A game device has a series of annular wheels with exposed game indicia carrying facets around perimetallic edges and rotatively mounted in stacked, face-to-face relation on an axle rod extending from a handle housing part mounting an LCD display and mode operating buttons. An actuating and locking rod is mounted on a free end of the axle rod. Wheel interiors are provided with coded areas identifying rotational positions and detected by detectors on the axle rod identifying wheel sequence and rotational positions corresponding to combinations of aligned indicia such as letters, the sensors providing corresponding signal to a microprocessor in the handle programmed to compare words with a dictionary in memory and calculate a players score for display on the LCD. The coded area can be bar codes or apertures for detection by a scanning head driven along the axle or circuit board mounted contact protuberances.
Fig. 5
HANDHELD WHEEL SPELLING GAME DEVICE

RELATED APPLICATION

[0001] Priority is claimed from provisional application 60/641,475, filed Jan. 05, 2005, the disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The invention concerns a handheld, wheel game device and, particularly, a handheld magnetic wheel game device wherein a plurality of magnetic wheels stacked together in coaxial, face-to-face relation, preferably, by magnetic force have peripheral edge portions formed with respective facets marked with respective discrete indicia whereby relative rotation of the wheels brings the indicia into a selected axial alignment to complete an equation, word, picture pattern etc.

BACKGROUND OF THE INVENTION

[0003] The game device is an electronic development of the device taught by my U.S. Pat. No. 4,865,324 issued: Sep. 12, 1989, the disclosure of which is incorporated herein by reference.

[0004] Such prior game device comprises a plurality of magnetic wheels mounted together stacked in coaxial, face-to-face relation by their magnetic force. A peripheral (circular, circumferential) edge portion of each wheel is formed with facets marked with respective discrete indicia. The magnetic wheels are rotatable relative to each through a series of 'click-stops,' (pimples on one face received in depressions on an adjacent face of an adjacent wheel), which correspond to discrete relative positions of the magnetic wheels in which the respective facets and their associated marking are axially aligned. A solution is achieved when all of the indicia on each of the magnetic wheels are aligned in accordance with a predefined or selected manner forming a predefined/selected word, number, pattern, or picture. The numbers/symbols may correspond to those found on a conventional computer game keyboard.

[0005] A disadvantage of the prior game device is that all calculations based on the aligned indicia must be performed by the user. For example, where the indicia are individual letters for a spelling game, alleged words formed by aligned letters must be looked up in a dictionary by the user, and scores based on numerical values assigned to such words must be calculated and totaled by the player which can be time consuming and arduous/repetitive procedures detracting from the enjoyment of the game.

SUMMARY OF THE INVENTION

[0006] It is an object of the invention to obviate the requirement for the player to perform the aforementioned routine searches and calculations and so increase the enjoyment of the game.

[0007] According to one aspect, the invention provides a game device comprising: a plurality of individual wheels each having an exposed circumferential edge portion formed with facets marked with respective discrete indicia; means for mounting, releasably, the plurality of wheels stacked together in coaxial, face-to-face relation for relative rotation of selected individual wheels to bring the indicia into a selected axial alignment to complete one of an equation, word, picture, and pattern, release of the wheels permitting shuffling thereof as loose piece items for remounting in a different sequence/order; means on respective individual wheels for identifying their relative rotational and sequential positions when stacked together, corresponding to relative positions of selected respective indicia; means coopernible with the identifying means for detecting said at least one of said relative rotational positions and said sequential positions of the wheels corresponding to relative position of selected respective indicia and providing signals indicative of such positions; signal processing means comprising an input operably linked to the detecting means for receipt of said signals therefrom, at least one database correlating said signals with respective values associated with respective indicia and an executable program for at least one of comparing said values with a database (such as a dictionary) and for calculating a score corresponding to the relative positions of selected respective indicia and for determining and providing a result signal to an output; and, a display, operably linked to the output to receive the result signal and display the result determined by the processor.

[0008] The result may, for example, be a score determined from a calculation or values assigned to words presented by the relative positions of wheel indicia. The mounting means may comprise at least one of magnetic elements on the wheels, a wheel mounting axle extending coaxially through the wheels and a channel receiving, rotatively lower peripheral edge portions of the wheels. The mounting means may comprise a handle-form housing connected to one axial end of the wheel mounting axle to prevent release of wheels from that end, the wheels being releasable for shuffling from another end of the axle.

