

May 30, 1933.

W. L. GILCHRIST ET AL

1,911,684

COIN SELECTING AND DETECTING DEVICE

Filed Aug. 16, 1930

3 Sheets-Sheet 1

FIG. 1

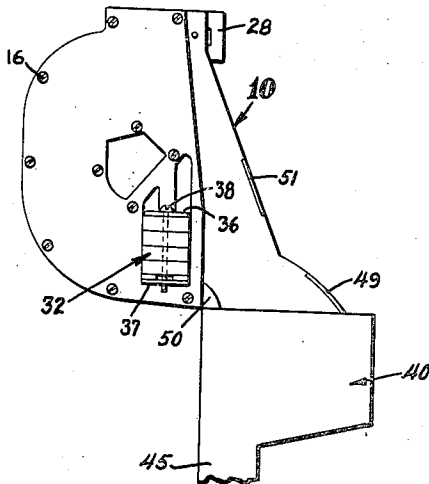


FIG. 2

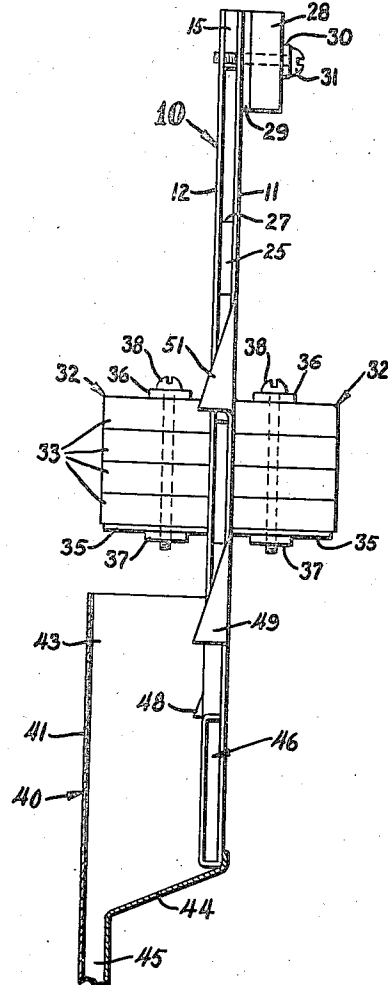


FIG. 7

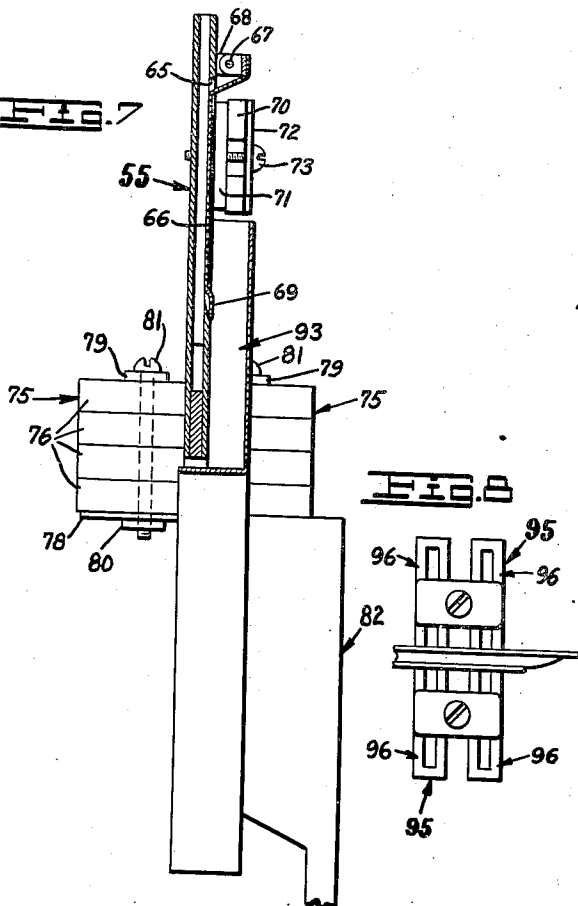


