US 20040166932A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2004/0166932 A1

Lam et al. (43) Pub. Date: Aug. 26, 2004

(54) METHOD AND APPARATUS FOR CONTROLLING A DISPLAY ON A LIGHT DEVICE IN A GAMING UNIT

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(21) Appl. No.: **10/369,921**

(22) Filed: **Feb. 20, 2003**

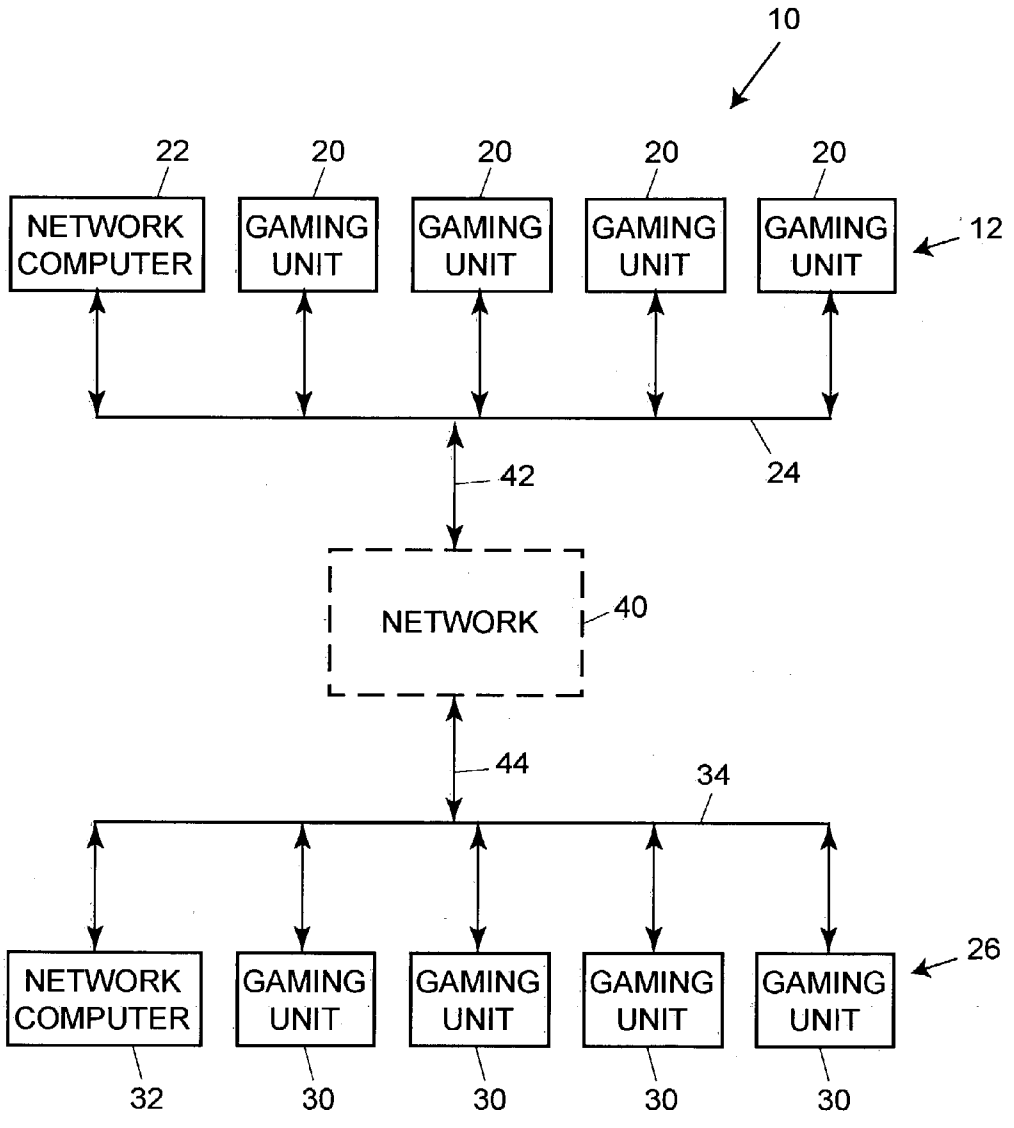
Publication Classification

(51) **Int. Cl.**[7] **A63F 9/24**

(52) **U.S. Cl.** **463/30**

(57) **ABSTRACT**

A gaming machine having a light device coupled to the gaming machine by a peripheral bus connection. The gaming machine capable of reading a pattern file, containing a light pattern display. The gaming machine further capable of sending the light display pattern to a light device controller via the peripheral bus connection. The light device controller capable of parsing the light display pattern, interpreting the pattern to be capable of generation on the light device, and causing the pattern to be generated on the light device.



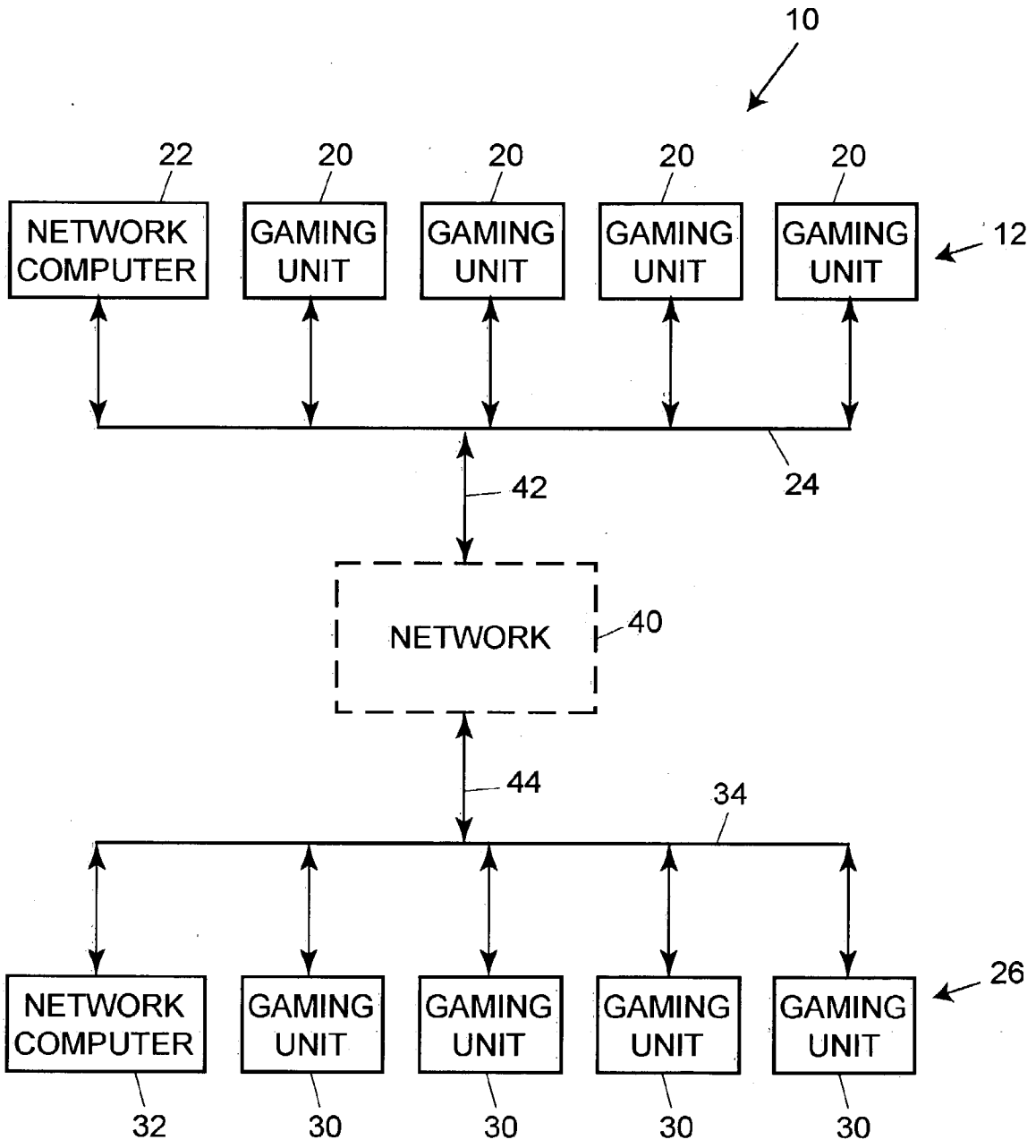

10
22
20
20
20
20
NETWORK COMPUTER
GAMING UNIT
GAMING UNIT
GAMING UNIT
GAMING UNIT
12
24
42
NETWORK
40
44
34
NETWORK COMPUTER
GAMING UNIT
GAMING UNIT
GAMING UNIT
GAMING UNIT
26
32
30
30
30
30

FIG. 1

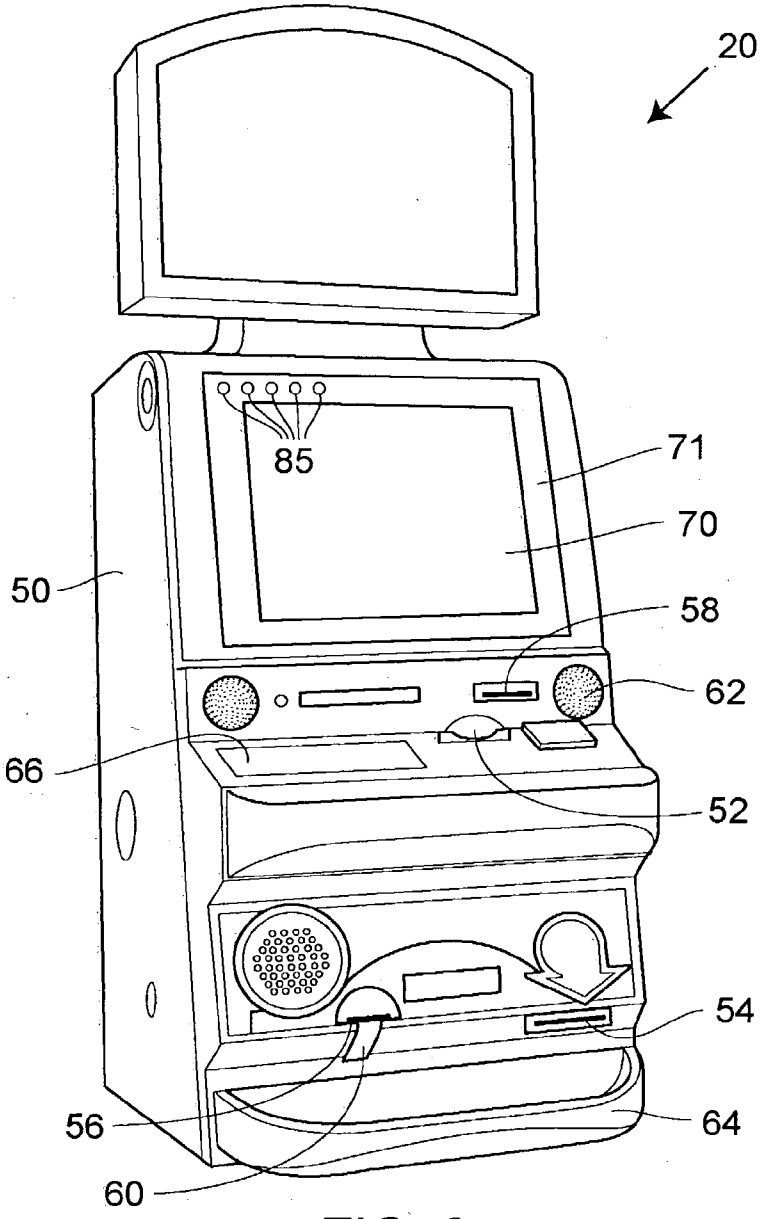

20
85
71
70
50
58
62
66
52
54
56
64
60

FIG. 2

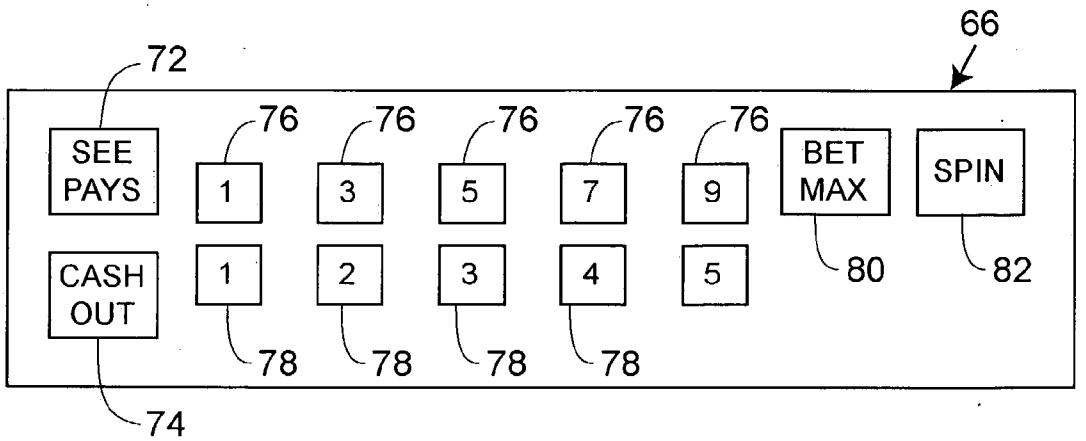

66
72
SEE PAYS
76
1
76
3
76
5
76
7
76
9
BET MAX
SPIN
CASH OUT
1
2
3
4
5
80
82
78
78
78
78
74

FIG. 2A

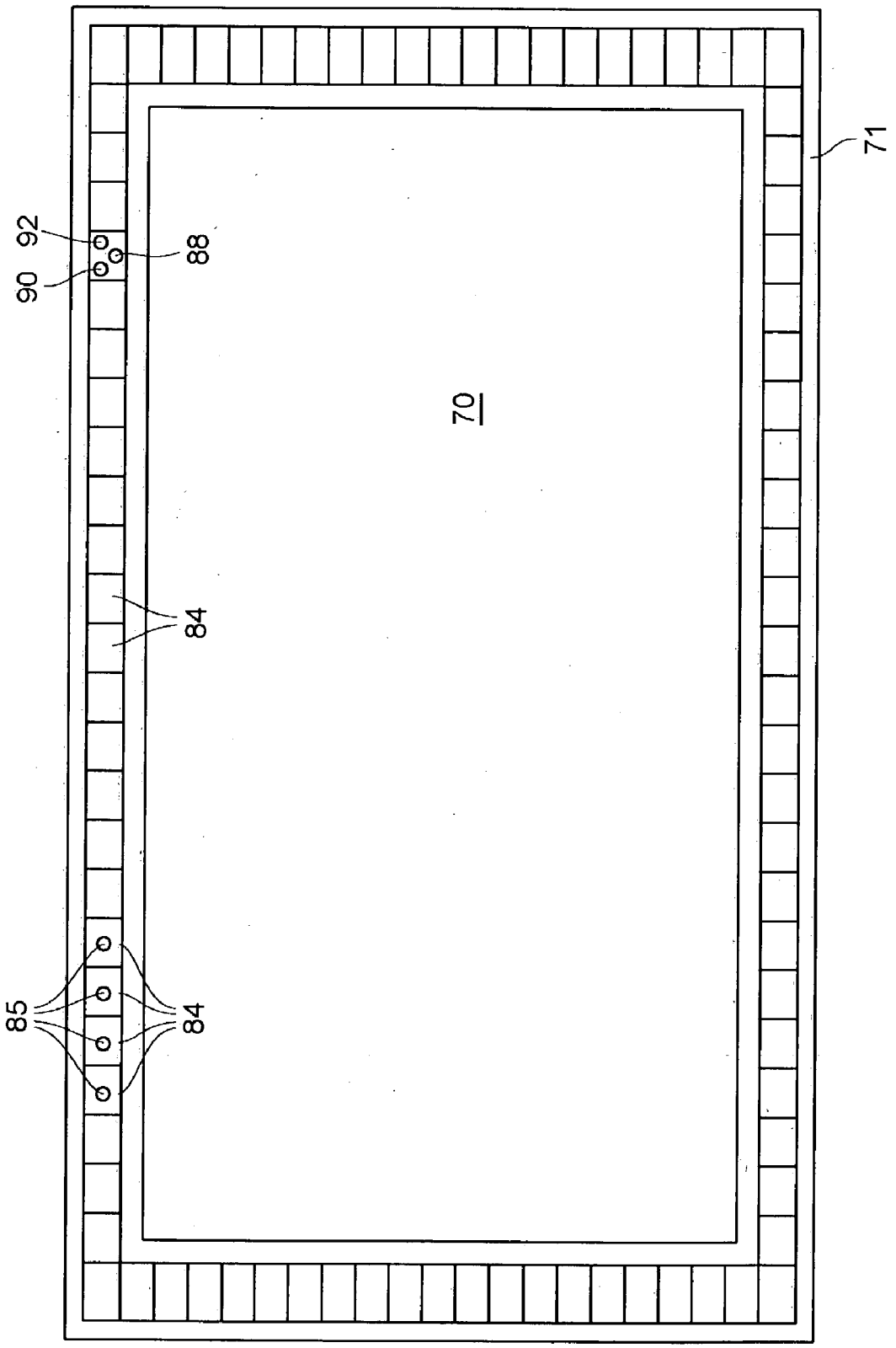


FIG. 2B

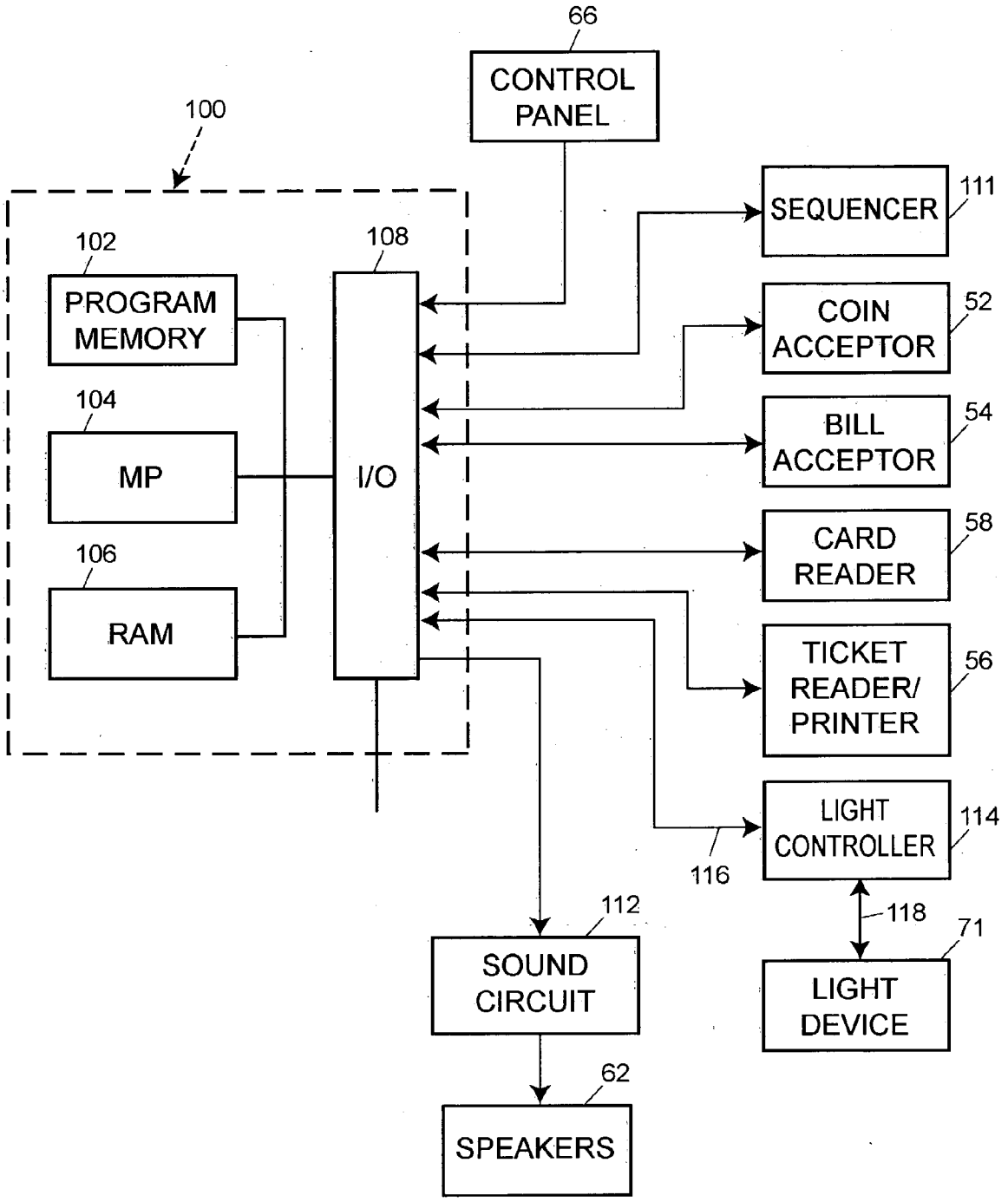

66
CONTROL PANEL
100
102
PROGRAM MEMORY
104
MP
106
RAM
108
I/O
SEQUENCER
111
COIN ACCEPTOR
52
BILL ACCEPTOR
54
CARD READER
58
TICKET READER/ PRINTER
56
LIGHT CONTROLLER
114
116
118
LIGHT DEVICE
71
112
SOUND CIRCUIT
62
SPEAKERS

