US 20010015310A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2001/0015310 A1

Cole (43) Pub. Date: Aug. 23, 2001

(54) COIN DELIVERY, STORAGE AND DISPENSING SYSTEM FOR COIN OPERATED MACHINES AND METHOD FOR SAME

(76) Inventor: **Joseph W. Cole**, Las vegas, NV (US)

Correspondence Address:
R. Scott Weide
Weide & Associates, Ltd.
11th Floor, Suite 1130
330 South 3rd Street
Las Vegas, NV 89101 (US)

(21) Appl. No.: **09/823,724**

(22) Filed: **Mar. 30, 2001**

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/630,505, filed on Aug. 2, 2000, which is a continuation of application No. 09/224,384, filed on Dec. 31, 1998, now Pat. No. 6,200,213.

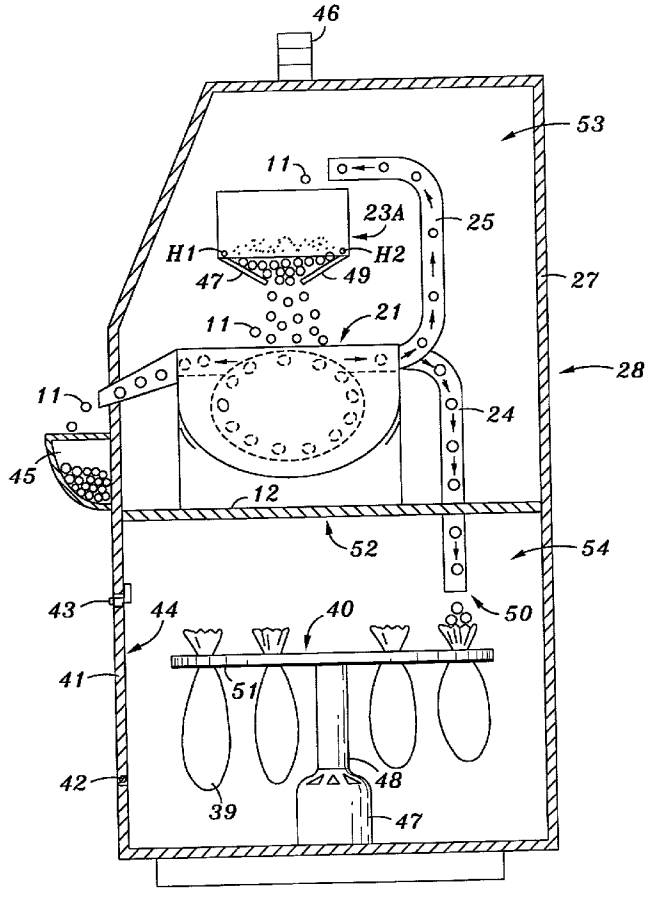
Publication Classification

(51) **Int. Cl.**[7] **G07D 1/00**; G07D 9/04; G07F 5/00

(52) **U.S. Cl.** **194/229**; 453/18; 453/58

(57) **ABSTRACT**

An improved apparatus and method for the delivery, holding, storing, and dispensing of coins and the like from coin-operated machine, such as a gaming machine into which coins are deposited and, when an award is indicated, coins are dispensed as all or part of an award or prize is disclosed. After depositing coins in the coin slot of the gaming machine, the coins are deposited into one or more coin hoppers located in the front or the rear, or the top or bottom, or to the left or right of the coin counting and moving mechanism in the slot machine. Once deposited into the coin hoppers, the coins can then be dispensed as awards to the gaming machine customer, or, alternatively, further deposited into a coin drop consisting of one or more containers, such as coin bags, mounted beneath the coin hoppers on a motorized carousel thereby improving security and minimizing customer play interruption on payout and coin service intervals. A coin counter is provided for accurately counting the coins delivered from the coin hopper to the coin drop.



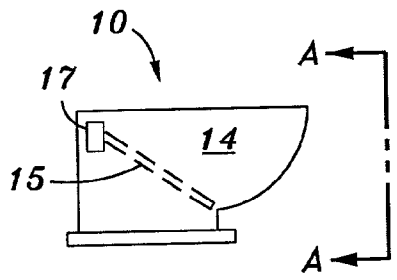


FIG. 1
(PRIOR ART)

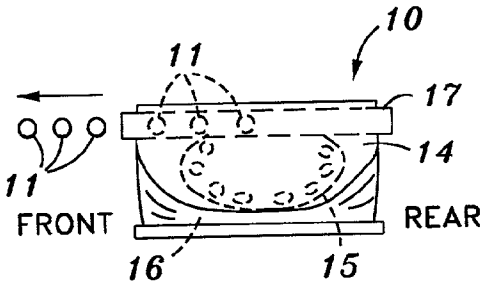


FIG. 2
(PRIOR ART)

