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OKADA(10) **Pub. No.: US 2008/0305872 A1**(43) **Pub. Date: Dec. 11, 2008**(54) **GAMING MACHINE ADJUSTING THE
VOLUME LEVEL OF BACKGROUND MUSIC****Publication Classification**(51) **Int. Cl.**
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(52) **U.S. Cl.** **463/35**(57) **ABSTRACT**

Disclosed is a gaming machine. The gaming machine comprises a game that is operated by a betting of a player; background music information that is a sound signal that becomes a background music of the game; function music information that is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player; a volume level changer capable of changing a volume level of the sound signal that becomes a background music of the game; a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game; a speaker that converts the sound signal into a sound wave and turns it up; and a game controller. The game controller is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch and to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

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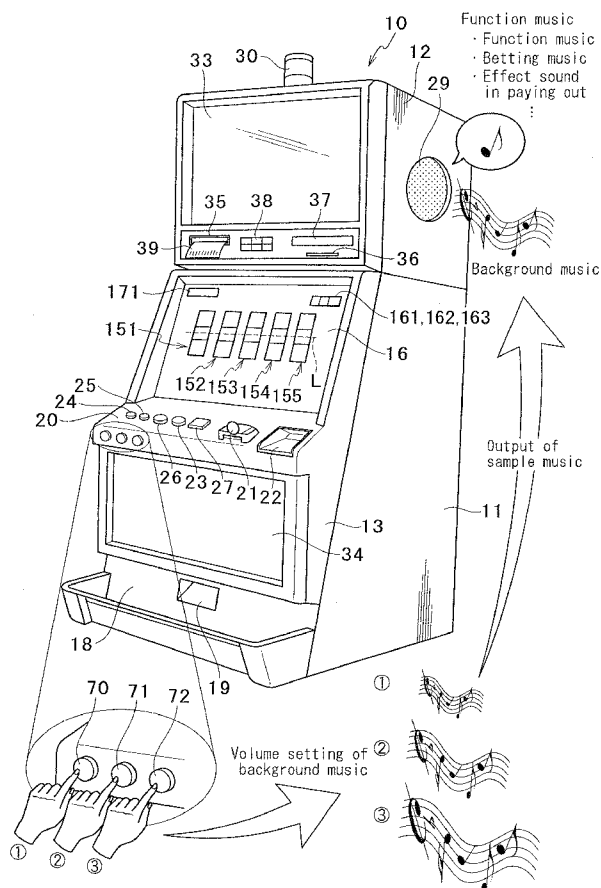
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INC., Las Vegas, NV (US)(21) **Appl. No.: 11/932,294**(22) **Filed: Oct. 31, 2007****Related U.S. Application Data**(60) **Provisional application No. 60/924,976, filed on Jun.**
7, 2007.

