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COIN CHECKING MEANS AND METHOD

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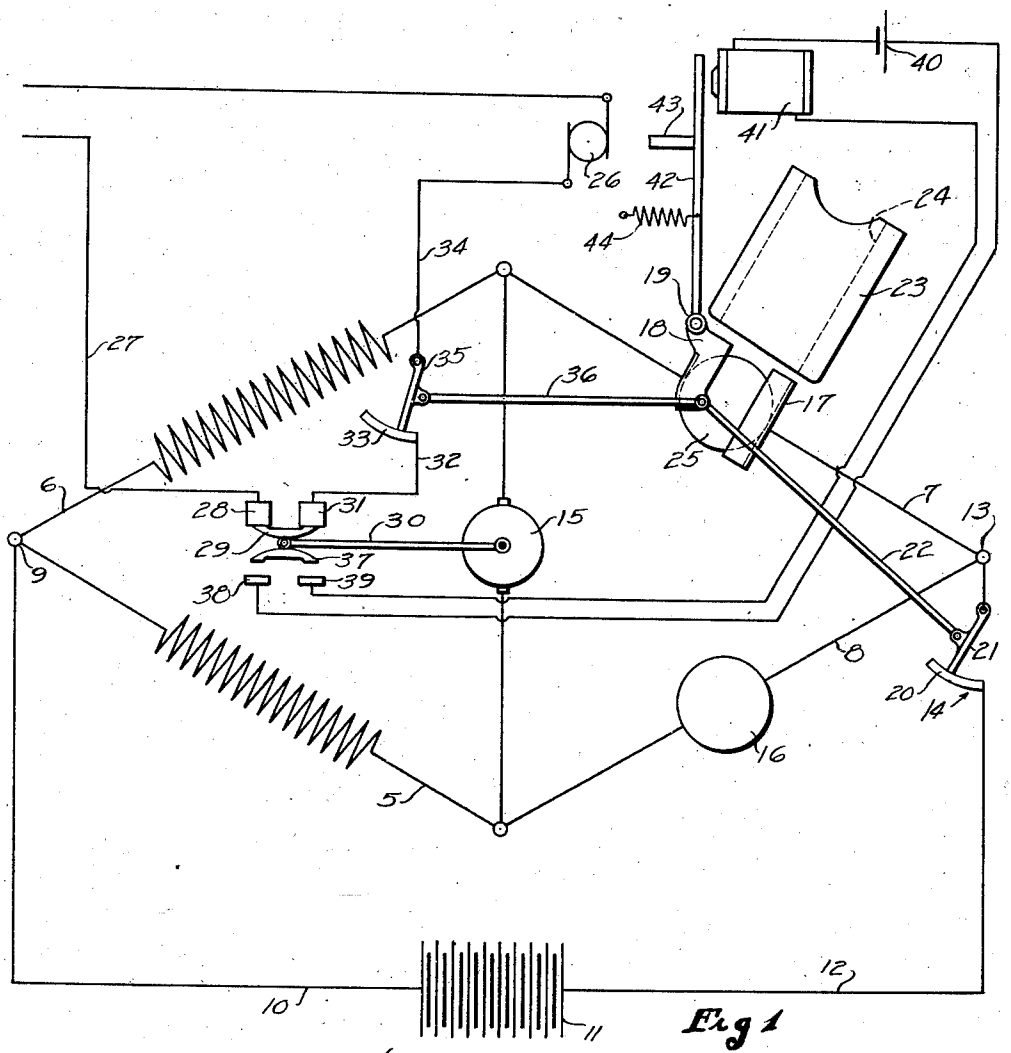


