Aug. 10, 1943. P. E. PEARSON ET AL 2,326,675

CROWN CAP COUNTING MECHANISM

Filed March 6, 1941 7 Sheets-Sheet 1

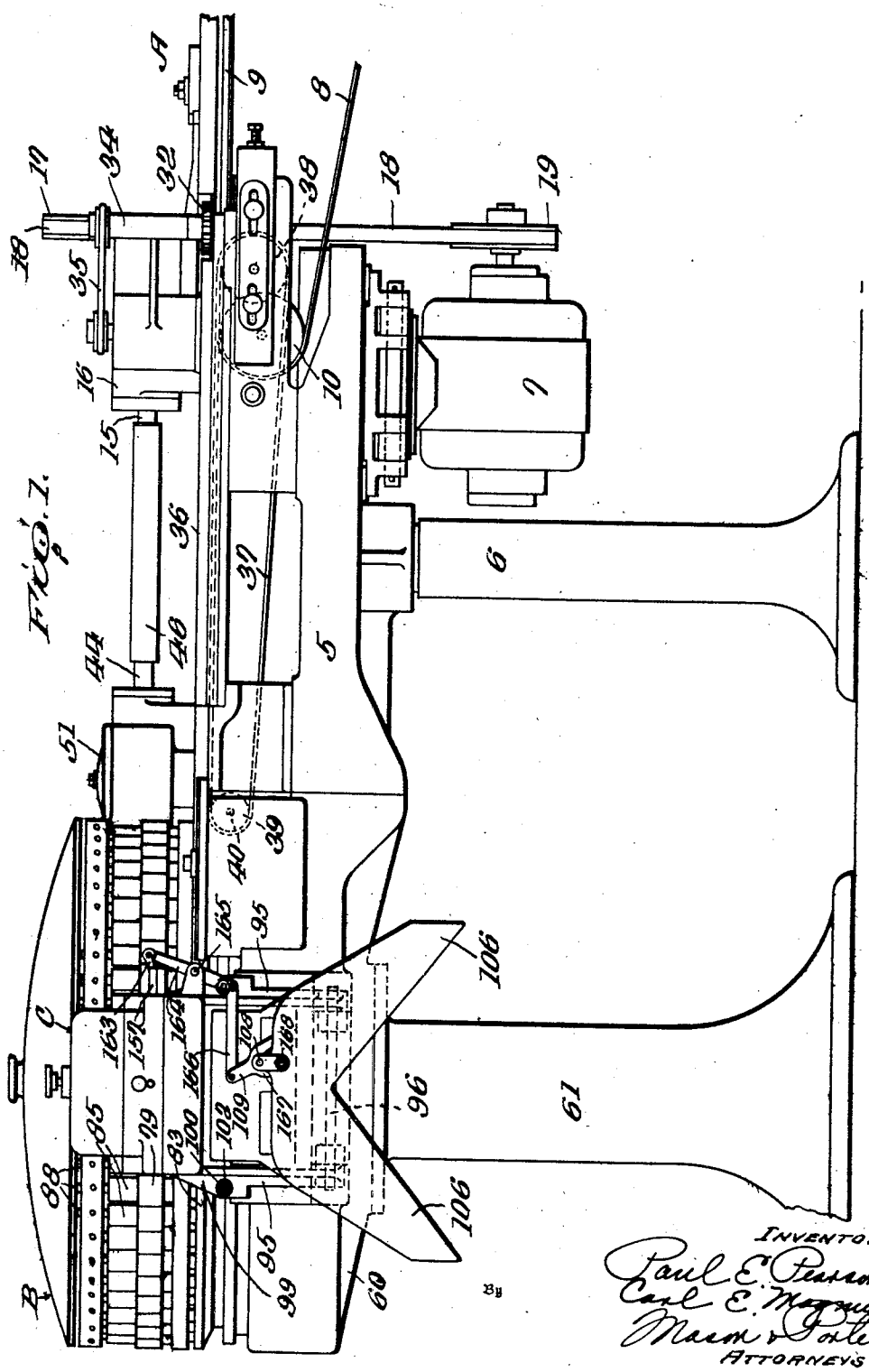


FIG. 1.

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CROWN CAP COUNTING MECHANISM

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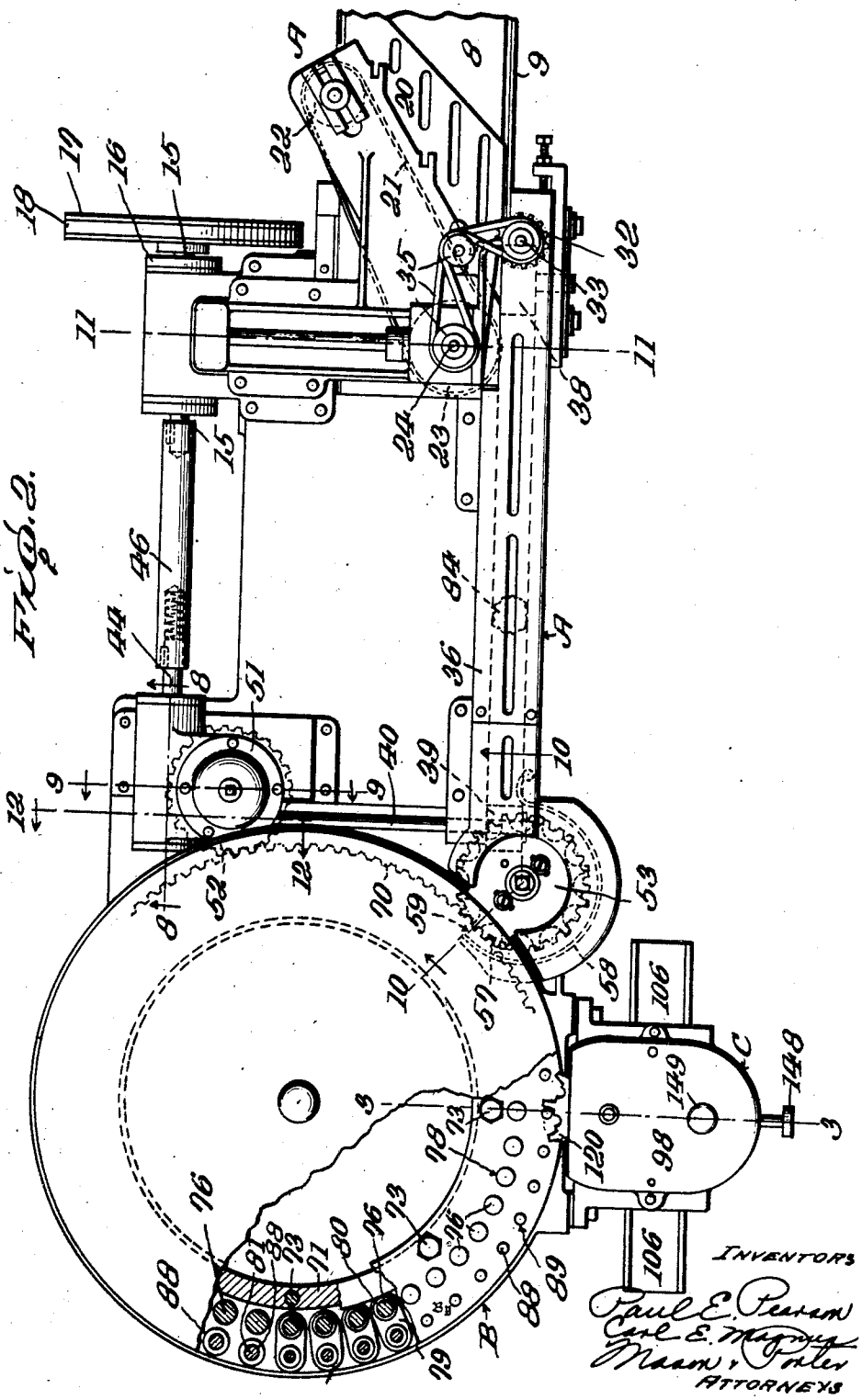


