(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 August 2009 (27.08.2009)

PCT

(10) International Publication Number
WO 2009/104823 A1

(51) International Patent Classification:
G06F 3/033 (2006.01)

(21) International Application Number:
PCT/KR2008/000938

(22) International Filing Date:
18 February 2008 (18.02.2008)

(25) Filing Language: Korean

(26) Publication Language: English

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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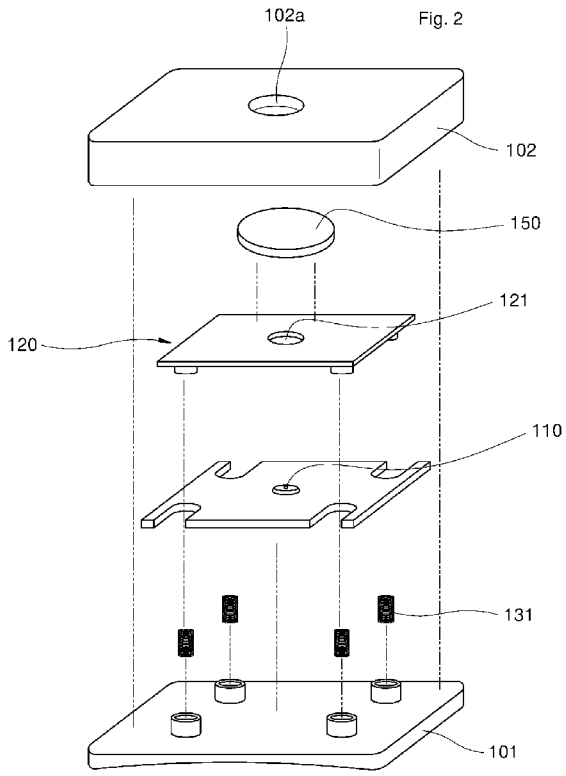
(54) Title: PAD INTEGRATED MOUSE

Fig. 2



(57) Abstract: Provided is a pad integrated mouse in which a pad is integrated with a mouse body, to thereby solve burdensomeness that a conventional mouse should use a pad separated from the mouse, and to thus enable the pad integrated mouse regardless of location of the mouse. The pad integrated mouse includes: a lower housing (101) in which an optical sensor (110) is installed; a pad (150) which is provided so as to be movable in all directions on the upper portion of the optical sensor (110), and reflects the light irradiated from the optical sensor (110); a support unit which supports the pad (150) so as to be movable in all directions; and an upper housing (102) which is combined with the lower housing (101) in which a manipulative opening portion (102a) is formed at a position corresponding to the pad (150). Thus, the pad integrated mouse can solve inconveniences of a conventional mouse which should be used together with a separate pad, since a pad (150) is integrated with a mouse body.

WO 2009/104823 A1

Published:

— *with international search report (Art. 21(3))*

Description

PAD INTEGRATED MOUSE

Technical Field

[1] The present invention relates to a pad integrated mouse, and more particularly to a pad integrated mouse in which a pad is integrated with a mouse body, to thereby solve burdensomeness that a conventional mouse should use a pad separated from the mouse, and to thus enable the pad integrated mouse regardless of location of the mouse.

Background Art

[2] In general, an optical mouse for use in a computer is a computer peripheral device that indicate position of a cursor indicated on a monitor, that is, a device that detects a state of transfer of the mouse using an amount of light reflected from irradiated light. Particularly, optical mouses detect their motions precisely and move softly, in comparison with conventional ball-type mouses. Accordingly, the optical mouses are gradually increasingly used.

[3] FIG. 1 is a cross-sectional view showing a conventional optical mouse, which includes a base plate 10 having a position determination protrusion 20 at one side thereof and a throughhole 15 at the center thereof, and a lens 30 which is safely mounted on the throughhole 15 formed at the center of the base plate 10.

[4] In addition, the conventional optical mouse includes a circuit board 70 which is fixed at one side end of the position determination protrusion 20 and simultaneously is seated on the lens 20, an optical sensor 50 which is electrically connected and fixed on the upper surface of the circuit board 70, a light source 40 such as a light-emitting diode which emits light, and a fixing clip 60 that prevents the circuit board 70, the optical sensor 50, and the light source 40 from shaking due to outside impact or vibration.

