Feb. 16, 1954

S. MAY

2,669,335

COIN CONTROL AND CHANGE APPARATUS

Filed June 11, 1945

4 Sheets-Sheet 1

FIG. 1.

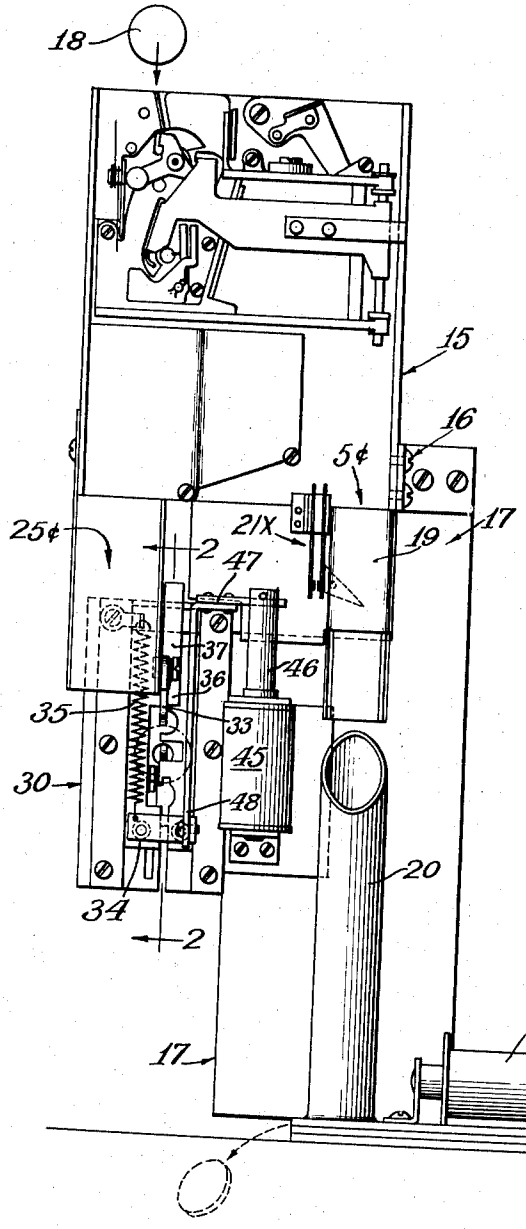
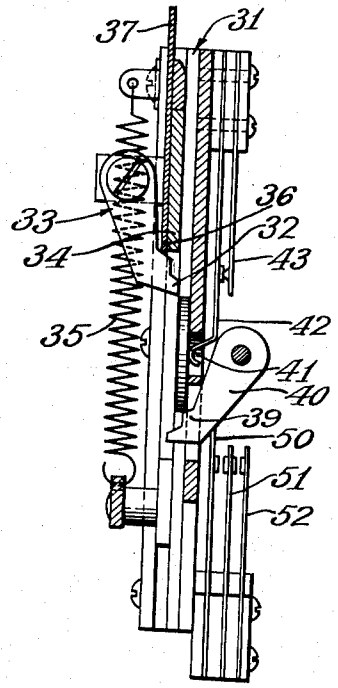


FIG. 2.



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COIN CONTROL AND CHANGE APPARATUS

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FIG. 3.

