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

(11) EP 2 465 591 A2

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
20.06.2012 Bulletin 2012/25

(21) Application number: **10817370.9**

(22) Date of filing: **01.09.2010**

(51) Int Cl.:
A63F 13/00 *(2006.01)* ***A63F 5/04*** *(2006.01)*

(86) International application number:
PCT/KR2010/005914

(87) International publication number:
WO 2011/034301 (24.03.2011 Gazette 2011/12)

(84) Designated Contracting States:
AL 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

(30) Priority: **18.09.2009 KR 20090088293**

(71) Applicant: **Tovis Co. Ltd.**
Yeonsu-gu, Incheon 406-840 (KR)

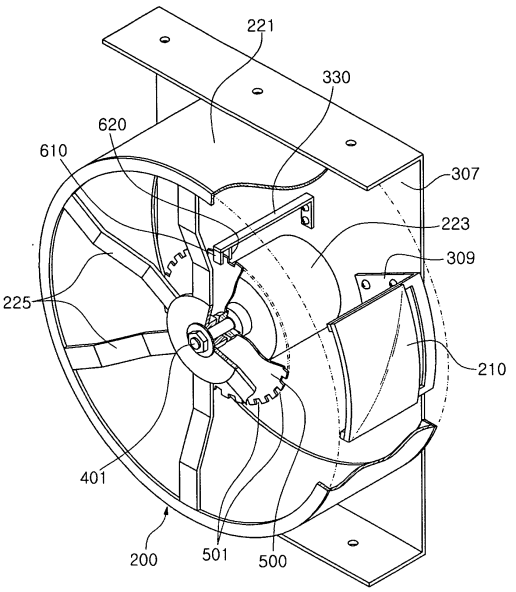
(72) Inventors:
- **KIM, Yong Beom**
  Incheon 406-736 (KR)
- **PARK, Woon Yong**
  Suwon-si
  Gyeonggi-do 443-470 (KR)

(74) Representative: **Manitz, Finsterwald & Partner GbR**
Martin-Greif-Strasse 1
80336 München (DE)

(54) REEL APPARATUS FOR A GAMING MACHINE

(57) A reel apparatus includes: a plurality of display panels which are fixedly disposed at predetermined positions; a plurality of reels respectively having reel strips which are installed to independently rotate with respect to a single axis in a state of respectively covering a front surface of the display panels; a plurality of driving motors for respectively rotating the reels; and a controller for controlling image display operation of the display panel based on a signal representing rotation speed of the reel strips such that images of the display panels rotate respectively in response to a rotation speed of the reel strips. Instead of providing a plurality of display panels for each reel, one fixed display panel is provided for each reel and image displayed on the display panel rotates, so each reel requires only one display panel and thereby a manufacturing cost can be reduced.

【FIG. 3】



EP 2 465 591 A2

Description

[Field of the invention]

[0001] The present invention relates to a reel apparatus of a game machine.

[Background Art]

[0002] Various game machines have been introduced with increase of demand for various games, and a game machine such as a slot machine which is used in a casino is one of them.

[0003] A game machine such as a slot machine is provided with a plurality of reels on which symbols such as picture or number are printed, and result of game may be determined by combination of such symbols.

[0004] In a conventional reel apparatus, various symbols are printed on the surface of the reel strip, and the reel is rotated and stopped to select specific symbols.

[0005] A technology for making a reel apparatus with an image display device instead of marking symbols on the reel strip is now being developed.

[0006] However, in case many display devices are provided for each reel, manufacturing cost for a reel apparatus is increased, and in case of rotating an image display device, durability of an image display device is deteriorated.

[Detailed Description of the Invention]

[Technical Problem]

[0007] The present invention has been made in an effort to provide a reel apparatus for a game machine which uses an image display device which operates electrically and has a lower manufacturing cost and does not deteriorate durability of an image display device.

[Technical Solution]

[0008] An exemplary reel apparatus of a game machine according to an embodiment of the present invention includes: a plurality of display panels which are fixedly disposed at predetermined positions; a plurality of reels respectively having reel strips which are installed to independently rotate with respect to a single axis in a state of respectively covering a front surface of the plurality of the display panels; a plurality of driving motors for respectively rotating the plurality of the reels; and a controller for controlling image display operation of the display panel based on a signal representing rotation speed of the reel strips such that images of the plurality of the display panels rotate respectively in response to a rotation speed of the plurality of the reel strips.