FIG. 3

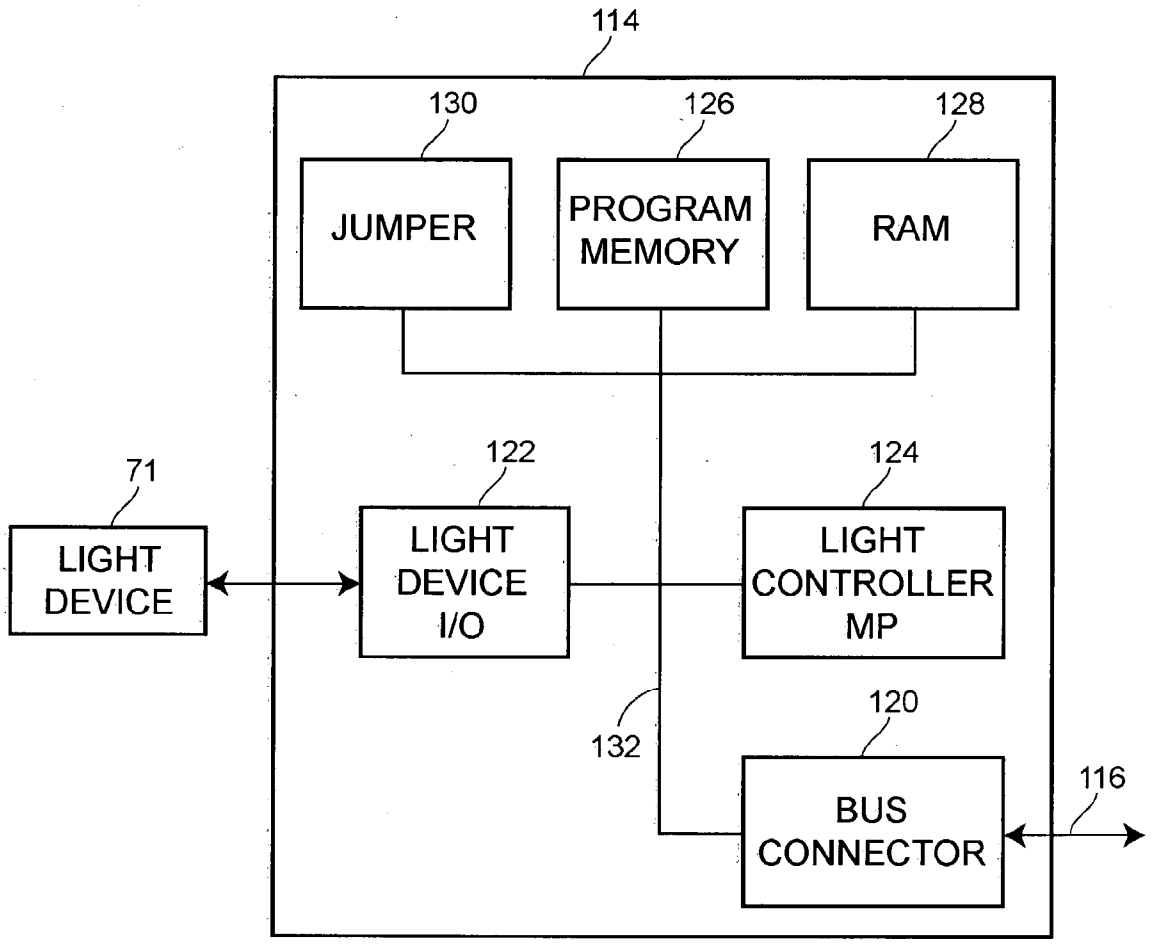

114
130
126
128
JUMPER
PROGRAM MEMORY
RAM
71
122
124
LIGHT DEVICE
LIGHT DEVICE I/O
LIGHT CONTROLLER MP
132
120
116
BUS CONNECTOR

FIG. 3A

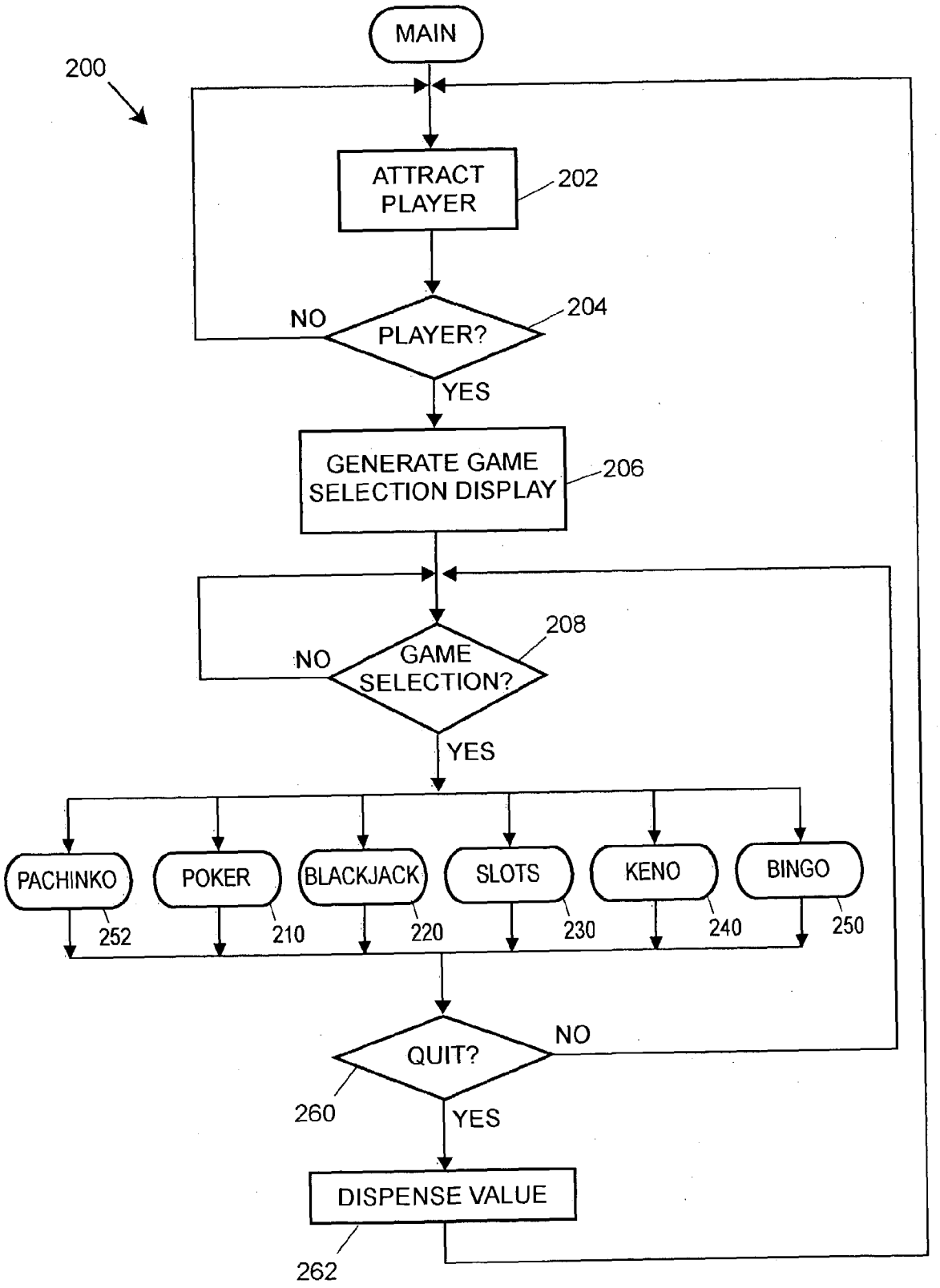

MAIN
200
ATTRACT PLAYER
202
NO
PLAYER?
204
YES
GENERATE GAME SELECTION DISPLAY
206
208
NO
GAME SELECTION?
YES
PACHINKO
POKER
BLACKJACK
SLOTS
KENO
BINGO
252
210
220
230
240
250
QUIT?
NO
260
YES
DISPENSE VALUE
262

FIG. 4

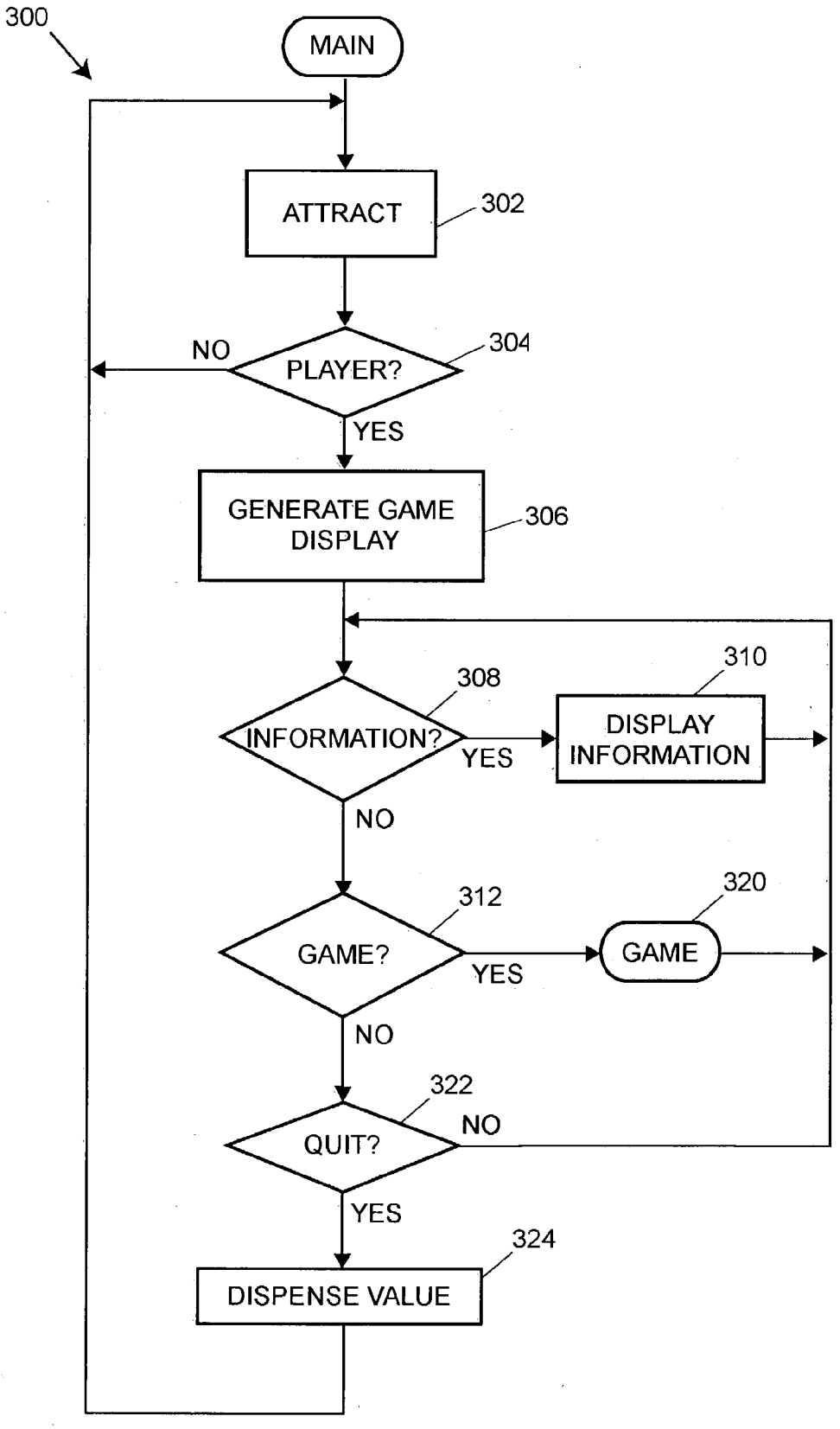

300
MAIN
ATTRACT
302
NO
PLAYER?
304
YES
GENERATE GAME DISPLAY
306
308
INFORMATION?
YES
310
DISPLAY INFORMATION
NO
312
GAME?
YES
320
GAME
NO
322
QUIT?
NO
YES
324
DISPENSE VALUE

FIG. 5

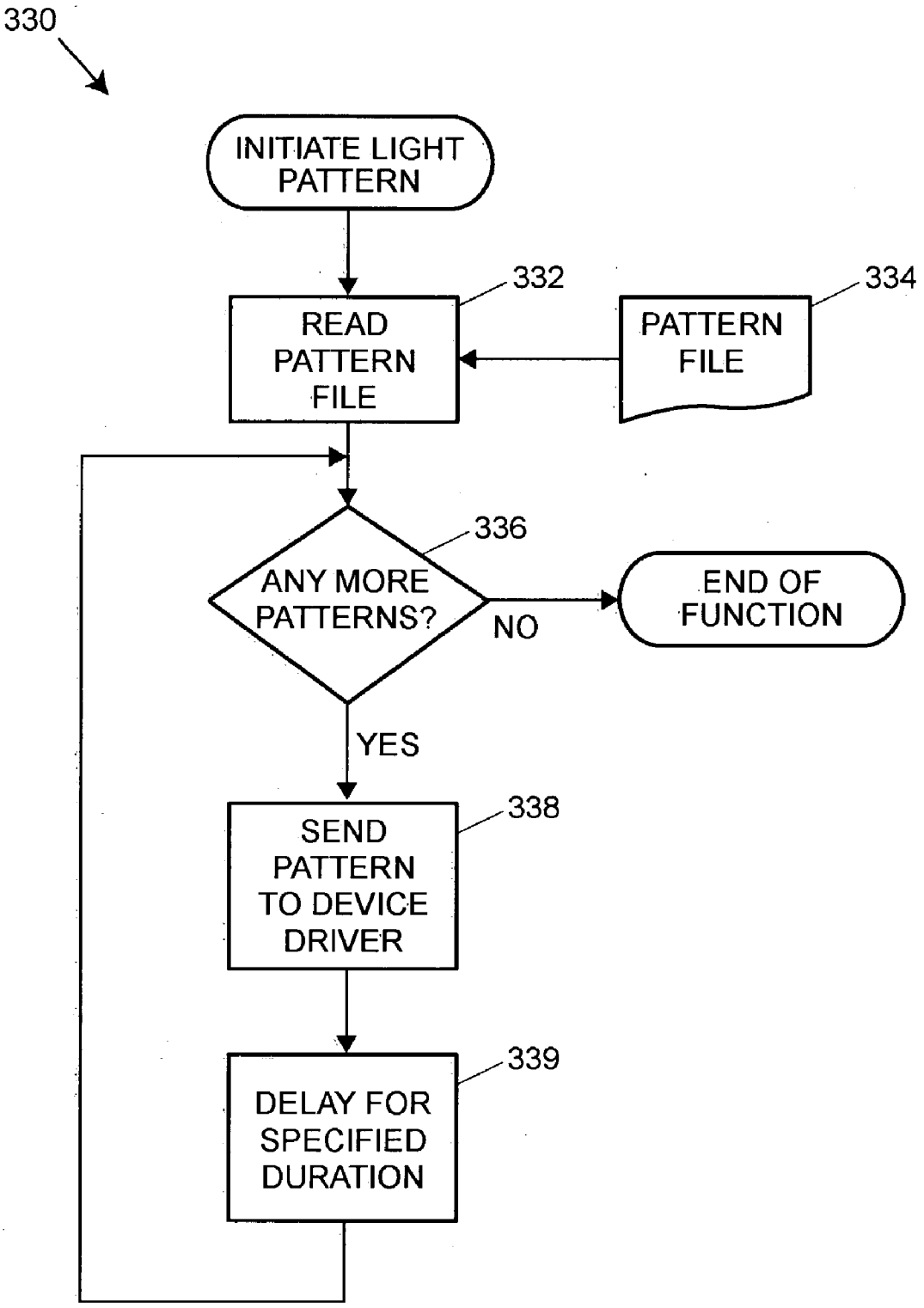

330
INITIATE LIGHT PATTERN
332
READ PATTERN FILE
334
PATTERN FILE
336
ANY MORE PATTERNS?
NO
END OF FUNCTION
YES
338
SEND PATTERN TO DEVICE DRIVER
339
DELAY FOR SPECIFIED DURATION

