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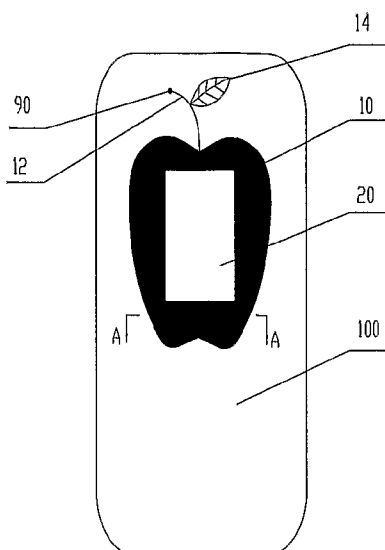
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[Continued on next page]

(54) **Title:** HOUSING FOR MOBILE PHONE AND MOBILE PHONE HAVING THE SAME



(57) **Abstract:** The present invention provides a housing for mobile phone having an antenna, wherein the antenna is embedded into a groove formed on the housing, thus decreasing the total volume of the mobile phone and beautifying the appearance of the mobile phone. Particularly, a housing for mobile phone according to the present invention has an antenna, the housing has a groove in a surface thereof, and the antenna is embedded into the groove. The present invention also provides a mobile phone comprising the housing as mentioned above. Since the antenna is embedded into the groove formed on the housing for mobile phone, rather than protruded out of the housing, so that the total volume of the mobile phone will be decreased, and the antenna cannot be bent or break off due to impact, further the appearance of the mobile phone will be more aesthetic.



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA,
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

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Housing for Mobile Phone and Mobile Phone Having the Same

FIELD OF INVENTION

The present invention relates to a housing for mobile phone and a mobile phone
5 comprising said housing.

BACKGROUND

A conventional antenna for mobile phone is divided into an external antenna and an
internal antenna.

10 Generally the external antenna is in the shape of a post that is protruded out of the
housing for mobile phone, which increases the total volume of the mobile phone.
Furthermore, the post-shaped antenna is easy to be bent or break off due to impact, falling
or any other accidents. At the same time many users think that the antenna protruding out
of the housing influences the aesthetic appearance of the mobile phone.

15 Accordingly the designers have developed an internal antenna for mobile phone,
which is provided inside of the mobile phone. Although the internal antenna for mobile
phone overcomes the defections of external antenna as mentioned above in some extents, it
is necessary to provide additional fixing devices and fixing process in order to fix the
antenna to the internal of the mobile phone. Further, the internal antenna will occupy the
20 internal space of the mobile phone, which will influence the utilization efficiency of the
internal space of the mobile phone and make the design of the internal construction of the
mobile phone more difficult. Especially it is disadvantageous for the mobile phone having
more functions, more complex construction and more added components.

25 SUMMARY OF THE INVENTION

The present invention is intended to provide a housing for mobile phone, which can
solve the problems existing in the prior art, that is the external antenna increases the
volume of housing for mobile phone and is easy to be broken off.

In order to solve the problems as mentioned above, a housing for mobile phone
30 according to the present invention comprises an antenna, wherein the housing has a groove
in a surface thereof, and the antenna is embedded into the groove.

The present invention also provides a mobile phone comprising the housing as

mentioned above, that is the housing has a groove in the surface thereof, and the antenna is embedded into the groove.

Since the antenna is embedded into the groove formed on the housing for mobile phone, rather than provided inside of the mobile phone or protruded out of the housing, so that the total volume of the mobile phone will be decreased, and the antenna cannot be bent or break off due to impact. Furthermore, the invention not only solve the problem existing in the prior art, that is the internal antenna influences the utilization efficiency of the internal space of the mobile phone, but also make the appearance of the mobile phone more aesthetic.

DESCRIPTIONS OF THE DRAWINGS

Fig. 1 is a schematic view illustrating a mobile phone or a housing for mobile phone according to the present invention.

Fig. 2 is a cross-sectional view taken along the line A-A of fig. 1.

Fig. 3 is a schematic view illustrating a mobile phone or a housing for mobile phone according to another embodiment of the present invention.

