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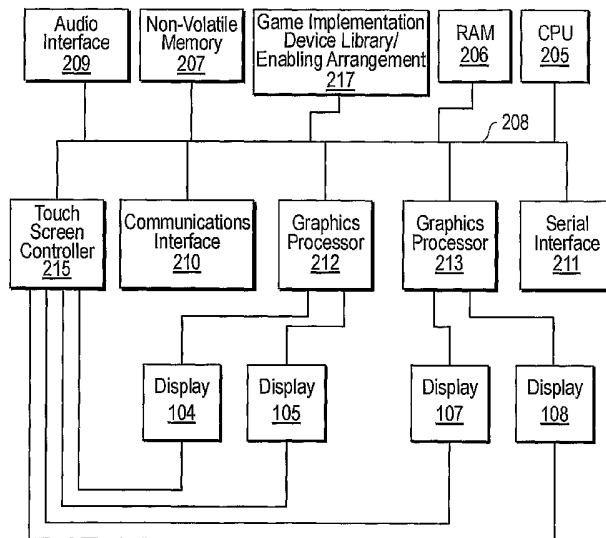
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(54) Title: CONFIGURABLE GAMING MACHINE AND METHOD FOR CONFIGURING GAMES IN A GAMING MACHINE



(57) Abstract: A gaming machine (100) includes a number of game implementation devices, each adapted to be placed alternatively in an enabled or disabled condition. Each respective game implementation device is operable to implement at least a portion of a respective game at the gaming machine (100) when the respective game implementation device is in its enabled state in the gaming machine. The gaming machine (100) also includes an enabling arrangement for selectively placing any of the respective implementation devices in the enabled state. A video display (104) is included in the gaming machine (100) for displaying graphic portions of a respective one of the games when the respective game is implemented at the gaming machine (100).

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CONFIGURABLE GAMING MACHINE AND METHOD FOR CONFIGURING GAMES IN A GAMING MACHINE

TECHNICAL FIELD OF THE INVENTION

The present invention relates to gaming machines through which a player may make a wager in return for a chance at some payout or prize. More particularly, the invention relates to a securely configurable gaming machine that may provide any one of a number of different games.

BACKGROUND OF THE INVENTION

Modern gaming machines employ various electronic devices for conducting games and/or for presenting results to players. Some of these gaming machines are entirely electronic and use a video display device to present images to the player in the course of play. For example, video slot machines use a video display to present representations of spinning reels to imitate the reels of a mechanical slot machine. Another example of a gaming machine that uses a video display in the play of a game is a video poker machine, which uses a video display to produce graphic representations of playing cards.

Modern gaming machines also employ various types of processing devices for performing or directing the various gaming machine functions. Functions that may be performed by a processing device in a gaming machine include identifying results of a play in a game and correlating results with prizes, for example. Some modern gaming machines employ one or more general purpose processors, executing suitable operational program code to perform or direct the required functions. Other types of gaming machines may employ one or more special purpose processing devices to perform the required gaming machine functions.

Regardless of whether general purpose or special purpose processing devices are employed in a gaming machine, modern gaming machines employing such electronic devices may be relatively easy to modify as compared to traditional mechanical gaming machines. In the case of gaming machines using general purpose processing devices, games may be modified substantially by causing the processing devices to execute new or different operational program code. In the case of gaming machines employing a special purpose processing device for performing a given function, that function may be changed simply by replacing the special purpose processing device with a different special processing device.

While the ability to easily modify modern gaming machines opens up a great number of possibilities for gaming facility operators, the relative ease with which modern gaming machines may be modified also presents serious security issues. Chief among these issues is the potential for a gaming machine to be modified in an illegal or otherwise unauthorized manner. For example, an electronically implemented gaming machine might be changed in an unauthorized manner to change the odds of winning at the machine.

SUMMARY OF THE INVENTION

The present invention provides a gaming machine that may have certain electronically controlled functions modified in a secure fashion from a remote location and without requiring physical access to the secure interior components of the gaming machine. The invention also provides methods and program products for securely modifying electronically controlled functions of a gaming machine from a remote location. The electronically controlled functions that may be modified according to the invention may comprise any aspect of a game or even the entire game. In particular, the present invention allows the graphics used in the course of a game, that is, the game presentation to be modified or completely replaced. The present invention also allows the result determination or selection functions performed at a gaming machine to be securely modified or replaced.

A gaming machine embodying the principles of the invention includes a number of game implementation devices, each adapted to be placed alternatively in an enabled or disabled condition. Each respective game implementation device is operable to implement at least a portion of a respective game at the gaming machine when the respective game implementation device is in its enabled state in the gaming machine. The gaming machine also includes an enabling arrangement for selectively placing any of the respective implementation devices in the enabled state. A video display is included in the gaming machine for displaying graphic portions of a respective one of the games when the respective game is implemented at the gaming machine.

In some forms of the invention, each game implementation device comprises a read only memory device storing operational program code. In these forms of the invention, the game implementation devices are read by a suitable reading device and loaded into memory associated with a processing device which executes the operational program code to implement the intended portion of a game. Other forms of the present invention use game

implementation devices that comprise electronic circuits containing processing elements. In these forms of the invention, each game implementation device is placed in an enabled state by either physically securing the device in a suitable connector while the remaining game implementation devices remain unconnected or by selectively addressing the desired game implementation device from among the other connected game implementation devices.

As used in this disclosure and the accompanying claims, implementing a portion of a game at a gaming machine means that at least some aspect of the game is performed. For example, the portion of the game may be a portion of a display generated at a video monitor in the course of the game. As another example, the portion of the game may be the portion that determines the result for a given game play and/or how the result will be presented to the player through a video display at the gaming machine. It will be noted that the game implementation devices according to the invention may implement an entire game including the various graphics that are presented to the player through the video display or displays of the gaming machine and including the manner in which results are determined and the manner in which inputs are taken from the player.

A preferred method according to the present invention includes housing a number of the game implementation devices in a secure area of a gaming machine, selecting a respective one of the game implementation devices in response to a game loading command, and placing the selected game implementation device in an enabled state. The method also includes conducting a game at the gaming machine at least in part through the selected implementation device in the enabled state.

Some forms of the present invention are implemented through a computer program executed at the gaming machine. Thus, the invention also encompasses program products. A program product according to one preferred form of the present invention includes game enabling program code and command program code. The game enabling program code is executable to selectively enable a respective one of the game implementation devices in response to a game loading command. The command program code is executable to receive a game selection input and generate the game loading command in response to the game selection input.

By housing a number of different game implementation devices at a gaming machine according to the invention, the gaming machine may be securely configured to provide many different types of games or many different versions of a given game. This configuration may

be performed both for gaming machines employing general purpose processing devices and special purpose processing devices or combinations of both different types of processing devices. The configuration may also be performed without having to actually download game program code to the gaming machine from a remote location, and thus, the gaming machine need not be enabled to receive such program code. This allows gaming machines according to the present invention to be maintained in a more secure condition.

These and other advantages and features of the invention will be apparent from the following description of the preferred embodiments, considered along with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is view in perspective of a gaming machine embodying the principles of the present invention.

Figure 2 is diagrammatic representation of the various components that may be included in a gaming machine according to the present invention.

Figure 3 is a diagrammatic side view of a game instruction library according to one preferred form of the present invention.

Figure 4 is a diagrammatic end view of the game instruction library shown in Figure 3.

Figure 5 is a diagrammatic representation of an alternate game instruction library according to the present invention.

Figure 6 is a diagrammatic representation of another alternate game instruction library according to the present invention.

Figure 7 is a process flow diagram illustrating a process according to the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The claims at the end of this application set out novel features which the Applicants believe are characteristic of the invention. The various advantages and features of the invention together with preferred modes of use of the invention will best be understood by reference to the following description of illustrative embodiments read in conjunction with the drawings introduced above.

