Nov. 11, 1941. C. F. HARRIS 2,262,322

COIN CHANGER AND COIN CONTROL DEVICE

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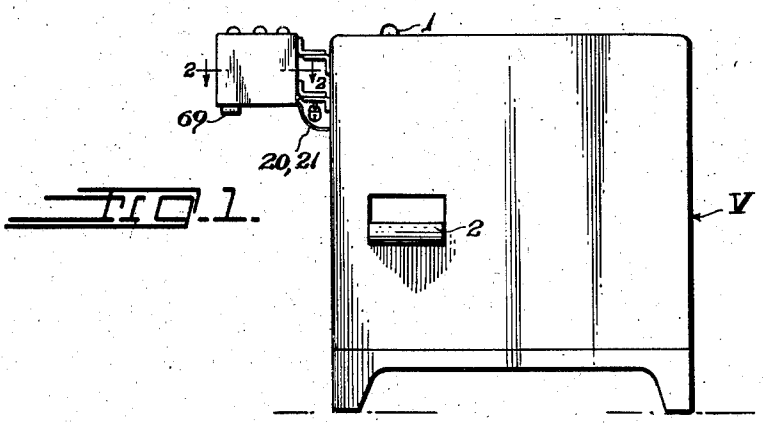


Fig. 1.

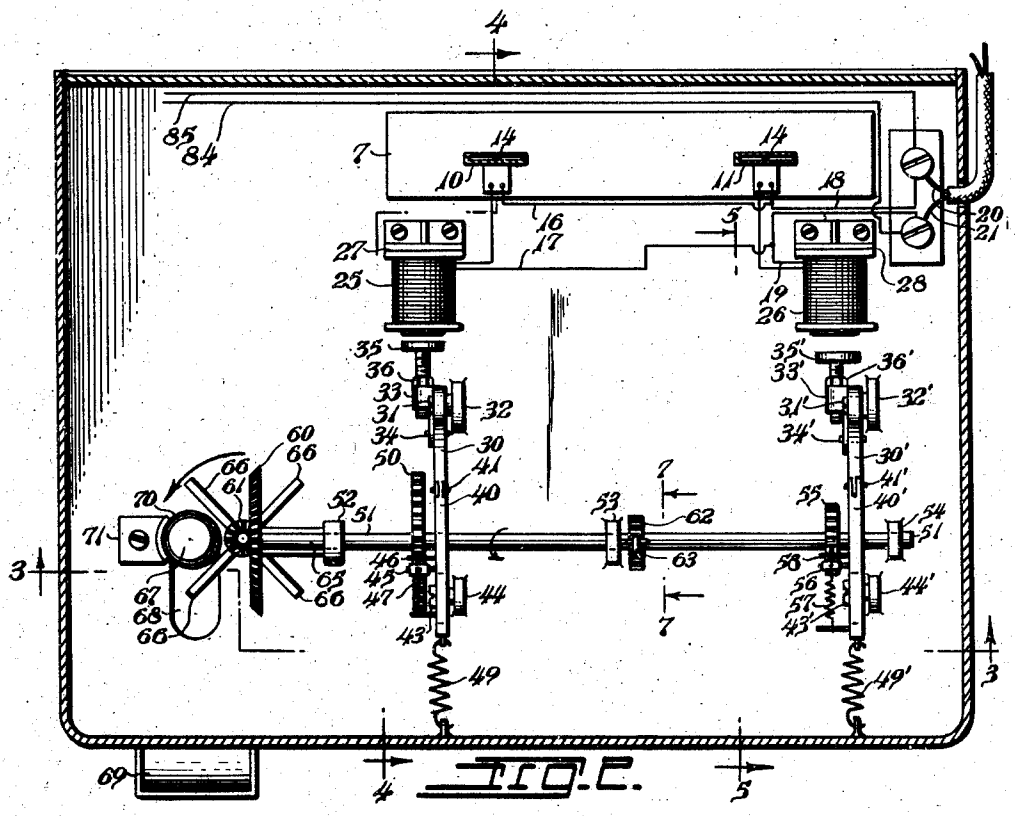


Fig. 2.

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COIN CHANGER AND COIN CONTROL DEVICE

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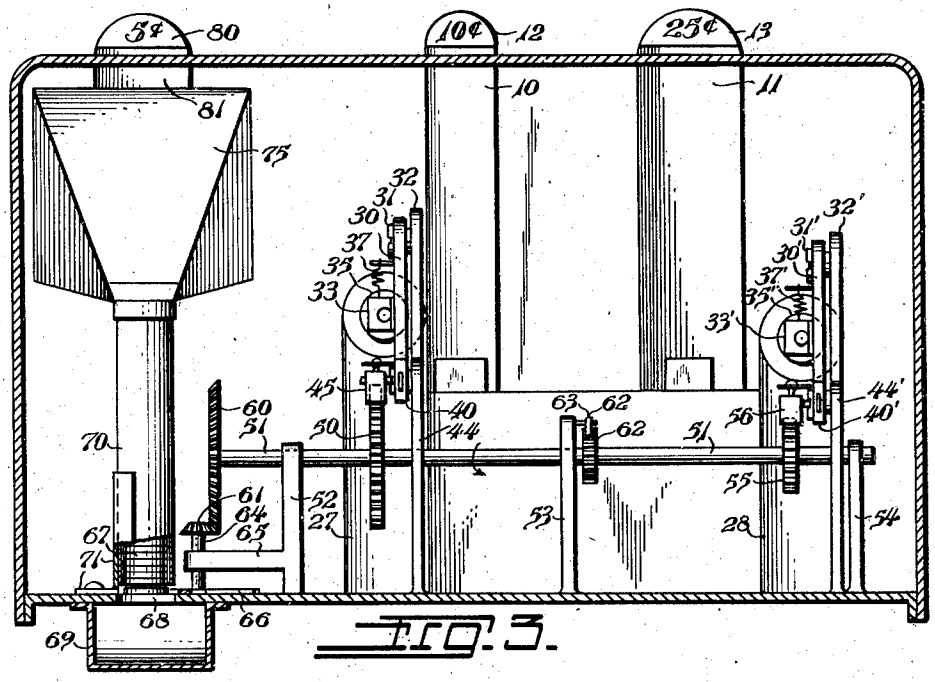


FIG. 3.

