June 19, 1945. D. J. CROWLEY 2,378,621

GAME

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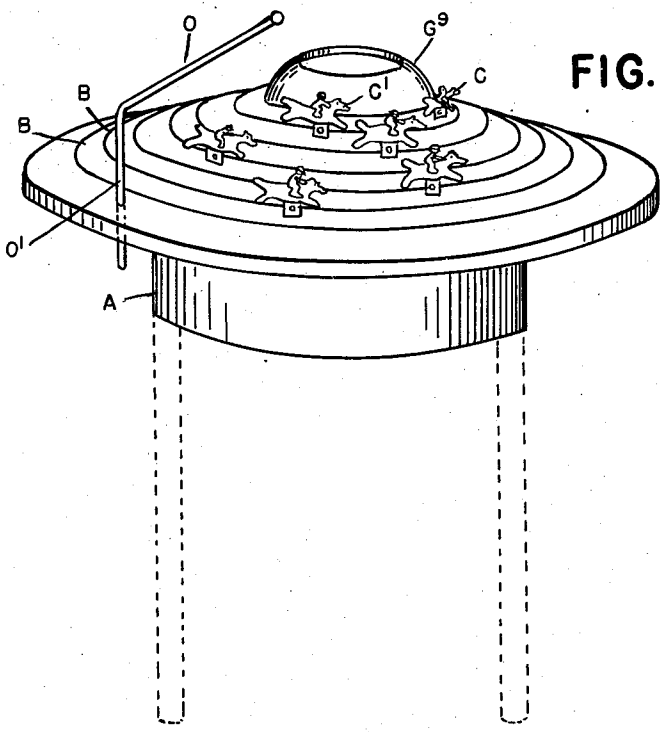


FIG. 1.

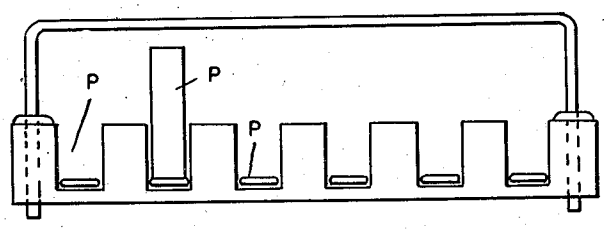


FIG. 17.

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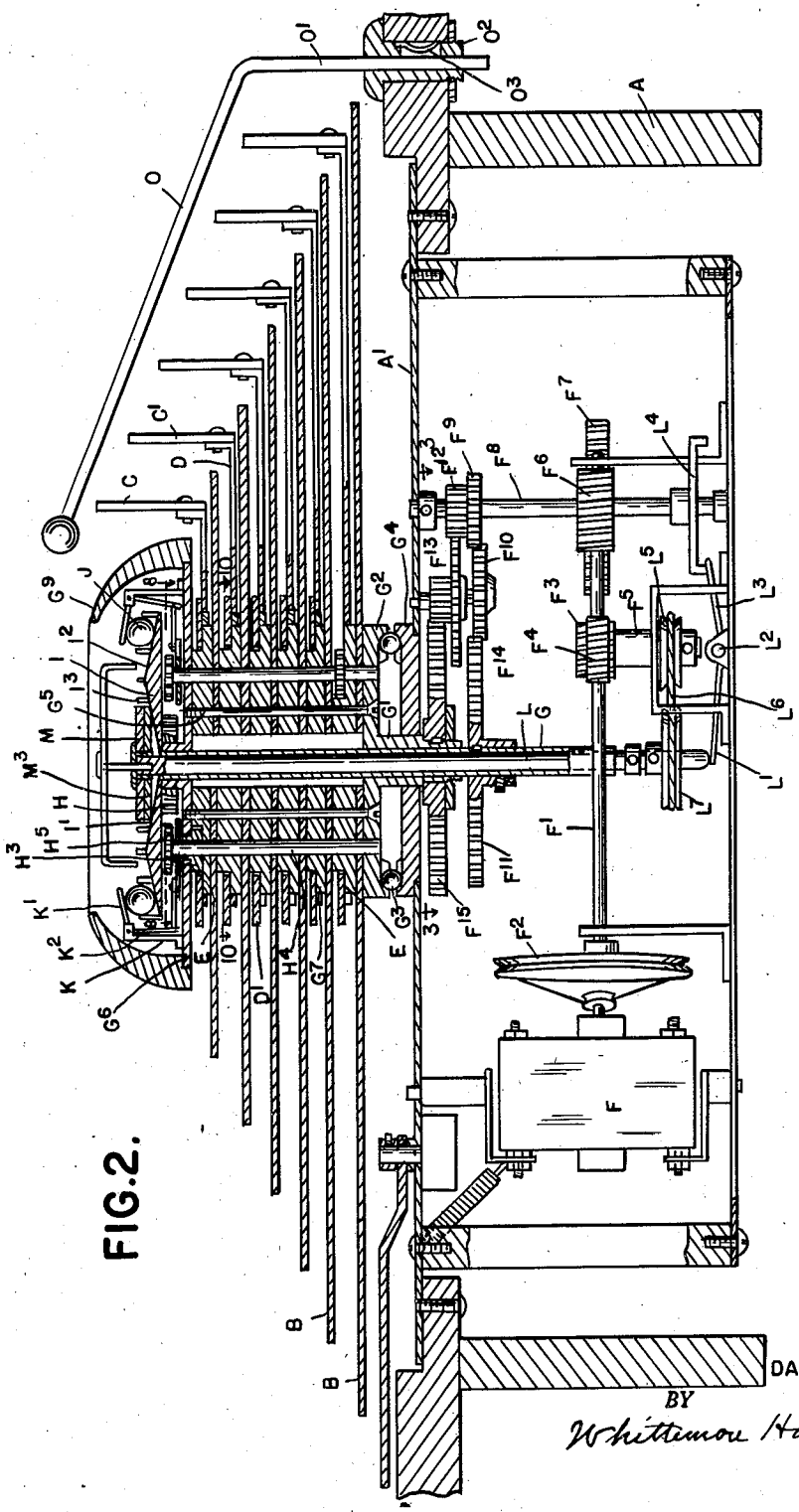


FIG. 2.

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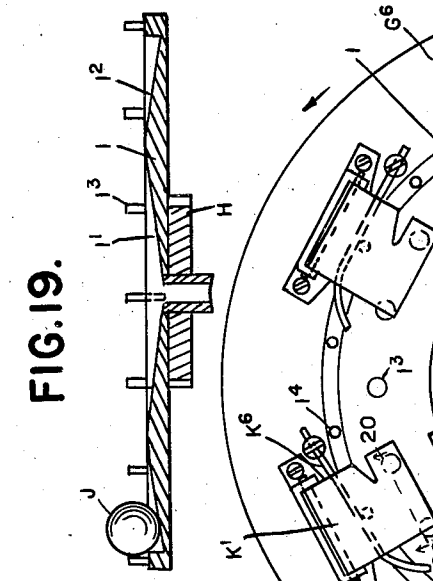


FIG. 19.