[0009] The controller may control the image display operation of the display panel based on a motor driving signal for operating the driving motor.

[0010] In another embodiment of the present invention, the reel apparatus may further includes: a plurality of slot members which are respectively mounted to the plurality of the reels so as to rotate together with the plurality of the reels and are arranged along a circumferential direction; a plurality of light generators which emit respectively light selectively passing through the slots depending on rotation position of the slot member; and a plurality of light receivers which are respectively disposed opposite to the light generators so as to receive light emitted from the light generator and having passed through the slots. The controller may receive the motor driving signal and a signal representing the number of detection of light detected by the light receiver and may control the image display operation of the display panels based on the received signals.

[0011] In yet another embodiment of the present invention, the reel apparatus may further includes: a plurality of slot members which are respectively mounted to the plurality of the reels so as to rotate together with the plurality of the reels and are arranged along a circumferential direction; a plurality of light generators which emit respectively light selectively passing through the slots depending on rotation position of the slot member; and a plurality of light receivers which are respectively disposed opposite to the light generators so as to receive light emitted from the light generator and having passed through the slots. The controller may receive a signal representing the number of detection of light detected by the light receiver and may control the image display operation of the display panels based on the received signal.

[0012] The display panel may have a curved shaped responding to a shape of the reel strip.

[Advantageous Effects]

[0013] According to the present invention, instead of providing a plurality of display panels for each reel, one fixed display panel is provided for each reel, and images displayed on the display panel rotates at the same speed with the rotation speed of the reel, so each reel requires only one display panel and thereby a manufacturing cost can be reduced. Further, since the display panel is fixed rather than rotating together with the reel, the display panel can be prevented from being damaged by rotation and durability deterioration can be prevented.

[Brief Description of Drawings]

[0014]

FIG. 1 is a perspective view of a game machine to which a reel apparatus according to an embodiment of the present invention is applied.

FIG. 2 is a perspective view of a reel apparatus according to an embodiment of the present invention.

FIG. 3 is a partially cut perspective view of a reel

apparatus according to an embodiment of the present invention.

FIG. 4 is a block diagram for explaining image display control of a display panel of a reel apparatus according to an embodiment of the present invention.

[Best Mode]

[0015] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown.

[0016] In the drawings, the thickness of layers, films, panels, regions, etc. are exaggerated for clarity. Like reference numerals designate like elements throughout the specification. It will be understood that when an element such as a layer, film, region or substrate is referred to as being "on" or "under" another element, it can be directly on or directly under the other element or intervening elements may also be present. In contrast, when an element is referred to as being "directly on" or "directly under" another element, there are no intervening elements present.

[0017] Referring to FIG. 1, a reel apparatus 200 according to an embodiment of the present invention is installed in a game machine and displays images.

[0018] The reel apparatus 200 may be installed within a game machine and may be fixed such that a user can see images displayed thereon through a display window which is formed to a display plate 201 of a game machine.

[0019] For example, a game machine may have a cabinet-shaped body 101, and various parts and controllers for performing game may be provided to the body 101. For example, a coin insertion hole 103 for inserting coins, various input buttons 105 for performing games, and other various parts may be provided to the body 101.

[0020] The reel apparatus 200 according to an embodiment of the present invention will be explained in detail hereinafter with reference to the drawings.

[0021] The reel apparatus 200 may include a plurality of display panels 210 and a plurality of reels 220. The display panels 210 and the reels 220 are provided with the same number, and although the numbers of these are three in the drawing, the number of them is not limited thereto.

[0022] The display panels 210 and the reels 220 may be mounted to a support frame 300 which is fixed within a game machine.

[0023] The display panels 210 are fixed to predetermined positions respectively.

[0024] The display panel 210 may be realized as an arbitrary display panel which can display images by electrical signals, and for example may be realized as various display panels such as a liquid crystal display panel, OLED, PDP, or the like. Meanwhile, the display panel 210 may have a curved shape, and explanation for the curved shape will be made later.

[0025] The plurality of reels 220 includes respectively a reel strip 221 which is configured to independently rotate with respect to a single axis in a state of covering a front surface of the display panels 210 respectively.

