



US 20130147112A1

(19) **United States**(12) **Patent Application Publication**
Halliburton et al.(10) **Pub. No.: US 2013/0147112 A1**(43) **Pub. Date: Jun. 13, 2013**(54) **TRAP DOOR AMUSEMENT GAME**(76) Inventors: **Ronald Halliburton**, Delray, FL (US);
Steven Corso, Jupiter, FL (US); **Camilo Cruz**, Boynton Beach, FL (US)(52) **U.S. Cl.**CPC **A63F 9/24** (2013.01)USPC **273/148 R**(21) Appl. No.: **13/261,599**(22) PCT Filed: **Aug. 23, 2011**(86) PCT No.: **PCT/US11/01481**

§ 371 (c)(1),

(2), (4) Date: **Feb. 21, 2013****Related U.S. Application Data**

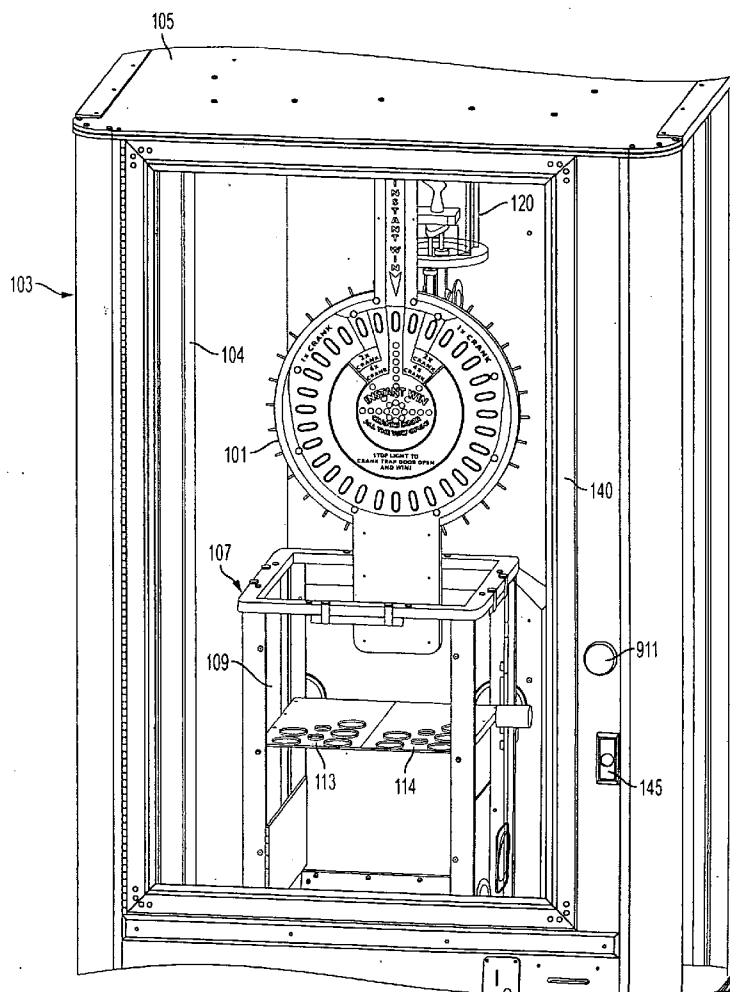
(60) Provisional application No. 61/401,941, filed on Aug. 23, 2010.

Publication Classification(51) **Int. Cl.**
A63F 9/24

(2006.01)

(57) **ABSTRACT**

An amusement game is disclosed that includes a skilled based feature that allows players to try to time the activation of a pressure sensitive switch at the same time a light is illuminated at a target position, and if the player accurately times the activation of the switch, a central proceeding unit sends a signal to a stepper motor to energized and completely open a door that is mounted in a horizontal plane by pivoting downwardly. The door is designed to supports a prize that will be distributed to a player. If the timing is not precise, a signal is sent to a central proceeding unit to incrementally open the door. As the door continues to be opened, any prize that is supported by the door will eventually distributed as the door is allowed to be directed to the prize to a receiving area. Sensors provided on the door detect the absence of a prize on the door and send a signal to a central processing unit to activate a claw mechanism that transfers prizes from a retaining area to a position on said door.



