Disclosed are games, gaming machines, gaming systems and methods including a collapsible active reel display. During play of a game, the reels may be reduced in height from spin to spin in order to form different winning combinations. A multiplier may be modified upon each reduction in height. Similar reductions in the active reel display may result from columns or individual symbol cells being removed from subsequent play.
DURING THE FREE GAMES Bonus

THE TEMPLE'S STONE WALL CLOSES OVER ONE ROW OF REELS AT A TIME INCREASING FREE GAMES MULTIPLIER EACH TIME THE WALL CLOSES!

WIN RITUAL STAFF TO HOLD WALL FOR ADDITIONAL SPINS

FIG. 2C
FREE GAMES ARE COMPLETE WHEN THE STONE WALL REACHES THE BOTTOM.

FREE GAMES OUTRO

FIG. 2D
FIG. 4
initiate primary game play

pay player according to primary game outcome

feature game trigger?

no

display and spin feature reels

inc. feature pay based on win(s)

collapse trigger?

yes

remove one row of reels from play

no

feature game over?

pay any feature award to player

FIG. 7
FREE GAMES

INITIATED BY
3 SCATTERED
ON AVERAGE EVERY 60 GAMES

ALL bonus pays are
SCATTER PAYS

A VARIETY OF
MULTIPLIERS
AWARDED DURING BONUS

FIG. 10
WAGERING GAME WITH COLLAPSIBLE REEL AREA

BACKGROUND OF THE INVENTION

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[0002] 1. Field of the Invention

[0003] The present invention is directed to wagering games, gaming machines, networked gaming systems and methods and, more particularly, to wagering games, gaming machines, networked gaming systems and methods having collapsible reels.

[0004] 2. Description of the Related Art

[0005] In the prior art, various types of gaming machines have been developed with different features to captivate and maintain player interest. In general, a gaming machine allows a player to play a game in exchange for a wager. Depending on the outcome of the game, the player may be entitled to an award which is paid to the player by the gaming machine, normally in the form of currency or game credits. Gaming machines may include flashing displays, lighted displays, or sound effects to capture a player's interest in a gaming device.

[0006] Another important feature of maintaining player interest in a gaming machine includes providing the player with many opportunities to win awards, such as cash or prizes. For example, in some slot machines, the display windows show more than one adjacent symbol on each reel, thereby allowing for multiple-line betting. Feature games of various types have been employed to reward players above the amounts normally awarded on a standard game pay schedule. Generally, such feature games are triggered by predetermined events such as one or more appearances of certain combinations of indicia in a primary game. In order to stimulate interest, feature games are typically set to occur at a gaming machine on a statistical cycle based upon the number of primary game plays.

[0007] Some gaming machine games today include one or more progressive prize awards. In some configurations, the progressive prize may have a small probability of a player winning it; thus making it possible to have a larger progressive prize. In other game configurations, the progressive prize may be a small amount; thus allowing the player patron to win the progressive prize more frequently. In most typical game configurations, the player wins the progressive prize as a result of a specific game outcome within the primary or main game.

[0008] While gaming machines including feature games and progressive prizes have been very successful, there remains a need for games that provide a player with enhanced excitement and increased opportunity of winning.

SUMMARY OF THE INVENTION

[0009] In accordance with one or more embodiments of the invention, a wagering game includes an interface activatable by a player and a primary game comprising one or more game plays, at least one of the game plays occurring after activation of the interface by the player. A set of indicia is displayed according to a primary game outcome. The game also includes a reel-based feature game. Certain triggering combination(s), lack of combination(s), appearance of a certain symbol, a certain number of spins, or other triggers may cause the top row of symbols of the feature game reels to “collapse.” This makes the game eventually from, for example, 5-reels wide, 4 symbols-tall to 5-reels wide, 3 symbols-tall, then to 5-reels wide, 2 symbols-tall, and then 5-reels wide, 1 symbol tall. Each time a row collapses, the games associated with the new layout may pay with an increased win multiplier; for example, 1-tall=1x, 3-tall=2x, 2-tall=5x, and 1-tall=10x. Certain combination(s) or the appearance of a certain symbol may delay the next reel collapse for a certain number of additional spins, enhancing the win opportunities with the current layout by awarding extra spins at that level. The feature game ends when all rows have collapsed. The feature game may be otherwise terminated, for example, by the appearance of a terminating symbol, expiration of time or a certain number of spins, etc. In other embodiments, instead of rows, the collapsing area may comprise columns or individual symbol positions that are removed from play.

[0010] Other features and advantages will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which illustrate by way of example, the features of the various embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a display image associated with an example game in accordance with one or more embodiments.

[0012] FIGS. 2A-2D illustrate various aspects of a collapsible reels feature game in accordance with one or more embodiments.

[0013] FIG. 3 illustrates stacked wilds in accordance with one or more embodiments.

[0014] FIG. 4 is a perspective view of a gaming machine in accordance with one or more embodiments.

[0015] FIG. 5 is a block diagram of the physical and logical components of the gaming machine of FIG. 4 in accordance with one or more embodiments.

[0016] FIG. 6 is a block diagram of the logical components of a gaming kernel in accordance with one or more embodiments.

[0017] FIG. 7 is a functional block diagram depicting the steps associated with carrying out an example method in accordance with one or more embodiments.

