Aug. 10, 1943. B. W. FRY ET AL 2,326,211

COIN SELECTOR

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FIG.1.

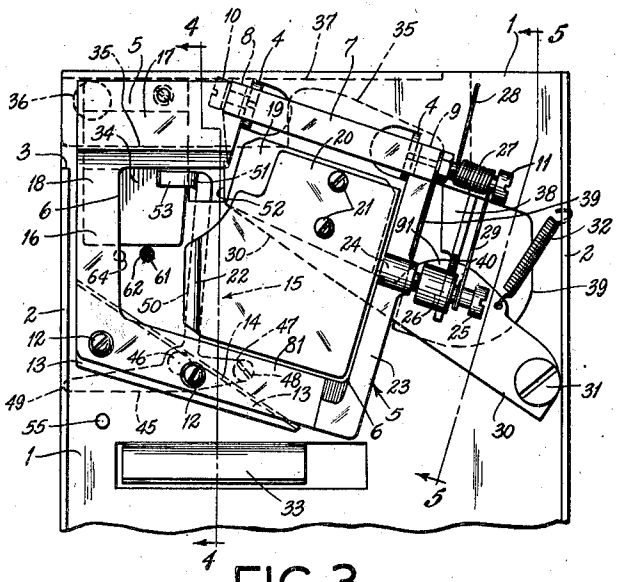


FIG.4

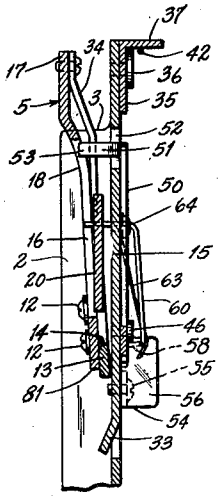


FIG.3.

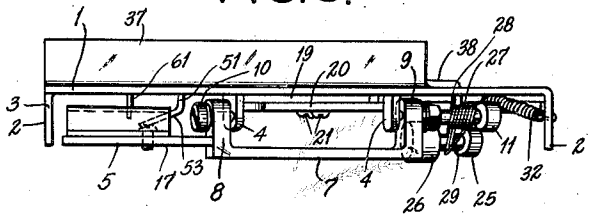


FIG.5.

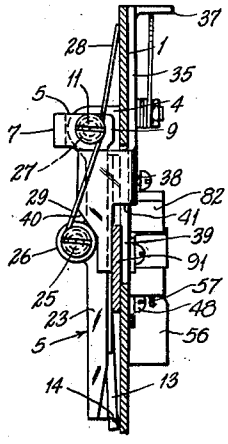
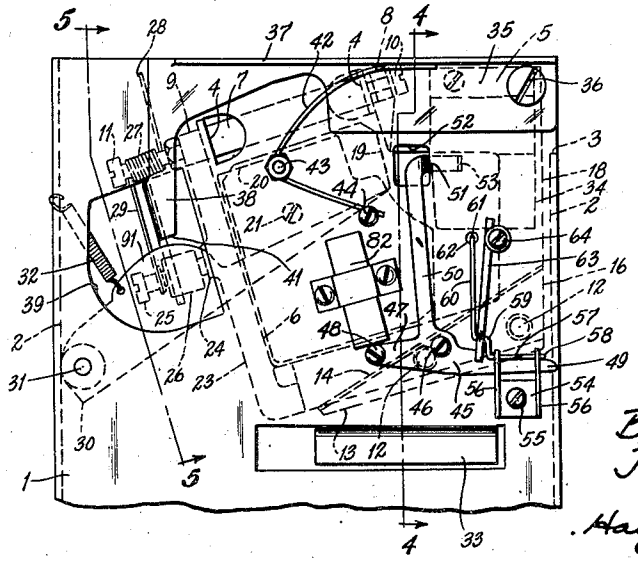


FIG.2.



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FIG.6.

