Jan. 8, 1952 S. MAY 2,581,681

COIN CONTROL

Filed Feb. 9, 1945 2 SHEETS—SHEET 1

FIG. 1.

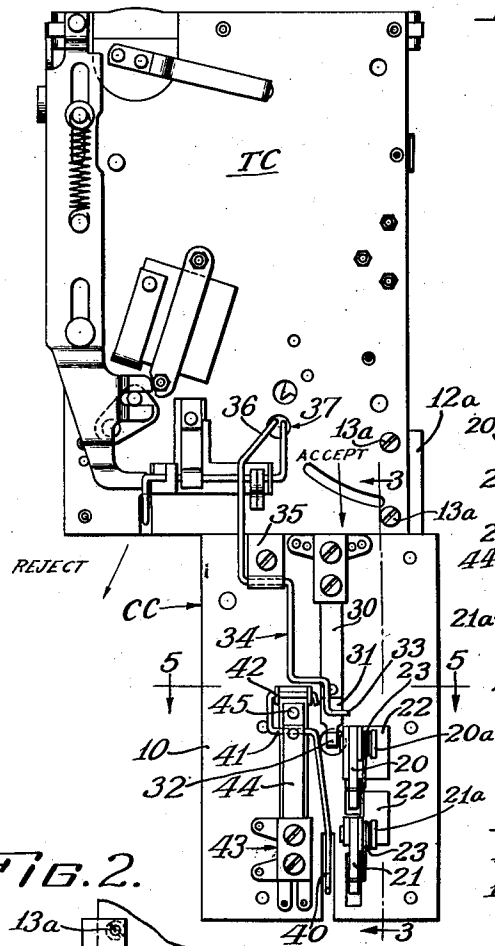


FIG. 3.

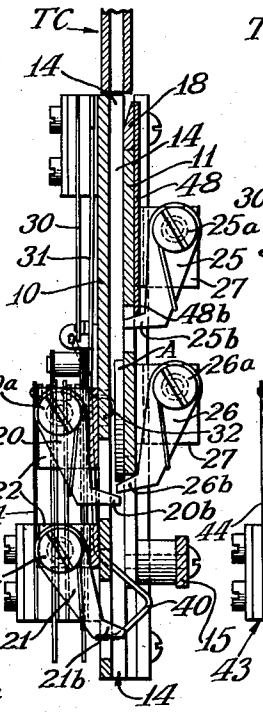


FIG. 4.

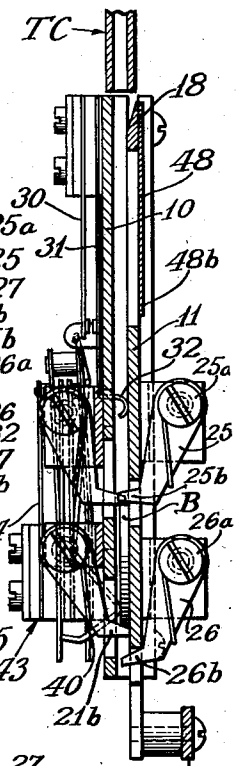


FIG. 5.

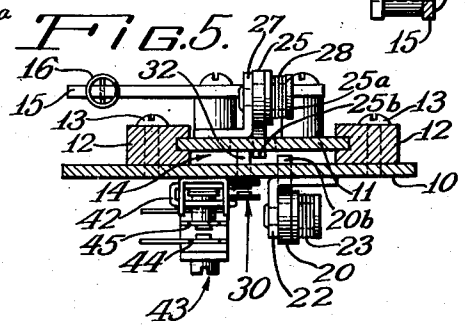
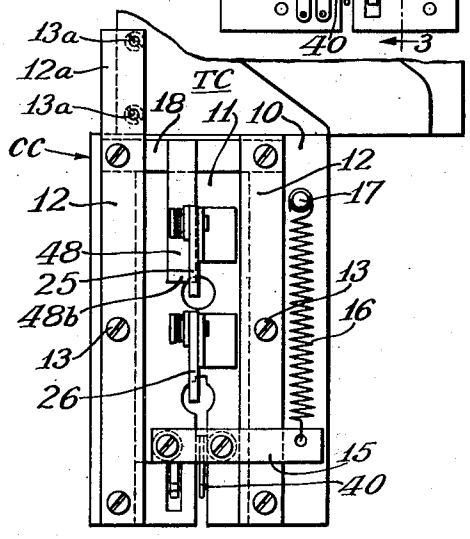


FIG. 2.



