |                     |

This collection of information is required by 37 CFR 1.16. 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| APPLICATION<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 12/860,234            | 08/20/2010               | 2617            | 1090          | 891.0013.U2(US) | 20         | 3          |

**CONFIRMATION NO. 9585**

29683  
HARRINGTON & SMITH  
4 RESEARCH DRIVE, Suite 202  
SHELTON, CT 06484-6212

## FILING RECEIPT



\*OC000000043320160\*

Date Mailed: 09/02/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

### Applicant(s)

Claus H. Jorgensen, Frederiksberg, DENMARK;

### Assignment For Published Patent Application

Nokia Corporation

**Power of Attorney:** The patent practitioners associated with Customer Number 29683

### Domestic Priority data as claimed by applicant

This application is a CON of 11/393,510 03/29/2006 PAT 7,787,618

### Foreign Applications

**If Required, Foreign Filing License Granted:** 09/01/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/860,234**

**Projected Publication Date:** To Be Determined - pending completion of Corrected Papers

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

Portable Electronic Device

**Preliminary Class**

455

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 12/860,234         | 08/20/2010            | Claus H. Jorgensen    | 891.0013.U2(US)        |

**CONFIRMATION NO. 9585**

29683  
HARRINGTON & SMITH  
4 RESEARCH DRIVE, Suite 202  
SHELTON, CT 06484-6212

## FORMALITIES LETTER



\*OC000000043320161\*

Date Mailed: 09/02/2010

## NOTICE TO FILE CORRECTED APPLICATION PAPERS

### *Filing Date Granted*

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 2, 3, and 7-10.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 1-13 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

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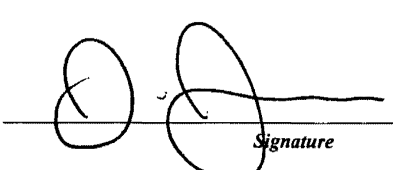
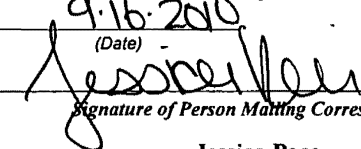
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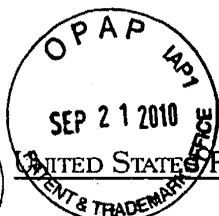
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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

IFW

| TRANSMITTAL OF FORMAL DRAWINGS                                                                                                                                                                                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               | Docket No.<br>891.0013.U2(US) |                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|---------------------------------|
| In Re Application Of: <b>Claus H. JORGENSEN</b>                                                                                                                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                               |                                 |
| Application No.<br><b>12/860,234</b>                                                                                                                                                                                         | Filing Date<br><b>08/20/2010</b> | Examiner                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Patent Number<br><b>29683</b> | Group Art Unit<br><b>2617</b> | Confirmation No.<br><b>9585</b> |
| Invention: <b>Portable Electronic Device</b>                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                               |                                 |
| Address to:<br><b>Commissioner for Patents<br/>P.O. Box 1450<br/>Alexandria, VA 22313-1450</b>                                                                                                                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                               |                                 |
| Transmitted herewith are:<br><br>6 sheets of formal drawing(s) for this application.<br><br><input checked="" type="checkbox"/> Each sheet of drawing indicates the identifying indicia suggested in 37 CFR Section 1.84(c). |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                               |                               |                                 |
| <br>Signature                                                                                                                             |                                  | Dated: 9/16/2010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                               |                               |                                 |
| Juan Juan<br>Registration No. 60,564<br><br>Harrington & Smith<br>Attorneys at Law, LLC<br>4 Research Drive<br>Shelton, CT 06484                                                                                             |                                  | <div>I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on<br/>9.16.2010<br/>(Date)<br/><br/>Signature of Person Mailing Correspondence<br/>Jessica Pace<br/>Typed or Printed Name of Person Mailing Correspondence</div> |                               |                               |                                 |

P23B/REV03



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MFH/JJ

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| 12/860,234         | 08/20/2010            | Claus H. Jorgensen    | 891.0013.U2(US)        |

CONFIRMATION NO. 9585

FORMALITIES LETTER

29683

HARRINGTON & SMITH

4 RESEARCH DRIVE, Suite 202  
SHELTON, CT 06484-6212

US ACTION  
DUE DATE 11-1-2010  
PAPER DATED 9-2-2010  
OA FINAL  
MSG PT DWG  
APPEAL ISSUE FEE  
OTHER \_\_\_\_\_



Date Mailed: 09/02/2010

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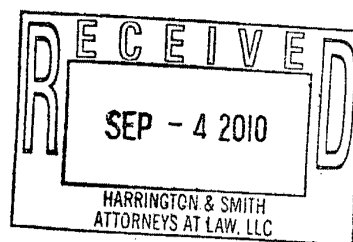
*Filing Date Granted*

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1/6

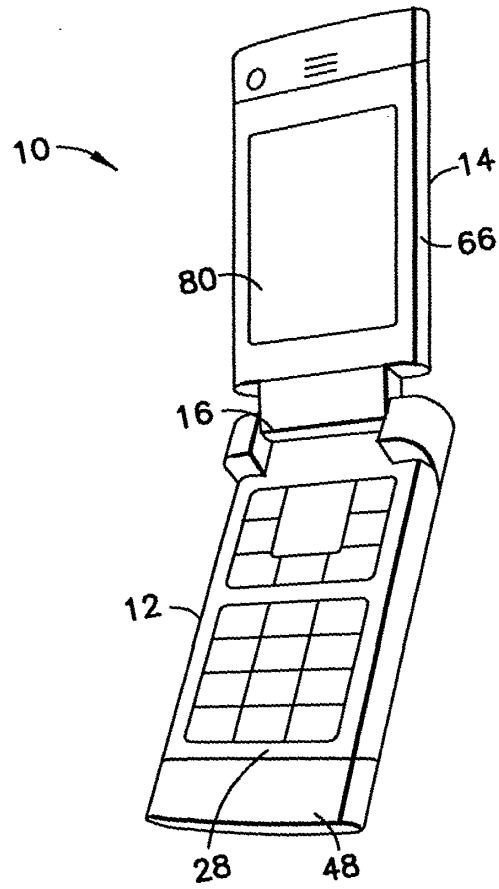


FIG. 1

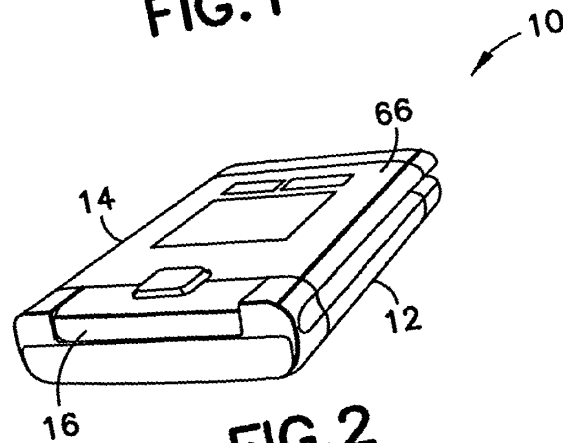


FIG. 2

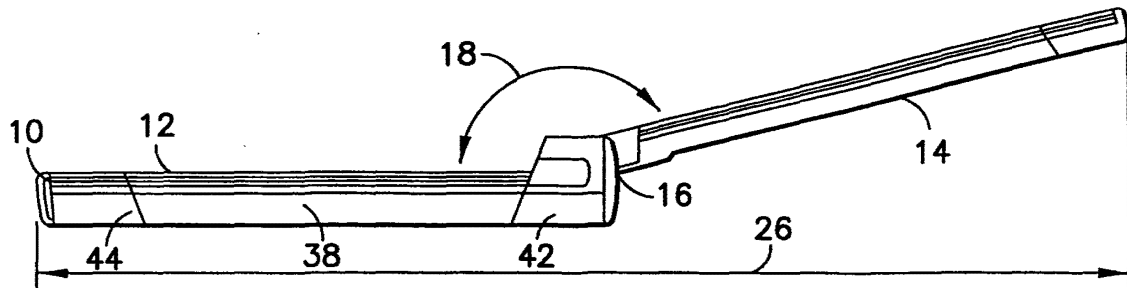


FIG. 3

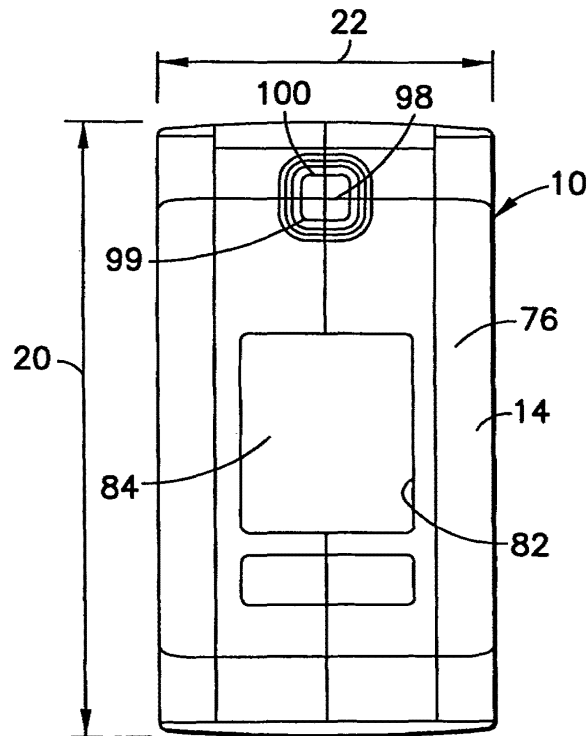


FIG. 4

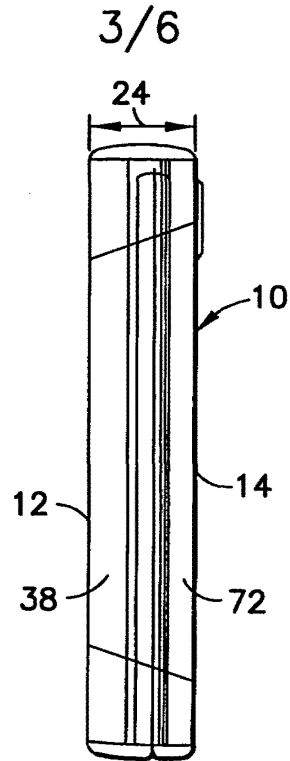


**FIG. 5**

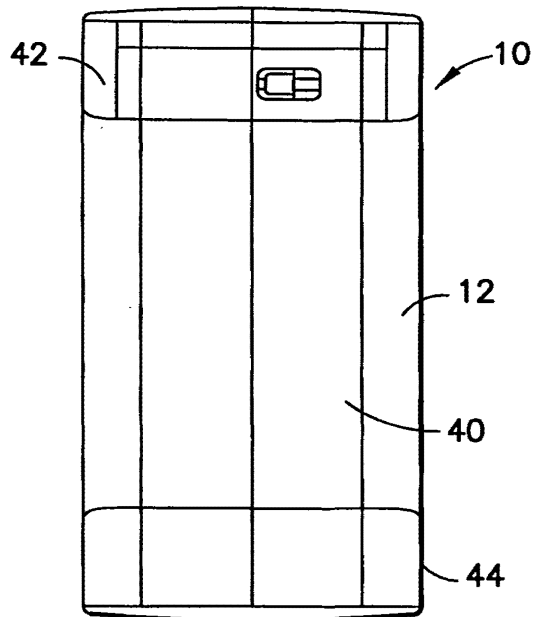


**FIG. 6**

4/6

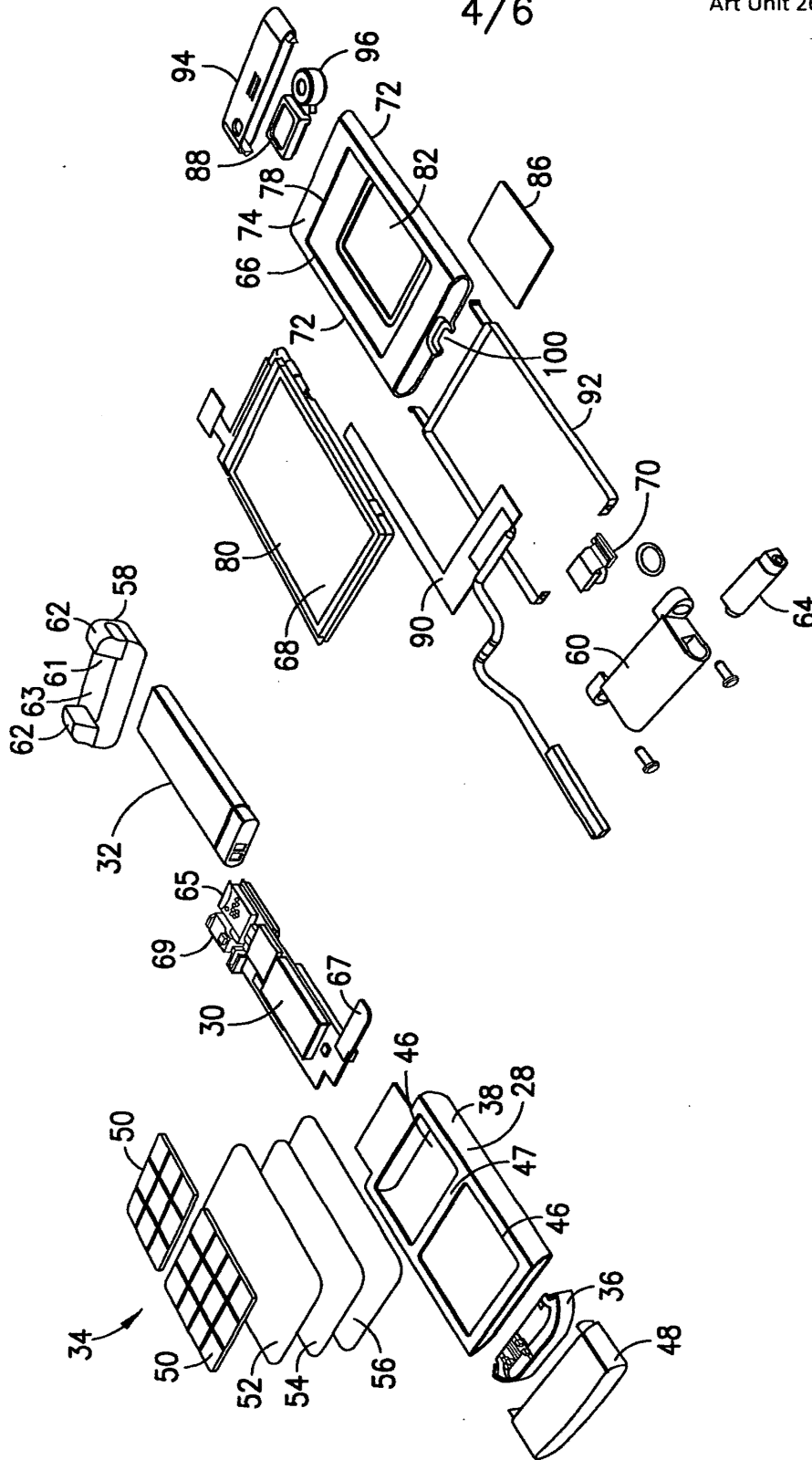


FIG. 7

5/6

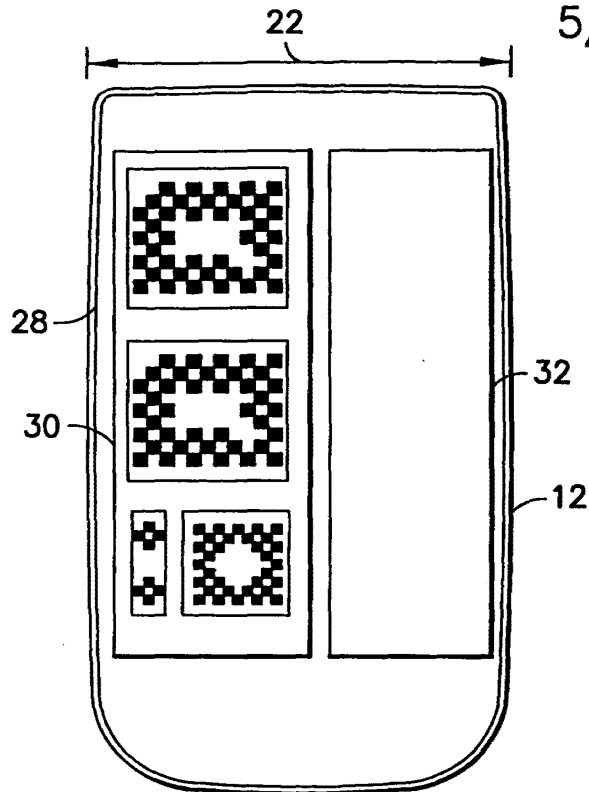


FIG. 8

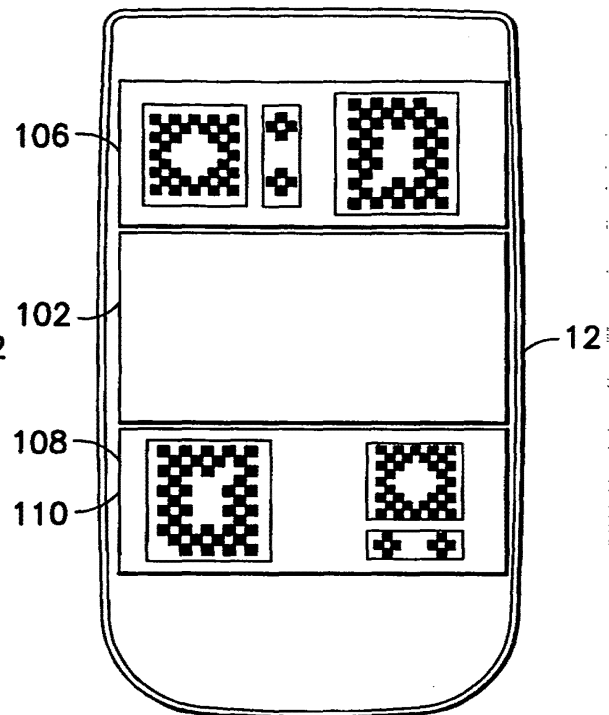


FIG. 10

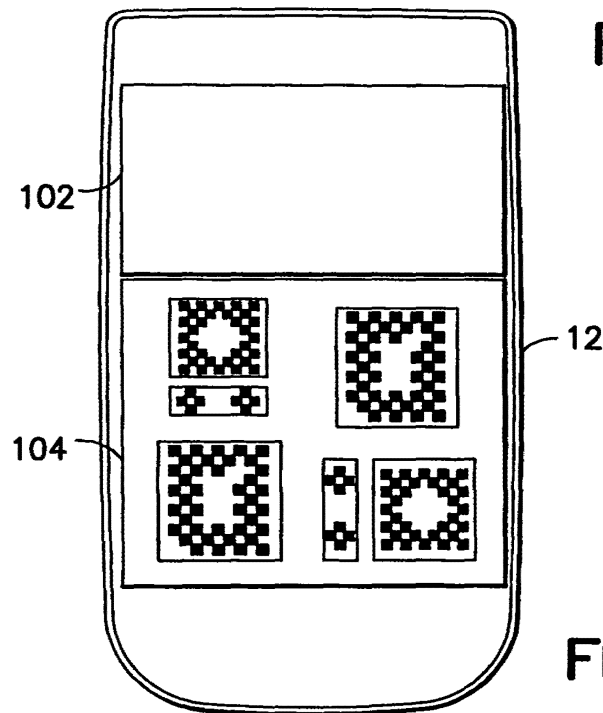


FIG. 9

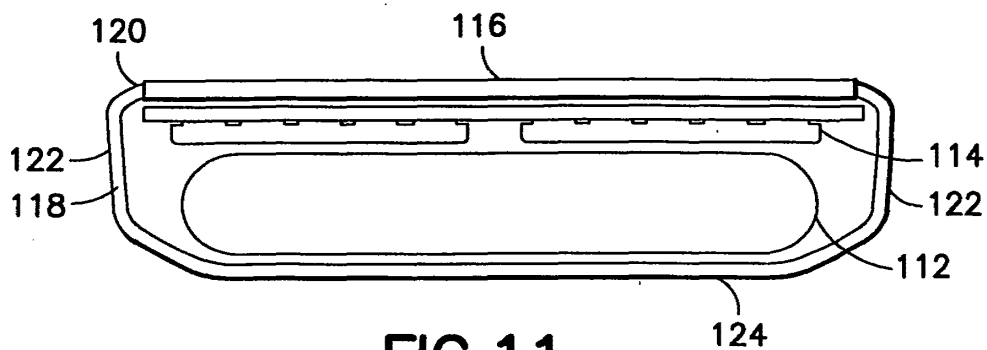


FIG. 11

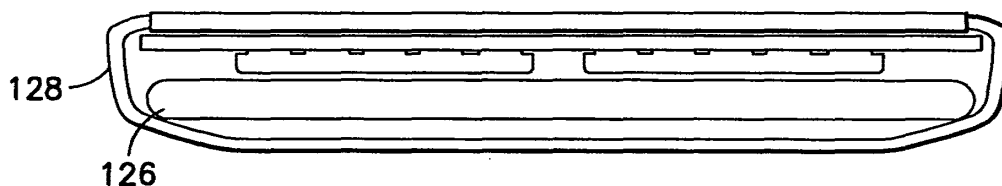


FIG. 12

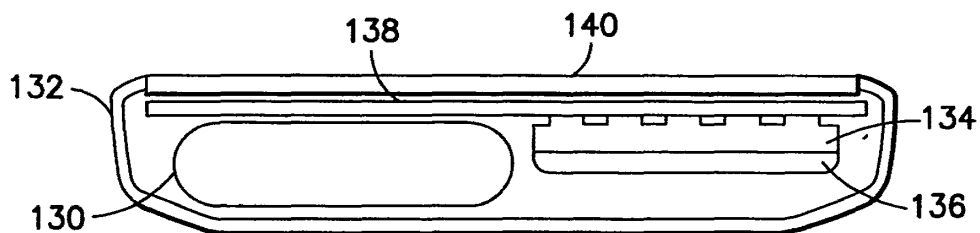


FIG. 13



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| APPLICATION<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 12/860,234            | 08/20/2010               | 2617            | 1090          | 891.0013.U2(US) | 20         | 3          |

**CONFIRMATION NO. 9585**

29683  
HARRINGTON & SMITH  
4 RESEARCH DRIVE, Suite 202  
SHELTON, CT 06484-6212

## UPDATED FILING RECEIPT



\*0C000000043800930\*

Date Mailed: 10/05/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

### Applicant(s)

Claus H. Jorgensen, Frederiksberg, DENMARK;

### Assignment For Published Patent Application

Nokia Corporation

**Power of Attorney:** The patent practitioners associated with Customer Number 29683

### Domestic Priority data as claimed by applicant

This application is a CON of 11/393,510 03/29/2006 PAT 7,787,618

### Foreign Applications

**If Required, Foreign Filing License Granted:** 09/01/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/860,234**

**Projected Publication Date:** 01/13/2011

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

Portable Electronic Device

**Preliminary Class**

455

**PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

**LICENSE FOR FOREIGN FILING UNDER****Title 35, United States Code, Section 184****Title 37, Code of Federal Regulations, 5.11 & 5.15****GRANTED**

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as

set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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| APPLICATION NUMBER | FILING OR 371(C) DATE | FIRST NAMED APPLICANT | ATTY. DOCKET NO./TITLE |
|--------------------|-----------------------|-----------------------|------------------------|
| 12/860,234         | 08/20/2010            | Claus H. Jorgensen    | 891.0013.U2(US)        |

**CONFIRMATION NO. 9585**

10948

Harrington & SMith , Attorneys At Law, LLC  
4 Research Drive, Suite 202  
Shelton, CT 06484

## PUBLICATION NOTICE



\*OC000000045470167\*

**Title:**Portable Electronic Device

**Publication No.**US-2011-0007892-A1

**Publication Date:**01/13/2011

## NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at [www.uspto.gov](http://www.uspto.gov). The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at [www.uspto.gov](http://www.uspto.gov) using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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| APPLICATION NUMBER | PATENT NUMBER | GROUP ART UNIT | FILE WRAPPER LOCATION |
|--------------------|---------------|----------------|-----------------------|
| 12/860,234         |               | 2614           |                       |



**Correspondence Address/Fee Address Change**

The following fields have been set to Customer Number 10948 on 11/15/2010

- Correspondence Address
- Power of Attorney Address

The address of record for Customer Number 10948 is:

10948  
Harrington & SMith , Attorneys At Law, LLC  
4 Research Drive, Suite 202  
Shelton, CT 06484

PLUS Search Results for S/N 12860234, Searched Mon Jan 30 10:56:48 EST 2012  
The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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| 5915895 99 |            |
| 6009916 99 |            |
| 4342139 95 |            |
| 4504165 95 |            |
| 4512177 95 |            |
| 4583062 95 |            |
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| APPLICATION NO.                                                                                                        | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO.       |
|------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|------------------------------|------------------------|
| 12/860,234                                                                                                             | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)              | 9585                   |
| 10948 7590 02/06/2012<br>Harrington & Smith, Attorneys At Law, LLC<br>4 Research Drive, Suite 202<br>Shelton, CT 06484 |             |                      | EXAMINER<br>NGUYEN, TUAN DUC |                        |
|                                                                                                                        |             |                      | ART UNIT<br>2614             | PAPER NUMBER           |
|                                                                                                                        |             |                      | MAIL DATE<br>02/06/2012      | DELIVERY MODE<br>PAPER |

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

The time period for reply, if any, is set in the attached communication.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 12/860,234             | JORGENSEN, CLAUS H. |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | TUAN NGUYEN            | 2614                |  |

**-- 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) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, 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 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 20 August 2010.

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

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.

4) ☐ 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**

5) ☒ Claim(s) 25-44 is/are pending in the application.

5a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.

6) ☐ Claim(s) \_\_\_\_ is/are allowed.

7) ☒ Claim(s) 25-44 is/are rejected.

8) ☐ Claim(s) \_\_\_\_ is/are objected to.

9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

10) ☐ The specification is objected to by the Examiner.

11) ☐ 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).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**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.

**Attachment(s)**

|                                                                                                                                     |                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>08/20/2010</u> . | 6) <input type="checkbox"/> Other: ____.                                                |

## DETAILED ACTION

### *Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).  
  
A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 C.F.R.1.130(b).  
  
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).
2. Claims 25-41 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 7,787,616. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-20 of U.S. Patent No.

7,787,616 are similar in scope to claim 25-41 of the US patent application 12/860,234 with obvious wording variations.

***Claim Rejections - 35 USC § 102***

3. 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 (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 25-31, 33, 36 and 41-42 are rejected under 35 U.S.C. 102(e) as being anticipated by the applicant's cited reference US 2005/0282593 (Spence et al hereinafter Spence).

Regarding claims 25 and 41, Spence discloses a portable electronic device (figs. 3, 4 and 6, paragraphs 0025-0028) comprising: an engine section (348) comprising a printed circuit board, a transceiver, a processor and a memory; a battery (342) located adjacent the engine section; and a user input section located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

Regarding claims 26, 31 and 42, Spence also shows wherein the battery is located at a lateral side of the engine section or providing the engine section and the battery in a substantial side by side arrangement (see figs 3, 4 and 6).

Regarding claim 27, Spence also shows wherein the engine section is located at opposite sides of the battery (see figs. 3, 4 and 6).

Regarding claims 28-30, Spence also teaches these claimed limitations (see figs 3, 4 and 6).

Regarding claim 33, Spence also teaches wherein the user input section comprises a keypad (see paragraphs 0025).

Regarding claim 36, Spence also teaches wherein the portable electronic device comprises a mobile phone (see fig. 1, 3, 4 and 6, paragraphs 0002, 0016).

### ***Claim Rejections - 35 USC § 103***

5. 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 negated by the manner in which the invention was made.

6. Claims 32, 34, 35, 37-40, 43 and 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Spence.

Regarding claims 34, 35, 37 and 44, the only difference between Spence and the applicant's claimed limitations is the dimension of the battery and the engine section (see the reasons for rejection of other claimed limitations in claims 25 and 41 above). However, changing the size of the battery and the engine section is a design choice.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the size of the battery and the engine section by Spence for a particular mobile phone.

Regarding claims 32, 40 and 43, this claimed limitation is also a design choice.

Regarding claims 38 and 39, Spence also teaches these claimed limitations (see reasons for rejection of claims 25 and 26 above).

### ***Conclusion***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TUAN NGUYEN whose telephone number is (571)272-8163. The examiner can normally be reached on M-F 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curt Kuntz can be reached on (571) 272-7499.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TDN  
2/2/12  
/Tuan D. Nguyen/  
Primary Examiner, Art Unit 2614

| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)      |                                           | Serial No.: to be assigned |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------|-------------------------------------------|----------------------------|-----------|
|                                                                                                                                                                                                                               |                                                    | Applicant(s): Claus H. Jorgensen |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    | Filing Date: herewith            |                                           | Group:                     |           |
| <b>U.S. PATENT DOCUMENTS</b>                                                                                                                                                                                                  |                                                    |                                  |                                           |                            |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Number-Kind Code)              | Publication Date<br>(MM-DD-YYYY) | Name of Patentee or Applicant             | Class                      | Sub-class |
|                                                                                                                                                                                                                               | US-DES. 427,171                                    | 06-27-2000                       | Frye et al.                               | D14                        | 138       |
|                                                                                                                                                                                                                               | US-2005/0282593 A1                                 | 12-22-2005                       | Spence et al.                             | 455                        | 575.3     |
|                                                                                                                                                                                                                               | US-2003/0199290 A1                                 | 10-23-2003                       | Viertola                                  | 455                        | 575.1     |
|                                                                                                                                                                                                                               | US-2001/0034242                                    | 10-2001                          | Takagi, Hisamitsu                         | 455                        | 550       |
|                                                                                                                                                                                                                               | US-2004/0253508 A1                                 | 12-16-2004                       | Kohri et al.                              | 429                        | 100       |
|                                                                                                                                                                                                                               | US-6,219,257 B1                                    | 04-17-2001                       | Arnold                                    | 361                        | 814       |
| <b>FOREIGN PATENT DOCUMENTS</b>                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Country Code-Number-Kind Code) | Publication Date<br>(MM-DD-YYYY) | Name Of Patentee of Applicant             | Translation?<br>Yes/No/n/a |           |
|                                                                                                                                                                                                                               | EP-1209880-A3                                      | 02-05-2003                       | Nokia Corporation                         | Abstract                   |           |
|                                                                                                                                                                                                                               | EP-1533983-A1                                      | 05-25-2005                       | LG Electronics Inc.                       |                            |           |
|                                                                                                                                                                                                                               | GB-2391740-A                                       | 02-11-2004                       | Matsushita Electrical Industrial Co. Ltd. |                            |           |
|                                                                                                                                                                                                                               | JP-2005-318064-A                                   | 11-10-2005                       | Toshiba Corp                              |                            |           |
|                                                                                                                                                                                                                               | EP-1496672-A1                                      | 01-12-2006                       | Matsushita Electric Industrial Co., Ltd.  |                            |           |
| <b>OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)</b>                                                                                                                                              |                                                    |                                  |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
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|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                                           |                            |           |
| Examiner's Signature: /Tuan Nguyen/                                                                                                                                                                                           |                                                    |                                  | Date Considered: 02/02/2012               |                            |           |
| Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.<br>Include a copy of this citation form with your next correspondence to the Applicant(s). |                                                    |                                  |                                           |                            |           |

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.N./

|                                                                                                                     |                                                |                                                                           |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------|
| <b><i>Search Notes</i></b><br><br> | <b>Application/Control No.</b><br><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br><br>JORGENSEN, CLAUS H. |
|                                                                                                                     | <b>Examiner</b><br><br>TUAN NGUYEN             | <b>Art Unit</b><br><br>2614                                               |

| SEARCHED |                              |         |          |
|----------|------------------------------|---------|----------|
| Class    | Subclass                     | Date    | Examiner |
| 379      | 433.01,433.08,433.11,433.13  | 1/30/12 | TN       |
| 455      | 90.3,575.1,575.3,572,573,574 | 1/30/12 | TN       |

| SEARCH NOTES             |         |          |
|--------------------------|---------|----------|
| Search Notes             | Date    | Examiner |
| PLUS and inventor search | 1/30/12 | TN       |

| INTERFERENCE SEARCH |          |      |          |
|---------------------|----------|------|----------|
| Class               | Subclass | Date | Examiner |
|                     |          |      |          |

|  |                                                 |
|--|-------------------------------------------------|
|  | /TUAN NGUYEN/<br>Primary Examiner.Art Unit 2614 |
|--|-------------------------------------------------|

|                                                                                                                        |                                            |                                                                       |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <p><b><i>Index of Claims</i></b></p>  | <b>Application/Control No.</b><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br>JORGENSEN, CLAUS H. |
|                                                                                                                        | <b>Examiner</b><br>TUAN NGUYEN             | <b>Art Unit</b><br>2614                                               |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant |          | <input type="checkbox"/> CPA |  | <input type="checkbox"/> T.D. |  | <input type="checkbox"/> R.1.47 |  |  |  |
|----------------------------------------------------------------------------------------|----------|------------------------------|--|-------------------------------|--|---------------------------------|--|--|--|
| CLAIM                                                                                  |          | DATE                         |  |                               |  |                                 |  |  |  |
| Final                                                                                  | Original | 02/02/2012                   |  |                               |  |                                 |  |  |  |
|                                                                                        | 1        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 2        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 3        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 4        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 5        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 6        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 7        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 8        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 9        | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 10       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 11       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 12       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 13       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 14       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 15       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 16       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 17       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 18       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 19       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 20       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 21       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 22       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 23       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 24       | -                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 25       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 26       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 27       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 28       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 29       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 30       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 31       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 32       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 33       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 34       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 35       | ✓                            |  |                               |  |                                 |  |  |  |
|                                                                                        | 36       | ✓                            |  |                               |  |                                 |  |  |  |

|                                                                                                                                       |                                            |                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <p align="center"><b><i>Index of Claims</i></b></p>  | <b>Application/Control No.</b><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br>JORGENSEN, CLAUS H. |
|                                                                                                                                       | <b>Examiner</b><br>TUAN NGUYEN             | <b>Art Unit</b><br>2614                                               |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |          |            |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|--|--|--|--|--|--|--|--|
| CLAIM                                                                                                                                                                             |          | DATE       |  |  |  |  |  |  |  |  |
| Final                                                                                                                                                                             | Original | 02/02/2012 |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 37       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 38       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 39       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 40       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 41       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 42       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 43       | ✓          |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                   | 44       | ✓          |  |  |  |  |  |  |  |  |

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NO. 484

P. 1

JUL 05 2012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/860,234      Confirmation No.: 9585  
Applicant(s): Jorgensen, Claus H.  
Filed: 08/20/2010  
Art Unit: 2614  
Examiner: Nguyen, Tuan Duc  
Title: Portable Electronic Device

Attorney Docket No.: 891.0013.U2(US)  
Customer No.: 10,948

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Amendment

Sir:

This is in response to the Office Action mailed 02/06/2012 in regard to the above-identified patent application. Please amend the Application as indicated on the following pages. Please charge deposit account 50-1924 the amount of \$560.00 as payment for the petition fee for a two month extension of time.

**Amendments to the Claims** are reflected in the listing of claims which begin on page 2 of this paper.

**Remarks** begin on page 8 of this paper.

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01 FC:1252 560.00 DA

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NO. 484

P. 2

JUL 05 2012

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1-24. (Canceled)

25. (Currently amended) A portable electronic device comprising:

a one piece housing forming enclosed exterior lateral sides and a rear side;

an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

a battery located adjacent the engine section; and

a user input section located above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween;

wherein the battery and engine section are housed in the housing and the user input is located in a hole through the front side of the housing.

26. (Previously presented) A portable electronic device as in claim 25 wherein the battery is located at a lateral side of the engine section.

JUL 05 2012

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

27. (Previously presented) A portable electronic device as in claim 25 wherein the engine section is located at opposite sides of the battery.

28. (Currently amended) A portable electronic device as in claim 25 wherein the ~~portable electronic device comprises a first section comprising a first~~ one-piece housing member having comprises a general tubular shape ~~and forming opposite exterior lateral sides of the first section, wherein the engine section, battery and user input section are housed in the first section.~~

29. (Previously presented) A portable electronic device as in claim 28 wherein the portable electronic device comprises a second section pivotably connected to the first section, wherein the second section comprises a second one-piece housing member having a general tubular shape and forming opposite exterior lateral sides of the second section.

30. (Previously presented) A portable electronic device as in claim 25 wherein the portable electronic device comprises a first section pivotably connected to a second section by a hinge, wherein the hinge comprises a first hinge member connected to the first section and a second hinge member connected to the second section; and the portable electronic device further comprises a camera connected to the second section, wherein the camera is housed at an exterior side of the portable electronic device by a junction of a portion of the second hinge member and a portion of a one-piece second tubular housing member of the second section, wherein the

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

second tubular housing member forms opposite exterior lateral sides of the second section.

31. (Previously presented) A portable electronic device as in claim 25 wherein the battery is located alongside the engine section in a substantial side by side arrangement.

32. (Previously presented) A portable electronic device as in claim 25 wherein the battery is located between two portions of the engine section.

33. (Previously presented) A portable electronic device as in claim 25 wherein the user input section comprises a keypad.

34. (Previously presented) A portable electronic device as in claim 25 wherein a width of the battery is about less than half a width of the portable electronic device.

35. (Previously presented) A portable electronic device as in claim 25 wherein a width of the engine section is about less than half a width of the portable electronic device.

36. (Previously presented) A portable electronic device as in claim 25 wherein the portable electronic device comprises a mobile phone.

37. (Previously presented) An apparatus comprising:

a housing member comprising a top end, a bottom end, a first lateral side, and a second lateral side, wherein the first and second lateral sides extend between the top end and the bottom end, and wherein a width of the housing member

Appl. No.: 12/860,234  
Reply to Office Action of: 02/06/2012

extends between the first lateral side and the second lateral side;

an engine section comprising a printed circuit board, a transceiver, a processor, and a memory, wherein a lateral side of the engine section is proximate the first lateral side of the housing member, and wherein a width of the engine section is about less than half the width of the housing member;

a battery adjacent the engine section, wherein a lateral side of the battery is proximate the second lateral side of the housing member, and wherein a width of the battery is about less than half the width of the housing member; and

a user input section at a front side of the housing member, wherein the user input section is disposed directly opposite the battery.

38. (Previously presented) An apparatus as in claim 37 wherein the user input section is located above the engine section and the battery, and wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween.

39. (Previously presented) An apparatus as in claim 37 wherein the battery is between the second lateral side of the housing member and another different lateral side of the engine section.

40. (Previously presented) An apparatus as in claim 37 wherein the engine section comprises a first portion and a second portion, and wherein the battery is located between the first portion and the second portion of the engine section.

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

41. (Currently amended) A method comprising:

providing a one piece housing forming enclosed exterior lateral sides and a rear side;

providing an engine section comprising a printed circuit board, a transceiver, a processor and a memory;

providing a battery located adjacent the engine section;  
and

providing a user input section above the engine section and the battery, wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween;

wherein the battery and engine section are housed in the housing and the user input is located in a hole through the front side of the housing.

42. (Previously presented) A method as in claim 41 wherein the providing of the engine section and the providing of the battery further comprises providing the engine section and the battery in a substantial side by side arrangement.

43. (Previously presented) A method as in claim 41 wherein the providing of the battery further comprises disposing the battery between two portions of the engine section.

44. (Previously presented) A method as in claim 41 wherein the providing of the engine section, the providing of the battery, and the providing of the user input section further comprises providing the engine section, the battery, and the user input

Appl. No.: 12/860,234  
Reply to Office Action of: 02/06/2012

section at a housing member, wherein a width of the battery is about less than half a width of the housing member, and wherein a width of the engine section is about less than half a width of the housing member.

Appl. No.: 12/860,234  
Reply to Office Action of: 02/06/2012

REMARKS

In the outstanding non-final Action, claims 25-41 are rejected on the grounds of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of US 7,787,616. Applicant thanks the Examiner for pointing out the above potential double patenting issues and reserves the right to file a terminal disclaimer should it be necessary.

Claims 25-31, 33, 36, 41, and 42 were rejected under 35 U.S.C. 102(e) as being anticipated by Spence (US 2005/0282539). Claims 32, 34, 35, 37-40, 43, and 44 were rejected under 35 U.S.C. 103(a) as being unpatentable over Spence (US 2005/0282539). The examiner is requested to reconsider these rejections.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). It is submitted that Spence fails to teach each and every element as set forth in claims 25 and 41 for at least the reasons described below.

Applicants have amended claim 25 to recite, *inter alia*, "a one piece housing forming enclosed exterior lateral sides and a rear side ... wherein the battery and engine section are housed in the housing and the user input is located in a hole through the front side of the housing".

Support for this amendment may be found, for example, at paragraphs [0027], [0035], [0036], and original claim 28.

Appl. No.: 12/860,234  
Reply to Office Action of: 02/06/2012

Independent claim 41 has also been amended to include similar recitations as claim 25 above.

Spence discloses a clamshell wireless communication device 100 comprising a battery 342, a circuit board 348, and a keypad 336. However, Spence does not teach, disclose, or suggest a circuit board adjacent to an edge of the battery, as the battery is placed near the hinge area there is no further space for any circuit board.

Spence fails to disclose these features as Figures 3-6 show a housing **having two parts** (346 and 332), not a one piece housing as in applicant's claimed invention.

Furthermore, Spence shows an input section 124 is part of the housing 346 and therefore not located in a hole through the front side of the housing.

Thus, Spence fails to teach "a one piece housing forming enclosed exterior lateral sides and a rear side ... wherein the battery and engine section are housed in the housing and the user input is located in a hole through the front side of the housing", as claimed in amended claim 25. Accordingly, claim 25 is patentable over the art of record and should be allowed.

For at least the foregoing reasons, independent claim 25 is patentable over Spence. As mentioned above, similar amendments as those for claim 25 have been made to independent claim 41. Therefore, independent claim 41 also is patentable over Spence for corresponding reasons regarding correspondingly recited subject matter.

Appl. No.: 12/860,234  
Reply to Office Action of: 02/06/2012

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Claim 37 recites, *inter alia*, "wherein a width of the housing member extends between the first lateral side and the second lateral side ... wherein a width of the engine section is about less than half the width of the housing member ... and wherein a width of the battery is about less than half the width of the housing member ...".

The examiner admits that Spence does not teach the dimension of the battery and engine section. The examiner states that "changing the size of the battery and the engine section is a design choice".

The examiner is directed to MPEP 2144.04 which states that "mere scaling up of a prior art process capable of being scaled up, if such were the case, would not establish patentability in a claim to an old process so scaled" [emphasis added].

The examiner is also directed to MPEP §2143.01. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Applicant submits that the battery of Spence is not capable of being "scaled" and even if it were, if one skilled in the art

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

modified the battery of Spence as proposed by the examiner, then the device of Spence would be rendered unsatisfactory for its intended purpose. This is because Spence is directed to making "cellular telephones smaller" (see Background section). Spence further teaches that "this arrangement also **limits the longitudinal size of the battery**. In the interest of extending battery capacity and thereby the duration of standby time and the amount of communication that can be conducted with the device 100 before battery recharging is necessary, the **width of the battery 342 is increased**" (see paragraph [0021]) [emphasis added].

Therefore, since Spence teaches that longitudinal size of the battery is limited, and that the width of the battery is **increased**, this precludes the battery of Spence from being 'scaled' as proposed by the examiner. Additionally, the intended purpose of Spence is to make the device smaller while extending battery capacity and thereby the duration of standby time. If one were to modify the battery of Spence so that a width of the battery is about less than half the width of the housing member, then the battery would be smaller as the longitudinal size is limited, and thus, it would be inconsistent with the teaching of Spence to make the battery smaller since this would not "extend battery capacity". Thus any such modification would render Spence inoperable for its intended purpose.

Applicant submits that there is no suggestion to modify the reference as the examiner is attempting to do (at least not until after reading applicant's patent application).

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the reference itself or in the knowledge generally available to one of ordinary skill in the art. (see MPEP 2143.01, page 2100-98, column 1). The mere fact that a reference can be modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination (see MPEP 2143.01, page 2100-98, column 2). A statement that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the reference relied upon teach that all aspects of the claimed invention were individually known in the art is **not sufficient** to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. (see MPEP 2143.01, page 2100-99, column 1) Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). >See also Al-Site Corp. v. VSI Int'l Inc., 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) (The level of skill in the art cannot be relied upon to provide the suggestion to combine references.)

In the present case, there is no teaching, suggestion, or motivation, found in either the reference itself or in the knowledge generally available to one of ordinary skill in the art, to provide "wherein a width of the housing member extends between the first lateral side and the second lateral side ... wherein a width of the engine section is about less than half the width of the housing member ... and wherein a width of the

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

battery is about less than half the width of the housing member ...", as claimed in claim 37. The features of claim 37 are not disclosed or suggested in the art of record. Therefore, claim 37 is patentable and should be allowed.

Accordingly, as all independent claims are patentable, all pending dependent claims also are patentable at least in view of their dependency from an allowable independent claim.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record. Accordingly, favorable reconsideration and allowance is respectfully requested. If there are any additional charges with respect to this Amendment or otherwise, please charge deposit account 50-1924 for any fee deficiency. Should any unresolved issue remain, the examiner is invited to call applicant's attorney at the telephone number indicated below.

JUL. 5. 2012 12:33PM

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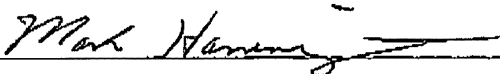
NO. 484

P. 14

Appl. No.: 12/860,234

Reply to Office Action of: 02/06/2012

Respectfully submitted,

  
\_\_\_\_\_  
Mark Harrington (Reg. No. 31,686)

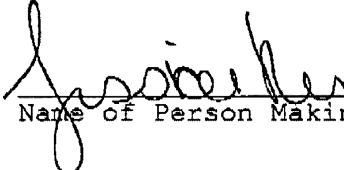
7/5/12  
\_\_\_\_\_  
Date

**Customer No.: 10948**  
Harrington & Smith,  
Attorneys At Law, LLC  
4 Research Drive  
Shelton, CT 06484-6212  
203-925-9400

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------------------|---------------------------------------------------|------------------------------------------|----------------------------------|-------------------------|-----------------------------------------|---------------------|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875                                                                                                                                                                                                                                                                                                                                                    |                                                                                          |                                                                                                                                                                                                                               |              |                                    | Application or Docket Number<br><b>12/860,234</b> |                                          | Filing Date<br><b>08/20/2010</b> |                         | <input type="checkbox"/> To be Mailed   |                     |
| <b>APPLICATION AS FILED – PART I</b>                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                          |                                                                                                                                                                                                                               | (Column 2)   |                                    |                                                   | SMALL ENTITY <input type="checkbox"/> OR |                                  | OTHER THAN SMALL ENTITY |                                         |                     |
| FOR                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                          | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA |                                    | RATE (\$)                                         | FEE (\$)                                 |                                  | RATE (\$)               | FEE (\$)                                |                     |
| <input type="checkbox"/> BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                                                                                                                                                                                                                                                                                                                                                  |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                    | N/A                                               |                                          |                                  | N/A                     |                                         |                     |
| <input type="checkbox"/> SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m))                                                                                                                                                                                                                                                                                                                                                                 |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                    | N/A                                               |                                          |                                  | N/A                     |                                         |                     |
| <input type="checkbox"/> EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                                                                                                                                                                                                                                                                                                                                                            |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                    | N/A                                               |                                          |                                  | N/A                     |                                         |                     |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                          | minus 20 =                                                                                                                                                                                                                    | *            |                                    | X \$ =                                            |                                          | OR                               | X \$ =                  |                                         |                     |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                          | minus 3 =                                                                                                                                                                                                                     | *            |                                    | X \$ =                                            |                                          |                                  | X \$ =                  |                                         |                     |
| <input type="checkbox"/> APPLICATION SIZE FEE<br>(37 CFR 1.16(s))                                                                                                                                                                                                                                                                                                                                                                    |                                                                                          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                                                                                                                                                                                                                                                                                                                                                           |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                          |                                                                                                                                                                                                                               |              |                                    | TOTAL                                             |                                          |                                  | TOTAL                   |                                         |                     |
| * If the difference in column 1 is less than zero, enter "0" in column 2.                                                                                                                                                                                                                                                                                                                                                            |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
| <b>APPLICATION AS AMENDED – PART II</b>                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
| (Column 1)                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                          |                                                                                                                                                                                                                               | (Column 2)   |                                    |                                                   | (Column 3)                               |                                  |                         | SMALL ENTITY OR OTHER THAN SMALL ENTITY |                     |
| AMENDMENT                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>07/05/2012</b>                                                                        | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA                                     | RATE (\$)                                | ADDITIONAL FEE (\$)              |                         | RATE (\$)                               | ADDITIONAL FEE (\$) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total (37 CFR 1.16(i))                                                                   | * 20                                                                                                                                                                                                                          | Minus        | ** 20                              | = 0                                               | X \$ =                                   |                                  | OR                      | X \$60=                                 | 0                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | Independent (37 CFR 1.16(h))                                                             | * 3                                                                                                                                                                                                                           | Minus        | *** 3                              | = 0                                               | X \$ =                                   |                                  | OR                      | X \$250=                                | 0                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   | TOTAL ADD'L FEE                          |                                  | OR                      | TOTAL ADD'L FEE                         | <b>0</b>            |
| AMENDMENT                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                          | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA                                     | RATE (\$)                                | ADDITIONAL FEE (\$)              |                         | RATE (\$)                               | ADDITIONAL FEE (\$) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total (37 CFR 1.16(i))                                                                   | *                                                                                                                                                                                                                             | Minus        | **                                 | =                                                 | X \$ =                                   |                                  | OR                      | X \$ =                                  |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | Independent (37 CFR 1.16(h))                                                             | *                                                                                                                                                                                                                             | Minus        | ***                                | =                                                 | X \$ =                                   |                                  | OR                      | X \$ =                                  |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   | TOTAL ADD'L FEE                          |                                  | OR                      | TOTAL ADD'L FEE                         |                     |
| <p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p> |                                                                                          |                                                                                                                                                                                                                               |              |                                    |                                                   |                                          |                                  |                         |                                         |                     |

Legal Instrument Examiner:  
/CURTIS NELLOMS JR/

This collection of information is required by 37 CFR 1.16. 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



1/fw

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/860,234      Confirmation No.: 9585  
Applicant(s): Jorgensen, Claus H.  
Filed: 08/20/2010  
Art Unit: 2614  
Examiner: Nguyen, Tuan Duc  
Title: Portable Electronic Device

Attorney Docket No.: 891.0013.U2 (US)  
Customer No.: 10,948

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Information Disclosure Statement

(37 C.F.R. §1.97(c))

Sir:

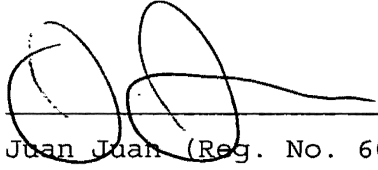
The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

An extended European search report issued in regard to EP Application No. 12159141.6 on June 4, 2012, which is a counterpart application to the present U.S. application. Enclosed is a copy of the extended European search report. Applicant's Attorney is aware of the art cited on the enclosed Form PTO-1449. Copies of the non-U.S. patent art are enclosed with the Form PTO-1449 for the Examiner's use.

- ☒ Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement, or
- ☐ No item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Statement.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to patentability (37 C.F.R. §1.97(h)). If there are any additional charges with respect to this Statement or otherwise, please charge deposit account 50-1924 for any fee deficiency.

Respectfully submitted,



Juan Juan (Reg. No. 60,564)

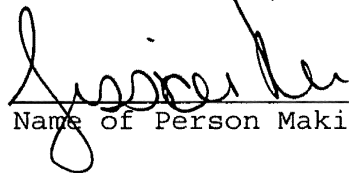
9/4/2012  
Date

**Customer No.: 10948**  
Harrington & Smith,  
Attorneys At Law, LLC  
4 Research Drive  
Shelton, CT 06484-6212  
203-925-9400

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail on the date shown below in an envelope addressed to: Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

9.4.2012  
Date

  
Name of Person Making Deposit



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**04-06-2012**

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For any questions about  
this communication:  
Tel.: +31 (0)70 340 45 00

Date  
04.06.12

|                                           |                                                 |
|-------------------------------------------|-------------------------------------------------|
| Reference<br>BP205614/JVN                 | Application No./Patent No.<br>12159141.6 - 2414 |
| Applicant/Proprietor<br>Nokia Corporation |                                                 |

#### Communication

The extended European search report is enclosed.

The extended European search report includes, pursuant to Rule 62 EPC, the European search report (R. 61 EPC) or the partial European search report/ declaration of no search (R. 63 EPC) and the European search opinion.

Copies of documents cited in the European search report are attached.

☒ 0 additional set(s) of copies of such documents is (are) enclosed as well.

The following have been approved:

☒ Abstract ☒ Title

☐ The Abstract was modified and the definitive text is attached to this communication.

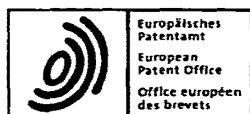
The following figure(s) will be published together with the abstract: 7

#### Refund of search fee

If applicable under Article 9 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.



EPO Form 1507N 08.10



# EUROPEAN SEARCH REPORT

Application Number  
EP 12 15 9141

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                  |                                                 |                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                                    | Relevant to claim                               | CLASSIFICATION OF THE APPLICATION (IPC)         |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 2005/282593 A1 (SPENCE MICHAEL F [US] ET AL) 22 December 2005 (2005-12-22)<br>* paragraph [0016] *<br>* paragraph [0019] - paragraph [0021] *<br>* paragraph [0023] *<br>* paragraph [0025] - paragraph [0026] *<br>* paragraph [0028] *<br>* figures 3,4,6 * | 1-12                                            | INV.<br>H04M1/02                                |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 2 391 740 A (MATSUSHITA ELECTRIC IND CO LTD [JP]) 11 February 2004 (2004-02-11)<br>* page 5, line 10 - line 21 *<br>* page 6, line 15 - line 22 *<br>* page 8, line 20 - line 23 *                                                                            | 1-12                                            |                                                 |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | GB 2 383 472 A (NOKIA MOBILE DEVELOPMENTS [GB]; VERTU LTD [GB]) 25 June 2003 (2003-06-25)<br>* page 3, line 33 - page 4, line 4 *<br>* page 11, line 1 - line 14 *<br>* figure 7 *                                                                               | 1,4,11,12                                       |                                                 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EP 1 209 880 A2 (NOKIA CORP [FI]) 29 May 2002 (2002-05-29)<br>* paragraph [0005] *<br>* paragraph [0026] *                                                                                                                                                       | 8,9                                             | TECHNICAL FIELDS SEARCHED (IPC)<br>H04M<br>H05K |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                  |                                                 |                                                 |
| Place of search<br>Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                  | Date of completion of the search<br>23 May 2012 | Examiner<br>Bianchi, Damiano                    |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                                                                                                                                  |                                                 |                                                 |

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 15 9141

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-05-2012

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---------------------|----------------------------|---------------------|
| US 2005282593 A1                          | 22-12-2005          | BR PI0502421 A             | 31-01-2006          |
|                                           |                     | CN 1973523 A               | 30-05-2007          |
|                                           |                     | EP 1762085 A1              | 14-03-2007          |
|                                           |                     | RU 2325776 C1              | 27-05-2008          |
|                                           |                     | US 2005282593 A1           | 22-12-2005          |
|                                           |                     | WO 2006007222 A1           | 19-01-2006          |
| GB 2391740 A                              | 11-02-2004          | AU 2003244377 A1           | 02-09-2003          |
|                                           |                     | CN 1507735 A               | 23-06-2004          |
|                                           |                     | GB 2391740 A               | 11-02-2004          |
|                                           |                     | JP 2003229938 A            | 15-08-2003          |
|                                           |                     | US 2004132511 A1           | 08-07-2004          |
|                                           |                     | US 2011172003 A1           | 14-07-2011          |
|                                           |                     | WO 03067857 A1             | 14-08-2003          |
| GB 2383472 A                              | 25-06-2003          | AU 2002353185 A1           | 15-07-2003          |
|                                           |                     | GB 2383472 A               | 25-06-2003          |
|                                           |                     | WO 03056891 A1             | 10-07-2003          |
| EP 1209880 A2                             | 29-05-2002          | EP 1209880 A2              | 29-05-2002          |
|                                           |                     | GB 2369519 A               | 29-05-2002          |
|                                           |                     | US 2002061736 A1           | 23-05-2002          |

EPO FORM P0459

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

Datum  
Date cf Form 1507  
Date

Blatt  
Sheet 1  
Feuille

Anmelde-Nr:  
Application No: 12 159 141.6  
Demande n°:

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The examination is being carried out on the **following application documents**

**Description, Pages**

1-13 as originally filed

**Claims, Numbers**

1-12 as originally filed

**Drawings, Sheets**

1/6-6/6 as originally filed

- 1 Reference is made to the following documents; the numbering will be adhered to in the rest of the procedure.