FIG. 6A

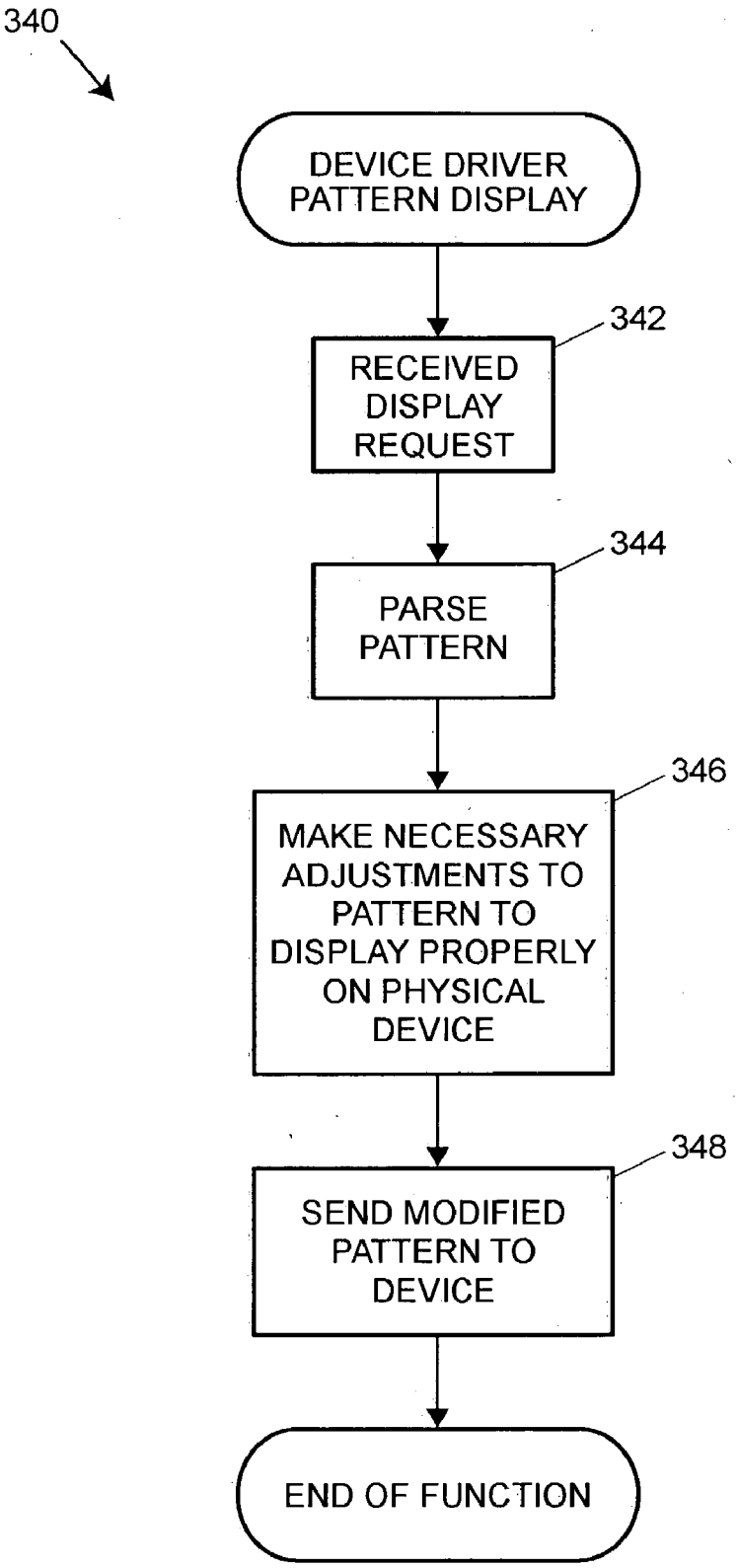

340
DEVICE DRIVER PATTERN DISPLAY
342
RECEIVED DISPLAY REQUEST
344
PARSE PATTERN
346
MAKE NECESSARY ADJUSTMENTS TO PATTERN TO DISPLAY PROPERLY ON PHYSICAL DEVICE
348
SEND MODIFIED PATTERN TO DEVICE
END OF FUNCTION

FIG. 6B

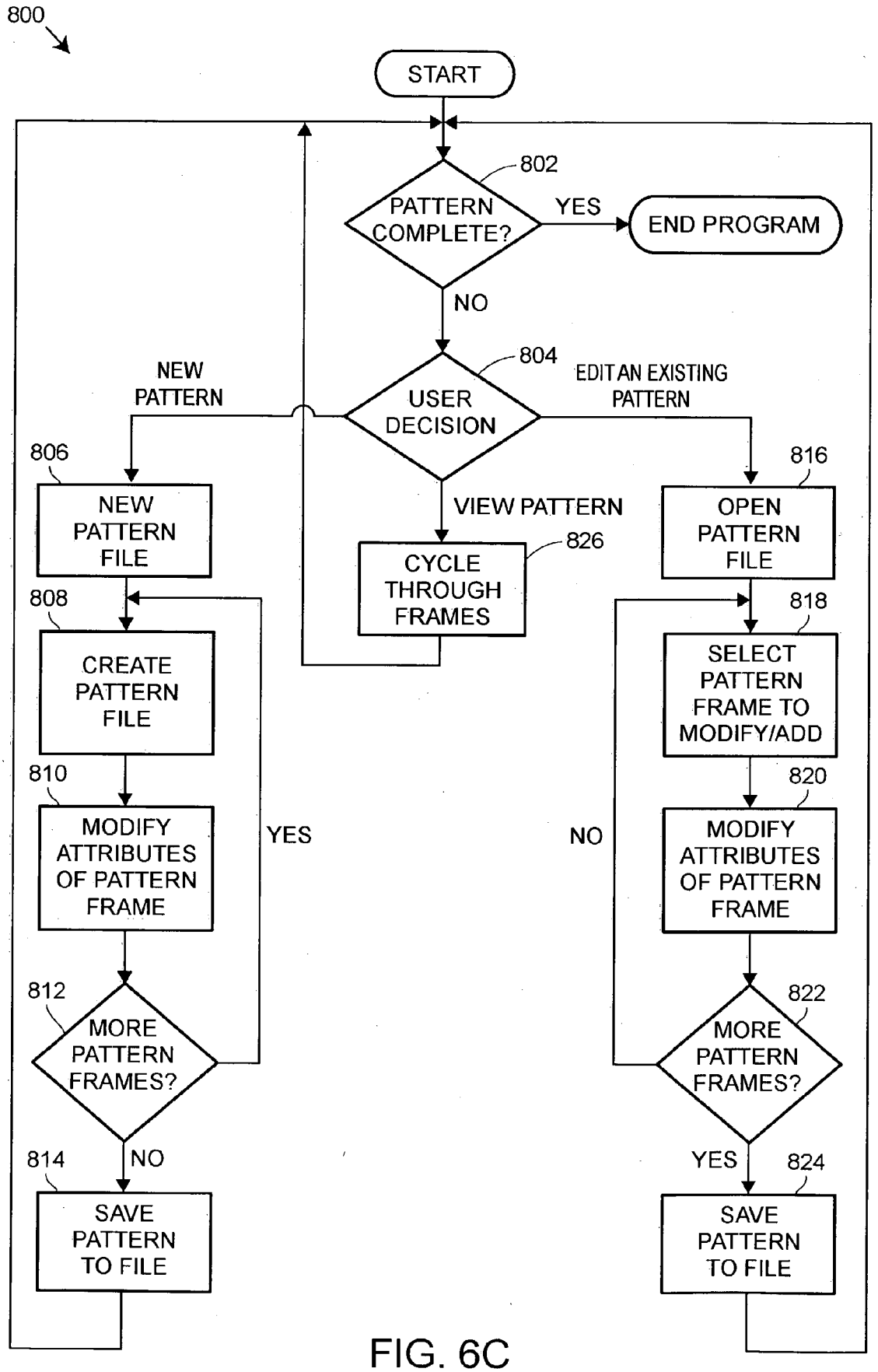

800
START
802
PATTERN COMPLETE?
YES
END PROGRAM
NO
804
USER DECISION
NEW PATTERN
EDIT AN EXISTING PATTERN
VIEW PATTERN
806
NEW PATTERN FILE
808
CREATE PATTERN FILE
810
MODIFY ATTRIBUTES OF PATTERN FRAME
812
MORE PATTERN FRAMES?
YES
814
NO
SAVE PATTERN TO FILE
826
CYCLE THROUGH FRAMES
816
OPEN PATTERN FILE
818
SELECT PATTERN FRAME TO MODIFY/ADD
820
MODIFY ATTRIBUTES OF PATTERN FRAME
822
MORE PATTERN FRAMES?
NO
YES
824
SAVE PATTERN TO FILE

FIG. 6C

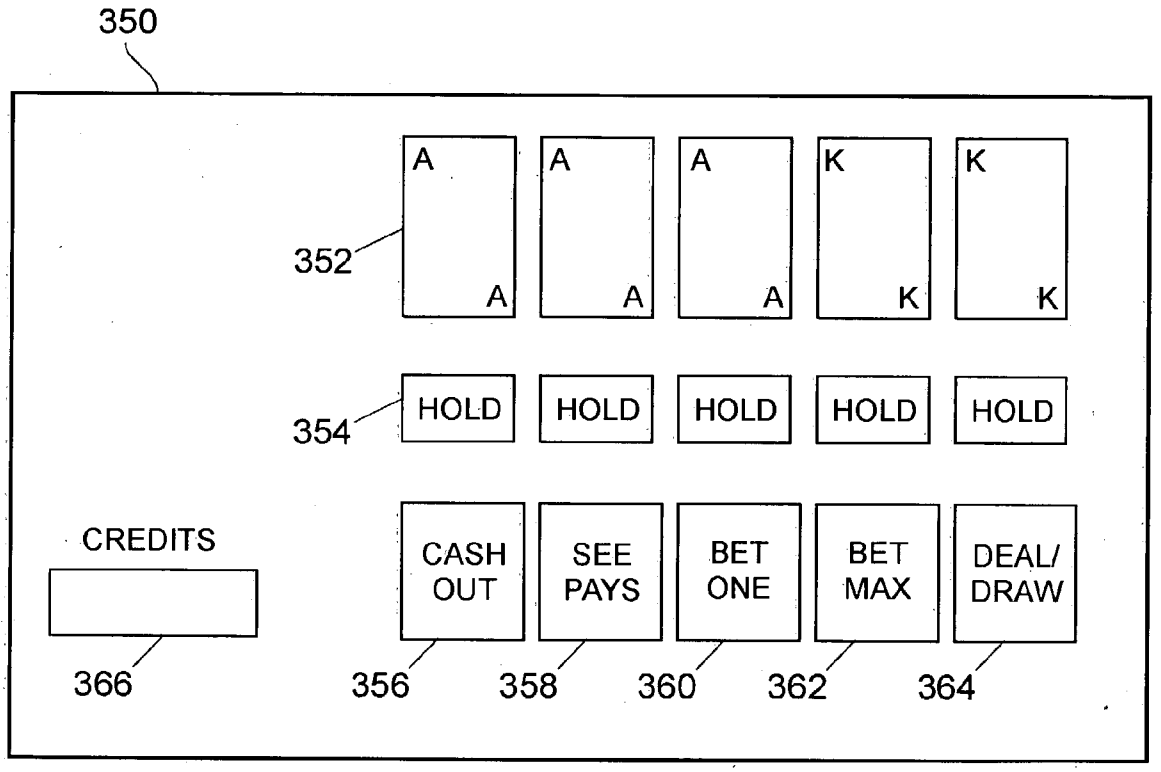

350
A
A
A
K
K
352
A
A
A
K
K
354
HOLD
HOLD
HOLD
HOLD
HOLD
CREDITS
CASH OUT
SEE PAYS
BET ONE
BET MAX
DEAL/ DRAW
366
356
358
360
362
364

FIG. 7

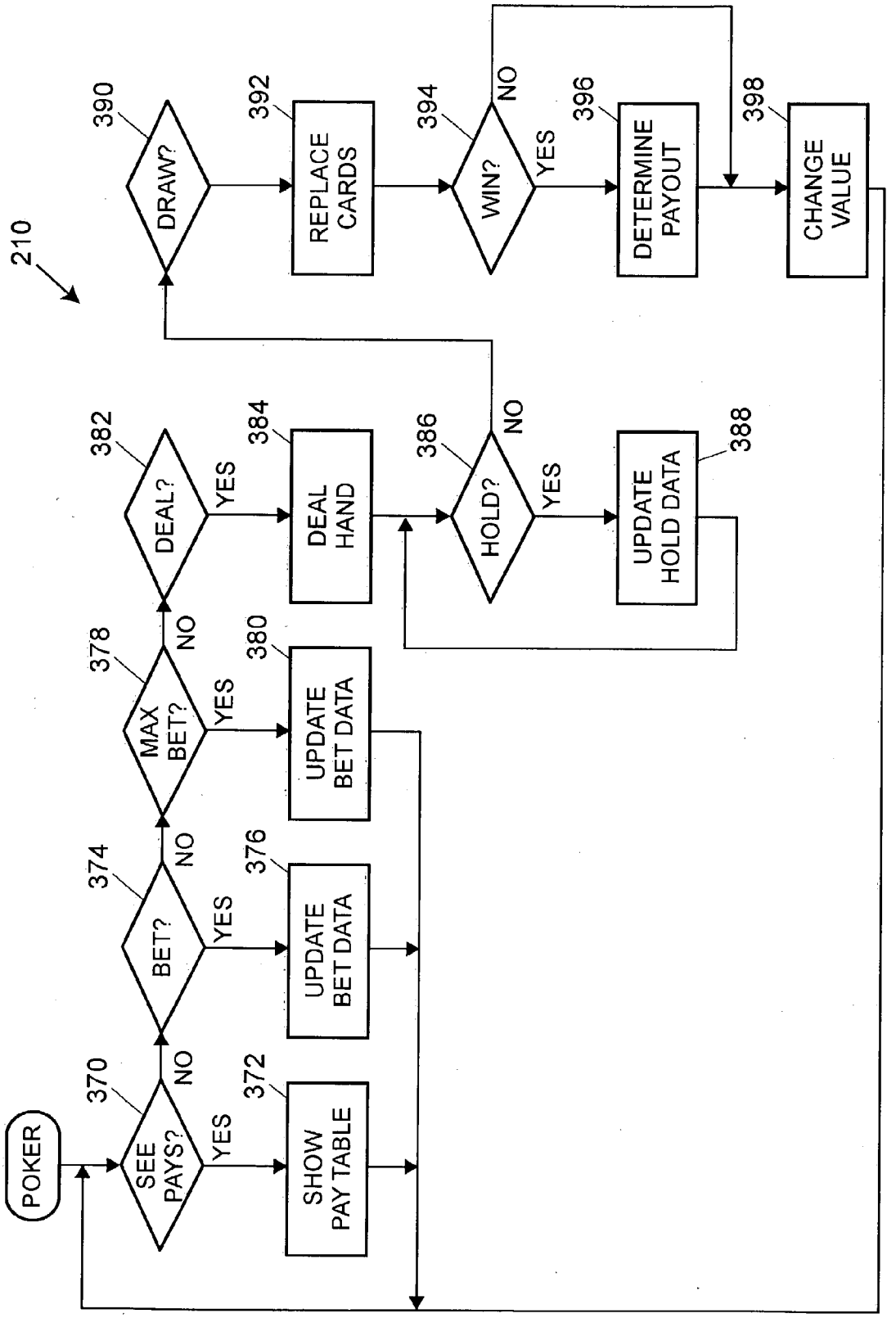

210
POKER
370
SEE PAYS?
YES
NO
372
SHOW PAY TABLE
374
BET?
YES
NO
376
UPDATE BET DATA
378
MAX BET?
YES
NO
380
UPDATE BET DATA
382
DEAL?
YES
384
DEAL HAND
386
HOLD?
YES
NO
388
UPDATE HOLD DATA
390
DRAW?
392
REPLACE CARDS
394
WIN?
YES
NO
396
DETERMINE PAYOUT
398
CHANGE VALUE

FIG. 8

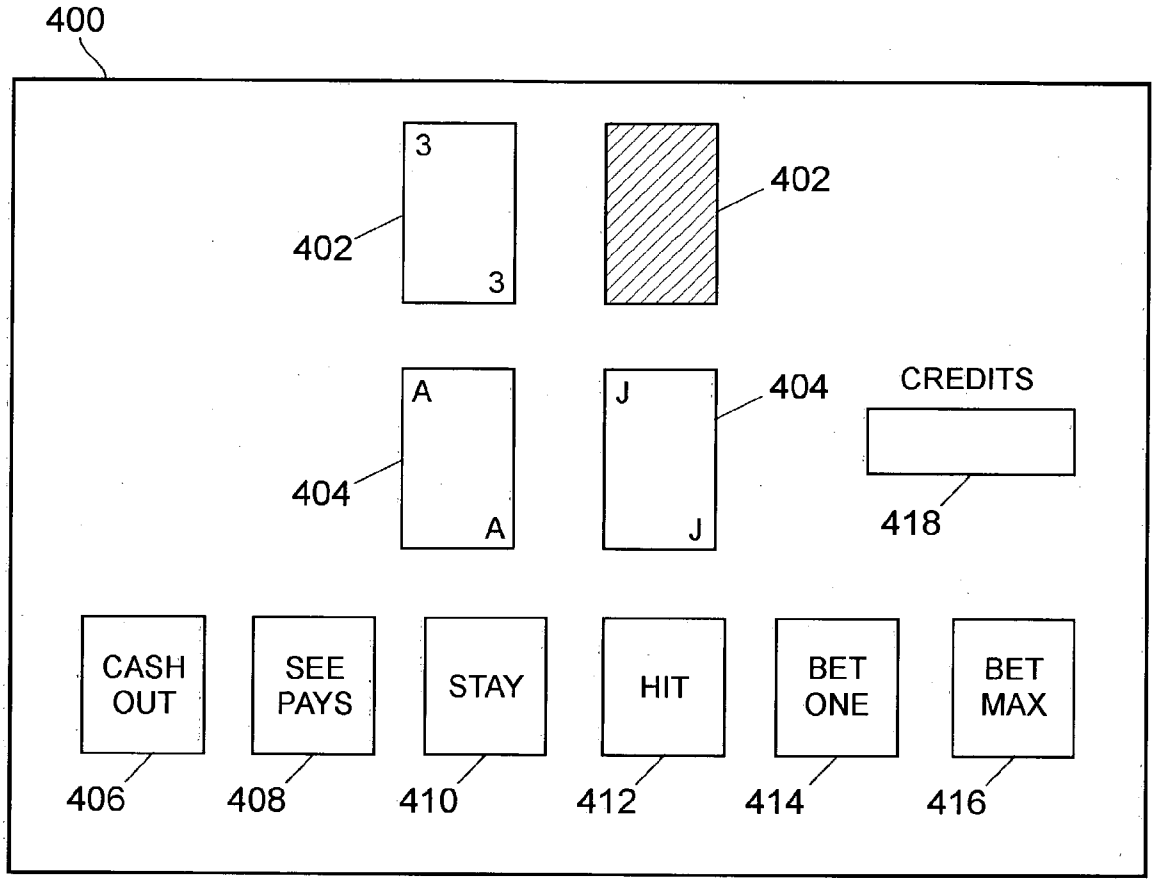

400
3
3
402
402
A
A
404
404
J
J
404
CREDITS
418
CASH OUT
SEE PAYS
STAY
HIT
BET ONE
BET MAX
406
408
410
412
414
416

FIG. 9

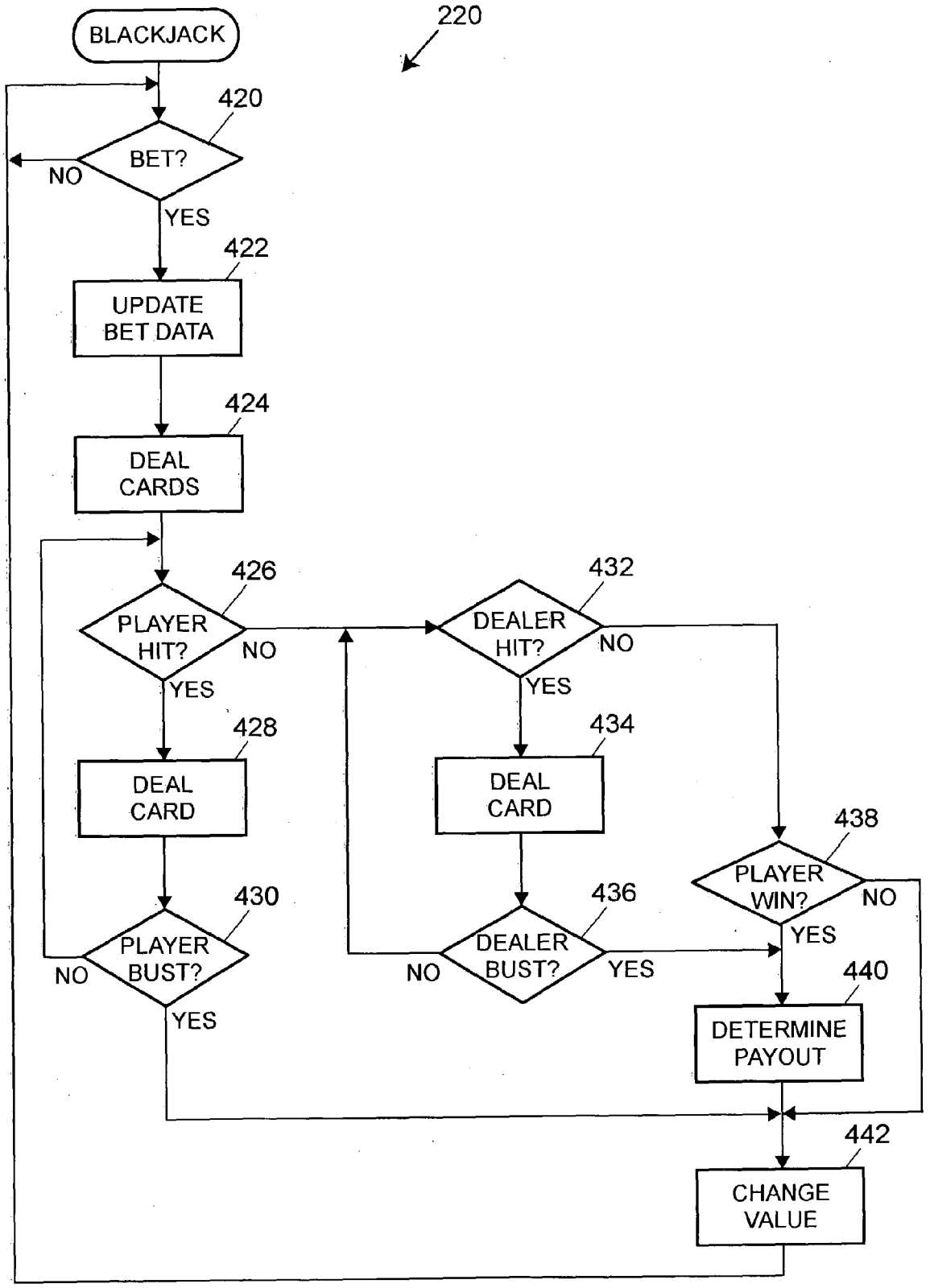

220
BLACKJACK
420
BET?
NO
YES
422
UPDATE BET DATA
424
DEAL CARDS
426
PLAYER HIT?
NO
YES
428
DEAL CARD
430
PLAYER BUST?
NO
YES
432
DEALER HIT?
NO
YES
434
DEAL CARD
436
DEALER BUST?
NO
YES
438
PLAYER WIN?
NO
YES
440
DETERMINE PAYOUT
442
CHANGE VALUE

