ABSTRACT: A game device having an electrical control for indicating the advance or backward movement of a token and preferably for advantageously driving the token is operated by a punch card such as a computer-type card having, for example, ten or more cross columns and eighty or more longitudinally arranged columns for storing the playing information. The token advantageously comprises a football, race horse, hockey puck, etc. and the game is played by inserting a card into a control circuit connection and actuating the circuit for obtaining a motor-driven advance or retardation of the token over a playing board or field.
FIG. 3

INVENTOR.

HARRY EDWARD KRAMER

BY

McGraw & Torren

ATTORNEYS
PUNCH CARD OPERATED GAME

The device is particularly applicable for football, and it may be played by inserting two cards into a play slot, one being the selected play by the offensive player and the other being the selected defense by the defensive player. The electrical apparatus is arranged so that when the two cards are positioned in the slot, one or more punches through the card will align to actuate one of a plurality of photoelectric cells which are electrically connected to drive a token advance driving motor in either a forward or backward manner.

SUMMARY OF THE INVENTION

This invention relates in general to a game device and in particular to a new and useful electronically operated game, particularly football, wherein a play and a gain or loss as a result of the play is automatically carried out electrically in dependence on information stored on an offensive play selection card along or in combination with a defensive play selection card.

The present invention is an improvement over the prior art, particularly in respect to the fact that the game is automatically electrically controlled and that the control is effected by an electrical circuit in response to actuation of one or more photocells to control the running of a driving motor for a token which is advanced or moved backwardly by the driving motor over a playing field in accordance with an infinite number of variable responses to play conditions. The electric circuit includes a plurality of photocells, at least one of which is connected electrically through a reversing switch to a driving motor for a token such as a football. The token is driven by the motor either backwardly or forwardly along the playing field and in some instances from side to side in accordance with the progress of the play as determined by the punch cards and the responsive electronic circuit.

Some of the photocells of the electric circuit are also electrically connected to a motor drive timing circuit which includes other secondary photocells which receive light through slots of a continuously rotating drum at a certain rate of speed. Depending on which of the photocell circuits is closed by the principal photocell exposed to the play control light, the motor will be continuously rotated for the length of time set during which anyone of the secondary photocells is exposed to light from overlapping light signals through the slots. The circuit is advantageously powered by a low voltage source of DC power and the motor for driving the token is advantageously rotated in a forward direction or a reverse direction, depending on whether or not a reversing switch in the photocell circuit is initially thrown one way or the other in accordance with which player is on the offense and thereafter in accordance with which photocells are energized.

At least one of the photocell circuits is also connected to means for indicating the type of play which has been run and whether or not the play results in possession by the other player. The photocells include a delay relay circuit connection to provide a delayed motor reversal and redrive so that after a certain amount of advance in a given direction is achieved, a return in an opposite direction will be indicated. The score is indicated by sensing means located at a goal line and responsive to the passing of the token over the goal line to indicate a score. The plays are indicated as to interception of passes, fumble, etc., by indicators actuated after each play.

Accordingly it is an object of the invention to provide an improved game device including means for driving a token in a direction to effect either a gain or a loss which is actuated electronically by a punched card.

A further object of the invention is to provide a device which provides for the automatic advance or retardation of a token along a game board field such as a football field, race course, or the like, wherein the amount of gain or loss for each play is governed by the number of electrical circuits which are connected by the passage of light through a device such as a punched card in order to electrically connect a token driving motor to its power source for moving the token for a predetermined period of time.

A further object of the invention is to provide a football game device which may be played with punched cards and wherein an offensive player may select a punched card and a defensive player may select a defensive card to defend against the offensive play represented by the card, and including an electronic circuit means adapted to scan the cards, and as a result to drive an electric drive motor for advancing a token in accordance with one of a plurality of different circuit variables indicating variations of play conditions.

