Dec. 28, 1954 J. B. HERSH 2,698,180

RACING GAME

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Fig. 1.

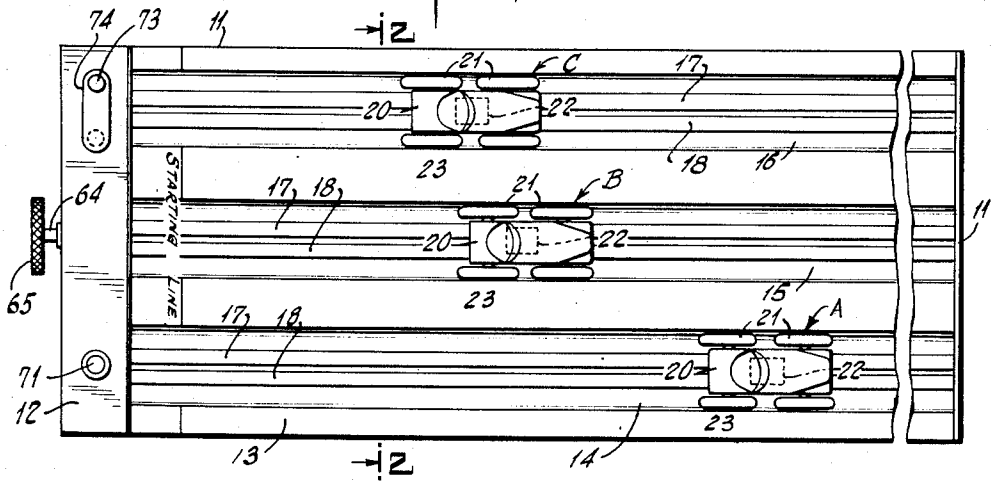


Fig. 2.

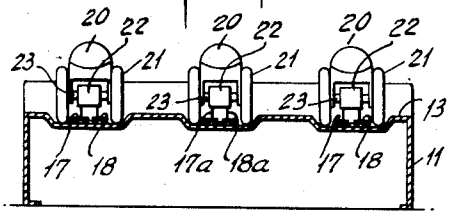


Fig. 3.

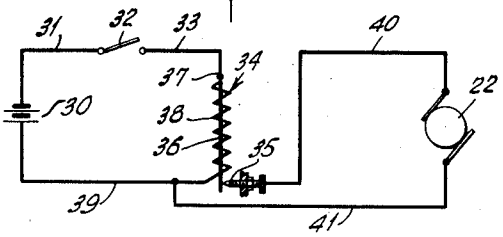


Fig. 7.

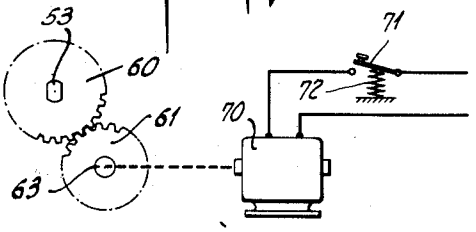


Fig. 6.

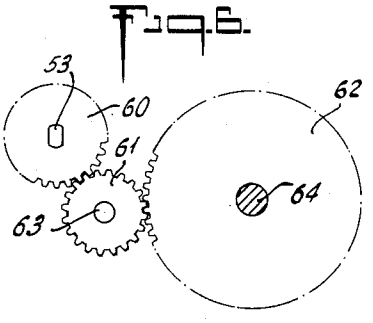
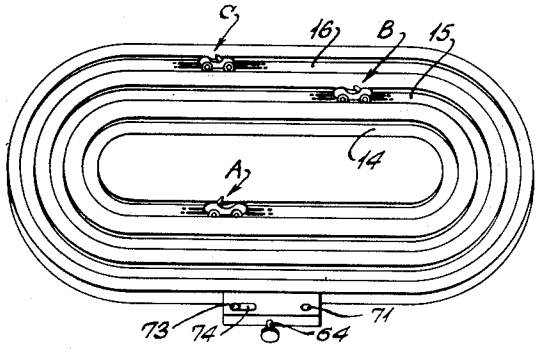


Fig. 8.