Fig. 4 is a schematic view illustrating a mobile phone or a housing for mobile phone according to still another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the housing for mobile phone and the mobile phone according to the present invention, the housing has a groove in the surface thereof, an antenna for mobile phone is embedded into the groove. Generally, the groove is positioned in the outer surface of the housing as discussed below, but the present invention is not limited to this, i.e. the groove may also be formed in the inner surface of the housing, which also falls into the protection scope of the present invention.

Now, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings.

As shown in figs. 1 and 2, the antenna 10 for mobile phone is a sheet-shaped antenna which is in the form of a closed-loop, and preferably but not limited to, the antenna 10 is positioned around a symbol body 20 provided on the housing for mobile phone, so as to beautify the appearance of the mobile phone remarkably. Wherein, the symbol body 20 refers to a structure, such as a liquid crystal display, a speaker, a key press or a pattern etc.,

which is provided on the housing 100. The sheet-shaped antenna provided around the symbol body 20 may be in the form of a closed-loop, for example positioned around a liquid crystal display and having a shape consistent with the liquid crystal display, or may be in the form of an open-loop, such as C-type etc.

5 In the case of the housing for mobile phone having a folded-type cover or a slid-type cover, the antenna of the present invention is preferably provided on the folded-type cover or slid-type cover, which may increase the utilization efficiency of space on the housing and may be easy for realizing the so-called streamline design of the housing to beautify the appearance of the mobile phone. On the common mobile phone without a folded-type
10 cover or a slid-type cover, the antenna of the present invention is preferably provided on a front surface of the housing to make the appearance of housing more aesthetic. Alternatively, the antenna may be provided on a back surface or a side surface of the housing, wherein the side surface of housing includes top, bottom or both sides of the housing.

15 In the case of the antenna being not provided around the symbol body, the antenna may be formed as any shapes, for example in the shape of a sword, a heart, or a spiral etc., which are not limited by the shape of the symbol body. That is, the antenna for mobile phone of the present invention is not limited to the above shapes and positions, all of the antennas formed in any shapes and provided at any positions on the housing will fall into
20 the protection scope of the present invention.

As known in the prior art, the antenna for mobile phone may have a signal input and output pin 12 and grounded pin 14 for receiving and sending signals. To accomplish the function of receiving and sending signal, any well-known techniques may be used, here omitting their detailed description for short.

25 The antenna for mobile phone may be made of any suitable materials, such as Cu or alloy of Cu and Be, which does not need to satisfy special requirement in the present invention.

The antenna 10 may be directly embedded into the groove formed on the housing 100 by profile or frictional engagement. Alternatively, the antenna 10 may also be attached
30 to the groove by an adhesive layer 40 to increase the strength of the connection between the antenna and the housing.

In order to prevent the antenna from being oxidized, an antioxidant layer 50, such as Cr, may be coated on the surface of the antenna. Furthermore as known in the prior art, a

transparent protective layer 60 may be covered on the position of antenna on the housing or on the whole outer surface of the housing to prevent from abrasion. The protective layer 60 may be formed of a common hard or hardened transparent material, such as hard transparent plastic or a layer of wearable transparent lacquer. Further, providing a transparent protective layer on the outer surface of the housing corresponding to the position of the antenna may increase the fastness and sealability of the connection between the antenna and the housing, and may protect the antenna from being abraded or eroded, etc.

A conductive foam 90 connected with a flexible PCB plate may be attached on the signal input and output pin 12 of the antenna 10 to accomplish the connection between the antenna and the flexible PCB plate.

It is noted that the drawings of the present invention is only used for illustration, so they are not made in actual proportion. For example, each of the adhesive layer 40, the antioxidant layer 50 and the protective layer 60 is actually a very thin film, but here each of which has an obviously increased thickness for more clearly illustrating. Further, embedding the antenna into the groove formed on the housing includes the cases that embedding the antenna into the groove completely, and embedding the antenna into the groove in part, even in a few parts.

