Aug. 5, 1958 S. REYNOLDS 2,846,226

TILTABLE CHUTE COMPETITIVE GAME APPARATUS

Filed July 25, 1955

2 Sheets-Sheet 1

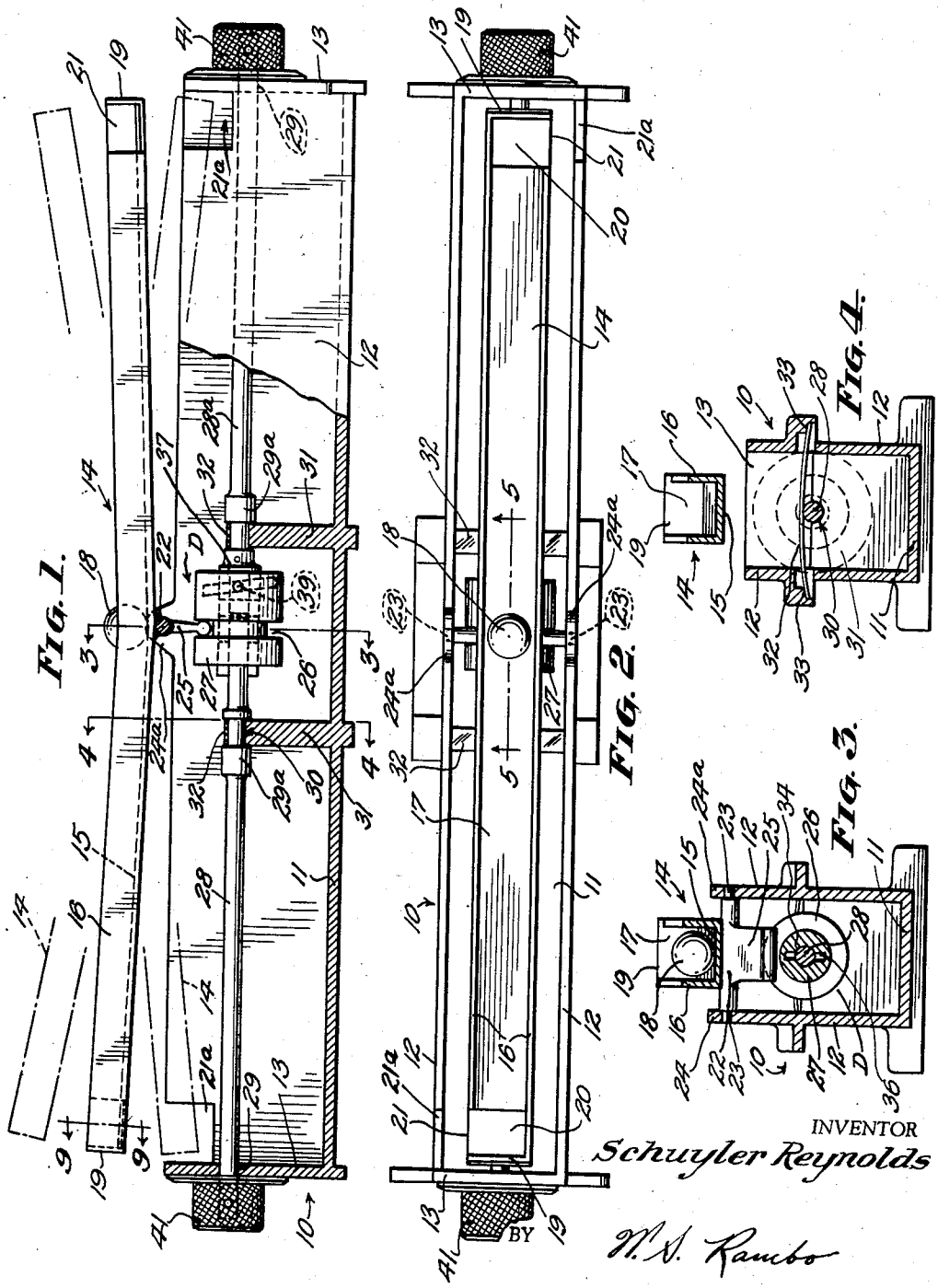


FIG. 1.

