Jan. 23, 1951 E. G. WEILER 2,538,820

COIN SELECTOR FOR COIN CONTROLLED MACHINES

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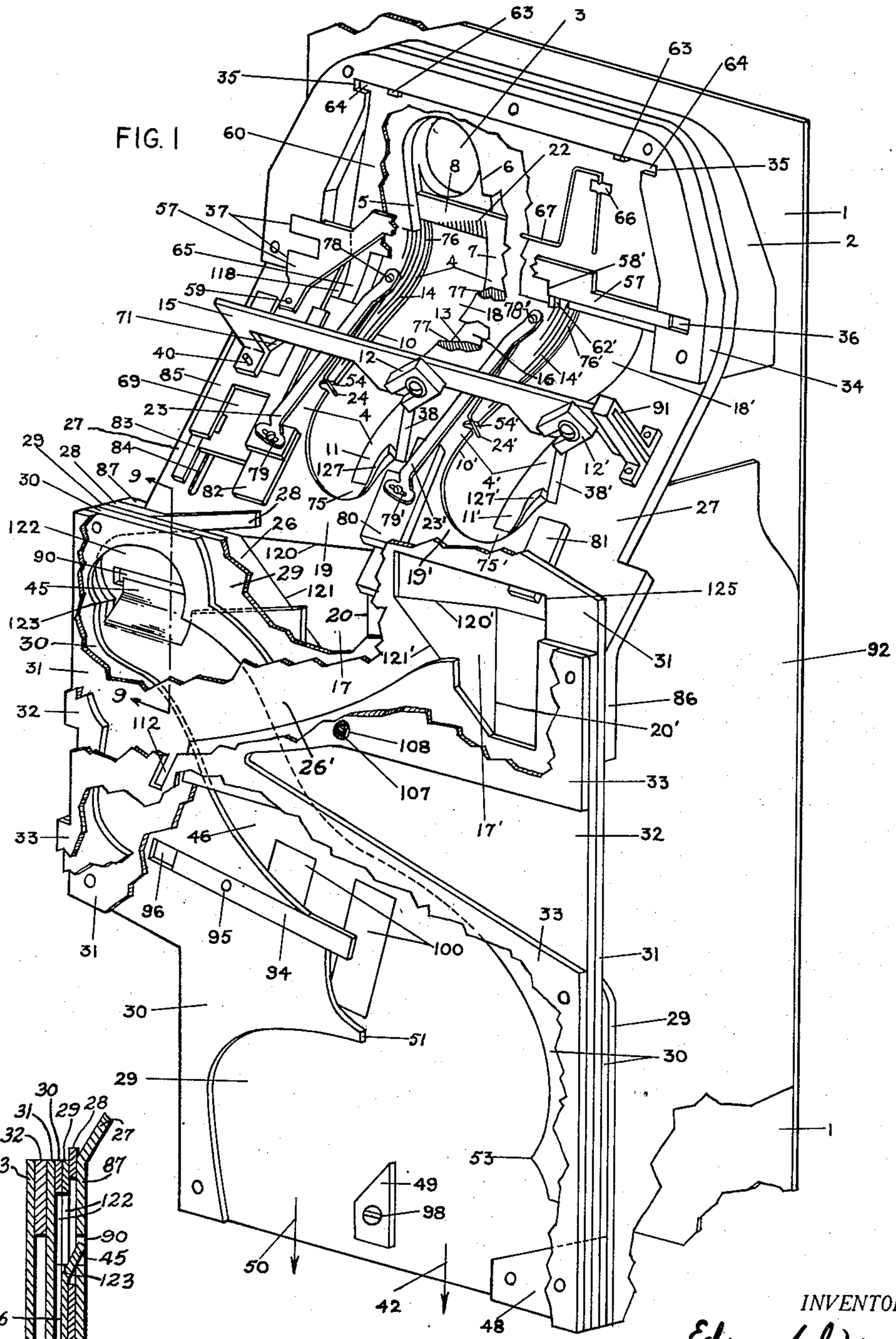
FIG. 1



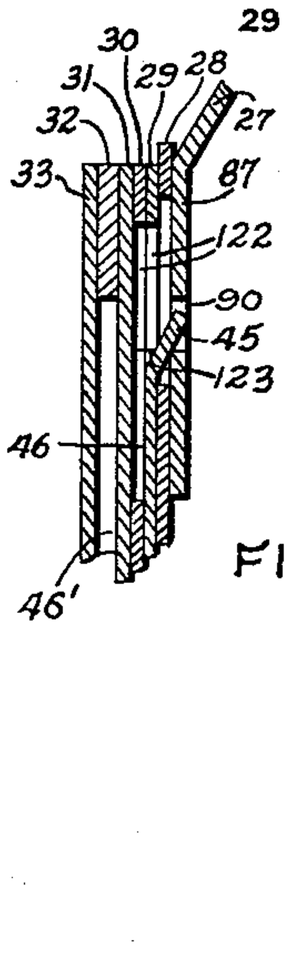


FIG. 9.