[5] The conventional optical mouse operates as follows. The light emitted from the light source 40 is reflected from a bottom pad 80, and an image on the detected surface is inputted through the lens 30, to then be received by the optical sensor 50 in the circuit board 70. The optical sensor 50 which receives light detects an amount of a travel of the mouse through a variation in a light-receiving amount, and outputs a pre-determined signal according to the detected result to then be transferred to a micro-controller unit (MCU) (not shown). The output signal is transferred to a computer main body together with data input from an input unit.

[6] However, in order to operate the conventional optical mouse, the pad 80 whose bottom is flat is required so that light is reflected smoothly. Here, since the pad 80 is

used separately from the mouse, it is inconvenient to keep the pad in custody together with the mouse and to carry the pad and the mouse to other places. Further, in the case that a space for putting a pad on a table or desk is narrow during using a computer, it is inconvenient to use the pad.

[7] In addition, since a pad is separately provided from a main body of a mouse, the pad is apt to be polluted by alien substance such as dust, operational characteristics of the mouse is fallen.

Disclosure of Invention

Technical Problem

[8] Therefore, to solve the above problems, it is an object of the present invention to provide a pad integrated mouse in which a pad is integrated with a mouse, to thereby make it easy to keep the pad and the mouse in custody and carry them conveniently, and to thus enable the pad integrated mouse to be used at any other positions, for example, at a part of a user body.

Technical Solution

[9] To accomplish the above objects of the present invention, according to an aspect of the present invention, there is provided a pad integrated mouse for a computer in which light irradiated from an optical sensor is reflected from a pad and a cursor is moved on a monitor using the reflected light, the pad integrated mouse comprising: a lower housing in which the optical sensor is installed; a pad which is provided so as to be movable in all directions on the upper portion of the optical sensor, and reflects the light irradiated from the optical sensor; a support unit which supports the pad so as to be movable in all directions; and an upper housing which is combined with the lower housing in which a manipulative opening portion is formed at a position corresponding to the pad.

[10] Preferably but not necessarily, the support unit comprises: an escalation plate which includes a light transmission hole through which light emitted from the optical sensor passes, and which supports the pad in which the escalation plate is provided to be escalated on the upper portion of the optical sensor; a plurality of first springs whose lower ends are fixed to the lower housing and whose upper ends are fixed to the escalation plate; a plurality of support blocks which support the pad movably on the escalation plate; and a second spring whose one end is fixed to any one of the upper and lower housings, and whose other end is fixed to the plurality of support blocks.

[11] Preferably but not necessarily, the support unit comprises: an elastic plate which includes a light transmission hole through which light emitted from the optical sensor passes, and which supports the pad at a position corresponding to the light transmission hole, in which the elastic plate is elastically supported up and down on the lower

housing so as to be elastically deformed; and a plurality of elastic wires which support the pad on the elastic plate so as to be returned to the original position and movable on the elastic plate.

[12] Preferably but not necessarily, the bottom surface of the lower housing is concavely formed.

[13] Preferably but not necessarily, the upper surface of the pad is indented.

Advantageous Effects

[14] As described above, the present invention provides a pad integrated mouse in which a pad is integrated with a mouse body, to thus solve inconveniences that a computer user should prepare a pad in addition to a mouse.

[15] In addition, since a special space for positioning a pad on which a mouse is put is not required, it is advantageous for a computer user to assume a working space.

[16] In addition, a pad is integrated with a mouse body, to thus reduce a manipulative error due to foreign matter such as dust which frequently occurs in a conventional pad.

[17] In addition, since the bottom surface of the lower housing is concavely formed, the pad integrated mouse is supported on a part of a computer user such as the lap or thigh of the computer user, to thus enable the computer user to conveniently manipulate the pad integrated mouse.

[18] In addition, since unevenness portions are formed on the upper surface of the pad, the pad integrated mouse can be manipulated with fingers without causing slipping, to thereby enable a cursor to move accurately at a desired distance.

Brief Description of the Drawings

[19] The above and/or other objects and/or advantages of the present invention will become more apparent by describing the preferred embodiments thereof in detail with reference to the accompanying drawings in which:

[20] FIG. 1 is a cross-sectional view showing essential parts of a conventional optical mouse;

[21] FIG. 2 is an exploded perspective view showing a mouse according to an embodiment of the present invention;

[22] FIG. 3 is a plan view showing an upper housing of FIG. 2;

[23] FIGS. 4 to 6 are cross-sectional views for explaining operation of the mouse of FIG. 2, respectively;

[24] FIG. 7 is an exploded perspective view showing a mouse according to another embodiment of the present invention; and

[25] FIGS. 8 to 10 are cross-sectional views for explaining operation of the mouse of FIG. 7, respectively.

