July 1, 1941. D. NEIDIG 2,247,888

VENDING MACHINE

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Fig. 1.

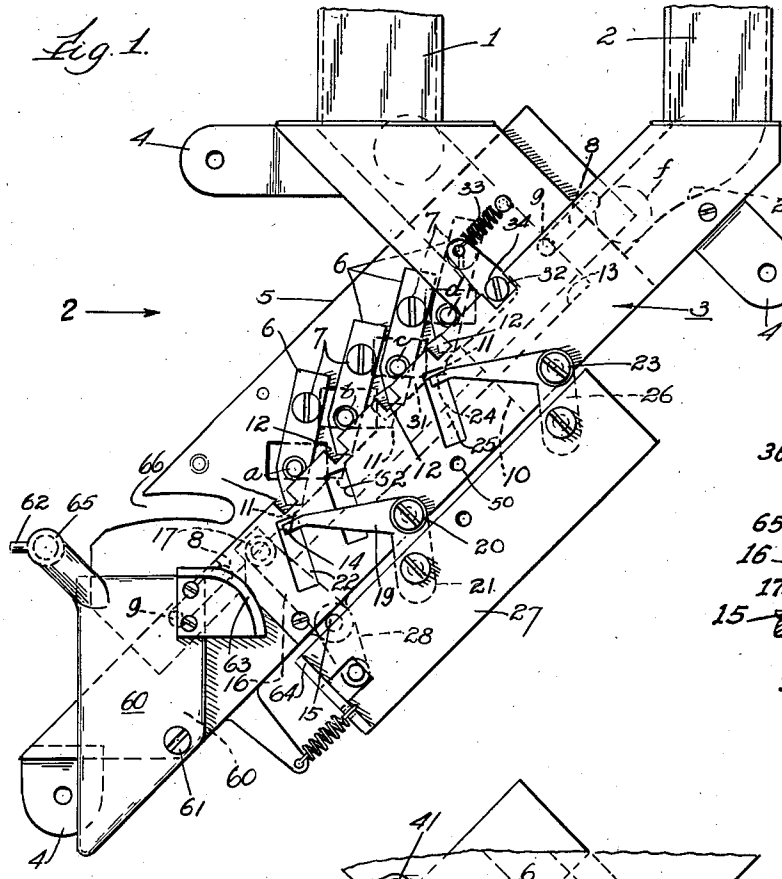


Fig. 2.

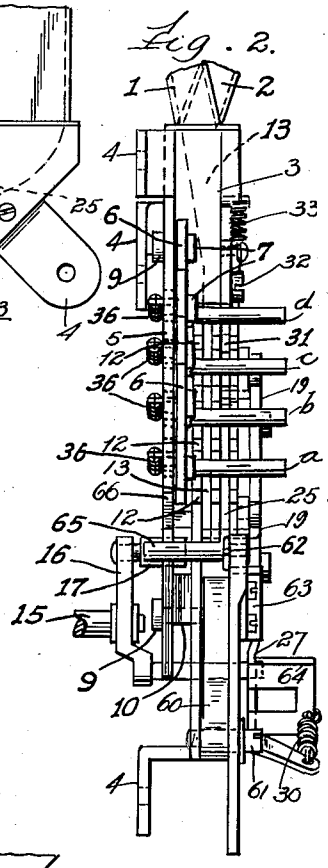


Fig. 6.