[0026] The reel strip 221 may have a ring shape with a constant width, and is made of transparent material such that a user can see images displayed on the display panel 210 which is disposed therebehind. For example, the reel strip 221 may be made of transparent or semi-transparent synthetic resin material such as acrylic, polyethylene. That is, although numbers or symbols are printed on a rotating reel strip of a conventional reel apparatus for a game machine and a user directly sees these numbers or symbols, numbers or symbols are not printed on the reel strip according to an embodiment of the present invention and the reel strip simply rotates and a user sees images displayed on the display panel which is located behind the reel strip.

[0027] The reel 220 may include a reel drum 223 and a spoke 225. The reel drum 223 may be connected to an output shaft 401 of a driving motor 400 (not shown in FIG. 2 and FIG. 3) for rotating the reel 220 and is configured to rotate by the same, and the spoke 225 connects the reel drum 223 and the reel strip 221.

[0028] The driving motor 400 may be any motor such as a step motor for providing rotation force for rotating the reel 220.

[0029] As mentioned above, the display panels 210 and the reels 220 may be mounted to the support frame 300, and the support frame 300 may be provided with opposing side walls 301, and an upper wall 303 and a lower wall 305, and a plurality of support members 307 may be disposed between the side walls 301.

[0030] The plurality of reels 220 may be disposed to independently rotate between the side wall 301 and the support member 307 or between the support members 307.

[0031] For example, the driving motor 400 may be mounted to the support member 307 or the side wall 301, and the reel drum 223 which is a part of the reel 220 is connected to the output shaft 401 such that the output shaft 401 of the driving motor and the reel 220 rotate together. Accordingly, the respective reels 220 can rotate about the output shaft 401 of the driving motor.

[0032] The driving motor 400 is provided with the same number as the plurality of the reels 220, and the driving motors are respectively connected to the plurality of the reels 200 so that one driving motor rotates one reel 220, and the reels 220 independently rotate by the respective driving motors.

[0033] Meanwhile, the display panel 210 may have a curved shape, and may be formed in a curved shape responding to a ring shape of the reel strip 221. That is, when a user sees from the front, the display panel 210 has a constant width in a horizontal direction and is formed in a curved shape along a vertical direction so as to have a shape in which a vertically central portion thereof is convex.

[0034] At this time, the display panel 210 may be fixed

at a predetermined position by being mounted to a side wall 301 or a connecting member 309 which is connected to the support member 307.

[0035] Meanwhile, the reel apparatus according to an embodiment of the present invention includes a controller 211 for controlling operation of the display panel 210. The controller 211 may be a conventional controller for controlling a display panel, and separate controllers may be provided for respective display panels 210 or one controller 211 may separately control the plurality of the display panels 210. Hereinafter, for ease of description, a case that one controller 211 controls the plurality of the display panels 210 will be explained.

[0036] The controller 211 controls image display operation of the respective display panels 210 to rotate at the same speed corresponding to the rotation speed of the reel strip 221. At this time, the controller 211 receives a signal representing the rotation speed of the reel strip 221 and controls image display operation of the display panels 210 based on the received signal.

[0037] That is, the controller 211 detects the rotation speed of the respective reel strips 221 in real time, and controls image display of the display panel 210 such that image of the display panel 210 rotates at the same speed.

[0038] Hereinafter, referring to FIG. 4, a method for controlling image display of the display panels 210 by the controller 211 will be explained.

[0039] First, a motor driving signal (e.g., a pulse signal) which is output to control operation of the driving motor 400 by a motor controller 403 for controlling operation of the driving motor 400 may be a signal representing the rotation speed of the reel strip 221, and the controller 211 may receive the motor driving signal of the motor controller 403 and may control image display of the display panels 210 such that image of the display panels 210 rotate at the same speed with the rotation speed of the reel strip 221. That is, by synchronizing rotation speeds of an image displayed on the display panel 210 and the reel strip 221 such that image displayed on the display panel 210 which is fixed at a predetermined position rotates at the same speed with the rotation speed of the reel strip 221 which actually rotates, an effect that the fixed display panel 210 seems to rotate together with the reel strip 221 can be obtained, so without rotating the display panel 210 images may be seemed to rotate.