FIG. 10

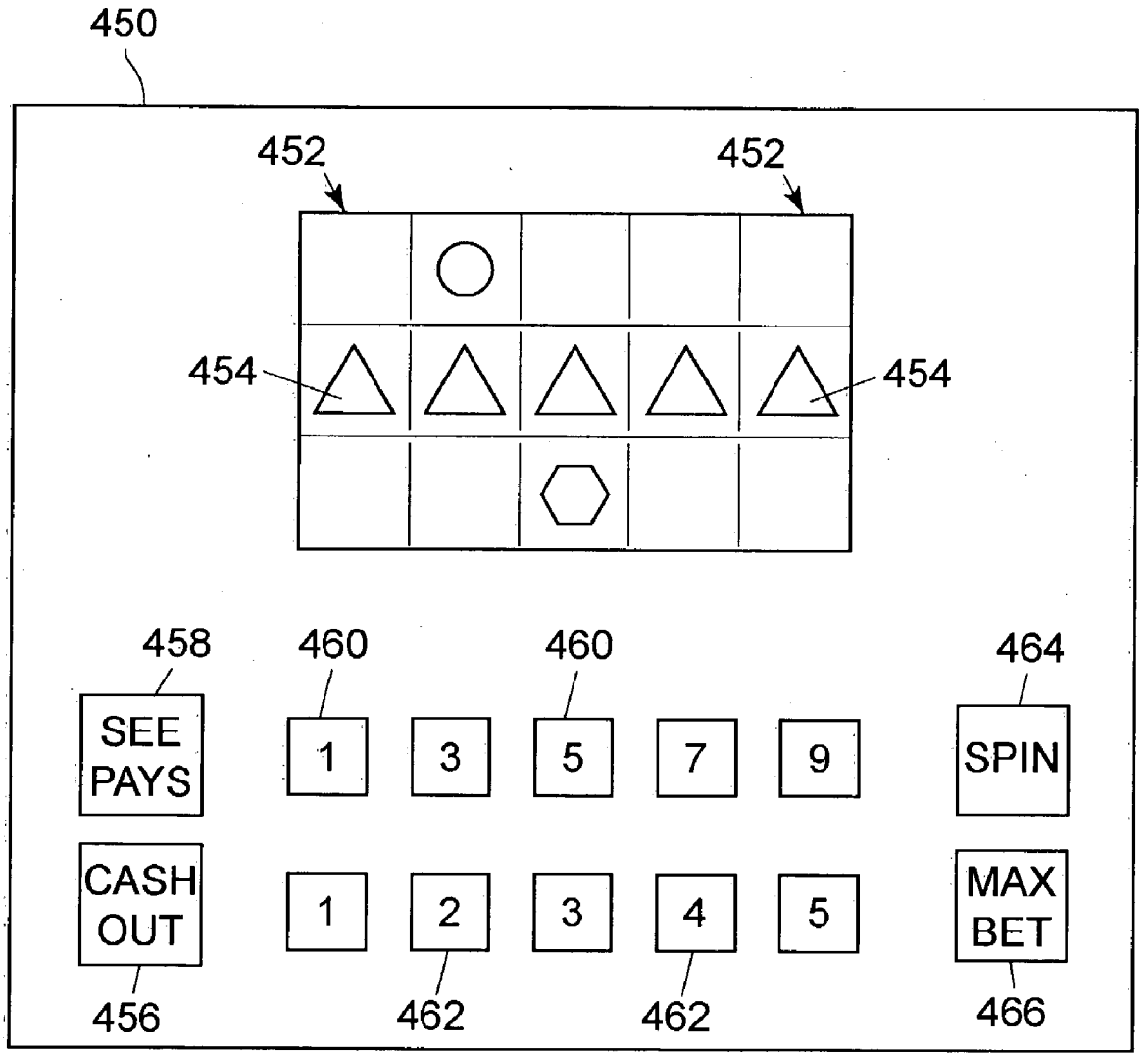

450
452
452
454
454
458
460
460
464
SEE PAYS
1
3
5
7
9
SPIN
CASH OUT
1
2
3
4
5
MAX BET
456
462
462
466

FIG. 11

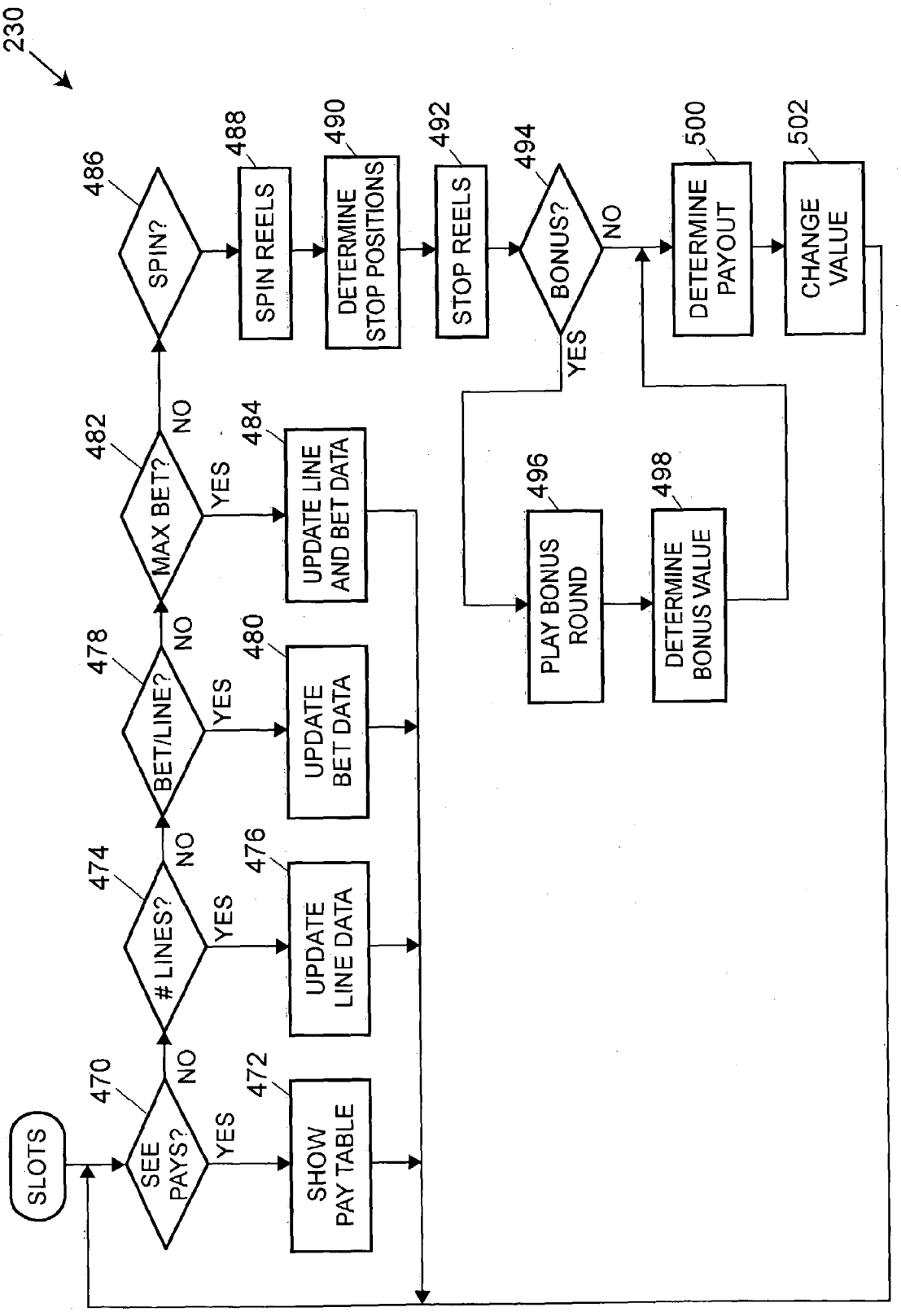

230
SLOTS
470
SEE PAYS?
YES
NO
472
SHOW PAY TABLE
474
LINES?
YES
NO
476
UPDATE LINE DATA
478
BET/LINE?
YES
NO
480
UPDATE BET DATA
482
MAX BET?
YES
NO
484
UPDATE LINE AND BET DATA
486
SPIN?
488
SPIN REELS
490
DETERMINE STOP POSITIONS
492
STOP REELS
494
BONUS?
YES
NO
496
PLAY BONUS ROUND
498
DETERMINE BONUS VALUE
500
DETERMINE PAYOUT
502
CHANGE VALUE

FIG. 12

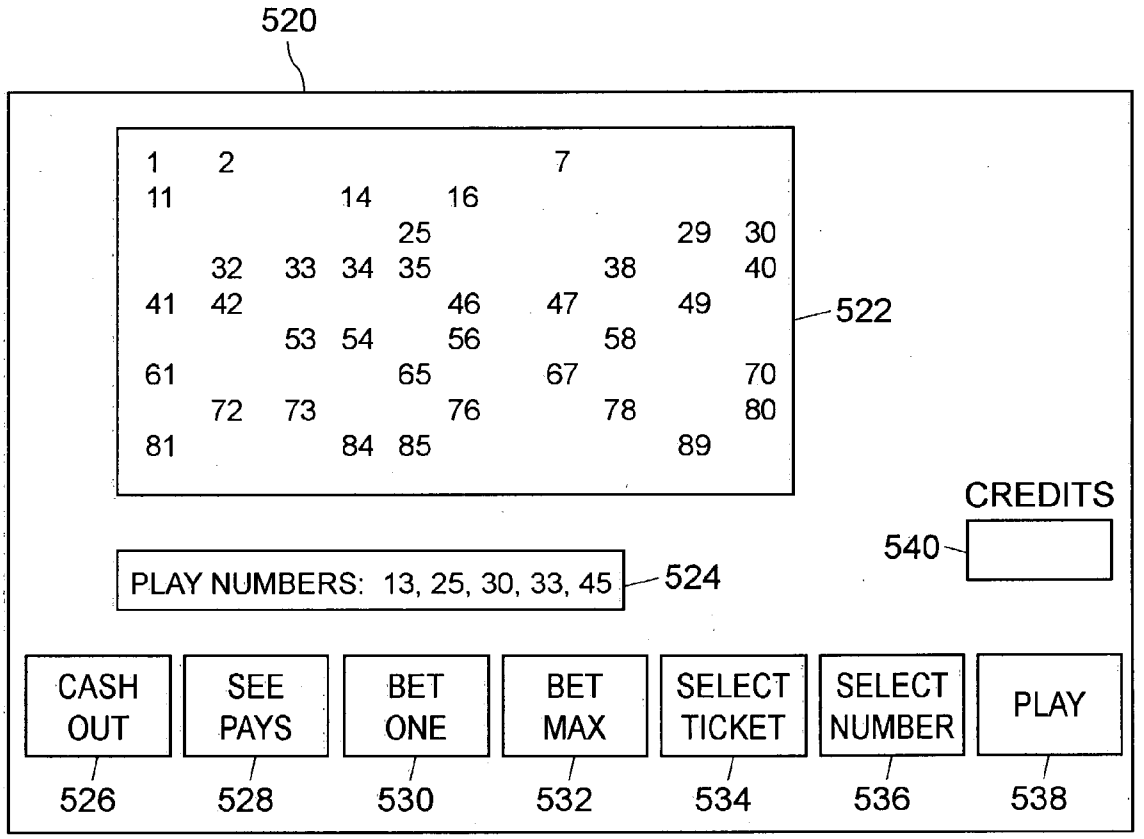

520
1 2 7
11 14 16
25 29 30
32 33 34 35 38 40
41 42 46 47 49
522
53 54 56 58
61 65 67 70
72 73 76 78 80
81 84 85 89
CREDITS
540
PLAY NUMBERS: 13, 25, 30, 33, 45
524
CASH OUT
SEE PAYS
BET ONE
BET MAX
SELECT TICKET
SELECT NUMBER
PLAY
526
528
530
532
534
536
538

FIG. 13

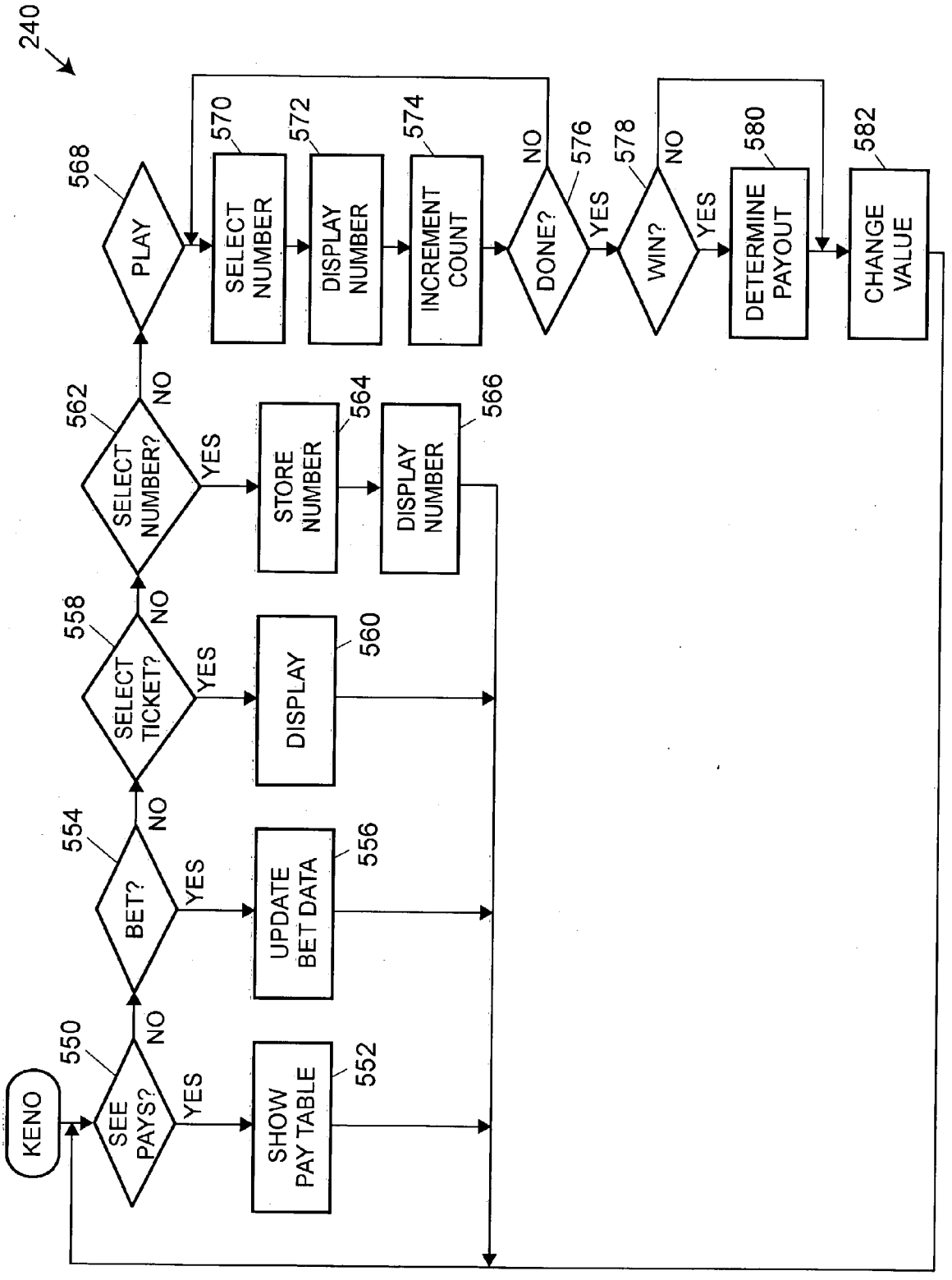

240
KENO
550
SEE PAYS?
YES
NO
552
SHOW PAY TABLE
554
BET?
YES
NO
556
UPDATE BET DATA
558
SELECT TICKET?
YES
NO
560
DISPLAY
562
SELECT NUMBER?
YES
NO
564
STORE NUMBER
566
DISPLAY NUMBER
568
PLAY
570
SELECT NUMBER
572
DISPLAY NUMBER
574
INCREMENT COUNT
576
DONE?
NO
YES
578
WIN?
NO
YES
580
DETERMINE PAYOUT
582
CHANGE VALUE

