United States Patent

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[45] Patented **Mar. 30, 1971**
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[54] **THREE DIMENSIONAL GAME AND VENDOR APPARATUS**
5 Claims, 13 Drawing Figs.

[52] **U.S. Cl.** **273/1,** 221/210, 254/184
[51] **Int. Cl.** **A63f 9/00**
[50] **Field of Search** ..... 273/1 (E); 254/184; 221/210

[56] **References Cited**

UNITED STATES PATENTS

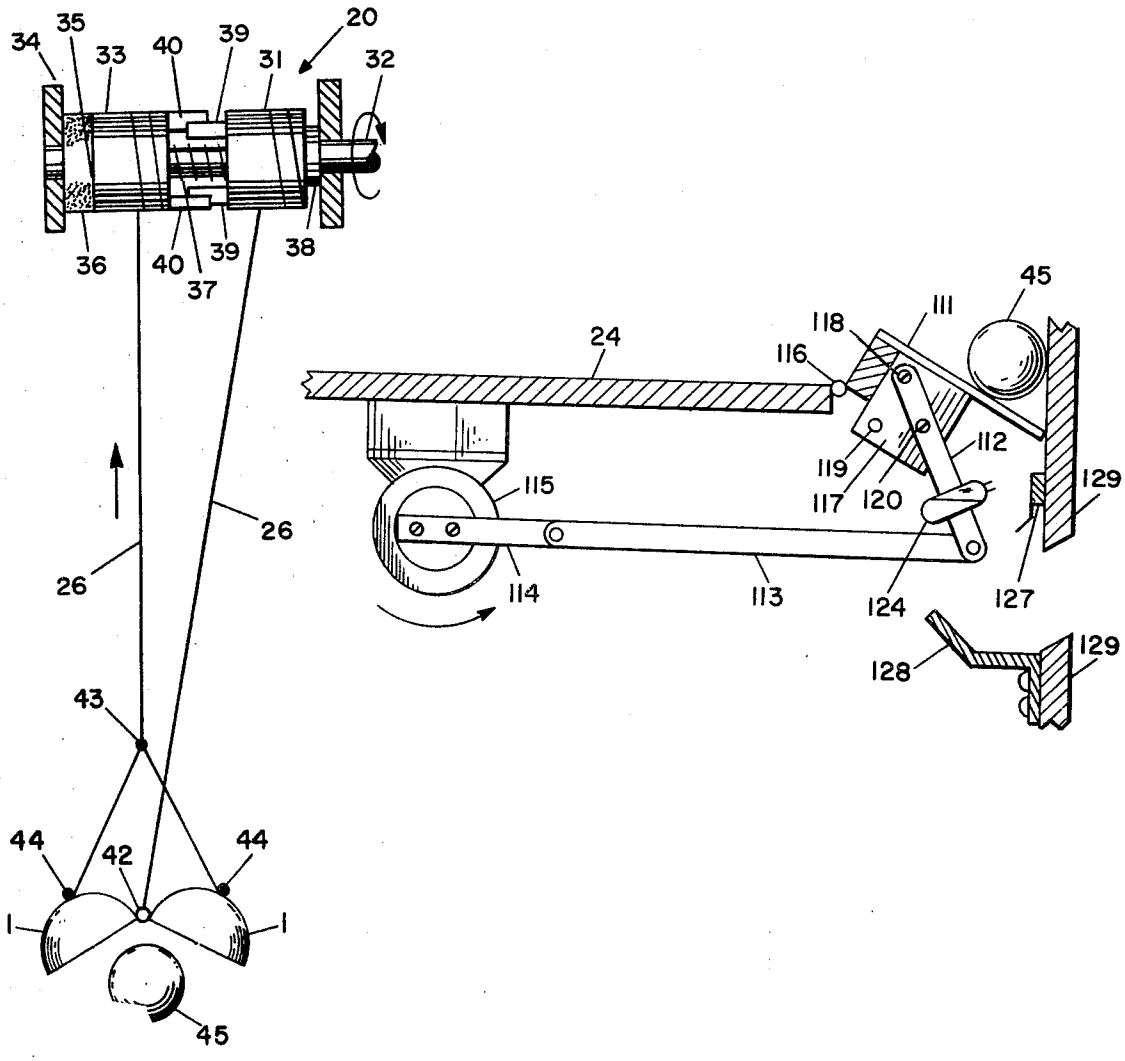
1,882,563	10/1932	Bartlett	221/210X
1,958,037	5/1934	Engler	254/184
2,600,849	6/1952	Collins et al.	221/210X

FOREIGN PATENTS

508,937	1920	France	254/184
544,333	1922	France	254/184
662,305	1964	Italy	221/210

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Assistant Examiner—Paul E. Sharpiro
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ABSTRACT: A three dimensional game and vending apparatus with opposing cups attached to a winch mechanism with this mechanism motor controlled for movement in a horizontal plane by movement of a rotatable pair of winch drums along a square support shaft mounted on a carriage mechanism. The drums are mounted on a common horizontal axis and each drum has protruding pins which engage the pins on the other drum. A ball or capsule of merchandise is dropped by the cups on a leaf mechanism which may be adjusted for either return to the game or dispensed in a vending machine.



