E. A. BUCKMAN & H. L. FELIO.

COIN TESTING APPLIANCE.

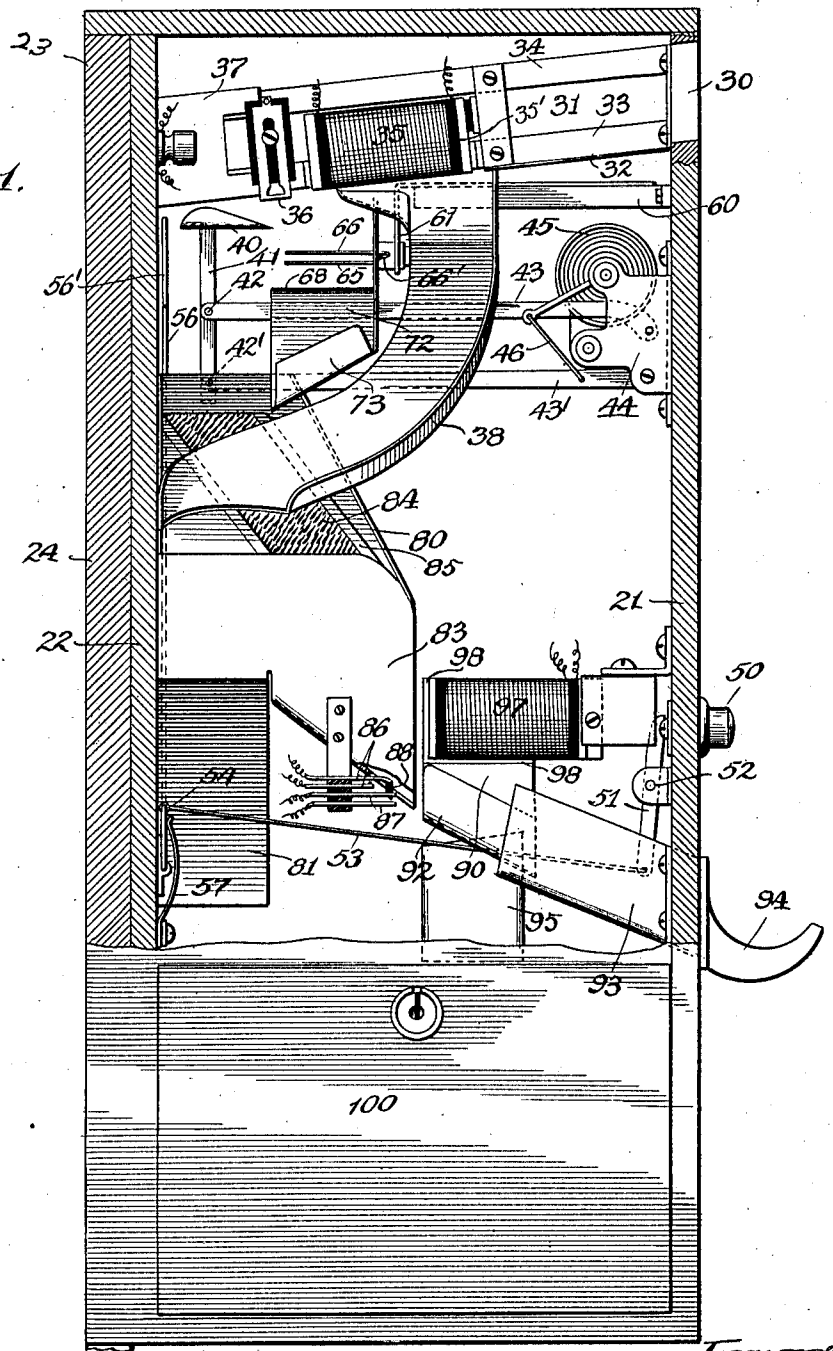
APPLICATION FILED AUG. 2, 1907.

1,027,032.

