April 21, 1953 J. C. SECKULA, SR 2,635,730

COIN SEPARATING AND COUNTING MACHINE

Filed Dec. 23, 1949 3 Sheets-Sheet 1

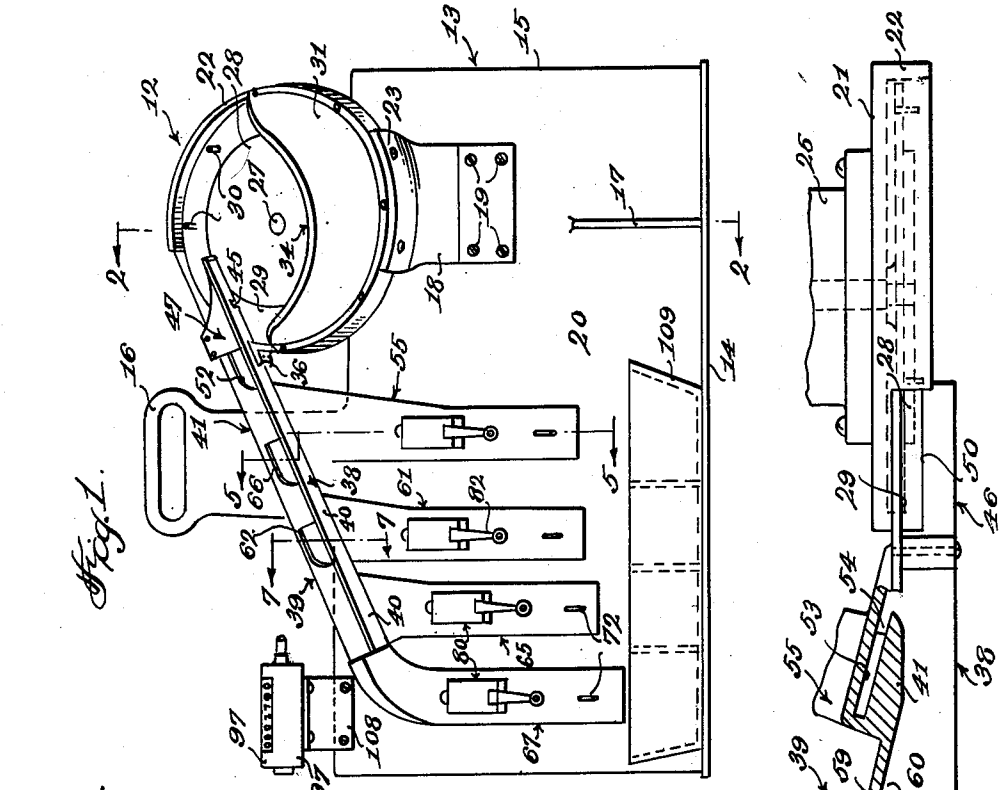


Fig. 1.

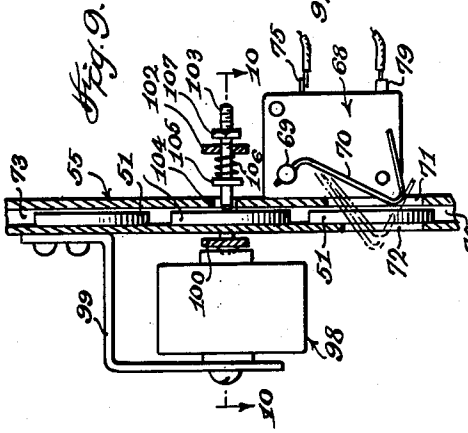


Fig. 9.

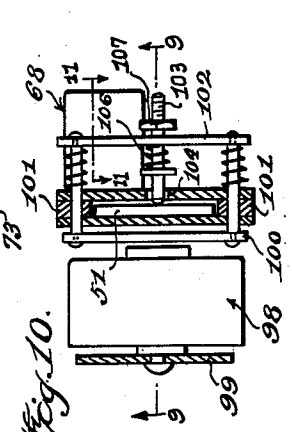


Fig. 10.

Fig. 4.

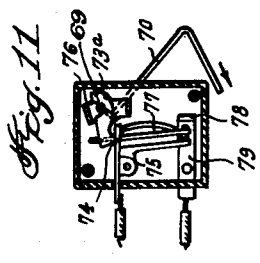


Fig. 11.

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Fig. 2.

