United States Patent

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[54] ELECTRICALLY OPERATED PLURAL REEL CHANCE DEVICE

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[52] **U.S. Cl.** ..... **273/143 C**

[51] **Int. Cl.** **A63f 5/04**

[58] **Field of Search** ..... 273/143, 138 A

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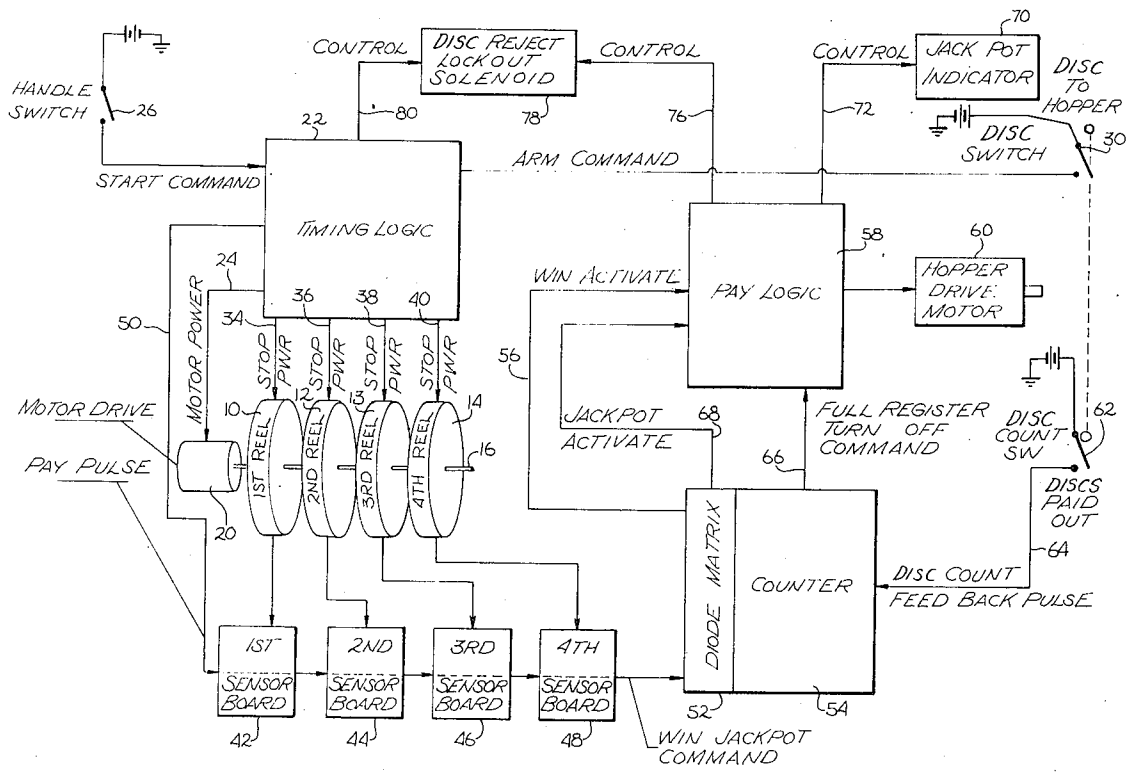
[57] **ABSTRACT**

An electronically operated gaming device is described which detects the relative position of a plurality of rotatably mounted reels. The amusement device is the type which is activated by a disc operated switch and which can thereinafter be enabled by an arm or handle connected to the gaming device. The handle trips a drive motor which in turn activates timing logic having a plurality of timed outputs. Each timed output activates a reel stopping mechanism and a further time delay. This time delay activates the next corresponding reel stop mechanism, and so on, until all reel mechanisms are stopped. The timing delay logic also in turn activates position sensor boards which detects the relative position of the reels with one another. The positions of the reels may or may not be indicative of a pay-off sequence. A diode matrix responsive to the sensor boards loads the maximum count a counter may have to register full. The diode matrix simultaneously starts a plurality of signals into pay logic. The pay logic starts a hopper motor which mechanically dispenses a number of discs. Discs dispensing from the hopper energize a disc count switch which feeds count pulses into the counter. The counter then counts up on these pulses until full. Thereafter a full register count is applied to the pay logic which stops the hopper motor.

