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(54) **HELD REEL WITH MULTIPLE DIFFERENT FEATURES AND AN ASSOCIATED ACCUMULATION SEQUENCE**

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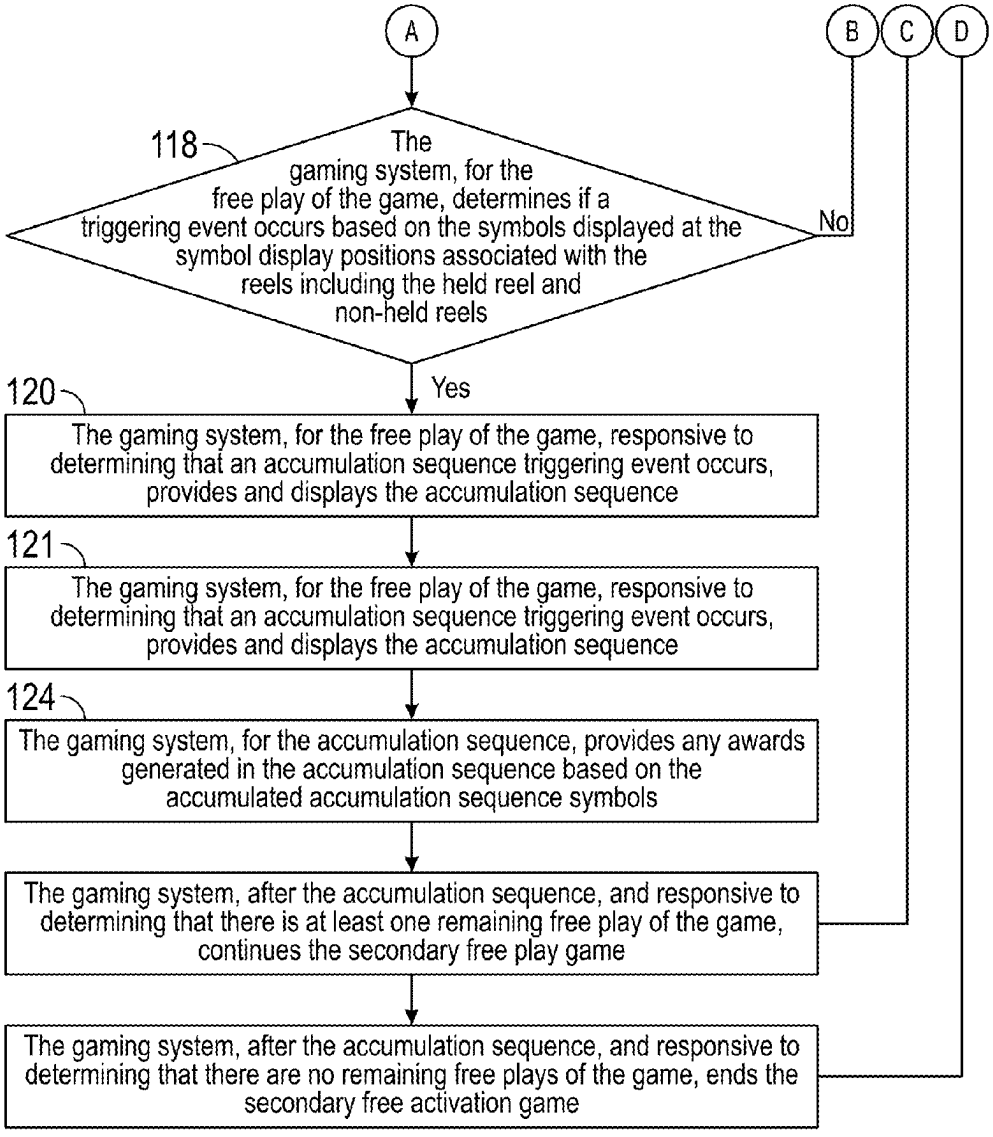
(57) **ABSTRACT**

In various embodiments, the present disclosure relates to gaming systems and methods providing a reel game including a plurality of reels, wherein one or more of the reels is a held reel with multiple different overlapping features. For each of one or more plays of the reel game, for each held reel, a first one of the overlapping features of that held reel is used and a second one of the overlapping features of that held reel is ignored, and for another evaluation of that held reel, a second one of the overlapping features of that held reel is used and the first one of the overlapping features of that held reel is ignored.



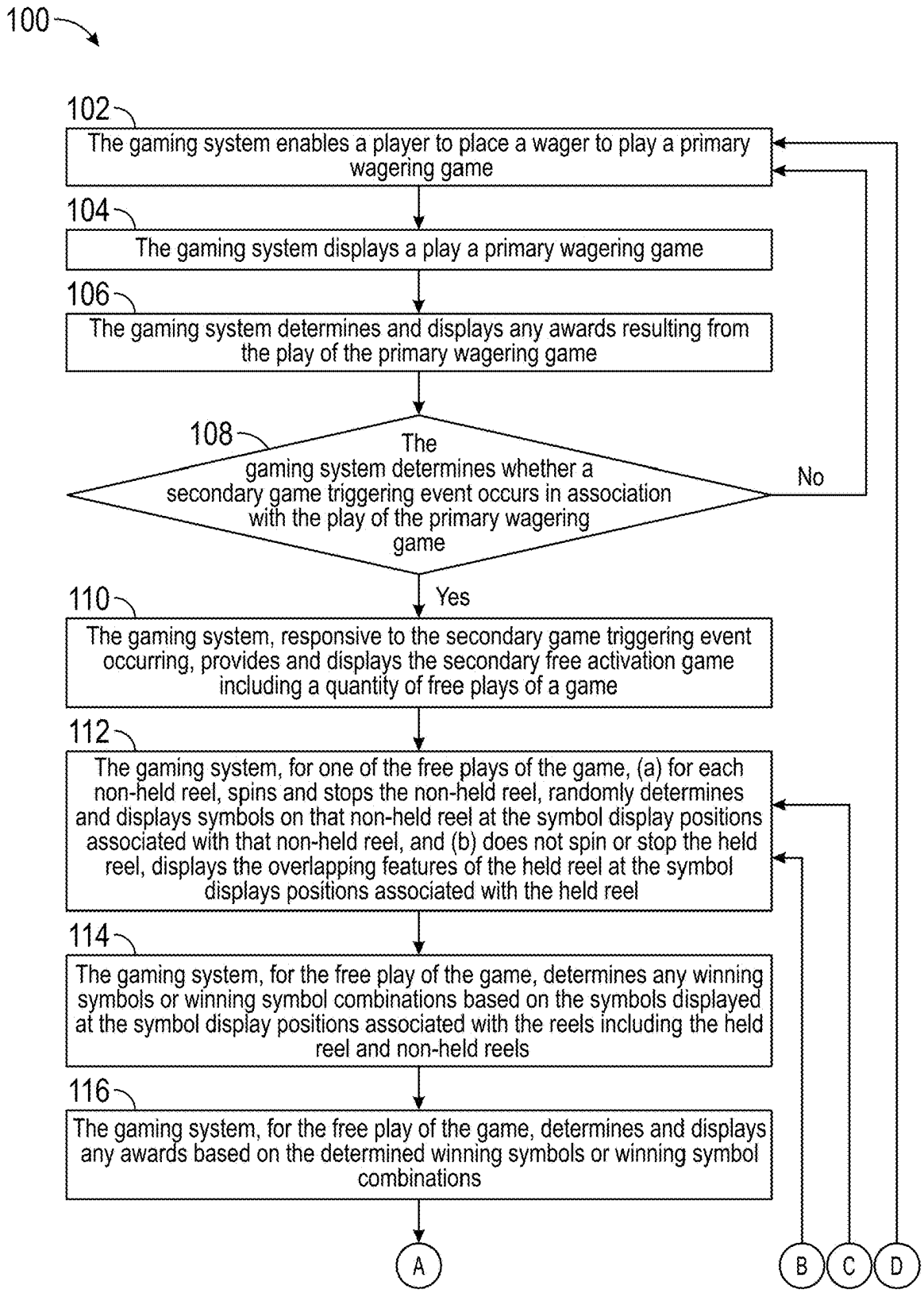

100
102
The gaming system enables a player to place a wager to play a primary wagering game
104
The gaming system displays a play a primary wagering game
106
The gaming system determines and displays any awards resulting from the play of the primary wagering game
108
The gaming system determines whether a secondary game triggering event occurs in association with the play of the primary wagering game
No
Yes
110
The gaming system, responsive to the secondary game triggering event occurring, provides and displays the secondary free activation game including a quantity of free plays of a game
112
The gaming system, for one of the free plays of the game, (a) for each non-held reel, spins and stops the non-held reel, randomly determines and displays symbols on that non-held reel at the symbol display positions associated with that non-held reel, and (b) does not spin or stop the held reel, displays the overlapping features of the held reel at the symbol displays positions associated with the held reel
114
The gaming system, for the free play of the game, determines any winning symbols or winning symbol combinations based on the symbols displayed at the symbol display positions associated with the reels including the held reel and non-held reels
116
The gaming system, for the free play of the game, determines and displays any awards based on the determined winning symbols or winning symbol combinations
A
B
C
D

FIG. 1A

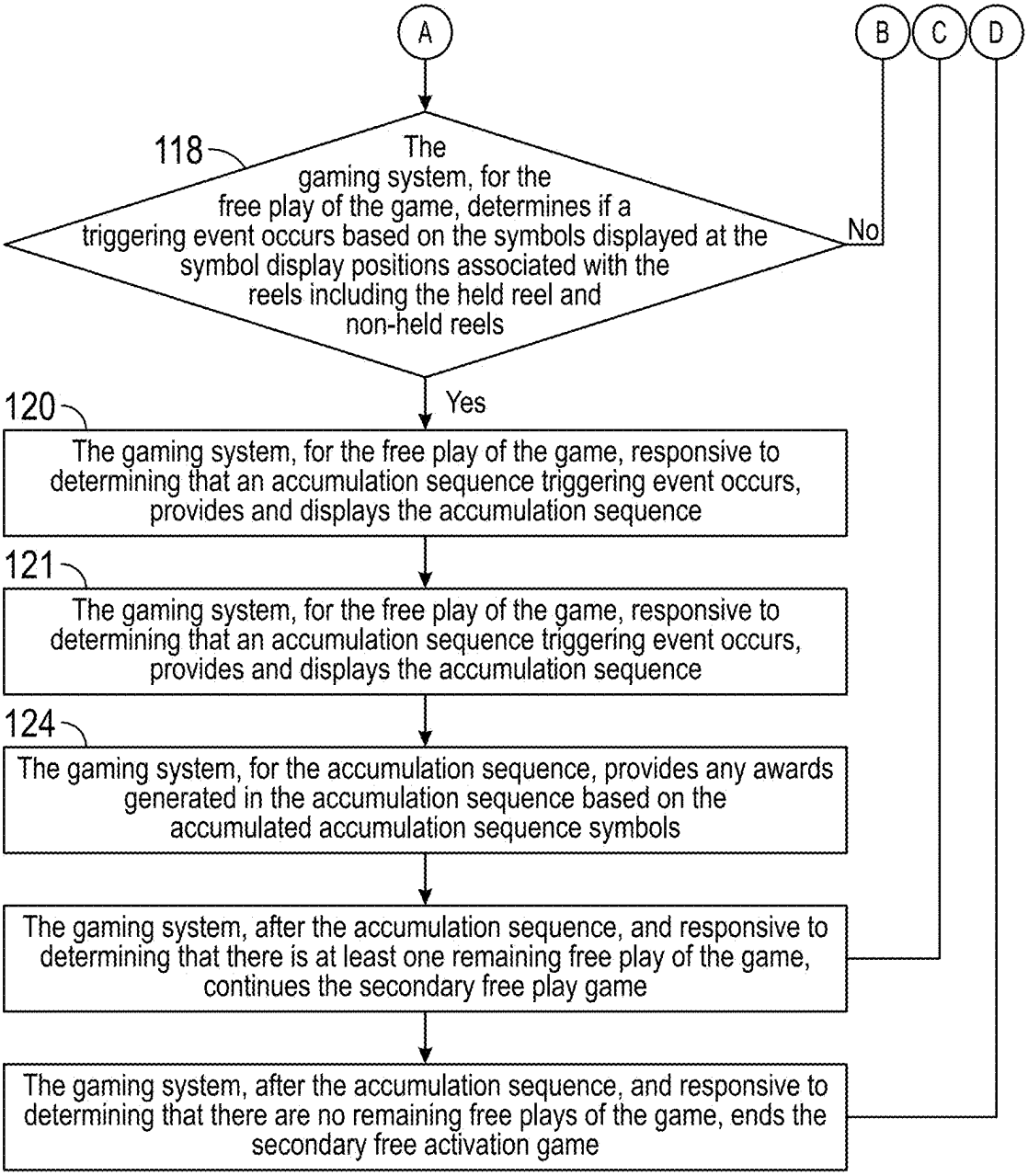

A
B
C
D
118
The gaming system, for the free play of the game, determines if a triggering event occurs based on the symbols displayed at the symbol display positions associated with the reels including the held reel and non-held reels
No
Yes
120
The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event occurs, provides and displays the accumulation sequence
121
The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event occurs, provides and displays the accumulation sequence
124
The gaming system, for the accumulation sequence, provides any awards generated in the accumulation sequence based on the accumulated accumulation sequence symbols
The gaming system, after the accumulation sequence, and responsive to determining that there is at least one remaining free play of the game, continues the secondary free play game
The gaming system, after the accumulation sequence, and responsive to determining that there are no remaining free plays of the game, ends the secondary free activation game

FIG. 1B

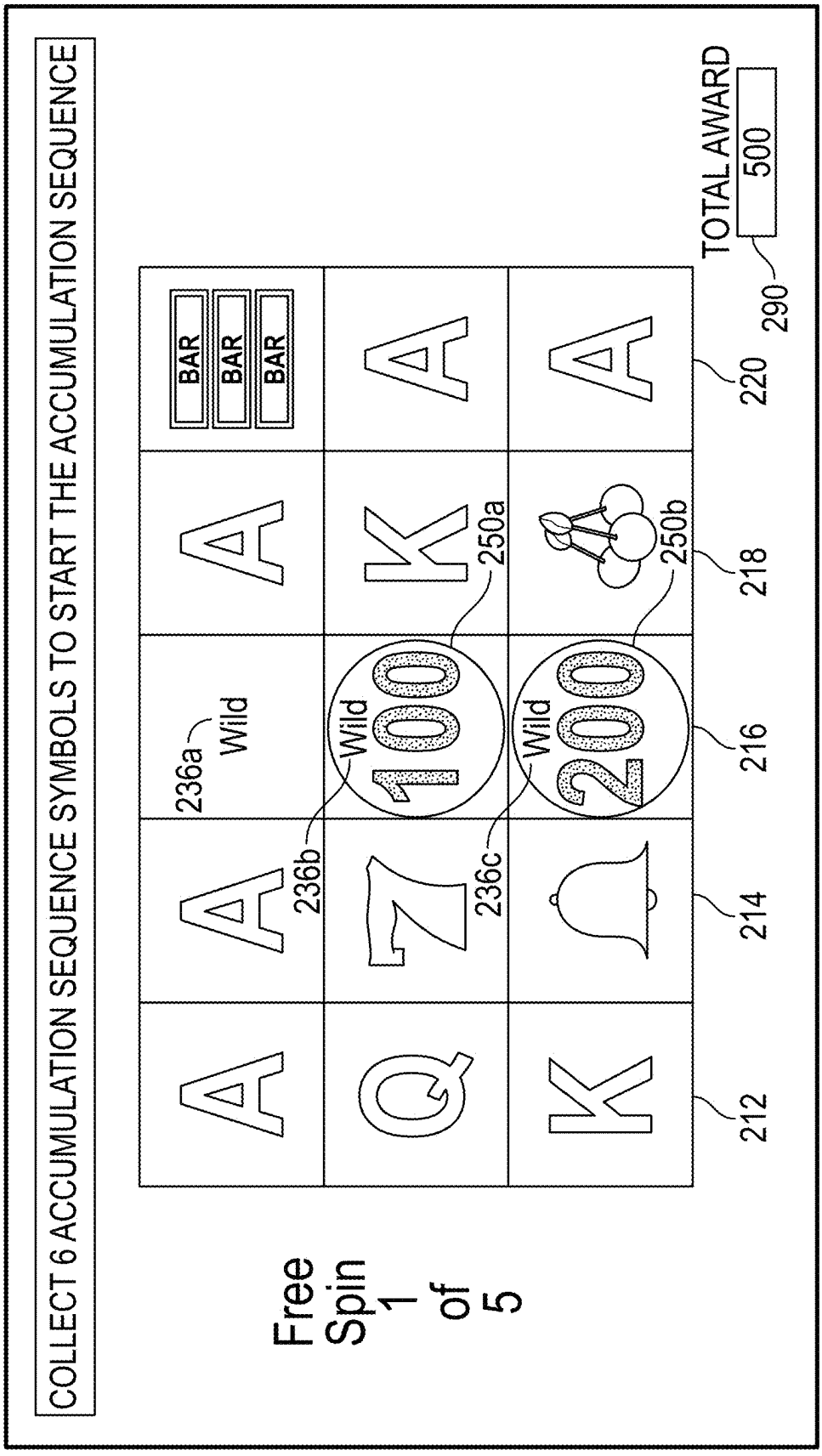

COLLECT 6 ACCUMULATION SEQUENCE SYMBOLS TO START THE ACCUMULATION SEQUENCE
Free Spin 1 of 5
BAR
BAR
BAR
236a
Wild
236b
Wild
100
250a
236c
Wild
200
250b
212
214
216
218
220
TOTAL AWARD
500
290

FIG. 2A

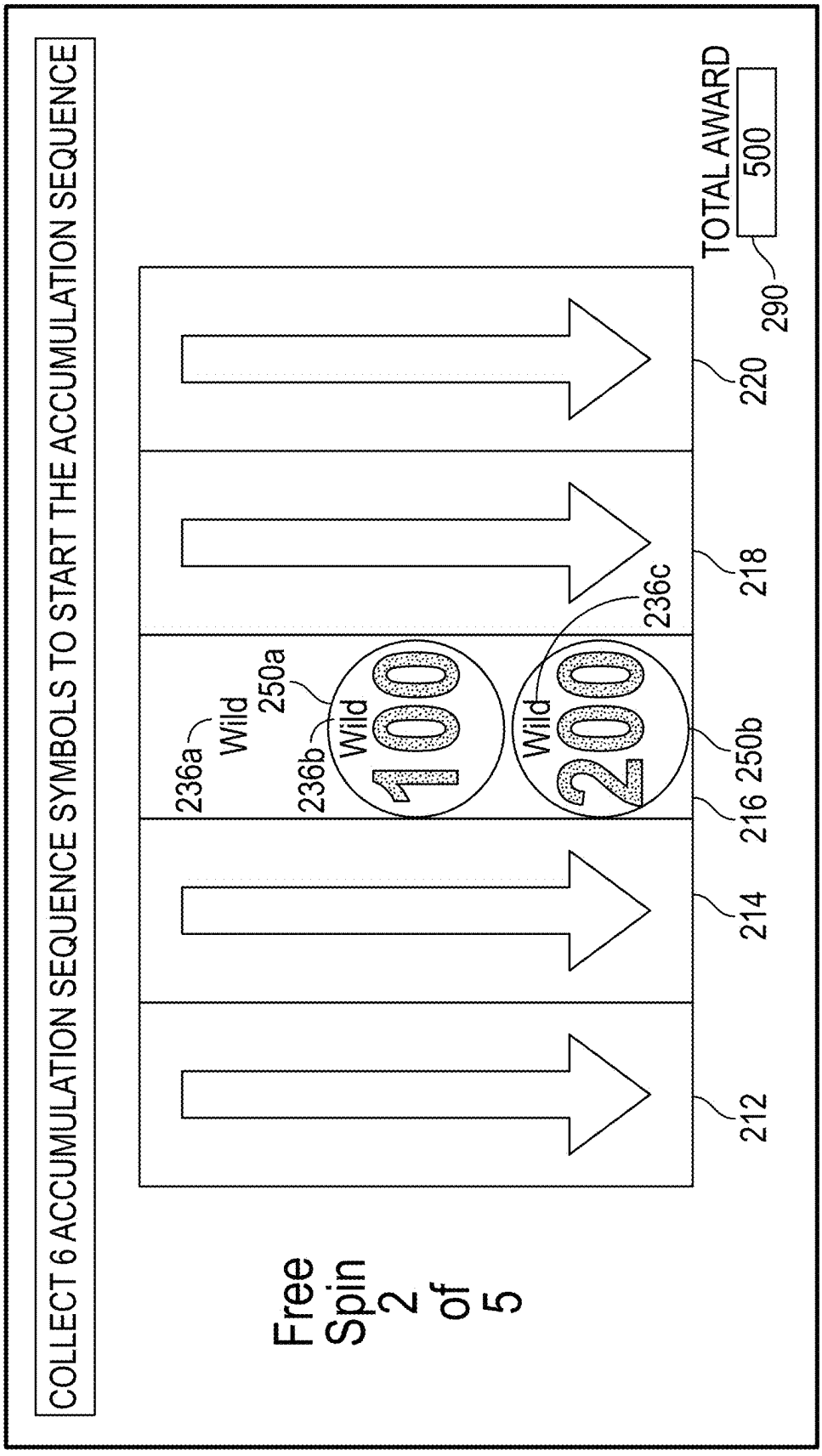

COLLECT 6 ACCUMULATION SEQUENCE SYMBOLS TO START THE ACCUMULATION SEQUENCE
Free Spin 2 of 5
TOTAL AWARD
500
290
212
214
216
250b
218
220
236a
Wild
250a
236b
Wild
100
Wild
200
236c

