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(54) **SYSTEM AND METHOD FOR 3D REEL EFFECTS**

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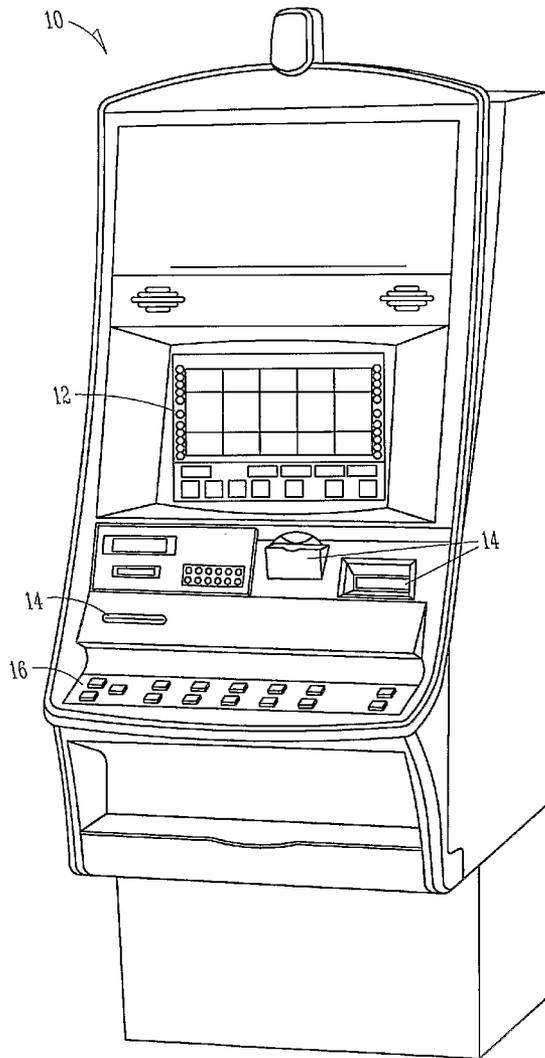
(57) **ABSTRACT**

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Embodiments of the invention described herein include a method for displaying a gaming outcome, in a reel-based gaming machine. The method includes displaying a reel image on a display; modifying the reel image to reflect a gaming outcome; and highlighting a winning combination with a three-dimensional effect.