[0018] FIG. 8 is a schematic block diagram showing the hardware elements of a networked gaming system in accordance with one or more embodiments.

[0019] FIGS. 9-10 illustrate various other aspects in accordance with one or more embodiments of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0020] Various embodiments are directed to a game, gaming machine, gaming networks and method for playing a game, wherein the game includes adjustable multi-part indicia. The embodiments are illustrated and described herein, by way of example only, and not by way of limitation. Referring now to the drawings, and more particularly to FIGS. 1-8, there are shown illustrative examples of games, gaming machines, gaming networks and methods for playing a game in accordance with various aspects of the invention.
An example game in accordance with one or more aspects of the invention is shown in FIGS. 1-3. Referring to FIG. 1, game 100 is implemented using five spinning reels 101-105. Each of 30 pay line patterns (not shown) passes through one indicium on each of the five reels. For example, the first pay line 160 extends horizontally through the top row of each of the five reels 101-105. The number of pay lines and their patterns are by way of example only and may vary. The player selects the number of played pay lines and the number of credits or coins wagered on each line using touch screen controls or gaming device control buttons. Win PAID meter 140 and CASH CREDITS meter 150 provide the player with information about the amount paid by the last game played and the total number of credits available for play. BET meter 160 displays the size of the currently selected wager. The player may collect the balance of his credits by pressing a COLLECT button (not shown).

The player initiates game play by pressing a SPIN/ENROLL touch screen button 170. In some embodiments, the player may simultaneously select all pay lines at the maximum number of coins or credits allowed per line by pressing a MAX BET button (not shown). Buttons (see FIG. 4, 460) on gaming machine 400 (FIG. 4) or touch screen buttons similar to button 170 may be used to perform the actions described here without deviating from the scope of the invention. Reels 101-105 are made to spin and stop in predetermined stop positions. A determination is then made whether the stop positions of the reels resulted in a winning game outcome.

The player may view the pay table associated with the primary game on the primary game display by way of a HELP/PAYS 180 or similar button. In alternate embodiments, the pay table may be presented on a second video or printed display attached to the gaming device (i.e. display 453 or “pay glass” 452, FIG. 4). A winning combination, for example, could be three or more symbols adjacent to one another on an active pay line. For each winning combination, the game device awards the player the award in the pay table, adjusted as necessary based on the number of credits wagered on the pay line on which the win occurred. For example, three MAYAN MOON symbols adjacent to one another from left-to-right on an active pay line might pay 100 times the player's wager.

In some embodiments, various primary game outcomes may be utilized to trigger the play of a feature game, including, but not limited to, awarding feature play when certain symbols appear on a pay line, when certain symbols are scattered, when no symbols of a certain type appear, when a certain winning combination occurs or, regardless of the visible symbols, at random or fixed intervals. The availability of the feature game may be restricted based on the size of the wager.

In accordance with one or more embodiments, a triggering event in the primary game initiates a free-spin feature game as illustrated by the various aspects of FIG. 2. For example, three PYRAMID symbols scattered on the primary game reels may initiate play. In the example of Mayan Moon, initiation of the feature game may result in a set of sliding doors 205 closing over the primary reels, then re-opening to reveal a set of feature game reels 210, as shown in FIGS. 2A and 2B. In one or more embodiments, the feature game may require one or more additional wagers by the player.

The feature game is played by spinning the set feature game reels 210. At the conclusion of each spin, the reels display a set of indicia. Certain triggering symbol combination(s), lack of combination(s), appearance of a certain symbol, a certain number of spins, or other triggers cause the top row of symbols to “collapse,” as illustrated in FIG. 2C. In the example of Mayan Moon, a stone wall 215 gradually descends upon each triggering event, obscuring the next lower row of reel symbols. In one embodiment, the set of reels remains visible, but is dimmed or otherwise partially masked, and is not considered in the win evaluation of subsequent spins. In one or more embodiments, the reels are mechanical reels and a shutter or an LCD in front of the reels is used to obscure rows that have been collapsed.

As play of the feature game progresses, the active and/or visible reel display area eventually shrinks from, for example, 5-reels wide, 4 symbols-tall to 5-reels wide, 3 symbols-tall, then to 5-reels wide, 2-symbols tall, and then 5-reels wide, 1-symbol tall. Each time a row collapses or is obscured, the games associated with the new display layout may pay with an increased win multiplier; for example, 4-tall=1× multiplier, 3-tall=2× multiplier, 2-tall=5× multiplier, and 1-tall=10× multiplier. In some embodiments, the multiplier may change independent of collapsing reel rows or does not change at all. Certain combination(s) or the appearance of a certain symbol, such as a RITUAL STAFF 320, may delay the next reel collapse for a certain number of spins, enhancing the win opportunities with the current layout by awarding extra spins at that level. The feature game ends when all rows have collapsed, as shown in FIG. 2D. In one or more embodiments, a feature terminating event, such as a “feature over” symbol appearing anywhere on the reels or reaching a maximum number of spins in the game may terminate the feature game before all rows have collapsed.

While the example of reels collapsing in order from the top to the bottom has been described, it is also possible for reels to collapse from the bottom to the top, or to merely lose an additional row with each collapse without the requirement that the removal of the row happen in order.

In accordance with other embodiments, the active reel display area may collapse by eliminating particular cells without entire rows being eliminated. For example, each symbol position include an individual reel which may be made inactive by a collapsing trigger. In one embodiment, a particular symbol appearing on such an individual reel removes it from play. The feature game ends when all individual reels have been disabled.