FIG. 14

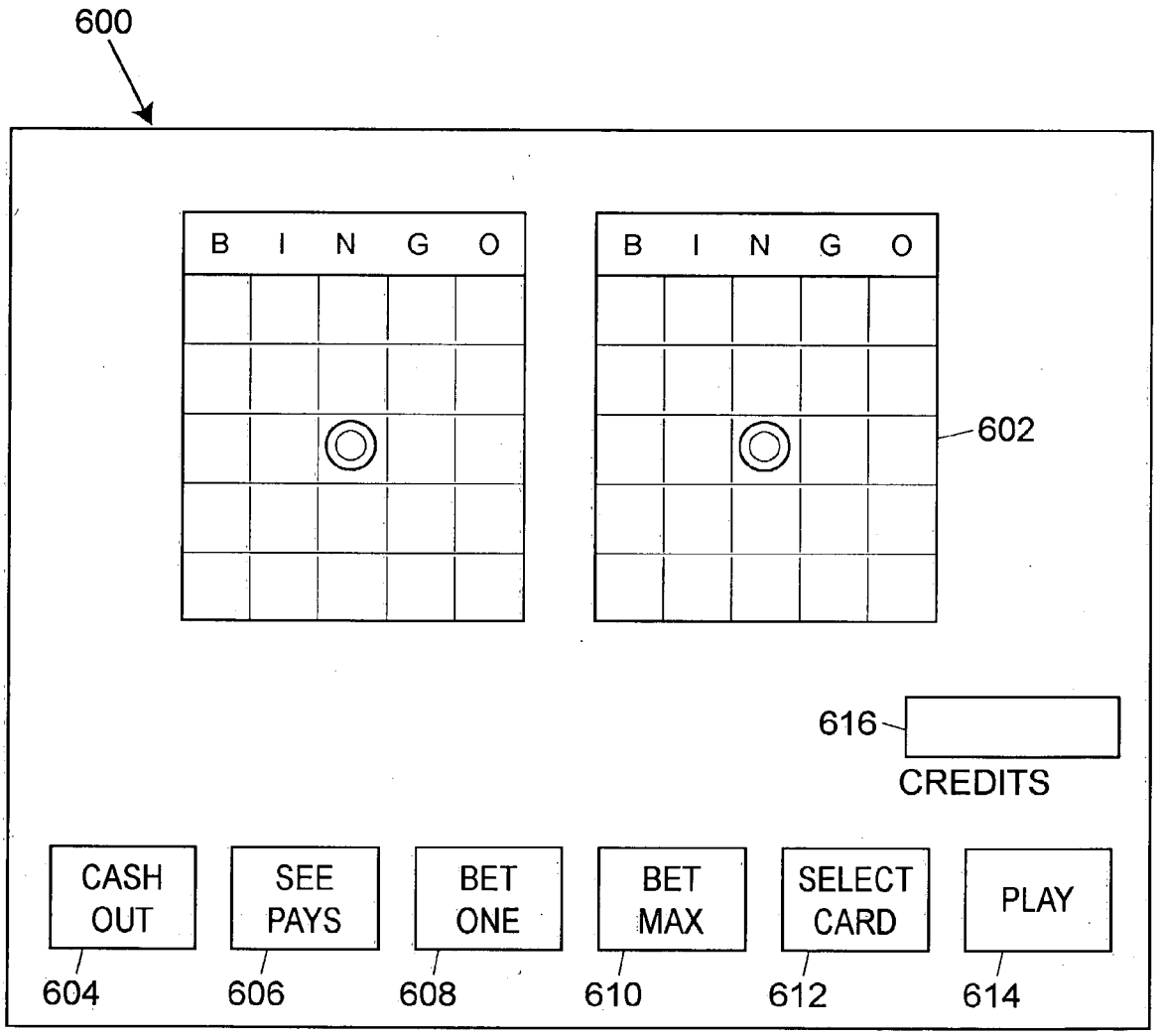

600
B I N G O
B I N G O
602
616
CREDITS
CASH OUT
SEE PAYS
BET ONE
BET MAX
SELECT CARD
PLAY
604
606
608
610
612
614

FIG. 15

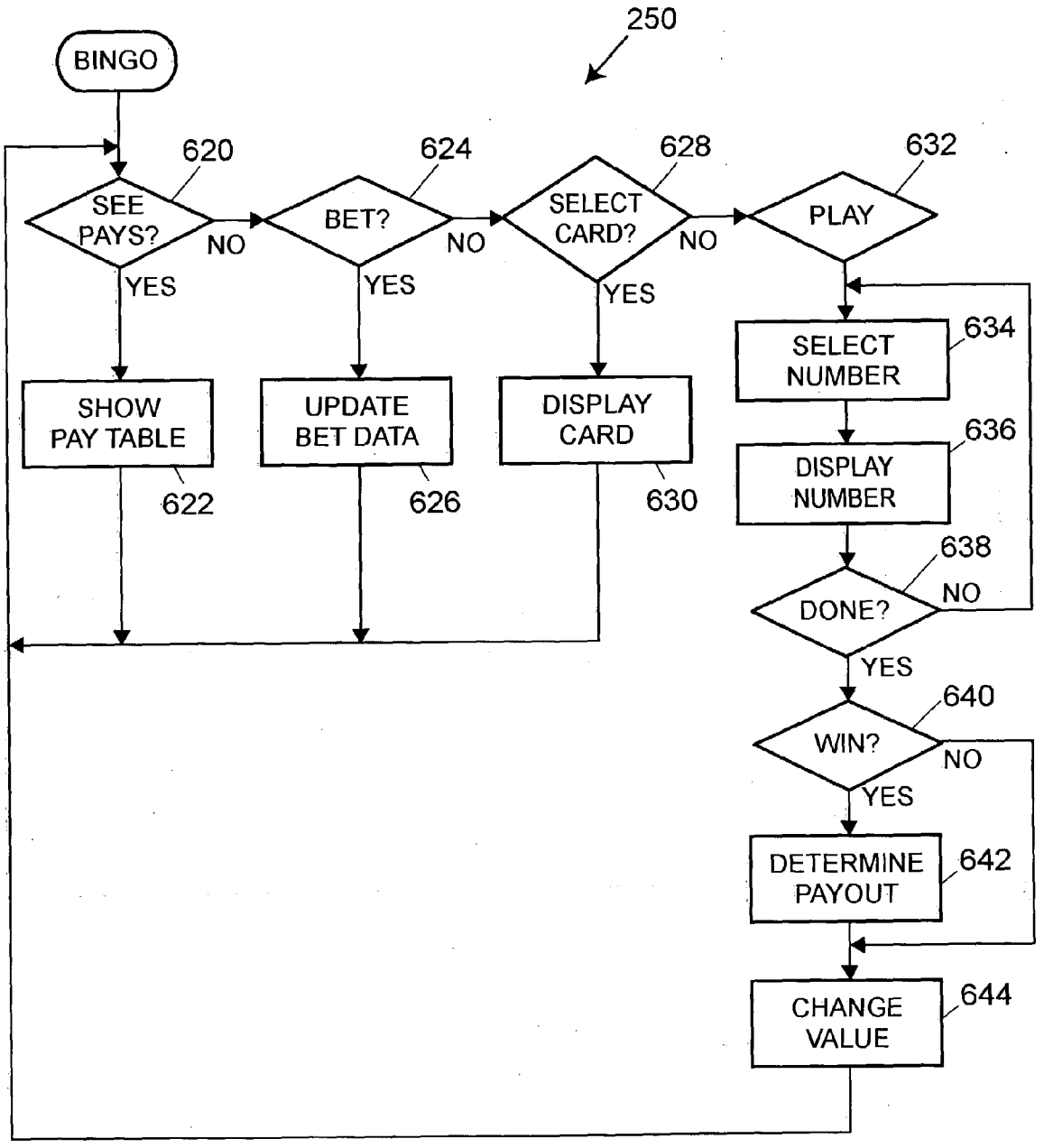

250
BINGO
620
SEE PAYS?
NO
YES
624
BET?
NO
YES
628
SELECT CARD?
NO
YES
632
PLAY
SHOW PAY TABLE
622
UPDATE BET DATA
626
DISPLAY CARD
630
634
SELECT NUMBER
636
DISPLAY NUMBER
638
DONE?
NO
YES
640
WIN?
NO
YES
642
DETERMINE PAYOUT
644
CHANGE VALUE

FIG. 16

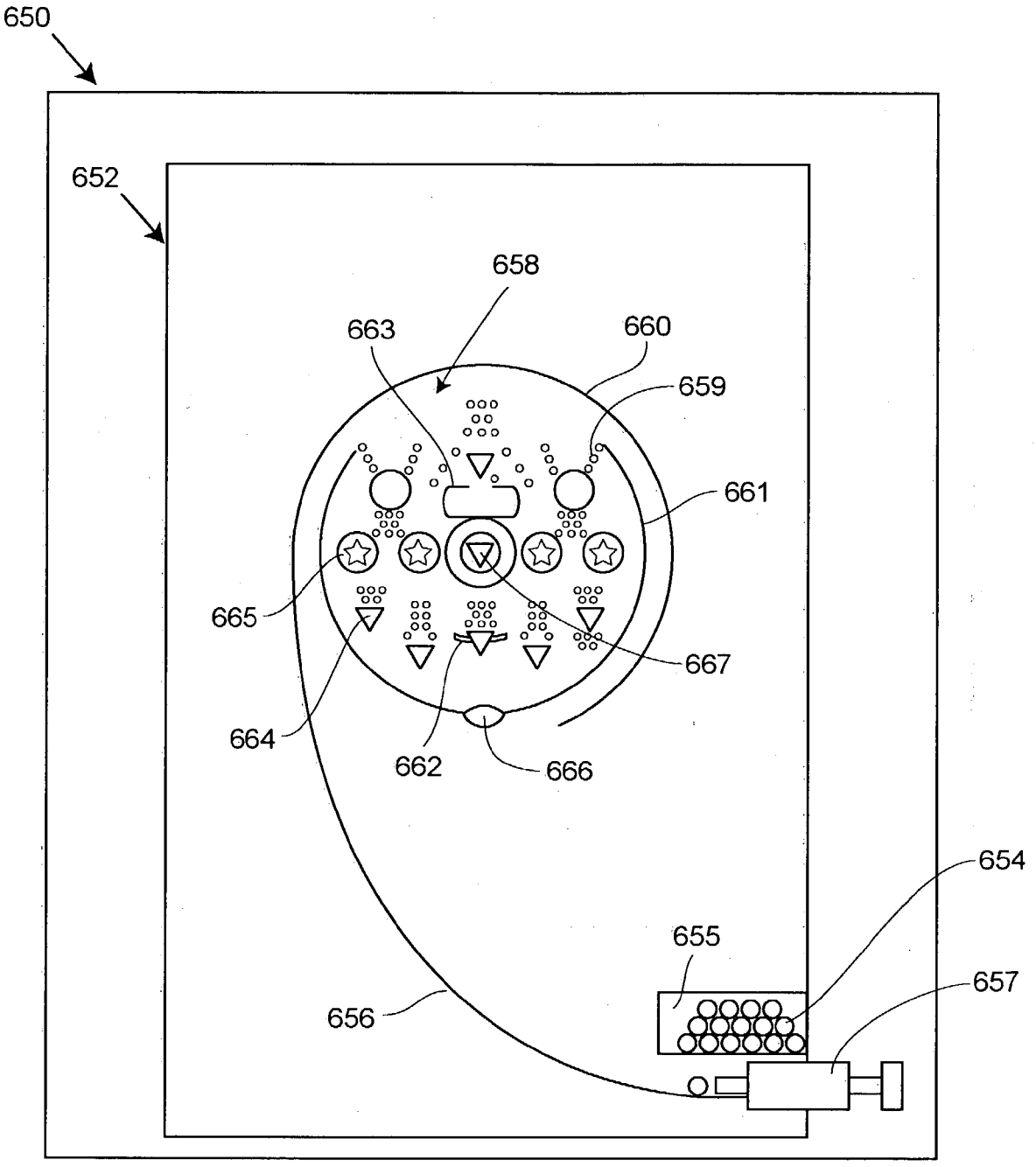


FIG. 17

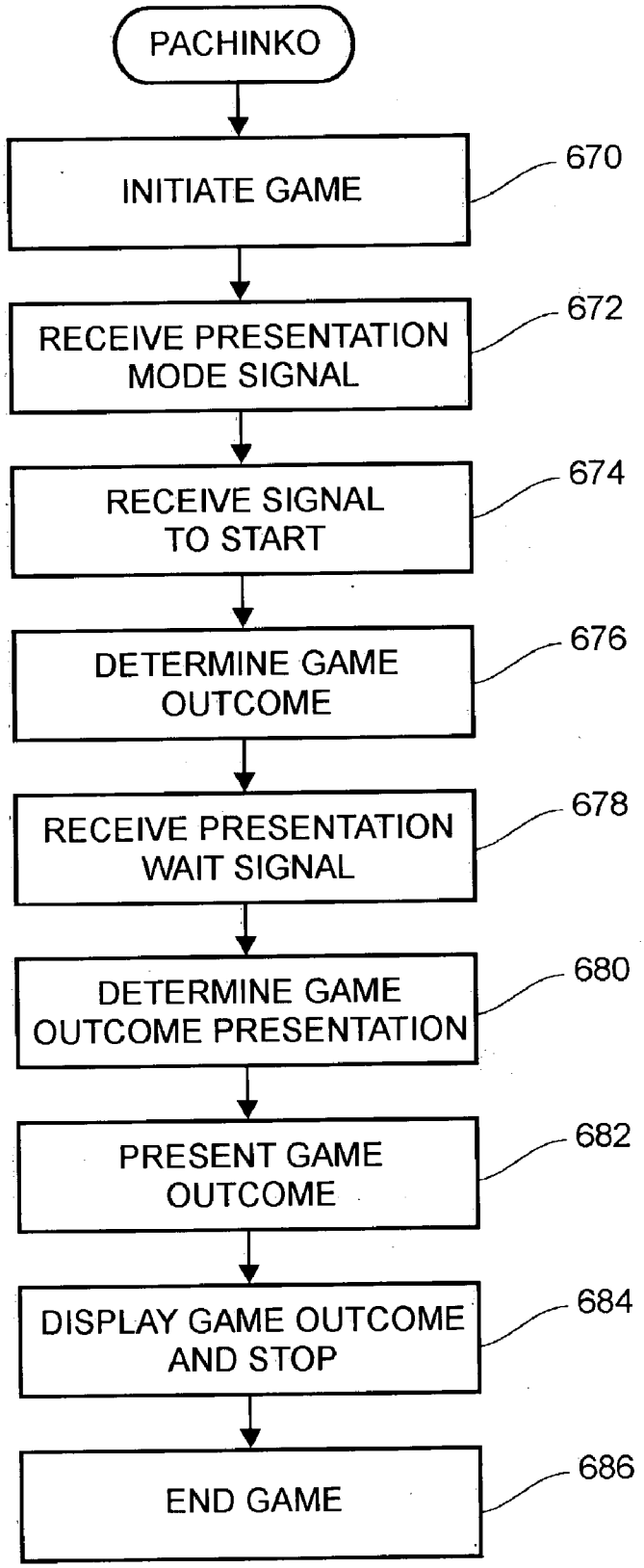

PACHINKO
INITIATE GAME
670
RECEIVE PRESENTATION MODE SIGNAL
672
RECEIVE SIGNAL TO START
674
DETERMINE GAME OUTCOME
676
RECEIVE PRESENTATION WAIT SIGNAL
678
DETERMINE GAME OUTCOME PRESENTATION
680
PRESENT GAME OUTCOME
682
DISPLAY GAME OUTCOME AND STOP
684
END GAME
686

FIG. 18

METHOD AND APPARATUS FOR CONTROLLING A DISPLAY ON A LIGHT DEVICE IN A GAMING UNIT

BACKGROUND

[0001] The present disclosure relates to gaming units and, more particularly, to an apparatus for controlling a display on a light device in a gaming unit.

[0002] Conventional gaming units are typically provided with a cabinet and a gaming display mounted inside the cabinet. The gaming display may be mechanical, such as a series of stepper wheels, may be electronic such as a video display that is capable of generating video images, or may be a combination of the two, such as a stepper wheel with an electronic video display attached thereto. Whether mechanical, electronic, or combination, the gaming display of conventional gaming units has generated images associated with a gaming system, such as poker, blackjack, slots, keno, or bingo.

[0003] While the gaming display is the primary functional component, many gaming units include one or more design or stylistic elements to attract a player's attention to the gaming unit. Such stylistic elements include the use of certain color schemes or themes, and back-lit, semi-opaque panels having artwork or gaming information printed thereon. In addition to design or stylistic elements, many gaming units incorporate stylistic or function lighting elements to attract a player's attention. For example, a gaming unit may include flashing lights to attract a player.

[0004] In addition to attracting a player's attention, many gaming units incorporate additional stylistic or functional elements to keep the player's attention as long as possible by increasing the play value of the gaming unit. For example, a typical gaming unit may have a special or bonus mode that is triggered as a result of a certain outcome of the gaming session. During bonus mode, the gaming unit runs a different gaming session or provides increased value payouts, thereby enhancing the play value.

[0005] In order to attract a player, or to adequately alert the player when a special or bonus mode is triggered, the typical gaming unit has been provided with an illuminated bezel, which comprises a transparent material that allows a plurality of lights to be viewed therethrough when the lights are illuminated. These displays are typically operated by a proprietary controller operatively connected to the gaming unit through a proprietary channel such as Senet or Netplex.

[0006] Each light device needs a controller to control the plurality of lights. These light device controllers can only be used in gaming machines that support the proprietary channels. Moreover, it is difficult to retrieve information regarding the controller and the physical lights via these proprietary channels. For example, a Senet light controller cannot inform the typical gaming unit that there is a hardware problem, without complicated custom programming or custom hardware additions. Similarly, the typical gaming unit is unable to determine whether the desired illumination is supported by the physical light device.

[0007] The use of a gaming machine having a plurality of gaming peripherals, each communicating with a master gaming controller via a standard peripheral interface is described in U.S. Pat. No. 6,251,014 to Stockdale, et al.

SUMMARY OF THE INVENTION

[0008] The invention is directed to a gaming apparatus that may comprise a display unit capable of generating video images, a value input device, a light device, a gaming unit controller, and a light device controller. The gaming unit controller may comprise a processor and a memory, and may be programmed to allow a person to wager on the outcome of a video poker, video blackjack, video slots, video keno or video bingo game. The gaming unit controller may be further programmed to initiate a light display on the light device by utilizing a pattern file. The pattern file may contain light display pattern frames, which when parsed and interpreted by the light device controller, may display on the light device.

[0009] Additional aspects of the invention are defined by the claims of this patent.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] **FIG. 1** is a block diagram of an embodiment of a gaming system in accordance with the invention;

[0011] **FIG. 2** is a perspective view of an embodiment of one of the gaming units shown schematically in **FIG. 1**;

[0012] **FIG. 2A** illustrates an embodiment of a control panel for a gaming unit;

[0013] **FIG. 2B** illustrates an embodiment of a light device for a gaming unit;

[0014] **FIG. 3** is a block diagram of the electronic components of the gaming unit of **FIG. 2**;

[0015] **FIG. 3A** is a block diagram of the electronic components of the light controller of **FIG. 3**;

[0016] **FIG. 4** is a flowchart of an embodiment of a main routine that may be performed during operation of one or more of the gaming units;

[0017] **FIG. 5** is a flowchart of an alternative embodiment of a main routine that may be performed during operation of one or more of the gaming units;

[0018] **FIG. 6A** is a flowchart of an embodiment of a main routine that may be performed during initiation of a light pattern display by one or more of the gaming units;

[0019] **FIG. 6B** is a flowchart of an embodiment of a main routine that may be performed during display of a light pattern by the light controller of **FIG. 3**;

[0020] **FIG. 6C** is a flowchart of an embodiment of a main pattern creation routine that may be performed by the gaming system;

[0021] **FIG. 7** is an illustration of an embodiment of a visual display that may be displayed during performance of the video poker routine of **FIG. 8**;

[0022] **FIG. 8** is a flowchart of an embodiment of a video poker routine that may be performed by one or more of the gaming units;

[0023] **FIG. 9** is an illustration of an embodiment of a visual display that may be displayed during performance of the video blackjack routine of **FIG. 10**;

[0024] **FIG. 10** is a flowchart of an embodiment of a video blackjack routine that may be performed by one or more of the gaming units;

[0025] **FIG. 11** is an illustration of an embodiment of a visual display that may be displayed during performance of the slots routine of **FIG. 12**;

[0026] **FIG. 12** is a flowchart of an embodiment of a slots routine that may be performed by one or more of the gaming units;

[0027] **FIG. 13** is an illustration of an embodiment of a visual display that may be displayed during performance of the video keno routine of **FIG. 14**;

[0028] **FIG. 14** is a flowchart of an embodiment of a video keno routine that may be performed by one or more of the gaming units;

[0029] **FIG. 15** is an illustration of an embodiment of a visual display that may be displayed during performance of the video bingo routine of **FIG. 16**;

[0030] **FIG. 16** is a flowchart of an embodiment of a video bingo routine that may be performed by one or more of the gaming units;

[0031] **FIG. 17** is an illustration of an embodiment of a visual display that may be displayed during performance of the video pachinko routine of **FIG. 17**; and

[0032] **FIG. 18** is a flowchart of an embodiment of a video pachinko routine that may be performed by one or more of the gaming units.