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COIN SELECTOR FOR COIN CONTROLLED MACHINES

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FIG. 3

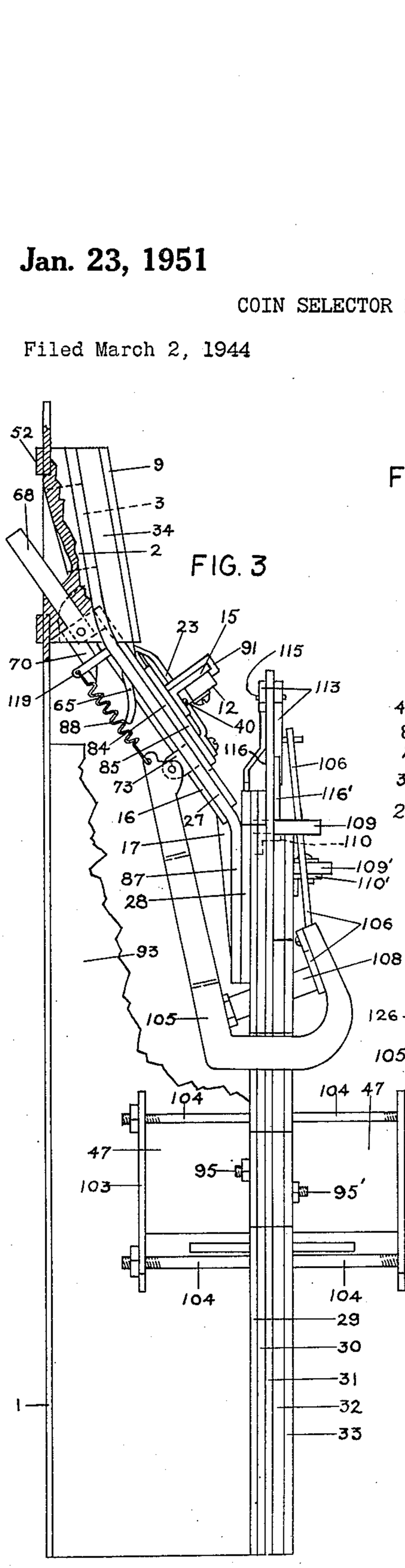

FIG. 2

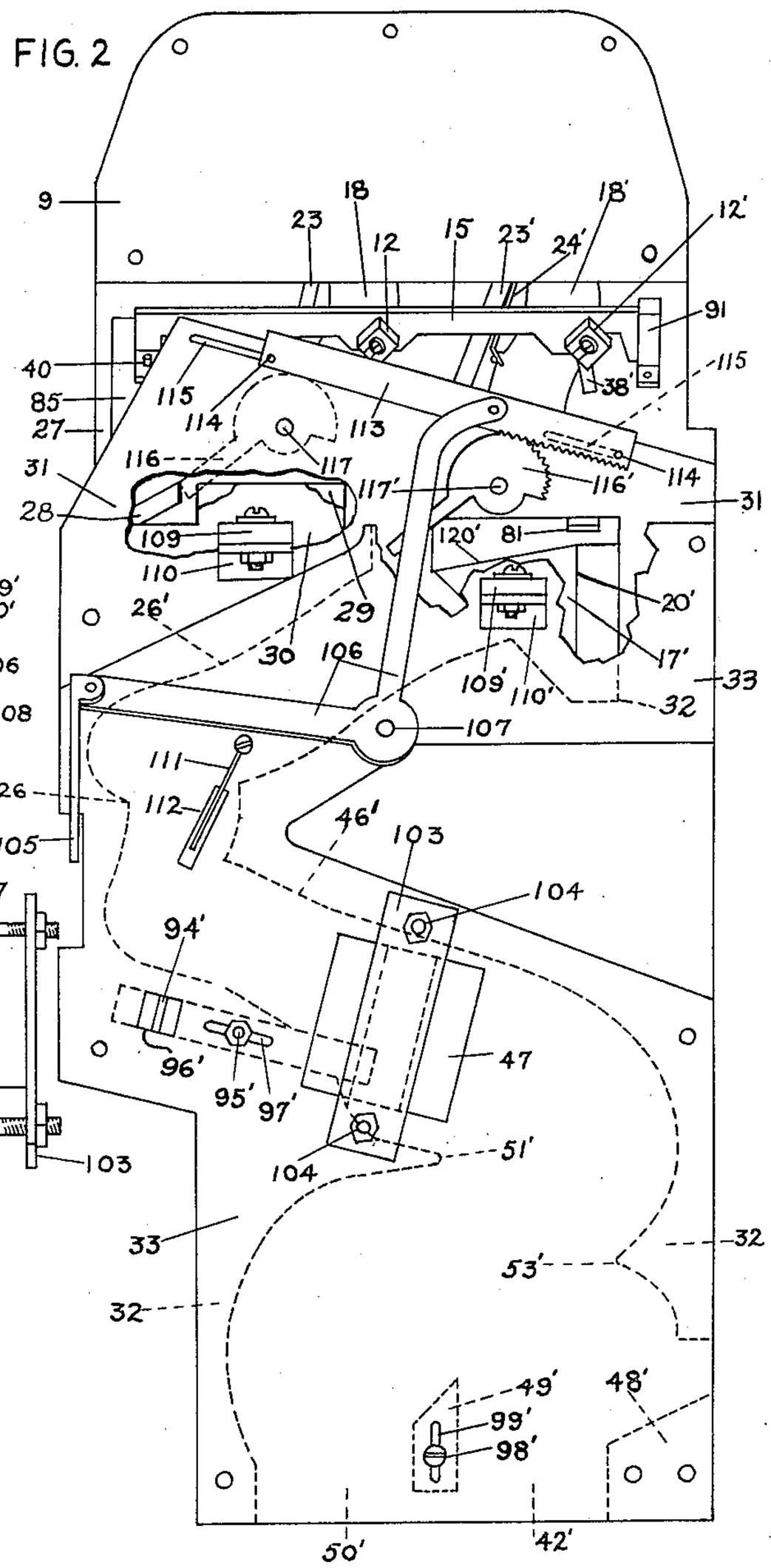

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FIG. 4

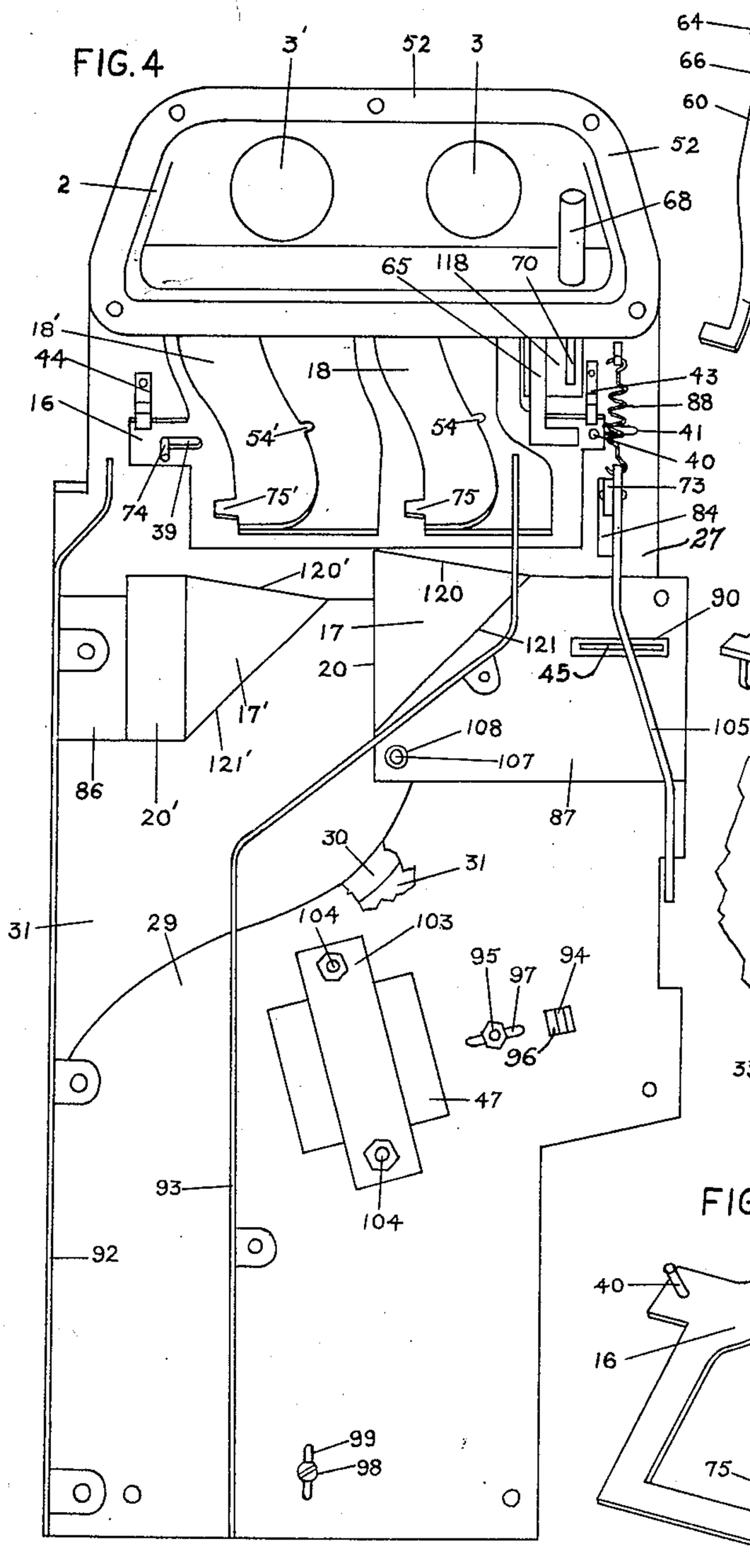


FIG. 5

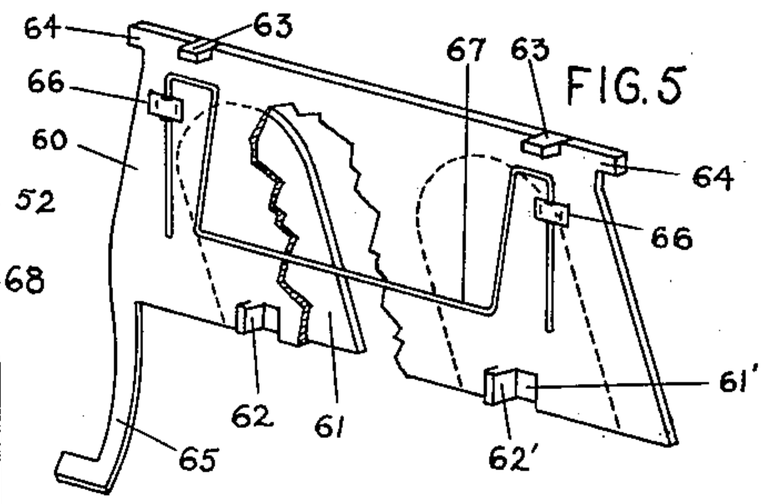


FIG. 6

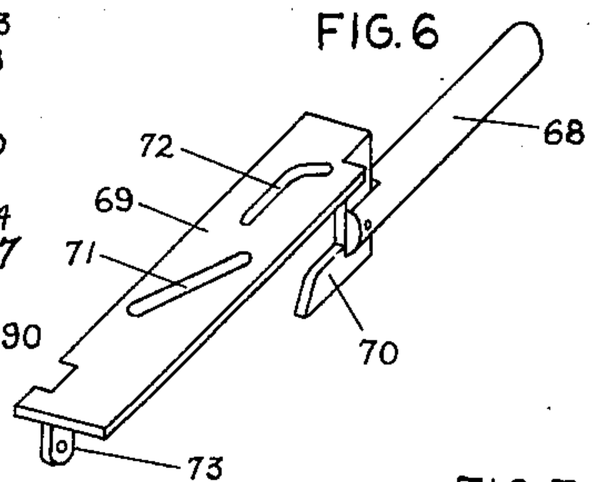


FIG. 7

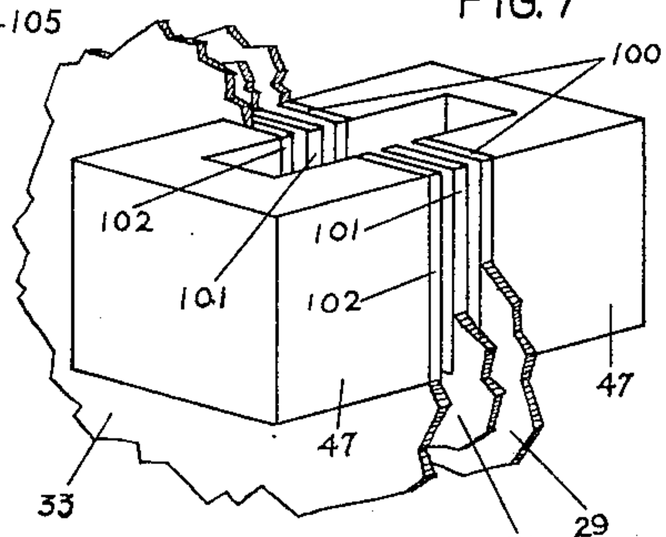
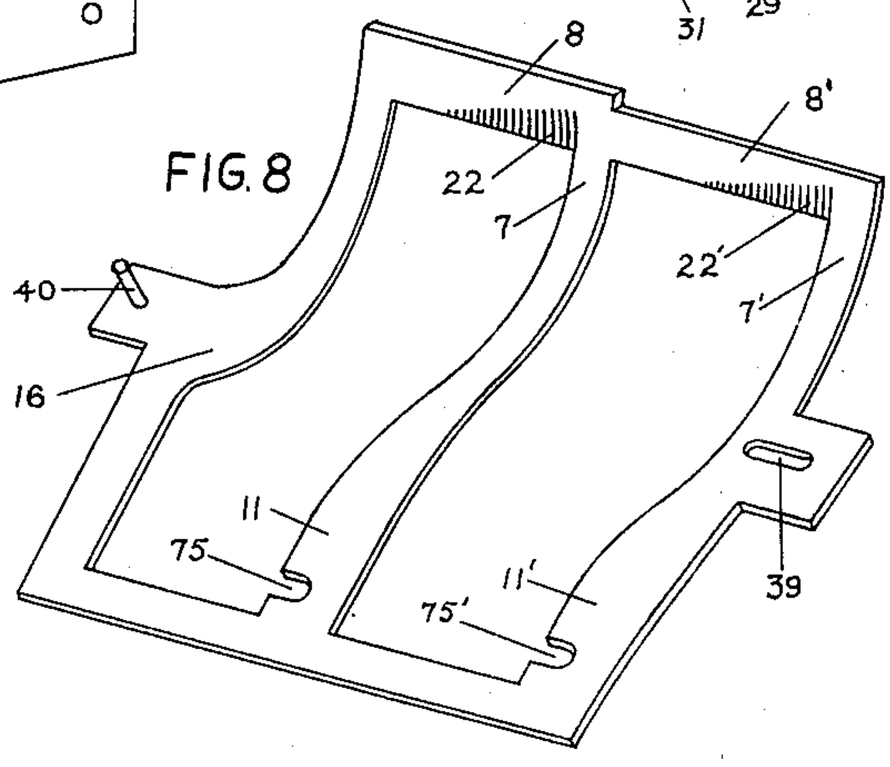


FIG. 8



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Patented Jan. 23, 1951 2,538,820

UNITED STATES PATENT OFFICE

2,538,820

COIN SELECTOR FOR COIN-CONTROLLED MACHINES

Edward G. Weiler, Columbus, Ohio

Application March 2, 1944, Serial No. 524,665

6 Claims. (Cl. 194—97)

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This invention relates to coin selectors for coin controlled machines. More particularly it comprises improvements and additional features in the coin selectors disclosed in my co-pending patent application Serial No. 210,692 filed May 28, 1938 now Patent 2,343,352.

This invention is a continuation in part of the co-pending patent application Serial No. 210,692 on coin selectors for coin controlled machines.

The principal object of the invention is to provide a device having maximum efficiency in the separation of spurious coins from genuine coins including means to prevent the device from becoming clogged by mutilated coins or by any other objects that may be inserted in the device. This is accomplished, first, by making the test for each property of a coin such that the coin is entirely free to be carried on by gravity at each point of separation, second, the sequence of the tests is such that any coin is taken out in one of the first tests in the sequence that might interfere with any succeeding test and third, means are provided to readily release any coins or objects that might become stuck in the device.

Another object of the invention is to provide a compact multi-coin selector in which the different selector units have certain parts in common.

A further object of the invention is to simplify and reduce to a minimum the adjustment necessary to set the device for accurate separation of spurious coins from genuine coins.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a perspective view of the rear of the apparatus shown mounted on a panel with the rear plate or cap plate of the coin entrance removed and parts of the lower walls of the nickel coin channel cut away to show the greater part of the dime channel.

Fig. 2 is a rear view of the apparatus.

Fig. 3 is a right hand side view of the apparatus shown mounted on a panel.

Fig. 4 is a front view of the apparatus.

Fig. 5 is a perspective view of the thickness gauge plate.

Fig. 6 is a perspective view of the coin release operating slide and coin release plunger.

Fig. 7 is a perspective view of the lower magnets showing the iron inserts in the walls of the nickel and dime coin channels.