FIG. 2.

FIG. 4.

FIG. 3.

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2 Sheets-Sheet 2

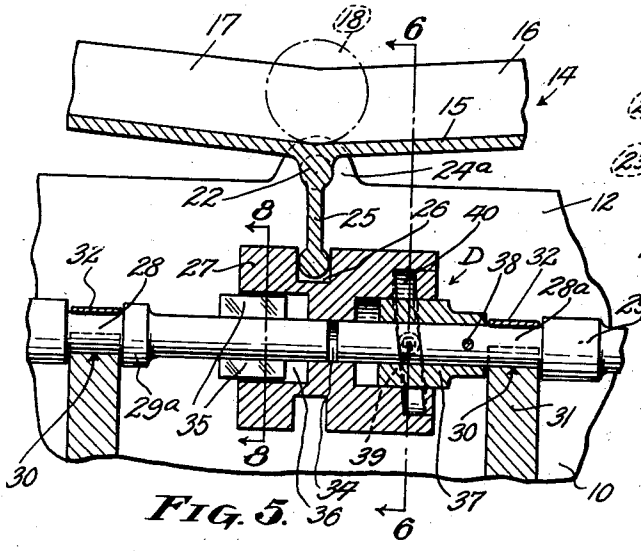


FIG. 5.

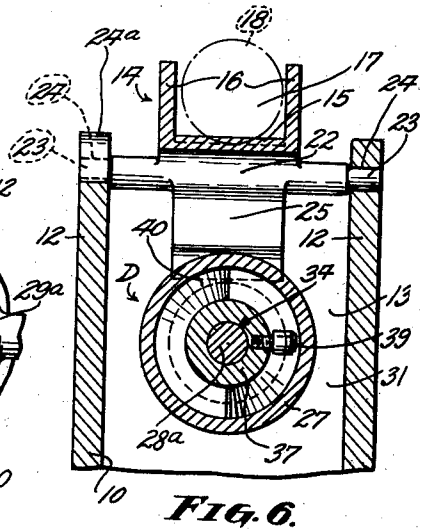


FIG. 6.

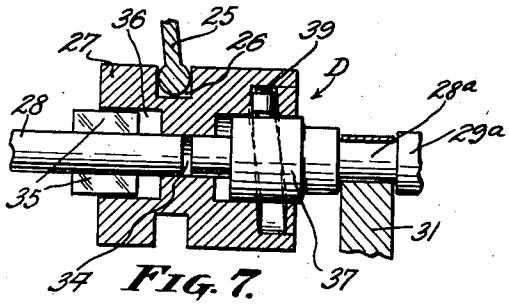


FIG. 7.

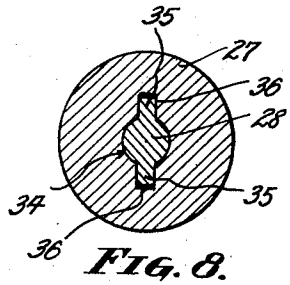


FIG. 8.

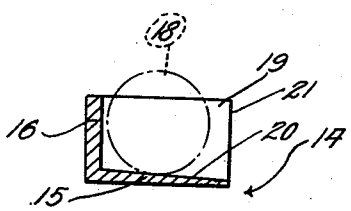


FIG. 9.

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2,846,226

TILTABLE CHUTE COMPETITIVE GAME APPARATUS

Schuyler Reynolds, Columbus, Ohio

Application July 25, 1955, Serial No. 524,161

3 Claims. (Cl. 273—110)

This invention relates to game apparatus, and has particular reference to mechanical game apparatus capable of being operated or played simultaneously in a skill-requiring, competition-affording manner by opposing players.