[0040] Meanwhile, in another embodiment of the present invention, the controller 211 may control image display of the display panel 210 such that an image displayed on the display panel 210 rotates at the same speed with the rotation speed of the reel strip 221 based on a signal of a sensor instead of a motor driving signal.

[0041] For this, the reel apparatus may include a plurality of slot members 500, a plurality of light generators 610, and a plurality of light receivers 620. The slot member 500, the light generator 610, and the light receiver 620 are respectively provided with the same number as that of the reel 220, and are mounted for respective reels 220.

[0042] First, the slot members 500 are respectively mounted to the reels 220 so as to rotate at the same speed with the respective reels 220. For example, the slot member 500 may have a member having a circular ring shape which is fixed to the reel drum 223.

[0043] The slot member 500 has a plurality of slots 501 which are arranged along a circumferential direction. The slot 501 may have various shapes, and may be formed in a shape in which an outer side is closed instead of being opened as shown in the drawing.

[0044] The light generator 610 may be realized as any light generating device which may emit light, and the light receiver 620 may be realized as any device which receives light and outputs a corresponding signal.

[0045] The light generator 610 and the light receiver 620 are fixed to predetermined positions rather than rotating together with the reel 220. For this, the light generator 610 and the light receiver 620 may be mounted to the side wall 310 of the support frame 300 or the support member 307. For example, as shown in the drawing, the light generator 610 and the light receiver 620 may be fixed to the support member 307 by a connecting member 330.

[0046] At this time, the light generator 601 is disposed such that light emitted therefrom can selectively pass through the slot 501 depending on rotation position of the slot member 500. That is, the light generator 610 may be disposed in the vicinity of the slot member 500 and at the same vertical level of a rotation trace of the rotating slots 501. Accordingly, as the slot member 500 rotates, in case that the slot 501 locates at the same vertical position with the light generator 610, light emitted from the light generator 610 passes through the slot 501 and goes forward, and in case that the blocked portion between the slots 501 locates at the same vertical position with the light generator 610, light emitted from the light generator 610 is blocked by the slot member 500.

[0047] The light receiver 620 is disposed opposite to the light generator 610 so as to receive light emitted from the light generator 610 and then having passed through the slot 501 of the slot member 500. That is, the light generator 610 and the light receiver 620 are disposed to face each other on both sides of the rotation trace of the slots 501 of the slot member 500.

[0048] The controller 211 may receive a signal representing the number of detection of light detected by the light receiver 620 and may control image display of the display panel 210 based on the received signal. That is, by using information on distance between the slots 501 of the slot member 500 which are stored in a memory and the number of detection of light which passes through the slot 501 and is detected by the light receiver 620, rotation position and a rotation speed can be known and the display panel 210 can be controlled such that image of the display panel 210 rotates at the same speed of the rotation speed of the reel 220 based on these information.

[0049] Although it has been explained that the image display of the display panel 210 is controlled based on

the motor driving signal or the signal of the light receiver 620, image display of the display panel 210 can be controlled by using both of the motor driving signal and the signal of the light receiver 620. For example, the controller 211 controls image display of the display panel 210 basically based on the motor driving signal of the driving motor 400 for rotating the reel 220, and may auxiliary use the signal of the light receiver 620. For example, in case that there are errors between position and rotation speed of the reel 220 which are determined by the motor driving signal and the real position and rotation speed thereof, the determination on whether there are these errors can be made according to whether the rotation speed of the reel 220 obtained by the motor driving signal is different from the rotation speed obtained from the signal of the light receiver 620. If there is an error, the controller 211 may control image display of the display panel 210 based on the signal of the light receiver 620.

[0050] While this invention has been described in connection with what is presently considered to be practical exemplary embodiments, it is to be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

[Industrial Applicability]

[0051] The present invention relates to a reel apparatus and can be applied to a game machine, so it has an industrial applicability.

Claims

1. A reel apparatus of a game machine, comprising:

a plurality of display panels which are fixedly disposed at predetermined positions;
a plurality of reels respectively having reel strips which are installed to independently rotate with respect to a single axis in a state of respectively covering a front surface of the plurality of the display panels;
a plurality of driving motors for respectively rotating the plurality of the reels; and
a controller for controlling image display operation of the display panel based on a signal representing rotation speed of the reel strips such that images of the plurality of the display panels rotate respectively in response to a rotation speed of the plurality of the reel strips.

