

Nov. 13, 1956

B. A. ANDREWS ET AL

2,770,343

COIN TESTER

Filed Nov. 26, 1951

3 Sheets-Sheet 1

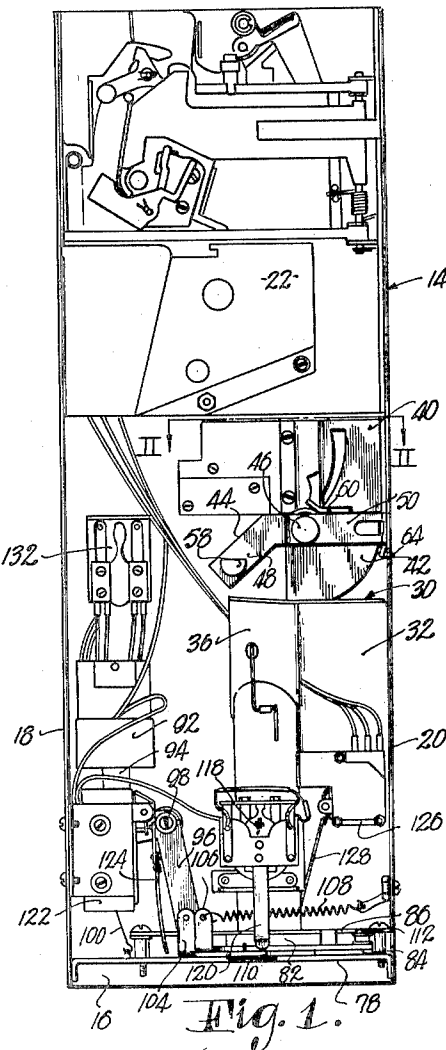


Fig. 1.

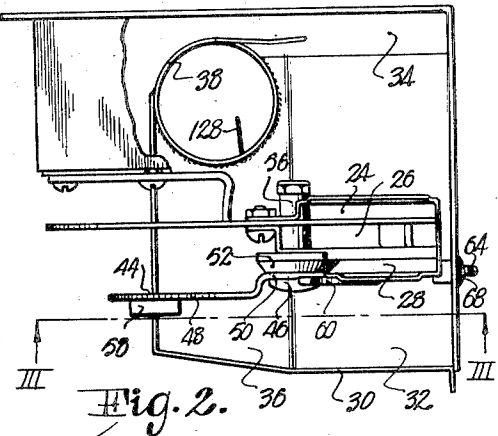


Fig. 2.

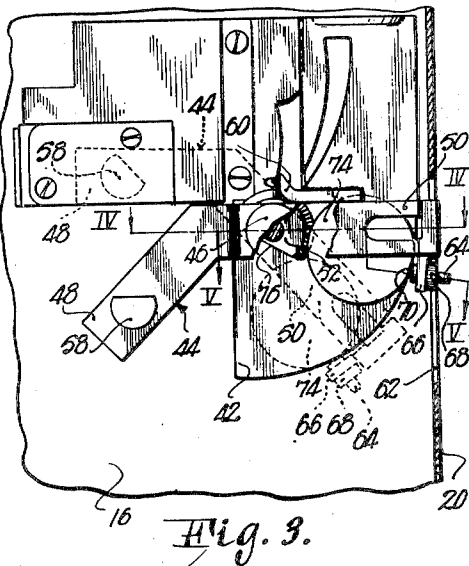


Fig. 3.

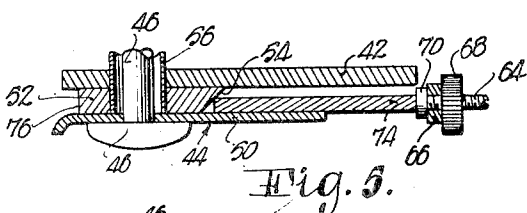
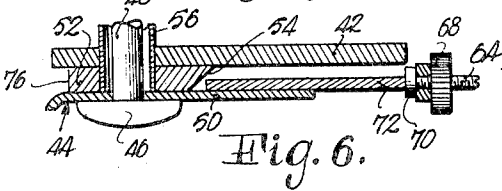


Fig. 5.