Best Mode for Carrying Out the Invention

[26] According to respective embodiments of the present invention, there is provided a pad integrated mouse for a computer in which light irradiated from an optical sensor is reflected from a pad and a cursor is moved on a monitor using the reflected light, in which a pad is integrated with a mouse body, differently from a conventional mouse which operates on a pad which reflects light and is separated from the mouse. The pad integrated mouse includes: a lower housing in which an optical sensor is installed; a pad which is provided so as to be movable in all directions on the upper portion of the optical sensor, and reflects the light irradiated from the optical sensor; a support unit which supports the pad so as to be movable in all directions; and an upper housing which is combined with the lower housing in which a manipulative opening portion is formed at a position corresponding to the pad. Accordingly, the pad integrated mouse does not need a space for manipulating the mouse, but can simply operate.

Mode for the Invention

[27] Hereinbelow, a pad integrated mouse according to preferred embodiments of the present invention will be described with reference to the accompanying drawings. Like reference numerals denote like elements through the following embodiments.

[28] Referring to FIGS. 2 to 6 which show a pad integrated mouse according to a first embodiment of the present invention, the pad integrated mouse includes: a lower housing 101 in which an optical sensor 110 is installed; a pad 150 which is provided so as to be movable in all directions on the upper portion of the optical sensor 110, and reflects the light irradiated from the optical sensor 110; a support unit which supports the pad 150 so as to be movable in all directions; and an upper housing 102 which is combined with the lower housing 101 in which a manipulative opening portion 102a is formed at a position corresponding to the pad 150.

[29] The support unit includes: an escalation plate 120 which includes a light transmission hole 121 through which light emitted from the optical sensor 110 passes, and which supports the pad 150 in which the escalation plate 120 is provided to be escalated on the upper portion of the optical sensor 110; a plurality of first springs 131 whose lower ends are fixed to the lower housing 101 and whose upper ends are fixed to the escalation plate 120; a plurality of support blocks 140 which support the pad 150 movably on the escalation plate 120; and a second spring 141 whose one end is fixed to the upper housing 102, and whose other end is fixed to the plurality of support blocks 140.

[30] The operation of the pad integrated mouse according to the first embodiment of the present invention will follow.

[31] If user's finger is put into the manipulative opening portion 102a to then pressurize the pad 150, for manipulation of the mouse, the pad integrated mouse 100 is changed

from a pad initial state shown in FIG. 4 to a pad descent state shown in FIG. 5. Here, the pad 150 is positioned at a distance close to the optical sensor 110. Accordingly, a signaling operation starts according to light reflection.

[32] If the pad 150 is moved in desired directions, that is, in any directions, as shown in FIG. 6 by a frictional force between the finger and the pad, at the state where the pad 150 has descended, a cursor (not shown) moves on a monitor (not shown) in the direction where the pad has moved, to thereby enable the pad integrated mouse to perform a desired function. Here, the pad 150 slidably moves on the upper surface of the escalation plate 120.

[33] In the case that a user wishes to move a cursor at a remote distance on a monitor, the user moves the pad 150 within a range of the diameter of the manipulative opening portion 102a, for example, at maximum to the left, and takes off the finger from the pad 150. Then, the escalation plate 120 moves upwards by the restoring forces of first springs 131. As a result, the pad 150 deviates from a sensing range of the optical sensor 110, and thus movement of the cursor is stopped. Here, support blocks 140 return to an original position by a second spring 141, and the pad 150 returns to the central position of the escalation plate 120.

[34] If the pad 150 is pressurized and thus moves to the left-side direction, a cursor position on the monitor moves continuously to the left side. Accordingly, the cursor can move at a remote distance.

[35] Referring to FIGS. 7 to 10 which show a pad integrated mouse according to a second embodiment of the present invention, the pad integrated mouse includes: a lower housing 101 in which an optical sensor 110 is installed; a pad 150 which is provided so as to be movable in all directions on the upper portion of the optical sensor 110, and reflects the light irradiated from the optical sensor 110; a support unit which supports the pad 150 so as to be movable in all directions; and an upper housing 102 which is combined with the lower housing 101 in which a manipulative opening portion 102a is formed at a position corresponding to the pad 150.

[36] The support unit includes: an elastic plate 160 which includes a light transmission hole 121 through which light emitted from the optical sensor 110 passes, and which supports the pad 150 at a position corresponding to the light transmission hole 121, in which the elastic plate 160 is elastically supported up and down on the lower housing 101 so as to be elastically deformed; and a plurality of elastic wires 170 which support the pad 150 on the elastic plate 160 so as to be returned to the original position and movable on the elastic plate 160.

