(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 163 282 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.03.2010 Bulletin 2010/11

(51) Int Cl.:
A63B 43/06 *(2006.01)*

(21) Application number: **09011549.4**

(22) Date of filing: **09.09.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **15.09.2008 TW 97135320**

(71) Applicant: **Lin, Keng-Hsien**
Hsiao-Kang Dist., Kaohsiung City (TW)

(72) Inventor: **Lin, Keng-Hsien**
Hsiao-Kang Dist., Kaohsiung City (TW)

(74) Representative: **Leifert & Steffan**
Patentanwälte
Postfach 10 40 09
40031 Düsseldorf (DE)

(54) Light-emitting ball

(57) A light-emitting ball (2) includes an inflatable ball bladder (21), a transparent skin layer (222) that encloses the ball bladder (21), and an electrically operable display module (223), such as a flexible organic light emitting diode (OLED) display module, that is disposed between the ball bladder (21) and the skin layer (222) and that is operable to generate images visible through the skin layer (222).

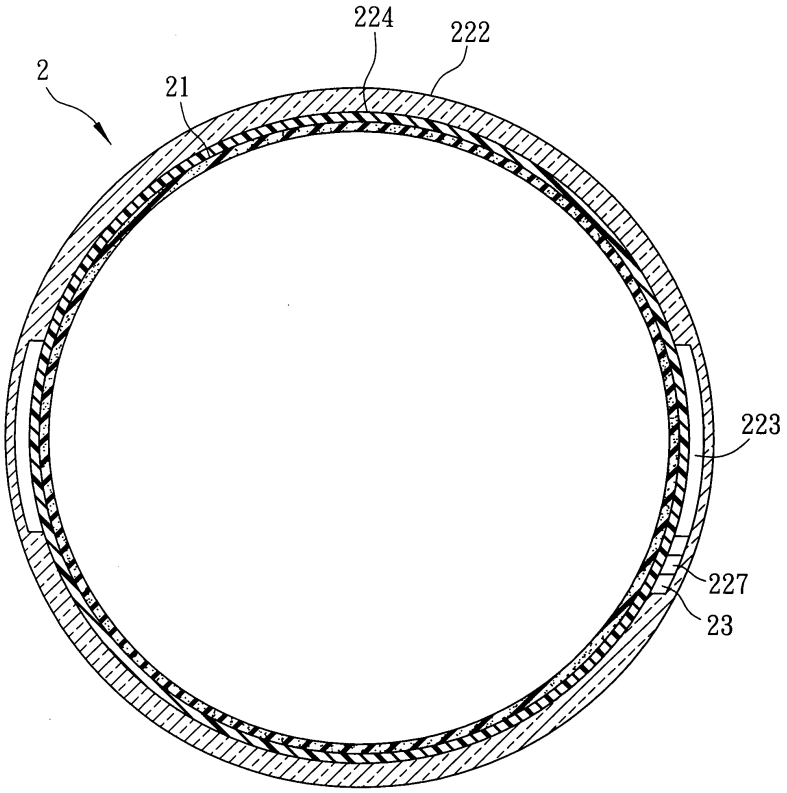

FIG. 4

EP 2 163 282 A1

Description

[0001] The present invention relates to a ball, more particularly to a light-emitting ball.

[0002] Sport activities played with a ball are popular. Examples of such sport activities include baseball, basketball, soccer, volleyball, softball, and so on.

[0003] Referring to Figures 1 and 2, a conventional sports ball 1 includes an inflatable ball bladder 12 and a skin layer 11 that encloses the ball bladder 12. The skin layer 11 has a plurality of interconnected patch segments 111 enclosing the ball bladder 12. Each of the patch segments 111 has a backing layer 112 attached to an outer surface of the ball bladder 12, an intermediate layer 113 disposed on an outer surface of the backing layer 112, and an outer layer 114 disposed on an outer surface of the intermediate layer 113. In order to improve visual effects, patterns or colors on the sports ball 1 can be changed only via the outer layer 114. However, even if the patterns or the colors can be changed, an appearance of the sports ball 1 remains dull.

[0004] Therefore, the object of the present invention is to provide a light-emitting ball, which can effectively promote visual effects.

[0005] Accordingly, a light-emitting ball of the present invention comprises an inflatable ball bladder, a transparent skin layer that encloses the ball bladder, and an electrically operable display module that is disposed between the ball bladder and the skin layer and that is operable to generate images visible through the skin layer.

[0006] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments with reference to the accompanying drawings, of which:

Figure 1 is a perspective view of a conventional sports ball;

Figure 2 is a fragmentary sectional view of the conventional sports ball;

Figure 3 is a perspective view of a first preferred embodiment of a light-emitting ball according to the present invention;

Figure 4 is a sectional view of the light-emitting ball of the first preferred embodiment taken along line IV-IV in Figure 3;

Figure 5 is a circuit block diagram of a second preferred embodiment of a light-emitting ball according to the present invention;

Figure 6 is a perspective view of a third preferred embodiment of a light-emitting ball according to the present invention;

Figure 7 is a sectional view of the light-emitting ball of the third preferred embodiment; and

Figure 8 is a circuit block diagram of the light-emitting ball of the third preferred embodiment.

