April 4, 1939. E. J. BRANDT ET AL 2,152,952

COIN COUNTING MACHINE

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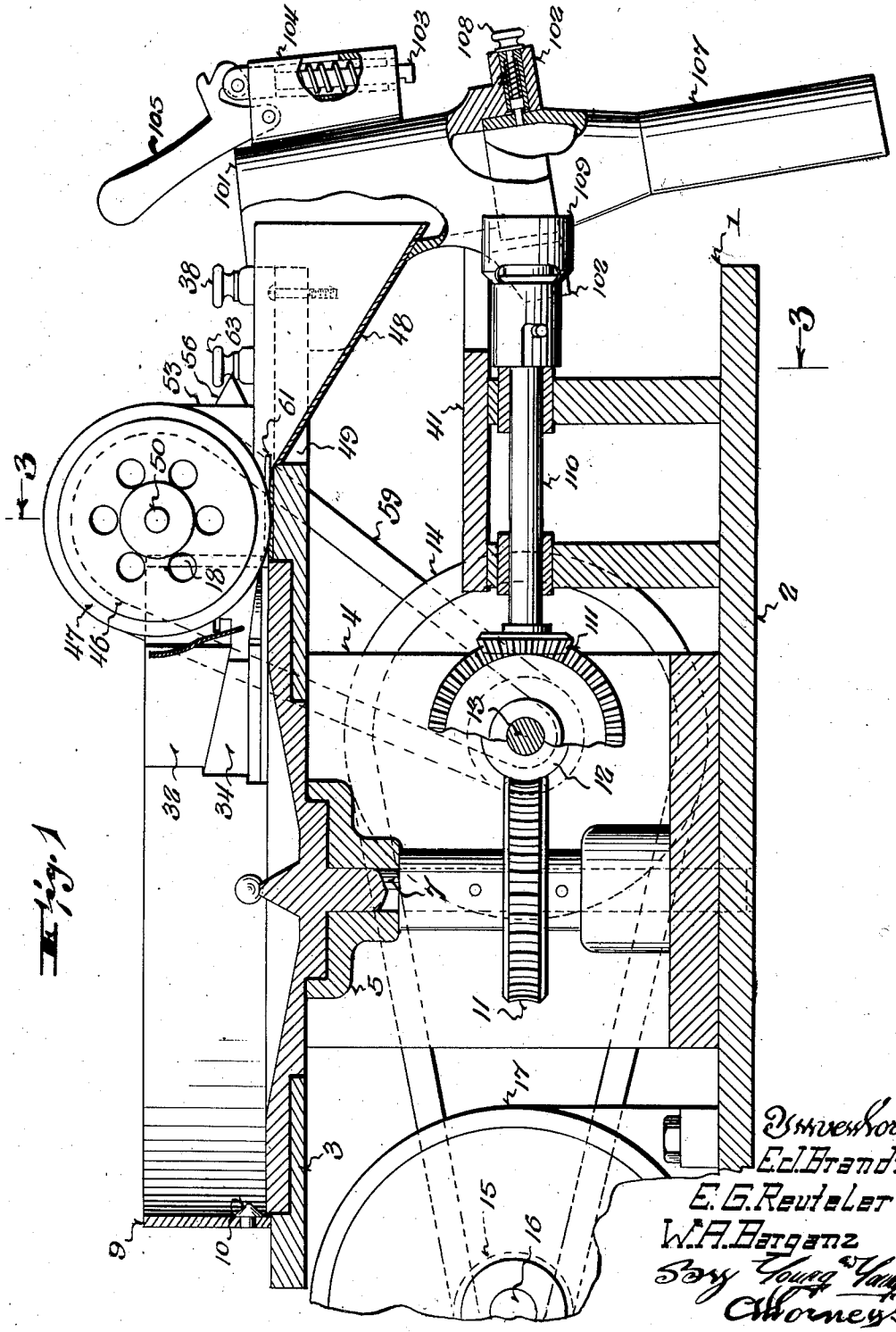


Fig. 1

Inventors
E. J. Brandt
E. G. Reutelet
W. A. Bargenz
Bary Young & Yaney
Attorneys

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Fig. 2.