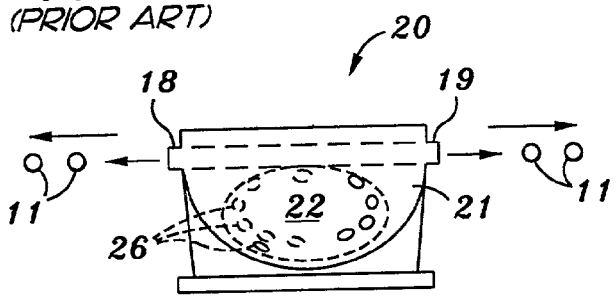


FIG. 3

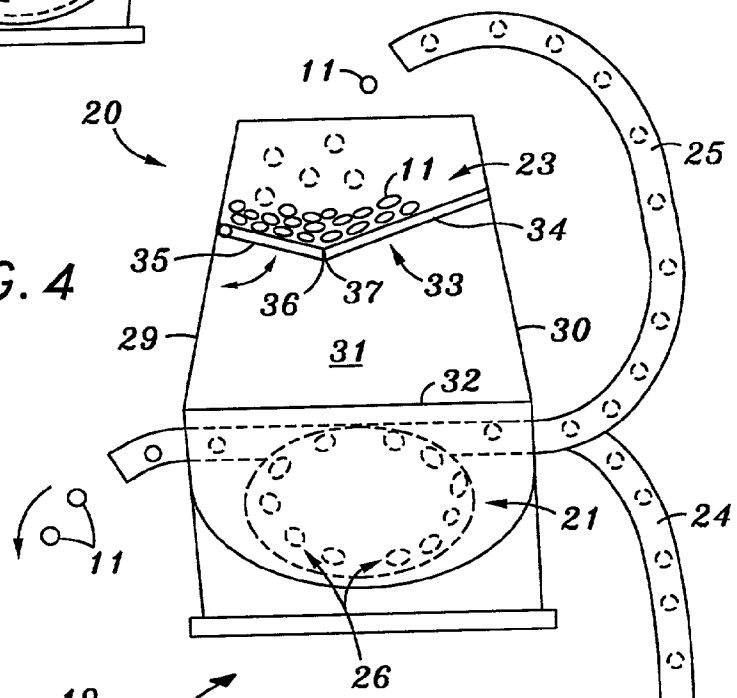


FIG. 4

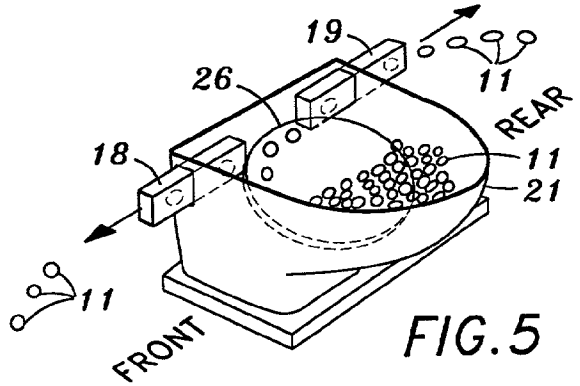


FIG. 5

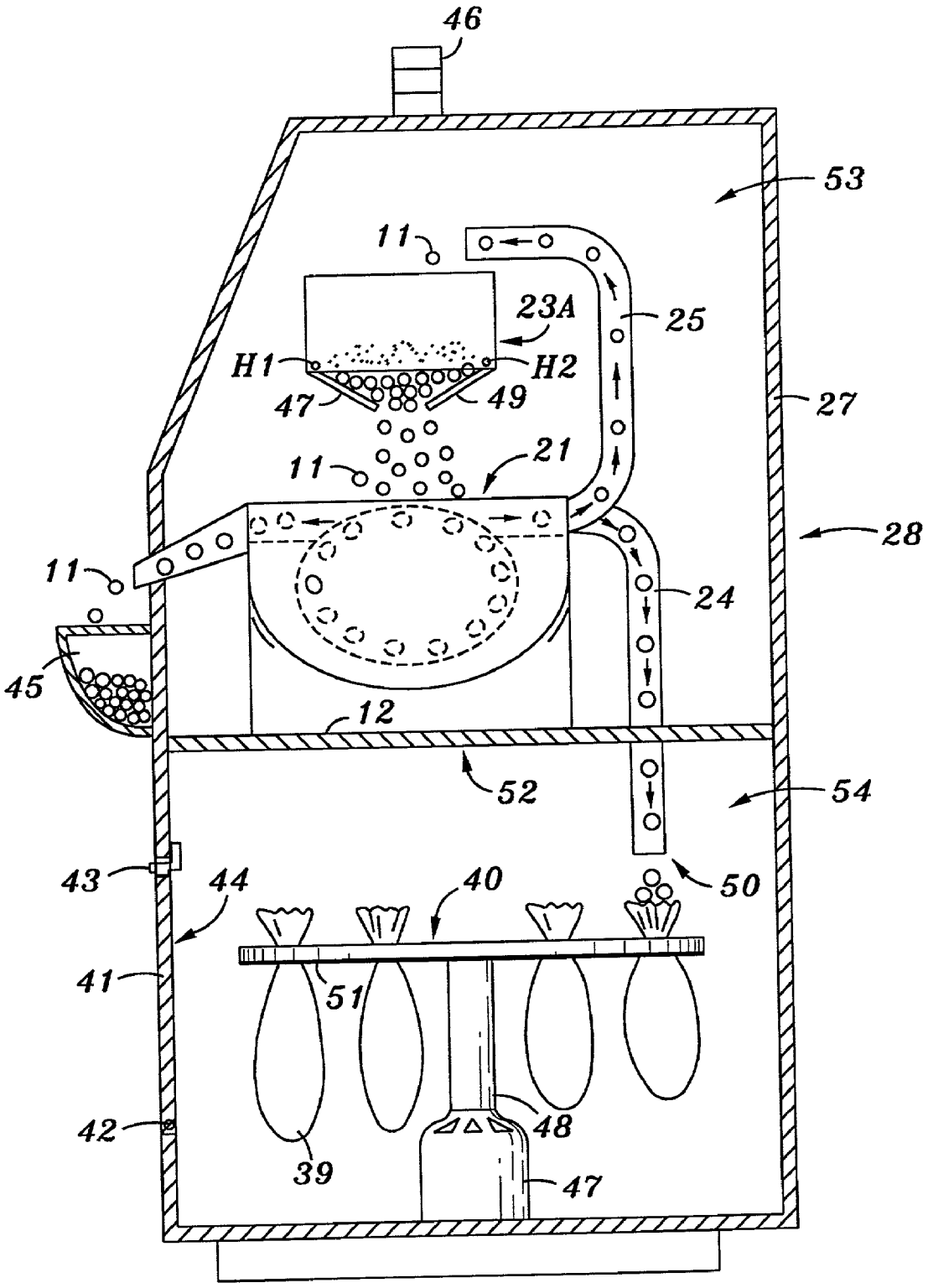

46
53
11
23A
25
H1
H2
47
49
27
11
21
28
11
24
45
12
52
54
43
44
40
50
41
51
42
48
39
47

FIG. 6

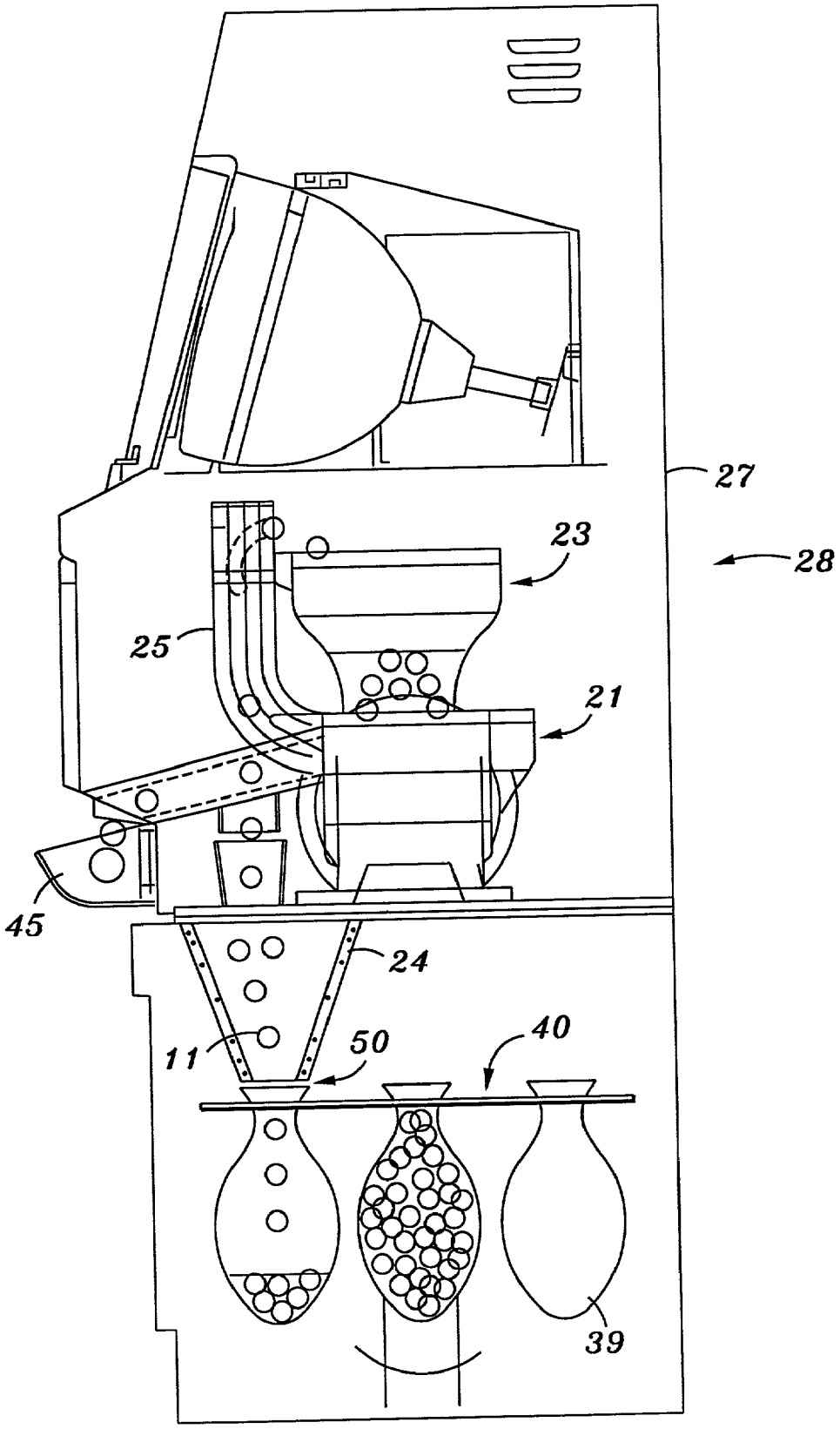


FIG. 7

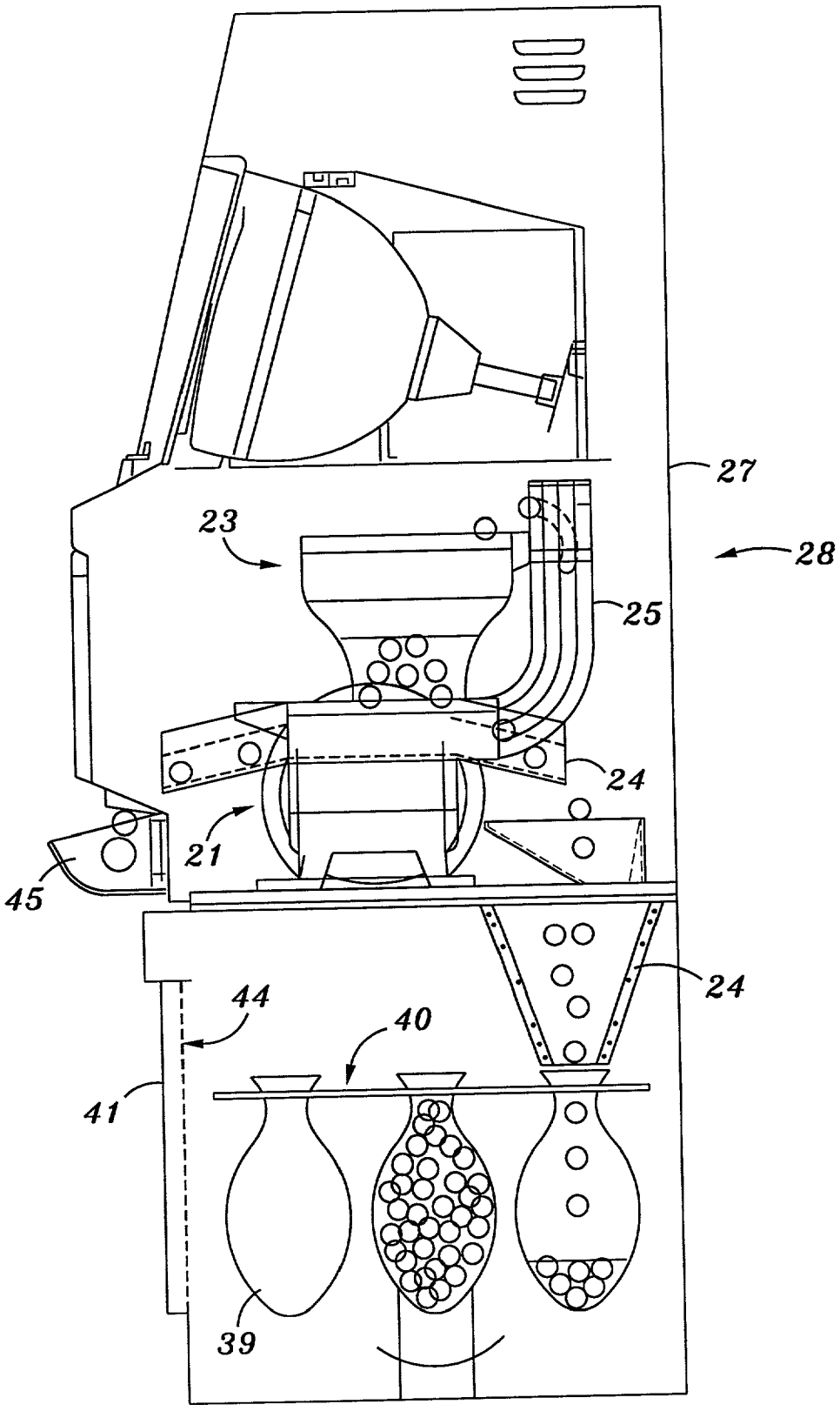


FIG. 8

COIN DELIVERY, STORAGE AND DISPENSING SYSTEM FOR COIN OPERATED MACHINES AND METHOD FOR SAME

RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. application Ser. No. 09/630,505 filed Aug. 2, 2000, which is a continuation of U.S. application Ser. No. 09/224,384, filed Dec. 31, 1998, now U.S. Pat. No. 6,200,213.

FIELD OF THE INVENTION

[0002] The present invention relates to coin or gaming token processing systems of the type which include hoppers or storage systems typically located inside a lockable cabinet in which the gaming machine is also housed, and, more particularly, relates to an improved coin or gaming token acceptance/processing system in which coins are delivered to a first coin storage container or coin hopper and can also be delivered to one or more additional coin hoppers associated with the first coin hopper.

BACKGROUND OF THE INVENTION

[0003] Gaming machines, such as "slot" machines, receive credits in the form of coins, paper money, or gaming tokens. The game is played, and, if the gaming machine registers a win, the gaming machine may be arranged to dispense one or more coins or gaming tokens into a coin tray accessible to the gaming player as the prize or award. Typically, coins or gaming tokens used as credits are first deposited into a coin slot and the coins or tokens are delivered into a locked cabinet of the gaming machine. Inside the gaming machine, the coins are either delivered to a "drop" or collection box, or to a coin hopper. Usually, because of the instant gratification that the gaming customer receives from receiving a prize or an award in the form of coins, the gaming machines will pay out the prize by removing coins from the cache of customer-deposited coins in the coin hopper and thereafterwards discharging these coins into a customer-accessible coin tray located at the front of the gaming machine cabinet.

[0004] Obviously, there is a limit to the number of coins that the coin hopper can physically hold, the size and coin-carrying capacity being restricted by the allowable size of the cabinet housing of the gaming machine. The floor space in gaming establishments is so expensive and limited that every square foot of floor space must be productive. As a result, the gaming machine cabinet is limited in size to a specific amount of horizontally-disposed floor space. Consequently, in view of the limitation on the number of coins that can be stored inside a gaming machine due to the gaming machine cabinet size limitations, a significant problem is presented when the volume and frequency of the gaming action must be increased to pay for the sizeable operating costs of the gaming establishments without increasing the size of the gaming establishment.

