June 17, 1958 W. A. PATZER 2,839,175

COIN TESTING DEVICE

Filed Dec. 1, 1954

Fig. 1

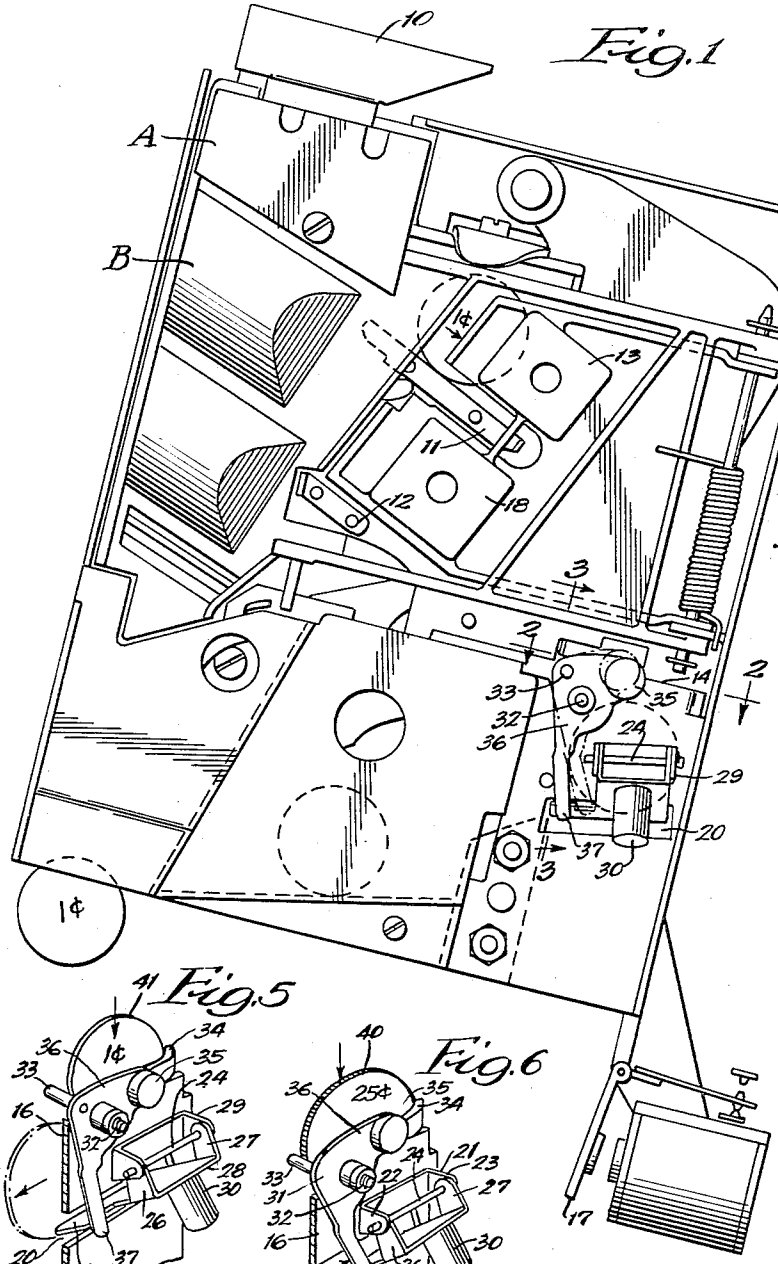


Fig. 2

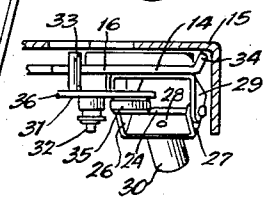


Fig. 3

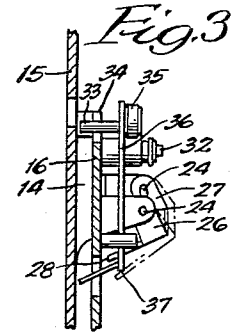


Fig. 4

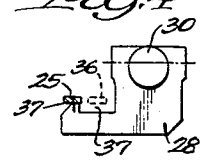


Fig. 5

Fig. 6

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COIN TESTING DEVICE

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Application December 1, 1954, Serial No. 472,364

1 Claim. (Cl. 194—102)

This invention relates to a coin testing device and more particularly, to a device of the type described for use in combination with coin-operated machines for testing coins inserted to reject illegitimate coins and to separate the legitimate coins which pass through the device into their various denominations for delivery to the coin-operated machine.

