April 13, 1954 A. R. BUCHHOLZ ET AL 2,675,008

COIN COUNTING MACHINE

Filed Aug. 28, 1950 4 Sheets-Sheet 1

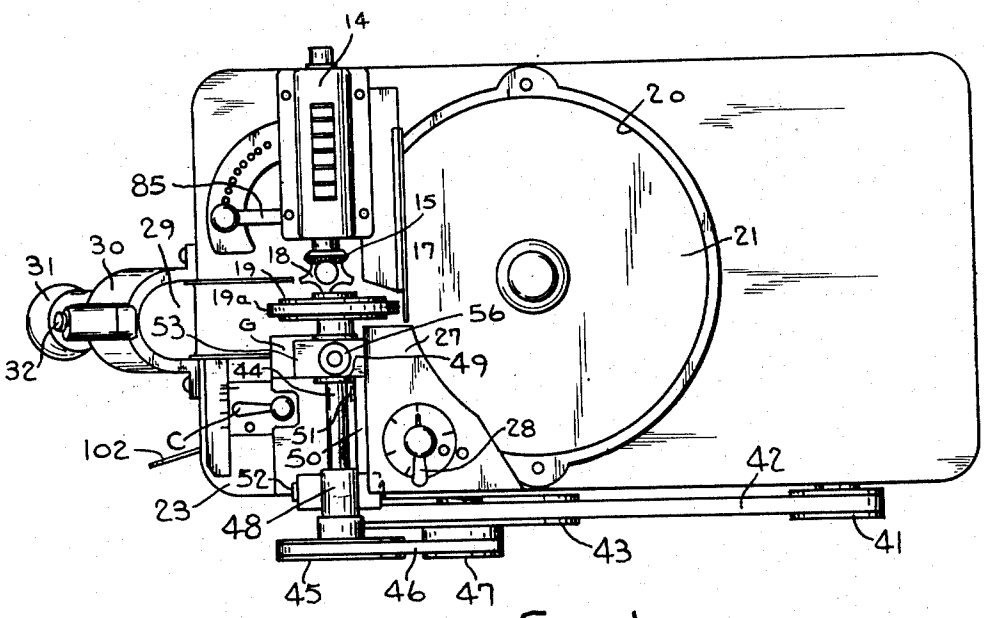


FIG. 1

