

FIG. 1

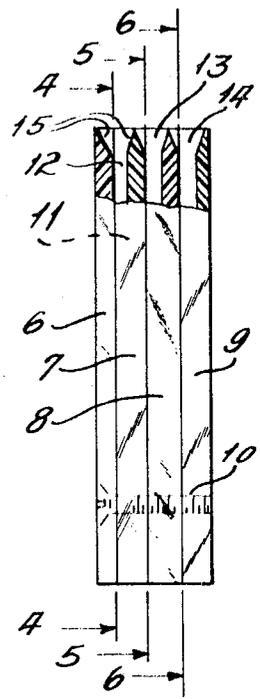


FIG. 3

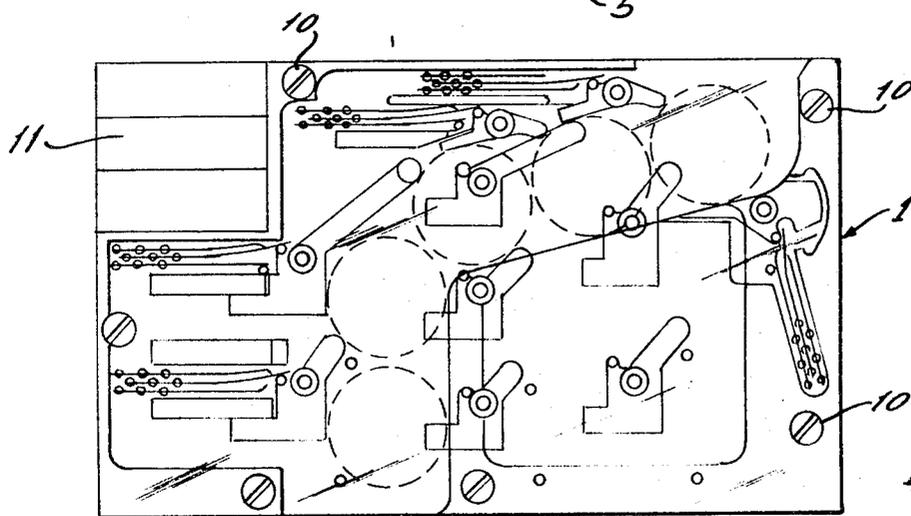


FIG. 2

INVENTOR:
BY Merrill M. Jenkins
Paul M. Denk
ATTORNEY.

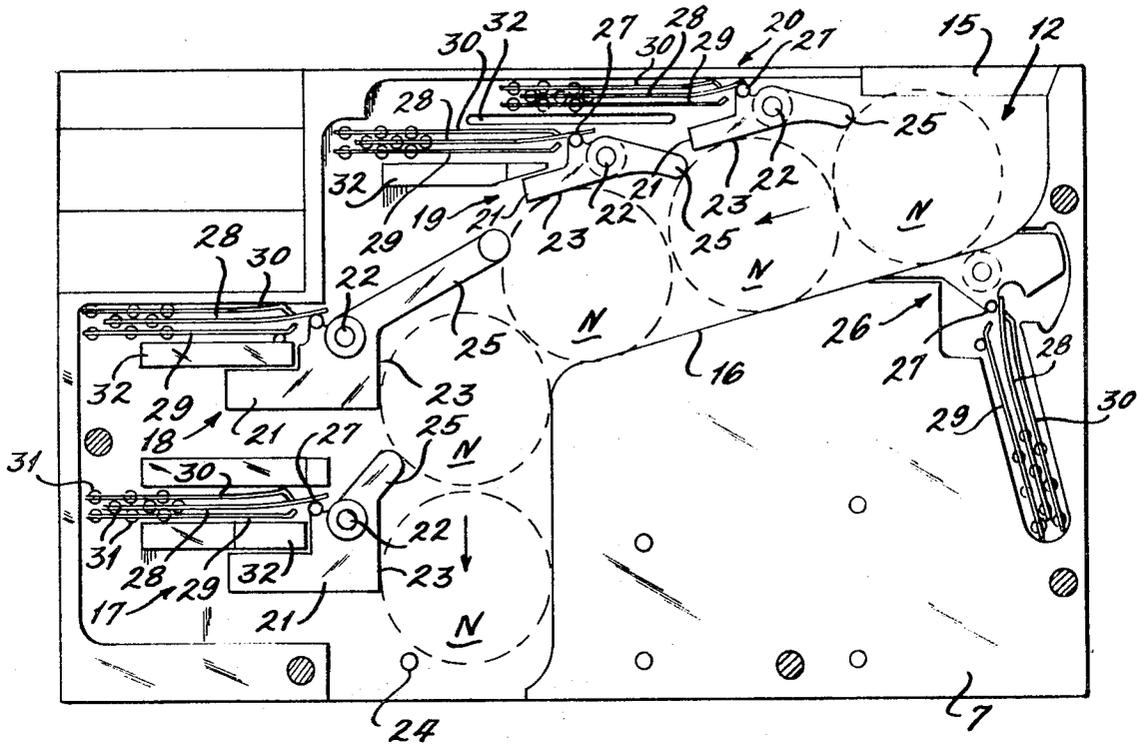


FIG. 4

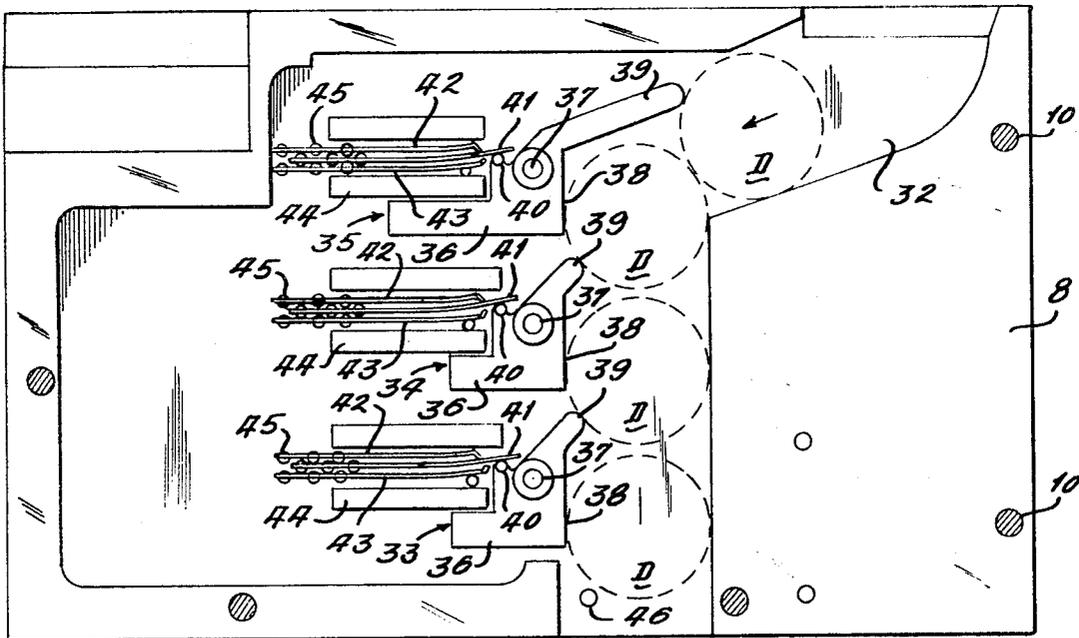


FIG. 5

INVENTOR:
BY Merrill M. Jenkins

Paul M. Denk
ATTORNEY.