FIG. 8

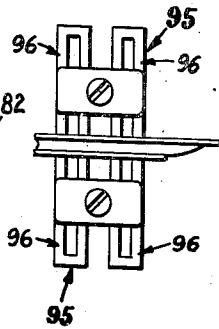
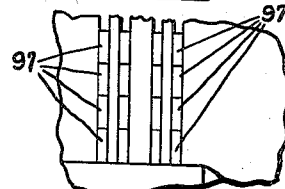


FIG. 9



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FIG. 3

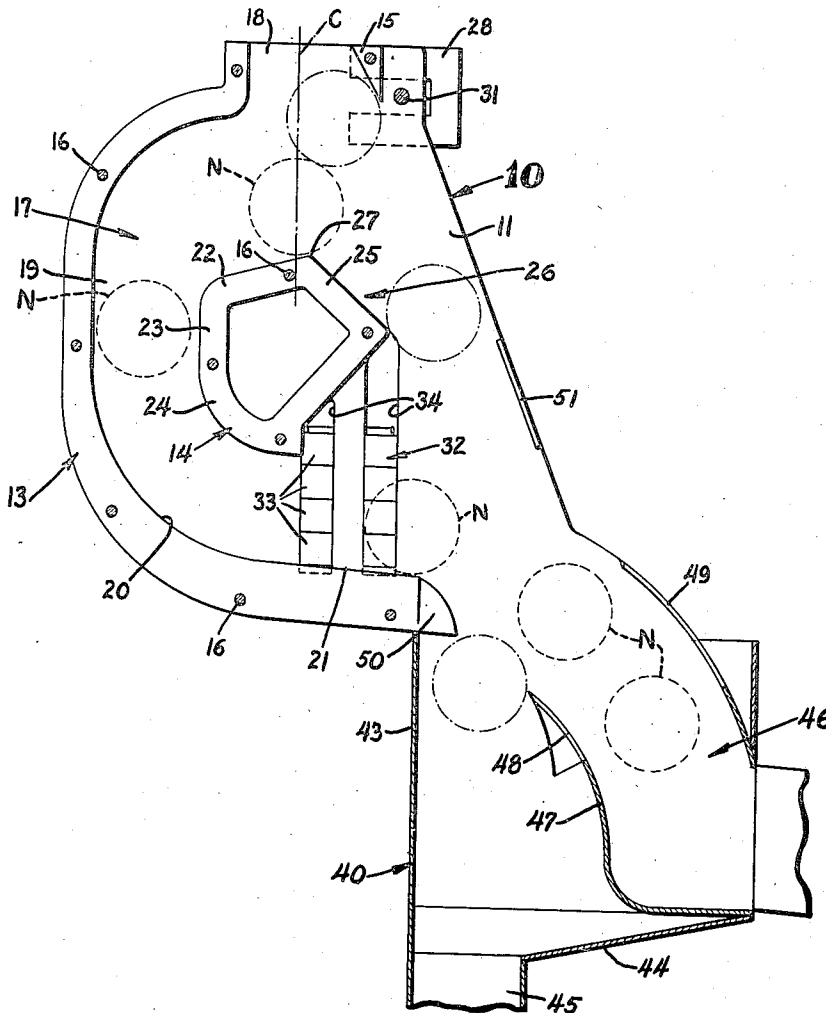
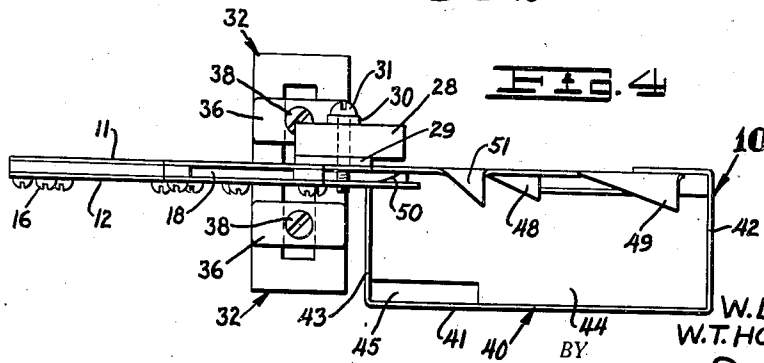