Fig 1

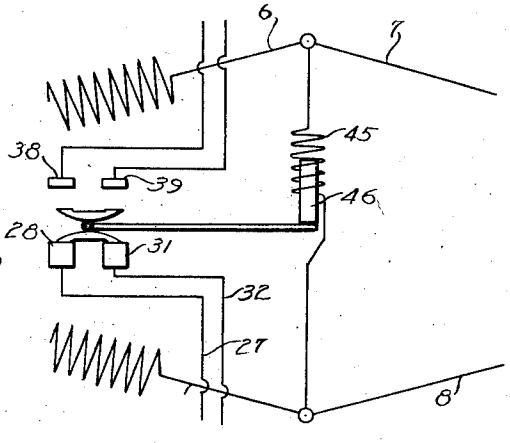


Fig 2

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# UNITED STATES PATENT OFFICE

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## COIN CHECKING MEANS AND METHOD

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This invention relates to new and useful improvements in coin testing or checking apparatus or means, particularly adapted for use in vending machines, telephone coin boxes and the like.

In the following specification, wherever the word "coin" is used, it is to be understood that this refers to whatever is offered to the machine, be it a genuine coin or a check, slug or the like.

An object of the invention is to provide a means for testing the resistance of a coin offered to a machine and to prevent said coin from operating the machine if the coin is of greater than a selected resistance and to permit said coin to place the machine in condition for operation if the coin is of proper resistance.

A further object is to provide a coin testing apparatus including a Wheatstone bridge circuit adapted to be closed by a coin and an independent circuit to a motor adapted to be closed through the action of the galvanometer of the bridge circuit when the coin is of the proper resistance.

An additional object is to provide a coin testing apparatus including a Wheatstone bridge circuit adapted to be closed by a coin, a means, and an independent circuit thereto which independent circuit is normally open and adapted to be closed by the galvanometer of the bridge circuit when said coin is not of the proper resistance whereby said means acts to move the coin out of the bridge circuit.

Another object is to provide a coin testing apparatus comprising an open circuit including a current detecting means including a movable part, a pair of independent circuits, and said movable part adapted to normally close one of the said independent circuits and adapted when said bridge circuit is closed and unbalanced to move to close the other of said independent circuits.

A still further object is to provide a coin testing apparatus including a circuit adapted to be closed by the coin and means being provided for breaking said circuit through removal of said coin from the circuit either after it has performed its function, or immediately, if it is a slug.

With the foregoing and other objects in view, as will become apparent as the description proceeds, the invention resides in certain features of construction, combination and arrangement of parts as will be hereinafter fully described and finally pointed out in the claims.

While the invention will be disclosed in detail and in a preferred and satisfactory embodiment, this is for the purpose of making clear as far as possible its construction and operation, and is not a limitation on the scope of the invention, it being necessary to refer to the annexed claims for a statement of the limitations of the invention.

Referring to the drawing:—

Fig. 1 is a diagrammatic view showing the arrangement of circuits and showing certain structural details when necessary to a complete understanding of the invention; and

Fig. 2 is a diagrammatic view of a detail showing a modification.

In the drawing, a Wheatstone bridge circuit is shown (referring now particularly to Fig. 1) and the same includes the arms 5, 6, 7 and 8. Arms 5 and 6 are connected at 9 and also connected at this point is a wire 10 leading from one side of any source of power, illustrated as a battery 11. From the other side of the battery 11 a line 12 is connected with point 13 through a contact switch 14. As shown point 13 is the juncture of arms 7 and 8.

15 indicates the galvanometer. In the arm 8 is disposed any known resistance 16, preferably although not necessarily, a coin. For example, the resistance 16 might be in the form of a dime, quarter or the like. Within the arm 7 are a pair of contact members 17 and 18, one of which, shown as 18, is pivotally mounted as at 19.

The switch 14, comprises a fixed contact 20 and a pivoted piece 21, connected as by a rod or link 22 with the movable contact 18 in the arm 7. In the present instance we are primarily concerned with a testing or checking apparatus designed to be used in

connection with a vending machine to be operated by coins of denominations usually made of silver, which metal offers comparatively little resistance to the passage of electricity.