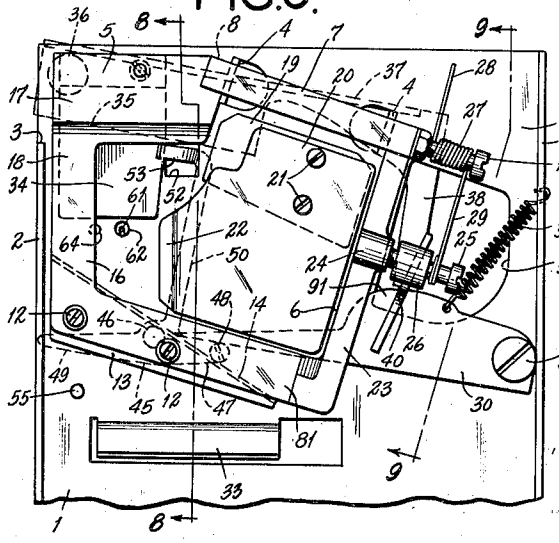


FIG.8.

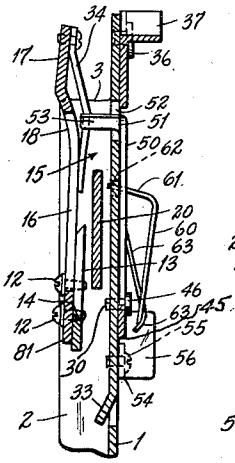


FIG.9.

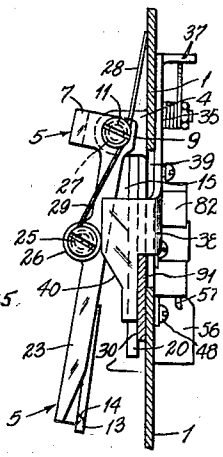


FIG.7.

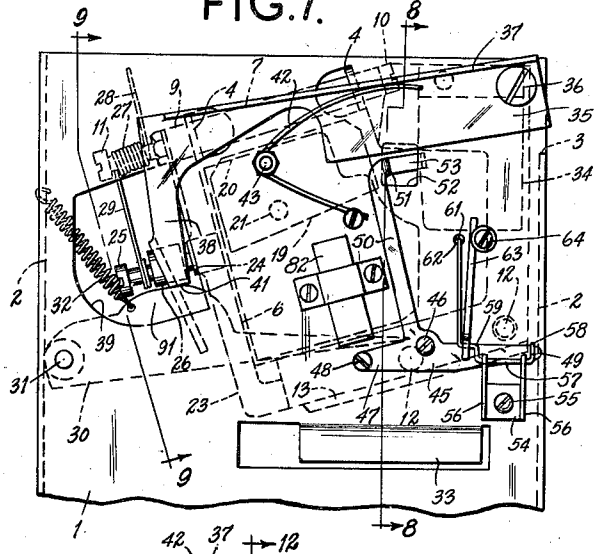


FIG.10.

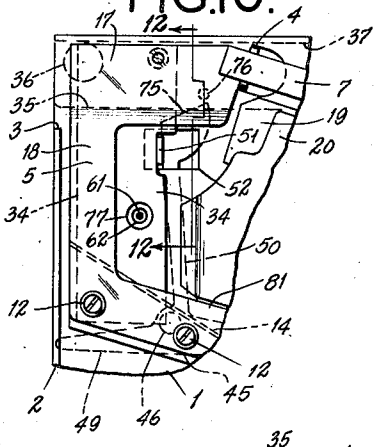


FIG.11.

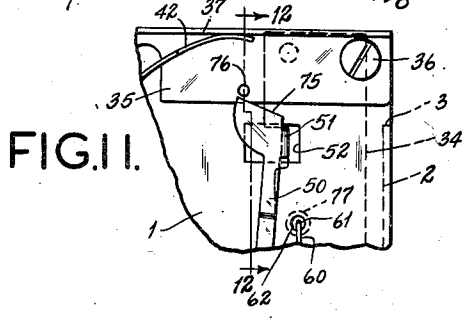
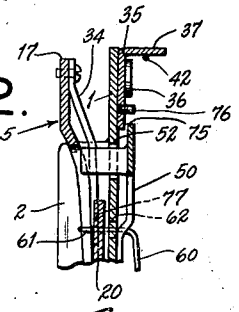


FIG.12.



