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PRIZE ACQUISITION GAME DEVICE AND CRANE

Abstract

A prize acquisition game device includes: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space. The crane includes: a base; at least three arms that extend radially around a central axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed. Among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.

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Background/Summary

BACKGROUND

Technical Field

[0001] The present invention relates to a prize acquisition game device and a crane.

Description of Related Art

[0002] There are known prize acquisition game devices provided with an acquisition unit (or crane) for acquiring a prize by opening and closing two arms (for example, patent document 1).

Patent Documents

[0003] Patent Document 1: JP 2012-45204 A

Technological Problem to be Solved by Invention

[0004] In such a prize acquisition game device, in order to enable stable acquisition of the prize, the number of arms of the acquisition unit may be increased to three or more. In this case, as the number of arms increases, the number of arm drivers that open and close the arms also increases, and thus there is a risk that the entire acquisition unit will become larger unless a large number of arm drivers are stored compactly inside the body.

SUMMARY

[0005] One or more embodiments of the present invention reduce a size of an acquisition unit for acquiring a prize using three or more arms.

[0006] In one aspect of the present invention, a prize acquisition game device comprises: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space, wherein the crane comprises: a base; at least three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.

[0007] Other features of the present invention will become apparent from the following detailed description of the present invention and the accompanying drawings.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0008] FIG. 1 is an external view illustrating a configuration of a prize acquisition game device 1 according to one or more embodiments.

[0009] FIG. 2 is a block diagram illustrating a configuration of a prize acquisition game device 1 according to one or more embodiments.

[0010] FIG. 3 is a schematic diagram illustrating a configuration of a moving unit (or crane driver) 50 according to one or more embodiments.

[0011] FIG. 4 is a perspective view illustrating a configuration of an acquisition unit (or crane) 130 of the comparative example.

[0012] FIG. 5 is a front view illustrating a configuration of the acquisition unit **130** of the comparative example.

[0013] FIG. 6 is a plan view illustrating a configuration of the acquisition unit **130** of the comparative example.

[0014] FIG. 7 is a perspective view illustrating a configuration of an acquisition unit **20** (or crane) according to one or more embodiments.

[0015] FIG. 8 is a front view illustrating a configuration of the acquisition unit **20** according to one or more embodiments.

[0016] FIG. 9 is a plan view illustrating a configuration of the acquisition unit **20** according to one or more embodiments.

[0017] FIG. 10 is a schematic view for describing the relationship between the arm **29**, the arm coupling portion **28**, and an arm driver **35** according to one or more embodiments.

[0018] FIG. 11 is a schematic view illustrating the arm **29** in a closed state according to one or more embodiments.

DETAILED DESCRIPTION OF EMBODIMENTS

[0019] At least the following will become apparent from the description of this specification and the accompanying drawings.

[0020] That is, a prize acquisition game device comprises: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space, wherein the crane comprises: a base; at least three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.

[0021] According to such a prize acquisition game device, by effectively utilizing an upper space of the arm connectors corresponding to the respective arms, the arm drivers corresponding to the respective arms can be stored compactly inside the body, and thus the crane for acquiring the prize can be downsized using three or more arms.

[0022] Furthermore, such a prize acquisition game device may also dispose the arm drivers that drives the one of the two adjacent arms above an arm connector that connects the other of the two adjacent arms to the base by mounting the arm driver that drives the one of the two adjacent arms to the base by tilting the arm driver that drives the one of the two adjacent arms to a side of the other of the two adjacent arms.

[0023] According to such a prize acquisition game device, by attaching the arm driver that drives the one of the two adjacent arms to the base at an angle tilted to a side of the other of the two adjacent arms, the height of the arm driver in the vertical direction can be disposed while being lowered compared to the case where the arm driver is attached to the base without tilting, and thus each arm driver can be stored compactly inside the body.

[0024] Furthermore, a prize acquisition game device comprises: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space, wherein the crane comprises: a base; three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein the arms include a first arm, a second arm, and a third arm, and the arm drivers includes: a first arm driver that drives the second arm and is disposed to extend above the arm connector that connects the first arm to the base; a second arm driver that drives the third arm and is disposed to extend above the arm connector that connects the second

arm to the base; and a third arm driver that drives the first arm and is disposed to extend above the arm connector that connects the third arm to the base.

[0025] According to such a prize acquisition game device, the arm driver corresponding to the second arm can be stored compactly inside the body by effectively utilizing an upper space of the arm connector corresponding to the first arm, the arm driver corresponding to the third arm can be stored compactly inside the body by effectively utilizing an upper space of the arm connector corresponding to the second arm, and the arm driver corresponding to the first arm can be stored compactly inside the body by effectively utilizing an upper space of the arm connector corresponding to the third arm. As a result, the arm driver corresponding to each arm can be stored inside the body in a compact manner that fits well in a trifurcated shape, and thus the crane for acquiring the prize can be made smaller using the three arms.