FIG. 1

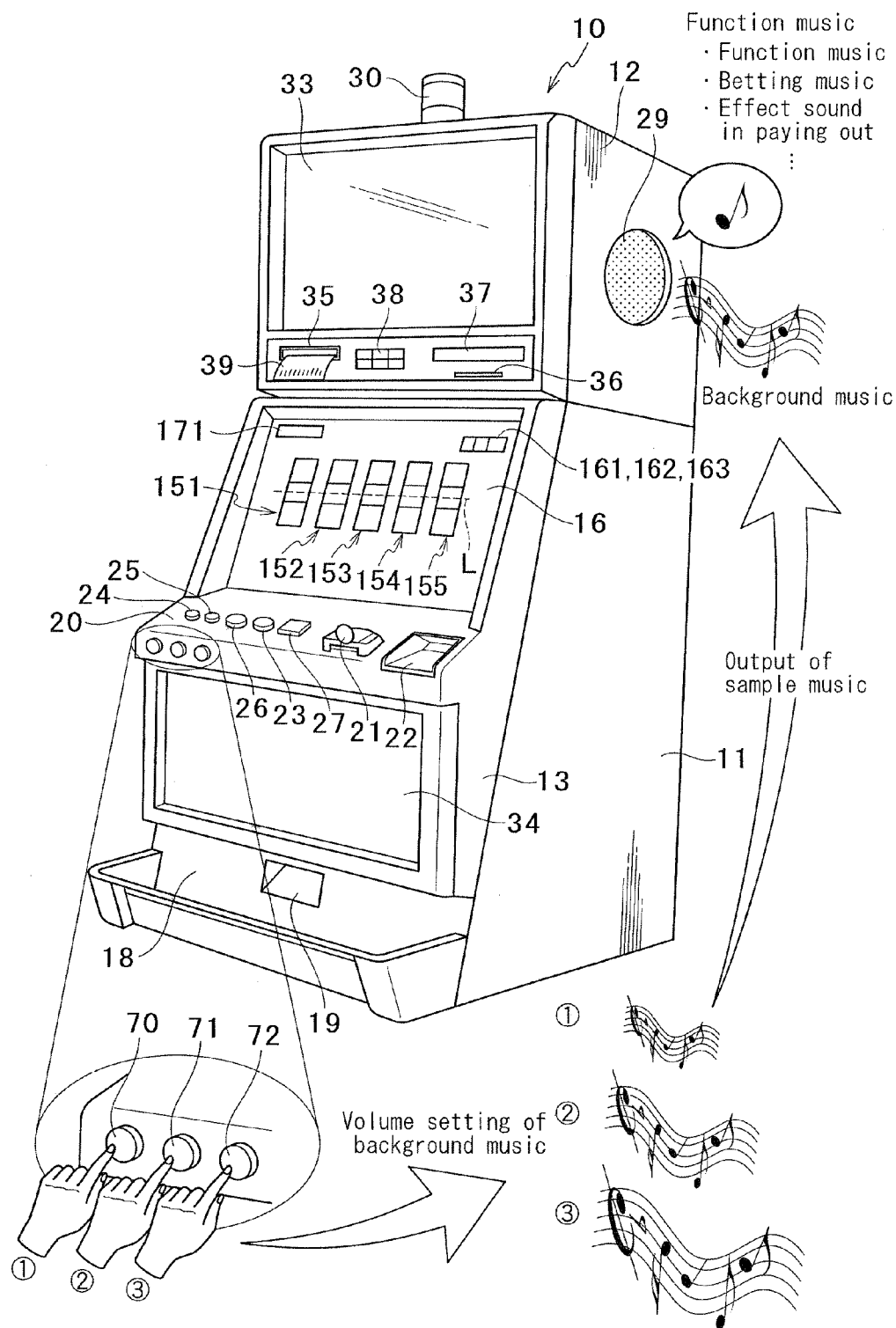


FIG. 2

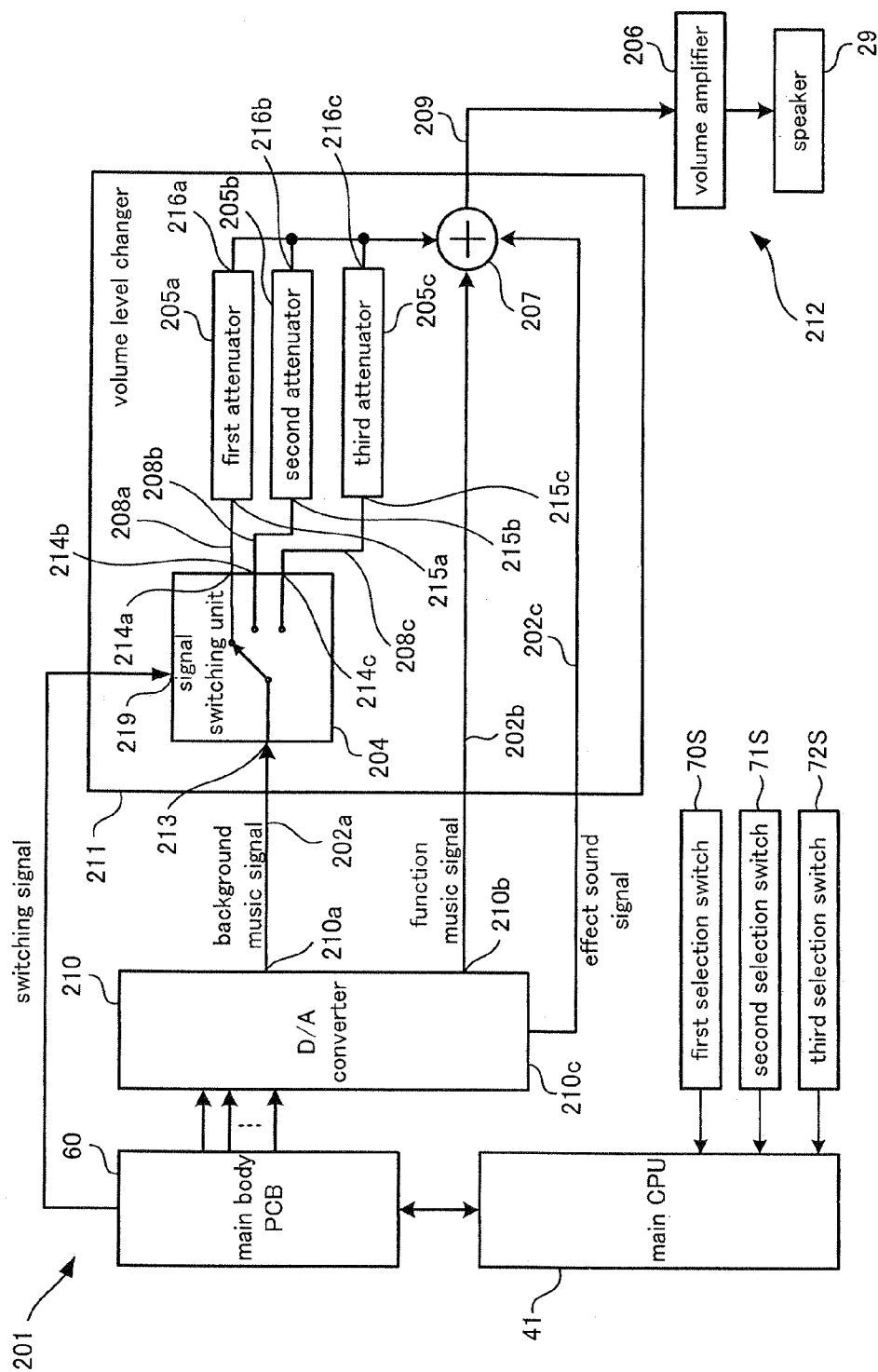


FIG. 3

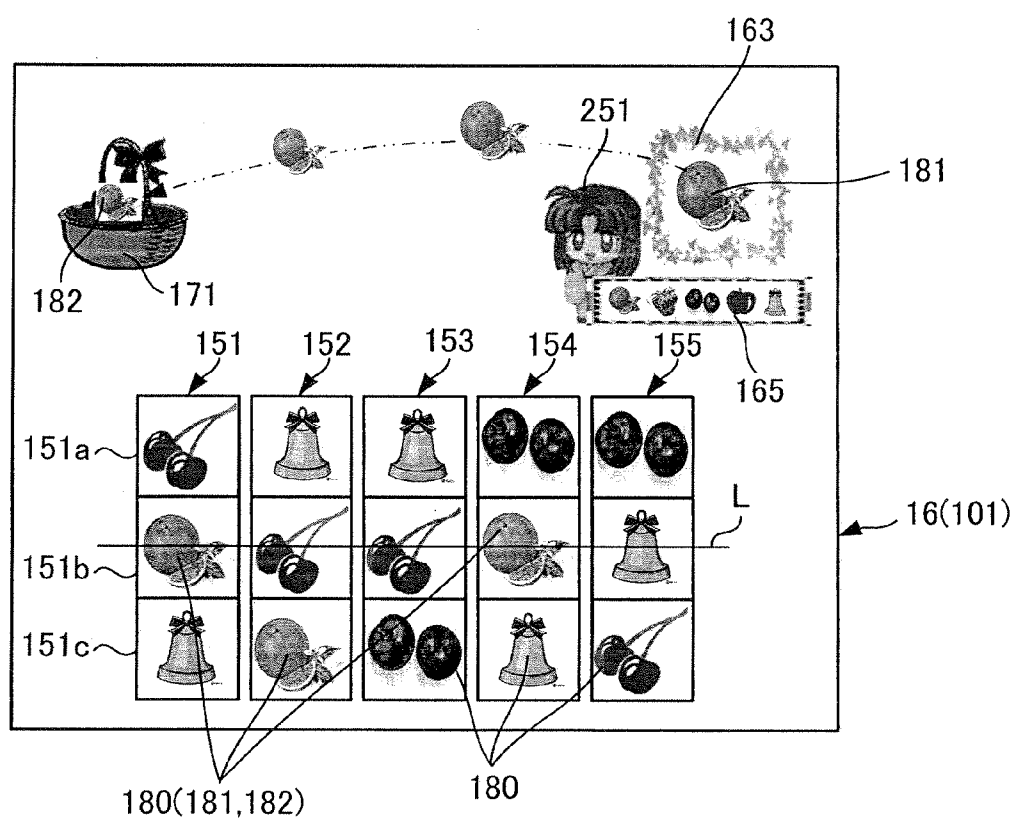


FIG. 4

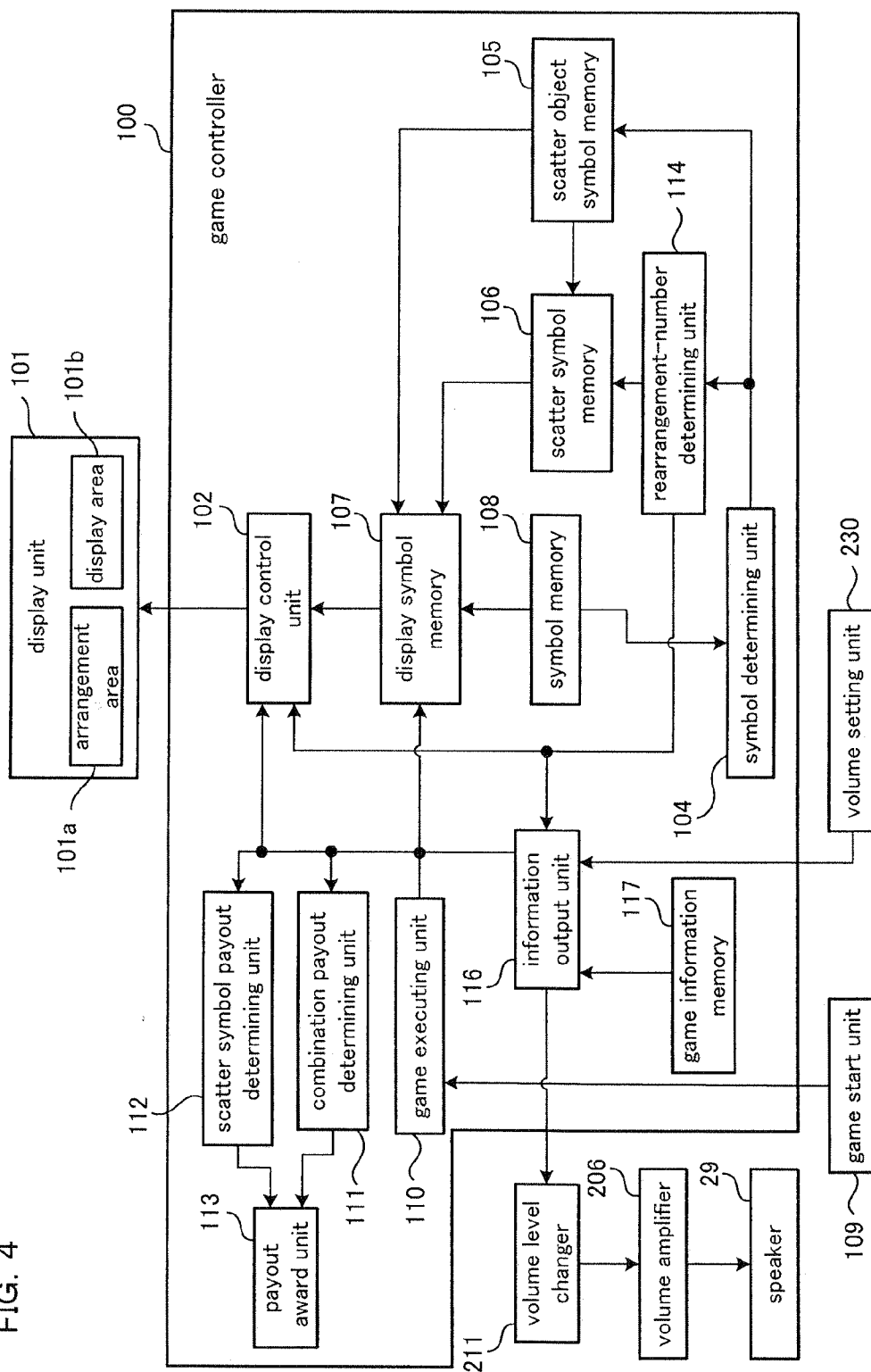


FIG. 5

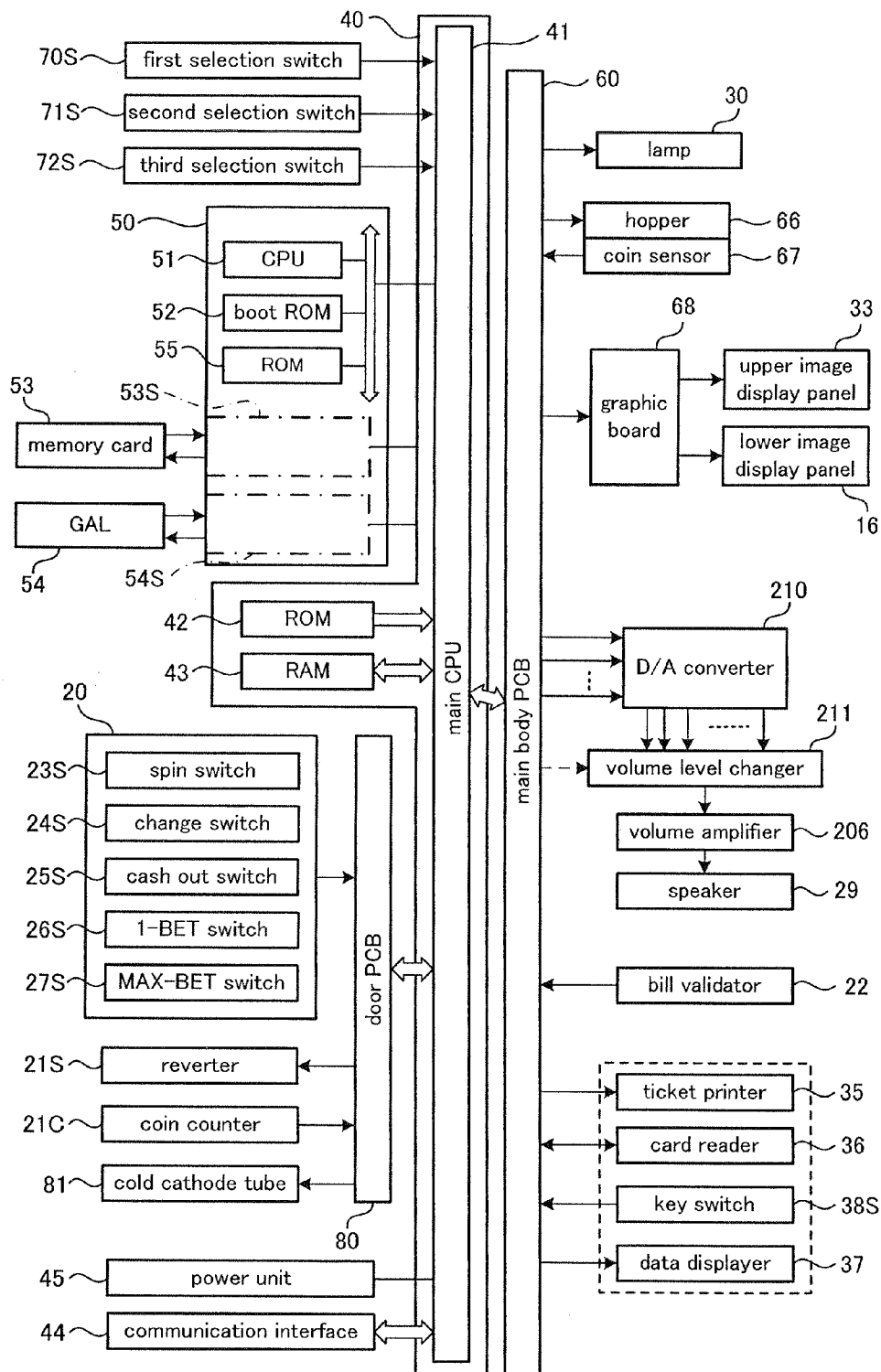


FIG. 6

Code No.	Reel 14A	Reel 14B	Reel 14C	Reel 14D	Reel 14E
	Symbol	Symbol	Symbol	Symbol	Symbol
00	JACKPOT7	JACKPOT7	JACKPOT7	JACKPOT7	JACKPOT7
01	PLUM	BELL	CHERRY	ORANGE	APPLE
02	ORANGE	APPLE	ORANGE	PLUM	ORANGE
03	PLUM	BELL	APPLE	STRAWBERRY	BELL
04	ORANGE	CHERRY	ORANGE	BELL	PLUM
05	PLUM	ORANGE	PLUM	PLUM	BLUE7
06	ORANGE	PLUM	ORANGE	APPLE	ORANGE
07	PLUM	CHERRY	PLUM	BLUE7	APPLE
08	BLUE7	BELL	ORANGE	PLUM	PLUM
09	CHERRY	APPLE	PLUM	ORANGE	BELL
10	ORANGE	BELL	ORANGE	BELL	CHERRY
11	BELL	STRAWBERRY	PLUM	ORANGE	PLUM
12	ORANGE	PLUM	BELL	PLUM	BELL
13	STRAWBERRY	BLUE7	STRAWBERRY	CHERRY	ORANGE
14	BLUE7	BELL	BLUE7	APPLE	APPLE
15	ORANGE	APPLE	BELL	STRAWBERRY	PLUM
16	APPLE	BELL	CHERRY	CHERRY	CHERRY
17	PLUM	STRAWBERRY	PLUM	BELL	ORANGE
18	ORANGE	PLUM	ORANGE	PLUM	BELL
19	PLUM	CHERRY	PLUM	ORANGE	ORANGE
20	BLUE7	BELL	ORANGE	CHERRY	PLUM
21	CHERRY	APPLE	PLUM	PLUM	STRAWBERRY

