

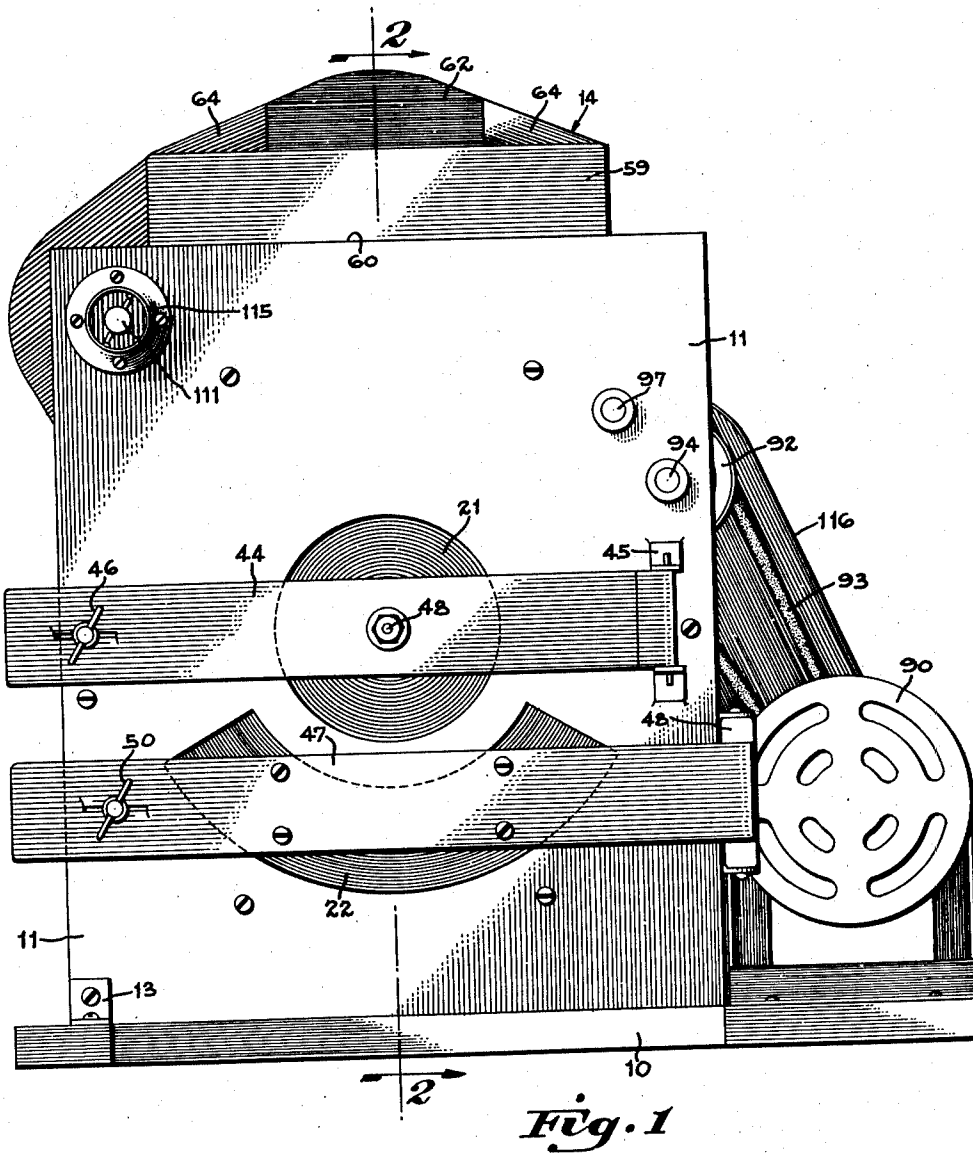
April 13, 1954

J. W. YOUNG ET AL
COIN SORTING MACHINE

2,675,007

Filed Dec. 22, 1949

4 Sheets-Sheet 1



INVENTORS
BY *John W. Young and David Beall*
Wood, Argy, Henon & Evans
ATTORNEYS

April 13, 1954

J. W. YOUNG ET AL
COIN SORTING MACHINE

2,675,007

Filed Dec. 22, 1949

4 Sheets-Sheet 2

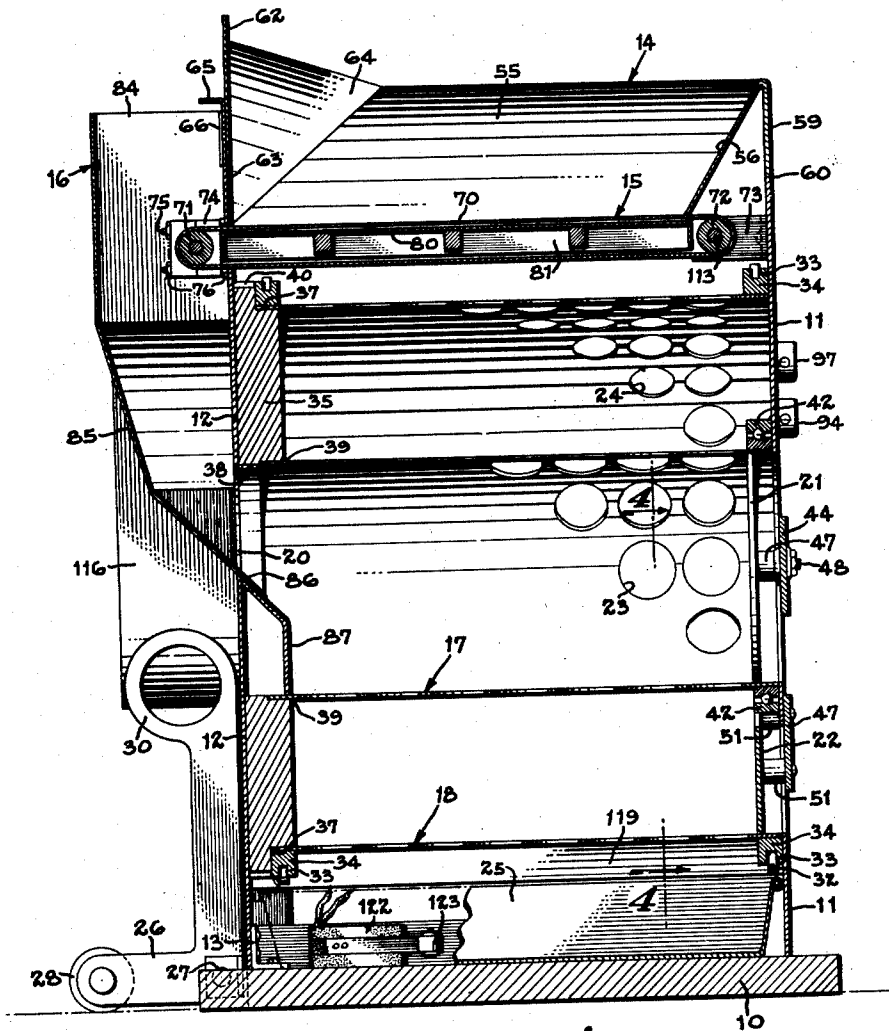


Fig. 2

INVENTORS
John W. Young and
David Ball
Wood, Gray, Henon & Evans
ATTORNEYS

April 13, 1954

J. W. YOUNG ET AL
COIN SORTING MACHINE

2,675,007

Filed Dec. 22, 1949

4 Sheets-Sheet 3

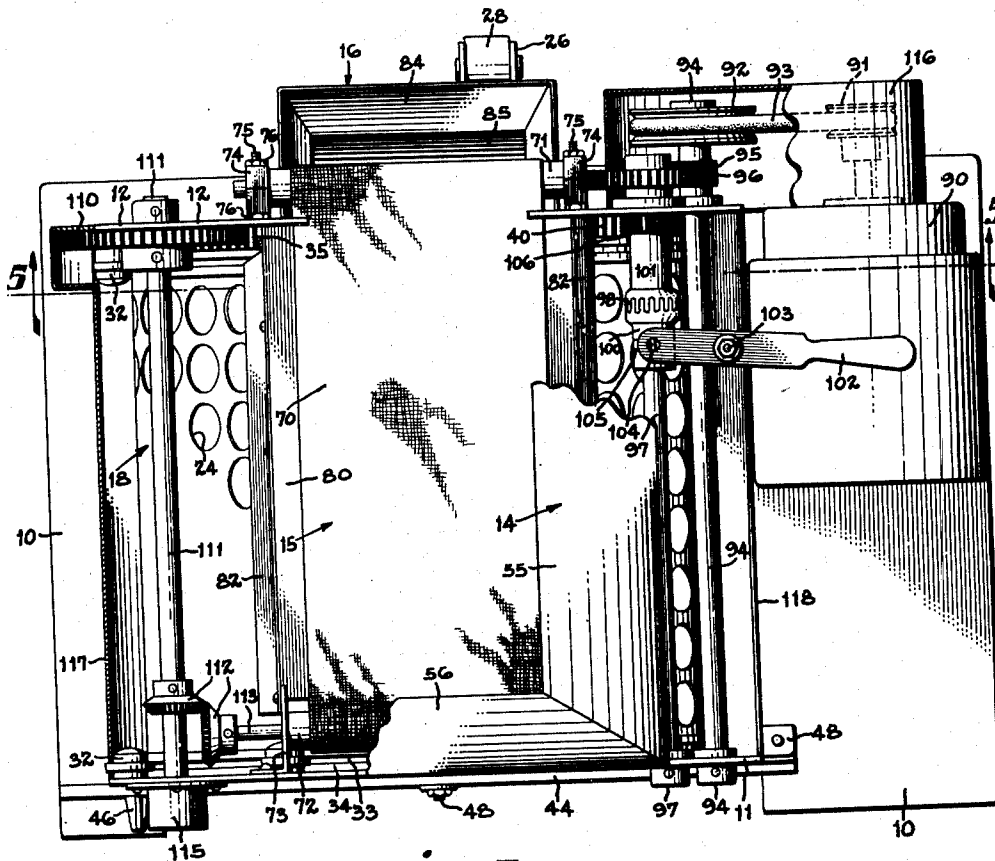


Fig. 3

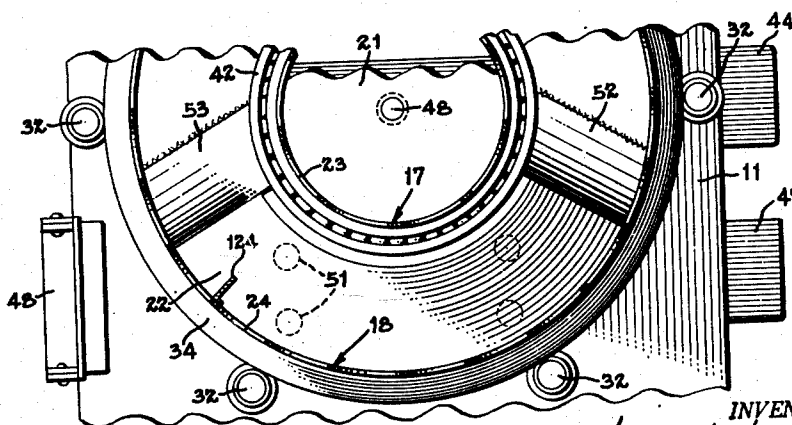


Fig. 4

INVENTORS
BY John W. Young and
David Beall
Wood, Cary, Henon & Sman
ATTORNEYS

April 13, 1954

J. W. YOUNG ET AL
COIN SORTING MACHINE

2,675,007

Filed Dec. 22, 1949

4 Sheets-Sheet 4

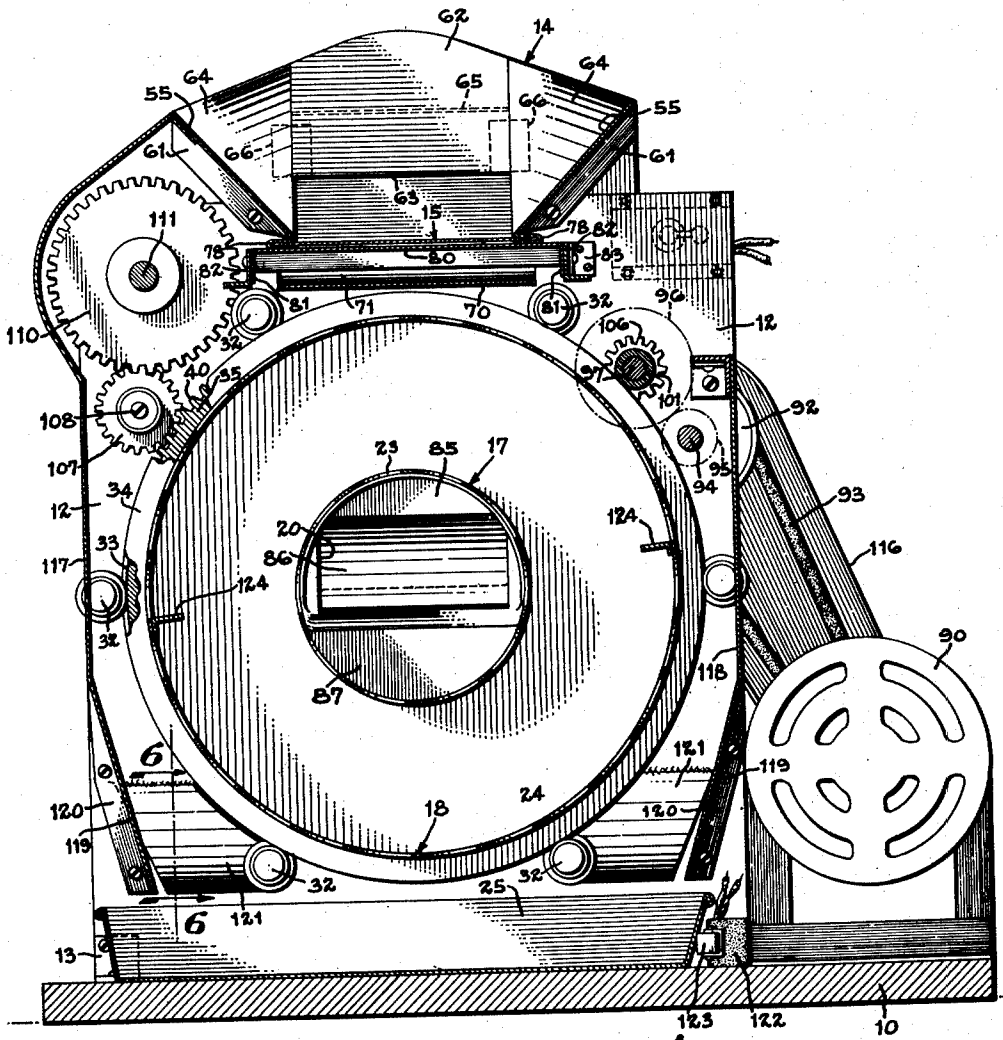