With this in view, an entrance piece 23 for the coin is provided. This entrance member 23 has a slot 24 therein, the slot being of such width and diameter as to receive only a disc of the selected dimensions. On the coin being pushed through the slot 24 it engages between the contact members 17 and 18, making contact with each of them and closing the circuit through arm 7. As the coin, designated 25, is pushed between contacts 17 and 18, contact 18 is swung on its pivot 19 moving member 21 to close the circuit through the bridge, the parts being in the relative positions shown in Fig. 1.

An independent circuit to a motor 26 for a vending machine (not shown) is provided. This circuit receives current from any suitable source, through line 27, to a contact 28. A bridging piece 29 is carried by the pointer 30 of the galvanometer 15. This bridging piece 29 is a conductor and electrically connects contact 28 with a contact 31.

From contact 31 a line 32 leads to the arcuate contact 33 adapted to be connected with line 34 and thus to motor 26 by means of a friction contact switch 35. The line 34 completes the circuit and a rod or link 36 connects switch 35 with the movable contact 18. When the parts are in their normal position, conductor or bridging piece 29 is spanning the contacts 28 and 31 and 33 and 35 are not in contact.

As previously suggested, when the parts are in normal position the switches 14 and 35 are both open and therefore both the motor circuit and bridge circuit are broken. On contact 18 being moved by a coin 25, switch 21 is moved to closed position before switch 35 also controlled by contact 18 reaches its closed position. This is due to the arrangement of the respective switches relative to the contacts 20 and 33.

Immediately switch 21 touches contact 20, the bridge circuit is closed and if coin 25 has a resistance so great as to unbalance the circuit, then pointer 30 moves downwardly. This leaves the contacts 28 and 31 separated and when switch 35 engages contact 33 there is no circuit to motor 26. As the pointer 30 moves downwardly, it brings a conductor or bridging piece 67 into engagement with contacts 38 and 39 closing a circuit from battery 40 or other source of power to magnet 41.

On being energized, the magnet 41 attracts an iron or steel rod 42 rigidly connected with contact 18, moving or swinging the latter to permit the slug to drop out of the circuit. The parts then return to normal position with switches 21 and 35 open and conductor 29 bridging contacts 28 and 31.

When the piece 25 is of proper thickness and diameter, it will pass through slot 24 and when in addition it has the proper resistance as determined by resistance 16, it will balance the circuit and pointer 30 will not move. Accordingly, contacts 28 and 31 will remain electrically connected and when switch 35 closes, as coin 25 reaches its final position, the circuit to motor 26 is complete and the motor proceeds to do its work.

After a predetermined time, any apparatus operated by motor 26, as for example a cam 45 strikes rod or bar 42 or pushes pin 43 carried thereby, to move the contact 18 whereby the coin 25 passes from the circuit and the parts return to normal position as under the influence of a spring 44.

In Fig. 2 there is shown a slight modification. Here the galvanometer 15 is replaced by a solenoid coil 45 and the pointer 30 by a core 46. Further, the position of the pairs of contacts 28 and 31, and 38 and 39 are reversed. In this form of the invention, conductor 29 closes the circuit between the contacts 28 and 31 due to gravity when the coil 45 is not energized. The coil when energized, under the same circumstance as the galvanometer would be effected in the arrangement previously described, draws the core 46 upwardly bringing conductor 37 in position to electrically connect contacts 38 and 39.

The arrangement of circuits and switches is the same in connection with the apparatus shown in each figure of the drawing.

Having thus described our invention, what we claim is:—

1. In a coin checking means, an open electric circuit adapted to be closed by the introduction into the circuit of the coin to be tested, a current detecting instrument in said open circuit, electrical means set in operation by the action of said instrument to immediately remove said coin from the circuit when the coin has greater than a determined resistance, and means for actuating an associated mechanism and operable to actuate other means to remove the coin from the circuit when the coin offers resistance less than that required to bring about operation of the first coin removing means.