Fig.3 is a schematic view illustrating a mobile phone according to another embodiment of the present invention. The antenna 10 is provided around the liquid crystal display 20 of the housing 100 and is formed as a heart shape in the form of a closed-loop, so as to make the appearance of the housing for mobile phone more aesthetic.

Fig.4 is a schematic view illustrating a mobile phone according to still another embodiment of the present invention. In this embodiment, the antenna is in the shape of a sword in order to enhance the decorative effect. The upper portion of the housing for mobile phone or the folded-type cover 100 is provided with a LCD display 20, and the lower portion thereof is provided with a groove having a shape corresponding to the antenna 10. The antenna 10 coated with an adhesive on both sides is attached into the groove, the housing for mobile phone or the outer surface of the folded-type cover may be coated with a transparent protective layer. The antenna 10 is provided with two pins (signal input, output point) 12, 14 electrical connected with the main plate of the mobile phone.

Claims

1. A housing for mobile phone having an antenna, characterized in that, the housing has a groove in a surface thereof, and the antenna is embedded into the groove.

5

2. The housing for mobile phone according to claim 1, wherein the antenna has a signal input and output pin.

3. The housing for mobile phone according to claim 1, wherein the groove is positioned in a front surface or a side surface of the housing.

10

4. The housing for mobile phone according to claim 1, wherein the housing comprises a folded-type cover or a slid-type cover, and the groove is positioned in a surface of the cover.

15

5. The housing for mobile phone according to claim 1, wherein the antenna is in the shape of a sheet.

6. The housing for mobile phone according to claim 5, wherein the groove and the sheet-shaped antenna embedded in the groove are positioned around a symbol body provided on the housing.

20

7. The housing for mobile phone according to claim 6, wherein the sheet-shaped antenna is in the form of a closed-loop or an open-loop.

25

8. The housing for mobile phone according to claim 7, wherein the symbol body is a liquid crystal display or a key press.

9. The housing for mobile phone according to any one of claims 1 to 8, wherein the antenna is attached to the groove by an adhesive layer.

30

10. The housing for mobile phone according to claim 9, wherein an antioxidant layer

is formed on the antenna.

11. The housing for mobile phone according to claim 10, wherein a transparent protective layer is formed on the outer surface of the housing corresponding to the position
5 of the antenna.