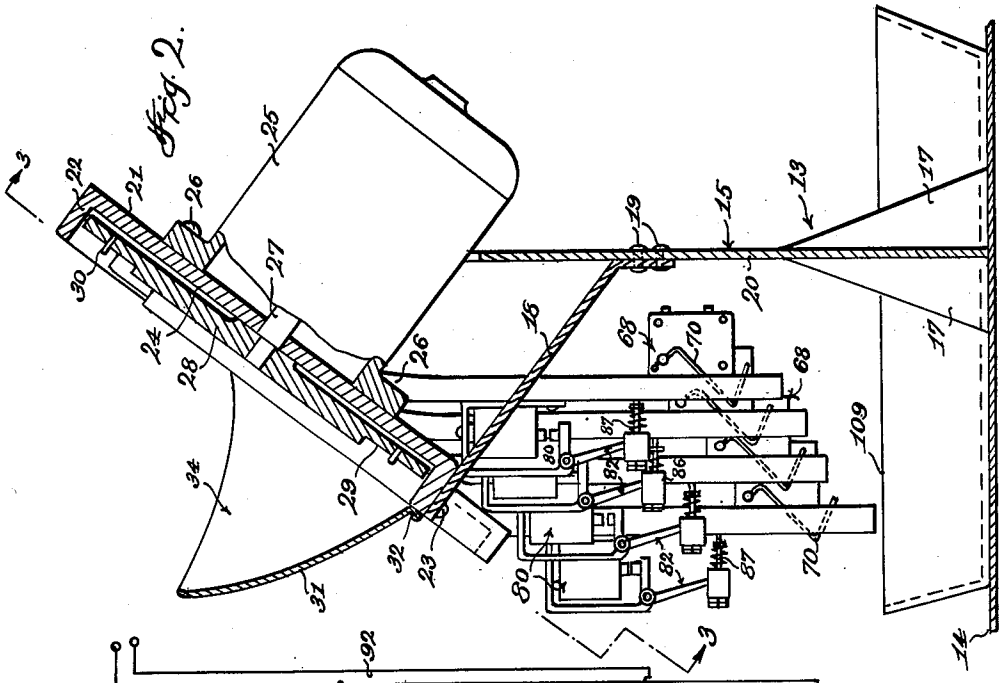


Fig. 5

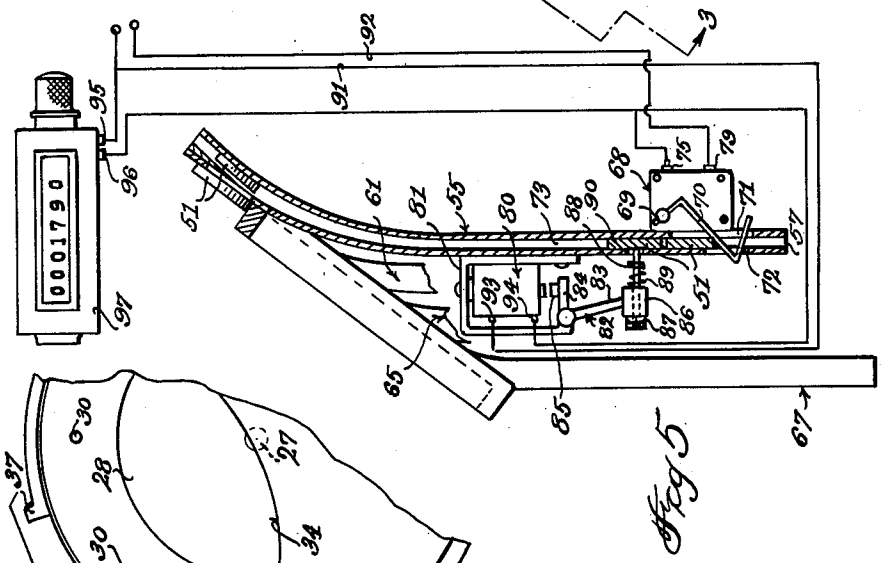
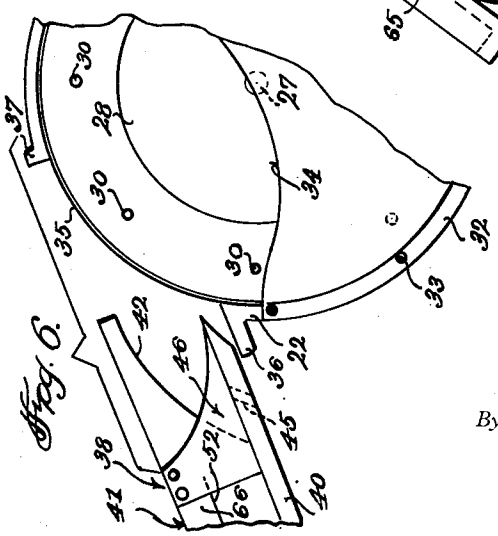


Fig. 6.