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Fig. 5.

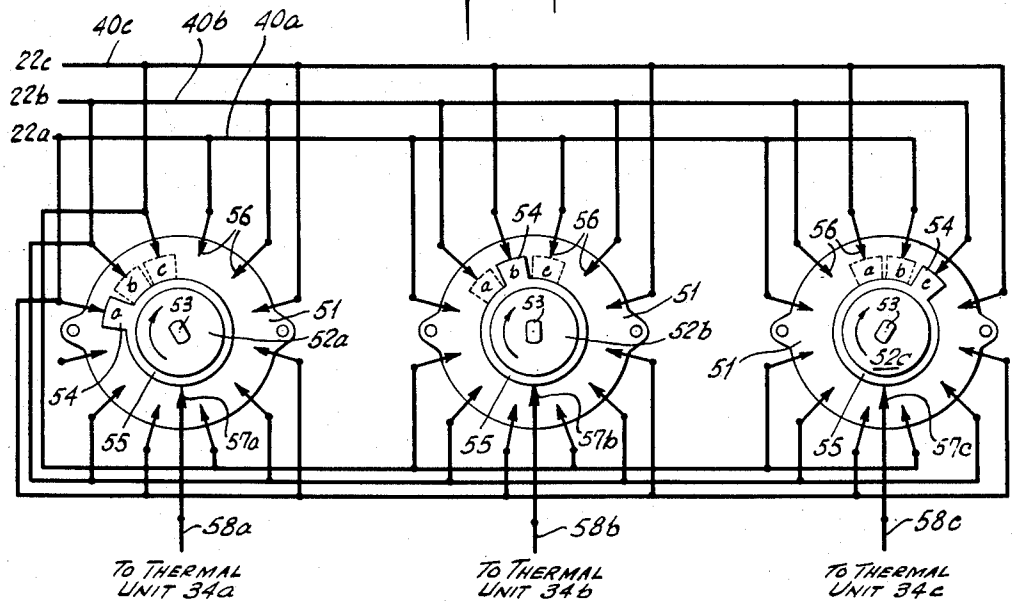
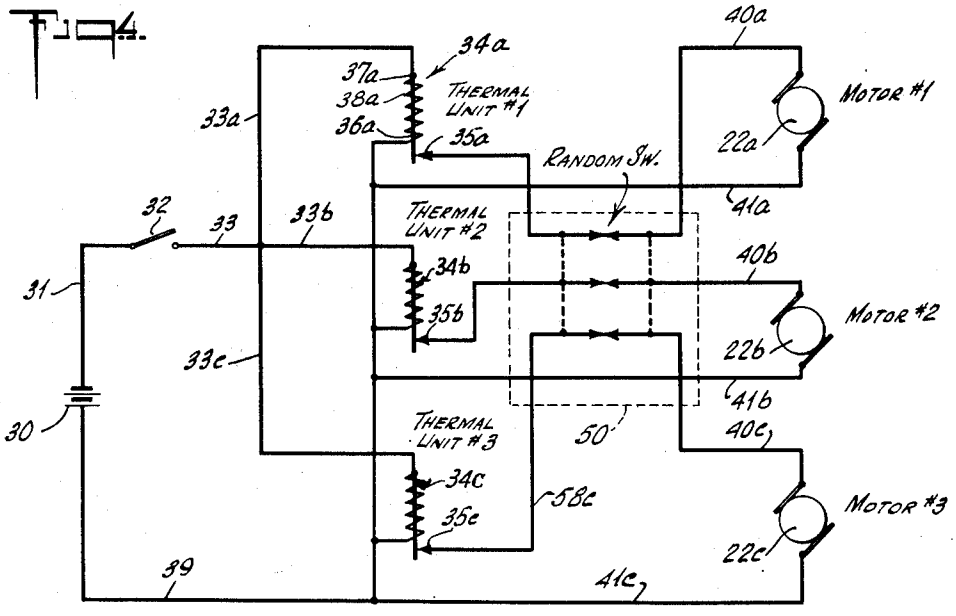


Fig. 4.