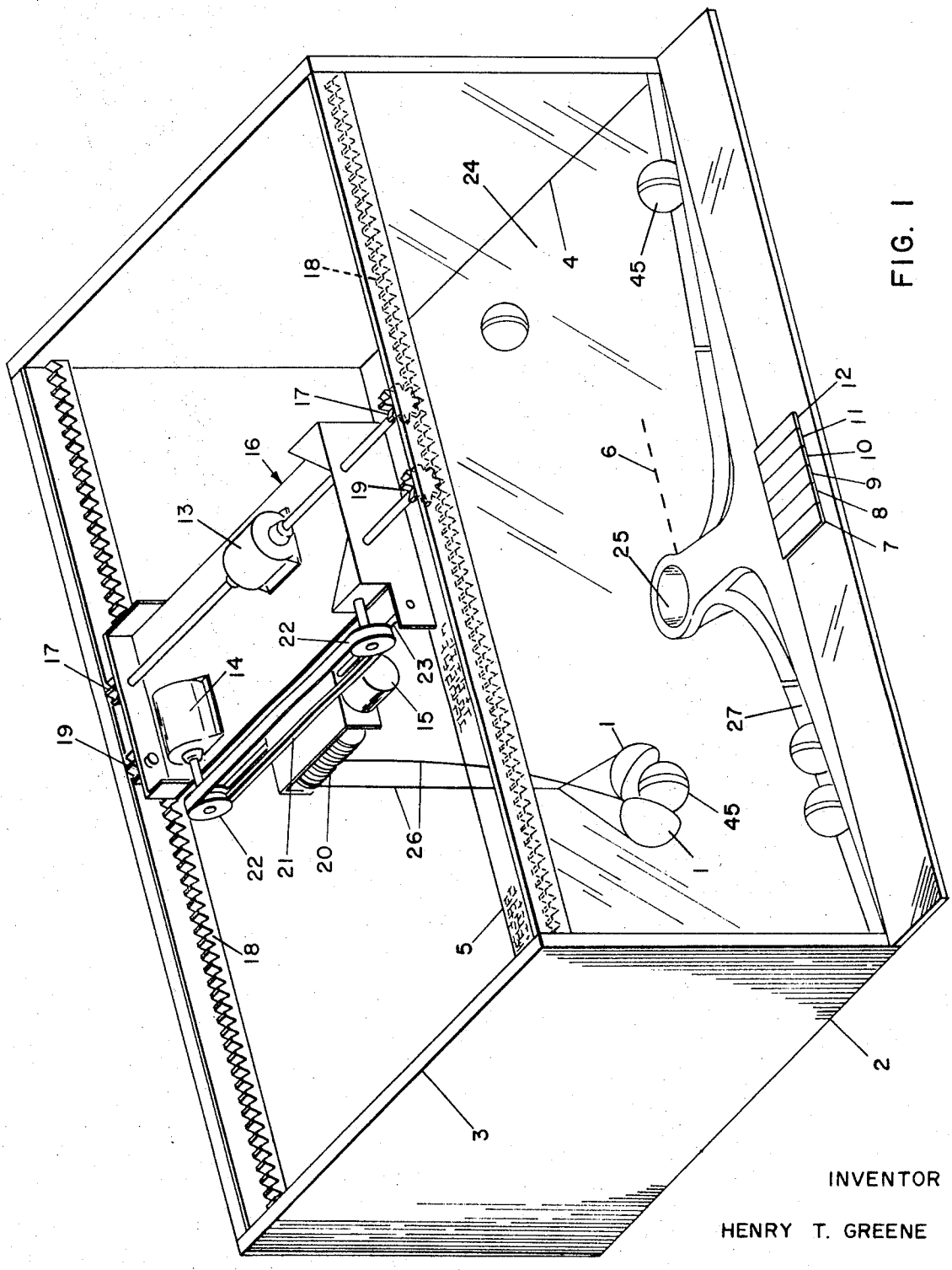


FIG. 1

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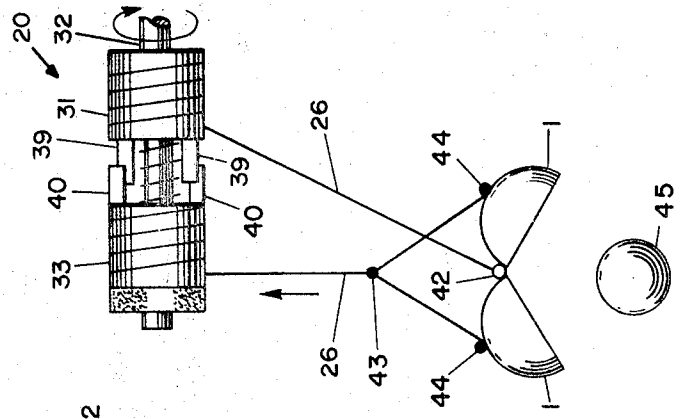