FIG. 4



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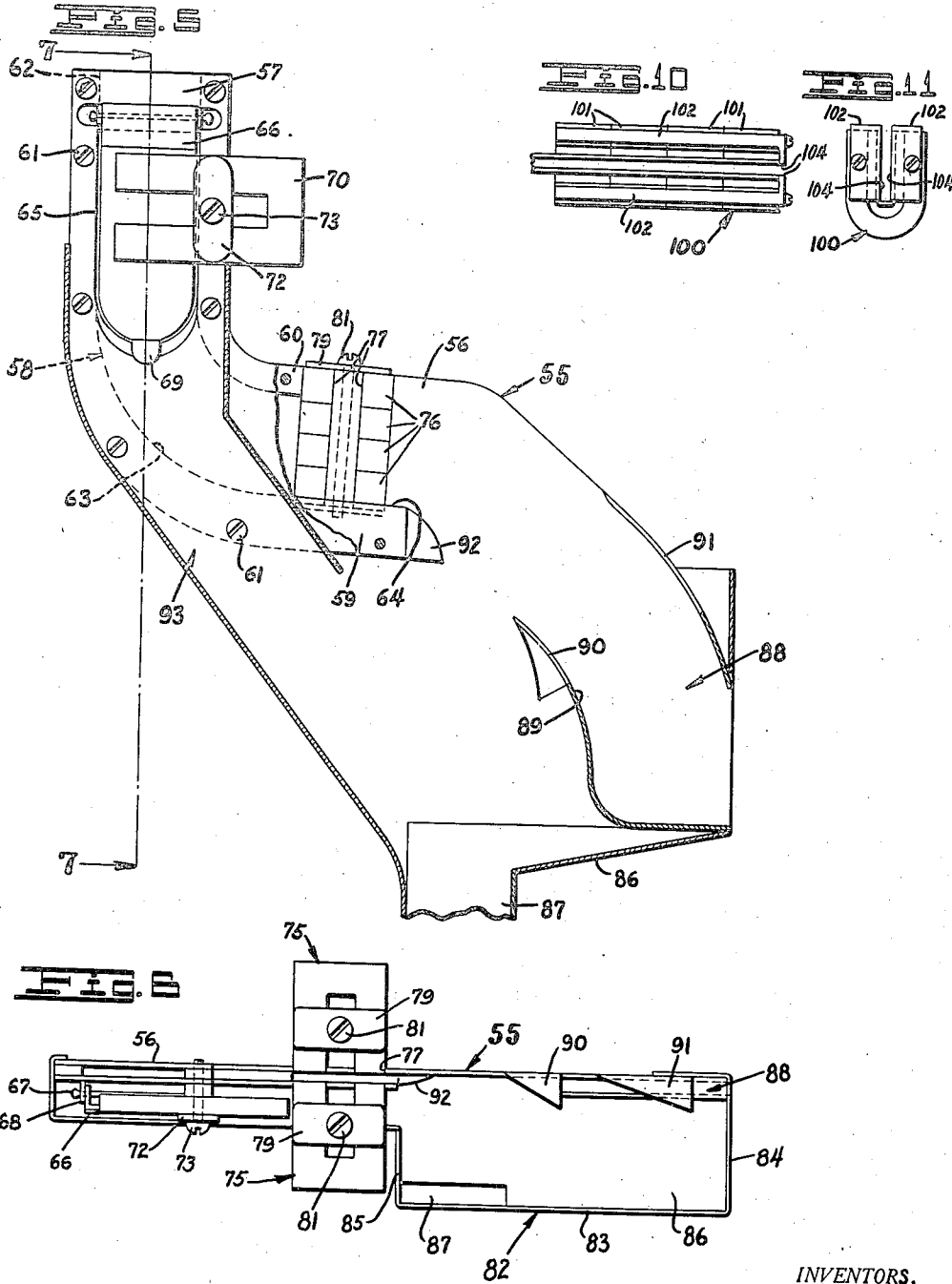
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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COIN SELECTING AND DETECTING DEVICE