[0009] The display and operating buttons may be mounted in exposed positions on the handle form housing and the signal processing means are contained within the handle form housing. The axle comprises a hollow rod and the detecting means extends along the rod past each wheel.

[0010] Preferably, the detecting means comprises a circuit board extending along an interior of the rod and having a contact surface covered with a matrix array of spaced apart contact pairs, a strip of elastomeric detent contacts mounted on the contact face of the circuit board with respective detent contacts aligned with respective contact pairs, the identifying means comprising wheel and indicia identifying patterns of detent receiving recesses on an inner periphery of each wheel and means for moving the detents into and out from engagement with inner peripheries of each wheels so that some of the detents are received in respective recesses and others of the detents are compressed between inner surface portions of the wheels adjacent the recesses and the contact face of the circuit board in electrical bridging engagement with respective aligned contact pairs to complete an electrical connection therebetween and produce a corresponding electrical signal.

[0011] The rod hollow comprises a cover shell formed with apertures aligned with respective detents to receive, guide and support the detents during said movement. Preferably, the moving means comprises a circuit board supporting carriage extending along the interior of the rod; a cam shaft providing with a fingerpiece at one axial end and mounted along the rod below the platform for limited movement against the action of a biasing spring and the carriage and cam shaft being formed with engageable complementary cam surfaces, whereby operation of the fingerpiece moves the cam shaft to bring the complementary cam surfaces on the cam shaft and the car-
riage progressively into engagement to raise the platform and thereby move the detents into engagement with the inner peripheries of the wheels to complete the electrical connections.

[0012] Alternatively, the identifying means comprises bar codes on respective wheels and the detecting means comprises a bar code scanning head driven along the axle rod passed respective wheels to scan at least one bar code thereon.

[0013] In a sense, the wheel stack simulates a keyboard in which the individual keys are detachable for resorting.

[0014] The sensing means may comprise a bar scanner arranged to scan bar codes marked on respective wheels in different rotational positions.

[0015] The magnetic wheels are rotatable relative to each through a series of ‘click-stops,’ (pimples on one face received in depressions on an adjacent face of an adjacent wheel), which correspond to discrete relative positions of the magnetic wheels in which the respective facets and their associated marking are axially aligned. A solution is achieved when all of the indicia on each of the magnetic wheels are aligned in accordance with a pre-defined or selected manner forming a pre-defined/selected word, number, pattern, or picture. The numbers/symbols may correspond to those found on a conventional computer game keyboard.

[0016] Thus, the game device comprises a central electronic processor for executing at least one program from associated memory; a scoring LCD display, start and On/Off buttons/keys, an I/O interface, and a language dictionary held in memory in a tree format. The tree is traversed alphabetically in accordance with a known or standard algorithm controlled by a tree search control module. A random number generator responds to the input word size to produce a numerical value for each selected position of each letter along the created/selected word.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. 1 is a schematic perspective view of a first embodiment of game device according to the invention;

[0018] FIG. 2 is an exploded view of the game device;

[0019] FIG. 3 is a perspective view of the game device with the wheels and some housing parts removed to reveal internal components;

[0020] FIG. 4 is a similar view to FIG. 3 with additional components removed to show the camshaft; and,

[0021] FIG. 5 is a perspective view, partly in cross-section showing a second embodiment.

PARTICULAR EMBODIMENTS

[0022] As shown in FIG. 1-4, the game device comprises a series of eight annular wheels 1 having exposed game indicia carrying facets 2 around perimetrical edges and rotatably mounted in stacked face-to-face relation on an axle rod 3 extending from a handle housing part 4 mounting an LCD display 5 and three mode operating buttons 7. An actuating and locking ring button 6 is mounted on a free-end of the axle rod.

[0023] As shown particularly in FIG. 4, each annular wheel 1 comprises a nest of three concentric rings 11, 12 and 13. The outer, plastic ring 11 carries the facets and indicia and has a rear face formed with a ring of rotation locating pimples 15. The intermediate wheel 12 is a permanent magnet. The inner metal ring 13 is formed with a front peripheral mounting flange 16 having a front face formed with a ring of pimple receiving recesses 17 and a pattern of coding apertures 18 extending forwards from a rear edge.