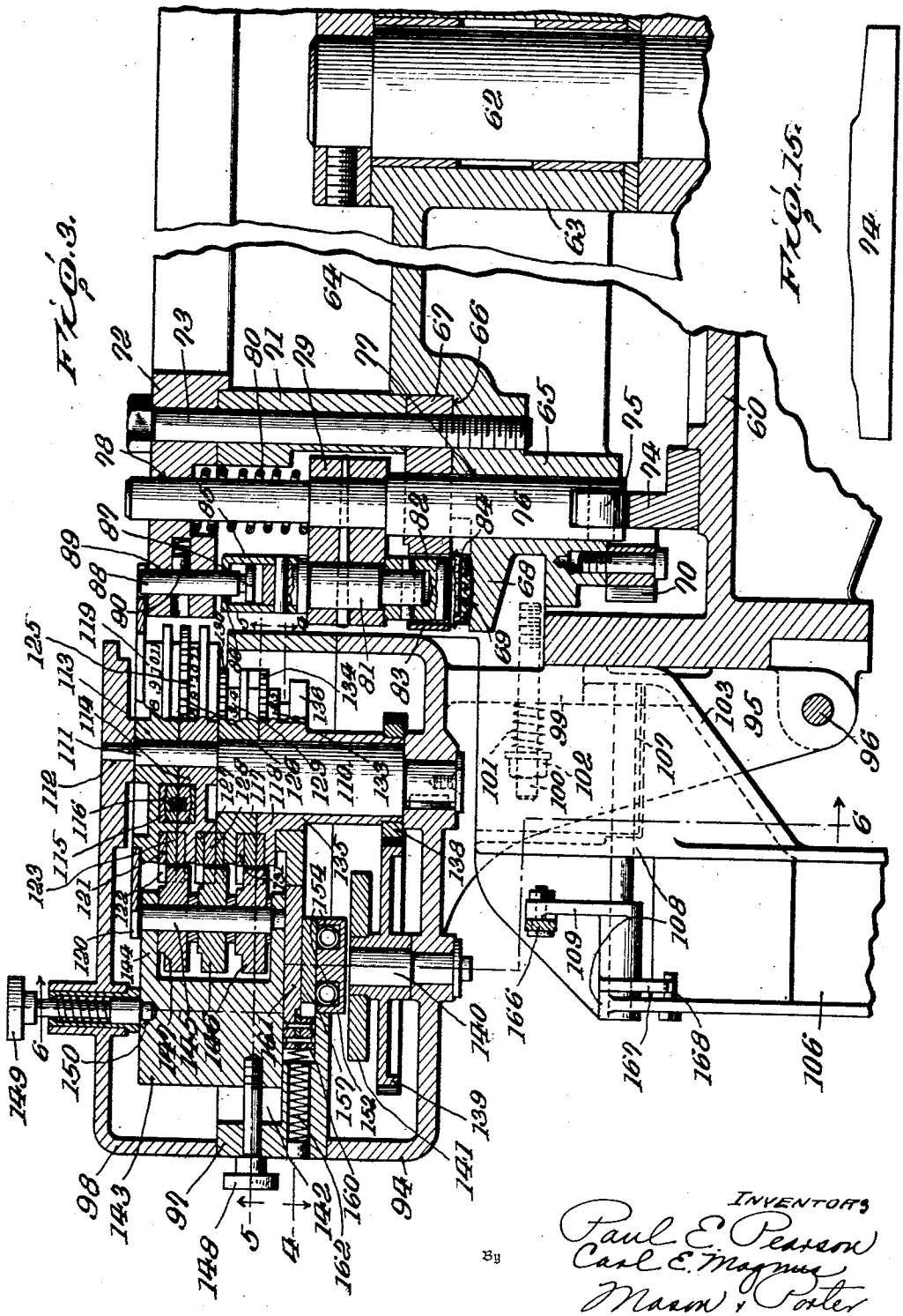
Fig. 2.

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CROWN CAP COUNTING MECHANISM

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CROWN CAP COUNTING MECHANISM

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FIG. 4.

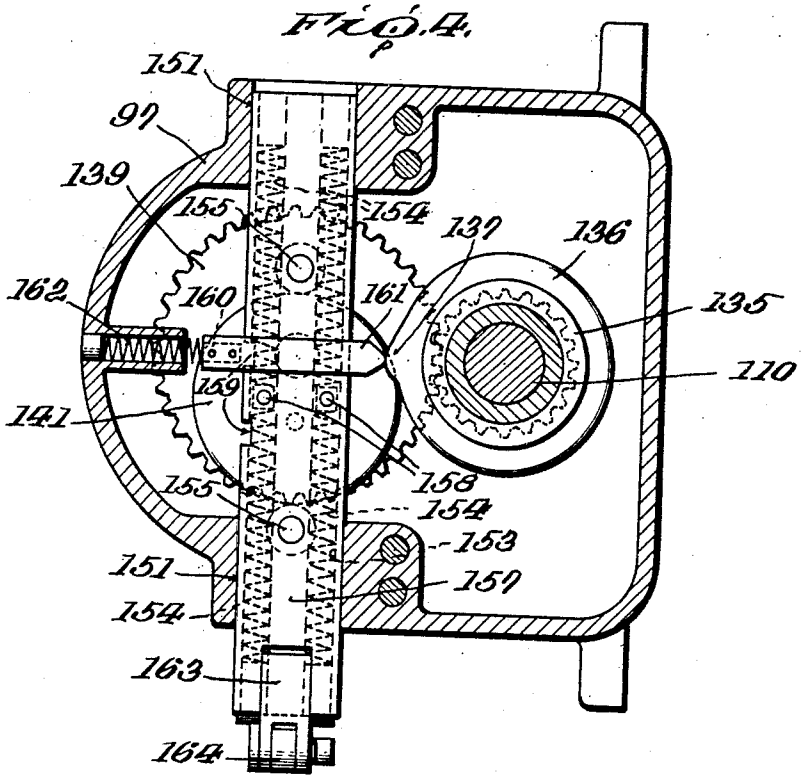
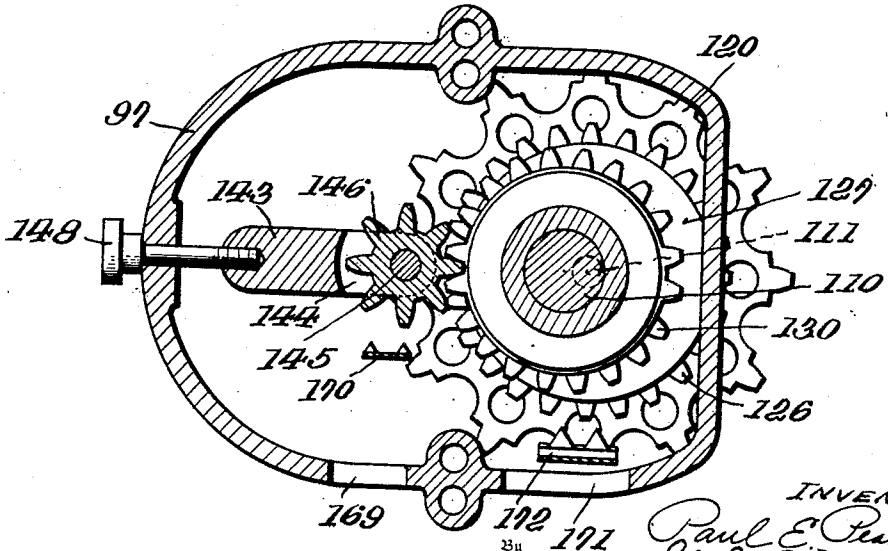


FIG. 5.



