

[54] FORWARD AND BACKWARD ROLLER COUNTER ESPECIALLY WITH PRESELECTOR MEANS

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[58] Field of Search **235/92 C, 92 CT, 235/92 DP, 92 GA, 92 AC, 92 MP, 92 EV, 92 CN, 92 K, 92 V, 92 EA, 92 WT; 194/9 R**

[56] References Cited

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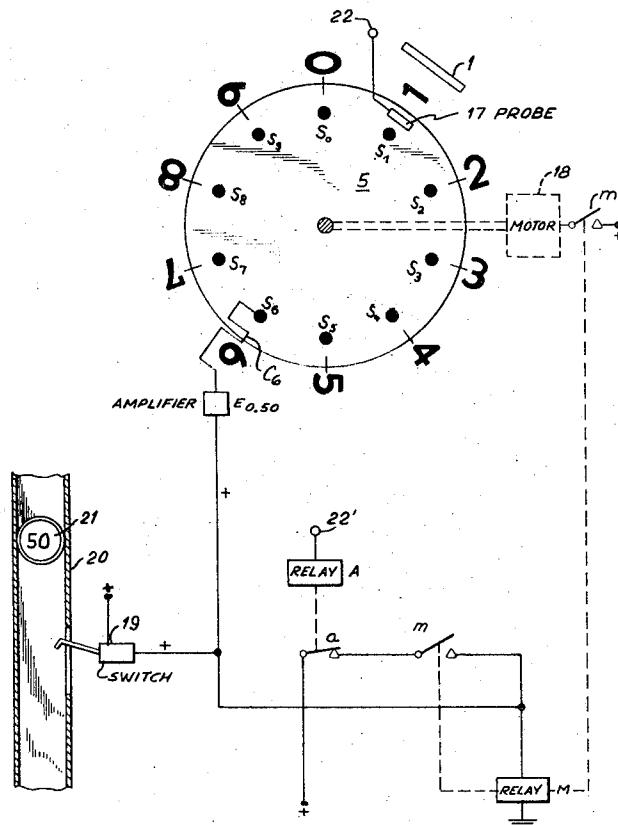
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[57] ABSTRACT

The present roller or register counter has a read-out window and is useful in coin operated devices such as slot machines, vending machines, and especially in automatic gaming devices for adding and subtracting amounts by means of forwardly and reversely rotating rollers or registers driven through the register for indicating the lowest credit. A memory member is provided for each position of the lowest credit register. A pick-up device is located at said read-out window. Storing stations are arranged at predetermined steps remote from said window for inserting values in the respective memory member in response to coins inserted into the apparatus.

10 Claims, 3 Drawing Figures



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2 Sheets-Sheet 1

FIG. 1

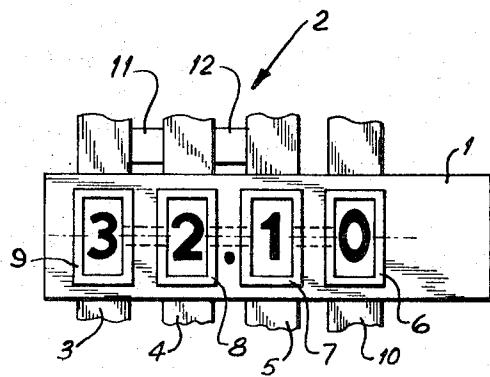
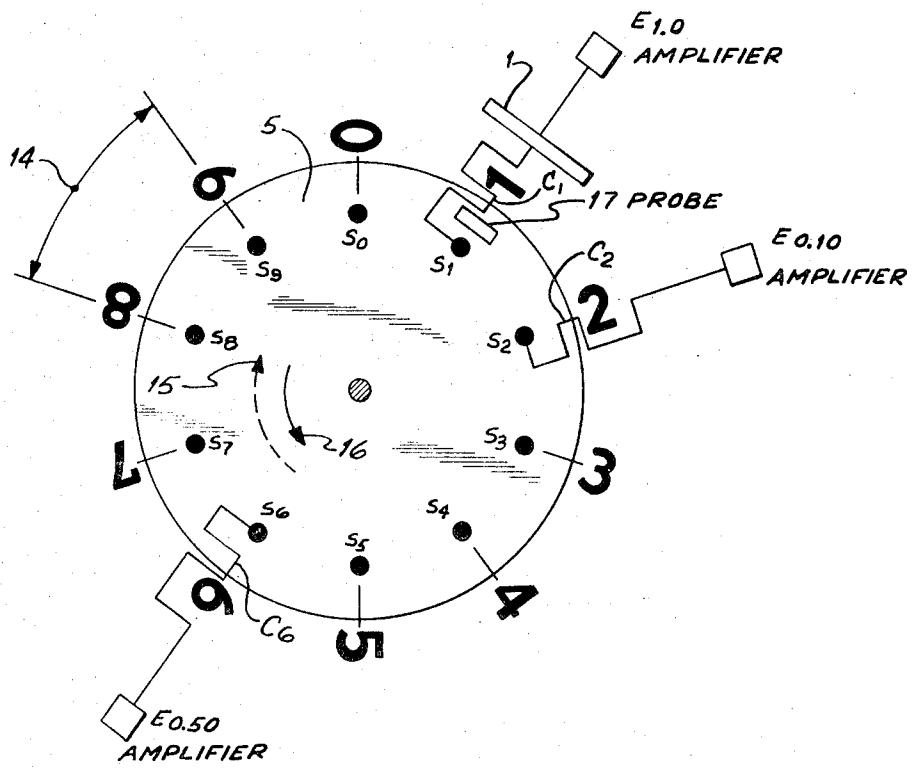