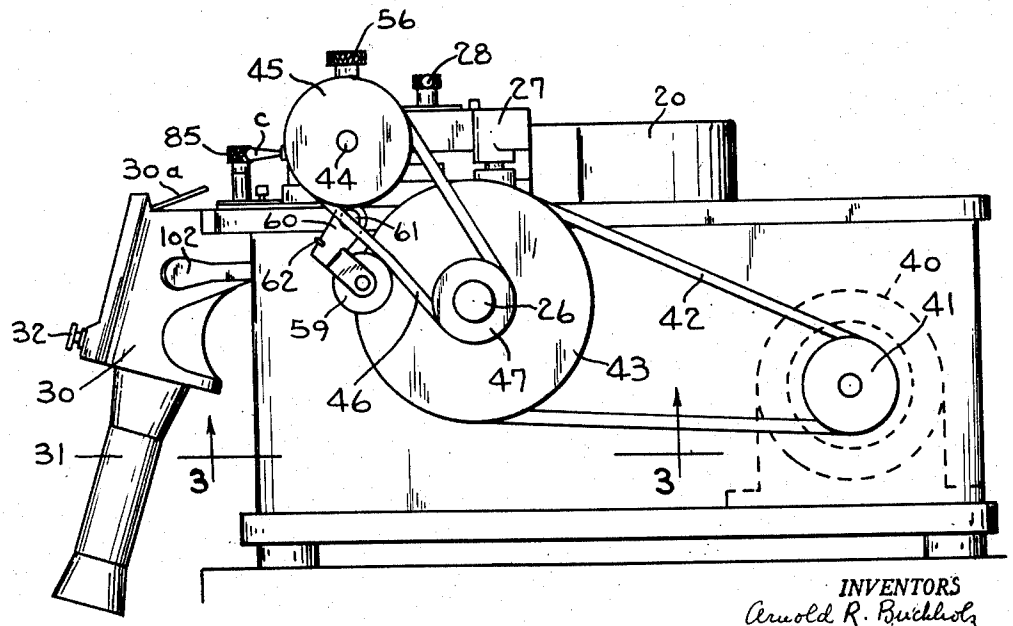


FIG. 2

BY

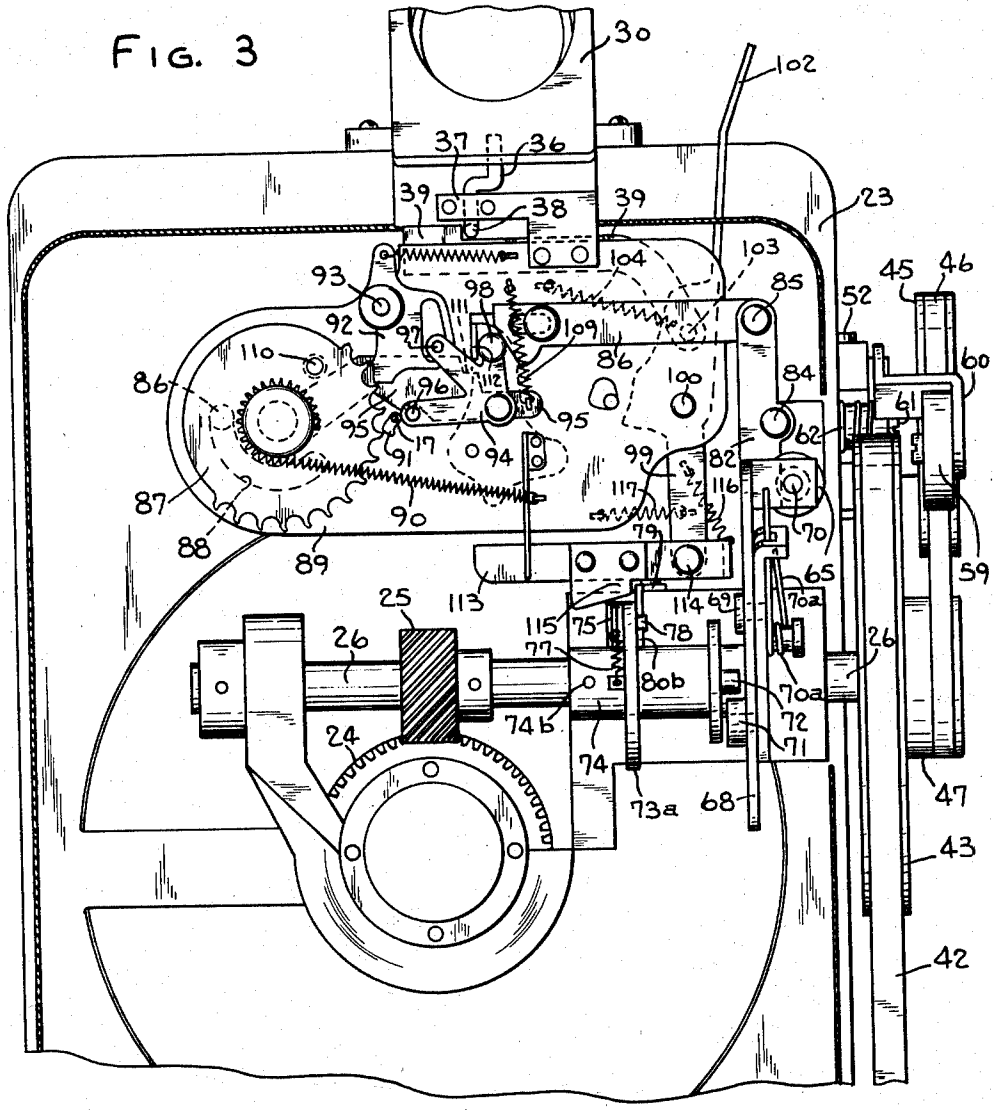
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FIG. 3