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Fig. 9.

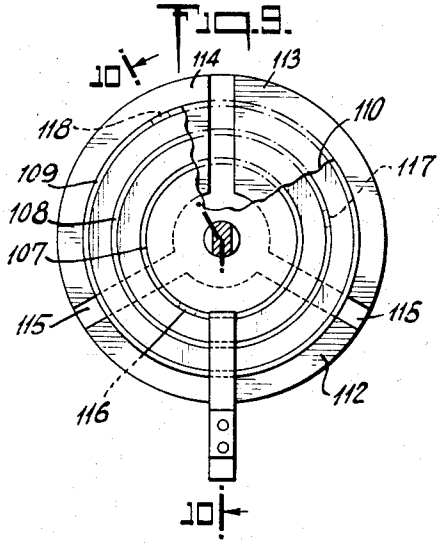


Fig. 10.

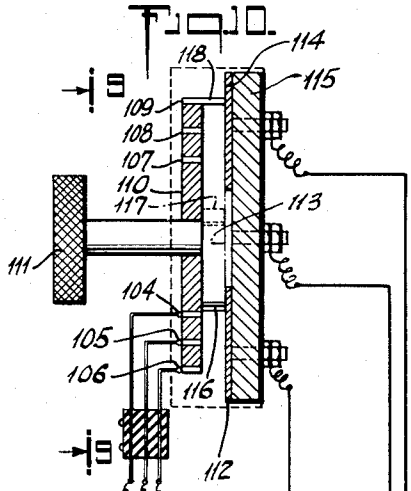


Fig. 11

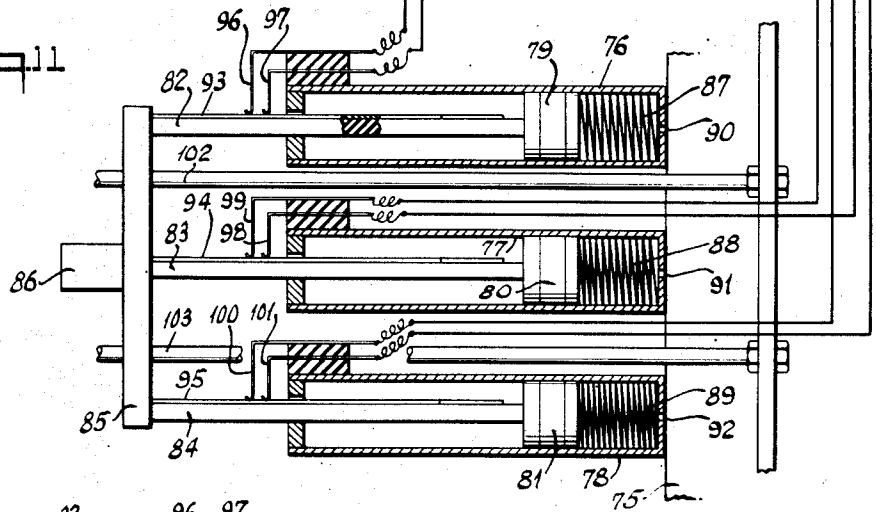
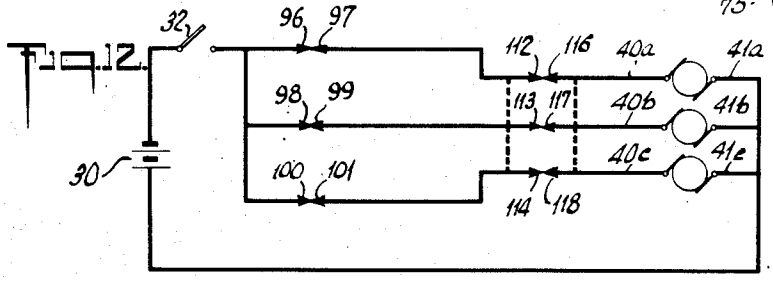


Fig. 12.



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RACING GAME

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Application August 23, 1950, Serial No. 180,935

13 Claims. (Cl. 273—86)

This invention relates to a racing game and more particularly to a game wherein a plurality of racing units are propelled over a race course with random means for determination of the winner.