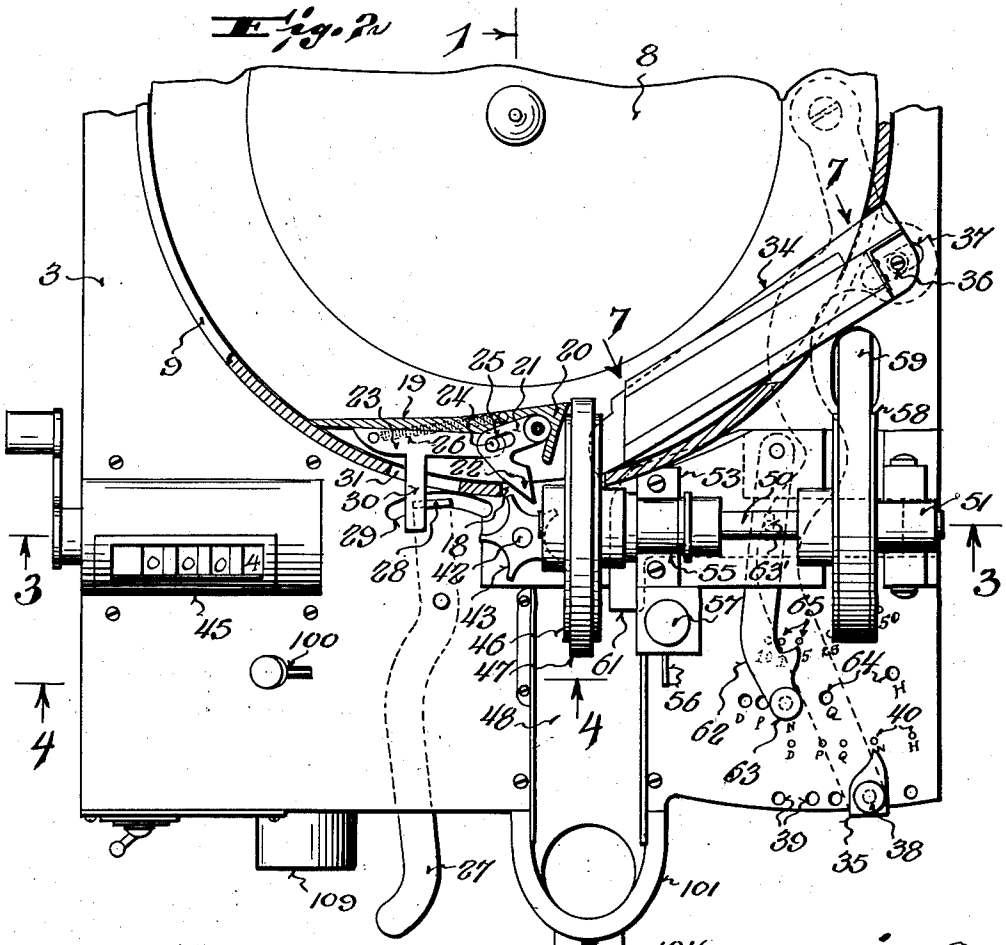


Fig. 6

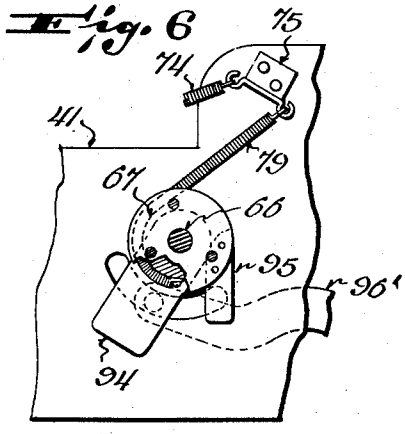
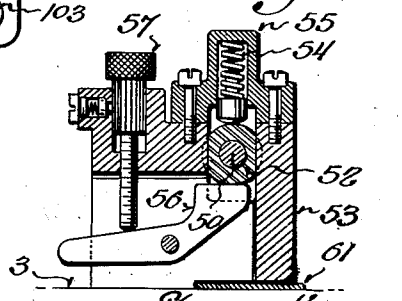


Fig. 9.



Inventors
E. J. Brandt
E. G. Reutelet
W. A. Bargantz
Barry Yount & Young
Attorneys