FIG. 7

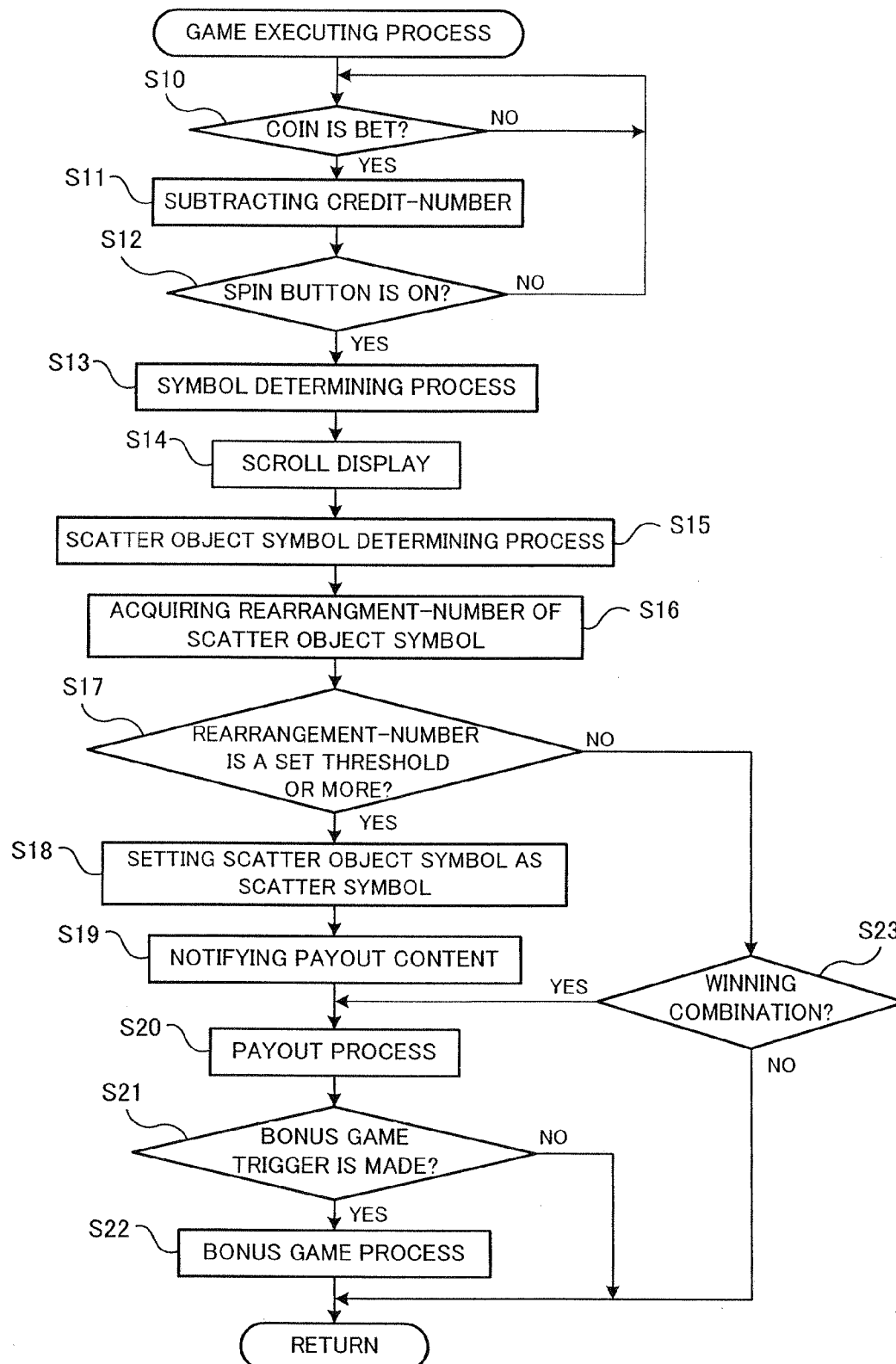


FIG. 8

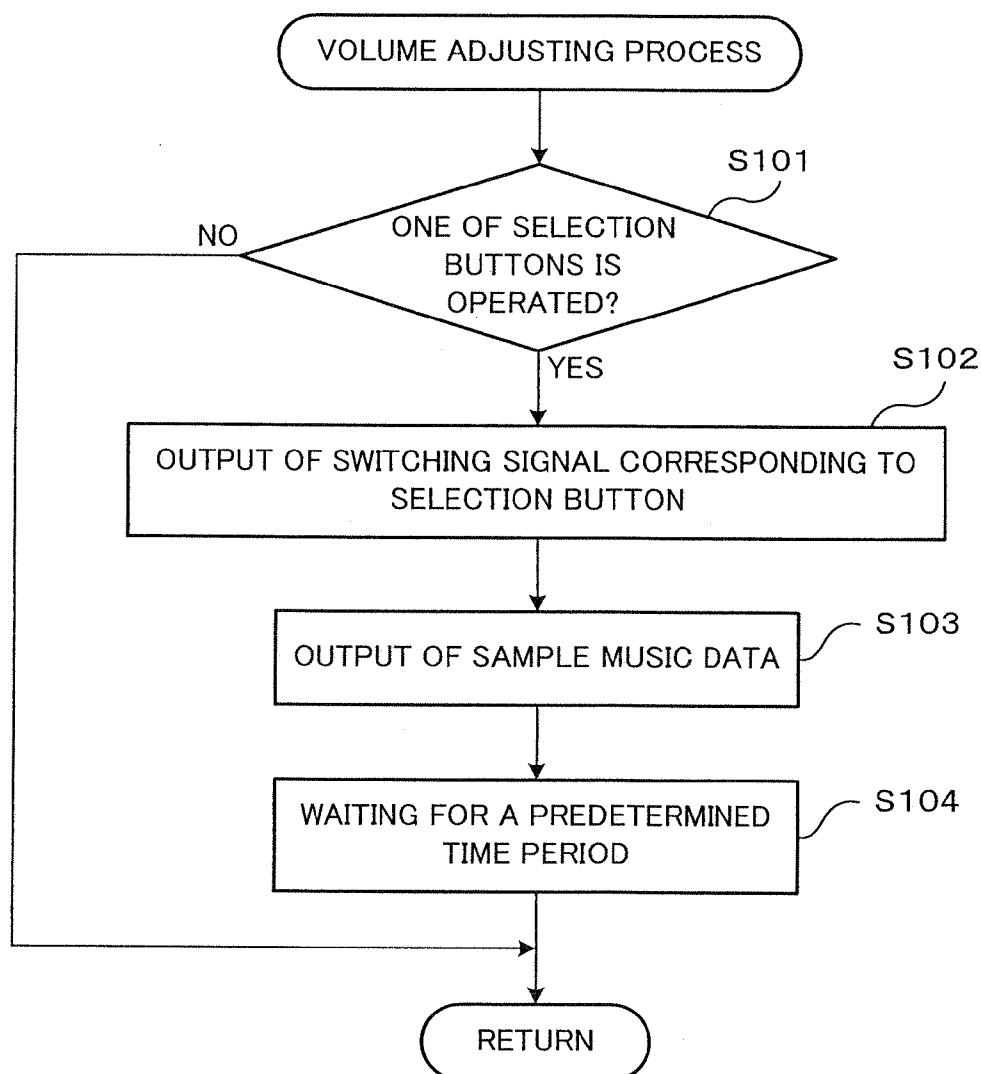
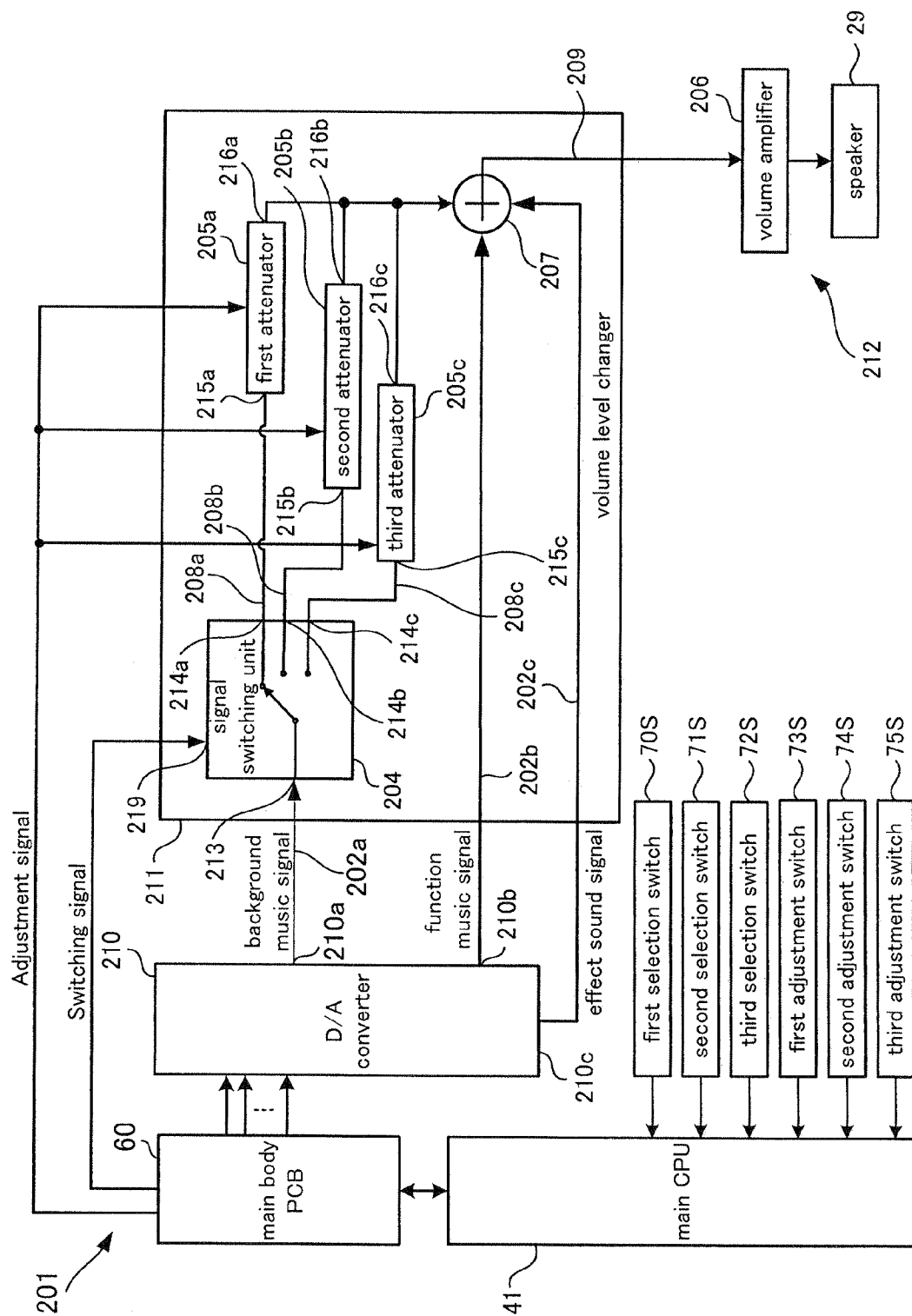


FIG. 9



GAMING MACHINE ADJUSTING THE VOLUME LEVEL OF BACKGROUND MUSIC

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 60/924,976, filed on Jun. 7, 2007.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The invention relates to a gaming machine and a method of adjusting a volume thereof.

[0003] In a conventional gaming machine, when a player inserts a game medium such as coin or bill into an insertion slot of the gaming machine and presses a start button, symbols are variably displayed in a display mounted on a front of a cabinet and the symbols are then stopped automatically.

[0004] The gaming machine, as disclosed in U.S. Pat. No. 7,128,650, for example, comprises a sound circuit that outputs a sound signal, in which a variety of effect sounds such as background music, game effect sound and the like are overlapped, and a speaker that converts the sound signal into a sound wave and turns it up. Then, the machine carries out a game effect through the effect sound outputted from the speaker. When adjusting a volume of the effect sound, a volume adjustor is operated in the sound circuit, so that an output voltage of the sound signal is increased or decreased. As a result, the volumes of all the effect sounds such as background music or game effect sound included in the sound signal are adjusted into a same level by the volume adjustor.

[0005] The invention provides a gaming machine having an adjustment function of an effect sound, which is not provided to the conventional gaming machine, and a method of adjusting a volume thereof.

SUMMARY OF THE INVENTION

[0006] The invention provides a gaming machine having structures as described below. The gaming machine comprises a game, background music information, function music information, a volume level changer, a selection switch, a speaker and a game controller. The game is operated by a betting of a player. The background music information is a sound signal that becomes a background music of the game. The function music information is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player. The volume level changer can change a volume level of the sound signal that becomes a background music of the game. The selection switch can be operated from an outside. In addition, the selection switch selects a volume level of the sound signal that becomes a background music of the game. The speaker converts the sound signal into a sound wave and turns it up. The game controller is programmed to operate as described in steps of (a1)~(a2). In a step of (a1), the game controller is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch. In a step of (a2), the game controller is programmed to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

[0007] According to the above structure, a volume level of the sound signal that becomes a background music of a game can be selected. After the sound signal, which becomes a background music of a game, is changed into the selected volume level, a sound signal including the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave that is then turned up.

[0008] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music.