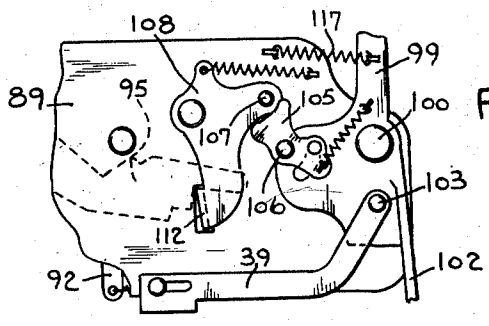


FIG. 4

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COIN COUNTING MACHINE

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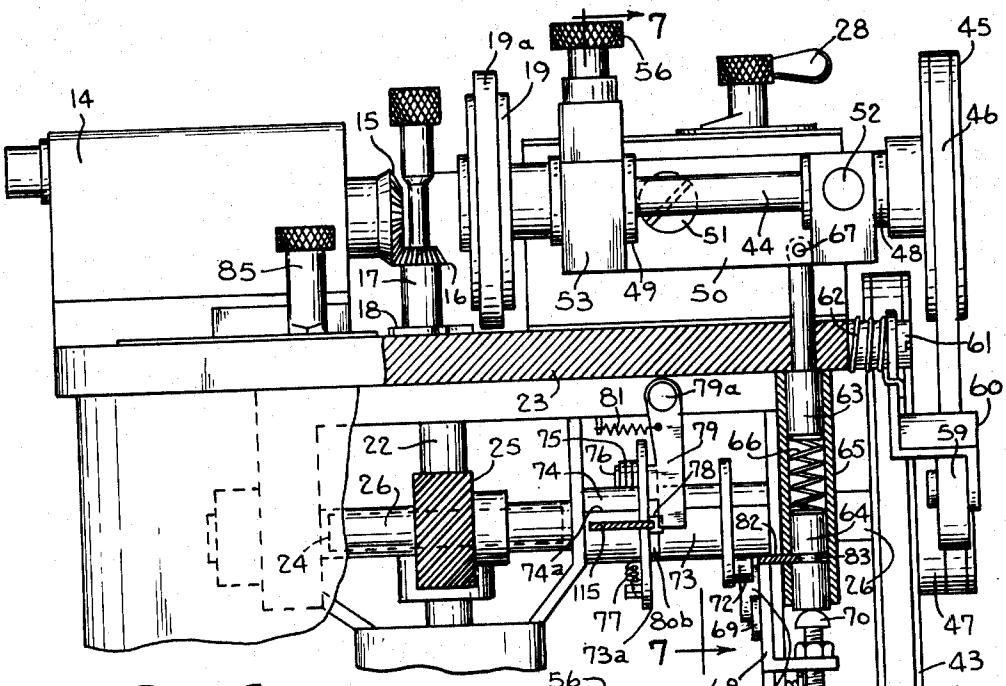


