July 22, 1952 H. M. SMITH ET AL 2,604,323

COIN-CONTROLLED RACING GAME

Filed Jan. 28, 1949 3 Sheets-Sheet 1

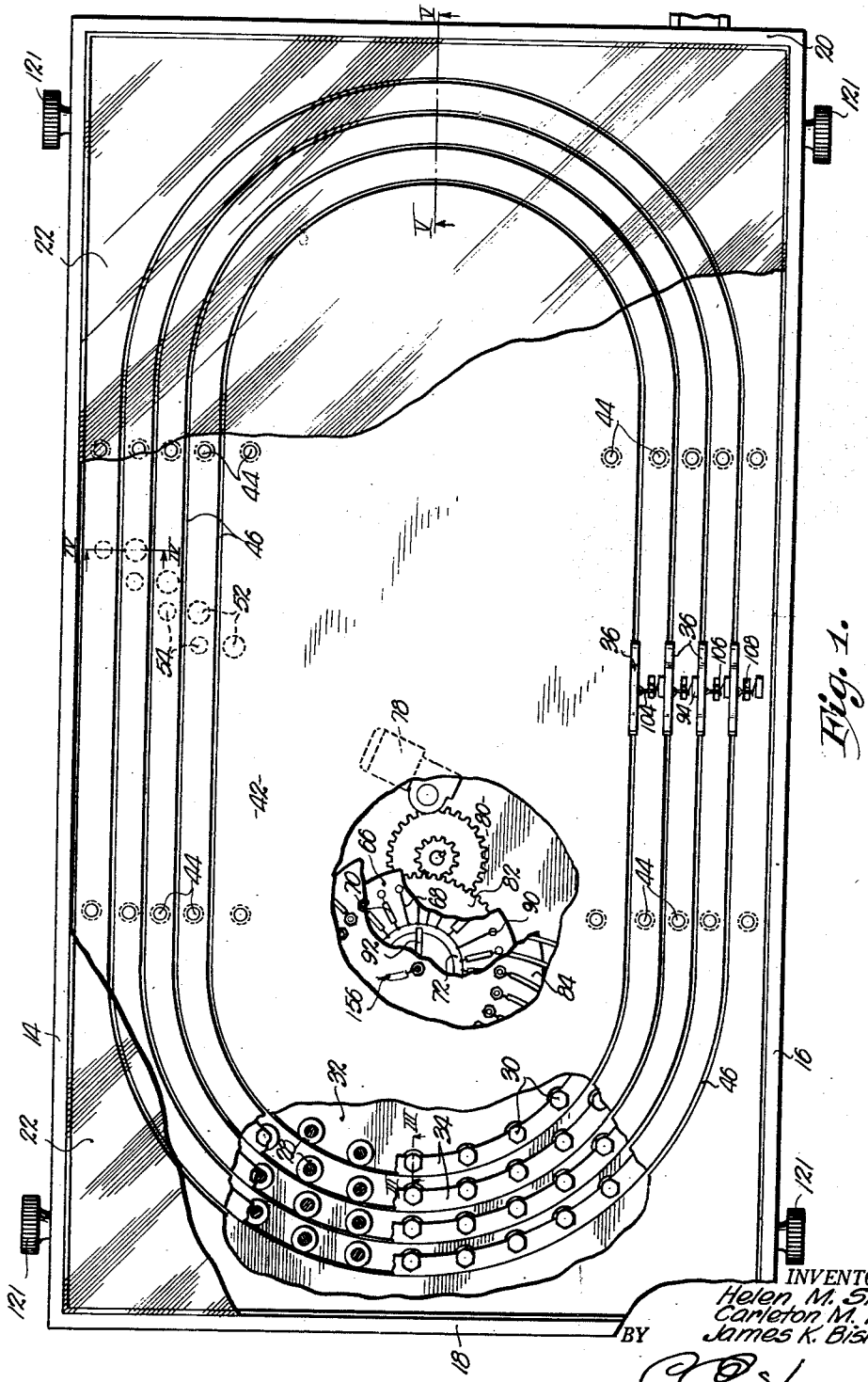


Fig. 1.