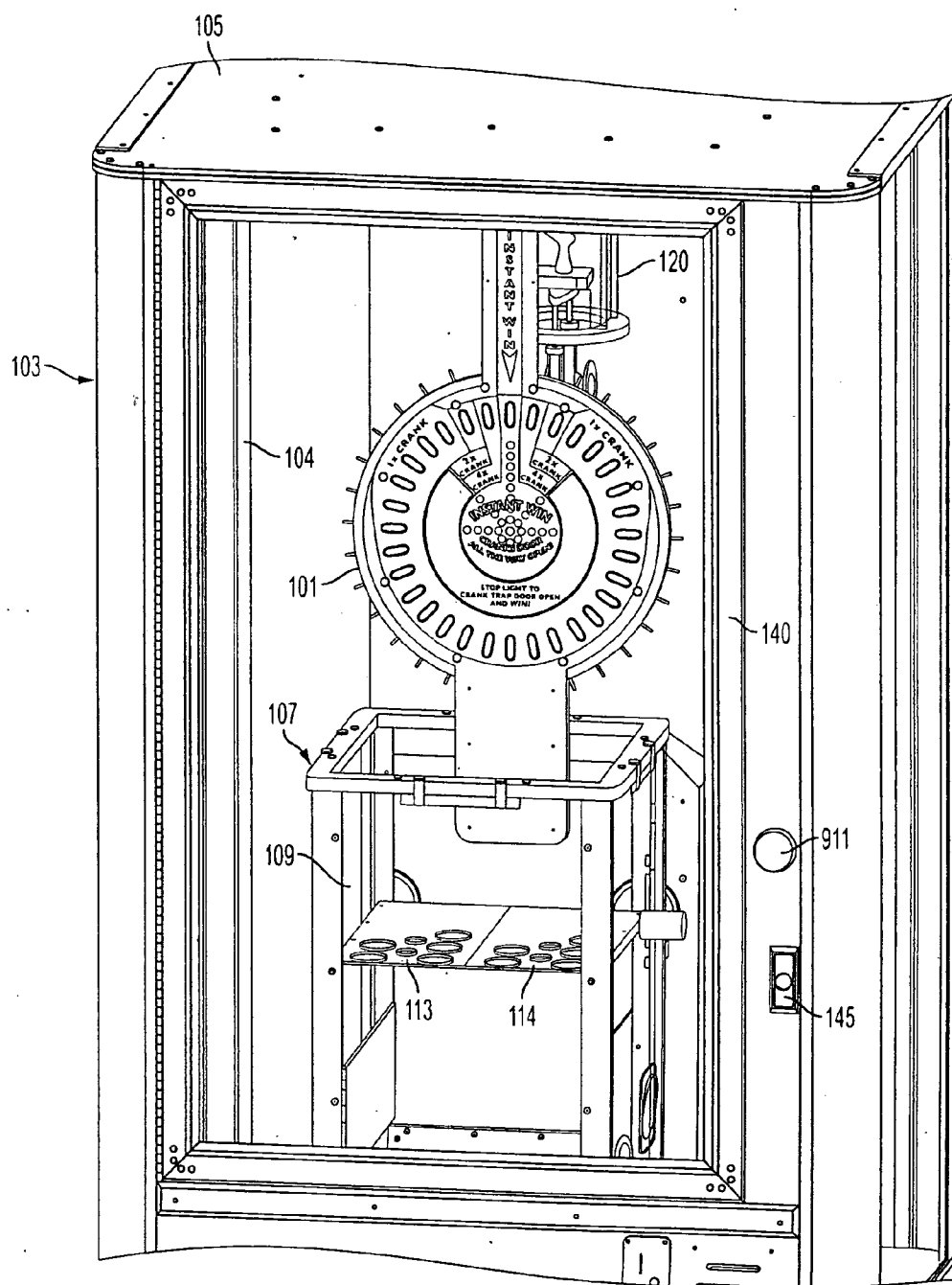


FIG. 1

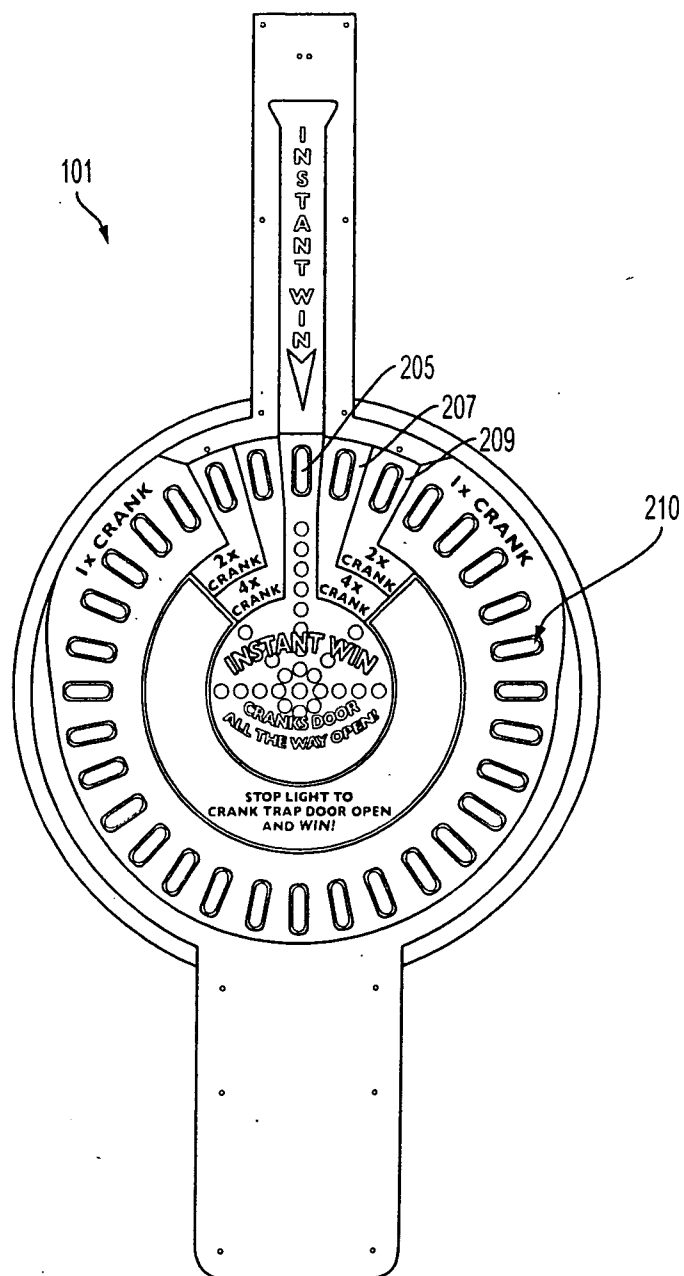


FIG. 2

