March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 1

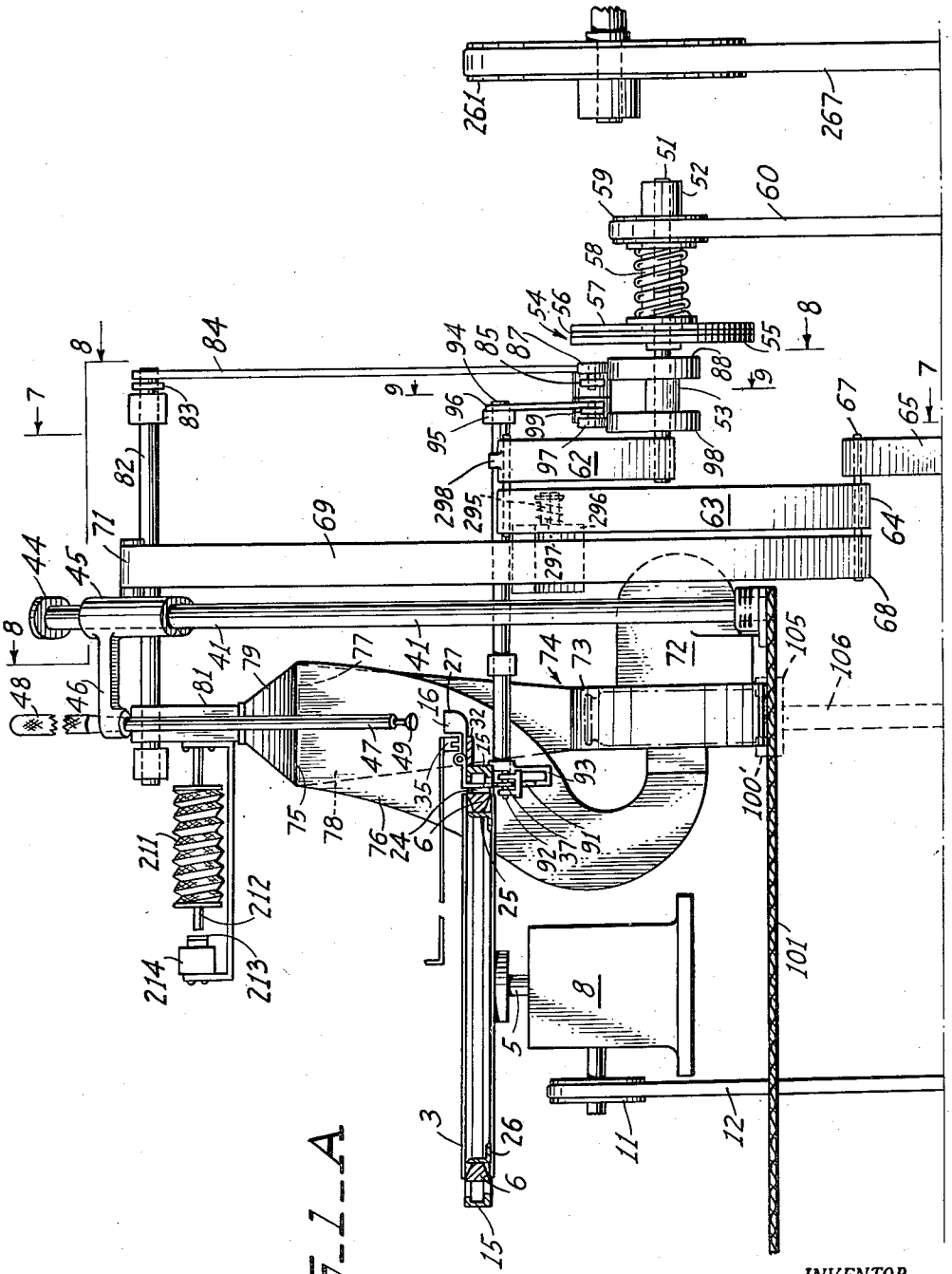


FIG. 1-A

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 2

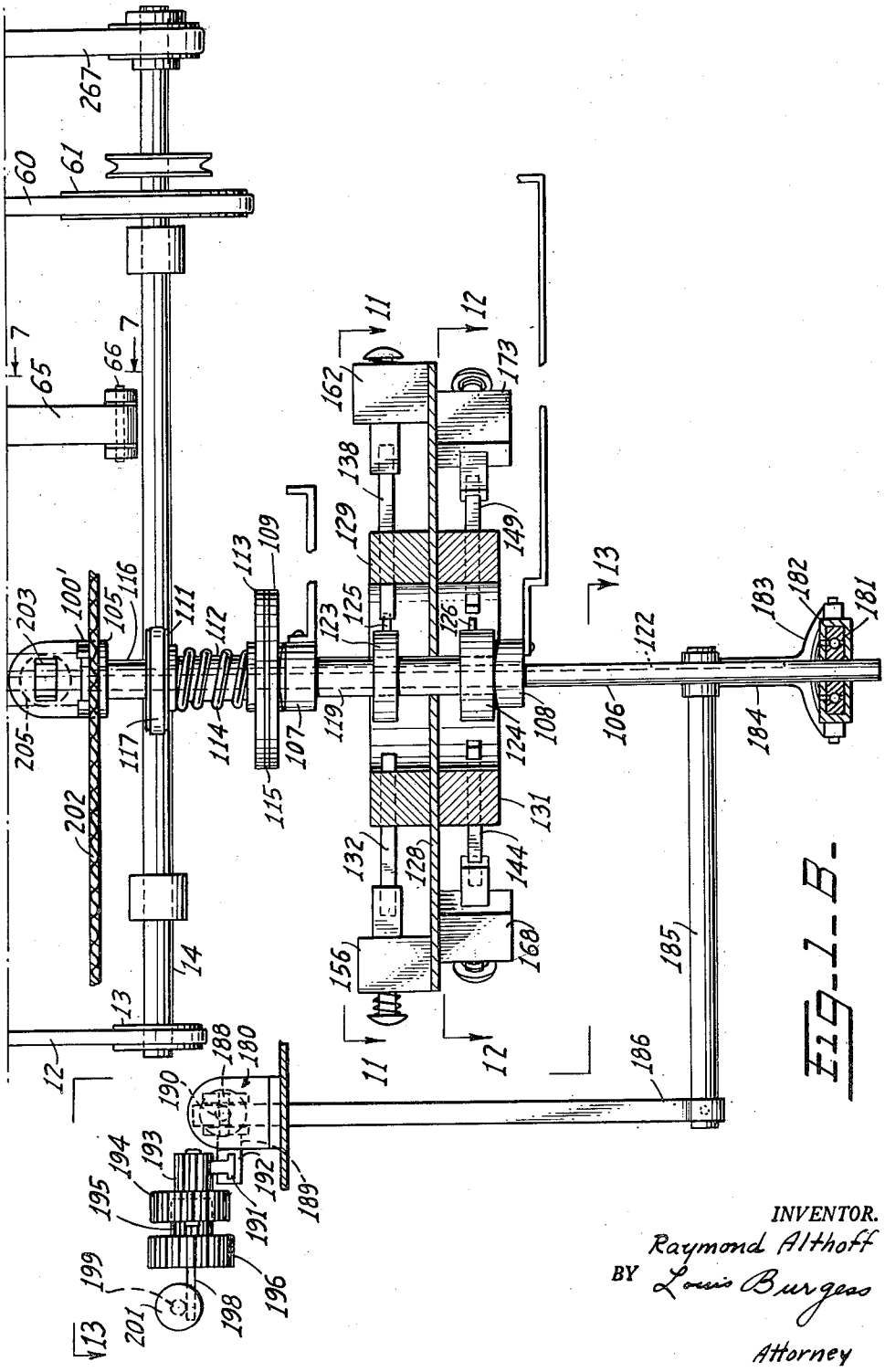


FIG. 1 B.