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COIN COUNTING MACHINE

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Fig. 3

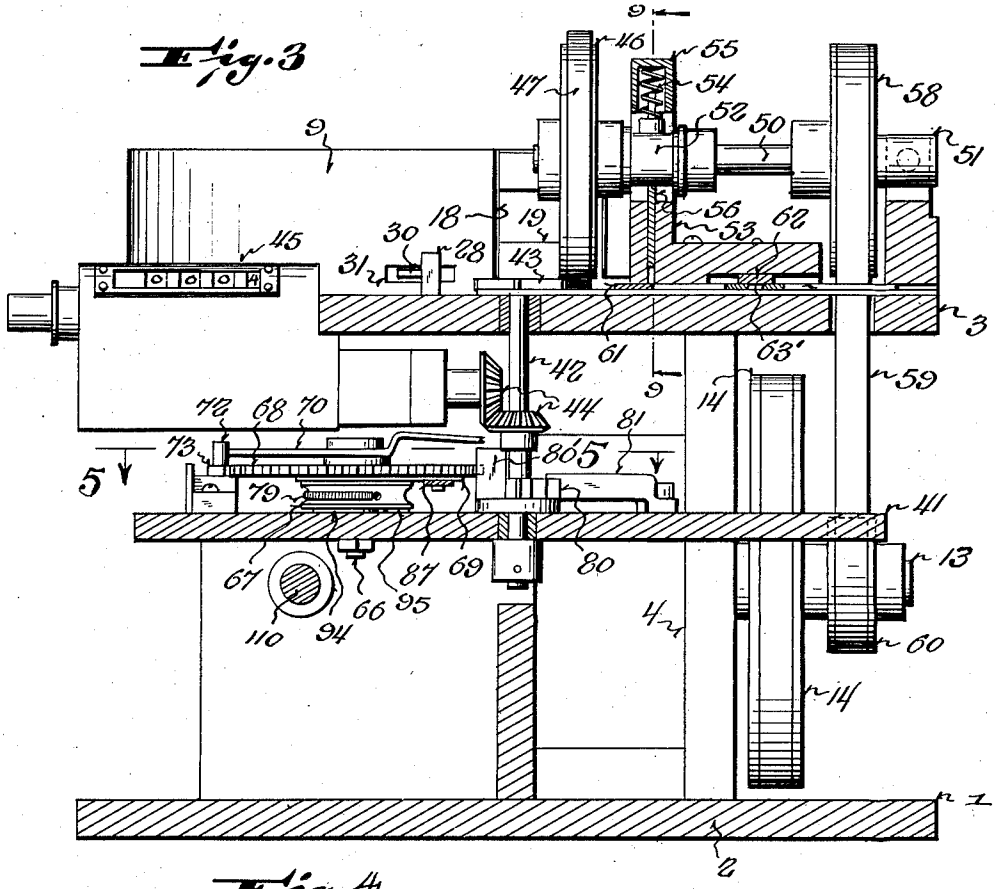
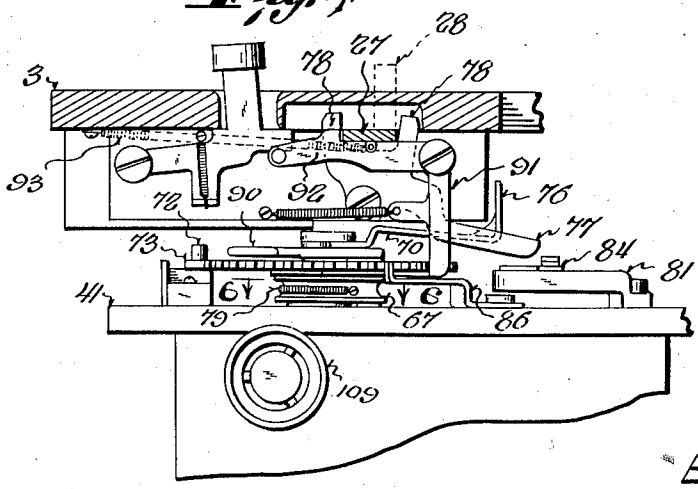