An object of the invention is the provision of a racing game having a plurality of racing units all of which are energized from a single power source and in which each unit is connected to a separate control means which determines the length of time each unit runs.

Another object of the invention is the provision of control means whereby the several racing units are permitted to run for different lengths of time with one of the units running for a longer period of time than the other units so as to win the race.

Another object of the invention is the provision of a switch arrangement whereby the control means for determining the length of time each of the racing units runs may be changed for each race either manually or automatically so that a random selection of the winner is made beyond the control of the operator or participants of the game.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the following claims.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a plan view of the racing field of the game;

Figure 2 is a vertical section through a portion of the race track, on line 2—2 of Figure 1;

Figure 3 is a circuit drawing of the basic control circuit for each racing unit;

Figure 4 illustrates a typical three unit racing circuit with a random switch arrangement;

Figure 5 is a detailed circuit diagram of the random switch arrangement;

Figure 6 shows a mechanical means for operating the random switch;

Figure 7 shows an electrical means for operating the random switch;

Figure 8 is a view of an alternative form of racing deck in the shape of an oval;

Figure 9 is a plan view, partly broken away showing an alternative random selector dial;

Figure 10 is a section view taken along line 10—10 of Figure 9.

Figure 11 is a side view, partly in section, showing a portion of the alternative random selection apparatus; and

Figure 12 is a circuit diagram of the alternative random selection apparatus.

Figures 1 and 2 show one embodiment of my racing game which comprises a frame or casing 11 with a control section 12 within which the racing controls are concealed. Within the frame 11 is mounted a racing deck 13 of insulating material in which a plurality of racing grooves or depressions 14, 15 and 16 are provided. In each groove two contact rails 17 and 18 are provided.

Each track is adapted to accommodate a racing unit or car generally designated A, B and C respectively, comprising a frame 20 supported on wheels 21 which are adapted to engage and ride over the contact rails of the grooves. Each car is provided with an electric motor 22 operatively connected by appropriate gearing to at least one of the shafts 23 for driving wheels 21 of the car. Electrical power for energizing each of the motors is supplied by way of the electrically conductive rails 17 and 18 acting as leads, each racing unit being positioned in a depression or trough and bridging the circuit from rail 17 to rail 18 by means of contact wipers 17a and 18a. The rails and the tracks with which they are associated may desirably be elliptical, as indicated in Figure 8.

The basic circuit for electrically operating and controlling each of the cars is diagrammatically illustrated in Figure 3 wherein current from a power source 30 passes through line 31 to a make and break reset switch 32, thence along line 33 to a thermal switch generally designated by the numeral 34. Said thermal unit 34 comprises a contact stud 35 with a contact arm 36 which is made of a heat responsive material which bends or deflects when subjected to changing electrical or heat conditions or both. Contact arm 36 is connected to lead line 33 at post 37 to which one end of a coil 38 of resistance wire may also be connected. The other end of said resistance coil is tied to line 39 leading back to power source 30. Motor 22 is connected to contact stud 35 by line 40 and to the power source by line 41.

The contact arm 36 of said thermal switch comprises an electrically resistive material which bends or is deflected when heated by electric current passing through it. The said arm may comprise a bimetallic blade consisting of two strips of different metal bonded to each other, said strips having different coefficients of expansion and different electrical resistive characteristics. When an electrical current passes through such a bimetallic blade, the heat generated by the resistivity of the metals causes the respective strips to expand at different rates. It is arranged that the particular strip whose face is on the contact side of the contact arm has the greater coefficient of expansion so that an increase in heat causes the contact arm 36 automatically to lift or curl away from contact stud 35 thereby breaking the circuit and causing motor 22 to stop running.

The time constant for contact arm 36 may be predetermined in several different ways, as for example, by the length of arm 36, or by the types of metals in the bimetallic strip or an adjusting screw at 35. The action of breaking the circuit is speeded up by encircling arm 36 with the helical coil 38 of resistance wire which is connected to the power source in parallel with said arm and is made up of a proper number of turns to generate sufficient heat to cause the deflection of the bimetallic arm 36 away from contact stud 35 in a desired predetermined time. The heat from coil 38 also maintains the thermal switch in the open position until the completion of the race.