[0005] Another problem associated with prior coin processing systems of game devices relates to coin counting. As stated above, the coins are normally accepted through a slot. The coins are then routed downwardly at high speed through a chute. The accepted coins are detected at a comparitor, and as stated above, either routed to a hopper or a coin box. In general, coins are directed to the coin box when the coin hopper is full or nearly full. These coins may be removed from the machine by the operator by opening the cabinet and removing the coin box. As stated above, the coins routed to the hopper may be dispensed as change or winnings to a user of the device.

[0006] Because of the high speed at which the coins are moving through the chute and the irregularity with which coins may be deposited by a player, it is difficult to accurately count and identify each coins directed to the coin drop. Thus, even though the coins may be counted as deposited, it is difficult to know at any given time the exact value of the coins in the coin box. Instead, when the box is removed, such as when full, the coins may be removed and re-counted. This requires additional time and resources.

[0007] The coins boxes or bags may be of a standard size is an attempt to eliminate the additional expense and task of counting the coins after removal since the value of the coins can be determined by merely counting the coin bags before the coin bags or containers are removed from the gaming machine cabinet. The number of coins in each bag/box may be determined simply by weighing the bag of coins, subtracting the tare weight of the coin bag/box, and dividing the remainder by the weight of each coin. This method still does not avoid the fact that a re-count was necessary. In addition, this coin counting method requires the operator to engage in exacting weighing procedures on each and every bag or box both before it is placed in a gaming device, and after it is removed.

[0008] Another major problem faced by the gaming industry is theft of money from the gaming machines. To prevent or deter such theft, gaming machine cabinets are preferably constructed so as to thwart and reduce unauthorized access to the money deposited by gaming machine players and held and stored inside the gaming machine cabinet. One way to minimize theft or coin shortages relative to the coins deposited in the gaming machine is to reduce the number of times that the gaming machine must be accessed over a 24 hour period to remove the excess coins deposited into the gaming machines by the players. Such excess coins represent, in part, the profits for gaming machine owners.

