Oct. 17, 1950 E. FLORIMONT 2,526,215

BALL-ACTUATED RACING GAME DEVICE

Filed June 12, 1945 4 Sheets-Sheet 1

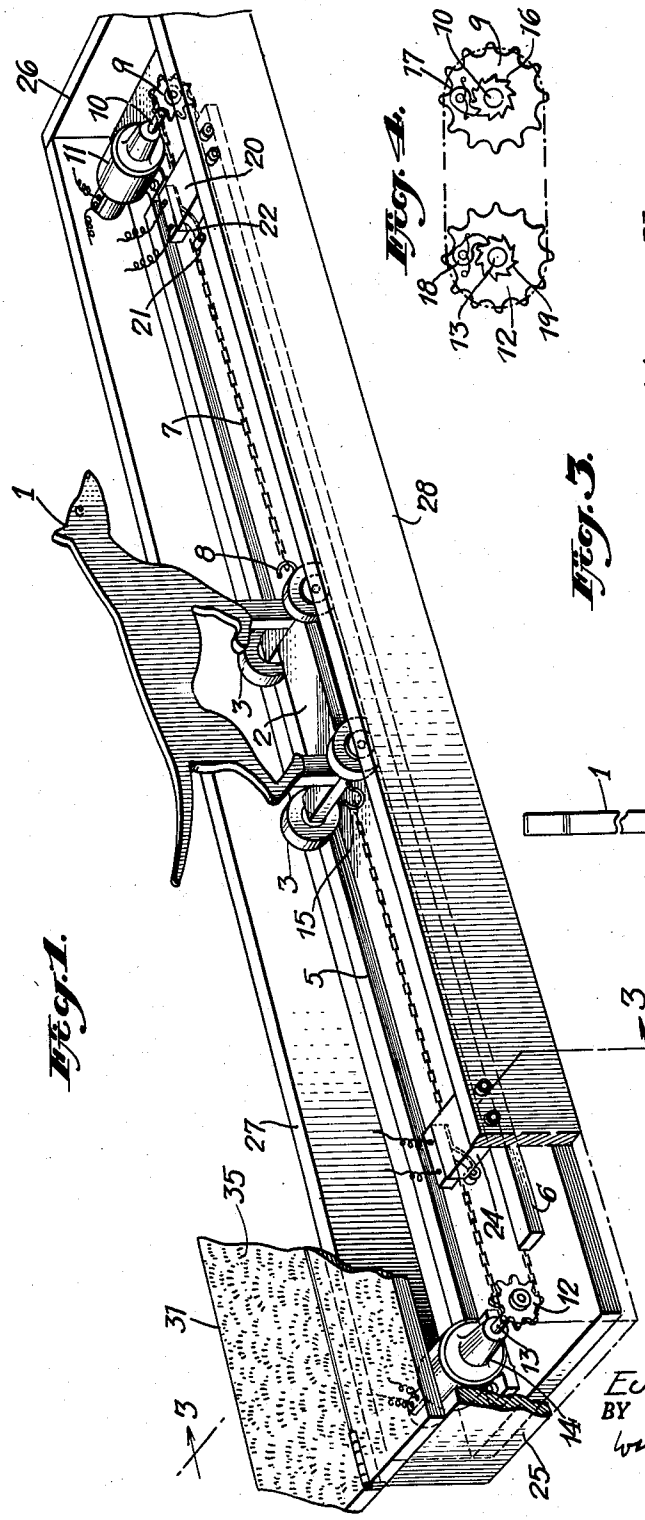


Fig. 1.

Fig. 4.

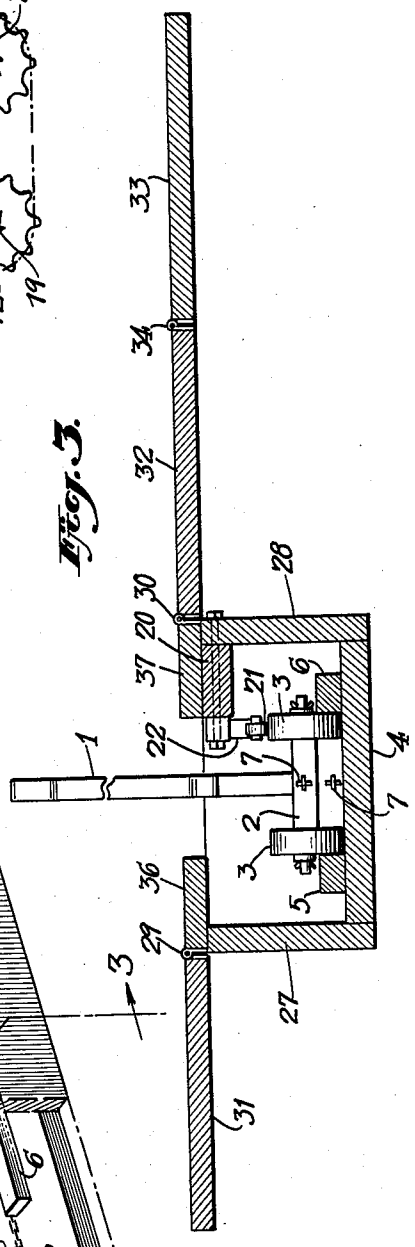


Fig. 3.