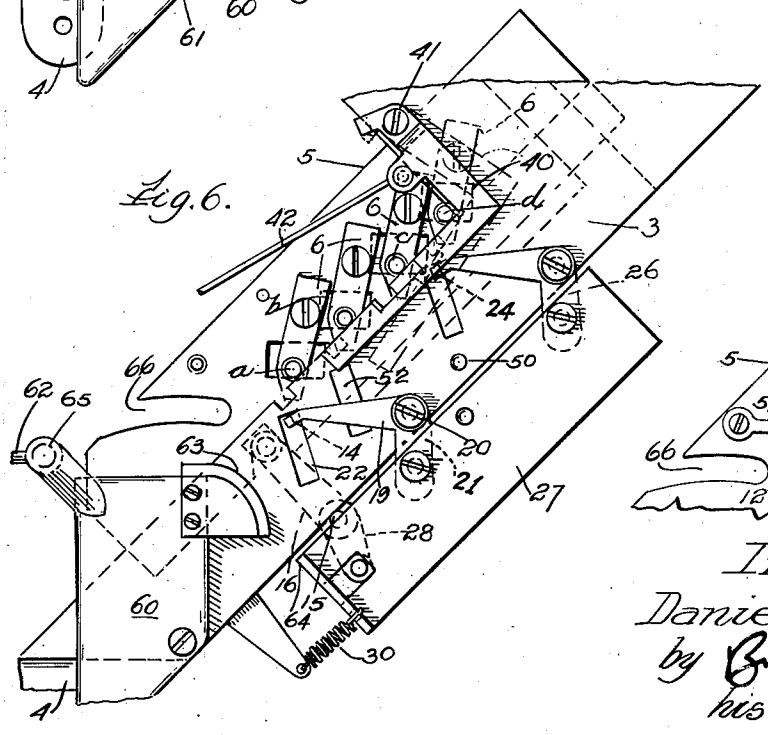
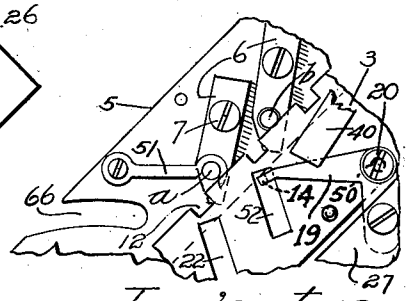


Fig. 7.



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Fig. 3.

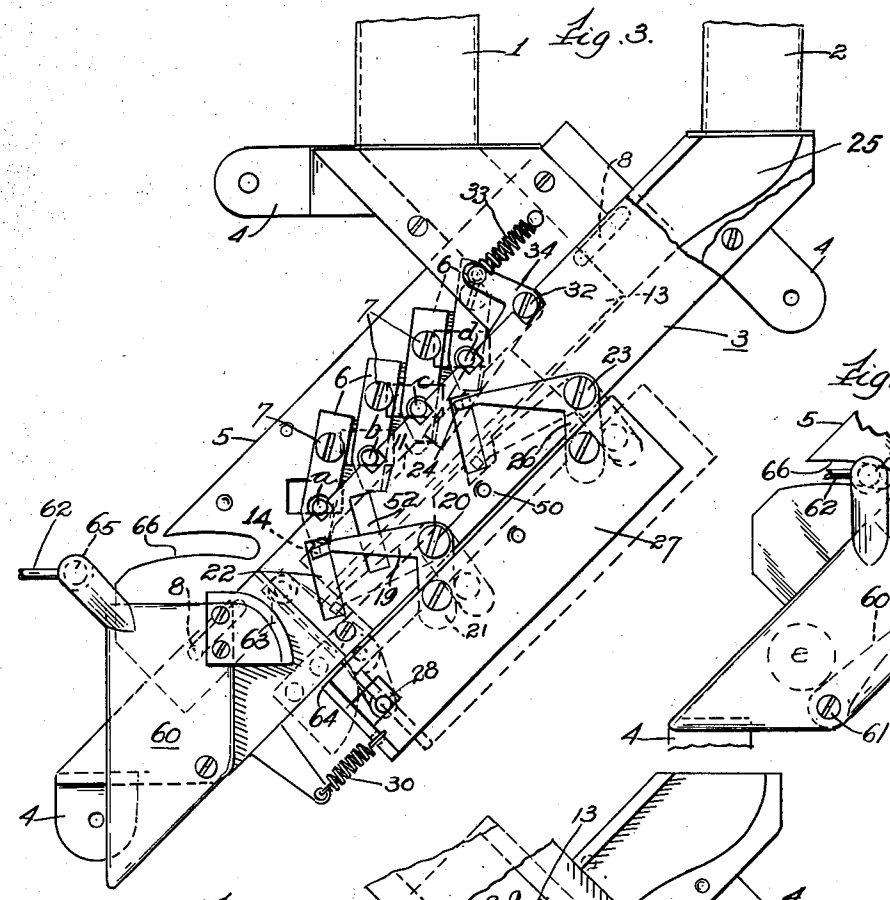


Fig. 9.

Fig. 4.