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COIN CONTROL

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Fig. 6.

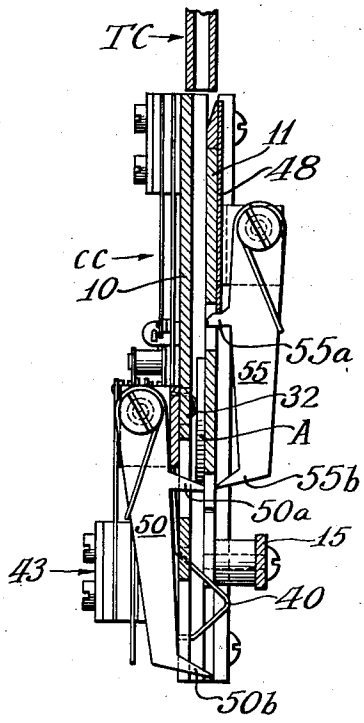


Fig. 7.

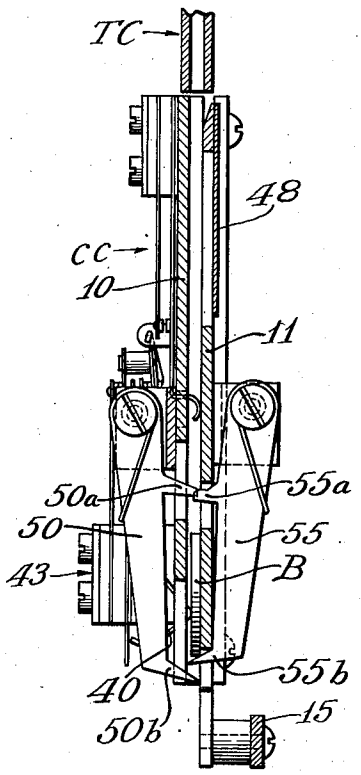
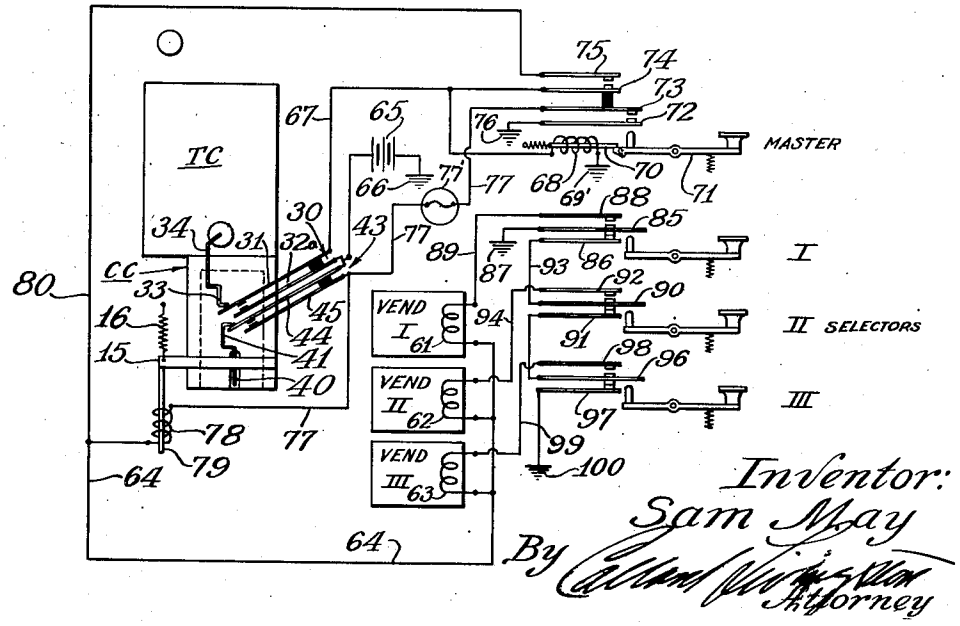


Fig. 8.