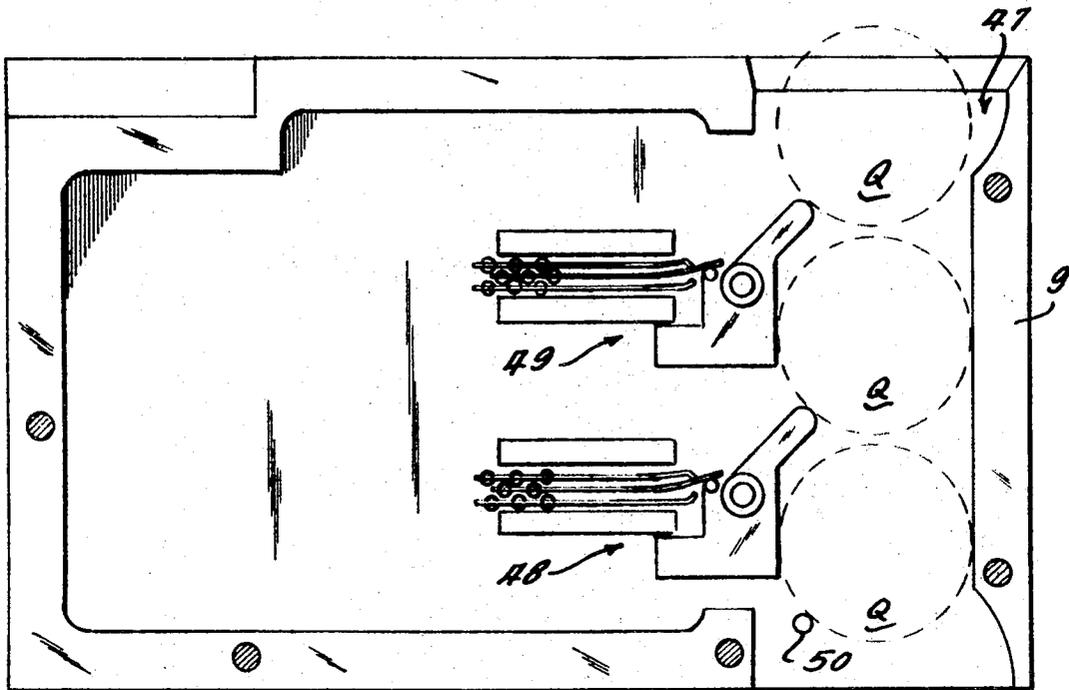


FIG. 6

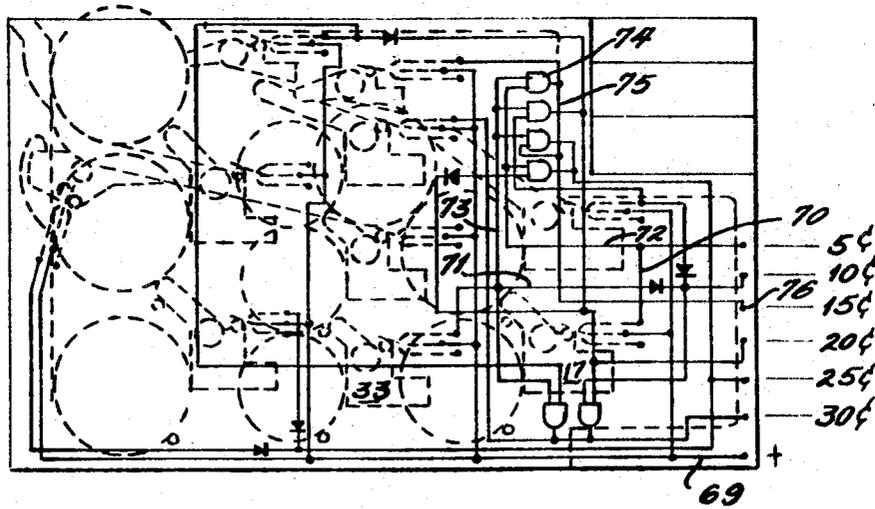


FIG. 7

INVENTOR:
BY Merrill M. Jenkins
Paul M. Hend
ATTORNEY.