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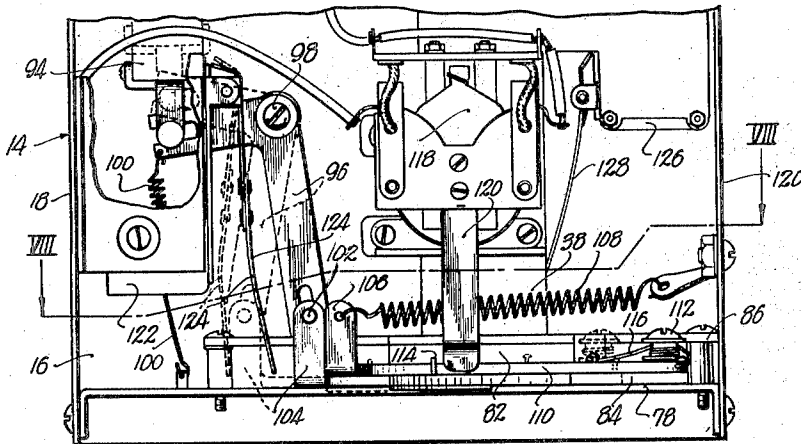


Fig. 7.

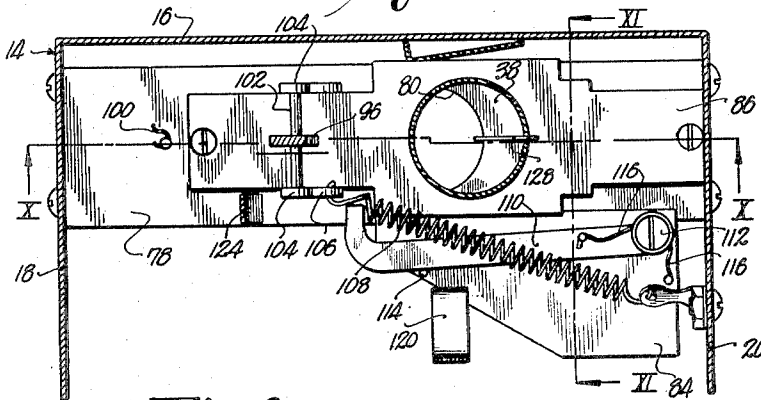


Fig. 8.

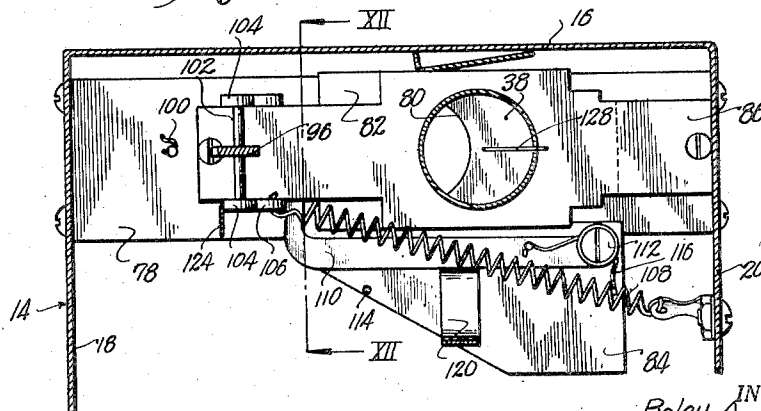


Fig. 9.

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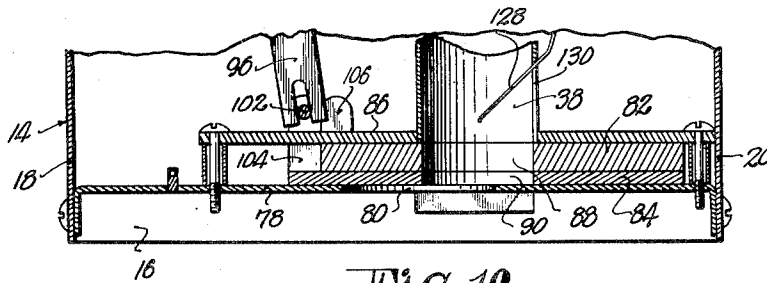


Fig. 10.