[0024] The handle housing part 4 comprises an upper handle half shell 21 formed with windows 22 and 23, respectively, for the LCD display 5 and buttons 7, and contains LCD housing frame 25; guides 26; microprocessors 27; main circuit board 28 for mounting the microprocessors, buttons etc; end cap 29, integral, twin battery housing 31 and lower, semi-cylindrical, axle rod half shell 32, lower handle half shell 33 and cover member 34.

[0025] The axle rod comprises the lower and upper, semi-cylindrical half shells 32 and 36 containing axial return springs 38; a cam shaft 40, four biasing springs 42, circuit board mounting platform 44; return springs 46; signal circuit board 48; and a strip 49 of elastomeric detent contacts.

[0026] An annular permanent magnet 50 is mounted in the housing on the root end of the axle rod.

[0027] The lower axle rod half shell 32 is molded with a compartment 54 trapping the axial biasing springs 38, axially spaced upstanding posts 57 locating the springs 46 which bias the platform 44 downwards and, platform supporting posts 45 with metal inserts 47 locating springs 42.

[0028] The camshaft 40 is formed with three, axially spaced apart cam surfaces 56 providing (30 degree angle) platform raising ramps; two post/spring receiving apertures 60; and, a depending, spring engaging catch 66 for engaging return springs 38.

[0029] The platform 44 is formed with an upper, channel section face receiving the circuit board 48 and overlying elastomeric contact strip 49 and has a lower face formed with sockets 62, 64 (not seen) trapping the biasing springs 46 and 42 and cam/ramp surfaces of complementary shape to, and engaging, cam surfaces 56 of the cam shaft 40.

[0030] The elastomeric micro contact strip 49 comprises a strip of upstanding elastomeric pimple detents 68 aligned with respective contacts of a matrix grid array of spaced contacts on an upper surface of the circuit board 48.

[0031] The upper axle rod half shell 36 is formed with a series of detent guiding apertures 70 aligned to receive respective pimple detents 68.

[0032] In operation of the assembly, axial depression of the button 6 urges cam shaft 40 towards the handle so that the surfaces of engaging ramps ride across each other to raise the platform forcing the respective elastomeric detents through respective guiding apertures 70 towards the coded inner surfaces of wheel 13 where respective tips of the detents either engage the inner surface portions of the ring 13 causing them to be squeezed against the contact surface of the circuit board constrained from expansion by the edges portions defining the apertures, so that they are pressed against the circuit board and cause a contact between respective aligned pairs of lines on the circuit board completing a signal circuit, or the contact tips enter the apertures 18 so that they are not compressed against the contact face of the circuit board so that no signal contact is made. Releasing the button permits return springs 46 to lower the platform and contact strip, withdrawing the elastomeric detent pimples beneath the surface of the rod avoiding interference with wheel movement. In the second embodiment shown in FIG. 5, an interior surface of each annular wheel is marked with barcodes 75 for indentifying each wheel and its rotary position. A bar code reading head 77 is reciprocated axially along an axially extending circuit board 79 to read bar codes of all wheels by an externally threaded spindle 81 rotated, via a gear chain, by an electric...
motor 83 mounted in the handle shell, in response to depression of the button or key. Signals read by the reading head are connected to a main processor mounted on one of two circuit boards mounted in the handle shell and a read out is obtained by an LCD mounted on one of the circuit boards. The half shells forming the axle provide a housing for batteries 83.

[0033] In playing the game, all indicia carrying annular wheels are pulled axially off the axle removing/pulling off all wheels from the handle and shuffled by placing flat on a surface table placing them flat and then reassembled on the axle in random order or sequence. The button is depressed to sound a beep and start a timer (200 sec) with the count down displayed on the screen. Where the indicia are letters, a player rotates the wheels to arrange word forming indicia lin a row, which is axially aligned with the screen, to form a known dictionary word. The button is then depressed to raise the contacts to read such word for scoring. The computerized unit will verify by searching internal dictionary and will beep to acknowledge and display the score or alternatively, will beep in a different tone indicating an erroneous input. (Each letter equals one point, unless indicated otherwise by a small number near the letter for higher values).

[0034] Another button enables selections of wheels where more than one word is formed while depression of the third button of the button group 7 enables deselection of different game modes.