INVENTORS.
Helen M. Smith
Carleton M. Burr
James K. Bishop, Sr.

BY Joel Hoover
ATTORNEY.

July 22, 1952 H. M. SMITH ET AL 2,604,323

COIN-CONTROLLED RACING GAME

Filed Jan. 28, 1949 3 Sheets-Sheet 2

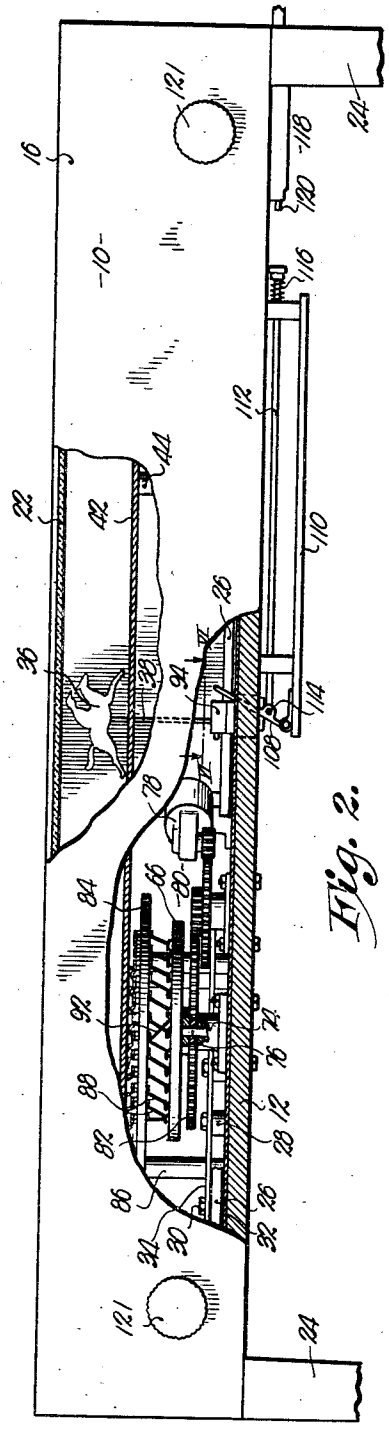


Fig. 2.

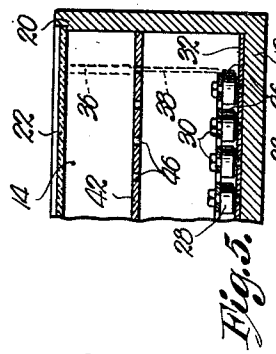


Fig. 5.

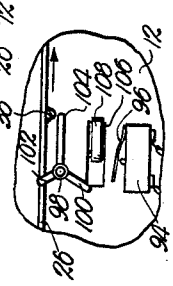


Fig. 9.

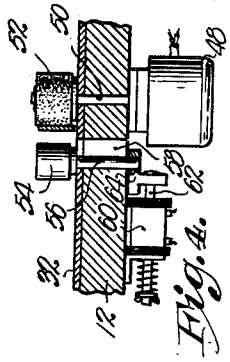


Fig. 4.

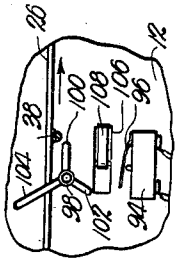


Fig. 8.

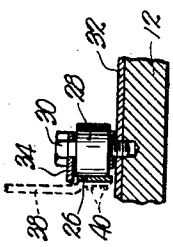


Fig. 3.

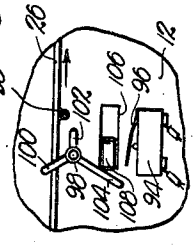


Fig. 7.

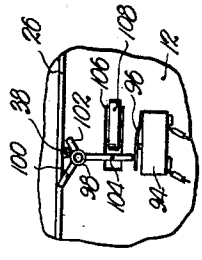


Fig. 6.