12 Claims, 9 Drawing Figures



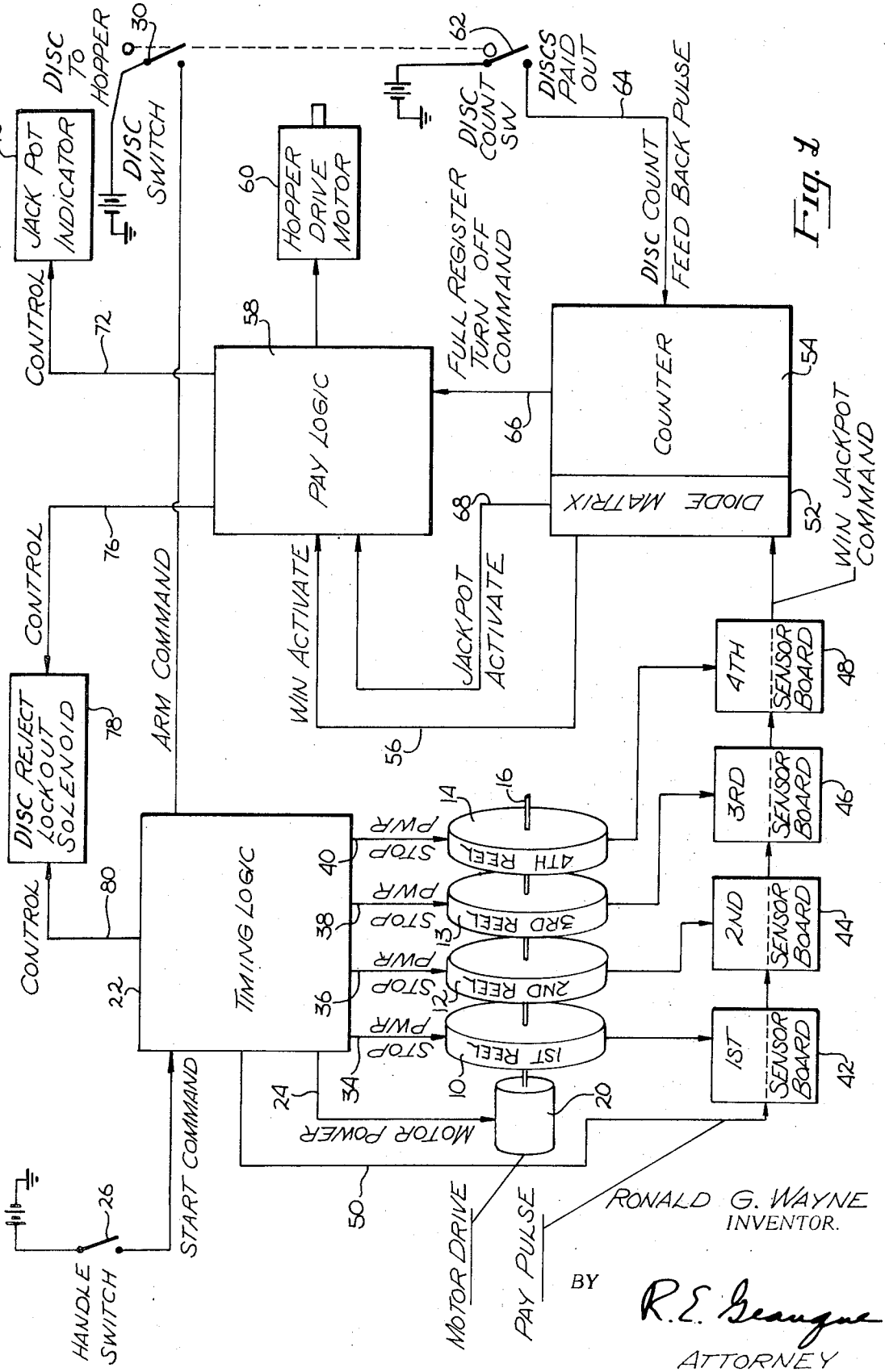


Fig. 1

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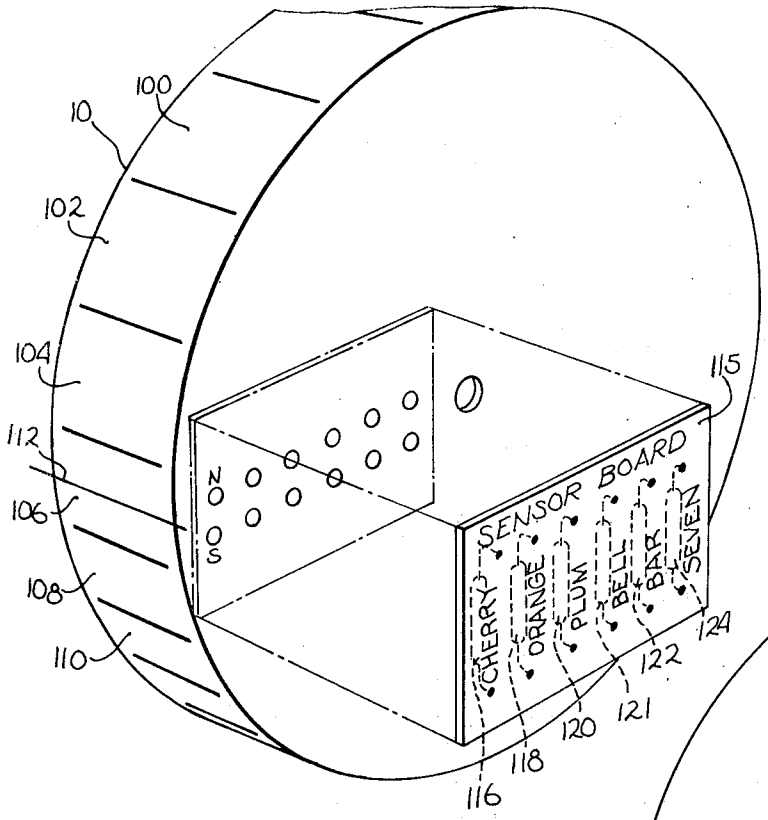


Fig. 2

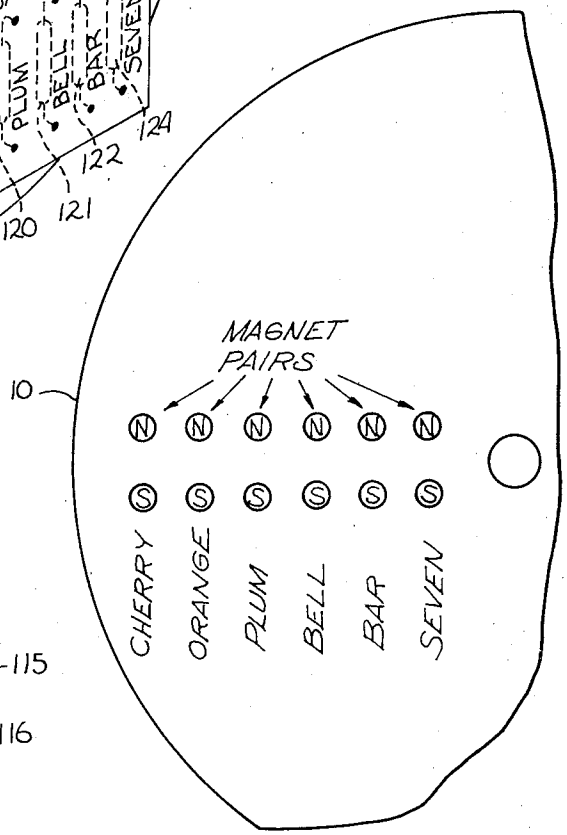
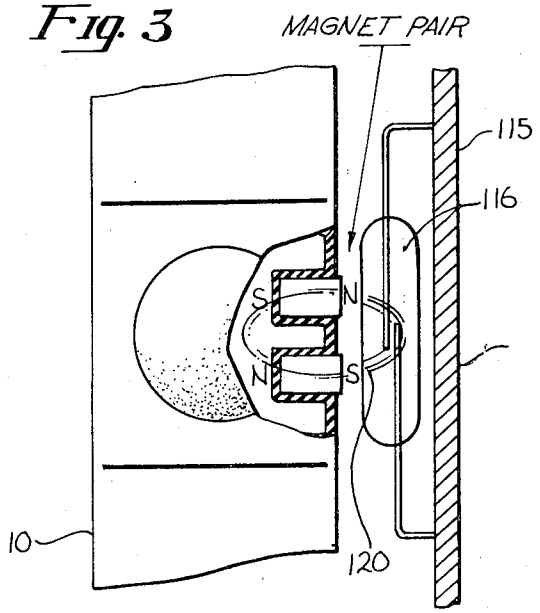