Application filed August 16, 1930. Serial No. 475,756.

This invention relates to improvements in coin selecting and detecting devices.

The general object of this invention is to provide an improved magnetic coin selector.

5 Another object of the invention is to provide a coin selector wherein a magnetic field or flux coacts with gravity for segregating various coins or tokens.

10 A further object of the invention is to provide an improved coin selector including opposed horseshoe magnets which provide a magnetic field to set up eddy currents in a rolling coin or token.

15 Another object of the invention is to provide means for preventing paramagnetic coins from reaching the flux field.

20 Other objects and the advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings wherein:

Fig. 1 is a side view of our improved coin selecting device.

Fig. 2 is an enlarged end view of the device shown in Fig. 1.

25 Fig. 3 is an enlarged view similar to Fig. 1 with the side plates removed.

Fig. 4 is a top plan view of the device shown in Fig. 3.

30 Fig. 5 is a side view partly in section of a modified form of our invention.

Fig. 6 is a top plan view of the device shown in Fig. 5.

35 Fig. 7 is a section taken on line 7—7 of Fig. 5.

Fig. 8 is a top plan view of a modified form of magnet member and a fragment of a coin chute.

40 Fig. 9 is an inner end view of one of the magnet sets shown in Fig. 8.

Fig. 10 is a top plan view of another modified form of magnet and a fragment of a coin chute and

45 Fig. 11 is an end view of the device shown in Fig. 10.

Referring to the drawings by reference characters we have indicated our improved coin selecting device generally at 10. This device is adapted to be used in combination 50 with token or coin controlled machines,

change making devices or can be used independently for testing coins.

As shown the device 10 comprises spaced side plates 11 and 12 having coin chutes 55 formed therebetween by guides 13, 14 and 15 to which the side plates are secured by screws 16.

The guide 13 forms the outer portion of a coin chute 17 which includes a vertical entrance portion 18 and an offset vertical portion 19 the wall of which curves as at 20 60 into a substantially horizontal portion 21 which is slightly inclined downward away from the offset vertical portion.

The guide 14 includes an upper inclined 65 top portion 22, a vertical portion 23 and a curved portion 24 all of which form the inner portion of the coin chute 17. The guide 14 further includes an inclined portion 25 70 which joins the portion 22 and is inclined at a steeper angle than the portion 22 and forms the inner portion of a coin chute 26, the outer portion of which is formed by the guide 15.

75 The apex 27 at the juncture of the inclined portion 22 of the chute 17 and the inclined portion 25 of the chute 26 is positioned at the side of the center line C of the entrance 18 nearest the chute 26.

80 Adjacent the top of the device we provide a magnet 28 which is of the horseshoe type. This magnet is positioned adjacent the side of the entrance 18 towards the chute 26 and is positioned on the outside of the plate 11. Various means may be used to secure the 85 magnet in position but we have shown the magnet as engaging a diamagnetic spacer 29 and being clamped to the plate 11 by a bar 30 and a screw 31.

90 At the portion 21 of the chute 17 and spaced a slight distance from the curved portion 20 we provide a pair of opposed magnet members indicated generally at 32. These magnetic members are of the horse- 95 shoe type and may each be one solid piece or may be laminated and made up of a plurality of separate magnetic members 33 as shown. When they are made up of separate magnets as shown the north and south 100 poles are placed on alternate sides. As

shown the pole ends of the magnets 32 are positioned in apertures 34 provided in the plates 11 and 12 and are flush with the inner faces of the plates. The magnets 32 are mounted on lips 35 turned out from the plates and clamped to the lips by bars 36 and 37 and screws 38.