FIG. 4.

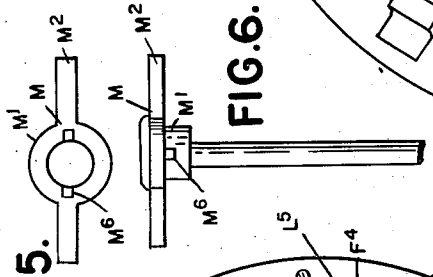


FIG. 5.

FIG. 6.

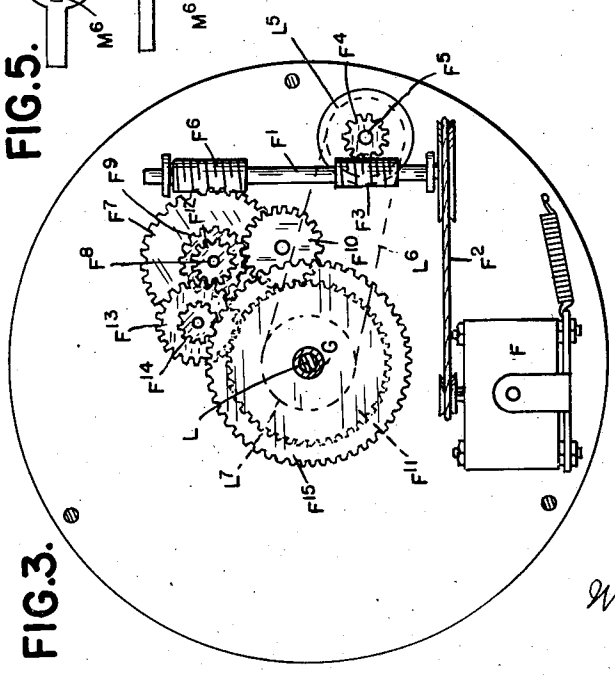


FIG. 3.

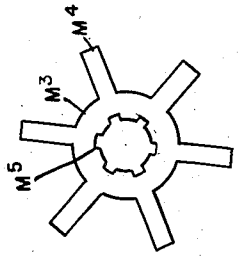


FIG. 7.

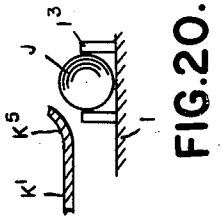


FIG. 20.

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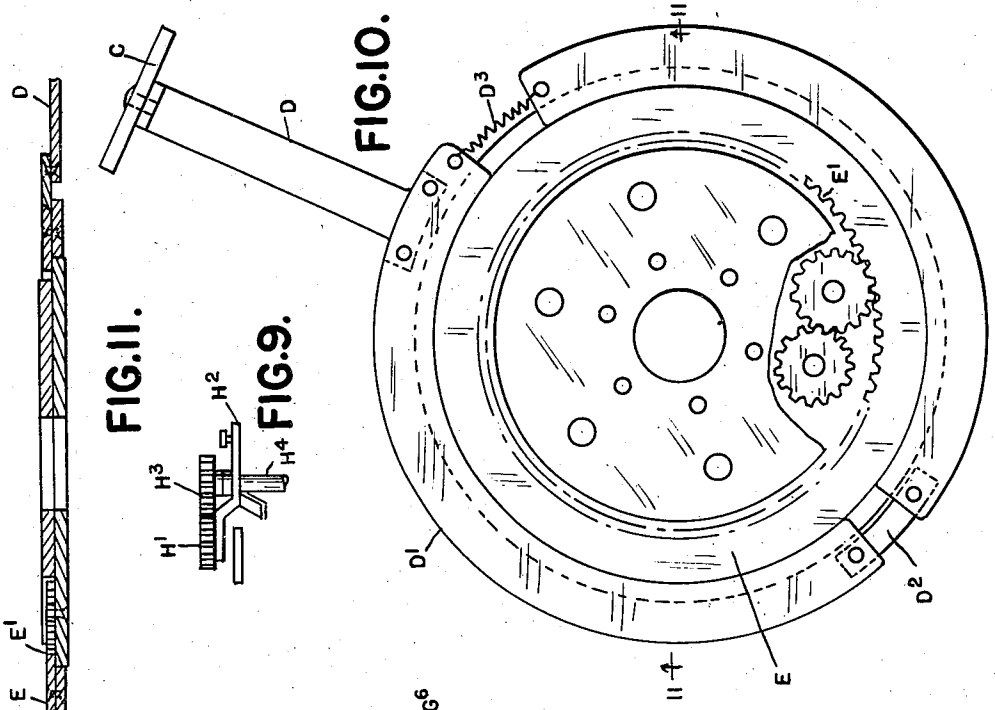


FIG.10.

FIG.11.

FIG.9.

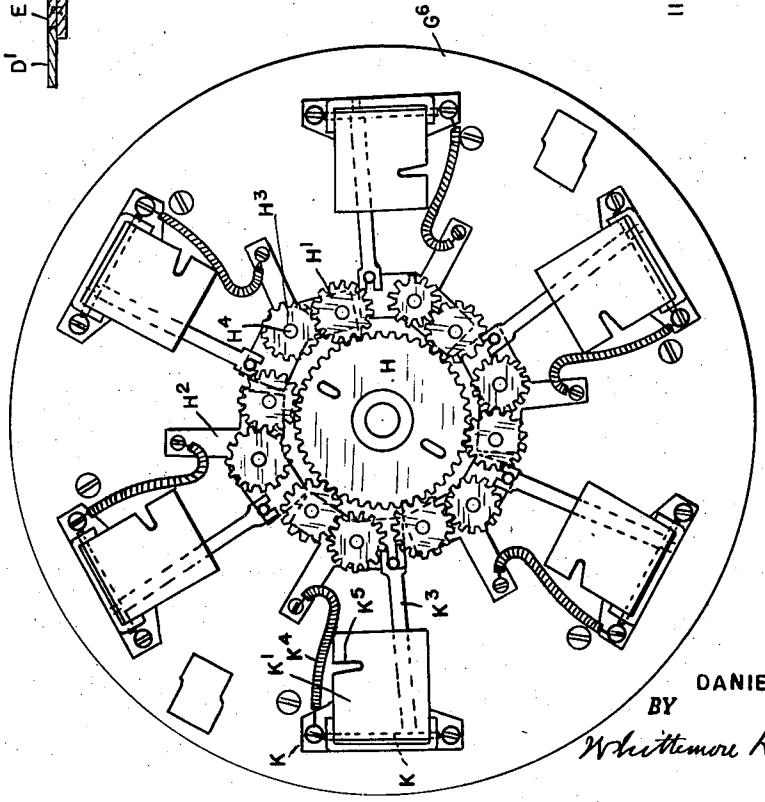


FIG.8.

