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(54) Gaming machine operation speed control.

(57) To increase player appeal, an automatic speed control function is implemented on a gaming machine so as to increase or decrease the speed of operation of the machine in response to the perceived skill of the player. Criteria for modifying the speed of the machine includes the quantity of amounts won and the rate at which the gaming machine controls are operated by a player.

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Technical Field

The invention relates to the field of gaming machines and more particularly to the field of gaming machine speed control.

Background of the Invention

In gaming machines such as slot machines, video poker machines and video lottery terminals, the speed of the machine and hence the rate of game play is normally set at the factory. In some cases the machine is provided with a control which can be used by the owner of the machine to adjust the speed of the machine. Machine speed, for example the rate at which the cards are dealt in a video poker machine, is an important consideration in gaming machine design because it can affect the rate of game play and at the same time it can have an effect on the attractiveness of the game from a customer standpoint. On the one hand the faster the game operates the greater the rate of game play can be thus resulting in increased earnings for the machine. On the other hand, very fast gaming machine operation can discourage the less experienced customers especially in a game of skill such as video poker. As a result, the machine will not be Gaming machine speed therefore generally reflects an estimation by the machine designers as to the optimum speed which will balance the speed of machine play against the attractiveness to various types of customers. To permit a machine owner to optimize the speed for the types of customers that patronize his establishment, some gaming machines provide a control mechanism that permits the owner to adjust the speed of the machine. There are also gaming machines that are equipped with a speed control button that permits the customers to adjust the speed of the machine. This approach is not always desirable because this additional machine control can be confusing to customers since it is difficult to provide clear instructions for its use without cluttering the machine display screen. However, none of these machines has the capability of automatically adjusting its speed to reflect the skill or preferences of the individual customer who may be playing that particular machine. This can be a significant disadvantage since most gaming establishments including casinos and video lottery locations serve customers having a variety of skills or preferences.

Summary of the Invention

It is therefore an object of the invention to provide a gaming machine that includes a mechanism for automatically adjusting the speed of the machine to reflect the skill of the player playing the machine.

It is an additional object of the invention to provide a gaming machine that includes a mechanism that adjusts the speed of the machine in accordance with predetermined play criteria such as the number of games won by the player.

It is a further object of the invention to provide a gaming machine that includes a mechanism that adjusts the speed of the machine as a function of the rate of play of the machine by the player.

Another object of the invention is to provide a gaming machine that includes a mechanism for increasing the rate of speed of the machine as a function of the amount won by the player.

It is yet another object of the invention to provide a gaming machine that includes a credit meter for storing a credit value where the machine increases in speed from a preset rate as the frequency of winning games increases and as the value of winning games increases as reflected in the amount stored in the credit meter. The game speed is reset to the preset value when the play operates a collect button to collect the value stored in the credit meter.

Brief Description of the Drawings

Fig. 1 is a front view of a video lottery terminal type gaming machine;

Fig. 2 is a block diagram of a gaming machine incorporating the invention; and

Fig. 3 is a flow chart illustrating the operation of the invention in the machines of Figs. 1 and 2.

Detailed Description of the Invention

In Fig. 1 is provided a front view of a gaming machine 10 in this case a video lottery terminal. Enclosed with a housing 12 is a video display 14 upon which a game such as video draw poker can be displayed. In this case, five cards 16a-16e are presented on the display screen 14 along with a paytable 18 and a credit meter 20. On a control deck 22 secured to the housing 12, is a set of control buttons including a bet one button 24, five hold/cancel buttons 26a-26e, a max bet button 28 and a deal/draw button 30. Also included is a collect button 32 that can be used by a player to collect the credits displayed on the credit meter 20. A coin slot 34 for receiving coins or tokens paid into the machine 10 is mounted on the deck 22. An additional pay in mechanism in the form of a bill acceptor 36 is mounted in the lower portion of the machine housing 12. Also located in the lower portion of the housing is a pay out mechanism 38 which in the case of the machine shown in Fig. 1 is a ticket printer. For casino type gaming machines, the pay out mechanism 38 will typically be a coin hopper.