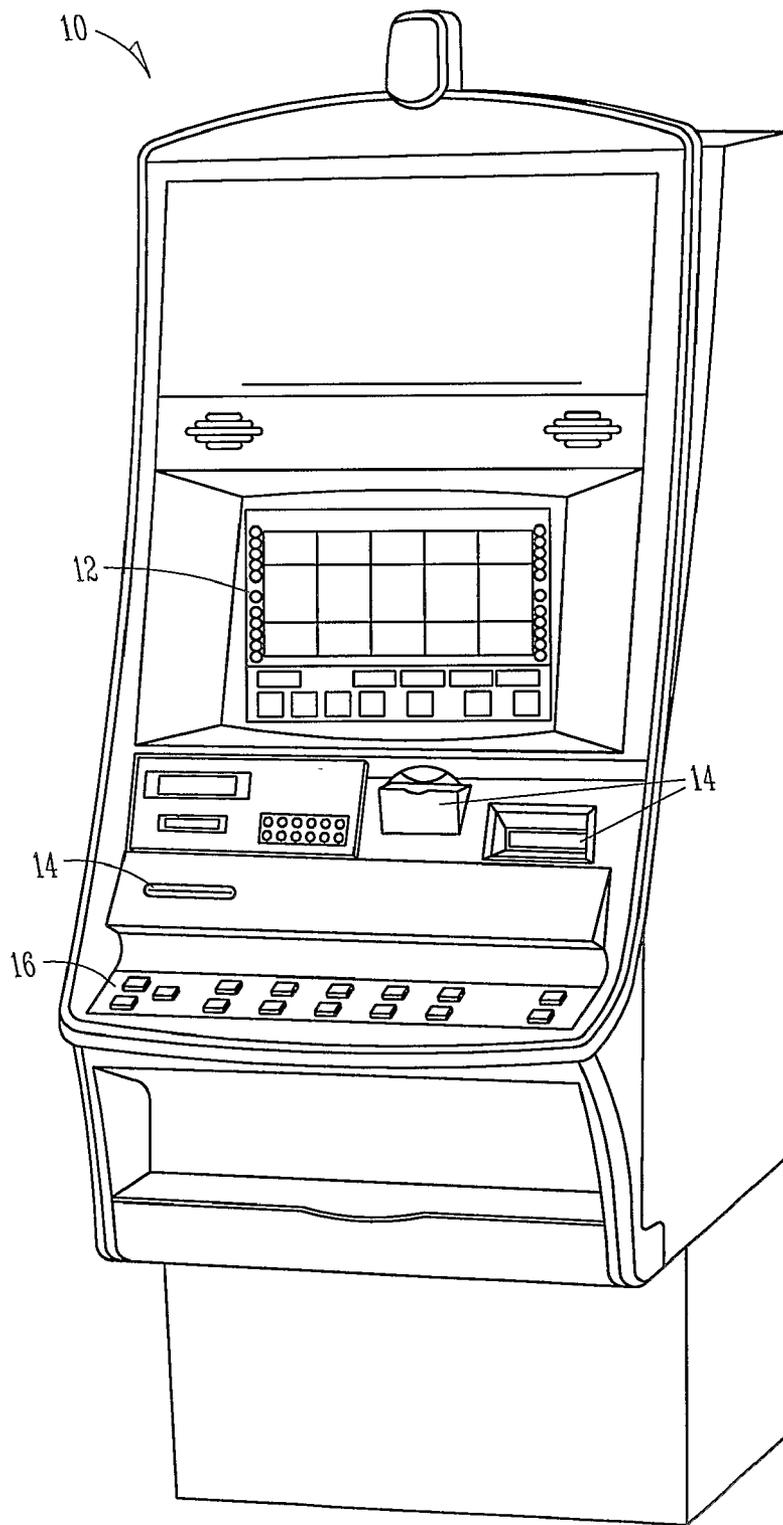


FIG. 1

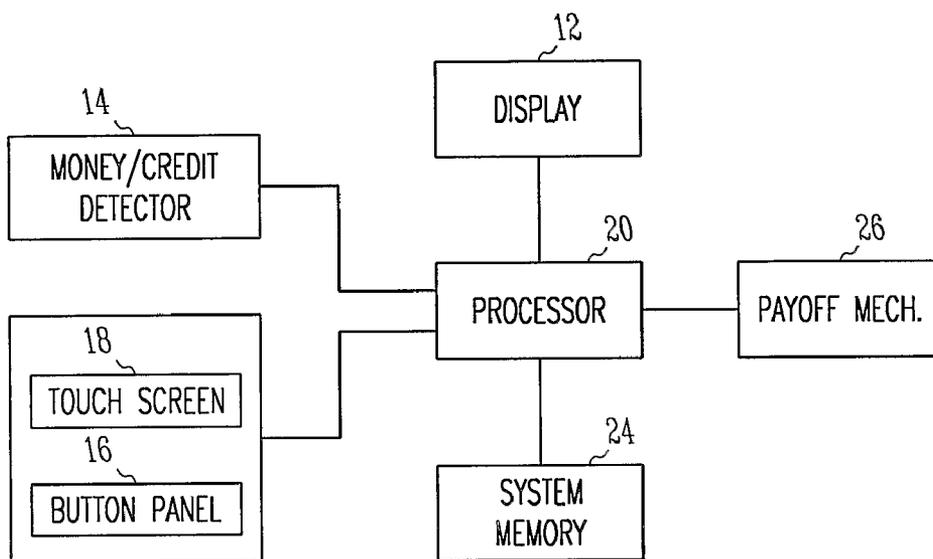


FIG. 2

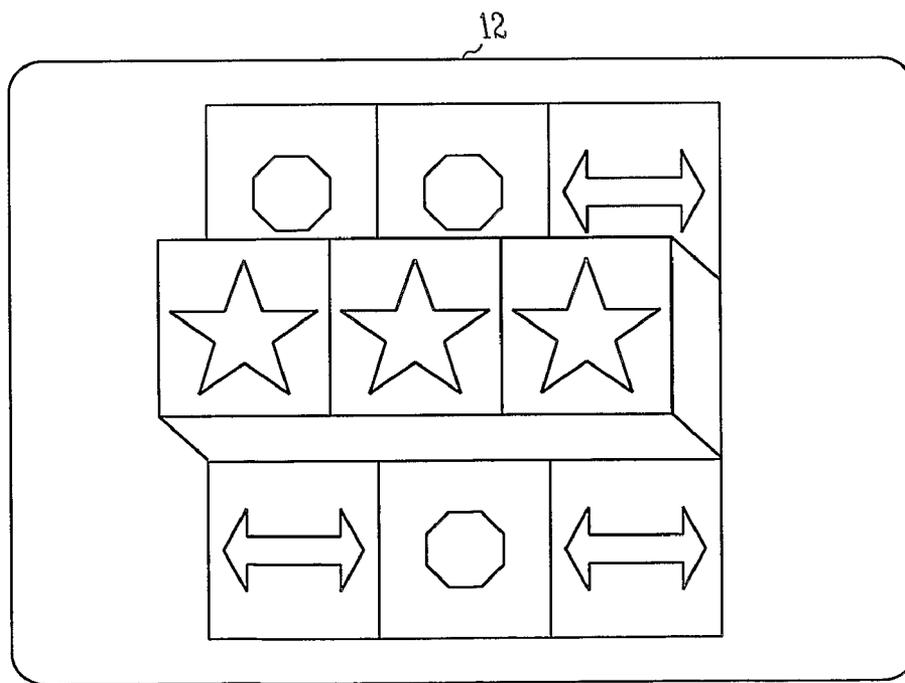


FIG. 3

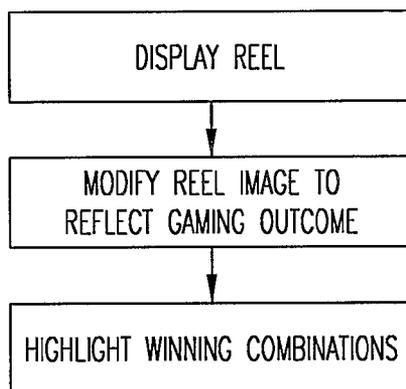


FIG. 4

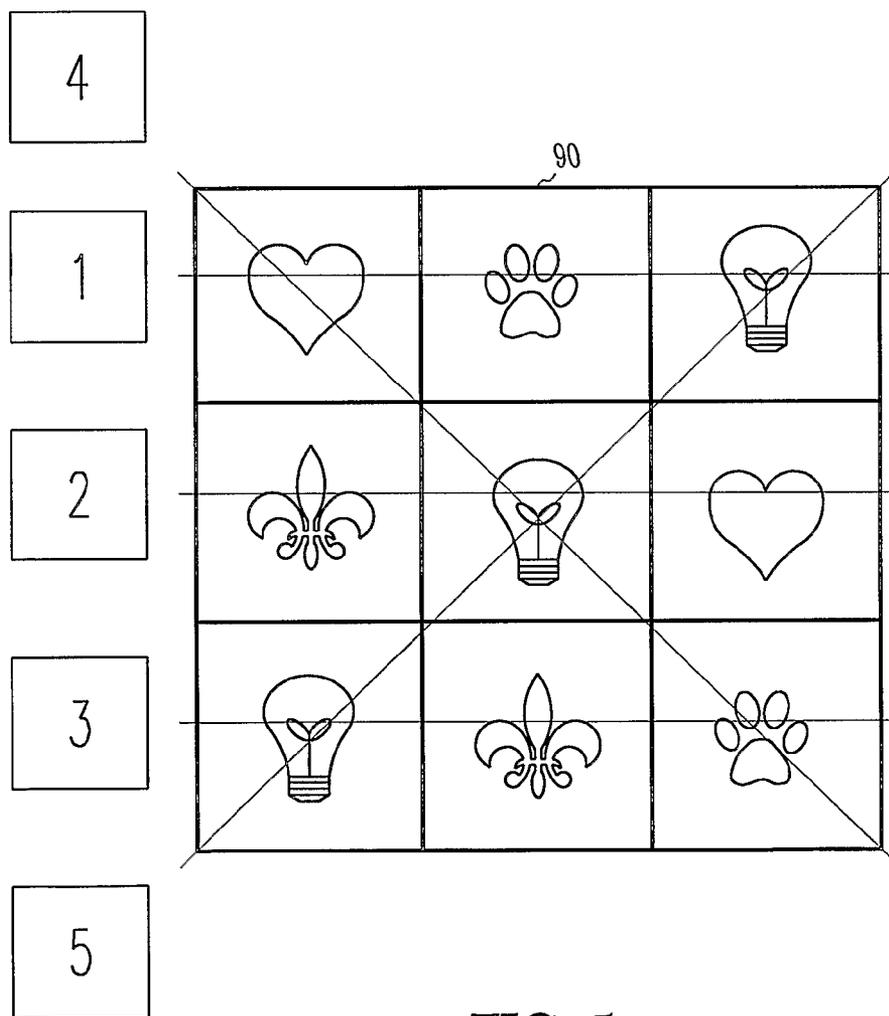


FIG. 5

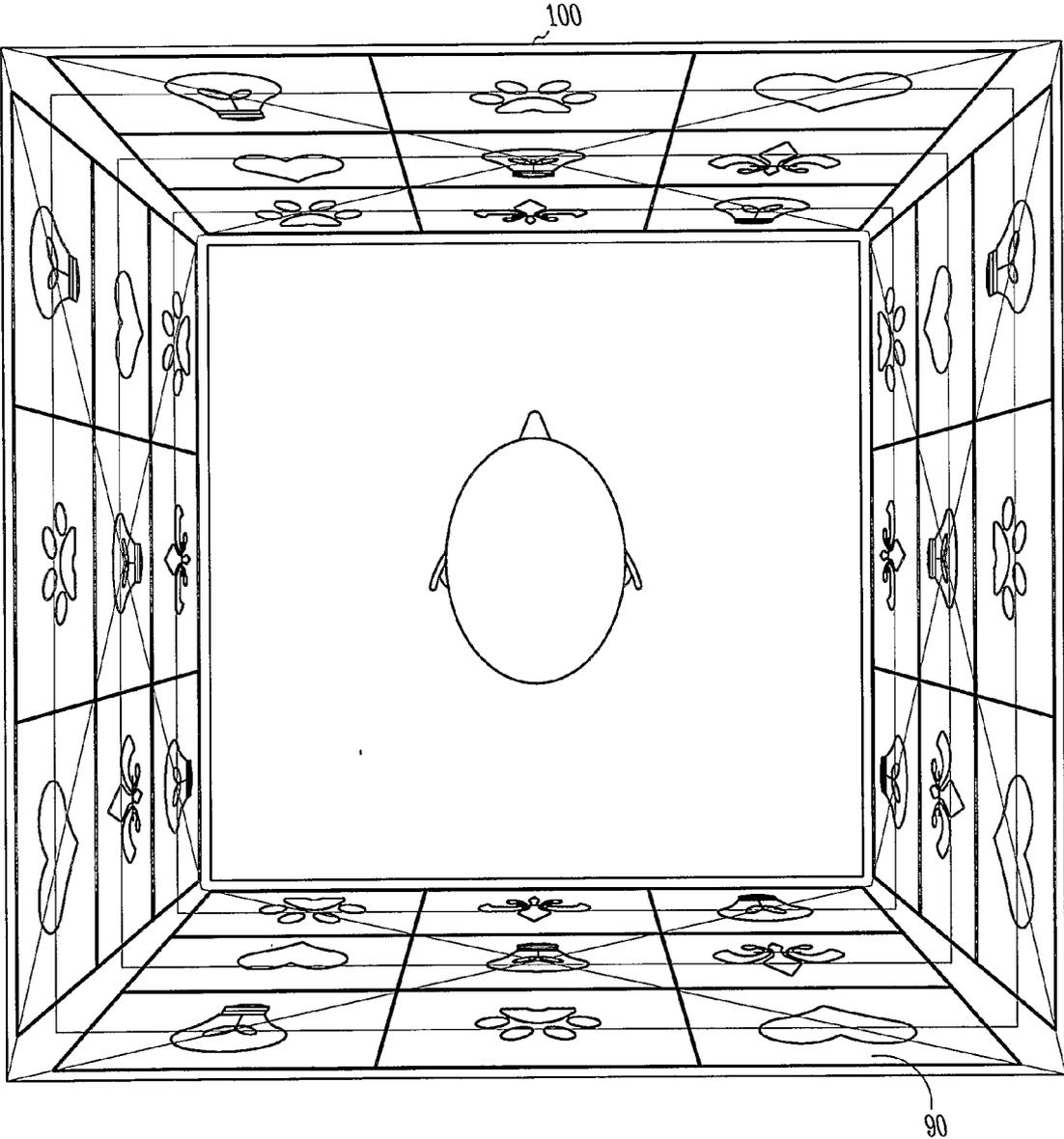


FIG. 6

SYSTEM AND METHOD FOR 3D REEL EFFECTS

RELATED APPLICATION

[0001] This application claims the priority benefit of U.S. Provisional Application Ser. No. 60/615,144 filed Oct. 1, 2004, the contents of which are incorporated herein by reference.

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BACKGROUND OF THE INVENTION

[0003] 1. Field of the Invention

[0004] This patent application pertains generally to gaming systems, and more particularly, but not by way of limitation, to a system and method for displaying three-dimensional reel spins and effects in a gaming machine.

[0005] 2. Background Information