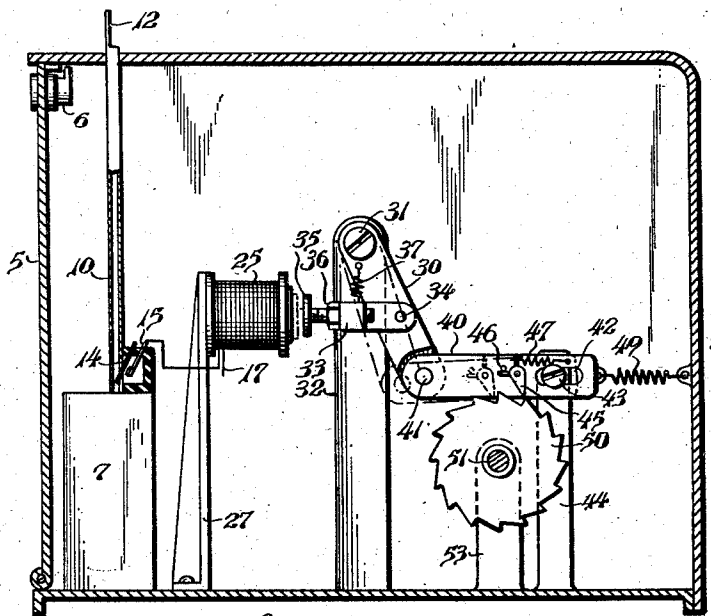


FIG. 4.

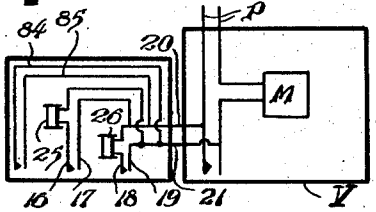


FIG. 8.

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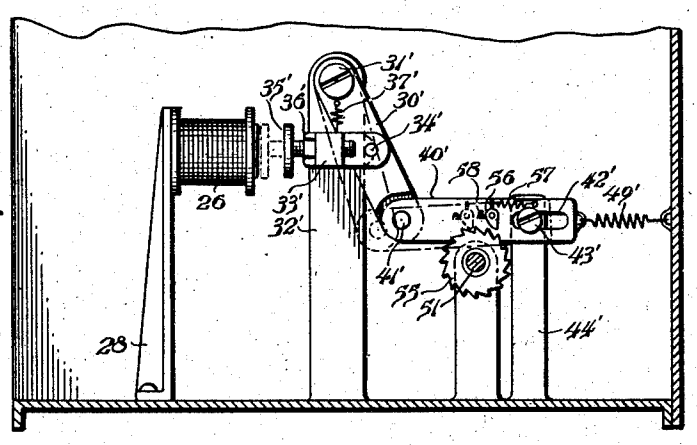
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COIN CHANGER AND COIN CONTROL DEVICE

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Fig. 5.



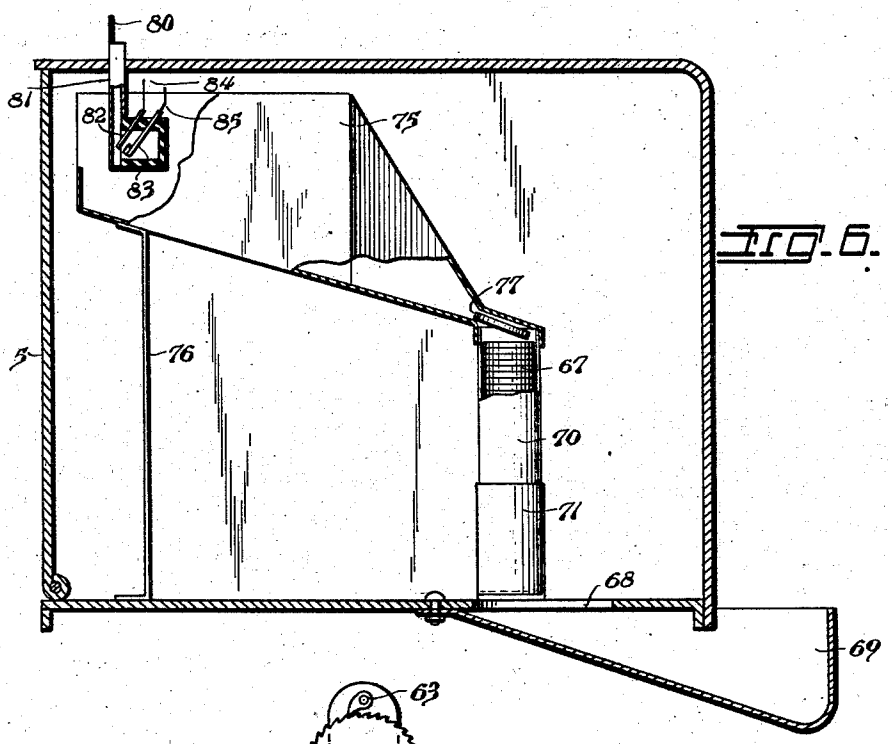
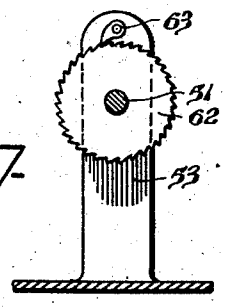


Fig. 6.

Fig. 7.



