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RACING GAME

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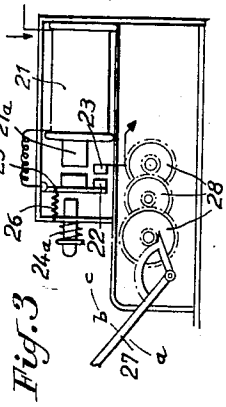

Fig. 3

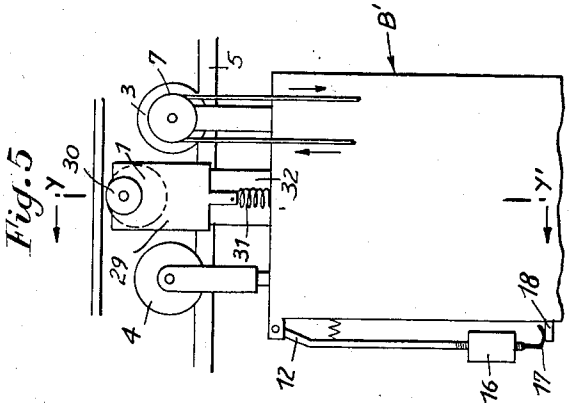

Fig. 5

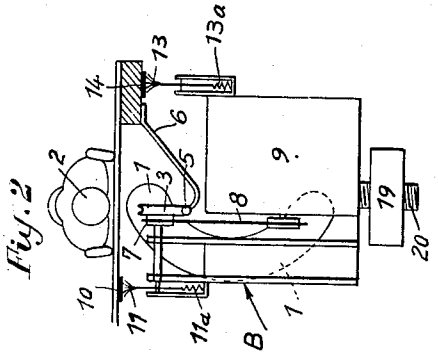

Fig. 2

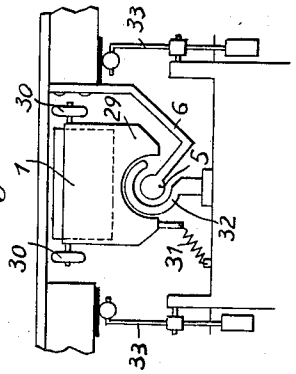

Fig. 6

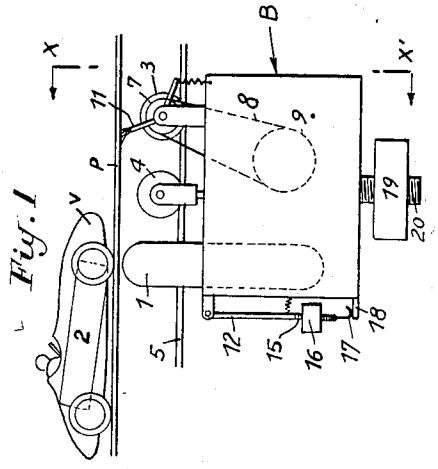

Fig. 1

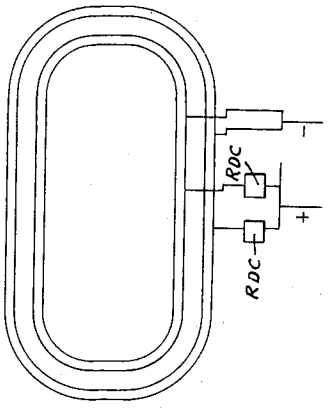

Fig. 4

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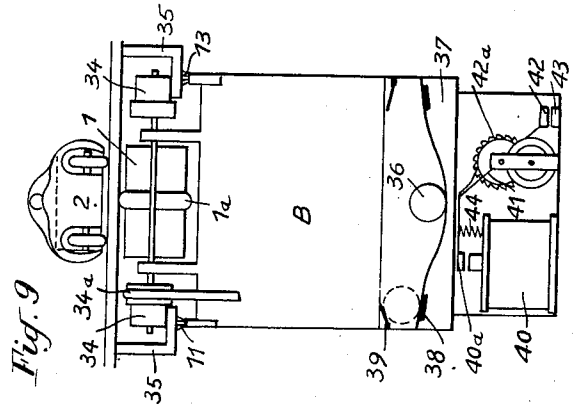