[0006] Video gaming machines are popular within the gaming industry. They typically are operable to play traditional games such as slots, poker, bingo, keno and blackjack. Such machines have been enhanced in recent years by adding effects that make them more attractive, exciting and entertaining.

[0007] Effects for video games fall broadly into two categories: reel spin and bonus events. Reel spin effects usually rely on visual changes within the image representing the reel in a slot machine. Bonus events occur outside the reel spin, injecting either a random event or fostering some player interaction to trigger a random event.

[0008] The graphical capabilities of processors have increased dramatically over the last decade. At the same time, there is a continuing need to develop new and exciting effects for video gaming machines. What is needed is a way of harnessing the graphics power of processors to introduce new and innovative reel effects in video gaming machines.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 illustrates a gaming machine according to the present invention;

[0010] FIG. 2 is a block diagram of a control system suitable for operating the gaming machine of FIG. 1;

[0011] FIGS. 3 and 4 illustrate a method of highlighting a winning combination according to the present invention; and

[0012] FIGS. 5 and 6 illustrate a three-dimensional reel-based game according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0013] In the following detailed description of the preferred embodiments, reference is made to the accompanying drawings which form a part hereof, and in which is shown by way of illustration specific embodiments in which the invention may be practiced. It is to be understood that other embodi-

ments may be utilized and structural changes may be made without departing from the scope of the present invention.

[0014] FIG. 1 illustrates an exemplary video gaming machine 10, also referred to as a Video Lottery Terminal (VLT), in which embodiments of the invention may be implemented. In some embodiments, gaming machine 10 is operable to conduct a wagering game such as mechanical or video slots, poker, keno, bingo, or blackjack. The gaming machine 10 shown in FIG. 1 includes a video display 12 such as a cathode ray tube (CRT), liquid crystal display (LCD), plasma, or other type of video display known in the art. In one such embodiment, a touch screen overlies the display 12. In the illustrated embodiment, the gaming machine 10 is an "upright" version in which the display 12 is oriented vertically relative to a player. Alternatively, the gaming machine may be a "slant-top" version in which the display 12 is slanted at about a thirty-degree angle toward the player.