Fig. 4



Inventors
E. J. Brandt
E. G. Reutelet
W. A. Bargantz
By Young & Young
Attorneys

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COIN COUNTING MACHINE

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Fig. 5

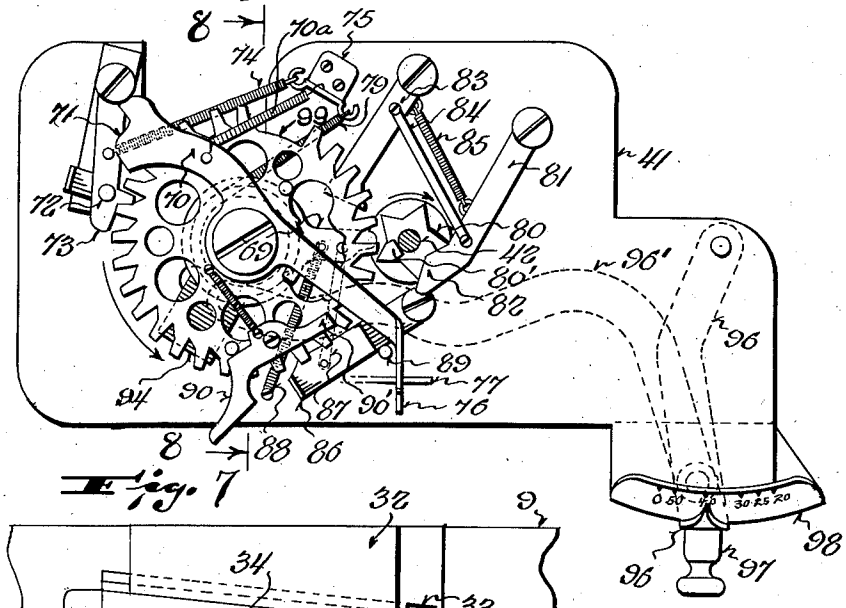


Fig. 7

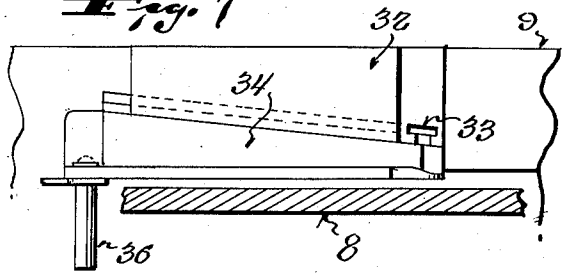
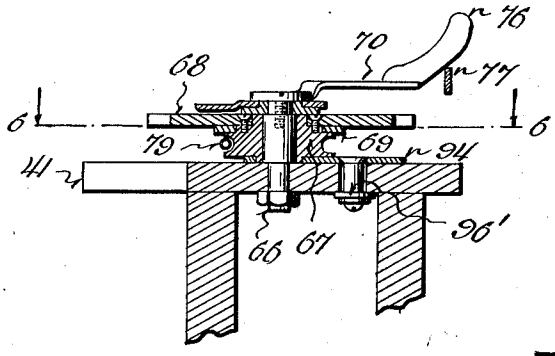


Fig. 8



Inventors
E. J. Brandt
E. G. Reutelet
W. A. Bergantz
By Young & Young
Attorneys

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UNITED STATES PATENT OFFICE

2,152,952

COIN COUNTING MACHINE

Edward J. Brandt and Edward G. Reuteler, Watertown, and Walter A. Barganz, Dodge County, Wis., assignors to Brandt Automatic Cashier Co., Watertown, Wis., a corporation of Wisconsin

Application February 25, 1933, Serial No. 658,596

7 Claims. (Cl. 133—8)

This invention relates to improvements in coin counting machines of the general type designed to automatically count either an unlimited or predetermined number of coins of varying denominations.

The invention has primarily for its object to improve machines of the foregoing type, by the provision of an exceedingly simplified structure, which is more accurate and rapid in its operation, and which provides for simultaneously cutting off the supply of coins delivered to the star wheel, and automatically resetting the mechanism for controlling a predetermined number of coins counted, thus setting the machine for another cycle of operation upon manual release of the coins.

Incidental to the foregoing, a more specific object of the invention resides in the provision of a machine having the foregoing characteristics, in which a coin-controlled gate is automatically tripped and closed upon a predetermined number of operations of the star wheel, whereupon the tripping mechanism is automatically reset for another cycle of operation upon manual opening of the gate.

A further object resides in the provision of an exceedingly simple and novel mechanism for determining the number of coins to be counted.

A still further object resides in the provision of simplified means for determining the diameter of coin to be delivered to the star wheel for actuation thereof.

A still further object is to provide adjustable means for controlling the maximum thickness of coin to be delivered to the star wheel.

While the objects of the invention have been generally stated, other objects residing in specific details of construction will be apparent from time to time as the description proceeds.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts, substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

In the drawings:

Figure 1 is a transverse section through a coin sorting machine constructed in accordance with one form of the present invention, and taken on the line 1—1 of Figure 2.

Figure 2 is a fragmentary plan view, with parts broken away and in section to more clearly illustrate structural details.

Figure 3 is a vertical section taken on the line 3—3 of Figure 2.

Figure 4 is a similar detail section taken on the line 4—4 of Figure 2.

Figure 5 is a detail plan section taken on the line 5—5 of Figure 3.

Figure 6 is a fragmentary detail section taken on the line 6—6 of Figure 8.

Figure 7 is a fragmentary detail section taken on the line 7—7 of Figure 2.

Figure 8 is a detail section taken on the line 8—8 of Figure 5, and

Figure 9 is a detail section taken on the line 9—9 of Figure 3.

Referring now more particularly to the accompanying drawings, the numeral 1 designates generally a frame comprising a base plate 2 and a top plate 3, connected by a vertical bracket 4 provided with upper and lower bosses 5 and 6, respectively, which serve as bearings for a depending shaft 7 carried by a centrifugal annular plate 8 rotatably positioned upon the top plate 3 of the frame, and surrounded by a vertical annular guard wall 9, which normally confines the coins delivered to the centrifugal plate. Studs 10 are secured to the inner face of the guard wall 9 at spaced intervals adjacent the top of the centrifugal plate 8 to agitate the coins deposited upon the plate and thus prevent their bunching and accumulation.

