

July 11, 1939.

C. L. DOWNEY

2,165,241

COIN COUNTING MACHINE

Filed Aug. 26, 1935

6 Sheets-Sheet 1

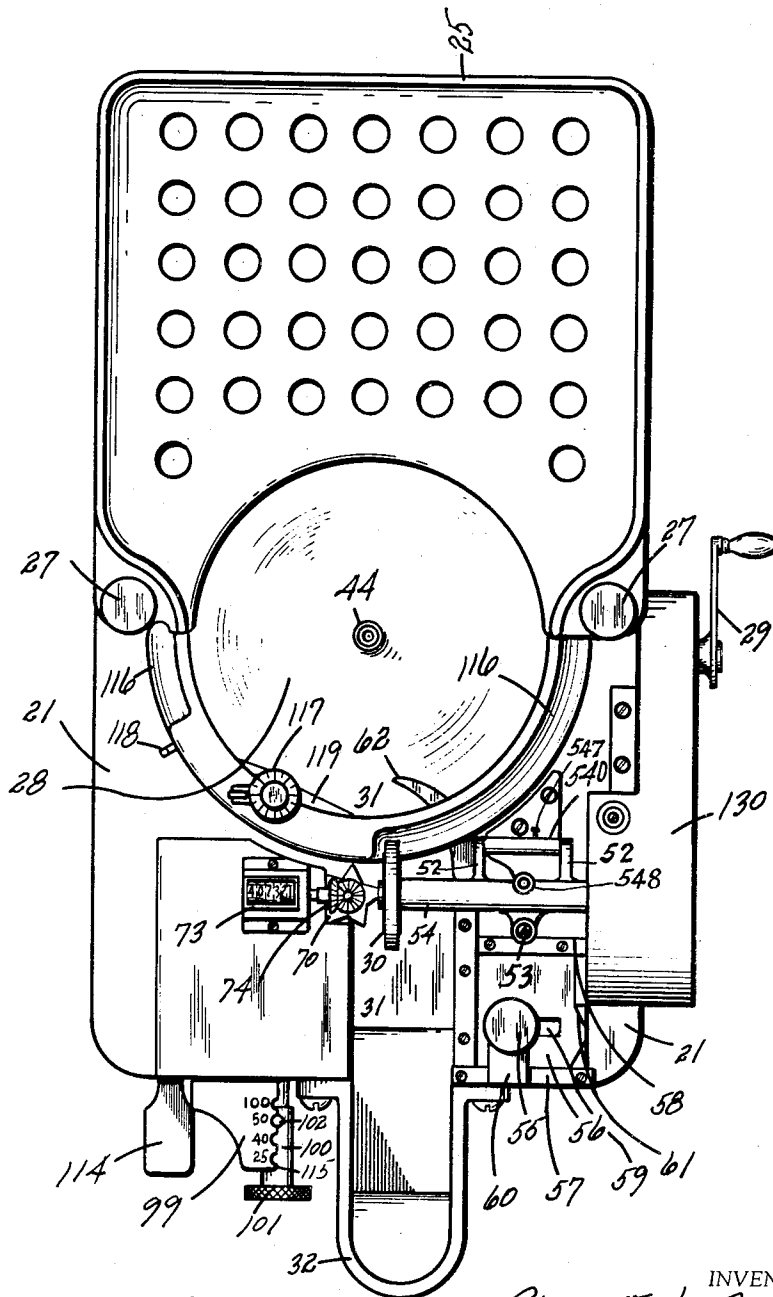


Fig. 1.

INVENTOR.
CLEMENT L. DOWNEY
BY *Charles Tietz*
ATTORNEY.

July 11, 1939.

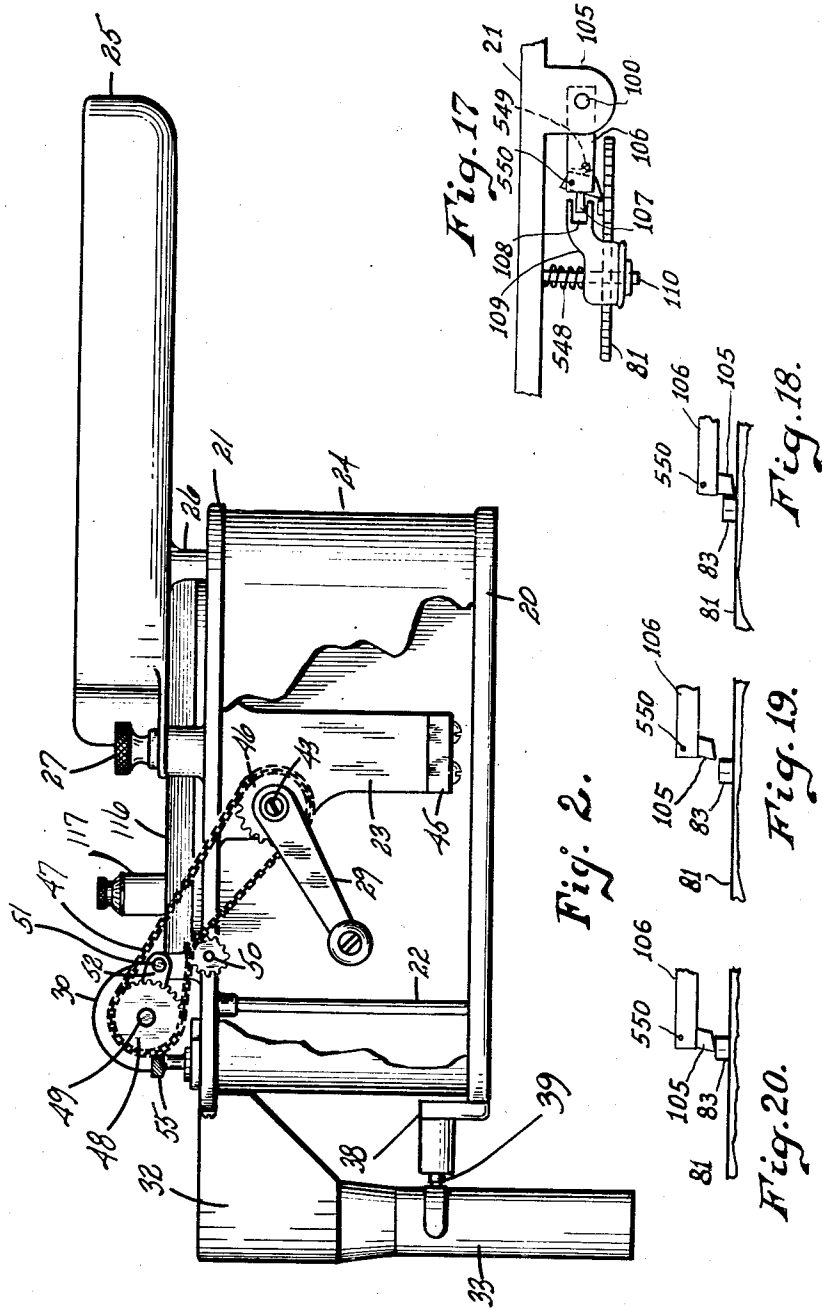
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6 Sheets-Sheet 3