- D1 US 2005/282593 A1 (SPENCE MICHAEL F [US] ET AL) 22 December 2005 (2005-12-22)
- D2 GB 2 391 740 A (MATSUSHITA ELECTRIC IND CO LTD [JP]) 11 February 2004 (2004-02-11)
- D3 GB 2 383 472 A (NOKIA MOBILE DEVELOPMENTS [GB]; VERTU LTD [GB]) 25 June 2003 (2003-06-25)
- D4 EP 1 209 880 A2 (NOKIA CORP [FI]) 29 May 2002 (2002-05-29)

- 2 Claim 1 is not compliant with Article 84 EPC for the following reason:
- The claim contains a negative limitation (see claim 1, lines 8 to 9, "*without a portion of the engine section therebetween*"). Negative limitations may be allowed in special cases when it is not possible to define the claimed object with positive features (see also the Guidelines, Part C-III, 4.12), which is not the case for claim 1. In fact, since the present application relates to

constructional features of a portable electronic device, it appears possible to define the structural limitations of the device by means of a positive formulation.

- 3 The above-mentioned non-compliance with Article 84 EPC notwithstanding, the subject matter of independent claim 1 is not new in the sense of Article 54 (1) and (2) EPC for the following reason:

In accordance with the features of the claim, document D1 discloses:

**A portable electronic device** (see paragraph [0016], "*a clamshell wireless communication device*" and figure 3, "100") **comprising:**

**an engine section comprising a printed circuit board, a transceiver, a processor and a memory** (see paragraph [0020], "*A populated printed circuit board 348 that includes communication and control circuits of the device*", paragraph [0026], "*As shown in FIG. 7 the device 100 comprises a transceiver 402, a processor 404, a program memory 416, and a workspace memory 418*" and paragraph [0028], "*The transceiver 402, the processor 404, and optionally other blocks shown in FIG. 7 are embodied in circuits of the populated printed circuit board 348*");

**a battery** (see paragraph [0020], "*A battery 342*") **located adjacent the engine section** (see paragraph [0021], "*Note that the battery 342 and the populated printed circuit board 348 are located in a common plane 362 (FIG. 4) in a lengthwise L direction, and do not overlap in the direction of depth D*" and figure 4, "342", "348"); **and**

**a user input section** (see paragraph [0021], "*keypad*" and figure 3, "124") **located above the engine section and the battery** (see figure 3), **wherein the user input section is located directly opposite the battery without a portion of the engine section therebetween** (see figures 3 and 6, "124", "342", "348").

As a consequence claim 1 is not allowable (Article 52(1) EPC).

The applicants' attention is drawn to the fact that the disclosure of additional prior art documents D2 and D3 is prejudicial to the novelty of claim 1 as well. See in particular the passages indicated in the European Search Report.

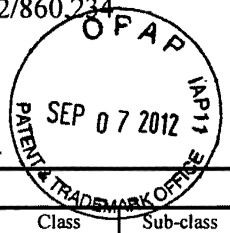
- 4 The subject matter of dependent claims 2 to 12 is either not new (Article 54(1) and (2) EPC) or does not involve an inventive step (Article 56 EPC) for the following reasons:

- 
- 4.1 The additional features of claims 2 to 4, 11 and 12 are disclosed by D1 (see in particular the passages cited in the European Search Report).
- 4.2 Claims 5 to 7 define variations concerning the spatial placement of the battery with respect to the engine section that are considered to fall within the design capabilities of the skilled person in this technical field.
- 4.3 The additional features of claims 8 and 9 (first and second housing members having a tubular shape) are also considered to represent standard design measure in this technical field. Housings for portable electronic devices including a tubular shape are in fact well known in the art (see for instance document D4) and the skilled person would adopt such housings in the device of D1 when circumstances make it desirable without requiring an inventive step.
- 4.4 Claim 10 defines first that the device has a first and second sections that are pivotably connected by a hinge, such features being known from document D1 (see e.g. figure 3). Further, the claim defines that the device comprises a camera connected to the second section. This feature is also disclosed in document D1 (see e.g. paragraph [0019], "*camera 318*"). The additional details defined in claim 10 relating to the placement of the camera on the second housing are considered to represent obvious design options for the skilled person that do not justify an inventive step.
- 5 It is not at present apparent which part of the application could serve as a basis for a new, allowable claim. Should the applicants nevertheless regard some particular matter as patentable, an independent claim should be filed taking account of Rule 43(1) EPC. The applicants should also indicate in the letter of reply the difference of the subject matter of the new claim vis-à-vis the state of the art and the significance thereof.
- The following matters should also receive attention:
- 5.1 To meet the requirements of Rule 42(1)(b) EPC, document D1 should be identified in the description and the relevant background art disclosed therein should be briefly discussed.
- 5.2 Any independent claims should be in the two-part form in accordance with Rule 43(1) EPC, which in the present case would be appropriate, with those features known in combination from D1 being placed in the preamble (Rule 43(1)(a) EPC) and with the remaining features being included in the characterising part (Rule 43(1)(b) EPC).
-

If however, the applicants are of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicants should ensure that it is clear from the description which features of the claimed subject matter are already known in combination from the document D1 (see the Guidelines, C-III, 2.3.2).

- 5.3 The features of the claims should be provided with reference signs placed in parentheses to increase the intelligibility of the claims (Rule 43(7) EPC). This applies to both the preamble and characterising portion (see the Guidelines, C-III, 4.19).
- 5.4 The attention of the applicants is drawn to the fact that the application may not be amended in such a way that it contains subject matter which extends beyond the content of the application as filed, Art. 123(2) EPC.

According to Rule 137(4) EPC, the applicants shall identify any amendments carried out to the application documents, irrespective of whether they concern amendments by addition, replacement or deletion and shall indicate the basis for the amendments in the application as filed.

|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-----------|
| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)      |                               | Serial No.: 12/860.234                                                              |           |
|                                                                                                                                                                                                                               |                                                    | Applicant(s): Claus H. Jorgensen |                               | Filing Date: 08/20/2010                                                             |           |
|                                                                                                                                                                                                                               |                                                    | Group: 2614                      |                               |  |           |
| <b>U.S. PATENT DOCUMENTS</b>                                                                                                                                                                                                  |                                                    |                                  |                               |                                                                                     |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Number-Kind Code)              | Publication Date<br>(MM-DD-YYYY) | Name of Patentee or Applicant | Class                                                                               | Sub-class |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| <b>FOREIGN PATENT DOCUMENTS</b>                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Country Code-Number-Kind Code) | Publication Date<br>(MM-DD-YYYY) | Name Of Patentee of Applicant | Translation?<br>Yes/No/n/a                                                          |           |
|                                                                                                                                                                                                                               | GB 2 383 472 A                                     | 06/25/2003                       | Vertu Limited                 | n/a                                                                                 |           |
| <b>OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)</b>                                                                                                                                              |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
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|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| Examiner's Signature:                                                                                                                                                                                                         |                                                    |                                  | Date Considered:              |                                                                                     |           |
| Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.<br>Include a copy of this citation form with your next correspondence to the Applicant(s). |                                                    |                                  |                               |                                                                                     |           |

# (12) UK Patent Application (19) GB (11) 2 383 472 (13) A

(43) Date of A Publication 25.06.2003

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(54) Abstract Title  
**A PCB mounting**

(57) A printed circuit board (50) for mounting within an electronic device has a plurality of resilient mounting members (505) such that the board may be mounted in the device without the device requiring complementary mounting members. The board with mounting members enables the device casing to be reused with future technology boards as the boards are easily replaceable within the device. Such devices are typically mobile phones, electronic diaries and notepads.

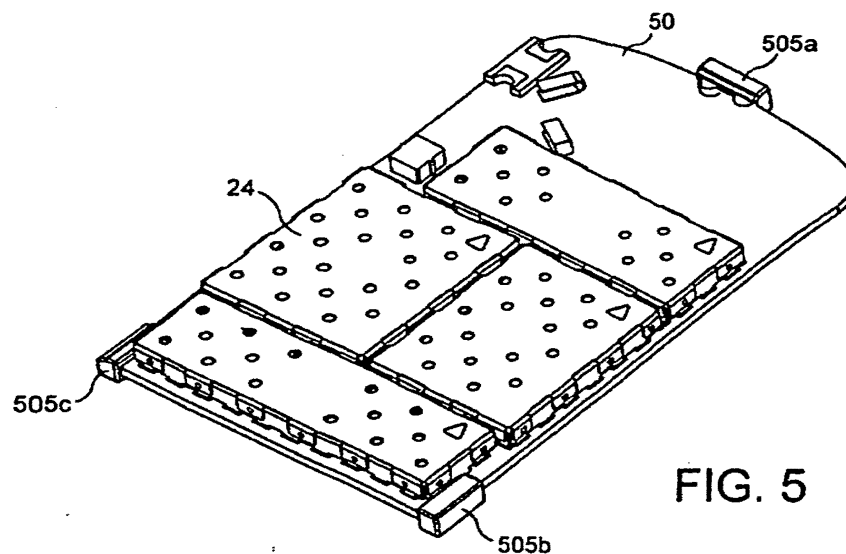


FIG. 5

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The print reflects an assignment of the application under the provisions of Section 30 of the Patents Act 1977.

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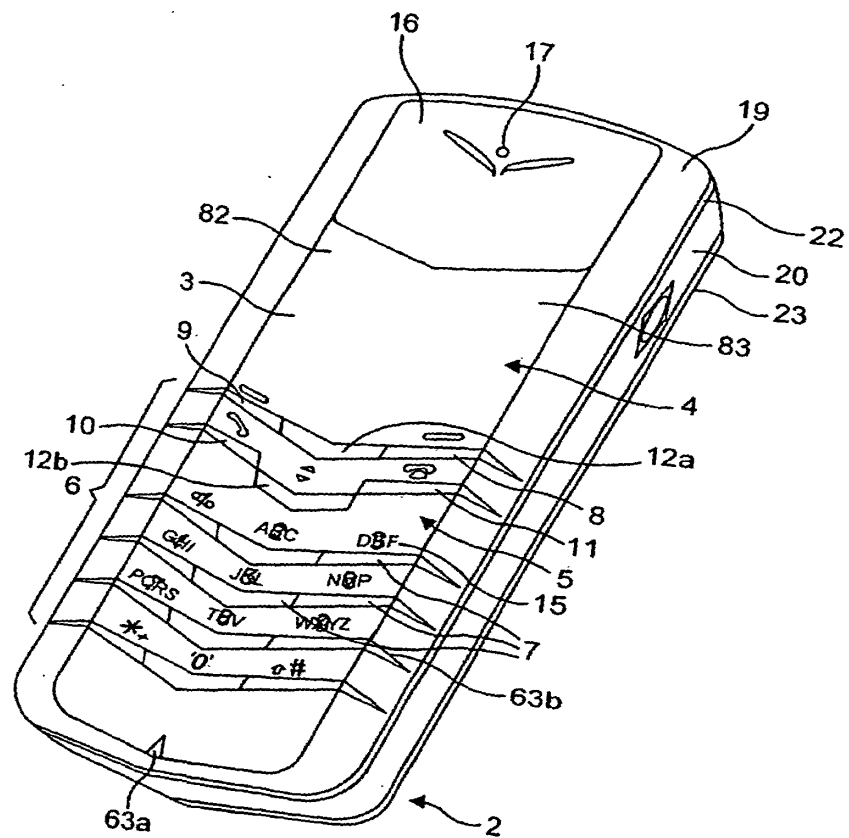
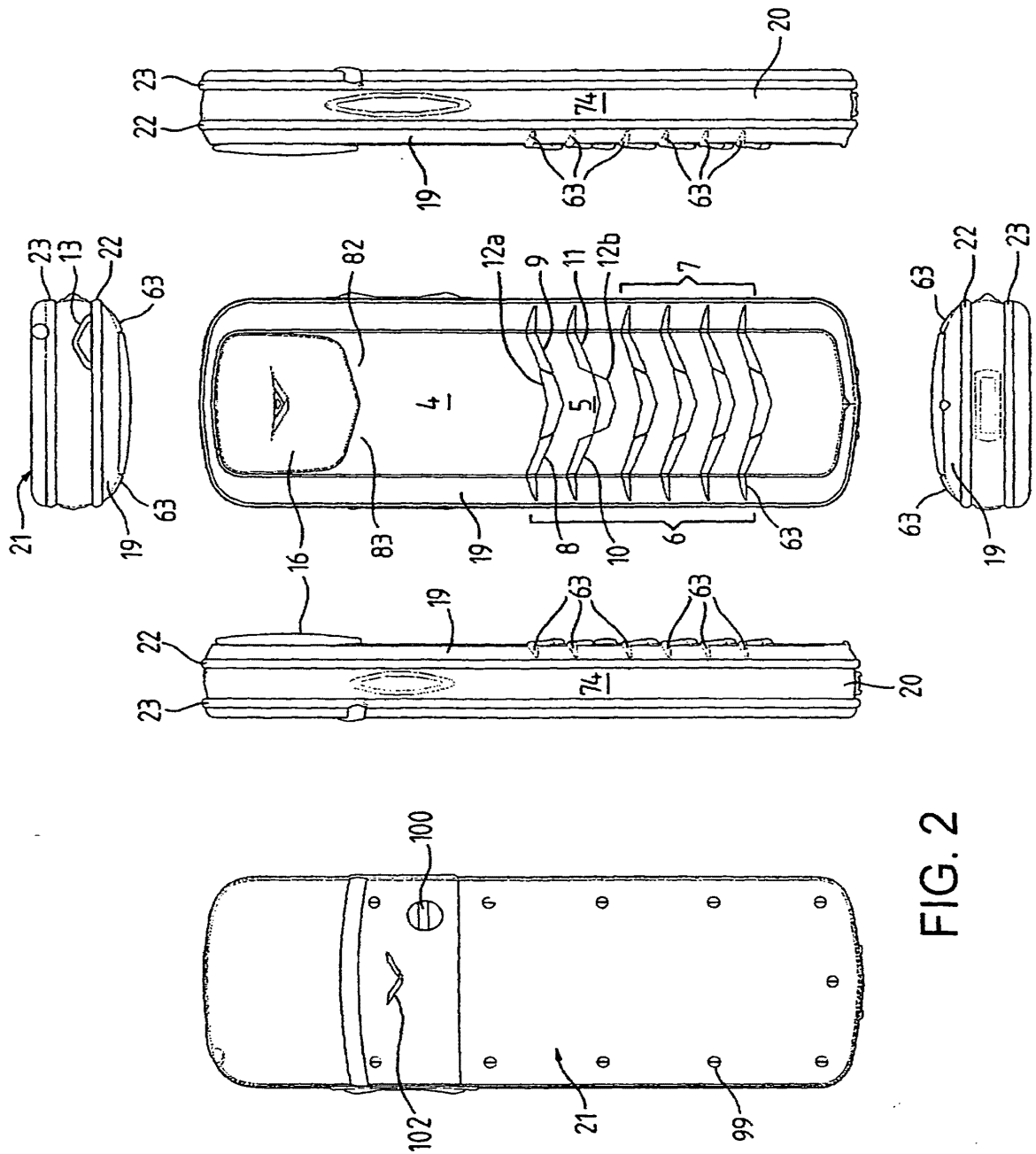


FIG. 1



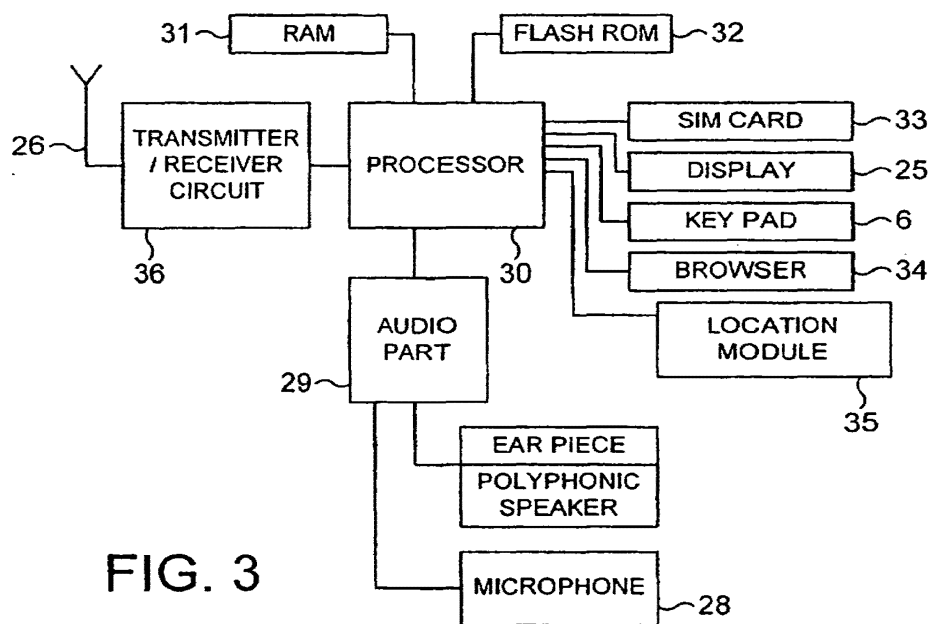
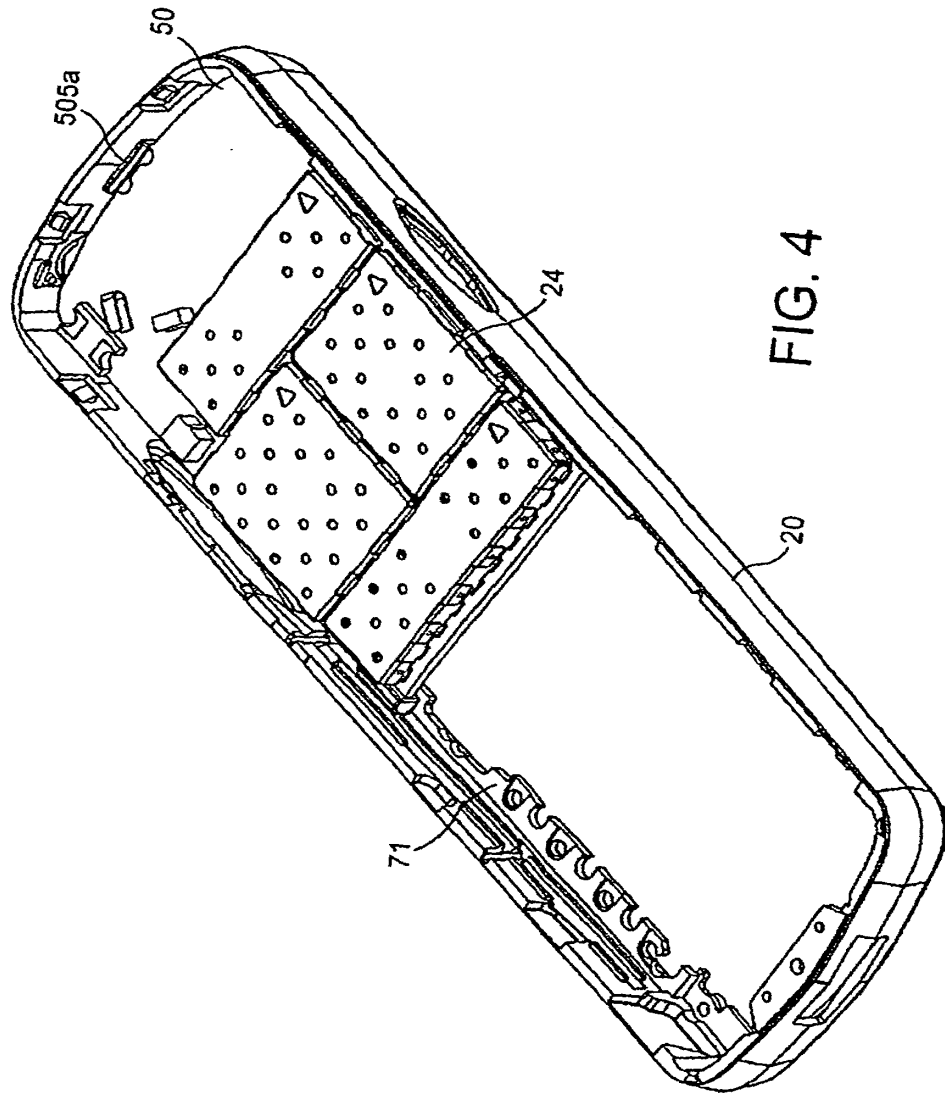
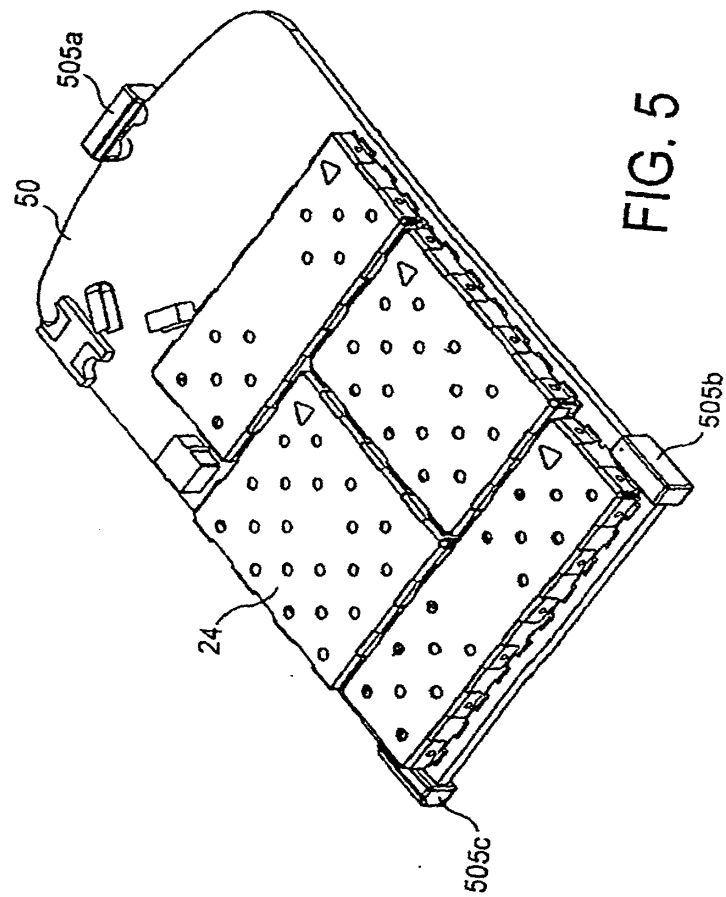


FIG. 3





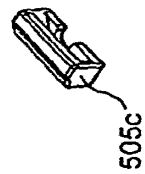
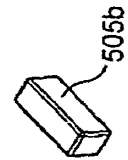
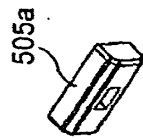


FIG. 6

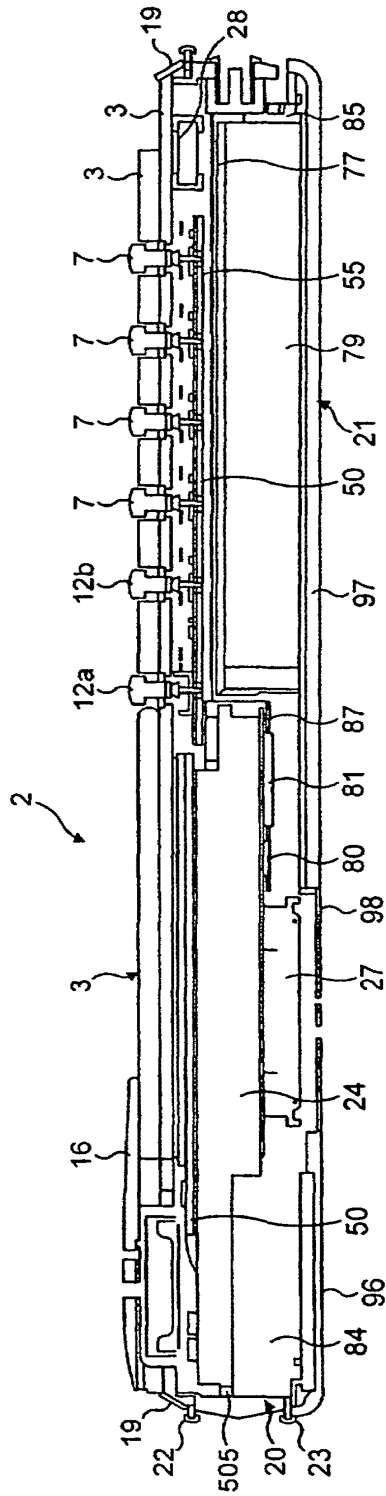


FIG. 7

A Mounting

- 5 The invention relates to portable communication devices and in particular to mountings for such devices and associated methods.

Items of technical equipment are generally bought for their functionality. They are quickly superseded and replaced when a faster, cheaper to operate,  
10 smaller, or higher specification alternative is released onto the market, the previous model being discarded. The value of the product to its user is in what it can achieve, and perhaps to an extent the image that attaches to the owner of such an item. As fashion is constantly changing so is the image promoted by owning an individual item particularly in a fast moving technical  
15 area. What may have been the height of fashion can swiftly become out moded.

In fast moving technical areas changes are prompted by, amongst other things, the requirement to make the product smaller, cheaper, cheaper to use,  
20 have greater functionality, make use of emerging technologies or move with the latest tastes in design.

Generally when a radically new technical product is brought onto the market, for an initial period the product is elite and expensive. Consequently only  
25 limited numbers are produced. In the early years, because of the inherent rarity and the cost of components, there is a propensity to repair as much as possible. Despite the economic requirement for repair, as soon as a better product is launched, the previous item is soon obsolete and abandoned. The drive for innovation is the challenge of technical advancement and reduction  
30 of costs. This pattern has been followed with many items including the first colour televisions, and the first mobile phones.

In other products such as personal computers upgrading is a possibility, but these upgrades are possible only within carefully predefined limits. The

casings are retained as a matter of convenience, it being the retention of the maximum amount of the existing technological hardware that drives the changes.

- 5 In accordance with a first aspect of the present invention there is provided a printed circuit board for mounting within an electronic device, the board having a plurality of resilient members to mount the board within the device without requiring complementary mounting members on the device.
- 10 Thus the PCB may be mounted in a device without requiring further attachment means. This allows the electronics of an electronic device to be upgraded without requiring any changes to the casing of the device. The electronic device may be any electronic device although the invention is particularly suitable for use in portable devices or in electronic devices in
- 15 which the hardware may be upgraded relatively regularly.

Preferably the resilient members are compressible. The resilient members may be made from natural or synthetic rubber.

- 20 Preferably the mounts are designed to hold the board within the casing by means of force between the mounts and surfaces of the device. The mounts may be designed to exert a force laterally against the sides of the board. Additionally or alternatively the mounts may be designed to exert a force perpendicular to the major plane of the board.

25

The total amount that the mounts extend around the perimeter of the board is preferably less than 25% of the perimeter of the board and may be less than 10% or 5%.

- 30 The invention also relates to a reusable casing for a personal portable communication device having an operating face carrying a user interface including a plurality of user input elements, the casing comprising housing elements defining a cavity for receiving an engine providing the electronic

functionality of the device and a battery for powering the engine and a printed circuit board according to the invention.

The casing may include elements made from precious material.

5

The invention also relates to a personal portable communication device including a printed circuit board according to the invention and the device may include precious material.

10 Devices such as mobile phones and computers have historically been designed with the foreknowledge that, within periods as short as months, more desirable products with vastly greater functionality will have overtaken the current models. The devices are accordingly built with these periods of time in mind.

15

The various aspects of the present invention result from a radically different approach to portable communication devices. A reusable casing for a portable communication device that may be precious, and customisable with sentimental value, turns the drives for previous innovation on their heads. In  
20 embodiments of the present invention it is the casing that is the more enduring element of a technical device.

When creating a reusable casing there are new considerations. Future engines as yet undesigned need to be accommodated. Future technologies  
25 need to be factored in. One result is that the engine size will probably not remain the same. To account for this in embodiments of the present invention the means for defining the battery cavity may be replaceable to provide different respective volumes for the battery and engine cavities. In this way as engines with greater functionality become smaller a larger battery can be  
30 utilised should this be desirable to fill the vacant space and provide a longer battery life.

By displacing the battery and the engine along the length of the casing, end-to-end reductions in the size of the engine, for example, can be directly

translated into an increase in size for the battery. In conventional devices where the engine and battery are back to back, this direct correspondence does not occur as the battery size is determined by the casing itself rather than the engine size.

5

The casing in embodiments of the invention will be the most enduring feature of the device. It will perhaps out live a succession of engines. The display may be a replaceable module as is the engine and the battery. Alternatively the display may be one of the enduring elements of the design.

10

To be flexible enough for future developments the casing may be provided with external connectors allowing for greater capability than is provided for by the functionality of a current engine. This allows higher data capacity, for example, to be provided in the future when the processing capability of the engines increases. This may mean that one or more of the electrical connectors provided on the casing is not arranged to convey signals. In the interim the connector could be used for another purpose.

The casing may be a conventional one part casing or a clam shell, or other two or more part arrangement, where the user input elements or keys may be located on a different face to a display. In such two part arrangements generally respective casing portions are fixed such that one is movable relative to the other. The movement may be rotational or lateral.

When a casing is to be reusable it can be made from more valuable materials as these will not be redundant and cast aside when the next best technology comes along. A vast range of materials become available for customisation of elements of the device in fact there are virtually no bounds. Embodiments of the invention may use precious and semi precious materials including gem stones, other jewels and minerals, metals including those ranging from gold, silver, and platinum through to alloys such as steel. Materials such as ceramics in their various forms are also available for use in embodiments of the invention, the brittle nature of these materials, being able to be accommodated by the design of some embodiments. In addition, materials

not generally considered in the context of technological devices, such as skins (leather being a particular example), wood and similar materials can also be utilised in embodiments of the invention.

5 As well as the materials themselves individual elements can be customised with surface decoration that could include veneers of desired materials on plastic or other subframes. The elements could have instead, or in addition, surface texture provided by a particular finish or an engraving or encrustation with gems or other stones or materials.

10

Embodiments of the invention will now be described in more detail with reference to Figures 1 to 7 of the accompanying drawings of which:

Figure 1 is a perspective view of a communication device showing one  
15 embodiment of the invention;

Figure 2 shows front, rear, sides and top views of the communication device of figure 1;

20 Figure 3 is a schematic representation of a communication device suitable for embodiments of the present invention;

Figure 4 is a perspective view of a circuit board according to the invention mounted in a casing of a portable communications device.

25

Figure 5 is a perspective view of a circuit board according to the invention;

Figure 6 is a perspective view of the mounts of the circuit board shown in Figure 5; and

30

Figure 7 is a longitudinal cross-section of the device shown in Figure 1.

Embodiments of the invention will be described in greater detail below with exemplary materials being given for some specific or individual elements of

the device. Where a material or veneer is discussed in relation to an element, the particular character of the element described is one of many or several that may be provided as options to a party commissioning a personalised device in accordance with the invention. In addition the exact material or surface decoration of the element could be individually commissioned. Although a communication device is described, the invention is applicable to any electronic device.

The embodiment illustrated in Figure 1 is a communication device 1 with a precious retainable casing 2. The casing 2 of the device has been designed to be customisable to individual taste with precious materials. To enable individual devices to be created, the number of external parts that the casing is formed from is relatively large in contrast to existing communication devices.

The casing 2 has an optically permeable front face 3 that includes a key array 6. The key array 6 includes a first group of alphanumeric keys 7, for entering telephone numbers, writing text messages (SMS), writing names (associated with phone numbers), etc. Each of the twelve alphanumeric keys 7 is provided with a figure "0-9" or a sign "#" or "\*", respectively. In an alpha mode each key is associated with a number of letters and special signs used in text editing. The key array 6 additionally comprises two soft keys 8, 9, two call handling keys 10, 11, two scroll keys 12, and an on/off key 13.

The functionality of the soft keys 8, 9 may depend on the state of the communication device and position within the menu accessed using the scroll keys 12. The current functionality of the soft keys 8, 9 can be shown in separate fields in the display region 4 just above the respective keys 8, 9.

The two call handling keys 10, 11 are used for establishing a call or a conference call, terminating a call or rejecting an incoming call.

The two direction keys or scroll keys 12, in the handset illustrated, are placed centrally on the front surface of the communication device between the

display region 4 and the group of alphanumeric keys 7 and perform a scrolling function.

5 The seamless face 3 is formed from an optically seamless light guide providing light to illuminate the display region 4 and key legends 15 located on the light guide and associated with individual keys of the key array 6.

10 The front face 3 is overlaid with a pillow 16 providing apertures 17 to channel sound from a loud speaker 18 and providing an appropriate feel for an element of the device that will be located close to the user's ear. The front face 3 is surrounded by a bezel 19 that can be made from a precious metal. This acts to protect the edges of the light guide 14 and can help in some embodiments in securing the elements of the casing 2 together.

15 The keys of the key array in this particular embodiment are arranged to provide particular sensory guidance to the user. Aspects of the design also allow the light guide 14 to be made from a wide range of materials including those that are brittle and so need to be carefully handled and protected from shattering.

20 The casing 2 is formed from the front face 3 surrounded by the bezel 19, a side frame 20 and a back cover 21. The interface between the side frame 20 and the bezel 19 and the side frame 20 and the rear cover 21 are shielded by rails 22, 23 in this embodiment. The rails 22, 23 hide raw edges from view and exposure to ensure that the device 1 is both long lasting and elegant.  
25 The construction of the casing 2 enables the casing 2 to be opened with ease to update the engine 24 inside when desired. The casing 2 is also designed to allow the device to accommodate different sized and shaped engines 24, which may be necessary through its life.

30 Other elements of the design will be discussed in greater detail with reference to the later drawings. By way of introduction, the device will be briefly discussed with reference to its functional elements.

The communication device 1, includes the key array 6, a display 25, an antenna 26, an ear piece speaker 18, a polyphonic speaker 27, and a microphone 28. The communication device 1 is adapted for communication via a wireless telecommunication network, e.g. a wireless network. However, 5 the communication device could also have been designed for a cordless network. Fig. 3 shows schematically and functionally elements of the communication device 1. The microphone 28 records the user's speech, and the analogue signals formed thereby are A/D converted by an A/D converter before the speech is encoded in an audio part 29. The encoded speech signal 10 is transferred to processor 30. The processor 30 may support software in the phone. The processor 30 also forms the interface to peripheral units of the apparatus. These may include a Random Access Memory (RAM) 31 and a Flash Read Only Memory (ROM) 32, a SIM card 33, the display 25, and the key array 6, and perhaps a browser application 34, and a location module 35.

15

The browser application 34 can be used to request and receive information from the Internet. The location module 35 enables the terminal 1 to determine its current position.

20 The processor 30 communicates with a transceiver 36, e.g. a circuit, which is adapted to send and receive messages in a telecommunication network. The telecommunications network may be a GSM or W-CDMA network, but the invention may also be applied in connection with any other network, including but not limited to other kinds of wireless networks and various forms of 25 cordless phone systems or in dual band phones accessing sets of these systems or networks. The audio part 29 speech-decodes the signal, which is transferred from the processor 30 to the earpiece 18 via a D/A converter.

30 The display 25 may form a permanent part of the casing or, to increase the potential for upgrading the engine throughout the life of the casing it may be a module that can be replaced to, for example, account for the inevitable improvements in graphics that may occur.

The constructed casing 2 provides a housing for the printed circuit board 50 holding the engine components 24, and a battery 79 (see Figure 7). When the device 1 is a radio telephone, the casing 2 may also provide a SIM card holder to accommodate a SIM card. For operation under some radio protocols this will clearly not be necessary. The casing 2 is completed by assembling the back cover 21 to the side frame 20.

In the embodiment described the front 3 and rear 21 casing elements are secured to the side frame 20. A silicon sealant may be extruded around the inside of the back cover 21 to prevent unwanted ingress of dirt and fluid.

The skilled man will be aware that the character described above in relation to specific elements of the device can be mixed and matched to suit many distinct design options.

Further aspects of the invention will now be described with reference to Figures 4 to 7.

Figure 4 is a perspective view of a printed circuit board (PCB) 50 according to the invention mounted in a casing of a portable communications device. The circuit board 50 is mounted in the casing in a removable manner as will be described below. The casing comprises a frame member 20 that forms the side of the device. The side frame member 20 may be visible to an end user or other side elements of a more attractive nature may cover the side frame member.

The side frame member 20 has a flange 71 that forms a rest for the PCB. The PCB is held within the casing by mounts 505 a, b, c. These mounts can be seen more clearly in Figures 5 and 6. Figure 5 shows a printed circuit board having mounts in accordance with the invention. The printed circuit board 50 has engine components 24 mounted on one or both surfaces and is of a suitable size to fit within the recess provided by the side frame member 20.

Figure 6 shows the mounts 505 in more detail. The mounts are resilient and preferably slightly compressible and are preferably formed of a natural or synthetic rubber material. The mounts hold the PCB within the casing by means of the force between the mounts and the sides 20 of the casing. In the 5 embodiments illustrated, this force is exerted laterally against the sides of the PCB. However it is also envisaged that additionally or alternatively the mounts may result in a force exerted perpendicular to the major plane of the PCB.

10 The mounts as shown are rectangular in cross-section. It is believed that this provides the optimum compression forces for the least number of mounts. However other shaped mounts may be used, for instance ones of a circular cross section. A reduction in contact area between the mounts and the device surface may mean that an increased number of mounts is necessary.

15 It should be noted that the resilient mounts 505 provide shock absorbency for the PCB as well as being the only means of mounting the PCB within the casing. The PCB is not held with screw fittings or the like. This provides the advantages that the PCB itself does not have to be designed to fit snugly 20 within particular sized recesses within the casing or to match screw holes provided on the side member frame of the casing. Thus the PCB and hence the engine can be easily upgraded without having to re-design or reproduce the casing for the phone. The resilient mounts 505 simply need to be of such as size and have sufficient resilience to hold the PCB within the casing by 25 compression forces.

The mounts only extend for a small proportion of the perimeter of the PCB, for instance less than 25% and more likely less than 10% of the perimeter.

30 Although the drawings show three mounts it should be clear to a person skilled in the art that any suitable number may be used. For instance two or more mounts may be used as required, so long as the board is held within the casing as required.

As shown in Figures 1 and 7, the reusable casing 2 for a personal portable communication device has a user interface 6 including a plurality of user input elements 7. The casing has housing elements 3, 19, 20, 21, an engine 24 for providing the electronic functionality of the device and a battery 79 for powering the engine. The housing elements are releasably attached one to another to provide access to the interior of the casing. A dividing member 87 defines a battery cavity 85 accessible to the user and an engine cavity 84. The dividing member 87 also accommodates a connection between the battery 79 and the engine 24. The mounts 505 (only one of which is shown in Figure 7) mount the engine PCB 50 within the engine cavity 84 in a removable manner. The device also includes a PCB 55 for the key array 6. This PCB is also held within the casing by rubber mounts as described above with reference to PCB 50. The battery 79 may also be provided with similar mounts.

The casing 2 has a rear cover 21 and internal compartments 84, 85 suitable for retaining the engine 24, the battery 79 and in this embodiment a SIM card 81. The device illustrated, in common with many other radio telephones, advantageously allows access to the battery compartment 85 as the battery 79 may periodically need replacement. Along side the battery compartment 85 in this embodiment is the SIM card holder 80. Under protocols where a SIM card 81 is used to hold subscription information, the user may wish to remove the SIM card 81. For this reason it is convenient for the back cover 21 to be removable to expose both the battery 79 and the SIM card 81. The battery compartment 85 and SIM card holder 80 are provided by an internal dividing element in the form of casing element 87 that is secured to the side frame 20. This may be formed from plastic or one of many other suitable materials. In one embodiment the compartments are formed from stamped metal sheet. Titanium and aluminium are two from the numerous suitable materials.

The portable communication device may be modified by removing the engine 24 from the casing and replacing the engine with another engine having hardware providing a different predetermined processing capability. This may

mean that the dividing element 87 is moved to allow for an engine and/or a battery of a different size e.g. a larger engine 24 and a smaller battery 79 or vice versa. The invention means that this new PCB does not have to be manufactured to fit with any existing fixing means (e.g. screw holes) on the casing. In a conventional arrangement, where the PCB is screwed or clipped  
5 into the housing, it would be necessary to ensure that the new PCB has screws or fixing means in positions that corresponded to the complementary fixing means on the casing. However this is not the case with the present invention in which resilient mounts are provided which do not require  
10 complementary parts on the casing. Thus if the dividing element 87 is moved, this does affect the mounting means used.

Aspects of the invention have been discussed with reference to a radio telephone function. It will be clear to the skilled man that these aspects apply  
15 equally to other electronic devices, such as (but not limited to) other portable communications devices supporting in addition or as an alternative other functions, such as, amongst others electronic diaries, and electronic notepads.

20 In the future, although the casing will probably be maintained in substantially the same condition, the engine could be replaced with an engine that perhaps has greater processing power or allows for different functionality, for example improved graphics. To replace the engine will be a relatively simple manner of removing the existing engine and replacing it with a new one. The battery  
25 and internal casing walls may be changed at the same time if greater battery volume is then possible.

The present invention includes any novel feature or combination of features disclosed herein either explicitly or any generalisation thereof irrespective of  
30 whether or not it relates to the claimed invention or mitigates any or all of the problems addressed.

In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

**Claims**

1. A printed circuit board for mounting within an electronic device, the board having a plurality of resilient members to mount the board within the device without requiring complementary mounting members on the device.
2. A board as claimed in claim 1 wherein the resilient members are compressible.
3. A board as claimed in claim 1 or 2 wherein the resilient members are made from natural or synthetic rubber.
4. A board as claimed in claim 1, 2 or 3 wherein the mounts are designed to hold the board within the casing by means of force between the mounts and surfaces of the device.
5. A board as claimed in claim 4 wherein the mounts are designed to result in a force exerted laterally against the sides of the board.
6. A board as claimed in claim 4 or 5 wherein the mounts are designed to result in a force exerted perpendicular to the major plane of the board.
7. A board as claimed in any preceding claim wherein the total amount that the mounts extend around the perimeter of the board is less than 25% of the perimeter of the board.
8. A board as claimed in any preceding claim wherein the total amount that the mounts extend around the perimeter of the board is less than 10% of the perimeter of the board.
9. A board as claimed in any preceding claim wherein the total amount that the mounts extend around the perimeter of the board is less than 5% of the perimeter of the board.

10. A reusable casing for a personal portable communication device having an operating face carrying a user interface including a plurality of user input elements, the casing comprising:  
housing elements defining a cavity for receiving an engine providing the  
5 electronic functionality of the device and a battery for powering the engine;  
a printed circuit board as claimed in any preceding claim.
11. A casing according to claim 10 wherein the casing further comprises means for attaching the housing elements one to another to provide access to  
10 the cavity for receiving the engine;  
a dividing member for defining a battery cavity accessible to the user and an engine cavity, the dividing member accommodating a connection between the battery and the engine;
12. A reusable casing according to claim 11 wherein the means for defining the battery cavity is replaceable to provide different respective volumes for the battery and engine cavities.
13. A reusable casing according to claim 10, 11 or 12 wherein the battery  
20 and the engine are displaced along the length of the casing.
14. A reusable casing according to any of claims 10 to 13 wherein the design of a replacement means for receiving the engine and battery is dependent upon the size and shape of a second engine and battery pair.  
25
15. A reusable casing according to any of claims 10 to 14 wherein the casing includes elements made from precious material.
16. A personal portable communication device including a printed circuit  
30 board as claimed in any of claims 1 to 9.
17. A personal portable communication device according to claim 15 wherein the device includes precious material.

18 A personal portable communication device comprising an engine and a reusable casing according to any of claims 10 to 15.

19. A printed circuit board substantially as hereinbefore described with  
5 reference to figures 3 to 6 of the accompanying drawings.

20. A casing substantially as hereinbefore described with reference to figures 1 to 6 of the accompanying drawings.

10 21. A portable communication device substantially as hereinbefore described with reference to figures 1 to 6 of the accompanying drawings.



**Application No:** GB 0130746.1  
**Claims searched:** 1-18

**Examiner:** S M Colcombe  
**Date of search:** 11 September 2002

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.T): H1R (RBG, RBP, RBS, RBV)  
Int CI (Ed.7): H04M, H05K  
Other: Online: WPI, EPODOC, JAPIO

**Documents considered to be relevant:**

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|-------------------------------------------|--------------------|
| A        | US 5541448 (CARPENTER)                    |                    |
| A        | US 5537294 (SIWINSKI)                     |                    |
| X        | JP 2001007550 (NIPPON ELECTRIC) Abstract  | 1, 2 at least      |
| X        | JP 2000133973 (NIPPON ELECTRIC) Abstract  | 1, 2 at least      |
| X        | JP 110331333 (NEC) Abstract               | 1, 2 at least      |

|   |                                                                                                           |   |                                                                                                                  |
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TITLE OF INVENTION: PORTABLE ELECTRONIC DEVICE

| APPLN. TYPE    | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO           | \$1740        | \$300               | \$0                  | \$2040           | 12/10/2012 |

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- B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

**II. PART B - FEE(S) TRANSMITTAL**, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). 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. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

**III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop 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.**

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** **Mail** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 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: Use Block 1 for any change of address)

10948 7590 09/10/2012

Harrington & Smith, Attorneys At Law, LLC  
4 Research Drive, Suite 202  
Shelton, CT 06484

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 Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

|                    |
|--------------------|
| (Depositor's name) |
| (Signature)        |
| (Date)             |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 12/860,234      | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)     | 9585             |

TITLE OF INVENTION: PORTABLE ELECTRONIC DEVICE

| APPLN. TYPE    | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO           | \$1740        | \$300               | \$0                  | \$2040           | 12/10/2012 |

| EXAMINER         | ART UNIT | CLASS-SUBCLASS |
|------------------|----------|----------------|
| NGUYEN, TUAN DUC | 2614     | 379-433080     |

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, 1 \_\_\_\_\_
- (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. 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. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.111. 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 submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

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, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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| APPLICATION NO.                           | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------|-------------|----------------------|---------------------|------------------|
| 12/860,234                                | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)     | 9585             |
| 10948                                     | 7590        | 09/10/2012           | EXAMINER            |                  |
| Harrington & Smith, Attorneys At Law, LLC |             |                      | NGUYEN, TUAN DUC    |                  |
| 4 Research Drive, Suite 202               |             |                      | ART UNIT            | PAPER NUMBER     |
| Shelton, CT 06484                         |             |                      | 2614                |                  |

DATE MAILED: 09/10/2012

## 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 49 day(s). 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 Patent Term Adjustment will be 49 day(s).

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) WEB site (<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 (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

|                               |                        |                     |  |
|-------------------------------|------------------------|---------------------|--|
| <b>Notice of Allowability</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                               | 12/860,234             | JORGENSEN, CLAUS H. |  |
|                               | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                               | TUAN NGUYEN            | 2614                |  |

**-- 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 07/05/2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 25-44 and renumbered as 1-20.

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: \_\_\_\_.

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.**

5. ☐ 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.

6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") 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./Mail Date \_\_\_\_.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

7. ☐ 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. <input type="checkbox"/> Notice of References Cited (PTO-892)<br>2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)<br>3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date ____<br>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 5. <input type="checkbox"/> Notice of Informal Patent Application<br>6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date ____ .<br>7. <input type="checkbox"/> Examiner's Amendment/Comment<br>8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance<br>9. <input type="checkbox"/> Other _____. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                     |  |
|-----------------------------------------------------|--|
| /Tuan D. Nguyen/<br>Primary Examiner, Art Unit 2614 |  |
|-----------------------------------------------------|--|

|                                                                                                                  |                                            |                                                                       |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <b>Issue Classification</b><br> | <b>Application/Control No.</b><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br>JORGENSEN, CLAUS H. |
|                                                                                                                  | <b>Examiner</b><br>TUAN NGUYEN             | <b>Art Unit</b><br>2614                                               |

| ORIGINAL           |                                   |          |  |  |  | INTERNATIONAL CLASSIFICATION |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|--------------------|-----------------------------------|----------|--|--|--|------------------------------|---|---|---|---------------------|-------------|--|--|--|--|--|--|--|--|
| CLASS              |                                   | SUBCLASS |  |  |  | CLAIMED                      |   |   |   |                     | NON-CLAIMED |  |  |  |  |  |  |  |  |
| 379                |                                   | 433.08   |  |  |  | H                            | 0 | 4 | M | 1 / 00 (2006.01.01) |             |  |  |  |  |  |  |  |  |
| CROSS REFERENCE(S) |                                   |          |  |  |  | H                            | 0 | 4 | M | 9 / 00 (2006.01.01) |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
| CLASS              | SUBCLASS (ONE SUBCLASS PER BLOCK) |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
| 379                | 433.01                            | 433.13   |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
| 455                | 575.3                             |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |
|                    |                                   |          |  |  |  |                              |   |   |   |                     |             |  |  |  |  |  |  |  |  |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47 |          |       |          |       |          |       |          |       |          |       |          |       |          |       |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|-------|----------|
| Final                                                                                                                                                                             | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|                                                                                                                                                                                   | 1        |       | 17       | 9     | 33       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 2        |       | 18       | 10    | 34       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 3        |       | 19       | 11    | 35       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 4        |       | 20       | 12    | 36       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 5        |       | 21       | 13    | 37       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 6        |       | 22       | 14    | 38       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 7        |       | 23       | 15    | 39       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 8        |       | 24       | 16    | 40       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 9        | 1     | 25       | 17    | 41       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 10       | 2     | 26       | 18    | 42       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 11       | 3     | 27       | 19    | 43       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 12       | 4     | 28       | 20    | 44       |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 13       | 5     | 29       |       |          |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 14       | 6     | 30       |       |          |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 15       | 7     | 31       |       |          |       |          |       |          |       |          |       |          |       |          |
|                                                                                                                                                                                   | 16       | 8     | 32       |       |          |       |          |       |          |       |          |       |          |       |          |

|                                                 |        |                              |                   |
|-------------------------------------------------|--------|------------------------------|-------------------|
| NONE                                            |        | <b>Total Claims Allowed:</b> |                   |
|                                                 |        | 20                           |                   |
| (Assistant Examiner)                            | (Date) |                              |                   |
| /TUAN NGUYEN/<br>Primary Examiner.Art Unit 2614 | 9/6/12 | O.G. Print Claim(s)          | O.G. Print Figure |
| (Primary Examiner)                              | (Date) | 1                            | 1 and 7           |

|                                                                                                              |                                                |                                                                           |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------|
| <b>Search Notes</b><br><br> | <b>Application/Control No.</b><br><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br><br>JORGENSEN, CLAUS H. |
|                                                                                                              | <b>Examiner</b><br><br>TUAN NGUYEN             | <b>Art Unit</b><br><br>2614                                               |

| SEARCHED |                              |         |          |
|----------|------------------------------|---------|----------|
| Class    | Subclass                     | Date    | Examiner |
| 379      | 433.01,433.08,433.11,433.13  | 1/30/12 | TN       |
| 455      | 90.3,575.1,575.3,572,573,574 | 1/30/12 | TN       |
|          | updated same as above        | 9/5/12  | TN       |

| SEARCH NOTES             |         |          |
|--------------------------|---------|----------|
| Search Notes             | Date    | Examiner |
| PLUS and inventor search | 1/30/12 | TN       |

| INTERFERENCE SEARCH |                       |        |          |
|---------------------|-----------------------|--------|----------|
| Class               | Subclass              | Date   | Examiner |
|                     | updated same as above | 9/5/12 | TN       |

|  |                                                 |
|--|-------------------------------------------------|
|  | /TUAN NGUYEN/<br>Primary Examiner.Art Unit 2614 |
|--|-------------------------------------------------|



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## BIB DATA SHEET

CONFIRMATION NO. 9585

|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          |                                                              |                                                   |                               |                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|-------------------------------|------------------------------------|
| <b>SERIAL NUMBER</b><br>12/860,234                                                                                                                                                                                                                                                        | <b>FILING or 371(c)<br/>DATE</b><br>08/20/2010<br><b>RULE</b>                                                     | <b>CLASS</b><br>379                                      | <b>GROUP ART UNIT</b><br>2614                                | <b>ATTORNEY DOCKET<br/>NO.</b><br>891.0013.U2(US) |                               |                                    |
| <b>APPLICANTS</b><br>Claus H. Jorgensen, Frederiksberg, DENMARK;<br><b>** CONTINUING DATA *****</b><br>This application is a CON of 11/393,510 03/29/2006 PAT 7,787,618<br><b>** FOREIGN APPLICATIONS *****</b><br><b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b><br>09/01/2010 |                                                                                                                   |                                                          |                                                              |                                                   |                               |                                    |
| Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Verified and /TUAN DUC<br>NGUYEN/<br>Acknowledged Examiner's Signature              |                                                                                                                   | <input type="checkbox"/> Met after Allowance<br>Initials | <b>STATE OR<br/>COUNTRY</b><br>DENMARK                       | <b>SHEETS<br/>DRAWINGS</b><br>6                   | <b>TOTAL<br/>CLAIMS</b><br>20 | <b>INDEPENDENT<br/>CLAIMS</b><br>3 |
| <b>ADDRESS</b><br>Harrington & Smith, Attorneys At Law, LLC<br>4 Research Drive, Suite 202<br>Shelton, CT 06484<br>UNITED STATES                                                                                                                                                          |                                                                                                                   |                                                          |                                                              |                                                   |                               |                                    |
| <b>TITLE</b><br>Portable Electronic Device                                                                                                                                                                                                                                                |                                                                                                                   |                                                          |                                                              |                                                   |                               |                                    |
| <b>FILING FEE<br/>RECEIVED</b><br>1090                                                                                                                                                                                                                                                    | FEES: Authority has been given in Paper<br>No. _____ to charge/credit DEPOSIT ACCOUNT<br>No. _____ for following: |                                                          | <input type="checkbox"/> All Fees                            |                                                   |                               |                                    |
|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          | <input type="checkbox"/> 1.16 Fees (Filing)                  |                                                   |                               |                                    |
|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          | <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) |                                                   |                               |                                    |
|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          | <input type="checkbox"/> 1.18 Fees (Issue)                   |                                                   |                               |                                    |
|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          | <input type="checkbox"/> Other _____                         |                                                   |                               |                                    |
|                                                                                                                                                                                                                                                                                           |                                                                                                                   |                                                          | <input type="checkbox"/> Credit                              |                                                   |                               |                                    |

|                                                                                                                    |                                            |                                                                       |
|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <b><i>Index of Claims</i></b><br> | <b>Application/Control No.</b><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br>JORGENSEN, CLAUS H. |
|                                                                                                                    | <b>Examiner</b><br>TUAN NGUYEN             | <b>Art Unit</b><br>2614                                               |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant |          |            |            | <input type="checkbox"/> CPA |  |  |  | <input type="checkbox"/> T.D. |  |  |  | <input type="checkbox"/> R.1.47 |  |  |  |
|----------------------------------------------------------------------------------------|----------|------------|------------|------------------------------|--|--|--|-------------------------------|--|--|--|---------------------------------|--|--|--|
| CLAIM                                                                                  |          | DATE       |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| Final                                                                                  | Original | 02/02/2012 | 09/06/2012 |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 1        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 2        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 3        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 4        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 5        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 6        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 7        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 8        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 9        | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 10       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 11       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 12       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 13       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 14       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 15       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 16       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 17       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 18       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 19       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 20       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 21       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 22       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 23       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
|                                                                                        | 24       | -          |            |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 1                                                                                      | 25       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 2                                                                                      | 26       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 3                                                                                      | 27       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 4                                                                                      | 28       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 5                                                                                      | 29       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 6                                                                                      | 30       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 7                                                                                      | 31       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 8                                                                                      | 32       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 9                                                                                      | 33       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 10                                                                                     | 34       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 11                                                                                     | 35       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |
| 12                                                                                     | 36       | ✓          | =          |                              |  |  |  |                               |  |  |  |                                 |  |  |  |

|                                                                                                                                       |                                            |                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
| <p align="center"><b><i>Index of Claims</i></b></p>  | <b>Application/Control No.</b><br>12860234 | <b>Applicant(s)/Patent Under Reexamination</b><br>JORGENSEN, CLAUS H. |
|                                                                                                                                       | <b>Examiner</b><br>TUAN NGUYEN             | <b>Art Unit</b><br>2614                                               |

|   |                 |   |                   |   |                     |   |                 |
|---|-----------------|---|-------------------|---|---------------------|---|-----------------|
| ✓ | <b>Rejected</b> | - | <b>Cancelled</b>  | N | <b>Non-Elected</b>  | A | <b>Appeal</b>   |
| = | <b>Allowed</b>  | ÷ | <b>Restricted</b> | I | <b>Interference</b> | O | <b>Objected</b> |

| <input type="checkbox"/> Claims renumbered in the same order as presented by applicant |          | <input type="checkbox"/> CPA |            | <input type="checkbox"/> T.D. |  | <input type="checkbox"/> R.1.47 |  |  |  |
|----------------------------------------------------------------------------------------|----------|------------------------------|------------|-------------------------------|--|---------------------------------|--|--|--|
| CLAIM                                                                                  |          | DATE                         |            |                               |  |                                 |  |  |  |
| Final                                                                                  | Original | 02/02/2012                   | 09/06/2012 |                               |  |                                 |  |  |  |
| 13                                                                                     | 37       | ✓                            | =          |                               |  |                                 |  |  |  |
| 14                                                                                     | 38       | ✓                            | =          |                               |  |                                 |  |  |  |
| 15                                                                                     | 39       | ✓                            | =          |                               |  |                                 |  |  |  |
| 16                                                                                     | 40       | ✓                            | =          |                               |  |                                 |  |  |  |
| 17                                                                                     | 41       | ✓                            | =          |                               |  |                                 |  |  |  |
| 18                                                                                     | 42       | ✓                            | =          |                               |  |                                 |  |  |  |
| 19                                                                                     | 43       | ✓                            | =          |                               |  |                                 |  |  |  |
| 20                                                                                     | 44       | ✓                            | =          |                               |  |                                 |  |  |  |



# UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO.                                                                                                        | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO.       |
|------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|------------------------------|------------------------|
| 12/860,234                                                                                                             | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)              | 9585                   |
| 10948 7590 10/18/2012<br>Harrington & Smith, Attorneys At Law, LLC<br>4 Research Drive, Suite 202<br>Shelton, CT 06484 |             |                      | EXAMINER<br>NGUYEN, TUAN DUC |                        |
|                                                                                                                        |             |                      | ART UNIT<br>2656             | PAPER NUMBER           |
|                                                                                                                        |             |                      | MAIL DATE<br>10/18/2012      | DELIVERY MODE<br>PAPER |

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

The time period for reply, if any, is set in the attached communication.

|                                                |                 |                     |  |
|------------------------------------------------|-----------------|---------------------|--|
| <b>Supplemental<br/>Notice of Allowability</b> | Application No. | Applicant(s)        |  |
|                                                | 12/860,234      | JORGENSEN, CLAUS H. |  |
|                                                | Examiner        | Art Unit            |  |
|                                                | TUAN D. NGUYEN  | 2656                |  |

**-- 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 09/07/2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 25-44 and renumbered as 1-20.