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 3

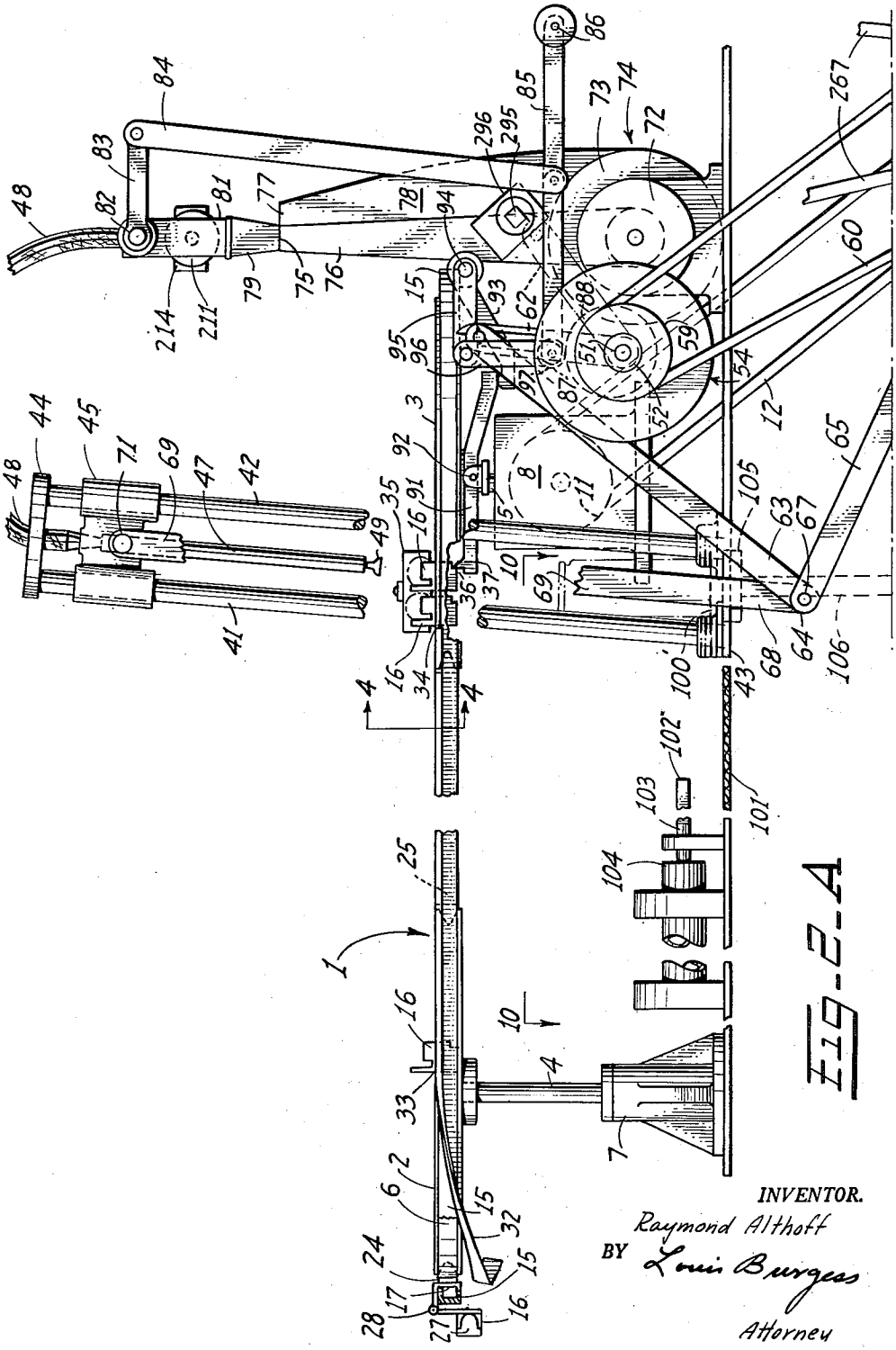


FIG. 2-A

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 4

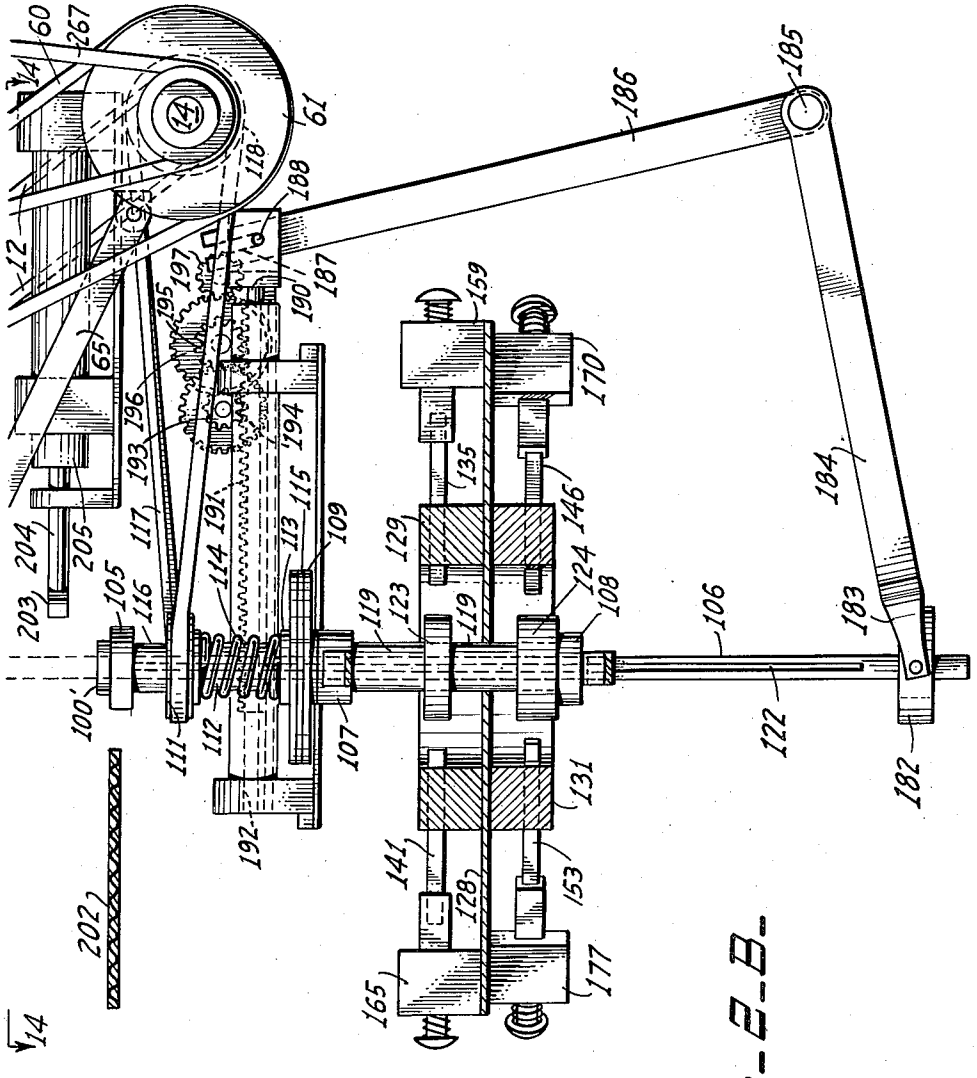


Fig. 2B.