Fig. 9

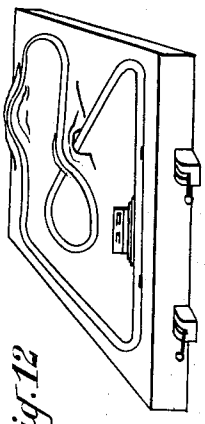

Fig. 12

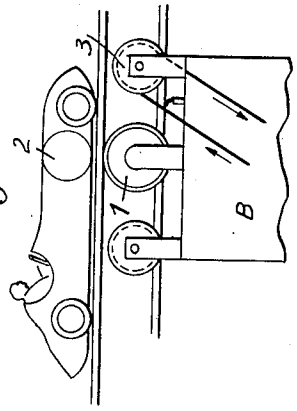

Fig. 8

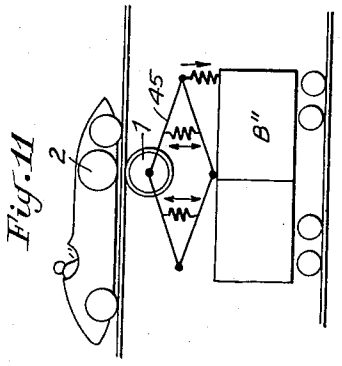

Fig. 11

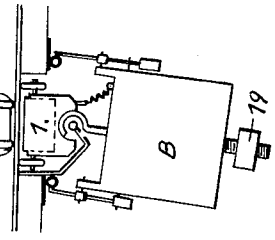

Fig. 7a

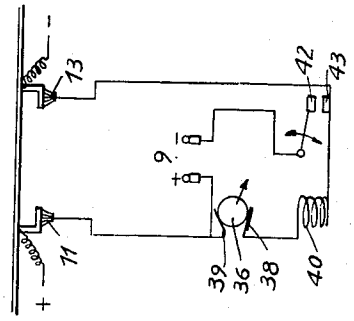

Fig. 10

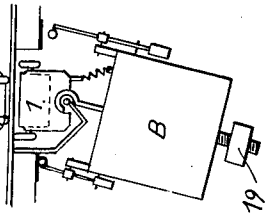

Fig. 7

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Fig. 14

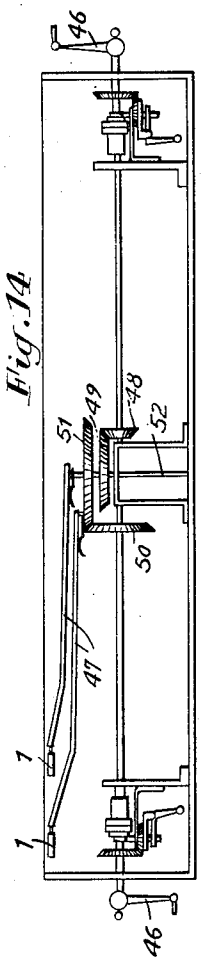


Fig. 15

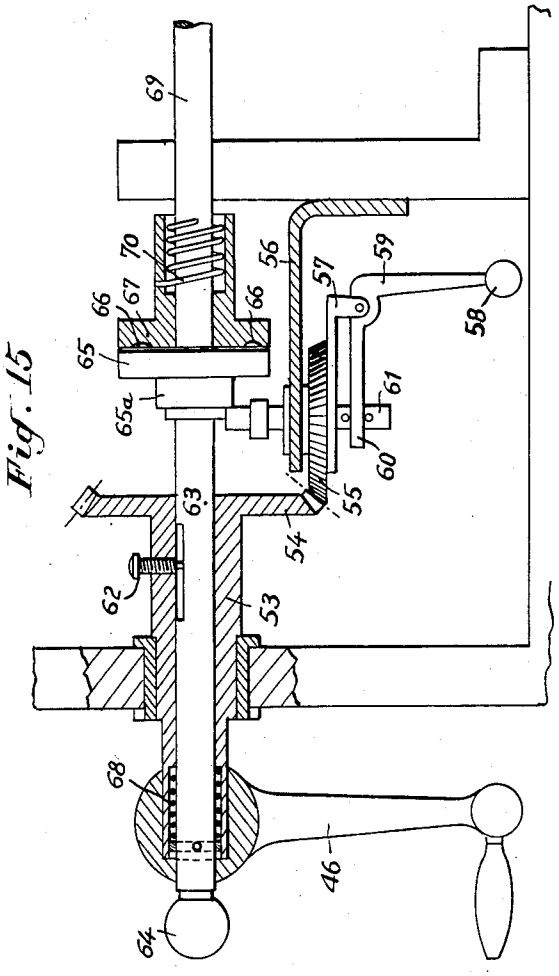


Fig. 13

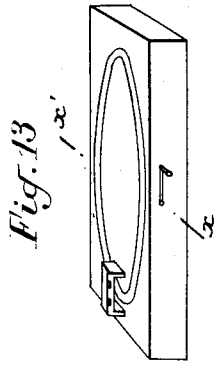
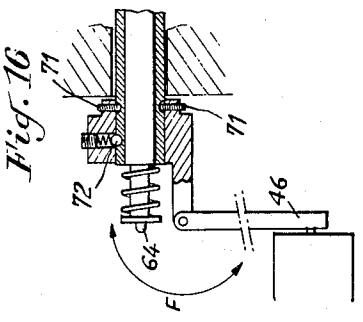


Fig. 16



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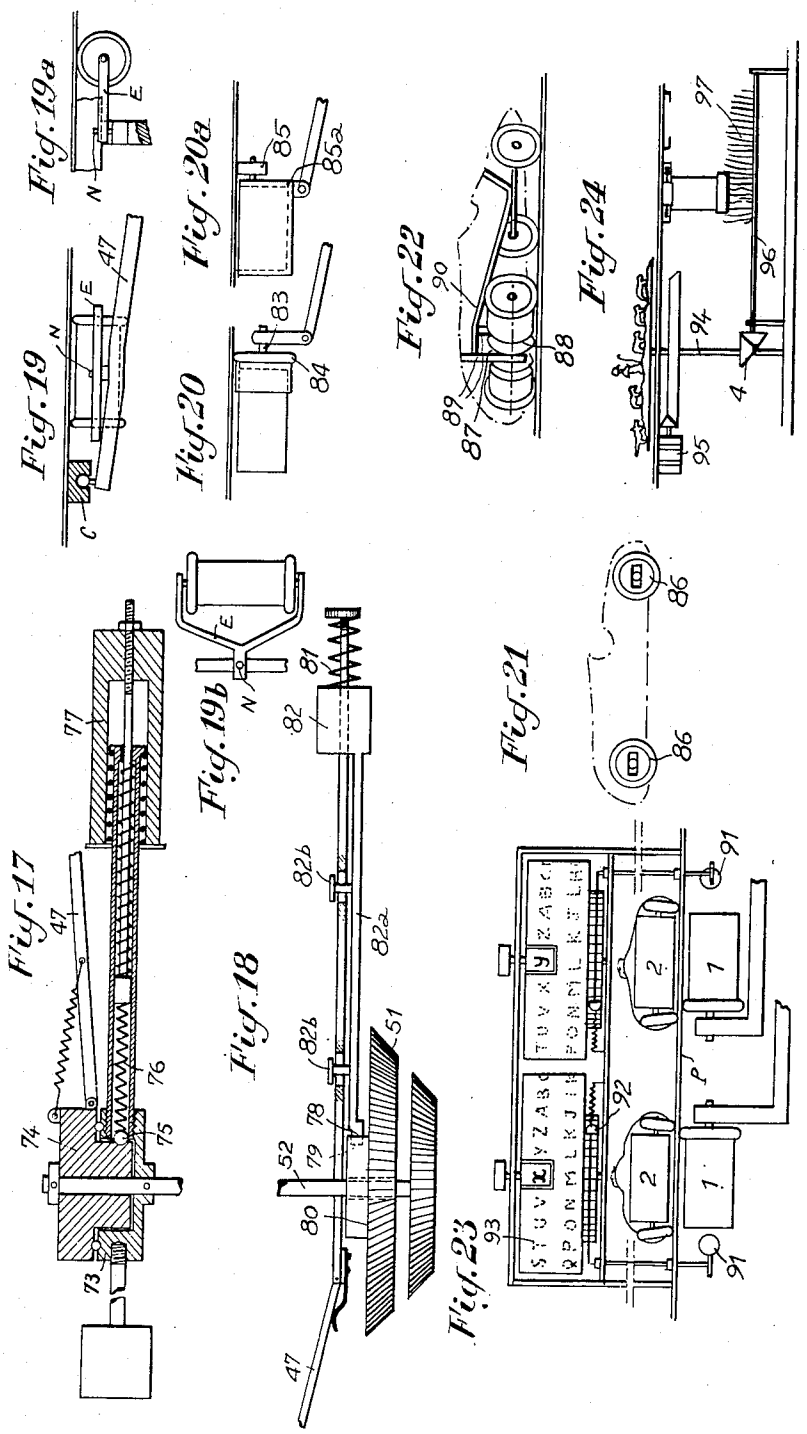
RACING GAME

Filed March 6, 1959 4 Sheets-Sheet 4



United States Patent Office

3,120,389

Patented Feb. 4, 1964

3,120,389

RACING GAME

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Filed Mar. 6, 1959, Ser. No. 797,777
Claims priority, application Morocco Mar. 8, 1958
8 Claims. (Cl. 273—86)

The present invention relates to racing games. Racing games are known in which various moving bodies are made to compete, their displacement being carried out following pre-determined trajectories on a track which is free of any visible system of driving or guiding.