It is an object of the invention to provide an interest-stimulating, mechanical, game appliance for use by opposing competitive players, and so constructed that through the operation of an improved differential mechanism, effected through the rotation of a pair of manually operated controls, a pivotally mounted play-controlling member may be tilted about a central horizontal axis to produce such positioning of the member as to bring about the winning or termination of a play cycle.

A further object is to provide game apparatus of this nature wherein novel means are provided enabling each player, by exercise of playing skill, to control to his advantage the governable tilting of a vertically swinging play-controlling member in imparting desired movement of a spherical rolling element movable along the play-controlling member.

It is another object of the invention to provide game apparatus of this character wherein a base is provided on which a play-controlling member is tiltably mounted, and wherein novel means are provided, responsive to variations in the relative positions of rotation of a pair of manually, independently and simultaneously operated controls to produce tilting movement of said member, such movement taking place in a direction causing a rolling element, for example, deposited on the member, to gravitate toward the end of the latter containing the control which is positioned in a definite relation to that occupied by the opposing control.

An additional object is to provide game apparatus having a base on which is pivotally mounted a movable figure or member and wherein a differential mechanism, having a pair of independently rotatable player-rotated shafts, is provided for imparting rocking movement to said figure or member in directions desired by the players, said mechanism including a sleeve in which adjoining, longitudinally aligned, end portions of said shafts are received, the sleeve rotating in unison with one of said shafts and having formed therein, around the other independent shaft a continuous cam groove in which is positioned a follower carried by and projecting radially from the independent shaft, the arrangement of these parts being such that when the shafts are independently rotated in directions and at relative rates of speed desired or produced by the players, the changes in the operating positions of the follower from a normal or starting position, will result in imparting longitudinal shifting movement to the sleeve, such latter movement being utilized to impart oscillatory play-producing movement to said figure or member.

A further object is to provide mechanical game apparatus of this character which is simple, inexpensive and

reliable in its construction and operation and apparatus which is capable of supplying its players with elements of interest, amusement and excitement in the operation thereof and, also, in many instances, mystification as to its mechanical mode of functioning.

With these and other objects in view, as will become apparent as the description proceeds, the invention consists of the novel features of construction, combinations of elements and arrangement of parts hereinafter to be fully described and pointed out in the claims.

For a better understanding of the invention, reference may now be had to the accompanying drawings, forming a part of the present disclosure, wherein:

Fig. 1 is a view partly in side elevation and partly in vertical longitudinal cross section of game apparatus formed in accordance with the present invention;

Fig. 2 is a top plan view thereof;

Figs. 3 and 4 are vertical transverse cross sectional views taken through the apparatus on the planes indicated by the lines **3—3** and **4—4**, respectively, of Fig. 1;

Fig. 5 is a fragmentary vertical longitudinal sectional view on an enlarged scale and taken on the line **5—5** of Fig. 2;

Fig. 6 is a transverse sectional view on the line **6—6** of Fig. 5;

Fig. 7 is a detail longitudinal sectional view of the differential drive mechanism employed for tilting the pivoted chute member of the apparatus;

Fig. 8 is a transverse cross sectional view on the line **8—8** of Fig. 5;

Fig. 9 is a similar view on the line **9—9** of Fig. 1.

In the specific, exemplary, embodiment of the invention illustrated in the drawings, game apparatus is shown comprising an elongated trough-shaped base **10**. In the form thereof shown, the base includes a horizontal bottom wall **11**, transversely spaced, upstanding, longitudinally extending, parallel side walls **12**, upright, transversely disposed end walls **13** and an open top. While the base may be formed in any desired manner from any suitable materials, I have found it advantageous to mold the same to constitute an integral body of one or more of the so-called plastics.

