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(54) GAMING MACHINE

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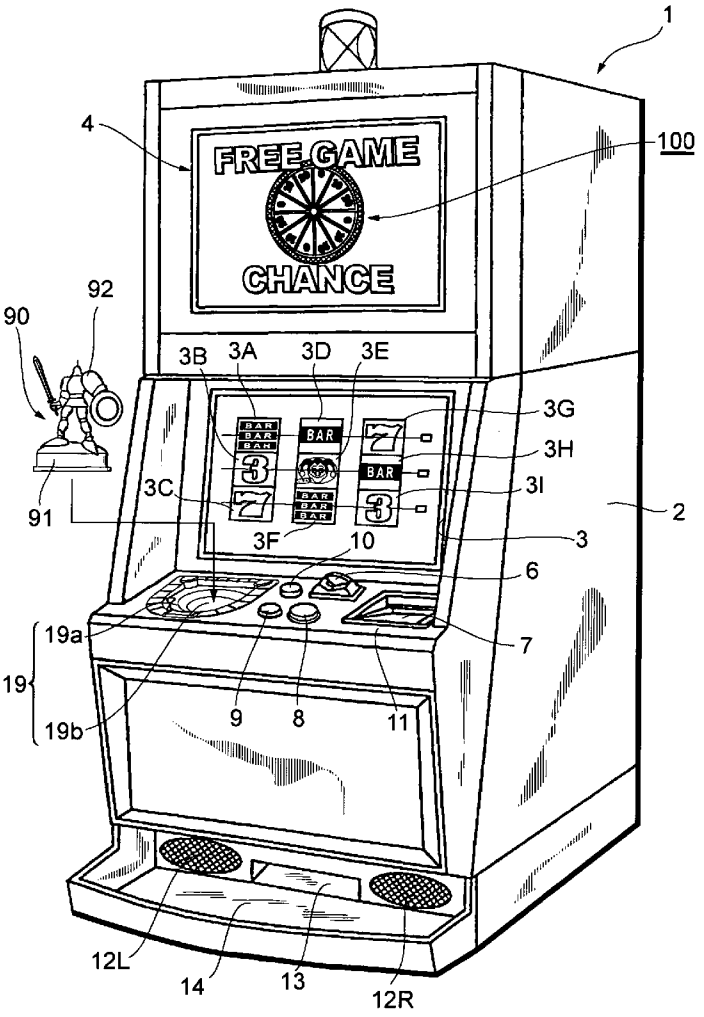
(57) **ABSTRACT**

It is an object to provide the player with an incentive to play the game repeatedly by varying an effect display mode since the effect display mode to notify the information relating to the game can be selected at the player's choice such that the player's taste and wish may be reflected on the mode. A gaming machine **1** comprises: a display device **4** for displaying a circumferentially-arranged image having a plurality of symbols arranged circumferentially; and a reading device **19** for reading the identification information from a game article storing the identification information, wherein an array change of the plurality of symbols in the circumferentially-arranged image is conducted in a case where the identification information is read; and wherein the display device displays a changed circumferentially-arranged image after the array change.



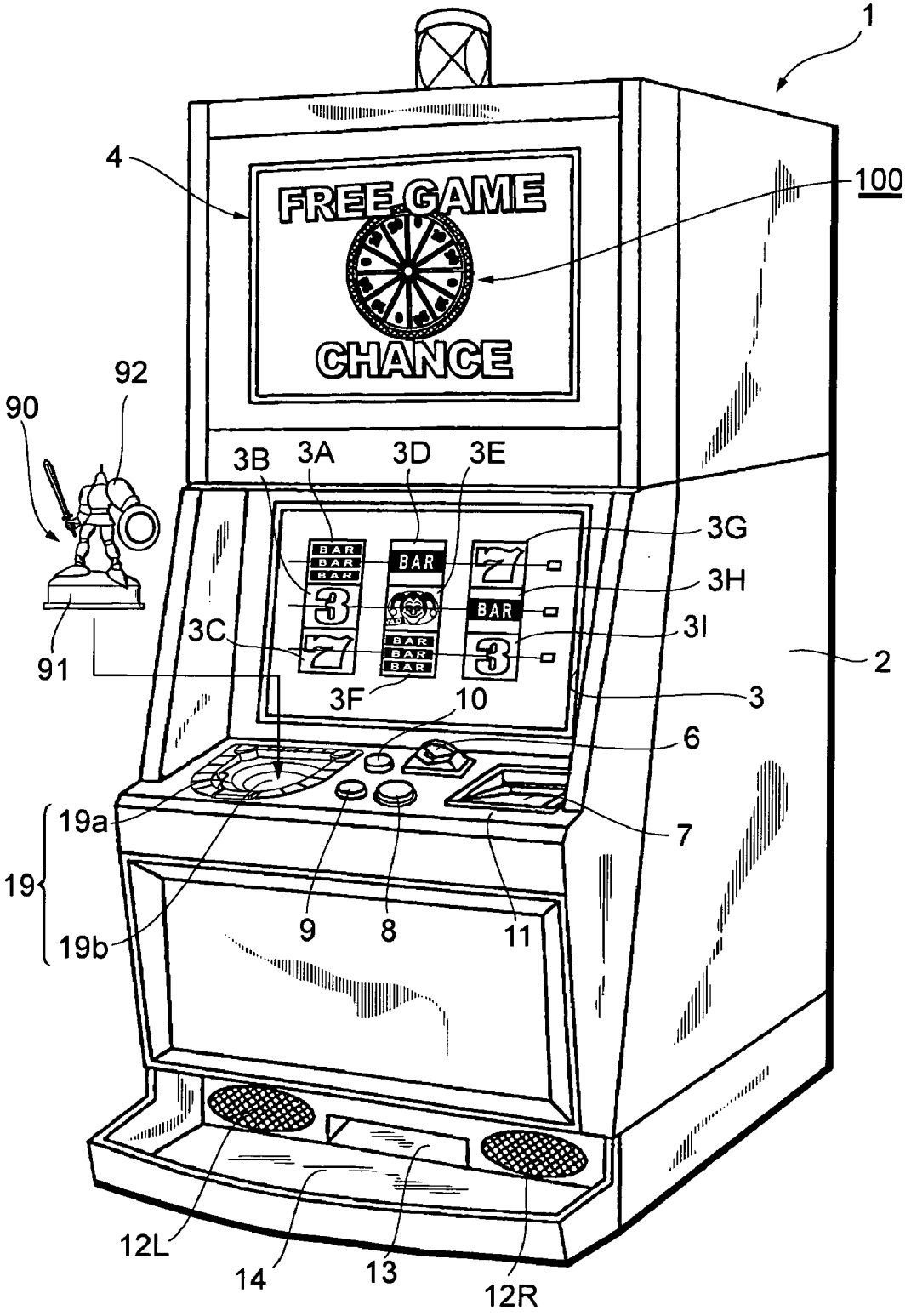

1
4
100
FREE GAME
CHANCE
92
90
3B
3A
3D
3E
3G
3H
3I
3C
91
2
3F
10
3
6
19a
19
19b
7
9
8
11
12L
14
13
12R

Fig. 1

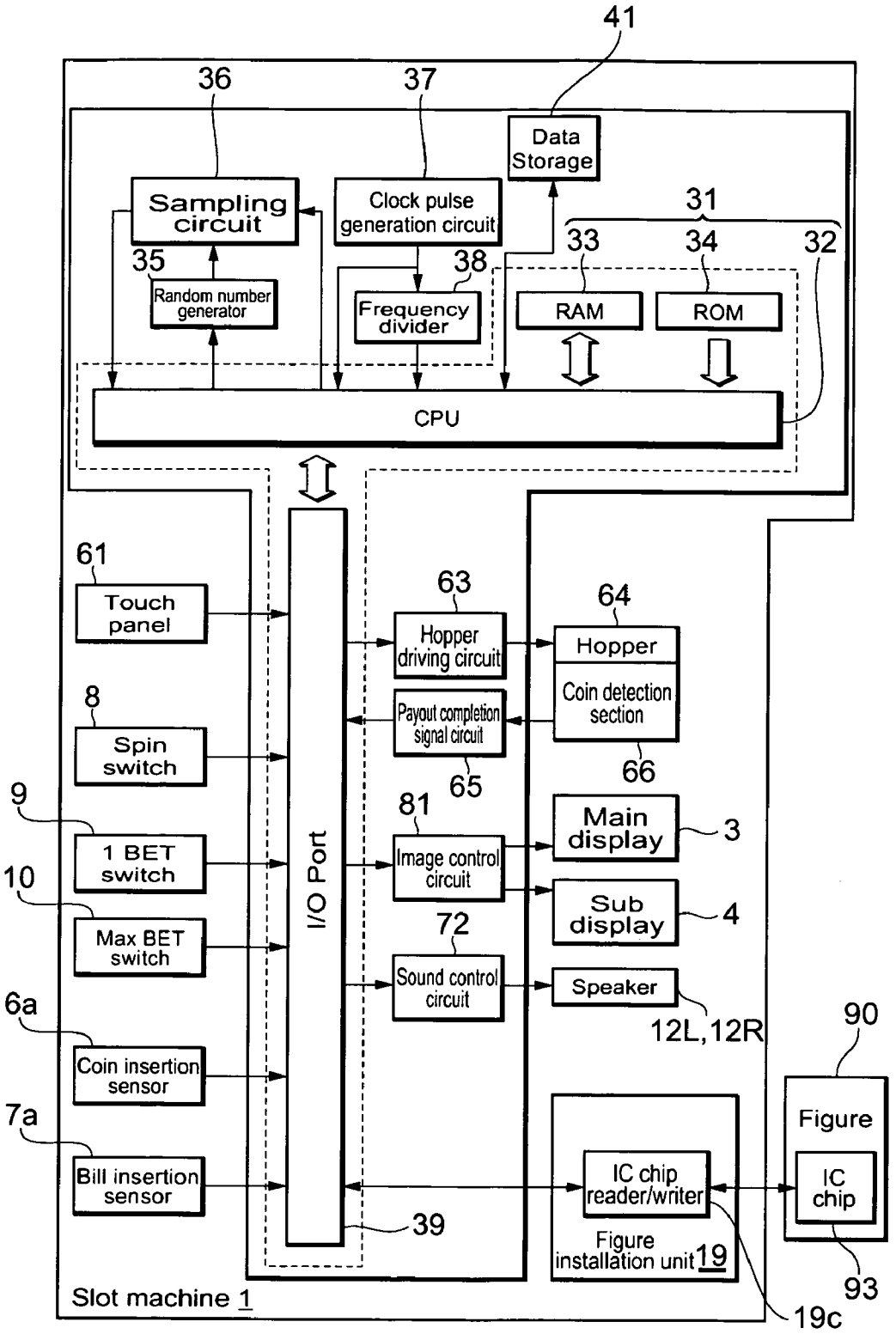

41
36
37
Data Storage
Sampling circuit
Clock pulse generation circuit
31
33
34
32
35
38
Random number generator
Frequency divider
RAM
ROM
CPU
61
Touch panel
63
Hopper driving circuit
64
Hopper
Coin detection section
8
Spin switch
Payout completion signal circuit
65
66
9
1 BET switch
81
Image control circuit
Main display
3
10
Max BET switch
I/O Port
Sub display
4
72
Sound control circuit
Speaker
6a
Coin insertion sensor
12L,12R
90
7a
Bill insertion sensor
IC chip reader/writer
Figure
IC chip
39
Figure installation unit 19
93
Slot machine 1
19c

