

TITLE OF THE INVENTION

GAMING MACHINE

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION:

The present invention relates to a gaming machine, and more particularly to a ball-enclosed-type gaming machine which allows a player to play a game using gaming balls which circulate inside the gaming machine while being enclosed therein.

2. DESCRIPTION OF THE RELATED ART:

In this ball-enclosed-type gaming machine, a predetermined number of gaming balls are enclosed and stored inside a pachinko gaming machine and gaming balls (sealed balls) are used in a circulated manner in the gaming machine.

To be more specific, the gaming balls enclosed inside the gaming machine are transferred to a shooting position with a handle manipulation of a player, and the gaming balls which are transferred to a shooting position are shot with a resilient repulsive force generated by a shooting device and are fed to a game area on a gaming panel while being guided by rails. The gaming balls which are fed to the game area collide obstacle nails and flow downwardly. Then, when the gaming ball enters an award port in the course of flowing down along a panel surface, award balls are paid out to the

player. On the other hand, when the gaming balls flow along the panel surface and eventually do not enter the award ports, the gaming balls enter an out port.

The gaming balls which enter the award ports and the out port are collected and collected in a storage tray by way of a payout opening and, thereafter, are returned to the shooting position again. Then, the enclosed balls which are collected to the shooting position are shot again with the resilient repulsive force generated by the shooting device.

As documents which describe such a ball-enclosed-type gaming machine, for example, Japanese Patent Laid-open 2003-218019, Japanese Patent Laid-open 2003-190588, Japanese Patent Laid-open 2002-827 and the like can be named.

Here, in Japanese Patent Laid-open 2000-218019, the gaming balls are isolated or separated from the player by covering a storage tray with a cover. Further, in Japanese Patent Laid-open 2003-190588, the award balls are paid out from a payout port mounted on a left side of a storage tray. Still further, in Japanese Patent Laid-open 2002-827, a lifting and feeding unit is provided in place of an upper tray.

SUMMARY OF THE INVENTION

However, in the ball-enclosed-type gaming machine, since the gaming balls are circulated using the lifting and

feeding unit or the like, a manufacturing cost of the gaming machine is pushed up.

To suppress the cost, it may be possible to form a payout port at a position below the out port without using a lifting and feeding unit and to directly pay out the gaming balls which are collected from the out port and the award ports into the storage tray.

In such a structure, since the gaming balls flow out to a center portion of the storage tray from the payout port, the flow of the gaming balls is not monotonous whereby an interest the player holds on the game is increased. In this case, however, since the gaming balls are scattered in the left and right directions, it is difficult for the player to trace the flow of the gaming balls.

Accordingly, it is an object of the present invention to provide a ball-enclosed-type gaming machine which can make the change of flow of gaming balls conspicuous to a player so that a player can easily and clearly recognize the flow of the gaming balls with interest.

To overcome the above-mentioned drawback, the present invention provides a gaming machine which performs a game using gaming balls, wherein the gaming machine includes a game ball recovery port which includes an out port arranged at a lower portion of a game area and collects the gaming balls which flow downwardly in the game area, a storage tray which temporarily stores the gaming balls which are collected from the game ball recovery port and, at the same time, is

provided with a ball passage which guides the gaming balls to a shooting position, and a payout port which is formed below the out port and opens toward the ball passage, and a tray cover which is mounted on the storage tray and covers the ball passage while having a viewing window which allows a player to view a portion of the ball passage.

In this manner, since the viewing window is formed on a portion of the tray cover which covers the ball passage formed in the storage tray, the gaming balls which are paid out to the storage tray become conspicuous through the viewing window and hence, the player can easily and clearly recognize the change of flow of the gaming balls whereby the game can attract the interest of the player more effectively.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing a gaming machine according to one embodiment of the present invention;

Fig. 2 is a block diagram of the gaming machine shown in Fig. 1;

Fig. 3 is a view showing a storage tray which constitutes the gaming machine shown in Fig. 1, and

Fig. 4 is an exploded view showing the storage tray shown in Fig. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, preferred embodiments for carrying out the present invention are specifically explained in conjunction with attached drawings. Here, in all attached drawings, identical parts are given same numerals and their repeated explanation is omitted. Further, although the explanation made hereinafter describes the preferred embodiments which are provided for carrying out the present invention, the present invention is not limited to these preferred embodiments.

