Dec. 20, 1960 M. CALVACHE ET AL 2,964,893

OLIVE PACKING MACHINE

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FIG. 1

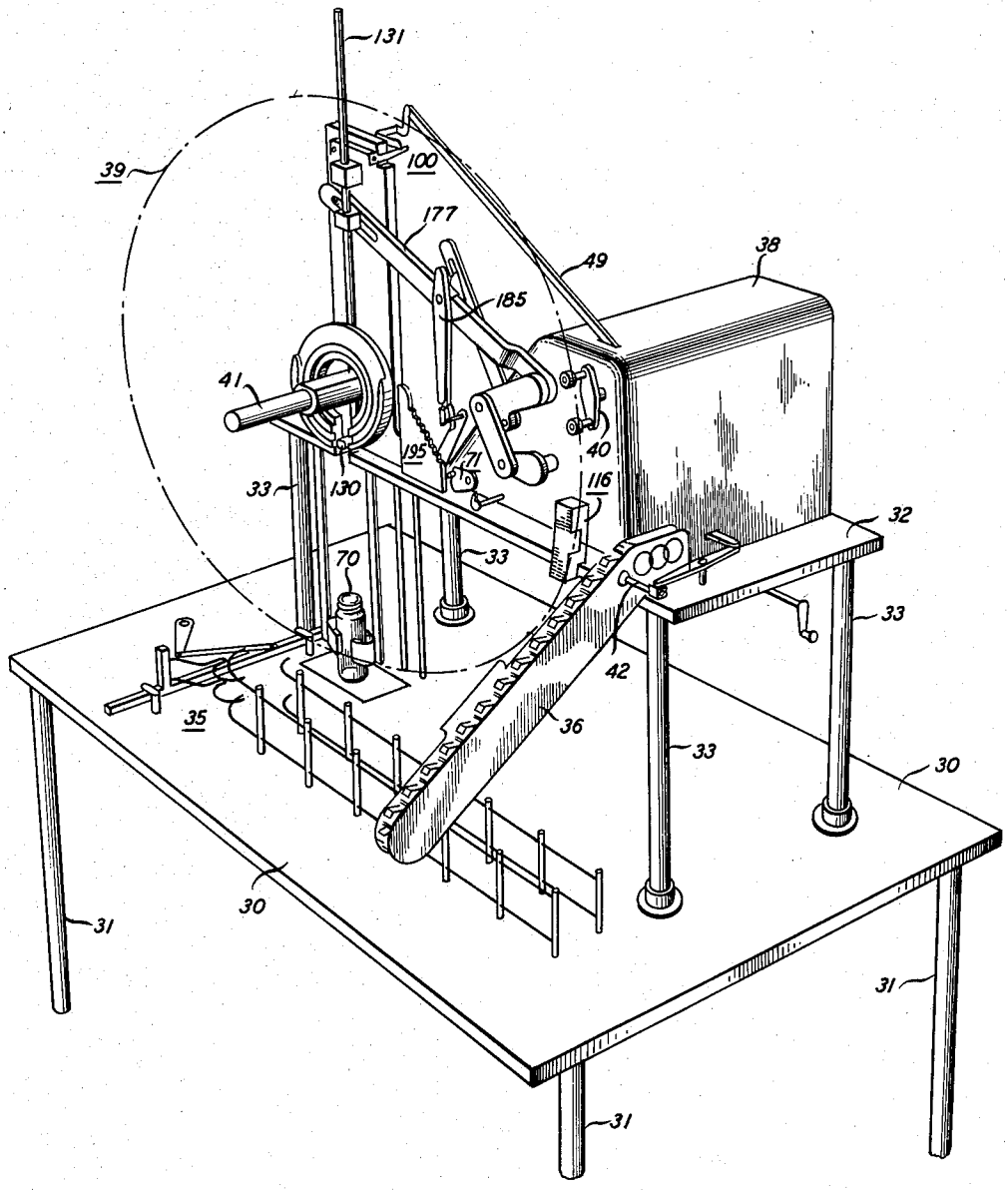

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FIG. 9

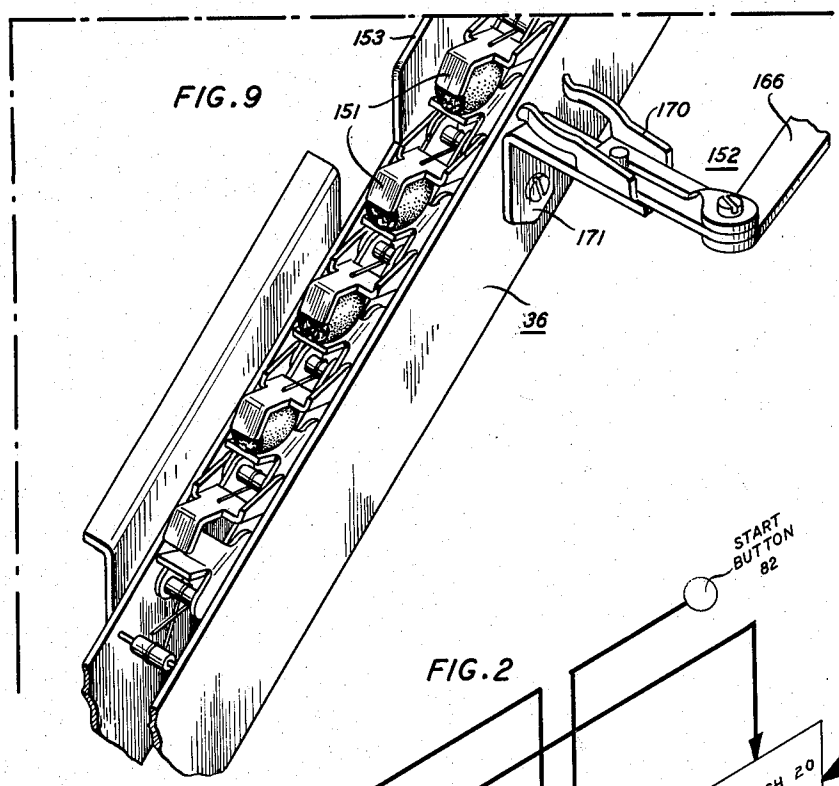

FIG. 2

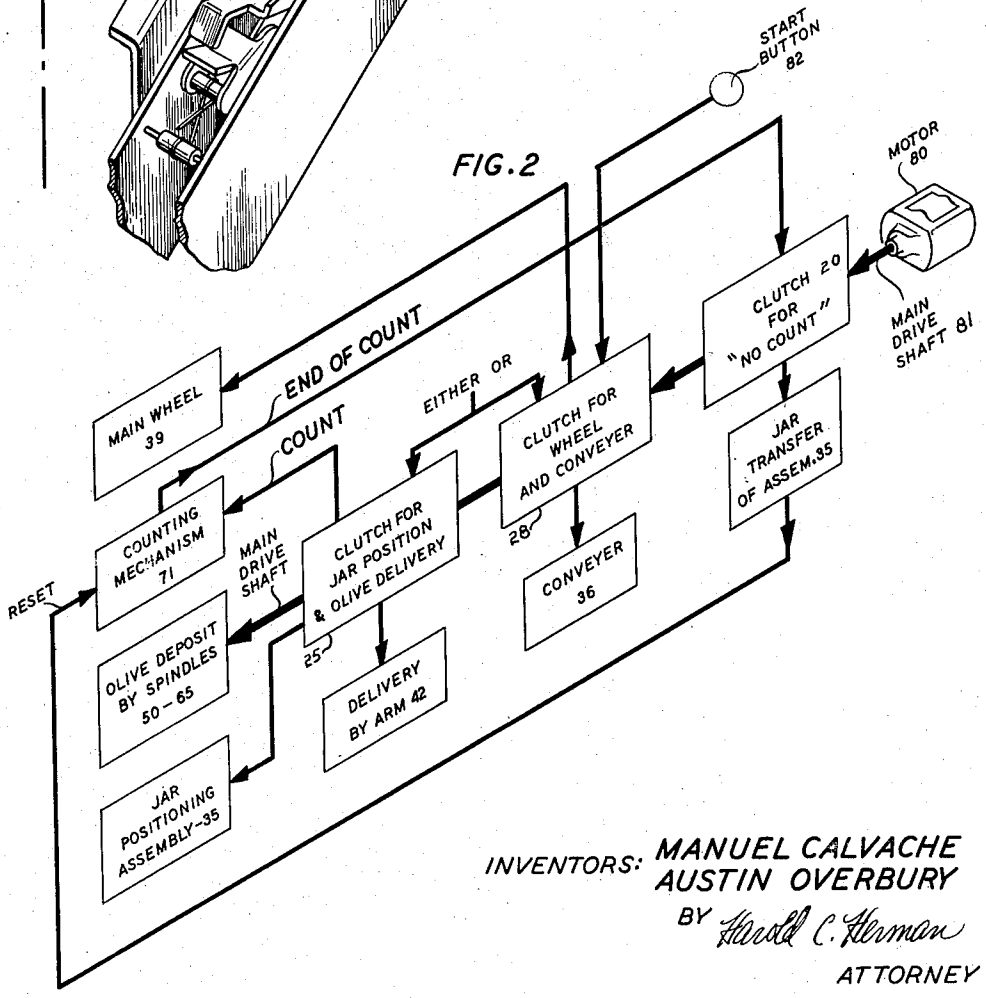

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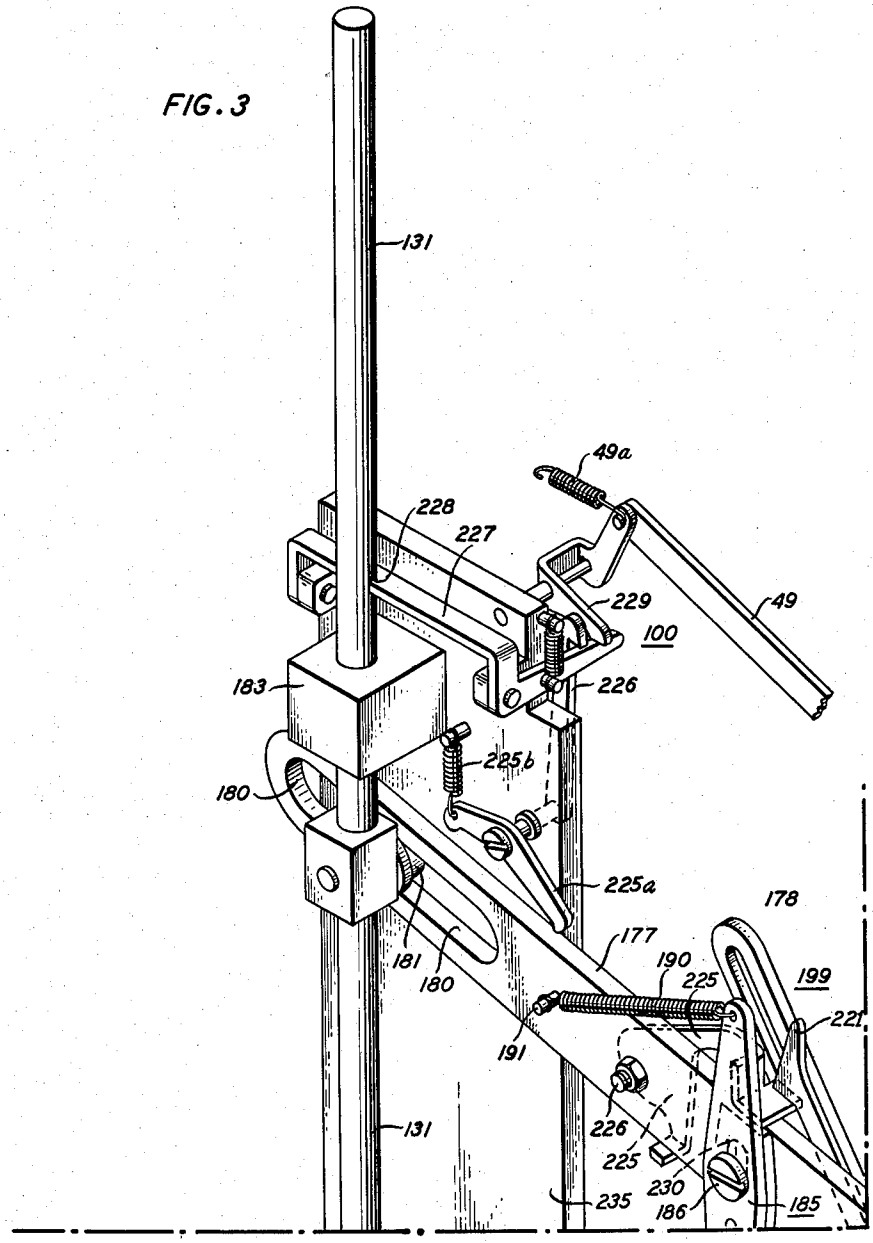
FIG. 3