The plate 11 extends below the portion 21 of the chute and has provided thereon an open topped receiver 40 which includes a side wall 41 spaced from the plate 11, end walls 42 and 43 and an angular bottom 44 which inclines downward and outward towards a chute 45.

In the receiver 40 we provide a coin chute 46 which is spaced from the open lower end of the coin chute 17 and includes a curved portion 47, the upper end of which is positioned so that the correct coin passing from the chute 17 will enter the chute 46. From the chute 46 the coin may be directed in any desired manner to any desired operating mechanism or receptacle.

In front of the inner end of the curved portion 47 of the chute 46 we provide a spur shaped deflector 48 and in front of the outer side of the chute 46 we provide a spur shaped deflector 49 and at the end of the lower portion of the guide 13 we provide a deflector portion 50. Opposite the inclined portion 25 of the guide 14 and therebelow we provide a spur shaped deflector 51.

In operation when the device is constructed to segregate nickels from counterfeit money and slugs, when a nickel as indicated at N is dropped in the entrance 18 it will strike the inclined portion 22 of the guide 14 and roll into the vertical portion 19 of the chute 17 and be guided by the curved portion 20 onto the inclined portion 21 from which it will exit. The momentum of the coin when it leaves the chute 17 will overcome the force of gravity sufficiently to carry the nickel or coin past the deflector 48 into the chute 46.

All counterfeit coins or slugs made of a diamagnetic material will pursue the same course as the nickel until they reach the end of the horizontal inclined portion 21 of the chute 17.

The magnets 32 are of such construction that the eddy currents set up by the nickel rolling through the flux field will effect the momentum of the nickel in a manner whereby the force of gravity will direct it into the chute 46 as previously described, while the eddy currents set up by a counterfeit nickel or a slug will retard or damp the momentum of the same in correspondence to the counter currents generated when the counterfeit nickel or slug cuts the field and to an extent depending on the materials of which the counterfeit coin or slug is constituted.

The deflector 48 prevents slugs which con-

tain materials similar to a nickel from entering the chute 46 and the deflector 49 prevents slugs which might be repelled from the magnets 32 faster than a nickel from entering the chute 46 while the deflector 50 guides greatly retarded slugs away from the plate 11 so that even though the device was tilted forward the slug would not enter the chute 46.

When a paramagnetic slug is dropped in the entrance 18 the magnet 28 attracts it thereby causing the slug to fall on the angular portion 25 of the guide 14 whereupon it rolls down the portion 25 and strikes the deflector 51 which directs it away from the side plate 11 and prevents it from entering the coin chute 46. All the rejected coins which fall into the receiver pass therefrom through the chute 45 to a suitable return out of the machine with which the device is associated.

In Figs. 5, 6 and 7 we have indicated generally at 55 a slight modification of our invention wherein the paramagnetic slugs are removed in a different manner from that in the device 10.

As shown the device 55 comprises spaced side plates 56 and 57 having a coin chute 58 formed therebetween by guides 59 and 60 to which the plates are secured by screws 61.

The chute 58 includes a vertical portion 62 which curves as at 63 into a portion 64 which is slightly inclined downwardly away from the vertical portion.

Adjacent the top of the device we provide an elongated aperture 65 which is the same width as the chute 58. For closing the aperture 65 we provide a closure member or door 66 which is pivoted on a rod 67 supported by ears 68 turned out from the plate 57. The door 66 is preferably made of a very thin and light weight material and the inner face of the door is adapted to be normally flush with the inner face of the plate 57. A lip 69 adjacent the lower end of the door engages the outer face of the plate 57 and prevents the door from swinging inward beyond the inner face of the plate 57.