Fig. 1 is a perspective view showing a gaming machine according to one embodiment of the present invention, Fig. 2 is a block diagram of the gaming machine shown in Fig. 1, Fig. 3 is a view showing a storage tray which constitutes the gaming machine shown in Fig. 1, and Fig. 4 is an exploded view showing the storage tray shown in Fig. 3.

In Fig. 1, a gaming machine 10 is an integral body which is formed of a housing 11 which constitutes an individual bank and a pachinko gaming machine (hereinafter referred to as "gaming machine body") 12 which is mounted on the housing 11. The housing 11 supports the gaming machine body 12 in a state that a gaming area 13a of a gaming panel 13 of the gaming machine body 12 is positioned at a level of eyes of a player. Further, at a position right below the gaming machine body 12 in the housing 11, a mounting base 14 which extends frontwardly from the housing 11 is provided, while right above the gaming machine body, a display panel 15 which informs the player of predetermined

information is provided.

Predetermined number of gaming balls are enclosed and stored in the gaming machine body 12 and the game is performed by circulating these enclosed gaming balls.

With respect to the gaming machine body 12, a frame body on which the above-mentioned gaming panel 13 is mounted is rotatably mounted on the housing 11 by way of hinges. On a front surface of the gaming panel 13, a glass door 16 which covers the gaming panel 13 in a state that the player can observe the gaming panel 13 is mounted such that the glass door 16 can be opened and closed. Below the glass door 16, a tray unit 17 is mounted in a state that the tray unit 17 can be opened and closed.

With respect to the gaming panel 13, on the gaming area 13a which is defined by rails 18 and constitutes an area where the shot gaming balls flow down, a large number of obstacles such as gaming nails and pinwheels (not shown in the drawing), award ports 19 such as a start port 19a, a general award ports 19b and a big award port 19c are suitably arranged. Further, on a lower portion of the gaming area 13a, an out port 20 in which the gaming balls which do not enter these award ports 19 flow is arranged. Further, the award ports 19 and the out port 20 constitute a gaming ball recovery port which collects after the gaming balls flow down through the gaming area 13a.

Further, a special symbol display part 21 is formed on the gaming area 13a. This special symbol display part

21 changes a display mode of symbols which constitutes a plurality of (for example, three) identification information images, wherein the symbols are started or stopped in response to the entrance of the awarded gaming balls in the start port 19a. Then, when the combination of the symbols in a stopped state agrees with a predetermined winning combination, the game is shifted to a special gaming state advantageous for the player in which the big award port 19c assumes an open state in accordance with a predetermined symbol.

As described previously, the tray unit 17 is arranged below the gaming panel 13. The tray unit 17 is provided with a storage tray 22 in which the gaming balls which are paid out and the gaming balls which are shot into the gaming area 13a are temporarily stored. Here, although a lower tray 23 is provided below the storage tray 22, in this embodiment which is directed to the ball-enclosed-type gaming machine, the gaming balls are not stored in the lower tray 23. Accordingly, in this embodiment, a shutter lever 25 which is originally provided for allowing the gaming balls stored in the storage tray 22 to fall on the bottom tray 23 by opening a flow passage of the gaming balls which allows the storage tray 22 and the bottom tray 23 to communicate with each other is made inoperable.

Here, the detail of the peripheral structure of the storage tray 22 is described later.

On the right side of the tray unit 17, a handle 24

which is manipulated at the time of shooting the gaming balls into the gaming area 13a of the gaming panel 13 through the rail 18 is provided. By rotating the handle 24, a shooting device (not shown in the drawing) is operated and the gaming ball supplied to the shooting position is shot with a resilient and repulsive force. Here, the shooting device swings a hammer at a predetermined speed under a control of a payout/shooting control circuit and shoots the gaming ball at the shooting position (a terminal end of a guide passage leading to the shooting device from the storage device 22) toward the gaming panel 13 by hitting the gaming ball with a distal end of the hammer.