[0009] Various of the prior art discloses coin counting and sorting mechanisms. For example, U.S. Pat. No. 3,695,279 (Black et al.) discloses a high speed coin counting and sorting mechanism. Various coins of different sizes and values can be counted and sorted by this machine. The coins are deposited into an accumulating receiver 16. Once the bag 30 in FIGS. 1 and 2 is filled, excess coins are deflected by deflector 14 and are directed to an endless belt 26 which returns the coins to the supply for recycling. When the bag is full of the desired number of a particular denomination of coins, a signal light 28 is actuated and alerts the operator who may then remove the bag or other container 30 from the receiver 16 and replace it with an empty container and then actuate a reset button 32 to restore the deflector 14 to its lower position and initiate the counting and sorting of a new series of coins of that denomination.

[0010] U.S. Pat. No. 3,746,211 (Burgess, Jr.) discloses a vibratory quantifying or counting apparatus for determining a numerical quantity of items or articles of similar geometric configuration. It is primarily useful as a means for counting and sorting pills or capsules, but can also be used for counting washers, bolts coins, etc. The chutes and their

arrangement are novel in combination with the gate means for diverting parts or coins or pills after a predetermined number has been reached.

[0011] U.S. Pat. No. 4,383,540 (De Meyer et al.) discloses a coin processing machine which employs a coin hopper 19 which empties into a coin splitting chute assembly 25 with divergent spouts 27 and 28 to deliver a half batch of coins to each of two coin sorters 38 and 39 operating on parallel. Following the coin sorting operation, the coins are delivered from the bottom of the coin sorters 38 and 39 to a pair of stationary coin bags 49 for storage and removal.

[0012] U.S. Pat. No. 4,620,559 (Childers, et al.) discloses a coin sorting and counting apparatus generally indicated at 10. Three coin loading trays 22 are hingedly attached to the funnel 20 by their open end for dumping of a batch of coins in the trays 22 into the funnel 20. The loading tray 22 containing the batch of coins to be processed may be tilted upwardly to dump coins into the frame 20 by lifting the loading tray upward and pivoting the tray about a hinge 22*a*. Positioned below the funnel 20 is a coin hopper 34 to receive the batch of coins dumped from the loading tray 22 as shown in FIGS. 3 and 5. The hopper 34 is rigidly attached to a queuing head 36 and extends upwardly therefrom. As the coins come through the central opening 35 and the head 36, the coins enter a loading area and encounter the centrifugal force generated by the rotating upper surface of the disc 38. The disk 38 then carries the coins in the queue positioned adjacent to the peripheral rim of the disc 38 to the coin-engaging wheels 60 for sorting by denomination. The coins are hurled over the peripheral rim 40 of the disc 38 by the centrifugal force into a coin-catching device 62. The coins are counted by an electro-optical sense 64 as they travel through the air. The flights paths of the coins after they leave the rotating disc 38 are shown by broken-line arrows in FIG. 5. Coin holding tanks 172 are provided for temporarily holding each denomination of coin being sorted. Later, the coins in the holding tank 172 are deposited in the coin-collecting receptacle 86. The coin-collecting receptacles 86 have an open upper end and are sized to receive a coin back 188 therein. The coin collecting receptacles 86 are secured to the rotatable carrier plate 82 by a detachable hinge. The operator may open the door 16, rotate the inner frame 68 relative to the stationary base 14, and hence the coin-collecting receptacles 86 on the carrier plate 82 to position the indicated receptacle in the door opening. The carrier plate 82 may be positively locked to prevent unintended rotation when a coin collecting receptacle 86 is being tilted forward or removed, and to provide a means for indexing to insure the receptacle is properly positioned in the center of the door opening. Each of the holding tanks 172 are removably fixed to the wall 74 by a combination of lug 173 and a removable fastener 175. The discs, queuing head, sorting wheels, counters, bag receptacles, and coin holding tanks 172 are mounted for rotation with the frame, and may be rotated to selectively bring a bag receptacle to the operator for its removal while the machine is sorting and counting coins. Basically, in this invention, the coin hopper or coin holding tanks are beneath coin loading aperture, and, the coin-collecting receptacles 86 are arranged on the top of a rotatable carrier plate 82, or manually-operable carousel.

[0013] An improved coin processing apparatus and method which overcomes one or more of the above-stated problems is desired.

SUMMARY OF THE INVENTION

[0014] In general, the instant invention is an improved coin processing system for coin-operated gaming or "slot" machines, or the like, which accept coins and dispense coins as a prize or award. As one aspect of the invention, there is provided an improved coin hopper design which allows coins to be delivered by a delivery mechanism to the front or, to the rear of the slot machine, to the top or to the bottom of the slot machine, or even to the right or to the left of the gaming apparatus. In accordance with the invention, the system includes at least two coin hoppers permitting coins to be delivered to either a first coin hopper or a second coin hopper, increasing the coin holding capacity of the gaming machine which, in turn, permits the gaming machine to dispense a larger number of coins for a payout or award and significantly improves the potential for complete payout to the anxiously awaiting customer via a customer accessible coin tray typically mounted at the front of the gaming machine cabinet.

[0015] As desired, or selected, the coins can also be discharged from the coin hopper to either the left or right side of the coin hopper thereby allowing for greater flexibility in dispensing the coins from the gaming machine. Another benefit produce by this improved coin delivery and coin hopper re-orientation and added coin storage is that such allows for the further incorporation of a carousel. Such a carousel is arranged beneath the coin hopper and is adapted to receive and hold a plurality of coin bags or containers. The use of such a carousel and coin bag/container arrangement substantially increases the number of coins that can be stored inside the licked gaming machine cabinet thereby reducing the number of times during a 24 hour period that the bottom coin drop will require access for the removal of the coins in the bottom coin drop.

[0016] It is one object of the instant invention to create an improved coin hopper design which allows for a top reserve coin drop to be filled by the coin moving mechanism working in conjunction with the typical coin counter and coin hopper arrangement. Such an improved arrangement allows the coins to be delivered to a storage area above the coin hopper. By the addition of a top reserve coin drop, a larger quantity of coins can be stored for discharge to the customer, improving both the size of the award and significantly increasing the gaming machine's capacity for holding and retaining the coins or tokens that have been deposited into the machine by the players.

[0017] A yet still further primary and important objective of the instant invention is to provide an improved coin hopper design which incorporates a coin discharge mechanism which may be conveniently arranged to discharge the coins to either the right or the left of the coin hopper.

[0018] It is one further and important objective of the invention herein to provide an improved combination coin hopper device which delivers coins to a plurality of bags or containers operably secured on a motorized carousel beneath the coin hopper. Once the bag or container is filled with coins, the motorized carousel rotates to bring another bag or container into position beneath at least one coin discharge guide to be filled with coins. When a bag or container filled with coins is removed from the powered carousel, a locking mechanism can be used to secure the coins in the bag or container thereby preventing unauthorized access to the

coins herein. The number of coins in the bag or container can be readily and easily verified by weighing the entire combination of coins and bag or container and then subtracting the weight of the bag or container and then dividing the remaining weight by the individual weight of a single coin or by electronically (mechanical switch or non-contact sensor) counting the coins dispensed to each bag wherein the quantity of coins per bag can be pre-selected and controlled through electronics.

[0019] Another important and significant object of the invention disclosed herein is that by depositing more coins in the coin hopper, the more frequent activation of the motor will produce more frequent vibration throughout the system and the coins in the coin hopper will be caused to vibrate more frequently to eliminate stacking of the coins in one area of the coin hopper resulting in a premature overflow of the coins from the coin hoper bowl. This vibrating action increases the actual coin holding capacity of the coin hopper bowl by forcing the coins to be arranged more efficiently and uniformly in the coin hopper bowl.

