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Brown

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[54] **TILTABLE TABLE APPARATUS FOR BALL ROLLING GAMES**

[75] Inventor: **Richard L. Brown,** Bellevue, Nebr.

[73] Assignee: **Midway Manufacturing Company,** Schiller Park, Ill.

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[52] **U.S. Cl.** **273/110**

[51] **Int. Cl.** **A63b 67/14**

[58] **Field of Search** ..... 273/110, 109, 115, 113; 35/12 N, 12 P, 12 C

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Primary Examiner—Richard C. Pinkham
Assistant Examiner—Theatrice Brown
Attorney, Agent, or Firm—George R. Nimmer

[57] **ABSTRACT**

A table as a playing field for a rollable ball which table is tiltable about one or both of a pair of substantially horizontal perpendicular axes, the apparatus being provided with suitable power source means for tilting the table whereby the ball travel relative to a table target is independent of a contestant's physical strength, but rather is dependent upon his ability in wielding a manipulator device for the powering means, which device is wielded at a remotely positioned operator's station. The table tilting powering means is preferably throttled whereby the ball is not catapulted from the table but rather remains rollably engaged therealong, the manipulator device motion is desireably directionally correlated with the ball rolling direction likely to result therefrom, and there is the further capability for two competing players at opposed operator stations including therewith apparatus means for resolving individual player efforts to control the ball through the table tilting powering means.

11 Claims, 6 Drawing Figures

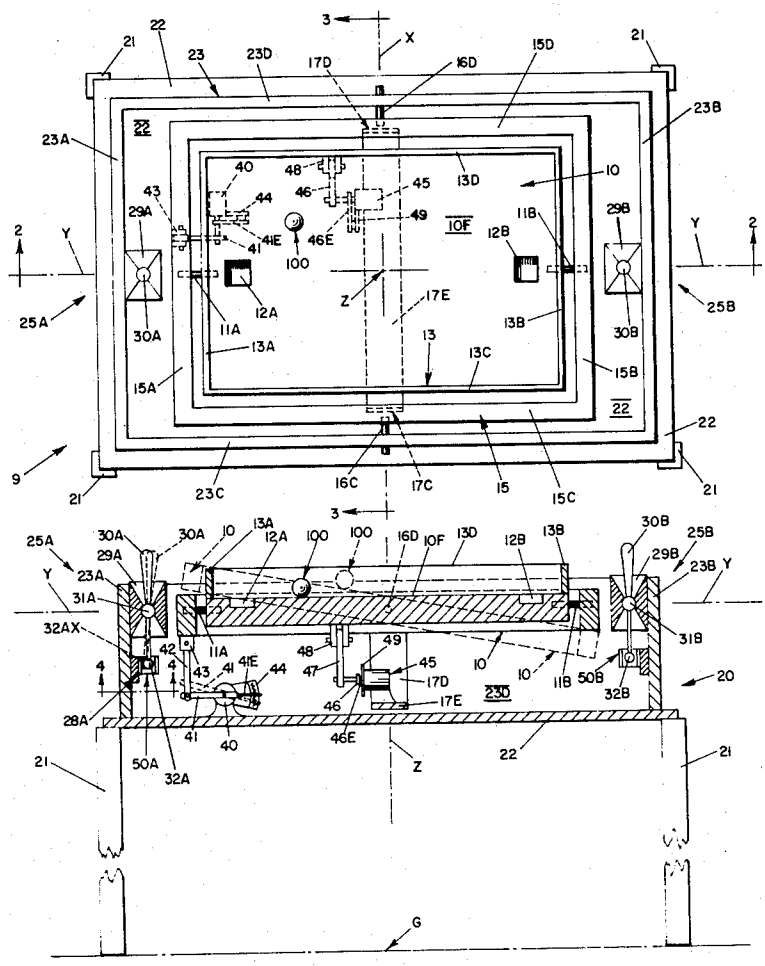
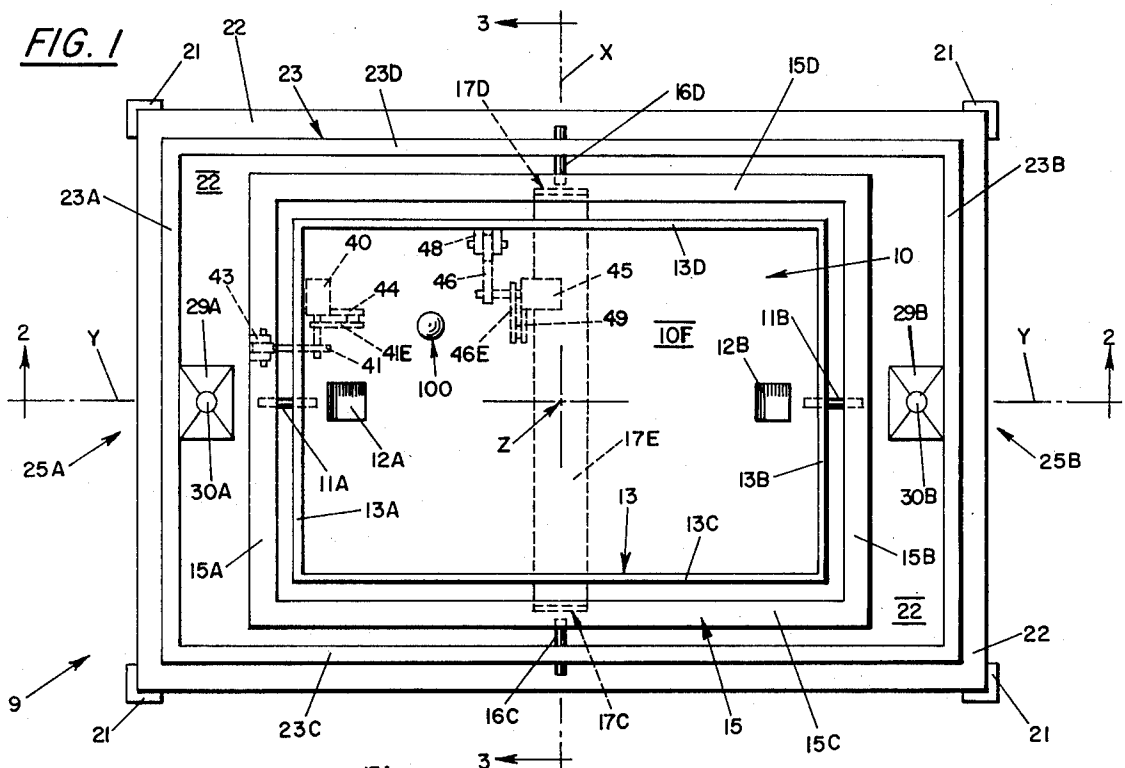