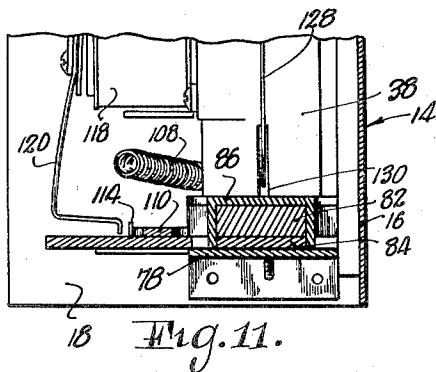


Fig. 11.

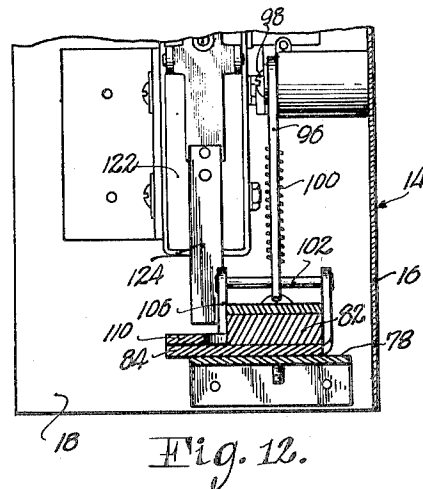


Fig. 12.

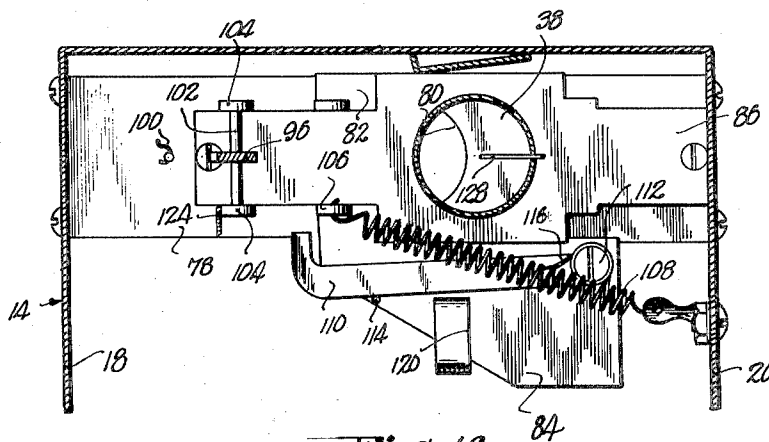


Fig. 13.

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1

2,770,343

COIN TESTER

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Application November 26, 1951, Serial No. 258,264

2 Claims. (Cl. 194—102)

This invention has to do with control units for vending machines and the like, and has for its primary object the provision of structure for receiving coins of differing denominations as the purchase price of vended articles, and including means for returning change to the depositor wherein only coins of a predetermined size are used by the unit as a change-making medium.

There has heretofore been provided in vending machines and the like, structure for returning change to a customer when more than the amount required for purchase of a given vended article is deposited. For instance, in the event the article costs 5 cents, such structure will return the proper change automatically to the customer when a coin of a larger denomination is deposited in the machine. Usually a supply chamber of nickels is included from which change is made, but it is desired that the deposited nickels be collected and utilized as the supply for returning the change. Difficulties arise in providing this feature however, because of the fact that nickels vary in size, particularly in thickness and diameter.

It is the most important object of this invention therefore, to provide in a change-return system wherein satisfactory operation occurs only through use of coins of a predetermined thickness, means for deflecting certain coins to a supply chamber and directing coins inserted into the machine that are worn and thin to a receptacle for subsequent collection.

Another important object of the present invention is to provide a coin selector adapted to freely pass coins below a predetermined size, and particularly thickness and diameter but capable of receiving thicker coins and directing the same to a supply chamber for use in supplying change to customers inserting coins of larger denomination.

