

THROWING GAME

Technical Field

[0001] The present invention relates to a throwing game.

Background Art

[0002] Conventionally, a throwing game has been known, in which a player throws a throwing instrument including a magnet toward a target made of a ferromagnetic body and determines a score corresponding to a position in the target, to which the throwing instrument is attracted by a magnetic force, to thereby compete for a throwing skill of the player.

[0003] For example, Patent Document 1 discloses a target board targeted by a throwing instrument including a magnet, the target board including a surface layer containing a predetermined amount of ferromagnetic body powder and having indication of a target of a dart game printed thereon.

Citation List

Patent Document

[0004] Patent Document 1: Japanese Patent No. 3820363

Summary

Technical Problem

[0005] In the target board, since the indication of the target is printed on the surface layer in advance, a form of the indication of the target is unchangeable and fixed, which lacks amusement performance of a game. Further, in order to provide a situation in which a player more indulges in a throwing game, there is a demand for performing various performance displays according to the throwing game.

[0006] Therefore, an object of the present invention is to provide a game apparatus that can improve amusement performance of a throwing game by changing a display form of an image of the throwing game.

Solution to Problem

[0007] A throwing game apparatus according to one aspect of the present invention is a throwing game apparatus that controls progress of a throwing game performed using a

throwing instrument including a magnet, the throwing game apparatus including: a display unit that displays an image including a target in a form corresponding to the throwing game; a throwing-instrument holding unit disposed to cover at least a part of the display unit and containing a ferromagnetic body to be capable of holding the throwing instrument, a plurality of through-holes being provided in the throwing-instrument holding unit to enable visual recognition of the image displayed by the display unit; and a position detecting unit that detects a position of the throwing instrument held by the throwing-instrument holding unit.

[0008] According to this aspect, a display form of the image of the throwing game is changeable, and amusement performance of the throwing game is thus improved.

Advantageous Effects of Invention

[0009] According to the present invention, it is possible to provide a game apparatus that can improve amusement performance of a throwing game by changing a display form of an image of the throwing game.

Brief Description of Drawings

[0010] Fig. 1 is a perspective view of a dart game apparatus 1 according to a first embodiment of the present invention.

Fig. 2 is a block diagram showing an example of hardware of the dart game apparatus 1.

Fig. 3 is an exploded perspective view of a panel unit 202.

Fig. 4 is a front schematic view of the panel unit 202.

Fig. 5 (a) is an enlarged plan view of a dart holding unit 30 and Fig. 5(b) is a sectional view of a dart holding unit 30 in an A-A' line shown in Fig. 5(a).

Fig. 6(a) is a side view of a magnet dart 4 and Fig. 6(b) is a diagram for explaining a state in which the magnet dart 4 is held on the panel unit 202.

Fig. 7 is a front schematic view of a position detecting unit 50.

Figs. 8(a) to 8(d) are diagrams for explaining examples of images displayed according to progress of a dart game.

Fig. 9 is a diagram for explaining another example of the dart holding unit.

Description of Embodiments

[0011] Preferred embodiments of the present invention are explained with reference to the accompanying drawings. (Note that, in the figures, components denoted by the same reference numerals and signs have the same or similar configurations.)

[0012] [First Embodiment]

Fig. 1 is a perspective view of a dart game apparatus 1 according to a first embodiment of the present invention.

[0013] The dart game apparatus 1 is an example of a throwing game apparatus that controls progress of a dart game. The dart game apparatus 1 includes a housing 2 and members explained below provided in the housing 2. An operation unit 203 and a coin depositing device 204 are provided in the front of the housing 2. A display area 3 (a first display area 3A and a second display area 3B) inclined rearward at a predetermined angle with respect to the vertical direction is provided above the housing 2. Note that the dart game apparatus 1 may include a mechanism that can change the angle of the inclination of the display area 3. Images related to the dart game such as a target and various performances are displayed on the display area 3 in forms corresponding to progress of the dart game.

[0014] Fig. 2 is a block diagram showing an example of hardware of the dart game apparatus 1.

[0015] The dart game apparatus 1 includes, for example, a computing device 100, an audio output device 201, a panel unit 202, the operation unit 203, and the coin depositing device 204.

[0016] The computing device 100 collectively controls the dart game apparatus 1. The computing device 100 is a computer circuit element including, for example, a chip set consisting of various processors, memories, and the like.

[0017] The computing device 100 includes, for example, a CPU (a control unit) 101, a main memory 102, a BIOS-ROM 103, a storage device 104, a sound processing unit 105, an image processing unit 106, a communication interface 107, a peripheral interface 108, and a system bus 110 that connects these devices.