FIG. 5

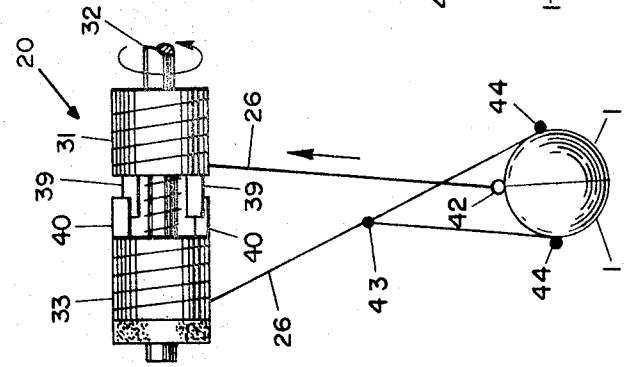


FIG. 4

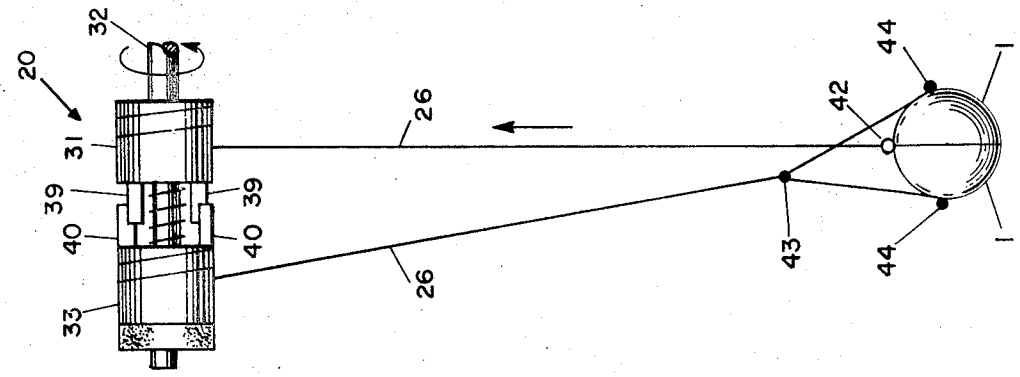


FIG. 3

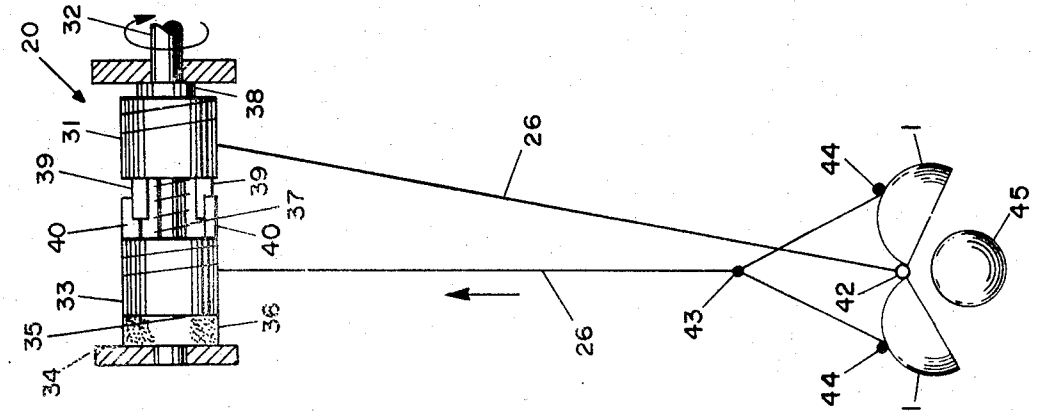


FIG. 2

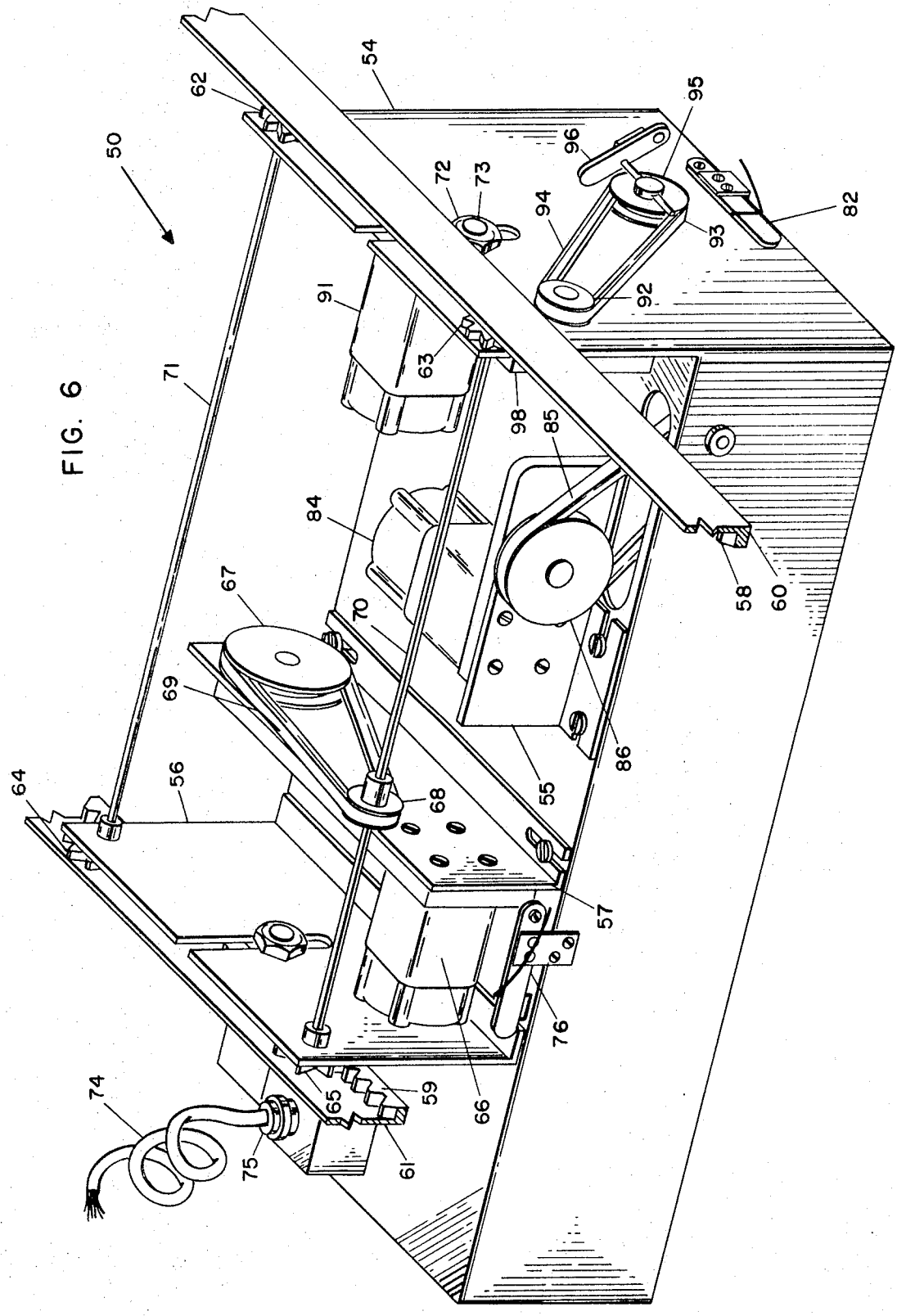

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FIG. 6

