June 6, 1933. C. A. FOWLER ET AL 1,912,699

SPURIOUS COIN DETECTOR

Filed March 15, 1932

Fig. 1

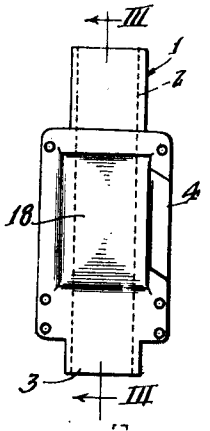


Fig. 2

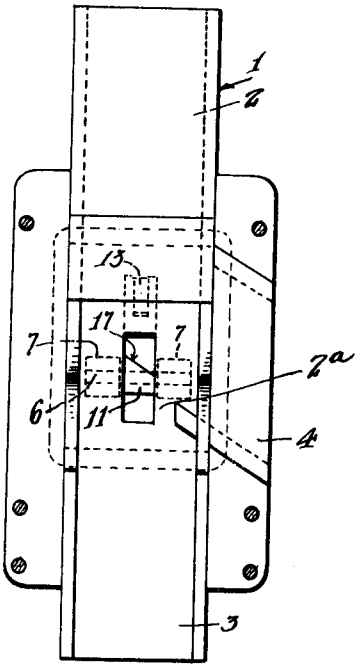


Fig. 3

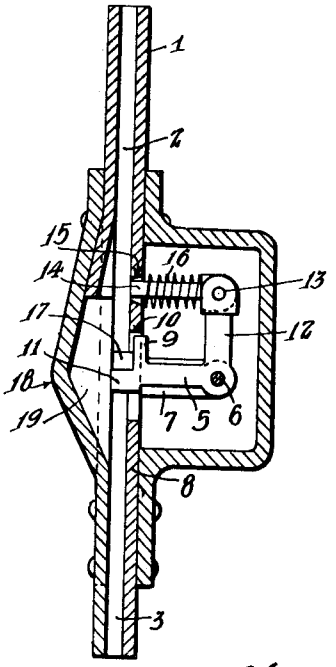


Fig. 4

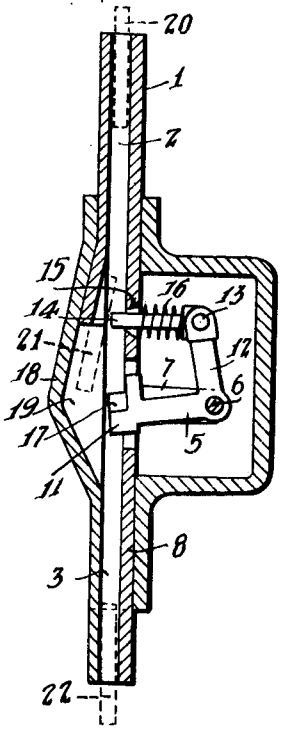


Fig. 5

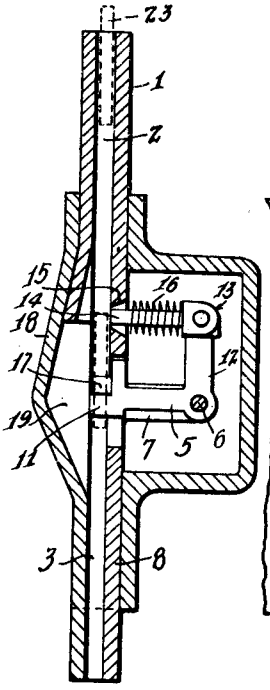


Fig. 6

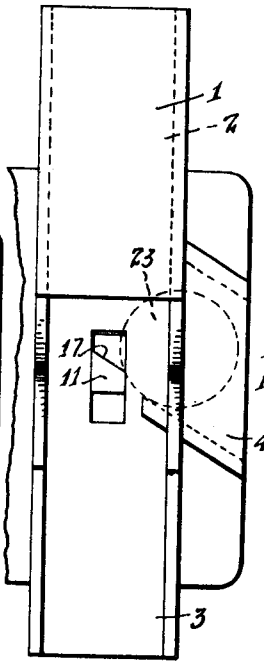
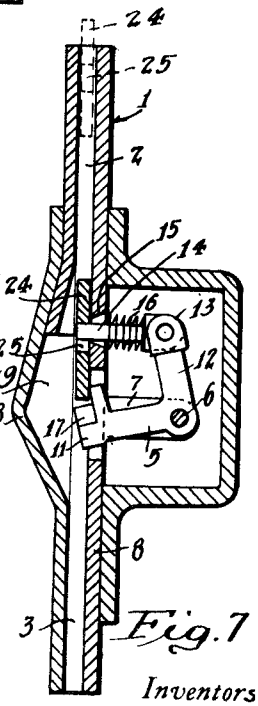


Fig. 7



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UNITED STATES PATENT OFFICE

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SPURIOUS COIN DETECTOR

Application filed March 15, 1932. Serial No. 598,932.