FIG. 1


3
X
22
21
23
23D
17D
16D
15D
23B
23A
40
48
46
45
13D
10
43
44
29A
49
10F
11B
29B
2
Y
41E
41
46E
12B
100
Z
17E
25A
25B
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17C
15
15C
9
23C

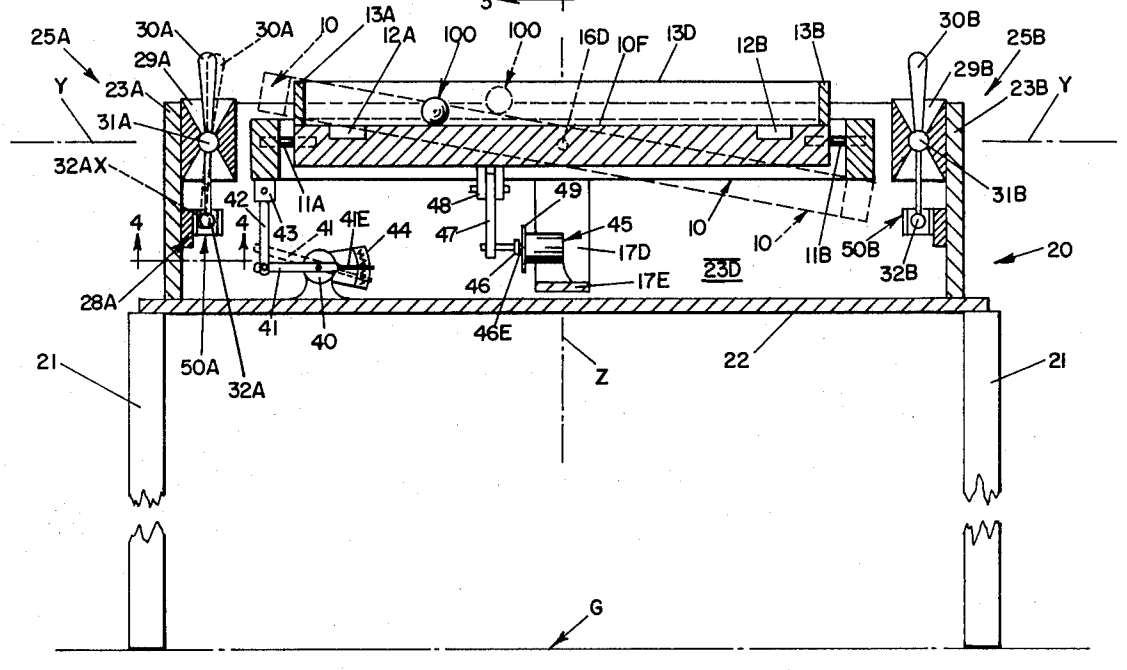

3
25A
30A
10
13A
12A
100
16D
10F
13D
12B
13B
30B
25B
29A
29B
23A
23B
Y
31A
32AX
11A
48
49
45
17D
17E
10
11B
50B
31B
42
43
41
41E
44
47
4
28A
46
46E
40
50A
32A
23D
32B
20
21
22
Z
G