This result is generally obtained by means of permanent magnets or electro-magnets which move underneath the track and retain said moving bodies under their close control due to the magnetic attraction of other driven permanent magnets which are suitably arranged and concealed in these moving bodies.

Means are also known whereby each player is permitted in the course of the game to vary the speed of one of the moving bodies which is specially placed under his control.

This variation of the speed is made possible, in the case in which the game is driven by electrical means, by rheostats which are placed at the disposal of each player and which control the intensity of the current and in consequence, the speed of displacement of the magnet-carrying members which drive the moving bodies by magnetic attraction. In the case in which these carrying members are moved by purely mechanical means, the player himself provides the motive power needed for their displacement by turning a crank-handle control and makes the effort exerted on the crank-handle in proportion to the speed which he requires to impart to the moving body under his control.

The feature which thus enables the player to regulate the speed of a vehicle placed under his control does not constitute an element which is sufficient to endow the game with a truly competitive character. The fact of the matter is that:

Either the moving bodies are so closely applied to the track on which they move that under racing conditions, they remain normally and conventionally placed on the track irrespective of the speed which they are given or of the accelerations transmitted: in such a case the race is reduced to an arbitrary contest which is devoid of all interest, since it relies solely on the rapidity with which the player operates the driving crank-handle or on the resistance of the mechanical or electrical driving devices, or the precision with which they are adjusted.

Or else under certain conditions of speed or acceleration, the moving bodies are liable to go off the track or lose contact with their driving device. In this case, the first incident of this nature upsets the normal progress of the race, since the finishing order of the vehicles becomes open to doubt and the intervention of the players to put their vehicles back in the race lends a disorderly character to the contest.

It is an object of the invention to provide means for controlling the bodies which is an accurate measure of the skill of the operator.

More particularly it is an object of the present invention to produce a racing game using automobiles or any other moving bodies such as boats, aircraft, animals, various figures, etc., of the type comprising the two known features described above—that is to say, magnetic drive of the moving bodies and a device enabling the players to control their speed—in which an automatic penalizing device causing a brief stop or slowing down of the moving body is imposed as a penalty for certain exactly defined

faults, such as a too abrupt start, too sharp acceleration or slowing down, excessive speed on a curve or at any given point along the course.

The automatic penalizing of said faults is carried out in accordance with the present invention by means of devices which come into operation for pre-determined values of speed or acceleration and are essentially characterised in that on the one hand, the inertia forces set up by starting and accelerating the moving bodies or the magnet-carrying members which drive them, in the center of masses which are flexibly coupled to these latter and, on the other hand, the centrifugal forces set up by the influence of the curves or the rotation of the moving parts in the center of said carrying members or in the center of said parts, are together employed to cause, above a given limit value and by displacement of the masses which are acted upon by the said forces, either the disconnection of a mechanical coupling or the opening of an electrical contact transmitting motive power to the said carrying members of the magnets driving the moving bodies.

It is a further object of the invention to extend the stopping time caused by the automatic penalizing devices, so as to increase the penalty imposed on the offending player. These slowing-down or delaying devices are characterised in that certain operations which require an appreciable length of time to be carried out, are compulsorily imposed on the offending player, so that he has to re-establish the mechanical or electrical contact which was interrupted by the intervention of the penalizing device, in order thus again to set into motion the moving body under his control.

A further object of the invention relates to a lap-counting device which is capable of informing the players or the spectators at any given moment of the number of laps completed by each moving body in the race, and consequently their individual classification at any particular moment.

By means of the combination of these various devices, namely a penalizing device, a slowing-down device and a lap-counter, the whole aspect of this type of game to which they may be applied is thus completely transformed.

The racing game in accordance with the present invention has in fact the character of a genuine contest in which the players are on the one hand obliged to conform to the same restrictions as those imposed in a full-scale speed contest by the mechanical performances of the engines and, on the other hand, the players have to show certain qualities involving the exercise of skill, rapidity of reflex action, and prudence, and these alone single out the winner. Finally the progress of the race is regulated by the limitations of speed and acceleration which are imposed and is controlled by the lap-counting device, thus avoiding any difference of opinion as to the order in which the moving bodies are placed.

The present invention combines various embodiments of the different devices which have just been described, these embodiments being more particularly adapted either to a type of game which operates by the use of electric motors, the power of which is regulated by each player by means of a rheostat, or to a type of game which is normally made to work by the action of manually operated crank-handles, but which may also comprise the use of electric motors.

The design and arrangement of the various devices forming the object of the invention are thus a function of the particular features which properly belong to both types of game.

In accordance with the invention there is contemplated a racing game for bodies which are individually movable along respective trajectories on a track which is free of

any visible driving and guiding systems. The game comprises means for displacing the movable bodies at variable speeds and accelerations and means operatively associated with the means for displacing the movable bodies and responsive to the acceleration and speed thereof for dissociating the same from said movable bodies with the latter exceeding a predetermined acceleration and independently of the speed of the bodies. The latter said means automatically restores the association between the movable bodies and the means for displacing the same when the acceleration of the bodies is reduced to a magnitude which is less than the predetermined acceleration.

Other secondary features of the present invention will appear in addition to the various devices forming the object of the invention which will be described below, reference being made to the accompanying drawings in which:

FIG. 1 shows a diagrammatic view in elevation of a first embodiment of the invention.

FIG. 2 is a view taken along the line X—X' of FIG. 1.

FIG. 3 is a diagrammatic view of a re-engagement delay device in accordance with the invention.

FIG. 4 is a circuit diagram in diagrammatic form of a game having two vehicles, provided with corresponding control stations.

FIG. 5 is a diagrammatic view in elevation of an alternative form of construction of the device in accordance with FIG. 1.

FIG. 6 is a cross-section taken along the line Y—Y' of FIG. 5.

FIGS. 7 and 7*a* represent end elevational views of the embodiment of FIG. 6, showing two positions of the device respectively shown at a bend taken at an excessive speed and on a bend taken at a permissible speed.

FIGS. 8 and 9 respectively show side and front elevational views of an alternative form of construction of the device in accordance with FIG. 1.

FIG. 10 is a diagrammatic illustration of the electrical distribution circuit of the penalizing device in accordance with FIG. 9.

FIG. 11 is a diagrammatic view in elevation of a form of construction of the driving and supporting member.

FIG. 12 represents a general respective view of an electrical form of game with two cars in accordance with the invention.