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 5

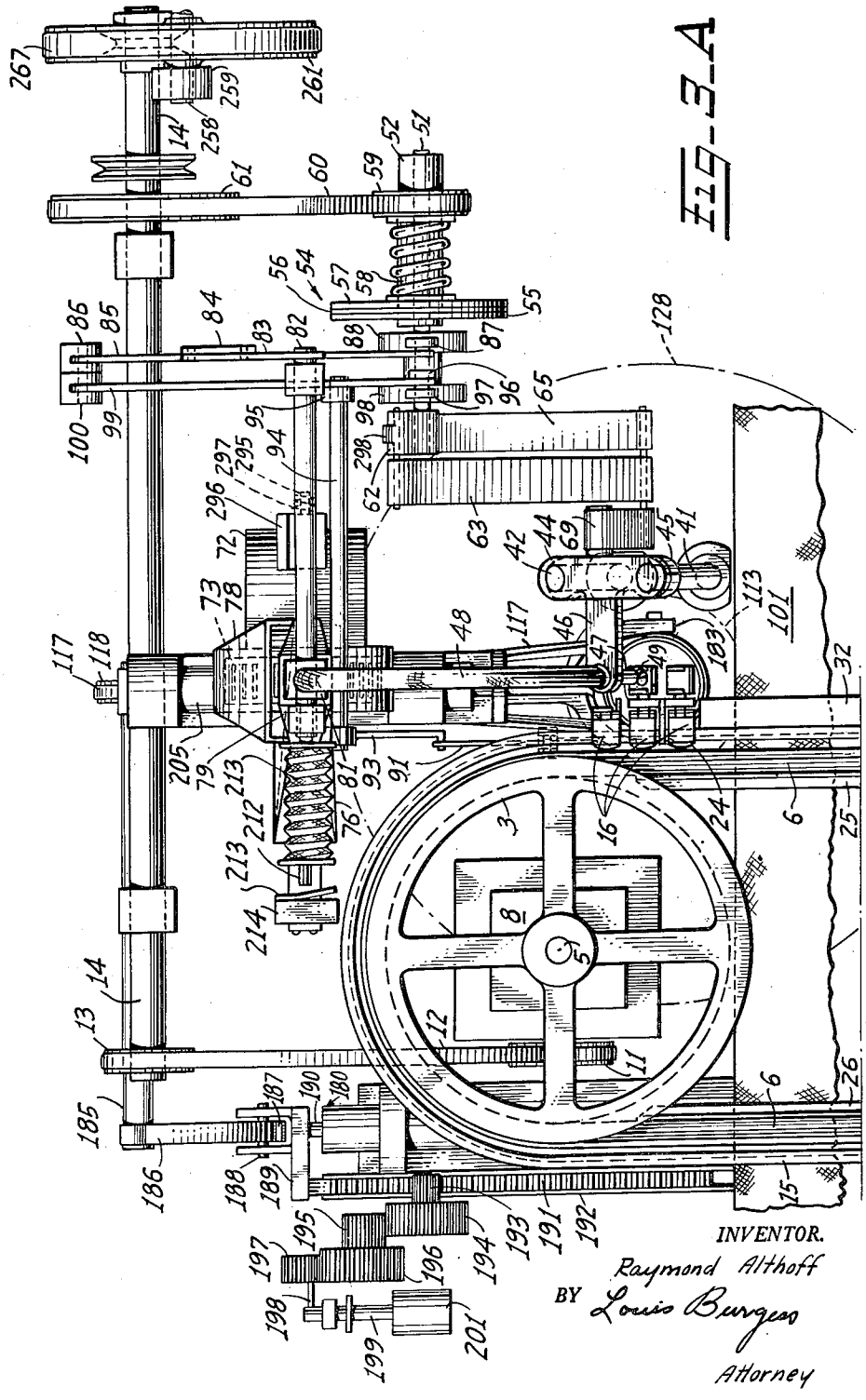


FIG. 3-A

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 6

Fig. 10

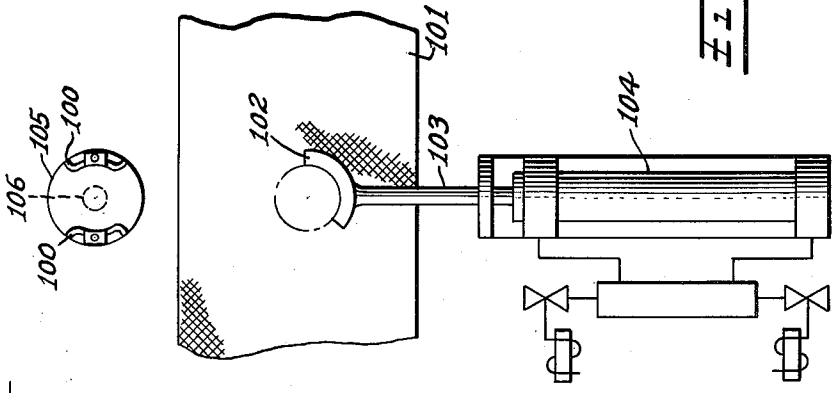
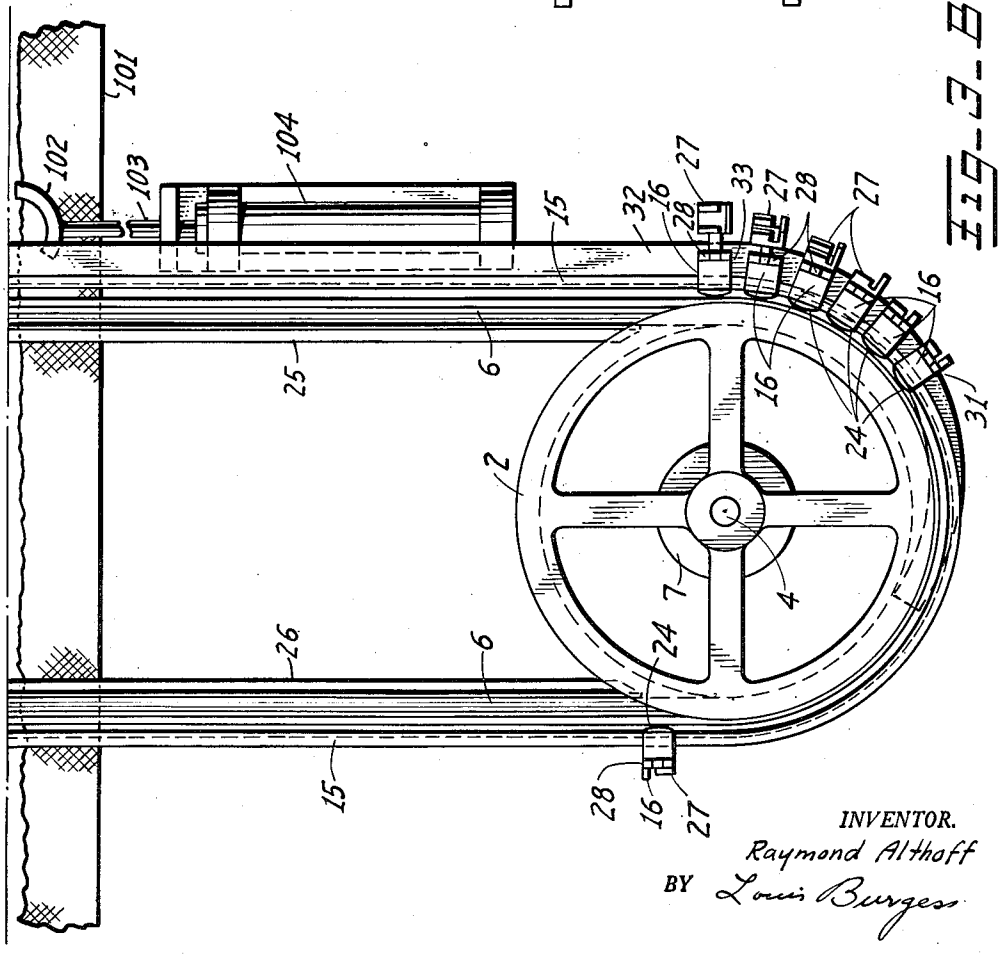


Fig. 3B



INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 7

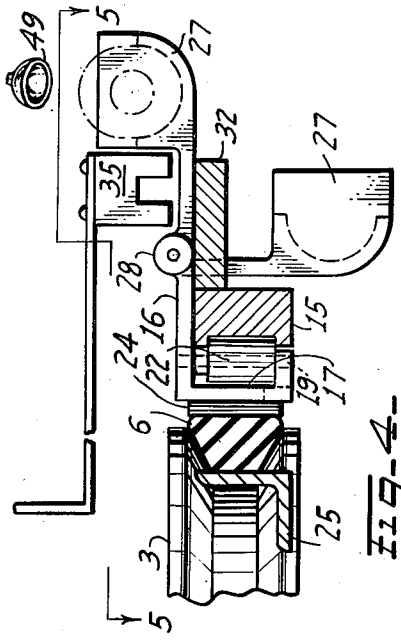


Fig. 4.

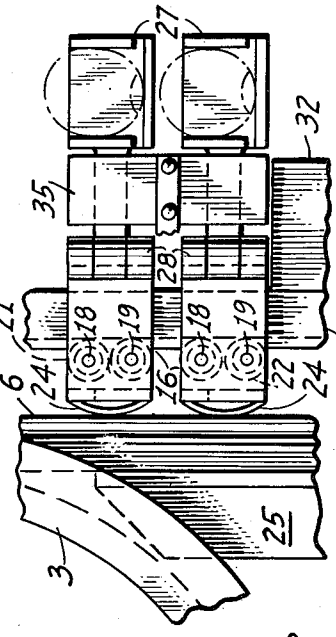


Fig. 5.

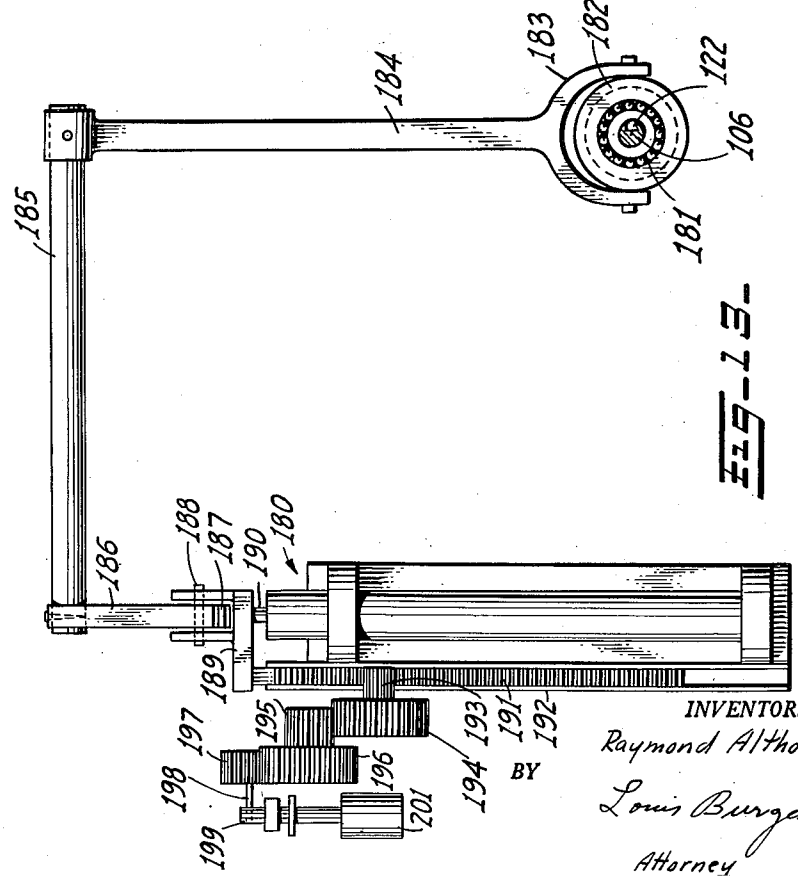


Fig. 13.

INVENTOR.
Raymond Althoff
BY
Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 8

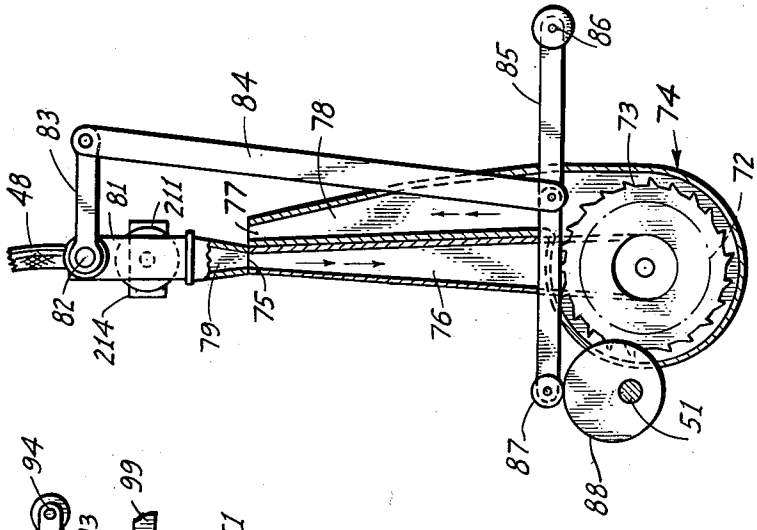


Fig. 8.

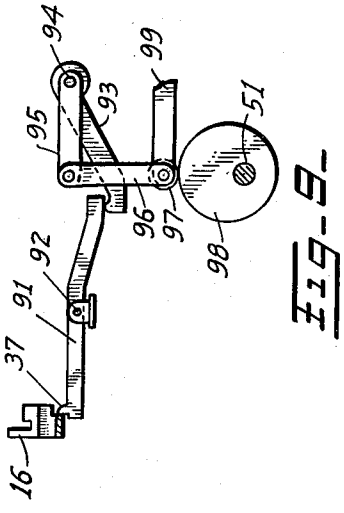


Fig. 9.

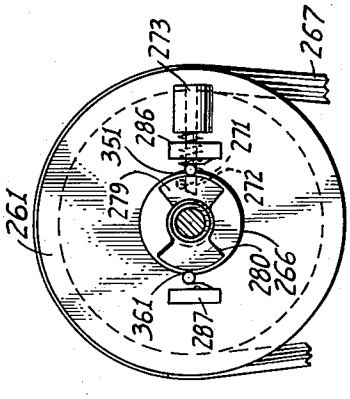


Fig. 17.

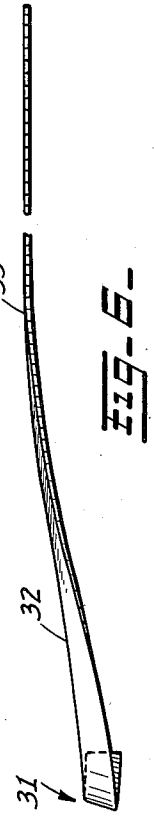


Fig. 6.