Another object of the present invention is to provide a coin selector having a plurality of chutes for receiving quarters, dimes and nickels, the nickel chute being capable of freely passing relatively thin, worn nickels and having means for receiving thicker nickels, temporarily retarding the free gravitational movement of the latter and deflecting the same to a supply tube that forms a part of the change-return features of the control unit.

Another object hereof is to provide a coin selector wherein nickels of differing thicknesses are automatically divided and channeled through differing paths of travel within the machine, all through the medium of a swingable member that includes an adjustable stop, receiving the peripheral edge of the nickel, together with a beveled and arcuate disc that receives one marginal edge of the thicker nickels.

A further object hereof is to provide in a control unit of the aforementioned character, change-return means that includes a plurality of reciprocable plates of differing thicknesses, each adapted to receive a number of coins and returning the same to a customer when quarters or dimes are inserted into the machine.

A further object hereof is to provide means for use

2

in connection with the aforementioned reciprocable plates that automatically causes one of the plates to reciprocate to return one nickel to the customer when a dime is inserted in the machine and adapted to connect the plates for simultaneous reciprocation when a quarter is inserted into the machine to the end that four nickels are returned from the aforementioned supply chamber or tube.

Other objects include many details of construction, all of which will be made clear as the following specification progresses.

In the drawings:

Figure 1 is an elevational view showing the innermost face of an electrical coin changer made pursuant to the present invention.

Fig. 2 is an enlarged, fragmentary, cross-sectional view taken on line II—II of Fig. 1.

Fig. 3 is an enlarged, fragmentary, elevational view showing a portion of the structure of Fig. 1.

Fig. 4 is a detailed, cross-sectional view taken on line IV—IV of Fig. 3.

Fig. 5 is an enlarged, detail, cross-sectional view taken on irregular line V—V of Fig. 3 showing a relatively thick standard coin in engagement with the swingable arm.

Fig. 6 is a cross-sectional view similar to Fig. 5 showing a thin, worn coin in place.

Fig. 7 is an enlarged, elevational view showing another portion of the structure of Fig. 1, parts being broken away for clearness.

Fig. 8 is a cross-sectional view taken on irregular line VIII—VIII of Fig. 7, with the reciprocable plates in the normal stand-by position.

Fig. 9 is a cross-sectional view similar to Fig. 8, showing both plates reciprocated to a change-return position.

Fig. 10 is a cross-sectional view taken on line X—X of Fig. 8.

Fig. 11 is a cross-sectional view taken on line XI—XI of Fig. 8.

Fig. 12 is a cross-sectional view taken on line XII—XII of Fig. 9; and

Fig. 13 is a cross-sectional view similar to Figs. 8 and 9, but showing the uppermost plate only reciprocated to its change-return position.

As above indicated, the present invention is adapted for use wherever change is to be returned upon insertion of a coin or like medium, the primary use being in connection with vending machines and the like.

As will hereinafter appear, it is contemplated that the merchandise to be vended shall have a purchase price of 5 cents and that therefore, whenever a nickel is inserted a single article will be vended without the accompanying return of change to the purchaser. On the other hand, in the event a quarter or dime is inserted, the article of merchandise will be vended and four nickels or one nickel respectively, will be returned to the customer. The nickels that are inserted are collected for use in making change for customers inserting quarters or dimes, but only such nickels that have a predetermined thickness are used for this purpose. Other thin, worn nickels are channeled to a suitable receiving receptacle in the machine.

The entire assembly is shown in Fig. 1 of the drawings, mounted within a U-shaped case 14, having a bight or wall 16 and a pair of legs or side walls 18 and 20.

A conventional slug rejector broadly designated by the numeral 22, is carried by the case 14 at the uppermost end thereof for receiving articles inserted by a customer, returning slugs and defective coins to the customer, and directing good coins to a plurality of chutes including a quarter chute 24, a dime chute 26 and a nickel chute 28. After gravitational movement through the chutes 24, 26 and 28, the coins fall upon shelf 30 underlying the chutes and inclined toward the wall 16. The quarters, dimes and certain of the nickels fall upon a portion 32 of the shelf

30 and slide downwardly therealong toward the wall 16 through a space 34 where the same are collected by a suitable receptacle not shown, beneath the case 14.