[0026] Furthermore, such a prize acquisition game device may comprise: the first arm driver disposed to extend above the arm connector that connects the first arm to the base by tilting the first arm driver to a side of the first arm when attaching the first arm driver to the base; the second arm driver disposed to extend above the arm connector that connects the second arm to the base by tilting the second arm driver to a side of the second arm when attaching the second arm driver to the base; and the third arm driver disposed to extend above the arm connector that connects the third arm to the base by tilting the third arm driver to a side of the third arm when attaching the third arm driver to the base.

[0027] According to such a prize acquisition game device, by attaching the arm driver corresponding to each arm to the base at a tilted angle, the height of the arm driver in the vertical direction can be kept low and disposed compared to the case where the arm driver is attached to the base without tilting, and thus each arm driver can be stored compactly inside the body.

[0028] Furthermore, a crane used in a prize acquisition game device to perform a prize acquisition operation, the crane comprising: a base; at least three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.

[0029] According to such a crane, by effectively utilizing an upper space of the arm connectors corresponding to the respective arms, the arm drivers corresponding to the respective arms can be stored compactly inside the body, and thus the crane for acquiring the prize can be downsized using three or more arms.

[0030] Furthermore, a crane used in a prize acquisition game device, the crane comprising: a base; three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein the arms include a first arm, a second arm, and a third arm, and the arm drivers include: a first arm driver that drives the second arm and is disposed to extend above the arm connector that connects the first arm to the base; a second arm driver that drives the third arm and is disposed to extend above the arm connector that connects the second arm to the base; and a third arm driver that drives the first arm and is disposed to extend above the arm connector that connects the third arm to the base.

[0031] According to such a crane, the arm driver corresponding to each arm can be stored inside the body in a compact manner that fits well in a trifurcated shape, and thus the crane for acquiring the prize can be made smaller using the three arms.

EMBODIMENTS

Configuration of Prize Acquisition Game Device 1

[0032] A configuration example of the prize acquisition game device 1 according to one or more

embodiments will be described using FIG. 1 to FIG. 3. FIG. 1 is an external view illustrating a configuration of a prize acquisition game device **1** according to one or more embodiments. FIG. 2 is a block diagram illustrating a configuration of a prize acquisition game device **1** according to one or more embodiments. FIG. 3 is a schematic diagram illustrating a configuration of a moving unit (or crane driver) **50** according to one or more embodiments.

[0033] In the following description, each direction is defined as illustrated in each FIG. That is, the vertical direction is defined as the “up-down direction,” and “up” and “down” are defined according to gravity. In addition, the front-back directions are defined as the “front” being the front side and the “back” being the back side from the perspective of a player facing the prize acquisition game device **1**. Additionally, the direction perpendicular to the up-down and front-back directions is defined as the “left-right direction,” and “right” and “left” are defined based on the view from the player's side.

[0034] The prize acquisition game device **1** of one or more embodiments is used when a player plays a prize acquisition game, and is equipped with a housing portion (or housing) **10** that stores one or more prizes, and a base portion (or base) **80** disposed below the housing portion **10**.

[0035] As illustrated in FIG. 1, the housing portion **10** is formed of transparent members (for example, transparent resin, glass, or the like) on the front surface and the left-right sides so that the prize housed within the housing space can be seen by the player. An opening and closing door **11** is disposed on the front of the housing portion **10**, allowing a service provider (for example, a store clerk or the like) to display and replenish the prizes.

[0036] The housing space enclosed by the housing portion **10** is used as a play field where a player plays the prize acquisition game.

[0037] As illustrated in FIG. 1 and FIG. 2, the housing portion **10** in one or more embodiments has an acquisition unit (or crane) **20** that performs the operation of acquiring or catching prizes, a moving unit **50** that moves the acquisition unit **20**, and a display section (or exhibition part) **60** for displaying/exhibiting the prizes in the housing space.

[0038] Note that in one or more embodiments, as illustrated in FIG. 1, an acquisition unit **20** is disposed corresponding to each play area in which the playfield is divided left-right, and each acquisition unit **20** is configured to be able to move within each play area.

[0039] The acquisition unit **20** is a crane for acquiring the prizes contained in the housing portion **10** (the prizes displayed in the display section **60**) by opening and closing the arm. As illustrated in FIG. 1, the acquisition unit **20** in one or more embodiments is configured so as to be able to grasp a prize by means of three arms, and is linked to the lower end of the lifting member **52a**.

[0040] The moving unit **50** moves the acquisition unit **20** within the play field formed by the housing portion **10**. As illustrated in FIG. 2, the moving unit **50** in one or more embodiments has a horizontal moving portion (or horizontal crane driver) **51** and a vertical moving portion (or vertical crane driver) **52**.