FIG. 13 represents a general perspective view of a mechanical form of game with two cars and a circular track.

FIG. 14 is a cross-section view of the mechanism of a game taken along the line X—X' of FIG. 13.

FIG. 15 shows a detail of the mechanism of FIG. 14 showing the mechanical penalizing and re-engagement delay devices.

FIG. 16 illustrates an alternative form of the re-engagement delay device.

FIGS. 17 and 18 illustrate two alternative forms of the penalizing device in a racing game in accordance with FIG. 13.

FIGS. 19, 19*a* and 19*b* respectively show in front view, profile view and plan view, a form of construction of the device carrying the driving magnets in a game in accordance with FIG. 13.

FIGS. 20 and 20*a* represent two forms of construction of the assembly of the magnet which drives the moving body.

FIG. 21 represents a form of construction of the assembly of the driven magnet arranged within the moving body.

FIG. 22 represents another form of construction of the assembly of the driven magnet arranged in the interior of the moving body.

FIG. 23 represents a diagrammatic view of a lap-counting device in accordance with the invention.

FIG. 24 represents a diagrammatic view of an accessory device designed to provide scenic interest of one of the games in accordance with the invention.

Reference being made to FIGS. 1 and 2, the guiding and driving magnet 1 which roughly has the shape of an arc of a circle, is so arranged on a carrying member that it continuously skims over, and as closely as possible to, the lower surface of the track P which is of very small thickness, and continuously retains in its control a car V oppositely arranged on the upper surface of the track. This car, which is of non-magnetic material, for example plastic material, in turn carries a magnet 2—or a mass of soft iron—preferably cylindrical and either arranged in the axis of direction of movement of the car, as in the form of construction shown in FIGS. 1 and 2, or at right angles to this axis as shown in the other figures.

The driving member which carries the driving magnet is constituted by a bucket B which is suspended from pulleys 3 and 4 from a rail 5 which is secured by brackets 6 to the lower surface of the track.

The pulley 3 is rigidly fixed to a driving pulley 7 coupled by a driving-belt 8 to an electric motor 9. The electric current supplying the motor is conveyed to this latter by means of a copper strip 10—inserted in the lower surface of the track—through a collector-brush 11 provided with a spring 11*a* and after having passed through a change-over switch device 12. As it passes out of the motor 9, the return of current is ensured by another collector-brush 13, also provided with a spring 13*a* and making contact with another copper strip 14, also inserted in the lower surface of the track.

The change-over switch 12 is constituted by a platinum-plated contact 17 rigidly fixed to a pendulum provided at its extremity with a threaded portion 15, onto which is screwed a weight-head 16, and by a platinum-plated contact 18 rigidly fixed to the bucket, the two contacts being in contact when the pendulum is in a position of equilibrium.

When stopped, or in normal operating position, the brushes 11 and 13 are respectively in contact with the current supply strips 10 and the current return strips 14 and on the other hand, the change-over switch 12 is in its contact position.

In the event that the bucket B—and in consequence car V—is started suddenly or accelerated too rapidly, the inertia of the weight-head 16 causes the separation of the two platinum-plated contacts 17 and 18 through which the current has to pass in order to energize the motor 9. The effect of this separation is to stop the said motor and, as a result, the bucket B together with the car which it drives both slow down and come to a stop.

In the case of either a left hand or right hand curve taken by the bucket at too great a speed, as shown in FIG. 7, one of the brushes 11 or 13, which is retained by a stop (not shown on the drawings) loses contact with the strip which it engages, on the exterior of the curve, as a result of the tilting of the bucket which is pivotally mounted on the rail 5 and which is acted on by centrifugal force. The flow of current is then cut off, the motor 9 stops as well as the bucket B and the car V, the mass of which should be calculated in such manner that even if the bucket comes to a relatively sudden stop, the magnetic coupling established between the car and the magnet 1 cannot be broken, on account of the forces of inertia which have been set up.

A massive metallic washer 19, moving on a threaded shaft 20 provided on the lower portion of the bucket B is capable of modifying the position of the center of gravity of the bucket, depending on whether the said washer is more or less screwed along the shaft. An adjustment made on these washers before the beginning of the race thus enables the maximum speed to be determined at which the curves may be approached without incurring the risk of a penalty in the course of the race. Similarly the weight-head 16 may be adjusted in like manner at the extremity of its pendulum by screwing it

on the threaded portion 15 to a more or less substantial extent, in such manner that a greater or lesser degree of sensitivity may be conferred upon the device for penalizing straight line accelerations or reductions of speed.

In a device in accordance with FIGS. 1 and 2, the current is automatically restored as soon as the causes which produce its interruption have been removed. In consequence, it is possible that the penalty inflicted on an unskillful palyer may not be sufficiently heavy.

In order that the penalizing system may be made more effective, a delayed make-and-break system has been provided, coupled to each of the rheostats which serve as a control station for each player.

This delayed make-and-break device which is shown in FIG. 3 together with the rheostat to which it is coupled, has the following characteristics:

A coil 21 delivers current to the rheostat as soon as the platinum-plated contacts 22 and 23 come into contact, by the thrust of a button 24 on a pivoting plate 25 provided with a spring 26 and carrying at its extremity the platinum-plated contact 22.

The button 24 being also provided with a return-spring 24*a* reverts to its initial position as soon as it is no longer actuated. In spite of the return of the button 24, the passage of current, when once established, is nevertheless maintained automatically by means of the attraction then exerted on the plate 25 by a soft iron core 21*a* placed in the center of the coil 21.

If, as a result of a mistake made by a player, a break occurs in the current supply at the level of the brushes 11 or 13 or of the platinum-plated contacts 17 and 18, the passage of current will not be restored merely by the automatically-effected contact of the contacts 17 and 18 or by the renewal of contact between the brushes and the current supply or return strips.

In fact, since the coil 21 is no longer energized by reason of the interruption in question, the plate 25 is no longer attracted by the soft iron core 21*a* and the platinum-plated contact 22, which is recalled by the spring 26, loses contact with the platinum-plated contact 23, thus producing a second break in the circuit in addition to that which directly resulted from the player's error of operation. In order to re-establish the circuit, it is again necessary to apply pressure on the button 24. This pressure may be obtained by means of the operating lever 27 of the rheostat itself, this lever being mounted in such manner that, over a portion of its travel (from *a* to *b*), it moderates the intensity of the current and that, at the end of its travel (at *c*), it hits the button 24 and its thrust action causes the contact of the contacts 22 and 23 to be restored. In order to overcome any possibility of cheating, the device may be built in such manner that the lever 27 is alone capable of actuating the push-button 24 and that this latter cannot be directly actuated by hand.