Fig. 2

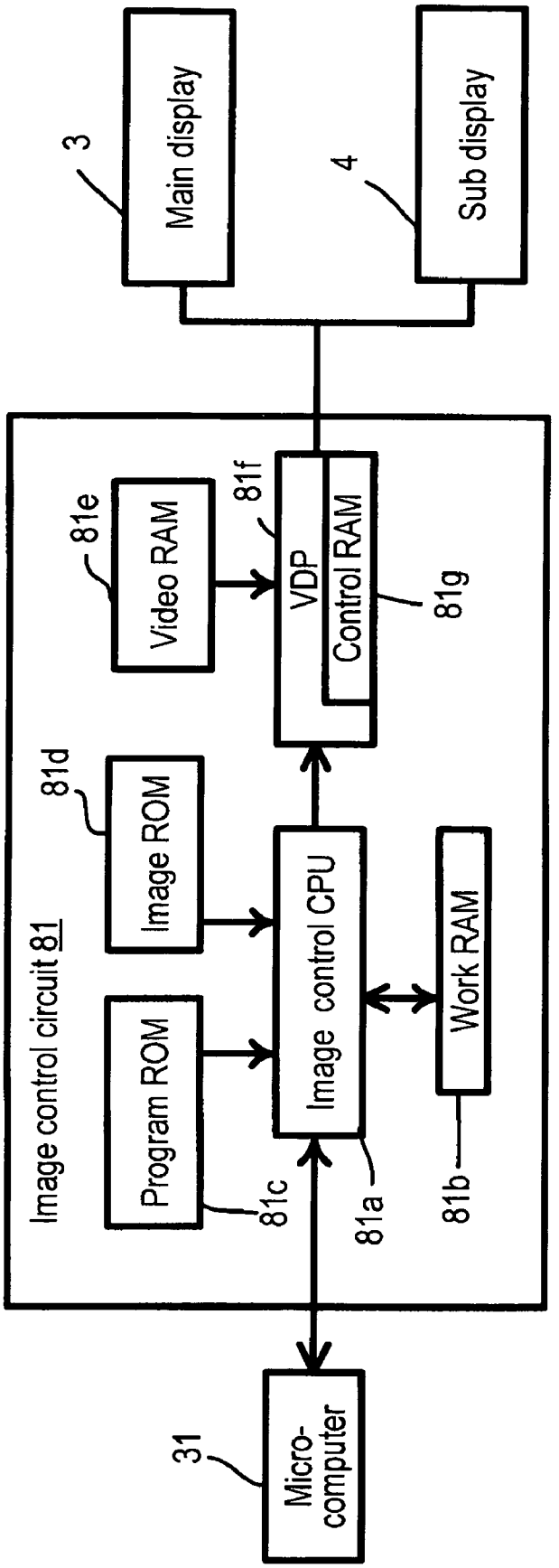

3
Main display
4
Sub display
Image control circuit 81
81e
Video RAM
81f
VDP
Control RAM
81g
81d
Image ROM
Program ROM
81c
Image control CPU
81a
Work RAM
81b
31
Micro-computer

Fig. 3

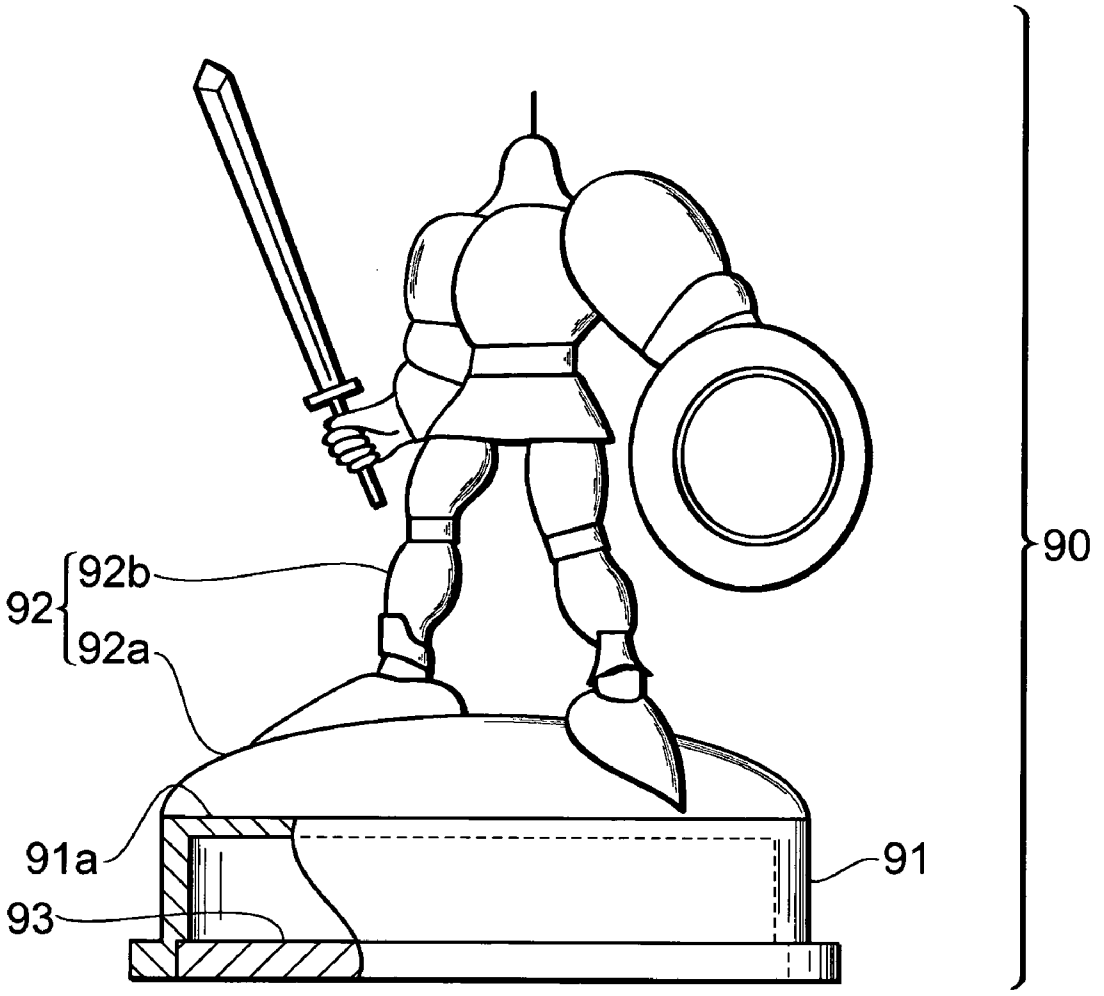
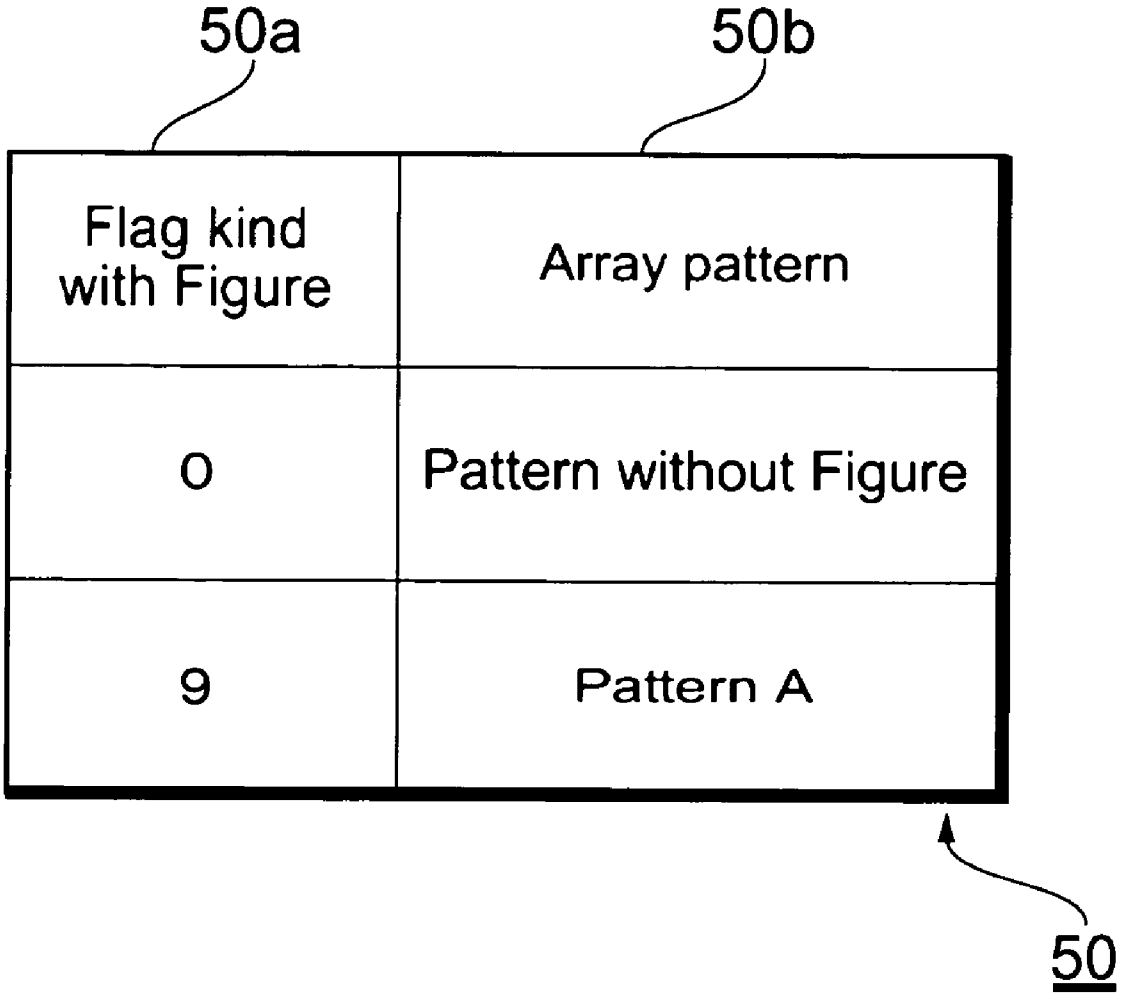


Fig. 4



Array pattern table with and without Figures

Fig. 5

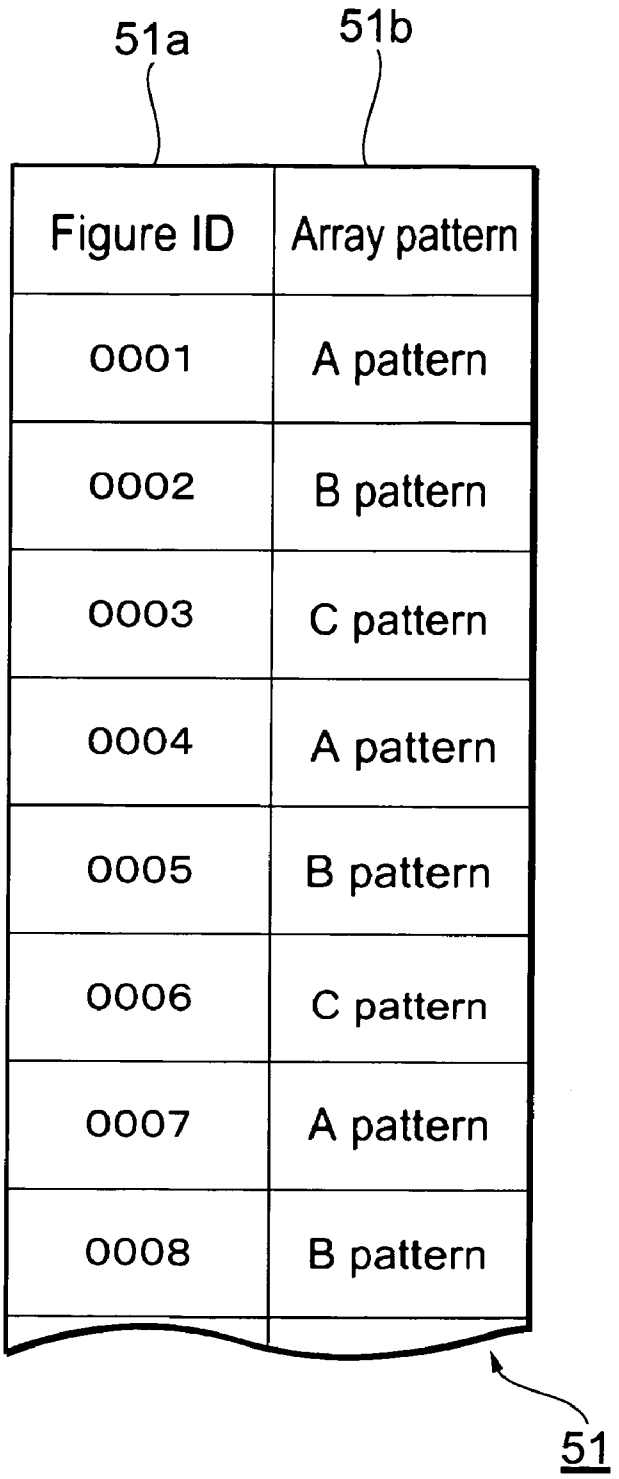


Figure ID array pattern table

Fig. 6

Array pattern	NO. 0	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11
Without Figure	0	10	20	0	10	20	0	10	20	0	10	20
Pattern A	0	0	0	0	10	10	10	10	20	20	20	20
Pattern B	0	0	10	10	20	20	0	0	10	10	20	20
Pattern C	0	10	10	20	20	20	0	0	0	10	10	20