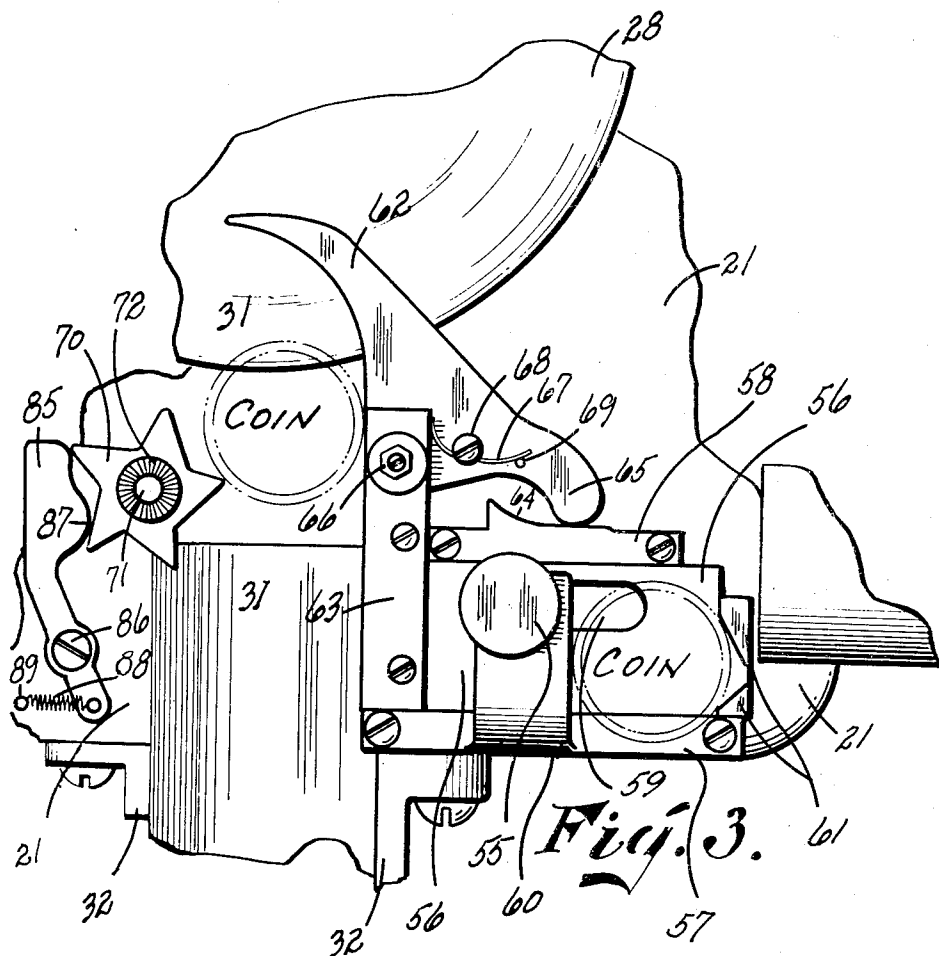
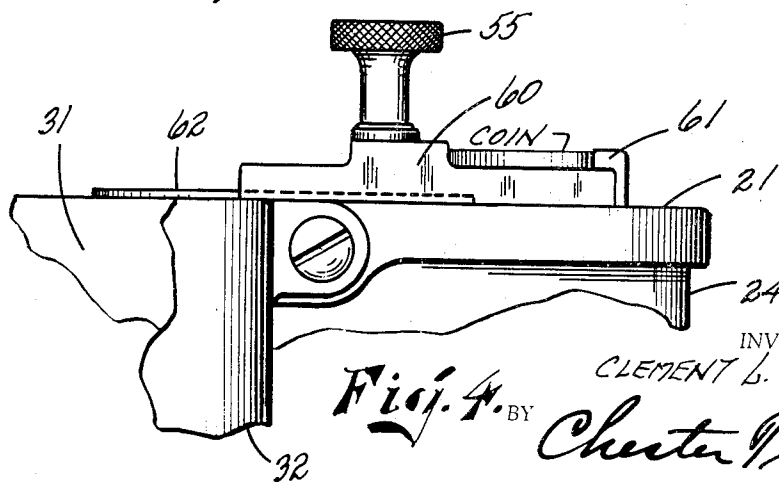


Fig. 4. BY

INVENTOR.
CLEMENT L. DOWNEY
Chester T. Tietz
ATTORNEY.

July 11, 1939.