2. The reel apparatus of claim 1, wherein the controller controls the image display operation of the display panel based on a motor driving signal for operating the driving motor.

3. The reel apparatus of claim 2, further comprising:

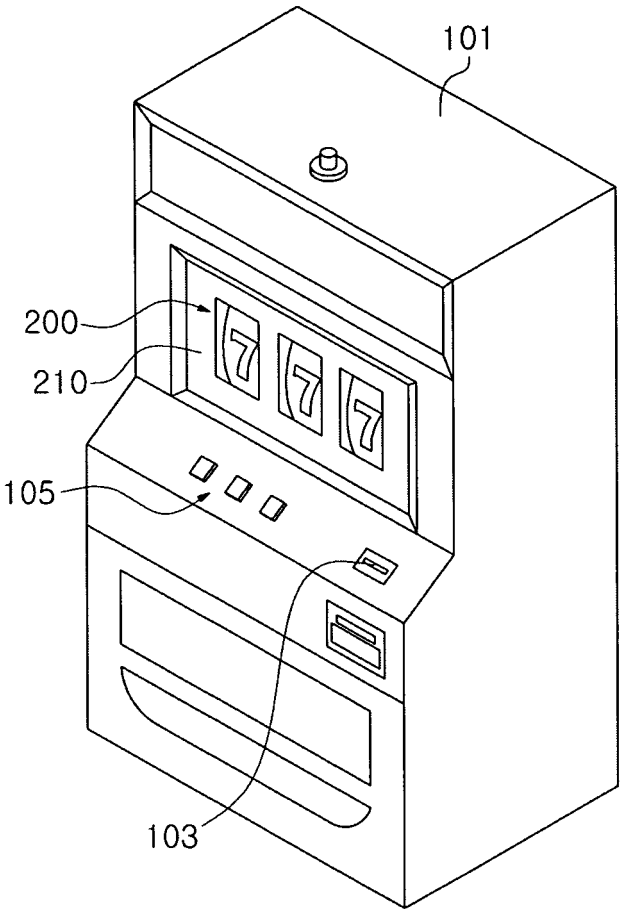
a plurality of slot members which are respectively mounted to the plurality of the reels so as to rotate together with the plurality of the reels and are arranged along a circumferential direction;
a plurality of light generators which emit respectively light selectively passing through the slots depending on rotation position of the slot member; and
a plurality of light receivers which are respectively disposed opposite to the light generators so as to receive light emitted from the light generator and having passed through the slots,
wherein the controller receives the motor driving signal and a signal representing the number of detection of light detected by the light receiver and controls the image display operation of the display panels based on the received signals.