FIG. 2

FIG. 3

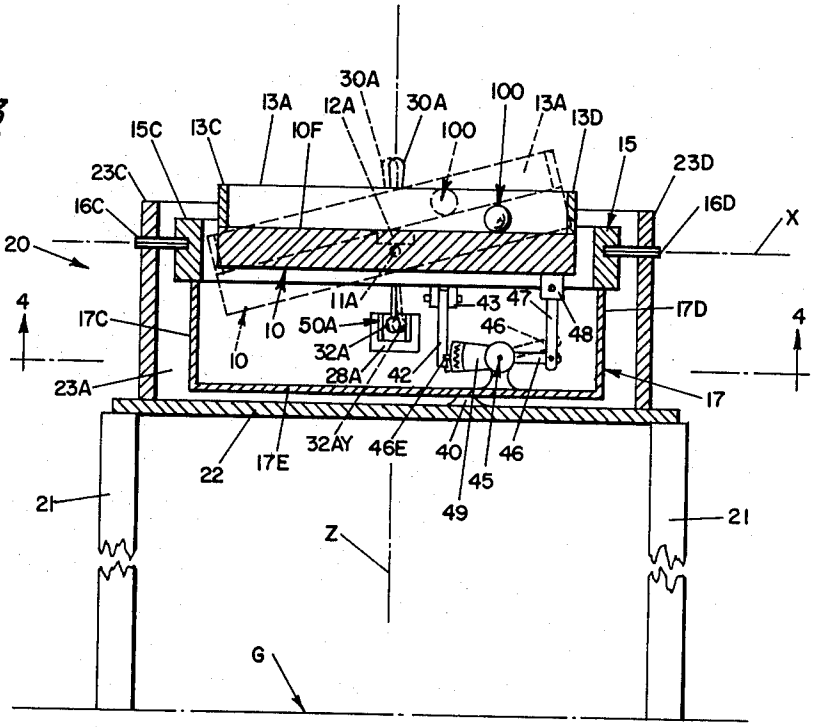


FIG. 4

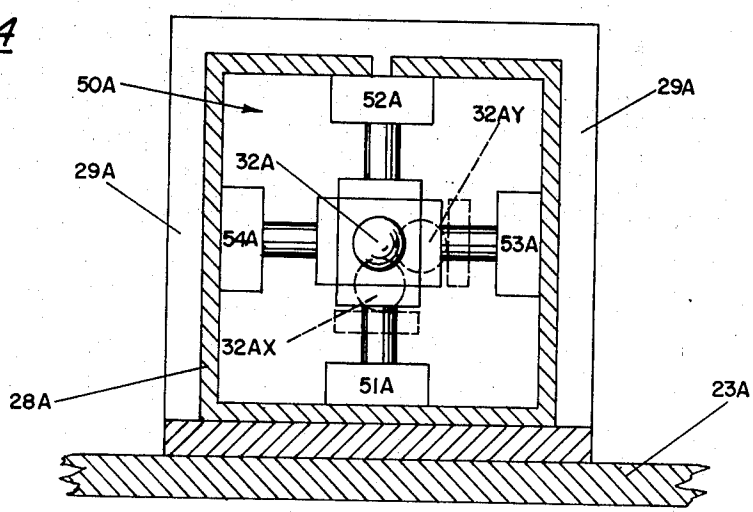
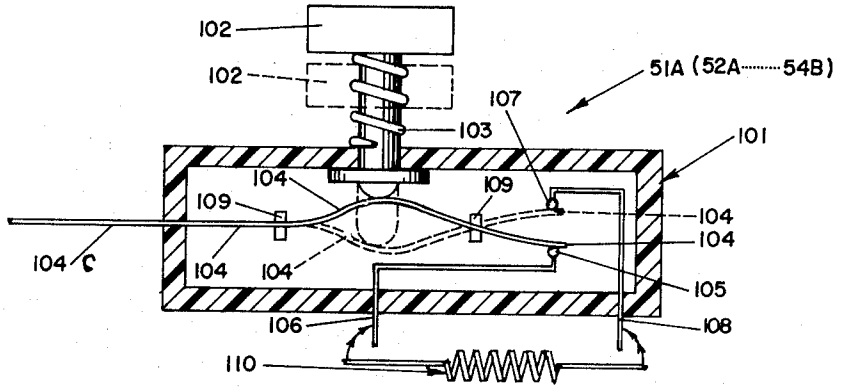