A block diagram of the gaming machine 10 is provided in Fig. 2. A microprocessor 40 is used to control the machine 10 utilizing computer programs stored in a memory 42. Forming part of the memory 42 is a game speed register 44 that contains a speed factor

which is used by the programs contained in the memory 42 to regulate the speed of the games played on the machine 10. The memory 42 also includes a preset rate register 46 for storing a preset or default game speed and a credit meter register 48 that stores the amount of credit that a player has in the machine 10. This credit is usually the amount that the player has paid into the machine through the pay in mechanism 34 or 36 plus the value of the players winnings less his losses. A base amount register 50 stores a value that represents a credit value that can be used to govern the speed of the machine 10. As shown in Fig. 2 the microprocessor 40 receives input from the control buttons 24-30, the collect button 32 and the pay in mechanism 34. The microprocessor 40 also serves to control the display 14 and the payout mechanism 38. The machine 10 can optionally include a speed control input 52 that can be implemented by a variety of mechanisms such as a key pad or a dip switch thereby permitting the owner of the machine 10 to manually adjust the speed of the machine 10. Another manual input is an automatic speed control switch 54 that permits the owner of the machine 10 to select an automatic game speed control program. In the preferred embodiment both the speed control 52 and the automatic speed control switch 54 will be enclosed within the housing 12 so that they are not accessible to players.

Operation of the preferred embodiment of the invention will be described in conjunction with the flow chart of Fig. 3. As in most gaming machines currently on the market, the gaming machine 10 is controlled by the microprocessor 40 utilizing programs stored in the memory 42. In this embodiment of the invention, an automatic gaming machine speed control routine illustrated by the flow chart in Fig. 3 is initiated by a periodic interrupt indicated at 56. The routine first determines at 58 whether the automatic speed control switch 54 is on. If the switch 54 is off, then the routine exits as shown at 60. However if the switch 54 is on, thus indicating that the machine 10 is an automatic speed control mode of operation, the routine will, as shown at 62, check to determine if the collect button 32 has been pressed since the last speed control interrupt. In the event that it has, the routine will as indicated at 64 reset the value in the game speed control register 44 to the preset rate or base value stored in the register 46 and then exit the routine at 60. This sequence of logic 62 and 64 is used to in effect reset the speed of the machine 10 for each new customer. It is based on the assumption that when a customer is finished playing the machine 10, he will cash out by pressing the collect button 32. In addition to checking the status of the collect button 32 the logic indicated at 62 can check the status of the credit meter 48 and if it has remained zero for a predetermined amount of time, for example five minutes, it can be assumed that the customer has finished playing. Also, it can be desirable to wait a similar amount of time after the collect button 32 has been pressed before the logic 62 causes the speed to be reset at 64 because customers will occasionally cash out for short period of time before resuming play.

Assuming that the collect button 32 has not been pressed since the last interrupt, the routine then checks the value of the amount in the credit meter 48 against a base credit value stored in the register 50 as indicated at 68. If the value in the credit meter 48 exceeds the base amount, the routine will then compare at 70 the game speed in register 44 to the preset rate in register 46. Should the value of the game speed in register 44 not be equal to the preset speed in register 46, the routine assumes that the machine 10 is operating at an increased speed and exits at 60 otherwise the value in the speed register 44 is increased at 72. The object of this portion of the routine is to compare the players winnings to a predetermined amount and if they exceed this amount, the presumption is that the player is a skilled player and would therefore desire a faster rate of play. For example, if the machine 10 is a dollar video poker machine and the base amount is $500, then it can be assumed that the player is a skilled poker player. For casino type gaming machines, it may be desirable to take into account the amount paid in to the machine 10 via the pay in mechanism 34 because a large portion of the value in the credit meter 48 may represent the amount that player put into the machine 10. In this case, a more accurate gage of the players winnings could be obtained by subtracting the pay in from the base amount in the register 50 for each player. Additionally, the amount paid into the machine 10 by the pay mechanism 34 can be used to increase the speed of the machine. In this case, if an amount exceeding a base amount is paid into the machine 10, say $500 into a dollar machine, then the logic of Fig. 3 will transfer to the comparison 70. This is based on the assumption that an individual paying in a large amount is more likely to be a skilled player.

