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ART OF TESTING COINS OR OTHER TOKENS FOR GENUINENESS

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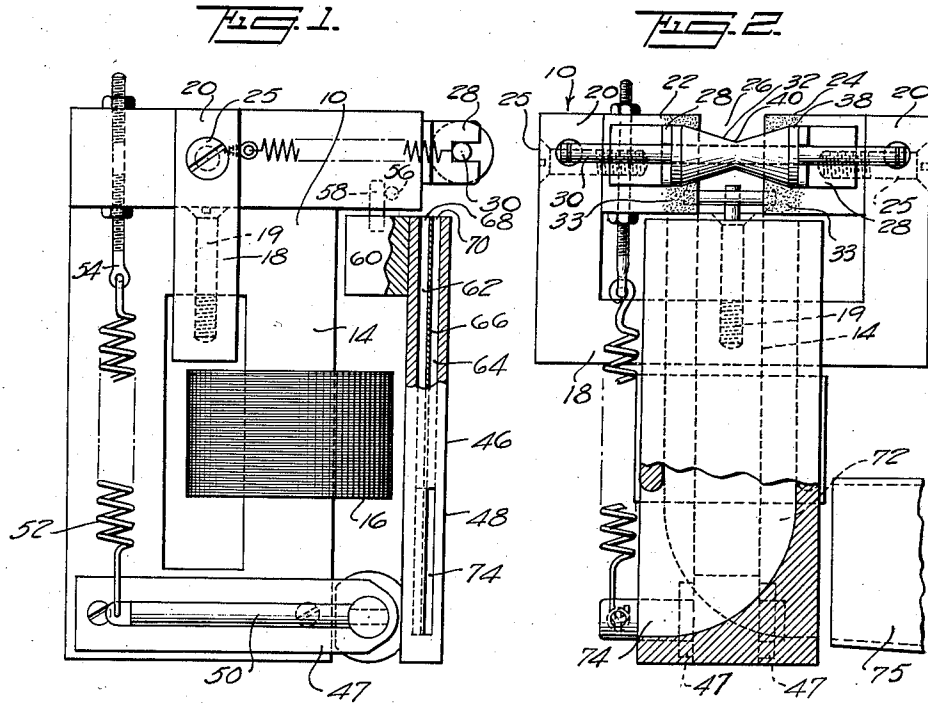
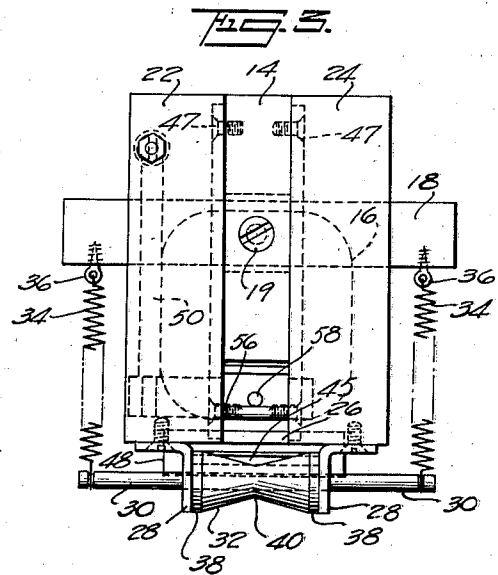
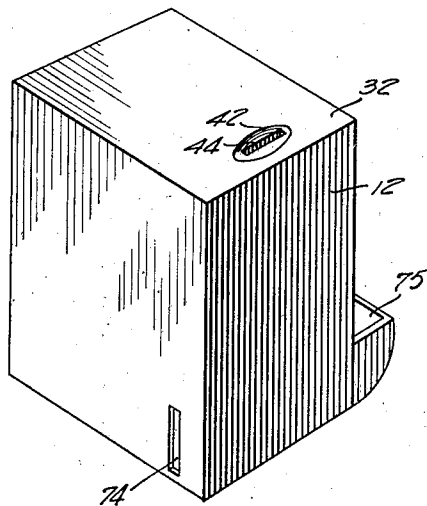


Fig. 4



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ART OF TESTING COINS OR OTHER TOKENS FOR GENUINENESS

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My invention relates to improvements in means and methods for testing coins, tokens or like devices for genuineness and for retaining or accepting the genuine pieces or devices and refusing or rejecting the spurious or counterfeit ones.

An object of the invention is to distinguish between the coins or tokens by reliance upon a property or quality of the genuine coin or device not possessed by the various spurious or counterfeit devices presented, such as the electrical resistance of the genuine coin or token, the spurious devices being rejected because of the absence of said specific or particular property or quality therein.