Arranged to extend centrally and longitudinally of the base for tilting movement thereon in a vertical plane is a chute member **14**, which may, also, comprise a one-piece molding of plastic materials, in order that the same, together with the base, may be relatively light in weight, of ample strength for the purposes and uses of the apparatus and relatively economical to produce under quantity conditions. The chute member comprises a longitudinally elongated, trough-shaped body, having a bottom wall **15**, upstanding sides **16** and an opening defining a runway **17** for the reception of a spherical rolling element **18**, such as a small, solid ball, marble or the like. The bottom wall **15** of the chute member may, as shown in Fig. 1, diverge upwardly at a slight angle to the horizontal when the member is normally positioned, thus causing a rolling element deposited in its runway **17** to gravitate toward the lower intermediate portion of the member, which is disposed midway of its ends.

The opposite or outer ends of the chute member, as shown in Figs. 2 and 9, include upstanding end walls **19** defining stops for arresting outward movement of the rolling element **18**. Adjacent the walls **19**, the bottom wall **15** has its upper surface locally beveled in a lateral direction, as at **20**, toward an opening **21** formed in the side walls **16** adjacent each end of the chute member. The ball or rolling element is adapted for discharge laterally from the runway **17**, at one side or the other thereof, through one or the other of the oppositely dis-

posed openings 21, depending upon which end of the chute member occupies a lowered position as a result of seesaw movement on the part thereof.

In order to enable two competing players operating the apparatus at the same time to mainpulate individual controls in producing controlled tilting motion of the chute member in a direction desired by the more experienced or skillful of the two players, the under part of the chute member, at a midway position in its length, is formed with an integral transverse formation 22 having horizontal trunnion extensions 23 on the ends thereof. These extensions are journaled in a pair of transversely aligned, horizontally disposed, bearing openings 24 formed in ears 24*a* provided on the center and upper edge portions of the side walls 12 of the base member 10. The formation 22 also includes a rigid, depending crank arm 25, the latter having its lower end positioned in an annular groove 26 formed in the sleeve 27 of a differential mechanism D. By moving the sleeve 27 longitudinally along its principal axis, it will be evident that, through the engagement of the lower end of the crank arm 25 with the sides of the groove 26, rocking or tilting movement is imparted to the chute member about an axis defined by the trunnion extensions 23.

In producing such longitudinally directed sliding movement on the part of the sleeve 27, the differential mechanism makes use of a pair of independently rotatable, longitudinally aligned operating shafts 28 and 28*a*. These shafts are supported at their outer ends for rotation in bearing openings 29 formed in the end walls 13 of the base member 10. Toward their contiguous inner ends, the shafts are formed with collars 29*a* and are supported in semicircular depressions 30 formed in the upper edges of upright bracket webs 31 integrally formed with the base member. The shafts are removably retained in the depressions 30 by means of leaf spring retainers 32 which extend transversely of the hollow interior of the base member and have their ends detachably received in sockets 33 provided in the side walls 12, as shown in Fig. 4.

The sleeve 27 includes an axial bore 34 for the reception of the adjacent ends of the operating shafts. In this instance, the shaft 28, within the confines of the sleeve, includes a key-forming web 35 which is received in aligned radial slots 36 formed in the sleeve in open communication with the axial bore 34, so that rotation of the shaft 28 causes the sleeve to rotate in unison therewith. The inner end of the shaft 28*a* carries in this instance a hub 37, the latter being fastened at 38 to the last-named shaft. Projecting radially from the hub 37 is a roller-equipped pin 39 which is received in an angularly pitched internally disposed, annular groove 40 formed in the sleeve 27.

In the operation of the apparatus, the chute member is adjusted to assume the substantially horizontal position of Fig. 1, and a playing piece or ball element 18 is placed in the center or midway position of the runway 17. Each of the players, stationed at the opposite ends of the apparatus, rotates a shaft 28 or 28*a* by manipulating one of the exteriorly disposed knobs 41 which are fixed on the outer ends of the shafts at positions beyond the end walls 13 of the base member. If the shaft 28 should be rotated by a player manipulating the same and at a higher rate of rotation than that imparted in the same direction of turning movement by the opposing player to the shaft 28*a*, the difference in the rate of turning movement of the two shafts will enable the sleeve 27 to gradually turn about the collar 29*a* of the shaft 28*a*. This action results in imparting longitudinal movement to the sleeve 27, which through the engagement of the crank arm 25 with the groove 26 of the sleeve, causes the chute member to rock about its pivot mounting axis on the base member and thereby assume a tilted position which may be sufficient to cause the ball element to roll toward one end of the runway 17 for discharge through one of the outlet openings 21. This operation, however, may be checkmated by the opposing player, who, upon