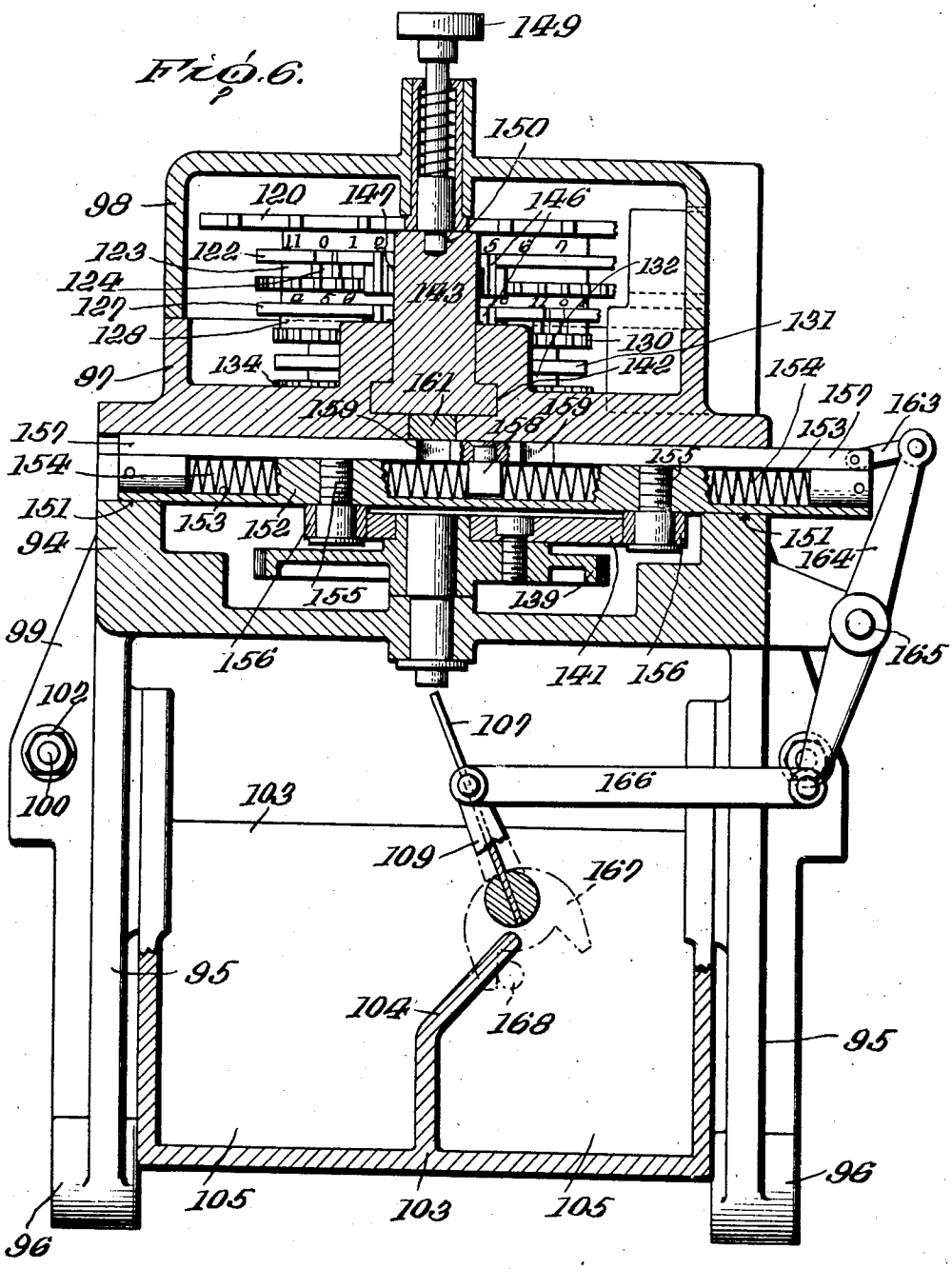
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CROWN CAP COUNTING MECHANISM

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FIG. 6.



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CROWN CAP COUNTING MECHANISM

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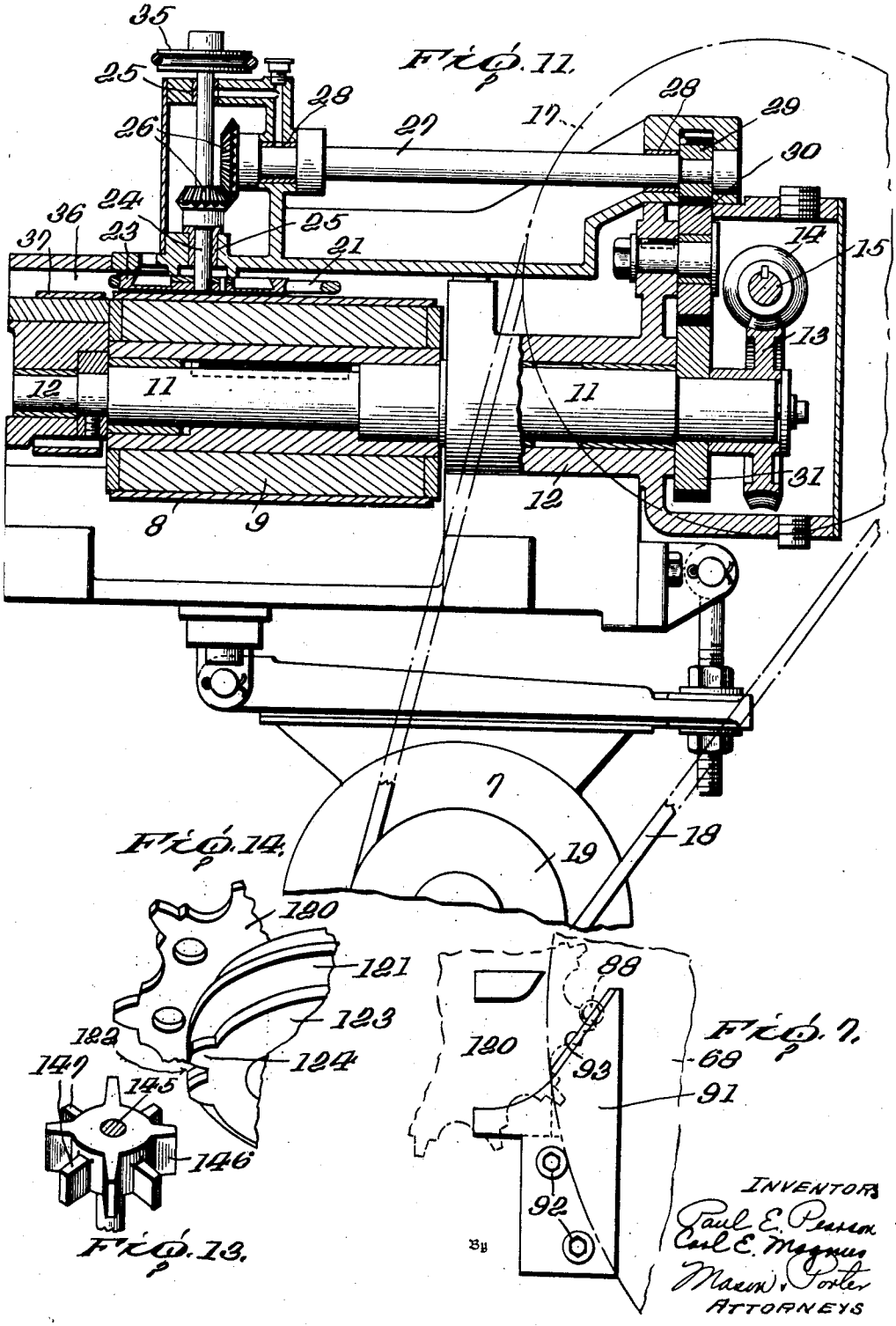