Fig. 5

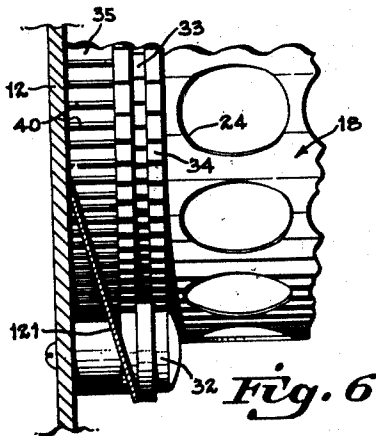


Fig. 6

INVENTORS
John W. Young and
David Beall
BY Wood, Aray, Henson & Evans
ATTORNEYS

UNITED STATES PATENT OFFICE

2,675,007

COIN SORTING MACHINE

John W. Young, Miami, Fla., and David Beall,
Hamilton, Ohio

Application December 22, 1949, Serial No. 134,506

1 Claim. (Cl. 133—3)

1

This invention is directed to improvements in coin sorting machines of the type utilizing concentrically mounted, rotatable perforated cylinders which screen the coins according to size.

The primary object of the invention is to provide a comparatively simple and inexpensive automatic coin sorting machine which is capable of sorting a large volume of coins rapidly with a minimum of effort on the part of the operator. For example, the improved machine is capable of sorting between twelve and fifteen hundred coins a minute; or in other words, in