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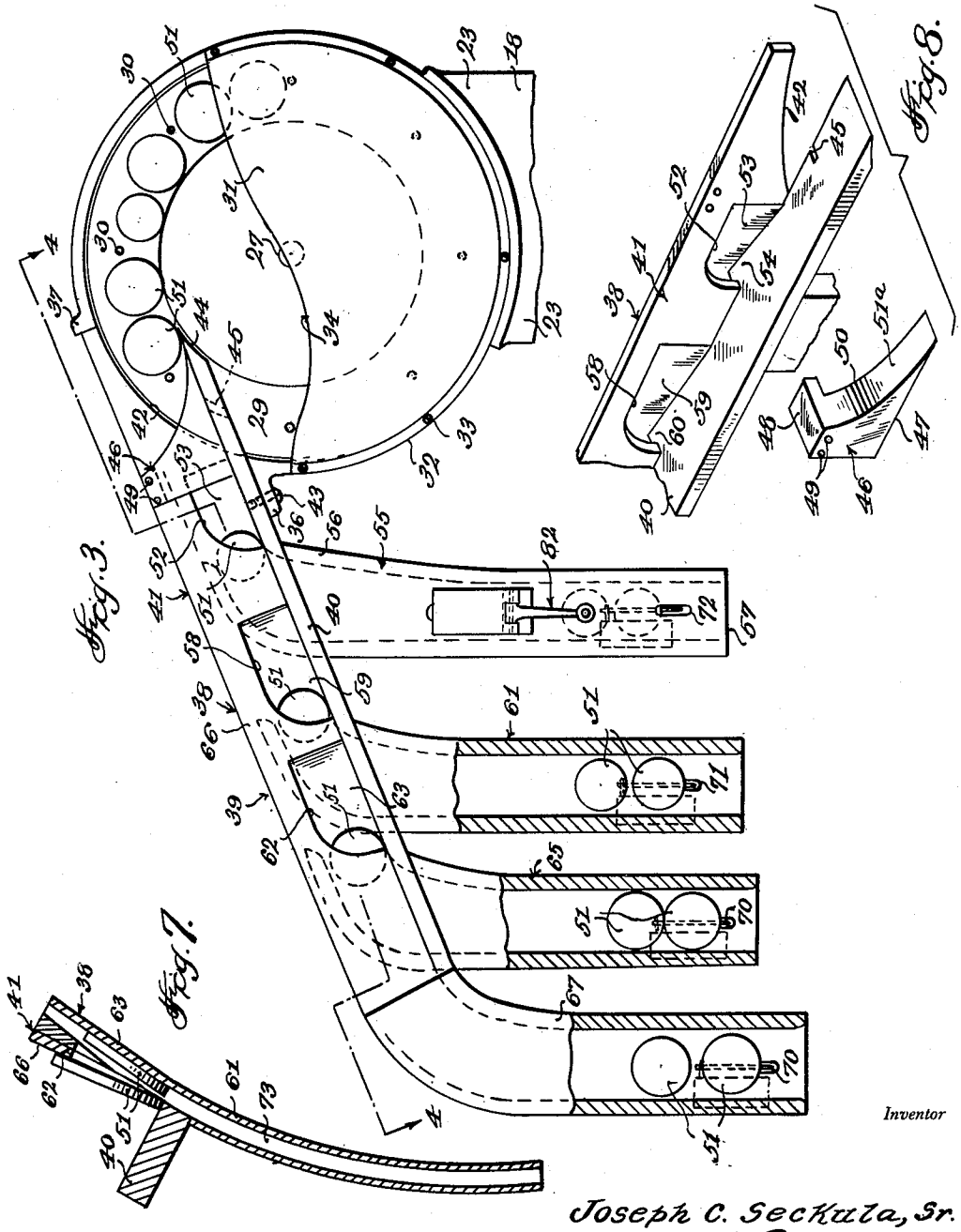


Fig. 3.

Fig. 7.

Fig. 8.

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Patented Apr. 21, 1953 2,635,730

UNITED STATES PATENT OFFICE

2,635,730

COIN SEPARATING AND COUNTING MACHINE

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Application December 23, 1949, Serial No. 134,730

5 Claims. (Cl. 194—9)

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This invention relates to a novel construction of machine into which coins may be emptied en masse and of different denominations and which will function to separate the coins according to their denominations and to count the number of coins of each denomination separately for affording an accurate separation and counting of mixed coins such as pennies, nickels, dimes and quarters.