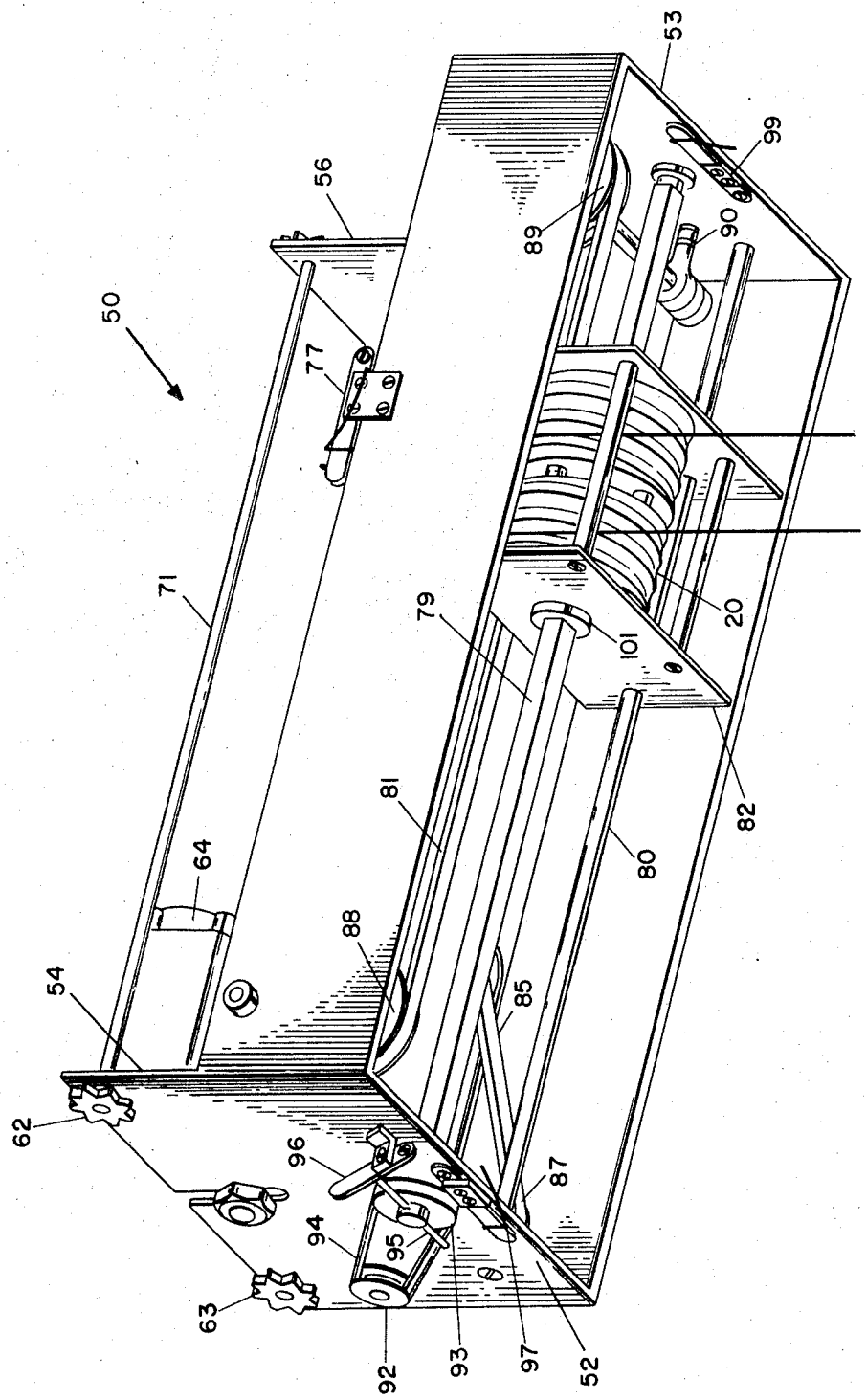


FIG. 7

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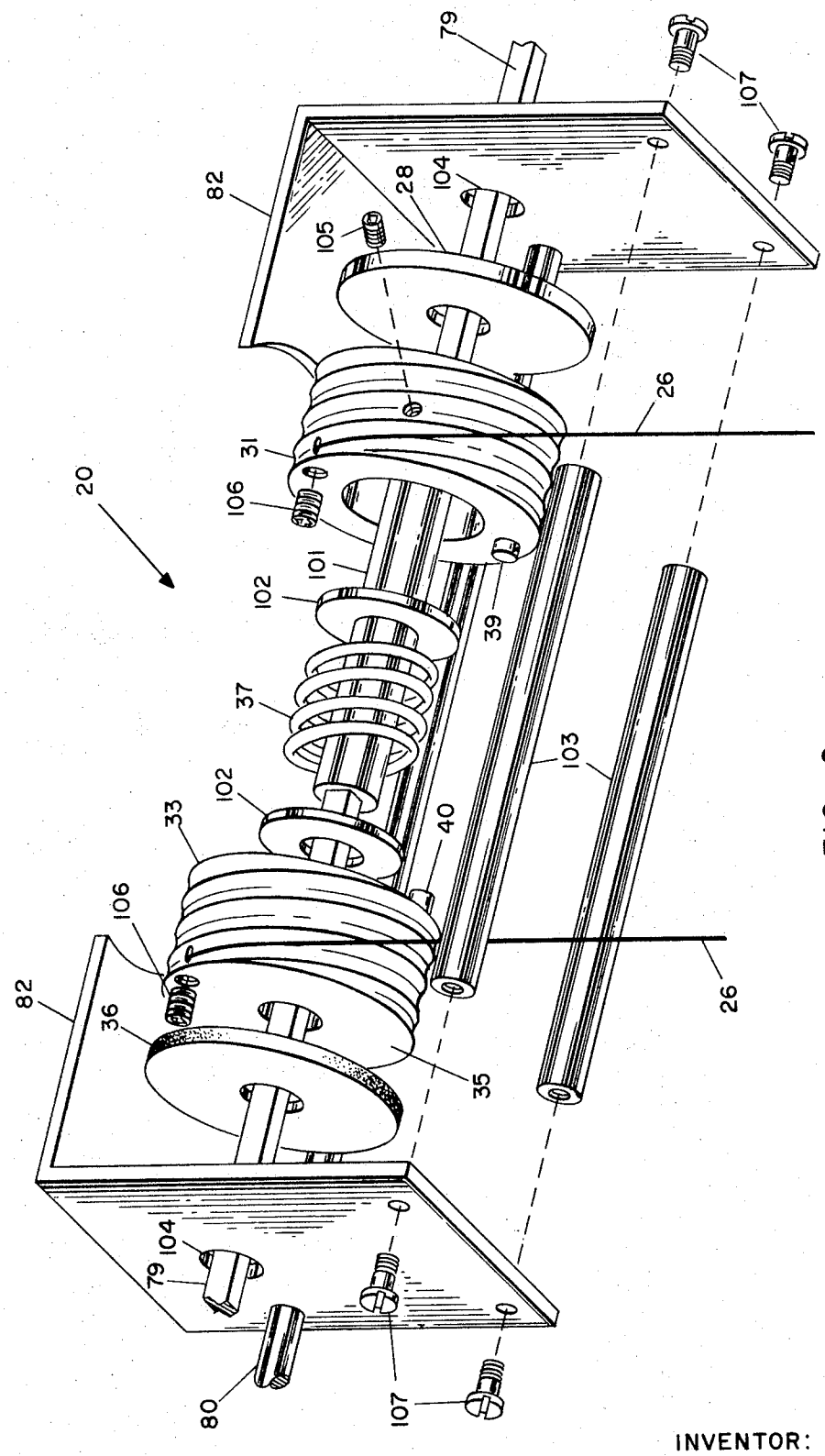


FIG. 8

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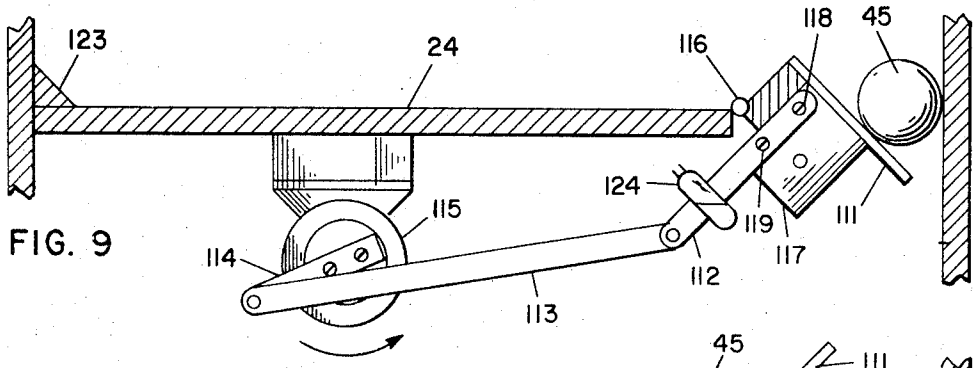