Patented May 21, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



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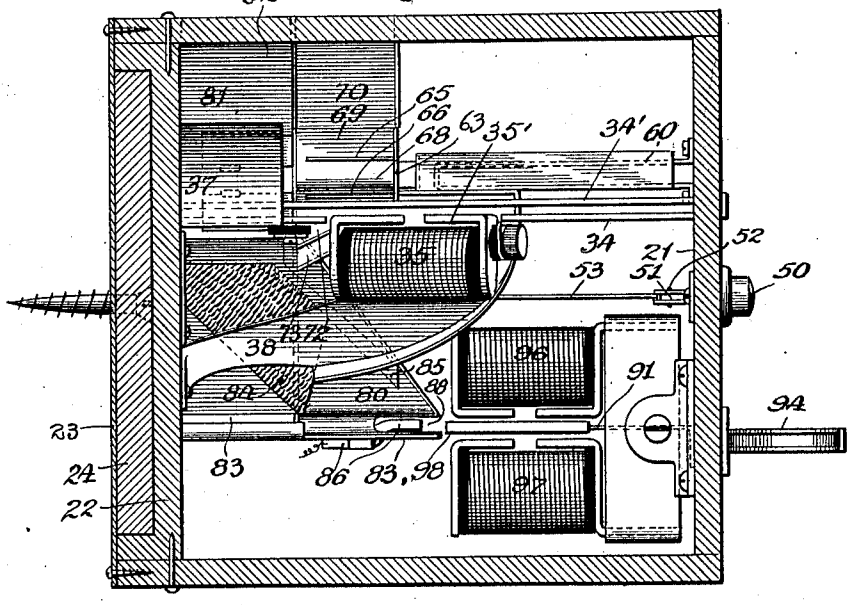
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

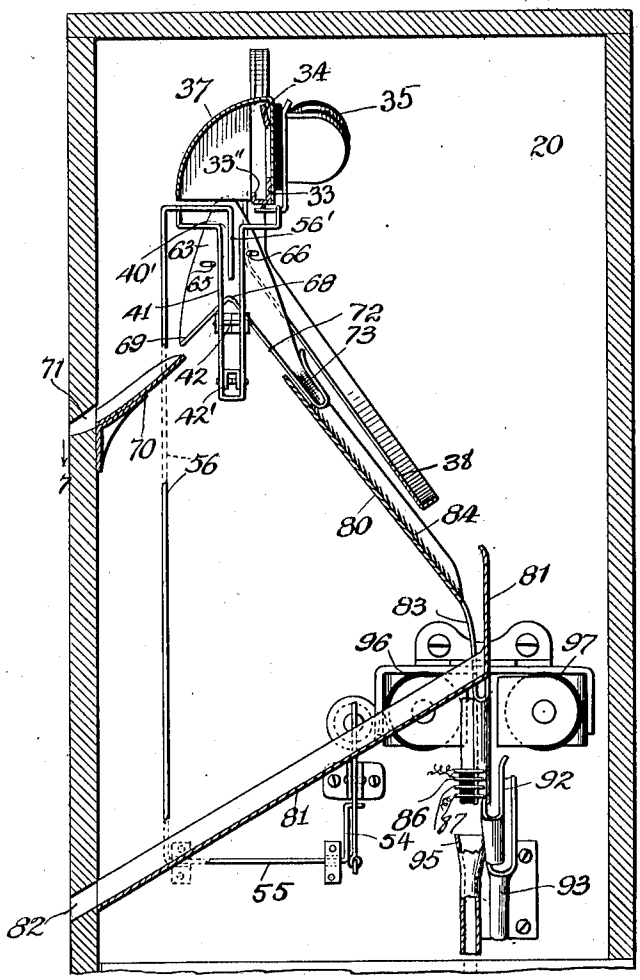
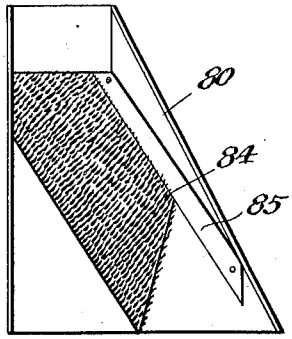


Fig. 4.