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BALL-ACTUATED RACING GAME DEVICE

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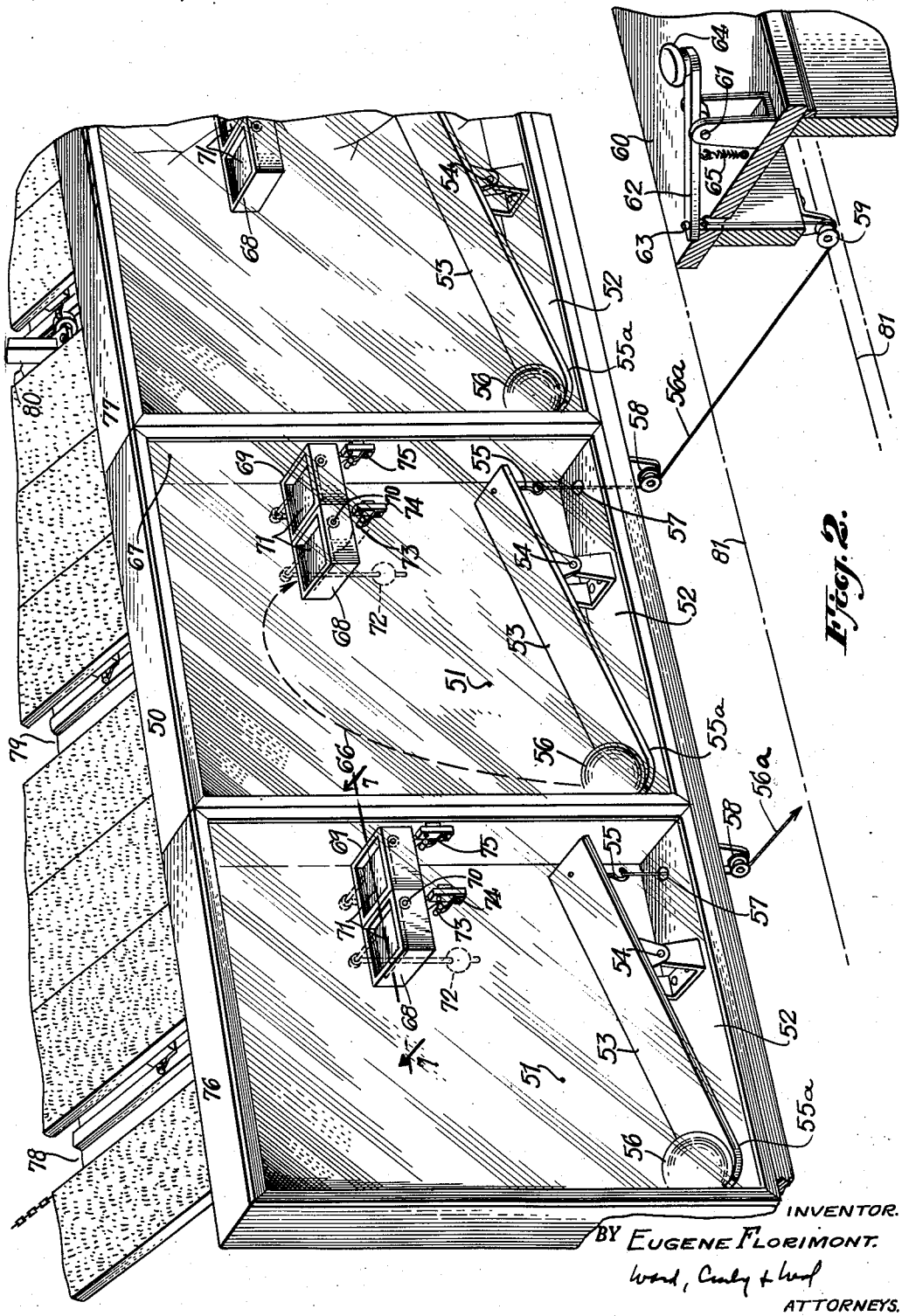


Fig. 2.

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BALL-ACTUATED RACING GAME DEVICE

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Fig. 5.