[0020] One or more other embodiments of the invention comprise a coin processing system in which accepted coins are all routed to a coin hopper. A coin counter or similar device is then utilized to count or track coins which are selectively discharged from the hopper and directed to a coin box or bag. Control over the flow of coins from the hopper allows for accurate counting using the coin counter. Secondary coin counting means may be used, if desired, to verify the coin count. For example, the weight method of determining the coins may additionally be used.

[0021] The foregoing and other objects and advantages of the invention will appear from the following description. In the description, reference is made to the accompanying drawings which from a part hereof, and in which there is shown by way of illustration one preferred embodiment of the invention. Such embodiment does not necessarily represent the full scope of the invention, however and reference is therefore made to the claims for interpreting the scope of the invention.

DESCRIPTION OF THE DRAWINGS

[0022] **FIG. 1** is a front elevational view of the typical prior art coin hopper designs in the form of a pay out only standard unit.

[0023] **FIG. 2** is a top view of the typical prior art hopper design illustrated in **FIG. 1**.

[0024] **FIG. 3** is a top view of one embodiment of the improved coin hopper design disclosed and described herein.

[0025] **FIG. 4** is a side elevational view of the one embodiment of the improved coin hopper design showing front coin discharge, rear coin discharge to the bottom coin drop and the rear coin discharge to the top coin hopper.

[0026] **FIG. 5** is a perspective view of the new and improved hopper shown in front elevation in **FIG. 3**.

[0027] **FIG. 6** is a side elevational view, shown partially in section, of one embodiment of the improved coin hopper design illustrating the combination of a bottom coin drop and a top fill.

[0028] **FIG. 7** is a side elevational view, shown partially in section, of one embodiment of the invention herein depicting a front coin delivery system from the first coin hopper to the second coin hopper and the carousel coin drop.

[0029] **FIG. 8** is a side elevational view, shown partially in section, of one embodiment of the invention herein depicting a rear coin delivery system from the first coin hopper to the second coin hopper and the carousel coin drop.

DETAILED DESCRIPTION OF THE INVENTION

[0030] One of the significant economic problems faced by gaming establishments, such as casinos, in the use of coin or gaming token-operated gaming machines, is the limited amount of square footage of the floor that is available for use by such gaming machines. This vexing economic and operational problem has now been overcome by the improved method and gaming machine apparatus disclosed herein by increasing the coin-holding capacity of the gaming machine by vertically stacking additional coin hoppers above and/or below the normal, or standard coin hopper within the gaming machine. By doing so, use of the empty, available space within the gaming machine, while limited to some extent, is effectively utilized and does not require an increase in the amount of casino floor space needed for the gaming machine cabinet to occupy. Since floor space is essentially fixed by way of economic limitations in existing gaming establishments, the addition of two coin hoppers or containers results in a 2 to 3 times increase in the coin-holding capacity of each square foot of floor space occupied by the gaming or slot machine without the need to increase the size of the floor space.

Prior Art coin Hopper system Design and Method

[0031] With continuing reference now to all of the drawings herein, and with particular references now to **FIGS. 1 and 2**, there is shown the PRIOR ART COIN HOPPER system design. The PRIOR ART COIN HOPPER system design, generally shown at **10**, incorporates a pay-out only coin hopper design. In **FIGS. 1 and 2**, the coin hopper is identified by the number **14**. **FIG. 1** is a side elevational view of the PRIOR ART COIN HOPPER system design. As shown in **FIG. 1**, the PRIOR ART COIN HOPPER system design includes a coin hopper **14** and a motorized disc **15** which spans the distance between the bottom of the coin hopper **14** and the coin chute **17**. With special emphasis now on **FIG. 2**, the view of the standard PRIOR ART COIN HOPPER system design unit, generally indicated at **10**, consists of a coin hopper **14**, a motorized disc **15** and a coin chute **17**. Inside the coin hopper **14** is a motorized disc **15** with shallow coin receptacles **16** disposed thereabout are each designed for the temporary receiving and holding of a coin or gaming token **11**. As shown in **FIG. 2**, the motorized disc **15** is rotated counterclockwise, and gathers the coins **11** from the coin hopper **14** by allowing the coins to be deposited into the coin receptacles **16**. As the coins **11** are gathered from the bottom of the coin hopper **14** into the shallow receptacles **16** (typically in the peripheral portion of the disc **15**), the coins **11** are carried up and then tossed by the centrifugal force developed at the peripheral portion of the motorized disc **15** into the entrance of the coin chute **17** and thereafterwards delivered out the exit of the coin chute **17** located at the FRONT of the coin hopper **14**. Typically,

after the tossed coin **11** exits the coin chute **17**, the coin **11** is deposited into a coin bowl (not shown) which is accessible to the gamine machine player.

[**0032**] As shown and illustrated in **FIG. 2**, the coins **11** are discharged only from the FRONT or from the REAR, but not both. As can be readily seen, such PRIOR ART COIN HOPPER system design is limited to a single coin hopper and coin discharge arrangement. In short, the PRIOR ART COIN HOPPER system design is limited to a single coin hopper and is originally set up for a single direction of discharge for the coins **11**, that is, from the FRONT or the REAR. Coins **11** are then diverted to only a bottom-located coin payout tray accessible to the gaming machine customer (not shown in FIGS. **1** or **2**) or to a coin drop not accessible to a gaming machine customer (not shown in FIGS. **1** or **2**), located beneath the coin hopper **14**. On pay-out, should the PRIOR ART COIN HOPPER system be depleted of its coins **11**, a typical occurrence, the customer's ability to continue play is impeded. Obviously, such interruptions of the operation of the gaming machines are highly undesirable because they reduce the income produced by the gaming machines, are labor intensive, and increase the risk of losses due to personnel negligence and theft.

[**0033**] It should be clearly understood and noted that for purposes of the present description, the term "coins" is used solely for convenience to describe both monetary coins and gaming tokens.

New and Improved Coin Hopper system Design and Method

[**0034**] With specific reference now to **FIGS. 3, 4** and **5**, there is described the new and improved coin hopper system design generally indicated at **20** for coin-operated gaming machines. As shown in **FIGS. 3 and 5**, as part of the new coin hopper system **20** there is shown and illustrated that the coins **11** in the coin hopper **21** may be discharged from the coin chutes **18, 19** either to the FRONT or to the REAR of the cabinet.

[**0035**] In the particular example shown and depicted in **FIG. 5**, when the motorized disc **22** is driven counterclockwise, the coins **11** are picked up in the shallow receptacle **26** and as the disc **22** moves from the bottom to the top of the coin hopper **21**, the coins **11** are thrown by centrifugal force into the coin chute **18** which discharges the coins **11** to the FRONT. When the motorized disc **22** is driven clockwise, as the disc **22** moves from the bottom to the top of the coin hopper **21**, the coins **11** are lodged in the coin receptacles **26** as the motorized disc **22** moves through the bottom of the coin hopper **21**, the coins **11** in the coin receptacle **26** in the disc **22** are thrown by centrifugal force of the motorized disc **22** into the coin chute **19** which discharges the coins **11** to the REAR. In this particular embodiment of the present invention, whether the coins **11** are discharged through the FRONT coin chute **18** or through the REAR coin chute **19** depends on the direction of the rotation of the motor driving the motorized disc **22** and upon a sufficient rotational velocity to achieve the proper amount of centrifugal force to toss the coins **11** into either one of the entrances to the coin chutes **18, 19** and out the opposite end or exit thereof.

[**0036**] It should be clearly noted at this time that by rotating the coin hopper **21** shown in **FIG. 5** ninety degrees, the coin chute **18, 19** would be oriented to discharge the coins **11** either to the RIGHT or LEFT side of the cabinet **27** rather than the FRONT and the REAR.