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COIN CHANGER AND COIN CONTROL DEVICE

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FIG. 9.

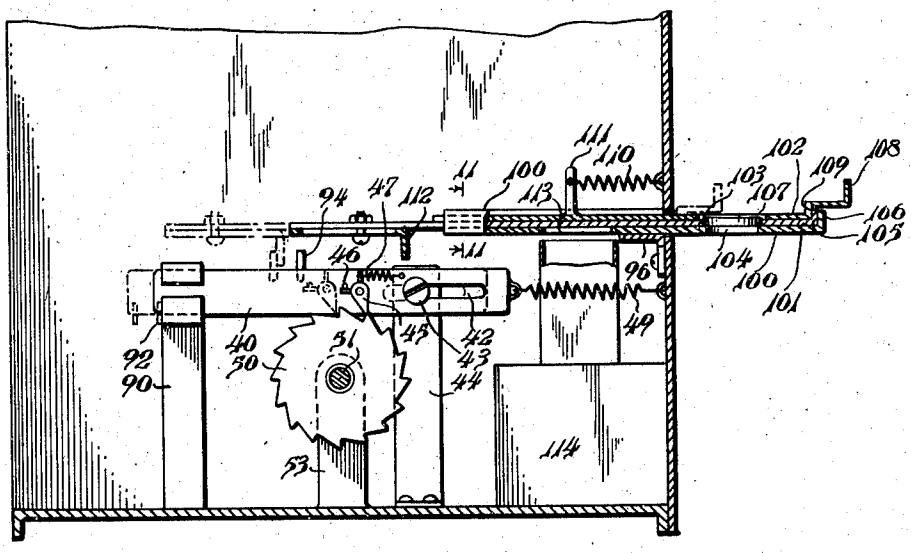
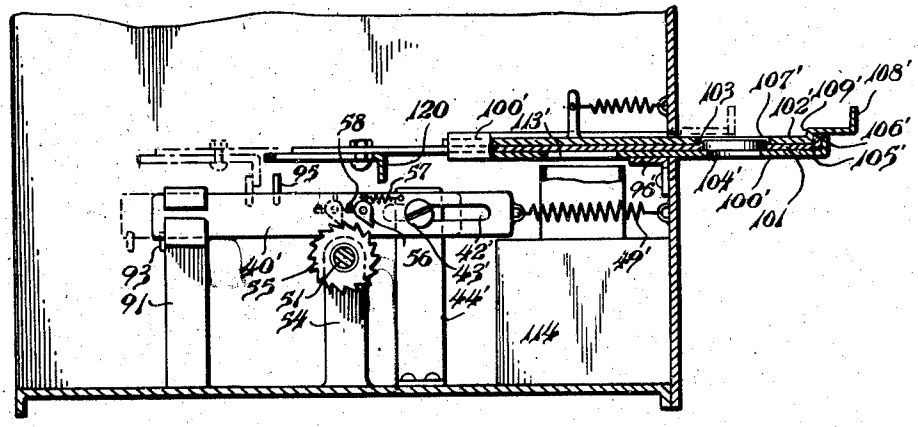


FIG. 10.



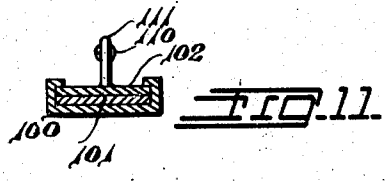


FIG. 11.

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Patented Nov. 11, 1941 2,262,322

UNITED STATES PATENT OFFICE

2,262,322

COIN CHANGER AND COIN CONTROL DEVICE

Charles F. Harris, Fayetteville, N. C., assignor of one-half to A. E. Dixon, R. M. Olive, and C. E. Rankin

Application January 17, 1939, Serial No. 251,425

6 Claims. (Cl. 194—10)

This invention relates in general to coin changing and coin control apparatus and deals, more particularly with a device of this character which may be conveniently and efficiently attached to various vending machines now on the market as a control device and/or for use as a coin changing apparatus returning the correct change for coins of greater value than the cost of the article purchased.

A primary purpose of the invention is the provision of a change making and coin control device which may be readily attached to a vending machine to permit the use of such vending machine by means of a coin of greater value than the cost of the article purchased in serving not only to actuate the vending machine to deliver the article purchased but also to deliver the proper change depending on the value of the coin deposited. For example, if the price of an article delivered by the vending machine is five cents, the improved coin changer and coin control device of the present invention may be attached to the vending machine to permit the use thereof by a dime or quarter whereupon the article purchased will be delivered by the vending machine and the proper amount of change returned by the coin changer, which amount will be a nickel in the event a dime is inserted or four nickels in the event a quarter is deposited. However, it is to be understood that the coin changer is not limited to use with coins of such denominations but is equally adaptable for use with coins of other values by varying the size and proportions of the various operating parts of the device or otherwise changing the relation of certain mechanical elements thereof.

Another object of the invention is for the provision of a coin changer of the type described comprising manually operated means for actuating the coin changing mechanism thereof.

A still further object of the invention is to provide a coin changing device of the character stated which is of simple compact construction, efficient in operation and comprises relatively few, simple, inexpensive parts making possible the production of such devices at comparatively low cost.