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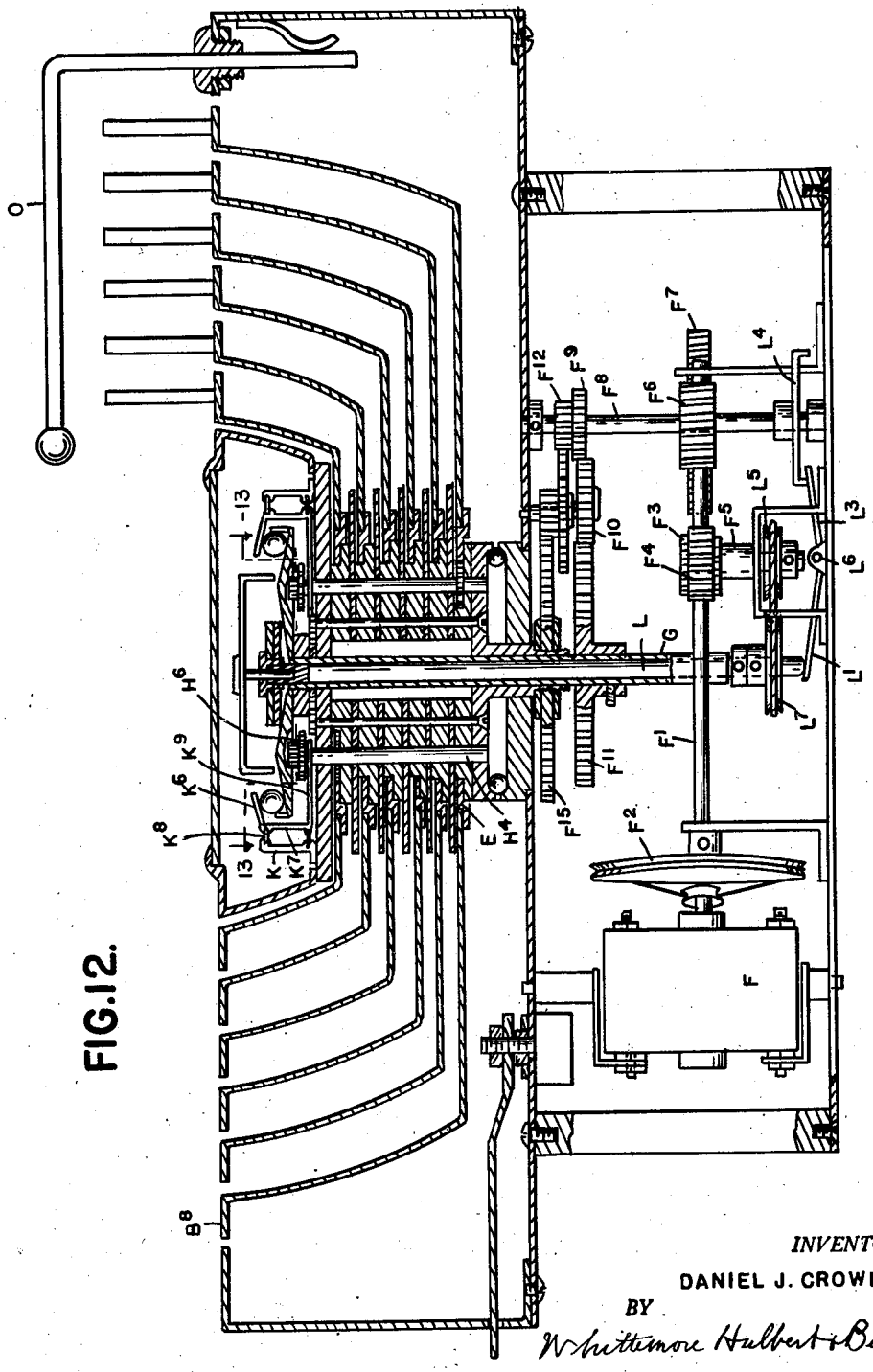


FIG.12.

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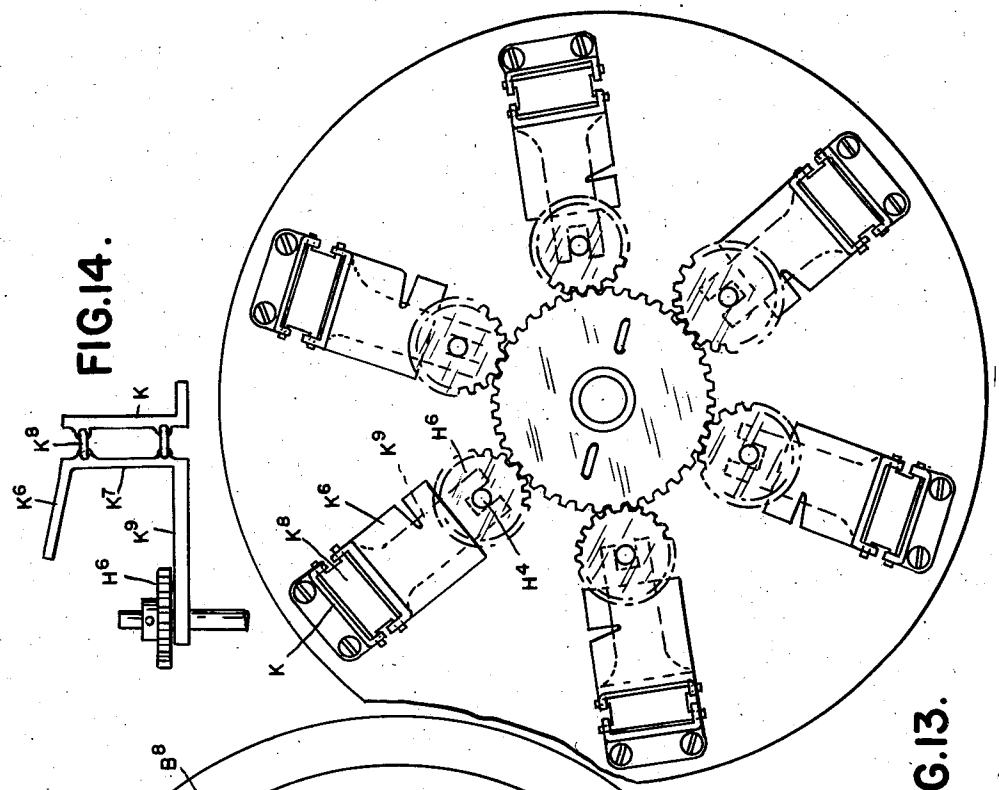


FIG.14.