Another object of the invention is to insure the acceptance of the good coin or token by the effects of a current of predetermined value or amperage obtained when a genuine coin or token is presented for test and not obtained when other coins or tokens are presented.

Another object of the invention is to control the current relied on for testing the coin or token by variation in the impedance of the circuit thereof by or through the coin or token when the same is presented to the circuit for test, whereby to effect an economy in the use of current at idle periods and permit of the elimination of switches and cut-outs likely to cause when actuated current surges producing unreliable results.

Another object of the invention is to enable the rejection of spurious coins or tokens composed of metals, such as copper, having a value of resistance close to that of a genuine silver alloy coin or token.

Another object of the invention is to provide a novel method for producing apparatus capable of distinguishing between said last named copper and silver tokens or devices.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends, my invention consists of the novel features of construction, and in the combination, connection and arrangement of parts, and in the steps constituting my said meth-

ods, hereinafter more fully described and then pointed out in the claims.

In the accompanying drawing:

Figure 1 is a side elevation with parts in section showing one form of apparatus constructed according to and embodying my invention;

Fig. 2 is a front elevation thereof;

Fig. 3 is a plan thereof, and

Fig. 4 is a perspective showing the apparatus encased.

Referring to the drawing, an electrical element 10 resembling a transformer, and constituting means for testing coins, tokens or like devices is disposed within a casing 12. The element 10 includes an endless magnetic core 14, preferably of laminated silicon construction and a multi-turn coil 16 disposed about the vertical front portion of the core 14 and constituting a choke or impedance. A U-shaped electrically conductive secondary member 18, preferably of copper, for controlling or reducing the impedance of the coil 16 embraces the upper portion of the core 14 back of the coil 16. A bolt 19 serves to secure the member 18 to the core with the ends 20 thereof extending above the upper side of the core.

A pair of spaced conductive members 22 and 24, preferably composed of copper are electrically and mechanically connected to the ends 20 of the U-shaped member 18 by the screw 25. The members 22 and 24 extend forwardly above and beyond the core 14 to form a gap 26 adapted to be bridged by the coin, token or like device to form a closed endless circuit.

A pair of slotted brackets 28 are secured in suitable position at opposite sides of the gap 26 for receiving the pintles 30 of the guiding roller 32 within the slots thereof, the roller being biased to move towards the contact forming ends 33 of the members 22 and 24 by means of springs 34 secured to the pintles 30 and to suitable abutments 36, upon member 18. The roller 32 preferably comprises cylindrical outer portions 38 and a double conical intermediate portion 40 tapering towards the center of the roller. The casing 12 has a depressed portion 42 in the

top thereof having a slot 44 therein aligned with the passage 45 between the ends 33 and roller 32. The slot 44 is of a length corresponding to the diameter of the coin or other token for which the device is to be adapted. When the coin or other token, if of the required size, is inserted through the slot 44 the lower sector of the token is guided by double conical portion 40 until the cylindrical portions 38 engage the lateral peripheral portions of the coin or token. Thereupon the roller 32 presses the coin or token into engagement with the ends 33 to close the circuit of the secondary member 18. As the coin passes downwardly the coin disengages the portion 38 and the double conical portion 40 facilitates the passage of the coin past the roller.

The coin or other token after closing the gap 26 is received by the coin selecting or chute means 46 which is preferably in the form of a bell crank pivoted upon the forward ends of brackets 47 secured to the lower portion of the core 14 and projecting beyond the front thereof. The arm 48 of the chute 46 is disposed vertically at the front of the coil 16 in relatively close proximity thereto and the arm 50 thereof extends rearwardly at the side of the core 14. A spring 52 is connected at one end to the rear end of the arm 50 and at its opposite end to an abutment 54 located vertically above the arm 50 upon the member 22 and adapted to be adjusted to control the spring tension. Outward movement of the arm 48 is limited by a stop 56 on the members 22 and 24 adapted to be engaged by a pin 58 on the armature 60 secured to the upper portion of the arm 48 and projecting rearwardly towards the core 14 above the coil 16. The arm 48 and armature 60 are composed of magnetic material, such as soft iron. The arm 48 is provided with parallel coin or token receiving passages or guideways 62 and 64 separated by a relatively thin partition 66. The passages 62 and 64 are open at their upper ends, as indicated at 68 and 70, and at their lower ends are deflected laterally in opposite directions to provide exits 72 and 74 for the coins or tokens. When the arm 48 is in position with the pin 58 thereof engaging the stop 56, the passage 62 is in alignment with the passage 45 between the ends 33 and roller 32. The armature 60 faces the upper front portion of the core 14, and, with the parts in the position shown, is spaced therefrom a distance such that, when the arm 48 and armature 60 are attracted by the core 14 and the armature 60 moves into engagement with the latter, the slot or passage 64 then moves into alignment with said passage 45. A cup 75 is arranged externally of the casing 12 at the exit end 72 of the passage 62 for receiving the coins or tokens if counterfeit or spurious, or if of insufficient size, whereby to return the inadequate devices to the person