[**0037**] Turning now to **FIG. 4**, there is illustrated the new and improved coin hopper system design generally indicated at **20** for coin-operated gaming machines including a second coin hopper **23** vertically disposed above the first coin hopper **21**. When the motorized disc **22** is cause to rotate in a clockwise direction, the disc **22** moves through the coin hopper **21** from the bottom to the top, and as it does so, it picks up coins **11** in its plurality of coin receptacles **26** and just after it emerges from the coins **11** in the coin hoper **21**, the coins **11** are tossed depending on the rotational velocity of the motorized disc **22** either onto the entrance to the coin chute **24** which directs and delivers the coins **11** from the coin hopper **21** to the bottom coin drop (not shown if **FIG. 4**) or into the entrance of the coin chute **25** which channels the coins **11** from the coin hopper **21** to the second coin hopper **23**. Of course, other means such as selectively alternating the entrances of the coin chutes **24, 25** into alignment with the stream of coins **11** as the coins **11** are being launched from the coin receptacle **26** on the motorized disc **22** following the emerging from the top of the stack of coins **11** in the coin hopper **21**.

[**0038**] As previously noted, the addition of a second coin hopper **23** doubles the coin-holding capacity of the gaming machine generally indicated at **28** in **FIG. 6**. One method utilized in the interoperable functioning of the first coin hopper **21** and the second coin hopper **23** is to allow the coins **11** to first fill the first coin hopper **2**. After the first coin hopper **21** is filled as determined by either counting the coins **11** as the coins **11** are deposited into the coin slot of the gaming machine **28**, or by pre-weighing the first coin hopper **21** to determine the tare (or empty) weight of the first coin hopper **21** and subtracting the tare weight from the combined weight of the coins **11** in the first coin hopper **21**. Weighing could be accomplished a number of different ways. One way is to incorporate a simple electronic scale into the base **12** of the first coin hopper **21** coupled to a simple digital electronic digital or analog displays such a as created using one or more LEDs (Light Emitting Diodes) or LCDs (Liquid Crystal Displays). Another way would be utilize a standard mechanical weight scale. Since the coins **11** are of a single denomination, size and weight, it would be a relatively easy matter to precisely determine the exact number of coins contained in the first coin hopper **21** at any given time. Alternatively, the primary coin hopper **21** would contain two (2) sets of conductive probes, a high and low position, wherein the "low" set would direct the filling of said primary hopper from the secondary hopper **23**. The "high" set would effect a transfer of coins from the primary hopper **21**, the secondary hopper **23** wherein the secondary hopper **23**, also contains a set of conductive probes which control its volume of coins and in a "high" position would cause the primary hopper **21** to direct the coins **11** to the coin drop or a plurality of coin bags located in the base of the gaming machine. If, when replenishing the primary hopper **21** from the secondary hopper **23**, the volume of the coins dispensed from hopper **23**, does not satisfy the coin payout requirement, the gaming machine is set to inactivate and service is required to replenish the primary hopper **21** with coins **11**.

[**0039**] With reference once again to **FIG. 4**, the second coin hopper **23** is arranged to be disposed vertically above

the first coin hopper **21**. The second coin hopper **23** is mounted above the first coin hopper **21** by plurality of typically four walls of which three walls are shown in **FIG. 4**; namely, **29**, **30**, **31**. The fourth wall is oppositely disposed from wall **31**. All four walls are joined along their vertical edges. The bottom portions of these four walls are secured to the top **32** of the first coin hopper **21**. The second coin hopper **23** is formed by the upper portions of the four walls **29**, **30**, **31** (the 4th wall directly opposite of wall **31** is not shown in the drawing of **FIG. 4**) and by a floor portion generally indicated at **33**. The floor portion **33** is formed by a pair of floor members **34**, **35** which are each set at a downward sloping angle towards the downwardmost edges **36**,**37** of the floor members **34**, **35** respectively.

[**0040**] One of the floor members **34** is fixed; the other floor member **35** is hinged at (A) where it is attached to the wall **30**. The floor member **35** is opened and closed electronically and/or mechanically controlled by a conventional hinge control system as desired. As the coins **11** are delivered from the first coin hopper **21** via the coin chute **25**, the coins **11** exit therefrom and are deposited into the second coin hopper **23** and, when the floor member **35** is held closed as depicted in **FIG. 4** by the hinge pivoting control system, the coins **11** accumulate in the second coin hopper **23**.

[**0041**] When both the first coin hopper **21** and the second coin hopper **23** are both filled to their respective maximum capacities, any additional coins **11** deposited into the gaming machine **28** into the first coin hopper **21** are delivered into the entrance to the coin chute **24** and delivered into a bottom coin drop (not shown) or into the coin bags **39** mounted on a carousel as shown and illustrated in **FIG. 6**.

[**0042**] Once delivered to the bottom coin drop typically a box with an opening into the top, or into the coin bags **39**, such coins **11** are not available for distribution as an award or prize to the gaming machine customer. When the bottom coin drop, or coin bags **39**, are filled, the bottom coin drop or coin bags **39**, are removed by authorized personnel permitted access into the gaming machine cabinet **27** via a door **41** covering an opening **44** into the cabinet **27** matchably mated to the peripheral contour of the door **41**. The door **41** is mounted to the cabinet **27** via a hinge **42**. A lock **43** is secured to the door **41** for locking the door **41** to the cabinet **27** when the door **41** is closed to cover the opening **44** into the gaming machine cabinet **27**.

[**0043**] In the event that the gaming customer wins a very large number of coins **11** beyond the coin-holding capacities of either the first coin hopper **21** or the second coin hopper **23**, the coins **11** in the first coin hopper **21** are first delivered into the coin chute **18** for deposit into a gaming customer-accessible tray **45** such as depicted in **FIG. 6**. It should be noted, at this time, that the coin-holding capacity of tray **45** is typically larger that the combined coin-holding capacities of the first coin hopper **21** and the second coin hopper **23**.

[**0044**] Once nearly all of the coins **11** in the first coin hopper **21** are removed and delivered to the customer-accessible tray **45**, the hinge control system is activated to allow the floor member **35** to be opened and to allow the downwardmost edge **37** to be disengaged from the downwardmost edge **36** of the fixed floor member **34** thereby allowing the coins **11** in the second coin hopper **23** to be dropped from the second coin hopper **23** directly into the first coin hopper **21** and filling the first coin hopper **21**. Once the first coin hopper **21** is filled, the motorized disk **22** is rotated counterclockwise to deliver the coins **11** into the entrance to the coin chute **18** and out the exit thereof into the customer-accessible coin receptacle **45** to present the customer with his or her winnings.

[**0045**] Turning now to **FIG. 6**, there is shown and illustrated a gaming machine **28** and cabinet **27** containing the new and improved coin delivery, storage and dispensing system as previously described herein.

[**0046**] Mounted on top of the cabinet **27** is a towerlight **46** containing a plurality of different colored lights. The towerlight **46**, when triggered "ON", provides a visual indication by way of a colored and/or blinking light that the customer operating this particular gaming machine **28** has won a particular size award. One of the colored lights, or even a white (uncolored) light, can be turned "ON" independently of the other lights in the towerlight **46** to signal to the owners of the gaming machine **28** that the gaming machine customer needs assistance.

[**0047**] The gaming machine cabinet **27** is divided internally into at least two different sections; the top section, generally indicated at **53**, houses a plurality of coin hoppers **21**, **23**A and the bottom section, generally indicated at **54**, houses a coin drop. A support means is typically used to support the coin hoppers **23**A and **21** in the form of a shelf **52** mounted to the cabinet **27**.

[**0048**] As shown in the top section of the gaming machine cabinet **27** of **FIG. 6**, there are two coin hoppers. The first coin hopper is labeled **21**; the second coin hopper is labeled **23**A. The operation of the first coin hopper **21** has been previously discussed herein. Coins are deposited into the first coin hopper **21** when the gaming machine customer feeds the coins **11** into a coin slot **53** typically mounted in the front part of the gaming machine cabinet **27** where the gaming customer accessible coin holding tray **45** is located. A coin comparitor may be used to determine if slugs or other unauthorized elements have been presented. If so, these elements may be diverted to the coin tray **45** by way of a diverter chute **58**. In the preferred embodiment of the invention, each and every coin which is deposited by the player is routed to the coin hopper **21**.