observing the tilting of the chute member in a direction which, if unchecked, will cause the ball element to be discharged from the chute member in a direction and in a manner counting against said opposing player, may increase the speed of rotation of the shaft 28*a* to equal or exceed that of the shaft 28, or the opposing player may reverse the direction of turning movement of the shaft 28*a*.

Thus, quickness, skill, attention and dexterity are required on the part of the players in the turning of the operating shafts of the differential mechanism to bring the chute member to a position of inclination providing for the discharge of the ball element or other playing piece from a desired end thereof, conditions which enable the apparatus to offer its players elements of excitement, novelty and interest in establishing its appeal and popularity. While the construction of differential mechanism is of course subject to variation or modification, I have found the particular mechanism here illustrated well suited for the requirements and purposes defined, particularly in view of its structural simplicity, economy of manufacture and the fact that it does not cause binding or locking of the shafts when rotated in opposing directions.

The sides 12 of the base adjacent their upper edges are formed with recesses 21*a* which are adapted for alignment with the openings 21 of the chute member side walls to provide for the discharge of a ball element 18 at the ends and to the sides of the base. Also, it will be observed that the bowed retainer springs 32, as shown in Fig. 4, bear frictionally on the shafts 28 and 28*a* in a manner holding the shafts, or other equivalent rotary controls, against casual rotation, so that the positions of the relatively rotatable differential parts are maintained unless the same are positively rotated.

It will be appreciated that the specific forms of the invention as here disclosed may be modified. For example, various other play-controlling members besides the particular chute member 14 here indicated may be utilized, and likewise other changes. Therefore, I intend to include within the scope of my invention all such structural variations or modifications that may be said to fall fairly within the scope of the following claims.

I claim:

1. Game apparatus comprising a base; an elongated chute having a longitudinally extending runway for the guided reception of a ball element; means pivotally uniting said chute with said base for tilting movement in a vertical plane for causing said ball element to travel gravitationally along said runway from a position substantially midway of its length to either of its ends; a pair of independently manually operated controls rotatably supported and held against sliding movement by said base; a longitudinally shiftable differential member slidably mounted on and rotatable in unison with a first of said controls, said member including an internal annular cam groove; radially disposed pin means carried by and projecting from the second of said controls and received in said cam groove; and means responsive to longitudinal movement of said differential member, produced as a result of differences in the manual rotation imparted to said controls, for producing tilting movement of said chute in causing the same to occupy positions of inclination in which said ball element will roll along the runway of said chute toward an end thereof.

2. Game apparatus comprising a base; a play-controlling member movably supported on said base; manually operated means for imparting play-determining movement to said member, said means embodying a pair of longitudinally aligned manually rotatable shafts supported in said base for independent rotation; a sleeve receiving axially thereof adjacent ends of said shafts, said sleeve being rotatable in unison with one of said shafts and independently rotatable with respect to the other shaft, said sleeve including an internally disposed continuous cam groove disposed concentrically of the longi-

tudinal axis of said shafts; a follower projecting radially from said independently rotatable shaft and receivable in said cam groove to impart longitudinal shifting movement to said sleeve, such movement being effected when the operating position of the follower in the groove, as normally occupied by the follower, is changed through shaft rotation; and means operated by longitudinal shifting movement of said sleeve to impart play-determining movement to said member.

3. Game apparatus as defined in claim 2, and wherein said shafts are restrained against casual rotation by means frictionally disposed in contact therewith.

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