FIG. 11.

FIG. 14.

FIG. 13.

FIG. 7.

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Fig. 8.

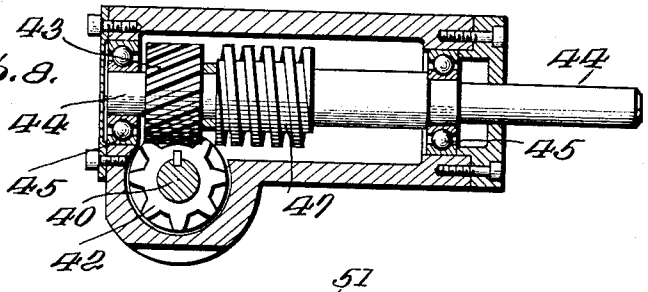


Fig. 9.

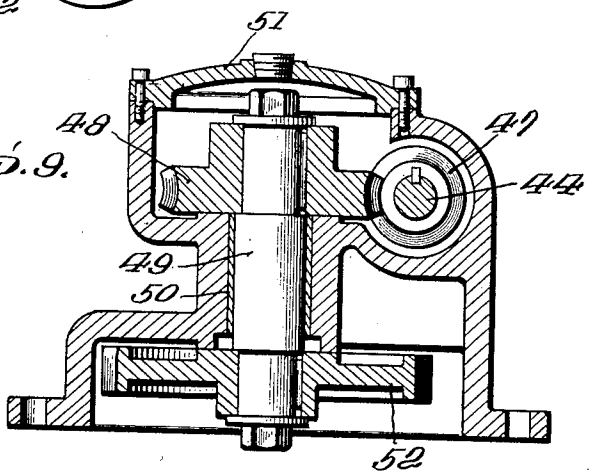


Fig. 10.

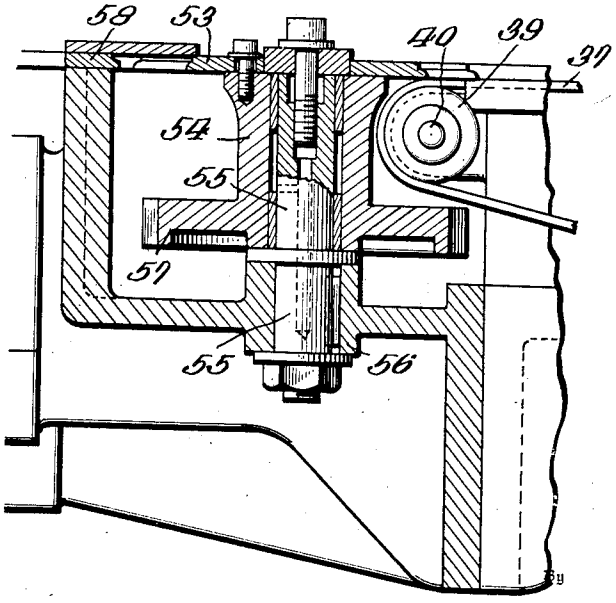
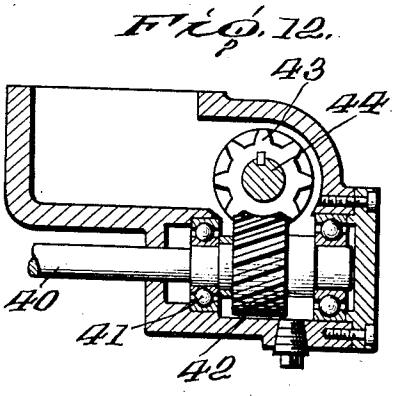


Fig. 12.



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UNITED STATES PATENT OFFICE

2,326,675

CROWN CAP COUNTING MECHANISM

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Application March 6, 1941, Serial No. 382,056

9 Claims. (Cl. 235—98)

The invention relates generally to the art of manufacturing the crown caps commonly employed in closing bottles or similar beverage or foodstuff containers, and it primarily seeks to provide novel means for counting and registering the manufactured caps and delivering them in predetermined lots into the cartons or other packages in which they are marketed.

An object of the invention is to provide a novel crown cap counting mechanism in which the counting devices are actuated by elements the effective position of which is controlled by contact with the crown caps themselves, thereby making it impossible to count and register a cap when no cap is present.

Another object of the invention is to provide a counting mechanism of the character stated in which the crown cap positioned actuating elements include means for yieldably applying pressure to the caps and the customarily provided spotted pad inserts therein, thereby to aid in setting the assembly of said cap components.

Another object of the invention is to provide novel counter actuating and cap pressing means including reciprocable plunger units individually engageable with the caps, each said unit comprising a cap pressing plunger and a counting means actuating element having lost motion connection with the plunger so as to permit necessary projection and retraction thereof by the plunger to and from the counting mechanism actuating position and also the independent movement of the plunger desirable to enable discharging of caps without displacing said element from its effective position.

Another object of the invention is to provide novel means for receiving caps en masse or in groups and delivering them one by one and in suitably spaced relation for being engaged by said plunger units.

Another object of the invention is to provide a counting mechanism of the character stated which will automatically count off a predetermined number of caps while delivering them into one receptacle, and then divert and count off a like number of caps into another receptacle.

Another object of the invention is to provide a counting mechanism of the character stated in which the counting function can be discontinued at will, always with a clear indication of the number of caps that have passed therethrough.

Another object of the invention is to provide a counting mechanism of the character stated in which the counting devices can be set and reset at will, and with great facility.

Another object of the invention is to provide a counting mechanism of the character described which can be readily conditioned for distributing different predetermined lots into the alternately filled receptacles.

Another object of the invention is to provide a novel counting mechanism of the character stated including a pivoted vane for controlling distribution of the caps, and spring loaded, cam controlled means for positioning said vane.

Another object of the invention is to provide a novel pivotal and yieldable mounting for the counting unit, thereby to permit movement of the unit away from the associated actuating devices in case of jamming of parts or an intent to temporarily discontinue the counting function.

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

In the drawings:

Figure 1 is a side elevation illustrating the invention.

Figure 2 is a plan view, parts being broken away and in section.