C. L. DOWNEY

2,165,241

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6 Sheets-Sheet 4

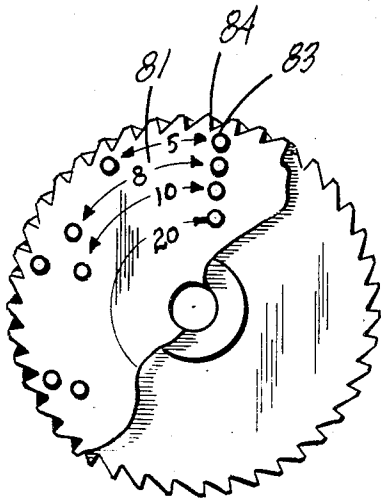


Fig. 5.

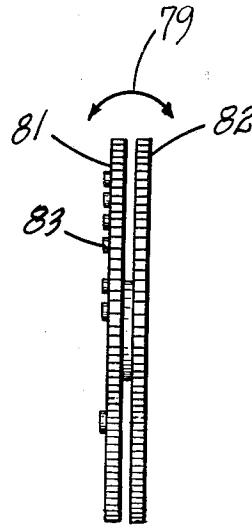


Fig. 6.

Fig. 7.

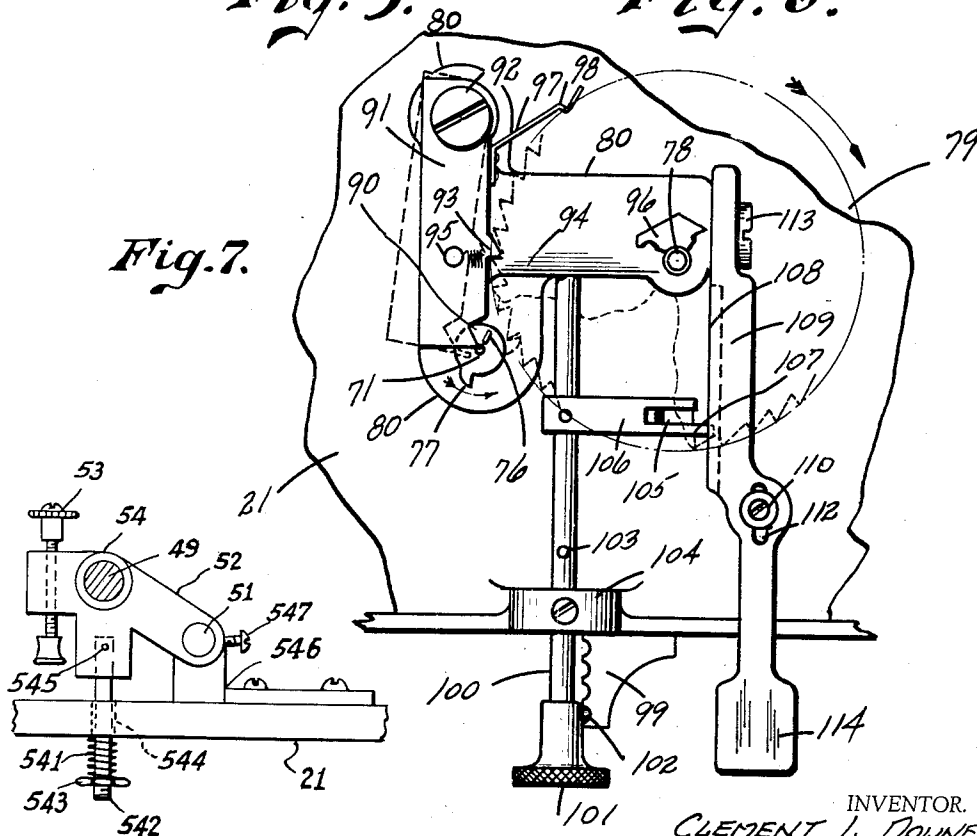


Fig. 16.

INVENTOR.
CLEMENT L. DOWNEY
BY
Chester Tietz
ATTORNEY.

July 11, 1939.

C. L. DQWNEY

2,165,241

COIN COUNTING MACHINE

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6 Sheets-Sheet 5

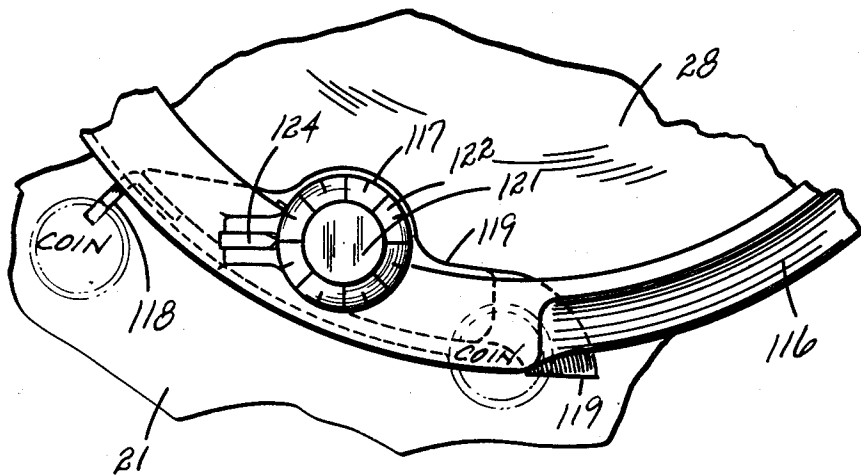


Fig. 8.