Further objects and advantages of the invention and other new and useful features in the construction, arrangement and general combination of parts thereof will be readily apparent to those skilled in the art as a description thereof proceeds with reference to the accompanying drawings in which like reference characters designate like parts throughout the same, and in which:

Fig. 1 is a front elevational view showing a form of vending machine with the improved coin control and coin changing device of the invention mounted thereon and connected in operative relation thereto;

Fig. 2 is a horizontal sectional view taken along line 2—2 of Fig. 1, looking in the direction of the arrows, showing in plan the several operating mechanisms of the coin changer and coin control device;

Fig. 3 represents a section taken along line 3—3 of Fig. 2, looking in the direction of the arrows;

Fig. 4 is a section taken along line 4—4 of Fig. 2, looking in the direction of the arrows, and showing in elevation the structure of one of the operating means of the device;

Fig. 5 is a similar section of Fig. 2 taken along line 5—5, looking in the direction of the arrows, showing in elevation the structure of another of the operating means;

Fig. 6 is a section showing in side elevation the coin stack mechanism and magazine therefor illustrated in Fig. 3;

Fig. 7 is a view taken along line 7—7 of Fig. 2, looking in the direction of the arrows;

Fig. 8 is a diagrammatic view illustrating the electrical circuits;

Fig. 9 to 11 inclusive illustrate a further embodiment of the invention comprising manually operated actuating means, Fig. 9 representing a section through a coin changing device of this character showing the structure of one of the operating means which may be employed;

Fig. 10 is a view similar to Fig. 9 illustrating the structural parts of another of the operating means in this form of the invention; and,

Fig. 11 is a section taken on line 11—11 of Fig. 9, looking in the direction of the arrows.

Fig. 1 shows in general the arrangement by which the improved coin changer and coin control device of the invention may be mounted onto a vending machine V normally operated for example, by a nickel inserted into slot 1, and which sets into motion an electrically operated motor apparatus (not shown) to deliver the article purchased to a receptacle 2 where it may be conveniently removed by the purchaser. The coin changer is preferably a relatively small unitary device comprising any selected form of casing having a removable or hinged door panel 5, Fig. 4, which may be provided with a suitable lock 6 whereby access to the interior of the coin changer may be had only by the attendant or other authorized persons.

Referring to Fig. 2 which is a section taken on line 2—2 of Fig. 1, the various operating parts of the coin changer device are shown in plan comprising a pair of coin chutes 10, 11 receiving, for example, dimes and quarters deposited in their respective slots 12, 13, at the top of the casing as seen in Fig. 3. At a suitable point adjacent the lower end of each chute, spaced con-

tact elements 14, 15, Fig. 4, are provided one of which extends normally into the chute in position to arrest a coin inserted therein to cause a momentary closing of said contact elements, the coin subsequently falling into the collection receptacle 7. These contact elements 14, 15 in either chute close the circuit in which they are included either through wires 16, 17 leading from the contact elements in the dime chute 10, Fig. 2, or wires 18, 19, leading from the contact elements in the quarter chute 11. Wires 16, 17, as shown in Fig. 2, are in circuit with solenoid 25 and wires 18, 19 in circuit with solenoid 26 respectively, these conductors being connected in parallel and leading to terminal wires 20, 21 connected to the source of current which of course may be a battery but in the illustration of the present invention is the power line P supplying A. C. or D. C. current to the vending machine in a hook-up such as illustrated in Fig. 8 for example. Since said wires leading from the contact elements in the receptive chutes 10, 11 are connected in parallel, the insertion of a coin in either chute to close the circuit as aforesaid will energize only the solenoid associated therewith and will not affect the other, the solenoids thus being adapted to function in independent relation in the operation of the machine as hereinafter more fully set forth.

The solenoids 25, 26 are mounted in the casing by supports 27, 28, in operative position for actuating their respective coin change operating members, substantially as shown in Figs. 2, 3 and 4, it being understood that the operating mechanism of Fig. 4 associated with solenoid 25 is actuated upon insertion of a dime in chute 10 while that of Fig. 5 is actuated by solenoid 26 when energized by a quarter deposited in chute 11.

As shown in Fig. 4, the operating mechanism actuated upon insertion of a dime in chute 10 comprises a substantial lever or connecting rod 30 pivotally mounted at one end by pintle 31 to a support 32 fixedly secured in the casing. A cross-head 33 pivotally secured to said lever or connecting rod at 34 comprises a solenoid plunger or armature 35 having preferably a screw threaded engagement with the cross-head 33 for adjustment purposes, the same being held locked in any selected adjusted position by lock nut 36. Since said armature 35 is threadely mounted in cross-head 33 the same may be adjusted as necessary with respect to solenoid 25 to provide the required throw of said lever or connecting rod 30 about its pivot 31, said armature otherwise being maintained in normal operative position with respect to the solenoid by a coil spring 37 Fig. 4, suitably attached to cross-head 33 at one end and at its opposite end to said rod 30, as by a pin adjacent pintle 31, said spring thus permitting suitable relative movement of the cross-head and connecting rod when actuated but maintaining said armature in proper position to be attracted by the solenoid when energized in a succeeding operation.

At its lower end the connecting rod lever 30 is pivotally connected to a crank or push rod member 40 by a pintle 41, Figs. 2 and 4. Said crank is mounted in the assembly preferably by means of an elongated slot 42 intermediate its ends receiving a pin 43 held by a support 44 shown fixedly secured to the base of the casing. Thus said crank is adapted both for axial sliding movement and a certain degree of pivotal movement about said pin 43 when the several parts of the mechanism are actuated substantially in the manner indicated by the dotted line showing, Fig. 4. Carried by said crank member 40 is a pivotally mounted pawl 45 having a pair of lug elements one of which is designed to engage a stop 46 on the crank while the other is engaged by a spring 47 to hold the pawl in its normal position but capable of counterclockwise movement in positively engaging the teeth of a cooperating ratchet wheel 50 to actuate the same on forward movement of the crank 40 under influence of a suitable coil spring 49 when the solenoid 25 is deenergized, said spring being secured at one end to said crank and at its opposite end to the adjacent wall of the casing. Thus as best seen in Fig. 4, on rearward movement of crank 40 taking place through connecting rod 30 and armature 35 attracted by solenoid 25, said pawl 45 is adapted to pass over a single tooth of ratchet wheel 50 and engage said tooth such that on forward return movement of said crank under influence of spring 49, a corresponding rotary movement is transmitted to the ratchet wheel 50 and the horizontal main shaft 51 to which it is fixedly secured in any suitable manner.