[0041] The horizontal moving portion **51** moves the acquisition unit **20** horizontally (that is, front-back and left-right) on the play field. As illustrated in FIG. 3, the horizontal moving portion **51** in one or more embodiments has a left-right moving portion (left-right crane driver) **53** and a front-back moving portion (front-back crane driver) **54**.

[0042] The left-right moving portion **53** moves the acquisition unit **20** left and right on the play field.

[0043] As illustrated in FIG. 3, the left-right moving portion **53** in one or more embodiments has a pair of fixed rails **53a** extending in the left-right direction, a left-right moving motor **53b**, an encoder that is not illustrated, and a limit sensor that is not illustrated.

[0044] The pair of fixed rails **53a** are fixed to the upper portion of the housing portion **10** so as to be parallel to each other along the left-right direction. A front-back moving portion **54** is attached to the pair of fixed rails **53a** so as to be slidable in the left-right direction. By driving the left-right moving motor **53b**, the front-back moving portion **54** can be moved left-right along the fixed rail

53a.

[0045] The encoder detects the number of rotations of the left-right moving motor **53b**. Based on the output of this encoder, the position of the front-back moving portion **54** in the left-right direction (in other words, the position of the acquisition unit **20** in the left-right direction) can be detected.

[0046] The limit sensor is for detecting when the front-back moving portions **54** reach a limit position in the left-right direction (that is, when the acquisition unit **20** reaches a limit position in the left-right direction).

[0047] The front-back moving portions **54** move the acquisition unit **20** in the front-back direction in the playfield.

[0048] As illustrated in FIG. 3, the front-back moving portions **54** in one or more embodiments include a movable rail **54a** extending along the front-back directions, a front-back moving motor **54b**, an encoder that is not illustrated, and a limit sensor that is not illustrated.

[0049] A vertical moving portion **52** is attached to the movable rail **54a** so as to be slidable along the front-back direction. The vertical moving portion **52** can be moved in the front-back direction along the movable rail **54a** by driving the front-back moving motor **54b**.

[0050] The encoder detects the number of rotations of the front-back moving motor **54b**. The position of the vertical moving portion **52** in the front-back direction (that is, the position of the acquisition unit **20** in the front-back direction) can be detected based on the output of this encoder.

[0051] The limit sensor is for detecting when the vertical moving portion **52** reaches a limit position in the front-back direction (that is, when the acquisition unit **20** reaches a limit position in the front-back direction).

[0052] The vertical moving portion **52** moves the acquisition unit **20** in the vertical direction (that is, the up-down direction) on the play field.

[0053] As illustrated in FIG. 3, the vertical moving portion **52** in one or more embodiments has a lifting member **52a** that is configured to be freely expandable and contractable in the up-down direction, a wire winding unit that is not illustrated, a vertical moving motor that is not illustrated, an upper limit sensor that is not illustrated, and a lower limit sensor that is not illustrated.

[0054] The lifting member **52a** is configured by fitting a plurality of pipes of successively smaller diameters in a telescopic manner so as to be freely slidable. The acquisition unit **20** is attached to the lower end of the lifting member **52a** in a state of being connected to a wire that passes through the inside of the pipe.

[0055] The wire winding unit is driven by an up-down moving motor to wind up the wire, thereby raising the acquisition unit **20** while sequentially storing the lower pipes in the upper pipe, or to unwind the wire, thereby lowering the acquisition unit **20** while sequentially sending out the lower pipes from the upper pipe.

[0056] The upper limit sensor detects whether or not the rising of the acquisition unit **20** has stopped by winding up the wire connected to the acquisition unit **20**.

[0057] The lower limit sensor detects whether the lowering of the acquisition unit **20** has stopped based on the change in the tension of the wire connected to the acquisition unit **20**.

[0058] The display section **60** is for displaying the prizes in the housing portion **10**, and forms the bottom surface of the play field as illustrated in FIG. 1. The display section **60** in one or more embodiments is composed of an unillustrated frame and a panel.

[0059] The frame is supported inside the base portion **80** and is configured to be able to support a plurality of panels. The panel is configured so that the prize can be displayed on the upper surface thereof, and is removable and supported with respect to the frame.

[0060] Furthermore, the disposition area where the panels are disposed becomes a display area where the prize can be displayed, while the disposition area where the panels are not disposed becomes an opening area where the prize can be passed.

[0061] When the prize that is acquired and then dropped by the acquisition unit **20** passes (drops)

through the opening area of the display section **60**, it is considered to have moved from the play field to the base portion **80**. The prize dropped from the opening area of the display section **60** is detected by an optical sensor and then guided to the prize outlet **96** via a guide path. The optical sensor detects the presence or absence of a prize by using a light-emitting element and a light-receiving element that are installed on the guide path.

[0062] The base portion **80** is a base portion of a housing disposed below the housing portion **10**, and holds the housing portion **10** at a high position so that a player can play a game while facing the front in a standing position.