a lot comprising mixed nickels, dimes and quarters in the usual proportions found in cigarette vending machines and the like, somewhere in the neighborhood of one hundred dollars' worth of coins a minute.

The lot or batch method of operation is used. That is, the operator dumps a batch of mixed coins into a hopper, the machine is turned on, and the sorted coins removed from the machine before the next batch is introduced. It has been found that the batch method as utilized in the improved machine is unusually efficient and insures a complete separation of the various sizes of coins. The removal of the coins is accomplished in a novel manner, each group of sorted coins being automatically discharged in a lot. Thus, by providing rapid sorting and automatic lot discharge, the number of coins sorted per unit of time is substantially greater than that possible with the complex and expensive coin sorting machines which operate on the continuous discharge principle in which but a few coins are processed at a time.

In the preferred embodiment of the invention two perforated cylinders are utilized. The cylinders are mounted concentrically, and the coins fed into the inner cylinder. The perforations are graded down in size from the inner to the outer cylinder so that of three coins of different sizes; the largest coin is trapped in the inner cylinder, while the two smaller coins fall through the perforations in the inner cylinder to the outer cylinder; the intermediate size coin is trapped in the outer cylinder; and the smallest size coin, after falling through the perforations in the outer cylinder, is caught in a receptacle. It will be observed that additional cylinders may be added to adapt the machine to operation with a greater number of different size coins.