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OLIVE PACKING MACHINE

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FIG. 4

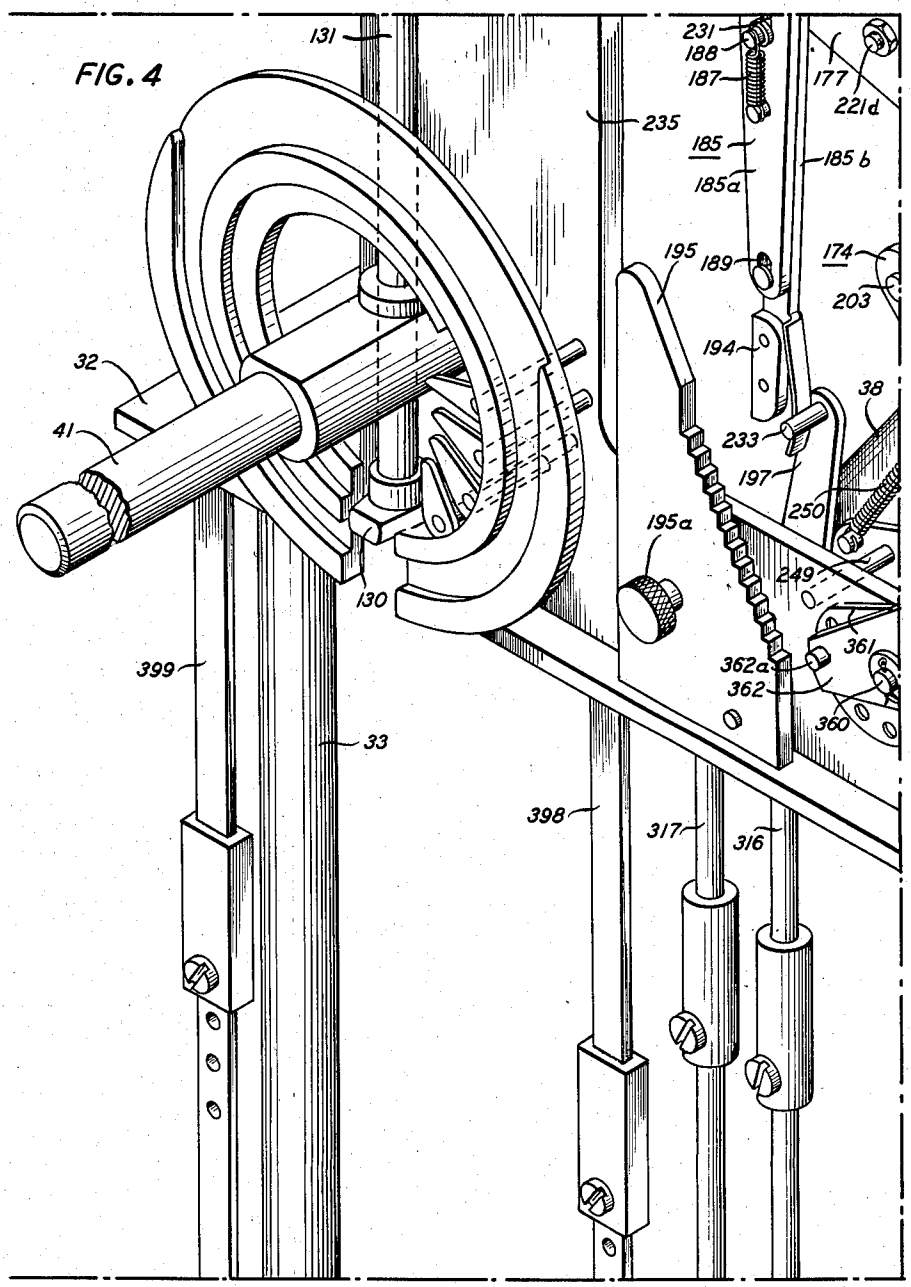

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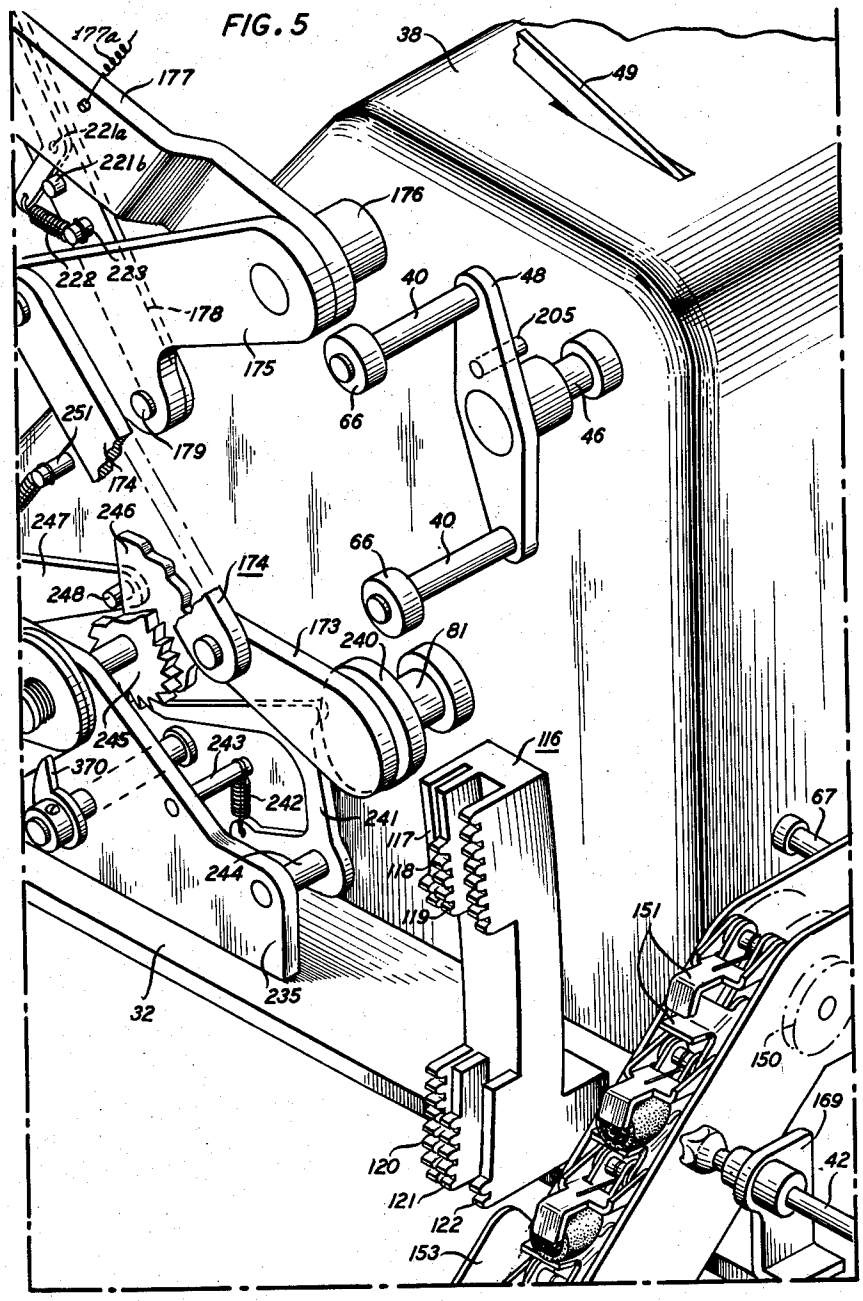
FIG. 5



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OLIVE PACKING MACHINE
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FIG. 5A

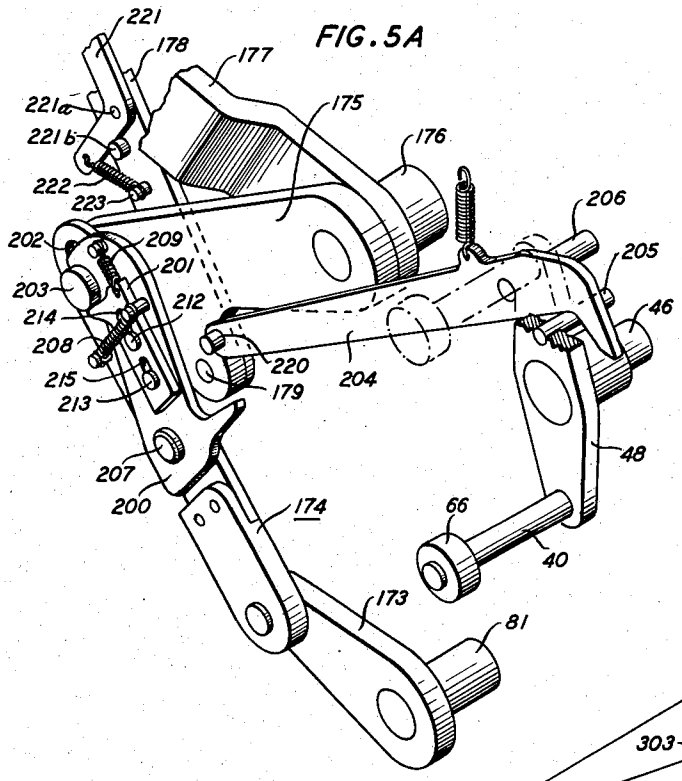

FIG. 11

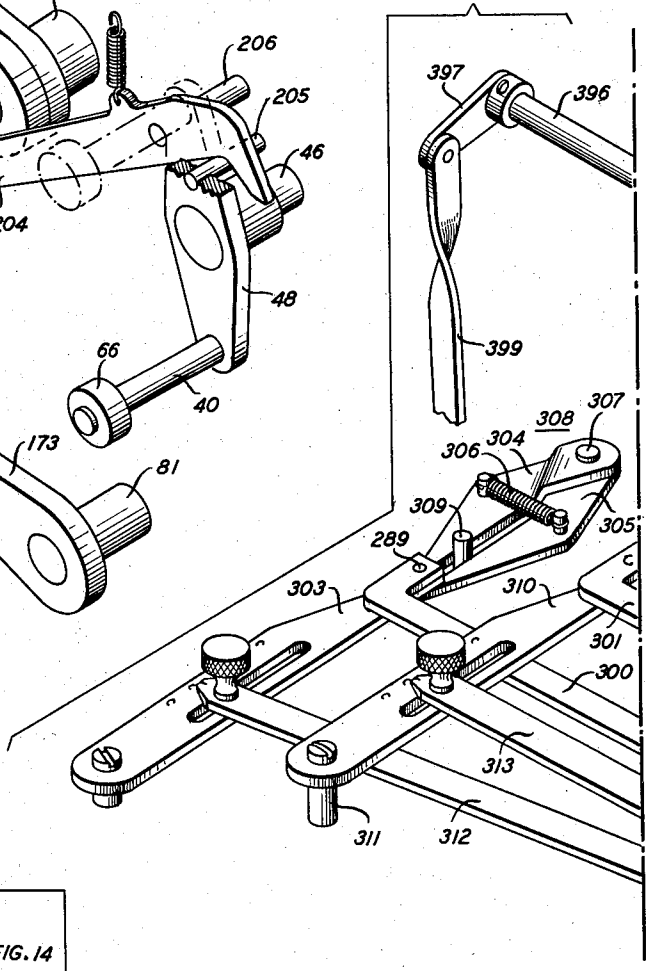

FIG. 16

FIG. 11	FIG. 12	FIG. 13	FIG. 14
	FIG. 15		

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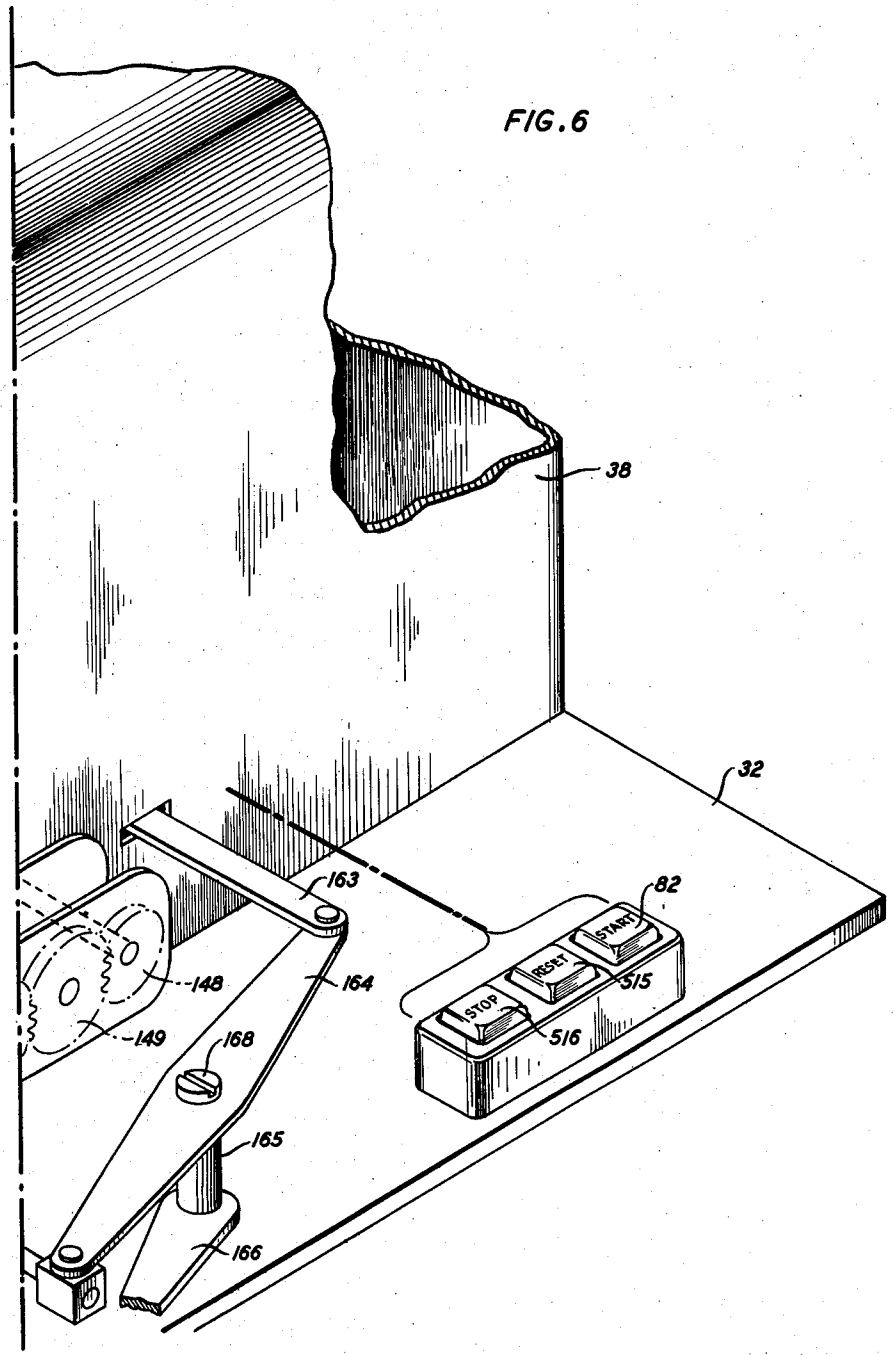
FIG. 6



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Dec. 20, 1960 M. CALVACHE ET AL 2,964,893
OLIVE PACKING MACHINE
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FIG. 10

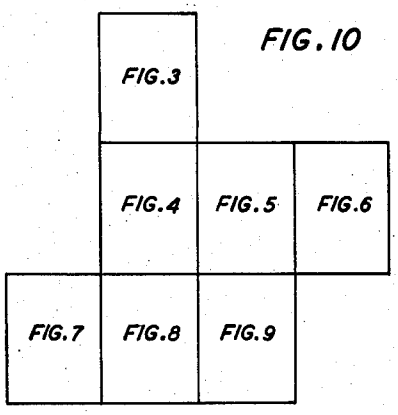
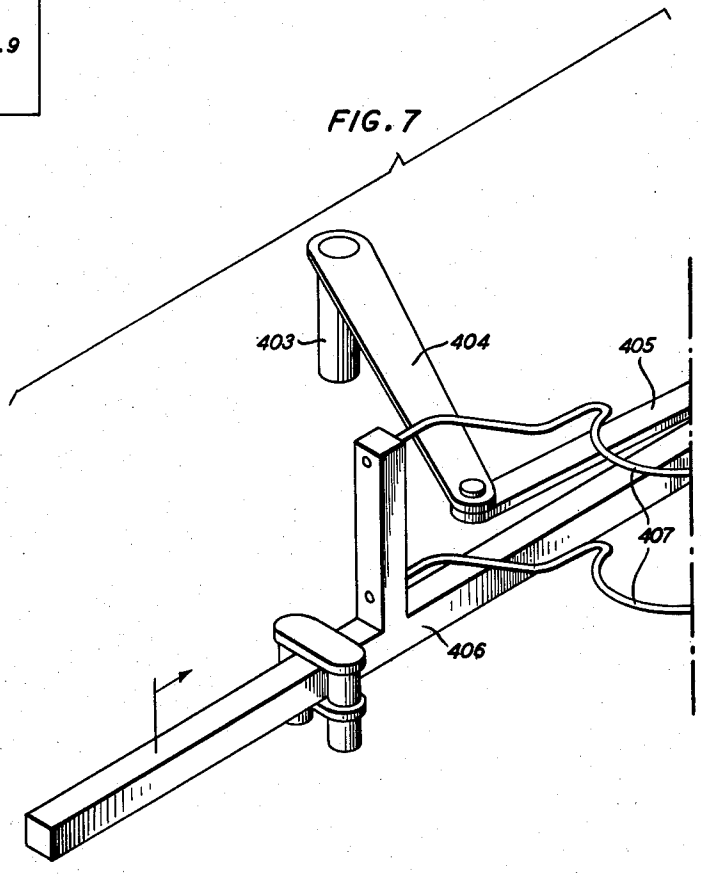