As will hereinafter appear, other nickels are deflected to a portion 36 of the inclined shelf 30 where the same slide into the uppermost open end of a vertical supply tube 38, depending from the shelf 30.

The chute 28 includes a pair of walls 40 and 42, the latter extending downwardly toward the shelf 30 below the lowermost end of the wall 40 and swingably carrying a substantially L-shaped arm 44 by means of a pivot pin 46. Arm 44 includes a pair of legs 43 and 50, the distance between leg 50 and wall 42 being substantially the same as the distances between walls 40 and 42. The leg 50 is held in such spaced-relationship to wall 42 by a disc 52 on the pin 46 between leg 50 and wall 42 and having an arcuate edge 54 partially underlying the lowermost open end of chute 28 as shown in Fig. 2 of the drawings. Edge 54 of the disc 52 is beveled outwardly toward the wall 42 of chute 28 and is concentric with the longitudinal axis of pin 46 or the axis of swinging movement of the arm 44.

It is preferred that disc 52 be rigid on the wall 42 through the medium of a sleeve 56 and that the pin 46 be secured to the arm 44 for rotation therewith within the sleeve 56 as illustrated in Figs. 4 to 6 inclusive.

The arm 44 is yieldably held biased with leg 50 thereof, bearing against the lowermost edge of wall 40 through the medium of a counterweight 58 on the leg 48. A stop 60 on the wall 40 adjacent the lowermost end thereof and extending laterally toward the wall 18 of case 14, limits the extent of swinging movement of the arm 44 to the dotted line position shown in Fig. 3 of the drawings. Wall 20 of the case 14 has an opening 62 therein for clearing that end of leg 50 remote from pin 46, opening 62 also rendering accessible an adjustable screw 64 carried by an ear 66, depending from the leg 50. Screw 64 is movable toward and away from the axis 46 of rotation of arm 44 upon loosening of a lock nut 68 on the screw 64. By adjusting the screw 64, the distance between head 70 of screw 64 and the beveled arcuate edge 54 of disc 52, may be varied so that nickels 72 inserted in the machine and gravitating through chute 28, will clear the arm 44 and fall upon portion 32 of shelf 30 to slide into the space 34. It is understood that these coins 72 are substandard, not only because of being worn away to reduce the thickness thereof, but because the diameters are less than a standard coin 74, such as illustrated in Fig. 5 of the drawings.

If coins 74 above a predetermined thickness and/or diameter, are inserted in the rejector 22, and thence fall into chute 28, the same will come into engagement at their peripheries with head 70 and with the inclined face 54 of disc 52 adjacent one marginal edge, all as shown in Fig. 5 of the drawings. It is noted that when coins 74 are temporarily retarded in their gravitational movement by the arm 44, they bear against the innermost face of leg 50 as shown in Fig. 5, and against the arcuate, beveled face 54 of disc 52. As soon as coins 74 strike head 70 and disc 52, the weight thereof overcomes the counterweight 58, causing the arm 44 to swing in the manner illustrated by dotted-lines in Fig. 3 of the drawings, whereby arm 44 serves to deflect the coins 74 to the portion 36 of shelf 30 and as above indicated, these good coins 74 are deposited in the supply tube 38.

During the downward swinging movement of coins 74 from the lowermost end of the chute 28 with arm 44, such coins 74 slide or roll around the substantially semi-circular, arcuate face 54 of disc 52. As arm 44 comes into engagement with the stop 60, the coins 74 will roll from the head 70 to the shelf 30, it being noted that disc 52 is provided with a straight, lowermost edge 76, rendering disc 52 substantially semi-circular, whereby the inclined face 54 will not retard the discharge of coins 74 from the head 70. As soon as coins 74 fall to the shelf

30, the counterweight 58 operates to return the arm 44 to the normal stand-by position shown in full lines by Fig. 3.