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Patented Jan. 8, 1952 2,581,681

UNITED STATES PATENT OFFICE

2,581,681

COIN CONTROL

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Application February 9, 1945, Serial No. 577,011

5 Claims. (Cl. 194—9)

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This invention pertains to coin control devices, particularly those employed in conjunction with vending machines, and the like, and has for its principal object the provision of a control unit adapted for use with conventional types of coin testing chutes, and operating to move a tested and acceptable coin, after discharge from the testing chute, into a plurality of positions or stations to actuate control instrumentalities, such for example as switches, whereby to set up control circuits for various types of coin-operated or controlled vending machines.

A more particular object is the provision of a control unit of the class described consisting of a coin slideway, into which acceptable coins are directed from a coin testing chute, into a first station at which is a control switch closed by said coin, thereby setting up a master control circuit so that a main operating lever or control may be actuated to cause movement of the coin to a second station at which additional control switch means will be operated by the coin to set up a selecting circuit, enabling the operation of a vending selector to cause delivery of desired merchandise or the like.

Further objects and aspects of novelty of the device relate to details of the construction and operation of the illustrative embodiment hereinafter described and including a control chute having a reciprocable slide for moving a coin progressively from station to station; means actuated by a coin at the first station for holding back following coins in the testing chute until the first station is cleared; devices, such as dogs, for preventing retrograde movement of the coins in the control chute when the slide is reciprocated; and construction and arrangement of parts affording a compact control unit particularly adaptable to the vertical or drop type of testing chute, all of which will appear more fully as the following description proceeds in view of the drawings, in which:

Fig. 1 is a front elevation of a coin testing chute and the novel control unit in cooperative combination therewith;

Fig. 2 is a fragmentary rear elevation of the control unit alone;

Fig. 3 is a vertical section through the control unit along lines 3—3 of Fig. 1, with the slide in normal position;

Fig. 4 is a section identical to that of Fig. 3 but showing the slide in advanced position;

Fig. 5 is a horizontal section through the control unit along lines 5—5 of Fig. 1;

Fig. 6 is a vertical section through a modified form of the control unit, similar to Fig. 3, showing the slide in normal position;

Fig. 7 is a vertical section identical to that of Fig. 6 but showing the slide in advanced position;

Fig. 8 is a circuit diagram of the control unit

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in conjunction with a selective vending machine circuit.

In Fig. 1 there is shown a conventional type of gravity coin-testing chute TC, in which a coin is deposited through a slot in the upper left-hand corner (not seen) to gravitate past various testing instrumentalities known in the art and not described here since the testing chute per se does not constitute part of the invention. If the coin is not acceptable, it will drop from the chute in the direction of the arrow marked "Reject," but if the coin is acceptable, it will drop from a slot (not seen) near the lower right-hand corner in the direction of the arrow marked "Accept," and pass into the control chute CC.

The control chute or unit CC consists of a main backing or mounting plate 10 having on its opposite side, as in Fig. 2, a slide member 11 working between a pair of guide bars 12 secured to the plate 10 as by screws 13. This construction is more clearly visualized in the sectional view of Fig. 5. The control chute is preferably attached to the testing chute by means of an extension 12a and screws 13a on one of the guide bars, Figs. 1 and 2. As in Figs. 3, 4, and 5, the spacing between the mounting plate and the slide defines a coin passage 14, said passage being open at the top, to receive an accepted coin, and at the bottom for discharge of such coin after it has served its control purposes.

As in Fig. 2, the slide carries an arm 15 to which is attached one end of a spring 16 having its other end anchored to a post 17 on plate 10; this spring normally urges the slide to its upper limit defined by a stop bar 18 (see Fig. 3 also); this is the coin-receiving position.

On the outside of the mounting plate 10, Fig. 1, are dogs 20 and 21 (see Fig. 3, also) pivoted respectively at 20a and 21a on angles 22 welded to the plate 10; coil springs 23 on each pivot 20a and 21a urge the respective noses 20b and 21b of these dogs through slots in the mounting plate so that said noses project normally into the passage 14, as in Fig. 3.