Fig. 4

Fig. 3



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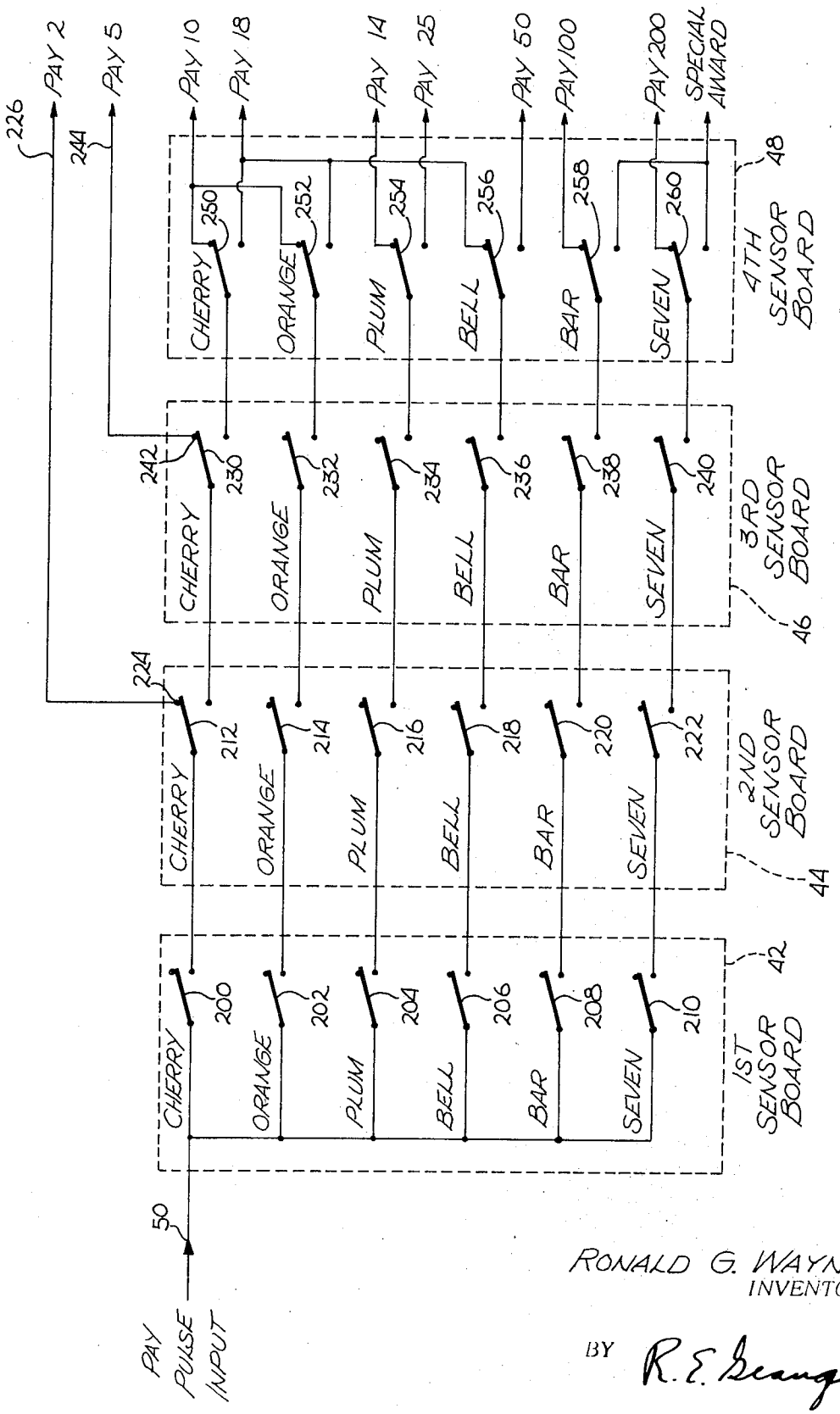

Fig. 5

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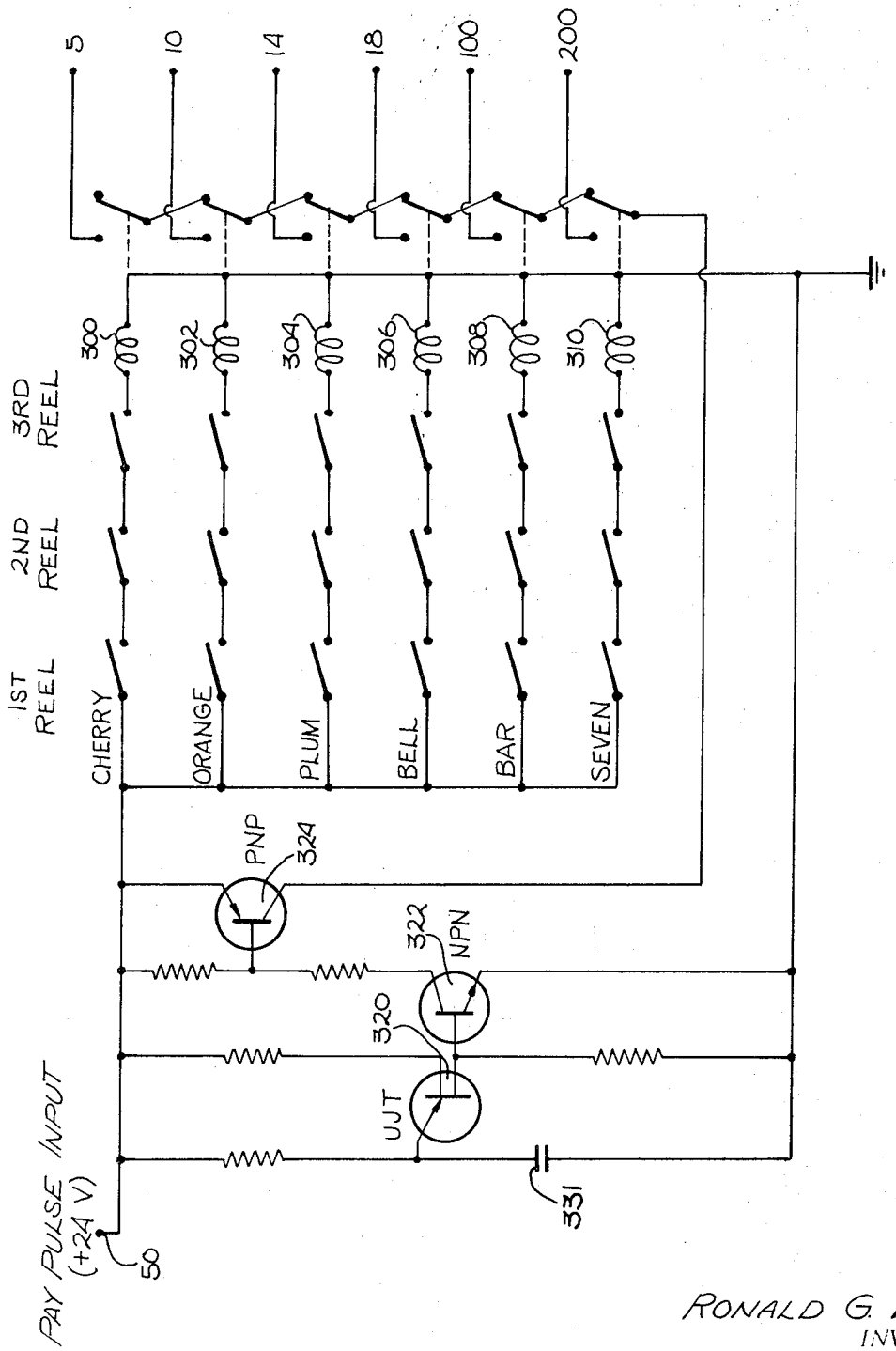

Fig. 6

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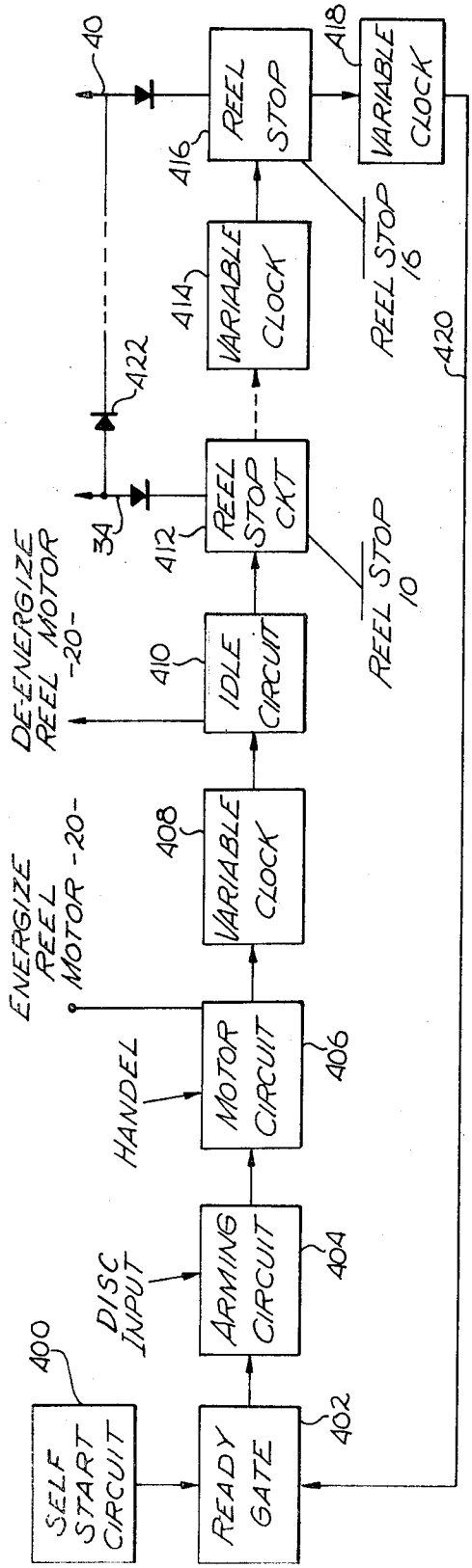