[0035] If there is more than one word in the active row, the computerized system can calculate the aggregate value such words.

[0036] At the end of the count down period a total score will appear on the LCD. For each round, where a higher score is achieved, a special cheering beep is made.

[0037] After 200 seconds has elapsed without pressing the switch, the device will enter a battery saving mode. Depressing the switch for a long time will also cause the device to enter the sleep mode.

[0038] An alternative form of identification of wheel sequence and rotational position comprises are inductive tags on respective wheels.

[0039] In another embodiment, the annular wheels are not mounted on a central communications circuit board but are formed as disks holding respective circuit board mounted processors. Each wheel has a unique digital address and sub addresses for each of the ten facets. Each wheel has contact pins mounted on the circuit board which engage pins of adjacent wheels when rotated to another relative rotary position to transmit a wheel and facet identifying signal to the central processor.

1. A game device comprising:

a plurality of individual wheels each having an exposed circumferential edge portion formed with facets marked with respective discrete indicia;

means for mounting, releasably, the plurality of wheels stacked together in coaxial, face-to-face relation for relative rotation of selected individual wheels to bring the indicia into a selected axial alignment to complete one of an equation, word, picture, and pattern, release of the wheels permitting shuffling thereof as loose piece items for remounting in a different sequence/order;

means on respective individual wheels for identifying their relative rotational and sequential positions when stacked together, corresponding to relative positions of selected respective indicia;

means cooperable with the identifying means for detecting said at least one of said relative rotational positions and said sequential positions of the wheels corresponding to relative position of selected respective indicia and providing signals indicative of such positions;

signal processing means comprising an input operably linked to the detecting means for receipt of said signals therefrom, at least one database correlating said signals with respective values associated with respective indicia and an executable program for at least one of comparing said values with a database (such as a dictionary) and for calculating a score corresponding to the relative positions of selected respective indicia and for determining and providing a result signal to an output; and,

a display, operably linked to the output to receive the result signal and display the result determined by the processor.

2. The game device of claim 1 wherein the mounting means may comprise at least one of magnetic elements on the wheels, a wheel mounting axle extending coaxially through the wheels and a channel receiving, rotatively, lower peripheral edge portions of the wheels.

3. The game device of claim 2 wherein the mounting means may comprise a handle-form housing connected to one axial end of the wheel mounting axle to prevent release of wheels from that end, the wheels being releasable for shuffling from another end of the axle.

4. The game device of claim 3 wherein the display and operating buttons are mounted in exposed positions on the handle form housing and the signal processing means are contained within the handle form housing.

5. The game device of claim 3 wherein the axle comprises a hollow rod and the detecting means extends along the rod past each wheel.

6. The game device of claim 5 wherein the detecting means comprises:

a circuit board extending along an interior of the rod and having a contact surface covered with a matrix array of spaced apart contact pairs,

a strip of elastomeric detent contacts mounted on the contact face of the circuit board with respective detent contacts aligned with respective contact pairs, the identifying means comprising wheel and indicia identifying patterns of detent receiving recesses on an inner periphery of each wheel and means for moving the detents into and out from engagement with inner peripheries of each wheels so that some of the detent contacts are received in respective recesses and others of the detent contacts are compressed between inner surface portions of the wheels adjacent the recesses and the contact face of the circuit board in electrical bridging engagement with respective aligned contact pairs to complete an electrical connection therebetween and produce a corresponding electrical signal.

7. The game device of claim 6 wherein the hollow rod comprises a cover shell formed with apertures aligned with respective detents to receive, guide and support the detents during said movement.

8. The game device of claim 7 wherein the moving means comprises a circuit board supporting carriage extending along the interior of the rod, a cam shaft providing with a fingerpiece at one axial end and mounted along the rod below the platform for limited movement against the action of a biasing spring and the carriage and cam shaft being formed
with engageable complementary cam surfaces, whereby operation of the fingerpiece moves the camshaft to bring the complementary cam surfaces on the camshaft and the carriage progressively into engagement to raise the platform and thereby move the detents into engagement with the inner peripheries of the wheels to complete the electrical connections.

9. The game device of claim 1 wherein the identifying means comprises bar codes on respective wheels and the detecting means comprises a bar code scanning head driven along the axle rod passed respective wheels to scan at least one bar code thereon.

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