In accordance with one or more embodiments, the feature game of FIG. 2 may be one of a set of primary games randomly selected for play following initiation of play by the player. For example, multiple primary games are disclosed in U.S. application Ser. No. 11/428,220, entitled “Multiple Primary Games Triggered by Random Number Generator,” filed on Jun. 30, 2006, which is hereby incorporated by reference, in which a gaming machine has at least two distinct primary games. After receiving a wager, the gaming machine determines which primary game to activate. The selected primary game is activated and a game outcome is presented to the player on a game display. A payout may be awarded according to the game outcome. The availability of the game may be restricted based on the size of the wager.

In accordance with one or more embodiments, the primary or feature game may have additional features such as “stacked wilds” as shown in FIG. 3. In the example of Mayan Moon, the appearance of a MAYAN MOON symbol anywhere on a reel causes all displayed symbols on that reel
to be wild, substituting for some or all symbols for the purpose of completing winning combinations of symbols.

[0032] In accordance with one or more embodiments of the invention, progressive prizes may be awarded as part of primary or feature game play. The progressive prizes may be calculated by a progressive controller such as a controller manufactured by Miktou Inc. The progressive controller monitors wagering during base game play, calculates a current value for one or more progressive jackpot pools and transmits the current pool values to the gaming machine. In one or more embodiments, progressive awards are accumulated during regular play as a percentage, such as three percent, of the game play take. The prizes may be sized according to the preferences of the casino operator. The number of prizes may vary without deviating from the scope of the invention. The size of the prizes is dependent on the amount of play prior to initiating feature play and may come from the contributions of a single gaming machine or a number of linked gaming machines. In another aspect, the prizes may be set amounts established by the casino operator from non-coin-in funds, such as marketing funds.

[0033] In one or more embodiments, the prizes for feature game play may be accumulated based on funding mechanisms other than a percentage of wagers accumulated by the gaming machine. For example, an operator may initially fund various award pools with a pre-determined amount of money, such as $1000 for one progressive, $500 for a second progressive, $100 for a third progressive and so on. Subsequently, the casino operator may determine to increase the amounts of one or more of the awards at pre-determined times which may be periodically or randomly selected with a range of times or periods. Once a winner has occurred at any level, the award levels may be rolled back to the initial funding level. In one or more embodiments, only the winning award level is rolled back to the initial funding level.

[0034] In one or more embodiments, the prizes for feature game play may be set amounts, i.e. non-progressive. In one or more embodiments, the algorithms to determine the amounts may be determined by a statistical percentage based on an average take of a gaming machine and the likelihood of the win over a period of time. In the case where one or more gaming machines are networked, a common award table may be utilized where the award algorithms are determined based on an average take (total wagers) of all the networked gaming machines and the likelihood of a win of an award over a period of time. Each award may be calculated in a similar manner based on the likelihood of a winning outcome being achieved during a game play session.

[0035] Referring to FIG. 4, gaming machine 400 is shown, in accordance with one or more embodiments, including cabinet housing 420, primary game display 440 upon which a primary game and feature game may be displayed, top box 450 which may display multiple progressives that may be won during play of the feature game, player-activated buttons 460, player tracking panel 436, bill/voucher acceptor 480 and one or more speakers 490. Cabinet housing 420 may be a self-standing unit that is generally rectangular in shape and may be manufactured with reinforced steel or other rigid materials which are resistant to tampering and vandalism. Cabinet housing 420 may alternatively be a handheld device including the gaming functionality as discussed herein and including various or described components herein. For example, a handheld device may be a cell phone, personal data assistant, or laptop or tablet computer, each of which may include a display, a processor, and memory sufficient to support either stand-alone capability such as gaming machine 400 or thin client capability such as that incorporating some of the capability of a remote server.

[0036] In one or more embodiments, cabinet housing 420 houses a processor, circuitry, and software (not shown) for receiving signals from the player-activated buttons 460, operating the games, and transmitting signals to the respective displays and speakers. Any shaped cabinet may be implemented with any embodiment of gaming machine 400 so long as it provides access to a player for playing a game. For example, cabinet 420 may comprise a slant-top, bar-top, or table-top style cabinet, including a Bally Cinevision™ or CineReels™ cabinet. The operation of gaming machine 400 is described more fully below.

[0037] The plurality of player-activated buttons 460 may be used for various functions such as, but not limited to, selecting a wager denomination, selecting a game to be played, selecting a wager amount per game, initiating a game, or cashing out money from gaming machine 400. Buttons 460 may be operable as input mechanisms and may include mechanical buttons, electromechanical buttons or touch screen buttons. Optionally, a handle 485 may be rotated by a player to initiate a game.

[0038] In one or more embodiments, buttons 460 may be replaced with various other input mechanisms known in the art such as, but not limited to, a touch screen system, touch pad, track ball, mouse, switches, toggle switches, or other input means to accept player input. For example, one input means is a universal button module as disclosed in U.S. application Ser. No. 11/096,212, entitled “Universal Button Module,” filed on Apr. 14, 2005, which is hereby incorporated by reference. Generally, the universal button module provides a dynamic button system adaptable for use with various games and capable of adjusting to gaming systems having frequent game changes. More particularly, the universal button module may be used in connection with playing a game on a gaming machine and may be used for such functions as selecting the number of credits to bet per hand.