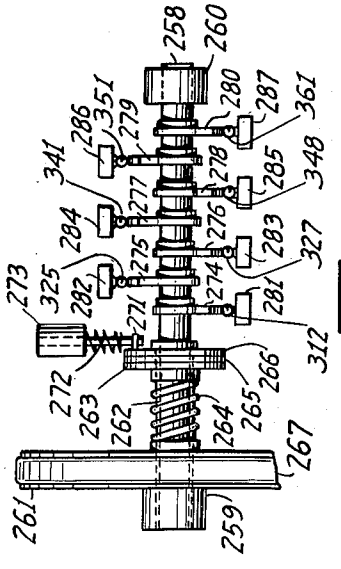


Fig. 15.

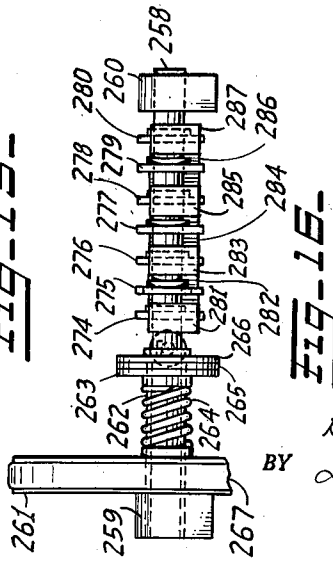


Fig. 16.

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 9

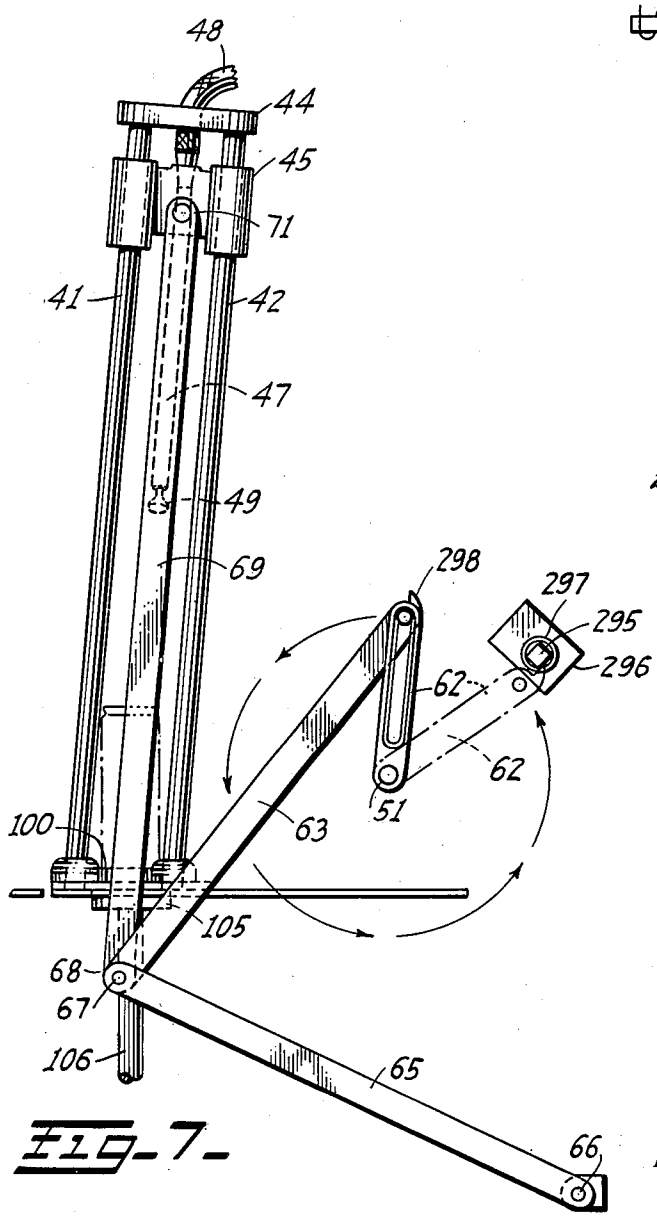


Fig. 7.

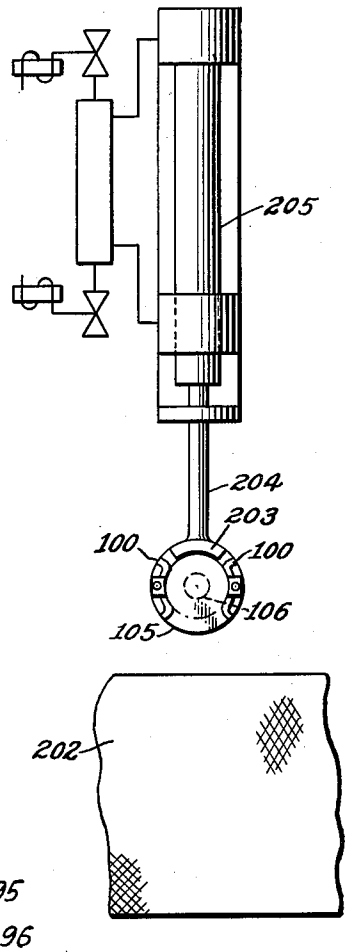


Fig. 14.

INVENTOR.
Raymond Althoff

BY Louis Burgess
ATTORNEY

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 10

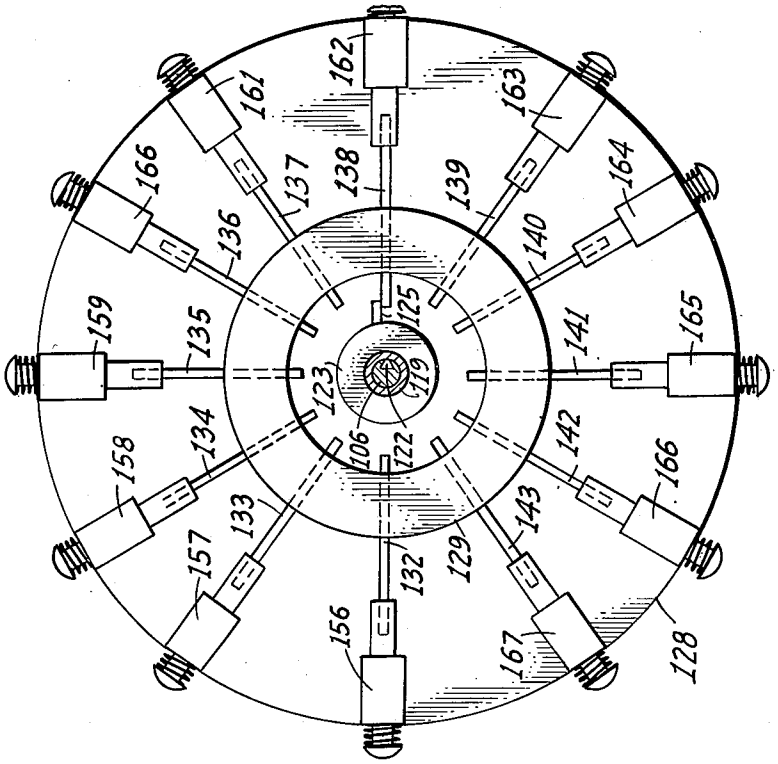


FIG-11-

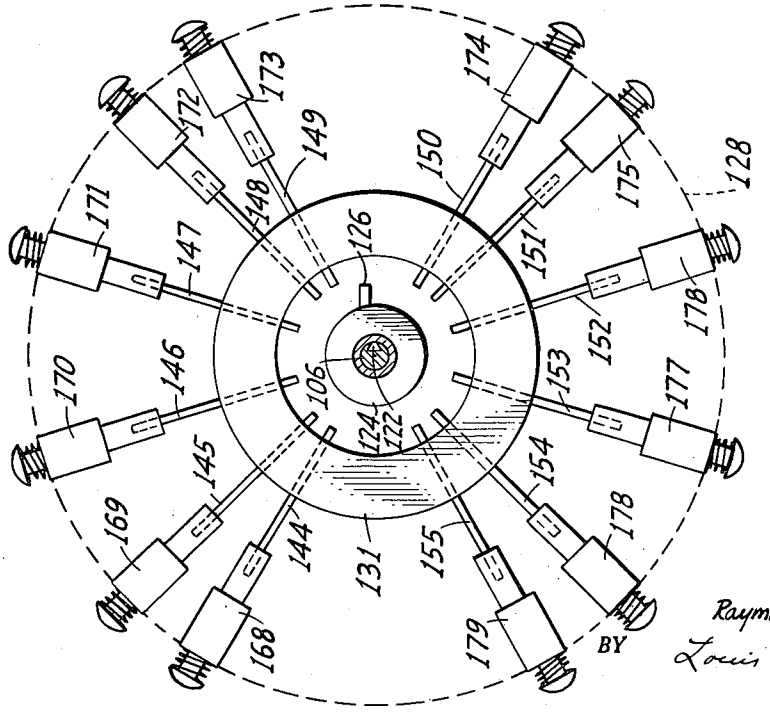


FIG-12-

INVENTOR.
Raymond Althoff
BY
Louis Burgess
Attorney

March 4, 1952 R. ALTHOFF 2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Filed April 26, 1949 11 Sheets-Sheet 11