Such devices for testing coins may be adapted for use with coins of a single denomination, such as a 5-cent piece or a 25-cent piece, depending upon the character and price of the commodity being dispensed, but the majority of coin testing devices are adapted for use with machines wherein a number of coins of different denominations may be employed, in the alternative, for operation thereof. When constructed for use with a single coin, means for separation of the coins inserted into their various denominations become unnecessary and simple means may be employed for testing the coins to reject those which are either undersize or oversize, and conventional means may be employed for separation of the coins of proper size into legitimate coins and counterfeits, based upon compositions of the coins, as by causing the coins to travel laterally over an inclined runway through a magnetic field.

Devices adapted for use in combination with machines capable of being operated by coins of more than one denomination are more complicated in their construction and operation. Means such as previously described for operation with a single coin are generally employed, but before such tests to effect separation based on composition can be utilized, it is expedient first to separate the coins of one denomination from the coins of other denominations. Various means have been developed for effecting such preliminary separations. For the most part, such preliminary testing means have been achieved on the basis of size and weight of the coins, with the coins of larger dimension, such as coins having the dimension of a 25-cent piece, being separated out first, followed by separation of coins having the dimension of a 5-cent piece and then a 10-cent piece, and the like. In one such means, use is made of rocker arms spaced apart a predetermined distance for arresting coins of a predetermined dimension on the arms thereof, after which the arms are rocked, if the coin is of sufficient weight, to deliver the separated coins laterally onto an inclined runway over which the coins of that particular dimension travel through a magnetic field for examination by composition. A device operating in this manner is described in Patent No. 2,292,628, and others.

In another system which has more recently been developed and which is described in my co-pending application Serial No. 405,936, filed January 25, 1954, the separation of coins into their various denominations is achieved without the use of moving parts. In the system described in the aforementioned patent application, the inserted coins fall by gravitational force downwardly through a series of slots and runways, which will hereinafter be described, for separation of the coins of larger

dimension on the upper runway, etc. over which the separated coins travel laterally onto the inclined runway for passage through a magnetic field adapted to have the desired effect on the particular coin for separation based upon composition.

After the coins travel laterally over the runways, either in a single coin testing device or in a multiple coin testing device, if the coin of the particular dimension has the proper composition for coins of that denomination, they will fall from the end of the runway into a particular slot for coins of that denomination by which the coins are delivered to the corresponding coin slots of the coin-operated machine.

Such coin testing devices as have been heretofore described operate successfully for the purposes intended, except that it is possible with some units to cheat the machine by very skillful operation to cause a coin of smaller dimension, such as a 1-cent piece, to follow the path of a coin of larger dimension, such as a 25-cent piece, with the result that a machine intended to be operated by the 25-cent piece for purchase of a commodity or the like might be operated instead only by a 1-cent piece, with consequent loss to the owner. For the protection of those machines which do not have a coin testing device embodying the features of this invention, detailed description will not be given herein of the manner in which such operations to cheat the machine can be effected. Suffice it to say, that the 1-cent piece or the like is displaced to cause it to travel laterally over the runway adapted exclusively for use by the 25-cent piece without being thrown out by the magnetic test, so that the coin will successfully enter the coin slot for the delivery of the 25-cent piece to the coin-operated machine.

It is an object of this invention to produce a coin testing device of the type described in which such cheating operations can be prevented.

More specifically, it is an object of this invention to produce a coin testing device of the type described in which the coins that have successfully passed the various tests of the device are engaged in the coin slot leading to the coin-operated machine to prevent passage of coins which have erroneously or otherwise entered the slot prior to the operation of the machine, thereby to prevent such cheating operations and provide greater protection again loss by the owner of the machine.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawing, in which—

Fig. 1 is an elevational view of a coin testing device embodying the features of this invention;

Fig. 2 is a sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is an elevational view of the shelf member forming a part of the device illustrated in Fig. 1;

Fig. 5 is a perspective elevational view, partially in section, of the anti-cheating portion of the device shown in Fig. 1 embodying the features of this invention; and

Fig. 6 is a perspective elevational view, partially in section, of the portion of the device shown in Fig. 5 in the operated position.