[0007] Before the present invention is described in greater detail, it should be noted that like components are assigned the same reference numerals throughout the following disclosure.

[0008] Referring to Figures 3 and 4, a first preferred embodiment of a light-emitting ball 2 according to the present invention is shown to comprise an inflatable ball bladder 21, a transparent skin layer 222, and an electrically operable display module 223.

[0009] The transparent skin layer 222 encloses the ball bladder 21. The electrically operable display module 223 is disposed between the ball bladder 21 and the skin layer 222, is attached to an inner surface of the skin layer 222, and is operable to generate images visible through the skin layer 222. The display module 223 has a shape of an annular band in this embodiment, and includes a remotely controllable battery-operated power supply unit 227 for supplying electric power thereto.

[0010] In this embodiment, the skin layer 222 is made of a thermoplastic resin, such as thermoplastic polyurethane (TPU). The display module 223 is a flexible organic light emitting diode (OLED) display module. The material for the skin layer 222 is not limited to the above example as long as light from the display module 223 can pass therethrough.

[0011] The light-emitting ball 2 further comprises a backing layer 224 that is disposed between the display module 223 and the ball bladder 21, and a controller 23 that is disposed on the display module 223, that is coupled to the display module 223, and that is operable to provide image data thereto. The display module 223 is operable to generate the images based upon the image data received thereby, and can be configured to display predetermined images that may be, for example, stored in the display module 223.

[0012] Figure 5 illustrates a circuit block diagram of a controller 23 of a second preferred embodiment of a light-emitting ball 2 according to the present invention.

[0013] In the second preferred embodiment, the controller 23 includes a processor 232 that is electrically coupled to the remotely controllable battery-operated power supply unit 227 and a screen 225 of the display module 223, and a data source 25 that is coupled to the processor 232. The processor 232 is operable to provide the image data to the screen 225 of the display module 223 based upon an output of the data source 25. The data source 25 includes at least one of a gravitational accelerometer 233, a global positioning system (GPS) receiver module 235, and an image library module 251. The gravitational accelerometer 233 is used for measuring acceleration of the ball 2 when moving and converting the measured acceleration into speed, and may transmit a speed signal to the processor 232, for subsequent display of the ball speed on the display module 223. The GPS receiver module 235 is used for obtaining coordinates of the ball 2, and may transmit a coordinate signal to the processor 232 for subsequent display of the position of the ball 2 on the display module 223 when the speed of the ball 2 is below a threshold value. The image library module 251 may include the predetermined images, which can be

accessed by the processor 232 for subsequent transmission to the display module 233.

[0014] Referring to Figures 6,7, and 8, a third preferred embodiment of a light-emitting ball 2 of the present invention is shown to be similar to the first and second preferred embodiments. The third preferred embodiment differs from the first and second preferred embodiments in the following aspects.

[0015] The display module 223 includes a plurality of display units 253, each of which includes a screen 225 and a remotely controllable battery-operated first power supply unit 227 for supplying electric power thereto. The skin layer 222 includes a plurality of interconnected patch segments 221. Each of the display units 253 is attached to an inner surface of a corresponding one of the patch segments 221. The controller 23 is disposed in the ball bladder 21, and further includes a remotely controllable battery-operated second power supply unit 234 for supplying electric power thereto. The light-emitting ball 2 further comprises a suspension mechanism 24 for suspending the controller 23 in the ball bladder 21. The suspension mechanism 24 includes a frame member 241, a set of first elastic components 242 that interconnect the controller 23 and the frame member 241, and a set of second elastic components 243 that interconnect the frame member 241 and the ball bladder 21. By virtue of the elastic components 242, 243, shock forces that act on the controller 23 when the ball 2 is in use can be reduced.

[0016] The controller 23 is coupled to each of the display units 253, and is operable to provide image data thereto. Each of the display units 253 is operable to generate the images based upon the image data received thereby. The controller 23 further includes a transmitter 231 for transmitting the image data wirelessly to the display units 253, and each of the display units 253 further includes a receiver 226 for receiving the image data from the controller 23 and for providing the received image data to the screen 225. Like the previous embodiment, the controller 23 further includes a processor 232 coupled to the transmitter 231, and a data source 25 coupled to the processor 232. The processor 232 is operable to provide the image data to the display units 253 based upon an output of the data source 25. The remotely controllable battery-operated second power supply unit 234 is for supplying electric power to the processor 232.

[0017] In the third preferred embodiment, the first and second elastic components 242, 243 of the suspension mechanism 24 are not limited to compression springs, and may be other elastic components as long as shock forces that act on the controller 23 can be reduced.

Claims

1. A light-emitting ball (2) including:

an inflatable ball bladder (21); and
a skin layer (222) that encloses said ball bladder (21) ;
characterized in that said skin layer is transparent, and an electrically operable display module (223) is disposed between said ball bladder (21) and said skin layer (222) and is operable to generate images visible through said skin layer (222).

2. The light-emitting ball (2) as claimed in claim 1, **characterized in that** said skin layer (222) is made of a thermoplastic resin.

3. The light-emitting ball (2) as claimed in any one of the preceding claims, **characterized in that** said display module (223) is attached to an inner surface of said skin layer (222).