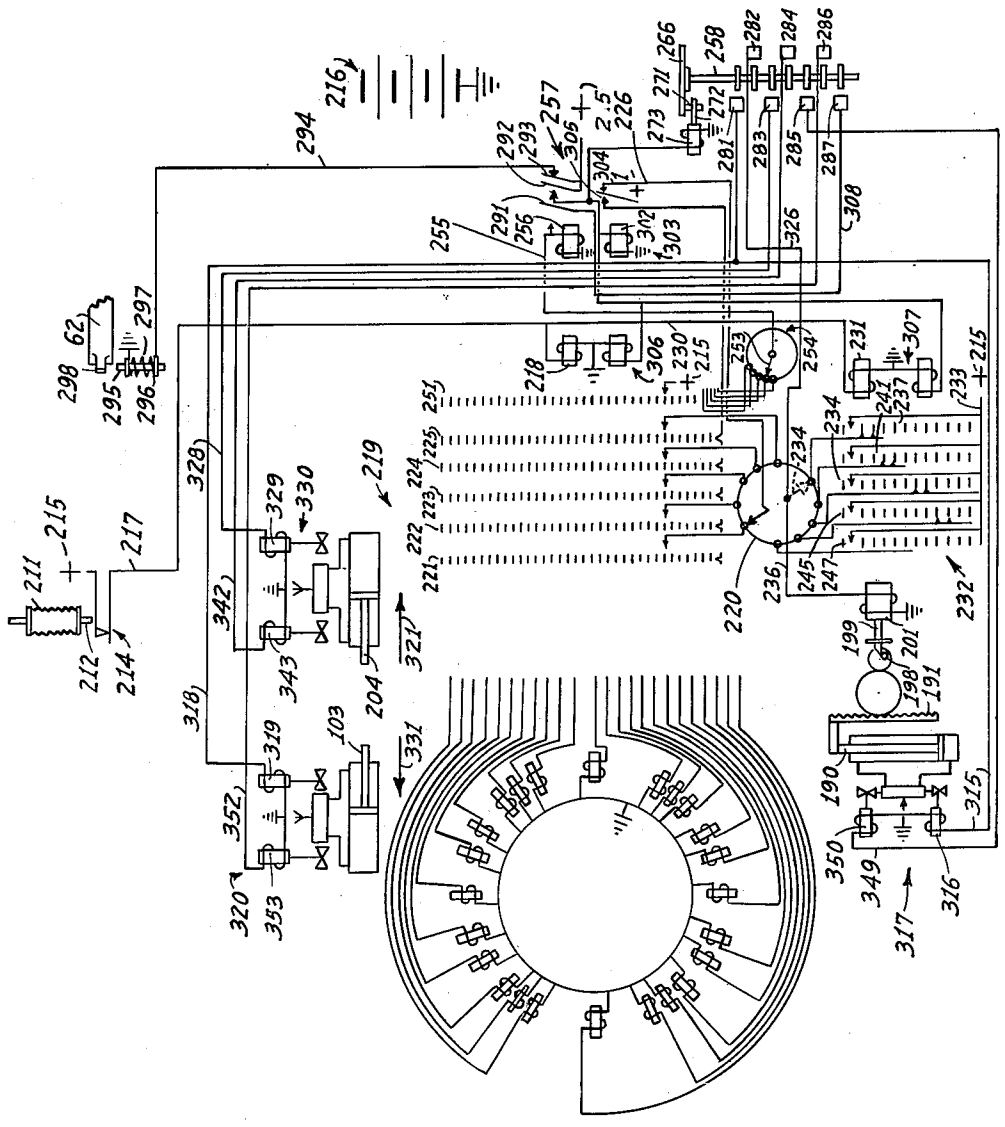


Fig-18-

INVENTOR.
Raymond Althoff
BY Louis Burgess
Attorney

Patented Mar. 4, 1952

2,587,584

UNITED STATES PATENT OFFICE

2,587,584

MACHINE FOR PACKING BOTTLES WITH RELATIVELY SMALL OBJECTS

Raymond Althoff, Somerville, N. J.

Application April 26, 1949, Serial No. 89,663

29 Claims. (Cl. 226—16)

1

This invention is a new and useful machine for packing bottles and similar containers with relatively small objects of yieldable or non-rigid material. One application of the machine is to packing bottles with objects such as pickles and olives. The desideratum is to produce a uniform arrangement of the objects wtihin the bottle which will be pleasing and attractive to the eye of the customer. In the embodiment shown in the drawings, the machine is particularly adapted to packing olives, especially olives of the pimento type, placing the olives radially within the bottle with the pimento end outermost, to present a colorful and pleasing appearance. Heretofore this has been done by hand. One objective of the instant invention is to perform this work efficiently and rapidly by machine, thereby dispensing with a large part of the hand labor and reducing the cost of the product to the consumer.

The invention will be fully understood from the following description read in conjunction with the drawings in which:

Fig. 1 is a end view of a preferred embodiment of the machine of my invention;

Fig. 2 is a side view of the showing in Fig. 1;

Fig. 3 is a plan view of the showing in Fig. 1;

Fig. 4 is a detailed cross-section through part of the construction shown in Fig. 2 on the plane indicated by 4—4;

Fig. 5 is a view of the construction shown in Fig. 4 on the plane indicated by 5—5;

Fig. 6 is a side view of one element of the construction shown in Figs. 2 and 3;

Fig. 7 is a section through part of the construction shown in Fig. 1 on the plane indicated by 7—7;

Fig. 8 is a section through part of the construction shown in Fig. 1 on the plane indicated by 8—8;

Fig. 9 is a section through part of the showing in Fig. 1 on the plane indicated by 9—9;

Fig. 10 is a section through part of the showing in Fig. 2 on the plane indicated by 10—10;

Fig. 11 is a section through part of the showing in Fig. 1 on the plane indicated by 11—11;

Fig. 12 is a section through part of the showing in Fig. 1 on the plane indicated by 12—12;

Fig. 13 is a section through part of the showing in Fig. 1 on the broken plane indicated by 13—13;

Fig. 14 is a section through part of the showing in Fig. 2 on the plane indicated by 14—14;

Fig. 15 is a plan view of a circuit control mechanism employed in the machine of my invention;

Fig. 16 is a side view of the showing in Fig. 15;

Fig. 17 is an end view of the showing in Fig. 15; and

Fig. 18 is a wiring diagram of the electric circuits involved.

Referring to the drawings, carrier 1 for the

2

objects to be packed (Figs. 1, 2 and 3) includes V-belt pulleys 2 and 3 horizontally oriented, carried respectively by vertical shafts 4 and 5. Pulleys 2 and 3 carry belt 6. Pulley 2 is an idler; shaft 4, by which it is carried, turns freely in bearing 7. Belt 6 is driven by pulley 3 through shaft 5 which is turned by reduction gear 8 (Figs. 1 and 3); reduction gear 8 is operated (Fig. 3) through driven pulley 11, belt 12 and drive pulley 13 from main drive shaft 14. Belt 6 is surrounded by continuous guide rails 15, shown in cross-section in Fig. 4. An unbroken sequence of carriers 16 (Figs. 3 and 5) ride on guide rail 15. As shown in the enlarged detail in Figs. 4 and 5, each carrier includes channel section 17 carrying (Fig. 5) pins 18 and 19 upon which rolls 21 and 22 turn. These rolls track in groove 23 formed in guide rail 15 (Fig. 4) thereby enabling the carrier to slide freely in a horizontal direction along the guide rail. Each carrier is provided with a leaf spring 24 which lightly engages belt 6 so that the carriers are releasably propelled along the guide rail by the motion of the belt. To maintain rubbing contact between belt 6 and springs 24 in the stretch between pulleys 2 and 3, angle rail stiffeners 25 and 26 are provided (Figs. 3 and 4) which maintain rubbing contact with the inside surface of belt 6 and hold it to a rectilinear path between the pulleys. Each channel section 17 of a carrier carries a cradle 27 pivotally attached to it by hinge 28. Cradle 27 is shaped to provide a rest or retainer for the objects to be packed so long as the cradle is supported in a horizontal position as shown in solid outline in Fig. 4, but if unsupported the cradle falls to the vertical position shown in dotted outline in Fig. 4, in which position it is inoperative as a retainer. The particular cradles illustrated in the figures are shaped to hold olives, although it will be obvious that by slight modifications they can be adapted to hold any small object to be packed in predetermined arrangement in a bottle or similar receptacle.

During most of their travel along guide rail 15, the cradles are dependent, but at the point 31 (Figs. 3 and 6) they are engaged by rail cam 32 which has returned them to horizontal position by the time they reach point 33.

In operation the carriers move past this point at the approximate rate of 3600 per hour. The olives are received in bulk and in the case of pimento olives are already pitted and stuffed. The operator manually places an olive in each cradle as it moves past, and in the case of pimento olives, they are placed in the cradles with the pimento ends facing the trailing edges of the carriers. The cradles are of paramagnetic material and up to the point 34 they are rigidly supported by rail cam 32. Beyond this point they run off of the rail cam but are still held in

horizontal position by the permanent magnet 35. At the point 36 the lower edge of channel section 17 encounters pawl 37 (Figs. 2 and 9) and the carrier is temporarily stopped.

Rods 41 and 42 (Figs. 1, 2, 3 and 7) are rigidly secured at their lower ends to plate 43, and at their upper ends to cross bar 44. Slider 45 is carried by rods 41 and 42. The slider is integral with horizontally projecting arm 46 which carries hollow plunger 47 connected at its upper end to flexible hose 48 and at its lower end to suction cup 49. Provision is made for reciprocating the plunger. The descent of the plunger brings cup 49 into contact with an object to be packed resting in cradle 27 which has been stopped by pawl 37 at that exact point. During descent, a light suction is applied to suction cup 49 through flexible hose 48 so that on contact the suction cup holds the object. The continued descent of the suction cup forces cradle 27 out of the field of magnet 35 thereby permitting the cradle to drop away from the object to a vertical position and permitting plunger 47 to continue its descent. The plunger continues its descent until suction cup 49 arrives at the bottom of its stroke, at which point the suction is replaced by a slight plus pressure to separate the object from cup 49 and deliver it at this exact point. Plunger 47 then returns to the position shown in solid outline in Fig. 1.

The stopping of the carrier, reciprocation of the plunger, and alternation from vacuum to plus pressure on the suction cup, are all operated through jack shaft 51 (Figs. 1, 2 and 3). The jack shaft is mounted in bearings 52 and 53 (Fig. 1) and is releasably driven by friction clutch 54 which includes flange 55 pinned to shaft 51, friction disk 56 and flange 57 splined to sleeve 58, which sleeve is journalled on shaft 51. Sleeve 58 is pinned to driven pulley 59 which in turn is driven through belt 60 and drive pulley 61 by main drive shaft 14.