FIG. 5

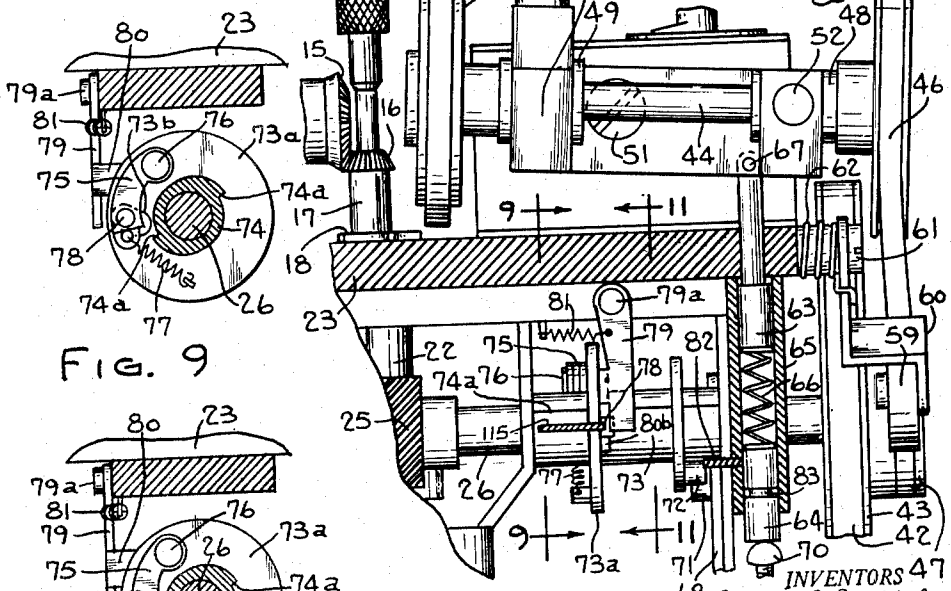


FIG. 6

FIG. 9

FIG. 10

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COIN COUNTING MACHINE

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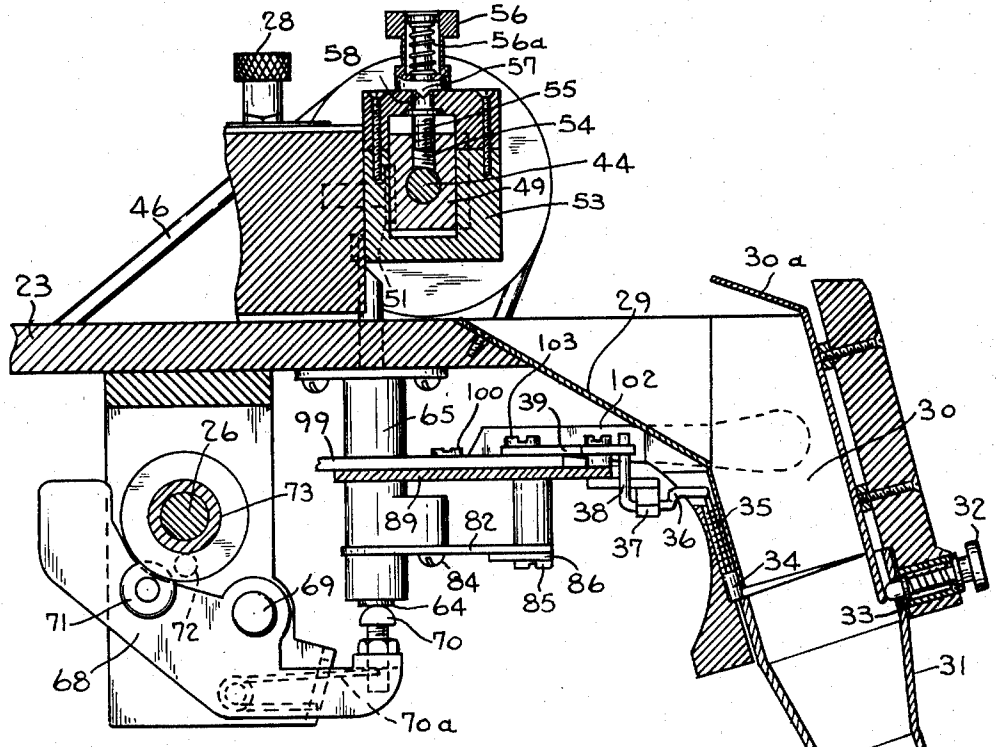


FIG. 7

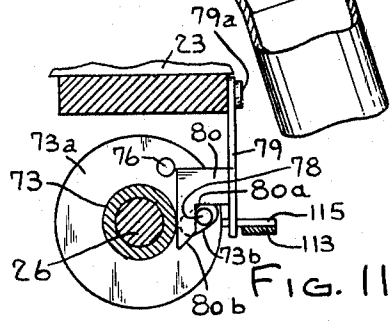


FIG. 11

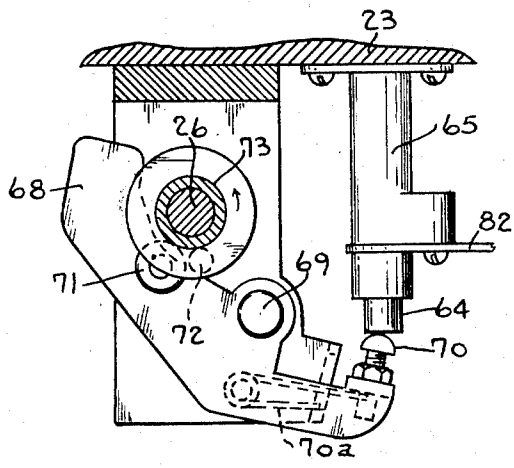


FIG. 8

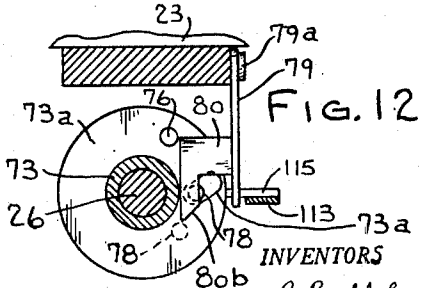


FIG. 12

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UNITED STATES PATENT OFFICE

2,675,008

COIN COUNTING MACHINE

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Application August 28, 1950, Serial No. 181,713

4 Claims. (Cl. 133—8)

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The invention relates to coin counting machines adapted for automatically counting either an unlimited or a predetermined number of coins of varying dimensions, and if desired, depositing the same in a bag or tube.