FIG. 2

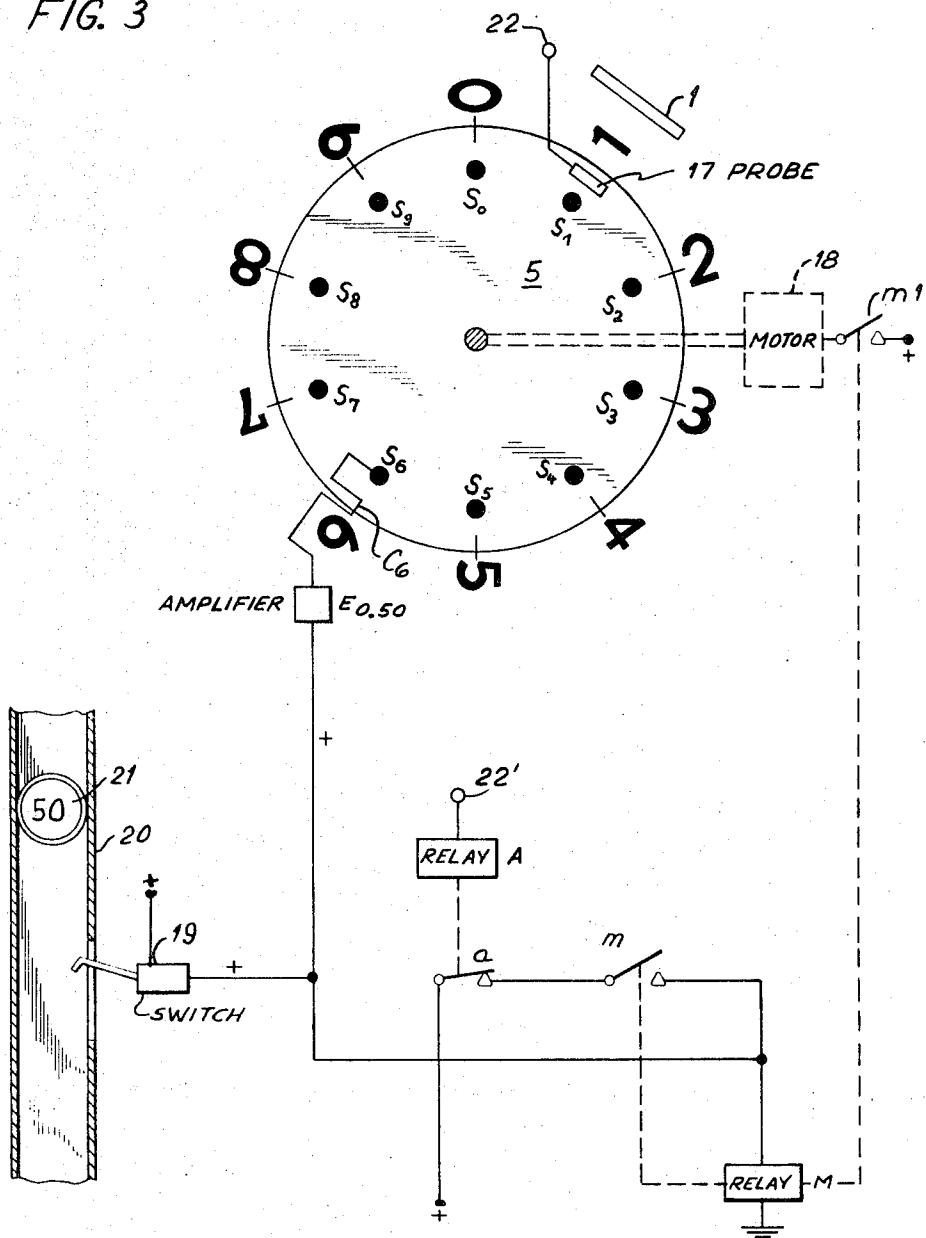


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FIG. 3



FORWARD AND BACKWARD ROLLER COUNTER ESPECIALLY WITH PRESELECTOR MEANS

BACKGROUND OF THE INVENTION

This invention relates to a forward and backward roller or register counter, especially with preselector means. Such counters are used, for example, in coin operated gaming devices for adding the inserted coins and/or the gain won and for subtracting the played amount or stake. The registers or rollers of the counter are driven by drive means which are effective through the register for displaying the lowest credit.

Such register counters may be used in various coin operated devices, for example, gaming devices, jukeboxes, automatic vending machines, slot machines or similar devices. The problems encountered in connection with the use of such a register counter as a credit memory or store in a coin operated gaming apparatus will be described, by way of example, in the following specification. Coin operated gaming devices normally comprise several, preferably three rotational bodies, so called registers, provided with gain and loss symbols and which are set into rotation at the begin of a game. At the end of a game these registers display a certain symbol combination representing a gain or loss for the player.

In these automatic gaming devices the pay-out of any gain takes place at the end of a game provided the symbol combination displays a gain. Therefore, the operational time of the apparatus comprises two components, namely the play time proper and the time required for activating the pay-out device. The play time proper is usually about 12 seconds, whereas the pay-out time requires at least 3 seconds because the duration of the pay-out time depends on the repeated actuation of the pay-out magnet, especially for paying-out a higher gain or for paying-out the entire content of the credit storage.

In certain machines a series of games may be caused by a credit whereby these games follow directly one after the other in sequence. In such a situation, a pause must usually occur between two games following one after the other in the sequence. This pause must be sufficient for possibly actuating the pay-out magnet and/or for adding up series of games or rather the results of a series of games. During these pauses, no operational steps take place which normally take place during a game because the registers which determine the gain must be at rest at the begin of the pay-out time and/or at the begin of the time required for adding up a series of games. These registers may be reactivated only after the termination of these time periods.