[0039] Cabinet housing 420 may optionally include top box 450 which contains “top glass” 452 comprising advertising or payout information related to the game or games available on gaming machine 400. Player tracking panel 436 includes player tracking card reader 434 and player tracking display 432. Voucher printer 430 may be integrated into player tracking panel 436 or installed elsewhere in cabinet housing 420 or top box 450.

[0040] Game display 440 may present a game of chance wherein a player receives one or more outcomes from a set of potential outcomes. For example, one such game of chance is a video slot machine game. In other aspects of the invention, gaming machine 400 may present a video or mechanical reel slot machine, a video keno game, a lottery game, a bingo game, a Class II bingo game, a roulette game, a craps game, a blackjack game, a mechanical or video representation of a wheel game or the like.

[0041] Mechanical or video/mechanical embodiments may include game displays such as mechanical reels, wheels, or dice as required to present the game to the player. In video/mechanical or pure video embodiments, game display 440 is, typically, a CRT or a flat-panel display in the form of, but not limited to, liquid crystal, plasma, electroluminescent, vacuum fluorescent, field emission, or any other type of panel display known or developed in the art. Game display 440 may
be mounted in either a “portrait” or “landscape” orientation and be of standard or “widescreen” dimensions (i.e., a ratio of one dimension to another of at least 16:9). For example, a widescreen display may be 32 inches wide by 18 inches tall. A widescreen display in a “portrait” orientation may be 32 inches tall by 18 inches wide. Additionally, game display 440 preferably includes a touch screen or touch glass system (not shown) and presents player interfaces such as, but not limited to, credit meter (not shown), win meter (not shown) and touch screen buttons (not shown). An example of a touch glass system is disclosed in U.S. Pat. No. 6,942,571, entitled “Gaming Device with Direction and Speed Control of Mechanical Reels Using Touch Screen,” which is hereby incorporated by reference.

[0042] Game display 440 may also present information such as, but not limited to, player information, advertisements and casino promotions, graphic displays, news and sports updates, or even offer an alternate game. This information may be generated through a host computer networked with gaming machine 400 or its own initiative or it may be obtained by request of the player using either one or more of the plurality of player-activated buttons 460; the game display itself; if game display 440 comprises a touch screen or similar technology; buttons (not shown) mounted about game display 440 which may permit selections such as those found on an ATM machine, where legends on the screen are associated with respective selecting buttons or any player input device that offers the required functionality.

[0043] Cabinet housing 420 incorporates a single game display 440. However, in alternate embodiments, cabinet housing 420 or top box 450 may house one or more additional displays 453 or components used for various purposes including additional game play screens, animated “top glass,” progressive meters or mechanical or electromechanical devices (not shown) such as, but not limited to, wheels, pointers or reels. The additional displays may or may not include a touch screen or touch glass system.

[0044] Referring to FIG. 5, electronic gaming machine 501 is shown in accordance with one or more embodiments. Electronic gaming machine 501 includes base game integrated circuit board 503 (EGM Processor Board) connected through serial bus line 505 to game monitoring unit (GMU) 507 (such as a Bally MC300 or ACSC NT), and player interface integrated circuit board (PIB) 509 connected to player interface devices 511 over bus lines 513, 515, 517, 519, 521, 523. Printer 525 is connected to PIB 509 and GMU 507 over bus lines 527, 529. EGM Processor Board 503, PIB 509, and GMU 507 connect to Ethernet switch 531 over bus lines 533, 535, 537. Ethernet switch 531 connects to a slot management system (SMS) and a casino management system (CMS) network over bus line 539. GMU 507 also may connect to the SMS and CMS network over bus line 541. Speakers 543 connect through audio mixer 545 and bus lines 547, 549 to EGM Processor Board 503 and PIB 509. The proximity and biometric devices and circuitry may be installed by upgrading a commercially available PIB 509, such as a Bally iView unit. Coding executed on EGM Processor Board 503, PIB 509, and/or GMU 507 may be upgraded to integrate a game having adjustable multi-part indicia as is more fully described herein.

[0045] Peripherals 551 connect through bus 553 to EGM Processor Board 503. For example, a bill/ticket acceptor is typically connected to a game input-output board 553 which is, in turn, connected to a conventional central processing unit (“CPU”) board 503, such as an Intel Pentium microprocessor mounted on a gaming motherboard. I/O board 553 may be connected to CPU processor board 503 by a serial connection such as RS-232 or USB or may be attached to the processor by a bus such as, but not limited to, an ISA bus. The gaming motherboard may be mounted with other conventional components, such as is found on conventional personal computer motherboards, and loaded with a game program which may include a gaming machine operating system (OS), such as a Bally Alpha OS. Processor board 503 executes a game program that causes processor board 503 to play a game. In one embodiment, the game program provides a slot machine game having adjustable multi-part indicia. The various components and included devices may be installed with conventionally and/or commercially available components, devices, and circuitry into a conventional and/or commercially available gaming machine cabinet, examples of which are described above.