Figures 1 and 2 may be used to describe a particular gaming machine embodying the principles of the present invention. Figures 3 through 6 will be used below to describe various alternate game implementation devices and enabling arrangements for enabling the game implementation devices. The process flow diagram of Figure 7 will be referred to below to describe a method embodying the principles of the invention.

Referring to Figure 1, a gaming machine 100 includes a cabinet 101 having a front side generally shown at reference numeral 102. A game video display 104 is mounted in a central portion of the front surface 102 with a ledge 106 positioned below the game video display and projecting forwardly from the plane of the game video display. In addition to game video display 104, the illustrated gaming machine includes a first additional video display 107 positioned on the front side of cabinet 101 above game video display 104, and a second additional video display 108 mounted on the front side of the cabinet below the game video display. Each of these displays, game video display 104, first additional video display 107, and second additional video display 108 participate in the operation of game machine 100 to provide a presentation for a particular game or potentially presentations for multiple games simultaneously. It is noted that gaming machine 100 is shown in an operating position in Figure 1 and the descriptions of positions above or below certain elements are made with reference to this illustrated operating position.

Gaming machine 100 illustrated in Figure 1, includes a player control touch screen display 105 that forms a portion of the ledge 106 extending from the plane of game video display 104. With this separate player control touch screen, the illustrated gaming machine 100 includes a total of four different video displays, that is, video display devices, that together provide the game presentation or presentations in the course of operation of the gaming machine. In addition to the separate player control touch screen 105, gaming machine 100 also includes mechanical player control buttons or other input devices 109 mounted on ledge 106. Other forms of the invention may include switches, joysticks, or other player input devices mounted on ledge 106 or elsewhere on cabinet 101. However, all of the traditional player control inputs from devices such as switches, buttons, and pointer controls, can be provided through the illustrated touch screen display/player control device 105 and/or touch screen elements incorporated with the other displays 104, 107, and 108 included in gaming machine 100. Using the separate player control touch screen display 105 in gaming machine 100 allows

the player controls to be modified readily from one game presentation to the next and even within a single presentation.

It will be appreciated that gaming machines may also include player interface devices in addition to devices that are considered player controls for use in playing a particular game. For example, gaming machines commonly include a player card reader, a voucher or ticket reader/issuer, a currency acceptor/validator, and/or coin or token acceptors/dispensers. Gaming machine 100 shown in Figure 1 includes these types of additional player interface devices on a lower portion of the cabinet 101 generally in the plane of the lower or second additional video display 108. These additional player interface devices are shown collectively at reference numeral 110 and are located around the periphery of second additional video display 108. However, other forms of the invention may configure one or more separate displays to make up the overall display 108 with interface devices 110 or even mechanical player controls mounted within the area of the second additional video display. This use of apparent openings in the video display also applies to player control video display 105 and other video displays on machine 100.

Although Figure 1 shows four separate video displays that combine to produce the game presentation or presentations for gaming machine 100, it will be appreciated that fewer video displays may be used. For example, a gaming machine according to the invention may include only a single video to produce a game presentation or a portion of a game presentation. However, the use of multiple display devices in places normally reserved for static gaming machine displays (such as the "top glass" and "belly glass" of a gaming machine) allows the games or game presentations that may be produced at the gaming machine substantially infinitely variable. Also, although each video display shown in Figure 1 is indicated as being a single display, it will be appreciated that each video display 104, 105, 107, and 108 shown in Figure 1 may in fact be made up of two or more separate displays that combine to provide what appears to the user to be a single display. Furthermore, the invention is not limited to any particular type or combination of video displays. Suitable video display devices include cathode ray tubes, liquid crystal displays, plasma displays, LED displays or any other type of video displays currently known or that may be developed in the future.

Figure 2 is a block diagram showing further components of gaming machine 100 together with displays 104, 105, 107, and 108 shown in Figure 1. Gaming machine 100 includes a central processing unit (CPU) 205 along with random access memory (RAM) 206

and non-volatile memory/storage device 207. All of these devices are operatively connected together with an audio interface device 209, a communications interface 210, and a serial interface 211 through a suitable bus or bus arrangement 208. Two graphics processors 212 and 213 are also connected on the bus arrangement 208 and are connected to drive video display devices 104, 105, 107, and 108. Graphics processor 212 controls game video display 104 and player control display 105 while graphics processor 213 controls first additional display 107 and second additional display 108. The system shown in Figure 2 also includes a touch screen controller 215 connected to system bus 208. Touch screen controller 215 is also connected to receive signals from touch screen elements associated with each display device, 104, 105, 107, and 108. It will be appreciated that the touch screen elements themselves comprise thin films that are secured over the respective video display. These touch screen elements are not illustrated or referenced separately in the figures. It will also be appreciated that touch screen elements may not be associated with each display, although most preferred forms of gaming machines according to the present invention will have a touch screen element associated with at least game video display 104 and player control video display 105.

All of the elements 205, 206, 207, 208, 209, 210, and 211 shown in Figure 2 are elements commonly associated with a personal computer. These elements are preferably mounted on a standard personal computer chassis and housed in a standard personal computer housing which is itself mounted in cabinet 101 shown in Figure 1. Alternatively, the various processing elements may be mounted on one or more circuit boards mounted within cabinet 101 without a separate enclosure such as those found in personal computers. Those familiar with data processing systems and the various data processing elements shown in Figure 2 will appreciate that many variations on this illustrated structure may be used within the scope of the present invention. For example, since serial communications are commonly employed from a touch screen element secured over a video display, a system according to the invention may not include a separate touch screen controller 215. Rather, communications from the touch screen elements may be accommodated through any suitable peripheral interface such as a USB controller or a IEEE 1394 controller. Thus, the connections shown from touch screen controller 215 to the various video displays may alternatively run from the video displays (or more precisely the touch screen elements associated with the displays) to the serial interface 211 or any other suitable interface. Numerous other variations in the gaming

machine internal structure and system may be used in accordance with the principles of the present invention.

It will also be appreciated that graphics processors are also commonly a part of modern computer systems. Although two separate graphics processors 212 and 213 are shown for controlling the four displays included in this form of the invention, it will be appreciated that a separate graphics processor may be included in the system for each particular display. It is also possible for a single graphics processor to control all of the video displays mounted on gaming machine 100. Generally, the invention is not limited to any particular arrangement of graphics processors for controlling the various gaming machine video display devices, nor is the invention limited to gaming machines that use one or more special graphics processors separate from main processor, CPU 205.

In the illustrated gaming machine 100, CPU 205 executes game software which ultimately controls the entire gaming machine 100 including the presentation provided through video displays 104, 105, 107, and 108. CPU 205 also executes software related to communications handled through communications interface 210, and software related to various peripheral devices such as those connected to the system through audio interface 209, serial interface 211, and touch screen controller 215. CPU 205 may also execute software to perform accounting functions associated with game play. RAM 206 provides memory for use by the central processing unit in executing its various software programs while the non-volatile memory 207 (also referred to herein as "mass storage") provides storage for other data generated or used in the course of gaming machine operation. Communications interface 210 provides an interface to other components of a gaming system that may be involved in game play. For example, some gaming machines rely on remote processing units for providing accounting functions associated with game play and also for providing game results. U.S. Patent No. 6,524,184 provides an example of a gaming system which includes player terminals and remote systems for providing results from predetermined game play records stored at the remote systems. Even where the results of game play are determined at the gaming machine itself, gaming machines are commonly interfaced with systems for accounting and control purposes, and communications interface 210 may also provide an interface for such communications. Communications interface 210 also provides an interface to a remote device that may communicate a game loading command to gaming machine 100 as will be described further below.

Audio interface 209 provides an interface for an audio system that may be included in gaming machine 100. Serial interface 211 provides an interface for serial devices such as player controls not incorporated in any touch screen display, and possibly the touch screen elements themselves, and other player interface devices such as currency acceptors/validators, a player card reader, voucher readers/printers, and coin/token drops. Serial interface 211 may also provide an interface with various meters that may be included in gaming machine 100 such as a progressive meter, for example. Commonly, a single serial interface device is used to communicate with a number of serial devices through a suitable serial protocol such as USB or IEEE 1394. However, it will be appreciated that additional serial interfaces may be used depending upon the nature of the serial protocols used for communications and the number of serial devices included in gaming machine 100.