[37] The operation of the pad integrated mouse according to the second embodiment of the present invention will follow.

[38] If user's finger is put into the manipulative opening portion 102a to then pressurize

the pad 150, for manipulation of the mouse, the pad integrated mouse is changed from a pad initial state shown in FIG. 8 to a pad descent state shown in FIG. 9. Then, the elastic plate 160 is elastically deformed, and thus the pad 150 is descent within a sensing range of the optical sensor 110.

[39] If the pad 150 is moved in desired directions, that is, in any directions, as shown in FIG. 10, at the state where the pad 150 has been pressurized, a cursor (not shown) moves on a monitor (not shown) by a signal which is light reflected from the pad 150 to which light is irradiated from the optical sensor 110. Here, if a user takes off the finger from the pad 150, the elastic plate 160 is elastically restored, and thus the pad 150 deviates from a sensing range of the optical sensor 110. Then, the pad 150 returns to the central position of the elastic plate 160 by the restoring forces of the elastic wires 170.

[40] Meanwhile, it is desirable that the upper surface of the pad 150 which the user finger contacts is indented so that the surface of the pad 150 is coarse, in order to increment a frictional force with the finger.

[41] In addition, the bottom surface of the lower housing 101 is concavely formed, so that the pad integrated mouse is put on user's lap or thigh, so as to be easily manipulated.

[42] As described above, the present invention has been described with respect to particularly preferred embodiments. However, the present invention is not limited to the above embodiments, and it is possible for one who has an ordinary skill in the art to make various modifications and variations, without departing off the spirit of the present invention. Thus, the protective scope of the present invention is not defined within the detailed description thereof but is defined by the claims to be described later and the technical spirit of the present invention.

Industrial Applicability

[43] As described above, a pad integrated mouse according to the present invention can be applied to a computer peripheral device that indicate position of a cursor indicated on a monitor, that is, a device that detects a state of transfer of the mouse using an amount of light reflected from irradiated light, for use in a computer.

Claims

[1] A pad integrated mouse for use in a computer in which light irradiated from an optical sensor is reflected from a pad and a cursor is moved on a monitor using the reflected light, the pad integrated mouse comprising:
a lower housing (101) in which an optical sensor (110) is installed;
a pad (150) which is provided so as to be movable in all directions on the upper portion of the optical sensor (110), and reflects the light irradiated from the optical sensor (110);
a support unit which supports the pad (150) so as to be movable in all directions; and
an upper housing (102) which is combined with the lower housing (101) in which a manipulative opening portion (102a) is formed at a position corresponding to the pad (150).

[2] The pad integrated mouse according to claim 1, wherein the support unit comprises:
an escalation plate (120) which includes a light transmission hole (121) through which light emitted from the optical sensor (110) passes, and which supports the pad (150) in which the escalation plate (120) is provided to be escalated on the upper portion of the optical sensor (110);
a plurality of first springs (131) whose lower ends are fixed to the lower housing (101) and whose upper ends are fixed to the escalation plate (120);
a plurality of support blocks (140) which support the pad (150) movably on the escalation plate (120); and
a second spring (141) whose one end is fixed to any one of the upper and lower housings (101)(102), and whose other end is fixed to the plurality of support blocks (140).

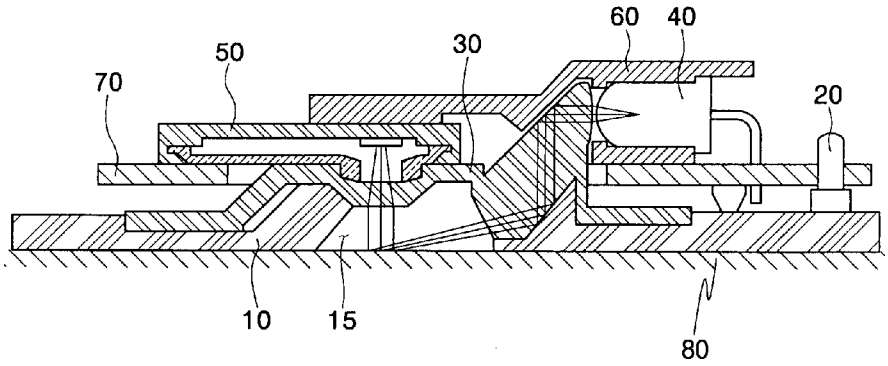
[3] The pad integrated mouse according to claim 1, wherein the support unit comprises:
an elastic plate (160) which includes a light transmission hole (121) through which light emitted from the optical sensor (110) passes, and which supports the pad (150) at a position corresponding to the light transmission hole (121), in which the elastic plate (160) is elastically supported up and down on the lower housing (101) so as to be elastically deformed; and
a plurality of elastic wires (170) which support the pad (150) on the elastic plate (160) so as to be returned to the original position and movable on the elastic plate (160).