Dogs 20 and 21 are thus seen to be spaced apart vertically, and they constitute means for positioning the coin for control purposes and for preventing retrograde movements of the coin when the slide is advanced; they are beveled downwardly, as will be seen in Fig. 3, so that a coin may pass downwardly thereof, but the coin may not pass upwardly of these dogs.

Similarly, as viewed in Figs. 2 and 3, particularly, the slide carries a pair of vertically spaced-apart dogs 25 and 26, pivoted respectively at 25a and 26a on brackets 27 welded to the slide, and each said dog is provided with spring means 28 normally urging the respective noses 25b and 26b through slots in the slide, into the passage 14. This second pair of dogs also has downwardly beveled noses, so that they will be raised to pass

a coin on upward movement of the slide, but the coin may not pass upwardly of these dogs.

Mounted on the outside of the plate 10, Fig. 1, is a switch 30 having a spring blade arm 31 with a nose portion 32 offset to project through a hole in plate 10 into the passage 14 at a point just above dog 20 (see also Fig. 5), such that a coin resting at the first station A, Fig. 3, in which the coin will be held by dog 26, will be engaged by said offset nose and cause blade 31 to be raised, closing contact with switch blade 32*a*, and rocking the offset end 33 of a blocking lever 34 pivoted in cleat 35 on plate 10, so that the opposite end portion 36 of this lever will be projected into the coin passage of the testing chute through an opening 37 in the latter, thus blocking descent of additional coins from the testing chute into the control chute until the control functions of the preceding coin have been fulfilled and the control chute cleared of such preceding coin, as by operation of the slide 11.

Assuming certain operations of the control slide in the intended manner, as will more fully appear hereinafter, a coin will ultimately become lodged at a second station B (Fig. 4) in which it is held by the second dog 21 on the main plate; in this station, the coin is engaged by the offset nose 40 of a switch-operating lever 41 (Fig. 1), pivoted at 42 on a second switch 43 mounted on the plate 10, so that the lever will be raised, thus closing switch arms 44 and 45 so long as the coin rests in the second position.

An important feature is the provision of means for holding the first or uppermost dog 25, Figs. 2 and 3, partly raised in order that an entering coin may pass directly to the first station, A in engagement with the nose 26*b* of dog 26, as in Fig. 3. This means is preferably in the form of an arm 48 (Fig. 2) attached to the stop bar 18 at its upper end and having its lower end 48*b* (Figs. 2, 3, 4) disposed to engage the nose 25*b* of the upper dog so that the latter will be cammed outwardly when the slide is in its upper or normal position, thus withdrawing nose portion 25*b* so that the coin may drop directly into engagement with dog 26. A very slight downward movement of the slide from normal position clears dog 25 of this camming means and at once permits dog 25 to block the coin passage and prevent retrograde or upward movement of the coin.

In the modified construction shown in Figs. 6 and 7, the control chute structure is identical to that just described, but dogs 20 and 21 and 25 and 26 are respectively replaced by compound dogs 50 and 55, each have vertically spaced nose portions 50*a*, 50*b*, and 55*a*, 55*b*, respectively.

The compound dogs are normally urged by spring means identical to that described heretofore for the separate dogs, so as to project their respective nose portions into the coin passage; however, in the case of the upper compound dog 55, both nose portions 55*a*, 55*b* are normally withdrawn from the passage by action of the camming bar 48 raising the dog 55 when the slide is in upper or normal position. Accordingly, in this modified construction, a coin received in the control chute will drop directly into engagement with nose portion 50*a*, position A in Fig. 6, at which it is engaged by the nose 32 of the first switch, closing the latter, as in the case of the arrangement of Fig. 3. When the slide is moved downwardly a slight amount, nose portion 55*a* disengages the camming bar 48 and dog 55 pivots inwardly disposing both nose portions 55*a*, 55*b* in blocking position in the passage 14, so that a

coin in either station A or station B will be carried downwardly by corresponding movement of the slide. This construction effects economies in space and cost, and is particularly desirable for coins of larger diameter, such as quarters and half-dollars.