Inasmuch as the coins delivered to the centrifugal plate 8 are discharged therefrom through centrifugal action, the plate 8 is rotated through a worm gear 11, meshing with a worm 12 mounted on a transverse shaft 13 journaled in the side arms of the bracket 4. The shaft 13 has secured thereto a pulley 14 having belt connection with a pulley 15 secured to the armature shaft 16 of a motor 17 mounted on the base.

As best shown in Figure 2, the guard wall 9 is provided with an opening 18 adjacent the forward side of the machine, through which the coins are discharged from the centrifugal plate 8. To facilitate discharge of coins from the outer periphery of the centrifugal plate 8, a guard block 19 is secured by screws or other suitable means to the inner face of the guard wall 9 adjacent one side of the opening, and is provided with a nose 20 projecting over the face of the plate 8

to engage coins riding on its outer edge and direct the same through the opening 18. To control the discharge of coins through the opening 18 a gate 21 is pivotally mounted within an elongated recess formed in the guard block 19, as best shown in Figure 2 and is provided with an offset nose 22 adapted to be swung into position between the guard block 19 and the opposite edge of the opening 18 formed in the guard wall, thus blocking the discharge of coins. Pivotal movement of the gate 21 is accomplished by means of a slidable shoe 23 also mounted in the recess formed in the guard block 19, and provided at one end with a pin 24 engaged in a slot 25 formed in the gate 21. Obviously, reciprocative movement of the shoe 23 will impart oscillatory movement for projecting or retracting the nose 22 of the gate from between the guard block and one edge of the opening 18. A spring 26, connecting the guard block and shoe, serves to normally urge the nose 22 of the gate to projected, closed position, while retraction of the nose is accomplished by means of a manually operated lever 27 pivotally connected to the under side of the top plate 3, and provided with an upturned end 28, projecting through the slot 29 in the top plate 3, and engaging the tail 30 carried by the sliding shoe 23 and projecting through a slot 31 formed in the guard wall 9.

In order to control the maximum thickness of coins to be discharged through the opening 18, a bracket 32 is secured to the inner face of the guard wall 9 adjacent the forward edge of the opening 18. As best shown in Figures 2 and 7, the lower face of the bracket 32, which is inclined downwardly toward the opening 18, is provided with a dove-tail slot 33 for slidable reception of a block 34, which projects across the outer edge of the centrifugal plate 8. Obviously, as the block 34 is reciprocated in the bracket 32, its bottom face will be raised or lowered with relation to the top face of the centrifugal plate, thus determining the thickness of coin which can pass under the block into contact with the guard wall 9 where it is engaged by the nose 20 of the guard block 19 and directed through the opening 18.

Adjustment or reciprocation of the block 34 is obtained by means of a manually operable lever 35, pivotally connected at its inner end to the bottom of the top plate 3, and provided intermediate its ends with a slot for reception of a pin 36 carried by the guard block 34, and depending through a slot 37 formed in the top 3, as best shown in Figures 2 and 7. The outer end of the lever 35 is preferably provided with a spring-urged plunger 38 for projection into the recesses 39, formed in the top plate, to latch the lever 35 in its adjusted position. As shown in Figure 2, the top plate may be provided with any suitable indications 40 designating the denomination of coins for which the machine is adjusted.

Journaled in the top plate 3, and intermediate the plate 41, adjacent the rear side of the opening 18, is a shaft 42, which carries a star wheel 43 at its upper end positioned upon the top of the plate 3 in the path of coins discharged through the opening 18. Obviously, as the discharged coins engage the prongs of the star wheel 43, the same will be rotated in a clockwise direction, thus rotating the shaft 42, which, through a beveled gear connection 44, actuates a conventional counting mechanism 45 secured to the top plate 3.

Inasmuch as the momentum of the coins discharged by centrifugal force through the opening 18 would not be sufficient to actuate the star wheel 43, a feed wheel 46 is positioned above the path of the coins and is provided with a frictional peripheral face 47, which engages the coins and forces them past the star wheel, from which point they are discharged into the inclined chute 48 secured to the top plate 3, and projected downwardly therefrom through a slot 49 formed in the plate, as best shown in Figure 1.

In order to compensate for the feeding of coins of varying thicknesses past the star wheel 43, the feed wheel 46 is mounted on a shaft 50 journaled at its outer end in a pivotal bearing 51, and at its inner end adjacent the star wheel in a floating bearing 52, vertically guided in a slotted bracket 53. A spring 54, housed in the cup 55, secured to the top of the bracket 53, creates a downward pressure upon the bearing 52, thus urging the feed wheel into engagement with the coins, and at the same time permitting vertical movement of the wheel, essential for the desired engagement with coins of different thicknesses.