At one-side end (on a right side in a viewing direction when illustrated on the drawing) of the gaming machine body 12, a ball dispenser (gaming medium lending units) 30 which lends the gaming balls a quantity of which corresponds to an amount which the player inserts is provided.

This ball dispenser 30 is provided with a credit number display portion 31, a credit adjustment button 32, a credit transfer button 33, a medal number display portion 34 and an infrared ray communication portion 35 and the like on a front surface thereof.

Here, the credit number display portion 31 is constituted of seven segment LEDs (light emitting diodes) of three digits and displays the number of coins which are currently credited in the inside of the machine (the number of credit data of coins). Further, the medal number display

portion 34 is also constituted of seven segment LEDs (light emitting diodes) of three digits and displays the number of medals currently credited in the inside of the machine.

The credit transfer button 33 is a button which transfers the credit data on the coins, medals or the like which are credited to the gaming machine body 12, wherein the transfer of the credit data is performed by pushing this button. Here, the transfer is performed as follows, for example.

When the credit transfer button 33 is pushed down, the CPU confirms the content of the credited data. When the coins are credited as a result of the confirmation, the credit data of the coin is transferred to the gaming machine body 12. Accordingly, the gaming machine body 12 receives the credit data and converts the credit data to the gaming ball number data. For example, when the credited coin is a 100 yen coin, assuming that the credited coin has a value equivalent to 120 gaming balls per 100 yen, the credit coin is converted into the gaming ball data amounting 120 balls. Here, in the credit number display portion 31, the number which is subtracted by "1" is displayed.

On the other hand, when the medals are credited as the result of confirmation, the credit data of the medal is transferred to the gaming machine body 12. Accordingly, the gaming machine body 12 receives the credit data and converts the credit data to the gaming ball number data. For example, when the credited medals have a value of seven

gaming balls per one medal, the credited data is converted to the gaming ball data of seven balls. Here, the number which is subtracted by "1" is displayed on the medal number display portion 34.

Here, in this embodiment, each time the credit transfer button is pushed once, one credit data is transferred to the gaming machine body 12. However, the present invention is not limited to such a mode and all credit data may be transferred to the gaming machine body 12 with one pushing operation.

Further, when both of coins and medals are credited at the time of pushing the credit transfer button 33, in this embodiment, the credit data of coins is preferentially transferred to the gaming machine body 12. However, as an opposite case, the credit data of medals may be preferentially transferred.

The credit adjustment button 32 is a button which performs the payout of the credited coins and credited medals, wherein the payout is performed by pushing this button. Here, the credited coins are converted to medals and the medals are paid out from the medal payout port 36.

For example, when the credited coins are two pieces of 100 yen coins, since the credited coin has a value corresponding to seventeen medals per 100 yen, when the credit adjustment button 32 is pushed, 34 pieces of medals in total are paid out from the medal payout port 36.

On the other hand, with respect to the medals, the

credited number of medals are directly paid out from the medal payout port 36. For example, assuming the number of credited medals as six, when the credit adjustment button 32 is pushed, six medals are paid out from the medal payout port 36.

When such a payout operation is finished, an indication that the balance of credit is "0" is displayed on the credit number display portion 31 and the medal number display portion 34.

Further, below the medal number display portion 34, a medal insertion port 37 through which the player inserts medals as gaming mediums, a medal return lever 37a which the player manipulates to recover the medal inserted in the medal insertion port 37, and a medal return port 37b to which the medal is returned when an irregular medal is inserted or the player manipulates the medal return lever 37a are provided.

Further, below the medal return port 37b, a coin insertion port 38 through which a coin such as 100 yen coin or the like is inserted, a coin return lever 38a which is manipulated by the player to recover the coin inserted in the coin insertion port 38, and a coin return port 38b to which the coin is returned when an irregular coin is inserted or the player manipulates the coin return lever 38a are provided.

Here, in this embodiment, a 100 yen coin is used as the regular coin and hence, when a coin other than the 100

yen coin is inserted in the coin insertion port 38, the coin is considered as an irregular coin. However, the present invention is not limited to such a case and other coin may be considered as the regular coin.

An infrared transmission part 35 is provided between the medal number display portion 34 and the medal insertion port 37.