[0009] The invention provides a gaming machine having structures as described below. The gaming machine comprises a game, background music information, function music information, a volume level changer, a selection switch, sample music information, a speaker and a game controller. The game is operated by a betting of a player. The background music information includes a sound signal that becomes a background music of the game. The function music information includes a sound signal that becomes a function music representing an operating state of the game relating to an action of the player. The volume level changer can change a volume level of the sound signal that becomes a background music of the game. The selection switch can be operated from an outside. In addition, the selection switch selects a volume level of the sound signal that becomes a background music of the game. The sample music information is a sound signal that becomes a sample music having a background music and a function music. The speaker converts the sound signal into a sound wave and turns it up. The game controller is programmed to operate as described in steps of (a1)~(a3). In a step of (a1), the game controller is programmed to use the sound signal of the sample music information when the selection switch is operated. In a step of (a2), the game controller is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch. In a step of (a3), the game controller is programmed to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

[0010] According to the above structure, a volume level of the sound signal that becomes a background music of a game can be selected. After the sound signal, which becomes a background music of a game, is changed into the selected volume level, a sound signal including the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave that is then turned up. In addition, when it is selected a volume level of the sound signal that becomes a background music, a sample music, which includes a background music of the selected volume level and a function music, is used.

[0011] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music. In addition, since the sample music includes the background music and the function music, it is possible to easily adjust the volume level.

[0012] The invention provides a gaming machine having structures as described below. The gaming machine comprises a game, background music information, function music information, a volume level changer, a selection switch, an adder, a speaker and a game controller. The game is operated by a betting of a player. The background music information is a sound signal that becomes a background music of the game. The function music information is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player. The volume level changer can change a volume level of the sound signal that becomes a background music of the game. The selection switch can be operated from an outside. In addition, the selection switch selects a volume level of the sound signal that becomes a background music of the game. The adder can add a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music. The speaker converts the sound signal into a sound wave and turns it up. The game controller is programmed to operate as described in steps of (a1)~(a3). In a step of (a1), the game controller is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch. In a step of (a2), the game controller is programmed to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music. In a step of (a3), the game controller is programmed to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

[0013] According to the above structure, a volume level of the sound signal that becomes a background music of a game can be selected. After the sound signal, which becomes a background music of a game, is changed into the selected volume level, a sound signal including the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave that is then turned up.

[0014] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in

accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music. In addition, since the adder adds the background music signal and the function music signal, it is possible to handle the background music and the function music as a same signal.

[0015] The invention provides a gaming machine having structures as described below. The gaming machine comprises a game, background music information, function music information, a volume level changer, a selection switch, an adjustment switch, an adder, a speaker and a game controller. The game is operated by a betting of a player. The background music information is a sound signal that becomes a background music of the game. The function music information is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player. The volume level changer can change a volume level of the sound signal that becomes a background music of the game. The selection switch can be operated from an outside. In addition, the adjustment switch adjusts a volume level of the sound signal that becomes a background music of the game. The adder can add a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music. The speaker converts the sound signal into a sound wave and turns it up. The game controller is programmed to operate as described in steps of (a1)~(a3). In a step of (a1), the game controller is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch. In a step of (a2), the game controller is programmed to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music. In a step of (a3), the game controller is programmed to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

[0016] According to the above structure, a volume level of the sound signal that becomes a background music of a game can be selected. In addition, the selectable volume level can be adjusted. Furthermore, after the sound signal, which becomes a background music of a game, is changed into the selected volume level, a sound signal including the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave that is then turned up.

[0017] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music. In addition, since the adder adds the background music signal and the function music signal, it is possible to handle the background music and the function music as a same signal.

[0018] Further, the adjustment switch capable of setting a volume level, which can be selected by a player using the selection switch, is provided in a gaming machine cabinet. Thereby, a manager of the gaming machine can enable a player to select a volume level of the background music, from a volume level that a manager such as receptionist desires.

[0019] The invention provides a method of adjusting a volume of a gaming machine having structures as described below. A volume level of a sound signal that becomes a background music of a game can be selected by an operation from an outside, a volume level of a sound signal that becomes a background music of a selected game is changed into the selected volume level and a sound signal including at least a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music representing an operating state of the game relating to an action of the player is converted into a sound wave that is then turned up.

[0020] According to the invention, a volume level of the sound signal that becomes a background music of a game can be selected. After the sound signal, which becomes a background music of a game, is changed into the selected volume level, a sound signal including the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave that is then turned up.

[0021] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG. 1 illustrates a volume adjustment state of a gaming machine;

[0023] FIG. 2 is a block diagram of a gaming machine;

[0024] FIG. 3 illustrates a display screen;

[0025] FIG. 4 is a block diagram of a gaming machine;

[0026] FIG. 5 is a block diagram showing a control circuit of a gaming machine;

[0027] FIG. 6 shows symbols and code numbers thereof;

[0028] FIG. 7 is a flow chart of a game executing process;

[0029] FIG. 8 is a flow chart of a volume adjusting process; and

[0030] FIG. 9 is a block diagram of a gaming machine.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiment 1

[0031] Hereinafter, it will be described a first embodiment of a gaming machine and a method of adjusting a volume thereof according to the invention. Meanwhile, in the following embodiment, a slot machine is described as an example of the gaming machine. However, it should be noted that the invention is not limited thereto.

[0032] (Volume Adjusting Method)

[0033] As shown in FIG. 1, a slot machine 10 executes a volume adjusting method comprising a first step of enabling a volume level of a sound signal, which becomes a background music (BGM) of a game, to be selected by an operation from an outside, a second step of changing a volume level of a sound signal that becomes a background music of a selected game into the selected volume level and a third step of converting a sound signal including at least a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music into a sound wave and turning it up. Herein, the function music is a voice sound representing an operating state of a game relating to an action of a player. For example, the function music includes a voice sound that is generated in inserting a coin, a voice sound that is generated in betting, a voice sound that is generated in paying out a coin and the like.

[0034] Thereby, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. As a result, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music.

[0035] For example, in FIG. 1, when a background music and a function music are outputted at the same time, it is possible to maintain a volume of a voice sound that is indicated as a speech bubble, even though an overall volume is decreased.

[0036] Furthermore, in the first step, a volume level of a sound signal that becomes a background music can be selectively inputted, based on a volume control signal received from an outside such as hall computer. Thereby, each slot machine 10 can collectively adjust the volumes, based on the volume control signal.

[0037] (Structure of the Volume Adjustment)

[0038] The volume adjusting method is carried out by the slot machine 10. The slot machine 10 comprises a game that is operated by a betting of a player, background music information of a sound signal that becomes a background music of the game, function music information of a sound signal that becomes a function music representing an operating state of the game relating to an action of the player, a volume level changer that can change a volume level of the sound signal that becomes a background music of the game, a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game, an adder that can add the sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music, a speaker that converts the sound signal and turns it up and a game controller programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of the game selected in the selection switch, to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music, and to turn up the added sound signal from the speaker.

[0039] In the embodiment, the slot machine 10 has a function of changing a sound signal that becomes a background music (hereinafter, referred to as background music signal) into a predetermined volume level so that it becomes a volume corresponding to an environment in a hall by an operation of a player or receptionist, thereby turning up the sound wave from the speaker together with at least the sound signal that becomes a function music (hereinafter, referred to as function music signal).

[0040] As shown in FIG. 2, the slot machine 10 has a main CPU 41, a sound signal output device 201, a volume level changer 211 and a voice sound output device 212. The sound signal output device 201 is connected to the main CPU 41 and outputs sound signals in parallel. The volume level changer 211 selectively changes a volume level of the sound signal that becomes a background music, among the sound signals outputted from the sound signal output device 201. The voice sound output device 212 overlaps the background music signal having the volume level changed, the function music signal in which the volume level is not changed and an effect sound signal and converts them into a sound wave. Herein, the effect sound signal indicates a sound signal that becomes an effect sound outputted from the speaker depending on the game states, rather than an action of the player.

[0041] The sound signal output device 201 has a main body PCB (Printed Circuit Board) 60 that outputs sound signals of a digital format in parallel and a D/A converter 210 that converts the sound signal outputted from the main body PCB 60 into an analog format. The D/A converter 210 has three output terminals 210a, 210b, 210c. The output terminals 210a, 210b, 210c output the sound signals, which are converted into the analog format in the D/A converter 210, in parallel. In the embodiment, each of the output terminals 210a, 210b, 210c is adapted to output the background music signal, the function music signal and the effect sound signal, respectively.

[0042] The sound signal output device 201 is connected to the volume level changer 211 via first transmission lines 202a, 202b, 202c so that it inputs the background music signal, the function music signal and the effect sound signal thereto. The volume level changer 211 has a signal switching unit 204, first to third attenuators 205a, 205b, 205c, an adder 207, second transmission lines 208a, 208b, 208c and an output bus 209.

[0043] The signal switching unit 204 has a single input terminal 213, three output terminals 214a, 214b, 214c and a switch changeover terminal 219. The first attenuator 205a has a single input terminal 215a and a single output terminal 216a. The second attenuator 205b has a single input terminal 215b and a single output terminal 216b. The third attenuator 205c has a single input terminal 215c and a single output terminal 216c. The adder 207 has three input terminals 217a, 217b, 217c and a single output terminal 218.

[0044] The first transmission line 202, the second transmission line 208 and the output bus 209 are respectively formed by signal lines. The signal switching unit 204 is adapted to switch to which output terminals 214a, 214b, 214c the sound signal inputted from the output terminal 213 is outputted. A switching signal is outputted in an operation timing of first to third selection buttons 70, 71, 72 and represents a connection state corresponding to the first to third selection switches 70S, 71S, 72S.

[0045] The first to third attenuators 205a, 205b, 205c consist of fixed resistors decreasing an output of the sound signal.

Meanwhile, the first to third attenuators 205a, 205b, 205c are not limited to the resistors and may consist of an OP AMP, for example.

[0046] One ends of the first transmission lines 202a~202c are respectively connected to the output terminals 210a~210c of the D/A converter 210. The other end of the first transmission line 202a is connected to the input terminal 213 of the signal switching unit 204. Thereby, the background music signal outputted from the D/A converter 210 is inputted to the signal switching unit 204 via the first transmission line 202a.

[0047] The signal switching unit 204 switches to which output terminals 214a, 214b, 214c the inputted background music signal is outputted, by a switching signal from the main body PCB 60. In the embodiment, when a first selection button 70 is pushed, the background music signal is outputted to the output terminal 214a, when a second selection button 71 is pushed, the background music signal is outputted to the output terminal 214b and when a third selection button 72 is pushed, the background music signal is outputted to the output terminal 214c.

[0048] The one ends of the second transmission lines 208a~208c are respectively connected to the output terminals 214a~214c of the signal switching unit 204. The other ends of the second transmission lines 208a, 208b, 208c are respectively connected to the input terminals 215a, 215b, 215c of the first to third attenuators 205a, 205b, 205c.

[0049] Thereby, when the background music signal is outputted to the output terminal 214a from the signal switching unit 204, an output of the background music signal is decreased by the first attenuator 205a and outputted to the output terminal 216a. In the mean time, when the background music signal is outputted to the output terminal 214b from the signal switching unit 204, an output of the background music signal is decreased by the second attenuator 205b and outputted to the output terminal 216b. In addition, when the background music signal is outputted to the output terminal 214c from the signal switching unit 204, an output of the background music signal is decreased by the third attenuator 205c and outputted to the output terminal 216c.

[0050] Meanwhile, in the embodiment, the signal outputted from the signal switching unit 204 is adapted to pass to one of the first to third attenuators 205a, 205b, 205c. However, the invention is not limited thereto. For example, by omitting the third attenuator 205c from the volume level changer 211, an output level of the background music signal may not be changed when the background music signal is outputted from the output terminal 214c. Thereby, it is possible to carry out an effect of the gaming machine by the voice sound including the background music and the function music, more flexibly.

[0051] The respective output terminals 216a, 216b, 216c of the first to third attenuators 205a, 205b, 205c are connected to the adder 207 through the signal line. The other ends of the first transmission lines 202b, 202c are connected to the adder 207.

[0052] Thereby, the background music signal in which the volume level thereof is changed by the first to third attenuators 205a, 205b, 205c, the function music signal outputted from the output terminal 210b of the D/A converter 210 and the effect sound signal outputted from the output terminal 210c of the D/A converter 210 are inputted to the adder 207. Then, the adder 207 outputs a new sound signal from the output terminal, in which the background music signal having the volume level changed, the function music signal and the effect sound signal are added.