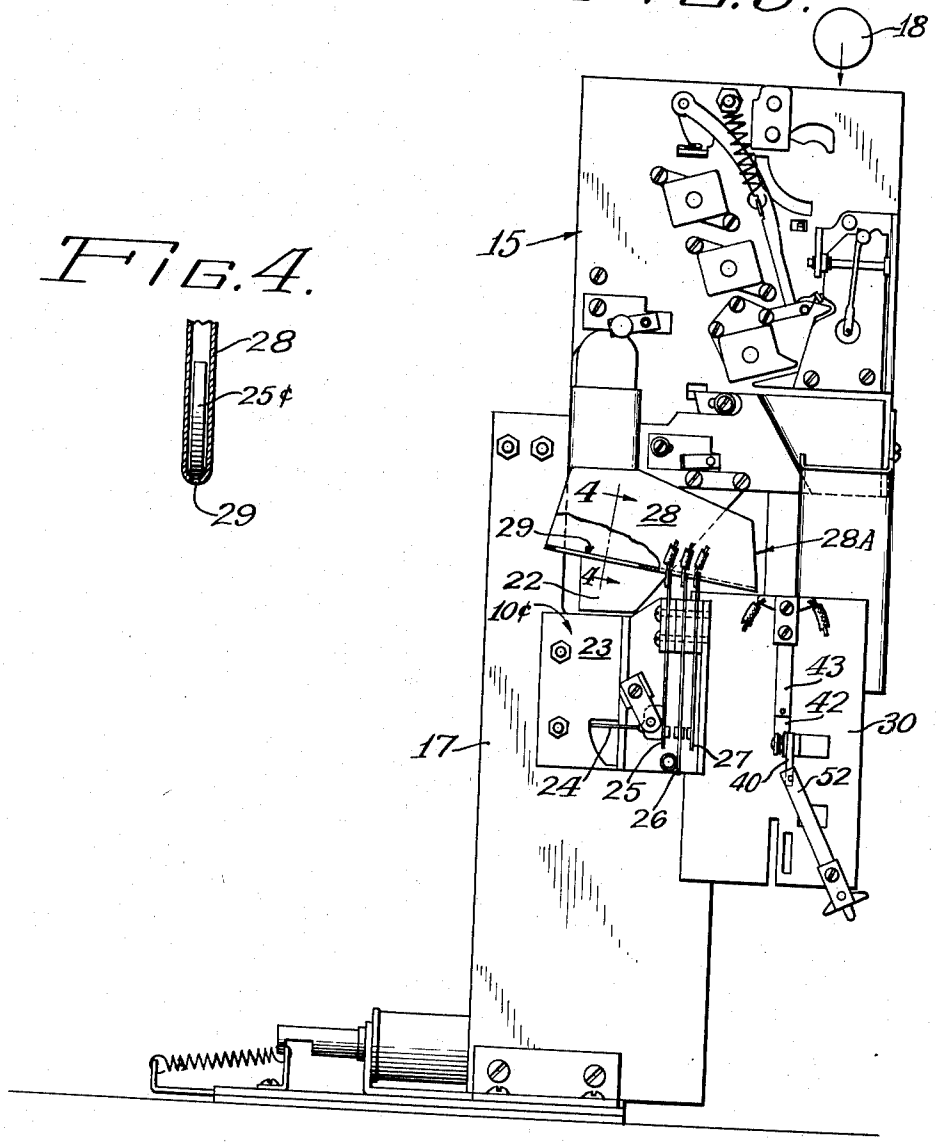

FIG. 4.

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COIN CONTROL AND CHANGE APPARATUS

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FIG. 5.

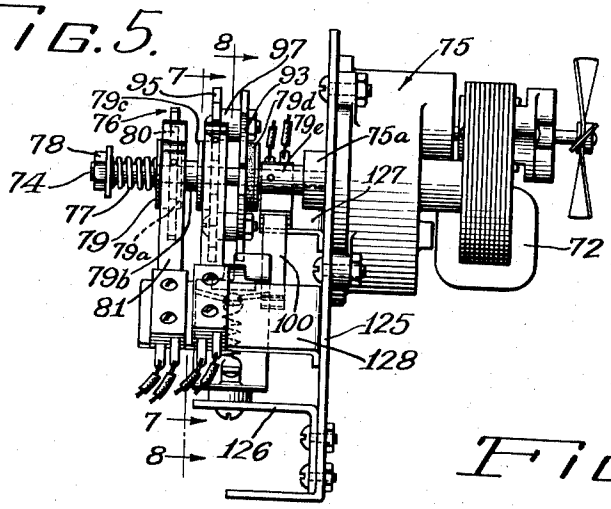


FIG. 7.

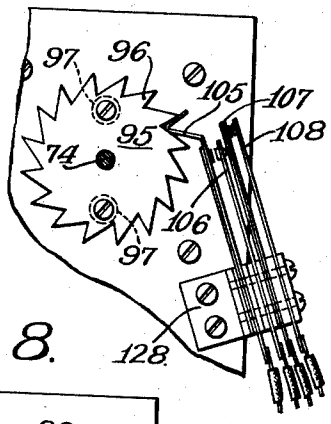


FIG. 6.

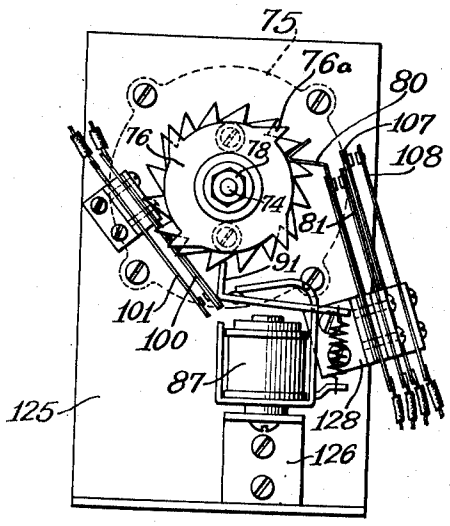
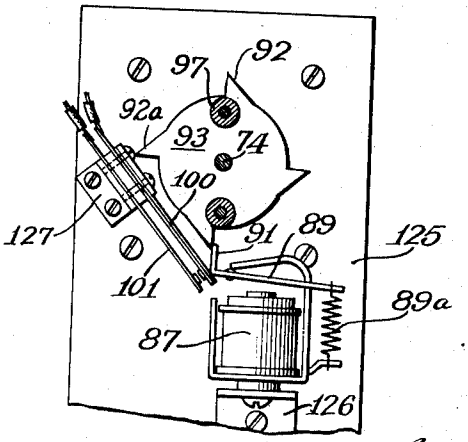


FIG. 8.