This infrared transmission part 35 is capable of transmitting the gaming data (acquired medal number) after finishing the game. For example, the player receives the gaming data from the infrared transmission part 35 using his/her mobile phone and, thereafter, gets access to a predetermined site on the Internet and allows the site to register the acquired medal number of the player. Accordingly, when a large number of players perform the similar registrations, it is possible to realize the display of the nationwide ranking of the acquired medal numbers during a predetermined period (for example, one day, one week). Accordingly, the gaming machine can further attract the interest of the player.

The circuit constitution of the control system of a gaming machine body 12 in such a gaming machine 10 is shown in Fig. 2.

The control system of the gaming machine body 12 includes a main control circuit 40 and a sub control circuit 50 connected to the main control circuit 40.

In this control system, the main control circuit 40

constitutes a main constitutional element and is mounted on a back surface of the gaming panel 13.

In the main control circuit 20, a main CPU (ultra-miniaturized arithmetic processor) 41, an initial reset circuit 42, a main RAM 43 and a main ROM are mounted. Here, the main CPU 41 performs the gaming operation of the gaming machine body 12 in accordance with the preset program. The initial reset circuit 42 returns the various settings to the initial values at the time of the occurrence of abnormal condition. The main RAM 43 stores the various data which are necessary for operating the main CPU 41. The main ROM 44 stores a program which allows the main CPU 41 to perform processing control of the gaming operation of the gaming machine body 12, a big award determination table which is used as the reference at the time of performing the big award determination based on the random number lottery and various probability tables such as an effect group selection table which is used as reference at the time of performing an effect lottery or the like.

Here, the main CPU 41 performs big award determination processing in which the determination of the big award is made when the gaming ball enters the start port 19a and the start award is generated, processing for determining an effect display of a special symbol and a background image which are changeably displayed on a special symbol display portion 21, and processing for determining a content which is displayed on a usual symbol display portion (not shown

in the drawing). Further, the main CPU 41 constitutes a big award port SOL control unit which controls a big award port SOL (solenoid) 60 to open/close a door of the big award port 19c when the gaming machine is shifted to a special gaming state.

To an I/O port 46 of the main control circuit 40, a V/counter SW (switch) 61 which counts the number of gaming balls which pass through a particular zone (V zone) provided to the big award port 19c, a counter SW (switch) 62 which counts the number of gaming balls which pass through a general zone (V zone) provided to the big award port 19c, a general award port SW 63 which detects the entrance of the gaming ball into the general award port 19b, a passing gate SW 64 which is provided inside the starting gate (not shown in the drawing) and detects the passing of the gaming balls, a start award port SW 65 which detects the entrance of the gaming ball in the start port 19a, a start port SOL 66 which opens and closes a usual electrically-operated door of the start port 19a, a big award port SOL 60 which opens and closes a door of the big award port 19c, a seesaw SOL 67 which drives a seesaw for distributing the gaming balls which enter the big award port 19c into the particular zone and the general zone, and a backup clear SW 68 which eliminates various data stored in the main ROM 44 are connected.

When the above-mentioned respective SWs 61 to 65 detect the gaming balls, the detected signals are inputted to the

main CPU 41 of the main control circuit 40 and, in response to the inputted detected signals, the main CPU performs the respective drive controls of the above-mentioned respective SOLs 60, 66, 67. Further, control commands are transmitted to the sub control circuit 50 and the payout/shooting control circuit 70 from the main control circuit 40 through a command output port 45. Due to such a constitution, operations of an LCD (image display device) 80, a speaker 81, a lamp/LED 82 and a payout device 71 and a shooting device 72 are controlled by the sub control circuit 50 and the payout/shooting control circuit 70.

In the sub control circuit 50, a sub CPU 51, a work RAM 52 and a program ROM 53 are mounted.

The sub CPU 51 interprets the control commands received from the main control circuit 40 through the command input port 54 and performs controls of an image control circuit 55, a voice control circuit 56 and a lamp control circuit 57 in accordance with a result of the interpretation.