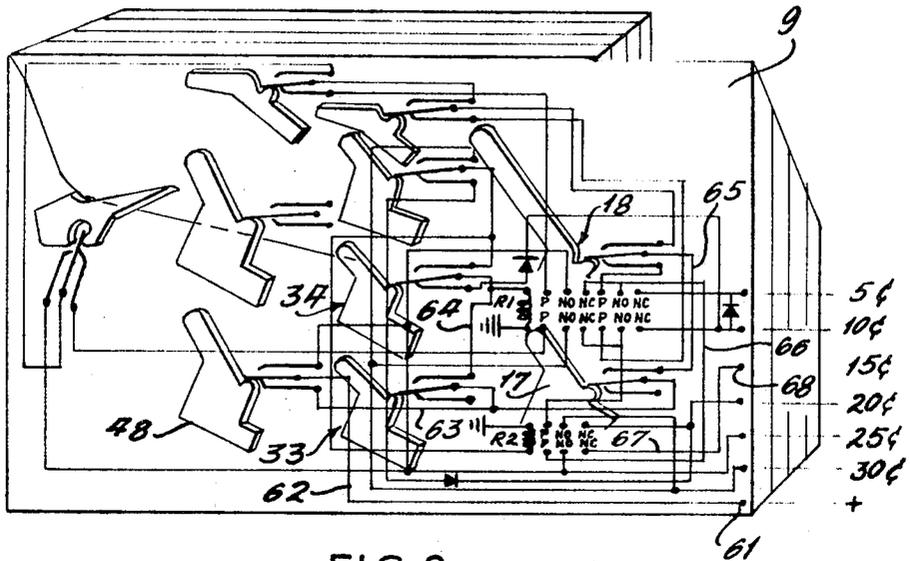


FIG. 8

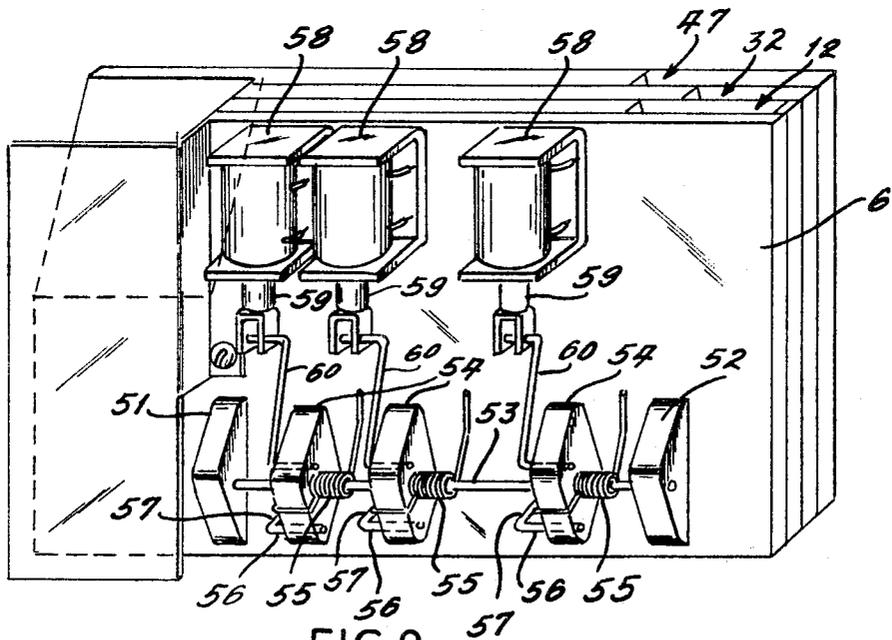


FIG. 9

INVENTOR:
 BY Merrill M. Jenkins
 Paul M. Denk
 ATTORNEY.

FIG. 10

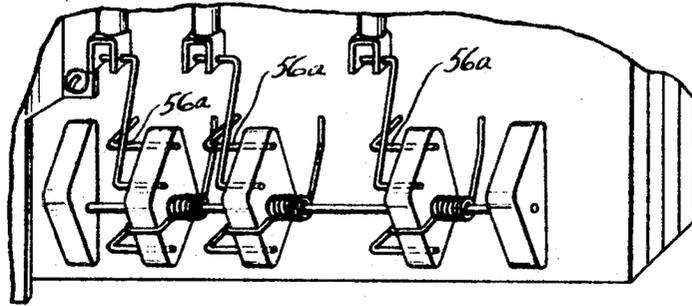
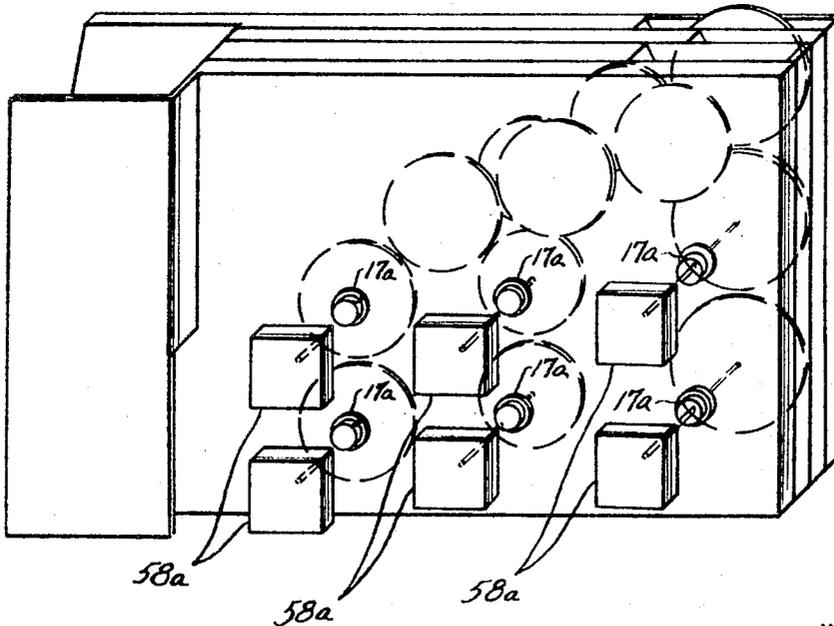


FIG. 11



INVENTOR

MERRILL M. JENKINS

BY

Paul M. Jenkins

ATTORNEY

MONEY-HANDLING DEVICE

BACKGROUND OF THE INVENTION

This invention relates generally to a money-handling device which may be used in conjunction with the present coin accumulators and change dispensers which, for example, are used in present vending machines and money changers, wherein the device provides for the continued separation of the deposited coins into their respective denominational values, allows for crediting of the deposited coins upon an inherent recording means, and then refunds all or part of the coins while escrowing or storing any coins that are to be retained.

Coin accumulating selected changing devices heretofore designed and perfected for use in conjunction with, for example, vending machines, have been generally constructed to receive a select quantity of coins having a total value simply equivalent to or merely slightly in excess of the price for a singular selected item to be vended. Most every one of these prior art coin devices merely function in the nature of a changer which receives the various coins deposited into the vendor, and refunds any remaining money due after the party has selected an individual item from the accompanying vending machine.

Significantly, the coin devices or changers heretofore disclosed incorporate integrally a multitude of mechanically actuated interengaging and cooperating levers, pivotal parts, coin-responsive rotatable elements, mechanical ejectors, and many more similar components, which function mainly in cooperation with vertically disposed tubes or cylindrical reservoirs into which the separated coins are deposited prior to pay out. In addition, as the coins are passing through the various aforementioned components of these prior coin devices, generally the actuation of each lever or switch functions to transmit electrical pulses representative of the presence of a particular coin to an electromechanical accumulator or stepper which functions to record the presence of the coin or coins. Immediately, these recorded tube are then diverted either into a cashbox for storage, while in other devices just certain of the deposited coins, as for example, the nickels, are directed to a coin tube which is part of the change-dispensing mechanism or payout device which is useful, although in a very limiting sense, for providing some means for change after selection of a fixed-priced vendible item. Generally the coins of larger denomination are usually directed to the cashbox, and are not used in refunding any change to the purchaser.

All of these prior art devices, although functioning effectively to regulate the exchange of money during a vend of a single item, are limited in their capacity of operation, not only due to the multitude of mechanically interengaging parts, but also because the coin storage tubes are designed to hold only a limited supply of money, and then generally only coins of a small value and singular denomination. For example, in most of these prior art devices, after the purchaser has selected a single item from the vending machine, he would be refunded his excess change which usually comprises only one or two nickels after his initially deposited coins have already been escrowed. None of these previous devices are adaptable for functioning in combination with a larger capacity vending machine which may display a greater selection of higher priced items, nor may they be used in conjunction with a vending machine that may display a great number of items from which the purchaser may immediately select in a single transaction two or more items from an individual or repeat deposit of a larger quantity of money.

It is, therefore, the principal object of this invention to provide a money-handling device for use in combination with a multiitem-vending machine which is receptive to larger quantities of money when deposited into it, provides for the inherent crediting of said money by the money-handling device itself, and then subsequently provides for the debiting of these funds simultaneously as the purchaser makes selections of one or more of the displayed items, and finally refunds any excess change.