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2,669,335

COIN CONTROL AND CHANGE APPARATUS

Filed June 11, 1945

4 Sheets-Sheet 4

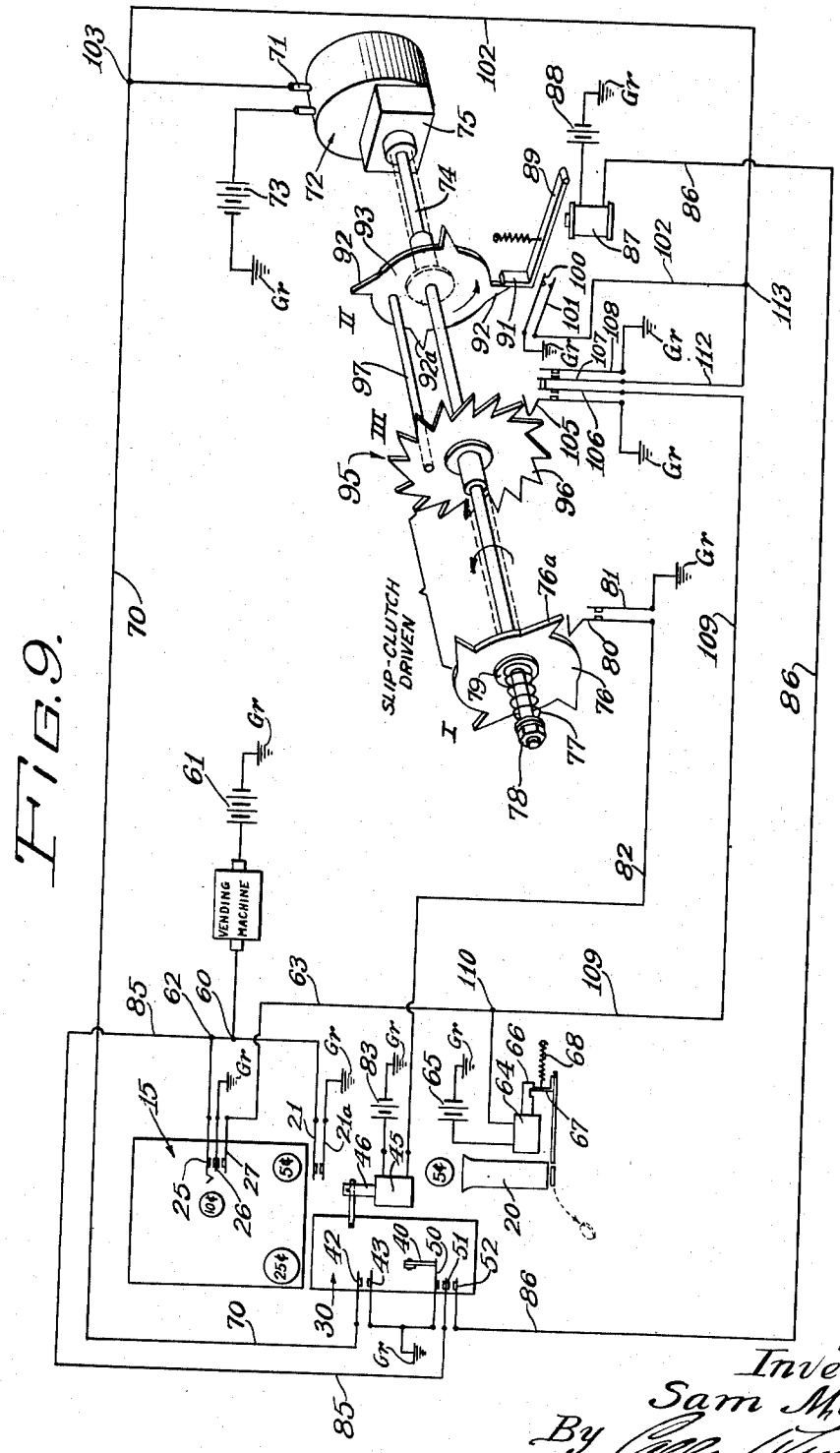

FIG. 9.

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Patented Feb. 16, 1954

2,669,335

UNITED STATES PATENT OFFICE

2,669,335

COIN CONTROL AND CHANGE APPARATUS

Sam May, Chicago, Ill., assignor of one-half to Raymond T. Moloney, Chicago, Ill.

Application June 11, 1945, Serial No. 598,832

10 Claims. (Cl. 194—10)

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This invention pertains to coin-control apparatus, particularly coin changers, and has for its principal object the provision of improved coin-control and coin changing means of general application, but especially adapted for use in conjunction with coin-operated vending and dispensing machines, the novel control means operating to return the change of a coin exceeding in value that required to actuate the vending or dispensing machine, among other things.

More specifically, it is an object of the invention to provide coin-control apparatus suited for use with known types of coin testing apparatus, and which by reason of its structural and functional peculiarities, obstructs the practice of certain kinds of fraud to which machines of this class are vulnerable.

Further objects are the provision of coin control means of general application and especially suited for use with a vertical or gravity type coin testing chute; the provision of a control unit in which the accepted coin lodges and actuates certain circuit control means, which results in the removal of the coin to another control position from which it cannot be retracted by fraudulent practices; the provision of control circuit means actuated by the accepted coin in the second position for causing an amount of change to be returned quickly and accurately; the provision of apparatus of the class described which is of a rugged and relatively simple character, structurally and functionally, whereby it is capable of rapid, accurate operation over long periods of time with minimum attention and servicing.

Additional objects and aspects of novelty relate to details of construction and operation of the illustrative embodiment hereinafter described in view of the annexed drawings in which:

Fig. 1 is a side elevation of the novel coin apparatus;

Fig. 2 is a vertical section, to enlarged scale, through the coin control unit, viewed along lines 2—2 of Fig. 1;

Fig. 3 is a side elevation of the coin apparatus of Fig. 1 viewed from its opposite side;

Fig. 4 is a vertical sectional detail along lines 4—4 of Fig. 3 showing the fraud preventive coin trough;

Fig. 5 is a side elevation of the circuit control unit;

Fig. 6 is a front elevation of the unit shown in Fig. 5;

Fig. 7 is a front elevational detail of the change payout control switch on the unit of Fig. 5 looking in the direction of lines 7—7 of the latter;

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Fig. 8 is a front elevational detail of the clutch means for the unit of Fig. 5, looking in the direction of lines 8—8 of the latter, and

Fig. 9 is a schematic wiring diagram of the complete coin control apparatus.