[0046] When a player has inserted a form of currency such as, for example and without limitation, paper currency, coins or tokens, cashless tickets or vouchers, electronic funds transfers or the like into the currency acceptor, a signal is sent by way of I/O board 553 to processor board 503 which, in turn, assigns an appropriate number of credits for play in accordance with the game program. The player may further control the operation of the gaming machine by way of other peripherals 551, for example, to select the amount to wager via electromechanical or touch screen buttons. The game starts in response to the player operating a start mechanism such as a handle or touch screen icon. The game program includes a random number generator to provide a display of randomly selected indicia on one or more displays. In some embodiments, the random generator may be physically separate from gaming machine 400; for example, it may be part of a central determination host system which provides random game outcomes to the game program. Thereafter, the player may or may not interact with the game through electromechanical or touch screen buttons to change the displayed indicia. Finally, processor board 503 under control of the game program and OS compares the final display of indicia to a pay table. The set of possible game outcomes may include a subset of outcomes related to the triggering of a feature game. In the event the displayed outcome is a member of this subset, processor board 503, under control of the game program and by way of I/O Board 553, may cause feature game play to be presented on a feature display.

[0047] Predetermined payout amounts for certain outcomes, including feature game outcomes, are stored as part of the game program. Such payout amounts are, in response to instructions from processor board 503, provided to the player in the form of coins, credits or currency via I/O board 553 and a pay mechanism, which may be one or more of a credit meter, a coin hopper, a voucher printer, an electronic funds transfer protocol or any other payout means known or developed in the art.

[0048] In various embodiments, the game program is stored in a memory device (not shown) connected to or mounted on the gaming motherboard. By way of example, but not by limitation, such memory devices include external memory devices, hard drives, CD-ROMs, DVDs, and flash memory cards. In an alternative embodiment, the game programs are stored in a remote storage device. In one embodiment, the remote storage device is housed in a remote server. The gaming machine may access the remote storage device via a network connection, including but not limited to, a local area network ("LAN") or the Internet ("INTERNET").
network connection, a TCP/IP connection, a wireless connection, or any other means for operatively networking components together. Optionally, other data including graphics, sound files and other media data for use with the EGM are stored in the same or a separate memory device (not shown). Some or all of the game program and its associated data may be loaded from one memory device into another, for example, from flash memory to random access memory (RAM).

[0049] In one or more embodiments, peripherals may be connected to the system over Ethernet connections directly to the appropriate server or tied to the system controller inside the EGM using USB, serial or Ethernet connections. Each of the respective devices may have upgrades to their firmware utilizing these connections.

[0050] GMU 507 includes an integrated circuit board and GMU processor and memory including coding for network communications, such as the G2S (game-to-system) protocol from the Gaming Standards Association, Las Vegas, Nev., used for system communications over the network. As shown, GMU 507 may connect to card reader 555 through bus 557 and may thereby obtain player card information and transmit the information over the network through bus 541. Gaming activity information may be transferred by the EGM Processor Board 503 to GMU 507 where the information may be translated into a network protocol, such as S2S, for transmission to a server, such as a player tracking server, where information about a player’s playing activity may be stored in a designated server database.

[0051] PID 509 includes an integrated circuit board, PID processor, and memory which includes an operating system, such as Windows CE, a player interface program which may be executable by the PID processor together with various input/output (I/O) drivers for respective devices which connect to PID 509, such as player interface devices 511, and which may further include various games or game components playable on PID 509 or playable on a connected network server and PID 509 is operable as the player interface. PID 509 connects to card reader 555 through bus 521, display 559 through video decoder 561 and bus 521, such as an LVDS or VGA bus.

[0052] As part of its programming, the PID processor executes coding to drive display 559 and provide messages and information to a player. Touch screen circuitry interactively connects display 559 and video decoder 561 to PID 509, such that a player may input information and cause the information to be transmitted to PID 509 either on the player’s initiative or responsive to a query by PID 509. Additionally soft keys 565 connect through bus 517 to PID 509 and operate together with display 559 to provide information or queries to a player and receive responses or queries from the player. PID 509, in turn, communicates over the CMS/SM network through Ethernet switch 531 and busses 535, 539 and with respective servers, such as a player tracking server.

[0053] Player interface devices 511 are linked into the virtual private network of the system components in gaming machine 501. The system components include the iVIEW processing board and game monitoring unit (GMU) processing board. These system components may connect over a network to the slot management system (such as a commercially available Bally SDS/SMS) and/or casino management system (such as a commercially available Bally CMP/CMS).

[0054] The GMU system component has a connection to the base game through a serial SAS connection and is connected to various servers using, for example, HTTPs over Ethernet. Through this connection, firmware, media, operating system software, gaming machine configurations can be downloaded to the system components from the servers. This data is authenticated prior to install on the system components.

[0055] The system components include the iVIEW processing board and game monitoring unit (GMU) processing board. The GMU and iVIEW can combined into one like the commercially available Bally GTM iVIEW device. This device may have a video mixing technology to mix the EGM processor’s video signals with the iVIEW display onto the top box monitor or any monitor on the gaming device.

[0056] In accordance with one or more embodiments, FIG. 6 is a functional block diagram of a gaming kernel 600 of a game program under control of processor board 503. The game program uses gaming kernel 600 by calling into application programming interface (API) 602, which is part of game manager 603. The components of game kernel 600 as shown in FIG. 6 are only illustrative, and should not be considered limiting. For example, the number of managers may be changed, additional managers may be added or some managers may be removed without deviating from the scope and spirit of the invention.