It is another object of this invention to provide a money-handling device which effectively credits all of the money or coins deposited into it at the commencement of a transaction, and will dispose for further crediting any additional funds inserted into the device before or during selection of the vendible items, can provide for a reduction in the amount of credit upon each selection of an item by the purchaser, and finally refund any excess change of various valued coins upon the termination of the vending operation.

It is a further object of this invention to provide a money-handling device which automatically increases or decreases the credit of any funds that may be temporarily inserted into it either initially or intermediate the selection of one or more items by the purchaser from the accompanying vending machine.

It is still another object of this invention to provide a multifunctional money-handling device which may be used in conjunction with a standard multiitem or single item vending machine.

It is an additional object of this invention to provide a money-handling device which may be used in conjunction with the standard coin acceptor, rejector, or validator presently employed in association with the standard vending machines.

It is still a further object of this invention to provide a money-handling device including a coin-discriminating means having substantially few mechanically functioning components, which effectively segregates, mainly through gravity attraction, the coins introduced into the vending machine, and which properly arranges each of the separated coins for sequential crediting by its accompanying and responsive recording means.

It is still an additional object of this invention to provide a money-handling device including a coin processing and temporary escrowing means which may provide for either individual coin or multivalued coin refund of money back to the purchaser while delivering the remaining coins to storage tubes or to more final escrowing in a cashbox.

Another object of this invention is its use in various coin and currency-changing devices presently in use.

Another feature of this invention is the provision of a money-handling device which is simple to manufacture, and effective in operation since it incorporates a substantially reduced number of mechanically movable components.

Many other objects will become apparent to those skilled in the art in the light of the following description and accompanying drawings.

SUMMARY OF THE INVENTION

The money-handling device of this invention is designed and constructed sufficiently distinct from the principle of operation of coin accumulating and changing devices heretofore in usage, but significantly, this device is designed allowing for its usage as a replacement component in standard single item, but preferably, multiitem coin accumulators and vending machines. Most contemporary coin-handling devices contain integrally or act in conjunction with an accepting or rejecting device into which a supply of coins is initially introduced, and while the coins traverse through the acceptor they are validated mainly for the purpose of determining their authenticity or falsity, and if one of the latter category is detected, it is rejected and returned as a slug. The coin-handling device of this invention may employ and act in association therewith, receive the validated coins for further processing and temporary escrowing.

The device is receptive to all validated coins that are fed into the vendor, accumulates and maintains the coins segregated as received from the validator, and inherently credits the monetary value of the total deposited coins while simultaneously deducting the money value of the item or items selected by the purchaser.

The variety of validated and segregated coins delivered from the coin acceptor and/or rejector are transferred into

this present invention wherein the various coins, whether they be of the penny, nickel, dime, or quarter categories, or even of foreign denominations, and so forth, traverse and are channeled by means of gravity attraction through a series of predisposed paths or chutes, one for each coin denomination. Each grouping of the separate coins are attracted by gravity into their selected paths, wherein the initial coins of each group encounters a sensor means which upon actuation by said coin energizes a recording means, or completes its circuitry which functions to credit the total value of the coin. As is coins trigger their respective sensor means, they also are credited, a function that provides for the total crediting of all the coins that may be disposed within the various chutes of the device. This money-recording means, which may be more descriptively referred to and which operates in the capacity of a computer, is useful for the purpose of crediting each coin as it is inserted into the coin-handling device and temporarily escrowed therein. The coin-recording means, and a few examples of the variety of circuitry from which it may be constructed, will be more fully hereinafter discussed, but preferably, is formed inherently within the construction of the device, such as its deposition upon one side of the device as through the use of printed circuitry, or the like. This means is responsive to the operation of the various switch means associated with the coin chutes to provide for this crediting function. Each coin, as it is delivered to and subsequently passes through the switch means of each respective coin path, eventually credited along with the total value of all other present coins of the same or other denominations so as to provide for a proper recordation of all validated money fed into the vendor by the prospective purchaser. The coins as they are disposed within each coin chute may be retained therein until selections of one or more items are made upon the vending machine, or as each coin is recorded its respective sensor means and associated stop means may once again be reactivated to provide for passage of that particular credited coin, and then become readjusted for reception of the next following coin, if any, for its accrediting. There is at least one sensor means and stop means provided for acting in conjunction with the path for each select denomination of coins, and said sensor means are electrically associated through the computerlike circuitry of the recording means which may include a variety of AND or OR gates so that each coin as it passes through each coin chute will receive proper credit upon the coin recorder. To provide proper operation of the aforesaid sensor means, it is necessary to temporarily escrow or retard movement of the coins through the select chutes, and although the sensor means of this invention are formed to provide for retarding passage of subsequent coins beyond the initial coin introduced into the chute, it is necessary to provide the associated stop means for temporarily retarding passage of this initial coin in each chute. To achieve such, one embodiment has been developed utilizing toggle switches which are rendered functional through the use of and there may be a toggle associated with each chute which series of toggles may be operatively associated with a single solenoid, or there may be a solenoid operatively connected with each toggle so as to provide for individual and independent release of coins from separate chutes. These toggles may be constructed for either single or double action, wherein the former embodiment the retraction of a particular single toggle may provide for discharge of the initial and all coins from a chute. In a double-acting toggle, the sensor means associated with each chute need not necessarily include their own inherent stop means, but rather, the double-acting toggle will function to allow for discharge of the initial coin in each chute, while allowing all remaining coins to move one position downward. During the function of this stop means, and particularly when constructed as toggle switches, the coins passing through their respective chutes will energize their proximate sensor means to provide for closing of the computer or recorder circuitry which allows for an instantaneous recording of the total value of money temporarily escrowed within this money-handling device. The

release of one or more of these initial coins disposed within the device, as when the selection of an item has been made upon the vending machine, will allow all of the remaining coins to move forward within the coin-handling device and provide for, again, an instantaneous reevaluation of the total amount of money temporarily escrowed within the coin-handling device. Hence, the debiting function of the recording means comprises a release from the money-handling device of the exact amount of coins representing the cost of the vended item, and then a reevaluation of the remaining coins in the device. When a full selection of one or more items has been made upon the vending machine by the purchaser, means may be provided for instructing the coin-handling device that final selection has been completed, wherein all the remaining coins stored within the device may be refunded back to the purchaser. Naturally, all the other coins that have been released from the money-handling device as a result of selection of items from the vending machine will be deposited within a coin storage device which may be comprised of a cash box, or even select tubes for the various coin denominations to provide for a supplemental pay out mechanism which may further operate in conjunction with the coin-handling device to refund precise change.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, FIG. 1 reveals the money-handling device of this invention as associated with standard coin validating and accumulating mechanisms, shown in phantom lines;

FIG. 2 provides a front view of the coin handling device of this invention;

FIG. 3 is a right side view of the coin-handling device disclosed in FIG. 2;