One of the novel aspects of the improved machine resides in the manner in which the cylinders are mounted. The particular arrangement makes it possible to feed the coins into the inner cylinder automatically while the cylinders are

2

rotating. It also makes it possible to utilize the rotative movement of the cylinders to expedite the removal of the sorted coins from the machine. Discharge doors at one end of the unit open directly into the ends of the respective cylinders. The doors are mounted independently so that the coins may be discharged a size at a time. Thus, if it is found in a particular collection of coins that one size far outnumbers another, the minority coins may be permitted to accumulate through a number of sorting runs. The doors are mounted in such a manner that they do not interfere with the tumbling and sorting action of the machine and offer no obstacles to the passing of the coins from one cylinder to the other. Upon discharge of the coins, the doors may be opened while the cylinders are turning, it being unnecessary to stop the machine. Provision is made for elevating the one end of the machine so that the cylinders slant toward the doors, thus with the rotative movement and the slant, the coins discharge from the cylinders very rapidly.

Other objects and advantages of the invention are pointed out in the following detailed description of the drawings, in which:

Figure 1 is a front elevational view of a coin sorting machine embodying the present improvements.

Figure 2 is a cross sectional view taken on line 2—2 of Figure 1, particularly illustrating the arrangement of the various parts inside the machine.

Figure 3 is a top plan view of the machine in which certain parts are broken away to illustrate the details of the driving mechanism more clearly.

Figure 4 is an enlarged fragmentary, sectional view taken on line 4—4 of Figure 2.

Figure 5 is a cross sectional view taken on the line 5—5 of Figure 3.

Figure 6 is an enlarged fragmentary view taken on line 6—6 of Figure 5.

In the preferred embodiment shown in the drawings, the machine is mounted on a base 10, which has at the front a vertical wall member 11 and at the rear a vertical wall member 12. Both of the wall members are secured to the base by means of small angles 13 which are riveted or otherwise appropriately fixed to the wall members and secured to the base by screws or the like. The two vertical wall members 11 and 12 constitute the main frame of the machine and for this reason preferably are fabricated from sheets of rather heavy-gauge metal. At the top of the unit a hopper 14 is mounted, the hopper cooperating with a conveyor belt 15 and a chute 16 for in-

roducing the coins into the machine. Referring to Figure 2, it will be noted that two perforated cylinders are shown. The inner cylinder is indicated generally at 17 and the outer cylinder is indicated generally at 18. The two cylinders are mounted concentrically, and in the present embodiment are adapted to rotate together.

Briefly, the operation of the unit is as follows. Coins are placed into the hopper 14, carried by the conveyor 15 to the chute 16 and then directed by the chute 16 into the inner cylinder 17 through an opening 20 in the vertical wall member 12. At the end of the unit opposite the chute 16 a pair of doors 21 and 22 is provided, these doors opening respectively into the ends of the two cylinders 17 and 18. It will be noted that the perforations 23 in the cylinder 17 are larger than the perforations 24 in the outer cylinder. Figure 2, being somewhat diagrammatic, shows only a few of the perforations in the walls of the two cylinders, but it will be understood that the perforations are over substantially the whole area of each cylinder and as close together as is practical without weakening the material of the cylinders to the extent that the connecting webs between the perforations will be broken by the action of the coins during rotation of the cylinders. The unit shown is designed to sort coins of three different sizes. The perforations 23 in the inner cylinder are of such a size that the largest coin of the three cannot pass through. In the outer cylinder the perforations are of such a size that the intermediate size coin cannot pass. Thus, when a batch of coins is introduced into the inner cylinder, the largest coins, for instance, quarters, are retained inside the cylinder 17; the next sized coins, for instance nickels, are retained in the outer cylinder; and the smallest sized coin, for instance dimes, are collected in a pan 25 located below the two cylinders. To discharge the coins from the cylinders the machine is tipped by means of a bellcrank lever 26 which is pivotally mounted as at 27 at the rear of the base of the machine. The lever 26 carries a roller 28 at the one end and a handle 30 at the other end to facilitate swinging the lever into an elevating position. When the handle is swung down, the roller end of the lever is moved to a position in which the base is supported on an angle. Thus, when the doors 21 and 22 are opened, with the cylinders rotating, the coins are very rapidly discharged from their respective cylinders.