Said main shaft 51 is rotatably mounted in the casing by bearing supports 52, 53, and 54, Figs. 2 and 3, and has secured thereto another ratchet wheel 55, Figs. 2 and 5, which is operated by means substantially similar to that described with reference to Fig. 4 but which is actuated only when solenoid 26 is energized which, it will be recalled, takes place upon insertion of a quarter in chute 11. Accordingly as best seen in Fig. 5, said operating means for ratchet wheel 55 comprises conecting rod 30' pivotally mounted by pintle 31' to a support 32' fixedly secured in the casing. Cross-head 33' pivotally secured to said connecting rod at 34', comprises a solenoid plunger or armature 35' adjustably retained by lock nut 36', said cross-head being held in normal operative position by coil spring 37' substantially in the manner aforesaid. The lower end of said connecting rod 30' is connected to crank or push rod 40' by pintle 41', said crank having a slot 42' receiving pin 43' held by support 44'. Said crank carries a pawl 56 provided with a pair of lug elements one of which abuts against a stop 58 while the other is engaged by spring 57 to hold the pawl in its normal position but capable of counterclockwise movement in passing over the teeth of said ratchet wheel 55 associated therewith on backward movement of the said crank 40', whereby to positively engage the same on return forward movement of said crank under influence of spring 49' in likewise causing a corresponding rotary movement of shaft 51.

Said shaft 51 is connected with a coin ejecting mechanism, presently to be described, which in the event a dime is inserted in the machine returns one nickel change, but in the event a quarter is deposited will return four nickels. The movement of such ejecting means in the present example is uniform and it is therefore necessary that the operating means for ratchet wheel 55 be such as to cause the same to transmit a rotary motion to said main shaft which is a multiple of that imparted when ratchet wheel 50 is actuated. Thus the movement transmitted by ratchet wheel 55 must be four times that of ratchet wheel 50 since as stated, when the same is actuated four nickels are to be returned whereas only one nickel is returned on actuation of ratchet wheel 50. In order that the setting for either actuating mechanism be in proper position for

operation regardless of the number of times the other is actuated, said ratchet wheels 50, 55 are provided having the same number of teeth, for example 16, whereupon both may move on any rotation of the shaft 51 with the assurance that at the end of such movement, some tooth on either ratchet wheel is always in proper position to be engaged by its associated pawl for the next succeeding operation. However said ratchet wheel 55 is provided of substantially one-half the radius of ratchet wheel 50 and its pawl actuating mechanism designed to actuate the same twice the distance thereof by passing over two teeth to engage the second of such teeth as illustrated in dotted lines in Fig. 5. The movement of the pawl 56 by the crank 40' through such distance is taken care of by adjusting the threaded shank of armature 35' to suitably actuate connecting rod 30' which in turn actuates said crank 40' to substantially the position illustrated by dotted lines wherein the pawl 56 engages the second of two teeth passed over and rotates the shaft 51 a proportionate distance on forward return movement of the crank. Thus by reducing the size of ratchet wheel 55 to one-half that of ratchet wheel 50 and having the pawl 56 actuate through a distance of two teeth rather than one, the shaft 51 is rotated by ratchet wheel 55 four times the distance the same is moved upon actuation of ratchet wheel 50. In other words, in the present example, ratchet wheel 55 when actuated moves the shaft 51 through a full quarter turn whereas ratchet wheel 50 moving only one tooth and being twice the diameter of ratchet wheel 55 is merely one-fourth as effective thereby actuating said shaft only one-sixteenth of a revolution. The foregoing is intended merely as an illustration of one ratio of movement which may be obtained in the design and operation of the ratchet wheels and it is quite obvious that various other desired ratios may be provided for by suitable change in the size, proportion and number of teeth of the ratchet wheels and operating mechanism therefor.

As shown in Figs. 2 and 3 one end of said shaft 51 carries a bevel gear 60 meshed with a pinion 61, said gears in the present example having a four to one ratio, whereupon a quarter turn of shaft 51 causes a full revolution of said pinion 61. Operative movement of shaft 51 is necessarily only in the direction indicated by the arrows Figs. 2, 3, and in order to prevent accidental reverse movement thereof which would disturb the setting of any of the actuating parts, a stop mechanism is provided at any suitable point on said shaft comprising ratchet wheel 62, Fig. 7, fixedly secured to said shaft and held against reverse movement by a gravity pawl 63 carried by the adjacent support 53, for example.

Said pinion 61 is carried at one end of a vertical shaft 64 journalled in a bearing arm 65 which may be an element of support 52 as shown in Fig. 3. The opposite end of said vertical shaft 64 carries fixedly connected thereto a coin ejecting wheel comprising four arms 66, Fig. 2, uniformly spaced in a common horizontal plane. Thus upon rotation of the pinion said arms of the ejecting wheel successively engage the lowermost nickels at the bottom of the coin stack 67 and push the same forward to drop into slot 68 and change tray 69.

The coin stack comprises a cylindrical receptacle 70 fixedly mounted to the base of the casing by a support 71 but having its lower edge spaced from said base as shown in Fig. 3, such that the lowermost coin at the bottom of the stack may be freely removed by contact therewith of the adjacent arm 66 of the ejecting wheel. As a coin is removed, succeeding coins of course fall into position by gravity and the arms 66 of the ejecting wheel engage such coins in the order they come to the bottom of the stack in the path of said arms. Thus, in the event a plurality of coins are to be ejected at one time as when four successive nickels is the correct change to be returned to the purchaser, a complete revolution of the ejecting wheel takes place with each of the four arms 66 forcing a coin from the bottom of the stack in successive relation. In such operation, in order to provide sufficient time to permit each coin to fall by gravity to the bottom of the stack before contact therewith of the next arm 66, said arms are designed between their points of engagement with the coins with a spacing greater than the size of such coins. This differential spacing therefore may be designed as necessary to provide for the time required during movement of the ejecting wheel to permit a coin to fall in position to the bottom of the stack following the ejection of a preceding coin and before the next effective ejecting arm swings into operative ejecting position.