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: \_\_\_\_\_.

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.**

5. ☐ 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.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") 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./Mail Date \_\_\_\_\_.  
     (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

7. ☐ 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. <input type="checkbox"/> Notice of References Cited (PTO-892)<br>2. <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)<br>3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>09/07/2012</u><br>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 5. <input type="checkbox"/> Notice of Informal Patent Application<br>6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.<br>7. <input type="checkbox"/> Examiner's Amendment/Comment<br>8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance<br>9. <input type="checkbox"/> Other _____. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                    |  |
|----------------------------------------------------|--|
| /TUAN D NGUYEN/<br>Primary Examiner, Art Unit 2656 |  |
|----------------------------------------------------|--|

|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|----------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-----------|
| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)      |                               | Serial No.: 12/860.234                                                              |           |
|                                                                                                                                                                                                                               |                                                    | Applicant(s): Claus H. Jorgensen |                               | Filing Date: 08/20/2010                                                             |           |
|                                                                                                                                                                                                                               |                                                    | Group: 2614                      |                               |  |           |
| <b>U.S. PATENT DOCUMENTS</b>                                                                                                                                                                                                  |                                                    |                                  |                               |                                                                                     |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Number-Kind Code)              | Publication Date<br>(MM-DD-YYYY) | Name of Patentee or Applicant | Class                                                                               | Sub-class |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| <b>FOREIGN PATENT DOCUMENTS</b>                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Country Code-Number-Kind Code) | Publication Date<br>(MM-DD-YYYY) | Name Of Patentee of Applicant | Translation?<br>Yes/No/n/a                                                          |           |
| /T.N./                                                                                                                                                                                                                        | GB 2 383 472 A                                     | 06/25/2003                       | Vertu Limited                 | n/a                                                                                 |           |
| <b>OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)</b>                                                                                                                                              |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
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|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
|                                                                                                                                                                                                                               |                                                    |                                  |                               |                                                                                     |           |
| Examiner's Signature: /Tuan Nguyen/                                                                                                                                                                                           |                                                    |                                  | Date Considered: 10/17/2012   |                                                                                     |           |
| Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.<br>Include a copy of this citation form with your next correspondence to the Applicant(s). |                                                    |                                  |                               |                                                                                     |           |



1/fw

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/860,234      Confirmation No.: 9585  
Applicant(s): Jorgensen, Claus H.  
Filed: 08/20/2010  
Art Unit: 2614  
Examiner: Nguyen, Tuan Duc  
Title: Portable Electronic Device

Attorney Docket No.: 891.0013.U2 (US)  
Customer No.: 10,948

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Information Disclosure Statement

(37 C.F.R. §1.97(c))

Sir:

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

An extended European search report issued in regard to EP Application No. 12159141.6 on June 4, 2012, which is a counterpart application to the present U.S. application. Enclosed is a copy of the extended European search report. Applicant's Attorney is aware of the art cited on the enclosed Form PTO-1449. Copies of the non-U.S. patent art are enclosed with the Form PTO-1449 for the Examiner's use.

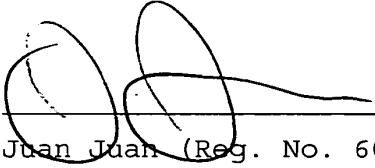
1  
ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.N./

- ☒ Each item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Statement, or
- ☐ No item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in this Statement was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Statement.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to patentability (37 C.F.R. §1.97(h)). If there are any additional charges with respect to this Statement or otherwise, please charge deposit account 50-1924 for any fee deficiency.

2  
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Respectfully submitted,

  
\_\_\_\_\_  
Juan Juan (Reg. No. 60,564)

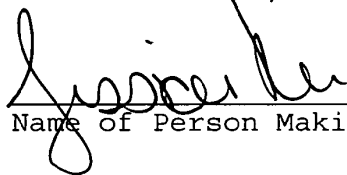
9/4/2012  
\_\_\_\_\_  
Date

**Customer No.: 10948**  
Harrington & Smith,  
Attorneys At Law, LLC  
4 Research Drive  
Shelton, CT 06484-6212  
203-925-9400

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/Tuan Nguyen/

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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

10949 7590 09/10/2012  
Harrington & Smith, Attorneys At Law, LLC  
4 Research Drive, Suite 202  
Shelton, CT 06484

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 Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Elaine F. Mian (Depositor's name)  
*Elaine F. Mian* (Signature)  
October 30, 2012 (Date)

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 12/860,234      | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)     | 9585             |

TITLE OF INVENTION: PORTABLE ELECTRONIC DEVICE

| APPLN. TYPE    | SMALL ENTITY | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE   |
|----------------|--------------|---------------|---------------------|----------------------|------------------|------------|
| nonprovisional | NO           | \$1740        | \$300               | \$0                  | \$2040           | 12/10/2012 |

| EXAMINER         | ART UNIT | CLASS-SUBCLASS |
|------------------|----------|----------------|
| NGUYEN, TUAN DUC | 2614     | 379-433080     |

|                   |           |        |            |
|-------------------|-----------|--------|------------|
| 10/31/2012 STANN2 | 000000001 | 501924 | 12/10/2012 |
|-------------------|-----------|--------|------------|

|            |            |
|------------|------------|
| 01 FC:1501 | 1770.00 DA |
| 02 FC:1504 | 300.00 DA  |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.563).

- ☐ 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.

Harrington &amp; Smith

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. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Nokia Corporation

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Espoo, Finland

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 submitted:

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☒ Publication Fee (No small entity discount permitted)  
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☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-1924 (enclose an extra copy of this form).

## 5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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.

Authorized Signature

Typed or printed name

Juan Juan

Date October 30, 2012

Registration No. 60,564

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, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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NO. 330 P. 2

OCT 31 2012

PTO/SB/47 (09-08)

Approved for use through 04/30/2009. OMB 0881-0016  
U.S. Patent and Trademark Office: U. S. DEPARTMENT OF COMMERCE

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**"FEE ADDRESS" INDICATION FORM**Address to:  
Mail Stop M Correspondence  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450Fax to:  
571-273-6500

- OR -

**INSTRUCTIONS:** The issue fee must have been paid for application(s) listed on this form. In addition, only an address represented by a Customer Number can be established as the fee address for maintenance fee purposes (hereafter, fee address). A fee address should be established when correspondence related to maintenance fees should be mailed to a different address than the correspondence address for the application. **When to check the first box below:** If you have a Customer Number to represent the fee address. **When to check the second box below:** If you have no Customer Number representing the desired fee address, in which case a completed Request for Customer Number (PTO/SB/125) must be attached to this form. For more information on Customer Numbers, see the Manual of Patent Examining Procedure (MPEP) § 403.

For the following listed application(s), please recognize as the "Fee Address" under the provisions of 37 CFR 1.363 the address associated with:

☒ Customer Number:

00197

OR

☐ The attached Request for Customer Number (PTO/SB/125) form.

| PATENT NUMBER<br>(if known) | APPLICATION NUMBER |
|-----------------------------|--------------------|
|                             | 12/860,234         |

Completed by (check one):

☐ Applicant/Inventor☒ Attorney or Agent of record 60,564  
(Reg. No.)☐ Assignee of record of the entire interest. See 37 CFR 3.71.  
Statement under 37 CFR 3.73(b) is enclosed.  
(Form PTO/SB/96)☐ Assignee recorded at Reel \_\_\_\_\_ Frame \_\_\_\_\_

Signature

Juan Juan

Typed or printed name

203-925-9400

Requester's telephone number

October 30, 2012

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 1.363. 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 1.11 and 1.14. This collection is estimated to take 5 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, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND COMPLETE D FORMS TO THIS ADDRESS. SEND TO: Mail Stop M Correspondence, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 12/860,234      | 12/11/2012 | 8331553    | 891.0013.U2(US)     | 9585             |

10948 7590 11/21/2012  
Harrington & Smith, Attorneys At Law, LLC  
4 Research Drive, Suite 202  
Shelton, CT 06484

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 49 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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) WEB site (<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 (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Claus H. Jorgensen, Frederiksberg, DENMARK;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

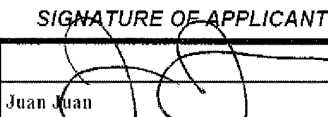
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

|                                                                                                                                                                                                                |                        |                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------|
| <p align="center"><b>Request<br/>For<br/>Continued Examination (RCE)<br/>Transmittal</b></p> <p>Address to:<br/>Mail Stop RCE<br/>Commissioner for Patents<br/>P.O. Box 1450<br/>Alexandria, VA 22313-1450</p> | Application Number     | 12/860,234         |
|                                                                                                                                                                                                                | Filing Date            | 08-20-2010         |
|                                                                                                                                                                                                                | First Named Inventor   | Claus H. Jorgensen |
|                                                                                                                                                                                                                | Art Unit               | 2614               |
|                                                                                                                                                                                                                | Examiner Name          | Nguyen, Tuan Duc   |
|                                                                                                                                                                                                                | Attorney Docket Number | 891.0013.U2(US)    |

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**  
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).
- a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
- i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_
- ii. ☐ Other \_\_\_\_\_
- b. ☒ Enclosed
- i. ☐ Amendment/Reply
- ii. ☐ Affidavit(s)/Declaration(s)
- iii. ☒ Information Disclosure Statement (IDS)
- iv. ☐ Other \_\_\_\_\_
2. Miscellaneous
- a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of \_\_\_\_\_ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
- b. ☐ Other \_\_\_\_\_
3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
- a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments to Deposit Account No. 50-1924.
- i. ☒ RCE fee required under 37 CFR 1.17(e)
- ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)
- iii. ☐ Other \_\_\_\_\_
- b. ☐ Check in the amount of \$ \_\_\_\_\_ enclosed
- c. ☐ Payment by credit card (Form PTO-2038 enclosed)

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

| SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED |                                                                                     |                  |           |
|-----------------------------------------------------|-------------------------------------------------------------------------------------|------------------|-----------|
| Signature                                           |  | Date             | 12/3/2012 |
| Name (Print / Type)                                 | Juan Juan                                                                           | Registration No. | 60,564    |

| CERTIFICATE OF MAILING OR TRANSMISSION                                                                                                                                                                                                                                                                                                                  |  |      |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|--|
| I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below. |  |      |  |
| Signature                                                                                                                                                                                                                                                                                                                                               |  |      |  |
| Name (Print / Type)                                                                                                                                                                                                                                                                                                                                     |  | Date |  |

This collection of information is required by 37 CFR 1.114. 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 1.11 and 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 the burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

| Electronic Patent Application Fee Transmittal |          |                                |        |                      |
|-----------------------------------------------|----------|--------------------------------|--------|----------------------|
| Application Number:                           |          | 12860234                       |        |                      |
| Filing Date:                                  |          | 20-Aug-2010                    |        |                      |
| Title of Invention:                           |          | PORTABLE ELECTRONIC DEVICE     |        |                      |
| First Named Inventor/Applicant Name:          |          | Claus H. Jorgensen             |        |                      |
| Filer:                                        |          | Mark F. Harrington/Elaine Mian |        |                      |
| Attorney Docket Number:                       |          | 891.0013.U2(US)                |        |                      |
| Filed as Large Entity                         |          |                                |        |                      |
| Utility under 35 USC 111(a) Filing Fees       |          |                                |        |                      |
| Description                                   | Fee Code | Quantity                       | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                 |          |                                |        |                      |
| Petition fee- 37 CFR 1.17(h) (Group III)      | 1464     | 1                              | 130    | 130                  |
| Request for continued examination             | 1801     | 1                              | 930    | 930                  |
| Pages:                                        |          |                                |        |                      |
| Claims:                                       |          |                                |        |                      |
| Miscellaneous-Filing:                         |          |                                |        |                      |
| Petition:                                     |          |                                |        |                      |
| Patent-Appeals-and-Interference:              |          |                                |        |                      |
| Post-Allowance-and-Post-Issuance:             |          |                                |        |                      |

| Description        | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
|--------------------|----------|----------|--------|----------------------|
| Extension-of-Time: |          |          |        |                      |
| Miscellaneous:     |          |          |        |                      |
| Total in USD (\$)  |          |          |        | 1060                 |



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United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

Decision Date : December 3, 2012

In re Application of :

Claus Jorgensen

### DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 12860234

Filed : 20-Aug-2010

Attorney Docket No : 891.0013.U2(US)

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed December 3, 2012, to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

**Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.**

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2656 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

| Electronic Acknowledgement Receipt          |                                |
|---------------------------------------------|--------------------------------|
| <b>EFS ID:</b>                              | 14366312                       |
| <b>Application Number:</b>                  | 12860234                       |
| <b>International Application Number:</b>    |                                |
| <b>Confirmation Number:</b>                 | 9585                           |
| <b>Title of Invention:</b>                  | PORTABLE ELECTRONIC DEVICE     |
| <b>First Named Inventor/Applicant Name:</b> | Claus H. Jorgensen             |
| <b>Customer Number:</b>                     | 10948                          |
| <b>Filer:</b>                               | Mark F. Harrington/Elaine Mian |
| <b>Filer Authorized By:</b>                 | Mark F. Harrington             |
| <b>Attorney Docket Number:</b>              | 891.0013.U2(US)                |
| <b>Receipt Date:</b>                        | 03-DEC-2012                    |
| <b>Filing Date:</b>                         | 20-AUG-2010                    |
| <b>Time Stamp:</b>                          | 14:32:44                       |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)    |

### Payment information:

|                                          |                 |
|------------------------------------------|-----------------|
| Submitted with Payment                   | yes             |
| Payment Type                             | Deposit Account |
| Payment was successfully received in RAM | \$1060          |
| RAM confirmation Number                  | 816             |
| Deposit Account                          | 501924          |
| Authorized User                          |                 |

### File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/<br>Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|
|-----------------|----------------------|-----------|-------------------------------------|------------------|------------------|

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    |                                         |                                                    |    |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|----------------------------------------------------|----|---|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Petition automatically granted by EFS              | petition-request.pdf                    | 31828<br>050275d398e2abb77fca76c4c6dc9695d77c74f5  | no | 2 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                         |                                                    |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         |                                                    |    |   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quick Path Information Disclosure Statement        | RequestunderPilotProgram-12-03-2012.pdf | 47920<br>3abf367ed97964cf26e266af633b239f23c33a6d  | no | 1 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                         |                                                    |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         |                                                    |    |   |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Information Disclosure Statement (IDS) Form (SB08) | IDS-12-03-2012.pdf                      | 76052<br>0c5218f7dceb1b77c95afb3fe53755ec3167e392  | no | 3 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                         |                                                    |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         |                                                    |    |   |
| This is not an USPTO supplied IDS fillable form                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    |                                         |                                                    |    |   |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Request for Continued Examination (RCE)            | RCE-12-03-2012.pdf                      | 62793<br>cb87022451c083b93283ca00c015fa3bcbfd98a6  | no | 1 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                         |                                                    |    |   |
| This is not a USPTO supplied RCE SB30 form.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                    |                                         |                                                    |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         |                                                    |    |   |
| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Fee Worksheet (SB06)                               | fee-info.pdf                            | 32177<br>a775ed35d29d654c7c9b283363a12450debdcc609 | no | 2 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |                                         |                                                    |    |   |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         |                                                    |    |   |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                                         | 250770                                             |    |   |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p> |                                                    |                                         |                                                    |    |   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                            |                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Doc Code: PET.AUTO<br>Document Description: Petition automatically granted by EFS-Web                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                            | PTO/SB/140<br>U.S. Patent and Trademark Office<br>Department of Commerce |
| Electronic Petition Request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)</b> |                                                                          |
| Application Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 12860234                                                                                                   |                                                                          |
| Filing Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20-Aug-2010                                                                                                |                                                                          |
| First Named Inventor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Claus Jorgensen                                                                                            |                                                                          |
| Art Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2656                                                                                                       |                                                                          |
| Examiner Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TUAN NGUYEN                                                                                                |                                                                          |
| Attorney Docket Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 891.0013.U2(US)                                                                                            |                                                                          |
| Title                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PORTABLE ELECTRONIC DEVICE                                                                                 |                                                                          |
| <p>An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.</p> <p>APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).</p> <p>A grantable petition requires the following items:</p> <p>(1) Petition fee; and</p> <p>(2) One of the following reasons:</p> <p>(a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;</p> <p>(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or</p> <p>(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).</p> |                                                                                                            |                                                                          |
| <p>Petition Fee</p> <p><input type="checkbox"/> Applicant claims SMALL ENTITY status. See 37 CFR 1.27.</p> <p><input type="checkbox"/> Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).</p> <p><input type="checkbox"/> Applicant(s) status remains as SMALL ENTITY.</p> <p><input checked="" type="checkbox"/> Applicant(s) status remains as other than SMALL ENTITY</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                            |                                                                          |
| Reason for withdrawal from issue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                            |                                                                          |



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/860,234    Confirmation No.: 9585  
Applicant(s): Claus H. Jorgensen  
Filed: 08-20-2010  
Art Unit: 2614  
Examiner: Nguyen, Tuan Duc  
Title: Portable Electronic Device  
Attorney Docket No.: 891.0013.U2 (US)  
Customer No.: 10,948

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Information Disclosure Statement

(QPIDS Pilot Program)

Sir:

The following is being submitted in compliance with the Quick Path Information Disclosure Statement (QPIDS) Pilot Program.

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

Applicant's Attorney is aware of the art cited on the enclosed Form PTO-1449. Copies of any non-U.S. patent art is/are enclosed with the Form PTO-1449 for the examiner's use.

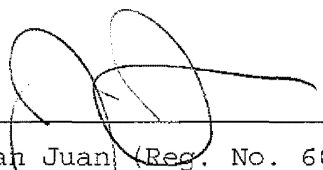
Please charge deposit account 50-1924 the amount of \$180.00 as payment for the petition fee under 37 C.F.R. §1.17(p).

Applicants' Attorney hereby petitions for consideration of this Information Disclosure Statement under 37 C.F.R. §1.97(d). Please charge any fee deficiency to deposit account 50-1924.

No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of this information disclosure statement.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to Patentability (37 C.F.R. §1.97(h)).

Respectfully submitted,

  
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Juan Juan (Reg. No. 60,564)

12/3/2012  
\_\_\_\_\_  
Date

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| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)      Serial No.: 12/860,234<br><br>Applicant(s): Claus H. Jorgensen<br><br>Filing Date: 08-20-2010      Group: 2614 |                               |                            |           |
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### (54) Hinge frame for portable computer and structure for mounting the same

(57) The present invention relates to a hinge frame for a portable computer and a structure for mounting the same. The hinge frame of the present invention comprises a frame body through which a plurality of fastening holes are perforated, a hinge fastening portion which is formed at a portion of the hinge body and to which a hinge unit is fastened, and a plurality of covering portions which are formed along an edge of the frame body and cause parts mounted on a board to be seated therein. The present invention provides the advantages of the hinge unit being more firmly fixed to the main body, improved installation strength of connectors and the like mounted on the main board, and relatively reinforcement of the main board.

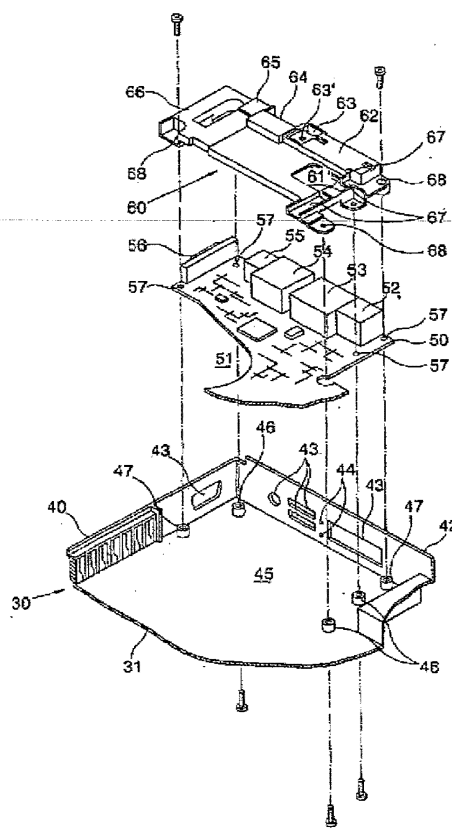


FIG. 4

EP 1 617 313 A2

## Description

**[0001]** The present invention relates to a portable computer. More particularly, the present invention relates to a hinge frame permitting a hinge assembly to be fixed to a main body of a portable computer and a structure for mounting the same.

**[0002]** A hinge frame is a component for securing a portion of a hinge assembly for allowing a display unit to be pivoted on a main body of a portable computer. In general, the hinge frame is installed in the main body of the portable computer. FIG. 1 shows the external configuration of a general portable computer of the background art. A main body 1 of the portable computer is of a generally flat parallelepiped shape, and a variety of parts of the portable computer are installed within the main body 1.

**[0003]** A bottom case 3 and a keyboard deck 4 define an external appearance of the main body 1. The bottom case 3 defines a bottom external appearance of the main body 1 and the keyboard deck 4 defines a top external appearance of the main body. A keyboard 5 is installed on the keyboard deck 4. A display unit 9 is connected to a rear end of the main body 1 via a hinge unit 7. The display unit 9 is operated such that it is folded onto or unfolded at a predetermined angle from the main body 1 about the hinge unit 7. The display unit 9 is provided with a liquid crystal panel 10.

**[0004]** FIG. 2 shows a state where hinge frames of the background art are installed within the main body of a personal computer. A main board 11 is provided in the bottom case 3. A plurality of connectors 13 and a power jack 14 are installed at a position on the main board 11 corresponding to a rear end of the bottom case 3. The connectors 13 and power jack 14 are exposed from the rear surface of the main body 1. In addition, the hinge frames 16 are provided at both sides of the rear end of the bottom case 3. The hinge frames 16 are generally fastened and fixed to the bottom case 3 together with the main board 11. A portion of the hinge unit 7 is fixed to the hinge frame 16. A radiating fan 18 is also shown in FIG. 2.

**[0005]** However, the present inventors have determined that the structure of the background art suffer from the following disadvantages. As the overall dimensions of portable computers have recently increased, the size of the display unit 9 has increased accordingly. Therefore, the weight of the display unit 9 is increased, and a load that is applied to the hinge unit 7 pivotably supporting the display unit 9 with respect to the main body 1 is also increased. Accordingly, the present inventors have determined that the hinge frame 16 for fixing the hinge unit 7 to the main body 1 must be able to support larger loads. However, the hinge frames 16 of the background art merely secure the hinge unit 7 to the main body 1, and are not sufficient to handle the increased loading that is present in the relatively larger, portable computers.

**[0006]** Since the connectors 13 and the power jack 14

are mounted on only the main board 11, the strength of the installation is relatively weak. In addition, there is the added inconvenience of an additional metal plate that should be installed to cover the connectors 13 and the power jack 14 to prevent electromagnetic waves from leaking to the surroundings through the connectors 13, the power jack 14 and the like. Furthermore, the main board 11 should be partially cut away and removed in order to prevent interference with the parts installed on the bottom case 3. Therefore, there is a further problem in that a portion adjacent to the cut-away portion is relatively narrowed and its strength is thus weakened.

**[0007]** The present invention overcomes the shortcomings associated with the background art and achieves other advantages not realized by the background art.

**[0008]** An object of the present invention is to provide a latch device that securely engages a main body and a display to each other and easily operates in relatively large portable computers.

**[0009]** Another object of the present invention is to provide a latch device that makes it possible to minimize a space required to install a latch and a plurality of hooks typically operated by a release mechanism.

**[0010]** Another object of the present invention is to provide a latch device that makes it possible to minimize the number of parts in the latch assembly.

**[0011]** One or more of these and other objects are accomplished by a hinge frame for a portable computer, comprising a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole; a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and at least one covering portion being formed along an edge of the frame body for covering parts mounted on a board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body.

**[0012]** One or more of these and other objects are accomplished by a portable computer main body comprising a bottom case including at least one fastening boss protruding from a bottom surface thereof; a board fastened to the fastening bosses of the bottom case; a hinge frame, the hinge frame having a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole; a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and at least one covering portion being formed along an edge of the frame body for covering parts mounted on the board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body; and a

hinge unit secured to the hinge frame and permitting a display unit to rotate about the hinge unit with respect to the main body.

**[0013]** One or more of these and other objects are accomplished by a portable computer comprising a bottom case including at least one fastening boss protruding from a bottom surface thereof; a display unit secured to the bottom case; a board fastened to the fastening bosses of the bottom case; a hinge frame, the hinge frame having a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole; a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and at least one covering portion being formed along an edge of the frame body for covering parts mounted on the board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body; and a hinge unit secured to the hinge frame and permitting the display unit to rotate about the hinge unit with respect to the main body.

**[0014]** One or more of these and other objects are accomplished by a method for assembling a hinge frame for a computer, wherein the hinge frame includes a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole; a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and at least one covering portion being formed along an edge of the frame body for covering a part mounted on a board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body, the method comprising securing the hinge frame to a bottom case of the computer, wherein the board is positioned between an upper surface of the bottom case and a lower surface of the hinge frame, the at least one covering portion covering the part mounted on the board.

**[0015]** One or more of these and other objects are accomplished by a hinge frame for a portable computer, comprising a frame body formed with a plurality of perforated fastening holes and a perforated portion for permitting a board positioned beneath the frame body to be exposed through the frame body; a hinge unit; a hinge fastening portion formed at a portion of the frame body to permit the hinge unit to be fastened thereto; a plurality of covering portions formed along an edge of the frame body to cause parts mounted on a board to be seated beneath the covering portions; and a reinforcing portion formed at a portion of the frame body along a periphery of the perforated portion and being fastened to the board to reinforce the board.

**[0016]** Further scope of applicability of the present invention will become apparent from the detailed description

given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the scope of the invention will become apparent to those skilled in the art from this detailed description.

**[0017]** The present invention will become more fully understood from the detailed description given hereinafter and the accompanying drawings which are given by way of illustration only, and thus are not limitative of the present invention, and wherein:

**[0018]** FIG. 1 is a perspective view showing an external configuration of a general portable computer of the background art;

**[0019]** FIG. 2 is a perspective view showing that a hinge frame of the background art installed within a main body of a portable computer;

**[0020]** FIG. 3 is a partially cut-away, perspective view showing the configuration of a portable computer having a hinge frame according to a first embodiment of the present invention;

**[0021]** FIG. 4 is a partially cut-away, exploded perspective view showing the configuration of the first embodiment of the present invention;

**[0022]** FIG. 5a is a plan view showing the configuration of the hinge frame according to the first embodiment of the present invention;

**[0023]** FIG. 5b is a rear view showing the configuration of the hinge frame according to the first embodiment of the present invention;

**[0024]** FIG. 5c is a side view showing the configuration of the hinge frame according to the first embodiment of the present invention;

**[0025]** FIG. 5d is a bottom view showing the configuration of the hinge frame according to the first embodiment of the present invention;

**[0026]** FIG. 6 is a partially cut-away, perspective view showing the configuration of a hinge frame according to a second embodiment of the present invention;

**[0027]** FIG. 7 is a partially, cut-away exploded perspective view showing the configuration of the hinge frame of the second embodiment of the present invention;

**[0028]** FIG. 8a is a plan view showing the configuration of the hinge frame according to the second embodiment of the present invention;

**[0029]** FIG. 8b is a rear view showing the configuration of the hinge frame according to the second embodiment of the present invention;

**[0030]** FIG. 8c is a side view showing the configuration of the hinge frame according to the second embodiment of the present invention;

**[0031]** FIG. 8d is a bottom view showing the configuration of the hinge frame according to the second embodiment of the present invention;

**[0032]** FIG. 9 is a partially cut-away, perspective view showing the configuration of a portable computer having

a hinge frame according to a third embodiment of the present invention;

[0033] FIG. 10 is a partially cut-away, exploded perspective view showing the configuration of the hinge frame according to the third embodiment of the present invention;

[0034] FIG. 11a is a plan view showing the configuration of the hinge frame according to the third embodiment of the present invention;

[0035] FIG. 11b is a rear view showing the configuration of the hinge frame according to the third embodiment of the present invention;

[0036] FIG. 11c is a side view showing the configuration of the hinge frame according to the third embodiment of the present invention; and

[0037] FIG. 11d is a bottom view showing the configuration of the hinge frame according to the third embodiment of the present invention;

[0038] The present invention will be described hereinafter with reference to the accompanying drawings. FIG. 3 is a partially cut-away, perspective view showing the configuration of a portable computer having a hinge frame according to a first embodiment of the present invention. FIG. 4 is a partially cut-away, exploded perspective view showing the configuration of the first embodiment of the present invention. FIG. 5a is a plan view showing the configuration of the hinge frame according to the first embodiment of the present invention. FIG. 5b is a rear view showing the configuration of the hinge frame according to the first embodiment of the present invention. FIG. 5c is a side view showing the configuration of the hinge frame according to the first embodiment of the present invention. FIG. 5d is a bottom view showing the configuration of the hinge frame according to the first embodiment of the present invention.

[0039] Referring to these figures, a bottom case 31 and a keyboard deck 33 define an external appearance of a main body 30 of the portable computer. In general, the bottom case 31 defines a bottom external appearance of the main body 30 while the keyboard deck 33 defines a top external appearance of the main body. A keyboard 34 is provided on the keyboard deck 33. A display unit 37 is connected to a rear end of the main body 30 via a hinge unit 35. The display unit 37 can be rotated about the hinge unit 35 with respect to the main body 30. The display unit 37 is generally provided with a liquid crystal panel 38 in a preferred embodiment.

[0040] A side wall 40 is provided at a rear end of a side of the bottom case 31. The side wall 40 defines a portion of a side surface of the main body 30. A rear wall 42 is provided at a rear end of the bottom case 31 such that it is connected to the rear end of the side wall 40. The rear wall 42 defines a rear surface of the main body 30. A plurality of openings 43 are formed on the side wall 40 and rear wall 42. The openings 43 are used to expose the connectors 52, 53, 54 and 56 and a power jack 55, which will be explained later, to the outside. Fastening holes 44 for fastening the hinge unit 35 are perforated

into the rear wall 42.

[0041] A plurality of fastening bosses 46 are formed in a region adjacent to a rear corner of the bottom case 31, e.g., a corner where the side wall 40 and the rear wall 42 are interconnected with each other (hereinafter, referred to as a "corner region 45"). A hole through which the bottom case 31 is fully penetrated is formed at each of the fastening bosses 46. In addition to the fastening bosses 46, a plurality of guide bosses 47 are provided at the corner region 45. Each of the guide bosses 47 is formed with a predetermined groove. Each of the guide bosses 47 supports the main board 50 to be explained later and also causes an end of a fastener, which couples the main board 50 and the hinge frame 60 with each other, to be securely seated into its groove.

[0042] The main board 50 is installed within the main body 30. A variety of parts including a central processing unit (CPU) are mounted on the main board 50. A variety of the connectors 52, 53, 54 and 56 and the power jack 55 are mounted on a corner of the main board 50 corresponding to the corner region 45. A cut-away portion 51 that is removed from the main board 50 to prevent interference with other parts is also shown.

[0043] A modem connector 52 is provided at a rear edge of the main board 50 adjacent to the rear wall 42. The modem connector 52 serves to connect a modem and a telephone. A LAN connector 53 is mounted next to the modem connector 52. The LAN connector 53 serves to connect a hub and a LAN card. A USB connector 54 is provided at the rear edge of the main board 50 to be adjacent to the LAN connector 53. The USB connector 54 serves to connect a USB device and the main board 50. A power jack 55 is also provided at the rear edge of the main board 50 and is adjacent to the USB connector 54. The power jack 55 serves to connect an external power source and the main board 50. An external monitor connector 56 is provided at a side edge of the main board 50 adjacent to the side wall 40. The external monitor connector 56 is used to transmit image information to an external monitor.

[0044] In addition, a plurality of fastening holes 57 are formed on the region of the main board where the connectors 52, 53, 54 and 56 and the power jack 55 are mounted. The fastening holes 57 are perforated at positions corresponding to the fastening bosses 46 and guide bosses 47. The fastening holes 57 are used for the fastening of the bottom case 31 and the hinge frame 60 to be explained later.

[0045] The hinge frame 60 is used to secure the hinge unit 35 to the main body 30. The hinge frame 60 also covers the connectors and power jack 52, 53, 54, 55 and 56 and reinforces the main board 50 in addition to securing the hinge unit 35. The hinge frame 60 is fastened and secured to the main board 50 and the bottom case 31.

[0046] FIGs. 5A to 5D show in detail the configuration of the hinge frame 60. It is preferred that a frame body 61 of the hinge frame 60 be made of a metal material to provide a desired strength and/or to shield electromag-

netic waves. However, if the function of shielding electromagnetic waves is not required, the frame body 61 may be molded from a synthetic resin.

**[0047]** The frame body 61 is formed with a perforated portion 61' at a certain position thereof. The perforated portion 61' is formed by vertically perforating the frame body 61 and used to allow the parts installed on the main board 50 to be exposed to the outside when the frame body 61 is mounted on the main board 50. The size, the position, etc. of the perforated portion 61' should vary with the positions of parts mounted on the main board 50.

**[0048]** A first covering portion 62 is provided at a certain position on the frame body 61. The first covering portion 62 is formed in such a manner that it protrudes at a top face of the frame body 61 and appears as a recess with respect to a bottom face of the frame body. The first covering portion 62 is open toward the opening 43 of the rear wall 42 and the bottom of the frame body 61. The first covering portion 62 serves to cover the modem connector 52 and the LAN connector 53. Accordingly, the modem and LAN connectors 52 and 53 mounted on the main board 50 are seated in the first covering portion 62. When the frame body 61 is fastened to the main board 50, the modem and LAN connectors 52 and 53 are firmly positioned in a space defined by the main board 50 and the first covering portion 62 of the frame body 61.

**[0049]** A hinge fastening portion 63 is provided at a position adjacent to the first covering portion 62. The hinge unit 35 is fastened to the hinge fastening portion 63. A plurality of fastening holes 63' are perforated through the hinge fastening portion 63.

**[0050]** A second covering portion 64 is formed at a position adjacent to the hinge fastening portion 63. The second covering portion 64 serves to cover the USB connector 54. The second covering portion 64 is also formed in such a manner that it protrudes at the top face of the frame body 61 and appears as a recess with respect to the bottom face of the frame body. A tip end of the second covering portion 64 is formed to be relatively inwardly recessed such that it can be open toward a top face of the frame body. The second covering portion 64 is also open toward the rear wall 42 such that the USB connector 54 is exposed to the outside.

**[0051]** A third covering portion 65 is formed next to the second covering portion 64. The third covering portion 65 serves to cover the power jack 55. The third covering portion 65 is formed in such a manner that it includes a recess facing toward the bottom face of the frame body 61 and opens toward the rear wall 42.

**[0052]** A fourth covering portion 66 is provided at a position on the frame body 61 corresponding to the side wall 40. The fourth covering portion 66 serves to cover the external monitor connector 56. The fourth covering portion 66 is also formed in such a manner that it protrudes at the top face of the frame body 61 and is recessed at the bottom face of the frame body. The fourth covering portion 66 is open toward the side wall 40 such

that the external monitor connector 56 can be exposed to the outside through the opening 43 of the side wall 40.

**[0053]** In addition, a cable passage 67 is formed in the frame body 61. The cable passage 67 is formed along a portion on a top surface of the frame body 61. The cable passage 67 is formed by causing the top surface of the frame body 61 to be recessed. A protrusion 67' is formed at a certain position along the cable passage 67. The protrusion 67' prevents cables from inadvertently escaping out of the cable passage 67. The cables provide the electrical connection between the main body 30 and the display unit 35 pass through the cable passage 67.

**[0054]** A plurality of fastening holes 68 are perforated through the frame body 61. The fastening holes are used to fasten the hinge frame 60 to the main board 50 or bottom case 31. The fastening holes are formed at positions where the covering portions 62, 64, 65 and 66 are not formed, by vertically perforating the frame body 61. In particular, since the frame body 61 requires a space for defining the covering portions 62, 64, 65 and 66, the fastening holes 68 are perforated at the positions where the top surface of the frame body 61 is relatively depressed. The fastening holes 68 are formed at the positions corresponding to the fastening holes 57 on the main board 50.

**[0055]** FIGs. 6 to 8D show a second embodiment of the present invention. Referring to these figures, a bottom case 131 and a keyboard deck 133 define an external appearance of a main body 130 of the portable computer, and a keyboard 134 is provided on a top surface of the keyboard deck 133.

**[0056]** A display unit 137 is connected to a rear end of the main body 130 via a hinge unit 135. The hinge units 135 are generally provided at both sides of the rear end of the main body 130. The display unit 137 can be rotated about the hinge units 135 with respect to the main body 130. The display unit 137 is generally provided with a liquid crystal panel 138.

**[0057]** A side wall 140 is provided at a rear end of a side of the bottom case 131. The side wall 140 defines a portion of a side surface of the main body 130. A locking hole 141 is provided at a position adjacent to a rear end of the side wall 140. The locking hole 141 is a part where a fastener is fixed, e.g., such as so-called Kensington lock.

**[0058]** A rear wall 142 is provided at the rear end of the bottom case 131 such that it is connected to the rear end of the side wall 140. The rear wall 142 defines a rear surface of the main body 130. A plurality of openings 143 are formed on the side wall 140 and rear wall 142. The openings 143 are used to expose jacks 152 and 153 and a connector 154, which will be explained later, to the outside. Fastening holes 144 for fastening the hinge unit 135 are perforated into the rear wall 142.

**[0059]** A plurality of fastening bosses 146 are formed in a region adjacent to a rear corner of the bottom case 131, i.e. a corner region 145 where the side wall 140 and the rear wall 142 are interconnected with each other. A

hole through which the bottom case 131 is fully penetrated is formed at each of the fastening bosses 146.

[0060] In addition to the fastening bosses 146, a plurality of guide bosses 147 are provided at the corner region 145. Each of the guide bosses 147 opens upwardly and is formed with a predetermined groove, and accepts a tip end of the fastener for fastening a board 150 and a hinge frame 160 to each other for securely seating the fastener within the guide bosses 147.

[0061] Furthermore, the board 150 is installed within the main body 130. A variety of parts are mounted on the board 150. The board 150 may be, for example, a portion of the main board 150 or an additional board separated from the main board 50.

[0062] An audio jack 152 is connected to edge of the board 150 corresponding to the rear wall 142. The audio jack 152 serves to input/output audio signals. A super video jack 153 is provided next to the audio jack 152. The super video jack 153 serves to input/output video signals. A USB connector 154 is provided at another edge of the board 150 corresponding to the side wall 140. The USB connector 154 serves to connect a USB device and the main body 130. Fastening holes 157 permitting the board 150 to be fastened to the bottom case 131 or hinge frame 160 are formed in the board 150.

[0063] The hinge frame 160 is used to secure the hinge unit 135 to the main body 130. The hinge frame 160 also covers the jacks and connector 152, 153 and 154 and reinforces the main board 150 in addition to fixing the hinge unit 135. The hinge frame 160 is fastened and fixed to the board 150 and the bottom case 131.

[0064] FIGs. 8A to 8D show in detail the configuration of the hinge frame 160. It is preferred that a frame body 161 of the hinge frame 160 be made of a metal material to provide a desired strength and/or to shield electromagnetic waves. However, if the function of shielding electromagnetic waves is not required, the frame body 161 may be molded from a synthetic resin.

[0065] The frame body 161 is formed with a perforated portion 161'. The perforated portion 161' is formed by vertically perforating the frame body 161 and used to allow the parts installed on the main board 150 to be exposed to the outside when the frame body 161 is mounted on the main board 150. Although a preferred relative sizing and positioning is shown in the enclosed drawings, it will be appreciated that the size, the position, etc. of the perforated portion 161' should vary with the positions of parts mounted on the main board 50.

[0066] A first covering portion 162 is provided at a certain position on the frame body 161. The first covering portion 162 is formed in such a manner that it is recessed into top and bottom surfaces of the frame body 161. This is because the height of audio jack 152 covered by the first covering portion 162 is relatively low. The first covering portion 162 opens toward the opening 143 of the rear wall 142 and the bottom of the frame body 161. The audio jack 152 mounted on the board 150 is securely seated in the first covering portion 162. Therefore, when

the frame body 161 is fastened to the board 150, the audio jack 152 is firmly positioned in a space defined by the board 50 and the first covering portion 162 of the frame body 161.

[0067] A hinge fastening portion 163 is provided at a position adjacent to the first covering portion 162. The hinge unit 135 is fastened to the hinge fastening portion 163. A plurality of fastening holes 163' are perforated through the hinge fastening portion 163 for securing the hinge unit 135 to the hinge fastening portion 163.

[0068] A second covering portion 164 is formed at a position adjacent to the first covering portion 161 but opposite to the hinge fastening portion 163. The second covering portion 164 serves to cover the super video jack 153. The second covering portion 164 is formed in such a manner that it protrudes at the top face of the frame body 61 and is recessed at the bottom face of the frame body. The second covering portion 164 is also open toward the rear wall 142 such that the super video jack 153 is exposed to the outside through the opening 143.

[0069] A locking hole reinforcing portion is provided at a side of the frame body 161 corresponding to the side wall 140. The locking hole reinforcing portion 165 is formed with a locking hole 165' at a position corresponding to the locking hole 141. Therefore, a protrusion of the lock, e.g., a Kensington lock, introduced into the hinge frame through the locking hole 141 is hooked in the locking hole 165' of the locking hole reinforcing portion 165 made of a metal material.

[0070] A third covering portion 166 is formed at the side of the frame body 161 corresponding to the side wall 140. The third covering portion 166 serves to cover the USB connector 154. The third covering portion 166 is also formed in such a manner that it protrudes at the top face of the frame body 161 and is recessed at the bottom face of the frame body 161. The third covering portion 166 is open toward the side wall 140 such that USB connector 154 can be exposed to the outside through the opening 143 of the side wall 140. A portion of a tip end of the third covering portion 166 is formed to be relatively inwardly retracted or recessed.

[0071] A plurality of fastening holes 168 are perforated through the frame body 161. The fastening holes are used to fasten the hinge frame body 160 to the board 150 or bottom case 131. The fastening holes are formed at positions where the covering portions 162, 164 and 166 are not formed, by vertically perforating the frame body 161. In particular, since the frame body 161 requires a space for defining the covering portions 162, 164 and 166, the fastening holes 168 are formed at the positions where the top surface of the frame body 161 is relatively depressed. Of course, the position or height of the fastening holes 168 may vary with an internal shape of the bottom case 131.

[0072] Next, a third embodiment of the present invention will be described with reference to FIGs. 9 to 11. In this embodiment, a bottom case 231 and a keyboard deck 233 define an external appearance of a main body 230

of the portable computer. In general, the bottom case 231 defines a bottom external appearance of the main body 230 while the keyboard deck 233 defines a top external appearance of the main body 230. A keyboard 234 is provided on the keyboard deck 233.

[0073] A display unit 237 is connected to a rear end of the main body 230 via a hinge unit 235. The display unit 237 can be rotated about the hinge unit 235 with respect to the main body 230. The display unit 237 is generally provided with a liquid crystal panel 238. A side wall 240 is provided at a rear end of a side of the bottom case 231. The side wall 240 defines a portion of a side surface of the main body 230. A rear wall 242 is provided at a rear end of the bottom case 231 such that it is connected to the rear end of the side wall 240. The rear wall 242 defines a rear surface of the main body 230. A plurality of openings 243 are formed on the side wall 240 and rear wall 242. The openings 243 are used to expose connectors 252 and 253 and a power jack 254, which will be explained later, to the outside. Fastening holes 244 for fastening the hinge unit 235 are perforated into the rear wall 242.

[0074] A plurality of first fastening bosses 246 and second fastening bosses 247 are formed in a region adjacent to a rear corner of the bottom case 231, i.e. a corner where the side wall 240 and the rear wall 242 are interconnected with each other (hereinafter, referred to as a "corner region 245"). A threaded portion is formed at inner circumferential surface of each of the first fastening bosses 246, while a through hole is vertically formed at each of the second fastening bosses 247. A fastener extends from a bottom face to a top face of the bottom case 231 through each second fastening boss 247 such that the bottom case 231 is fastened to the keyboard deck 233.

[0075] A plurality of guide bosses 248 are also provided at the corner region 245 of the bottom case 231. Each of the guide bosses 248 is formed with a predetermined upward groove. A portion of the fastener that causes a board 250 and hinge frame 260 to be fastened to each other is securely seated into the groove.

[0076] Furthermore, the main board 250 is installed within the main body 230. A variety of parts including a central processing unit (CPU) are mounted on the main board 250. The connectors 252 and 253 and power jack 254 are mounted on the corner of the main board 250 corresponding to the corner region 245. A cut-away portion 251 that is removed from the main board 250 to prevent interference with other parts.

[0077] A connector 252 is provided at a rear edge of the main board 250 adjacent to the rear wall 242. Different connectors may be used as the connector 252 depending on design requirements. For example, either a separate LAN connector or modem connector or a connector in which the two connectors are integrated may be installed. Reference numeral 253 denotes a USB connector that is exposed to the side wall 240 and provided on the main board 250.

[0078] A power jack 254 is mounted at the rear edge

of the main board 250 adjacent to the connector 252 such that it is exposed to the opening 243 of the rear wall 242. The power jack 254 serves to connect an external power source and the main board 250. In addition, a plurality of fastening holes 257 are formed on the region of the main board where the connectors 252 and 253 and the power jack 254 are mounted. The fastening holes 257 are perforated at positions corresponding to the first and second fastening bosses 246 and 247 and the guide bosses 248. Each of the first fastening bosses 246 is a part where the fastener, which passes through the main board 250 and the hinge frame 260, is fastened. Each of the second fastening bosses 247 is a part that allows the fastener to pass through the main board 250 and the hinge frame 260 from the bottom of the bottom case 231 such that the fastener can be fastened to a bottom surface of the keyboard deck 233.

[0079] The hinge frame 260 is used to fix the hinge unit 235 to the main body 230. The hinge frame 260 also performs the functions of covering the connectors and power jack 252, 253 and 254 and reinforcing the main board 250 in addition to fixing the hinge unit 235. The hinge frame 260 is fastened and fixed to the main board 250 and the bottom case 231.

[0080] FIGs. 11A to 11D show in detail the configuration of the hinge frame 260. It is preferred that a frame body 261 of the hinge frame 260 be made of a metal material. This is because the hinge frame can have certain strength and perform a function of shielding electromagnetic waves. However, if the function of shielding electromagnetic waves is not required, the frame body 261 may be molded from a synthetic resin.

[0081] The frame body 261 is formed with a perforated portion 261' at a certain position thereof. The perforated portion 261' is formed by vertically perforating the frame body 261 and used to reduce the weight of hinge frame 260 as well as to allow the parts installed on the main board 250 to be exposed to the outside when the frame body 261 is mounted on the main board 250. The size, the position, etc. of the perforated portion 261' should vary with the positions of parts mounted on the main board 250.

[0082] A first covering portion 262 is provided at a certain position on the frame body 261. The first covering portion 262 is formed along the top surface and side surfaces of the connector 252 with a constant width. The first covering portion 262 is open at a rear edge of the frame body 261, i.e. toward the rear wall 242, and also communicates with the perforated portion 261'. Further, the first covering portion 262 is open toward the top surface of the main board 250. The first covering portion 262 is formed in such a manner that it protrudes at a top face of the frame body 261 and is recessed at a bottom face of the frame body 261.

[0083] The first covering portion 262 serves to hold or support the connector 252 on the main board 250 not to inadvertently move thereon. That is, when the frame body 261 is fastened to the main board 250, the connector 252

is firmly positioned in a space defined by the main board 250 and the first covering portion 262 of the frame body 261.

[0084] A hinge fastening portion 263 is provided at a position adjacent to the first covering portion 262. The hinge unit 235 is fastened to the hinge fastening portion 263. A plurality of fastening holes 263' are perforated through the hinge fastening portion 263 such that the hinge unit 235 is fastened with the fastener.

[0085] A second covering portion 264 is formed at a position adjacent to the hinge fastening portion 263. The second covering portion 264 serves to cover the power jack 254. The second covering portion 264 is formed in such a manner that it protrudes at the top face of the frame body 261 and is recessed at the bottom face of the frame body 261 (i.e., a surface facing the main board 250). A through hole 264' is formed on a top surface of the second covering portion 264. The hole 264' serves to reduce the weight of the hinge frame 260. The second covering portion 264 is also open toward the rear wall 242, and thus, the power jack 254 can be exposed to the outside through the opening 243.

[0086] A locking hole reinforcing portion 265 is formed to extend from the second covering portion 264. The locking hole reinforcing portion 265 serves to reinforce a locking hole 240' perforated through the side wall 240. The locking hole 240' is a part in which a protrusion of a locking mechanism for locking the portable computer to the furniture or desk is hooked. The locking hole reinforcing portion 265 is seated in a rear surface of the rear wall 240 with the locking hole 240' perforated therethrough so as to reinforce the locking hole 240'. The locking hole reinforcing portion 265 is formed with a locking hole 265' at a position corresponding to the locking hole 240'.

[0087] A board reinforcing portion 266 is further provided at a position on the frame body 261 opposite to the locking hole reinforcing portion 265. The board reinforcing portion 266 is fastened to the main board 250 and serves to reinforce the fastened portion of the main board 250. In this embodiment, the board reinforcing portion 266 is fastened to a portion of which a width of the main board is relatively reduced in the main board 250 by way of a cut-away portion 251, and thus, reinforces the strength in the narrow portion.

[0088] In addition, a cable passage 267 is formed in the frame body 261. The cable passage 267 is formed along a portion on a top surface of the frame body 261. The cable passage 267 is formed by causing the top surface of the frame body 261 to be recessed. Protrusions 267' are formed at regular intervals along opposite lateral sides of the cable passage 267. The protrusions 267' are preferably formed alternately at the opposite sides of the cable passage 267. The cable passage 267 prevents cables from inadvertently escaping out of the cable passage 267. The cables for electrical connection between the main body 230 and the display unit 235 pass through the cable passage 267.

[0089] A plurality of fastening holes 268 are perforated

through the frame body 261. The fastening holes 268 are used to fasten the hinge frame 260 to the main board 250 or bottom case 231. The fastening holes 268 are formed at regions out of the covering portions 262 and 264, the perforated portion 261' and the like, by vertically perforating the frame body 261. In particular, since the frame body 261 requires a space for defining the covering portions 262 and 264, the fastening holes 268 are perforated at the positions where the top surface of the frame body 61 is relatively depressed. The fastening holes 268 are formed at the positions corresponding to the fastening holes 257 on the main board 250.

[0090] A hinge cap catching portion 269 is provided on a top surface of the first covering portion 262 of the frame body 261. The hinge cap catching portion 269 is a part in which an end of a hinge cap (not shown) for preventing the hinge unit 235 from being exposed to the outside of the main body 230 is hooked.

[0091] Hereinafter, the operation of the hinge frame and the structure and method for mounting the same according to the respective preferred embodiments of the present invention configured as above will be described in detail with reference to the accompanying drawings.

[0092] First, it is described how to fasten the hinge frame 60 to the main board 50 and bottom case 31 in accordance with the first embodiment of the present invention. The hinge frame 60 is first mounted to the main board 50. The hinge frame 60 is securely seated on the main board 50 in such a manner that the first covering portion 62 covers the modem connector 52 and LAN connector 53, the second covering portion 64 covers the USB connector 54, the third covering portion 65 covers the power jack 55, and the fourth covering portion 66 covers the external monitor connector 56.

[0093] Then, the external monitor connector 56 is fastened to the hinge frame 60 via connector fastening holes 66'. The main board 50 with the hinge frame 60 seated thereon is also seated onto the bottom case 31. At this time, a bottom surface in the corner region of the main board 50 is supported by the fastening bosses 46 and the guide bosses 47.

[0094] Next, the relevant fasteners are fastened into the fastening holes 68 of the hinge frame 60 and the fastening holes 57 of the main board corresponding to the guide bosses 47. A tip end of the fastener is seated in the groove of the boss 47.

[0095] Furthermore, the other fasteners are fastened to the main board 50 and the hinge frame 60 through the fastening bosses 46 from the bottom of the bottom case 31. Therefore, the bottom case 31, the main board 50 and the hinge frame 60 are sequentially fastened with one another by the fasteners passing through the fastening bosses 46. Accordingly, since the main board 50 is fastened with either the hinge frame 60 or the bottom case 31 and hinge frame 60, its strength can be enhanced.

[0096] Then, a portion of the hinge unit 35 is fastened to the hinge fastening portion 63 of the hinge frame 60.

The hinge unit 35 is fastened simultaneously to the hinge frame 60 and the bottom case 31 by means of the fasteners that pass through the fastening holes 44 formed on the rear wall 42 of the bottom case 31. The portion of the hinge unit 35 is also fastened on a top surface of the hinge frame 60.

**[0097]** As described above, since the hinge frame 60 is fastened to the main board 50 and bottom case 31, the connectors 52, 53, 54 and 56 and the power jack 55 are covered with the hinge frame 60. Further, since the connectors and power jack are positioned between the main board 50 and hinge frame 60 which are substantially integrally formed with each other, their mounting strength is relatively increased. Since it is made of a metal material, the hinge frame also serves to prevent electromagnetic waves from being radiated to the outside through the connectors 52, 53, 54 and 56 and the power jack 55.