It will be obvious that other combinations of cylinders than those shown in the drawings may be utilized. For example, if it is desired, the machine can be adapted to sort all five of the denominations of coins used in the United States by adding two more cylinders having perforations of appropriate sizes.

Described in detail, the cylinder assembly is mounted on rollers 32 which are pivotally journaled on the front and back wall members. In the embodiment shown in the drawings, six idler rollers are utilized for each end of the cylinder assembly. The rollers 32 are idlers which are adapted to engage in circular tracks 33 cut in the peripheries of support rings 34. Two rings 34 are utilized, one at each end of the cylinder assembly as shown in Figure 2. The rings 34 may be brazed or otherwise appropriately fixed to the outside of the outer cylinder 18. At the rear end of the cylinder assembly, that is, at the end into which the coins are introduced, the two cylinders are secured to an annulus comprising a gear member 35 (Figure 6). This gear member is

counter-turned on the forward face to provide a shoulder 37 for supporting the outer cylinder, and is cut out centrally as at 38 to a size corresponding to the opening 20 in the vertical wall member at the back of the machine. The central opening thus provided is also counter-turned as at 39 to provide a shoulder for seating the rear end of the inner cylinder 17, the cylinder being brazed or otherwise appropriately fixed to the gear member. The periphery of the gear member 35 is cut to provide gear teeth 40 which extend completely around the circumference of the gear member, and these teeth are in driving engagement with a gear train, to be described later, for driving the cylinder assembly in rotative movement.

Thus, it will be noted that the rear end of both cylinders are secured to the gear member 35 and thus, in effect, the outer cylinder supports the inner. However, at the forward end of the cylinder assembly the ends of the two cylinder members are mounted independently. The outer member is mounted on the rollers 32 just as at the rear, but the inner cylinder is journaled in the inner race of a ballbearing unit 42, the outer race of this bearing being welded or otherwise appropriately fixed to the inner face of the front vertical wall member 11. The wall member 11 is cut out in the area at the forward end of cylinder 17 and door 21 seated therein. Both of the doors 21 and 22 are set in from the front wall member 11 an amount substantially equal to the width of the forward ring 34. Thus, the doors lie adjacent the respective perforations 23 and 24 and there is no dead space in which coins could become entrapped during the sorting run of the machine.

For the inner cylinder 17, the door 21 is circular and fits somewhat snugly with the inside diameter of the cylinder. The door 21 is carried on a strap 44 which extends across the front of the machine, being hinged at the one end as at 45 and latched as at 46 to the other end. The door 21 is spaced inwardly from the strap 44 by means of a bushing 47 which is carried by a bolt 48 secured to the strap 44. The bushing provides a rotatable journal for the doors, so that it turns freely with the cylinder 17; thus, cutting down the drag which would otherwise be on the cylinder. The outer cylinder door 22 is also mounted on a strap 47 which extends across the front of the machine parallel to strap 44, at the one end being hinged to the side of the front wall member as at 48 and latched at the other end as at 50. The door 22 is spaced from strap 47 by means of spacer elements 51 so that the two doors lie in the same plane. It will be noted in Figure 1 that the lower door is arcuate, corresponding in size and shape to the opening between the outer drum 18 and the ballbearing unit 42. Referring now to Figure 4, a pair of fillet plates 52 and 53 are mounted at the two ends of door 22. These plates are secured to the inside of wall member 11 and serve to deflect coins away from the ends of the door so coins do not become caught behind the door and thus prevented from passing on through the outer cylinder.

Described in detail, the hopper 14 comprises side walls 55—55 and a front end wall 56. The side walls and front end wall slope inwardly to provide a funneling effect for directing the coins onto the conveyor 15. The front end wall 56 of the hopper is bent downwardly from the top to provide the facing 59 which seats on the upper edge of the forward wall member 11 as

at 60. At the rear of the hopper unit the side walls 55 are bent outwardly at right angles to provide the flanges 61 which are bolted to the rear vertical wall member 12, see Figure 5. At the rear end of the hopper unit, a vertical wall 62 is provided, and fillet plates 64 are provided at the sides of the wall member 62 between the side walls 55 and the end wall 62 to deflect the coins and thus prevent jamming. The end wall 62 of the hopper is cut out as at 63 to accommodate the conveyor 15. For convenience, a sliding door 65 is placed on wall 62, the door being slidable vertically in channels formed by tangs 66—66 secured to the wall 62 at the sides of door 65. The door provides a convenient reminder to the operator to check whether or not the pan 25 is in place before turning on the machine.