INVENTORS.
Helen M. Smith
Carleton M. Burr
BY James K. Bishop, Sr.
ATTORNEY.

July 22, 1952 H. M. SMITH ET AL 2,604,323

COIN-CONTROLLED RACING GAME

Filed Jan. 28, 1949 3 Sheets-Sheet 3

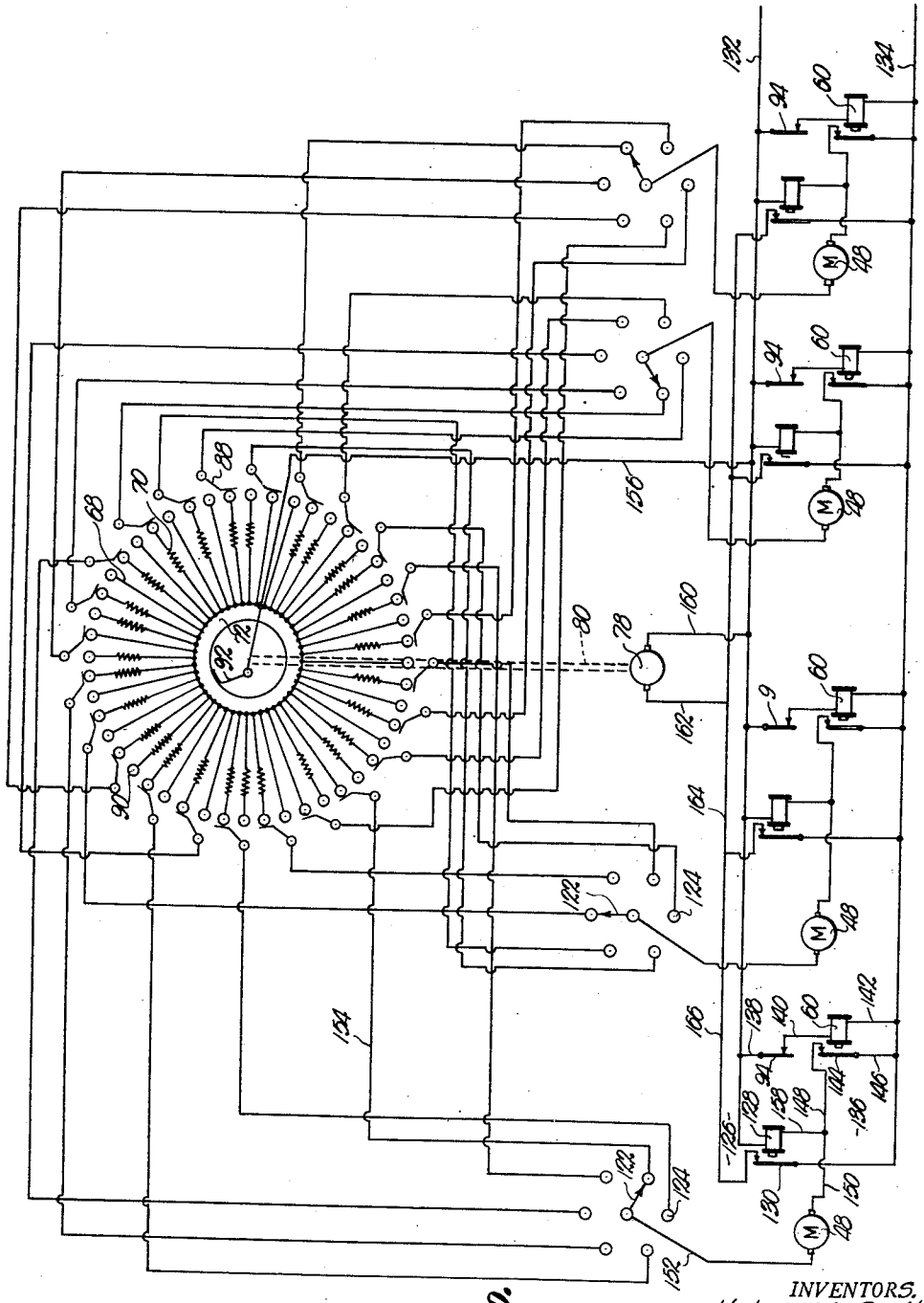


Fig. 10.