Fig. 7

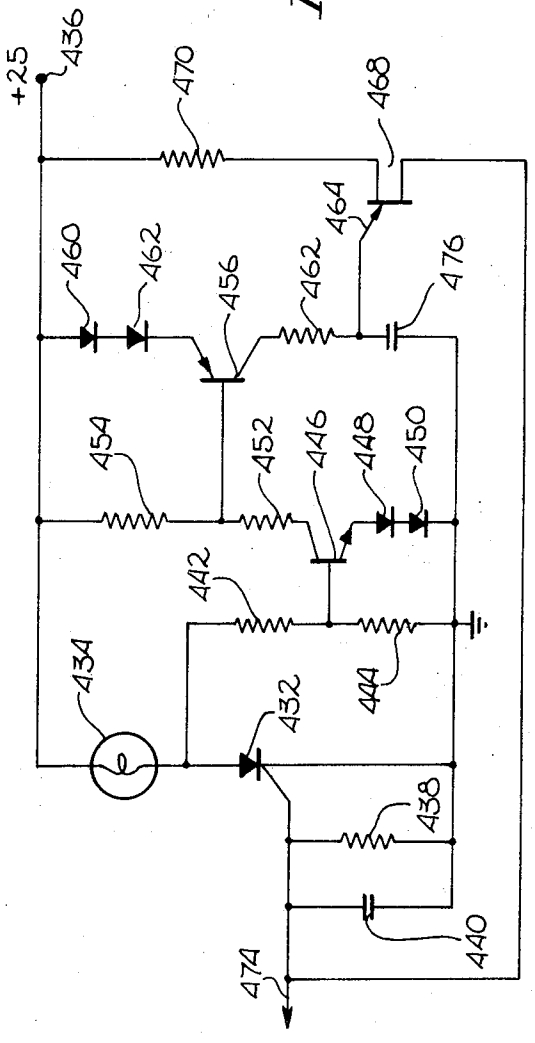

Fig. 8A

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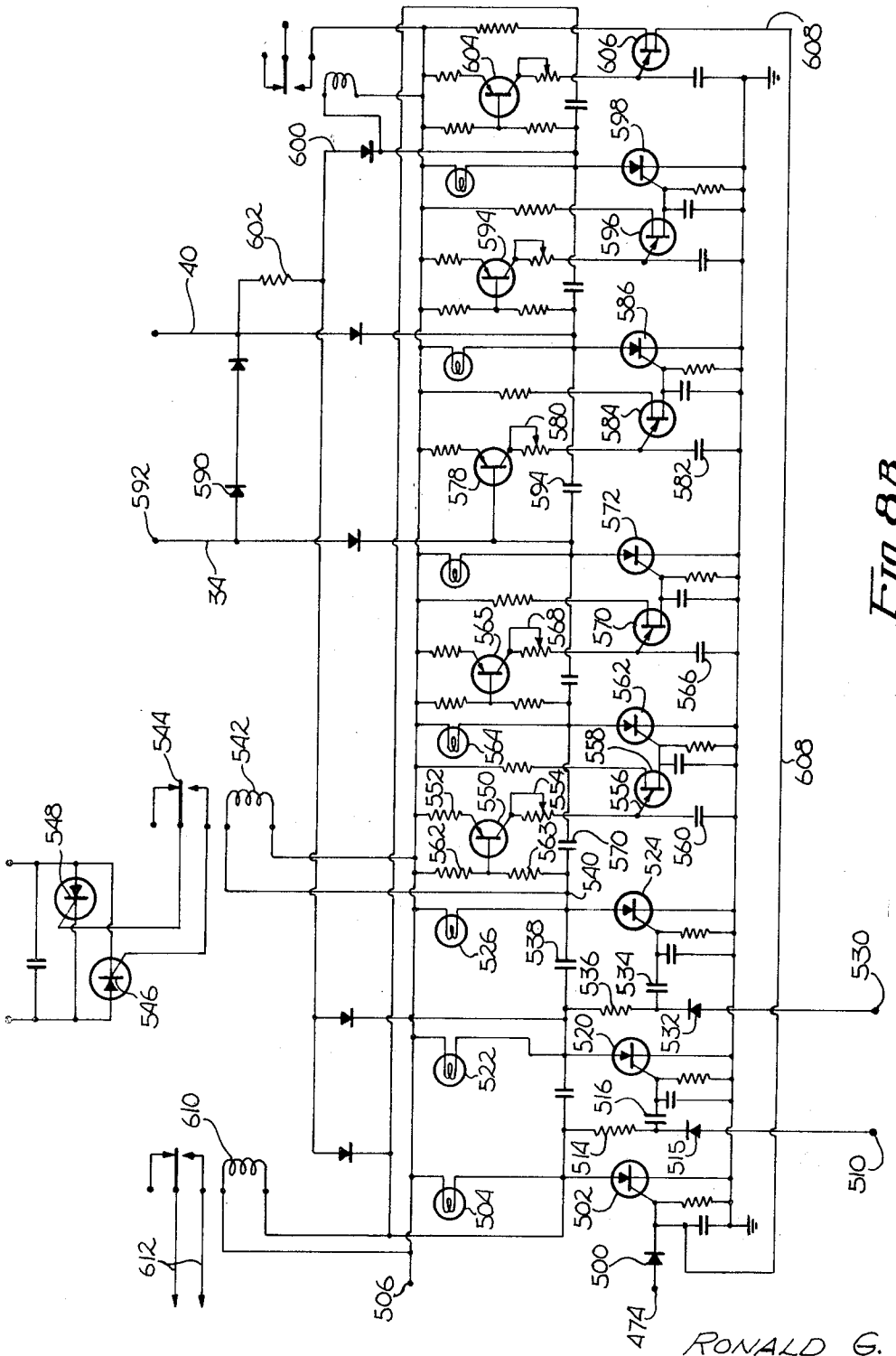

Fig. 8B

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ELECTRICALLY OPERATED PLURAL REEL CHANCE DEVICE

BACKGROUND OF THE INVENTION

a. Field of the Invention

This invention relates to amusement or gaming devices and more particularly a novel improved electronically controlled disc pay-off, sequence and sensing system or the like.

b. Discussion of the Prior Art

Devices in the prior art comprise mechanical gaming devices which comprise a plurality of vertically mounted reels, usually three or four, which are rotated about a horizontal axis. On the reels there are placed a plurality of indicias such as fruit, bars, bells, or numbers, and the like. The reels are started to rotate by a handle which is pulled down to either sharply start gears and wheels within the gaming devices to be forced into movement or, in the more modern sophisticated devices, to engage an electric motor which starts the reels rotating. Devices within the gaming devices, sometimes referred to as random generators, randomly stop the reels in a sequential order by means of a mechanical clock. Generally the far left-hand reel will stop first and the preceding ones will stop in their sequential order. Scoring in the gaming devices of these prior art systems depends upon the radial position of each of the reels. Mechanical sensory devices are provided which indicate to mechanisms the radial position of the reels and give an indication of the position of the reels to illustrate to the operator his winning score.