The conveyor 15 comprises an endless belt 70 which passes around a roller 71 at the rear and a roller 72 at the front of the machine. Roller 72 is carried by angle brackets 73—73 which are secured to the inside of front wall member 11. At the rear, roller 71 is on the outside of the rear wall member 12 and is journaled at the respective ends in adjustable pillow blocks 74—74. These blocks are adjustable toward and from the end wall 12 in order to provide means for tightening belt 70. In each instance, adjustment is accomplished by means of a bolt 75 which passes through the two pillow blocks and has nuts 76—76 threaded thereon in engagement with the respective outer faces of the pillow blocks. Thus, by loosening one bolt and tightening the other, the pillow blocks are moved longitudinally of bolt 75 between the two nuts 76. The upper run of the belt 70 is made with the two edges of the belt passing through channels 78—78 which are formed by bending the lower ends of the two side wall members 55 of the hopper in U configuration, with the open ends of the U's facing each other. This arrangement is utilized so that none of the coins become jammed between the side walls 55 and the belt 70.

The belt 70 is supported on a table 80 which extends from the front wall member 11 to the back wall member 12 underneath the belt. The two side edges of the table 80 are bent downwardly to provide flanges 81—81 which are secured to support angles 82—82. The angles 82 are in turn secured to the respective back and front wall members of the frame. At the front, attachment is made by securing the angle members 82 to the flanges 73 which journal the roller 72. At the rear, simple angle brackets 83, which are attached to the rear wall 12, are provided for supporting the table unit. The chute 16 is mounted in a position to receive the coins as they drop from the end of the conveyor belt. The chute comprises a hood 84 which is generally rectangular in shape; enclosing the rear end of the conveyor belt. The lower end of the hood terminates in tapering walls 85, these walls finally terminating in a funneling chute 86 which directs the coins into the inside of cylinder 17 through opening 20. Where the funneling chute 86 opens into cylinder 17, a filleting member 87 is provided so that the coins in cylinder 17 cannot be caught beneath the funneling chute in the marginal area where there are no perforations in the wall of the cylinder.

In the preferred embodiment, the coin sorting machine is provided with both a motor drive and a crank or hand drive. An electric motor

90 is mounted on the base 10 at the one side of the machine toward the rear. The motor may be connected directly to the gear train, however, it is preferred that a rubber belt and pulley drive be interposed between the motor and the gear train as a safety factor in the event that the machine becomes jammed. This arrangement is not absolutely necessary but it has been found that when coins are taken from coin operated parking meters, cigarette and other vending machines, there are a number of foreign objects mixed with the coins that have been inserted into the machines in an effort to jam the mechanism or cause it to operate without a coin. For this reason, the safety factor is suggested.

Referring now to Figure 3, the pulley on the motor is indicated at 91 and the pulley on the gear train indicated at 92. The two pulleys are linked by means of a rubber belt 93. The pulley 92 is mounted on a shaft 94 which is journaled in the respective front and back wall members 11 and 12 of the frame. The shaft 94 also carries pinion 95, the pinion meshing with a gear 96. The gear 96 is mounted on a shaft 97 which extends parallel to shaft 94 and is also journaled at the respective ends in the two wall members of the frame. A toothed clutch 98 is interposed in the gear train at this point in order to provide means of disconnecting the drive from the motor to the cylinders. This clutch is an added safety factor and is designed to be operated very quickly in case of an emergency jam of the machine. The clutch comprises two toothed members 100 and 101 which are mounted on shaft 97. Member 101 is simply journaled on shaft 97, however, member 100 is keyed to the shaft 97, but is free to move longitudinally thereof into or out of engagement with the other member. This movement is accomplished by means of a lever 102 which is pivotally journaled as at 103 near the center and which carries a pair of yoke pins 104 adapted to ride in a circumferential groove 105 cut in the member 100. The gear train is completed by clutch member 101 which carries a gear 106 in mesh with the teeth 40 on the gear member 35. The driving connection is made through an idler gear 107 (Figure 5) which meshes with the teeth 40, this idler gear being pivotally journaled as at 108 on the rear wall member 12 of the frame. Above gear 107 a gear 110 is mounted on a shaft 111. Gear 107 is meshed with gear 110 and thus shaft 111 is rotated. Shaft 111 is rotatably journaled in the respective front and rear wall members of the frame similar to shafts 97 and 94. Near the front of the machine a pair of bevel gears 112 are mounted respectively on shaft 111 and on a shaft 113. Shaft 113 is a continuation of roller 72 and thus transmits the drive to the belt 70. At the forward end of the shaft 111 conventional means are provided for making a connection with a hand crank (not shown). The connection is protected by means of a housing 115 (Figure 1) bolted to the face of the front wall member. Thus, it will be seen that the whole assembly may be driven by means of the hand crank from shaft 111 or from the motor by means of the gear train. It will also be noted that the clutch 98 may be disengaged whenever the drive is by manual power so that the motor and the rest gears in the train are disconnected.