Plunger 47 (Figs. 1, 2 and 7) is operated from jack shaft 51 as follows: Shaft 51 is pinned to crank 62 which in turn operates pitman 63. The actual path traversed by free end 64 of pitman 63 is predetermined by arm 65, one end of which is pivotally connected to end 64 of pitman 63 and the other end of which is carried by fixed pivot point 66. Arm 65 is relatively long so that end 64 of the pitman travels in an arc of considerable radius approximating rectilinear movement. Pin 67 which connects end 64 with arm 65 also carries pivotally end 68 of pitman 69, the other end 71 of which is pivotally connected to and reciprocates slider 45. As a result of this construction, the plunger 47 moves rapidly during descent and ascent, but more gradually when approaching the end of a stroke from either direction.

Alternate suction and plus pressure at the suction cup 49 are controlled from jack shaft 51 as follows (Figs. 1, 2 and 8): Motor 72 drives impeller 73 of centrifugal blower 74 to produce a negative pressure adjacent the axis of rotation and a positive pressure adjacent the periphery. The negative pressure is transmitted to point 75 through duct 76 and the positive pressure to point 77 through duct 78. Hood 79 is connected to duct 81 and hose 48 and is pivotally supported at the axis 82 so that it can be flipped to register with the upper end of either duct 76 or duct 78, thereby applying either negative or positive pressure to hose 48 and through hose 48 to suction cup 49. For the purpose of flipping the hood, the axis of duct 81 is connected through crank 83 to push rod 84, which in turn is pivotally connected to walking beam 85, one end of which is pivotally secured at 86, while the other end carries roller 87 which rides on cam 88 pinned to jack shaft 51. Cam 88 is shaped to maintain suction on hose 48 during the descending stroke of plunger 47 reversing this to plus pressure at the bottom limit of the stroke.

Pawl 37 is operated from jack shaft 51 as follows (Figs. 1, 2, 3 and 9): Pawl 37 is integral with lever 91 pivotally carried at the point 92. This in turn is actuated by arm 93 pinned to shaft 94. The other end of shaft 94 is secured to horizontal arm 95 coupled through push rod 96 to roller 97 which rides on cam 98 pinned to jack shaft 51. Roller 97 is also pivotally secured to walking beam 99, one end of which rides cam 98 and one end of which is pivotally secured at the point 100. Cam 98 is shaped to trip pawl 37 as plunger 47 approaches the top of its stroke, thereby permitting the unloaded carrier to move forward out of position and a loaded carrier to move forward into position beneath the plunger, at which point it is in turn stopped.

In combination with the foregoing, I utilize means for holdling a bottle or similar receptacle surrounding the point at which the objects are delivered by suction cup 49, for turning the bottle either continuously or intermittently so that the deposited objects will be properly spaced and oriented to form a horizontal layer of regular arrangement and pleasing appearance and for intermittently lowering the bottle to accommodate each succeeding horizontal layer.

The bottles to be filled (Figs. 2 and 10) are brought to the machine on conveyor belt 101 at spaced intervals. When an empty bottle in its forward movement encounters the arcuate hand 102, it is stopped and at the instant when the machine cycle starts, push rod 103 of double acting air cylinder 104, actuated by a solenoid controlled air valve, moves forward to force the bottle onto platen or holder 105 provided with spring clips 100' to hold the bottle in position. Platen 105 (Figs. 1 and 2) is mounted on shaft 106 which is slidably and rotatably carried in bearings 107 and 108. Flange 109 is splined to shaft 106. Pulley 111 is integral with sleeve 112 rotatably and slidably carried by shaft 106. Flange 113 is splined to sleeve 112. Pressure is maintained between pulley 111 and flange 113 by spring 114, which pressure is transmitted through flange 113 to friction disk 115. The end thrust of spring 114 is taken up by bearings 107 and 116. Pulley 111 is driven through V-belt 117 by drive pulley 118 (Fig. 3) carried by main drive shaft 14. This results in releasably turning shaft 106.

Shaft 106 is surrounded by sleeve 119 (Figs. 1 and 2). This sleeve is longitudinally slidable on shaft 106 but turns with the shaft as a result of inwardly projecting key 121 slidable in the longitudinal keyway 122 formed in shaft 106. Sleeve 119 is integral with collars 123 and 124 which carry projections 125 and 126.

Sleeve 127 is surrounded by stationary annular plate 128. Plate 128 carries adjacent the inner edge of its upper surface the stationary annulus 129 and adjacent the inner edge of its lower surface the stationary annulus 131. Each of these is bored radially to form guides for a number of stops 132–155 (Figs. 1, 11 and 12). Each stop is controlled by one of the solenoids 156–179 so that when a particular solenoid is energized, the stop moves radially inward to encounter the projec-

tion or one of the collars 123 and 124, thereby arresting the turning of shaft 106 and platen 105 at a selected angle of turn. To allow for stopping the turning of shaft 106 at the various points which may be required in actual practice, solenoid controlled stops are provided at the following angles with respect to the axis of shaft 106:

0°	180°
30°	210°
36°	216°
45°	225°
60°	240°
72°	252°
90°	270°
108°	280°
120°	300°
135°	315°
144°	324°
150°	330°

Owing to the difficulty of accommodating so many stops in a single horizontal plane, half are mounted above and half below the annular plate 128. Thus the following solenoid controlled stops at the following angles of turn (Fig. 11) are built into the top layer:

Stop No.	Angle of Turn	Stop No.	Angle of Turn
	Degrees		*Degrees*
132	0	138	180
133	36	139	216
134	60	140	240
135	90	141	270
136	120	142	300
137	144	143	342

The following solenoid controlled stops (Fig. 12) at the following angles of turn are built into the bottom layer:

Stop No.	Angle of Turn	Stop No.	Angle of Turn
	Degrees		*Degrees*
144	30	150	210
145	45	151	225
146	72	152	252
147	108	153	288
148	135	154	315
149	150	155	330

The vertical position of shaft 106 and platen 105 is controlled (Figs. 1, 2, 3, 13) through air cylinder 180 (actuated by a solenoid controlled air valve) as follows: the lower end of shaft 106 is pinned (Fig. 1) to the inner race of ball bearing 181, the outer race of which is fixed in retainer ring 182 which in turn is pivotally connected to yoke 183 (Fig. 12) integral with lever 184 pinned to horizontal shaft 185. Shaft 185 is in turn pinned to the upraised arm 186 which terminates at its upper end in slot 187 (Fig. 2) carried by pin 188 in cross head 189 on the end of piston rod 190 of air cylinder 180.

As is evident from the foregoing the horizontal movement of piston rod 190 operates to raise or lower shaft 106 and platen 105 carried thereby. Piston rod 190 also carries (Fig. 12) rack 191 adapted to move with and parallel to the piston rod in channel 192. The rack meshes with pinion 193 integral with gear 194. Gear 194 in turn meshes with pinion 195 integral with gear 196. Gear 196 meshes with pinion 197 carrying projection 198. When projection 198 contacts armature 199 of solenoid 201, the gear train and the associated movement of rack 191 and piston rod 190 are stoped. By momentarily withdrawing the armature of solenoid 201 and suitable pressure applied to air cylinder 180, piston rod 190 will be moved through a distance predetermined by the gear train, and shaft 106 and platen 105 moved downwardly a predetermined distance. In practice this distance is set by selection of the proper gears to accommodate one layer of the objects being packed. Conversely, by withdrawing armature 199 of solenoid 201 for a longer time and applying suitable pressure to air cylinder 180, shaft 106 and platen 105 can be moved to bottom position. The armature is hinged at point 200 to permit the platen to be moved freely to top position.

Since the bottle is moved intermittently downward during the packing operation, i. e., whenever a particular layer has been completed in order to accommodate the next succeeding layer, platen 105 is lowered intermittently during the packing operation. When the packing operation is completed, the platen is lowered to the bottom of its stroke. This brings the bottom of the packed bottle level with conveyor belt 202 (Figs. 1 and 14), at which point it is engaged by hand 203 intergal with piston rod 204 of double acting air cylinder 205 by which it is pushed from platen 105 onto conveyor belt 202, which carries it from the machine for sealing, labeling and packaging.

The following relates to the electrical control by which the mechanical sequence of operations is predetermined and which control may be manually pre-set to determine the particular operating condition desired.

The bellows 211 (Figs. 1 and 3) is carried by and opens into duct 81 which carries hood 79. As previously described hood 79 is equipped to register with the upper end of either duct 76 or 78. Duct 78 normally carries a negative pressure to provide the necessary suction for suction cup 49 and duct 78 provides the positive pressure necessary to separate the object carried from suction cup. Positive and negative pressure are therefor alternately impressed upon bellows 211. Bellows 211 (Fig. 1) through push rod 212 normally exerts pressure on leaf spring 213 to close the contacts of microswitch 214. Whenever vacuum is impressed on bellows 211, push rod 212 is withdrawn, thereby opening the circuit through microswitch 214 which is again closed by the next succeeding pressure pulse. In case the operator has omitted to place an olive in the cradle immediately beneath suction cup 49, or for any other reason a loaded carrier is not in position, the necessary suction will not build up in duct 81 and the circuit through microswitch 214 will not be interrupted. The electrical circuit through microswitch 214 controls the sequence of operations involved in turning and lowering the bottle and since bellows 211 is not actuated unless an object is actually engaged by the suction cup, this insures that the turning and lowering of the bottle will at no time be out of step with the actual number of objects engaged by the cup and discharged at the fixed point in space surrounded by the bottle. Each contraction of the bellows 211 (Fig. 18) and subsequent expansion transmits a new pulse from positive 215 of battery 216 or equivalent source of energy through microswitch 214 into conductor 217, thereby causing current to flow through solenoid 218 controlling the 100 point 6 pole stepping relay 219. Each time the solenoid 218 is energized the roving contact in each of the six banks of contacts in stepping relay 219 moves forward one step to the next succeeding output position. By means of manually controlled switch 220, I am able to select the roving contact in

any one of the first five banks 221–225 and energize it by connecting it through conductor 226 to the positive 215 of battery 216.