Operation

Assuming a coin to be deposited in the testing chute TC of Fig. 1, and that such coin successfully traverses the latter, it will gravitate from the acceptance passage in TC, so-marked in Fig. 3, into passage 14 in the control chute and pass dog 25, since the latter is raised by camming member 48, and lodge in position A upon the nose 26*b* of dog 26. In such position, the offset nose 32 of switch 30 will engage the side of the coin, being thereby raised to close switch 30 for certain control purposes shortly to be described.

Closure of switch 30 as aforesaid conditions a circuit which makes possible the electrical actuation of the slide 11, from its normal, coin-receiving, position of Fig. 3, to the advanced position of Fig. 4. When slide 11 descends, nose 25*b* on dog 25 engages the edge of the coin and pushes it downwardly past nose 20*b* on dog 20 until the coin rests on the nose 21*b* of dog 21, as in Fig. 4.

When the actuating circuit which caused the downward movement of slide 11 is broken in a manner later to be described, spring 16 (Fig. 2) restores the slide to normal position, and the cammed nose 26*b* of dog 26 yields to pass the coin, while nose 20*b* on dog 20 prevents upward movement of the coin. Thus, the coin is transported into a second position or station B, as in Fig. 4, and the offset projection 40 (Fig. 1 also) on switch operating lever 41, engages the side of the coin and closes the contact blades of the second switch 43, thereby conditioning further control circuit means, to be described, for operation, as in conjunction with a vending machine or the like.

Where the compound dogs 50 and 55 are used, as in Figs. 6 and 7, the action of the control chute is the same as just described with the difference that, instead of initially resting upon the nose 26*b* of the second, shiftable dog 26, as in the embodiment of Fig. 3, the coin in the first station or position A, rests upon the nose 50*a* of the stationary compound dog 50, as in Fig. 6, since the shiftable dog 55 is normally withdrawn by camming action of nose part 55*a* with the camming bar 48. However, a slight downward movement of the slide 11 will disengage nose part 55*a* from bar 48 and permit this dog 55 to be pivoted by its spring into fully projected condition in passage 14, and the coin will be trapped, in a manner of speaking, between nose portions 55*a* and 55*b*, and thereby carried downwardly past nose portion 50*a* of dog 50 to the second station, B, as in Fig. 7; when the slide 11 is restored by its spring to normal, raised position, nose portion 50*a* prevents upward movement of the coin, while nose portion 55*b* is cammed away and passes upwardly over the coin to normal position, leaving the coin in the second position, as described in view of Fig. 4. In other respects, the action of the modified form of the device is the same as the form of Figs. 1 through 5.

In Fig. 8 there is disclosed one form of control circuit utilizing the novel control means in a vending machine, which includes a plurality of individual vending devices of known type, marked Vend I, Vend II, Vend III, each adapted to be individually actuated by an associated electromagnetic operating coil 61, 62, or 63, respec-

tively. These devices are well-known in the art and do not per se constitute part of the invention, and are therefore not described in further detail, it being pointed out simply that energization of any of the coils 61, 62, or 63 will cause vending of a desired article from the associated vending mechanism.

Control circuit

Referring to Fig. 8, wherein the control unit CC is shown schematically with a testing chute TC, the two control switches 30 and 43 are arranged for actuation respectively by a coin at first and second stations. The circuit is best understood by tracing its operation following deposit of an acceptable coin in TC, which coin first closes blade 31 against its companion blade 32*a*, thereby closing circuit from battery 65, grounded at 66, through conductor 67 and magnetic lock coil 68, grounded at 69', energizing this coil to withdraw the lock member or plunger 70 and free the master control lever 71 for operation by the patron.

Operation of master control 71 closes master switch blades 72, 73 and 74, 75, thus connecting ground 76 through contacts 72, 73, conductor 77, a safety resistance 77', which is preferably a signal lamp, coin slide actuating coil 78, conductor 80 through switch blades 75, 74, conductor 67, coin contacts 31, 32*a* to battery or power 65, thereby causing coin slide actuating coil 78 to be energized to retract plunger 79, connected with coin slide 11 at 15, so that the coin is thereby moved from its first position or station to the second station, closing the second control switch 43, it being observed that as soon as the coin leaves its first station, switch 30 opens, de-energizing both the magnetic lock coil and the slide actuating coil, so that the coin slide returns to normal position, and the master control lever 71 becomes locked as soon as released.