Accordingly, it is now seen that the distance between head 70 and the face 54 determines which coins will fall upon the portion 36 of shelf 30 and which coins will drop to the portion 32 of shelf 30 for discharge into the space 34. While such separation of coins is controlled in part by the diameters of the coins inserted into the chute 28, primarily variances in thicknesses of the coins is the determining factor, since the distance between the leg 50 and the face 54, progressively increases as the wall 42 is approached. Thus, two coins may well have the same diameter but a thin coin 72 will fall freely through to the shelf 30, whereas a thicker coin 74 will engage the face 54 and be temporarily wedged between disc 52 and the head 70 prior to downward swinging movement of leg 50 under influence of the weight of the coin 74.

An elongated, flat wall 78 spans the distance between the walls 18 and 20 adjacent the lowermost end of the case 14 beneath the tube 38 that receives nickels 74. Wall 78 is provided with an opening 80 that is offset relative to the lowermost open end of tube 38 as shown in Fig. 10 and, a pair of reciprocable plates 82 and 84 are disposed between the uppermost face of wall 78 and a perforated support 86 for the tube 38 carried by the wall 78.

Plates 82 and 84 are provided with openings 88 and 90 respectively that are normally aligned with the tube 38 and adapted to be brought into registration with the opening 80 upon reciprocation from the normal stand-by position shown in Figs. 7, 8 and 10. The thickness of plate 84 is substantially the same as the thickness of a single coin 74, whereas, the thickness of the plate 82 is substantially the same as the thickness of three stacked coins 74.

An electromagnet 92 is secured to the wall 16 adjacent wall 18 above wall 78, and is provided with a vertically reciprocable core 94 pivotally connected with an L-shaped crank 96 swingably mounted on wall 16 by pivot pin 98. A spring 100 connecting wall 78 with crank 96 yieldably holds the core 94 at the lowermost end of its path of travel. Crank 96 is pivotally connected with a cross-pin 102 joining a pair of upstanding ears 104 integral with the plate 84 and embracing the support 86.

The plate 82 has an upstanding ear 106 between one of the ears 104 and the wall 20 that is connected with the latter by means of a spring 108. An L-shaped arm 110 swingably secured to the plate 84 by means of a vertical pivot pin 112, is yieldably held biased against a stop 114 on the plate 84 by means of a spring 116 coiled about the pin 112 and having its ends joined to the arm 110 and the plate 84 respectively. Arm 110 is swung from the normal position shown in Fig. 8 to the position shown in Fig. 9 of the drawings by means of a solenoid 118 carried by the tube 38 and provided with an L-shaped arm 120 depending therefrom and engageable with the arm 110 above the plate 84 upon energization of solenoid 118 as is clear in Fig. 11.

A normally closed switch 122 on the wall 18, has an actuating arm 124 within the path of travel of one of the ears 104 on the plate 84. A normally closed switch 126 has an actuating arm 128 extending through a slot 130 formed in the tube 38 and into the latter when emptied of coins 74 in the manner shown in Fig. 10 of the drawings.

A holding relay 132 is mounted on wall 16 above the electromagnet 92.

In operation, slugs and the like, inserted in rejector 22 are returned to the depositor, whereas good coins either quarters, dimes or nickels, are fed by rejector 22 to the corresponding chutes 24, 26 and 28 respectively. Worn nickels 72 passing through the chute 28, fall to the shelf 30 for deposit in a collecting receptacle by way of space 34. The article is vended and obviously no change is returned. Standard nickels 74, or those above a pre-

determined thickness as governed by the setting of screw 64, are deflected to the portion 36 of the shelf 30 and thence to the tube 38 for subsequent use in making change. Here again, upon deposit of a single nickel 74, an article of merchandise will be vended and no change returned. As long as sufficient nickels are within the tube 38 and accordingly, within openings 88 and 89 of plates 82 and 84 respectively, resting upon the wall 78, the actuating arm 128 of switch 126 will be maintained in a position closing switch 126. When the tube 38 is depleted of coins 74, switch 126 will close, energizing a "Sold Out" lamp and deenergizing a solenoid not shown, which in turn causes a gate within the rejector 22 to move to a position deflecting inserted coins for return to the customer.

A dime passing through the rejector 22 and into the chute 26 will also fall to the space 34 and permit operation of the vending machine to dispense an article of merchandise as such dime passes through the rejector 22.