In order that the operator may be aware of his winning score, certain scores are given if certain of the indicias on the reels are lined up. For example, two cherries lined up on the first two reels may indicate to a winner that he has a five score. Three cherries may, for example, be a ten score, and four cherries in a row may indicate an 18 score. Three oranges in a line may indicate a 10 score while four oranges in a line may indicate an 18 score. Three bars in a row may indicate a 100 score or normal jackpot while four sevens, for example, may indicate a special award jack pot of a 1000 or more.

Other devices operating in similar nature require a disc to be inserted into the machine before the lever is releasable. When the disc is placed in and the lever is pulled out, the reels begin to rotate and stop in their random sequential order. If the sensory devices indicate certain win scores by the radial position of the reels, a number of discs are returned, depending upon the alignment of the indicias, such as hereinbefore set forth.

Heretofore, the above-mentioned apparatus was sometimes mechanically operated with gears and levers within the mechanism. Such gears and levers and other mechanical mechanisms are cumbersome, complex and unreliable. Such mechanical devices required a considerable amount of maintenance in order to keep them operating in their top condition and to pay out the amount of discs should the right indicias be aligned on the reels.

A further disadvantage of the prior art devices is that because of the fact that they are mechanically operated, the devices are subject to wear. Once the gears, linkages, etc., within the gaming device become worn, the tolerances therein become sloppy and error is oftentimes introduced into the mechanisms, that is, they pay off coins when they should not and vice versa.

Finally, the prior art does not lend itself to modularized construction to permit extremely rapid maintenance and design modifications including reel percentage changes.

SUMMARY OF THE INVENTION

An amusement device is described which is the type comprised of rotating reels. Means is associated with each reel to indicate the radial position of each reel. A diode matrix is responsive to the read-out means and changes the full register number or total capacity of a counter depending upon the signals received on the sensing means. Pay logic is energized by the diode matrix which operates the hopper drive motor to pay discs to the operator past a disc count switch. Each time a disc activates the disc count switch, a disc count feed-back pulse counts into the counter. When the counter is full, a full register turn-off command is received by the pay logic which stops the drive hopper.

Timing logic may be included to stop the rotation of the reels at random intervals in a sequential manner. A first start command is necessary through a disc switch which indicates that a disc has been first placed into the machine to activate the discs switch. The timing logic is then activated by a start command which is provided by a handle switch. During the pay logic count time and during the operating time a lock-out solenoid is provided to lock out all the discs from being inserted into the coin slot.

Unique mechanisms in the form of magnetic pairs are placed into the indicia reel. The magnets are lined up with a sensor board which has a plurality of reed switches which are activated by the magnets in the reel indicia. The reed switches are activated depending upon the relative position of the reel and activates a switch which is indicative of a certain indicia on the "-payline."

DESCRIPTION OF THE DRAWINGS

These and other features and advantages will become more apparent to those skilled in the art when taken into consideration with the following detailed description wherein like reference numerals indicate like and corresponding parts throughout the several views and wherein:

FIG. **1** is a schematic block diagram illustrating the system of one preferred embodiment of this invention;

FIG. **2** illustrates the relative position of the sensor boards and the magnetics affixed to the reel;

FIG. **3** illustrates the relative position of an air gap of a reed capsule in relation to the magnetics on the reel;

FIG. **4** illustrates various positions of magnetics as they appear on the indicia reel;

FIG. **5** illustrates typical reel sensing board interconnection switching logic;

FIG. **6** illustrates a different embodiment of the switching logic used in a three-reel switching system, in which only the highest award of several simultaneous winning combinations will activate in the pay logic and counter circuits.

FIG. **7** is a block diagram of the timing circuit used in the preferred embodiment of this invention; and

FIG. 8A and 8B is an electrical schematic of the timing circuit set forth in FIG. 7.

DESCRIPTION OF PREFERRED EMBODIMENTS

Turning now to FIG. 1, there is illustrated a block diagram system of one preferred embodiment of this invention. A plurality of indicia reels, and in this example four are shown, are provided whereby numeral **10** indicates the first reel and numeral **12** indicates the second reel, numeral **13** indicates the third reel, and numeral **14** indicates the fourth reel. Each reel is rotatably mounted on a shaft **16** which is rotated by a drive motor **20**. Timing logic **22** is provided which is coupled to the drive motor by the lead **24**. A disc switch **30** activates an arming command when a disc is passed thereby and closes the switch **30**. This is done by a disc passing thereover which then falls into a disc hopper (not shown). Such disc hoppers are well known to those skilled in art and provided, for example, in co-pending Patent application Ser. No. 830,677, filed on June 5, 1969, and now U.S. Pat. No. 3,612,073, filed on behalf of Carl D. Calos for Coin Payout Mechanism for Amusement Devices and assigned to the Assignee of this invention. A handle switch **26** engages a "start command" into the timing logic **22**. When this handle is pulled down, the switch **26** engages.

When a command signal from the handle switch **26** and the disc switch **30** is introduced into the timing logic **22**, a signal is applied through the line **24** to the drive motor **20** and starts the reels **10**, **12**, **13** and **14** rotating on the axle **16**. At predetermined delay times stop power is provided on lines **34**, **36**, **38** and **40** at random and sequential times. By random times there is no way of selecting at the exact time the first wheel will be stopped by the stop power from the lead **34** but this particular reel **10** will be stopped first, then the second reel **12** will be stopped, thereafter the third reel **13** will be stopped, and consequently the fourth reel **14** will be stopped. Such apparatus for stopping these reels **10**, **12**, **14** and **16** may be found in co-pending application Ser. No. 829,183 filed June 2, 1969, and now U.S. Pat. No. 3,625,515 for a Random Generator on behalf of Carl D. Calos and Lloyd D. Main and assigned to the assignee of this invention.

Sensor boards **42**, **44**, **46** and **48** with reed capsules magnetically activated by reels receive a signal from the timing logic **22** through the pay pulse lead line **50**. The sensor boards **42**, **44**, **46** and **48** sense the radial position of each indicia reel **10**, **12**, **13** and **14** relative to one another and provide a certain signal into a diode matrix **52**, in the event of appropriate winning combinations.

The diode matrix **52** sets up a full register count and sets this count into a counter **54**. A counter circuit which is useful for this purpose is found in co-pending patent application Ser. No. 827,690, filed May 26, 1969, and now U.S. Pat. No. 3,609,311, for a Coincident Counting System on behalf of Ronald G. Wayne and assigned to the Assignee of this invention. At this time a win activate pulse may be applied to the lead **56** or jackpot activate lead **68** to pay logic **58**. The pay logic **58** in turn drives a hopper motor **60** which starts feeding discs from the hopper in accordance with the manner taught in said co-pending patent application. As these discs pass from the hopper, by the hopper motor **60**, the discs therefrom will close a disc count switch **62** each time a disc is paid out. The disc switch will be opened and closed on each individual disc and send a disc count feed back pulse via lead **64** into the counter **54**. The counter **54** will then begin to count and hold pulses until a full register is indicated. At this time a full register turn off command pulse is applied to the pay logic **58** through the lead line **66**, thus causing the pay logic to stop the hopper drive motor **60**. At certain times such as a winning combination which yields an award larger than the capacity of the counter, the diode matrix **52** will be-pass the counter **54** when a jack pot pulse is present. A jack pot activating pulse is supplied from the diode matrix **52** to the pay logic through the lead line **68**. A jack pot indicator **70** is then energized by a control pulse from the pay logic through the lead **72**.