FIG. 5



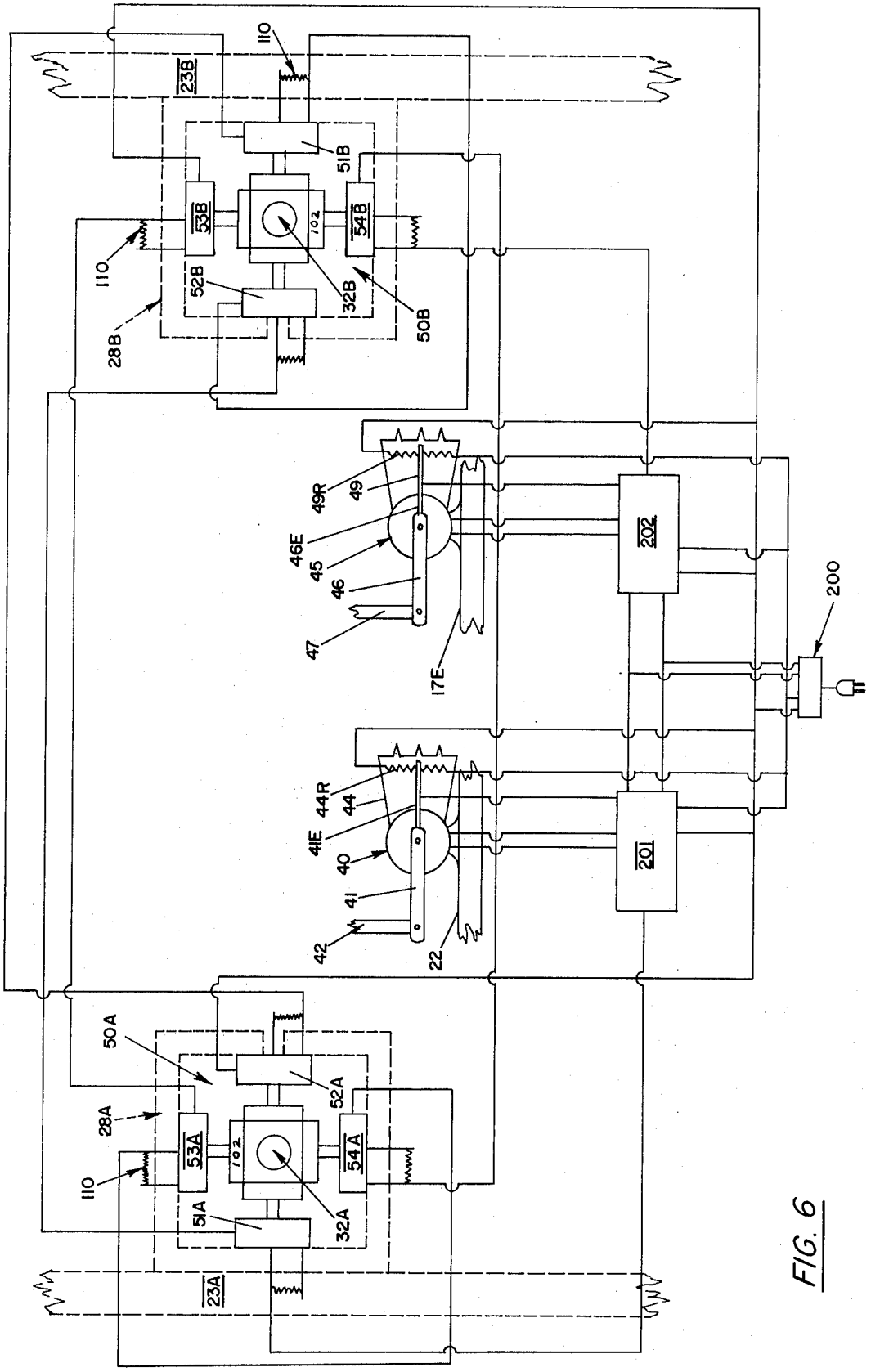

110
238
51B
53B
54B
102
110
52B
32B
50B
28B
49R
49
46E
45
46
47
17E
202
200
44R
44
41E
40
41
42
22
201
50A
52A
28A
53A
54A
110
51A
32A
23A

FIG. 6

TILTABLE TABLE APPARATUS FOR BALL ROLLING GAMES

The prior art is replete with teachings of tiltable tables for ball rolling games and equipped with one or more table targets, the table being amenable to tilting by a single player, or even by two or more competitively operating contestants. However, such tiltable table ball rolling games tend to suffer from one or more of the following disadvantages and deficiencies. With certain prior art structures the table is tiltably supported about one axis only; accordingly, the ball directional movement relative to a target is only partially operator controllable, there also being dependence upon chance or luck, which tends to bore and frustrate most contestants. While certain other prior art structures do provide table tilting capability about two perpendicular horizontal axes, the control furnished to each contestant at his operating station is for table tilting about only one of the two axes, which makes the target maneuvering quest partially dependent upon chance and hence similarly boring and frustrating. With a number of prior art apparatus the rate or degree of table tilt is largely dependent upon the physical strength of the respective contestants; hence, the physically stronger competitor will almost assuredly wrest table control and win the ball rolling contest, which soon discourages the weaker opponent. Another notable prior art deficiency resides in the fact that the table tilting controls available to the contestants, even if not wholly dependent upon an operator's degree of physical strength, do not readily correlate with the ball travel direction likely to result therefrom. Another objectionable tendency with many tilting table ball rolling games is that the ball is apt to become catapulted away from the table; not only is ball catapulting a nuisance and unsafe for the players and spectators, but also renders tilting table ball rolling games very impractical for "coin-operated" or "arcade" public installations.

It is accordingly the general object of the present invention to provide a tiltable apparatus for ball rolling games and contests that overcomes the several disadvantages and deficiencies of prior art apparatus.

It is another general object of the present invention to provide a titltable table apparatus suitable for ball rolling contests and games that is unusually suited and amenable to coin-operated or public installations thereof. In this vein, it is an ancillary object to reasonably ensure that the ball travel path relative to a target is dependent upon a player's skill in adroitly controlling the table tilt about the two respective horizontal axes through a suitable manipulator device requiring only a modicum or initiate-level of operator strength capability to motivate said manipulator device.

It is another object to provide a tiltable apparatus for ball rolling games that is interesting and challenging to a wide spectrum of potential pairs of player contestants, the target scoring capability being largely independent of luck, chance, or ones muscular prowess, but rather almost entirely dependent upon a contestant's quickness, adroitness, and visual perception.

It is a further object to provide a tiltable table apparatus for ball rolling contests that can be built sturdily, safely, and reliably for so-called "coin-operated" or "arcade" public installations.

It is yet another object to provide a tiltable table apparatus of the class described wherein the table tilting manipulator device controls at the operator station can be readily mastered by the contestant so that he can quickly gain a ball control "feel" for predicting the resultant effect of his control efforts upon the table inclination and the ball travel path influenced thereby. For so-called "coin-operated" public installations especially, it is important that the typical operator's learning time to master the controls be minimal.

With the above and other objects and advantages in view, which will become more apparent as this description proceeds, the tiltable table apparatus for ball rolling games of the present invention generally comprises: a base member adapted to elevate a table having a substantially horizontal normal-condition at which the table has a spatial relationship to three imaginary axes including a pair of mutually perpendicular horizontal axes defining the table and both axes also perpendicularly intersecting a vertical axis; the table having a broad upper-side as a playing field and adapted to rollably support a ball therealong and being non-rotatable about the vertical axis but tiltable bidirectionally about each of the horizontal axes; powering means attached to the apparatus and adapted to tilt the table selectively about each of the horizontal axes, including throttling means to limit tilting accelerations whereby the rolling ball will remain on the table rather than being catapulted upwardly therefrom; at least one (and preferably an opposed pair of) operator station, each station including an operator wieldable manipulator device that is actuatably connected to the powering means and that requires only a relatively low initiate-level operator physical exertion. A servomechanism is preferably interposed between the manipulator device and the powering means to provide said low initiate-level and the powering means throttling; for simultaneously competing players at respective opposed operator stations, and each providing input to the servomechanism, there are dualinput resolution means.