The lever 56, pivotally carried by the bracket 53, and engaged by the floating bearing 52, serves to limit the downward movement of the feed wheel, while an adjusting screw 57, carried by the bracket 53 and engaging the tail of the lever 56, serves to adjust the position of the lever, and consequently the feed wheel 47, for coins of different thicknesses. The feed wheel 47 is rotated by means of a pulley 58 secured on the shaft 50 and driven by a belt 59 connected with the pulley 60 mounted on the transverse shaft 13.

Inasmuch as it is essential to hold coins of various sizes in intimate contact with the star wheel 43 for actuation thereof, a plate 61 is slidably mounted on the top plate 3 adjacent one side of the path of travel of the coins and alined transversely with the star wheel 43. Adjustment of the plate 61 with relation to the star wheel 43 is accomplished by a manually operated lever 62 pivotally connected to the bracket 53 and provided with a pin 63' engaged in a slot formed in the plate, as best shown in Figures 2 and 3. Like the lever 35, the lever 62 is also provided with a spring-urged plunger 63 for projection into the openings 64 formed in the top plate, thus serving to lock the levers 62 in adjusted position. Designations 65 may be provided on the plate 3 to indicate the denomination of coin for which the plate 61 is adjusted.

Considering now the mechanism for controlling the number of coins to be counted, and with particular reference to Figure 5, mounted on the intermediate plate 41 is a stud 66 upon which a grooved hub 67 is journaled. The top of the hub 67 has secured thereto a toothed wheel 68, and rotatably mounted on the hub beneath the toothed wheel is an arm 69, the purpose of which will be later described.

Loosely mounted upon the top of the stud 66 for movement independent of the toothed wheel 68, is a spring biased trip lever 70 provided at one of its ends with a cam notch 71 for engagement with a pin 72 carried by the holding dog 73 which normally holds the toothed wheel 68 against reverse movement. A spring 74, connected to the dog, and a bracket 75 holds the nose of the dog into engagement with the teeth of the wheel 68. The opposite end of the trip lever is provided with an inclined cam nose 76 for engagement with a rocking lever 77 pivotally carried by the top plate and provided with a bifurcated end 78, which straddles the pivotal lever 27, as best illustrated in Figure 4.

Rotation of the hub 67, and consequently the toothed wheel 68 in one direction, is obtained by means of a coil spring 79, connected to the bracket 75 and wrapped around the groove in the hub 67 with one of its ends secured thereto.

In the normal operation of the machine, a notched wheel 80, secured on the star wheel shaft 42, is provided with a vertically projecting tooth 80', which upon rotation engages one tooth at a time of the toothed wheel, and feeds the same a step forward, in which position the toothed wheel is held by the pawl 73. In order to prevent overrunning of the star wheel means is provided for frictionally latching the same after each actuation. This is accomplished by means of a pivotal dog 81 provided with a nose 82 adapted to normally engage the notches of the wheel 80, as best shown in Figure 5. Also, in order to insure a positive, definite movement of the star wheel upon each actuation, an escapement is provided in the form of a pivoted dog 83, connected to the dog 81 by a link 94. A spring 85, connecting the dogs 83 and 81, serves to normally urge the dogs towards each other, and at the same time to hold the nose 82 into engagement with the notched wheel 80. Obviously, as the notched wheel is rotated, forcing the nose 82 outwardly, the nose of the dog 83 is drawn into engagement with the notched wheel 80, thereby limiting its movement to one notch at a time.

An escapement is also provided to prevent overrunning of the toothed wheel 68, and insure a positive step-by-step movement. In this instance a pivoted dog 86 is connected to the arm 69 by a link 87, and as best seen in Figure 5, as the notched wheel 80 engages the arm 69, the end of the dog 86 is swung inwardly between the teeth of the wheel 68 to positively limit its movement to one tooth at a time. A spring 88, connecting the arm 69 with the plate 41, serves to hold the dog 86 out of engagement with the teeth of the wheel 68 against the stop 89.

From the foregoing, it will be noted that each time the notched wheel, which is actuated by the star wheel, makes a complete revolution, the tooth 80' will engage one of the teeth of the wheel 68 and move the same forward the distance of one tooth, in which position it is held by the dog 73, thus providing a positive, definite step-by-step movement, due to the fact that over-running of both the star wheel and the toothed wheel 68 is definitely prevented by the escapements heretofore described.

Referring to Figures 4 and 5, it will be noted that the toothed wheel 68 carries a pivotal trip lever 90, which, as the toothed wheel is rotated, engages the tail 91 of a spring biased latch arm 92, which engages the gate lever 27 to hold the same in its set or open position. Obviously, when the trip lever 90 engages the tail 91, the latch arm 92 is actuated, releasing the gate lever 27, which is then actuated by a spring 93 connecting the lever with the top plate 3, causing the sliding shoe to be released, which in turn projects the nose 22 into the path of coins, thereby cutting off the supply to the star wheel 43.