More particularly, it is an aim of the present invention to provide a counting machine capable of accomplishing the aforedescribed result yet which is of extremely simple construction enabling it to be economically manufactured and sold and readily serviced yet which is extremely efficient and durable for accomplishing its intended result with speed and accuracy.

Still a further object of the invention is to provide an improved feeding and selecting means by which mixed coins may be fed at substantially a uniform speed to the selector unit wherein the coins may be accurately separated according to denominations and which is so constructed that the possibility of coins overriding one another and being thereby prevented from being properly separated is substantially eliminated.

Still another object of the invention is to provide a coin separating and counting machine having electrically operated means actuated by the coins for separately counting the coins of each denomination passing through and being discharged from the machine and including associated electrically actuated stop means for positively preventing the coins of any denomination from being discharged other than intermittently, one by one to insure an accurate count of the coins.

Still a further object of the invention is to provide a coin separating and counting machine having electrically actuated counting and speed control means for regulating the speed at which the coins of each denomination will be discharged from the machine and the parts of which means may be readily removed and replaced where required without dismantling the machine thereby greatly facilitating maintenance of the machine.

Numerous other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating presently preferred embodiments thereof, and wherein:

Figure 1 is a side elevational view looking toward the front side of the machine;

Figure 2 is an enlarged transverse vertical sectional view thereof, partly in elevation, taken

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substantially along a plane as indicated by the line 2—2 in Figure 1;

Figure 3 is a fragmentary longitudinal sectional view, partly in side elevation taken substantially along a plane as indicated by the line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view, partly in plan, taken substantially along a plane as indicated by the line 4—4 of Figure 3;

Figure 5 is a transverse vertical sectional view, partly in side elevation, taken substantially along a plane as indicated by the line 5—5 of Figure 1;

Figure 6 is a fragmentary exploded plan view of a portion of the machine;

Figure 7 is a transverse vertical sectional view taken substantially along a plane as indicated by the line 7—7 of Figure 1 and on an enlarged scale;

Figure 8 is an exploded fragmentary perspective view of a part of the coin selector;

Figure 9 is an enlarged fragmentary vertical sectional view partly in side elevation and on an enlarged scale, similar to Figure 5 and illustrating a modified form of the coin stop mechanism;

Figure 10 is a horizontal sectional view thereof taken substantially along a plane as indicated by the line 10—10 of Figure 9, and

Figure 11 is a sectional view of the coin actuated switch, taken substantially along a plane as indicated by the line 11—11 of Figure 10.

Referring more specifically to the drawings, the coin selecting and counting machine in its entirety is designated generally 12 and includes a supporting frame, designated generally 13, which is composed of a base 14 and an upstanding wall 15 which rises perpendicularly from the base 14. The base 14 may rest on any suitable supporting surface such as a table and, if desired, may be provided with legs, not shown, for supporting the base 14 in an elevated position relatively to a supporting surface. The wall 15 extends longitudinally of the base 14 and is disposed intermediate of its side edges, as illustrated in Figure 2 and is preferably provided intermediate of its ends with an upwardly projecting extension having an elongated opening therein and forming a handle 16 by which the machine 12 may be lifted and carried. The wall 15 may be braced relatively to the base 14 adjacent one end thereof by webs or flanges 17 and said wall 15 is provided above said webs 17 with a supporting bracket 18 which is secured thereto by fastenings 19. The supporting bracket 18 projects obliquely upwardly from the front side 20 of the wall 15.

A disk 21 is provided with a flanged periphery 22 a portion of which is secured by fastenings 23 to the upper, outer end of the bracket 18 and so that said disk 21 is disposed substantially at an oblique angle to the base 14 and also to the wall 15 and substantially at a right angle to the bracket 18. The flange 22 of the disc 21 extends upwardly and forwardly therefrom so that said disk 21 is provided with an upwardly and forwardly facing recess 24 in the front side thereof. A conventional electric motor 25 is secured to the opposite, rear side of the disk 21 by fastenings 26 and has a driven shaft 27 which extends centrally through the disk 21 and is journaled therein. A table 28 is secured at its center to the driven shaft 27 and is disposed for rotation in the recess 24 of the disk 21 and is of a diameter slightly less than the internal diameter of the disk flange 22. The outer or forward side of the table 28 has an annular recessed surface 29 extending inwardly from the periphery thereof. A plurality, preferably eight pins or studs 30 are anchored in the table 28 and project perpendicularly from the recessed surface 29 and are disposed in equally spaced relationship circumferentially of said recessed surface 29. A plate 31 has an arcuate bottom and inner flanged edge 32 which is suitably secured by fastenings 33 to the bottom half portion of the flange 22 and said plate 31 projects upwardly and outwardly with respect to the disk 21 and combines therewith to form an upwardly opening hopper 34 into which the coins to be separated and counted may be emptied en masse. As illustrated in Figure 1, the parts 18 to 34 are located adjacent one end of the upright wall 15.

