May 27, 1930. F. H. BRINKERHOFF 1,760,579

METHOD OF AND MEANS FOR TESTING COINS

Filed Jan. 23, 1929

FIG. 1.

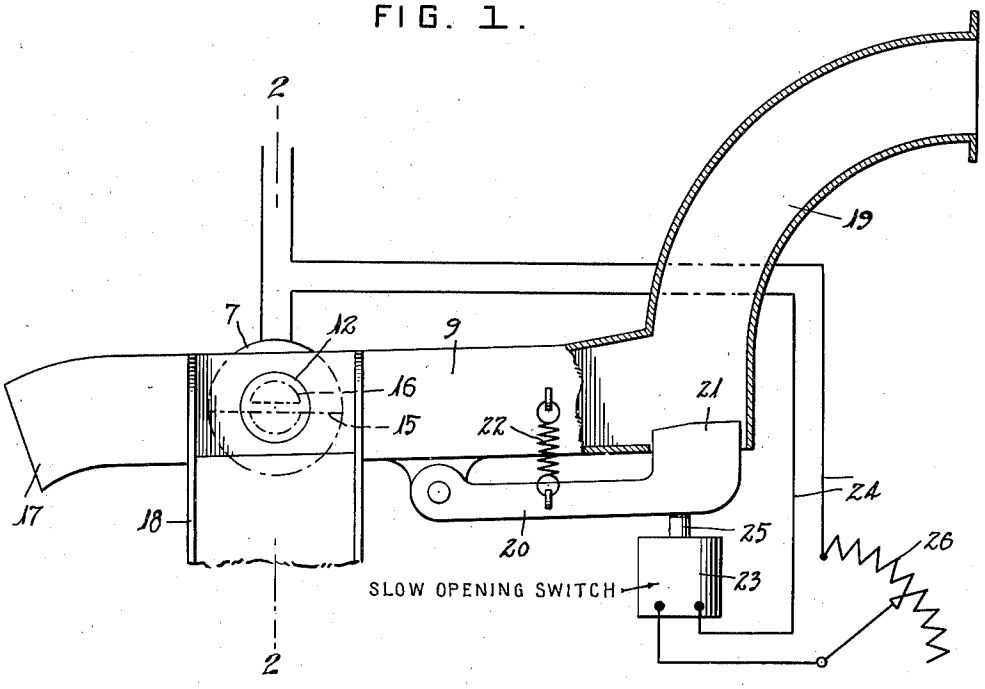

FIG. 2.