INVENTORS.
Helen M. Smith
Carleton M. Burr
James K. Bishop, Sr.
BY
ATTORNEY.

Patented July 22, 1952

2,604,323

UNITED STATES PATENT OFFICE

2,604,323

COIN-CONTROLLED RACING GAME

Helen M. Smith, Carleton M. Burr, and James K. Bishop, Sr., Kansas City, Mo.

Application January 28, 1949, Serial No. 73,382

1 Claim. (Cl. 273—86)

1

This invention relates to a game having a plurality of separate racing members such as horses, dogs, autos and the like, each being provided with a motor actuated conveyor, the primary object being to provide automatic means within the electrical circuits for the motors for intermittently varying the speed of each racing member throughout the entire race whereby to eliminate positively any element of likeness of performance in predetermined sequences.

It is the most important object of the present invention to provide a racing apparatus of the above mentioned character wherein each member races throughout each lap at a number of differing speeds, the change of speed of each member being in no particular sequence either in successive laps of a single race or in successive races, all to increase interest in the game and to maintain the question of which member will win a given race as a matter of guess.

Another important object of the present invention is to provide a racing game having a plurality of endless conveyors for the racing members themselves, each conveyor being provided with a separate actuating means including an electric motor, the circuits for all of the motors being provided with structure in the nature of a rotatable element having a number of resistances carried thereby, to the end that the speed of the motor for each conveyor is continually changed throughout the race by the introduction of resistors of different ohmages into the circuits.

A still further object of the present invention is to provide manual control mechanism in addition to the aforesaid resistance changing means capable of changing the particular resistor within a given circuit during the race to the end that the game is provided with an element of skill for the individual players.

More minor objects including details of construction will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawings, wherein:

Fig. 1 is a top plan view of a coin controlled racing game made in accordance with the present invention, parts being broken away to reveal details of construction.

Fig. 2 is a fragmentary, side elevational view thereof, parts being broken away and in section for clearness.

Fig. 3 is a fragmentary, detailed cross-sectional view taken on line III—III of Fig. 1.

Fig. 4 is a fragmentary cross-sectional view taken on line IV—IV of Fig. 1.

2

Fig. 5 is a detailed cross-sectional view taken on line V—V of Fig. 1.

Fig. 6 is a top plan view of a control switch forming a part of the game taken on line VI—VI of Fig. 2.

Figs. 7, 8 and 9 are top plan views of the switch illustrated in Fig. 6 showing progressive positions thereof during the operation of the game; and

Fig. 10 is a schematic wiring diagram illustrating the electrical elements forming a part of the game.

The entire game about to be described is mounted within and upon a hollow case broadly designated by the numeral 10 and illustrated in Figs. 1 and 2 of the drawings. Case 10 includes a horizontal bottom walls 12, upright side walls 14 and 16 and end walls 18 and 20, presenting an open top that is covered by a panel 22 formed from glass or other transparent material.

The entire case 10 may be supported by a plurality of legs 24 or in any other suitable manner. A plurality of movable carriers taking the form of endless belts 26 are mounted within the case 10 and upon the uppermost face of the bottom wall 12 thereof. The particular form and mounting of the conveyors 26 is of no consequence to the broad operation of the game, and structure other than a flexible belt as shown at 26, may well be used if desired. The belts 26 are all mounted within the case 10 in an elliptical pattern and are stretched about a plurality of spaced apart rollers 28 that are secured directly to the bottom wall 12 of case 10 by vertical pintles 30. If desired, the bottom wall 12 may include a coverage plate 32 of metallic material serving as a means for mounting the pintles 30 and also as a smooth surface against which the lowermost edges of the belts 26 may slide.