12. A mobile phone, comprising the housing for mobile phone according to any one of claims 1 to 11.

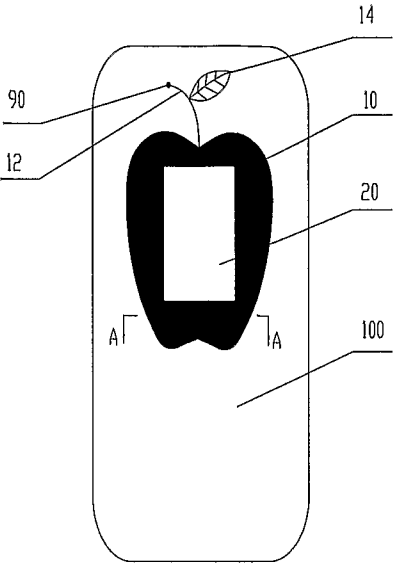


Figure 1

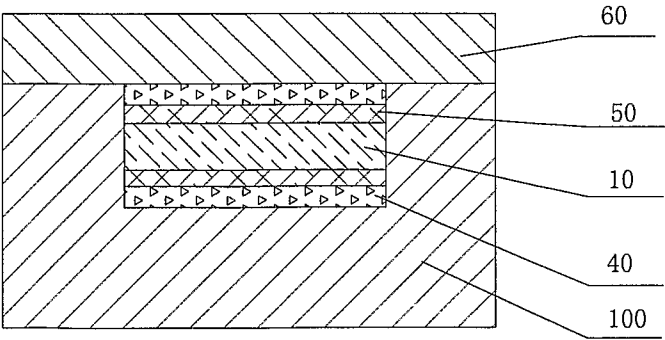


Figure 2

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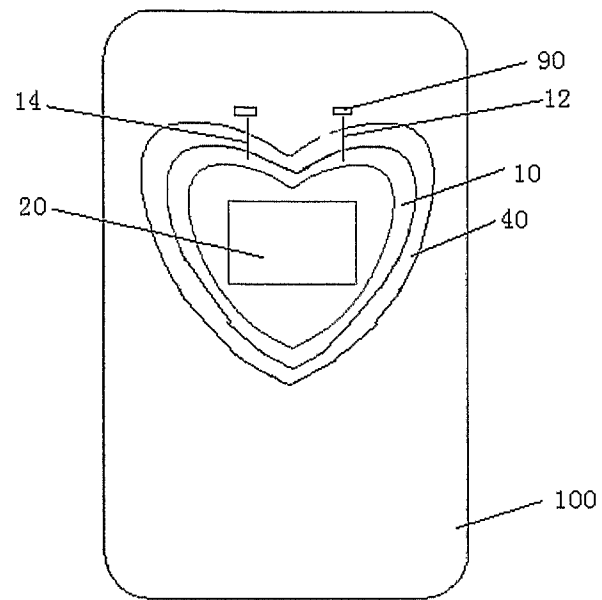


Figure 3

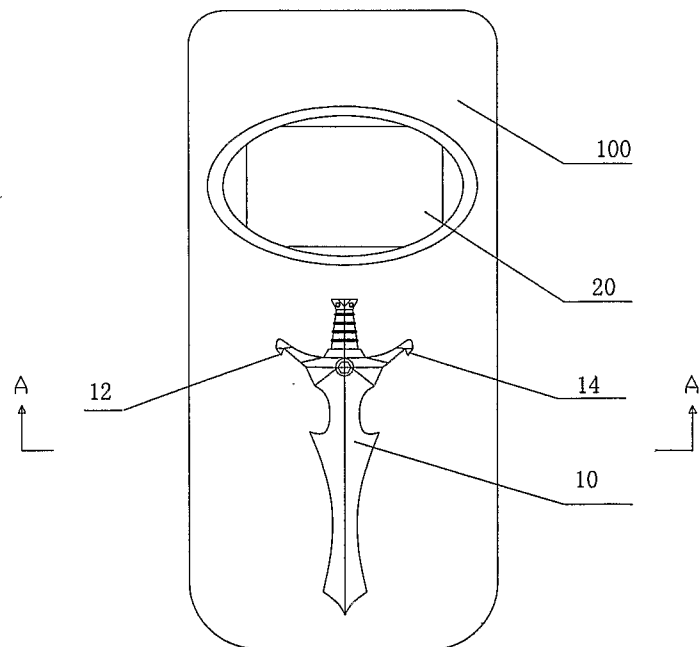


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2006/001408

A. CLASSIFICATION OF SUBJECT MATTER

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)

H04M(2006.01) H01Q(2006.01) H04Q(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, PAJ, CPRS, CNKI: mobile, wireless, portable, handset, telephone, phone, pin, hous+/cas+/shell/crust, groove/neck/nick/dike, surface/face/external, antenna/aerial, embed+, signal.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN1480815A (LEGEND BEIJING LTD) 10.Mar.2004(10.03.2004) see description page 2, line 21-page 3, line 25, page 5, line 6-page 6, line25, fig. 1	1-12
X	JP3099559A (MATSUSHITA ELEC IND CO LTD) 24.Apr. 1991(24.04.1991) see abstract, fig. 1,2	1-2,12
A	JP2002280821A (FURUKAWA ELECTRIC CO LTD) 27.Sep.2002(27.09.2002) see the whole document	1-12
A	CN1420581A (ASULAB SA) 28.May 2003(28.05.2003) see the whole document	1-12
A	CN1355576A (LIN Y) 26.Jun.2002(26.06.2002) see the whole document	1-12

☐ 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 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 application or patent but 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)	"&"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	

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2006/001408

Continuation of: A. CLASSIFICATION OF SUBJECT MATTER

H04M1/02 (2006.01) i

H01Q1/22 (2006.01) n