More particularly, the invention relates to that type of coin counting machines in which the coins are fed into a hopper having a revolving plate for its bottom by which the coins are fed by centrifugal force toward the periphery of the hopper having an opening at one side formed in part by an adjustable gate through which opening the coins pass to a discharge passage along which the coins are fed by a feed wheel past a counter operating star wheel prior to their discharge from the machine. In a copending application Serial No. 115,272, filed September 12, 1949, of Earl W. Quirk and Arnold R. Buchholz, there is disclosed a machine of the general type above described in which a continuous rotatable feed wheel is tiltably mounted for movement to a coin feeding position and to an inoperative position, the tilting movement being controlled by mechanism controlled by predetermined count mechanism, which mechanism is preferably of the type shown in U. S. Patent No. 2,378,828, dated June 19, 1945, to A. R. Buchholz et al. The present invention has for its object to provide an improved and simplified mechanism over that of the above mentioned copending application which will accomplish all the objects of said prior application and in which the tilt operating mechanism under the control of the predetermined count mechanism comprises a cam which may be clutched and unclutched to the drive shaft of the machine through a simple form of one way clutch mechanism, thereby simplifying and making a more foolproof construction over the shiftable cam and its associated parts of said prior application.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings:

Fig. 1 is a plan view of a coin counting machine embodying the invention;

Fig. 2 is a side elevation view of the machine;

Fig. 3 is a horizontal sectional view of the machine looking into it from the underside taken generally along the line 3—3 of Fig. 2 and with the motor removed;

Fig. 4 is a detailed view of parts of the predetermined count mechanism;

Fig. 5 is a front elevation view of the machine, parts being broken away and parts being shown in section showing the coin feeding wheel in feeding position;

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Fig. 6 is a view similar to Fig. 5 showing the coin feed wheel in its inoperative position;

Fig. 7 is a detailed vertical sectional view taken on the line 7—7 of Fig. 5;

Fig. 8 is a detailed sectional view of parts shown in Fig. 7 showing the plunger operating lever in a release position;

Fig. 9 is a detailed vertical sectional view taken on the line 9—9 of Fig. 6 showing the clutch parts in a release position;

Fig. 10 is a view similar to Fig. 9 showing the clutch parts in a position for engagement;

Fig. 11 is a detailed vertical sectional view taken on the line 11—11 of Fig. 6 showing the clutch setting and release lever in a position where the clutch pawl of the clutch mechanism is in an inoperative position;

Fig. 12 is a view similar to Fig. 11 showing the clutch setting and release lever just before the release of the clutch.

Referring to the drawings, as in all machines of this general type, a counter 14 is provided which, as shown in Fig. 5, carries a bevel gear 15 meshing with a bevel gear 16 on an upright shaft 17 carrying a coin operated star wheel 18, the coins being fed past said wheel 18 by a feed wheel 19 as they are delivered to the wheel 19 through an adjustable opening at one side of a hopper 20 whose bottom 21 is a rotary plate carried by a vertically disposed shaft 22 suitably journalled in the top plate 23 and carrying a spiral gear 24 meshing with a spiral gear 25 on the main drive shaft 26, see Figs. 1, 3, and 5.

As in the Buchholz et al. patent, the adjustable gate 27, which determines the size of the side discharge opening from the hopper 20 is vertically adjustable by the turning of a screw shaft carrying a handle 28. Also in accordance with known practice, a gauge plate G is slidably mounted relative to the star wheel 18 to adjust the width of the passage between said wheel and plate for the particular coins being counted and is locked in position by a hand clamp C.

Referring to Fig. 7, beyond the wheel 18, the discharge passage is formed by a chute 29 which discharges the counted coins into a tube section 30 which has a coin deflector 30a projecting above the outlet end of the chute 29. A discharge tube 31 has its upper end removably secured in the lower end of the section 30 by a spring pressed detent 32 engageable with an opening 33 in said tube which is loosely mounted in the tube section 30 so that it may be tilted upwardly about said detent 32 as a fulcrum so as to engage and press upwardly on a plunger 34 normally held against movement by a spring 35 and adapted when

moved to engage one arm of a rocker lever 36 pivoted at 37 and having its other arm 38 operatively engageable with a link 39 forming a part of a count starting control hereinafter described.

Referring to Fig. 2, an electric motor 40 has a pulley 41 mounted on its drive shaft and connected by a belt 42 with a pulley 43 on the main drive shaft 26.

Referring to Figs. 2, 5 and 6, the feed wheel 19, which has a rubber coin contacting face 19a, is mounted on a shaft 44 carrying a pulley 45 connected by a belt 46 with a pulley 47 on the drive shaft 26. The shaft 44 is mounted in a rear bearing 48 and a front bearing 49 carried by a tiltable support 50 mounted to turn on a pivot shaft 51. The rear bearing 48 is pivotally supported in the support 50 by trunnions 52. The front bearing 49, as shown in Fig. 7, is vertically slidably mounted in a box 53 formed as a part of the support 50 and has a threaded bore 54 engaged by a manually adjustable screw shaft 55 journalled in the top wall of the box 53 so that turning of the shaft 55 will move the bearing 49 relative to said support so that the shaft 44 may be tipped about the rear bearing to various angular positions relative to the support 50 to compensate for wear of the face 19a. The shaft 55 is turned by a thumb wheel 56 which is of the locking type, that is, it is lengthwise movable on the shaft 55 and yieldingly urged toward the box 53 by a spring 56a so that its diametrically disposed projections 57 may engage in similarly disposed recesses 58 in the top of the box.