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UNITED STATES PATENT OFFICE

2,326,211

COIN SELECTOR

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Application August 28, 1939, Serial No. 292,174

2 Claims. (Cl. 194—97)

This invention relates to coin selectors, and with regard to certain more specific features, to coin selectors for segregating legitimate coins from counterfeit coins, slugs, discs, tokens, and the like.

Among the several objects of the invention may be noted the provision of a coin selector of the class described which is adapted to segregate coins (which term is used herein as inclusive of both good coins and counterfeit coins, slugs, discs, washers, tokens and the like) in accordance with their weight, diameter and surface characteristics, being adapted to receive and direct good coins along one path, but to intercept and ultimately direct along another path coins of subnormal weight, of excessive or subnormal diameter, and of improper surface characteristics, such as abnormal roughness or of perforated character; the provision of a coin selector of the class described which includes elements readily adapted for conjoint use with other types of coin testing apparatus; and the provision of a coin selector of the class described which is simple in construction, and effective, positive, and reliable in operation. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which are illustrated several of various possible embodiments of the invention,

Fig. 1 is a front elevation of a coin selector embodying the present invention;

Fig. 2 is a rear elevation of the coin selector of Fig. 1;

Fig. 3 is a top plan view of the coin selector of Fig. 1;

Figures 4 and 5 are vertical cross sections taken substantially along lines 4—4 and 5—5, respectively, of Figures 1 and 2;

Fig. 6 is a front elevation, similar to Fig. 1, showing the coin selector in a different operating position;

Fig. 7 is a back elevation similar to Fig. 2, but showing the coin selector in its Fig. 6 operating position;

Figures 8 and 9 are cross sections respectively similar to Figures 4 and 5, and taken respectively along lines 8—8 and 9—9 of Figures 6 and 7, showing the coin selector in its Fig. 6 operating position;

Fig. 10 is a fragmentary front elevation of a coin selector constituting a second embodiment of the invention;

Fig. 11 is a fragmentary back elevation of the coin selector of Fig. 10; and

Fig. 12 is a cross section taken substantially along line 12—12 of Figures 10 and 11.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

The present invention is concerned particularly with testing means for coin selectors, to simultaneously subject the coins to several tests of their physical characteristics. It thereby differs from coin selectors testing coins in accordance with their compositional characteristics. It is to be noted, however, that in many coin selectors, it s advantageous to test coins both for their physical characteristics and for their compositional characteristics, and one of the principal advantages of the apparatus of the present invention is that it can readily be embodied in a single coin selector with testing means for the composition of the coins presented thereto. In fact, the embodiments of the invention illustrated in the drawings are particularly designed for cooperation with compositional testing means of the electrical resistance type, such as magnets inducing eddy currents in the coins presented thereto, although it will be understood that the invention is by no means so limited.

Since a large proportion of the counterfeit coins or slugs presented to the ordinary coin selector are abnormal in their physical, rather than their compositional characteristics, it is advisable that the physical testing means of the present invention be embodied in the coin selector ahead of the compositional testing means; in that way, the use of the compositional testing means is limited to those coins which successfully pass the physical tests. For this reason, the testing means of the present invention is preferably mounted, in a complete coin selector, at a location near the point at which coins are introduced into the selector, and the invention, while not so limited, will accordingly be so described.

Referring now more particularly to Figures 1 through 5, there is illustrated a coin selector embodying the present invention. The coin selector comprises a base plate 1, which is to be mounted in a vertical, or other position such that coins travel therealong by gravity. Along its two sides, the base plate 1 is provided with forwardly extending flanges 2, by means of which the coin

selector is usually supported, for example, in the vending or other machine in which it is to be used. The flange 2 on the left-hand side of the base plate 1, as viewed in Fig. 1, terminates somewhat short of the top edge of the base plate 1, as indicated by numeral 3.