inserting the same. Good coins or tokens received into the passage 64 pass into a suitable box disposed contiguous to the exit 74, or such good coin or token may be diverted for actuating other devices, such as bells or other signalling or indicating devices, or other mechanism to be controlled by the coins, with which mechanism the selector mechanism embodying the present invention may be incorporated.

The coin selecting means 46 is controlled magnetically by the magnetism of core 14 resulting from and proportional to the current flow through coil 16. The weight of the bell crank member 46 and the tension of the spring 52 is adjusted to require a magnetic influence of predetermined intensity before the member 46 can be actuated to engage the core 14.

The magnetism of the core depends upon the amperage of the current through the coil 16 and this in turn is controlled by the U-shaped conductive member 18. When a good coin or token such as an ordinary silver coin engages the contact ends 33 and closes the gap 26 thereof, a current of predetermined amperage is developed in the coil 16 which in turn develops a magnetism in the core 14 of predetermined intensity, sufficient to attract the member 46 and cause the armature 60 thereof to engage the core. Coins or tokens having a greater resistance than that of the good or desired coins or tokens prevent the development of sufficient current in the coil 16 to actuate the member 46, and hence such spurious coin or token passes through the passage 45 into the passage or guideway 62, and is returned to the person who inserted the same.

However when a good coin or token having the resistance for which the device is adjusted is inserted, the member 46 is attracted and the coin slips past the roller 32 and enters the slot or passageway 64 for delivery to the box therefor or to a point for actuating other devices or mechanisms.

Before the good coin entirely disengages the contact ends 33 the lower portion thereof enters the passage 64 so that when the current through the coil 16 reduces upon disengagement of the coin from the contacts 33 and chute 46 returns to normal position the good coin or token is free to slide through the passage 64.

The slot 44 through which the coin or token is inserted is of substantially the size necessary to receive a coin or token of the desired denomination or diameter while excluding coins or tokens of greater diameter. Coins or slugs smaller than those for which the opening 44 is designed pass through the member 46 without operating the mechanism and are returned.

I have found, however, that certain slugs may be surreptitiously employed which are composed of copper having when uncorrod-

ed a resistance which is approximately close to the resistance of a genuine silver alloy coin. These slugs unless the apparatus is extremely sensitive are likely to operate the apparatus like a genuine coin does. To prevent this surreptitious operation the ends 33, constituting the contacts, are formed as follows: Silver nitrate crystals and relatively fine silver filings are placed upon the ends 33 of the copper members 22 and 24. The gap 26 is then short circuited by a separate bridging member. This causes a current through members 18, 22 and 24 which develops considerable heat therein. The heating is continued until the crystals of silver nitrate fuse and a solid mass composed of silver nitrate admixed with silver filings is formed upon the ends 33. The short circuiting is then discontinued and the apparatus is ready for normal operation. By employing contacts 33 formed as above described I find that the current developed in the coil 16 when a copper piece bridges the gap 26 is substantially less than the current developed in the coil 16 when a silver coin bridges the gap. The selector member 46 and the spring 52 thereof may therefore be adjusted to respond to the greater amperage or current strength without responding to the lesser amperage developed when a copper slug bridges such gap.

The apparatus depends primarily for operation on characteristics, properties or qualities of genuine or good coins or tokens such as the silver, copper and nickel alloy coins of the United States and may be employed for testing and assorting the coins of various denominations. The characteristic of the coin which is relied on is its electrical resistance. The silver coin, for instance, has a resistance which is lower than that of any other metal from which slugs or spurious coins are usually made, such as iron, aluminum, lead and the like, and the apparatus herein shown and described as one embodiment is arranged for operation with silver coins.

In operation, when the apparatus is not in use and the gap 26 is open, the high impedance of the coil 16 and core 14 effectively retards or reduces the flow of alternating current from the main line for the purpose of obtaining economy in the use of current.