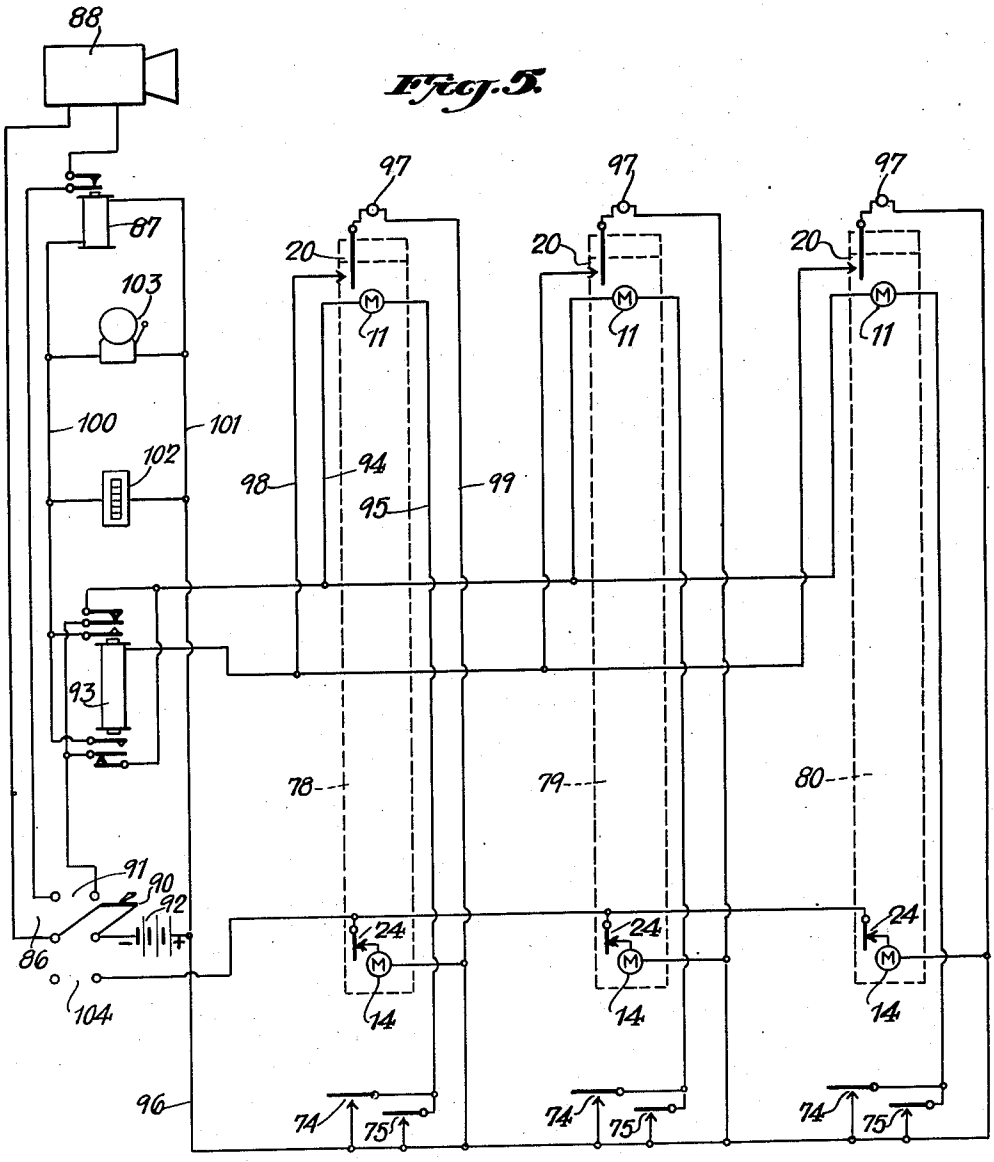
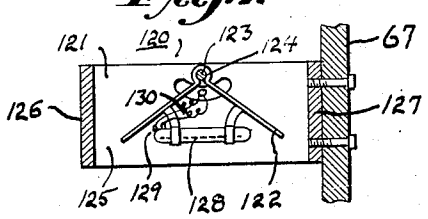


Fig. 7.



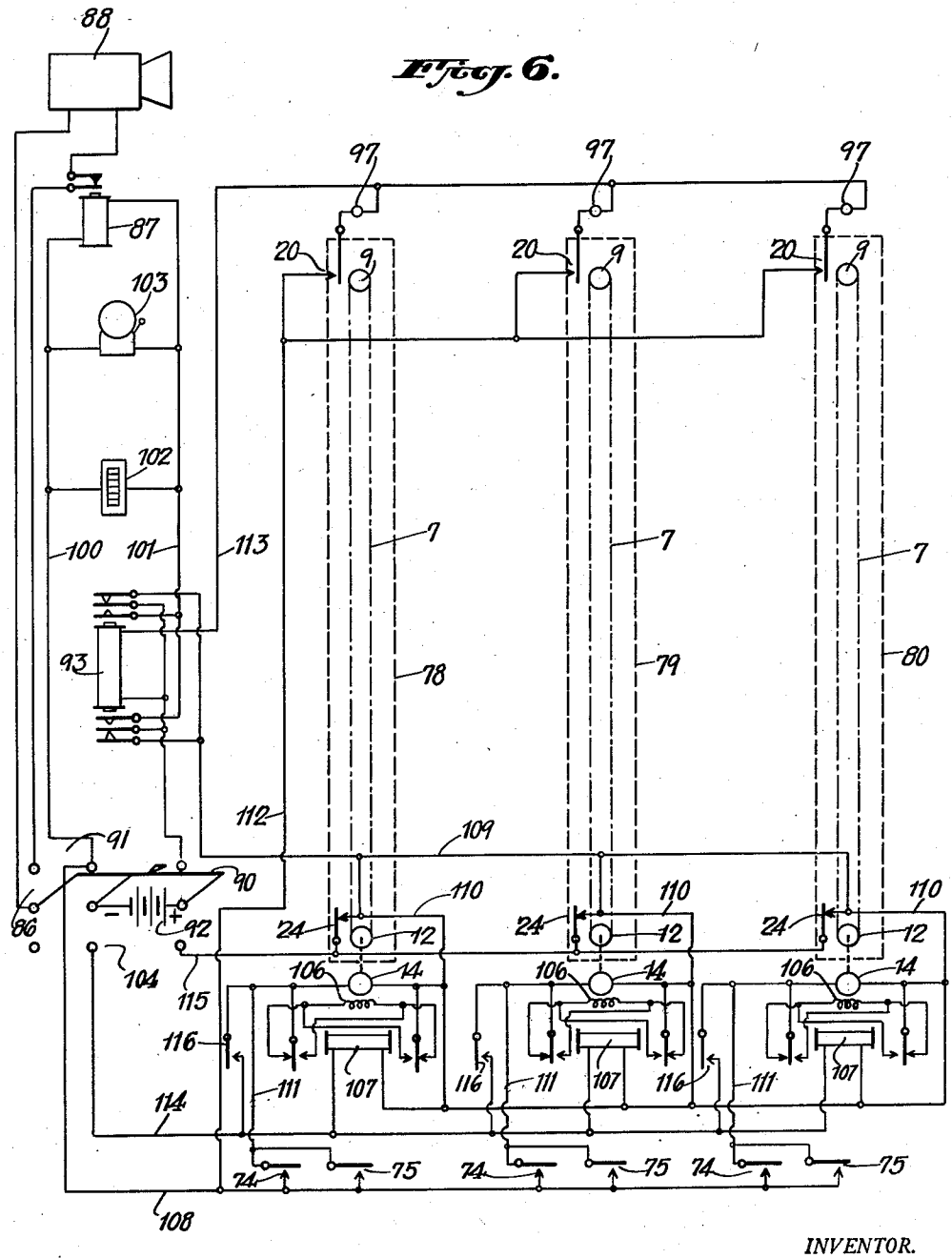
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BALL-ACTUATED RACING GAME DEVICE