FIG. 9

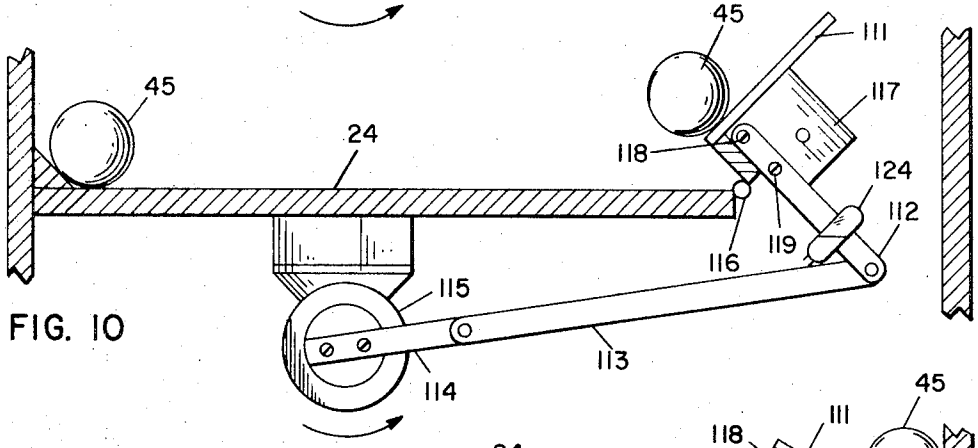


FIG. 10

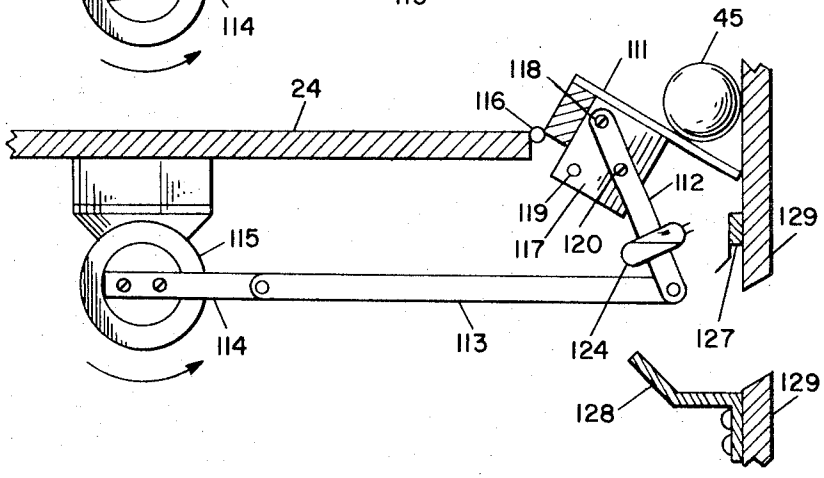


FIG. 11

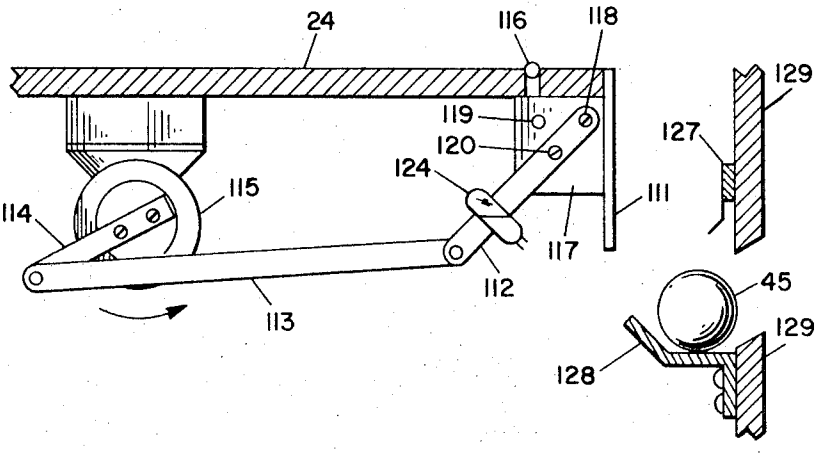


FIG. 12

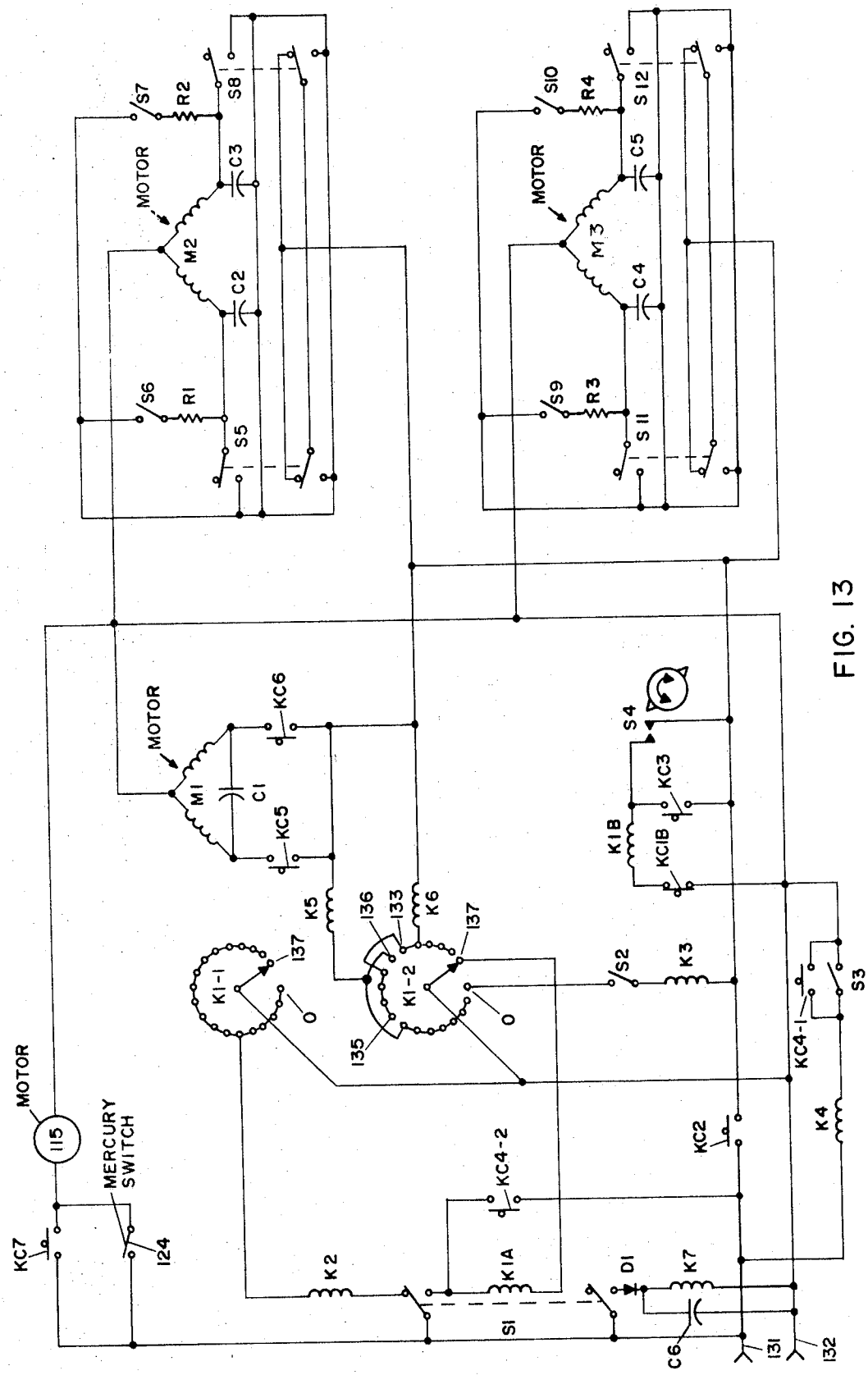

MOTOR
115
MERCURY SWITCH
KC7
124
MOTOR
M1
C1
KC6
KC5
MOTOR
M2
C3
C2
S7
R2
S8
S6
R1
S5
MOTOR
M3
C5
C4
S10
R4
S12
S9
R3
S11
K5
136
133
K6
137
K1-1
K1-2
135
0
S2
K3
S4
KC3
K1B
KC1B
KC4-1
S3
K4
KC2
KC4-2
K2
K1A
S1
D1
K7
C6
131
132

FIG. 13

THREE DIMENSIONAL GAME AND VENDOR APPARATUS

The present invention relates to apparatus which may operate as a game or as a vending machine or which can combine the game portion as part of the venting apparatus.

In games and vending machines of the three dimensional type which are manually operated, it is important to overcome disadvantages inherent in that type of apparatus. This has been done by automated games which portray the game in its conventional form, but automate its operation, still leaving certain skills to be required in its operation. Such automation minimizes the loss and breakage attributable to participant usage, and requires less floor area and can be made in a form to permit installation in establishments not able to accommodate the game in its conventional and original form.

In addition, the game any be combined with venting apparatus so as to be used as a novel game vender offering a large choice of encapsulated merchandise wherein the participant is permitted a selection of attractively displayed wares while introducing an amusement factor which should enhance the sale of the merchandise.

Basically, the present invention is a three dimensional apparatus which may be operated either as a game or capsule vender or combination of both, wherein the controlled play can traverse the full length, depth, and height of the field of play either singly in each direction, or simultaneously in a direction of combined directional movement requiring skill which determines the participant's final tally accumulated during the duration of play. The time of play is determined by factors such as the participant's skill, a programmed time limit, or allowing the participant to play until a capsule is dispensed.

Depending upon the type of game and whether the machine is also a vending machine, the capsules used may take any of several forms. If a rolling motion of the capsule is desired, it should be spherical, of course, as a ball. Either the capsule or ball in play may be dispensed in a vending machine or the capsule may activate the machine when it reaches a predetermined position so as to dispense a different capsule especially made to be vended. Such a machine may be particularly useful in the vending of flexible capsule containers designed specifically for merchandising soft ice creams, frozen custards or other merchandising derivatives of the ice cream or soft food industry wherein the product can be consumed by removing an outlet lid or cover and squeezing the encapsulated contents into the mouth. Such containers may be made in configurations depicting cartoon or popular characters to further promote the sales of the products.

Another object of the present invention is to provide the composite mechanization of an apparatus capable of acquiring and depositing one or more balls or capsules through the control of a game cup which operates either independently or concurrently in three dimensions within a field of play having boundaries which are defined by the length, height, and depth of a given housing of economical and durable construction.

Still another object of the present invention resides in providing a bidirectional winch mechanism which controls, by its revolving action about a horizontal axis, the vertical position, the opening and closing, and the lift of a game cup as is required for the acquisition, transport and release of game balls or capsulated merchandise.

A further object of the present invention is to provide a leverage controlled leaf mechanism which may be employed as a game ball accumulator and dispersion device or a pickproof vending shutter and as such is convertible to either form by the relocation of a linking arm.

A still further object of the present invention is to provide a game cup having spherical cups and capable of opening and closing for the purpose of picking up game balls and capsules.

These and other objects and innovations of the invention will become apparent in the subsequent description in the following specification and drawings, in which:

FIG. 1 is a reduced size perspective view of the composite three-dimensional convertible game-vending apparatus;

FIGS. 2, 3, 4 and 5 are detailed views of the winch and game cup mechanism;

FIG. 6 is a top perspective view of the carriage assembly;

FIG. 7 is a bottom perspective view of the carriage assembly of FIG. 6 from the opposite side shown in FIG. 6;

FIG. 8 is a perspective exploded view of the bidirectional winch mechanism;

FIGS. 9, 10, 11 and 12 are partially sectioned views of the leverage-controlled leaf mechanism; and

FIG. 13 is an electrical schematic diagram of the three-dimensional game-vendor apparatus.