FIG.13.

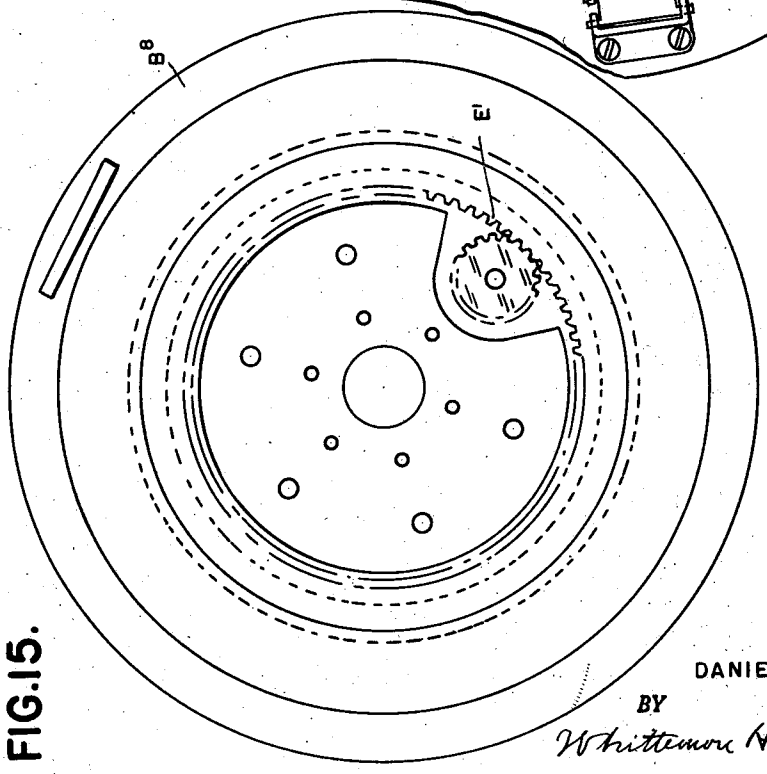


FIG.15.

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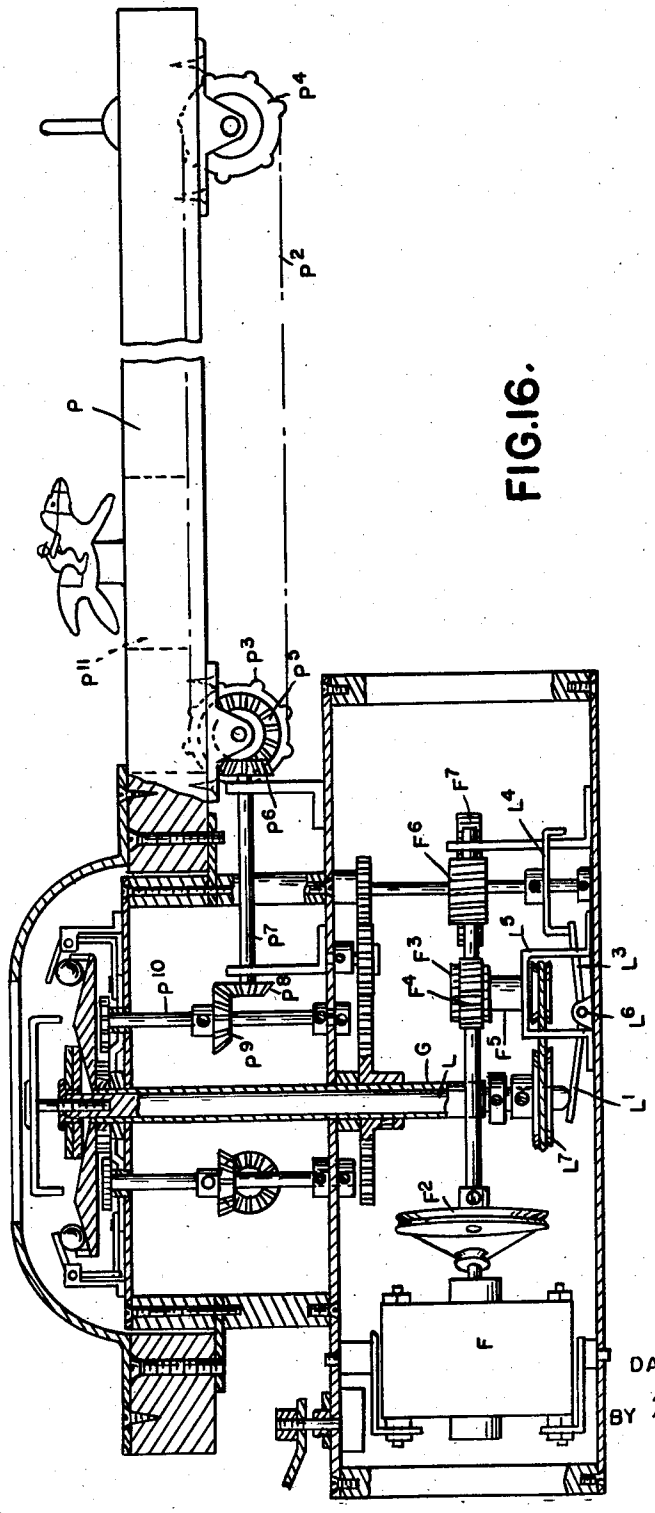


FIG.16.