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Fig. 6.



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Patented Oct. 17, 1950 2,526,215

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2,526,215

BALL-ACTUATED RACING GAME DEVICE

Eugene Florimont, Brooklyn, N. Y., assignor to Greyhound Amusement Device Company, Brooklyn, N. Y., a copartnership composed of Eugene Florimont, Leo Stober, and Isidor Rubenstein

Application June 12, 1945, Serial No. 599,054

4 Claims. (Cl. 273—86)

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This invention pertains to amusement devices and, more especially, to a racing game adapted for mass play by a number of players competing for the winner.

A feature of the invention resides in the fact that the game involves a certain amount of skill and an element of uncertainty, whereby the winner cannot be forecast irrespective of the number of players competing.

A further feature is that the game can be played by any number of individuals competing concurrently, up to the limit of the available equipment.

In accordance with a further feature, the game comprising the invention is extremely simplified as to construction and operation in that the majority of the operations are effected electrically by means of switch and relay actuated electrical motor drives for the racing elements, in contrast to mechanical actuations derived from energy supplied by the players.

In accordance with still another feature, the game is composed of wholly self-contained and portable individual racing units, any desired number of which may be quickly assembled for play and as quickly disassembled for storage or shipment.

In accordance with a further feature, the winning of the play by one racing element automatically stops all play by competing elements and operates appropriate signaling devices to indicate and announce the winner, thereby to avoid all confusion as to the outcome.

In accordance with the broad principles of the invention, each self-contained racing unit of the game includes a toy whippet or the like, mounted on rollers and propelled along a race track provided with appropriate guides, by means of motor-actuated chains, cables or the like extending between the whippet and drive sprockets located at opposite ends of the track. During play, the motor actuation is such, as explained below, as intermittently to advance the whippet from a starting point at one end of the track toward its goal at the opposite end of the track. When the play is ended as determined by a winner, the motor actuation is such as to return the whippet to the starting point, irrespective of its position along the track at the end of the play.

Advancement of the whippet along the track during play is based on the principle of successfully tossing a ball through a miniature hoop, as determined by the skill of the player in actuating a ball-tossing mechanism associated with each racing unit. The ball-tossing mechanism for

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each racing unit is mounted within a substantially rectangular or box-like housing, provided with a glass front, whereby the player may view the operation of the mechanism therein. Within the housing on the base thereof, a ball-tossing board which operates like a see-saw is pivotally mounted off-center, so that one end normally rests on the housing base. This end terminates in an upwardly curved portion to provide a normal resting place for the ball. To this end, a ball is provided having a diameter slightly less than the depth of the housing, so that irrespective of any particular trajectory which it may follow when tossed, it will fall back on the tossing board and thereupon roll back to its normal resting place owing to the off-center pivotal mounting of the board.

Actuation of the tossing board tosses the ball in a trajectory directed toward the opposite side of the housing, and mounted on this side in elevated relation to the board are one or more miniature hoop-like structures, the openings of which are normally closed by counterweighted flaps. If the ball happens to fall through one of these flaps, the weight of the ball in passing through depresses the flap, thereby momentarily actuating an associated switch. Actuation of this switch energizes the motor control circuit for advancing the whippet along the track a certain distance for each such actuation, for example, about six to twelve inches. Actuation of the tossing board is accomplished by means of a cable secured at one end to the normally elevated end of the board and extending over appropriate pulleys to one end of a pivoted lever provided at its opposite end with a knob or handle for manual actuation by the player.

Having now generally described the invention, reference is made, for a more detailed description, to the accompanying drawings, wherein:

Fig. 1 is a perspective view of one of the racing units with parts broken away to show the construction and operation.