Fig. 7

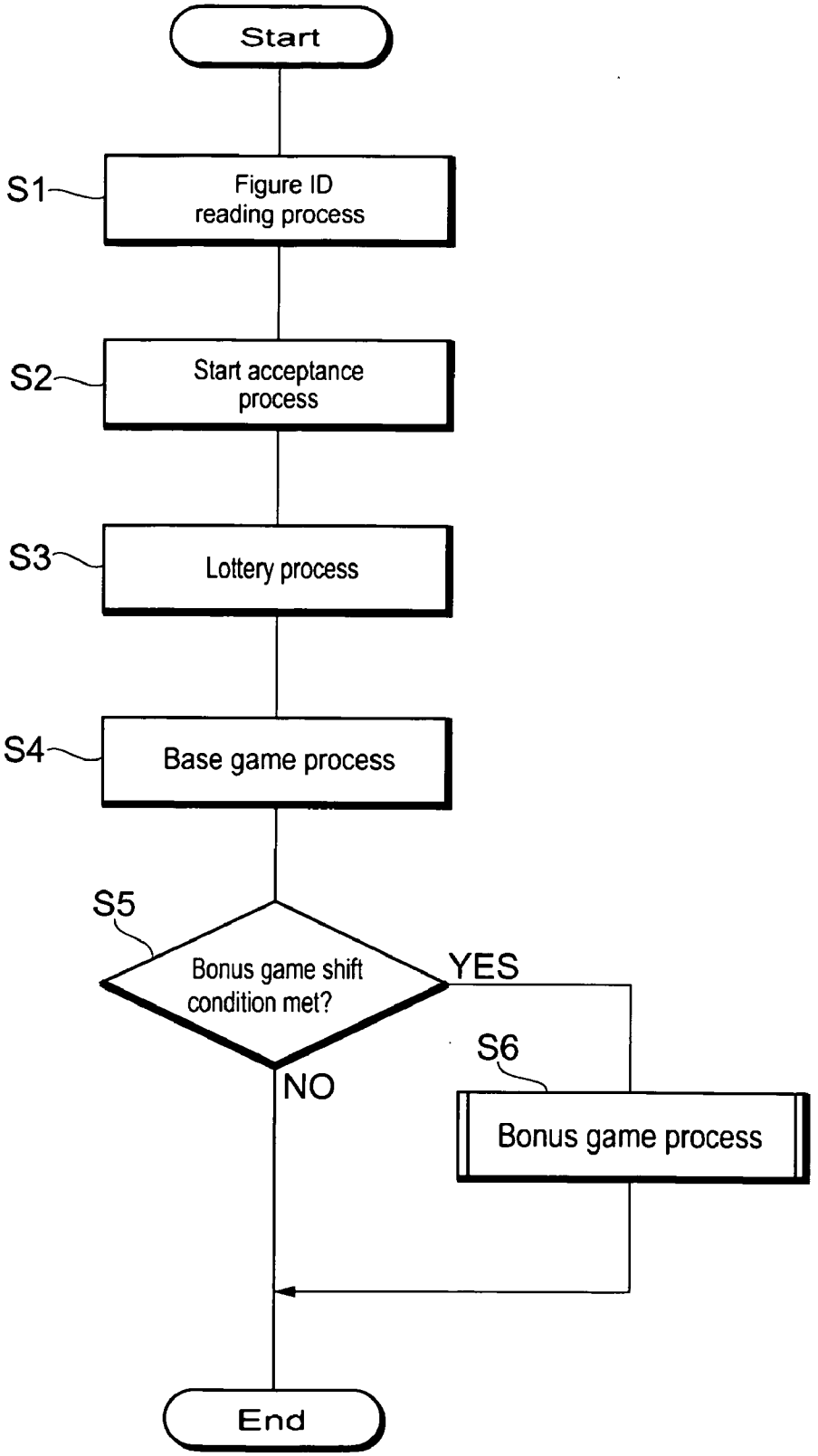

Start
S1
Figure ID reading process
S2
Start acceptance process
S3
Lottery process
S4
Base game process
S5
Bonus game shift condition met?
YES
NO
S6
Bonus game process
End

Fig. 8

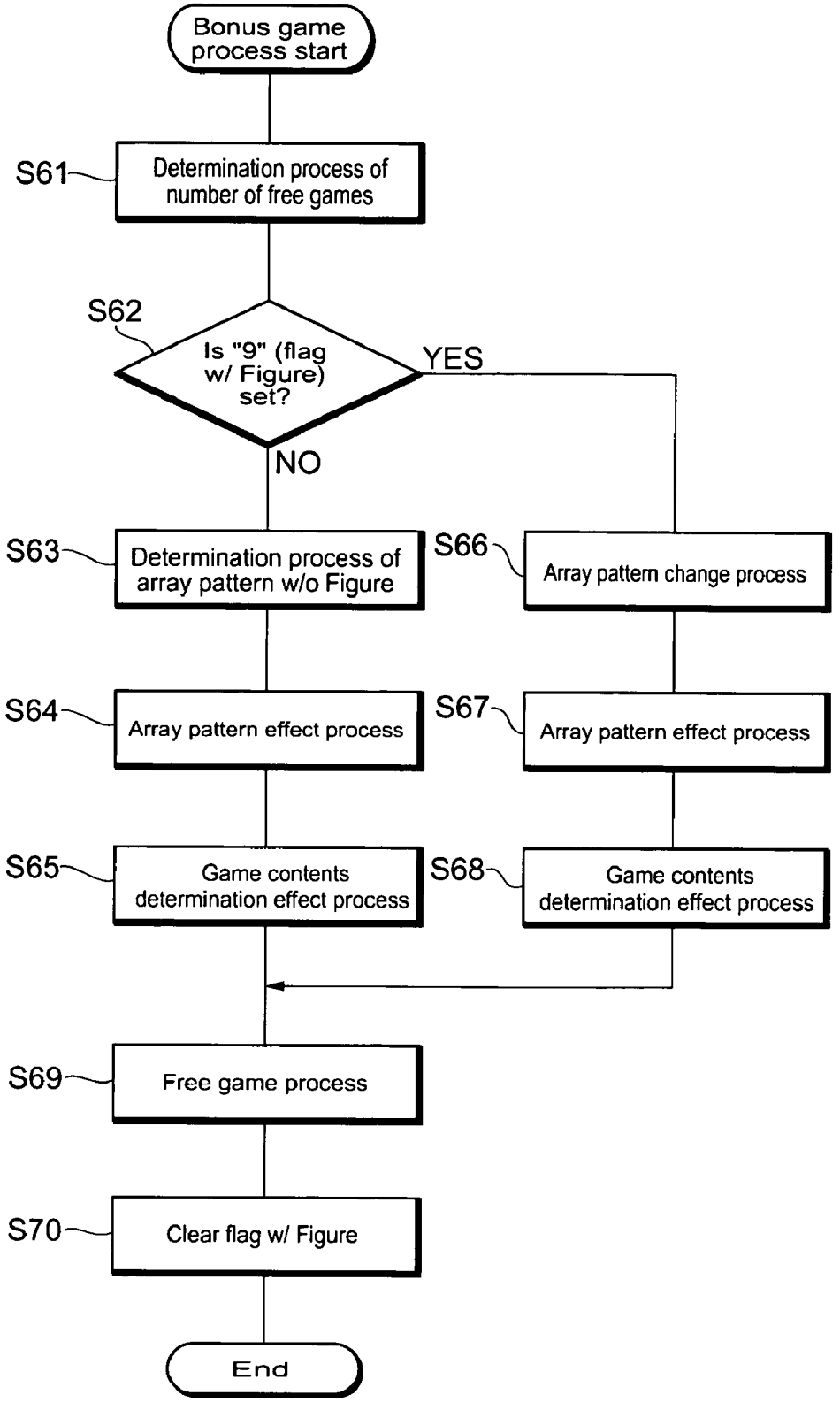

Bonus game process start
S61
Determination process of number of free games
S62
Is "9" (flag w/ Figure) set?
YES
NO
S63
Determination process of array pattern w/o Figure
S66
Array pattern change process
S64
Array pattern effect process
S67
Array pattern effect process
S65
Game contents determination effect process
S68
Game contents determination effect process
S69
Free game process
S70
Clear flag w/ Figure
End

Fig. 9

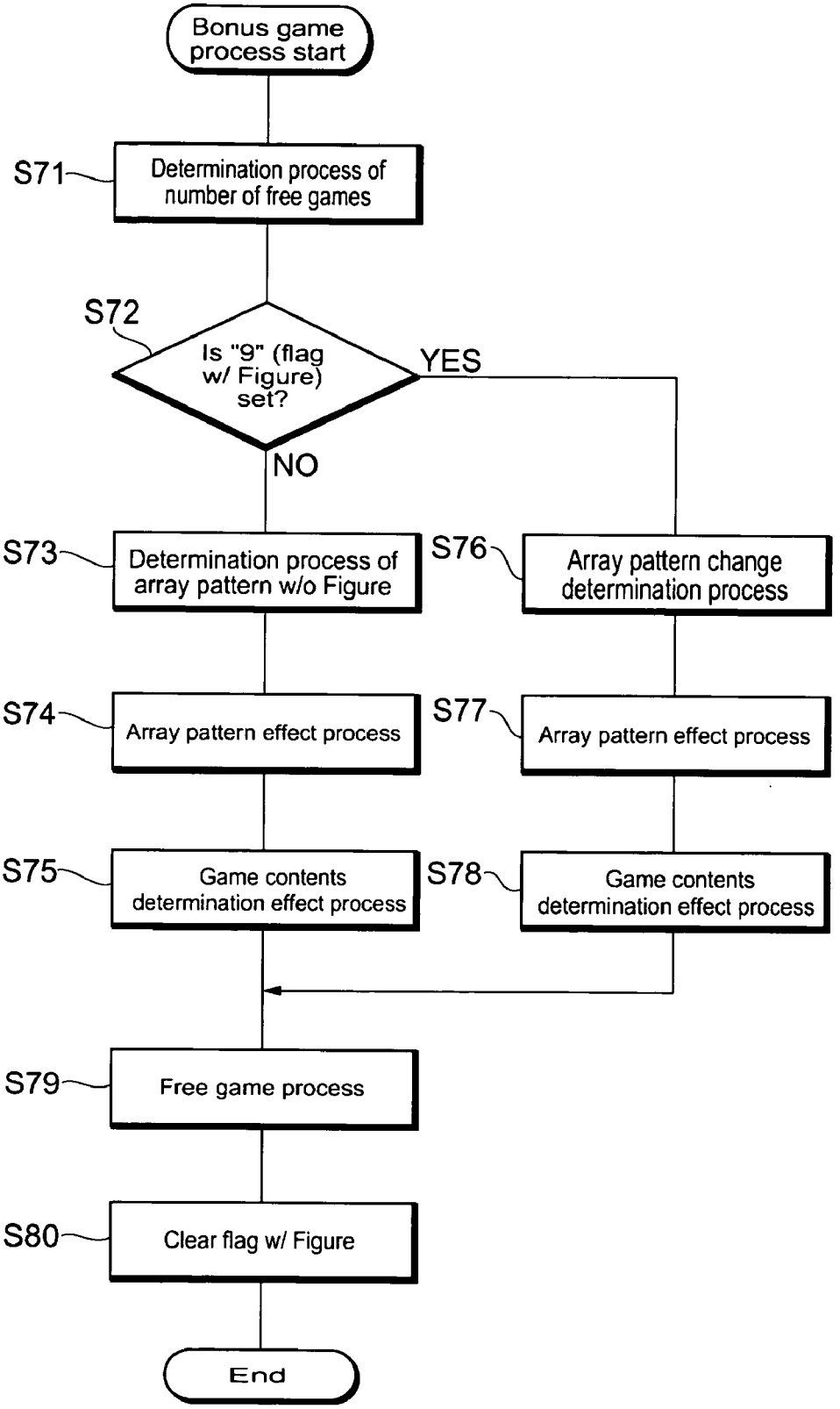

Bonus game process start
S71
Determination process of number of free games
S72
Is "9" (flag w/ Figure) set?
YES
NO
S73
Determination process of array pattern w/o Figure
S76
Array pattern change determination process
S74
Array pattern effect process
S77
Array pattern effect process
S75
Game contents determination effect process
S78
Game contents determination effect process
S79
Free game process
S80
Clear flag w/ Figure
End