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GAME

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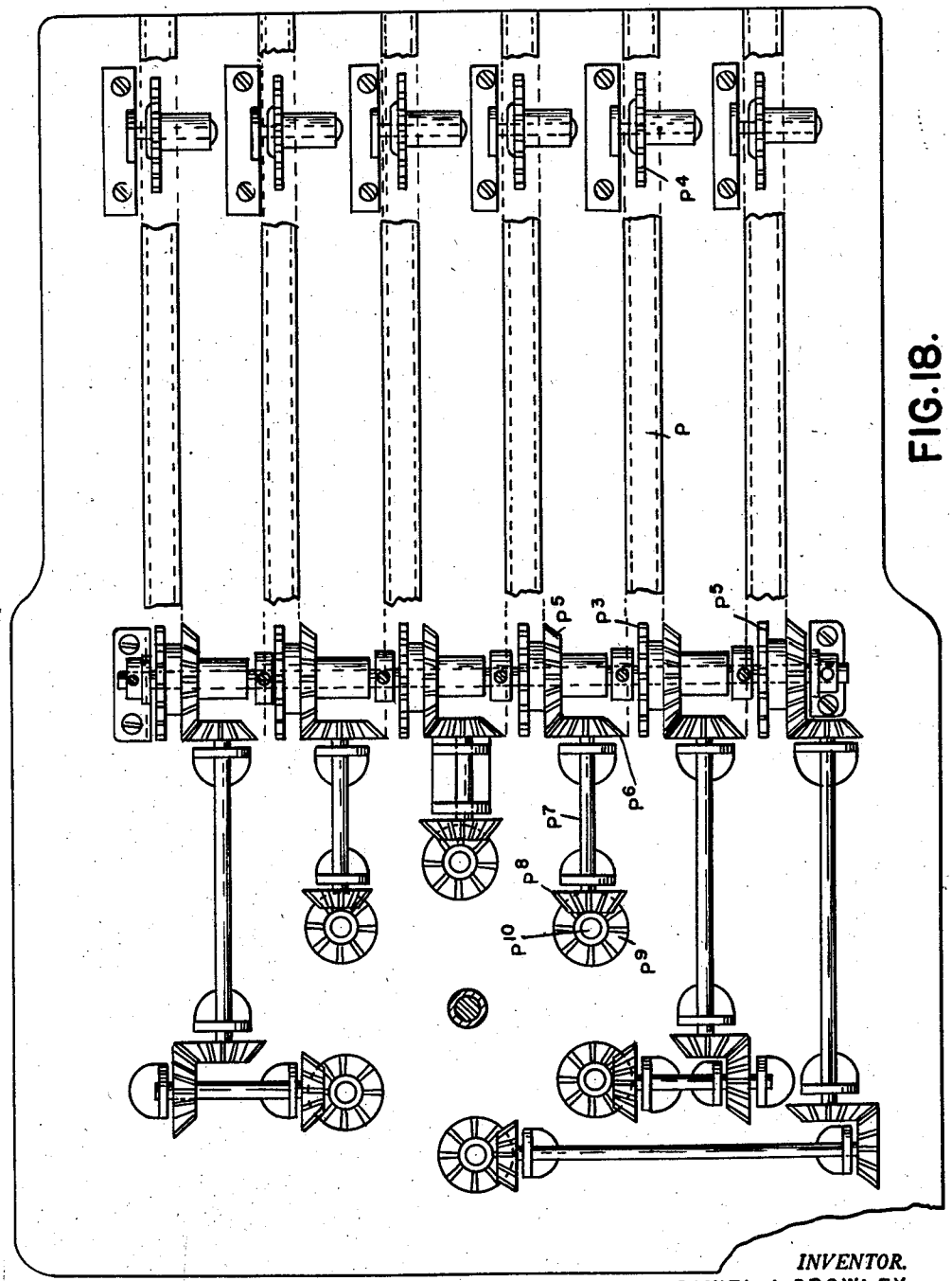


FIG. 18.

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Patented June 19, 1945 2,378,621

UNITED STATES PATENT OFFICE

2,378,621

GAME

Daniel J. Crowley, Grosse Pointe, Mich.

Application March 27, 1944, Serial No. 528,287

12 Claims. (Cl. 273—86)

The invention relates to games and more particularly to games that simulate the racing of horses or other animals along a track.

It is the object of the invention to obtain a construction which while mechanically operated is, nevertheless, one in which the advancement of the individual contestants is irregular and unpredictable thereby maintaining interest throughout the entire progress of the game. To this end the invention consists in the general construction and organization of the device. Further, in the means employed for rendering the operation of individual elements uncertain and further in various features of construction as hereinafter set forth.

In the drawings:

Fig. 1 is a perspective view illustrating the general appearance of the game;

Fig. 2 is a vertical central section therethrough;

Fig. 3 is a horizontal section on line 3—3, Fig. 2;

Fig. 4 is a plan view of the controlling means;

Fig. 5 is a plan view of one of the elements shown in Fig. 4;

Fig. 6 is a side elevation thereof;

Fig. 7 is a plan view of another element of Fig. 4;

Fig. 8 is a horizontal section on line 8—8; Fig. 2;

Fig. 9 is an elevation of one of the gear carriers;

Fig. 10 is a horizontal section on line 10—10, Fig. 2, showing one of the horse driving mechanisms in plan view;

Fig. 11 is a section on line 11—11, Fig. 10;

Fig. 12 is a view similar to Fig. 2 showing a modified construction;

Fig. 13 is a horizontal section substantially on the line 13—13, Fig. 12;

Fig. 14 is an elevation of the gear shifting mechanism in Figs. 12 and 13;

Fig. 15 is a plan view of one of the discs shown in Fig. 12 together with the driving means therefor;

Fig. 16 is a view similar to Figs. 2 and 12 showing another modification;

Fig. 17 is an end elevation thereof;

Fig. 18 is a plan view;

Fig. 19 is a section similar to Fig. 2 showing the ball supporting plates; and

Fig. 20 is a section on line 20—20, Fig. 4.

General construction

In general construction my improved game comprises a casing A containing the operating mechanism having arranged at the top thereof a series of overlapping discs B, B', etc. representing parallel lanes of a circular race track. Above each of these lanes is the figure of a race horse and rider, and such figures C, C', etc. are actuated by means extending between adjacent discs and concealed thereby. The actuating means for each individual contestant includes a radius arm D which extends inward from the figure and is attached at its inner end to a revoluble member E concentric with its axis of the discs. This revoluble member is alternatively driven at different speeds through the medium of a plurality of differential transmission mechanisms interposed between the same and a common source of energy, such as an electric motor F, together with mechanically actuated but indeterminate selective controlling means for said transmissions. Thus, the speed of advancement of each individual will depend upon which of the transmission mechanisms is actuating the same and for how long a period each is in operation. This, however, cannot be predetermined for the operation of the controlling means is uncertain.

Variable speed transmission mechanism

As shown in Figs. 2 and 3, the motor F drives a shaft F' through a belt and pulley connected F^2. On the shaft F' is a worm F^3 in mesh with the worm gear F^4 on a vertical shaft F^5. There is also a second worm F^6 on the shaft F' in mesh with the worm gear F^7 on a vertical shaft F^8. Driven from the shaft F^8 are two gear trains, one including the successive gear wheels F^9, F^{10} and F^{11} and the other the gear wheels F^{12}, F^{13}, F^{14} and F^{15}. The gear wheels F^{11} and F^{15} are concentric with each other and with the axis of the discs B, B'. The former is connected to a tubular shaft G and the latter to a hub G' revoluble thereon and to which all of the discs B, B', etc. are mounted. The connection between the hub and discs includes a circular plate G^2 which is supported on ball bearings G^3 from a stationary circular plate G^4 mounted on the top plate A' of the casing A. The plate G^2 is connected by a series of vertically extending bolts G^5 to a top plate G^6 and all of the discs B, B', etc. together with intermediate spacers G^7 are clamped between the plates G^2 and G^6 by the bolts G^5. Thus, all of the discs will rotate with the gear wheel F^{15}.