FIG. 2B

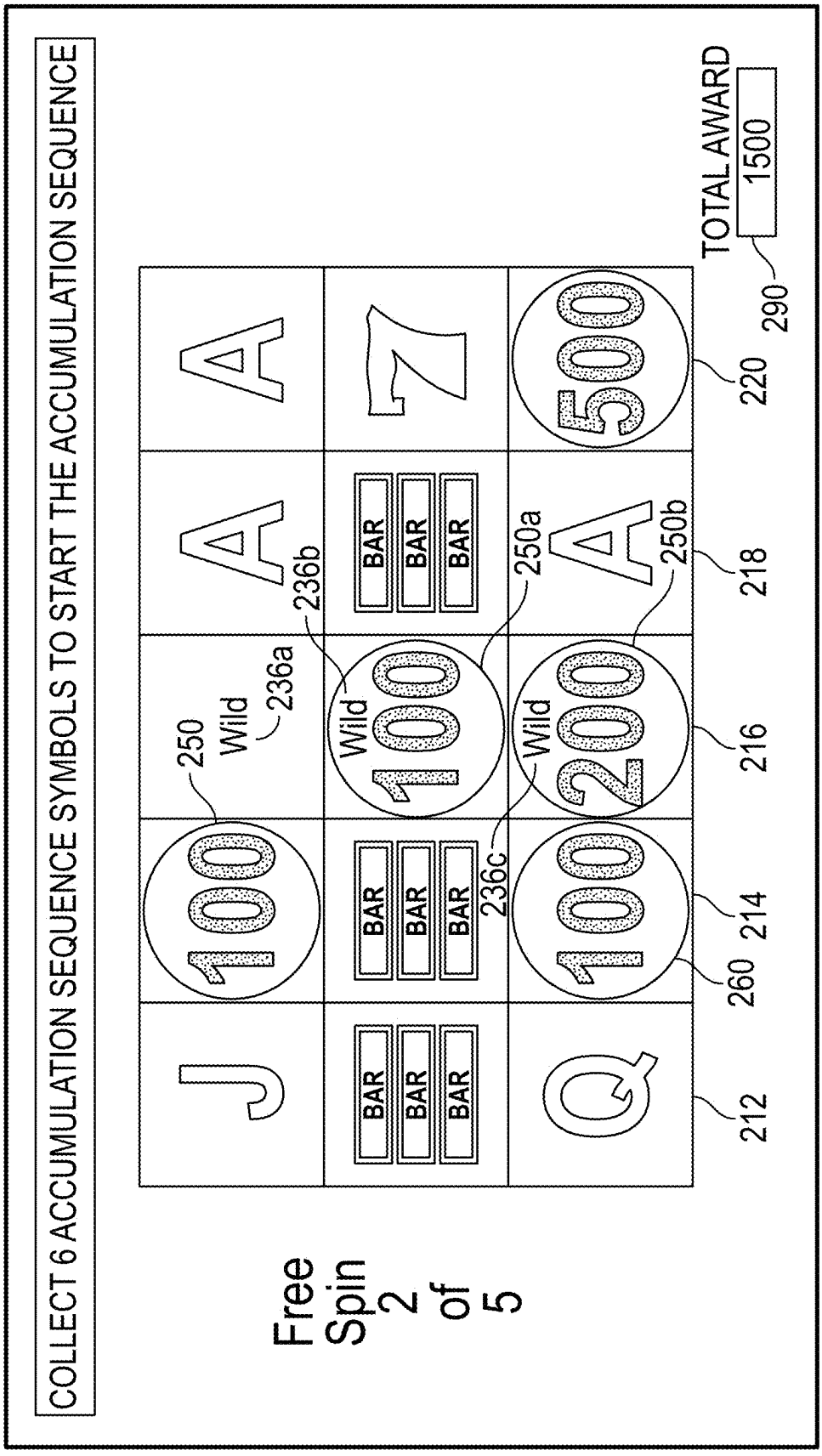

COLLECT 6 ACCUMULATION SEQUENCE SYMBOLS TO START THE ACCUMULATION SEQUENCE
Free Spin 2 of 5
J
100
A
A
7
500
Q
100
200
A
BAR
BAR
BAR
BAR
BAR
BAR
BAR
BAR
BAR
Wild
Wild
Wild
250
236a
236b
236c
250a
250b
212
214
216
218
220
260
290
TOTAL AWARD
1500

FIG. 2C

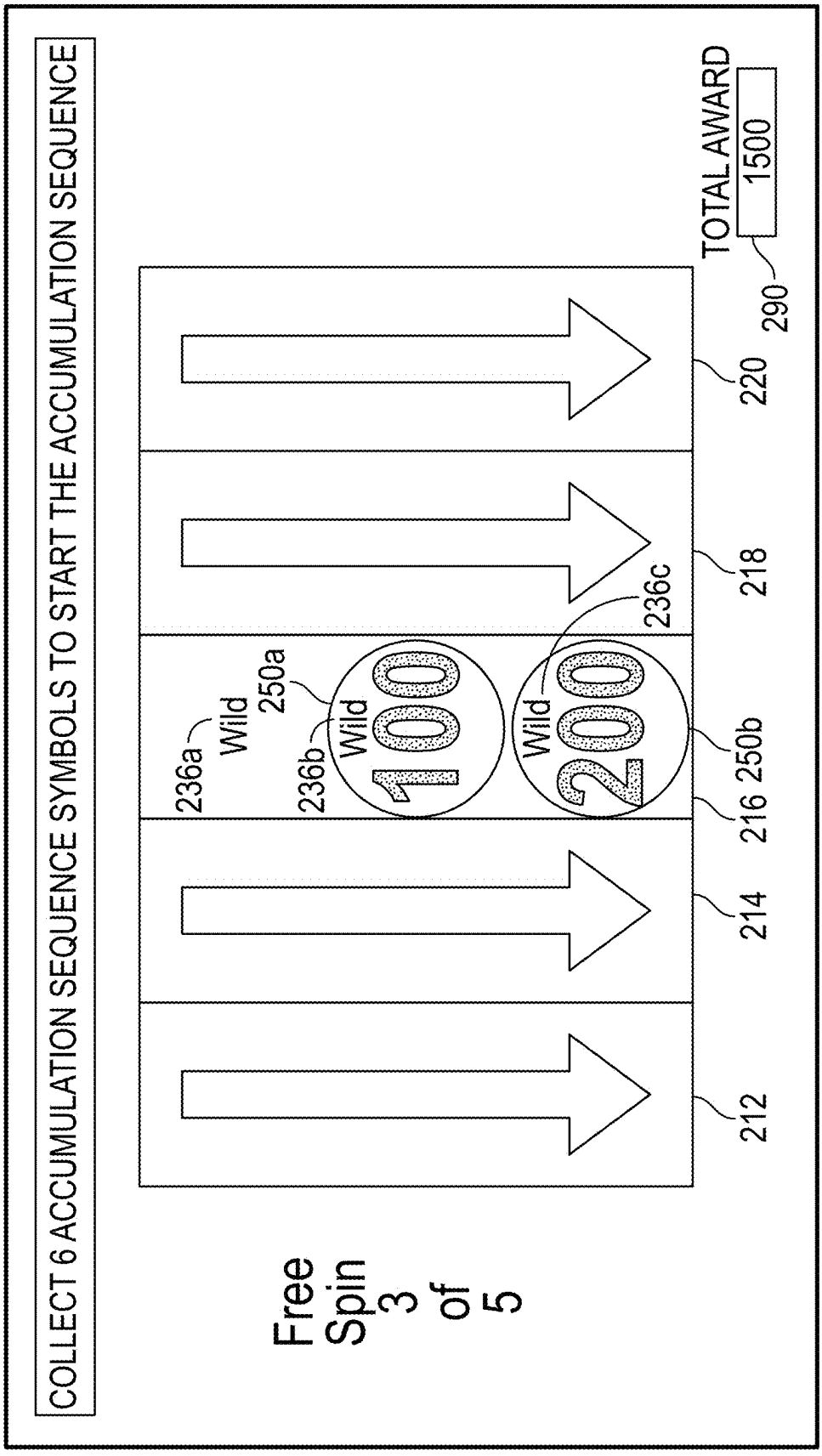

COLLECT 6 ACCUMULATION SEQUENCE SYMBOLS TO START THE ACCUMULATION SEQUENCE
Free Spin 3 of 5
TOTAL AWARD
1500
290
212
214
216
250b
218
220
236a
Wild
250a
236b
Wild
100
Wild
200
236c

FIG. 2D

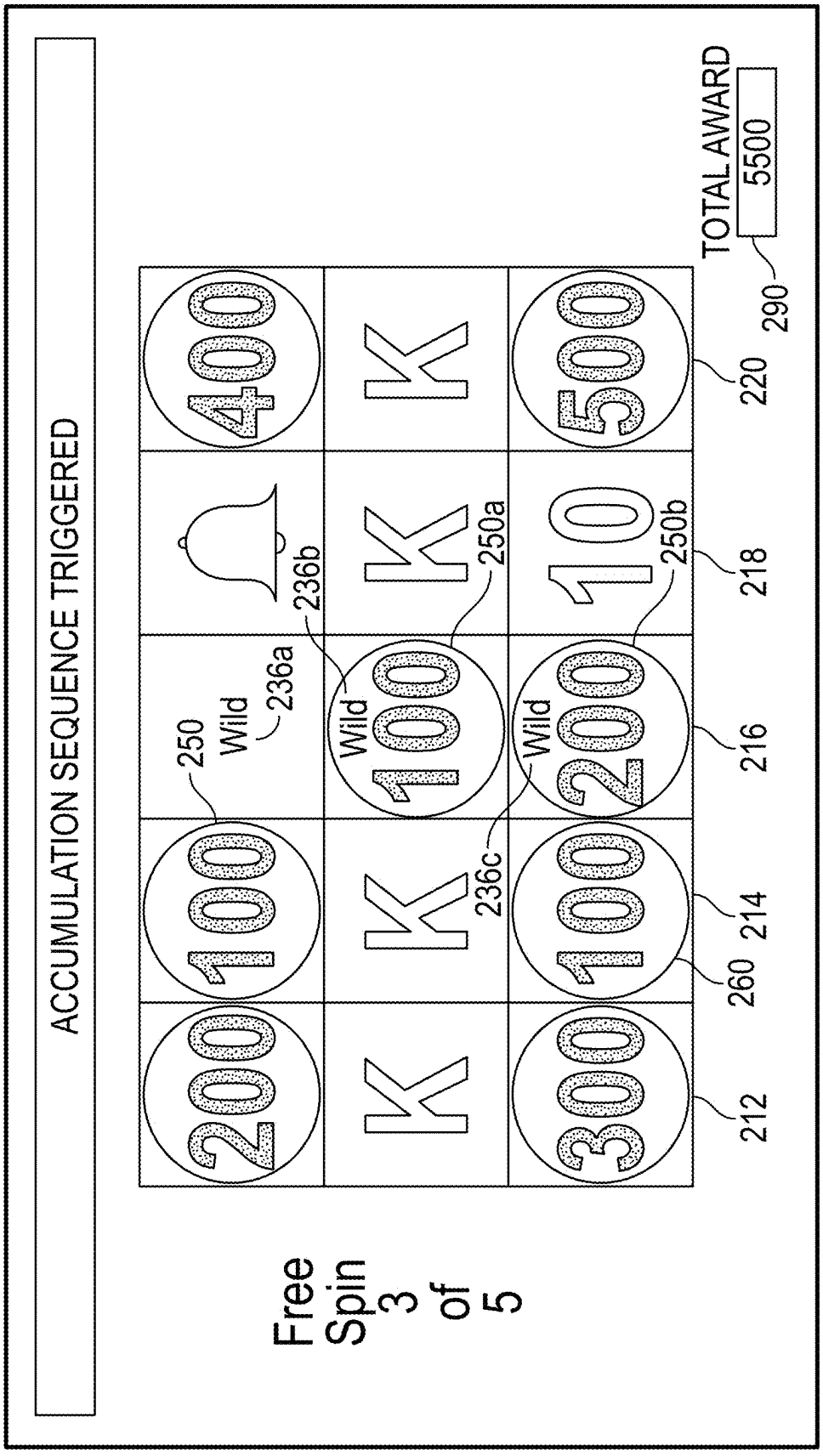

ACCUMULATION SEQUENCE TRIGGERED
Free Spin 3 of 5
200
100
K
300
100
K
100
K
200
10
400
K
500
250
Wild
236a
236b
250a
236c
250b
260
212
214
216
218
220
TOTAL AWARD
5500
290

FIG. 2E

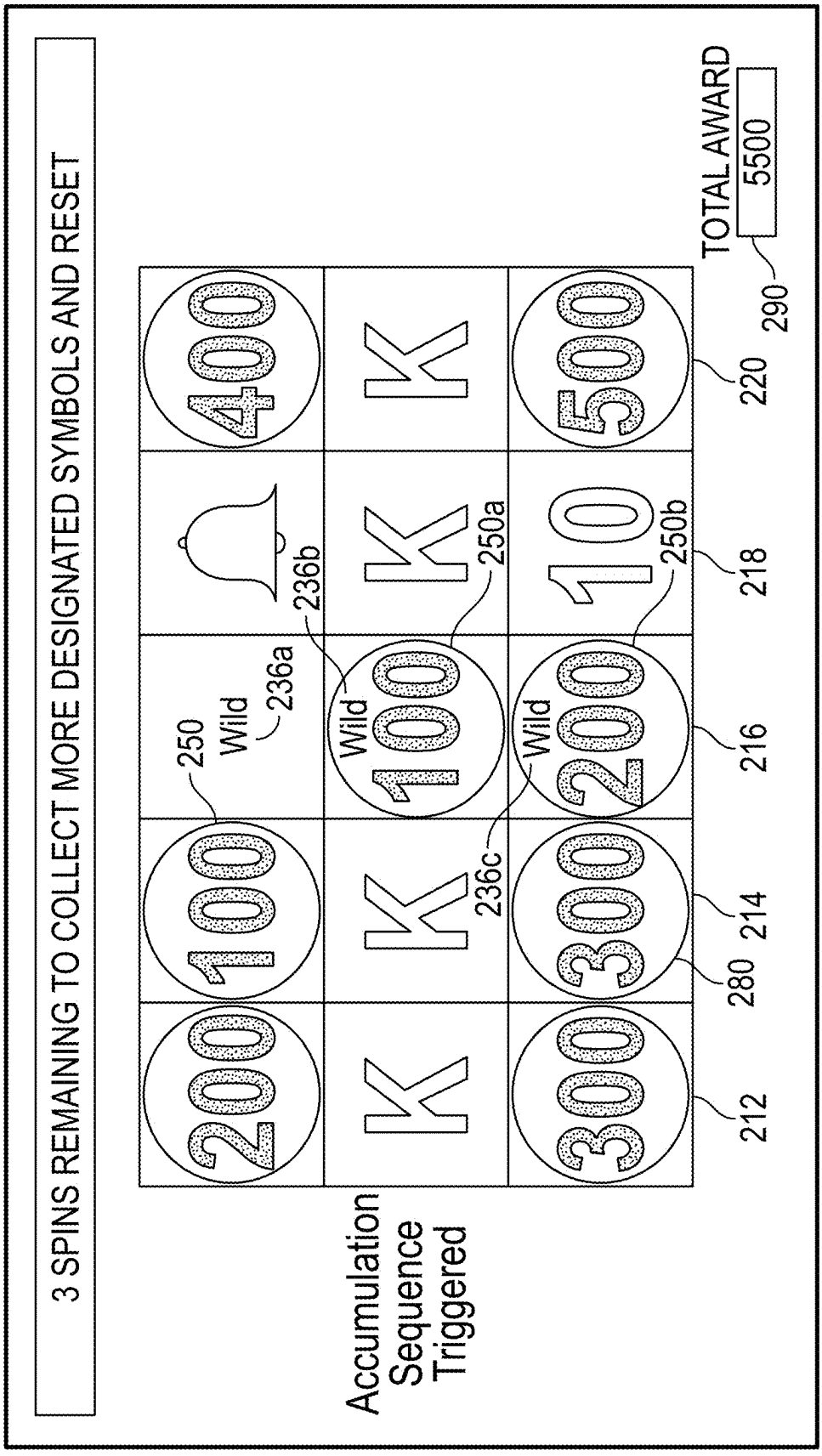

3 SPINS REMAINING TO COLLECT MORE DESIGNATED SYMBOLS AND RESET
Accumulation Sequence Triggered
200
100
250
Wild
236a
K
K
100
Wild
236b
250a
K
K
400
300
300
236c
Wild
200
250b
10
500
212
280
214
216
218
220
TOTAL AWARD
5500
290

FIG. 2F

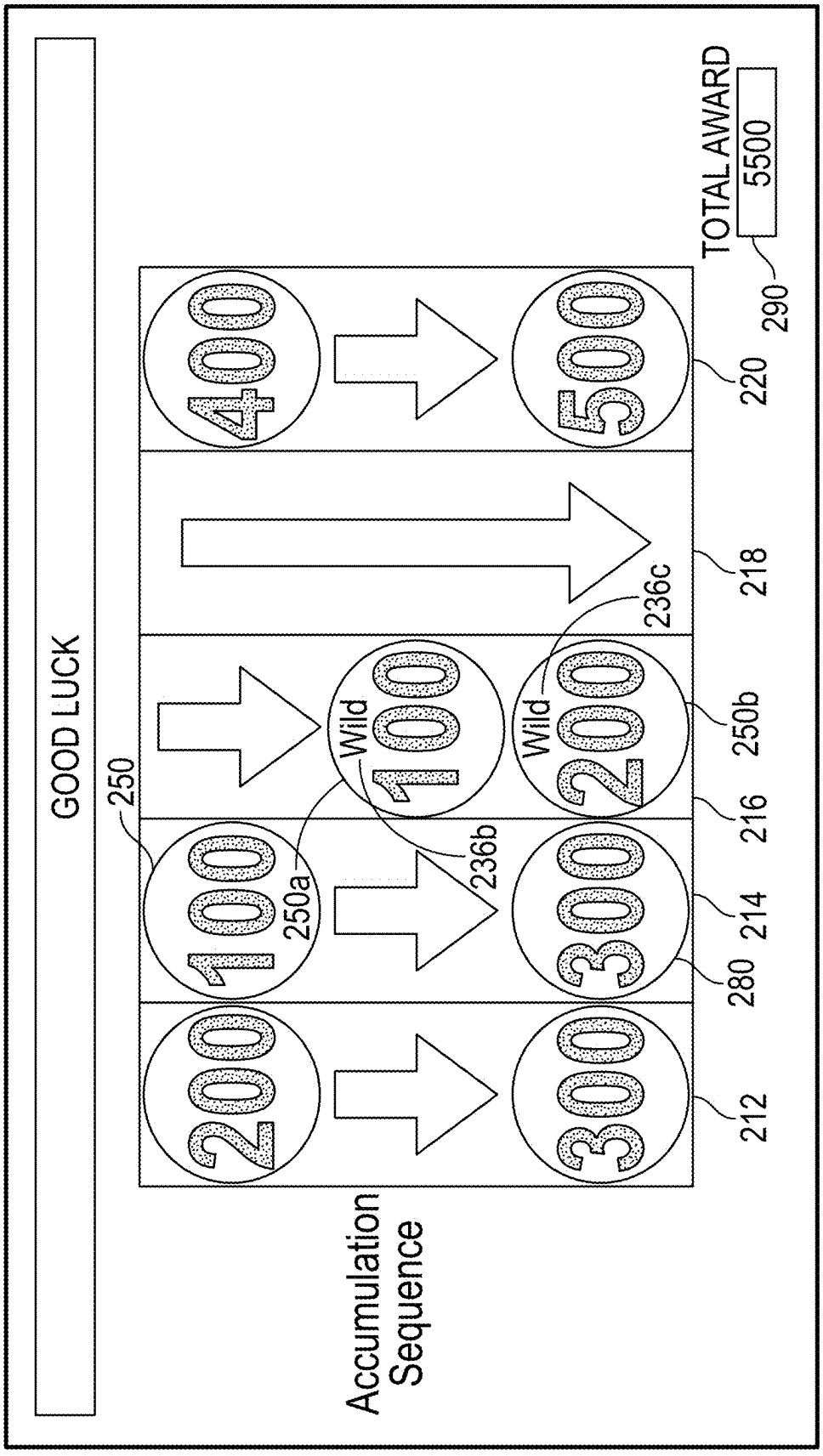

GOOD LUCK
250
2000
1000
250a
Wild
100
236b
Wild
200
236c
400
500
300
300
212
280
214
216
250b
218
220
TOTAL AWARD
5500
290
Accumulation Sequence