FIG. 7



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OLIVE PACKING MACHINE

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FIG. 8

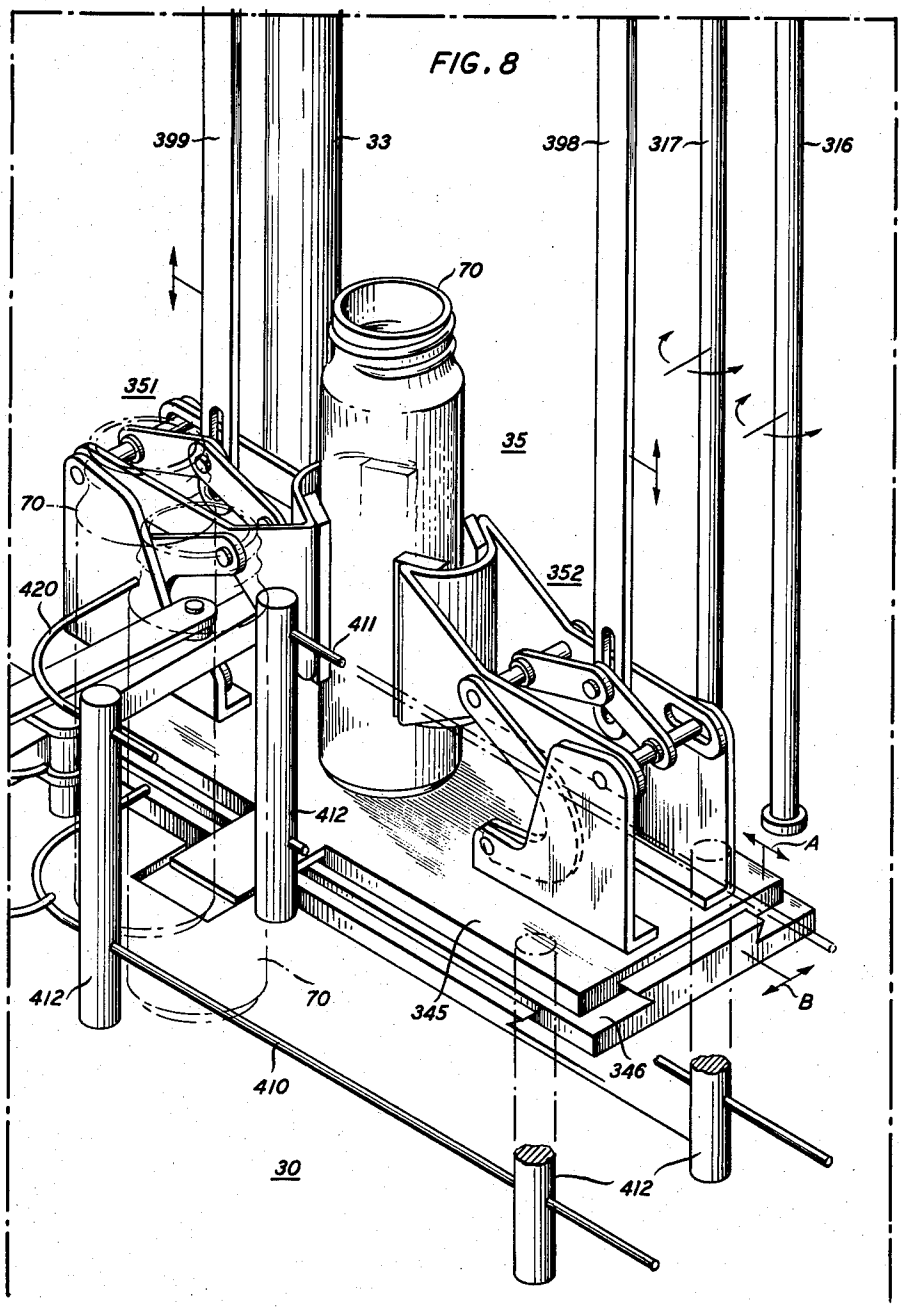

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FIG. 12

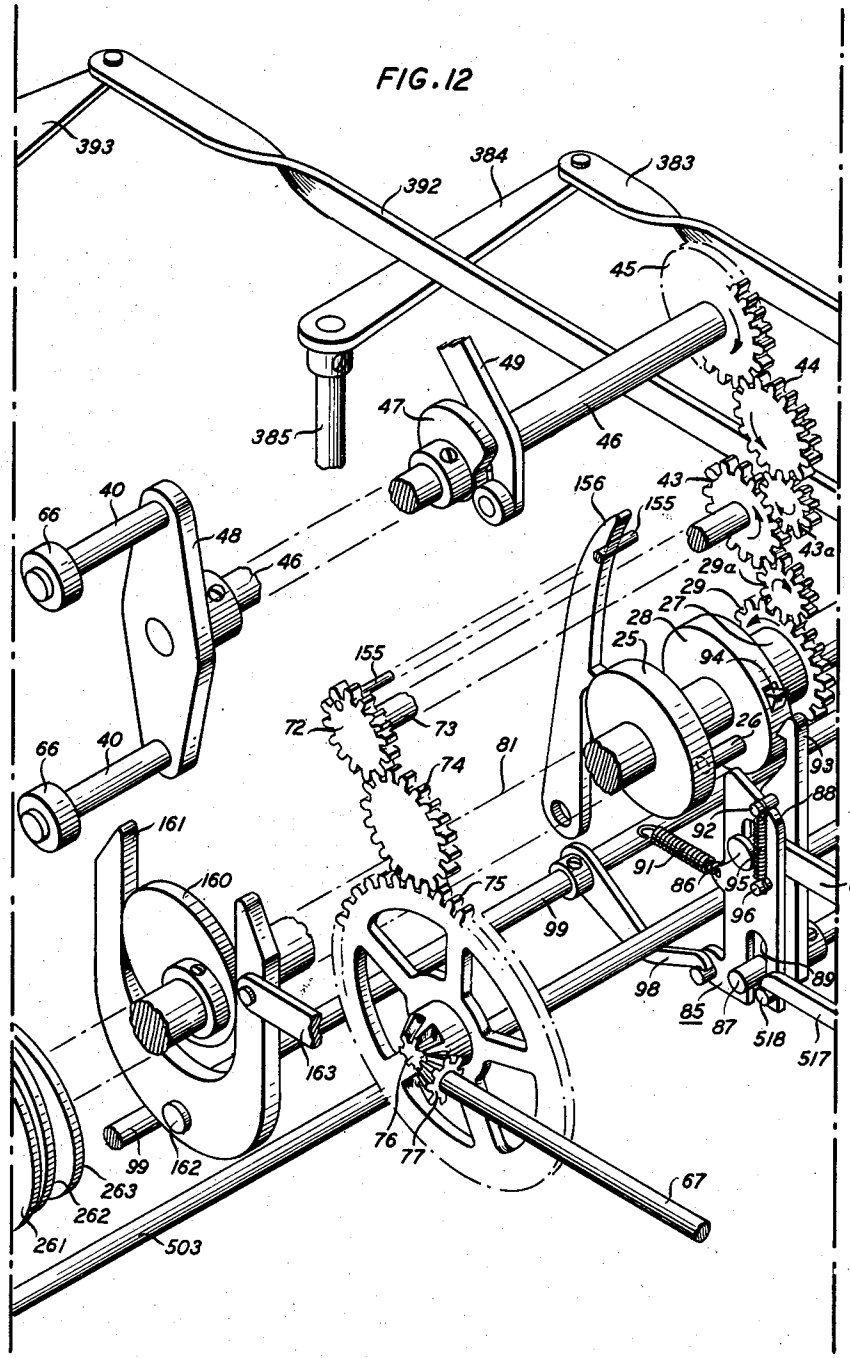

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FIG. 13

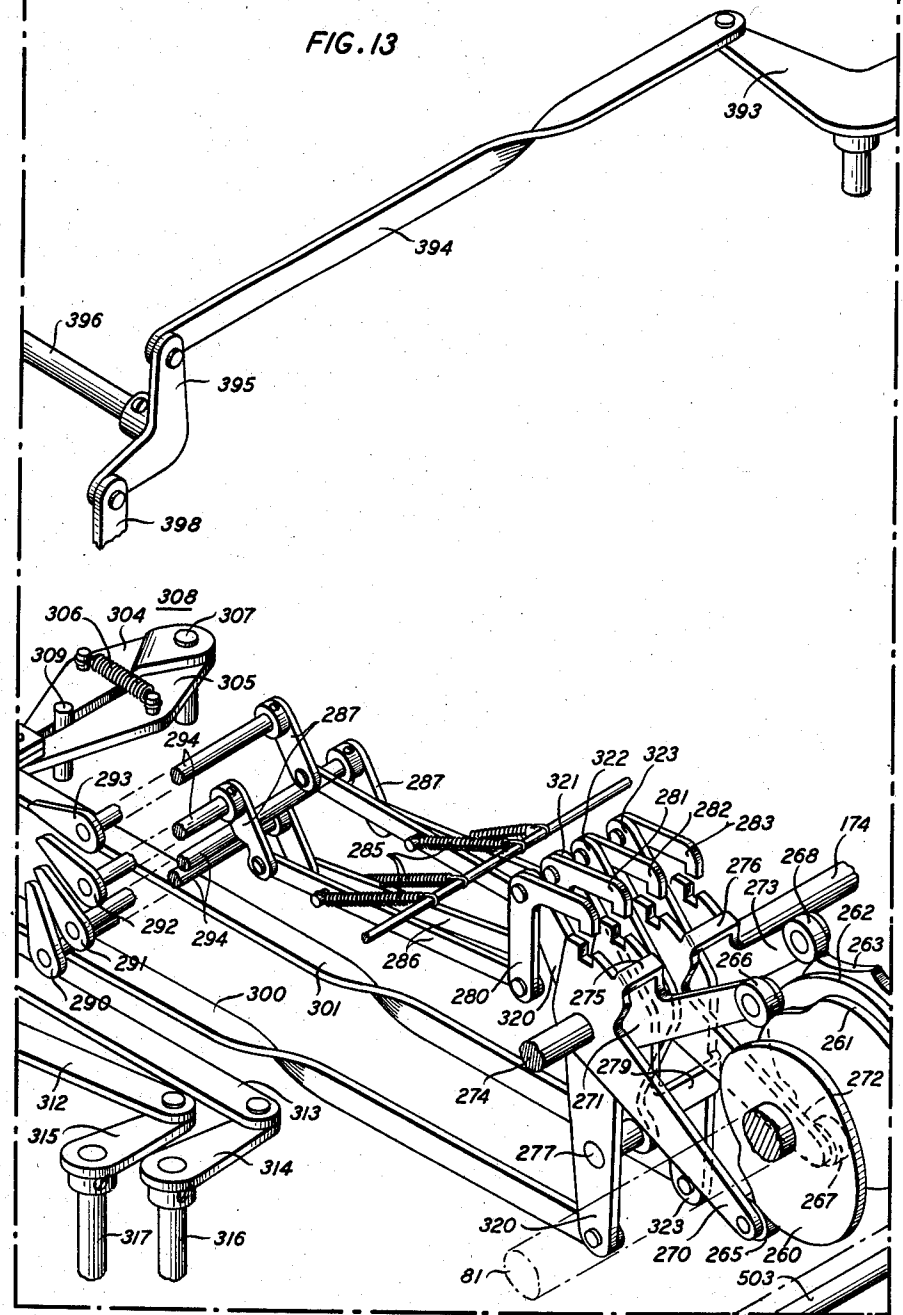

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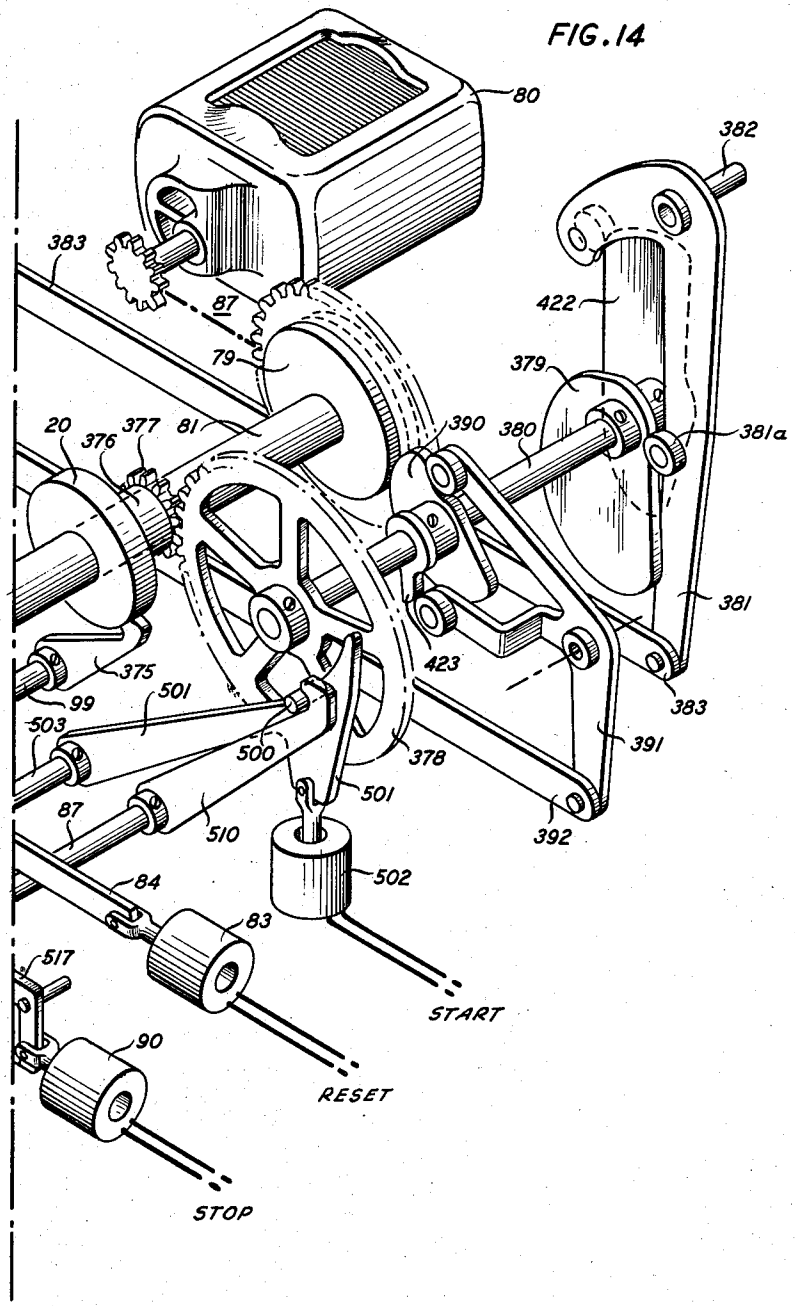
FIG. 14



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Dec. 20, 1960 M. CALVACHE ET AL 2,964,893
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FIG. 15