DETAILED DESCRIPTION OF VARIOUS EMBODIMENTS

[0033] Although the following text sets forth a detailed description of numerous different embodiments of the invention, it should be understood that the legal scope of the invention is defined by the words of the claims set forth at the end of this patent. The detailed description is to be construed as exemplary only and does not describe every possible embodiment of the invention since describing every possible embodiment would be impractical, if not impossible. Numerous alternative embodiments could be implemented, using either current technology or technology developed after the filing date of this patent, which would still fall within the scope of the claims defining the invention.

[0034] It should also be understood that, unless a term is expressly defined in this patent using the sentence "As used herein, the term '_____' is hereby defined to mean . . . " or a similar sentence, there is no intent to limit the meaning of that term, either expressly or by implication, beyond its plain or ordinary meaning, and such term should not be interpreted to be limited in scope based on any statement made in any section of this patent (other than the language of the claims). To the extent that any term recited in the claims at the end of this patent is referred to in this patent in a manner consistent with a single meaning, that is done for sake of clarity only so as to not confuse the reader, and it is not intended that such claim term by limited, by implication or otherwise, to that single meaning. Finally, unless a claim element is defined by reciting the word "means" and a function without the recital of any structure, it is not intended that the scope of any claim element be interpreted based on the application of 35 U.S.C. § 112, sixth paragraph.

[0035] **FIG. 1** illustrates one possible embodiment of a casino gaming system **10** in accordance with the invention. Referring to **FIG. 1**, the casino gaming system **10** may include a first group or network **12** of casino gaming units **20** operatively coupled to a network computer **22** via a network data link or bus **24**. The casino gaming system **10** may include a second group or network **26** of casino gaming units **30** operatively coupled to a network computer **32** via a network data link or bus **34**. The first and second gaming networks **12, 26** may be operatively coupled to each other via a network **40**, which may comprise, for example, the Internet, a wide area network (WAN), or a local area network (LAN) via a first network link **42** and a second network link **44**.

[0036] The first network **12** of gaming units **20** may be provided in a first casino, and the second network **26** of gaming units **30** may be provided in a second casino located in a separate geographic location than the first casino. For example, the two casinos may be located in different areas of the same city, or they may be located in different states. The network **40** may include a plurality of network computers or server computers (not shown), each of which may be operatively interconnected. Where the network **40** comprises the Internet, data communication may take place over the communication links **42, 44** via an Internet communication protocol.

[0037] The network computer **22** may be a server computer and may be used to accumulate and analyze data relating to the operation of the gaming units **20**. For example, the network computer **22** may continuously receive data from each of the gaming units **20** indicative of the dollar amount and number of wagers being made on each of the gaming units **20**, data indicative of how much each of the gaming units **20** is paying out in winnings, data regarding the identity and gaming habits of players playing each of the gaming units **20**, etc. The network computer **32** may be a server computer and may be used to perform the same or different functions in relation to the gaming units **30** as the network computer **22** described above.

[0038] Although each network **12, 26** is shown to include one network computer **22, 32** and four gaming units **20, 30**, it should be understood that different numbers of computers and gaming units may be utilized. For example, the network **12** may include a plurality of network computers **22** and tens or hundreds of gaming units **20**, all of which may be interconnected via the data link **24**. The data link **24** may be provided as a dedicated hardwired link or a wireless link. Although the data link **24** is shown as a single data link **24**, the data link **24** may comprise multiple data links.

[0039] **FIG. 2** is a perspective view of one possible embodiment of one or more of the gaming units **20**. Although the following description addresses the design of the gaming units **20**, it should be understood that the gaming units **30** may have the same design as the gaming units **20** described below. It should be understood that the design of one or more of the gaming units **20** may be different than the design of other gaming units **20**, and that the design of one or more of the gaming units **30** may be different than the design of other gaming units **30**. Each gaming unit **20** may be any type of casino gaming unit and may have various

different structures and methods of operation. For exemplary purposes, various designs of the gaming units **20** are described below, but it should be understood that numerous other designs may be utilized.

[**0040**] Referring to **FIG. 2**, the casino gaming unit **20** may include a housing or cabinet **50** and one or more input devices, which may include a coin slot or acceptor **52**, a paper currency acceptor **54**, a ticket reader/printer **56** and a card reader **58**, which may be used to input value to the gaming unit **20**. A value input device may include any device that can accept value from a customer. As used herein, the term "value" may encompass gaming tokens, coins, paper currency, ticket vouchers, credit or debit cards, smart cards, and any other object representative of value.

[**0041**] If provided on the gaming unit **20**, the ticket reader/printer **56** may be used to read and/or print or otherwise encode ticket vouchers **60**. The ticket vouchers **60** may be composed of paper or another printable or encodable material and may have one or more of the following informational items printed or encoded thereon: the casino name, the type of ticket voucher, a validation number, a bar code with control and/or security data, the date and time of issuance of the ticket voucher, redemption instructions and restrictions, a description of an award, and any other information that may be necessary or desirable. Different types of ticket vouchers **60** could be used, such as bonus ticket vouchers, cash-redemption ticket vouchers, casino chip ticket vouchers, extra game play ticket vouchers, merchandise ticket vouchers, restaurant ticket vouchers, show ticket vouchers, etc. The ticket vouchers **60** could be printed with an optically readable material such as ink, or data on the ticket vouchers **60** could be magnetically encoded. The ticket reader/printer **56** may be provided with the ability to both read and print ticket vouchers **60**, or it may be provided with the ability to only read or only print or encode ticket vouchers **60**. In the latter case, for example, some of the gaming units **20** may have ticket printers **56** that may be used to print ticket vouchers **60**, which could then be used by a player in other gaming units **20** that have ticket readers **56**.

[**0042**] If provided, the card reader **58** may include any type of card reading device, such as a magnetic card reader or an optical card reader, and may be used to read data from a card offered by a player, such as a credit card or a player tracking card. If provided for player tracking purposes, the card reader **58** may be used to read data from, and/or write data to, player tracking cards that are capable of storing data representing the identity of a player, the identity of a casino, the player's gaming habits, etc.

[**0043**] The gaming unit **20** may include one or more audio speakers **62**, a coin payout tray **64**, an input control panel **66**, a color video display unit **70** for displaying images relating to the game or games provided by the gaming unit **20**, and a light device **71**, such as, for example, an illuminated light bezel. The audio speakers **62** may generate audio representing sounds such as the noise of spinning slot machine reels, a dealer's voice, music, announcements or any other audio related to a casino game. The input control panel **66** may be provided with a plurality of pushbuttons or touch-sensitive areas that may be pressed by a player to select games, make wagers, make gaming decisions, etc. The light device **71** may be coupled to the front face of the cabinet **50** and may enclose a plurality of lights **85**.

[**0044**] **FIG. 2A** illustrates one possible embodiment of the control panel **66**, which may be used where the gaming unit **20** is a slot machine having a plurality of mechanical or "virtual" reels. Referring to **FIG. 2**A, the control panel **66** may include a "See Pays" button **72** that, when activated, causes the display unit **70** to generate one or more display screens showing the odds or payout information for the game or games provided by the gaming unit **20**. As used herein, the term "button" is intended to encompass any device that allows a player to make an input, such as an input device that must be depressed to make an input selection or a display area that a player may simply touch. The control panel **66** may include a "Cash Out" button **74** that may be activated when a player decides to terminate play on the gaming unit **20**, in which case the gaming unit **20** may return value to the player, such as by returning a number of coins to the player via the payout tray **64**.

[**0045**] If the gaming unit **20** provides a slots game having a plurality of reels and a plurality of paylines which define winning combinations of reel symbols, the control panel **66** may be provided with a plurality of selection buttons **76**, each of which allows the player to select a different number of paylines prior to spinning the reels. For example, five buttons **76** may be provided, each of which may allow a player to select one, three, five, seven or nine paylines.

[**0046**] If the gaming unit **20** provides a slots game having a plurality of reels, the control panel **66** may be provided with a plurality of selection buttons **78** each of which allows a player to specify a wager amount for each payline selected. For example, if the smallest wager accepted by the gaming unit **20** is a quarter ($0.25), the gaming unit **20** may be provided with five selection buttons **78**, each of which may allow a player to select one, two, three, four or five quarters to wager for each payline selected. In that case, if a player were to activate the "5" button **76** (meaning that five paylines were to be played on the next spin of the reels) and then activate the "3" button **78** (meaning that three coins per payline were to be wagered), the total wager would be $3.75 (assuming the minimum bet was $0.25).

[**0047**] The control panel **66** may include a "Max Bet" button **80** to allow a player to make the maximum wager allowable for a game. In the above example, where up to nine paylines were provided and up to five quarters could be wagered for each payline selected, the maximum wager would be 45 quarters, or $11.25. The control panel **66** may include a spin button **82** to allow the player to initiate spinning of the reels of a slots game after a wager has been made.

[**0048**] In **FIG. 2A, a** rectangle is shown around the buttons **72**, **74**, **76**, **78**, **80**, **82**. It should be understood that that rectangle simply designates, for ease of reference, an area in which the buttons **72**, **74**, **76**, **78**, **80**, **82** may be located. Consequently, the term "control panel" should not be construed to imply that a panel or plate separate from the housing **50** of the gaming unit **20** is required, and the term "control panel" may encompass a plurality or grouping of player activatable buttons.

[**0049**] Although one possible control panel **66** is described above, it should be understood that different buttons could be utilized in the control panel **66**, and that the particular buttons used may depend on the game or games that could be played on the gaming unit **20**. Although the

control panel **66** is shown to be separate from the display unit **70**, it should be understood that the control panel **66** could be generated by the display unit **70**. In that case, each of the buttons of the control panel **66** could be a colored area generated by the display unit **70**, and some type of mechanism may be associated with the display unit **70** to detect when each of the buttons was touched, such as a touch-sensitive screen.

[**0050**] Furthermore, although one possible display unit **70** is described above, it should be understood that different embodiments could be utilized in the display unit **70**. For example, the display unit **70** may be a plurality of physical reels controlled by stepper motors as commonly known in the art. In that case, a player initiates spinning of the reels through any number of means, including pushing the spin button **82**. The physical reel may then be rotated and observed by the player through a display glass. The spinning reel may then be stopped and the outcome of the game determined.

[**0051**] **FIG. 2B** illustrates one possible embodiment of the light device **71**, which may be used where the gaming unit **20** is a slot machine having a plurality of mechanical or "virtual" reels. The light device **71** may be operatively coupled to the front face of the cabinet **50** of the gaming unit **20**, as shown in **FIG. 2**. The light device **71** may extend around the color video display unit **70** to provide an attractive "frame" for the display unit **70**. The light device **71** may be formed of a transparent plastic material which allows a player to view a plurality of lights **85** positioned within or behind the light device **71**. In one embodiment, the light device **71** may be constructed of molded plastic having an aperture sized to provide an unobstructed view of the display unit **70** when the light device **71** is attached to the front face of the cabinet **50**.

[**0052**] Furthermore, in the illustrated embodiment, the plurality of lights **85** may be disposed within a number of light segments **84**, for example, ninety light segments. Each light segment **84** may be a logical or physical subdivision of the light device **71**. Each segment **84** may be lit individually by a single light **85** or may be illuminated by several light emitting diodes (LEDs). By providing several LEDs, for example a red LED **88**, a green LED **90** and a blue LED **92**, an assortment of different colors per segment **84** may be generated. Moreover, it will be understood that the light device **71** may be any physical shape, and may have any number of light display attributes, including, for example, any number of segments, any number of supported colors, and any number of contrast and/or brightness settings. Furthermore, the light device may comprise any known or yet to be developed type of light device, including, by way of example, a cathode ray tube, an organic light emitting device, a plasma display, a liquid crystal display, or the like.

Gaming Unit Electronics

[**0053**] **FIG. 3** is a block diagram of a number of components that may be incorporated in the gaming unit **20**. Referring to **FIG. 3**, the gaming unit **20** may include a controller **100** that may comprise a program memory **102**, a microcontroller or microprocessor (MP) **104**, a random-access memory (RAM) **106** and an input/output (I/O) circuit **108**, all of which may be interconnected via an address/data bus **110**. It should be appreciated that although only one microprocessor **104** is shown, the controller **100** may include multiple microprocessors **104**. Similarly, the memory of the controller **100** may include multiple RAMs **106** and multiple program memories **102**. Although the I/O circuit **108** is shown as a single block, it should be appreciated that the I/O circuit **108** may include a number of different types of I/O circuits. The RAM(s) **104** and program memories **102** may be implemented as semiconductor memories, magnetically readable memories, and/or optically readable memories, for example.

[**0054**] Although the program memory **102** is shown in **FIG. 3** as a read-only memory (ROM) **102**, the program memory of the controller **100** may be a read/write or alterable memory, such as a hard disk. In the event a hard disk is used as a program memory, the address/data bus **110** shown schematically in **FIG. 3** may comprise multiple address/data buses, which may be of different types, and there may be an I/O circuit disposed between the address/data buses.

[**0055**] **FIG. 3** illustrates that the control panel **66**, the coin acceptor **52**, the bill acceptor **54**, the card reader **58** and the ticket reader/printer **56** may be operatively coupled to the I/O circuit **108**, each component being so coupled by either a unidirectional or bidirectional, single-line or multiple-line data link, which may depend on the design of the component that is used. Additionally, a sequencer **111** may also be operatively coupled to the I/O circuit **108**. The sequencer **111** may be implemented by software, hardware or firmware as is well known in the art. The sequencer **111** may function as a mixer, synchronizer and manager of video and audio presentations by the gaming unit **20**. The speaker(s) **62** may be operatively coupled to a sound circuit **112**, that may comprise a voice- and sound-synthesis circuit or that may comprise a driver circuit. The sound-generating circuit **112** may be coupled to the I/O circuit **108**.

[**0056**] The components **52**, **54**, **56**, **58**, **66**, **111**, **112**, as shown, may be connected to the I/O circuit **108** via a respective direct line or conductor. Different connection schemes could be used. For example, one or more of the components shown in **FIG. 3** may be connected to the I/O circuit **108** via a common bus or other data link that is shared by a number of components. Furthermore, some of the components may be directly connected to the microprocessor **104** without passing through the I/O circuit **108**.

[**0057**] **FIG. 3** also illustrates that the light device **71** may be operatively connected to the I/O circuit **108**, via a light controller **114**. The use of a gaming machine having a plurality of gaming peripherals, each communicating with a gaming machine controller via a standard peripheral bus connection is described in U.S. Pat. No. 6,251,014 to Stockdale, et al., and is hereby incorporated by reference. In the present example, the light controller **114** may be coupled to the I/O circuit **108** by a standard peripheral bus connection **116**, for example a Universal Serial Bus (USB) version 1.1 standard peripheral bus. The light device **71** may be operatively connected to the light controller **114** by an address/data bus **118** which may be either a unidirectional or bidirectional, single-line or multiple-line data link, depending on the design of the component that is used.

[**0058**] The standard peripheral bus connection **116** may be a plug-and-play interface between the controller **100** and the light controller **114**. With the bus connection **116**, a new light

device **71** may be added to the gaming unit **20** without having to add an adapter card or even having to turn the gaming unit **20** off. The plug-and-play bus connection **116** may give the gaming unit **20** operator the ability to plug a light device **71** into the gaming unit **20** and have the gaming unit **20** recognize that the light device **71** is there. For instance, if the light device **71** is newly connected to the controller **100** via the standard peripheral bus connection **116**, the controller **100** may send a "discover" request asking if there were any light devices connected. The light device **71** may then identify itself to the controller **100**. The light device **71** may also be able to report errors to the controller **100**, such as a non-functioning light, and allow the controller **100** to report the error accordingly.

[**0059**] **FIG. 3A** is a block diagram of a number of components that may be incorporated in the light controller **114**. Referring to **FIG. 3**A, the light controller **114** may include a peripheral bus connector **120**, a light device connector **122**, and a light controller microcontroller or microprocessor (MP) **124**. As will be understood, the light controller **114** may also have a program memory **126**, a random-access memory (RAM) **128** and a jumper **130** for configuring hardware settings. All of the components may be interconnected via an address/data bus **132**. Additionally, the light controller **114** may include a light device input/output (I/O) circuit **122**. The light device **71** may be connected to the light device I/O circuit **122** via the address/data bus **118**. The light controller **114** may be self-powered (e.g., receives power from an external source) or bus-powered (e.g., receives power from the bus **116**). The light controller **114** may be operatively coupled to a plurality of light devices **71**, and furthermore, the light device **71** may be operatively coupled to a plurality of light controllers **114**.

[**0060**] The light controller **114** may be controlled by software, hardware, or firmware, located in the light controller MP **124**, in program memory **126**, or both. If firmware is used, the firmware may be responsible for interpreting lighting commands from the gaming unit **20** controller **100**, as is described in detail below. Upon interpretation of the lighting commands, the light controller **114** may send the appropriate lighting commands to the lights **85** via the data link **118**. Specifically, the lights **85** may be electrically connected together, or independently to the data link **118**, and may be illuminated upon receiving the appropriate command from the light controller **114**.

[**0061**] The light device **71** may be connected to the light device I/O circuit **122** via a direct line or conductor. Different connection schemes could be used. For example, the light device **71** may be connected to the light device I/O circuit **122** via a common bus or other data link that is shared by a number of light devices. Furthermore, the light device **71** may be directly connected to the light controller MP **124** without passing through the light device I/O circuit **122**. Still further, the light device I/O circuit **122** may be operatively connected to a plurality of light devices **71**.

Overall Operation of Gaming Unit

[**0062**] One manner in which one or more of the gaming units **20** (and one or more of the gaming units **30**) may operate is described below in connection with a number of flowcharts which represent a number of portions or routines of one or more computer programs, which may be stored in one or more of the memories of the controller **100**. The computer program(s) or portions thereof may be stored remotely, outside of the gaming unit **20**, and may control the operation of the gaming unit **20** from a remote location. Such remote control may be facilitated with the use of a wireless connection, or by an Internet interface that connects the gaming unit **20** with a remote computer (such as one of the network computers **22**, **32**) having a memory in which the computer program portions are stored. The computer program portions may be written in any high level language such as C, C++, C#, Java or the like or any low-level assembly or machine language. By storing the computer program portions therein, various portions of the memories **102**, **106** are physically and/or structurally configured in accordance with computer program instructions.