This invention relates to spurious coin detectors, and has particular reference to a device for segregating true coins from spurious coins either of low weight or different in configuration from a true coin.

In connection with coin controlled devices, such as telephones, weighing machines, and other devices of similar character, it is desirable to provide a device which will automatically measure coins or imitation coins which may be deposited for the operation of such machines, and to discard imitation coins so that they cannot operate the coin-controlled machines and to permit only true coins to pass into the operating mechanism of the machine to cause its operation.

This application is a continuation in part of applications Serial Numbers 443,668 and 494,686, filed jointly by us on April 12, 1930, and November 10, 1930, respectively.

It is an object of this invention to provide a spurious coin detector which will automatically measure all coins, imitation coins, tokens, or other devices deposited, and reject the spurious or imitation coins while permitting operation of the machine by true coins.

Another object of the invention is to provide a coin detector of the character described in the preceding paragraph, in which the detector may be formed as an attachment constituting a part of the coin chute of a coin-controlled machine.

Another object of the invention is to provide a device which will measure coins and imitation coins, and which will reject light weight imitation coins while permitting true coins of the correct weight to pass through.

Another object of the invention is to provide a device as set forth in the preceding paragraph in which imitation coins or tokens having an aperture through them will be automatically selected and disregarded before entry into the operating portions of the machine.

Another object of the invention is to provide a spurious coin detector in which imitation coins formed of magnetic material will be detected from true coins and be disregarded.

Other objects of the invention will be apparent from a study of the following specifications, read in connection with the accompanying drawing, wherein

Figure 1 is a front elevational view of a coin detector constructed in accordance with our invention, the embodiment shown being that of a single coin chute for the selection of true coins of one denomination.

Figure 2 is an elevational view of the spurious coin detector shown in Figure 1, with the cover plate removed therefrom to disclose the collection and rejection chutes.

Figure 3 is a vertical sectional view, taken along line III—III of Figure 1.

Figure 4 is a sectional view, similar to Figure 3, illustrating the operation of the device for the selection of true coins.

Figure 5 is a view similar to Figure 3, illustrating the operation of the device for the selection and rejection of light weight or imitation coins.

Figure 6 is a front elevational view, similar to Figure 2, illustrating the selection and discarding of light weight coins.

Figure 7 is a sectional view, similar to Figure 3, illustrating the operation of the device for the selection and rejection of coins having an aperture therethrough.

Referring to the drawing, we have illustrated in Figure 1, a coin detector comprising a coin chute 1 which may be formed of any suitable material and of any suitable configuration to provide a downwardly descending passage 2 therethrough, through which coins may pass of a denomination for which the chute is selected. The passage 2 is illustrated as branching at a junction 2^a into two branches comprising, respectively, a collection branch or chute 3, through which true coins may pass to a collection receptacle or to operating mechanism to which the device may be attached, and a rejection or refund branch 4 through which light weight or spurious coins may pass to a refund receptacle or to a suitable receptacle for receiving them, preventing effective operation of the machine.

By referring particularly to Figures 2 and 3, it will be observed that the coin chute 1 is of considerable length and has a coin

measuring device interposed therein immediately above the branching of the chute into the collection and rejection chutes.

The coin measuring device comprises a weight responsive mechanism illustrated as a bell crank lever 5 pivoted at 6 to a pair of brackets 7 mounted upon the rear side 8 of the chute 1. One leg 9 of the bell crank 5 extends forwardly through an aperture 10 in the rear wall 8 of the coin chute so as to interpose the outer end 11 of the leg 9 in the path of a descending coin. The other leg 12 of the bell crank 5 is illustrated as extending upwardly to form a pivotal mounting 13 for a pin 14 which extends through a second aperture 15 into communication with the slot or passage 2 of the descending coin. A spring 16 is provided upon the pin 14, preferably bearing between the leg 12 of the bell crank and the rear wall of the coin chute.

As illustrated in Figure 3, the normal position of the bell crank is such that the outermost end of the pin 14 is just flush with the inner surface of the rear wall 8 of the coin chute though if desired a small amount of lost motion may be provided by normally mounting the pin so that its outer end lies just clear of the passageway 2.