A further object of the invention is to provide a football game device which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a top plan view of a football field with a game playing device constructed in accordance with the invention;
FIG. 2 is a plan view of a punch card having information thereon for playing a football game;
FIG. 3 is a schematic electrical view indicating the electrical circuit for the football game control and driving device;
FIG. 4 is a partial development of the drum indicated in FIG. 3; and
FIG. 5 is a diagrammatic illustration of the nature of the control and driving possibilities which are possible with the system.

GENERAL DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in particular, the invention embodied therein comprises an electronically operated game device generally designated 10 which is played by inserting one or more punch cards 12 with information in the form of punches 12a thereon into a slot 14 of the device and then actuating a play button 16 to electrically connect a control circuit indicated in FIG. 3 in order to operate a driving motor 18 which advances or retracts a token, for example a football 20, along a playing field such as a football field 22.

In the preferred arrangement and in the event that the game is to be played as a football game, the football token 20 is carried on a nut 23 which is rotatable on a spirally grooved spindle 24 which extends completely across the playing field 22. Rotation of the spindle 24 causes the nut 23 with the football 20 to move backwardly and forwardly across the football field. Since side to side movement normally occurs during the usual course of a football game, it is desirable therefore to include with the game of football a driving motor 26 which may be actuated selectively and intermittently by a control element (not shown) which is controlled in a manner similar to the actuation of the motor 18 to be described more fully hereinafter.

The motor 26 is advantageously carried on a nut 28 which includes an internal portion which is guided on a helical groove 30 of a spindle 32 so that rotation of the spindle 32 moves the nut 28 in a selected direction toward either the goal post A or the goal post B as determined by the electronic control mechanism indicated schematically in FIG. 3 and arranged to drive the driving motor 18.

The punch cards 12 advantageously include a plurality of punches or cutouts 12a which are preferably selected after careful consideration and based on an analysis of a play of a type indicated on a pictorial representation portion 12b of the card. The portion 12b advantageously includes a visual dia-
gram of the lineup of the offensive lineman and backs for the play, represented by the card 12 and in addition may include a word description of the type of play, for example pass, kick, run, etc. A defensive card similar to the card 12 but not shown also includes punched areas and the two cards are inserted into the slot 14 at the same time. The play button 16 is then pushed and the football 20 will be driven by the motor 18 either forwardly or backwardly, and in some instances either to the left or to the right, in accordance with the activation of the electronic circuit which produces one of many variable driving connections to the motor 18.

As indicated in FIG. 3, the electronic circuit includes a light source or bulb 34 which is connected to a suitable AC source when the game is switched on such as by actuation of an on-off button 36 on the device 10 in FIG. 1. An offensive card 12 and a defensive card 13 is positioned in a slot 37 in alignment with the light source 34, and, depending upon which of the punch portions 12a on the card 12 align with the punch portions on the card 13, light will be directed through the card to one or more of a plurality of photoelectric cells, in this instance eight different primary photoelectric cells 40, 42, 44, 46, 48, 50, 52 and 54.

Photoelectric cell 40 is connected so that its voltage energizes a coil 56 of a relay 58 to close contact 60. The contacts lead from one side to a coil 62 of a reversing switch 64 which may be reversed either manually or automatically. The reversing switch 64 is first set to the left or to the right in accordance with whether the player pressing the play button is an offensive player proceeding toward the goal A or toward the goal B. Thereafter, energization of the primary photoelectric cell 40 from the light source 34 because of the arrangement of the cards 12 and 13 will produce a reversing of the switch 64 by the action of a switching reverse relay 66. The relay 66 is energized by the energization of the photocell 40 and this causes the driving of the motor 18 in an opposite direction from that expected so that it will register a continuing loss by the movement of the football 20 during the actuation time which is controlled by one or more of the other primary photoelectric cells.