The peripheral flange 22 above the plate 31 is provided with a gap 35 one end of which is defined by an outturned lip 36 of the flange 22 and the other end of which is defined by an upturned lip 37 of said flange. The gap 35 faces upwardly and generally toward the opposite end of the machine 12 and is provided to accommodate the entrance end of a runway, designated generally 38 forming a part of the coin separator, designated generally 39. Said runway 38, as best illustrated in Figures 4 and 8 includes a bottom wall 40 and a side wall 41 which rises from and is disposed perpendicular to the bottom wall 40 and adjacent one longitudinal side edge thereof. The side wall 41 is disposed in substantially the same plane as the disk 21 and table 28 or at an oblique angle to the vertical wall 15 and the horizontal base 14 and the bottom 40 of the runway 38 is likewise disposed with its plane at an oblique angle to the wall 15 and base 14. As seen in Figures 1 and 3, the runway 38 is inclined downwardly from the end thereof which connects with the disk 21 to its opposite end. The wall 41 is provided with an undercut arcuate portion 42 at one end thereof which is adapted to bear against a portion of the arcuate edge of the recess 35 of the disk 21 and so that said wall 41 is disposed in substantially the same plane as the recessed table surface 29. A portion of the bottom wall 40 rests upon the lip 36 and is detachably secured thereto by fastenings 43 and so that the upper end of said bottom wall 40 will extend into the disk recess 24 and substantially across a portion of the recessed surface 29 of the table 28. The terminal portion of the upper end of the bottom wall 40 is beveled as seen at 44 so as to be disposed substantially concentric to the inner annular wall defining the recess 29, as best seen in Figure 3. When the runway 38 is thus secured to the disk 21 the upper end of the side wall 41 thereof will abut against the upper lip 37. The edge portion of the bottom wall 40 which is disposed in the recess 29 and which is spaced slightly from the surface thereof to afford clearance is provided with a notch 45 through which the pins 30 pass when the table 28 is revolved. A gauge block 46 forms a part of the runway 38 and is secured thereto adjacent the upper end of said runway and includes a bottom surface 47 which rests upon the upper surface of the bottom wall 40. The gauge block 46 is provided at its top with an inwardly extending flange 48 which bears against the side wall 41, adjacent the upper edge thereof and fastenings 49 extend through the upper portion of the gauge block 46 through the flange 48 for securing said block to the side wall 41. The inner side wall 50 of the gauge block 46 is spaced by the flange 48 from the side wall 41 to afford clearance therebetween for the passage of coins 51 from the table 28 onto the runway 38 and so that the coins in entering the runway between the gauge block 46 and side wall 41 will be disposed to roll on the bottom wall 40 and lie against the side wall 41. The top wall 51*a* of the gauge block 46 is concave and slopes away from the flange 48 and extends into the disk recess 24 so that coins 51 before being released by the pins 30, as will hereinafter be described, to roll into the runway 38 will move into positions so that portions thereof are disposed between the recessed table surface 29 and the gauge block 46 to insure that the coins will be disposed substantially in the same plane as the table 28 and side wall 41 when admitted to the runway 38.

The wall 41, adjacent the gauge block 46, is provided with an elongated opening 52 which extends longitudinally of the wall 41 and which is formed by a portion 53 which is struck out from the wall 41 and which is inclined away from its upper surface, as best illustrated in Figure 8. The bottom wall 40 is provided with a portion 54 which extends between the upper or front surface of the wall 41 and the surface of its angular wall portion 50. The upper end of a chute 55 merges with the free end of the wall portion 53 and the bottom wall portion 54. Said chute 55 is arcuate in shape at its upper end as seen at 56 and extends downwardly from the runway 38 and has an open lower end 57 which opens above the base 14 and in front of the wall 15. Beyond or below the first coin selecting opening 52, the wall 41 is provided with a second similar coin selecting opening 58 having a wall portion 59 associated therewith and corresponding to the wall portion 53 and a bottom portion 60 corresponding to the bottom portion 54. The portions 59 and 60 likewise merge with a second chute 61 which substantially corresponds with the first chute 55. Beyond and below the second coin selecting opening 58 is a third similar coin selecting opening 62 which likewise has associated therewith a side wall portion 63, corresponding to the portion 53 and a bottom wall portion 64 corresponding to the bottom wall portion 54, as best illustrated in Figure 4. A third chute 65 has an upper end merging with the wall portions 63 and 64 and which extends downwardly from the runway 38 and substantially corresponds to the chutes 55 and 61. The portion of the wall 41 above the coin selecting openings 52, 58 and 62 forms a coin supporting rail 66, as illustrated in Figures 1, 3 and 8. The coin selecting opening 58 ex-