Spaced from the door 66 and overlaying it intermediate its length we provide a magnet 70 which is shown as of the horseshoe type. The magnet 70 engages a spacer block 71 and is clamped thereto by a bar 72 which is secured in position by a screw 73.

Intermediate the length of the portion 64 of the chute 58 we provide a pair of opposed magnet members indicated generally at 75. These magnetic members are of the horseshoe type and like the magnets 32 of the device 10 may each be one solid piece or may each be made up of a plurality of separate magnetic members 76 as shown. As shown the pole ends of the magnets 75 are positioned in apertures 77 provided in the plates 56 and 57 and are flush with the inner faces

of the plates. The magnets 75 are mounted on lips 78 turned out from the plates 56 and 57 and clamped to the lips by bars 79 and 80 and screws 81.

5 The plate 56 extends below the horizontal portion 64 of the chute and has provided thereon an open topped receiver 82 which includes a side wall 83 spaced from the plate 56, end walls 84 and 85, and an
10 angular bottom 86 which inclines downward and outward towards a chute 87.

In the receiver 40 we provide a coin chute 88 which is spaced from the open lower end of the coin chute 58 and includes a curved
15 portion 89, the upper end of which is positioned so that the correct coin passing from the chute 58 will enter the chute 88. From the chute 88 the coin may be directed in any desired manner to any desired operating
20 mechanism or receptacle.

In front of the inner end of the curved portion 89 of the chute 88 we provide a spur shaped deflector 90 and in front of the other side of the chute 88 we provide a spur
25 shaped deflector 91 and at the lower end of the guide 59 we provide a deflector 92.

In operation when the device 55 is constructed to segregate nickels from counterfeit money and slugs, when a nickel is
30 dropped in the vertical portion 62 of the chute 55 it passes the door 66 and rolls past the magnets 75 and passes from the chute 58. The momentum of the coin when it leaves the chute 58 will overcome the force
35 of gravity sufficiently to carry the nickel past the deflector into the chute 88.

All other counterfeit coins or slugs made of diamagnetic material will follow the same course as the nickel until they reach the end
40 of the chute 58.

The magnets 75 like the magnets 32 of the device 10, are of such construction that the eddy currents set up by the nickel rolling through the flux field will effect the momentum of the nickel in a manner whereby the
45 force of gravity will direct it into the chute 88, while the eddy currents set up by a counterfeit nickel or slug will retard or damp the momentum of the same in correspondence to the counter currents generated and
50 to an extent depending on the materials of which the slug is constructed.

The deflector 90 prevents slugs which contain materials similar to nickels from entering the chute 88 and the deflector 91 prevents slugs which might be repelled from the magnets 75 faster than a nickel from entering the chute 88 while the deflector 92 guides greatly retarded slugs away from
60 the plate 56 so that even though the device is tilted forward the slug will not enter the chute 88.

When a paramagnetic slug is dropped in the entrance of the chute 58 the magnet 70
65 attracts the slug towards itself whereupon

the pressure of the slug opens the door 66 and as the slug continues to fall it moves out through the apertures 65 and drops into a chute 93 which directs the slug into the receiver 82. 70

Although we have shown and described the devices 10 and 55 as being constructed to segregate nickels from counterfeit slugs it will be understood that our invention may be constructed to operate in the same manner for selection of metal coins, tokens, etc. of any denomination or description. 75

In Figs. 8 and 9 we have indicated generally at 95 a modified form of opposed magnet members which may be used in place of the magnets 32 in the device 10 and the magnets 75 in the device 55. The magnetic members 95 each include two horseshoe magnets 96 which may be mounted similar to the magnet members 32 and 75 and which
80 like the magnet members 32 and 75 may be each made of one solid piece or a plurality of horseshoe magnets 97 superimposed and having their north and south poles arranged in alternate relation. 85