The revoluble members E previously referred to are annular and are provided with internal gear teeth E'. These members are successively

arranged between the discs and are supported on bearings G^8 integral with the respective spacers G^7. A depending flange E^2 on each of the members E engages the periphery of the bearing G^8 to hold said member E concentric therewith but independently revoluble thereon. As before described, the tubular shaft G is within the hub G' and independently revoluble. This shaft G extends upward through the plate G^6 and has mounted at its upper end a gear wheel H to be revoluble therewith. This gear wheel is adapted to mesh with each of a circular series of small gear wheels or pinions H' surrounding the same. Said pinions are, however, mounted on carrier members H^2 which are individually adjustable to move the pinion into or out of mesh with the gear wheel H. The pinions H' are also in mesh with gear wheels H^3 mounted on the same carrier H^2 and said carrier is pivotally mounted concentric with the axis of the gear wheel H^3. Shafts H^4 secured to each of the gear wheels H^3 extend downward therefrom through the spacers G^7 and on each of these shafts is mounted a pinion H^5 which is in mesh with the internal gear teeth E' on one of the revoluble members E. The arrangement is such that the rotary motion of the gear wheel F^{11} will be transmitted to the gear wheel H and from the latter through the pinions H', gear wheels H^3, shafts H^4 to the pinions H^5 and to the rotary members E driving the latter at a different speed from that of the discs B, B', etc. However, when any one of the pinions H' is out of mesh with the gear wheel H, the transmission train will be broken and the revoluble member E will rotate at the same speed as the bearing G^8 on which it is resting.

Control means

To operate the carriers H^2 which move the pinions H' into or out of mesh with the gear wheel H, there is provided a mechanism which is indeterminate in its operation and which is of the following construction. G^9 is an inwardly curving rim surrounding the plate G^6 and attached thereto. I is a circular plate mounted on the tubular shaft G above the gear wheel H. This plate is fashioned to form a central bowl-shaped portion I' which slopes downward towards the center and a surrounding annular portion I^2 which slopes downward towards the circumference. Projecting upward from the plate I are pins or studs I^3 which are arranged in a circular series and are spaced from each other a sufficient distance for the passage of a ball or marble J therebetween. A second series of upwardly projecting pins I^4 are arranged in a circle of larger radius and intermediate the pins I^3 so that a marble passing between any pair of pins I^3 will be stopped from further outward movement by a pin I^4. Mounted on the plate G^6 on a portion thereof beyond the periphery of the plate I are standards K having pivotally mounted at their upper ends plates K' extending radially inward over the plate I but spaced above the same. Each of the plates K' has a downwardly extending arm K^2 forming in connection therewith a bell crank lever. The lower end of the arm K^2 is attached by a link K^3 with one of the carriers H^2. The construction and arrangement is such that if any one of the plates K' is swung upward, by the wedging of a marble between the same and the plate I (as will be hereinafter described), this through the bell crank arm K^2 and link K^3 will shift the carrier H^2 so as to unmesh the pinion H' from the gear wheel H. A spring K^4 shown as a U-shaped coil spring will return the pinion H' into mesh with the gear wheel H whenever the marble is removed to permit the plate K' to swing downward. Each of the plates K' has an upturned inclined flange K^5 at one side thereof so that a marble J lodged between a pair of pins I^3 on one side of said plate will be carried by the differential speed of rotation of the plates G^6 and I into engagement with said flange K^5 to lift the plate K' and pass beneath the same. Further relative movements of the plates G^6 and I will carry the marble beyond the plate K' permitting it to drop to its normal position. The marble is returned to the center of the plate I by any one of a series of spring arms K^6 mounted on the plate G^6 adjacent to the periphery of the plate I. The free ends of these springs extend radially inward over the plate I so that in the relative rotation of said plates I and G^6 the pins I^4 will successively cam the spring arms K^5 radially outward and then release the same to permit them to spring inward. Such inward movement will strike any ball positioned in the path of the spring and will throw it inward onto the portion I'.

The marbles J are normally held in the bowl I' but are periodically thrown radially outward therefrom by a mechanism now to be described. Within the hollow shaft G is a shaft L. The lower end of this shaft rests upon an arm L' of a rockable member pivoted at L^2 and having an oppositely extending actuating arm L^3. A rotary cam L^4 secured to the shaft F^8 engages the arm L^3 and during the rotation of said shaft will periodically depress said arm thereby causing an upward movement of the arm L' and the shaft L. The shaft L is rotated by a drive mechanism including the vertical shaft F^5 previously described, a pulley L^5 mounted thereon, and a belt L^6 connecting said pulley with a pulley L^7 on the shaft L. This drive connection does not, however, interfere with the vertical movement of the shaft L by the cam L^4. At the upper end of the shaft L is a member M having a hub M' and two oppositely projecting arms M^2. Sleeved upon the hub M' is another member M^3 having a series of radially projecting arms M^4. The member M^3 is also provided with a series of keyways M^5 cut therein, any pair of which is engageable with a pair of keys M^6 on the hub M'. Normally the keys M^6 are engaged with the keyways M^5 so that both the members M and M^3 will rotate together at the same speed as the shaft L which has a higher angular speed than that of the shaft G and plate I. When, however, the cam L^4 operates to raise the shaft L which will disengage the keys M^6 from the keyways M^5, this will permit the member M^3 to revolve at the same angular speed as the plate I on which it rests while the member M continues to rotate at a higher speed.

With the construction just described assuming that a number of marbles J are in the cup I^2 these will be arranged between the radially projecting arms M^4 of the member M^3 and will be carried around with said member. When through the operation of the cam L^4 the shaft L is raised and the keys M^6 disengaged from the keyways M^5, then the member M rotating at a faster speed than the member M^3 will cam the marbles out from the pockets between the arms M^4 throwing them outward upon the oppositely inclined portion I^5 of the plate I. Here they will meet the obstruction of the pins I^3 so that certain of the marbles may lodge in one or more of the clear spaces between

said pins while others are deflected leaving said spaces between the pins vacant. Consequently one or more of the plates K' may be lifted as before described and through the connected mechanism will unmesh the corresponding pinion H' from the gear wheel H. As the members E rest upon the bearings G^7, they will be frictionally driven at the same angular speed as said bearings whenever their corresponding pinion H' is disengaged from the gear wheel H. On the other hand, when said pinion and gear wheel are in mesh, then the corresponding rotary member E will be driven at a different and slower speed from that of the discs B, B', etc. Consequently, the horses C may at certain times travel at the same speed as their corresponding discs, while at other times they will travel at a slower speed.