4. The light-emitting ball (2) as claimed in any one of the preceding claims, **characterized in that** said displaymodule (223) is a flexible organic light emitting diode (OLED) display module.

5. The light-emitting ball (2) as claimed in any one of the preceding claims, further **characterized by** a backing layer (224) disposed between said display module (223) and said ball bladder (21).

6. The light-emitting ball (2) as claimed in any one of the preceding claims, **characterized in that** said display module (223) includes a remotely controllable battery-operated power supply unit (227) for supplying electric power thereto.

7. The light-emitting ball (2) as claimed in any one of the preceding claims, further **characterized by** a controller (23) coupled to said display module (223) and operable to provide image data thereto, said display module (223) being operable to generate the images based upon the image data received thereby.

8. The light-emitting ball (2) as claimed in claim 7, **characterized in that** said controller (23) includes a processor (232) coupled to said display module (223) and a data source (25) coupled to said processor (232), said processor (232) being operable to provide the image data to said display module (223) based upon an output of said data source (25).

9. The light-emitting ball (2) as claimed in claim 8, **characterized in that** said data source (25) includes at least one of a gravitational accelerometer (233), a global positioning system receiver module (235), and an image library module (251).

10. The light-emitting ball (2) as claimed in any one of claims 1 to 5, **characterized in that** said display module (223) includes a plurality of display units

(253), each of which includes a remotely controllable battery-operated power supply unit (227) for supplying electric power thereto.

11. The light-emitting ball (2) as claimed in claim 10, **characterized in that** said skin layer (222) includes a plurality of interconnected patch segments (221), each of said display units (253) being attached to an inner surface of a corresponding one of said patch segments (221).

12. The light-emitting ball (2) as claimed in any one of claims 10 and 11, further **characterized by** a controller (23) coupled to each of said display units (253) and operable to provide image data thereto, each of said display units (253) being operable to generate the images based upon the image data received thereby.

13. The light-emitting ball (2) as claimed in claim 12, **characterized in that** said controller (23) includes a transmitter (231) for transmitting the image data wirelessly to said display units (253), and each of said display units (253) includes a receiver (226) for receiving the image data from said controller (23).

14. The light-emitting ball (2) as claimed in claim 13, **characterized in that** said controller (23) further includes a processor (232) coupled to said transmitter (231) and a data source (25) coupled to said processor (232), said processor (232) being operable to provide the image data to said display units (253) based upon an output of said data source (25).

15. The light-emitting ball (2) as claimed in claim 14, **characterized in that** said controller (23) further includes a remotelycontrollablebattery-operatedpower supply unit (234) for supplying electric power to said processor (232).

16. The light-emitting ball (2) as claimed in any one of claims 13 to 15, **characterized in that** said controller (23) is disposed in said ball bladder (21) and further includes a remotelycontrollablebattery-operatedpower supply unit (234) for supplying electric power thereto.

17. The light-emitting ball (2) as claimed in claim 16, further **characterized by** a suspension mechanism (24) for suspending said controller (23) in said ball bladder (21), said suspension mechanism (24) including a frame member (241), a set of first elastic components (242) that interconnect said controller (23) and said frame member (241), and a set of second elastic components (243) that interconnect said frame member (241) and said ball bladder (21).