From the foregoing, it will be understood that the structure already described and shown in general in Fig. 2 provides the desired coin control apparatus operating upon the insertion of a dime or quarter in the machine. In the present example, the cost of the article purchased is a nickel and accordingly this mechanism serves also to return the proper change in either case, which is a nickel when a dime is deposited in chute 10 or four nickels when a quarter is inserted in chute 11. In addition to dime chute 10 and quarter chute 11, the coin changer includes a nickel chute 81, Fig. 3, for receiving such coins of the exact value of the article purchased and controlling the operation of the vending machine to deliver the article purchased without returning change, of course. Said nickel chute 81 is provided in a manner to replenish the coin stack 67 with nickels for subsequent change returning purposes, while dimes and quarters deposited in the machine are collected in the separate receptacle 7, Figs. 2 and 4, as aforesaid. The coin control and coin changer device is thus designed to receive either a nickel, dime or quarter, as the case may be. As previously set forth, in the present example, the coin changer is shown employed as an attachment to a vending machine V, Fig. 1, previously in use and which includes an electrically operated motor apparatus (not shown) to deliver the article purchased to the receptacle 2 thereof. Therefore, inasmuch as the coin changer itself is adapted to receive nickels also and control the operation of the vending machine in a similar manner without returning change, as presently to be described, the previously used coin slot 1 of said vending machine is no longer necessary and may be sealed or otherwise dispensed with as desired.

Referring to Figs. 3 and 6, a preferred arrangement of nickel receiving and coin control means operating the vending machine is shown embodying a magazine 75, supported by suitable standard 76, receiving a large quantity of coins dropped therein and adapted to automatically issue single coins through port 77 in a manner to replenish the coin stack 67 without danger of clogging. Extending within said magazine from the nickel coin slot 80 projecting outside said casing, is a coin chute 81 provided with spaced contact ele-

ments 82, 83 adapted to momentarily arrest a coin passing through said chute before falling into said magazine 75. Said contact elements are connected through conductors 84, 85, to terminal wires 20, 21, Fig. 2, which as previously set forth are connected to the power line P supplying current to the motor M of the vending machine as illustrated in Fig. 8. Thus upon insertion of a nickel in said coin slot 80, the vending machine is operated in its usual manner without in any way affecting the coin changing apparatus which is operated only when a dime or quarter is deposited in the proper coin slot 12 or 13 as the case may be.

In operation, in the use of a coin changer and control device embodying all three coin chutes, comprising nickel chute 81, dime chute 10, and quarter chute 11 arranged in order, Fig. 3, the device is mounted onto the vending machine V as ilustrated in Fig. 1 for example, with the terminal wires 20, 21 connected to the power line P supplying current to the vending machine delivery apparatus substantially as represented in Fig. 8. As above set forth, the insertion of a nickel in the coin chute 81 serves to complete a circuit only through wires 84, 85 and terminal wires 20, 21 to the vending machine delivery apparatus to produce the article purchased, the nickel subsequently falling into magazine 75 where it replenishes the coin stack 67 in a most practical manner as will be appreciated from Figs. 3 and 6.

As respects the operation of the vending machine delivery apparatus, it will be understood that insertion of the proper coin in any chute completes a circuit causing the delivery apparatus to operate automatically either when such apparatus embodies a quick release switch operated mechanism or a motor actuated means. In the latter case, the momentary closing of the circuit by the coin inserted may not be sufficient, in some instances, to cause the motor to run the required length of time for the delivery operation whereupon a suitable relay device (not shown) is employed for this purpose.

When a dime is inserted into its proper chute 10, the control device becomes effective not only to operate the vending machine to deliver the article purchased but also to return a nickel to the purchaser in the change tray 69. Thus in operating the vending machine, a circuit is closed by contacts 14, 15, Fig. 4, through wires 16, 17, and terminal wires 20, 21. At the same time solenoid 25, Figs. 2 and 4, in the circuit of said wires is energized to serve as a magnet attracting the armature 35 into contact therewith, it being understood that this contact is only momentary and ends with the breaking of the circuit when contacts 14, 15 open upon passing of the dime into coin box 7. The axial movement of the armature 35, Fig. 4, actuates connecting rod 30 through cross-head 33, said connecting rod in turn actuating the crank 40 in a rearward movement against the tension of spring 49 to substantially the position shown by dotted lines Fig. 4 wherein pawl 45 is shown passed over a single tooth to positively engage at the rear thereof. The pawl is thus set to actuate the ratchet wheel and rotate the same as long as it is in contact therewith, this actuation taking place on the return or forward movement of crank 40 under influence of spring 49 incident to release of armature 35 from the solenoid 25 on breaking of the circuit as aforesaid. The main shaft 51 is thereby turned an amount proportionate to the distance one tooth on the ratchet wheel 50 is actuated, and this movement in turn imparts a rotary motion to the arms 66 of the ejecting wheel through bevel gears 60, 61 and vertical shaft 64, Figs. 2 and 3. Said gears in the present example, have a four to one ratio inasmuch as four arms are provided on the ejecting wheel and it is desired that one arm be moved through the proper distance to eject a single coin in response to the single tooth distance the ratchet wheel is moved. In this relation, it will be quite readily appreciated that simply by changing the ratio of gears 60, 61, and/or the number of teeth passed over by the pawl to move the ratchet wheel the necessary distance, the ejecting wheel may be caused to rotate sufficient to enable several of the arms 66 to eject a plurality of coins from the coin stack, in an arrangement for returning, say three pennies change from a penny coin stack when the article purchased is seven cents and a dime is inserted in the machine.