[0057] As shown in the example, there are three layers: a hardware layer 605; an operating system layer 610, such as, but not limited to, Linux; and a game kernel layer 600 having game manager 603 therein. In one or more embodiments, the use of a standard operating system 610, such a UNIX-based or Windows-based operating system, allows game developers interfacing to the gaming kernel to use any of a number of standard development tools and environments available for the operating systems. This is in contrast to the use of proprietary, low level interfaces which may require significant time and engineering investments for each game upgrade, hardware upgrade, or feature upgrade. The game kernel layer 600 executes at the user level of the operating system 610, and itself contains a major component called the I/O Board Server 615. To properly set the bounds of game application software (making integrity checking easier), all game applications interact with gaming kernel 600 using a single API 602 in game manager 603. This enables game applications to make use of a well-defined, consistent interface, as well as making access points to gaming kernel 600 controlled, where overall access is controlled using separate processes layer 604.

[0058] For example, game manager 603 parses an incoming command stream and, when a command dealing with I/O comes in (arrow 604), the command is sent to an applicable library routine 612. Library routine 612 decides what it needs from a device, and sends commands to I/O Board Server 615 (see arrow 608). A few specific drivers remain in operating system 610’s kernel, shown as those below line 606. These are built-in, primitive, or privileged drivers that are (i) general (ii) kept to a minimum and (iii) are easier to leave than extract. In such cases, the low-level communications is handled within operating system 610 and the contents passed to library routines 612.

[0059] Thus, in a few cases library routines may interact with drivers inside operating system 610, which is why arrow 608 is shown as having three directions (between library utilities 612 and I/O Board Server 615, or between library utilities 612 and certain drivers in operating system 610). No matter which path is taken, the logic needed to work with each device is coded into modules in the user layer of the diagram. Operating system 610 is kept as simple, stripped down, and
common across as many hardware platforms as possible. The library utilities and user-level drivers change as dictated by the game cabinet or game machine in which it will run. Thus, each game cabinet or game machine may have an industry standard processor board 505 connected to a unique, relatively dumb, and as inexpensive as possible I/O adapter board 540, plus a gaming kernel 600 which will have the game-machine-unique library routines and I/O Board Server 615 components needed to enable game applications to interact with the gaming machine cabinet. Note that these differences are invisible to the game application software with the exception of certain functional differences (i.e., if a gaming cabinet has stereo sound, the game application will be able to make use of API 602 to use the capability over that of a cabinet having traditional monaural sound).

[0060] Game manager 603 provides an interface into game kernel 600, providing consistent, predictable, and backwards compatible calling methods, syntax, and capabilities by way of game application API 602. This enables the game developer to be free of dealing directly with the hardware, including the freedom to not have to deal with low-level drivers as well as the freedom to not have to program lower level managers 630, although lower level managers 630 may be accessible through game manager 603's interface 602 if a programmer has the need. In addition to the freedom derived from not having to deal with the hardware level drivers and the freedom of having consistent, callable, object-oriented interfaces to software managers of those components (drivers), game manager 603 provides access to a set of upper level managers 620 also having the advantages of consistent callable, object-oriented interfaces, and further providing the types and kinds of base functionality required in casino-type games. Game manager 603, providing all the advantages of its consistent and richly functional interface 602 as supported by the rest of game kernel 600, thus provides a game developer with a multitude of advantages.

[0061] Game manager 603 may have several objects within itself, including an initialization object (not shown). The initialization object performs the initialization of the entire game machine, including other objects, after game manager 603 has started its internal objects and servers in appropriate order. In order to carry out this function, the kernel's configuration manager 621 is among the first objects to be started; configuration manager 621 has data needed to initialize and correctly configure other objects or servers.

[0062] The upper level managers 620 of game kernel 600 may include game event log manager 622 which provides, at the least, a logging or logger base class, enabling other logging objects to be derived from this base object. The logger object is a generic logger; that is, it is not aware of the contents of logged messages and events. The log manager's (622) job is to log events in non-volatile event log space. The size of the space may be fixed, although the size of the logged event is typically not. When the event space or log space fills up, one embodiment will delete the oldest logged event (each logged event will have a time/date stamp, as well as other needed information such as length), providing space to record the new event. In this embodiment, the most recent events will thus be found in the log space, regardless of their relative importance. Further provided is the capability to read the stored logs for event review.

[0063] In accordance with one embodiment, meter manager 623 manages the various meters embodied in the game kernel 600. This includes the accounting information for the game machine and game play. There are hard meters (counters) and soft meters; the soft meters may be stored in non-volatile storage such as non-volatile battery-backed RAM to prevent loss. Further, a backup copy of the soft meters may be stored in a separate non-volatile storage such as EEPROM. In one embodiment, meter manager 623 receives its initialization data for the meters, during startup, from configuration manager 621. While running, the cash in (624) and cash out (625) managers call the meter manager's (623) update functions to update the meters. Meter manager 623 will, on occasion, create backup copies of the soft meters by storing the soft meters' readings in EEPROM. This is accomplished by calling and using EEPROM manager 631.

[0064] In accordance with still other embodiments, progressive manager 626 manages progressive games playable from the game machine. Event manager 627 is generic, like log manager 622, and is used to manage various gaming machine events. Focus manager 628 correlates which process has control of various focus items. Tilt manager 632 is an object that receives a list of errors (if any) from configuration manager 621 at initialization, and during game play from processes, managers, drivers, etc. that may generate errors. Random number generator manager 629 is provided to allow easy programming access to a random number generator (RNG), as a RNG is required in virtually all casino-style (gambling) games. RNG manager 629 includes the capability of using multiple seeds.