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Fig. 8 is a perspective view of the coin release slide.

Fig. 9 is a sectional view taken along the line 9—9 in Fig. 1 looking in the direction of the arrows and including certain parts cut away in Fig. 1.

As is clearly shown in Fig. 1 of the drawings the device may be attached to the wall 1 of a vending machine or other coin operated apparatus. The drawings illustrate a coin selector in a unit structure handling U. S. nickels and dimes using certain parts in common. The following description refers to these two coins in particular but it will be evident that the device may be readily adapted to handle any other coins. The operation of the device shown for nickels is the same as that shown for dimes with the exception that a somewhat different method is used for bringing the coin to rest momentarily in the lower unit as will be explained later. With this exception the following description of the dime selector will apply also to the nickel selector the same reference numerals being applied to the corresponding parts, those for the nickel selector being indicated by a prime. For example the deflecting magnet is designated 12 in the dime selector and the corresponding magnet in the nickel selector is designated 12'.

The upper part of the device, including the coin entrance and the sloping coin channels, is adapted to prevent the insertion of objects larger than a genuine coin and to eject objects smaller than a genuine coin, magnetic coins and coins of lesser weight than a genuine coin. This part will be referred to as the upper unit.

The lower part of the device containing the vertical coin channels is adapted to eject coins having electrical conductivity or resilience differing from that of a genuine coin. This part will be referred to as the lower unit.

As shown in Figs. 1 and 3, a throat piece 2, a base plate 27, a spacer block 34 and a cap plate 9, the latter being omitted in Fig. 1 for clarity, are attached by suitable rivets or bolts to a front panel 1. A rim 52, Figs. 3 and 4, surrounding the front of the coin entrance, may be provided to improve the appearance. The panel 1 is cut out at approximately the inner edges of the rim 52 to provide an opening to receive the throat piece 2 which is correspondingly recessed to fit into this opening. The upper part of the base plate 27 slopes slightly to the rear relatively to the vertical front panel 1 then is curved to the rear in the section beginning just above the lower edge of the throat piece 2 and ending just below the lower edge of throat piece 2. From this point

downward the base plate 27 is at a greater slope relative to front panel 1 than is the upper part of base plate 27.

A cylindrical bore 3 is provided in throat piece 2 of such diameter as to just pass a genuine dime and prevent the insertion of a disc larger in diameter than a dime. A corresponding cylindrical bore 3' is also provided in throat piece 2 of such diameter as to just pass a nickel. An opening is provided in base plate 27 the top of which opening is semi-cylindrical in shape and is in alignment with the upper part of bore 3. Approximately tangent to said semi-cylindrical opening the plate 27 is cut away to form walls 5 and 6 that slope slightly to the left relatively to a vertical plane through the axis of bore 3.

The indication of direction by the terms right and left are to be considered throughout this description as right hand or left hand as viewed from the front of the apparatus, Fig. 4, regardless of the views in which the parts referred to may appear.

Below the opening between walls 5 and 6 the plate 27 is further cut away in the more inclined portion so that between the edges of parts 7 and 11 on release slide 16 and an edge 10 of the said opening in plate 27 an opening 18 is formed through which under size discs and irregularly shaped pieces may be ejected.

A thickness gauge plate 60, Fig. 5, is supported in the space inside the inverted U-shaped spacer block 34 by means of ears 64 which fit loosely in the notches 35 in the block 34. The cap plate 9 covers the opening in the spacer block 34 and lugs 63 on the top of plate 60, loosely engaging the cap plate 9, serve to limit the movement of the top of the plate 60 so that it is in effect pivoted at its top on the ears 64. A spring 67, attached by means of ears 66 to plate 60, by engagement with cap plate 9, serves to hold plate 60 in normal position against the base plate 27. A plate 61, attached to thickness gauge plate 60 and adapted to project slightly into the opening between walls 5 and 6 in the base plate 27, is made of such thickness that a dime of maximum thickness will just pass through the passageway formed by walls 5 and 6, plate 61 and a bridge surface 8, Fig. 1.

A locking slide 57 is provided adapted to have a slight endwise movement in slots 36 and 37 in the spacer block 34 and is retained in place by the cap plate 9. A locking edge 58', shown in Fig. 1, is provided on slide 57 which is adapted to engage a lug 62' on thickness gauge plate 60 to prevent the gauge plate from being pushed back thus preventing the insertion of a disc thicker than a genuine dime. For greater rigidity a locking edge 58, identical in structure and function to locking edge 58', is provided on slide 57 for engagement with lug 62 on plate 60, Fig. 5. The locking edge 58 is on the portion of bar 57 that is cut away in Fig. 1 and therefore does not appear in the drawing.

A coin release slide 16, Fig. 8, having its upper part curved and adapted to fit on the under side of the base plate 27 in the position shown in Figs. 1 and 4, is slideably attached to the base plate 27 so as to permit a slight endwise movement in a direction parallel to the slot 39. It is guided at one end by a pin 40 on slide 16 engaging with a slot 41 in plate 27 and guided at the other end by a pin 74 on plate 27 engaging in a slot 39 in plate 16. The throat piece 2 is cut away to accommodate the upper part of slide 16 in the position shown in Fig. 1 and to permit the end-

wise motion of slide 16. The slide 16 is held in position against the under side of plate 27 by means of springs 43 and 44 attached to plate 27.

A narrow curved shelf 76 is provided projecting below the lower side of base plate 27. The uppermost surface of shelf 76 is in alignment with bridge 8 and its lower surface merges into an inclined surface 14 extending along the edge 10 of the hole 18.

The wall 6, which is perpendicular to the surface of plate 27, extends downward and merges into an edge 77 that is at a gradually decreasing angle relative to the surface of plate 27. The edge 77 extends along surfaces 7 and 11 on the coin release slide 16 forming a V-groove 13 which has a gradually decreasing angle relative to the surfaces 7 and 11. The V-groove 13 curves to the rear away from panel 1 at its upper end and also curves to the right.

An iron insert 38 extending through the plate 27 from top to bottom is cut away at its upper end to form a continuation of the edge 77 and thus forming a continuation of the V-groove 13 to a point where it runs out or ends at the edge of the iron insert 38. The distance between the lower end of the V-groove 13 and the diametrically opposite point of the wall 10 is such that a genuine coin of minimum thickness, fully seated in the V-groove, will very slightly overlap the surface 14 above wall 10.

A permanent magnet 12 mounted on a bar 15 is placed so that one of its poles is in contact with the upper end of the iron insert 38 thus creating a magnetic field at the lowermost end of the V-groove 13. One end of the bar 15 is adapted to slide in a guide bracket 91 attached to plate 27 and the other end is supported on pin 40 extending through the foot of the bracket 15.

An L-shaped light steel spring 24 is provided attached at its upper end to a spring support 23 pivoted on a screw 78 and having an adjustment slot 79 with a suitable retaining screw at its lowermost end. The arm on the spring 24 extends through the discharge opening 18 across the edge of the coin path and a notch 54 is provided in the edge 10 in plate 27 to receive the arm of spring 24 when it is deflected by a coin.

The front of the throat piece 2, Fig. 4, that is accessible through the opening in the front panel 1, contains the entrance to the cylindrical bores 3 and 3' for receiving dimes and nickels respectively. The front of the throat piece is dished out along a surface approximately parallel with the plate 27 down to the lower edges of the coin entrances from which point it slopes sharply toward the front. Below the dime coin entrance and to the right of it a sloping hole is provided through the throat piece 2 adapted to slideably support a coin release plunger 68 that extends out the front partially in the dished out portion of the throat piece 2. The inner and lowermost end of the plunger 68 is attached by a pin or rivet to an L-shaped arm 70 on a coin release operating slide 69, shown detached in Fig. 6. The slide 69 is slideably retained in a channel formed by plate 27, guide blocks 82 and 83 and an H-shaped cover plate 85 suitably fastened together by rivets or screws. A hole 118 is provided in the curved portion of the plate 27 to receive the upper end of the slide 69 and the arm 70 thereon.