2. In a coin testing means, an open electric circuit adapted to be closed by the introduction into the circuit of the coin to be tested, a current detecting instrument in said open circuit, electromagnetic means set in operation by operation of said instrument to immediately remove said coin from the circuit when the coin has greater than a determined resistance, and means for actuating an associated mechanism and operable to actuate other means to remove the coin from the circuit when the coin offers re-

sistance less than that required to bring about operation of the first coin removing means.

3. In a coin checking means, an open electric circuit adapted to be closed by the introduction into the circuit of the coin to be checked, a current detecting instrument in said open circuit, a circuit adapted to be closed by said detecting instrument when said coin is of greater than a determined resistance, electromagnetic means in said second mentioned circuit for removing the coin from the first circuit when the second mentioned circuit is closed, and means for actuating an associated mechanism and operable to actuate other means to remove the coin from the circuit when the coin offers resistance less than that required to bring about operation of the first coin removing means.

4. In a coin checking apparatus, a bridge circuit, a current detecting device in said circuit one arm of said bridge circuit adapted to receive a given coin and have it form part of the arm, a second arm of the circuit adapted to receive the coin to be checked and have it form part of the second arm, a second circuit, means in the second circuit and controlled by said current detecting device to eject the coin from the arm when the coin is of greater resistance than the coin in the first arm, and means for actuating an associated mechanism and operable to actuate other means to eject the coin from the second arm when the coin is of less resistance than that required to bring about operation of the first ejecting means.

5. In a coin checking apparatus, a bridge circuit, said circuit adapted to have the coin to be checked introduced into one of its arms, a current detecting instrument in said circuit, shiftable means operable to permit the coin to pass from the arm of the bridge circuit, means to operate said shiftable means to permit the coin to pass out of the circuit when the coin has more than a determined resistance, means for actuating an associated mechanism and operable to actuate other means to operate the shiftable means to permit the coin to pass out of the circuit when it has less than the resistance required to bring about operation of the first means, and means whereby said current detecting instrument controls said means to operate said shiftable means and said means for actuating an associated mechanism.

6. In a coin checking means, a normally open circuit adapted to be closed by the introduction into the circuit of the coin to be checked, a second circuit including a pair of spaced contacts and a switch, a current operated means in said normally open circuit and including means normally closing the circuit between said spaced contacts, the switch in said second circuit operable by a coin to close the said second circuit when said coin is introduced into said normally open circuit, said current operated means adapted to maintain the circuit closed between said contacts when the coin is of less than a predetermined resistance, motor means in the second circuit, and means operated by the motor means and adapted to operate to remove the coin from the first circuit when the coin is of less than a predetermined resistance.

7. In a coin checking apparatus, in combination, a slot to receive a coin of a predetermined thickness and diameter, a wheatstone bridge circuit, a switch in said bridge circuit, a second circuit, a normally closed and a normally open switch in said second circuit, means acted on by said coin after it enters said slot to close the switch to said bridge circuit, means in one of the bridge arms adapted to receive a coin to form a part of said arm, said coin adapted to close the normally open switch in the second circuit, a current operated means in said bridge circuit, said current operated means controlling said normally closed switch in the second circuit and adapted to maintain the same closed when the coin is of proper resistance, motor means in the second circuit, means operated by the motor means and adapted to remove the coin from the first circuit when said coin is of the proper resistance, and said current operated means adapted to open said normally closed switch in the second circuit when the coin is of greater than a predetermined resistance.

8. In a coin checking means, a normally open circuit adapted to be closed by the introduction into the circuit of a coin to be checked, a second circuit including a pair of spaced contacts and a switch, a current operated means in said normally open circuit and including means normally closing the circuit between said spaced contacts, the current operated means and the switch in said second circuit being operable by a coin of less than a predetermined resistance to close the said second circuit when said coin is introduced into said normally open circuit, motor means in the second circuit, means operated by the motor means and adapted to operate to remove the coin from the first circuit, and said current operated means acting to shift said means normally closing the circuit between said spaced contacts to open the second circuit and prevent operation of the motor when said coin has greater than a determined resistance.