Closure of the second coin control switch 43 connects battery or power supply 65 through contact blades 44, 45, conductor 77, coin slide actuating coil 78, conductor 64 to one terminal of each of the three vending unit actuating coils 61, 62, 63, so that the patron may now make a selection and depress one of the several selector levers marked I, II, III.

Assuming that the patron depresses selector lever I, contact blade 85 will break circuit from blade 86, grounded at 87, and close circuit with blade 88, thereby energizing vending coil 61 via conductor 89, since this coil, as well as the remaining vending coils, is connected through conductor 64, coin slide coil 78, and second coin switch 43 to battery 65. Thus, actuation of selector lever I effects operation of the first vending unit, Vend I.

Should the patron depress the second selector lever II, instead of lever I, then in that case contact blade 90 would break circuit with normal contact 91 and make circuit with contact 92, thereby connecting ground from 87 via normally closed contacts 85, 86, conductor 93 to the second vending coil 62 via conductor 94, actuating the second vending unit Vend II.

If the patron attempts to depress several selector levers at once to defraud the machine, only one vending unit will be operated in any event, because it will be apparent that if selectors I and II, for example, be simultaneously depressed, the necessary ground circuit from 87 will simultaneously be broken at contacts 85, 86 of the first selector switch, and there will be no ground on contact 90 of the second selector necessary for operation of the second coil.

Should the patron desire to actuate the third vending unit, instead of the first or second, he depresses selector lever III, thereby causing contact blade 96 to break circuit with its normal contact 97, grounded at 100, and closing circuit from ground 87 via contacts 85, 86, closed, of the first selector switch, and contacts 90, 91, closed, of the second selector switch, to contact 98, and energizing vending coil 63 via conductor 99 and the power connection through coin slide coil 78 and second coin switch 43, as heretofore described.

If an attempt is made to defraud the machine by depressing more than one selector lever, for example the second and third, only one vending unit will be actuated, namely, the second unit, since operating ground for the third unit will be broken at selector switch contacts 90, 91 the instant the second switch is operated; and operating ground from 87 via contacts 85, 86 of the first switch, normally closed, will be applied to the second vending coil through second selector switch contacts 90, 92. Similarly, depression of all three (or any number of analogously connected selector switches) will result in the actuation of only one vending unit, namely, the first one, since ground 87 will be connected to the latter via contacts 85, 88 of the first selector switch, while ground for the other two or remaining coils will be broken at contacts 90, 91 and 85, 86.

Thus, the provision of fraud preventive circuit means including a series or link ground connection through all selector switches, prevents operation of more than one vending unit at a time, for each coin deposited, regardless of how many selectors are actuated.

It will also be observed that since the coin slide coil 78 is connected in series with the operating circuit for any vending coil, via conductor 64 and second coin switch 43, that the coin slide will be actuated each time any vending unit is actuated, thereby removing the coin from operative relation with the second coin switch 43, and preventing repeated operation of the vending units after one has been operated for each coin deposited.

Should a coin be resting at the first station, closing coin switch 30, lever 34 will be thereby rocked into the coin testing chute TC to block additionally deposited coins until the first station is cleared, thereby preventing jamming of coins in the control unit.

In my co-pending application, Serial No. 538,773, filed June 5, 1944, which issued as Patent No. 2,426,781, September 2, 1947, I disclose a type of coin control unit which may be used with any type of coin chute and which is particularly adapted for the type of vending machine which employs a plurality of coin testing units or coin sources.

The present invention provides a control unit especially suited to use with the vertical or gravity type of coin tester, in a machine having a plurality of selectable vending units but only one coin testing unit. It will be apparent, however, that the present control unit may be used with any type of coin testing unit or coin source capable of delivering the coin into the upper or receiving end of the said control unit.