Fig. 10

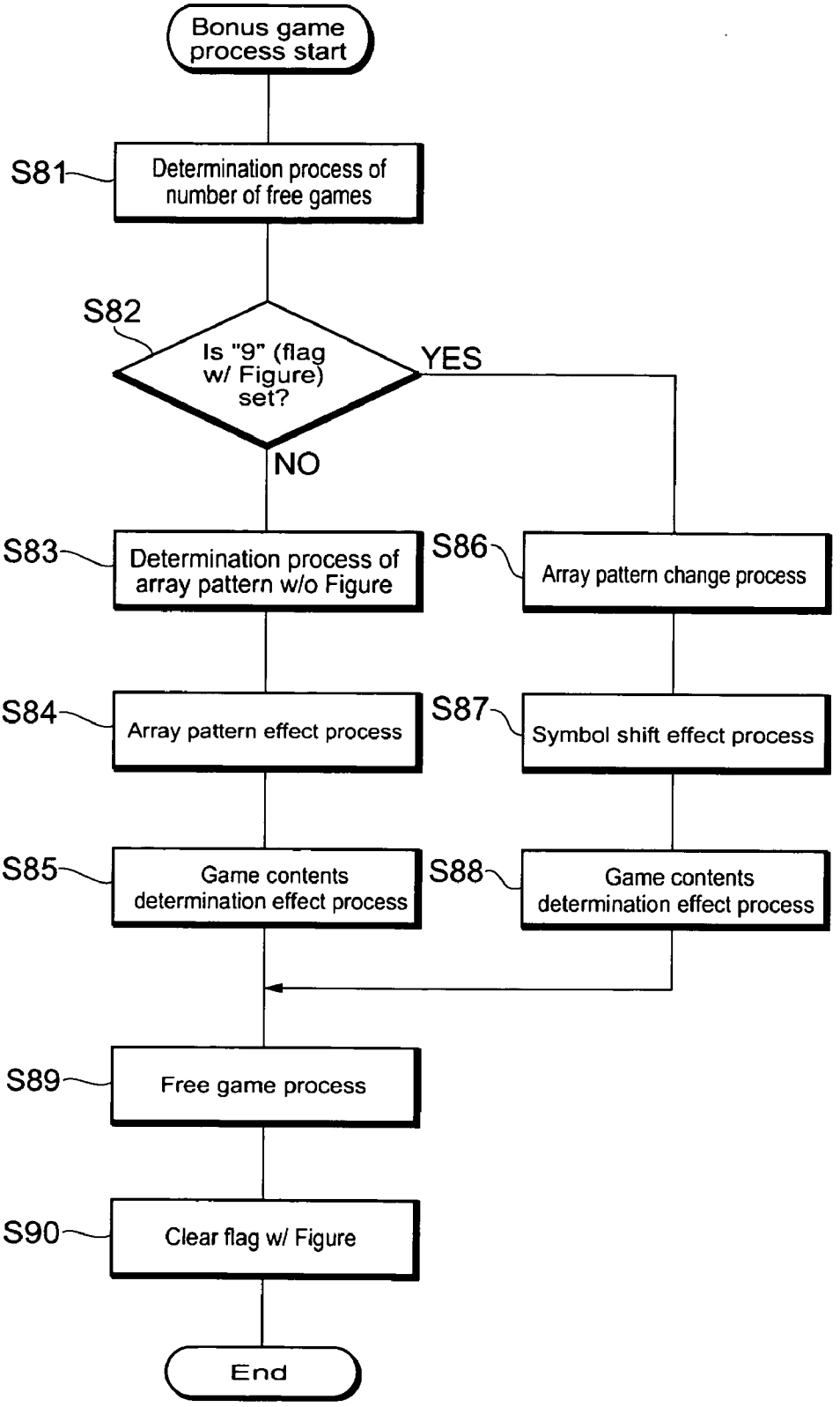

Bonus game process start
S81
Determination process of number of free games
S82
Is "9" (flag w/ Figure) set?
YES
NO
S83
Determination process of array pattern w/o Figure
S86
Array pattern change process
S84
Array pattern effect process
S87
Symbol shift effect process
S85
Game contents determination effect process
S88
Game contents determination effect process
S89
Free game process
S90
Clear flag w/ Figure
End