Thus it is seen that in accordance with the basic circuit of Figure 3, it is possible to determine in advance how long a motor connected to said circuit will run. When a plurality of racing units are employed, it is most practicable to set a different time constant for each thermal switch so that the relative running time and final position of each racing unit can be clearly differentiated.

Figure 4 illustrates the manner in which the basic circuit of Figure 3 is adapted to operate a racing game having three racing units by way of example. Motors 22a, 22b and 22c are connected in parallel to power source 30 by means of corresponding leads 40, 41, 33, 31 and 39. Make and break reset switch 32 is provided as in Figure 3. Corresponding thermal switches 34a, 34b and 34c are provided, in leads 33a, 33b and 33c respectively, for each of the racing unit motors 22, but instead of being directly connected to the respective motors, there is a novel random switch arrangement whereby each of said thermal switches may be connected to each of the different motors at different times.

The random switch 50, shown schematically by the dotted line box in Figure 4, is illustrated in greater detail in Figure 5. The random switch may take the form

of a wafer switch comprising three annular stator members 51 arranged in tandem alignment and three center rotor members 52^a, 52^b and 52^c positioned within said stator members respectively, said rotor members being attached to and rotated by shaft 53. In Figure 5, the respective stator and rotor members are shown separated in a lateral position in order to illustrate clearly the relationship of the various elements in the circuit.

Each rotor 52^a, 52^b and 52^c has a contact lip 54, said lips being designated *a*, *b* and *c*, respectively. Attached to each rotor member is an electrically conductive ring strip 55 which is connected to the contact lip 54.

Each stator member has a series of contact studs 56 arranged annularly around the rotor member, each stud being contacted one at a time by the contact lip 54 on the rotor member associated with the stator member. Contact studs 56 are connected in successive series of three to the three circuits respectively controlling racing unit motors 22^a, 22^b and 22^c by way of leads 40^a, 40^b and 40^c.

Contact studs 57^a, 57^b and 57^c are attached to said stator wafers 51 respectively, and are in constant contact with the respective ring members 55. Contacts 57^a, 57^b and 57^c are connected to corresponding thermal switches 34^a, 34^b and 34^c by way of leads 58^a, 58^b and 58^c.

Rotors 52^a, 52^b and 52^c are arranged in tandem on shaft 53 and in fixed angular relation to each other so that the contact lip 54 of each, through portions *a*, *b* and *c*, respectively, is always in contact simultaneously with three separate contact studs 56 leading to separate racing unit motors by way of leads 40^a, 40^b and 40^c. Whatever the angular position to which shaft 53 is rotated, the contact lips are in position to complete the circuits for the three separate racing unit motors.

Although each rotor is in constant circuit connection with its respective thermal unit, the rotation of the rotor serves to connect a particular thermal unit to a different racing unit motor. At the left of Figure 5, the contact lip 54 of rotor 52^a is shown in contact with contacts 56 leading through leads 40^a, 40^b and 40^c respectively to motors 22^a, 22^b and 22^c. In this position motor 22^a is connected to thermal switch 34^a through lead 58^a and ring strip 55 of said rotor at the left in Figure 5; motor 22^b is connected to thermal switch 34^b through lead 58^b and said ring strip 55; and motor 22^c is connected to thermal switch 34^c through lead 58^c and said ring strip 55. With the shaft 53 in this position the race will be controlled in accordance with the different predetermined time constants at which the respective thermal switches have been set.

When shaft 53 is rotated one step clockwise, as shown in the center of Figure 5, it is seen that motor 22^b is now connected to thermal switch 34^a through lead 40^b to the portion *a* of lip 54 (previously connected to motor 22^a through lead 40^a) ring strip 55, and lead 58^a, and in corresponding manner motor 22^c is now connected to thermal unit 34^b, and motor 22^a is now connected to thermal switch 34^c. Another step rotation of shaft 53 sets up a still different relationship between the various motors and the corresponding thermal units that control them, as shown at the right of Figure 5.