In the embodiment of the invention shown in Fig. 3, if the amount in the credit meter 48 is less than the base amount as tested at 68, the routine will compare at 74 as one measure of a quantity of games with the actual amount won by the player for a set number of individual games to the average amount won by average players for the same number of games played on the machine 10. For example, in a video poker machine if the average win is two or three of a kind and the player is obtaining wins of a full house or better it can be presumed that the player is of above average skill. The operation 74 can be implemented by a table maintained in the memory 42 which stores the players win amounts for a certain number of games and the average win amount for the same number of games. In the event that the players win amounts are greater than the average win amounts, the operation

74 will return the routine to the speed increasing operations 70 and 72. Alternatively, as a measure of the quantity of games won, the logic 74 can compare the average value of the amount won in each winning game to a predetermined win value per winning game. The amounts won by a skilled player in poker for each winning game will generally be greater than an unskilled player because the skilled player knows that the average return will be greater if he elects to try for a hand that has a higher payoff as opposed to the unskilled player who is more likely to take a guaranteed win with a lower payoff. For example, the skilled player will often sacrifice a pair to attempt to obtain a royal flush due to the fact that the expected return for the royal flush is much greater than the return for a pair. Other measures of the quantity of games won which can be implemented by the comparison logic 74 includes the number of winning games per minute or the percentage of winning games.

Where the win amounts do not exceed the average win amounts, the routine of Fig. 3 will then compare the player's play rate with an average play rate at 76. For a video poker machine play rate can be measure by the rate that the player operates the control buttons 24-30 and in a slot machine the play rate can be measured by the number of handle pulls over a period of time. These values can be computed by the microprocessor 40 and compared to average values stored in the memory 42 to implement the comparison 76. Again a greater play rate suggests a player having above average skill. If the play rate exceeds the average rate, the operation 76 will return the routine to the speed increasing operations 70 and 72 otherwise the routine will exit at 60.

Although the routine illustrated in Fig. 3 tests the amount won at 68, then the win amounts for a number of games at 74 and then finally the rate of play at 76, it will be understood that the priority of these tests can be varied in making a determination as to whether the speed of the machine 10 should be increased. To simplify the description of the invention, the illustration of the speed increasing operation as shown at 70 and 72 involves only a single increase in speed of the machine 10. However, it is possible to increase the speed of the machine 10 in steps in response to the criteria shown in the operations 68, 74 and 76. This can be achieved for example by a table in the memory 42 which contains values that can be placed in the game speed register 44 in response to the tests performed at 68, 74 and 76. In this manner it is possible to adjust the speed of the machine to a wide variety of player skills. By the same token the speed of the machine 10 can be reduced in the event that the player should begin to loose. For example, if the amount in the credit meter 48 should fall below the base amount in the register 50 or another predetermined amount, thereby indicating that the player is beginning to loose, the value in the speed register 44 can be reduced.

Claims

1. A gaming machine comprising:
   display means for displaying a game;
   player control means for permitting a player to operate the gaming machine;
   payout means for paying out payout amounts; and
   game control means, operatively associated with said display means, said player control means and said payout means, for controlling the gaming machine wherein said game control means includes rate means for increasing the speed of game play from a preset rate as a function of predetermined game play criteria.

2. The machine of Claim 1 wherein said rate means additionally decreases the speed of game play as a function of said predetermined game play criteria.

3. The machine of Claim 1 wherein said predetermined game play criteria includes player skill as measured by the quantity of games won and wherein said rate means increases the rate of game play as the quantity of winnings increases.

4. The machine of Claim 3 wherein said rate means decreases said rate of game play as the quantity of losing games increases.

5. The machine of Claim 3 wherein said quantity of games won includes the number of winning games per minute.

6. The machine of Claim 3 wherein said game control means includes a credit meter and said rate means resets the rated of game play to said preset rate when the player operates said player control means to payout through said payout means the value in said credit meter.