Fig. 11

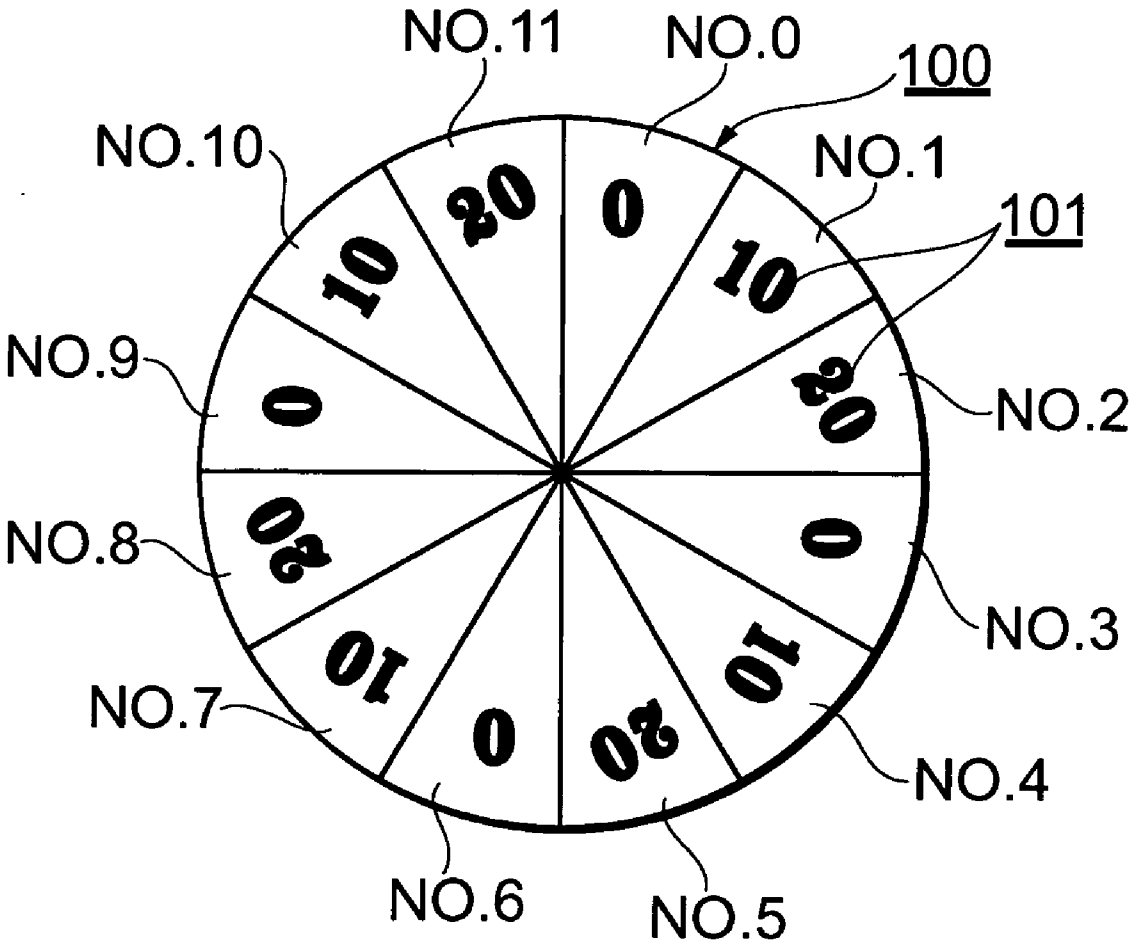

NO.11
NO.0
100
NO.10
NO.1
101
NO.9
NO.2
NO.8
NO.3
NO.7
NO.4
NO.6
NO.5
0
10
20
0
10
20
0
10
20
0
10
20
0
10
20
0
10
20

Fig. 12

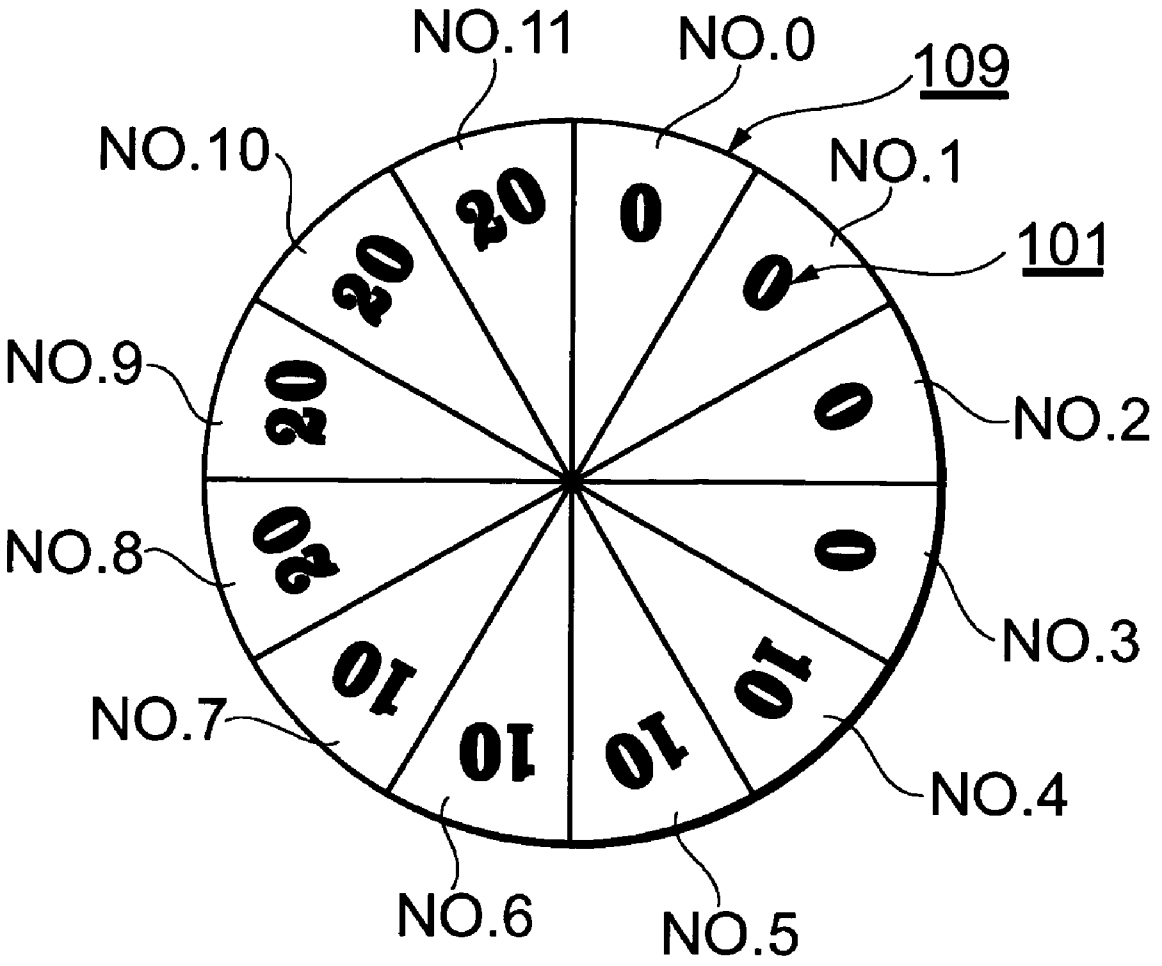


Fig. 13

Fig. 14A

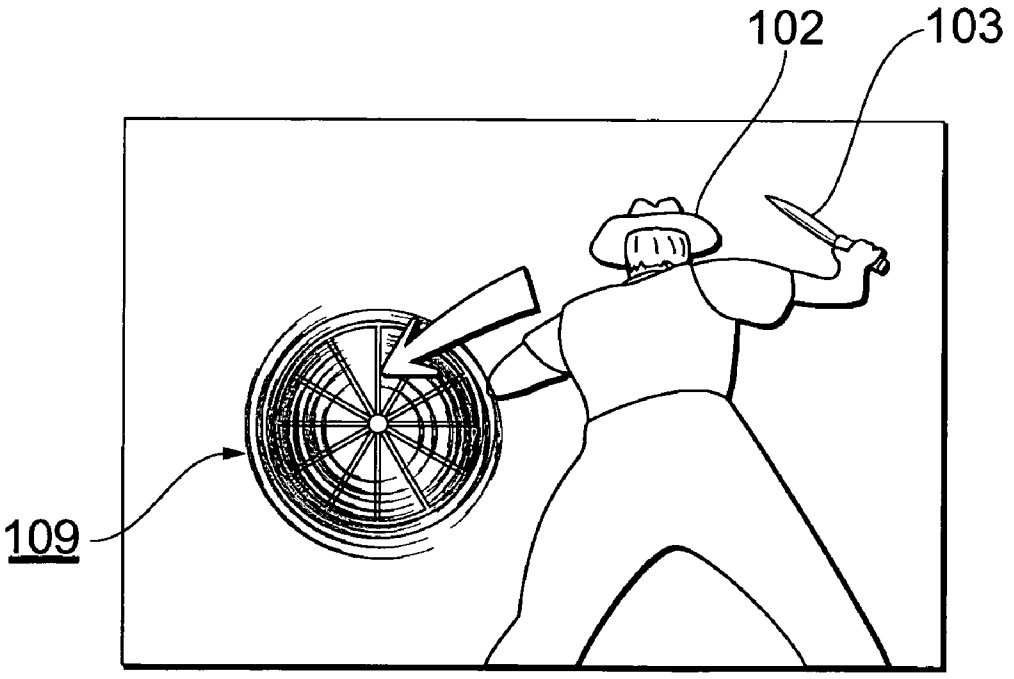


Fig. 14B

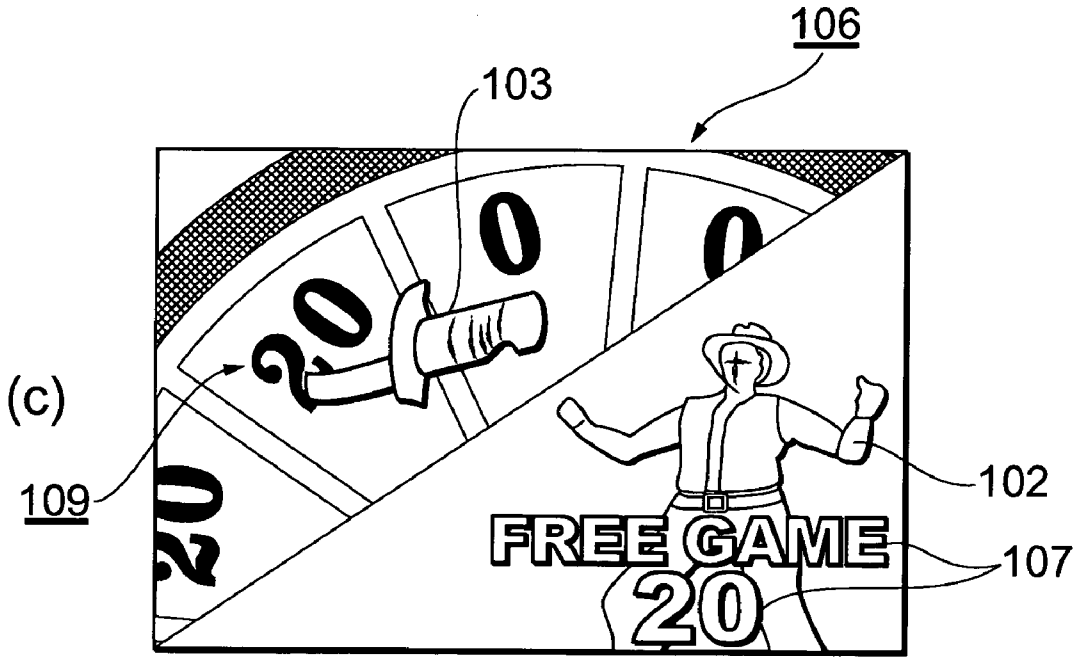


Fig. 14C

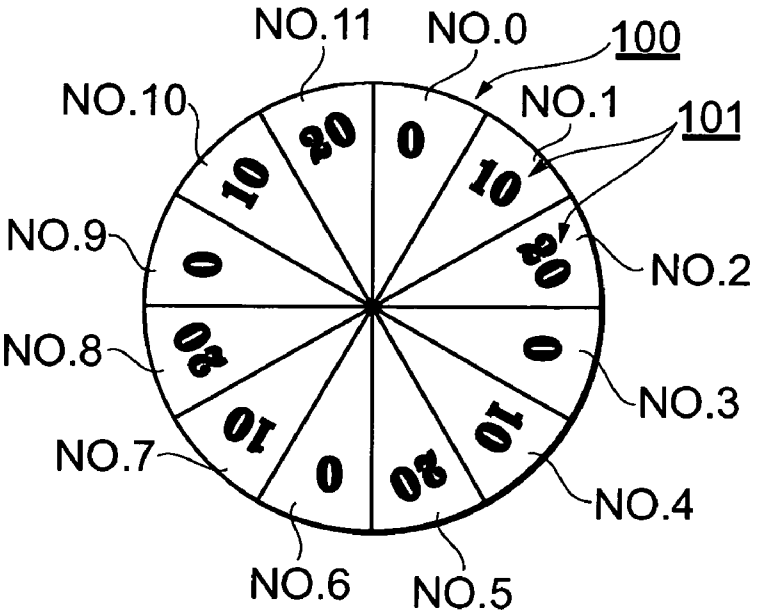


Fig. 15A

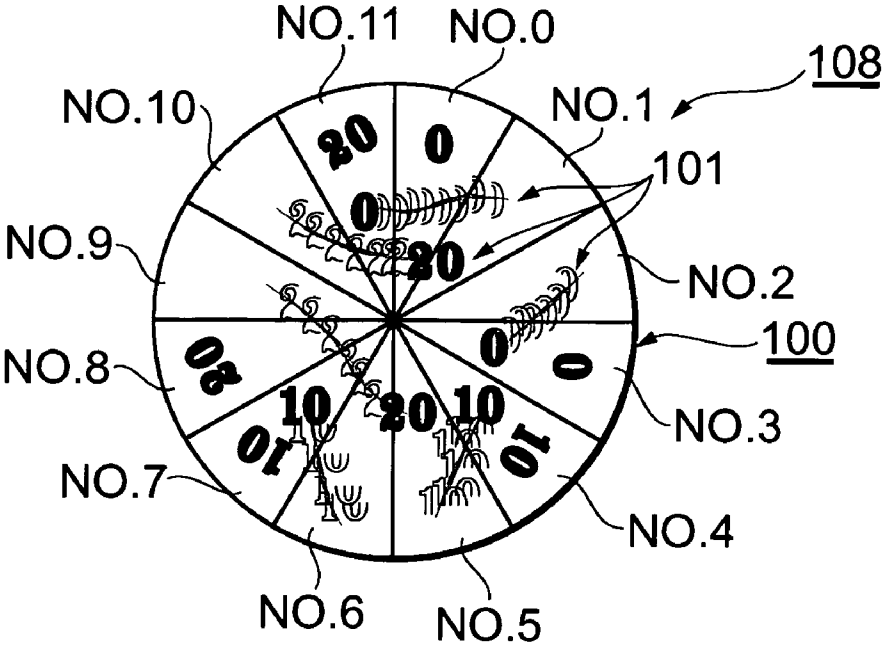


Fig. 15B

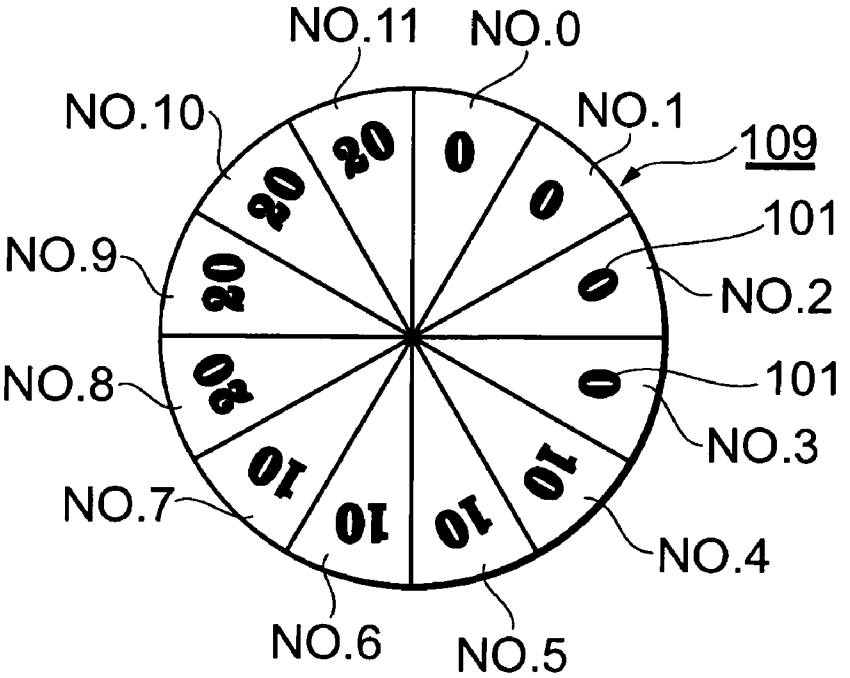


Fig. 15C

GAMING MACHINE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is based upon and claims the benefits of priority from Japanese Patent Application No. 2005-061327 filed on Mar. 4, 2005, the entire contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a gaming machine comprising provided with a variable display device which displays a plurality of variably displayed symbols and an image display device which displays variable display images of the plurality of symbols.

RELATED ART

[0003] There has been a gaming machine which displays a game image (for example, a card image and a variable display image composed of a plurality of symbols) and performs a game utilizing the game image. There has been a gaming machine of this kind which notifies a player of information relating to game contents and information of change of the game contents by an effect image specifically determined. For example, Japanese unexamined patent publication No. 2003-180908 discloses a gaming machine (hereafter referred to as "conventional machine") which notifies beforehand a change (shift) to a predetermined number of variable display games (may also be called "free game") in which no game media are necessary when a predetermined symbol is stopped and displayed.

[0004] However, the conventional machine can only notifies a specific effect image (specific symbol being stopped and displayed) that has been predetermined in the conventional machine although it notifies the shift. Therefore, contents of the effect have little variation and are monotonous although the effect is conducted such that the player will be bored if the game is repeated and no incentive to continue to play the game is not provided to the player.

SUMMARY OF THE INVENTION

[0005] In the present invention, the player can have an option in the way of displaying the information relating to a game such that the player may be provided with an incentive to play the game repeatedly since the way of display the information is variable.

[0006] According to the present invention, there is provided a gaming machine performing a game to shift from a base game mode to a special game mode upon satisfaction of a predetermined condition. The gaming machine comprises: a display device for displaying a circumferentially-arranged image having a plurality of symbols arranged circumferentially; and a reading device for reading the identification information from a game article storing the identification information. In the gaming machine, an array change of the plurality of symbols in the circumferentially-arranged image may be conducted in a case where the identification information is read; and the display device may display a changed circumferentially-arranged image after the array change.

[0007] Further features of the present invention, its nature, and various advantages will be more apparent from the accompanying drawings and the following description of the preferred embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] **FIG. 1** is a perspective view showing a general configuration of a slot machine according to an embodiment of the present invention.

[0009] **FIG. 2** is a block diagram illustrating mainly an internal configuration.

[0010] **FIG. 3** is a block diagram illustrating an example of an internal configuration of an image control circuit.

[0011] **FIG. 4** is a partially broken front view of a figure.

[0012] **FIG. 5** illustrates an example of a figure present-absent array pattern table.

[0013] **FIG. 6** illustrates an example of a figure ID array pattern table.

[0014] **FIG. 7** illustrates an example of a relationship between the array pattern and symbol arrangement.

[0015] **FIG. 8** is a flow chart illustrating an operation procedure of a main process from the start to the end of a slot game.

[0016] **FIG. 9** is a flow chart illustrating an operation procedure of a bonus game process according to the first operation contents.

[0017] **FIG. 10** is a flow chart illustrating an operation procedure of a bonus game process according to the second operation contents.

[0018] **FIG. 11** is a flow chart illustrating an operation procedure of a bonus game process according to the third operation contents.

[0019] **FIG. 12** illustrates a general appearance of a circumferentially-arranged image before a symbol array change.

[0020] **FIG. 13** illustrates a general appearance of a circumferentially-arranged image (A pattern) after a symbol array change.

[0021] **FIGS. 14A** to **14**C illustrate examples of images displayed in a array pattern effect process and a game content determination effect process.

[0022] **FIGS. 15A** to **15**C illustrate examples of images displayed in a symbol shift effect process.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Hereinafter, an explanation will be made for a gaming machine of an embodiment according to the present invention. In the following description, like element numerals are used to describe like elements illustrated in one or more figures and duplicated explanation may be omitted.

[0024] A slot machine according to the embodiment of the present invention is a coin-insertion type of gaming machine with which it is required to input game media such as bills and coins to start a game. And a usual variable display game (hereafter referred to as "base game") is initiated with the

slot machine when a player inputs game media and conduct a predetermined operation. Then, a special game is triggered in the base game when a predetermined condition is satisfied. A game mode where the base game is conducted is referred to as a base game mode and a game mode where the special game, which the base game mode is shifted to, is conducted is referred to as a special game mode. In the present embodiment, the special game is a free game in which no additional game media are inputted (or inserted) to initiate a variable display game. The slot machine is configured to perform an effect to show circumferentially-arranged image, symbol determination image and the like so as to notify the player of the number of free games (hereafter referred to as "free game number") when the game is shifted into the special game mode. The configuration of the slot machine **1** will be explained in the following paragraphs.