Those familiar with modern gaming machines will understand that gaming machine 100 will include basic components other than those shown in Figure 2, such as a power supply, cooling systems for the various processors, audio amplifiers and speakers, and other devices that are common in gaming machines. These additional components are omitted from the drawings so as not to obscure the present invention in unnecessary detail.

Figure 2 also shows that gaming machine 100 includes a game instruction library/enabling arrangement 217. Game instruction library 217 includes a number of game implementation devices together with at least a portion of an enabling arrangement for selectively placing any of the respective game implementation devices in and enabled state. The present invention encompasses a number of different types of game implementation devices and enabling arrangements. In the particular form of the invention shown in Figure 2, each game implementation device comprises a data carrier storing secure and certified copies of game implementing operational program code to be executed by CPU 205. In this form of the invention, the enabled state for a game implementation device is a state in which the program instructions are read into RAM 206 or other suitable memory available to CPU 205 and then executed by the CPU to implement a portion of the game offered through gaming machine 100. Embodiments of the present invention in which the game implementation device comprises a data carrier storing operational program code may employ many different types of data carriers. For example, the each data carrier may comprise a magnetic medium such as a magnetic disk or tape, an optically read medium such as an optical disk (CD or DVD for example), an electronic data carrier such as a PROM, EPROM, or flash memory device,

or any other type of data carrier currently existing or developed in the future. The particular enabling arrangement used in a given implementation of the invention will depend upon the nature of the data carrier. Examples of different enabling arrangements will be discussed below in connection with Figures 3 through 6.

The present invention is not limited to instances where the game implementation devices comprise data carriers storing operational program code. In some forms of the invention, the game implementation devices may each include one or more special purpose processing devices, or one or more general purpose processing devices together with memory storing operational program code to be executed to implement one or more game functions. For example, a game implementation device according to the present invention may comprise a special purpose processor, that is, a circuit, for determining a result for a given play in the game. Instead of or in addition to a result determining circuit, a game implementation device may include a circuit adapted to identify data for use in producing an appropriate display graphic on one or more of the video displays 104, 105, 107, and 108 in view of a given result. As another example, a game implementation device according to the present invention may include a general purpose processor together with a suitable memory device such as a PROM chip that carries operational program code to be executed by the general purpose processor.

In forms of the present invention in which the game implementation devices include processing circuits, some or all of the processing performed by CPU 205 in Figure 2 may be performed instead by the enabled one of the game implementation devices. Thus, some forms of the invention may omit CPU 205. It should also be noted that some forms of the present invention may include processing elements, random access memory, and non-volatile memory on a single game implementation device. Thus, not only CPU 205, but also RAM 206 and non-volatile memory 207 may be omitted from a gaming machine according to the invention, and the functions of all of those elements performed by components included in the respective game implementation devices.

Figures 3 and 4 show an example of a game instruction library/enabling arrangement 300 having a carousel structure 301 carrying eight different game implementation devices 302. This game instruction library/enabling arrangement combination may be used for element 217 shown in Figure 2. Game implementation devices 302 may include circuits storing operational program code, circuits for performing game processing functions or both memory circuits and processing circuits. Game instruction library/enabling arrangement 300 also includes a motor

304 for driving carousel structure 301, a socket or other suitable connector 305 for operably engaging a selected one of the game implementation devices 302, and a manipulating structure 306 for moving any selected one of the game implementation devices from a stored position on the carousel structure to an operating position in connector 305. Game implementation device library/enabling arrangement 300 also includes a controller 307 for controlling the operation of carousel motor 304 and manipulating structure 306.

In the operation of game implementation library/enabling arrangement 300, controller 307 receives a game loading instruction to place a particular one of the game implementation devices 302 in an enabled state. Preferably, game implementation devices 302 are loaded in a known position on carousel structure 301 and the instruction to the controller simply causes controller 307 to drive the carousel structure to a position in which the desired game implementation device 302 aligns with manipulating structure 306 and connector 305. Once the desired game implementation device 302 is aligned with manipulating structure 306 and connector 305, the manipulating structure contacts a portion of the aligned game implementation device and pulls the game implementation device upwardly (in the orientation of both Figures 3 and 4) until the game implementation device is in the operating position, securely engaged with connector 305. At this point electrical contacts between game implementation device 302 and connector 305 allow the game implementation device to function as required to implement the desired game or game portion. For example, where the game implementation device includes a circuit such as a flash memory circuit storing operational program code, the code may be accessed by a processing device (such as CPU 205 in Figure 2) when the game implementation device is in the operating position.

The invention encompasses any suitable arrangement for engagement between manipulating structure 306 and the respective aligned game implementation device 302. The particular example shown in Figures 3 and 4 includes an engagement structure 308. This engagement structure 308 is connected at one end to a drive device 309 such as a suitable solenoid. The opposite end of engagement structure 308 includes two spaced apart slots 310 that are each adapted to receive a flange 311 extending from the aligned game implementation device 302 (as shown best in Figure 4). In this engaged position, drive device 309 may operate to pull the aligned and engaged game implementation device 302 upwardly in the orientation of the figures into operative engagement with the socket. Each game implementation device 302 is slidably mounted on carousel 301 to facilitate movement along a radial line with respect

to the carousel axis of rotation A shown in Figure 3. Any suitable slidable arrangement may be used in the carousel structure to facilitate the desired movement of the respective game implementation device 302 between the stored and operating position. For example, each game implementation device 302 may be loaded into a slot providing a slight frictional engagement to maintain the game implementation device in the desired position on carousel 301 until engaged and moved by manipulating arrangement 306. When it is no longer necessary to operatively engage a given game implementation device 302 in connector 305, manipulating arrangement 306 returns the game implementation device to its stored position on carousel 301. In the illustrated form of the invention shown in Figures 3 and 4 drive device 309 is driven to push engagement structure 308 downwardly in the orientation of the figures to remove the game implementation device 302 from connector 305 and return it to its stored position on carousel 301.

It will be appreciated by those skilled in the art that numerous different arrangements may be used to selectively place a given one of the game implementation device 302 in Figures 3 and 4 in the operating position in which the operational program code and data stored on the respective device 302 may be read by a suitable processing device such as CPU 205 in Figure 2. For example there are numerous ways to engage a particular one of the game implementation devices 302 to bring it into operative contact with connector 305. Numerous drive arrangements may be used in lieu of a solenoid for drive device 309. For example, a pinion gear may be driven by a suitable motor to drive a rack which in turn causes the engagement structure 308 to move as required to position the aligned game implementation device 302. Also, some forms of the invention may not include a separate controller associated with the game implementation device library/enabling arrangement 300. Other forms of the invention may control drive device 309 and carousel motor 304 directly through signals from a processing device such as CPU 205 in Figure 2.

The game implementation device library/enabling arrangement 300 shown in Figures 3 and 4 is suitable for many different types of game implementation devices. For example, each game implementation device may be a flash memory device with a USB or IEEE 1394 connector. In this case, connector 305 would be the corresponding USB or IEEE 1394 connector. Arrangement 300 is also suitable for use with game implementation devices each made up of a circuit board having a suitable edge connector. For example, each game implementation device 302 in Figures 3 and 4 may be a PCI card carrying one or more

processing devices, one or more memory devices, and additional circuitry for implementing a game or portion of a game according to the present invention. In this example, the edge connector would be a PCI male connector and connector 305 would be the corresponding PCI slot connector. Any other suitable connector arrangement may be used to provide the desired operative connection between the selected game implementation device 302 in the operating position and connector 305. Any other standard interface may be used to connect a selected game implementation device according to the present invention such as EIDE, PCI, SCSI, or future standard interfaces. Also, a custom interface may also be used to operatively connect a selected game implementation device 302 in the operating position.