As illustrated in the drawings, the rollers 28 are disposed on the innermost faces of the endless belts 26 only at the ends thereof, but if desired, additional guiding means may be provided along the longitudinal stretches of such belts 26. The belts are held in place and against upward movement on the rollers 28 through the medium of an arcuate plate 34 that overlies the rollers 28 and is supported by the pintles 30. As illustrated in Fig. 3 of the drawings, these arcuate plates 34 overlap the uppermost edge of the respective belt 26. Each of the belts 26 carries a racing member 36 that takes the form illustrated in the drawings of a racing horse and its jockey. Obviously, the racing members 36 may be formed to simulate a small auto, a dog or

other pictorial representations as desired. These racing members 36 are mounted directly upon the uppermost end of a vertical pin 38 that is in turn secured at its lowermost end directly to the outermost face of belt 26 by rivets or the like 40.

A horizontal partition 42 for the case 10, is disposed between the racing members 36 and the bottom wall 12 of case 10 through the medium of a plurality of posts 44. The uppermost face of this partition 42 may be painted to simulate a race track including rails, bleachers and the like, all as desired by the manufacturer of the game.

The partition or track 42 is provided with a continuous oval slot 46 for each belt 26 respectively to clear and aid in the guiding of the supporting rods 38 for racing members 36. These slots 46 take the same elliptical contour and size as the respective belts 26 and are disposed directly thereabove. All of the belts 26 and their racing members 36 are actuated by a motor therefor, designated by the numeral 48 and detailed in Fig. 4 of the drawings.

Motor 48 is mounted directly upon the lowermost face of the bottom wall 12 in suspending relationship thereto and its drive shaft 50 is vertically disposed and passes through an opening formed in said bottom wall 12. The uppermost end of the drive shaft 50 for motors 48 projects above the uppermost face of the plate 32 and carries a frictional driving pulley 52. Pulley 52 is disposed on the innermost face of the belt 26 and a second pulley 54 is rotatably mounted on a vertical shaft 56 disposed on the opposite side of the belt 26. Shaft 56 passes through a slot 58 formed in the bottom wall 12 and plate 32, permitting movement of shaft 56, together with its roller 54 toward and away from the belt 26. This movement of the shaft 56 within the slot 58 is accomplished through the use of a solenoid 60 or other electromotive device having a reciprocable plunger 62.

A bracket 64 interconnects plunger 62 and the lowermost end of the shaft 56. A circular disc 66 disposed within the case 10 between partition 42 and bottom wall 12 and formed from any suitable insulating material such as Bakelite, carries a plurality of conductors 68 disposed radially in spoke-like fashion upon the uppermost face of the disc 66. Certain of these conductors 68 are each provided with a resistor 70 interposed therein. In the instance illustrated, there are forty-eight conductors designated by the numeral 68 and of these forty-eight conductors, twenty-eight are provided with resistors 70. The resistors 70 are of differing ohmages and disposed in scrambled relationship on the disc 66.

A collector ring of conductible material 72 is mounted upon that face of the disc 66 having conductors 68 and resistors 70 mounted thereon and the innermost ends of all of the conductors 68 are connected directly to collector ring 72.

A bearing 74 secured to the uppermost face of the bottom wall 12 has a vertical shaft 76 rotatably mounted therein and the disc 66 is secured directly to the uppermost end of shaft 76. Rotation of the shaft 76 and consequently the disc 66 is accomplished by an electrical motor 78 mounted upon the wall 12 of case 10 and having its drive shaft connected to the shaft 76 through a train of gears broadly designated by the numeral 80. One of such gears is designated by the numeral 82 and is secured directly to the shaft 76 between bearing 74 and the disc 66. A stationary plate 84 spaced directly above the disc 66 and held in place by a plurality of posts 86 that are in turn mounted upon the bottom wall 12 is provided with a plurality of resilient fingers 88 that depend from the lowermost face thereof in wiping engagement with a circular arrangement of contact points 90 on the uppermost face of the disc 66. There is a contact point 90 connected to the outermost end of each conductor 68 respectively. In the instance illustrated, there are twenty-four of these stationary wiping fingers 88. The plate 84 is also provided with a single depending wiping finger 92 that is disposed in constant wiping engagement with the collector ring 72.