The present invention makes it possible to eliminate relays entirely by utilizing the deposited coin to actuate control switches in a plurality of positions into which the coin is moved successively as an incident of the operation of the vending

machine, thereby reducing costs, service problems, and the possibility of defrauding the machine, especially where said machine has a plurality of selectively operable vending or other units only one of which is intended to be operable for each coin deposited.

I claim:

1. A coin control device comprising a stationary and a reciprocable member defining a coin passage in which a coin moves in one of the directions of movement of the reciprocable member, a pair of dogs on the reciprocable member, a pair of dogs on the stationary member, said dogs yieldingly urged in a direction to project into said passage and the dogs of each pair being relatively spaced apart in the direction of movement of a coin therein for purposes of locking movement of a coin oppositely to said direction under predetermined conditions but yieldable to permit movement of a coin in the said direction of movement, means yieldingly urging the reciprocable member into a normal position, means engageable with at least one dog on the reciprocable member, when the latter is in normal position, for effecting withdrawal of said dog to permit movement of a coin into a first position determined by one of the dogs on the stationary member, at least one of said dogs on the reciprocable member effecting movement of a coin at said first position into a second position by movement of the reciprocable member a determined amount from normal position, control switch means at said first and second positions actuated by coins thereat, at least one of said dogs on the reciprocable member acting to remove a coin from said second position responsive to movement of the reciprocable member from normal position.

2. A coin control comprising a vertical chute, a vertically reciprocable slide forming a side portion of said chute, a first dog on said slide yieldingly projecting into the chute and arresting a coin gravitating into the chute at a first position, a second dog on said slide yieldingly projecting into said chute above said first dog, means holding said second dog withdrawn from the chute when the slide is in normal position so that a coin may pass to said first position, said second dog projecting into the chute to engage a coin at said first position and move the coin to a second position responsive to predetermined movement of the slide from normal position, a third dog on said chute yieldingly projecting into the latter below said first dog and holding a coin, moved from first position as aforesaid, in a second position, a fourth dog on said chute yieldingly projecting into the latter and blocking movement of coins from second to first position but yieldable to permit movement of coins from first to second position, control means actuated by a coin at both said first and second positions, said first dog acting to dislodge coins at second position for discharge from the chute responsive to predetermined movement of the slide from normal position.

3. In a coin control chute, a coin actuated control switch at a first position, a coin actuated control switch at a second position, a reciprocable member and cooperating pivoted dog means on the chute and on the reciprocable member for disposing coins by unidirectional movement progressively through the chute successively at said first and second positions and beyond the latter, and further acting to prevent movement of coins reversely in the chute and to block movement of coins received in the chute to said first position while the reciprocable member is in a certain range of positions of reciprocation, electromechanical means for reciprocating said reciprocable member, and including circuit means conditioned for operation by both said control switches.

4. A coin control including a chute having a slidable wall opposite a stationary wall, a pair of dogs on the stationary wall yieldingly urged into the chute to hold a coin at a first station and at a second station therebelow, a second pair of dogs on the slidable wall and spring means urging the same into the chute, spring means urging the slidable wall into a normal position, stationary means engaged by the second dog structure in said normal position of the slidable wall withdrawing said second pair of dogs from the chute and permitting entrance of these dogs into the chute responsive to slight movement of the slidable wall from said normal position, whereby a first dog of the second pair engages and transports a coin from first to second station while a second dog of said second pair holds the transported coin at second station responsive to predetermined advance of the slidable wall from normal position, a first dog of said first pair holding the transported coin at second station during return of the slidable wall to said normal position, and control means actuated by a coin at either station.

5. Coin control apparatus comprising a control chute for receiving coins, reciprocable slide means and cooperating dog means in the control chute operable to position received coins successively at a plurality of control positions in the control chute, control switch means actuated by coins at said control positions, a master control conditioned for operation by actuation of the control switch means at a first said control position, slide-operating means actuated responsive to operation of said master control for moving a coin from first to second position, a plurality of selector devices conditioned for operation by actuation of control switch means at a second control position, said slide-operating means being actuated by operation of any of said selector devices for actuating said slide means to remove a coin from said second control position, and circuit means including said switch means at the second position for preventing operation of more than one selector device for each coin received in said chute and actuating the switch means at first and second positions as aforesaid.

SAM MAY.

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