The support 50 is moved to a feed wheel release position by the action of a belt tensioner acting on the belt 46. This tensioner (see Figs. 2 and 5) includes a pulley 59 engageable with the belt 46 and carried by an arm 60 mounted to swing on a fixed stud 61 and urged to tensioned position by a spiral spring 62.

The support 50 is moved to feed wheel operative position by a plunger means shown in Figs. 5 to 8 and comprising a pair of plunger members 63 and 64 working in a guide tube 65 and operatively connected together by a coiled spring 66 so that the plunger member 63 operatively connected at 67 with the support 50 may yield relative to the plunger member 64 in case a coin should become jammed between the wheel and discharge chute. The spring 66 when under compression between the plunger parts 63 and 64 also acts to exert a yielding downward pressure on the wheel 19. A plunger operating lever 68 is pivotally mounted intermediate its ends at 69 on a fixed part of the machine and at one end 70 engages the outer end of the plunger member 64 and normally rests on a spring stop and shock absorber spring 70a. The opposite arm of the lever 68 carries a roller 71 engageable with a pin 72 forming part of a cam 73 which is loose on the shaft 26 but which is adapted to be driven thereby through a one revolution clutch.

Referring to Figs. 5, 6 and 9 to 12, the clutch includes a double toothed sleeve 74 keyed to the shaft 26 by a pin 74b, a pawl 75 pivotally mounted on a pin 76 carried by a disk portion 73a of the cam 73 and engageable with one or the other of the teeth 74a on said sleeve toward which it is normally urged by a tension spring 77 connected at one end to said pawl and at its other end to disk 73a. The pawl 75 carries a pin 78 working in and projecting through a slot 73b in the disk 73a, and its movement is controlled by means engageable with said pin. For this purpose a pawl holding and release lever 79 is pivotally mounted at 79a on the frame of the machine, and as shown in Figs. 11 and 12, carries a finger 80 having a pawl holding notch 80a therein and a pawl releasing or resetting cam surface 80b. The lever 79 is normally urged to move the finger 80 against the face of the disk 73a by a spring 81.

With this construction when the pin 78 is disposed in the notch 80a of the finger 80, the pawl 75 is in a released position, as shown in Fig. 9, so that the cam 73 is free on the shaft 26. When, however, through the operation of a count starting control means hereinafter described, the lever 79 is swung toward the right, as viewed in Figs. 5 and 6, and against the action of the spring 81 it is released from holding engagement with the pin 78 so that the spring 77 then swings the pawl 75 inwardly to a clutching position, as shown in Fig. 10, and then as the shaft 26 continues to revolve, the pawl 75 is engaged by one of the teeth 74a, and the pawl together with the cam 73 revolves as a unit with the sleeve 74 and shaft 26 for a single revolution, during which the pin 72 engages the roller 71 on the lever 68 and swings the end 70 of said lever upwardly from the position shown in Fig. 8 to the position shown in Fig. 7, thus moving the plunger assembly including plunger member 64 upwardly and tilting the support 50 to bring the feed wheel 17 into coin feeding position in which it is latched or held by a latch member 82 working through a slot in the tube 65 and engageable with an annular slot 83 in the plunger 64. The latch member 82 is pivoted intermediate its ends on a pivot pin 84 and at its opposite end is pivotally connected by a pin 85 to a plunger release link 86. Referring back to the clutch, just before the cam 73 completes its revolution, the pin 78 comes into contact with the cam surface 80b of the finger 80 which, as shown in Fig. 12, has been moved back against the disk 73a by the spring 81, and as the cam continues to turn, the pin 78 rides up on this surface 80b until it is free to drop or move back into the pocket or notch 80a and again be held free of the sleeve 74.