[0063] As illustrated in FIG. **1** and FIG. **2**, the base portion **80** in one or more embodiments has an operation unit (or input device/interface) **90**, a play fee detector **93**, a prize outlet **96**, a setting unit **100** (or I/O interface), a control unit (or controller) **110**, and a memory unit (or memory) **120**.

[0064] The operation unit **90** allows the player to operate the game. As illustrated in FIG. **1** and FIG. **2**, the operation unit **90** in one or more embodiments has at least a joystick **91** and an operation button **92**.

[0065] The joystick **91** is an operating lever that is used by the player to move the acquisition unit **20** in the horizontal direction. The operation button **92** is an operation button used by the player to determine the position of the acquisition unit **20** in the horizontal direction. When the operation button **92** is pressed by the player, the acquisition unit **20** starts to descend at the determined position.

[0066] The play fee detector **93** detects the payment of a play fee by a player. The play fee detector **93** in one or more embodiments has a coin slot **94**, a coin detection sensor that is not illustrated, a coin passage path that is not illustrated, and a coin box that is not illustrated.

[0067] In one or more embodiments, the prize acquisition game is started when a player inserts a predetermined number of coins into the coin slot **94**. A coin inserted through the coin slot **94** is detected by a coin detection sensor.

[0068] The coin detection sensor is, for example, an optical sensor, and detects the presence or absence of a coin inserted through the coin slot **94** by a light-emitting portion and a light-receiving portion attached on the coin passage. Coins that have passed through the coin currency path in this manner are stored in the coin box.

[0069] The prize outlet **96** is disposed on the front surface of the base portion **80** and is for removing a prize that has fallen when the prize acquired by the acquisition unit **20** falls through the opening area in the display section **60**.

[0070] The setting unit **100** is used when a player performs game operations or the like, or when a service provider performs setting operations. As illustrated in FIG. **1** and FIG. **2**, the setting unit **100** in one or more embodiments has a setting operation unit **101** and a screen display **102**.

[0071] The setting operation unit **101** is for receiving operation input. The setting operation unit **101** in one or more embodiments is constituted of a touch panel, and receives input instructions from the operator from the pressing position thereof.

[0072] The touch panel is layered on top of the screen display **102**, and when a touch operation is performed on the screen, the pressed position (contact position) can be detected based on the change in electrostatic capacitance between the fingertip and the conductive film.

[0073] The screen display **102** displays various screens such as a game screen and a setting screen. The screen display **102** in one or more embodiments is constituted of a liquid crystal display.

[0074] The control unit **110** is disposed inside the base portion **80** and is a control unit for carrying out various controls of the prize acquisition game device **1**. As illustrated in FIG. **2**, the control unit **110** includes at least a central processing unit (CPU) **111** and a memory **112**.

[0075] The CPU **111** is an arithmetic processing device for controlling the entire game device. The memory **112** is used to secure an area for storing programs or instructions for the CPU **111**, a working area, and the like, and includes a storage element such as a random access memory (RAM).

[0076] The memory unit **120** is a unit that stores programs or instructions and data for the control unit **110** to execute game processing. In one or more embodiments, a memory element such as a read only memory (ROM) which is a read-only memory area is provided.

Configuration of Acquisition Unit **20**

<Acquisition Unit **130** of Comparative Example>

[0077] First, before describing the configuration of the acquisition unit **20** according to one or more embodiments, a configuration of a conventional acquisition unit (or crane) **130** will be described using FIG. **4** to FIG. **6** as comparative examples. FIG. **4** is a perspective view illustrating a configuration of the acquisition unit **130** of the comparative example. FIG. **5** is a front view illustrating a configuration of the acquisition unit **130** of the comparative example. FIG. **6** is a plan view illustrating a configuration of the acquisition unit **130** of the comparative example. Note that in each FIG., the acquisition unit **130** is illustrated having the design cover removed.

[0078] As illustrated in FIG. **4** to FIG. **6**, the acquisition unit **130** of the comparative example includes a base portion (or base) **131** linkable to a lower end of the lifting member **52a**, an arm **139** that performs an opening and closing operation, a claw **140** attached to a tip of the arm **139**, an arm connector **138** that connects the arm **139** to the base portion **131** in a removable manner, and an arm driver **141** that opens and closes the arm **139**.

[0079] The base portion **131** of the comparative example has protruding portions **132** that extend radially so as to have equal angle spacing around a center axis along a vertical direction. Specifically, as illustrated in FIG. **6**, it is composed of a first protruding portion **132A**, a second protruding portion **132B**, and a third protruding portion **132C** having a trifurcated protruding shape shifted at 120 degree intervals three ways, centered on the center axis of the base portion **131**.

[0080] The arm **139** of the comparative example is composed of three arms: a first arm **139A**, a second arm **139B**, and a third arm **139C**, and extends radially around the center axis of the base portion **131** at intervals of 120 degrees. That is, as illustrated in FIG. **6**, a first arm **139A**, a second arm **139B**, and a third arm **139C** are disposed corresponding to the first protruding portion **132A**, the second protruding portion **132B**, and the third protruding portion **132C**.