Figure 5 shows an alternate game implementation device library/enabling arrangement 500 within the scope of the present invention. In this arrangement, each game implementation device 502 is associated with a respective drive device 504 and respective connector 505. In particular, Figure 5 shows six different game implementation devices 502, each mounted on a respective carrier 506. Each game implementation device 502 is adapted to be positioned on its respective carrier 506 alternatively in a stored/retracted position or an operating/extended position under control of the respective drive device 504. In the retracted position, a respective game implementation device 502 is disabled and unable to implement any portion of a game or affect the operation of the gaming machine. However, when a given one of the game implementation devices 502 is in the operating position in its respective connector 505, the respective game implementation device is operable to implement a portion or all of a given game available at the gaming machine in which game implementation device library/enabling arrangement 500 is included. As in the game implementation device library/enabling arrangement shown in Figures 3 and 4, each game implementation device 502 may be a circuit device such as flash memory for storing operational program code, or a processing device, or a circuit board or other package carrying one or more memory devices and one or more processing devices. Also as with the embodiment shown in Figures 3 and 4, the engagement between the respective game implementation device 502 and its respective connector 505 may be any suitable engagement that allows respective game implementation device to perform its intended function to implement all or a portion of a game. Each drive device 504 be a solenoid, rack and pinion or other gear driven arrangement, or any other device capable of selectively moving the respective game implementation device 502 on its respective carrier between the retracted and operating position. A separate controller 508 is

included in the illustrated arrangement 500 for generating the required control signal or signals to operate each respective drive device 504.

In operation of the game implementation library/enabling arrangement 500 shown in Figure 5, the arrangement receives a game loading instruction to place one of the game implementation devices 502 in an enabled state operatively engaged with its respective connector 505. This game loading instruction causes controller 508 to send a suitable drive or control signal to the respective drive device 504 associated with the selected game implementation device 502 to move the game implementation device to the left in the orientation of Figure 5 into operative engagement with the respective connector 505. Once the operative engagement with the respective connector 505 is no longer necessary, controller 508 may produce an appropriate signal to cause the drive device 504 associated with the selected game implementation device 502 to retract the game implementation device from the connector back to the retracted position.

As with the embodiment shown in Figures 3 and 4, the game implementation library/enabling arrangement 500 shown in Figure 5 preferably stores the various game implementation devices 502 in known positions. In this way, the controller 508 may easily direct the desired game implementation device 502 to be moved to the enabled state, operatively engaged in its respective connector 505. Unlike, the embodiment shown in Figures 3 and 4, the embodiment shown in Figure 5 has the possibility of leaving two or more of the different game implementation devices in an enabled state. Thus, different game implementation devices may be mixed and matched to implement a given game. For example, one game implementation device may include a circuit that produces a random result for a game, while another game implementation device may include program code or a processor to produce graphics instructions to driving displays of the gaming machine (such as display devices 104, 105, 107, and 108 of gaming machine 100 in Figures 1 and 2). The same game implementation device 502 that functions to produce graphics for a game may be used alternatively with two or more different result producing game implementation devices which may, for example, provide different win distributions.

Figure 6 shows yet another alternate embodiment for a game implementation device library/enabling arrangement shown at reference numeral 217 in Figure 2. This game implementation device library/enabling arrangement 600 includes a bus 601 to which are connected a number of different game implementation devices 602. Figure 6 shows five

separate game implementation devices 602 connected to bus 601 through a suitable connection 605. As in the embodiments of Figures 3, 4, and 5, game implementation devices 602 may comprise any suitable circuit device, circuit board, or other circuit carrier device that carries one or more memory circuits storing operational program code and/or one or more general or special purpose processing circuits. The connection between each game implementation device 602 and bus 601 may be any of the types of connections discussed above with reference to Figures 3 through 5. Also, the connections employed in the embodiment of Figure 6 may also be permanent or soldered connections, such as C4 connections for example. Bus 601 may be a system bus (such as bus 208 shown in Figure 2) or any other suitable communications bus over which the desired signals may be communicated to the other components of the gaming machine. For example, the bus may comprise a USB type bus and each of the sockets may comprise a USB connector. In this USB example, each game implementation device 602 would include a USB interface and a USB controller (not shown) could provide an interface between USB type bus 601 and the system bus of the gaming machine. Alternatively, bus 601 could be a PCI bus, a SCSI bus, or some non-standard/custom bus.

The different game implementation device libraries/enabling arrangements described above with reference to Figures 3 through 6 are particularly well suited for instances of the present invention in which the game implementation devices are circuit devices, circuit boards, or other circuit carriers. In other forms of the present invention, some or all of the game implementation devices may be read only memory devices such as CD-ROMs or DVD ROMs, for example, and the enabling arrangement may be a CD or DVD changer. In these forms of the invention the CD or DVD changer may interface with the other components of the gaming machine in any suitable fashion. For example, such a CD or DVD changer may rely on a PCI, SCSI, EIDE, USB, IEEE 1394, or any other suitable interface. Regardless of the particular interface employed, a CD or DVD in this CD or DVD changer form of the invention would preferably be enabled by having operational program code and data required to implement a given game read from the CD or DVD into memory associated with the gaming machine. The program code would then be executed with a processing device associated with the gaming machine such as CPU 205 in the example gaming machine shown in Figure 2.

It will be noted from the above alternate game implementation device libraries/enabling arrangements that the meaning of an "enabled state" for a given game implementation device depends upon the nature of the game implementation device and how it is used in the given

gaming machine. For example, where one or more processing devices make up a game implementation device, an enabled state for the game implementation device is that state in which it is operatively connected in the gaming machine and capable of communicating with the other components of the gaming machine. Where a game implementation device is made up of a device such as a memory circuit or data carrier such as a CD or DVD storing operational program code, the enabled state for the game implementation device is a state in which a processing device such as the CPU 205 in Figure 2 may access and execute the operational program code to implement the desired game or portion of a game.

The method of configuring securely configurable gaming machine according to the present invention may be described with reference to the process flowchart shown in Figure 7. The method includes housing a number of the game implementation devices (302 in Figures 3 and 4, 502 in Figure 5, and 602 in Figure 6) at a gaming machine as shown at process block 701 in Figure 7. The method also includes receiving a game change/game loading command as indicated at process block 702. In response to the game change/game loading command, the method includes enabling one or more of the game implementation devices 302/502/602 as shown at process block 703. The method then includes conducting a game as dictated by the enabled game implementation device or devices as shown at process block 704.

The process shown in Figure 7 enables a gaming machine, such as gaming machine 100 shown in Figures 1 and 2, to be securely configured to change a game offered at the gaming machine or at least change one or more characteristics of a game provided at the gaming machine. For example, prior to performing the steps indicated at blocks 702, 703, and 704 in Figure 7, a gaming machine may be configured to offer a first game. The steps at blocks 702 and 703 may then be performed to re-configure the gaming machine to offer a second game which may be conducted as indicated at block 704. These first and second games may be entirely unrelated games. For example, the first game implemented at gaming machine 100 may be a video poker game and the steps at blocks 702 and 703 may be performed to reconfigure the gaming machine to offer a reel-type (slot machine-type) game. As another example, the first game might be video poker game with a certain graphic theme or presentation, and the second game to which the gaming machine is configured may be a video poker game with a different graphic theme, but characteristics of play identical to the first game.

The invention encompasses a number of different ways to house a number of the game implementation devices at a gaming machine. Some forms of the invention house all of the game implementation devices in a single secure area in the interior of the gaming machine, accessible only to authorized personnel of the gaming facility operator or the gaming machine provider. As discussed above with reference to Figures 3 through 6, the game implementation devices 302/502/602 themselves may vary widely within the scope of the invention from media such as CD-ROMs and DVD-ROMs, to electronic memory circuits, to general or special purpose data processing devices, to combinations of memory circuits and general or special purpose data processing devices.