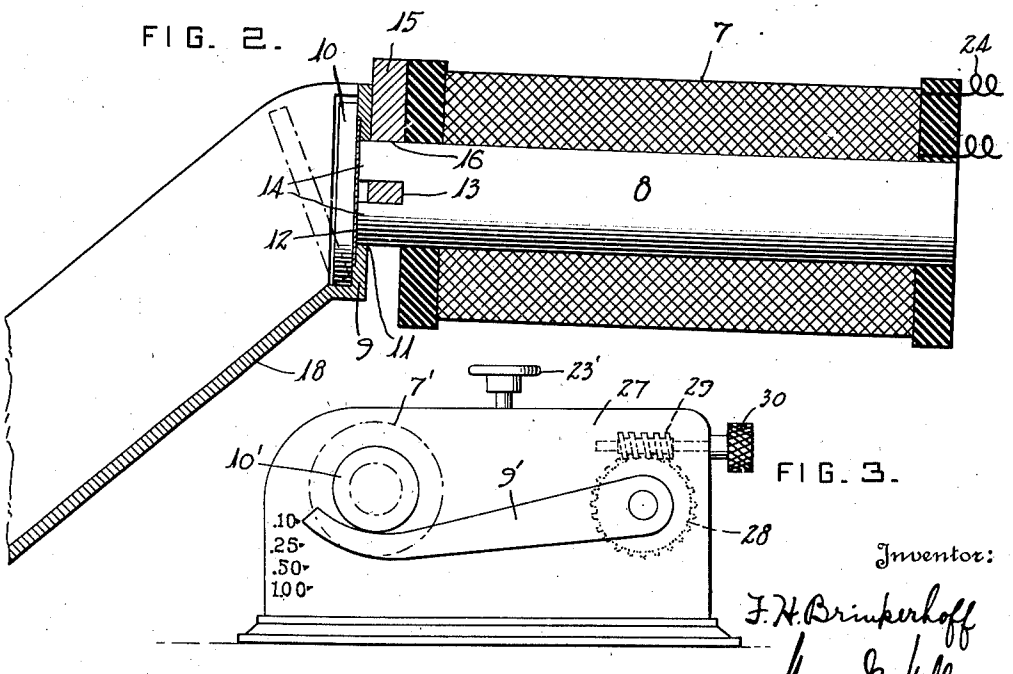

FIG. 3.

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METHOD OF AND MEANS FOR TESTING COINS

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The present invention relates to coin testing devices, and aims to provide a novel method of and means for testing silver coins in order that counterfeits, and disks of brass, nickel, iron and other base metals will be rejected.

The invention is intended for use in coin-controlled vending machines, and the like, to detect and reject spurious coins and disks or slugs of baser metal, and the invention may also be used in banks and elsewhere for testing silver coins.

It is also an object of the invention to provide a method of and means for testing silver coins in a simple and rapid manner, without injuring the coins.

The invention is illustrated in the accompanying drawing, wherein—

Figure 1 is an elevation of one form of coin testing device, portions being shown in section and the electrical circuit being shown diagrammatically.

Fig. 2 is an enlarged section on the line 2—2 of Fig. 1.

Fig. 3 is an elevation of another form of coin testing device embodying the invention.

The invention resides in the use of an alternating current electromagnet 7 by means of which the coins are tested in the presence of an alternating magnetic field produced by the electromagnet.

Figs. 1 and 2 show one form of device embodying the electromagnet 7. The core 8 of the electromagnet has a projecting terminal or pole entering an opening 11 in one side of a chute 9. The chute slopes longitudinally so that a coin 10 will roll along the chute past the end of the core 8, and said chute is also inclined transversely toward the electromagnet, as seen in Fig. 2, so that the coin 10 will lay against the corresponding wall of the chute.

As shown, a thin disk 12 of paper, fibre or similar non-magnetic material is embedded in the wall of the chute 9 across the end of the core 8, to provide a smooth surface along which the coin moves past the electromagnet.

The forward terminal portion of the core 8, as shown, is bifurcated and has the diametrical horizontal slot 13 forming the upper and lower pole sectors 14, which divide the magnetic field above and below the slot 13, and a shield 15 of copper, a copper alloy, or equivalent material, is disposed across the upper half of the forward end of the electromagnet. The shield is provided with an opening 16 receiving the upper pole portion 14.

The use of the copper shield 15 has been found to be of some advantage in separating silver coins and spurious disks. However, the shield may be dispensed with for general use.

Coins and disks which roll past the electromagnet are delivered from the discharge end 17 of the chute 9 into a receptacle (not shown) for receiving the rejected coins and disks, or they may be returned by being discharged from the vending machine with which the device is used. The chute 9 is open at the side opposite to the electromagnet, and has a chute 18 for the passage of silver coins which are kicked away from the electromagnet, as seen in dotted lines in Fig. 2.

It has been found that by using alternating current of 110 voltage and 60 cycle, and by regulating the current, a silver coin 10 disposed or moving in front of the core 8 in the alternating magnetic field at the terminal or pole of the core, will be kicked or tilted away from the electromagnet, so as to fall away from the magnet into the chute 18 or other receiver, whereas spurious coins and disks of brass, nickel, iron or other baser metals will not be so effected. Brass, copper and similar non-magnetic disks will roll past the electromagnet, while disks of iron or magnetic material will stick and create a vibratory noise, and as soon as the current is shut off such iron disks will roll from the electromagnet.

Thus, in positioning the coin or disk or moving same in the field of an alternating current electromagnet, with the coin or disk leaning toward the electromagnet, a silver coin will be kicked or tilted away from the magnet to be discharged, while coins or disks of brass, nickel, iron, and other baser metals will not be similarly effected, thereby making the selection automatically and quickly.