Coin-control apparatus, including change-return means, as known in the art, may be attendant-operated or entirely or partially automatic, and in the latter two categories the machines are vulnerable to various kinds of fraudulent operation dependent in each instance upon the kind of coin-testing and coin-handling mechanisms employed.

The long-established and widespread use of the vertical-drop or gravity type of coin testing chute has led to the development of numerous refinements for preventing the use of spurious coins, slugs, and instrumentalities for causing fraudulent operation of the various machines with which these coin-testing devices are used; and where a change-return means is employed, the seriousness of the fraud problem is greatly amplified.

The present invention provides coin-handling means and cooperating circuit control means actuated by a proper coin, after it has left the coin-testing unit, the arrangement being such that access of defrauding tools to otherwise vulnerable control parts is blocked and, moreover, it is necessary that there be a certain sequence of operations of the control parts initiated as by a proper coin, if the change-return means is to be operated.

To this end, the apparatus shown in Fig. 1 includes a conventional coin-testing unit 15 mounted as at 16 on the upper part of a plate 17, and in the present instance, adapted to receive coins of three denominations, namely, five cents, ten cents, and twenty-five cents. Since the testing chute 15 does not per se constitute part of the invention, and its operating principles are well known in the art, the details of its construction are not set forth herein.

For purposes of description, it is sufficient to point out that all three coins, namely, nickels, dimes, and quarters, are deposited in the chute 15 in a passage at the upper left-hand corner as indicated by the coin 18, and the nickels, if acceptable, issue from the lower right-hand corner of chute 15 into a guide 19, from which they gravitate into a hopper 20 forming part of the change-return means. The nickels, in passing through chute 19 operate a switch 21X for actuation of whatever vending or dispensing means (not shown) may be associated with the con-

trol apparatus, as for example a beverage vending machine. Thus the acceptable coins of lowest denomination, the nickels, are stored in the change-return unit to provide the bank from which change may be made, the unit of sale in this instance being five cents.

Referring now to Fig. 3, coins of ten-cent denomination, issue from the testing chute **15** at its lower left-hand corner (in Fig. 3) and pass into a guide **22** by which they are directed into a switch unit **23** to operate a lever arm **24** and close switch contacts **25, 26, 27** and thereafter drop free into a suitable collecting receptacle (not shown). Closure of contacts **25, 26,** and **27** will result in operation of the vending or dispensing apparatus and the change-return means in a manner hereinafter explained in detail.

Coins of twenty-five cent denomination also issue from the testing chute **15** in the region of its lower left-hand corner (in Fig. 3) and drop into a special fraud-preventive deflector **28** in the nature of a trough of U-shaped configuration, pitched downwardly, toward the right, and having a perforate bottom as at **29**, which is not wide enough to permit the quarter to drop through, but which is otherwise sufficiently open so that a defrauding probe or wire or the like would pass through, whereby efforts to force the defrauding probe or wire to follow the channel and passage of the quarters is prevented, as will presently appear.

The quarters leave the end **28A** of the deflector and drop into a special control chute **30** of the type shown and claimed in my U. S. Patent No. 2,581,681, issued January 8, 1952, the general construction of which is illustrated in Fig. 2, and includes a coin passage **31** into which the quarter drops and gravitates past the nose **32** of a first dog **33** normally spring-urged to project said nose **32** into said passage **31**. The dog **33** is carried on a vertically reciprocable slide **34** which is normally raised by spring **35**, causing an end portion of the dog **33** to bear against the end **36** of a vertical bar **37** (see also Fig. 1) fast on the control chute frame, so that the nose **32** of this dog is withdrawn from the coin passage when the slide is normally raised as by spring **35**, thus permitting the quarter (indicated 25¢) to drop directly onto the nose **39** of a second dog **40** normally spring-urged into blocking position across the coin passage in the control chute. In this latter or first position of the quarter, the offset end **41** of switch contact **42** bears against the side of the coin and is thereby closed against its companion contact **43** to close a control circuit for purposes hereinafter particularly described.

Closure of the control circuit by the quarter in said first position results, among other things, in the energization of a solenoid **45**, Fig. 1, having a plunger **46** linked as at **47** and **48** to the control slide **34**, so that the latter is moved downwardly against the tension of spring **35**, carrying the first dog away from the lower end of bar **37** so that this dog is free to project into the passage **31** (Fig. 2) and bear against the upper edge of the quarter and carry the latter downwardly with the descent of the control unit slide **34** past the second dog **40**, thereby pivoting the latter dog outwardly against switch contact arm **50** so that the latter contact closes against its companion contact **51**, thereby effecting further control operations for the change-return means as hereinafter described. Thereafter, the quarter leaves the control chute **30** and passes into a suitable receptacle (not shown). The coin cannot be retracted so long as the first dog **33** is in the passage; nor after the coin moves past the second dog **40**.

Thus, it will appear that acceptable nickels deposited in the coin testing chute operate a switch **21X** in leaving said chute and pass directly into the hopper **20**, while dimes operate switch means **24—25—26—27** in leaving the testing chute; and quarters pass from the testing chute into the control unit **30** and operate two switches **42—43** and **50—51—52** in first and second positions or stations. The switch operated by the nickel will cause operation of the vending or dispensing machine; the switch operated by the dimes will also cause operation of the vending or dispensing machine, and in addition, will effect operation of the change-return means to return one nickel; and the switches actuated by the quarters will likewise cause operation of the vending or dispensing machine, and in addition, will cause the change-return means to return four nickels by means now to be described.