**[0098]** Next, the operation of the second embodiment will be described. The board 50 is seated on the fastening bosses 146 and the guide bosses 147 in the corner region 145. Then, the hinge frame 160 is seated on the board 150. At this time, the audio jack 153 is covered with the first covering portion 162 of the hinge frame 160, the super video jack 153 is covered with the second covering portion 164 of the hinge frame 160, and the USB connector 154 is covered with the third covering portion 166 of the hinge frame 160.

**[0099]** After the hinge frame 160 is seated on the board 150 as described above, the fasteners are fitted into the fastening holes 168 corresponding to the guide bosses 147 such that the hinge frame 160 and the board 150 are fastened with each other. Then, the hinge unit 135 is mounted and fastened onto the hinge frame 160. The hinge unit 135 is fastened onto the hinge fastening portion 163 of the hinge frame 160. That is, the fasteners are fastened to the hinge fastening portion 163 from the top of the hinge frame 160 through the hinge unit 135. In addition, other fasteners are installed through the hinge fastening holes 144 formed on the rear wall 142 such that the bottom case 131, the hinge frame 160 and the board 150 are integrally fastened with one another.

**[0100]** The hinge frame 260 can also be fastened to the main board 250 and the bottom case 231 in accordance with the third embodiment of the present invention. The hinge frame 260 is first mounted on the main board 250. In other words, the hinge frame 260 is seated onto the main board 250 in such a manner that the connector 252 is covered with the first covering portion 262 of the hinge frame 260 and the power jack 254 is covered with the second covering portion 264 of the hinge frame 260.

**[0101]** Then, the fasteners are fastened into the fastening holes 257 and 268 of the main board 250 and hinge frame 260 corresponding to the guide bosses 248. That is, the fasteners are fastened into the fastening holes 257 and 258 of the main board 250 and hinge frame 260 from the bottom of the main board 250. Thereafter, the main board 250 with the hinge frame 260 seated thereon is seated onto the bottom case 231. At this time, a

bottom surface of the main board 250 corresponding to the corner region 245 is supported by the fastening bosses 246 and 247 and the guide bosses 248.

**[0102]** Other fasteners are fastened through the fastening holes 268 and 257 of the hinge frame 260 and the main board 250 corresponding to the first fastening bosses 246 in a state where the main board 250 is seated on the bottom case 231. At this time, the fasteners are fastened into the first fastening bosses 246 through the main board 250 from the hinge frame 260.

**[0103]** In a state where the keyboard deck 233 is prefabricated to the bottom case 231, the bottom case 231, main board 250, hinge frame 260 and keyboard deck 233 are fastened with one another through the second fastening bosses 247. In other words, the bottom case 231, main board 250, hinge frame 260 and keyboard deck 233 are fastened with one another at one time by fastening the fasteners into the second fastening bosses from the bottom of the bottom case 231.

**[0104]** Accordingly, the locking hole reinforcing portion 265 is placed at the rear surface of the side wall 240 with the locking hole 240' provided thereon. At this time, the locking holes 240' and 265' of the side wall 240 and locking hole reinforcing portion 265 are aligned with and communicate with each other.

**[0105]** In addition, the cables are placed in the cable passage 267. The cables connect between the main body 230 and the display unit 237. The protrusions 267' prevent cables from being escaped inadvertently from the cable passage 267. Further, a portion of the hinge unit 235 is fastened to the hinge fastening portion 263 of the hinge frame 260. The hinge frame 260 are fastened simultaneously to the hinge frame 260 and bottom case 231 by the fasteners that pass through the hinge fastening holes 244 formed on the rear wall 242 of the bottom case 231. The portion of the hinge unit 235 is also fastened on a top surface of the hinge frame 260. Then, a hinge cap is hooked onto a hinge cap catching portion 269 such that the hinge unit 235 is not exposed to the outside.

**[0106]** As described above, since the hinge frame 260 is fastened to the main board 250, bottom case 231 and keyboard deck 233, the connectors 252 and 253 and the power jack 254 are covered with the hinge frame 260. Further, since the connectors and power jack are positioned between the main board 250 and hinge frame 260 which are substantially integrally formed with each other, their mounting strength is relatively increased.

**[0107]** Further, since the board reinforcing portion 266 of the hinge frame 260 is fastened to both the first and second fastening bosses 246 and 247, it is substantially fastened to the bottom case 231, keyboard deck 233, and main board 250. Therefore, the strength of the fastened portions of the main board 250 is relatively increased.

**[0108]** Since the hinge frame 260 is also made of a metal material, it also serves to prevent electromagnetic waves from being radiated to the outside through the

connectors 252 and 253 and the power jack 254. The hinge frame for a portable computer and structure for mounting the same according to the present invention configured as described above in detail has the following advantages.

[0109] Since the hinge frame is coupled with the board and bottom case over a relatively large region, the magnitude of load that is held or supported by the hinge unit fixed to the hinge frame becomes relatively large. Therefore, there is an advantage in that the hinge unit to which large load is applied due to the display unit of the large portable computer can be more firmly fixed to the main body.

[0110] Further, since a plurality of covering portions are provided in the hinge frame, the connectors and jack mounted on the board can be more firmly fixed by simply fastening the hinge frame onto the board. Therefore, there is another advantage in that the strength of the connectors and jack to be mounted on the board is relatively enhanced, and thus, endurance and reliability of the products are improved.

[0111] Furthermore, since the connectors and jack mounted on the board are covered with the hinge frame made of a metal material, electromagnetic waves can be prevented from being leaked out through the connectors and jack.

[0112] Moreover, since the hinge frame is fastened simultaneously to the board and bottom case, there is a further advantage in that board strength can be reinforced. Finally, since the hinge frame has a variety of functions as described above, a single hinge frame can be substituted for several parts or components. Therefore, there is a still further advantage in that the number of parts of the portable computer can be minimized.

## Claims

1. A hinge frame for a portable computer, comprising:

a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole;  
a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and  
at least one covering portion being formed along an edge of the frame body for covering parts mounted on a board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body.

2. The hinge frame according to claim 1, wherein the frame body is made of a metal material or a synthetic

resin.

3. The hinge frame according to claim 1 or 2, wherein the at least one fastening hole is formed in a portion of the upper surface of the frame body not including the at least one covering portion.

4. The hinge frame according to claim 1, 2, or 3, further comprising a cable passage for guiding a cable provided along a side of the frame body.

5. The hinge frame according to claim 4, wherein the cable passage is formed as a recessed portion along the upper surface of the frame body.

6. The hinge frame according to any of claims 1 to 5, wherein the raised surface of the at least one covering portion protrudes upwardly away from the upper surface.

7. The hinge frame according to any of claims 1 to 6, further comprising a locking hole reinforcing portion having a locking hole formed therein, the locking hole reinforcing portion being provided at a portion of the frame body.

8. A portable computer main body comprising:

a bottom case including at least one fastening boss protruding from a bottom surface thereof;  
a board fastened to the fastening bosses of the bottom case;

a hinge frame, the hinge frame having a frame body having an upper surface and a lower surface, the frame body being formed with at least one perforated fastening hole;  
a hinge fastening portion being formed at a portion of the frame body and being capable of receiving a hinge unit fastened on the upper surface thereto; and

at least one covering portion being formed along an edge of the frame body for covering parts mounted on the board positioned beneath the lower surface of the frame body, wherein the at least one covering portion includes a raised surface protruding to a first side of the frame body and a recess facing toward an opposite side of the frame body; and  
a hinge unit secured to the hinge frame and permitting a display unit to rotate about the hinge unit with respect to the main body.

9. The main body according to claim 8, wherein the hinge frame is seated on a corner region of the board adjacent to a corner of the bottom case where a side wall and rear wall of the bottom case interconnect with each other, and the at least one covering portion opens toward an opening formed in either the side

wall or the rear wall to permit a part of the board covered with the at least one covering portion to be exposed to the exterior of the main body.

10. The main body according to claim 9, further comprising a plurality of the fastening bosses formed with fastening holes vertically perforating the fastening bosses, and fasteners are fastened to the hinge frame from a bottom of the bottom case.
11. The main body according to claim 10, further comprising a plurality of guide bosses formed on the corner region adjacent to the fastening bosses on the bottom case, wherein each of the guide bosses is formed with a groove into which a fastener for securing the hinge frame and the board together is seated.
12. The main body according to any of claims 8 to 11, wherein the hinge frame is made of a metal material or a synthetic resin.
13. The main body according to any of claims 8 to 12, further comprising a cable passage for guiding a cable along a side of the hinge frame.
14. The main body according to any of claims 8 to 13, further comprising a locking hole reinforcing portion, the locking hole reinforcing portion having a locking hole at a portion of the hinge frame.
15. The main body according to any of claims 8 to 14, further comprising a perforated portion in the upper surface of the frame body for reducing a weight of the hinge frame.
16. The main body according to any of claims 8 to 15, further comprising a reinforcing portion formed in the frame body for securing the hinge frame to the board.
17. A portable computer comprising:
  - a portable computer main body according to any of claims 8 to 16; and
  - a display unit secured to the bottom case of the main body.
18. A method for assembling a hinge frame according to claim 1 for a computer, the method comprising:
  - securing the hinge frame to a bottom case of the computer, wherein the board is positioned between an upper surface of the bottom case and a lower surface of the hinge frame, the at least one covering portion covering the part mounted on the board.
19. The method according to claim 18, further comprising:

ing securing the hinge frame to a wall of the bottom case with a locking hole formed in a locking hole reinforcing portion of the hinge frame.

20. A hinge frame for a portable computer, comprising:
  - a frame body formed with a plurality of perforated fastening holes and a perforated portion for permitting a board positioned beneath the frame body to be exposed through the frame body;
  - a hinge unit;
  - a hinge fastening portion formed at a portion of the frame body to permit the hinge unit to be fastened thereto;
  - a plurality of covering portions formed along an edge of the frame body to cause parts mounted on a board to be seated beneath the covering portions; and
  - a reinforcing portion formed at a portion of the frame body along a periphery of the perforated portion and being fastened to the board to reinforce the board.
21. The hinge frame according to claim 20, wherein the frame body is made of a metal material or a synthetic resin, and the fastening holes are formed at positions in the frame body not including the covering portions and the perforated portion.
22. The hinge frame according to claim 20 or 21, wherein the fastening holes are formed at positions in the frame body not including the covering portions and the perforated portion, the covering portions and the fastening holes being positioned along the periphery of the perforated portion.
23. The hinge frame according to claim 20, 21, or 22, wherein a cable passage for guiding a cable is further provided along a side of the frame body, and protrusions for holding the cable in the cable passage are formed alternately along opposite lateral sides of the cable passage.
24. The hinge frame according to any of claims 20 to 23, further comprising a locking hole reinforcing portion with a locking hole formed therein, the locking hole reinforcing portion being formed at a portion of the frame body.
25. The hinge frame according to any of claims 20 to 24, wherein a first covering portion of the hinge frame includes a hinge cap catching portion for securing a hinge cap.

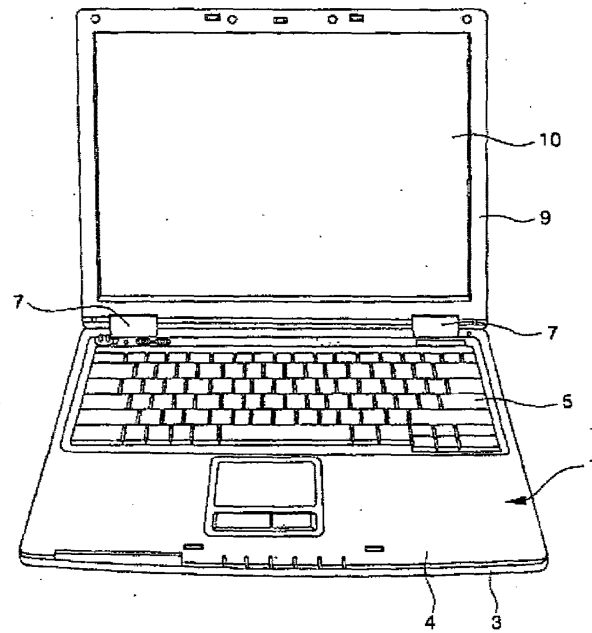


FIG. 1  
BACKGROUND ART

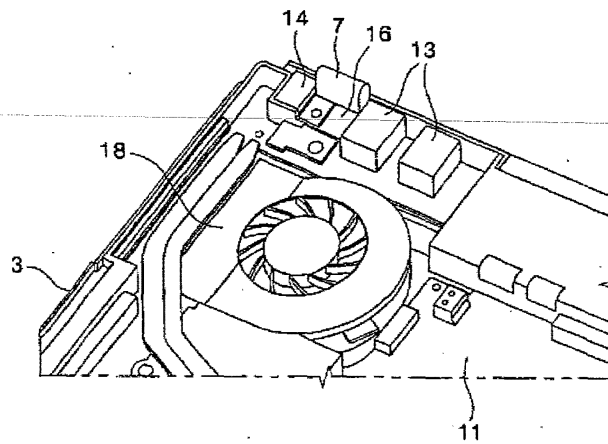


FIG. 2  
BACKGROUND ART

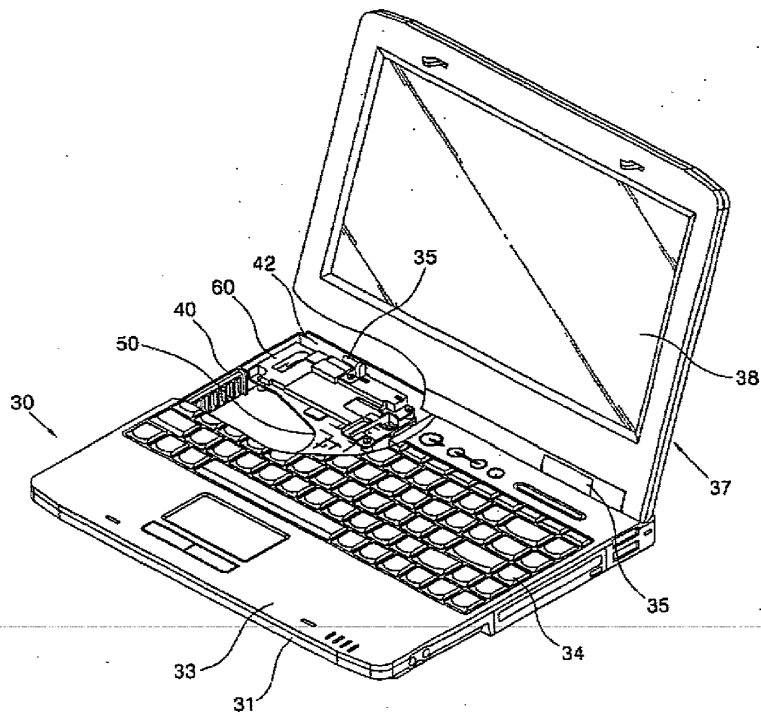


FIG. 3

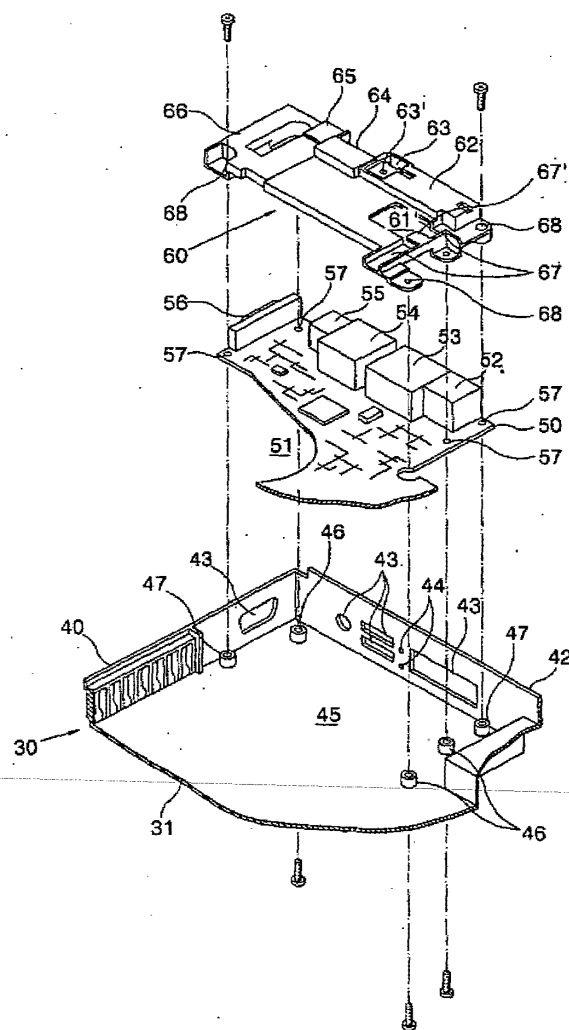


FIG. 4

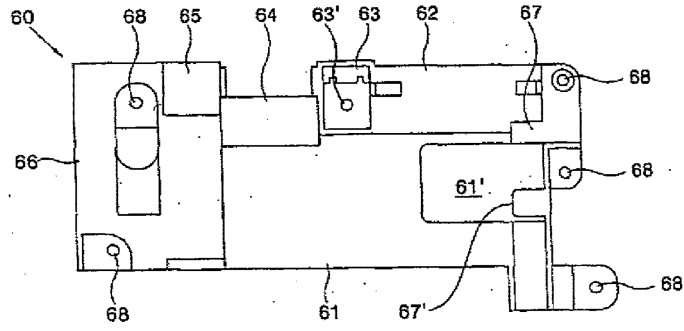


FIG. 5A

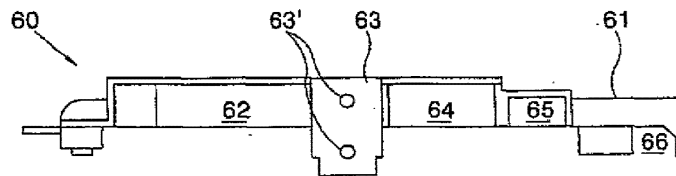


FIG. 5B

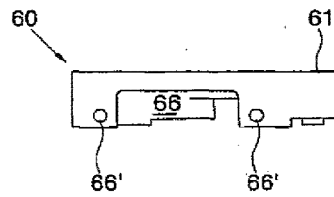


FIG. 5C

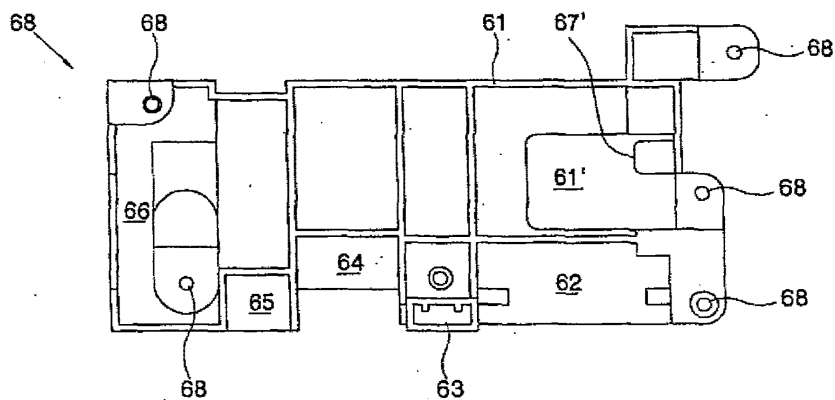


FIG. 5D

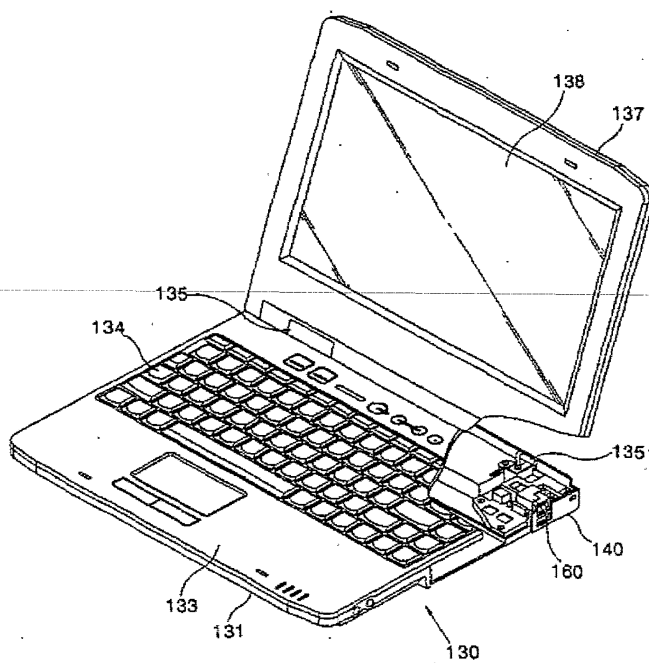


FIG. 6

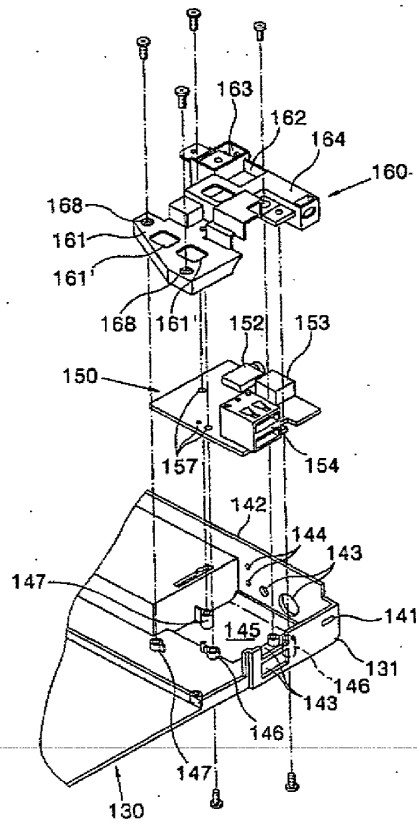


FIG. 7

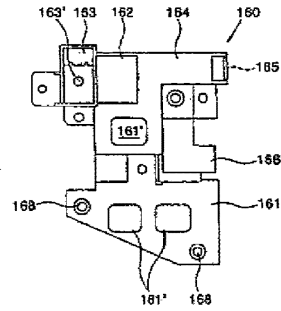


FIG. 8A

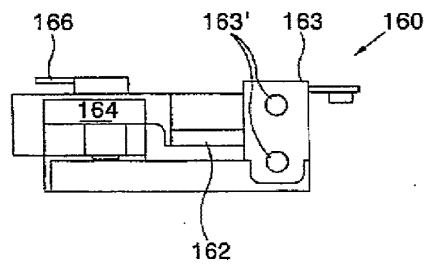


FIG. 8B

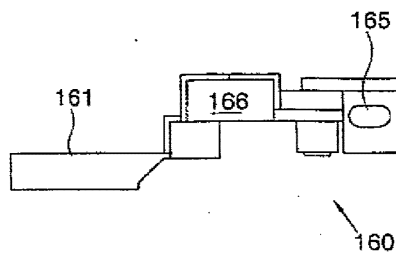


FIG. 8C

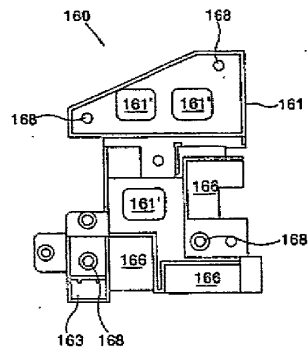


FIG. 8D

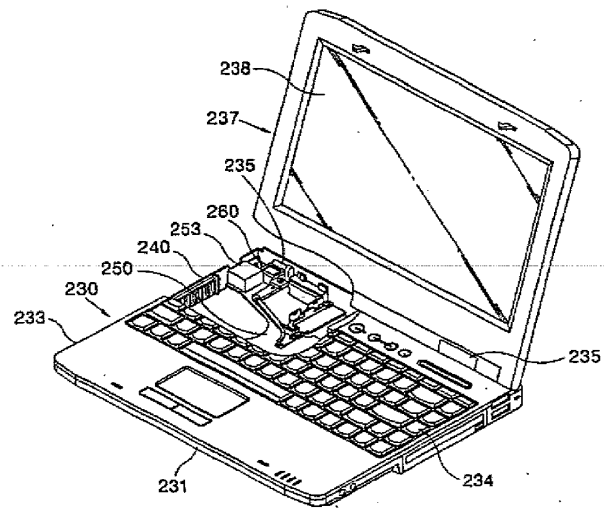


FIG. 9

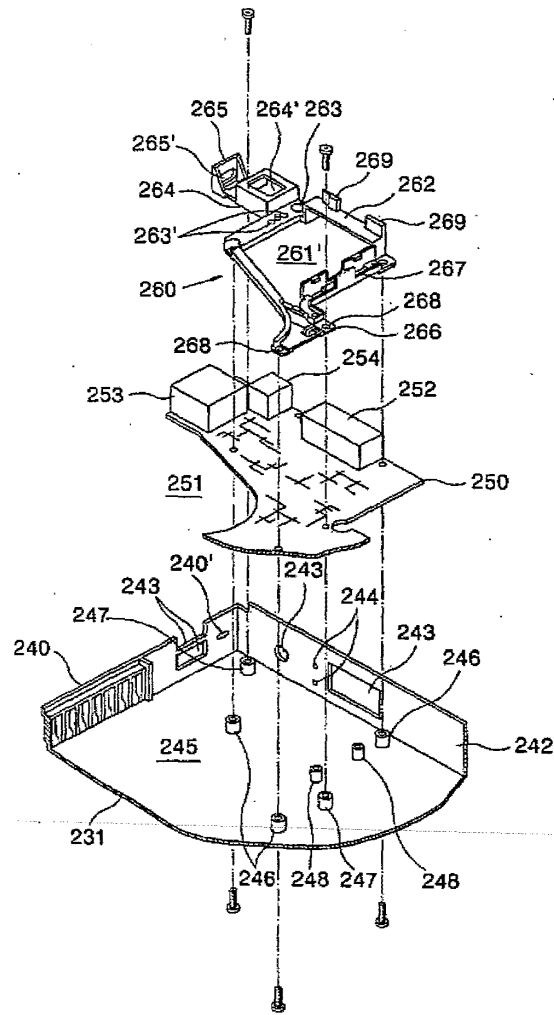


FIG. 10

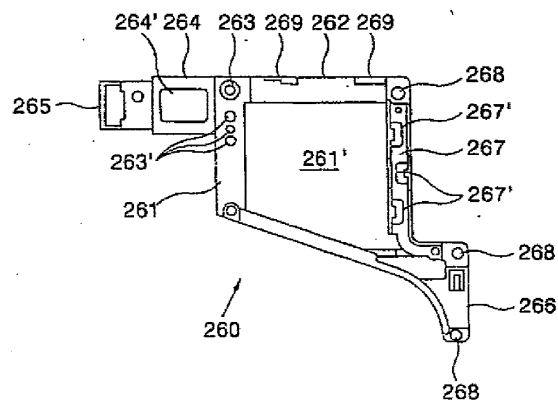


FIG. 11A

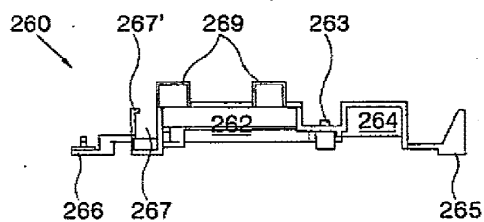


FIG. 11B

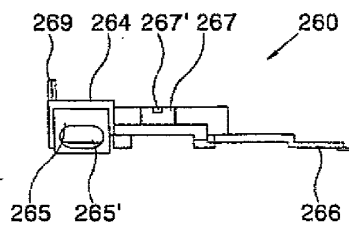


FIG. 11C

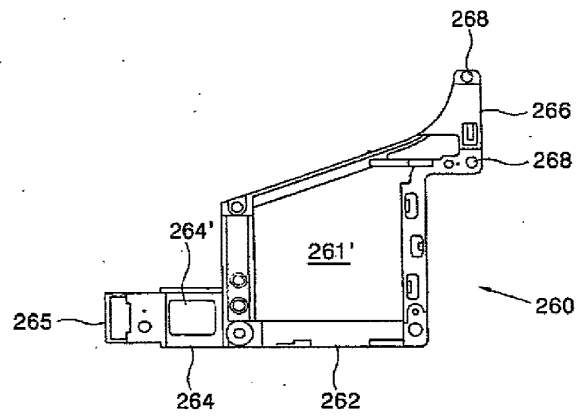


FIG. 11D

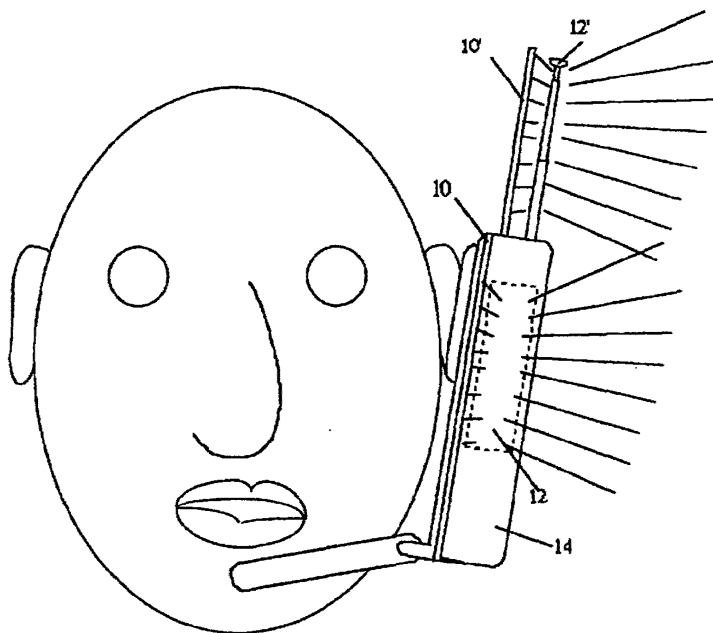
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| <b>(71)(72) Applicant and Inventor:</b> DANIELS, John, J. [US/US];<br>323 Roosevelt Drive, Seymour, CT 06483 (US).                                                                                       |  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                         |

**(54) Title:** RADIATION SHIELDING APPARATUS FOR A RADIO TRANSMITTING DEVICE**(57) Abstract**

A radiation shielding apparatus for a transmitting device, such as a cellular phone (14). A radiation shield (10, 10') is disposed between a radiation component (12, 12') and a user to prevent unwanted exposure of the user to emanating radiation from the radiation emanating component. The cellular telephone radio transmitting device may be a hand-held cellular telephone (14), and the radiation emanating component may be an internal (12) or external antenna (12') or any other electromagnetic radiation source, such as a transmitter. The radiation shield can be retrofitted to an existing cellular telephone, or may be designed specific for different models of cellular phones. The radiation shield can absorb, block and/or reflect electromagnetic wave radiation to shield the user of such cellular telephones from unwanted and possibly harmful exposure to electromagnetic wave radiation.



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## **RADIATION SHIELDING APPARATUS FOR A RADIO TRANSMITTING DEVICE**

### **BACKGROUND OF THE INVENTION**

The present invention pertains to a radiation shielding apparatus for a radio transmitting device. More particularly, the present invention pertains to a radiation shielding apparatus for protecting a user from radiation generated by a hand-held cellular phone.

It is well known to shield circuitry from electromagnetic wave radiation by providing a layer of electromagnetic wave shielding material between an electromagnetic wave source and the circuitry to be protected. Conventionally, such shielding is provided to prevent the influence of electromagnetic wave noise from affecting the protected circuit.

Cellular radio telephones have recently become well known devices. A cellular radio telephone is generally a portable unit for communication over hard wire phone lines by transmitting electromagnetic wave signals between the mobile cellular phone and stationary transmission/reception units known as "cells". These cells are connected with the hard wired telephone network, usually through a direct mechanical link. Thus, a user of a cellular phone is not confined by the traditional limitations of being mechanically linked with the hard wired telephone network. Rather, the user of a cellular phone has mobility due to the radio transmission of the electromagnetic wave signals between the cellular phone and the cells. The user is able to communicate via the hard wired telephone network, as long as the cellular phone is within range of an appropriate cell.

A typical cellular radio frequency is between 800 and 900 megahertz. In other words, in order to communicate via the cellular telephone, the cellular telephone receives electromagnetic wave radiation in the frequency range between 800 and 900 megahertz from a cell, and also transmits electromagnetic wave radiation at this frequency range to the cell.

The transmission from the portable cellular telephone is traditionally accomplished through an antenna. In one configuration of a cellular telephone, known as a car phone, the transmitting/receiving unit is fixed at a location in the car, usually the trunk. The antenna in this configuration is fixed to the exterior of the car to facilitate reception and transmission of electromagnetic wave signals. The car phone also has a hand set disposed at an accessible location for the user. Usually, the hand set is disposed in the passenger cabin and is mechanically and electrically linked to the antenna by a mechanical and electrical link with the transmitting/receiving unit of the car phone. Thus, in this configuration the user has minimal exposure to the electromagnetic waves generated by the car phone. The transmitting/receiving unit of the car phone, which may be a source of electromagnetic wave radiation exposure, is at a relatively safe distance from the user in the trunk. The antenna of the car phone, which transmits the electromagnetic wave radiation, is also at a relatively safe distance at a portion of the exterior of the car. Furthermore, the metal construction of the car acts to shield the user from the electromagnetic wave radiation.

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In another configuration of a cellular phone, known as a transmobile phone, the transmitting/receiving unit is carried in a bag, and an antenna fixed to the transmitting/receiving unit transmits the electromagnetic wave radiation necessary for communication. Again, the hand set, which the user places against the head to hear and to speak, is disposed separate from the electromagnetic wave generating components of the cellular phone such as the transmitting/receiving unit and the antenna. Furthermore, when used within a car, a second antenna may be used which is disposed outside the vehicle to facilitate reception and transmission of the electromagnetic waves.

In a third configuration of a cellular phone, known as a hand-held cellular phone, the transmitting/receiving unit and antenna are provided in the interior and/or disposed on an outside surface of the handset. In other words, in the hand-held cellular phone, the transmitting/receiving unit, hand set (including a mouthpiece and an earpiece) and the antenna are provided in a single compact unit. This type of cellular phone has steadily increased in popularity because of the convenience and mobility afforded by its compact structure. Traditionally, these cellular phones transmit at a cellular frequency range between 800 and 900 megahertz and at a power anywhere from less than one to six or more watts.

When using the hand-held cellular phone, the user places the hand set to his head so that his ear is in contact with the earpiece, and his mouth is at a location close to the mouthpiece. The antenna, which usually extends from the top surface of the hand set, transmits and receives the electromagnetic wave radiation. It is also well known to provide an internal antenna within the hand set to make the hand-held cellular phone even more compact. The electromagnetic wave radiation transmitted by the antenna is generated by a transmitter disposed in the interior of the hand set. Therefore, the user is in close proximity to the source of transmission of electromagnetic wave radiation, and the head and brain of the user receives direct exposure of this electromagnetic wave radiation generated by the hand-held cellular phone.

It has been determined that the presence of the biological tissue (body, head and brain) alters the radiation pattern and reduces the antenna gain, and, that between 48 and 68% of the power delivered to the antenna of a hand-held cellular telephone is absorbed by the head and hand of the user (see, *EM Interaction of Handset Antennas and a Human in Personal Communications*, Proceedings of the IEEE, Vol. 83, No. 1, January 1995).

The power absorbed by the head and hand reduces the strength of the radiation signal emitted from the antenna for communication. In addition, by requiring the antenna to output a stronger signal, the power absorbed by the head and hand decreases the usable life of the battery of the cellular telephone.

Researchers are only now beginning to look into the potential link between cellular telephone use and detrimental biological effects, such as brain tumors. However, epidemiological studies have suggested that a link exists between exposure to power frequency electric and magnetic fields and certain types of cancer, primarily leukemia and brain cancer (see, *Questions and Answers About Electric and Magnetic Fields Associated With the Use of Electric Power*,

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National Institute of Environmental Health Sciences, U.S. Department of Energy, November 1994).

Figure 7 shows a typical configuration for a hand-held cellular phone, commonly known as a "flip phone". This conventional cellular phone has a main phone body 1 having an earpiece 2 disposed thereon. A mouthpiece 3 shown in the closed position is flipped downward so that when the hand-held cellular phone is appropriately positioned by a user, the earpiece 2 is adjacent to the user's ear, while the mouthpiece 3 is adjacent to the user's mouth. An antenna 4, which may be telescoping or fixed, is disposed externally on the phone body 1. Alternatively or additionally, an antenna 4 may be internally disposed. The antenna 4 emits electromagnetic wave radiation to send communication signals from the hand-held cellular phone to a distant cell of a cellular network and receives electromagnetic radiation carrying communication signals from the cell. Thus, the user is able to communicate through the cellular network to the hard wire telephone network.

Antenna configurations include the familiar wand-like monopole, which extends from the top of the telephone, interior antennas, which are disposed within the telephone case, and flush mounted antennas, which are usually located on the sides, back or top of the telephone. Another type of antenna that can be used for transmitting and receiving cellular telephone signals is constructed by forming a metal patch on a dielectric substrate. This antenna configuration can be used as a flush mounted antenna. Examples of this type of antenna is disclosed in U.S. Patent No. 5,245,745, issued to Jensen et al., and U.S. Patent No. 5,241,321, issued to Tsao.

Each of these antenna configurations suffers from the problems of power being absorbed by the head and hand of the user. In particular, the flush mounted antennas suffer from a higher degree of electromagnetic interaction, since the head and hand are typically disposed very close to the antenna during use of the telephone. Also, the hand holding the telephone tends to mask the flush mounted antenna, causing a detuning effect on the antenna resonant frequency and impedance. This detuning can reduce the communication range of the telephone (see, *EM Interaction of Handset Antennas and a Human in Personal Communications*, Proceedings of the IEEE, Vol. 83, No. 1, January 1995).

As shown in Figure 8, internal radiation emanating components 5, and the external antenna 4 emit radiation which exposes the user to the health risks now being associated with exposure to electromagnetic wave radiation in the cellular frequency band. Furthermore, it is possible that the electromagnetic wave radiation emanating from the hand-held cellular phone or some other emanating radiation from the hand-held cellular phone is causing the recently observed health problems. However, at the present time the exact cause of the health risks is not known. But, it is apparent that there is great demand for a means to shield the users of hand-held cellular phones from unwanted, and possibly harmful, exposure to the radiation generated by the cellular phone. The extent of the danger seems to be as yet not known. In fact, there seems to be a deficiency in research on health effects of electromagnetic fields, particularly those emitted by portable phones in the cellular frequency band - 800 to 900 millions of cycles per second or megahertz. The cellular phone industry has done studies which target the thermal effects of electromagnetic fields. However, apart from thermal effects, recent tests have shown that radio waves around the cellular

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frequency band can damage the resilient blood-brain barrier, which protects the brain from toxins. Furthermore, radio frequencies, including the European cellular frequency, have been shown to damage the calcium coating in cells that regulate the passage of hormonal "messages" between cells. Some scientists believe that the brain tissue absorbs some of the power of the electromagnetic radiation. In addition, higher frequency, higher power radiation signals are being looked at for satellite-based wireless communication systems. In these systems, a hand-held radio telephone will transmit and receive communication signals via satellites in earth orbit. The higher frequency radiation, possibly 1.6 gigahertz or higher, may pose even more of a risk to biological tissue, such as the body and brain of the user, due to the shorter wave length and higher transmission energy of the signal.

The exact empirical health risks which can be directly linked to the cellular phone are still not known. However, it is apparent that the users and future purchasers of cellular phones are demanding a means to protect themselves as much as possible from exposure to the radiation generated by the cellular phone.

Very recently, serious questions have arisen regarding the safety of users exposed to the cellular phone electromagnetic wave radiation. It has also been suggested that such exposure, particularly due to the use of a hand-held cellular phone, has contributed to the occurrence of cancer and brain tumors in the brains of users of cellular phones. It has recently been speculated that the electromagnetic wave radiation transmitted by the hand-held cellular phone has a detrimental effect on the blood-barrier when a user is exposed to electromagnetic wave radiation around the cellular frequency. It has been suggested further that the electromagnetic wave radiation generated by the cellular phone has a detrimental effect on calcium contained by body cells and disrupts the functioning of such cells. These serious concerns have prompted widespread consternation by users of cellular telephones. In fact, due to the concern over the effects of exposure to the electromagnetic wave radiation generated by the cellular phone, the future of the "wireless" communication industry has very recently been questioned.

Therefore, there is an urgent need in the cellular telephone art to provide a means for protecting users of cellular phones, particularly hand-held cellular phones, from unnecessary and possibly harmful exposure to the electromagnetic wave radiation generated by the cellular telephone. However, the conventional art merely provides electromagnetic wave shielding to protect internal circuitry from the noise influence of background radiation. There is no conventional device which is effective for protecting a user of cellular phones from unwanted exposure to electromagnetic wave radiation generated during use of the cellular phone.

#### **SUMMARY OF THE INVENTION**

The present invention is intended to overcome the drawbacks of the conventional art. It is an object of the present invention to provide a radiation shielding apparatus for a radio transmitting device which can shield a user from unwanted exposure to radiation emanating from a radiation emanating component of a radio transmitting device. It is another object of the present invention to provide a radiation shield for an antenna of a radio transmitting device, such as a hand-held cellular

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telephone, for preventing unwanted exposure of a user of the hand-held cellular telephone to radiation emanating from a radiation emanating antenna, while allowing transmission of the emanating radiation so that the hand-held cellular telephone is effective for communication.

In accordance with the present invention, a radiation shielding apparatus for a radio transmitting device has shielding means disposed between a radiation emanating component and a user for preventing unwanted exposure of the user to emanating radiation from the radiation emanating component. The radiation emanating component may be an external antenna, or other electromagnetic radiation source, which may also be disposed in the interior of the radio transmitting device. The antenna may be either an internal antenna disposed in the interior of the radio transmitting device, or an external antenna, which is disposed on the exterior of the radio transmitting device.

The shielding means may be a radiation shield dimensioned to be retrofitted to an existing radio transmitting device. The shielding means may be effective to reflect electromagnetic radiation, block and/or absorb electromagnetic radiation.

The radio transmitting device may be a cellular phone radio, in particular a hand-held cellular phone. Alternatively, the radio transmitting device may be a radio transmitting computer modem, fax machine or the like. In the case of these devices, such as a hand-held cellular phone, a transmitter for transmitting electromagnetic radiation in a cellular frequency band may be included. The cellular frequency band is conventionally between 800 and 900 megahertz. The device, such as a hand-held cellular phone may have an internal or external antenna which transmits electromagnetic radiation in the cellular frequency band (or other electromagnetic frequency). Thus, the shielding means is effective to shield the user of the hand-held cellular phone from electromagnetic radiation emanating from either an external antenna, internal antenna, or other electromagnetic wave transmitter of, for example, a cellular phone.

In accordance with the present invention, a radiation shield is provided for an antenna of a radio transmitting device. Shielding means, disposed between a radiation emanating antenna and a user, prevents unwanted exposure of the user to emanating radiation from the radiation emanating antenna, while allowing transmission of the emanating transmission so that the cellular phone is effective for communication. The shielding means may be an elongated member disposable between the antenna and the user. The elongated member may be curved so as to wrap at least partially around a radius of radiation emanating from the antenna. Thus, the radiation emanating from the antenna toward the user is shielded from the user, and radiation emanating from the antenna not toward the user can be transmitted so that the cellular phone is effective for communication. The elongated member may be telescoping and have fixing means for fixing the elongated member at a position adjacent to the antenna. Thus, the inventive shielding means may be retrofitted to an existing cellular phone so that cellular phones already purchased can be made safe in view of the recently discovered potential health hazards due to exposure to electromagnetic wave radiation around the cellular frequency band. The elongated member may be an electromagnetic wave absorber, blocker and/or reflector. Furthermore, the shielding means may be one of an electromagnetic wave absorber, blocker, and/or reflector which is integrally disposed

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on the antenna. In this case, the shielding means may be a coating, a material adhered to an antenna by an adhesive, or applied in other suitable fashion. Furthermore, antennas so equipped may be provided in the after-purchase market of the hand-held cellular phones so that existing cellular phones can be safely used, while shielding the user from unwanted exposure to electromagnetic or microwave radiation.

In accordance with another embodiment of the invention, the shielding means comprises a protective case. The protective case is made from a lamination comprising an outer durable cover and an inner shielding layer. The durable cover is preferably made of an aesthetically pleasing material, such as leather or vinyl, or can be formed from vacuum or injection molded plastic. The durable cover may alternatively be formed of a low density neoprene covered with a fabric (such as the material used in a scuba diver's wet suit). This construction provides a shock-absorbing protective case, and may be water tight to provide further protection to the cellular phone. The inner shielding layer is preferably made of a rip resistance material capable of preventing or attenuating passage of electromagnetic radiation (in the case of a cellular telephone, microwave radiation). An example of a material that may be used for the inner shielding layer is known as metalized mylar, which is a laminate of a metallic foil adhered to a sheet of mylar. Other materials can be used for the inner shielding layer, provided the appropriate reduction in the passage of electromagnetic radiation is obtained. To ensure consistent shielding characteristics, the shielding layer may be grounded to the ground of the cellular telephone. In accordance with this embodiment of the present invention, a features circuit is used for providing advantageous features, such as selectively increasing the volume of the sound emitted by the cellular phone speaker. The features circuit includes a microphone disposed facing the cellular phone speaker with the outer shell of the cellular telephone. An electric signal corresponding to the sound emitted by the cellular phone speaker is generated by the microphone and amplified by an amplifier. A battery supplies power to the features circuit. The amplified electric signal is received by an amplifying speaker, and the sound emitted by the cellular phone speaker is regenerated as an amplified sound by the amplifying speaker.

In accordance with another aspect of the present invention, a method of shielding an electronic circuit component is provided. The electronic circuit component may be, for example, the cellular telephone circuitry and/or antenna of a cellular telephone. A radiation shielding battery is disposed adjacent to the electronic component. To provide electrical shielding, the battery is comprised of at least one shielding material that is effective for electrically shielding electromagnetic radiation. The shielding material is preferably also a component of the energy storage construction of the battery. The battery may be constructed of a negative planar electrode disposed at an electrically negative side of the battery. A positive planar electrode is disposed at an electrically positive side of the battery, and a plastic electrolyte is disposed between the negative planar electrode and the positive planar electrode. By this construction, a thin, flexible battery is provided that can be formed into an appropriate shielding shape, and may be part of the wall of the telephone case, thus maximizing space and weight considerations. At least one of the negative planar electrode and the positive planar electrode is a shielding material that shields electromagnetic

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radiation. To further enhance the shielding effect, the electronic component may be grounded to the electrically negative side of the battery.

The battery may be formed into a hollow shape defining an electrically shielded interior space, and the electronic component may be disposed within the electrically shielded interior space. Thus, the battery effectively shields the electronic component from electromagnetic radiation and provides a self-contained rechargeable power source.

In accordance with another aspect of the invention, an antenna assembly is provided for a radio transmitting device. A first unshielded antenna receives electromagnetic radiation from a remote source, and a separate second shielded antenna emits electromagnetic radiation from the radio transmitting device. A radiation shielding apparatus is disposed during use of the radio transmitting device between the antenna and a user so as to be effective to shield the user from at least some of the electromagnetic radiation emanating from the antenna toward the user while allowing at least some of the electromagnetic radiation emanating from the antenna not toward the user to be transmitted, so that exposure of the user to potentially harmful radiation from the first antenna is prevented, while allowing the first antenna to transmit the electromagnetic radiation from the radio transmitting device. By this construction, the receiving antenna is shielded by the shielding apparatus only to a small extent, if at all. Thus, the receiving antenna is able to receive relatively weak radiation signals necessary for cellular telephone communication. The shielding apparatus shields the radiation emitted by the transmitting antenna toward the user, so as to prevent unwanted exposure of the user to radiation, but allows the radiation signal to be transmitted in directions away from the user.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a view showing a hand-held cellular phone having the inventive shielding means for shielding an electromagnetic radiation source disposed in the interior of the cellular phone and shielding means for shielding electromagnetic wave radiation from an external antenna disposed on the outside of the cellular phone;

Figure 2(a) is an illustration of an embodiment of the inventive radiation shielding apparatus shown shielding radiation emanating from an interiorly disposed radiation source in the body of the cellular phone and a radiation source disposed in the mouthpiece of the cellular phone;

Figure 2(b) is a view showing an embodiment of the inventive radiation shielding apparatus shown shielding an interiorly disposed radiation source of a cellular phone so that no unwanted radiation emanates from the radiation source;

Figure 3(a) shows an embodiment of the radiation shield for an antenna of a radio transmitting device comprised of an elongated member disposed adjacent to an external antenna of a cellular phone;

Figure 3(b) is a top plan view of the elongated member radiation shield shown in Figure 3(a) showing the elongated member having an open curve construction;

Figure 3(c) is a partial perspective view of a cellular phone showing an elongated member constructed as a sheath encompassing an external antenna of the cellular phone;

**SUBSTITUTE SHEET (RULE 26)**

Figure 3(d) is a top plan view of the elongated member radiation shield shown in Figure 3(c);

Figure 4(a) is a partial perspective view of a cellular phone showing a telescoping elongated member disposed adjacent to an external antenna;

Figure 4(b) is a view of the telescoping elongated member having an antenna top clip attached to an external antenna of a cellular phone;

Figure 4(c) shows one embodiment of fixing means for attaching the inventive antenna shield to the antenna by an antenna base clip;

Figure 4(d) is an embodiment of fixing means of the inventive antenna shield for attaching the antenna shield to the cellular phone by a screw;

Figure 4(e) is an embodiment of fixing means of the inventive antenna shield having an clamp for fixing the antenna shield to an external antenna of a cellular phone;

Figure 4(f) is an embodiment of the fixing means of the inventive antenna shield showing the use of an adhesive for fixing the antenna shield to the hand-held cellular phone;

Figure 5 is a partial perspective view of a hand-held cellular phone having radiation shielding integrally disposed on an external antenna;

Figure 6(a) shows a construction of the radiation shield comprising a substrate supporting a radiation reflector;

Figure 6(b) shows a construction of the radiation shield comprising a substrate supporting a radiation absorber and/or blocker;

Figure 6(c) shows a construction of the radiation shield comprising a substrate supporting a radiation reflector and radiation absorber and/or blocker;

Figure 6(d) shows a construction of the radiation shield comprising a radiation reflector and radiation absorber and/or blocker;

Figure 6(e) shows a construction of the radiation shield comprising just a radiation reflector;

Figure 6(f) shows a construction of the radiation shield comprising just a radiation absorber and/or blocker;

Figure 7 shows the configuration of a conventional hand-held cellular phone;

Figure 8 shows the conventional hand-held cellular phone in use;

Figure 9 shows another embodiment of the radiation shield in use on a hand-held cellular telephone;

Figure 10(a) is a front view of the embodiment of the radiation shield shown in Figure 9 in a retracted, non-shielding position;

Figure 10(b) is a front view of the embodiment of the radiation shield shown in Figure 9 in a raised, shielding position;

Figure 11(a) is a front and side view of a radiation shield in accordance with the embodiment shown in Figure 9;

Figure 11(b) is a front and side view of a mounting piece in accordance with the embodiment shown in Figure 9;

**SUBSTITUTE SHEET (RULE 26)**

Figure 11(c) is a top plan view of the radiation shield shown in Figure 11(a);

Figure 11(d) is a perspective view of the radiation shield and the mounting piece in accordance with the embodiment shown in Figure 9;

Figure 12(a) is a front view showing the embodiment of the radiation shield shown in Figure 9, and a radiation shielding antenna;

Figure 12(b) is a side view showing the embodiment of the radiation shield shown in Figure 9, and the radiation shielding antenna;

Figure 13 is a plan view of a prior art antenna assembly for a hand-held cellular phone;

Figure 14(a) is a side view and a top view of an internal antenna component of the prior art antenna assembly shown in Figure 13;

Figure 14(b) is an enlarged top plan view of the internal antenna component shown in Figure 14(a);

Figure 14(c) is an enlarged top plan view of an embodiment of an internal antenna component in accordance with the present invention;

Figure 14(d) is an enlarged top plan view of another embodiment of an internal antenna component in accordance with the present invention;

Figure 15(a) is a side and top view of a fixing member of the prior art antenna assembly shown in Figure 13;

Figure 15(b) is an enlarged top plan view of the fixing member shown in Figure 15(a);

Figure 15(c) is an enlarged top plan view of an embodiment of the fixing member in accordance with the present invention;

Figure 16(a) is an isolated view of an external antenna having a shielding strip in accordance with the present invention;

Figure 16(b) is an enlarged cross sectional view of the external antenna having a shielding strip shown in Figure 16(a);

Figure 16(c) is an enlarged cross sectional view of the external antenna shown in Figure 16(b) installed in the embodiment of the fixing member shown in Figure 15(c);

Figure 17 is a side view of a hand-held cellular telephone being shielded and protected by another embodiment of the invention comprised of a protective case shown in cross section;

Figure 18(a) is an enlarged cross section showing a laminate construction of the protective case shown in Figure 17;

Figure 18(b) is an enlarged cross section of the protective case having a features circuit in accordance with the embodiment shown in Figure 17;

Figure 19(a) is a top plan view of a splayed protective case pattern in accordance with the embodiment shown in Figure 17;

Figure 19(b) is an enlarged isolated view of a jack shown in Figure 19(a);

Figure 20(a) is a perspective view of a cellular telephone having the protective case;

Figure 20(b) is an isolated perspective view of the assembled protective case;

Figure 21(a) is a front view of the protective case installed on a cellular telephone;

Figure 21(b) is a side view of the protective case installed on a cellular telephone;

**SUBSTITUTE SHEET (RULE 26)**

Figure 21(c) is a back view of the protective case installed on a cellular telephone;

Figure 22(a) is a side view of another embodiment of the protective case having a shielding flap and installed on a cellular telephone;

Figure 22(b) is a side view of the protective case having a shielding flap and installed on a cellular telephone in a flap shielding position;

Figure 23(a) is an isolated enlarged cross sectional view of a flexible rechargeable battery used in accordance with the present invention;

Figure 23(b) is an isolated schematic view of a cellular phone circuit board disposed adjacent to the flexible rechargeable battery;

Figure 24(a) is a cross sectional top view of a flexible rechargeable battery and phone case shell prior to assembly in accordance with a manufacturing aspect of the present invention;

Figure 24(b) is a cross section top view of the assembled flexible rechargeable battery and phone case shown in Figure 24(a);

Figure 24(c) is a cross sectional side view taken along line c-c of the assembled flexible rechargeable battery and phone case shown in Figure 24(b);

Figure 24(d) is an isolated enlarged cross sectional side view of an assembled and electrically sealed end of the phone case shown in Figure 24(c);

Figure 25(a) is a perspective view of an unassembled wrapped flexible rechargeable battery and electrically sealing endcaps;

Figure 25(b) is a perspective view of an assembled wrapped flexible rechargeable battery having electrically sealed ends and having wires in communication with the interior of the wrapped flexible rechargeable battery;

Figure 25(c) is a perspective view of an inventive cylindrical shaped cellular telephone;

Figure 25(d) is a cut away perspective view of an alternative construction of the wrapped flexible battery having an antenna window through-hole;

Figure 26(a) is a cross sectional side view of another embodiment of the inventive cellular telephone having the flexible rechargeable battery disposed for radiation shielding and having a retractable hand shield;

Figure 26(b) is a cross sectional back view taken along line b-b of Figure 26(a) of the inventive cellular telephone having the flexible rechargeable battery disposed for radiation shielding and having a retractable hand shield;

Figure 26(c) is an isolated and enlarged cross sectional side view of the antenna assembly shown in Figures 26(a) and 26(b);

Figure 27(a) is a schematic cross sectional view of another embodiment of an inventive cellular telephone having a closed retractable mouthpiece;

Figure 27(b) is a schematic cross sectional view of the embodiment of the inventive cellular telephone shown in Figure 27(a) having an open retractable mouthpiece;

Figure 28(a) is a block diagram of inventive electrical power supply and battery selection circuitry;

Figure 28(b) is a block diagram of inventive telephone mode selection circuitry;

**SUBSTITUTE SHEET (RULE 26)**

Figure 29(a) is a side perspective view of another embodiment of the inventive cellular telephone having grip disposing surfaces;

Figure 29(b) is a back perspective view of the embodiment of the inventive cellular telephone shown in Figure 29(a);

Figure 29(c) is a front perspective view of the embodiment of the inventive cellular telephone shown in Figure 29(a);

Figure 30 is a perspective view of an embodiment of the inventive cellular telephone in use being gripped by a hand of a user;

Figure 31(a) is a perspective view of a home-base unit and external battery pack in accordance with an embodiment of the inventive cellular telephone;

Figure 31(b) is a perspective view of an embodiment of the inventive cellular telephone having an attached external battery pack;

Figure 31(c) is a perspective view of the embodiment of the inventive cellular telephone shown in Figure 31(b) having attached add-on function modules;

Figure 32 is a perspective view of a car-base unit and an embodiment of the inventive cellular telephone;

Figure 33 is a schematic view of radiation shielding components in accordance with an embodiment of the inventive cellular telephone;

Figure 34(a) is an exploded perspective view of an embodiment of a shielded radiation patch antenna assembly in accordance with the present invention;

Figure 34(b) is a perspective view of an assembled radiation patch antenna in accordance with the embodiment shown in Figure 34(a);

Figure 34(c) is a perspective view of an assembled shielded radiation patch antenna assembly in accordance with the embodiment shown in Figure 34(a);

Figure 35(a) is an exploded perspective view of another embodiment of a shielded radiation patch antenna assembly in accordance with the present invention;

Figure 35(b) is a perspective view of an assembled radiation patch antenna in accordance with the embodiment shown in Figure 35(a);

Figure 35(c) is a perspective view of an assembled shielded radiation patch antenna assembly in accordance with the embodiment shown in Figure 35(a);

Figure 36(a) is an exploded perspective view of another embodiment of a shielded radiation patch antenna assembly in accordance with the present invention;

Figure 36(b) is a perspective view of an assembled shielded radiation patch antenna assembly in accordance with the embodiment shown in Figure 36(a);

Figure 37 is an exploded perspective view of another embodiment of a shielded radiation patch antenna assembly in accordance with the present invention; and

Figure 38 is a side perspective view of another embodiment of the inventive cellular telephone having grip disposing surfaces and having a shielded radiation patch antenna assembly.