In a preferred form of the invention which is described in detail in the instant disclosure only by way of example with the understanding that the invention in no manner or form is limited thereby, ratchet wheel 50 is provided with 16 teeth and the gears 60 and 61 in a four to one ratio with 64 and 16 teeth, respectively, and accordingly, a movement of said ratchet wheel 50 through a distance of one tooth as aforesaid, causes the pinion 561 to move a distance of four teeth thereon, thereby effecting a substantial quarter turn of the ejecting wheel to actuate a single arm 66 in ejecting a single coin, which in this instance is a nickel change since the cost of the article purchased is five cents and a dime was deposited in the coin changer.

When a quarter is dropped into its proper chute 11, four nickels change are to be returned and accordingly a circuit through wires 18, 19 and terminal wires 20, 21, is completed to operate the vending machine in the usual manner aforesaid, the solenoid 26 in such circuit being energized simultaneously to attract the armature 35' Fig. 5 in setting the operating mechanism for ratchet wheel 55. Said operating mechanism is substantially similar to that described employed for actuating ratchet wheel 50 and comprises connecting rod 30' actuated by said armature through a cross-head 31', said connecting rod in turn drawing the crank or push rod 40' in a rearward movement against the tension of spring 49'.

Ratchet wheel 55 is provided with the same number of teeth as ratchet wheel 50, namely, 16 in the present example, and is only one-half the size thereof, and accordingly, to permit the same to rotate shaft 51 a distance four times as much, the associated pawl 56 on crank 40' is operated to pass over two teeth and engage the second of such teeth substantially as shown by the dotted line position of said pawl in Fig. 5. The movement of the crank 40' for this purpose is readily provided for by adjusting armature 35' to exert the necessary throw on connecting rod 30'. Thus on the return movement of crank 40' under influence of spring 49' when the circuit is broken, ratchet wheel 55 causes shaft 51 to rotate a full quarter turn whereas ratchet wheel 50 twice the size thereof and actuated only the distance of one tooth as aforesaid, is capable of moving said shaft only one-sixteenth of a revolution in ejecting only one nickel. Accordingly, ratchet wheel 55 on being actuated a full quarter turn, moves bevel gear 60 a like amount, and since such gear

and pinion 61 have a four to one ratio, said pinion and the ejecting wheel connected thereto are rotated through a full revolution. During such full revolution of the ejecting wheel, the four arms 66 thereof eject four successive nickels into the tray 69 which is the correct amount of change necessary to be returned for the quarter deposited.

Figs. 9–11 inclusive show a modification of the coin changer structure which is similar in operation to that described with reference to Figs. 2–5 inclusive but instead of the electrically operated coin control means, there is provided manually operated coin control means comprising a coin slide device associated with each ratchet mechanism of the coin changer, as aforesaid. As shown in Figs. 9 and 10, the ratchet wheels 50, 55 and the respective actuating means therefor, are substantially similar to those described with reference to Figs. 4 and 5 respectively in structure and operation, the same being designed for use with dimes and quarters in the illustration given. In the present embodiment, however, inner ends of cranks 40, Fig. 9, and 40', Fig. 10, are mounted for slidable movement on standards 90 and 91 and provided with adjustable pin stops 92, 93 limiting the forward movement thereof under influence of the springs 49 and 49' respectively. Additional stops 94, 95 are provided on said cranks in position to be actuated by the manually operated control means in setting either ratchet wheel operating mechanism in a manner presently to be described.

Suitably positioned above the ratchet wheel operating mechanism of Fig. 9, is a shelf 96 extending from the front of the casing and supporting a channel shaped guide bar 100 in which are slidably received a slide bar 101 and push bar 102 in superposed relation, the same being held in assembled position by inturned flanges provided on the guide bar 100 as shown in Fig. 11. Slide bar 102 has an aperture 103 the exact size of a coin required in operating the control means, and when said slide bar is disposed in normal coin receiving position the coin receiving aperture therein is in exact alignment with an aperture 104 provided in the guide bar 100 of slightly smaller size than said aperture 103 to retain a proper size coin in said aperture 103 but permit a coin of smaller size to fall through said aperture 104, thereby preventing fraudulent operation of the machine. A stop 105 on slide bar 101 engaging the upturned end stop 106 on the guide bar, limits the outward movement of said slide bar and otherwise positions the same in proper coin receiving position.

Push bar 102 is provided with an opening presenting a shoulder 107 engaging a coin properly positioned in the aperture 103 of the slide bar. Said push bar also includes a handle 108 and a shoulder 109 limiting the inward movement thereof as represented in dotted lines, and otherwise serving as an abutment means engaging stop 105 on the slide bar whereby the same are interengaged in being simultaneously returned to the proper coin receiving position shown. Return of these elements automatically is preferably provided for by means of a spring 110 connected from the front of the casing to a pin 111 secured to the push bar 102 and urging the same to its normal retracted position wherefore said shoulder 109 thereon abuts stop 105 on the slide bar automatically returning both said members to proper coin receiving position as limited by upturned stop 106 of the guide bar.

At the inner end of said slide bar a dog 112 is adjustably mounted in fixed relation thereto as by a bracket secured by a bolt fastening, said dog being adapted to engage stop 94 on the crank 40 of the ratchet wheel actuating mechanism and the adjustable mounting permitting the same to be adapted for transmitting any desired movement to the crank 40 which in turn rotates the ratchet wheel 50 and shaft 51 a proportionate distance through pawl 45 carried thereby as described with reference to Fig. 4.

Unless a coin is placed in coin receiving aperture 103 no inward operating movement of the slide bar 101 can take place and if the push bar 102 is forced inwardly regardless, as by one tampering with the machine, said push bar merely slides inoperatively relative to the slide bar into the interior of the casing.