Pivotally supported on parallel ears 4 struck forwardly from the base plate 1 is a movable coin chute-defining plate 5. The plate 5 is in the form of a modified rectangular frame, having a large central opening 6, with a triangular portion (in outline) extending from the left-hand rectangular edge thereof. The top portion 7 of the plate 5 comprises a bridge extending across the gap between the ears 4, in front thereof (see Fig. 3). The ears 4, it will be noted, are disposed at different distances from the top of the plate 1, so that the bridge portion 7, and the remainder of the plate 5, occupy a relatively sloping position as compared to the upper edge of base plate 1. The two ends 8 and 9 of the bridge portion 7 are of sufficient length to extend substantially adjacent to the surface of the plate 1. Through these ends 8 and 9 pass screws 10 and 11, respectively, which are threaded into the ears 4 to establish the axis on which the plate 5 pivots. The portions of the ends 8 and 9 nearest the surface 1 are rounded, in order that the plate 5 may pivot on the screws 10 and 11, without jamming against the base plate 1.

Numeral 31 indicates the lower edge of the plate 5, which is preferably parallel to the bridge portion or upper edge 7 of the plate 5. To the inner surface of this lower portion 31 is secured, as by screws 12, a block 13, the upper edge 14 of which constitutes a coin runway. The block 13 is preferably only slightly thicker than the predetermined thickness of a legitimate coin to be accepted by the selector. The block 13 serves to hold the lower part of the plate 5 spaced from the base plate 1 a suitable distance so that coins introduced therebetween will roll along the edge 14 of the block 13. Preferably, although not necessarily, the edge 14 is bevelled or sloped in cross-section (see Fig. 4), and is so mounted on the plate 5 that said edge slopes downwardly away from the inner surface of plate 5. The base plate 1, pivoted plate 5, and edge 14 of block 13 thus serve to define a sloping coin chute indicated generally by numeral 15.

The left-hand end of the pivoted plate 5 includes a vertical frame portion 16 and a topmost horizontal frame portion 17, which together connect the left-hand end of the bottom portion 31 and the left-hand end of bridge portion 7 of said plate 5. The lower end of the vertical portion 16 is in substantially the same plane as the bottom portion 31, but an off-set 18, about mid-way of the length of the vertical portion 16, brings the upper end of said portion 16, and substantially the entire portion 17, into approximately the plane of the top of the bridge portion 7. This means that at the upper left-hand corner of the coin selector, as viewed in Fig. 1, the plate 1 and the portion 17 of plate 5 are spaced apart at a considerable distance (see also Fig. 3). This is the region provided for the introduction of coins to the selector of the present invention, and constitutes a substantially vertical coin chute delivering coins to the upper end of sloping coin chute 15. It will be seen that a coin can be introduced, generally parallel to the base plate 1, and hence in a substantially vertical plane, at any point around the upper left-hand corner of the selector between the upper edge 3 of the left-hand side flange 2, and the pivot screw 10. A coin so introduced will drop vertically downwardly, in a substantially vertical plane, until it engages the edge 14 of block 13, and then rolls or slides down said edge 14 through the chute 15 (assuming, for the moment, that no obstructive means are present to prevent such movement).

In order to prevent coins from falling out sideways through the opening 6 in pivoted plate 5, a spacing block 19, substantially the same in thickness as the block 13, and a superimposed plate 20 are secured as by screws 21 to the base plate 1. The plate 20 extends over substantially the entire area of the right-hand end of said opening 6, but the block 19 is of limited width, so that it does not extend into or obstruct the chute 15. Referring to Fig. 9 it will be seen that in the region of the chute 15 the plate 20 is spaced from the base plate 1 at a distance equal to the thickness of the block 19, which is the same as the thickness of the block 13. The left-hand end of the plate 20 is preferably flared outwardly by a slight angle, as indicated at numeral 22, to aid in guiding coins into the chute 15.