In the drawing, illustration is made of a construction embodying the features of this invention in combination with a coin testing device of the type described in my co-pending application Serial No. 405,936. Since the concepts of this invention may be employed independently of the particlular type of coin testing device, detailed description thereof will not be made.

Suffice it to say, that a coin testing device of the conventional type, such as is illustrated in the drawing,

comprises means for receiving the coins inserted into the coin chute 10 for separating the coins into various denominations from the standpoint of size or weight or combinations of both size and weight. Where such means are employed for separating the inserted coins into denominations for subsequent testing on the basis of composition, it is usually the practice to first extract the coins of larger dimension, then the next largest, and etc.

The coins upon separation are delivered laterally to inclined runways 11 and 12 over which the coins travel for subsequent testing based on composition or the like. Thus, coins having the dimension of weight of a 25-cent piece are displaced in section A from the normal path of travel of the coins inserted into the device through the coin chute. The coins separated in section A are displaced laterally onto the inclined runway 11 over which the separated coins roll between permanent magnets 13 which operate by way of a magnetic attraction to control the rate of travel of the coins over the runway, with the result that legitimate coins of the particular dimension fall from the end of the runway along a path which carries them into the coin chute 14 between spaced walls 15 and 16 of the coin testing device, and through which the coins travel to the coin-operated machine for actuation of the coin-controlled lever arm 17, or switch, for actuation of the machine before being deposited in a coin receiver (not shown).

Coins smaller or having less weight than a 25-cent piece negotiate through the first test section A into the next section B below, wherein coins having the dimensional characteristics or the weight of a 5-cent piece are displaced from the normal path of travel of the coins through the device. These are delivered laterally onto the inclined runway 12 for passage between magnets 18 which test the separated coins for composition. The remainder of the coins continue downwardly through the device for other tests designated to separate one coin from another and to eliminate the non-legitimate coins from the legitimate coins of particular denominations.

As previously pointed out, it is possible for a party inserting coins into the machine to cause a coin of smaller dimension to be displaced from the normal path of travel of the coins through the testing device at an earlier stage in a section designed to effect the displacement of coins of larger dimension. From the practical standpoint, the only gain to a party intending to cheat a machine in the manner described is a cause a 5-cent piece to be displaced for travel through the device in the manner of a 50-cent piece, or to cause a 1-cent piece to be displaced for travel through the device in the manner of a 25-cent piece or a 50-cent piece, or the like coin of higher denomination.

For purposes of illustration, description of the invention will be made of the construction for preventing operation to enable a 1-cent piece successfully to pass through the device as a 25-cent piece for operation of the coin-controlled machine. It will be understood that the testing means embodying the features of this invention may be employed separate and apart from any previous testing mechanism. For example, it may be employed with a single coin slot intended to be used only with a 50-cent piece or a 25-cent piece or the like.

It will be further understood that the anti-cheating means embodying features of this invention may be used in a coin chute through which coins of a particular dimension are caused to travel to the means for initiating operation of the coin-controlled machine without any previous tests. For example, the features of this invention may be employed solely in a coin slot in communication with a coin chute into which coins of a single denomination are adapted to be inserted, such as a 50-cent piece or a 25-cent piece, but in which a party attempting to cheat the machine may try to effect operation of the machine with a 1-cent piece or the like.

Referring now to the drawing for a detailed description of the anti-cheating means embodying features of this invention, the numeral 14 represents a coin chute in the form of a vertically-disposed slot between the face plate 15 of the coin testing device and a backing plate 16 spaced one from the other in fixed relation by an amount to enable the coin to fall vertically downwardly therebetween.