If it is desired to pack the olives two to a layer, the manually controlled switch 220 is turned to engage the roving contact of bank 221 which is initially in contact with stop 132 at 0° and moves sequentially to the posts which are in electrical connection with the following solenoid controlled detents:

Detent No.	Angle of Turn	Detent No.	Angle of Turn
	Degrees		Degrees
138	180	132	0
141	21	135	90
135	90	141	270
138	180		

and repeat.

This provides for a minimum angular turning of shaft 106 compatible with the maximum spacing of the olives in a layer of two and with a 90° shift in the orientation of the olives in each succeeding layer to allow for maximum closeness of packing.

If it is desired to pack three olives per layer, the manually controlled switch 220 is turned to engage the roving contact of bank 222 which is initially in contact with stop 132 at 0° and moves sequentially to the posts which are in electrical connection with the following solenoid controlled detents:

Detent No.	Angle of Turn	Detent No.	Angle of Turn
	Degrees		Degrees
136	120		
140	240	142	300
142	300	134	60
134	60	136	120
138	180	140	240
140	240	132	0
132	0	134	60
136	120	138	180
138	180	142	300

The foregoing provides for the minimum angular turning of shaft 106 compatible with spacing the olives three to a layer and with a 60° shift in position of the olives in each succeeding layer to permit a maximum closeness of packing.

If it were desired to pack the olives four to a layer, the manually controlled switch 220 is turned to engage the roving contact of bank 223 which is initially in contact with stop 132 at 0° and makes contact sequentially with the following solenoid controlled detents:

Detent No.	Angle of Turn	Detent No.	Angle of Turn
	Degrees		Degrees
135	90	141	270
138	180	132	0
141	270	135	90
154	315	148	135
145	45	151	225
148	135	154	315
151	225	145	45
141	270	135	90
132	0	138	180
135	90	141	270
138	180	132	0
151	225	145	45
154	315	148	135
145	45	151	225
148	135	154	315
138	180		

and repeat.

If it is desired to pack the olives five to a layer, the manually controlled switch 220 is turned to engage the roving contact of bank 224 which is initially in contact with stop 132 at 0° and makes contact sequentially with the following solenoid controlled detents:

Detent No.	Angle of Turn	Detent No.	Angle of Turn
	Degrees		Degrees
146	72	152	252
137	144	143	324
139	216	133	36
153	288	147	108
143	324	137	144
133	336	139	216
147	108	153	288
138	180	132	0
152	252	146	72
153	288	147	108
132	0	138	180
146	72	152	252
137	144	143	324
139	216	133	36
152	252	146	72
143	324	137	144
133	336	139	216
147	108	153	288
138	180	132	0
139	216	133	36
153	288	147	108
132	0	138	180
146	72	152	252
137	144	143	324
138	180		

If it is desired to pack the olives six to a layer, the manually controlled switch 220 is turned to engage the roving contact of bank 225 which is initially in contact with stop 132 at 0° and makes contact sequentially with the following solenoid controlled detents:

Detent No.	Angle of Turn	Detent No.	Angle of Turn
	Degrees		Degrees
138	0	138	180
134	60	140	240
136	120	142	300
138	180	132	0
140	240	134	60
142	300	136	120
155	330	149	150
144	30	150	210
135	90	141	270
149	150	155	330
150	210	144	30
141	270	135	90
142	300	136	120
132	0	138	180
134	60	140	240
136	120	142	300
138	180	132	0
140	240	134	60
141	270	135	90
155	330	149	150
144	30	150	210
135	90	141	270
149	150	155	330
150	210	144	30
140	240	134	60
142	300	136	120
132	0	138	180
134	60	140	240
136	120	142	300
138	180	132	0
140	240	134	60
141	270	135	90
155	330	149	150
144	30	150	210
135	90	141	270
149	150	155	330
150	210	144	30
140	240	134	60
142	300	136	120
132	0	138	180
134	60	140	240
136	120	142	300
138	180	132	0
150	210	144	30
141	270	135	90
155	330	149	150
144	30	150	210
135	90	141	270
149	150	155	330

and repeat.

The same pulse controlled by microswitch 214 moving through conductors 217 and 230 through solenoid 231 advances all roving contacts of the five pole 60 point stepping relay 232 designed for momentary contacts only. Each of these roving contacts is connected through conductor 233 to positive 215. Each bank of contacts is designed for a predetermined number of olives per layer for the purpose of momentarily actuating armature 199 (Figs. 1, 3, 13 and 18) of solenoid 201, thereby permitting rack 191 and piston rod 190 to move the distance required (operating elements 186, 185 and 184 to lower shaft 106), to move platen 105 and the bottle carried thereby downwardly the required distance to accommo-

date the next succeeding layer to be packed. Inasmuch as this sequence is also determined by the number of olives introduced, it is controlled by arm 234 of manually controlled switch 220 which connects with selected fixed stops in any bank of contacts in this relay. Thus, in case it is desired to pack two olives per layer, arm 234 places the conductor 236 connected to solenoid 201 in electrical connection with certain fixed stops of bank 237. In this bank the odd contacts are dead but the even contacts are live and on completion of each even contact (predetermined by the fact that an even number of olives completes a layer), the roving contact of the bank energizes solenoid 201, thereby causing platen 105 and the bottle being packed to be lowered a predetermined distance equal to the space occupied by a single layer.

If it is desired to pack the olives three to a layer, the arm 234 of switch 220 makes contact with the fixed posts of bank 241. In this case every third post only of bank 241 is live, so that whenever a layer consisting of three olives has been completed, the roving contact of this bank momentarily actuates solenoid 201, thereby permitting platen 105 and the jar carried thereon to move downwardly a distance equal to the thickness occupied by a particular layer.

The control in case it is determined to pack the olives four, five or six to a layer, will be similarly evident from the diagrammatic showing in Fig. 18. Thus in case the olives are packed four to a layer, every fourth post of bank 243 is live; five to a layer, every fifth post of bank 245; and six to a layer, every sixth post of bank 247.

Referring again to the stepping relay 219 a bank of contacts 251 controls the number of olives to be packed per jar. In this case the roving contact is connected to positive 215 of battery 216 while any fixed post may be selected by arm 253 of manually controlled switch 254, which arm is connected through conductor 255 to solenoid 256 controlling relay 257. It is therefore obvious from the foregoing that if arm 253 had been manually turned to the fixed contact corresponding to the number of olives which it is desired to introduce in a jar, upon completion of that number relay 257 will be energized.

This relay is operated in cooperation with the circuit control mechanism diagrammatically indicated in Fig. 1 and detailed in Figs. 15–17. As detailed, this includes shaft 258 carried in bearings 259 and 260. Pulley 261 is rotatably mounted on the shaft and is splined to the sleeve 262 which is also rotatably mounted on the shaft and pinned to flange 263. Spring 264 exerts a uniform pressure on flange 263 and thus on the friction disk 265 interposed between flange 263 and flange 266, which is pinned to shaft 258. Pulley 261 is driven through belt 267 (Figs. 1, 3) from main drive shaft 14. This releasably drives the shaft 258 which, however, is normally restrained from turning by projection 271 carried by flange 266 in engagement with armature 272 of solenoid 273. Shaft 258 carries cams 274, 275, 276, 277, 278, 279 and 280 so formed and set in relation to the shaft that when the shaft turns, the contacts of microswitches 281, 282, 283, 284, 285, 286 and 287 are operated in the sequence enumerated.

Projection 271 is normally immobilized by armature 272 of solenoid 273. When, however, the solenoid is momentarily energized and the armature withdrawn, projection 271 is momentarily released, with the result that shaft 258 makes a complete turn, operating in sequence the electrical circuits controlled by microswitches 281–287.

The energization of relay 257 closes contacts 291 and 292 and opens contacts 293. The opening of contacts 293 disconnects conductor 294 from positive 215, releasing armature 295 of solenoid 296 (normally inoperative) thereby permitting it under pressure of spring 297 to engage the projection 298 on the end of crank 62, thereby immobilizing jack shaft 51 and arresting operation of the controls actuated by this jack shaft, i. e., plunger 47, the carrier release, and negative and positive pressure control on suction cup 49. Closing of contacts 292 energizes solenoid 302 of relay 303, thereby breaking contacts 304 and making contacts 305. Breaking contacts 304 disconnects one arm of switch 220 from positive 215, thereby killing the roving fingers of banks 221–225 and 251. The making of contacts 305 energizes the zero post of banks 221–225, thereby operating detent 132 controlling the zero degrees position of collar 123 and restoring shaft 106 and platen 105 to the position from which the turning movements of the platen are started. The closing of contacts 292 operates re-set relays 306 and 307. Re-set relay 306 of stepping relay 219 turns the roving fingers of banks 221–225 and 251 to zero position and re-set relay 307 of stepping relay 232 turns the roving fingers of banks 237, 241, 243, 245 and 247 to zero position. This would of course de-energize solenoid 256 except for the fact that making contacts 291 provides an alternative holding circuit through conductor 308 and normally closed contacts 351 of microswitch 287. The making of contacts 292 through conductor 311 also energizes solenoid 273, thereby retracting armature 272 and holding projection 271 and permitting shaft 258 to turn. The turning of shaft 258 performs in sequence the following operations:

(*a*) Contacts 312 of microswitch 281 are closed when shaft 258 is in position with projection 271 bearing against armature 272 of solenoid 273, thereby energizing conductor 315 and solenoid 316 of air valve 317 to urge platen 105 downwardly and also energizing conductor 318 feeding solenoid 319 of air valve 320 to move push rod 103 in the direction indicated by arrow 331. This contact is broken by the turning of shaft 258 but is held for sufficient angle to enable it to break simultaneously with the next succeeding contact.

(*b*) Contact 325 of microswitch 282 normally open is closed, thereby energizing conductors 326 and 236 feeding solenoid 201 to withdraw stop 199 and permit the lowering of platen 105 to the extreme bottom of its stroke.