The coins and disks may either be rolled past the electromagnet, or may be positioned in front of the electromagnet. As shown in Figs. 1 and 2, the coins or disks roll past the electromagnet.

It is preferable to cut off the current from the electromagnet, excepting when a test is being made, to avoid over-heating of the electromagnet, and one way of doing this is shown in Fig. 1. The chute 9 has an entrance portion 9 down which the coin drops when inserted, so as to swing the lever 20 downwardly by the impact of the coin on the portion 21 of the lever below the portion 19 of the chute, the lever being yieldingly raised by a spring 22.

A switch 23 in the circuit 24 of the electromagnet 7 has a plunger 25 arranged to be depressed by the lever 20, for closing the circuit, and the switch is slow opening so as to hold the circuit closed sufficiently long to permit the coin to roll past the electromagnet. The switch opening automatically after an interval of time will avoid over-heating of the electromagnet, and a rheostat 26 is preferably provided in the circuit 24 to regulate the current. Other automatic means may be used for closing the circuit and opening same.

Fig. 3 illustrates a testing device for use in banks and elsewhere for testing coins. The electromagnet 7′ is carried by a back plate or case 27, and a coin supporting arm 9′ is disposed in front of said case 27 and is adapted to be adjusted to different positions for properly supporting various sizes of silver coins in front of the electromagnet. As shown, the face of the case 27 is graduated for dimes, quarters, half-dollars and dollars, and the arm 9′ is adjusted by means of a worm wheel 28 connected thereto and meshing with a worm 29 having a knob 30 to be rotated by hand. A push button 23′ is provided to operate a switch (not shown) for closing the circuit of the electromagnet.

With the arm 9′ properly adjusted, the coin 10′ is placed on the arm in front of the electromagnet, the face of the case or plate 27 leaning away from the observer, as seen in Fig. 3, so that the test is made substantially the same as hereinbefore described.

The electromagnet need not be concentric with the coin and its axis may be arranged higher than the center of the coin. The alternating current may also be regulated according to the size of coin to be tested. The "leaning" angle of the coin may also be changed so as to require more or less kick to kick or throw the genuine silver coins away from the electromagnet, without doing the same with counterfeits, and disks of baser metals. Although coins and disks of nickel, iron, copper, brass, and the like, are not kicked away from the magnet, coins and disks of silver and aluminum are kicked from the magnet by the alternating magnetic field. Aluminum being lighter than silver enables the aluminum disks to be readily separated from the silver coins such as by making a weight test. It has also been found that larger silver coins are thrown with greater force from the magnet than smaller coins. The "leaning" angle of the coin, in practice, is from about five degrees to ten degrees from a vertical line, and although some spurious coins or disks may be vibrated slightly they are not kicked from the magnet. The "leaning" angle is therefore sufficiently large with respect to a vertical line so that only silver and aluminum coins and disks are kicked beyond the vertical line.

Having thus described the invention, what is claimed as new is:

1. The method of testing a coin consisting in disposing a coin on edge in a leaning position, and then subjecting the coin on the side toward which it leans to an alternating magnetic field so as to kick the coin away from the magnetic field.

2. The method of testing a coin consisting in disposing a coin on edge in a leaning position, and then subjecting the coin on the side toward which it leans to an alternating magnetic field so as to kick the coin away from the magnetic field, with the leaning angle of the coin to a vertical line being sufficiently great that the coin will not be kicked from the magnetic field excepting if the coin is of silver or aluminum.

3. A coin testing device comprising means for supporting a coin on edge in a leaning position, and means for subjecting the coin on the side toward which it leans to an alternating magnetic field so as to kick a coin of predetermined metal away from the magnetic field.

4. A coin testing device comprising an alternating current electromagnet, and means for supporting a coin on edge at a pole of said electromagnet with the coin leaning toward the magnet.

In testimony whereof I hereunto affix my signature.

FREDERIC H. BRINKERHOFF.