[0081] The arm connector **138** of the comparative example is composed of three parts: a first arm connector **138A**, a second arm connector **138B**, and a third arm connector **138C**, and is disposed for each arm. That is, the first arm connector **138A** connects the first arm **139A** to the first protruding portion **132A** of the base portion **131** as illustrated in FIG. **4**. Similarly, the second arm connector **138B** connects the second arm **139B** to the second protruding portion **132B** of the base portion **131**, and the third arm connector **138C** connects the third arm **139C** to the third protruding portion **132C** of the base portion **131**.

[0082] The arm driver **141** of the comparative example is composed of three parts, a first arm driver **141A**, a second arm driver **141B**, and a third arm driver **141C**, one for each arm. As illustrated in FIG. **4** to FIG. **6**, the first arm driver **141A**, the second arm driver **141B**, and the third arm driver **141C** correspond to the first arm **139A**, the second arm **139B**, and the third arm **139C**, respectively, and drive them to open and close separately.

[0083] As illustrated in FIG. **4**, the first arm driver **141A** has an arm opening and closing motor **141Aa**, and a gearbox **141Ab** linked to the arm opening and closing motor **141Aa**. The first arm **139A** performs the opening and closing operation by the power of the arm opening and closing motor **141Aa** being transmitted via the gearbox **141Ab**. Similarly, the second arm driver **141B** has an arm opening and closing motor **141Ba** and a gearbox **141Bb** linked to the arm opening and closing motor **141Ba**, and the third arm driver **141C** has an arm opening and closing motor **141Ca** and a gearbox **141Cb** linked to the arm opening and closing motor **141Ca**.

[0084] In the case of this comparative example, as illustrated in FIG. **4**, the arm driver **141** (first arm driver **141A** to third arm driver **141C**) of the comparative example is disposed inside the acquisition unit **130** in a standing state along the up-down direction (vertical direction). Therefore, as illustrated in FIG. **5**, an increase in the up-down thickness **L1** (that is, the vertical height) may

cause the entire acquisition unit **130** to become larger.

[0085] Furthermore, inside the acquisition unit **130** of the comparative example, the upper space of each arm connector **138** is respectively empty. For example, when looking at the first arm connector **138A**, as illustrated in FIG. **4** to FIG. **6**, the upper space **143** of the first arm connector **138A** is an empty space (indicated by diagonal lines in the figure). Similarly, the upper space of the second arm connector **138B** and the third arm connector **138C** is empty. By forming a large number of such empty spaces inside the acquisition unit **130**, there is a risk that the entire acquisition unit **130** will become larger.

<Acquisition Unit **20** of One or More Embodiments>

[0086] Configuration examples of the acquisition unit **20** according to one or more embodiments will be described using FIG. **7** to FIG. **11**. FIG. **7** is a schematic diagram illustrating a configuration of an acquisition unit **20** according to one or more embodiments. FIG. **8** is a front view illustrating a configuration of an acquisition unit **20** according to one or more embodiments. FIG. **9** is a plan view illustrating a configuration of the acquisition unit **20** according to one or more embodiments. FIG. **10** is a schematic diagram for describing the relationship between the arm **29**, the arm coupling portion **28**, and the arm driver **35** according to one or more embodiments. FIG. **11** is a schematic view illustrating the arm **29** according to one or more embodiments in the closed position. Note that in each FIG., the acquisition unit **20** is illustrated having the design cover removed.

[0087] As illustrated in FIG. **7** to FIG. **9**, similarly to the case of the above comparative example, the acquisition unit **20** according to one or more embodiments includes a base portion (or base) **21** linked to a lower end of the lifting member **52a**, an arm **29** that performs an opening and closing operation, a claw **30** attached to a tip of the arm **29**, an arm connector **28** that connects the arm **29** to the base portion **21** in a removable manner, and an arm driver **35** that opens and closes the arm **29**.

[0088] The base portion **21** of the comparative example has protruding portions **22** that extend radially so as to have equal angle spacing around a center axis along a vertical direction. Specifically, as illustrated in FIG. **9**, it is composed of a first protruding portion **22A**, a second protruding portion **22B**, and a third protruding portion **22C** having a trifurcated protruding shape shifted at 120 degree intervals three ways, centered on the center axis of the base portion **21**.

[0089] The arm **29** of the comparative example is composed of three arms: a first arm **29A**, a second arm **29B**, and a third arm **29C**, and extends radially around the center axis of the base portion **21**. Specifically, as illustrated in FIG. **9**, the first arm **29A**, the second arm **29B**, and the third arm **29C** are disposed corresponding to the first protruding portion **22A**, the second protruding portion **22B**, and the third protruding portion **22C**, and each arm **29** extends radially so as to have an equiangular interval (120 degree interval) centered on the center axis of the base portion **21**. As illustrated in FIG. **7**, the arm **29** has a claw **30** attached to the tip thereof, and an arm connector **28** is connected to the base thereof.