(*c*) It closes contacts 327 of microswitch 283, thereby energizing conductor 328 to actuate solenoid 329 of air valve 330 to move push rod 204 in the direction indicated by arrow 331 (Fig. 14) to transfer the packed bottle to conveyor 202.

(*d*) It makes contacts 341 of microswitch 284 thereby energizing conductor 342 to actuate solenoid 343 of air valve 330 to move push rod 204 in the direction indicated by arrow 321.

(*e*) It makes contacts 348 of microswitch 285 to energize conductor 349 to actuate solenoid 350 of air valve 317 to move platen 105 upwardly. Armature 199 is hinged to free projection 198 during the upward movement of the platen so that this contact restores the platen to its topmost, i. e., to the loading position.

(*f*) It makes contacts 351 of microswitch 286

noid 353 of air valve 320 to move piston 103 of air cylinder 104 in the direction indicated by arrow 321, thereby transferring an empty bottle from conveyor 101 onto platen 105.

(g) It breaks contacts 361 of microswitch 287 thereby killing conductor 308 in the holding circuit of relay 257 releasing solenoid 256 opening contacts 291 and 292 and closing contacts 293. Opening contacts 292 kills solenoid 302 of relay 303 thereby transferring control of relays 219 and 232 back to manual switch 220. Closing contact 293 energizes conductor 294 thereby withdrawing armature 295 holding stop 298 and permitting jack shaft 51 to turn. As the projection 271 again comes into contact with armature 272, contacts 312 of microswitch 281 again close thereby energizing conductor 315 and solenoid 316 of air valve 217 to urge platen 105 downwardly and conductor 318 feeding solenoid 319 of air valve 321 to move push rod 103 in the direction indicated by arrow 331.

At this point the machine starts another cycle and will continue through the method steps hereinabove described.

Te foregoing specific description is for purposes of illustration and not of limitation and it is therefore my intention that the invention be limited only by the appended claims or their equivalents wherein I have endeavored to claim broadly all inherent novelty.

I claim:

1. A bottle packer comprising means for delivering an object to be packed at a fixed point in space, means for holding a bottle surrounding said point, means for turning a bottle so held, a number of solenoid controlled arrestors for arresting such turning at predetermined angles of turn, an electric pulse generator coupled to said means for delivering, a pulse-operated electric controller in series with said electric pulse generator adapted to release one solenoid controlled arrestor and energizing a succeeding solenoid controlled arrestor.

2. A bottle packer comprising means for delivering an object to be packed at a fixed point in space, means for holding a bottle surrounding said point, means for turning a bottle so held, a number of solenoid controlled arrestors for arresting such turning at predetermined angles of turn, an electric pulse generator coupled to said means for delivering, a number of pulse-operated electric controllers, each adapted to release one solenoid controlled arrestor and energize a succeeding solenoid controlled arrestor in a predetermined sequence and a manually controlled switch adapted to selectively place a particular electric controller in series with said pulse generator.

3. A bottle packer comprising means for delivering an object to be packed at a fixed point in space, means for holding a bottle surrounding said point, means for turning and means for lowering a bottle so held, a solenoid controlled arrestor for arresting such lowering at predetermined levels, an electric pulse generator coupled to said means for delivering, a pulse-operated electric controller in series with said electric pulse generator adapted to release said solenoid controlled arrestor and re-set same for a lower predetermined level in response to a predetermined number of pulses.

4. A bottle packer comprising means for delivering an object to be packed at a fixed point in space, means for holding a bottle surrounding said point, means for turning and means for lowering a bottle so held, a number of arrestors for arresting such turning at predetermined angles of turn, means operatively coupled to said means for delivering sequentially releasing one arrestor and energizing a succeeding arrestor, an arrestor for arresting such lowering at predetermined levels and means operatively coupled to said means for delivering controlling said last mentioned arrestor.

5. A bottle packer comprising means for delivering an object to be packed at a fixed point of space, means for holding a bottle surrounding said point, means for turning and means for lowering a bottle so held, at least one electric pulse generator coupled to said means for delivering, a number of solenoid controlled arrestor for arresting such turning at predetermined angles of turn, a pulse-operated electric controller in series with such an electric pulse generator adapted to release one solenoid controlled arrestor and energize a succeeding solenoid controlled arrestor, a solenoid controlled arrestor for arresting said lowering at predetermined levels, a second pulse-operated electric controller in series with such a pulse generator adapted to release said arrestor for arresting such lowering and reset same for a lower predetermined level in response to a predetermined number of pulses.

6. A bottle packer comprising means for delivering an object to be packed at a fixed point in space, means for holding a bottle surrounding said point, means for turning and means for lowering a bottle so held, at least one electric pulse generator coupled to said means for delivering, a solenoid controlled arrestor for arresting such lowering at predetermined levels, a pulse-operated electric controller in series with such a pulse generator adapted to arrest such lowering and re-set same for a lower predetermined level in response to a predetermined number of pulses, solenoid controlled means for removing a bottle so held, a pulse-operated electric controller in series with such a pulse generator adapted to actuate said last mentioned means on receipt of a predetermined number of pulses.

7. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for holding a bottle to be packed, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers, and to project said suction cup within a bottle so held, means for turning and means for intermittently lowering a bottle so held.

8. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for holding a bottle to be packed, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers, and to project said suction cup within a bottle so held, means for intermittently turning and means for intermittently lowering a bottle so held.

9. A bottle packer according to claim 8 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

10. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying said suction cup, means for holding a bottle, means for reciprocating said plunger to project said said suction cup into contact with an object held in one of said retainers, and to project said suction cup within a bottle so held, means for turning a bottle so held, a number of solenoid controlled arrestors for arresting such turning at predetermined angles of turn, an electric pulse generator operated by said plunger, a pulse-operated electric controller in series with said electric pulse generator adapted to release one solenoid controlled arrestor and energizing a succeeding solenoid controlled arrestor.

11. A bottle packer according to claim 10 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

12. A bottle packer according to claim 10 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

13. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying said suction cup, means for holding a bottle, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning a bottle so held, a number of solenoid controlled arrestors for arresting such turning at predetermined angles of turn, an electric pulse generator operated by said plunger, a number of pulse-operated electric controllers, each adapted to release one of said solenoid controlled arrestors and energize a succeeding solenoid controlled arrestor in a predetermined sequence, and a manually controlled switch adapted to place a particular electric controller in series with said pulse generator.

14. A bottle packer according to claim 13 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

15. A bottle packer according to claim 13 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

16. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for holding a bottle, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, an arrestor for arresting such lowering at predetermined levels and means operatively coupled to said plunger controlling said arrestor.

17. A bottle packer according to claim 16 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

18. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for holding a bottle, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, a solenoid controlled arrestor for arresting such lowering at predetermined levels, an electric pulse generator operated by said plunger, a pulse-operated electric controller in series with said electric generator adapted to release said arrestor and re-set same for a lower predetermined level in response to a predetermined number of pulses.

19. A bottle packer according to claim 18 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

20. A bottle packer according to claim 18 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

21. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for moving said plunger to and from a position in which said cup overlays one of said retainers, means for holding a bottle, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, a solenoid controlled arrestor for arresting such lowering at predetermined levels, an electric pulse operated by said plunger, a number of pulse-operated electric controllers, each adapted to release said means for arresting and re-set same for a lower predetermined level in response to a predetermined number of pulses and a manually controlled switch adapted to selectively place a particular electric controller in series with said pulse generator.

22. A bottle packer according to claim 21 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

23. A bottle packer according to claim 21 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

24. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such

suction cup, means for moving said plunger to and from a position in which said cup overlays one of said retainers, means for holding a bottle, means for reciprocating said plungers to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, a number of arrestors for arresting such turning at predetermined angles of turn, means operated by said plunger sequentially releasing one arrestor and energizing a succeeding arrestor, an arrestor for arresting such lowering at predetermined levels and means operated by said plunger controlling said last mentioned means for arresting.

25. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for holding a bottle, means reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, at least one electric pulse generator operated by said plunger, a number of solenoid controlled arrestors for arresting such turning at predetermined angles of turn, a pulse-operated electric controller in series with such an electric pulse generator adapted to release one solenoid controlled arrestor and energize a succeeding solenoid controlled arrestor, a solenoid controlled arrestor for arresting such lowering at predetermined levels, a second pulse-operated electric controller in series with such a pulse generator adapted to release said last mentioned solenoid controlled arrestor and re-set same for a lower predetermined level in response to a predetermined number of pulses.

26. A bottle packer according to claim 25 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

27. A bottle packer comprising a carrier, means for intermittently advancing said carrier over a predetermined path, a series of retainers in said carrier, each adapted to hold an object to be packed, a suction cup, a plunger carrying such suction cup, means for moving said plunger to and from a position in which said cup overlays one of said retainers, means for holding a bottle, means for reciprocating said plunger to project said suction cup into contact with an object held in one of said retainers and to project said suction cup within a bottle so held, means for turning and means for lowering a bottle so held, at least one electric pulse generator operated by said plunger, a solenoid controlled arrestor for arresting such lowering at predetermined levels, a pulse-operated electric controller in series with such pulse generator adapted to arrest such lowering and re-set same for a lower predetermined level in response to a predetermined number of pulses, solenoid controlled means for removing a bottle so held and a pulse-operated electric controller in series with such pulse generator adapted to actuate said last mentioned means on receipt of a predetermined number of pulses.

28. A bottle packer according to claim 27 comprising in addition means for applying a vacuum to said suction cup and means operated by said vacuum controlling said pulse generator whereby failure of said cup to engage an object produces a pulse skip.

29. A bottle packer according to claim 27 in which the means for reciprocating said plunger is inclined at an angle to the axis of a bottle so held terminating its reciprocation with said suction cup adjacent the inner side wall of such bottle.

RAYMOND ALTHOFF.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
952,352	Pieper	Mar. 15, 1910
1,643,367	Bergman et al.	Sept. 27, 1927
2,524,846	Socke et al.	Oct. 10, 1950
2,546,501	Hamilton	Mar. 27, 1951