The invention encompasses any manner for receiving the game change/game loading command at the gaming machine. In some forms of the invention, the game change/game loading command may be received from a remote processing device in a networked gaming system in which the gaming machine is included. In other forms of invention in the game change/game loading command may be received through a player input device at the gaming machine. A gaming machine itself may be configured to produce a game change/game loading command under certain circumstances detected by the gaming machine, for example, inactivity at the gaming machine for a certain period or at certain times of the day when the gaming machine is not being used by a player. Other forms of invention may be configured to receive the game change/game loading command either from a remote system or from a user interface at the gaming machine.

Regardless of where the game change/game loading command originates, the command may take any suitable form. In each case, the game change/game loading command will identify a game to which the game machine will be changed and/or the individual gaming implementation devices that must be enabled in order to allow the game machine to conduct the desired game. In some preferred forms of invention, the game change/game loading command comprises a code which prompts the desired action. For example, a controller associated with a game implementation device library/enabling arrangement (such as controller 307 in Figure 3 for example) may interpret a received game change/game loading command code to identify the game implementation device or devices which must be enabled to conduct a given game. As another example, a controller such as controller 307 may receive a game change/game loading command code and be required to locate the required game implementation device(s) necessary to implement a game indicated by the code. In yet other

forms of the invention, the game change/game loading command itself may include information which directly identifies which game implementation device(s) to place in the enabled state by the location of the game implementation device(s) in the respective game implementation device library/enabling arrangement (such as 300, 500, and 600 in Figures 3, 5, and 6, respectively).

The steps required to enable the required game implementation device(s) required for the respective game associated with the game change/game loading command will depend upon the nature of the game implementation device and the enabling arrangement. For example, enabling a game implementation device may include moving one or more game implementation devices from a stored or retracted position to an operating position operatively connected to a suitable connector such as shown in the embodiment of Figures 3 and 4 and the embodiment of Figure 5. In these arrangements, once each required game implementation device is in the operating position, the enabling process may include a boot or initialization sequence that must be performed to place the respective game implementation device in the enabled state. Where the game enabling arrangement includes an arrangement such as that shown in Figure 6, the step shown in process block 703 in Figure 7 may include simply addressing the required game implementation device(s) on the bus.

Where a particular game implementation device (302/502/602) stores operational program code that must be executed by processing device such as CPU 205 shown Figure 2, enabling the game implementation device includes placing the game implementation device in a position in which the code may be read from the device. Enabling such a game implementation device also includes reading the code and placing it in condition where it may be executed by the suitable processing device. Where one or more game implementation devices comprise a data carrier such as a CD-ROM or DVD-ROM, the enabling step shown at process block 703 in Figure 7 will include positioning the required data carrier in a reading position in the CD-ROM or DVD-ROM changer, and reading the required operational program code.

In any of the embodiments of the game implementation device library/enabling arrangement, it will be appreciated that the step shown at process block 703 in Figure 7 may also include disabling one or more game implementation devices that were previously enabled to implement an earlier game offered by the gaming machine. For example, where a current game offered through a gaming machine uses a game implementation device including a result

generating processing device, that game implementation device must be placed in a disabled state if a new game to be offered at the gaming machine obtains results in some other fashion, such as according to some other algorithm or from a remote network component. Placing a game implementation device in a disabled state may require removing the device from its connector (such as connector 305 in Figure 3). Alternatively, where a game implementation device only stores operational program code executed by a gaming machine processor (such as CPU 205 in Figure 2) placing the game implementation device in a disabled state may include erasing or deallocating memory locations available to the processing device which previously stored the operational program code.

The specific processes or functions that are performed for process block 704 in Figure 7 will also depend upon the nature of the game implementation devices used in the gaming machine and the nature of the enabling arrangement. The steps performed for process block 704 will also depend upon the nature of the game to be conducted at the gaming machine. For example, conducting a game requiring result determination at a remote device includes communicating with that remote device (such as a lottery ticket server or bingo game result server) to obtain the result and then producing a suitable graphic presentation to show the result. Other games may rely on results determined at the gaming machine itself. Conducting this sort of game includes determining the result at the gaming machine and producing a graphic presentation to show the result. In either the remote result determination or local result determination, conducting the game will include generating instructions for the video display devices to cause those devices to present the desired graphics. A given game implementation device may include a processing element and/or program code used to generate these graphics instructions or at least participate in generating the graphics instructions.

The above described preferred embodiments are intended to illustrate the principles of the invention, but not to limit the scope of the invention. Various other embodiments and modifications to these preferred embodiments may be made by those skilled in the art without departing from the scope of the present invention.

CLAIMS

1. A gaming machine including:
 - (a) a number of game implementation devices, each respective game implementation device being operable to implement at least a portion of a respective game at the gaming machine when the respective game implementation device is in an enabled state in the gaming machine;
 - (b) an enabling arrangement for selectively placing any of the respective implementation devices in the enabled state; and
 - (c) a video display for displaying graphic portions of a respective one of the games when the respective game is implemented at the gaming machine.
2. The gaming machine of claim 1 further including a processing device for driving the video display to produce the graphic portions of the respective one of the games being implemented at the gaming machine.
3. The gaming machine of claim 1 wherein each respective implementation device includes a circuit carrier containing at least one electronic circuit device.
4. The apparatus of claim 3 wherein the enabling arrangement includes at least one socket and a manipulating device for selectively inserting or withdrawing a respective one of the circuit carriers in the socket.
5. The gaming machine of claim 1 further including a processing device, wherein each respective implementation device comprises a memory device storing operational program code, and wherein the enabled state enables the processing device to execute the operational program code stored by the respective memory device.
6. The gaming machine of claim 5 wherein each respective memory device comprises a read only memory device.

7. The gaming machine of claim 5 wherein the enabling arrangement comprises a memory device changer for selectively accessing any one of the memory devices.
8. The gaming machine of claim 1 further including at least two additional video displays for displaying additional graphic portions of the respective one of the games being implemented at the gaming machine.
9. A method including:
 - (a) housing a number of game implementation devices in a secure area of a gaming machine, each respective game implementation device being operable when in an enabled state to implement at least a portion of a respective game at the gaming machine;
 - (b) selecting a respective one of the game implementation devices in response to a game loading command and placing the selected game implementation device in an enabled state; and
 - (c) conducting a game at the gaming machine, the game being conducted at least in part through the respective implementation device in the enabled state.
10. The method of claim 9 wherein the placing the selected game implementation device in the enabled state includes inserting a circuit carrier in a socket.
11. The method of claim 9 wherein the placing the selected game implementation device in the enabled state includes placing a data carrier in a data reading position in a data carrier changer.
12. The method of claim 9 wherein the placing the selected game implementation device in the enabled state includes reading game implementation data and instructions from the respective implementation device in the enabled state.
13. The method of claim 9 further including the step of receiving the game loading command from a separate processing device over a network communications path.

14. The method of claim 9 further including the step of generating the game loading command at the gaming machine in response to a player input.
15. A program product stored on at least one machine readable medium, the program product including:
 - (a) game enabling program code executable to selectively enable a respective game implementation device in response to a game loading command, the respective game implementation device being selected from among a number of different game implementation devices, each respective game implementation device being operable when in a respective enabled state to implement at least a portion of a game offered through a gaming machine; and
 - (b) command program code executable to receive a game selection input and generating the game loading command in response to the game selection input.
16. The program product of claim 15 wherein the command program code is executed by a processing device at the gaming machine and further including player interface program code for enabling a player at the gaming machine to enter the game selection input.
17. The program product of claim 15 wherein the command program code is executed by a processing device remote from the gaming machine and further including command communications program code that configures the gaming machine to receive the game loading command over a communications network.
18. The program product of claim 15 wherein the game enabling program code is executed to address a respective one of the game implementation devices from among the number of different game implementation devices.
19. The program product of claim 15 wherein the game enabling program code is executed to position a respective one of the game implementation devices in a socket to facilitate communications to and from the game implementation device.