Referring now to the schematic circuit diagram of Fig. 9, wherein the coin testing chute **15** and the coin control unit **30** are shown in outline form, it will be seen that the nickel switch **21X** has one of its terminals **21*a*** connected to a common return or ground *Gr*, while the companion contact terminal **21** is connected via junction **60** to one terminal of an electrically operable vending machine, so designated, the remaining terminal of this vending machine being connected to a source of power, illustrated as a battery **61** having its return terminal connected to the common return or ground *Gr*.

A five-cent coin or nickel traversing the chute **19** on its way into the hopper **20** (Fig. 1) will close switch contacts **21, 21*a***, and cause the vending machine or other controlled device to be energized from power source **61**, Fig. 9.

A ten-cent coin or dime would strike the switch-operating lever **24** (Fig. 3), closing contacts **25, 26, 27** (Fig. 9). Contact **26** is connected to the common return or ground *Gr*, so that the energizing circuit for the vending machine from grounded power supply **61** is closed to ground through contacts **25, 26**, junction **62** and junction **60**; and in addition the change-return means is actuated by substantially simultaneous closing of grounded contact **26** with contact **27**, which is connected via conductor **63** connecting at **110** to one terminal of a payout solenoid **64** having its remaining terminal connected with battery or power source **65** grounded at *Gr*. Since the dime passes transiently over the switch-operating lever **24**, the payout solenoid or coil will be impulsed once, resulting in the attraction of its core piece **66** and the advance of a coin-ejecting slide **67** against the normal tension of spring **68**, with the result that the bottommost coin or nickel in the hopper **20** will be ejected for return to the customer via a conventional return chute (not illustrated), and the payout slide **67** will be quickly returned by spring **68**. Electromagnetic coin payout devices, such as the device **20—64—66—67—68**, are well-known in the art, a form suitable for present uses being shown in elevation in Fig. 1.

Acceptable twenty-five cent coins or quarters will be delivered from the testing chute **15** into the control chute **30**, wherein the quarter will lodge in the first position, as in Fig. 2, closing starting switch contacts **42, 43**, which results in the connection of ground *Gr* through contact

43 to contact 42 and via conductor 70 to one terminal 71 of a motor 72 (Fig. 9), the remaining terminal of this motor being connected to battery or power source 73 grounded at Gr; thus, motor 72 is started, and in consequence the shaft 74, driven through a speed-reduction unit 75 of conventional type, begins to turn slowly carrying with it a toothed switch-operating disc 76 having four equally spaced teeth 76a.

The switch-operating disc 76 is impositively driven with shaft 74 through the agency of a slip-clutch means including a spring 77 compressed between a nut 78 on the shaft, at one end, and a friction washer 79 of felt or the like, at its other end, the friction washer being urged by the spring against the disc 76 and tending to carry the latter with the shaft provided no restraining effort is applied to the disc of sufficient force to overcome the frictional coupling effort of the spring 77 and washer 79. Additional details of this construction will appear in conjunction with the description of the motor control unit in view of Figs. 5 through 8, hereinafter.

Thus, starting of motor 72 causes rotation of the first switch-control disc 76 through the slip-clutch means, and in consequence the first tooth 76a, for example, will engage and close switch contacts 80 and 81, the latter being grounded at Gr, and contact 80 connecting via conductor 82 to one terminal of the coin-control unit solenoid 45, thus energizing the latter from power source 83 grounded to the common return or ground Gr, thus causing attraction of the armature or core piece 46 and a consequent downward movement of the control-unit slide 34 (Fig. 2) so that the quarter is thereby removed from first position, in which the starting switch contacts 42—43 are closed by the quarter, as in Fig. 2, into the second position or station momentarily, wherein the quarter passes the second dog 40 and pivots the latter to cause a closing of switch contacts 50, 51 and 52 as the quarter is ejected from the control chute by the aforesaid action of the slide 34, heretofore described.

A first result of the closing of the second control-unit switch means 50, 51, 52 is the actuation of the vending machine by connection of ground Gr through contact 50 to contact 51 and conductor 85 to junction 60 with the vending machine thereby closing the power circuit from battery or power source 61 for the latter. In addition, the ground connection through contacts 50, 51 is extended to contact 52 and via conductor 86 to the operating coil 87 of a clutch release device, thus energizing this coil from its battery 88 grounded at Gr.

Energization of clutch coil 87 attracts a clutch armature 89 against the normal tension of its spring 89a (Fig. 8), thereby withdrawing the offset end 91 of the armature from blocking or restraining position relative to the teeth 92 of another or second toothed disc 93 floating on shaft 74 and driven impositively through friction clutch means including the clutch parts 77 and 79 heretofore described and more particularly described hereinafter, it being sufficient for purposes of the present description that so long as motor 72 is running, the first disc 76 will rotate and will exert a turning effort on a third toothed disc 95 through the slip clutch drive so-designated in Fig. 9, with the disc 95; and since the third or intermediate disc 95 is directly linked or tied to the second disc 93 by a rod 97, this turning effort is also exerted upon the second disc 93; but the latter is normally restrained against rotation by blocking or arresting action of the clutch armature part 91, so that only the first disc 76 rotates when the motor first starts.