The backing plate 16 is formed with an elongate slot 20 extending at a slight downward incline from the outer edge to the right in Fig. 1, inwardly across the width of the plate corresponding to the path of travel of the coin through the coin slot 14. Mounted on the rear wall of the backing plate, above the slot 20, is a bracket 21 in the form of a yoke having a pair of laterally-spaced, outwardly-extending arm portions 22 and 23 between which a pin 24 is mounted for pivotal support of means shiftable through the slot 20 into the path of the coin between blocking and unblocking positions. The means, as illustrated, comprises a shelf plate 25 formed of a rigid material, such as a metallic strip, having a pair of ears 26 and 27 struck upwardly perpendicularly from the rearward end portion thereof to form a yoke having openings in the end portions thereof which receive the pin 24 pivotally to support the shelf plate on the backing plate 16. The forward end portion 28 of the shelf plate 25 is dimensioned to have a width which is less than the width of the slot 20, and which is in alignment therewith to enable movement of the end portion 28 through the slot into the path of the coin travelling downwardly through the coin slot 14. The length of the plate is such as to enable the end 28 of the plate to extend through the slot into engagement with the face plate 14 while in blocking position with the upper surface of the portion of the shelf plate extending through the slot being disposed at a relatively sharp downward incline to provide a cam surface 29 for displacement of the plate rearwardly about its pivot responsive to camming action between the coin passing downwardly through the slot and the cammed surface of the shelf plate lying in the path thereof. The forward end portion 28 of the shelf plate adapted to extend through the slot 20 into blocking position, is disposed at a tilt corresponding to that of the slot 20 which provides an inclined runway for lateral displacement of coins incapable of camming the shelf plate from its path.

The shelf plate 25 is constantly urged to rock about its pivot in the direction to bring its edge portion 28 into blocking position in the path of travel of coins downwardly through the coin slot, but with a force insufficient to prevent the shelf plate from being cammed outwardly to unblocking position upon engagement of a coin of the desired weight with the cam surface 29 of the shelf plate which lies in the path of the coin, when in blocking position. The shelf plate may be resiliently urged towards blocking position by various means including spring and the like, but it is preferred to make use of a counterweight 30 depending from the outer end portion of the shelf plate below the pivot for more accurate and better control.

The shelf plate 25 is normally latched in its blocking position by means adapted temporarily to release the shelf plate in response to the passage of a coin of the desired dimension downwardly through the coin slot for a time sufficient to enable the coin to cam the shelf plate out of blocking position so as to enable continued passage of the coin downwardly through the coin slot to the coin-operated machine.

Such latching means responsive to the passage of coins through the coin slot in advance of the shelf plate comprises a bell lever 31 pivoted intermediate its ends for rocking movement on a stud 32 extending rearwardly from the backing plate 16 above the slot 20. A pin 33, offset from the pivot, extends inwardly from the intermediate portion of the bell lever 31 through a slot or opening 34 in the backing plate for rocking movement

between normal and operated positions of adjustment. When in normal position, the pin **33** is adapted to be spaced laterally from the opposite wall defining the coin slot through which the coin travels by an amount which is slightly less than the diameter of the coin adapted to be processed therethrough, but greater than coins of smaller dimension. The wall opposite the pin **31** defining the space in the coin slot between which the coin is adapted to travel may constitute a portion of the face plate **14** or the backing plate **16** or some attachments thereto, but it is preferred, for purposes of more accurate control, to form said opposite wall by striking a portion **34** of the backing plate **16** inwardly the calculated distance from the pin **33**.

The bell crank lever **31** is constantly urged, as by means of a counterweight **35** on the outer end of one arm **36** or by spring means or the like, to rock the arm in the direction for locating the pin **33** in normal position within the coin slot, but with a force insufficient to resist displacement of the pin **33** and the lever arm **31** by rocking movement about its pivot when the pin is cammed outwardly upon engagement by a coin of the desired dimension passing downwardly through the coin slot between the pin **33** and the wall **34**. The other arm **36** of the bell crank lever extends downwardly beyond the rear edge portion of the shelf plate **25** into operative engagement with the rear edge thereof when in normal position, and in alignment with a cutout portion **37** of the shelf plate when the lever arm is displaced to operated position. When the arm **36** is aligned with the cutout portion **37** in operated position, it is possible for the coin during continued passage downwardly through the coin slot, to displace the shelf plate from blocking to unblocking position. When the arm **36** is disposed in normal position, the engagement between the arm and the rear edge of the shelf plate prevents displacement of the shelf plate from blocking to unblocking position.