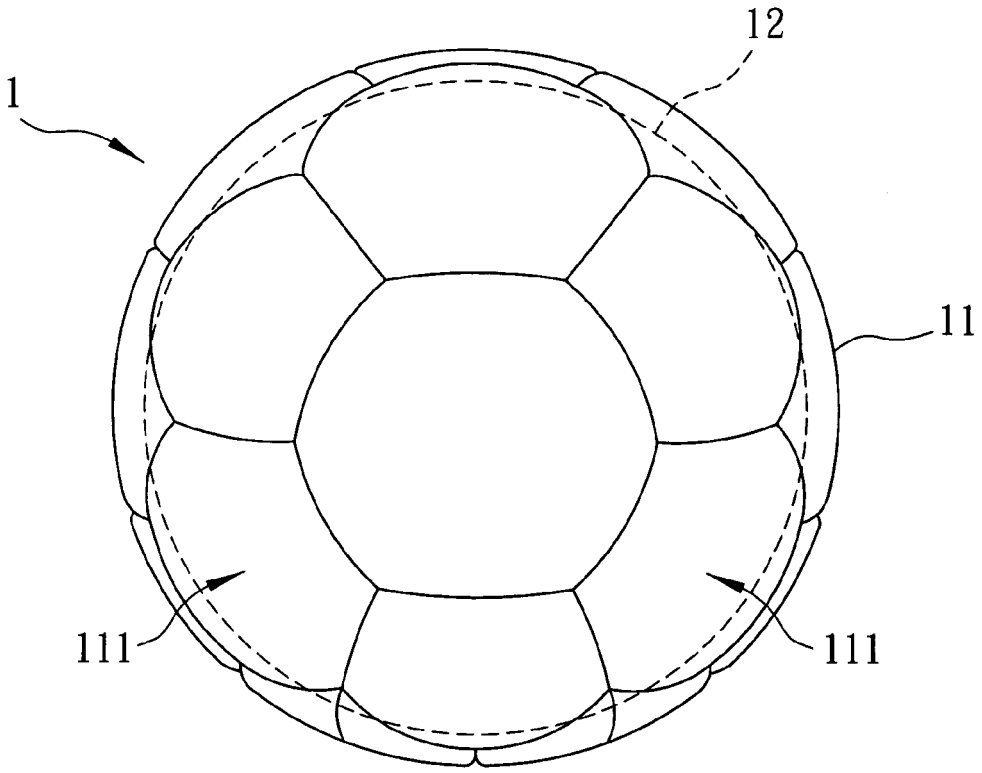

FIG. 1
PRIOR ART

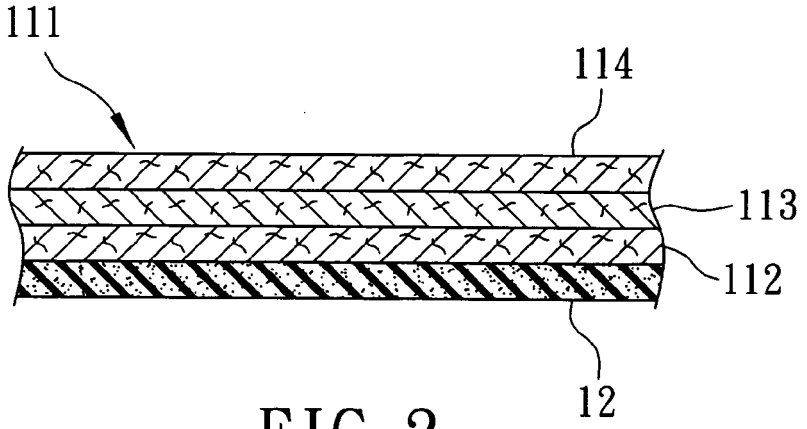

FIG. 2
PRIOR ART