7. The machine of Claim 1 wherein said predetermined criteria includes the rate of operation of said player control means by the player and wherein said rate means increases the rate of game play as the rate of operation of said player control means increases.

8. The machine of Claim 2 wherein said predetermined criteria includes the rate of operation of said player control means by the player and wherein said rate means increases the rate of game play as the rate of operation of said player control means increases and decreases the rate of game play as the rate of operation of said player control means decreases.

9. The machine of Claim 1 where said predetermined game criteria includes the value of winning games per winning game and said rate means increases said rate of game play as said value increases.

10. The machine of Claim 1 wherein said predetermined game criteria includes the frequency of winning games per games played and wherein said rate means increases said rate of game play as said frequency increases.

11. The machine of Claim 10 wherein said predetermined game criteria includes the value of winning games per winning game and wherein said rate means increases said rate of game play as said value increases.

12. The machine of Claim 9 wherein said predetermined criteria includes the rated of operation of said player control means by the player and wherein said rate means increases the rate of game play as the rate of operation of said player control means increases.

13. The machine of Claim 11 wherein said predetermined criteria includes the rated of operation of said player control means by the player and wherein said rate means increases the rate of game play as the rate of operation of said player control means increases.

14. The machine of Claim 1 wherein the machine includes a pay in mechanism and wherein said predetermined game criteria includes a measure of amounts paid in through said pay in mechanism and wherein said rate means increases the rate of game play when said amount paid in exceeds a base value.

15. The machine of Claim 1 wherein said game control means includes a credit meter for storing a credit value and said player control means includes a collect button for permitting a player to collect said credit value and wherein said rate means includes reset means for resetting the rate of game play to said preset rate when said collect button is operated.

16. The machine of Claim 15 wherein said reset means resets the rate of game play after a predetermined amount of time.

17. The machine of Claim 15 wherein said reset means resets the rate of game play when said credit value remains zero for a predetermined amount of time.

18. The machine of Claim 1 wherein said machine includes switch means for permitting manual enabling of said rate means.

19. The machine of Claim 18 wherein said switch means includes speed control means for permitting manual setting of the speed of game play.

20. The machine of Claim 18 wherein said game control means and said switch means are enclosed within a housing.

21. The machine of Claim 1 wherein the machine is a slot machine.

22. A gaming machine comprising:

display means for displaying a game;

player control means including permitting a player to play the game and includes a collect button;

payout means for paying out winning amounts;

game control means, operatively associated with said display means, said player control means and said payout means, including a credit meter for storing a credit value, for controlling the gaming machine wherein said game control means includes a rate means for increasing the rate of game play from a preset rate as the frequency of winning games increases and as the value of winning games increases and wherein said rate means resets the rate of game play to said preset rate when the player operates the collect input to collect via said payout means said credit value in said credit meter.

23. The machine of Claim 22 wherein said rate means additionally increases said rate of game play as the rate of operation of said player control means by the player increases.

24. The machine of Claim 22 wherein the gaming machine is a video poker machine.

25. The machine of Claim 23 wherein the gaming machine is a video poker machine and wherein said player control means includes a deal button and wherein said rate means increases the rate of game play as the rate of operation of said deal button increases.