[0065] In accordance with one or more embodiments, a credit manager object (not shown) manages the current state of credits (cash value or cash equivalent) in the game machine, including any available winnings, and further provides denomination conversion services. Cash out manager 625 has the responsibility of configuring and managing monetary output devices. During initialization, cash out manager 625, using data from configuration manager 621, sets the cash out devices correctly and selects any selectable cash out denominations. During play, a game application may post a cash out event through the event manager 627 (the same way all events are handled), and using a callback posted by cash out manager 625, cash out manager 625 is informed of the event. Cash out manager 625 updates the credit object, updates its state in non-volatile memory, and sends an appropriate control message to the device manager that corresponds to the dispensing device. As the device dispenses dispensable media, there will typically be event messages being sent back and forth between the device and cash out manager 625 until the dispensing finishes, after which cash out manager 625, having updated the credit manager and any other game state (such as some associated with meter manager 623) that needs to be updated for this set of actions, sends a cash out completion event to event manager 627 and to the game application thereby. Cash in manager 624 functions similarly to cash out manager 625, only controlling, interfacing with, and taking care of actions associated with cashing in events, cash in devices, and associated meters and credit.
data writes to the EEPROM device to write the appropriate data in the proper location within the device. Any errors detected will be sent as IPC messages to game manager 603. All of this processing is asynchronous.

[0067] In accordance with one embodiment, button module 617 within I/O server 615, polls (or is sent) the state of buttons every 2 ms. These inputs are debounced by keeping a history of input samples. Certain sequences of samples are required to detect a button was pressed, in which case the I/O server 615 sends an inter-process communication event to game manager 603 that a button was pressed or released. In some embodiments, the gaming machine may have intelligent distributed I/O which debounces the buttons, in which case button module 617 may be able to communicate with the remote intelligent button processor to get the button events and simply relay them to game manager 603 via IPC messages. In still another embodiment, the I/O library may be used for pay out requests from the game application. For example, hopper module 618 must start the hopper motor, constantly monitor the coin sensing lines of the hopper, debounce them, and send an IPC message to the game manager 603 when each coin is paid.

[0068] Further details, including disclosure of lower level fault handling and/or processing, are included in U.S. Pat. No. 7,351,151 entitled “Gaming Board Set and Gaming Kernel for Game Cabinets” and provisional U.S. patent application No. 60/313,743, entitled “Form Fitting Upgrade Board Set For Existing Game Cabinets,” filed Aug. 20, 2001; said patent and provisional are both fully incorporated herein by explicit reference.

[0069] A logical flow diagram generally depicting the steps associated with a method 700 for carrying out a game having collapsible reels, in accordance with one aspect of the invention, is presented in FIG. 7. The order of actions as shown in FIG. 7 is only illustrative, and should not be considered limiting. For example, the order of the actions may be changed, additional steps may be added or some steps may be removed without deviating from the scope and spirit of the invention.

[0070] First at block 710, a primary game play is played by a player as described above. In one embodiment, the player places a wager and starts the game, whereby each reel then displays a representation of a slot machine reel spin before stopping with particular indicia displayed to the player. A win occurs if a series of indicia (BAR, BAR, BAR, for example) appears on one or more pay lines or patterns, as described above, and the player may be paid for any winning symbol combinations at block 720. At block 730, it is determined whether a feature game has been triggered. If not, primary game play continued at Box 710.

[0071] In the case where a feature game has been triggered as the result of a triggering event, the feature reels are displayed and spun. As with the primary game, any winning combinations of symbols on the feature reels results in a corresponding win amount to be added to a feature game award at box 750.

[0072] At box 760, it is further determined whether a reel collapse triggering event has occurred. As described above, this may include the display of one or more symbols, the lack of particular symbols, or be the result of a condition other than the display indicia. For example, each level may be limited to a certain number of spins, at which time a reel collapse is automatically triggered.

[0073] If a reel collapse triggering event has occurred, one row of reels is “collapsed” or otherwise removed from play at box 765.

[0074] At box 770, it is determined whether the feature game is over, either as the result of all rows having been removed from play or from some other condition, such as, but not limited to, display of a feature termination symbol, a certain number of spins having been exceeded, or a certain time elapsed. If the feature game has not been completed, the feature game continues at box 740. If the feature game is over, the total feature award is paid to the player at box 780 and the game continues at box 710 with the start of a new primary game.