The R. P. M. of the motor is geared down through the gear train and particularly at the meshing connection between gear 106 and the comparatively large gear 35. However, the

tumbling action is equally efficient over a comparatively wide range of operating speeds. The ideal operating speeds of the cylinders and the ideal feeding capacity of the conveyor belt for particular operations are easily determined by experiment. It is suggested that a guard similar to the one shown at 116 be provided over the pulley drive and that side plates similar to those shown at 117 and 118 be provided adjacent the cylinder assembly. At the lower ends, plates 117 and 118 may be bent inwardly as at 119 so that coins hitting against these parts will be deflected toward the pan 25, see Figure 5. The side plates 117 and 118 may be secured in place by means of flanges similar to those shown at 120 which are bolted to the respective front and back wall members of the frame. It is also suggested that pairs of fillet plates 121-121 similar to those utilized at the ends of door 22 be utilized near the lower rollers 32 in order to deflect coins away from them.

It has been found desirable to break the electric wiring to the driving motor at a mercury switch 122 so that the motor cannot be turned on unless pan 25 is in place to catch the coins. The switch is located at the side of the machine near the base and carries a roller 123 adapted to be engaged by the pan for closing the switch. This switch may be of any conventional type adapted to close on contact.

The principles of operation of the coin sorting machine disclosed here may be utilized in a machine adapted for manual operation only, that is, a machine in which the gear train and motor drive are omitted. This modification would lighten the machine considerably and adapt it to be transported more easily. It will be obvious that the machine is also equally well adapted to be installed as a part of a permanent installation in which sheet metal coin chutes are provided at the discharge openings. In the latter instance, the hinge of discharge door 22 may be modified slightly in order to provide clearance for the chute leading from the discharge end of the inner cylinder. Also, baffle plates similar to those shown at 124-124 in Figure 5 may be installed in the cylinders to increase the agitating and tumbling effect of the coins when the cylinders are rotated. These and other modifications will be apparent to those skilled in the art.

Having described our invention, we claim:

A coin sorting machine comprising a base, front and rear wall members mounted on the base, an inner cylinder and an outer cylinder, said cylinders being concentrically disposed intermediate said front and rear wall members, each of said cylinders being perforated over substantially its entire surface, the perforations in the inner cylinder being larger than the perforations in the outer cylinder, mounting means for rotatably supporting said cylinders adjacent to said front and rear wall members, the mounting means adjacent the rear wall comprising an annulus secured to an end of said inner and outer cylinders and members rotatably journalling said annulus adjacent the periphery of the outer cylinder, the mounting means adjacent the front wall comprising journal members disposed at the periphery of each of said cylinders, drive means associated with said annulus for rotating said cylinders, said rear wall having an aperture therein in registry with the central portion of said annulus and said inner cylinder, a coin chute extending through said aperture for introducing coins to the inner cylinder, a circular door in the front wall member adapted to fit into the inner cylinder, said door being hinged to the front wall member and being mounted for rotation with the inner cylinder, a second door hinged to the front wall, said door being of an arcuate configuration and opening into the space between the inner and outer cylinders below the circular door, said arcuate door being in registry with the lowermost portion of the outer cylinder, and means for tipping the machine toward the doors, whereby the coins may be discharged while the cylinders are rotating.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
419,696	Merrell	Jan. 21, 1890
1,147,283	Tuttle	July 20, 1915
1,172,626	Moussette	Feb. 22, 1916
1,585,242	Hageman	May 18, 1926
1,668,626	Brandt	May 8, 1928
1,842,019	Godefroid	Jan. 19, 1932

FOREIGN PATENTS

Number	Country	Date
124,465	Germany	Oct. 21, 1901