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UNITED STATES PATENT OFFICE.

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COIN-TESTING APPLIANCE.

1,027,032. Specification of Letters Patent. Patented May 21, 1912.

Application filed August 2, 1907. Serial No. 386,776.

To all whom it may concern:

Be it known that we, EDWARD A. BUCKMAN and HARRY L. FELIO, citizens of the United States, residing, respectively, at Green Bay, in the county of Brown and State of Wisconsin, and at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Coin-Testing Appliances, of which the following is a specification.

Our invention relates to improvements in coin testing appliances, and in some of its features has particular reference to telephone toll boxes and toll systems.

The general object of our invention is to provide in a coin receiving apparatus means for testing coins or tokens inserted therein while in transit between the point of entry and the receptacle for final lodgment of the coin, so arranged and operated that objects failing to display, on test, the characteristics of the appropriate, lawful coin which the apparatus is designed to receive, are discarded or discharged from the coin path and prevented from entry to the coin receptacle.

Other objects of our invention are to improve generally and in detail coin testing apparatus, to minimize the percentage of slugs or tokens acceptable by the apparatus as good, and to provide an improved system of simultaneous registering of coins deposited, operating both at the toll station and at the central station.

In the particular embodiment of our invention shown the appropriate coin to be received in the apparatus is a nickel or five-cent piece, and one of the tests applied to each coin, token or object inserted in the machine has reference to the diamagnetic qualities of the coin. Other tests as applied in the machine, however, may, with equal virtue, be adapted to coins or tokens of paramagnetic material. These tests particularly refer to the weight of the inserted object and to the character of its surface.

In the embodiment of our invention we provide means forming a path for a proper coin from a suitable point of entry to a receptacle of final deposit, and arrange in operative association with such path means for testing the diamagnetic qualities of the inserted object occasioning the discharge from such path of paramagnetic objects; means for testing the weight of the inserted object and occasioning the discharge of any object which is substantially heavier or lighter than a true coin of the desired denomination, and means for testing the surface qualities of the object, and occasioning the discharge from the path of any smooth object. By these means every slug, or token, of iron, every overweight or underweight coin or token, and every smooth token or coin, is discharged from the coin path.

More detailed objects of our invention and further features thereof may best be gathered from the following description taken in conjunction with the accompanying drawings, wherein;

Figure 1 is a side elevation of a coin testing apparatus taken from the left, with the side of the casing removed; Fig. 2 is a plan view, with the top of the casing removed; Fig. 3 is a vertical central section; and Fig. 4 is an enlarged detail of the surface-testing instrumentality.

Throughout the several views like numerals of reference refer always to like parts.

20 indicates in general an outer casing of any suitable construction, having a front 21, and a back 22 inset somewhat with respect to the sides and top, so that the rear of the casing provides a recess, bridged at its top by strip 23, whereby the casing as a whole may be hooked over a supporting board 24, permanently secured in vertical position, the casing, when in place, being held against removal by a latch 25 engaging the back 22 through a suitable aperture 26 made therein, such latch being preferably positioned to be covered by a removable coin receptacle 100 to be hereafter described, so that when the coin receptacle is in place and locked the casing as a whole may not be removed from its supporting board 24.

Adjacent the top of the machine, in its front face, is provided a coin entrance slot 30, communicating with an inclined coin runway, generally indicated at 31, and in general comprising, as illustrated in Fig. 6, a bottom member 32 whereon the coin may roll, a lower pair of side guides 33, 33′, and an upper pair of side guides 34, 34′. At a suitable point in the runway 31, we provide for the elimination of paramagnetic tokens or objects, and to this end we arrange in juxtaposition to the guideway an electromagnet, and opposite the polar surfaces thereof cut away the guide in such manner

that any paramagnetic disk, rolling down the guideway, upon coming within the field of the electromagnet, when the latter is properly energized, will be drawn out from the guideway by such magnet, and we further so arrange the connections of the electromagnet that said magnet is cut into circuit by the weight of the token or coin itself, operating a small switch, which said switch is released to demagnetize the electromagnet as soon as the token has been pulled from its normal course, so that after deflection from the runway the token is dropped into a discharge chute for ejection from the casing.