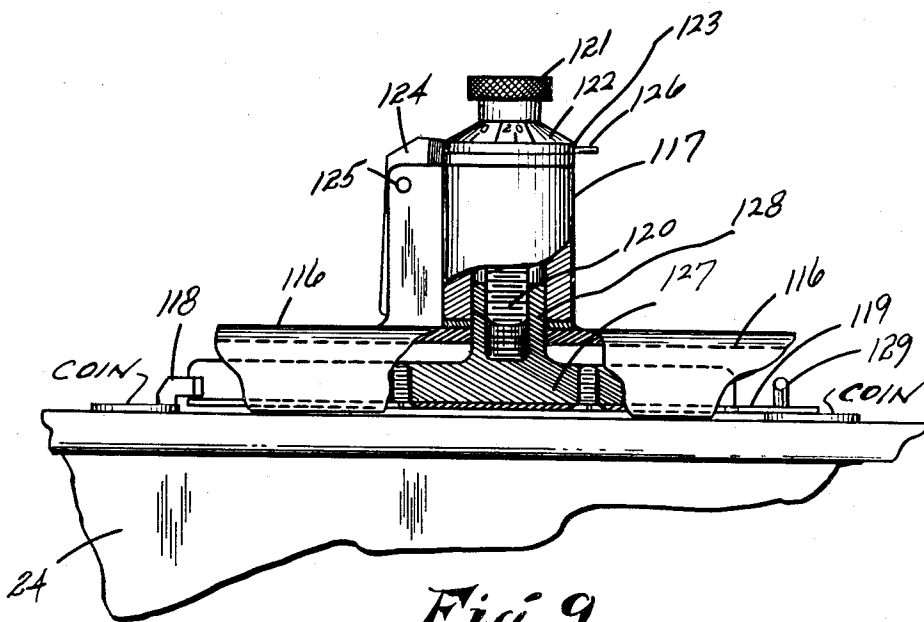


Fig. 9.

INVENTOR.
CLEMENT L. DOWNEY
BY *Chester Tietz*
ATTORNEY.

July 11, 1939.

C. L. DOWNEY

2,165,241

COIN COUNTING MACHINE

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6 Sheets-Sheet 6

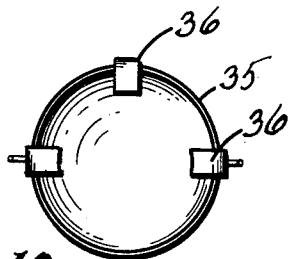


Fig. 10.

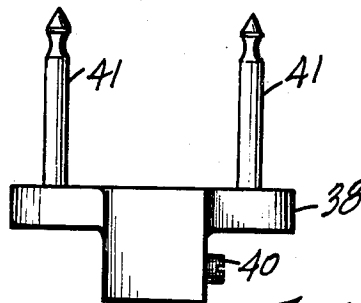


Fig. 12.

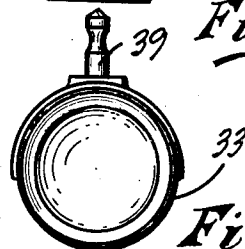


Fig. 13.

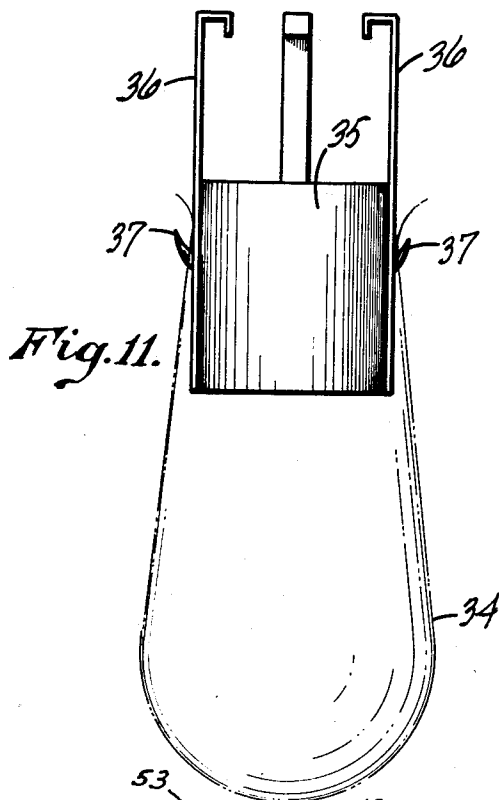


Fig. 11.

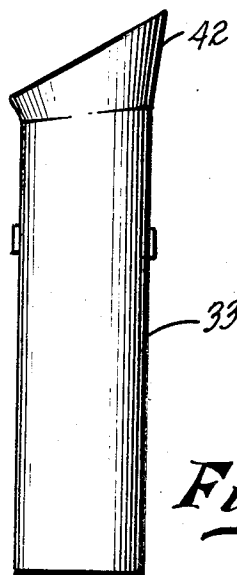


Fig. 14.

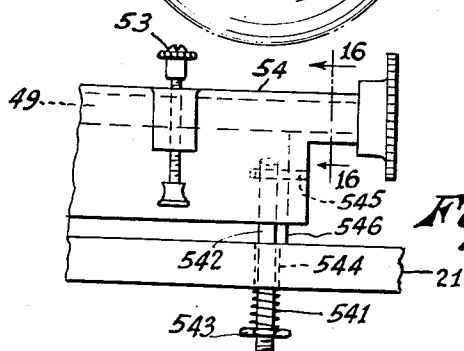


Fig. 15.

INVENTOR.
CLEMENT L. DOWNEY
BY *Chester Tietz*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,165,241

COIN COUNTING MACHINE

Clement L. Downey, Cincinnati, Ohio

Application August 26, 1935, Serial No. 37,891

5 Claims. (Cl. 133—8)

This invention relates to a coin counting machine, this application being a continuation-in-part of my co-pending application Serial No. 612,781 filed May 21, 1932.

Among the objects of this invention is to provide a machine of this character that can handle all metallic coins between given maximum and minimum sizes, with a minimum of effort and time in setting the machine therefor. In such respects, the present invention constitutes an improvement upon the subject matter of the application referred to.

An object of the invention is to provide simple and effective means for adjusting the mechanism and parts thereof so as to accommodate the device as a whole, to coins of different widths and thicknesses.