Figure 3 is an enlarged vertical cross section taken on the line 3—3 on Figure 2.

Figure 4 is a horizontal section taken on the line 4—4 on Figure 3.

Figure 5 is a horizontal section taken on the line 5—5 on Figure 3.

Figure 6 is a vertical cross section taken on the line 6—6 on Figure 3.

Figure 7 is a somewhat diagrammatic horizontal sectional view illustrating the position of the cap stripper member.

Figure 8 is a fragmentary vertical cross section taken on the line 8—8 on Figure 2.

Figure 9 is a fragmentary vertical cross section taken on the line 9—9 on Figure 2.

Figure 10 is a fragmentary vertical cross section taken on the line 10—10 on Figure 2.

Figure 11 is a fragmentary vertical cross section taken on the line 11—11 on Figure 2.

Figure 12 is a fragmentary vertical cross section taken on the line 12—12 on Figure 2.

Figure 13 is a detail perspective view of one of the mutilated pinions of the counting mechanism.

Figure 14 is a fragmentary perspective view illustrating a mutilated gear driving portion of the units dial of the counting mechanism.

Figure 15 is a development of the lifter cam.

In the apparatus herein disclosed as an example of embodiment of the invention, there is included a cap feeding means generally designated A, and upon which the crown caps are fed from the assembling or spotting machine to the counting mechanism, a cap pressing and counter mechanism actuating unit generally designated B, and a counting mechanism or unit proper designated C. See Figures 1 and 2.

The feeding means A includes a bed frame 5 supported upon a standard 6 and from which is suspended an electric motor 7. The crown caps enter the apparatus en masse or in transverse rows on their way from the assembling or spotting machine to the counting mechanism on a wide belt 8, the delivery end of which passes over a support trough 9 and over a pulley 10. The pulley 10 is mounted on a cross shaft 11 which is rotatable in frame bearings 12 and carries a worm wheel 13 to which rotation is imparted by a worm gear 14 mounted on a driver shaft 15 rotatable in frame bearings 16. The shaft 15 also carries a large pulley 17 which is driven by a belt 18 from the motor drive pulley 19. See Figures 1, 2 and 11.

The belt 8 feeds the caps, hollow side uppermost, under a single layer confining shelf 20 and against an aligned belt 21 disposed diagonally across the belt 8 and which turns about a tensioning idler pulley 22 at the receiving side of the belt 8 and over a driver pulley 23 at the delivery side of said belt. The driver pulley 23 rotates in close proximity to the belt 8 and is carried at the lower end of a vertical shaft 24 rotatable in bearings 25 and driven through a bevel gear couple 26 by a driver shaft 27. See Figures 1, 2 and 11. The shaft 27 is rotatable in bearings 28 and is equipped with a pinion 29 to which rotation is imparted through an idler gear 30 from a driver gear 31 mounted on the cross shaft 11.

A knurled rotor 32 is opposed to the delivery end of the aligner belt 21, being spaced therefrom a distance just in excess of the diameter of the crown caps so as to cause the caps to pass in single file between said rotor and belt without jamming. The rotor 32 is mounted at the lower end of a shaft 33 rotatable in the vertically disposed frame bearing 34 and driven by pulley and belt connections 35 with the vertical extension of the shaft 24. See Figures 1, 2 and 11.

Crown caps passing single file between the delivery end of the aligner belt 21 and the jam preventing rotor 32 pass into the single file guideway 36 and onto an endless conveyor 37 which passes over a tightener idler pulley 38 at its receiving end, and over a driver pulley 39 at its delivery end. The driver pulley 39 is affixed to one end of a driver shaft 40 rotatable in frame bearings 41 and having a worm gear 42 mounted thereon to which rotation is imparted by a worm gear 43 fixed upon a shaft 44. The shaft 44 is rotatable in frame bearings 45 and is releasably drive coupled, as at 46, with the shaft 15 hereinbefore referred to. See Figures 2, 8 and 12.

The shaft 44 also carries a worm gear 47 which meshes with and imparts rotation to a worm wheel 48 mounted on a shaft 49 rotatable about a vertical axis in a bearing 50 in the casing unit 51 and which carries a spur gear 52 at its lower end and which serves to drive the turret or motor of the unit B in a manner later to be described. See Figures 2 and 9.

At its delivery end, the conveyor belt 37 delivers the crown caps one by one into the peripheral pockets of a distributer disk 53 which is adjustably affixed to the upper end of a sleeve 54 rotatable about a stud shaft 55 fixed vertically in a frame bearing 56. The sleeve 54 carries a spur gear 57 to which rotation is imparted by the turret or rotor gear to which, in turn, rotation is imparted by the gear 52 previously referred to. See Figures 2 and 10. While traveling about in the pockets of the distributer disk 53, the crown caps are retained by a surrounding wall 58 which extends to the discharge point 59 at which the crown caps are delivered one by one to the cap pressing, counter mechanism actuated unit B.

The unit B includes a bed frame 60 supported on a frame standard or pedestal 61 and which supports a fixed center shaft 62 about which rotates the hub 63 of the unit turret or rotor 64. The turret includes a skirt portion 65 provided with a step 66 on which is supported a ring 67. The ring 67 extends over and is vertically spaced from the annular table or shelf extension 68 of the skirt portion, the latter preferably being equipped with equidistantly spaced depressions or seats 69 to receive the crown caps one by one from the cap feeding means A at the discharge point 59. See Figures 1, 2 and 3.

Affixed to the skirt portion 65 is a ring gear 70 which meshes with the driver and driven spur gears 52 and 57 hereinbefore referred to. See Figures 2 and 3.

A skirt ring 71 extends upwardly from the inner part of the ring 67, and another ring 72 overlies the ring 71 and extends over and in parallel relation above the ring 67. The ring 72, the skirt ring 71, the ring 67 and the skirt portion 65 are secured in rigid assembled relation by screw bolts 73.

A cam track 74 is secured to and projects upwardly from the bed frame 60 and extends in concentric relation with the axis of the turret 64 over that portion of the bed frame at which the crown cap discharging and receiving stations are located. This lifter cam track is engaged by rollers 75 carried in the bifurcated lower ends of rods or plungers 76, one of which is disposed radially inward of each of the crown cap receiving seats or depressions 69. The rods or plungers 76 are reciprocably mounted and vertically guided in equidistantly spaced guide bores 77 formed in the turret skirt portions 65, and reduced upper end portions of these rods or plungers extend through guide bores 78 provided in the top ring 72. See Figures 3 and 15.

Each plunger 76 has a head piece 79 secured thereon in spaced relation above the ring 67 and is depressed by a compression spring 80 interposed between the respective head piece 79 and the overlying ring 72. The head pieces extend radially outwardly beyond the plungers on which they are carried and in the outer end of each thereof is secured a pin 81 which projects above and below the same. At its lower end each pin 81 has secured thereto a crown cap presser head, and these heads are engageable with crown caps positioned in the table seats or depressions 69 through openings 83 provided in the ring 67. The crown caps are designated 84. At its upper end each pin 81 has a sleeve 85 secured thereon, and each said sleeve has a bore in its upper end which is smaller than the internal diameter of the sleeve so as to provide overhanging shoulders 86. The shoulders 86 and the upper ends of the pins 81 define the upper and lower limits of sleeve chambers for accommodating movement of the enlarged heads 87 formed on the lower ends of the actuator pins 88 which project up-

wardly through bores 89 provided therefor in the upper ring 72, said pins being frictionally held in their receiving bores by spring pins 90. See Figures 2 and 3.