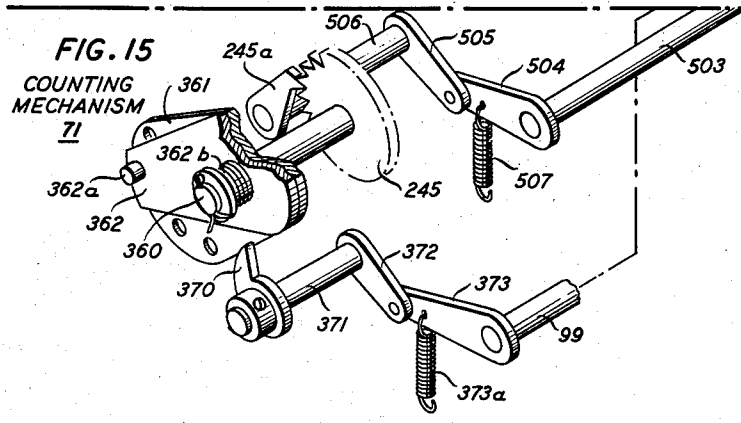

FIG. 17

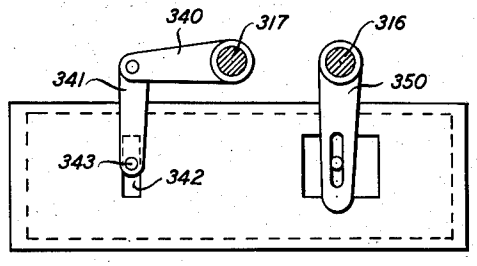

FIG. 18

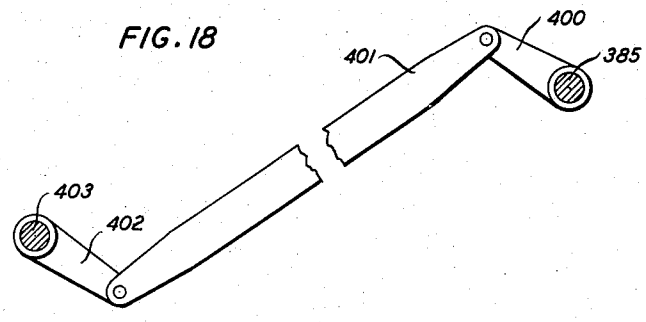

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FIG. 19

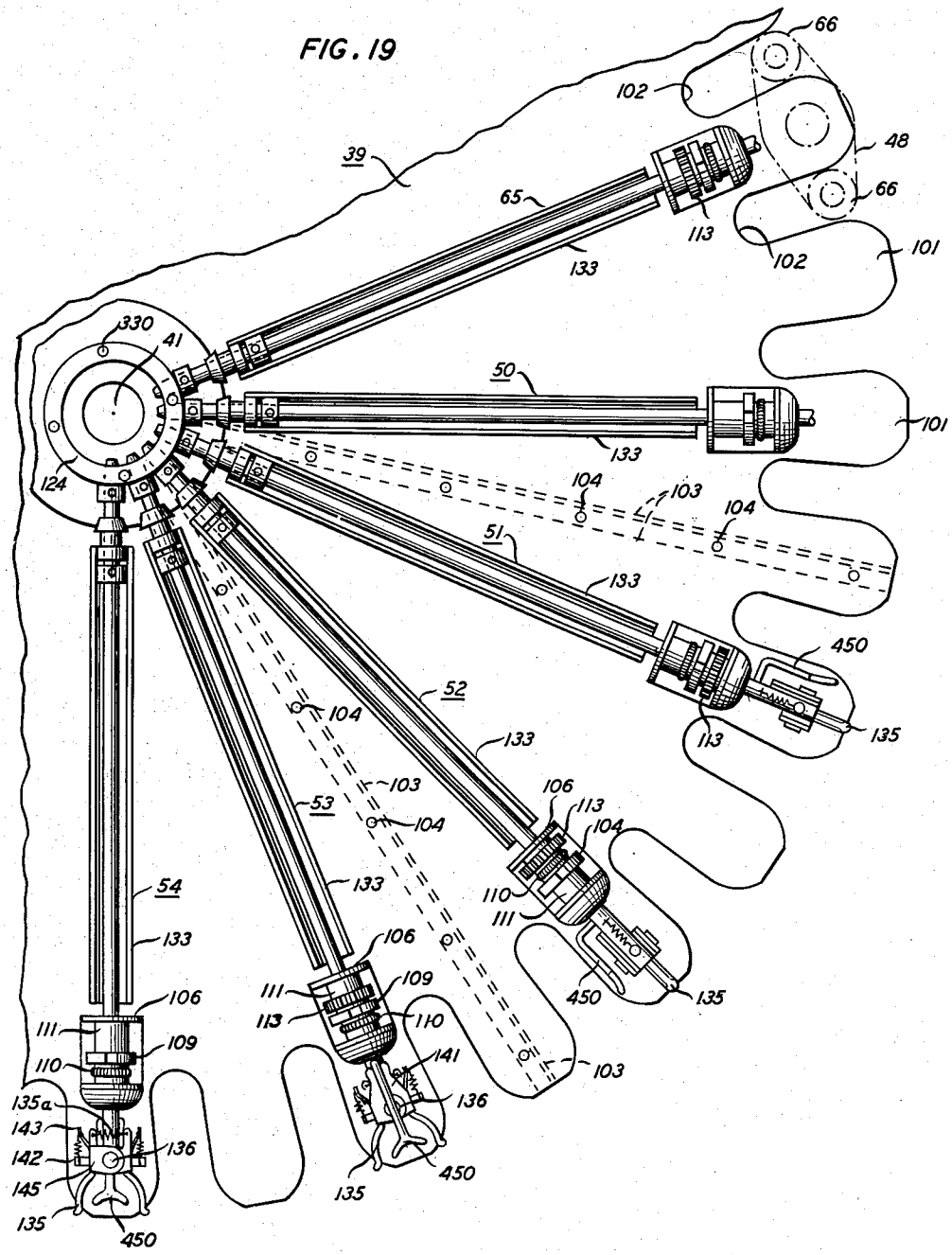

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FIG. 21

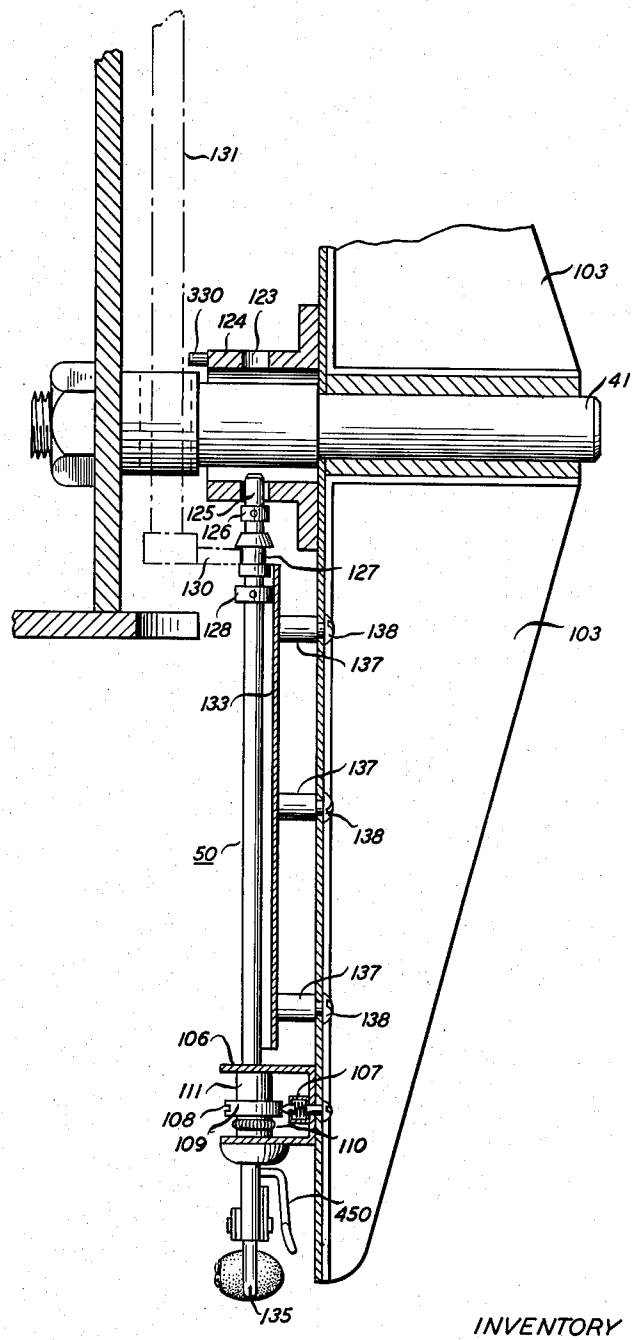
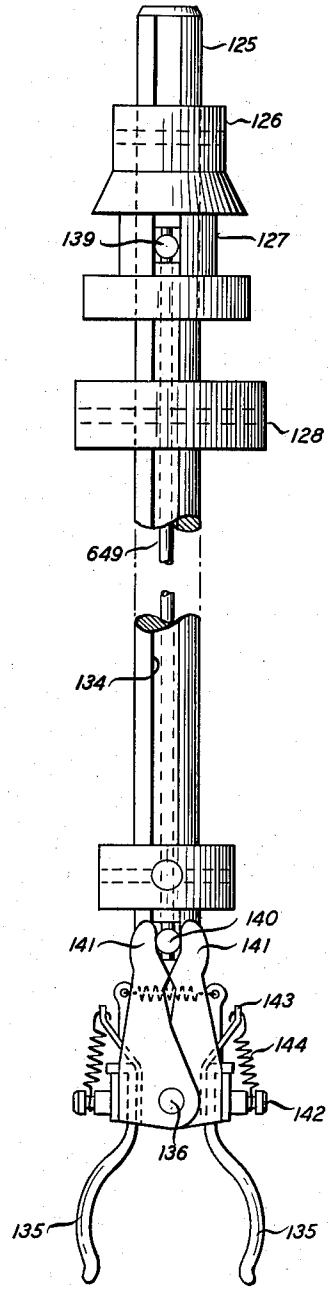


FIG. 20



INVENTORY MANUEL CALVACHE
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United States Patent Office

2,964,893

Patented Dec. 20, 1960

2,964,893

OLIVE PACKING MACHINE

Manuel Calvache, 651 Mountain Ave., North Caldwell, N.J., and Austin Overbury, West Orange, N.J.; said Overbury assignor to said Calvache

Filed Apr. 24, 1959, Ser. No. 808,825

20 Claims. (Cl. 53—237)

This invention relates to automatic packing machines for packing fancy goods such as pimento stuffed olives in transparent glass jars.

Though olives and other fancy goods are sold in a variety of different containers and packing conditions, the major demand is for a particular arrangement and container. The consumer demands that the goods be packed in narrow-necked cylindrical glass jars with the goods being carefully positioned in successive layers. Each of the layers is rotatably displaced from the layers immediately above and below it. When the fancy goods are stuffed olives, an additional requirement is that the olives be positioned with the stuffing, which is usually a piece of pimento, against the cylindrical wall of the jar. The resulting arrangement is esthetically attractive to the consumer to the extent that a considerable amount of the retail sales of packaged olives are of stuffed olives packaged in this manner.

Machines have been designed to pack olives but for a variety of reasons they have been generally unsatisfactory so that stuffed olives and other similar fancy goods are still manually packed. For example, the machine disclosed in the Reissue Patent 24,095 to F. W. Olson is designed to pack olives two at a time in cylindrical jars which do not have a narrow neck. Such a machine, however, does not meet the consumer demand for a narrow necked jar. If narrow necked jars are packed by such machines, the olives are released away from the walls of the jar. The narrow neck complicates the packing problem and does not readily permit the simultaneous insertion of two olives which will be positioned against the cylindrical wall of the jar. If the olives are inserted individually, a variety of problems exist such as maintaining the first deposited olive in each layer in place, especially of the first layer, before and as the next olive in that layer is inserted and deposited adjacent thereto. Moreover, a relative transverse as well as a longitudinal movement of the olive with respect to the cylindrical wall of the jar is required because of the narrow neck of the jar in order to position the olive against the wall of the jar. For these reasons, and because of the positioning accuracy and complication of the various relative movements, prior attempts to provide a practical olive packing machine have been unsuccessful.

In one specific embodiment of this invention, an olive packing machine is provided for packing stuffed olives or the like one at a time into cylindrical jars having narrow necks. The machine includes a main wheel which supports a number of spindles and which is stepped by mechanical control apparatus. At each step of the main wheel, an olive is delivered to one of the spindles on the wheel and a second spindle inserts an olive into the jar.

A feature of this invention relates to the provision of positive control means for the spindles which deliver the olives into the jar. The entire downward movement or

delivery stroke of the spindles is a positive operation as well as the return stroke of the spindles to insure the proper timing in the sequence of operations. The delivery and return of the spindles is achieved utilizing only axial or longitudinal movement of the spindles to avoid complicated angular movements which differ for each level of the olives in the jar. The movement need only be axial even though a narrow necked jar is utilized because the position of the jar is adjusted before and after the spindle is inserted into the jar to position the inside of the wall of the jar against the olive. The jar is automatically moved for successive olives in four different sets of directions to position it against successively inserted olives.

The angular position of the stuffed olive is determined by the angular position of the spindle and the angular position of the spindle is adjusted as it is rotated with the main wheel to the delivery position. As the main wheel is stepped, the spindles are successively positioned at the delivery position. The angular position of each spindle is adjusted during the rotation of the wheel so that each successive four olives are positioned at 90 degree variations.

Important features of this invention relate to the means for delivering the olives into the jar. The utilization of the main wheel and the spindles permits the automatic delivery of the olives to the spindles and the delivery thereafter of the olives from the spindles to the jar.

Other features of this invention pertain to the provision of resilient engaging fingers on each of the spindles which hold an olive. A plunger shaft, which controls the longitudinal motion of the spindles into and out of the jar, also controls the fingers of the spindle to release the olive. When the plunger shaft is returned to its start condition, it reverses its return stroke for a small distance to reclose the fingers of the spindle so that another olive can be inserted and grasped thereby.

Still other features of this invention relate to the provision of means for stabilizing the position of the first olive inserted in the jar when the second olive is deposited adjacent thereto. The first olive of each level or layer is accurately located when the second olive at that level is deposited by means of an aligning member supported adjacent the fingers on each of the spindles.

Still other features of this invention relate to the provision of an automatic packing machine having most of its moving parts located above or adjacent the jars which are to be filled to avoid brine from a broken jar falling to the moving apparatus.

Further objects and features will become apparent upon consideration of the following description taken in conjunction with the drawings wherein:

Figure 1 is a perspective view of the olive packing machine of this invention with the main wheel shown in phantom;

Figure 2 is an operational or sequence flow chart illustrating the operation of the olive packing machine of this invention;

Figures 3 through 9, when arranged in accordance with Figure 10, are a perspective view of the olive packing machine of this invention with the main wheel and spindles removed;

Figure 5*a* is a detailed perspective view of a portion of Figure 5;

Figure 10 illustrates the arrangement of Figures 3 through 9;

Figures 11 through 15, when arranged in accordance with Figure 16, are an exploded perspective view of the control mechanism of the olive packing machine of this invention;

Figure 16 illustrates the arrangement of Figures 11 through 15;

Figure 17 is a bottom view of the lower table of the olive packing machine of this invention;

Figure 18 is a side view of a linkage interconnecting the lower and upper tables of the olive packing machine of this invention;

Figure 19 is a front view of a portion of the wheel including some of the spindles of the olive packing machine of this invention;

Figure 20 is an enlarged front view of one of the spindles of the olive packing machine of this invention; and

Figure 21 is a sectional view through the wheel of the olive packing machine of this invention.

General description

Before proceeding with a detailed description of the olive packing machine of this invention, the machine will first be generally described, including the main operational functions, referring to the pictorial view shown in Figure 1 and to the operational flow chart shown in Figure 2.

Referring first to Figure 1, the olive packing machine includes a lower table **30**, supported on four legs **31**, and an upper table **32**, supported by four legs **33** on the lower table **30**. The two tables **30** and **32** support the rest of the olive packing machine, with the lower table **30** supporting a jar positioning assembly **35** and the bottom of an input stepping conveyor or chain **36**, and the upper table **32** supporting a control mechanism or assembly **38** and by means of the shaft or axle **41**, a main wheel **39** which is shown in phantom. The control mechanism **38** drives or steps the wheel **39** in a counterclockwise direction by means of two roller spindles **40** which are part of a Geneva gear movement that is hereinafter described. At the same time that the wheel **39** is stepped the conveyor **36** is also stepped to position an olive adjacent an olive delivery arm **42**. The orientation of each stuffed olive in the jar **70** is determined by rotating the spindles **50** to **65** about their longitudinal axes on the wheel **39** as it is stepped in a counterclockwise manner.

At each of sixteen circumferential steps of the wheel **39**, the control mechanism **38** performs four main functions:

(*a*) It drives one of sixteen spindles **50** to **65**, not shown in Figure 1, which are supported on the wheel **39**, into a narrow-necked jar **70** to deposit a stuffed olive;

(*b*) It operates a counting mechanism **71** which counts the number of olives delivered into the jar **70**;

(*c*) It operates the jar positioning assembly **35**, positioning the jar **70** to one of four positions as the spindle is inserted into the jar **70** and then after the spindle is inserted, it returns the jar **70** to its original position as the spindle is retracted; and

(*d*) It delivers an olive by means of the olive delivery arm **42** to one of the sixteen spindles **50** to **65**.

The olive is released by the spindle against the inside of the cylindrical wall of the jar **70** after the jar **70** has been positioned. The spindle on wheel **39**, which is now positioned adjacent the jar **70**, is driven into and out of the jar **70** by a plunger shaft **131**. The plunger shaft **131** also operates the spool **127** on the spindle to release the olive when the shaft **131** begins its return stroke. After restoring to the top of its return stroke, the shaft **131** reverses its direction for ¼ of an inch to close the fingers **135** in preparation for the reception of another olive from the olive delivery arm **42**.

The length of the delivery stroke of the plunger shaft **131** and, therefore, the elevation of the olive in the jar **70**, is controlled by a rotatable vertical limiting arm **185** which is automatically adjusted to contact successive steps on the plate **195** to change the elevation, layer by layer, of the deposited olives.