Fig. 2 is a perspective view of the associated ball-tossing mechanism, this view also showing several such mechanisms and portions of their associated racing units in assembled relation such as to permit competition by a number of players.

Fig. 3 is a transverse section at 3—3 of Fig. 1.

Fig. 4 is an elevational detail of the motor-actuated chain sprocket mechanism of Fig. 1.

Fig. 5 is a diagrammatic layout of the electrical circuits and components involved in operation of the Figs. 1 to 3 construction.

Fig. 6 is a more simplified form of circuit arrangement which may also be employed with slight modification as explained below.

Fig. 7 is a sectional view of a hoop-like structure for receiving the ball when tossed, this structure being a modification of that shown in Fig. 2.

Referring to Figs. 1, 3 and 4, a toy whippet 1 is mounted on a chassis 2, provided with rollers 3 which ride along a race track 4 of wood or the like, having affixed to the upper surface thereof longitudinally extending guides 5, 6 for guiding the whippet along the track.

The mechanism for propelling the whippet along the track includes a chain 7, secured at one end by a hook 8 on the forward end of chassis 2, the chain passing thence over a sprocket 9 carried on the shaft 10 of a motor 11 mounted at the forward end of track 4, the chain 7 returning thence under the chassis 2 and passing over a sprocket 12 carried by the shaft 13 of a motor 14 mounted at the rear end of the track, the chain 7 extending thence back to the chassis and terminating on a hook 15 secured to the rear end thereof.

Motor 11, when energized, rotates in a clockwise direction as viewed in the drawings, and thereby advances the whippet along the track; while motor 14, when energized, rotates counterclockwise to return the whippet to the starting point. In order, however, to prevent any motor when energized from dragging the rotor of the other motor around with it through the intermediary of the interlinking chain and sprocket assembly, each sprocket 9, 12 is driven by its associated motor 11, 14 through a pawl and ratchet mechanism such that each motor, when energized, transmits a positive drive to its associated sprocket, during which time, however, the sprocket associated with the remaining or deenergized motor merely slips around on the motor shaft.

Fig. 4 shows the arrangement by which this is accomplished. Thus, the shaft 10 of the forward motor 11 has keyed thereto a ratchet wheel 16, engaged by a pawl 17, pivoted to sprocket 9, the latter being otherwise rotatably journaled to shaft 10. This pawl and ratchet mechanism is constructed as shown to transmit a positive drive between shaft 10 and sprocket 9 only in the clockwise direction of rotation. The reverse arrangement is employed for coupling the shaft 13 of motor 14 to its sprocket 12, the associated pawl and ratchet mechanism 18, 19 being such as to provide a positive drive between elements 12, 13 only when rotated in the counterclockwise direction of rotation.

When the whippet advances to the extreme forward end of the track, it operates a switch 20 thereat which prevents further operation of motor 11 as explained below. The actuation of this switch results from one of the forward rollers 3 on the whippet chassis engaging a roller 21 carried by a resilient switch arm 22 of switch 20, in the manner illustrated in Fig. 3. A similar switch 24 is provided at the starting end of the track for deenergizing the return motor 14 upon return of the whippet to the starting position as explained below.

As above stated, the racing unit of Figs. 1, 3 and 4 is of self-contained portable construction and to this end is provided with end closure members 25, 26, and side members 27, 28, to which are hinged, as at 29, 30, extension members 31, 32, member 32 having a further extension 33 hinged thereto, as at 34. These hinged members 31, 32, 33 are adapted to open out into a horizontal surface as shown in the drawings, to render the unit operative for play and to simulate the appearance of a race track, the upper surface of which, thereby exposed to view, may be painted green or provided with imitation grass as indicated at 35. When, however, it is desired to assemble the unit for storage or shipment, sides 31, 32 are brought up to the vertical position to constitute extensions of sides 27, 28, while the end member 33 is swung through 180° into the opposite horizontal position to provide a cover over the whippet, spanning members 31, 32 as vertically arranged. Also, for partially covering the operating mechanism during play, the inwardly extending horizontal members 36, 37 are provided, as shown.

Referring now to Fig. 2, the ball-tossing mechanism above referred to comprises a box-like housing 50 having a glass front 51. Within the housing and on the base 52 thereof, a tossing board 53 is pivotally mounted off-center, as at 54, and such that the larger end 55*a* normally rests on the base 52 of the housing. The end 55*a* terminates in an upward curvature, as shown, and thus provides a receptacle for a ball 56.

At its opposite end, the tossing board is provided on its under side with a hook 55 to which is secured one end of a cable 56*a* extending therefrom through an aperture 57 in the base 52, thence under pulleys 58, 59, to a playing counter 60, on which is pivotally mounted, as at 61, a lever 62, to one end 63 of which the cable 56*a* is attached, while the other end is provided with an operating handle 64. A tension spring 65 extends between lever 62 and counter 60 for normally maintaining the lever in the position shown.

It will be observed from the construction described that as the handle 64 is sharply depressed, as by means of a percussion blow, the accompanying elevation of the opposite end 63 will be transmitted through cable 56*a* to produce a corresponding sharp depression of the cable-attached end of tossing board 53, thereby to toss the ball 56 in the air along some such trajectory as 66. That is, the ball will be tossed toward the side 67 of the housing.