A further object of this invention is to provide means by which the counting wheels are movable only by a pawl or dog on the end of the star wheel shaft, which form of control dispenses with spring pressure which otherwise would apply stress to the feed roller, star wheel and the dog on the star wheel shaft.

A still further object is to provide a feed roller adjustment that is within sight and easy regulation of the operator.

Referring to the accompanying drawings, Figure 1 is a plan view of the entire machine.

Figure 2 is a side elevation of the entire machine.

Figure 3 is a plan view of the coin raceway and adjusting means for coin width.

Figure 4 is an elevation of the same.

Figures 5 and 6 are plan and edge views respectively of the counting wheel.

Figure 7 is a detailed plan view of the counting and stop mechanism viewed from below, the combined ratchet wheels 81 and 82 being omitted, but indicated in broken lines, and showing the motion followed in allowing traverse of one tooth.

Figure 8 is a plan view of the adjusting means for coin thickness.

Figure 9 is an elevation of the same.

Figure 10 is a plan view of a bag holder adapted to be held by the delivery chute.

Figure 11 is an elevation of the bag holder showing a bag attached.

Figure 12 is a plan view of a coin reservoir retainer adapted to be inserted into the base of the machine.

Figure 13 is a plan view of a coin reservoir while Figure 14 is an elevation of the same.

Fig. 15 is an enlarged fractional view of one end

of the mounting for the means for moving coins through the raceway 31.

Fig. 16 is a sectional view on line 16—16 of Fig. 15.

Fig. 17 is a fractional detail view showing the means for stopping the counting of coins after a selected number of coins have been counted.

Fig. 18 is a fractional, diagrammatical illustration of parts shown in Fig. 17, and showing the position of parts when the counting of coins has been stopped by the means shown therein.

Fig. 19 is a view similar to Fig. 18 and showing the same parts when one of them has been initially moved to effect release of said parts.

Fig. 20 is a view similar to Figs. 18 and 19 and showing the parts fully released and conditioned preparatory to counting another selected number of coins.

Referring to Figures 1 and 2, my machine comprises a base 20, an upper platform 21, a plurality of legs 22 spacing and joining said base and said platform, a cradle 23 for supporting some of the mechanism below the platform, a sheet metal supporting housing 24 fitting between the platform and base, a perforated coin tray 25 resting on its own legs 26 on the rear of the platform and retained by thumb screws 27. The coin tray is adapted to fit about one half of and slightly above a centrifugal disc 28 which is adapted to be rotated at a lively speed by manual or power means thru a crank 29. The cradle 23 is for the purpose of supporting the drive from said crank to the disc 28.

Power derived from crank 29 also drives a friction feed roller 30 which is adapted to transfer coins thrown from the disc 28 thru a raceway of adjustable width thence into a hopper 32 and one of a series of cylindrical coin reservoirs 33 of different diameters, tiltably attached thereunder or in lieu of them a bag 34. A bag holder 35 may for this purpose be attached by prongs 36 to the upper edge of the hopper. It is provided with two sharp pins 37 which are adapted to pierce the bag. Since means for tilting the cylindrical coin reservoir 33 are not required when a bag is used and are in fact in the way, a pivot holder 38 is provided which is detachable from the edge of the base 20. The pivot holder contains a recess (not shown) into which a pivot 39 is adapted to fit, each of said pivots being permanently attached to the side of one coin reservoir 33. Attachment is by a snap detent (not shown) which is adjustable by screw 40. Attachment of the pivot holder 38 to base 20 is by two prongs 41 each of which is constricted near its tip, as is pivot 39 for the recep-

tion of snap detents. Reservoirs 33 are each provided with flared tops 42 in order to guide coins from the bottom of hopper 32 into the coin reservoirs. The pivot 39 is on that vertical point of each reservoir so that the portion of said reservoir below it is the heavier and the flared top 42 will be pressed against the bottom of hopper 32 by the weight of said reservoir portion. To discharge stack of coins from the reservoir, it is therefore, only necessary to further tilt the latter without removing it from the machine.

The means for driving the disc 28 are conventional and for this reason not shown altho they will now be described. A shaft 43 extends from the crank 29 all the way across the machine and is rotatably carried in bearings in the cradle 23 at both ends. Midway, this shaft carries a spiral gear which engages another such gear at right angles thereto, the latter being carried on a vertical shaft extending from a boss 44 at the center of disc 28 to a bearing in the lower cross member 45 of a cradle 23 and being about half as large as the driving gear. The described mechanism is substantially as shown and explained in my Patent 1,843,358, except that herein, manual means are provided for operation of said parts. The boss 44 prevents any coins from lying at the center of the disc and so insures that all of them will be at once thrown to the circumference.

On the shaft 43 a sprocket 46 is carried between the crank 29 and the cradle bearing. A chain 47 extends over this sprocket to another 48, on a shaft 49 which drives the friction feed roller 30. This shaft is mounted above platform 21, the chain passing over an idler sprocket 50 mounted on the platform edge. Rotation of sprockets 48 and 46 is in 1 to 1 ratio.

Shaft 49 with its sprocket and roller, is adapted to be rocked on another shaft 51 by means of a link 52. This rock is under control of a screw adjustment 53 (Figure 1) comprising a screw stem and knurled lock nut therefor by which the height of friction feed roller 30 over raceway 31 can be regulated. Said screw adjustment is mounted on a sleeve 54 thru which shaft 49 passes and shaft 51 is also provided with a sleeve 540 (Figure 1). The sleeve 540 is part of a block 546 mounted on the platform 21 and supports the shaft 51. The opposite ends of the shaft 51 extend from the sleeve 540 and have mounted thereon, the links, arms or brackets 52, of which there are two. The links extend rearwardly and downwardly from sleeve 54 and receive opposite ends of the shaft 51. Preferably the links are free to move on the shaft 51 and a suitable set screw 547, carried by sleeve 540, secures the shaft 51 from displacement relative to the sleeve 540. An oil cup is shown at 548.