[**0063**] **FIG. 4** is a flowchart of a main operating routine **200** that may be stored in the memory of the controller **100**. Referring to **FIG. 4**, the main routine **200** may begin operation at block **202** during which an attraction sequence may be performed in an attempt to induce a potential player in a casino to play the gaming unit **20**. The attraction sequence may be performed by displaying one or more video images on the display unit **70** and/or causing one or more sound segments, such as voice or music, to be generated via the speakers **62**. The attraction sequence may include a scrolling list of games that may be played on the gaming unit **20** and/or video images of various games being played, such as video poker, video blackjack, video slots, video keno, video bingo, etc.

[**0064**] During performance of the attraction sequence, if a potential player makes any input to the gaming unit **20** as determined at block **204**, the attraction sequence may be terminated and a game-selection display may be generated on the display unit **70** at block **206** to allow the player to select a game available on the gaming unit **20**. The gaming unit **20** may detect an input at block **204** in various ways. For example, the gaming unit **20** could detect if the player presses any button on the gaming unit **20**; the gaming unit **20** could determine if the player deposited one or more coins into the gaming unit **20**; the gaming unit **20** could determine if player deposited paper currency into the gaming unit; etc.

[**0065**] The game-selection display generated at block **206** may include, for example, a list of video games that may be played on the gaming unit **20** and/or a visual message to prompt the player to deposit value into the gaming unit **20**. While the game-selection display is generated, the gaming unit **20** may wait for the player to make a game selection. Upon selection of one of the games by the player as determined at block **208**, the controller **100** may cause one of a number of game routines to be performed to allow the selected game to be played. For example, the game routines could include a video poker routine **210**, a video blackjack routine **220**, a slots routine **230**, a video keno routine **240**, a video bingo routine **250**, and a video pachinko routine **252**. At block **208**, if no game selection is made within a given period of time, the operation may branch back to block **202**.

[**0066**] After one of the routines **210**, **220**, **230**, **240**, **250**, **252** has been performed to allow the player to play one of the games, block **260** may be utilized to determine whether the player wishes to terminate play on the gaming unit **20** or to select another game. If the player wishes to stop playing the gaming unit **20**, which wish may be expressed, for

example, by selecting a "Cash Out" button, the controller **100** may dispense value to the player at block **262** based on the outcome of the game(s) played by the player. The operation may then return to block **202**. If the player did not wish to quit as determined at block **260**, the routine may return to block **208** where the game-selection display may again be generated to allow the player to select another game.

[**0067**] It should be noted that although five gaming routines are shown in **FIG. 4, a** different number of routines could be included to allow play of a different number of games. The gaming unit **20** may also be programmed to allow play of different games.

[**0068**] **FIG. 5** is a flowchart of an alternative main operating routine **300** that may be stored in the memory of the controller **100**. The main routine **300** may be utilized for gaming units **20** that are designed to allow play of only a single game or single type of game. Referring to **FIG. 5**, the main routine **300** may begin operation at block **302** during which an attraction sequence may be performed in an attempt to induce a potential player in a casino to play the gaming unit **20**. The attraction sequence may be performed by displaying one or more video images on the display unit **70** and/or causing one or more sound segments, such as voice or music, to be generated via the speakers **62**.

[**0069**] During performance of the attraction sequence, if a potential player makes any input to the gaming unit **20** as determined at block **304**, the attraction sequence may be terminated and a game display may be generated on the display unit **70** at block **306**. The game display generated at block **306** may include, for example, an image of the casino game that may be played on the gaming unit **20** and/or a visual message to prompt the player to deposit value into the gaming unit **20**. At block **308**, the gaming unit **20** may determine if the player requested information concerning the game, in which case the requested information may be displayed at block **310**. Block **312** may be used to determine if the player requested initiation of a game, in which case a game routine **320** may be performed. The game routine **320** could be any one of the game routines disclosed herein, such as one of the five game routines **210**, **220**, **230**, **240**, **250**, **252**, or another game routine.

[**0070**] After the routine **320** has been performed to allow the player to play the game, block **322** may be utilized to determine whether the player wishes to terminate play on the gaming unit **20**. If the player wishes to stop playing the gaming unit **20**, which wish may be expressed, for example, by selecting a "Cash Out" button, the controller **100** may dispense value to the player at block **324** based on the outcome of the game(s) played by the player. The operation may then return to block **302**. If the player did not wish to quit as determined at block **322**, the operation may return to block **308**.

Display Operating Routine

[**0071**] During performance of the main operating routine **200** or the alternative main operating routine **300** as described above, the controller **100** may initiate a light display on the lights **85**. For example, the controller **100** may initiate a light display on the light device **71** during the attraction sequences **202**, **302**, for the purpose of attracting a player. It will be understood that the controller **100** may initiate a light display during various stages of the main operating routines **300**, including during game play, or to inform the player of various game occurrences, such as bonus games, or winning play.

[**0072**] **FIG. 6A** is a flowchart of a main operating routine **330** that may be stored in the memory of the controller **100** to initiate the light display. Referring to **FIG. 6A**, the main routine **330** may begin operation at block **332** during which the controller **100** may read a pattern file **334** stored in the program memory **102**. It will be appreciated that while in the disclosed example the pattern file **334** is stored in the program memory **102**, it may be stored in any storage element, including any internal, or external storage device.

[**0073**] The pattern file **334** may specify a pattern that has approximately the same shape as the physical light device **71**. The pattern file may contain a series of pattern frames with attributes such as: color; display duration; total segments supported, e.g., the preferred number of light segments; total number of pattern frames contained within the file; a delay counter; a compression type description, e.g., JPEG compression; and a pattern frame number.

[**0074**] The pattern file **334** may be created by a pattern file interface program which may operate on the controller **100**, or alternatively, operate on a separate controller not shown. **FIG. 6C** is a flowchart of a main pattern creation routine **800** that may be stored in the memory of the controller **100** to create the pattern file **334**. Referring to **FIG. 6C**, the main pattern creation routine **800** may begin operation at block **802** during which the controller **100** may read a pattern file **334** stored in the program memory **102** and determine if the pattern file **334** is complete. If the pattern file **334** is complete, the main pattern creation routine may terminate. Again, it will be appreciated that while in the disclosed example the pattern file **334** is stored in the program memory **102**, it may be stored in any storage element, including any internal, or external storage device and moreover, the pattern file **334** may not have been created and thus, not stored in any storage device.

[**0075**] If the pattern file **334** is not complete, at a block **804**, the pattern file **334** may be created as a new file, an existing pattern file **334** may be edited, or the pattern file **334** may be viewed. If the pattern file **334** is created as a new file, a new pattern file **334** may be created at a block **806**. A pattern frame may be created at a block **808**, and the attributes of the pattern frame may be modified at a block **810**. If more pattern frames are desired to be created, processing may be returned to the block **808** by a block **812**. Otherwise, the pattern file **334** may be saved at a block **814** and processing returned to the block **802**.

[**0076**] If an existing pattern file **334** is modified, an existing pattern file **334** may be opened at a block **816**. A pattern frame may be selected for modification or addition at a block **818**, and the attributes of the chosen pattern frame may be modified at a block **820**. If more pattern frames are desired to be modified or added, processing may be returned to the block **818** by a block **822**. Otherwise, the pattern file **334** may be saved at a block **824** and processing returned to the block **802**. To view a preview of the pattern file **334**, the pattern frames may be visually cycled through at a block **826**.

[**0077**] Returning to **FIG. 6A**, at a block **336** the controller **100** determines whether there is a pattern frame to display.

If there is no pattern frame to display, the main routine **330** may terminate. If, however, there is a pattern frame to display, the controller **100** may send the pattern frame to the light controller **114** at a block **338** via peripheral bus connection **116**. As is described below, in connection with **FIG. 6**B, the light controller **114** may process and display the pattern frame on the light device **71**.

[**0078**] Upon sending the pattern frame to the light controller **114**, the controller **100** may utilize the delay counter contained in the pattern file **334** to delay for a specified period of time. During the delay, the controller **100** may be free to continue processing the main operating routines **200**, **300** as necessary. Once the delay is complete, the operation may return to the block **336**.

[**0079**] While the pattern frame may usually be played in coordination with the specified delay, it may be desirable to coordinate the pattern frame display with other animations and/or sounds. For example, the gaming designer may wish for the light pattern frame to emphasize an event, such as, for example, an attraction sequence, a gaming win or the triggering of a bonus play, each of which are described below. Hence, the controller **100** may be programmed to utilize the sequencer **111** to synchronize the display of the light pattern frame with other gaming unit **20** animations and/or sounds by adjusting the delay counter contained in the pattern file **334**.

[**0080**] To perform synchronization, the sequencer **111** may utilize the timing specified within the pattern file **334**, or may utilize another timing source, such as the timing associated with the animation or sound being coordinated. For example, the pattern file **334** may contain two pattern frames while an attraction sequence may contain two distinct sequences. The sequencer **111** may synchronize the first pattern frame with the first attraction sequence, and synchronize the second pattern frame with the second attraction sequence.

Light Controller Operating Routine

[**0081**] Referring now to **FIG. 6**B, there is illustrated a flowchart of a main operating routine **340** that may be stored in the memory of the light controller **114** to display the light pattern frame. As described herein above, The main operating routine may be implemented by software, hardware, or firmware, located in the light controller MP **124**, in program memory **126**, or both.

[**0082**] The display pattern frame may be received at the light controller **114** by the peripheral bus connector **120** which is operatively connected to the peripheral bus connection **116**. The peripheral bus connector **120** may transmit the pattern frame to the light controller MP **124** via the address/data bus **132**. Once received by the light controller MP **124**, the light controller **114** may parse the pattern file **334** at block **344**. For instance, the light controller **114** may divide the pattern file **334** into the individual attributes contained within the file.

[**0083**] At a block **346**, the light controller MP **124** may interpret the parsed pattern frame for proper display on the light device **71**. Specifically, the pattern frame may include attributes not visually supported by the light device **71** and which may need to be altered to display correctly. For example, the pattern frame may specify a "light green" attribute, while the light device **71** only is capable of displaying one shade of green. In such a situation, the light controller MP **124** may interpret and adapt the "light green" to mean "green" as supported by the light device **71** and alter the attribute accordingly, thereby allowing the color to displaying as correctly as possible based on the limitations of the light device. Similarly, in another example, the pattern frame may specify forty-five segments, while the light device **71** may support ninety segments. In this instance, the light controller MP **124** may duplicate each segment to double the supported number of segments and thereby display correctly. Once the pattern frame is interpreted, at a block **348**, the light controller MP **124** may send the modified pattern frame to the light device **71**, via the light device connector **122**, for display.

Video Poker

[**0084**] **FIG. 7** is an exemplary display **350** that may be shown on the display unit **70** during performance of the video poker routine **210** shown schematically in **FIG. 4**. Referring to **FIG. 7**, the display **350** may include video images **352** of a plurality of playing cards representing the player's hand, such as five cards. To allow the player to control the play of the video poker game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Hold" button **354** disposed directly below each of the playing card images **352**, a "Cash Out" button **356**, a "See Pays" button **358**, a "Bet One Credit" button **360**, a "Bet Max Credits" button **362**, and a "Deal/Draw" button **364**. The display **350** may also include an area **366** in which the number of remaining credits or value is displayed. If the display unit **70** is provided with a touch-sensitive screen, the buttons **354**, **356**, **358**, **360**, **362**, **364** may form part of the video display **350**. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit **70**.

[**0085**] **FIG. 8** is a flowchart of the video poker routine **210** shown schematically in **FIG. 4**. Referring to **FIG. 8**, at block **370**, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button **358**, in which case at block **372** the routine may cause one or more pay tables to be displayed on the display unit **70**. At block **374**, the routine may determine whether the player has made a bet, such as by pressing the "Bet One Credit" button **360**, in which case at block **376** bet data corresponding to the bet made by the player may be stored in the memory of the controller **100**. At block **378**, the routine may determine whether the player has pressed the "Bet Max Credits" button **362**, in which case at block **380** bet data corresponding to the maximum allowable bet may be stored in the memory of the controller **100**.

[**0086**] At block **382**, the routine may determine if the player desires a new hand to be dealt, which may be determined by detecting if the "Deal/Draw" button **364** was activated after a wager was made. In that case, at block **384** a video poker hand may be "dealt" by causing the display unit **70** to generate the playing card images **352**. After the hand is dealt, at block **386** the routine may determine if any of the "Hold" buttons **354** have been activated by the player, in which case data regarding which of the playing card images **352** are to be "held" may be stored in the controller **100** at block **388**. If the "Deal/Draw" button **364** is activated again as determined at block **390**, each of the playing card

images **352** that was not "held" may be caused to disappear from the video display **350** and to be replaced by a new, randomly selected, playing card image **352** at block **392**.

[**0087**] At block **394**, the routine may determine whether the poker hand represented by the playing card images **352** currently displayed is a winner. That determination may be made by comparing data representing the currently displayed poker hand with data representing all possible winning hands, which may be stored in the memory of the controller **100**. If there is a winning hand, a payout value corresponding to the winning hand may be determined at block **396**. At block **398**, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the hand was a winner, the payout value determined at block **396**. The cumulative value or number of credits may also be displayed in the display area **366** (**FIG. 7**).

[**0088**] Although the video poker routine **210** is described above in connection with a single poker hand of five cards, the routine **210** may be modified to allow other versions of poker to be played. For example, seven card poker may be played, or stud poker may be played. Alternatively, multiple poker hands may be simultaneously played. In that case, the game may begin by dealing a single poker hand, and the player may be allowed to hold certain cards. After deciding which cards to hold, the held cards may be duplicated in a plurality of different poker hands, with the remaining cards for each of those poker hands being randomly determined.

Video Blackjack

[**0089**] **FIG. 9** is an exemplary display **400** that may be shown on the display unit **70** during performance of the video blackjack routine **220** shown schematically in **FIG. 4**. Referring to **FIG. 9**, the display **400** may include video images **402** of a pair of playing cards representing a dealer's hand, with one of the cards shown face up and the other card being shown face down, and video images **404** of a pair of playing cards representing a player's hand, with both the cards shown face up. The "dealer" may be the gaming unit **20**.

[**0090**] To allow the player to control the play of the video blackjack game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button **406**, a "See Pays" button **408**, a "Stay" button **410**, a "Hit" button **412**, a "Bet One Credit" button **414**, and a "Bet Max Credits" button **416**. The display **400** may also include an area **418** in which the number of remaining credits or value is displayed. If the display unit **70** is provided with a touch-sensitive screen, the buttons **406**, **408**, **410**, **412**, **414**, **416** may form part of the video display **400**. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit **70**.

[**0091**] **FIG. 10** is a flowchart of the video blackjack routine **220** shown schematically in **FIG. 4**. Referring to **FIG. 10**, the video blackjack routine **220** may begin at block **420** where it may determine whether a bet has been made by the player. That may be determined, for example, by detecting the activation of either the "Bet One Credit" button **414** or the "Bet Max Credits" button **416**. At block **422**, bet data corresponding to the bet made at block **420** may be stored in the memory of the controller **100**. At block **424**, a dealer's hand and a player's hand may be "dealt" by making the playing card images **402**, **404** appear on the display unit **70**.

[**0092**] At block **426**, the player may be allowed to be "hit," in which case at block **428** another card will be dealt to the player's hand by making another playing card image **404** appear in the display **400**. If the player is hit, block **430** may determine if the player has "bust," or exceeded 21. If the player has not bust, blocks **426** and **428** may be performed again to allow the player to be hit again.

[**0093**] If the player decides not to hit, at block **432** the routine may determine whether the dealer should be hit. Whether the dealer hits may be determined in accordance with predetermined rules, such as the dealer always hit if the dealer's hand totals 15 or less. If the dealer hits, at block **434** the dealer's hand may be dealt another card by making another playing card image **402** appear in the display **400**. At block **436** the routine may determine whether the dealer has bust. If the dealer has not bust, blocks **432**, **434** may be performed again to allow the dealer to be hit again.

[**0094**] If the dealer does not hit, at block **438** the outcome of the blackjack game and a corresponding payout may be determined based on, for example, whether the player or the dealer has the higher hand that does not exceed 21. If the player has a winning hand, a payout value corresponding to the winning hand may be determined at block **440**. At block **442**, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the player won, the payout value determined at block **440**. The cumulative value or number of credits may also be displayed in the display area **418** (**FIG. 9**).

Slots

[**0095**] **FIG. 11** is an exemplary display **450** that may be shown on the display unit **70** during performance of the slots routine **230** shown schematically in **FIG. 4**. Referring to **FIG. 11**, the display **450** may include video images **452** of a plurality of slot machine reels, each of the reels having a plurality of reel symbols **454** associated therewith. Although the display **450** shows five reel images **452**, each of which may have three reel symbols **454** that are visible at a time, other reel configurations could be utilized.

[**0096**] To allow the player to control the play of the slots game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button **456**, a "See Pays" button **458**, a plurality of payline-selection buttons **460** each of which allows the player to select a different number of paylines prior to "spinning" the reels, a plurality of bet-selection buttons **462** each of which allows a player to specify a wager amount for each payline selected, a "Spin" button **464**, and a "Max Bet" button **466** to allow a player to make the maximum wager allowable.

[**0097**] **FIG. 12** is a flowchart of the slots routine **230** shown schematically in **FIG. 4**. Referring to **FIG. 12**, at block **470**, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button **458**, in which case at block **472** the routine may cause one or more pay tables to be displayed on the display unit **70**. At block **474**, the routine may determine whether the player has pressed one of the payline-selection buttons **460**, in which case at block **476** data corresponding to the number of paylines selected by the player may be stored in the

memory of the controller **100**. At block **478**, the routine may determine whether the player has pressed one of the bet-selection buttons **462**, in which case at block **480** data corresponding to the amount bet per payline may be stored in the memory of the controller **100**. At block **482**, the routine may determine whether the player has pressed the "Max Bet" button **466**, in which case at block **484** bet data (which may include both payline data and bet-per-payline data) corresponding to the maximum allowable bet may be stored in the memory of the controller **100**.

[**0098**] If the "Spin" button **464** has been activated by the player as determined at block **486**, at block **488** the routine may cause the slot machine reel images **452** to begin "spinning" so as to simulate the appearance of a plurality of spinning mechanical slot machine reels. At block **490**, the routine may determine the positions at which the slot machine reel images will stop, or the particular symbol images **454** that will be displayed when the reel images **452** stop spinning. At block **492**, the routine may stop the reel images **452** from spinning by displaying stationary reel images **452** and images of three symbols **454** for each stopped reel image **452**. The virtual reels may be stopped from left to right, from the perspective of the player, or in any other manner or sequence.

[**0099**] The routine may provide for the possibility of a bonus game or round if certain conditions are met, such as the display in the stopped reel images **452** of a particular symbol **454**. If there is such a bonus condition as determined at block **494**, the routine may proceed to block **496** where a bonus round may be played. The bonus round may be a different game than slots, and many other types of bonus games could be provided. If the player wins the bonus round, or receives additional credits or points in the bonus round, a bonus value may be determined at block **498**. A payout value corresponding to outcome of the slots game and/or the bonus round may be determined at block **500**. At block **502**, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the slot game and/or bonus round was a winner, the payout value determined at block **500**.

[**0100**] Although the above routine has been described as a virtual slot machine routine in which slot machine reels are represented as images on the display unit **70**, actual slot machine reels that are capable of being spun may be utilized instead.

Video Keno

[**0101**] **FIG. 13** is an exemplary display **520** that may be shown on the display unit **70** during performance of the video keno routine **240** shown schematically in **FIG. 4**. Referring to **FIG. 13**, the display **520** may include a video image **522** of a plurality of numbers that were selected by the player prior to the start of a keno game and a video image **524** of a plurality of numbers randomly selected during the keno game. The randomly selected numbers may be displayed in a grid pattern.