In the program ROM 53, a control program which allows the sub CPU 51 to perform a processing control of the image control circuit 55 based on an image control command signal outputted from the main control circuit 40, a control program which allows the sub CPU 51 to perform a processing control of the voice control circuit 56 based on a voice generation command signal outputted from the main control circuit 40, a control program which allows the sub CPU 51 to perform a processing control of the lamp control circuit 57 based

on a lamp control command signal outputted from the main control circuit 40 and the like are stored.

The work RAM 52 temporarily constitutes memory means which allows the sub CPU 51 to perform the processing control in accordance with the above-mentioned control programs.

A LCD 80 is connected to the image control circuit 55. The image control circuit 55 performs, based on the control of the sub CPU 51, the image display control processing such as the changing display of the special symbol and the background view corresponding to the result of the big award determination on the special symbol display part 21 of the LCD 80. Further, the image control circuit 55 and the LCD 80 are configured to include informing means which informs the presence or the non-presence of the generation of a li-zhi effect in the game depending on an effect display mode at the time of changing display of the special symbol, the kind of generated li-zhi effect or the probability of the generation of the big award.

A speaker 81 is connected to the voice control circuit 56. The voice control circuit 56 generates voice signals based on the control of the sub CPU 51 and the speaker 81 generates sounds based on these inputted voice signals.

A lamp/LED 82 is connected to the lamp control circuit 57. The lamp control circuit 57 generates optical signals based on the control of the sub CPU 51. Then, the lamp/LED 82 performs a lit display and the like based on these inputted optical signals.

To the payout/shooting control circuit 70, a payout device 71 and a shooting device 72 are connected. Here, the payout/shooting control circuit 70 performs a drive control of the shooting device in response to a rotary manipulation of the handle 24 so as to shoot the gaming ball or pays out the medals to the player in accordance with the payout instruction from the main control circuit 40.

Next, the tray unit 17 is explained in conjunction with Fig. 3 and Fig. 4.

As shown in these drawings, the tray unit 17 is provided with the storage tray 22. A ball passage 22a is formed in the storage tray 22, and the gaming balls which are paid out and the gaming balls which are shot into the gaming area 13a and are collected by the gaming ball recovery ports 19, 20 are temporarily stored in the ball passage 22a.

The ball passage 22a is communicated with the shooting position of the gaming ball. To feed the gaming balls to the shooting position while allowing the gaming balls to roll, the ball passage 22a is formed in a downwardly inclined manner toward the shooting position. Further, the ball passage 22a has a side thereof arranged opposite to the shooting position (left side facing the drawing) widened in a shape that the ball passage 22a bulges in the frontward direction. Still further, the ball passage 22a has a width thereof gradually narrowed toward the shooting position from the widened position and eventually assumes a width

corresponding to a diameter of one gaming ball.

Accordingly, the gaming balls which roll in the direction toward the shooting position are arranged in a row by being restricted by the width of the ball passage 22a which is gradually narrowed and hence, the gaming balls are guided to the shooting position one by one.

A payout port 26 opens toward such a storage tray 22. The payout port 26 is formed below the out port 20 which is arranged at a lower portion of the above-mentioned gaming area 13a (see Fig. 1) and hence, the gaming balls which are collected by the gaming ball recovery ports 19, 20 roll downwardly and are paid out to a center portion of the storage tray 22 from the payout port 26.

Further, as shown in the drawings, a tray cover 27 is mounted on the storage tray 22. The tray cover 27 covers the ball passage 22a and, at the same time, forms a fitting hole 27a therein which is engaged with a shutter lever 25 at a position where a shutter closes the passage of the gaming balls ranging from the storage tray 22 to the lower tray 23 so as to fix the shutter lever 25 at the position. Due to such a constitution, the manipulation of the shutter lever 25 becomes inoperable and hence, the player is prohibited from falling the gaming balls stored in the storage tray 22 into the lower tray 23 and taking out the enclosed gaming balls to the outside of the machine.

Positioning holes 27b are formed at four portions of the tray cover 27, while positioning projections 22b are

formed on the storage tray 22 at four positions corresponding to these positioning holes 27b. The positioning projections 22b are fitted in the positioning holes 27b. Due to such a constitution, the tray cover 27 is positioned and is fixed to the storage tray 22.