A spring 541, under platform 21 tends to hold shaft 49 and related parts down as far as the screw adjustment 53 will permit. Any suitable arrangement may be employed for yieldingly supporting the shaft 49 for limited oscillation of shaft 49 about the shaft 51 as an axis. As shown herein, the spring 541, disposed below the platform 21 is coiled about a pin 542 and has its upper end in abutment upon the under face of platform 21 and has its lower end in abutment upon the nut 543 adjustably mounted on the threaded lower end of pin 542. The pin 542 extends through an opening 544 in the platform and has a transverse aperture in its upper end whereby to receive and pivotally attach the pin to a stud 545 carried by the housing or casing comprising the sleeve 54.

The opening 544 in the platform is sufficiently

large to avoid binding of the pin 542 upon the walls of such opening and so as not to interfere with the rocking motion of the shaft 49 on shaft 51. Altogether this assembly constitutes a means for adjusting after wear has reduced the diameter of the feed roller and is readily accomplished from above.

On the right side of the raceway is a coin width adjustment screw 55 which is a knurled vertical screw, a laterally slidable width plate 56, forward and rear guides 57 and 58 respectively, for the slidable width plate, a lateral slot 59 in the width plate, thru which screw 55 extends; and a supporting strip 60 to provide an upper bearing for screw 55. At the right hand edge of width plate 56 there is a raised coin stop 61 so shaped that a coin may be held by it while the width plate is slid to the left until the coin edge comes in contact with the right hand edge of supporting strip 60. The raceway, which is controlled by width strip 56 in use, will be then just wide enough to handle coins of the width used to adjust.

Raceway 31 extends from the throat of hopper 32 as far back as disc 28 and it is controlled as to width by the pressure of width plate 56 on a curved finger 62 thru a guide 63 which is attached by screws to width plate 56 the point of regulation being a contact between stationary cam edge 64 on guide plate 58 and a rounded spur or lobe 65 on the finger 62. The said finger is pivoted to the guide 63 at 66, a point adjacent to the raceway and near the balance point of said finger. Pressure ample to keep the curved finger 62 in contact with the cam edge 64 at all times, is provided by a leaf spring 67 which extends two ways from a fulcrum 68, this being a screw, while the left end is in contact with guide 63 and the right end braced against a peg 69.

The left side of the raceway 31 is defined in part by the tips of a star wheel 70 which is tight on a shaft 71. Over the star wheel and also tight on shaft 71 is a bevel pinion 72 the function of which is to drive a counter 73 (Figure 1) thru another bevel gear 74 associated therewith. Very little power is required to drive this assembly, therefore the energy of the coins derived from the friction of feed roller 30 is ample to cause a partial rotation of the star wheel thru impingement of a coin on one of its points. This rotation is only enough to bring the next point into position for engagement with the next coin.

To drive the counter is not however, the only function that star wheel 70 must perform. The shaft 71 extends thru a boss 30 and thru platform 21, and as can be seen from Figure 7, the lower surface of said shaft bears a small radial lug 76 at the edge thereof the purpose of which will shortly be explained, and the edge of the shaft bears a single tooth or pawl 77.

Rotatably mounted on a shaft 78 which is mounted in a boss (not shown) on the under side of platform 21 there is a double ratchet wheel 79, shown in Figures 5 and 6 and in dotted line on Figure 7. It consists of two comparatively thin ratchet wheels 81 and 82, having the same number and size teeth, the first of these bearing a plurality of small round stops 83. When the wheel is in use, these stops face the under side of platform 21 and the teeth 84 on this wheel face toward the left when the machine is viewed upright and from the front. The teeth 84 of the wheel 82 face in the opposite direction. In practice the thickness distance between the two wheels is about $\frac{1}{16}$ " and their relation is fixed so

that the teeth of one wheel are opposite the notches of the other.

The entire ratchet assembly now being described has three functions as follows:—

5. 1. To count the total number of coins going thru the raceway 31 with counter 73.
2. To prevent overrun of the ratchet wheel 79, which would lead to inaccuracy in the count. The mechanism which prevents this is the various
10. parts which engage the teeth of the ratchet wheel.
3. To lock the machine after a predetermined number of coins out of a given batch have been counted. This is the function of the stops 83 and of parts to be described, which contact them
15. to lock the star wheel against the passage of additional coins.

What amounts to a fourth function of the machine is the star wheel control which can be seen on Figure 3. This comprises a spring pressed detent 85 to the left of star wheel 70. It is pivoted on platform 21 by a screw 36 at a point intermediate of the detent's ends. A cam edge 87, somewhat hollowed out in its rounded portion, is provided on the left side of the detent and is

20. in contact with one point of the star wheel at a time. The leading edges of the star wheel are somewhat longer than the trailing edges. A coil spring 88 attached to a pin 89 and which is attached by its other end to the detent shank 85

25. below the pivot point 86, keeps the cam edge in contact with the star wheel.

The function of the detent is to prevent overrun of the star wheel. After the leading edge of the star wheel ceases to be in contact with the

30. cam edge and the point passes the "dead center," detent 85, due to its hollowed cam edge snaps in to the space between the star wheel-points with a velocity greater than the peripheral velocity of the star wheel. The result is an action of great

35. positiveness.

The dog shaft 71 and its downwardly projecting lug 76 compel the ratchet wheels 81 and 82 to move to the extent of only one tooth at the passage of the fifth coin past the star wheel.