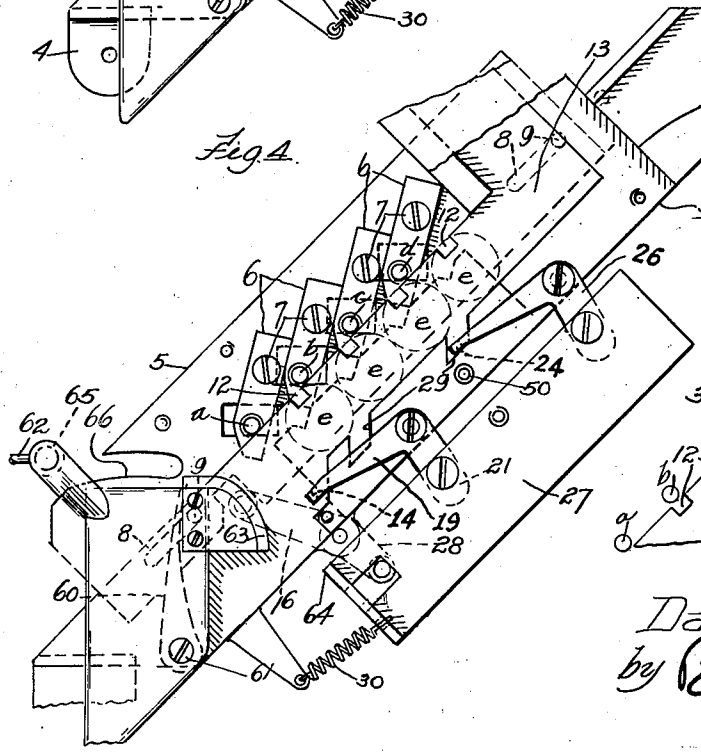
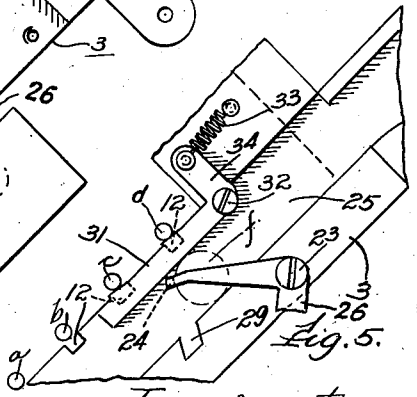


Fig. 5.



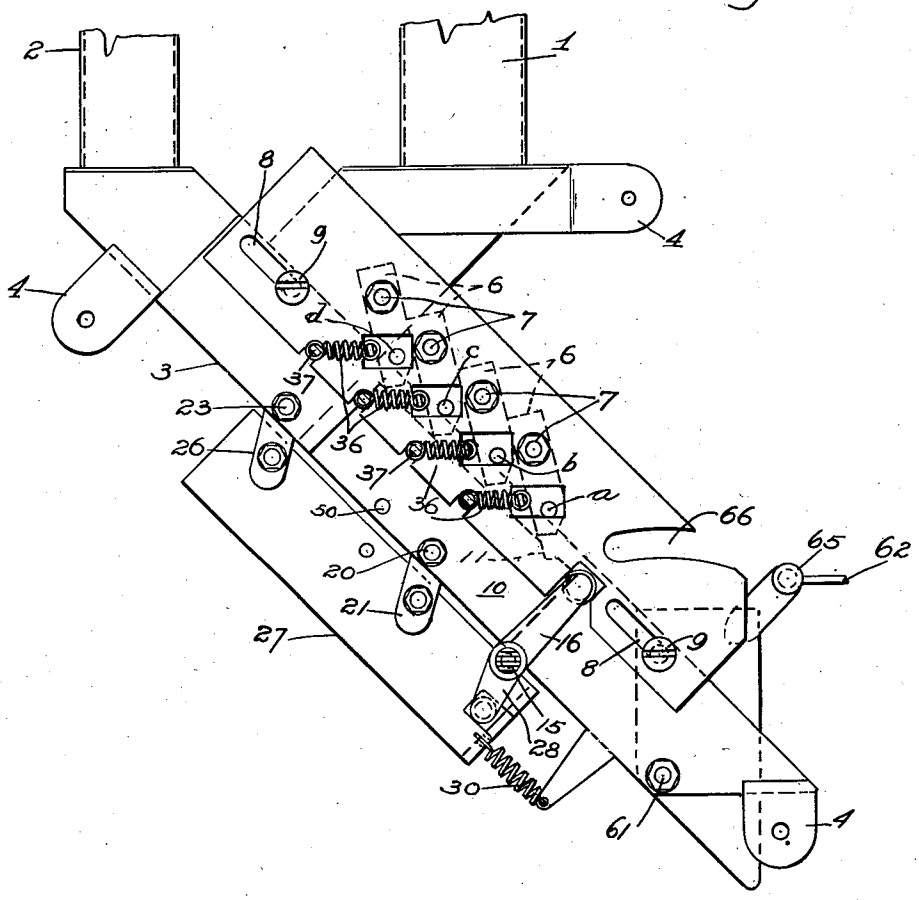
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Fig. 8.