German Patent 1,298,755 discloses a gaming apparatus wherein a plurality of games may follow one after the other without a pause between the operational steps of two adjacent games. In other words, the operational steps of two adjacent games are not separated from each other by a pause. This is accomplished by keeping the control means of the apparatus at the end of a sequence of steps representing one game for a certain length of time in the pay-out position, this may be done either by mechanical means or by storing the pay-out position in electrical storage means known as such and by a special device having known individual drive means for controlling the pay-out magnet.

Furthermore, it is known to use instead of a direct gain pay-out, a gain accumulator with display means, wherein any gains are stored as a credit or bonus. However, if now at the end of a game sequence the credit is to be paid-out, the available time of about 3 seconds is generally insufficient for a complete pay-out because the repeated actuation of the pay-out magnet is usually required. Accordingly, where the apparatus is used continuously, pause periods occur which are to be considered as dead time because during these periods the player is not entertained.

OBJECTS OF THE INVENTION

15 In view of the foregoing, the invention aims at achieving the following objects singly or in combination:

to overcome the drawbacks of the prior art, especially to assure a continuous operation, for example, in connection with gaming apparatus, so that pauses and dead time are avoided;

20 to provide a forward and reversely operating register counter with preselect or means for coin operated automats which counter is simple in construction and which, especially in connection with gaming apparatus, assures a continues series of game sequences without any kind of pauses;

25 to provide a wheel counter which will add up the inserted coins and/or the resulting gain and which will also subtract the stake;

30 to provide a register counter which is actively driven through the register representing the lowest credit;

35 to provide a wheel or roller counter which is uniquely useful in any kind of coin operated automated device such as gaming automats, jukeboxes, vending machines, slot machines and the like;

40 to provide a register counter for gaming automats which will operate as intended regardless whether an accumulated credit is withdrawn during a game sequence or when the automat is not operating or performing a sequence of operational steps;

45 to provide a counter which may be used in any situation where the values of inserted coins must be stored and where values must be called up in sequence; and

50 to use simple storage means in a register counter for coin operated automats.