9. A device as in claim 6 said current operated means including a coil and a core.

10. In a coin checking apparatus, a bridge circuit including a current operated device, one arm of said bridge circuit adapted to

receive a given coin and have it form part of the arm, a second arm of the circuit adapted to receive the coin to be checked and have it form part of the second arm, a second circuit, means in the second circuit to eject the coin from the second arm when a coin is of greater resistance than the coin in the first arm, a third circuit, an operating motor in said third circuit, a normally closed and a normally open switch in said third circuit, said normally closed switch controlled by the current operated device of the bridge circuit, means to operate said normally open switch to circuit closing position and said normally closed switch adapted to remain closed when said coin being tested is of less than a predetermined resistance, and means adapted to be operated by the motor in the third circuit to remove the coin from the first circuit when said coin is of less than a predetermined resistance.

11. In a coin checking means, an open electric circuit adapted to be closed by the introduction into the circuit of a coin to be tested, a current detecting instrument including an indicator, said current detecting instrument being in said circuit, a second circuit, means operated by said coin to close said second circuit when said coin is of less than a predetermined resistance, means set into operation by the indicator of said detecting instrument to prevent said coin closing said second circuit when said coin is of greater than a predetermined resistance, a motor means in the second circuit, and means adapted to be operated by the motor means to remove the coin from the first circuit after the second circuit is closed.

12. In combination, a bridge circuit having a switch, a current sensitive device in said bridge circuit, a second circuit having a normally open and a normally closed switch, means in one arm of the bridge circuit for receiving a coin, means operated by said coin on introduction of the coin into said arm of the bridge circuit to close the switch to said bridge circuit, other means operated thereafter when the coin is of less than a predetermined resistance to close the normally open switch in said second circuit while the normally closed switch of said circuit remains closed, motor means in the second circuit, means operated by the motor means and adapted to operate to remove the coin from the first circuit, and said current sensitive device including means to open said normally closed switch in said second circuit to prevent operation of said motor when said coin is of greater than said predetermined resistance.

13. In a coin checking apparatus, a bridge circuit, said circuit adapted to have the coin to be checked introduced into one of its arms, a current detecting instrument in said circuit, means operable to permit the coin to pass from the arm of the bridge circuit when the coin is of less than a predetermined resistance, other means to permit said coin to pass from the arm of the bridge circuit when the coin is of greater than said predetermined resistance, and means under the control of the current detecting instrument and controlling the operation of each of said means.

14. In a coin checking apparatus, a bridge circuit adapted to have a coin to be checked introduced into an arm thereof, a current detecting instrument in the bridge circuit, said instrument including a movable part, and means whereby said movable part controls the movement of the coin out of the circuit in accordance with the resistance of the coin.

15. In a coin checking means, an open electric circuit adapted to be closed by the introduction into the circuit of the coin to be tested, a current detecting instrument in said circuit, said instrument including an indicator, said instrument being so disposed in said circuit that when the coin is of less than a predetermined resistance the indicator does not move and when said coin is of greater than said predetermined resistance the indicator moves, a normally open circuit adapted to be closed by the indicator when the indicator moves, means in said normally open circuit to bring about the immediate removal of the coin from the first circuit, and other means to remove the coin from the circuit when the coin offers resistance less than that required to bring about operation of the first coin removing means.

16. In a coin checking apparatus, a bridge circuit, said circuit adapted to have the coin to be tested introduced into one of the arms of the circuit, a current detecting instrument in said circuit, said instrument including an indicator, said indicator adapted to move to bring about removal of the coin from the circuit arm when the resistance of the coin is such as to unbalance the circuit and cause the indicator to move in one direction, and other means to bring about the removal of the coin from the circuit when the resistance of the coin is not such as to unbalance the circuit to cause the indicator to move in the said direction.

Signed at Bridgeport, in the county of Fairfield, and State of Connecticut, this 12th day of September, A. D. 1928.

SAMUEL D. POLSEN.
SVEN H. NELSON.