FIG. 2G

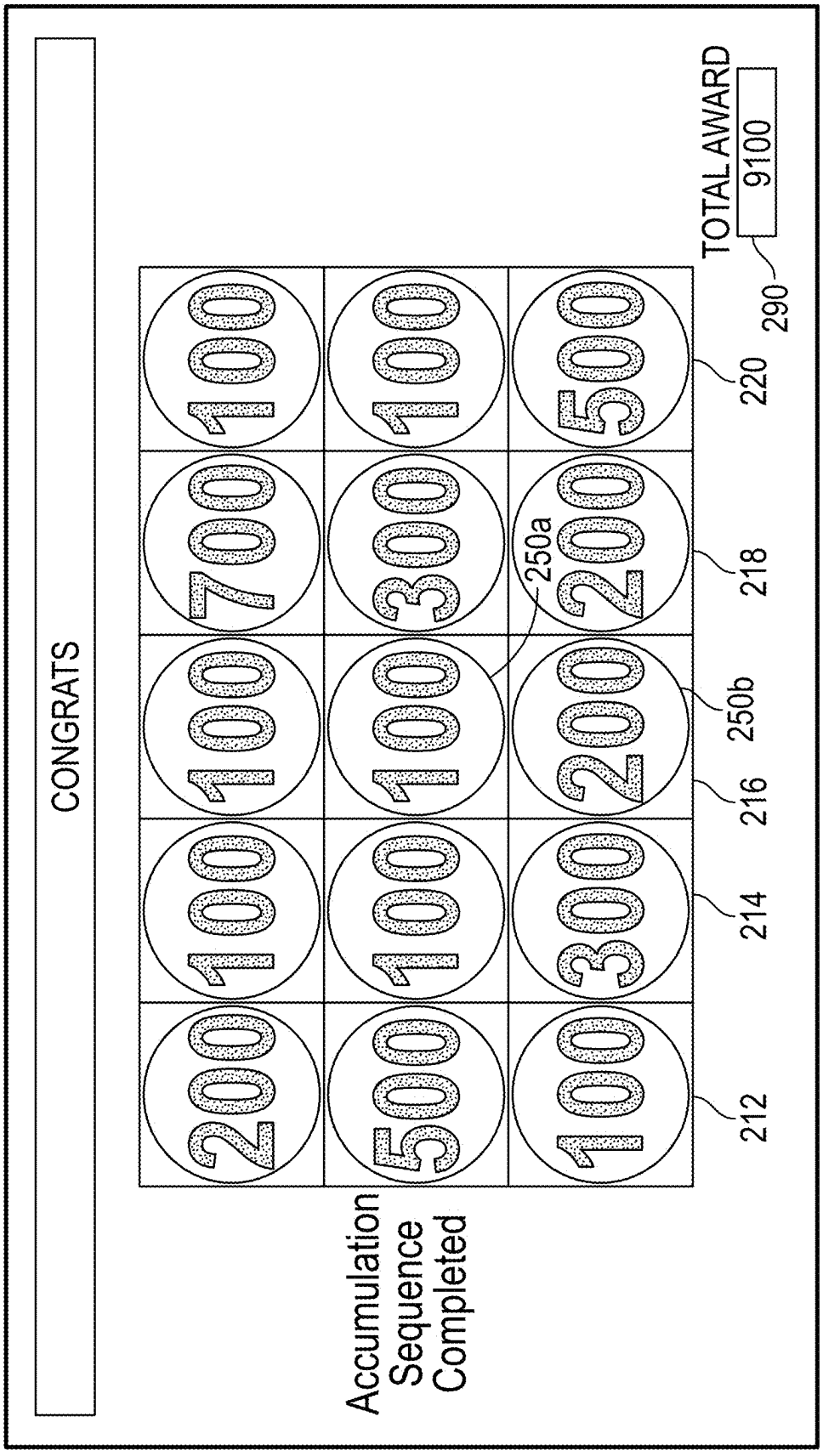

CONGRATS
Accumulation Sequence Completed
200 100 100 700 100
500 100 100 300 100
100 300 200 200 500
212
214
216
250b
250a
218
220
TOTAL AWARD
9100
290

FIG. 2H

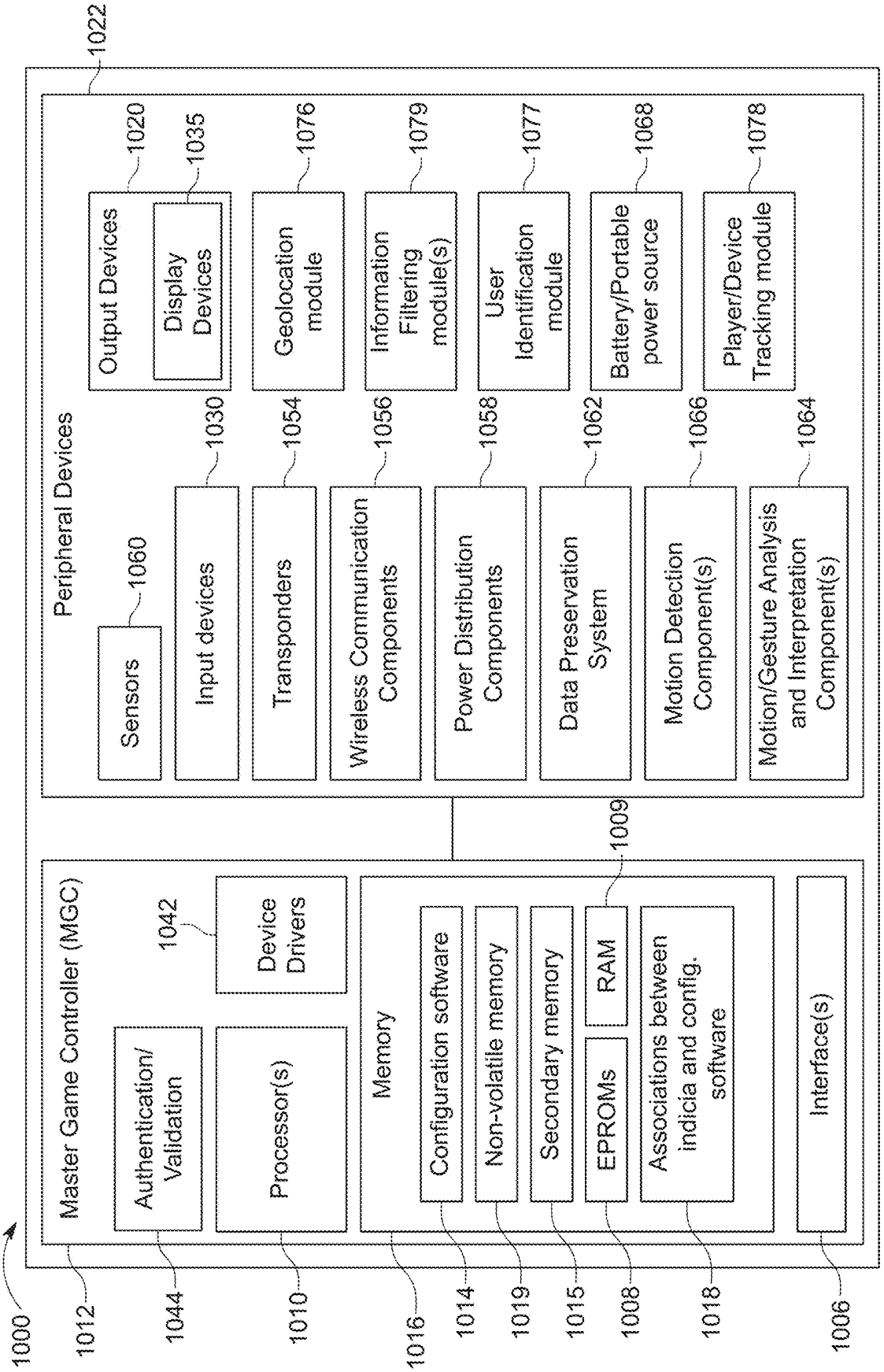

1000
1012
Master Game Controller (MGC)
Authentication/ Validation
1044
Processor(s)
1010
1042
Device Drivers
Memory
1016
Configuration software
1014
Non-volatile memory
1019
Secondary memory
1015
EPROMs
RAM
1008
1009
Associations between indicia and config. software
1018
Interface(s)
1006
1022
Peripheral Devices
Sensors
1060
Input devices
1030
Transponders
1054
Wireless Communication Components
1056
Power Distribution Components
1058
Data Preservation System
1062
Motion Detection Component(s)
1066
Motion/Gesture Analysis and Interpretation Component(s)
1064
Output Devices
1020
Display Devices
1035
Geolocation module
1076
Information Filtering module(s)
1079
User Identification module
1077
Battery/Portable power source
1068
Player/Device Tracking module
1078

FIG. 3

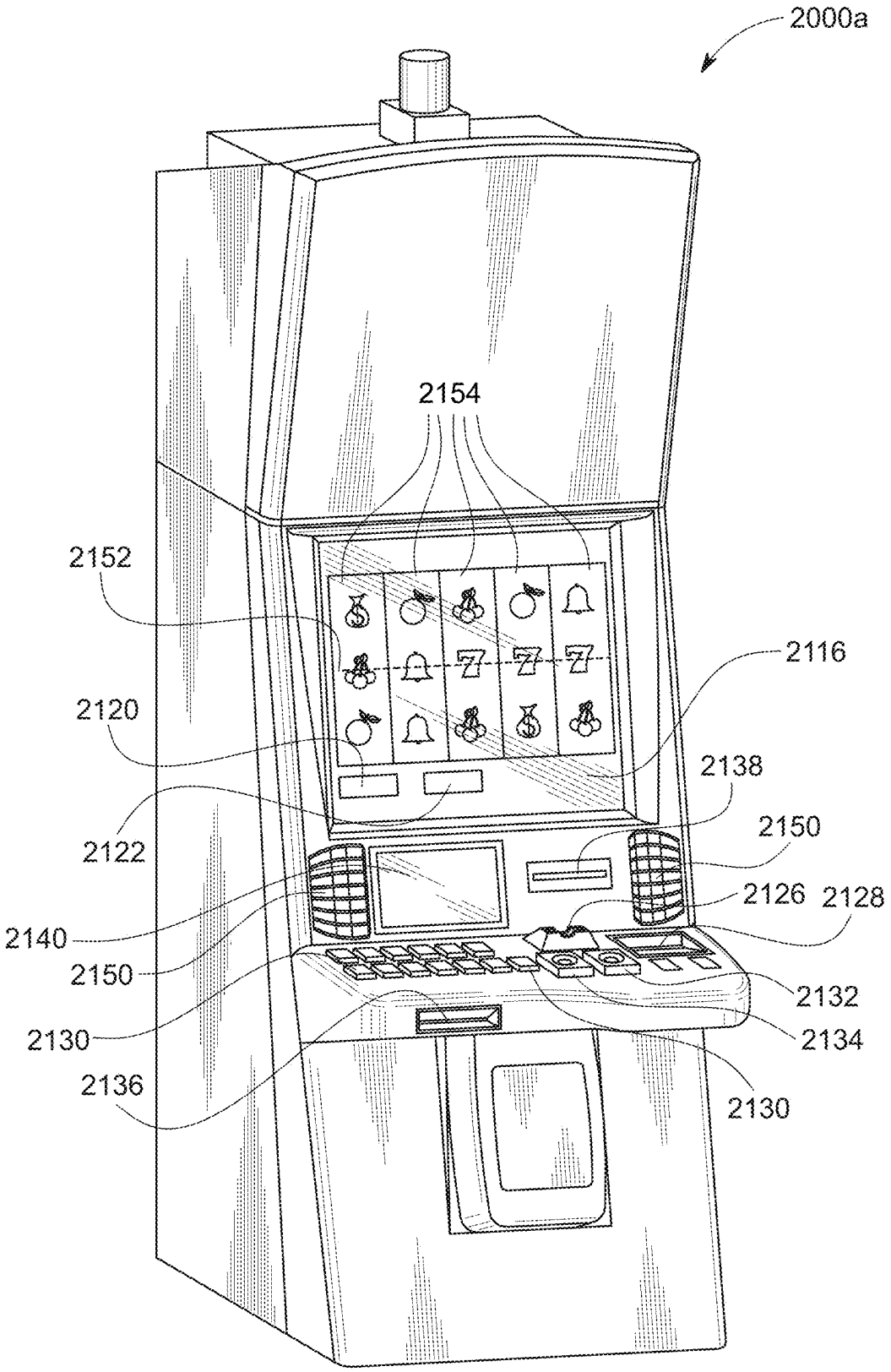

2000a
2154
2152
2116
2120
2138
2122
2150
2126
2128
2140
2150
2132
2130
2134
2136
2130

FIG. 4A

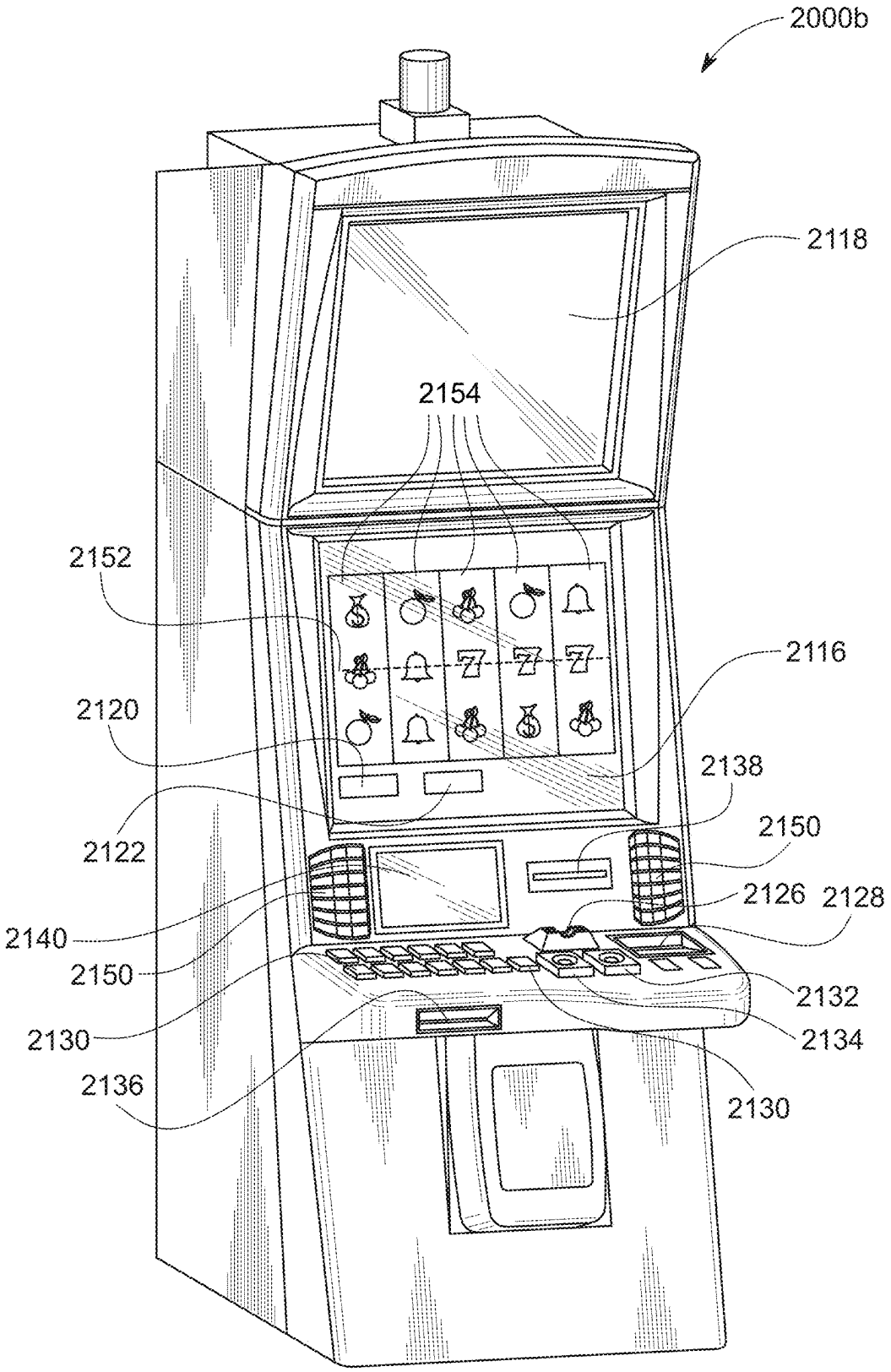

2000b
2118
2154
2152
2116
2120
2138
2122
2150
2126
2128
2140
2150
2132
2130
2134
2136
2130

FIG. 4B

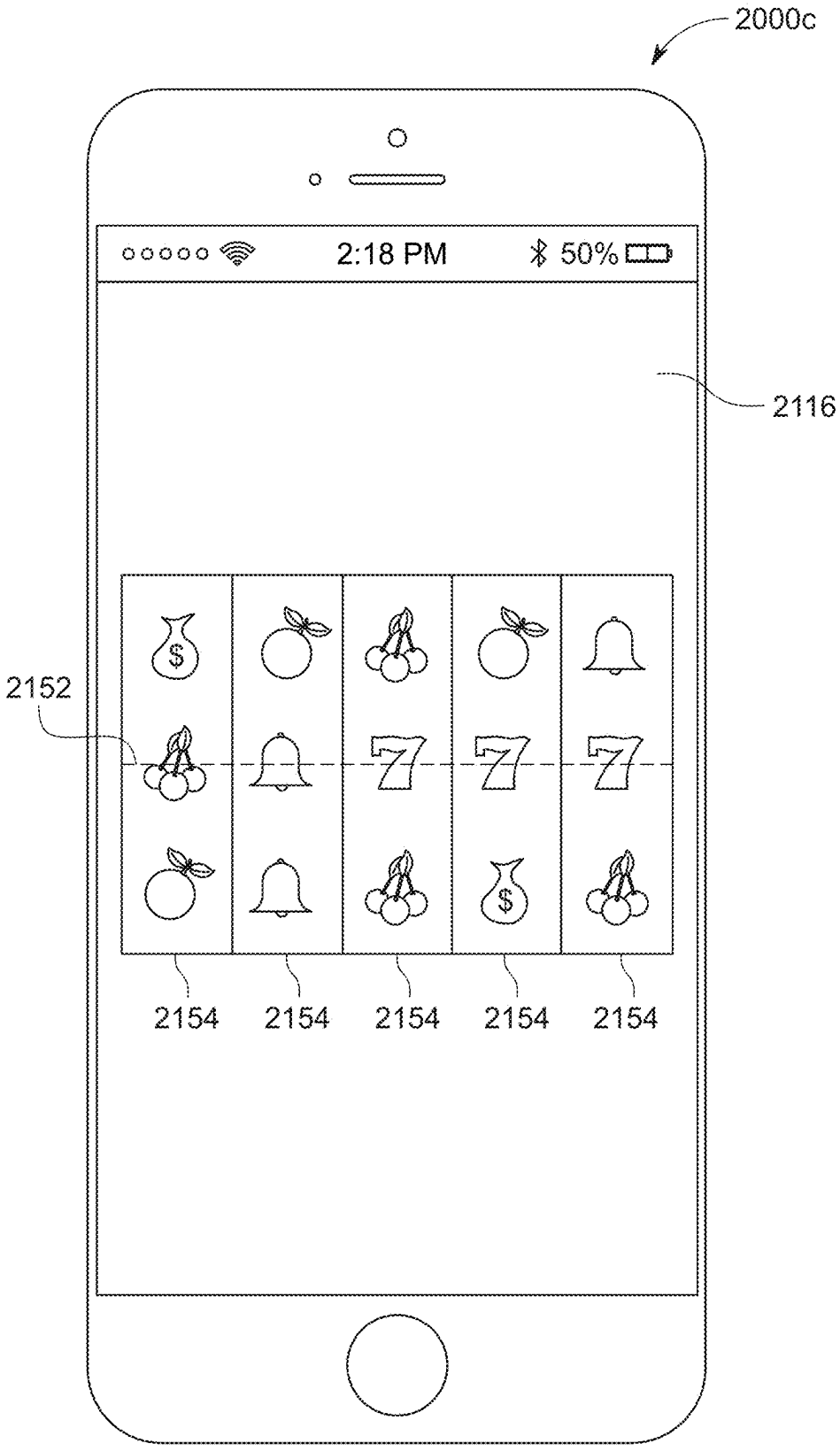


FIG. 4C

HELD REEL WITH MULTIPLE DIFFERENT FEATURES AND AN ASSOCIATED ACCUMULATION SEQUENCE

PRIORITY

[0001] This application is a continuation of, claims priority to and the benefit of U.S. patent application Ser. No. 17/937,515, filed on Oct. 3, 2022, the entire contents of which is incorporated herein by reference.