[**0049**] In one embodiment, the system is adapted to accept only coins of a single size/determination. In such event, other coins which are presented may be rejected by the comparitor. In another embodiment, coins of many sizes/denominations may be accepted. In such event, coin sorters (not shown) may be used. In that case, multiple hoppers or divided hoppers may be used for accepting, storing and dispensing the different coins.

[**0050**] When the first coin hopper **21** is filled to capacity any additional coins **11** are moved either to the second coin hopper **23**A disposed in the top section of the cabinet **27** or to the coin drop located in the bottom of the cabinet **27**. Delivery of the coins **11** to the second coin hopper **23**A is accomplished via the coin chute **25** and delivery of the coins **11** to the coin drop is arranged by passing the coins **11** through the coin chute **24**.

[**0051**] The second coin hopper **23**A is secured to the cabinet **27** and disposed above the first coin hopper **21**. The second coin hopper **23**A, as shown is depicted in the form of an alternate arrangement and configuration to the second

coin hopper **23** shown in **FIG. 4**. The second coin hopper **23A** consists of a pair of hinged floor members **47** and **48** which are pivotally hinged at H1 and H2 respectively.

[**0052**] When the floor members **47** and **48** are horizontally arranged with each of their respective forwardmost edges either in intimate opposing relationship to on each other, or are arranged in operative overlapping relationship with each other and are deemed to be "CLOSED". When in the "CLOSED" position, the floor members **47** and **48** are cooperatively arranged to form a continuous floor for the second coin hopper **23** so that when coins **11** are deposited therein, the floor members **47** and **48** will cooperatively hold and retain the coins **11** deposited in the second coin hopper **23**.

[**0053**] At any time when the second coin hopper **23A** contains coins **11**, should it be desired to do so, the hinged floor members **47** and **48** can be powered to their "OPEN" position which is accomplished as the floor members are powered from their respective horizontal positions to their respective vertical positions. Once the hinged floor members **47** and **48** are moved downwardly away from their horizontal positions, the coins **11** are allowed to drop downwardly into the open top portion of the first coin hopper **21**.

[**0054**] The hinged floor members **47** and **48** can be controlled by any number of conventional power control and hinge door opening systems which are well-known and available via the prior art. Typically, for this application the hinged floor members **47** and **48** can be powered and positionally-controlled by an electrically powered system.

[**0055**] Of course, those of skill in the art will appreciate that a variety of means may be provided for delivering coins from the second coin hopper **23A** to the first coin hopper **21**. This means may comprise mechanical/electromechanical coin feeder mechanisms, means for selectively opening and closing slots or openings through which the coins may be directed, such as by gravity or otherwise.

[**0056**] The particular coin drop illustrated in **FIG. 6** consists of a motor-driven carousel generally indicated at **40**. This carousel arrangement **40** also incorporates a turntable **51** having receptacles for receiving and holding a plurality of coin bags **39**. An electric motor **47** is mechanically coupled with the turntable **51** via a shaft **48**. When electricity is applied to the electric motor **47** by turning the motor **47**"ON", the motor **47** turns and drives the shaft **48** coupled to the turntable **51**, thereby causing the turntable **51** to rotate about the shaft **48** of the motor **47**. When the turntable **51** rotates, one of the coin bags **39** held by the bag-holding receptacle in the turntable **51**, is caused to be rotated into a position so that the entrance to the opening **49** of the coin bag **39** is operably positioned beneath the exit or outlet **50** of the coin chute **24** to allow the coin bag **39** receive the coins **11** existing therefrom. When in position, the electric motor **47** is turned "OFF" by disconnecting the source of electricity thereto typically by means of an electric switch or an electronic motor speed control unit.

[**0057**] In a preferred embodiment, a coin counting device or mechanism **55** is utilized to determine the number of coins which are delivered from the hopper **21**. The coin counting device **55** may comprise a wide variety of elements, such as the well known photoelectric coin counting device or mechanical switch type device. In one embodiment, the coin counting device **55** is associated with a portion of the coin chute **24** to monitor the passage of coins therethrough. Importantly, because the flow of coins from the hopper **21** is controllable, the coin counting device **55** can accurately determine the number of coins which are being delivered to the drop. In one embodiment, the rate at which coins are delivered from the hopper **21** and/or the periods of time during which the coins are delivered from the hopper are controlled to ensure that the coin counting device **55** accurately determines/registers the number of coins delivered. Preferably, a control is provided for controlling the flow of coins. The control may control the speed of rotation of the motorized disk of the first coin hopper coin delivery device, a flow control associated with the coin chute **24** or other means for controlling the flow (including time and/or speed) of coins.

[**0058**] Using the coin counting device **55**, the value of the coins delivered to the coin drop can accurately be determined. In addition, the number of coins delivered can be used to determine when a particular coin bag **39** is filled with coins.

[**0059**] In one embodiment, once the coin bag **39** is filled with coins **11**, the electricity to the motor (not shown) which drives the disk **22** is turned "OFF" and the motor driving the disk **22** stops causing the disk **22** to stop rotating. When the motor-driven disk **22** stops, the coins **11** are no longer delivered into the coin chute **24** and thereafterwards into the coin bag **39** which has been filled to its capacity with coins **11**.

[**0060**] When the coin-counting device **55** detects that no coins **11** are being delivered into the coin chute **24** and passing therethrough, the electrical power to the motor **47** is turned "ON" and the motor **47** rotates the turntable **51** to move the filled coin bag **39** away from it's coin-receiving position. As this is being accomplished, the next coin bag **39** which is empty, is moved into the position formerly occupied by the coin bag **39** filled with coins **11**. Once the entrance to the empty coin bag **39** is operably positioned beneath the exit or outlet **50** of the coin chute **24** to allow the coin bag **39** to receive the coins **11** existing therefrom, the electric power to the motor **47** is turned "OFF" and the motor **47** stops thereby stopping the turntable **47**. Once this is accomplished, electricity is applied to the motor (not shown) which drives the disc **22** and as the disc **22** begins to rotate, the coins **11** are again delivered into the coin chute **24** and into the empty coin bag **39**, and the processing sequence again repeats itself until all of the coin bags **39** are filled with coins **11**.

[**0061**] Once all of the coin bags **30** are filled with coins **11**, the owner/operator of the gaming establishment is notified by an electronic signal, or otherwise, such as a flashing towerlight **46**, and personnel are dispatched to the site of the gamin machine. Once the authorized personnel arrive at the gaming machine cabinet **27** and the lock **43** on the cabinet door **41** is opened, access to the lower portion of the cabinet **27**, the carousel **40** and the coin bags **39** is provided. The coin bags **39** are locked and removed from the turntable **51** and thereafterwards deposited in a locked container or strongbox which the authorized personnel have brought with them to the gaming machine. Empty coin bags **39** are mounted in the turntable **51**, and the door to the cabinet **27** shut and locked to prevent unauthorized entry thereinto.

[0062] In accordance with the invention, because all deposited coins are delivered first to the hopper and then routed to the coin drop, the number of coins delivered to the coin drop can be accurately determined, such as with the coin counting device **55**. In one or more embodiments, however, the coin bags **39** may also be weighed (both before and after use) to determine the number of coins deposited therein and their value, as described in more detail above.

[0063] **FIG. 7** illustrates a gaming machine similar to that illustrated in **FIG. 6**, except where a front coin delivery system is used to deliver coins from the first coin hopper **21** to the second coin hopper **23**. **FIG. 8** illustrates another embodiment of a gaming machine having a rear coin delivery system similar to that illustrated in **FIG. 6**.

[0064] One of the most significant improvements of the new and improved coin hopper configuration of the invention is that the coin holding capacity of the gaming machine is greatly increased over the prior art single coin hopper and coin drop design. By this new and improved arrangement, the frequency of coin filling of the primary hopper **21**, located in the gaming machine cabinet **27**, is significantly reduced thereby reducing the cost of labor involved in maintaining and servicing the gaming machine and its operation. Also, by reducing the frequency of coin filling, the opportunity for coin shortages due to negligence and/or theft is significantly reduced.