A lug 73 on the slide 69 extends through a slot 84 in plate 27. A coin release operating link 105 is attached at one end by a loose rivet or the like to the lug 73 and at its other end to a coin

release operating lever 106 pivoted at 107 in the lower unit as explained later.

The slide 69 contains a slot 71 adapted to receive the pin 40 attached to the coin release slide 16 which pin extends up through a slot 41 in plate 27. The pin 40 also extends on up through a hole in the foot of the magnet supporting bracket 15. The slide 69 contains also a slot 72 adapted to receive a pin 59 attached to an arm on the locking slide 57. A coil spring 88 attached at one end to the link 105 and at its other end to a lug 119 on plate 27 tends to retain the coin release operating slide 69 in normal position. When the plunger 68 is depressed the slide 69 is pushed downward against the tension of spring 88. The sliding action of pin 40 in the slot 71 moves the coin release slide 16 to the left thereby sliding the surfaces 7 and 11 back to the beginning or base of the sloping edge 77 in plate 27 thus in effect removing the bottom of the V-groove for the purpose of releasing any bent or irregularly shaped coin that might become wedged therein. This movement of the pin 40 also moves the magnet mounting bracket 15 to the left moving the magnet 12 out of contact with the iron insert 38 permitting any magnetic pieces that might become attached thereto by magnetic attraction to be released.

The shape of the slot 72 in the slide 69 is such that the locking bar 57 is not moved during the first part of the movement of the slide 69 but near the end of its movement the sliding action of the pin 59 on bar 57 in the slot 72 will move the bar 57 slightly to the left so that the locking edge 58' on bar 57 will disengage the lug 62'. On a slight further movement of the slide 69 a sloping extension on the arm 70 on slide 69 will slideably engage the L-shaped end of arm 65 on the thickness gauge plate 60 rocking the plate 60 slightly to the rear for the purpose of releasing any bent or extra thick coin that might become lodged in the passageway between the bridge 8 and the plate 61. This movement of the slide 69 will move the link 105 to rock the lever 106 on pin 107 in the lower unit for a purpose explained later.

When the plunger 68 is released it will normally be restored to its starting position by the spring 88. At the beginning of its return movement the extension on arm 70 will pass out of engagement with the end of arm 65 on the plate 60 enabling the spring 67 to return the plate 60 to normal position against the plate 27 if there are no obstructions in the coin channel to prevent this. If there should be an obstruction in the coin channel to prevent the restoral of plate 60 the edge 58' on bar 57, which at this point would normally be moved to the right by the sliding action of pin 59 in slot 72, will engage lug 62' on plate 60 preventing this and the slope in the slot 72 will prevent the spring 88 from restoring the slide 69 to normal position. The coin release slide 16 would therefore not be restored to bring the bottom 7 of the V-groove 13 into operative position and any coins or objects inserted would not be supported by the surface 7 and would be discharged through the opening 18. When the obstruction is removed, permitting the plate 60 to restore by the action of spring 67, the lug 62' will pass out of engagement with the edge 58' on the locking bar 57 and the locking bar will be free to move toward the right by the action of spring 88 on slide 69, consequently the slide 16 and the magnet bar 15 will restore to

normal position ready for the reoperation of the device.

The coin channels and discharge channels provide for a general downward movement of a coin or other object after its insertion through the bore 3. It is to be understood therefore that the movements of a coin or object as it passes through the device are affected by the force of gravity with the exception of its movement after the rebound from the anvil in the lower unit. The path of a genuine coin from the passageway between bridge 8 and plate 61 and continuing downward with its edges supported by the V-groove 13 and the surface 14 is indicated on the drawings by the reference numeral 4 and it is to be understood that this reference numeral does not refer to any particular element of the device. The upper part of this coin path 4 is in the form of an elbow or a coin channel bent edgewise. This elbow also curves toward the rear away from the front panel 1.

A genuine dime will pass freely through the coin entrance or bore 3 to a point parallel to the plate 61 thence through the passageway formed by wall 5, bridge 8, wall 6 and plate 61. This passageway slopes slightly to the rear so that the coin has a tendency to slide against the bridge point 8 and owing to the slope of wall 5 it will slide or roll on its edge along wall 5 to the end of wall 5. A portion 22 of the bridge 8 is cut away at a slight slope forming an edge that is an extension of the edge of the surface 7. The perpendicular distance, relative to wall 5, from the lower end of wall 5 to the edge of surface 7 is somewhat less than the diameter of a dime so that at this point a dime will be supported on one edge by the surface 7 and on its opposite edge by the shelf 76. Since surfaces 7 and 76 curve toward the rear at this point the dime will be deflected toward the rear. The coin in passing down the channel with its edge in contact with wall 5 will gain some momentum and be deflected edgewise toward the left due to the slope of wall 5. This momentum is sufficient to prevent the coin from slipping off the edge of surface 7 after it passes out of contact with wall 5. As the coin continues downward its one edge will be supported by surface 14 and its opposite edge will enter and be supported by V-groove 13 which is curved in such direction as to deflect the coin edgewise toward the right.

The edgewise change in the direction of the coin takes advantage of the momentum of the coin to cause it to become fully seated in the V-groove. The angle of the V-groove gradually decreases as it extends downward, as has been explained, to further aid in fully seating the coin in the V-groove. The surface 76 and the surface 14 into which it merges are formed with a gradually increasing slope relative to the plate 27 down to a point diametrically opposite the lower end of the V-groove, this slope being in such direction that it also tends to crowd the coins into the V-groove.

The momentum of the dime as it passes out of the V-groove at the edge of the iron insert 38 carries it along a trajectory, supported on its opposite edges by surfaces 11 and 14, toward the spring 24. The edge of the coin strikes the spring 24 which is of such strength and adjusted in such position that it will be deflected by a genuine dime, of any weight in normal circulation, a sufficient amount to move the spring 24 into the notch 54 far enough to permit the edge of the dime to continue to ride on surface 14 causing the dime to be guided thereby over the sloping

surface 19 through the space between blocks 80 and 82 and over a portion of the tilted surface 17 into a vertical channel 26 in the lower unit.

A disc larger in diameter than a genuine dime will not pass through the bore 3 and an object of greater thickness than a dime will not pass through the passageway between bridge 8 and the spacer plate 61. Likewise an object having one dimension greater than the diameter of a dime will not pass through the bore 3 in a position parallel to the spacer plate 61 and therefore it would not pass into the coin channel. An object having one dimension only slightly greater than a dime might be inserted at an angle to the plate 61 and become wedged between the plate 61 and the bridge 8. In this case the operation of the coin release plunger 68 will cause plate 61 to be pushed back and the under surface 7 of the V-groove 13 to be pushed aside thus allowing such an object to pass and be ejected through the opening 18. Likewise a disc or object thicker than a dime that might become lodged between the bridge 8 and the plate 61 may be released to pass out the opening 18. Thus objects having any dimension greater than the corresponding dimension of a dime are prevented from passing down the coin path or coin channel 4.