When coins or tokens which are smaller than the opening 44 are inserted the coin slides through the guideway 62 into the return box without actuating the mechanism. Obviously coins too large to pass through the slot 44 cannot be used. When such device is of non-metallic or non-conducting material the same will not actuate the mechanism, and is returned.

My apparatus therefore rejects coins or devices which are not of the required size or denomination or which are of non-con-

ducting material, thereby preventing the use of a large class of slugs or other spurious pieces made of substances such as glass, fibre, or the like.

If the device inserted is a metallic one of the proper size but of a material different from that of a genuine coin, the same bridges the gap 26 to cause some increase of current in the coil 16 but not enough to actuate the pivoted member 46. Such metallic device is also returned to the person inserting the same.

With the apparatus shown, when a silver coin of definite resistance closes the secondary gap 26 the increase in current strength or amperage in coil 16 resulting from the decrease in impedance thereof increases the magnetism in the core 14 sufficiently to move the coin selecting member 46 to bring the passage 64 thereof into alignment with the passage 45. By placing the magnetic member 46 in the external field of the coil 16, the flux is concentrated and increase in current intensity obtained.

A characteristic or feature of the present invention is the provision of means, such as the diverting means 46, responsive only to the predetermined current strength or amperage obtained when a genuine coin or token closes the gap 26 for indicating or making known the character of the token or coin, whether the same is genuine or spurious, and/or for controlling the disposition of the coin, token or like device according to the character thereof. The invention is applicable for testing coins such as silver, which has a resistance lower than slugs of other metals usually employed, or for testing coins such as copper or nickel-copper alloys which have resistances intermediate the resistances of slugs of the various metals, some of which may have a lower resistance and some of which may have a higher resistance than the genuine coin or token.

Another characteristic or feature of my invention resides in the impedance means 16 which permits of the use of alternating current and serves to effectively retard or reduce the flow of current when the apparatus is not in use. When the coin or token closes the gap 26 the coin is traversed by relatively small current incapable of causing sparking or unduly heating the coin, and the resulting increase in current through the coil 16 is gradual and inversely proportional to the coin resistance. Were the circuit of the testing means controlled by cut-outs or circuit makers or breakers the closing thereof would cause momentary increases of current flow corresponding to that for genuine coins or tokens even in the presence of a false coin, resulting in the inadvertent acceptance of such false coin or device by the diverting means.

With my arrangement all non-metallic de-

vices as well as all metallic devices not of the required size are rejected and the test imposed upon the other metallic devices is such that those not having the particular property or quality of the genuine or good coin or token are also rejected.

Further, the means for controlling the disposition of the metallic devices is responsive only to some single property possessed by good coins or devices and not possessed by the spurious coins or devices. Coins or tokens presented for test and not satisfying the conditions imposed on the apparatus for operation are rejected, thereby rendering unnecessary a number of testing means each dependent for operation on a different property of the several kinds of slugs or spurious devices which may possibly be submitted for test.

Apparatus embodying my said invention may be incorporated with other apparatus if so desired, such as telephone pay boxes, turnstiles, vending machines, automatic money changers and the like.

I claim:

1. The hereindescribed method of distinguishing between genuine and spurious coins, tokens or like devices which consists in presenting the devices to a circuit having impedance controlling the current therethrough, and utilizing the conductivity of said devices for reducing said impedance and causing a current flow varying in inverse relation to the resistance of the devices, and utilizing the magnetic field of said impedance developed by current of certain of the amperages obtained for making known the character of the device presented.

2. The hereindescribed method of distinguishing between genuine and spurious coins, tokens or like devices which consists in presenting the devices to a circuit having impedance controlling the current therethrough, and utilizing the conductivity of said devices for reducing said impedance and causing a current flow varying in inverse relation to the resistance of the devices, and utilizing the magnetic field developed about the impedance by current of the amperage obtained in the presence of a genuine device to the exclusion of the field produced by current of other amperages, and producing thereby mechanical movement for diverting the genuine device.

3. An apparatus of the character described comprising a circuit including electromagnetic means, means for presenting coins, tokens, or like devices to said circuit to control the current thereof in accordance with the composition of the devices, said circuit when subjected to the effect of a genuine or good coin or device developing a current flow of a predetermined amperage, and an armature controlled by said electromagnetic means and responsive to said current of predetermined amperage, said armature having

a passage aligning with said device presenting means in one position of the armature and another passage aligning with said device presenting means in the other position of said armature.