[0053] The volume level changer **211** structured as described above is connected to the sound voice output device **212**. The sound voice output device **212** has a volume amplifier **206** and a speaker **29**. The volume amplifier **206** is connected to an output terminal of the adder **207**. The volume amplifier **206** amplifies the sound signal inputted from the adder **207** by a predetermined amplifying ratio. The volume amplifier **206** is connected to the speaker **29**. The speaker **29** converts the sound signal into a sound wave and turns it up.

[0054] Meanwhile, in the embodiment, the volume adjustment is performed in the single slot machine **10** by forming a switching signal with the first to third selection switches **70S**, **71S**, **72S** provided to the slot machine **10**. However, the invention is not limited thereto. In other words, the volume adjusting method may be carried out in a system having several slot machines **10**, a hall computer (not shown) and a communication network such as LAN or Internet that connects the slot machines **10** and the hall computer in a data communication manner. In this case, the hall computer can collectively change the volumes of the background music that are outputted from all the slot machines **10**.

[0055] In addition, the slot machine **10** has sample music information of the sound signal that becomes a sample music including the background music having the volume level selectable by the selection buttons **70**, **71**, **72** and the function music. The slot machine may have a game controller programmed to use the sound signal of the sample music information when the first to third selection buttons **70**, **71**, **72** are operated, to change a volume level of the background music signal selected in the first to third selection buttons **70**, **71**, **72** and to output the background music signal from the speaker. In this case, since the sample music includes the background music and the function music, the player can easily change the volume level.

[0056] (Slot Machine **10**)

[0057] In the followings, the slot machine **10** having the volume level changer **211** will be specifically described.

[0058] As shown in FIGS. 1 and 3, the slot machine **10** executes a playing method comprising steps of randomly selecting a scatter object symbol **181** from many symbols **180**, rearranging the symbols **180** in a display, awarding a payout determined by a combination of the symbols **180** rearranged on a payline **L**, and when a predetermined number or more of the scatter object symbols **181** is rearranged, setting the scatter object symbol **181** as a scatter symbol **182**, notifying a content of a payout determined on the basis of the scatter symbol **182** and awarding the payout.

[0059] In addition, the slot machine **10** executes a playing method comprising steps of providing a display area (scatter object symbol display unit **163**) to a part different from an arrangement area (display windows **151**~**155**) for arranging the symbols **180** and displaying the scatter object symbol **181** in the display area, and when a predetermined number or more of the scatter object symbols **181** is rearranged, notifying that the scatter object symbol **181** is set as a scatter symbol **182**.

[0060] Herein, the “arrangement” means a state in which the symbols **180** including the scatter symbol **182** are allowed to be visible with naked eyes of an exterior player. In other words, the symbols **180** are under state of being displayed in the display windows **151**~**155**. In the mean time, the “rearrangement” is meant by arranging the symbols **180** again after dismissing the arrangement of the symbols **180**. In addition, the “payline” **L** is provided to determine a combination of the

symbols **180**. In other words, when the symbols **180** are rearranged on and out of the payline **L**, a combination is determined for only the symbols **180** rearranged on the payline. As a result of the determination for a combination, when it is made a winning combination, it is carried out, for example, a process of paying out a coin in accordance with the winning combination.

[0061] In addition, the “scatter symbol” **182** is a symbol making it a condition that a winning is made through only the arrangement thereof, irrespective of the payline **L**. In other words, when the scatter symbol **182** is rearranged, a winning is made and it is carried out, for example, a process of paying out a coin on the basis of the number of all the scatter symbols **182** rearranged on and out of the payline **L**. The “scatter object symbol **181**” is a symbol functioning as a scatter symbol on condition that a predetermined number or more of the symbols is rearranged. For example, in a case where a scatter object symbol is “BELL” and the number of rearrangement (set threshold) is set to be “3,” when three or more “BELLS” are rearranged, it functions as a scatter symbol and when two or less “BELLS” are rearranged, it functions as a typical symbol. In addition, the “symbol **180**” means all symbols used in the slot machine **10** and includes the scatter symbol **182** and the scatter object symbol **181**. The payline **L**, the symbol **180**, the scatter symbol **182** and a winning combination will be more specifically described later.

[0062] (Display Unit **101**)

[0063] As shown in FIG. 3, the slot machine **10** executing the above playing method is provided with a display unit **101** (display) and a game controller **100**. The display unit **101** is structured to have the payline **L** and to arrange the symbols **180** including the scatter symbol **182**. In addition, the display unit **101** is structured to provide the scatter object symbol display unit **163** (display area **101b**) to a part different from the display windows **151**~**155** (arrangement area **101a**) for arranging the symbols **180**.

[0064] The display unit **101** may be a mechanical structure with a reel device for arranging the symbols **180** by rotation of a reel or electrical structure with a video reel on which an image is displayed for arranging the symbols **180**. Further, the display unit **101** may be a structure of combining a mechanical structure (reel) and an electrical structure (video reel). The electrical structure may include a liquid crystal device, a CRT (cathode-ray tube), a plasma display and the like. A detailed structure of the display unit **101** will be described later.

[0065] (Game Controller **100**)

[0066] The game controller **100** is structured to execute a first process of randomly selecting a scatter object symbol **181** from many symbols **180**, a second process of rearranging the symbols **180** in a display, a third process of awarding a payout determined by a combination of the symbols **180** rearranged on a payline **L**, and a fourth process of when a predetermined number or more of the scatter object symbols **181** is rearranged, setting the scatter object symbol **181** as a scatter symbol **182**, notifying a content of a payout determined on the basis of the scatter symbol **182** and awarding the payout. In other words, the game controller **100** has a first processing unit, a second processing unit, a third process unit and a fourth processing unit.

[0067] In addition, the game controller **100** is structured to execute a fifth process of providing a display area **101b** (scatter object symbol display unit **163**) to a part different from an arrangement area **101a** (display windows **151**~**155**) for arranging the symbols **180** and displaying the scatter object

symbol **181** in the display area **101b**, and a sixth process of when a predetermined number or more of the scatter object symbols **181** is rearranged, notifying that the scatter object symbol **181** is set as a scatter symbol **182**. In other words, the game controller **100** has a fifth processing unit and a sixth processing unit in addition to the first to fourth processing units.

[0068] The game controller **100** comprises a scatter object symbol memory **105** for storing the scatter object symbols **181**, a scatter symbol memory **106** for storing a scatter symbol **182**, a symbol memory **108** for storing all symbols including the scatter symbols **182** and a display symbol memory **107** for storing the symbols in the respective memories **105**, **106**, **108** as a display symbol. The display symbol memory **107** can be accessed by a display control unit **102**. The display control unit **102** sets the arrangement area **101a** for arranging the symbols **180** and the display area **101b** for displaying the scatter object symbols **181** in the different parts of the display unit **101**. In addition, the display control unit **102** reads out the symbols **180** in the display symbol memory **107** under control of a game executing unit **110** and displays the symbols **180** in the arrangements area **101a** and the scatter object symbols **181** in the display area **101b**. A detailed display state will be described later.

[0069] Further, the game controller **100** is connected to a game start unit **109**. The game start unit **109** has a function of outputting a game start signal in accordance with control of the player. The game controller **100** comprises a game executing unit **110** for rearranging the symbols with an input of a game start signal, as trigger, from the game start unit **109**, a combination payout determining unit **111** for determining a payout determined by a combination of the symbols rearranged on the payline in a unit game, a scatter symbol payout determining unit **112** for determining a payout determined on the basis of the scatter symbols rearranged on and out of the payline and a payout award unit **113** for awarding the respective payouts determined in the combination payout determining unit **111** and the scatter symbol payout determining unit **112**.

[0070] In addition, the game controller **100** has a symbol determining unit **104** that is operated when a game start signal is inputted from the game start unit **109**. The symbol determining unit **104** randomly selects the scatter object symbol **181** from the symbols **180**. The symbol determining unit **104** outputs the scatter object symbol **181** to a rearrangement-number determining unit **114** and the scatter object symbol memory **105**. The rearrangement-number determining unit **114** sets the scatter object symbol **181** as a scatter symbol **182** when a predetermined number of the scatter object symbols **181** is rearranged. In other words, the rearrangement-number determining unit **114** enables the scatter object symbol memory **105** to transmit the scatter object symbol **181** stored therein to the scatter symbol memory **106**, thereby setting it as the scatter symbol **182**.

[0071] Furthermore, the game controller **100** comprises an information output unit **116** and a game information memory **117** and a volume setting unit **230** connected to the information output unit **116**. The game information memory **117** stores the background music data of a sound signal that becomes a background music of a game, the function music data of a sound signal that becomes a function music representing an operating state of a game relating to an action of a player and the sample music data of a sound signal that becomes a sample music having the background music and

the function music. In addition, the game information memory **117** stores character data corresponding to the scatter symbol **182**, payout-number data and description data and the like, in addition to the above information.

[0072] The volume setting unit **230** is adapted to be operated from an outside and to select a volume level of the sound signal. Specifically, it consists of the first to third selection switches **70S**, **71S**, **72S** in FIG. 2 and the other switches. In the mean time, the volume setting unit **230** may be a touch panel provided to the display unit **101** of a liquid crystal display device. In addition, the volume setting unit **230** may be installed to an outside of the gaming machine and alternatively, may be installed in the gaming machine.

[0073] The information output unit **116** is adapted to read out the data stored in the game information memory **117** and to output it as a sound signal to the volume level changer **211**. In addition, the information output unit **116** is adapted to output a switching signal of the volume setting unit **230** to the volume level changer **211**. The volume level changer **211** is adapted to switch, by the switching signal, a volume level of the background signal that is to be changed. Thereby, the information output unit **116** reads out a variety of data from the game information memory **117** and outputs it to the volume level changer **211**, thereby outputting a voice sound, in which the background music having the volume level selected on the basis of the switching signal and the function music are overlapped, through the volume amplifier **206** and the speaker **29**.

[0074] In the mean time, each block of the game controller **100** may be structured with a hardware or software, as required.

[0075] (Operation of the Game Controller **100**)

[0076] With the above structure, an operation of the game controller **100** will be described.

[0077] When a game start signal is outputted from the game start unit **109** through an operation of a player, the symbol determining unit **104** starts a process and the game executing unit **110** starts a unit game, so that the symbols **180** are rearranged (second process). The symbol determining unit **104** randomly selects a scatter object symbol **181** from the symbols **180** stored in the symbol memory **108** (first process). The determined scatter object symbol **181** is stored in the scatter object symbol memory **105** and is also used for a determination process in the rearrangement-number determining unit **114**.

[0078] The scatter object symbol **181** stored in the scatter object symbol memory **105** is outputted to the display symbol memory **107** and then used for an image process in the display control unit **102**, so that it is displayed in the display area **101b** of the display unit **101**. In other words, the game controller **100** executes the fifth process of providing the display area **101b** to a part different from the arrangement area **101a** for arranging the symbols **180** and displaying the scatter object symbol **181** in the display area **101b**. Thereby, the player can easily recognize the scatter object symbol **181** since the scatter object symbol **181** is displayed in the display area **101b** separated from the arrangement area **101a**.

[0079] In addition, when the symbols **180** are rearranged as a unit game is executed, the rearrangement-number determining unit **114** specifies the scatter object symbol **181** among the rearranged symbols **180** and calculates a rearrangement-number of the scatter object symbol **181**. Then, when the predetermined number or more of the scatter object symbols **181** is rearranged, it sets the scatter object symbol **181** as a

scatter symbol **182**. In other words, it transmits the scatter object symbol **181** stored in the scatter object symbol memory **105** to the scatter symbol memory **106**. Thereby, the scatter object symbol **181** serves as a scatter symbol **182**.

[0080] In addition, when the scatter symbol **182** is set, the information output unit **116** reads out the character data corresponding to the scatter symbol **182**, the payout-number data and the description data from the game information memory **117** and outputs the data to the display control unit **102**. Then, it is notified the contents of a payout determined on the basis of the scatter symbols **182** rearranged on and out of the payline L and the payout is awarded (fourth process). Further, the data is outputted to the volume level changer **211** and then outputted as voice sound from the speaker **29**.