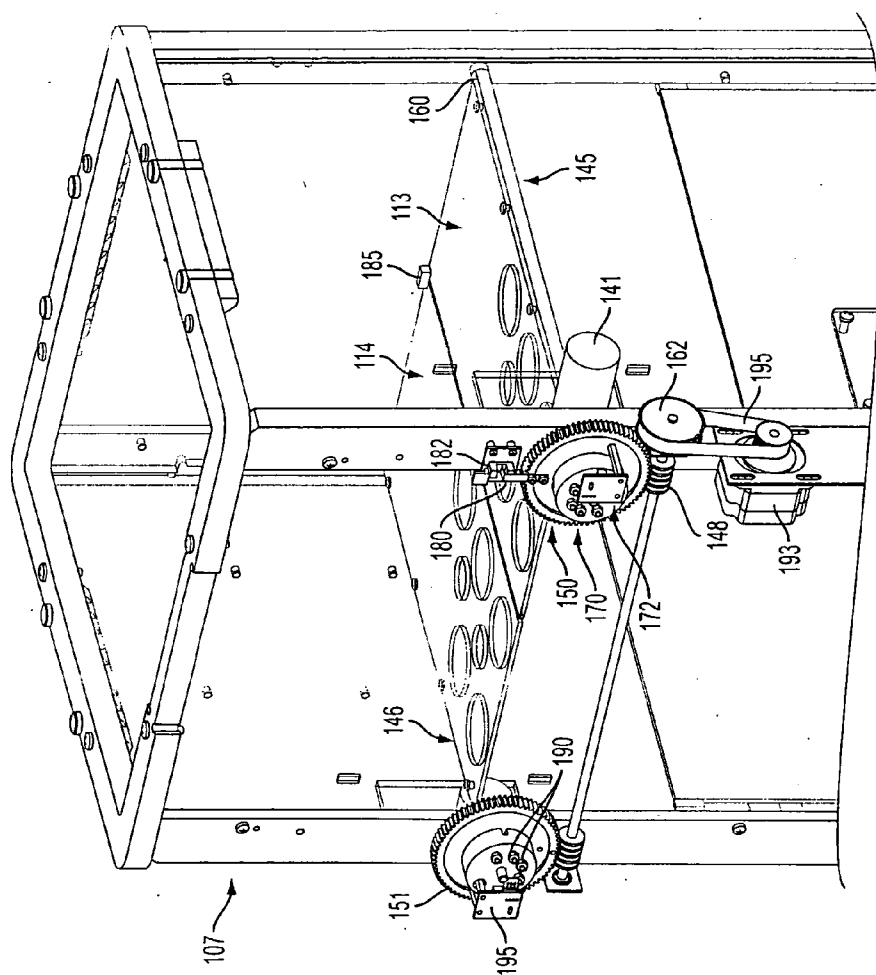


FIG. 3

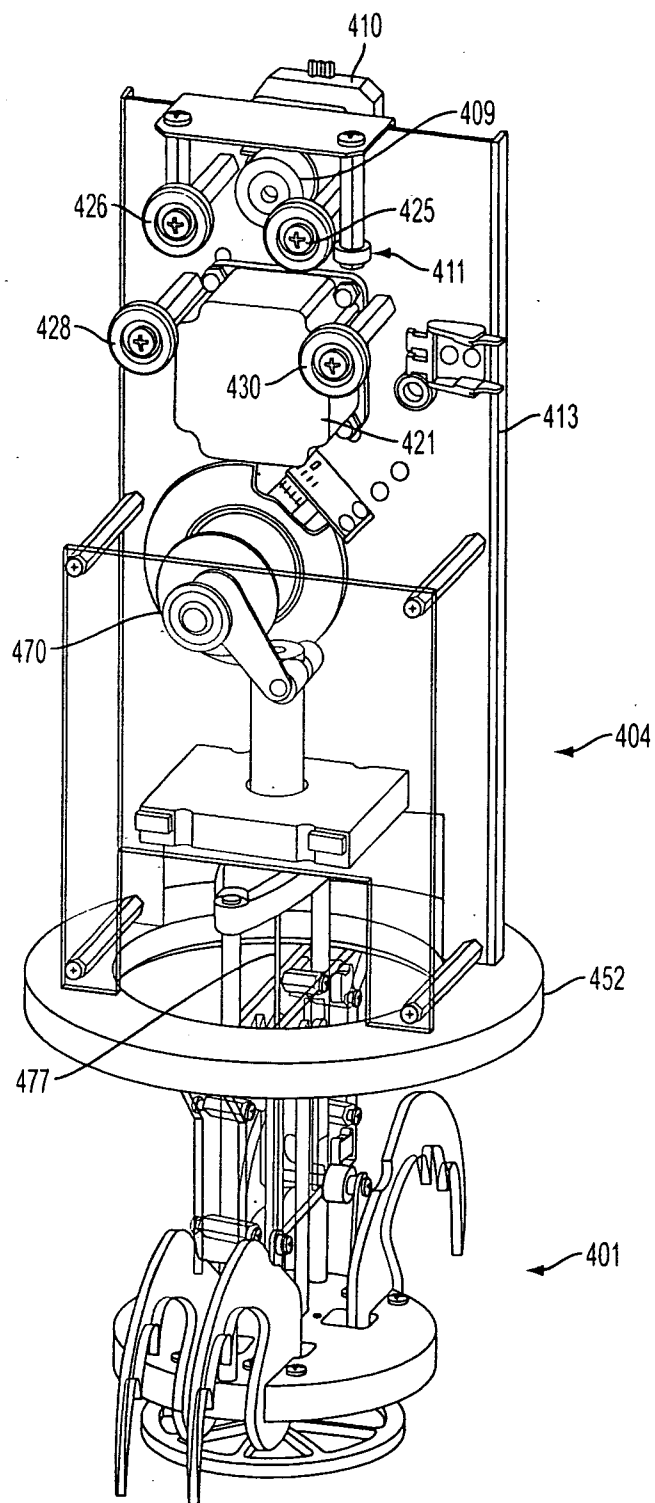


FIG. 4

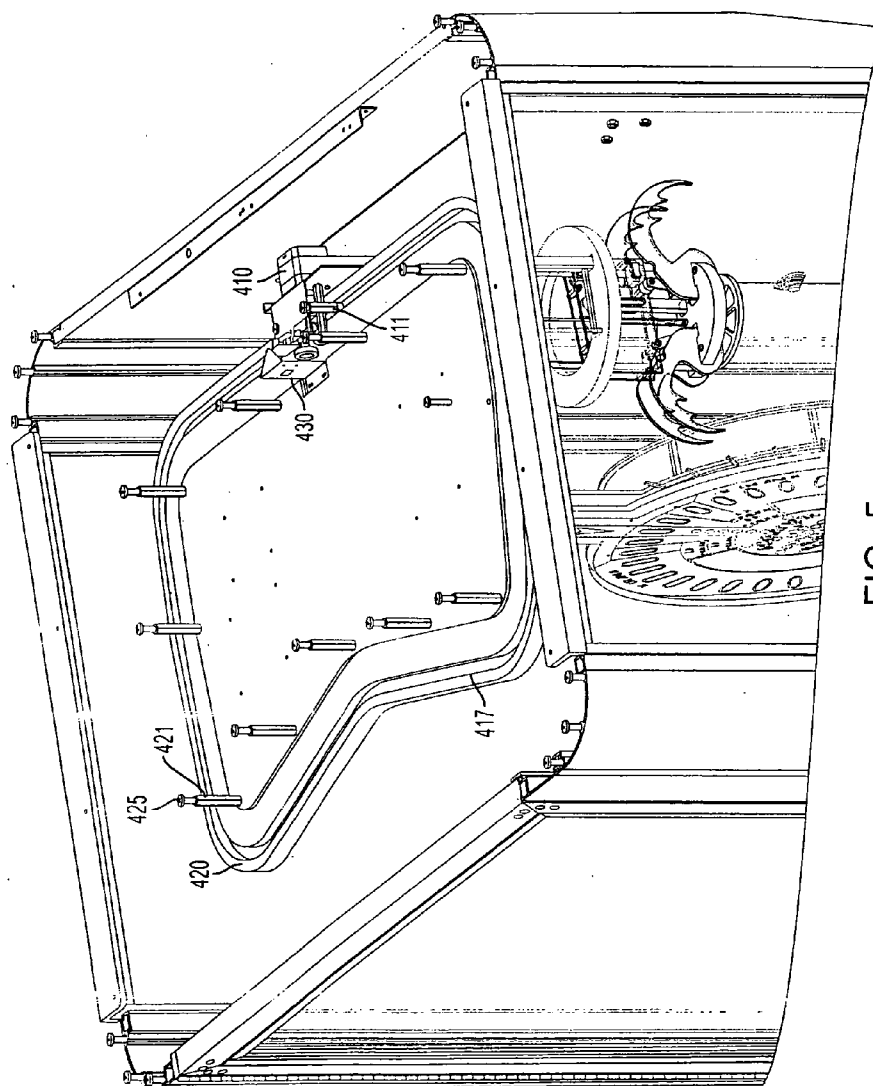