The lifter cam 74 is shaped so as to engage each roller before the plunger by which it is carried reaches the cap discharging and counting station so as to lift the plunger and move the respective presser head 82 well above the underlying crown cap 84, thereby to free the crown cap and allow it to be stripped from the annular table or shelf 68 by the stationary stripper or discharging cam 91 secured as at 92 on the frame and including a stripper nose portion 93 overlying the table portion 68 for that purpose. See Figure 7 and the cam portion at left of center in Figure 15. This lifting movement has no effect upon the respective actuator pin 88 because of the lost motion provided in the sleeve 85.

The roller 75 then engages the cam portion to the right of center in Figure 15, and the additional upward movement of the respective plunger 76 and pin 81 serves to lift the respective actuator pin 88 and project the upper extremity thereof still higher and higher than the counting mechanism actuating position above the upper surface of the ring 72 which is illustrated in Figure 3. As rotation of the turret 64 continues, the respective roller 75 will ride off the lift crest or highest point of the cam 74 so as to permit the respective plunger 76 to drop and the presser head 82 thereof to engage in the crown cap 84 which has just been deposited on the shelf 68 at the discharge point 59. See Figure 2. The chamber within the respective sleeve 85 permits this amount of downward movement of the presser head necessary to engage in a crown cap without retracting the actuator pin to an ineffective low position in which it cannot engage and actuate the counting mechanism. See Figure 3. Whenever a crown cap is not present beneath one of the presser heads, however, the respective plunger 76 and pin 81 is permitted to move downwardly a greater distance sufficient to cause the sleeve shoulders 86 to engage the enlarged head 87 of the respective pin and retract it downwardly from its previous, effective projection above the ring 72. Thus retracted by the absence of the crown cap, the actuator pin will not be effective to later actuate the counting mechanism, and, as will be apparent from the previous description, the lift imparted to the pin 81 by the first engaged cam portion at the left of center in Figure 15 will be insufficient to engage the head 87 and lift the pin 88 to its counter mechanism engaging position. Note the clearance beneath the pin 88 in Figure 3. By this means it is assured that counting and registering of crown caps will not take place when crown caps are not present on certain of the table seats 69.

The parts are so proportioned that when no crown cap is present, the particular head piece 79 will engage the ring 67 and limit downward movement of the respective plunger 76 before the presser head 82 comes into direct contact with the annular table or shelf portion 68 of the turret.

The counter unit proper, hereinbefore generally designated C, includes a casing or framing composed of a base casing section 94 having depending side legs or standards 95 which are pivoted at their lower ends, as at 96, to the turret base frame, a central body casing portion 97 and a removable cover portion 98. Ears or lugs 99 project laterally from the legs 95 and are apertured to receive mounting bolts 100 extending from the turret base frame. Coil springs 101 surround the bolts between the ears 99 and adjustable abutment nuts 102 applied to said bolts and serve to yieldably hold the unit casing against the turret base frame. See Figures 1, 3, 4, 5, and 6.

Between the legs 95 there is secured a distributer casting having a cap receiving body 103 divided by a partition wall 104 into two discharge compartments 105 leading into individual distributer chutes 106 disposed for delivering crown caps into one or the other of two cartons or receptacles (not shown) placed below said chutes. The crown caps discharged from the turret table or shelf portion 68 by the stripper cam 91 are delivered into one or the other of the distributer chutes 106 under the control of a distributer vane 107 mounted on a rockable shaft rockably mounted in suitable bearing equipment 108 and equipped with a crank arm 109 to which movement is imparted for determining the position of the vane in a manner later to be described.

In the base section 94 there is secured a stud shaft 110 which is disposed vertically and includes a reduced upper end extension 111 which is eccentrically disposed with respect to the axis of the lower portion of the stud shaft and has support bearing, as at 112, in the cover section 98. See Figure 3.

A unit dial plate 113 and a dozen dial plate 114 are freely rotatably mounted in superposed relation on the reduced eccentric extension 111 of the stud shaft 110, and suitable friction brake equipments generally designated 115 and including interposed compression springs 116 are provided between these dial plates.

An upper gross dial 117 and a lower gross dial 118 are freely rotatably mounted in superposed relation on the main body of the stud shaft 110. It will be observed by reference to Figure 3 of the drawings that the dial plates 113, 114, 117, 118 are so related on the stud shaft portions 111 and 110 that the side portions thereof disposed at the left, as viewed in this figure, are vertically aligned, whereas the opposite side portions are aligned in upper and lower pairs 113, 114 and 117, 118.

The dial plate 113 is divided into twelve equal divisions 119 at the periphery, said divisions being numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and is equipped with a toothed ring 120 at the top thereof provided with twelve equidistantly spaced teeth presented for individual engagement by such of the actuator pins 88 as project a proper distance above the turret ring 72. The dial plate 113 is also equipped with a ring 121 having a single tooth receiving recess 122 and an underlying ring 123 having two movement imparting lugs 124 (see Figure 14) providing a tooth receiving space between them and registering with the recess 122. The dial plate 114 is divided into twelve equal divisions 125 at its periphery and which like those of the dial plate 113 are numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. The dial plate 114 carries a twenty-four toothed gear ring 126 at its upper edge and is also equipped with a ring 127 having a single, tooth receiving recess therein similar in form and purpose to the recess 122 previously referred to, and an underlying ring 128 having driving lug and intervening tooth receiving space equipments identical in form and purpose with the similar equipments in the ring 123.

The dial plate 117 is divided at its periphery into ten equal spaces 129 numbered 0, 1, 2, 3, 4, 0, 1, 2, 3, 4. This plate 117 also is equipped with a gear ring 130 at its upper edge, but this ring has only twenty teeth. Ring equipments 131 and 132 are included on the dial plate 117 however, which includes two diametrically opposite disposed single tooth receiving recesses and driving lug equipments identical in form and purpose with those 122 and 123 previously described.

The lowermost dial plate 118 is divided into ten equal peripheral spaces 133 numbered 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, and this plate also carries a gear ring 134 having twenty teeth and is affixed to the upper end of a sleeve 135 which is freely rotatable about the stud shaft 110.

The sleeve 135 also carries a cam 136 having a latch releasing nose or projection 137, and a spur gear 138 is affixed to the lower end of this sleeve in position for meshing with and imparting movement to a spur gear 139 freely rotatable about a stud shaft 140 fixed on the casing base 94. The gears 138 and 139 bear 1-to-2 ratio so that the gear 139 will be rotated once for each two rotations of the gear 136, and to the hub of the gear 139 is affixed a spring loading cam 141. See Figures 3, 4, 5 and 6.

In a slideway 142 formed in the central casing part 97 is mounted a slide bearing 143 in the arm extensions 144 of which a shaft 145 is mounted. The shaft 145 is vertically disposed and three pinions 146 are freely rotatable about this shaft between the upper and lower arm extensions of the slide bearing 143. Every other tooth of each of these pinions is mutilated by cutting away of the top portion thereof, as at 147, thereby to accommodate free movement of the rings 121, 127 and 131, said mutilated teeth being deep enough, however, to bridge the respective ring sets 123 and 126, 128 and 130, 132 and 134, and all full depth teeth of all gears are deep enough to bridge all triple ring sets, namely, 121, 123, 126 and 127, 128, 130, and 131, 132, 134. See Figures 3, 6, 13 and 14.