Photoelectric cells 42, 44 and 46 are connected through relays 68, 70 and 72 with switches 73, 74 and 76 which are closed when light is received by the respective photoelectric cells 42, 44 and 46. The closing of the switch 73 actuates a relay 80 to close a switch 82 to a photoelectric cell connecting circuit for a secondary photoelectric cell 84. During the time at which the secondary photoelectric cell 84 is receiving light from a light source 86 which is contained within a continuously rotated drum 88, it energizes a coil 90 of a relay 92 to close the circuit to the motor 18 from the power source which in this instance is a low voltage (30 volt DC) supplied from an AC source and delivered through a rectifier 96. Motor 98 which drives the drum 88 is a constant speed motor and will normally be turned on when the on-off switch 36 is actuated.

A feature of the construction is that three secondary photoelectric cells, including the secondary photoelectric cell 84 and a photoelectric cell 100 and another secondary photoelectric cell 102 provide a large range variation of the running time of the driving motor 18. This is so because the drum 88 which is partially shown in development in FIG. 4 includes an area labeled with the photoelectric cell 84 with slots 104 of a size and a spacing to actuate the electrical circuit to the driving motor 18 for a selected time period. Slots 106 and 110 are longer and spaced differently from the slots 104, and for example, the annular area with slots 110 is provided with five interruptions around the complete periphery of the drum 88. The photoelectric cell 102 were exposed completely only to the slots without any break it would maintain the driving motor 18 in driving engagement for 25 yards maximum. Similarly the slot area with slots 106 includes nine breaks between slots around the complete periphery of the drum so that the maximum drive would be 13 yards. The slot area with slots 104 includes 21 breaks around the periphery thereof so that the maximum drive for the motor 18 would be 6 yards.

The photoelectric cell 44 is connected to activate a relay 112 to close switch 114 and the photoelectric cell 46 activates relay 116 to close switch 118. Switches 114 and 118 are respectively connected to one side of respective switches 120 and 122 which are closed by actuation of coils 124 and 126 by photoelectrical 100 and 102, respectively. It should be appreciated that one or all three of the photocells 42, 44 and 46 may be energized by the positions of the cards 12 and 13 and combinations produce variable results in respect to the yards gained or lost. For example, if photocells 84 and 100 are set for connection to the motor circuit 18, only three breaks between slots 104 and 106 would be encountered during a rotation of the drum 88 so that the token could be moved a total of 40 yards. A combination of photoelectricals 100 and 102 would produce only two breaks in the drum and a maximum of 60 yards could be obtained. The combination of photoelectricals 84 and 102 will provide the maximum yardage which can be effected which would be up to 125 yards which naturally would advance the token over the goal line if completely carried out. The timing motor is advantageously arranged to rotate at one and one-half revolutions per minute. It should be appreciated that the results will vary by the holding time with the various relays after the starting button 16 is actuated.

The photoelectric cell 48 energizes a coil 130 of a heat delay relay 132 which in the embodiment illustrated has a delaying time of 15 seconds so that when this relay is actuated by the orientation of cards 12 and 13, it will take 15 seconds for the relay to operate to close a switch 134 which in turn will then close the relay 58. Relay 58 will then reverse the current to the motor 18 and permit driving backwardly in an opposite direction. Thus it can be seen that the photoelectric cell 46 is one which will be operated when the ball is kicked such as at the kick off after a touchdown and conversion try or at the beginning of the game. The movement of the football 20 will be first in one direction down to the receiver and then backwardly in an opposite direction indicating the run back. During this play generally speaking the cards will also be set to actuate the combination of two or three of the photocells 42, 44 and 46 to provide for the long driving engagement of the motor 18.

The photoelectric cell 50 is connected to actuate a delay relay 136 to energize a delay relay 138 and to close a switch 140 in a manner similar to photoelectric 48 but with the exception that relay 138 has a delay time of only 6 seconds. This photoelectric cell 50 will thus normally be energized for short passes which are intercepted and run back by a certain amount. When 50 of a relay 136 is energized, it will light up an indicator 142 to indicate, for example, that it is a fumble and was intercepted to run the ball back behind the line of scrimmage.