4. The reel apparatus of claim 1, further comprising:

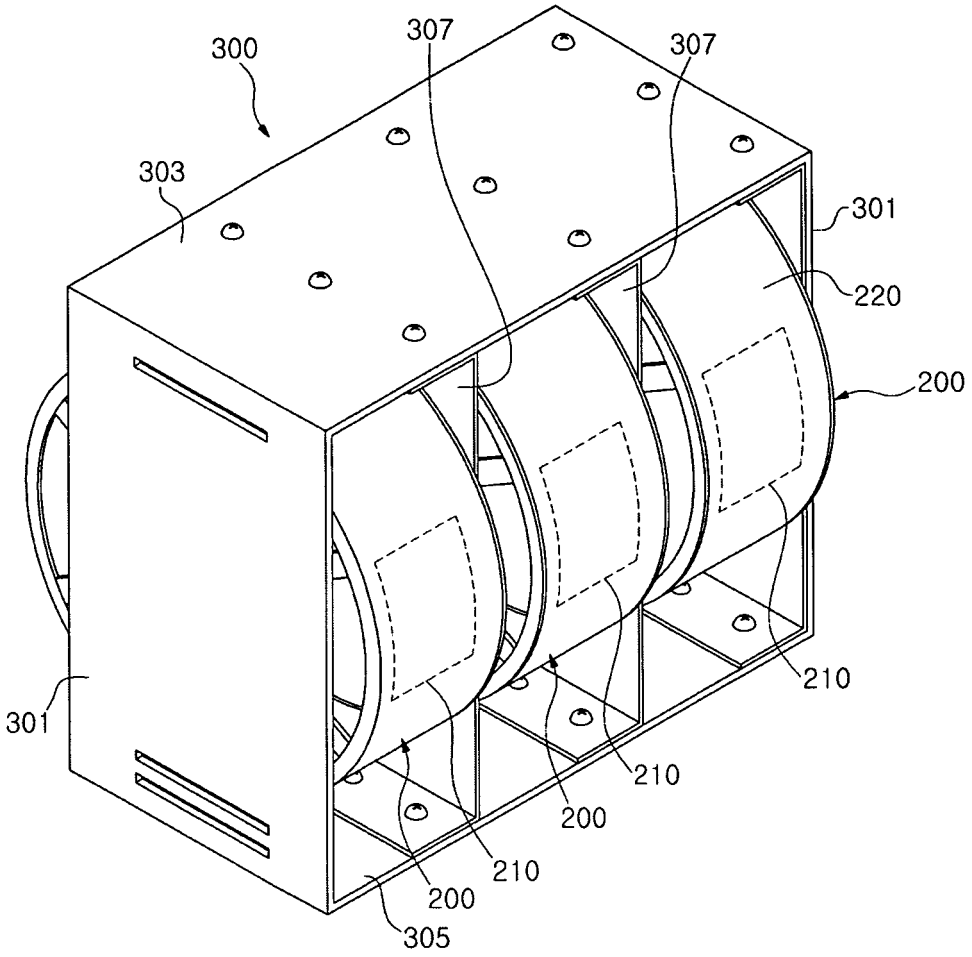
a plurality of slot members which are respectively mounted to the plurality of the reels so as to rotate together with the plurality of the reels and are arranged along a circumferential direction;
a plurality of light generators which emit respectively light selectively passing through the slots depending on rotation position of the slot member; and
a plurality of light receivers which are respectively disposed opposite to the light generators so as to receive light emitted from the light generator and having passed through the slots,
wherein the controller receives a signal representing the number of detection of light detected by the light receiver and controls the image display operation of the display panels based on the received signal.