A disc appreciably smaller in diameter than a dime will roll down along wall 5 through the channel between bridge 8 and spacer 61 but the edge of the coin diametrically opposite the edge that is in contact with wall 5 will not extend far enough to be supported by the surface 7. The disc will therefore slip off the edge of surface 7 and pass through the discharge opening 18.

At the lower end of wall 5 the plate 27 is cut away to form a surface that merges with the surface of the shelf 76, and the edge of surface 7 extends downward a gradually increasing distance from the end of wall 5. This construction is provided so that a coin having a flattened side or one slightly out of round and of such a dimension that it will just barely reach the edge of surface 7 will not bind between the edge of surface 7 and the lower end of wall 5. When such a coin slips off the edge of surface 7 the increasing distance between this edge and the end of wall 5 allows the coin to pass on down the coin path or channel 4 with its right hand edge free to pass over shelf 76 and surface 14 thus leaving its left hand edge slip completely off the edge of surface 7 at a point where this edge curves toward the rear and toward the right allowing the coin to pass out the opening 18. In a similar manner small irregularly shaped objects pass out through the opening 18.

A disc of a diameter only slightly less than that of a dime is carried by its momentum into the V-groove 13 and proceeds down the coin path 4 in the same manner as a dime, passing out the lower end of the V-groove toward the spring 24 as has been explained. Such a disc being fully seated in the V-groove, as has been explained, will slip off the surface 14 just above the spring 24 and its right hand edge will slip down over the edge 10 causing the coin to be ejected through the opening 18. Likewise a disc that is thinner than a dime will be seated deeper in the V-groove than a dime and will slip off the surface 14 and down over the edge 10 just above the spring 24 and be ejected through opening 18.

A disc that is of the same dimensions as a dime but of lighter weight material will travel in the same path as a dime to the point where it strikes the spring 24 but will not have enough

momentum to deflect the spring 24 a sufficient amount to permit its edge to be supported by the surface 14. It will therefore slip off the surface 14 down along the edge 10 at a point at or below the spring 24. As the coin continues downward, with its left hand edge supported by surface 11, its right hand edge will continue to drop slightly along the edge 10 so that its lowermost edge will strike the lowermost edge of the opening 18 causing the coin to drop or slide out the lower end of the opening 18 the left hand edge of the coin passing through the notch 75 in the slide 16.

A genuine dime that is worn thin will have less weight than a new dime and in order to prevent such a coin from being ejected like a coin of light weight material as explained above the strength of spring 24 and the amount of its deflection after being struck by a coin is so chosen as to compensate for the variation in thickness of genuine dimes. A thin dime is seated deeper in the V-groove than a new dime and therefore its trajectory is such that its edge will not strike spring 24 as quickly as a new dime and the strength and deflection of spring 24 under this condition is such as to permit the edge of the thin dime to ride on surface 14 and be guided over surface 19 into the channel 26 in the lower unit.

A disc of light weight material having the thickness of a new dime will be seated in the V-groove as deep as a new dime and its trajectory will be such as to strike the spring 24 sooner than a thin dime and the deflecting force of the spring is such as to cause such a coin to be ejected in the manner explained.

A disc of iron or other magnetic material that has passed down the coin path 4 will, as it passes the end of the V-groove, be attracted by the magnetized insert 38 and roll along the edge of the insert 38 which slopes slightly toward the left. This will cause the right hand edge of the coin to slip off the edge of surface 14 and the coin will tend to drop through the opening 18. The magnet 12 is in contact with the insert 38 near the top of insert 38 therefore the strength of the magnetic field decreases toward the lower end of insert 38 and the edge of plate 27 projects very slightly at a point 127 beyond the lower edge of insert 38. The magnetic attraction between the coin and the insert 38 will therefore decrease as the coin proceeds downward and, when the edge of the coin strikes the projection 127, in the non-magnetic plate 27 its momentum will release it from the insert 38 allowing the coin to pass out the opening 18.

When a coin that is attracted by the insert 38 slips off the edge of surface 14 its right hand edge tends to drop along wall 10 and its left hand edge may be tipped up and be pulled by magnetic attraction over the top of the insert 38. The projection 127 is formed so as to engage a coin that might reach this position to prevent it from being drawn so far to the left as to cause it to be deflected over the surface 19 into the channel 26.

Should any object become lodged in the V-groove 13 the depression of the coin release plunger 68 will cause the surface 7 and 11, forming the bottom of the V-groove, to be pushed aside allowing the object to drop out by gravity. Should any magnetic object become attached to the iron insert 38 the operation of the plunger 68 will move the magnet 12 away from the insert 38 and will also move the surface 11 to the left. The magnetism will thus be removed from the insert

38 tending to release the object from the insert 38 and the return movement of surface 11 will assist in the release of the object allowing it to pass out through the opening 18.

In the upper unit described above coins or objects of improper size, coins of light weight material and most magnetic coins are kept out or ejected and only non-magnetic coins or very slightly magnetic coins of the size and weight of a genuine dime pass down over the surface 19 into the channel 26 in the lower unit.

In the lower unit two coin channels are provided in parallel vertical planes, a dime channel on the front side of a center plate 31 and a nickel channel on the rear side of the center plate 31. In Fig. 1 the center plate 31 is cut away and only fragments of the parts forming the nickel channel are shown so as to show the greater part of the dime channel and to show also the relative locations of the various plates of both channels. The plates are fastened together by suitable rivets or bolts.

The base plate 27 of the upper unit is bent to form vertical extensions 86 and 87 to which the plates 31 and 28 of the lower unit are attached and which form a part of the wall structure of the lower unit. Before the extension 87 is bent to vertical position a V-shaped opening is cut in the plate 27 one edge of which extends along a line 120. After the piece 87 is bent to vertical position it is also bent along a line 121 to form a V-shaped tilted surface 17 which joins the plate 27 along the line 120. The edge 121 of the sloping surface 17 is so located relative to the upper end of channel 26 that, if there is no obstruction in channel 26 at this point, a coin passing from the upper unit between the blocks 80 and 82 will be deflected by plate 29 into a vertical position falling on the lower leg of spacer plate 28 which leg extends just far enough to receive the coin and direct it down the coin channel 26. Above this point, in channel 26, the floor of the channel is cut away in such manner that it may direct a coin toward discharge outlet 20 if there should be an obstruction in the channel at this point as will be described later.

A spacer plate 28 slightly thicker than a dime and having a channel slightly wider than the diameter of a dime is provided adjacent to the extension 87 and a plate 29 is provided on the opposite side of spacer 28 to form coin channel 26. The upper leg of spacer 28 extends approximately to the edge of block 82 so that a coin from the upper unit will pass it and be deflected by plate 29 into a vertical position falling on the lower leg of spacer 28 which is extended far enough to receive it and direct it down the coin channel 26.

A hole 122, slightly larger than a dime, indexing with the lowermost end of channel 26, Fig. 1, is provided in plates 29 and 30 and a sloping shelf 45 is provided below the hole 122 extending across the lower end of channel 26 into an opening 90 in extension plate 87 as shown in Fig. 9. The spacer 28 is cut away to receive this sloping shelf which is so positioned relative to the lower wall of channel 26 as to receive a coin passing down the channel and deflect it laterally through the hole 122. A spacer block 30 is provided next to the plate 29 having an opening adapted to form a coin runway 46 between plate 29 and the center plate 31. The uppermost end of runway 46 is enlarged and an abutment 123, Fig. 1, is provided between the enlarged portion and the main runway 46 and corresponding abutments

are formed in the adjoining holes in plates 29 and 30. The edges of the holes 122 in plates 29 and 30 opposite the abutment 123 are in a radius, relative to the abutment 123, slightly greater than the diameter of a dime. A coin passing down channel 46 is deflected laterally by the sloping shelf 45 and striking the abutment 123 in this position it can rebound only slightly due to engagement on rebound with an edge of hole 122 opposite the abutment 123. Since the momentum is thus taken out of the coin it comes practically to a state of rest momentarily as it passes on to the floor of the runway 43.