BACKGROUND

[0002] The present disclosure relates to held reel with multiple different features and an associated accumulation sequence for gaming environments.

[0003] Gaming machines may provide players awards in plays of primary games. Gaming machines may require a player to make a wager to activate a play of a primary game. The awards may be based on winning symbols or symbol combinations and on the amount of the wager. Gaming machines may provide players awards in plays of secondary games.

SUMMARY

[0004] In various embodiments, the present disclosure relates to a gaming system including a processor and a memory device that stores a plurality of instructions, which when executed by the processor, for a play of a game, cause the processor to: cause a display, by a display device, of a held reel with displayed indications of different first and second overlapping features of the held reel, wherein the displayed indications are displayed on the held reel at symbol display positions associated with the held reel, and to cause a display, by the display device, of a plurality of non-held reels each displayed with a plurality of symbols on that non-held reel at symbol display positions associated with that non-held reel. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the first overlapping feature of the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the second overlapping feature of the held reel, and cause a display, by the display device, an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the second overlapping feature of the held reel and all of the displayed symbols on the non-held reels, wherein the second evaluation ignores the first overlapping feature of the held reel. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of any awards resulting from the first evaluation, and cause a display, by the display device, of an accumulation sequence resulting from the second evaluation.

[0005] In various other embodiments, the present disclosure relates to a gaming system including a processor and a memory device that stores a plurality of instructions, which when executed by the processor, for each of a plurality of play of a game, cause the processor to: cause a display, by a display device, of a held reel including at least one wild symbol displayed on the held reel at all of the symbol display positions associated with the held reel, and an accumulation sequence symbol on the held reel displayed on the held reel at one of the symbol display positions associated with the held reel, and cause a display, by the display device, of a plurality of non-held reels, wherein each non-held reel displays a plurality of symbols on the non-held reel at all of the symbol display positions associated with the non-held reel, wherein one or more of the displayed symbols can be accumulation sequence symbols. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the displayed at least one wild symbol on the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the displayed accumulation sequence symbol on the held reel, and cause a display, by the display device, an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the displayed accumulation sequence symbol on the held reel and the displayed symbols on the non-held reels, wherein the second evaluation ignores the displayed at least one wild symbol on the held reel. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of any awards resulting from the first evaluation, and cause a display, by the display device, of any accumulation sequence resulting from the second evaluation.

[0006] In various other embodiments, the present disclosure relates to a gaming system including a processor and a memory device that stores a plurality of instructions, which when executed by the processor, for each of a plurality of play of a game, cause the processor to: cause a display, by a display device, of a held reel including wild symbols displayed on the held reel at all of the symbol display positions associated with the held reel, and a plurality of accumulation sequence symbols on the held reel displayed on the held reel a plurality of the symbol display positions associated with the held reel in an overlapping manner with the wild symbols, and cause a display, by the display device, of a plurality of non-held reels, wherein each of the non-held reels displays a plurality of symbols on that non-held reel at all of the symbol display positions associated with that non-held reel, wherein one or more of the displayed symbols can be accumulation sequence symbols. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the displayed wild symbols on the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the displayed accumulation sequence symbols on the held reel, and cause a display, by the display device, of an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the displayed accumulation sequence symbols on the held reel and the displayed symbols on the non-held reels, wherein the second evaluation ignores the displayed wild symbols on the held reel. The plurality of instructions, when executed by the processor, further cause the processor to cause a display, by the display device, of any awards resulting from the first evaluation, and cause a display, by the display device, of any accumulation sequence resulting from the second evaluation, wherein the accumulation sequence includes the accumulation sequence symbols on the held reel and the non-held reels.

[0007] Additional features and advantages are described in, and will be apparent from, the following Detailed Description and the figures.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0008] FIGS. **1**A and **1**B are flow charts of an example process for operating a gaming system providing a held reel with multiple different features and an associated accumulation sequence.

[0009] FIGS. **2**A, **2**B, **2**C, **2**D, **2**E, **2**F, **2**G, and **2**H are front views of parts of a plurality of plays of a secondary game including a held reel with multiple different features and parts of an associated accumulation sequence in accordance with one example embodiment of the present disclosure.

[0010] FIG. **3** is a schematic block diagram of one embodiment of an electronic configuration of an example gaming system disclosed herein.

[0011] FIGS. **4**A and **4**B are perspective views of example alternative embodiments of the gaming system disclosed herein.

[0012] FIG. **4**C is a front view of an example personal gaming device of the gaming system disclosed herein.

DETAILED DESCRIPTION

[0013] In various embodiments, the present disclosure relates generally to gaming systems and methods providing a reel game including a plurality of reels, wherein one or more of the reels is a held reel with multiple different overlapping features displayable on the held reel at the symbol display positions associated with that held reel. For each of one or more plays of the reel game, for a first evaluation, a first one of the overlapping features of the held reel(s) is/are used and a second one of the overlapping features of the held reel(s) is/are ignored, and for second evaluation, a second one of the overlapping features of the held reel(s) is/are used and the first one of the overlapping features of the held reel(s) is/are ignored. In various embodiments, the gaming systems and methods also provide an associated accumulation sequence.

[0014] In various embodiments, the non-held reels of the plurality of reels include a plurality of different symbols that are displayable at a plurality of symbol display positions associated with the non-held reels for each play of the game.

[0015] In various embodiments, a first one of the different features for each held reel includes all of the displayed symbols on the held reel being wild (e.g., the entire held reel functions as a wild symbol reel) for each play of the game, and a second one of the different features for each held reel includes a quantity (such as one or more) accumulation sequence symbols. In various embodiments, the quantity is one or more. In various embodiments, the quantity is one or more, but less than the quantity of accumulation sequence symbols needed to trigger the accumulation sequence.

[0016] In various embodiments, the plurality of reels including the one or more held reels are part of a primary game (such a primary wagering game). In various embodiments, the plurality of reels including the one or more held reels are part of a secondary game (such a secondary free spin game). In various embodiments, the plurality of reels including the one or more held reels are part of a primary game (such a primary wagering game) and are also part of a secondary game (such a secondary free spin game) triggered from or in association with one or more plays the primary game.

[0017] In various embodiments, for each play of such game, the non-held reels of the plurality of reels display a plurality of randomly determined symbols of such non-held reels at a plurality of symbol display positions associated with such non-held reels. In various such embodiments, for each play of such game, the held reels of the plurality of reels displays indications of both of the features of the held reel at a plurality of symbol display positions associated with such held reel.

[0018] In various embodiments, for each of a first quantity of plays of the game, the gaming system displays: (1) each held reel with the wild symbol indication for that reel at the plurality of symbol display positions associated with that held reel; (2) each held reel with the quantity of accumulation sequence symbols at one or more symbol display positions associated with that held reel; and (3) for each of the non-held reels, the randomly determined symbols on that non-held reel at the plurality of symbol display positions associated with those non-held reels. In various embodiments, the first quantity is one or more plays of a game. For example, for a primary game (such a primary wagering game) the first quantity can be one. For example, for a secondary game (such a secondary free spin game) the first quantity can be one or more (such as including 10 or 15 free spins of the reels).

[0019] In these embodiments, for each of the first quantity of plays of the game, the gaming system determines any winning symbols or winning symbol combinations based on the symbols displayed at the symbol display positions associated with the reels including the held reel and non-held reels. For this evaluation, the gaming system ignores the held accumulation sequence symbols and only uses the wild symbols feature of each of the held reels for such evaluation.

[0020] In these embodiments, for each of the first quantity of plays of the game, the gaming system also determines if an accumulation sequence triggering event occurs based on the quantity of accumulation sequence symbols displayed by the reels including the held and non-held reels. For this evaluation, the gaming system ignores the wild symbols of each of the held reels for such evaluation. Thus, each held reel is evaluated differently for the different determinations by the gaming system.

[0021] In various embodiments, an accumulation sequence triggering event occurs when a quantity of the accumulation sequence symbols occurs for a play of the game. In various embodiments, the quantity of accumulation sequence symbols on the held reels are less than the quantity of accumulation sequence symbols needed to cause the accumulation sequence triggering event to occur in a play of a game, such that at least one accumulation sequence triggering symbol must occur on one of the non-held reels for the accumulation sequence triggering event to occur in a play of the game. In various embodiments, a plurality of accumulation sequence symbols must occur on one or more of the non-held reels in a play of a game for the accumulation sequence triggering event to occur in the play of the game. In various embodiments, a plurality of accumulation sequence symbols must occur on a plurality of the non-held reels in a play of a game for the accumulation sequence triggering event to occur in the play of the game.

[0022] In various embodiments, responsive to the occurrence of the accumulation sequence triggering event, the gaming system provides an accumulation sequence, wherein such accumulation sequence employs the accumulation sequence symbols of the held and non-held reels.

[0023] In various embodiments, the accumulation sequence symbols are accumulated in the accumulation sequence. In various embodiments, only the accumulation sequence triggering symbols of the held reel(s) are employed in the accumulation sequence. In other words, the wild symbol feature of the held reel(s) is not employed in the accumulation sequence.

[0024] In various embodiments, the gaming system provides, for the accumulation sequence, a predefined initial quantity of activations of the reels wherein the gaming system employs the previously occurring plays of the game triggering symbols that are displayed at the symbol display positions associated with the held and non-held reels. For each activation of the reels, the gaming system holds the accumulation sequence symbols in place and can accumulate zero, one, or more additional accumulation sequence symbols.

[0025] For each such play of the game of the accumulation sequence, responsive to the gaming system accumulating a quantity of additional accumulation sequence symbols, the gaming system resets the remaining quantity of activations of the reels to the predefined initial quantity. The gaming system concludes the accumulation sequence when either the quantity of activations of the reels have all been used or when accumulation sequence symbols have been accumulated at a quantity such as all of the symbol display positions associated with the reels. At such point, the gaming system provides an award based on the accumulated accumulation sequence symbols.

[0026] Such a configuration of employing held reels during one or more plays of a game in which one or more accumulation sequence symbols are held and are then further employed in a different matter the accumulation sequence provides a technical advantage of multi feature reels, multi-function symbol display positions, and alternatively performed evaluations of the same reels.

[0027] Certain embodiments described below are directed to a primary game that triggers a series of secondary free games and that in turn triggers an associated accumulation sequence. Certain embodiments described below are directed to a series of secondary free games and an associated accumulation sequence. Although not described below, it should be appreciated that various embodiments may be employed in association with a primary game that directly triggers an associated accumulation sequence.

[0028] While the player's credit balance, the player's wager, and any awards are displayed as an amount of monetary credits or currency in certain of the embodiments described below, one or more of such player's credit balance, such player's wager, and any awards provided to such a player may be for non-monetary credits, promotional credits, and/or player tracking points or credits.

[0029] FIGS. **1**A and **1**B are a flowchart of an example process or method of operating the gaming system of the present disclosure. In various embodiments, the process is represented by a set of instructions stored in one or more memories and executed by one or more processors. Although the process is described with reference to the flowchart shown in FIGS. **1**A and **1**B, many other processes of performing the acts associated with this illustrated process may be employed. For example, the order of certain of the illustrated blocks or diamonds may be changed, certain of the illustrated blocks or diamonds may be optional, or certain of the illustrated blocks or diamonds may not be employed.

[0030] In operation of this example embodiment, the process **100** begins after the gaming system establishes a credit balance for a player (such as but not limited to after a physical acceptor of the gaming system receives and validates physical currency, a physical ticket associated with a monetary value, or an electronic payment).

[0031] The gaming system enables a player to place a wager to play a primary wagering game, as indicated in block **102**. In certain embodiments, the gaming system enables a player to place a wager from the credit balance and of a plurality of different wager amounts.

[0032] The gaming system displays a play a primary wagering game, as indicated by block **104**.

[0033] The gaming system determines and displays any awards resulting from the play of the primary wagering game, as indicated by block **106**.

[0034] The gaming system determines whether a secondary game triggering event occurs in association with the play of the primary wagering game, as indicated by diamond **108**.

[0035] The gaming system, responsive to the secondary game triggering event not occurring, returns to block **102**.

[0036] The gaming system, responsive to the secondary game triggering event occurring, provides and displays the secondary free activation game including a quantity of free plays of a game, as indicated by block **110**. The quantity can be two or more. For each free play of the game, the game includes a plurality of reels, wherein one of the reels is a held reel with multiple different overlapping features. In various embodiments, the held reel has first and second different overlapping features that are respectively employed or ignored for different evaluations (as described above). In various embodiments, the first and second different overlapping features include a first feature of all of the displayed symbols thereon being wild symbols (e.g., the entire reel functions as a wild symbol reel) and a second feature including a quantity (such as two) accumulation sequence symbols on the held reel.

[0037] The gaming system, for one of the free plays of the game, (a) for each non-held reel, spins and stops the non-held reel, randomly determines and displays symbols on that non-held reel at the symbol display positions associated with that non-held reel, and (b) does not spin or stop the held reel, displays the overlapping features of the held reel at the symbol display positions associated with the held reel, as indicated by block **112**.

[0038] The gaming system, for the free play of the game, determines any winning symbols or winning symbol combinations based on the symbols displayed at the symbol display positions associated with the reels including the held reel and non-held reels, as indicated by block **114**. For this evaluation, the gaming system ignores the held accumulation sequence symbols and only uses the wild symbols feature of the held reel for such evaluation.

[0039] The gaming system, for the free play of the game, determines and displays any awards based on the determined winning symbols or winning symbol combinations, as indicated by block **116**.

[0040] The gaming system, for the free play of the game, determines if a triggering event occurs based on the symbols displayed at the symbol display positions associated with the reels including the held reel and non-held reels, as indicated by diamond **118**. For this evaluation, the gaming system ignores the wild symbols and only uses the accumulation sequence symbols feature of the held reel for such evaluation.

[0041] The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event does not occur and that there is at least one remaining free play of the game, returns to block **112**.

[0042] The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event does not occur and that there are no remaining free plays of the game, returns to block **102**.

[0043] The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event occurs, provides, and displays the accumulation sequence, as indicated by **120**. The gaming system provides the accumulation sequence wherein the accumulation sequence symbols of the held reel and the other accumulation sequence symbols that collectively triggered the accumulation sequence are employed in the accumulation sequence. The wild symbols of the held reel are not employed in this example embodiment of the present disclosure.

[0044] The gaming system, for the free play of the game, responsive to determining that an accumulation sequence triggering event occurs, provides, and displays the accumulation sequence, as indicated by **122**.

[0045] The gaming system, for the accumulation sequence, provides any awards generated in the accumulation sequence based on the accumulated accumulation sequence symbols, as indicated by **124**.

[0046] The gaming system, after the accumulation sequence, and responsive to determining that there is at least one remaining free play of the game, returns to block **112**.

[0047] The gaming system, after the accumulation sequence, and responsive to determining that there are no remaining free plays of the game, returns to block **102**.

[0048] Turning now to FIGS. **2**A, **2**B, **2**C, **2**D, **2**E, **2**F, **2**G, and **2**H, one example embodiment of the gaming system and method of the present disclosure including parts of a plurality of plays of a secondary game and parts of an accumulation sequence is illustrated. In this example, the secondary game includes reels **212**, **214**, **216**, **218**, and **220** and a plurality of different symbols on each reel. In this example, reels **212**, **214**, **218**, and **220** are non-held reels for each play of the secondary game and reel **216** is a held reel for each play of the secondary game. The held reel **216** includes wild symbols **236***a*, **236***b*, and **236***c* displayed at each of the symbol display positions associated with the reel **216** and two accumulation sequence symbols **250***a* and **250***b* displayed at two of the symbol display positions associated with the reel **216**. The two accumulation sequence symbols **250***a* and **250***b* are associated with different awards (such as respective example credit amounts **100** and **200**); although it should be appreciated that the accumulation sequence symbols can be alternatively configured in accordance with the present disclosure. It should also be appreciated that any suitable quantity of reels, non-held reels, held reels, and accumulation sequence symbols can be employed in accordance with the present disclosure.

[0049] FIG. **2**A illustrates the result of the play of the first free game of a series of five free plays of the game that have been awarded to the player by the gaming system. The free plays can be triggered by an event in or associated with a play of a primary wagering game or otherwise. FIG. **2**A illustrates the result of the play of the first free game after the non-held reels **212**, **214**, **218**, and **220** have spun and stopped. In this example embodiment, the held reel **216** does not need to be spun because the symbols displayed by the held reel **216** do not change from free game play to free game play. In this example, the held reel **216** includes wild symbols **236***a*, **236***b*, and **236***c* respectively displayed at three of the symbol display positions associated with that held reel **216** and accumulation sequence symbols **250***a* and **250***b* respectively displayed at two of the symbol display positions associated with that held reel **216**. Thus, the held reel **216** partly functions as a wild reel and also provides two accumulation sequence symbols that can function with other accumulation sequence symbols on the non-held reels **212**, **214**, **218**, and **220** to trigger the accumulation sequence. These two functions and respective symbols are completely different and function completely independently of each other in this example embodiment. The gaming system performs two evaluations including: (1) a first evaluation wherein the wild symbols **236***a*, **236***b*, and **236***c* of displayed by the held reel **216** (and the other symbols on the non-held reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the accumulation sequence symbols **250***a* and **250***b* displayed by the held reel **216** are ignored for the evaluation; and (2) a second evaluation wherein the accumulation sequence symbols **250***a* and **250***b* (and any other accumulation sequence symbol on reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the wild symbols **236***a*, **236***b*, and **236***c* displayed by the held reel **216** are ignored for the evaluation. For this play of the first free game, this first evaluation by the gaming system results in an award of 500 credits for the winning symbol combination (A-A-WILD-A). The award of 500 credits in indicated in the total award indicator **290**. For this evaluation, the gaming system ignores the accumulation sequence symbols **250***a* and **250***b*. For this play of the first free game, the second evaluation by the gaming system does not result in the trigger of the accumulation sequence because only two accumulation sequence symbols are displayed, and six accumulation sequence symbols are needed to trigger the accumulation sequence. For this evaluation, the gaming system ignores the wild symbols **236***a*, **236***b*, and **236***c*.

[0050] FIG. **2**B illustrates a first part of the play of the second free game of the series of five free plays of the game that have been awarded to the player by the gaming system. FIG. **2**B illustrates that the non-held reels **212**, **214**, **218**, and **220** are spinning and that the held reel **216** is not spinning because the symbols displayed by the held reel **216** do not change from free game play to game play. The held reel **216** thus displays wild symbols **236***a*, **236***b*, and **236***c* and accumulation sequence symbols **250***a* and **250***b* at the symbol display positions associated with that held reel **216**.

[0051] FIG. **2**C illustrates the result of the play of the second free game of the series of five free plays of the game that have been awarded to the player by the gaming system. FIG. **2**C illustrates the result of the play of the second free game after the non-held reels **212**, **214**, **218**, and **220** have spun and stopped, and of the held reel **216** that does not change from free game play to free game play. In this

example, the held reel **216** continues to display wild symbols **236***a*, **236***b*, and **236***c* and accumulation sequence symbols **250***a* and **250***b*. The gaming system performs two evaluations including: (1) a first evaluation wherein the wild symbols **236***a*, **236***b*, and **236***c* of displayed by the held reel **216** (and the other symbols on the non-held reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the accumulation sequence symbols **250***a* and **250***b* displayed by the held reel **216** are ignored for the evaluation; and (2) a second evaluation wherein the accumulation sequence symbols **250***a* and **250***b* (and any other accumulation sequence symbol on reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the wild symbols **236***a*, **236***b*, and **236***c* displayed by the held reel **216** are ignored for the evaluation. For this play of the second free game, this first evaluation by the gaming system results in an award of 1000 credits for the winning symbol combination (Triple Bar-Triple Bar-WILD-Triple Bar). The award of 1000 credits added to the total award indicator **290**. For this evaluation, the gaming system ignores the accumulation sequence symbols **250***a* and **250***b*. For this play of the second free game, the second evaluation by the gaming system does not result in the trigger of the accumulation sequence because four accumulation sequence symbols are displayed, and six accumulation sequence symbols are needed to trigger the accumulation sequence. For this evaluation, the gaming system ignores the wild symbols **236***a*, **236***b*, and **236***c*.

[0052] FIG. **2**D illustrates a first part of the play of the third free game of the series of five free plays of the game that have been awarded to the player by the gaming system. FIG. **2**D illustrates that the non-held reels **212**, **214**, **218**, and **220** are spinning and that the held reel **216** is not spinning because the symbols displayed by the held reel **216** do not change from free game play to game play. The held reel **216** thus displays wild symbols **236***a*, **236***b*, and **236***c* and accumulation sequence symbols **250***a* and **250***b* at the symbol display positions associated with that held reel **216**. It should be appreciated that even though two accumulation sequence symbols occurred on the second reel **214** in the play of the second free game, those accumulation sequence symbols are not held during the free spins.