[0018] The CPU 101 executes, for example, a game program related to a dart game developed on the main memory 102 and causes the computing device 100 to realize various functions to thereby control progress of the dart game.

[0019] The storage device 104 includes, for example, at least one of a magnetic tape device, a magnetic disk device, and an optical disk device and stores programs and various data. The sound processing unit 105 transmits, under the control by the CPU 101, sound data corresponding to the progress of the dart game to the audio output device 201.

[0020] The image processing unit 106 transmits, under the control by the CPU 101, image data corresponding to the progress of the dart game to an image display unit 10. An image related to the image data is an image displaying a target of the dart game and various performances corresponding to the progress of the dart game.

[0021] The communication interface 107 includes a communication interface circuit for connecting the dart game apparatus 1 to a communication network such as the Internet and enables communication with a server and other game apparatuses. The peripheral interface 108 is an interface that enables communication with peripheral devices such as a position detecting unit 50 included in the panel unit 202, the operation unit 203, and the coin depositing device 204.

[0022] The audio output device 201 outputs sound related to the dart game based on the sound data related to the dart game received from the sound processing unit 105. As explained below, the panel unit 202 displays an image corresponding to the progress of the dart game and holds, with a magnetic force, a magnet dart 4 thrown by a player. The operation unit 203 may be any device if operation of the dart game apparatus 1 is possible through the device. The operation unit 203 is, for example, a touch panel or key buttons. The operation unit 203 receives operation by the player and supplies a signal corresponding to the operation to the computing device 100. The coin depositing device 204 includes a depositing port into which the player deposits coins and a sensor that detects the coins deposited from the depositing port.

[0023] Fig. 3 is an exploded perspective view of the panel unit 202. In the following explanation, as shown in Fig. 3, the latitudinal direction of the panel unit 202 is represented as an X axis, the longitudinal direction of the panel unit 202 is represented as a Y axis, and a direction perpendicular to the X axis and the Y axis is represented as a Z axis. In some case, an X-axis positive direction is referred to as right, an X-axis negative

direction is referred to as left, a Y-axis positive direction is referred to as upper, and a Y-axis negative direction is referred to as lower.

[0024] The panel unit 202 is configured by sequentially laminating the image display unit 10, an image display unit protection sheet 20, a dart holding unit 30, a dart holding unit protection sheet 40, and the position detecting unit 50.

[0025] The image display unit 10 is, for example, a display unit such as a liquid crystal display or an organic EL (Electro-Luminescence) display approximately 529 mm in width (an X-axis direction length), approximately 940 mm in length (a Y-axis direction length), and approximately 50 mm in thickness (a Z-axis direction length). The image display unit 10 displays an image based on the image data corresponding to the progress of the dart game received from the image processing unit 106.

[0026] The image display unit protection sheet 20 is, for example, a thin film sheet made of transparent acrylic resin having substantially the same dimension as the image display unit 10 in an XY plane view and approximately 5 mm in thickness (a Z-axis direction length). The image display unit protection sheet 20 protects the surface of the image display unit 10 from, for example, a shock of the magnet dart 4.

[0027] The dart holding unit 30 is, for example, a punching metal plate approximately 500 mm in width (an X-axis direction length), approximately 500 mm in length (a Y-axis direction length), and approximately 0.6 mm in thickness (a Z-axis direction length). The dart holding unit 30 is disposed to cover a portion of the image display unit 10 equal to or lower than a predetermined height (a predetermined position in the Y-axis direction). A detailed configuration of the dart holding unit 30 is explained below.

[0028] The dart holding unit protection sheet 40 is, for example, a thin film sheet made of transparent acrylic resin having substantially the same dimension as the dart holding unit 30 in the XY plane view and approximately 0.5 mm in thickness (a Z-axis direction length). The dart holding unit protection sheet 40 protects the surface of the dart holding unit 30 from a shock of the magnet dart 4.

[0029] The position detecting unit 50 is, for example, a member in which an opening section 50H is provided in the center, the member having substantially the same dimension as the image display unit 10 in the XY plane view. The position detecting unit 50 detects the position of the magnet dart 4 held on the panel unit 202. A detailed configuration of the position detecting unit 50 is explained below.

[0030] Fig. 4 is a front schematic view of the panel unit 202.

[0031] As shown in Fig. 4, in the panel unit 202, the display area 3 is configured in the opening section 50H of the position detecting unit 50.