tends to a height above that of the opening 52 and the opening 62 extends to a height above that of the opening 58. Beyond the opening 62, the walls 40 and 41 of the coin selector runway 38 merge integrally with the arcuate upper end of a fourth chute 67.

Each of the coin chutes is provided with a coin actuated switch, designated generally 68 and a description of one of said switches will suffice for all. The switch 68 of each coin chute, as illustrated in Figures 5, 9 and 11 is of a conventional construction, relatively small in size and extremely sensitive and which is commercially known as a "microswitch." The housing of the switch 68 is suitably secured to the back side of its associated chute, as for example the chute 55 as seen in Figure 5 and is provided with a shaft 69 which is journaled in the housing and which has an exposed end in which is connected one end of a strand of wire 70. An intermediate portion of the strand 70 extends obliquely through openings 71 and 72 in the front and rear walls, respectively, of the chute and across the coin passage 73 thereof so that a coin 51 passing by gravity down through the passage 73 strikes a downwardly inclined oblique portion of the strand 70 before reaching the discharge end 57 of the chute and the weight of the coin will swing the strand 70 and turn the shaft 69 counterclockwise for the normal circuit interrupting position of Figure 5 of said parts to the circuit closing position as illustrated in full lines in Figure 9 and in which latter position, the strand 70 clears the passage 73 to allow the coin 51 to pass and be discharged from the outlet 57. As seen in Figure 11, a non-conducting electrical member 73*a* which fulcrums at 74 on one switch contact 75 within the housing of the switch 68 is rocked by engagement with a lever member 76 which is fixed to the shaft 69 by this movement of the shaft and the strand 70 for causing a spring member 77 which engages the member 73*a* and the contact 75 to move to the right of Figure 11 by a snap action and into engagement with the lip 78 of the other contact 79 of the switch 68. When the coin 51 clears the strand 70, the spring 77 returns the parts to their positions of Figure 11 displacing the lower end of the spring conductor member 77 to the left and out of engagement with the contact 79. This closing and re-opening of the switch 68 is practically instantaneous. A conventional electric solenoid 80 is mounted by means of a bracket 81 on the front part of each chute above the switch 68. A lever 82 including a depending arm 83 and a substantially horizontal arm 84 is pivotally mounted at its apex on a portion of the bracket 81 and below the solenoid 80. The arm 84 carries on its upper side the core 85 of the solenoid 80 which is attracted by the solenoid when energized for rocking the lever 82 counterclockwise as seen in Figure 5. The arm 83 terminates at its lower end in a sleeve 86 which is disposed substantially perpendicular to the chute and through which a pin 87 slidably extends and which has a head at its outer end. The pin 87 carries an adjustable stop 88 which is spaced inwardly from the sleeve 86 and which seats one end of an expansion spring 89, the opposite end of which bears against said sleeve for urging the pin 87 inwardly and toward the associated chute. The pin 87 extends loosely into an opening 90 in the front wall of the chute but normally does not extend into the chute passage 73. A positive conductor 91 and a negative conductor 92 leading

from a suitable source of electric current, such as a conventional outlet, not shown, of 110 volts connected with the switch contacts 75 and 79, respectively and said conductors 91 and 92 have portions which connect with the two posts of the solenoid 80, designated 93 and 94 and the two posts 95 and 96 of an electric counter 97. It will be readily apparent that the switch 68 and solenoid 80 of each of the other chutes has a similar electric circuit to that as illustrated in Figure 5 and in each of which electric circuits is also interposed an electric counter corresponding to the counter 97. All of said circuits may be connected to the same outlet and the electric motor 25 may likewise be connected to the same outlet. If desired, an electric switch, not shown, may be interposed in the circuit so that the circuit to each switch 68 and to the motor 25 may be simultaneously energized or de-energized.