(Overall Configuration of Slot Machine)

[**0025**] **FIG. 1** is a perspective view to show the overall configuration of the slot machine. The slot machine **1** is configured to perform a variable display game (being possibly referred to as slot game) utilizing a variable display image of a plurality of symbols. The slot machine **1** is provided with a figure installation unit **19** on which a figure **90** can be set as described later.

[**0026**] The slot machine **1** is also provided with a main display **3** including a liquid crystal display device on the front face of the cabinet **2**. It is also provided with a sub display **4** including a liquid crystal display device in a similar manner on an upper part above the main display **3**.

[**0027**] The main display **3** includes nine variable display parts **3**A, **3**B, **3**C, **3**D, **3**E, **3**G, **3**H and **3**I being arranged in three rows and three columns. The main display **3** is configured to show a variable display image (a reel image showing varying symbols as if the mechanical reel were rotated) showing a plurality of symbols moving down in each variable display part **3**A to **3**I in either base game mode or special game mode. As shown in **FIG. 1**, since the slot machine **1** has nine variable display parts **3**A to **3**I, eight activation lines are set in total as three vertical, three horizontal and two diagonal lines can be drawn in the variable display parts **3**A to **3**I.

[**0028**] The sub display **4** as display means of this embodiment displays a roulette image **100** as a circumferentially-arranged image of this embodiment mimicking the wheel utilized in the roulette game when a shift condition to the special game mode is satisfied, details of which will be described later. Subsequently, a symbol determination image **106** is displayed to specify the numerical symbol corresponding to the symbol of this embodiment as if the knife having been thrown by the venturer had hit the roulette image **100**. And the array display of the roulette image **100** is configured to be changed depending on whether the figure **90** is set in the figure installation unit **19** or not. The sub display **4** further displays other images such as game contents and explanation thereof which are not directly related to the variable display itself.

[**0029**] The slot machine **1** also is provided with an operation panel **11** being arranged substantially in a horizontal manner at the bottom of the main display **3**. The operation panel **11** is provided with the figure installation unit **19**, a coin insertion slot **6**, a bill insertion slot **7**, a spin switch **8**, a 1-BET switch and a max BET switch.

[**0030**] The figure installation unit **19** comprises a reading part **19***b* and a base fitting part **19***a* being fixed on the surface of the operation panel **11**. The base fitting part **19***a* comprises a circular recess inside with a certain depth corresponding to the disk shape of a base portion **91** of the figure **90** to be described later (refer to **FIG. 4**). The reading part **19***b* is positioned in the recess of the base fitting part **19***a* and provided with an IC chip reader/writer **19***c*.

[**0031**] The coin insertion slot **6** is provided for the player to insert coins to bet in the game and has an insertion coin sensor **6***a* which outputs a signal showing the coin insertion (refer to **FIG. 2**). The bill insertion slot **7** is also provided for the player to insert a bill and has an insertion bill sensor **7***a* which outputs a signal showing the bill insertion (refer to **FIG. 2**). The spin switch **8** initiates a display of the variable display image such that it is provided for the player to conduct the operation to initiate the game. The 1-BET switch **9** is provided for the player to bet one coin by one operation thereof. The max BET switch **10** is provided for the player by one operation thereof to bet the maximum number of coins which can be bet in one game.

[**0032**] Further, the slot machine **1** is provided with a coin receiving part **14** holing coins paid out and a coin payout opening **13** at the bottom of the cabinet **2**. Further, speakers **12**L and **12**R are provided on the left and right sides of the coin payout opening **13**, respectively.

[**0033**] **FIG. 2** is a block diagram of the slot machine **1** showing mainly the inside configuration. The slot machine **1** has a plurality of components around the micro-computer **31**.

[**0034**] The micro-computer **31** comprises a CPU (Central Processing Unit) **32**, a RAM (Random Access Memory) **33** and a ROM (Read Only Memory) **34**. The CPU **32** operates according to the program stored in the ROM **34** and receives signals from respective parts of the control panel **11** via an I/O port **39** while the CPU **32** inputs and outputs signals from and to other components so as to control the whole operation of the slot machine **1**. The RAM **33** stores data and programs to be used when the CPU **32** operates. By way of example, random numbers being sampled by a sampling circuit **36** to be described later are stored in the RAM **34** temporarily after the game starts. The ROM **34** stores a program to be executed by the CPU **32** and permanent data, for example, a game content determination table (not shown) as described later.

[**0035**] The slot machine **1** is also provided with a random number generator **35**, the sampling circuit, a clock pulse generation circuit **37**, a frequency divider **38** and data storage **41**. The random number generator **35** operates according to the instruction by the CPU **32** so as to generate a certain range of random numbers. The sampling circuit **36** picks up any random numbers from the random numbers having been generated by the random number generator **35** and thus-picked random numbers are inputted to the CPU **32**. The clock pulse generator **37** generates a standard clock frequency for activating the CPU **32** and the frequency divider **38** inputs to the CPU **32** a signal being divided with a certain cycle time. The data storage **41** stores a figure ID array pattern table **51** and a pattern table with and without figures to be described later.

[**0036**] Further, the slot machine **1** is provided with a touch panel **61**, a hopper driving circuit **63**, a hopper **64**, a payout

completion signal circuit **65** and a coin detection section **66**. The slot machine **1** also provided with an image control circuit **81**, a sound control circuit **72** and an IC chip reader/writer **19***c*.

[**0037**] The touch panel **61** is provided in a manner that the display screen of the main display is covered and detects a position where the player touches on the panel so that the signal corresponding to the detected position is inputted to the CPU **32**. The hopper driving circuit **63** drives the hopper **64** according to the control by the CPU **32** and the hopper **64** operates to pay out coins having been acquired by the winning such that the coins are paid out from the payout opening **13** to the coin receiving part **14**. The coin detection section **66** counts the number of coins being paid out from the hopper **64** and sends data of the counted number of the coins to the payout completion signal circuit **65**. The payout completion signal circuit **65** receives the data of the counted number of the coins from the coin detection section **66** and sends a notification signal of the coin payout completion as the counted number reaches the predetermined number.

[**0038**] The image control circuit **81** controls the main display **3** and the sub display such that the main display **3** displays a variable display image of the plurality of symbols and that the sub display **4** displays the circumferentially-arranged image, symbol determination image and the like.

[**0039**] The image control circuit **81** comprises an image control CPU **81***a*, a work RAM **81***b*, a program ROM **81***c*, an image ROM **81***d*, a video RAM **81***e* and a VDP (Video Display Processor) **81***f* as shown in **FIG. 3**.

[**0040**] The image control CPU **81***a* determines an image to be displayed on the sub display **4** and an image (variable display image, stop symbol image being displayed when the variable display is stopped) to be displayed on the main display **3** according to the image control program (relating to the display on the main display **3** and the sub display **4**) having been stored in the program ROM **81***c* based on the parameters being set by the micro-computer **31**.

[**0041**] The work RAM **81***b* is configured to be temporary storage means when the image control CPU **81***a* executes the image control program. The program ROM **81***c* stores the image control program, various kinds of selection tables and the like. The image ROM **81***d* stores dot data for forming images. In this embodiment, such dot data include symbol image data for showing various symbols utilized in the base game and the free game, image data of the circumferentially-arrayed image and the like. The video RAM **81***e* is configured to be temporary storage means for forming images by the VDP **81***f*. The VDP **81***f* comprises the control RAM **81***g* and forms images corresponding to the display contents on the main display **3** and the sub display **4** having been determined by the image control CPU **81***a*.

[**0042**] The sound control circuit **72** (refer to **FIG. 2**) send sound signals to the speakers **12**L and **12**R such that the speakers **12**L and **12**R output sound.

[**0043**] The IC chip reader/writer **19***c* comprises an antenna part, sending/receiving part and the like, and operates as reading means of this embodiment. The IC chip reader/writer **19***c* is connected to the CPU **32** via the I/O port **39**. The IC chip reader/writer **19***c* sends to the CPU **32** the stored information (e.g., figure ID) having been read from the IC chip **93** built in the base portion **91** of the figure **90** being fitted (set) in the figure installation unit **19** and writes predetermined information on the IC chip **93** according to the instruction from the CPU **32**.

(Figure Configuration)

[**0044**] As shown in **FIG. 4**, the figure **90** comprises the base portion **91** and the figure main body **92**, and further comprises the IC chip **93** storing the figure ID.

[**0045**] The base portion **91** has a size corresponding to that of the base fitting part **19***a* of the figure installation unit **19** and is formed in a shape of a short cup placed upside down as a top portion **91***a* corresponding to the sole of the short cup is on the top such that the IC chip **93** is fitted and fixed in the circular open end at the bottom.

[**0046**] The figure main body **92** comprises a foot part **92***a* fixed on the top portion **91***a* of the base portion **91** and a figurine portion **92***b* modeling a character such as a wizard, a warrior and the like standing on the foot part **92***a*.

[**0047**] The IC chip **93** stores a specific figure ID for each **FIG. 90**. The figure ID is composed of four digits, which indicates the specific identification number to distinguish (discern one from the others) each figure from the others. The figure **90** can be identified as a certain kind by the player from the appearance of the figure main body **92** and can be identified individually by the slot machine from the figure ID. Here, the figure **90** of this embodiment is a "warrior" and the figure ID is "0002". The **FIG. 90** may be referred to as a game article according to the present invention and the figure ID may be referred to as identification information.

(Slot Machine Operation)

[**0048**] In the slot machine **1** of this embodiment, the CPU **32** may operate as game progress control means so as to control the game progress in the base game mode and the special game mode. The CPU **32** controls the variable display game progress to be initiated by the use of the game media such as a bill and a coin in the base game mode, and the free game progress in the special game mode, in which no game media are used. As the game is shifted to the special game mode, the circumferentially-arrayed image is displayed to notify the player of the free game. And the array change of numerical symbols in the circumferential image is conducted if the figure **90** is set. Therefore, the player can have a chance to obtain his or her favorite array of numerical symbols by using the **figure 90**. The first operation contents of the slot machine **1** will be explained in the following paragraphs in reference to **FIGS. 8 and 9**.

[**0049**] **FIG. 8** shows a flow chart with each block process illustrating the main operation procedure from the beginning to the end of the game with the slot machine **1**. Here, the step is abbreviated as 'S' in **FIGS. 8 and 9**.

(Main Operation)

[**0050**] The slot machine **1** conducts the figure ID reading process as the program proceeds to the step **1** once the main operation is initiated as shown in **FIG. 8**. When the figure ID reading process is initiated, the IC chip reader/writer **19***c* operates as reading means such that the figure ID is read from the figure **90** set on the figure installation unit and is inputted to the CPU **32**. When the figure ID is inputted, the CPU **32** sets "9" to the flag with the figure (figure-existing flag), which may be determination factor whether the figure

ID can be read or not, and makes the RAM **33** stores the read figure ID. Then, the program proceeds to the subsequent step **2**. Here, when the figure ID is not inputted to the CPU **32** (the figure ID cannot be read), the flag is set to the initial value of "0". Further, when the figure ID is inputted, the CPU **32** may instruct the image control circuit **81** such that the sub display **4** displays an effect image to notify the change of the roulette image **100** as the circumferentially-arranged image.

[**0051**] In the step **2**, the start acceptance process to demand the player to conduct the initiation operation for starting the game is initiated and the lottery process is conducted in the subsequent step **3**. When the lottery process is initiated, the CPU **32** conducts a stop symbol determination process, a winning determination process and a winning mode determination process being similar to a free game lottery process to be described later. Here, the CPU **32** determines whether the shift condition to the special game mode is met or not (e.g., a special symbol is determined as the stop symbol or not) and sets "1" to the shift condition flag that is a determination factor to shift to the special game mode if the shift condition is satisfied while the CPU **32** sets "2" to the flag if the shift condition is not satisfied. When the program proceeds to the subsequent step **4**, the base game is initiated and the CPU **32** makes the main display show the variable display image and the stop symbol image so that a predetermined payout is made if the winning is obtained. In the subsequent step **5**, the CPU **32** determines whether the bonus game shift condition is satisfied or not. Here, the CPU **32** determines that the shift condition is satisfied if the shift condition flag is set to "1" and operates as shift means, and the bonus game process of the step **6** is conducted while the main process is terminated by determining that the shift condition is not satisfied if the shift condition flag is set to "2". In the following paragraphs, the bonus game process will be explained in reference to **FIG. 9**.