[0065] Further, since one method for determining the operational cost of a casino or gambling establishment is on a income/cost-per-square foot of floor space analysis relative to the building housing such a business operation, with the improved potential for larger coin payouts, the opportunity is created for reducing the cost per square foot of gaming machine floor space by increasing the gross income per each coin-operated gaming machine.

[0066] One of the improvements offered by this new and novel coin hopper design is that coins can be discharged from either or both the front and the rear of the coin hopper. With such front and/or rear coin discharge arrangement, where front discharge is the preferred method, the coin hopper is capable of performing other important and significant functions such as:

[0067] 1. It allows a top reserve coin drop or second coin hopper **23** (**FIG. 4**) and coin hopper **23**A (**FIG. 6**) to be filled with coins thereby, at least doubling, the coin payout capacity of the gaming machine cabinet **27** without increasing the amount of floor space taken up thereby. Such an arrangement allows the coins to be delivered to storage located ABOVE the traditional bottom coin hopper. By the addition of a top reserve coin drop in the form of a second coin hopper **23** as illustrated in **FIG. 4** or the second coin hopper **23**A such as shown in **FIG. 6, a** significantly larger quantity of coins can be stored for discharge to the customer as an award or "payout" as previously disclosed herein.

[0068] 2. This improvement allows extra coins to be sent to the bottom coin drop such as generally indicated in **FIG. 6** for either collection or to be reused as part of a discharge or award to the gaming machine player.

[0069] 3. The coin discharge may be conveniently arranged either as a right or a left hand discharge.

[0070] 4. When the coins are sent to the bottom coin drop or to the top coin drop, the coins will be accurately counted by photo-electric coin counters mounted in the coin chutes.

[0071] 5. When the coins are sent to the bottom coin drop, the coins can be placed in a secure, lockable bag **39** or other container. A plurality of bags **39** or containers can be operably secured and mounted on a motorized carousel **40**. Once one or more bags **39** are filled with coins **11**, the motorized carousel **40** can rotate to position empty coin bags **39** secured to the turntable **51** to be filled with coins **11**. When a bag **39** of coins **11** is removed from the carousel **40**, a lock (not shown) will be activated thereby securing the coins **11** in the bag **39** to prevent any premature removal of coins **11** from the coin bags **39** except by authorized personnel having the keys to unlock such coin bags **39**.

[0072] 6. By depositing more coins **11** in the coin hoppers, such as **21**, the coins **11** in the coin hopper **21** will be caused to vibrate much more which will prevent the coins **11** from stacking in one area of the coin hopper **21** which could, and often does, result in the coins **11** overflowing the coin hopper bowl **21**. This vibrating action increases the actual coin holding capacity of bowl of the coin hopper **21** by moving the coins **11** into a more compact arrangement inside the coin hopper **21**.

[0073] 7. This improved design allows for the elimination of the mechanical coin diverting mechanism typically located adjacent the coin comparator and, thereby, provides for greater utilization of the cabinet's space. Since the coin diverter is not required to divert or send the coins to the coin drop, the coins, when fed into the gaming machine pass through the comparator, bad or counterfeit coins and/or slugs, are directed back to the customer at the front of the cabinet **27**, and accepted coins are dispensed into the primary hopper **21**.

[0074] 8. This improved arrangement also allows the coin bowl of the coin hopper **21** to be located under the coin comparator because the coin chute-to-bottom coin drop is eliminated. This also increases the coin holding capacity of the gaming machine cabinet **27**.

[0075] 9. In accordance with the improved design, coins which are deposited by a player/user of the device are all routed to a coin hopper. Coins are routed from the hopper to coin bags or coin drops of other forms. Because the flow of the coins is controlled from the hopper, a coin counting device can be utilized to accurately determine the coins which are deposited to the coin bags.

[0076] As has been previously described and shown herein, this improved design allows it to operate in several additional modes, such as:

[0077] 10. STANDARD MODE—as found and illustrated in the prior art arrangement described hereinbefore;

[0078] 11. TOP FILL MODE—to move the coins **11** deposited by the customer to a TOP COIN DROP

(described herein as second coin hopper such as depicted as **23** in **FIG. 4** or in a **23**A in **FIG. 6**) to provide additional storage of coins for a larger pay-out to the customer by operating the trap door, such as the floor member **35** in **FIG. 4**, to deposit more coins **11** into the first coin hopper **21** below in **FIGS. 4 and 6**.

[**0079**] 12. BOTTOM FILL MODE—to move the coins **11** deposited by the customer to a bottom coin drop to provide for storage of coins **11** in coin bags **39** mounted on a motorized carousel **40**.

[**0080**] 13. RIGHT or LEFT COIN DISCHARGE: Allows the coins **11** to be discharged either to the right or to the left hand side of the first coin hopper **21**.

[**0081**] While the invention described and detailed herein is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings. It should be understood, however, that it is not intended to limit the invention to the particular forms disclosed, but, on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

I claim:

1. An improved coin processing apparatus for a coin-operated gaming machine in which customer-deposited coins can be selectably dispensed therefrom to the gaming machine customer or retained inside the gaming machine comprising:

a coin acceptor for accepting a coin from a customer;

a coin deliverer delivering each accepted coin to a first coin hopper;

a coin drop to which coins from the first coin hopper may be delivered for removal from the gaming machine;

a coin counting device adapted to count coins delivered from the first coin hopper to the coin drop; and

a control adapted to control the flow of coins from the first coin hopper to the coin drop.

2. The apparatus in accordance with claim 1 including a second coin hopper.

3. The apparatus in accordance with claim 1 wherein said second coin hopper is located above said first coin hopper.

4. The apparatus in accordance with claim 1 including a coin delivering apparatus adapted to selectively deliver coins from said first coin hopper to said second coin hopper.

5. The apparatus in accordance with claim 1 wherein said coin acceptor comprises a coin chute.

6. The apparatus in accordance with claim 1 wherein said control is arranged to control the rate of delivery of coins from said first coin hopper to said coin drop.

7. The apparatus in accordance with claim 1 wherein said coin drop comprises at least one bag in which coins may be stored.

8. A method of processing coins delivered to a gaming device, said gaming device including a coin acceptor for accepting a bet in the form of one or more coins and adapted to pay one or more coins if a winning event is achieved playing a game presented by the device comprising the steps of:

accepting one or more coins;

routing all of said coins to a first coin hopper;

dispensing at least one coin from said first coin hopper to a coin drop; and

counting the coins delivered from said first coin hopper to said coin drop.

9. The method in accordance with claim 8 wherein said gaming device includes a second coin hopper and including the step of delivering one or more coins from said first coin hopper to said second coin hopper.

10. The method in accordance with claim 9 including the step of delivering one or more coins from said second coin hopper back to said first coin hopper.

11. The method in accordance with claim 8 including the step of controlling the flow of coins from said first coin hopper to said coin drop.

12. The method in accordance with claim 11 wherein said controlling step includes controlling a rate of coin delivery.

13. The method in accordance with claim 8 including the step of dispensing one or more coins from said first coin hopper to a player of said gaming machine in the event the player wins a game presented by the gaming machine.

14. A method of processing coins delivered to a gaming machine comprising:

delivering all coins presented by a player to said gaming device to a coin hopper;

delivering one or more coins from said coin hopper to said player in the event the player is a winner of a game presented by said gaming machine;

delivering one or more of said coins from said coin hopper to a coin storage element for removal from said gaming machine; and

determining the number of coins delivered from said coin hopper to said coin storage element.

15. The method in accordance with claim 14 wherein said step of delivering said coins from said player to said coin hopper comprises routing coins through a coin chute from a coin slot to said coin hopper.

16. The method in accordance with claim 14 including the step of controlling the flow of coins delivered from said coin hopper to said coin storage element.

* * * * *