SUMMARY OF THE INVENTION

According to the invention there is provided a register counter with a display window which counter is operable forwardly and reversely by drive means preferably effective through the register for displaying the lowest credit. For each rotational position of said lowest credit register there is provided a memory device. A sensing or pick-up device is located at said window. At predetermined fixed positions remote from said pick-up device there are located storing stations for the insertion of coins of respective value and for storing such value or values in the respective memory device.

In order to make the present counter as versatile as possible so that it may be used in any coin operated machine, the memory devices may be capacitors, magnetizable elements such as magnetic core memories or mechanical elements.

BRIEF FIGURE DESCRIPTION

In order that the invention may be clearly understood, it will now be described, by way of example, with reference to the accompanying drawings, wherein:

FIG. 1 illustrates in a schematic manner a read-out device of the register counter according to the invention as used in a gaming apparatus;

FIG. 2 is a diagrammatic side view of the register for representing the lowest credit in the present counter; and

FIG. 3 is a view partially similar to that of FIG. 2 but including electrical circuit means for illustrating the operation of the present register counter.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

Referring to FIG. 1, the present register counter 2 has a read-out window 1 as well as a plurality of rollers or registers 3, 4, and 5 forming a display device including, for example, four individual display windows 6, 7, 8, and 9. A fixed register 10 for displaying the zero digit is arranged behind the individual window 6. The register 5 behind the window 7 indicates the dime credit. The register 4 behind the window 8 displays the dollar credit. The register 3 behind the window 9 shows the 10 dollar credit.

The rollers or registers 3, 4, and 5 are interconnected with each other, for example, in a manner known per se by means of a drive shaft 11 and a ratchet tooth 12. However, the teaching of the present invention is equally applicable where the registers are each driven individually, instead by a drive shaft and ratchet, by separate drive means provided for each register whereby it is possible to directly actuate each individual register in accordance with the value of the inserted coins. Although, the dime and dollar windows are separated from each other by a period, in other countries, for example in Europe, they may be separated by a comma and display respective other monetary units.

FIG. 2 shows a schematic sideview of the register 5 allocated to display the lowest credit. The register 5 comprises display digits 0 to 9 which are located around its circumference at equally spaced steps 14. For simplicity's sake only the step between the display digits 8 and 9 is shown, for example. Each step corresponds to the credit of one dime provided the register rotates in the clockwise direction. The full line arrow 16 indicates the direction of rotation of the counter 2 during addition, whereas the dashed line arrow 15 indicates the direction of rotation during subtraction of the credit.

A memory element S_0 to S_9 is provided according to the invention for each digit of the register 5. These memory elements S_0, S_1, \dots are physically carried by the lowest credit register 5 and thus rotate with this register. Rotational and stationary contact means C_1, \dots are provided for writing information into these memory elements as the register 5 passes through certain of its rotational steps as will be described in more detail below with reference to FIG. 3. A pick-up or sensing station 17 is located directly behind the read-out window 1. A storing station E 0.50 including means for inserting the insertion of a dime, is located in a position

one step removed from the sensing station 17 because the register 5 is calibrated in terms of dime steps. Accordingly, a storing station E 0.50 including means for sensing the insertion of a half dollar piece is located 5 five steps removed from the sensing station 17. A further storing station E 1.0 is located at the same position as the sensing station 17. The memories S_0, S_1, \dots are represented as dots for simplicity's sake and because different types of memory elements may be employed.

The present register counter operates as follows. The total credit pay-out mechanism is not shown since it is well known. Such pay-out mechanism may be actuated when the automat is not operating or during the performance of a game sequence.

Referring to FIG. 3, let it be assumed, for example, that the register 5 which is correlated to the lowest credit, has the position for displaying the read-out digit "1." If now a half dollar piece 21 is inserted in the channel 20 of the storing station E 0.50, suitable circuit means such as an amplifier of this station will receive a signal from a source not shown through a switch 19 which is actuated by the passage of the coin 21 through 15 said channel 20. Many different versions for sensing this coin passage are known. As noted above, the storing station E 0.50 is located five steps removed from the read-out window 1.