FIG. 4 is a transverse sectional view taken along the line 4—4 of FIG. 3, and more particularly showing a nickel path of this invention;

FIG. 5 is a transverse sectional view taken along line 5—5 of FIG. 3, and more particularly showing a dime coin path of this invention;

FIG. 6 is a transverse sectional view taken along the line 6—6 of FIG. 3, and which more particularly shows the quarter coin path of this invention;

FIG. 7 provides a backside view of the coin-handling device of this invention, and further indicating how circuitry may be provided thereon to furnish the recording means for crediting or debiting the total value of coins passing through the device;

FIG. 8 provides a perspective view from the backside of the money-handling device of this invention, and further shows another form of the variety of circuitry which can operate in conjunction with the switch means of the invention to provide for recordation of the value of coins passing through said device;

FIG. 9 provides a perspective view from the front side of the money-handling device of this invention showing the solenoid-actuated stop means that provides for temporary detention or discharge of the initial coin of each coin denomination passing through the respective coin chutes;

FIG. 10 provides a partial perspective view of the front side of this money-handling device showing a double-acting stop means which is energized by solenoids for use in temporarily detaining coins within this invention; and

FIG. 11 discloses a perspective view from the front side of the money-handling device of this invention showing a series of stop means comprising solenoids for use in temporarily detaining coins, in addition to light-sensitive diodes or resistors that can sense the presence of select coins within this money-handling device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings for an illustrative embodiment of the money-handling device of this invention, in FIG. 1, reference characteristic 1 generally depicts the device as mounted as a component within the standard coin accumula-

tor 2 as presently embodied and used in conjunction with a vending machine. These present coin accumulators, although being of varied designs, are generally constructed having a coin-validating portion 3 located in its upward regions, said validating portion usually including a coin acceptor and a slug rejector which components initially provide for segregation of the coins into their selective denominations. In addition, these coin accumulators generally include a coin return chute 4 and have adjacent thereto various tubes 5 useful for storing and paying out coins usually of one denomination as the means for refunding any change after purchase of a select item from the vending machine. Thus, it can be readily seen that the money-handling device 1 of this invention is readily adaptable for insertion as a component within present day accumulators, and thereby eliminate the plurality of other components, such as the coin switch chutes and the electromechanical steppers that are responsive to said switches that are normally included in an accumulator.

Referring to FIGS. 2 and 3, it can be seen that the money-handling device is generally rectangular in configuration, and comprises a series of approximately equisized segments 6, 7, 8 and 9, which are retained together to form an integral unit by means of a series of fasteners, such as the screw 10 as shown. One upper corner of the device is milled upon an incline, as at 11, so as to provide a means for deflecting coins directly from the validator into the chute 4 for refunding, as when the vending machine may be deplete of vendible items, or when a slug has been inserted into the coin acceptor and requires immediate discharge.

In FIG. 3, it can be seen that a series of chutes 12, 13, and 14 are formed in certain of the segments, with each of the chutes having an upwardly bevelled opening, as at 15, so as to provide for unencumbered reception of their respective segregated coins as they release from the validator 3. In this particular embodiment of the device, the three chutes are disposed for reception of select coins, with chute 12 being arranged for reception of nickels, chute 13 being arranged for reception of dimes, and chute 14 being disposed for receiving quarters. Although this device is shown for reception of these select segregated coins, it should be remarked that the device may be formed containing additional chutes for reception of coins of other denominations, or even for foreign currency.

It may also be remarked that this money-handling device may be constructed of any sturdy material which may withstand repeated passage of coins, such materials as aluminum, metal, or the like have been found useful, and in the embodiment shown in FIG. 2 of this invention, the device 1 is formed of a polymer, or a transparent plastic as shown, so as to make it lighter in weight. In addition, the various components comprising the integral mechanism of this device are readily visible for inspection when constructed in this manner.

By referring to FIG. 4, that segment of the device which is receptive to and processes one or more nickels passing through a coin accumulator is shown, and this view generally depicts segment 7 of the device, with segment 6 having been removed from view. This segment 7 is formed having a chute 12, as previously described, formed therein, which chute is arranged having a shoulder 16 upon which the nickels N may rest and be guided while traversing through the money-handling device. Arranged proximate the other side of the chute 12 are a series of switch or sensor means 17 through 20, each means comprising a member 21 which is disposed for limited pivotal movement about a shaft 22. A face portion 23 of each pivotal member 21 is normally disposed by means of its integral weighted balancing within the nickel opening of the chute 12, so that as a coin is initially introduced into the chute it will effect a limited pivotal movement of each sensor means until it encounters the lower sensor means 17, at which time a stop means 24, which will be more fully hereinafter described, prevents further movement of said coin. It should be noted that as the coin encounters the face 23 of switch 17, it effects a slight pivoting of its member 21 thereby inducing a stem 25 to become projected into the chute 12 and retard the passage of

any subsequent coins introduced into the device. Each member 21 of the associated sensor means is provided with an integral projecting stem 25, so that as a coin comes to rest adjacent the face portion 23 of a particular sensor, its integral stem 25 will project into and temporarily retard passage of the next succeeding coin. To increase the coin capacity of the chute 12, an additional switch means 26 is disposed proximate the entrance into the chute, and is provided for sensing the presence of the final coin temporarily retained within said chute. Each of the sensor means is provided with a projection 27 which is generally disposed for engagement with a resilient arm 28 which is located centrally of a set of contacts 29 and 30 associated within each switch means. These contacts are electrically associated with circuitry provided within the recording means of this invention, with the first contact 29 comprising the normally open circuit relationship which indicates the nonpresence of a coin with respect to this particular sensor means. On the other hand, when contact is made between the arm 28 and the contact 30, which relationship is usually encountered as during the presence of a coin which induces pivotal movement of the member 21 and projection 27, this relationship normally completes the circuitry associated with this switch indicating the presence of a select coin proximate this particular switch means. These arms and contacts are mounted within its particular segment by any usual method, such as the use of a plurality of slotted bosses 31, as shown, which rigidly stabilizes these components in place. Furthermore, so as to prevent a too forceful engagement of the contacts with their respective arms, most of the switch means are provided with a detent 32 which is disposed for engagement with the member 21 to prevent too far a pivoting of each of said members. Thus, it can be seen, that this particular embodiment in the money-handling device is designed to accommodate at least five nickels, and that the passage of each initial and succeeding nickel through the chute induces a cooperation between certain of the sensor means, causing their closing of circuitry and recording of the presence of said coins; the cooperating relationship of said recording means with the switch means, as well as the various stop means, acting with the initial coin in the chute in an operation to be described subsequently.