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UNITED STATES PATENT OFFICE

2,247,888

VENDING MACHINE

Daniel Neidig, Chicago, Ill., assignor to James H. Martin, Chicago, Ill.

Application December 26, 1939, Serial No. 310,923

15 Claims. (Cl. 194—92)

This invention relates to vending machines, and it is particularly concerned with a coin-handling mechanism for use in such machines. One object of the invention is to provide a relatively simple and sturdy construction capable of long wear, and adapted to stand rough usage. Another object is to provide a coin-controlled release for the vending mechanism, adapted to be operated by coins of more than one denomination. A further object is to provide a coin return device, with interlocking means to prevent simultaneous actuation of the merchandise delivery mechanism. Other objects will appear as the description proceeds. The invention consists in certain features and elements of construction in combination, as herein shown and described and as indicated by the claims.

In the drawings:

Fig. 1 is a side elevation of a coin chute and parts associated therewith for the control of a vending machine.

Fig. 2 is an edge view of the same parts, looking in the direction of the arrow, 2, on Fig. 1.

Fig. 3 is a side elevation similar to Fig. 1, but showing the slidable "actuator" advanced in the initial portion of its stroke and checked against further advance by the coin-controlled mechanism.

Fig. 4 is a view similar to Fig. 1, with certain parts broken away to condense the view, and with one wall of the nickel slot removed to illustrate the action of the coins in releasing the slidable actuator for its full stroke.

Fig. 5 is a fragmentary detail view showing the other dime slot with one wall removed to illustrate the action of a compensator bar.

Fig. 6 is a side elevation similar to Fig. 1, showing the low purchase attachment as applied and in operative position.

Fig. 7 is a fragmentary detail view showing the means for adjusting one detector to inoperative position.

Fig. 8 is an elevational view of the parts shown in Fig. 1 as seen from the opposite side.

Fig. 9 is a detail side elevation showing the coin return member in active position.

The coin-handling mechanism which is the subject of this invention is applicable to a wide variety of vending machines, but, as a matter of convenience, will be described as designed for operation by nickels and dimes, as in the case of machines vending cigarettes. Such machines are ordinarily provided with coin-receiving slots for nickels and dimes respectively, and it is usually desirable that each machine be capable of vending cigarettes of at least two different prices, for example, fifteen cents and twenty cents. Thus it is required that the vending mechanism be operable by coins whose total value amounts to either fifteen cents or twenty cents. Fig. 1 indicates the coin tube 1, extending from the nickel-receiving slot, and the coin tube 2, leading from the dime-receiving slot. Both tubes communicate with an inclined chute, which includes a passage for nickels and a separate passage for dimes. This chute is indicated generally by numeral 3, and may be supported and mounted by means of lugs 4 in any convenient manner. Adjacent the inclined chute 3, there is slidably mounted a plate 5, hereinafter referred to as the "actuator" by reason of the fact that it is in constant mechanical connection with the means by which the delivery mechanism is actuated when the proper coins have been inserted in the machine and an article of merchandise is to be obtained therefrom. It may be understood, however, that the plate 5 is not necessarily an actuating element for this mechanism but may be simply coupled with it so that its actuation is necessarily coincident with that of the delivery mechanism, and so that such mechanism cannot be actuated when movement of the plate 5 is blocked.

The plate 5 carries a plurality of locking dogs 6, each attached to the plate by a pivot 7. Each dog includes a laterally projecting detector pin, and for the purpose of identification these pins are marked on the drawings as *a*, *b*, *c* and *d*. The detector pins normally rest on the upper edges of the chute 3, as seen in Fig. 1, while the plate 5 is guided for its sliding movement by means of slots 8 in the plate engaging fixed guide pins 9, supported by the chute 3. A fixed locking plate 10 is supported on the side of the chute 3 and its upper edge is formed with notches 11, positioned to receive and engage the lower ends of the dogs 6 when the plate 5 is moved downwardly under certain conditions to the position indicated in Fig. 3. The chute 3 comprises two coin slots or passages, arranged side by side. The nickel slot is indicated at 13 leading from the tube 1, and the dime slot is seen at 25 connecting with the tube 2. The pins *a*, *b*, *c* and *d* normally rest on the side walls of the chute 3, but said walls are formed with notches 12, each dimensioned and positioned to accommodate one of the detector pins *a*, *b*, *c* and *d*, so that in the absence of any coins in the chute these pins will drop into the notches 12, and