FIG. 5

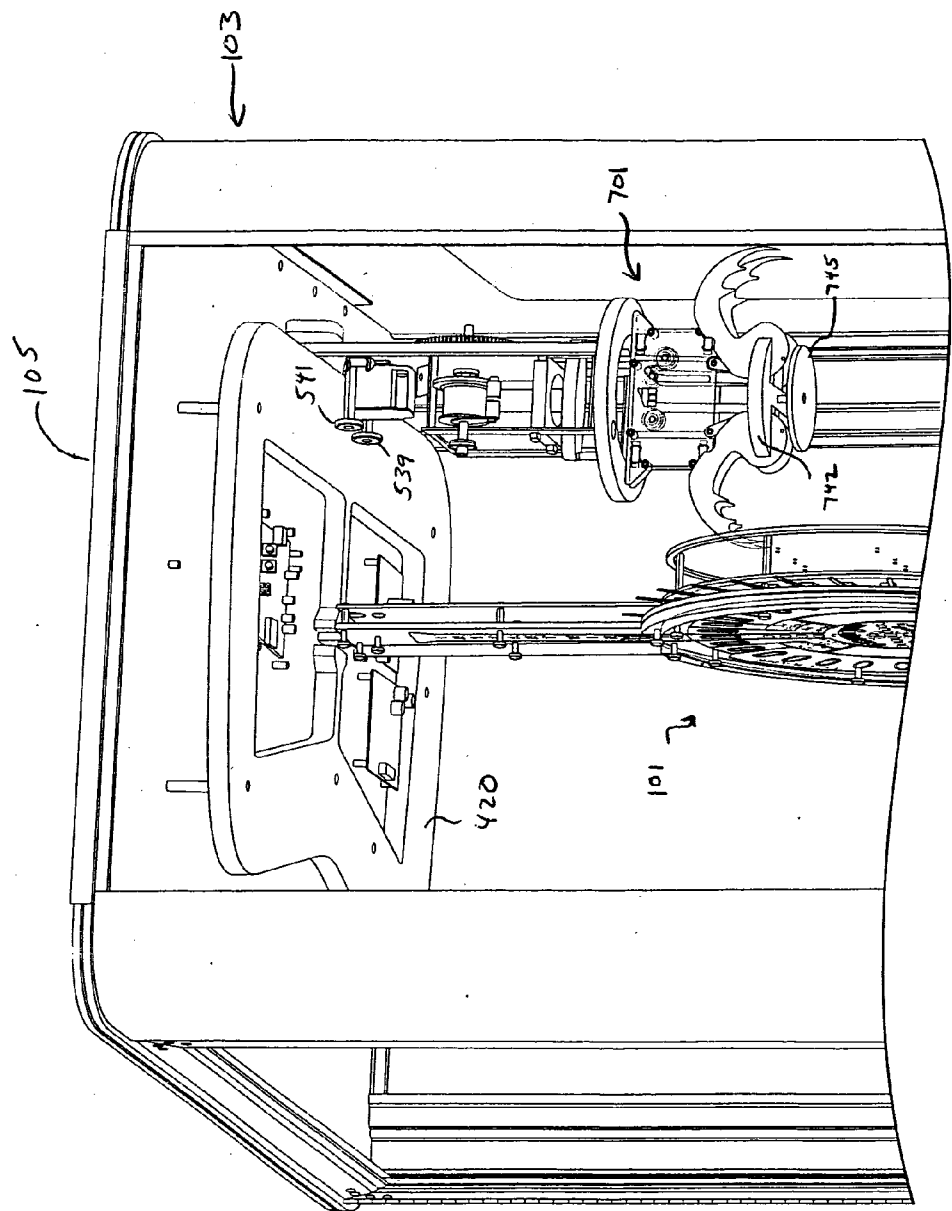
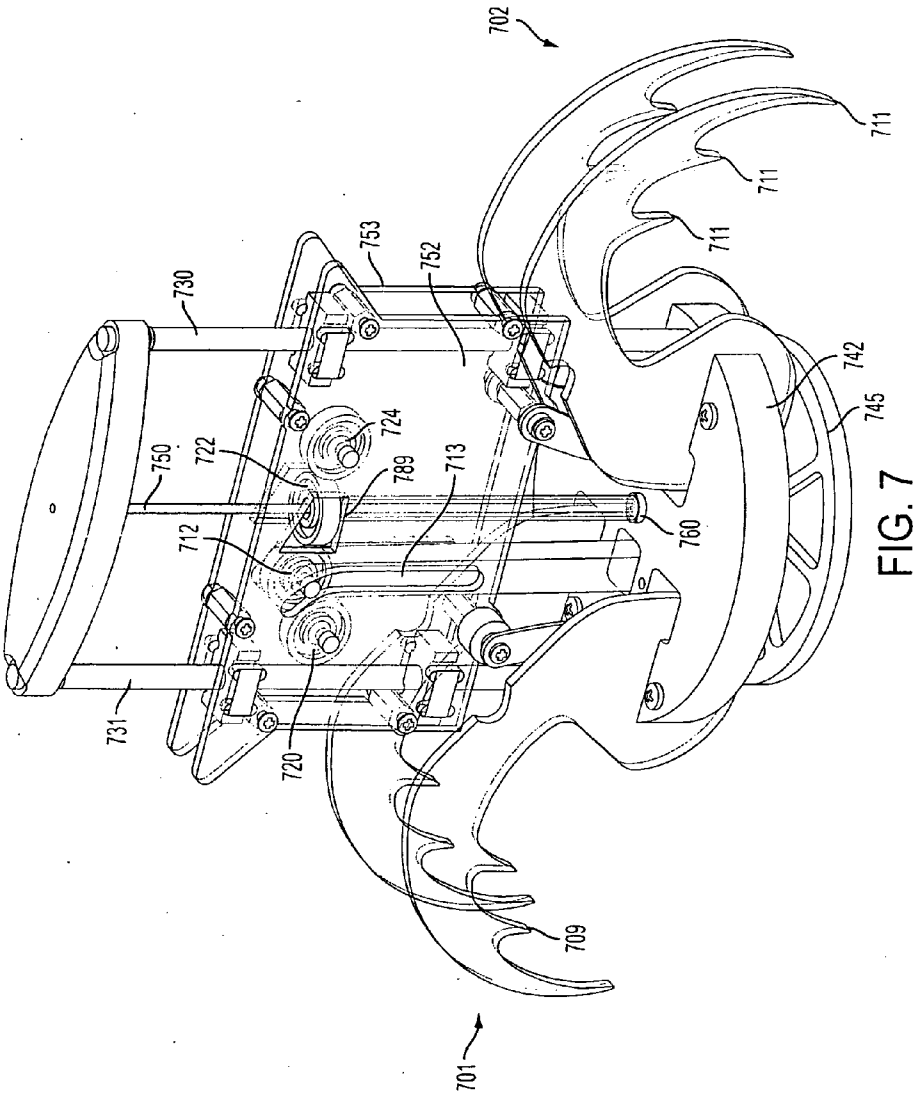