This current-restoring operation, which is necessary to start the penalized vehicle again, may additionally be slowed down by a set of toothed wheels 28 or by any other braking device rigidly fixed to the lever 27 so as to make the penalizing device more sensitive by increasing the time of operation which is necessary to restore the current.

The operation of the rheostat, in this method of construction as in other methods to be analysed later, may itself cause the infliction of a penalty upon a careless operator by bringing his car to a standstill. It suffices for this purpose that, by passing beyond the extreme point corresponding to the maximum power of the motor, the current is cut off. In this way the player who attempts to run his car at the highest possible speed permitted by the rheostat will invariably run the risk of overshooting this extreme limit and of being consequently penalized by stoppage of the car under his control.

FIG. 4 is a diagram of the distribution of current to the circuits in a game having two cars with corresponding control stations. Each of the two copper strips 11 and 13 is connected to the public electricity supply with or without previous transformation of the current. The RDC systems of make-and-break time-delay rheostats which have been described above may additionally be interposed between this supply connection and the circuits.

FIGS. 5, 6 and 7 represent a particular form of construction of the device in accordance with FIG. 1, in which the driving magnet 1 does not have the shape of the arc of a circle as in FIG. 1, but has a cylindrical shape and is placed perpendicular to the direction of movement of the bucket, said bucket being laterally oscillatable beneath said rail independently from said carriage, one of said brushes losing contact with said corresponding strip with said oscillatory movement at a determinable amplitude, while the magnet installed on the car to be driven is then arranged in the same fashion.

In accordance with this form of construction, the driving magnet should nevertheless be able to remain in its horizontal position at all times during the race, even though the carrying bucket carries out a swinging movement at the curves in the path.

For this purpose, the support 29 of the magnet 1 arranged between the pulleys 3 and 4 is provided with two rollers 30 and, when the car is moving in a straight line, these rollers remain separated from the lower surface of the track by a space of 1 to 2 millimeters and this support 29 is kept in a perfactly horizontal position by means of a spring 31.

At each turning, one of the rollers 30 makes contact with the lower surface of the track and prevents the support 29 and the magnet 1 from following the swinging movement of the bucket.

In order that this swinging movement should not be hindered by the abutment constituted by the rollers 30, the support 29 is pivotally mounted on the bucket by the intermediary of a member 32 which is rigidly fixed to this latter and has the profile of a hockey stick which enables it to pass over the rail 5 and its supporting member 6 and also permits the swinging movement of the said support 29 in relation to hockey stick member 32.

In FIGS. 6, 7 and 7*a*, the brushes 11 and 13 have been replaced by an alternative system of contactor-rollers 33 which carry out the same function.

FIGS. 7 and 7*a* illustrate the manner in which it is possible in the course of turning for the buckets to sway when without causing the driving magnets 1 to deviate substantially from their horizontal position and also how, in the case of a curve which is taken too fast (FIG. 7*a*) the interruption of the current supplying the motor 9 is caused by loss of contact between one of the rollers 33 and the corresponding current supply or return strip.

FIGS. 8 and 9 show a form of construction of the driving and penalizing devices in accordance with the invention, and characterised in that the driving bucket does not make any swaying movement during the turnings.

In accordance with this form of construction, the bucket is susepnded by a system of rollers on angle-iron members arranged underneath the track and constituting a roller-track.

The rolling system of each bucket comprises a front axle, at the extremity of which are mounted two rollers 34, for example of plastic material, and resting on the angle-iron rolling track 35.

One of these front rollers is provided with a grooved pulley 34*a* coupled by a driving-belt to the electric motor 9 of the bucket.

A rear axle, at the extremity of which two rollers are axially mounted, rotates freely.

The entire roller system is mounted in such manner that the bucket is able to negotiate ascents, downhill gradients and turns without any swinging effect from front to rear, from right to left or from left to right.

The rear axle may additionally comprise a system of pivots in a horizontal plane enabling the bucket to be disengaged and withdrawn from its roller-track, for the purpose of assembly, maintenance or repair.

The driving magnet 1 may be simply fixed on the upper portion of the bucket in the position shown in the drawings, or it may be mounted on a shaft which enables it to rotate. In this case, the magnet 1 is hooped by a rubber ring 1*a* which makes contact with the inner surface of the track and thus causes the said magnet to rotate.

On the upper portion of the bucket are fixed two brushes 11 and 13 which make contact with the angle-iron members 35 during the entire progress of the race, and irrespective of the impulses received by the bucket; these angle-iron members are made of a metal having good conductive properties and serve for the arrival and return of the current supplying the motor 9.

Following another form of construction, the rollers themselves may be used as current supply and return terminals.

In the lower portion of the bucket is arranged a make-and-break system which is capable of penalizing the errors of operation committed by the player, by stopping the bucket and the corresponding car for an appreciable length of time.

This make-and-break contact, of which FIG. 9 illustrates by way of example and not by way of limitation, a form of construction, and of which FIG. 10 represents the electrical distribution diagram, is constituted as follows:

A metallic ball 36 rolls freely in a circular cup 37 of any insulating material. This ball, which is located at the bottom of the cup when the bucket is stationary or moving forward normally, moves towards the periphery of this cup under the influence of centrifugal force or the force of inertia set up by too sudden starting or stopping or excessive speed on a curve.

A copper ring 38 is housed in the rim of the cup 37 and a ring 39 of copper foil is arranged as shown in FIGS. 9 and 10, above the ring 38, at a distance from this latter which is approximately equal to the diameter of the ball 36.

The ring 39 is connected to the rod supplying the current to the motor 9, while the ring 38 is in contact with the rod which ensures the return of the current supply from the motor (FIG. 10).

An electro-magnet 40 is adapted to attract a small mass 40*a* of soft iron, which is placed at one extremity of an oscillating plate 41. At the other extremity of this plate is secured a platinum-plated contact 42 which loses contact with an oppositely-placed contact 43 when the electro-magnet 40, which is energized, attracts the mass 40*a*. Under the action of a small return spring 44, this contact 42 again makes contact with the said contact 43 as soon as the electro-magnet ceases to be energised.

The electro-magnet 40 is connected on the one hand to the ring 38 and on the other hand to the contact 43 which is in turn connected to the collector-brush 13 which is used as the current return.

The make-and-break contact operates as follows:

When the ball 36 reaches one edge of the cup 37, it establishes contact between the rings 38 and 39, the current passes through the electro-magnet 40, the contacts 42 and 43 are separated and the driving motor 9 is no longer supplied with current.

After sliding fairly slowly round the rim of the cup, the ball 36 no longer ensures contact between the rings 38 and 39, the current which energises the electro-magnet 40 is cut-off, the contacts 42 and 43 are joined together and the current supply to the motor 9 is restored.

Various alternative forms may evidently be adopted for this system without thereby departing from the principle of the invention and its essential characteristics.