the ends of the dogs 6 will engage in the notches 11 of the locking plate 10, as seen in Fig. 3. However, if the nickel slot or passage 13 of the chute 3 contains four nickels, as indicated at *e* in Fig. 4, these coins are arrested by a stop 14, which extends across the slot 13 so as to hold the coins in such positions that they serve to mask all the notches 12, and the detector pins *a*, *b*, *c*, *d* will ride over the notches 12 without permitting their respective dogs 6 to drop into the locking notches 11; thus the plate 5 will be thus permitted to make its full stroke downwardly in the general direction of the inclined chute 3.

This stroke of the actuator plate 5 may be produced by any suitable mechanism, and, as shown in the drawings, it may be understood that a rock shaft 15 is arranged for actuation by a manual lever or crank, not shown. The shaft carries a lever arm 16, having a roller 17 at one end engaged in a notch 18 in the plate 5, so that the shaft 15 can be actuated only when the plate 5 is free to move.

The coin stop 14 is formed as the bent end of a bell crank lever 19, pivoted at 20 on the side of the chute 3, with its other arm extending below the chute. The stop portion 14 projects through a clearance slot 22 in the side of the chute, and the normal position of the stop is near the upper end of this slot, where it will encounter the first of the coins *e* as it is deposited by way of the tube 1 and coin slot 13. A second bell crank lever is pivoted at 23, and one end of this lever is bent to form a stop 24, which extends into the separate slot 25, which extends alongside the slot 13 and receives dimes from the tube 2. The depending arm 26 of the second bell crank is connected to the arm 21 of the first bell crank by a bar 27, which engages a crank pin 28 on the lower arm of the lever 16, so that the movement of the slidable plate 5 downwardly along the chute 3 is accompanied by a movement of the bar 27 upwardly in a direction to swing the stop 14, and also the stop 24, out of contact with coins in the chute so as to permit the coins to roll down the chute and to be discharged therefrom into any suitable receiver, not shown. Clearance notches 29 are provided in the bottoms of the coin slots 13 and 25 to accommodate the stops 14 and 24 when they are thus retracted. Preferably, a return spring 30 connects the bar 27 with a suitable anchorage on the chute 3, so that this spring is stressed by the upward movement of the bar 27, just described, and causes the return of the bar and stops to the normal initial position illustrated in Fig. 1.

The dime slot 25 is upwardly open like the nickel slot 13, but its bottom wall is disposed at such a distance from the upper edge of the chute member 3 that dimes in the slot 25 will not directly contact with the detector pins or mask the notches 12. However, a compensator 31, in the form of a bell crank lever, is pivoted at 32 near the upper end of the dime slot 25, and lies in the upper portion of the slot, extending past the first two, or upper two, notches 12. A light spring 33, connected to the other arm 34 of the compensator lever serves to hold the arm 31 in a position which permits a dime to roll freely under it and into engagement with the stop 24 when the dime enters the slot 25 from the tube 2. Thus, a single dime positioned against the stop 24, and under the lever arm 31, as seen at *f* in Fig. 5, will serve to uphold the lever 31 in the position in which it will continue to mask the notches 12, 12 in the event of movement of the actuator plate 5 downwardly from its initial position. Thus the compensator arm 31, acting in conjunction with a single dime *f*, will serve to uphold the two detector pins *c* and *d* in the same manner as two nickels in the slot 13 would uphold these pins. In other words, to free the actuator plate 5 for downward movement it is only necessary to insert two nickels in the slot 13 to uphold the detector pins *a* and *b*, while a single dime is inserted in the slot 25 to support the pins *c* and *d* through the medium of the compensator arm 31. If an attempt is made to actuate the plate 5 without the dime *f* in place under the arm 31, the detector pins *c* and *d* will press down the arm 31, overcoming spring 33, and will enter the notches 12, 12, so that the ends of the corresponding locking dogs 6 will engage notches 11 in the locking plate 10, and thus check further movement of the actuator plate 5. The detector pins *c* and *d* are able to overcome the spring 33 because each of the dogs 6 is yieldingly urged downward toward its locking position by means of a spring 36, anchored to a suitable lug 37 on the plate 5, as seen in Fig. 8.