The olives are, in this manner, delivered vertically into the jar **70** and positioned against the wall of the jar **70** by moving the jar **70** against the pimento or stuffed end of the olive. Both delivery and retraction of the spindle is positively controlled so that the olives are accurately positioned.

The stepping sequence continues in this manner until the counting mechanism **71** registers the total number of olives to be packed in the jar **70**. When the counting mechanism **71** indicates that the jar is full, the control mechanism **38** operates the jar positioning assembly **35** to remove the full jar **70** and move an empty jar **70** to the packing position. The packing sequence is then repeated.

The sequence of operations functionally described in reference to Figure 1 is illustrated in the flow chart shown in Figure 2 together with some of the control equipment in the control mechanism **38**. As is hereinafter described in the detailed description the control mechanism **38** includes a motor **80** which drives a main shaft **81** that supports three different clutches **20**, **25** and **28**. The clutch **28** is operated by a start button **82** which initiates the packing sequence. When the clutch **28** is operated, it steps the conveyor **36** and the main wheel **39** and it operates the clutch **25**. When the clutch **25** operates, it releases the clutch **28** and it performs the above-listed four functions of delivering an olive to one of the spindles **50–65**, stepping the counter-mechanism **71** and operating the jar positioning mechanism **35** to position the jar against the pimento stuffed olive. The two clutches **28** and **25** operate alternatively in this manner with each successive operation thereof causing the accurate positioning of an olive in the jar.

When the counting mechanism **71** indicates the jar being packed is full, it operates the clutch **20** which disengages a portion of the shaft **81** to effectively disable the clutches **28** and **25**. The clutch **20** also operates the jar transfer mechanism of the positioning assembly **35** so that an empty jar is positioned for packing, it resets the counting mechanism **71** and it reinitiates the packing sequence.

The flow chart in this manner illustrates the operational sequence of events in the olive packing machine. The same reference designations utilized in Figures 1 and 2 are also utilized in the detail figures so that Figures 1 and 2 may be also considered when the detailed description is read.

Detailed description

The detailed figures include two main composite arrangements, namely, Figures 3 to 9 arranged in accordance with Figure 10 which depict most of the machine except for the wheel **39** and the details of the control mechanism **38**, and Figures 11 to 15 arranged in accordance with Figure 16 which depict the details of the control mechanism **38**. Figures 19 to 21 show the details of the wheel **39** and the spindles **50** to **65**.

As indicated above, the operation of the olive packing machine is initiated by operating a start button **82** which is shown in Figures 2 and 6. The start button **82** initiates the operation of the machine by closing an operating circuit for the start solenoid **83**, shown in Figure 14 which is part of the control mechanism **38**. As is hereinafter described, the solenoid **83** unlatches the clutch **28** to initiate the alternate operating sequence of the clutches **25** anw **28** briefly described above in reference to the sequence flow chart in Figure 2. More specifically, when the solenoid **83** is energized, it attracts a link **84** of the latching mechanism **85** to rotate the mechanism **85** in a clockwise direction as shown in Figure 12 about a shaft **87** and thereby unlatch the clutch **28**. The link **84** is rotatably attached by a screw **86** to a control arm **88** which is part of the latching mechanism **85**. The control arm **88** is both rotatable and slidable about the shaft **87** due to its longitudinal opening **89**. As is hereinafter described, the control arm **88** is moved longi-

tudinally so that it slides on the shaft 87 when a stop solenoid 90 is energized. As the control arm 88 is rotated by the link 84, it stretches or distorts a restoring spring 91 which is effective to return the latching mechanism 85 to its normal condition when the start solenoid 83 is de-energized.

The control arm 88 rotates against the screw 86 of a latching arm 93 to cause the arm 93 to disengage from a pawl 94 on the clutch 28. The latching arm 93, which rotates with the control arm 88 about the shaft 87, is connected to the arm 88 by means of the screw 86. A coiled spring 95 coupled between a pin 96 on the arm 88 and a pin 92 on the arm 93 supports the control arm 88. The spring 95 permits relative vertical movement of the arms 88 and 93 under tension of the spring 95 when the stop solenoid 90 is energized.

In addition to being controlled by the solenoids 83 and 90, the latching mechanism is also controlled by a disabling finger 98 which is mounted on a shaft 99 controlled by the counting mechanism 71. When, as is hereinafter described, the counting mechanism 71 reaches a predetermined count indicative of a full jar, the shaft 99 is rotated in a clockwise direction causing the finger 98 to bear against a pin 88*a* on the lower end of the control arm 88. The movement of the finger 98 in this manner causes the vertical or longitudinal movement of the arm 88 just as does the energization of the stop solenoid 90. The longitudinal or vertical movement of the arm 88 prevents it from being rotatably deflected by a pin 26 on the clutch 25, to in turn, rotate the latching arm 93 away from engagement with the pawl 94. The clutch 28, therefore, cannot be unlatched when the control arm 88 is at its lower position due to the disabling fingers 98 or the stop solenoid 90.

Returning now to the sequence initiated by the energization of the start solenoid 83, the latching mechanism 85 releases the pawl 94 on the clutch 28 allowing it to rotate. The driving shaft 81 is driven in a counter-clockwise direction by the motor 80 through a gear linkage 78 and a safety clutch 79. When the clutch 28 rotates, it rotates therewith a bushing 27 and a gear 29 supported on the bushing 27. The bushing 27, which is concentrically mounted on the shaft 81, is attached to the clutch 28 and to the gear 29. The gear 29 drives a gear train including the gears 29*a*, 43, 43*a*, 44 and 45. The gear 45, which is rotated in a clockwise direction, as viewed in Figure 12, is rigidly mounted on a shaft 46. The shaft 46 supports and rotates therewith a cam 47 at a central location along the shaft 46 and a bracket 48 at the front end of the shaft 46. As is hereinafter described, the cam 47 controls the displacement of a rod 49 which is part of a latching mechanism 100 shown in Figure 3. The latching mechanism 100 is utilized to hold shaft 131 accurately while the wheel 39 is rotated. The bracket 48, which is rotated in a clockwise direction with the gear 45 and shaft 46, supports a pin 205 and the two roller spindles 40 briefly described above in reference to Figure 1.

When the bracket 48 is rotated, the pin 205 engages a rocker 204 which is pivoted on a pin 206 supported on the housing of the control mechanism 38. As the pin 205 rotates in a clockwise direction, it rotates the rocker 204 in a counter-clockwise direction so that a roller 220 supported at one end of the rocker 204 engages a primary latch 200. As is hereinafter described, the latch 200 is rotated in a clockwise direction by the roller 220 to disengage a stud 203 to ready mechanism utilized for delivering an olive to the jar 70. This mechanism is not operated at this time to deliver an olive but operates, as is hereinafter described, when a clutch 25 is released at the end of a revolution by the clutch 28.

As indicated above, the bracket 48 supports two roller spindles 40. Each of the two spindles 40 includes a rotatable bearing 66 which engages the arcuate circumferential teeth 101 and slots 102 of the main wheel 39 which is shown in Figure 19. As the spindles 40 are rotated on the shaft 46 in a clockwise direction, they drive the wheel 39 in a counter-clockwise direction, 22.5 degrees or 1/16 of a revolution about the supporting axial shaft 41 for each revolution of the clutch 28.

As shown in Figures 19 to 21, the wheel 39 is a circular plate having 32 peripheral fingers 101, and eight stiffening ribs 103 (Figure 21) attached thereto at 45 degree angular locations by a number of screws 104 (Figure 19). The wheel 39, which may be fabricated of stainless steel or the like, has a diameter of 26.25 inches. The stiffening ribs 103 prevent the wheel 39 from flexing during the packing sequence to maintain the small tolerances in movement necessary for adequately packing the olives in the jar 70 (Figure 8).

As indicated above, the wheel 39 supports sixteen cylindrical spindles 50 to 65 which function to pick up the olives at the conveyor 36 and deliver them in the correct angular position and height into the jar 70. Each of the spindles 50 to 65 is both movable in a radial direction on the wheel 39 and also rotatable about its longitudinal axis. In its normal position, as shown in Figure 21, the spindle 50 is rotatably supported at its peripheral end by a bracket 106. The bracket 106 is affixed to the wheel 39 by screws, not shown. A detent member 107 resiliently engages one of four notches 108 in a positioning disc or locator 109 which is slidably mounted with a fraction disc 110 and a spacer 111 on the spindle 50. Actually, the spindle 50 and every other fourth spindle 54, 58 and 62 are not rotated. The rest of the spindles which are rotated, also include a pinion or gear 113 (Figure 19) slidingly mounted with the locator 109 and friction disc 110 and held in position on the wheel 39 by the bracket 106. As is hereinafter described, the pinions 113 determine the angle of rotation of the spindles as they are rotated with the wheel 39 from their loading position at the conveyor 36 to their unloading position at the glass jar 70.

The spindles 50, 54, 58 and 62 do not include a pinion so that they are not rotated about their longitudinal axes as they are rotated with the wheel 39. The spindles 51, 55, 59 and 63 include a pinion 113 which is mounted on the spindle towards the lower or outer end of the bracket 106 adjacent two olive fingers 135. The spindles 53, 57, 61 and 65 include a pinion 113 which is mounted centrally in the bracket 106, and the spindles 52, 56, 60 and 64 include a pinion 113 which is mounted in the bracket 106 towards the shaft 41 of the wheel 39. In this manner, every fourth spindle includes a pinion 113 which is mounted in a similar location.

During each 22.5 degree rotational step of the wheel 39, one of the brackets 106 of the 16 spindles 50 to 65 passes adjacent a composite rack arrangement 116 which is shown in Figures 1 and 5. As shown particularly in Figure 5, the arrangement 116 has a first set of racks 117, 118 and 119 and a second complementary set of racks 120, 121 and 122. The arrangement 116 is mounted on the upper table 32 in a manner such that a horizontal spindle on the wheel 39 adjacent the conveyor 36 is positioned between the two sets of racks of the arrangement 116. After the spindle has been loaded with an olive in a manner which is hereinafter described, the first rotational step of the wheel 39 by the spindles 40 causes the rotation of the loaded spindle about its longitudinal axis in accordance with the position of its pinion 113. As indicated above, the spindles 50, 54, 58 and 62 do not include a pinion so that they are not rotated as they pass adjacent the rack arrangement 116. The pinion 113 of the spindles 51, 55, 59 and 63 meshes with the rack 119 which rotates them 270 degrees. The rack 118 meshes with the centrally located pinion 113 of the spindles 53, 57, 61 and 65 to rotate them 180 degrees and the rack 117 meshes with the gear 113 of the spindles 52, 56, 60 and 64 to rotate them 90 degrees. As the wheel 39 is rotatably stepped in a counterclockwise di-

rection, the rotation of the spindles 50 and 65 is the sequence of 0 degrees, 270 degrees, 90 degrees, 180 degrees, 0 degrees, 270 degrees, etc. The sequence is established in this manner because, as described above, two oppositely positioned olives are positioned in each layer of the jar 70 and at a 90 degree rotational displacement from the layers above and below it. The spindles 51 and 52 position two olives 180 degrees displaced in one layer, the spindles 53 and 54 position the next two olives in the next layer 180 degrees displaced from each other and 90 degrees from the olives in the preceding layer, etc. By rotating the spindles 50 to 65 in this manner, the olives are in rotatable position for insertion into the jar 70. The jar 70 need not, therefore, be rotated after the spindles are inserted.

The racks 120, 121 and 122 are complementary to the racks 117, 118 and 119 in that they restore the spindles 50 to 65 to their original angular position during the last step of the wheel 39 before they are brought back to the loading position adjacent the conveyor 36. During the last step before loading, the spindles 50 to 65 are rotated in the sequence 0 degrees, 90 degrees, 270 degrees, 180 degrees, 0 degrees, etc.

As described above and shown in Figures 19 to 21, the peripheral ends of the spindles 50 to 65 are supported by the brackets 106. The central ends 125 of the spindles 50 to 65 are supported respectively in 16 holes 123 of an annular ring 124 that is affixed to the wheel 39. As shown particularly in Figure 20, each of the spindles 50 to 65 includes a stop bushing or collar 126 which is affixed to the spindle adjacent to its end 125. Each of the spindles 50 to 65 also supports a slidable spool 127 between the collar 126 and another collar 128 which is also affixed to the spindle. Assume that the spindle 51 is the first loaded spindle positioned for delivery to the jar 70. The spindle 51 is driven to its delivery position in a manner hereinafter described by a shoe 130 of a vertical delivery or plunger shaft 131 (shown in Figures 1, 3 and 4 and in phantom in Figure 21) which engages the spool 127 forcing it against the collar 128. By means of the shoe 130 and collar 128, the spindle 51 is radially driven along the wheel 39 with the collar 28 sliding along a semi-cylindrical guide 133 of the spindle. The guide 133 is supported on the wheel 39 by means of spacers 137 and screws 138 (Figure 21). The pinion 113, locator 109, spacer 111, and friction split collar 110 remain positioned by the bracket 106 and so are not driven with the cylindrical spindle 51 along the wheel 39. The thrust driving the spindle 51 through these members is relatively large as they frictionally engage the spindle so as to permit the rotation of the spindle by the pinion 113.

Each of the spindles 50 to 65 has a milled slot in which a slidable rod 134 is set. The rod 134 opens and closes a pair of olive tongs or fingers 135 briefly mentioned above, which are pivoted on a pin 136 at the peripheral end of the spindle. The axial movement of the rod 134 relative to the rest of the spindle 51 is controlled by a pin 139 of the spool 127. When the spool 127 is against the collar 128, the rod 134 is in its lower position and the fingers 135 are closed or in their olive-holding position. A pin 140 at the lower end of the rod 134 cams the ends of the flexible members 141. The members 141 bear against the fingers 135 in a manner to rotate them to the relatively closed olive-holding position when the members 141 are rotated away from each other by the pin 140 and to a relatively open or releasing position shown in Figure 20 to release an olive when the members 141 are rotated towards each other. More specifically, when the members 141 are rotated or cammed by the pin 140, they rotate therewith two pins 142 which are also supported on the pin 136. The pin 136 supports the fingers 135 and two flexible finger members 143 against the members 141. A spring 135a shown in Figure 19 holds the fingers 135 against the pin 140 at all times. The ends of the members 143 are resiliently connected by the springs 144 to the pins 142. The finger members 143 together with another pair of flexible members 145 (Figure 19) function as a balanced resilient system to maintain the fingers 135 in an open or olive releasing position in the absence of the camming action of the pin 140, and to cause the fingers 135 to resiliently support olives having different diameters.

Since the spool 127 is kept against the collar 128 as the spindle 51 is driven by the shoe 130 to the delivery position, the fingers 135 remain closed about the olive during the delivery stroke. As indicated above, the fingers 135 are shown in their open condition in Figure 20 with the collar 127 being against the collar 126.

Returning now to the sequence of operations initiated by the energization of the start solenoid 83 shown in Figure 14, the gear 29 drives the gear train including the gears 43, 44 and 45. The gear 45 is mounted on the shaft 46 which drives the wheel 39 in a manner described above to successively position the spindles 50 to 65 at the delivery position adjacent the jar 70 and at the load position adjacent the conveyor 36. The gear 43 also functions to control another sequence of operations. The gear 43 which is part of the gear train to the gear 45 and which rotates in a counter-clockwise direction as shown in Figure 12, is supported on a shaft 73. Mounted on the front end of the shaft 73 which rotates with the gear 43, a gear 72 by way of the gears 74 and 75 and the bevel gears 76 and 77, drives a conveyor shaft 67. The conveyor shaft 67 extends from the control mechanism 38 as shown in Figures 5 and 6 to drive a gear train consisting of gears 148, 149 and 150. Each pair of links 151 which are resiliently urged towards each other hold an olive in position for delivery by the delivery arm 42 to the fingers 135 of a horizontally positioned spindle.