[0090] The arm connector **28** of the comparative example is composed of three parts: a first arm connector **28A**, a second arm connector **28B**, and a third arm connector **28C**, and is disposed for each arm. That is, the first arm connector **28A** connects the first arm **29A** to the first protruding portion **22A** of the base portion **21** as illustrated in FIG. **7**. Similarly, the second arm connector **28B** connects the second arm **29B** to the second protruding portion **22B** of the base portion **21**, and the third arm connector **28C** connects the third arm **29C** to the third protruding portion **22C** of the base portion **21**. Hereinafter, only the first arm connector **28A** will be specifically described, and the rest will be omitted as all of the arm connectors **28** have the same configuration.

[0091] As illustrated in FIG. **10** and FIG. **11**, the first arm connector **28A** includes a protruding portion **28Aa**, an arm shaft **28Ab** that serves as a central axis when the first arm **29A** rotates, a transmission gear **28Ac** that rotates integrally with the arm shaft **28Ab**, a torsion spring **28Ad** as an example of an elastic body, and a fastening portion **28Ae**.

[0092] As illustrated in FIG. **11**, the protruding portion **28Aa** is disposed at one end of the first arm

connector **28A**, and abuts the stopper **24** of the base portion **21** to limit the rotational operation of the first arm **29A** in the closed direction.

[0093] The arm shaft **28Ab** is inserted into an insertion hole that is not illustrated of the first arm connector **28A** and attached to the base portion **21** through a passage hole that is not illustrated of the first protruding portion **22A**. The transmission gear **28Ac** is fitted so as to be integrated with the arm shaft **28Ab**, and transmits power to the first arm **29A** by driving the arm driver **35**.

[0094] The torsion spring **28Ad** applies a gripping force to the arm **29**, and, as illustrated in FIG. **9**, is attached to the arm shaft **28Ab** by screwing the fastening portion **28Ae** so as not to fall off. The first arm connector **28A** is connected to the first arm **29A** via the torsion spring **28Ad**.

[0095] The arm driver **35** of the comparative example is composed of three parts, a first arm driver **35A**, a second arm driver **35B**, and a third arm driver **35C**, one for each arm. As illustrated in FIG. **7** to FIG. **9**, the first arm driver **35A**, the second arm driver **35B**, and the third arm driver **35C** correspond to the first arm **29A**, the second arm **29B**, and the third arm **29C**, respectively, and drive them to open and close separately. Hereinafter, only the first arm driver **35A** will be specifically described, and the rest will be omitted as all of the arm drivers **35** have the same configuration.

[0096] As illustrated in FIG. **10** and FIG. **11**, the first arm driver **35A** has an arm opening and closing motor **35Aa**, a gearbox **35Ab** linked to the arm opening and closing motor **35Aa**, an output shaft **35Ac** of the gearbox **35Ab**, and a transmission gear **35Ad** attached to the output shaft **35Ac**.

[0097] The gearbox **35Ab** reduces the rotational force of the arm opening and closing motor **35Aa** and outputs it. Note that the transmission gear **35Ad** may be directly attached to the output shaft of the arm opening and closing motor **35Aa** (not illustrated) without going through the gearbox **35Ab**.

[0098] When the transmission gear **35Ad** is rotated via the gearbox **35Ab** by the drive of the arm opening and closing motor **35Aa**, power is transferred to the transmission gear **28Ac** that engages the transmission gear **35Ad**. As a result, the first arm **29A** connected to the first arm connector **28A** via the torsion spring **28Ad** rotates around the arm shaft **28Ab**.

[0099] In the case of the acquisition unit **20** according to one or more embodiments, unlike the case in the comparative example, when two adjacent arms **29** from among the three arms **29** are captured as one set, as illustrated in FIG. **7** or FIG. **9**, the arm driver **35** for opening and closing the other arms **29** is disposed in the upper space of the arm connector **28** that connects one arm **29** from among the two arms **29** to the base portion **21** in both sets. This arrangement is achieved by attaching the arm driver **35** that drives the other arms **29** to the base portion **21** by tilting them toward one arm **29**. That is, as illustrated in FIG. **9**, each arm driver **35** is disposed in a shape of a ring around the center axis of the acquisition unit **20**.

[0100] Specifically, as illustrated in FIG. **7** or FIG. **9**, the second arm driver **35B** corresponding to the second arm **29B** is disposed in the upper space of the first arm connector **28A** corresponding to the first arm **29A**. Here, this arrangement is achieved by rotating the second arm driver **35B** corresponding to the second arm **29B** around the output shaft **35Bc** of the second arm driver **35B** and tilting the base portion **21** toward the first arm **29A**.