Numeral 23 indicates the right side of the pivoted plate 5. At a point substantially midway between its ends, the side 23 is provided with a forwardly extending boss or projection 24. A screw 25 is threaded into this boss 24, and carried on the screw 25 is a roller 26, for purposes hereinafter to be described.

Coiled around the pivot screw 11 is a coil spring 27, one end 28 of which bears against the base plate 1, while the other end 29 bears against the screw 25. Spring 27 serves to resiliently hold the pivoted plate 5 against the base plate 1, and said pivoted plate 5 may be lifted from the base plate 1 only against the reaction of spring 27.

Numeral 30 indicates a scavenger device, or blade, that is pivoted on a screw 31 mounted in the base plate 1 along the right-hand edge thereof. The scavenger blade 30, which is of slightly less than the thickness of the blocks 13 and 19, extends up the chute 15, between the plates 1 and 20, substantially to the left-hand end of block 19. This blade 30 has a cam portion or projection 31 along its upper edge at a position just to the right of the pivoted plate 5, (Fig. 1). Hooked into the blade 30 is one end of a tension spring 32, the other end of which is secured in the right-hand flange 2. The tension spring 32 tends to maintain the scavenger blade 30 at all times in its uppermost position, with its top edge (inside the region of the pivoted plate 5) abutting the lower edge of block 19, as shown in Fig. 1.

The upper edge 14 of the block 13 and the lower edge of the scavenger blade 30 gradually converge toward each other, proceeding downwardly along the chute 15. These edges are separated, at a point substantially represented at the inner end of the block 13, by a distance just enough greater than the diameter of a legitimate coin, which the selector is designed to accept, so that such legitimate coin will pass therebetween. Coins of excessive diameter, however, will become wedged between the edge 14 and the lower edge of the scavenger blade 30, at points along the chute 15 determined by their diameters.

Numeral 33 indicates a shelf or projection that is struck forwardly at a slope from the base plate 1 (see also Fig. 4). This shelf 33 serves to direct coins discharged from within the chute 15, when the pivoted plate 5 is lifted, sidewardly away from the plane of the base plate 1, for purposes hereinafter to be made clear.

Numeral 34 indicates a thin rectangular coin-guiding plate that is secured to the inner surface of the pivoted plate 5 at the upper left-hand corner thereof. This plate 34 may be made integral with plate 5 if desired. The plate 34, as will be apparent from Fig. 4, conforms generally to the shape of the plate 5, with regard to its various degrees of spacing from the base plate 1.

Referring now more particularly to the rear elevation of the coin selector, Fig. 2, numeral 35 indicates an operating lever pivoted on a screw 36 at the coin-receiving (now right-hand) upper corner of the base plate 1. The lever 35 has a forwardly extending flange 37, to which is usually attached some means, such as a pull or push plunger, associated with the manual operation of the vending or other machine in which the coin selector is embodied. At its free end the lever 35 has a downwardly extending projection 38, and the lower end of the projection 38 projects forwardly through an opening 39 (see also Fig. 5) in base plate 1. The said lower end of projection 38 has a forward sloping or cam edge 40, which operates against the under side of the roller 26 on screw 25 mounted on pivoted plate 5, and a rearward shoulder 41, which is adapted to engage the cam portion 91 on scavenger blade 90.

Referring again to Fig. 2, it will be seen that a coil spring 42 is provided on a screw 43 mounted in base plate 1, with one end of the coil spring 42 bearing against the under side of the flange 37, and its other end bearing against a stop screw 44 likewise mounted in base plate 1. The spring 42 is arranged to apply, at all times, an upward force on the under surface of said flange 37, tending to cause said lever 35 always to rotate to its uppermost position. The uppermost position of said lever 35 is limited by engagement of the top edge of the projection 38 with the top edge of the opening 39 in plate 1 (see Fig. 2).