In referring to FIG. 5, the construction of the segment 8 which is disposed for reception and temporary retention of a plurality of dimes D within its integral chute 32 is shown. This path for traversing of the dimes is quite similar in construction to the various component parts described in segment 7 providing for transfer and accounting of the nickels, and this segment 8 also includes a series of switch or sensor means 33, 34 and 35 which are disposed for sensing the presence of one or more dimes as they enter into and move through said chute 32. These switch means include a member 36 which is arranged for slight pivotal movement about a shaft 37, which pivotal movement is mainly induced through encountering of the edge of a coin against the integral surface 38 of each member. Additionally, each member has a projecting stem 39 which becomes disposed for temporarily retarding further movement of a subsequent coin when the just succeeding coin has induced the aforescribed pivotal movement of the member 36. Control of the electrical conductivity of the sensor means between the sensing of the presence of a coin and the absence of a coin is achieved through contact between the projections 40, formed integrally of each member, as it engages the resilient central arm 41 of each sensor and induces it upwardly into contact with the upper contact 42 so as to detect said presence of a coin proximate said sensor means, or to detect the nonpresence of a coin as when the member 36 pivots slightly into the chute 32, allowing a projection 40 to lower and create contact between said arm 41 and a lower contact 43. Limitations upon the extent of pivoting of the member 36 is achieved by means of a detent 44 which is disposed for engagement with the member 36 as when the presence of a coin urges said member into a clockwise pivotal movement. Mountings for the various contacts and the

resilient arms is achieved by means of a series of slotted bosses 45.

The operations acquired by dimes moving through this chute 32 is similar to other chutes previously described, wherein the initial dime as it enters into and through said chute encounters a stop means 46 while simultaneously urging the member 36 to pivot in a manner that forms contact between the arm 41 and the upper contact 42, thereby completing circuitry for sensing the presence of a coin by a recording means. Furthermore, as a second coin enters into the chute and drops towards the initial coin, it encounters the projecting stem 39 of sensor 33 that temporarily retards further movement, but at the same time, said coin urges a shifting of the member 36 of sensor 34 to form contact between its arm 41 and upper contact 42, thereby allowing the recording means to sense the presence of a second dime. The sensing of other dimes in the chute is achieved in a similar manner.

As disclosed in FIG. 6, segment 9 of the device is formed having a chute 47 into which and through which quarters Q may pass. Switch or sensor 48 and 49, identical in construction to the switch means previously described act in cooperation with the presence of any quarters to provide means for sensing and recording of the same. A retractable stop means 50 is disposed for temporarily retarding movement of the initial quarter, and said quarter in conjunction with the sensor means 48, will also temporarily prevent movement of any succeeding coins.

Referring to FIG. 9, one embodiment of a plurality of stop means for use in conjunction with the device for temporarily retarding passage of the initial and subsequent coins entering into the nickel, dime and quarter slots is shown. This arrangement in stop means discloses a pair of brackets 51 and 52 which are mounted to and are integral with the surface of the front segment 6 of the device, and spaced between brackets is a shaft 53. Pivotaly mounted upon said shaft are a series of rocker arms 54, with the lower end of each rocker arm being normally biased in a direction towards the surface of the segment 6 by means of the springs 55. Pivotaly mounting to the lower end of each rocker arm is a link 56 and each link is integrally formed having an inwardly bent portion 57 that extends into and through the segment 6, as well as, in certain cases, into the other segments of the device. Furthermore, each of the inserting portions 57 respectively extend into the chute portions of the nickel, dime or quarter chutes, and therefore corresponds and comprises the description of the stop means 24, 46, and 50 previously described for use in temporarily retarding the passage of initial coins from their respective chutes. Thus, it can be seen that through the bias of the springs 55, the links and their inserting portions 57 are normally disposed within the path of their respective chutes. Further mounting upwardly upon the segment 6 are a series of solenoids 58 whose electromechanically actuated shafts 59 are each connected by means of a link 60 to each of the rocker arms 54. These solenoids, when not energized, normally allow for the disposition of the inserting portions 57 within the device, but that when said solenoids become selectively energized, the upward movement of its shaft 59 causes its associated link 60 to rock the arm 54 upwardly, thereby providing for a retraction of its inserting portion 57 from within the device, thereby precluding further blockage of its respective chute. Thus, it can be seen that where the solenoids are maintained electrically responsive to the recording means of this device, and to the controls of the accompanying vending machine, that when, for example, a refund lever may be depressed upon the vending machine, all of the solenoids may become energized thereby allowing for a complete discharge of all coins from their temporary detention within this money-handling device.

Where it is desirable to provide for sequential discharge of coins from their respective chutes in the money-handling device, such may be easily accomplished by adding another link 56a (FIG. 10), similar to the links 56, to the upward por-

tion of the rocker arms 54, which links also will include inserting portions that extend into and through select coin chutes. The use of these added links will retard passage of the second coin in any particular chute. Ordinarily, these upper links will be normally retracted from their disposition through a particular coin chute when the solenoids are unenergized, but when any particular solenoid becomes energized, this causes a movement of the rocker arm in a manner which retracts the lower link 56, but simultaneously causes an insertion of this upper link thereby retarding temporarily passage of the second and subsequent coins, while the first coin is allowed to be discharged from a chute of the device. Naturally, the insertion of the upper link occurs just before the stem from the member below releases the second coin. Upon immediate deenergization of any particular solenoid, the spring will induce a reentry of the link 56 back into and through a particular chute, while retracting the upper link, thereby allowing the coins to fall one place downwardly in a chute. This particular arrangement in the stop means is beneficial where said stop means may be wired directly to the vend selection switch of the vending machine, and upon a selection, the solenoids associated with a particular value of coin or coins will energize to allow a select value of coins to discharge and fall from the device into storage. The value of the coins discharged will represent the value of the sale for the particular vended item.

It should be remarked that heretofore in this application the solenoid and rocker arm relationship, as described in FIG. 9, had been defined as the stop means, but other forms of stop means are within the contemplation of the invention and which may be employed, such as hydraulically actuated members, or solenoids 58a that mount directly upon the surface of the segment 6 and have their shafts extend directly into and through the device and its integral coin chutes (see FIG. 11). These are mere variations in the design of the type of stop means that could connect into the circuitry of the device and could be employed in the operation of this invention. Furthermore, the various sensor means heretofore described function primarily to sense the presence of a coin in a particular chute. Other forms of sensor means than those including contacts and resilient arms could be used, such as light sensitive diodes or resistors 17a that mount laterally of each coin position in the chute which could be used to sense the presence of a coin and register the same for crediting. This one variation is herein discussed to make apparent that other types of switch means for use in sensing the presence of coins could be readily incorporated within this money-handling device, and be within the scope of this invention.

Referring to FIGS. 7 and 8 of the drawings, each discloses a form of circuitry which is responsive to the operation of the switch means of this money-handling device, and is also disposed for cooperating with the control circuitry of an associated vending machine so as to instruct the same when the equivalent of or money in excess of that required to allow for purchase and vend of one or more items is present in the money handling device. It should be remarked that the two particular circuits disclosed herein are only exemplary of the type of circuits that could be printed, wired, or the like, to the surface of the money-handling device, therein making it a compact unit, and yet function as the recording means that acts in cooperation with the device to credit and debit coins passing therein. Obviously, numerous designs in circuitry could be utilized, but the use of a circuit mounting to one side of a coin-handling device is herein deemed to make this invention efficient.