20. The program product of claim 15 wherein the game enabling program code is executed to position a respective one of the game implementation devices in a reading position in a media changer.

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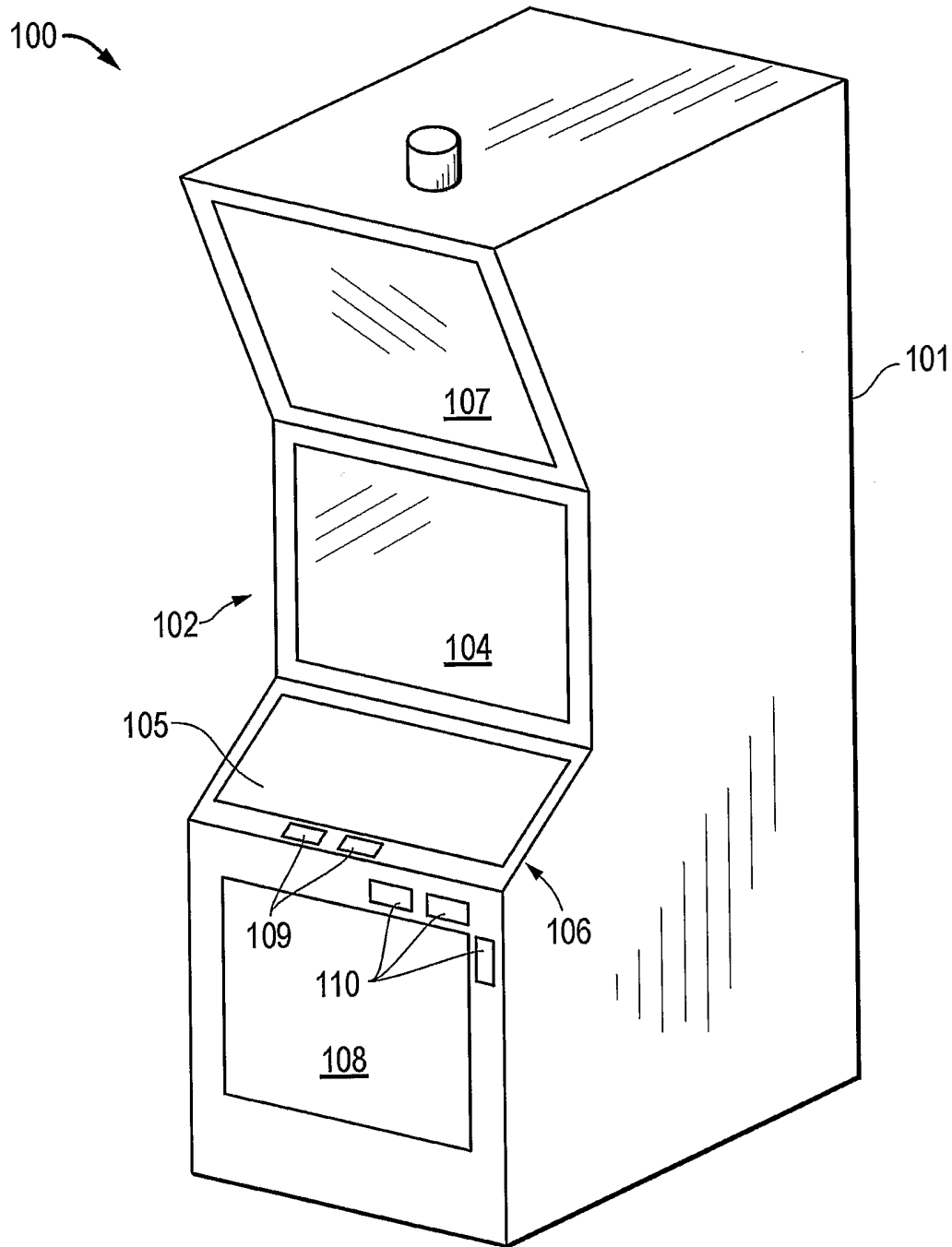