Numeral 45 indicates a substantially horizontal simple lever that is freely pivoted on a screw 46 mounted in the back of base plate 1. The left-hand arm 47 of the lever 45 has a steel screw 48 mounted therein, which is attractable to a permanent magnet 62 suitably mounted on the back of base plate 1. This arrangement provides, through the magnetic attraction of magnet 62 for screw 48, for a clockwise rotative tendency for lever 45. Extending upwardly from the central portion of lever 45, just above the screw 46, is a rocker arm 50, the upper end 51 of which is bent to extend forwardly through a hole 52 in base plate 1, in a substantially vertical plane (see also Figures 1 and 4), and which finally terminates as a sloping portion 53 directed forwardly and towards the left-hand (Fig. 1) edge of the selector. The opening 52, viewed from the aspect of Fig. 1, is just to the right of the right-hand edge of plate 34 which is mounted on pivoted plate 5.

Referring again to Fig. 2, numeral 54 indicates a bracket mounted by a screw 55 on base plate 1 near the right-hand edge thereof, under the arm 49 of lever 45. The bracket 54 has extending outwardly therefrom spaced parallel side plates 56, which extend upwardly to provide bearings for a wire 57, the wire 57 being, at this region, parallel to the plate 1. The wire 57, at its end nearest the right-hand edge of the plate 1, is bent at substantially a right angle towards said plate, as indicated at numeral 58, to be in position to engage and rest upon the upper surface of arm 49 of lever 45. To the left of the bracket 54, the wire 57 is provided with an offset portion 59 and a vertical portion 60. The vertical portion 60 upwardly terminates as a bent portion comprising a wire projection 61 which extends through an opening 62 in the base plate 1, and projects, in normal position, across the chute 15. A leaf spring 63, mounted as by a screw 64 on the back of base plate 1, bears at its free end on the offset portion 59 of wire 57, tending to rotate said wire at all times so that its projecting portion 61 will extend across the coin chute 15, as heretofore described.

The operation of the coin selector as thus described will next be indicated:

It is assumed that the elements of the selector are initially positioned as shown in Figures 1 through 5. When, now, a legitimate coin is dropped in the selector, from the upper left-hand corner thereof as viewed in Fig. 1, it falls vertically downwardly, positioned in a substantially vertical plane by plates 1 and 34, until its lower edge engages the edge 3 of flange 2 and the portion 51 of rocker arm 50. The edge 3 and portion 51 are initially arranged so as to be spaced apart a distance considerably less than the diameter of the legitimate coins which the selector is designed to accept.

The weight of the legitimate coin will now cause the rocker arm 50 to rotate to the right, as viewed from the aspect of Fig. 1, moving the portion 51 farther and farther away from the edge 3 until the space is sufficient for the coin to pass therebetween, continuing its downward travel.

When the rocker arm 50 is moved to the right, viewed as in Fig. 1, it rotates the lever 45 so that the arm 49 thereof is raised, thus bearing upon the end 58 of wire 57 and rotating said wire in a clockwise direction, as viewed in Fig. 4, to pull the wire end 61 back through the opening 62 and remove it from obstructing position in the coin chute 15. After the coin passes portion 51, rocker arm 50 tends at once to return to its initial position, due to the magnetic pull of magnet 62 on screw 48, thus permitting wire end 61 also to return to its initial, obstructing position across chute 15. With a legitimate coin, however, the spacing of the elements is such that the face of the coin will have become positioned across the opening 62 in plate 1 before the rocker arm 50 returns to its initial position, so that the wire projection 61 will not have yet returned to obstructing position and will be prevented from doing so by the face of the coin, and will thus be ineffective to stop that legitimate coin from proceeding downwardly along chute 15, to be delivered at the lower right-hand corner of the selector, viewed as in Fig. 1. This holding action on wire 60, 61 is possible, while the arm 50 moves to initial position, because arm 49 may separate from end 58 with lost motion.

When the inserted coin is of subnormal diameter, then, in passing between edge 3 and portion 51 of rocker arm 50, it will rotate said rocker arm through an extent insufficient to withdraw the wire projection 61 completely from obstructing position across the chute 15, and consequently the undersized coin will come to rest with its lower edge against said wire projection 61, and will not proceed further into chute 15.