[4] The pad integrated mouse according to any one of claims 1 to 3, wherein the

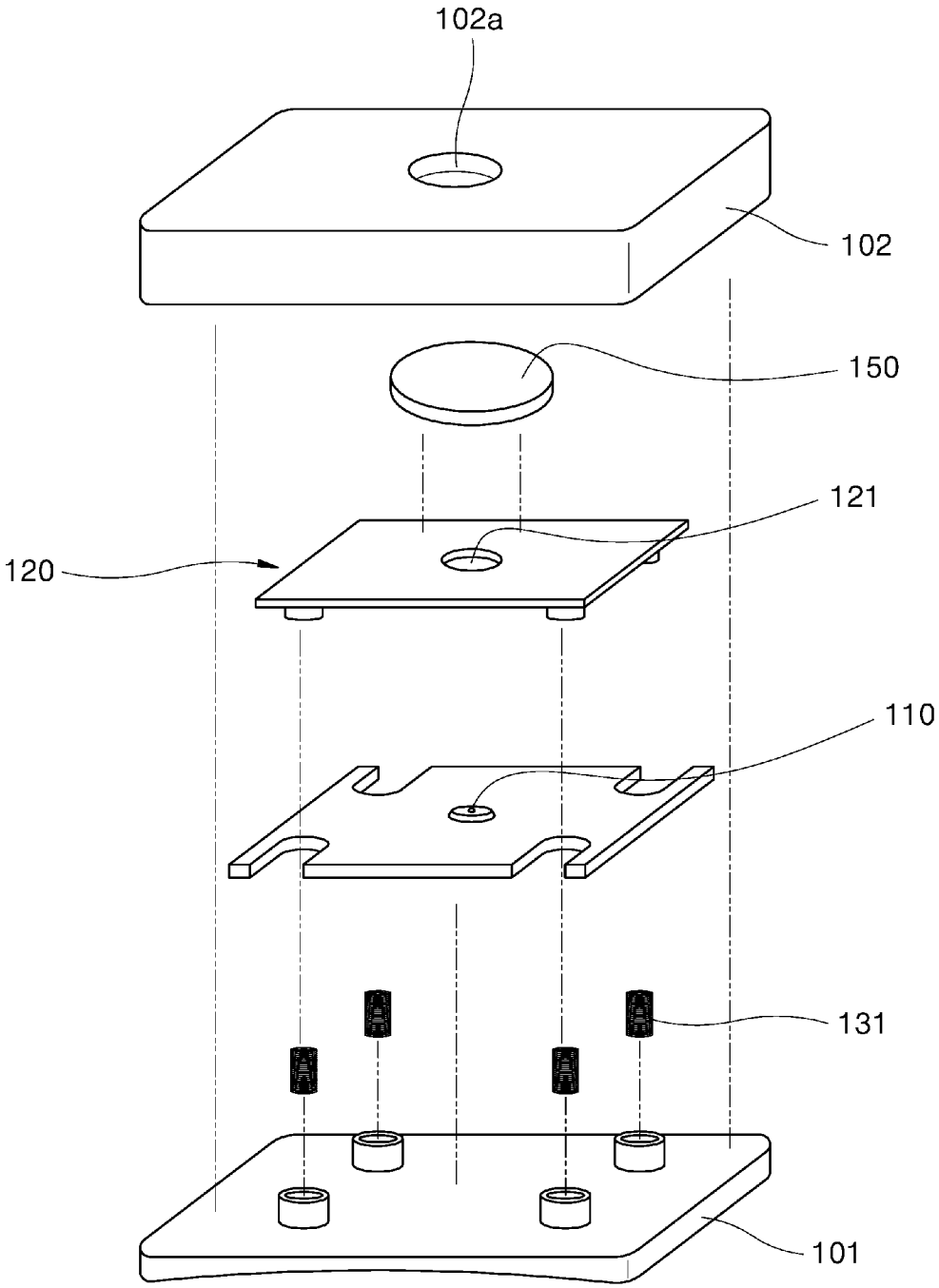
bottom surface of the lower housing is concavely formed.