[0101] Then, as illustrated in FIG. **7** or FIG. **9**, the third arm driver **35C** corresponding to the third arm **29C** is disposed in the upper space of the second arm connector **28B** corresponding to the second arm **29B**. Here, this arrangement is achieved by rotating the third arm driver **35C** corresponding to the third arm **29C** around the output shaft **35Cc** of the third arm driver **35C** and tilting the base portion **21** toward the second arm **29B**.

[0102] Furthermore, as illustrated in FIG. **7** or FIG. **9**, the first arm driver **35A** corresponding to the first arm **29A** is disposed in the upper space of the third arm connector **28C** corresponding to the third arm **29C**. Here, this arrangement is achieved by (see FIG. **11**) rotating the first arm driver **35A** corresponding to the first arm **29A** around the output shaft **35Ac** of the first arm driver **35A** and tilting the base portion **21** toward the third arm **29C**.

[0103] In other words, as illustrated in FIG. **9**, each arm driver (first arm driver **35A** to third arm driver **35C**) is disposed in a trifurcated shape around the center axis of the acquisition unit **20** inside

the acquisition unit **20**.

[0104] In this manner, in one or more embodiments, the arm driver **35** (first arm driver **35A** to third arm driver **35C**) is disposed inside the acquisition unit **20** in a state that is tilted with respect to the up-down direction (vertical direction). Therefore, as illustrated in FIG. **8**, the thickness **L2** in the up-down direction (that is, the height in the vertical direction) can be made thinner than the thickness **L1** in the comparative example described above (see FIG. **5**). In other words, because the height of the arm driver **35** can be disposed while being kept low in the vertical direction, the entire acquisition unit **20** can be made smaller by storing the arm driver **35** compactly inside the body. Furthermore, by making the acquisition unit **20** thinner, the amount of movement in the vertical direction within the housing space of the acquisition unit **20** can be increased compared to the comparative example.

[0105] Furthermore, in the comparative example described above, the upper space of each arm connector **138** is respectively empty inside the acquisition unit **130**, but in one or more embodiments, the upper space of each arm connector **28** is effectively utilized inside the acquisition unit **20**. Thus, by reducing wasted space inside the body, the arm driver **35** corresponding to each arm **29** can be stored compactly inside the body, and thus the entire acquisition unit **20** can be made smaller.

OTHER EMBODIMENTS

[0106] The above embodiments are provided to facilitate understanding of the present invention, and are not to be construed as limiting the present invention. The present invention can be modified or improved without departing from the spirit thereof, and the present invention also includes equivalents thereof. In particular, the embodiments described below are also included in the present invention. In other words, the present invention can be configured by appropriately combining the above embodiments with the embodiments described below.

[0107] Furthermore, it is also possible to construct various inventions by appropriately combining multiple invention-defining matters disclosed in the above embodiments. For example, the invention may be constructed by deleting some of the invention-defining matters from all of the invention-defining matters disclosed in the above embodiments, or the invention may be constructed by appropriately combining all of the invention-defining matters disclosed in the above embodiments with the invention-defining matters disclosed in the embodiments described below.

Prizes

[0108] In the above embodiments, the prizes stored in the housing portion **10** are not limited to items that the player can directly acquire (for example, stuffed toys or the like), but also include items that are stored as targets for acquisition in the game and can be exchanged for other prizes after acquisition, and items that are not provided themselves but are used to compete for points or rankings.

Arm

[0109] In the above embodiments, the acquisition unit **20** having three arms **29** has been described as an example, but the present invention is not limited to this. For example, the present invention can also be applied to an acquisition unit **20** having four or more arms **29**. In this case, as the number of arms **29** increases, the number of arm connectors **28**, arm drivers **35**, protruding portions **22** of the base portion **21**, and the like can be increased.

Arm Driver

[0110] In the above embodiments, a case where a motor is used as an example of a rotating driving unit **35** is described, but the present invention is not limited thereto. For example, the present invention can also be applied to a linear arm driver **35** such as a solenoid.

[0111] Although the disclosure has been described with respect to only a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that various other embodiments may be devised without departing from the scope of the present invention. Accordingly, the scope of the invention should be limited only by the attached claims.