The operation of the clutch control lever 79 and the latch 82 are controlled by mechanism associated with the counter which is adapted to move the lever 79 to a position releasing the pin 78 so that pawl 75 engages with sleeve 74 at the start of the count to bring the feed wheel 19 to coin feeding position and to move the latch 82 to a release position at the end of the count of a predetermined number of coins, so that the feed wheel 19 may be swung upwardly out of coin feeding position. The predetermined count mechanism that we have chosen to illustrate in connection with the present invention is substantially identical with that shown in the Buchholz et al. Patent No. 2,378,828, and Fig. 3 of the present application shows the parts of this mechanism in the same position as Fig. 10 of that patent and in what has been described therein as the pre-set position while Fig. 4 shows part of the structure shown in Fig. 3 of said patent. It is believed that this showing is sufficient for the understanding of the present invention and avoids a duplication of Figs. 9 and 11 of said patent.

As in the aforementioned patent, the number of coins to be counted is determined by the setting of a lever 85 of known form having a part adapted to engage a pin 86 on a counter operated ratchet wheel 87, said pin extending through an arcuate slot 88 in a base plate 89. As in the patent, the ratchet wheel 87 is turned in one direction by a spring 90 and in the opposite direc-

tion by a cam or tooth member 91 on the inner end of the shaft 17 that carries the coin operated star wheel 18. The wheel is prevented from being turned backwardly by the spring 99 by a holding pawl 92 pivoted at 93. The tooth spacing of the wheel 87 is such that for five coins fed through the discharge passage on each revolution of the star wheel, the ratchet wheel 87 is advanced one tooth. For a continuous count, the lever 85 is moved so that the spring 90 may turn the wheel 87 to a position in which its toothed section is out of mesh with the cam member 91. For predetermined counts the lever 85 acts on the pin 86 to set the wheel 87 to a predetermined position, and as shown in Fig. 3, the wheel, set for the counting of ten coins, has been moved to a pre-set position as the seventh and eighth coins are counted as described in said patent. Thereafter, the cam 91 is turned clockwise as viewed in Fig. 3 as the ninth and tenth coins are fed past it. While the tenth coin is passing the star wheel, the cam 91 moves to operate a three arm lever 94 pivotally mounted at the outer end of a lever 95 corresponding to lever 59 of the patent, said cam acting on a pin 96 on one arm of the lever to swing the lever 95 clockwise, thereby causing a pin 97 on the second arm of said lever working in a slot in the pawl 92 to release said holding pawl and also causing a pin 98 on the third arm of the lever to push toward the right against the plunger release link 86 which, as previously noted, is pivotally connected by a pin 85 to the latch 82, moving said link, so as to swing said latch to a release position so that the plunger means previously described is free to return to its initial position shown in Fig. 6 under the action of the belt tensioner spring 62 and the wheel 17 is moved to inoperative or non-feeding position.

For starting the operation of the counting mechanism, a re-set member 99 similar to the member 99 of the patent is pivoted on a pin 100 mounted on the base plate and has a hand lever extension 102 to which the link 39, previously referred to, is pivotally connected at 103, said member 99 being normally urged to an inoperative position by a spring 104. Member 99, as shown in Fig. 4, has a dog 105 pivotally mounted thereon at 106 which is adapted to engage a pin 107 on a pivoted latch member 108, corresponding to the member 87 of said patent so as to swing said latch member out of holding engagement with the lever 95 so that the spring 109 connected to said lever may swing it and the lever 94 back to their initial position in which the cam 91 is again effective to turn the ratchet wheel 87 and thereafter move the lever 94 as previously described, it being noted that in the pre-set position of the mechanism a pin 110 on the ratchet wheel 87 has engaged the lever 95 and moved it clockwise to a position in which its shoulder 111 may be engaged by the end 112 of the latch 108 at which time the three armed lever 94 as shown in Fig. 3 is in a position for actuation by the cam 91. In addition to acting as a re-set member for the predetermined count mechanism, said member 99 also has a member 113 pivotally connected thereto by a pin 114 and provided with a finger or projection 115 which is normally held in an operative position by a spring 116 connecting a part of said member 113 with the member 99, which member 113 by engaging the lever 79 as the member 99 is operated to start the count moves the finger portion 80 of said lever out of engagement with the pin 78 so that the clutch pawl 75

is moved by a spring 77 to an operative position relative to the clutch sleeve 74 so that the cam 73 is then clutched to the shaft 26 so that through the operation of the plungers 63 and 64 by the cam 73 the support 50 will be tilted to bring the feed wheel 19 into operative feeding association with the coins and move them past the star wheel. As soon as the lever portion 102 of the member 99 is released, a spring 117 associated with the part 99 swings this lever and the associated member 113 back to its initial position so that the spring 81 may move the lever 79 back against the face of the disk 73a of the cam, and in that position the clutch is re-set to a release position as previously described. The feed wheel continues to operate until through the operation of the predetermined count mechanism the member 86 and the latch 82 are operated to release the plunger 64 and permit the spring 62 to restore the wheel and its associated mechanism to an inoperative position.

To briefly sum up the operation of the machine, with the motor 40 running so that the disk 21 is revolving and the feed wheel 19 is also rotating in the position shown in Fig. 6, no coins can pass the star wheel 18. If now either the handle 102 is swung toward the left as viewed in Fig. 3 or the coin receiving tube 31 is tilted toward the left as viewed in Fig. 7 so as to move plunger 34 to swing the lever 36 so as to shift link 39 to the left, the re-set member 99 is moved to re-set the predetermined count means, and the member 113 moves the clutch release lever 79 to a position to release the one way clutch including the pawl 75 so that the cam 73 is then operated from the drive shaft 26 to move the plungers 63 and 64 from the position shown in Fig. 6 to the position shown in Fig. 5, the release of the lever permitting the restoring of the clutch to a release position after one revolution as previously described. The parts are now in position for the feed wheel 19 to feed the coins past the star wheel 18, which it proceeds to do until said star wheel has turned the cam member 91 through two or more revoutions to advance the ratchet wheel 87 two or more teeth depending upon the setting of the lever 85 at which time the pin 110 acts on the lever 95 swinging it down so that the cam 91 acting through lever 94 or link 86 may release the latch 82 so as to release the pressure of the plunger means on the support 50 to permit the wheel 19 to move to inoperative position shown in Fig. 6.

It will be noted from the foregoing that we have provided means driven by the machine for moving the feed wheel to operative position, which means includes a cam driven by a shaft 26 and connectible thereto by a one revolution clutch which is controlled by the count starting control or re-set member 99. The cam 73 in its one revolution moves the lever 68 operating on a shiftable link means comprising the plungers 63 and 64 and the spring 66 to tilt the tiltable support 50 to a position in which the feed wheel 19 is in coin feeding position and that the predetermined count mechanism including the release link 86 controlled by the coin operated cam 91 acts through the latch 82 to control the movement of the support 50 to a position in which the feed wheel is inoperative. Also in case the feed wheel face 19a should wear, the shaft 44 through adjustment of the jaws 49 may be shifted relative to the support 50 to compensate for this wear. Finally, in operations where the predetermined number of coins are fed into tubular containers,

it is not necessary for the operator to use one of his hands to operate the lever 102 to start the counting operation, but this may be effected by tilting the coin tube 31 by the same hand that is holding the container to be filled at the lower end of said tube.

We desire it to be understood that this invention is not to be limited to any particular form or arrangement of parts except in so far as such limitations are included in the appended claims.

What we claim as our invention is:

1. In a coin counting machine having a counting device, a motor, a feed wheel continuously rotated by said motor for feeding coins past said counting device to actuate the same, a movable mounting for said feed wheel to permit positioning said wheel in coin feeding position and in an operative position, predetermined count mechanism, a starting control for said predetermined count mechanism, a drive shaft continuously rotated by said motor, and mechanism controlling the movement of said mounting comprising cam means driven by said shaft and operatively connected to said mounting for moving said mounting to position said feed wheel in coin feeding position, means for holding said mounting in its feed wheel coin feeding position, means acting automatically when a predetermined number of coins have been fed past said counting device to release said holding means, and means for moving said mounting to position said wheel in an inoperative position on the release of said holding means, that improvement which comprises a one revolution clutch for connecting said cam means to said drive shaft, and an operating connection between said starting control and said clutch for setting said clutch in an operative position.

2. The structure defined in claim 1 in which the one revolution clutch includes a shiftable pawl carried by the cam, a toothed wheel secured to said drive shaft and engageable with said pawl, and a control member for said pawl.

3. The structure defined in claim 1 in which the one revolution clutch includes a swinging pawl carried by the cam, a spring for urging the pawl to a clutched position, a toothed wheel secured to said drive shaft and engageable with said pawl, and a control member for holding the pawl in a released position and for moving said pawl from its clutched position to a released position.

4. In a coin counting machine having a counting device, a continuously rotated feed wheel for feeding coins past the counting device to actuate the same, said feed wheel being tiltably mounted for movement to an operative and inoperative position, the combination of a cam operated lever, a plunger means operable by said lever and operatively connected with said feed wheel for moving the same to coin feeding position, and spring means engageable with said lever in its inoperative position forming a yieldable stop and shock-absorber for said lever.

No references cited.