To adapt the machine to handle articles of two different prices, Fig. 6 shows a low purchase attachment which comprises an angular lever 40, pivoted to the chute structure at 41 and normally disposed in the position indicated in dotted outline. It will be understood that a vending machine handling articles at different prices will be provided with a separate lever, push-button, plunger or other manually operable member for effecting delivery of each of the separate lines of merchandise. Supposing the machine to be set up for vending twenty cent articles and fifteen cent articles, the levers or plungers which deliver the twenty cent articles will be connected to operate the actuator plate 5, but the levers or plungers which deliver the fifteen cent articles will be connected to operate this plate 5, and also by means of a link 42 and other suitable connecting means, will be arranged to swing the lever 40 into operative position, as shown in Fig. 6. This renders the plate 5 releasable for reciprocation by the presence of only three nickels in the slot 13, instead of four, because the lever 40 is formed to extend under two detector pins *b* and *d* and thus holds their locking dogs 6 clear of the notches 11, but a notch in the upper edge of the lever 40 is positioned to register with the pin *c*, so that this detector pin and its locking dog 6 remain operative. The first nickel inserted in slot 13 will support the detector pin *a* and the second nickel will act as a stop for a third nickel, and the third nickel will then support the detector pin *c*. Thereupon, since all the pins *a*, *b*, *c* and *d* are thus upheld and prevented from entering the notches 12, the plate 5 may be moved downwardly through its full range, allowing the fifteen cent item to be discharged by the delivery mechanism (not shown). With this adapter lever 40 in active position, the machine is also operable by means of one nickel and one dime, because the nickel inserted in slot 13 will support the detector pin *a*, and the dime inserted in slot 25 will support detector pin *c* through the medium of the compensator bar 31. Since the lever 40 supports the other two pins *b* and *d*, the plate 5 is thus freed for action.

If desired, this same mechanism may be read-

ily adapted to use in a machine handling ten and fifteen cent items, by shifting the pivot screw 20 of the stop lever 19 to a threaded hole 50, provided for that purpose, so as to bring the bent end 14 of the lever 19 into position to extend through the opening 52, so as to arrest the first nickel in the slot 13 in a position where it will serve to support the detector pin *b*. The detector pin *a* is then secured out of operative position by means of a hook 51 carried on the plate 5, as seen in Fig. 7. With the parts thus arranged, three nickels will support the detector pins *b*, *c* and *d*, or with the low purchase lever 40 in operative position the pin *b* will be upheld by the lever 40, the first nickel will rest against the stop 14, and the second nickel will support the pin *c*. Since the pin *d* is already supported by the lever 40, the actuator 5 will be freed for operation by the two nickels. Or for a fifteen cent purchase a single nickel in the slot 13 will support the pin *b*, and a dime in the slot 25 will support pins *c* and *d* through the medium of compensator lever 31. And with the low purchase lever 40 lifted to active position a single dime in the slot 25 will support the detector pin *c* through the medium of compensator lever 31, while the pins *b* and *d* are taken care of by the lever 40.

If, before actuating the delivery mechanism, the purchaser, for any reason, should wish to recover the coins which he has placed in the coin chute, he may do so by operating a special lever (not shown) which controls a coin return track 60, pivotally attached to the lower end portion of the chute at 61. Thus the said lever, not shown, operating a suitable connection such as the link 62, will swing the track section 60 into alignment with the lower end of the slots 13 and 25, thus forming a continuation of these slots. The member 60 carries a cam 63, so formed and positioned that as the member 60 is thus swung into alignment with the coin slots, the cam acts against a shoulder 64 on the bar 27, and shifts the bar in a direction to lower the stops 14 and 24, thus releasing any coins in the slots 13 and 25 and allowing them to roll down over the track section 60 to a return receptacle, not shown, which is accessible to the purchaser for recovery of his coins. To prevent fraudulent use of this coin return mechanism the part 60 carries a transversely extending locking pin 65, which swings into a slot 66 in the actuator plate 5 as the member 60 is moved toward its position of alignment with the coin chute 3. The actuator plate 5, being thus blocked against movement, it is impossible to operate the delivery mechanism which is interconnected with the plate 5; hence, no merchandise can be obtained from the machine when the customer has elected to operate the coin return mechanism.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and re-arrangements of the parts may be made without departing from the spirit and scope of the invention, and that the same is not limited to the particular form herein shown and described, except in so far as indicated by the appended claims.