The rotation of shaft 53 before each race serves to connect selectively the various motors with different thermal units, and since contact lips 54 and contact studs 56 are concealed from view the racing game appears to be chance-controlled.

In order that familiarity of the operator with the angular position of shaft 53 controlling the random switch 50 may not reduce the chance elements of the racing game, it is desirable to rotate shaft 53 by remote control as, for example, by a simple gear train illustrated in Figure 6. Gear disk 60 mounted on and controlling the rotation of shaft 53 is in turn rotated by gear disks 61 and 62, mounted on shafts 63 and 64 respectively. The gear train together with the random switch and other circuitry is concealed in compartment 12 (Figure 1) while shaft 64 extends through the end of said compartment. A circular handle 65 is mounted on shaft 64. The dimensions of gear disks 60, 61 and 62 are selected so that the operator rotating handle 65 cannot knowingly predetermine the relationship between the various motors and the controlling thermal units. This can be accomplished by making the ratio of gear disks 62 and 60 to be one to three and eleven twelfths or one to four and seven twelfths, for example. Other suitable odd ratios may be set up to obviate the possibility of the operator "learning the combination" and thereby preventing the game from being chance-controlled.

The human element may further be eliminated as shown in Figure 7 by operating the shaft 53 of the random switch by means of an electric motor 70 connected by suitable gearing to shaft 63 of the gear train. Before each race motor 70 may be operated for a short time by closing switch 71 which is normally maintained in the open position by expansion spring 72, for example. While switch 71 is closed motor 70 operates to rotate shaft 53 of random switch 50 and when switch 71 is released or opened to cut off the current, the inertia of motor 70 is sufficient to cause shaft 53 to continue to rotate an intermediate and uncontrolled amount thereby permitting the final position of random switch 50 to be arrived at by chance.

In operation before each race the reset switch 32 is opened by moving switch button 73 (Figure 1), connected to said switch, to the open position in slot 74 in compartment 12. Random switch 50 is operated either mechanically by handle 65 or electrically by push button switch 71 for a short period of time. The concealed random switch 50 comes to rest with the respective contacts 54 and 56 in an alignment that is unknown to the operator and participants of the game. The racing units are now placed in position at the "start" of racing oval 13 and reset switch 32 is closed by sliding button 73 to the "closed" end of slot 74. The racing circuit now being closed, the racing units A, B and C, are propelled by their respective motors 22 and proceed along until they are individually and successively cut off from the power source by the circuit-breaking operation of the corresponding thermal switches to which they happen to be connected. Since one of the three thermal switches is set so that it does not break its circuit as quickly as the other two thermal switches, it is seen that the racing unit controlled by the thermal switch having the longest delayed action will win the race by running the longest distance.

It is to be noted that as each thermal switch breaks the circuit for its corresponding racing unit, there is no interruption of current to the remaining closed contact thermal switches that are still connected with the power source.

After each race the reset switch 32 is opened to permit the thermal switches to cool and return to their closed contact position, while random switch 50 is operated again either manually or automatically to provide a new matching or pairing between each racing unit and a corresponding thermal switch, so that a new chance-controlled winner is selected for the next race. Thereafter a new race is started by closing reset switch 32.

The number of sets of contacts 56 on switch wafer 51 may be changed to suit the optimum function of the random switch. It will also be seen that the circuits described in connection with Figure 5 would also be operable if the leads from contacts 57 were connected to the racing units while the leads from contacts 56 were connected to the various thermal switches.

An alternative random selection system may be provided, the components of which are shown in Figures 9, 10 and 11 while the schematic circuit is shown in Figure 12. Mounted on a support 75 are three cylinders 76, 77 and 78 in which pistons 79, 80 and 81 move longitudinally back and forth. Said pistons are attached respectively to shafts or rods 82, 83 and 84 which are all simultaneously operated by a plunge board or reset arm 85 having handle 86. Positioned within the right end of the cylinders are springs 87, 88 and 89 which urge pistons 79, 80 and 81, respectively, to the left. Vent holes 90, 91 and 92 are provided to permit the passage of air as the pistons move within the cylinders.