FIG. 1

100 →

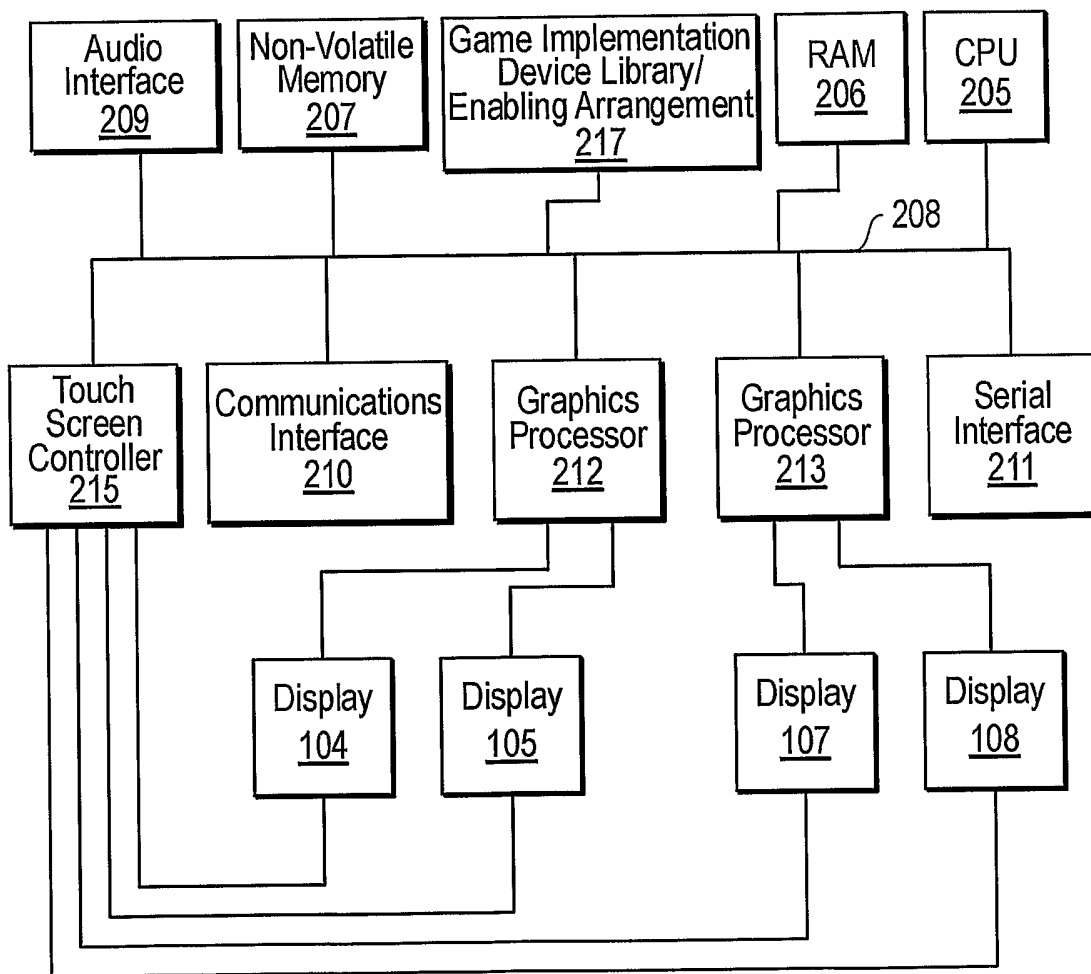


FIG. 2

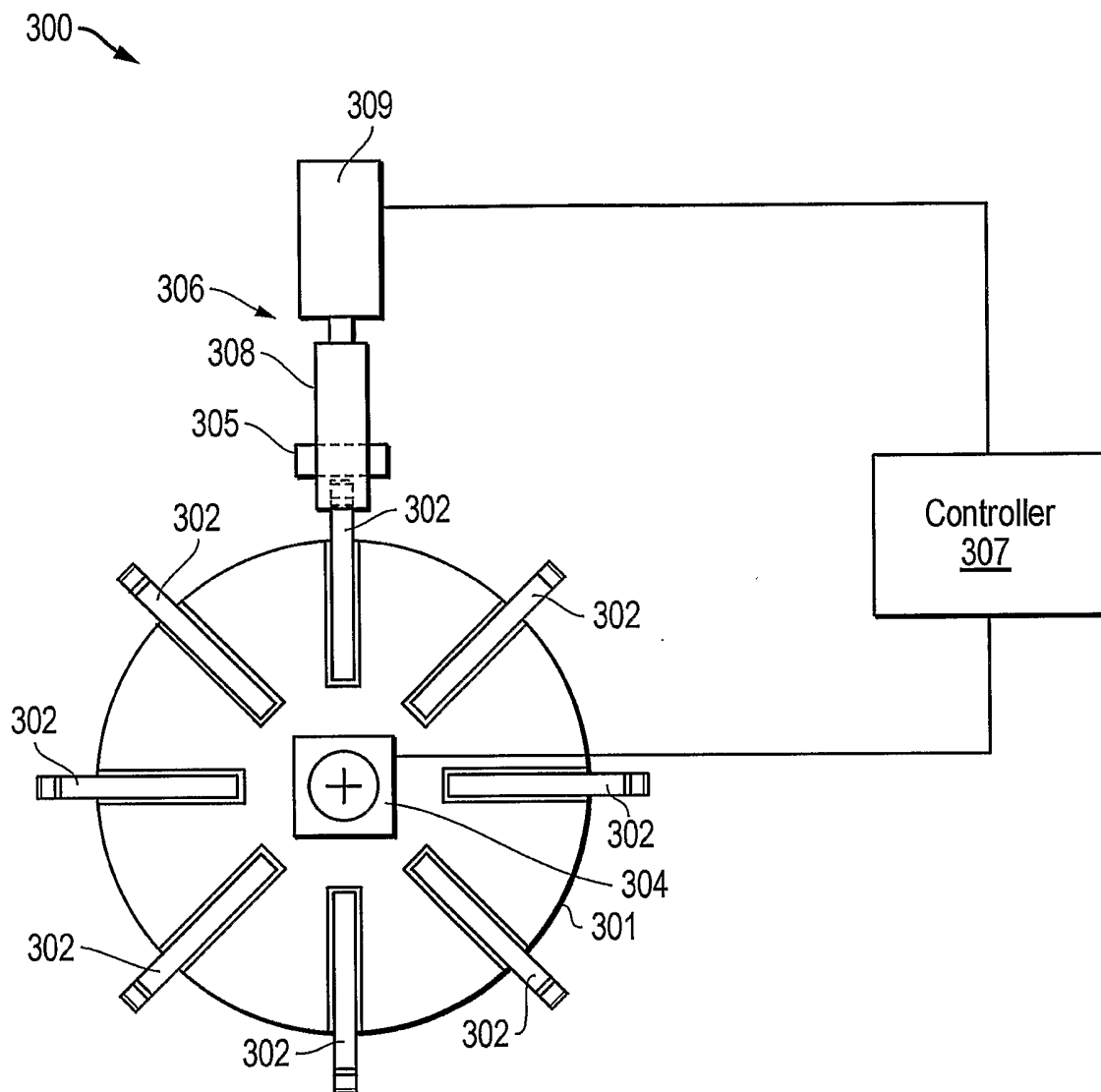


FIG. 3

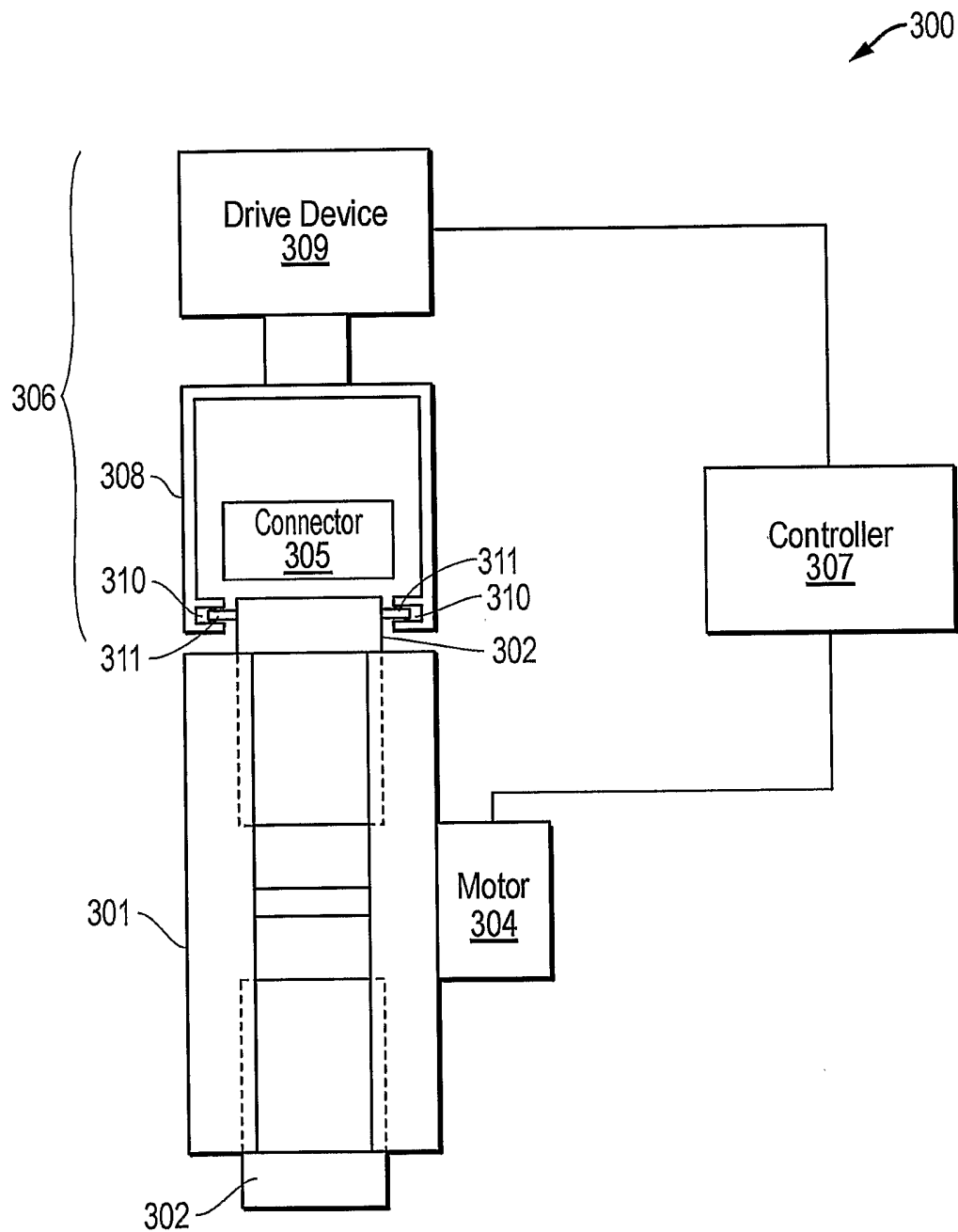


FIG. 4