[0081] In addition, when the game is executed as described above, a function music representing a game start is outputted in starting a game and a function music representing a payout is outputted in awarding a payout. In addition to the function music, a background music is outputted. At this time, the background music has a volume level that is selected in the volume setting unit **230** by the volume level changer **211**.

[0082] Thereby, since the player can select a background music that the player desires with respect to the function music, it is possible to decrease the displeasure of the player. In addition, when the volume setting unit **230** is operated, the sample music including the background music and the function music is outputted. Accordingly, it is possible to easily adjust the volume level.

[0083] (Display State)

[0084] It is specifically described an example of a display state of the display unit **101**, with respect to the operation processes of the slot machine **10**. In the mean time, as shown in FIG. 3, the display state is described with reference to a structure in which the display unit **101** arranges the symbols with a video reel manner.

[0085] The display unit **101** has display windows **151~155** as the arrangement area for arranging the plural symbols. The display windows **151~155** are arranged in a central part of the display unit **101**. In the display windows **151~155**, symbol columns consisting of the plural symbols **180** are scroll-displayed. In addition, each of the display windows **151~155** is divided into upper, center and lower stages **151a**, **151b**, **151c**. Each of the symbols **180** is stopped (arranged) in the respective stages **151a**, **151b**, **151c**. For example, in FIG. 3, "ORANGE" is stopped in the upper stage **151a** of the display window **151**, "STRAWBERRY" is stopped in the center stage **151b** of the display window **151** and "BLUE 7" is stopped in the lower stage **151c** of the display window **151**. As a result, the display windows **151~155** display a symbol matrix consisting of 5 columns and 3 rows. In the mean time, the symbol matrix is not limited to 5 columns/3 rows.

[0086] In addition, the display unit **101** has the scatter object symbol display unit **163** as the display area for displaying the scatter object symbols **181**. The scatter object symbol display unit **163** is arranged in a right-handed upper part of the display unit **101** so as not to overlap with the display windows **151~155**. In the mean time, the scatter object symbol display unit **163** may be provided in an arbitrary position on condition that it can avoid overlapping with the display windows **151~155**.

[0087] A selection object window **165** is provided below the scatter object symbol display unit **163**. The selection object window **165** displays a symbol which will be a candidate for the scatter object symbol **181**. Accordingly, the player

can intuitively recognize that a scatter object symbol **181** is randomly selected among the candidate symbols displayed in the selection object window **165** and then displayed in the scatter object symbol display unit **163**.

[0088] In addition, the display unit **101** has a scatter symbol display unit **171**. The scatter symbol display unit **171** is basket-shaped, and displays the scatter symbol **182** as a received thing. The scatter symbol display unit **171** is provided to a left-handed upper corner part of the display unit **101**. In the mean time, the scatter symbol display unit **171** may be provided to an arbitrary position on condition that it can avoid overlapping with the display windows **151~155** and the scatter object symbol display unit **163**.

[0089] A display state of FIG. 3 shows a state that the scatter symbol **182** has been set. Specifically, "ORANGE" is displayed as a received thing in the scatter symbol display unit **171**, through a series of operations that "ORANGE" displayed in the scatter object symbol display unit **163** is moved to the scatter symbol **182** and then received. As a result, the player can intuitively recognize that "ORANGE" has been set as the scatter symbol **182** by observing the displayed state of the scatter symbol **182** with naked eyes.

[0090] (Symbol, Combination, Etc.)

[0091] As shown in FIG. 5, the symbols **180** to be displayed in the display windows **151~155** of the display unit **101** constitute columns of symbols by 22 symbols. The symbols constituting the respective columns of symbols are given with one code number of 0~21. Each of the columns of symbols is constituted with a combination of symbols of "JACKPOT 7," "BLUE 7," "BELL," "CHERRY," "STRAWBERRY," "PLUM," "ORANGE" and "APPLE."

[0092] The three successive symbols in the columns of symbols are displayed (arranged) in the upper, center and lower stages **151a**, **151b**, **151c** of the display windows **151~155**, respectively, so that they constitute a symbol matrix of 5 columns/3 rows. When a 1-BET button **26** or MAX-BET button **27** is pushed and then a spin button **23** is pushed, the symbols constituting the symbol matrix starts the scroll. When the scroll starts, the scrolls of the respective symbols are stopped (rearranged) after a predetermined time period has lapsed.

[0093] In addition, various winning combinations are predetermined with regard to the respective symbols. The winning combination is a combination that a combination of symbols stopped on the payline L becomes an advantageous state to the player. The advantageous state is a state in which a coin is paid out in accordance with the winning combination, the payout-number of coins is added to a credit, a bonus game is started, and the like.

[0094] Specifically, when a combination of "APPLE" symbol is stopped on the payline L, a bonus is triggered and a gaming state is shifted to a bonus game from a basic game. In addition, when a symbol of "CHERRY" is stopped on the payline L, 20 coins (game medium) are paid out per one bet. When a symbol of "PLUM" is stopped on the payline L, 5 coins are paid out per one bet.

[0095] In the mean time, a bonus game is a gaming state that is more advantageous than a basic game. In one embodiment, the bonus game is a free game. The free game is a gaming state allowing a player to play a game for a predetermined number of times, without betting a coin. The bonus game is not particularly limited as long as it is a gaming state advantageous to the player, i.e., it is more advantageous than the basic game. For example, the bonus game may include a state in

which it is possible to obtain more game medium than the basic game, a state in which it is possible to obtain a game medium in a higher probability than in the basic game, a state in which a game medium is less consumed than in the basic game, and the like. Specifically, a free game, a second game and the like are examples of the bonus game.

[0096] (Mechanical Structure)

[0097] In the followings, it will be described an example of the slot machine 10 structured in a mechanical and electrical manner.

[0098] As shown in FIG. 1, the slot machine 10 is provided in a game arcade. The slot machine 10 executes a unit game by using a game medium. The game medium is a coin, bill or electronic negotiable information corresponding to them. Meanwhile, in the invention, the game medium is not particularly limited. For example, a medal, token, electronic money, ticket and the like can be used. The ticket is not particularly limited and may be a ticket with a barcode that will be described later.

[0099] The slot machine 10 comprises a cabinet 11, a top box 12 provided to an upper part of the cabinet 11 and a main door 13 provided to a front of the cabinet 11. The main door 13 is provided with a lower image display panel 16. The lower image display panel 16 has a transparent liquid crystal panel for displaying a variety of information. The lower image display panel 16 displays a video reel and a variety of information and effect images relating to a game. Specifically, the lower image display panel 16 displays the display windows 151~155 of 5 columns/3 rows, the scatter object symbol display unit 163 and the scatter symbol display unit 171, and other effect images, as required.

[0100] In the mean time, in this embodiment, it is exemplified a case where the symbols of 5 columns/3 rows are displayed with the lower image display panel 16. However, the invention is not limited thereto. For example, a mechanical reel having symbols provided to a periphery thereof may be rotated and stopped to display symbols that are beyond a display window 151.

[0101] One activated payline L is displayed in the lower image display panel 16. The payline L is set to horizontally traverse the center stages 151b of the display windows 151~155. Meanwhile, in this embodiment, although the payline L traverses the center stages 151b of the display windows 151~155, it may traverse the other stages of the display windows 151~155. For example, the payline L may traverse the upper stages 151a or lower stages 151c of the display windows 151~155. Alternatively, the payline L may traverse the lower stage 151c of the display window 151, the center stage 151b of the display window 152 and the upper stage 151a of the display window 153. Further, the payline L may be 2 or more. When two or more paylines L are provided, all paylines L may be activated and the number of paylines L relating to a predetermined condition such as bet-number of coins may be activated.

[0102] In the mean time, a credit-number display unit and a payout-number display unit may be displayed in the lower image display panel 16. The credit-number display unit displays a total number that the slot machine 10 can pay out to a player (which will be referred to as total credit-number). The payout-number display unit displays number of coins to be paid out when a combination of symbols stopped on the payline is a winning combination.

[0103] A control panel 20, a coin receiving slot 21 and a bill validator 22 are provided below the lower image display

panel 16. The control panel 20 is provided with plural buttons 23~27. The buttons 23~27 allows instructions, which are related to a game progress by a player, to be inputted. The coin receiving slot 21 enables a coin to be received in the cabinet 11.

[0104] The control panel 20 is provided with a spin button 23, a change button 24, a cash out button 25, a 1-BET button 26, a MAX-BET button 27 and the first to third selection buttons 70, 71, 72. The spin button 23 is a button for inputting an instruction to start the scroll of symbols. The change button 24 is a button to be used when a player asks a staff in the game arcade for exchange of money. The cash out button 25 is a button for inputting an instruction to pay out the coins of total credit-number into a coin tray 18.

[0105] The 1-BET button 26 is a button for inputting an instruction to bet one coin, among coins of the total credit-number, per one game. The MAX-BET button 27 is a button for inputting an instruction to bet maximum coins (for example, 50 coins), among coins of the total credit-number, per one game.

[0106] The bill validator 22 validates whether bill is normal or not and receives the normal bill into the cabinet 11. In the mean time, the bill validator 22 can read a ticket 39 having a barcode which will be described later. When the bill validator 22 reads the ticket 39 having a barcode, it outputs a reading signal relating to the read content to a main CPU 41.

[0107] A belly glass 34 is provided to a lower frontal surface of the main door 13, i.e., below the control panel 20. A character of the slot machine 10 and the like are drawn on the belly glass 34. An upper image display panel 33 is mounted to a front of the top box 12. The upper image display panel 33 has a liquid crystal panel and displays, for example, an effect image and an image indicating an introduction of a game content and an explanation of a game rule.

[0108] To the top box 12 is mounted a speaker 29 for outputting voice. A ticket printer 35, a card reader 36, a data display 37 and a keypad 38 are provided below the upper image display panel 33. The ticket printer 35 prints a barcode having data encoded thereto, such as credit-number, date and time, identification number of the slot machine 10 and the like, onto a ticket, thereby outputting the ticket 39 having the barcode. The player can play a game in another gaming machine with the ticket 39 having a barcode and exchange the ticket 39 having a barcode with bill in a change booth of the game arcade.

[0109] The card reader 36 reads and writes the data from and into a smart card. The smart card is a card carried by a player, into which data for identifying the player and data relating to a game history of the player are memorized.

[0110] The data display 37 consists of a fluorescent display and the like, and displays the data read by the card reader 36 and the data inputted by the player through the keypad 38. The keypad 38 inputs instructions or data relating to a ticket issue.

[0111] (Electrical Structure)

[0112] A control unit having the game controller 100 or the volume level changer 211 shown in FIG. 4 is mounted in the cabinet 11. As shown in FIG. 5, the control unit comprises a motherboard 40, a main body PCB (Printed Circuit Board) 60, a gaming board 50, a sub CPU, a door PCB 80, and various switches and sensors.

[0113] The gaming board 50 is provided with a CPU (Central Processing Unit) 51, a ROM 55 and a boot ROM 52 which are connected to each other by an internal bus, a card slot 53S

corresponding to a memory card **53** and an IC socket **54S** corresponding to a GAL (Generic Array Logic) **54**.

[0114] The memory card **53** stores a game program and a game system program therein. The game program includes a stop symbol determining program. The stop symbol determining program is a program for determining a symbol (code number corresponding to the symbol) to be stopped on the payline **L**. The stop symbol determining program includes symbol weight data corresponding to each of plural payout rate (for example, 80%, 84%, 88%). The symbol weight data is data representing a correspondence relation between the code number of each symbol and 1 or plural random numbers belonging to a predetermined numerical range (0~256) for each of the display windows **151~155**.

[0115] The payout rate is determined on the basis of data for setting a payout rate, which data is outputted from the GAL **54**, and a stop symbol is determined on the basis of the symbol weight data corresponding to the payout rate.

[0116] Further, the memory card **53** stores various data used for the game program and the game system program. Specifically, the data representing a relationship between the symbols **180** displayed in the display windows **151~155** and the random number ranges and the data representing a relationship between the set thresholds and the random number ranges and the like are stored in a data table form shown in FIG. **1**. In the mean time, these data are transmitted to a RAM **43** of the motherboard **40** when executing the game program.