An electrical switch 94 having an actuating arm 96 is mounted upon the bottom wall 12 of case 10 adjacent each belt 26 respectively and to one side thereof adjacent one of the longitudinal stretches of belt 26 as illustrated in Fig. 1. An actuating member is provided for each switch 94 respectively and mounted for rotation on a vertical axis between switch 94 and the corresponding belt 26. This actuating member includes a hub 98 having three radial fingers 100, 102 and 104 of differing lengths. Only the finger 104 is sufficiently long to actuate the switch 94 as illustrated in Fig. 6.

The fingers 100, 102 and 104 are disposed for contact and actuation by the supporting rod or staff 38 for the racing members 36. A slot 106 extending longitudinally of and formed in the bottom wall, between each belt 26 and its switch 94, receives an arm 108 that is pivotally secured to a bracket 110 depending from the lowermost face of the bottom wall 12.

A plunger 112 extending longitudinally of the bottom wall 12 is reciprocably carried by the bracket 110 and has one end thereof pivotally secured as at 114 to the arm 108 intermediate the ends of the latter and below the wall 12.

The arm 108 extends into the case 10 a distance sufficient to contact the finger 104 when plunger 112 is moved in one direction against the action of a coil spring 116 on plunger 112.

Manual actuating means, broadly designated by the numeral 118, is provided adjacent one end of the case 10 to impart reciprocable movement to the plunger 112. This actuating mechanism 118 may constitute any of the usual coin control means commonly used in games of this character if desired, but primarily, all that is necessary is a reciprocable member 120 forming a part of such apparatus 118 to move into and out of contact with the proximal end of plunger 112.

Manual control means is provided for each racing member 36 and in Figs. 1 and 2 of the drawings, the actuating knob 121 therefor is illustrated. These knobs 121 each have a rotatable wiping contact arm 122 secured thereto and disposed to successively move across a plurality of stationary contacts 124 arranged in a circular path as illustrated in Fig. 10.

In addition to the electrical assembly thus far set forth, there is provided and illustrated in Fig. 10 of the drawings a relay 126 for each racing member 36 that includes a solenoid 128 and a switch 130. Electrical energy is supplied to the various circuits of the game from a suitable source not illustrated, through the medium of a pair of lead lines 132 and 134. When the game is at rest, the four racing members 36 illustrated, are disposed in alignment next adjacent their switches 94 and the actuating members for the

switches 94 are in the position illustrated in Fig. 6. When in such position, the finger 104 of such actuating member is in engagement with the arm 96 of switch 94 holding the same normally open. As soon as the operator actuates the apparatus 118 to move all of the plungers 112 inwardly, the arms 108 will engage the respective fingers 104 and move the same out of engagement with the spring-loaded member 96 and thereby close all of the switches 94. The belts 26 will thereupon commence movement as about to be described and the staffs 38 will move from the position illustrated in Fig. 6 in the direction of the arrow shown in Fig. 7, away from the finger 102.

Closing of the switches 94, as shown in Fig. 10 of the drawings, energizes all of the motors 48. Since the four motor circuits are identical and include not only the motor 48, relay 128, solenoid 60, one of the manual control means including arm 122 and contact points 124, as well as the resistor disc 66, and the motor 78 for actuating disc 66, only one of such circuits needs to be traced, and this one unit is broadly designated in Fig. 10 by the numeral 136.

The circuits for this unit 136 are traceable as follows:

From lead line 132, through wire 138, closed switch 94, wire 140, solenoid 60 and wire 142 to lead line 134.

Solenoid 60 is thereby energized to move the shaft 56 toward the shaft 50 of motor 48 (Fig. 4), to press the pulley 54 tightly against the belt 26 and thereby hold said belt 26 in driving engagement with and by the pulley 52 on motor shaft 50. Energization of the solenoid 60 also closes a switch 144 shown only in Fig. 10.