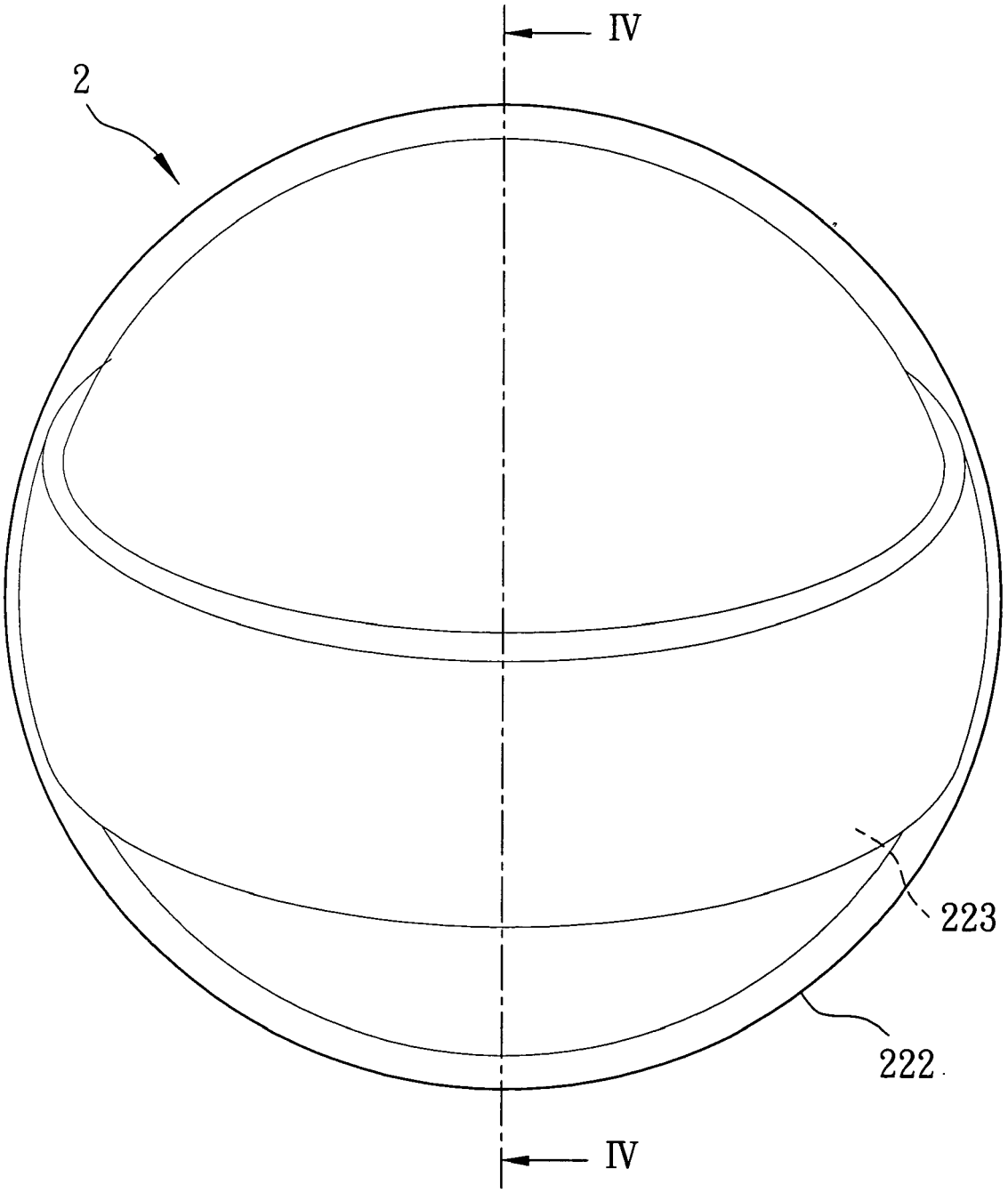

FIG. 3

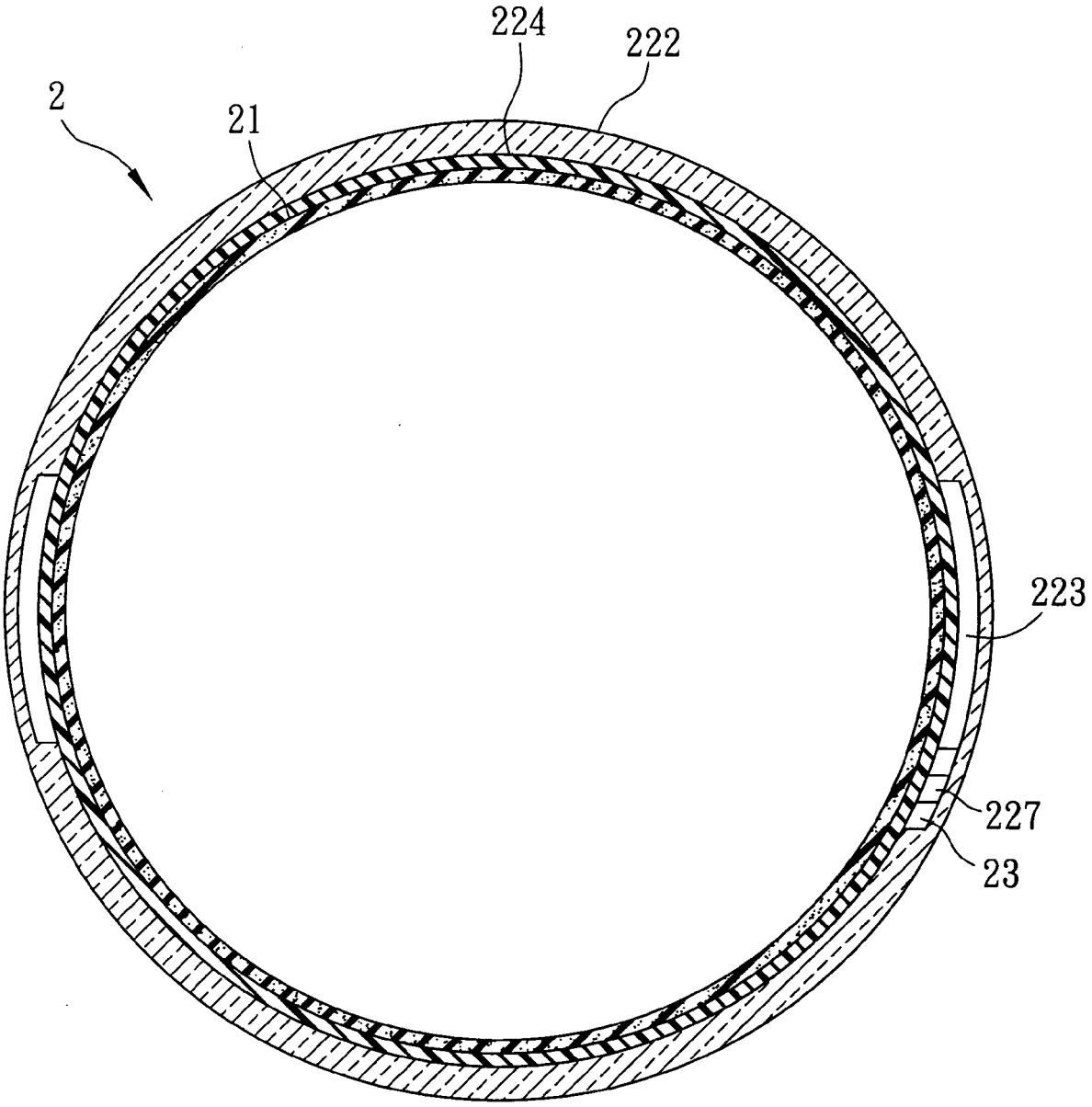

FIG. 4

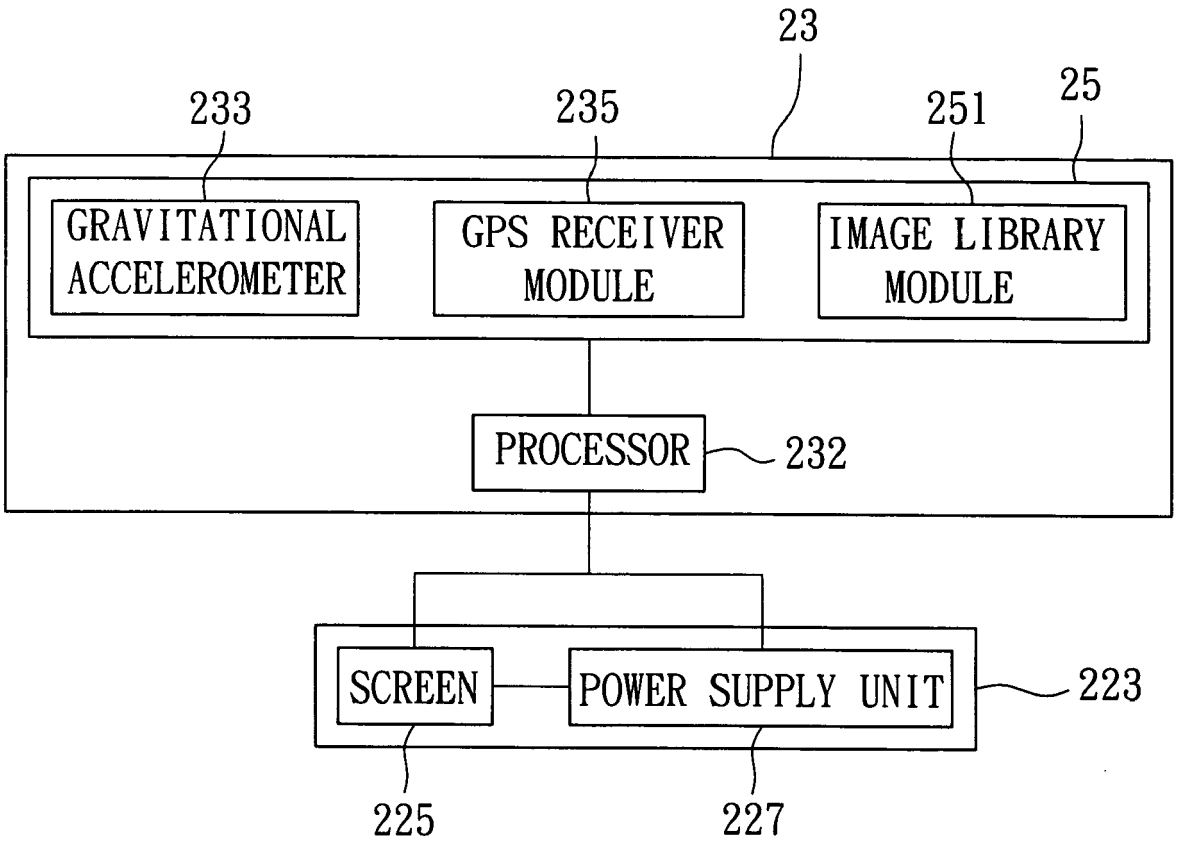
23
233
235
251
25
GRAVITATIONAL ACCELEROMETER
GPS RECEIVER MODULE
IMAGE LIBRARY MODULE
PROCESSOR
232
SCREEN
POWER SUPPLY UNIT
223
225
227