The manner in which coins of excessive diameter are stopped in the chute 15, by wedging be-

tween the edge 14 and the lower edge of the scavenger blade 30, has heretofore been discussed. Thus coins of excessive diameter are likewise unable to pass through the chute 15.

When a perforated coin, such as a washer, is introduced into the device, assuming that it is of the same diameter as a legitimate coin, it will operate the elements in the manner heretofore described for a legitimate coin until the following events take place: It will be remembered that, when a legitimate coin passes the portion 51 of rocker arm 50, it causes the wire projection 61 to be withdrawn from the opening 62, and that the legitimate coin covers over the opening 62, flat-wise, with its lower edge, before the pin 61 has a chance to return to obstructing position due to the return movement of the rocker arm 50. However, the pin 61 commences to return to obstructing position, under the influence of the spring 63, substantially immediately after a coin has passed the portion 51 of rocker arm 50; consequently, by the time a fraction of an inch of a coin has passed the pin 61, the pin 61 is tending to press back into its obstructing position. Thus, by the time the opening in a perforated coin or washer reaches the wire projection 61, said wire projection 61 is tending to return to obstructing position, and consequently it will jump into the perforation of the coin or washer, and, being lodged there, it will prevent the further movement of the perforated coin or washer down the chute 15.

Coins of excessive surface roughness are stopped in a manner similar to the stopping of perforated coins, only in this instance the stoppage is due to excessive friction between the end of pin 61 and the rough surface of the coin.

Coins of subnormal weight, such as paper or fiber slugs, are unable, by reason of their lack of weight, to push the rocker arm 50 to the right when their edges engage the portion 51 of said rocker arm. The lever 45 and rocker arm 50 are balanced in advance with this weight consideration in mind. Thus coins of insufficient weight are unable ever to pass between edges 3 and 51.

To recapitulate, it will be seen that good coins pass freely through the indicated mechanisms into chute 15 and roll therealong to be delivered to the lower right-hand corner of the selector. Or, if compositional or other testing means are to be provided, they may be delivered into such testing means by the chute 15. Coins of insufficient weight are prevented from ever reaching the chute 15 by hanging up on edges 3 and 51. Coins of subnormal diameter pass freely between edges 3 and 51, but come to rest with their lower edges on pin 61. Coins of excessive diameter jam in chute 15 between edge 14 and the lower edge of scavenger blade 30. Perforated coins and coins of excessive surface roughness, like coins of subnormal diameter, pass between edges 3 and 51, but hang up with the pin 61 extending through their perforations or frictionally engaged against their rough surfaces. It will thus be seen that improper coins of all of the classes indicated are unable to reach or pass through the chute 15, for various reasons.

Any improper coin thus stopped within the device may be freed and removed simply by depressing the free, or right-hand end of lever 35, viewed from the aspect of Fig. 1. This operation causes the projection of the downward extension 38 of lever 35, through its sloping edge 40, to bear upwardly on the under side of roller 26, thus raising said roller and with it pivoting the plate 5 on its screws 10 and 11, the pivoting being such that the lower edge of said pivoted plate 5 moves outwardly away from the base plate 1. This movement carries with it the plate 34 mounted on the under side of plate 5, and the right-hand edge of plate 34, bearing on the under side of sloping projection 53 extending forwardly from rocker arm 50, causes said rocker arm 50 to rotate to the right, as if a good coin were presented thereto. This rotation withdraws the pin 61 from its obstructing position; but by this time, the plate 13 is lifted off the plate 1, and there is thus no longer a lower defining means or runway for the coin chute 15. Consequently upon this action the following things take place:

Oversized coins jammed between edge 14 of block 13 and the lower edge of scavenger blade 30 are at once freed by the lifting away from plate 1 of said edge 14, and the freed oversized coin falls vertically down, out from under plate 5, until it engages the sloping shelf 33 and is projected forwardly away from the plane of plate 1, to be delivered approximately at the lower left-hand corner of the selector. An undersized coin, stuck with its lower edge against the pin 61, is freed by withdrawal of said pin, and consequently the undersized coin falls as do the oversized coins.