In Figs. 10 and 11 we have indicated generally at 100 another modified form of magnet member which may be used in place of the magnet members 32 and 75. When the member 100 is used the horizontal portion
90 of the coin chute is preferably made longer. The magnet member 100 is made up of a plurality of horseshoe magnets 101 which are arranged with their poles positioned on each side of the coin chute. The magnets 101 may be secured in position in any desired manner and the poles on each side of the chute are all connected together by bars 102. The bars 102 include inter-
95 ends 104 the faces of which lie flush with the inner surface of the coin chute. The effect of the magnets 101 on diamagnetic coins and slugs is the same as previously described in connection with the effects of the magnets 32 and 75 of the devices 10 and 55. 100

From the foregoing description it will be apparent that we have provided a novel coin detector which is simple in construction and highly efficient in use.

Having thus described our invention, we
105 claim:

1. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming
120 two chutes, one of said chutes being for diamagnetic coins and slugs and the other being for paramagnetic coins and slugs, said first chute including a vertical entrance portion, an offset vertical portion communicating with said entrance portion, and an inclined portion communicating with said offset vertical portion, said inclined portion being inclined downwardly away from said offset vertical portion, said paramagnetic
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chute communicating with said entrance portion of said first chute, a magnetic member adjacent the side of said entrance to said paramagnetic chute, said paramagnetic chute having an exit opening communicating with the exit opening of said first chute, a third chute and means to direct a correct coin towards said third chute.

2. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto; said guide members forming a chute, said chute including a vertical portion, and an inclined portion communicating with said vertical portion, said inclined portion being inclined downwardly away from said vertical portion, a second coin chute spaced below and ahead of the lower end of said first chute, means to control the momentum of a correct coin whereby it will be carried into the second chute after leaving said lower end of said first chute, a deflector to direct spurious coins away from said second chute, there being an aperture in one of said side plates intermediate the length of said vertical portion of said first chute, a hinged closure for said aperture, a magnetic member spaced from and overlaying said closure, said magnet being adapted to attract paramagnetic coins toward itself whereupon said coins will swing said closure outward and said coins will drop outside of said drop chute.

3. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming a chute, said chute including a vertical entrance portion, an offset vertical portion communicating with said entrance portion and an inclined portion communicating with said offset vertical portion, said inclined portion being inclined downwardly away from said offset vertical portion, a pair of opposed magnetic members intermediate the length of said inclined portion, each of said magnetic members including a plurality of horseshoe magnets, the poles of said magnets being positioned in apertures in said side plates, a second coin chute spaced below and ahead of the lower end of said first chute, said second chute being in a position whereby the momentum of a correct coin after leaving said lower end of said first chute will carry it into said second chute.

4. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming a chute, said chute including a vertical entrance portion, an offset vertical portion communicating with said entrance portion and an inclined portion communicating with said offset vertical portion, said inclined portion being inclined downwardly away from said

offset vertical portion, a pair of opposed magnetic members intermediate the length of said inclined portion, each of said magnetic members including a plurality of horseshoe magnets, the poles of said magnets being positioned in apertures in said side plates, a second coin chute spaced below and ahead of the lower end of said first chute, said second chute being in a position whereby the momentum of a correct coin after leaving said lower end of said first chute will carry it into said second chute, a spur shaped deflector adjacent the inner end of said second chute to direct spurious coins away from said second chute and another spur shaped deflector adjacent the outer side of said second chute adapted to direct a spurious coin away from said second chute.

5. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming a chute, said chute including a vertical portion, and an inclined portion communicating with said vertical portion, said inclined portion being inclined downwardly away from said vertical portion, a pair of opposed magnetic members intermediate the length of said inclined portion, each of said magnetic members including a plurality of horseshoe magnets, the poles of said magnets being positioned in apertures in said side plates, a second coin chute spaced below and ahead of the lower end of said first chute, said second chute being in a position whereby the momentum of a correct coin after leaving said lower end of said first chute will carry it into said second chute, a spur shaped deflector adjacent the inner end of said second chute to direct spurious coins away from said second chute, another spur shaped deflector adjacent the outer side of said second chute adapted to direct a spurious coin away from said second chute, there being an aperture in one of said side plates intermediate the length of said vertical portion of said first chute, a hinged closure for said aperture, a magnetic member spaced from and overlaying said closure, said magnet being adapted to attract paramagnetic coins toward itself whereupon said coins will swing said closure outward and said coins will drop outside of said first chute.

6. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming two chutes, one of said chutes being for diamagnetic coins and slugs and the other being for paramagnetic coins and slugs, said first chute including a vertical entrance portion, an offset vertical portion communicating with said entrance portion and an inclined portion communicating with said offset vertical portion, said inclined portion being inclined

downwardly away from said offset vertical portion, a third coin chute spaced below and ahead of the lower end of said diamagnetic chute, means to control the momentum of a correct coin whereby it will be carried into the third coin chute after it has left the lower end of the diamagnetic chute, means to direct spurious coins away from said third chute, said paramagnetic chute communicating with said entrance portion of said first chute, a magnetic member adjacent the side of said entrance to said paramagnetic chute, said paramagnetic chute having an exit opening above the exit opening of said first chute, and a deflector adjacent said exit of said paramagnetic chute adapted to direct spurious coins away from said third chute.

7. In a coin detector, a pair of spaced side plates, a plurality of guide members positioned between said side plates and secured thereto, said guide members forming two chutes, one of said chutes being for diamagnetic coins and slugs and the other being for paramagnetic coins and slugs, said first chute including a vertical entrance portion, an offset vertical portion communicating with said entrance portion and an inclined portion communicating with said offset vertical portion, said inclined portion being inclined downwardly away from said offset vertical portion, a pair of opposed magnetic members intermediate the length of said inclined portion, each of said magnetic members including a plurality of horseshoe magnets, the poles of said magnets being positioned in apertures in said side plates, a third coin chute spaced below and ahead of the lower end of said diamagnetic chute, said third chute being in a position where the momentum of a correct coin after leaving said lower end of said first chute will carry it into said third chute, a spur shaped deflector adjacent the inner end of said third chute to direct spurious coins away from said third chute, a spur shaped deflector adjacent the outer side of said third chute adapted to direct a spurious coin away from said third chute, said paramagnetic chute communicating with said entrance portion of said first chute, a magnetic member adjacent the side of said entrance to said paramagnetic chute, said paramagnetic chute having an exit above the exit opening of said first chute, a spur shaped deflector adjacent said exit of said paramagnetic chute adapted to direct spurious coins away from said third chute.

8. In a coin detector, a pair of spaced side plates, means to form two coin chutes between said plates, said chutes having a common entrance portion, one of said chutes being for diamagnetic coins and slugs and the other chute being for paramagnetic coins and slugs, said first chute including an offset

portion in communication with said entrance portion and an inclined portion communicating with said offset portion, said inclined portion being inclined downwardly away from said offset portion, said paramagnetic chute having an entrance portion and having a magnetic member adjacent to said entrance portion, said paramagnetic chute having an exit opening adjacent to the exit opening of said first chute, a third chute, and means to direct a good coin towards said third chute.

9. In a coin detector a pair of side plates including means to form a pair of coin chutes having common entrance way, said chutes diverging beyond said entrance way, magnetic means to cause paramagnetic coins and slugs to proceed in one chute while diamagnetic coins proceed in the other chute, said chutes including portions whereby the chutes cross, means associated with the diamagnetic chute adjacent the juncture of the chutes to produce a flux field across the chute and a deflector having a pointed front end arranged in advance of the juncture of said chutes and in the path of coins passing through the flux field.

In testimony whereof, we hereunto affix our signatures.

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WILLIAM T. HOOFNAGLE.

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