26. The machine of Claim 22 wherein the gaming machine is a slot machine.

Fig. 1

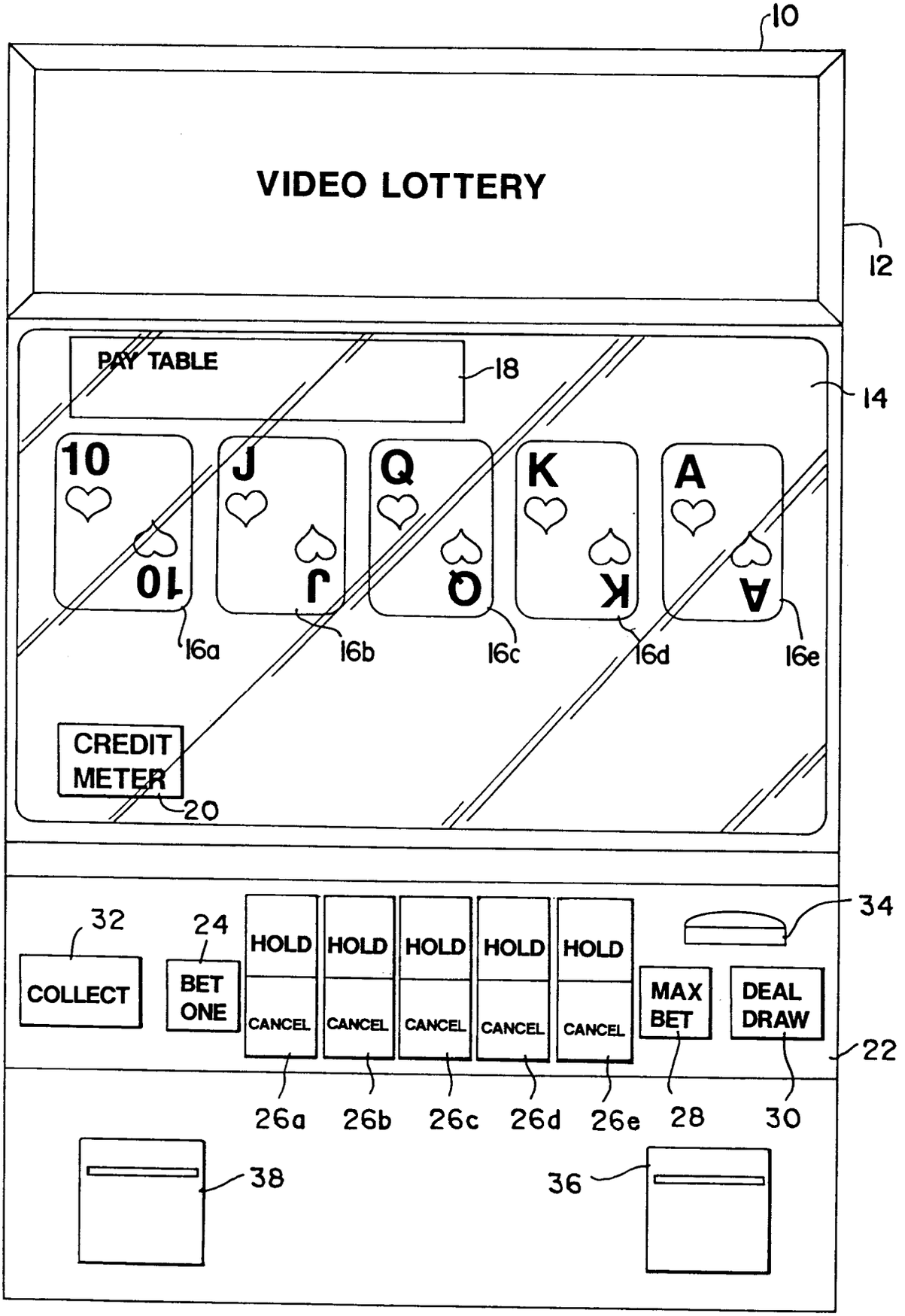
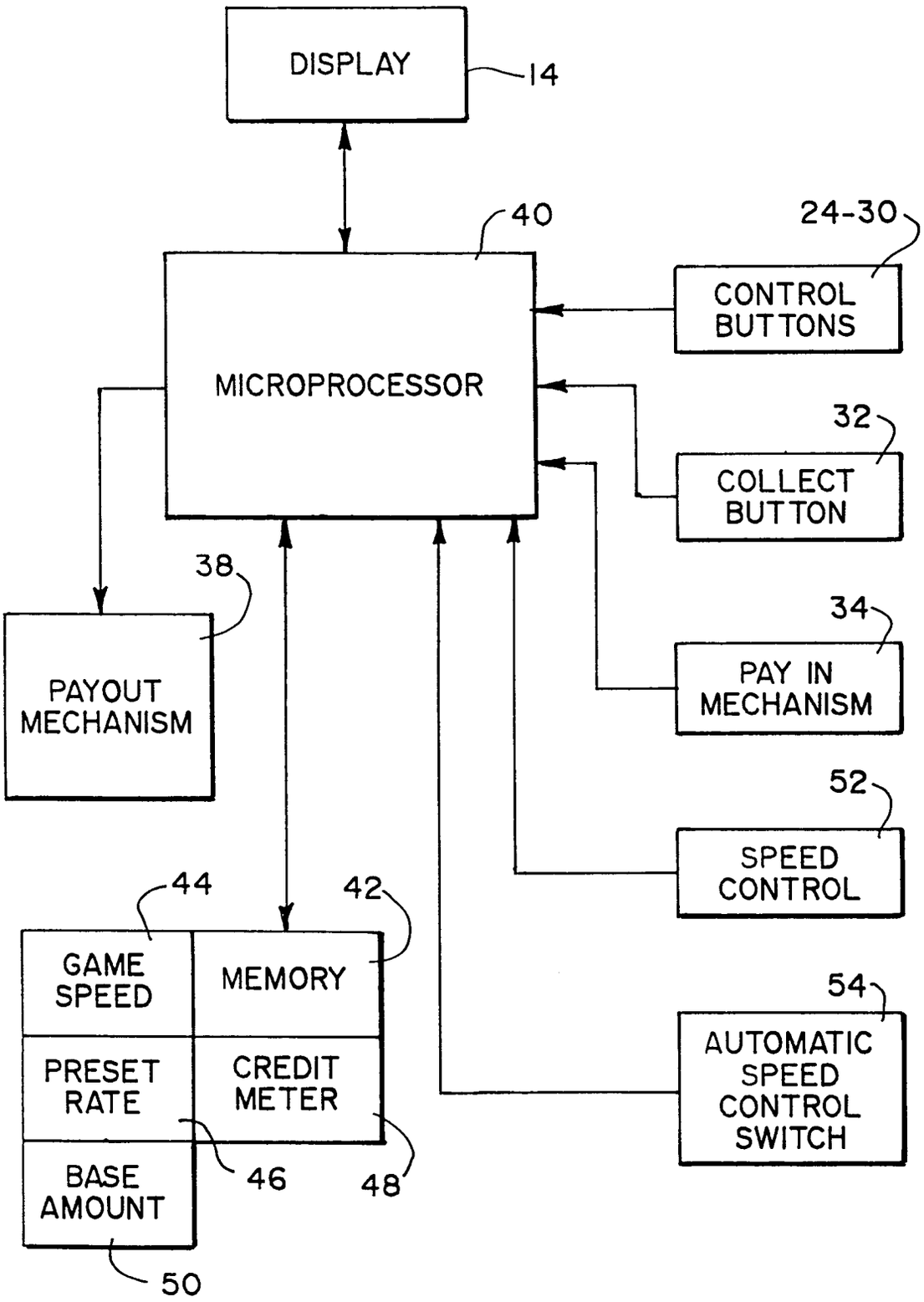