The olives are inserted manually, or by other means, not shown, between the pairs of links 151 with the pimento facing forward or away from the machine as shown in Figure 9. As the conveyor 36 is stepped by the conveyor drive shaft 67, an olive straightener 152 accurately aligns each olive against a backing member 153. The operation of the delivery arm 42 which successively delivers the olives to the spindles 50 to 65 and the straightener arm 152 are both hereinafter described.

The gear 72, which is at the beginning of the mechanical linkage driving the conveyor 36, supports a long pin 155. After one complete revolution of the gear 72 in a counter-clockwise direction, the pin 155 engages and rotates a finger or stop 156 away from the clutch 25. The finger 156 unlatches a pawl, not shown, on the clutch 25 to allow it to rotate in a manner similar to that described above in reference to the latching mechanism 85 and the clutch 28. At the same time that the clutch 25 starts rotating, the clutch 28 is latched as the pawl 94 on the clutch 28 engages the latching arm 93 of the latching mechanism 85.

The clutches 25 and 28 are alternately operative with each initiating the operation of the other after one complete revolution. The clutch 28 initiates the operation of the clutch 25 by means of a gear linkage; the pin 155 and the latching finger 156, and the clutch 25 initiates the operation of the clutch 28 after one revolution by means of the pin 26 which cams or rotates slightly the control arm 88 of the latching mechanism 85. As described above, when the arm 88 is rotated in this manner, it bears against the stud 86 of the arm 93 to cause it to unlatch the clutch 28.

The clutch 25, which is released after one revolution of the clutch 28, is somewhat different from the clutch 28. As described above, the clutch 28 is free on the main shaft 81 which passes through it. It controls the bushing 27 attached thereto and the gear train beginning with the gear 29 that is mounted on the bushing 27. The

clutch 25, however, is attached to the shaft and when it is latched the portion of the main drive shaft 81 at the front of the clutch 25 does not rotate. As is hereinafter described, a clutch 20 which is also mounted on the main drive shaft 81 differs from the clutches 28 and 25 because as long as it is latched, the main drive shaft 81 rotates but when the clutch 20 is released the part of the main shaft 81 in front of it does not rotate.

When the clutch 25 rotates, it performs four main functions in addition to unlatching the clutch 28 at the end of its revolution on the shaft 81.

(1) It delivers an olive by means of the olive delivery arm 42 to one of the sixteen spindles 50 to 65 and it straightens or aligns the olives in the conveyor 36 by means of the straightener 152;

(2) It initiates a sequence for delivering one of the sixteen spindles 50 to 65 to position an olive in the narrow necked jar 70;

(3) It operates the jar positioning assembly 35 back and forth in one of four different directions depending upon the orientation of the olive delivered into the jar; and

(4) It operates the counting mechanism 71 which counts the olives delivered into the jar 70.

Each of these four main functions are hereinafter described in detail in the order in which they are listed above.

When the front section of the main drive shaft 81 is rotated with the clutch 25 due to its release by the finger 156, an eccentric cam 160 mounted on the shaft 81 operates a rocker arm 161 to rotate about a pivot 162. As the cam 160 rotates to rock the arm 161, a link 163, which is pivoted on the arm 161, is moved back and forth. The link 163 passes through the housing of the control mechanism 38 and, as shown in Figure 6, is rotatably attached to one end of a bracket 164. The bracket 164 rotates together with a cylindrical shaft 165 and an arm 166 about a pivot which is attached to the upper table 32 by the screw 168 through the center of the shaft 165. As the bracket 164 rotates in a clockwise manner, it moves the delivery arm 42 to push an olive supported between an adjacent pair of links 151 of the conveyor 36. The arm 42 slides in a bracket 169 which is supported on the upper table 32 of the olive packing machine.

As described above, the olive is positioned with the pimento facing forward between the links 151 so that the arm 42 contacts the olive along its side, not at the pimento. The olive is delivered by the arm 42 to a resiliently closed pair of fingers 135 of one of the sixteen spindles 50 to 65. As described above, the rack assembly 116 has rotated the spindle to its normal position ready to receive an olive as the spindle is moved to the horizontal position of the wheel 39. Each time the clutch 28 rotates, the wheel 39 is stepped to position another spindle at the horizontal loading position, and each time the clutch 25 rotates, an olive is delivered by the arm 42 from the conveyor 36 to the horizontally positioned spindle.

The arm 166 which is rotated with the bracket 164 is part of the olive straightener 152 which was briefly described above. The olive straightener 152 includes a pair of flexible positioners 170 which are slidably mounted by a bracket 171 on the side of the olive conveyor 36. At the same time that the arm 42 is moved to the left (Figure 5) to deliver an olive to the fingers 135 of one of the spindles 50 to 65, the fingers 170 of the olive straightener 152 are moved to the left (Figure 9) to accurately align an olive supported between a pair of links 151 against a backing member 153 which is mounted on the other side of the conveyor 36. In this manner, the olives are accurately positioned in the conveyor 36 as they are stepped along by the conveyor 36 to the delivery position adjacent the delivery arm 42. This automatic alignment of the olives is provided because the olives are not accurately aligned when they are manually inserted between the links 151 of the conveyor 36. By automatically aligning the olives in the conveyor 36 they are accurately positioned in the jar 70 against the cylindrical glass wall when they are released. If the olives are not aligned, they may be released at a small distance away from the cylindrical glass wall or they may be bumped against the glass wall. Even small variations in positioning the olives in the jar 70 should be avoided because the error is accumulative with succeeding layers also being displaced.

As tabulated above, when the clutch 25 is released, it rotates the front section of the main driving shaft 81 to initiate the olive delivery sequence for delivering an olive into the jar 70. As shown in Figure 5 and in Figure 5a, which depicts the details of a link 174, a crank 173 is rotated with the driving shaft 81 in a counter-clockwise direction driving a link 174 which is pivoted at its lower end to the crank 173. As shown in Figure 5a, the upper end of the link 174 has a short longitudinally extending slot 202 which engages a stud 203. The stud 203 is fixedly attached to an arm 175 which rotates in a counter-clockwise direction about a shaft 176 under the influence of the link 174. The shaft 176 is supported on the housing of the control mechanism 38.

The stud 203 may be engaged by a primary latch 200 which is rotatably supported by a pin 207 mounted on the link 174. As described above, however, the latch 200 was disengaged from the stud 203 by the rocker 204 which operated during the time that the wheel 39 was stepped. When the bracket 48 is rotated with the shaft 46 and clutch 28, it functions to drive the wheel 39 and also by means of a pin 205 to rotate the rocker 204 in a counter-clockwise direction. A roller 220 at the end of the rocker 204 engages the latch 200 causing it to rotate in a clockwise direction about its pivot 207 on the link 174 thereby releasing the stud 203. The stud 203 is, therefore, free to move longitudinally relative to the slot 202 in the link 174. When the latch 200 releases the stud 203, it remains in its unlatched position under control of a secondary latch 201 even though it is urged in a counter-clockwise direction by a spring 208. The secondary latch 201 has two slots 214 and 215 which engage pins 212 and 213 respectively on the primary latch 200. The latch 201 is also resiliently connected to the latch 200 by means of a spring 209. When the latch 200 is rotated by the rocker 204 in a clockwise direction, the secondary latch 201 slides along the primary latch 200 under the influence of the spring 209 reducing the opening of the jaws formed by the latches 200 and 201 for the stud 203. The stud 203 is, therefore, free to move longitudinally in the slot 202 and it remains free as long as the stud 203 rotates in a clockwise direction relative to the slot 202 of the link 174 forcing the latch 200 away from it or as long as it is in the top part of the slot 202. When, however, the stud 203 returns to the bottom of the slot 202 and its rotation reverses, which occurs about half-way in the rotating cycle of the crank 173, the latch 200 is urged towards its latching position due to the frictional engagement between it and the stud 203. The change in the direction of friction which is aided by the effect of the spring 208 is sufficient to force the latch 200 over the stud 203 with the stud 203 moving the secondary latch 201 against the tension of the spring 209. The latch 200 is not effective when the stud 203 is toward the top of the slot 202 but only becomes effective to relatch the stud 203 after the stud 203 has returned to its normal position at the bottom of the slot 202 and its direction of relative rotation has reversed.

The crank 173 rotates through one revolution during the motion of the plunger shaft 131, which is further hereinafter described in detail, as follows:

(1) A brief delay in the downward motion of the shaft 131 due to the effect of the slot 202;

(2) A downward movement of the shaft 131 for a

distance determined by the vertical limiting arm 85 and a stepped plate 195;

(3) A period in which the shaft 131 remains in its lower position as determined by the slot 202 and a latching mechanism 199;

(4) An upward movement of the shaft to its uppermost position; and

(5) A downward movement of one-quarter inch under control of the latching mechanism 100 to reclose the opened finger 135 of the spindle and return the shaft 131 to its start or normal position.

Each of these portions of the delivery sequence or cycle is hereinafter described.

The slot 202 causes a delay in the effect of the crank 173 to permit the bottle positioning mechanism or assembly 35 to shift the bottle 70 to allow more clearance for guide fork so that the guide does not hit the lip of the cyclical glass wall of the jar 70 as the olive enters the jar. The operation of assembly 35 is hereinafter described. The latch 200 re-engages the stud 203 so that it will be ready to pull down the plunger or delivery arm 131 one-quarter of an inch to its normal position from its uppermost position. As described above, this one-quarter inch movement functions to reclose the fingers 135 of the spindle which deposited an olive in the jar 70. As described above, it is assumed that the spindle 51 is the first spindle to deposit an olive.

The latching mechanism mounted on the link 174 is one of three latching mechanisms involved in the links utilized in operating the shaft 131 to drive the spindle 51 into the jar 70. The second latching mechanism, which is the mechanism 199 briefly mentioned above, is mounted on slotted arm 177. The sloted arm 177 is rotatable on the shaft 176 which also supports the arm 175. The arm 175 is rotated in a counter-clockwise direction about the shaft 176 under control of the link 174 and the latch 200 mounted thereon to in turn rotate the arm 177 in a clockwise direction by means of the latching mechanism 199. The latching mechanism 199 includes a slotted link 178 which is pivoted at a pin 179 on the arm 175. Attached to the link 178 is a latching member 221 which is pivoted at the pin 221*a* of the link 178 and urged in a counter-clockwise direction by a spring 222 which is attached to the end of the latching member 221 and to a pin 223 mounted on the link 178. The latching member 221 is forced against a stop pin 221*b* and also against a bracket 225 (Figure 3) which is rotatable about the screw 226. The stop pin 221*b* is mounted on the link 178, and the screw 226 is mounted on the link 177.

When the arm 175 rotates in a counter-clockwise direction, it pulls the link 178 therewith and the link 178 drives the slotted arm 177 by means of the latching member 221 and a pin 221*a* (Figure 4) which is mounted on the link 177 and against which member 221 bears. The member 221 also bears against the rotatable member 225. The latching member 221 remains engaged under the pull developed by the rotation of the arm 175. In this manner, as the arm 175 is rotated in a counter-clockwise direction, the arm 177 is lowered also being rotated in a counter-clockwise direction about the shaft 176 due to the engagement of the latching mechanism 199. The arm 177 is rotated to stretch a counterbalancing spring 177*a*. The arm 177 also includes a longitudinal slot 180 which engages a roller 181 rotatably attached to the plunger shaft 131. As the arm 177 is lowered, the roller 181 rotates in the slot 180 allowing the shaft 131 to move down with the arm 177. As the arm 177 is lowered, it also allows a latch arm 225*a* which engages it along its upper surface to rotate in a clockwise direction as urged by the spring 225*b*.

The arm 225*a*, which is part of the latching mechanism 100, rotates therewith a latching member 226 which keeps the latch 227 rotated away from the slot 228 of the shaft 131 until the shaft 131 is near the top of its return stroke. As described above, the latch 227 is reset when the wheel 39 is stepped under control of the cam 47 and the rod 49. The rod 49 rotates the resetting member 229 against the tension of a spring 49*a* in a clockwise direction to unlatch the shaft 131 preparing it for delivering an olive. With the shaft 131 unlatched by the resetting member 229, it remains unlatched for the downward stroke of the shaft 131 delivering an olive to the jar 70.

The downward stroke of the plunger shaft 131 is limited by the vertical limiting arm 185 which is mounted by a screw 186 on the arm 177. The screw 186 engages a hole not shown in the section 185*b* and it also engages the slotted opening 230 in the section 185*b* of the arm 185. The sections 185*a* and 185*b* are resiliently interconnected by a spring 187. The spring 187 is attached to a pin 188 of the section 180*b* which slides in a slot 231 in the section 185*a*. The slot 231, the slot 230 and a slot 189 in the section 185*a* permits a small amount of movement between the two sections 185*a* and 185*b*.

The vertical limiting arm 185, which is rotatable about the screw 186, is maintained in a substantially vertical position by the spring 190 attached to its upper end and to a pin 191 of the arm 177. The spring 190 urges the vertical limiting arm 185 in a counter-clockwise direction about the screw 186 forcing arm 185*b* to bear against a pin 233 of a control arm 197. As is hereinafter described, the control arm 197 is adjustable, being shifted one step to the left for each pair of olives to be delivered to the jar 70.

The downward stroke of the slotted arm 177 and the plunger shaft 131 is halted when the vertical limiting arm 185 contacts one of the steps of the stepped plate 195. The stepped plate 195 is attached by means of a threaded member 195*a* to the supporting member 235 which is mounted on the upper table 232. The contact member 194 of the vertical limiting arm 185 hits against one of the steps of the plate 195 as determined by the angular position of the arm 185 under the influence of the control arm 197. When the member 194 of the arm 185 contacts the plate 195, the section 185*b* of the arm 185 is driven against the rotatable bracket 225 which releases the latch 221. The spring 187 takes up some of the shock which occurs when the member 194 hits the plate 195. With the latch 221 released, the slotted link 178 continues the downward movement with a screw 220 of the arm 177 sliding in the longitudinal slot of the link 178 but the downward movement of the arm 177 and the shaft 131 are halted, even though the arm 175 and the link 178 continue to rotate. The latch 199 remains released until the link 178 begins its upward movement during the second half of the operating cycle of the arm 175.

When the screw 220 engages the bottom of the longitudinal slot of the link 178, the link 178 then drives the arm 177 in an upward direction. Near the top of the upward movement, the arm 177 engages the rotatable member 225*a* to ready the mechanism 199 for a downward movement of the shaft 131. The latch 227 engages the slot 228 as the shaft 131 moves down one-quarter of an inch.

To briefly recapitulate; during the revolution of the crank 173 with the main shaft 81, first, a delay is provided due to the movement of the pawl 203 in the slot 202 of the link 174, then the shaft is driven downward through a distance determined by the angular position of the vertical limiting arm 185. With the spindle 51 in the delivery position over the jar 70 and holding the first olive to be delivered, the member 194 is then driven down by arm 177 until it contacts the lowest or first step of the plate 195. The plate 195 has thirteen steps as the number of olive layers in the jar is assumed to be thirteen. The vertical height of the steps of the plate 195 is designed to change the length of the

downward stroke by a distance approximately equal to the average diameter of the olives to be packed in the jar 70.

The spindle 51 remains inserted in the jar 70 until the bottom of the longitudinal slot of the link 178 reaches the screw 220 on its upward movement. As soon as the plunger shaft 131 moves up one-quarter of an inch driven by a linkage including the link 178 and slotted arm 177, it releases the olive by opening the fingers 135 of the spindle 51. As described above and illustrated in Figures 19 through 21, the fingers 135 remain closed as long as the shoe 130 of the shaft 131 forces the spool 127 against the collar 128. Throughout the downward stroke of the shaft 131, the shoe 130 continues to force the spool 127 downward or against the collar 128. The collar 128 slides with the spool 127 along the guide 133 driving the fingers 135 of the spindle 51 into the jar 70.