Closing of the switch 144 energizes motor 48 of the unit 136 through the following circuit:

From lead line 134 through wire 146, closed switch 144, wires 148 and 150, motor 48, wire 152, arm 122, one of the contacts 124 that is engaged by the arm 122, wire 154 having connection with said one contact point 124, wiping contact 88 having connection with the wire 154, contact point 90 then in engagement with the wiping finger 88 that is connected with wire 154, one of the conductors 68 joined with said last mentioned contact point 90, collector ring 72, stationary wiping contact 92 and wire 156 to lead line 132.

Closing of the switch 144 also energizes solenoid 128 of relay 126 as follows:

From lead line 134 through wire 146, closed switch 144, wires 148 and 158 and solenoid 128 to lead line 132.

Energization of the solenoid 128 closes switch 130 of relay 126 and thereby energizes the motor 78 through the following circuit:

From lead line 132 through wire 160, motor 178, wires 162, 164 and 166, and closed switch 130 to lead line 134.

It is thus clear that the moment the machine is placed in operation by insertion of a coin or otherwise actuating the assembly 18, all four motors 48 will be energized simultaneously and the racing devices 36 will immediately commence the first lap of the race. At the same time, the motor 78 commences to rotate the disc 66 to continuously and successively bring different conductors 68 into the circuit for all four motors 48.

It is to be noted also that each of the plurality of stationary contact points 124 is provided with a wire 154 leading to a differing wiping contact 88. Furthermore, no two side-by-side wiping contacts 88 have direct connection with

the same manual control means that constitute arm 122 and contacts 124.

As a further explanation of the operation of the game, it is to be noted that the wire designated by the numeral 154 and having connection with motor 48 of unit 136 is at the beginning of the cycle of operation connected with a conductor 68 having no resistance 70 therein. Accordingly, the racing member 36 that is operated by the unit 136 will commence at its greatest speed. However, as soon as the disc 66 commences to rotate, resistors 70 will be successively brought into and out of the motor circuit and the speed of the motor 48 and consequently of the racing member 36 will continually change, the rate of change depending upon the speed of rotation of disc 66. Because of this arrangement the period of time necessary for each racing member 36 to complete a full lap, will vary even though the arms 122 are left in a stationary position. While a particular racing member 36 may complete the first lap ahead of the remaining racing members, at the end of the second and third laps an altogether different racing member 36 may be in the lead. Since the disc 66 stops at a different position at the end of each cycle of operation as successive games are played, differing racing members 36 will win the race. Movement of the arms 122 by the individual players will still further change the limit of time necessary for the individual racing member 36 to complete a lap around the track. It is to be noted that the moment arm 122 is moved to a different contact point 124, a different conductor 68 is brought into the motor circuit. Consequently, by skillful manipulation of the arm 122 or through pure chance and luck, an operator may be successful in bringing his racing member in to the finish line ahead of the remaining contesting racing members.

Referring now to Figs. 6 to 9 inclusive of the drawings, it will be noted in Fig. 7 that the moment staff 38 commences its movement away from fingers 100, 102 and 104, the finger 100 will be swung into the path of travel of the staff 38 as the same nears the end of the first lap of the race. When staff 38 moves against finger 100, the latter will be swung to the position illustrated in Fig. 8 of the drawings, and the finger 104 will be swung into the path of travel of staff 38. At the end of the second lap of the race, staff 38 will contact finger 104 and swing the finger 102 into the path of travel of staff 38 as illustrated in Fig. 9. At the end of the third lap, staff 38 will move into contact with the finger 102 and swing the finger 104 into engagement with the arm 96 of switch 94 and thereby open the latter, all as illustrated in Fig. 6 of the drawings. Obviously, more or less fingers could be provided on this actuating means for switch 94 to vary the number of laps for a complete race.

Opening of the switch 94 deenergizes solenoid 60 to move roller 54 out of engagement with the belt 26 and to open switch 144. This deenergizes the motor 48 for the particular racing member 36 that has completed three laps and won the race. The remaining racing members 36 will continue, however, until they deenergize their respective motors 48 as just described. It is necessary, because of the provision of relays 126, for all four racing members 36 to complete three laps and to thereby deenergize their re-

lays 128 before the motor 78 is denergized and before the rotating disc 66 comes to a stop.