FIG. 6



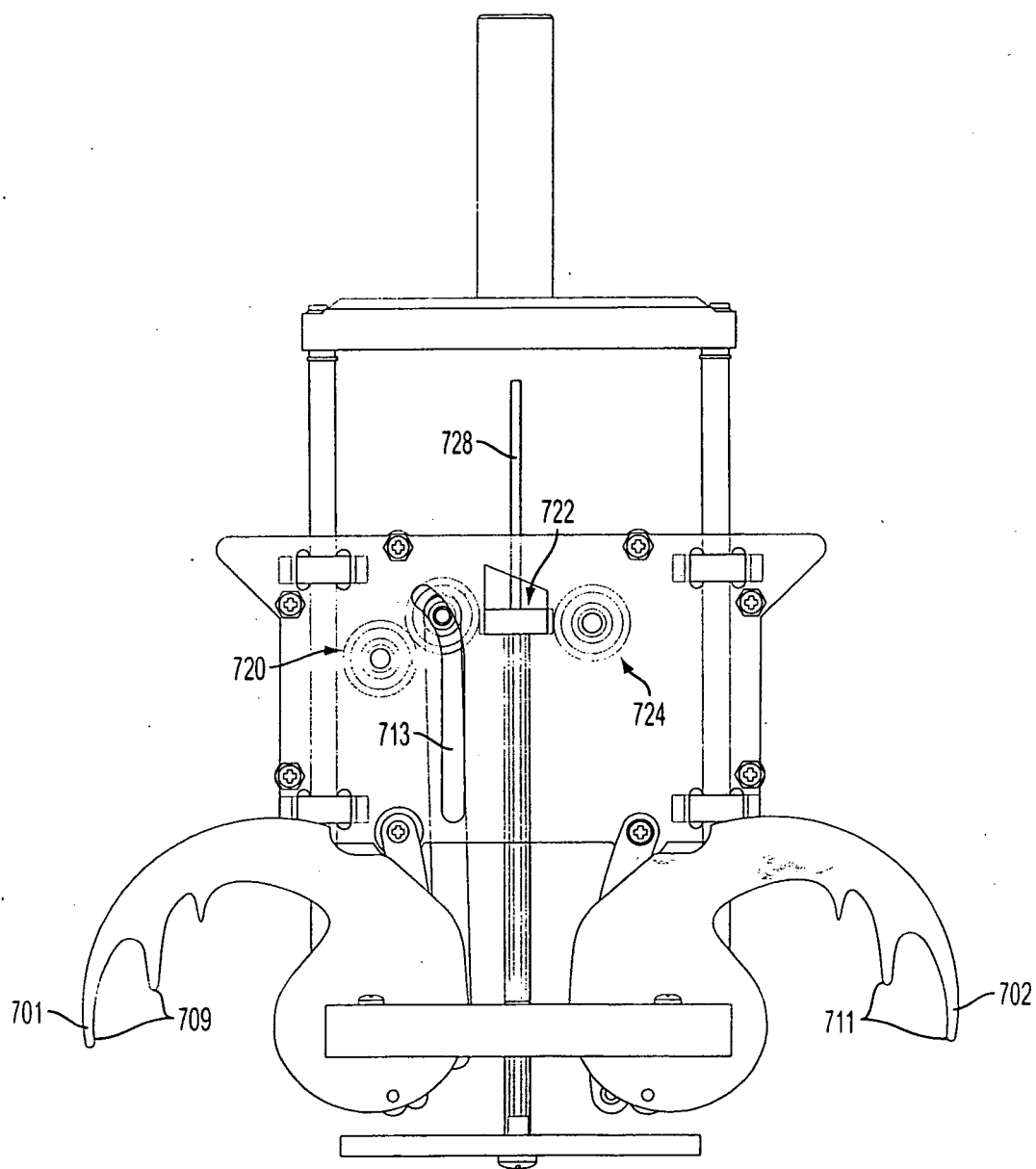


FIG. 8

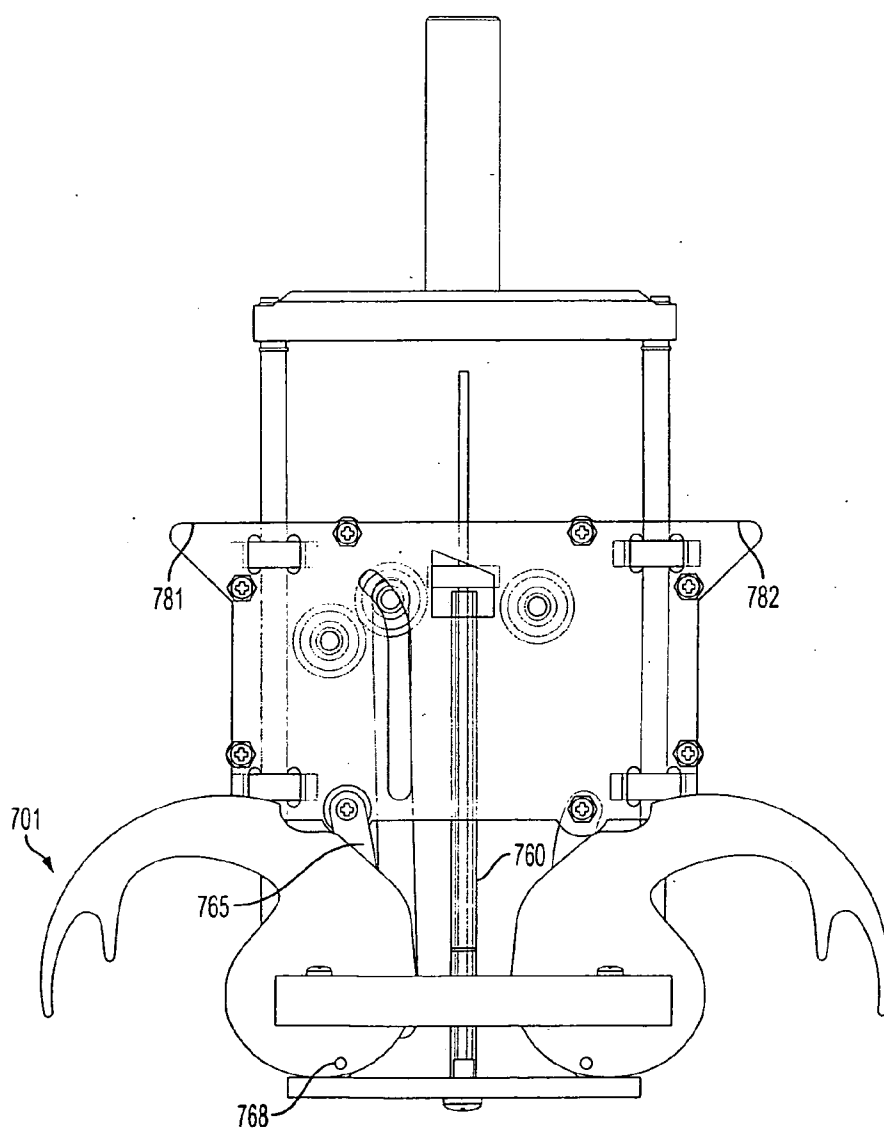


FIG. 9

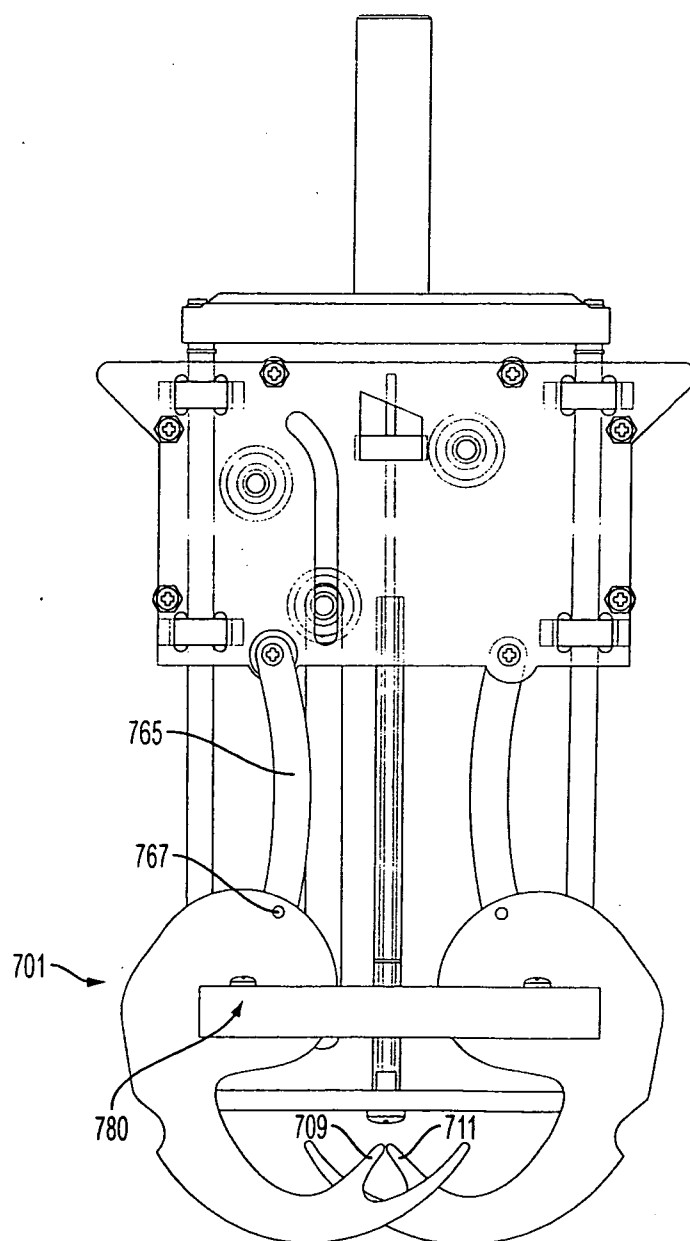


FIG. 10

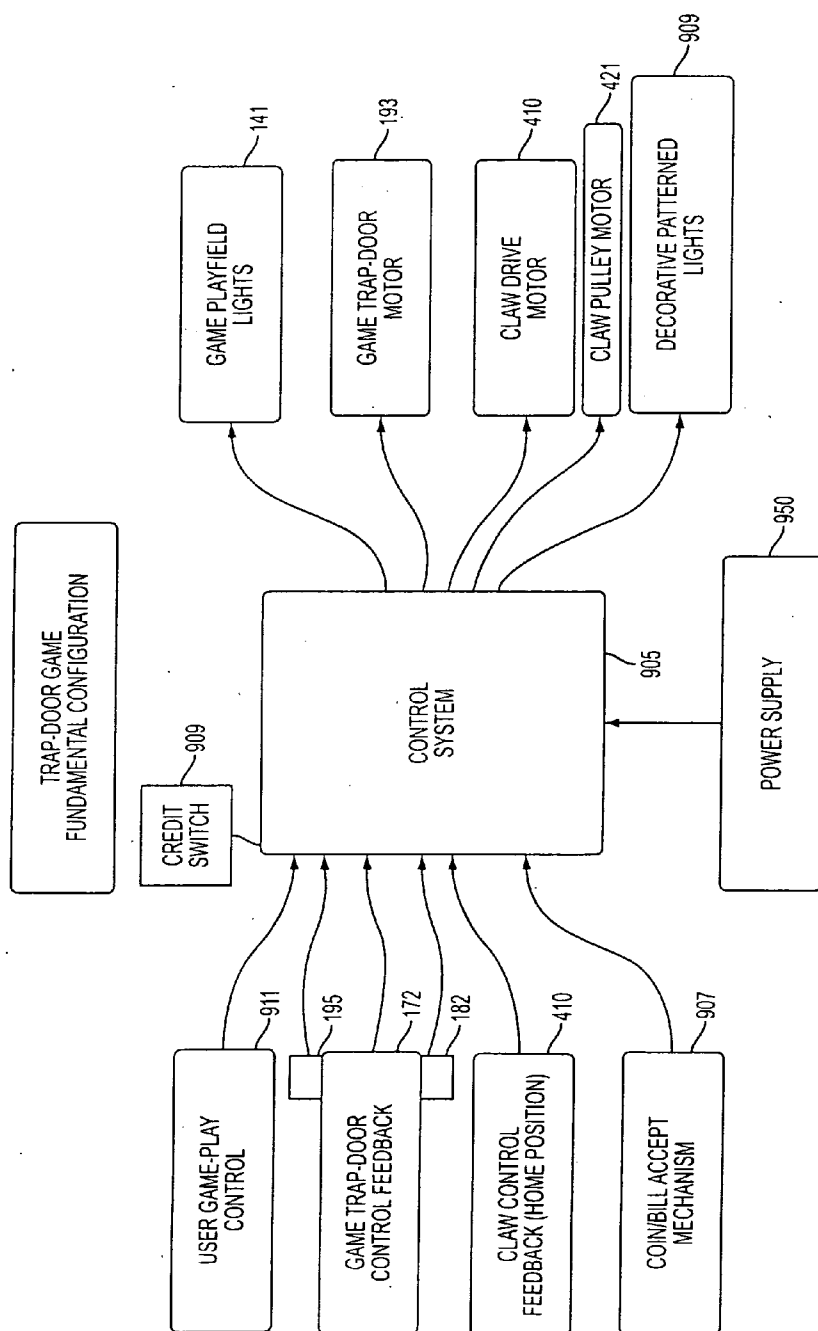


FIG. 11

TRAP DOOR AMUSEMENT GAME

[0001] This application claims the benefit of the filing date of U.S. Application No. 61/401,941. The present invention is directed to an amusement game where the object of the game is to win a prize by accurately timing the activation of a switch to correspond with the position of a light at a target location that is sequentially illuminated around a dial. The game includes a light dial for game play, a bulk storage area for prizes, a prize chute, a trap door connected to the prize chute on which a prize that is play resides, and a claw mechanism for delivering prizes from the bulk storage area to the surface of the trap door. After a prize has been distributed, the claw mechanism is activated to engage a prize from the bulk storage area and deliver the prize to the trap door. To win the prize that has been placed on the trap door, a player tries to time the activation of a switch when the light is at or near the target position. The activation of the switch when the light is illuminated at the exact target position will cause stepper motors to be activated that will open opposite door flaps completely, wherein the flaps are oriented in a vertical orientation. In the event that the switch is activated when the light is illuminated at a position near the target position, the opposite door flaps are incrementally opened from an existing position to a further opened position. As the flaps are incrementally opened they will eventually reach a position that allows the prize to fall through the doors to an area accessible to the player.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] FIG. 1 is a front perspective view of a first embodiment of the invention.

[0003] FIG. 2 is a front view of the light dial feature of the first embodiment of the invention.

[0004] FIG. 3 is a rear perspective view of the prize chute and trap door assembly.

[0005] FIG. 4 is a perspective view of the claw and claw travel assembly.

[0006] FIG. 5 is a perspective view of the track element and engagement of the track element by the claw travel assembly.

[0007] FIG. 6 is a side view of top portion of the device including the claw assembly, the claw travel assembly, and the light dial suspended from the top of the device.

[0008] FIG. 7 is a perspective view of a claw assembly according to the first embodiment of the invention in an open position.

[0009] FIG. 8 is a side view of the claw assembly depicted in FIG. 7.

[0010] FIG. 9 is a side view of the claw assembly depicted in FIG. 7 with the contact plate displaced toward a claw arm support member.

[0011] FIG. 10 is a side view of the claw assembly depicted in FIG. 7 with the contact plate displaced toward the claw support member and the claw arms in a closed position.