[0117] In addition, the card slot **53S** is structured to insert and remove the memory card **53** and connected to the motherboard **40** through an IDE bus. Accordingly, it is possible to change a type or content of a game to be executed in the slot machine **10**, by removing the memory card **53** from the card slot **53S**, writing another game program and game system program in the memory card **53** and inserting the memory card **53** into the card slot **53S**.

[0118] The game program includes a program relating to a game progress and a program for shifting a gaming state into a bonus game.

[0119] The GAL **54** is provided with plural input and output ports. When the data is inputted into the input ports, the GAL **54** outputs data corresponding to the inputted data from the output ports. The data outputted from the output ports is the data for setting a payout rate that has been described above.

[0120] The IC socket **54S** is structured to attach and detach the GAL **54**. The IC socket **54S** is connected to the motherboard **40** through a PCI bus. Accordingly, it is possible to change the data for setting a payout rate which is outputted from the GAL **54**, by detaching the GAL **54** from the IC socket **54S**, rewriting the program stored in the GAL **54** and then attaching the GAL **54** to the IC socket **54S**.

[0121] The CPU **51**, the ROM **55** and the boot ROM **52**, which are connected to each other by the internal bus, are connected to the motherboard **40** through the PCI bus. The PCI bus carries out a signal transfer between the motherboard **40** and the gaming board **50** and supplies power to the gaming board **50** from the motherboard **40**. The ROM **55** stores nation identification information and an authentication program. The boot ROM **52** stores a preliminary authentication program and a program (boot code) enabling the CPU **51** to execute the preliminary authentication program.

[0122] The authentication program is a program (falsification check program) for authenticating the game program and the game system program. The authentication program is a program for confirming and verifying that the game program

and the game system program are not falsified. In other words, the authentication program is described in accordance with a procedure for authenticating the game program and the game system program. The preliminary authentication program is a program for authenticating the authentication program. The preliminary authentication program is described in accordance with a procedure for verifying that the authentication to be authenticated is not falsified, i.e., for authenticating the authentication program.

[0123] The motherboard **40** is provided with a main CPU **41** (controller), a ROM (Read Only Memory) **42**, a RAM (Random Access Memory) **43** and a communication interface **44**.

[0124] The main CPU **41** has functions of a game controller for controlling the whole slot machine **10**. In particular, the main CPU **41** carries out a control for outputting a command signal to scroll the symbols of the lower image display panel **16** when the spin button **23** is pushed after the credit is bet, a control for determining symbols to be stopped after the symbols are scrolled and a control for stopping the determined symbols in the display windows **151~155**.

[0125] In other words, the main CPU **41** has functions of an arrangement controller for selecting and determining arrangement symbols with regard to a symbol matrix from the plural types of symbols so as to rearrange them, as a new symbol matrix after scrolling the plural symbols to be displayed in the lower image display panel **16**, and executing an arrangement control which will be stopped at the determined symbols from the scroll state.

[0126] In addition, the main CPU **41** has functions of the game controller **182** for executing a first process of randomly selecting a scatter object symbol **181** from the symbols **180**, a second process of rearranging the symbols **180** in the display, a third process of awarding a payout determined on the basis of the symbols **180** on the payline **L** and a fourth process of when a predetermined number or more of the scatter object symbols **181** is rearranged, setting the scatter object symbol **181** as a scatter symbol **182**, notifying a content of a payout determined on the basis of the scatter symbol **182** through voice sound and display and awarding the payout. Further, the main CPU **41** has a function of the game controller **100** for executing a fifth process of providing a display area (scatter object symbol display unit **163**) to a part different from the arrangement area (display windows **151~155**) for arranging the symbols **180** and displaying the scatter object symbol **181** in the display area and a sixth process of when a predetermined number or more of the scatter object symbols **181** is rearranged, notifying that the scatter object symbol **181** is set as a scatter symbol **182**.

[0127] The ROM **42** stores a program such as BIOS (Basis Input/Output System) executed by the main CPU **41**, and data that is permanently used. When the BIOS is executed by the main CPU **41**, each of peripheral devices is initialized and the game program and the game system program stored in the memory card **53** are read out through the gaming board **50**.

[0128] The RAM **43** stores the data or program which is used when the main CPU **41** carries out a process. For example, in the RAM **43**, the scatter object symbol memory **105**, the scatter symbol memory **106**, the symbol memory **108**, the display symbol memory **107** and the game information memory **117** shown in FIG. **4** are respectively provided in a data area form. The data area of the scatter object symbol memory **105** stores the scatter object symbol **181**. The data area of the scatter symbol memory **106** stores the scatter

symbol **182**. The data area of the symbol memory **108** stores the symbols **180**. The data area of the display symbol memory **107** stores the symbols **180**, the scatter object symbols **181** and the scatter symbol **182**.

[0129] The communication interface **44** is provided to communicate with a host computer and the like through a communication line, which are mounted in the game arcade. In addition, the motherboard **40** is connected to the main body PCB (Printed Circuit Board) **60** and the door PCB **80** through a USB (Universal Serial Bus). Further, the motherboard **40** is connected to a power unit **45**. When power is supplied to the motherboard **40** from the power unit **45**, the main CPU **41** of the motherboard **40** is operated and the power is supplied to the gaming board **50** through the PCI bus, so that the CPU **51** is also operated.

[0130] The main body PCB **60** and the door PCB **80** are connected to a device or apparatus for producing an input signal which will be inputted to the main CPU **41**, and a device or apparatus which is controlled by the control signal outputted from the main CPU **41**. The main CPU **41** executes the game program and the game system program stored in the RAM **43**, based on the input signal inputted to the main CPU **41** to carry out an arithmetic process, thereby storing a result thereof in the RAM **43** or transmitting a control signal to each device or apparatus to control it.

[0131] The main body PCB **60** is connected with a lamp **30**, the sub CPU, a hopper **66**, a coin sensor **67**, a graphic board **68**, the D/A converter **210**, the volume level changer **211**, the bill validator **22**, the ticket printer **35**, the card reader **36**, a key switch **38S** and the data displayer **37**. The D/A converter **210** is connected to the speaker **29** through the volume level changer **211** and the volume amplifier **206**.

[0132] The lamp **30** is turned on/off on the basis of the control signal outputted from the main CPU **41**. The sub CPU controls the scroll of symbols of the display windows **151~155** and is connected to a VDP (Video Display Processor). The VDP reads out image data of the symbol stored in an image data ROM, produces a scroll image to be displayed in the display windows **151~155** and outputs the scroll image in the lower image display panel **16**.

[0133] The hopper **66** is mounted in the cabinet **11** and pays out predetermined number of coins to the coin tray **18** from the coin payout slot **19**, based on the control signal outputted from the main CPU **41**. The coin sensor **67** is mounted in the coin payout slot **19** and outputs an input signal to the main CPU **41** when it detects that the predetermined number of coins are paid out from the coin payout slot **19**.

[0134] The graphic board **68** controls an image display in the upper image display panel **33** and the lower image display panel **16**, based on the control signal outputted from the main CPU **41**. In addition, the graphic board **68** is provided with a VDP for producing image data on the basis of the control signal outputted from the main CPU **41**, a video RAM for temporarily storing the image data produced by the VDP, and the like.

[0135] The bill validator **22** reads an image of the bill and accommodates the normal bill in the cabinet **11**. In addition, in accommodating the normal bill, the bill validator **22** outputs an input signal to the main CPU **41**, based on an amount of the bill. The main CPU **41** stores a credit-number, which corresponds to the amount of the bill transmitted by the input signal, in the RAM **43**.

[0136] The ticket printer **35** prints a barcode having data encoded thereto, such as credit-number stored in the RAM

43, date and time, identification number of the slot machine **10** and the like, on a ticket, based on the control signal outputted from the main CPU **41**, thereby outputting the ticket **39** having the barcode.

[0137] The card reader **36** reads the data from the smart card to transmit it to the main CPU **41**, and writes the data into the smart card, based on the control signal outputted from the main CPU **41**. The key switch **38S** is mounted to the keypad **38**, and outputs an input signal to the main CPU **41** when the player manipulates the keypad **38**. The data displayer **37** displays the data which is read by the card reader **36** or the data which the player inputs through the keypad **38**, based on the control signal outputted from the main CPU **41**.

[0138] The door PCB **80** is connected with the control panel **20**, a reverter **21S**, a coin counter **21C** and a cold cathode tube **81**. The control panel **20** is provided with a spin switch **23S** corresponding to the spin button **23**, a change switch **24S** corresponding to the change button **24**, a cash out switch **25S** corresponding to the cash out button **25**, a 1-BET switch **26S** corresponding to the 1-BET button **26** and a MAX-BET switch **27S** corresponding to the MAX-BET button **27**. Each of the switches **23S~27S** outputs an input signal to the main CPU **41** when each of the corresponding buttons **23~27** is pushed by a player.

[0139] The coin counter **21C** is mounted in the coin receiving slot **21** and validates whether a coin, which is inserted in the coin receiving slot **21** by the player, is normal or not. A coin except the normal coin is discharged from the coin payout slot **19**. In addition, the coin counter **21C** outputs an input signal to the main CPU **41** when it detects a normal coin.

[0140] The coin counter **21C** is operated on the basis of the control signal outputted from the main CPU **41** and distributes a coin, which is recognized as a normal coin by the coin counter **21C**, to a cash box (not shown) or hopper **66** mounted in the slot machine **10**. In other words, when the hopper **66** is fully filled with the coins, the normal coin is distributed into the cash box by the reverter **21S**. In the mean time, when the hopper **66** is not fully filled with the coins, the normal coin is distributed into the hopper **66**. The cold cathode tube **81** functions as a backlight mounted to rear sides of the lower image display panel **16** and the upper image display panel **33** and is turned on, based on the control signal outputted from the main CPU **41**.

[0141] (Volume Adjustment)

[0142] Hereinafter, it is described a volume adjustment that is performed in the slot machine **10**. As the main CPU **41** executes a volume adjustment processing routine of FIG. **8**, it is determined whether one of the first to third selection buttons **70, 71, 72** is operated by the player (S101). When the first to third selection buttons **70, 71, 72** are not operated (S101, NO), this routine is ended and a standby state is made until the operation is carried out.

[0143] When the first to third selection buttons **70, 71, 72** are operated (S101, YES), a switching signal corresponding to the first to third selection buttons **70, 71, 72** is outputted to the volume level changer **211** (S102). Then, the sample music data is outputted to the volume level changer **211** (S103). After a predetermined time period of standby elapses (S104), this routine is ended.

[0144] Thereby, as shown in FIG. **2**, the sample music data is outputted to the D/A converter **210** via the main body PCB **60** and then is converted into an analog signal format. A background music signal is outputted from the first output terminal **210a** of the D/A converter **210** and a function music

signal is outputted from the second output terminal **210b**. The background music signal passes to a connection passage corresponding to the switching signal of the signal switching unit **204** and is then outputted to the first to third attenuators **205a**, **205b**, **205c** specified by the switching signal.

[0145] After the volume level of the background music signal is decreased in the first to third attenuators **205a**, **205b**, **205c**, the background music signal is overlapped with the function music signal in the adder **207**, which is then outputted to the volume amplifier **206**. Then, the sample music in which the volume of the background music is decreased is outputted from the speaker **29**, so that the player having operated the first to third selection buttons **70**, **71**, **72** hears the sound. The player determines whether the sample music is proper or not. When the player is dissatisfied with the volume of the background music with respect to the function music, the player may tentatively hear a next sample music by operating the first to third selection buttons **70**, **71**, **72**, and adjust the volume so that it becomes a desired volume.

[0146] (Processing Operation)

[0147] In the followings, it will be described a process which is carried out in the slot machine **10** wherein the volume is adjusted as described above. When the main CPU **41** reads out and executes the game program, a game is started. As shown in FIG. 7, in the game executing process, it is determined whether a coin is bet (S10). In this process, it is determined whether it is received an input signal from the 1-BET switch **26S** as the 1-BET button **26** is pushed and whether it is received an input signal from the MAX-BET switch **27S** as the MAX-BET button **27** is pushed. When the coin is not bet (S10, NO), the step of S10 is re-executed and it is under standby state until a coin is bet.