Thus, in the method of assembly shown in FIG. 9, the return of the contact 42 to its position of contact with the contact 43 is delayed by the intervention of a multiplying gear provided with a ratchet 42*a* or, still more simply, not by using a gear wheel but merely by using a spring ratchet device.

Following a form of construction of the present invention which is more particularly adapted to games in which a substantial overall size is permissible, the bucket carrying the driving and guiding magnet may be replaced, as shown in FIG. 11, by a vehicle B'' which travels on rails, and the track for the support and movement of the cars forms a ceiling above the vehicle carrying the driving magnet.

In order to ensure that the driving magnet skims constantly over the lower surface of the track, the said driving magnet may be adapted to a trolley device 45 with springs.

The racing game in accordance with the invention may be driven in the manner described above, by purely mechanical means which are themselves actuated by the effort applied by the players to the crank-handles.

FIG. 13 represents the general aspect of a form of construction of this type of game. This relates to a game for two players with a circular track comprising a lap-counting gantry, the characteristics of which will be described below.

As shown in FIG. 14, the crank handles 46 which are each used by one player, are placed opposite to each other, their movement of rotation being communicated to the arm 47 supporting the driving magnets 1 by means of a central gear system which, as an example only and without any limitation being implied, is constituted by a set of conical pinions 48, 49, 50 and 51, the pinion 49 being rigidly fixed to the shaft 52 and the pinion 51 being mounted to rotate freely about this same shaft 52.

The systems of automatic disengagement which constitute the penalizing devices in accordance with the invention are placed between the crank-handles and the central gearing of the game, as shown in FIGS. 14 and 15.

The crank-handle 46 is rigidly fixed to a cylindrical member 53 which terminates at its other extremity in an angle pinion 54 which in turn engages another pinion 55 supported by a bracket 56.

The pinion 55 is provided on its lower face with an arm 57, at the extremity of which may oscillate a weight-head 58 mounted on a right-angle member 59 which is arranged in such manner that, under the influence of the centrifugal force set up by the rotation of the pinion 55 and the arm 57, the extremity of the right-angle member 59 causes the downward movement of a shaft 61 which slides freely in the web of the pinion 55.

In the interior of the cylindrical member 53 and also in the hub of the crank-handle 46, a shaft 63 slides, but is prevented from rotating by virtue of the co-operation of a pin 62 with a groove 62*a*. The said shaft 63 is provided at one extremity with a push-button 64 and at the other extremity with a shouldered member 65*a* and with a clutch disc 65 provided with nipples 66 enabling this disc 65, when the shaft 63 is thrust forward, to engage a counter-disc 67 having recessed portions corresponding to the nipples 66. A spring 68 urges this shaft 63 towards the exterior of the game.

When pressure is applied to the button 64, the upper extremity of the shaft 61 which normally rests when stationary, on the shouldered member 65*a*, moves into the position shown in FIG. 15, that is to say in front of this shouldered member 65*a*, and for this reason, the shaft 63 is unable to move towards the exterior of the game under the influence of the spring 68, and the disc 65 and the counter disc 67 are thus in their engaged position.

When the crank-handle 46 is too strongly actuated, the movement of the weight-head 58 which is induced by centrifugal force, causes the downward withdrawal of the shaft 61, and the shaft 63 which is no longer retained by the head of this shaft 61, moves back under the action of the return spring 68 and the clutch disc 65 also moves back; the disc 65 and the counter-disc 67 are then disengaged.

The player who is thus penalized by the stoppage of

the device must, in order to re-engage, press again on the push-button 64: the re-engagement operation thus takes place as described above.

The counter-disc 67 is so mounted that its separation from the disc 65 is completely effected when the shaft 63 is in a position of withdrawal towards the exterior of the game and in such manner that it is sufficiently coupled with the disc 65 when the shaft 63 is retained in the position of engagement by the head of the shaft 61.

A flexible coupling is obtained between this counter-disc 67 and the shaft 69 which, in the position of engagement, transmits the movement to the central gear. This flexible coupling is ensured by means of a spiral spring 70, one extremity of which engages the shaft 69 itself.

In the case in which the player jerks the crankhandle by actuating it too strenuously, the nipples 66 come out of their recesses, and the spiral spring 70 is compressed. A complete turn has then to be given to the crank-handle before the engagement of the discs 65 and 67 again takes place.

In order to inflict a more severe penalty on the player who exceeds the speed permitted by the disengagement device as described above, the thrust action on the button 64 may be made more arduous and take more time to achieve, by means of a device shown in FIG. 16.

Following this method of construction, the pointed shape of the push-button 64 does not allow it to be directly actuated with a finger. In order to actuate this latter, it is necessary to swivel the arm of the crank-handle which is suitably jointed for this purpose, in the direction of the arrow F, and in such manner that this arm itself applies the necessary pressure to force it in.

FIG. 16 also shows a detail of construction which is designed to make the action of the crank-handle more effective. Instead of being screwed to the cylindrical member 53 as shown in FIG. 15, the hub of the crank-handle 46 is secured to this member 53 by means of tenons 71 which slide in a circular groove formed in this member 53. The presence of a steel ball 72 which is forcibly applied by an adjustable spring into a recessed portion formed in the member 53, prevents the crank-handle from coming away from this latter, so long as the action of the player is not too brutal. If it is, the ball is dislodged from its recess and the crank-handle turns freely for a complete revolution, at the end of which the ball falls back into position. In this case also, the player is therefore penalised.

The various mechanisms which have been described above tend to make the players very slowly progressive in their controlling action and, while endowing the game with a quality of discipline, they avoid the possibility of the car becoming detached from the attraction of its driving magnet while moving round the track.

FIGS. 17 and 18 illustrate two alternative forms of the automatic disengagement type of penalizing device, which are designed to be applied to games provided with crank-handles and which are arranged at the points of attachment of the arms carrying the driving magnets.

The device shown in FIG. 17 comprises on the one hand a circular plate 73 keyed on the shaft 52 and hollowed out at its centre in the shape of a cup and on the other hand, a second circular plate 74 provided with a shouldered portion freely engaged in the cup of the plate 73 and carrying at its periphery the point of attachment of one of the arms 47 shown in FIG. 14.

These two plates 73 and 74 are only rigidly fixed to each other when a ball 75 is engaged, by the thrust of a spring 76, in a recessed portion formed in the shoulder of the plate 74.

In the event of the assembly of the members rotating too rapidly, the thrust of this spring 76 on the ball 75 is annulled by the oppositely-acting tractive force applied on the other extremity of this spring 76 by a mass 77 which is thus acted upon by centrifugal force.