Also, when the gate lever 27 is released, and actuated by the spring 93, the same actuates the rocking lever 77, which engages the cam nose 76 of the latch lever 70, forcing the cam notch 71 under the pin 72, thereby releasing the pawl 73 and permitting the spring 79 to return the toothed wheel to its normal position.

Inasmuch as the number of coins to be counted at one cycle of operation is determined by the distance of movement of the toothed wheel, and the number of step-by-step actuations required before the trip lever 90 engages the tail 91 of the latch arm 92, to cut off the supply of coins, an adjustable stop arm 94 is rotatably mounted on the lower end of the hub 67, and, as best shown in Figure 6, the projecting lug 95, carried by the hub 67, engages the stop 94 and thereby limits the return movement of the toothed wheel 68 by the spring 79. Adjustment of the stop 94 is obtained by means of a manually operable lever 96 pivotally carried by the intermediate plate 41 and connected with the rotatable stop 94 by a link 96'. Obviously, as the stop 94 is swung to different positions, the same will determine the normal position of the toothed wheel, and the distance to be traveled by the trip lever 90 before the latch 92 is released, thus determining the number of step-by-step movements of the star wheel required to stop the counting of coins.

The end of the lever 96 is also provided with a spring-urged plunger 97 adapted to latch the lever in adjusted position on the arcuate plate 98, which is provided with indications designating the number of coins to be counted at each cycle of operation of the machine, as best shown in Figure 5.

In some instances it is desired to obtain a continuous count of an unknown quantity of coins, without the necessity of going through the several cycles of operation of the machine, which requires a manual release of the coin gate for each cycle of operation. To accomplish this, the toothed wheel is provided with a blank space 99, and the adjustable stop 94 is so set that the blank space 99 alines with the notched wheel 80 and the tooth 80', in which instance rotation of the tooth 80' has no effect upon the toothed wheel 68, and therefore no tripping of the coin-control gate occurs. After the count is completed, the gate can be manually actuated by depressing the spring-held lever 100, which engages the latch arm 92, as best shown in Figure 4, and thus releases the gate lever 27, in the same manner as when the latch arm is tripped by the member 90.

Here it will also be noted that the trip member 90 is provided with a tail 90', which is engaged by the tooth 80' when the toothed wheel has carried the same into the path of the tooth, thus rocking the trip member to engage the tail 91 of the latch bar 92 to release the gate lever at a predetermined position of the star wheel at all times. It will be noted that the star wheel, which is provided with five pockets, must make one revolution in order to actuate the toothed wheel 68 one notch. Therefore, in the present instance, predetermined count of coins must be in fives, or multiples of fives. However, it will be quite obvious that this can be varied without affecting the principles of the invention.

Considering now the complete operation of the machine, which it is believed will be quite apparent from the foregoing explanation, considered in connection with the accompanying drawings, assuming it is desired to count forty, or $2 worth of nickels at each cycle of operation. The lever 62 is first set at the nickel notch, indicated on the top plate 3, which regulates the distance between the star wheel 43 and the guide plate 61 to the desired space for a nickel to effectively actuate the star wheel. Next the lever 35 may be set to the nickel notch, which regulates the space between the centrifugal plate 8 and the block 34 to the proper thickness for permitting a nickel to pass therebetween. The lever 96 is

then set at the "40" notch of the plate 98, which shifts the adjustable stop 94 to such position that the toothed wheel is fed in a step-by-step movement the desired distance to count forty nickels before the trip member 90 engages the tail 91 and releases the latch arm 92, which, as heretofore explained, projects the nose 22 into the path of coins and prevents further delivery to the star wheel.

In order to initiate the cycle of operation, after the coins have been deposited upon the centrifugal plate 8, the gate lever 27 is manually actuated to withdraw the gate 22 from the path of the coins, permitting the same to be discharged through the opening 18 by centrifugal force, and fed past the star wheel by the feed wheel 46. Actuating lever 27 to withdraw the gate 22 also lowers rocking lever 77 which permits the spring 70a of trip 70 to release the trip lever from engagement with the pin 72. Spring 74 then positions holding dog 73 into operative relation with toothed wheel 68. Each coin is then counted by the counting mechanism 45, and then discharged into the chute 48.

When forty coins have been counted, and the gate tripped to cut off further supply, the latch lever 70 is actuated to release the pawl 73 and permit the spring 79 to return the toothed wheel to its normal position, wherein the lug 95 engages the adjustable stop 94. During the foregoing operation, the discharged coins are either bagged or packaged, as will be hereinafter described. The machine is then set for another cycle of operation, which is accomplished by merely actuating the gate lever 27 to withdraw the gate, whereupon another quantity of nickels is fed past the star wheel.