5. The reel apparatus of claim 1, wherein the display panel has a curved shaped responding to a shape of the reel strip.

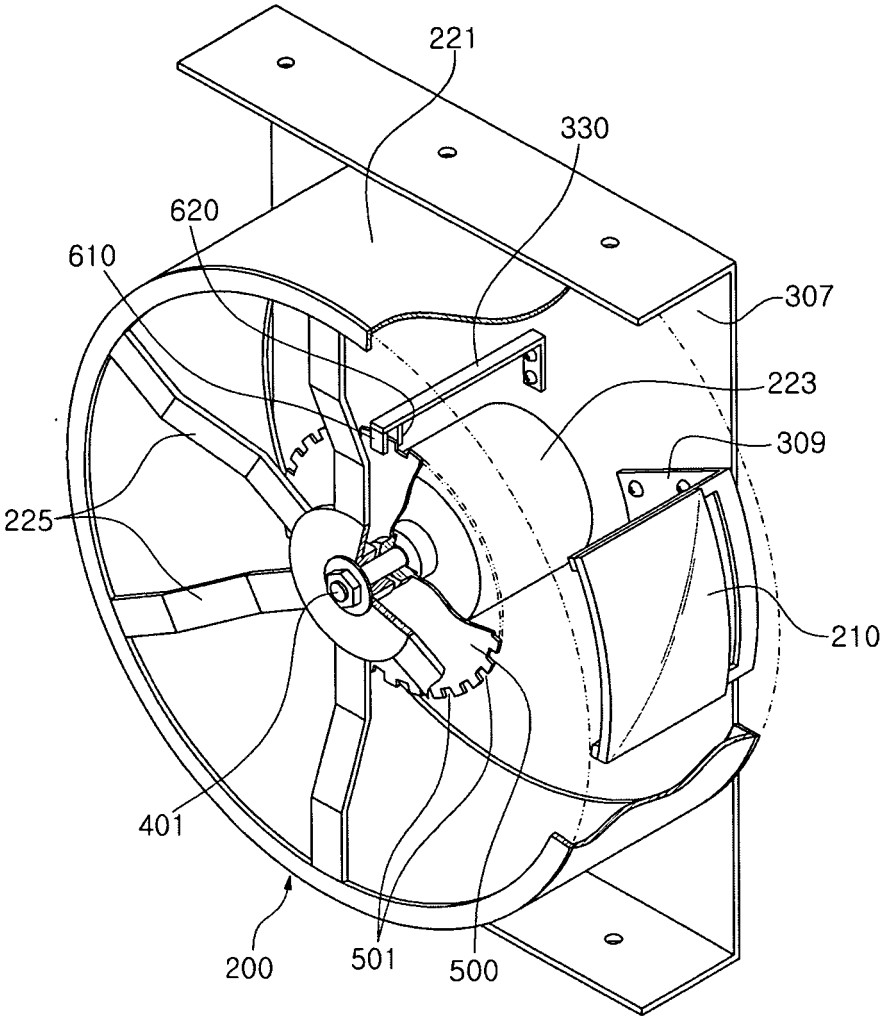
【FIG. 1】



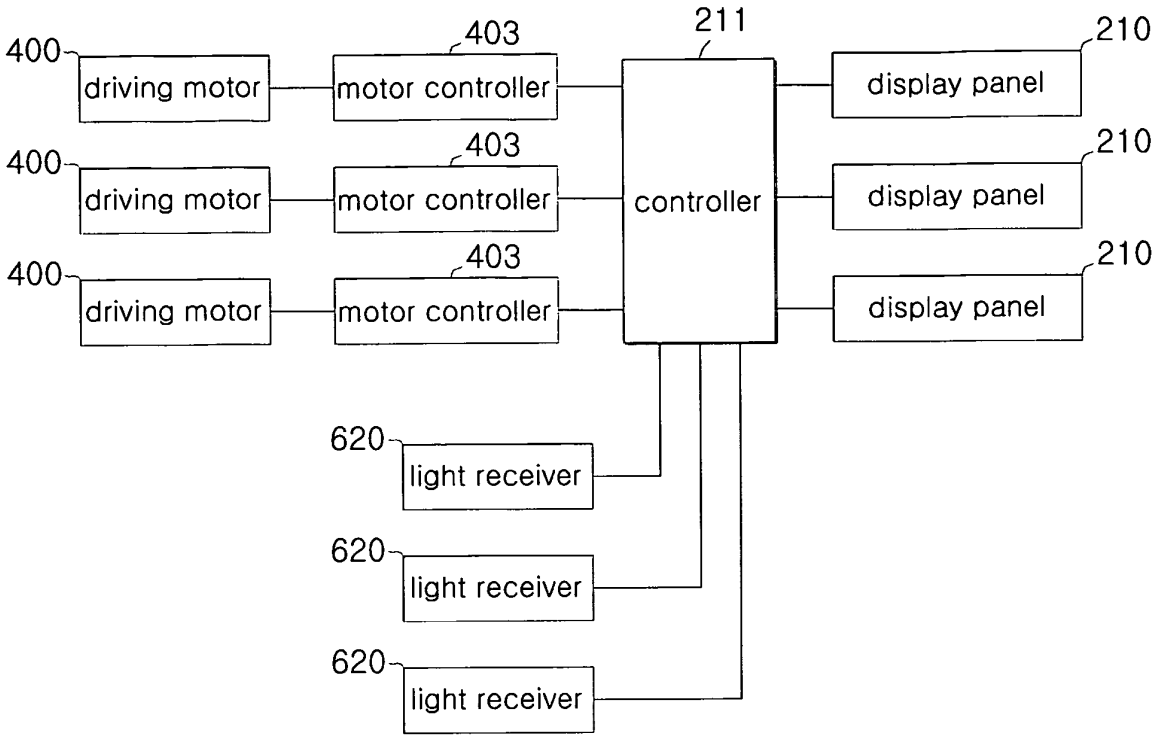
【FIG. 2】



【FIG. 3】



【FIG. 4】


400
driving motor
403
motor controller
211
controller
210
display panel
400
driving motor
403
motor controller
210
display panel
400
driving motor
403
motor controller
210
display panel
620
light receiver
620
light receiver
620
light receiver