Referring first to FIG. 1, game cups 1 may be positioned and operated within the height, length or depth dimensions shown by boundaries 2—3, 2—4, and 5—6, respectively, either independently or concurrently by manual operation of pushbuttons 7, 8, 9, 10, 11 and 12, which electrically actuate motors 13, 14 and 15, causing the mechanical movement of game cups 1 in one or both axes of the horizontal plane and/or the vertical plane respectively within the three dimensional field of play which is restricted to the limits of the aforementioned boundaries for the purpose of providing an electromechanical ball game or vending machine wherein the intent of the operation is to acquire, transport and deposite balls or merchandise from the field of play to an accumulator or dispensing chute.

To attain this object, pushbuttons activated by piano keys 7 and 8 control right and left movement respectively of carriage assembly 16 by running motor 13 clockwise or counterclockwise which results in the rotation of gears 17 in pinion tracks 18, causing like rotation of the follower gears 19 which stabilize the carriage when right or left movement is encountered. Similarly, motor 14 is caused to rotate clockwise or counterclockwise when pushbuttons controlled by piano keys 9 or 10 are depressed, thus resulting in forward or aft movement of the winch mechanism 20 and its associated drive motor 15. This is effected by the resulting movement of belt 21 that is attached to mechanism 20 whose movement corresponds to the rotation of motor 14 and pulleys 22. Support shaft 23 serves to guide mechanism 20 when movement of mechanism 20 is encountered. Correspondingly, vertical movement of the game cups 1 is controlled by pushbuttons controlled by piano keys 11 and 12, which causes motor 15 and the driven drum 31 (FIG. 2) of winch mechanism 20 to rotate either clockwise or counterclockwise. The bidirectional winch 20 functions to open, close, raise and lower the game cups 1, as is required to pick up and release game balls or capsules 45.

Simultaneous operation of two or more of keys 7—8, 9—10 and 11—12 permits the game cups 1 movement to traverse two or three axes concurrently. Simultaneous operation of opposing positions within any one of the three axes is prevented by electrical restraints designed into the electrical switching circuit. Similarly, electrical limit switches constrain the mechanical limit in which movement in the horizontal plane may be attained.

FIG. 2, 3, 4 and 5 illustrate the manner in which the winch mechanism 20 operates to perform its function of controlling game cups 1. Referring to FIG. 2, the driven winch drum 31 is attached to and rotates with the drive shaft 32, which derives its torque from electric motor 15 which is controlled by operation of pushbutton by keys 11 and 12. The inner surface of clutch drum 33 and a bearing (not shown) mounted in clutch brake plate 34 form a bearing surface wherein the shaft 32 may freely rotate. Movement of drum 33 is prevented due to a pushing force acting against end bearing 38 and the end surface 35 of drum 33, which causes friction brake washer 36, attached to the clutch drum 33, to act against brake plate 34 so as to equalize the force set by the compression spring 37. Clutch drum 33 is caused to rotate in accordance with the rotation of driven drum 31 when studs 39, attached to drum 31, engage studs 40 which extend from drum 33. In the angular position shown, said clutch engagement results in a clockwise rotation of both drums 31 and 33, thus causing descent of the game cups 1 by virtue of its gravitational pull

against points 42 and 43 which receive the cables disseminating from drums 31 and 33. Furthermore, said clutch engagement provides more tension on the cable attached to juncture 43 than on that cable attached to juncture 42, thereby causing lift at points 44 which, in turn, causes the two hemispheres 1 to be positioned open.

A game ball 45 is acquired by the game cups 1 when the drive shaft 32 is reversed from a clockwise to counterclockwise rotation. FIG. 3 shows that counterclockwise rotation of shaft 32 disengages the driven clutch stud 39 from follower stud 40, thereby causing more tension on pivot 42 than on pivot 43, since drum 33 is friction locked in its last position. Thus the lift applied to point 42 is transferred to pivot point 43, which in turn closes the cups about the ball 45 by the weight of the gravity-loaded cup hemispheres 1. Continued counterclockwise rotation of shaft 32, as in FIG. 4, causes driven studs 39 to engage with studs 40, thereby causing drum 33 to follow drum 31 which thereafter maintains the relative tension between the cables 26 attached to points 42 and 43 during the time game cups 1 are elevated by cable takeup due to the rotation of drums 31 and 33. The release of ball 45 is accomplished by again reversing the rotation of shaft 32, as is illustrated in FIG. 5. Counterclockwise rotation of shaft 32 disengages drum 31 from drum 33, which action causes the gravity-loaded cups 1 to transfer their load from point 42 to point 43 since drum 33 no longer rotates. Such action thereby provides lift to pivot point 44, causing the game cups 1 to open and release the ball 45. Following this action, continued counterclockwise rotation of shaft 32 causes the driven studs 39 to engage with follower studs 40, thus permitting the game cups 1 to descend to the position shown in FIG. 2.

The overall mechanization of the game apparatus depicted in FIG. 1 has been described insofar as the mechanics involved in acquiring and transporting the game ball 45 from playing table surface 24 to its disposition in pocket 25, or any other objective pertinent to a given game or vender; however, to make the game more appealing and to provide greater challenge to the participant, additional features can be added. In the case of a pool game for example, a storage rack 27 may be added to display the player's or players' accumulative score with provisions to release the balls either on the player's command or game initiation or termination where said release is mechanized so as to insure uniform ball distribution on the playing field. This ball release mechanization is fully described in the portion of the specification that follows, where details of this mechanism are discussed in connection with FIGS. 9—12. Another feature of the bidirectional winch mechanism not heretofore mentioned is that when the cable 26 of FIG. 1 is released for the descent of the game cups 1, such release is accomplished with an aftward movement of the cable 26 as it unwinds from the winch drums 31 and 33. This action requires additional skill on the part of the participant in order to compensate for this movement when the cups have been positioned over a given object to be acquired. Another feature that makes the game more challenging is an electrical program which permits only a limited time for the participant to deposit the ball in pocket 25 after the descent command of the cups is initiated by the participant. As such, failure to manipulate the controls within the prescribed time limit releases the ball back to the playing field. This feature and the game duration control (time or play until lose) are described within the context of the discussion of the electrical control circuitry.

When conventional momentary push button switches are subjected to public usage, as is experienced by amusement and vending machines, extraordinary measures must be taken to protect both the mechanical and electrical functions of said devices. A further requirement of the stated employment is that the surface area of the manually operated pushbutton actuator must be large for easy accessibility and operation. Such an actuator which fits these specifications is in the form of piano keys 7—12. Conventional pushbutton switches may be mounted below keys 7—12 and be enclosed by them so as to be actuated when any of keys 7—12 are pressed. To accomplish this the ends of the keys 7—12 within the enclosure of the apparatus may be hingedly attached with a means to limit the downward travel of the keys to prevent pressing buttons beyond their limits of travel in the switches. Rocker switches may be assembled in a like manner.

The carriage assembly 16 shown in FIG. 1 is shown in simplified form. A more detailed disclosure of a carriage assembly structure is shown in FIGS. 6 and 7. The compact assembly 50 shown in FIGS. 6 and 7 is packaged as a lightweight unit so as to permit its use either in a console or upright game or vending apparatus. In operation, the carriage 50 is suspended by pinion tracks 58 and 59, whose support is sustained by firmly anchoring steel angles 60 and 61 to the inside walls of the housing enclosing the game apparatus. Spur gears 62, 63, 64 and 65 ride in said pinion tracks 58 and 59 to provide a geared raceway for the carriage 50 when motor 66 drives spur gears 63 and 65 through pulleys 67 and 68 which are mechanically coupled by belt 69 and shaft 70. Follower gears 62 and 64 coupled by shaft 71 provide carriage balance. Roller bearing 72 and its like member mounted in bracket 56 serve to affix the carriage gear brackets 54 and 56 to the underside of pinion track supports 60 and 61, thus preventing gear jumping which would otherwise occur in transport or rough usage. The idler bearing 83 may be adjusted by releasing nut 73, thence permitting bearing shaft movement in the slots provided in brackets 54 and 56.