Operation

The description of the construction and operation of the machine as above given may be briefly summarized as follows. Before starting the motor the horses on the several lanes formed by the overlapping discs are all placed in radial alignment. The mechanism will then be set in motion and, assuming that all of the pinions H' are in mesh with the gear wheels H, all of the horses will start to travel at the same angular speed thereby maintaining their radial alignment. However, the balls or marbles between the arms M^4 of the member M^3 and in the cup I' will be periodically thrown outward by the camming action of the arms M^2 of the member M whenever said member is raised by the operation of the cam L^4. Some of the balls thus thrown outward may enter one or more of the vacant spaces between the pins I^3 to be carried with said pins and plate I beneath an adjacent plate K' so as to declutch the gear train driving the corresponding horse. If this occurs, the horse will increase its speed for it will then move with the disc beneath the same which is travelling at higher angular speed than that of the rotary members E. However, the faster speed will not be long continued for the plates I and G are rotating at different speeds which will disengage the ball from the member K'. Also the balls will be returned to the bowl I' by the action of the springs K^5 and the operation will be repeated. It will be obvious that no one can exactly predetermine which of the horses will be speeded up or how often this will occur so that it is indeterminate which one will win the race. To further increase the uncertainty, I preferably provide another mixing device for the balls which consists of a pronged member N connected to rotate with the shaft L with the prongs thereof radially between the members M, M^3 and the pins I^3.

Starting and stopping means

To assist in aligning the horses before starting the race and also for stopping them at the conclusion, I have provided an arm O extending radially over the discs and having a vertical shank O' engaging a bearing O^2 on the frame. The arm may be raised or lowered by sliding the shank O' in the bearing and a spring O^3 or other friction device will hold it in any position of adjustment. Thus, to align the horses before starting the race, the arm O is depressed and all of the horses are adjusted into contact therewith. Such adjustment is possible by reason of a slip connection between the radius arm D and the corresponding rotary member E. As shown in Fig. 10, such connection comprises a pair of friction shoes D' on opposite sides of the periphery of the member E, said shoes being pivotally connected to a link D^2 at one end and having a spring D^3 connecting their other ends. Consequently, the friction will be sufficient to normally drive the radius arm D but will permit of independent movement of said arm in aligning the horses. After the horses are aligned for starting, the arm O is raised to clear the same but is again depressed before the completion of the race to assist in determining the winner.

Modified construction

Fig. 12 shows a modified construction in which the discs have the lane portions B^8 thereof all arranged in the same plane. Also these discs instead of being positively connected to the hub G' are attached to or formed integral with the rotary members E and the horses are fixedly secured to the respective lanes. The construction is otherwise substantially the same as previously described and the advancement of the individual horses is dependent upon whether or not the gear train is connected or broken. In the latter case the disc will be frictionally driven by the bearing on which it rests which is connected to the hub G'. I have, however, provided a modified construction for meshing or unmeshing gears in the driving train which is as follows. In place of pivotally connecting the plates K' to the standards K, I employ fingers K^6 having depending arms K^7 which latter are connected by a pair of links K^8 with the standard K. At the lower end of the arm K^7 is a shifter arm K^9 which engages a pinion H^6 slidable on the shaft H^4, said pinion being normally in mesh with the gear wheel H. Thus, whenever a ball or marble passes beneath the finger K^6 to raise the same, this will lift the shifter K^9 and move the pinion H^6 out of mesh with the gear wheel H. This, in turn, will permit the corresponding member E to rotate with its supporting bearing which is at a lower angular speed than when driven by the gear connection.

Another modification

In place of having the horses travel around a circular track, it may be desired to have them travel along parallel straight tracks. Such a construction is illustrated in Figs. 16 to 18 in which P is a shelf extending laterally from the casing A and having a series of parallel grooves P' in which are located chains P^2 passing around sprockets P^3 and P^4. Each of the sprockets P^3 is driven through the medium of beveled gear wheels P^5 and P^6 from a radially extending shaft P^7 which, in turn, is driven through beveled gear wheels P^8 and P^9 from a vertical shaft P^{10}. The shafts P^{10} correspond to the shafts H^4 and are driven by a similar mechanism including the means for meshing or unmeshing gears in each individual train. The horses are mounted on posts P^{11} extending upward from the chains P^2 so as to be advanced with these chains. Whenever one of the gear trains is broken by the unmeshing of the gear thereof, the corresponding chain and horse will remain stationary while the other chains and horses continue to advance. Thus, the race will be along a straight track which may be extended to any distance desired.

What I claim as my invention is:

1. In a racing game, a frame provided with a pluraliy of parallel tracks or lanes, figures representing individual contestants mounted for travel along the respective lanes, a driving means, a plurality of differential speed transmissions be-

tween said driving means and each of said figures, and means for alternatively and indeterminately coupling one or the other of said transmissions to each of said figures said mechanism including a plurality of balls, centrifugal means for propelling said balls radially outward and lever for cooperating with certain of said balls whereby the relative advancement of said figures along their respective lanes is unpredictable.

2. In a racing game, a frame provided with a plurality of parallel tracks or lanes, figures representing individual contestants mounted for travel along the respective lanes, a driving means, a plurality of differential speed transmissions between said driving means and each of said figures, and mechanism also driven by said driving means for alternatively and indeterminately coupling one or the other of said transmissions to each of said figures said mechanism including a plurality of balls, centrifugal means for propelling said balls radially outward and lever for cooperating with certain of said balls whereby the relative advancement of said figures along their respective tracks is unpredictable.

3. In a racing game, a frame provided with a plurality of parallel tracks or lanes, figures representing individual contestants mounted for travel along the respective lanes, a driving means, a plurality of differential speed transmissions between said driving means and each of said figures, and mechanism also driven by said driving means for alternatively and indeterminately coupling one or the other of said transmissions to each of said figures in successive time intervals said mechanism including a plurality of balls, centrifugal means for propelling said balls radially outward and lever for cooperating with certain of said balls whereby the relative advancement of said figures along their respective lanes is unpredictable.

4. In a racing game, a frame, a plurality of discs of different diameters concentrically mounted in said frame in overlapping relation to provide with their exposed portions adjacent tracks or lanes, a plurality of figures representing individual contestants mounted above the respective lanes and supported by the corresponding discs, driving means, a plurality of differential speed transmissions between said driving means and each of said figures, one including the corresponding disc, means for coupling and uncoupling the other of said transmissions to said figures, and mechanism also driven by said driving means for indeterminately operating said coupling means in successive time intervals said mechanism including a plurality of balls, centrifugal means for propelling said balls radially outward and lever for cooperating with certain of said balls whereby the figure driven by the coupled transmission will be advanced at greater angular speed than the speed of said discs and the relative advancement of said figures is unpredictable.