[5] The pad integrated mouse according to any one of claims 1 to 3, wherein the upper surface of the pad (150) is indented.

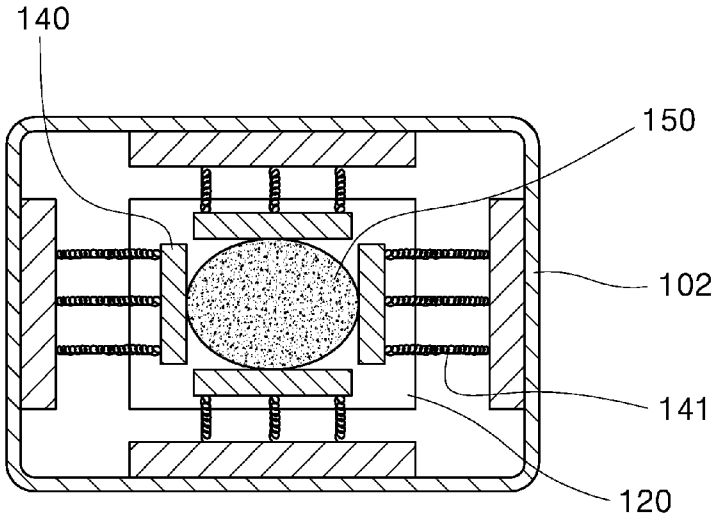
[Fig. 1]



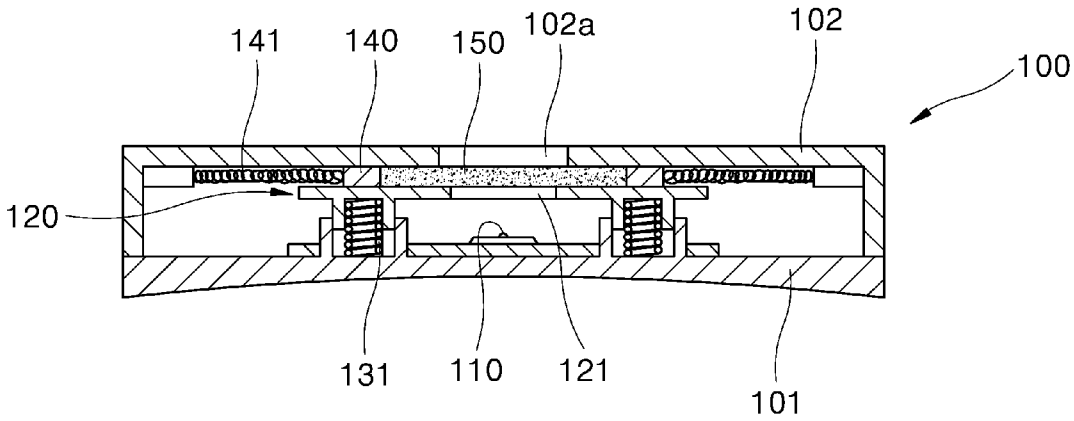
[Fig. 2]



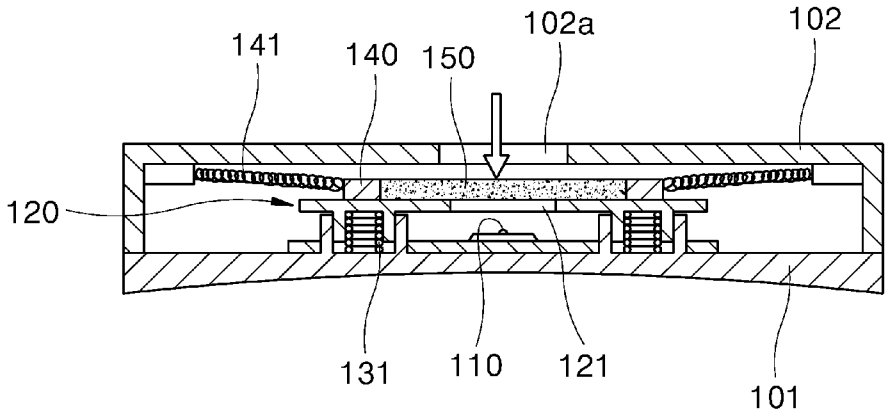
[Fig. 3]