It is apparent from the foregoing that the combination can never be determined by the operators even if all of the arms 122 are left in a stationary position during a large number of complete races. Obviously, the apparatus is so constructed to compensate for the fact that the innermost racing member 36 travels a shorter distance than the remaining of the racing members and that the outermost racing member 36 travels the longest distance in making a complete cycle around the track.

Such construction constitutes variance in the diameters of the drive pulleys 22 on motor 48, the largest pulley 52 being on the outermost belt 26 and the smallest of the four pulleys 52 having driving connection with the innermost belt 26. It is contemplated that the four driving motors 48 operate at a constant and equal speed, but in lieu of the differing sizes of the pulleys 52, these four motors could be chosen to operate at differing speeds.

While it is not deemed necessary, it is obvious that each of the motors 48 could be provided a rheostat to simplify the maintenance of proper speed thereof.

The tremendously large number of scrambled arrangements that could be used in the mounting conductors 68 as well as those having resistors 70 therein upon the disc 66, is apparent. This is, also, enhanced by the fact that the ohmage of value of the resistors might well differ in differing machines. Accordingly, if it were believed that the game was operating on a definite sequential pattern, the owner could quickly break up such pattern by simply changing one or more of the resistors 70 or replace the entire disc 66 and its component parts. Finally, a variance of the speed of rotation of the disc 66 would break up any operational pattern that may be claimed.

Interest in the game is stimulated by the fact that a large number of players may take part and further by the fact that the potentialities of any given racing member is equal to that of the remaining racers.

While four units have been illustrated in the drawings and herein described, and while a given number of conductors 68, and a specified number of resistors 70 have been set forth, it is apparent that such limitations are not contemplated by this game. It is, also, apparent that the number of wiping contacts 88 and the number of stationary contacts 124 may be also varied to suit the desire of the manufacturer.

To assure that the racing members 36 will move continuously during each race, the wiping contacts 88 are all formed to make connections with an approaching contact 90 before breaking with a succeeding contact 90. The same arrangement is provided for in the arms 122 and their stationary contacts 124.

It is apparent, therefore, that the entire apparatus is capable of an extremely large number of modifications, particularly in details of mechanical construction, all of which are within the scope of this invention; and those that fairly come within the limits of the appended claim are contemplated hereby.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

In a racing game, a plurality of racing elements each having actuating structure therefor including an electric motor; a continuously rotating program switch including a plurality of conductors each having a movable contact point and a collector ring joining the same, a resistor in each conductor respectively, said resistors being of differing ohmages, and a plurality of stationary contact points successively engagable by the movable contact points as the program switch rotates; an electric power circuit; a stationary brush in series with said power circuit and disposed in wiping engagement with said collector ring; an electric operating circuit for each of said motors respectively in series with the power circuit; and a manual switch for each motor respectively, each manual switch including a manually rotatable contact arm in series with the corresponding operating circuit, and a plurality of stationary contacts selectively engagable by the contact arm, each of said stationary contacts of the manual switches being connected in series with one of said stationary contact points, whereby the speeds of the motors constantly vary as the program switch rotates and whereby the sequence of speed variations of the motors may be individually changed through actuation of the corresponding contact arms during energization of the motors and while the program switch rotates.

HELEN M. SMITH.
CARLETON M. BURR.
JAMES K. BISHOP, SR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,144,613	Riordan	June 29, 1915
1,454,968	Higuchi	May 15, 1923
2,036,603	Pallada	Apr. 7, 1936
2,093,522	Keith	Sept. 21, 1937
2,180,448	Williams	Nov. 21, 1939
2,188,619	Bernhardt	Jan. 30, 1940
2,202,572	Casstevens	May 28, 1940
2,358,604	Stewart	Sept. 19, 1944

FOREIGN PATENTS

Number	Country	Date
22,798	Great Britain	of 1909