A slide bearing position determining knob 148 is affixed to the slide bearing 143 and projected outside the unit casing, and a spring pressed plunger 149 is carried by the cover and is engageable in a recess 150 in the upper surface of said slide bearing. When the spring plunger 149 is projected into the recess 150 the slide bearing is locked in the position in which the pinions 146 cooperate with the several dial plates. It will be obvious that by withdrawing the plunger 149 from the receiving recess and pull-in outwardly on the knob 148 the slide bearing 143 may be moved so as to displace the pinions 146 from said effective position. See Figures 3 and 5.

In slideways 151 formed in the base casing section 94 and between it and the central section 97 is mounted an energy storing slide 152 having parallel grooves 153 in its upper surface in which are mounted four compression springs 154 arranged in two sets of two springs each. The slide 152 has two pins 155 depending therefrom each of which is surrounded by a roller 156 engageable at opposite sides of the spring loading cam 141. It will be obvious that as the cam 141 is rotated it will shift the slide longitudinally, first in one direction and then in the opposite direction. See Figures 3, 4 and 6.

A vane shifter slide 157 is slidably mounted on top of the energy storing slide 152 and is equipped with two pins 158 which depend therefrom into the slide grooves 153 between the compression springs 154 of the respective sets. The slide 157 has two latching recesses 159 formed in one edge thereof, said recesses being alternately engageable by a latch member 160 depending from the slide 161 slide guided for movement across the path of travel of the slide 157, said slide being moved in one direction by the cam 136, 137, and in the opposite direction, or in a direction for being held against said cam, by a compression spring 162. See Figures 3 and 4.

The slide 157 is link-connected, as at 163, to the upper end of a lever 164 which is pivoted intermediate its ends, as at 165, on the base section 94. The lower end of the lever 164 is link-connected, as at 166, to the vane actuating crank 109. The crank 109 is equipped with stop lugs 167 engageable with stop pins 168 to determine the rest positions of the crown cap distributor vane. See Figures 3 and 6.

A suitable window 169 is provided in the unit casing, and a double pointer 170 is provided and is supported by the casing portion 97 in position for being viewable through said window for clearly indicating to an observer whether the pinions are in or out of effective position. When it is observed that the centrally disposed tooth of the pinion 146 is opposite the pointer 170 farthest to the right as viewed in Figure 5 it is known that the parts are in the effective position, whereas when this tooth is opposite the pointer 170 farthest to the left it is known that the parts are in the ineffective or out of mesh position. Similar window equipment 171 is provided in the casing through which a similarly supported pointer equipment 172 can be viewed for aiding in the resetting of the several dial plates, the pointer equipment 172 being so positioned that the zero markings on the dial plates can be brought into registry with said pointer 172 in resetting the dials. See Figure 5.

Operation

During the operation of the apparatus, every actuator pin 86 which is projected a proper distance above the turret ring 72 to indicate the presence of a crown cap 84 therebeneath, will engage a tooth of the ring 120 and advance said ring and the attached dial plate 113 one of its twelve spaces or divisions 119 about the stud shaft extension 111. Upon completion of a full rotation of the dial plate 113, or during the 12th step movement thereof indicating that one dozen crown caps have been counted and discharged from the turret, the uppermost pinion 146 will be moved to impart a single step or space movement to the dial plate 114. Thus upon completion of twelve complete rotations of the dial plate 113, the dial plate 114 will have been moved twelve spaces, or through one complete rotation, thereby indicating that twelve dozen or one gross of crown caps have been counted and discharged from the turret.

At each completion of a full rotation of the dial plate 114, a single step movement or one-tenth rotation will be imparted to the dial plate 117, and upon completion of each half rotation of the dial plate 117, a single step movement or one-tenth rotation will be imparted to the dial plate 118 and to the cam 136 and gear 138 affixed to the sleeve 135 on which it is carried.

Because of the 1-to-2 ratio of the gears 138, 139, each rotation of the sleeve 135 and gear 138 will have moved the slide 152 a distance in one direction or the other for storing a maxi-

mum of energy in the springs 154 which are engaging the latch-secured slide pins 158 in the direction in which said slide is moving at the particular time, and at the instant said rotation is completed, indicating the completion of the lot count intended and the delivery into a respective carton or receptacle of its complement or lot of caps, the cam nose 137 will release the slide securing latch 160 and permit the springs to shift the slide 157 to its opposite position thereby shifting the cap diverting vane 187 so as to divert the next counted and discharged crown cap, and those succeeding in count and discharge, into the carton or receptacle next to be supplied with its complement of caps.

When it is desired to reset the counting mechanism after a counting operation, it is only necessary to displace the pinions 146 by proper manipulation of the plunger 149 and knob 148 and to turn the several dial plates to the count starting positions. The dial plates can be thus reset by hand manipulation, and without special tools, the removable cover portion 98 first having been removed to render the dial plates readily accessible for this resetting manipulation. The lower dial plate 118 is turned in a clockwise direction until its zero marking registers with the pointer equipment 172. This dial should always be turned clockwise so as to energize or release the slide energy storing spring equipments. It will be recalled that as the dial plate 118 makes a complete rotation or cycle, the distributor gate 187 is shifted to its opposite position. After the dial plate 118 has been reset in the manner stated, the other dial plates 113, 114, 117 are reset by moving the zero markings thereon into registry with the pointer equipment 172. It will be observed by reference to Figure 5 that the two position pointer 172 disposed just inside the casing window 171 will greatly aid in the resetting of the dial plates. One of the position indicators aligns with the axis of the stud shaft 110 and the dial plates thereon, and the other with the offset or eccentrically disposed extension 111 thereof and the dial plates thereon. See also Figure 3. The pinions 146 are next lined up, being certain that the teeth properly line up with the pointer equipment 170. The knob 148 is next pressed in to cause the pinions to move into their effective position, and when this position is attained the spring plunger 149 will drop into the receiving recess 150 and secure the slide bearing and pinions in the effective position.

It will be obvious that the markings on the various dial plates 113, 114, 117, 118 register the number of caps which have been counted at any given time, and by observing the pointer equipment 172 and its relation with the dials at any given time, an operator can conveniently tell the number of caps which have been counted and discharged. For example, an observation showing the numeral 8 on the unit dial plate 113 and zeros on the remaining dial plates would indicate that eight crown caps had been counted. An observation showing the numeral 2 on the dozen dial plate 114 and zeros on the remaining dial plates would indicate that two dozen crown caps had been counted. An observation showing the numeral 3 on the gross dial plate 117 and zeros on the remaining dial plates would indicate that three gross crown caps had been counted, and an observation showing the numeral 5 on the gross dial plate 118 and zeros on the remaining dial plates would indicate that five gross crown caps had been counted. Similarly, the observation of the numeral 1 on the unit dial plate 113, the numeral 2 on the dozen dial plate 114, the numeral 4 on the gross dial plate 117, and the numeral 7 on the gross dial plate 118 would indicate that 1 cap, plus 2 dozen caps, plus 4 gross caps, plus 7 gross caps, or 1609 caps in all had been counted.

Each time the lowermost dial plate makes a complete cycle, the intended complement of crown caps will have been discharged into a given carton or receptacle and the vane 187 will be shifted to divert succeeding caps into another carton or receptacle. This operation continues automatically so long as the apparatus is running, and it will be obvious that by removal of the casing cover section and substitution of different dial plate combinations, the number of crown caps delivered into the respective cartons or receptacles can be readily varied.