Specifically, 35 indicates an electromagnet, suitably supported lengthwise in parallelism to the runway 31, such magnet having angular pole pieces 35′ at opposite ends bent to overlie a side face of the magnet and to approach each other in a common plane parallel with the vertical extent of the runway. The lower side rail 33 is cut away completely throughout an area corresponding with the length of the magnet face or poles, to afford a discharge opening, and to provide for control of the electromagnet, a suitable part of the bottom 32 of the runway is attenuated, as shown at 32′, and beyond said attenuation 32′ provides a free tongue 32″ readily depressible by the weight of a coin or token, and normally, by virtue of its resilience, standing above and out of contact with a contact point 36 suitably insulated from the guideway structure, and conveniently adjustable thereon as to vertical position.

Now it will be apparent that, (assuming the switch 32″—36 to control the electrical connections of electro-magnet 35,) as a paramagnetic token rolls down the runway 31 upon the tongue 32″ it depresses the latter into contact with the point 36 to energize magnet 35, which attracts the paramagnetic token in the manner illustrated in Fig. 5, drawing its bottom portion through the side rail opening and off of the switch tongue 32″, whereupon the latter rises and, the magnet becoming deënergized, the paramagnetic token is released and slips through the space between the pole pieces of the magnet and the tongue 32″ of the runway. A chute 38 receives such rejected token and conducts it toward a proper discharge opening or exit, preferably to a point where it may be delivered into a discharge chute 81 hereafter referred to. Obviously a five cent piece or nickel, being diamagnetic, will not be discharged from the runway and will pass the electromagnet, run over the end of the switch tongue 32″ and continue along the runway toward the rear of the casing.

At its rear end, as best shown in Fig. 3, the runway is so arranged that a coin will topple out of it, top first, and fall flatwise to one side thereof. To this end bottom rail 33′ is almost cut away to leave only a small flange 33″, top rail 34′ is entirely cut away and top rail 34 is distorted into position to tilt the coin outwardly toward the open upper side of the runway.

37 indicates a hood for guiding the coin in its fall and preventing it from bounding out of the proper position. A coin which successfully has passed the magnetic test and falls from the runway is next weighed, and to this end a scale pan 40 is arranged in position to receive the coin as it falls flatwise from the hood 37. Such scale pan preferably comprises two separated portions, arranged to leave therebetween a slot 40′ completely through the pan, and each such section is connected to or made integral with a leg 41 of a support, the two legs being connected together adjacent their lower extremities at two points, by pins 42, 42′, which form the pivotal connections for two link-pairs 43, 43′ extending to and pivoted at their ends in a bracket 44 connected to the front of the casing and affording support also for a coiled balance spring 45 at one end fixedly received and at its other connected as by a link 46 with one of the lever pairs, 43′.

The construction described constitutes an efficient scale although it will be apparent that any other suitable construction might be substituted, and the weight of a nickel will always result in the depression of the scale pan 40 to a predetermined position below the initial position of the pan.

Associated with the weighing scale we provide means for removing the coin from the scale when the latter has come to rest in position determined by the weight of the object upon the pan, and means for directing the further progress of the object removed from the pan, arranged to pass the objects presented thereto in the plane to which a proper coin will depress the scale pan, and to reject all objects presented thereto in a substantially higher or lower plane, to direct them into a discharge course.