On shafts 82, 83 and 84 there are attached longitudinal electrically conductive strips or sliders 93, 94 and 95 upon which respectively brush contacts 96 and 97, 98 and 99, 100 and 101 impinge. The shaft plunger and cylinder assembly operates as a circuit breaking device for three racing circuits with each circuit being broken at different delay periods depending upon the tension of the springs within the cylinders or the size of the vent holes or both.

As illustrated in Figure 11, since the springs have different numbers of turns, it will be apparent that spring

89 will operate faster than spring 88 which in turn will operate faster than spring 87. As these springs urge their respective pistons toward the left, the ends of strips 93, 94, and 95 pass beyond contacts 97, 98 and 101, thereby breaking the electrical circuits. It is understood that reset arm 85 is not attached to shafts 82, 83, and 84, but rides back and forth on guide shafts 102 and 103.

The time delay switches are connected to a random selector as shown in Figures 9 and 10. Contacts 96, 99 and 100 are connected to brush contacts 104, 105 and 106, respectively, which impinge on concentric conductor rings 107, 108, and 109, which are positioned on disk or wheel 110 rotated by handle 111.

Contacts 97, 98 and 101 are electrically connected to conductor segments 112, 113, and 114 respectively, mounted on base 115. Conductor rings 107, 108 and 109 are provided with contacts 116, 117 and 118, respectively, said contacts being adapted to make contact selectively with said conductor segments. The disposition of contacts 116, 117 and 118 and of segments 112, 113 and 114 are arranged so that each segment will be impinged by only one contact when wheel 110 is at rest.

It can be seen that with the racing motors in series circuit with each of the conductor segments, a separate timing circuit is provided for each racing unit, which may be selected by random means. The timing of circuit breaking is determined by the different tension characteristics of the cylinder springs as well as by the size of apertures 90, 91 and 92 which restrict the speed at which air returns to the cylinders.

With the racing units at the starting position, handle 111 is turned to rotate wheel 110 which is concealed behind a panel. Each racing unit is matched up at random with a cylinder-plunger time delay switch through the selection of particular segments 112, 113 and 114 by the respective contacts 116, 117 and 118.

At this time pistons 79, 80 and 81 are at rest under the urging of their respective springs at the extreme left of the cylinders, in which position all of the electrical circuits are open.

The operator of the game now pushes shafts 82, 83 and 84 by means of reset plate 85 toward the right thereby causing strips 93, 94 and 95 to close their circuits. Plate 85 is then drawn rapidly back to the left away from the ends of piston rods 82, 83 and 84, thereby permitting the free return of said rods. As soon as the circuits are closed the racing unit motors begin to operate while springs 87, 88 and 89 begin to urge their respective pistons back toward the left. Since each piston has a different travel time interval the respective circuits will be opened after different periods if time, thereby determining the winning order of the racing units.

It can be seen that in this embodiment of my invention also, a series of predetermined time constant circuit breaking switches exemplified by the plunger cylinders are selected at random by means of a concealed selector device whereby the winning of the race is placed beyond the control of the person operating the racing game.

The electrical circuit incorporating the reset piston time delay switches is shown in Figure 12 which is substantially the same as that shown in Figure 4. Also the means for insuring random selection as exemplified in Figures 6 and 7 may also be adapted to the random selecting means described in connection with Figures 9 and 10.

It is understood, of course, that although only three racing units have been illustrated, the present invention contemplates the utilization of as many racing units as are practicable and desirable. The racing units may be represented by a variety of devices by suitable construction over the racing carriages 20 in the form of automobiles, horses or dogs, for example.

These and other variations are contemplated by this invention as being within the purview of the specification and within the scope of the appended claims.

What I claim is:

1. In a racing game, the combination of a power source, a plurality of racing units connected to said power source, a time-delay circuit breaking switch between each of said racing units and said power source, said switches having different time constants for breaking the circuits respectively, and chance-operated means including a movable member connecting different of said switches to different of said racing units.