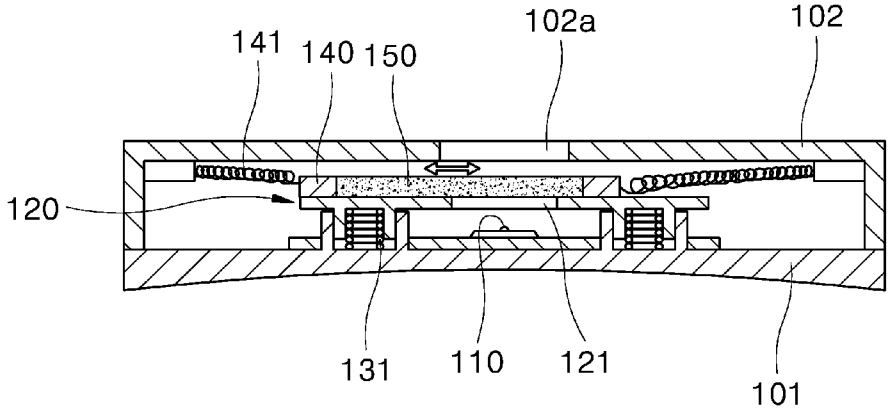
[Fig. 4]



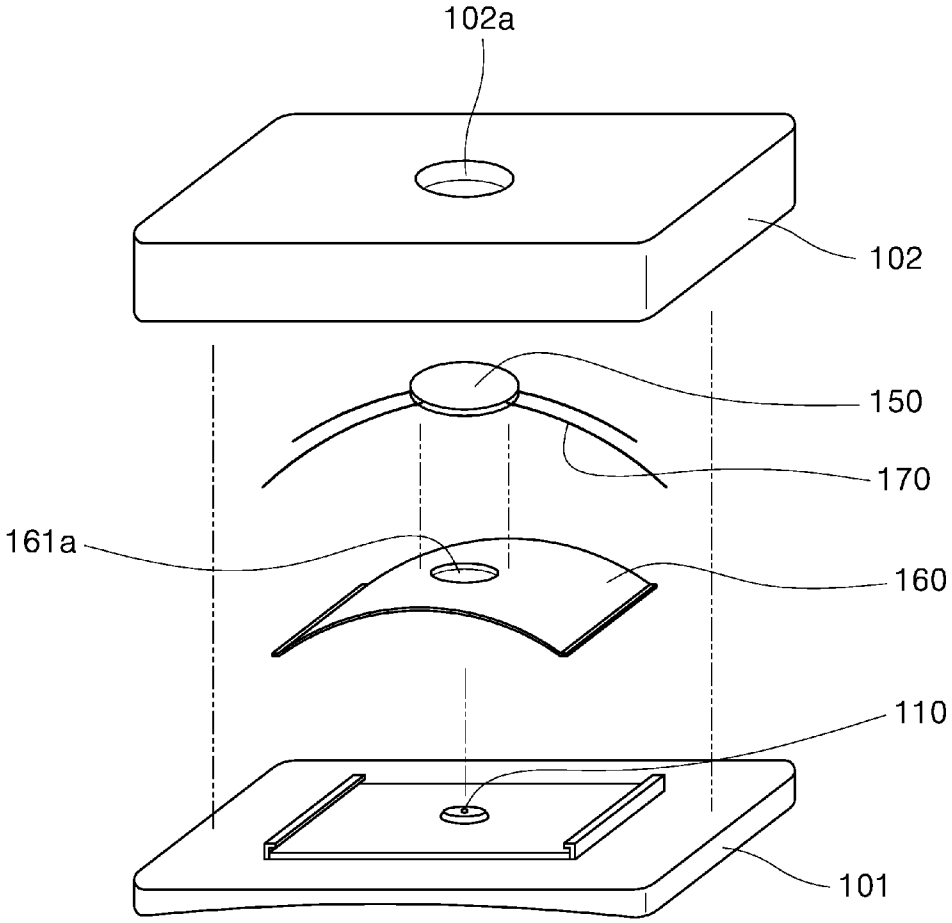
[Fig. 5]