Here, the fitting hole 27a may not be formed and the tray cover may have a shape which obviates the interference of the tray cover 27 with the shutter lever 25. Further, the positioning holes 27b and the positioning projections 22b which are engaged with the positioning holes 27b by fitting also may not be formed. In this case, the tray cover is simply placed on the storage tray 22.

Here, the tray cover 27 is formed of an opaque material (for example, metal or plastic) as a whole and a viewing window 27c which allows the viewing of a portion of the ball passage 22a formed in the storage tray 22 is formed in an arcuate shape in the tray cover 27.

By forming such a viewing window 27c, it is possible to allow the player to view the gaming balls which are paid out to the storage tray 22 in a limiting manner only through the viewing window 27c of the tray cover 27 and hence, the flow of the gaming balls becomes conspicuous to the player. Accordingly, the player can easily and clearly recognize the change of the flow of the gaming balls and hence, it is possible to attract the interest of the player more effectively.

Here, in this embodiment, the viewing window 27c is

formed of the material having transparency such as plastic, for example. However, it is sufficient for the viewing window 27c that a portion of the ball passage 22a can be observed. Accordingly, in place of the material having transparency, the viewing window 27c may be formed by forming a portion of the tray cover 27 in mesh or by forming slits in the tray cover 27, for example. Here, with the formation of the viewing window 27c using the material having transparency such as plastic, the mesh or the slit, it is possible to form the viewing window using a relatively simple and convenient means. Further, the shape of the viewing window 27c is not limited to the arcuate shape.

It is preferable that the viewing window 27c is provided at a periphery of the payout port 26 as in the case of this embodiment. This is because that as described above, since the gaming balls which are collected by the gaming machine recovery ports 19, 20 are paid out from the payout port 26, it is possible to allow the periphery of the payout port 26, that is, a place where the change of flow of the game balls is most vigorous to become conspicuous to a player.

To recapitulate the above-mentioned invention, according to the present invention, the viewing window is formed on a portion of the tray cover which covers the ball passage which is formed in the storage tray and hence, the gaming balls which are paid out to the storage tray become conspicuous through the viewing window whereby the player

can easily and clearly recognize the change of the flow of the gaming balls thus attracting the interest of the player.

Further, by providing the viewing window at the periphery of the payout port, it is possible to allow the periphery of the payout port which constitutes the place where the change of the flow of the gaming balls is most vigorous to become conspicuous to the player.

Further, by forming the viewing window using the material having transparency, or by forming the viewing window in mesh or slits, it is possible to form the viewing window with relatively simple and convenient means.

Although the present invention has been explained with respect to the case in which the pachinko gaming machine is used as the gaming machine body, the gaming machine body of the present invention is not limited to the pachinko gaming machine and is applicable to various gaming machine bodies which use the gaming balls as gaming mediums such as smart balls or mahjong or the like, for example.

What is claimed is:

1. A game machine comprising:
 - a gaming panel 13 which is covered with a glass door 16;
 - a storage tray 22 which temporarily stores gaming balls paid out at a lower portion of the gaming panel 13 and gaming balls fed to a game area;
 - a lower tray 23 which is arranged below the storage tray 22;
 - an inclined ball passage 22a which is formed in the storage tray 22 and guides gaming balls to the shooting position one by one by arranging in a row;
 - game ball recovery ports 19, 20 which are communicated with a ball passage 22; and
 - a tray cover 27 which covers the ball passage 22 and, at the same time, is engaged with a shutter lever 25 provided for closing a passage of the gaming balls ranging from the storage tray 22 to the lower tray 23, wherein
 - further, the tray cover 27 makes the shutter lever 25 inoperable and, at the same time,
 - a player is prohibited from taking out the gaming balls which are stored in the storage tray 22 to the outside of the machine, and
 - further, a viewing window 27c which allows the viewing of a portion of the ball passage 22a formed in the storage tray 22 is formed in the tray cover 27.
2. A gaming machine according to claim 1, wherein the viewing window is provided at a periphery of the payout port.
3. A gaming machine according to claim 1 or claim 2, wherein the viewing window is formed of a material having transparency or is formed in mesh or slits.