40. Dog 77 on dog shaft 71 is therefore adapted to engage the teeth of the upper ratchet wheel 81 while its dependent lug 76 engages only a notch 90 of another spring pressed detent 91 which is pivoted by its end furthest from the notch under platform 21 on boss 60 by means of a screw

45. 92. That edge of the detent nearest ratchet wheel 82 bears a single tooth 93 adapted to engage the teeth of that wheel at such times as the dog 77 of pawl on shaft 71 is disengaged from the teeth of ratchet wheel 81. Spring tension to cause tooth 93 to so engage is provided by a

50. coil spring 94 which extends from a pin 95 on the lower surface of the detent to the shaft 78 on which the ratchet wheels revolve and with which a nut 96 is integral. The function of the latter is to rotatably support the ratchet wheels.

As a safeguard against vibration of the ratchet wheels, there is provided a light leaf spring 97 on the same edge of boss 80 that bears the tooth 93.

55. This spring is bent to form a notch 98 which engages teeth 84.

Now describing the means provided to accomplish the third function, that of locking the mechanism after a predetermined number of

60. coins have been counted, it will be noticed that in Figure 7, the rotation of the ratchet wheel 79 is clockwise. It will also be noticed from Figure 3 that star wheel 70 is five pointed. Since passage of one coin rotates the star wheel only one

65. fifth of its segmental travel, it follows that it

takes five coins to cause the ratchet wheel to progress one tooth. The stops 83 are therefore, opposite the teeth and are arranged at intervals of a definite number of teeth. The stops 83 occupy positions on four different circles (Figure

5. 5) and each circle is arranged as follows: the outer one in multiples of five teeth, (to count twenty-five coins); the one second from the circumference in multiples of eight, (to count forty

10. coins); the third row in multiples of ten (to count fifty coins) and the innermost row in multiples of twenty (to count one hundred coins). The total number of teeth on each ratchet wheel is forty. The lock scale may be seen indicated in

15. Figure 1 on a scale plate 99 the edge of which bears four notches, each one opposite a figure. A rod 100 on which there is a knurled grip 101 is

20. slidable in and out past the notches and bears a pin 102 adapted to be held therein so as to take a reasonable amount of force to slide it to a neighboring notch. Setting the pin in the

25. notch indicating the desired number of coins sets the machine to stop after that number of coins has passed the star wheel as will be explained.

Below platform 21 rod 100 bears a stop pin 103

30. which is adapted to abut against bearing 104 in which the rod is mounted and so limit its travel. Rod 100 also is carried at its opposite end in a hole (not shown) through boss 80. About mid-way between pin 103 and the hole there is a

35. spring pressed stop lug 105 in the form of a tooth and is carried in a fork 106 through which the rod 100 also passes and which is tightly mounted on said rod. The coil spring 549 is received in a

40. suitable recess or pocket formed in the lower portion of fork 106 and has its opposite ends in abutment upon the fork 106 and upon the lower end of lug 105, whereby to yieldingly urge the

45. lower end of lug 105 about the pivotal mounting 550 of the lug on the fork. As a stop approaches the fork 106, the stop contacts the lug 105 and moves the lug, against the action of spring 549, to the position shown in Fig. 18. At the end of

50. the fork there is a prolongation 107 of one of the times, which is carried in a slot 108 in the side of a stop lifter 109 which is pivoted to the edge

55. of boss 80 so that it may be lifted against spring pressure to disengage stop lug 105 from its usual position in engagement with the top side of ratchet wheel 81 and the stop pins 83 thereon. The spring 548 furnishing the pressure is a coil

60. spring wound about a screw 110 and lies between the lifter 109 and the underside of platform 21 hence cannot be shown in Figure 7, but is shown in Fig. 17. A slot is provided in lifter 109 to allow

65. partial rotary movement of the lifter about its fulcrum, screw 113, despite the presence of screw 110. A tab 114 extends beyond the frame of the machine for purposes of easy lifting so that with stop 105 disengaged, pin 102 can be set by grip

70. 101 to any desired notch, or if continuous counting of coins is desired, it can be pulled out beyond the notches and allowed to rest against the uncut edge of plate 99 at point 115 (Figure 1). Such setting places the tooth 105 entirely beyond the

75. range of stops 83.

A flange 116 is provided on platform 21 about the area covered by disc 28. At the left side of the machine, this flange is interrupted by the presence of the coin thickness adjustment 117 a

70. finger 118 of which projects beyond the circle defined by flange 116. A thickness gate or gauge 119 projects over disc 28 (Figure 3) and the height thereof over said disc is controllable by the screw 120 which has a knurled end 121, a

75.

dial 122 and a milled edge 123 thereon. A spring pressed detent 124 pivoted at 125 presses against the milled edge and so preserves the adjustment. A stop pin 126 projects from the milled edge at the zero point of the dial and engages the detent when the gauge reads zero. Its purpose is to provide maximum and minimum stop limits for the screw adjustment. The gate itself may be a fiat stamping 119 which is attached by screws to the solid foot 127 of a sleeve 128 in which screw 120 works.

The improved feature of this construction lies largely in having finger 118 project through and beyond flange 116. This enables the fiat, stationary surface of platform 21 to be used to place the coin upon to be gauged and allows easy manipulation of the coin with the left hand and the screw knob 121 with the right, thus providing an instant correct setting of the gauge for thickness of coin. This feature of the machine is not limited to having the screw knob mounted in a flange such as 116. It could be mounted on the platform 21 so that it could be manipulated with the left hand. Finger 118 could project thru the flange and over the disc 28 so that the coin could be laid on the disc and manipulated with the right hand. One end of gate 119 guards the raceway 31 so that coins must pass under it in order to get into the raceway. An upright pin 129 is provided at the raceway end of 119 to cover the latter and to bar the way to coins which jump over gate 119.

A chain guard 130 is provided at the right side of the machine to protect the operator.