4. An apparatus of the character described comprising a circuit including electromagnetic means, spaced contacts forming a gap in a portion of said circuit, a spring pressed roller facing said gap and having an intermediate portion of reduced diameter, said roller and said contacts forming a passage therebetween for receiving a coin, token or like device to close the circuit at said gap, and means actuated by said electromagnetic means and controlling the destination of the device passing from said passage.

5. An apparatus of the character described comprising a circuit having an impedance therein, means adapted to be engaged by a coin, token or like device for controlling said impedance, and means actuated by the electromagnetic effects of said impedance for controlling the destination of the device.

6. An apparatus of the character described comprising a magnetic core, an impedance on said core adapted to be placed in circuit with a source of current, a secondary member on said core having spaced contacts forming a gap and adapted to be engaged by a coin, token or like device to control said impedance, and a pivoted armature disposed in the external field of said impedance and actuated by said core, said armature having means for controlling the destination of the device.

7. Apparatus of the character described comprising a core, an impedance coil about said core, an open secondary member about said core, conducting member extending forward from said secondary member and providing spaced contacts for engagement with a coin, token or like device, a spring pressed roller facing said contacts and forming a passage for said device, a vertically extending armature pivoted at the lower end thereof contiguous to said core, and having vertical device receiving passages therein, a stop, and a spring normally holding said armature against said stop and one passage thereof in alignment with said first named passage, said armature being actuated magnetically by said core to move the other of said passages into alignment with said first named passage upon development in said impedance of a current of predetermined amperage resulting from the presence of a genuine coin or device, and being immune to currents of lesser amperage.

8. An apparatus of the character described comprising a circuit having spaced contacts adapted to be engaged by a coin, token or like device for controlling the current, said contacts including masses of silver nitrate admixed with silver filings, and means controlled by said circuit and indicating the

character of the coin or device presented for test.

9. An apparatus of the character described comprising a circuit having copper terminals forming a gap adapted to be closed by a coin, token or like device to control the current, said terminals having thereon a dry mixture of silver nitrate and silver filings adapted to produce a substantially greater flow of current in the presence of a silver device than in the presence of a copper device, and means controlled by said circuit and indicating the character of the coin or device presented for test.

10. An apparatus of the character described comprising a circuit including electromagnetic means, means for presenting coins, tokens or like devices to said circuit to control the current therein in accordance with the composition of the devices, and an armature in operative relation to said electromagnetic means and restrained against being actuated thereby before the current attains a predetermined amperage, said armature including a portion having a plurality of passages for the devices, one passage aligning with said device presenting means in one position of the armature, and the other passage aligning with said device presenting means in the other position of the armature.

11. An apparatus of the character described comprising an impedance constituting electromagnetic means adapted to be traversed by a fluctuating current, contacts adapted to be engaged by a coin, token or like device for varying said impedance and causing a flow of current therein, and means actuated by the electromagnetic effects of said impedance for controlling the destination of the device.

12. An apparatus of the character described comprising a closed magnetic core, an impedance coil on said core adapted to be traversed by a fluctuating current, a secondary member on said core having a gap adapted to be bridged by a coin, token or like device to vary the impedance and cause a flow of current, and means actuated by the magnetic effects of said core for controlling the destination of the device.

13. An apparatus of the character described comprising a core, a coil thereon constituting an impedance and electromagnetic means, and adapted to be traversed by a fluctuating current, contacts adapted to be bridged by a coin, token or like device for varying the impedance of said coil, means for pressing the device against said contacts, and means actuated by the magnetic effects of said core for controlling the destination of the device.

14. An apparatus of the character described comprising impedance means adapted to be traversed by a fluctuating current, means for presenting coins, tokens or like de-

vices to the circuit of said impedance means to cause a flow of current therein inversely proportional to the resistance of the device presented, and an armature for controlling the destination of the device actuated by the magnetic effects of said impedance means, and adjusted to be responsive to the current developed in the presence of a genuine device, and to be immune to currents developed in the presence of other devices.

15. An apparatus of the character described comprising electromagnetic means including a core and a coil thereon, means for varying the current through said coil in inverse proportion to the resistance of the coins, tokens or like devices presented to the circuit thereof, and an armature for controlling the destination of the device actuated by the magnetic effects of said core, and adjusted to be responsive to a current of predetermined amperage developed in the presence of a genuine device and to be immune to currents of other amperages.

In testimony whereof, I have signed my name hereto.

FAIRFIELD W. HOBAN.