In operation, a coin **40** entered by coin chute **10** falls gravitationally downward through the coin chute **14** until it enters the area between pin **33** and the opposite wall **34**. When in normal position, the spaced relation between the pin **33** and the wall **34** is slightly less than the diameter of the coin adapted to be processed therethrough, such as the 25-cent piece **40**, with the result that the edge of the coin engages the pin **33** and cams the pin **33** outwardly. The amount of displacement of the pin **33** by the coin **40** is sufficient to cause rocking movement of the bell lever **31** from normal to operated position which brings the arm **36** out of engagement with the rear edge of the shelf plate **25** and into alignment with the cutout portion **37** for a time sufficient to enable the coin to engage the cam surface of the shelf plate lying in the path thereof for displacement of the shelf plate to unlocking position out of the path of the coin. Thus the coin is able to continue its travel in the normal manner through the coin slot **14** to the coin-operated machine for actuation of the controls **17** thereof.

On the other hand, when a coin, such as a 1-cent piece **41** is caused to pass downwardly through the coin slot **14**, the coin will be of insufficient dimension to cause displacement of the pin **33** from its normal position. Thus the bell lever **31** remains in normal position with the arm **36** in operative engagement with the shelf plate **25** to latch the plate in blocking position in the path of the coin. As the coin falls downwardly beyond the pin **33** into engagement with the cam surface of the shelf plate in blocking position, it will be unable to cam the plate from blocking to unblocking position because of the inability of the shelf plate to rock about its pivot. As a result, a coin of smaller dimension will be arrested on the inclined surface of the shelf plate lying in the path thereof in blocking position so that the coin will roll laterally over the inclined surface for displacement out of the coin chute into a coin reject receiver (not shown).

It will be apparent from the foregoing description that I have provided positive means for controlling the passage of coins, independent of any previous tests to separate coins of undesired dimension from those adapted to travel through the particular coin slot to the coin-operated machine. The spaced relation between the lever arm **31** and the elements associated therewith, and the cam plate lying in the path of the coin is such that the coin will be able to engage the cam surface of the shelf plate before the counterweight **35** becomes effective to rock the lever arm out of alignment with the opening **37** and into latching engagement with the shelf plate to prevent displacement thereof. It will be apparent that when the shelf plate is displaced from blocking to unblocking position, the end portion of the lever arm **36** will be received within the cutout **37** and will be prevented from return of the lever arm to normal position until the coin has traversed the space between the shelf plate and the face plate, and the shelf plate has rocked back to its blocking position.

It will be understood that the elements described may be disposed on the opposite walls, such as the arrangement on the face plate **15** as distinguished from the backing plate **16** or the like.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claim.

I claim:

In a coin testing device, a coin chute having a pair of spaced walls between which coins of a predetermined denomination are adapted to travel during passage through the device, one of said walls having an elongate slot extending transversely across the coin chute, a plate having a shelf shiftable through said slot between blocking position with the shelf positioned in the path of the coins and unblocking position with the shelf withdrawn from the path of the coins to enable the coins to travel downwardly through the coin chute, the top surface of the shelf, when in blocking position, being inclined downwardly from the position adjacent the slot toward the opposite wall and tilted laterally from one end to the other for crosswise displacement of the coins coming to rest on the shelf, said space between the walls being clear adjacent the lower end of the tilted shelf for at least a distance upwardly from the shelf corresponding to the diameter of the coins of the predetermined denomination to enable automatic displacement of the coins from the shelf when in the blocking position, means constantly urging the plate toward blocking position but with a force insufficient to prevent the plate from being displaced from blocking to unblocking position responsive to engagement between the coin and the inclined surface of the shelf, means for normally holding the plate in blocking position, pins normally spaced one from the other by a distance slightly less than the diameter of the coins of predetermined denomination and spaced upwardly from the shelf by an amount greater than the diameter of the coins of predetermined denomination, at least one of said pins being mounted for shifting movement in the direction away from the other responsive to camming action of the coins of predetermined denomination to enable passage therebetween, an operative connection between said displaceable pin and said holding means for releasing said shelf plate in response to displacement of the pin, and means constantly urging said pin and holding means towards normal position.

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