The machine is operated as follows: The machine is first adjusted to the size of coin to be counted, for its thickness by laying the coin on platform 21 under finger 118 screwing the latter down upon it and then backing off the screw slightly. The raceway 31, is adjusted for coin width by placing the coin in the width gauge as shown in Figures 3 and 4 and tightening screw 55. Cam edge 64 then automatically adjusts finger 62 to the proper position. Tab 114 is then lifted, releasing stop tooth 105 and pin 102 is set in the notch indicating the number of coins to be counted, say 25. A few coins are run thru the machine until tooth 105 encounters a stop as shown in Fig. 18. Tab 114 is then lifted, thus slightly turning the rod 100 and raising the lug 105 above the stop 83, whereupon the lug 105 assumes the position shown in Fig. 19. When the tab 114 is then released, the lug 105 assumes the position shown in Fig. 20 and the stop 83 is then released, tooth or lug 105 being then free to drop into position to engage the next stop 83 on the outermost circle of said stops on the side of ratchet wheel 81. The heap of coins is then dumped in tray 25, crank 29 actuated to whirl disc 28 and the coins fed by hand from the tray to the surface of disc 28. The disk 28, as shown in Figs. 1 and 3, moves in counter-clockwise direction. There centrifugal force is imparted to them and causes coins to pass through the gate 119 between the left edge of raceway 31 and finger 62 and are shot down the raceway under friction feed roller 30 and in impingement with star wheel 70. The relation of the direction of rotation of disk 28, finger 62 and star wheel 70 is such, that the centrifugal force imparted to the coins is exhausted upon finger 62 thus protecting the star wheel and the mechanisms associated therewith, from shock or impact incident to coins entering the raceway while so impelled. The action of the feed roller enables them to rotate

star wheel 70 one fifth of a turn for each coin. The feed roller is previously adjusted by means of screw 53 so that setting will take care of many varying thicknesses.

Counter 73 is actuated to register one number by each one fifth turn of the star wheel. A full turn of the star wheel causes pawl shaft 71 to complete one turn, and to allow dog 77 and tooth 93 alternately to progress the distance of one tooth on their respective ratchet wheels. After five teeth are so passed, stop tooth 105 will come into contact with the next pin 83 on the outer circle of said pins, thereby locking the star wheel. Meanwhile the counted coins have passed through hopper 32 and have been deposited in a reservoir 33 and therein automatically stacked by gravity. The reservoir is now tilted to the right, sliding a stacked pile of twenty five coins into the operator's hand or any special wrapper held to receive them.

The lower end of the screw adjustment 53 comprises a foot 520 preferably provided on its under face with a cushioning pad 531 of rubber or the like which is adapted to be brought into contact with plate 56 or guide 58 whereby to attain the desired vertical adjustment of the shaft 49 and the friction feed roller 30 carried thereby.

I claim as my invention:

1. In a coin counting device the combination of a platform, a revolubly mounted disk for imparting centrifugal force to coins disposed thereon, the disk and the platform having their upper faces disposed in the same plane, a flange on the platform extending about the disk, the flange having a pair of openings therein, one of said openings communicating with a raceway, a thickness gauge positioned adjacent said openings and disposed above the disk and having an under face in substantial parallelism with the upper face of the disk, and a finger carried by the gauge extending through the second of the openings in the flange, said finger having a lower face disposed at the same distance above the platform as the distance between the disk and the under face of the gauge whereby adjustment of the finger in relation to the top face of a coin disposed on the platform simultaneously effects identical adjustment of the under face of the gauge relative to the upper face of the disc.

2. In a coin counting device the combination of a platform having a horizontal upper face, a revolubly mounted disk having a horizontal upper face for imparting centrifugal force to coins disposed thereon, a flange on the platform extending about the disk and having a coin outlet therein, a vertically adjustable thickness gauge positioned adjacent to and in advance of said outlet and having a horizontal under face, and a finger on the gauge extending over the platform and having a horizontal under face spaced from the horizontal upper face of the platform at a distance identical to the distance at which the under face of the gauge is spaced from the horizontal upper face of the disk whereby adjustment of the finger in relation to the top face of a coin disposed on the platform simultaneously effects identical adjustment of the under face of the gauge relative to the upper face of the disk.

3. The combination with a coin counting device comprising a rotatably mounted disk, means for rotating the disk, a flange extending around the disk for retaining coins on the disk and having an opening therein through which opening coins may leave the disk, means defining one side of a

raceway communicating with the opening in the flange and through which raceway coins may pass from the disk, guide means providing a channel extending laterally from the raceway and disposed across the raceway from said means defining one side of the raceway, a cam formed on said guide means, and a width plate adjustable in said channel and relative to said guide means for varying the width of said raceway, of a coin receiving pocket carried by the width plate, a fixed member with which a coin, received in the pocket, may contact for controlling the width of the raceway, and a finger forming a forward portion of the raceway, pivotally mounted on the width plate, extending over the disk for directing coins from the disk into the raceway and yieldingly engaged with the cam on the guide means for varying the position of said finger incident to adjustment of the width plate.

4. In combination with a coin counting machine, an adjustable width gauge, guides for said gauge, one of said guides forming a cam, a coin deflector pivoted to said width gauge and pro-

vided with a heel engaging said cam, of means for receiving coins of variable diameters for establishing various adjusted positions of the gauge and of the deflector.

5. In combination with a coin counting machine having a rotating centrifugal disk, a raceway leading from the disk, a feed roller for feeding coins along the raceway and means for counting coins passing along the raceway, of a width gage adjustably mounted adjacent said feed roller, a pair of guides for said gage, a coin stop on one of the guides, said gage and the coin stop on said one of said guides providing co-operating means for receiving coins of various diameters for establishing various widths of the raceway, one of said guides provided with a cam face, and a deflector extending over the disk, pivoted to said gage, and provided with a heel co-acting with said cam face for adjusting the position of the deflector relative to the disk and the raceway in conformity with other width adjustments of the raceway.

CLEMENT L. DOWNEY.