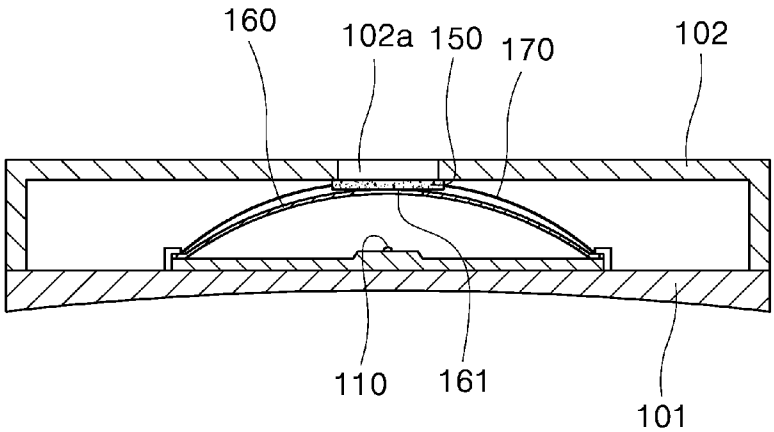
[Fig. 6]



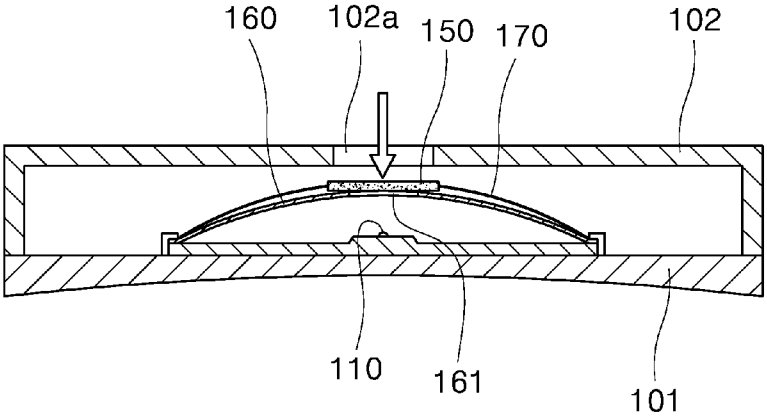
[Fig. 7]



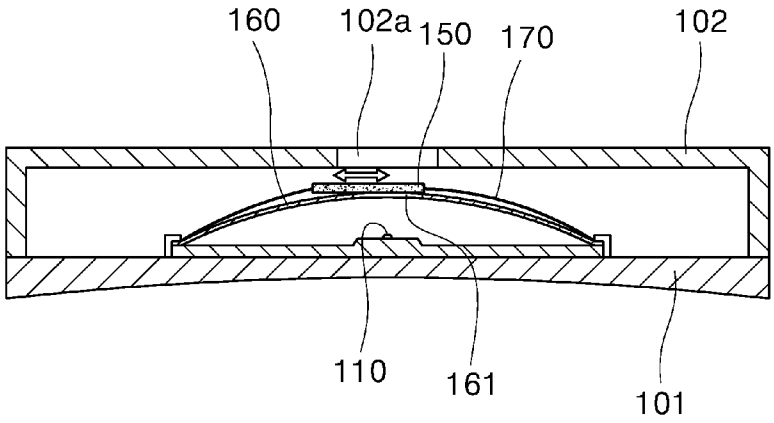
[Fig. 8]



[Fig. 9]



[Fig. 10]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/000938

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/033(2006.01)i

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)

IPC 8 G06F

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

Korean Utility Models and Applications for Utility Models since 1975
Japanese Utility Models and Applications for Utility Models since 1975

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

eKIPASS (KIPO internal) " (optic, optical), (mouse, pointing device, pointer), (elastic, spring, restoring), (pad) "

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 09-128139 A (SHARP CORP) 16 May 1997 Abstract, Claims 1-6, Figs. 1,5,6, Paragraphs [0001]-[0015]	1-5
X	JP 2001-195191 A (SHARP CORP) 19 Jul. 2001 Abstract, Claims 1-6, Figs. 1,8-10, Paragraphs [0001]-[0008]	1-5
A	JP 08-147100 A (SANYO ELECTRIC CO LTD) 07 Jun. 1996 Abstract, Claim 1, Fig. 2, Paragraphs [0001]-[0010]	1-5
A	JP 05-094259 A (MATSUSHITA ELECTRIC IND CO LTD) 16 Apr. 1993 Abstract, Claims 1,2,4,5, Figs. 1,8,9,11, Paragraphs [0001]-[0009]	1-5

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 NOVEMBER 2008 (18.11.2008)	**18 NOVEMBER 2008 (18.11.2008)**

Name and mailing address of the ISA/KR
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Facsimile No. 82-42-472-7140

Authorized officer
CHUN, Dae Sik
Telephone No. 82-42-481-5871

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/000938

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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JP 2001-195191 A	19.07.2001	None	
JP 08-147100 A	07.06.1996	None	
JP 05-094259 A	16.04.1993	None	