## DETAILED DESCRIPTION OF THE DRAWINGS

## SUBSTITUTE SHEET (RULE 26)

For purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, there being contemplated such alterations and modifications of the illustrated device, and such further applications of the principles of the invention as disclosed herein, as would normally occur to one skilled in the art to which the invention pertains.

Referring to Figure 1, an embodiment of the inventive radiation shielding apparatus for a radio transmitting device is shown. In this case, the radio transmitting device comprises a hand-held cellular phone. However, the radio transmitting device may be any other radio transmitting system in which a source of potentially harmful electromagnetic radiation is disposed close to the body of the user. In this case, the exact configuration of the radiation shield may vary depending on what type of component is being shielded. However, such alterations are expressly within the scope of the present invention.

As shown in Figure 1, shielding means 10 is disposed between a radiation emanating component 12 (external antenna 12' and interiorly disposed electromagnetic radiation source 12) and a user to prevent unwanted exposure of the user to radiation emanating from the radiation emanating component 12. The antenna 12' may be an external antenna 12' disposed on the exterior of the radio transmitting device, or an internal antenna disposed in the interior of the radio transmitting device 14. The shielding means 10 may be a radiation shield 10' which is dimensioned to be retrofitted to an existing radio transmitting device 14. For example, to shield the user from electromagnetic radiation emanating from an interior radiation emanating component 12, such as a transmitter within an existing cellular phone without such shielding, a preformed sheet member (comprising an electromagnetic wave radiation reflector, blocker and/or absorber), may be disposable within the interior of the existing cellular phone at a position effective to shield emanating electromagnetic wave radiation from exposing the user. Alternatively, the radiation shield may be more generic and can be cut and bent into a shape so that it can be disposed within the interior of an existing cellular phone at a position where it is effective for its intended use. Although a cellular phone is shown, the radiation emanating component may be a part of a radio transmitting computer modem, fax transmission device, or other radio transmission device.

Shielding means 10 may be disposed within a hand-held cellular phone to prevent exposure of a user from radiation emanating from a transmitter within the phone. In the case of a typical cellular phone, the transmitter transmits radiation in a cellular frequency band conventionally between 800 and 900 megahertz. Therefore, the material comprising the shielding means 10 is composed of a material effective to block, absorb or reflect electromagnetic wave radiation within this band range. However, since other frequency ranges may be emitted by different radio transmitting devices, the appropriate type and dimensions of the material of the shielding means 10 should be selected accordingly.

Referring now to Figures 2(a) and 2(b), alternative configurations of the shielding means 10 is shown shielding interiorly disposed electromagnetic wave radiation sources of a hand-held cellular phone. These configurations represent two shielding states, one in which the interiorly

**SUBSTITUTE SHEET (RULE 26)**

disposed electromagnetic radiation source 12 is partially shielded and the other in which the interiorly disposed electromagnetic radiation source 12 is fully shielded. As shown in Figure 2(a), the interiorly electromagnetic radiation source 12 which may be a transmitter within the body of the cellular phone, is shielded so that electromagnetic wave radiation traveling in a direction towards the user is blocked, absorbed or reflected. In this embodiment, the electromagnetic wave radiation may still be transmitted from the hand-held cellular phone so that communication with a distant cell of a cellular network is possible. This configuration can be used to shield an internal electromagnetic wave transmitter, such as an internal antenna disposed in the interior of a hand-held cellular phone radio transmitting device 14, in which case the external antenna may or may not be present. Also, as shown, if other portions contain electromagnetic wave radiation sources 12, such as in the mouthpiece 16, these components may be shielded to prevent unwanted exposure of the user. As shown in Figure 2(b), an interiorly disposed transmitter may be fully shielded so that no harmful electromagnetic wave radiation generated by such a transmitter can expose the user. In this case, an external antenna 12' disposed on the exterior of the hand-held cellular phone radio transmitting device 14 is typically used for transmission of electromagnetic wave radiation. In which case, the external antenna 12' has appropriate shielding for preventing exposure of the user to electromagnetic wave radiation as described herein.

Referring now to Figure 3(a) and 3(b), a radiation shield for an antenna 12' of a radio transmitting device 14 is shown. In this embodiment, shielding means 10 is disposed between a radiation emanating antenna 12' and a user for preventing unwanted exposure of the user to emanating radiation from the radiation emanating antenna 12' while allowing transmission of the emanating radiation so that communication between the hand-held cellular phone and a distant cell of a cellular network is possible. The radiation emanating antenna 12' comprises at least one of an internal antenna 12' disposed in the interior of the radio transmitting device 14 (represented by the interiorly disposed electromagnetic radiation sources, shown for example, in Figure 2) and an external antenna 12' disposed on the exterior of the hand-held cellular phone radio transmitting device 14 as shown in Figure 3. The antenna 12' transmits electromagnetic radiation in a cellular frequency band, typically between 800 and 900 megahertz. The shielding means 10 comprises an electromagnetic radiation reflector, blocker and/or absorber.

In the configuration shown in Figures 3(a) and 3(b), the shielding means 10 comprises an elongated member 10' which in use is disposed between the antenna 12' and the user. The elongated member 10' has an open curve construction so as to wrap partially around a radius of radiation emanating from the antenna 12' (shown in Figure 3(b)) so that radiation emanating from the antenna 12' toward the user is shielded from the user while radiation emanating from the antenna 12' not toward the user can be transmitted to allow communication between the hand-held cellular phone radio transmitting device 14 and a distant cell of a cellular network.

In the configuration shown in Figures 3(c) and 3(d), the shielding means 10 comprises an elongated member 10' disposable between the antenna 12' and the user. The elongated member 10' has a closed curve construction so as to sheath the antenna 12' and wrap completely around a radius of radiation emanating from the antenna 12' (shown in Figure 3(d)). The side of the

**SUBSTITUTE SHEET (RULE 26)**

elongated member 10' closest to the user comprises a material which shields the user from radiation emanating from the antenna 12' toward the user. The other side of the elongated member 10' allows radiation emanating from the transmitter to pass so that communication is possible. This side may comprise a material which does not prevent transmission of the emanating radiation, or may have a construction, such as through-holes, which allows transmission. In the case of this side being metal, it may be in direct electrical contact with the antenna 12' so as to become a radiation emanating component 12. This configuration can be easily slipped over an existing cellular phone antenna and may be clipped, clamped or fastened to the antenna 12' at an orientation effective to shield the user from harmful exposure while allowing transmission of electromagnetic radiation necessary to allow communication.

As shown in Figures 4(a) and 4(b), the elongated member 10', used as a radiation shield for an antenna 12' may comprise at least two telescoping portions so as to be telescoping between an extended and a retracted position. This construction may also comprise a radiation shield elongated member 10' having different cross sectional configurations. For example, it may take the form of an open or closed boxed shape, open or closed curve, or a flat planar member. Fixing means shown in Figure 4(b) through 4(f) is provided for fixing the radiation shield to either the body of the hand-held cellular phone or to the antenna 12'. For example, as shown in Figure 4(b), an antenna top clip 18 extending from the top portion of the telescoping elongated member 10' radiation shield clips onto the top portion of a telescoping antenna 12'. The base of the radiation shield may have fixing means for attaching the base to the antenna 12' base and/or the body of the hand-held cellular phone. Thus, the telescoping radiation shield may be extended and retracted in conjunction with the telescoping antenna 12'. In the case of a fixed antenna 12', the radiation shield may be disposed so that it is also non-telescoping or still can be a telescoping member. Other construction of the shielding means 10 will lend to alternative constructions of the fixing means. For example, the shielding means may be configured as a sheath disposable over the antenna 12' and capable of blocking or reflecting radiation in a particular harmful frequency range, while allowing transmission of other radiation for communication.

As shown in Figure 4(c), the fixing means may comprise an antenna base clip 20 which clips onto the antenna 12' at the antenna base. A more permanent radiation shield fixing means is shown in Figure 4(d) in which the base of the radiation shield is fixed by a screw 22 screwed to the body of the hand-held cellular phone radio transmitting device 14. In Figure 4(e), the base of the radiation shield is clamped, the clamp represented by a box 24, to the base of the antenna 12'; and in Figure 4(f), the bottom surface of the base of the radiation shield is fixed to the body of the hand-held cellular phone radio transmitting device 14 by an adhesive 26. It is noted that these examples of the fixing means are in no way exhaustive, and many other configurations would be readily apparent to one of ordinary skill in the art.

Figure 5 shows another embodiment of the inventive radiation shield for an antenna 12'. In this embodiment, the shielding means 10 comprises at least one of an electromagnetic wave absorber, reflector and/or blocker which is integrally disposed on the antenna 12'. As shown, the shielding means 10 may comprise a radiation shielding coating applied to a portion, for example

**SUBSTITUTE SHEET (RULE 26)**

along the longitudinal length, of the antenna 12' to one side thereof. Thus, a portion of the antenna 12' is still effective for transmitting electromagnetic wave radiation to a distant cell of a cellular network. However, electromagnetic wave radiation directed toward the user is effectively blocked to thereby prevent possible harmful effects of such exposure to electromagnetic wave radiation. It is noted that many existing hand-held cellular phone radio transmitting devices 14 are provided with detachable antennas, and as such, the inventive radiation shield integrally disposed on a retro-fittable antenna 12' may be provided so that the existing hand-held cellular phone radio transmitting device 14 is still usable by merely switching antennas. In the case of a radiation blocking shielding coating, a material such as lead can be applied and integrally fixed to the antenna.

Figures 6(a) through 6(f) show various configurations for the inventive shielding means 10. As shown in Figure 6(a), the shielding means 10 may comprise a substrate 28, such as metal, polymer, fiberglass or other suitable material, having a radiation reflector 30, such as aluminum, other metal, polymer or other suitable material disposed thereon. As shown in Figure 6(b), the substrate 28 may have a radiation absorber and/or blocker 32, such as lead, or other suitable material disposed thereon. As shown in Figure 6(c), the substrate 28 may have both a radiation reflector 30, a radiation absorber and/or a radiation blocker 32 (or other combination) disposed thereon. As shown in Figure 6(d), the shielding means 10 may comprise a radiation reflector 30 and a radiation absorber and/or radiation blocker 32 formed together in a self supporting structure. As shown in Figure 6(e), the shielding means 10 may simply be a radiation reflector 30 comprised of a material capable of being self supporting. Similarly, as shown in Figure 6(f), the shielding means 10 may comprise a radiation absorber and/or blocker 32 which is also self supporting thereby obviating the need for an additional substrate 28. The shielding material can be formed on the antenna in a variety of processes. For example, a shielding material can be spray coated at appropriate portions of an antenna. Alternatively, the shielding material can be formed by sputtering, vacuum deposition, dip coating, or any other suitable process. The shielding means 10 can be made to block the electromagnetic radiation emanating from the electromagnetic source, such as the antenna 12', and toward the user. For example, a material which presents a relatively dense block to the passage of electromagnetic radiation, such as lead, can be used.

The shielding means 10 can be made to reflect the electromagnetic radiation emanating from the electromagnetic source, such as the antenna, and toward the user. For example, a polished material, such as aluminum, provides high reflectance. The elongated member 10' may be shaped to optimize the advantages of directing the reflected electromagnetic waves. For example, a parabolic shape with a highly reflective surface, will direct the waves to a focus (as shown, for example, in Figure 25(c)).

On the other hand, it may be advantageous to reflect the waves at diffusing angles so that they spread out and reflect off of nearby surfaces so as to provide a more non-uniformity of the transmission direction. This is advantageous since the cell may be in a direction from the antenna in line with the user's head. In this case, the shielding means 10 might attenuate transmission of electromagnetic waves if the waves are directed and focused in the opposite direction. However,

**SUBSTITUTE SHEET (RULE 26)**

by diffusing (or scattering) the direction of the electromagnetic radiation, communication with such a cell may be improved.

The shielding means 10 can be made to absorb the electromagnetic radiation so that radiation emanating towards the user is absorbed and does not expose the user to the potential harmful effects of the electromagnetic radiation.

Further, a combination of one or more layers of reflecting, absorbing and blocking material can be used to provide an optimum radiation field. In any case, the material selected can be such that the radiation exposure of the user is minimized by selecting appropriate materials to "tune" to the anticipated radiation frequency range.

Referring to Figure 9, an embodiment of the inventive radiation shielding apparatus is shown retrofitted on an existing cellular telephone 14. In this case, the radio transmitting device comprises a hand-held cellular phone 14. However, the radio transmitting device 14 may be any other radio transmitting system in which a source of potentially harmful electromagnetic radiation (in the case of a cellular telephone, microwave radiation) is disposed close to the body of the user. In this case, the exact configuration of the radiation shield may vary depending on what type of component is being shielded. However, such alterations are expressly within the scope of the present invention.

As shown in Figure 9, shielding means 10 is disposed between a radiation emanating component 12 (internal antenna 12' and/or external antenna 12') and a user to prevent unwanted exposure of the user to radiation emanating from the radiation emanating component 12. The shielding means 10 may be configured to be retrofitted as a replacement antenna assembly including an internal antenna 12' and an external antenna 12'.

Shielding means 10 may be disposed within a hand-held cellular phone to prevent exposure of a user from radiation emanating from a transmitter within the phone. In the case of a typical cellular phone, the transmitter transmits radiation in a cellular frequency band conventionally between 800 and 900 megahertz. Since other frequency ranges may be emitted by different radio transmitting devices, the appropriate type and dimensions of the material of the shielding means 10 should be selected accordingly.

Figures 9-16(c) show a specific embodiment of the inventive shielding means 10 and inventive antenna radiation shield 10' retrofitted to a Motorola Digital Personal Communicator™ cellular telephone. Referring to Figure 10(a), the shielding means 10 is shown in a non-shielding position. This non-shielding position provides no attenuation of an incoming signal from a cell of a cellular network. The external antenna 12' is shown retracted. In this position, the user may have the phone in the "stand-by" mode and tucked away in a brief case or coat pocket. In such a case, it would not be desirable for the shielding means to attenuate the incoming signal from a cell. However, when a call is received (or when the user wishes to place a call) the external antenna 12' is extended. To shield the user from exposure to the radiation emanating from the internal antenna, the shielding means 10 may be raised into the shielding position, as shown in Figures 9 and 10(b). In this position, the shielding means 10 reflects radiation emanating from the internal antenna 12'

**SUBSTITUTE SHEET (RULE 26)**

toward the user in directions away from the user. Since the radiation is reflected, it is still available for transmission to the cell so that there is little or no attenuation of the transmission signal.

Figures 11(a)-11(d) show an embodiment of the inventive radiation shielding device which can be easily and inexpensively produced. This configuration is designed specifically for hand-held cellular phones such as the Motorola Digital Personal Communicator™. However, various other configurations can be readily designed to fit any specific application. The configuration consists of a shield member 10 having a front face 34 with a slot 36 disposed therein. The shield member 10 may have a gripping edge 38 to facilitate positioning of the shield member 10 as described below. The shield member 10 has a suitable bend (such as 90 degrees) to form a side 40. In accordance with this embodiment, the front face 34 and side 40 shield the user's head from radiation emanating from the internal antenna 12' when the shield member 10 is in the raised position (Figures 9 and 10(b)). The front face 34 and the side 40 may have a flat profile, or as shown in Figure 11(c), either or both of them may be curved.

As shown in Figure 11(b), a mounting piece 42 has posts 50 extending from its front surface. The back surface of the mounting piece 42 is covered with a pressure sensitive adhesive 52 for adhering the mounting piece 42 at an appropriate location on the cellular phone 14 to position the shielding means 10 for its intended use (as shown in Figures 9 and 10(b)).

Figure 11(d) shows perspective views of the shield member 10 and mounting piece 42. When assembled, the posts 50 pass through the slot 36 and the shield member 10 is retained on the mounting piece via the retaining ends 54 of the posts 50. This assembly is permanently or semi-permanently fixed on the cellular phone 14 by the pressure sensitive adhesive 52.

In use, when the shielding means 10 is to be positioned for shielding, the user grasps the gripping edge 38 and slides the shield member 10 into position. Bumps (not shown) on the slot 36 may be provided to temporarily lock the shield member 10 in the up or down position. In this configuration, the user has the option of lowering the shield member 10 if the signal is too weak and if the raised shield is between a distant communicating cell of the cellular network and the phone 14. Raising the shield member 10 reflects the radiation and may increase the signal sent and received by a distant communicating cell that is in a direction away from the user's head.

This embodiment of the invention can be very easily and very inexpensively manufactured. The shield member 10 is simple to form by die-cutting and bending a thin metal sheet. To increase the effectiveness of the shielding means 10, a grounding wire (not shown) may be providing for grounding the shielding means 10 with the ground of the cellular telephone 14. The mounting piece 42 is readily adaptable to an injection molding process. Also, a shield member substrate can be formed by injection molding, and made from a material with a color and texture that matches or complements the existing cellular phone body. This injection molded shield member substrate may then have a radiation blocker, absorber and/or reflector material disposed on its peripheral surface. The peripheral surfaces may be sensitized and then electroplated, and may be spray coated or vacuum deposited with an appropriate material.

Figures 12(a) and 12(b) are front and side views, respectively of a hand-held cellular phone 14, such as the Motorola Digital Personal Communicator™. The hand-held cellular phone

**SUBSTITUTE SHEET (RULE 26)**

14 is shown retrofitted with the shielding means 10 consisting of a shielding member 10 as described above, and antenna shielding means 10' consisting of a shielding strip 56 disposed on a replacement extendible external antenna 12'. The shielding strip 56 blocks radiation from emanating from the wire coil disposed within the external antenna 12' toward the user. However, radiation emanating in a direction not toward the user is not shielded. It is noted that either the shielding member 10 or the shielding strip 56 may be used separately, depending on a determined potential exposure concern. The dimensions and material of the shield member 10 and shielding strip 56 depends on a determined balance between radiation shielding and signal attenuation.

Figure 13 shows an exploded view of a prior art antenna assembly for use with a hand-held cellular phone 14, such as the Motorola Digital Personal Communicator™. This assembly includes the external antenna 12' which has a wire coil (not shown) disposed within a plastic substrate. A fixing member 58 screws in place in a threaded hole on the cellular phone 14 to secure the antenna assembly on the cellular phone 14. The internal antenna 12' plugs into the cellular phone transmission/reception circuitry and provides most or all of the emanating radiation when the external antenna 12' is in the retracted position. A cap 60 snaps in place on the cellular phone 14 and forms a part of the assembled cellular phone body structure.

Figure 14(a) shows a respective side and top plan view of the internal antenna 12' in accordance with the prior art. Figure 14(b) shows an enlarged top plan view of the prior art internal antenna 12'. Figure 14(c) shows an internal antenna 12' in accordance with the invention having a radiation shielding structure 10'. A foil radiation shielding structure 10' is fixed on the surface of the inventive internal antenna 12' at a position designed to block exposure of radiation directed at the user. Figure 14(d) shows a configuration of the inventive internal antenna 12' with a metal radiation shielding member 10' having a shielding effect to a broad range of radiation. The shielding member 10' may include one or a combination of a radiation absorber, radiation reflector and/or radiation blocker.

Referring now to Figure 15(a) a respective side and top plan view of the prior art fixing member 58 is shown. Figure 15(b) shows an enlarged top plan view of the prior art fixing member 58. The prior art fixing member 58 has a hollow cylindrical shape having a circular profile through which the prior art external antenna 12' passes and is free to rotate about its longitudinal axis. When assembled on the hand-held cellular telephone 14, the prior art internal antenna 12' passes over the fixing member 58. Figure 15(c) shows a configuration of the fixing member 58 in accordance with the present invention and has in top plan view a semicircular profile forming an orientation retaining surface 58' which acts with a similar profile of the inventive external antenna 12' (shown in Figures 16(a)-16(c)) to maintain an effective orientation by preventing rotation of the external antenna 12'.

Figure 16(a) shows an embodiment of the inventive external antenna 12' which has the shielding strip 56 (shown by cross-hatch) disposed along its length. The width of the shielding strip 56 determines the degree and direction of the shielding effect. Figure 16(b) shows a top plan cross sectional view taken at line a-a of Figure 16(a). The inventive external antenna 12' has a semi-circular profile similar to the semi-circular profile of the inventive fixing member 58. As

**SUBSTITUTE SHEET (RULE 26)**

shown in Figure 16(c), when the inventive external antenna 12' is assembled with the fixing member 58, the semi-circular profiles maintain the external antenna 12' at a desired orientation. This orientation disposes the shielding strip 56 to provide shielding of the user from emanating radiation while allowing transmission of electromagnetic wave radiation (shown by fanned lines) for cellular communication.

Figure 17 shows a side view of a cellular telephone 14 shielded by another embodiment of the inventive shielding means 10, shown in cross section. In accordance with this embodiment of the invention, the shielding means 10 comprises a protective case 62. The protective case 62 is made from a lamination comprising an outer durable cover 64 and an inner shielding layer 66 (shown in enlarged isolated cross section in Figure 18(a)). The durable cover 64 is preferably made of an aesthetically pleasing material, such as leather or vinyl, or can be formed from vacuum or injection molded plastic. The durable cover 64 may alternatively be formed of a low density neoprene covered with a fabric (such as the material used in a scuba diver's wet suit). This construction provides a shock-absorbing protective case 62, and may be water tight to provide further protection to the cellular phone 14. The inner shielding layer 66 is preferably made of a rip resistant material capable of preventing or attenuating passage of electromagnetic radiation. An example of a material that may be used for the inner shielding layer is known as metalized mylar, which is a laminate of a metallic foil adhered to a sheet of mylar. Other materials can be used for the inner shielding layer, provided the appropriate reduction in the passage of electromagnetic radiation is obtained. In accordance with this embodiment of the present invention, an additional advantageous feature is the inclusion of a features circuit 68 that is used for providing advantageous features, such as selectively increasing the volume of the sound emitted by the cellular phone speaker 70 (shown in enlarged isolated cross section in Figure 18(b)). The features circuit 68 includes a microphone 72 disposed facing the cellular phone speaker 70 with the outer shell 14' of the cellular telephone 14. An electric signal corresponding to the sound emitted by the cellular phone speaker 70 is generated by the microphone 72 and amplified by an amplifier 74. A battery 76 supplies power to the features circuit 68. The amplified electric signal is received by an amplifying speaker 78, and the sound emitted by the cellular phone speaker 70 is regenerated as an amplified sound by the amplifying speaker 78.

Figure 19(a) shows a splayed protective case pattern 80 from which is formed the folded protective case 62 shown in Figure 20(b). The splayed protective case pattern 80 is folded into the shape shown in Figures 20(a) and 20(b) for fitting onto and protecting a hand-held cellular phone 14. Although a specific splayed protective case pattern 80 is shown for protecting a specific cellular phone body type, other patterns can be used having a particular shape corresponding to the particular shape of the cellular phone intended to be protected and shielded. The splayed protective case pattern 80 shown in Figure 19(a) has Velcro hook patches 82 and corresponding Velcro loop patches 84 which maintain the shape of the folded protective case 62 as shown in Figures 20(a) and 20(b). Windows 86 are provided for allowing access to buttons 88 and viewing of a display screen 90 of the protected and shielded cellular phone 14, as shown in Figure 20(a). A flap portion 92 is provided for covering the top and a portion of the back of the cellular phone 14, and

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includes a through-hole 94 for accommodating the antenna 12' and cap 60 of the cellular phone 14. A tail portion 96 may be provided that slips into a gap provided by a hinged portion of the cellular telephone 14 located between the mouthpiece 16 and the main phone body (as shown in Figures 21(a) through 21(c)). The tail portion 96 includes a jack 98 which is received in a jack receiver 100 of the cellular telephone 14 (shown in Figure 21(a)-21(c)). Again, this embodiment is being described with reference to a specific configuration applicable to a specific cellular telephone body style (namely, the Motorola Digital Personal Communicator™). Other configurations of the protective case 62 will have a different shape. The jack 98 includes an electrical contact 102 for connection with the ground of the cellular telephone 14 for grounding the shielding layer 66. By thus grounding the shielding layer 66 the shielding aspects of the inventive shielding means 10 is greatly enhanced, as compared with an ungrounded shielding layer 66. Alternatively, other means may be incorporated for connecting the shielding layer 66 with the ground of the cellular telephone 14 and still be encompassed by the scope of the invention. Figure 19(b) shows an enlarged view of the jack 98. In addition to the ground electrical contact 102, other electrical contacts 102 can be provided. The other electrical contacts 102 can be utilized to provide such things as power or signals to the features circuit 68 for providing additional advantageous features, such as a call timer, digital message recorder, or other features depending on the outputs of the jack receiver 100.

As shown in Figures 20(a) and 20(b), when installed on a cellular telephone 14, the protective case 62 is positioned so that the through-holes 94 are facing the phone speaker 70, and the windows 86 allow access to the buttons 88 and viewing of the display screen 90. The tail portion 96 is slipped into a gap provided by a hinged portion of the cellular telephone 14 located between the mouthpiece 16 and the main phone body. The tail portion may terminate in the jack 98, or may terminate in a Velcro covered end for engaging with a Velcro patch disposed on the back surface of the protective case 62. As an alternative to Velcro, other fastening devices can be used, such as snaps, zippers, laces, etc. The cellular phone 14 is held within the protective case 62, and the durable cover 64 is effective for preventing damage to the cellular phone 14 due to it being dropped or otherwise abused, while the shielding layer 66 is effective for preventing harmful exposure of the user to the radiation emitted by the cellular phone 14.

Figures 21(a) through 21(c) show the various components of the features circuit 68 in position on a hand-held cellular phone 14. The positional relationships, sizes and number of components is illustrated by way of example only, the actual attributes of the features circuit 68 will depend on the desired features and the phone body type. The microphone 72 and amplifying speaker 78 are preferably disposed adjacent to and facing the phone speaker 70. The microphone 72 and/or the amplifying speaker 78 may be piezoelectric elements, so as to reduce the overall thickness of the installed protective case 62. Also, although shown covering substantially the entire cellular telephone 14, the protective case may have a reduced size, and if only the feature circuitry 68 is desired, may be provided lacking the shielding layer 66. The feature circuitry 68 includes at least one of the means for amplifying the phone speaker 70 (microphone 72, amplifier 76 and amplifying speaker 78); a power source (battery 76 or a power line tapping off of the phone

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battery), a call timer 104, a recorder 106, a call screener 108, an external speaker jack 110, an external microphone jack 112, a modem/fax port 114, or other advantageous circuitry. The call timer 104 is provided to enable the user to determine the length of time spent on a current phone call and/or the time remaining before extending into the next billing unit. Usually, a billing unit consists of a minute of connect time. For example, most cellular telephone services charge their clients for each minute or portion of a minute used to make a cellular phone call. The cost per minute or per portion of a minute used to make a cellular telephone call is fairly expensive. To make the most economical use of the time charged for a cellular phone call, the call should terminate just before the end of a billing unit, and before the call extends into the next billing unit. The call timer 104 provides the advantageous feature of warning the user when the end of a billing unit is coming up. For example, the call timer 104 can produce an audible signal at the end of every 50 seconds of each minute billing unit, thus warning the user that if the call is not terminated within 10 seconds, another billing unit will be charged. The call timer 104 can be manually activated by pressing a button 116 at the onset of a cellular phone call, or may be activated by a switch (not shown) that is turned on each time the mouthpiece 16 is flipped open (in which case, the call timer 104 is only accurate when a call is received and answered by flipping open the mouthpiece 16). For a more accurate determination of the connect time, the call timer 104 may be activated by a signal received from the cellular telephone 14 each time a billable connection with the cellular phone network is made. The signal may be received through a wire (not shown) connected with an electrical contact 102 included on the jack 98 and connected with an appropriate output of the cellular telephone 14. A resettable memory unit (not shown) can also be provided to keep track of and display accumulated billable connect time.

The recorder 106 is used to record the sound emitted from the phone speaker 70. The recorder 106 can provide many useful features, such as answering machine capabilities for sending a user-recorded outgoing message and recording a caller-recorded message. The recorder 106 can also be used for recording information received during a phone call. For example, directions, phone numbers, or other messages given by the caller during a phone conversation with the user can be recorded by the recorder 106. The recorder 106 is activated manually by the user by pressing a record button 118 and the recorded information is played back by pressing a play button 120. Answering machine circuitry 122 can be provided, linked to the cellular phone through the jack 98, for outputting a recorded outgoing message upon the reception of a call, and after playing the outgoing message, recording a caller-recorded message for later playback by the user. The answering machine circuitry 122 can incorporate similar circuitry as that utilized in a conventional answering machine. The recorder 106 can include a nonvolatile memory integrated circuit capable of storing analog signals, such as an EEPROM capable of storing analog data written directly into a single cell without A/D or D/A conversion. This storage method results in an increase in storage density as compared with equivalent digital storage methods, and allows non-volatile storage of analog data. An example of an EEPROM capable of storing analog data is the ISD1000A family of storage devices manufactured by Information Storage Devices, Inc. of San Jose, California, and sold under the trademark DAST™. The advantages of the DAST™ storage device for use in the

**SUBSTITUTE SHEET (RULE 26)**

recorder 106 include obviating the conventionally required magnetic tape, and corresponding drive motor and circuitry, allowing for a great reduction in size and making the recorder suitable for use with a small hand-held cellular phone. The DAST™ storage device, and its equivalents, require very few parts for use as a single chip voice message system. The sound amplifying components of the invention, the microphone 72, amplifying speaker 78 and battery 76, along with a few switches, resistors and capacitors, are all that is required to provide a complete voice record and playback system. Functions, such as pre-amplification, filtering, AGC, power amplification, logic control and analog storage are all performed on the single chip. To further reduce the overall size of the inventive protective case 62, the capabilities of the single chip may be used when providing other inventive features, such as sound amplification of the sound emitted by the phone speaker 70. Stated otherwise, particular capabilities of the single chip, namely, pre-amplification, filtering, AGC, power amplification and/or logic control, can be used for the voice record and playback system, as well as for the sound amplification system, external speaker, modem/fax port. etc. The recorder 106 may, alternatively, utilize conventional recording tapes (such as the commonly used micro-cassette tape) and recording devices, if minimizing the size of the device is not a major consideration.

The call screener 108 receives a caller phone number signal when an incoming call is received by the cellular telephone. The call screener 108 converts the caller phone number signal to a displayed value so that the user can determine from what phone number the incoming call is being sent. If the cellular phone 14 has appropriate capabilities (either by modification or by stock design) the call screener 108 can input the caller phone number through the jack 98 to be received by the cellular phone 14 by the jack receiver 100 for display of the caller phone number on the cellular telephone display. Alternatively, a separate LCD display (not shown) can be provided on the inventive protective case 62.

The external speaker jack 110 is provided for allowing a connection between the amplified sound emitted from the phone speaker 70 and an external speaker; or between the cellular telephone internal speaker wiring and an external speaker using a connection between the jack receiver 100 and the jack 98. The external microphone jack 112 is provided for allowing a connection between an external microphone and the cellular telephone 14 using a connection between the jack receiver 100 and the jack 98.

The modem/fax port 114 allows connection with a fax machine or a computer for the transmission of data through the wireless connection between the cellular telephone 14 and the cellular phone network. For data reception, the sound emitted from the phone speaker 70 can be received by the modem/fax port 114. If data transmission is desired, then a connection with the mouthpiece 16 or the internal microphone wiring of the cellular telephone 14 is provided (not shown) so that sounds emitted by the modem/fax port can be sent over the wireless cellular phone network from the cellular telephone 14.

As shown in Figure 21(b), the cellular telephone 14 has a battery 103. Different sized batteries 103 may be used with the cellular telephone 14 depending on the charge time desired, whereas a larger sized battery 103 is used when an extended usable charge time is desired, while a

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small sized battery 103 is used when the overall size of the cellular telephone 14 is to be minimized. In order to accommodate different sized batteries 103, the protective case 62 may include elastic fabric portions 101.

Figures 22(a) and 22(b) show another embodiment of the inventive protective case 62 installed on a cellular telephone 14. The flap portion 92 shown, for example, in Figure 19(a) is elongated to form a shielding flap 124. When the external antenna 12' of the cellular telephone 14 is retracted, the shielding flap 124 is fixed to the back of the protective case 62. When the external antenna 12' is raised, the shielding flap 124 is placed in a shielding position in front of the external antenna 12' to prevent radiation emanating from the antenna 12' from reaching the user.

Figure 23(a) is an isolated enlarged cross sectional view of a flexible rechargeable battery 126 used in accordance with the present invention. The flexible rechargeable battery 126 is used, in accordance with the present invention, as a radiation shielding battery 126 that includes at least one shielding material that is effective for electrically shielding electromagnetic radiation. The radiation shielding battery 126 is preferably a rechargeable plastic lithium-ion battery, such as that produced by Bellcore, of Livingston, NJ. Such a battery has an unfolded thickness that is about the same as the thickness of a creditcard. The battery 126 comprises a plastic member 128, which is formed by impregnating a plastic with a liquid electrolyte. The resulting plastic electrolyte member 128 is typically about 50% liquid and cannot leak. The plastic electrolyte member 128 is sandwiched between a positive plastic electrode 130 melded to an aluminum mesh 132 and a negative plastic electrode 134 melded to a copper mesh 136. Thus, in accordance with the present invention, the radiation shielding battery 126 comprises a negative planar electrode side (negative plastic electrode 134 and copper mesh 136) disposed at an electrically negative side of the battery 126, a positive planar electrode side (positive plastic electrode 130 and aluminum mesh 132) disposed at an electrically positive side of the battery 126, and an electrolyte member 128 disposed between the negative planar electrode side and the positive planar electrode side. At least one of the negative planar electrode side and the positive planar electrode side is comprised of the shielding material for electrically shielding electromagnetic, or microwave, radiation. In accordance with the preferred embodiment of the invention, the negative planar electrode side comprises the shielding material. Preferably, an electronic component 138 that is to be shielded is grounded to the negative planar electrode side through an appropriate electrical connection, such as a ground wire 140 electrically connected between a connecting land 142 of the battery 126 and a connecting land 142 of the electrical component 138. To provide additional electromagnetic shielding, a radiation absorbing layer 144 may be disposed as a laminate component of the radiation shielding battery 126, as shown in Figure 23(a). Also, a radiation blocking layer and/or reflecting layer (not shown) may be included in addition to, or substituted for, the radiation absorbing layer 144. The radiation blocking, reflecting and/or absorbing layer may include a magnetic shielding material, such as Mu metal, to enhance the prophylactic features of the invention.

Figure 23(b) is an isolated schematic view of a cellular phone circuit board (electronic component 138) disposed adjacent to the flexible rechargeable battery 126. The radiation

**SUBSTITUTE SHEET (RULE 26)**

absorbing layer 144 (and/or radiation blocking layer, radiation reflecting layer) may be disposed as a separate structure adjacent to a folded radiation shielding battery 126, which may or may not include a laminate component radiation absorbing layer 144. In accordance with the present invention, as shown in Figure 23(b), the radiation shielding battery 126 comprises a thin laminar structure that can be cut, shaped and folded into appropriate dimensions to fit within a case shell of the cellular telephone. By this construction, the radiation shielding battery 126 functions both as a radiation shielding member and as a rechargeable electrical power source. The obtainable voltage from the radiation shielding battery 126 can be adjusted by electrically connecting two or more similarly constructed batteries.

Figures 23(a) and 23(b) illustrate an inventive method of shielding an electronic circuit component 138. In accordance with the inventive method, an electronic component 138 is provided, such as the circuit components, internal antennae, keyboard, speaker, microphone, etc. of a cellular telephone. A radiation shielding battery 126 is disposed adjacent to the electronic component 138. The battery 126 is comprised of at least one shielding material (such as the copper mesh 136 of the negative planer electrode side) which is effective for electronically shielding electromagnetic radiation. As shown, the battery comprises a negative planer electrode disposed at an electrically negative side of the battery. A positive planer electrode is disposed at an electrically positive side of the battery, and an electrolyte member 128 is disposed between the negative planer electrode and the positive planer electrode. Preferably, at least one of the negative planer electrode and the positive planer electrode comprises a material which is effective to act as the shielding material for shielding electrode magnetic radiation. Thus, by this construction, an electromagnetic shield is provided for shielding the electronic component 138 of the cellular telephone from incoming electromagnetic wave radiation (to reduce circuit noise), and for shielding electromagnetic wave radiation emanating from the electronic component 138 (to prevent exposure of the user from electromagnetic radiation generated by the components of the cellular telephone). Preferably, as shown in Figure 23(b), the electronic component 138 is electrically grounded to the electrically negative side of the radiation shielding battery 126. A circuit ground wire 140 may be soldered or otherwise fixed to the electronic component 138 (circuit board) and the copper mesh 136 of the radiation shielding battery 126.

Figure 24(a) is a cut away perspective top view of a flexible rechargeable battery 126 and a case shell substrate 146 prior to assembly in accordance with a manufacturing aspect of the inventive method for shielding an electronic component 138. The flexible rechargeable battery 126 preferably has the structure described above with reference to Figures 23(a) and 23(b). The flexible rechargeable battery 126 is preferably fixed to a case shell substrate 146 using an adhesive 148. The adhesive 148 may have radiation shielding, reflecting or blocking properties, and may be comprised of, for example, fine Ferro-magnetic particles dispersed within a rubber or epoxy adhesive medium. Prior to assembly, the flexible rechargeable battery 126 and the case shell substrate 146 are substantially flat sheet-like members, and thus can be easily shipped from a place of manufacture to a distant place of assembly. The case shell substrate 146 has notches 150 which facilitate folding of the case shell substrate 146. Two of the edges of the case shell substrate 146

**SUBSTITUTE SHEET (RULE 26)**

terminate in toothed engaging structures 152 which, as shown in Figure 24(b) mate together and become engaged to retain the case shell substrate 146 and the rechargeable battery 126 in a folded position. By this structure, a cellular telephone case member can be easily formed simply by folding the rechargeable battery 126 and case shell substrate 146 and engaging the toothed engaging structures 152. In accordance with the present invention, the cellular telephone case member is very easy and inexpensive to manufacture, while providing both electromagnetic shielding and a rechargeable battery.

Figure 24(b) shows a cross-section top view of the inventive cellular telephone case member formed from the assembled flexible rechargeable battery 126 and case shell substrate 146 shown in Figure 24(a). As shown, once the flexible rechargeable battery 126 and case shell substrate 146 are folded, and the toothed engaging structures 152 are mated, an electrically shielded interior space 154 is defined within the formed cellular telephone case member. The electrically shielded interior space 154 is electromagnetic shielded to prevent radiation emanating from internally disposed electronic components 138 from reaching the user of the cellular telephone, and also preventing external electromagnetic radiation from reaching the electrically shielded interior space 154 of the cellular telephone case member to prevent the unwanted introduction of circuit noise.

Figure 24(c) is a cross-sectional side view taken along line c-c of the assembled flexible rechargeable battery 126 and case shell substrate 146 shown in Figure 24(b). In Figure 24(c), the flexible rechargeable battery 126 has more folds, and thus is shown having more layers than are shown in Figures 24(a) and 24(b). The number of layers, and thus the length of the unfolded, unassembled flexible rechargeable battery 126 will depend on factors such as desired battery life, shielding capabilities, weight, and required interior space 154 of the assembled case shell substrate 146 member. In accordance with the inventive method for shielding an electronic circuit component, the rechargeable battery 126 is formed into a hollow shape defining an electrically shielded interior space 154. An electronic component 138 (cellular phone circuitry) is disposed within the electrically shielded interior space 154. The interior space 154 defined by the battery is opened at its ends, and thus preferably these ends should be electrically shielded to prevent electromagnetic radiation from entering the electrically shielded interior space 154 and from exiting from the electrically shielded interior space 154. A shielding cap member 156 is fixed to the folded flexible battery to electronically close the open ends. The shielding cap members 156 may be fixed to the folded flexible battery 126 using either or both of a conductive adhesive 148 and a conductive tape (shown in Figure 26(b)).

In accordance with the present invention, the circuit components of a cellular telephone may be disposed within a electrically sealed folded flexible rechargeable battery 126 and electrically connected with the battery 126 to enhance the shielding aspects, and to provide a rechargeable power source for the phone circuitry. Appropriate electrode leads 160 may be provided from the cellular phone circuitry, through the shielding cap member 156 and electronically connected with a jack 162 so that the electronic phone circuitry 138 shielded within the electrically shielded interior space 154 can be connected with components disposed outside of the electrically shielded interior

**SUBSTITUTE SHEET (RULE 26)**

space 154. In this case, the radiation shielding battery 126 may be formed and sealed to create a hollow electrically shielded interior space 154 that is electrically sealed to prevent electromagnetic radiation in the form of external noise from effecting the cellular phone circuitry 138, while preventing electromagnetic radiation generated by the cellular phone circuitry 138 from exiting the electrically shielded interior space 154 to thereby protect the user of the cellular phone. The thus formed flexible rechargeable battery 126 containing within a sealed electrically shielded interior space 154 the cellular phone circuitry 138 may simply be inserted within a cellular case shell substrate 146 which includes the other necessary components for cellular phone communication. In this case, the folded flexible rechargeable battery 126 and the cellular phone circuitry 138 disposed within the electrically shielded interior space 154 comprise an easy to install modular unit which can be plugged into the cellular phone (not shown) and electrically connected via the jack 162. By this construction, an easy to carry, compact unit is provided which includes a self-contained rechargeable power supply. The cellular phone circuitry 138 is shielded against electronic noise, and is shielded from emitting harmful radiation and/or electronic noise. The self-contained unit may include circuitry 138 containing personal data, such as a phone number, speed-dial numbers, voice recognition, call log, modem, fax, etc., and may be easily transported by the user and inserted in a variety of devices. For example, rental car companies may provide a cellular telephone system which includes all of the necessary hardware except for that contained within the self-contained unit. A user then merely has to insert the personalized self-contained unit into the cellular phone hardware supplied with the rental car, to instantly obtain a customized cellular telephone communication device.

Figure 24(d) is an isolated enlarged cross-sectional view of an assembled and electrically sealed end of the case shell substrate 146 shown in Figure 24(c). The shielding cap member 156 is adhered to and fixed with the folded flexible rechargeable battery 126 through the use of an electrically conductive seal, such as an electrically conductive adhesive 148 or an electrically conductive tape. As shown, an electrically conductive adhesive 148 is used to completely seal off the electrically shielded interior space 154 so that electromagnetic radiation cannot enter or escape from the electrically shielded interior space 154. Also, the adhesive 148 or tape may comprise appropriate material, such as silicone, epoxy, etc. to provide a water type seal thus waterproofing the electrically shielded interior space 154. By this construction, a completely waterproof cellular telephone may be easily provided, as will be described in more detail below. In accordance with the present invention, the cellular telephone case member can be easily formed by fixing the flexible rechargeable battery 126 to the case shell substrate 146 so that the case member has at least a portion of at least one wall comprised of the case shell substrate 146 and the battery 126. By this construction, the overall size of the phone may be greatly reduced, since the interior portion of the cellular phone includes a rechargeable power source that also functions as a shielding device. Thus, an external power pack, which is conventionally required, may be obviated. Also, the case shell substrate 146 may comprise a thin and flexible material, as opposed to the conventionally required thicker and usually brittle material, since the case member includes both the structural integrity of the case shell substrate 146 and the structural integrity of the flexible rechargeable

**SUBSTITUTE SHEET (RULE 26)**

battery 126. Therefore, in accordance with the present invention, a cellular phone may be designed having excellent electromagnetic shielding capabilities to prevent unwanted noise and to prevent harmful exposure of the user to electromagnetic radiation, while having a substantially reduced size and more durable construction as compared with the conventional art. Also, in accordance with the radiation shielding battery construction described above with reference to Figure 23(a), through-holes may be easily formed in the battery to electrically connect the electronic components 138 disposed within the electrically shielded interior space 154 with exteriorly disposed components (i.e., external battery pack, antenna, microphone, speaker, keyboard, etc.). Thus, in accordance with the present invention, a through-hole may be formed in the radiation shielding battery 126, and a conductive wire 164 may be passed through the through-hole and electrically connected with the electronic circuit component 138 (as shown in Figure 25(b)).

Figures 25(a) through 25(c) show an alternative method of manufacturing an electronically shielded electronic device such as a cellular telephone. As shown, a case is provided for electronically shielding an electronic device. The case includes a case shell substrate 146, which as shown, may define a hollow tubular shape. The case shell substrate 146 may be easily formed by an injection molding process, or other suitable forming method. A radiation shielding battery 126, such as that shown, for example in Figure 23(a), includes at least one shielding material that is effective for electrically shielding electromagnetic radiation. The radiation shielding battery 126 is rolled into a hollow tubular shape so as to define an electrically shielded interior space 154. An electronic component 128 is disposed within the electrically shielded interior space 154. A pair of shielding cap members 156 are fixed to the rolled radiation shielding battery 126. The shielding cap members 156 include a shape-maintaining cylindrical extension 166 which fits snugly within the inside diameter of the rolled radiation shielding battery 126. When installed on the rolled battery 126, the battery 126 is maintained between the outside peripheral surface of the shape-maintaining cylindrical extension 166 and the inner peripheral surface of an outer cylindrical portion 168 of the shielding cap member 156. As shown in Figure 23(a), at least one of the shielding cap members 156 may include a jack 162 having electrical terminals that can be electrically connected with the electronic circuit disposed within the electrically shielded interior space 154 and the positive and/or negative electrode sides of the radiation shielding battery 126. This jack 162 may then be utilized for electrical communication between the battery, the circuitry 138 disposed within the electrically shielded interior space 154, and externally disposed circuitry, such as a speaker, microphone, keyboard, antenna, etc. of a cellular phone unit.

Figure 25(b) is a perspective view of an assembled rolled flexible rechargeable battery 126 having electrically sealed ends. The electrically sealed ends are formed by installing the shielding cap members 156 as described above, and then wrapping a conductive sealing tape 170 so that each shielding cap member 156 is fixed to and electrically sealed with the rolled radiation shielding battery 126. In addition to, or instead of the jack 162, through-holes may be formed in the rolled radiation shielding battery 126 and wires 164, such as a speaker wire, a mike wire, and a keyboard wire may be passed through the through-holes for electrical communication with the circuitry 138

**SUBSTITUTE SHEET (RULE 26)**

disposed within the electrically shielded interior space 154. The through-holes may be electrically sealed using an appropriate sealant 172, such as a silicone, rubber or epoxy sealant containing Ferro-magnetic particles.

Figure 25(c) is a perspective view of an assembled inventive cylindrical shaped cellular telephone. In accordance with this embodiment, the electrically sealed radiation shielding battery 126 containing the electronic circuitry 138 may be easily installed within the tubular shaped shell case 146. The shell case 146 has mounted within it a keyboard, microphone, speaker, and antenna.

Figure 25(d) is a cut-away perspective view of an alternative construction of the rolled flexible battery 126. In accordance with this embodiment, the rolled flexible battery includes an antenna window through-hole 174 which may be cut, punched, or drilled into the flexible radiation shielding battery 126. In accordance with the construction of the radiation shielding battery 126 described with reference to Figure 23(a), the forming of an antenna window through-hole 174 will have only a minimal affect on the battery performance. The antenna window through-hole 174 is disposed at the side of the inventive cellular telephone that points away from the user. The battery 126 provides electromagnetic shielding of the user from the radiation emitted from the antenna 180 of the inventive cellular telephone, while the antenna window through-hole 174 allows electromagnetic radiation emitted from the antenna to pass through the antenna window through-hole for communication purposes. Thus, in accordance with this aspect of the invention, a cellular telephone antenna 180, which may be mounted on the cellular telephone circuit board, is disposed within an electrically shielded interior space 154 defined by the wrapped tubular radiation shielding battery 126. The antenna 180 is positioned within the electrically shielded interior space 154 so that it is adjacent to the antenna window through-hole 174. During use of the inventive cellular telephone, the radiation shielding battery 126 is disposed between the user and the antenna 180, thus protecting the user of the inventive cellular telephone from the harmful effects of the emitted radiation, while allowing for the effective transmission of a radiation signal by the antenna 180 for communication purposes.

Figure 26(a) is a view of another embodiment of the inventive cellular telephone having the flexible rechargeable battery 126 disposed for radiation shielding. In accordance with this embodiment, the flexible rechargeable battery 126 is folded in such a way that it is effective to electrically shield the various circuit components 128 of the cellular telephone, and to electrically shield a transmitting antenna. The flexible rechargeable radiation shielding battery 126 may have the structure described with reference to Figure 23(a). As shown, the flexible rechargeable battery 126 is folded so as to form an electrically shielded interior space 154 within which is disposed the various circuit components of the cellular telephone. Also, an antenna assembly space 176 is defined by the folded flexible rechargeable battery 126 within which is disposed an antenna assembly 178 including a transmitting antenna 180 for cellular phone communication. The antenna assembly space preferably is positioned so that the transmitting antenna 180 is disposed at the back of the inventive cellular telephone, with a large amount of the folded rechargeable battery 126 disposed between the transmitting antenna 180 and the user of the cellular telephone during

**SUBSTITUTE SHEET (RULE 26)**

use of the phone to optimize the prophylactic shielding effect of the folded rechargeable battery 126. The antenna assembly space 176 thus allows electromagnetic radiation signals to be transmitted by the transmitting antenna 180 only in directions away from the user, thereby preventing harmful exposure of the user to the emitted electromagnetic wave radiation. As shown in dashed lines and solid lines, a retractable hand shield 182 may be disposed at the back of the inventive cellular telephone. The retractable hand shield 182 is pivotably fixed to the phone case member and can be disposed in a raised position (solid lines) to provide an additional shield for preventing exposure of the hand of the user to electromagnetic wave radiation emitted by the transmitting antenna 180. The retractable hand shield 182 may be pivoted against the cellular telephone body when not in use (dashed lines). The retractable hand shield 182 may be comprised of a radiation blocker, radiation absorber, and/or radiation reflector, and may have a component which is electrically grounded with the circuit ground of the inventive cellular telephone to enhance the prophylactic effect of the hand shield 182. To further enhance the electrical shielding effect, a sealing cap member 156 may be installed to the flexible battery 126 and the case substrate 146 in a similar manner as described above with reference to Figures 24(c) and 24(d). The sealing cap members described herein may be comprised of an electrically conductive layer disposed on a supporting plastic substrate. The electrically conductive layer enables the electromagnetic wave shielding effect, while the supporting plastic substrate provides strength and integrity to the cellular telephone case member.

Figure 26(b) is a cross-sectional back view taken along line b-b of Figure 26(a) of the inventive cellular telephone. As shown, an additional electronic shield member (which may be another a flexible rechargeable battery 126) is disposed perpendicular to and adjacent with the folded flexible rechargeable battery 126 shown in cross-section in Figure 26(a). This additional shielding member is preferably adhered to and fixed with the folded rechargeable flexible battery through the use of a conductive adhesive 148 or conductive tape (not shown) so as to define an electrically shielded interior space 154 having an efficient shielding characteristic. The configuration and number of flexible rechargeable batteries 126 depends on the folding pattern, required voltage, shielding capabilities and storage requirements of the battery system. The flexible battery described with reference to Figure 23(a) provides exceptional design flexibility. Also shown are a pair of back-up battery 184 which may be provided for allowing emergency use of the cellular telephone. In accordance with this aspect of the invention, the back-up battery 184 provide a long shelf life electrical power supply, such as alkaline batteries. These alkaline back-up battery 184 are usable at any time, so that, for example, if the rechargeable batteries associated with the inventive cellular telephone become discharged at an inopportune time, the back-up battery 184 may be tapped to provide continuous usage of the cellular telephone.

Figure 26(c) is an enlarged and isolated cross-sectional side view of the transmitting antenna assembly 178 shown in Figures 26(a) and 26(b). In accordance with this aspect of the invention, a transmitting antenna 180 is disposed adjacent to an electromagnetic shielding system comprised of a radiation absorber, a radiation reflector, and/or a radiation blocker. As shown, a grounded electromagnetic shield 186 is provided fixed with a radiation absorber 188. The

## **SUBSTITUTE SHEET (RULE 26)**

grounded electromagnetic shield 186 is in electrical communication through a ground wire 140 with the circuit ground of the inventive cellular telephone. The radiation absorber 188 is provided to enhance the radiation shielding effect and to prevent unwanted exposure of the user to the radiation emitted by the transmitting antenna 180. The radiation absorber 188 and electromagnetic shield 186 are disposed between the transmitting antenna 180 and the user during use of the inventive cellular telephone. Thus, the user is adequately and effectively shielded from the harmful effects of the electromagnetic radiation emitted from the transmitting antenna 180, while still allowing the electromagnetic wave signal to be transmitted from the transmitting antenna 180 for effective communication. Also shown in Figures 26(a) and 26(b) is a separate receiving antenna 190 which is disposed within the telephone case member of the inventive cellular telephone so as to allow reception of a received electromagnetic radiation signal from a remote site, such as a terrestrial-based cell site, or a satellite transmitter in earth orbit. The receiving antenna 190 is preferably not shielded, since the radiation signal that it receives may be relatively weak. The receiving antenna 190 does not emit radiation, and therefore does not pose a potential radiation hazard to the user of the cellular telephone. Thus, in accordance with this aspect of the invention, two antennas are provided; one which is shielded and which transmits electromagnetic radiation, and another which is not shielded and which receives electromagnetic wave radiation.

Figures 27(a) and 27(b) show a schematic cross-sectional view of another embodiment of the inventive cellular telephone. In accordance with this embodiment, a retractable mouthpiece 192 is provided. The retractable mouthpiece 192 is housed in a closed position within the body of the inventive cellular telephone. To extend the mouthpiece to an open position, a hinged door 193 is opened allowing the retractable mouthpiece 192 to extend from its position within the cellular phone housing while being urged by a spring member 196. A coil spring 198 disposed at a pivot point of the retractable mouthpiece swings the retractable mouthpiece into position for communication. The retractable mouthpiece 192 preferably includes a microphone (not shown) which is effective for providing an electrical signal corresponding to the voice of the cellular phone user to the circuit board of the inventive cellular telephone. Also, as shown, a pair of back-up batteries 184 are provided for emergency use of the cellular telephone. The back-up battery 184 may be comprised of disposable alkaline batteries which have a long storage shelf life. Alternatively, slow-to-recharge but long storage life rechargeable batteries may be used as the back-up battery 184. A shielded transmitting antenna 180 is provided for transmission of an electromagnetic wave radiation signal, while an unshielded receiving antenna 190 is provided for reception of a radiation signal received from a remote transmitter, such as a terrestrial-based cell site, or a satellite transmitter in earth orbit. As an alternative, or in addition, to the radiation shielding battery 126 shown above, a shield member 195 may be provided comprised of a radiation absorber, radiation blocker, and/or radiation reflector, and may extend around the circuit board and circuit components of the cellular telephone. In the case of a radiation absorber, a rubberized material embedded with graphite or Ferro-magnetic particles may be utilized for absorbing electromagnetic wave radiation to thereby prevent harmful exposure of the user to the

**SUBSTITUTE SHEET (RULE 26)**

radiation emitted by the components of the cellular telephone, while shielding the circuit components of the cellular telephone from the effects of outside introduced electromagnetic noise.