Similarly, perforated coins or washers and excessively rough coins are likewise released by the withdrawal of the pin 61, and fall as do the oversized and undersized coins.

Coins of insufficient weight are similarly released by the forcible rotation of rocker arm 50 by plate 34, and fall downwardly in the same manner as the oversized, undersized, and perforated coins.

When the free end of operating lever 35 is depressed in the manner described, the shoulder 41 on projection 38 likewise comes to bear on cam portion 91 along the upper edge of scavenger blade 30. This causes the scavenger blade 30 to rotate downwardly, and to sweep across the coin chute 15, thus dislodging therefrom any coin stuck therein (such as a coin of excessive thickness if such coin has not already fallen as the edge 14 is removed by the pivoting of plate 5).

When the free end of operating lever 35 is released, the spring 42 causes it to return to its normal, upper position, and thus to permit the pivoted plate 5 to return to its normal position in juxtaposition to the plate 1. The spring 63, operating on offset 59 of wire 57, simultaneously causes the end 58 of wire 57 to press on arm 49 of lever 45, and thus rotate rocker arm 50 back to its normal or Fig. 1 position. The selector is thus repositioned in its normal position for receiving and testing another coin.

Figures 10, 11 and 12 illustrate a second embodiment of the invention wherein a different means is provided for operating the rocker arm 50 when the lever 35 is depressed. Referring particularly to Fig. 11, it will be seen that the upper edge of said rocker arm 50 is formed as a sloping or cam surface 75, adapted to be engaged by a pin 76 permanently mounted in the lever 35. When the said lever 35 is depressed, the pin 76, engaging said sloping surface 75, causes the rocker arm 50 to be rotated to the left (Fig. 11), or to the right, viewed from the front, as in (Fig. 10). The pin 76 and sloping edge 75 thus take the place of the forward sloping portion

53 of the rocker arm 50 of the Fig. 1 embodiment, which is accordingly omitted.

Still another difference of the embodiment of Figures 10, 11 and 12 from the embodiment of Fig. 1 is that the plate 34, in the Fig. 10 embodiment, has been extended downwardly as far as the bottom of the pivoted plate 5, and an opening 77 has been provided therein through which the projecting pin 61, in its normal position, ordinarily passes. As in the previous embodiment, the plate 34 may be made integral with plate 5, if desired.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. In a coin selector, a coin passageway, intersecting means movably positioned in said passageway and mounted for deflection by a coin propelled by the action of gravity in said passageway, an abutment movably affixed to said coin selector adjacent to said passageway and adapted to intersect said passageway at a point below said intersecting means, said abutment being operatively related to said means, means for normally and simultaneously urging said intersecting means into said passageway into the path of coins deposited therein and urging said abutment into said coin passageway, whereby the deposit of a coin having a diameter less than that of an acceptable value will not move said intersecting means sufficiently far to withdraw said abutment an adequate distance to permit the passage of said coin, said abutment also adapted to engage one of the face surfaces and thereby retain coins having face surface deformations greater than those of an acceptable coin, to separate acceptable coins from spurious coins.

2. In a coin selector, a coin passageway, intersecting means movably positioned in said passageway and pivotally mounted for deflection by a coin propelled by gravity in said passageway, an abutment movably affixed to said coin selector adjacent to said passageway having an end adapted to intersect said passageway at a point below said intersecting means, said abutment being operatively related to said intersecting means and the said coin selector including means for normally and simultaneously urging said intersecting means into said passageway into the path of a coin deposited therein and urging said end of said abutment into said coin passageway, whereby the relative movement of said intersecting means and said end of said abutment by the action of said urging means will cause the said end to clear the leading edge of a perforated coin deposited in said passageway and project into said perforation to suspend said coin on said end of said abutment, to separate acceptable coins from spurious coins.

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