The coin runway 46 starts with a very slight slope and its bottom wall, just below the sloping surface 45, is about half the diameter of a dime below the bottom of the slope 45. The slope of runway 46 increases as it extends downward then decreases again to a point where its bottom merges with the upper edge of an adjustment bar 94. At this point the coin channel passes through a field of magnetic flux formed by a pair of permanent magnets 47. The adjustment bar 94 is adapted to slide in a slot 96 in the spacer plate 30. A screw 95 extending through a slot 97 in the side plate 29 permits adjustment so that the bar 94 and consequently the bottom of the coin runway 46 may be positioned within certain limits in the field of magnets 47.

The magnets 47 furnish the field of flux for both dime and nickel coin channels. Iron inserts 100, 101 and 102, Fig. 7 or inserts of high magnetic permeability are fastened in the walls 29, 31 and 33 respectively and the surfaces of the inserts are faced off along the surfaces of the walls so that coins passing down the channels will have free passage without possibility of interference by any offset edges on projections in the coin channels. The front magnet 47 is attached by means of a yolk 103 and flat head bolts 104 to the plate 29 and the rear magnet 47 is similarly attached to the plate 33. The strength of the magnet is such as to pass sufficient flux across both the dime and nickel channels to serve for the separation of either dimes or nickels from spurious coins and the dime and nickel coin channels are so placed in the field of magnetic flux as to produce the desired effect on the respective coins in their passage through the channels as will be explained.

Below the lowermost end of the adjustment bar 94 two abutments are provided in a widened portion of the coin passage one abutment 51 being just below the trajectory path of a genuine coin and the other abutment 53 being slightly above or beyond the trajectory path of a genuine coin. An anvil 48 is provided in the trajectory path of a genuine coin and an adjustable barrier 49 is provided arranged so that a genuine coin will just pass over it in its rebound from the anvil.

A magnet 109 is attached by a bracket 110, extending through suitable openings in plates 30 and 31, to the plate 29 with its poles extending just through the plate 29 at the point in the coin channel 26 where the coins are deposited after leaving the upper unit. A magnet 109' is attached in a similar manner to plate 33 at the point in the coin channel 26' where nickels are deposited after leaving the upper unit.

A bearing post 108 is rigidly attached to center plate 31 and holes are provided in plates 29, 30, 32 and 33 through which the bearing post projects when the plates are assembled. A pivot post 107 rigidly attached to the coin release lever

106 is supported in the bearing post 108 and may be held from slipping out by a suitable lock nut or a pin at the end of the post 107.

A U-shaped rack 113 is adapted to slide on the upper edge of plate 31 held in place by pins 114 extending through slots 115 in plate 31. The upper end of the lever 106 is loosely attached by a pin to the rack 113 so that when the coin release plunger 68 is depressed the lever 106 is rocked on its pivot post 107, as has been explained, causing the rack 113 to be moved toward the right. A sweep piece 116' pivoted on a pin 117' attached to plate 31 is adapted to be moved by the action of the rack 113 to sweep cross the space in the nickel channel adjacent to the poles of the magnet 109'. A sweep piece 116 shown dotted in Fig. 2, similar in structure and performance to the sweep piece 116' which is shown more clearly in Fig. 2, is provided in connection with the dime channel.

A coin that passes from the upper unit into coin channel 23 will be of the size of a genuine dime and generally of non magnetic material. However, a coin of material that is only slightly magnetic may not be attracted with sufficient force to the field of magnet 12 to be ejected in the upper unit and it would pass to the lower unit. When such a coin is deflected against the plate 29 at the point where the magnetic field of magnet 109 is established it will be attracted and held by this magnet. The operation of the coin release plunger 68 causes the arm of sweep piece 116 to be moved over the space adjacent to the poles of magnet 109 sliding the coin to the left to a point where the lower floor of channel 26 is cut away and releasing the coin from the magnet 109 allowing the coin to pass over the sloping surface 17 out through a discharge opening 20 between the edge of surface 17 and the plate 29.

If, when one magnetic coin is being held by the magnet 109, a dime is inserted in the device, it will strike the side of the stuck coin. The tilted surface 17 is so positioned relative to the stuck coin that the good coin will be deflected to the left between face of the stuck coin and the tilted surface 17 and be ejected through the discharge opening 20. The purpose of this arrangement is to prevent any slightly magnet coin from passing down the coin channels 26 and 46 to the strong magnets 47 and sticking in the channel at this point to completely clog up the selector.

A coin passing down the channel 26 will be carried by its momentum over the sloping surface 45 so that its edge will strike the abutment 123. Since the distance between the abutment 123 and the wall directly opposite it is approximately equal to the diameter of a dime the right and left movement of the coin is essentially stopped and the coin will be constrained to slide over sloping surface 45 into the coin runway 46 where it will be brought practically to rest momentarily because the only momentum it has when it strikes the bottom of runway 46 is that gained in falling from the surface 45 down to the bottom of the runway. The coin runway 46 slopes slightly at this point allowing the coin to roll by gravity down the coin runway 46 through the field of magnets 47. In passing through this magnetic field the coins are retarded more or less in proportion to the electrical conductivity of the metal of which they are made and travel in different trajectories after leaving the supporting edge of the bar 94 in the bottom of the runway. A genuine dime will have such trajectory as to pass

clear of the abutments 51 and 53 and strike the anvil 48 squarely and rebound over the barrier 49 into the channel 50 for genuine coins.

A coin having higher conductivity than a dime will be retarded more than a dime and its edge will strike the abutment 51. It may be deflected by the abutment 51 sufficiently to cause its edge to strike also the abutment 53. In this case it would be deflected by the abutment 53 in such manner that it would not strike the anvil 48 squarely and with sufficient force to cause it to rebound over the barrier 49. The coin would therefore pass out the discharge opening 42. A coin may strike abutment 51 and be deflected just enough to strike the anvil 48 missing the abutment 53. The contact of the coin with the abutment 51 slightly changes its direction, slightly changes its momentum and has a slight tendency to cause it to rotate. The coin being subjected to all of these effects combined does not strike the anvil with the clean blow necessary to cause it to rebound over the barrier 49. Such a coin sometimes has the appearance of being trapped bouncing around from one of the points 48, 49 and 53 to the other and finally passing out the discharge opening 42.

A coin having a lower conductivity than a dime will have such a trajectory that its edge will strike the abutment 53. In this case it will either be deflected through the discharge opening 42 or strike the anvil with insufficient momentum to cause it to rebound over the barrier 49 and it will therefore pass out the discharge opening 42.

In the upper unit the nickel coin selector is identical in structure and functions to the dime selector the nickels passing to the lower unit through the space between the blocks 80 and 81. In the lower unit the details of the construction of the channel 26' for receiving a nickel from the upper unit are somewhat different from the dime channel construction and a different principle is employed for bringing a coin to rest momentarily before starting down the coin runway 46'. These differences are used to facilitate the construction of the device in a combined unit for both nickels and dimes.