In the drawing, wherein like characters refer to like parts in the several views, and in which:

FIG. **1** is a top plan view of a representative embodiment of the tiltable table apparatus for ball rolling games of the present invention with the table at substantially horizontal normal-condition and defined thereat by a pair of mutually perpendicular horizontal axes, herein arbitrarily denominated as a longitudinally extending *y*-axis and a transversely extending *x*-axis.

FIG. **2** is a sectional elevational view taken along the longitudinally extending *y*-axis of FIG. **1**, phantom line indicating table tilting about the transversely extending *x*-axis caused when an upright handle manipulator (e.g. **30**A) is moved in one longitudinal direction.

FIG. **3** is a sectional elevational view taken along the transversely extending *x*-axis of FIG. **1**, phantom line indicating table tilting about the longitudinally extending *y*-axis resulting when an upright handle manipulator (e.g. **30**A) is moved in one transverse direction.

FIG. **4** is a fragmentary sectional plan view taken along lines **4**—**4** of FIGS. **1** and **2**.

FIG. **5** is a detail sectional view of one of the four identical switches of FIG. **4**.

FIG. **6** is a circuit diagram schematically indicating how the table tilting actions alluded to in phantom line in FIGS. **2** and **3** are effected upon operator control of the upright handle manipulators (e.g., **30**A, **30**B).

Representative embodiment **9** of the tiltable table apparatus for ball rolling games comprises a base member

(generally referred to as **20**) adapted to stably rest upon a floor G or other suitable underlying substrate and for elevating above the substrate a table **10** having a substantially horizontal normal-condition; the table **10** at normal-condition (indicated in solid line in FIGS. **2–3**) is horizontally defined by a pair of mutually perpendicularly intersecting (at Z) horizontal axes *x* and *y*, the table having an upper-side **10F** as a broad playing field for spherical ball **100** and preferably including at least one target (herein as two recesses **12A** and **12B** in field **10F**) for the ball; table **10** is associated with base member **20** so as to be selectively tiltable about each of the axes *x* and *y*; powering means (e.g., **40, 45**) attached to the apparatus and adapted to tilt the table about the respective horizontal axes; a pair of opposed operator stations (herein stations **25A** and **25B** located on opposite sides of the *x*-axis) each station including an operator wieldable manipulator device (e.g., handles **30A** and **30B**), each handle being substantially physically divorced from the tiltable table **10** and being actuatably connected to the powering means whereby from either remote operator station table **10** can be made to tilt in either angular direction about each horizontal axis.

As already mentioned, the table through the base means must be elevated above an underlying substrate (G) and the tiltably supported, commencing at substantially horizontal normal-condition, in both angular directions about each of the table's substantially horizontal perpendicular axes, e.g., *x* and *y*. The base means **20** utilized in apparatus embodiment **9** comprises a substantially horizontal rectangular shelf **22** having four upright legs **21** depending from the respective corners thereof whereby legs **21** elevate shelf **22** above horizontal floor underlying substrate G. A rectangular box **23** stably rests upon shelf **22**, and includes four stationary walls **23A–23D** each extending vertically upwardly from shelf **22**; walls **23A** and **23B** extend transversely (herein parallel to the *x*-axis) while walls **23C** and **23D** extend longitudinally (herein parallel to the *y*-axis). Rectangular table **10** has a substantially planar horizontal upper-side **10F** herein provided with recesses **12A** and **12B** located along the y-axis as a target means for the rollable ball **100.** There is desireably ball containment means effectively surrounding the vertical *z*-axis to contain a rolling ball within the broad playing field circumscribed thereby; the rectangular peripheral fence type ball containment means **13** has its four linear sections each extending uprightly from playing field **10F**, including transversely extending sections **13A** and **13B** and longitudinally extending sections **13C** and **13D**. Table **10** herein is surrounded by a substantially horizontal annular frame **15,** the table being tiltable about the longitudinally extending *y*-axis through longitudinally colinear pivot pons **11A** and **11B** extending from the table **10** to frame transverse sections **15A** and **15B**, respectively. The longitudinally extending sections **15C** and **15D** are pivotably connected through transversely colinear pivot pins **16C** and **16D** to the respective upright walls **23C** and **23D**. Thus, there is provided a gimbol-type connection **11A** between table **10** and the base member shelf **22** wherein during table tilting the table midpoint (e.g., the intersection of axes *x*, *y*, and z) remains at constant elevation. Moreover, annular frame **15** remains horizontal (untilted) when table **10** tilts about the longitudinally extending *y*-axis only; frame **15** needs to tilt only when table **10** is to be tilted about the transverse *x*-axis.

Unlike typical prior art situations, the tilting force for the table of the present invention is not essentially dependent upon a human contestant's physical and muscular ability to directly grasp and wrestle either the table **10** or the frame **15.** Rather, the force for tilting the table is dependent upon a powering means comprising a connected component part for the apparatus itself, such as hydraulically or pneumatically actuated reciprocating pistons, motors of various types, etc. The powering means is actuated through an operator wielded handle (e.g. **30A**) or other manipulator device that is physically divorced from the tiltable table and that requires only a relatively low initiate-level of operator physical exertion to actuate the powering means. Thus, assuming the operator is not physically infirm and possesses at least that modicum initiate-level of physical strength required to move the manipulator device, then the powering means (e.g. **40, 45**) is the only force required to tilt the table.