Electrical power and control inputs are provided from an overhead flexible cable 74, which terminates in a chassis mounted quick disconnect plug 75. Limit switches 76 and 77 serve to initiate motor dynamic braking and interrupts the electrical input to motor 66 when the carriage 50 approached either sidewall of the game housing.

The winch mechanism 20, which slides along square shaft 79 and support rod 80, is positioned in the longitudinal plane by belt 81, which is attached to the top of the winch casing 82. Limit switches 97 and 99 are provided to cause cessation of drive when either end of the winch casing 82 approaches end plates 52 and 53. This is done by dynamic braking of motor 84, which drives belt 81 through belt 85 and pulleys 86, 87 and 88. Tension of belt 81 is derived from the bearing surfaces of the shafts on which pulleys 88 and 89 are mounted. The shaft attached to pulley 89 is made variable in the longitudinal plane of belt 81 to provide tension adjustment thereof by tightening eye bearings 90 (one not shown) by means of a nut affixing the threaded shaft of the bearing. The rotation of the winch 20 drums is controlled by motor 91 which drives the square shaft 79 projecting through the winch mechanism 20, by means of pulleys 92 and 93 that are coupled by belt 94. Each motor bracket 55, 57 and 98 is equipped with a variable adjustment so as to permit tension control of their respective belt drivers.

FIG. 8 illustrates in detail the assembly of the constituent parts comprising the winch mechanism 20. The principal parts, some of which were discussed in connection with FIGS. 2—5, are casing 82, square drive shaft 79, drive sleeve adapter 101, compression spring 37, steel washers 102, driven drum 31, clutched drum 33, leather brake washer 36, alignment support rod 80, washer 28, and spacer rods 103. Casing holes 104 are of such a diameter to permit clearance of the drive sleeve adapter 101 when the mechanism is assembled. Thusly assembled, square shaft 79 slides within the inner square bearing surface of the sleeve adapter 101 whose outer round surface clears the first boring provided in drums 31 and 33. A second larger boring is provided in the ends of the drums to accept the compression spring 37 and the steel washers 102 so as to permit engagement of studs 39 and 40 when the mechanism is assembled. The leather brake washer 36 is fastened to the end surface 35 of drum 33, thereby providing a friction surface against the inner facing of the end casing. The driven drum 31 is affixed to the drive sleeve adapter 101 by setscrew 105 as are the cables wound around each drum set by screws 106. Spacer rods 103 are held by screws 107 and provided to channel the cables 26 for the proper alignment of

these cables. Likewise, alignment rod 80 maintains the mechanism alignment within the carriage mount 50 or 16. Assembled, the device functions the same as described in connection with FIGS. 2, 3, 4, and 5 except that the mechanism now slides longitudinally upon its own drive shaft 79.

By replacing the cables 26 shown in FIG. 8 with ball chains, twisting and tangles which occur during operation are prevented, since each ball link of such chains can swivel about 360°. Corresponding improvements may be made in the carriage assembly 50 shown in FIGS. 6 and 7 by replacing the pulley and belt drive design with roller chains and sprocket gears. These and other changes can be made within the spirit of the invention utilizing the techniques of pneumatics, hydraulics, magnetics, and electrostatics, but only a preferred embodiment has been illustrated herein.

A further aspect of the apparatus of the present invention is a convertible leverage-controlled leaf mechanism which permits the apparatus herein described to be employed as either a game or vending machine. FIGS. 9 and 10 illustrate the manner in which said device functions when the apparatus is employed as a game. When the leaf 111 is in the position shown in FIG. 9, it serves as a rack in which balls 45 may be deposited subsequent to the participant's manipulation of placing the balls 45 in an appropriate pocket or hole 25 (FIG. 1). In this position, lever arms 112, 113 and 114 are held rigid by virtue of a mechanical brake associated with drive motor 115. Upon command, coin insertion or other, motor 115 commences to rotate counterclockwise, thereby causing the leaf 111 to pivot on hinge 116 and rotate in an upward direction as a result of the follower action of lever arms 114, 113 and 112, whose resultant movement is applied to leaf bracket 117 since lever arm 112 is firmly attached to bracket 117 at points 118 and 119. As the pivot points associated with lever arms 112, 113 and 114 move to the extreme right, all balls 45 deposited in the rack leaf 111 are released back to the playing table surface 24 due to the momentum resulting from the lift applied to leaf 111 and the gravitational force established by the elevation of the balls 45 above the table surface 24, as shown in FIG. 10. Both the torque and elevation of the leaf 111 are adjusted to permit the balls 45 to travel from their positions on top of leaf 111 to table surface 24 at such a velocity as to cause the balls 45 to spin when they encounter ramp 123 on the opposite side of table surface 24. This action results in a random distribution of all balls on the surface 24 of the playing field as they are dispersed from the ramp formed by leaf 111. The unidirectional rotation of motor 115 then completes one cycle of operation and then ceases to rotate when the lever arms 112, 113 and 114 return to the position shown in FIG. 9. This entire operation is controlled by mercury switch 124. As shown in FIG. 9, when switch 124 is in the open position, a momentary excitation of motor 115, through a coin initiated time delay relay, causes the lever arm 113 to move to the right, consequently causing switch 124 to close its contacts which become the only source of electrical power to motor 115 after the time delay relay has become deenergized. This is further explained in connection with the electric control circuit schematic diagram of FIG. 14. Continued counterclockwise rotation of the motor 115 permits the switch 124 to remain closed until such time as the initial start position of FIG. 9 is approached, at which time switch 124 opens its contactors and thereby interrupts the input power to motor 115, which automatically is set into its mechanical brake condition.

The leaf mechanism described above is readily adaptable for employment as a shutter applicable to vending machines. One change required is the shifting of lever arm 112 from its connection at point 119 on leaf bracket 117 to point 120, as in FIGS. 11—12. In the leverage configuration shown in FIG. 11, mercury switch 124 must also be reversed to cause its contacts to be open in this normal inactive position to enable it to perform the same function as previously described. Thus assembled as a shutter, the hinged leaf 111 now travels in a downward direction when motor 115 commences to rotate counterclockwise, thereby causing capsule or ball 45, shown in FIG. 11, to fall to depository 128 when the leaf 111 approaches the open position shown in FIG. 12. In the path of the free fall of the capsule or ball 45 is microswitch 127 which, upon closing, terminates the vending cycle. In the event that switch 127 is not closed (indicating that a capsule or ball 45 has not been dispensed) an electrical control circuit automatically resets the vending machine for another play, to insure that the participant receives merchandise for each coin he deposits. An opening is provided in wall 129 to permit the participant to secure the vended capsule. As in the game apparatus, motor 115 continues to rotate until the shutter closed position is approached, in which position the mercury switch 124 becomes open. Another salient feature of the shutter device is that when it is in the closed condition, attempts to secure merchandise by way of the access opening in wall 129 are foiled. A similar pickproof arrangement can be made when the shutter is in the open position by attaching a second leaf perpendicular to leaf 111 so that it extends from the riser attached to pivot point 116 to wall surface 120 when leaf 111 is in the downward position, thereby providing complete merchandise security.