Mounted at an elevated position on this side are a pair of rectangular hoop-like structures 68, 69, within the opening of each of which is pivotally mounted as at 70, a flap 71 which is so counterweighted, as at 72, as normally to maintain the aperture closed. If now the ball happens to be tossed along a trajectory 66 such that in falling it passes through one of the hoop members, such as indicated at 68, the weight of the ball will deflect the flap 71 downwardly during passage of the ball through the hoop. The downward deflection of flap 71 will actuate the resilient arm 73 of a switch 74 and thereby momentarily energize the forward motor 11, Fig. 1, to advance the whippet 1 a short distance along the track, as explained below. Hoop member 69 is provided with a similar switch 75.

The switches 74, 75 may be so arranged that the operation of one will energize motor 11 for a slightly longer duration than the other, thereby to advance the whippet a greater distance if the ball falls through one hoop than it does for the other. It will be understood, of course, that if the ball is tossed so inaccurately that it fails to pass through a hoop, there will be no advance of the whippet for that try, but the whippet will be advanced, say, six to twelve inches, or any

other desired distance for each toss that the ball does pass through one of the hoops.

The dimensions of the housing **50**, tossing board **53** and ball **56** are relatively such that the ball in falling back will always land on the board **53**, which in turn is pivoted a sufficient distance off-center to assure return of the ball to its normal receptacle **55***a* as shown.

As further shown in Fig. 2, any desired number of the individual racing assemblies may be mounted side-by-side with the ball-tossing mechanisms mounted, as shown at **76**, **50**, **77**, and with their associated race tracks extending in upwardly inclined direction therefrom, as indicated at **78**, **79**, **80**. The playing counter **60** will extend the length of the race track assemblies, as indicated by the dashed lines **81**, so that the players may stand side-by-side along the counter, each having before him a lever, such as **62**, for operating his particular ball-tossing mechanism.

Refer now to Fig. 5 for an explanation of the electrical features of the invention, the mechanical details of which have been above described. In Figs. 1 to 5 inc., like elements are similarly designated. In Fig. 5, three track assemblies **78**, **79**, **80** are shown mounted side-by-side as in Fig. 2. The ball-actuated play switches are designated **74**, **75** as in Fig. 2. The motors advancing the whippets and those for returning them to their starting positions are designated as **11** and **14** respectively, and the switches thereat actuated by the whippets are designated **20**, **24** as in Fig. 1.

Assuming all of the whippets are in their starting positions, the system is energized for starting the play by operating the double-pole, double-throw switch **90**, to contact **91**. This completes a circuit over conductors **86** and through normally closed back contacts of a relay **87**, to actuate a phonograph **88** which thereupon announces the starting of the play, providing instructions therefor and subsequent appropriate sound effects, etc., during the play. Operation of switch **90** to contact **91** also connects a battery **92** through the back contacts in multiple of a normally released relay **93** and over circuits, such as **94**, **95**, **96**, extending through the play motors **11** and the normally open contacts of the ball-actuated switches **74**, **75** in parallel. Thus, if any switch **74**, **75** for any particular race track **78**, **79**, **80** is actuated mometarily, by passage of the ball **56** through a hoop **68**, **69**, the associated play motor **11** will be momentarily energized over the circuit above traced to advance the corresponding whippet a short distance along its track in the manner above explained.

As the play proceeds, the whippets will thus be intermittently advanced along tracks **78**, **79**, **80**, at relative rates depending on the luck and skill of the players manipulating the control knobs **64**. In this connection, all players will of course be required to actuate these knobs in unison for the same total number of times until one of the whippets advances to the goal line.

Proceeding in this fashion, when any particular whippet reaches the upper end of the race track, it will close the switch **20** thereat in the manner above explained, which in turn will close a circuit to light a lamp **97** over the winner, and also to operate relay **93**, this circuit being traced from the negative terminal of battery **92** through the winding of relay **93**, the contacts of the operated switch **20** and associated lamp **97** over conductors, such as **98**, **99**, returning thence to the positive terminal of the battery over conductor **96**. The operation of relay **93** will open its back contacts, and thus open the energizing circuits for all of the "play" motors **11** so that no whippet can be advanced along its track thereafter. Also, the operation of relay **93** closes, through its front contacts, a circuit completed over conductors **100**, **101**, and connecting the battery **92** across the following elements in parallel, viz.: a counting relay **102** which thereupon operates to chalk up the number of the race; a bell **103**, the ringing of which announces acoustically that the race has been won, thereby to direct attention to the lamp **97** illuminated as aforesaid over the winning position; relay **87** which operates to open the energizing circuit for phonograph **88** which thereupon shuts off the phonograph.

Now that the race has been won, it is necessary to return all whippets to their starting positions, irrespective of their relative positions along the tracks **78**, **79**, **80**. This is accomplished by operating switch **90** to contact **104**. This connects the battery **92** across all of the return motors **14** in parallel through the normally closed contacts of their associated whippet-actuated switches **24**. Thus, when any particular whippet is returned to its starting position, it actuates switch **24** to deenergize its return motor **14**. This action continues for each whippet independently of the others until all are returned.