For embodiment **9,** the table tilting powering means comprises two separate electric gear motors **40** and **45,** each motor having an electromagnetically driven shaft. Motor **40** is mounted on shelf **20** and carries an elongate arm **41** co-revolvable with the motor shaft; there are a pair of lugs **43** rigidly depending from frame transverse section **15A**, and a pivotal-link **42** extends from arm **41** to lugs **43.** Thus, as is indicated in phantom line in FIG. **2,** actuation of motor **40** (as through handle manipulator **30A**) causes tilting of table **10** about the transverse *x*-axis. Motor **45** is mounted on the horizontal leg **17E** of a U-shaped carriage **17** that depends from frame sections **15C** (at **17C**) and **15D** (at **17D**) whereby motor **45** and carriage **17** are co-tiltable with frame **15.** There is a pair of lugs **48** rigidly depending from table **10** (beneath **13D**), pivotal-link **47** extending from lugs **48** to arm **46** that is co-revolvable with the shaft of motor **45.** Thus, as is indicated in phantom line in FIG. **3,** actuatable excitation of motor **45** (as through handle manipulator **30A**) causes tilting of table **10** about the longitudinal *y*-axis.

As has been previously alluded to, the operator wieldable manipulator device (e.g., **30A**) is sufficiently physically divorced from the tiltable table that any degree of operator physical exertion exceeding said modicum initiate-level will have essentially no additional effect upon table tilting. Appropriately, the manipulator device is located at an operator's station which is located remote from the tiltable table. For example, operator's station **25A** comprises a stationary chest **29A** and rigidly secured to stationary box wall **23A**, chest **29A** being located midway between walls **23C** and **23D** and remote of frame **15** and table **10** and having the manipulator device (**30A**) movably secured thereto. Although many of the novel concepts of the present invention are amenable to tiltable table apparatus having only one operator station, the use of a pair of opposed operator stations will provide greater operational versatility. In this vein, a second operator's station **25B** similarly comprises a stationary chest **29B** and rigidly secured to stationary box wall **23B**, chest **29B** being located midway between walls **23C** and **23D** and outwardly remote of frame **15** and having the manipulator device (**30B**) movably secured thereto. Thus, herein, the stations **25A** and **25B** are colinearly arranged along

the longitudinal *y*-axis on opposite sides of the transverse x-axis and remotely outward frame **15.**

It is exceedingly desireable that there be ball travel path correlation means extending from the multi-directionally movable manipulator device to the table tilting powering means, this feature giving the operator "feel" for his ball control efforts, i.e., allowing him to coordinate his manual control movements with the ball travel path likely to result therefrom. Without a ball travel path correlation means, it would be exceedingly difficult for the operator to learn to contral the ball travel path along the tiltable playing field **10F**, which would tend to frustrate and discourage many players particularly those at "coin-operated" public installations. While a complete description of a preferred ball travel path correlation means will need to await FIG. **6,** the correlation means is aptly schematically alluded to in FIGS. **2** and **3** in conjunction with the uprightly extending handle manipulator device **30A** (and assuming the existence of one operator only at station **25A**). Referring to FIGS. **2** and **3** and commencing with the movable handle **30A** (having a medial spherical portion **31A** revolvably secured to chest **29A**) vertically upright and the table **10** horizontal as indicated in solid line. A rightward movement of handle **30A** parallel to the *y*-axis will cause a clockwise tilt of table **10** about the *x*-axis (**16C–16D**) as indicated in FIG. **2** phantom line and ball **100** rolls rightwardly along **10F**; conversely of the handle **30A** were moved leftwardly parallel to the *y*-axis, table **10** would tilt counterclockwise about the x-axis. As seen in FIG. **3** phantom line, a leftward movement of handle **30A** parallel to the *x*-axis will cause a counterclockwise tilt of table **10** about the *y*-axis (**11A–11B**) ball **100** also moving left; conversely, if the handle **30A** were moved rightwardly parallel to the *x*-axis, table **10** would tilt clockwise about the *y*-axis. As FIG. **6** will show, the same ball travel directional correlation would result if a single player at station **25B** would manipulate handle **30B**. In other words, the apparatus **9** herein has operational symmetry with respect to the transverse *x*-axis, the same kind of ball control by a single player being possible by said player from whichever manipulator device **30A** (at **25A**) or **30B** (at **25B**) he chooses to use.

The two powering means **40** and **45** are selectively operable, both individually and in concert, from the same manipulator device whereby the table **10** can tilt simultaneously about both horizontal axes and ball **100** can travel along field **10F** obliquely (i.e., non-parallel) to the *x* and *y* axes. Each manipulator device is actuatably connected to the motor **40** through an exciter (e.g., **51, 52**) therefor and also actuatably connected to motor **45** through an exciter (e.g. **53, 54**) therefor. The upright handle type manipulator device (**30A, 30B**) has its medial portion (**31A, 31B**) connected in universal joint fashion to its chest (**29A, 29B**), the handle lower portion (**32A, 32B**) extending below said chest. Handles **30A** and **30B** are spring-loaded so as to remain normally vertical, and hence, engaged with an exciter only when manually operated. Herein, the handle lower portion might actuate the said motor exciters, which exciters are herein individual identical push-button switches (**51A–54A**, and **51B–54B**) maintained by brackets (**28A, 28B**) in tetraswitches array (**50A, 50B**) rectangularly surrounding the lower part (**32A, 32B**) of the respective handles (**30A, 30B**). As alluded to in FIG. **4** at typical station **25A** for handle **30A**, when the handle lower part **32A** (at phantom line condition **32Ax**) strikes switch **51A**, table tilting about *x* indicated in FIG. **2** phantom line results). Similarly, when the handle lower part (at phantom line condition **32Ay**) strikes switch **53A**, table tilting about *y* alluded to in FIG. **3** phantom line results. Handle lower portion **32A** is adapted to contact two adjacent switches (e.g., both **51A** and **53A**) simultaneously whereby dual-axial table tilting results to provide ball travel oblique to both horizontal axes.