In FIG. 18 is shown an appreciably simplified device, in which the washer or circular plate carrying the arm 47 supporting the driving magnet is only rigidly coupled to the pinion 51, which is capable of communicating its movement of rotation to said plate, when a nipple 78 is engaged in a recess or notch 79 formed in a circular shoulder 80 on the end of the pinion 51.

The nipple 78 constitutes the head of a rod 82*a*, the upper extremity of which is provided with a mass 82. Lugs 82*b* formed along this rod and engaged in slots machined in the arm 47 or in its extension, rigidly fix the rod for rotation with this latter, while still enabling said rod to make a relative sliding movement with respect to the arm 47.

The nipple 78 is normally engaged in the notch 79 by the thrust of a spring 81. When the speed of rotation of the members is sufficiently great, the centrifugal force which acts upon the member 82 neutralizes the thrust of the spring 81 and the nipple 78 disengages by itself from the notch 79: the arm 47 and the rod 82*a* to which it is rigidly coupled are then disengaged from the driving pinion 51.

When the cause of disengagement has been removed, that is to say when the speed of rotation of the members is reduced, the nipple 78 returns to the notch 79 under the thrust, which is once again predominant, of the spring 81. The re-engagement only takes place, however, when the notch and the nipple have again returned to their oppositely-facing positions, and this causes a certain time-delay in the running of the corresponding car and constitutes a penalty for the offending player.

All the so-called "crank-handle" games, that is to say games driven by purely mechanical means, may be provided, as additions to the supporting arms for the driving magnets, with extension and withdrawal systems of various types, the sliding type for example, or the so-called Nuremberg tongs, etc., which enable these arms to be automatically extended and shortened in such manner as to make it possible to build tracks having a variety of twists and contours. In this case, the extremities of the arms supporting the magnets are guided by the rails or else by angle-irons of the type which has been given the reference C in FIG. 19, and in which is engaged a nipple formed at the extremity of the arm 47.

In a form of construction of this kind, the driving magnet should similarly be able to oscillate in a horizontal plane in such manner that, in the curves, its axis remains at right angles to the axis of the track. In FIGS. 19, 19*a* and 19*b* is also shown looking on the front, in profile and in plan, this form of fixation of the driving magnet, essentially constituted by a member in the form of a stirrup which receives the extremities of the shaft of the magnet and swivels about a pivot rigidly fixed to the extremity of the arm 47.

FIG. 20 represents a further form of construction of the assembly of the driving magnets in a crank-handle game. The magnet is capable of rotating about its axis 83, its rotation being caused by the contact of a small rubber ring 84 with the lower surface of the track. As shown in FIG. 20*a*, the magnet may also be fixed in a member 85*a* in the form of a cradle, with the addition of a small roller 85 which retains the magnet in a good position for skimming over the track.

Following another form of construction which is not shown in the drawings, the cradle-shaped member is constituted by a small bucket suspended by rollers from angle-irons placed beneath the track and forming a rolling-track.

In accordance with a feature of the present invention the driven magnets which are mounted on the cars may serve as a rolling system for said cars. In this case they are provided at their extremities with small rubber washers 86 and they rotate on shafts which are rigidly fixed to the frame of the car, as shown in FIG. 21.

In accordance with the form of construction shown in FIG. 22, the magnet is provided with a central groove 87

having thickened edges 88. Two small rods 89 which are coupled by a longitudinal member 90 to the rear-wheel system, pass over this groove and these thickened edge portions and thus adequately retain the magnet, while at the same time permitting a certain lateral movement of the magnet about these rods, this movement enabling the assembly of the car to remain "in line," that is to say correctly placed in the axis of the road, irrespective of the position of the magnet which serves as a rolling system, under the influence of the driving magnet.

The racing game in accordance with the present invention is provided with a lap-counting device which constitutes an element of essential interest, since it gives the contest its full meaning.

The lap-counting device which will be described below with reference to FIG. 23, relates to a game which is mechanically driven by crank-handles, but it is quite clear that an identical or similar device may be adapted to an electrical game and falls within the scope of the present invention.

The lap-counter shown in FIG. 23 is in the form of a gate or gantry which is placed above the track in the position shown in FIG. 13 and so arranged that each player faces the indicator windows showing the lap scores.

A magnetized weight-head 91 forming a horizontal pendulum is arranged exactly on the edge of the trajectory followed by a driving magnet. When the driving magnet passes, this driving magnet causes said weight-head to pivot, either by direct contact or by magnetic influence.

The movement of the pendulum constituted by the weight-head 91 and its rod is communicated by an escapement system 92 to a drum 93 on which are marked the figures which are intended to appear in the indicator window.

The drum comprises two series of figures placed one above the other: one series being grouped in one window located on one side of the drum while the other series is grouped in one window located on the other side of the drum. In this manner, when for example, the figure 22 appears in the indicator window which faces towards the player who is placed on one side of the game, another figure 22 similarly appears in the indicator window facing the player who is placed on the other side of the game.

It is of course understood that the game comprises the number of lap-counting devices corresponding to the number of cars on the track. Thus, whatever number of cars the game comprises, the spacing of the figures appearing in the indicator windows enables each player to be informed at all times, on his position in the race and that of each or all of his opponents.

FIG. 23 shows by way of example and not by way of implied limitation one of the extremely varied devices which are designed to add interest to any one of the forms of construction of the game forming the object of the invention. This particular form of construction is more especially adapted to the game which operates electrically.

This device is designed to introduce a road hazard with the purpose of obliging the players to slow down or to accelerate the movement of their cars so as not to incur the penalty of being stopped by means of the automatic operation of the penalizing device which has previously been described.

A small turn-table 93 on which are arranged miniature figures (for example a flock of sheep driven by a shepherd) turns on its axis, in such manner that the figures which it supports are made to turn at intervals to face in the direction of the track, as if the flock were preparing to cross the track.

This turn-table is supported by a shaft 94 which rotates under the action of a small electric motor 95 placed beneath the track. A counter-shaft angle pinion transmits the movement of the shaft 94 to a shaft 96 provided, on the portion of its length which is located beneath the roadway, with a kind of brush 97 having a braking effect on the bucket which hits it. This braking action gives a slight jerk to the bucket and thus causes the opening of the penalizing make-and-break contact which it comprises.

The device which has just been described is adjusted in such manner that the brush is placed in its raised position and is thus liable to be hit by the bucket, when the miniature figures carried by the turn-table are made to face in the direction of the track. By paying attention to these figures, the player is thus warned that he is exposed to the risk of incurring a penalty and is thus able to take steps accordingly by varying the speed of his vehicle.