As previously stated, initial rotation of the first disc 76 closes switch contacts 80, 81, causing the coin to be moved to the next position with a consequent closure of the second set of control-unit contacts 50, 51, 52, resulting in the operation of the vending machine, and also in the energization of the clutch coil 87, so that the clutch armature means 89—91 is withdrawn, and disc 93 as well as its companion disc 95 begin to rotate, and in addition, the clutch armature 89 engages and closes switch contacts 100 and 101, thereby applying a holding ground from Gr via contacts 100, 101, conductor 102, junction 103 to motor terminal 71, thereby affording an operating ground for the latter to replace the starting ground initially applied by the first control-unit contacts 42—43, since the latter will be quickly opened as soon as the quarter is moved to second position by action of the control-unit slide 34 as aforesaid, thus permitting the motor to continue running.

However, the holding ground through contacts 100, 101 is of brief duration since the clutch coil 87 is only momentarily energized by passage of the quarter into and out of second position in the control unit, and clutch armature 89 is rather quickly released immediately following the freeing of disc 93, so that a second holding ground must be applied.

As a result of the operation of the electromagnetic clutch release means, the second and third discs 93 and 95 begin joint rotation, and the third disc 95 is provided with a plurality of teeth 96 exceeding in number those on the second disc, such that there is an interval between successive teeth 92 on the second disc equivalent to four teeth on the third disc; in other words, during the time which elapses between withdrawal of the clutch armature part 91 to free the second and third discs, and the abutment of the next succeeding tooth 92a on the second disc with the clutch part 91 to arrest these two discs, four of the teeth 96 on the third disc will have passed in engagement with contact 105 of a second or quarter payout switch, as a result of which, contact 105 will connect ground from Gr through contact 106, conductor 109 and junction 110 to complete an energizing circuit for payout coil 64 from its battery 65, whereby the payout coil will be impulsed once for each tooth 96 permitted to pass into engagement with contact 105 during the interval of rotation permitted disc 93 between successive operations of the electromagnetic clutch means; in this instance there will be four such impulses for each releasing operation of the clutch armature 89, corresponding to the ejection of four coins or nickels from the payout hopper 20, so that the change of a quarter will be returned to the customer.

Jointly closed with contacts 105, 106 are contacts 107 and 108, which serve to provide the further holding ground for continued operation of the motor 72 during the payout interval, these contacts serving to connect ground Gr through contact 108, contact 107, conductor 112 to junction 113 with conductor 102 leading to motor terminal 71.

A form of motor control unit suitable for use with the aforesaid coin testing and coin control means, is shown in Fig. 5, wherein the motor 72 and speed-reduction means 75 are mounted as

a unit on an upright bracket plate 125, through which the shaft 74 projects.

In Fig. 8, the second toothed disc 93 is shown floating on shaft 74, and the release magnet 87 is supported on the plate 125 by a bracket 126. Spring means 89a normally holds the clutch release armature 89 in raised position to project the offset end 91 thereof into the path of the teeth 92 on disc 93. The first holding switch for the motor, including contacts 100, 101, is mounted on a bracket 127 on plate 125 with the switch blade 100 disposed to be pressed downwardly into contact with contact blade 101 when the armature 89 is attracted by coil 87. In this view are seen also the tie rod means 97 by which the second disc 93 is positively coupled with the third disc 95; see also Fig. 5.

The arrangement of the third disc 95, floating on shaft 74, is seen in Fig. 7, the corresponding switch means 105, 106, 107, 108 being carried on a bracket 128 secured to the plate 125 with the cammed end of contact blade 105 riding the teeth 96 of disc 95 and dropping into the notches between said teeth.

The first disc 76 is viewed endwise in Fig. 6, its switch means 80, 81 being mounted also on the bracket 128 with the cammed end portion of blade 80 riding in the notch or tooth portions.

As in Fig. 5, the clutch spring 77 presses against a friction washer of felt or the like, indicated at 79, which is thereby pressed against the disc 76, there being another of these friction washers 79a on the opposite side of said disc, which in turn is pressed against a short sleeve 79b, while the latter sleeve presses against another friction washer 79c urging the latter against disc 95, so that the latter tends to rotate with the first disc 76, and since the third disc 93 is tied to the second or intermediate disc by means 97, the tendency is for the second and third discs to rotate with the first one; however the normal restraining action of clutch parts 89—91 prevents such rotation and the first disc rotates alone until coil 87 is energized. The slip clutch means is completed by the provision of another friction washer 79d and sleeve 79e working between disc 93 and the hub portion 75a of the speed reduction unit.

Summary of operation

The novel coin control means is intended to be used with one or another form of coin operated device, such as a merchandise vending or beverage dispensing machine in which the unit of sale is preferably but not necessarily five cents. In Fig. 9 the controlled instrumentality is designated a "vending machine," and this machine may be actuated by deposit of a five-cent coin or nickel in the conventional coin-testing chute 15; if the nickel is accepted by chute 15, it will gravitate from the latter and transiently operate switch 21—21a with the sole result of closing an energizing circuit for the vending machine from power source 61. As shown in Fig. 1, the accepted nickel is guided by chute 19 into a coin hopper 20, which constitutes the bank from which change is made, and the switch means 21—21a is conveniently positioned adjacent chute 19.

If the customer deposits a dime in chute 15 and the dime is "accepted" by the latter, it will transiently close switch contacts 25, 26, 27 (Fig. 9), thereby closing an energizing circuit for the vending machine from power supply 61, and also energizing coil 64 of the change-return payout from power supply 65 via the circuit hereinbefore traced, thereby causing the payout slide 67 to

be reciprocated once with the result that one five-cent coin is ejected from the bottom of the coin hopper 20 for return to the customer.