Specifically 50 indicates a push button in the front of the casing having connected with one end of an operating lever 51, pivoted as at 52 and having its opposite extremities connected by a link 53 with a lever arm 54 of a rock shaft 55 suitably mounted at the back wall of the casing, connected with the upwardly extending lever arm 56 which terminates in a downturned finger 56′, arranged to sweep through the slot 40′ between the sections of the scale pan as the rock shaft turns. A spring 57 normally pressing against the lever arm 54 holds the finger 56′ in retracted position flat against the rear wall of the casing. It will be apparent, however, that whenever push button 50 is pressed inward moving lever 51 to draw

forward the lever 54, lever 56 and its finger 56′ are swung forward to sweep out of the scale pan 40 any coin or token which may be resting thereon.

For determining the direction of further travel of the coin or token thus removed from the pan, we preferably provide means as follows: 60 indicates a brace projecting from the front wall of the casing, having its extremity downturned as at 61 and suitably slotted as at 61′ to receive the stem 62 projecting from plate 63 through the slot and carrying a clamping screw 62′. In the face of plate 63 are made two laterally elongated apertures 64 through which extend spring pins 65, 66, each taking through its aperture in the plate and at the rear of said plate formed into a spring coil 65′, 66′ to give the pin lateral resilience. The pins 65 and 66 are arranged at different heights, and project into close proximity to the path of movement of the scale pan 40. They define vertically the opposite boundaries of the plane in which an object must be presented to pass onward in the true coin path, and so necessitate the presentation of an object of proper weight in order that such object may find passage into such path. The lateral separation of the pins 65 and 66 is less than the width of the coin, so that any coin pressed forward from the scale pan 40, above either of the pins 65 or 66 will land unbalanced on the pin nearest below and slip off in the direction toward the other pin. Below the pins 65, 66 is arranged a peak 68 carried by and adjustable with plate 63, forming the junction point between two coin-directing surfaces, one constituting part of the true path for the coin and the other constituting part of a discharge way. 69 indicates the discharge chute section arranged above the lower section 70 secured to the side wall of the casing and opening to a discharge mouth 71 in said side wall. 72 indicates the oppositely inclined chute member constituting part of the true coin path through the machine, such portion 72 being provided at its lower end with a deflecting lip 73 suitably bent to discharge the coin toward the rear of the machine.

The relative arrangement of the pins 65, 66 and the peak 68 is such that when a coin is ejected from the scale pan 40 at an elevation above the pin 66 it is tilted by said pin 66 and slipped over the opposite pin 65 down on to the discharge chute 69—70 for discharge through the orifice 71 out of the casing. Any object passing between the pins 65 and 66 (as will a proper coin) is deflected by pin 65 in the opposite direction and passes down upon the chute-member 72 of the true coin path. The peak 68 is slightly off center, so that a coin of too great weight, passing beneath pin 65 rests in unbalanced position upon the peak 68 and slips therefrom down the chute 69 to be discharged. Thus the only objects which will pass the weight testing mechanism are those which are presented to the testing mechanism from the scale pan in the plane assumed by a coin of proper weight. It will be observed in this connection that the pins 65, 66 may each spring outwardly, putting under tension their coils 65′, 66′, and it will further be observed that the ends of the pins are given a slight outward bend so that any coin presented to either pin in exactly the plane of such pin, moves such pin outwardly, (as shown in dotted lines in Fig. 10) from which position the pin is returned by its spring as the coin leaves the scale pan, and the spring action throws the coin in the direction which it will have taken if presented from the scale pan on top of the same pin. An object successfully passing the weight test is discharged from the chute members 72 onto a surface testing appliance.

The surface tester in general comprises a gravity slide way of suitable length, having a narrow receiving end, and at its bottom widened for discharge of an object through either of two passages, one being a passage for rejected objects and the other being a part of the path for a proper coin. The discharge passage for rejected objects is so located that an unimpeded gravitational drop of the object will land it in such passage, while the passage constituting part of the true coin path is so located that a considerable deflection of the coin from its natural gravitational path is necessary to land the coin therein. Associated with the gravity slideway, therefore, we provide a deflecting medium arranged to act upon an embossed surface of a coin or token presented thereto to automatically and invariably deflect an embossed-surface token from the longitudinal path into the non-alining true-coin path, such deflecting medium being of such character as to pass a smooth coin or token without deflecting it. Such a medium we provide by arranging a surface for engagement with a side-face of the coin or token during its gravitational descent, presenting a series of flexible, resilient spines, teeth or fibers, in the coin path with their points or free ends extending upward to oppose the passage of the coin, and with the spines or teeth protruding in arrangement such that the weight of the coin bends them down, bringing their points (and consequently the coin engaging such points) always in the direction toward which the coin must be deflected to continue thence in the true coin path.