10
VIDEO LOTTERY
12
PAY TABLE
18
14
10
J
Q
K
A
16a
16b
16c
16d
16e
CREDIT METER
20
32
24
34
COLLECT
BET ONE
HOLD
CANCEL
MAX BET
DEAL DRAW
22
26a
26b
26c
26d
26e
28
30
38
36

Fig. 2


DISPLAY
14
40
24-30
CONTROL BUTTONS
MICROPROCESSOR
32
COLLECT BUTTON
38
34
PAYOUT MECHANISM
PAY IN MECHANISM
52
SPEED CONTROL
44
42
GAME SPEED
MEMORY
54
AUTOMATIC SPEED CONTROL SWITCH
PRESET RATE
CREDIT METER
46
48
BASE AMOUNT
50

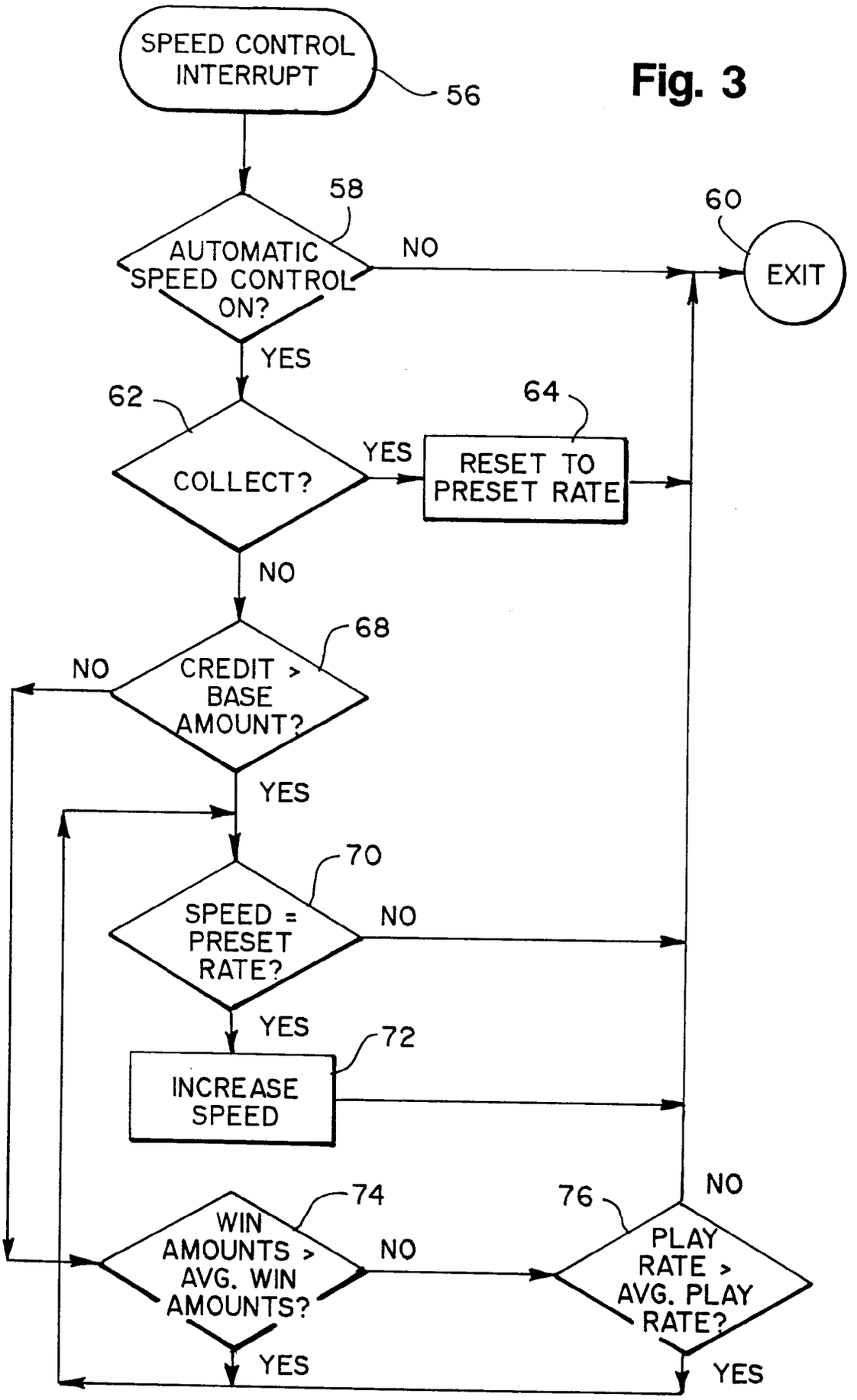

SPEED CONTROL INTERRUPT
56
58
AUTOMATIC SPEED CONTROL ON?
NO
60
EXIT
YES
62
COLLECT?
YES
64
RESET TO PRESET RATE
NO
68
CREDIT > BASE AMOUNT?
NO
YES
70
SPEED = PRESET RATE?
NO
YES
72
INCREASE SPEED
74
WIN AMOUNTS > AVG. WIN AMOUNTS?
NO
76
PLAY RATE > AVG. PLAY RATE?
NO
YES
YES

Fig. 3