[0032] The display area 3 is divided into, at a predetermined height (in a predetermined position in the Y-axis direction) of the panel unit 202, the first display area 3A disposed further on the upper side than the predetermined height and the second display area 3B disposed further on the lower side than the predetermined height. The first display area 3A is an area where the dart holding unit 30 and the dart holding unit protection sheet 40 are not laminated in the display area 3. The second display area 3B is an area where the dart holding unit 30 and the dart holding unit protection sheet 40 are laminated in the display area 3.

[0033] In the first display area 3A and the second display area 3B (the display area 3), images corresponding to the progress of the dart game are displayed by the image display unit 10. The image displayed by the image display unit 10 and included in the first display area 3A is visually recognized by the player via the image display unit protection sheet 20. The image displayed by the image display unit 10 and included in the second display area 3B is visually recognized by the player via the image display unit protection sheet 20, the dart holding unit 30, and the dart holding unit protection sheet 40.

[0034] When the magnet dart 4 thrown by the player reaches the second display area 3B, the magnet dart 4 is held on the panel unit 202 in a position where the magnet dart 4 reaches in the second display area 3B by a magnetic force acting between the magnet dart 4 and the dart holding unit 30.

[0035] Fig. 5(a) is an enlarged plan view of the dart holding unit 30. Fig. 5(b) is a sectional view of the dart holding unit 30 in an A-A' line shown in Fig. 5(a).

[0036] The dart holding unit 30 is, for example, a punching metal plate formed by a base 30M in which a plurality of holes 30H are provided. The base 30M contains a predetermined amount of a ferromagnetic body and can hold, with a magnetic force, the magnet dart 4 thrown by the player and reaching the surface of the panel unit 202. The material of the base 30M may be any material if the material has a nature of the ferromagnetic body in a degree capable of holding the magnet dart 4. For example, the material may be iron, cobalt, nickel, alloys of these kinds of metal, and the like. Each hole 30H has a substantially cylindrical shape centering on an axis facing the thickness

direction of the dart holding unit 30 (the Z-axis direction). An opening section of each hole 30H has a dimension smaller than the tip portion of the magnet dart 4. Specifically, for example, a diameter D of the opening section in the XY plane view of each hole 30H is approximately 2 mm.

[0037] The plurality of holes 30H are arrayed at predetermined pitches respectively in the X-axis direction and the Y-axis direction. Specifically, for example, a pitch P_X in the X-axis direction of the holes 30H is 3 mm and a pitch P_Y in the Y-axis direction of the holes 30H is 3 mm. The plurality of holes 30H are arrayed such that each hole 30H is disposed in the middle between two holes 30H included in an upper row or a lower row.

However, not only this, but the plurality of holes 30H may be arrayed such that each hole 30H is disposed in the same X-axis direction position as one hole 30H included in the upper row or the lower row. Alternatively, the plurality of holes 30H may be arrayed in any other form.

[0038] The holes 30H transmit at least a part of light emitted by the image display unit 10. Therefore, the holes 30H transmit at least a part of an image displayed by the image display unit 10. Therefore, the player can visually recognize, via the dart holding unit 30, an image related to the dart game displayed by the image display unit 10.

[0039] Fig. 6(a) is a side view of the magnet dart 4. Fig. 6(b) is a diagram for explaining a state in which the magnet dart 4 is held on the panel unit 202.

[0040] As shown in Fig. 6(a), the magnet dart 4 is configured from a tip 4T, a barrel 4B, and a flight 4F. The tip 4T is a member made of a magnet, the member having a shape obtained by coupling two substantial cylinders, which have the same center axis and different diameters, in the direction of the center axis. The tip portion of the tip 4T has a dimension for preventing the tip 4T from being included in each hole 30H provided in the dart holding unit 30. The barrel 4B is a substantially cylindrical member made of resin connected to the rear end of the tip 4T. The flight 4F is a plurality of vane members made of resin connected to the rear end of the barrel 4B. The tip 4T, the barrel 4B, and the flight 4F may be configured to be detachably attachable to one another. Note that the shape and the dimension of the magnet dart 4 explained above are examples. Any other shape and dimension may be adopted.

[0041] When the magnet dart 4 thrown by the player reaches the second display area 3B of the panel unit 202, as shown in Fig. 6(b), the magnet dart 4 is held on the panel unit 202

by a magnetic force acting between the magnet dart 4 and the dart holding unit 30. Specifically, the magnet dart 4 is held to be substantially perpendicular to the panel unit 202 with the tip 4T brought into contact with the dart holding unit protection sheet 40.

[0042] Fig. 7 is a front schematic view of the position detecting unit 50.