I claim:

1. In a vending machine a downwardly directed coin chute, an actuator mounted for reciprocation, a movable locking dog on the actuator normally engageable with an abutment fixed with relation to the chute, and having a coin detector arm disposed for encounter with the edge of a coin in the chute whereby the dog is held clear of the abutment to permit operation of the actuator, together with a movable stop extending into the chute in position to hold the coin in operative relation to the detecor arm, and means by which the stop is withdrawn upon reciprocation of the actuator to permit the coin to pass out of the chute.

2. In a vending machine a downwardly directed coin chute, an actuator mounted for reciprocation, a movable locking dog on the actuator normally engageable with an abutment fixed with relation to the chute, and a coin detector arm extending from the dog for encounter with the edge of a coin in the chute whereby the dog is held clear of the abutment to permit operation of the actuator, a movable stop extending into the chute in position to hold the coin in operative relation to the detector arm, means by which the stop is withdrawn upon the reciprocation of the actuator, auxiliary means operable at will independently of the actuator to withdraw the stop, and a coin return track automatically connectible with the chute by operation of said auxiliary means.

3. In a vending machine a downwardly directed coin chute limited in width substantially to the thickness of a coin, an actuator mounted for movement, a plurality of pairs of cooperating locking elements, one element of each pair being carried on the actuator and being normally engageable with the other element of the pair to check movement of the actuator and one element of each pair having a coin detector arm, said arms being spaced apart along the chute for respectively engaging the edges of coins aligned edge to edge therein whereby each coin holds one pair of locking elements apart so that the actuator is released for operation when enough coins are present in the chute to thus control all the locking elements.

4. In a vending machine a downwardly directed coin chute limited in width substantially to the thickness of a coin, an actuator mounted for reciprocation, and a plurality of movable locking dogs on the actuator normally engageable with fixed abutments to check reciprocation of the actuator, each dog having a detector arm, said arms being spaced apart along the chute for respectively engaging the edges of coins aligned edge to edge therein whereby each coin holds one of the dogs out of position for engaging a corresponding abutment so that the actuator is released for operation when enough coins are present in the chute to thus control all the dogs.

5. In a vending machine a downwardly directed coin chute, an actuator mounted for reciprocation, a plurality of movable locking dogs on the actuator normally engageable with fixed abutments to check reciprocation of the actuator, each dog having a detector arm, said arms being spaced apart along the chute for respectively engaging the edges of coins aligned therein whereby each coin holds one of the dogs clear of a corresponding abutment so that the actuator is released for operation when enough coins are present in the chute to thus control all the dogs, a second chute disposed beside the first to receive a coin whose value is a multiple of the coin employed in the first chute, and a compensator bar held, by a single coin in the second chute, in position to engage a plurality of the detector arms and thus hold out of locking position a plurality of locking dogs corresponding to the value

of the coin as compared with a coin of the denomination which operates in the first chute.

6. In the combination defined in claim 5, an adapter adjustable to hold out of locking position one of the detectors and its dog not engaged by the compensator to permit release of the actuator by less than the total of coins otherwise required in the two chutes.

7. In the combination defined in claim 5, an adapter adjustable to hold out of locking position one of the detectors and its dog not engaged by the compensator to permit release of the actuator by less than the total of coins otherwise required in the two chutes, said adapter being normally inactive, and means for automatically adjusting it to active position incidentally to the operation of the actuator.

8. In a vending machine an inclined, upwardly open coin chute, a stop to arrest a coin therein, the sides of the chute having upwardly open notches positioned to register with a coin thus arrested, an actuator mounted for reciprocation adjacent the chute, a movable locking dog on the actuator, an abutment fixed with relation to the chute, a coin detector arm extending from the dog and dimensioned to enter the notches of the chute in the absence of a coin registered therewith, thereby causing the dog to engage the abutment and check reciprocation of said actuator; said notches being masked by a coin registered therewith so that the detector arm is upheld by the coin and holds the dog clear of the abutment to permit reciprocation of the actuator.