As also described above, the fingers 135 support an olive therebetween which was delivered thereto by the arm 42 from the conveyor 36 when the spindle 51 was horizontally extending to the right (Figures 1 and 5). After the spindle 51 was loaded, during the next step of the wheel 39, it was rotated 270 degrees in clockwise direction viewed from the right in Figures 1 and 5, so that the olive originally facing forward as delivered to the spindle 51 is facing downward after the first step. As the wheel is rotated in a counter-clockwise direction step by step through the next eleven steps or for a total of 270 degrees or twelve steps, the spindle 51 is not rotated. The olive, which was facing down when the spindle 51 was substantially horizontal at the spindle loading position, is therefore rotated with the spindle 51 and wheel 39 until the spindle 51 is at the jar loading position. At the jar loading position, the olive or rather its pimento stuffing is facing to the left.

The following chart illustrates the various rotational movements of the sixteen spindles 50 to 65:

Spindle	Rotation by Ass. 116	Olive Position at Jar 70
51	270	left.
52	90	right.
53	180	back.
54	0	front.
55	270	left.

Each four spindles 51 through 54, 55 through 58, etc. form a set in which the respective rotational movements of the various corresponding spindles are similar.

The fingers 135 of spindle 51 remain closed after they are inserted in the jar 70 until the shoe 130 moves up one-quarter of an inch. The movement of the shoe 130 moves the spool 127 against the collar 126 (Figure 21) of the spindle 51 opening the fingers 135 and releasing the olive with the pimento stuffing facing left (Figure 8).

As shown in Figures 19 and 21, each of the spindles 50 to 65 includes an olive fork or aligner 450 which is supported on the pin 136 adjacent the fingers 135. The fork 450 is stationary with respect to the rest of the spindle. The function of the fork 450 is to align or accurately position the first olive in any layer in the jar 70 when the second olive is deposited. As described above, there are only two olives in each layer and the two olives are angularly displaced by 180 degrees or oppositely positioned. Actually, the fork 450 on the even numbered spindles 52, 54, 56, etc. aligns the olives, as the fork does not perform a useful function when the first olive in a layer is deposited.

The first olive deposited into the jar, which in the illustration being described is the olive held by the spindle 51, is the most troublesome olive as it readily changes its position at the bottom of the jar. The vibration of the machine or a slight angle of the bottom of the jar the first olive may cause the displacement of the first olive. It is particularly important to accurately align the first olive in the jar as it determines the accuracy of all 70 to the horizontal, or an irregularity in the shape of the successive layers above it. The first olive in each of the other layers is more or less aligned between the two olives in the layer beneath. Though the alignment of these olives is also useful, the alignment of the first olive into the jar is more important.

The forks 450 function as an aligning member by adjusting the position of a displaced olive so that it is aligned with the olive being deposited. In this manner, when the spindle 52 is inserted to deposit the second olive in the jar 70, its fork 450 aligns the first olive which was deposited by the spindle 51.

The fingers 135 of the spindle 51 withdraw by the shoe 130 of the shaft 131 which continues its upward movement after the olive has been released. The shaft 131 is moved to the top of its stroke releasing the latching member 226 of the latch 100 (Figure 3). The latch 201 (Figure 5A) is moved down by the rotation of the stud 203 as the shaft 131 begins its upward movement. The crank 173 and shaft 81 rotate sufficiently to drive the shaft 131 down one-quarter of an inch. The reengagement of latch 200 provides for a positive downward movement. The movement of the shaft 131 is halted when the latch 227 re-engages the slot 228 (Figure 3) in the plunger shaft 131.

The latching mechanism 227 is released as described above, when the wheel 39 is stepped to the next position to ready the delivery linkages for the delivery of the next olive.

The sequence for delivering an olive to the jar 70 is initiated as described above when the clutch 25 is released by the latch 156. In addition to the olive delivering sequence, the clutch 25 also operates the jar positioning assembly 35 and the counting mechanism 71.

As described above, when the clutch 25 is released it rotates therewith the front portion of the main driving shaft 81. In addition to the cam 160 (Figure 12) which operates the olive delivery arm 42 and the crank 173 (Figure 5) which operates the plunger shaft 131, the main driving shaft 81 also supports four cams 260, 261, 262 and 263. The cams 260 through 263 are effectively input controlling members to the jar positioning mechanism 35 which is shown in Figures 11 and 12. Under control of the four cams 260 through 263, the jar positioning mechanism 35 functions to shift the position of the jar 70 as the plunger shaft 131 delivers an olive to the jar 70 and then back to its original position thereafter. As described above, during the sequence for delivering an olive, the link 174 has a longitudinal slot 202 which engages a stud 203. During the time that the stud 203 moves from the top of the longitudinal slot to the bottom of the slot, a delay interval is provided in operating the plunger shaft 131 during which the jar positioning mechanism 35 functions to shift the jar 70. In other words, when the plunger shaft 131 starts its downward stroke to enter the bottle 70, it has been shifted in one of four directions to center it relative to the end of the olive and to the positioning fork 450 of the spindle 51 delivering the olive. During this delay interval, before the operation of the plunger shaft 131, only one pair of movements under control of the mechanism 35 takes place. For example, when the first olive is delivered by the spindle 51, the jar 70 shown in Figure 8, is moved three-sixteenths of an inch to the left, the olive is inserted into the jar 70 and then, on the upward stroke of the shaft 131, the jar is returned to its original center position. When the olive is inserted into the jar 70, the jar 70 is moved slightly to the right so that the inside wall of the jar is pressed against the olive which is still supported in the closed fingers 135 of the spindle 51. The olive is released before the return movment of the jar 70 to its original position. In other

words, the olive is released in the jar 70 before the completion of the second of two opposite movements of the bottle positioning apparatus 35. After the olive is released against the inside of the cylindrical glass wall of the jar 70, the spindle 51 is withdrawn therefrom by the plunger shaft 131 and the bottle 70 is returned to its original position.

The four cams 260 through 263 are engaged respectively by the rollers 265 through 268 supported on notched arms 270 through 273. The arms 270 through 273 are respectively engageable by the rotatable latches 280 through 283. Only one of the arms 270 through 273 is engaged by its respective latch at any one time. The position of the latches 280 through 283 are controlled respectively by the four fingers 290 through 293 which are rigidly attached to the shafts 294. The fingers 291 through 293 are successively engaged by the pins 330 (Figure 19) of the hub 124 of the main wheel 39. Each time that the wheel 39 is stepped, one of the four pins 330 engages one of the fingers 290 through 293. At every fourth step of the wheel 39, a different one of the pins 330 repeats the cycle of successively engaging the four fingers 290 through 293.

The wheel 39 is stepped in a counter-clockwise direction so that the first finger engaged by one of the pins 330 is the finger 290. When the finger 290 is contacted by a pin 330, it is rotated through a small arc in a clockwise direction rotating therewith its associated shaft 294 and an arm 287 mounted on the shaft 294. The arm 287 is pinned to one end of a link 286. The other end of the link 286 is pinned to one end of the latch 281. As the arm 287 rotates in a clockwise direction it stretches a spring 285 and rotates the latch 281 to engage the notched arm 271.

The four latches 280 through 283 are respectively supported on four vertically extending members 320 through 323. The members 321 and 323 control the movement of the jar 70 first to the left before the spindle 51 is inserted and then to the right after the spindle 51 has been inserted into the jar 70 to press the jar against the olive. The movement to the right is completed after the spindle is withdrawn from the jar. The vertically extended members 320 and 322 control the movement of the jar 70 to the rear and front. The members 320 and 322 are inter-connected by a pin 277 and the members 321 and 323 are inter-connected by a bracket 279 which is contiguous with the vertically extending member 323.

In this manner, when the finger 290 is in its operated or clockwise position, the latch 281 engages the notched arm 271. When the cam 261 is rotated with the other three cams 260, 262 and 263, it moves the roller 266 engaged by the latch 281, it rotates therewith the vertically extending member 321. The member 321 is in this manner rotated but none of the other three vertically extending members, 320, 322 and 323, are rotated even though their associated notched arms 270, 272 and 273 are rotated by their respective cams because they are not latched thereto.

When the member 321 is rotated, it moves a link 301. The link 301 is one of two similar links 300 and 301 which are utilized to control similar linkages that position the bottle 70. A rotatable pin 289 at the end of the arm 301 is mounted on a slotted bracket 310. When the arm 301 is moved to the right by the member 321, the bracket 310 is rotated in a clockwise direction about a pin 311. The movement of the pin 289 also stretches a spring 306 inter-connecting the two arms 304 of a center positioner 308. Only one of the arms 304 is rotated about the common pivot pin 307 as a stop pin 309 prevents the movement of the other arm 304. Depending, therefore, upon the displacement of the arm 301, one or the other of the positioner arms 304 and 305 is rotated to stretch the spring 306. The spring 306 is, in this manner, effective to return the arm 301 to its normal position when the latch 281 is released.

The slotted bracket 310 is rotated in a clockwise direction when the arm 301 is shifted to the right. The bracket 310 supports an adjustable link 313 which it moves therewith to the right to rotate a crank 314 and a shaft 316 to which the crank 314 is attached.

As indicated above, the fingers 291 through 293 control two similar sets of linkages, one for moving the jar 70 forward and backward or backward and forward and the other for moving the jar 70 to the left and right or to the right and left. One set of linkages rotates the shaft 316 and the other set of linkages rotates a shaft 317 by means of the arm 300, a bracket 303, and links 312 and 315 to the shaft 317. The shafts 317 and 316 which pass through the upper table 32 are adjustable in length as shown in Figure 4.

The bottom half of the shafts 317 and 316 also pass through the lower table 30 as shown in Figure 8. The bottom view of the lower table 30 is shown in Figure 17. As shown in Figure 17, the shaft 317 rotates therewith a crank 340 and the crank 340 moves a link 341 along a slot 342 in which a stud 343 of the link 341 moves. The stud 343 passes through the table 30 to engage a platform 345 (Figure 8). The platform 345 is one of two mating platforms 345 and 346 which are supported on the lower table 30 with the platform 345 being supported on the platform 346. As shown in Figure 8, the platform 345 is movable to the rear or front as shown by the arrows B on the platform 346, and the platform 346 is movable to the left or right as shown by the arrows A. The stud 343 of the link 341 engages the platform 345 so that the entire bottle assembly 35 is shifted forward or back when the shaft 317 rotates and the bottle 70 is shifted to the right or left to the platform 345 when the shaft 316 rotates. As described above, the shaft 316 is rotated in a clockwise direction (Figure 12) and in a counter-clockwise direction (Figure 17) to rotate the crank 350 to the left thereby shifting the platforms 345 and 346 to the left.

The platform 345 supports toggle assemblies 351 and 352 which clamp the jar 70 in position. As is hereinafter described, when the jar 70 is filled, the toggles 351 and 352 are broken to unclamp the jar 70 so that it may be automatically moved off the platform 345 and an empty jar 70 shifted to its place.

The bottle assembly 35 is shifted to the left by means of a linkage initiating with the cam 261 on the main drive shaft 81 before the plunger shaft 131 begins its downward motion. The assembly 35 remains shifted to the left so that the olive in the fingers 135 of the spindle 51 clears the narrow neck of the jar 70. Before the jar 70 is shifted, the olive is accurately aligned to be in vertical alignment with the inside cylindrical wall of the jar 70. After the spindle 51 is inserted in the jar, the cam 263, which also controls the link 301, moves the assembly 35 part of the way back to the right, positioning the inside wall of the jar 70 against the pimento of the olive still held in the fingers 135 of the spindle 51. Thereafter, the fingers 135 are opened, the spindle 51 is withdrawn and the jar 70 is returned the rest of the way back to its original position. For the next olive, the positioning of the assembly 35 is reversed being moved first to the right then to the left.

The sequence for adjusting the position of the bottle 70 is initiated as described above when the clutch 25 is released. In addition to the operation of the bottling positioning mechanism 35 and the plunger shaft 31, the clutch 25 also operates the olive counting mechanism 71. The counting mechanism 71 keeps track of the number of olives in the bottle 70, and when a predetermined indication is obtained, it initiates a sequence for shifting the full jar 70 from the platform 345 and replacing it with an empty jar 70.

When the front portion of the main drive shaft 81 is rotated with the clutch 25, it rotates, as shown in Figure 5, an eccentric cam 240 as well as the crank 173. The eccentric cam 240 operates a rocker arm 241 to en-

gage a ratchet 245, which is also shown in Figure 15. As shown in Figure 15, the ratchet 245 is engaged by a pawl 245*a* which steps once each time the rocker 240 is rotated in a counter-clockwise direction by the eccentric cam 240. The rocker 241 is pivoted on a pin 244 and urged in a clockwise direction by a spring 242 that is attached to a pin 243. The ratchet 245 is mounted with a helical stepped cam 246 (Figure 5) on a shaft 360. Attached to the shaft 360 is a selector assembly consisting of a plate 361 and a plate 362. The plate 362 may be set to any one of a number of positions relative to the plate 361. The compression spring 362*b* maintains the plate 362 against the plate 361.

The counting mechanism 71 does not perform a function as the olive is delivered into the jar 70 until a predetermined count is obtained as determined by the setting 362 relative to the plate 361. The stepped cam 246 which is mounted with the ratchet 245 on the shaft 360 does, however, perform an important function as the olives are delivered one by one to the jar 70. As the cam 246 is rotated in a clockwise direction with the ratchet 245, it moves a pin 248 step by step further away from the shaft 360. The pin 248 is supported on an arm 247 which is rotatable on a pin 249. Actually, each two steps of the cam 246 are at a similar radial distance so that the arm 247 is rotated through a small angle for every other step of the cam 246. The arm 247 is resiliently connected by means not shown to the control arm 197 which, as described above, determines the angular position of the vertical limiting arm 185. In this manner, the control arm 197 is moved to the left one step for every two steps of the cam 246. This particular motion is provided because two olives are delivered in one layer or at one vertical height in the jar 70. After the first two olives have been delivered to the jar 70, the cam 246 steps the control arm 197 to move the vertical positioning arm 185 in a clockwise direction so that it will contact the next step on the step plate 195.

When the required number, illustratively 26, of olives have been deposited in the jar 70, the stroke or olive counting ratchet 245 brings a pin 362*a* of the plate 362 in contact with a finger 370. By means of the shaft 371, the crank 372, a crank 373 which is pinned to the crank 372 and mounted on a shaft 99, a latch 375 is rotated in a counter-clockwise direction to release the clutch 20 and a finger 98 is rotated to disengage the engaging mechanism of slide 85. The clutch 20 as briefly described above when engaged by the latch 375 effectively provides a connection between the sections of the main drive shaft 81. When the clutch 20 is released, the clutches 25 and 28 are effectively disabled.

When the clutch 20 is released, it rotates a bushing 376 which is attached thereto and concentric with the main drive shaft 81. The bushing 376, by means of a gear linkage, including the gears 377 and 378 operates a jar transfer cam 379. The clutch 20 and the gear 377 rotate through four revolutions for a single revolution of the gear 378. As is hereinafter described, the clutch 20 remains released for four revolutions to provide sufficient time for a number of operations. The cam 379 is mounted with the gear 378 and a number of other cams 390, 423 and 422 on a shaft 380. The jar transfer cam 379 rotates against a roller 381*a* of a link 381 pivoted on a pin 382 to shift a link 383 (Figure 12) to the right rotating therewith a crank 384 in a clockwise direction. The crank 384 is attached to an adjustable jar transfer shaft 385. As is hereinafter described, the shaft 385 functions to transfer the full jar 70 from the platform 345 and to substitute an empty jar 70 therefor.

Before the jar transfer takes place, an open jar cam 390, which is also mounted on the shaft 380, by means of a split link 391 and a link 392, rotates a bell crank 393. The crank 393, by means of a link 394 and a crank 395, rotates a shaft 396. A crank 397 is mounted at one end of the shaft 396, and the crank 395 is mounted at the other end of the shaft 396. As both cranks 395 and 397 are rotated in a clockwise direction, they raise, respectively, the links 398 and 399. As shown in Figure 4, the links 398 and 399 pass through the upper table 32 and are adjustable. The links 398 and 399 engage, respectively, the toggle assemblies 352 and 351, as described above, which clamp the jar 70 in position on the platform 345. When the links 398 and 399 are moved down, the toggles are broken and the jar 70 is unclamped. This sequence of releasing the jar 70 occurs under control of the cam 390 (Figure 14) before the cam 379 effectively initiates the jar transfer sequence.