Fig. 6 shows an electrical circuit arrangement which may be substituted for that of Fig. 5, and which is much simpler in that but one motor **14** is required per track, in contrast to the two motors **11**, **14** per track employed in the Fig. 5 arrangement. In the Fig. 6 circuit, each motor **14** is reversible and to this end is provided with a shunt field winding **106** energized in one polarity from battery **92**, through the back contacts of an associated, normally released relay **107**, and energized in the opposite polarity from battery **92** through the front contacts of relay **107**. That is to say, the operation of this relay reverses the direction in which the current from battery **92** traverses the field winding while maintaining the direction of current flow on the rotor winding unchanged, whereby the direction of rotation of the motor is reversed, by operation of the relay.

With this circuit arrangement, the chain sprocket **12** is permanently keyed to the motor shaft **13**, Figs. 1 and 4, the pawl and ratchet mechanism **18**, **19** being eliminated. Also, at the finish line of the track, motor **11** is omitted and sprocket **9** journaled to a shaft **10** for rotation in either direction, omitting the pawl and ratchet mechanism **16**, **17**. Accordingly, the whippet **1** will be propelled either forward or backward by motor **14** depending on its direction of rotation.

Reverting to Fig. 6, the system is energized for starting the play by operating switch **90** to contact **91**. This closes the circuit over conductors **86** to actuate the phonograph. It also connects the negative terminal of battery **92** to conductor **108**, and the positive terminal of the battery through the normally closed back contacts of relay **93** to conductor **109**. Now it will be observed that a connection **110** extends from conductor **109** to each motor **14** from whence multiple paths are traced directly through the rotor and through the armature and back contacts of relay **107** and the field winding of the motor, the connection extending thence over a single conductor **111** and through the normally open contacts in

multiple of the ball-actuated switches 74, 75 to conductor 108.

Accordingly, when any switch 74 or 75 is actuated, the associated motor 14 will be momentarily energized from battery 92 over the circuit above traced to advance the whippet a short distance along its track. As the play proceeds, one whippet will reach the finish line first, to close switch 20 thereat. This completes a circuit, to light the lamp 97 over the winner, and to actuate relay 93 traced from the negative terminal of battery 92, over conductors 108 and 112, contacts of the actuated switch 20, conductor 113, and winding of relay 93, returning thence to the positive battery terminal. Operation of relay 93 opens, at its back contacts, the energizing circuits for all of the motors 14, so that no further advances of the whippets are possible. It also closes, through its front contacts, the circuits traced over conductors 100, 101, for operating the counter 102, bell 103 and relay 87 which stops the phonograph.

In order to return all whippets to the starting point, switch 99 is operated to contact 104. This connects the negative battery terminal to a conductor 114 and the positive terminal to a conductor 115. It will be noted that a circuit is traced from conductor 114 through the winding of each relay 107 and contacts of the normally closed associated switch 24 to conductor 115. Each relaly 107 thereupon operates to reverse the connection of the field winding 106 across the rotor, by openng the back contacts and closing the front contacts to which the field winding is connected. At the same time, an outer armature 116 of relay 107 closes and connects the negative battery terminal over conductor 114 and through said armature 116 to one side of the motor, the opposite side of which is connected through switch contact 24 and over conductor 115 to the positive battery terminal. All motors 14 are accordingly energized in the reverse direction from that previously stated, to return the whippets to their starting point. As each whippet returns to the starting point, it opens its switch 24 to deenergize its motor.

Fig. 7 shows a modified construction of the hoop members 68, 69 (Fig. 2), Fig. 7 being a sectional view such as would be obtained at 7—7 of Fig. 2, with the structure of this figure replacing elements 68, 69 therein. The Fig. 7 construction comprises a single rectangular element 120 mounted on the side 67 of the housing 50 as shown, element 120 having about the dimensions of elements 68, 69, Fig. 2, combined. About midway along the longitudinal sides 121 of element 120, a double-flap member 122 is pivotally mounted on a shaft 123, the opposite ends of which are secured to the sides 121 respectively. Member 122 comprises a single, initially rectangular section of sheet metal or the like, which is so crimped about shaft 123, as shown at 124, as to rockingly engage the shaft but without being disengageable therefrom. The opposite ends of the flap member 122 are downwardly inclined as shown, but leave sufficient space between the flap member and the hoop member 120, as at 125, to permit the flap member to rock or swing freely on its shaft 123. The dimensions between shaft 123 and the ends 126, 127 of the hoop member are such as to permit the ball 56 to fall through the hoop member on either side of the shaft, thus providing a double-hoop arrangement similar to 68, 69, Fig. 2. Depending on which side of shaft 123 the ball happens to pass in falling through the hoop, its contact with the flap member 122 will swing the same initially in one direction or the opposite direction.

Mounted on the under side of the flap member 122 is a mercury switch 128, from the terminals 129 of which flexible leads 130 extend to the hoop member 120 and thence over suitable conductors to the motor control circuits of Figs. 5 and 6, wherein the contacts of switch 128 are designated as 74. The contacts of the mercury switch will be closed momentarily to actuate the whippet-advancing motor irrespective of which side of shaft 123 the ball passes through, on the forward swing if the ball falls through one side and on the back swing if it falls through the other, the closure being effected for a longer interval in the former instance than in the latter, thereby to provide a differential in increment of motor advance.