Figure 28(a) shows electrical power supply and battery selection circuitry. As described above with reference to Figures 26(a) through 26(c), and 27(a) and 27(b), in accordance with one aspect of the present invention a supplemental or back-up battery 184 may be used to provide emergency battery power so that the inventive cellular telephone is available for communication at times where it otherwise may not be. In accordance with an embodiment of the inventive cellular telephone, an internal battery 126 is provided which comprises a rechargeable flexible battery 126 that acts as a radiation shield (see Figures 23(a) through 26(b)). An external battery 194 may be included as described below (see, for example, Figures 31(b)). The external battery 194 and the internal battery 126 preferably comprise rechargeable battery units, such as a lithium or nickel-cadmium battery typically used in portable electronic devices. The internal battery 126 of the inventive cellular telephone may thus be supplemented with either or both of an external battery 194 and a disposal back-up battery 184. The user can choose between different modes of operation. In an auto switching mode, the telephone circuitry 200 is automatically supplied with power first from the external battery 194 (if present), and then, when a charge sensor 196 detects depletion of the external battery 194, a switch 198 automatically draws power from the internal battery 126. When the charge sensor 196 detects that the internal battery 126 is depleted, the switch draws charge from the disposable battery. This hierarchy uses the added external battery 194 first, since it can easily be replaced with another freshly charged external battery 194. The internal battery 126 is then used when the external battery 194 has been depleted. The internal battery 126 is less easy to be recharged than the external battery 194, since the phone is placed out of commission while it is placed in the charger to charge its internal battery 126. As a last resort, the back-up battery 184 can be used to provide emergency cellular phone communication. The disposable or back-up battery may be a conventional alkaline battery, or may be a rechargeable battery that is slow to charge but capable of holding its charge for long periods (as opposed to the internal battery 126 and external battery 194, which typically are quicker to recharge but have a relatively short storage shelf-life). A voltage conditioner 202 may be utilized to step up or step down the voltage and/or current obtained from the internal, external, or supplemental battery systems, so that the appropriate voltage and current is applied to the telephone circuitry 200. The user can utilize a battery mode selector 204 to manually select which battery to draw the power from for operating the telephone circuitry 200. Thus, if the external battery 194 and internal battery 126 are depleted, the user may select to utilize the back-up battery 184 for keeping the cellular phone in standby mode for both sending and receiving calls. In another selected mode, the back-up battery 184 is only used for sending calls, and thus will not be consumed while waiting for a call to be received. Thus, in accordance with this aspect of the present invention, an electrical power supply for an electronic device, such as a cellular telephone is provided. An internal battery 126 is provided for powering the electronic device. The internal battery 126 is disposed within the case member which contains the electronic device. An external battery 194 is provided which is connectable with the case member for powering the electronic device, and a back-up battery 184 is

**SUBSTITUTE SHEET (RULE 26)**

disposable within the case member for powering the electronic device. Switching means are provided for switching a connection between the electronic device and the internal battery 126, the external battery 194, and the back-up battery 184 so that the electronic device is powered at different times by the different batteries. Controlling means (charge sensor 196 and switch 198) may be provided for determining an existence and a state of charge of at least one of the internal battery, the external battery 194, and the back-up battery 184, and for controlling the switching between the batteries and the telephone circuitry 200 depending on the determined existence and state of charge of the internal battery 126, external battery 194, and back-up battery 184. The switching means may be controlled so that if it is determined that an external battery 194 exists, then the electronic device is first powered by the external battery 194 until a state of charge of the external battery 194 reaches a predetermined limit. The electronic device is then powered by the internal battery until a state of charge of the internal battery 126 reaches a predetermined limit, and then the electronic device is powered by the back-up battery 184. Preferably, the internal battery comprises a radiation shielding battery 126 having the configuration and dimensions as described herein, so as to be effective in shielding the user from the potential harmful radiation emitted by the telephone circuitry 200 and antenna 180, preventing unwanted electromagnetic noise from effecting the performance of the telephone circuitry 200, and providing a power source.

Figure 28(b) is a block diagram of an inventive telephone mode selection circuitry. In accordance with this aspect of the invention, a cellular telephone is provided having cordless telephone circuitry 206, shared telephone circuitry 208, and cellular telephone circuitry 210. The cordless telephone circuitry 206 includes the circuitry components necessary for enabling the inventive phone to act as a cordless telephone. This type of telephone is particularly useful within the general location of a home-base unit provided at the home or office. The cellular telephone circuitry 210 includes the circuitry components necessary for the phone to act as a cellular telephone, allowing it to be taken with the user for use at remote distances from the home-base site. The shared telephone circuitry 208 includes all the circuitry components which are in common with the cordless telephone and cellular modes of operation. Thus, redundant circuit components are not necessary, and the inventive cellular telephone can act as a cordless telephone when appropriate and automatically switch to a cellular telephone when appropriate. A telephone mode selector 212 is provided which automatically detects when the user is within range of the cordless telephone home-base through a "handshake" signal. In this case, since the cost of a conventional telephone call is typically less than the cost of a cellular telephone call, it is preferred that the inventive telephone be used with the home-base as a cordless phone. A selector 213 receives a signal from the telephone mode selector and automatically selects the cordless telephone circuitry 206 when within range of the home-base unit. When the phone is not within range of the home-base unit (i.e., no "handshake" signal is received by the phone from the home-base unit within a predetermined interval), the selector 213 switches to the cellular telephone circuitry 210. If a transmitted call signal from the phone is received by the home-base, a home-base "handshake" signal is sent to the phone and the cordless phone circuitry 206 is used. If a "handshake" signal from the home-base is not received, then the cellular phone circuitry 210 is used to make the call.

**SUBSTITUTE SHEET (RULE 26)**

The selection of cellular or cordless phone circuitry can be manually overridden for times when the phone is out of range of the home-base, so that the determination of which kind of phone circuitry to utilize can be obviated, and a cellular phone call is automatically made.

Figures 29(a) through 29(c) show a configuration of an inventive cellular telephone which promotes the correct placement of the hand of the user so that exposure of the hand to the radiation emitted by a radiation transmitting antenna 180 is reduced or avoided. In accordance with this aspect of the invention, the transmitting antenna 180 is shielded as described above. Also, a second receiving antenna 190 is provided which is not shielded so as to be effective for receiving the signals transmitted from a remote cell site or satellite. A grip disposing surface 214 is provided on the body of the cellular phone at locations that encourage the user of the cellular phone to position his hand within an area of safety that is shielded from the electromagnetic wave radiation emanating from the transmitting antenna 180. Figure 29(a) is a side perspective view of this embodiment of the cellular telephone having grip disposing surfaces 214. Figure 29(b) is a back perspective view, and Figure 29(c) is a front perspective view of this embodiment of the inventive cellular telephone. During use of the inventive cellular telephone, the hand gripping the cellular telephone is presented with a relatively softer, easier to grip surface located in the region covered by the grip-disposing surfaces 214. Preferably, the grip-disposing surfaces 214 occupy a region located at the sides and back, from the bottom of the cellular telephone to a location above the midpoint of the longitudinal axis of the cellular telephone. The front and the top region of the sides and back of the cellular telephone do not have the grip-disposing surfaces 214, but rather, preferably comprise a relatively harder, smooth surface texture, which is less likely to be gripped by the user's hand. Further, the user can be instructed to grip the phone only at the grip-disposing surfaces 214 in order to place his hand out of the way of the potential harmful radiation emitted by the transmitting antenna 180. A hook button 216 is provided at a convenient location at either of the sides of the cellular phone. The hook button 216 is used to answer an incoming call, or to hang-up after a call has been completed. Preferably, the display and keypad 217 are disposed at the back of the phone so that any radiation leakage or emission caused by the necessity for these components (due to, for example, electrical connection with the circuit components 138) is directed away from the user.

Figure 30 is a perspective view of the inventive cellular telephone shown in Figures 29(a) through 29(c), shown in use being gripped by a hand and disposed adjacent to the head of the user. As shown, the grip-disposing surfaces 214 present a tactile surface that is easily distinguished by the hand, so that the user grips the phone appropriately. The transmitting antenna 180 is disposed within a shielded antenna assembly space which allows effective transmission of the emitted electromagnetic wave radiation signal in directions that are away from the user, while preventing the harmful exposure of the head and body (i.e., hand) of the user to emitted radiation when the cellular telephone is in use. The receiving antenna 190 is shown disposed at the back and top of the inventive cellular telephone, within an area that is not purposefully shielded. Thus, the receiving antenna 190 is effective for receiving the transmitted electromagnetic wave radiation signal being sent by a remote cell site or satellite. The location and configuration of the receiving

**SUBSTITUTE SHEET (RULE 26)**

antenna 190 and the transmitting antenna 180 is shown for illustrative purposes only, although it is preferable that the transmitting antenna 180 be disposed at a location which promotes the effective shielding of the transmitted electromagnetic radiation to prevent it from impinging on and possibly harming the body, hands, and head of the user. The type of antenna used may be a quarter wave antenna, monopole antenna, dielectric antenna, etc. and is effective for transmitting the electromagnetic wave radiation signal that is used for communication with the inventive phone or other electronic device.

Figure 31(a) is a perspective view of a home-base unit 218 and external battery 194 in accordance with an embodiment of the inventive cellular telephone. As shown, the home-base unit 218 includes an electrical power supply plug 220 which plugs into the standard wall socket of conventional home electrical wiring. A telephone jack 222 plug is provided for electrically connecting the home-base unit 218 with the telephone system of the home. A reception/transmission antenna 224 is provided for receiving a signal from the inventive cellular telephone, and transmitting a signal to the inventive cellular telephone. The signal received and transmitted constitutes the phone communication carried through the home telephone system. As shown in Figure 31(a), an external battery 194 may be charged by placing the battery pack within a receiving well, in a conventional charging manner. As shown in Figure 31(b), the external battery 194 may be attached to the inventive cellular telephone. Alternatively, the inventive cellular telephone may include the internal flexible rechargeable battery 126 described above with reference to Figure 23(a), and thus the external battery 194 may be obviated, or provided to extend the useful time available for communication with the cellular telephone. The external battery 194 and internal flexible rechargeable battery 126 may be depleted in the manner described above with reference to, for example, Figure 28(b). Also, a back-up battery system as described above may be included within the inventive cellular telephone.

As shown in Figure 31(c), one or more add-on modules 226 may be attached to the cellular telephone. The stackable add-on modules 226 allow the user to customize and enhance the cellular telephone features. Also, the stackable add-on modules 226 allow the inventive cellular telephone to be updated so that, for example, an analog cellular telephone may be converted to a digital cellular telephone by attaching the appropriate stackable add-on module, which is in turn electrically connected with appropriate circuitry 138 of the inventive cellular telephone. Also, the stackable add-on modules 226 may provide the features of a digital recorder, a voice-recognition system, a call screener, call timer, the supplemental back-up battery 184, the rechargeable external battery 194, a fax/modem, a pager, a computer down-loadable address book, a computer down-loadable call log (for client billing, checking phone usage, etc.), or other stackable add-on modules 226 which may be developed through the course of further refinements to the inventive cellular telephone system.

Figure 32 shows a car-based unit 228 and the embodiment of the inventive cellular telephone shown in Figures 29(a) through 29(c). The car-base unit 228 is mountable within an automobile to enable battery charging and enhanced use of the inventive cellular phone. The internal rechargeable battery 126 is recharged by placing the cellular telephone within the receiving

**SUBSTITUTE SHEET (RULE 26)**

well of the car home-base unit 228. The car-base unit 228 includes a stereo speaker wire harness 230 which electrically connects with the stereo speaker wire harness provided with the stereo system of an automobile. Thus, the speakers of the automobile used for the radio, cassette, or CD player may also be utilized for telephonic communication utilizing the inventive cellular telephone. Furthermore, the stereo speaker wire harness 230 may include an appropriate construction that allows one or more of the speakers of the car stereo system to act as an external microphone for cellular communication. For example, during a phone conversation, the driver's side front speaker may be utilized as a microphone, while the rest of the car's speakers are utilized as the telephone speakers for the inventive cellular telephone. By this construction, the inventive cellular telephone may be disposed in the receiving well of the car-base unit 228, and if a call comes in while the driver is driving, an appropriate switching signal is provided to by-pass the stereo sound signals generated by the stereo of the automobile, and utilize the speakers of the car for cellular phone communication. The stereo speaker wire harness 230 may include switching means receptive of the switching signal and effective for switching a connection with the speakers between the home-base unit 228 and the stereo system of the car. The front driver's side speaker acts as a receiving microphone, while the rest of the speakers of the automobile perform as speakers for the cellular telephone. Thus, an easy to install hands-free cellular phone system is provided in accordance with this aspect of the invention. A car cigarette lighter adapter 232 is provided for supplying electrical power to the car-base unit 228. The car-base unit 228 may include a microphone 234 and an external speaker 236 disposed within it for communication via the cellular telephone. An external antenna connector 238 may also be provided for connecting with an externally disposed antenna, which may be placed at the outside surface of the car. An alternate antenna 240 may be provided on the car-base unit 228, which is capable of emitting a stronger signal than the transmitting antenna 180 of the hand-held cellular telephone. The relatively stronger signal emitted by the car-home-base will be more effective for cellular phone communication, but since it is located at a remote distance from the driver, it will not present a potential radiation hazard. The output of the alternate antenna 240 should not however be so great as to pose any potential health risks. The car-base unit 228 emits a "handshake" signal that is different from the "handshake" signal emitted by the home-base unit 218. Thus, the cellular phone can determine the base unit type (cellular or cordless), utilizing the circuitry described above with reference to Figure 28(b). The car-base unit 228 (and/or the home-base unit 218) may emit a digital "handshake" which can be programmed in the cellular phone. Thus, different cellular phones can be added to the communication signal by programming in the cellular phone the "handshake" of the car-base unit 228 and the home-base unit 218. The "handshake" insures that call transmission is only receivable between phones and home bases programmed for a particular system.

Figure 33 is a schematic view of radiation shielding components in accordance with the inventive cellular telephone. The shielding and sealing means described with reference to, for example, Figures 24(a) through 24(d) and 23(a) through 25(d), allow for the manufacture of a waterproof and electromagnetically shielded cellular phone. A circuit board and antenna assembly is appropriately shielded utilizing the inventive electromagnetic wave shielding mechanism

## **SUBSTITUTE SHEET (RULE 26)**

described herein. The microphone and speaker of the cellular telephone are constructed with a waterproof metalized mylar diaphragm 242, as opposed to the conventionally used paper diaphragm. The metalized mylar diaphragms shield the user against radiation emitted by a magnetic field coil 244 that is connected with a circuit wire 246 for electrical communication with the telephone circuitry 138. Alternatively, or in addition, an absorber 248 may be disposed adjacent to the magnetic field coil of the speaker and microphone. Thus, the user is protected against electromagnetic wave radiation that is conducted through the circuit wire 246. The circuit board 138 of the cellular telephone is encased in a radiation shield 250, which may include a radiation absorber, reflector and/or blocker, and which may be a radiation shielding battery 126 as described above. The antenna assembly 178, including a transmitting antenna 180, is disposed adjacent to a radiation shield 250, which may include a radiation absorber, reflector and/or blocker, and which may be a radiation shielding battery 126 as described above. A reflecting layer 252 may be provided along a wall of the radiation shield 150 facing the antenna assembly space 176. Preferably, the reflecting layer 252 is disposed at a distance of  $l/4$  from the radiation absorber 188 of the antenna assembly 178, wherein  $l$  is equal to the wave length of the radiation signal emitted from the transmitting antenna 180. By this construction, at least some of the radiation that leaks past the radiation absorber 188 is reflected by the reflecting layer 252 as a cancellation wave back toward the radiation absorber 188. As shown, the keypad and display 217 may be disposed at the back of the cellular telephone so that the radiation shield is disposed between the user, and the keypad and display. By this construction, the user is protected from any potential harmful radiation that may be emitted from the keypad and display 217 due to the electrical connection of these components with the radiation generating components of the telephone circuitry 138.

Figures 34(a) through 38 show embodiments of the present invention which provide a shielded radiation patch antenna assembly 254. In accordance with this aspect of the present invention, a patch antenna 256 is used as a communication signal transmitter for the cellular telephone. The patch antenna 256 may also be used as a signal receiver, or, a separate unshielded receiving antenna 190 (having any appropriate antenna construction) may be used. In accordance with the present invention, the radiation emitting patch antenna 256 is effectively shielded to prevent the unwanted and potentially harmful exposure of the user to the emitted radiation, while allowing for transmission of an emitted radiation signal in directions away from the user.

A thin-film patch antenna 256 is formed by coating or lamination both sides of a dielectric substrate 258 with a thin film of metal. The metal can be formed on the dielectric substrate 258 by sputtering, screen printing, vacuum depositing, etc. The metal on one side is formed into a high-resolution patch antenna 256 (using photolithography, screen printing and/or etching techniques) having a configuration and dimensions that are effective to form a microwave antenna. The metal layer on the other side of the dielectric substrate 258 is used as a ground plane 260 for signal transmission and/or reception. Figure 34(a) shows in an exploded view the components of an inventive shielded radiation patch antenna assembly 254 including the dielectric substrate 258, the patch antenna 256, the ground plane 260 and a radiation blocker/absorber and/or reflector member 262.

**SUBSTITUTE SHEET (RULE 26)**

An exploded perspective view of an embodiment of a shielded radiation patch antenna assembly 254 in accordance with the present invention is shown in Figure 34(a). In accordance with the present invention, the patch antenna 256 may have tuning tabs 264. As is known in the prior art and disclosed, for example, in U.S. Patent No. 5,245,745, issued to Jensen et al., these tuning tabs 264 can be trimmed using, for example, a laser, to adjust the characteristics (such as the frequency, impedance and polarization) of the patch antenna 256 after it has been formed on the dielectric substrate 258. During a prefabrication test of the patch antenna 256 it may be determined to be defective due to unacceptable characteristics resulting from inconsistent material or fabrication methods. The defective antenna may be salvaged by adjusting the characteristics to overcome the defects, allowing a higher manufacturing yield.

Figure 34(b) is a perspective view of an assembled radiation patch antenna in accordance with the embodiment shown in Figure 34(a). The assembled radiation patch antenna can be manufactured using similar material and according to highly successful manufacturing techniques used for the fabrication of printed circuit boards and the like. Thus, the overall cost of the antenna is reduced, since existing manufacturing plant capacity can be utilized. In this embodiment, the patch antenna 256 has a feed through-hole 266 for receiving a signal line from the cellular telephone circuitry 138. Also, the ground plane 260 may be in electrical contact with the circuit ground of the circuitry 138 and/or battery 126. A shielded co-axial circuit cable (not shown) may be used for connection with the patch antenna 256 and/or the ground plane 260.

Figure 34(c) is a perspective view of an assembled shielded radiation patch antenna assembly 254 in accordance with the embodiment shown in Figure 34(a). The assembled radiation patch antenna (shown in Figure 34(b)) is received by the radiation blocker/absorber and/or reflector member 262. The radiation blocker/absorber and/or reflector member 262 may be integrally formed with, for example, the radiation shielding battery 126 or case member of the cellular telephone. Alternatively, the radiation blocker/absorber and/or reflector member 262 may be a separate unit mounted to the cellular telephone during assembly. The radiation blocker/absorber and/or reflector member 262 may comprise the radiation absorbing materials described herein, or other known absorbers, and may have a laminated layer structure including a combination of radiation blocker/absorber and/or reflector materials. The geometry of the components of the inventive shielded radiation patch antenna assembly 254 shown are for illustrative purposes, and other configurations and dimensions may be preferable depend on the application and desired characteristics. For example, the radiation blocker/absorber and/or reflector member 262 may have softer corners to be more effective at shielding the user from the emitted radiation, the ground plane 260, dielectric substrate 258 and patch antenna 256 may be shaped differently to obtain specific antenna characteristics, or to overcome defects due to inconsistent materials and/or fabrication steps.

Figures 35(a) through 35(c) show another embodiment of a shielded radiation patch antenna assembly 254 in accordance with the present invention. In this embodiment, an electromagnetic antenna feed radiator 268 is used to electromagnetically couple the transmission and/or reception signal between the telephone circuitry 138 and the patch antenna 256. The patch

**SUBSTITUTE SHEET (RULE 26)**

antenna 256 is formed on one side of a first dielectric substrate 258, and the electromagnetic antenna feed radiator 268 comprises a conductor that is patterned on the opposite side of the dielectric substrate 258. The electromagnetic antenna feed radiator 268 is electrically connected with the telephone circuitry 138 through an antenna feed line 270. Dielectric spacers 272 may be provided adjacent to the electromagnetic antenna feed radiator 268 to maintain a space having certain electrical characteristics between the first dielectric substrate 258 and a second dielectric substrate 274. The second dielectric substrate 274 may be thicker than the first dielectric substrate 258 to electrically isolate the electromagnetic antenna feed radiator 268 from the ground plane 260. The shapes, thickness, locations and dimensions of the components of the inventive shielded radiation patch antenna assembly 254 depend on the particular application and desired characteristics. For example, the location and shape of the electromagnetic antenna feed radiator 268 relative to the patch antenna 256 (and/or ground plane 260) can be altered to obtain specific signal characteristics and to correct for defects due to inconsistent materials and/or fabrication techniques.

Figure 35(b) is a perspective view of an assembled radiation patch antenna 256 in accordance with the embodiment shown in Figure 35(a). The dielectric spacers 272 ensure that the electrical properties of the space between the patch antenna 256 and the ground plane 260 are controlled to produce an appropriate transmitted signal and/or received signal using the inventive antenna assembly. However, if the electromagnetic antenna feed radiator 268 is a thin film or nested into either the first or second dielectric substrate 258, 274, then the dielectric spacers 272 may not be needed.

As shown in 35(c), when the antenna assembly is installed within the radiation blocker/absorber and/or reflector member 262, the antenna feed line 270 is accommodated in a notch 276 (or through-hole) formed in the radiation blocker/absorber and/or reflector member 262. Also, an electrical connecting line (not shown) for connecting the ground plane 260 with the telephone circuitry or battery may pass through another notch 276 or through-hole formed in the radiation blocker/absorber and/or reflector member 262.

Figures 36(a) and 36(b) show another embodiment of the inventive shielded radiation patch antenna assembly 254. In accordance with this embodiment, two or more patch antennas 256 are provided. By providing two or more patch antennas 256, different communication signals can be received and transmitted by the same antenna assembly and thus the cellular telephone can have a more universal use. For example, one patch antenna 256 may be used to transmit and/or receive communication signals having a frequency and polarization effective for communication using a terrestrial based cellular phone system. The other patch antenna 256 may be used to transmit and/or receive communication signals having a different frequency and/or polarization (or other different characteristics), or for example, a satellite based telephone communication system, paging system, radiotelephone system, telepoint system, etc. The shape, composition, configuration and location of the components of the shielded radiation patch antenna assembly 254 may be selected depending on the intended use. For example, the electromagnetic antenna feed radiator(s) 268 may be replaced with shielded co-axial cable(s), etc. In accordance with this feature, a single cellular

**SUBSTITUTE SHEET (RULE 26)**

telephone is simultaneously receptive of different transmitted signals. Thus, a user needs only one communication device to communicate via a variety of radio-based systems.

Figure 37 is an exploded perspective view of another embodiment of a shielded radiation patch antenna assembly 254. In accordance with this embodiment, at least one (two are shown) patch antennas 256 are formed adjacent to a first dielectric substrate 258. A corresponding ground plane 260 is formed adjacent to the opposite side of the dielectric substrate 258. An antenna feed 278 is formed adjacent to a second dielectric substrate 274 separating the antenna feed 278 from the ground plane 260. The ground plane 260 may have an aperture 280 to electromagnetically couple a signal between the patch antenna 256 and the antenna feed 278. As known in the prior art, and disclosed, for example, in U.S. Patent No. 5,241,321, issued to Tsao, interaction of the antenna feed 278 with the aperture 280 of the ground plane 260 produces a polarized radiation signal. The shape, location, dimensions and composition of the components of the inventive antenna assembly can be varied depending on the application and/or to correct defects due to inconsistent material and/or fabrication processes. For example, the orientation and shape of the antenna feed 278 and/or aperture 280 may be altered to produce a signal having a particular polarization, depending on the type of communication system on which the patch antenna 256 will be used.

Figure 38 is a side perspective view of another embodiment of the inventive cellular telephone having grip disposing surfaces and having a shielded radiation patch antenna assembly 254. As shown, the inventive shielded radiation patch antenna assembly 254 may be used as a transmission antenna assembly along with an unshielded receiving antenna 190. Of course, the patch antenna 256 can be used for reception and the receiving antenna 190 may not be necessary, depending on the positioning of the radiation blocker/absorber and/or reflector member 262 and its shielding effect.

With respect to the above description, it is realized that the optimum dimensional relationships for parts of the invention, including variations in size, materials, shape, form, function, and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art. All equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described. Accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

**SUBSTITUTE SHEET (RULE 26)**

## Claims:

40

1. A method of shielding an electronic circuit component, characterized by the steps of: providing an electronic component; and providing a radiation shielding battery disposed adjacent to the electronic component, the battery being comprised of at least one shielding material being effective for shielding electromagnetic radiation.

2. A method of shielding an electronic circuit component according to claim 1; further comprising the step of providing the battery comprising a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and an electrolyte disposed between the negative planar electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

3. A method of shielding an electronic circuit component according to claim 2; further comprising the step of electrically grounding the electronic component to the electrically negative side of the battery.

4. A method of shielding an electronic circuit according to claim 1; further comprising the steps of forming the battery into a hollow shape defining an electrically shielded interior space; and disposing the electronic component within the electrically shielded interior space.

5. A method of shielding an electronic circuit component according to claim 4; further comprising the step of providing the hollow shape having at least one open end; and further comprising the step of fixing a shielding cap member to electronically close said at least one open end.

6. A method of shielding an electronic circuit component according to claim 1; further comprising the step of fixing the battery to a case shell substrate to form a case member having at least a portion of at least one wall comprised of the case shell substrate and the battery.

7. A method of shielding an electronic circuit component according to claim 1; further comprising the step of providing the battery comprising a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and a plastic electrolyte formed by impregnating a plastic with a liquid electrolyte, the plastic electrolyte being disposed between the negative planar electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

8. A cellular telephone, characterized by: radiation emitting cellular telephone circuitry for emitting microwave radiation; an antenna assembly for emitting microwave radiation; and shielding

**SUBSTITUTE SHEET (RULE 26)**

means disposable during use for shielding a user of the cellular telephone from at least one the microwave radiation emitted from the cellular telephone circuitry and the microwave radiation emitted from the antenna assembly, the shielding means comprising a radiation shielding battery disposed adjacent to at least one of the cellular telephone circuitry and the antenna assembly, the battery being comprised of at least one shielding material being effective for shielding microwave radiation..

9. A cellular telephone according to claim 8; wherein the battery comprises a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and an electrolyte disposed between the negative planar electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

10. A cellular telephone according to claim 8; wherein the battery is formed into a hollow shape defining an electrically shielded interior space for containing the cellular telephone circuitry within the electrically shielded interior space.

11. A cellular telephone according to claim 8; wherein battery defines the hollow shape having at least one open end; and further comprising a shielding cap member to electronically close said at least one open end.

12. A cellular telephone according to claim 8; further comprising a case shell substrate fixed to the battery for forming a case member having at least a portion of at least one wall comprised of the case shell substrate and the battery.

13. A cellular telephone according to claim 8; wherein the battery comprises a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and a plastic electrolyte formed by impregnating a plastic with a liquid electrolyte, the plastic electrolyte being disposed between the negative planar electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

14. An antenna assembly for a radio transmitting device, comprising: a first antenna for receiving electromagnetic radiation from a remote source; a second antenna for emitting electromagnetic radiation from the radio transmitting device to a remote receiver; and shielding means disposed during use of the radio transmitting device between the second antenna and a user so as to be effective to shield the user from at least some of the electromagnetic radiation emanating from the second antenna toward the user while allowing at least some of the electromagnetic

**SUBSTITUTE SHEET (RULE 26)**

radiation emanating from the second antenna not toward the user to be transmitted, so that exposure of the user to potentially harmful radiation from the antenna is prevented while allowing the second antenna member to transmit the electromagnetic radiation from the radio transmitting device to the remote receiver, and allowing the first antenna to receive electromagnetic radiation from the remote source.

15. An antenna assembly according to claim 14; wherein the shielding means comprises at least one of an electromagnetic radiation absorber, an electromagnetic radiation absorber and an electromagnetic radiation reflector.

16. A antenna assembly according to claim 14; wherein the shielding means comprises a radiation shielding battery disposed adjacent to the second antenna, the battery being comprised of at least one shielding material being effective for shielding electromagnetic radiation.

17. An antenna assembly according to claim 16; wherein the radiation shielding battery comprises a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and an electrolyte disposed between the negative planer electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

18. An antenna assembly according to claim 16; wherein the battery comprises a negative planar electrode disposed at an electrically negative side of the battery, a positive planar electrode disposed at an electrically positive side of the battery, and a plasitc electrolyte formed by impregnating a plasitc with a liquid electrolyte, the plastic electrolyte being disposed between the negative planer electrode and the positive planar electrode, at least one of the negative planar electrode and the positive planar electrode being said at least one shielding material for shielding electromagnetic radiation.

19. An antenna assembly according to claim 16; wherein the battery further compries a radiation absorbing layer.

20. An antenna assembly according to claim 16; wherein the battery is formed into a concave shape defining a space for accomodating the second antenna.

**SUBSTITUTE SHEET (RULE 26)**

**AMENDED CLAIMS**

[received by the International Bureau  
on 18 October 1995 (18.10.95);  
new claims 21-45 added; remaining claims unchanged (5 pages)]

21. A radiation shielding apparatus for a radio signal transmitting device, the radiation shielding apparatus characterized by: shielding means disposed during use between a radiation emanating component comprising an electromagnetic radiation transmitting antenna of a radio signal transmitting device and a user, the electromagnetic radiation transmitting antenna comprising at least one of an internal antenna disposed in the interior of the radio signal transmitting device and an external antenna disposed on the exterior of the radio signal transmitting device, the shielding means for preventing unwanted exposure of the user to emanating radiation from the electromagnetic radiation transmitting antenna.

22. A radiation shielding apparatus for a radio signal transmitting device according to claim 21; wherein the radiation emanating component further comprises an electromagnetic radiation source disposed in the interior of the radio signal transmitting device.

23. A radiation shielding apparatus for a radio signal transmitting device according to claim 21; wherein the shielding means comprises a radiation shield dimensioned to be retrofitted to an existing radio signal transmitting device.

24. A radiation shielding apparatus for a radio signal transmitting device according to claim 21; wherein the shielding means comprises at least one of an electromagnetic radiation reflector, an electromagnetic radiation absorber and an electromagnetic radiation blocker.

25. A radiation shielding device for a radio signal transmitting device according to claim 21; wherein radio signal transmitting device is a cellular telephone; and the electromagnetic radiation transmitting antenna transmits electromagnetic radiation in a cellular frequency band.

**AMENDED SHEET (ARTICLE 19)**

26. A radiation shielding apparatus for a radio signal transmitting device according to claim 25; wherein the electromagnetic radiation transmitting antenna transmits electromagnetic radiation at a frequency between 800 and 900 megahertz.

27. A radiation shielding apparatus for a radio signal transmitting device according to claim 26; wherein the shielding means comprises at least one of an electromagnetic radiation reflector, an electromagnetic radiation absorber and an electromagnetic radiation blocker.

28. A radiation shielding apparatus for a radio signal transmitting device according to claim 21; further comprising fixing means for disposing, fixing and maintaining the shielding means at an operable position between the electromagnetic radiation transmitting antenna and the user.

29. An electrical power supply for an electronic device, characterized by: an internal battery for powering an electronic device, the internal battery being disposed with a case member for containing the electronic device; an external battery connectable with the case member for powering the electronic device; a back-up battery disposable within the case member for powering the electronic device; and switching means for switching a connection between the electronic device and the internal battery, the external battery and the back-up battery so that the electronic device is powered at different times by at least one of the internal battery, the external battery and the back-up battery.

30. An electric power supply according to claim 29; further comprising controlling means for determining an existence and a state of charge of at least one of the internal battery, the external battery and the back-up battery and for controlling the switching means depending on a determined existence and state of charge of said at least one of the internal battery, the external battery and the back-up battery.

AMENDED SHEET (ARTICLE 19)

31. An electric power supply according to claim 29; wherein the internal battery comprises a radiation shielding battery comprising at least one shielding material being effective for electrically shielding electromagnetic radiation.

32. A case for shielding a user of a radio signal transmitting device from radiation, the case characterized by: a protective case member configured and dimensioned to receive a radio signal transmitting device within an interior volume defined by the protective case member, the protective case member including a radiation shielding layer for preventing transmission through the protective case member of electromagnetic radiation emitted from the radio signal transmitting device.

33. A case for shielding a user of a radio signal transmitting device according to claim 32; wherein the protective case member includes an outer layer disposed adjacent to the radiation shielding layer, the outer layer comprising a durable material.

34. A case for shielding a user of a radio signal transmitting device according to claim 31; wherein the radiation shielding layer includes a metallic foil.

35. A case for shielding a user of a radio signal transmitting device according to claim 31; further comprising a grounding wire for electrically connecting the radiation shielding layer to an electrical ground of the radio signal transmitting device.

36. An electronic circuit for a radio signal transmitting device, the electronic circuit characterized by: a features circuit comprising at least one of a speaker volume increasing circuit, a call timer circuit, a recording circuit, a call screener circuit, an external speaker jack and a modem/fax port.

37. An electronic circuit according to claim 36; wherein the speaker volume increasing circuit comprises a microphone, and amplifier and a speaker.

AMENDED SHEET (ARTICLE 19)

38. An electronic circuit according to claim 36; wherein the call timer circuit comprises determining means for determining a predetermined length of time elapsing during use of the radio signal transmitting device, and audible signal generating means for generating an audible signal when the predetermined length of time elapses.

39. An electronic circuit according to claim 36; wherein the recording circuit includes a memory integrated circuit device for storing audible information.

40. An antenna assembly for a radio signal transmitting device, the antenna assembly characterized by: a driven antenna member for transmitting a radio signal from the radio signal transmitting device; shielding means disposed between the driven antenna member and a user of the radio signal transmitting device for shielding the user from the transmitted radio signal from the driven antenna member.

41. An antenna assembly according to claim 40; wherein the driven antenna member comprises a patch antenna comprised of a thin film of conductive material formed on a dielectric substrate.

42. A handset housing of a radio signal transmitting device, characterized by: a handset housing for containing internal circuitry of a radio signal transmitting device, the handset housing having an outer surface area; a grip disposing surface disposed at predetermined locations of the outer surface area, the grip disposing surface having a tactile texture when touched by a hand of a user of the radio signal transmitting device; and non-gripping surface disposed at other predetermined locations of the outer surface area, the non-gripping surface having a different tactile texture different than the tactile texture of the grip disposing surface when touched by a hand of the user, so that the user can easily distinguish between the grip disposing surface and the non-gripping surface.

43. A handset housing according to claim 42; wherein the grip disposing surface is relatively soft; and the non-gripping surface is relatively hard.

44. A modular unit for a radio signal transmitting device, characterized by: a modular unit housing for containing a feature electronic circuit and a connection jack for electrically connecting the feature electronic circuit with a radio signal transmitting device.

45. A modular unit according to claim 44; wherein the feature electronic circuit comprises a memory for storing predetermined data, the predetermined data being effective for customizing use of the radio signal transmitting device.

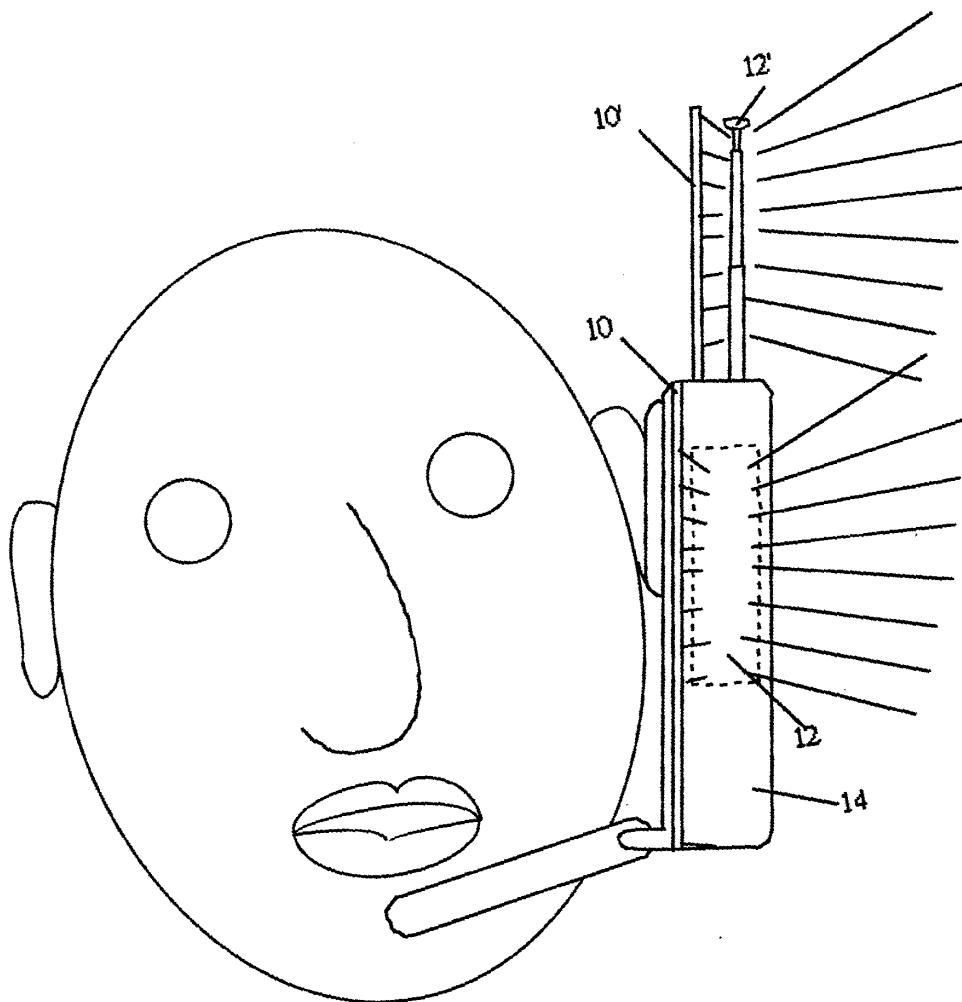
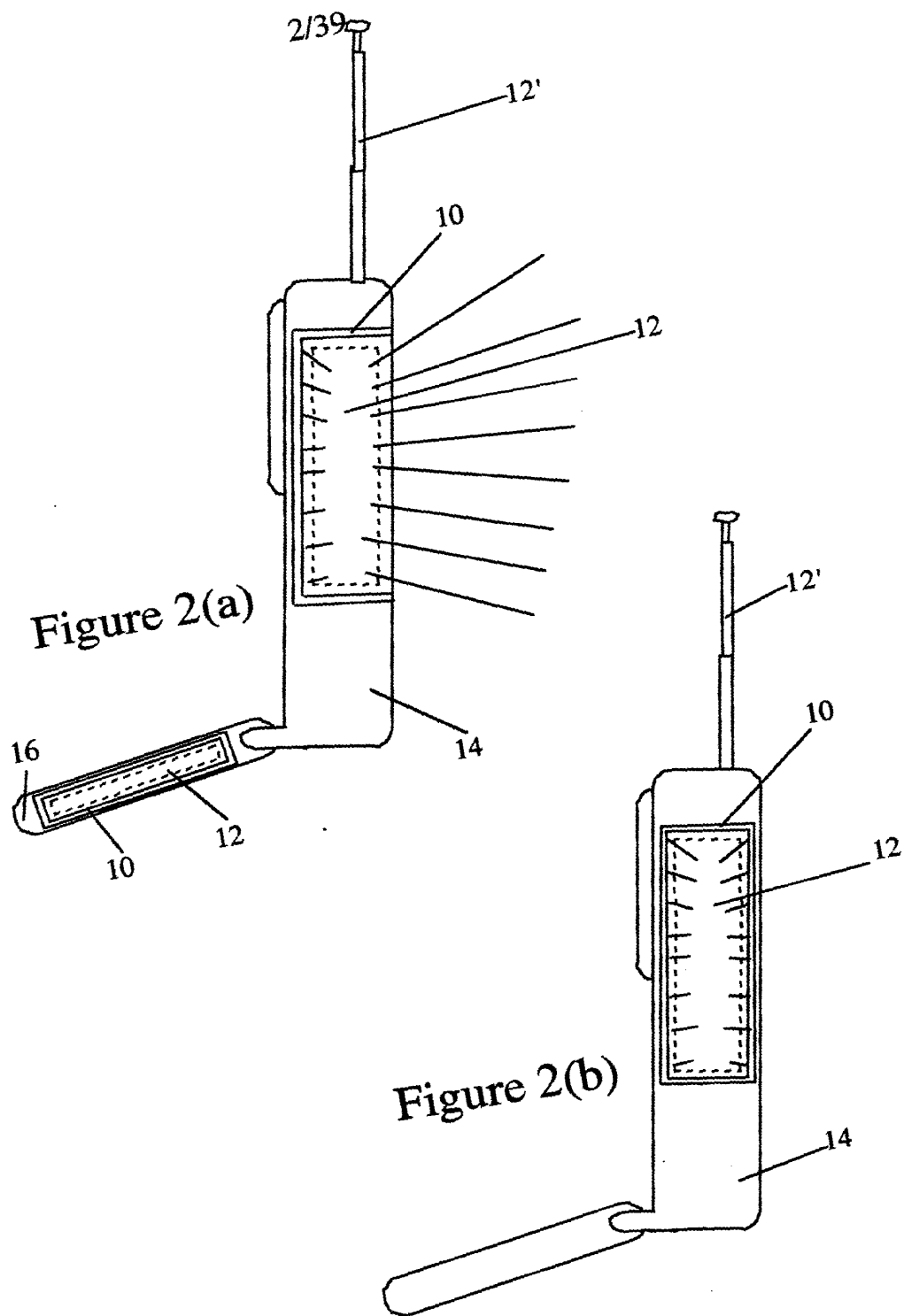
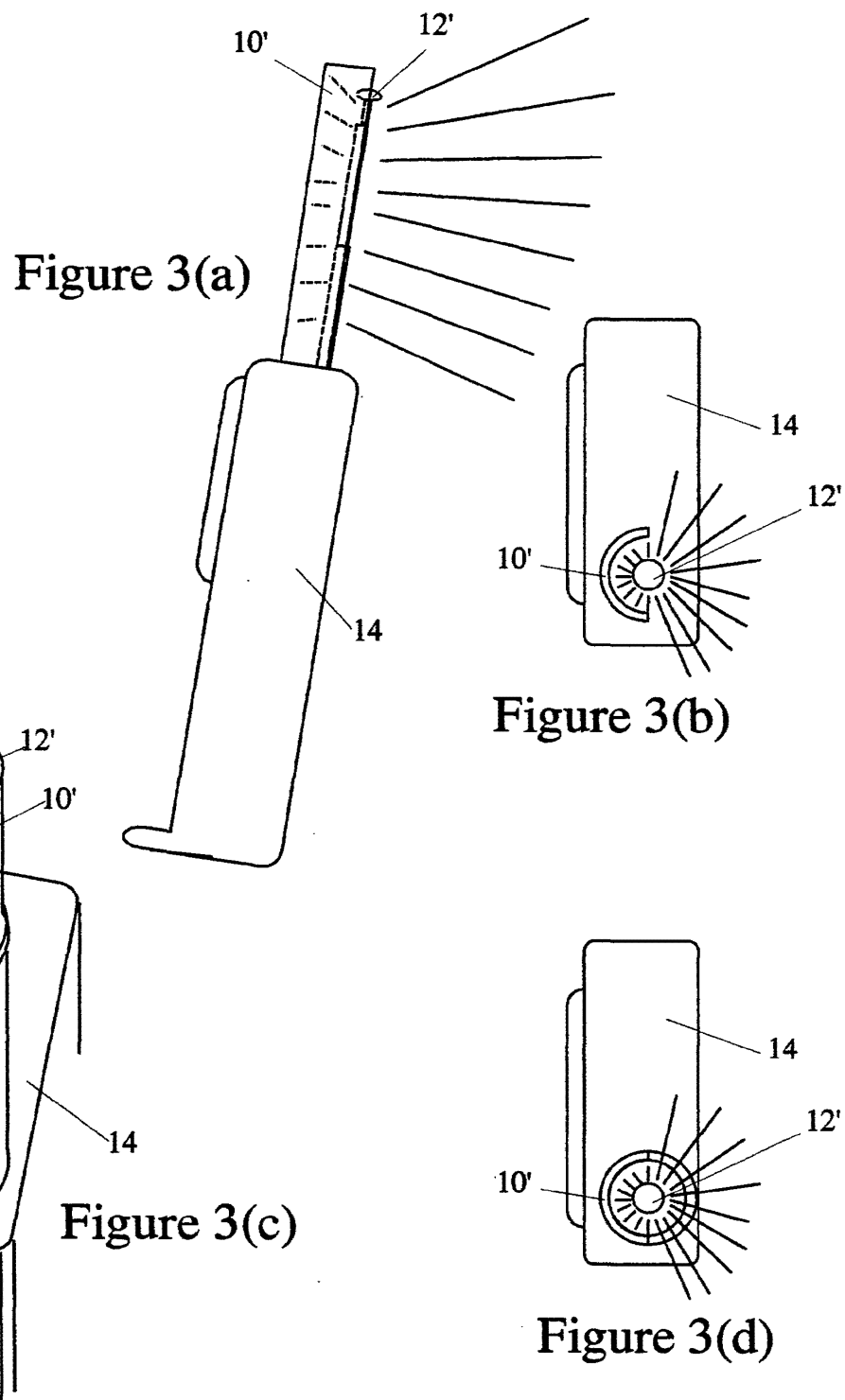


Figure 1

WO 95/31048



3/39



4/39

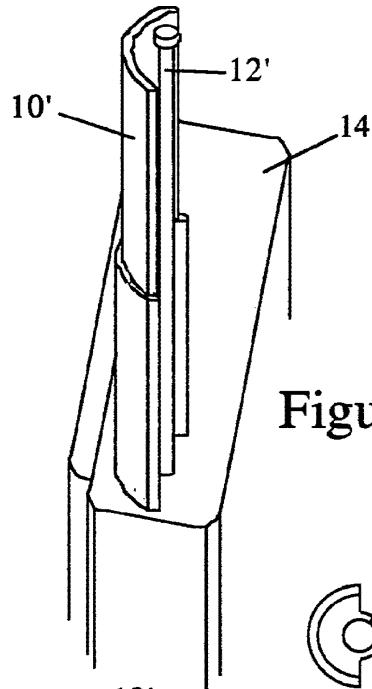


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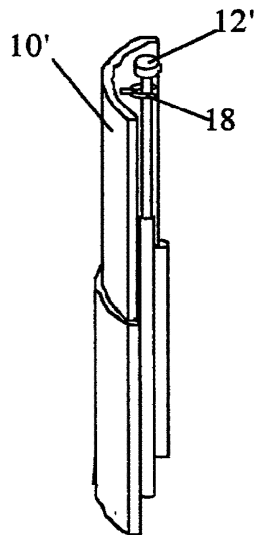


Figure 4(b)



Figure 4(c)



Figure 4(d)



Figure 4(e)



Figure 4(f)

5/39

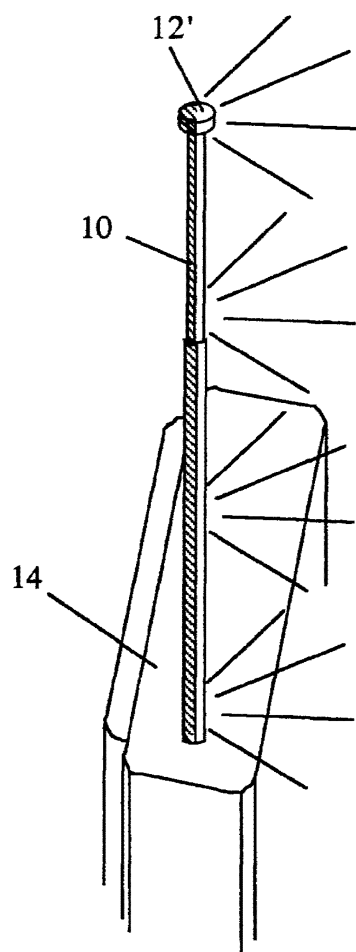


Figure 5

6/39

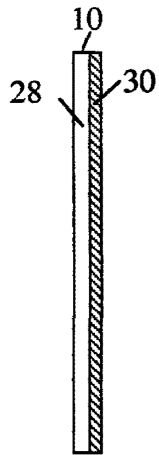


Figure 6(a)

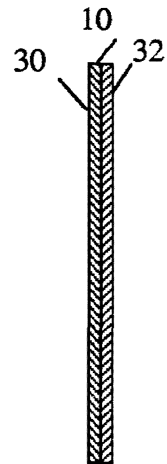


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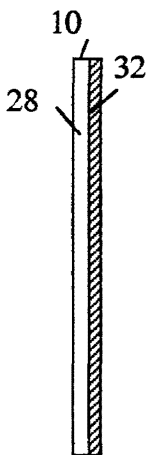


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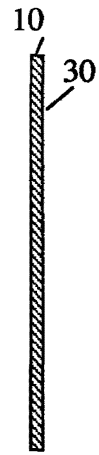


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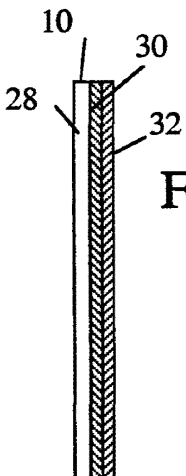


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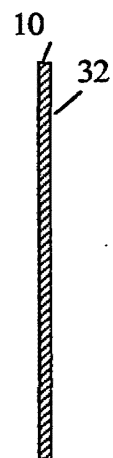


Figure 6(f)