As indicated in FIG. **5,** each of the eight herein identical switches **51A–54A** and **51B–54B** might be of the conventional snap-action push-button type generally comprising a housing **101,** the reciprocatable push-button **102** being resiliently depressible as by helical spring **103.** Such conventional switches have three external leads, herein including an endward "common" lead **104C**, a bottomcenter "normally closed" lead **106** (having stationary housed terminus **105**), and a bottom-corner "normally open" lead **108** (having stationary housed terminus **107**). Common lead **104C** extends from a housed springy metallic portion **104** twice nodally restrained at positions **109.** Thus, the housed free end of springy member **104** is adapted to effect abrupt and affirmative switching between housed terminals **105** (having lead **106**) and **107** (having lead **108**) as push-button **102** moves toward (phantom line), or away from (solid line), the housing **101.** As indicated by the two double-headed arrows, a resistor is adapted as **110** to be connected to leads **106** and **108.** As indicated by the tir-cusped configuration for motor mounting plates **44** and **49** in FIG. **6,** the resistance values of resistors **44R** and **49R** each exceed the resistance value of resistor **110** by a factor of four. Gear motor **40** carries a mounting plate **44** for resistor **44R**, which is sweepable by bar **41E** co-angularly driven with arm **41** about the motor shaft. Similarly, gear motor **45** carries a mounting plate **49** for resistor **49R**, which is sweepable by bar **46E** co-angularly driven with arm **46** about the motor shaft.

The table tilting powering means (e.g., gear motors **40,45**) is preferably throttled to limit table tilting accelerations about the *x* and *y* horizontal axes; this assures that ball **100** will remain rollable disposed along the tiltable playing surface **10F** rather than being upwardly catapulted therefrom. Ball catapulting upwardly from the tiltable playing field would not only frustrate and discourage an operator's quest to negotiate a target, but would also be inimical to so-called "coin-operated" public installations where a catapulted ball could injure spectators or damage a protective transparent cover for the playing field. The ball anti-catapulting means preferably comprises a servomechanism (e.g., comprising servoamplifiers **201–202,** electric current supply **200,** and ancillary circuitry) interposed between the operator wieldable manipulator device and the individual table tilting powering means, exemplified in FIG. **6.** Moreover, such servomechanism will be seen to provide the capability that only a modicum initiate-level of operator physical exertion to the manipulator device is required to actuate the table tilting powering means (e.g., gear motors **40, 45**).

As has already been stated, representative apparatus embodiment **9** might be operated by a single lone player in substantially identical fashion and result from whichever operating station (e.g. handle **30A** at **25A**, or handle **30B** at **25B**) he chooses to utilize. In the sin-

gle lone player situation, each servomechanism (e.g., including **201, 202**) has by definition only one input effort introduceable thereinto, i.e., that effort from whichever single manipulator device (e.g. **30A**, or **30B**) that the lone operator chooses to use. Thus, as indicated in FIGS. **2** and **3**, table tilting at some finite-amplitude in both angular directions and about either selected horizontal axis is afforded, and the lone player has complete control over the path of ball **100** along the tiltable playing field **10F**. However, it is within the additional optional capability of the representative embodiment **9** to accommodate simultaneously two opposed competitive players, each player simultaneously wielding a different manipulator device whereby they might therethrough exert competitive efforts to control the rollable ball along the tiltable playing field.

For two players simultaneously acting through different manipulator devices (e.g., handles **30A** and **30B**), there is by definition two input efforts simultaneously introduceable into one or both of the intra-axial powering means (e.g., gear motors **40, 45**). In this regard, the servomechanism for each individual powering means needs to have the capability of accepting two arbitrary inputs, and of resolving the two inputs into one powered output to the tiltable table. For example, each of the two players might simultaneously desire to have the table tilt in opposite angular directions about the *x*-axis (handles **30A** and **30B** being moved toward each other parallel to *y*-axis); in this countervailing situation, the *x*-axial servomechanism (e.g. **201,** etc.) would "instruct" the *x*-axis powering means **40** through resistor **44R** to make the table assume the level normal-condition. But, if each of the two players should simultaneously concur to have the table tilt in the same angular direction about the *x*-axis (by moving the handles in the same direction along *y*) the x-axial servomechanism would "instruct" the *x*-axis powering means **40** to furnish an augmented amplitude (e.g., twice the finite-amplitude) about the *x*-axis. With respect to table tilt about the *y*-axis, if each of the two players simultaneously moved handles **30A** and **30B** parallel to the *x*-axis and in countervailing intent, the *y*-axial servomechanism (e.g. **202,** etc.) would "instruct" the *y*-axis powering means **45** through resistor **49R** and bar **46E** to make the table assume the level normal-condition. But, if instead each of the players simultaneously concurs to have the table tilt in the same angular direction about the *y*-axis, the *y*-axial servomechanism would "instruct" the *y*-axis powering means **45** to furnish an augmented amplitude tilt about the *y*-axis. As had already been indicated, simultaneous control control about both horizontal axes is possible, wherein both powering means and their servomechanisms come into use. Moreover, the two players ball rolling contest can be seen to be independent of their relative physical strengths, provided each player possesses that modicum initiate-level of physical strength to move the physically divorced manipulator device.

Although the above described two operating stations (e.g., **25A** and **25B**) apparatus embodiment **9** might be played by two simultaneously competing human players, it is also within the purview of the present invention to utilize a simulated competitor robot means for a single lone player. For example, one of the two manipulator devices, or the powering means exciters directly, might be automatically moved or stimulated according to some seemingly-random predetermined schedule thereby offering a robot simulated competitor to a lone human player.