Reference should now be made to the electrical schematic diagram shown in FIG. 13. Switch S1, which may be operated from a coin-operated mechanism, initiates the controlled machine operation by the closure of switch S1 which actuates stepper reset coil K1A, thereby causing both ganged sections of the stepping switch K1–1 and K1–2 to reset to their zero position. Then when the upper section of switch S1 is returned to its normal position, relay coil K2 becomes energized and thereby energizes the entire control circuit by applying power from lines 131 and 132 upon closing its contactor KC2. The lower section of switch S1 corresponding actuates relay coil K7 and charges capacitor C6 through diode D1. This action causes relay coil K7 to close its contactor KC7, which in turn starts the rack release motor 115. Discharge of capacitor C6, after switch S1 returns to its normal position sustains the coil of relay K7 for a time duration necessary for mercury switch 124 to close its contact as a result of rotation of motor 115. Then relay coil K7 becomes deenergized and switch 124 assumes command of the rack operation. When the apparatus is operated as a vender, relay K7 is operated off an auxiliary point of switch K1–1 corresponding to position 133. When the control circuit is thus energized, the three positioning motors may be operated by the closure of switches S2, S5, S8, S11 or S12, controlled by piano keys of FIG. 1. Motors M2 and M3, which control the game cup positioning in the horizontal plane, are identical in their operation and therefore the control description of motor M2 is also applicable to motor M3. Motors M2 and M3 are equivalent to motors 13 or 66 and 14 or 84, respectively, which were discussed in connection with other FIGS.

Depression of push button switch S5 causes clockwise rotation of motor M2 by applying electrical power supplied through the lower section of switch S5 to both motor windings. One winding receives an in-phase current by the bridging action of the upper section of switch S5 across capacitor C2, whereas the other winding receives a leading current established by the series capacitor C3, thus resulting in a rotating magnetic field causing rotor rotation. If motor M2 is allowed to continue to rotate in this direction, limit switch S7 closes and thereby bridges out capacitor C3, which causes the rotating field to collapse, resulting in rotor lockup herein termed dynamic braking. Resistors R1 and R2 are placed in series with the limit switches so as to limit the power dissipation across the motor when it is in a brake condition. Counterclockwise rotation of motor M2 involves the operation of switch S8 and limit switch S6. Such operation is identical to that established for clockwise rotation. When both switches S5 and S8 are depressed, no current is supplied to the motor, since the lower section of both switches S5 and S8 open the AC supply.

Closure of pushbutton switch S2 causes relay coil K3 to close its contact KC3, which in turn actuates stepper coil K1B

through its normally closed auxiliary contactor KC1B. This action causes the stepper auxiliary contactor KC1B to open, and thus advances the wiper of the stepper switch to the first position of the switch. At this time relay coil K5 becomes energized and closes its contact KC5 which causes clockwise rotation of motor M1, which action corresponds to game cup descent. In this state, switch S2 can no longer be controlled by the operator and the entire subsequent action is a result of the cam-operated switch S4, whose closure is made by a cam geared to motor M1. These are cam **95** and switch **96** of FIGS. **6** and **7**. Each closure of switch S4 which corresponds to a half turn of the winch drums **31** and **33** advances the stepper switch K1 in a clockwise direction. When the game cup descent operation is completed, the wiper of the stepper switch advances to position **135**, which deenergizes relay coil K5 and energizes relay coil K6, thus opening contactor KC5 and closing contactor KC6, thereby causing the motor M1 to rotate in a counterclockwise direction, resulting in the closure of game cups **1**. It is from this time forth that the skill of the operator is required to place the ball **45** in the pocket **25** by manipulating controls effecting the horizontal position before time limit determined entirely by the rotation of motor M1 ends its cycle. Then ascent of the game cups **1** commences and continues until the stepper switch wiper advances to position **136**, at which time the cups open and release the ball **45** if acquisition has been made. If the ball **45** drops through the pocket **25**, momentary switch S3 actuates time delay relay coil K4, which closes its holding contact KC4–1 for duration longer than the advance cycle dictated by the rotation of motor M1. Advance of switch K1–2 to position **133** causes the game cups **1** to close and accordingly positions it in the start play position by reversing the operation of relays K5 and K6. If a game ball **45** has been dropped through the pocket **25**, the stepper switches K1–1 and K1–2 are automatically reset when the wiper advances to position **137** as a result of the closed contact of KC4–2 of time delay relay coil K4 which bridges the game start switch S1. If the ball **45** does not drop through the pocket **25**, switch S1 must be reset for another play. This sequence allows the participant to play until he loses. Another method used to set the duration of the game is to let switch S3 be a section of switch S1, thus the time delay relay coil K4 is actuated upon initial operation of switch S1 and as such permits the playing time to be controlled by setting the time delay of relay K4. These and many other programmed sequences may be derived by simple wiring changes of the basic control circuit.

One inherent advantage to the control circuit herein described resides in the employment of A.C. motors for the control of bidirectional rotation. This results in an electrically quiet system which does not radiate energy to interfere with radio and television reception as is normally experienced when D.C. motors are employed.

When ice cream vending machines are used in conjunction with the present invention there is of course refrigeration system required and a heating plant required for the vending of hot food stuffs.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

I claim:

1. A three dimensional game apparatus comprising:
a casing;
a playing surface within said casing;
an article adapted for movement on said playing surface;
lifting means in said casing to grasp said article from said playing surface;
receiving means in said casing having a portion below said lifting means in one of its positions with said casing including:
a pivotable leaf means to receive said article on its surface;
motor-driven linkage means connected to said leaf means to pivot said leaf means in relation to said playing surface;
and bracket means attached to said leaf means and said linkage means;
said linkage means having at least two intermediate pivot points along its length;
said bracket means having at least three points of attachment for said linkage means, one of said points being a pivot point of attachment and the other two points being alternate points of attachment; and
whereby connection to one of the alternate points allows return of said article to said playing surface upon operation of said motor-driven linkage means and connection to the other of the alternate points allows dispensing of said article from the apparatus.

2. The apparatus of claim **1**, further characterized by mercury switch means to control movement of said motor-driven linkage means located on said linkage means, in an upright position when said linkage means is connected to one of said alternate points of attachment, and in an inverted position when said linkage means is connected to the other of said alternate points of attachment.

3. A three dimensional game apparatus comprising:
a casing;
a playing surface within said casing;
an article adapted for movement on said playing surface;
lifting means in said casing to grasp said article from said playing surface;
receiving means in said casing having a portion below said lifting means in one of its positions within said casing;
said lifting means including:
a pair of opposing cuplike containers having their open ends facing each other and attached to each other at a top pivot point;
and a winch mechanism movable in a horizontal plane and having cables connected to said cuplike containers and including:
a pair of coacting winding drums mounted on a single horizontal axis each having projecting stop pin means positioned in operative relation with each other;
one of said drums being a driven drum to be driven by the other of said drums through said projecting stop pin means;
one of said cables extending from each of said winding drums;
said cable from one of said winding drums connected to said top pivot point;
said cable from the other of said winding drums having an intermediate connection point thereon having a connecting cable to a point on the outer surface of each of said cuplike container; and
whereby the raising and lowering and the opening and closing of said cuplike containers is controlled through said cables.

4. The apparatus of claim **3**, further characterized by; and
braking means in contacting relationship with one of said winding drums including spring means between said winding drums.

5. The apparatus of claim **3**, further characterized by; and
braking mechanism including spring means in contacting relationship with one of said winding drums.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,572,703 Dated March 30, 1971

Inventor(s) Henry T. GREENE

It is certified that error appears in the above-identified paten and that said Letters Patent are hereby corrected as shown below:

In the Specification

Column 1, line 5, change "venting" to --vending--
line 16, change "venting" to --vending--

Column 2, line 24, change "deposite" to --deposit--

Column 6, line 5, change "$\frac{1}{.}$27" to --127--
line 33, change "corresponding" to --correspo

Column 7, line 22, before "time" insert --the--

In the Claims

Claim 1, column 8, line 3, change "with" to --within--
line 15, delete "; and"

Claim 3, column 8, line 57, change "container" to --containers--
line 57, delete "; and"

Claim 4, column 8, line 61, delete "; and"

Claim 5, column 8, line 65, delete "; and"

Signed and sealed this 28th day of September 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. — Attesting Officer

ROBERT GOTTSCHALK — Acting Commissioner of Pat