In lieu of the solenoid arrangement as illustrated in Figure 5, a solenoid 98, as illustrated in Figure 9 may be provided and which is supported by a bracket 99 likewise in front of its chute. With the arrangement of Figure 9, the solenoid core 100 comprises a bar which is disposed between the solenoid 98 and the front wall of the associated chute, as seen in Figure 10 and which is supported at its ends on corresponding ends of two rods 101 which extend reciprocally through the chute adjacent its side edges and which do not extend through the chute coin passage 73. A crosshead 102 is secured to the opposite ends of the rods 101 behind the chute and has a stop pin 103 extending reciprocally through its intermediate portion. The inner end of the stop pin 103 extends loosely into an opening 104 in the rear wall of the chute and said pin carries an adjustable stop 105 which is disposed between the chute and crosshead 102. A spring 106 is mounted on the stop pin 103 between the stop 105 and crosshead 102 and said pin carries an adjusting nut 107 which is adjustable thereon and adapted to bear against the outer side of the crosshead 102.

The four electric counters 97 are supported on the wall 15 by a bracket 108.

Assuming that the machine 12 is connected to a suitable electric source of current or outlet, the circuits to the four solenoids 80 and the four counters 97 will normally be de-energized by the switches 68 in their positions of Figure 5 but the motor 25 will be energized for revolving the table 28. Assuming that a relatively low speed motor is used having, for example, a 40 R. P. M., the table 28 will be revolved forty revolutions per minute and as will hereinafter become apparent the machine will then function to separate and count six hundred and forty coins of different denominations per minute. The machine 12 is shown as equipped with four chutes for counting pennies, nickels, dimes and quarters but could obviously be provided with a fifth chute and associated parts for additionally counting half dollars, if desired. Coins to be counted of the four denominations are emptied into the hopper 34 and the revolving table 28 will cause two of the coins to be picked up in the space of the recessed surface 29 between each two adjacent pins 30 so that sixteen coins will be carried upwardly and discharged into the runway 38 at each revolution of the table 28. The table 28 revolves counterclockwise as seen in Figure 3 and as each pin 30 thereof enters the slot 45 the two coins 51 disposed therebehind are released and propelled by the next trailing pin 30 into the run-

way 38 between the gauge block 46 and wall 41 so that the coins roll on the bottom wall 40 and lie at an incline against the wall 41, as best illustrated in Figure 7. The first coin selector opening 52 is of a height to allow dimes to roll therethrough and the dimes will thereby be separated from the other coins at this station and will follow the wall 53 and will roll on the bottom surface 54 into the first or dime chute 55 while the nickels, pennies and quarters which are of a larger diameter will pass over the first opening 52 by engagement with the rail 66 above said opening. At the second station, the pennies will enter the opening 58 following the wall portion 59 and rolling on the bottom wall portion 60 into the second chute 61 while the nickels and quarters will engage the rail 66 above the opening 58 and will thus be prevented from entering this second station. The nickels will then enter the third station through its opening 62 and will be similarly directed by the wall portion 63 and bottom portion 64 into the third chute 65 while the quarters will similarly ride the rail 66 above the opening 62 and accordingly will roll on into the last chute 67. It will thus be readily apparent that the coins will roll one behind the other along the runway 38 to be segregated by the selector 39, as just previously described, and will be prevented from overlapping one another in their movement along the runway by the restricted entrance opening offorded by the gauge block 46. Furthermore, a slight intermittent feeding of the coins is provided by the coins being fed two at a time and with a slight spacing between each two coins produced by the pins 30. The first coin in each chute will strike the blade or strand 70 of the switch 68 thereof for momentarily closing said switch to cause the associated counter 97 to record the passage of the coin through the chute and this closing of the switch will also energize the solenoid to project the stop pin 87 into the passage 73 of the chute to catch the following coin 51, usually as illustrated in Figure 5 by gripping engagement therewith. The spring 89 allows the stop pin 87 to yield relatively to the sleeve 86 so that the pin will engage the coin with sufficient force to hold it in the passage 73 yet will prevent the stop pin from banging too forcibly against the coin when the solenoid is energized. The switches 68 and solenoids 80 or 96 are capable of functioning with sufficient rapidity so that the machine 12 may accurately count coins all of one denomination at the normal rate of operation of the machine, for example, six hundred and forty coins per minute. The solenoids 96 will function in substantially the same manner as the solenoids 80 except that the armature will reciprocate toward and away from the solenoid field rather than oscillating relatively thereto as in Figure 5.

The coins may be discharged from the lower outlet end of the chute into a tray 109 which rests upon the base 14 and which has a separate compartment for coins of each denomination or the lower ends of the chutes may be connected to bags or other suitable receptacles, not shown, into which the coins may be discharged after being separated and counted.