Any suitable mechanism may be provided for accomplishing this purpose and since the same forms no part of the present invention, has not been shown. Simultaneously, a switch in the rejector 22 not shown, will be energized to operate the holding relay 132 which will in turn hold the electromagnet 92 energized with its core 94 retracted. As core 94 moves upwardly, it swings the crank 96 against the action of spring 100, thereby shifting the plate 84 and the coin 74 within opening 90 from the position shown in Figs. 7, 8 and 10, to the position shown in Fig. 13. The ears 104 move away from ear 106 since plate 82 is held in the normal position shown in Figs. 7, 8, 10 and 13 by spring 108.

When opening 90 registers with opening 80, the coin 74 within opening 90 will drop through opening 80 and be returned to the customer. Thus, a nickel change is dispensed for the initial dime deposited. When one of the ears 104 contacts the actuator 124, switch 122 will be opened to break the holding relay 132 and deenergize the electromagnet 92. Spring 100 thereupon, returns core 94, crank 96 and plate 84 to the original stand-by position for receiving another coin 74.

When a quarter is deposited in the rejector 22, it will not only close the aforesaid switch temporarily to operate holding relay 132 and therefore, electromagnet 92, but it will also close a switch for energizing the solenoid 118 that is held energized by the relay 132 even after the quarter passes into the chute 24 and thence, falls to a point of collection below the space 34. Such energization of the solenoid 118 attracts the arm 120, the latter moves against the arm 110 and shifts the same against action of spring 116 away from stop 114 to a point between ear 106 and the wall 20 as shown in Fig. 9. Thereupon, when core 94 of electromagnet 92 is retracted, crank 96 will shift the plate 84 toward the wall 18, together with the arm 110, the latter of which, bearing against the ear 106, will also shift the plate 82 toward the wall 18 as shown in Fig. 9 because of the interengagement between ear 106 and the proximal ear 104.

The three nickels 74 in the opening 88, as well as the nickel 74 in the opening 90, will be discharged through the opening 80 for return to the customer. Actuation of arm 124 to open switch 122 will break the holding relay 132, thereupon deenergizing electromagnet 92 and solenoid 118 and the plates 82 and 84 will return to the

position shown in Fig. 10 for receiving four more nickels from the tube 38.

The importance of utilizing nickels in the openings 88 and 90 is now apparent. The plates 82 and 84 each receive a predetermined number of nickels and unless such nickels are substantially of uniform thickness, jamming would otherwise occur upon reciprocation of plate 84 or of plates 82 and 84. Thus, by provision of the arm 44 and its cooperating parts, there is an assurance that only coins 74 will be fed into the tube 38 and coins 72 below a predetermined thickness, will not be used and the consequent likelihood of jamming as aforementioned, will be avoided.

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

1. In a coin selector, a coin-receiving chute having spaced walls and adapted to freely pass gravitating coins below a predetermined thickness, one of said walls extending downwardly below the other wall; an arm below said other wall and spaced from said one wall; means mounting said arm for swinging movement on a horizontal axis toward and away from said other wall; and structure normally disposed for engagement by thicker coins gravitating through the chute and including a beveled disc adjacent said means for engagement by one marginal edge of the thicker coins for decreasing the clearance between the arm and said one wall intermediate the ends of the arm, and a stop on one end of the arm for engagement by the peripheral edge of said thicker coins and movement thereby with the arm to deflect the larger coins as they fall below the lowermost end of said other wall.

2. In a coin selector, a coin-receiving chute having spaced walls and adapted to freely pass gravitating coins below a predetermined thickness, one of said walls extending downwardly below the other wall; an arm below said other wall and spaced from said one wall; means mounting said arm for swinging movement on a horizontal axis toward and away from said other wall; and structure normally disposed for engagement by thicker coins gravitating through the chute and including a disc adjacent said means for engagement by one marginal edge of the thicker coins for decreasing the clearance between the arm and said one wall intermediate the ends of the arm, said disc being arcuate, concentric with said means, and transversely beveled, and a stop on one end of the arm for engagement by the peripheral edge of said thicker coins and movement thereby with the arm to deflect the larger coins as they fall below the lowermost end of said other wall.

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