The photoelectric cell 52 is connected to energize a coil 144 of a relay 146 to actuate a switch 148 which illuminates a penalty indicator 150. The photoelectric cell 54 actuates a relay 152 to energize a coil 154 and actuate a switch 156 to indicate that a pass is incomplete by an indicator 158.

The circuit is completed by a relay 160 having one line opened and one line closed and one line connected to a score board 162 which is energized only after power goes through the complete circuit and after energization of a coil 164 by the depressing of the actuating button 16.

As indicated in FIG. 5, the invention provides a computer type device for playing the game and it provides means for advancing a play token in a certain direction and for a certain period of time depending upon the outcome of the actuation of the computer as caused by various play cards. The computer device may be used for playing the game of football and in which event a single offensive card may be positioned in the computer, or a combination of an offensive and a defensive card positioned therein. If one only card is positioned in the computer, the photosensitive means for receiving electrical impulse by the penetration of light through the punched openings of the card or cards are exposed in a manner which is usual for the particular game being played in order to move the play token either forwardly or in a reverse manner. When
two cards are employed, the punches in the card and the electrical circuit are arranged such that the light which will penetrate through aligned openings of the two cards through the photo-sensitive means will produce a result in accordance with the characteristics which are expected by the plays illustrated on the two cards which are inserted.

For the game of football, an offensive card and a defensive card are positioned in the computer and each player has an opportunity of selecting from a plurality of cards which represent the offense or the defense which he thinks most appropriate to the situation in accordance with the play token foot ball, etc. The photosensitive means which are arranged to receive the impulses from the punched card are then connected to drive a driving motor for the play token either forwardly or in reverse in dependence upon which photosensitive means is energized, and in addition, additional photosensitive means are energized to open circuits to timing mechanisms for timing the length of time at which the motor is driven. The whole circuit is such that after an initial energization the complete play is programmed and carried out by the driving motor and any indications of the play which are necessary are shown on an indicator immediately after the play has run and the circuit becomes deenergized.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