In the normal operation of such control means upon insertion of a proper coin in the coin aperture 103 as shown, the shoulder 107 presented by the opening in the push bar 102 engages the coin and moves the slide bar together with the push bar to the interior of the machine to a position where the coin overlies coin passage 113 in the guide bar and drops into the chute of a coin collection receptacle 114 at the front of the casing.

During such inward movement of the slide bar under force of said push bar, the dog 112 carried by said slide bar engages stop 94 on the crank 40 to move the same to substantially the dotted line position illustrated whereupon pawl 45 passes over a single tooth of ratchet wheel 50, and upon backward movement of said crank under influence of spring 49 imparts a rotary movement to the ratchet wheel and a corresponding movement to shaft 51, said shaft thereupon operating the coin ejecting means substantially in the manner described with reference to such structure appearing in Figs. 2 and 4.

The ratchet wheel operating mechanism of Fig. 10 is substantially similar to that of Fig. 5 and the slide bar, push bar and related parts of the manually operated coin control means are identical to those just described with respect to Fig. 9 with the exception that the dog 120 thereof is so adjusted for engaging stop 95 as to push crank 40' over a distance sufficient for pawl 56 to pass over two teeth on ratchet wheel 55. This becomes necessary by reason of the fact, it will be recalled, that ratchet wheel 55 is only half the size of ratchet wheel 50 and the cooperating pawl 56 is required to pass over and engage the second of two teeth as shown in dotted lines, in order to impart to the shaft 51 a movement four times that of said wheel 50, to function in the manner described with reference to Figs. 4 and 5 in the example given, wherein actuation of the coin ejecting mechanism through movement of the shaft by ratchet wheel 55, Fig. 5, delivers four nickels change upon insertion of a quarter, whereas movement of the shaft by ratchet wheel 50, Fig. 4, causes the ejecting means to return only one nickel change when a dime is inserted in the machine.

Though the invention is shown and described as respects the making of change for coins of two different denominations, namely dimes and quarters, not including pennies, it will of course be understood that the same may be adapted to include pennies without departing from the scope of the invention. It will also be appreciated that the principles of the invention are capable of

indefinite extension and design for returning change for any of the larger denominations of coins, or selected number of denominations, by employing the required number of coin chutes, a plurality of coin ejecting mechanisms and the necessary operating means therefor.

While the invention has been described in detail with specific examples, such examples are intended as illustrations only, since it will be apparent to those skilled in the art that other modifications in the construction, arrangement and general combination of parts may be devised without departing from the spirit and scope of the invention. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, with all changes falling within the scope, meaning and range of equivalency of the claims intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a device of the character described, a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to the shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, operating means for each of said ratchet members adapted to impart distinct turning movements to said shaft, only one separate and distinct movement of said shaft being imparted at any time.

2. In a device of the character described, a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to the shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, operating means for each of said ratchet members comprising a reciprocating member associated therewith adapted to move said ratchet members through different distances to impart distinct turning movements to said shaft, only one separate and distinct movement of said shaft being imparted at any time, a spring connected to said reciprocating member, said reciprocating member being adapted for a setting movement tensioning said spring, said reciprocating member incident to said setting movement moving the ratchet member associated therewith a predetermined distance under influence of said spring.

3. In a device of the character described, a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to the shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, operating means for each of said ratchet members comprising a reciprocating member associated therewith adapted to move said ratchet members through different distances to impart distinct turning movements to said shaft, only one separate and distinct movement of said shaft being imparted at any time, a spring connected to said reciprocating member and a pawl carried thereby, said reciprocating member being adapted for a setting movement tensioning said spring and disposing the pawl carried thereby in positive engagement with the ratchet member associated therewith, said reciprocating member incident to said setting movement moving the ratchet member associated therewith a predetermined distance under influence of said spring.

4. In a device of the character described, a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to the shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, a reciprocating member associated with each ratchet member adapted to move said ratchet members through different distances to impart distinct turning movements to said shaft, only one separate and distinct movement of said shaft being imparted at any time, a spring connected to said reciprocating member, said reciprocating member being adapted for a setting movement tensioning said spring, said reciprocating member incident to said setting movement moving the ratchet member associated therewith a predetermined distance under influence of said spring, and control means associated with said reciprocating member for actuating the same in providing such setting movement, said control means comprising a solenoid and an armature connected to said reciprocating member.

5. In a device of the character described, a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to the shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, a reciprocating member associated with each ratchet member adapted to move said ratchet members through different distances to impart distinct turning movements to said shaft, only one separate and distinct movement of said shaft being imparted at any time, a spring connected to said reciprocating member and a pawl carried thereby, said reciprocating member being adapted for a setting movement tensioning said spring and disposing the pawl carried thereby in positive engagement with the ratchet member associated therewith, said reciprocating member incident to said setting movement moving the ratchet member associated therewith under influence of said spring, and control means associated with said reciprocating member for actuating the same in providing such setting movement, said control means comprising a solenoid and an armature connected to said reciprocating member, and means for energizing said solenoid through the medium of a deposited coin.

6. An electrically operated coin changer and control device for use with an electrically operated vending machine, said device comprising a plurality of coin receiving chutes embodying coin actuated control means adapted to actuate the delivery apparatus of the vending machine upon insertion of a coin therein, said control means also actuating change returning means upon deposit therein of coins of greater value than the cost of the article delivered by the vending machine, said change returning means comprising a shaft, a coin ejecting mechanism and means connecting said coin ejecting mechanism to said shaft to be actuated in proportion to rotation of said shaft, independent ratchet members of different size associated with said shaft, and operating means for each of said ratchet members adapted to impart distinct turning movements to said shaft to cause said coin ejecting mechanism to deliver the change required in accordance with the denomination of the deposited coin.

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