[0015] Gaming machine 10 includes one or more credit receiving mechanisms 14 for receiving credits to be used for placing wagers in the game. The credit receiving mechanisms 14 may, for example, include a coin acceptor, a bill acceptor, a ticket reader, and a card reader. The bill acceptor and the ticket reader may be combined into a single unit. The card reader may, for example, accept magnetic cards and smart (chip) cards coded with money or designating an account containing money. In some embodiments, credit receiving mechanism 14 receives credits through a network interface.

[0016] In some embodiments, the gaming machine 10 includes a user interface comprising a plurality of push-buttons 16, the above-noted touch screen, and other possible devices. The plurality of push-buttons 16 may, for example, include one or more "bet" buttons for wagering, a "play" button for commencing play, a "collect" button for cashing out, a "help" button for viewing a help screen, a "pay table" button for viewing the pay table(s), and a "call attendant" button for calling an attendant. Additional game specific buttons may be provided to facilitate play of the specific game executed on the machine. The touch screen may define touch keys for implementing many of the same functions as the push-buttons. Other possible user interface devices include a keyboard and a pointing device such as a mouse or trackball.

[0017] A processor controls operation of the gaming machine 10. In response to receiving a wager and a command to initiate play, the processor randomly selects a game outcome from a plurality of possible outcomes and causes the display 12 to depict indicia representative of the selected game outcome. In the case of slots for example mechanical or simulated slot reels are rotated and stopped to place symbols on the reels in visual association with one or more pay lines. If the selected outcome is one of the winning outcomes defined by a pay table, the processor awards the player with a number of credits associated with the winning outcome.

[0018] FIG. 2 is a block diagram of a control system suitable for operating the gaming machine 10. Money/credit detector 22 signals a processor 20 when a player has inserted money, tickets, tokens, cards or other mechanism for obtaining credits for plays on the gaming machine through credit mechanisms 14. Using a button panel 16 and/or a touch screen 18, the player may select any variables associated with the wagering game and place his/her wager to purchase a play of the game. In a play of the game, the processor 20 generates at least one random event using a random number generator (RNG) and provides an award to the player for a winning outcome of the random event.

[0019] Alternatively, the random event may be generated by a remote computer using an RNG or pooling schema and

then transmitted to the gaming machine. The processor **20** operates the display **12** to represent the random event(s) and outcome(s) in a visual form that can be understood by the player. In addition to the processor **20**, the control system may include one or more additional slave control units for operating the display **12** and any secondary displays.

[0020] System memory **24** stores control software, operational instructions and data associated with the gaming machine. In one embodiment, the system memory **24** comprises a separate read-only memory (ROM) and battery-backed random-access memory (RAM). However, it will be appreciated that the system memory **24** may be implemented on any of several alternative types of memory structures or may be implemented on a single memory structure.

[0021] A payoff mechanism **26** is operable in response to instructions from the processor **20** to award a payoff to the player. The payoff may, for example, be in the form of a number of credits. The number of credits is determined by one or more math tables stored in the system memory **24**.

[0022] In one embodiment, gaming machine **10** includes three-dimensional virtual controls such as shown in FIG. **3**.

[0023] Three dimensional effects have been used in previous gaming machines. Effects to date have, however, relied on pre-rendered presentations of three-dimensional images. The use of pre-rendered images limited the types of user interaction that could be handled and, therefore, was view as somewhat gimmicky. Gaming machines **10** according to the present invention generate their three-dimensional effects in real-time. The result is a much more interactive and interesting environment for the gaming player.

[0024] In one embodiment, the three-dimensional virtual controls are implemented using a game design package such as RenderWare Studio 2.0 running, for example, on a processor designed by Intel or AMD.

[0025] In one embodiment, three-dimensional effects are used to highlight winning combinations. In one embodiment, such as is illustrated in FIGS. **3** and **4**, processor **20** displays a reel image on a display **12** at **40** and waits for a user input. When a user input is received, control moves to **42**, where the reel image is modified to reflect a gaming outcome. Control then moves to **44** where a winning combination is highlighted with a three-dimensional effect.

[0026] In one embodiment, the effect is a camera zoom. When a winning combination is formed, the camera zooms in on the winning combinations showing more details (3D presentation of the symbols).

[0027] In one embodiment, the effect is to show winning combinations on the “backside” of the reel. This creates the ability to bet on the “backside” of the reels. In this effect the camera shows the standard reels, then flies behind the reels (either using a 180° move or by moving through the reel strips), shows an additional set of reels and pays on winning combinations on the other side.

[0028] In one embodiment, if a win is awarded, the pay lines highlight as normal. The symbols themselves, however, would “pop” forward and rotate on a 3D axis to emphasize the pay. Such a presentation can be used for both line pays and scatter pays.

[0029] In one embodiment, if a win is awarded the pay lines and the symbols highlight using 3D motion (moving forward and back (z-order) slightly).

[0030] In one embodiment, when a bonus trigger appears in a potential winning position, it performs a 3D move (in/out or rotates).

[0031] In one embodiment, when bonus symbols form a trigger, they move forward from the reels and the reels move backwards fading to black.

[0032] This approach also creates the possibility of adding “phantom” reels. A game can be constructed in which five reels are displayed. If the player wants to add a 6th or 7th reel to a game, when the 6th or 7th are bet, the camera ‘leans’ and shows the additional reels.

[0033] In one embodiment, a cascade game uses three-dimensional effects. In one such embodiment, a reel image having three-dimensional symbols is shown on display **12**. The reel image is modified to reflect a gaming outcome. For instance, in one embodiment, the default view is standard, with the exception of the symbols being three-dimensional objects. When a drop results in a cascade the point of view (POV) of the display rotates slightly to the left or right to show the win in a slight 3D perspective.

[0034] In one embodiment, symbols within the reel image appear to move as the reels spin. In one embodiment, the symbols appear to move closer to and farther from the player as if riding a wave. In one such embodiment, the motion is from left to right; the wave moves from the upper leftmost reel symbol to the lower rightmost reel symbol.

[0035] In one embodiment, the player picks a corner to start the wave. If symbols land in pre-determined winning spots or patterns, gaming machine **10** pays. The pick determines the order.

[0036] In one embodiment, reel symbols are used as textures. When triggered by a bonus or other event, the entire reel image “skins” to a 3D shape (Sphere, Cube, Pyramid, decahedron etc.), with the symbol becoming a surface texture. The 3D shape can then be moved around display **12** (e.g., the symbols could be folded around a cube and the cube rolled like a die). Such an effect can also be used for free spins and bonus spins.

[0037] In one embodiment, reels are highlight with real-time lighting effects. In one such embodiment, spot lighting and shadows fall on the reels to illuminate the symbols as the reels spin. In one such embodiment, a light rotates into view, or from behind to in front of a symbol, on a trigger. In one embodiment, scene attributes such as color, the density of light, flashes and mist can be used to highlight symbols in real-time.

[0038] Three-dimensional effects also open up new games. In one game, gaming machine **10** displays an immersive multi-reel game. In one embodiment, the environment is such that it appears that four versions of the multi-reel grid such as is shown in FIG. **5** are placed around the player. In the embodiment shown in FIG. **5**, each grid **90** is 3×3 with five pay lines. As can be seen in FIG. **5**, pay line **5** has a winning combination of three light bulbs.

[0039] In one embodiment, such as is shown in FIG. **6**, where the player has a POV of being inside a cube **100**. Four sides of the cube have grids **90** displayed on them but these are only “virtual” screens. Only one grid is displayed at a time; the player rotates the cube to show the other grids **90**.

[0040] In one embodiment of the system of FIG. **6**, if the result of the spin is a pay the cube side containing the pay rotates to be in front of the player (shown by blue cone **102**). If there are additional wins on other sides of the cube, the cube rotates to have them appear to the player in a similar method.

[0041] In the example shown in FIG. **6**, there are four winning 3 light bulb pays.

[0042] In one embodiment, pay lines extend across edges allowing pays of up to 12 symbols in the example shown.

[0043] In one embodiment, the player selecting another play can stop the rotation and display of winning pay lines.

[0044] In one embodiment, display 12 can be manipulated by the player so that the player is outside the cube looking into the cube. In one embodiment, the player sees through one of the grids (i.e., the grid is translucent). In another embodiment, the player only sees three of the screens. The one "behind" him disappears but can be brought into view by rotating the cube.

[0045] In one embodiment, the cube is a cylinder and the pay line extends around the circumference of the cylinder. The player could also be placed in the middle of a sphere or other three-dimensional object.

[0046] In the above discussion, the term "processor" is defined to include any digital or analog data processing unit. Examples include any microprocessor or microcontroller capable of embodying the inventions described herein.

[0047] Examples of articles comprising machine readable media are floppy disks, hard drives, CD-ROM or DVD media or any other read-write or read-only memory device.

[0048] Portions of the above description have been presented in terms of algorithms and symbolic representations of operations on data bits within a computer memory. These algorithmic descriptions and representations are the ways used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. An algorithm is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like. It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise as apparent from the following discussions, terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar computing device, that manipulates and transforms data represented as physical (e.g., electronic) quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices.

[0049] Although specific embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement which is calculated to achieve the same purpose may be substituted for the specific embodiment shown. This application is intended to cover any adaptations or variations of the present invention. Therefore, it is intended that this invention be limited only by the claims and the equivalents thereof.

What is claimed is:

- 1. In a reel-based gaming machine, a method of displaying a gaming outcome, comprising:
 - displaying a reel image on a display;
 - modifying the reel image to reflect a gaming outcome; and

highlighting a winning combination with a three-dimensional effect.

2. The method of claim 1, wherein the three-dimensional effect is generated in real time.

3. The method of claim 1, wherein the three-dimensional effect is a camera zoom.

4. The method of claim 1, wherein the three-dimensional effect includes a showing of one or more winning combination on a backside of a reel.

5. The method of claim 1, wherein the three-dimensional effect includes a view of symbols on a pay line moving forward on a 3D access.

6. The method of claim 1, wherein the three-dimensional effect includes a view of motion of symbols on pay lines moving forward and backward.

7. The method of claim 1, wherein the three-dimensional effect includes a view of bonus symbols moving forward from the reels and the reels moving backwards.

8. The method of claim 1, wherein the three-dimensional effect includes a view of phantom reels.

9. An article comprising a machine readable medium having instructions thereon, wherein the instructions, when executed in a computer, create a system for executing the method of claim 1.

10. In a reel-based gaming machine, a method of displaying a gaming outcome, comprising:

- displaying a reel image on a display;
- modifying the reel image to reflect a gaming outcome;
- modifying the reel image to reflect a cascade; and
- highlighting a winning combination with a three-dimensional effect.

11. The method of claim 10, wherein symbols within the reel image appear to move as the reels spin.

12. The method of claim 10, wherein highlighting a winning combination includes projecting a texture on the reel image.

13. An article comprising a machine readable medium having instructions thereon, wherein the instructions, when executed in a computer, create a system for executing the method of claim 10.

14. In a reel-based gaming machine, a method of displaying a gaming outcome, comprising:

- displaying a reel image on a display, wherein the reel image includes two or more grids, wherein each grid is in a plane and wherein each grid plane is orthogonal to the other grid a neighboring grid plane;
- modifying the reel image to reflect a gaming outcome; and
- highlighting a winning combination across two or more grid planes.

15. The method of claim 14, wherein highlighting a winning combination across two or more grid planes includes applying a three-dimensional effect to the winning combination.

16. An article comprising a machine readable medium having instructions thereon, wherein the instructions, when executed in a computer, create a system for executing the method of claim 14.

17. The method of claim 14, wherein reels are highlighted with real-time lighting effects.

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