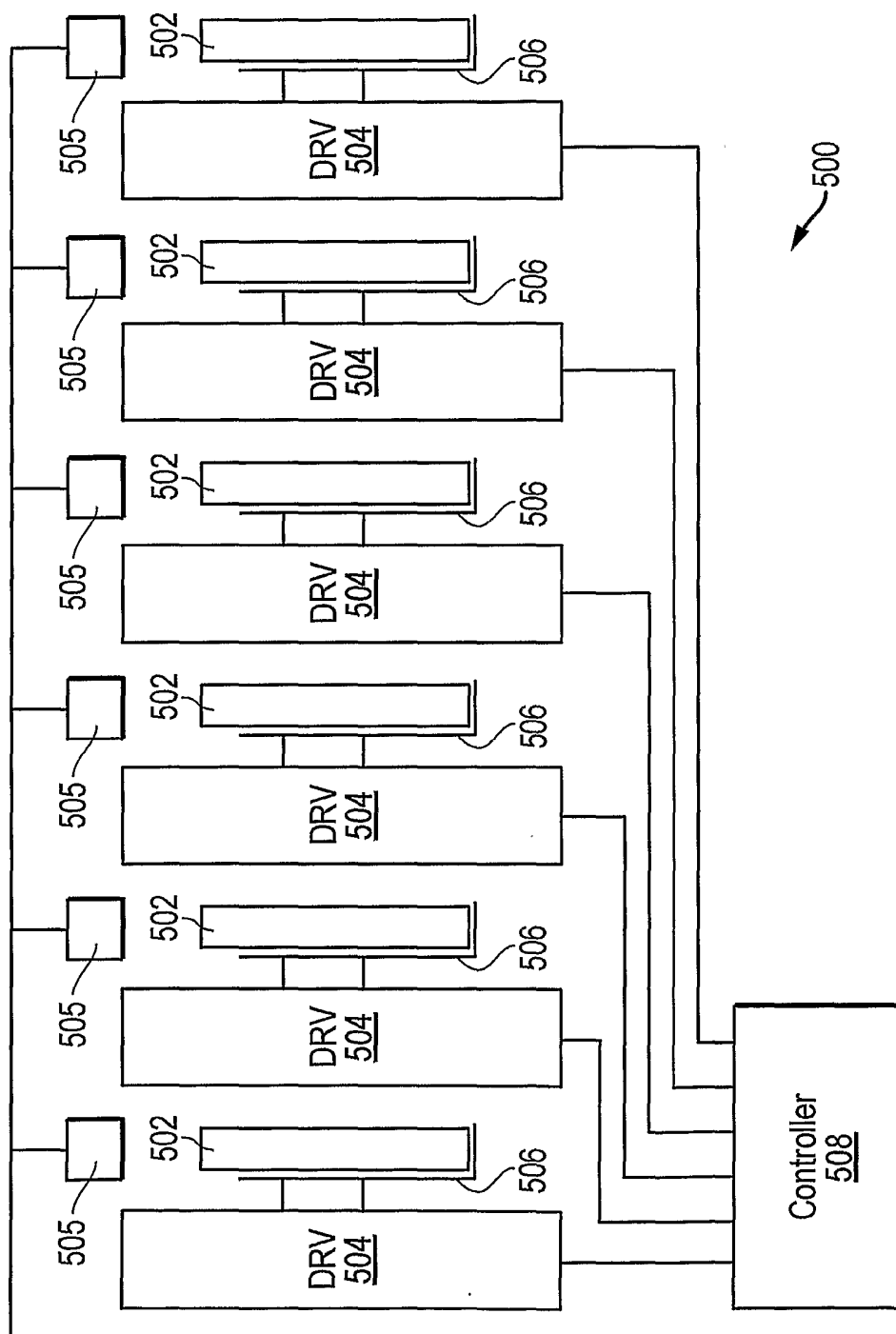


FIG. 5

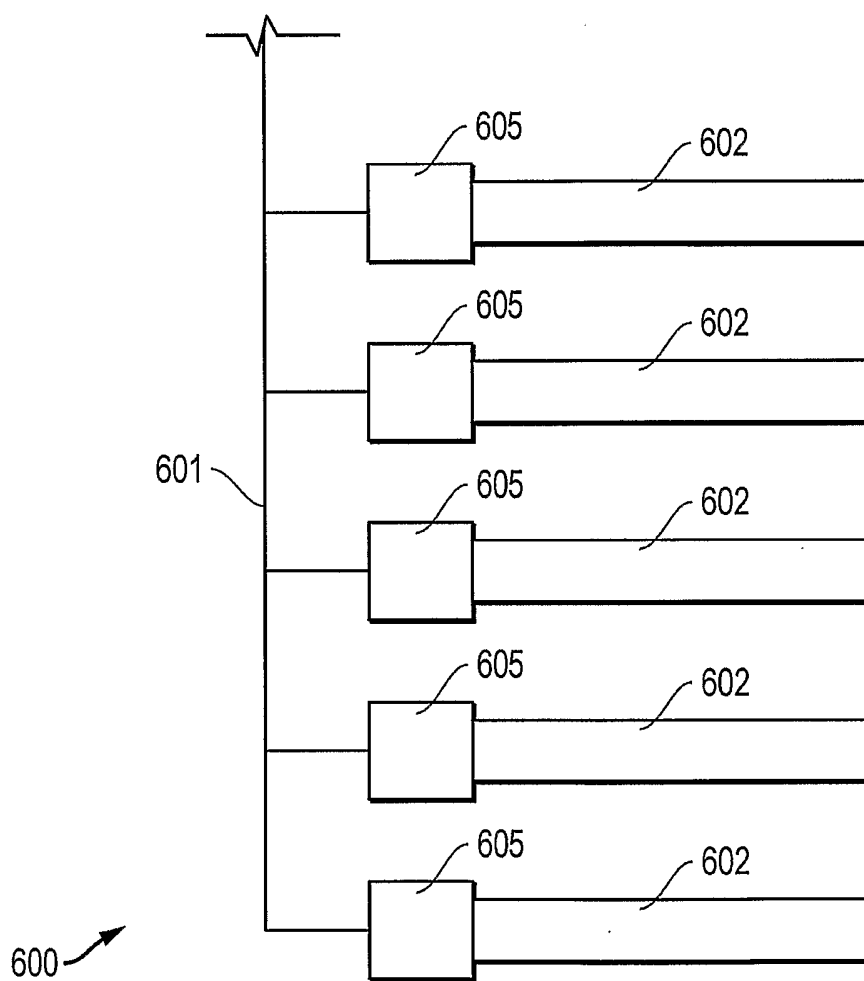


FIG. 6

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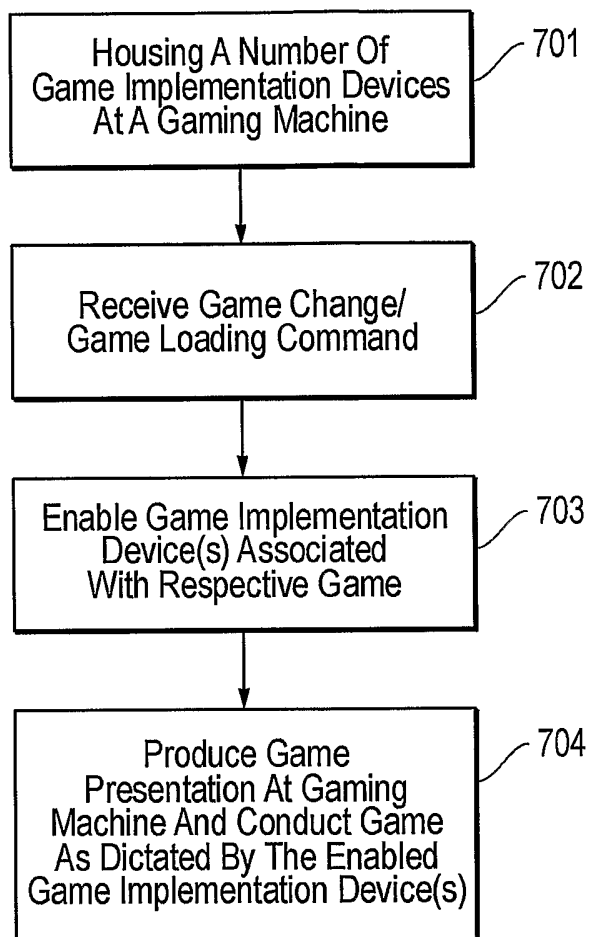


FIG. 7