[0012] FIG. 11 is a schematic diagram depicting the various electronic devices used in the invention in communication with a central controller.

DETAILED DESCRIPTION

[0013] Now referring to FIG. 1, a front view of a first embodiment of the invention is depicted showing light dial display 101 that is positioned in the center of cabinet 103. The cabinet 103 has transparent panels in its side walls including front door panel 104. Light display dial 101 is supported from the top 105 of cabinet 103 and by prize chute 107. Front

sidewall 109 of prize chute 107 is made of a transparent material such as glass, plexiglass or other transparent synthetic resin to allow the player to inspect a prize that may be located on trap doors 113 and 114 in the prize dispensing position. A claw 120 is depicted in a home position behind light dial 101. Surrounding prize chute 107 is a bulk storage area that is defined by the sidewalls of the cabinet and the exterior sidewalls of the prize chute 107. The bulk prize storage area may be inspected by prospective players through transparent wall panels of the game cabinet. The bulk storage space may be accessed by door 140 which is secured by lock 145.

[0014] Now referring to FIG. 2, the light display dial 101 includes 35 lights arranged in 35 locations around the dial. When the game is activated, a light chases around the circle, sequentially illuminating each light. The player pushes a button or switch to try to stop the light at a winning position that has been indicated on the dial. If the light stops in the center jackpot target position 205, the prize doors completely open to release the prize through the trap door. If the player stops the light near but not on the target jackpot position, such as at position 207 identified as "4× crank," the doors incrementally open a predetermined amount. Adjacent to the "4× crank" position 207 is "2× crank" position 209. If the button is activated so that the light stops in this location, the doors will open a predetermined distance that is less than the 4× crank distance. 4× crank positions and 2× crank positions are also provided on the opposite side of the dial that also correspond with the same predetermined distances. The remainder of the positions, such as position 20, are identified as "1× Crank." In the event that a player activates the switch at a time corresponding to the lights passing by the positioned that have a value of 1×, the doors will open a smaller distance than the distance the doors will open when the light is stopped at positions that correspond with larger values. The prize can therefore be won eventually by the successive play of the game, wherein each play will opens the door some distance until the door opening is wide enough to allow a prize to fall through. If a player leaves the machine before winning a prize, the doors remain in the same position where the last player left the game. A prize that is released from the trap doors is directed to a prize access area that may be accessed by a player.