[0075] Referring to FIG. 8, enterprise gaming system 801 is shown in accordance with one or more embodiments. Enterprise gaming system 801 may include one casino or multiple locations and generally includes a network of gaming machines 803, floor management system (SMS) 805, and casino management system (CMS) 807. SMS 805 may include load balancer 811, network services servers 813, player interface (VIEW) content servers 815, certificate services server 817, floor radio dispatch receiver/transmitters (RDC) 819, floor transaction servers 821 and game engines 823, each of which may connect over network bus 825 to gaming machines 803. CMS 807 may include location tracking server 831, WRG RICEM server 833, data warehouse server 835, player tracking server 837, biometric server 839, analysis services server 841, third party interface server 843, slot accounting server 845, floor accounting server 847, progressives server 849, promo control server 851, bonus game (such as Bally Live Rewards) server 853, download control server 855, player history database 857, configuration management server 859, browser manager 861, tournament engine server 863 connecting through bus 865 to server host 867 and gaming machines 803. The various servers and gaming machines 803 may connect to the network with various conventional network connections (such as, for example, USB, serial, parallel, RS-485, Ethernet). Additional servers which may be incorporated with CMS 807 include a responsible gaming limit server (not shown), advertisement server (not shown), and a control station server (not shown) where an operator or authorized personnel may select options and input new programming to adjust each of the respective servers and gaming machines 803. SMS 805 may also have additional servers including a control station (not shown) through which authorized personnel may select options, modify programming, and obtain reports of the connected servers and devices, and obtain reports. The various CMS and SMS servers are descriptively entitled to reflect the functional executable programmable store thereon and the nature of databases maintained and utilized in performing their respective functions.

[0076] Gaming machines 803 include various peripheral components that may be connected with USB, serial, parallel, RS-485 or Ethernet devices/architectures to the system components within the respective gaming machine. The GMU has a connection to the base game through a serial SAS connection. The system components in the gaming cabinet may be connected to the servers using HTTP or G2S over Ethernet. Using CMS 807 and/or SMS 805 servers and devices, firmware, media, operating systems, and configurations may be downloaded to the system components of the respective gaming machines for upgrading or managing floor content and offerings in accordance with operator selections or automatically.
depending upon CMS 807 and SMS 805 master programing. The data and programming updates to gaming machines 803 are authenticated using conventional techniques prior to install on the system components.

[0077] In various embodiments, any of the gaming machines 803 may be a mechanical reel spinning slot machine, video slot machine, video poker machine, keno machine, video blackjack machine, or a gaming machine offering one or more of the above described games including a group play game. Alternatively, gaming machines 803 may provide a game with collapsing reels as one of a set of multiple primary games selected for play by a random number generator, as described above. A gaming system of the type described above also allows a plurality of games in accordance with the various embodiments of the invention to be linked under the control of a group game server (not shown) for cooperative or competitive play in a particular area, carousel, casino or between casinos located in geographically separate areas. For example, one or more examples of group games under control of a group game server are disclosed in U.S. application Ser. No. 11/938,079, entitled “Networked System and Method for Group Play Gaming,” filed on Nov. 9, 2007, which is hereby incorporated by reference in its entirety for all purposes.

[0078] The various embodiments described above are provided by way of illustration only and should not be construed to limit the claimed invention. For example, it may further be appreciated that a game in accordance with one or more aspects of the invention may be associated with a table game such as a poker or blackjack. For example, a player may receive a chance to win one or more game plays on a gaming machine located adjacent the table, the opportunity based on cards or hands received during play of the table game. The game plays would provide multiple opportunities to win an award according to results achieved by spinning a set of collapsible reels as described above.

[0079] Those skilled in the art will readily recognize various modifications and changes that may be made to the claimed invention without following the example embodiments and applications illustrated and described herein, and without departing from the true spirit and scope of the claimed invention, which is set forth in the following claims.

What is claimed:
1. A wagering game comprising:
an interface activatable by a player;
a primary game comprising one or more game plays, at least one of the game plays occurring after activation of the interface by the player;
a set of indicia displayed according to a primary game outcome; and
a feature game comprising a set of collapsible reels.

2. The game of claim 1 wherein the reels are collapsed by removing at least one row of indicia displayed on the reels from win evaluation during subsequent spins of the collapsible reels.

3. The game of claim 2 wherein the collapsible reels are presented as collapsed by dimming the at least one row of indicia displayed on the reels.

4. The game of claim 2 wherein the collapsible reels are presented as collapsed by preventing the at least one row of indicia displayed on the reels from subsequently spinning.

5. The game of claim 1 wherein the primary game outcome is randomly or pseudo-randomly determined.

6. The game of claim 1 further comprising a wager, wherein play of the feature game is restricted by an amount of the wager.

7. The game of claim 1 further comprising a multiplier applied to each winning outcome of the feature game, the multiplier modified upon collapsing the collapsible reels.

8. A method of operating a game on a gaming machine comprising a central processor and a memory and further comprising program logic stored in the memory usable to play at least one game in exchange for a wager, the method comprising the steps of:
   accepting a wager from a player;
   initiating play of a first game according to the wager;
   displaying a first game outcome;
   upon a triggering event, initiating play of a feature game comprising a set of reels by way of the processor executing the program logic; and
   removing at least one row of indicia from play in response to a second triggering event.

9. The method of claim 8 wherein the first game outcome is randomly or pseudo-randomly determined.

10. The method of claim 8 wherein play of the second game is restricted by an amount of the wager.

11. The method of claim 8 wherein the row of indicia are removed from play by eliminating that row from win evaluation at the end of each subsequent spin of the reels.

12. The method of claim 11 wherein the row of indicia are visually removed from play by dimming illumination of the row.

13. The method of claim 11 wherein the row of indicia are visually removed from play by obscuring the player's view of the row.

14. The game of claim 11 wherein the row of indicia are visually removed from play by preventing the spinning of the removed row in subsequent spins.

15. The game of claim 8 further comprising a multiplier, the multiplier modified upon occurrence of the second triggering event.

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