[0043] The position detecting unit 50 includes a frame body 50F formed in a rectangular shape to surround the display area 3, a recursive reflection material 51 disposed to be opposed to the inner side along the peripheral direction in the frame body 50F, and a plurality of light emitting and receiving elements 52 embedded at the four corners (upper left, upper right, lower left, and lower right) in the frame body 50F.

[0044] The light emitting and receiving element 52 is configured by laminating, in the Z-axis direction, a light emitting body (for example, an infrared light emitting diode) and a light receiving body (for example, a PIN photodiode) that can receive light emitted by the light emitting body. The light receiving body can specify an incident direction of the received light. The recursive reflection material 51 is configured by a reflection material that can reflect, when light is made incident, the light in the opposite direction of an incident direction of the light, the reflection material being, for example, a glass bead reflection material or a microprism reflection material.

[0045] The light emitting body of each light emitting and receiving element 52 is controlled by the computing device 100 and is always in an energized light emitting state during the game. The light receiving body of each light emitting and receiving element 52 is controlled by the computing device 100 and is always in a light receiving state during the game. A light reception signal of the light receiving body of each light emitting and receiving element 52 is sent to the computing device 100.

[0046] When the magnet dart 4 thrown by the player is held by the panel unit 202 in a position indicated by a sign P in Fig. 7, light traveling to the position P in light emitted by each light emitting and receiving element 52 is blocked in the position P. Consequently, the computing device 100 specifies the direction of the position P by detecting that the intensity of light received from the position P via each light emitting and receiving element 52 decreases. The computing device 100 detects X and Y coordinates of the position P of the magnet dart 4 according to the principle of triangulation.

[0047] Fig. 8(a) to Fig. 8(d) are diagrams for explaining examples of images displayed according to the progress of the dart game. Forms of images corresponding to the

progress of the dart game displayed in the display area 3 are explained below with reference to Fig. 8(a) to Fig. 8(d).

[0048] Fig. 8(a) is an example of an image related to the dart game displayed in the display area 3 by the image display unit 10. For example, a round number and a score are displayed in the first display area 3A. For example, a target 300 of the dart game is displayed in the second display area 3B.

[0049] The image display unit 10 may change a display form of the target 300 before the player throws the magnet dart 4. For example, as shown in Fig. 8(b), the image display unit 10 may display the target 300 to gradually move to the right side on a screen. Alternatively, as shown in Fig. 8(c), the image display unit 10 may display the target 300 such that a dimension of the target 300 gradually changes. With the configuration, the player throws the magnet dart 4 aiming at the target 300, the form of which changes at every moment. Therefore, amusement performance of the dart game is improved. The ways of the change in the display form of the target 300 explained above are examples. Any other way of the change may be adopted.

[0050] The image display unit 10 may change the display form of the target 300 after the magnet dart 4 thrown by the player hits the target 300. For example, as shown in Fig. 8(d), the image display unit 10 may display a segment 310 hit by the magnet dart 4 to be highlighted in various forms. With the configuration, the player can sense with more presence that the magnet dart 4 hits the target 300. Therefore, the amusement performance of the dart game is improved. The form of the highlighted display explained above is an example. Any other form of the highlighted display may be adopted.

[0051] The image display unit 10 may display various objects for performance according to the progress of the dart game. For example, as shown in Fig. 8(d), the image display unit 10 may display an object for performance 320 (in the figure, shown as a schematic diagram representing a mountain) in the first display area 3A. For example, as shown in Fig. 8(d), the image display unit 10 may display an object for performance 330 (in the figure, shown as a schematic diagram representing lightening) in the second display area 3B. With the configuration, the player can sense various performances according to the progress of the dart game. Therefore, the amusement performance of the dart game is improved. The objects for performance explained above are examples. Any other object for performance may be adopted.

[0052] [Modifications]

In the first embodiment, the image display unit 10 is substantially rectangular in the XY plane view. However, not only this, but the shape in the XY plane view of the image display unit 10 may be polygons such as a substantial triangle and a substantial hexagon, a circle, an ellipse, a shape formed by a linear part and a curved part, and any other irregular shape.

[0053] In the first embodiment, the dart holding unit 30 is disposed to cover the portion equal to or lower than the predetermined height (the predetermined position in the Y-axis direction) of the image display unit 10. However, not only this, but the dart holding unit 30 may be disposed to cover any portion such as a portion equal to or higher than the predetermined height (the predetermined position in the Y-axis direction) of the image display unit 10. Alternatively, the dart holding unit 30 may be disposed to cover the entire image display unit 10.