7/39

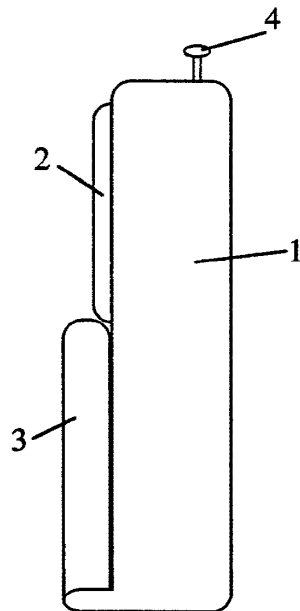


Figure 7  
Prior Art

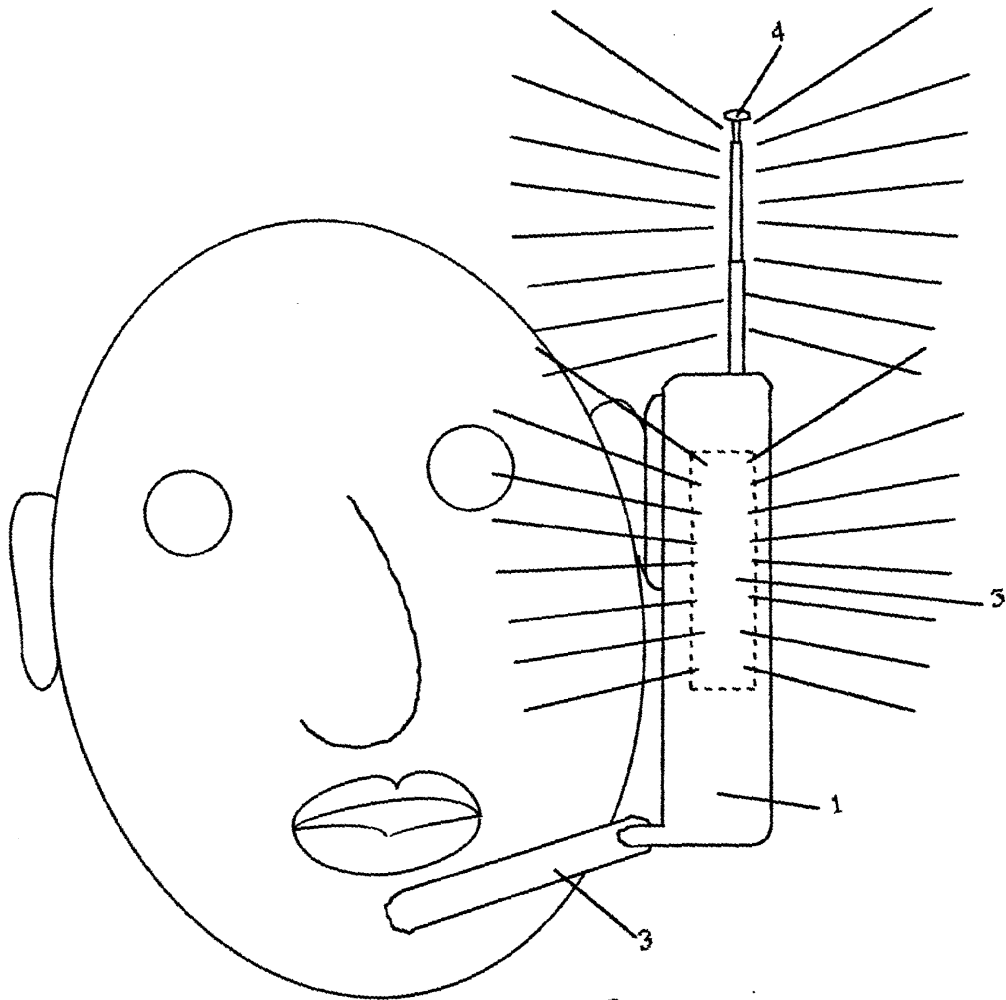


Figure 8  
Prior Art

9/39

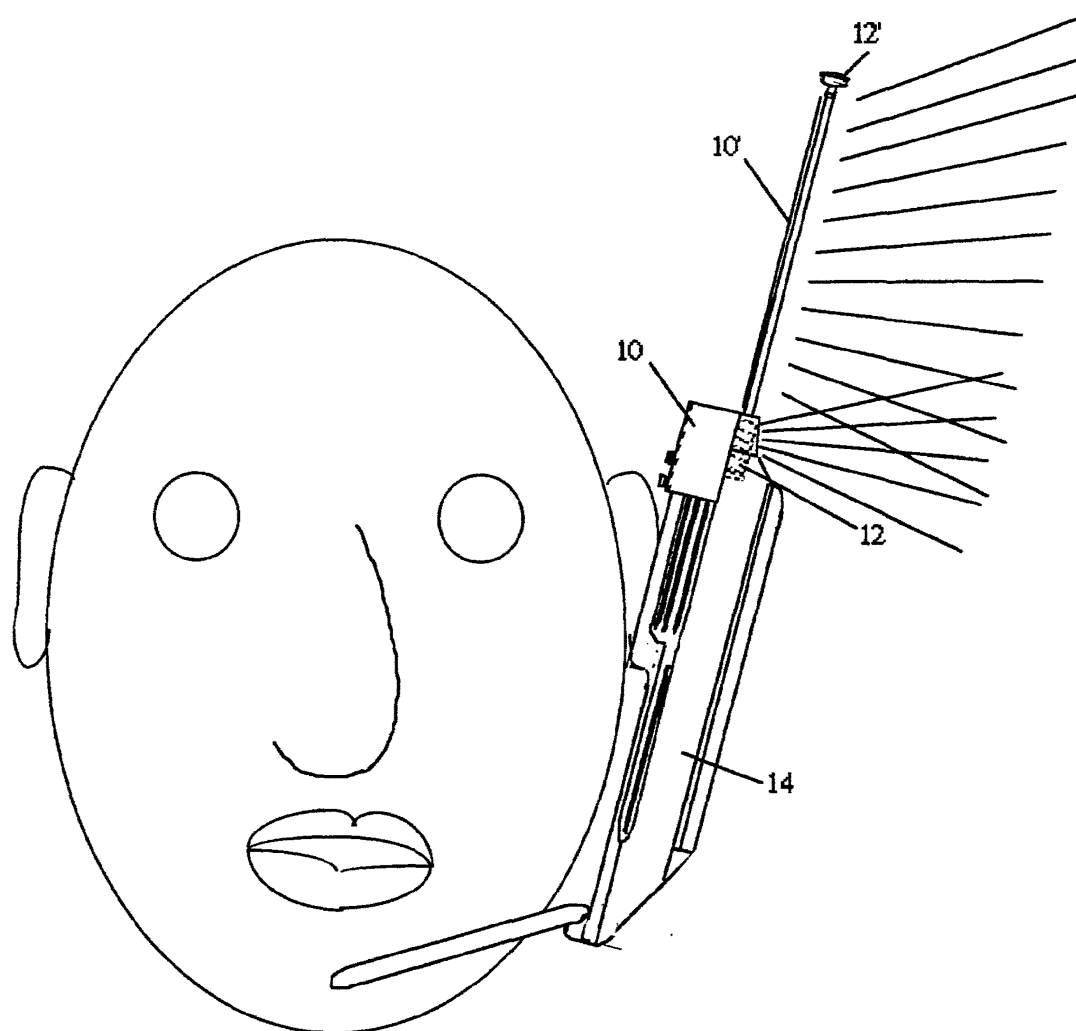


Figure 9

10/39

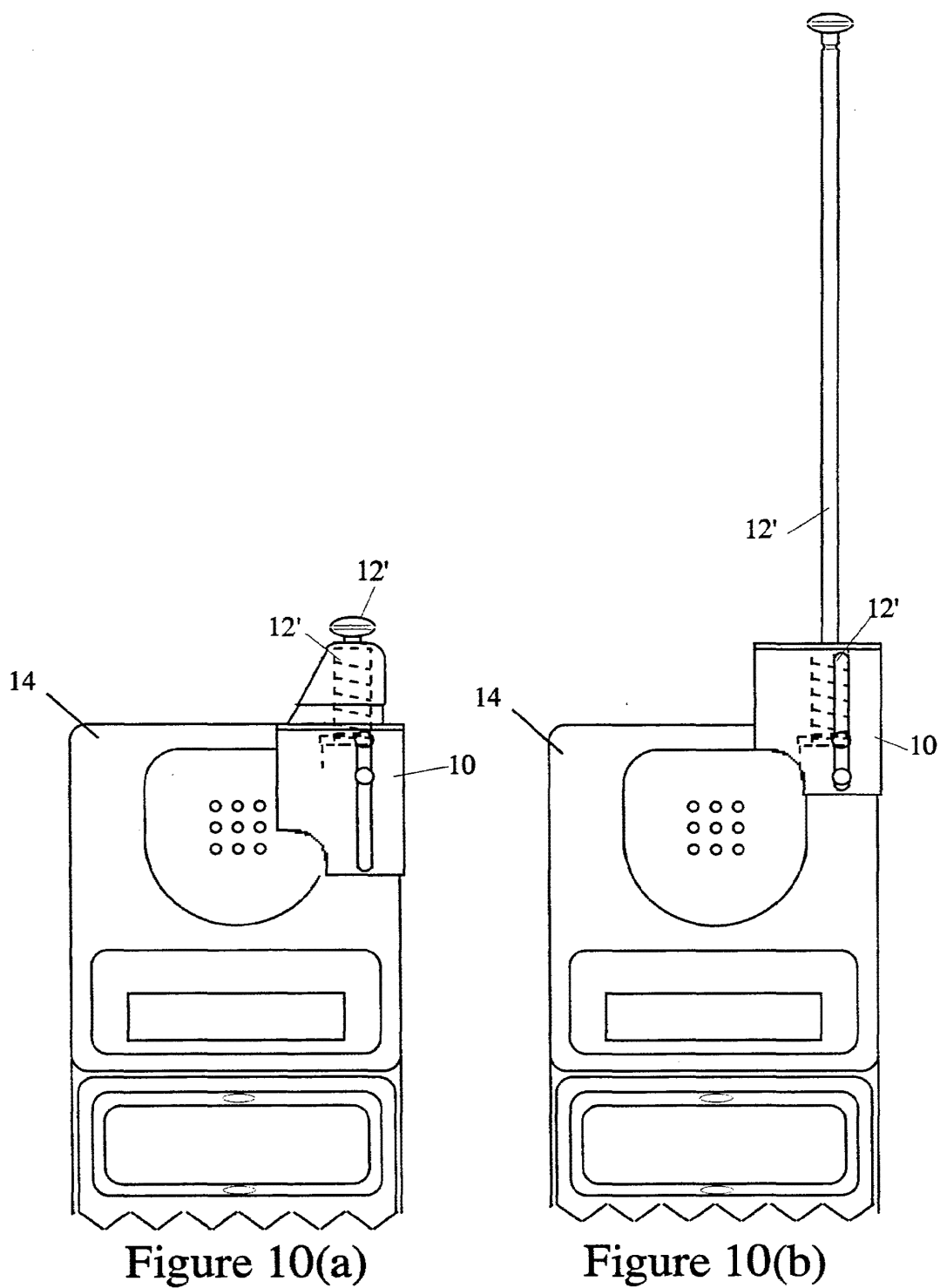
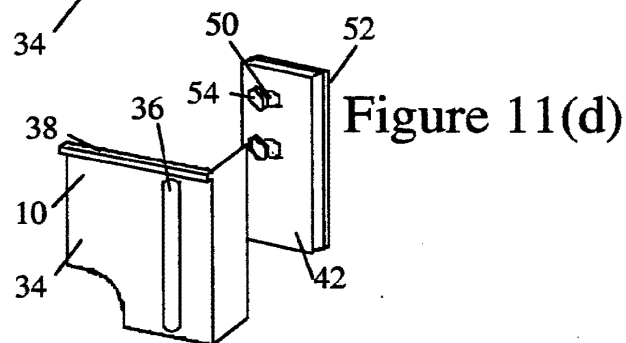
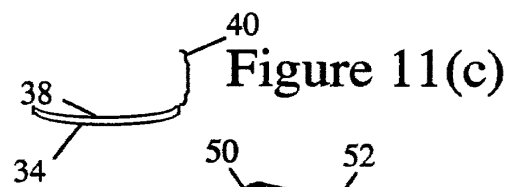
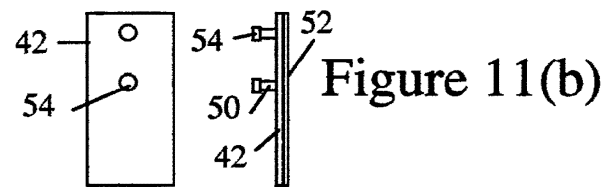
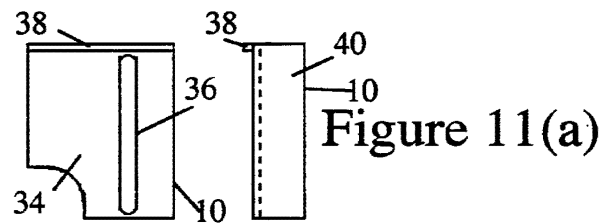


Figure 10(a)

Figure 10(b)

11/39



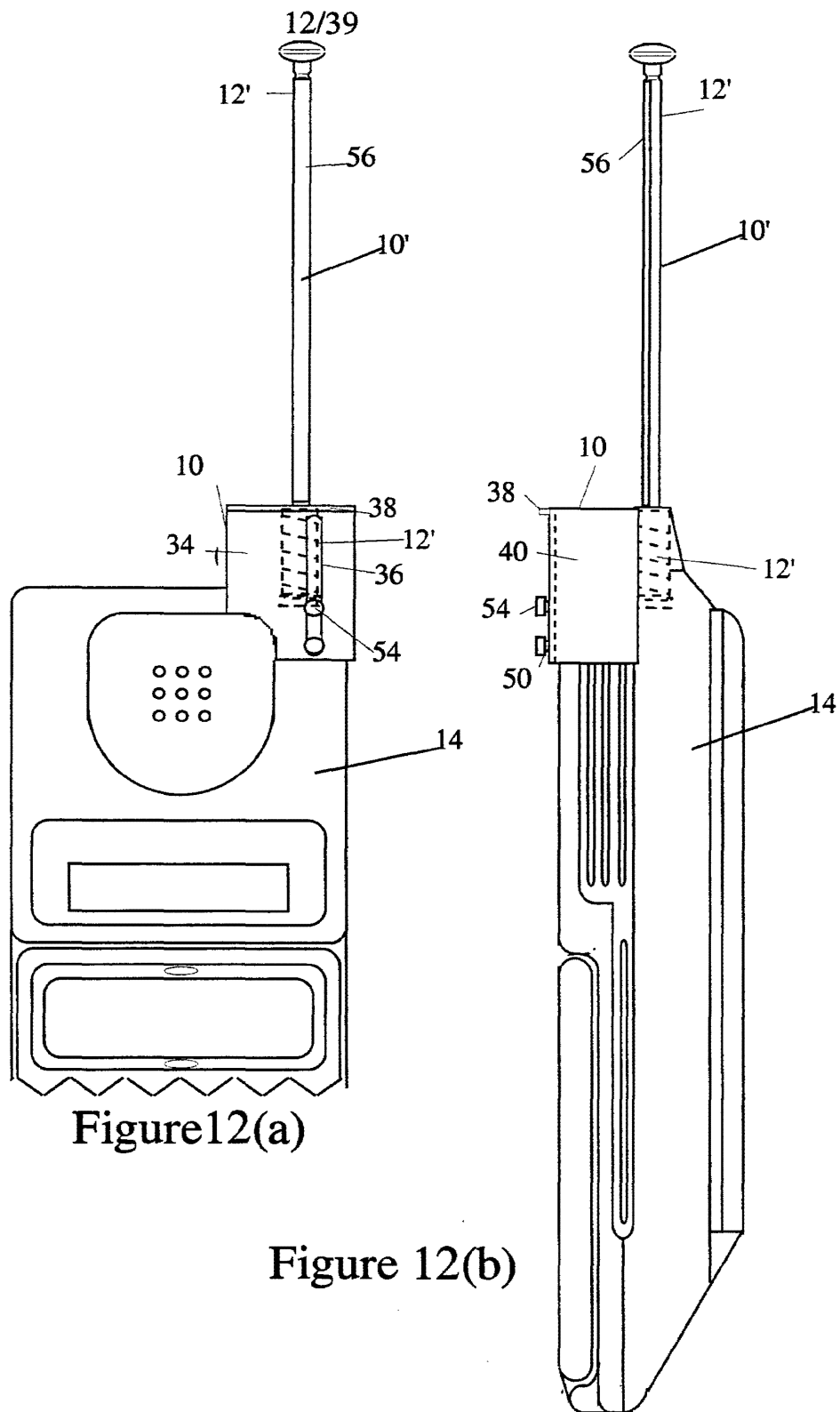
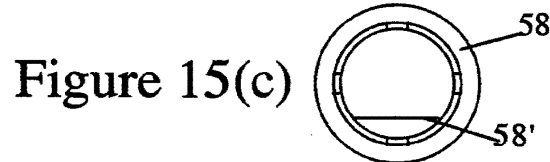
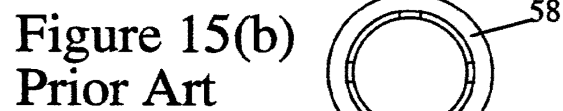
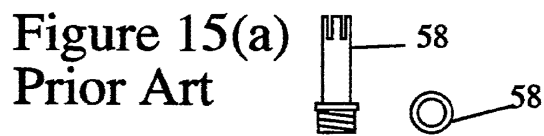
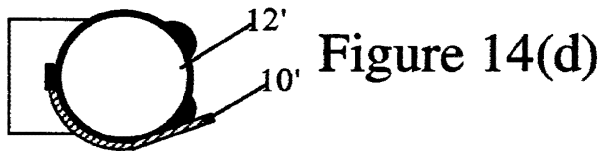
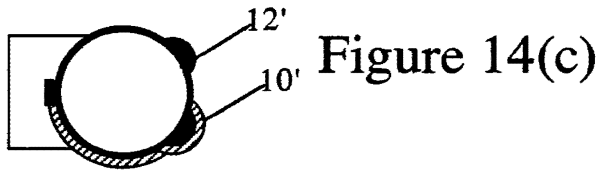
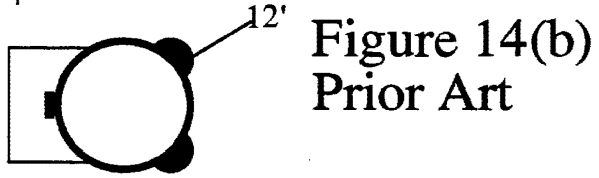
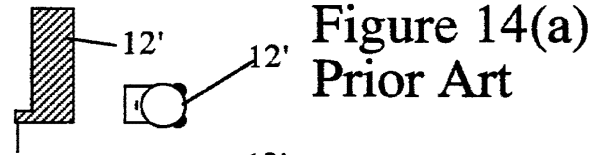
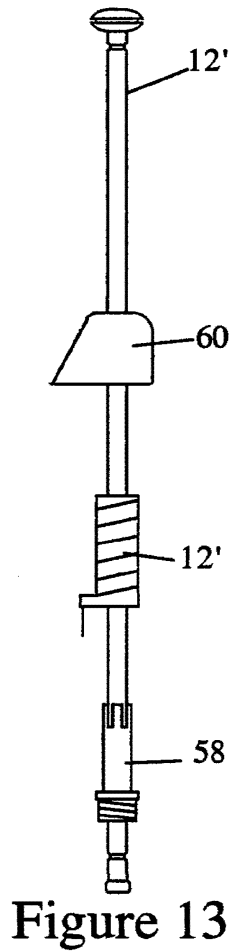


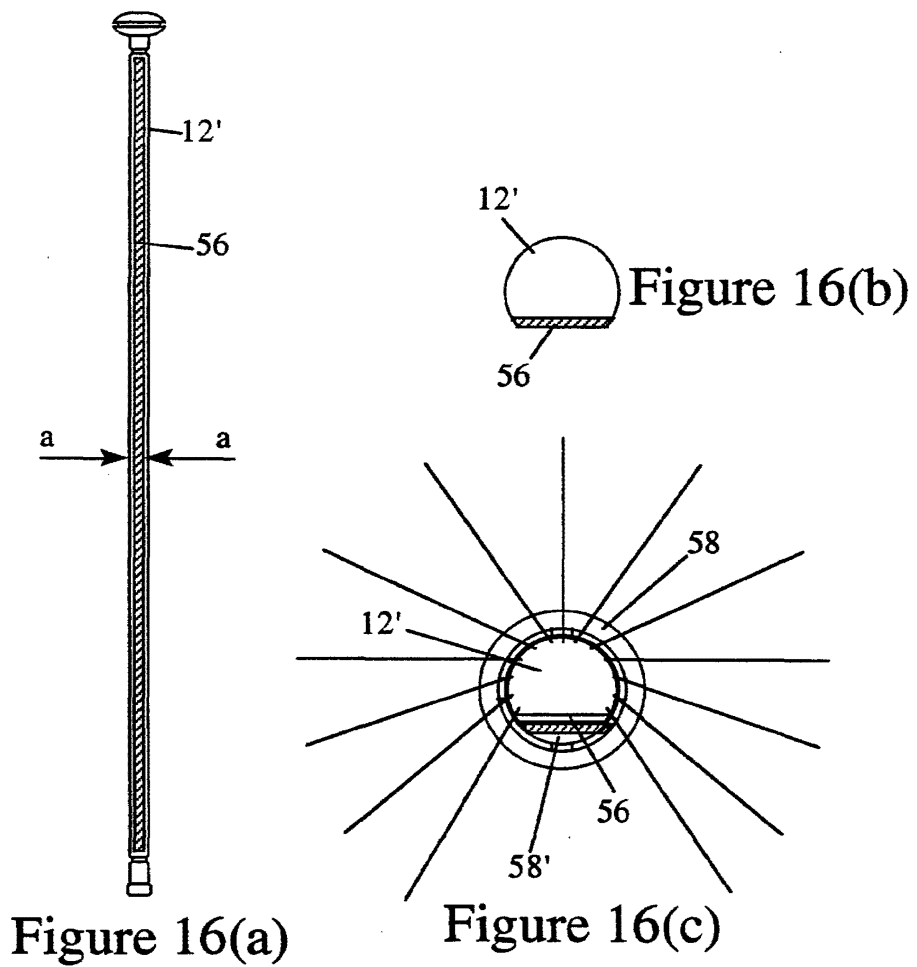
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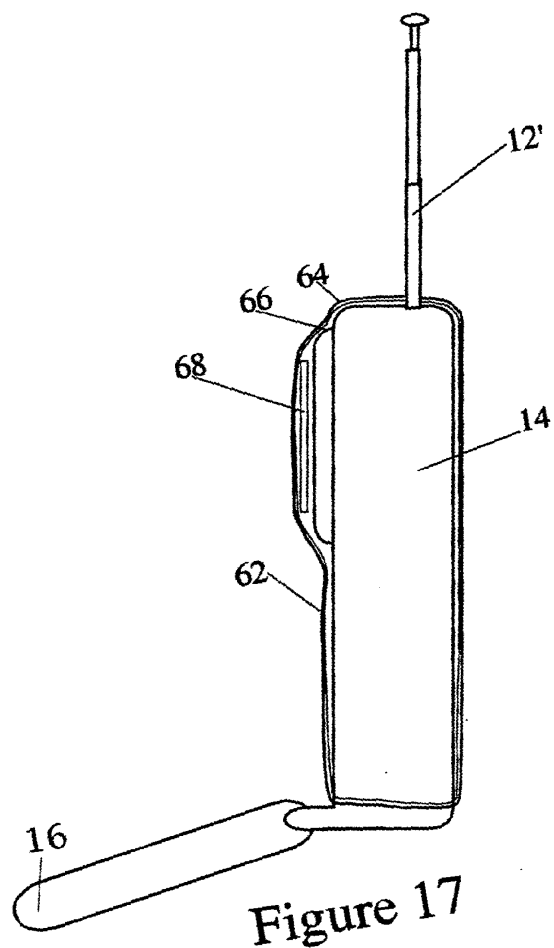
Figure 12(b)

13/39



14/39





16/39

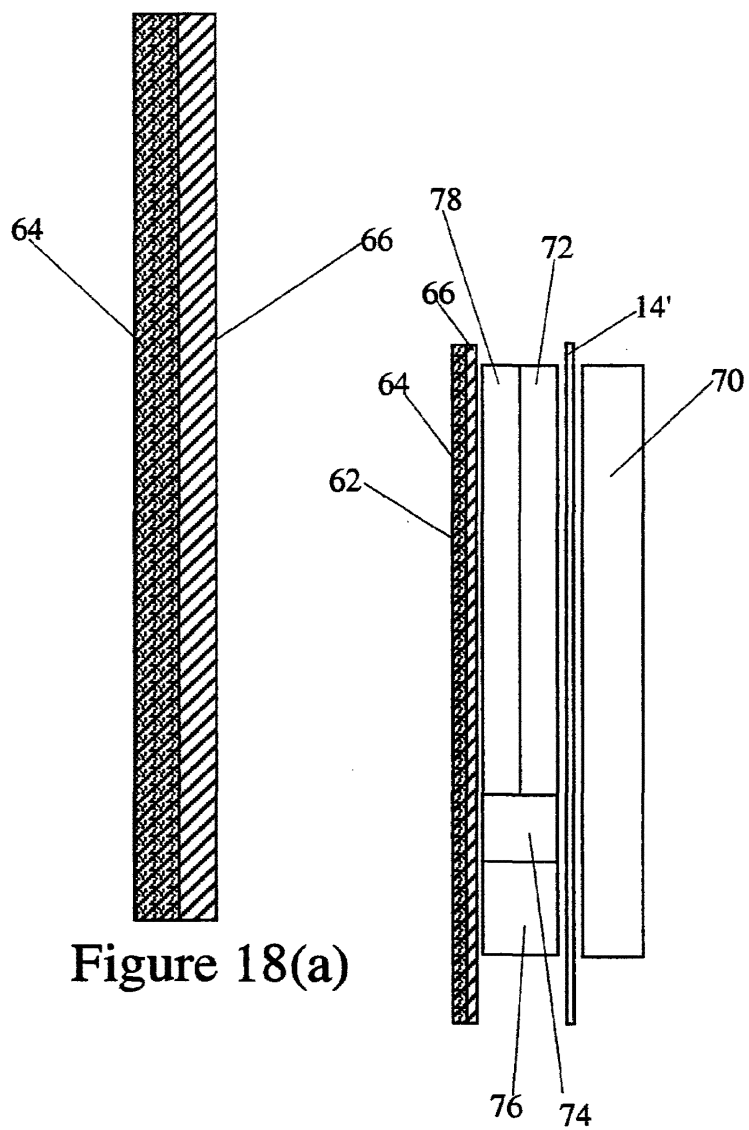


Figure 18(a)

Figure 18(b)

17/39

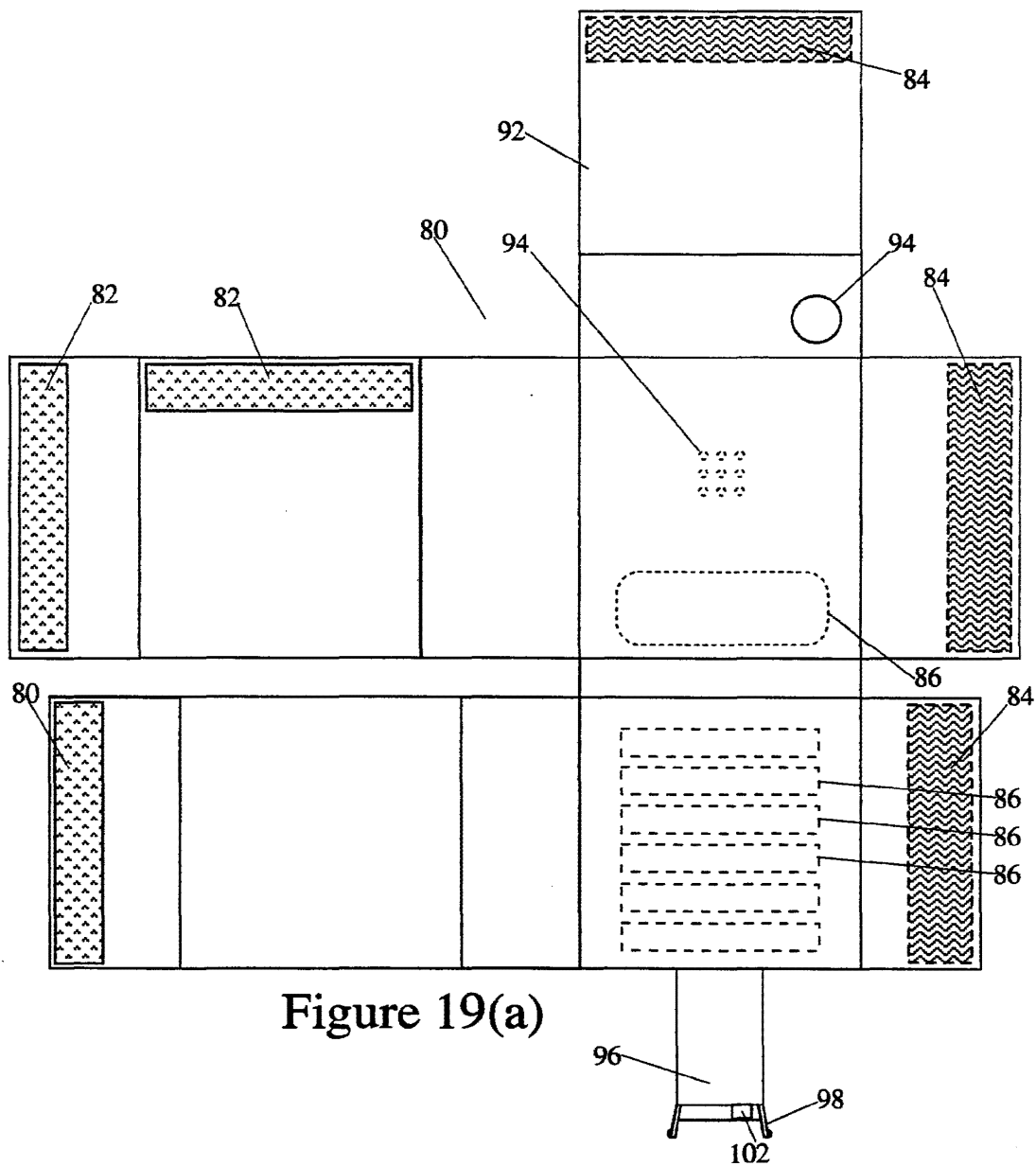


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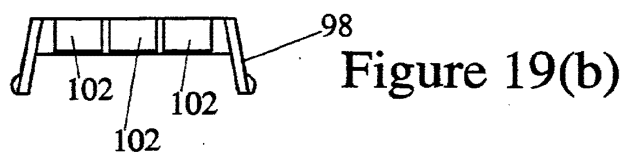
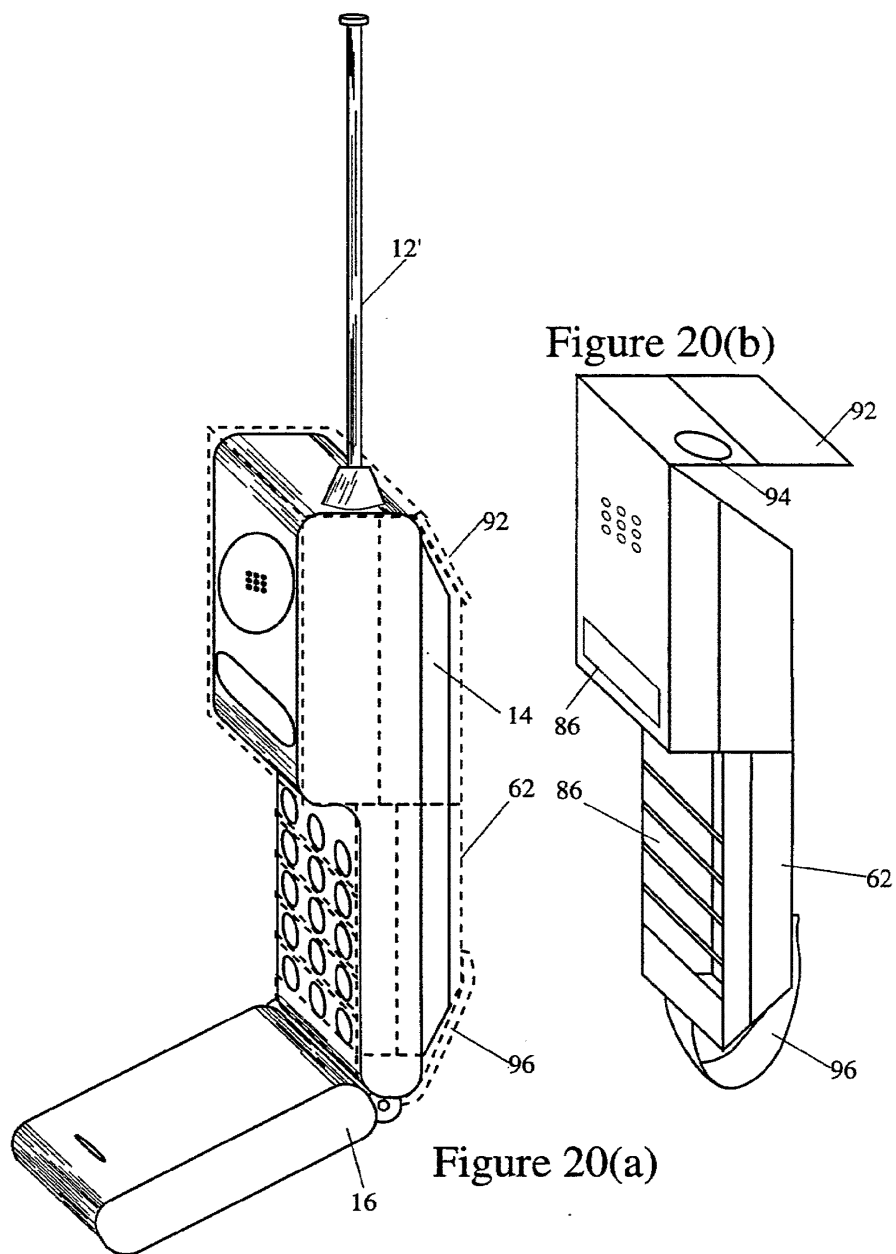


Figure 19(b)

18/39

**SUBSTITUTE SHEET (RULE 26)**

19/39

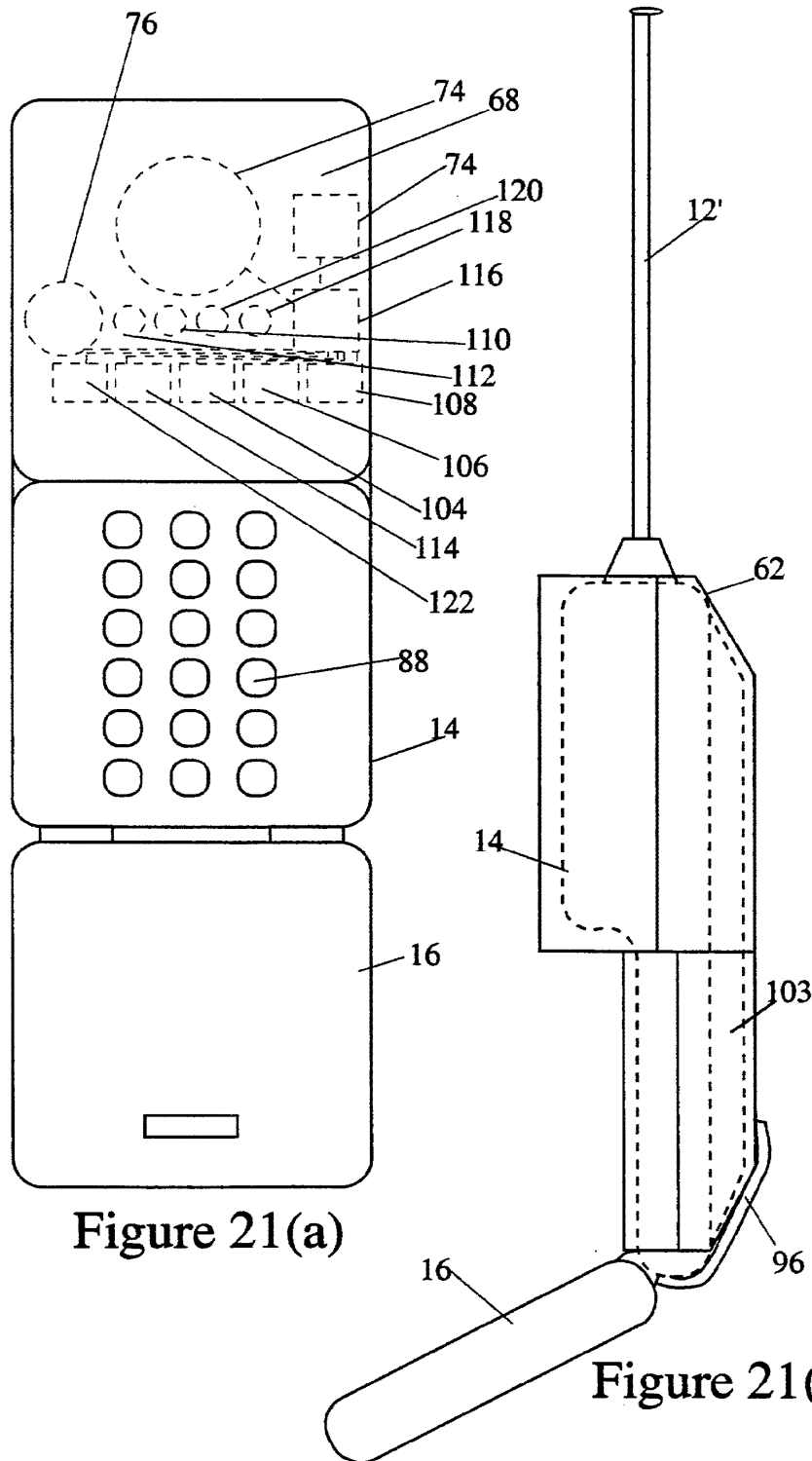


Figure 21(a)

Figure 21(b)

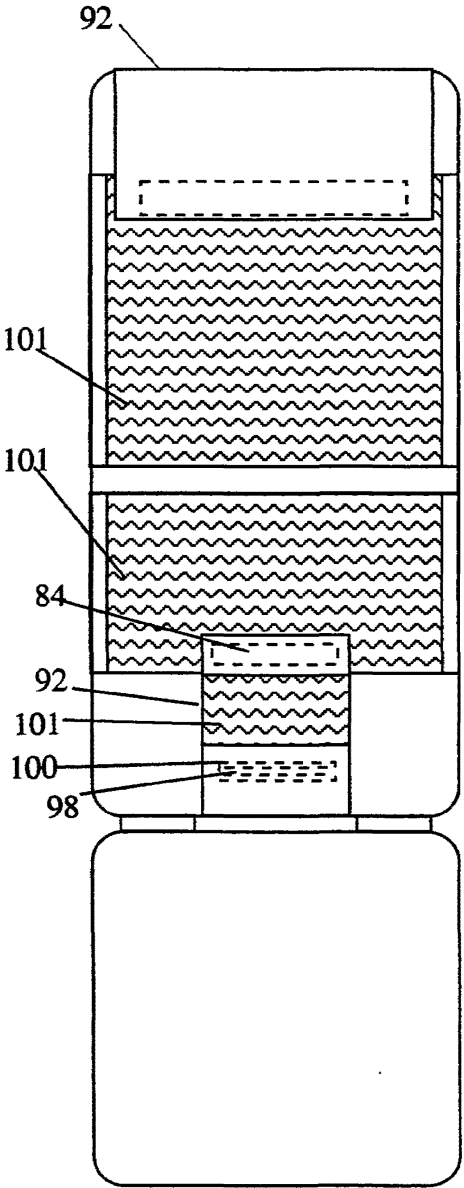
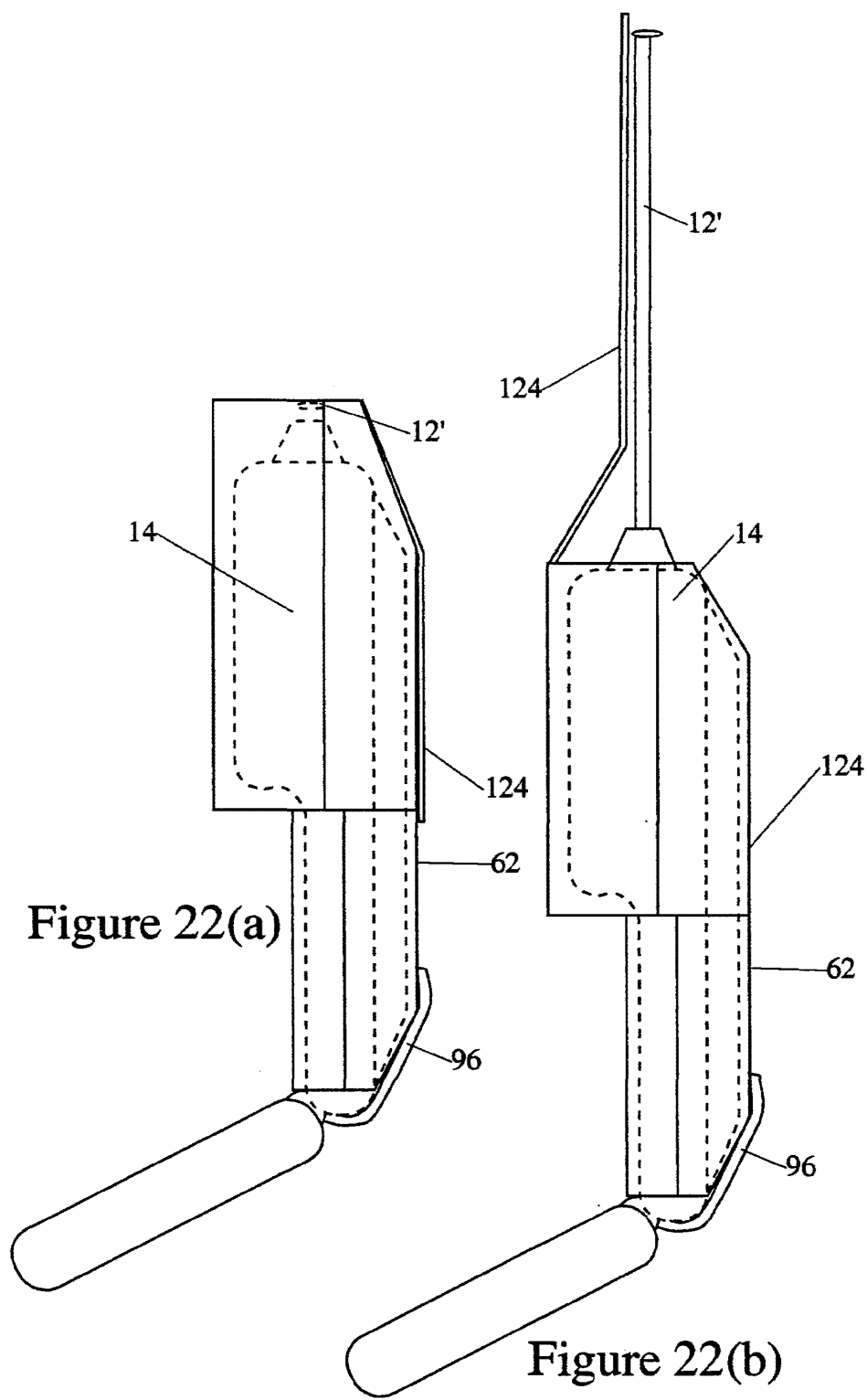


Figure 21(c)

21/39



22/39

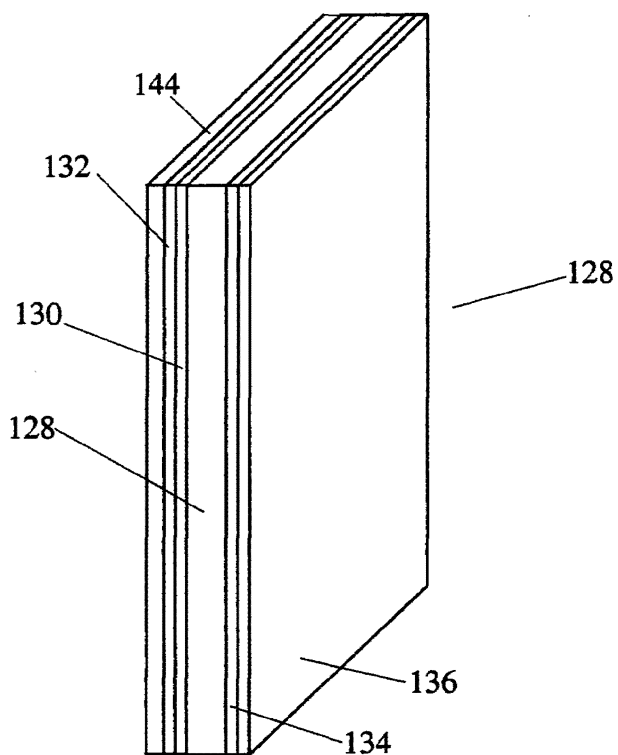


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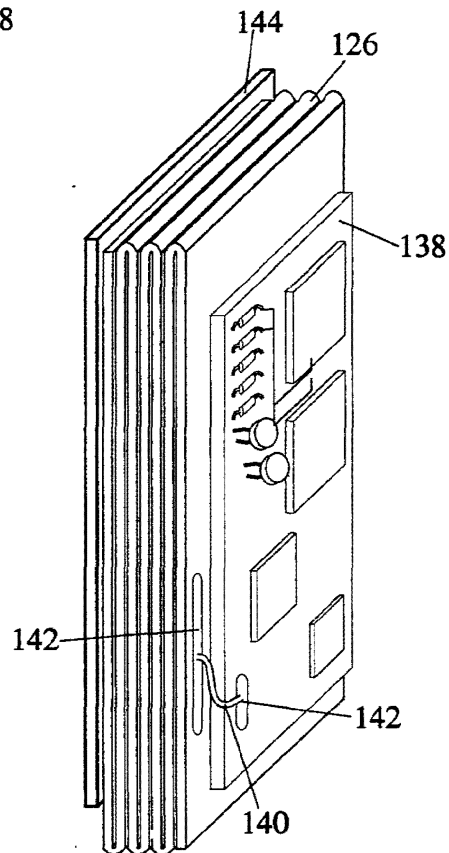
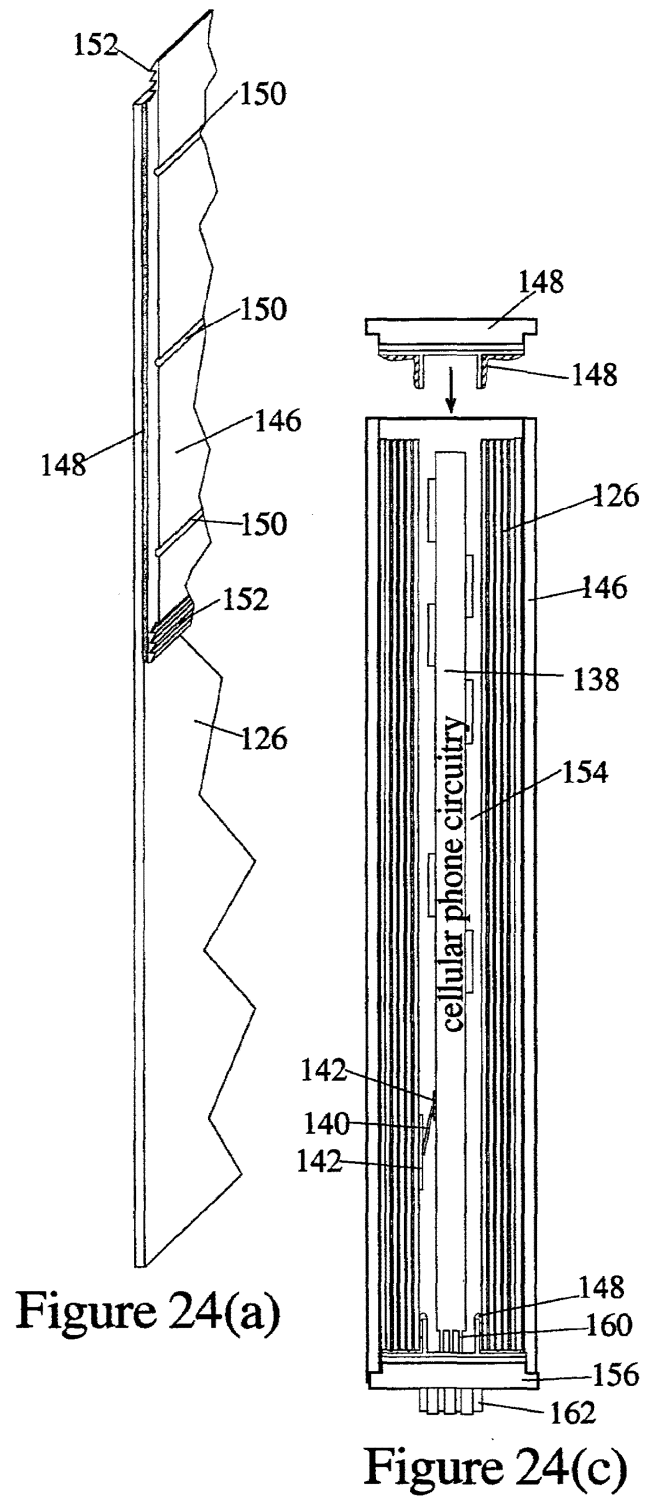
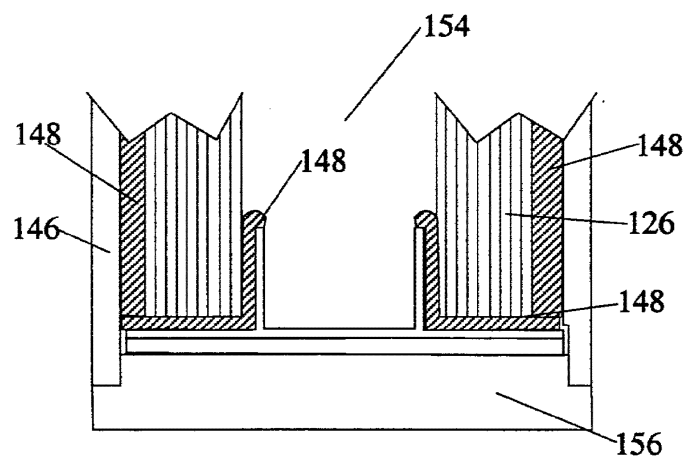
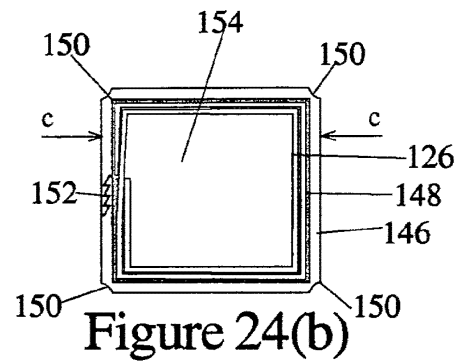


Figure 23(b)

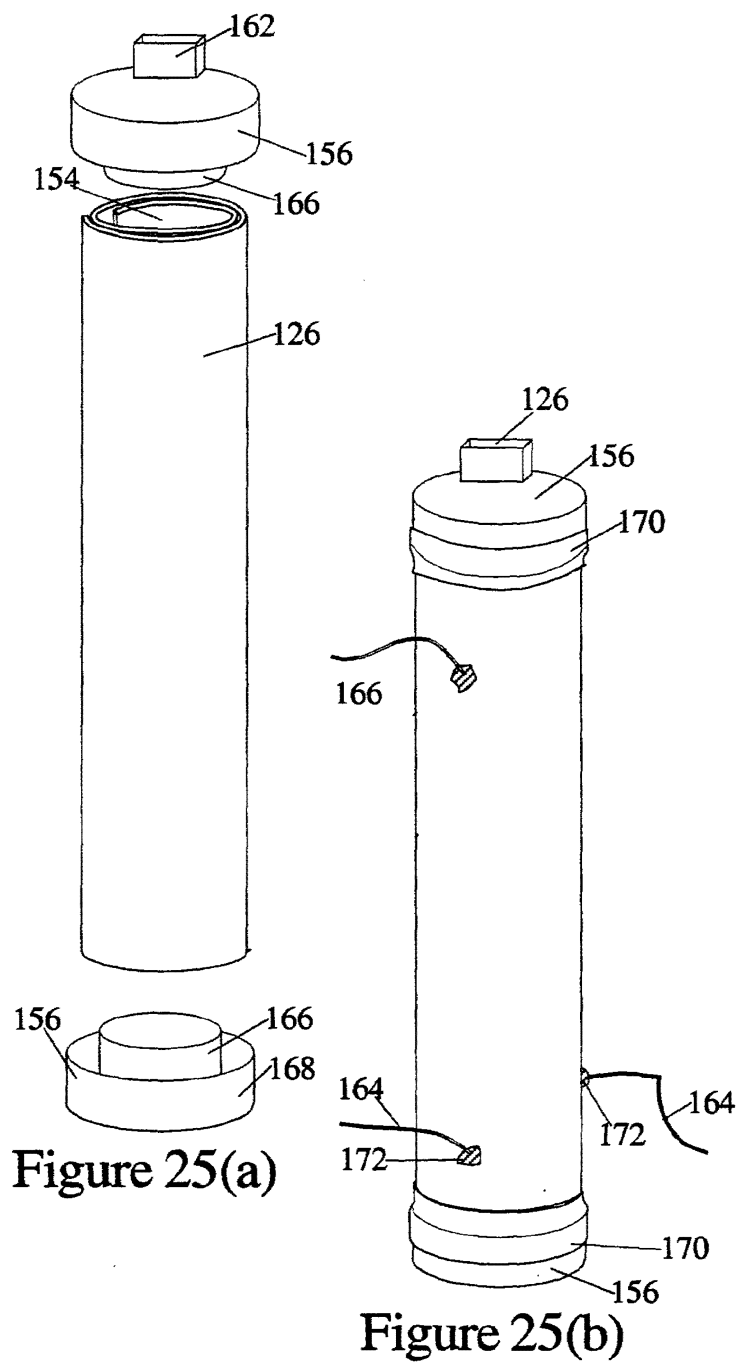
23/39



24/39



25/39



26/39

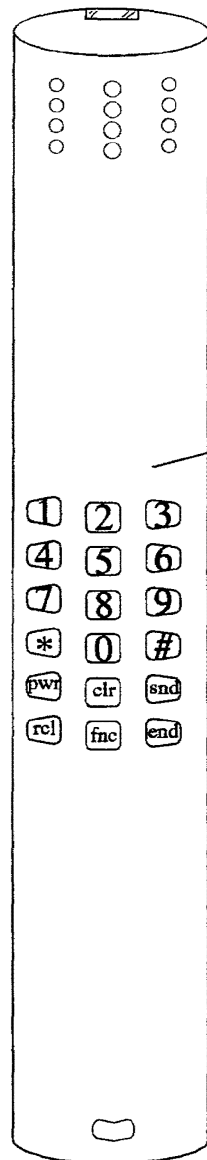


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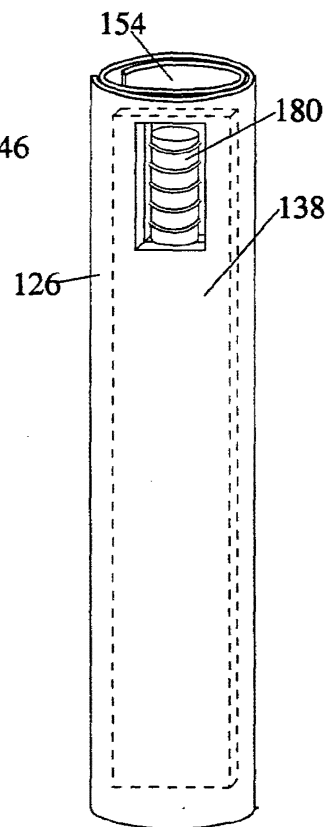


Figure 25(d)

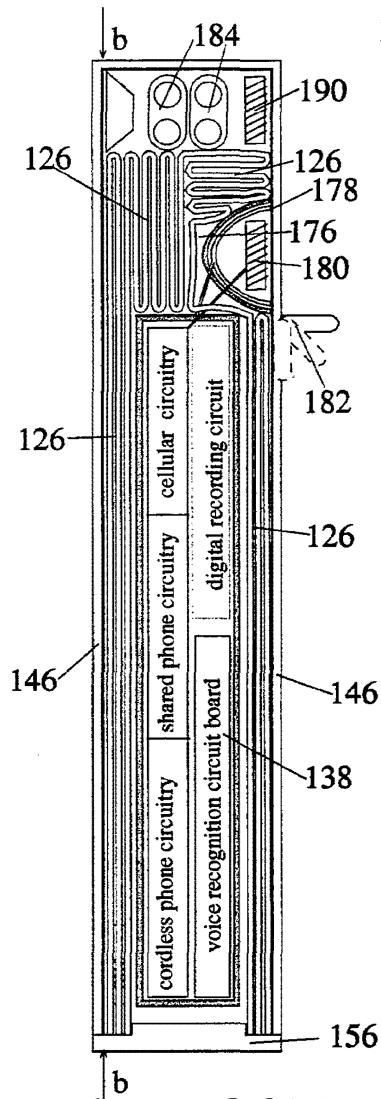


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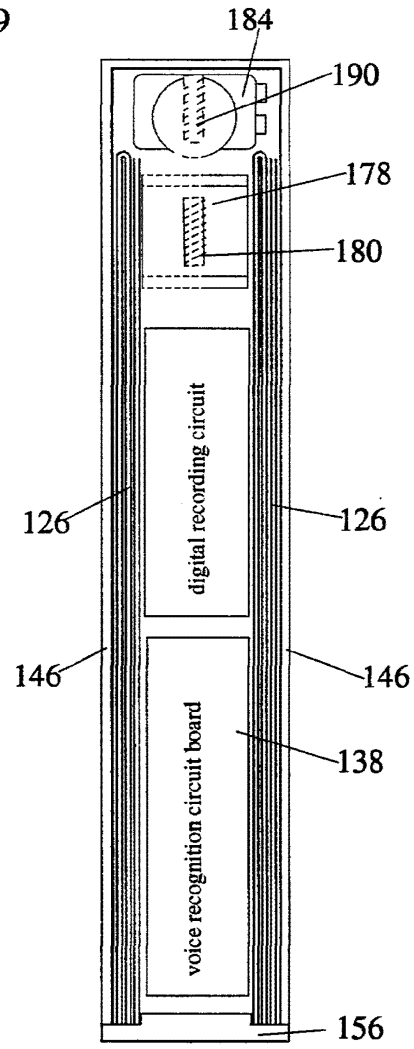


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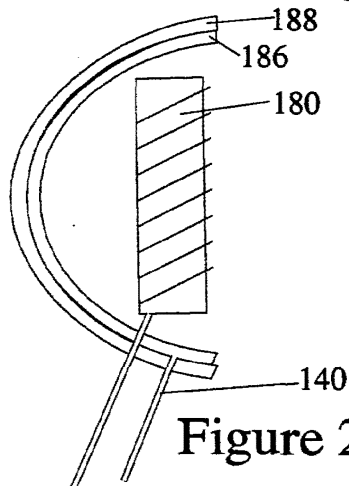


Figure 26(c)

28/39

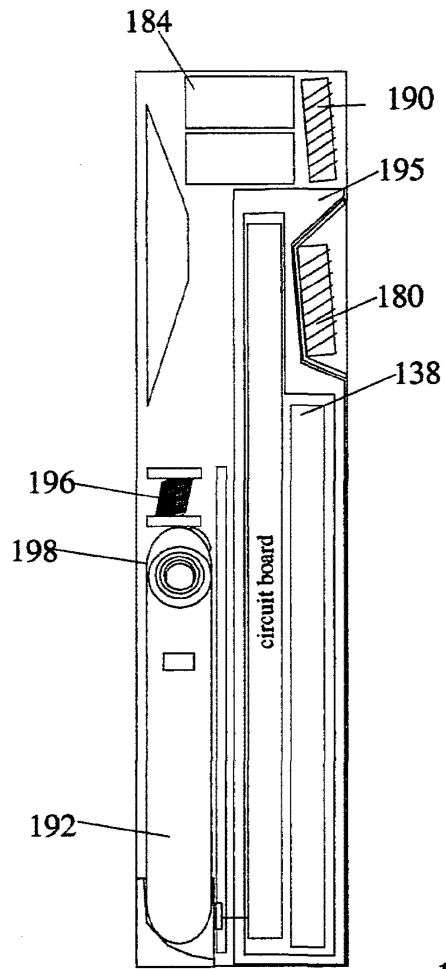


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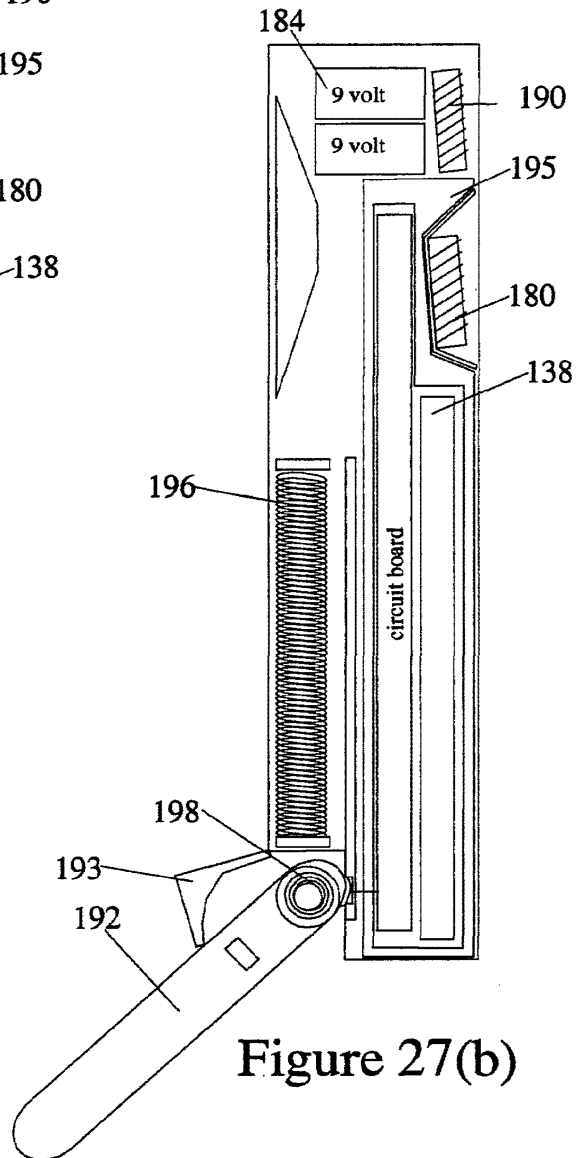