The signal signifying the passage of a coin through 20 the channel 20 is fed when the switch 19 closes through said amplifier and rotational contacts C_6 to the memory elements S_6 . Simultaneously a relay M is actuated to close its normally open holding contact "m" and a further normally open contact "m 1." The contact "m" 25 keeps a holding circuit for the relay M closed. The contact "m 1" energizes a motor 18 for advancing the counter whereby the register 5 is rotated until the memory S_6 reaches the sensing station 17 which, upon 30 sensing the memory 6 produces a control signal. The sensing means as such are well known in the art, for example, magnetic pick-up heads may be used where the memories are magnetic storage elements. It should be noted here that the time required for energizing the 35 relay M is sufficient for writing the signal caused by the coin insertion into the respective memory elements prior to the begin of the rotation of the lowest credit register 5.

The energizing circuit for the relay M includes a normally closed contact "a" which is opened through a relay "A" upon energization of said relay "A" by said 40 control signal from the sensing station 17, whereby the relay M is de-energized. Accordingly, its contacts "m" and "m 1" open and the rotation of the register 5 is 45 stopped. The output 22 of the probe 17 is connected to the terminal 22' of the relay "A."

The energizing circuit for the motor 18 comprises means (not shown) for energizing the motor 18 to rotate in one or the other direction in response to 50 whether addition or subtraction is required. Such drive reversing circuits are well known in the art and hence 55 are not shown in FIG. 3.

It should be noted that the step 14 may correspond to any desired division of the 360° circumference of the register 5. Thus, in case an 0.20 division should be employed, a dime would be paid out directly in response 60 to the insertion of a half dollar piece. It is further within 65

the ambit of the invention, to replace, for example, the shown decimal division on the register 5 by a 20 division, thus "0.20; 0.40; 0.60; 0.80; 1.0" whereby a respective memory is provided individually for each display number. The storing stations corresponding to the individual coin values are then also located in positions which are removed from the sensing station 17 at spacings corresponding to the coin value which the respective storing station represents.

Further it is possible to call up partial amounts by means of the register counter according to the invention. For example, if the credit storage of a gaming automat displays a credit of \$3.50 the player may cause to be paid any amount between a dime and \$3.50. Yet another advantage of the present invention is seen in that the present credit storage may be used for a series of games as an addition and subtraction counter, whereby the time saved or gained in the addition of a series of games is of special significance since no dead time is involved. In this instance, the storing stations are not calibrated in terms of coin values but rather in terms of a number of games corresponding to a respective stake or gain.

Yet another advantage of the invention is seen in its simple structure which is achieved by the use of simple structural elements known as such, and as mentioned, in the fact that pauses or dead times have been avoided between the steps of an individual game and between successive games. Last but not least, in an apparatus according to the invention the credit may be called up at any time during a game sequence or when the automat is not in operation.

Although the invention has been described with reference to specific examples, it should be noted, that it is intended to cover all modifications and equivalents within the scope of the appended claims.

What I claim is:

1. A forward and backward register counter comprising a plurality of rotatably mounted registers each carrying indicia at a predetermined number N of regularly angularly spaced apart positions, a fixed window positioned to permit viewing of said indicia whereby a single indicia is visible from each register at any time, drive means for rotating said register, N memory means

5 mounted on one of said registers for rotation therewith and positioned at regularly angularly spaced apart positions, fixed sensing means positioned to sense information from said memory means at a given angular displacement thereof, a plurality of storing means corresponding to angular displacements of said one register spaced from said given angular displacement by integral numbers of steps, wherein a step corresponds to the angular spacing between adjacent memory means, said storing means being positioned to store information in a memory means at the angular displacement of the one register corresponding thereto, and control means responsive to said storing means and said sensing means for controlling said drive means for 10 selectively positioning said registers.

2. The register counter of claim 1, wherein said one register is a lowest credit display register.

3. The register counter of claim 1, wherein said memory means comprise electrical capacitors.

4. The register counter of claim 1, wherein said memory means comprise magnetic memory elements.

5. The register counter of claim 1, wherein said memory means comprise mechanical memory elements.

6. The register counter of claim 1, wherein the positions of said storing means correspond to coin values.

7. The register counter of claim 1, wherein the positions of said storing means correspond to a respective number of additional games.

8. The register counter of claim 1, wherein said drive means comprise means operatively connected to said one register for driving the other registers of the counter by way of said one register.

9. The register counter of claim 1, further comprising a source of information signals connected to said storing means, said control means comprising means responsive to receipt of signals from said source to cause said drive means to turn said one register in one direction, and means responsive to the alignment of a memory means with said given displacement is aligned with said window.

10. The register counter of claim 1, wherein said given displacement is aligned with said window.

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