[0015] Now referring to FIG. 3, the prize chute 107 contains two doors 113 and 114 each of which cover half of the chute opening when in a closed position. These doors 113 and 114 can form a plane that is horizontal and parallel with the support surface on which the amusement game is placed. Counterweight 141 is provided on opposite side of the door shaft 145 on the opposite side of door 113 to overbalance the door toward the closed position. The door 113 can pivot on shaft 145 that is attached to one side of the door. One end of shaft 145 is seated in opening 160 which allows for pivotal movement. On the opposite side shaft 145 extends through spur gear 150 and into pin plate 120. Worm gear 148 drives spur gears 150 and 151 that are attached to the door shafts 145 and 146 and to open and close the trap doors. The spur gears 150 and 151 float on the pin plates that are fixed to the door shafts 145 and 146 and thereby allow for limited concentric movement. When a prize is positioned on the doors 113 and 114 in chute 107, the weight of the prize causes the shaft that is attached to the door to rotate within the spur gear until it reaches a stop (about 5 degrees). When the door is rotated to this position, a flag mounted on pin plate 170 interrupts an

optical sensor **172**, which is mounted on spur gear **150** indicating the presence of a prize. At the same time, flag **180** is displaced from interfering with the light from light detector **182** which assists with the detection of the doors when they are at the closed home position. When there is no prize in the chute the counterweight acts to rotate the shaft within the spur gear toward the closed position and flag **180** passes through the photo detector **182**. This signal is sent to the controller which in turn activates the claw assembly. The doors are prevented from further movement by a stop **185** attached to the rear of chute **107**. The closed position is also detected by an optical sensor mounted on the chute that detects the presence of a pin **190** that is provided on the pin plate. In an alternative embodiment the pins are provided with a reflective material that transmits infrared radiation to a photo detector. The optical sensors include a light source such as an infrared light source or LED and a photo detector. The photo detectors transmit a signal to a central processor when light impinges on its surface. When an object is placed between the light source and the photo detector, no signal is transmitted and the processor will detect the absence of a signal. The counterweight **141** causes the door to be completely pivoted to a closed position. Thus, when a prize is placed on the trap doors, because the drive shaft is connected to the spur in a floating arrangement, the doors may be displaced slightly downwards. The position of the doors may then be detected by the optical sensor **172**. The home and closed position of the doors, is reflected by the presence of the flag **180** within optical sensor **182**. While the flag may remain in the optical detector, the weight of the prize will slightly displace the doors downward which is detected by sensor **172**. Upon the reception of a signal from detector **172**, the game is ready for play and the controller will accept a signal from the credit switch permitting play. The spur gear which controls the opening and closing of the doors is driven by worm gear **148** which is connected to sprocket **162** that translates power from stepper motor **193** via drive belt **195**.

[0016] Referring now to FIG. 4, a spring loaded claw assembly **401** and claw travel assembly **404** is used to load the prizes into prize chute **107** from a bulk storage location within the cabinet that surrounds the sides and rear of the prize chute. The bulk storage area is generally a U shaped region that surrounds the sides and rear of chute **107**. The claw travel assembly **404** includes a drive roller **409** and track guide pin **411** that is attached to a claw support plate **413**. The drive roller **409** is powered by drive stepper motor **410** and is activated by the controller. A pulley **470**, which can wind and unwind line that connects the travel support plate portion of the travel assembly to the claw assembly **401** in response to signals from a central controller, is powered by pulley stepper motor **421**. The pulley stepper motor is also controlled by a central controller. Also provided with the claw travel assembly are top stabilizing wheels **425** and **426** and bottom stabilizing wheels **428** and **430**. These stabilizing wheels engage the top and bottom of the track plate element **420**.

[0017] As seen in FIG. 5 the track guide **411** on the claw travel assembly **404** is received in track groove **417** that is provided in upper track plate element **420**. Track plate element **420** is suspended from the top of the cabinet by spacers **421** and bolt **425**. A home position optical sensor **430** is also provided on the track plate element **420** which detects when the claw assembly is in the home position. The travel drive roller **409** is powered by stepper motor **421** and controlled by a central processor. Because the device uses a stepper motor,

the controller can accurately determine the location of the claw assembly based upon the steps taken by the motor from the home position. Upon the detection of the absence of a prize on the trap doors, as reflected by signals from detectors **172**, **182** and **195**, the claw travel assembly **404** will travel from the home position to a first position over the bulk prize storage area and stop. Next spool **470** will unwind line dropping the spring loaded claw **401** toward the prize storage area. Upon contact, a trigger releases the compression on a spring and the opposite arms of the claw may engage any prize that is within the range of the arms.

[0018] After the spring is released, the claw assembly is retracted to a first position wherein the flanges **781** and **782** of vertical support plate **752** and **753** contact the claw travel assembly support ring **452**. Next the claw travel assembly, including the claw is driven by stepper motor **421** to a location above the prize chute. The location of the chute with respect to the claw travel assembly is tracked by the number of steps that the stepper motor has incremented from its home position. In contemplated embodiments, additional detectors may be provided adjacent to the track to detect the presences of the claw travel assembly. When the claw assembly is above the prize chute, the pulley motor is again activated to further reel in the line. As the flanges **781** and **782** engage support ring **452**, the springs on the guide rods are compressed and the arms of the claw pivot thereby releasing any item caught between the arms of the claw causing the item to fall into the chute and on to the trap doors. This procedure essentially cocks the spring loaded arms. Accordingly, as the springs are compressed, the trigger is locked and maintains the claw arms in an open and loaded position. If the controller does not receive a signal from the optical sensors that reflects the presence of a prize on the trap doors, the motor is again energized for a calculated number of steps which causes the claw assembly to travel to a second position above the bulk storage area, and the claw is again lowered and the arms spring closed upon contact. This process is repeated until a prize is detected so that the claw assembly may be positioned at numerous predetermined locations above the bulk storage area until the controller receives a signal that reflects that a prize has been released onto the trap door. If after a predetermined number of attempts no signal reflecting a prize has been received in the prize chutes, the processor will interpret the condition of the machine as empty and the processor will deactivate the power. If a prize is detected on the trap doors, the claw assembly will return to the home position and the play may begin by the activation of a credit switch. The home position includes an optical sensor wherein the controller receives a signal to reset a counter that tracks the incremental activation of the stepper motor.

[0019] As best seen in FIG. 7, the claw is depicted in the open and locked position and includes arms **701** and **702** which have engagement fingers **709** and **711**. The claw is locked by the engagement of claw level trigger **713** by fixed bearing **720**, floating lock disk **722** and fixed bearing **724**. To lock the claw in the cocked position, coiled springs that are placed around claw guide rods **731** and **732** are compressed between vertical plate **740** and horizontal base plate **742**. As the pulley retracts line **750**, the coiled springs (not shown) that are positioned around claw guide rods **730** and **731** are compressed between vertical plates **752** and **753** and horizontal base plate **742**. As horizontal base plate **742** moves towards the vertical plates **752** and **753**, the bearing **712** rolls along fixed bearing **720** and pushes floating lock bearing **722**

upwards. After the diameter of the trigger bearing 712 passes floating lock bearing 722, floating bearing falls to a position where it is supported by ledge 789 provided through vertical plate 752, fixed bearing 724 and trigger bearing 712 and locks the trigger in place.