From the foregoing, the construction and operation of the tiltable table apparatus for ball rolling games will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

I claim:

1. A tiltable table apparatus for ball rolling games and comprising:

A. A base member adapted to stably rest upon a suitable underlying substrate and being adapted to elevate above said substrate a tiltable table having a substantially horizontal normal-condition;

B. The said table at normal-condition intersecting a vertical *z*-axis and being horizontally defined by a pair of mutually perpendicular horizontal axes including an *x*-axis and a *y*-axis which axes also perpendicularly intersect said vertical *z*-axis, the table having a broad upper-side as a playing field for a rollable ball and being provided with ball containment means effectively surrounding the *z*-axis and defining said playing field, said table through the base member being elevated above the substrate and being aptly associated therewith so as to be non-rotatable about the vertical z-axis and also, commencing at said normal-condition, selectively tiltable about the *x*-axis and the *y*-axis; a first manipulator device at a first operator station and a second manipulator device at a second operator station;

C. Two separate powering means attached to said apparatus operable both individually and in concert including a first powering means having a servomechanism for accepting directive input from either manipulator device and also from both manipulator devices simultaneously, and a second powering means having a servomechanism for accepting directive input from either manipulator device and also from both manipulator devices simultaneously, said first and second power means causing table tilting about the x-axis and the y-axis respectively, the respective powering means being throttled to limit table tilting acceleration to prevent the rollable ball from being catapulted upwardly away from the playing field;

each said manipulator device requiring only a relatively low initiate-level of operator physical exertion to actuate said powering means and being sufficiently physically divorced from the table that operator physical exertion upon the manipulator device exceeding said low initiate-level will have substantially no additional effect upon table tilting.

2. The tiltable table apparatus of claim **1** wherein said servomechanism is interposed between the operator wieldable manipulator device and the table tilting powering means, said servomechanism providing the capability that only a modicum initiatelevel of operator physical exertion to the manipulator device is required to actuate the powering means, said servomechanism also providing the function of a throttled powering means to limit the table tilting acceleration to ensure

against catapulting the rollable ball upwardly from said tiltable table playing field.

3. The tiltable table apparatus of claim 2 wherein the operator wieldable manipulator device is multi-directionally movable by the operator, there being ball travel path correlation means extending from the manipulator to the powering means to ensure that a predetermined directional movement for the manipulator will direct a prescribed tilting motion for the table.

4. The tiltable table apparatus of claim 3 wherein the manipulator device is an uprightly extending handle with the manually wieldable upper portion at initiate-level physical exertion being multi-directionally movable including parallel to the respective horizontal axes, the ball travel path correlation means extending from the handle to the powering means.

5. The tiltable table apparatus of claim 4 wherein the handle is attached to the base member remote of the tiltable table with universal joint means whereby the multi-directionally movable handle upper portion includes directions reflecting vectorial combinations of said horizontal axes, said correlation means ensuring that the ball travel path will be directionally similar to handle movement and even including directions non-parallel to said horizontal axes.

6. The tiltable table apparatus of claim 2 wherein said at least one operator wieldable manipulator device is actuatable connected to the first powering means through an exciter assigned thereto and also to the second powering means through an exciter assigned to it, there being ball travel path correlation means operatively extendable from the operator movable manipulator device to the first and second exciters to ensure that a predetermined directional movement for the manipulator device will direct a prescribed tilting motion for the table.

7. The tiltable table apparatus of claim 6 wherein the manipulator device is an uprightly extending handle having its medial portion attached to the base member remote of the tiltable table with universal joint means whereby the operator wieldable upper portion is multi-directionally movable including bi-directionally parallel to and vectorial combinations of the x and y horizontal directions, the multi-directionally movable handle being even selectively engageable with the first and second exciters simultaneously to provide the ball travel path correlation means.

8. The tiltable table apparatus of claim 7 wherein the first exciter includes a pair of opposed switches independently actuatable by opposite directional handle movements in the x direction, the first exciter two switches respectively causing through the powering means clockwise and counterclockwise table tilting about the y-axis, and wherein the second exciter includes a pair of opposed switches independently actuatable by opposite directional handle movements in the y direction, the second exciter two switches respectively causing through the powering means assigned thereto clockwise and counterclockwise tilting about the x-axis, the said four switches being maintained in a rectangular array surrounding the handle lower portion whereby said handle can selectively simultaneously engage two switches for causing table tilting about both horizontal axes simultaneously.

9. The tiltable table apparatus of claim 2 wherein there is a pair of opposed operator stations, each station having thereat a said operator wieldable manipulator device appropriately actuatably connected to the two respective table tilting powering means whereby identical table tilting directions and movements can be afforded by a single lone player for the apparatus from whichever operator station he chooses to utilize.

10. The tiltable table apparatus of claim 2 including means operatively connected to said servomechanisms and to said manipulator devices for receiving with respect to either horizontal axis simultaneous tilting directives from the two manipulator devices, countervailing directives from two players resulting in no tilting about the axis and concurrent directives resulting in augmented tilted amplitude about the axis.

11. The tiltable table apparatus of claim 10 wherein at each manipulator device the first exciter includes a pair of opposed switches independently actuatable by opposite directional movements of a handle like manipulator device in the x direction, the first exciter two switches respectively causing through the powering means and its servomechanism clockwise and counterclockwise tilting about the y-axis; and wherein the second exciter includes a pair of opposed switches independently actuatable by opposite directional movements of the handle in the y direction, the second exciter two opposed switches respectively causing through the appropriate powering means and its servomechanism clockwise and counterclockwise tilting about the x-axis, the said four switches at each handle manipulator being maintained in a rectangular array surrounding the lower portion of said upright handle, the handle medial portion being supported in universal joint fashion whereby the handle can selectively engage two switches simultaneously for causing table tilting about both horizontal axes simultaneously.

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