The spring 16 is selected dependent upon the denomination coin for which the chute is designed and dependent upon the length of the vertical drop of the coin in the chute before it springs the outer end 11 of the bell crank 5. That is, the spring must be sufficient to overbalance the weight of a true coin resting upon the bell crank but not sufficient to resist depression of the bell crank when practiced with the combined force of the weight of the coin plus the momentum acquired during its vertical fall. Thus a true weight coin descending through the chute 1 will impact the outer end 11 of the bell crank 5 and will cause the bell crank to be depressed into the position shown in Figure 4, which movement will be accompanied by a forward movement of the pin 14. The length of the leg 12 of the bell crank 5 is preferably selected such that when a coin of the proper diameter to descend through the chute 1 is resting upon the outer end 11 of the bell crank, the pin 14 is in a position to contact at substantially the center of such coin.

By referring particularly to Figures 2 and 6, it will be observed that the outer end 11 of the bell crank 5 is provided with an angular upper face 17 so that a coin which impacts the same will tend to roll to one side of the coin chute dependent upon the direction of angularity of the face 17. It will also be observed that the rejection chute 4 constitutes a passageway leading laterally from the chute 1 on the side toward which the face 17 is angled. The passageway 4 is selected at such height relative to the bell crank 5 that a coin which descends upon the bell crank without depressing the same will immediately pass laterally over the angular surface 17 and into the rejection chute 4.

By referring particularly to Figure 3, it will be observed that the front side of the chute 1 is cut away immediately adjacent the outer end 11 of the bell crank 5 so that a coin descending in the chute is permitted to be canted forwardly a sufficient distance to pass from the end 11 of the bell crank. The chute 1 is illustrated as being provided with a cover 18 which has a depression 19 formed therein to provide a passageway in front of the bell crank 5 through which coins which pass from the front of the bell crank may pass downwardly into communication with the collection chute 3, which, as hereinbefore described, communicates with a collection receptacle or with suitable operating mechanism to which our device may be attached.

The operation of our device is as follows:

Assuming that a true coin of correct weight is deposited in the coin chute 1, it will follow the path indicated in Figure 4. A true coin of the correct weight is illustrated in dotted lines at 20 which will descend through the chute 1 to impact the extending end 11 of the bell crank 5. Since this is a true coin, its weight, plus the momentum acquired by the coin in descending though the chute 1, will exert a force upon the bell crank 5 sufficient to depress the bell crank and to press the pin 14 inwardly of the passageway 2. The end of the pin 14 will therefore strike the coin and push the same forwardly, as is indicated at 21, so that the lower edge of the coin passes off the extended end 11 of the bell crank 5 and hence the coin will pass through the passageway 19 into the collection chute 3, as is indicated at 22.

It will be observed that the bell crank 5 with its pin 14 and spring 16 will constitute a measuring device which will test the weight of the coin descending so that only coins equal to the true weight will be passed into the collection chute.

By referring particularly to Figure 5, it will be observed that light weight coins will not be permitted to pass into the collection chute. A light weight coin is illustrated in dotted lines at 23 which in descending through the passage 2 will impact the bell crank 5 but the short weight of the coin, combined with its momentum, will be insufficient to compress the spring 16 so that the pin 14 will not push this coin off of the end 11 of the bell crank 5. Thus the light weight coin will come to rest momentarily upon the bell crank 5 and by reason of the inclined face 17 will immediately slide laterally from the chute 1 into the inclined rejection chute 4.

By referring to Figure 6, it will be observed that any coin which is lighter than a

true coin will immediately pass into the rejection or refund chute 4.

Our device will also detect spurious coins having an aperture therein, such as various types of tokens now in general use, even though such tokens approximate the weight of a true coin.

By referring particularly to Figure 7, it will be observed that a spurious coin 24 having an aperture 25 therein, when descending through the passageway 2, will impact the bell crank 5, as in the case of a true coin.

Assuming that the weight of the coin 24 is sufficient to depress the bell crank 5, such operation will cause the pin 14 to be projected forwardly, but instead of the pin striking the coin and pushing it forward, as in the case of a true coin, in this instance the pin will be projected into the aperture 25 of the spurious coin. Thus the coin will be brought to rest upon the pin 14 so that its momentum being overcome, the bell crank 5 may be retracted to withdraw the pin 14. Upon withdrawal of the pin 14, the coin is resting upon the inclined surface 17 of the bell crank 5 and hence passes laterally into the rejection or refund chute 4. The bell crank 5 and the pin 14 are preferably made of magnetic material so that together they may form a magnet for causing the rejecting of spurious coins formed of magnetic material. The bell crank 5 and the pin 14 may be made of relatively hard steel and may be magnetized so as to form a permanent magnet. The walls of the chute 1 are preferably formed of non-magnetic material so that a spurious coin of magnetic material descending therein will enter the magnetic field of the bell crank and pin and thus be retarded in its downward movement.

The retardation will be sufficient to overcome the momentum of the coin so that the impact thereof upon the bell crank 5 will not be sufficient to depress the bell crank and thus the coin will come to rest momentarily upon the inclined surface 17 and will be rejected as described for a light weight coin.