DESCRIPTION OF REFERENCE NUMERALS

[0112] **1** Prize acquisition game device [0113] **10** Housing portion [0114] **11** Opening and closing door [0115] **20** Acquisition unit [0116] **21** Base portion [0117] **22** Protruding portion [0118] **22A** First protruding portion [0119] **22B** Second protruding portion [0120] **22C** Third protruding portion [0121] **24** Stopper [0122] **28** Arm connector [0123] **28A** First arm connector [0124] **28Aa** Protruding portion [0125] **28Ab** Arm shaft [0126] **28Ac** Transmission gear [0127] **28Ad** Torsion spring [0128] **28Ae** Fastening portion [0129] **28B** Second arm connector [0130] **28C** Third arm connector [0131] **29** Arm [0132] **29A** First arm [0133] **29B** Second arm [0134] **29C** Third arm [0135] **30** Claw [0136] **35** Arm driver [0137] **35A** First arm driver [0138] **35Aa** Arm opening and closing motor [0139] **35Ab** Gearbox [0140] **35Ac** Output shaft [0141] **35Ad** Transmission gear [0142] **35B** Second arm driver [0143] **35Ba** Arm opening and closing motor [0144] **35Bb** Gearbox [0145] **35Bc** Output shaft [0146] **35Bd** Transmission gear [0147] **35C** Third arm driver [0148] **35Ca** Arm opening and closing motor [0149] **35Cb** Gearbox [0150] **35Cc** Output shaft [0151] **35Cd** Transmission gear [0152] **50** Moving unit [0153] **51** Horizontal moving portion [0154] **52** Vertical moving portion [0155] **52a** Lifting member [0156] **53** Left-right moving portion [0157] **53a** Fixed rail [0158] **53b** Left-right moving motor [0159] **54** Front-back moving portion [0160] **54a** Movable rail [0161] **54b** Front-back moving motor [0162] **60** Display section [0163] **80** Base portion [0164] **90** Operation unit [0165] **91** Joystick [0166] **92** Operation button [0167] **93** Play fee detector [0168] **94** Coin slot [0169] **96** Prize outlet [0170] **100** Setting unit [0171] **101** Setting operation unit [0172] **102** Screen display [0173] **110** Control unit [0174] **111** CPU [0175] **112** Memory [0176] **120** Memory unit [0177] **130** Acquisition unit [0178] **131** Base portion [0179] **132** Protruding portion [0180] **132A** First protruding portion [0181] **132B** Second protruding portion [0182] **132C** Third protruding portion [0183] **138** Arm connector [0184] **138A** First arm connector [0185] **138B** Second arm connector [0186] **138C** Third arm connector [0187] **139** Arm [0188] **139A** First arm [0189] **139B** Second arm [0190] **139C** third arm [0191] **140** Claw [0192] **141** Arm driver [0193] **141A** First arm driver [0194] **141Aa** Arm opening and closing motor [0195] **141Ab** Gearbox [0196] **141B** Second arm driver [0197] **141Ba** Arm opening and closing motor [0198] **141Bb** Gearbox [0199] **141C** Third arm driver [0200] **141Ca** Arm opening and closing motor [0201] **141Cb** Gearbox [0202] **143** Upper space

Claims

1. A prize acquisition game device, comprising: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space, wherein the crane comprises: a base; at least three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.
2. The prize acquisition game device according to claim 1, wherein, by mounting the arm driver that drives the one of the two adjacent arms to the base by tilting the arm driver that drives the one of the two adjacent arms to a side of the other of the two adjacent arms, the arm driver that drives the one of the two adjacent arms is disposed to extend above the arm connector that connects the other of the two adjacent arms to the base.
3. A prize acquisition game device, comprising: a housing having a housing space in which a prize is disposed; a crane configured to acquire the prize; and a crane driver that drives the crane to move in a horizontal and vertical direction in the housing space, wherein the crane comprises: a base; three arms that extend radially around a center axis along a vertical direction of the base; an arm

connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein the arms include a first arm, a second arm, and a third arm, and the arm drivers include: a first arm driver that drives the second arm and is disposed to extend above the arm connector that connects the first arm to the base; a second arm driver that drives the third arm and is disposed to extend above the arm connector that connects the second arm to the base; and a third arm driver that drives the first arm and is disposed to extend above the arm connector that connects the third arm to the base.

4. The prize acquisition game device according to claim 3, wherein the first arm driver is disposed to extend above the arm connector that connects the first arm to the base by tilting the first arm driver to a side of the first arm when attaching the first arm driver to the base, the second arm driver is disposed to extend above the arm connector that connects the second arm to the base by tilting the second arm driver to a side of the second arm when attaching the second arm driver to the base, and the third arm driver is disposed to extend above the arm connector that connects the third arm to the base by tilting the third arm driver to a side of the third arm when attaching the third arm driver to the base.

5. A crane used in a prize acquisition game device to perform a prize acquisition operation, the crane comprising: a base; at least three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein among the arm drivers, an arm driver that drives one of two adjacent arms is disposed to extend above the arm connector that connects another of the two adjacent arms to the base.

6. A crane used in a prize acquisition game device, the crane comprising: a base; three arms that extend radially around a center axis along a vertical direction of the base; an arm connector that is disposed for each of the arms and connects each of the arms to the base; and arm drivers that are disposed respectively for the arms around the center axis and drive the arms to be opened and closed, wherein the arms include a first arm, a second arm, and a third arm, and the arm drivers include: a first arm driver that drives the second arm and is disposed to extend above the arm connector that connects the first arm to the base; a second arm driver that drives the third arm and is disposed to extend above the arm connector that connects the second arm to the base; and a third arm driver that drives the first arm and is disposed to extend above the arm connector that connects the third arm to the base.