What I claim is:

1. A racing game for bodies which are individually movable along respective trajectories on a track which is free of any visible driving and guiding system, said game comprising: means for displacing said movable bodies at varying speeds and accelerations, and means operatively associated with the means for displacing the movable bodies and responsive to the acceleration and speed thereof for disassociating the same from said movable bodies with the latter exceeding a predetermined acceleration and independently of the speed of said bodies, the latter said means automatically restoring the association between the movable bodies and the means for displacing the same with the acceleration of the bodies reduced to a magnitude less than said predetermined acceleration.

2. A game as claimed in claim 1 wherein both said means cooperatively comprise driving magnets beneath said track movable along said trajectories, a permanent magnet in each of said bodies for being attracted and moved by said driving magnets, a rail arranged beneath said track; a bucket arranged beneath said rail for each of said driving magnets; grooved wheels resting on said rail; means for suspending said bucket from said grooved wheels; an electric motor arranged in said bucket; means for driving the wheels by said motor; a current conductor-strip beneath said track; a metallic brush in contact with said strip and connected to said motor; a second conductor-strip beneath said track; a second metallic brush in contact with said second strip and connected to said motor; a hooked member in the shape of a hockey stick secured to the upper portion of said bucket and mounted astride said rail; a carriage supported on the upper portion of said hooked member for pivoting thereabout; runner-rollers arranged on the upper portion of said carriage and spaced from said track with said carriage in a horizontal position; said driving magnet associated with the bucket being arranged on the upper portion of said carriage and skimming the lower surface of said track and spaced therefrom; a return spring between the lower portion of said carriage and the upper portion of said bucket said bucket being laterally oscillatable beneath said rail independently from said carriage, one of said brushes losing contact with said corresponding strip with said oscillatory movement at a determinable amplitude.

3. A game as claimed in claim 1 wherein both said means cooperatively comprise driving magnets beneath said track movable along said trajectories, a permanent magnet in each of said bodies for being attracted and moved by said driving magnets, a rail arranged beneath said track; a bucket for each of said driving magnets arranged beneath said rail; grooved wheels resting on said rail; means for suspending said bucket from said grooved wheels; an electric motor arranged in said bucket; means for driving the wheels by said motor; a current conductor-strip arranged beneath said track; a metallic brush in contact with said strip and connected to said motor; a second conductor-strip beneath said track; a second metallic brush in contact with said second strip and connected to said motor; said bucket being operative to support the associated driving magnet such that the latter is adapted for skimming the lower surface of said track while spaced therefrom; a vertical threaded shaft extend-

ing beneath said bucket; a mass threadably engaged on said shaft, the vertical position of said mass on said shaft being adjustable, said bucket being laterally oscillatable beneath said rail about the axis constituted by said rail one of the brushes being adapted to lose contact with said corresponding strip with said oscillatory movement at a determinable amplitude.

4. A game as claimed in claim 1 wherein both said means cooperatively comprise driving magnets beneath said track movable along said trajectories, a permanent magnet in each of said bodies for being attracted and moved by said driving magnets, a rail mounted beneath said track at a constant distance from said track; an electric motor member supporting said magnet and adapted for being self-propelled along the rail when supplied with current; means for suspending said supporting motor member on said rail; means for supplying current to said motor member; a switch device in the electrical supply circuit of said electric supporting motor-member; a pendulum member having opposite ends, said pendulum member being suspended at said supporting motor member by the upper of said ends and adapted to operate said switch device by contact at the lower ends with the pendulum member at rest, said switch device being opened by a determinable displacement of the lower end of said pendulum member.

5. A racing game for moving bodies of the type in which the moving bodies are driven individually in accordance with their respective trajectories, on a track which is free of any visible driving and guiding system, by driving magnets which move beneath said trajectories and retain said moving bodies undes their close control by the magnetic attraction of other driven permanent magnets which are suitably arranged in the moving bodies, said game comprising: parallel angle-irons arranged beneath said track; a runner-wheel system rolling on said angle-irons; a bucket rigidly suspended from said runner-wheel system; electrical means for moving said bucket along said angle-irons; a magnet carried by said bucket and skimming along the lower surface of said track and spaced from said surface; a cup arranged in said bucket; a first ring of electrically conductive metal surrounding said cup; a second ring of conductive metal arranged above said first ring; a ball of conductive metal rolling freely in said cup; a switch device including contacts interposed in the electric supply circuit of said electrical means; an electro-magnet adapted when supplied with current, to open said switch device by separating one contact from the other, said electromagnet being energized when said ball establishes contact between said rings.

6. A game as claimed in claim 1 wherein both said means cooperatively comprise driving magnets beneath said track movable along said trajectories, a permanent magnet in each of said bodies for being attracted and moved by said driving magnets, a rail mounted beneath said track at a constant distance from said track; an electric motor member supporting said magnet and adapted for being self-propelled along said rail when supplied with current; means for suspending said supporting motor member on said rail; means for supplying current to said supporting motor member; means proportional to the acceleration of the moving body and adapted to come into operation with said acceleration exceeding a pre-determined value, to cause the moving body to come to a stop; a rheostat externally controlled in the electric supply circuit of said motor member; a circuit-breaking device with a contact interposed in said circuit; an electromagnet energized by said circuit and keeping said circuit-breaking device closed when energized; a push-button adapted to re-close the contact of said circuit-breaking device when said contact has been broken as a result of an interruption of said supply circuit, caused by said subordinated means which also caused the electro-magnet to become de-energized; and a system of gears which is adapted to delay said contact re-closure by means of said push-button.

7. A game as claimed in claim 1 comprising means responsive to the acceleration of the driving magnets and operative with said acceleration less than a pre-determined value to cause respective of said moving bodies to come to a stop; obstacles arranged beneath said track and which, when hit by said means which displaces the moving bodies causes said members to slow down abruptly, thereby also causing said subordinated means to come into operation; and mechanical means adapted to ensure that said obstacles may be withdrawn at intervals and in an unpredictable manner from the trajectory followed by said means which drives the moving bodies.

8. A racing game for movable bodies of the type in which the bodies are driven individually along respective trajectories on a track which is free from any visible driving and guiding system, said game comprising: permanent magnets in said bodies, driving magnets, means supporting said driving magnets and adapted for movement beneath said trajectories to move the driving magnets at determinable speeds and accelerations, the driving magnets controlling movement of said bodies by the magnetic attraction of the driving magnets with the permanent magnets in the bodies, a source of electricity for energizing the first said means for moving the same, conducting elements for coupling the source of electricity to said first means, said conducting elements including stationary first conducting elements, and second conducting elements on and movable with said first means and adapted for contacting the first said elements to couple said source to said first means, said second conducting elements being subjected to the acceleration of said first means and being displaced to interrupt the flow of electricity between said first means and the stationary first conducting elements with said first means exceeding a predetermined acceleration, said second conducting elements being automatically displaced to restore the flow of electricity to said first means when the acceleration of the latter decreases to a magnitude less than that of said predetermined acceleration.

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