(Bonus Game Process)

[**0052**] When the bonus game process is initiated, the free game number determination process is conducted as the program proceeds to the step **61** as shown in **FIG. 9**. When the free game number determination process is initiated, the CPU **32** operates as game content determination means and determines the free game number (game contents) performed in the special game mode. Here, the CPU **32** instructs the random generator **35** to generate a certain range of random numbers. Also, the CPU **32** instructs the sampling circuit **36** to pick up any random number from the random numbers having been generated by the random number generator **35** such that the free game number is obtained by referring to the game content determination table (not shown) stored in the ROM **34** as the picked random number is used as the search key. The game content determination table is a table in which the game determination factors as the free game numbers (e.g., "0 time,""10 times," and "20 times") are stored in association with the random numbers. Thus, the CPU **32** operates as the game content determination means and determines the game contents (the free game number) by obtaining (specifying) one game determination factor from the plurality of game determination factors. As described later, the numerical symbol corresponding to the game contents (free game number) having been determined by the CPU **32** is to be specified from the plurality of numerical symbols in the symbol determination image **106** (refer to **FIG. 14**). Here, the game contents are not limited to the free game number, but may include at least either a payout number (the number of game media to be paid out when the winning is obtained) or payout rate (the rate of the number of game media to be paid out to the number of game media having been used in one game). In such a case, the game determination factor may be, for example, "the payout number is 10,""the payout number is 20,""the payout rate is 10 times,""the payout rate is 20 times," and so on. Further, it is also possible to store various kinds of game content determination factors in one game content determination table. For example, "the free game number is 10,""the payout number is 10,""the free game number is 20," and "the payout rate is 20 times" may be stored. In such a case, by setting the random number as the search key, the free game number is obtained in an occasion and the payout number or the payout rate may be obtained in another occasion. Further, the game determination factor may be a combination of the free game number and the payout number, for example, "the free game number is 10 and the payout rate is 10,""the free game number is 20 and the payout number is 20," and the like.

[**0053**] As the program proceeds to the subsequent step **62**, the procedure branches depending on whether the CPU **32** has read the figure ID or not. Here, it is determined that the figure ID has not been read unless the flag with the figure (figure-present flag) is set to "9." Then, the program proceeds to the steps **63** to **65**. On the other hand, it is determined that the figure ID has been read if the flag with figure (figure-present flag) is set to "9." Then, the procedure branches off to the steps **66** to **68**. Thus, the array change of the numerical symbols is conducted in the roulette image **100** by changing the steps to be executed depending on whether the figure ID has been read or not.

[**0054**] First, the steps **63** to **65** which are conducted if the **FIG. 1D** has not been read are explained.

[**0055**] When the program proceeds to the step **63**, the array pattern determination process without the figure is conducted. Once the array pattern determination process without the figure is initiated, the CPU **32** obtains the array pattern corresponding to the flag with the figure (figure-present flag) of "0" by referring to the figure present-absent array table **50** (**FIG. 5**). Here, the figure present-absent table **50** to be referred to includes a figure present-absent column **50***a* to be used as the main key and an array pattern column **50***b* in association with figure existence such that the value of "0" set to the flag with figure is set to be the search key to obtain the corresponding array pattern. **FIG. 7** shows symbol arrays for respective array patters and the pattern without the figure is so arranged that "0", "10", "20", "0", "10", "20", "0", "10", "20", "0", "10", and "20" are allocated in respective divided areas of Nos. 0 to 11.

[**0056**] When the program proceeds to the subsequent step **64**, an array pattern effect process is conducted, and when the program proceeds to the subsequent step **65**, a game content determination effect process is conducted. The array pattern effect process and the game content determination effect process are similar to respective processes conducted in the steps **67** and **68**. Therefore, they are described later.

[**0057**] Next, respective process at the steps **66** to **68** will be explained when it is determined that the figure ID has been read.

[0058] When the program proceeds to the step **66**, the array patter change process is conducted. When the array pattern change process is initiated, the CPU **32** operates as change means and obtains an array pattern corresponding to the flag ("9") with figure after the change by referring to the figure present-absent array table **50** (**FIG. 5**). The array pattern after the change which is obtained at this step is "A pattern" and, as shown in **FIG. 7**, the pattern is so arranged that "0", "0", "0", "0", "10", "10", "10", "10", "20", "20", "20", and "20" are allocated in respective divided areas of Nos. 0 to 11.

[0059] In "A pattern", symbols of the same kind are collected for respective kinds: "0", "10" and "20". Therefore, it is easy for the player to recognize the ratio of each kind to the entirety. By way of example, a sample game mode may be described as follows. The roulette as shown in **FIG. 14A** is rotated (**FIG. 14B**) and a knife is thrown to hit one of the regions in the roulette which specifies the number corresponding to the free game number (**FIG. 14C**). Since there is a lottery feature in such a sample game mode, this ratio is important. That is, the player tends to consider it is quite likely that the knife hits one of these regions of the kind. Since it is usually thought that an internal lottery is set in this way in the gaming machine, the ratio of each region to the entirety is important.

[0060] Further, the player may think it is more likely for the knife to hit this specific region if this kind of region is scattered evenly along the circumferential direction depending on the rotational speed of the roulette. Further, a character mimicking a venturer is used in **FIG. 14B**, but the player may think another kind of array may cause more often the knife to hit this specific region if another kind of character corresponding to the identification information is used. Therefore, an appearance of the figure, an array change of symbols and an appearance of the character in the screen can be mutually associated with the key of identification information and the player may enjoy the game more.

[0061] When the program proceeds to the subsequent step **67**, an array pattern effect process is conducted. When the array pattern effect process is initiated, the CPU **32** operates as display control means and obtains the array pattern (A pattern) so as to instruct the image control circuit to display the roulette image **109** as the changed circumferentially-arranged image after the array change accordingly. The roulette image **109** is composed of radially-divided areas, in which numerical symbols are placed respectively, of the circular area of the wheel used in the roulette game. In the array pattern effect process, for example, the sub display **4** displays the roulette image **109** as shown in **FIG. 13** along with a logo image such as "FREE GAME" and "CHANCE" as shown in **FIG. 14A**

[0062] When the program proceeds to the subsequent step **68**, the game content determination process is conducted. Once the game content determination process is initiated, the CPU **32** instructs the image control circuit **81** to display an image appearing as if the roulette were rotating, a character image **102** being associated with the venturer, and a knife image **103** appearing to be thrown by the venturer on the sub display **4** as shown in **FIG. 14B**.

[0063] After that, the CPU **32** operates as display control means and instructs the image control circuit **81** to display the symbol determination image **106** to specify the numerical symbol (any one of the numerical symbols showing the same number as the free game number) corresponding to the free game number having been determined in the free game number determination process (step **61**) among the plurality of numerical symbols in the roulette image **109** on the sub display **4**. The symbol determination image **106** is composed of a knife image appearing to specify the numerical symbol of "20" by sticking out of the roulette image **109** as shown in **FIG. 14C**, logo images **107** of "FREE GAME" AND "20", and a character image **102** appearing to raise both hands for joy so as to notify the player that the free game number is 20. Here, the character image **102** appearing in the symbol determination image may be associated with the appearance of the figure main body **92**.

[0064] As described in the foregoing, in the slot machine **1**, the array pattern of the roulette image **100** may be changed by setting the figure **90** and the roulette image **109** after the change is displayed so that the player may choose either image **100** or **109** (before or after the change) by selecting the game without or with the figure **90** to be read.

[0065] In the slot machine **1**, the numerical symbol may also include "0". In other words, the symbol corresponding to the game number (game contents) may include a losing symbol so that it is possible to perform an effect (losing effect) specifying the losing symbol as the game content after notifying that the shift condition to the special game mode is satisfied. Therefore, it is possible to enhance the amusement of the game by performing such an unexpected effect so as to keep tension high. Further, the character's posture (action effect) in the symbol determination image may be changed according to the determined contents as the game contents (the free game number in this embodiment) such that the effect display of the action may be designed to match the player's emotion so as to enhance the game amusement.

[0066] When the program proceeds to the subsequent step **69**, the free game process is initiated, and the free game lottery process and scrolling process are repeated as many times as determined in the free game number determination process (step **61**).

[0067] When the free game lottery process is initiated, a stop symbol determination process, a winning/losing determination process and a winning mode determination process are conducted. When the stop symbol determination process is initiated, the CPU **32** instructs the random number generator **35** to generate a certain range of random numbers, picks up any random numbers among the generated random numbers, and obtains stop symbols to be stopped and displayed in respective variable display parts **3**A to **3**I by referring to the symbol determination table not shown (table storing code numbers of symbols in association with random numbers) and the stop table (table storing symbol code numbers in association with stop symbols).

[0068] When the subsequent winning determination process is initiated, the CPU **32** determines whether it is won or not by referring to the winning determination table including distinguishably winning symbol patterns and non-winning symbol patterns in association with respective code numbers and combinations thereof, and when the winning mode determination process is initiated, the CPU **32** obtains payout information corresponding to the winning mode by

referring to the mode table including the payout information in association with the winning symbol pattern (winning mode).

[0069] When the subsequent scrolling process is initiated, the CPU **32** makes the variable display of symbols displayed in respective variable display parts **3**S to **3**I on the main display **3**, and causes the payout of coins or the like corresponding to the obtained payout information in the winning mode determination process.

[0070] When the program proceeds to the subsequent step **70**, the CPU **32** conducts a process clearing the flag with the figure, that is, setting the initial value of "0" to the flag with the figure and terminates the bonus game process.

[0071] In the slot machine **1** performing the aforementioned first operation contents, the roulette image **100** having a plurality of numerical symbols arranged circumferentially is displayed, and the numerical symbol array in the roulette image **100** may be changed when the figure **90** is set (the figure ID is read by the IC chip reader/writer **19***c*). Therefore, in the slot machine **1**, the player may select the roulette image **100** by utilizing the **figure 90**. Further, since the roulette images **100** before and after the change are displayed according to the player's wish, the display mode of the roulette images **100** is not monotonous so as to be an incentive for the player to play the game repeatedly.

[0072] Further, in the slot machine, the sub display **4** displays the symbol determination image **106** to specify the numerical symbol corresponding to the free game number (game determined information) having been determined as game contents among the plurality of numerical symbols in the roulette image **100**. Therefore, the numerical symbol in the roulette image **100** and the free game number (game contents) get related and the player can easily identify (grasp) the free game number in the symbol determination image **106**.

[0073] Although the numerical symbol indicates the same number as the free game number in the present slot machine **1**, other numerical symbols such as numerical characters representing one-tenth and one-hundredth of the free game number to be determined as the game contents may be arranged in the circumferentially-arranged image.

[0074] Further, the symbol determination image is to be displayed after shifting to the special game mode and before the free game process (step **69**) under the control of the CPU **32** in the present slot machine **1** so that the player is to be notified of the free game number, before the initiation of the free game, by the circumferentially-arranged image including the circumferentially-arranged image after the change.

[0075] Next, the second operation contents of the slot machine **1** are explained. The second operation contents differ from the first operation contents in the operation contents of the bonus game process. Therefore, the different parts of the bonus game process of the first operation contents are mainly explained.

[0076] When the bonus game process is initiated, the program proceeds to the step **71** as shown in **FIG. 10** and the free game number determination process is conducted in a similar manner to that in the bonus game process of the first operation contents (hereafter referred to as "first bonus game process"). Then, the program proceeds to the subsequent step **72**. In the step **72**, the procedure branches depending on whether the flag with the figure is set to "9" or not. And the CPU **32** controls the game so that it proceeds to the steps **73** to **75** if the flag with the figure is not set to "9" and the array pattern determination process without the figure, the array pattern effect process and game content determination process are conducted in a similar manner to those in the first bonus game process. Then, the program proceeds to the step **79** and the free game process is initiated.

[0077] On the other hand, the program proceeds to the step **76** if the flag with the figure is set to "9" and the CPU **32** operates as the change means and a changed array pattern determination process conducting the array change is executed according to the array pattern corresponding to the figure ID having been read by the IC chip reader/writer **19***c* from the plurality of array patterns stored in association with the figure IDs. Here, the CPU **32** obtains the array pattern corresponding to the figure ID by referring to the figure ID array pattern table **51** (refer to **FIG. 6**) stored in the data storage **41** as the figure ID stored in the RAM **33** is set as the search key. The figure ID array pattern table **51** now being referred to includes a figure ID column in which the main key may be set and an array pattern column **51***b* which is associated with the figure ID such that the array pattern can be obtained by setting the figure ID as the search key. Since the figure ID stored in the figure of this embodiment is "0002", "B pattern" is obtained as the array pattern.