In the specific construction shown and described 80 indicates a slideway plate, which, as shown in Fig. 3, has a sharp angular drop, the plate being narrow at its upper end at a point close to the rear wall of the casing where it receives the coin or token,

(see Fig. 1.) and being more than double the width of a coin at its bottom end. Directly below the receiving end of the coin chute is the mouth of a spout 81 leading direct to a discharge orifice 82 in the side of the casing, so that any object dropping undeflected down the slide 80 will land in said discharge chute 81. Farther inward in the machine, out of the true gravitational path of fall of a smooth object, is the mouth of a chute 83 downwardly and forwardly inclined and constituting part of the true coin path through the machine. The surface of the slideway 80 intermediate the receiving end and its discharge end, is provided in whole or in part with a deflecting medium of the characteristics above described.

In the particular construction shown 84 indicates a strip of plush arranged diagonally of the slideway, such strip being in width about the width of the mouth or upper end of the slideway and diagonaling therefrom to the mouth of chute 83. The fabric is pasted or otherwise secured in the slideway surface, such plush being cut and arranged on the bias so that the spines, or fibers of the pile project upwardly with each spine or thread lying at an angle of about 45° from the vertical and inclining from its base toward its point in the direction to be taken by a true coin in continuing in the true coin path, that is, toward chute 83. We prefer further that a metallic strip 85 should be laid along the edge of the deflecting surface 84 toward which the true coin is to be deflected.

Now it will be apparent that the construction described operates as follows: When a smooth token or worn coin falls upon the mouth of the slideway 80, it slips down over the plush unimpeded thereby and takes the natural gravitational course into the discharge spout 81. A true coin, however, or a token, having an embossed face, upon reaching the testing surface has its embossed portions engaged by the projecting fibers or spines of the surface, which tends to hold it back or retard its progress. The teeth, however, are of insufficient strength to support the weight of the coin or token, and, therefore, bend, the angle at which they are arranged being such that naturally they always bend toward the chute 83, (to the right, in Fig. 4) or in the direction in which it is desired that the coin shall be deflected. This action takes place continually throughout the extent of the fabric, and we have found in practice that an embossed coin or token is unfailingly deflected to the chute 83 not alining with the mouth of the slide, while every smooth coin or token unfailingly passes in direct descent to the discharge part 81 alining with the receiving end of the slideway. It will be obvious, however, that for accomplishing the results described we are not limited to a piled fabric, such as we have described, as any arrangement of spines or teeth having the characteristics specified will serve the purpose. The overlying metal strip 85 we have found useful in lightening the wear upon the deflecting surface and obviating any possibility of the coin sticking, as the coin is usually deflected so that its one edge rests upon the metal strip 85 down which it may easily slip, while only its outer edge is engaged by the testing surface, such engagement being ample to secure the proper deflecting action. When the coin has successfully passed the surface test and been received in the chute 83 its acceptability is finally determined and the coin has only to be disposed of. For many purposes, therefore, the chute 83 may be considered as leading direct to the final point of deposit in the box, but for telephone purposes we arrange means whereby the central operator may be notified of the arrival of the coin in the chute 83 and may by proper manipulation of the central telephone apparatus determine the further progress of the coin into the coin receptacle or for return to the customer. At its lower end the bottom of the chute 83 is cut away, as indicated in Fig. 1, and through the orifice thus made two spring switches 86 and 87, each composed of two normally separated contact members, are projected in such relation that a coin rolling to the bottom of the chute, depresses the upper members of the two switches (connected together by an insulating member 88) into contact with their respective lower contacts. Normally the end of the chute 83 is closed by a switch member 90 carried by a spring arm 91, secured to and projecting from the front of the casing, such coin switch having on one side thereof a return chute portion 92 arranged to lead into communication with a run 93 opening through the front wall of the casing to the customary returned-coin bracket 94. Directly below the end of the chute 83 is a flaring coin spout 95 for conducting a coin downward into a coin receptacle therebelow. When the switch stands in normal position it blocks the end of the chute 83; when moved to the right (with reference to Fig. 3) it permits the coin to drop into the coin box through the chute 95; and when moved to the left it receives the coin in its chute sections 92 and delivers the same to the return run-way 93. Suitably supported in a frame secured to the front of the casing are two electromagnets 96 and 97 of suitable construction, preferably similar to that of the magnet 35 heretofore described, each presenting its polar surfaces in parallelism to the switch 90, which is preferably provided with a polarized armature 98. Said magnets are arranged to present opposite poles to either pole end of the armature, so that passage of