Deposit of a quarter in testing chute 15 results in the gravitation of an acceptable coin of this denomination from chute 15 into the fraud-preventive, perforate, guide 28 (Fig. 3) and thence into the coin control unit 30 (Fig. 9) wherein this coin lodges in first position, as heretofore described in detail, to close the starting switch 42—43, which results in energization of the payout motor 72 from its power supply 73, with a consequent rotation of the first control disc 76 and a closure of switch means 80—81 by one of the teeth 76a, for example, in consequence of which the coin-moving slide 34 (Fig. 2) of coin control unit 30 is reciprocated once, causing the quarter to be shifted downwardly from its initial position past the dog 40 of the control unit 30 and outwardly of the latter. As the quarter engages dog 40 in this second position, it pivots the dog and the latter closes switch contacts 50, 51, 52. Meanwhile, contacts 42—43 have opened and motor 72 might stop but for the closure of contacts 50—51—52 almost instantly thereafter, by shifting of the quarter to second position.

Closure of contacts 50—51—52 as aforesaid energizes clutch coil 87, thereby freeing the second disc 93 for rotation the distance between two successive teeth 92, 92a, and the armature 89 closes contacts 100—101 to set up a holding circuit 113, 103 for motor 72 from power supply 73 for the interval during which clutch disc 93 rotates as aforesaid. Also, closure of contacts 50—51 energizes the vending machine via conductor 85. Closure of contacts 50—51—52 is momentary, so that the vending machine is actuated only once, and the clutch coil 87 is energized only once, in the illustrative embodiment.

While the clutch disc 93 is permitted to travel the distance between two successive teeth 92, 92a, the payout disc 95 will move with it a like distance and four of its teeth 96 will operate the payout switch means 105—106 four times, causing four energizations of the payout coil 64 with a consequent ejection of four nickels from hopper 20 for return to the customer as change for the quarter. Also, switch contacts 107—108 will likewise be closed rapidly four times, thereby affording a further holding circuit for motor 72, it being pointed out that the latter four holding impulses follow in such rapid succession that the combined momentum and over-run of the motor and speed reduction means assures an apparently uninterupted operation of the motor control unit during the change-return operation of the payout means 64—67 as aforesaid.

In specifically describing one form of the invention for illustrative purposes, as aforesaid, it is contemplated that any type of controlled instrumentality may be substituted for the vending machine suggested, such coin-operated devices being of many types and well known in the art. Moreover, it is contemplated that separate coin chutes may be employed for each denomination of coin, in place of the nickel, dime, and quarter chute 15 illustrated, and in such case, the switch means 21—21a would be associated with the nickel chute, the switch means 25, 26, 27 with the dime chute, and the control unit 30 with the quarter chute, such substitution requiring no change in the circuit connections, the hopper 20 being placed to receive accepted nickels from the nickel chute as illustrated herein.

It is also to be understood that the employ-

ment of battery power sources in Fig. 9 has been resorted to merely to simplify the wiring diagram, and that any electrical power supply and connection suitable for the operation of the invention may be employed. In general, the foregoing detailed specification is not intended to be limiting excepting as may be expressly provided in the appended claims.

I claim:

1. Coin control apparatus including a coin payout device, motor-driven control means for actuating said device, a coin-control unit for receiving a coin and moving said coin with respect to a plurality of positions, means actuated by a coin in a first one of said positions for initiating operation of said motor control means, means actuated by said motor control means following initial operation thereof as aforesaid for effecting movement of said coin from said first position to a second position in the control unit, means actuated under control of a coin in said second position for effecting a continued operation of said motor control means, and means actuated under control of said motor control means during said continued operation thereof for operating said payout device a desired number of times.

2. Coin control apparatus comprising coin-control means for receiving a coin and operable to move said coin from a received position to a second position, a coin payout device, electrical means for actuating said coin-control means, electrical means for actuating said payout device, electrically operated circuit control means, switch means operated by a coin in said received position for actuating said circuit control means, circuit connections controlled by operation of said circuit control means for actuating the electrically operated means for moving a coin from received to second position, switch means actuated responsive to movement of said coin into second position effecting further actuation of said circuit control means, and circuit connections effectuated by said circuit control means following movement of said coin into second position as aforesaid for actuating said payout device a certain predetermined number of times.

3. In a coin control apparatus, cooperating instrumentalities including a plurality of rotary switches, motor means, slip-clutch means providing driving connection between said motor means and said rotary switches, electro-clutch means normally restraining certain of said rotary switches against operation by said motor means, electrically operated coin payout means connected for operation by a restrained one of said rotary switches, a coin control unit receiving a coin in a first position, electrically operated means actuated under control of an unrestrained one of said rotary switches for moving a coin from received position to second position, switch means actuated by a coin in said received position for starting said motor means, said unrestrained rotary switch means thereupon effecting movement of said coin to second position by the coin-moving means aforesaid, switch means actuated responsive to movement of said coin into second position for actuating said electro-clutch means to free the restrained rotary switch means for operation, said freed rotary switch means thereupon actuating said payout means and a holding circuit for said motor means and operated by said freed rotary switch means to energize said motor for a predetermined time following starting thereof as aforesaid.