[0078] As shown in **FIG. 7**, "B pattern" so arranged that "0", "0", "10", "10", "20", "20", "0", "0", "10", "10", "20", and "20" are allocated in respective divided areas of Nos. 0 to 11.

[0079] When the program proceeds to the steps **77** and **78**, processes similar to those in the first bonus game process are conducted and the program proceeds to the subsequent step **79**. After the free game process is conducted, the program proceeds to the step **80** so as to clear the flag with the figure and the bonus game process is completed.

[0080] The slot machine **1** executing the above-described second operation contents is configured to conduct the array change of the numerical symbols according to the array pattern corresponding to the figure ID having been read by the IC chip reader/writer **19***c* as the figure **90** is set. Therefore, the player may change the original roulette image **100** to a new roulette image **100** corresponding to a new figure **90** by replacing the original **FIG. 90** with the new figure **90** so as to have more options in the roulette image **100**. Especially, since the array pattern composed of numerical symbols is changed according to the figure ID stored in the **figure 90**, it is possible to provide the player with an incentive to play the game repeatedly as the player expects the game with various kinds of array patterns and thus the player is provided with new amusement by collecting various kinds of FIGS. **90** as he or she becomes eager to collect the figures.

[0081] Now, the third operation contents of the slot machine **1** are explained. Here, the third operation contents differ from the first or the second operation contents partially in the operation contents of the bonus game process. Therefore, the differences in the bonus game process from the first or the second operation contents are mainly explained in reference to **FIG. 11**.

[0082] When the bonus game process is initiated, the program proceeds to the step **81** as shown in **FIG. 11** and the

CPU **32** operates as the change means in a similar manner to the way in the first bonus game process so as to branch the procedure depending on whether the flag with the figure is set to "9" or not. Then, under the control of the CPU **32**, the program proceeds to the steps **83** to **85** if the flag with the figure is not set to "9", the array pattern determination process without the figure, the array pattern effect process and the game content determination process are conducted in a similar manner as described in the first bonus game process and the program proceeds to the step **89** to initiate the free game process.

[**0083**] On the other hand, the program proceeds to the step **86** if the flag with the figure is set to "9" and the figure present array pattern determination process is conducted so as to proceeds to the step **87**.

[**0084**] When the program proceeds to the step **87**, a symbol shift effect process is conducted. When the symbol shift effect process is initiated, the CPU **32** operates as the display control means and instructs the image control circuit **81** to display the roulette image **100** before the array change (the numerical symbol array of the pattern without the figure) as shown in **FIG. 15A** on the sub display **4**. Next, the CPU **32** instructs the image control circuit **81** to display a symbol shift image **108** showing a moving state of the numerical symbols constituting the roulette image **100** on the sub display **4** as illustrated in **FIG. 15B**. And the CPU **32** instructs the image control circuit **81** to display a roulette image of "A pattern" corresponding to a circumferentially-arranged image after the change as shown in **FIG. 15C** and the symbol shift effect process is completed.

[**0085**] When the program proceeds to the subsequent steps **88**, **89** and **90**, the game content determination effect process, the free game process and the figure-present flag clearance are conducted in a similar manner as described in the first or the second bonus game process and the bonus game process is completed.

[**0086**] The above-described slot machine **1** executing the third operation contents and the slot machine **1** executing the first operation contents has common effects. Further, the present slot machine **1** can notify the player by the image effect appearing as if the numerical symbols were moving during the transition period from the roulette image **100** before the array change to the roulette image **109** after the array change such that the player can easily recognize the array change of the roulette image **100** by setting the figure. In the above explanation of the third operation contents, an example to change the numerical symbol array pattern to "A pattern" is illustrated, but it should be understood that the numerical symbol array pattern can be changed to the array pattern (for example, B pattern or C pattern) corresponding to the figure ID as described in the second operation contents.

[**0087**] The gaming machine according to the present invention is not limited to the above-mentioned embodiments, but may include a gaming machine capable of performing a game utilizing a card image of the card game or a mah-jong tile image of the mah-jong game. It may also include a gaming machine comprising a slot machine including a plurality of mechanical reels, which is provided with display means composed of a liquid crystal display device or the like.

[**0088**] Further, the plurality of symbols constituting the circumferentially-arranged image are not limited to the numerical symbols, but may include alphabet symbols, Greek alphabet symbols, and other character symbols and word symbols.

[**0089**] Further, the circumferentially-arranged image is not limited to the image comprising: a circular area mimicking a wheel in the roulette game and a plurality of numerical symbols arranged radially along the periphery, but may include a circular area mimicking a dart board of the dart game or other circular areas composed of radially and evenly divided sectors, in which numerical symbols are provided respectively; and an elliptic area or a polygonal area (e.g., hexagonal area and octagonal area) composed of circumferentially and evenly divided portions, in which numerical symbols are provided respectively.

[**0090**] Further, according to the present invention, the game article is not limited to the figure, but may include a card or the like (e.g., a membership card to be used permanently by the player and a house card to be used temporarily by the player); a cassette; and other articles. Further, the way to store the identification information in the game article is not limited to that utilizing the IC chip from which data can be read in a non-contact manner, but the storage media may be a contact type of data storage means. And without data storage means such as a memory, the game related information can be stored by the game article which is provided with an information display part having an information storing function by engraving the code on; directly printing the code on; or attaching a seal with the code to the game article, the code comprising: a bar-code and a two-dimensional code. Here, the two-dimensional code may be referred to as two-dimensional bar-code such as QR Code (Registered trademark of DENSO WAVE INCORPORATED). This two-dimensional code may include a large amount of information coding several tens and several hundreds of times as many data as the bar-code. As mentioned above, if the information display part is provided, a bar code reader or the like is provided as the reading means instead of the IC chip reader/writer.

[**0091**] Further, the game media for initiating the game is not limited to the bill or the coin, but may include an information storage media such as a prepaid card and a magnetic card. In this instance, a predetermined value is used from the monetary information or the credit stored in the information storage media to start the game.

[**0092**] According to the present invention, there may be provided a gaming machine which can provide the player with an incentive to play the game repeatedly by varying an effect display mode since the effect display mode to notify the information relating to the game can be selected at the player's choice such that the player's taste and wish may be reflected on the mode.

[**0093**] As mentioned above, a gaming machine in which an effect display mode for showing information about the game can be selected by the player such that the player's taste and wish may be reflected on the image allows the effect display mode to vary in order to provide an incentive to play the game repeatedly.

[**0094**] Therefore, the gaming machine may comprise: display means for displaying a circumferentially-arranged image having a plurality of symbols arranged circumferentially; reading means for reading identification information

from a game article storing the identification information distinguishable from others; change means for conducting array change of symbols in the circumferentially-arranged image when the identification image is read by the reading means; and display means for displaying a changed circumferentially-arranged image after the change means conducts the array change.

[0095] In this gaming machine, since the changed circumferentially-arranged symbol array is displayed when the identification information is read from the game article, the circumferentially-arranged symbol array can be changed depending on whether the player allows the game article to be read or not. Thus, the player can choose the circumferentially-arranged symbol either before or after the change to be displayed by allowing the game article to be read or not.

[0096] Further, the above-mentioned display control means may cause the display means to display a symbol determination image specifying an image corresponding to at least one of the game contents such as a game number, a payout number and a payout rate.

[0097] In this gaming machine, there will be generated a relationship between the image in the circumferentially-arranged symbol array and the game contents such that the display of the symbol determination image may notify the player of the game contents.

[0098] Further, the above-mentioned change means may conduct the array change in accordance with the array pattern corresponding to the identification information having been read by the reading means among the plurality of array patterns corresponding to the identification information.

[0099] For such a gaming machine, the number of the options of the circumferentially-arranged image the player can choose is increased.

[0100] Further, the above-mentioned display control means may cause the changed circumferentially-arranged image after the circumferentially-arranged image before the change and a symbol shift image showing a moving state of each symbol constituting the circumferentially-arranged image.

[0101] In such a gaming machine, since the change display includes movement of a symbol array constituting the circumferentially-arranged image, the player may grasp the array change with ease.

[0102] The circumferentially-arranged image may comprise: any one of a circular area of a wheel to be used in a roulette game, a circular area of a dart board to be used in a dart game, and another circular area, each circular area being composed of radially-divided sectors, in which numerical symbols are arranged respectively.

[0103] In such a gaming machine, the player can easily grasp the array of the numerical symbols and the array change.

[0104] The gaming machine may be characterized by comprising: game progress control means for controlling progress of a game in a special game mode in which game media are not necessary for starting the game and a base game mode in which game media are necessary for starting the game; and shift means for shifting from the base game mode to the special game mode upon satisfaction of a shift condition, wherein the symbol determination image specifying a symbol corresponding to a game number in the special game mode from a plurality of symbols in the circumferentially-arranged image is displayed on the display means.

[0105] In such a gaming machine, the arrangement of the circumferentially-arranged image is changed when the identification information is read from the game article, thereby allowing the player to get options. And the player is notified of the game number by specifying a symbol corresponding to the game number in the symbol determination image.

What is claimed is:

1. A gaming machine performing a game to shift from a base game mode to a special game mode upon satisfaction of a predetermined condition, the gaming machine comprising:

a display device for displaying a circumferentially-arranged image having a plurality of symbols arranged circumferentially; and

a reading device for reading the identification information from a game article storing the identification information,

wherein an array change of the plurality of symbols in the circumferentially-arranged image is conducted in a case where the identification information is read; and

wherein the display device displays a changed circumferentially-arranged image after the array change.

2. The gaming machine according to claim 1 wherein a symbol shift image showing a moving state of the symbols constituting the circumferentially-arranged image before the changed circumferentially-arranged image is displayed.

3. The gaming machine according to claim 1 wherein the array change is characterized by collecting symbols of a same kind.

4. The gaming machine according to claim 1,

wherein the identification information is read in the base game mode;

wherein the changed circumferentially-arranged image is displayed in the special game mode;

wherein the identification information is associated with an appearance of the game article; and

wherein display contents in the special game mode is associated with the identification information.

5. The gaming machine according to claim 1,

wherein the display device displays a symbol determination image specifying any one of the plurality of symbols.

6. The gaming machine according to claim 1,

wherein the circumferentially-arranged image comprises any one of a circular area of a wheel to be used in a roulette game, a circular area of a dart board to be used in a dart game, and another circular area, each circular area being composed of radially-divided sectors, in which numerical symbols are arranged respectively.

7. The gaming machine according to claim 1,

wherein game media are necessary to start the game in the base game mode;

wherein the game media are not necessary to advance the game in the special game mode; and

wherein the display device displays a symbol determination image for specifying a symbol corresponding to a game number in the special game mode among the plurality of symbols.

8. The gaming machine according to claim 2 wherein the array change is characterized by collecting symbols of a same kind.

9. The gaming machine according to claim 2,

wherein the identification information is read in the base game mode;

wherein the changed circumferentially-arranged image is displayed in the special game mode;

wherein the identification information is associated with an appearance of the game article; and

wherein display contents in the special game mode is associated with the identification information.

10. The gaming machine according to claim 2,

wherein the display device displays a symbol determination image specifying any one of the plurality of symbols.

11. The gaming machine according to claim 2,

wherein the circumferentially-arranged image comprises any one of a circular area of a wheel to be used in a roulette game, a circular area of a dart board to be used in a dart game, and another circular area, each circular area being composed of radially-divided sectors, in which numerical symbols are arranged respectively.

12. The gaming machine according to claim 2,

wherein game media are necessary to start the game in the base game mode;

wherein the game media are not necessary to advance the game in the special game mode; and

wherein the display device displays a symbol determination image for specifying a symbol corresponding to a game number in the special game mode among the plurality of symbols.

13. The gaming machine according to claim 3,

wherein the identification information is read in the base game mode;

wherein the changed circumferentially-arranged image is displayed in the special game mode;

wherein the identification information is associated with an appearance of the game article; and

wherein display contents in the special game mode is associated with the identification information.

14. The gaming machine according to claim 3,

wherein the display device displays a symbol determination image specifying any one of the plurality of symbols.

15. The gaming machine according to claim 3,

wherein the circumferentially-arranged image comprises any one of a circular area of a wheel to be used in a roulette game, a circular area of a dart board to be used in a dart game, and another circular area, each circular area being composed of radially-divided sectors, in which numerical symbols are arranged respectively.

16. The gaming machine according to claim 3,

wherein game media are necessary to start the game in the base game mode;

wherein the game media are not necessary to advance the game in the special game mode; and

wherein the display device displays a symbol determination image for specifying a symbol corresponding to a game number in the special game mode among the plurality of symbols.

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