current one way through the magnets attracts the armature to one magnet while reversal of the current direction throws the armature to the other magnet.

100 indicates in general a coin receptacle, arranged in the bottom of the casing in such position that it covers the latch 25 when in place.

Having thus described our invention what we claim and desire to secure by Letters Patent of the United States, is:

1. In a coin detecting apparatus, means providing a path for a proper coin including a slideway at an angle to the horizontal down which the coin may slide upon one of its parallel faces under the influence of gravity, the true coin path down said slideway being at an angle to a direct gravitational path, and means, comprising yielding projections for engagement with one of said parallel faces of an object upon the slideway, for deflecting embossed objects from the direct gravitational path into the true coin path, and permitting the passage of smooth objects in the direct gravitational path and out of the coin path.

2. In a coin testing apparatus, means for separating smooth and embossed coins comprising a part affording a normal path for smooth objects and a deflecting agency comprising a large number of yielding projections arranged and adapted for coöperation with the embossed side face of a coin to deflect it from said path.

3. In a coin testing apparatus, means for separating smooth from embossed coins comprising a plurality of teeth projecting from an inclined slide, each arranged to yield downwardly and laterally, thereby laterally to deflect an embossed object by the yielding of said teeth under the engagement of the embossed surface of said object.

4. In a coin testing apparatus, a coin slideway terminating in two separated paths, said paths comprising a dischargeway for smooth objects, arranged with respect to the top of the slideway to receive any objects proceeding down it under the influence of gravity alone, and a receiver for embossed objects laterally removed from the said gravitational path, and a plurality of projections upon the surface of said slideway arranged to engage the embossed side face of a true coin, and under the influence of its weight to yield downwardly and laterally toward the last said receiver, thereby to deflect objects into said last said receiver and to permit the gravitational passage of smooth objects into the discharge way.

5. In a coin testing apparatus, means for separating smooth from embossed objects comprising a slideway having a single receiving area at its top and separated discharge passages at its bottom, one of said discharge passages being positioned to receive objects passing from said slideway under the influence of gravity alone, and the other discharge passage being out of such gravitational path, a surface of said slideway engaged by one of the parallel faces of the coin providing a series of projecting points arranged to oppose the passage of an object thereover and disposed to descend under the weight of an object thereover always in the direction tending to carry their points toward the passageway out of the gravitational path.

6. In a coin tester, an embossed coin deflector comprising a surface arranged for contact with the side surface of the coin and composed of minute projections having their ends opposing the passage of the coin and disposed at an angle to the gravitational path of the coin, such projections being yieldable under the weight of the coin in the direction in which the coin is to be deflected.

In testimony whereof we hereunto set our hands.

EDWARD A. BUCKMAN.
HARRY L. FELIO.

In the presence of—
GEO. C. HOLMES,
GEO. T. MAY, Jr.