4. Coin control apparatus comprising, in combination, first and second coin switches; electrically operated transport means for moving a coin from operative engagement with the first coin switch into operative engagement with the second coin switch; an electrically operated coin payout; a rotary transport-operating switch; a rotary payout-operating switch; a motor energizable to drive said rotary switches, an electrically releasable clutch means normally restraining operation of said payout switch by said motor; a starting circuit controlled by said first coin switch for starting said motor to actuate said transport switch; a circuit controlled by said second coin switch for releasing said clutch means to effect operation of said payout switch, and a holding circuit operative to energize said motor a limited time following coin operation of the second coin switch.

5. Coin change apparatus comprising a coin payout; a first named means for actuating said payout; a second named means actuated under control of the first named means for moving a coin from a first to a second position; a third-named means actuated by presence of a coin at said first position to initiate operation of said first-named means; a fourth-named releasable means normally preventing said first-named means from actuating said payout notwithstanding initiated operation thereof as aforesaid; a fifth-named means actuated by the presence of a coin moved from first to second position for effecting release of said fourth-named means whereby to cause operation of the payout by said first-named means; and a sixth means actuated cooperably with said fifth-named means in releasing operation of the latter, and also with said first-named means in payout-actuating operation of the latter, for continuing the initiated operation of said first-named means a predetermined time.

6. Coin change apparatus comprising a coin payout, a motor switch including a plurality of switch devices actuated thereby; a first said switch device connected for operation to actuate said payout; a coin-moving means operated under control of a second said switch device for moving a coin from a first to a second position; means including a first coin switch actuated by presence of a coin at said first position to initiate operation of said motor switch; means including an electrically releasable brake normally preventing effective operation of said first switch device of the motor switch notwithstanding initiated operation thereof by the first coin switch as aforesaid, means including a second coin switch operated by a coin at said second position for releasing said brake means and thereby causing operation of said first switch device to actuate the payout; and a normally open carry-over circuit connected for closure to continue the initiated operation of said motor switch, said carry-over circuit including a first carry-over switch actuated by said brake means to close said circuit contemporaneously with release of said brake means, and a second carry-over switch actuated cooperatively with said first switch device to close said carry-over circuit at least once during actuations of the payout.

7. Coin payout means comprising a coin receiver, electrically operated means for moving a coin in said receiver, switch means actuated by presence of a coin at first and second positions in said receiver, electrically actuated coin payout means, a plurality of electrically driven switches, electrical means for driving said last-mentioned

switches, circuit connections effectuated by a coin in said receiver at said first position actuating said first-mentioned switch means for starting said driving means, circuit connections effectuated by one of said electrically driven switches following starting of the driving means as aforesaid for actuating said coin moving means to move said coin to second position, electrically releasable means normally restraining driving operation of another of said driven switches and released by circuit connections effectuated by coin operation of said switch means at second position in said receiver, and circuit connections effectuated by said other driven switch, released as aforesaid, for actuating said payout means; and holding switch means cooperable with said releasable means for continuing operation of said driving means a limited time.

8. Coin control apparatus comprising a coin payout; electrical means for operating said payout; electrically driven switch means including a plurality of pulse switches and motor driving means therefor; electrically releasable holding means normally restraining operation of at least one of said pulse switches by said driving means; coin-operated switches disposed at a plurality of positions; means for guiding a coin into a first one of said positions to operate a first one of said coin switches thereat; circuit connections effectuated by operation of said first coin switch for initiating operation of said driving means to operate a certain pulse switch; coin-moving means actuated by said certain pulse switch for moving a coin from said first position to a second coin switch at a second one of said positions; circuit connections effectuated by operation of the second coin switch by a coin moved thereto from said first position for releasing said holding means to effect operation of a second one of said pulse switches by said driving means; circuit connections effectuated by operation of said second pulse switch released as aforesaid for actuating said payout; a first holding switch means operated by said releasable means in released condition for maintaining an operating circuit for said driving means following release of the releasable means as aforesaid; and a second holding switch means cooperable with said second pulse switch and actuated during released pulsing operation thereof for intermittently closing a second holding circuit for said driving means for each pulsed operation of said payout.

9. In a coin control and change-making apparatus, a coin transport device adapted to dispose a coin at a first station and operable to move said coin in one direction only from said station past a second station, a change coin payout electrically actuated; motor switch means and an operating motor therefor; a starting switch actuated by a coin in said transport at the first station to start the motor of said motor switch means; a first control means actuated by said motor switch means responsive to starting thereof for operating said transport to move a coin therein to and past a second station; a second control means part of said motor switch means and including an electrical release means normally rendering the same ineffective for actuation by said motor; switch means actuated by a coin at said second station for actuating said release means to effect operation of said second control means and energizing connections between it and said payout to operate said payout a determined number of times to payout change; additional circuit means controlled by coin-operation of said second-station switch means for continuing operation of said motor-switch means after starting thereof, and for then stopping said operation after actuation of the payout said determined number of times; and vending mechanism actuated by said switch means at said second station responsive to presence of a coin thereat.

10. Coin control apparatus comprising an electrically operated coin payout; a coin receiver including means for unidirectionally guiding a coin into a succession of control positions; a coin switch at at least two of said positions; electrically operated coin transport means for moving a coin from one to another of said two positions; an electrically driven and controlled rotary switch device; and circuit connections for said coin switches and said driven switch device for actuating the latter responsive to presence of a coin operating a coin switch at said one of said two positions, said rotary switch device thereupon actuating said transport means to move said coin to the other of said two positions to operate the coin switch thereat and establish a circuit for effecting a further operation of said rotary switch by which the latter actuates said payout.

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