1 claim:
1. A game device comprising a play area, a play token movable along said play area, a play token driving motor for driving said play token along said play area, a light actuated variable photosensitive electrical circuit connected to said motor for selectively driving said motor forwardly in reverse and for selected periods of time, a light source and control means comprising at least one punched card between said light source and photosensitive circuit for varying the light influencing said circuit to vary the direction and amount in which said play token is driven by said motor.
2. A game device, according to claim 1, wherein said variable photosensitive circuit means includes a plurality of photosensitive elements arranged at spaced locations from said light source, and said control means comprising said at least one punched card being located between said light source and said photosensitive elements to permit selected ones of said photosensitive elements to receive light from said light source.
3. A game device comprising a play token driving motor for driving a play token along a play area, light actuated variable photosensitive electrical circuit means connected to said motor for selectively driving said motor forwardly in reverse and for selected periods of time, said variable photosensitive electrical circuit means including a continuously rotating drum having a plurality of separate slotted areas each having openings of varying spacing, a light positioned within said drum, a plurality of photoelectric cells arranged adjacent said drum opposite said respective areas having said openings for receiving light pulses from said light source as said drum is rotated and being electrically connected to said drive motor to maintain said drive motor in running operation for a period of time in accordance with which of said photoelectric cells is energized.
4. A game device comprising a play area, a play token driving motor for driving a play token along said play area, a light source, a plurality of photosensitive elements arranged adjacent said light source, means permitting introduction of play cards between said light source and said photosensitive elements which cards are adapted to block at least one of said photosensitive elements from receiving light from said light source, and timing means connected to at least one of said photosensitive elements and to said motor for driving said motor for a length of time in accordance with which of said photosensitive elements is actuated by said light source.
5. A game device according to claim 4 including reversing switch means connected to said motor and at least one of said photosensitive elements for reversing the direction of rotation of said motor, said timing means being connected to at least two of said photosensitive elements and to said motor and including means for varying the length of time of driving of said motor in accordance with which of said photosensitive elements is actuated by said light source.
6. A game device according to claim 5 wherein at least one of said photosensitive elements is connected to indicator means for indicating a condition of game play.
7. A game device according to claim 5 wherein said play area comprises a game board, a token adapted to be movable along said game board, and drive means connected between said drive motor and said token for advancing and retarding said token along said game board.
8. A game device according to claim 7 including separate drive means connected to said token for moving said token backwardly and forwardly transversely of said game board in addition to its movement forwardly and backwardly along said game board.
9. A game device according to claim 5 wherein said timing means includes at least two secondary photoelectric cells, said motor, said photoelectric cells being connected to said electrical circuit energizing means in a manner to maintain said circuit connected to said motor when said photoelectric cells are energized, separate ones of said photosensitive elements being separately connected to said photoelectric cells in a manner such that upon actuation of said photosensitive elements one of said photoelectric cells is connected electrically to said electrical circuit energizing means for driving said motor as long as said photoelectric cell is energized, and means for directing a varying time pulse of light of said photoelectric cells to energize said photoelectric cells for a predetermined period of time.
10. A game device according to claim 9 wherein said means for directing a pulse of light to said photoelectric cells includes a secondary light source, a continuously rotating drum around said secondary light source, means for rotating said drum at a fixed rate of speed, said drum having at least two series of spaced slots thereon with one series in alignment with each of said photoelectric cells which permit light from said secondary light source to pass therethrough to said photoelectric cell.
11. A game device according to claim 9 wherein said electrical circuit energizing means includes means for supplying a constant voltage of direct current to said motor and switch means for connecting said electrical circuit energizing means to permit said motor to be driven for a period of time regulated by said timing means and in a direction controlled by said reversing switch means.
12. A game device according to claim 9 including a punched card having a play indicated thereon and adapted to be positioned between said light source and said photosensitive elements.
13. A game device according to claim 12 including punched cards of two different types, one being for the offensive player, the other being for the defensive player, adapted to be positioned together and between said photosensitive elements and said light source.
14. A football game device comprising a football play token adapted to be moved backwardly and forwardly along a game board playing field, a driving motor connected to said football play token for driving said play token along said play field area in both forward and rearward directions, a punch card operated electrical signal circuit connected to said motor for selectively driving said motor in forward and in reverse directions and for timing the length of time said motor is connected to said football play token and including a light source, a plurality of photosensitive elements arranged adjacent said light source, means permitting introduction of play cards between said light source and said photosensitive elements which are adapted to block at least one of said photosensitive
elements when receiving light from said light source, reversing switch means connected to said motor and at least one of said photosensitive elements for reversing the rotation of said motor to drive said football play token backwardly to indicate that a loss is being made on the play, and timing means connected to at least two of said photosensitive elements and to said motor for driving said motor for a length of time in accordance with which of said photoelectric cells is selected.

15. A football game device according to claim 14 including means for indicating the condition of play connected to at least one of said photosensitive elements.

16. A football game device according to claim 14 including relay means connected to said timing means to permit running of said timing means in one direction and connected to said reversing means to drive said motor with said timing means in an opposite direction in order to drive said football play token first in one direction to indicate, for example, a pass, and then in an opposite direction to indicate a return by the opposite player to indicate the run back by an interception.

17. A football game device according to claim 16, wherein at least two of said photosensitive elements are connected to separate delay relays and to said reversing switch means to effect reversing of drive of said motor after said motor has been operative in a selected direction by said timing means and to reenergize said timing means to drive said motor in an opposite direction after a selected length of time.

18. A football game device according to claim 14, wherein said reversing switch means includes means for manually connecting said driving motor to drive said football game token in a selected direction in accordance with which of the players has possession of the ball.

19. A football game device according to claim 14, including drive means connected to said football play token for moving said football play token backwardly and forwardly across the field as it is advanced or retarded along the field.