During the time when the counter is filling and no full turn-on pulse command is supplied to lead **66** to the pay logic **58**, a pulse is provided on a lead line **76** to a coin reject lock-out solenoid **78**. This solenoid is useful to lock the discs from being positioned into the machine during the pay-out time. A pulse may be provided to the solenoid **78** from the timing logic **22** through the lead line **80**. This is to lock out discs during the time the reels **10**, **12**, **13** and **14** are continuing to rotate.

Turning now to FIG. 2, there is shown sensing mechanism which will indicate the radial position of an indicia reel. In this example, reel **10** will be described. It should be understood that all reels operate in a similar manner as reel **10**. As can be seen, the reel is divided into a number of increments **100**, **102**, **104**, **106**, **108**, **110**, etc. Around the entire peripheral edge thereof each reel will have a different indicia in each one of these indicia segments. For each of these segments a pair of north-south pole magnets are aligned on the radial axis thereof. This can best be shown with reference to FIG. 4. Associated with each indicia reel is a sensor board **115** which is aligned to the exact pay-off line **112** and which is aligned with all other pay lines on the remaining reels. The sensor board **115** may be firmly affixed to a partition which is positioned between each rotating reel and mounted in a suitable manner thereto. Associated with each pair of magnets in the pay line row is a reed switch **116**, **118**, **120**, **122** and **124**. With reference to FIG. 3, the reed switch **116** will be discussed in association with a pair of magnets. When the reel **10** finally comes to a stop, the flux path of the magnet, as shown by the line **120**, will enter the metallic switch of the air gap reed capsule **116**, causing this reed capsule to close. If there is no magnet present in a particular position near a reed switch, the switch naturally will not close. Each circumferential row of each radial row is associated with the symbol on the indicia segment thereof. For example, if the indicia segment **106**, had an orange therein, the second reed switch **116** would be the only switch activated because the second circumferential row would contain the north-south magnetic poles. All of the other remaining holes therein would be empty. The reed capsules **116** may be mounted to a printed circuit board **115** and the printed circuit board mounted to the partition of the reel assembly as in a rigid position adjacent the rotating reel as set forth. The air gap (actuation point) of the

reed capsule **116** are all aligned on the radius of the reel common to the pay line **112** so that pictures or indicias appearing on the pay line has a corresponding magnet pair in position to actuate the corresponding reed capsule.

Referring now to FIG. **5**, there is shown a typical four-reel sensor board interconnection and switching logic and in this particular embodiment all switches are shown deactivated.

The first sensor board **42** has six switches **200, 202, 204, 206, 208** and **210** which correspond to a cherry, orange, plum, bell, bar and seven indicia, for example. Each switch has a common terminal coupled to a pay input pulse which is received from the timing logic **22** via pay pulse input line **50**. The second sensor board **44** comprises switches **212, 214, 216, 218, 220** and **222** and each has a common connection to a corresponding switch in the first sensor board **42**. The switches are indicative of cherry, orange, plum, bell, bar and seven indicias similar to that on the first sensor board **42**. Switch **212** is a double throw switch and has a terminal **224** which is coupled to a pay two output lead **226**. When a signal is received on line **226**, the diode matrix **52** sets the counter **54** to have a full register when two counts are fed in. Thereafter the pay logic **58** starts the hopper drive motor driving until two discs activate the disc count switch **62** and feeds two pulses through the feed-back pulse lead **64** to counter **54**. Thereafter, the counter indicates a full register turn-off command to the lead **66** to the pay logic **58** which thereafter stops the motor **60** from operating.

The next sensor board **46** has a plurality of switches **230, 232, 234, 236, 238, 240** which correspond to a cherry, orange, plum, bell, bar and seven. These terminals all have a common terminal which is activated by a corresponding switch on the second sensor board **44**. Switch **230** is a double pull switch and has one terminal **242** coupled to a pay five output lead **244**. This will set the diode matrix **52** and the counter **54** in a similar manner as set forth with the pay two signal, except that it will cause the counter to have a full register when it reaches the numeral **5**.

The fourth sensor board **48** has similar switches **250, 252, 254, 256, 258, 260** all having a terminal which corresponds to corresponding switches on a third sensor board **46**. In this fourth sensor board **48** all of the switches thereon are double throw switches and coupled in such a manner to provide different signals to the diode matrix **52** to enable different counts to be inserted into the counter **54**.

Referring now to FIG. **6**, there is shown an example of a three reel switching logic which is designed to insure pay command only on the highest award given. The set up of the switches are similar to that shown in FIG. **5** except that a plurality of relays **300** are activated when straight line connections are provided from the pay pulse input **50**. Electronic circuitry is provided to yield a pay pulse signal very shortly after the original pay pulse input along line **50** has been introduced, to permit time for corresponding relays to energize. For example, the pay pulse input along line **50** has a duration of 1 second, 50 milliseconds after the start of this pulse, the injunction transistor **320** conducts and turns on transistor **324** which then injects a pulse into the line of relay switches, now activated. The relays will pull in the switches so that the signal will pay on the highest award only.

For example, if three bells are lined up on one certain place on the reels and three sevens are also lined up on a different place, current will charge the capacitor **331** at the emitter of the unijunction transistor **320**, and after a short time delay to allow the relays to energize, turning on the transistors **322** and **324**. Switch **310** will be pulled in to allow pay-out through a pay **200** output lead and the relay **306** will pull in the switch to the pay **18** pay-out terminal. Because the **200** pay-out relay **310** has been pulled in, no current will be supplied to the relay **306** and therefore only the **200** pay command will be applied to the diode matrix.

Referring now to FIG. **7** there is shown the timing logic used in the embodiment of this invention which comprises a self start circuit **400** which starts and sets a ready gate **402**. When the ready gate **402** is turned on an arming circuit **404** is ready to be set by a coin input pulse. This pulse is provided when a coin is inserted into the machine and trips the coin input switch **30**, and sends the arm command into the timing logic. When the arm command is present, a handle switch **26** is energized and provides a start command to a motor circuit **406**. It is this circuit **400** which supplies energy to start motor **20** (FIG. **1**) rotating. This motor circuit **406** in turn energizes a variable clock **408** which is on for a preset time. After the preset time, the variable clock **408** sets an idle circuit **410** which in turn de-energizes the reel motor **20**, and the reels **10, 12, 13** and **14** idle by virtue of their own inertia. The idle circuit has a timing circuit therein which, after the preset time, activates a reel stop circuit **412**. The reel stop circuit provides a stop signal on the lead **34** to the first reel **10**, causing that reel to stop. The reel circuit **412** also starts a variable clock **414** which also, after predetermined time, energizes the next preceding reel stop circuit (not shown). This next reel stop circuit applies energy to the lead **36** on the timing logic **22** and stops the reel **12** from rotating. Each reel is stopped in turn by the variable clocks in the timing circuit **22** until the reel **16** is stopped by the reel stop circuit **416**.

The reel stop circuits also start the corresponding variable clock **418** which thereafter provides a ready signal to the ready gate **402** via the line **420**. This readies the gate for the next self start signal from the self start circuit **400** and sets the arming circuit to accept disc input signals. The arming circuit **404** is provided so that no disc input signal is available on the arming circuit **404** without a signal present from the ready gate **402**.

To assure that each of the reels are stopped, a feedback leakage circuit is provided through the diodes **422** in a manner such that enough current is supplied to each one of the leads **34, 36, 38** and **40** in their sequential order as provided by the appropriate reel stop circuit so that the solenoids or the like that stop the reels **10, 12, 13** and **14** in a manner to keep them held in and prevent the reels from rotating off their alignment.

Referring now to FIG. **8A** there is shown a circuit diagram of the system concept of FIG. **7**. The self start circuit **400** which provides the initial pulse includes an SCR diode **432** which has its anode electrode coupled through a lamp **434** into a terminal **436** which may have a positive voltage applied thereto (**24** volts DC).

The cathode electrode of the SCR diode **432** is coupled to the ground potential. A biasing resistor **438** is coupled between the gate electrode of the diode **432** and the ground potential and a capacitor **440** is coupled in parallel with the resistor **438**. The capacitor **440** may be referred to as a denoising capacitor and used in a manner well known to those skilled in the art. A leakage current appears across the lamp **434** and is applied across biasing resistors **442** and **444** which are coupled between the anode electrode of the SCR diode 432 and the ground potential and has the base electrode of a transistor **446** coupled between the resistors 442 and 444. The leakage current which appears across the lamp 434 will eventually turn on the transistor **446**.

The transistor **446** has its emitter electrode coupled to a pair of diodes **448** and **450** which are coupled in series to the ground potential. The collector electrode thereof is coupled through a pair of current resistors 452 and 454 to the terminal **436**. The base electrode of a transistor **456** is coupled between the resistors **452** and 454 and when transistor **446** turns on, transistor 456 is also turned on and provides a phase inversion. The emitter electrode of the transistor **456** is coupled through a pair of diodes **460** and **462** to the terminal 436 and the collector electrode is coupled through a resistor 462 to the gate electrode **464** of a unijunction transistor **468**. The source electrode of the unijunction transistor **468** is coupled through a current resistor **470** to the terminal **436** and the drain electrode of the unijunction transistor **468** is coupled back in to the gate electrode of the diode **432** and to the output lead **474**.

When transistor **456** turns on it causes a capacitor 476 which is coupled between the gate electrode **464** of the unijunction transistor **468** and the ground reference to charge in a manner dictated by the resistance of the resistor 462. Eventually the current charge on the capacitor 476 reaches a potential and applies this potential to the gate electrode **464** of the unijunction transistor 468 until the breakdown voltage is reached thereacross. At this time a signal is applied directly to the output lead 474. This signal is also applied to the gate electrode of the silicon controlled rectifier **432** which causes that diode **432** to conduct. When **432** starts conducting, the base electrode of transistor **446** falls low and that transistor in turn turns off. This turns off transistor 456 which thereafter turns off unijunction transistor 468.

As can be apparent, the self starting system is regenerative and continues to provide pulses on the output lead 474 in a regenerative manner and in a time sequence as set by the RC time constant of resistor **462** and capacitor 476.

Referring now to FIG. 8b, the output lead **474** from the self starting circuit **400** shown in FIG. 8a is coupled to a diode **500** into the gate electrode of the SCR diode 502. The anode of the SCR diode is coupled through a lamp **504** to a terminal **506** which may have the plus **25** volts DC applied thereto. The cathode electrode of the SCR diode **502** is coupled to the ground reference. An input terminal **510** is coupled through a diode **515** and a resistor **514** to the anode electrode of the SCR diode 502. The terminal **510** is activated by the coin switch 30 and provides a pulse to the terminal **510** when the switch **30** is activated.

When a timing pulse from the self start circuit **400** is applied to the gate electrode of the SCR diode **502**, the lamp **504** is turned on indicating to the operator that a disc may be deposited into the system at this time. If the ready gate **402** comprising the SCR diode **502** is not operated, discs placed into the machine will not activate the system.

The cathode of diode **515** is coupled through a capacitor **516** to the gate electrode of a SCR diode **520**. The anode electrode of the SCR diode **520** is coupled to a lamp **522** through the terminal **506** and the cathode electrode is coupled to the ground reference. SCR diode **502** must be energized before a pulse applied to **510** from the switch **30** will activate the SCR diode **520**.

A similar circuit is coupled in series with the preceding circuit and comprises an SCR diode **524** having an anode coupled through a lamp **526** to the terminal **506** and having a cathode electrode coupled to the ground reference. A pulse input **530** is coupled through a diode **532** through a capacitor **534** to the gate electrode of the SCR diode **524**. Also coupled to the cathode of diode **532** is a series coupled resistor **536** and a capacitor **538** back to the anode of the diode **524**. When a signal is applied to the terminal **530** as a start command from the switch **26** of FIG. **1**, SCR diode **524** will turn on. This starts the capacitor **538** charging which in turn turns off the preceding SCR diodes **520** and **502**. The signal applied to **530** will not energize the diode **524** until a signal has been applied to terminal **510** to energize SCR diode **520**. When diode **524** comes on, the junction **540** between the anode electrode of SCR diode **524** and the lead **526** goes virtually to ground and this causes the relay **542** to energize the switch **544** which pulls in an SCR reel motor turn on control comprising SCR diodes **546** and **548**. The purpose of using the SCR diodes in this particular embodiment is a well known expedient which prevents inductive feedback from the motor **520** into the circuit.

A clock circuit is provided and comprises a transistor **550** having an emitter electrode coupled through a current resistor **552** to a terminal **506** which provides a plus **25** voltage DC power thereto. The collector electrode of the transistor **550** is coupled through control rheostat **554** to the gate electrode **556** of a unijunction transistor **558**. The gate electrode **556** of unijunction transistor **558** is coupled through a capacitor **560** to the ground reference. The base of transistor **550** is coupled through a resistor **562** to the terminal **506** and also through the resistor **564** to the junction **540**.

When the SCR diode **524** turns on in the manner heretofore described and the junction **540** goes to ground, a current builds up sufficient across the resistors **562** and **564** to cause the transistor **550** to turn on. When transistor **550** turns on, the capacitor **560** charges in a time provided by the RC time constant of the capacitor **560** and the resistor **554**. This timing is adjustable by adjusting the wiper arm of the rheostat **554**. When the charge on the transistor **560** reaches a sufficient level it causes a breakdown of the unijunction transistor **558** causing it to conduct.

An SCR transistor **562** is coupled between the ground reference and through a lamp **564** to the terminal **506** and has its gate electrode coupled to the drain electrode of the unijunction transistor **558**. When

unijunction transistor **558** starts to conduct, a clock signal from the circuit comprising the transistor **564** and operating similar to the transistor clock circuit **550** starts to charge a like capacitor **566** through the resistor **568**. When SCR diode **562** turns on the capacitor **570** causes the SCR diode **524** to turn off. When the capacitor **566** is charged to the sufficient level, unijunction transistor **570** conducts, causing the SCR diode **572** to conduct.

When SCR diode **562** turns on and causes SCR diode **524** to turn off the relay **542** disconnects the switch **544**. The motor **20** no longer receives energy and the reels **10, 12, 13** and **14** thereafter start to idle by their own inertial force.

The variable clock **414** and the reel stop circuit **416** are represented by the circuit comprising he transistor **578**, the resistor **580** and the capacitor **582**. The reel stop circuit **416** includes the unijunction transistor **584** and the SCR diode **586**. This circuit operates similar in the fashion as heretofore explained in the previous circuits. Between each of the output leads **34, 36, 38** and **40** (where only **34** and **40** are shown in the schematic in FIG. **8***b*) the diode **590** is coupled between the circuits **34** and **36**, for example, to provide a leakage current back to the lead **34**. Thus when SCR diode **572** is turned on and supplies stop current to the terminal **592** on lead **34**, the reel **10** will stop and likewise when the preceding reel **12** receives stop energy from its appropriate clock and stopping circuit, current is applied to lead **36**. This lead provides leakage current through the diode **590** to hold current to the terminal **592** to hold reel **10** in place, but the current provided by diode **572** is no longer available in that **572** has stopped by virtue of the operation of the capacitor **594** in the manner previously described.

A reel stop and clock circuit comprising transistor **594**, unijunction transistor **596** and SCR diode **598** provide current through the lead **600** which holds all reels stopped and also through the resistor **602** for a predetermined time. The next clock and reel stop comprising transistor **604** and unijunction transistor **606**, provides current through the lead **608** to again turn on SCR diode **502** to start the current operating in the manner previously described.

An interlock or disc stop circuit **610** is included and is operated whenever the diode **502** is conducting by virtue of the ground being at the anode of the diode **502** and the **25** volt DC power provided by the terminal **506**. This provides the disc reject lock-out solenoid **78** as shown in FIG. **1** is energized through the leads **612**.

An advantage is provided by the timing circuit shown in FIG. **8***a* and **8***b* in that each clock signal provided to the timing circuit is independently adjustable and can be independently adjusted in time to each reel **10, 12, 13** or **14** to provide the stop signals at appropriate times. The adjustability of such a timing circuit provides that precision adjustment may be provided to each output.

It should be understood that many modifications and alterations are possible. For example, the number of reels used is immaterial in that any number can be used to make the game more interesting. The type of reed switches are illustrative of only one type of reed switches and it should be understood that other types of reed switches could also be used.

Having thus described one preferred embodiment of this invention, what is claimed is:

1. A gaming device, including:
- a plurality of rotatable reels, each reel having indicia around the circumference thereof which is indicative of a selected meaning:
- a plurality of magnetic means for each reel of said plurality of reels, each magnetic means of each plurality of reels being disposed at a different location along the radial axis of the corresponding indicium of each reel to determine the indicia on the corresponding circumferential end;
- drive means coupled to said plurality of reels for causing said plurality of reels to rotate;
- stop circuit means associated with each reel of said plurality for applying a stop signal independently to each reel of said plurality;
- a disc-operated start switch;
- timing logic means responsive to said start switch for applying an energizing signal to said drive means and for individually applying an energizing signal to said stop circuit means associated with each reel;
- sense means associated with each said plurality of magnetic means of each reel of said plurality for sensing the predetermined value of each reel according to the indicium thereon when said reels stopped rotating;
- computing means responsive to said sense means for computing the cumulative value of the reels according to the alignment of the indicias thereon;
- and payout means responsive to said computing means for paying out a plurality of discs dependent upon the cumulative value of said computing means.

2. A gaming device as defined in claim wherein said payout means includes:
- first logic means responsive to said computing means for providing output signals indicative of the combined positions of said reels;
- a counter-register having a changeable full register point responsive to said first logic means and being adapted to having a full register capacity depending upon the output signals of said computing means;
- second logic means responsive to said first logic means for providing an output signal;
- and count means responsive to the output signal of said second logic means for providing count pulses to said counter register.

3. The gaming device defined in claim **2** wherein said count means includes;
- a rotatable hopper adapted to hold a plurality of discs and to pay out discs during rotation thereof;
- a drive motor adapted to be energized by the output signal of said second logic means to drive said hopper; and
- disc operated switch means adapted to be energized by said discs passing thereby and provide a count pulse to said counter-register for each disc passing thereby until the sum total of the disc count pulses agrees with the full register capacity registered in said counter register.

4. The gaming device as defined in claim **3** wherein said counter register further including an output means

coupled to said second logic means to cause said second logic means to de-energize said drive motor when the total disc count pulses agree with the registered capacity of said counter register.

5. The gaming device as defined in claim 1 wherein said magnetic means disposed along the radius of each of said reel of said plurality including magnets, one each being disposed on a differing circumferential radius of each reel and said sense means associated with each reel including a plurality of stationary reed switches disposed in a line with circumferential radius and adapted to be energized by the magnet associated therewith.

6. The gaming device as defined in claim 5 and further including a pay pulse output circuit being responsive to said computing means and being coupled to said reed switches, and said computing means including a plurality of output circuits coupled to said sensing means and being adapted to be energized by the combination of reed switches energized by said magnets.

7. The gaming circuit as defined in claim 6 wherein said payout means including disc operated switch means adapted to be energized by discs passing thereby and providing a count pulse to said counter for each disc.

8. The gaming device as defined in claim 1 wherein said timing logic means including:

a self-start circuit;

a ready gate adapted to be activated by said self-start circuit;

an arming gate being adapted to be energized by said disc operated start switch and said ready gate and being adapted to de-energize said ready gate;

a drive means gate for energizing said drive means and de-energizing said arming gate, said drive means gate including a first input means being energized by said arming gate, and a second input means, said drive means gate being energized by said first input means and said second input means;

an idle gate adapted to be energized by said drive means gate adapted to de-energized said drive means; and

said reel stop circuit means coupled to said plurality of rotatable reels including delay means for each reel stop circuit means for applying said independent stop signal to each reel in a sequential order.

9. The gaming device as defined in claim 8 and further including delay means coupled between the last reel stop circuit means and said ready-gate for de-energizing said ready-gate when the last stop circuit means is energized.

10. The gaming device as defined in claim 9 and further including a delay means coupled between said drive means gate and said idle gate, said pair of delay means being adjustable for different delay times between said drive means gate and said idle gate

11. A gaining device including:

11. A gaming device including:

a plurality of rotatable reels, each said reel having a plurality of sectors along the periphery thereof and each sector having an indicia thereon representative of a predetermined value;

a magnet disposed along the radial axis of each reel and at a different diametrical position depending upon the peripheral sector for providing a signal indicative of the predetermined value;

drive means coupled to said plurality of reels for causing said reels to rotate;

stop circuit means associated with each reel of said plurality for applying a stop signal independently to each reel of said plurality;

a disc operated start switch;

timing logic means responsive to said start switch for applying an energizing signal to said drive means and for individually applying an energizing signal to said stop circuit means associated with each reel;

sense means associated with each reel of said plurality for sensing the predetermined value of each reel when stopped, said sense means including a plurality of radial disposed magnetically operated switches disposed on each circumferential radii and a selected one of said magnetically operated switches being adapted to be enabled by the corresponding magnet on the corresponding sector of the selected reel;

computing means responsive to said sense means for computing cumulative value of each reel; and

pay-out means responsive to said computing means for paying out a plurality of discs depending upon the cumulative value of said computing means.

12. The gaming device as set forth in claim 11 wherein said magnetically operated switches being reed switches.

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