2. A racing game according to claim 1 in which each switch comprises a contact arm consisting of a bimetallic strip and a contact stud, said bimetallic strip responding to increases in heat by bending away from said contact stud thereby breaking the circuit.

3. A racing game according to claim 2 in which said switch further comprises a coil of electrically resistive wire wound around and connected in parallel with said bimetallic strip.

4. In a racing game, the combination of a power source, a plurality of racing units, a plurality of thermal switches connected to said power source, said thermal switches having different time constants for breaking the circuits respectively, and being equal in number to said racing units, and a random switch including first separate connections to said thermal switches and second separate connections to said racing units, and means randomly connecting different first connections and different second connections.

5. A chance-controlled circuit comprising in combination a power source, a plurality of motors, a plurality of thermal switches connected to said power source, said switches equalling said motors in number, said switches each comprising a contact head and a bimetallic arm being responsive to the passing of electric current therein by bending away from said contact head and thereby breaking the electrical circuit, each of said thermal switches having a time constant of circuit breaking operation different from the time constants of each of the other thermal switches, and a random switch adapted by rotation to connect each thermal switch with a motor, said random switch including first separate connections to said thermal switches and second separate connections to said motors, and a rotatable element connecting different thermal switch connections to different motor connections at various rotated positions thereof, whereby said connections may be changed to different connections between motors and thermal switches when said random switch is rotated.

6. Circuit according to claim 5 and further comprising a coil of resistive wire wound around and connected in parallel with said bimetallic contact arm.

7. Circuit according to claim 6 and further comprising a remote control including concealed mechanism for rotating said rotatable element, whereby the connections between said motors and said thermal units are made by chance.

8. Circuit according to claim 7 in which said remote control comprises a manually operable rotatable handle and a gear train connecting said handle and said rotatable element, said gear train being characterized by an odd ratio of rotation between said handle and said rotatable element.

9. Circuit according to claim 7 in which said remote control comprises an electric motor connected to drive said rotatable element, said motor having sufficient inertia after its current is cut off so that it causes the rotation of said rotatable element an indeterminate amount that is not controllable by the operator.

10. In a racing game, the combination of an electric power source, a plurality of electrically operated racing units, a plurality of tracks accommodating said racing units, a plurality of heat responsive switch means corresponding in number to said racing units having different time constants respectively, a make and break switch connecting said power source to said heat responsive switch means, a random switch means for connecting each of said heat responsive switch means with a corresponding racing unit by chance-controlled selection, said random switch means including a displaceable element connecting different heat-responsive switch means to different racing units at various displaced positions thereof.

11. A racing game comprising a power source, a plurality of racing units connected to said power source, a plurality of time-delay circuit breaking means, each of said circuit breaking means having a different time constant for breaking the circuits respectively, and a random selection means connecting each of said racing units to a different one of said circuit breaking means, and including first separate connections to said circuit breaking means and second separate connections to said racing units, and means randomly connecting different first connections to different second connections.

12. A racing game according to claim 11 wherein said random selection means includes a rotatable element and further comprising a rotating operating handle for rotat-

ing said rotatable element, and a gear train between said rotatable element and said handle, said gear train being characterized by an odd rotational ratio between said handle and said rotatable element.

13. A racing game according to claim 4, wherein said last-defined means includes a rotatable element, having contact members fixed thereon for making connection between said switches and racing units, manual means for rotating said element, and a gear train between said rotatable element and said manual means, said gear train being characterized by an odd rotational ratio between said rotatable element and said manual means.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
894,199	Gaston	July 28, 1908
1,668,249	Rich	May 1, 1928
2,003,638	Nothstine	June 4, 1935
2,036,603	Pallada	Apr. 7, 1936
2,188,619	Bernhardt	Jan. 30, 1940
2,280,000	Millar et al.	Apr. 14, 1942
2,468,772	Mungall	May 3, 1949
2,526,215	Florimont	Oct. 17, 1950

FOREIGN PATENTS

Number	Country	Date
467,421	Great Britain	June 16, 1937