In FIG. 8, which is a rear view of the money handling device, the electrical circuitry which in combination with the switch means when energized indicates the presence of coins of the value of 5 cents, 10 cents, 15 cents, and so forth, are shown extending to approximately the lateral edge of the backside of segment 9. The significant aspect of this circuitry to be noted is that the presence of a coin in the device does not require the transmittal of an electrical pulse to establish its value, but rather, the coin itself closes upon a computer, a

switch to complete a circuit that in itself determines the value of the deposited coin or coins.

As an example of the operation of the circuitry of this recording means when functioning in cooperation with the sensor means and other components of this money-handling device, it will be assumed that a nickel and a dime have been deposited into the device, and have come to rest proximate their respective sensor 17 and 33, with the nickel sensor 17 forcing a closing of its contacts, while the dime forces pivotal movement of its switch 33 thereby urging its contact also into closure. In this arrangement, a positive charge as displayed at location 61 energized line 62 which passes a charge through the open contacts of sensor 48, the open lower quarter switch, and to circuit line 63; at this point, energy will be conducted through each of the sensors 33 and 17 since they both will be pivoted forcing their respective contacts into closure. The charge passing through line 64 will be conducted through the open contact of sensor 34, and induce energization of relay 1. This energization of relay 1 will cause its four pivots P to change from normally closed contacts NC to normally open contacts NO. In addition, the charge from line 63 will pass through the now closed contacts of switch 17, into and through line 65 and now through the open contacts of sensor 18 to the normally open contact of line 66. The charge being conducted through line 66 will encounter relay 2, which has not been energized and is maintained normally closed NC, and will be conducted through line 67 to sense the presence of 15 cents, as along lead 68 of the money-handling device. As previously described, if the associated vending machine is set to accommodate the sale of a 15-cent item, as this money-handling device, containing a nickel and a dime, senses the presence of this 15-cent deposit, the vending machine when its selection switch for the particular item is depressed, it will complete circuitry with the money-handling device and become fully energized to discharge one of the 15-cent items to the purchaser.

It can also be seen from the foregoing description of FIG. 8 that if a greater quantity of money is deposited into this money-handling device, and for the particular embodiment shown, an amount up to \$1.40 can be inserted at one time into the device, as selections are made upon the vending machine, the particular item or items selected in sequence will be delivered to the purchaser, and at the same time the stop means, such as the arrangement shown in FIG. 9, can also be selectively energized by connecting circuitry to allow for a discharge to a cashbox of the precise amount of money representative of the value of items vended, with the remaining coins in the device moving downwardly into contact with the lower sensors pending selection of further items from the vending machine, or an actuation of a lever which dictates a refund of all remaining money back to the purchaser. As a further illustration, the vending machine selection switches can be connected not only with the leads, as at 68, but can also electrically connect and energize, upon depressing, select stop means, as for example, the double-toggle type, to discharge the precise amount of funds to storage, representative of the value of the item vended.

The exemplary circuitry shown in FIG. 7 is more in the nature of computer circuitry involving the use of, in this particular example, the AND gates, as shown. This particular circuitry is designed to allow for any selection and vending of items from 5 cents to 30 cents in value, but again, since this money-handling device can accommodate \$1.40 of coins, a multiple of the valued items may be vended upon the deposition of an ample supply of coins into said device. As an example of the operation of this particular circuitry as mounted upon a side of the money-handling device, if the combination of one dime and one nickel are deposited into said device, the bus bar 69 conducts electric charges up to and through the now-closed switches 17 and 33, with the charge being conducted through the line 70 indicating the presence of at least 5 cents in the device, and with the charge being conducted also through the line 71 indicating the presence of at least 10 cents

in the same device. In addition, charge is conducted through the lines 72 and 73 up to and through the AND-gate 74, and out through circuit line 75 to lead 76 to indicate and sense the presence of 15 cents in the money handling device. In this manner, if either a 5, 10, or 15-cent item is disposed for vending and selected from the vending machine, such an item will be vended. Obviously, through the cooperation of the various sensors contained in this money-handling device, in addition to the coordination or the stop means, especially with regard to the initial coins inserted into the device, a multiple of items having various fixed values may be vended from the associated vending machine, and up to an accumulative amount of at least \$1.40. Obviously, as items are selected from the vending machine, and the stop means allows for the sequential discharge of coins representative of the value of items selected, further space will be available upwardly within the chutes of the money-handling device to accommodate the insertion of additional coins. As more coins are added, circuitry of higher value will become energized due to the closing of additional switch means. In this manner, selections from the vending machine may be repeatedly made, and to a substantially higher total value. But on the other hand, this money-handling device, with its various leads, may be regulated to act in conjunction with a single item-vending machine and allow for a selection of only fixed value items. Under such an arrangement, as coins are inserted into the vending machine, and as the value of the item to be vended from the machine is finally accumulated, the item will be automatically vended, and any excess change over and above that necessary to compensate for the value of the selected item will be automatically refunded back to the purchaser.

In view of the foregoing discussions, it should be obvious that the versatility of this money-handling device is readily adaptable for usage with all types of vending machines, and in addition, since it can be constructed, as shown in these particular drawings, having fixed dimensions, it can be readily inserted as a replacement component directly into present day coin accumulators and changers.

Numerous variations in the construction of this money-handling device, and within the scope of the appended claims, will occur to those skilled in the art in the light of the foregoing disclosure. These described embodiments and examples are merely illustrative. In addition, the two circuits described are only illustrative of the multitude of circuitry which may be incorporated and used directly within this money-handling device to function as the direct-recording means and control the entire operation of the accompanying vending machine.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a coin-handling device for use in segregating and accumulating one or more deposited coins, a series of coin chutes each arranged to receive select coins of a particular size, sensor means disposed for sensing the presence of one or more coins of similar size temporarily retarded while passing through said chutes, recording means responsive to the operation of each sensor means and providing for accumulatively crediting the coins temporarily retarded in said chutes, and stop means proximate to said chutes and responsive to the crediting of said recording means for temporarily retarding or releasing the coins passing through a particular chute.

2. The invention of claim 1 wherein the coin-handling device is comprised of a series of adjoining segments, each segment formed having one of said chutes arranged therethrough and being disposed to receive select coins of a particular size, each segment having a series of sensor means responsive to the presence of one or more coins progressively passing through said chute, and said segments of the device being retained together to form an integral unit.

3. The invention of claim 1 wherein each sensor means includes a member pivotally mounting to the segment in which it operatively associates, a portion of said member being normally disposed within the chute formed in said segment and subject to being contacted by a coin passing thereby and ef-

fecting limited pivotal movement of said member, electrical contacts included in said sensor means and being responsive to the pivotal movement of said member providing for electrical conduction through the sensor means upon pivoting of its integral member as during passage of a coin, and said recording means being responsive to said electrical conduction and functioning to credit the presence of said coin.