[0053] FIG. **2**E illustrates the result of the play of the third free game of the series of five free plays of the game that have been awarded to the player by the gaming system. FIG. **2**E illustrates the result of the play of the third free game after the non-held reels **212**, **214**, **218**, and **220** have spun and stopped, and of the held reel **216** that does not change from free game play to free game play. In this example, the held reel **216** continues to display wild symbols **236***a*, **236***b*, and **236***c* and accumulation sequence symbols **250***a* and **250***b*. The gaming system performs two evaluations including: (1) a first evaluation wherein the wild symbols **236***a*, **236***b*, and **236***c* of displayed by the held reel **216** (and the other symbols on the non-held reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the accumulation sequence symbols **250***a* and **250***b* displayed by the held reel **216** are ignored for the evaluation; and (2) a second evaluation wherein the accumulation sequence symbols **250***a* and **250***b* (and any other accumulation sequence symbol on reels **212**, **214**, **218**, and **220**) are employed for the evaluation, and the wild symbols **236***a*, **236***b*, and **236***c* displayed by the held reel **216** are ignored for the evaluation. For this play of the third free game, this first evaluation by the gaming system results in an award of 4000 credits for the winning symbol combination (K-K-WILD-K-K). The award of 4000 credits added to the total award indicator **290**. For this evaluation, the gaming system ignores the accumulation sequence symbols **250***a* and **250***b*. For this play of the third free game, the second evaluation by the gaming system results in the trigger of the accumulation sequence because six accumulation sequence symbols including the two the accumulation sequence symbols **250***a* and **250***b* trigger the accumulation sequence. For this evaluation, the gaming system ignores the wild symbols **236***a*, **236***b*, and **236***c*. Since the accumulation sequence is triggered, the gaming system interrupts providing the series of free games and provides the accumulation sequence.

[0054] FIG. **2**F illustrates the start of the accumulation sequence. For the accumulation sequence, the gaming system maintains the accumulation sequence symbols that triggered the accumulation sequence. In this example, six accumulation sequence symbols are displayed and accumulated at this point in time. These symbols include the accumulation sequence symbols **250***a* and **250***b* on the held reel **216**. In this example, the accumulation sequence includes 3 spins of the reels to accumulate additional accumulation sequence symbols as indicated in FIG. **2**F. If during the 3 spins of the reels, any additional accumulation sequence symbols are displayed and accumulated, the gaming system resets this amount back to the original 3 spins. If during the 3 spins of the reels, no additional accumulation sequence symbols are displayed, the gaming system ends the accumulation sequence and provides the player an award based on the credit amounts associated with the accumulated sequence symbols. If during the 3 spins of the reels, a predetermined quantity accumulation sequence symbols are displayed and thus accumulated, the gaming system ends the accumulation sequence and provides the player an award based on the credit amounts associated with the accumulated accumulation sequence symbols. The quantity in this example embodiment is equal to the quantity of symbol display positions associated with the reels which in this example embodiment is 15.

[0055] FIG. **2**H illustrates the symbols on the reels after an activation of the reels during the accumulation sequence. In this example, fifteen accumulation sequence symbols are displayed and accumulated at this point in time. These symbols include the accumulation sequence symbols **250***a* and **250***b* on the held reel **216** and one additional symbol accumulated on the held reel **216** in this activation of the reels. In this example, since the predetermined quantity accumulation sequence symbols are displayed and thus accumulated, the gaming system provides the player an award based on the credit amounts associated with the accumulated accumulation sequence symbols. In this example, the award is 3600 credits which is added to the credit meter **290**. The gaming system also ends the accumulation sequence.

[0056] In various embodiments, before, during, or after the play of the primary game, the gaming system can randomly pick a quantity of reel (such as one or two reels) to be held. In various embodiments, before or during each free play of the game, the gaming system can randomly pick a quantity of reel (such as one or two reels) to be held. In various embodiments, before, during, or after the play of the primary game, the gaming system can randomly pick the quantity of accumulation sequence symbols (such as one, two, three, four or five) to place on each of the held reel(s).

In various embodiments, before or during each free play of the game, the gaming system can randomly pick the quantity of accumulation sequence symbols (such as one, two, three, four, or five) to place on each of the held reel(s).

[0057] In various embodiments, before, during, or after the play of the primary game, the gaming system can cause one or more of the accumulation sequence symbols to add a value to one or more of the other accumulation sequence symbols.

[0058] It should be further appreciated that while the example of FIGS. **2**A to **2**H employs wild symbols as one of the features of the held reel, in various other embodiments this feature could vary in accordance with the present disclosure. For example, this feature could be: (1) a stacked wild symbols feature; (2) an expanding wild symbols feature; (3) a nudging wild symbols feature; (4) a retrigger symbol feature; (5) an anti-terminator symbol feature; or (6) a modifier, such as a multiplier, feature.

[0059] In various embodiments, one or more awards provided in association with the games disclosed herein include one or more of: a quantity of monetary credits, a quantity of non-monetary credits, a quantity of promotional credits, a quantity of player tracking points, a progressive award, a modifier, such as a multiplier, a quantity of free plays of one or more games, a quantity of plays of one or more secondary or bonus games, a multiplier of a quantity of free plays of a game, one or more lottery based awards, such as lottery or drawing tickets, a wager match for one or more plays of one or more games, an increase in the average expected payback percentage for one or more plays of one or more games, one or more comps, such as a free dinner, a free night's stay at a hotel, a high value product such as a free car, or a low value product, one or more bonus credits usable for online play, a lump sum of player tracking points or credits, a multiplier for player tracking points or credits, an increase in a membership or player tracking level, one or more coupons or promotions usable within and/or outside of the gaming establishment (e.g., a 20% off coupon for use at a convenience store), virtual goods associated with the gaming system, virtual goods not associated with the gaming system, an access code usable to unlock content on an internet.

[0060] In various embodiments, one or more of the determinations described herein can be predetermined, randomly determined, randomly determined based on one or more weighted percentages, determined based on a generated symbol or symbol combination, determined independent of a generated symbol or symbol combination, determined based on a random determination by the central controller, determined independent of a random determination by the central controller, determined based on a random determination at the gaming system, determined independent of a random determination at the gaming system, determined based on at least one play of at least one game, determined independent of at least one play of at least one game, determined based on a player's selection, determined independent of a player's selection, determined based on one or more side wagers placed, determined independent of one or more side wagers placed, determined based on the player's primary game wager, determined independent of the player's primary game wager, determined based on time (such as the time of day), determined independent of time (such as the time of day), determined based on an amount of coin-in accumulated in one or more pools, determined independent of an amount of coin-in accumulated in one or more pools, determined based on a status of the player (i.e., a player tracking status), determined independent of a status of the player (i.e., a player tracking status), determined based on one or more other determinations disclosed herein, determined independent of any other determination disclosed herein or determined based on any other suitable method or criteria.

Gaming Systems

[0061] The above-described embodiments of the present disclosure may be implemented in accordance with or in conjunction with one or more of a variety of different types of gaming systems, such as, but not limited to, those described below.

[0062] The present disclosure contemplates a variety of different gaming systems each having one or more of a plurality of different features, attributes, or characteristics. A "gaming system" as used herein refers to various configurations of: (a) one or more central servers, central controllers, or remote hosts; (b) one or more electronic gaming machines such as those located on a casino floor; and/or (c) one or more personal gaming devices, such as desktop computers, laptop computers, tablet computers or computing devices, personal digital assistants, mobile phones, and other mobile computing devices.

[0063] Thus, in various embodiments, the gaming system of the present disclosure includes: (a) one or more electronic gaming machines in combination with one or more central servers, central controllers, or remote hosts; (b) one or more personal gaming devices in combination with one or more central servers, central controllers, or remote hosts; (c) one or more personal gaming devices in combination with one or more electronic gaming machines; (d) one or more personal gaming devices, one or more electronic gaming machines, and one or more central servers, central controllers, or remote hosts in combination with one another; (e) a single electronic gaming machine; (f) a plurality of electronic gaming machines in combination with one another; (g) a single personal gaming device; (h) a plurality of personal gaming devices in combination with one another; (i) a single central server, central controller, or remote host; and/or (j) a plurality of central servers, central controllers, or remote hosts in combination with one another.

[0064] For brevity and clarity and unless specifically stated otherwise, the term "EGM" is used herein to refer to an electronic gaming machine (such as a slot machine, a video poker machine, a video lottery terminal (VLT), a video keno machine, or a video bingo machine located on a casino floor). Additionally, for brevity and clarity and unless specifically stated otherwise, "EGM" as used herein represents one EGM or a plurality of EGMs, "personal gaming device" as used herein represents one personal gaming device or a plurality of personal gaming devices, and "central server, central controller, or remote host" as used herein represents one central server, central controller, or remote host or a plurality of central servers, central controllers, or remote hosts.

[0065] As noted above, in various embodiments, the gaming system includes an EGM (or personal gaming device) in combination with a central server, central controller, or remote host. In such embodiments, the EGM (or personal gaming device) is configured to communicate with the central server, central controller, or remote host through a data network or remote communication link. In certain such

embodiments, the EGM (or personal gaming device) is configured to communicate with another EGM (or personal gaming device) through the same data network or remote communication link or through a different data network or remote communication link. For example, the gaming system includes a plurality of EGMs that are each configured to communicate with a central server, central controller, or remote host through a data network.

[0066] In certain embodiments in which the gaming system includes an EGM (or personal gaming device) in combination with a central server, central controller, or remote host, the central server, central controller, or remote host is any suitable computing device (such as a server) that includes at least one processor and at least one memory device or data storage device. As further described herein, the EGM (or personal gaming device) includes at least one EGM (or personal gaming device) processor configured to transmit and receive data or signals representing events, messages, commands, or any other suitable information between the EGM (or personal gaming device) and the central server, central controller, or remote host. The at least one processor of that EGM (or personal gaming device) is configured to execute the events, messages, or commands represented by such data or signals in conjunction with the operation of the EGM (or personal gaming device). Moreover, the at least one processor of the central server, central controller, or remote host is configured to transmit and receive data or signals representing events, messages, commands, or any other suitable information between the central server, central controller, or remote host and the EGM (or personal gaming device). The at least one processor of the central server, central controller, or remote host is configured to execute the events, messages, or commands represented by such data or signals in conjunction with the operation of the central server, central controller, or remote host. One, more than one, or each of the functions of the central server, central controller, or remote host may be performed by the at least one processor of the EGM (or personal gaming device). Further, one, more than one, or each of the functions of the at least one processor of the EGM (or personal gaming device) may be performed by the at least one processor of the central server, central controller, or remote host.

[0067] In certain such embodiments, computerized instructions for controlling any games (such as any primary or base games and/or any secondary or bonus games) displayed by the EGM (or personal gaming device) are executed by the central server, central controller, or remote host. In such "thin client" embodiments, the central server, central controller, or remote host remotely controls any games (or other suitable interfaces) displayed by the EGM (or personal gaming device), and the EGM (or personal gaming device) is utilized to display such games (or suitable interfaces) and to receive one or more inputs or commands. In other such embodiments, computerized instructions for controlling any games displayed by the EGM (or personal gaming device) are communicated from the central server, central controller, or remote host to the EGM (or personal gaming device) and are stored in at least one memory device of the EGM (or personal gaming device). In such "thick client" embodiments, the at least one processor of the EGM (or personal gaming device) executes the computerized instructions to control any games (or other suitable interfaces) displayed by the EGM (or personal gaming device).

[0068] In various embodiments in which the gaming system includes a plurality of EGMs (or personal gaming devices), one or more of the EGMs (or personal gaming devices) are thin client EGMs (or personal gaming devices) and one or more of the EGMs (or personal gaming devices) are thick client EGMs (or personal gaming devices). In other embodiments in which the gaming system includes one or more EGMs (or personal gaming devices), certain functions of one or more of the EGMs (or personal gaming devices) are implemented in a thin client environment, and certain other functions of one or more of the EGMs (or personal gaming devices) are implemented in a thick client environment. In one such embodiment in which the gaming system includes an EGM (or personal gaming device) and a central server, central controller, or remote host, computerized instructions for controlling any primary or base games displayed by the EGM (or personal gaming device) are communicated from the central server, central controller, or remote host to the EGM (or personal gaming device) in a thick client configuration, and computerized instructions for controlling any secondary or bonus games or other functions displayed by the EGM (or personal gaming device) are executed by the central server, central controller, or remote host in a thin client configuration.

[0069] In certain embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a central server, central controller, or remote host through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is a local area network (LAN) in which the EGMs (or personal gaming devices) are located substantially proximate to one another and/or the central server, central controller, or remote host. In one example, the EGMs (or personal gaming devices) and the central server, central controller, or remote host are located in a gaming establishment or a portion of a gaming establishment.

[0070] In other embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a central server, central controller, or remote host through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is a wide area network (WAN) in which one or more of the EGMs (or personal gaming devices) are not necessarily located substantially proximate to another one of the EGMs (or personal gaming devices) and/or the central server, central controller, or remote host. For example, one or more of the EGMs (or personal gaming devices) are located: (a) in an area of a gaming establishment different from an area of the gaming establishment in which the central server, central controller, or remote host is located; or (b) in a gaming establishment different from the gaming establishment in which the central server, central controller, or remote host is located. In another example, the central server, central controller, or remote host is not located within a gaming establishment in which the EGMs (or personal gaming devices) are located. In certain embodiments in which the data network is a WAN, the gaming system includes a central server, central controller, or remote host and an EGM (or personal gaming device) each located in a different gaming establishment in a same geographic area, such as a same city or a same state. Gaming systems in which the data network is a WAN are substantially identical

to gaming systems in which the data network is a LAN, though the quantity of EGMs (or personal gaming devices) in such gaming systems may vary relative to one another.

[0071] In further embodiments in which the gaming system includes: (a) an EGM (or personal gaming device) configured to communicate with a central server, central controller, or remote host through a data network; and/or (b) a plurality of EGMs (or personal gaming devices) configured to communicate with one another through a data network, the data network is an internet (such as the Internet) or an intranet. In certain such embodiments, an Internet browser of the EGM (or personal gaming device) is usable to access an Internet game page from any location where an Internet connection is available. In one such embodiment, after the EGM (or personal gaming device) accesses the Internet game page, the central server, central controller, or remote host identifies a player before enabling that player to place any wagers on any plays of any wagering games. In one example, the central server, central controller, or remote host identifies the player by requiring a player account of the player to be logged into via an input of a unique username and password combination assigned to the player. The central server, central controller, or remote host may, however, identify the player in any other suitable manner, such as by validating a player tracking identification number associated with the player; by reading a player tracking card or other smart card inserted into a card reader (as described below); by validating a unique player identification number associated with the player by the central server, central controller, or remote host; or by identifying the EGM (or personal gaming device), such as by identifying the MAC address or the IP address of the Internet facilitator. In various embodiments, once the central server, central controller, or remote host identifies the player, the central server, central controller, or remote host enables placement of one or more wagers on one or more plays of one or more primary or base games and/or one or more secondary or bonus games and displays those plays via the Internet browser of the EGM (or personal gaming device). Examples of implementations of Internet-based gaming are further described in U.S. Pat. No. 8,764,566, entitled "Internet Remote Game Server," and U.S. Pat. No. 8,147,334, entitled "Universal Game Server," which are incorporated herein by reference.

[0072] The central server, central controller, or remote host and the EGM (or personal gaming device) are configured to connect to the data network or remote communications link in any suitable manner. In various embodiments, such a connection is accomplished via a conventional phone line or other data transmission line, a digital subscriber line (DSL), a T-1 line, a coaxial cable, a fiber optic cable, a wireless or wired routing device, a mobile communications network connection (such as a cellular network or mobile Internet network), or any other suitable medium. The expansion in the quantity of computing devices and the quantity and speed of Internet connections in recent years increases opportunities for players to use a variety of EGMs (or personal gaming devices) to play games from an ever-increasing quantity of remote sites. Additionally, the enhanced bandwidth of digital wireless communications may render such technology suitable for some or all communications, particularly if such communications are encrypted. Higher data transmission speeds may be useful for enhancing the sophistication and response of the display and interaction with players.

EGM Components

[0073] FIG. **3** is a block diagram of an example EGM **1000** and FIGS. **4**A and **4**B include two different example EGMs **2000***a* and **2000***b*. The EGMs **1000**, **2000***a*, and **2000***b* are merely example EGMs, and different EGMs may be implemented using different combinations of the components shown in the EGMs **1000**, **2000***a*, and **2000***b*. Although the below refers to EGMs, in various embodiments personal gaming devices (such as personal gaming device **2000***c* of FIG. **4**C) may include some or all of the below components.

[0074] In these embodiments, the EGM **1000** includes a master gaming controller **1012** configured to communicate with and to operate with a plurality of peripheral devices **1022**.

[0075] The master gaming controller **1012** includes at least one processor **1010**. The at least one processor **1010** is any suitable processing device or set of processing devices, such as a microprocessor, a microcontroller-based platform, a suitable integrated circuit, or one or more application-specific integrated circuits (ASICs), configured to execute software enabling various configuration and reconfiguration tasks, such as: (1) communicating with a remote source (such as a server that stores authentication information or game information) via a communication interface **1006** of the master gaming controller **1012**; (2) converting signals read by an interface to a format corresponding to that used by software or memory of the EGM; (3) accessing memory to configure or reconfigure game parameters in the memory according to indicia read from the EGM; (4) communicating with interfaces and the peripheral devices **1022** (such as input/output devices); and/or (5) controlling the peripheral devices **1022**. In certain embodiments, one or more components of the master gaming controller **1012** (such as the at least one processor **1010**) reside within a housing of the EGM (described below), while in other embodiments at least one component of the master gaming controller **1012** resides outside of the housing of the EGM.

[0076] The master gaming controller **1012** also includes at least one memory device **1016**, which includes: (1) volatile memory (e.g., RAM **1009**, which can include non-volatile RAM, magnetic RAM, ferroelectric RAM, and any other suitable forms); (2) non-volatile memory **1019** (e.g., disk memory, FLASH memory, EPROMs, EEPROMs, memristor-based non-volatile solid-state memory, etc.); (3) unalterable memory (e.g., EPROMs **1008**); (4) read-only memory; and/or (5) a secondary memory storage device **1015**, such as a non-volatile memory device, configured to store gaming software related information (the gaming software related information and the memory may be used to store various audio files and games not currently being used and invoked in a configuration or reconfiguration). Any other suitable magnetic, optical, and/or semiconductor memory may operate in conjunction with the EGM disclosed herein. In certain embodiments, the at least one memory device **1016** resides within the housing of the EGM (described below), while in other embodiments at least one component of the at least one memory device **1016** resides outside of the housing of the EGM.

[0077] The at least one memory device **1016** is configured to store, for example: (1) configuration software **1014**, such as all the parameters and settings for a game playable on the EGM; (2) associations **1018** between configuration indicia read from an EGM with one or more parameters and

settings; (3) communication protocols configured to enable the at least one processor **1010** to communicate with the peripheral devices **1022**; and/or (4) communication transport protocols (such as TCP/IP, USB, Firewire, IEEE1394, Bluetooth, IEEE 802.11x (IEEE 802.11 standards), hiperlan/2, HomeRF, etc.) configured to enable the EGM to communicate with local and non-local devices using such protocols. In one implementation, the master gaming controller **1012** communicates with other devices using a serial communication protocol. A few non-limiting examples of serial communication protocols that other devices, such as peripherals (e.g., a bill validator or a ticket printer), may use to communicate with the master game controller **1012** include USB, RS-232, and Netplex (a proprietary protocol developed by IGT).

[0078] In certain embodiments, the at least one memory device **1016** is configured to store program code and instructions executable by the at least one processor of the EGM to control the EGM. The at least one memory device **1016** of the EGM also stores other operating data, such as image data, event data, input data, random number generators (RNGs) or pseudo-RNGs, paytable data or information, and/or applicable game rules that relate to the play of one or more games on the EGM. In various embodiments, part, or all of the program code and/or the operating data described above is stored in at least one detachable or removable memory device including, but not limited to, a cartridge, a disk, a CD ROM, a DVD, a USB memory device, or any other suitable non-transitory computer readable medium. In certain such embodiments, an operator (such as a gaming establishment operator) and/or a player uses such a removable memory device in an EGM to implement at least part of the present disclosure. In other embodiments, part, or all of the program code and/or the operating data is downloaded to the at least one memory device of the EGM through any suitable data network described above (such as an Internet or intranet).

[0079] The at least one memory device **1016** also stores a plurality of device drivers **1042**. Examples of different types of device drivers include device drivers for EGM components and device drivers for the peripheral components **1022**. Typically, the device drivers **1042** utilize various communication protocols that enable communication with a particular physical device. The device driver abstracts the hardware implementation of that device. For example, a device driver may be written for each type of card reader that could potentially be connected to the EGM. Non-limiting examples of communication protocols used to implement the device drivers include Netplex, USB, Serial, Ethernet **175**, Firewire, I/O debouncer, direct memory map, serial, PCI, parallel, RF, Bluetooth™, near-field communications (e.g., using near-field magnetics), 802.11 (WiFi), etc. In one embodiment, when one type of a particular device is exchanged for another type of the particular device, the at least one processor of the EGM loads the new device driver from the at least one memory device to enable communication with the new device. For instance, one type of card reader in the EGM can be replaced with a second different type of card reader when device drivers for both card readers are stored in the at least one memory device.

[0080] In certain embodiments, the software units stored in the at least one memory device **1016** can be upgraded as needed. For instance, when the at least one memory device **1016** is a hard drive, new games, new game options, new parameters, new settings for existing parameters, new settings for new parameters, new device drivers, and new communication protocols can be uploaded to the at least one memory device **1016** from the master game controller **1012** or from some other external device. As another example, when the at least one memory device **1016** includes a CD/DVD drive including a CD/DVD configured to store game options, parameters, and settings, the software stored in the at least one memory device **1016** can be upgraded by replacing a first CD/DVD with a second CD/DVD. In yet another example, when the at least one memory device **1016** uses flash memory **1019** or EPROM **1008** units configured to store games, game options, parameters, and settings, the software stored in the flash and/or EPROM memory units can be upgraded by replacing one or more memory units with new memory units that include the upgraded software. In another embodiment, one or more of the memory devices, such as the hard drive, may be employed in a game software download process from a remote software server.

[0081] In some embodiments, the at least one memory device **1016** also stores authentication and/or validation components **1044** configured to authenticate/validate specified EGM components and/or information, such as hardware components, software components, firmware components, peripheral device components, user input device components, information received from one or more user input devices, information stored in the at least one memory device **1016**, etc. Examples of various authentication and/or validation components are described in U.S. Pat. No. 6,620,047, entitled "Electronic Gaming Apparatus Having Authentication Data Sets," which is incorporated herein by reference.

[0082] In certain embodiments, the peripheral devices **1022** include several device interfaces, such as: (1) at least one output device **1020** including at least one display device **1035**; (2) at least one input device **1030** (which may include contact and/or non-contact interfaces); (3) at least one transponder **1054**; (4) at least one wireless communication component **1056**; (5) at least one wired/wireless power distribution component **1058**; (6) at least one sensor **1060**; (7) at least one data preservation component **1062**; (8) at least one motion/gesture analysis and interpretation component **1064**; (9) at least one motion detection component **1066**; (10) at least one portable power source **1068**; (11) at least one geolocation module **1076**; (12) at least one user identification module **1077**; (13) at least one player/device tracking module **1078**; and (14) at least one information filtering module **1079**.

[0083] The at least one output device **1020** includes at least one display device **1035** configured to display any game(s) displayed by the EGM and any suitable information associated with such game(s). In certain embodiments, the display devices are connected to or mounted on a housing of the EGM (described below). In various embodiments, the display devices serve as digital glass configured to advertise certain games or other aspects of the gaming establishment in which the EGM is located. In various embodiments, the EGM includes one or more of the following display devices: (a) a central display device; (b) a player tracking display configured to display various information regarding a player's player tracking status (as described below); (c) a secondary or upper display device in addition to the central display device and the player tracking display; (d) a credit display configured to display a current quantity of credits,

amount of cash, account balance, or the equivalent; and (e) a bet display configured to display an amount wagered for one or more plays of one or more games. The example EGM **2000***a* illustrated in FIG. **4**A includes a central display device **2116**, a player tracking display **2140**, a credit display **2120**, and a bet display **2122**. The example EGM **2000***b* illustrated in FIG. **4**B includes a central display device **2116**, an upper display device **2118**, a player tracking display **2140**, a credit display **2120**, and a bet display **2122**.

[0084] In various embodiments, the display devices include, without limitation: a monitor, a television display, a plasma display, a liquid crystal display (LCD), a display based on light emitting diodes (LEDs), a display based on a plurality of organic light-emitting diodes (OLEDs), a display based on polymer light-emitting diodes (PLEDs), a display based on a plurality of surface-conduction electron-emitters (SEDs), a display including a projected and/or reflected image, or any other suitable electronic device or display mechanism. In certain embodiments, as described above, the display device includes a touch-screen with an associated touch-screen controller. The display devices may be of any suitable sizes, shapes, and configurations.

[0085] The display devices of the EGM are configured to display one or more game and/or non-game images, symbols, and indicia. In certain embodiments, the display devices of the EGM are configured to display any suitable visual representation or exhibition of the movement of objects; dynamic lighting; video images; images of people, characters, places, things, and faces of cards; and the like. In certain embodiments, the display devices of the EGM are configured to display one or more video reels, one or more video wheels, and/or one or more video dice. In other embodiments, certain of the displayed images, symbols, and indicia are in mechanical form. That is, in these embodiments, the display device includes any electromechanical device, such as one or more rotatable wheels, one or more reels, and/or one or more dice, configured to display at least one or a plurality of game or other suitable images, symbols, or indicia.

[0086] In various embodiments, the at least one output device **1020** includes a payout device. In these embodiments, after the EGM receives an actuation of a cashout device (described below), the EGM causes the payout device to provide a payment to the player. In one embodiment, the payout device is one or more of: (a) a ticket printer and dispenser configured to print and dispense a ticket or credit slip associated with a monetary value, wherein the ticket or credit slip may be redeemed for its monetary value via a cashier, a kiosk, or other suitable redemption system; (b) a bill dispenser configured to dispense paper currency; (c) a coin dispenser configured to dispense coins or tokens (such as into a coin payout tray); and (d) any suitable combination thereof. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a ticket printer and dispenser **2136**. Examples of ticket-in ticket-out (TITO) technology are described in U.S. Pat. No. 5,429,361, entitled "Gaming Machine Information, Communication and Display System"; U.S. Pat. No. 5,470,079, entitled "Gaming Machine Accounting and Monitoring System"; U.S. Pat. No. 5,265,874, entitled "Cashless Gaming Apparatus and Method"; U.S. Pat. No. 6,729,957, entitled "Gaming Method and Host Computer with Ticket-In/Ticket-Out Capability"; U.S. Pat. No. 6,729,958, entitled "Gaming System with Ticket-In/Ticket-Out Capability"; U.S. Pat. No. 6,736,725, entitled "Gaming Method and Host Computer with Ticket-In/Ticket-Out Capability"; U.S. Pat. No. 7,275,991, entitled "Slot Machine with Ticket-In/Ticket-Out Capability"; U.S. Pat. No. 6,048,269, entitled "Coinless Slot Machine System and Method"; and U.S. Pat. No. 5,290,003, entitled "Gaming Machine and Coupons," which are incorporated herein by reference.

[0087] In certain embodiments, rather than dispensing bills, coins, or a physical ticket having a monetary value to the player following receipt of an actuation of the cashout device, the payout device is configured to cause a payment to be provided to the player in the form of an electronic funds transfer, such as via a direct deposit into a bank account, a casino account, or a prepaid account of the player; via a transfer of funds onto an electronically recordable identification card or smart card of the player; or via sending a virtual ticket having a monetary value to an electronic device of the player. Examples of providing payment using virtual tickets are described in U.S. Pat. No. 8,613,659, entitled "Virtual Ticket-In and Ticket-Out on a Gaming Machine," which is incorporated herein by reference.

[0088] While any credit balances, any wagers, any values, and any awards are described herein as amounts of monetary credits or currency, one or more of such credit balances, such wagers, such values, and such awards may be for non-monetary credits, promotional credits, of player tracking points or credits.

[0089] In certain embodiments, the at least one output device **1020** is a sound generating device controlled by one or more sound cards. In one such embodiment, the sound generating device includes one or more speakers or other sound generating hardware and/or software configured to generate sounds, such as by playing music for any games or by playing music for other modes of the EGM, such as an attract mode. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a plurality of speakers **2150**. In another such embodiment, the EGM provides dynamic sounds coupled with attractive multimedia images displayed on one or more of the display devices to provide an audio-visual representation or to otherwise display full-motion video with sound to attract players to the EGM. In certain embodiments, the EGM displays a sequence of audio and/or visual attraction messages during idle periods to attract potential players to the EGM. The videos may be customized to provide any appropriate information.

[0090] The at least one input device **1030** may include any suitable device that enables an input signal to be produced and received by the at least one processor **1010** of the EGM.

[0091] In one embodiment, the at least one input device **1030** includes a payment device configured to communicate with the at least one processor of the EGM to fund the EGM. In certain embodiments, the payment device includes one or more of: (a) a bill acceptor into which paper money is inserted to fund the EGM; (b) a ticket acceptor into which a ticket or a voucher is inserted to fund the EGM; (c) a coin slot into which coins or tokens are inserted to fund the EGM; (d) a reader or a validator for credit cards, debit cards, or credit slips into which a credit card, debit card, or credit slip is inserted to fund the EGM; (e) a player identification card reader into which a player identification card is inserted to fund the EGM; or (f) any suitable combination thereof. The

example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a combined bill and ticket acceptor **2128** and a coin slot **2126**.

[0092] In one embodiment, the at least one input device **1030** includes a payment device configured to enable the EGM to be funded via an electronic funds transfer, such as a transfer of funds from a bank account. In another embodiment, the EGM includes a payment device configured to communicate with a mobile device of a player, such as a mobile phone, a radio frequency identification tag, or any other suitable wired or wireless device, to retrieve relevant information associated with that player to fund the EGM. Examples of funding an EGM via communication between the EGM and a mobile device (such as a mobile phone) of a player are described in U.S. Patent Application Publication No. 2013/0344942, entitled "Avatar as Security Measure for Mobile Device Use with Electronic Gaming Machine," which is incorporated herein by reference. When the EGM is funded, the at least one processor determines the amount of funds entered and displays the corresponding amount on a credit display or any other suitable display as described below.

[0093] In certain embodiments, the at least one input device **1030** includes at least one wagering or betting device. In various embodiments, the one or more wagering or betting devices are each: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). One such wagering or betting device is as a maximum wager or bet device that, when actuated, causes the EGM to place a maximum wager on a play of a game. Another such wagering or betting device is a repeat bet device that, when actuated, causes the EGM to place a wager that is equal to the previously-placed wager on a play of a game. A further such wagering or betting device is a bet one device that, when actuated, causes the EGM to increase the wager by one credit. Generally, upon actuation of one of the wagering or betting devices, the quantity of credits displayed in a credit meter (described below) decreases by the amount of credits wagered, while the quantity of credits displayed in a bet display (described below) increases by the amount of credits wagered.

[0094] In various embodiments, the at least one input device **1030** includes at least one game play activation device. In various embodiments, the one or more game play initiation devices are each: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). After a player appropriately funds the EGM and places a wager, the EGM activates the game play activation device to enable the player to actuate the game play activation device to initiate a play of a game on the EGM (or another suitable sequence of events associated with the EGM). After the EGM receives an actuation of the game play activation device, the EGM initiates the play of the game. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a game play activation device in the form of a game play initiation button **2132**. In other embodiments, the EGM begins game play automatically upon appropriate funding rather than upon utilization of the game play activation device.

[0095] In other embodiments, the at least one input device **1030** includes a cashout device. In various embodiments, the cashout device is: (1) a mechanical button supported by the housing of the EGM (such as a hard key or a programmable soft key), or (2) an icon displayed on a display device of the EGM (described below) that is actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). When the EGM receives an actuation of the cashout device from a player and the player has a positive (i.e., greater-than-zero) credit balance, the EGM initiates a payout associated with the player's credit balance. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a cashout device in the form of a cashout button **2134**.

[0096] In various embodiments, the at least one input device **1030** includes a plurality of buttons that are programmable by the EGM operator to, when actuated, cause the EGM to perform particular functions. For instance, such buttons may be hard keys, programmable soft keys, or icons icon displayed on a display device of the EGM (described below) that are actuatable via a touch screen of the EGM (described below) or via use of a suitable input device of the EGM (such as a mouse or a joystick). The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a plurality of such buttons **2130**.

[0097] In certain embodiments, the at least one input device **1030** includes a touch-screen coupled to a touch-screen controller or other touch-sensitive display overlay to enable interaction with any images displayed on a display device (as described below). One such input device is a conventional touch-screen button panel. The touch-screen and the touch-screen controller are connected to a video controller. In these embodiments, signals are input to the EGM by touching the touch screen at the appropriate locations.

[0098] In embodiments including a player tracking system, as further described below, the at least one input device **1030** includes a card reader in communication with the at least one processor of the EGM. The example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B each include a card reader **2138**. The card reader is configured to read a player identification card inserted into the card reader.

[0099] The at least one wireless communication component **1056** includes one or more communication interfaces having different architectures and utilizing a variety of protocols, such as (but not limited to) 802.11 (WiFi); 802.15 (including Bluetooth™); 802.16 (WiMax); 802.22; cellular standards such as CDMA, CDMA2000, and WCDMA; Radio Frequency (e.g., RFID); infrared; and Near Field Magnetic communication protocols. The at least one wireless communication component **1056** transmits electrical, electromagnetic, or optical signals that carry digital data streams or analog signals representing various types of information.

[0100] The at least one wired/wireless power distribution component **1058** includes components or devices that are configured to provide power to other devices. For example, in one embodiment, the at least one power distribution component **1058** includes a magnetic induction system that is configured to provide wireless power to one or more user input devices near the EGM. In one embodiment, a user

input device docking region is provided, and includes a power distribution component that is configured to recharge a user input device without requiring metal-to-metal contact. In one embodiment, the at least one power distribution component **1058** is configured to distribute power to one or more internal components of the EGM, such as one or more rechargeable power sources (e.g., rechargeable batteries) located at the EGM.

[0101] In certain embodiments, the at least one sensor **1060** includes at least one of: optical sensors, pressure sensors, RF sensors, infrared sensors, image sensors, thermal sensors, and biometric sensors. The at least one sensor **1060** may be used for a variety of functions, such as: detecting movements and/or gestures of various objects within a predetermined proximity to the EGM; detecting the presence and/or identity of various persons (e.g., players, casino employees, etc.), devices (e.g., user input devices), and/or systems within a predetermined proximity to the EGM.

[0102] The at least one data preservation component **1062** is configured to detect or sense one or more events and/or conditions that, for example, may result in damage to the EGM and/or that may result in loss of information associated with the EGM. Additionally, the data preservation system **1062** may be operable to initiate one or more appropriate action(s) in response to the detection of such events/conditions.

[0103] The at least one motion/gesture analysis and interpretation component **1064** is configured to analyze and/or interpret information relating to detected player movements and/or gestures to determine appropriate player input information relating to the detected player movements and/or gestures. For example, in one embodiment, the at least one motion/gesture analysis and interpretation component **1064** is configured to perform one or more of the following functions: analyze the detected gross motion or gestures of a player; interpret the player's motion or gestures (e.g., in the context of a casino game being played) to identify instructions or input from the player; utilize the interpreted instructions/input to advance the game state; etc. In other embodiments, at least a portion of these additional functions may be implemented at a remote system or device.

[0104] The at least one portable power source **1068** enables the EGM to operate in a mobile environment. For example, in one embodiment, the EGM **300** includes one or more rechargeable batteries.

[0105] The at least one geolocation module **1076** is configured to acquire geolocation information from one or more remote sources and use the acquired geolocation information to determine information relating to a relative and/or absolute position of the EGM. For example, in one implementation, the at least one geolocation module **1076** is configured to receive GPS signal information for use in determining the position or location of the EGM. In another implementation, the at least one geolocation module **1076** is configured to receive multiple wireless signals from multiple remote devices (e.g., EGMs, servers, wireless access points, etc.) and use the signal information to compute position/location information relating to the position or location of the EGM.

[0106] The at least one user identification module **1077** is configured to determine the identity of the current user or current owner of the EGM. For example, in one embodiment, the current user is required to perform a login process at the EGM in order to access one or more features. Alternatively, the EGM is configured to automatically determine the identity of the current user based on one or more external signals, such as an RFID tag or badge worn by the current user and that provides a wireless signal to the EGM that is used to determine the identity of the current user. In at least one embodiment, various security features are incorporated into the EGM to prevent unauthorized users from accessing confidential or sensitive information.

[0107] The at least one information filtering module **1079** is configured to perform filtering (e.g., based on specified criteria) of selected information to be displayed at one or more displays **1035** of the EGM.

[0108] In various embodiments, the EGM includes a plurality of communication ports configured to enable the at least one processor of the EGM to communicate with and to operate with external peripherals, such as: accelerometers, arcade sticks, bar code readers, bill validators, biometric input devices, bonus devices, button panels, card readers, coin dispensers, coin hoppers, display screens or other displays or video sources, expansion buses, information panels, keypads, lights, mass storage devices, microphones, motion sensors, motors, printers, reels, SCSI ports, solenoids, speakers, thumbsticks, ticket readers, touch screens, trackballs, touchpads, wheels, and wireless communication devices. U.S. Pat. No. 7,290,072 describes a variety of EGMs including one or more communication ports that enable the EGMs to communicate and operate with one or more external peripherals.

[0109] As generally described above, in certain embodiments, such as the example EGMs **2000***a* and **2000***b* illustrated in FIGS. **4**A and **4**B, the EGM has a support structure, housing, or cabinet that provides support for a plurality of the input devices and the output devices of the EGM. Further, the EGM is configured such that a player may operate it while standing or sitting. In various embodiments, the EGM is positioned on a base or stand, or is configured as a pub-style tabletop game (not shown) that a player may operate typically while sitting. As illustrated by the different example EGMs **2000***a* and **2000***b* shown in FIGS. **4**A and **4**B, EGMs may have varying housing and display configurations.

[0110] In certain embodiments, the EGM is a device that has obtained approval from a regulatory gaming commission, and in other embodiments, the EGM is a device that has not obtained approval from a regulatory gaming commission.

[0111] The EGMs described above are merely three examples of different types of EGMs. Certain of these example EGMs may include one or more elements that may not be included in all gaming systems, and these example EGMs may not include one or more elements that are included in other gaming systems. For example, certain EGMs include a coin acceptor while others do not.

Operation of Primary or Base Games and/or Secondary or Bonus Games

[0112] In various embodiments, an EGM may be implemented in one of a variety of different configurations. In various embodiments, the EGM may be implemented as one of: (a) a dedicated EGM in which computerized game programs executable by the EGM for controlling any primary or base games (referred to herein as "primary games") and/or any secondary or bonus games or other functions (referred to herein as "secondary games") displayed by the

EGM are provided with the EGM before delivery to a gaming establishment or before being provided to a player; and (b) a changeable EGM in which computerized game programs executable by the EGM for controlling any primary games and/or secondary games displayed by the EGM are downloadable or otherwise transferred to the EGM through a data network or remote communication link; from a USB drive, flash memory card, or other suitable memory device; or in any other suitable manner after the EGM is physically located in a gaming establishment or after the EGM is provided to a player.

[0113] As generally explained above, in various embodiments in which the gaming system includes a central server, central controller, or remote host and a changeable EGM, the at least one memory device of the central server, central controller, or remote host stores different game programs and instructions executable by the at least one processor of the changeable EGM to control one or more primary games and/or secondary games displayed by the changeable EGM. More specifically, each such executable game program represents a different game or a different type of game that the at least one changeable EGM is configured to operate. In one example, certain of the game programs are executable by the changeable EGM to operate games having the same or substantially the same game play but different paytables. In different embodiments, each executable game program is associated with a primary game, a secondary game, or both. In certain embodiments, an executable game program is executable by the at least one processor of the at least one changeable EGM as a secondary game to be played simultaneously with a play of a primary game (which may be downloaded to or otherwise stored on the at least one changeable EGM), or vice versa.

[0114] In operation of such embodiments, the central server, central controller, or remote host is configured to communicate one or more of the stored executable game programs to the at least one processor of the changeable EGM. In different embodiments, a stored executable game program is communicated or delivered to the at least one processor of the changeable EGM by: (a) embedding the executable game program in a device or a component (such as a microchip to be inserted into the changeable EGM); (b) writing the executable game program onto a disc or other media; or (c) uploading or streaming the executable game program over a data network (such as a dedicated data network). After the executable game program is communicated from the central server, central controller, or remote host to the changeable EGM, the at least one processor of the changeable EGM executes the executable game program to enable the primary game and/or the secondary game associated with that executable game program to be played using the display device(s) and/or the input device(s) of the changeable EGM. That is, when an executable game program is communicated to the at least one processor of the changeable EGM, the at least one processor of the changeable EGM changes the game or the type of game that may be played using the changeable EGM.

[0115] In certain embodiments, the gaming system randomly determines any game outcome(s) (such as a win outcome) and/or award(s) (such as a quantity of credits to award for the win outcome) for a play of a primary game and/or a play of a secondary game based on probability data. In certain such embodiments, this random determination is provided through utilization of an RNG, such as a true RNG or a pseudo RNG, or any other suitable randomization process. In one such embodiment, each game outcome or award is associated with a probability, and the gaming system generates the game outcome(s) and/or the award(s) to be provided based on the associated probabilities. In these embodiments, since the gaming system generates game outcomes and/or awards randomly or based on one or more probability calculations, there is no certainty that the gaming system will ever provide any specific game outcome and/or award.

[0116] In certain embodiments, the gaming system maintains one or more predetermined pools or sets of predetermined game outcomes and/or awards. In certain such embodiments, upon generation or receipt of a game outcome and/or award request, the gaming system independently selects one of the predetermined game outcomes and/or awards from the one or more pools or sets. The gaming system flags or marks the selected game outcome and/or award as used. Once a game outcome or an award is flagged as used, it is prevented from further selection from its respective pool or set; that is, the gaming system does not select that game outcome or award upon another game outcome and/or award request. The gaming system provides the selected game outcome and/or award. Examples of this type of award evaluation are described in U.S. Pat. No. 7,470,183, entitled "Finite Pool Gaming Method and Apparatus"; U.S. Pat. No. 7,563,163, entitled "Gaming Device Including Outcome Pools for Providing Game Outcomes"; U.S. Pat. No. 7,833,092, entitled "Method and System for Compensating for Player Choice in a Game of Chance"; U.S. Pat. No. 8,070,579, entitled "Bingo System with Downloadable Common Patterns"; and U.S. Pat. No. 8,398,472, entitled "Central Determination Poker Game," which are incorporated herein by reference.

[0117] In certain embodiments, the gaming system determines a predetermined game outcome and/or award based on the results of a bingo, keno, or lottery game. In certain such embodiments, the gaming system utilizes one or more bingo, keno, or lottery games to determine the predetermined game outcome and/or award provided for a primary game and/or a secondary game. The gaming system is provided or associated with a bingo card. Each bingo card consists of a matrix or array of elements, wherein each element is designated with separate indicia. After a bingo card is provided, the gaming system randomly selects or draws a plurality of the elements. As each element is selected, a determination is made as to whether the selected element is present on the bingo card. If the selected element is present on the bingo card, that selected element on the provided bingo card is marked or flagged. This process of selecting elements and marking any selected elements on the provided bingo cards continues until one or more predetermined patterns are marked on one or more of the provided bingo cards. After one or more predetermined patterns are marked on one or more of the provided bingo cards, game outcome and/or award is determined based, at least in part, on the selected elements on the provided bingo cards. Examples of this type of award determination are described in U.S. Pat. No. 7,753,774, entitled "Using Multiple Bingo Cards to Represent Multiple Slot Paylines and Other Class III Game Options"; U.S. Pat. No. 7,731,581, entitled "Multi-Player Bingo Game with Multiple Alternative Outcome Displays"; U.S. Pat. No. 7,955,170, entitled "Providing Non-Bingo Outcomes for a Bingo Game"; U.S. Pat. No.

8,070,579, entitled "Bingo System with Downloadable Common Patterns"; and U.S. Pat. No. 8,500,538, entitled "Bingo Gaming System and Method for Providing Multiple Outcomes from Single Bingo Pattern," which are incorporated herein by reference.

[0118] In certain embodiments in which the gaming system includes a central server, central controller, or remote host and an EGM, the EGM is configured to communicate with the central server, central controller, or remote host for monitoring purposes only. In such embodiments, the EGM determines the game outcome(s) and/or award(s) to be provided in any of the manners described above, and the central server, central controller, or remote host monitors the activities and events occurring on the EGM. In one such embodiment, the gaming system includes a real-time or online accounting and gaming information system configured to communicate with the central server, central controller, or remote host. In this embodiment, the accounting and gaming information system includes: (a) a player database configured to store player profiles, (b) a player tracking module configured to track players (as described below), and (c) a credit system configured to provide automated transactions. Examples of such accounting systems are described in U.S. Pat. No. 6,913,534, entitled "Gaming Machine Having a Lottery Game and Capability for Integration with Gaming Device Accounting System and Player Tracking System," and U.S. Pat. No. 8,597,116, entitled "Virtual Player Tracking and Related Services," which are incorporated herein by reference.

[0119] As noted above, in various embodiments, the gaming system includes one or more executable game programs executable by at least one processor of the gaming system to provide one or more primary games and one or more secondary games. The primary game(s) and the secondary game(s) may comprise any suitable games and/or wagering games, such as, but not limited to electromechanical or video slot or spinning reel type games; video card games such as video draw poker, multi-hand video draw poker, other video poker games, video blackjack games, and video baccarat games; video keno games; video bingo games; and video selection games.

[0120] In certain embodiments in which the primary game is a slot or spinning reel type game, the gaming system includes one or more reels in either an electromechanical form with mechanical rotating reels or in a video form with simulated reels and movement thereof. Each reel displays a plurality of indicia or symbols, such as bells, hearts, fruits, numbers, letters, bars, or other images that typically correspond to a theme associated with the gaming system. In certain such embodiments, the gaming system includes one or more paylines associated with the reels. The example EGM **2000*b*** shown in FIG. **4**B includes a payline **1152** and a plurality of reels **1154**. In certain embodiments, one or more of the reels are independent reels or unisymbol reels. In such embodiments, each independent reel generates and displays one symbol.

[0121] In various embodiments, one or more of the paylines is horizontal, vertical, circular, diagonal, angled, or any suitable combination thereof. In other embodiments, each of one or more of the paylines is associated with a plurality of adjacent symbol display areas on a requisite number of adjacent reels. In one such embodiment, one or more paylines are formed between at least two symbol display areas that are adjacent to each other by either sharing a common side or sharing a common corner (i.e., such paylines are connected paylines). The gaming system enables a wager to be placed on one or more of such paylines to activate such paylines. In other embodiments in which one or more paylines are formed between at least two adjacent symbol display areas, the gaming system enables a wager to be placed on a plurality of symbol display areas, which activates those symbol display areas.

[0122] In various embodiments, the gaming system provides one or more awards after a spin of the reels when specified types and/or configurations of the indicia or symbols on the reels occur on an active payline or otherwise occur in a winning pattern, occur on the requisite number of adjacent reels, and/or occur in a scatter pay arrangement.

[0123] In certain embodiments, the gaming system employs a ways to win award determination. In these embodiments, any outcome to be provided is determined based on a number of associated symbols that are generated in active symbol display areas on the requisite number of adjacent reels (i.e., not on paylines passing through any displayed winning symbol combinations). If a winning symbol combination is generated on the reels, one award for that occurrence of the generated winning symbol combination is provided. Examples of ways to win award determinations are described in U.S. Pat. No. 8,012,011, entitled "Gaming Device and Method Having Independent Reels and Multiple Ways of Winning"; U.S. Pat. No. 8,241,104, entitled "Gaming Device and Method Having Designated Rules for Determining Ways To Win"; and U.S. Pat. No. 8,430,739, entitled "Gaming System and Method Having Wager Dependent Different Symbol Evaluations," which are incorporated herein by reference.

[0124] In various embodiments, the gaming system includes a progressive award. Typically, a progressive award includes an initial amount and an additional amount funded through a portion of each wager placed to initiate a play of a primary game. When one or more triggering events occurs, the gaming system provides at least a portion of the progressive award. After the gaming system provides the progressive award, an amount of the progressive award is reset to the initial amount and a portion of each subsequent wager is allocated to the next progressive award. Examples of progressive gaming systems are described in U.S. Pat. No. 7,585,223, entitled "Server Based Gaming System Having Multiple Progressive Awards"; U.S. Pat. No. 7,651,392, entitled "Gaming Device System Having Partial Progressive Payout"; U.S. Pat. No. 7,666,093, entitled "Gaming Method and Device Involving Progressive Wagers"; U.S. Pat. No. 7,780,523, entitled "Server Based Gaming System Having Multiple Progressive Awards"; and U.S. Pat. No. 8,337,298, entitled "Gaming Device Having Multiple Different Types of Progressive Awards," which are incorporated herein by reference

[0125] As generally noted above, in addition to providing winning credits or other awards for one or more plays of the primary game(s), in various embodiments the gaming system provides credits or other awards for one or more plays of one or more secondary games. The secondary game typically enables an award to be obtained addition to any award obtained through play of the primary game(s). The secondary game(s) typically produces a higher level of player excitement than the primary game(s) because the secondary game(s) provides a greater expectation of winning than the primary game(s) and is accompanied with

more attractive or unusual features than the primary game (s). The secondary game(s) may be any type of suitable game, either similar to or completely different from the primary game.

[0126] In various embodiments, the gaming system automatically provides or initiates the secondary game upon the occurrence of a triggering event or the satisfaction of a qualifying condition. In other embodiments, the gaming system initiates the secondary game upon the occurrence of the triggering event or the satisfaction of the qualifying condition and upon receipt of an initiation input. In certain embodiments, the triggering event or qualifying condition is a selected outcome in the primary game(s) or a particular arrangement of one or more indicia on a display device for a play of the primary game(s), such as a "BONUS" symbol appearing on three adjacent reels along a payline following a spin of the reels for a play of the primary game. In other embodiments, the triggering event or qualifying condition occurs based on a certain amount of game play (such as number of games, number of credits, amount of time) being exceeded, or based on a specified number of points being earned during game play. Any suitable triggering event or qualifying condition or any suitable combination of a plurality of different triggering events or qualifying conditions may be employed.

[0127] In other embodiments, at least one processor of the gaming system randomly determines when to provide one or more plays of one or more secondary games. In one such embodiment, no apparent reason is provided for providing the secondary game. In this embodiment, qualifying for a secondary game is not triggered by the occurrence of an event in any primary game or based specifically on any of the plays of any primary game. That is, qualification is provided without any explanation or, alternatively, with a simple explanation. In another such embodiment, the gaming system determines qualification for a secondary game at least partially based on a game triggered or symbol triggered event, such as at least partially based on play of a primary game.

[0128] In various embodiments, after qualification for a secondary game has been determined, the secondary game participation may be enhanced through continued play on the primary game. Thus, in certain embodiments, for each secondary game qualifying event, such as a secondary game symbol, that is obtained, a given number of secondary game wagering points or credits is accumulated in a "secondary game meter" configured to accrue the secondary game wagering credits or entries toward eventual participation in the secondary game. In one such embodiment, the occurrence of multiple such secondary game qualifying events in the primary game results in an arithmetic or exponential increase in the number of secondary game wagering credits awarded. In another such embodiment, any extra secondary game wagering credits may be redeemed during the secondary game to extend play of the secondary game.

[0129] In certain embodiments, no separate entry fee or buy-in for the secondary game is required. That is, entry into the secondary game cannot be purchased; rather, in these embodiments entry must be won or earned through play of the primary game, thereby encouraging play of the primary game. In other embodiments, qualification for the secondary game is accomplished through a simple "buy-in." For example, qualification through other specified activities is unsuccessful, payment of a fee or placement of an additional wager "buys-in" to the secondary game. In certain embodiments, a separate side wager must be placed on the secondary game or a wager of a designated amount must be placed on the primary game to enable qualification for the secondary game. In these embodiments, the secondary game triggering event must occur and the side wager (or designated primary game wager amount) must have been placed for the secondary game to trigger.

[0130] In various embodiments in which the gaming system includes a plurality of EGMs, the EGMs are configured to communicate with one another to provide a group gaming environment. In certain such embodiments, the EGMs enable players of those EGMs to work in conjunction with one another, such as by enabling the players to play together as a team or group, to win one or more awards. In other such embodiments, the EGMs enable players of those EGMs to compete against one another for one or more awards. In one such embodiment, the EGMs enable the players of those EGMs to participate in one or more gaming tournaments for one or more awards. Examples of group gaming systems are described in U.S. Pat. No. 8,070,583, entitled "Server Based Gaming System and Method for Selectively Providing One or More Different Tournaments"; U.S. Pat. No. 8,500,548, entitled "Gaming System and Method for Providing Team Progressive Awards"; and U.S. Pat. No. 8,562,423, entitled "Method and Apparatus for Rewarding Multiple Game Players for a Single Win," which are incorporated herein by reference.

[0131] In various embodiments, the gaming system includes one or more player tracking systems. Such player tracking systems enable operators of the gaming system (such as casinos or other gaming establishments) to recognize the value of customer loyalty by identifying frequent customers and rewarding them for their patronage. Such a player tracking system is configured to track a player's gaming activity. In one such embodiment, the player tracking system does so through the use of player tracking cards. In this embodiment, a player is issued a player identification card that has an encoded player identification number that uniquely identifies the player. When the player's playing tracking card is inserted into a card reader of the gaming system to begin a gaming session, the card reader reads the player identification number off the player tracking card to identify the player. The gaming system timely tracks any suitable information or data relating to the identified player's gaming session. The gaming system also timely tracks when the player tracking card is removed to conclude play for that gaming session. In another embodiment, rather than requiring insertion of a player tracking card into the card reader, the gaming system utilizes one or more portable devices, such as a mobile phone, a radio frequency identification tag, or any other suitable wireless device, to track when a gaming session begins and ends. In another embodiment, the gaming system utilizes any suitable biometric technology or ticket technology to track when a gaming session begins and ends.

[0132] In such embodiments, during one or more gaming sessions, the gaming system tracks any suitable information or data, such as any amounts wagered, average wager amounts, and/or the time at which these wagers are placed. In different embodiments, for one or more players, the player tracking system includes the player's account number, the player's card number, the player's first name, the player's surname, the player's preferred name, the player's player tracking ranking, any promotion status associated with the

player's player tracking card, the player's address, the player's birthday, the player's anniversary, the player's recent gaming sessions, or any other suitable data. In various embodiments, such tracked information and/or any suitable feature associated with the player tracking system is displayed on a player tracking display. In various embodiments, such tracked information and/or any suitable feature associated with the player tracking system is displayed via one or more service windows that are displayed on the central display device and/or the upper display device. Examples of player tracking systems are described in U.S. Pat. No. 6,722,985, entitled "Universal Player Tracking System"; U.S. Pat. No. 6,908,387, entitled "Player Tracking Communication Mechanisms in a Gaming Machine"; U.S. Pat. No. 7,311,605, entitled "Player Tracking Assembly for Complete Patron Tracking for Both Gaming and Non-Gaming Casino Activity"; U.S. Pat. No. 7,611,411, entitled "Player Tracking Instruments Having Multiple Communication Modes"; U.S. Pat. No. 7,617,151, entitled "Alternative Player Tracking Techniques"; and U.S. Pat. No. 8,057,298, entitled "Virtual Player Tracking and Related Services," which are incorporated herein by reference.

Web-Based Gaming

[0133] In various embodiments, the gaming system includes one or more servers configured to communicate with a personal gaming device—such as a smartphone, a tablet computer, a desktop computer, or a laptop computer—to enable web-based game play using the personal gaming device. In various embodiments, the player must first access a gaming website via an Internet browser of the personal gaming device or execute an application (commonly called an "app") installed on the personal gaming device before the player can use the personal gaming device to participate in web-based game play. In certain embodiments, the one or more servers and the personal gaming device operate in a thin-client environment. In these embodiments, the personal gaming device receives inputs via one or more input devices (such as a touch screen and/or physical buttons), the personal gaming device sends the received inputs to the one or more servers, the one or more servers make various determinations based on the inputs and determine content to be displayed (such as a randomly determined game outcome and corresponding award), the one or more servers send the content to the personal gaming device, and the personal gaming device displays the content.

[0134] In certain such embodiments, the one or more servers must identify the player before enabling game play on the personal gaming device (or, in some embodiments, before enabling monetary wager-based game play on the personal gaming device). In these embodiments, the player must identify herself to the one or more servers, such as by inputting the player's unique username and password combination, providing an input to a biometric sensor (e.g., a fingerprint sensor, a retinal sensor, a voice sensor, or a facial-recognition sensor), or providing any other suitable information.

[0135] Once identified, the one or more servers enable the player to establish an account balance from which the player can draw credits usable to wager on plays of a game. In certain embodiments, the one or more servers enable the player to initiate an electronic funds transfer to transfer funds from a bank account to the player's account balance. In other embodiments, the one or more servers enable the player to make a payment using the player's credit card, debit card, or other suitable device to add money to the player's account balance. In other embodiments, the one or more servers enable the player to add money to the player's account balance via a peer-to-peer type application, such as PayPal or Venmo. The one or more servers also enable the player to cash out the player's account balance (or part of it) in any suitable manner, such as via an electronic funds transfer, by initiating creation of a paper check that is mailed to the player, or by initiating printing of a voucher at a kiosk in a gaming establishment.

[0136] In certain embodiments, the one or more servers include a payment server that handles establishing and cashing out players' account balances and a separate game server configured to determine the outcome and any associated award for a play of a game. In these embodiments, the game server is configured to communicate with the personal gaming device and the payment device, and the personal gaming device and the payment device are not configured to directly communicate with one another. In these embodiments, when the game server receives data representing a request to start a play of a game at a desired wager, the game server sends data representing the desired wager to the payment server. The payment server determines whether the player's account balance can cover the desired wager (i.e., includes a monetary balance at least equal to the desired wager).

[0137] If the payment server determines that the player's account balance cannot cover the desired wager, the payment server notifies the game server, which then instructs the personal gaming device to display a suitable notification to the player that the player's account balance is too low to place the desired wager. If the payment server determines that the player's account balance can cover the desired wager, the payment server deducts the desired wager from the account balance and notifies the game server. The game server then determines an outcome and any associated award for the play of the game. The game server notifies the payment server of any nonzero award, and the payment server increases the player's account balance by the nonzero award. The game server sends data representing the outcome and any award to the personal gaming device, which displays the outcome and any award.

[0138] In certain embodiments, the one or more servers enable web-based game play using a personal gaming device only if the personal gaming device satisfies one or more jurisdictional requirements. In one embodiment, the one or more servers enable web-based game play using the personal gaming device only if the personal gaming device is located within a designated geographic area (such as within certain state or county lines or within the boundaries of a gaming establishment). In this embodiment, the geolocation module of the personal gaming device determines the location of the personal gaming device and sends the location to the one or more servers, which determine whether the personal gaming device is located within the designated geographic area. In various embodiments, the one or more servers enable non-monetary wager-based game play if the personal gaming device is located outside of the designated geographic area.

[0139] In various embodiments, the gaming system includes an EGM configured to communicate with a personal gaming device-such as a smartphone, a tablet computer, a desktop computer, or a laptop computer—to enable

tethered mobile game play using the personal gaming device. Generally, in these embodiments, the EGM establishes communication with the personal gaming device and enables the player to play games on the EGM remotely via the personal gaming device. In certain embodiments, the gaming system includes a geo-fence system that enables tethered game play within a particular geographic area but not outside of that geographic area. Examples of tethering an EGM to a personal gaming device and geo-fencing are described in U.S. Patent Appl. Pub. No. 2013/0267324, entitled "Remote Gaming Method Allowing Temporary Inactivation Without Terminating Playing Session Due to Game Inactivity," which is incorporated herein by reference.

Social Network Integration

[0140] In certain embodiments, the gaming system is configured to communicate with a social network server that hosts or partially hosts a social networking website via a data network (such as the Internet) to integrate a player's gaming experience with the player's social networking account. This enables the gaming system to send certain information to the social network server that the social network server can use to create content (such as text, an image, and/or a video) and post it to the player's wall, newsfeed, or similar area of the social networking website accessible by the player's connections (and in certain cases the public) such that the player's connections can view that information. This also enables the gaming system to receive certain information from the social network server, such as the player's likes or dislikes or the player's list of connections. In certain embodiments, the gaming system enables the player to link the player's player account to the player's social networking account(s). This enables the gaming system to, once it identifies the player and initiates a gaming session (such as via the player logging in to a website (or an application) on the player's personal gaming device or via the player inserting the player's player tracking card into an EGM), link that gaming session to the player's social networking account(s). In other embodiments, the gaming system enables the player to link the player's social networking account(s) to individual gaming sessions when desired by providing the required login information.

[0141] For instance, in one embodiment, if a player wins a particular award (e.g., a progressive award or a jackpot award) or an award that exceeds a certain threshold (e.g., an award exceeding $1,000), the gaming system sends information about the award to the social network server to enable the server to create associated content (such as a screenshot of the outcome and associated award) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see (and to entice them to play). In another embodiment, if a player joins a multiplayer game and there is another seat available, the gaming system sends that information to the social network sever to enable the server to create associated content (such as text indicating a vacancy for that particular game) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see (and to entice them to fill the vacancy). In another embodiment, if the player consents, the gaming system sends advertisement information or offer information to the social network server to enable the social network server to create associated content (such as text or an image reflecting an advertisement and/or an offer) and to post that content to the player's wall (or other suitable area) of the social networking website for the player's connections to see. In another embodiment, the gaming system enables the player to recommend a game to the player's connections by posting a recommendation to the player's wall (or other suitable area) of the social networking website.

Differentiating Certain Gaming Systems from General Purpose Computing Devices

[0142] Certain of the gaming systems described herein, such as EGMs located in a casino or another gaming establishment, include certain components and/or are configured to operate in certain manners that differentiate these systems from general purpose computing devices, i.e., certain personal gaming devices such as desktop computers and laptop computers.

[0143] For instance, EGMs are highly regulated to ensure fairness and, in many cases, EGMs are configured to award monetary awards up to multiple millions of dollars. To satisfy security and regulatory requirements in a gaming environment, hardware and/or software architectures are implemented in EGMs that differ significantly from those of general purpose computing devices. For purposes of illustration, a description of EGMs relative to general purpose computing devices and some examples of these additional (or different) hardware and/or software architectures found in EGMs are described below.

[0144] At first glance, one might think that adapting general purpose computing device technologies to the gaming industry and EGMs would be a simple proposition because both general purpose computing devices and EGMs employ processors that control a variety of devices. However, due to at least: (1) the regulatory requirements placed on EGMs, (2) the harsh environment in which EGMs operate, (3) security requirements, and (4) fault tolerance requirements, adapting general purpose computing device technologies to EGMs can be quite difficult. Further, techniques and methods for solving a problem in the general purpose computing device industry, such as device compatibility and connectivity issues, might not be adequate in the gaming industry. For instance, a fault or a weakness tolerated in a general purpose computing device, such as security holes in software or frequent crashes, is not tolerated in an EGM because in an EGM these faults can lead to a direct loss of funds from the EGM, such as stolen cash or loss of revenue when the EGM is not operating properly or when the random outcome determination is manipulated.

[0145] Certain differences between general purpose computing devices and EGMs are described below. A first difference between EGMs and general purpose computing devices is that EGMs are state-based systems. A state-based system stores and maintains its current state in a non-volatile memory such that, in the event of a power failure or other malfunction, the state-based system can return to that state when the power is restored or the malfunction is remedied. For instance, for a state-based EGM, if the EGM displays an award for a game of chance but the power to the EGM fails before the EGM provides the award to the player, the EGM stores the pre-power failure state in a non-volatile memory, returns to that state upon restoration of power, and provides the award to the player. This requirement affects the software and hardware design on EGMs. General purpose computing devices are not state-based machines, and a majority of data is usually lost when a malfunction occurs on a general purpose computing device.

[0146] A second difference between EGMs and general purpose computing devices is that, for regulatory purposes, the software on the EGM utilized to operate the EGM has been designed to be static and monolithic to prevent cheating by the operator of the EGM. For instance, one solution that has been employed in the gaming industry to prevent cheating and to satisfy regulatory requirements has been to manufacture an EGM that can use a proprietary processor running instructions to provide the game of chance from an EPROM or other form of non-volatile memory. The coding instructions on the EPROM are static (non-changeable) and must be approved by a gaming regulators in a particular jurisdiction and installed in the presence of a person representing the gaming jurisdiction. Any changes to any part of the software required to generate the game of chance, such as adding a new device driver used to operate a device during generation of the game of chance, can require burning a new EPROM approved by the gaming jurisdiction and reinstalling the new EPROM on the EGM in the presence of a gaming regulator. Regardless of whether the EPROM solution is used, to gain approval in most gaming jurisdictions, an EGM must demonstrate sufficient safeguards that prevent an operator or a player of an EGM from manipulating the EGM's hardware and software in a manner that gives him an unfair, and in some cases illegal, advantage.

[0147] A third difference between EGMs and general purpose computing devices is authentication—EGMs storing code are configured to authenticate the code to determine if the code is unaltered before executing the code. If the code has been altered, the EGM prevents the code from being executed. The code authentication requirements in the gaming industry affect both hardware and software designs on EGMs. Certain EGMs use hash functions to authenticate code. For instance, one EGM stores game program code, a hash function, and an authentication hash (which may be encrypted). Before executing the game program code, the EGM hashes the game program code using the hash function to obtain a result hash and compares the result hash to the authentication hash. If the result hash matches the authentication hash, the EGM determines that the game program code is valid and executes the game program code. If the result hash does not match the authentication hash, the EGM determines that the game program code has been altered (i.e., may have been tampered with) and prevents execution of the game program code. Examples of EGM code authentication are described in U.S. Pat. No. 6,962,530, entitled "Authentication in a Secure Computerized Gaming System"; U.S. Pat. No. 7,043,641, entitled "Encryption in a Secure Computerized Gaming System"; U.S. Pat. No. 7,201,662, entitled "Method and Apparatus for Software Authentication"; and U.S. Pat. No. 8,627,097, entitled "System and Method Enabling Parallel Processing of Hash Functions Using Authentication Checkpoint Hashes," which are incorporated herein by reference.

[0148] A fourth difference between EGMs and general purpose computing devices is that EGMs have unique peripheral device requirements that differ from those of a general purpose computing device, such as peripheral device security requirements not usually addressed by general purpose computing devices. For instance, monetary devices, such as coin dispensers, bill validators, and ticket printers and computing devices that are used to govern the input and output of cash or other items having monetary value (such as tickets) to and from an EGM have security requirements that are not typically addressed in general purpose computing devices. Therefore, many general purpose computing device techniques and methods developed to facilitate device connectivity and device compatibility do not address the emphasis placed on security in the gaming industry.

[0149] To address some of the issues described above, a number of hardware/software components and architectures are utilized in EGMs that are not typically found in general purpose computing devices. These hardware/software components and architectures, as described below in more detail, include but are not limited to watchdog timers, voltage monitoring systems, state-based software architecture and supporting hardware, specialized communication interfaces, security monitoring, and trusted memory.

[0150] Certain EGMs use a watchdog timer to provide a software failure detection mechanism. In a normally-operating EGM, the operating software periodically accesses control registers in the watchdog timer subsystem to "re-trigger" the watchdog. Should the operating software fail to access the control registers within a preset timeframe, the watchdog timer will timeout and generate a system reset. Typical watchdog timer circuits include a loadable timeout counter register to enable the operating software to set the timeout interval within a certain range of time. A differentiating feature of some circuits is that the operating software cannot completely disable the function of the watchdog timer. In other words, the watchdog timer always functions from the time power is applied to the board.

[0151] Certain EGMs use several power supply voltages to operate portions of the computer circuitry. These can be generated in a central power supply or locally on the computer board. If any of these voltages falls out of the tolerance limits of the circuitry they power, unpredictable operation of the EGM may result. Though most modern general purpose computing devices include voltage monitoring circuitry, these types of circuits only report voltage status to the operating software. Out of tolerance voltages can cause software malfunction, creating a potential uncontrolled condition in the general purpose computing device. Certain EGMs have power supplies with relatively tighter voltage margins than that required by the operating circuitry. In addition, the voltage monitoring circuitry implemented in certain EGMs typically has two thresholds of control. The first threshold generates a software event that can be detected by the operating software and an error condition then generated. This threshold is triggered when a power supply voltage falls out of the tolerance range of the power supply, but is still within the operating range of the circuitry. The second threshold is set when a power supply voltage falls out of the operating tolerance of the circuitry. In this case, the circuitry generates a reset, halting operation of the EGM.

[0152] As described above, certain EGMs are state-based machines. Different functions of the game provided by the EGM (e.g., bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When the EGM moves a game from one state to another, the EGM stores critical data regarding the game software in a custom non-volatile memory subsystem. This ensures that the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the EGM. In general, the EGM does not advance from a first state to a second state until critical information that enables the first state to be reconstructed has been stored. This feature enables the EGM to

recover operation to the current state of play in the event of a malfunction, loss of power, etc. that occurred just before the malfunction. In at least one embodiment, the EGM is configured to store such critical information using atomic transactions.

[0153] Generally, an atomic operation in computer science refers to a set of operations that can be combined so that they appear to the rest of the system to be a single operation with only two possible outcomes: success or failure. As related to data storage, an atomic transaction may be characterized as series of database operations which either all occur, or all do not occur. A guarantee of atomicity prevents updates to the database occurring only partially, which can result in data corruption.

[0154] To ensure the success of atomic transactions relating to critical information to be stored in the EGM memory before a failure event (e.g., malfunction, loss of power, etc.), memory that includes one or more of the following criteria be used: direct memory access capability; data read/write capability which meets or exceeds minimum read/write access characteristics (such as at least 5.08 Mbytes/sec (Read) and/or at least 38.0 Mbytes/sec (Write)). Memory devices that meet or exceed the above criteria may be referred to as "fault-tolerant" memory devices.

[0155] Typically, battery-backed RAM devices may be configured to function as fault-tolerant devices according to the above criteria, whereas flash RAM and/or disk drive memory are typically not configurable to function as fault-tolerant devices according to the above criteria. Accordingly, battery-backed RAM devices are typically used to preserve EGM critical data, although other types of non-volatile memory devices may be employed. These memory devices are typically not used in typical general purpose computing devices.

[0156] Thus, in at least one embodiment, the EGM is configured to store critical information in fault-tolerant memory (e.g., battery-backed RAM devices) using atomic transactions. Further, in at least one embodiment, the fault-tolerant memory is able to successfully complete all desired atomic transactions (e.g., relating to the storage of EGM critical information) within a time period of 200 milliseconds or less. In at least one embodiment, the time period of 200 milliseconds represents a maximum amount of time for which sufficient power may be available to the various EGM components after a power outage event has occurred at the EGM.

[0157] As described previously, the EGM may not advance from a first state to a second state until critical information that enables the first state to be reconstructed has been atomically stored. After the state of the EGM is restored during the play of a game of chance, game play may resume and the game may be completed in a manner that is no different than if the malfunction had not occurred. Thus, for example, when a malfunction occurs during a game of chance, the EGM may be restored to a state in the game of chance just before when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the EGM in the state before the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the EGM may be restored with the cards that were previously displayed as part of the card game. As another example, a bonus game may be triggered during the play of a game of chance in which a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player has made one or more selections, the EGM may be restored to a state that shows the graphical presentation just before the malfunction including an indication of selections that have already been made by the player. In general, the EGM may be restored to any state in a plurality of states that occur in the game of chance that occurs while the game of chance is played or to states that occur between the play of a game of chance.

[0158] Game history information regarding previous games played such as an amount wagered, the outcome of the game, and the like may also be stored in a non-volatile memory device. The information stored in the non-volatile memory may be detailed enough to reconstruct a portion of the graphical presentation that was previously presented on the EGM and the state of the EGM (e.g., credits) at the time the game of chance was played. The game history information may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit for an award that they believed they won. The game history information may be used to reconstruct the state of the EGM before, during, and/or after the disputed game to demonstrate whether the player was correct or not in the player's assertion. Examples of a state-based EGM, recovery from malfunctions, and game history are described in U.S. Pat. No. 6,804,763, entitled "High Performance Battery Backed RAM Interface"; U.S. Pat. No. 6,863,608, entitled "Frame Capture of Actual Game Play"; U.S. Pat. No. 7,111,141, entitled "Dynamic NV-RAM"; and U.S. Pat. No. 7,384,339, entitled, "Frame Capture of Actual Game Play," which are incorporated herein by reference.

[0159] Another feature of EGMs is that they often include unique interfaces, including serial interfaces, to connect to specific subsystems internal and external to the EGM. The serial devices may have electrical interface requirements that differ from the "standard" EIA serial interfaces provided by general purpose computing devices. These interfaces may include, for example, Fiber Optic Serial, optically coupled serial interfaces, current loop style serial interfaces, etc. In addition, to conserve serial interfaces internally in the EGM, serial devices may be connected in a shared, daisy-chain fashion in which multiple peripheral devices are connected to a single serial channel.

[0160] The serial interfaces may be used to transmit information using communication protocols that are unique to the gaming industry. For example, IGT's Netplex is a proprietary communication protocol used for serial communication between EGMs. As another example, SAS is a communication protocol used to transmit information, such as metering information, from an EGM to a remote device. Often SAS is used in conjunction with a player tracking system.

[0161] Certain EGMs may alternatively be treated as peripheral devices to a casino communication controller and connected in a shared daisy chain fashion to a single serial interface. In both cases, the peripheral devices are assigned device addresses. If so, the serial controller circuitry must implement a method to generate or detect unique device addresses. General purpose computing device serial ports are not able to do this.

[0162] Security monitoring circuits detect intrusion into an EGM by monitoring security switches attached to access

doors in the EGM cabinet. Access violations result in suspension of game play and can trigger additional security operations to preserve the current state of game play. These circuits also function when power is off by use of a battery backup. In power-off operation, these circuits continue to monitor the access doors of the EGM. When power is restored, the EGM can determine whether any security violations occurred while power was off, e.g., via software for reading status registers. This can trigger event log entries and further data authentication operations by the EGM software.

[0163] Trusted memory devices and/or trusted memory sources are included in an EGM to ensure the authenticity of the software that may be stored on less secure memory subsystems, such as mass storage devices. Trusted memory devices and controlling circuitry are typically designed to not enable modification of the code and data stored in the memory device while the memory device is installed in the EGM. The code and data stored in these devices may include authentication algorithms, random number generators, authentication keys, operating system kernels, etc. The purpose of these trusted memory devices is to provide gaming regulatory authorities a root trusted authority within the computing environment of the EGM that can be tracked and verified as original. This may be accomplished via removal of the trusted memory device from the EGM computer and verification of the secure memory device contents is a separate third party verification device. Once the trusted memory device is verified as authentic and based on the approval of the verification algorithms included in the trusted device, the EGM is enabled to verify the authenticity of additional code and data that may be located in the gaming computer assembly, such as code and data stored on hard disk drives. Examples of trusted memory devices are described in U.S. Pat. No. 6,685,567, entitled "Process Verification," which is incorporated herein by reference.

[0164] In at least one embodiment, at least a portion of the trusted memory devices/sources may correspond to memory that cannot easily be altered (e.g., "unalterable memory") such as EPROMS, PROMS, Bios, Extended Bios, and/or other memory sources that are able to be configured, verified, and/or authenticated (e.g., for authenticity) in a secure and controlled manner.

[0165] According to one embodiment, when a trusted information source is in communication with a remote device via a network, the remote device may employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source and the remote device may exchange information using public and private encryption keys to verify each other's identities. In another embodiment, the remote device and the trusted information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities.

[0166] EGMs storing trusted information may utilize apparatuses or methods to detect and prevent tampering. For instance, trusted information stored in a trusted memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing trusted information might be designed to detect tampering attempts and clear or erase itself when an attempt at tampering has been detected. Examples of trusted memory devices/sources are described in U.S. Pat. No. 7,515,718, entitled "Secured Virtual Network in a Gaming Environment," which is incorporated herein by reference.

[0167] Mass storage devices used in a general purpose computing devices typically enable code and data to be read from and written to the mass storage device. In a gaming environment, modification of the gaming code stored on a mass storage device is strictly controlled and would only be enabled under specific maintenance type events with electronic and physical enablers required. Though this level of security could be provided by software, EGMs that include mass storage devices include hardware level mass storage data protection circuitry that operates at the circuit level to monitor attempts to modify data on the mass storage device and will generate both software and hardware error triggers should a data modification be attempted without the proper electronic and physical enablers being present. Examples of using a mass storage device are described in U.S. Pat. No. 6,149,522, entitled "Method of Authenticating Game Data Sets in an Electronic Casino Gaming System," which is incorporated herein by reference.

[0168] Various changes and modifications to the present embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present subject matter and without diminishing its intended advantages. It is therefore intended that such changes and modifications be covered by the appended claims.

The claims are as follows:

1. A method of operating a gaming system comprising a housing, a display device comprising mechanical rotatable reels supported by the housing, wherein one of the reels can be a held reel and a plurality of the reels can be non-held reels, the method comprising, for a play of a game:

causing a display, by the display device, of the held reel with displayed indications of different first and second overlapping features of the held reel, wherein the displayed indications are displayed on the held reel at symbol display positions associated with the held reel;

causing a display, by the display device, of the plurality of non-held reels each displayed with a plurality of symbols on that non-held reel at symbol display positions associated with that non-held reel;

causing a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the first overlapping feature of the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the second overlapping feature of the held reel;

causing a display, by the display device, an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the second overlapping feature of the held reel and all of the displayed symbols on the non-held reels, wherein the second evaluation ignores the first overlapping feature of the held reel;

causing a display, by the display device, of any awards resulting from the first evaluation; and

causing a display, by the display device, of an accumulation sequence resulting from the second evaluation.

2. The method of operating the gaming system of claim 1, wherein the first overlapping feature comprises the held reel being a wild reel.

3. The method of operating the gaming system of claim 2, wherein the second overlapping feature comprises an accumulation sequence symbol on the held reel.

4. The method of operating the gaming system of claim 1, wherein the second overlapping feature comprises an accumulation sequence symbol on the held reel.

5. The method of operating the gaming system of claim 1, wherein the second overlapping feature comprises a plurality of accumulation sequence symbols on the held reel.

6. The method of operating the gaming system of claim 1, wherein the accumulation sequence comprises the held reel and the accumulation sequence symbols on the held reel.

7. The method of operating the gaming system of claim 6, wherein the accumulation sequence comprises the accumulation sequence symbols on a plurality of the non-held reels.

8. The method of operating the gaming system of claim 7, wherein the accumulation sequence comprises a display, by the display device, of an additional accumulation sequence symbol on the held reel.

9. The method of operating the gaming system of claim 6, wherein the accumulation sequence comprises a display, by the display device, of an additional accumulation sequence symbol on the held reel.

10. A method of operating a gaming system comprising a housing, a display device comprising mechanical rotatable reels supported by the housing, wherein one of the reels can be a held reel and a plurality of the reels can be non-held reels, the method comprising, for each of a plurality of plays of a game:

causing a display, by display device, of the held reel comprising at least one wild symbol displayed on the held reel at all of the symbol display positions associated with the held reel, and an accumulation sequence symbol on the held reel displayed on the held reel at one of the symbol display positions associated with the held reel;

causing a display, by the display device, of the plurality of non-held reels, wherein each non-held reel displays a plurality of symbols on the non-held reel at all of the symbol display positions associated with the non-held reel, wherein one or more of the displayed symbols can be accumulation sequence symbols;

causing a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the displayed at least one wild symbol on the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the displayed accumulation sequence symbol on the held reel;

causing a display, by the display device, an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the displayed accumulation sequence symbol on the held reel and the displayed symbols on the non-held reels, wherein the second evaluation ignores the displayed at least one wild symbol on the held reel;

causing a display, by the display device, of any awards resulting from the first evaluation; and

causing a display, by the display device, of any accumulation sequence resulting from the second evaluation.

11. The method of operating the gaming system of claim 10, which, for the plays of the game, comprises causing a display, by the display device, of the held reel comprising a quantity of the accumulation sequence symbols on the held reel displayed on the held reel at a same quantity of symbol display positions associated with the held reel, wherein the quantity is more than one.

12. The method of operating the gaming system of claim 11, wherein the quantity is less than a quantity of accumulation sequence symbols needed to trigger the accumulation sequence.

13. The method of operating the gaming system of claim 10, wherein the plurality of plays of the game are part of a secondary free spin game.

14. The method of operating the gaming system of claim 10, which comprises, for each of the plurality of plays of the game, causing the held reel to not spin and causing each of the non-held reels to spin and stop.

15. The method of operating the gaming system of claim 10, wherein the accumulation sequence comprises the held reel and the accumulation sequence symbols on the held reel.

16. A method of operating a gaming system comprising a housing, a display device comprising mechanical rotatable reels supported by the housing, wherein one of the reels can be a held reel and a plurality of the reels can be non-held reels, the method comprising, for each of a plurality of plays of a game:

causing a display, by the display device, of the held reel comprising wild symbols displayed on the held reel at all of the symbol display positions associated with the held reel, and a plurality of accumulation sequence symbols on the held reel displayed on the held reel a plurality of the symbol display positions associated with the held reel in an overlapping manner with the wild symbols;

causing a display, by the display device, of the plurality of non-held reels, wherein each of the non-held reels displays a plurality of symbols on that non-held reel at all of the symbol display positions associated with that non-held reel, wherein one or more of the displayed symbols can be accumulation sequence symbols;

causing a display, by the display device, of an indication of a first evaluation of the held reel and the plurality of non-held reels, wherein the first evaluation is of the displayed wild symbols on the held reel and all of the displayed symbols on the non-held reels, and wherein the first evaluation ignores the displayed accumulation sequence symbols on the held reel;

causing a display, by the display device, of an indication of a second evaluation of the held reel and the plurality of non-held reels, wherein the second evaluation is of the displayed accumulation sequence symbols on the held reel and the displayed symbols on the non-held reels, wherein the second evaluation ignores the displayed wild symbols on the held reel;

causing a display, by the display device, of any awards resulting from the first evaluation; and

causing a display, by the display device, of any accumulation sequence resulting from the second evaluation, wherein the accumulation sequence comprises the accumulation sequence symbols on the held reel and the non-held reels.

17. The method of operating the gaming system of claim **16**, which comprises causing a display, by the display device, of the held reel comprising a quantity of the accumulation sequence symbols on the held reel displayed on the held reel at a same quantity of symbol display positions associated with the held reel, wherein the quantity is more than one.

18. The method of operating the gaming system of claim **17**, wherein a quantity of the accumulation sequence symbols needed to trigger the accumulation sequence is greater than the quantity of accumulation symbols on the held reel.

19. The method of operating the gaming system of claim **16**, wherein the plurality of plays of the game are part of a secondary free spin game.

20. The method of operating the gaming system of claim **16**, which comprises for each of the plurality of plays of the game, cause the held reel to not spin and causes each of the non-held reels to spin and stop.

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