FIG. 5

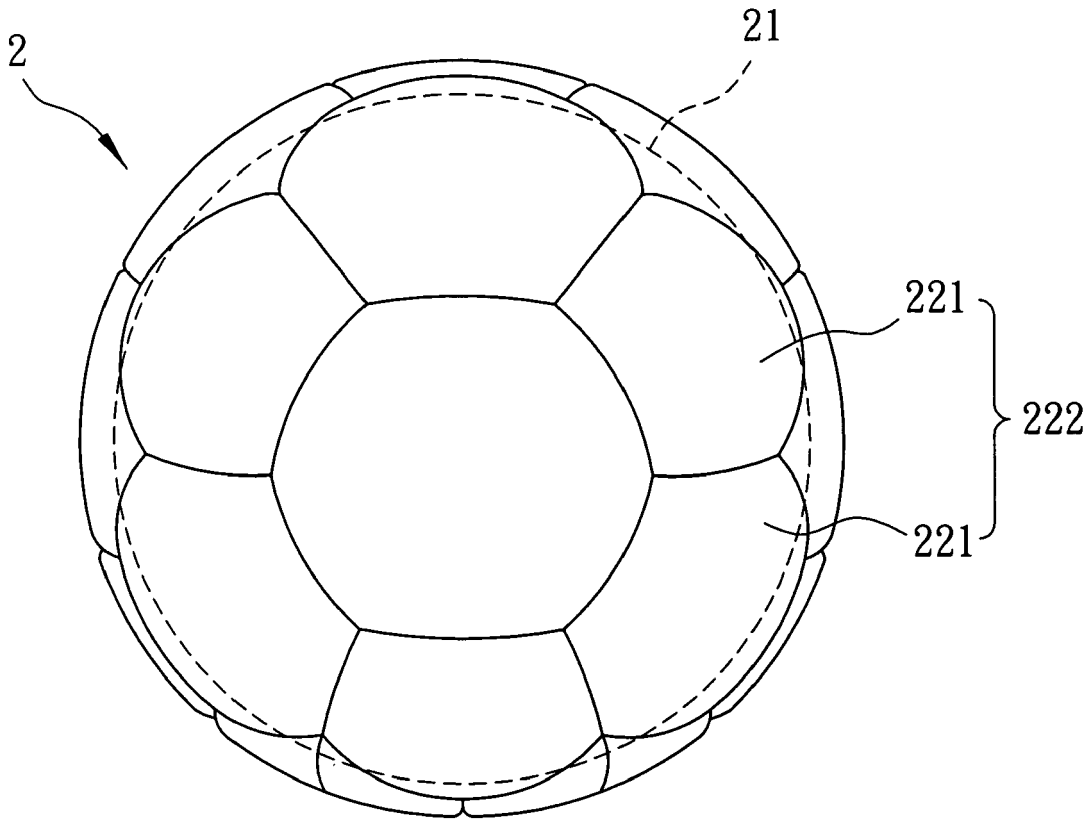

FIG. 6

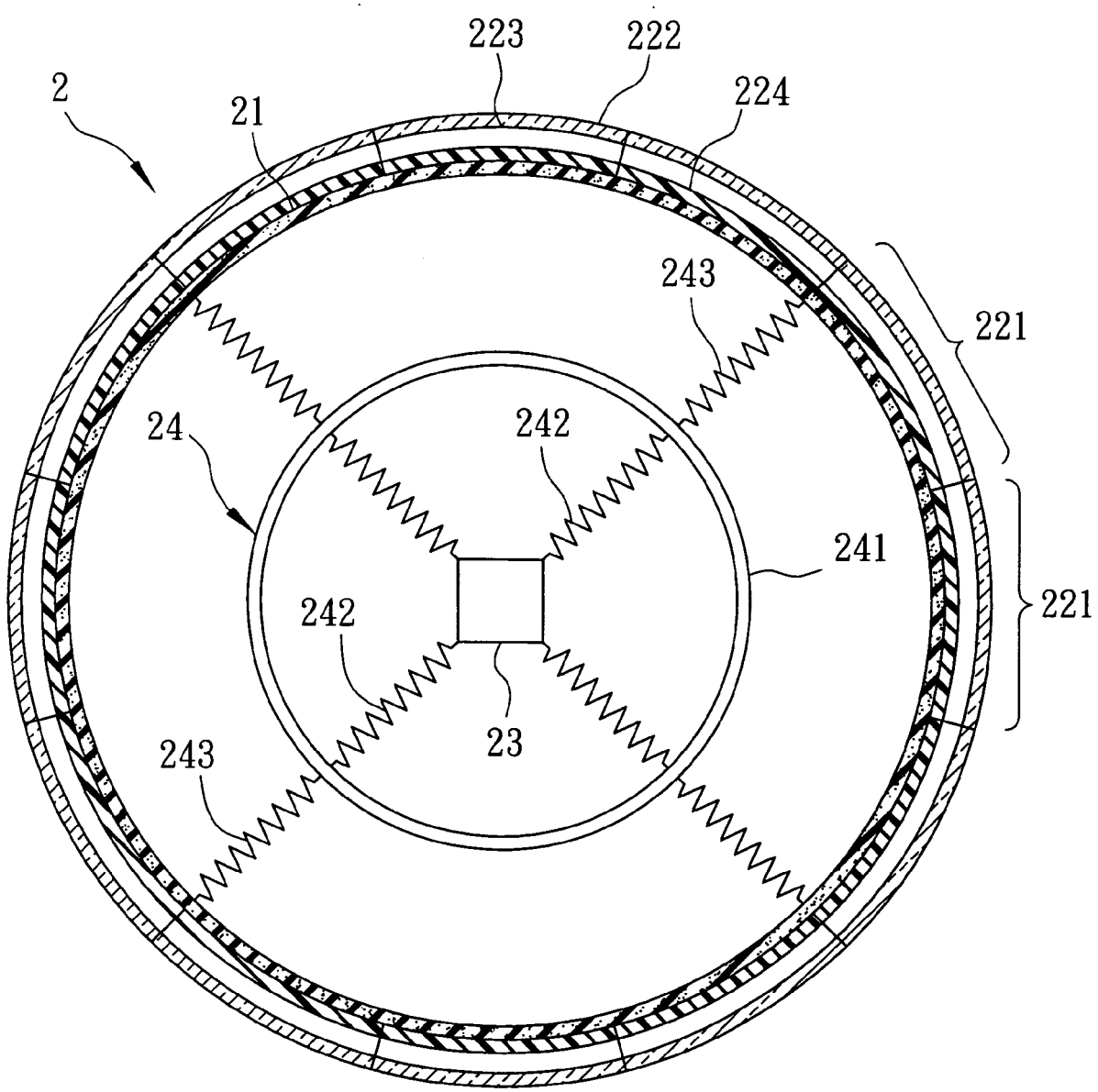

FIG. 7

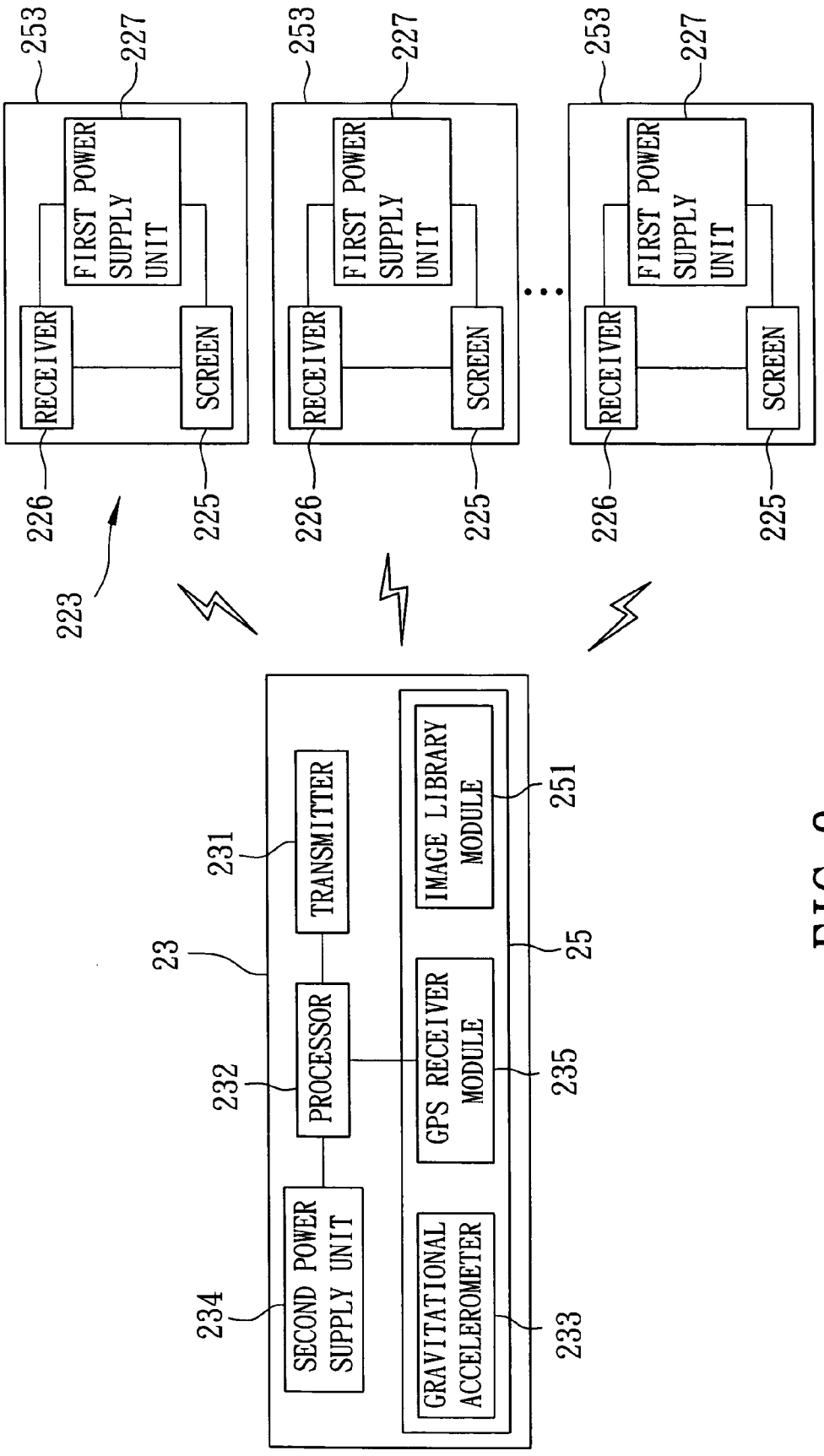
253
227
FIRST POWER SUPPLY UNIT
RECEIVER
SCREEN
226
225
223
23
231
TRANSMITTER
232
PROCESSOR
234
SECOND POWER SUPPLY UNIT
IMAGE LIBRARY MODULE
251
25
GPS RECEIVER MODULE
235
GRAVITATIONAL ACCELEROMETER
233

FIG. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 01 1549

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 Y	US 5 888 156 A (CMIEL PETER J [US] ET AL) 30 March 1999 (1999-03-30) * column 3, lines 10-65; figure 1 *	1-3,6 4,7-9	INV. A63B43/06
Y	WO 2008/015465 A1 (SANGHA PARAMJIT SINGH [GB]) 7 February 2008 (2008-02-07) * page 9, lines 3-9; figures 1,4 * * page 9, lines 19-24 *	4,7-9	
X A	US 5 779 575 A (HSIEH FRANK [TW]) 14 July 1998 (1998-07-14) * claims 1,3,6; figures 1-5 *	1-3 5	
A	EP 1 424 105 A1 (ADIDAS INT MARKETING BV [NL]; MOLTEN CORP [JP]) 2 June 2004 (2004-06-02) * paragraph [0016] *	2	

TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 January 2010	Jones, Mark

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 01 1549

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.

28-01-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5888156 A	30-03-1999	AU 1824397 A	28-07-1997
		WO 9724164 A2	10-07-1997
		US 5639076 A	17-06-1997
WO 2008015465 A1	07-02-2008	GB 2440510 A	06-02-2008
US 5779575 A	14-07-1998	NONE	
EP 1424105 A1	02-06-2004	AT 430605 T	15-05-2009
		DE 10255092 A1	17-06-2004
		JP 4157023 B2	24-09-2008
		JP 2004174256 A	24-06-2004
		US 2004144477 A1	29-07-2004

EPO FORM P0459

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