5. In a racing game, a frame provided with a plurality of tracks or lanes, figures representing individual contestants arranged above each of said lanes, means for advancing each of said figures along its lane, a driving means, a plurality of transmission mechanisms between said driving means and the respective advancing means, each transmission including a clutch, and indeterminate means for controlling said clutches comprising a revolving plate having a pocket at the center thereof, a plurality of balls in said pocket, levers for operating the respective clutches projecting over the peripheral portion of said plate to be spaced therefrom and at spaced points in the circumference thereof, and means for periodically propelling said balls outward from said pocket whereby any ball passing beneath one of said levers will raise the same to change the position of said clutch.

6. In a racing game, a frame provided with a plurality of tracks or lanes, figures representing individual contestants arranged above each of said lanes, means for advancing each of said figfigures along its lane, a driving means, a plurality of transmission mechanisms between said driving means and the respective advancing means, each transmission including a clutch, and indeterminate means for controlling said clutches comprising a revolving plate having a pocket at the center thereof, a plurality of balls in said pocket, levers for operating the respective clutches projecting over the peripheral portion of said plate to be spaced therefrom and at spaced points in the circumference thereof, means for periodically propelling said balls outward from said pocket whereby any ball passing beneath one of said levers will raise the same to change the position of said clutch, means for disengaging the ball from said lever after a brief interval to restore the clutch to its original position, and means for returning the released balls to the pocket in the center of said plate.

7. In a racing game, a frame provided with a plurality of tracks or lanes, figures representing individual contestants arranged above each of said lanes, means for advancing each of said figures along its lane, a driving means, a plurality of transmission mechanisms between said driving means and the respective advancing means, each transmission including a normally engaged clutch, and indeterminate means for controlling said clutches comprising a revolving plate having a pocket at the center thereof, a plurality of balls in said pocket, levers for releasing the respective clutches projecting over the peripheral portion of said plate to be spaced therefrom and at spaced points in the circumference thereof, means for periodically propelling said balls outward from said pocket whereby any ball passing beneath one of said levers will raise the same to release said clutch, means for disengaging the ball from said lever after a brief interval to permit reengagement of the clutch, and means for returning the released balls to the pocket in the center of said plate.

8. In a racing game, a frame provided with a plurality of tracks or lanes, figures representing individual contestants arranged above each of said lanes, means for advancing each of said figures along its lane, a driving means, a plurality of transmission mechanisms between said driving means and the respective advancing means, each transmission including a normally engaged clutch, and indeterminate means for controlling said clutches comprising two plates one above the other revolving at differential speed, the upper plate having a pocket at the center thereof, a plurality of balls in said pocket, levers for releasing the respective clutches mounted on the other of said plates and having plate arms projecting over the peripheral portion of said upper plate to be spaced therefrom and at spaced points around the circumference thereof, means for periodically propelling said balls outward from said pocket, obstructing means on said upper plate for limiting the free paths of outward movement of said balls but leaving restricted spaces on the outer portion of the plate in which one or more of said

balls may lodge whereby any ball so lodged will be carried by the relative rotation of said plates beneath an adjacent plate arm to lift the same and disengage the clutch while further rotation will carry the ball out from beneath said plate arm, and means for returning the released balls to the pocket in the center of the plate.

9. In a racing game, a frame provided with a plurality of tracks or lanes, figures representing individual contestants arranged above each of said lanes, means for advancing each of said figures along its lane, a driving means, a plurality of transmission mechanisms between said driving means and the respective advancing means, each transmission including a normally engaged clutch and indeterminate means for controlling said clutches comprising two superposed plates rotating at differential speeds, the upper plate having a pocket at the center thereof, a plurality of balls in said pocket, levers for releasing the respective clutches mounted on the lower plate and having plate arms projecting over the peripheral portion of the upper plate to be spaced therefrom and at spaced points around the circumference thereof, means for periodically propelling said balls outward from said pocket, a circular series of pins projecting upward from said plate to leave only slight clearance therebetween for the passage of balls, a second circular series of pins radially outward from said first series and intermediate the spaces between the latter to limit the outward movement of a ball lodging in any one of said spaces whereby the relative rotation of said plates will carry a ball so lodged beneath an adjacent plate arm to lift the same and disengage the corresponding clutch, a series of spring arms mounted on the lower plate to extend over the upper plate into the path of the outer series of pins to be successively deflected outward thereby and then released to spring inward, said inward movement of the spring arms serving to propel any ball in the path thereof radially inward to the center of the upper plate.

10. The combination with a frame, of a series of concentric rotary members mounted on said frame, a motor on said frame, a plurality of differential speed transmissions between said motor and each of said rotary members, and means for alternatively and indeterminately coupling one or the other of said transmissions to each of said rotary members including a plurality of balls, centrifugal means for propelling said balls radially outward and levers for cooperating with certain of said balls whereby the relative advancement thereof is unpredictable.

11. In a racing game, a frame, a series of superposed discs of progressively smaller diameter mounted on said frame to provide a series of tracks or lanes by their exposed portions, a motor and transmission means for rotating said discs at uniform angular velocity, figures representing individual contestants arranged above each of said lanes, means connected to each figure extending between adjacent discs, and independently revoluble members for rotating the latter at a different angular speed from that of the discs, said transmission including a clutch and mechanism also driven by said motor for indeterminately releasing and engaging said clutches whereby a figure driven by the clutch engaged transmission will rotate at a different speed than said discs while a figure corresponding to and unclutched transmission will rotate at the speed of the discs.

12. In a racing game, a plurality of discs of different diameters concentrically mounted on said frame in overlapping relation to provide with their exposed portions adjacent tracks or lanes, a plurality of figures representing individual contestants mounted above the respective lanes and supported by the corresponding discs, a motor on said frame, a transmission mechanism between said motor and discs for rotating the latter at a constant angular velocity, a transmission mechanism between said motor and each of said figures including a clutch, and mechanism also driven by said motor for indeterminately operating said clutches to engage or release the same comprising a pair of superposed plates rotating at differential speed, the upper plate having a central pocket, a plurality of balls in said pocket, levers for releasing the clutches of the several transmissions mounted on the lower of said plates having plate arms projecting over the upper plate to be spaced therefrom and at spaced points around the circumference thereof, means for periodically propelling said balls outward from said pocket, a circular series of pins surrounding said pocket and obstructing the paths of movement of said balls but leaving restricted spaces therebetween for the lodgement of certain balls in the path of rotation of said plate arms, each of said plate arms having an inclined flange at one side thereof whereby a ball in an adjacent space will be carried under said plate arm by the relative rotation of said plates to release the corresponding clutch.

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