It will be readily apparent that a defective or damaged switch or solenoid may be readily removed and replaced and as the counting machine 12 has few other working parts, it will be obvious that a minimum of maintenance will be necessary. Obviously, the specific types of switch 68 and solenoids 80 and 96 which have been illustrated and each of which is of a conventional construction are not the only types of switches and solenoids which may be employed and other switches possessing a sufficient degree of sensitivity and other solenoids may be utilized. Various other modifications and changes are likewise contemplated and may be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A coin counting mechanism comprising a downwardly extending chute through which coins are adapted to pass by gravity, means for supporting said chute, a normally open switch mounted on said chute having a spring biased actuating blade normally extending across the passage of the chute and adapted to be actuated by a coin passing downwardly through the chute for displacing the actuating blade out of the chute to move the switch to a circuit closing position, an electrically actuated coin counter connected to said switch and actuated by the closing of the switch for counting each coin passing through the chute, an electrically actuated stop unit mounted on said chute above the switch and electrically connected to said switch, said stop unit including an element movable into and out of engagement with the chute passage above the switch blade and actuated solely by the closing of said electric switch for movement into said chute passage above the coin which is in engagement with the actuating blade for stopping downward movement of coins through the chute and which are disposed above the coin which moved the actuating blade to a circuit closing position, the actuating blade portion which is in engagement with the first mentioned coin when the switch is moved to a circuit closing position being spaced from the stop element a distance greater than the diameter of the coin and less than twice the diameter thereof.

2. A coin counting mechanism comprising a downwardly extending chute defining a coin passage through which coins are adapted to pass by gravity, said chute being flat in cross section and having opposite adjacently disposed walls adapted to face opposite flat surfaces of a coin passing through the chute, said walls having aligned elongated openings extending longitudinally of the chute and disposed intermediate of its side edges, a normally open electric switch mounted on the chute having a spring biased actuating blade extending downwardly at an oblique angle from the switch through said aligned openings and across the coin passage of the chute, when the switch is in an open position, said actuating blade being adapted to be initially engaged by the leading edge portion of a coin passing downwardly through the passage and being displaced thereby out of the chute passage to move the switch to a circuit closing position, a portion of the actuating blade, disposed remote to the switch, engaging a side of the coin until the coin has passed downwardly to below the level of said blade portion and being retained thereby out of engagement with the chute passage to retain the switch in a circuit closing position until the coin has moved to a position below the actuating blade, an electrically actuated coin counter connected to said switch and actuated by the closing of the switch for counting each coin passing through the coin passage, and an electrically actuated stop unit mounted on said chute above the switch and including an element movable into and out of en-

gagement with the chute passage above and spaced from said elongated openings of the chute passage, said stop unit element being actuated solely by the closing of the electric switch for movement into the chute passage above the coin which is in engagement with the actuating blade for stopping downward movement of coins through the coin passage and which are disposed above the coin which is in engagement with the actuating blade, the actuating blade portion which is in engagement with the first mentioned coin when the switch is moved to a circuit closing position being spaced from the stop element a distance greater than the diameter of the coin and less than twice the diameter thereof.

3. A coin counting mechanism as in claim 2, said switch blade comprising a substantially rigid wire strand having a turned back free end forming a rounded part defining the portion of the blade which is disposed remote to the switch and engages the side of the coin.

4. A coin counting mechanism as in claim 2, said stop unit including a lever having an end swingably urged toward the chute by energizing of the stop unit, said stop element being slidably supported in and extending through said lever end, spring means urging the stop element toward the chute, and an abutment member retaining the stip element out of engagement with the chute when the stop unit is de-energized, said spring means cushioning the impact of the stop element against a coin contained in the chute when the stop element is projected into the chute by the stop unit being energized, and said spring means additionally functioning to yieldably retain the stop element against the last mentioned coin while the stop unit remains energized.

5. A coin counting mechanism as in claim 2, said stop unit including a carrier slidably mounted on the chute outwardly of the chute coin passage, means mounting the stop element on the carrier for limiting sliding movement relatively thereto toward and away from the coin passage, spring means biasing the stop element toward the coin passage, said stop element being maintained out of engagement with the coin passage by said carrier when the stop unit is de-energized and being displaceable into the coin passage by movement of the carrier when the stop unit is energized, said spring means cushioning the impact of the stop element against a coin contained in the chute when the stop element is projected into the chute, and said spring means additionally functioning to yieldably retain the stop element against the last mentioned coin while the stop unit remains energized.

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