As best shown in Figure 1, coins delivered to the chute 48 are discharged into a tubular head 101, from which the coins are delivered to a bag or any other desired receptacle. When a bag is employed, the mouth of the bag is drawn over the lateral projections 102, and in order to lock the same upon the head, a plunger 103, slidably mounted in the boss 104, carried by the head, is forced downwardly to engage and clamp one edge of the bag on the corresponding boss 102. This is accomplished by a pivotal cam lever 105, which engages the upper end of the plunger 103, and locks the same in projected position. When released, the plunger is returned to its normal, raised position by a spring 106.

In some instances it is desired to package the coins in the usual paper tube. Therefore means is provided for attaching the tube holder 107 to the head 101, wherein the upper end of the holder is inserted into the head and releasably held by a spring-urged plunger 108 projecting through one of the bosses 102 and engaging an opening in the holder.

The lower end of the holder is restricted to the size of coin to be packaged, and in operation it is merely necessary to insert the paper tube over the lower end of the holder until the desired number of coins have been counted. The holder and coins are then removed, and for convenience the ends of the package may be crimped or turned in by a crimping head 109, which is detachably connected to the end of a shaft 110 journaled in the frame and operatively connected with the shaft 13 through the beveled gears 111. Inasmuch as each size of coin requires a different sized paper tube, the holder 107 and the crimping head 109 may be quickly replaced, as desired.

From the foregoing explanation it will be quite apparent that an exceedingly simple, rapid, and accurate coin counting machine has been provided, which can be readily accommodated to handle coins of any denomination, and to count either a predetermined number of coins at each cycle of operation, or an unknown quantity. Particular attention is directed to the mechanism for determining the predetermined number of coins to be counted, wherein the operation is positive, and resetting is automatic instead of requiring a manual resetting commonly employed heretofore.

We claim:

1. In a coin counting machine, a hopper having a discharge opening, means for discharging the coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, and a slidable member for operating said gate to position the same in or out of the path of movement of the coins discharged through the hopper opening.

2. In a coin counting machine, a hopper having a discharge opening, means for discharging coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to said pivoted gate, means for operating said slidable member for positioning the gate out of the path of movement of the coins discharged through the hopper opening, and means for automatically releasing said operating means to permit operation of the slidable member to position the gate in the path of movement of the coins discharged through the hopper opening.

3. In a coin counting machine, a hopper having a discharge opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to the pivoted gate and having a lateral projection, a member adapted for engagement with said lateral projection to move the slidable member to position the pivoted gate out of the path of movement of coins discharged through the hopper opening, and means for releasing said member which engages the lateral projection to permit operation of the slidable member to position the pivoted gate in the path of movement of the coins discharged through the hopper opening.

4. In a coin counting machine, a hopper having a discharge opening, means for discharging coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to the gate and adapted to operate the same, means for normally holding the slidable member to position the gate out of the path of movement of coins discharged through the hopper opening, means operable by the star wheel for counting the discharged coins, and means operable by the counting mechanism for releasing the slidable member to position the gate in the path of movement of coins discharged through the hopper opening.

5. In a coin counting machine, a hopper having a discharge opening, means for discharging coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to the gate and adapted to operate the same, means for normally holding the slidable member to position the gate out of the path of movement of coins discharged through the hopper opening, means operable by the star wheel for counting the discharged coins, means operable by the counting mechanism for releasing the slid-

able member to position the gate in the path of movement of coins discharged through the hopper opening, and means for automatically resetting the counting mechanism for another cycle of operation.

6. In a coin counting machine, a hopper having a discharge opening, means for discharging coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to the gate and adapted to operate the same, means including a latch arm for normally holding the slidable member to position the gate out of the path of movement of coins discharged through the hopper opening, means operable by the star wheel for counting the discharged coins, means operable by the counting mechanism for releasing the latch arm and releasing the slidable member to position the gate in the path of movement of coins discharged through the hopper opening, and means for automatically resetting the counting mechanism for another cycle of operation.

7. In a coin counting machine, a hopper having a discharge opening, means for discharging coins through the opening, a star wheel positioned relative to the opening and adapted for operation by contact of the coins, a pivoted gate, a slidable member connected to the gate and adapted to operate the same, means including a latch arm for normally holding the slidable member to position the gate out of the path of movement of coins discharged through the hopper opening, means operable by the star wheel for counting the discharged coins, means operable by the counting mechanism for releasing the latch arm and releasing the slidable member to position the gate in the path of movement of coins discharged through the hopper opening, and means operable by the release of the latch arm for automatically resetting the counting mechanism for another cycle of operation.

EDWARD J. BRANDT.
EDWARD G. REUTELER.
WALTER A. BARGANZ.