[0148] In the mean time, when the coin is bet (S10, YES), the credit-number stored in the RAM **43** is subtracted, correspondingly to the number of coins bet (S11). Meanwhile, if the number of coins bet is larger than the credit-number stored in the RAM **43**, it is not carried out the process of subtracting the credit-number and the step of S11 is re-executed. In addition, if the number of coins bet is above the upper limit (50 pieces in this embodiment) which can be bet per one game, it is not carried out the process of subtracting the credit-number and a step of S12 is carried out.

[0149] Next, it is determined whether the spin button **23** is ON or not (S12). When the spin button **23** is not ON (S12, NO), the procedure is returned to the step of S10. Meanwhile, when the spin button **23** has not been ON (for example, the spin button **23** is not ON and an instruction to end the game is inputted), it is canceled the subtraction result in the step of S11.

[0150] In the mean time, when the spin button **23** is ON (S12, YES), a symbol determining process is executed (S13). In other words, a stop symbol determining program stored in the RAM **43** is executed, so that it is determined the symbols **180** which will be stopped in the fifteen respective stages of the display windows **151~155**. Thereby, it is determined a combination of symbols to be stopped on the payline L.

[0151] Then, the symbols **180** of the display windows **151~155** are scroll-displayed (S14). In the mean time, the scroll process is such that the symbols **180** are scrolled in an arrow direction and then the symbols **180** determined in the step of S13 are stopped (rearranged) in the display windows **151~155**.

[0152] After that, a scatter object symbol determining process is executed (S15). In other words, a scatter object symbol **181** is randomly determined from the symbols **180** of "BELL," "CHERRY," "STRAWBERRY," "PLUM,"

"ORANGE" and "APPLE." Then, the determined scatter object symbol **181** is displayed in the scatter object symbol display unit **163**.

[0153] When the scroll of the symbols **180** is stopped, it is acquired a rearrangement-number of the scatter object symbol **181** (S16). Then, it is determined whether the rearrangement-number is a set threshold or more (S17). When it is a set threshold or more (S17, YES), the scatter object symbol **181** is set as a scatter symbol **182**. Specifically, the scatter object symbol **181** is displayed as a received thing in the scatter symbol display unit **171**, through a series of operations that the scatter object symbol **181** is moved from the scatter object symbol display unit **163** to the scatter symbol display unit **171** and then received in the scatter symbol display unit **171** (S18).

[0154] After that, a character **251** is displayed between the scatter symbol display unit **171** and the scatter object symbol display unit **163** and a speech bubble representing a speech content of the character **251** is displayed. In addition, the speech content of the character **251** is outputted with a voice sound. Specifically, an original description image **252** of "ORANGE has become a scatter symbol" is displayed in the speech bubble and is voice-outputted (S19).

[0155] After that, a payout process is carried out. In other words, it is summed a payout-number of coins based on a winning combination and a payout-number of coins based on the display number of the scatter symbols **182**. Then, when the coins to be paid out are stored, a predetermined number of credits is added to a credit-number that is stored in the RAM **43**. In the mean time, when paying out the coins, a control signal is transmitted to the hopper **66**, so that a predetermined number of coins is paid out (S20).

[0156] In the mean time, when the rearrangement number is not a set threshold or more (S17, NO), it is determined whether a combination of the symbols **180** stopped on the payline L is a winning combination (S23). When it is not a winning combination (S23, NO), the combination is neither the scatter symbol **182** nor a winning combination. This means a blank, so that this routine is ended.

[0157] In the mean time, when the combination is a winning combination (S23, YES), the step of S20 is executed. After that, it is determined whether a bonus trigger is made as the winning combination. In other words, it is determined whether a combination of "APPLE" is arranged on the payline L (S21). When it is determined that a bonus trigger is made (S21, YES), a bonus game process is executed (S22). Meanwhile, when a bonus trigger is not made (S21, NO), this means a blank, so that this routine is ended.

Embodiment 2

[0158] In the followings, a second embodiment of the gaming machine and the volume adjusting method thereof according to the invention will be described. In the mean time, the same member as the first embodiment is provided with a same reference numeral and the description thereof is omitted. In addition, the descriptions of the structure and operation same as the first embodiment is omitted.

[0159] (Volume Adjusting Method)

[0160] A slot machine **10** according to this embodiment comprises a gaming machine cabinet, a game that is operated by a betting of a player, background music information of a sound signal that becomes a background music of the game, function music information of a sound signal that becomes a function music representing an operating state of the game relating to an action of the player, a volume level changer capable of changing a volume level of the sound signal that becomes a background music of the game, a selection switch that can be operated from an outside and selects a volume

level of the sound signal that becomes a background music of the game, an adjustment switch that is provided in the gaming machine cabinet and can adjust a volume level of the sound signal that becomes a background music of the game selected by the selection switch, and an adder that adds a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music, a speaker that converts the sound signal into a sound wave and turns it up, and a game controller programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch, to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music and to turn up the added sound signal from the speaker.

[0161] According to the above structure, it is possible to select a volume level of the sound signal that becomes a background music of a game. Furthermore, after the sound signal that becomes a background music of the game is changed into the selected volume level, the sound signal having added the sound signal that becomes a background music and the sound signal that becomes a function music is converted into a sound wave and then is turned up.

[0162] As a result, it is possible to enable a player to hear the background music having a volume based on the selected volume level and the function music. Accordingly, when increasing the volume level of the background music, it is possible to enable the player to have a difficulty in hearing the function music. To the contrary, when decreasing the volume level of the background music, it is possible to enable the player to easily hear the function music. Thereby, since it is possible to change the volume level of the function music in accordance with a provision environment of the gaming machine and the player's preference, the player can flexibly carry out an effect of the gaming machine by the voice sound including the background music and the function music. In addition, since the adder adds the background music signal and the function music signal, it is possible to handle the background music and the function music as a same signal.

[0163] Furthermore, the adjustment switch capable of setting a volume level, which can be selected by a player using the selection switch, is provided in a gaming machine cabinet. Thereby, a manager of the gaming machine can enable a player to select a volume level of the background music, from a volume level that a manager such as receptionist desires.

[0164] Specifically, as shown in FIG. 9, the slot machine 10 is different from the first embodiment 1 in that it has first to third adjustment switches 73S, 74S, 75S. In addition, it is different from the first embodiment in that it is connected to the main body PCB 60 and the first to third attenuators 205a, 205b, 205c through the signal lines. Furthermore, as compared to the first embodiment, the first to third attenuators 205a, 205b, 205c consist of variable resistors that decrease an output of a sound signal.

[0165] In this embodiment, the first to third adjustment switches 73S, 74S, 75S are electrically connected to the main CPU 41. In addition, the first to third adjustment switches 73S, 74S, 75S are provided in the cabinet 11. Accordingly, the player cannot adjust the first to third adjustment switches 73S, 74S, 75S. At a timing at which a manager such as receptionist operates any of the first to third adjustment switches 73S, 74S, 75S in the cabinet 11, an adjustment signal is transmitted from the main body PCB 60 to the first to third attenuators 205a, 205b, 205c corresponding to the first to third adjustment switches 73S, 74S, 75S.

[0166] The adjustment signal includes the information about the resistance magnitudes of the first to third attenua-

tors 205a, 205b, 205c, which are determined in accordance with the operation amount of the first to third adjustment switches 73S, 74S, 75S. Based on the information about the resistance magnitudes, any resistance magnitude of the first to third attenuators 205a, 205b, 205c corresponding to the first to third adjustment switches 73S, 74S, 75S operated is adjusted in accordance with the operation amount. The other structures are same as the first embodiment.

[0167] In the mean time, although the above descriptions of the first and second embodiments have been provided with regard to the characteristic parts so as to understand the invention more easily, the invention is not limited to the first and second embodiments as described above and can be applied to the other embodiments and the applicable scope should be construed as broadly as possible. Furthermore, the terms and phraseology used in the specification have been used to correctly illustrate the invention, not to limit it. In addition, it will be understood by those skilled in the art that the other structures, systems, methods and the like included in the spirit of the invention can be easily derived from the spirit of the invention described in the specification. Accordingly, it should be considered that the invention covers equivalent structures thereof without departing from the spirit and scope of the invention as defined in the following claims. Further, the abstract is provided so that an intellectual property office and a general public institution or one skilled in the art who is not familiar with patent and legal or professional terminology can quickly analyze the technical features and essences of the invention through a simple investigation. Accordingly, the abstract is not intended to limit the scope of the invention that should be evaluated by the claims. In addition, it is required to sufficiently refer to the documents that have been already disclosed, so as to fully understand the objects and effects of the invention.

[0168] The above descriptions include a process that is executed on a computer or computer network. The above descriptions and expressions have been provided so that the one skilled in the art can understand the invention most effectively. In the specification, the respective steps used to induce one result or blocks having a predetermined processing function should be understood as a process having no self-contradiction. In addition, the electrical or magnetic signal is transmitted/received and written in the respective steps or blocks. Although the processes in the respective steps or blocks embody the signal as a bit, value, symbol character, term, number and the like, it should be noted that these have been used for the convenience of descriptions. Further, although the processes in the respective steps or blocks have been often described as an expression common to a human action, the process described in the specification is executed by a variety of devices in principle. In addition, the other structures necessary for the respective steps or blocks are apparent from the above descriptions.

What is claimed is:

1. A gaming machine comprising:

- a game that is operated by a betting of a player;
- background music information that is a sound signal that becomes a background music of the game;
- function music information that is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player;
- a volume level changer capable of changing a volume level of the sound signal that becomes a background music of the game;
- a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game;

a speaker that converts the sound signal into a sound wave and turns it up; and

a game controller that is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch and to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

2. A gaming machine having comprising:

a game that is operated by a betting of a player;

background music information that is a sound signal that becomes a background music of the game;

function music information that is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player;

a volume level changer capable of changing a volume level of the sound signal that becomes a background music of the game;

a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game;

sample music information that is a sound signal that becomes a sample music having a background music and a function music;

a speaker that converts the sound signal into a sound wave and turns it up; and

a game controller that is programmed to use the sound signal of the sample music information when the selection switch is operated, to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch and to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

3. A gaming machine having comprising:

a game that is operated by a betting of a player;

background music information that is a sound signal that becomes a background music of the game;

function music information that is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player;

a volume level changer capable of changing a volume level of the sound signal that becomes a background music of the game;

a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game;

an adder that is capable of adding a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music;

a speaker that converts the sound signal into a sound wave and turns it up; and

a game controller that is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch, to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music and to turn up a sound signal, from the speaker, including the sound signal that becomes a background music of the game having the volume level changed and the sound signal that becomes a function music.

4. A gaming machine comprising:

a gaming machine cabinet;

a game that is operated by a betting of a player;

background music information that is a sound signal that becomes a background music of the game;

function music information that is a sound signal that becomes a function music representing an operating state of the game relating to an action of the player;

a volume level changer that is capable of changing a volume level of the sound signal that becomes a background music of the game;

a selection switch that is adapted to be operated from an outside and selects a volume level of the sound signal that becomes a background music of the game;

an adjustment switch that is provided in the gaming machine cabinet and is capable of adjusting a volume level of the sound signal that becomes a background music of the game;

an adder that is capable of adding a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music;

a speaker that converts the sound signal into a sound wave and turns it up; and

a game controller that is programmed to change, in the volume level changer, a volume level of the sound signal that becomes a background music of a game selected in the selection switch, to add, in the adder, at least the sound signal having the volume level changed and the sound signal that becomes a function music and to turn up the added sound signal from the speaker.

5. A method of adjusting a volume of a gaming machine wherein a volume level of a sound signal that becomes a background music of a game is adapted to be selected by an operation from an outside, a volume level of a sound signal that becomes a background music of the selected game is changed into the selected volume level and a sound signal including at least a sound signal that becomes a background music of the game having the volume level changed and a sound signal that becomes a function music representing an operating state of the game relating to an action of the player is converted into a sound wave that is then turned up.

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