[0020] When contact plate 745 comes into contact with an object, such as a prize or the bottom surface of the bulk surface area, the contact plate rod 760 lifts lock bearing 722 from ledge 789. When lock bearing 789 is lifted a predetermined distances, the trigger is activated, allowing bearing 712 to pass by fixed bearing 720 and lock bearing 722 and compression spring is allowed to release and expand causing the support plate 742 and vertical plates 752 and 753 to separate. As the plates separate, control linkage 765, which is attached to the vertical plates 752 and 753, pulls the point of attachment 767 on the linkage. As seen in FIG. 10, as point of attachment 767 is pulled around axis 780 by linkage 767, the fingers 709 swing downward and mesh with opposite fingers 711. In the event that a prize is in the path of the arms, the prize may be engaged and retained by the claw wherein the springs bias the arms in a closed position.

[0021] As discussed above, after the arms are triggered; the pulley motor reverses and lifts the claw assembly up and away from the bulk storage platform to a first position. The drive motor is then activated and the claw travel assembly is driven to a position above the prize chute. As discussed above, the claw that is disclosed herein uses a spring to drive the claw arms closed. A pulley motor 421 moves the claw assembly up and down by either releasing or taking up line 477. When the claw is driven upwardly to a first position wherein the flanges contact support ring 452, the stepper motor is presented with a load that is detected by the processor. The position of the claw assembly can alternatively be determined by the counting of the incremental steps of the stepper motor by the controller. The claw can then be lowered into the prize area. When the contact plate located at the bottom of the claw contacts a prize, the trigger is unlocked, allowing the springs to force the claw arms closed, capturing a prize. When the claw is raised up again beyond first position, the claw is again opened, releasing any prize that may have been engaged by the arms over prize chute 107 and resetting to a loaded position. The claw disclosed is particularly effective at engaging plush items that are used as prizes positioned in the prize bulk storage area. The claw assembly is moved over bulk storage area and chute by traveling on a track located at the top of the machine.

[0022] Now referring to FIG. 11, the device includes central controller 905 that receives input from numerous components including a coin acceptor, or dollar bill acceptor that will detect the presence of genuine currency, coins or tokens and provide a credit. A credit activation switch 909 which will activate the game play control switch 911. As described above, the game play control switch 911 is activated to try to stop the chasing lights at a predetermined target location. The controller of the device further includes feedback signals from trap door optical sensors 195, 172 and 182 that detect the location of the trap doors. Also depicted is input from the claw assembly including home position detector 410. The controller transmits control signals to the game play field lights 141 on light dial 101, the game trap door motor 193, the claw drive motor 410, the pulley motor 421 and decorative patterned lights 909 that are used in an attract mode on signage relating

to the game (not shown). A power supply 950 is also depicted that energizes the controller and the electronic components of the game.

[0023] While the claw that is disclosed herein is a spring loaded device, the trap door feature of the device can be used in combination with other prior art claw engagement devices that are typically used in crane machines. While the spring loaded arms have certain advantages as discussed herein, it is contemplated that prior art crane claws that have a control such as a solenoid may also be advantageous used with the trap door controlled prize chute. However, claws that are controlled by a solenoid may be more expensive to make, are more complicated to control and require drive energy such as electricity, delivered to the solenoid. An alternative prior art claw that may be used in connection with the invention uses an air powered piston to close arms of the claw which is disclosed in U.S. Pat. No. 7,344,789 and which is incorporated by reference herein. In yet a further contemplated embodiments, the engagement of the prize or other items within the game cabinet in may use a vacuum engagement. In yet further contemplated embodiment the prizes may be introduced to the trap door by a chute located above the door.

[0024] The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part of this disclosure. While a specific embodiment of the invention is shown and described in detail herein to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles. For example, while an embodiment of the present invention discloses a device wherein the player attempts to time the activation of a switch to correspond with a chasing light at a target position, other of exercises of skill, including timing games, shooting games, trivia games, games that involve successfully hitting a target, may also be employed with a trap door prize distribution feature of the invention. Upon the successful exercise of any game, the trap doors as described may be opened, either completely or incrementally. Likewise, the claw mechanism may be advantageously used in connection with other amusement devices or other distribution machines such as vending machines.

[0025] In yet further contemplated embodiments, the opening of the trap door, or the degree that a trap door may be opened, is determined at random. For example, in place of the chasing lights, a plurality of rotating wheels such as those provided on a conventional slot machine may be used to control the opening of the trap door. If a jackpot is won, the trap doors will completely open; if the player achieves a partial win, such as the matching of a plurality of identical icons but not all the icons, the door may be opened incrementally based upon the upon the respective value of the partial win. For example, if two out of three icons match, the doors may be incrementally opened.

[0026] The player's ability to inspect the prize at the doors incrementally are opened is an exciting feature of the game that attracts players to continue to play until the prize is distributed. A player that initiates play will not want to leave the doors in a partially opened state because the game machine it may appear to be close to distributing the winning prize. There is therefore an incentive for a player to continue to play when the doors are in a partially opened position because it will provides an advantage to the next player who may be unrelated to the previous player of the name.

[0027] While there has been shown and described what is considered to be preferred embodiments of the invention, it will, of course, be understood that various modifications and changes in form or detail could readily be made without departing from the spirit of the invention. It is therefore intended that the invention be not limited to the exact forms described and illustrated, but should be constructed to cover all modifications that may fall within the scope of the appended claims.

We claim:

1. An amusement game comprising a prize retaining area for receiving and storing a plurality of prizes, a prize moving element, for moving prizes from said prize retaining area to a prize chute, said prize chute further comprising a door mounted to open and close access to said chute, said door further having an engine for incrementally opening the door.

2. The amusement game recited in claim 1 wherein said door is incrementally opened by said engine upon the successful execution of a skilled-based task.

3. The amusement game recited in claim 1 wherein said skilled based task comprises the activation of a switch when a light is illuminated at a target position.

4. The amusement game recited in claim 1 wherein said prize moving element comprises a mechanical claw.

5. The amusement game recited in claim 1 wherein said mechanical claw further comprises opposite spring biased opposite arms and a trigger element, wherein when said trigger element is released, said springs cause said arms to close together.

6. The amuse device as recited in claim 1 further comprising a central processing unit and a least one door position

sensor, wherein said sensors provide a signal to a central processing unit relating to the presence of a prize on said door.

7. The device as recited in claim 2 further comprising a credit sensor and a game activate switch, said credit sensor in communication with a central processing unit wherein said central processing unit will activate said game switch in response to the detection of a credit to allow for the play of said skilled based game.

8. The device recited in claim 7 wherein said skill based game comprises a plurality of lights that are sequentially illuminated and a switch that may be activated by a player, wherein the object of the game is to activate the switch when a light is illuminated at a target position.

9. The device as recited in claim 1 further comprising a cabinet including a transparent window that encloses said prize area and the top portion of said prize chute.

10. An amusement device comprising at least one door that is oriented in a horizontal plane when in a closed position, said door functions to separate a passage to a prize chute and when in a closed position to support a prize, said door mounted to allow to allow for pivotal motion having a first side attached to a frame and an opposite second, said door further mounted to provide for the incremental opening, wherein the second side may pivot from said closed position in incrementally distances downwardly, and wherein when said door is allowed to pivot past a threshold point, any object on said may be released from said door and allowed to fall into a prize chute and prize access area.

* * * * *