[0054] The shape, the dimension, the pitch, the arraying form, and other parameters of each hole 30H provided in the dart holding unit 30 may be optionally set if an image displayed by the image display unit 10 can be visually recognized via the dart holding unit 30.

[0055] For example, in the first embodiment, the hole 30H is substantially cylindrical. That is, the shape in the XY plane view of the hole 30H is the substantial circle. However, not only this, but the shape of the XY plane view of the hole 30H may be an ellipse, a substantial polygon, and other irregular shapes.

[0056] For example, in the first embodiment, the diameter of each hole 30H in the thickness direction of the dart holding unit 30 (the Z-axis direction) is fixed. However, not only this, but the diameter in the thickness direction of the dart holding unit 30 of each hole 30H may not be fixed. For example, as shown in Fig. 9, a diameter D1 of an opening section on the player side (the opposite side of the image display unit 10, that is, the Z-axis negative direction side) may be larger than a diameter D2 of an opening section on the opposite side of the player (the image display unit 10 side, that is, the Z-axis positive direction side). With this form, an angle of view of the panel unit 202 expands. Therefore, the player can select, with predetermined latitude, a standing position where the player performs throwing. The amusement performance of the game is improved.

[0057] For example, in the first embodiment, the plurality of holes 30H are arrayed at the predetermined pitches respectively in the X-axis direction and the Y-axis direction. That is, the density on the XY plane of the holes 30H (a ratio of a total value of areas of the plurality of holes 30H included per unit area) is fixed irrespective of a position on the dart holding unit 30. However, not only this, but, for example, the density on the XY plane of the holes 30H may not be uniform and may be different according to a position on the dart holding unit 30. With this form, a force by the dart holding unit 30 for holding the magnet dart 4 changes according to a position in the display area 3. Therefore, the amusement performance of the throwing game is improved. Further, with this form, visibility of an image related to the dart game changes according to the position in the display area 3. Therefore, the amusement performance of the throwing game is improved.

[0058] In the first embodiment, the dart game is explained as an example. However, the present invention is not limited to the dart game and can be applied to any throwing game performed using a throwing instrument including a magnet.

[0059] The embodiment explained above is to facilitate understanding of the present invention and is not to limitedly interpret the present invention. Each element included in the embodiment and the disposition, the material, the conditions, the shape, the size, and the like of the element are not limited to the illustrated ones and can be changed as appropriate. Components explained in different embodiments can be partially replaced or combined.

Reference Signs List

[0060]

- 1 Dart game apparatus
- 2 Housing
- 3 Display area
- 3A First display area
- 3B Second display area
- 4 Magnet dart
- 10 Image display unit

20	Image display unit protection sheet
30	Dart holding unit
40	Dart holding unit protection sheet
50	Position detecting unit
51	Recursive reflection material
52	Light emitting and receiving element
100	Computing device
102	Main memory
103	BIOS-ROM
104	Storage device
105	Sound processing unit
106	Image processing unit
107	Communication interface
108	Peripheral interface
110	System bus
201	Audio output device
202	Panel unit
203	Operation unit
204	Coin depositing device
300	Target
310	Segment
320, 330	Object for performance

What is claimed is:

1. A throwing game apparatus that controls progress of a throwing game performed using a throwing instrument including a magnet, the throwing game apparatus comprising:
a display unit that displays an image including a target in a form corresponding to the throwing game; and
a throwing-instrument holding unit disposed to cover at least a part of the display unit and containing a ferromagnetic body to be capable of holding the throwing instrument, a plurality of through-holes being provided in the throwing-instrument holding unit to enable visual recognition of the image displayed by the display unit.
2. The throwing game apparatus according to claim 1, further comprising a position detecting unit that detects a position of the throwing instrument held by the throwing-instrument holding unit.
3. The throwing game apparatus according to claim 1 or 2, further comprising a display unit protection sheet laminated on the display unit.
4. The throwing game apparatus according to any one of claims 1 to 3, further comprising a throwing-instrument holding unit protection sheet laminated on the throwing-instrument holding unit.
5. The throwing game apparatus according to any one of claims 1 to 4, wherein a dimension of an opening section of at least a part of the plurality of through-holes on an opposite side of the display unit is larger than a dimension of an opening section of at least the part of the through-holes on the display unit side.
6. The throwing game apparatus according to any one of claims 1 to 5, wherein the throwing-instrument holding unit includes a first region and a second region different from the first region, and
a density of the plurality of through-holes in the first region is different from a density of the plurality of through-holes in the second region.

7. The throwing game apparatus according to any one of claims 1 to 6, wherein the image displayed by the display unit includes indication related to performance.