If desired, switch 128 may be made of arcuate shape with the mercury normally resting at the bottom of the arc and with contacts at each end corresponding to switches 74, 75, Figs. 5 and 6. In this case, one of the switches will be closed on the forward swing of the flap irrespective of the side of shaft 123 on which the ball passes, and the flap may be so damped as to prevent oscillations.

Referring to Fig. 1, the energizing conductors for switches 20, 24 and for motors 11, 14 may be terminated in jacks provided in the sides 27, 28 of the housing, whereby each racing unit is entirely self-contained, the necessary connections between a plurality of units when assembled and connected as shown in Figs. 5 and 6, being effected by means of jumper wires terminating in plugs adapted to engage the jacks aforesaid.

What is claimed is:

1. In an amusement device of the character described: a plurality of tracks extending between start and finish lines, an object movable along each track, a normally inactive electric motor-drive connected to each said object for advancing the object in the direction of the finish line when the electric motor thereof is energized, a plurality of switches connected to each electric motor for energizing said electric motor, said switches being intermittently actuatable and set to energize the electric motor for different predetermined periods of time, a second normally inactive electric motor-drive connected to each said object for returning the object to the starting line when the electric motor thereof is energized, a switch connected to said last mentioned electric motor for energizing the same and causing the object to return to the starting line, and a third switch located at the finish of each track and operable by the object on each track for deenergizing all first mentioned energized electric motors and for preventing energization of all first mentioned inactive electric motors, whereby the second mentioned switch may be free to energize the second mentioned electric motors to return the objects to the starting line.

2. In an amusement device of the character described: a plurality of tracks extending between start and finish lines, an object movable along each track in either direction thereon, an electric motor-drive connected to each object for intermittently advancing said object in the direction of the finish line, the electric motor of said drive being normally inactive, a plurality of switches connected to said motor for energizing said motor and advancing the object, said switches being intermittently actuable and be-

ing set to energize the motor for different predetermined periods of time, said switches being selectively operable and adapted for connection to a game of skill whereby the player of the game of skill may, by reason of his skill in playing the game, selectively actuate one of said switches, a second switch located at the finish line of each track and operable by the object on each track when said object reaches the finish line, each said second switch being connected to the electric motors of all of said objects to deenergize those electric motors which are energized and to prevent energization of those motors which are inactive, a second electric motor-drive connected to each said object for returning the object to the starting line, the electric motor of said second mentioned electric motor-drive being also normally inactive, and a switch connected thereto for energizing said last mentioned electric motor and returning the object to the starting line.

3. In a device of the character described: a plurality of tracks extending between start and finish lines, an object movable along each said track, normally inactive electric motor-drive means individual to said tracks for advancing said objects respectively, a manually operable ball-tossing device and associated ball for each track, each said device including a passage arranged in the path of a possible trajectory of said ball, a switch operable by said ball while in said passage for energizing the electric motor-drive of the associated track to advance the object thereon, whereby all said objects may be independently advanced by their associated ball-tossing devices, means including a switch at the finish of each track, operable by advance of the object thereon to said finish, each said switch being connected to all of said electric motor-drives for concurrently deenergizing all of said motor-drives which are energized and for preventing energization of all of said motor-drives which are inactive, thereby to prevent further advances by any of said objects, a second normally inactive electric motor-drive individual to said tracks for returning the objects to the starting line, a switch connected to all of said second mentioned electric motor-drives for energizing said drives and returning all of the objects to the starting line, and a switch located at the start of each track and operable by the return of the object thereon, said last mentioned switch being connected to said last mentioned electric motor-drive for deenergizing said electric motor-drive when the object is returned to the starting line.

4. In an amusement device of the character described: a track extending between start and finish points, an object movable along said track by means including sprockets at said start and finish points respectively and a chain extending therebetween, said chain being connected to said object, a pair of electric motors coupled to said sprockets respectively through oppositely arranged pawl and ratchet means, one of said motors being operable in clockwise direction and the other of said motors being operable in counterclockwise direction, both motors being normally inactive, one of said motors, when energized, being operative to advance the object in the direction of the finish point, an intermittently operable switch connected to said object advancing motor for energizing the same and thereby intermittently advancing the object toward the finish point, a switch situated at the finish point and actuated by the object when it reaches the finish point, said switch being connected to said object advancing motor to deenergize the same and prevent further forward movement of the object, the other motor constituting the return motor and being adapted, when energized, to return the object to the starting point, another switch connected to said return motor for energizing said motor when the advancing motor is deenergized for returning the object to the starting point and still another switch situated at the starting point and actuated by the object when the object reaches the starting point, said last mentioned switch being connected to the return motor for deenergizing the same when the object is back at the starting point.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
698,340	Vander Cook	Apr. 22, 1902
1,454,968	Higuchi	May 15, 1923
1,510,995	Lockyer	Oct. 7, 1924
1,697,701	Wallace	Jan. 1, 1929
1,816,471	Diederichs	July 28, 1931
2,076,054	Williams	Apr. 6, 1937
2,230,563	Gorms	Feb. 4, 1941
2,247,418	Smith	July 1, 1941
2,280,000	Millar et al.	Apr. 14, 1942