4. The invention of claim 3 wherein the sensor means includes a stem connecting integrally to its pivotal member and normally arranged externally of the proximate coin chute, said stem disposed for projection into said chute upon the movement of a coin into contact with said member when effecting its limited pivoting, the disposition of said stem in said chute temporarily retarding movement of the succeeding coin also moving through said chute.

5. The invention of claim 3 wherein each sensor means includes a pair of contacts, a resilient arm disposed intermediate said contacts and normally resting against one of the same maintaining said sensor open, said arm being arranged for engagement by the pivotal member upon passage of a coin thereby causing said arm to engage the other contact and rendering said sensor means conductive for inducing the recording means to credit the value of the present coin.

6. The invention of claim 2 wherein the stop means operatively associated with the chutes of the device comprises at least one solenoid for each chute whose movable core is capable of extension into the proximate chute to retard passage of a coin during the crediting cycle of the recording means, the core of said solenoid capable of retraction for allowing passage of the present coin thereby providing for its refund or entry into storage.

7. The invention of claim 6 wherein the solenoid operatively associated with each segment and its formed chute provides the means for temporarily retarding passage of the initial coin through its respective chute during the crediting cycle, each sensor means including a member pivotally mounting to the segment in which it operates, a portion of said member being normally disposed within the chute formed in said segment and subject to contact by a coin passing thereby for effecting limited pivotal movement of said member, said sensor means further including a stem connecting integrally to its pivotal member and normally arranged externally of the proximate coin chute, said stem disposed for projecting into said chute upon the movement of a coin into contact with said member in effecting its limited pivoting, the disposition of said stem in said chute-retarding movement of the succeeding coin also moving through said chute, said recording means also crediting the value of said succeeding coin.

8. The invention of claim 7 wherein said recording means provides for crediting of a succeeding coin when initial or prior coins occupy all chute coin spaces located in advance of the succeeding coin.

9. The invention of claim 8 wherein the recording means includes a series of relays providing for sequential crediting of the coins temporarily retained in each chute.

10. The invention of claim 8 wherein the recording means includes a series of sequentially arranged AND gates providing for crediting of the coins temporarily retained in each chute.

11. The invention of claim 7 wherein the recording means mounts to the surface of a segment of the coin handling device.

12. In a coin-handling device for use in conjunction with a vending machine capable of delivering one or more items upon selection, with said vending machine control normally including a coin acceptor and validator for accommodating initial reception of coins introduced into the vending machine, and further including payout and storage mechanisms providing for terminal processing of said coins, said coin-handling device comprising a series of adjoining segments, each segment formed having a chute disposed therethrough and arranged to receive and pass select coins of a particular size, each segment having a series of coin-detecting means respon-

sive to the presence of one or more coins traversing progressively through its respective chute, said segments of the device being retained together to form an integral unit, recording means responsive to the operation of each coin-detecting means and providing for an accumulative credit of the coins traversing through the chutes, said recording means responsive to the selection of an item from the vending machine and providing for a deduction of the value of the selected item from the accumulated credit by effecting a discharge of certain coins.

13. The process of handling coins comprising segregating said coins into their respective denominations upon entrance of said coins into the coin-handling device, channelling said segregated coins into separate chutes, causing said coins to activate detecting means operatively associated with each chute, temporarily retarding further movement of said coins through said chutes upon the initial coin in each chute encountering the first detecting means of said chute, energizing recording means responsive to said detecting means to credit the accumulative value of at least the initial coins present in the coin-handling device, and progressively discharging said retarded coins from said coin-handling device.

14. In the process of claim 13 wherein said discharged coins are refunded.

15. In the process of claim 13 wherein said discharged coins are channelled into storage.

16. In the process of claim 13 wherein a portion of said discharged coins are refunded, and a portion of said discharged coins are channelled into storage.

17. In the process of claim 13 wherein a portion of said discharged coins are refunded, a portion of said discharged coins are channelled into storage, and the remaining portion of the retarded coins being retained in the coin-handling device.

18. In the process of claim 13 wherein the recording means comprises electrical circuitry interconnecting with the detecting means providing for a determination of the value of present coins, and the presence of a coin adjacent a detecting means completes circuitry providing for a recording of the value of that particular coin.

19. In a coin-handling device for use in segregating, accumulating and processing one or more deposited coins, comprising a series of adjoining segments each formed having a chute disposed therethrough and arranged to receive and pass selected coins of a particular size deposited into the coin-handling device, each chute having at least one coin-detecting means operatively associated therewith and responsive to the presence of one or more coins traversing through its respective chute, said segments of the device being retained together to form an integral unit, at least one stop means operatively associated with each chute to temporarily retard movement of said coins during their processing, recording means responsive to the operation of the coin-detecting means and providing for the accumulative crediting of the coins traversing the chutes, and said stop means functioning to discharge the retarded coins upon completion of the recording operation.

20. In the coin-handling device of claim 19 wherein said recording means functions to deduct a select value of coins from the accumulated credit upon the discharge of select coins from said device at completion of the recording operation.

21. The invention of claim 19 wherein said stop means comprises at least one solenoid mounted in proximity with the chutes of the adjoining segments, at least one toggle switch operatively connecting to said solenoid, said toggle switch having at least one projecting stem capable of extension into the proximate chute and providing for temporary retention of a present coin, said toggle switch upon energization of the solenoid providing for retraction of the stem and passage of said retained coin.

22. The invention of claim 19 wherein said stop means comprises at least one solenoid mounted in proximity with the chutes of the adjoining segments, at least one toggle switch

operatively connecting to said solenoid, said toggle switch having a pair of projecting stems capable of alternate extension into the proximate chute and providing for temporary retention of present coins, said toggle switch upon repeated energization of the solenoid providing for alternate retraction of said stems from a chute and sequential passage of coins through said chute.

23. In a coin-handling device for use in segregating and accumulating one or more deposited coins, a series of coin chutes each arranged to receive select coins of a particular size, sensor means disposed for cooperating with the presence

of coins of similar size passing through said chutes, stop means proximate to said chutes and in cooperation with said sensor means providing for temporarily retarding or releasing the coins passing through a particular chute, electrical circuitry interconnecting with said sensor means providing for evaluation of the total valuation of coins disposed adjacent and actuating said sensor means, and said circuitry in combination with said sensor means providing for a revaluation of the remaining deposited coins after a discharge or addition of some coins.

* * * * *

15

20

25

30

35

40

45

50

55

60

65

70

75

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,620,340 Dated July 9, 1969

Inventor(s) Merrill M. Jenkins

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

In claim 3, Col. 10, Line 71, Change "1" to ---2---.

Signed and sealed this 13th day of June 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents