

July 18, 1950

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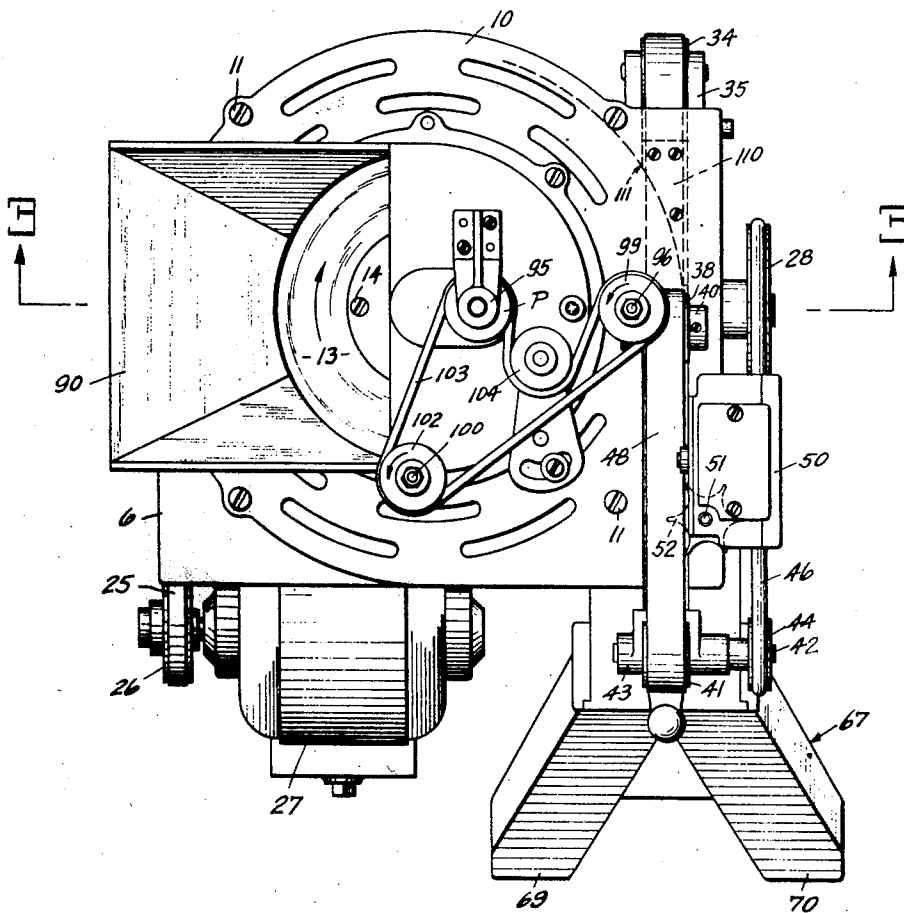
2,515,965

CROWN CAP COUNTING MACHINE

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4 Sheets-Sheet 1

Fig. 1



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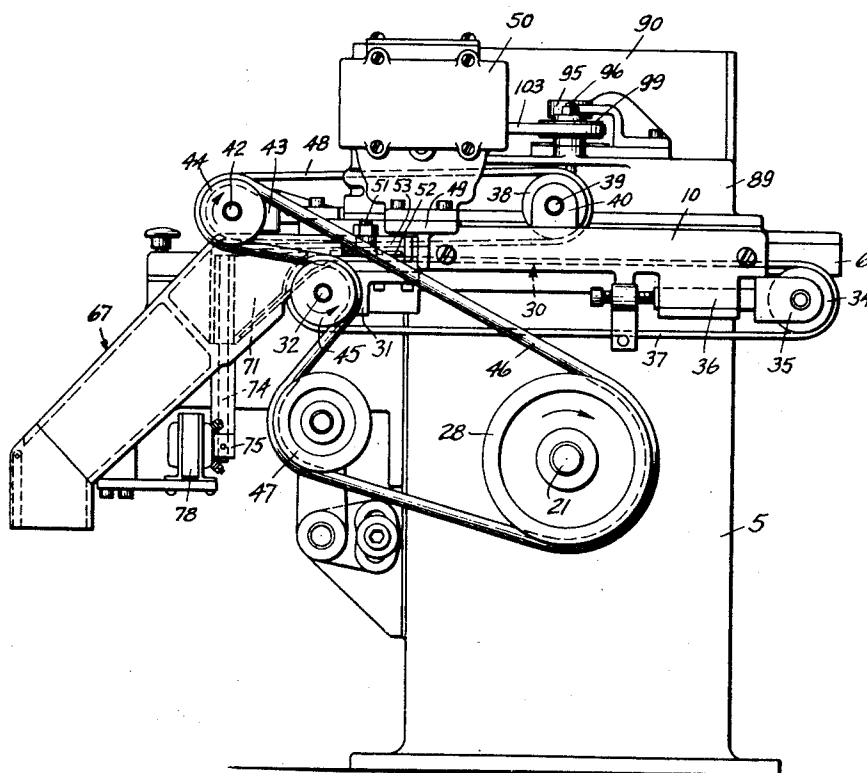
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CROWN CAP COUNTING MACHINE

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4 Sheets-Sheet 2

FIG. 2.



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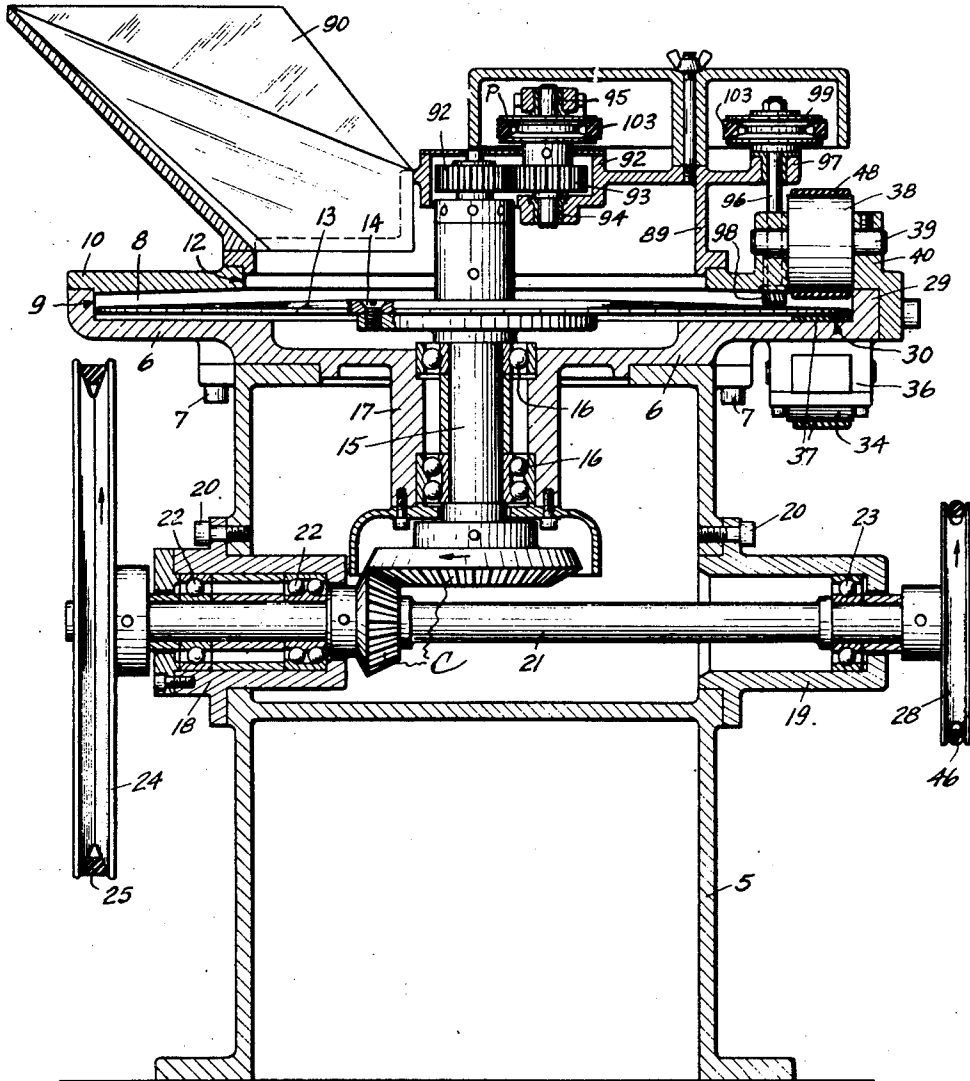
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CROWN CAP COUNTING MACHINE

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FIG. 3



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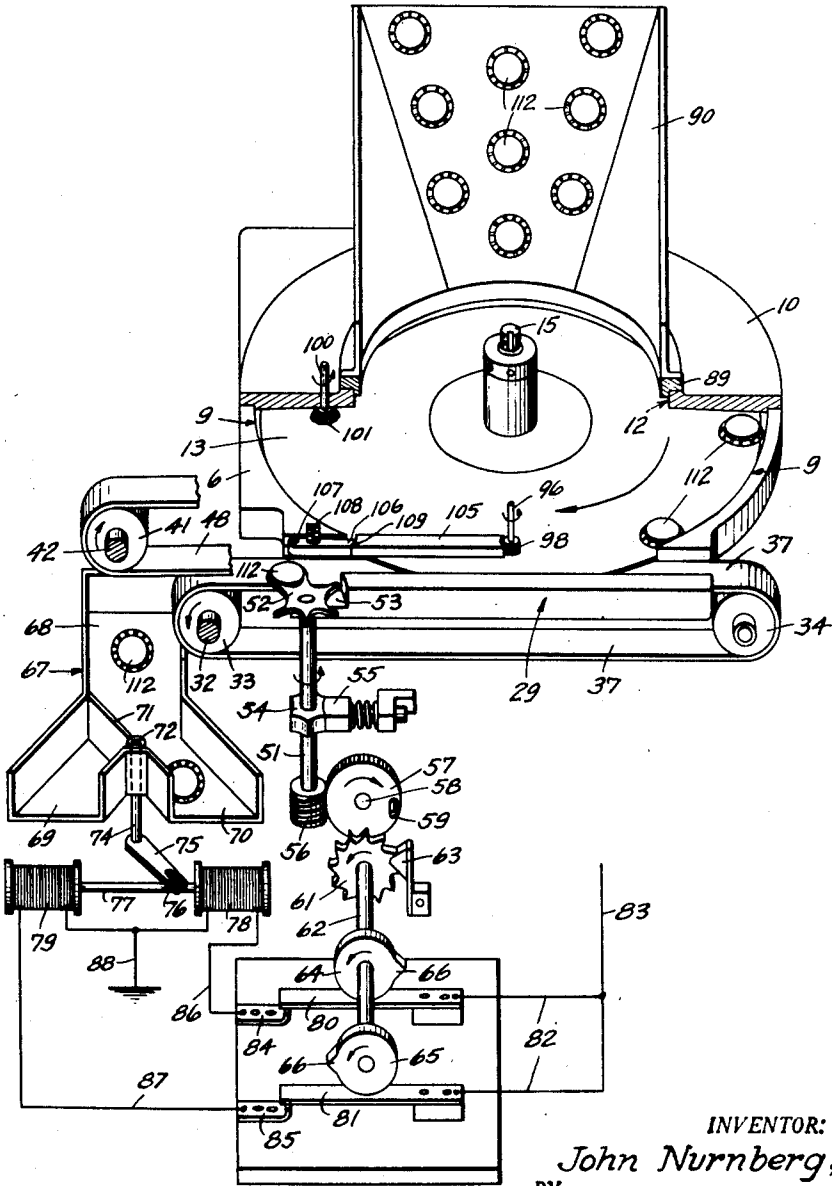
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CROWN CAP COUNTING MACHINE

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4 Sheets-Sheet 4

FIG. 4.



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2,515,965

CROWN CAP COUNTING MACHINE

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Application December 4, 1945, Serial No. 632,749

15 Claims. (Cl. 198—68)

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The invention relates generally to counting mechanism and primarily seeks to provide a novel machine for rapidly and accurately counting crown caps or comparable articles.

It is well known that the crown caps commonly employed in closing bottles and cans are somewhat difficult to handle because of the cupped shape and the crimped skirts thereof and the resulting tendency of the caps to nest and jam in handling machine structures. These caps are distributed in lots of predetermined numbers of caps and considerable difficulty has been experienced in providing means for counting and distributing the caps rapidly and without jamming.

Therefore, it is an object of the present invention to provide a novel crown cap counting machine structure including a hopper into which the crown caps can be deposited indiscriminately, novel counting devices, novel means for feeding the caps to the counting devices without nesting or jamming, and novel lot distributing means for alternately delivering lots of a predetermined number of caps to two receptacles.

Another object of the invention is to provide a novel machine of the character stated in which the counting devices include an actuating star wheel, opposed belt flights for gripping the caps individually between them and feeding said caps in contact with and past the star wheel, and means for presenting the caps individually between the belt flights.

Another object of the invention is to provide a novel machine of the character stated in which the means for presenting the caps individually between the belt flights comprises a rapidly rotating disk having an edge portion projecting between the belt flights, housing means including guiding wall portions effective to direct the caps into the space between the belt flights and against which the caps are thrown by centrifugal force, confining wall portions preventing nesting of the caps, and rotating agitator means for preventing jamming of caps.

Another object of the invention is to provide a novel machine of the character stated in which the cap counting and lot distributing means comprises the star wheel moved step-by-step by the caps fed individually into contact therewith by the belts, a chute structure having a portion in which to receive the caps from the belts after they pass the star wheel and two distributor portions disposed to distribute the caps into individual receptacles and also a gate shiftable to alternately direct lots of caps into said distributor portions, electrically operated gate shifting means

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and mechanical control devices therefor operated by movement of the star wheel to shift the gate each time a lot consisting of a predetermined number of caps has passed the star wheel.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims, and the several views illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a plan view illustrating a machine structure embodying the invention.

Figure 2 is a right side elevation of the machine illustrated in Figure 1.

Figure 3 is a vertical cross section taken on the line 3—3 on Figure 1.

Figure 4 is a somewhat diagrammatical vertical cross sectional perspective view illustrating the crown cap counting and distributing devices.

In the example of embodiment of the invention herein disclosed, there is included a framing and housing structure including a base 5 and a housing body 6 secured thereon as at 7. The body is constructed to provide a shallow chamber 8 defined by a circular wall 9 and having its peripheral portion closed by a cover plate or ring 10 which is secured upon the body 6 as at 11. See Figures 1 and 3. It will be noted that the plate 10 has a central opening 12.

A disk 13 is rotatable in the chamber 8 with its peripheral edge closely approximating the wall 9 in the manner clearly illustrated in Figures 3 and 4. The disk is secured as at 14 upon an upright shaft 15 which is rotatably mounted in bearings 16 in a bearing sleeve 17 depending from the bottom of the housing body 6. See Figure 3.

The base 5 has bearing sleeves 18 and 19 secured thereon in horizontal axially aligned position as at 20. See Figure 3. A driver shaft 21 is rotatably mounted in the bearing sleeves 18 and 19 in anti-friction bearings 22 and 23 respectively, and a pulley 24 is secured on one end of said shaft. Rotation is imparted to the pulley 24 by a belt 25 which passes thereabout and about a driver pulley 26 mounted on the shaft of the motor 27 which is supported on the base. See Figure 1. The shaft 21 is connected in driving relation with the upright shaft 15 through a bevel gear couple C as shown in Figure 3 and also has a driver pulley 28 secured on the other end thereof, as illustrated in Figure 3, and the purpose of this driver pulley will become apparent as this description progresses.

It will be apparent by reference to Figures 1

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and 4 of the drawings that the housing body 6 includes a straight portion 29 at one side thereof, and said portion provides a chamber floor extension 30 extending tangentially beneath the peripheral portion of the disk 13. At one end of the floor extension 30 a bracket 31 is secured to the cover ring, and this bracket serves to rotatably support a driver shaft 32 on which is secured a driver pulley 33. At the other end of the floor extension 30 a second or idler pulley 34 is mounted in a bearing bracket 35 which is adjustably supported as at 36. See Figure 2. A belt 37 takes over the pulleys 33 and 34 in the manner clearly illustrated in Figures 2 and 4, and it will be observed that the top flight of said belt moves over the floor extension 30 beneath the peripheral portion of the disk 13. See Figures 3 and 4.

An idler pulley 38 is rotatably supported on a shaft 39 which is fixed in bearings 40 extending upwardly from the cover ring 10 in the manner clearly illustrated in Figures 1, 2 and 3 of the drawings. A driver pulley 41 is secured on a shaft 42 which is rotatably mounted in bearings provided in a bracket 43 secured on the cover ring 10 as shown in Figures 1 and 2, and a driver pulley 44 is secured on the shaft 42. A driver pulley 45 also is secured upon the shaft 32, and rotation is imparted to the driver pulleys 44 and 45 by a belt 46 which passes about said driver pulleys in the manner illustrated in Figure 2, and about the previously mentioned driver pulley 28, an adjustably mounted tightener pulley 47 being provided for taking up slack in said belt.

A belt 48 passes over the pulleys 41 and 38, and it will be observed by reference to Figures 2 and 4 of the drawings that the parts are so cooperatively arranged that the belt 46 extends a distance beyond the underlying cooperating belt 37 and has its lower flight disposed on a slight downward incline toward the left as viewed in Figure 2, or in the cap feeding direction, thereby to provide an entrance between the cooperating lower and upper flights of the belts 48 and 37 respectively which is slightly greater in depth than the thickness of a crown cap, and a discharge portion directly over the pulley 33 which is slightly less in depth than the thickness of a crown cap. It will be apparent by reference to Figures 2 and 3 that the extension of the belt 48 beyond the underlying belt 37 assures the provision of a flexible belt portion directly over the pulley 33.

It will be apparent by reference to Figure 2 of the drawings that the cover ring 10 also is equipped with a support pad 49 whereon a control housing 50 is removably mounted. The housing 50 is designed to enclose the control devices which count the crown caps passing between the lower and upper flights of the belts 48 and 37 respectively and control the distribution of said caps. In the diagrammatic illustration in Figure 4, the control devices enclosed in the housing 50 are shown as extending below the belt 37 for purposes of clarity, but it is to be understood that said devices are mounted in the housing 50 and therefore extend above said belt in the manner clearly indicated in Figure 2.

The cap counting and distribution control devices referred to include a shaft 51 which is uprightly disposed and rotatably supported in bearings provided therefor in the housing 50. The shaft 51 carries a six-point star wheel 52 at its lower end, and it will be apparent by reference to Figures 2 and 4 of the drawings that this star wheel is disposed in the space between the lower

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and upper flights of the belts 48 and 37 respectively and has its peripheral edge or star point portion extended in the path of crown caps fed between said belts in the manner clearly illustrated in Figure 1. In order to permit the star wheel to project between the belt flights in the manner stated, the cover ring 10 is provided with a cutout 53. See Figures 2 and 4.

It will be apparent by reference to Figure 4 that the shaft 51 also has a hexagonal head 54 secured thereon which is engaged by a spring pressed detent block 55 effective to yieldably hold the star wheel in positions to which it is indexed by the passing crown caps, and a worm gear 56 is secured upon said shaft and meshes with a worm wheel 57 in the ratio of 100 to 1. In other words, for each 100 revolutions of the worm gear 56 a single complete revolution will be imparted to the worm wheel 57.

The worm wheel 57 is mounted on a horizontally disposed shaft 58 and carries an actuator pin 59 which is engageable with the twelve teeth provided on the ratchet wheel 61 in a manner for turning said ratchet wheel one step for each complete rotation of the worm wheel 57. The ratchet wheel 61 is secured upon a shaft 62, and a spring detent 63 engages the ratchet wheel in a manner for yieldably securing the same in the positions to which it is successively indexed by contact of the actuator pin 59. The shaft 62 has two control disks 64 and 65 secured thereon. Each of the disks 64 and 65 is equipped with a radially projecting detent 66, and it will be apparent by reference to Figure 4 that the detents 66 are diametrically oppositely disposed.

A crown cap receiving chute structure generally designated 67 is provided and is supported on the frame base 5 in the manner illustrated in Figure 2 in position for having the receiving portion or way 68 thereof receive crown caps fed between the lower and upper belt flights 48 and 37 respectively in the manner clearly illustrated in Figure 4. The chute structure also includes two diverging crown cap distributing channel portions or ways 69 and 70, and between said channel portions or ways is mounted a diverter gate 71 which is shiftable to cause crown caps received in the chute portion or way 68 to pass out of a selected one of the distributor channel portions or ways 69 and 70. In Figure 4, the gate is shown shifted to the left so as to cause the crown caps to pass through the chute portion 70, and it will be obvious that when the gate is shifted to the right the crown caps will be caused to pass through the chute portion 69.

The diverter gate 71 is pivotally mounted as at 72. It will also be apparent by reference to Figure 4 that the shaft to which the diverter gate is secured includes an extension 74 equipped with an actuator crank 75. The crank 75 is slot and pin connected as at 76 with an actuator rod 77 extending between and connected with the cores of two solenoids 78 and 79. It will be obvious that by alternately energizing the solenoids, the gate 71 can be shifted to alternately distribute crown caps through the chute portions 69 and 70. The solenoids may be mounted on a bracket extending from the chute structure in the manner clearly illustrated in Figure 2.

A resilient contact bar 80 is disposed opposite the control disk 64, and a similar contact bar 81 is disposed opposite the control disk 65. Each of the contact bars 80 and 81 is fixedly mounted at one end and is free at its other end, and the fixed ends of said bars are electrically connected

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as at 82 with a power source 83. At their free ends, the contact bars 80 and 81 overlie contacts 84 and 85 respectively, and said contacts are connected as at 86 and 87 respectively with the solenoids 78 and 79. The solenoids are grounded as at 88. It will be apparent from the foregoing that each time one of the control disk detents 66 engages and depresses a contact bar 80 or 81, one of the contacts 84 or 85 will be engaged to complete an electrical circuit through one of the solenoids 78 or 79, and this energizing of a solenoid and the resultant shifting of the distributor gate 71 takes place once in each half revolution of the ratchet wheel 60.

It will be apparent by reference to Figures 1, 2 and 3 of the drawings that a cover ring 89 is mounted on the cover ring 10. It will also be noted that a hopper 90 is secured on the ring 89 in position for delivering crown caps through the center opening 12 in the cover plate or ring 10 and onto the disk 13.

The cover ring 89 is provided with a gear housing 91, and a gear 92 secured upon the upper end of the shaft 15 extends into said housing and meshes with a gear 93 which is secured upon a shaft within said housing. The shaft is rotatably mounted in a bearing 94 provided in the housing 91, and in a bearing 95 secured on said housing in the manner clearly illustrated in Figures 1 and 3.

An agitator shaft 96 is rotatably supported in an upper bearing 97 provided in the cover ring 89 and in a lower bearing provided therefor in the ring 10, and at its lower end said shaft carries a knurled agitator head 98. It will be apparent by reference to Figures 3 and 4 that the knurled head 98 is disposed in close proximity above the disk 13 and is spaced from the adjacent wall portion of the straight part 29 of the body 6 a distance slightly greater than the diameter of the crown caps. A driver pulley 99 is secured upon the upper end of the shaft 96.

A second agitator shaft 100 is provided and equipped at its lower end with a frusto-coniform knurled agitator 101 which is disposed in close proximity above the disk 13 and is spaced from the adjacent wall 9 of the housing body 6 a distance slightly greater than the diameter of a crown cap as indicated in Figure 4. A driver pulley 102 is secured to the upper end of the shaft 100, and this pulley and the previously mentioned pulley 99 are driven by a belt 103 which passes thereabout and about a driver pulley P secured upon the upper end of the shaft carrying the driven gear 93. See Figures 1, 2 and 3. The belt 103 also passes an adjustably mounted tightener pulley 104.

By reference to Figure 4, it will be observed that a guide wall 105 is provided and extends over the peripheral portion of the disk 13 in parallel spaced relation to the belt 37 which extends beneath the disk. This guide wall cooperates with the straight wall portion 29 of the housing body in providing a guideway through which the crown caps are fed between the lower and upper belt flights 48 and 37 respectively, and it will be observed that the knurled agitator head 98 is disposed at the receiving end of said wall 105. The wall 105 includes a yieldable wall portion 106 disposed opposite the star wheel 52. The yieldable wall portion 106 is pivoted as at 107 and is spring pressed as at 108 against a limiting stop 109.

It will be apparent by reference to Figure 1 of the drawings that the guide piece 110 which

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is secured to depend from the cover ring 10 in position for overlying the top flight of the lower belt 37 forms a continuation of the housing wall 9 so as to smoothly guide the crown caps into the space between the lower and upper flights of the belts 48 and 37 and prevent abrupt jumping of the crown caps from the shoulder 111 of the chamber wall 109 directly over against the straight wall of the straight portion 29 at the opposite or outer side of the belt 37. It will also be apparent by reference to Figures 3 and 4 of the drawings that the space between the under-surface of the cover ring 10 and the top surface of the rapidly rotating disk 13 is only slightly greater than the depth of the crown caps 112, and thus it is impossible for the crown caps deposited through the hopper 90 into the center opening 12 of the cover ring 10 and onto the disk 13 to pass into the space between said disk and cover ring in nested condition.

In the operation of the machine, the crown caps 112 are deposited indiscriminately into the hopper 90 and through the cover ring opening 12 onto the top surface of the rapidly rotating disk 13. The caps are thrown by centrifugal force into the space between the upper surface of the peripheral portion of the disk 13 and the under-surface of the cover ring 10, and guided by the chamber wall 9 and the extension piece 110, said caps are directed one by one into the space between the lower flight of the belt 48 and the upper flight of the belt 37. Jamming of the caps is prevented by the rotating agitator 98 which rotates in the manner indicated in Figure 4 and tends to move any crown cap tending to jam in the entrance between the guide wall 105 and the straight wall at the opposite side of the belts away from said entrance. The rotating agitator head 101 serves a similar purpose in preventing jamming of crown caps in the position in which it is located.

As each crown cap passes the star wheel 52, it will engage the single finger or tooth which projects inwardly therefrom in the manner illustrated in Figure 1 and will index the star wheel a single step. The detent 55 will yieldably hold the star wheel in position after each indexing movement thereof. After each cap passes the star wheel, it will be fed by the cooperating belt flights into the receiving portion 68 of the chute structure generally designated 67 in the manner clearly illustrated in Figure 4.

Since the star wheel is provided with six fingers or teeth, the shaft 51 on which the star wheel is mounted will be rotated once for the passage of six crown caps. As previously described, the worm gear couple 56, 57 has a 100 to 1 ratio and therefore the worm wheel 57 will make one complete rotation in the passage of six hundred crown caps, and consequently a single indexing movement of the ratchet wheel 61 will be imparted in the passage of six hundred crown caps. The ratchet wheel 61 has twelve teeth, and as previously stated, the control disks 64 and 65 are provided with single detents diametrically oppositely disposed. Obviously, therefore, one or the other of the control disks 64 will be effective to energize one of the solenoids 78 or 79 when the ratchet wheel 61 has made a half turn. Thus each time 3600 crown caps have passed into one of the chute portions 69 or 70, the gate 71 will be shifted so as to deliver the next 3600 crown caps to the other chute distributor portion.

In the foregoing description is disclosed a machine for counting crown caps or comparable

objects, accurately and with great rapidity. In this structure, no stack feed or stacker is necessary, and no complicated timing mechanism need be employed. The articles are accurately counted as they pass the star wheel regardless of whether they are fed in a continuous line or in interrupted processional groups.

While one form of the invention has been shown for purposes of illustration, it is to be clearly understood that various changes in the details of construction and arrangement of parts may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage; means for feeding crown caps between said belt flights and including a rotary disk having a peripheral portion extended between said belt flights; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

2. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage; means for feeding crown caps between said belt flights and including a rotary disk having a peripheral portion extended between said belt flights, a hopper into which crown caps can be deposited indiscriminately, and wall portions spaced with relation to the crown cap engaging face of the disk in a manner for preventing nesting of the crown caps being fed between the belts; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

3. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage; means for feeding crown caps between said belt flights and including a rotary disk having a peripheral portion extended between

said belt flights, a walled guideway for the caps and said belt flights extending tangentially with respect to said disk peripheral portion, and a guide wall portion closely approximating and conforming to the periphery of the disk and extending over the lower belt flight to merge into the outer wall of said walled guideway; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

4. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage; means for feeding crown caps between said belt flights and including a rotary disk having a peripheral portion extended between said belt flights, a walled guideway for the caps and said belt flights extending tangentially with respect to said disk peripheral portion, and a guide wall portion closely approximating and conforming to the periphery of the disk and extending over the lower belt flight to merge into the outer wall of said walled guideway, said guideway being defined in part by a wall overlying a part of the disk and including a yieldable portion disposed opposite the star wheel; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

5. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage; means for feeding crown caps between said belt flights and including a rotary disk having a peripheral portion extended between said belt flights, a walled guideway for the caps and said belt flights extending tangentially with respect to said disk peripheral portion, and a guide wall portion closely approximating and conforming to the periphery of the disk and extending over the lower belt flight to merge into the outer wall of said walled guideway, said guideway being defined in part by a wall overlying a part of the disk and including a yieldable portion disposed opposite the star wheel; an agitator disposed at the end of said last mentioned wall and at the entrance into said guideway and rotating in a direction tending to move cap away from said entrance; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

6. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading

off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage, pulleys supporting said belt flights one said pulley being disposed a limited distance beyond the star wheel in position for delivering crown caps to said receiving conveyor portion and another of said pulleys supporting the cooperating belt flight being disposed a greater distance beyond said star wheel and so placed with relation to the first mentioned pulley and the star wheel as to provide a space between the opposing belt flights at the position of the star wheel which is less than the thickness of the crown caps being counted and distributed; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

7. In a machine of the character described, cap lot distributing means including a receiving conveyor way, two cap lot distributor ways leading off from said receiving conveyor way and diverter means shiftable from one position to another to divert crown caps to one or the other of said distributor ways; cap counting means including a star wheel; opposed travelling belt flights between which said star wheel projects and which are effective to grip crown caps between them and feed them in processional order past said star wheel to said receiving conveyor way and for moving the star wheel upon each cap passage, pulleys supporting said belt flights with the portions thereof between which the crown caps are received spaced a greater distance apart than the portions thereof passing said star wheel and the portions of said belt flights passing the star wheel being more closely spaced than the thickness of the crown caps being counted and distributed; and means operable after each counting off of a predetermined number of movements of the star wheel for shifting the diverter means.

8. In a machine of the character described, opposed travelling belt flights effective to grip crown caps between them and feed them in processional order past a counting station, means for directing caps between said belt flights, a star wheel extending between the belt flights at said station and adapted to be moved step-by-step by crown caps fed individually therepast, a chute structure having a portion in which to receive the caps from the belt flights after they pass said star wheel and two distributor portions disposed to distribute the caps in alternately directed lots and also a diverter gate shiftable to alternately direct lots of caps into said distributor portions, electrically operated gate shifting means and mechanical control devices therefor operated by movement of the star wheel to shift the gate each time a lot consisting of a predetermined number of caps has passed the star wheel, said electrically operated gate shifting means including a pair of solenoids and a contact making and breaking means connected with each thereof; and said mechanical control devices including a rotary shaft having disk means thereon effective upon predetermined movement of the shaft to actuate the contact making and breaking means

for alternately energizing the solenoids, a ratchet wheel on the shaft, an actuator shaft and an actuator pin movable therewith and thereabout in position for engaging and imparting a step movement to the ratchet wheel for each rotation of the actuator shaft, and a worm gear couple between the star wheel and the actuator shaft.

9. In a machine of the character described, a housing body having a chamber defined in part by a circular wall opening at one side into a tangentially disposed feedway, a pair of travelling belt flights disposed in superposed relation in said feedway and spaced apart a distance for receiving and gripping crown caps therebetween and feeding them through the feedway, a disk rotatably mounted in the chamber with its periphery close to the circular wall and extending between the belt flights into said feedway, a cover ring overlying the peripheral portion of said disk and spaced thereabove a distance effective to prevent nesting of crown caps thereunder, a hopper for indiscriminately directing crown caps through said ring onto said disk, and counting means including a star wheel having its periphery extending between said belt flights in position for being moved step-by-step by crown caps fed by said belt flights.

10. Machine structure as defined in claim 9 in which the feedway is defined in part by a wall paralleling the inner edges of the belt flights and terminating opposite the point of greatest projection of the disk between said belt flights to form an entrance into the feedway, and in which there is provided an agitator at the entrance end of said last named wall rotating in a direction tending to move caps away from said entrance.

11. Machine structure as defined in claim 9 in which the feedway is defined in part by a wall paralleling the inner edges of the belt flights and terminating opposite the point of greatest projection of the disk between said belt flights to form an entrance into the feedway, and in which there is provided an agitator at the entrance end of said last named wall rotating in a direction tending to move caps away from said entrance, and said last named wall includes a yieldable portion disposed opposite the star wheel.

12. Machine structure as defined in claim 9 in which the feedway is defined in part by a wall paralleling the inner edges of the belt flights and terminating opposite the point of greatest projection of the disk between said belt flights to form an entrance into the feedway, and in which there is provided an agitator at the entrance end of said last named wall rotating in a direction tending to move caps away from said entrance, and a second rotary agitator disposed closely over the disk and beneath the ring a distance from the circular wall slightly greater than the diameter of a crown cap and a distance beyond said parallel wall in the direction of rotation of the disk.

13. In a machine of the character described, a housing body having a chamber defined in part by a circular wall opening at one side into a tangentially disposed feedway, a pair of travelling belt flights disposed in superposed relation in said feedway and spaced apart a distance for receiving and gripping crown caps therebetween and feeding them through the feedway, a disk rotatably mounted in the chamber with its periphery close to the circular wall and extending between the belt flights into said feedway, a cover ring overlying the peripheral portion of said disk and spaced thereabove a distance effective to

prevent nesting of crown caps thereunder, a hopper for indiscriminately directing crown caps through said ring onto said disk, and counting means including a star wheel having its periphery extending between said belt flights in position for being moved step-by-step by crown caps fed by said belt flights, a chute structure having a portion in which to receive the caps from the belt flights after they pass said star wheel and two distributor portions disposed to distribute the caps in alternately directed lots and also a diverter gate shiftable to alternately direct lots of caps into said distributor portions, electrically operated gate shifting means and mechanical control devices therefor operated by movement of the star wheel to shift the gate each time a lot consisting of a predetermined number of caps has passed the star wheel.

14. Machine structure as defined in claim 13 in which the electrically operated gate shifting means includes a pair of solenoids and a contact making and breaking means connected with each thereof; and the mechanical control devices include a rotary shift having disk means thereon effective upon predetermined movement of the shaft to actuate the contact making and breaking means for alternately energizing the solenoids, a ratchet wheel on the shaft, an actuator shaft and an actuator pin movable therewith and thereabout in position for engaging and imparting a step movement to the ratchet wheel for each rotation of the actuator shaft, and a worm gear couple between the star wheel and the actuator shaft.

15. In a machine of the character described, a housing body having a chamber defined in part by a circular wall opening at one side into a tangentially disposed feedway, a pair of travelling belt flights disposed in superposed relation in said

feedway and spaced apart a distance for receiving and gripping crown caps therebetween and feeding them through the feedway, a disk rotatably mounted in the chamber with its periphery close to the circular wall and extending between the belt flights into said feedway, a cover ring overlying the peripheral portion of said disk and spaced thereabove a distance effective to prevent nesting of crown caps thereunder, a hopper for indiscriminately directing crown caps through said ring onto said disk, counting means including a star wheel having its periphery extending between said belt flights in position for being moved step-by-step by crown caps fed by said belt flights, and pulleys supporting said belt flights with the portions thereof between which the crown caps are received spaced a greater distance apart than the portions thereof passing said star wheel, one said pulley being disposed a limited distance beyond and below the star wheel and another of said pulleys supporting the cooperating belt flight being disposed a greater distance beyond said star wheel.

JOHN NURNBERG.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,144,708	Rau	Jan. 24, 1939
2,235,286	Cookson	Mar. 18, 1941
2,287,823	Pearson	June 30, 1942
2,304,982	Wilckens	Dec. 15, 1942

FOREIGN PATENTS

Number	Country	Date
818,058	France	June 7, 1937