Figure 27(b)

29/39

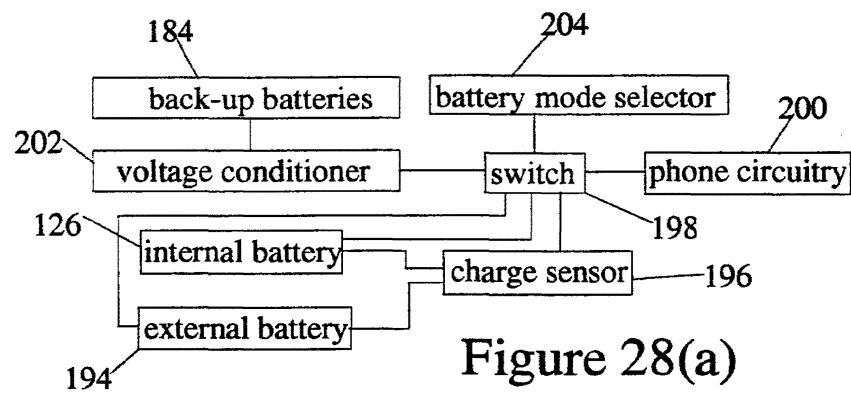


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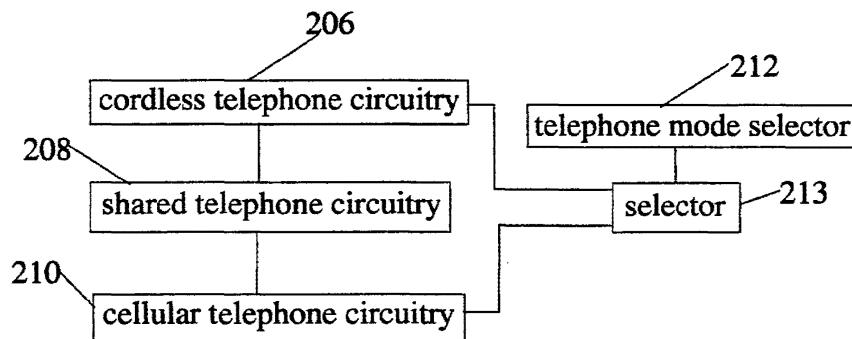


Figure 28(b)

30/39

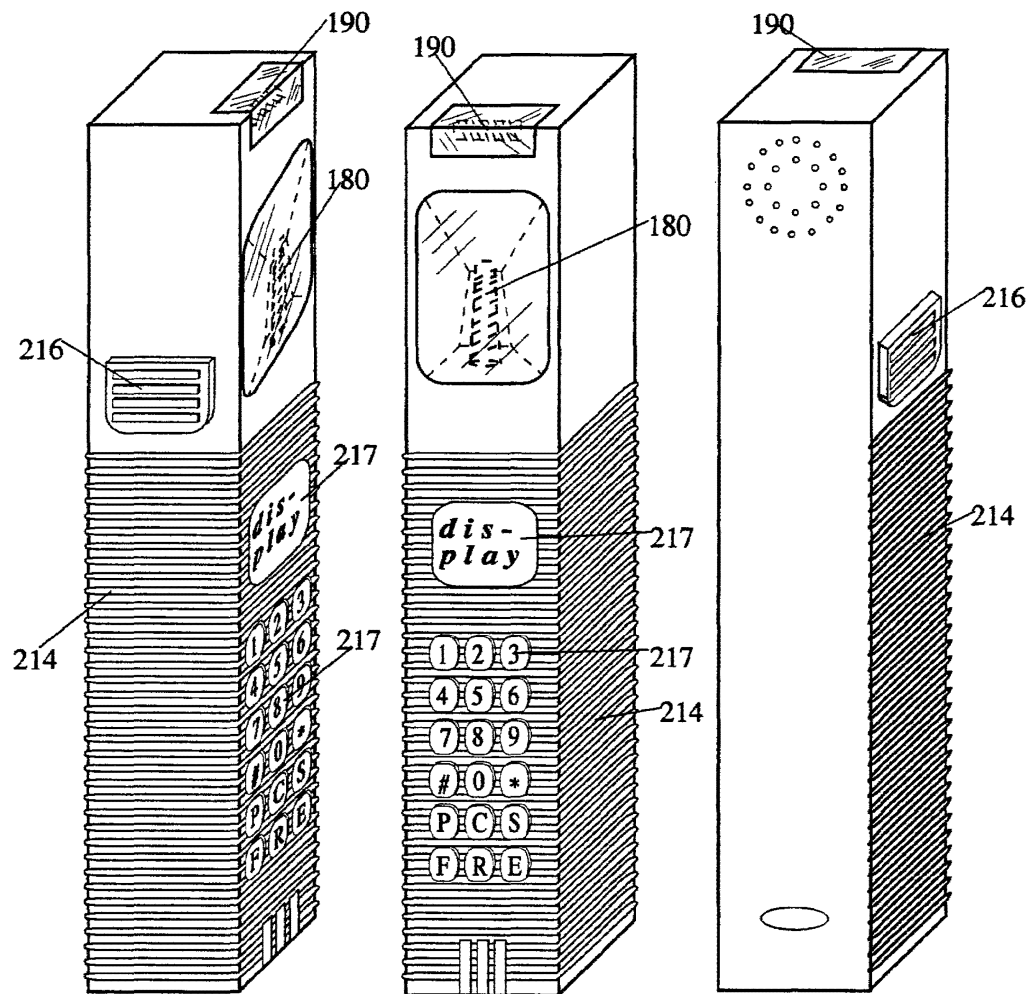


Figure 29(a) Figure 29(b) Figure 29(c)

31/39

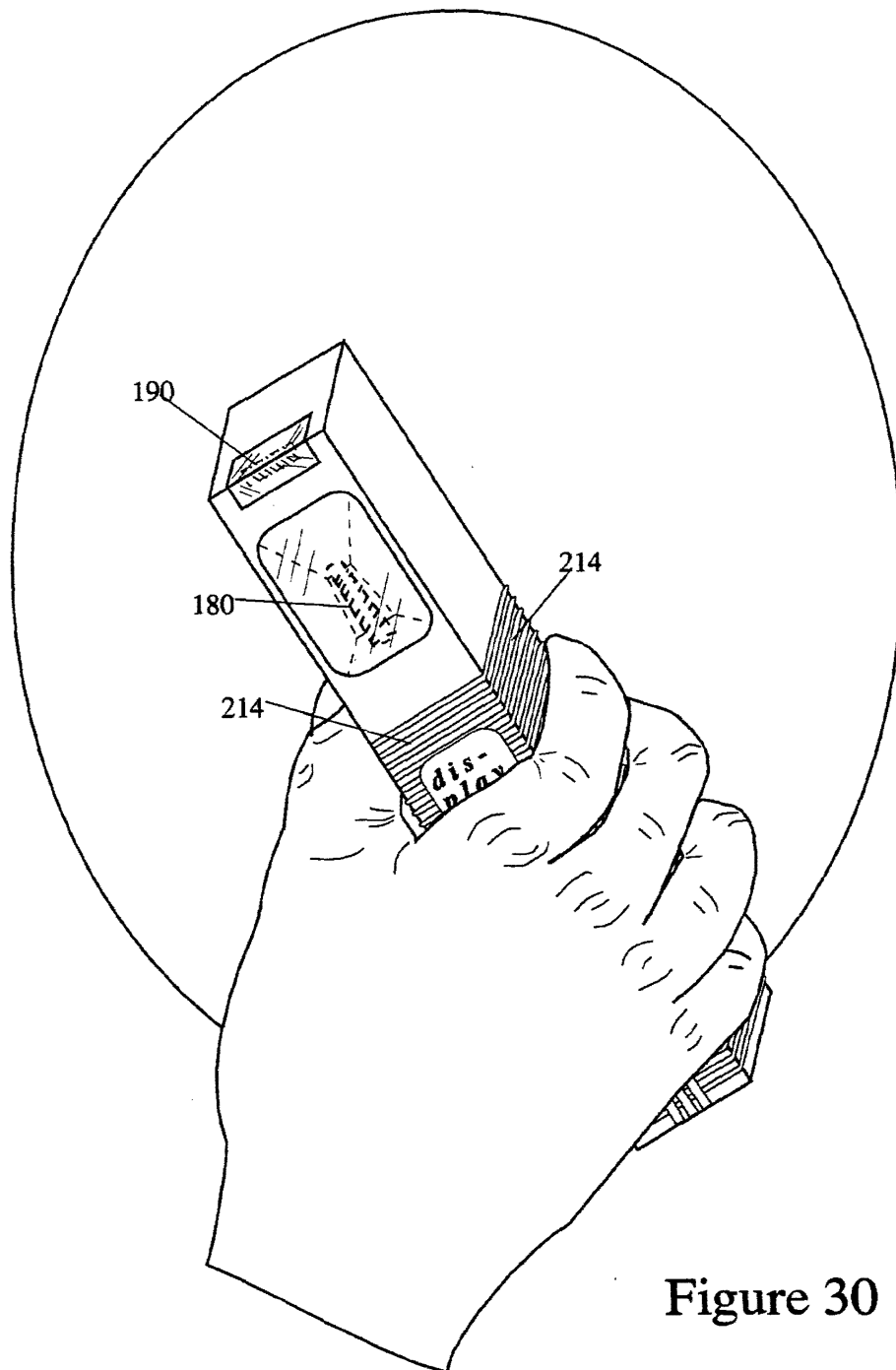
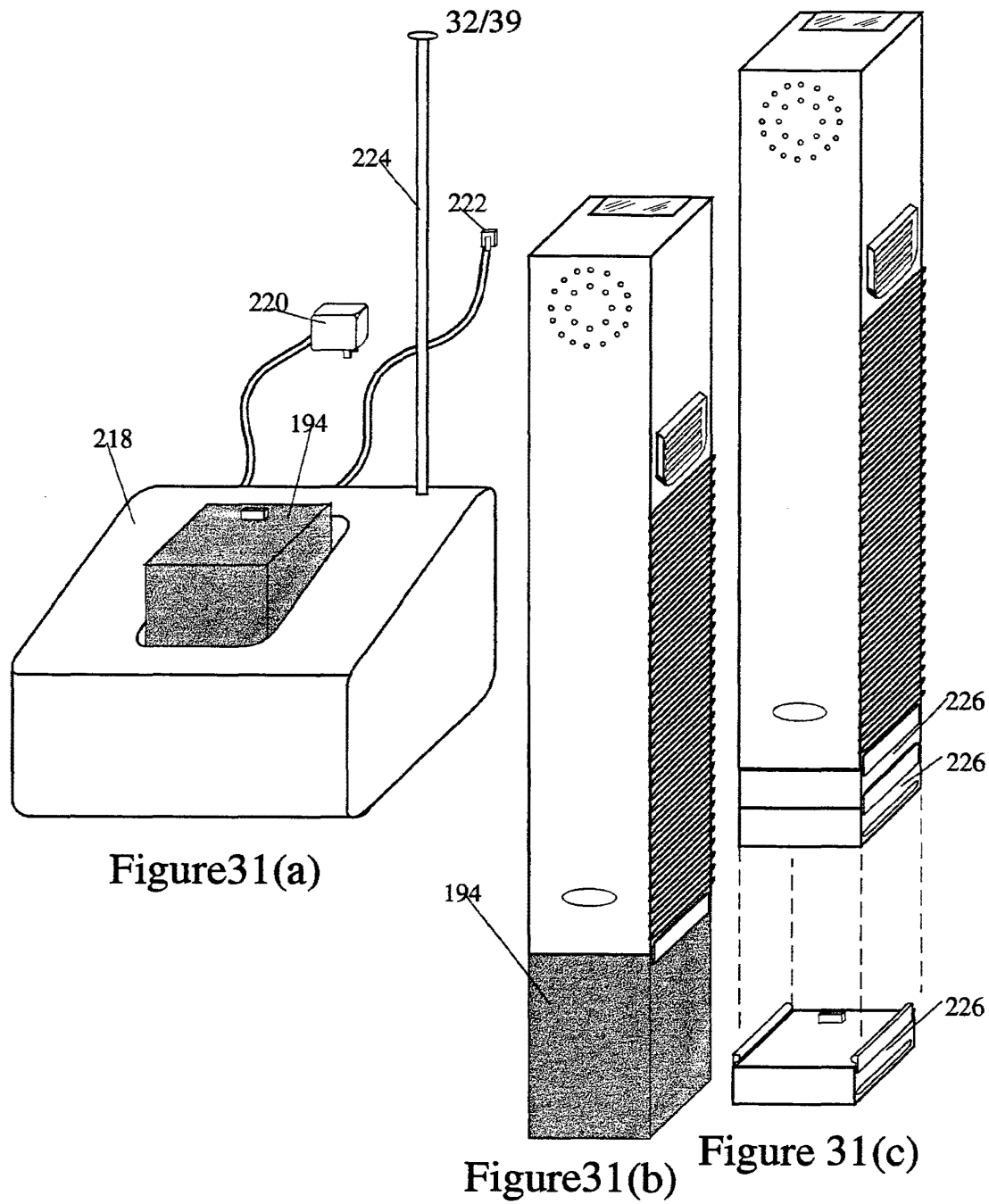


Figure 30



33/39

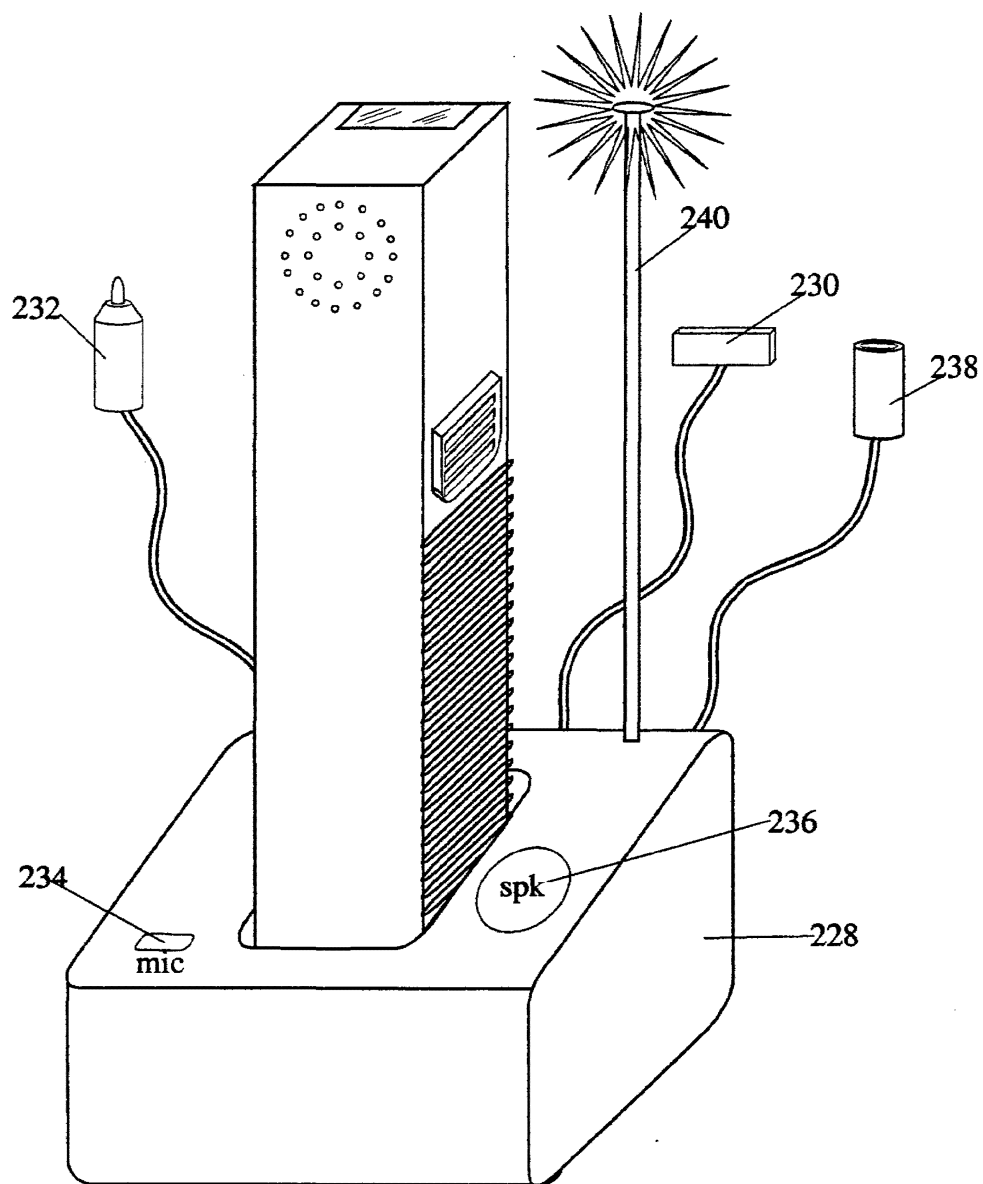


Figure 32

34/39

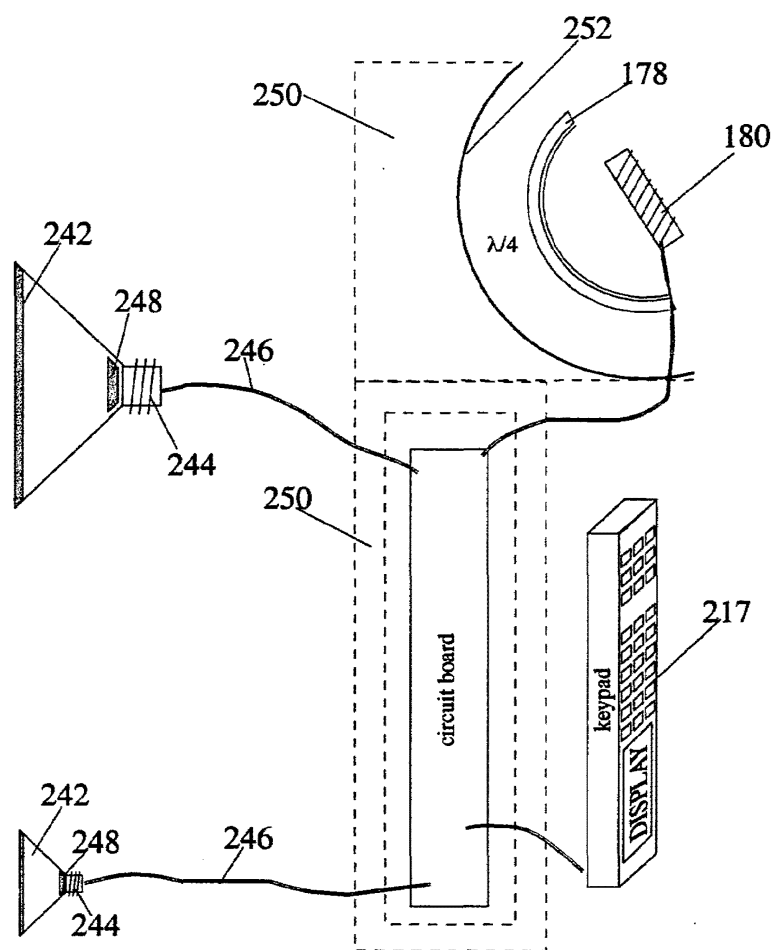
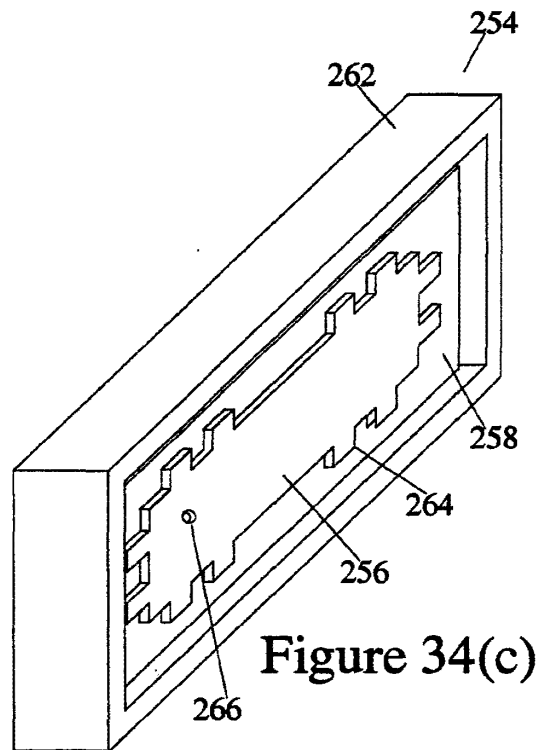
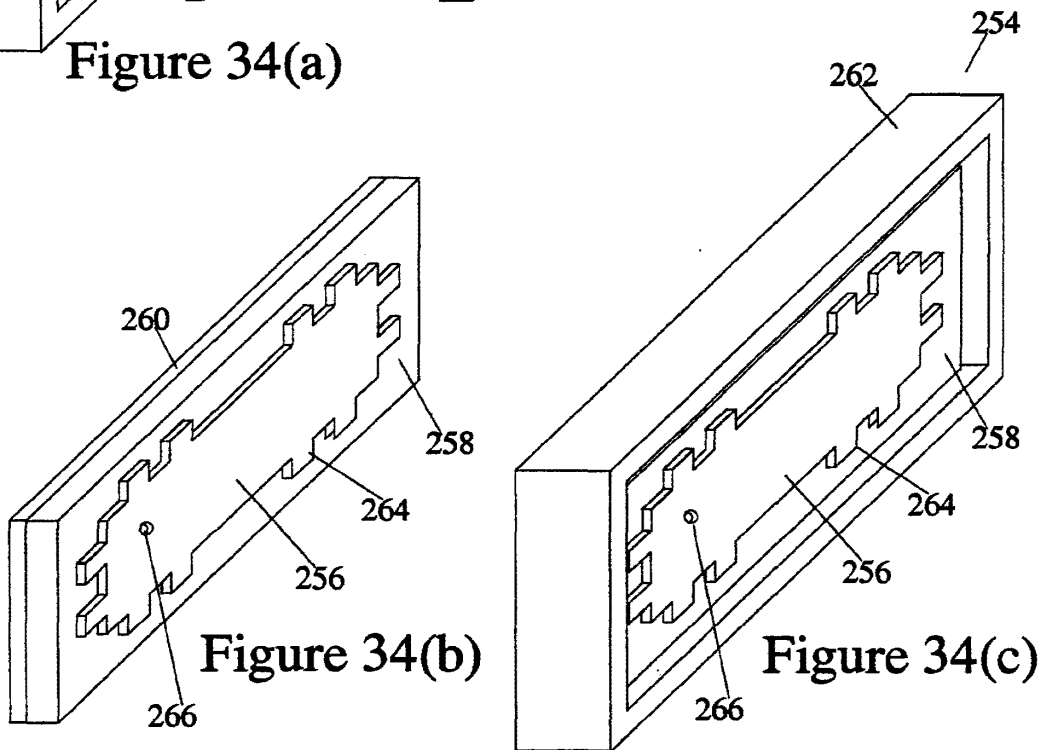
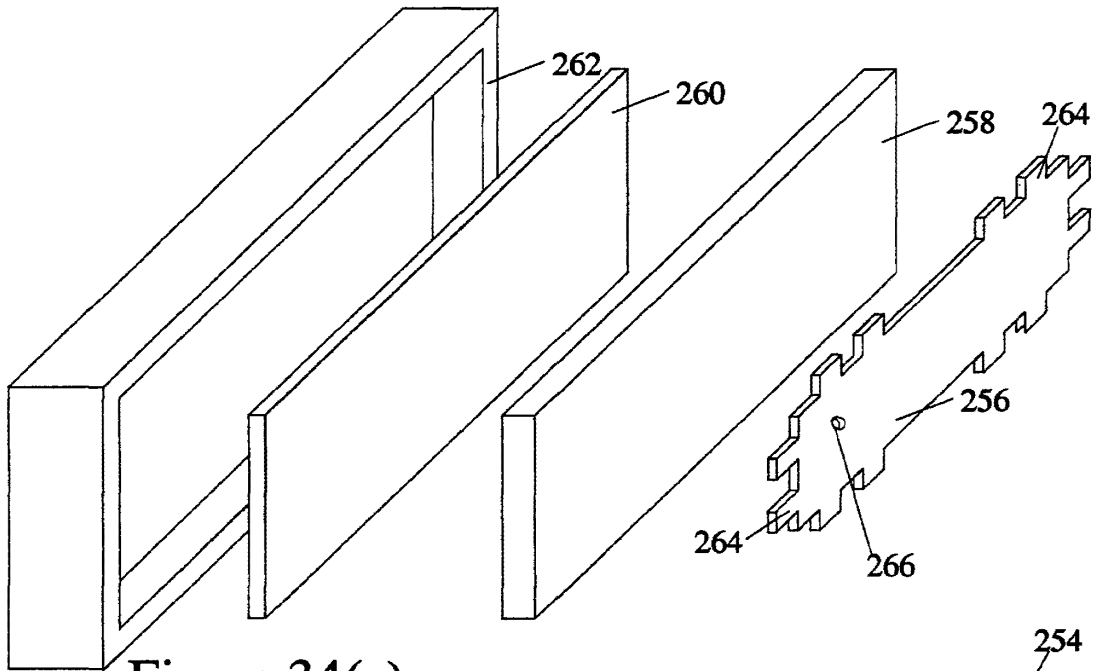
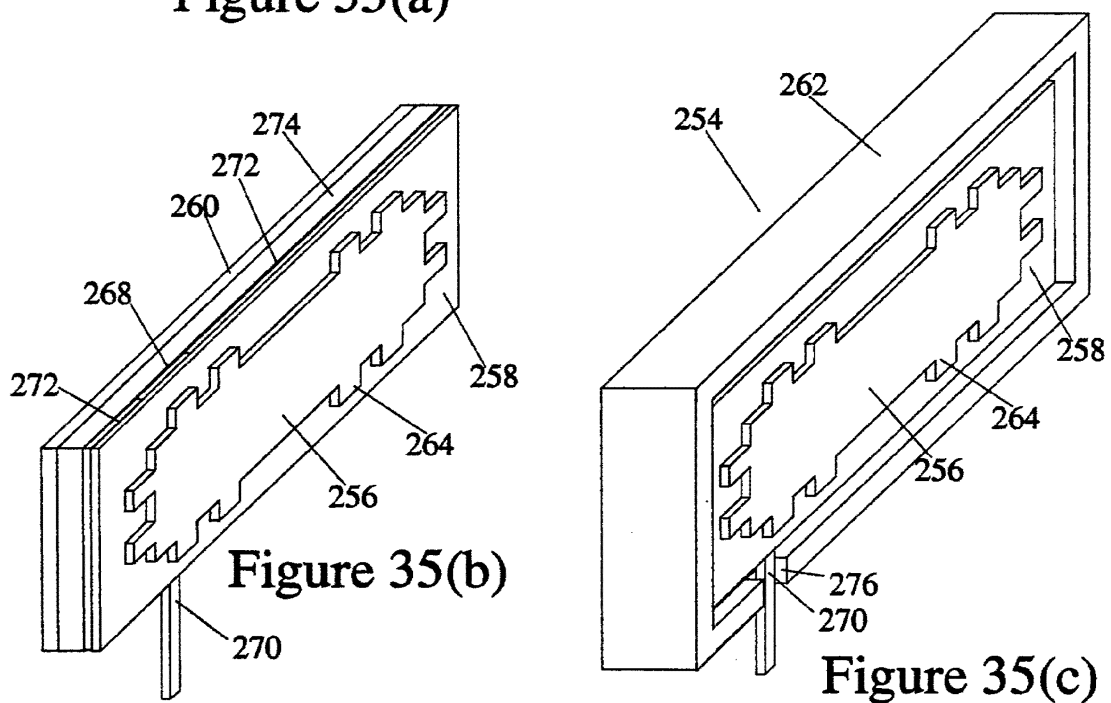
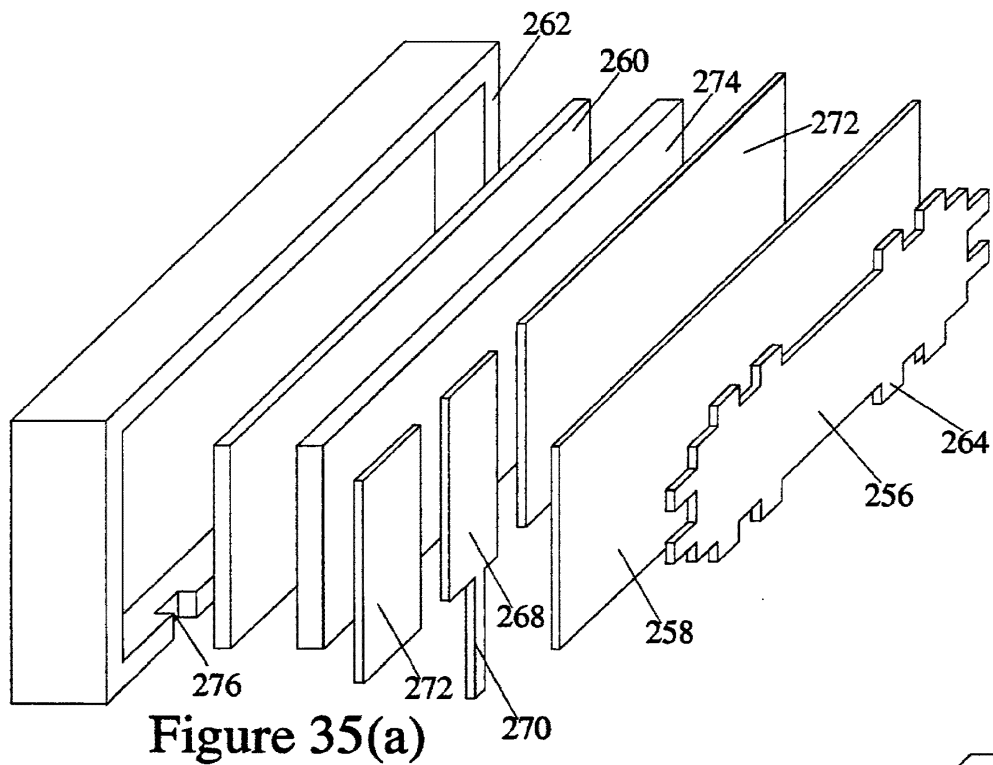


Figure 33

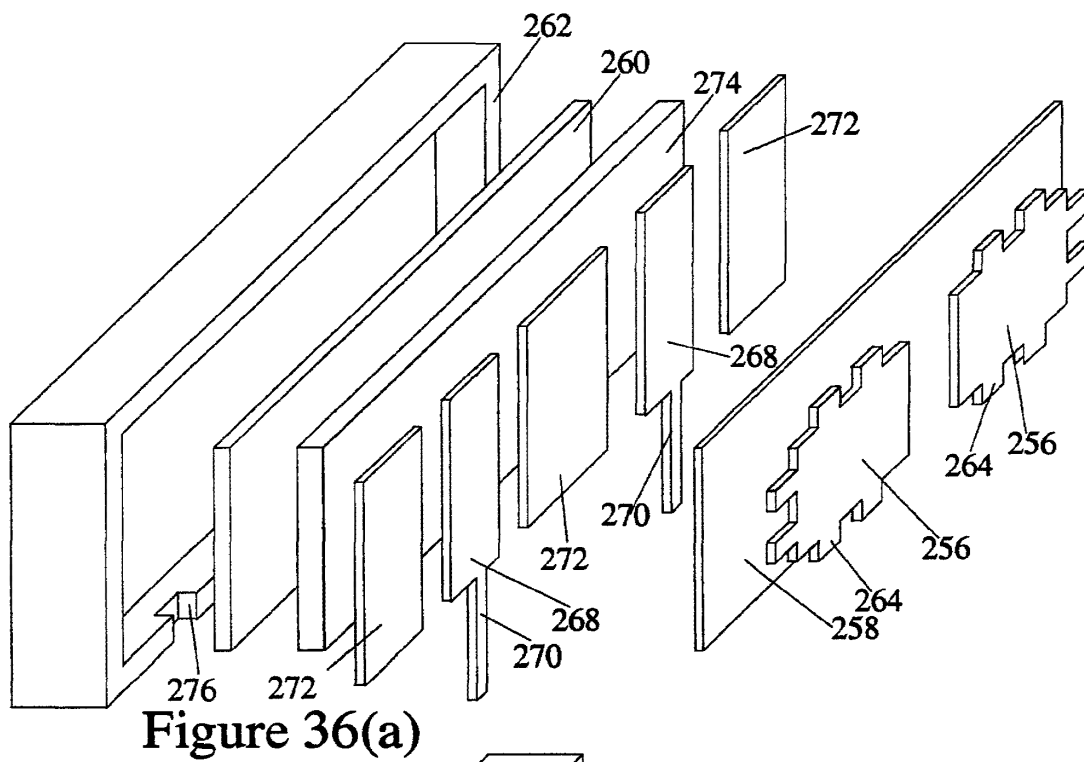
35/39



36/39



37/39



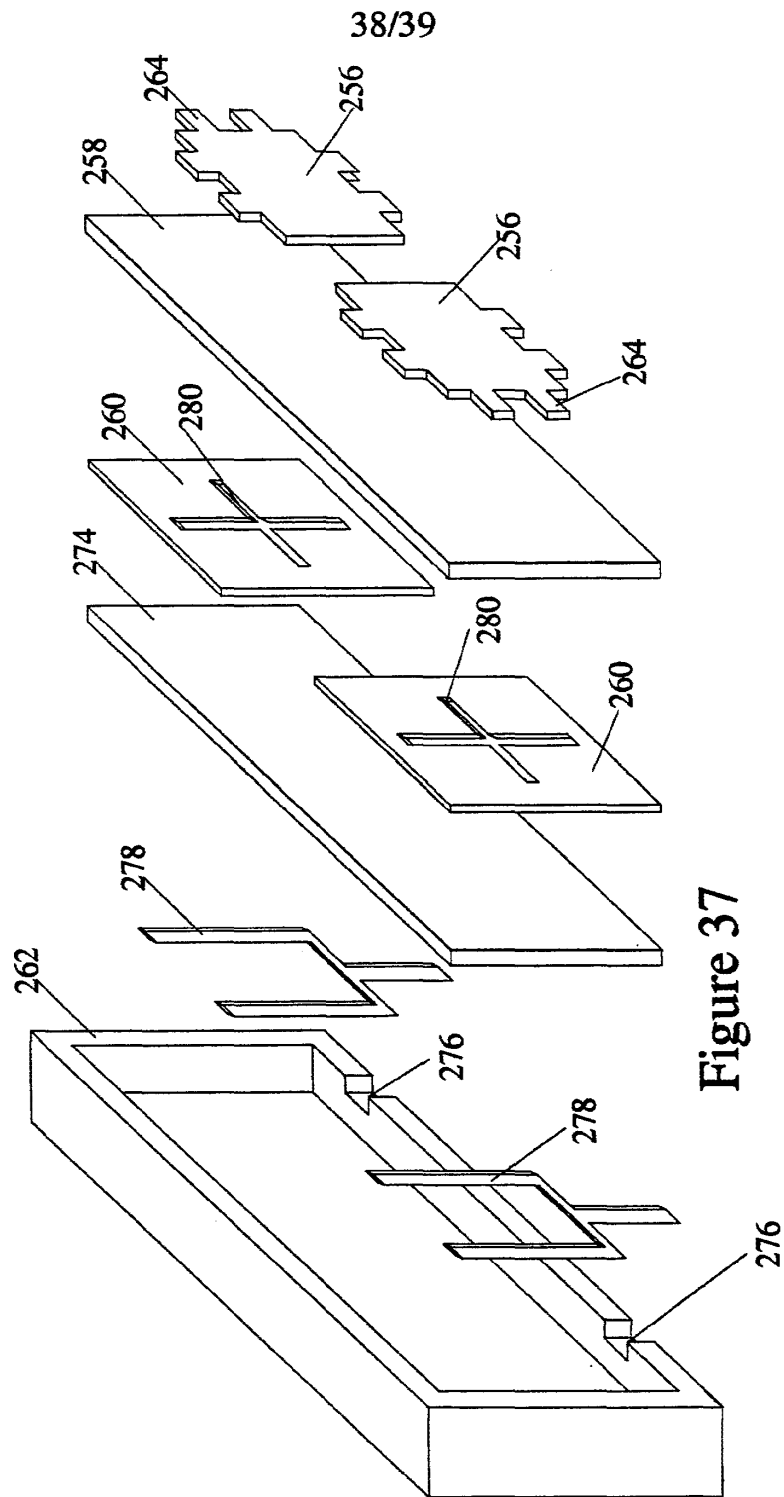


Figure 37

39/39

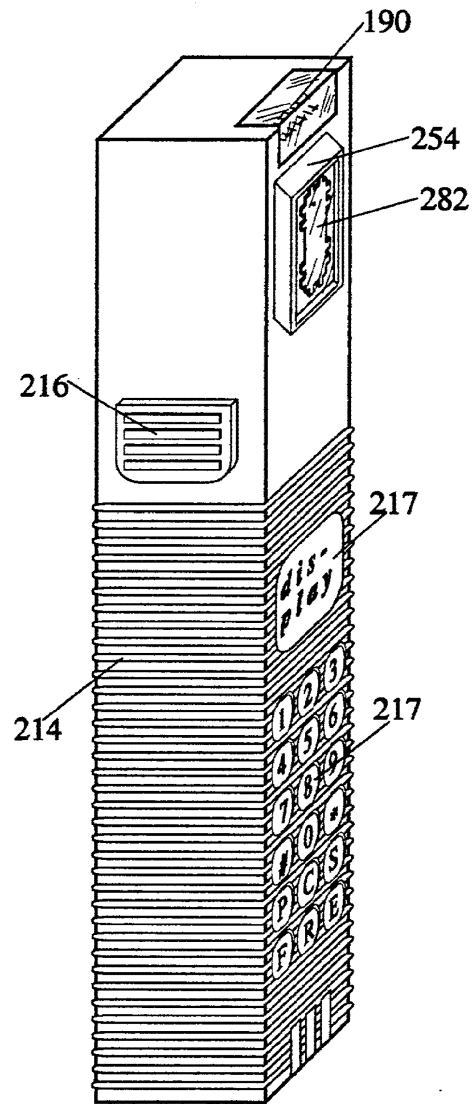


Figure 38

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/05866

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04B 1/38

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/89, 90, 117, 129; 379/59, 433, 451; 174/35MS; 361/814, 816; 343/702, 841

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
APS, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category*           | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.            |
|---------------------|------------------------------------------------------------------------------------|----------------------------------|
| X,P<br>---<br>Y,P   | US, A, 5,367,309 (TASHJIAN) 22 NOVEMBER 1994<br>(see figure 4)                     | 14-15<br>-----<br>1-13 and 16-20 |
| X,P<br>-----<br>Y,P | US, A, 5,373,304 (NOLAN ET AL) 13 DECEMBER 1994<br>(see figure 3)                  | 14-15<br>-----<br>1-13 and 16-20 |
| Y,P                 | US, A, 5,336,896 (KATZ) 09 AUGUST 1994                                             | 1-20                             |
| &                   | US, A, 5,335,366 (DANIELS) 02 AUGUST 1994<br>(see figures 1-7)                     | 1-20                             |

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

|                                                                                                                                                                         |                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * Special categories of cited documents:                                                                                                                                | "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                                              |
| "A" document defining the general state of the art which is not considered to be part of particular relevance                                                           | "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                                                                     |
| "E" earlier document published on or after the international filing date                                                                                                | "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "G" document member of the same patent family                                                                                                                                                                                                    |
| "O" document referring to an oral disclosure, use, exhibition or other means                                                                                            |                                                                                                                                                                                                                                                  |
| "P" document published prior to the international filing date but later than the priority date claimed                                                                  |                                                                                                                                                                                                                                                  |

Date of the actual completion of the international search  
21 JULY 1995Date of mailing of the international search report  
18 AUG 1995Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231Authorized officer  
  
ANDREW FAILE  
Telephone No. (703) 305-4700

Facsimile No. (703) 305-3230

Form PCT/ISA/210 (second sheet)(July 1992)\*

**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/US95/05866**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                       | Relevant to claim No. |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | IEEE Transactions on Antennas and Propagation, No. 6, June 1993, Toftgard et al, "Effects on Portable Antennas of the Presence of a Person", pp. 739-746 | 1-20                  |

Form PCT/ISA/210 (continuation of second sheet)(July 1992)\*

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US95/05866

A. CLASSIFICATION OF SUBJECT MATTER:  
US CL :

455/89, 90, 117, 129; 379/433, 451; 174/35MS; 361/814, 816; 343/702, 841

Form PCT/ISA/210 (extra sheet)(July 1992)★

| Electronic Acknowledgement Receipt   |                                |
|--------------------------------------|--------------------------------|
| EFS ID:                              | 14386387                       |
| Application Number:                  | 12860234                       |
| International Application Number:    |                                |
| Confirmation Number:                 | 9585                           |
| Title of Invention:                  | PORTABLE ELECTRONIC DEVICE     |
| First Named Inventor/Applicant Name: | Claus H. Jorgensen             |
| Customer Number:                     | 10948                          |
| Filer:                               | Mark F. Harrington/Elaine Mian |
| Filer Authorized By:                 | Mark F. Harrington             |
| Attorney Docket Number:              | 891.0013.U2(US)                |
| Receipt Date:                        | 05-DEC-2012                    |
| Filing Date:                         | 20-AUG-2010                    |
| Time Stamp:                          | 11:20:00                       |
| Application Type:                    | Utility under 35 USC 111(a)    |

### Payment information:

|                        |    |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

### File Listing:

| Document Number | Document Description | File Name      | File Size(Bytes)/<br>Message Digest                   | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|----------------|-------------------------------------------------------|------------------|------------------|
| 1               | Foreign Reference    | reference1.pdf | 880588<br>f62e94acd2804122ede4a25bd20179770d<br>d5fa8 | no               | 22               |

### Warnings:

### Information:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                |                                                     |         |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|-----------------------------------------------------|---------|----|
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Foreign Reference | reference2.pdf | 4279651<br>d7faeda87da28b91fc59751bf1a479eeb4afc198 | no      | 91 |
| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |                |                                                     |         |    |
| <b>Information:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                |                                                     |         |    |
| <b>Total Files Size (in bytes):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                |                                                     | 5160239 |    |
| <p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b><br/> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b><br/> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b><br/> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p> |                   |                |                                                     |         |    |

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

## PATENT WITHDRAWAL NOTICE

DATE WITHDRAWN

12/4/2012

WITHDRAWAL NUMBER

21672

The following application has been **WITHDRAWN** from the

12/11/2012 issue.

SERIAL NO.

12/860,234

PATENT NUMBER

8,331,553

DRAWINGS

006

CLASS

379/433

TITLE

PORTABLE ELECTRONIC DEVICE

NAME AND ADDRESS

CLAUS H. JORGENSEN  
FREDERIKSBERG, DENMARK

REASON FOR WITHDRAWAL

Office of Petitions granted applicant's request to withdraw patent from issue.  
AUTO-PETITION

APPROVED

/Kimberly Terrell/, Manager

Patent Publication Branch  
Office of Data Management

FORM PTO-302 -- (REV. 05-2009)



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                                                                                        | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.          | CONFIRMATION NO.       |
|------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|------------------------------|------------------------|
| 12/860,234                                                                                                             | 08/20/2010  | Claus H. Jorgensen   | 891.0013.U2(US)              | 9585                   |
| 10948 7590 12/19/2012<br>Harrington & Smith, Attorneys At Law, LLC<br>4 Research Drive, Suite 202<br>Shelton, CT 06484 |             |                      | EXAMINER<br>NGUYEN, TUAN DUC |                        |
|                                                                                                                        |             |                      | ART UNIT<br>2656             | PAPER NUMBER           |
|                                                                                                                        |             |                      | MAIL DATE<br>12/19/2012      | DELIVERY MODE<br>PAPER |

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

The time period for reply, if any, is set in the attached communication.

|                                                |                                      |                                            |  |
|------------------------------------------------|--------------------------------------|--------------------------------------------|--|
| <b>Supplemental<br/>Notice of Allowability</b> | <b>Application No.</b><br>12/860,234 | <b>Applicant(s)</b><br>JORGENSEN, CLAUS H. |  |
|                                                | <b>Examiner</b><br>TUAN D. NGUYEN    | <b>Art Unit</b><br>2656                    |  |
|                                                |                                      |                                            |  |

**-- 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 12/03/2012.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 25-44 and renumbered as 1-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

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: \_\_\_\_.

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.**

5. ☐ 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.

6. ☐ CORRECTED DRAWINGS ( as "replacement sheets") 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./Mail Date \_\_\_\_.

(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

7. ☐ 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. <input type="checkbox"/> Notice of References Cited (PTO-892)<br>2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)<br>3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>12/03/2012</u><br>4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 5. <input type="checkbox"/> Notice of Informal Patent Application<br>6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date ____.<br>7. <input type="checkbox"/> Examiner's Amendment/Comment<br>8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance<br>9. <input type="checkbox"/> Other _____. |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                    |  |
|----------------------------------------------------|--|
| /TUAN D NGUYEN/<br>Primary Examiner, Art Unit 2656 |  |
|----------------------------------------------------|--|

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 12/860,234    Confirmation No.: 9585  
Applicant(s): Claus H. Jorgensen  
Filed: 08-20-2010  
Art Unit: 2614  
Examiner: Nguyen, Tuan Duc  
Title: Portable Electronic Device  
Attorney Docket No.: 891.0013.U2 (US)  
Customer No.: 10,948

Commissioner For Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Information Disclosure Statement  
(QPIDS Pilot Program)

Sir:

The following is being submitted in compliance with the Quick Path Information Disclosure Statement (QPIDS) Pilot Program.

The following information is being disclosed to the U.S. Patent and Trademark Office as information that may be material to the examination of the above-identified patent application.

Applicant's Attorney is aware of the art cited on the enclosed Form PTO-1449. Copies of any non-U.S. patent art is/are enclosed with the Form PTO-1449 for the examiner's use.

Please charge deposit account 50-1924 the amount of \$180.00 as payment for the petition fee under 37 C.F.R. §1.17(p).

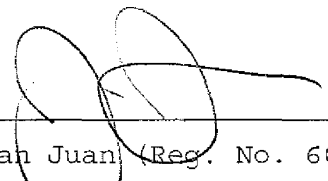
ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.N./

Applicants' Attorney hereby petitions for consideration of this Information Disclosure Statement under 37 C.F.R. §1.97(d). Please charge any fee deficiency to deposit account 50-1924.

No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of this information disclosure statement.

The filing of this Statement is not to be construed as a representation that a search has been made regarding the claimed invention (37 C.F.R. §1.97(g)) or that no other possible material information exists. In addition, the filing of this Statement is not to be construed to be an admission that the information cited in the Statement is, or is considered to be, material to Patentability (37 C.F.R. §1.97(h)).

Respectfully submitted,

  
\_\_\_\_\_  
Juan Juan (Reg. No. 60,564)

12/3/2012  
\_\_\_\_\_  
Date

Customer No.: 10,948  
Harrington & Smith, Attorneys At Law, LLC  
4 Research Drive  
Shelton, CT 06484-6212  
203-925-9400

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.N./

| <b>INFORMATION DISCLOSURE<br/>CITATION FORM FOR<br/>PATENT APPLICATION<br/>(FORM PTO-1449)<br/>(Substitute)</b>                                                                                                               |                                                    | Docket No.: 891.0013.U2(US)      Serial No.: 12/860,234<br><br>Applicant(s): Claus H. Jorgensen<br><br>Filing Date: 08-20-2010      Group: 2614 |                               |                            |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------|-----------|
| <b>U.S. PATENT DOCUMENTS</b>                                                                                                                                                                                                  |                                                    |                                                                                                                                                 |                               |                            |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Number-Kind Code)              | Publication Date<br>(MM-DD-YYYY)                                                                                                                | Name of Patentee or Applicant | Class                      | Sub-class |
|                                                                                                                                                                                                                               | US-5,768,098                                       | 06-16-1998                                                                                                                                      | Murayama                      | 361                        | 884       |
|                                                                                                                                                                                                                               | US-6,128,184                                       | 10-03-2000                                                                                                                                      | Ito et al.                    | 361                        | 681       |
|                                                                                                                                                                                                                               | US-6,317,315 B1                                    | 11-13-2001                                                                                                                                      | Lee et al.                    | 361                        | 681       |
|                                                                                                                                                                                                                               | US-6,805,998 B2                                    | 10-19-2004                                                                                                                                      | Jenson et al.                 | 429                        | 162       |
|                                                                                                                                                                                                                               | US-6,920,344 B2                                    | 07-19-2005                                                                                                                                      | Jang                          | 455                        | 575.5     |
|                                                                                                                                                                                                                               | US-6,933,981                                       | 08-23-2005                                                                                                                                      | Kishida et al.                | 348                        | 375       |
|                                                                                                                                                                                                                               | US-7,010,121                                       | 03-07-2006                                                                                                                                      | Wennemer et al.               | 379                        | 433.01    |
|                                                                                                                                                                                                                               | US-7,336,228 B2                                    | 02-26-2008                                                                                                                                      | Lu et al.                     | 343                        | 702       |
|                                                                                                                                                                                                                               | US-7,515,431 B1                                    | 04-07-2009                                                                                                                                      | Zadesky et al.                | 361                        | 752       |
|                                                                                                                                                                                                                               | US-7,522,889 B2                                    | 04-21-2009                                                                                                                                      | Wulff et al.                  | 455                        | 90.3      |
|                                                                                                                                                                                                                               | US-7,630,741 B2                                    | 12-08-2009                                                                                                                                      | Siddiqui et al.               | 455                        | 575.1     |
|                                                                                                                                                                                                                               | US-2004/0204009 A1                                 | 10-14-2004                                                                                                                                      | Cheng et al.                  | 455                        | 550.1     |
|                                                                                                                                                                                                                               | US-2003/0100275 A1                                 | 05-29-2003                                                                                                                                      | Hsu et al.                    | 455                        | 90        |
|                                                                                                                                                                                                                               | US-2006/0233356 A1                                 | 10-19-2006                                                                                                                                      | Lu et al.                     | 379                        | 433.01    |
|                                                                                                                                                                                                                               | US-                                                |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               | US-                                                |                                                                                                                                                 |                               |                            |           |
| <b>FOREIGN PATENT DOCUMENTS</b>                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
| Examiner<br>Initials                                                                                                                                                                                                          | Document Number<br>(Country Code-Number-Kind Code) | Publication Date<br>(MM-DD-YYYY)                                                                                                                | Name Of Patentee of Applicant | Translation?<br>Yes/No/t/a |           |
|                                                                                                                                                                                                                               | EP-1 617 313-A2                                    | 01-18-2005                                                                                                                                      | LG Electronics, Inc.          |                            |           |
|                                                                                                                                                                                                                               | WO-95/31048-A1                                     | 11-16-1995                                                                                                                                      | Daniels, John J.              |                            |           |
|                                                                                                                                                                                                                               | - -                                                |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               | - -                                                |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               | - -                                                |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               | - -                                                |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               | - -                                                |                                                                                                                                                 |                               |                            |           |
| <b>OTHER DOCUMENTS (Author (Capitalize), Title, Date, Pages, Etc., if known)</b>                                                                                                                                              |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
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|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
|                                                                                                                                                                                                                               |                                                    |                                                                                                                                                 |                               |                            |           |
| Examiner's Signature: /Tuan Nguyen/                                                                                                                                                                                           |                                                    |                                                                                                                                                 | Date Considered: 12/14/2012   |                            |           |
| Initial if reference was considered, whether or not citation is in conformance with MPEP. Mark through citation if not considered.<br>Include a copy of this citation form with your next correspondence to the Applicant(s). |                                                    |                                                                                                                                                 |                               |                            |           |

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /T.N./

| Electronic Acknowledgement Receipt   |                                |
|--------------------------------------|--------------------------------|
| EFS ID:                              | 14366312                       |
| Application Number:                  | 12860234                       |
| International Application Number:    |                                |
| Confirmation Number:                 | 9585                           |
| Title of Invention:                  | PORTABLE ELECTRONIC DEVICE     |
| First Named Inventor/Applicant Name: | Claus H. Jorgensen             |
| Customer Number:                     | 10948                          |
| Filer:                               | Mark F. Harrington/Elaine Mian |
| Filer Authorized By:                 | Mark F. Harrington             |
| Attorney Docket Number:              | 891.0013.U2(US)                |
| Receipt Date:                        | 03-DEC-2012                    |
| Filing Date:                         | 20-AUG-2010                    |
| Time Stamp:                          | 14:32:44                       |
| Application Type:                    | Utility under 35 USC 111(a)    |

### Payment information:

|                                          |                 |
|------------------------------------------|-----------------|
| Submitted with Payment                   | yes             |
| Payment Type                             | Deposit Account |
| Payment was successfully received in RAM | \$1060          |
| RAM confirmation Number                  | 816             |
| Deposit Account                          | 501924          |
| Authorized User                          |                 |

### File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|-----------|----------------------------------|------------------|------------------|
|-----------------|----------------------|-----------|----------------------------------|------------------|------------------|

| Electronic Patent Application Fee Transmittal                                                                                                                                                                                           |          |                                |        |                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------------|--------|----------------------|
| Application Number:                                                                                                                                                                                                                     |          | 12860234                       |        |                      |
| Filing Date:                                                                                                                                                                                                                            |          | 20-Aug-2010                    |        |                      |
| Title of Invention:                                                                                                                                                                                                                     |          | PORTABLE ELECTRONIC DEVICE     |        |                      |
| First Named Inventor/Applicant Name:                                                                                                                                                                                                    |          | Claus H. Jorgensen             |        |                      |
| Filer:                                                                                                                                                                                                                                  |          | Mark F. Harrington/Elaine Mian |        |                      |
| Attorney Docket Number:                                                                                                                                                                                                                 |          | 891.0013.U2(US)                |        |                      |
| Filed as Large Entity                                                                                                                                                                                                                   |          |                                |        |                      |
| Utility under 35 USC 111(a) Filing Fees                                                                                                                                                                                                 |          |                                |        |                      |
| Description                                                                                                                                                                                                                             | Fee Code | Quantity                       | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                                                                                                                                                                                                           |          |                                |        |                      |
| Petition fee- 37 CFR 1.17(h) (Group III)                                                                                                                                                                                                | 1464     | 1                              | 130    | 130                  |
| Request for continued examination                                                                                                                                                                                                       | 1801     | 1                              | 930    | 930                  |
| Pages:                                                                                                                                                                                                                                  |          |                                |        |                      |
| Claims:                                                                                                                                                                                                                                 |          |                                |        |                      |
| Miscellaneous-Filing: <div style="float: right; text-align: right;">             Adjusted date: 01/02/2013 SDIBETA1 12860234<br/>             12/04/2012 INTERSU 00000016 501924<br/>             02 FC:1801 930.00 CR           </div> |          |                                |        |                      |
| Petition:                                                                                                                                                                                                                               |          |                                |        |                      |
| Patent-Appeals-and-Interference:                                                                                                                                                                                                        |          |                                |        |                      |
| Post-Allowance-and-Post-Issuance:                                                                                                                                                                                                       |          |                                |        |                      |



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| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|------------|------------|---------------------|------------------|
| 12/860,234      | 01/29/2013 | 8363824    | 891.0013.U2(US)     | 9585             |

10948 7590 01/09/2013  
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### ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

#### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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) WEB site (<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 (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

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