The jar transfer shaft 385 (Figure 12) as shown in Figure 18 is connected through a linkage consisting of a crank 400, a linkage 401, and a crank 402 to a jar transfer shaft 403 which is also shown in Figure 7. The linkage 401 may consist of a number of links instead of just one as shown in Figure 18. The shaft 403 rotates a crank 404 which drives a link 405 and a mover assembly 406 to both remove the full bottle 70 and replace it with an empty bottle 70. Only one of two sets of fingers 407 is shown, one of the sets functioning to remove the full bottle 70 and the other functioning to shift in its place an empty bottle 70. The bottle 70 is brought into position between the guides 410 and 411 which are supported by the shafts 412 on the lower table 30. The jars 70 which are lined up between the guides 410 and 411 are under a small pressure forcing them to the left against a guide 420 so that an empty jar 70 is immediately shifted forward to replace the jar 70 which is substituted for the full jar 70.

In addition to the cam 379 which initiates the jar transfer sequence, another cam 422, which is also mounted on the shaft 380, functions to return the mover member 406 to its normal position through the same set of linkages utilized by the cam 379 to move to its operated position. After the effective operation of the return cam 422, a fourth cam 423, also mounted on the shaft 380 functions to close the jaws of the toggle assemblies 351 and 352 by reversing the rotation of the split member 391. When the member 391 is rotated in a counter-clockwise direction, it functions to raise links 398 and 399 relatching the assemblies 351 and 352.

As indicated above, when the arm 99 is rotated in a clockwise direction to initiate the jar transfer sequence, the finger 98 lowers the slide 88 of the latching mechanism 85 preventing the pin 26 from contacting the slide 88 and unlatching the clutch 28. Both clutches 28 and 25 remain, therefore, disengaged during the operation of the clutch 20.

Towards the end of the fourth revolution of the clutch 20, a pin 500 on the wheel 378 (Figure 14) cams a reset arm 501 which rotates with the shaft 503 in a clockwise direction. The shaft 503 rotates a crank 504 against the tension of a spring 507. The crank 504 is pinned to another crank 505 which rotates with a shaft 506 and the pawl 245*a* in a counter-clockwise direction. The pawl 245*a*, as described above, engages the counting ratchet 245 of the counting mechanism 71. With the pawl 245*a* rotated through a small angle away from the ratchet 245, the counting mechanism 71 is released and a torsion spring, not shown, which was distorted during the counting sequence, functions to return the plates 361 and 362 to their normal or zero count condition, and also to return the stepping helical cam 246 to its start condition. When the cam 246 is returned to its start condition, it rotates the control arm 197 to the right allowing the vertical limiting arm 145 to rotate in a counter-clockwise direction due to the spring 190 to its start position so that it will contact the first step of the plate 195 when the first olive is to be inserted in the next or empty jar 70.

When the plates 361 and 362 rotate in a counterclockwise direction back to the zero count position, the finger

370 is rotated due to the spring 373*a* in a clockwise direction rotating the shaft 99 in a counter-clockwise direction. When the shaft 99 is rotated in a counter-clockwise direction, it causes the latch 375 to re-engage the clutch 20 and the finger 98 to allow the slide 88 of the latching mechanism 85 to restore to its normal position against the stud 86. As described above, the spring 95 of the mechanism 85 causes the movement of the slide 88. The latching mechanism 85 is in this manner returned to normal, and the clutch 20 is halted when the counter 71 is reset.

Before the clutch 20 is halted, and immediately following the camming action of the pin 500 against the reset arm 501, the pin 500 contacts another arm 510 which is mounted on the shaft 87 described above in reference to the latching mechanism 85. The finger 500 rotates the arm 510 and the shaft 87 through a small angle before the clutch 20 is halted. The shaft 87 is attached to the latching arm 93 of the latching mechanism 85 so that it rotates with the shaft 87 away from the clutch 28. In this manner, after the latch 375 contacts the clutch 20, but before the pawl, not shown, on the clutch 20 reaches the latch 275 so that the clutch 20 is halted, the shaft 87 is rotated to unlatch the clutch 28. The clutch 28, therefore, begins rotating just before the end of the fourth revolution of the clutch 20. When the clutch 28 rotates, it initiates the sequence of operations described above for rotating the wheel 39 and packing twenty-six olives in the jar 70, with two olives being packed in each layer and each layer being rotated 90 degrees from its adjacent layers.

In addition to the start button 82 (Figure 6) two other buttons 515 and 516 are provided. The button 515 is a stop button which functions to energize the stop solenoid 90 which was briefly described above. As described above, the stop solenoid 90 rotates a crank 517 which engages a pin 518 on the control slide 88 of the latching mechanism 85. When the crank 517 is rotated in a counter-clockwise direction, it pulls down the slide 88 so that after an olive is delivered to the jar 70, the pin 26 of the clutch 25 is ineffective to release the latching mechanism 85 so that the clutch 25 remains latched. In other words, when the stop solenoid 90 is energized it does not instantaneously halt the olive packing machine but it prevents the release of the clutch 28 so that the sequence for delivering an olive which may be in process is completed. With the clutch 28 disengaged, the wheel 39 is not stepped to its next position.

When the button 515 is operated, it functions to reset the counting mechanism 71. More specifically, the return button 515 energizes a reset solenoid 502 which rotates the arm 501 in a clockwise direction. As described above, the arm 501 is mounted on the shaft 503 which rotates the pawl 245*a* away from the ratchet 245 of the counting mechanism 71 returning it to its zero or no-count condition.

Although this application has been disclosed and illustrated with reference to a particular embodiment, the principles involved are susceptible to numerous other applications and embodiments which will be apparent to persons skilled in the art. For example, the size of the jar 70 and the number of olives packed therewith may be readily changed by changing the stepping plate 195 so that it has more or less steps, by adjusting the plate 362 relative to the plate 361 to indicate a different maximum count and by changing the stepping cam 246 (Figure 5) which controls the movement of the vertical limiting arm 185 (Figure 4). The invention is, therefore, to be limited only as indicated by the scope of the appended claims.

We claim:

1. Apparatus for packing articles in successive layers in a container, including, a rotatable member positioned adjacent the container, a plurality of angularly spaced article-holding members movably supported on said rotatable member, means for stepping said rotatable member to successively position said article holding members adjacent said container, and means effective between the successive operations of said stepping means for moving said article holding member positioned adjacent the container with respect to said rotatable member to deliver an article into the container.

2. Apparatus for packing articles in successive layers in a container, including, a rotatable member positioned adjacent the container, a plurality of angularly spaced article-holding members supported on said rotatable member, means for stepping said rotatable member to successively position said article-holding members adjacent said container, means effective during each of the successive operations of said stepping means for rotating at least one of said article-holding members to orient the held article in a particular direction relative to the container, and means effective between the successive operations of said stepping means for moving said article-holding member positioned adjacent the container to deliver an article into the container.

3. Apparatus for packing articles in a predetermined array in a narrow-necked container, including, means for holding and delivering an article to be packed into the container, means effective before the article is delivered into the container for shifting the position of the container in a direction to move the narrow neck of the container out of the delivery path of the article held by said holding and delivery means, means effective after the article has been delivered into the shifted container by said holding and delivering means for shifting the container back to its original position to press the inside wall of the container against the article held by said holding and delivering means, and means effective after the container has been reshifted to its original position for releasing the article and for withdrawing said holding and delivering means from the container.

4. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular deviation from the adjacent layers, including, a plurality of rotatable members for depositing articles in the container, means for rotating said rotatable members through different particular angular displacements determinative of the angular position of the articles as deposited in the container by said rotatable means, and means effective before each article is deposited by any one of said rotatable means for adjusting the position of the container in a particular direction associated with the angular displacement of said one rotatable means.

5. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of rotatable members for depositing articles in the container, means for rotating said rotatable members through different particular angular displacement determinative of the angular position of the articles as deposited in the container by said rotatable means, means effective before each article is deposited by any one of said rotatable means for adjusting the position of the container in a particular direction associated with the angular displacement of said one rotatable means, and means effective after each article is deposited by said rotatable means for readjusting the position of the container back to its original position to press the article against the inside wall of the container.

6. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles when they are released in the container; means for successively positioning said spindles adjacent the container; means effective between the succes-

sive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article into said container; and means effective after the article is inserted into the container for operating said releasably holding means to release the inserted article.

7. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles when they are released in the container; means for successively positioning said spindles adjacent the container; means effective between the successive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article in the container; means effective before each article is inserted for adjusting the position of the container in a particular direction associated with the orientation of the article held by said positioned rotated spindle; means effective after each article is inserted for readjusting the position of the container back to its original position; means effective after the position readjustment of the container for operating said holding means of said positioned spindle to release the inserted article; and means effective after the article is released in the container for longitudinally moving said spindle to return it to its original longitudinal position.

8. Apparatus for packing articles in a container in accordance with claim 7, including, in addition, means effective before a spindle is rotated by said rotating means for delivering an article to said holding means of said spindle, and means effective after each of said rotated spindles is returned to its original longitudinal position for rotating said spindle back to its original angular position before it was rotated by said rotating means.

9. Apparatus for packing articles one at a time in successive layers in a container, each layer being rotationally disposed by a particular angular deviation from the adjacent layers, including, a plurality of rotatable members for depositing articles in the container, and means for rotating said rotatable members through different particular angular displacements determinative of the angular position of the articles as deposited in the container by said plurality of rotatable means; each of said rotatable members including releasable means for resiliently and releasably supporting one of the articles for deposit in one of the layers of the container, and article aligning means for adjusting the position of an article positioned in the same layer in the container as the article supported by said releasable means.

10. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles held thereby when they are released in the container; means for successively positioning said spindles adjacent the container; means effective between the successive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article in the container; each of said spindles including an aligning member for adjusting the position of an article previously positioned by one of said spindles; and means effective after the article is released in the container for longitudinally moving said spindle to return it to its original longitudinal position.

11. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles when they are released in the container; means for successively positioning said rotated spindles adjacent the container; means effective between the successive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article in the container; each of said spindles including an aligning member for adjusting the position of an article previously positioned by one of said spindles; means effective before each one of said spindles is rotated by said rotating means for delivering an article to said holding means of said spindle; and means effective after each of said spindles is returned to its original longitudinal position for rotating said spindle back to its original angular position before it was rotated by said rotating means.

12. Apparatus for packing articles one at a time in successive layers in a container, including, a plurality of movable members for releasably supporting articles to be packed in the container, means for successively positioning said movable members adjacent the container, and a reciprocating member movable in a first and a second direction for moving a positioned one of said movable members in the first direction to insert the article supported thereby into the container and in the second direction opposite to said first direction for returning said movable member to its original position, each of said movable members including means controlled by said reciprocating member for releasing the article supported by said movable member during the initial portion of the movement of said reciprocating member in said second direction.

13. Apparatus for packing articles one at a time in successive layers in a container, including, a plurality of movable members for delivering articles to the container, each of said movable members including means for releasably holding an article to be packed having an operative releasing condition and a normal holding condition, means for successively positioning said movable members adjacent the container, a reciprocating member movable in a first and a second direction and effective between operations of said positioning means for moving a positioned one of said movable members in the first direction to deliver an article held by said releasably holding means of said positioned movable member and then after an interval to move said positioned movable member in the second direction opposite to said first direction to return said positioned movable member to its original position adjacent the container, means controlled by said reciprocating member for maintaining said releasably holding means of said positioned movable member in said normal holding condition when said reciprocating member moves said positioned movable member in said first direction, and means controlled by said reciprocating member for changing the condition of said releasably holding means of said positioned movable member to said operative releasing condition when said reciprocating member initiates its movement in said second direction.

14. Apparatus for packing articles one at a time in successive layers in a container, including, a plurality of movable members for delivering articles to the container, each of said movable members including means for releasably holding an article to be packed having an operative releasing condition and a normal holding condition, means for successively positioning said movable members adjacent the container, a reciprocating member effective between operations of said positioning means for moving a positioned one of said movable members in a first direction to deliver an article held by said releasably holding means of said positioned movable member and then after an interval to move said positioned movable

member in a second direction opposite to said first direction to return said positioned movable member to its original position adjacent the container, means controlled by said reciprocating member for maintaining said releasably holding means of said positioned movable member in said normal holding condition when said reciprocating member moves said positioned movable member in said first direction; means controlled by said reciprocating member for changing the condition of said releasably holding means of said positioned movable member to said operative releasing condition when said positioned movable member is moved in said second direction by said reciprocating member, and means effective after said reciprocating member moves said positioned movable member in said second direction and before the operation of said positioning means to position another one of said movable members adjacent the container for moving said reciprocating member for a particular distance in said first direction to change the condition of said releasably holding means of said positioned movable member back to said normal holding condition.

15. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles held thereby when they are released in the container; means for successively positioning said spindles adjacent the container; means effective between the successive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article in the container; means coupled to said longitudinally moving means for adjusting the distance of the longitudinal movements of successively positioned ones of said spindles so that said articles are released in layers at different elevations in the container; and means effective after said article has been inserted for operating said holding means of said positioned spindle to release the inserted article.

16. Apparatus for packing articles in a container in successive layers, each layer being rotationally disposed by a particular angular displacement from the adjacent layers, including, a plurality of spindles each having a longitudinal axis, and means for releasably holding articles to be packed; means for rotating at least some of said spindles about said longitudinal axes through different predetermined angular distances to determine the angular position of the articles held thereby when they are released in the container; means for successively positioning said spindles adjacent the container; means effective between the successive operations of said positioning means for longitudinally moving the positioned one of said spindles to insert an article in the container; means coupled to said longitudinally moving means for adjusting the distance of the longitudinal movements of successively positioned ones of said spindles so that said articles are released in layers at different elevations in the container; means effective before each article is inserted for adjusting the position of the container in a particular direction associated with the orientation of the article in said positioned spindle; means effective after each article is inserted for readjusting the position of the container back to its original position; means effective after the position readjustment of the container for operating said holding means of said positioned spindle to release the inserted article; and means effective after the article is released in the container for longitudinally moving said spindle to return it to its original longitudinal position.

17. Apparatus for packing articles in successive layers in a container, including, a plurality of longitudinally movable elongate article holding means, means for successively positioning said article holding means adjacent said container, means effective between the successive operation of said positioning means for longitudinally moving the positioned one of said article holding means to insert an article in the container, means coupled to said longitudinally moving means for automatically adjusting the distance of the longitudinal movements of successively positioned ones of said article holding means so that the successively inserted articles are released at different predetermined elevations in the container to form successive layers in the container, and means effective after an article has been inserted in the container for operating said article holding means to release the inserted article.

18. Apparatus for packing articles one at a time in successive layers in a container, including, a plurality of movable members for releasably supporting articles to be packed in the container, means for successively positioning said movable members adjacent the container, and a reciprocating member for moving a positioned one of said movable members in a first direction to insert the articles supported thereby into the container and in a second direction opposite to said first direction for returning said movable member to its original position, and a step adjustable distance limiting means coupled to said reciprocating member for controlling the distance of movement of said reciprocating member and said positioned movable member so that the article is moved to a predetermined particular elevation in the container, means for automatically adjusting said limiting means before said reciprocating member moves said movable member in said first direction so that some of said successively positioned movable members insert the articles to different predetermined elevations.

19. Apparatus in accordance with claim 18 wherein said limiting means includes a stationary stepping plate and an adjustably rotatable limit arm mounted on said reciprocating member for contacting said stepping plate.

20. Apparatus in accordance with claim 19 wherein said stepping plate includes a step for each layer of articles to be deposited in the container, and said rotatable limit arm is positioned by said adjusting means to contact each of the steps of said stepping plate during two successive movements of said reciprocating member in said first direction and then to contact the next step of said stepping plate so that two articles are inserted to each predetermined elevation in the container.

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