[**0102**] To allow the player to control the play of the keno game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button **526**, a "See Pays" button **528**, a "Bet One Credit" button **530**, a "Bet Max Credits" button **532**, a "Select Ticket" button **534**, a "Select Number" button **536**, and a "Play" button **538**. The display **520** may also include an area **540** in which the number of remaining credits or value is displayed. If the display unit **70** is provided with a touch-sensitive screen, the buttons may form part of the video display **520**. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit **70**.

[**0103**] **FIG. 14** is a flowchart of the video keno routine **240** shown schematically in **FIG. 4**. The keno routine **240** may be utilized in connection with a single gaming unit **20** where a single player is playing a keno game, or the keno routine **240** may be utilized in connection with multiple gaming units **20** where multiple players are playing a single keno game. In the latter case, one or more of the acts described below may be performed either by the controller **100** in each gaming unit or by one of the network computer **22**, **32** to which multiple gaming units **20** are operatively connected.

[**0104**] Referring to **FIG. 14**, at block **550**, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button **528**, in which case at block **552** the routine may cause one or more pay tables to be displayed on the display unit **70**. At block **554**, the routine may determine whether the player has made a bet, such as by having pressed the "Bet One Credit" button **530** or the "Bet Max Credits" button **532**, in which case at block **556** bet data corresponding to the bet made by the player may be stored in the memory of the controller **100**. After the player has made a wager, at block **558** the player may select a keno ticket, and at block **560** the ticket may be displayed on the display **520**. At block **562**, the player may select one or more game numbers, which may be within a range set by the casino. After being selected, the player's game numbers may be stored in the memory of the controller **100** at block **564** and may be included in the image **522** on the display **520** at block **566**. After a certain amount of time, the keno game may be closed to additional players (where a number of players are playing a single keno game using multiple gambling units **20**).

[**0105**] If play of the keno game is to begin as determined at block **568**, at block **570** a game number within a range set by the casino may be randomly selected either by the controller **100** or a central computer operatively connected to the controller, such as one of the network computers **22**, **32**. At block **572**, the randomly selected game number may be displayed on the display unit **70** and the display units **70** of other gaming units **20** (if any) which are involved in the same keno game. At block **574**, the controller **100** (or the central computer noted above) may increment a count which keeps track of how many game numbers have been selected at block **570**.

[**0106**] At block **576**, the controller **100** (or one of the network computers **22**, **32**) may determine whether a maximum number of game numbers within the range have been randomly selected. If not, another game number may be randomly selected at block **570**. If the maximum number of game numbers has been selected, at block **578** the controller **100** (or a central computer) may determine whether there are a sufficient number of matches between the game numbers selected by the player and the game numbers selected at block **570** to cause the player to win. The number of matches may depend on how many numbers the player selected and the particular keno rules being used.

[0107] If there are a sufficient number of matches, a payout may be determined at block **580** to compensate the player for winning the game. The payout may depend on the number of matches between the game numbers selected by the player and the game numbers randomly selected at block **570**. At block **582**, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the keno game was won, the payout value determined at block **580**. The cumulative value or number of credits may also be displayed in the display area **540** (**FIG. 13**).

Video Bingo

[0108] **FIG. 15** is an exemplary display **600** that may be shown on the display unit **70** during performance of the video bingo routine **250** shown schematically in **FIG. 4**. Referring to **FIG. 15**, the display **600** may include one or more video images **602** of a bingo card and images of the bingo numbers selected during the game. The bingo card images **602** may have a grid pattern.

[0109] To allow the player to control the play of the bingo game, a plurality of player-selectable buttons may be displayed. The buttons may include a "Cash Out" button **604**, a "See Pays" button **606**, a "Bet One Credit" button **608**, a "Bet Max Credits" button **610**, a "Select Card" button **612**, and a "Play" button **614**. The display **600** may also include an area **616** in which the number of remaining credits or value is displayed. If the display unit **70** is provided with a touch-sensitive screen, the buttons may form part of the video display **600**. Alternatively, one or more of those buttons may be provided as part of a control panel that is provided separately from the display unit **70**.

[0110] **FIG. 16** is a flowchart of the video bingo routine **250** shown schematically in **FIG. 4**. The bingo routine **250** may be utilized in connection with a single gaming unit **20** where a single player is playing a bingo game, or the bingo routine **250** may be utilized in connection with multiple gaming units **20** where multiple players are playing a single bingo game. In the latter case, one or more of the acts described below may be performed either by the controller **100** in each gaming unit **20** or by one of the network computers **22**, **32** to which multiple gaming units **20** are operatively connected.

[0111] Referring to **FIG. 16**, at block **620**, the routine may determine whether the player has requested payout information, such as by activating the "See Pays" button **606**, in which case at block **622** the routine may cause one or more pay tables to be displayed on the display unit **70**. At block **624**, the routine may determine whether the player has made a bet, such as by having pressed the "Bet One Credit" button **608** or the "Bet Max Credits" button **610**, in which case at block **626** bet data corresponding to the bet made by the player may be stored in the memory of the controller **100**.

[0112] After the player has made a wager, at block **628** the player may select a bingo card, which may be generated randomly and displayed on the display unit **70** at a block **630**. The player may select more than one bingo card, and there may be a maximum number of bingo cards that a player may select. After play is to commence as determined at block **632**, at block **634** a bingo number may be randomly generated by the controller **100** or a central computer such as one of the network computers **22**, **32**. At block **636**, the bingo number may be displayed on the display unit **70** and the display units **70** of any other gaming units **20** involved in the bingo game.

[0113] At block **638**, the controller **100** (or a central computer) may determine whether any player has won the bingo game. If no player has won, another bingo number may be randomly selected at block **634**. If any player has bingo as determined at block **638**, the routine may determine at block **640** whether the player playing that gaming unit **20** was the winner. If so, at block **642** a payout for the player may be determined. The payout may depend on the number of random numbers that were drawn before there was a winner, the total number of winners (if there was more than one player), and the amount of money that was wagered on the game. At block **644**, the player's cumulative value or number of credits may be updated by subtracting the bet made by the player and adding, if the bingo game was won, the payout value determined at block **642**. The cumulative value or number of credits may also be displayed in the display area **616** (**FIG. 15**).

Video Pachinko

[0114] **FIG. 17** is an exemplary display **650** that may be shown on the display unit **70** during performance of the video pachinko routine **252** shown schematically in **FIG. 4**. Referring to **FIG. 17**, the display **650** may include one or more video images of a pachinko board **652** and an image of a pachinko ball **654** used during the game. Typically, the video pachinko game outcome presentation on the display **70** may begin with the pachinko ball **654** from a ball reservoir **655** being placed on a ramp **656** in front of a plunger **657**. The number of pachinko balls in the reservoir **655** may correspond to the number of credits a player has. Further, the number of credits represented by each ball may not be the same. For example, each ball may be color coded to represent a different wager amount. A silver ball might be worth **1** credit, a red ball might be worth **3** credits while a green ball might be worth **5** credits. The player may select a ball for a game from the ball reservoir **655** using gaming machine inputs including input buttons or a touch screen.

[0115] After a player selects a ball representing a certain wager amount and initiates a game play, the controller **100** may determine a game outcome and present a compatible game outcome presentation. On the display **70**, a virtual plunger **657** may be drawn backward away from the ball **654** and then released. When the plunger **657** is released, it may move forward toward the ball **654** and may appear to strike the ball **654**. After being hit by the plunger **657**, the ball **654** may be launched up the ramp **656** into a game playing area **658**. Typically, only one ball **654** may be launched up the ramp **656** at one time. However, two or more balls **654** may be launched at the same time, each ball **654** representing a different game with an independently calculated game outcome.

[0116] In the game playing area **658**, balls **654** may appear to interact with different objects while falling through the game playing area **658** including pegs **659**, an outer wall **660**, and inner wall **661**, flippers **662**, bonus region separator **663**, a cup **664**, a spinner **665**, and a ball exit **666**. For example, when a ball **654** appears to collide with a peg **659**, the trajectory of the ball **654** may be altered. Typically, the ball **654** may appear to collide with many different combi-

nations of objects before exiting the game playing area **658**. The exit of the ball **654** may correspond to the game outcome determined by the controller **100**. For example, when the ball **654** exits the game playing area **658** through the ball exit **666**, a player may lose the wager on the game. When the ball **654** exits the game playing area **658** through one of the cups **664** or the bonus region exit **667**, the game outcome may be an award of some type.

[**0117**] Many other objects and exits are also possible with a pachinko game. These objects and exits may vary in size and location on the video display **70**. Further, the distribution and number of objects on the video display **70** are not fixed and may be varied to change the game outcome presentation. However, the game outcome presentation does not affect the determination of the game outcome by the controller **100**.

[**0118**] **FIG. 18** is a flow chart of the pachinko routine **252** shown schematically in **FIG. 4**. In a block **670**, a player may initiate a game by making a wager. In a block **672**, the controller **100** may receive a presentation mode signal. The presentation mode signal may carry information regarding selections by the player for one or more of the following game inputs including game speed, game background pattern, elasticity of the pachinko balls, size of the pachinko balls or the game layout. The controller **100** may use the presentation mode signal to determine features of a game outcome presented to the player. In block **674**, the controller **100** receives a signal to start the pachinko gaming routine. In the block **676**, the controller **100** determines a game outcome using a random number generator and a pay table stored within a memory in the gaming machine. The game outcome may be affected by the wager the player has made on this game and previous games or the number of game outcome presentations being presented such as a player playing multiple pachinko balls at one time.

[**0119**] In block **678**, the controller **100** may receive a game presentation input signal. This signal may be used to determine the features of a game outcome presentation. For example, a game presentation input signal received by the controller **100** may contain information regarding the distance the player has moved a plunger away from a pachinko ball on the display screen **70**. This distance may be used to generate or select a trajectory for a game outcome presentation. In block **680**, the controller determines the game outcome presentation. The features of the game outcome presentation may depend on information from the presentation mode signal from block **672**, the game outcome determined by the controller **100** in block **676**, the information received from the presentation input signal in block **678** and information from previous game outcome presentations currently being presented on the display **70**.

[**0120**] In block **682**, after calculating an appropriate game outcome presentation for the game, the game outcome presentation is displayed on the display **70**. In block **684**, the game outcome is displayed on the display **70**. The game outcome may be a message of some type containing information regarding whether the outcome of the game is an award of some amount or loss of the wager made on the game.

[**0121**] Although the above routine has been described as a virtual pachinko machine routine in which a pachinko board and pachinko balls are represented as images on the display unit **70**, actual pachinko boards and pachinko balls capable of being manually manipulated may be utilized instead.

What is claimed is:

1. A gaming apparatus, comprising:

a display unit that is capable of generating video images;

a value input device;

a light bezel having a plurality of independently operable lights, said independently operable lights being capable of displaying visual colors;

a gaming unit controller operatively coupled to said display unit and said value input device, said gaming unit controller comprising a first processor and a first memory operatively coupled to said first processor,

said gaming unit controller being programmed to allow a person to make a wager,

said gaming unit controller being programmed to cause a video image representing a game to be generated on said display unit, said video image representing one of the following games: video poker, video blackjack, video slots, video keno or video bingo,

said video image comprising an image of at least five playing cards if said game comprises video poker,

said video image comprising an image of a plurality of simulated slot machine reels if said game comprises video slots,

said video image comprising an image of a pachinko board and a pachinko ball if said game comprises video pachinko,

said video image comprising an image of a plurality of playing cards if said game comprises video blackjack,

said video image comprising an image of a plurality of keno numbers if said game comprises video keno,

said video image comprising an image of a bingo grid if said game comprises video bingo,

said gaming unit controller being programmed to determine a value payout associated with an outcome of said game,

said gaming unit controller being programmed to read a light display pattern file stored in said first memory, said light display pattern file having a first light display pattern and a second light display pattern, each of said light display patterns having color illumination data for illuminating said plurality of lights; and

a light bezel controller operatively coupled to said light bezel and operatively coupled to said gaming unit controller via a universal serial bus (USB) peripheral bus connection, said light bezel controller comprising a second processor and a second memory operatively coupled to said second processor,

said light bezel controller being programmed to receive one of said light display patterns from said gaming unit controller,

said light bezel controller being programmed to read said illumination data contained within said light display pattern, and

said light bezel controller being programmed to cause the light display pattern to be generated on said light bezel by illuminating said plurality of lights in accordance with said illumination data.

2. A gaming apparatus as defined in claim 1, said light bezel controller being programmed to adapt said illumination data contained within said light display pattern to allow said illumination data to be capable of being generated on said plurality of lights of said light bezel.

3. A gaming apparatus as defined in claim 2, said light bezel controller being programmed to adapt said illumination data contained within said light display pattern to allow said illumination data to be capable of being generated on a second light bezel having a second plurality of lights.

4. A gaming apparatus as defined in claim 1, said gaming unit controller being programmed to initiate a light display on said light device to attract a player to said gaming unit.

5. A gaming apparatus as defined in claim 1, said gaming unit controller being programmed to initiate a light display on said light device to inform a player of said gaming unit of the status of a game play.

6. A gaming system comprising a plurality of gaming apparatuses as defined in claim 1, said gaming apparatuses being interconnected to form a network of gaming apparatuses.

7. A gaming system as defined in claim 6, wherein said gaming apparatuses are interconnected via the Internet.

8. A gaming apparatus, comprising:

a display unit that is capable of generating video images;

a value input device;

a peripheral bus connection adapted to operatively couple said gaming apparatus with a light device, said light device having a plurality of independently operable lights;

a gaming unit controller operatively coupled to said display unit and said value input device, said gaming unit controller comprising a first processor and a first memory operatively coupled to said first processor,

said gaming unit controller being programmed to allow a person to make a wager,

said gaming unit controller being programmed to cause a video image representing a game to be generated on said display unit, said video image representing one of the following games: video poker, video blackjack, video slots, video keno or video bingo,

said video image comprising an image of at least five playing cards if said game comprises video poker,

said video image comprising an image of a plurality of simulated slot machine reels if said game comprises video slots,

said video image comprising an image of a pachinko board and a pachinko ball if said game comprises video pachinko,

said video image comprising an image of a plurality of playing cards if said game comprises video blackjack,

said video image comprising an image of a plurality of keno numbers if said game comprises video keno,

said video image comprising an image of a bingo grid if said game comprises video bingo,

said gaming unit controller being programmed to determine a value payout associated with an outcome of said game,

said gaming unit controller being programmed to read a light display pattern file stored in said first memory, said light display pattern file having a first light display pattern and a second light display pattern, each of said light display patterns having color illumination data for illuminating said plurality of lights; and

a light device controller operatively coupled to said light device and operatively coupled to said gaming unit controller via said peripheral bus connection, said light device controller comprising a second processor and a second memory operatively coupled to said second processor,

said light device controller being programmed to receive one of said light display patterns from said gaming unit controller,

said light device controller being programmed to read said illumination data contained within said light display pattern, and

said light device controller being programmed to cause the light display pattern to be generated on said light device by illuminating said plurality of lights in accordance with said illumination data.

9. A gaming apparatus as defined in claim 8, said light device controller being programmed to adapt said illumination data contained within said light display pattern to allow said illumination data to be capable of being generated on said plurality of lights of said light device.

10. A gaming apparatus as defined in claim 9, said light device controller being programmed to adapt said illumination data contained within said light display pattern to allow said illumination data to be capable of being generated on a second light device having a second plurality of lights, wherein the second light device is operatively coupled to said gaming machine via said peripheral bus connection.

11. A gaming apparatus as defined in claim 8 wherein said controller is programmed to send said light display pattern to said light device controller via said peripheral bus connection.

12. A gaming apparatus as defined in claim 11 wherein said peripheral bus connection comprises a Universal Serial Bus (USB) peripheral bus connection.

13. A gaming apparatus as defined in claim 12, wherein said light device comprises a light bezel.

14. A gaming apparatus as defined in claim 12, said gaming unit controller being programmed to initiate a light display on said light device to attract a player to said gaming unit.

15. A slot machine, comprising:

a plurality of gaming reels;

a value input device;

a light device having at least one independently operable light;

a slot machine controller operatively coupled to said gaming reels and said value input device, said slot machine controller comprising a first processor and a first memory operatively coupled to said first processor,

said slot machine controller being programmed to allow a person to make a wager,

said slot machine controller being programmed to cause said gaming reels to rotate and stop, representing a game,

said slot machine controller being programmed to determine a value payout associated with an outcome of said game,

said slot machine controller being programmed to initiate a light display on said light device, and

said slot machine controller being programmed to read a light display pattern file stored in said first memory, said light display pattern file having a first light display pattern and a second light display pattern, each of said light display patterns having color illumination data for illuminating said at least one independently operable light; and

a light device controller operatively coupled to said light device and operatively coupled to said slot machine controller via a peripheral bus connection, said light device controller comprising a second processor and a second memory operatively coupled to said second processor,

said light device controller being programmed to receive one of said light display patterns from said slot machine controller,

said light device controller being programmed to read said illumination data contained within said light display pattern, and

said light device controller being programmed to cause the light display pattern to be generated on said light device by illuminating said at least independently operable light in accordance with said illumination data.

16. A slot machine as defined in claim 15 wherein said peripheral bus connection comprises a Universal Serial Bus (USB) peripheral bus connection.

17. A slot machine as defined in claim 16, wherein said light device comprises a light bezel.

18. A slot machine as defined in claim 15, said slot machine controller being programmed to initiate a light display on said light device to attract a player to said gaming unit.

19. A pachinko gaming apparatus, comprising:

a pachinko board element;

a plurality of pachinko ball elements;

a value input device;

a light device having a plurality of independently operable lights;

a pachinko gaming controller operatively coupled to said pachinko board element and said value input device, said pachinko gaming controller comprising a first processor and a first memory operatively coupled to said first processor,

said pachinko gaming controller being programmed to allow a person to initiate a pachinko game by causing at least one of said plurality of pachinko ball elements to contact said pachinko board element,

said pachinko gaming controller being programmed to determine a value payout associated with an outcome of said pachinko game,

said pachinko gaming controller being programmed to initiate a light display on said light device, and

said pachinko gaming controller being programmed to read a light display pattern file stored in said first memory, said light display pattern file having a first light display pattern and a second light display pattern, each of said light display patterns having color illumination data for illuminating said plurality of lights; and

a light device controller operatively coupled to said light device and operatively coupled to said pachinko gaming controller via a peripheral bus connection, said light device controller comprising a second processor and a second memory operatively coupled to said second processor,

said light device controller being programmed to receive one of said light display patterns from said pachinko gaming controller,

said light device controller being programmed to read said illumination data contained within said light display pattern, and

said light device controller being programmed to cause the light display pattern to be generated on said light device by illuminating said plurality of lights in accordance with said illumination data.

20. A pachinko gaming apparatus as defined in claim 19 wherein said peripheral bus connection comprises a Universal Serial Bus (USB) peripheral bus connection.

21. A pachinko gaming apparatus as defined in claim 20, wherein said light device comprises a light bezel.

22. A pachinko gaming apparatus as defined in claim 19, said pachinko gaming controller being programmed to initiate a light display on said light device to attract a player to said gaming apparatus.

23. A pachinko gaming apparatus as defined in claim 19, wherein said pachinko machine additionally comprises a display, and wherein said pachinko board element comprises an image of a pachinko board on said display

24. A pachinko machine as defined in claim 23, wherein said plurality of pachinko ball elements comprises images of pachinko balls on said display.

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