It will be understood that the force exerted by the magnet will not be sufficient to hold the magnetic spurious coin after it has been retarded so that the coin may readily slide sidewise off the bell crank. Also, the action of the spring will retract the pin slightly beneath the level of the wall of the coin chute thus effectively releasing mechanical contact with the coin to insure that there will be no sticking effect.

Coins of approximately the same weight as a true coin, but formed of less resilient material than that of a true coin, for example, lead, will be rejected even though these coins do not have an aperture therein. This result is accomplished by the fact that the lack of resilience of a lead coin will cushion the impact between the coin and the bell crank and while the momentum plus the weight may be equal to that of a true coin, the force of impact will not be as great as that of a true coin. Hence the lead, or similar material, coin, will not cause complete depression of the bell crank and such coins will therefore be rejected as described for light weight coins.

While we have illustrated and described the preferred embodiment of our invention, we do not wish to be limited to the details of construction described herein, except as defined in the appended claims.

We claim:

1. In a spurious coin detector, a coin chute having a passageway divided at a junction into a collection passage and a refund passage, a bell crank pivoted adjacent said chute, one arm of which projects into said passageway at said junction to receive the impact of a coin descending in said chute, a pin pivotally connected to the other arm of said bell crank and projectable into said passageway by movement of said bell crank under impact, and a spring associated with said bell crank normally resisting movement thereof under impact, said spring exerting resistive force upon said bell crank slightly in excess of the force exerted by the weight of a true coin upon said bell crank.

2. In a spurious coin detector, a coin chute, a bell crank pivoted adjacent said coin chute, one arm of said bell crank projecting into the path of coins descending in said chute to be impacted and depressed by descending coins, a pin pivoted to the other arm of said bell crank and projectable into said chute by depression of the bell crank to engage coins resting on said bell crank, a spring resisting depression of said bell crank by a force substantially equal to the weight of a true coin plus the momentum thereof when descending in said coin chute, a collection passageway associated with said chute for receiving coins pushed from the said bell crank by said pin, and a rejection passageway for receiving coins deflected by contact with said bell crank without depressing the same.

3. In a spurious coin detector, a coin chute having a passageway therethrough divided at a junction into a collection passage and a refund passage, a bell crank pivoted adjacent said coin chute, one arm of which projects into said passageway at said junction to obstruct said collection chute but permitting coins to pass to said refund chute, a pin pivotally secured to said bell crank and projectable into said passageway by movement of said bell crank to engage a coin while it contacts said bell crank and to press said coin toward the collection passageway past said bell crank, and a spring resisting depression of said bell crank by a force greater than the weight of a true coin.

4. In a spurious coin detector, a coin chute

having a passageway therethrough divided at a junction into a collection passage and a refund passage, a bell crank pivoted adjacent said chute, one arm of which projects into said passageway at said junction to obstruct the collection passage but permitting coins to pass to said refund passage, the end of said bell crank being formed to guide coins toward said refund passage, a pin secured to the other arm of said bell crank for projection into said passageway when said bell crank is depressed by impact of a coin thereon, said pin engaging a coin on said bell crank to press the same therefrom toward the collection passage, and a spring resisting depression of said bell crank by a force in excess of the weight of a true coin.

5. In a spurious coin detector, a coin chute having a passageway therethrough divided at a junction into a collection passage and a refund passage, a bell crank pivoted adjacent said chute, one arm of which projects into said passageway at said junction to obstruct the collection passage but permitting coins to pass to said refund passage, the end of said bell crank having a coin contact surface angled toward said refund passage, a pin secured to the other arm of said bell crank for projection into said passageway when said bell crank is depressed by impact of a coin thereon, said pin engaging a coin on said bell crank to press the same therefrom toward the collection passage, and a spring resisting depression of said bell crank by a force in excess of the weight of a true coin.

6. In a spurious coin detector, a coin chute having a passageway therethrough divided at a junction into a collection passage and a refund passage, a bell crank pivoted adjacent said chute, one arm of which projects into said passageway at said junction to obstruct the collection passage but permitting coins to pass to said refund passage, the end of said bell crank being formed to guide coins toward said refund passage, a pin secured to the other arm of said bell crank for projection into said passageway when said bell crank is depressed by impact of a coin thereon, said pin engaging a coin on said bell crank to press the same therefrom toward the collection passage, and a spring resisting depression of said bell crank by a force in excess of the weight of a true coin, said bell crank and said pin being permanently magnetized to retard passage of coins of magnetic material.

Signed at Salt Lake City, Utah, this 9th day of February, 1932.

CHARLES A. FOWLER.
BENJAMIN F. REDMAN.