The vertical extension 86 on the base plate 27 is attached to the center plate 31, Fig. 1. The spacer plate 32, slightly thicker than a nickel, is adjacent to the center plate 31 and within it are formed the nickel coin channels 23' and 46', Fig. 2. Plate 33 forms the rear wall of these coin channels. A hole 125 is provided in the plate 31 through which coins from the upper unit pass into the coin channel 26'. A tilted surface 17' is provided having the same function as the tilted surface 17 but in this case it is best formed by bending a triangular piece of plate 31 along the line 121' to meet plate 27 along the line 120'. A discharge opening 20' is provided at the edge of the tilted surface 17' the extension 86 being cut away at this point sufficiently to permit the ejection of coins passing over surface 17'. The spacer plate 32, forming the floor of channel 26', is also cut away at the upper end of channel 26' to permit passage of any coins ejected over surface 17' through the discharge opening 20' as explained in the operation of the dime selector.

A light spring 111 is attached to plate 33 and extends slantingly into the coin channel through opening 112. A nickel passing down the channel 26' is carried by its momentum against an abutment 126 formed in the coin channel then passes downward pushing aside the spring 111

and falling upon the floor of the upper end of the runway 46'. The coin striking the floor of runway 46' will have a tendency to rebound but this is prevented by its engagement with the spring 111 which after the passage of the coin returns to normal position to engage the upper edge of the coin. The coin is thus brought to a momentary state of rest. The coin then proceeds down the coin runway 46' the operation of the device from this point on being the same as described for the time selector.

The electrical conductivity of a dime is considerably higher than that of a nickel and therefore in order to obtain a proportional retarding or braking effect on these coins passing through the magnetic field of magnets 47 it is necessary to direct each type of coin through the part of the magnetic field that will give the desired retarding effect for maximum separation of a coin from spurious coins. For magnets of a particular strength the point of discharge in the nickel coin channel may be approximately as shown in Fig. 2, that is, slightly beyond the uppermost pole piece and slightly below its center. For magnets of this same strength the point of discharge in the dime channel would be approximately as shown in Fig. 1, that is, projecting slightly into the field of the lowermost poles and slightly above the center of the poles.

The adjustment bars 94 and 94' provide for adjusting the discharge points in the dime and nickel channels respectively. If the bar 94 is adjusted toward the right the trajectory of the coin would be brought nearer the abutment 51 and the coin would also pass through a greater number of lines of magnetic force further tending to bring the trajectory nearer the abutment 51. If the bar 94 is adjusted toward the left the trajectory of the coin would be brought nearer the abutment 53 and the coin would also pass through a smaller number of lines of magnetic force further tending to bring the trajectory nearer the abutment 53. This adjustment may be used in originally setting the device for proper separation of genuine coins from spurious coins and would also serve for readjusting the device should the strength of the magnets 47 become reduced.

Walls 92 and 93 are fitted between the panel 1 and the adjacent selector plates and suitably attached to the selector plates forming a channel through which coins ejected at the upper discharge openings 18, 18', 20 and 20' are directed to the bottom of the device adjacent to the lower discharge openings 42 and 42'.

The various devices for testing the size of the coins may be readily manufactured so that no adjustment of these elements is required, therefore the only adjustments required in the device are the relatively simple adjustments of the bars 94 and 94' and the adjustments of the springs 24 and 24' by means of the spring supports 23 and 23'.

The device described is a multi-coin unit for nickels and dimes. It is to be understood that the device may be employed for other coins by very minor changes in construction and that the same principles may be employed to construct a multi-coin unit for more than two coins.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. In combination in a coin selector, a coin entrance adapted to receive a coin the size of the respective genuine coin and to direct said coin to a coin channel, an edgewise inclined runway in a vertical plane leading from said channel, means to bring a coin to a momentary state of rest at the upper end of said runway, magnets disposed in the side walls of said runway to provide a field of magnetic flux across the lower end of said runway adapted to retard coins more or less in proportion to their electric conductivities, a passage in a vertical plane leading from said runway having abutments so positioned therein as to be struck a glancing blow by a coin that follows a trajectory other than that of a genuine coin; an anvil at the end of said passage adapted to cause only coins that have the same resilience as a genuine coin and that strike the anvil a clean blow free from the influence of said abutments to rebound over a barrier into a deposit outlet in the edge of said passage and a refund channel between said anvil and said barrier to eject coins not rebounding with sufficient momentum to carry them over said barrier.

2. In combination in a coin selector, a coin entrance adapted to receive a coin the size of the respective genuine coin, an edgewise inclined runway leading from said coin entrance, means within said runway for retarding in proportion to their respective electric conductivities the passage of coins therethrough, a rebound anvil in the path of flight of a genuine coin from said runway positioned to deflect a genuine coin into a coin outlet said outlet being positioned at a predetermined point relative to said anvil, an abutment disposed along the path of flight from the runway to the anvil positioned to be engaged by the edge of a coin of excessive electric conductivity, a second abutment disposed along the path of flight from the runway to the anvil positioned to be engaged by the edge of a coin of deficient electric conductivity, a barrier along the path of rebound from said anvil below said abutments and positioned to intercept and deflect from the coin outlet coins rebounding from said anvil along a path other than that of the respective genuine coins.

3. In combination in a coin selector, a channel for receiving coins, means for ejecting therefrom coins differing in size from the respective genuine coin, means for rejecting therefrom magnetic coins, a coin run-way leading from said channel, means within said run-way for retarding in proportion to their respective electric conductivities the passage of coins therethrough, a rebound anvil in the path of flight of a coin from said run-way and positioned to deflect only a genuine coin into a coin outlet positioned at a predetermined point relative to said anvil, an abutment adjacent to the lowermost edge of the path of flight of a genuine coin from the runway to the anvil engaging and deflecting a coin of excessive electric conductivity, a second abutment adjacent to the uppermost edge of the path of flight of a genuine coin from the runway to the anvil engaging and deflecting a coin of deficient electric conductivity, and means disposed in the path of rebound from said anvil below said abutments and positioned to intercept and deflect from the coin outlet coins rebounding from said anvil along a path other than that of the respective genuine coin.

4. In combination in a coin selector, a coin entrance adapted to receive a coin the size of the respective genuine coin and to direct said coin to a coin channel, an edgewise inclined runway in a vertical plane, a transfer passage connecting the lower end of said channel to the upper end of said runway, an edge of said transfer passage in the path of movement of a coin from said channel to said runway from which a coin will rebound in a retrograde direction, a stop in the path of rebound of a coin from said edge positioned a slightly greater distance from said edge than the diameter of a coin, so as to take the rebound momentum out of the coin and bring it to a momentary state of rest at the upper end of said runway.

5. In combination in a coin selector, a coin entrance adapted to receive a coin the size of the respective genuine coin and to direct said coin to a coin channel, an edgewise inclined runway in a vertical plane, a transfer passage connecting the lower end of said channel to the upper end of said runway, a member in the sidewall of said transfer passage permitting the free forward movement of a coin and positioned to engage the edge of the coin on a slight rebound from the floor of said runway absorbing the rebound momentum of the coin and bringing it to a momentary state of rest at the upper end of the runway.

6. In combination in a coin selector, a coin entrance adapted to receive a coin the size of the respective genuine coin and to direct said coin to a coin channel, an edgewise inclined runway in a vertical plane, a lateral transfer passage connecting the lower end of said coin channel to the upper end of said runway, an inclined side on said transfer passage directing a coin laterally from said channel to said passage, a barrier in the edge of said transfer passage from which a coin will rebound in a retrograde direction, a wall on said transfer passage positioned a slightly greater distance from said barrier than the diameter of a coin said wall absorbing the rebound momentum of a coin striking said barrier and bringing it to a momentary state of rest at the upper end of said runway.

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