It is of course to be understood that the details of structure and arrangement of parts may be variously changed and modified without departing from the spirit and scope of our invention.

We claim:

1. In cap counting mechanism, a traveling cap carrier, individual counting mechanism actuating elements carried by the carrier and including cap engaging portions and counting means actuating portions said cap engaging portions being engageable with caps on said carrier in a manner for controlling the positioning of the elements in effective position by reason of said cap engagement or in ineffective position in absence of said cap engagement whereby said elements are individually controlled as to non-effective or effective positions by the absence or presence on said carrier of individual caps, means for feeding caps onto said carrier, means for effecting disengagement of said cap engaging element portions individually from the caps and for discharging caps from said carrier, means for holding the counting means actuating element portions in said effective position after disengagement of said cap engaging element portions from the caps, and means actuated by said held element portions for counting the caps discharged from said carrier.

2. In cap counting mechanism, a traveling cap carrier, individual counting mechanism actuating elements carried by the carrier and each comprising upper and lower parts connected for limited independent movement, each said lower part being engageable or not with caps on said carrier in a manner for controlling the positioning of the connected upper parts in effective position by reason of said cap engagement or in ineffective position in absence of said cap engagement whereby the connected upper parts are individually controlled as to non-effective or effective positions by the absence or presence on said carrier of individual caps, means for feeding caps onto said carrier, means for holding the upper part of each element in said effective position after disengagement of the lower part of the same element from a cap, means actuated by said held element upper parts for counting the caps moved by said carrier, and means for discharging caps from said carrier.

3. In cap counting mechanism, a traveling cap carrier, means for counting the caps moved by said carrier, and means controlled by said counting means for directing predetermined lots of caps into selected receptacles, said last-named

means including two chutes directed to individual receptacles, a shiftable vane for directing caps into one or the other of the chutes, a vane shifting element, means effective during the counting of a predetermined lot of caps for storing energy for shifting said element, means controlling the shifting of the vane shifting element including a reciprocable trigger movable for releasing the stored energy, and a counter means actuated cam for positively displacing said trigger and releasing the energy and causing the shifting element to shift the vane each time said predetermined lot of caps has been counted.

4. In cap counting mechanism, a rotor having a plurality of equidistantly spaced cap receiving seats arranged in a circle, means for feeding caps onto said seats, a plunger equipment movable with the rotor and overlying and axially reciprocable toward and from each seat and engageable or not at its lower end with a cap and when so engaging a cap projecting at its upper end in counter mechanism actuating position, means for controlling the positions of said plunger equipments to lift them and thereby free for discharge caps underlying them and provide space for receiving caps therebeneath and to lower them onto underlying caps or when no cap is present to a lower level at which the upper end of the respective plunger equipment will be withdrawn from its counter mechanism actuating position, and counting mechanism actuated by each plunger equipment disposed in counting mechanism actuating position.

5. In crown cap counting mechanism, a rotor having a plurality of equidistantly spaced cap receiving seats arranged in a circle, means for feeding caps onto said seats, a plunger equipment movable with the rotor and overlying and axially reciprocable toward and from each seat and engageable at its lower end with a cap and when so engaging a cap projecting at its upper end in counter mechanism actuating position, cam means for controlling the positions of said plunger equipments to lift them and thereby free for discharge caps underlying them and provide space for receiving caps therebeneath and then to free them and permit them to lower onto underlying caps or when no cap is present to a lower level at which the upper end of the respective plunger equipment will be withdrawn from its counter mechanism actuating position, counting mechanism actuated by each plunger equipment disposed in counting mechanism actuating position, and spring means for yieldably urging the plunger equipments toward caps on the seats.

6. In cap counting mechanism, a rotor having a plurality of equidistantly spaced cap receiving seats arranged in a circle, means for feeding caps onto said seats, a plunger equipment movable with the rotor and overlying each seat and engageable at its lower end with a cap and when so engaging a cap projecting at its upper end in counter mechanism actuating position, means for controlling the positions of said plunger equipments to lift them so as to free for discharge caps underlying them and provide space for receiving caps therebeneath and to lower them onto underlying caps or when no cap is present to a lower level at which the upper end of the respective plunger equipment will be withdrawn from its counter mechanism actuating position, counting mechanism actuated by each plunger equipment disposed in counting mechanism actuating position, each said plunger equipment including an upper counting mechanism actuating section and a lower cap engaging section, means for yieldably holding each said upper section in positions to which it is moved, and means providing lost motion between the upper and lower sections of each plunger equipment so that each cap engaging section can be lifted to free the underlying cap for discharge without disturbing the position of the respective upper section.

7. In cap counting mechanism, a rotor having a plurality of equidistantly spaced cap receiving seats arranged in a circle, means for feeding caps onto said seats, a plunger equipment movable with the rotor and overlying each seat and engageable at its lower end with a cap and when so engaging a cap projecting at its upper end in counter mechanism actuating position, a cam track for controlling the positions of said plunger equipments to lift them and thereby free for discharge caps underlying them and provide space for receiving caps therebeneath and then to free them and permit them to lower onto underlying caps or when no cap is present to a lower level at which the upper end of the respective plunger equipment will be withdrawn from its counter mechanism actuating position, counting mechanism actuated by each plunger equipment disposed in counting mechanism actuating position, each said plunger equipment including an upper counting mechanism actuating section and a lower cap engaging section, means for yieldably holding each said upper section in positions to which it is moved, means providing lost motion between the upper and lower sections of each plunger equipment so that each cap engaging section can be lifted to free the underlying cap for discharge without disturbing the position of the respective upper section, and a plunger guided for reciprocation on the rotor and directly connected with each lower section, and spring means yieldably urging said lower sections and the connected plungers toward the caps and said cam track.

8. In article counting mechanism, article counting means including a rotor to which a definite amount of movement is imparted in the attainment of a predetermined definite lot count, means for imparting movement to said rotor, delivery chutes for directing counted articles into one or the other of two receptacles, a diverter vane shiftable to direct counted articles into one or the other of said chutes, a vane shifter slide equipment connected with said vane, means actuated by the rotor during the counting of a lot for storing energy in said slide equipment, reciprocable latch means for holding the vane stationary during the storing of energy, and a cam rotatable with means actuated by the rotor and effective upon completion of the lot count for releasing said latch and permitting the stored energy to shift the slide equipment and the connected vane.

9. In article counting mechanism, article counting means including a rotor to which a definite amount of movement is imparted in the attainment of a predetermined definite lot count, means for imparting movement to said rotor, delivery chutes for directing counted articles into one or the other of two receptacles, a diverter vane shiftable to direct counted articles into one or the other of said chutes, a vane shifter slide connected with said vane and having a projecting pin, an energy storing slide having a compression spring opposing said pin at each side and effective when moved against said pin in either direction to store energy in one or the

other of the springs tending to shift the shifter slide in one direction or the other, reciprocable latch means for holding the shifter slide against movement, said energy storing slide having spaced lugs extending therefrom, a rotary cam between and engaging said lugs and effective during rotation to impart energy storing movement in one direction or the other to the energy storing slide, means for driving the cam from the rotor, and a cam rotatable with the rotor and effective for releasing said latch means upon completion of a predetermined lot count to permit the stored energy to shift the shifter slide and vane.

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