9. In a vending machine an inclined, upwardly open coin chute, a stop to arrest a plurality of coins aligned therein, the sides of the chute having upwardly open notches positioned to register respectively with the coins thus arrested, an actuator mounted for reciprocation adjacent the chute, a plurality of movable locking dogs on the actuator, abutments fixed with relation to the chute and positioned to cooperate with said dogs respectively, each dog having a coin detector arm and said arms being positioned along the chute and dimensioned to enter the notches of the chute in the absence of coins registered therewith, such entry of any detector arm causing its dog to engage an abutment and check reciprocation of the actuator; said notches being masked respectively by coins registered therewith whereby each coin holds one of the dogs out of position for engaging a corresponding abutment so that the actuator is released for operation when enough coins are present in the chute to thus control all the dogs.

10. In a vending machine a downwardly directed coin chute, an actuator mounted for reciprocation, and a plurality of movable locking dogs on the actuator, fixed abutments with which said dogs are normally engageable to check reciprocation of the actuator, each dog having a detector arm, said arms being spaced apart along the chute for respectively engaging the edges of coins aligned therein whereby each coin holds one of the dogs out of position for engaging a corresponding abutment so that the actuator is released for operation when enough coins are present in the chute to thus control all the dogs, together with a stop extending into the chute in position to hold the coins in operative relation to the respective detector arms, said stop being mounted for withdrawal from its operative position and being removable from its mounting, means for re-mounting the stop at a position to hold a lesser number of coins, and means for securing at least one of the dogs out of its normal position to prevent it from engaging its corresponding abutment, thus rendering the actuator operable by such lesser number of coins in the chute.

11. In a vending machine, a downwardly directed coin chute and an actuator mounted for relative reciprocation, a movable locking dog on the actuator normally engageable with an abutment fixed with relation to the chute and including a coin detector arm disposed for encounter with the edge of a coin in the chute whereby the dog is held clear of the abutment to permit said relative reciprocation, a movable stop extending into the chute in position to hold the coin in operative relation to the detector arm, means for withdrawing the stop connected for operation coincidentally with the reciprocation of the actuator, auxiliary means operable at will to withdraw the stop independently of the actuator for releasing the coin, and interlocking means controlled by said auxiliary means and rendered effective by the operation thereof to prevent reciprocation of the actuator during such operation.

12. In a vending machine, a downwardly directed coin chute and an actuator mounted for relative reciprocation, a movable locking dog on the actuator normally engageable with an abutment fixed with relation to the chute and including a coin detector arm disposed for encounter with the edge of a coin in the chute whereby the dog is held clear of the abutment to permit said relative reciprocation, a movable stop extending into the chute in position to hold the coin in operative relation to the detector arm, means for withdrawing the stop connected for operation coincidentally with the reciprocation of the actuator, auxiliary means operable at will and including a coin return track movable into connection with the coin chute and a cam actuated by said return track in its said connecting movement to withdraw the stop, and a rigid arm extending from said return track and movable thereby into a slot in the actuator which extends transversely of the direction of reciprocation of the actuator whereby said arm prevents such reciprocation while the coin return track is in operative position.

13. In a vending machine a downwardly directed coin chute, an actuator mounted for reciprocation, a movable locking dog on the actuator, an abutment fixed with relation to the chute and with which said dog is normally engageable, and a coin detector arm extending from the dog for encounter with the edge of a coin in the chute whereby the dog is held clear of the abutment to permit operation of the actuator, a movable stop extending into the chute in position to hold the coin in operative relation to the detector arm, means by which the stop is automatically withdrawn upon the reciprocation of the actuator, a movable coin track section normally disposed at the end of the chute to collect coins therefrom, said track section being adjustable to act as a coin return chute for directing coins out of the machine, and means operable incidentally to such adjustment of the track section for withdrawing the stop independently of the actuator.

14. In a vending machine, a downwardly directed coin chute, an actuator mounted for reciprocation, and a plurality of movable locking dogs on the actuator, abutments with which said

dogs are engageable to prevent reciprocation of the actuator, each dog having a detector arm extending to the chute, said arms being spaced apart along the chute for respectively engaging the edges of coins aligned therein whereby each coin holds one of the dogs clear of the abutment which it would engage and the actuator is released for operation when enough coins are present in the chute to hold all the dogs, together with means adjustable to lock the last detector of the series in position to hold its dog clear of its abutment to permit release of the actuator by less than the full quota of coins.

15. In the combination defined in claim 14, means for effecting said adjustment incidentally to the operation of the actuator.

DANIEL NEIDIG.